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God save us from friends or How to ensure taxonomy against passing away by dint of a successful operation?

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Wy chcecie pieśni? Wy chcecie pieśni zapewne słodkiej i miłej dla ucha,
A ja mam dla Was, o! moi rówieśni, pieśń co przypomni Wam brzęki łańcucha!
[You want a song now? Perhaps you want a sweet song, melodious, that will sound pleasantly,
But I have for you, my coeval brothers, a song reminding you of chains'rattle!]
Kornel UJEJSKI: *Maraton.*

Let me present here a somewhat unusual paper, in which the „nominal" author – Roman HOŁYŃSKI – plays rather the role of editor of a multiauthored publication: my own text is but a commentary to earlier published (in some exceptional cases only hearsay) opinions of other persons. Two main reasons induced me to choose this style: on the one hand such an atypical, unhackneyed presentation looks interesting and worth trying; on the other... On the other I wished to secure myself – at least to some, even if slender, degree – against the (already more than once suffered on the occasion of similar discussions) „hit below the belt" in the form of „argument" that „*all scientists agree that editorial interventions, peer-reviewing, impact factor &c. are just and necessary, and suddenly some Hołyński speechifies counter to all the world*"; the quotations show that by far ***not everybody*** esteems the currently dominating practices as honest and warranted, and the "speechifying" HOŁYŃSKI finds himself in quite large (quoted excerptions represent of course but a small part of those selected, from a much more voluminous "database", at the start of preparation of this work) and respectable (including docents, professors, Nobel Prize winners and other world-famous authorities) company!

The majority of the quoted sentences reflect opinions illustrating the gist of here presented reasoning, but some play quite the opposite role: express the – in my opinion – false views, misleading arguments, pernicious stipulations, whose destructive influence on the situation of science in general and taxonomy in particular I am just trying to demonstrate. Despite my efforts, it was not always possible to avoid the doubling of citations: in some instances one of two expressions conveying the same or similar point was quoted for its attractive wording while the second for the prestige of its author; sometimes I used each of them in different place (to illustrate a different aspect of the problem), *&c.* I also preferred short, concise formulations, but here the "iron consistency" proved not possible, either. With all these (and many others) defi-

ciencies I dare to hope that the proper apprehension of what I wish to submit in this way for consideration will not raise difficulties. Naturally, as always, I would be very happy if these "my although not originally mine" arguments and conclusions act as an incentive to heated and fruitful discussion, so any reasonable comments – whether supporting, supplementing or criticizing – will be greatly appreciated! Thanking very much in anticipation, I am passing on *ad rem*!

[Bracketed remarks in distinctive (plain in original versions, italicized in translations) print within citations are my explanations added when seemed necessary]

COLLECTIONS ←TAXONOMY ←SCIENCE ←WORLD

> *Certain measurements are crucial to our ordinary understanding of the universe. What, for example, is the mean diameter of the Earth? It is 12,742 kilometers. How many star s are there in the Milky Way? Approximately 10^{11}. How many genes are there in a small virus particle? There are 10 (in φX174 phage). What is the mass of an electron? It is 9.1×10^{-28} grams. And how many species of organisms are there on the Earth? We do not know, not even to the nearest order of magnitude*
>
> E. O. WILSON, *ex*: WHEELER 2007.
>
> *It is important to browse through collections. Just as in a library, in looking for a book one thinks that one needs, it is actually the associated books that become important* YOCHELSON 2004.
>
> *Taxonomy ... is a science that is most explicitly and exclusively devoted to the ordering of complex data, and in this respect it has a special, ... almost a superscientific place among the sciences* SIMPSON 1961.
>
> *To 'simply' go to the field and collect specimens, study them carefully in the laboratory, compare them with collections, describe them, and publish their descriptions, taxonomy needs thousands of arms and brains (i.e. of permanent salaries). This is much more crucial for the discipline than computers, sophisticated techniques, molecular facilities, 'highly ranked' publications, and internet chats*
>
> DUBOIS 2008.

The „leading" subject of the Conference was the role of biological collections in taxonomy. It would be difficult to imagine taxonomy without private or public "museums" housing natural history specimens, but biogeography, palaeontology, phylogenetics, or any other branch of what is fashionably referred to as "biodiversity studies" – *i.e.* broadly conceived systematics – are also unimaginable without them. And whereas systematics is as well the starting point as the final "summary" of all biological knowledge (any sound research program must begin with the identification of the target organism, and the results of all such programs are integrated into the Great Synthesis: the natural classification), it can be said without exaggeration that collections make the foundation of the whole biology. On the other hand, taxonomy – even if not everybody is willing to accept this fact... – is a branch of science, and science runs in the real (gently speaking not quite ideal) – "environment", thus the problems and purposes of natural history collections cannot be rationally discussed without reference to the position of taxonomy in science and the general situation of science in the present-day world. I evaluate both that position and the general situation as the worst in the modern history of our civilization, and in my further considerations will try to substantiate this opinion in the context of the current trends (in scientific policy of "decision-makers" on the

one hand, and in the views and attitudes of scientists themselves on the other), and at last to formulate the conditions which must be satisfied to avoid the final catastrophe, and actions which we, taxonomists, can and should undertake in order to increase the chances to fulfil these conditions.

THE WORLD WE ARE LIVING IN

Czasem można odnieść wrażenie, że żyjemy w świecie, który wypił o jedną wódkę za dużo...

[Sometimes one has the impression that we live in the world having drunk one vodka too much] RZEWUSKI 2006.

Wygląda na to, że człowiek to małpa, która z drzewa nie zeszła, lecz spadła. Na głowę

[It seems that man is an ape which has not come but rather fallen down from tree. Head on] LEWANDOWSKI 2005.

Czy myślisz, że byłoby rzeczą złą, gdyby ktoś chciał przewrócić świat, do góry dnem przewrócony?

[Do you think it would be bad if somebody wishes to overturn the world, which has been turned heels over head?] Giordano BRUNO, *ex*: ŻYLIŃSKA 1977.

Deficyt zdrowego rozsądku jest typowym problemem europejskiej demokracji

[Deficit of commonsense is a typical problem of European democracy] Z. GIŁOWSKA; *ex*: CIELEMIĘCKI & TRĘBSKI 2006.

Mamy wodza wybierać, więc się, bracia, spieszmy,
Lecz wprzód sobie muzykę pułkową wybierzmy:
Na pierwszego trębacza podaję sapera,
Niech trąbi, choć nie umie; wszak go lud wybiera

[We have to appoint the commander, hurry up, brothers,
But previously regimental orchestra should be selected:
For the first trumpeter I propose the sapper,
Let him play, though unable, when chosen by the people!] MICKIEWICZ 19??

... w sejmie, podobnie jak we wszystkich demokratycznych parlamentach, o przyjęciu lub odrzuceniu ustawy, będącej np. wspólnym dziełem prawników i ekonomistów, decydują lekarze, rolnicy. aktorzy, geolodzy, spawacze i wiele innych, godnych szacunku osób, mających o przedmiocie głosowania jedynie mgliste pojęcie. Tym zresztą można tłumaczyć fakt uchwalania licznych ustaw, które, zanim jeszcze wejdą w życie, wymagają nowelizacji

[In the Sejm, like in all democratic parliaments, acceptance or rejection of an act elaborated *e.g.* by a team of lawyers and economists, is decided by doctors, farmers, actors, geologists, welders and many other respectable persons having but a nebulous idea of the voted subject. This, by the way, may explain the fact that so many bills are passed which must be amended even before having come into force] KĄCZKOWSKI 2006.

Bliskowschodnim politykom przyznano już sześć pokojowych Nagród Nobla, tylko pokoju tam jakoś nie widać...

[Politicians from the Near East have already been awarded six Nobel Prizes for Peace, only the peace cannot be seen there] WEISS 2008.

[W dzieciństwie] *doszedłem ... do wniosku, że miałem pecha urodzić się w świecie, którym rządzi niepodzielnie potwór zwany prawem, nieskończenie potężny, lecz równie nieskończenie głupi – od czasu do czasu przychodzi mi na myśl, że miałem rację*

[*In childhood*] I arrived at the conclusion that I had the misfortune to come into the world ruled unrestrictedly by a monster going by the name of law, infinitely powerful but also infinitely stupid – from time to time it comes to my mind that I was right] HOYLE 2001.

Igazságosságot akartunk, és megkaptunk... a jogállamot...
[We strove for justice, and received... State of Law...]
[German economist] B. BOHLEY, *ex*: SCHAUSCHITZ 1995.

Obywatel XVIII-wiecznej Europy poczułby się w dowolnym państwie XX-wiecznym jak pozbawiony swobód niewolnik
[A citizen of XVIII century Europe transferred to any XX century country would feel like a slave deprived of any liberties]
P. JASIENICA, *ex*: NOWAKOWSKI 2005: 82.

Nic nie daje takiego złudzenia inteligencji jak osobisty kontakt z wielkimi sumami pieniędzy
[Nothing else gives such an illusion of intelligence as personal contact with large amounts of money]
[American economist] J. K. GALBRAITH, *ex*: WOJTASIŃSKI 2006b.

Kupuję, więc jestem kimś
[I buy, so I am somebody] CIEŚLIK & ZACZYŃSKI 2004.

Pod hasłem walki o tolerancję w Krakowie odbyła się [gejowska] *manifestacja nietolerancji*
[Under the banner of struggle for tolerance a *[homosexual]* manifestation of intolerance passed off in Cracow] KNAP 2004.

Zgodnie z pewną koncepcją sztuki jest nią wszystko, cokolwiek artysta napluje
[According to some conception of art. it is everything whatever the artist spits out] BRALCZYK 2004.

We live in a grotesque world, stranger than ever before, where everything "stands on its head": what until quite recently was evident to everybody, is now refused; what earlier came to nobody's mind, now is considered normal. In politics the fundamental dogma became democracy, conceived in practice (though naturally not in rhetoric) as a system where all (or at least many) are responsible for everything, what means that nobody (except scapegoats) bears the responsibility for anything, and where each important decision is taken (sometimes – as in the case of "civil control over the army" – obligatorily) by dilettantes; Nobel Prizes for Peace are most often awarded to terrorist leaders; law, euphemistically defined as "administration of justice", is in fact a collection of rigid formulas and the arena of fencing with procedural loopholes and interpretational pitfalls, only just with justice has it very little in common (lawyers themselves frequently admit that "*the verdict is not just, but this-or-that article does not allow to rule othewise*"); journalists (applauded by a great part of "public opinion"...) insist on the unrestricted right to freely slander anybody they do not like, and even the demand to give the calumniated person the possibility to defend him/herself (to publish refutation) causes "righteous" indignation as an "*attempt to undermine the freedom of the press*"; art, in bygone days the source of aesthetic feelings, being dominated by watchwords like "*I shock, so I am*", becomes increasingly vulgar and often outright loathsome; sport, allegedly a domain of honest gentlemanly competition, is in fact governed by the "laws of business" (even the rules of contest are frequently – usually with glaring adulteration, or at least increasing fortuitousness, of the results – modified according to the preferences of television or advertisers); "political correctness" interdicts not only the use of generally understood terms (geographical names are being changed with any change of political orientation, a Gypsy must now be a "Roma" and a Negro from USA an "Afroamerican" – I wonder how to call a Negro living in Africa: "Afroafrican"?, and if his homeland is not known, then "Afrowho"???), but even the tapping of some

subjects; while the Earth sinks in rubbish, industry produces loads of utterly superfluous, by design undurable "novelties" and we prize this as "progress"; earnings are almost inversely proportional to the genuine importance of the performed work; *&c.*, *&c.*, *&c.*! And we have spoken only on the generally accepted phenomena, with no mention of illegal misdeeds like frauds, corruption, or drugs (which, by the way, are also direct or indirect consequences of those "normal" rules of the game)! By and large, everything is being subordinated to profit (in the purely "material" sense), career (evaluated in terms of the position on the "monkey's ladder") and bureaucracy (multiplying formal procedures to make any real activity more complicated and less effective).

CURIOUS WORLD'S CURIOUS SCIENCE

... most science in the western world is already merely a caricature of what science should be, ..., and that in the non-western world is simply a caricature of a caricature

LEVINS & LEWONTIN, *ex*: WILLIAMS 1988.

... nauka jako całość lub znaczna jej część staje się na naszych oczach czymś w rodzaju pop-science, a więc przejawem podkultury na wzór pop-art lub pop-musics...

[Science as a whole, or a significant part of it, becomes before our eyes a kind of pop-science, *i.e.* a manifestation of subculture like pop-art or pop-music]

FALIŃSKI 2004b.

Oto znamię naszych czasów: przy stale wzrastającym zatrudnieniu w instytucjach naukowych coraz mniej tzw. naukowców trudzi się na co dzień właściwymi dociekaniami naukowymi. Coraz większa liczba spośród nas zajmuje się zdobywaniem środków na badania (czytaj: na przetrwanie) i działalnością niby-naukową. Ta ostatnia zdaje się być zapowiedzią nowej epoki, kiedy to odpowiednio do nabytych umiejętności będziemy zaliczani do jednej z kast. Oto najważniejsi ich reprezentanci: naukowiec-planista, naukowiec-sprawozdawca, naukowiec-antyszambrownik, czyli skuteczny kwestarz, naukowiec-selekcjoner, czyli specjalista od rankingu, wreszcie naukowiec-szef, czyli najambitniejszy z nas, zarządzający permanentnie pokorną trzódką niegdysiejszych kolegów. Najkorzystniejsze będzie znalezienie się w kaście naukowców-planistów, zazwyczaj autorów najwyżej cenionych projektów badawczych; wszak nikt nie spodziewa się po nich ani artykułu teoretycznego, ani też gruntownej monografii, ani podręcznika akademickiego. Tytuł naukowiec-badacz będzie przydzielany przez administrację instytutu tylko wyjątkowo i tylko niezgułom, a więc tym, którzy nie radzą sobie w żadnej z wyliczonych specjalizacji

[Here is the stamp of our times: simultaneously with increasing employment in scientific institutions fewer and fewer so-called scientists trouble themselves every day with genuine scientific investigations. Increasingly many of us are occupied with procurement of funds for research (*viz.*: for survival) and pseudoscientific activities. This latter seems to presage the new epoch when according to the acquired skills we will be classified into one of several castes. The most important representatives are: scientist-planner, scientist-reporter, scientist-mendicant effective in antechambering for funds, scientist-selector or specialist in ranking, at last the most ambitious scientist-boss governing the permanently submissive herd of former colleagues. The most advantageous will be to get into the cast e of scientists-planners, ordinarily the authors of highest-evaluated research projects: after all, nobody expects from them either theoretical paper, or comprehensive monograph, or academic textbook. The title of scientist-researcher will be given by the institute's trusteeship only exceptionally and only to muffs unable to get along in any of the specialities listed above]

FALIŃSKI 2004c.

Republika nie potrzebuje uczonych
[The republic has no use for scientists]
Judge COFFINHAL sentencing LAVOISIER to death, *ex*: SIMMONS 1997.

Ani państwo, ani fundacje nie są ... zbyt skore do wydawania pieniędzy na autentyczne badania naukowe
[Neither the State, nor foundations are particularly prone to spend money on genuine scientific research] FALIŃSKI 2004c.

Panie i Panowie, dziewczęta i chłopcy, inteligentni, mniej inteligentni oraz doradcy prezydenta do spraw nauki!
[Ladies and gentlemen, girls and boys, intelligent, less intelligent, and scientific counsellors to the president!]
[„IgNobel" award cerem. 2005] M. ABRAHAMS, *ex*: SZYMCZAK 2005: 24.

Science does not function in a vacuum, therefore its condition is to a great extent determined by attitudes and trends dominating in the contemporary world. Contrary to the belief widely held among the non-scientific majority, and even to the optimistic pronouncements of some scientists, the trends and attitudes prevailing in the last decades are definitely unfavourable to scientific research – at least if the term "science" is understood in its exact, traditional, lexical meaning: as "*human activity aiming at methodical study of the objects, forces and phenomena of the physical universe, and description presenting results of this activity in the frames of a coherent system*". Only "applied sciences" and "circumscientific" bureaucracy fare relatively well, and the published indices of "outlays on science", grandiloquently advertised in national and international "scientific programs", *&c.*, refer almost entirely to them.

SCIENCE? WHAT IT IS?

Szermierze nauki prawdziwej jednego tylko znają nieprzyjaciela, to jest błąd, i jeden tylko cel, to jest prawdę
[Champions of genuine science recognize only one enemy: error, and only one aim: the truth]
[principle of Pol. students Univ. Dorpat XIX c.], *ex*: CIECHANOWICZ 1990.

Látni, amit már mindenki látott – és azt gondolni róla, amire még senki nem gondolt!
[To see what everybody has seen – and to think what nobody has thought about it!] A. SZENT-GYÖRGYI, *ex*: MARX 2000.

Próba zrozumienia, w jaki sposób działa przyroda, stanowi najpoważniejszy sprawdzian ludzkich zdolności umysłowych
[The attempt to understand how Nature operates is the weightiest test of human mental capacities] FEYNMAN 1999.

Życie, którego nie zgłębiamy, nie jest warte przeżycia
[The life which we do not investigate, is not worth living]
SOKRATES, *ex*: ANONIM 2005.

Nie należy oczekiwać, że ktoś, kto nie zgłębia wiedzy od podstaw, kiedykolwiek dotrze do jej sedna
[Who does not study thoroughly is not expected to get to the essence]
HELMHOLTZ, *ex*: SORBJAN 2001.

Minden kérdést, amit meg lehet kérdezni, meg is kell kérdezni
[Every question that could be asked, should be asked]
[famous Hungarian mathematician] Pál ERDŐS, *ex*: MARX 2000.

Żeby dostać się na szczyt, gdy chodzi o oryginalne badania, trzeba być wariatem, gdyż

tylko wariaci wciąż próbują. Wpadasz na pomysł numer 1, jesteś podniecony, ale kończy się to klapą. Wpadasz na pomysł numer 2, jesteś podniecony, jednak to również kończy się klapą. Później masz pomysł numer 99, znów jesteś podniecony i znowu kończy się to klapą. Tylko wariat może wpadać w podniecenie z powodu setnego pomysłu, ale może się zdarzyć, że dopiero za setnym razem wreszcie coś się uda. Jeśli nie jesteś dostatecznie zwariowany, by wciąż się podniecać, zabraknie ci motywacji, nie będziesz miał dość energii, by dalej to ciągnąć. Bóg wynagradza wariatów

[To climb to the top in original research one must be a madman, as only madmen persistently keep trying. You conceive idea no. 1, you are excited, but it goes phut. You conceive idea no. 2, you are excited, but it also goes phut. Then you conceive idea no. 99, you are again excited, and again it goes phut. Only a madman can fall into excitement on account of the hundredth idea, but just the hundredth may at last be successful. If you are not sufficiently mad to be endlessly excited, you will lack motivation, run short of energy to continue. God gratifies madmen] M. HELLMANN, *ex*: SINGH 2001.

Nie ma ... autentycznej twórczości w żadnej dziedzinie nauki, sztuki, wynalazczości, jeśli ... pracę trzeba ... wykonywać w niezgodzie ze swymi upodobaniami

[There is no ... genuine creativity in any branch of science, art., inventiveness, if ... the work must be ... done in disagreement with one's predilections] FALIŃSKI 2004c.

Uczony nie bada przyrody dlatego, że jest to użyteczne; bada ją, bo sprawia mu to przyjemność

[A scientist does not study nature because it is useful; he studies it because he finds pleasure in it] POINCARÉ, *ex*: CHANDRASEKHAR 1999.

What is science? – alas! the conceptions and practices related to this question have been perfectly confused: in the pronouncements concerning science this term is commonly used in the meanings having little to do with the definition quoted above. Especially pernicious is the lack of discrimination between genuine science (basic research) and works aimed at its practical utilization ("applied sciences", *i.e.* in fact technology), leading to the extremely destructive muddle mainly in official documents. So *e.g.* from those anyway very stingy outlays the budget provides for "science", after deduction of the lion's share spent on the grotesquely expanded administration and preparation of bombastic but scientifically almost (or quite...) empty super-programs, the overwhelming majority goes in fact to "utilizable" studies (even in the domains qualified officially as "basic", in evaluation of grant proposals the expected applications play a significant role!), prizes and distinctions have been as a rule adjudged for immediately profitable achievements, and if in the press or television any mention is made of "science" then almost invariably technical, agricultural or medical studies are concerned. What is worse, when at last these scraps find their way to the scientist really doing basic research, half of the time and effort (and so, effectively, half of the received funds!) he/she must spend on what prof. FALIŃSKI aptly terms "antechambering" (preparation of proposals, justifications, accounts, reports *&c.*), and even what remains is not truly at his/her disposal according to the ***real*** requirements of the project: it is the "grant-giver" who decides on what the particular hundred zloty may be spent, and for what it may not...

EVERYTHING IS BUSINESS, THE ONLY MEASURE OF SUCCESS IS PROFIT

Poland tackles science like a business SCHIERMEIER 2008.

Academy institutes should focus their research on selected areas of science that correspond to our national strategic and priority areas
[Polish minister of science] Barbara KUBRYCKA, *ex*: SCHIERMEIER 2008.

Najpierw dajcie wyniki, a potem sobie badajcie
[First show the results, then you may quietly play at science]
[opening a scientific institute] P. JAROSZEWICZ, *ex*: FALIŃSKI 2004a.

To nie nauce, lecz transferowi gotowych technologii zawdzięczamy wzrost gospodarczy
[We owe economic growth not to science, but to the transfer of ready technologies] BALCEROWICZ 2004b.

... az az ország, amely a tudomány és műveltség dolgában lemond az elsőség örömeiről és gondjairól, s mások ... követésére rendezkedik be, garantáltan ... szellemi öngyilkosságot követ el
[A country which would, as regards science and education, relinquish the pleasures and troubles of primacy and is inclined to follow others, inevitably commits intellectual suicide] VEKERDI 1986: 44.

Inwestowanie w abstrakcyjne badania – na poziomie mniejszym niż jeden procent budżetu państw uprzemysłowionych! – przez ponad trzysta lat przynosiło o wiele większe zyski niż przeciętne notowania Dow Jonesa. Mimo to ... terroryzują nas sfrustrowani politycy, którzy domagają się, by nauka skupiła się na bardziej pilnych potrzebach społeczeństwa, ... nie rozumiejąc ... że większość istotnych zdobyczy technicznych ... pochodzi z czystych, abstrakcyjnych i napędzanych ciekawością badań
[Investment in abstract research – at the level of less than one percent of the budget of industrialized countries – for more than three centuries yielded much higher profit than the average quotations of the Dow Jones. And in spite of this fact, we are terrorized by frustrated politicians who – unable to understand that the majority of significant technical achievements ... resulted from abstract studies motivated exclusively by curiosity – demand that science focus on the more urgent needs of society] LEDERMAN & TERESI 1996.

Konsekwentnie realizowana zasada ograniczania publicznego mecenatu nad badaniami naukowymi na rzecz sponsoringu ze strony bogatych firm prywatnych spowodowała, że w dziedzinach przynoszących krociowe zyski z bezwzględnej eksploatacji praw patentowych trudniej dziś o niezależnego eksperta z dobrze wyposażonym laboratorium niż o dziewicę w przemyśle rozrywkowym
[Consistently realized curtailment of the public patronage on scientific research in favour of sponsoring by rich private business has resulted in the situation where it would be easier to find a virgin in the recreation industry than an independent expert with well equipped laboratory in the branches yielding fabulous profits from relentless exploitation of patent rights] [Ł. TURSKI] RUT 2001.

Reduction of scientific projects to the role of business concerns, whose purpose is to yield prompt and predictable profit, is of course a direct consequence of the "consumer ideology", until recently characteristic mainly of uncivilized societies – apparently such are we in the opinion of those politicians who openly argue that this is not the time for original scientific research: first we should "overtake" developed countries taking advantage of their achievements, and only thereafter "play at science"... This parasitical "method" would perhaps be profitable from the purely utilitarian point of view, were it not for the fact that... in the last decades it is spreading all-over the world: if the trend continues, before long there will be nobody to crib from... But first of all→

WISE *HOMO SAPIENS* OR MERELY RAPACIOUS *HOMO AVIDUS*?

Człowiek nie powinien być jedynie fabryką gie i żyć dla zdobywania surowca na tę produkcję

[Man should not be just a shit factory and live merely to procure raw material for this production] Béla FEKETI, in: ŻUKROWSKI 1971.

Proszę nie mieszać dwóch pojęć i dwóch znaczeń – „warto" i „opłaca się". Nie wszystko, co się opłaca, warto robić. A nie wszystko, co warto robić, zaraz się opłaca

[Please do not confuse two notions and two meanings – „it is worth" and „it pays". Not everything that pays is worth doing. And not everything that is worth doing, pays] BARTOSZEWSKI 2005.

Hiszem, hogy a tudósnak társadalmi szerepe is van. Kérdés, mit értsünk „társadalmi szerep"-en. Biztosan nem a vulgár-marxizmus által hirdetett gazdasági hasznosságot. Ha ezt elfogadnánk, a kopernikuszi világkép kevésbé volna értékes, mint egy újfajta WC-kefe

[I believe that scientists perform an important social function. The question is, what do we mean by "social function"? Certainly not the economical benefit propagated by vulgar-Marxizm. If we accept this, the Copernican picture of the Universe would be of less value than a new form of toilet-brush]

A. KOESTLER, *ex*: MARX 2000.

You're not going to have science in the national interest if you don't have a national interest in science

[Acad. Freedom For., Univ. Calif.] M. R. C. GREENWOOD, ex: GRABSKI 2006.

We are not rich enough to spare funds on science G. POMPIDOU.

Nic tak nie hamuje postępu w dziedzinie nauk, jak pragnienie przedwczesnego wykorzystania jego osiągnięć

[Nothing hampers scientific progress so much as the anxiety for premature utilization of its achievements] G. C. LICHTENBERG, *ex*: WENDT 1960.

... nauka dla techniki jest loterią, w której kwota wygranych zawsze przekracza ponoszone na rozwój nauki koszty. Co nie oznacza, że wszystkie losy w tej loterii wygrywają. Nieliczne przynoszą wygraną od razu, liczniejsze – po wielu latach, a część – dopiero po długim czasie i nieraz po dodatkowych ciągnieniach... Technika zatem ... planowanie nauki musi pozostawić samej nauce, podobnie jak wartościującą ocenę jej postępów

[...science is for technology like a lottery in which the sum of winnings always exceeds the amount spent on the development of science. That does not mean that all tickets for this lottery win. Few bring the prize immediately, most – within several years, and some – only after a long time and often after additional drawings... Thus technology ... should leave the planning of science, as well as the evaluation of its progress, to science itself] KUNICKI-GOLDFINGER 1978.

Bardzo niewiele wynalazków przystaje do popularnego poglądu o potrzebie - matce wynalazków. ... W rzeczywistości wielu, jeśli nie większości wynalazków dokonali ludzie kierujący się czystą ciekawością lub zamiłowaniem do majsterkowania

[Very few inventions fit the popular slogan that „necessity is the mother of invention". ... In fact many, if not the majority, of inventions have been done by persons led by pure curiosity or a preference for tinkering] DIAMOND 2000.

... żeby zobaczyć, trzeba najpierw zrozumieć, co się widzi ...

[... to see, we must previously understand what are we looking at]

GOETHE, *ex*: JURGO PUSZCZ 2008.

Trudno jest uzasadnić wybór zagadnienia w dziedzinie badań teoretycznych. Dlaczegóż bowiem wybór jednego tematu ma być lepszy niż innego? Jednym z najważniejszych jest następujące kryterium: wybrany temat powinien zdecydowanie interesować badającego. Badania naukowe, ... wymagając oryginalności i myśli twórczej, są bardzo wrażliwe na stan psychiczny badacza. Jest nieprawdopodobne, żeby pracownik nie zainteresowany tematem stworzył nowe pomysły, niezbędne dla postępu

> [It is difficult to give the reasons for the choice of subject in theoretical sciences. Indeed, why should one topic be better that another? One of the most important is the following criterion: the chosen problem must be decidedly interesting for the researcher. Scientific studies, ... demanding originality and creative thought, are highly sensitive to the psychical condition of the student. A worker not interested in the subject is unlikely to invent new ideas necessary for its progress]
>
> WILSON 1968.

> *Ich wünschte, dass Ihr bestrebt seid zu denjenigen Wissenschaftlern zu gehören, die für das bezählt werden, was sie machen und nicht zu denjenigen, die das machen, wofür sie bezählt werden*
>
> [I wish you would attempt to belong to those scientists who are paid for what they do, rather than to those who do what they are paid for] ROHRER 2006a.

The scientific name of the human species reads *Homo sapiens*, what some scoffers explain as "gasping man" [pol. "sapać" means "to gasp"], but in LINNAEUS' intention it was "***wise*** man". Humans deserved this proud qualification by their intellectual achievements, whose roots – without exception – come directly or indirectly from their curiosity of the world, thirst for knowledge, need to know and understand the nearer and further environment and the phenomena occurring there. This need urged our ancestors to look for the originators of the observed but incomprehensible facts among heroes and gods, ancient Hindoos and Greeks to carry on heated disputes on spirit and matter, sailors to steer beyond every "Further Is Nothing" Cape or "Ultima Thule" Island; from this need religion and philosophy, mathematics and history, humanities and natural sciences originate – and only from them modern engineering, agriculture, medicine. These practical fields – applications of science, *i.e.* technology – can develop for some time within the frame of what the ***basic*** sciences have already discovered and explained, but without constant widening of that frame with new discoveries and interpretations the progress will unavoidably become stunted and finally stop. Moreover, various branches of science are rather closely interconnected like alpinists with a rope: one of them can temporarily come somewhat to the fore, but if the others lag too far behind, the "leader" must also slow down or stop! Petrified remains of extinct organisms were uninterpretable until geologists clarified the origins of rock layers – and then in turn the fossils became a (for a long time the only) reliable tool for (at least the relative) dating of these strata; evolutionary studies got stuck soon after DARWIN, to set forth again only when geneticists disclosed the mechanisms of heredity; the geographical distribution of animals and plants was subject to totally erroneous interpretations until geophysicists proved that the position of continents in relation to one another was not stable! At that, the interrelations between various scientific problems are usually unpredictable ("scientific alpinists" rarely know for whom they are waiting, whose delay hampers the progress of the "spearhead"). Thus, negligence of basic research, as well as discrimination of some branches in favour of others, inescapably causes stagnation in all. There is no reason to consider one scientific problem "more important" than any other, and if so, then the optimal subject to study is the one that we feel the most interesting: one performs best the work which he/she likes best!

CAN WE APPLY THE UNKNOWN?

There is no applied science, when there is no science to apply
[general director of the UNESCO] F. MAYOR, *ex*: KARCZEWSKI 1996.

Instytucje, które finansują badania naukowe, powinny ... zdawać sobie sprawę, jak mądre jest dalekowzroczne wspieranie badań czysto naukowych, bez względu na ich tematykę. Najważniejszą lekcją, jaką można wynieść z odkryć naukowych dokonanych w przeszłości, jest to, że podstawowe badania przyrody nie tylko poszerzają wiedzę o ... Wszechświecie, lecz także niezawodnie przynoszą nowe, nieoczekiwane korzyści, które potem odczuwamy w każdej dziedzinie naszego codziennego życia
[Institutions which finance research should ... realize how wise is sagacious supporting of purely scientific studies irrespective of their subject-matter. The most important lesson that could be drawn from the hitherto done discoveries is, that basic natural sciences not only broaden our knowledge of the ... Universe, but also unfailingly bring new, unexpected benefits we then feel in all spheres of our life] ASHALL 1997.

Nauka, wzbogacając teorię, dokonując nowych odkryć, może jednocześnie służyć praktyce; w większym jednak stopniu praktyce dnia jutrzejszego, niż dzisiejszego
[Besides enrichment of the theory and bringing about new discoveries, science may simultaneously serve the practice; however, the practice of tomorrow rather than that of today] [rektor SGPiS] W. SADOWSKI [*ex*: *Życie Warszawy* 7 III 1972].

... nie má podobno takiéy istoty między dziełami WSZECHMOCNEGO, któraby dlá Człowieka jakiéy korzyści nie przynosiła; a lubo wiele wydaią się nám nieużytecznémi: winę tego mniemaniá naszéy niewiadomości przypisać należy
[... There is probably no such being among the ALMIGHTY's creatures, which would not provide some benefit for Man; and although many of them seem useless: the blame for such opinion should be ascribed to our ignorance] JAROCKI 1825.

Do czego te badania [nad indukcją elektromagnetyczną] *mają służyć? – nie mam pojęcia, ale z pewnością skarb Jej Królewskiej Mości niedługo to opodatkuje*
[What are these observations *[on electromagnetic induction]* to be used for? – I have no idea, but surely before long the Lord High Treasurer will tax it]
M. FARADAY.

Fleming nie przeprowadził żadnych doświadczeń, w których próbowano by leczyć penicyliną ... możliwości penicyliny zostały docenione dopiero na początku drugiej wojny światowej ... w laboratorium kierowanym przez profesora Howarda Floreya
[Fleming did not perform any experiments attempting the medical application of penicillin ... the potential of penicillin was appreciated only at the beginning of World War II ... in the laboratory of prof. Howard Florey] ASHALL 1997.

Jedyną moją motywacją było zainteresowanie czysto naukowe. Kiedy zaczynaliśmy badania nad penicyliną, nie mieliśmy pojęcia, że znajdzie ona praktyczne zastosowanie w medycynie
[My only motivation was purely scientific interest. When we started the studies on penicillin, we had no idea that it would prove applicable to medicine]
[member of FLOREY's team] E. B. CHAIN, *ex*: ASHALL 1997.

... Szilárd Leó ... meglátogatta volt Rutherfordot és azt mondta neki: a nukleáris energiát hasznosítani lehet, ... Erre Rutherford kidobta az irodájából ... [és]*... napok múlva sem tudott másról beszélni, csak arról, hogy ez az ötlet milyen ostobaság*
[Leó Szilárd ... visited Rutherford and said that nuclear energy may be exploited ... Rutherford chucked him out ... *[and]* ... even after several days he could not stop speaking about how stupid such an idea was] E. TELLER, *ex*: MARX 2000.

Semmi sem praktikusabb, mint egy jó elmélet
[Nothing is more practical than a good theory]
[famous aircraft engineer] T. KÁRMÁN, *ex*: MARX 2000.

The inevitable consequence of stagnation in science is stagnation in technology: we cannot apply something we are not aware of. Without MAXWELL's work on electromagnetic waves we would not have radio or television; exploitation of atomic energy became possible in consequence of RUTHERFORD's studies on nuclear fission (though RUTHERFORD himself considered the practical applicability of his discoveries as irritating nonsense!); had FLEMING simply thrown the accidentally mouldy bacterial cultures on the scrap-heap instead of observing with curiosity the further "progress of events", we would not have antibiotics; *&c.*, *&c.*, *&c.*

LET'S ORDER... WHAT???

A kto to zamawiał?

[Who on earth did order this?]

[reacting to the discovery of mion] I. RABI, *ex*: LEDERMAN & TERESI 1996.

W dłuższym czasie da się wykorzystać wszystko, co jest naprawdę dobrą nauką: od teorii liczb po badania nad językami ludów Gwinei. Na nic nie zdadzą się natomiast innowacje na zamówienie

[In longer perspective every result of truly good science may be utilized: from the theory of numbers to linguistic studies on Guinean nations. Instead, innovations made to order will be of no avail] TURSKI 2004.

Jest rzeczą śmieszną obstalowywać poemat tak, jak się u krawca zamawia ubranie

[It is riduculous to order a poem as one orders a dress from a tailor] NAPOLEON, in.: ŁYSIAK 1990.

Charakterystycznym dziś błędem jest wyobrażanie sobie, że poseł, konserwatysta czy socjalista, może zadecydować o linii badań, a potem zostawić naukowcom wypracowanie szczegółów. Żaden król ani minister nie mógł polecić Newtonowi, aby odkrył prawo ciążenia, gdyż żaden z nich nie wiedział i nie mógł wiedzieć, że takie prawo było do odkrycia. Żaden urzędnik Ministerstwa Skarbu nie powiedział Flemingowi, żeby odkrył penicylinę. ... W naszych czasach jeden kraj zostaje pod względem naukowym w tyle za drugim, równie zamożnym, najprawdopodobniej dlatego, że rząd powiedział swoim uczonym, co mają odkryć. ... Więcej zasobów przeznaczono na projekty, które politycy mogą zrozumieć – to znaczy na rozwój odkryć już dokonanych i opublikowanych – mniej na odkrycia jeszcze niewyobrażalne

[A characteristic mistake nowadays is the idea that a member of parliament – no matter whether conservative or socialist – can decide the general line of research and then leave to scientists the elaboration of details. No king or minister could have ordered Newton to discover the law of gravitation, because none of them knew or could have known that such a law was to be discovered. No official of the Ministry of Finance told Fleming that he should discover penicillin. ... If in our times one country lags as regards scientific develpoment behind another equally wealthy, it is most probably because its government instructed its researchers what they should discover. ... More resources have been assigned for projects which politicians can understand – *i.e.* for the development of discoveries already done and published – less for the yet unimaginable ones] PARKINSON 1967.

Z przyszłości można przewidzieć tylko to, co jest podobne do przeszłości, a dzieło, które kiedyś się pojawi, z pewnością nie będzie podobne do żadnego z istniejących

[From the future we can predict only what is similar to the past, whereas what after some time will appear will certainly not resemble anything we know today] PARANDOWSKI 1968.

[Badania naukowe są] *czymś co się robi, kiedy się nie wie, co się robi*

[(*Scientific research is*) what we do when we do not know what are we doing]
[Secretary of State USA] C.E. WILSON, *ex*: SELYE 1967.

Krzyś wyciągnął notes i uzupełnił mapę o numery ... – Wędrujemy drogą numer Trzy – oznajmił. – Widzisz, Kubusiu, postępujemy teraz jak prawdziwi badacze. Wiemy, którą drogą idziemy. – A dokąd idziemy? – spytał Kubuś. – Tego nie wiem – przyznał Krzyś – ale przynajmniej zaczęliśmy wędrówkę w sposób naukowy

[Chris took out his notebook and supplemented the map with numbers ... – We follow road number Three – he announced. – You see, Jimmie, we are now proceeding like genuine scientists. We know, which way we are going. – And where are we going? – asked Jimmie. – This I do not know – admitted Chris – but at least we started in a scientific manner] HRYNKIEWICZ 2000.

Niedaleko zajdzie ten, kto wie dokąd zmierza

[If you know where are you going, you will not get far]
NAPOLEON, ex.: ??? 1999.

My advice is to go for the messes – that's where the action is. ... exploring the unclear, uncharted areas of science can lead to creative work WEINBERG 2003.

Mamy znane wiadome. Rzeczy, o których wiemy, że je wiemy. Wiemy również, że istnieją znane niewiadome. Innymi słowy, wiemy, że są pewne rzeczy, których nie wiemy. Ale są również nieznane niewiadome – takie, o których nie wiemy, że ich nie wiemy

[We have recognized knowns: things which we know that we know. We are also aware of the existence of recognized unknowns; in other words, we know that there are some things which we do not know. But there are also unrecognized unknowns – such of which we do not know that we do not know them]
[Amer. Secretary of Defence] Donald RUMSFELD, *ex*: SHERMER 2005.

Supporting projects which „*match the actual needs of the economy and market*" at the expense of basic research is an evident misconception that leads to mere "marking time": it is evident that nobody knows or could know to what degree and which "needs of economy" will match the not yet made discovery. We could hardly imagine an occupation less promising from the "practical" point of view than toilsome counting of white, pink and red pea-flowers (MENDEL would have little chance to win the EU grant...), but still harder would be to imagine modern agriculture or medicine without the results of that "drudgery"! But even if a given discovery does not bring any direct, concrete benefits, even then – by deepening and broadening our general knowledge of the world – it is conducive to others, many of whom undoubtedly will initiate progress, and in some cases a crucial turn, also in technology.

SHOULD THE TAIL WAG THE DOG?

Swoją funkcję [instytuty badań podstawowych] *pełnić mogą tylko w warunkach wolności uprawiania nauki. Owa wolność oznacza określoną relację między nauką a administracją, gdzie ta ostatnia winna pełnić funkcje służebne, a nie kierownicze*

[[Institutes of basic research] can fulfil their tasks only under conditions of scientific freedom. That freedom means particular relations between science and administration, where the latter should perform ancillary, not managing, functions]
ZAGÓRSKI-OSTOJA 2006.

Niestety, mamy ... grupę akademickich urzędników, nie rozumiejących, po co rozwija się badania oraz tworzy wyższe uczelnie

[Unfortunately we have ... a group of academic clerks who do not understand why scientific studies are supported and universities set up] TURSKI 2005.

Straty są wynikiem nadmiaru kontroli, nie jej braku

[Losses result from excess rather than from lack of control] PARKINSON 1967.

Ile dodatkowych batalionów można by utrzymać za sumę wydaną na wydział finansowy Ministerstwa Wojny?

[How many additional battalions could be maintained for the outlay spent on the Financial Department of the Ministry of War?] PARKINSON 1967.

Aby zadowolić biurokrację, trzeba ciągle podporządkowywać się czyimś poleceniom i właśnie dlatego dzisiejsza nauka, prawie w całości zdominowana przez biurokratów, jest w znacznej mierze jałowym zajęciem

[To satisfy the bureaucracy one must incessantly submit to somebody's instructions, and just therefore present-day science, almost totally dominated by bureaucrats, is to a significant degree a vapid occupation] HOYLE 2001.

When analyzing bureaucratic ideas, it is impossible to determine when the most foolish proposal ever will come to fore YOCHELSON 2004.

Ha egy elgondolást úgy is meg lehet valósítani, hogy előbb bürokratikus ellenőrzésen esett át, akkor nem volt érdemes megvalósítani

[If a given idea may be realized despite its having passed through bureaucratic control, it was not worthy of realization] BLOCH 1985.

Aki tudja, csinálja. Aki nem tudja, tanítja. Aki nem tudja tanítani, igazgatja

[Who is able, does. Who is unable, teaches. Who is unable to teach, manages] MENCKEN/MARTIN's Law, *ex*: BLOCH 1985.

Biurokracja jest stara jak prostytucja. Wszak pierwsze pismo wynaleziono na potrzeby biurokracji, a pierwsze zapisane w historii dochody podobno dotyczą dochodów z prostytucji

[Bureaucracy is as old as prostitution. Indeed, the first writing had been invented for the needs of the bureaucracy, and the historically earliest recorded revenues allegedly refer to income from prostitution] FALIŃSKI 2004c.

Conceiving science mainly or exclusively in terms of "business" and the dominating role of bureaucracy are closely related phenomena: bureaucrats are appointed by politicians, politicians owe their authority to the electorate, and in the ears of the overwhelming majority of electors the word "profit" sounds much more pleasant than discovering the mysteries of nature, whose relation to profit they do not understand... And as the rules of democracy impose short-term planning (in four years probably not "we" will be in power), so the profit (applications, economic benefits) should be direct and immediate – even if someone of the "decision-makers" realizes that by neglecting basic research he contributes to the technological stagnation in a somewhat longer perspective, this will already be a problem of the next team (and for "us" an additional advantage: the responsibility can be devolved on those successors, increasing "our" chances in the next elections...). When the power over science has been seized by *Santa Burrocratia*, it is being executed in the bureaucratic way: by rigid regulations, formal restrictions, "objective" indexes, multiplication of plans, reports, accounts, justifications. Those scientists unwilling or unable to accept so imposed style of work are eliminated, others *nolens volens* sacrifice half (or more) of their time and effort on the altar of the Supreme Deity, and the most zealous confessors quickly ascend on the rungs of monkey-ladder until they themselves become decision-makers, pursuing and further intensifying the "achievements" of their masters and predecessors...

RAT-RACE: *PUBLISH OR PERISH*

My... advice is... to forgive yourself for wasting time.... in the real world, it's very hard to know which problems are important, and you never know whether at a given moment of history a problem is solvable. ... As you will never be sure which are the right problems to work on, most of the time you spend in the laboratory or at your desk will be wasted. If you want to be creative, then you will have to get used to spending most of your time not being creative WEINBERG 2003.

Az arguskakas evezőtollai után az intraspecifikus szelekció legbutább terméke a modern emberiség munkatempója

[Next to the wing feathers of the male argus pheasant, the most foolish product of intraspecific selection is the modern man's working pace]

O. HEINROTH, *ex*: LORENZ 1988.

Pierwszy etap to intuicja – przychodzi ona nagle, trudności pojawiają się później. To się nie udaje, potem tamto – „pluskwy" – jak nazywamy takie drobne błędy i trudności – wychodzą na jaw i trzeba miesięcy usilnych obserwacji, studiów i pracy, zanim uzyska się pewność, że osiągnęło się komercyjny sukces lub poniosło porażkę... Mam właściwą zasadę postępowania i podążam we właściwym kierunku, lecz niezbędny jest także czas, ciężka praca i trochę szczęścia

[The first step is intuition – it comes suddenly, difficulties appear later. Now this fails, then something else: 'bugs' (as we call such trifling errors) emerge, and it takes months of strenuous effort, observations, studies to acquire certainty of success – or defeat... [...] I have a good idea and proceed in the right direction, but time, hard work and a bit of luck are also indispensable]

T. A. EDISON, *ex*: SPROULE 1991.

American universities, formerly citadels of thought, [have been transformed] *into organizations where, nowadays, no one has a moment in which to stop and think*

E. G. LEIGH, *ex*: HEADS 2002.

One of the now widely applied „objective" measures of the value of scientists' work is the number of publications, therefore everybody except the disdained „amateurs" must maximally extend the list. There are several recipes, all in common use: 1) "Divide each project into as many fragments as possible, and publish each of them as a separate paper: you will have five or ten publications instead of one"; 2) "Add the names of some colleagues as co-authors, then they will add yours in their papers, and again each of you will have several times more items on your lists"; 3) "Choose possibly most schematic subjects, in which the majority of work will be done by computer, and you will need only to change numbers and names in the introduction and discussion – you will save plenty of time otherwise lost on thinking and interpretation"; 4) "Avoid original, unorthodox methods and conclusions, so you will not be compelled to spend weeks or months on quarrels with reviewers and editors"; 5) "If nevertheless the reviewer or editor has found that you should change something, never let enter your mind the erratic hypothesis that perhaps right may be on your side, and anyway under no circumstances try to defend your view: quickly introduce the required changes, humbly express your gratitude for the valuable remarks, and automatically consider them in your further papers – after all, you will not be evaluated according to the aptness of your conclusions but to the number of your publications and the "ranking" of the journals they have appeared in. And always remember, that even if you have published thousands of papers in most renowned journals, this does not matter a bit unless you swiftly climbed to an adequately high rung on the "monkey ladder": as master you are nobody, as doctor – almost nobody, you begin to count only after habilitation...

PRODUCTION OF CHAFF

Ilość przechodzi w bylejakość
[Quantity transforms into flimsy quality]
Prof. J. KOSTRZEWSKI, *ex*: ROSZKO 1974.

Hustle and bustle of current science, focusing on writing the maximum number of papers about minimum publishable entities, selling himself at conferences, or investing substantial amount of energy and time in grant proposals with only maximum chance of 15% success KRELL 2005.

In fact, to do the full amount of comparative work appropriate to the first rate species hypothesis test one has in essence done the better part of a revision of at least some sub-clade of the higher taxon to which the species belongs. This is why taxonomists have relied upon revisions and monographs WHEELER 2004.

There are worse sins for a scientist than to be wrong. One is to be trivial
R. MACARTHUR; *ex*: BROWN 1999.

Unjustified splitting of research projects into exiguous contributions is the simplest and relatively least harmful way to expand the list of publications, but even this has serious faults: it enforces multiple repetitions (introduction, methods, references, acknowledgements), decreases the likelihood of completion of the entire project, occasions heterogeneity of elaboration (*e.g.* due to discordant editorial policies), is inconvenient for the readers (assembling all parts can be problematic), and above all makes it difficult to synthetize the results and draw general conclusions. In this way the author, maximizing the number (and total volume) of his/her publications, simultaneously minimizes their scientific value.

CO-AUTHORSHIP: BENEFIT AND GLORY *VS.* RESPONSIBILITY

Spółka to pomysłowy wynalazek dla zapewnienia sobie indywidualnych zysków i uniknięcia indywidualnej odpowiedzialności
[Company is an ingenious invention to assure individual profit avoiding individual responsibility] [writer] A. BIERCE; *ex*. NOWAKOWSKA 2002.

Im raport z badań ma więcej autorów, tym bardziej prawdopodobne jest, że idea i samo odkrycie (jeśli zaistniało odkrycie!) jest dziełem jednego lub co najwyżej dwojga z nich. ... Nierzadkie są ... przypadki, że owa zespołowość pracy wyrażona współautorstwem jest tylko przejawem pasożytnictwa ... spełnienia imperatywów niektórych szefów, decydentów, sponsorów
[The more authors have signed a research report, the more probable is that the idea and discovery (if there was any!) had been done by one, or at most two, of them. ... Not so rare are ... cases, where that collectivity of work expressed by co-authorship is in fact a manifestation of parasitism ... compliance with the requirements of some bosses, decidents, sponsors] FALIŃSKI 2004c.

If two men agree on everything, you may be sure that one of them is doing the thinking
L. B. JOHNSON, *ex*: WOLSAN 2005 *i.l.*

Jednej woli jednemu trzeba przedsięwzięciu,
Lepszy jeden wódz głupi niż mądrych dziesięciu
[One will is needed for one enterprise,
one stupid chief is better than ten wise] MICKIEWICZ 19??.

Any issue of Nature today has nearly the same number of Articles and Letters as one from 1950, but about four times as many authors. The lone author has all but disappeared. ... Curiously, however, in most journals we are not told which of[co-

authors] ... *did what part of the work, nor may we be certain (have we ceased to care?) who drafted the paper* GREENE: 2007.

Miej nawet mały rozum, ale swój
[Have even a small mind, but your own] J. W. GOETHE.

Z pieniędzy przeznaczanych na naukę korzystają głównie plagiatorzy
[From the funds allocated for science benefit mainly plagiarists] HOYLE 2001.

When, several years ago, a colleague of my Wife, asked to send for comparison some specimens of a common cyclops from his home area, replied that "*well, I will send, but on the condition that you accept me as the co-author of your paper*", I was exceedingly astounded and surprised – even not so much by the fact of making such a trivial comradely kindness dependent upon some conditions, but mainly by the demanding, or in fact the very willingness, to assume the responsibility for the content and form of not his own publication. Now such cases continue to astonish me, but already do not surprise: unfortunately multiauthored (often grotesquely) texts appear (especially in "high-ranked" journals) so frequently that I must have become accustomed, while bureaucratic criteria of evaluation of scientists have also provided the explanation... It is hard to believe that a one-page report in *Nature* has ***really*** been written by several tens (sometimes several hundred) of authors – one person formulated one sentence??? – but even if there are only two or three (except for totally problemless contributions and some very special situations where each author is responsible for his own well defined heading) one can be almost sure that either the paper was prepared by one of them and the others have been added as my Wife's colleague wished to be, or – still worse – the text is a "corrupt compromise" that does not fully match the opinion of any of the co-authors: there are no two thinking persons whose views would be identical!

HIS MAJESTY THE IMPACT FACTOR

Można powiedzieć, że życie naukowców przenosi się stopniowo z laboratoriów, bibliotek i poletek doświadczalnych – do biur, sal kongresowych, na ulice, na trybuny. Grozi nam powstanie czegoś, co nazwać możemy nauką bez uczonych. W nauce bez uczonych będą nadal bogato wyposażone laboratoria, a zwłaszcza liczne publikacje, wedle których urzędnicy wespół ze środkami masowego przekazu będą odpowiednio wyżej oceniać naszą aktywność niż jej efekty poznawcze
[One can say, that the life of scientists gradually moves from laboratories, libraries and experimental plots – to offices, conference rooms, into streets, onto tribunes. There is a treat of appearance of something that may be described as science without scientists. Science without scientists will still have richly equipped laboratories, and especially plentiful publications, according to which officials together with mass-media will appropriately higher evaluate our activity than its scientific effects] FALIŃSKI 2004b.

Państwo, w którym nagromadzi się zbyt wiele procedur formalnych, skazane jest na upadek
[The state in which too many formal procedures accumulate, is doomed to crash] HOYLE 2001.

Nasz świat zdaje się być blisko stanu ... szaleństwa, skoro niektórzy z nas całkowicie ogłupieli od liczenia filadelfijskich cytatów, ...; skoro czas przeznaczony na badanie przyrody zgodzili się poświęcić na sporządzanie nigdy nie kończących się planów

[Our world seems to be close to the state ... of madness, if some of us have been totally stupefied from counting Philadelphia citations, ... if the time destined for studying nature they agreed to spend on preparation of endless plans and reports]
FALIŃSKI 2004c.

... o częstotliwości cytowań danego autora, a ściślej któregoś z jego artykułów lub serii raportów, decyduje nie oryginalność pomysłu lub specjalne odkrycie, tylko świadome lub przypadkowe wejście czy też wpisanie się w aktualnie rozwijający się nurt badań, lub lepiej: w modny temat. ... może to być najbardziej prymitywny i mało obiecujący kierunek poszukiwań
[... the frequency of citations of a given author, or more exactly of some of his papers or series of reports, is determined not by the originality of the idea or special discovery, but deliberate or accidental joining or ascription to the currently developing trend, or better: fashionable topic. ... this may be just the most primitive and least promising target for research]
FALIŃSKI 2004c.

... unfashionable does not mean irrelevant
PARKES 1982.

Once citation counting became established as a means to determine prominence, players began to 'game the system' ..., and the metric ceased to have a close relation to the outcome it was designed to measure. Such attempts led to the somewhat occult business of impact factors, ...
GREENE: 2007.

Grzegorz Mendel opublikował w podrzędnym, lokalnym pisemku zaskakujące wyniki
[Gregor Mendel has published amazing results in a secondary, local magazine]
ŻYLICZ 2006.

Bureaucratic management could not go without „objective" evaluation of scientists and their publications according to some formal criteria (until recently the favourite was „citation index", now "impact factor" dominates). There would be nothing wrong with this, if the "objectivity" could be combined with adequacy – unfortunately the indexes proposed hitherto, though in a sense objective indeed, as a measure of scientific value of the researcher's work are hardly better than his/her stature or date of birth... In effect their application is to a considerable degree destructive: discriminates some branches of science (including taxonomy); inclines to choose fashionable (worked on by many other authors) and non-controversial (thence less likely to be rejected by reviewers or editors) problems; promotes opportunism in selection of methods, interpretation of results, and form of presentation; coerces submission of the manuscript to a "high-ranked" journal instead of one often more appropriate but not belonging to the "Mutual Admiration Society"; most frequently causes delay in publication ("renowned" periodicals are usually "overloaded"); *&c.*, *&c.*, *&c.*

IS THE GAME WORTH THE CANDLE? – THE COSTS OF EDITORIAL PRIGGISHNESS

Wielka to praca ... wielka i mozolna, ale za to jałowa!
[This was a great work ... great and arduous, but in reward idle]
[Actor-humorist] Franc FISZER, *ex*: BRALCZYK 2004.

Nie mam czasu, żeby tracić czas
[I have no time to waste time]
Ariel SZARON, *ex*: SZAFIR 2005.

Jestem osobą bardzo pracowitą i strasznie leniwą. ... Lenistwo jest potrzebne, aby zorientować się, w co inwestować swoją pracę
[I'm a very industrious but very lazy person. ... Laziness is necessary to recognize what is worth investing my work in]
TYSZKIEWICZ 2004.

Najwięcej nieporządku robią ci, co robią porządek
[Disorder is mostly introduced by those eager to make order]
KOTARBIŃSKI 1986.

Forma jest ekspresją treści
[Form is the expression of essence] René DUBOS, *ex*: FALIŃSKI 2004c.

Words differently arranged have a different meaning and meanings differently arranged have a different effect [NN], *ex*: WOLSAN 2005 *i.l.*

Musiałem za każdym razem, podobnie jak i inni ludzie, wyważać w swoim sumieniu, czy zgoda na opublikowanie czegoś niepełnego jest mniejszym złem niż całkowite milczenie, czy jest już złem, którego nie mogę przyjąć i rezygnować z publikowania
[Every time I – like others – must have weighed in my conscience whether consent to the publication of something deficient is a lesser evil than total silence, or it would be an already unacceptable evil and I must give up the publication] BARTOSZEWSKI 2004.

Each editor has a set of "the only acceptable" (though in each case different...), and exacted with stiff obstinacy, regulations – "instruction for the authors" often fills several pages! The hapless author first studies all these rules: where to put a full-stop and where a comma, what to emphasize by italics and what to leave unemphasized, whether the date of publication must be quoted after the author's name or after the volume number, *&c.*; then he diligently turns semicolons into dashes (or dashes into semicolons), changes the subtitle from "Literature" to "References" (or from "References" to "Literature"); abbreviates the journal titles (or unfolds the abbreviations), *&c.*; then, frowning with disgust for the coerced malformities submits the paper to the editor, who checks whether all is "made to order" and then sends the manuscript to referees who, among others, verify the adherence to the editorial rules; referees of course find some "improper" display or square brackets instead of round parentheses (or the opposite), the text returns to the author who again refashions, "corrects", and sends back to the editor, who checks... What wonder (especially if we supplement this with the effects of the professional "omniscience" of reviewers...) that while in the XIX century a text written with a quill after the lecture presented in July appeared in print in August or September, in the XXI century "*a typical paper* [in "*an **efficiently operated** scientific journal*" – emphasis mine (RBH)] ... *can spend 9 months to a year on various desks before actual publication*" (ERWIN & JOHNSON 2000)? What a lot of time, effort, money, stress; risk of introducing inconsistencies and errors (or at least disturbing the clarity of expression: after all, all these dashes and semicolons have not been invented in order that the editors may have what to regulate, but to enable the author to express his views as precisely as possible) – and all this for the only purpose of making some (for the reader mostly unnoticeable) formal details looking as preferred by the editor rather than as the author would like... Is it really worth it???

EVERYBODY KNOWS BETTER, ONLY THE AUTHOR IS BY DEFINITION IGNORANT

Dawniej o wiele łatwiej było opublikować artykuł w „Nature" o czymś nowym i niezwykłym; teraz można go „zarecenzować" na śmierć... Recenzowanie prac osiągnęło stan szaleństwa
[Formerly it was much easier to publish in „Nature" a paper on something new

and unusual; now it can be "overreviewed" to death... Reviewing of works has attained the state of madness]

[renowned cosmologist] G. BURBRIDGE, *ex*: CROSSWELL 1997.

Wszak wszyscy recenzenci wiedzą wszystko lepiej niż autorzy i raczej woleliby sami napisać książkę na dany temat niż trudzić się oceną cudzego rękopisu. Jednak nie pozwalają im na to ważniejsze obowiązki, które byli zmuszeni wziąć na siebie dla ogólnego dobra

[Isn't it that all reviewers know everything better than the authors and would rather prefer to write themselves a book on the given subject than to toil at the recension of other scientist's manuscript. However, they cannot afford to do this because of more important duties, which they must have undertaken in the public interest] FALIŃSKI 2004c.

Krytyk to kura, która gdacze, gdy inne znoszą jaja

[A reviewer is like a hen, which cackles when others are laying eggs]

Giovanni GUARESCHI, *ex*: DÄNIKEN 1991.

... odpowiedź wielkiego fizyka lorda Rayleigha na stwierdzenie Thomasa Huxleya, że: „Uczeni powyżej sześćdziesiątki czynią więcej złego niż dobrego". Rayleigh (mający wówczs 67 lat) odpowiedział: „Może tak być, jeśli uczony zajmuje się krytykowaniem prac młodszych kolegów, nie widzę jednak powodu, aby musiało tak być, jeśli zajmuje się sprawami, na których się zna"

[... the answer of the great physicist lord Rayleigh to Thomas Huxley's opinion that: „Scientists over sixty do more harm than good". Rayleight (then 67 years old) replied: „It may be so, if the scientist is busy with criticizing younger colleagues, but I do not see any reason to be it so if he is occupied with problems which he is experienced in] REES 1999.

Strzelanie zza płotu jest zawsze świństwem

[To shoot from behind a fence *[= "snipe", attack somebody from hiding]* is always a scurviness] J. DĄBROWSKI, *ex*: KOSSAK 1964.

... poprawiacz był widocznie przekonany, że wie lepiej. ... Tylko dlaczego to JA, WŁASNYM NAZWISKIEM, mam się pod tą głupotą podpisywać?

[The „corrector" was apparently persuaded that he knows better... But why it is ME who must sign this stupidity WITH MY NAME?] POKRYSZKO 1998.

Biorąc pod uwagę eksperymentalne skrzywienie tej książki, wyglądało to [korekta merytoryczna wykonana przez teoretyka] *tak, jakby Marcin Luter zwrócił się do papieża z prośbą o korektę ...* [swoich] *95 tez*

[Taking into consideration the experimental attitude of this book, it *[a recension by a theoretician]* looked as if Martin Luther asked the Pope for a review ... of his 95 theses] LEDERMAN & TERESI 1996.

Recenzowanie prac przed dopuszczeniem do publikacji to sposób stosowany przez elitę do obrony swojej pozycji

[Reviewing works before acceptance for publication is a method used by the élite to defend their positions] HOYLE 2001.

Jeśli powieść jest zła proszę jej nie drukować – ale toć to nie szkolne wypracowanie na podany przez profesora temat, aby je oceniać i kreślić

[If the novel is poor, do not publish it – but after all it is not a school exercise, on the topic given by the teacher, to be rated and crossed]

M. RODZIEWICZÓWNA, *ex*: GŁUSZENIA 1992.

... dotychczasowy rozwój nauki był możliwy jedynie dlatego, że przebiegał wbrew usankcjonowanym poglądom na metodę naukową. Jedyną zasadą, której należy w nauce bronić, jest teza o równouprawnieniu wszystkich, najbardziej nawet „szalonych" sposobów badania

[... the hitherto achieved development of science was only possible because it proceeded contrary to the sanctioned views on the scientific method. The only

rule which should be defended in science is the thesis of the equiponderance of all, even the most "crazy", ways of investigation]

[science philosopher] P. FEYERABEND, *ex*: BRONK 2006.

I am not prepared to spend months submitting manuscripts to journals before receiving negative replies simply because the referees have „opinions" different from mine DUBOIS 2005.

You can get almost anything into print if you go far enough down the ranks of journals SVETLOV 2004.

Często całkowicie błędne prace bardziej stymulują naukowców od tych poprawnych, ale niewiele wnoszących, prac badawczych

[Often totally erroneous works prove more stimulating for scientists than correct but trivial ones] ŻYLICZ 2006.

Ich [WATSONa i CRICKa o strukturze DNA] *praca opublikowana w „Nature" ... nie opierała się na żadnym doświadczeniu, była czystą spekulacją ... znając rady redakcyjne międzynarodowych czasopism, taka praca w obecnym czasie nigdy nie ukazałaby się ani w „Nature" ani w „Science"*

[Their *[WATSON & CRICK's on the structure of DNA]* paper published in „Nature" ... was not based on any experiment, was purely speculative ... knowing editorial committees of international journals, nowadays such work would have never appeared either in „Nature" or in „Science"] ŻYLICZ 2006.

Nie powinno być tak, że nieznanej z nazwiska osobie lub osobom udostępnia się najnowsze wyniki na kilka miesięcy wcześniej niż innym ... Znane są przypadki, w których recenzent doprowadził do odrzucenia pracy, a potem wykorzystał to, co w niej przeczytał, do własnych badań. Z drugiej strony osoba o nadmiernych skrupułach poproszona o zrecenzowanie czyjejś pracy może mieć potem opory wewnętrzne przed publikowaniem własnych prac na podobny temat. Opowiadano mi, że dlatego właśnie Wolfgang Pauli nie opublikował równania, które znane jest dzisiaj jako równanie Schrödingera

[It should not be so that the newest results are made available to an unknown person or persons several months earlier than to others ... Cases are known where a reviewer induced the rejection of a paper and then used its content to his own studies. On the other hand, an excessively scrupulous person asked to review somebody's work may then feel embarassing to publish his/her own works on a similar topic. I have been told that it was just therefore that Wolfgang Pauli had not published the equation known today as Schrödinger's equation]

HOYLE 2001.

Prosty język, łatwy styl, brak obcych słów, jasne i krótkie zdania ... – podstawowe kryteria naszych wydawców – to recepta na niezobowiązującą lekturę na plażę, ale nie na źródło poważnych informacji na ważkie tematy

[Simple language, easy style, lack of foreign words, clear and short sentences ... – the main criteria of our publishers – make a recipe for a light beach-lecture, but not for a source of serious informations on important matters]

RYSZKIEWICZ 2002.

Inni czynili mi zarzuty z powodu mego wysłowienia, któremu zbywa jakoby na powadze, a właściwie na oschłości akademickiej. Ci się lękają, że stronica, którą się czyta z łatwością, nie zawsze daje świadectwo prawdzie. Według nich, głębokim można być tylko pod warunkiem, że się jest niezrozumiałym

[Others accused me for my wording, which allegedly lacks solemnity, or in fact rather academic stiffness. They are afraid that a page easy to read may not always be good expression of the truth. According to them, one can be profound only on the condition of being abstruse] J. H. FABRE, *ex*: BANASZAK 2002.

„*Obligatory peer reviewing*" is one of the most worshipped fetishes – or, if one prefers, Sacred Cows – of present-day science: slogans preaching the enormous importance of this procedure to "*guarantee high standards*" of published works have been

repeated again and again to the point of boredom, but I have never met with any ***serious*** [*i.e.* not restricted to repetition of slogans] substantiation of its positive role (from time to time appearing timid voices to the contrary are either – in most cases – ignored, or put off with one more triteness). I do not wish to amplify on this subject here (I have discussed it already several times, and can send the respective publications with pleasure to those possibly interested), I only repeat some questions which would be nice to have answered in a non-slogan (*i.e.* ***supported by facts***) form: Is the procedure of "peer reviewing" ***truly efficient*** in elimination of worthless works? Is it ***really efficient*** in improving valuable contributions? Is it not possible to achieve these results ***without*** "peer reviewing"? Is the occasional publication of erroneous or worthless paper ***more harmful*** than ***rejection of a scientifically important*** one? What is the more harmful aspect of the circumstance which so troubles the author of one of the above citations (that "*you can get almost anything into print if you go far enough down the ranks of journals*"): the occasional appearance of poor quality papers (in the "top-ranked" periodicals they are also not so rare...), or rather the fact that you often ***must*** "*go far enough down the ranks of journals*" to publish a paper more or less faithfully presenting the views of the ***author*** (who signs it and is responsible for its content and form) rather than those of an anonymous (at least to the reader) editor and/or reviewer? And first of all, are the supposed benefits ***really not too extravagantly disproportionate to the costs*** [of course I mean as well those measured in zlotys or dollars as – especially! – others: the time wasted by the author, reviewer and editor; creation of the opportunity to dishonest "tripping" and/or usurp the results of the other's work; discouraging from bold, unfashionable, innovative methods and original interpretations in favour of "orthodox" stereotypes; muffling discussions and confrontation of views (it is difficult to fruitfully discuss with a "sniper" shooting from behind the fence of anonymity, even if – what happens rather rarely... – he/she is willing to venture to discussion...); abating or even fully suppressing the author's feeling of responsibility for the content and form of the papers published under his/her name]?

TO WHOM, WHAT FOR, AND WHY?

Nem az a kérdés, hogy van-e pénz, hanem hogyha nincs, mire van mégis
[The problem is not whether enough money is available, but if it is not, for what it nevertheless is?] [film director] J. GULYÁS, *ex*: TÓTH 1995.

Może wydawać się logiczne, że rząd, który dostarcza pieniędzy, powinien decydować, jak należy je wydać. Ale upieranie się ... przy prawie kontroli bardzo przypomina sytuację, w której pacjent pouczałby swego lekarza, mówiąc: „Ja płacę rachunek, więc ja będę decydował, ... na czym powinno polegać leczenie"
[It might seem logical that the government which provides the money should decide on what it must be spent. But insistence ... on the right of control would strongly resemble the situation where a patient would instruct the doctor, saying: "I am paying the bill, so I will decide ... what treatment you should apply"]
PARKINSON 1967.

Taxonomists are cheap dates. That might seem to be a good thing, but trends in academic science have gone in the opposite direction. Laboratory space and jobs go to those who can bring in the largest grants, those which will result in the greatest amount of overhead or profit returned to the university WINSTON 2007.

Rządy wydają setki milionów dolarów na systematyczne badania gwiazd, ale zaledwie drobną cząstkę tych sum przeznaczają na systematyczne badania przyrody na Ziemi

[Governments spend hundreds of millions of dollars on systematic studies of stars, but merely a trifling particle of these sums devote to systematic studies of Nature on the Earth] LEAKEY & LEVIN 1999.

Zdolności niezbędne do dobrego wykonywania pracy naukowej są zupełnie inne od tych, które pomagają w uzyskaniu subsydiów

[Abilities necessary to effective scientific work are totally different from those which help in procurement of subsidies] J. SELYE; *ex*: FALIŃSKI 2004c.

Lies, damned lies, and grant proposals STANLEJ & HIGLEY 1997.

Uciążliwa i w znacznej części zbędna jest ogromna praca, którą muszą wykonać naukowcy, starający się o fundusze u połączonego ciała naukowo-urzędniczego. ... Nie spełnia też oczekiwań żadnej ze stron: nie ułatwia podejmowania decyzji

[Arduous and largely superfluous is the enormous work, that scientists must do seeking to procure the funds from the joint scientific-clerical body. ... At that, it does not satisfy the expectations of either party: does not help in taking decisions] FALIŃSKI 2004c.

... najgorszą kradzieżą jest kradzież cudzego czasu

[... the worst theft is stealing of others' time] RERICH 1980.

Nie będzie użyteczne, jeśli rzecz [systemy finansowania nauki] *pozostanie w rękach administracji ministerialnej, mającej naturalną tendencję do zastępowania kompetencji formalizacją*

[It will not be useful if the matter *[system of funding science]* remains in the hands of ministerial administration, which shows the natural tendency to substitute formalities for competence] ZAGÓRSKI-OSTOJA 2006.

Sponsor ... najpierw żąda przekonującego opisu wyników badań ... Następnie oczekuje częściowych sprawozdań zgodnie z harmonogramem prac ... Wreszcie w zaplanowanym terminie chce otrzymać produkt. Jednak pomimo upodobnienia do procesu produkcyjnego nauka pozostaje nieprzewidywalna. ... Co ma zrobić badacz, kiedy odkryje, że nie uda się zrealizować oczekiwań lub dotrzymać terminów? „Podkręcić" wyniki? To by było oszustwo. Uczciwie poinformować sponsora, że projekt nie wypalił? Ryzykowałby, że nie dostanie następnych grantów. A może, zanim złożył wniosek o grant, powinien był się upewnić, czy jego projekt da się zrealizować? Ale do tego byłyby potrzebne badania, które ktoś musiałby sponsorować

[Sponsor ... at first demands a convincing description of the results of research ... Then expects partial reports according to the schedule of work ... At last he wishes to receive the product in the appointed time. However, despite some similarity to the production process science remains unpredictable. ... What should the scientist do when the realization of the project or keeping the appointment proved impossible? "Correct" the results? This would be a fraud. Honestly inform the sponsor that the project failed? This would decrease the chances of success in the future grant applications. Or perhaps he should make sure that the project is workable before submitting the application? But this would need a study which somebody must sponsor] ŁUKÓW 2007.

Skretyniali urzędnicy układający formularze, na których należy planować badania naukowe nie zdają sobie chyba sprawy z tego, że tylko wyrobnik nauki może przewidzieć, jakie wyniki osiągnie za trzy lata, a choćby i za rok (albo dalej nic nowego, albo siedemdziesiąty ósmy wariant dawno znanego wyniku). Twórca nie wie, czy i co uzyska za miesiąc czy rok. Często nawet nie wie, do czego konkretnie dąży...

[Cretinous clerks inventing the forms on which to plan research, apparently do not realize that only a pot-boiler of science can predict what will be the results achieved after three years or even one year (either nothing new, or seventyeighth

version of what has been known since long). A genuine scientist does not know what (if anything) will he get after a month or year. Oftentimes he does not even know what is he aiming at] RUT 1995.

... *trzeba być zawsze czujnym i rozglądać się bacznie dokoła, bo najciekawsze rzeczy dzieją się niespodziewanie*

[... you must always be watchful and look intently round, because the most interesting things happen unexpectedly]

the bear Baloo [in *The Jungle Book*], wg.: MANKIEWICZ 2008.

... *grant proposals have to be „so doable they're already done"*. ... [Applicant] *must ask for support for work already completed and use new funds to develop research for the next proposal* STANLEY et HIGLEY 1997.

Dziś o sensie i przebiegu sympozjum decydują sponsorzy, wszak uczestnictwo ... musi być poświadczone referatem lub plakatem, nawet jeśli nie ma się nic do powiedzenia na dany temat

[Nowadays the sense and course of a symposium is being decided by sponsors: participation must be justified by a lecture or poster, even if one has nothing to say in the matter] FALIŃSKI 2004c.

One must be either very rich or fanatically devoted to be able, under the present circumstances, to effectively conduct serious scientific studies without "grants" and climbing rungs of "monkey ladder", and these are conditioned by fulfilling some criteria having one trait in common: lack of apparent relation to ***real scientific*** qualifications of a researcher or ***real scientific*** value of his/her work. The procedure starts with preparation of the project – of course according to more and more detailed, schematic form and indispensably "*on-line only*" – in which the applicant must describe (***before the beginning*** of research, and even before the decision making it possible to undertake it!) the program of work, schedule of start and completion of each partial task, costs (with detailed partitioning into various "clauses" and justification), results, form of publication, possibilities for practical applications, *&c.* Only a clairvoyant or impostor can answer these questions before the ***termination*** of the research, and thus – as the gift of clairvoyancy is rather rare among scientists – the majority is forced to a not quite honest composition of "scientific poetry" (the ancient Romans would say: *mundus vult decipi, ergo decipiatur*...) so as to look more or less probable but leave the chances to "lie oneself out" when the reality will not comply with our wishful thinking... One must also be a clairvoyant to foresee what the reviewers will give as the justification (if they will honour the applicant with any...) for rejection of the application: the reasons are oftentimes absolutely grotesque and, at that, mutually contradictory! Sponsor pays, sponsor demands? Well, on the one hand a governmental sponsor does not pay with its own money but with that of the "tax-payers" (including those "magnanimously sponsored" scientists!); and on the other, having paid for the air-ticket, have I the right (to say nothing of sense...) to enter the cabin of pilots and dictate them the route, altitude and speed of flight???

WHY IS THE BELL LOUD? BECAUSE INSIDE EMPTY!

Ut aliquid fecisse videamur

[To make appearance of having something done]

LACTANTIUS, *ex*: JĘDRASZKO 1990.

Jeśli nie chcesz czegoś zrobić, powołaj komisję aby nad tym pracowała
[If you wish something to be never done, call a committee to work on it]
NAPOLEON.

Lepiej robić małe coś niż wielkie nic
[It is better to do a small something than a big nothing]
Stefan KISIELEWSKI, *ex*: BLINKIEWICZ & DZIERŻANOWSKI 2005.

Prawdziwa sztuka nie lubi chadzać w parze z przejaskrawioną propagandą
[Genuine art dislikes to go hand in hand with exaggerated propaganda]
SKURJAT 1975.

Risum teneatis, amici?
[May you resist laughing, my friends?] HORATIUS, *ex*: JĘDRASZKO 1990.

To receive support for an individual, nowhere "attached" project is little short of an impossibility: application must be submitted either through some institution (even such a "freelancer" as me can – or at least some years ago could – apply for a grant (by the way, on glaringly discriminative terms) only under the "patronage" of this or that Department or Institute], or in the frames of one of Polish or "European" programs. The problem is, that those programs, as a rule far-flung and grandiosely formulated, in practice almost invariably turn out a proverbial "mountain that gives birth to a mouse": after the empty watchwords having nothing to do with science (like "fight against discrimination of women", "tightening of the cooperation between nations", "promotion of less developed regions" *&c.*) have been filtered out not very much remains – they finance mainly their own administration...

PARIAHS OF SCIENCE

All animals are equal, but some animals are more equal than others".
ORWELL 1989.

Malheureusement, – et ceci accuse plus que tout l'imbécillité humaine, – la persécution s'attache de préférence à ceux qui, loin de la mériter à aucun titre, ont acquis le plus de droit à la considération universelle
[Unfortunately, one of the most serious blames of human imbecility is the fact, that persecutions affect most often those who not only do not deserve this, but even have gained special right to general respect]
HOLINSKI 1853 [≈HOŁYŃSKI 1981].

Istnieją niezliczone pomniki przedstawiające badaczy. Jak dotąd jednak nie wystawiono jeszcze żadnego pomnika samej pracy badawczej. Gdyby kiedyś zechciano go wznieść, należałoby na cokole żmudnej pracy naukowej ustawić posąg zadumanego dyletanta z głową okoloną nimbem błędu. Od Kolumba po Schliemanna bowiem całe legiony dyletantów przeciągały polami wiedzy, błądząc i wątpiąc, tratując ziarna zasiane przez naukowców, wprawiając w ruch koło epokowych rozstrzygnięć. Ich przypuszczenia bywały często mylne. Przeważnie nie udawało się im odnaleźć przedmiotu swych poszukiwań lecz w zamian za to odkrywali nowe światy
[There exist innumerable monuments commemorating scientists, but hitherto not a single monument has been erected for scientific work as such. If, at one time, it is to be raised, placed on the plinth of arduous research should be a statue of pensive amateur with the head enfolded in the aureole of error. Indeed, from Columbus to Schliemann legions of amateurs passed the fields of knowledge, straying and doubting, trampling the seeds sown by professioal scientists, setting the wheel of epoch-making solutions. Their suppositions proved often erroneous, in most cases they failed to find the object of their quest, but in return they discovered new worlds]
WENDT 1960.

Dziwnym zbiegiem okoliczności wszystkie niemal podstawowe prace dotyczące istoty ciepła zawdzięczamy fizykom-amatorom, dla których fizyka była tylko ulubioną rozrywką

[By strange coincidence nearly all fundamental works on the nature of heat we owe to amateur physicists, for whom physics was but the favourite pastime]

EINSTEIN & INFELD 1998.

... the vast majority of the published records used in compiling the recent conservation reviews of many British insect taxa ... were generated by amateurs, even for taxonomically difficult taxa ... The loss of amateurs rather than professionals may have a disproportionate impact on conservation efforts for a number of reasons. First, amateurs are more widely distributed across the country than professionals and their activity therefore provides a better geographic coverage of the fauna. Amateurs are also perhaps more likely to generate background information of interest to conservation, since they are free to pursue whatever they find interesting

HOPKINS & FRECKLETON 2002.

Można zaryzykować twierdzenie, że nieprzypadkowo największy wynalazca w dziejach Thomas Alva Edison, posiadacz rekordowej liczby 1097 patentów, miał za sobą zaledwie parę miesięcy szkolnego wykształcenia

[We can venture the assumption that not by mere accident the greatest inventor in history, Thomas Alva Edison, owner of the record number of 1097 patents, had only a few months of school education] ORŁOWSKI 2004.

Choć ani Karol Darwin, ani Alfred Wallace, dwaj giganci ... światowej nauki, nie mieli nawet formalnych tytułów i nigdy nie pracowali w instytucjach naukowych, ich osiągnięcia są nieprzemijające

[Although as well Charles Darwin as Alfred Wallace, the two giants ... of the world science, had no formal degrees and were never employed in scientific institutions, their achievements are imperishable] RYSZKIEWICZ 1995.

Historycy twierdzą, że [LINNEUSZ] *był leniwym uczniem i daleko mniej interesował się nauką niż kwiatami rosnącymi w ... ogrodzie jego ojca. Jeśli tak było istotnie, to można powiedzieć, że już wtedy obrał właściwy kierunek przyszłej drogi życiowej. Gdyby był wykazał tyleż pilności ... co jego młodszy brat ... toby go niewątpliwie skierowano na studium teologii, aby mógł objąć ... następstwo po ojcu. A tak ... bujającemu w obłokach Kallemu nie pozostało nic innego jak ... wkroczyć na drogę, która uczyniła zeń jednego z największych synów Szwecji*

[Historians assert, that *[Linnaeus]* was a lazy disciple and showed much less interest in learning than in flowers growing in ... his father's garden. If it was truly so, we might say that by then he had already embraced the direction of his future way of life. Should he be as sedulous ... as his younger brother, ... he would have certainly been sent to study theology in order to ... succeed his father. And thus ... day-dreaming Kalle had no choice but ... to step on the route that made him one of the greatest sons of Sweden] WENDT 1960.

Możesz nie być uczonym, ale musisz być doktorem (doktorem habilitowanym)

[You need not be a scientist, but you must be a doctor (qualified doctor *[in the Polish system]*)] [NN], *ex*: WOLSAN 2005 *i.l.*

Almost all "europrograms" include (if not in the subtitle then at least in the description) a solemn declaration of the exclusion of any discrimination according to sex, age, nationality, place of employment, *&c.*, *&c.*, *&c.* These declarations look very nice, but unfortunately have not very much in common with much less amiable reality: in practice each program which I know anything about contains discriminative restrictions! The most frequently "disqualifying" factors are age and – especially – lack of institutional background. The sense and motivation of the aversion to those so-called "amateurs", only because they are not paid for their scientific work, is difficult to find (commonsense

would suggest them to be especially patronized) – perhaps the only explanation is the bureaucrats general hostility towards any aspect of independence...

HERETICS TO THE STAKE!

Obecnie naukowiec, którego poglądy różnią się od dominujących, szybko przekona się, że jego artykuły nie są drukowane w czasopismach naukowych, a aplikacje o granty hurtem odrzucane przez państwowych dysponentów funduszy. ... środowisko naukowców nie dąży w gruncie rzeczy do prawdy naukowej, lecz do tego, by wszyscy jej członkowie myśleli tak samo

[Presently a scientist whose views differ from those currently dominating, will quickly see that his/her papers are not published in scientific periodicals and grant applications are outright rejected by the governmental fund disposers. ... scientific circles do not, in fact, aim at the scientific truth, but at the situation where all their members would think the same] HOYLE 2001.

Pojęcie „geniuszu" było używane w różnym znaczeniu, ale ... w nauce jego najbardziej charakterystyczną cechą jest oryginalność

[The term „genius" was used in various meanings, but ... in science its most characteristic trait is originality] SELYE 1967.

Astronomia stanowi domenę chwilowych mód i fetyszy. ... Pod względem psychologicznym mody te przypominają zabawy dziecięce. W danym momencie wszystkie dzieci bawią się w jedną zabawę, a po jakimś czasie zapominają o niej całkowicie

[Astronomy is a domain of transitory fashions and fetishes. ... From the psychological viewpoint these fashions resemble children's games: now all children play a given game, some time later they forget it altogether] HOYLE 2001.

W swej naiwności Kago ... nie wiedział, że ludzie mogą zostać powaleni jedną ideą jak cholerą czy dżumą. Odporność na durne pomysły na Ziemi nie istniała

[In his simple-heartedness Kago ... did not know, that humans may be knocked down by one idea as by cholera or pestis. Immunity from foolish conceptions had not existed on the Earth] Kurt VONNEGUT, *ex*: BIEDRZYCKI 1998.

Zawsze jak miałem rację, byłem w mniejszości

[Each time when I was right, I was in the minority]

CHURCHILL, *ex*: GWIAZDOWSKI 2006.

Metoda naukowa polega na używaniu głowy, a pozatym wszystkie chwyty są dozwolone

[The scientific method consists on using your brain, otherwise everything is permissible] [Amer. physicist] P. BRIDGMAN, *ex*: NEWTON 1996.

Do ogólnej teorii nie prowadzi żaden czysto logiczny proces. Potrzebna jest ... intuicja wsparta doświadczeniem

[No strictly logical process leads to a general theory. Necessary is intuition supported by experience] EINSTEIN, *ex*: WOJTASIŃSKI 2006a.

The good systematist develops what the medieval philosophers called a ***habitus****, which is more than a habit and is better designated by its other name of* ***secunda natura****. Perhaps, like a tennis player or a musician, he works best when he does not get too introspective about what he is doing* W. R. THOMPSON, *ex*: SIMPSON 1961.

Im prymitywniejszy stan nauki, tym łatwiej uczonemu ulegać iluzji, że jest czystym empirykiem

[The more primitive the level of knowledge the easier a scientist yields to the illusion of being a pure empiricist] EINSTEIN, *ex*: PAIS 2001.

Rozum jest wiernym sługą, ale intuicja to dar boski

[Reason is a faithful servant, but intuition is a divine gift] NEWTON 1996.

Uczony bez zwariowanych idei (z których tylko co setna, może co tysięczna ma w ogóle jakiś sens) nigdy nie będzie liczącym się badaczem

[A scientist without crazy ideas (of which but every hundredth, perhaps every thousandth makes any sense whatsoever) will never count as a researcher]
KARCZEWSKI 1998.

Nie ma żadnej wątpliwości, że mamy przed sobą zwariowaną teorię. Zagadnienie polega na tym, czy jest zwariowana dostatecznie, żeby być prawdziwą
[Beyond any doubt we have to do with a crazy theory. The only problem is, whether it is sufficiently crazy to be true]
Niels BOHR [on HEISENBERG's teory], *ex*: PARNOW 1971.

Nauczmy się śnić, panowie, może wtedy odkryjemy prawdę
[Let's learn to dream, gentlemen, perhaps then we will discover the truth]
F. KEKULÉ, *ex*: ROUKES 2001.

Science is that domain of human activity for which all kinds of formal stereotypes, dogmatic rules, authoritative instructions act as especially dangerous poison – and nevertheless it is nowadays dominated just by stereotypes, dogmas and directives. Whether submitting a grant proposal, defending doctor's dissertation, or attempting to publish a paper in an obligatorily "peer-reviewed" journal, we must be aware that any deviation from the current fashion, adoption of somewhat unorthodox assumptions, application of a less familiar method, original interpretation, let alone unpopular subject or non trite form of presentation, drastically decreases the likelihood of success. One of the particularly "unshakeable" axioms is "*exact demarcation of aims and unequivocal formulation of the problems to be solved*" as a necessary precondition of effective work, although in fact excessive "exactitude" and "univocality" are neither needed nor even advantageous – to the contrary, except for some very narrow questions (which, however, rarely occur separately, usually appearing as particular aspects of broader reasearch programs), are in most cases decidedly harmful!

OBJECTIVITY, MODERNNESS, AND OTHER FETISHES

Obiektywność to marzenie podobne do marzeń o perpetuum mobile
[Objectivity is a dream like that of perpetuum mobile] ŁUKÓW 2006.

A methodology that generally avoids all ad hoc hypotheses may be most parsimonious, but certainly will have to be regarded as senseless BECHLY 2000.

Praca badawcza jest zawsze opanowana przez uprzednio powzięte idee – to jest przez hipotezy
[Research work is always dominated by beforehand conceived ideas – that is, by hypotheses] Karl POPPER, *ex*: DENBIGH 1979.

Powie ktoś, że wszystko to jest tylko hipotezą, i to nazbyt śmiałą. Ale nauka rozwija się tylko dzięki śmiałym hipotezom
[One can say, all this is but a hypothesis, and overly bold at that. But science is developing only through bold hypotheses] KRAWCZUK 1990.

[S. ULAM swoje uzdolnienia] *określał jako „mieszankę pamięci i wyobraźni, czyli tego, co składa się na talent w matematyce i naukach ścisłych". (Mogłabym dodać, że oprócz tego miał jeszcze sporo zdrowego rozsądku)*
[(*S. Ulam his abilities*) defined as a „mixture of memory and imagination, that is what makes the talent in mathematics and science" (I could add that, besides these, he had a lot of common sense]
[Stanisław's wife] Françoise ULAM, in: ULAM 1996: 333.

If you close the door to all mistakes, the truth will remain outside
Rabindranath TAGORE.

Choć może się to wydać paradoksalne, wszystkie nauki ścisłe opanowane są przez nieścisłe przybliżenia

[Even if this may seem paradoxical, all exact sciences are dominated by inexact approximations] Bertrand RUSSELL, *ex*: SINGH 1999.

[wybitny matematyk, Solomon LEFSCHETZ] *Wręcz gardził matematykami, którzy tracili mnóstwo czasu na podanie ścisłego dowodu czegoś, co dla niego było oczywiste. Mówiono, że nigdy nie podał poprawnego dowodu matematycznego, ale też nigdy nie ogłosił fałszywego wyniku*

[*(Eminent mathematician, Solomon LEFSCHITZ)* held in outright contempt those mathematicians who lost much time to find strict proof of something that for him was evident. It was said that he had never given a correct mathematical proof, but had also never published an erroneous result] WRÓBLEWSKI 2005: 76.

Bóg istnieje, ponieważ matematyka jest niesprzeczna; diabeł zaś istnieje, ponieważ nie możemy tego udowodnić

[God exists, because mathematics is uncontradictory; devil also exists, because we are unable to prove this] André WEIL, *ex*: SINGH 1999.

It is better to know some of the questions than all of the answers

James TURNER, *ex*: DESALLE & SCHIERWATER 2007.

Lepiej powiedzieć coś, nie będąc pewnym, niż w ogóle nic nie mówić

[It is better to say something without certainty, than not to say anything at all] FEYNMAN 1999.

De omnibus dubitandum

[Everything should be doubted] KARTEZJUSZ, *ex*: BRALCZYK 2004.

If I have seen further it is by standing on ye shoulders of Giants

I. NEWTON, *ex*: HELLMAN 1998.

Ahhoz, hogy a jövöben igazunk legyen, néha bele kell nyugodni abba, hogy elavultnak látszunk

[To be in the right later, we must sometimes put up with being seemingly outdated] RENAN, *ex*: D. KOSÁRY, in: NÁDOR 1986.

Słabe są dzieła ..., których główną zaletą jest nowość, cecha ta bowiem jest tą właśnie, która najszybciej się starzeje

[Poor are the works ... whose main virtue is newness, as this is just that feature which becomes most rapidly old] W. LUTOSŁAWSKI, *ex*: ??? 2008.

... a misperception that you are not doing real science unless you are doing it on computers

KELLY 2008.

The actual internal workings of these [phylogenetic] *programs, ... are likely to be incomprehensible to all but the most knowledgeable computer person*

WILEY 1981.

Ha a komputerbe értelmetlenséget táplálunk be, csak értelmetlenség jöhet ki. De, a tapasztalat szerint, ez az értelmetlenség, minthogy drága gépen megy át, valahogy rangot kap, és senki sem meri kétségbe vonni

[If we enter senselessness into a computer, only a senselessness could get out. But experience shows that such senselessness, since it has passed through an expensive machine, somehow acquires a dignity and nobody dares to call it in question] ANONIM 1975.

One, admittedly subjective, test of a phylogeny for a biologist is that it must make sense according to various ecological, biogeographic and behavioural criteria

HUYS & BOXSHALL 1991.

Wiemy więc jaka była produkcja, respiracja, P/B, K1, K2 czy budżet energetyczny zooplanktonu w tym [Mikołajskim] *jeziorze, brak natomiast podstawowych, wydawałoby się, informacji – jakie gatunki ten zespół tworzyły i jaka była ich liczebność*

[Thus we already know what was the production, respiration, P/B, K1, K2 or energy budget of zooplankton in this lake *[Mikołajki]*, yet we lack the apparently fundamental information – the species the community consisted of, and their numbers] EJSMONT-KARABIN & KARABIN 1999.

If the world is real, there is a single objective truth about it; if the world is scientifically cognizable, there is no fundamental reason for the results of our studies not to be in agreement with the objective reality; if the aim of science is to get knowledge about the world, then the ultimate criterion of the value of our research results is just that agreement. Of course we do not know the objective reality (if we do, there would be no need for research), so we cannot directly compare our conclusions to it, but we can more or less exactly estimate which of the available methods is most likely to bring us to the adequate – agreeing with the reality – results. And just that method a reliable scientist should – ***is obliged to*** – apply, irrespective of whether and to what degree it fulfils all the other (even if "in principle" desirable) conditions like objectivity or modernness. By the way, ***no*** method, ***no*** experiment, ***no*** argumentation is truly objective, never objective is also the comparison of the degree of their objectivity, so the requirement of "objectivity" as criterion for evaluation of scientific work is a pure illusion and most often leads to glaringly erroneous decisions. The preference of "modernness" is still more evident nonsense: should we cease to travel by train or car because airplains exist?; should binoculars, field-glasses and "classical" telescopes be scrapped as "relicts of XVII century" as soon as the radiotelescope has been invented?; should scientific journals reject papers in which the colours of flowers or butterflies have been described with traditional terms ("red", "green", "blue", *&c.*) because "modern" spectrometer analysis "ought" to be performed and the distribution of light wave-lengths given??? The method applied in research should be maximally ***adequate*** (lead as likely as possible to correct conclusions), and such – according to the purpose and subject of the study, the conditions it is performed in, the abilities of the scientist, and many other circumstances – is sometimes that more and sometimes that less "objective", sometimes that invented a month ago and sometimes that known already to ancient Egyptians!

DO YOU NEED CANNON TO KILL A MOSQUITO?

Nie mylcie... doskonałości waszych narzędzi ze znaczeniem waszej pracy. To wasze osiągnięcia, a nie ... narzędzia, powinny być godne podziwu
[Do not mistake the ... perfection of your tools for the value of your work. It is your achievements, not ... equipment, that should be admirable] SELYE 1967.

Jego [Linusa PAULINGA] *zdaniem porównanie metod przybliżonych z dużo bardziej dokładnymi wypada na korzyść tych pierwszych, gdyż metody ścisłe nie przyczyniły się do rozwoju intuicji fizycznej. ... W nauce dostrzeganie stopnia dokładności potrzebnej i uzasadnionej w danych okolicznościach stanowi ważną umiejętność*
[In his [*Linus PAULING's*] opinion the comparison of approximate methods with much more exact ones falls out to the advantage of the former, because exact methods do not contribute to the development of physicists' intuition. ... In science the assessment of the degree of precision needed and justified in a given circumstances is an important ability] NEWTON 1996.

Rozwiązanie każdego problemu statystycznego ma pogłębiać wiedzę biologiczną, a nie tylko po raz kolejny udowadniać matematyczny geniusz badacza
[Solution of any statistical problem should deepen our biological knowledge, and not only once again prove the researcher's mathematical genius]
Masatoshi NEI, *ex*: STIX 2005.

... we know too little to specify a realistic model of evolutionary change. Even if we could do so, it would not be mathematically tractable FELSENSTEIN 1984: 188.

The danger of statistical (and general of mathematical) methods ... is that their application gives a stamp of extreme exactitude and reliability to conclusions even if derived from faulty, though sufficiently numerous, data

B. P. UVAROV, *ex*: KRELL 2004.

Sceptyk powiedziałby: „Być może ten układ równań jest rozsądny z punktu widzenia logiki, ale to jeszcze nie dowodzi, że jest on zgodny z przyrodą". Masz rację, drogi sceptyku. Tylko doświadczenie może zdecydować, czy to prawda

[Skeptic would say: „Perhaps this set of equations makes sense from the logical viewpoint, yet this does not prove that it agrees with the Nature". You are right, dear skeptic. Only experiment may decide whether it is true]

EINSTEIN, *ex*: PAIS 2001.

Numbers are increasingly used as a substitute for real explanation FRYER 1987.

Wiele nowo powstałych prac to tylko zabawy matematyczne na marginesie problemów biologicznych

[Many recent works are but mathematical games on the margin of biological problems] DORST 1987.

Probably another manifestation of the strive for „modernness" is the so frequent "shooting at mosquito with a cannon": application of excessively complicated procedures where simple ones would perfectly suffice. The most popular "cannons" are sophisticated statistical tests (from which, at that, oftentimes nothing follows to the extent that the authors do not even try to interpret their results...), but to the same category of phenomena belong, among many others, determination keys based on characters difficult to check (*e.g.* demanding special preparations or great magnifications) when some of those seen "at a glance" are equally diagnostic, superfluously "overphilosophized" argumentation, *&c.* Such practices are not only unneeded but also harmful: markedly increase the probability of mistaken interpretation, frequently cause cumulation of errors, and first of all lead to the habit of uncritical acceptation of results as The Last Word of Science.

IDEAL SCIENTIST: MULTIDISCIPLINARY MOUNTEBANK

Niechaj każdy z nas poznaje trud pracy urzędnika, nabierze do niej szacunku i uległości, niechaj nauczy się wszystkiego, by jednakowo sprawnie pisać wnioski o dotacje, ścinać trzcinę cukrową, naprawiać kanalizację, nadzorować budynek, nabrać nawyku do pracy w kamieniołomach i w oddziale specjalnym. Przecież dzięki wszechstronności i zaradności najambitniejszych jednostek ludzkość szczęśliwie przeżyła okresy wspólnoty pierwotnej i komunistycznej, a nawet ma szansę do którejś wspólnoty powrócić

[Let all of us become acquainted with the pains of clerks' work, develop respect and submissiveness to it, learn everything to be equally competent in writing applications for funds, cut sugarcane, repair sanitation, supervise a building, work in stone-pits and in the special section. Indeed, it is just to the versality and resourcefulness of the most ambitious individuals that humanity owes the lucky survival through the periods of primitive and communist communities and even has a chance to return to one of these communities] FALIŃSKI 2004c.

... I did learn one big thing: that no one knows everything, and you don't have to

WEINBERG 2003.

Mistrzostwo względne we własnej specjalności ma za warunek nieuctwo względne w specjalności cudzej

[Relative mastery in one's own speciality is conditioned by relative ignorance in specialities of others] KOTARBIŃSKI 1986.

Let us not confuse the need for taxonomy to have multiple data sources with an expectation that the full range is generated by each taxonomist WHEELER 2008.

The current fashion of multidisciplinary science is good in principle, but ... is achieved more easily through transdisciplinary teams rather than multidisciplinary individuals. Into these teams the community of amateur taxonomists should be integrated, although their numbers appear also to be declining WHEELER 2008.

Ernst [MAYR] *was truly a non-technical person; the most sophisticated tool he used was a Dictaphone ... he did not even know the location of the keys on the keyboard ... Computers were out of question* BOCK 2007.

Po tem wyższego męża możesz poznać w tłumie
Że on zawsze to tylko zwykł robić, co umie
[In a crowd is knowable the superior man
By his habit of doing only what he can] MICKIEWICZ 19??

[MAYR's] *belief in himself rested on a realistic assessment of his own strengths and limitations, constraining him – unlike some other great scientists and many great musicians – to stay within his competence* DIAMOND 2007.

One more picklock that according to „managers" of science should open the gate to magnificent results is multidisciplinarity, conceived unfortunately not as (not necessarily formalized) cooperation between experts of various specialities, but as preferential support to scientists who "know" everything from the taxonomy of springtails to computer technologies and DNA-sequencing. Apparently not everybody managed to notice that the times of „jacks-of-all-trades" have irrevocably passed; the present-day science is so extensive, diverse and complicated a domain that even the medieval expectation that a scholar should know "*everything about something and something about everything*" is manifestly unrealistic: a contemporary scholar knows a good deal about his/her own (sometimes two, exceptionally three), as a rule not too broad group of problems, and almost nothing about others, whereas an attempt to master many at once inevitably leads to superficial and chaotic "knowledge" – "multidisciplinary expert" is in fact almost always a multidisciplinary dabbler.

ONLY DEAD FISHES SWIM WITH THE CURRENT

Wer sich zum Schafe macht, dem zerreissen die Wölfe
[Who behaves like a sheep, will be torn up by wolves]
Ulrich VON JUNGINGEN, *ex*: WÓJCICKI 1986.

Dawniej człowiek był w gruncie rzeczy tylko piłką w rękach ślepych sił; dzisiaj jest poza tym piłką w rękach biurokratów. A jednak zgadza się na to
[Man was formerly but a ball in the hands of blind forces; now he is also a ball in the hands of bureaucrats. And yet he accepts this]
EINSTEIN, *ex*: FALIŃSKI 2004c.

Niejeden z nas łatwiej porozumiewa się z urzędnikami niż ze swymi kolegami. Na początek staje się wraz z nimi tylko autorem lub współautorem bezmyślnych dyrektyw i wymyślnych formularzy do sporządzania planów i sprawozdań z badań naukowych
[More than one of us comes to a better understanding with clerks than with his colleagues. At the beginning he joins them as the author or co-author of thoughtless directives and sophisticated forms to prepare plans and reports from scientific studies] FALIŃSKI 2004c.

I, however, miss the determination of the scientific community not only to regain the lost freedom, but even trying to increase it. ... Instead, the scientists even deprive themselves of some of their freedom by introducing unscientific practices into science. To name a few:

- Introducing competition for replacing standards. Competition is a cheap measure of whatever performance. "Better" does not even mean "good" and science is too serious a matter for racing contests. ...

- Scientist minds fall too often to the temptations of programs or of rich but narrowly focused agencies ROHRER 2006b.

Aby dojść do czegoś naprawdę wartościowego w pracy naukowej, należy iść pod prąd opinii swojego środowiska. ... Trzymanie się powszechnie uznawanej opinii nic nie kosztuje, nie ryzykuje się reputacji. Przyjmowanie do wiadomości istnienia dowodów z nią niezgodnych, wskazujących na inne możliwe wyjaśnienia ..., oznacza narażenie się na akademicką wersję wytarzania w smole i pierzu. Jednak nie podejmując tego ryzyka, możemy być pewni, że jeżeli kryje się w tym coś nowego, nie my to odkryjemy

[To achieve something truly valuable in scientific work one must go against the current of his/her community's opinion. ... Adherence to the generally held views costs nothing, reputation is not at risk. Acceptation of contradictory evidence pointing to possibly different interpretations ... means exposure to the academic version of being rolled in tar and feathers. However, having not taken the risk, we could be sure that if there is anything new, it will not be us who will discover this] HOYLE 2001.

Aki az árral uszik, lefelé halad [Who swims with the current, goes down] BODNÁR 1989.

Ciągle utrzymuj pan statek przeciw fali. ... Przeciw fali, ciągle przeciw fali to jedyny sposób przebicia się przez burzę

[Keep the ship constantly against waves. ... Against waves, constantly against waves, this is the only means to break through the storm]

Captain MAC WHIRR, *in*: CONRAD 1957.

Hitherto we spoke about „external" conditions, about the limitations and perversions coerced by politicians, bureaucrats, consumer's community, *&c.* Unfortunately, the responsibility for that state of affairs falls to a significant degree upon scientists themselves, who – complying zealously, without opposition to all those "directives" – provide a convenient "*alibi*" for their authors and followers. Some of them do so because as a matter of fact just such a style suits them: they perceive the perspective of career in what prof. FALIŃSKI dubbed "surroundings of science" rather than in serious scientific research; the majority perhaps from simple opportunism and a feeling of helplessness: the slogan that "*the world will not conform to us, thence we must conform to the world*" looks outwardly so logical that it paralyses all the inclination to not only active resistance, but even expressions of disagreement. Yet, one moment of reflection suffices to realize that this slogan is senseless: would it be right, or would everybody think so (what, by the way, happened in the case of communism, and just therefore it persisted for so long...), villeins would still be obliged to corvée, children would work in coal-mines for fifteen hours daily, heretics would perish at stakes, and *crimen laesae maiestatis* would be punished by putting to the rack... After all, that "world" which we allegedly "must" conform to, consists also of ourselves, bureaucratic restrictions are imposed on us not by some allmighty Cosmites but by politicians elected by us, ministers more than one of whom is a former or even actual scientist, editors having mostly originated from among our colleagues!

ENVIOUS SCHEMERS BACKBITE, ENEMIES REJOICE

Whitehall jest miejscem, gdzie nie można swobodnie oddychać. Wszyscy wokoło siedzą w maskach tlenowych, przy czym nikt nie ma kontroli nad własnym dopływem tlenu, może jedynie przykręcić zawór komuś innemu
[Whitehall is a place where one cannot breathe freely. Everybody around sits in oxigen-masks, whereas nobody has the control over his own oxygen-intake, only can turn somebody else's valve off] A. COTTRELL, *ex*: HOYLE 2001.

Polska to taki kraj, w którym szewc z Białegostoku na wieść o tym, że krawiec w Wilnie wygrał na loterii 25 zł, chory z zazdrości kładzie się na trzy dni do łóżka
[Poland is such a country, where a shoemaker in Białystok, having heard that a tailor in Vilna had won 25 zł. at a lottery, sick from jealousy goes for three days to bed] [pre-WWII Vilna columnist] Zygmunt NOWAKOWSKI, *ex*: WINIECKI 2004.

Nie spodziewaj się ..., że twoje dzieło posłuży na coś innym; strzeż się raczej, by nie zaszkodziło tobie samemu
[Do not expect that your work will be of any service to others; rather beware lest they hurt yourself] DIDEROT, *ex*: FALIŃSKI 2004c.

Dzisiaj dużo łatwiej być przyzwoitym człowiekiem. Każdy bez trudu może się wznieść do wymaganego poziomu etyki, gdyż ten obniżył się do poziomu każdego
[Nowadays it is much easier to be a decent man. Everybody can rise with no trouble to the required level, because that has descended to the level of everybody] ŁYSIAK 2000.

Natychmiastowy sukces jest dla większości ludzi bardziej przekonujący niż rozważania o zasadach
[Immediate success is more convincing for most people than considerations about principles] EINSTEIN, *ex*: PAIS 2001.

Opportunism is an injurious sin, but envy and mutual „backbiting" is a rascality towards colleagues and a crime against science. If a specialist in one branch of knowledge describes (especially from the position of "authority" and/or "decision-maker") another branch as "*XIX-century philately for which it is useless to spend money*", if a representative of a fashionable "school" presents the traditional approach (or the opposite) as "non-scientific" (of course I have not in mind a *bona fide* essential discussion between professionals but spiteful appeals intended directly or indirectly – Polish people would say "*speak to the cap that the man should hear*" – for "science managers"), if advocate of one method urges the rejection of papers based on alternative procedures, this is – to quote TALLEYRAND's adage – "*worse than a crime: a mistake*": such a person not only "plays foul" with coleagues, but undercuts the branch he himself is sitting on: earlier or later the "decision-makers" will use the argumens of all belligerent parties to reduce funds for science in general...

TAXONOMIST: A PARTICULARLY ENDANGERED SPECIES

One of the most threatened species in world: the natural historian and general entomologist LEATHER 2008.

The museum tradition is dying. ... (Robert E. Ricklefs, 1980)
The museum tradition is not dying – it is being killed; strangled by the pervasive attitude that only theoretical and experimental approaches to biology are valid, by university departments that have eliminated evolutionary or morphological biology from their curricula, and by museum administrators who fill curatorships with ecologists, ethologists and chemists while their collections languish (Storrs L. Olson, 1981) MCALPINE 1996.

Many taxonomists find it possible to produce their most important syntheses and monographs only once freed from the constraints of regular employment NEW 1999.

There are already too few high-quality international journals willing to publish basic taxonomic research, in spite of the fact that the description and conservation of biodiversity is greatly dependent on such studies SLUYS & *al.* 2004.

In light of the recent revival of plans for space exploration with the explicit goal of searching for extraterrestrial life, it never ceases to amaze me how little interest there is in investigating organismal aspect of our own planet NASKRECKI 2005.

What I think must be avoided is, on the one hand, the pecking order in taxonomy that believes, for example, that cladistic analysis of a group is better than the description of new species and on the other hand the belief that only "applied taxonomy" should be supported strongly. In short, there must be a rejection of the idea that taxonomists and taxonomy can be considered only as a tool for allied sciences, rather than a discipline in its own right SLATER 1984.

Taxonomy is a science and not a created (stable) frame of reference KRELL 2004.

New idea that DNA barcoding can replace normal taxonomy for naming new species and studying their relationships is worse than bad, it is destructive WILL & *al.* 2005.

Taxonomy is at the same time the most elementary and the most inclusive part of zoology, most elementary because animals cannot be discussed or treated in a scientific way until some taxonomy has been achieved, and most inclusive because taxonomy in its various guises and branches eventually gathers together, utilizes, summarizes, and implements everything that is known about animals SIMPSON 1945.

The taxonomic literature ages ... slowly ... Moreover, ... is large and diffuse and a much greater fraction is potentially relevant compared with most sciences. A taxonomist cannot just ignore a paper published in an obscure journal in an unfamiliar language as other scientist might be tempted to. A description anywhere is a taxonomic hypothesis that needs to be considered GODFRAY & *al.* 2007.

Być biologiem nie znaczy pracować jako biolog, to znaczy: wybrać pewien sposób życia

[To be a biologist does not mean to work as biologist, it means: to choose a particular way of life] MAYR 2002.

The object of interest of taxonomy is the almost unimaginably diversified world of living creatures: the studies comprise the entire process from meticulous analysis of intra- and interpopulational relations to the, resisting any schematic approach, final synthesis in form of natural classification; neither the methods of research nor the results seem usually attractive to society (fascinated by technological gadgets and "sensations"); practical applications are rarely direct, evident for laymen, effect of work, and still less frequently appear within a short time; all this (and many other factors) makes this branch of science especially susceptible as well to all kinds of bureaucratic restrictions, formalisms and authoritative regulations as to evil-minded demagogy.

AM I A BONY FISH?

Kochany, dobry człowiek. Szkoda tylko, że nie ma nic do roboty. Traci czas na spacerach po ogrodzie i czasami przez kwadrans lub dłużej przypatruje się jednemu kwiatkowi

[Dear, good man. It is only a pity that he has nothing to do. He wastes time walking in the garden and often looking at a single flower for quarter of an hour or more] DARWIN's gardener, *ex*: GOŁEMBOWICZ 1968.

I want to emphasize that taxonomists should be proud of their support of such important disciplines as ecology and conservation biology. However, ... the best taxonomy is done for its own sake. It follows that the best taxonomic services are spin offs of taxonomy done for its own sake
WHEELER 2007.

As a scientist, you're probably not going to get rich. Your friends and relatives probably won't understand what you're doing. And ... you won't even have the satisfaction of doing something that is immediately useful WEINBERG 2003.

Without accurate descriptive work all branches of natural history would be ... unreliable
WHEELER & VALDECASAS 2007.

Kladyści kupują sobie możliwość obiektywizmu za cenę pomijania ważnych dla biologii informacji
[Cladists buy the possibility of objectivism at the expense of neglecting biologically important informations] GOULD 1991.

Your work, Sir, is both new and good, but what's new is not good and what's good is not new Samuel JOHNSON, *ex*: WILL & *al.* 2005.

In a [natural] *classification those characteristics of the elements which serve as criteria of membership in a given class are associated, universally or with high probability, with more or less extensive clusters of other characteristics*
C. G. HEMPEL, *ex*: MAYR & BOCK 2002.

The maxim by which all systems professing to be natural must be tested is this: that the arrangement obtained from one set of characters coincides with the arrangement from another set W. WHEWELL, *ex*: MAYR & BOCK 2002.

In their overwhelming majority the objects of taxonomical research are organisms unknown and/or uninteresting for non-systematists: while the question whether Floresian "hobbit" was a microcephalic modern man or dwarfish ape-man, or whether Africa is inhabted by one or two species of elephants, may arouse the curiosity of at least some "élite" part of the general public, description of a new species of beetle or ant (to say nothing about a nematode, copepod or mite) will hardly fascinate anybody. At that, the research methods do neither allure with intelligibility, nor excite with technological refinement, nor impress with mathematic precision. The appearance of chaos and inconsistency further aggravates – contrary to the declared intentions – the currently *en vogue* cladistic "ideology" with its hermetic terminology, entangled argumentation and queer conclusions: the assertion that a chick is a dinosaur – based on the same logic as the (adopted from BRUMMITT 2006) title-question of this chapter – or that *Latimeria* is more closely related to the chimpanzee than to lungfish or even herring, may for a while look attractively shocking (on this effect base their careers many of the contemporary "artists"), but after a moment of reflection the surprise abates leaving behind only the feeling of unreality...

NOT PHYSICS, NOT PHILOSOPHY: BIOLOGY!

Prawa [naukowe] *mogą istnieć wyłącznie tam, gdzie istnieją klasy tworów, których wszyscy członkowie są ściśle podobni do siebie, o ile nawet nie nieodróżnialni*
[*(Scientific)* laws may exist only there, where there are categories of creatures whose members are all closely similar if not undistinguishable]
DENBIGH 1979.

The authors of many ... papers ... thought that those approaches would be most successful that were based on some basic philosophical principles. We had adopted the same approach in our first endeavours. But none of our attempts was successful
MAYR & BOCK 2002.

... now and then scientists are hampered by believing one of the oversimplified models of science that have been proposed by philosophers ... The best antidote to the philosophy of science is a knowledge of the history of science WEINBERG 2003.

Czyż cała filozofia nie jest jak gdyby napisana miodem? Wygląda cudownie, gdy ją kontemplujemy, ale gdy przyglądamy się jej ponownie, wszystko gdzieś znika, pozostaje tylko paćka

[Doesn't all philosophy make the appearance of having been written with honey? It looks superb when contemplated, but as soon as we examine it again all vanishes somewhere and only a mash remains] EINSTEIN, *ex*: PAIS 2001.

Descriptive research provides the fuel on which the hypothesis-testing engine must run MARTENS & SEGERS 2005.

[In phylogenetic reconstructions] *Morphology is THE place to start, ... And morphology based trees are often needed to design the geographic and taxon sampling of a molecular tree. ... the most challenging task is the collecting and morphology. I can train any undergraduate to do the molecular studies. But one has to be an accomplished scientist to do a morphological phylogeny*

[molecular biologist] Prof. G.A. WYNGAARD 2008 *i.l.*

No system of weighing is perfect, but almost any method of weighing is preferable to using unweighed characters, that is, to give all characters the same weight MAYR & BOCK 2002.

Similarities: all else is rhetoric CRACRAFT 2000.

In historical studies like phylogeny, ... the imagination, properly disciplined by respect for evidence, has a very important part to play CROWSON 1982.

Lack of mathematical precision, relative inadequacy of all kinds of rigid "algorithms", largely intuitive hypotheses, expose taxonomy to the accusation of "backwardness" or even "unscientific" character – critics do not understand (all the more so as for many of them it is convenient "not to understand"...) that the reason is not "underdevelopment" but on the one hand enormous complexity and diversity of living organisms, on the other "historical" (as opposed to "deductive") nature of taxonomic problems: here we never have two identical processes, circumstances, individuals, and even the same individual every time looks and behaves differently.

CHAOS AS A PLEDGE OF STABILITY?

Nomina si nescis, perit et cognitio rerum

[If you do not know names, knowledge of things also perish]

LINNAEUS, *ex*: LEPERT & TURYN 2005.

The god Stability is unlikely to find a reliable servant in the demon Inconsistency

OLSON 1990.

A vállalatok nem azért múlnak ki, mert rosszul dolgoznak. A legtöbb vállalat azért bukik el, mert habozik, és nem kötelezi el magát egy irányba

[Businesses crash not because of poor work. Most of them collapse because they hesitate, do not keep to one direction]

[INTEL dyrector Andy GROVE], *ex*: MARX 2000.

[in taxonomy] *stability is ignorance* GAFFNEY 1979.

Seemingly simple formula like "taxonomic stability" or "nomenclatural stability" is a complex matter that ... need to be solved by taxonomists, not by arrogant outsiders of the field DUBOIS 2005.

Phylogenetic nomenclature ... offers many opportunities for interesting philosophical debate, but it is patently an absurd proposition as a practical system

BENTON 2000.

The PhyloCode rests on arguments that range from the misguided (e.g. that names should be immutable for hypotheses that change; ...) to the false (e.g. that the PhyloCode is more stable than the Linnaean system; ...) to the absurd (e.g. that the Linnaean system cannot convey evolutionary schemes because it predates Darwin). ... it may be fairly concluded that what the PhyloCode seeks to do does not need to be done and what it claims to do it does not. ... The community should, in my view, boycott the proposed meeting on the PhyloCode ... with deafening unity. There are many good reasons to go to Paris. This is not one of them

WHEELER 2004.

Accelerating considerably the effort of collecting and studying the vanishing species on our planet in the coming decades is certainly much more important and urgent than ... 'redefining' the nomina of the already known taxa ... DUBOIS 2008.

Similar effect to that of cladistic muddle result (also in drastic discordance with declared aims) from the activity of the Commission of Zoological Nomenclature: frequently changing rules (every few years a new Code), contradiction between the Principle of Priority announced in Preamble and "Principle of Posteriority" ("*current usage*") ruling in practice, arbitrary (and almost always incongruent with the respective Articles) Opinions, strict regulations in cases where they are absolutely superfluous (the ending "-i" vs. "-ii" in species names based on personal names, comma between the name of the author and date of publication, *&c.*) – all this gives only the impression of "art for art's sake", empty quarrels on imaginary pseudoproblems. In the last years this effect has been amplified by attempts to bring about a "Cultural Revolution" with total abandonment of hitherto applied rules of nomenclature and replacing them by "PhyloCode".

HOW TO MEASURE THE UNMENSURABLE?

Not everything that counts can be counted, and not everything that can be counted counts [NN], *ex*: WOLSAN 2005 *i.l.*

Nauka jest działalnością racjonalną, ale trudną do skodyfikowania
[Science is a rational activity, but difficult to classify]

SOKAL & BRICMONT 2004.

It is becoming increasingly difficult to publish the results of descriptive research projects, as international journals, ... increasingly shy away from it because it is thought that such papers are bad for impact factors MARTENS & SEGERS 2005.

Wkrótce zostaną nam tylko statystycy i entuzjaści genów, ale nie będzie biologów...
[Before long only statisticians and enthusiasts of genes, but no biologists will remain] GOLDSCHMIDT 1999.

All kinds of schematic, „parametric" assessment of scientific value of either scientists or their publications („citation index", „impact factor" *et consortes*) are to but a very small degree correlated with what they are intended to measure – this is like if we try to measure weight with a ruler: "others being equal" a longer object should indeed weigh more, alas! "others" (*e.g.* shape or density) are almost never equal, and therefore a lead ball of one cm. in diameter will probably be heavier that a 100 m. flaxen thread. In taxonomy the unequality of "others" is particularly evident: with a relatively very small number of systematists in the face of huge diversity of organisms, most groups are studied at a given time by very few specialists, and thence even

a very important monograph may not be cited for years or decades – the more so that original publications where the taxa mentioned in text had been described (or even those used for identification) are customarily not listed in references, and especially that only a handful of journals taken into account in calculation of "impact factors" accepts taxonomical works for publication...

PRIMUM NON NOCERE

Prawdopodobnie wczesny Wszechświat łatwiej jest zrozumieć niż najmniejszy żywy organizm. To przed biologami i ewolucjonistami stoją najtrudniejsze wyzwania
[Early Universe has probably been easier to understand than the smallest living organism. It is biologists and evolutionists who are facing the hardest challenges]
REES 1999.

Science progresses by transmitting, transforming, increasing and challenging knowledge, but certainly not by ignoring it, and the achievements of centuries of research in comparative morphology must not be ignored DAYRAT 2005.

The modest recommendation of Luckett and Hartenberger ... is well worth repeating: „We also recommend that the accumulated wisdom from 300 years of assessing cranioskeletal and dental characters be considered when collecting and evaluating molecular or other biological data BERGSTEN 2005.

Powinniśmy koniecznie przestrzegać dwóch uzupełniających się zasad: nie zaczynać niczego, czego nie potrafilibyśmy opanować, nie robić niczego, co mogłoby prowadzić do sytuacji nieodwracalnych
[We should anyway observe two complementary rules: not enter upon anything that we could prove unable to control, and not doing anything what could lead to irreversible situations] DORST 1987.

High-powered computation and software come low on the list after the meagre needs of traditional taxonomy are (barely) met KELLY 2008.

... after over 90% of the world's bird species have been described, is it logical to select an entirely new form of documentation? PETERSON & LANYON 1992.

Lepsze jest wrogiem dobrego
[The best is the enemy of the good] [NN].

If it ain't broke, don't fix it BENTON 2000.

Ludzie to lubią, ludzie to kupią, byle na chama, byle głośno, byle głupio!
[People will like this, people will accept this, just do it roughly, rowdily, foolishly!]
Wojciech MŁYNARSKI.

The alleged „backwardness" of taxonomy is a synergetic effect on the one hand (*e.g.* inadequacy of some philosophical dogmas and mathematically strict formulas) of the specificity of the subject, and on the other (strikingly little number of described and classified species in relation to the really existing ones, *&c.*) catastrophic (even in comparison to other – also notoriously impecunious... – branches of basic research) underfunding, but some "allies" apparently do not understand this, and rivals do not wish to understand (it is symptomatic, that the ***objectively*** non-mathematical structure of organismal science – so hardly cognizable to many biologists – for physicists is usually obvious...). False interpretation of this situation is a good medium for more and more frequently – in good or bad faith – proposed means to "improve" or "sanify" taxonomy, what unfortunately (but nor surprisingly: revolutions always, under the cover of ***seeming*** advantages, bring ***quite real*** destruction...) is as a rule a "medicine worse than the disease".

THE SHORTEST WAY LEADS OFTEN ASTRAY

Pół-środki i pół-życzenia świadczą tylko o połowicznych ludziach
[Half-measures and half-desires only testify to half-personalities]
NAPOLEON, *ex*: WOŁOSZYNOWSKI 1992.

... underlying the taxonomic impediment is the fact that life is complex ...No one said that study of evolution would be easy, and the "grandeur in this view of life" (Darwin 1859) will be lost if we take the easy way out TREWICK 2008.

I find little comfort in the increasingly frequent "refuge" taken by scientists in terms such as "morphospecies", or the rather superficial application of "new characters" or "new techniques" as panaceas to mask or analyse variability of largely unknown taxonomic and biological significance NEW 1999.

Even a single morphological character in most cases is likely a summary of many genes and thousands of base pairs, filtered by eons of natural selection and canalized by the hierarchy that results from a history of common ancestry. Such a rich, highly predictive, broadly explanatory understanding of species, ... offer an imminently more interesting and powerful approach to taxonomy than the comparatively easy but relatively uninformative and phenetic barcoding alternative WILL *& al.* 2005.

Users seem content with inferior products; "molecular taxonomists" with providing them WHEELER & VALDECASAS 2007.

Greg Venter, the leader of the Human Genome Project, has announced on one of the barcoding meetings that he can sequence 100 000 species per week. ... But ... which army of taxonomists will identify the 100 000 species that Venter will sequence every week? MARTENS & SEGERS 2005.

"Astute media management skills" were at play [in promotion of DNA barcoding]
F. SPERLING, *ex*: WILL *& al.* 2005.

At all stages (e.g. collecting efforts, sorting specimens, curating collections of vouchers, providing names), the construction of a centralized DNA-based system of identification would depend in part on the expertise of 'non-DNA' taxonomists
DAYRAT 2005.

As internet sites have no long-term permanency ... the text as it is today on this site may be unavailable to future readers. [It is a] *„phantom" text. Discussing this unpublished text in publications is similar to discussing phantom unpublished manuscripts* DUBOIS 2005.

In face of the disastrous delay (already at the descriptive stage) in biodiversity research, which suddenly became (at least in rhetoric and solemn declarations...) a fashionable watchword, increasing popularity gain seemingly reasonable proposals to "take a short cut": replace taxonomy by "parataxonomy"; study (performed by systematists) of real taxa by counting various (pigeonholed by technicians) "morphospecies", "RTU"-s ("Recognizable Taxonomic Units"), *&c.*; specialistic "holomorphological" analysis of hundreds or thousands of individuals by mechanical comparison of a scrap of some primary biochemical structure ("barcoding"); *&c.* Eventual implementation of these proposals, ousting scientific methods by pseudoscientific ones, may only result in disastrous degeneration of taxonomy, its degradation to the role of undereducated laboratory assistant, not too reliably performing simple services for farmers, medicals or "environmentalists"...

ARE BIOLOGICAL COLLECTIONS NEEDED?

Systematic work that does not rely on museum specimens to verify or falsify the identities of the taxa studied is not science WINSTON 2007.

Prima laus est humanae sapientiae, valde similia posse distinguere

[A major pride of human wisdom is the ability to distinguish between the very similar] ARISTOTELES, wg.: JAROCKI 1825.

Inquiries based on careful examination of museum skins spawn many unexpected and unanticipated surprises long after the specimens themselves are added to the museum drawers, ranging from delineation of new species or even new genera, to documentation of phenotypic change in short timeframes, to comparison of toxin levels over time KANNAN 2007.

Regardless of how much information in museums is databased or how many specimens are scanned and high-resolution images posted to the World Wide Web, the ultimate value of collections resides in specimens WHEELER 2004.

Considerable effort and money will be spent in digitizing images of type specimens. The rationale will be that this will make material readily available worldwide. It will be a spectacular failure, for no image can substitute for looking at the real object YOCHELSON 2004.

... taxonomist will consult the literature, the original description and those that follow. However, except in the case of common well-known species, specimens must be consulted, both those available at nearby museums and those that must be borrowed from more distance institutions to ensure that results are science, not fantasy WINSTON 2007.

The most important contributions to systematics and ecology during the last two centuries, from Richard Owen and Charles Darwin to J.B.S. Haldane and Ernst Mayr, were made by scientists who studied specimens STUEBING 1998.

Major reason that museums are not doing well today is that they have increasingly distanced themselves from their taxonomic roots WHEELER 2004.

... I know of a few "very modern museums" which have become so over-staffed with theoretical systematists or molecular biologists that even basic identifications of major groups of plants and animals cannot be done! NG 2000.

Because selection is the result of interaction between the individual morphology/physiology and the environment, comparative morphology will always be essential for our understanding of evolution WÄGELE & WETZEL 1994.

[In] *all molecular systematic studies, the strength of interpretation relies on comparative morphological data to make biological sense* HUYS & *al.* 2006.

... the famed Raffles Museum, ... repository of some of the most significant collections of Southeast Asian fauna in the world, suffered a serious, unsettling policy change in the early 1970s. The authorities ... abruptly decided that ... the zoological collections should be removed, given away to interested parties, or even thrown away if there are no takers. Only through a mixture of luck, and the foresight of several local zoologists did the collections survive ... STUEBING 1998.

A group of entomologists from a university in eastern Europe was trying to develop a molecular profile of different populations [of] *some dangerous groups of mosquitoes, especially those responsible for dengue fever. ... The intrepid team of researchers was taken to jail in handcuffs while working on Palawan ... Their ambassador had to travel down from Jakarta to secure their release. They left behind 22 vials of dead mosquitoes in alcohol – which presumably now are in the "black museum" of the environment department as a major triumph. At the same time Manila was plastered with posters on how to kill as many mosquitoes as possible in dozens of ingenious ways* LARSEN 2005.

... to save species is to study them closely ... WILSON 1992.

That „museum" collections (no matter whether „public" or private, under the only condition to be available for study to all interested biologists) provide the basis for all systematical, biogeographical or phylogenetical studies (and to a high degree for all the remaining branches of biology) seems so evident that I feel embarrassed to write

about this: it is as if I would specially explain that there can be no archaeology without exeavations, history without archives, or geography without maps... And nevertheless suggestions to restrict (or even almost totally wind up) them, or at least to make them accessible only or mainly in form of internet "databases", "digital" pictures *&c.*, appear in increasing frequency. Simultaneously collecting, transport and exchange of botanical and zoological specimens encounter more and more numerous and drastical bureaucratic restrictions, respective institutions (museums) have no funds (and usually do not show particular interest) for this while "amateurs" are by any means impeded and discouraged from keeping collections or even forbidden to hold any!

ROBOT INSTEAD OF SIENTIST?

Computer scientists think they can just walk in the door and solve things. But they come to realize you need biology too
[bioinformatics expert] Wyeth WASSERMAN, *ex*: PEARSON 2006.

It seemed incredibly easy to do very slick, hypermodern science: just grab a bunch of fossils, measure the hell out of them, crank them through the IBM 7090/7094 – preferably using one of the sophisticated multivariate statistical procedures – and voilà! instant answers, instant results, instant success ... there has been (and still is) a tendency (ineluctable in some quarters) to let someone else's algorithm (numerical procedure) massage your data (more often than not these days collected by a technician) as a substitute for careful thinking about either the data themselves or even the assumptions and apparent results of the computer analysis
ELDREDGE 1989.

The old adage "the closer to the gene the closer to the truth" simply does not wash ... The closer to the gene, the more chances there are to pick up nonhomologues that are structurally identical
WILEY 1981.

Continuing emphasis on the mere computerization of label data from museums and herbaria is misguided, ... there is limited benefit in rapid electronic access to unreliable data. There are so few taxonomists that for many diverse taxa, such as insects, revisions are completed only once ot twice per century. The challenge before us is thus not to computerize museum data but to have an efficient system and a sufficient number of taxonomists to support ongoing improvement and verification of data as well as making those data rapidly searchable
WHEELER 2004.

Unfortunately, the tenor of American life is conditioning the public and some scientists to the view that anything that is not on the Internet is insignificant and can be ignored. If this attitude expands, it will mark the eventual end of the natural history for as a consequence, a single classification, or a single illustration of an organism, or even a single interpretation will be continuously recycled through future generations
YOCHELSON 2004.

Many scientists (and still more non-scientists), fascinated with the achievements of present-day technology, begin to consider them the panacea that will solve all the problems, making traditional, "non-modern", tools and methods of taxonomic work outdated and superfluous. This is especially the case at the stage of interpretation, when with increasing frequency the computer has been treated not as an aid for the scientist's brain, but as a substitute allowing (or even coercing) one to switch the brain off: a computer evaluation of computer analysis based on models selected by computer and statistics calculated by computer, providing – in many instances unquestionably useful

– preliminary material for considerations involving all the other available evidence, has been instead attributed the status of the Revealed Truth relieving the author from the duty of thinking...

WHAT SHOULD BE DONE?

> *The fact that knowing all of Earth's species requires a large number of scholars is a reason to educate and employ taxonomists, not an argument to abandon scholarship in favour of theoretically vacuous technology* WHEELER 2004.
>
> *In the midst of a biodiversity crisis ... we should make species exploration, discovery and description an extremely high priority. We should make the growth and development of natural history collections as comprehensive evidence of species and clade diversity a high priority. And we should make the practice of taxonomy according to its very best theories and methods a mandate ... Instead funds flow to the latest molecular techniques that we seem to do only because we now can, not because they offer improved estimates of species or reference systems* WHEELER & VALDECASAS 2007.
>
> *We need a taxonomy that integrates the expertise, diligence, knowledge, passion and talents of teams of specialists, each contributing something unique and excellent to collaborative studies of taxa. ... If someone is a good collector and that is what he or she enjoys and excels at, then let us provide support for collecting. ... If someone is interested in comparative morphology, then let us support him or her to be the best morphologist he or she can be, and not require a dilution of good morphology by prescribed molecular laboratory work. If another is interested in molecular techniques, then let us sustain that interest, and so forth. ... Let us celebrate the diversity of interests and motivations ..., and not attempt to define what a good 'systematist' is* WHEELER 2008.
>
> *... paradoksalne; istnieje centralne archiwum sekwencji DNA oznaczanych w laboratoriach biologii molekularnej na całym świecie, ale nie ma podobnej bazy danych na temat organizmów, z których materiał DNA się otrzymuje*
> [...paradoxically, there exist central archives of DNA sequences identified in molecular biology laboratories all-over the world, but there is no similar database for the organisms the DNA material is being obtained from]
> LEAKEY & LEVIN 1999.
>
> *By ignoring the traditional jobs of taxonomy (describing and corroborating species and characters, making species identifiable, providing informative names and predictive classifications, and continually exploring biological diversity at and above the species level) it is only a matter of time until untested species, outdated names, or unimproved classifications lead to mistakes of enormous cost. A misidentified desease vector or pest species at a port of entry; conflated species with similar barcode genes but significantly different attributes; use of name that no longer reflects an accurate understanding of natural patterns; or misidentification of a study organism can contribute to decisions with disastrous consequences in applied or experimental biology. Must we witness such disasters before restoring support and resources in to taxonomy?* WHEELER 2007.

In the context of all these impediments, insufficiency (and especially discriminative distribution) of funds, bureaucratic regulations that drastically reduce the effectiveness of work, "innovatory" ideas of "sanators", *&c.*, astounding is not the fact that taxonomy is passing through a crisis, but rather that it has nevertheless managed to remain "above ground": that there are still some cranks willing to perform difficult but not respected work at their own expense or for a salary amounting to a fraction of what

could be earned in intellectually much less demanding professions; that the knowledge about biodiversity – at a pace that is very slow in relation to the needs but impressive on the background of available outlays and possibilities – from year to year increases; that not only (coerced by short-term grants and the necessity to keep position in the rat-race) "contributions to the knowledge of...", "serials" on in fact the same topic, and other narrow-scope reports, but also resulting from many years of intensive work, comprehensive monographs of large groups continue to appear; that many systematists have retained the ability to use their brains and treat a computer-generated cladogram (with all its statistical indices) as the starting point to interpretational considerations rather that as the final result (evtl. to be mechanically "transcribed" into cladistic classification); *&c.* But of course it is also true that the enthusiasm of a few "desperates" is by far not enough (especially in face of the horrifying tempo of destruction of natural environments and resulting extermination of organisms inhabiting them). What, in such situation, should be done? The answer to this question is of course a consequence of what has been written above: the effective antidote against the present crisis would simply be the reverse of the described trends and practices: restraint of bureaucracy; distribution of funds such that for science is assigned more than just the scraps remaining after administration and applications have been satiated; desistance from discrimination of taxonomy in general and particular [groups of] taxonomists in prticular; relegation of the choice of methods, form of presentation *&c.* to the specialist performing the study; braking the snobistic technological "armament race"; evaluation of scientists and their publications based on real scientific value instead of "objective" but inadequate indexes; withdrawal from wringing the "rat-race", to leave researchers some time to think; *&c.*, *&c.*, *&c.*

WHAT CAN WE DO?

It is time that taxonomists find their backbones. A series of compromises and accomodations in the 20th century only served to further marginalize taxonomy.
WHEELER 2007.

Posłuszeństwo względem złych przepisów to najlepszy sposób ich utrwalenia
[Obedience with bad regulations is the best way to fix them]
KOTARBIŃSKI 1986.

Kiedy się działa, można się pomylić, nicnierobienie zawsze jest pomyłką
[Acting one can make a mistake; doing nothing is always a mistake]
Romain ROLLAND, *ex*: LEWIN 2004.

Jak możemy dokonać rzeczy niemożliwej? – Z entuzjazmem
[How can we do the impossible? – with enthusiasm]
Paolo COELHO, *ex*: FALIŃSKI 2004c.

Sukces to przechodzenie od porażki do porażki bez utraty entuzjazmu
[Success is to pass on from one defeat to another without loss of enthusiasm]
Winston CHURCHILL, *ex*: SKALSKI & SUPRANOWICZ 2007.

Gutta cavat lapidem non vi, sed saepe cadendo
[Drops wear the stone, not by force but by falling frequently]
OVIDIUS, *ex*: JĘDRASZKO 1990 107.

To work in a science in a crisis state is a more challenging and inspiring enterprise for a scientist endowed with a creative spirit than it is to labor in a field developing quickly and "normally",
DOBZHANSKY 1964.

I believe that an antithesis is most easily provoked by a categorical statement of a thesis, and that the issue is most readily resolved by such a confrontation of an uncompromising thesis and antithesis and that the ultimate synthesis is thus most quickly achieved E. MAYR, *ex*: FUTUYMA 1994.

When the greatest taxonomic institutions support molecular genetics, conservation, and ecological studies at the expense of taxonomy, what are others to think of the importance of the latter? If taxonomy is not important enough for us to make our own top priority, why should any agency or individual seriously entertain supporting it financially? WHEELER 2007.

Így lettem "nehéz ember", ..., így lettem "konok ember", és a hátam mögött mondva "ostoba ember" is. De ember akartam maradni mindig

[Thus I became a „difficult man", ... thus I became a „stubborn man", and in talks behind my back also a "stupid man". But man I have always tried to remain]

MÁTYÁS 2005.

„Cóż jest trucizną? Wszystko jest trucizną i nic nie jest trucizną. Wszystko zależy od dawki (Dosis facit venenum)

[What is poison? Everything is poison and nothing is poison. All depends upon the dose (Dose makes the venom)]

T. P. A. B. VON HOHENHEIM (PARACELSUS), in: ANONIM 2008: 18.

Not very much depends upon a single "private soldier" of science, but among taxonomists there are also "captains", "colonels", and even "generals", and while we are indeed not very numerous there is nevertheless enough of us to be heard if we speak loudly and unanimously. Therefore first of all we should break the silence, cease to passively accept bureaucratic regulations, refuse to dance to an imposed tune! Any of us, according to the filled post, performed function, professional and financial situation, has different possibilities to influence the "rules of the game" and their implementation: minister or director by issuing proper regulations; editor, reviewer, member of a qualifying committee by justly and honestly evaluating other scientists' work; professor by sensitizing future researchers to these problems; such an old "professional amateur" as Roman HOŁYŃSKI by delivering lectures on related topics, discussing with colleagues, obstinately trying to push polemical papers like this through editorial obstacles; and all of us by preserving common sense and not yielding to fashionable but destructive "trends"... People "from time immemorial" dreamt of the "panacea" that would solve all problems simply and without effort: not only fairy-tales have their Aladin's lamps, magic wands and Golden Fishes satisfying every desire of the lucky angler, but also quite serious scholars quite seriously searched for the "philosophers' stone" or "elixir of immortality", casted horoscopes and organized séances, constructed *perpetuum mobile* and devised systems of universal happiness. Today we do not believe any more in the existence of the philosophers' stone, but many of us still cherish the secret hope that some modern version will appear: the actual "general" favourite is informatics, and in biology DNA-sequences, therefore more than one scientist or – still more frequently – "decision-maker" eagerly strives to replace museal collections with internet databases and transmission of digital pictures, species descriptions with barcodes, laborious studies of phylogeny of organisms with mechanical constructing of computer-generated branching patterns (cladograms) of this or that gene. One of the ancient philosophers, asked by the sovereign about easy means to acquire mathematical knowledge, answered "*sorry, Sir, there is no king's way to mathematics!*"; no such way leads to real

achievements in any other branch of science, either, and thus also biologists – and especially persons deciding the distribution of funds, filling museal posts, acceptation of submitted papers, *&c.* – must reconcile themselves to the fact that if they are serious about so frequently pronounced declarations of the necessity (or even only willing) to make the biodiversity known, then there is only one way to achieve this goal: very much (in relation to the present outlay, though still very little as compared to the sums spent *e.g.* on space research, corpuscular physics or just on genomics) money must be assigned for funding the studies of very many taxonomists, who must devote very much effort through a very long time to find in the field, collect, describe and classify these ten, thirty or perhaps hundred million (this we will really know only if we succeed in accomplishing the task...) plant and animal species that we may manage to discover before they are totally exterminated. There is – and will never be – any alternative way: panaceas and philosophers' stones do not exist! Does it mean that we should eliminate computer programs, molecular analyses and other achievements of contemporary technology from our studies, and keep working only with "quill and abacus"? Naturally (despite the derisions of some fans of "modernness") nobody suggests anything like this: barcodes and molecular clocks, PAUP and MODELTEST, interactive databases and Markov chains, all are very useful, undoubtedly each of them may serve as efficient remedy for some "illness", and thus not only may but of course should be applied. However, any medicine is potent only in specified situations and in optimal doses, and so should be adhibited only according to the doctor's [in this case: the scientist's doing the particular research] advice: if applied inappropriately or overdosed, a medicament – even that recommended in the best faith by the best friend – becomes a poison: "successful" curation ends with passing away of the pacient!

BITTER CONCLUSION: WHY ARE WE SO OBSTINATE IN REPEATING WELL-KNOWN MISTAKES?

Można wywieść z błędu tego, kto popełnił pomyłkę niechcący; ale od której strony dotrzeć do człowieka broniącego się przed zdrowym rozsądkiem?
[One can disabuse somebody who made a mistake inadvertently, but from which side should we approach a man shielding himself from common sense?]
DIDEROT, *ex*: FALIŃSKI 2004c.

Jeden uważa tak, drugi uważa siak, a większość nie uważa
[One thinks this, other thinks that, and the majority doesn't think] [NN].

Jedni ludzie piszą, a drudzy nie czytają; jedni mówią, a drudzy nie słuchają
[Some people write, others don't read; some people speak, others don't listen]
S. KULCZYŃSKI, *ex*: FALIŃSKI 2004c.

Prawdziwy postęp to umiejętność przeanalizowania i zrozumienia tych wszystkich błędów, jakie w jego imieniu popełniamy
[True progress consists in the ability to analyse and understand the mistakes which we make in its name] S. AGA KHAN, *ex*: ŁYSIAK 2000.

Doświadczenie pozwala nam popełniać stare błędy bardziej finezyjnie
[Experience allows us to make old mistakes with more subtlety]
Derwood FINCHER; *ex*: NOWAKOWSKA 2002.

...choćbyśmy nawet mogli stać się uczonymi uczonością drugich, mądrzy możemy być jedynie własną mądrością

[... even if we could become scholars with others' erudition, wise can we be only with our own wisdom] Pope Klemens VII, *ex*: Faliński 2004c.

Why run a planet without an inventory? ... It comes down to a reason that has remained unspoken: to create a world-wide biodiversity inventory would be against the best interests of that short-term oriented, but overwhelmingly effective triumvirate: politics, money, and power. If you don't have an inventory, no one will ever know you've run out of something (...) that you used to have in stock. ... From that point of view natural science collections and their researchers are dangerous enemies

Winston 2007.

Gdy sytuacja zrobi się dostatecznie niedobra ludzie podejmą nawet najbardziej oczywiste i sensowne kroki

[When the situation becomes sufficiently bad, people will take even the most evident and rational steps]

[Amer. biznesman and politician] George Shultz, *ex*: Winiecki 2005.

As the quoted excerpts show, all the matters referred to in this paper were already discussed many times by other authors, not a single statement is my „discovery", every argument was again and again set forth – and yet the crisis of taxonomy does not abate: indeed, it deepens! Why is it so? In my opinion to a significant degree because we speak about this too rarely, too timidly, and almost exclusively within our own circles: young MSc-s and PhD-s occupying lower grades of the hierarchy, whom the negative trends affect most painfully, have no immediate contact with "decision-makers", while older scientists, after having attained influential positions which assure them a relatively high degree of "immunity" to most of these difficulties and restrictions (some of them being, by the way, advantageous for the better situated...), perhaps lack the motivation to "fight windmills". Some hope could be perceived in the truth expressed by the last of the quoted citations: indeed, when the situation is already very bad, *Homo sapiens* [???] begins to think seriously on remedial measures. This is, however, a very bitter truth – at the stage sufficiently advanced to dispose the "decision-makers" to effective action it is usually too late: so it is with endangered species which we start to protect (of course I have in mind ***real*** protection, not "make-believe" – mostly counter-productive – interventions like the absurd multiplication of collecting bans) only when (as in the case of European bison) not a single wild individual remained (and none could have remained, as in the meantime we managed to destroy all the habitats in which it could survive as truly ***natural*** – not fed, not selected, *&c.* – element of biocoenosis); so it is with "demographic explosion", that has already led the world population to the multiplicity of what it should be, and even so politicians are anxious about... minimal decrease in some countries of the most overcrowded continent; so it is with "greenhouse gases", which should have been dealt with (much more seriously than is even presently being done!) half a century ago, because now we can at most (with great difficulties and at hardly acceptable costs) perform some cosmetic manipulations allowing in the best case to delay slightly the catastrophe or perhaps somewhat reduce its scale; such examples could be multiplied to infinity... Will the same be the fate of taxonomy, will its importance be appreciated only when the proportion of „known" (*i.e.* recognized and described) species among those still in existence approaches 100% without further studies: when those unknown (and the majority of the "known"...) have departed into the irrevocable past together with the natural environments they could have lived in?

Cierpka to mowa jak krew spiekła, czarna, ale w niej skryta myśl zbawienna leży:
Wszak wiecie, Bracia, z cierpkiego to ziarna dąb rozłożysty pod niebo wybieży!
[Bitter my sermon, like black clotted bloodscab, but salutary is the thought it launches:
Recall, my brethren: from small bitter acorn powerful oaktree spreads its mighty branches!]

Kornel UJEJSKI: *Maraton.*

THE SOURCES OF THE CITATIONS

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To survive or to flourish? Status and role of natural history museums in the biodiversity research.

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ABSTRACT. Natural history objects and collections have been of interest to mankind since the beginning of culture and civilization. Natural history collections, like other types of museums, have several general aims, but also specific purposes related to the kind of objects and specimens they preserve. Presently, during a time of biodiversity crisis, natural history collections and museums must rise to of new challenges. Another issue affecting natural history collections is the taxonomic impediment. Management changes related to computerisation affect museum activities. Several international initiatives, such as the EDIT or SYNTHESYS programmes, have arisen to face the challenges of modern natural history collection standards and management. Polish collections are facing the same challenges, but numerous other organisational, financial and legal problems affect their present status and future. One of the proposals to meet these challenges is The National Bank of Museum Zoological Resources– a consortium of institutions gathering and preserving zoological collections.

Key words: natural history museum collections, mission of the museum, collections management, types of collections, challenges for the museums, consortia of museums, biodiversity, taxonomy.

INTRODUCTION

Since the beginning of civilization, human treatment of natural resources has changed from purely utilitarian, as source of food, tools, adornments or garments, to institutional – specialised institutions devoted to the gathering and protection of various objects. Humanity's interest in nature, accompanying all of us up to present times, is the second element, inspiring the erection and development of museums, understood as institutions in recent meaning.

The fact that "collection-mania" is deeply rooted in human *psyche* is a truism. The same truism is an ascertainment of the fact that human contact with nature is a fundamental need and its necessity is deeply imprinted in humans' mind (MILLER 2005; STOKES 2006; SAMWAYS 2007). Thus, it is extremely difficult to trace when (and where) *Homo sapiens* first began to gather plants and animals, as both living and lifeless collections. The primary goal of the earliest object collecting was utilitarian, directly related to fulfilment of basic needs: food, tools, garments, etc. Also, aesthetic needs were important at these times, as demonstrated by rock paintings, adornments and ceremonies of ancient humans (POIKALAINEN 2001; IWAN 2007).

The term "museum" comprises a wide variety of institutions of different types. The term "museum" as related to an institution, does not always bears the same connotations. There are institutions not officially named "museum, " but fulfilling most or all of the duties, functions and roles of a museum. This wide and imprecise interpretation

of the term and function of a "museum" is also affecting the institutions protecting natural history objects and collections – natural history museums, independently of their name and legal status.

The first historical records of famous natural history collections are from the time of the Library of Alexandria – the Museion, Alexandria, Egypt (JOHNSON 1970; BRUNDIGE 1991). The *Bibliotheca a Museion Alexandrinos* functioned in the years 295 B.C. – 415. It comprised the Library of Alexandria, Museum, botanical garden and zoological garden. The institution was the research institute, gathering about a hundred scientists and founded by the authorities (firstly Egyptian, later Romanian). The central point of the institution was the Library of Alexandria. The most important achievements of the Museion were works of Euclides, Apolonius of Perga, Archimedes, Eratosthenes of Cerene, and Hipparchus. Later, the workers of the Museion were Ptolomaeus Claudius (astronomer), and Galen (physician), and the first know female scientist, astronomer and Neo-Platonic philosopher – Hypatia. She was the daughter of the last Director of the Museion, the great mathematician Theon; and she was killed by Christian fanatics, on the order of Cyril, bishop of Alexandria, later elevated to sainthood (BRUNDIGE 1991).

The first public natural history museums were established in Europe. The museum in Bologna (Italy) was founded on the collections of ULISSES ALDROVANDI (1527–1605), gathered in his "Il Teatro della natura". Subsequently, in France, the natural history museum (currently known as the Museum national d'Histoire naturelle) was established by the edict of King LOUIS XIII, in 1626. It was established on the collections gathered by King's brother – GASTON JEAN BAPTISTE DUC D'ORLÉANS and the collection of the royal garden of medicinal plants (Le Jardin royal des plantes medicinal). The present Natural History Museum of Denmark in Copenhagen was founded in 1655, from the "cabinet of curiosities" of the OLE WORM, known as "Museum Wormianum". The famous collection of the Natural History Museum in London has its origins in the private collection of HANS SLOANE, bought for a symbolic amount of twenty thousand pounds by the British Parliament (1753). This institution was historically a private one, but is now public. The natural history objects were also collected earlier, since medieval times, as collections of curiosities in churches and monasteries, private hunting trophies, collections of alchemists, and pharmaceutical cabinets. Later, the establishment of natural history collections of scientific value was intimately connected with the development of scientific institutions and societies, and private natural history collections (IWAN 2007).

THE PURPOSE OF NATURAL HISTORY COLLECTIONS

The establishment and expansion of museums and similar institutions was related to civilization and social development, and to the establishment of various scientific disciplines. The common use of museum objects and materials (specimens), in research in botany, zoology, palaeontology, anatomy, histology, genetics, biochemistry, cytology, etc. led to the introduction of special methods of preparation, conservation and preser-

vation of the specimens, tissues or products of living organisms. In addition to these historical specimens, preserved in the "traditional" way (pinned insects, stuffed birds, alcohol preserved specimens, etc., see the frame below), "modern" types of collections (e.g. samples on Whatman leaves, frozen tissues, etc.) now exist.

NATURAL HISTORY COLLECTIONS

Traditional collections:

- herbarium sheets
- whole dried specimens, e.g. macrofungi
- samples of wood
- dermoplastics, mounts and skins
- rough skins, bones
- pinned insects, insects glued or pinned on cardboards, etc.
- "wet" collections – preserved in various preservative liquids
- fossils (natural compression and impression fossils, casts, ichnofossils)
- inclusions in fossil resins
- impressions and casts of original specimens

New types of collections:

- collections of seeds
- living collections – microorganisms and tissues cultures
- samples of organisms and their tissues frozen in liquid nitrogen
- samples of genetic material
- voucher specimens of molecular research
- banks of molecular and genetic sequences
- banks of morphological and anatomical images
- banks of geographical data

Two global processes bring new attention to the importance of natural history collections deposited in museums. The first phenomenon is the biodiversity crisis, (the "sixth extinction ") (WILSON 1992, 2004; MORELL 1999; ELDREDGE 2001; MYERS & KNOLL 2001), the violent pressure exerted by human activities on the environment, rapid destruction, disappearance and transformation of habitats and last untouched remnants of nature. The second is the taxonomic impediment (GODFRAY 2002; WHEELER 2004; ENGHOFF & SEBERG 2006; EVENHUIS 2007; SZWEDO 2007). Description of biodiversity is lagging far behind **1**) discovery of new biodiversity, and **2**) loss of biodiversity.

The term "taxonomic impediment" was used by the Union of Biological Sciences IUBS/Diversitas to describe the lack of taxonomic expertise and information necessary to handle the enormous task of identifying and naming biodiversity (HOAGLAND 1996). In recent years there have been a number of different opinions on what to do about the slow rate of publication of new species descriptions. Numerous papers on the taxonomic impediment and respective responses appeared recently (WHEELER et al. 2004; LYAL & WIETZMANN 2004; MARTIN 2004; GEETA et al. 2004; CAUSEY et al. 2004; YOUNG 2004; CARVALHO et al. 2005; FLOWERS 2007a, b; EVENHUIS 2007). Some see the impediment as

a complex interaction of low funding and slow adoption of new molecular techniques and informatics, others see it in the work habits of individual taxonomists (WHEELER et al. 2004; EVENHUIS 2007; FLOWERS 2007b). While the specific details of this impediment remain contentious, it is universally agreed that we still lack adequate taxonomic expertise to describe the biodiversity on this planet. Also the system of funding research, which is very competitive and disposed to rapid and attractive results, raises problems for basic research disciplines like taxonomy. Anyway the point identified, remedial measures undertaken could show results after long time (BoD EDIT REPORT 2008). Despite a strong emphasis on the importance of natural history collections, many of them, particularly those associated with museums and academic institutions, have recently experienced painful budgetary shortfalls (DALTON 2003; FROELICH 2003; GROPP 2003; SUAREZ & TSUTSUI 2004).

The consortium known as CETAF – Consortium of European Taxonomic Facilities (www.cetaf.org) is a networked alliance of scientific institutions in Europe formed to promote training, research and understanding of systematic biology and palaeobiology. Together, CETAF institutions hold very substantial biological (botanical and zoological), palaeobiological and geological collections and provide resources for the work of thousands of researchers in a variety of scientific disciplines. CETAF aims to provide access to the information and expertise of its member institutions by improving the efficiency of their taxonomic facilities through co-operation. In support of its aims, CETAF will act as a forum for the exchange of information and policies, working towards co-ordinated activities. The objectives for co-operation cover the following areas:

- Digitisation of collections and associated information, in line with agreed priorities.
- Development of information services for scientific, commercial and public use.
- Promotion of training for systematists, both at the academic and at the technical levels.
- Improvement of curation and conservation of collections.
- Improvement of access to collections for visiting researchers and other workers through common procedures and assistance routines at each of the members' facilities.
- Co-ordination of those scientific policies and other initiatives that will benefit from a common approach.
- Submission of joint funding proposals that will contribute to the previous objectives.

A number of CETAF members, or national consortia in which CETAF members play leading roles, have, since 1998, received support through the European Commission's Framework Programmes to enhance transnational access to their collections, equipment and expertise. Two huge initiatives arranged by CETAF are presently ongoing: SYNTHESYS and EDIT.

SYNTHESYS – Synthesis of Systematic Resources (www.synthesys.info) is a CETAF Integrated Infrastructure Initiative (EU 6th Framework Programme) for years 2004–2009.

The aims of SYNTHESYS are:

1) to provide transnational access grants to CETAF natural history museums and botanical gardens, and
2) to carry out Networking Activities focused on creating a single "virtual" museum service.

SYNTHESYS aims to raise scientists' awareness of best practices in handling and sampling collections by offering improved training and workshop opportunities, and guidelines for the care, storage and conservation of collections. It will create an integrated European resource; bringing together the biological and geological collections held by major natural history museums and other institutions. It will ensure that our collections and knowledge are shared and used to the maximum benefit of all; it will allow the partnership institutions to set the highest possible standards in collection care and take on the responsibility for ensuring their long-term availability. Co-operation from natural history institutions in states outside the European Union will be sought, to ensure that best practises and standards for collection management and access are developed on a global basis. A European Collections Standards Network (ECSN) should encourage the active participation of all European countries in the long-term preservation, targeted development and wide use of their collections and inherent information.

A CETAF Network of Excellence in Taxonomy (EU 6th Framework Programme), is provided for years 2006–2011. EDIT – Toward European Distributed Institute of Taxonomy (www.e-taxonomy.eu) is a project with aims:

1) to integrate taxonomic effort within the European Research Area, and
2) to build a world leading capacity.

The project will create a European virtual centre of excellence (EDIT), which will increase both the scientific basis and capacity for biodiversity conservation.

Project EDIT will aim to co-ordinate the European contribution to the global taxonomic effort with the Global Taxonomy Initiative (GTI), in and outside Europe, through:

1) production of new knowledge;
2) search to ensure complementarity of expert capacities through coordination of training and recruitment strategies;
3) the provision of the skills necessary for a taxonomic task force for inventories;
4) developing a programme of expert training both to enhance skills and to fill gaps;
5) implementing the integrated information infrastructure to feed the Clearing House Mechanism and the GBIF, which provide the general portals for access to taxonomic and other biodiversity information worldwide;
6) making the information housed in the collections and the taxonomy based on them better available to the countries of origin.

There are also several other CETAF related research projects, including:

ENBI – European Network for Biodiversity Information, with aim to make biodiversity data accessible through an integrated shared information infrastructure;

ENHSIN – European Natural History Specimen Information Network, with aim to enable the development of a shared, interoperable infrastructure of natural history specimen databases in European institutions;

BioCASE – A Biological Collection Access Service for Europe, with aim to establish a web-based information service providing users with unified access to biological collections in Europe;

FAUNA EUROPAEA – with aim to assemble a database of the scientific names and distribution of all living multicellular European land and fresh-water animals;

Euro+Med PlantBase – The Euro+Med PlantBase provides an on-line database and information system for the vascular plants of Europe and the Mediterranean region.

There are several initiatives around taxonomy and collections; however, attention is currently focused on "modern taxonomy", when so-called "traditional" taxonomy is marginalised. Even if more and more attention is paid to the taxonomic impediment the situation will not improve soon. Several problems surrounding taxonomic activities were discussed at international symposium "Future trends of Taxonomy organised by EDIT in Carvoeiro, Portugal, 21–23 January 2008. The problems of taxonomy and collections and taxonomy in collections are related to very different issues: human, organisational, institutional, funding and assessment. Some people describe themselves as taxonomists, but their taxonomic knowledge is very shallow. Playing with samples, rapid results, fast hypotheses are seen as more „modern" and useful than long-term research, based on collections, specimens, many years of experience and knowledge of the group, which modernises slowly and is believed to be unattractive, ineffective, and unfashionable. The challenges for both taxonomies (modern and classical) could be exemplified by the topics of plenary lectures:

- "A renaissance of insect morphology – μ-Ct and other innovative techniques" – Rolf Beutel (University of Jena, Germany).
- "Ancient (Museum preserved) tissues and DNA" – Matthew Collins (University of York, UK).
- Tissue & DNA storage and sharing: BRCs networking" – Manuel Morente (Cancer Research Center, Spain).
- "Field work: the need to scale up and adjust to new constraints" – Philippe Bouchet (MNHN, France).
- "Environmental sequencing" – Jeroen Raes (EMBL, Heidelberg, Germany).
- "Phyloinformatics – integrating everything" – Roderic Page (University of Glasgow, UK).
- "Uniting supertrees and supermatrices to derive the Tree of Life" – Olaf Bininda-Emonds (University of Jena, Germany).
- "New sequencing techniques" – Miguel Alvarez (ROCHE, Spain).
- "ZooBank and Zoological Nomenclature" – Ellinor Michel (ICZN, UK).
- "Zoological nomenclature: some urgent needs and problems" — Alain Dubois (MNHN, France).
- "Developments and threats in taxonomic research: a summary from statements

by leading European taxonomists and phylogeneticists" – Klauss Klass (Museum of Zoology, Dresden, Germany).

- "From field records to a sustainable taxonomic knowledge base: new approaches and opportunities for efficient biodiversity inventories" – Christopher Hauser (State Museum of Natural History, Stuttgart, Germany).
- "DNA taxonomy" – Alfred Vogler (NHM, UK).
- "DNA sequences in taxonomy: empirical performance, opportunities, and pitfalls" – Rudolph Meier (National University of Singapore, Singapore).
- "Initiatives for Improving Systematics: Attitudes, Impediments and Opportunities" – Diana Lipscomb (George Washington University, USA).

The future of taxonomy in the digital era has been discussed widely in recent years (Polaszek et al. 2005a, b; Wheeler 2007, 2008). There are lively discussions about the need for clear rules concerning electronic publication of nomenclatural acts as governed by the ICZN Code. There are attempts to set new standards for taxonomic publishing and incorporation of some already accepted, user-friendly features such as embedded hyperlinks, e-referencing, etc. Proposals as Open Access, does not seem be widely accepted, as taxonomy is concerned, although at least descriptions of taxa should be placed firmly in the public domain (Agosti & Johnson 2006). As a business model, Open Access journals is often termed "author pays but everyone can read at no charge," instead of traditional "publisher pays but everyone has pay to read" (Suber 2003, 2007). More immediate recognition of an article, its higher visibility and citation rate (Lawrence 2001; Antelman 2004; Eysenbach 2006) could be an advantage of Open Access journals. However, publication fees in Open Access journals form a strong barrier to taxonomic research, in particular when (very often) the model "author pays, readers also pay" is applied (Penev et al. 2008). More attention is now being paid to this challenge, in the form of high-level decisions to avoid and resolve the underlying problems. At the Council of Europe Meeting in Brussels on 22–23 November 2007, the Council emphasised "*the strategic importance of Europe's scientific development of current sustainable models for open access to scientific information*". Furthermore, in the same document the Council recognised that "*effective and long-lasting digital preservation of scientific information is fundamental for the current and future development of European research*" and invited the Member States to ensure by 2010 that "*repositories of scientific information are sustainable and interoperable*" (2832nd COMPETITIVENESS – Internal market, Industry and Research). Then authors are not expected to pay out of pocket, but rather from research grants, foundations, and institutional funds. This policy is already included in the budget plans of several funding agencies in the U.S.A. and Europe. However, with respect to taxonomic research a few problems are identified, e.g. copyright issues and intellectual property rights, limited institutional and grant resources in this field of inquiry, fewer possibilities for funding of privately-working taxonomists or retired taxonomists, who can produce excellent results but have no institutional bodies backing them to cover the costs, and revolutionary and rapid changes occurring in the transition from the Web to Web2.0 (Agosti et al. 2007; Penev et al. 2008). Other issues of taxonomy in digital era, widely

discussed, include the necessity and institutional status of a proposed universal register of new taxa within a central repository – ZooBank (www.zoobank.org) and mandatory registration of names in this database, data storage and links to repository of biological images documenting specimen based research – MorphBank (www.morphbank.net), a bank of morphological images and data – MorphoBank – Homology of the Phenotype Over the Web (www.morphobank.geongrid.org). Changes in taxonomy and taxonomic research, changes in virtual environment, changes in legal statements, changes in institutional duties and aims, affect also the museums and collections.

MUSEUMS AS TOOLS FOR RESEARCH

The modern museum and natural history collection should act not only as a repository but also as a tool for research. Besides of preservation of natural history objects and specimens, elaboration of collections, *stricte* scientific doings, the important issue is accessibility of information about collections and specimens. It is directly related to changes in collecting, retrieval and circulation of information and political changes as well. The biodiversity data accumulated for years were ready to be absorbed by global informatics systems. It is possible thanks of museum traditions, codified rules of nomenclature and hierarchical classification systems elaborated by taxonomy. The system of information circulation about collections must be multidirectional: between curators, taxonomists, specialists, users and producers of information. Such system could serve as a starting point for the creation of "virtual museums", as numerous libraries do now.

The institutions preserving the collections face several tasks:

- ❖ to gain over the objects;
- ❖ to gather and accumulate the objects;
- ❖ to preserve for recent and future research;
- ❖ to render accessible specimens and information about them.

Gaining over the specimens. Natural history objects could be obtained from various sources, field collecting, exploratory expeditions, or by purchasing collections of specific and unique value, or by acquiring collections from amateurs.

Gathering the specimens and materials. Natural history collections are the place for gathering the materials broadening the research base. **Accumulation of the collection is one of the main aims of every museum.** As opposed to scientific institutions, the museum gathers specimens not for current research purposes, but is also a deposit for next generations of researchers. Museum institutions should be designated for deposition of the materials gathered in non-selective samples, as well as information about these specimens and samples. The collection of such samples should be done with methods preventing even the tiny details and genetic features from destruction. Then another challenge for natural history collections is elaboration of methods of such collecting, making possible its use in future research activities.

Preservation. The specimens and samples gained over and deposited in museum institutions should be preserved as deposit for future research. The important issue

is the choice of method of preservation, enabling its use with the most modern and sophisticated research techniques. These samples must be preserved using methods enabling e.g. DNA extraction, then frozen in liquid nitrogen, preserved from external damage and contamination, in this way enabling use of Scanning Electron Microscopy, X-Ray Microtomography, Nuclear Magnetic Resonance techniques, or newer, rarely used methods, as synchrotron radiation techniques.

Making collections and data open to the public. One of the primary aims of museums and collections is throwing collections open to the public and offering facilities for researchers. This aim could be accomplished thanks to new information techniques, databases and systems of database management, digitisation of the specimens (type specimens in particular) and digitisation of data about collections and collectors. Lack of necessity of physical integration of specimens in the single, central institution, is of great importance. Elaboration and use of a single unified protocol for accessing collections and collections data is enough. Such a protocol enables substantial, remote curatorship on a particular collection led by a single specialist.

Globalisation as well as communication and information revolutions stimulate a change in performance of duties by natural history museums. Under the pressure of new technologies, necessity of its use comes not only in exhibitions or in didactic activities, but also to collections, to activities as gathering, elaboration and throwing the data on scientific collections. In the modern world, information is the central commodity, then the importance of natural history collections increases and natural history museums are revived as scientific institutions. The information gathered in their collections bears various forms and levels of knowledge, which could be ordered as follows:

1. DIRECT DATA, i.e. specimens of organisms, their parts and products. This level includes morphological and anatomical data, biochemical, cytological and genetic data. These data types demand special methods of conservation and preservation, as well as special storage of research material methods.
2. INDIRECT DATA, i.e. results of observations (collecting data, collector data, expeditions, special collections in the museum, names of the taxa and names of the people working with these materials; not published catalogues and lists; observation data from the field on biology, ethology, ecology, etc. of the specimens).

Both levels of data are of great importance for authors' collections, historical collections and recent collections, in particular to the collections housing rich type materials or unique at the world's scale collections. There are several unique and extremely precious collections deposited in Polish institutions, i.e. palaeontological collections of plant remains or collections of amber and its inclusions. Also a few historical collections, believed to be lost, are still preserved in Polish institutions. These collections should be digitalised, i.e. preserved as 3-D images in digital format and digitised, i.e. all additional information and data concerning the specimen (labels, notes, original sketches and drawings, original descriptions, etc.) must be available in digital format. Information about status of the collections and abundance of the most precious and important collections must be available. Biodiversity data, and collec-

tions data are already prepared for such action, for absorption into global information system. Thanks to museum tradition, codified rules of nomenclature, and 18th century savants the change from simple text data from labels, catalogues, notes and lists into electronically available data has been possible.

COLLECTIONS IN POLAND

There are several different types of natural history collections in Poland: scientific collections, educational collections, exhibition collections. These collections are deposited in institutions with different organisational and legal schemes:

- ❖ museum of varying status;
- ❖ university collections;
- ❖ collections of research institutes;
- ❖ collections of national parks.

From a legal and formal point of view, natural history collections in Poland are under the authority of different departments: Ministry of Culture and National Heritage, Ministry of Science and Higher Education, Ministry of Environment.

In this respect, the situation clearly differs from the position and status of natural history collections in the other European countries. Some countries, such as the United Kingdom, France, and Germany, with long and well established traditions and huge collections have one leading institution. Some other, smaller countries as Belgium, The Netherlands, Austria, Czech Republic, Slovakia, Hungary, with one national collection or with collections more dispersed produced consortia of institutions known as National Taxonomic Facilities. Why the consortia? The reason for establishing National Taxonomic Facilities are few. For example, the possibility of application for financial support from the European Commission for acting and development could be an example. The possibility of competition on one side and co-operation on the other with the huge institutions is important as well. NAFs established in smaller countries, with dispersed collections, allow them to be a real partner (and competitor), and permit the formation of real partnerships with leading European institutions.

Therefore, what are the aims and duties of natural history collections in Poland facing the global biodiveristy crisis? Is natural history museum management in Poland sentenced to senility? Or the strategy "just to survive" should be applied? Or contrary, maybe a "golden age" for natural history collections and museums will come? Which solutions should be promoted in Poland? Should the system of dispersed institutions and collections be maintained and supported; or central institution should be created? Should we establish a national natural history museum? Or rather consolidate the various institutions as a National Consortium? These questions remain unanswered. However, in present situation a National Consortium seems to be more reasonable solution than centralisation of collections.

POLISH WAY? – NATIONAL BANK OF ZOOLOGICAL MUSEUM RESOURCES

In year 2007, the National Bank of Zoological Museum Resources (Krajowy Bank Muzealnych Zasobów Zoologicznych) was established in Poland. It is scientific network, consortium of a few institutions, which could be a primer for the "virtual museum" in Poland. The consortium was established by the following institutions:

- Museum and Institute of Zoology, Polish Academy of Sciences in Warsaw;
- Institute of Systematics and Evolution of Animals, Polish Academy of Sciences in Cracow;
- Faculty of Biological Sciences, University of Wrocław;
- Faculty of Biology, Adam Mickiewicz University in Poznań;
- Institute of Biology, University of Gdańsk;
- Faculty of Biological Sciences, University of Zielona Góra;
- Department of Natural History, Upper Silesian Museum in Bytom.

The aims of the consortium are:

- Creation of a databank of zoological collections and a databank of specimens and taxa. This allows introduction of Polish institutions and researchers to world's initiatives as Assembling Tree of Life (AToL; www.atol.sdsc.edu), MorphoBank - Bank of Images and Morphological Data (MorphoBank – Homology of the Phenotype Over the Web; www.morphobank.geongrid.org), MorphBank – Bank of Digital Images of the Specimens (www.morphbank.net).
- Corroboration with the CETAF consortium www.cetaf.org – Consortium of European Taxonomic Facilities); Creation of the Polish Virtual Zoological Museum (PVZM), which should be a consortium of the Polish institutions storing collections and the research tool. This enables wider access and inclusion to the large scale European initiatives as SYNTHESYS (Synthesis of Systematic Resources, www.synthesys.info), EDIT (European Distributed Institute of Taxonomy, www.e-taxonomy.eu). This will be support for Polish institutions and researchers to programs and resources funded by EU.
- Strengthening and better use of research potential of Polish scientific and research institutions and museums. Support for gaining over, gathering, long-term preservation, conservation of zoological specimens and materials for broadly understood taxonomic research and related molecular, physiological, biochemical or ecological studies, directly related to practical use.
- Erection of bank of data about resources of Polish zoological collections. The bank of data will include inventory of materials available for DNA studies, widening of storage possibilities of such materials (e.g. deep freezing) among members of the consortium and co-operation with institutions providing DNA research, including other scientific networks and institutions.
- Modern natural history exploration of world's areas of biggest importance and potential value for nature conservation, biodiversity hot spots and zoological refugia. Inclusion of Polish institutions to the group organising and providing biodiversity protection and conservation initiatives.

- ❖ Standardisation of methods of collecting, gathering, preservation and cataloguing of the specimens, samples and collections. In particular, the methods enabling DNA studies, and use of modern methods of physical-chemical, morphological analyses, as well as physiological, cytological, histological, etc. Also the studies on new types of collections and the methods of their creation and preservation (e.g. DNA samples, tissue samples, etc) are to be conducted and elaborated, and available to scientific society.

Poland is the only European country in which a national natural history institution does not exist. There are several reasons for this unfortunate situation (IWAN 2007). The zoological collections gathered in Poland have different historical origins and different institutional placements in institutions of various traditions, possibilities and legal status, including Ministry level. Thinking realistically, there is no availability to change this situation in nearest future and taking into consideration formal possibilities. Anyway, it is necessary to think about the future steps.

The National Bank of Zoological Museum Resources (NBZMR) is an initiative to cover in part the aims of a central zoological museum. Particular points of interest to NBZMR are: to organize modern system of information flow and data accessibility of the collections gathered; to elaborate an organizational model for collections and specimen conservation methods, which fill modern research needs and purposes; to organize a system of acquiring new collections and scientific data, particularly from the areas enlisted in world's programs of biodiversity protection (e.g. All Taxa Biodiversity Index and Monitoring, ATBI+M led by the EDIT Work Package 8); to strengthen the position of Polish museum institutions worldwide and their abilities to co-operate with international research initiatives. We believe these organizational and information flow changes are the way to not be marginalized by national and international funding bodies, the way to improve fulfilment of the great scientific potential of Polish institutions and researchers.

The NBMZR consortium aims also to gather and order in digital format the information about type materials deposited in Polish collections. It is a challenge in the era of globalisation, of changes in museum functions and purposes, enforced by the modern world and society. Other aims are to overcome the taxonomic impediment and to incorporate researchers, institutions and their data, similar to the projects Assembling the Tree of Life (AToL), Encyclopedia of Life (www.eol.org), MorphoBank, etc., by the digitisation of collections and collections data. These actions also help to accelerate dissemination of the results of taxonomic and museum research, as e.g. easier identification of pathogens or fulfilment of CITES convention rules. The utility of the estimated 16 million specimens and samples gathered in the consortium institutions, the number of active researchers and hundreds of visitors accessing and working in these institutions has great potential. In our opinion the Polish Virtual Zoological Museum could be a "product" of the consortium, an outcome of their corroboration. Living in the era of global extinction of organisms, the natural history museum must be involved in biodiversity research and biodiversity protection. We believe that there are two main streams of activity of these institutions and their consortia in biodiversity studies:

Direct museum activities

- ❖ involvement in expanding specimen holdings and collections at various scales (global inventories, elaboration of faunas and floras of endangered areas and "biodiversity hot spots", geographical scale (both global and local studies) or time horizon (palaeontological studies);
- ❖ elaboration and introduction of specialised methods of conservation, preservation and storage, which enable future research using modern physical-chemical and molecular methods;
- ❖ cataloguing and elaboration of own collections including inventories and monitoring initiatives and studies.

Scientific activity

- ❖ basic taxonomic research (alpha taxonomy), systematic revisions, phylogenetics;
- ❖ studies of local floras and faunas, in co-operation with national and local scientific societies and organizations;
- ❖ studies of history of changes and transitions of floras and faunas in historical and palaeontological aspects (palaeoarchaeology, archaeozoology, palaeontology, palaeobotany, palaeozoology, palaeoecology);
- ❖ monographic studies, studies on biology and life history of organisms (known in 1% of known organisms!).

Museums are facing new challenges as a result of global changes in nature and society, as well as changes in legal issues surrounding environmental and biodiversity protection. It is not only the gathering and preservation of specimens, but also the establishment of new types of collections, which will be needed by the future generations of researchers. Unified standards of collections management, close co-operation among institutions and specialists, joint activities at local and global scales, elaboration of the new techniques of preservation and research, and widening the user's base – these are the challenges currently facing the National Bank of Zoological Museum Resources consortium.

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Description and significance of the Herbarium of the University of Silesia (KTU)

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ABSTRACT. The topic of the paper is the Scientific Herbarium of the University of Silesia (KTU), which currently contains over 130 000 specimens and 3500 plant species. Its history is presented, its present status is described and its significance and utility are discussed. The paper also contains remarks on plans for its future and aims for development.

Key words: herbarium, plant collection, University of Silesia, KTU.

INTRODUCTION

The KTU Herbarium holds a vast collection of preserved plant specimens gathered during more than 30 years. The collection represents most of the native and alien plants species in Poland of all plant groups - flowering plants, conifers, ferns, mosses, fungi, lichens, liverworts and algae. The specimens collected are from all parts of the world, but the greatest strength of the Herbarium are plants from Poland, especially from Upper Silesia, where the research has been focused.

HISTORY

The Scientific Herbarium of the University of Silesia (KTU) is about 35 years old. By Polish standards, it is a herbarium of an average size with regard to the size of its collection. The Herbarium started in the early 1970's within the Institute of Biology directed by Professor FLORIAN CELIŃSKI. In 1972, Professor KRZYSZTOF ROSTAŃSKI began his scientific patronage of the Scientific Herbarium at the University of Silesia. After his move from the University of Wrocław, he donated his collection of flora of Lower Silesia and its surroundings to the KTU. Owing to this donation, the collection of the Scientific Herbarium at the University of Silesia increased by about 10 000 specimens (ROSTAŃSKI & KRAWCZYK 1993). In 1974, due to KRZYSZTOF ROSTAŃSKI's efforts as its first Curator, the Herbarium of the Department of Plant Systematics at the University of Silesia was included into the international list of scientific herbaria (Index Herbariorium), being granted the acronym symbol of **KTU** (HOLMGREN et al. 1990), and also into the *Polish Herbaria* (MIREK 1990; MIREK et al. 1997). After certain reorganisation at the University of Silesia in 2002, the Faculty Laboratory of Botanical Documentation with the Scientific Herbarium started functioning at the Faculty of

Biology and Environmental Protection. Due to these changes, the Laboratory of Botanical Documentation with the Scientific Herbarium was removed to the Chorzów Campus of the University of Silesia (Chorzów, 75-go Pułku Piechoty), adapted with a financial contribution from the European Union. At that time, the herbarium collection was removed from its temporary storage location at the Department of Plant Systematics on Jagiellońska St. in Katowice. The organization of the Laboratory was possible thanks to the funds obtained through investment and equipment grants awarded by the State Committee for Scientific Research. Removing projects, transfer of the collection and reorganisation of the herbarium was done thanks to the efforts of Dr. ADAM ROSTAŃSKI, who has been the director-curator of the Laboratory of Botanical Documentation and the Herbarium (KTU) since 2002.

In May 2002, the official opening ceremony of the Laboratory of Botanical Documentation took place together with a scientific session on the "Importance of Herbarium Collections in Botanical Research".

In the autumn of 2001, the task of organising the existing collection of the scientific herbarium was initiated (with ca. 100 000 herbarium sheets in the collection at that time). This extremely arduous and responsible work involves entering all data into a computerised database.

The organisation of the Laboratory with Herbarium and its current activity has been based on a team of scientific workers and graduate students of the Department of Plant Systematics (Faculty of Biology and Environmental Protection, University of Silesia). The activity of the Herbarium currently involves systematic management and organisation of the hitherto gathered and steadily increasing collection (herbarium documentation of research projects, doctoral and master's theses, material collected during field trips and expeditions in Poland and abroad), entering data into databases, continuous conservation of specimens obtained in through exchange or as gifts, and at the same time rendering the collection accessible to researchers. The contemporary regular activity of the Herbarium consists in: exchanges with researchers, revisions of particular collections or specimens, and inclusion and conservation of new collections, updating and verification of data documentation.

The collections of the Herbarium are constantly enlarged through field research conducted by researchers, students, and through gifts, acquisitions, and exchanges of specimens from other herbaria.

Since 2005, the Laboratory of Botanical Documentation and Herbarium KTU has been a member of the Polish Biodiversity Information Network (PolBIN – KSIB), being a part of the Global Network: GLOBAL BIODIVERSITY INFORMATION FACILITY – GBIF.

DESCRIPTION OF THE COLLECTION – CURRENT STATUS

The total number of herbarium specimens in the Herbarium of the University of Silesia is more than 130 000 (more than 3 500 species and about 1 000 genera) and includes vascular plants (110 000 specimens), mosses and myxomycota (c.a. 20 000

specimens) (in 2008). The greatest part of the KTU collection documents botanic scientific researchers from the Silesian University and includes materials from areas where the research has been conducted. The most important and advanced research subjects studied at the Department of Plant Systematics and KTU-Herbarium are:

- flora of Upper Silesia (Southern Poland);
- taxonomy and chorology of chosen taxa of vascular plants (e.g. families: Onagraceae, Valerianaceae, Euphorbiaceae, Orchidaceae, Poaceae, Asteraceae etc.);
- monitoring of neophytes and analyzing their current status in the Polish flora.

The KTU collection also includes material from inter-herbarium exchange and private donations. The geographical origin of the specimens is Poland (Lower Silesia), the Mediterranean Region, Eastern and Western Europe, the Arctic, North America and Cuba, Asia: the Middle East and Yemen.

The biggest collection is an interesting one of Cuban plants collected by Prof. Krzysztof Rostański in the years 1981-1982 and 1989 during the expeditions of the Jardin Botanico National in Havana to various regions of Cuba. The collection of ca 2000 specimens includes Cuban ferns, vascular plants and especially grasses and species from the *Ludwigia* genus.

Table 1. A list of special collections and the main donors of the KTU collection (private and institutional); * – collection in prepare

Name	Organisms	Size Specimens	Region
Krzysztof Rostański	vascular plants	3 000*	Cuba, Russia, Western Europe
Abdul-Nasser al Gifri	vascular plants	1 000*	Yemen
Florian Celiński	vascular plants	1 500*	Canada, USA, France,
Stanisław Cabała	vascular plants	700*	Morocco, Algeria, Turkey, Iran, Spain, Peru
Jerzy Zygmunt	vascular plants	170*	Norway, Chile
Barbara Tokarska-Guzik	vascular plants	400	Croatia, Mediterranean Region
Adam Rostański	vascular plants	500	Eastern (Caucasus) and Western Europe
Andrzej Sendek	vascular plants	5 000	Poland - Upper Silesia
Paewł Szotkowski	vascular plants	1 500	Poland - Lower Silesia
Jacek Drobnik	vascular plants	915	Southern Poland
Kazimierz Nowak	vascular plants	756	Southern Poland
Antoni Tabacki	Myxomycota	900	Southern Poland
Flora Silesiaca Exsiccata	vascular plants	500	Poland – Lower Silesia
Flora Silesiaca Exsiccata	lichens	200	Poland – Lower Silesia

The unique feature of the KTU Herbarium is one of the biggest *Oenothera* L. collections in Europe. The Herbarium holds a collection of more than 12 000 specimens,

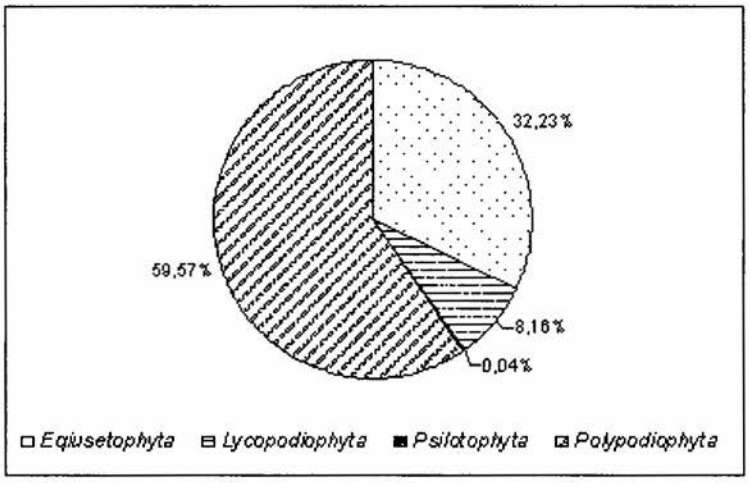
which is the result of the research conducted by Prof. K. ROSTAŃSKI. The collection of *Oenothera* L. in the KTU Herbarium is significant because of its contents – about 40 taxa (species, subspecies, varietas) and 9 holotypes i.a.: *Oenothera acerviphila* ROSTAŃSKI; *Oe. issleri* RENNER & ROSTAŃSKI; *Oe. italica* ROSTAŃSKI & SOLDANO. The largest part of the *Oenothera* collection registers botanical scientific research conducted in the whole Europe: from Eastern Russia to Portugal, and from Scandinavia to Italy, Turkey. The result of this over - 40–year long research is more than 90 publications, including so contributions as whole chapters of significant books. Among others, Professor ROSTAŃSKI has contributed to the Flora of German publications – chapters: "*Oenothera* L." in "Standardliste der Farn – und Blütenpflanzen Deutschlands" (WISSKIRCHEN R., HAEUPLER H., 1998) and "*Bildatlas der Farn und Blutenpflanzen Deutschlands*" (HAEUPLER & MUER 2000), and "*Oenothera* L. – Nachtkerze" in "*Exkursionsflora von Deutschland*" (ROTHMALER 1976, 1994, 2002, 2005). A very important outcome of research conducted by Prof. K. ROSTAŃSKI in Eastern Europe was the book published in 2004 – "*The Genus Oenothera L. in Eastern Europe*" (ROSTAŃSKI et al. 2004).

Professor ROSTAŃSKI retired in 2005, but he is still active and works on his collection and on the species from the whole of Europe sense to him for his critical review.

The activity and accessibility of the Herbarium is beingimproved thanks to its Computer Data Base, which is in construction. The approximate number of collections already catalogued is over 66 000 records (2008 status). These data are being constantly adapted to the standards of electronic publication. Until till now the following specimens of particularly groups have been digitalized: Equisetophyta, Polyopdiophyta, Lycopodiophyta, Pinophyta and Liliopsida class (mainly Poaceae family – grases). The database of the Magnoliopsida class is being constantly enlarged and filed according to a system of classification based on the alphabetical order of genus names of plants. 60% of the database has been entered so far.

The digitalized collection of Pteridophytes (Polypodiophyta, Lycopodiophyta, Equisetophyta, Psilotophyta) consists of 2 570 specimens as of 2008. In 2004, the collection of the Pteridophytes contained 2,100 specimens representing 44 genera and over 130 taxa (ROSTAŃSKI et al. 2004). At present, the Pteridophytes are represented by the Equisetophyta – 825 specimens, the Lycopodiophyta – 212 specimens, Polypodiophyta – 1 532 specimens. The Psilotophyta group is still represented only by one specimen from Cuba. Since 2004, the collection has been enriched by some rare species of flora of Poland: *Botrychium matricariifolium* (RETZ.) A. BRAUN & D .J. KOCH, *Dryopteris remota* (A. BRAUN *in* DOLL) DRUCE, *Dryopteris expansa* (C.PRESL) FRASER-JENK & JERMY, *Polystichum lonchitis* (L.) ROTH., *Asplenium septentrionale* (L.) HOFFM., *Diphasiastrum alpinum* (L.) HOLUB, *Diphasiastrum issleri* (ROVY) HOLUB.

The collection of Coniferophytes (Pinophyta) has been enlarged since 2006 (ROSTAŃSKI et al. 2006) by almost 500 specimens. At present (2008 status) it contains 1 697 specimens representing 28 genera and over 100 taxa and subspecies. The group of rare genus with single specimens includes, among others: *Araucaria*, *Athrotaxis*, *Cephalotaxus*, *Cuninghamia* and *Torreya*.



1. Percentage of divisions of the digitalized collection of the *Pteridophytes* in the KTU-Herbarium (2008 Status)

The third completely digitalized collection – the Poaceae family (grasses) - is an important part of the herbarium specimens. At present (2008 status) the collection of grasses represents over 8 500 specimens, being one thousand exempla more than in 2006 (Bzdęga et al. 2006).

Significance and utility of the KTU collection

For the last five years the KTU Herbarium has been one of the most active herbaria in Poland. It receives frequent requests for loans of plants from different institutions. Various visitors from Poland and abroad come to study specific groups because of the phytogeographic significance of the collection.

Such a vast collection is very useful in teaching ecology and floristic botany. Many students from Silesia visit the Herbarium every year. Moreover, students from the Department of Plant Systematics obtain their initial training in systematics by working with the staff and using the herbarium collections.

The KTU possesses wide documentation of the current flora of Upper Silesia, which is related to two database projects: ATPOL and ATPOL SILESIA lead by Dr. B. Tokarska-Guzik, the present head of the Department of Plant Systematics. It is the biggest collection of plants from Southern Poland. The flora of Upper Silesia is unique because of its origin – this is the biggest territory in Poland with the area modified industry.

The investigations conducted by a group of scientists from Silesian University have been aimed to estimate the changes that have taken place in Upper Silesia. As a result, the

KTU Herbarium holds a vast collection of plants from unique anthropological habitats – for example, the flora of heaps, the urban flora or many alien and invasive species which prefer such habitats. It is rich material for further investigations of expansions or changes of flora that have taken place in these unstable habitats.

One of the main purposes of the Herbarium is collecting specimens which should be available for further investigation. Being a member of the PolBIN gives the Herbarium an opportunity to integrate all data gathered by many people in one format. So far, due to the low accessibility, the data has not been used in scientific studies. Since 2008, the data of the KTU collection referring to *Pteridopytes, Pinophta* and *Liliopsida* are available on the Internet for everyone on the KSIB or the GBIF web-site.

Presently, the staff are involved in adapting the database of the Magnoliopsida class to the standards of electronic publication. It should be noticed that the bulk of work of the Herbarium is performed only by regular staff members. However, their work is supported by voluntary students. The database should be completed by the end of 2008.

In the century of very intensive development of biotechnology, the role of the Herbarium should be understood properly. The Herbarium provides the best basis of proper identification of investigated material. The herbaria collections should not be underestimated, as they provide researchers with interesting material to compare species, to take biometrical measurements, to answer many questions about the past and the changes of the state of flora which have taken place in our times.

CHARACTERIZATION OF THE COLLECTION OF THE KTU HERBARIUM
(SYSTEMATIC ORDER AFTER TAKHTAJAN 1968, 1997).

DIVISIO (PHYLUM)	
CLASSIS	
Family:	*Genus* (number of specimens).
EQUISETOPHYTA	
EQUISETOPSIDA	
Equisetaceae:	*Equisetum* (849).
LYCOPODIOPHYTA	
ISOËTOPSIDA	
Isoëtaceae:	*Isoëtes* (7)
Selaginellaceae:	*Selaginella* (8).
LYCOPSIDA	
Huperziaceae:	*Huperzia* (26).
Lycopodiaceae:	*Diphasiastrum* (23), *Lycopodiella* (17), *Lycopodium* (131).
OPHIOGLOSSOPSIDA	
Ophioglossaceae:	*Botrychium* (34), *Ophioglossum* (20).
Aspidiaceae:	*Dryopteris* (538), *Gymnocarpium* (87), *Polystichum* (45), *xDryopteris* (2).
Aspleniaceae:	*Asplenium* (114), *Ceterach* (4), *Phyllitis* (3).
Athyriaceae:	*Athyrium* (263), *Cystopteris* (54), *Matteucia* (31).
Blechnaceae:	*Blechnum* (54).

POLYPODIOPHYTA

POLYPODIOPSIDA

Cryptogrammaceae: *Cryptogramma* (5).
Hypolepidaceae: *Pteridium* (93).
Marsiliaceae: *Marsilea* (1).
Osmundaceae: *Osmunda* (21).
Polypodiaceae: *Polypodium* (50).
Pteridaceae: *Adiantum* (1).
Salviniaceae: *Pilularia* (1), *Salvinia* (26).
Thelypteridaceae: *Oreopteris* (49), *Phegopteris* (51), *Thelypteris* (19).

PINOPHYTA (GYMNOSPERMAE)

GINKGOPSIDA

Ginkgoaceae: *Ginkgo* (37).

PINOPSIDA

Araucariaceae: *Araucaria* (1).
Cephalotaxaceae: *Cephalotaxus* (1).
Cupressaceae: *Athrotaxis* (1), *Calocedrus* (2), *Chamaecyparis* (157), *Cupressus* (8), *Juniperus* (251), *Microbiota* (2), *Platycladus* (2), *Thuja* (172), *Thujopsis* (5).
Pinaceae: *Abies* (142), *Cedrus* (2), *Larix* (156), *Picea* (108), *Pinus* (425), *Pseudotsuga* (36), *Tsuga* (30).
Podocarpaceae: *Phyllocladus* (1), *Podocarpos* (1).
Taxaceae: *Taxus* (117), *Torreya* (1).
Taxodiaceae: *Cryptomeria* (7), *Cuninghamia* (1), *Metasequoia* (28), *Sequoiadendron* (2), *Taxodium* (18).

MAGNOLIOPHYTA

MAGNOLIOPSIDA

Acanthaceae: *Thunbergia* (1).
Aceraceae: *Acer* (805).
Actinidiaceae: *Actinidia* (5).
Adoxaceae: *Adoxa* (49).
Aizoaceae: *Carpobrotus* (1).
Amaranthaceae: *Amaranthus* (277).
Anacardiaceae: *Cotinus* (7), *Pistacia* (7), *Rhus* (46), *Schinus* (3).
Apiaceae: *Aegopodium* (112), *Aethusa* (75), *Anethum* (12), *Angelica* (110), *Anthriscus* (148), *Apium* (3), *Astrantia* (66), *Berula* (23), *Bupleurum* (36), *Carum* (63), *Caucalis* (8), *Cenolophium* (1), *Chaerophyllum* (195), *Cicuta* (17), *Cnidium* (4), *Conium* (18), *Coriandrum* (2), *Crithmum* (2), *Daucus* (155), *Echinophora* (1), *Eryngium* (27), *Falcaria* (55), *Ferulago* (1), *Foeniculum* (1), *Hacquetia* (33), *Heracleum* (168), *Hydrocotyle* (31), *Laserpitium* (20), *Levisticum* (9), *Libanotis* (23), *Meum* (4), *Mutellina* (2), *Myrrhis* (3), *Oenanthe* (54), *Orlaya* (4), *Pastinaca* (56), *Petroselinum* (5), *Peucedanum* (84), *Pimpinella* (94), *Pleurospresmum* (4), *Sanicula* (77), *Scandix* (6), *Selinum* (69), *Seseli* (54), *Silaum* (12), *Sium* (11), *Smyrnium* (1), *Torilis* (63), *Trinia* (1).
Apocynaceae: *Nerium* (10), *Periploca* (1), *Plumeria* (1), *Vinca* (67).
Aquifoliaceae: *Ilex* (8).
Araliaceae: *Acanthopanax* (1), *Aralia* (6), *Hedera* (121).
Aristolochiaceae: *Aristolochia* (8), *Asarum* (188).
Asclepiadaceae: *Vincetoxicum* (29), *Asclepias* (2).
Asteraceae: *Achillea* (508), *Adenostyles* (5), *Ambrosia* (22), *Amelanchier* (13), *Anaphalis* (2), *Andryala* (1), *Antennaria* (38), *Anthemis* (268), *Aposeris* (11), *Arctium* (213), *Arnica* (1), *Arnoseris* (33), *Artemisia* (368), *Aster*

(409), *Bellidiastrum* (5), *Bellis* (182), *Bidens* (243), *Buphthalmum* (2), *Calendula* (35), *Callisthepus* (3), *Carduus* (159), *Carlina* (82), *Carthamus* (3), *Centaurea* (868), *Cephalaria* (2), *Chamomilla* (235), *Chondrilla* (12), *Chrysanthemum* (9), *Cicerbita* (10), *Cichorium* (112), *Cirsium* (634), *Conyza* (175), *Coreopsis* (6), *Cosmos* (27), *Cotula* (1), *Crepis* (404), *Crinitaria* (1), *Crupina* (1), *Dahlia* (4), *Dendranthema* (3), *Doronicum* (35), *Echinops* (66), *Erechtites* (16), *Erigeron* (357), *Eupatorium* (149), *Filago* (58), *Gaillardia* (5), *Galinsoga* (244), *Gnaphalium* (214), *Hedypnois* (1), *Helenium* (1), *Helianthus* (119), *Helichrysum* (65), *Heliopsis* (4), *Hieracium* (1120), *Homogyne* (24), *Hypochoeris* (133), *Inula* (131), *Iva* (12), *Jurinea* (2), *Lactuca* (66), *Lapsana* (124), *Launaea* (2), *Leontodon* (375), *Leontopodium* (3), *Leucanthemum* (197), *Leuzea* (1), *Ligularia* (2), *Linosyris* (7), *Matricaria* (35), *Mycelis* (152), *Onopordum* (39), *Pallenis* (1), *Petasites* (148), *Picris* (81), *Podospermum* (2), *Prenanthes* (37), *Pulicaria* (12), *Rhagadiolus* (1), *Rudbeckia* (58), *Schorzonera* (37), *Scolymus* (2), *Senecio* (832), *Serratula* (36), *Sigesbeckia* (1), *Silybum* (2), *Solidago* (497), *Sonchus* (232), *Sparthium* (2), *Tagetes* (4), *Tanacetum* (224), *Taraxacum* (156), *Telekia* (20), *Tragopogon* (136), *Tripleurospermum* (56), *Tussilago* (129), *Xanthium* (62), *Xeranthemum* (15).

Balsaminaceae: *Impatiens* (324).

Berberidaceae: *Berberis* (151), *Mahonia* (28), *Epimedium* (5).

Betulaceae: *Alnus* (280), *Betula* (367).

Bignoniaceae: *Campsis* (3), *Catalpa* (41).

Boraginaceae: *Alkanna* (1), *Amsinckia* (3), *Anchusa* (148), *Borago* (3), *Cerinthe* (27), *Cynoglossum* (15), *Echium* (220), *Heliotropium* (4), *Lappula* (10), *Lithospermum* (97), *Myosotis* (703), *Nemophila* (3), *Nonnea* (28), *Omphalodes* (1), *Pulmonaria* (108), *Symphytum* (219).

Brasicaceae: *Arabidopsis* (134), *Alliaria* (92), *Alyssum* (104), *Arabis* (103), *Armoracia* (62), *Aubrieta* (1), *Barbarea* (141), *Berteroa* (142), *Biscutella* (26), *Brassica* (102), *Bunias* (48), *Cakile* (9), *Camelina* (93), *Capsella* (185), *Cardamine* (235), *Cardaminopis* (697), *Cardaria* (53), *Cheiranthus* (1), *Cochlearia* (12), *Conringia* (6), *Coronopus* (3), *Crambe* (1), *Dentaria* (165), *Descurainia* (60), *Diplotaxis* (96), *Draba* (12), *Erophila* (80), *Eruca* (1), *Erucastrum* (12), *Erysimum* (288), *Fibigia* (1), *Hesperis* (61), *Hirschfeldia* (2), *Hutchinsia* (6), *Iberis* (38), *Isatis* (6), *Kernera* (4), *Lepidium* (420), *Lobularia* (11), *Lunaria* (74), *Matthiola* (15), *Nasturtium* (18), *Neslia* (67), *Raphanus* (95), *Raphistrum* (24), *Rhynchosinapsis* (2), *Rorippa* (197), *Sinapis* (69), *Sisymbrium* (260), *Teesdalea* (47), *Thlaspi* (139), *Turritis* (25).

Buddlejaceae: *Buddleia* (6).

Buxaceae: *Buxus* (23), *Pachysandra* (1).

Caesalpiniaceae: *Caesalpinia* (1), *Cercis* (1), *Gymnocladus* (2).

Callitrichaceae: *Callitriche* (132).

Calycanthaceae: *Calycanthus* (1).

Campanulaceae: *Adenophora* (2), *Campanula* (687), *Edrianthus* (1), *Jasione* (104), *Lobelia* (6), *Phyteuma* (64).

Cannabaceae: *Cannabis* (15), *Humulus* (115).

Caprifoliaceae: *Abelia* (1), *Kolkwitzia* (3), *Leycesteria* (2), *Linnaea* (5), *Lonicera* (238), *Sambucus* (183), *Symphoricarpos* (89), *Viburnum* (156), *Weigela* (27).

Caryophyllaceae: *Agrostemma* (92), *Arenaria* (135), *Cerastium* (567), *Cucubalus* (55), *Dianthus* (373), *Gypsophila* (104), *Hernaria* (81), *Holosteum* (18), *Honckenya* (8), *Illecebrum* (9), *Lychnis* (162), *Melandrium* (238), *Minuartia* (17), *Moehringa* (108), *Myosoton* (128), *Petrorhagia* (32), *Sagina* (75), *Saponaria* (83), *Scleranthus* (128), *Silene* (355), *Spergula*

(144), *Spergularia* (68), *Stellaria* (322), *Vaccaria* (1), *Viscaria* (36).

Casuarinaceae: *Casuarina* (2).
Celastraceae: *Celastrus* (6).
Celastraceae: *Euonymus* (199).
Ceratophyllaceae: *Ceratophyllum* (52).
Cercidipyllaceae: *Cercidiphyllum* (9).
Chenopodiaceae: *Atriplex* (284), *Beta* (7), *Camphorosma* (1), *Chenopodium* (806), *Corispermum* (73), *Eurotia* (1), *Kochia* (70), *Obione* (2), *Polycnemum* (7), *Salicornia* (10), *Salsola* (43), *Spinacia* (1), *Suaeda* (3).
Cistaceae: *Cistus* (4), *Fumana* (1), *Helianthemum* (73).
Convolvulaceae: *Calystegia* (181), *Convolvulus* (159), *Cuscuta* (102), *Ipomoea* (3), *Pharbitis* (2).
Cornaceae: *Cornus* (288).
Corylaceae: *Carpinus* (160), *Corylus* (153), *Ostrya* (3).
Crassulaceae: *Cotyledon* (1), *Crassula* (1), *Jovibarba* (2), *Rhodiola* (4), *Sedum* (139), *Sempervivum* (43), *Umbilicus* (1).
Cucurbitaceae: *Bryonia* (34), *Citrullus* (1), *Cucumis* (4), *Cucurbita* (11), *Ecballium* (1), *Echinocystis* (90), *Sicyos* (1), *Thladnianta* (1).
Dipsacaceae: *Dipsacus* (65), *Knautia* (245), *Sucissa* (78), *Scabiosa* (106).
Droseraceae: *Drosera* (98).
Ebenaceae: *Diospyros* (2).
Elaeagnaceae: *Elaeagnus* (70), *Hippophaë* (50).
Elatinaceae: *Elatine* (15).
Empetraceae: *Empetrum* (18).
Ericaceae: *Andromeda* (45), *Arbutus* (4), *Arctostaphyllos* (14), *Bruckenthalia* (1), *Calluna* (164), *Daboecia* (1), *Enkianthus* (1), *Erica* (24), *Gaultheria* (1), *Ledum* (74), *Loiseleuria* (2), *Oxycoccus* (57), *Pieris* (3), *Rhododendron* (63), *Rhodothamnus* (1), *Vaccinum* (176).
Eucommiaceae: *Eucommia* (3).
Eucryphiaceae: *Eucryphia* (1).
Euphorbiaceae: *Chamesyceae* (1), *Euphorbia* (1353), *Merculiaris* (112).
Fabaceae: *Acacia* (2), *Amorpha* (16), *Anthylis* (141), *Astragalus* (182), *Calophaca* (1), *Caragana* (82), *Chamaecytisus* (155), *Cicer* (1), *Cladrastis* (2), *Colutea* (7), *Coronilla* (169), *Cytisus* (5), *Dorycnium* (10), *Erythrina* (1), *Eschscholtzia* (1), *Galega* (18), *Genista* (208), *Genistella* (1), *Gleditsia* (19), *Halimodendron* (1), *Hippocrepis* (1), *Hymenocarpos* (1), *Labunrum* (38), *Lathyrus* (605), *Lembotropis* (47), *Lotus* (306), *Lupinus* (117), *Medicago* (467), *Melilotus* (196), *Onobrychis* (35), *Ononis* (140), *Ornithopus* (21), *Oxytropis* (14), *Peltophorum* (1), *Phaseolus* (11), *Pisum* (28), *Psoralea* (1), *Sarothamnus* (99), *Scorpiurus* (2), *Securigera* (1), *Sophora* (3), *Tetragonolobus* (7), *Trifolium* (1288), *Ulex* (3), *Vicia* (1228), *Visteria* (6).
Fagaceae: *Castanea* (17), *Fagus* (174), *Quercus* (459).
Fumariaceae: *Dicentra* (3), *Fumaria* (166).
Gentianaceae: *Blackstonia* (4), *Centaurium* (214), *Gentiana* (155), *Gentianella* (82), *Sweertia* (3)
Geraniaceae: *Erodium* (112), *Geranium* (835).
Grossulariaceae: *Ribes* (213).
Haloragaceae: *Myriophyllum* (92).
Hamamelidaceae: *Fothergilla* (1), *Hamamelis* (16), *Liquidambar* (4).
Hippocastanaceae: *Aesculus* (140).
Hippuridaceae: *Hippuris* (9).
Hydrangeaceae: *Deutzia* (73), *Hydrangea* (16), *Philadelphus* (142).
Hydrophyllaceae: *Phacelia* (8).
Hypericaceae: *Hypericum* (468).

Illecebraceae: *Paronychia* (1).
Juglandaceae: *Carya* (10), *Juglans* (50), *Pteryocarya* (15).
Lamiaceae: *Acinos* (77), *Ajuga* (305), *Ballota* (99), *Betonica* (71), *Calamintha* (2), *Clinopodium* (111), *Elsholtzia* (37), *Galeobdolon* (*Lamiastrum*) (165), *Galeopsis* (589), *Glechoma* (245), *Hyssopus* (3), *Lamium* (505), *Lavandula* (4), *Leonurus* (89), *Lycopus* (132), *Marrubium* (9), *Melissa* (15), *Melittis* (28), *Mentha* (367), *Monarda* (1), *Nepeta* (69), *Origanum* (66), *Phlomis* (1), *Prunella* (153), *Salvia* (223), *Scutellaria* (96), *Sideritis* (3), *Stachys* (358), *Teucrium* (46), *Thymus* (320).
Larolizabalaceae: *Akebia* (1).
Lauraceae: *Laurus* (8).
Lentibulariaceae: *Pinguicula* (12), *Urticularia* (64).
Linaceae: *Linum* (154), *Radiola* (5).
Loranthaceae: *Loranthus* (4), *Viscum* (52).
Lordizabalaceae: *Decaisnea* (1).
Lythraceae: *Lythrum* (181), *Peplis* (12).
Magnoliaceae: *Liriodendron* (30), *Magnolia* (52).
Malvaceae: *Hibiscus* (2), *Abutilion* (3), *Alcea* (16), *Althaea* (21), *Lavatera* (11), *Malva* (298).
Meliaceae: *Melia* (1).
Menyantheaceae: *Nymphoides* (8), *Menyanthes* (50).
Mimosaceae: *Albizzia* (2).
Molluginaceae: *Mollugo* (1).
Monotropaceae: *Monotropa* (52).
Moraceae: *Ficus* (4), *Maclura* (2), *Morus* (62).
Myricaceae: *Myrica* (5).
Myrtaceae: *Callistemon* (1), *Eucalyptus* (8), *Myrtus* (3).
Nothofagaceae: *Nothofagus* (1).
Nyctaginaceae: *Oxybaphus* (1).
Nympheaceae: *Nuphar* (39), *Nymphaea* (51).
Oleaceae: *Chionanthus* (1), *Forsythia* (76), *Fraxinus* (270), *Jasminum* (1), *Ligustrum* (90), *Olea* (2), *Phillyrea* (2), *Syringa* (65).
Onagraceae: *Chamaenerion* (285), *Circaea* (183), *Clarkia* (2), *Epilobium* (928), *Fuchsia* (1), *Godetia* (2), *Lopezia* (1), *Ludwigia* (1), *Oenothera* (10000).
Orobanchaceae: *Orobanche* (55).
Oxalidaceae: *Oxalis* (198).
Paeoniaceae: *Paeonia* (4).
Papaveraceae: *Chelidonium* (159), *Corydalis* (111), *Glaucium* (5), *Papaver* (208).
Parnassiaceae: *Parnassia* (47).
Paulowniaceae: *Paulownia* (1).
Phytolaccaceae: *Phytolacca* (7).
Pittosporaceae: *Pittosporum* (5).
Plantaginaceae: *Globularia* (7), *Littorella* (1), *Plantago* (591).
Platanaceae: *Platanus* (72).
Plumbaginaceae: *Armeria* (96), *Limonium* (5), *Statice* (2).
Polemoniaceae: *Collomia* (1), *Phlox* (26), *Polemonium* (4).
Polygalaceae: *Polygala* (169).
Polygonaceae: *Erigonium* (1), *Fagopyrum* (25), *Fallopia* (117), *Oxyria* (2), *Polygonum* (720), *Reynoutria* (146), *Rheum* (2), *Rumex* (759).
Portulacaceae: *Montia* (1), *Portulaca* (9).
Primulaceae: *Anagallis* (142), *Androsace* (22), *Cyclamen* (2), *Glaux* (10), *Hottonia* (48), *Lysimachia* (452), *Primula* (138), *Samolus* (1), *Soldanella* (9), *Trentalis* (76).
Pyrolaceae: *Chimaphila* (43), *Moneses* (45), *Orthilia* (43), *Pyrola* (113).
Ranunculaceae: *Aconitum* (61), *Actaea* (55), *Adonis* (31), *Anemone* (270), *Aquilegia*

(61), *Batrachium* (139), *Callianthemum* (1), *Caltha* (191), *Ceraticephala* (1), *Cimicifuga* (1), *Clematis* (93), *Consolida* (153), *Delphinium* (10), *Ficaria* (149), *Helleborus* (3), *Hepatica* (83), *Isopyrum* (62), *Myosurus* (20), *Nigella* (40), *Pulsatilla* (26), *Ranunculus* (722), *Thalictrum* (132), *Trollius* (45).

Resedaceae: *Reseda* (88).

Rhamnaceae: *Frangula* (171), *Paliurus* (6), *Rhamnus* (76).

Rosaceae: *Agrimonia* (199), *Alchemilla* (636), *Amygdalus* (12), *Aphanes* (36), *Aremonia* (1), *Aronia* (7), *Aruncus* (35), *Cerasus* (224), *Chaenomeles* (51), *Comarum* (69), *Cotoneaster* (129), *Crataegus* (517), *Cydonia* (6), *Dryas* (8), *Duchesnea* (2), *Exochorda* (1), *Filipendula* (153), *Fragaria* (356), *Geum* (305), *Kerria* (11), *Malus* (158), *Mespilus* (3), *Padus* (168), *Persica* (2), *Physocarpos* (76), *Potentilla* (1223), *Prunus* (140), *Pyracantha* (8), *Pyrus* (58), *Rhodotypos* (7), *Rosa* (536), *Rubus* (1845), *Sanguisorba* (126), *Sorbaria* (46), *Sorbus* (215), *Spiraea* (179), *Stephalandra* (1), *xCrataegomespilus* (3).

Rubiaceae: *Asperula* (73), *Cephalanthus* (1), *Coffea* (1), *Cruciata* (196), *Galium* (1119), *Rubia* (2), *Sherardia* (33).

Rutaceae: *Citrus* (1), *Dictamnus* (5), *Evodia* (1), *Phelodendron* (6), *Ptelea* (34), *Ruta* (2), *Euodia* (1).

Salicaceae: *Populus* (439), *Salix* (854).

Santalaceae: *Osyris* (1), *Thesium* (19).

Sapindaceae: *Koelreuteria* (1).

Saxifragaceae: *Astilbe* (8), *Chrysosplenium* (127), *Escalonia* (1), *Heuchera* (4), *Saxifraga* (118).

Scrophulariaceae: *Antirrhinum* (11), *Bartsia* (3), *Chaenorhinum* (101), *Cymbalaria* (16), *Digitalis* (84), *Euphrasia* (263), *Gratiola* (5), *Kickxia* (9), *Lathraea* (44), *Limosella* (7), *Linaria* (253), *Lindernia* (2), *Melampyrum* (235), *Mimulus* (16), *Misopates* (4), *Nemesia* (2), *Odontites* (121), *Parentucelia* (1), *Pedicularis* (62), *Penstemon* (1), *Rhinanthus* (135), *Scrophularia* (208), *Tozzia* (1), *Veronica* (1006), *Verbascum* (474).

Simaroubaceae: *Ailanthus* (18).

Solanaceae: *Atropa* (16), *Datura* (42), *Hyoscyamus* (39), *Lycium* (20), *Lycopersicon* (12), *Nicotiana* (10), *Petunia* (4), *Physalis* (33), *Solanum* (178).

Staphyleaeae: *Staphylea* (2).

Styraceae: *Pterostyrax* (1).

Tamaricaceae: *Myricaria* (26), *Tamarix* (17).

Thymelaeaceae: *Daphne* (69), *Thymelaea* (4).

Tiliaceae: *Tilia* (293).

Trapaceae: *Trapa* (25).

Tropaeolaceae: *Tropaeolum* (3).

Ulmaceae: *Celtis* (4), *Hemiptelea* (1), *Ulmus* (186), *Zelkova* (1).

Urticaceae: *Urtica* (138), *Parietaria* (11).

Valerianaceae: *Valeriana* (457), *Valerianella* (89), *Centranthus* (1).

Verbenaceae: *Callicarpa* (1), *Verbena* (74), *Vitex* (1).

Violaceae: *Viola* (1409).

Vitaceae: *Ampelopsis* (4), *Parthenocissus* (35), *Vitis* (31).

Winteraceae: *Drimys* (1), *Pseudowintera* (1).

Zygophyllaceae: *Tribulus* (2).

LILIOPSIDA (MONOCOTYLEDONES)

Agavaceae: *Agava* (1), *Yucca* (2).

Alismataceae: *Alisma* (46), *Luronium* (2), *Sagittaria* (22).

Alliaceae: *Allium* (124).

Amaryllidaceae: *Galanthus* (35), *Leucojum* (5), *Anthericum* (15).

Araceae: *Acorus* (30), *Arum* (3), *Calla* (10).
Asparagaceae: *Asparagus* (35).
Butomaceae: *Butomus* (17).
Calochortaceae: *Streptopus* (6).
Commelinaceae: *Tradescantia* (3).
Convallariaceae: *Convallaria* (77), *Maianthemum* (67), *Polygonatum* (147).
Cyperaceae: *Blysmus* (25), *Bulboschoenus* (21), *Carex* (1025), *Cladium* (7), *Cyperus* (14), *Dichostyllis* (2), *Eleocharis* (15), *Eriophorum* (154), *Heleocharis* (123), *Holoschoenus* (3), *Isolepis* (18), *Pycreus* (3), *Rhynchospora* (24), *Schoenoplectus* (47), *Schoenus* (2), *Scirpus* (70), *Trichophorum* (1).
Dioscoreaceae: *Tamus* (7).
Hostaceae: *Hosta* (16).
Hyacinthaceae: *Hyacinthus* (3), *Hyacinthoides* (1), *Muscari* (16), *Ornithogallum* (63), *Scilla* (20).
Hydrocharitaceae: *Elodea* (26), *Hydrocharis* (17), *Stratiotes* (6).
Iridaceae: *Crocus* (14), *Gladiolus* (36), *Iris* (78), *Narcissus* (15), *Romulea* (1), *Sisyrinchium* (6), *Steinbergia* (1).
Juncaceae: *Juncus* (482), *Luzula* (375).
Lemnaceae: *Lemna* (36), *Spirodela* (6), *Wolffia* (5).
Liliaceae: *Asphodelina* (1), *Fritilaria* (3), *Gagea* (68), *Lilium* (72), *Lloydia* (11), *Tulipa* (2).
Melanthiaceae: *Toffieldia* (43), *Veratrum* (53).
Musaceae: *Musa* (1).
Najadaceae: *Najas* (9).
Orchidaceae: *Cephalanthera* (24), *Coeloglossum* (1), *Corallorhiza* (3), *Cypripedium* (1), *Dactylorhiza* (153), *Epipactis* (199), *Goodyera* (2), *Gymnadenia* (12), *Liparis* (5), *Listera* (43), *Malaxis* (11), *Microstilis* (1), *Neottia* (13), *Nigritella* (1), *Orchis* (9), *Platanthera* (25), *Pseudorchis* (1), *Traunsteinera* (1).
Palmae: *Chamaerops* (2), *Phoenix* (2).
Poaceae: *Aegilops* (3), *Aeluropus* (4), *Agropyron* (2), *Agrostis* (405), *Aira* (16), *Alopecurus* (291), *Ammophila* (8), *Anthoxanthum* (411), *Apera* (124), *Aristida* (2), *Arrhenatherum* (173), *Avena* (112), *Avenula* (110), *Bambusa* (2), *Beckmannia* (1), *Bothriochloa* (9), *Brachypodium* (100), *Briza* (97), *Bromus* (685), *Calamagrostis* (351), *Catapodium* (2), *Cenchrus* (1), *Chloris* (4), *Coleanthus* (2), *Corynephorus* (84), *Cynodon* (11), *Cynosurus* (104), *Dactylis* (204), *Dactyloctenium* (2), *Danthonia* (37), *Demostachya* (1), *Deschampsia* (290), *Digitaria* (113), *Diplachne* (1), *Echinochloa* (120), *Eleusine* (1), *Elymus* (194), *Eragrostis* (71), *Festuca* (853), *Festulolium* (12), *Gastridium* (1), *Glyceria* (246), *Helictotrichon* (1), *Hierochloë* (18), *Holcus* (276), *Hordelymus* (6), *Hordeum* (100), *Hyparrhenia* (1), *Koeleria* (35), *Lagurus* (1), *Leersia* (16), *Leymus* (15), *Lolium* (252), *Lophochloa* (2), *Melica* (145), *Milium* (89), *Miscanthus* (2), *Molinia* (135), *Nardus* (46), *Odyssea* (1), *Oreochloa* (3), *Oryza* (2), *Oryzopsis* (1), *Panicum* (33), *Parapholis* (1), *Paspalum* (1), *Pennisetum* (3), *Phalaris* (152), *Phleum* (227), *Pholiurus* (2), *Phragmites* (100), *Poa* (1074), *Puccinellia* (40), *Rostraria* (1), *Scolochloa* (1), *Secale* (30), *Sesleria* (11), *Setaria* (238), *Sorghum* (10), *Spartina* (3), *Sporobolus* (3), *Stipa* (19), *Triglochin* (1), *Trisetum* (85), *Triticum* (52), *Ventenata* (3), *Vulpia* (18), *Zea* (15), *xAmmocalamagrostis* (1), *xFestulolium* (13), *xTriticale* (6).
Potamogetonaceae: *Potamogeton* (162).
Ruppiaceae: *Ruppia* (6).
Ruscaceae: *Ruscus* (8).
Scheuchzeriaceae: *Scheuchzeria* (7).

Smilacaceae:	*Smilax* (7).
Sparganiaceae:	*Sparganium* (89).
Trilliaceae:	*Paris* (53).
Typhaceae:	*Typha* (45).
Zannichelliaceae:	*Zannichellia* (5).

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The range and significance of phenotypic plasticity of Broad-leaved Helleborine *Epipactis helleborine* (L.) CRANTZ for taxonomy (Orchidaceae: Neottieae)

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ABSTRACT. Phenotypic plasticity describes the capacity of a genotype to exhibit a range of phenotypes in response to variations in the environment (FORDYCE 2006). In taxonomic researches, and particularly in the species identification process, much significance is attributed to morphologic qualities (especially to the colour and size of flowers), which in case of taxonomy of the *Epipactis* genus is not always justifiable for its wide range of intraspecies changeability. The results of studies on the range of phenotype plasticity of morphological qualities substantial for taxonomy of the *Epipactis* genus, for instance the colour and size of flowers in reference to the presently accepted taxonomy of the species, are presented in this paper. A wide range of changeability within the examined taxon was discovered, which confirms the reasons to maintain the aggregate species status for *E.helleborine* s.l. The results of the research prove that in species as well as in genus taxonomy we should not rely solely on flower features nor solely on herbarium sheets, which frequently contain specimens which are atypical or unrepresentative for the genet they were collected from, but identify new taxa only in justifiable cases, on verification in natural conditions.

Key words: phenotypic plasticity, variation, *Epipactis helleborine* (L.) CRANTZ, taxonomy.

INTRODUCTION

Orchids belong to plant species which, when found in natural conditions, arouse emotions in consideration of their rarity and often the problem with marking. Among all representatives of Orchidaceae in Poland, *Epipactis helleborine* (L.) CRANTZ passes for one of the most controversial taxa, mainly because of the wide range of intraspecies morphologic plasticity related to the shape and colouration of perianth elements.

The range of this changeability still has not been worked out, though it seems to be the key issue. Some authors (BUTTLER 2000) suggest that distinguishing subspecies within *Epipactis helleborine* (L.) CRANTZ is a temporary solution for the lack of a detailed study of its forms.

This paper is an introduction to a complex study of significance of the morphologic plasticity phenomenon in *Epipactis* ZINN, 1757 genus taxonomy.

What is phenotypic plasticity?

The definition of this term was given by BRADSHAW (1965), according to whom phenotypic plasticity is the phenotypic result of genotype properties, i.e. the ability of a genotype to modify its phenotype under environmental conditions. Phenotypic changeability results from the fact that the same set of genes can produce distinct phenotypes

under various environmental conditions (WOJCIECHOWSKA 2002; FORDYCE 2006). Until quite recently, hypotheses on existence of "genes of plasticity" directly responsible for morphologic changeability phenomenon were considered controversial. Today they do not provoke emotions. It is generally accepted that three groups of genes: allelic sensitivity, plasticity and transduction genes are responsible for morphologic plasticity (PIGLIUCCI & BYRD 1998). Molecular basis of this phenomenon can also be determined by varied gene regulation belonging to multigene families, particularly MADS-box homeotic genes (SMITH 1990).

Studies on plasticity can concern typically morphologic qualities, such as size of individual shoots, shape and colour of flowers, as well as physiologic qualities, e.g. the rate of assimilation (WOJCIECHOWSKA 2002).

In taxonomic researches, and particularly in the species identification process, much significance is attributed to morphologic qualities (especially to the colour and size of flowers), which in case of the *Epipactis* genus taxonomy is not always justifiable for its wide range of intraspecies changeability (JAKUBSKA 2003).

Intraspecies changeability may come from different sources. According to BIELICKI (2000), these include e.g. age differences between examined individuals, but also, important from the taxonomic point of view, differences in frequency distribution and average values of a given feature between populations occurring in various geographic areas (BIELICKI 2000).

Plant morphology is influenced by several substantial ecological factors, for instance soil composition insolation of a habitat, as well as genetic factors like gene expression, mutations or recombination.

A particularly advantageous feature for examining morphologic plasticity is the clonality of the studied plants, as it allows to analyse the influence of diverse factors on the same genotype (WOJCIECHOWSKA 2002). *Epipactis* genus meets the condition, since it produces systems of ramified rhizomes and individual shoots that appear above the ground are usually not separate organisms, but belonging to one genet.

Morphologic changeability can also result from somatic mutations occurring in ramets within one genet.

When observing the range of morphologic changeability of Broad-leaved Helleborine, the following questions occur: is it possible that two different at first glance flowers (Plate 1.) belong to the same taxon? Or are we witnessing speciation?

MATERIALS AND METHODS

Researches on phenotypic plasticity of Broad-leaved Helleborine were conducted in the years 1999-2008. The structure of the column according to PROCHÁZKA & VELÍSEK (1983) and MEREDA (2002), taking into consideration the changeability in its morphology resulting from age differences between the flowers (JAKUBSKA 2003), was accepted as a fundamental taxonomic feature indispensable for species identification.

Ten populations of Broad-leaved Helleborine were chosen for studies on phenotypic changeability, all located in Dolny Śląsk, i.e. in the Kaczawskie Mountains (environs of

Wojcieszów Górny), around Srebrna Góra, Karpacz, Kletno and Gozdnik, in Krowiarki Mts., in the Orlickie and Bystrzyckie Mountains, in the Stołowe Mountains National Park and around Wrocław.

Special emphasis was put on observing differences in the flower size, the shape and size of labellum and the colouration of individual perianth segments. Biometric measurement of the distinctive elements of perianth size was performed and a detailed photographic documentation, being a source of reference for the obtained results, was produced.

Some soil was collected from the same experimental spaces, from the depth corresponding to the rhizosphere of *Epipactis helleborine*. The chemical properties were determined in this soil. Generally accepted methods were used. The metrical data and the empirical results were treated statistically.

RESULTS AND DISCUSSION

Changeability of flower shape, size and colouration in chosen populations of *Epipactis helleborine* (L.) CRANTZ

Conducted research allowed to unequivocally ascertain that *Epipactis helleborine* (L.) CRANTZ is a morphologically changeable species. This changeability manifests itself in diverse colouration of perianth, from pale green through light pink and scarlet to dark violet (Plate 1). Dichromatic flowers and those with markedly darker hypochil and often considerably lighter epichil can be met quite frequently.

It is worth adding that studies on perianth colouration of Broad-leaved Helleborine are only possible in natural conditions, as this quality usually does not preserve well in herbarium material.

Furthermore, the labellum shape may undergo modifications. It is usually heart-shaped with a sharp end, but can also be elongated or significantly shortened (Plate 1).

As far as outer perianth segments are concerned, not a wide range of shape changeability was observed, but only of colour. The pigmentation of these elements is also changeable they are usually pale green, yellowish-green or greenish-pink (Plate 1). Intensive dark violet colour is rare.

Little phenotype changeability within one genet was noticed in successive growing seasons. It is a very intriguing issue, still of undetermined etiology, that definitely requires further research.

Biometric parameters of perianth elements showed inconsiderable range of intrapopulation changeability, conditioned probably by the age and development phase of the analysed flowers. Average width of epichile studied populations was 0.5 cm, its length 0.6 cm and the width of sepals was usually approximate and 0.4 cm, while their length oscillated between 0.9 and 1.2 cm.

The diversification of labellum shape does not allow for faultless species identification on the ground of the lip shape or colouration, which makes marking plants basing solely on flower diagrams, found in popularised scientific publications (e.g. GIBBONS & BROUGH 1995), burdened with a wide range of error.

Plate 1. Individual phenotypic variability of of colours, shape and flowers size *Epipactis helleborine* (L.) Crantz (Phot. A. Jakubska-Busse)

Plate 2. Development anomaly in Broad-leaved Helleborine (A) and Marsh Helleborine (B) (Phot A. Jakubska-Busse)

In the course of the research, an anomaly rarely noted in nature development was observed, formed at the early stage of morphogenesis, probably as a result of distortion of the distribution of two flower buds (Plate 2a). This anomaly is taxonomically insignificant, occurs infrequently (FÜLLER 1986), and most often once within an inflorescence (Plate 2a). Such aberrations in the schemes are also seen in other species of the *Epipactis* genus, for instance in *Epipactis palustris* (L.) CRANTZ (Plate 2b) (JAKUBSKA et al. 2005).

Results of laboratory examinations of the samples collected during fieldwork did not allow to confirm the hypothesis explaining intra- and interpopulation morphologic differentiation of the studied plants under chemical composition of the soil (JAKUBSKA 2003). Although the analysed populations grow in very diverse habitats, also in regard to macro- and microelements content, the soil composition has no substantial influence on the flower morphology, which could be manifested through more intensive colouration of perianth or shape differences between its individual elements (JAKUBSKA 2003). It proves that explaining the changeability phenomenon solely as an influence of edafic factors, without taking into consideration the genetic principles of the process, is unjustifiable.

What is the use of morphologic plasticity?

The phenomenon is of great significance to the adaptation process of species to environment conditions that change with time (SCHLICHTING & PIGLUCCI 1998; WOJCIECHOWSKA 2002). According to NALBORCZYK (1996), the range of this changeability in natural ecosystems demarcates species' range borders and their acclimatisation properties in new, in regard to climate and soil, areas. It is possible that natural selection favours the more plastic genotypes, which easily adapt to changes in the environment.

There is no doubt that the gene pool and its population and ecotype changeability are of vital significance for ecosystems to survive.

Much attention is given to species preservation, yet it seems that preserving genetic changeability and diversity is equally important. We shall keep in mind that the process of limiting species' ranges and their consequent disappearance start from the impoverishment of their population and ecotype changeability (NALBORCZYK 1996).

Genetic and hormonal mechanisms of plasticity still have not been elaborated despite the fact that many specialists, e.g. SCHLICHTING & PIGLUCCI (1998), have worked on the issue.

Individual phenotypic plasticity of *Epipactis helleborine* s.l. versus its taxonomy

Determining the changeability range within a given species or a group of species is extremely important in the process of classification. It is especially important to establish which differences are of biological significance for taxonomic units are not simple entities but complex population systems (STEBBINS 1958). Conducting researches in fieldwork conditions, as well as detailed studies of an examined object in its natural

habitat, including establishing all interactions that can be of importance in estimating the scale of the problem, is not popular with systematisers or geneticists, who base their examinations on herbarium or garden specimens (STEBBINS 1958).

Today it is hard to believe that still in the middle of the 20th century many systematisers still adhered to the opinion that "if two things differ, they should be described as separate species", but the tangible evidence of such stance are numerous contemporary taxonomic revisions.

At present, two subspecies can be distinguished within *Epipactis helleborine* (L.) CRANTZ, differing in flower colour:

ssp. *helleborine* – with light pink, pink and pale violet flowers, and

ssp. *viridis* SOÓ – with green and greenish-yellow flowers, usually without characteristic bumps on epichil (e.g. POTÚČEK & ĆAĆKO 1996; SZLACHETKO 2001).

Studies on the range of morphologic changeability of flower colour and shape conducted in field conditions demonstrate that distinguishing these units should be of symbolic character, as co-occurrence of both colour types in populations, also within one genet, is quite common.

Interestingly, DELFORGE (1994, 1995) suggests that the green colour in species of the *Epipactis* genus can be a result of hypochromy, i.e. distorted synthesis of anthocyanins and therefore should not be significant taxonomically.

The results obtained in the course of the research indicate that it is legitimate to verify the existing taxonomy of *Epipactis* ZINN, 1757 with the use of various DNA analysis techniques and particularly the *E. helleborine* s.l. complex.

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Polish Collections of Thrips (Insecta: Thysanoptera)

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ABSTRACT. The aim of this article is to summarise the past and present fate of the collections of Thysanoptera that have been established in Poland. Attention is drawn to the function of such collections in various investigative disciplines, as well as the threats connected with long-term storage.

Key words: Thysanoptera, collections, threats of storage, use of collections.

INTRODUCTION

The main purpose of collecting biological specimens and establishing a reference collection is to document biological diversity within a specific region. Comparative investigations of large collections allow one to describe new species, define the spread and migration of species, and so on. These provide a basis for the creation of catalogues and monographs. Modern investigative techniques, both microscopic and molecular, have meant new tools for taxonomy, which allow the review of taxa and the investigation of their relationships based on materials collected over many years. The exchange of specimens among specialists is also very important. Collecting and making available of types of described species avoids falsification and duplication in the descriptions of new species. This is quite apart from the matter of evidence. Rich and diverse collections also document the history of investigative work, which is part of scientific and cultural heritage, and when exhibited, also fulfill a didactive function.

Thysanoptera, being insects of microscopic dimensions, have been the subject of investigation by a very narrow group of specialists. From the beginning of the twentieth century only a few individuals have been preoccupied with this group of insects in Poland, systematically enhancing our knowledge about these species within our territory. Out of around 6 000 species known in the world, Poland so far can attest approximately 220 (KUCHARCZYK 2007). Because of their tiny dimensions and the problems in distinguishing species, Thysanoptera have never enjoyed popularity among amateur collectors or collectors of impressive or beautiful species, or within comparative collections, such as can be found in research centres.

The aim of this article is to summarise the past and present fate of the collections of Thysanoptera that have been established in Poland. Attention is drawn to the function of such collections in various investigative disciplines, as well as the threats connected with long-term storage.

The presented material represents a typical example of the fate of a collection of any taxonomic entity which has been the subject of limited professional attention. This text is based on my own experience of twenty years and information passed on to me by Dr IRENA ZAWIRSKA, who has over many years allowed me access to her personal collection, part of which she has recently passed to the Department of Zoology, MCSU. I have also been provided with data collected by, among others, Prof. dr. hab. GABRIEL ŁABANOWSKI, of the Research Institute of Pomology and Floriculture in Skierniewice, Dr. WOJCIECH SIERKA of the Silesian University in Katowice, Dr. MARIA POBOŻNIAK of the University of Agriculture in Kraków, as well as their associates.

THE HISTORY OF THYSANOPTERA RESEARCH AND COLLECTING IN POLAND

The first investigator of Thysanoptera in Poland was FRYDERYK SCHILLE. Working as Forest Supervisor in Rytro (south-east Poland) between 1902 and 1912, he collected Thysanoptera in the Poprad Valley, Beskid Sądecki and in the Tatra Mountains.

He described a few new species: *Ankothrips niezabitowskii*, *Euchaetothrips kroli*, *Scolothrips uzeli*, *Notothrips albovittatus*, *Thorybothrips unicolor*, *Xylaplothrips fuliginosus* (SCHILLE 1911a, 1911b, 1912). His collection of forty-one species of apterygous insects and sixty-four species of thrips enriched the entomological collection of the Department of Zoology in the Dzieduszycki Museum in Lwów between 1914 and 1918 (BRZĘK 1994). Due to the lack of funds available for the upkeep of collections and the partial destruction during and after the Second World War, this collection in Lwów has not survived until today.

In the 1930s, Thysanoptera was the subject of research by STEFAN KÈLER, an employee of the agricultural research institutes in Bydgoszcz and Puławy. Working mainly on the basis of Schille's collection and his own specimens, KÈLER prepared the first published monograph, „Tripsy (przylżeńce) Polski" (KÈLER 1936). In that work, the author also refers to collections in Toruń and in the National Zoological Museum in Warsaw. After the Second World War, KÈLER emigrated to Germany, taking the collections with him. Similarly, the majority of the specimens belonging to HENRYK OETTINGEN, who researched Thysanoptera of the Bydgoszcz and Gorzów Wielkopolski areas (fifty-nine species, among which three have not been confirmed until today), ended up in the Institute for Plant Protection in Eberswald (formerly East Germany). A handful of specimens from this collection were deposited in IUNG in Puławy, whence they found their way to the collection of Dr. IRENA ZAWIRSKA. Oettingen's descriptions involved many mistakes, and the German collection was revised in the 1960s by Titschack (SCHLIEPHAKE 1972).

After the Second World War, research into the fauna, taxonomy, ecology and biology of thrips was carried out by Dr. KATARZYNA SĘCZKOWSKA (Maria Curie-Skłodowska University in Lublin), and Dr. IRENA ZAWIRSKA (The Institute of Plant Protection in Poznań). Thysanoptera material was collected in the Toruń district by Dr. MELITYNA GROMADSKA (Nicolaus Copernicus University, Toruń). Unfortunately, the collections of the above-mentioned researchers, put together in the 1960s and 1970s (with the

exception of the ZAWIRSKA collection), have perished as the result of poor preparation and upkeep. The disappearance of the SĘCZKOWSKA collection prevents us from verifying the presence in Poland of several species noted by this author for the first time, but which may be doubted in the light of subsequent research.

Precise data concerning researchers who have investigated Thysanoptera in Poland, including bibliography, can be found in the paper by SIERKA and FEDOR (2004).

CONTEMPORARY COLLECTIONS OF THYSANOPTERA IN POLAND

At present, the largest collections of Thysanoptera in Poland are situated in Lublin, Katowice and in the ZAWIRSKA collection (Warsaw). The latter were put together between 1955 and 2000 in various regions of the country and also include items from exchanges and gifts from other countries in Europe, South Africa and New Zealand. They contain 180 species, including new types such as *Taeniothrips zurstrasseni* ZAWIRSKA, 2007 - female, male and larvae and male of *Thrips crassicornis* (BAGNALL, 1923). Most specimens have been immersed in Berlese liquid and now require transfer to Canada balsam. For this reason, the most precious specimens, including the larvae collections, have been passed on to the Department of Zoology, MCSU in Lublin.

The collection of the MCSU Department consists of 220 species, representing mainly Polish fauna, as well as numerous specimens acquired by me through exchange, or collected during my foreign trips to Norway, France, Hungary, Slovenia, Turkey, Portugal and Holland. One may find here, among others, new specimens described in recent years: holotypes of *Taeniothrips zurstrasseni* ZAWIRSKA, 2007 and *Xylaplothrips zawirskae* KUCHARCZYK, 2008; as well as paratypus *Thrips latiareus* VIERBERGEN, 2004. Here, too, are the largest in Poland collections of *Thysanoptera* larvae, stemming both from the present author's personal collection and those presented by ZAWIRSKA.

The collection consists of approximately 7000 microscopic slides of imago as well as 2000 slides of Thysanoptera larvae mounted in Berlese liquid, and approximately 500 permanent slides in Canada balsam. Each slide contains one to four specimens. Apart from microscopic slides, the collection also includes about 1500 samples submerged in alcohol. Both the slides and the alcohol specimens have originated mainly from central and eastern Poland, and represent fauna of very diverse plant sites: forests, meadows, xerothermic grasslands as well as peat-bogs and marshes characteristic of the Białowieża Primeval Forests, Podlaska Lowland, Lublin Upland, Sandomierz Basin, Roztocze, Low Beskid Mountains and the valleys of the Vistula, Bug and Wieprz rivers. Materials originating from the Polish National Parks, such as: the Białowieża, Biebrza, Babia Mountain, Bieszczady, Polesie, Roztocze and Tatra Mountains, are also represented. In the Lublin collection one may also encounter certain very rare, both in Poland and Europe, Thysanoptera species: *Ankothrips niezabitowskii*, *Aptinothrips karnyi*, *Thorybothrips unicolor*, *Thrips fulvipes*, *Thrips menyanthidis*, *Thrips praetermissus*, *Treherniella inferna*, *Lispothrips crassipes*.

Apart from Lublin, there are also smaller collections which can be found, among others, in the Department of Zoology of the University of Silesia in Katowice, where

Dr. M. POKUTA started a collection of Thysanoptera in the 1990s. This work has been continued most prominently by Dr. W. SIERKA. The above-mentioned collection consists of 108 species, which represent the fauna of a variety of sites in the south of Poland and Slovakia. In the Research Institute of Pomology and Floriculture in Skierniewice there exist 30 species (around 1500 specimens) significant for the farming environment, which were put together by Prof. G. ŁABANOWSKI from the beginning of the 1980s. The collection in University of Agriculture in Kraków prepared by Dr. M. POBOŻNIAK is similar to the latter (private communication from SIERKA, ŁABANOWSKI and POBOŻNIAK).

THE USE OF THYSANOPTERA COLLECTIONS

The collections referred to above have been compiled and developed mainly as part of scientific research. They provided the basis for many monographs which document the diversity of fauna from various Polish regions (ZAWIRSKA 1988; POKUTA 1991; SĘCZKOWSKA 1966; SIERKA & SIERKA 2004). In many cases they describe fauna for the first time, in others they attempt an assessment of changes which have taken place in the given environment over the course of time (KUCHARCZYK 1997). The analysis of specimens collected over many years also allows one to identify species, rate dangers (including eradication) and create lists of species at risk (KUCHARCZYK & KUCHARCZYK 2008).

Despite the fact that fauna research is not considered a priority today, the continuation of this research has had a positive effect on enlarging reference collections of insects. One outcome here is the verification of information regarding the presence on Polish territory of species which are absent in old, destroyed collections. Rich data collected from various regions in the country – in contrast to insufficient publications on the subject – allows one to trace changes in the spread of species. An example is the previously-mentioned verification in the Oettingen collection, where the collector made a mistaken identification of *Anaphothrips silvarum,* which turned out to be another very rare species – *Thermothrips mohelensis.* Note that the latter species has been recently placed on the Red List of the Threatened Species in the Czech Republic and has not been detected in Poland since 1940 (PELIKÁN 2005; KUCHARCZYK & ZAWIRSKA 2001). Another example is the re-discovery after over 100 years of *Ankothrips niezabitowskii*, described in the past by Schille and considered to be extinct in Poland (KUCHARCZYK 2006a).

A critical review of collections with large series of specimens also allows comparative morphological research into various taxonomic levels beginning with the importance range of the species to order and the investigation of relationships among higher units. One result of this is synonymy in the names of species, as, for example, in comparative work of Vierbergen between *Thrips roepkei* DOEKSEN, 1936 and *Thrips inopinatus* zur STRASSEN, 1963, which, after precise analysis, turned out to be the same species (VIERBERGEN 2004).

The opposite turned out with *Thrips atratus* Haliday, 1836 and *Thrips montanus* (PRIESNER, 1920). Their taxonomic status changed repeatedly since the time they

were first described. They were considered two different species, the former being an unidentified species, or a lowland and mountain form of the same species. Both morphological and morphometric investigations of adults and larvae and application of statistical programmes to process collected data seem to suggest the correctness of the first hypothesis (Fig.1) (KUCHARCZYK 2006b). Additionally, comparison of morphological features in many specimens of the two rather extensive type species *Thrips* and *Taeniothrips*, which are found in Palearctic, allowed the review of taxons at a general level (zur STRASSEN 1997).

Today, dynamically-developing phylogenetic research considers both morphological and genetic features of taxons (MOUND & MORRIS 2004; INOUE & SAKURAI 2007). Increasingly greater attention is paid when using molecular material – while creating a genetic data base – to simultaneous documentation in the form of a traditional collection of specimens.

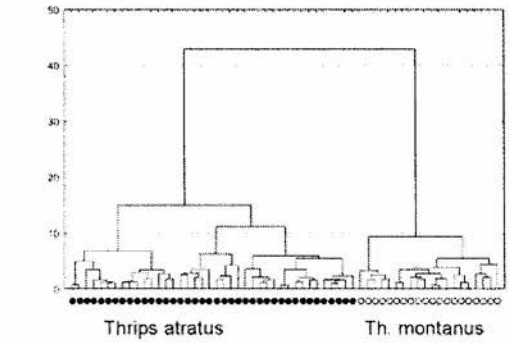
Commercial globalisation is one of the reasons for the fast spread of many species of pests, including Thysanoptera. Particularly alarming is the expansion of the pest species which constitute vectors for infectious plant viruses. It is crucial that those responsible for the identification of such insect pests be equipped with appropriate tools in the form of comparative material or a key for their recognition. Reference collections serve an important role in such cases, allowing exchange of material among specialists, to facilitate appropriate training of new personnel (Fig. 2).

Collections are the basis for multi-media presentations as well as establishing keys for species identification (MORRITZ et all 2001). For example, two large collections of Thysanoptera larvae from Lublin (already mentioned) and Wageningen (Holland) became the basis for a key to marking Thysanoptera larvae from the suborder *Terebrantia* found in Palearctic. This key has been supplemented with frequently-encountered invasive species originating in Europe and tropical countries (VIERBERGEN, KUCHARCZYK & NAKAHARA – forthcoming).

The didactic function of collections cannot be overestimated, as they can be applied in so many types and levels of training. In particular, in the case of the Lublin collection, specimens are constantly used in teaching entomology and systematic zoology at the Department of Zoology.

ISSUES WITH CONSERVATION AND USE OF COLLECTIONS

The main purpose of starting an entomological collection – as with any collection – is for that collection to serve subsequent generations, both as research and exhibition material. However, with small and unprepossessing insects such as Thysanoptera, collections are of use to a very narrow group of specialists. This fact does not excuse collectors from taking appropriate measures to preserve the specimens accordingly. Here, museums may appear a suitable destination, as they are generally accessible to the public and fulfill the functions of amassing collections and making them accessible, while they are also obliged to take preventative measures or the safekeeping of collections. Unfortunately, none of the Polish natural history museums has a collection of



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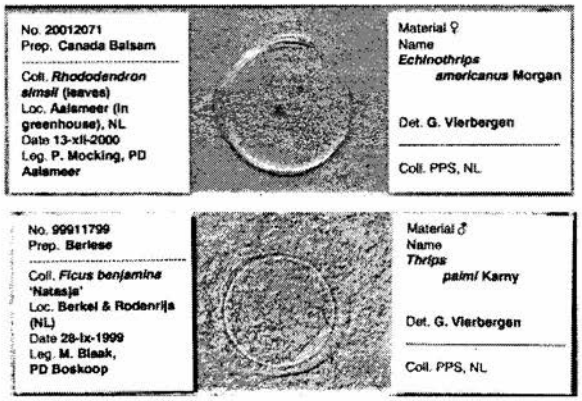

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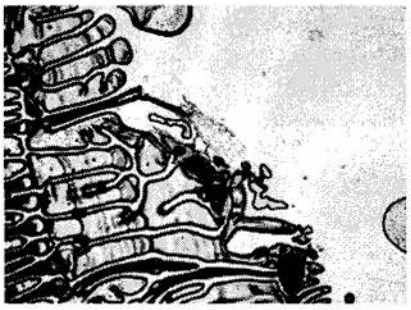

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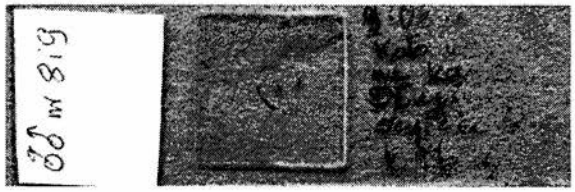

4

1. Example of use of the collected material - result of the cluster analysis for females, based on the quantitative features of 60 specimens of *Thrips atratus* and *Thrips montanus*; 2. Well-labelled slides of pest species – originating from exchange; 3. Slides with specimens damaged by drying of the liquid; 4. Poor labelling of slide making it difficult to identify in the future

Thysanoptera at present. As already discussed, the stormy history of this country had its impact on the fate of collections put together in the first half of the 20th century, while the lack of a systematic approach and the generally temporary character of collections by some individual researchers has caused the majority to perish. Today, Thysanoptera collections in many research centres have to be established from scratch and they soon become scattered, as they are used as comparative resource by a handful of specialists. Furthermore, the content of such collections is not made generally available.

Storage and conservation of Thysanoptera collections do not really cause major issues, as long as slides are appropriately mounted and labelled. The main negligence of which thysanopterologists in Poland have been guilty (which is also true of researchers into other groups of insects) is that collections are set up for the sole use of current research. Quick identification has normally taken priority, as well as data comparison. Hence, there is never sufficient time for the preparation of permanent slides in Canada balsam, especially given that the process is slow and painstaking (KIRK 1996; MOUND & KIBBY 1998). It is very rare that scientists concentrating on very narrow groups of life-forms work in teams or can afford to employ technical assistants to delegate slide preparation. Priority has always been on publishing research rather than establishing a lasting collection of specimens.

The identification of most Thysanoptera species requires the use of a microscope, likewise indispensable for the quick mounting of specimens in glycerine and Berlese's or similar liquids, which does not guarantee long-term preservation. The most frequent problem is mechanical damage of specimens as a result of excessive drying of the liquid due to air getting under the cover glass (Fig. 3) or sliding of the cover glass.

Larvae stages need to be observed, since, owing to their fine cuticula, they have to be submerged in Berlese's (or similar) liquid. To protect a specimen from being destroyed by air, the cover glass has to be additionally protected by a layer of resin from the recto, with the hardening fluid topped up as necessary. On the whole, slides need to be accessed infrequently and even more so after completing cataloguing. Temporary preparations are very seldom made into permanent ones.

Another drawback is poor labelling. Relying on memory and ignoring the needs of future users means that slides are labelled with abbreviations and symbols familiar only to a given collector. This can make future identification of the site, feeding plant, or collection date difficult or even impossible. Pens used for this purpose can fade with time, leaving only an unclear 'ghost' of the inscription (Fig. 4). Such resources are difficult to catalogue as well as refer to in monographs.

CONCLUSIONS

There is no doubt that the best place to keep entomological collections is an appropriate museum, staffed with specialists who are committed to their long-term supervision and upkeep and who will make them available to visiting researchers and general public. However, the public have always been more interested in impressive and colourful large specimens of butterflies and beetles, while the meaningful pre-

sentation of tiny life-forms of microscopic dimensions such as Thysanoptera would also require expensive optical equipment. Additionally, museums are always subject to their own limitations and donating Thysanoptera material to a museum might not be problem-free. Lack of personnel to make the material accessible may mean that painstakingly-collected specimens end up hidden away in a storehouse. Museums, as opposed to academic institutions, are perhaps more likely to be influenced by fashion and popular attitudes. Animal protection activists have for years lobbied museums to stop collecting zoological specimens which, in some cases, has led to the destruction historical entomological materials. For this reason, it seems that, in this country, individual researchers and their institutions will continue keeping small specialist collections themselves. It will be up to them and their successors whether their collections share the fate of the early assemblages, or in time become an important contribution to the development of Polish entomology.

Multimedia exhibitions using modern computer technology can be very helpful here. They offer the chance to preserve a collection as a sequence of documentary photographs, showing specific morphological features of specimens. In the Lublin collection, there is a virtually-complete photographic documentation of larvae and types of the recently-described Polish species. This database is systematically updated, first with rare or threatened species, and eventually incorporating all specimens in the Lublin Zoology Department. The painstaking work of placing the specimens which require it in Canada balsam and appropriate labelling also continues in the Department. The final step will be the creation of a digital bank of all known data from the Lublin collection and making it available togetherwith complete photographic documentation in the Internet.

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Description of male of *Laingia psammae* THEOBALD, 1922 with notes on its biology, distribution and host plants (Aphididae: Chaitophorinae)

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ABSTRACT. Apterous male of *Laingia psammae* THEOBALD, 1922 (Aphididae, Chaitophorinae: Siphini) is described and illustrated in detail. Notes on the biology, distribution as well as a list of host plants is given.

Key words: aphids, Siphini, male, bionomy, taxonomy.

INTRODUCTION

Laingia THEOBALD, 1922 is a monotypic genus belonging to the tribe Siphini (Aphididae: Chaitophorinae) which comprises 1 species: *L. psammae* THEOBALD, 1922. Apterous viviparous female is characterized by the body elongate and narrow, dorsum partially membranous with visible sculpture; dorsal hairs short and spiny. Antennae are short, 5-segmented, rostrum is also short, with an apical segment blunt, without secondary hairs. First tarsal segments with 5 hairs, empodial hairs pointed. Siphunculi are pore-shaped, placed on abdominal segment VI, cauda is broadly rounded. Apterous viviparous female was described and figured by THEOBALD (1922) and redescribed by IVANOVSKAYA (1977), STROYAN (1977), HEIE (1982), SZELEGIEWICZ (1985) and NIETO NAFRIA & MIER DURANTE (1998). A short description of alate viviparous female was given by STROYAN (1977), redescribed by HEIE (1982), SZELEGIEWICZ (1985) and NIETO NAFRIA & MIER DURANTE (1998). Description of oviparous female was given by NIETO NAFRIA & MIER DURANTE (1998) and WOOD-BAKER & HOPKINS (1998), whereas the only data about males was the number of secondary rhinaria on antenna (NIETO NAFRIA & MIER DURANTE 1998).

MATERIAL AND METHODS

MATERIAL EXAMINED

From Museum National d'Histoire Naturelle, Paris, France: Iran, Lashgarat, 23 XI 1962, *Graminae*, leg. REMAUDIERE, 2 males.

External structures were examined using a light microscope Nikon Eclipse 600. Measurements are given in mm (Table 1).

Laingia psammae THEOBALD, 1922

DESCRIPTION OF MALE

Apterous male (Fig. 1a). Coloration of live specimens: unknown; pigmentation when mounted: yellowish. Body elongate, slender; 1.20-1.40 mm long and 0.64-0.67 mm width. Body membranous, head and prothorax not fused. Sculpture visible – the body covered with rows of short spinules. Dorsal chaetotaxy: hairs fine, short 0.03-0.05 mm long, arranged in three visible rows, pointed. Head chaetotaxy: hairs pointed, 0.075-0.10 mm long. Antennae (Fig. 1b) long, reaching just to II segment of abdomen, 5-segmented, 0.47-0.53 times the body length. Processus terminalis 1.50-3.50 times the base, other antennal ratios are: Vb : III 0.68-0.72; V : III 0.95-1.10; V : IV 2.70-3.50. Antennal chaetotaxy: segment I with 3 hairs; segment II with 2 hairs; segment III with 3 hairs; segment IV with 1 hair; Va with 0-1 hair. Antennal hairs short, the longest antennal hair III as long as the basal articular diameter of this segment. Segment III with 20-22, segment IV with 5-9 roundish secondary rhinaria. Frons subconical. Eyes with distinct ocular tubercles. Rostrum (Fig. 1c) short, reaching second coxae with an apical segment (RAS) short, about 0.07 mm long, 0.27-0.31 times III antennal segment and 0.54-0.58 times II segment of hind tarsus (II HT), without secondary hairs. First tarsal segments with 5 hairs, empodial hairs pointed. Siphunculi placed on abdominal segment VI, pore-shaped, 0.025 mm in basal diameter. Cauda broadly rounded, 0.07 mm width with 2 0.005 mm long hairs. Genitalia (Fig. 1d) not well developed, weakly sclerotised.

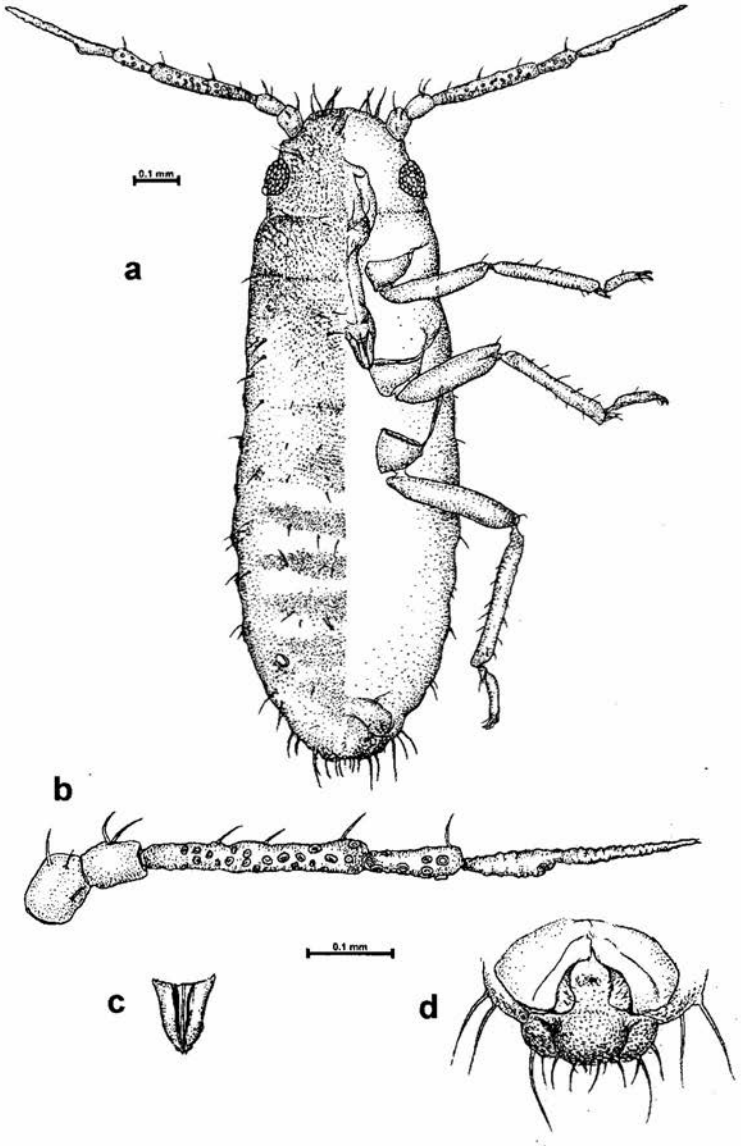
no.	body	antenna	antennal segments			apical segment of rostrum	hind tarsus
			III	IV	V: (Va+Vb)		
1	1.40	0.67	0.22	0.09	0.10+0.15	0.07	0.12
2	1.20	0.64	0.22	0.06	0.05+0.16	0.07	0.11

Table 1. Measurements of apterous male in mm. (lengths)

DISTRIBUTION AND BIOLOGY

Geographical distribution (Fig. 2): China (QIAO & ZHANG 2002: 762); Czech Republic (HOLMAN & PINTERA 1977: 104); Denmark (Jutland: HEIE 1982: 144-145); Finland (Helsinki, Tikkurila, Mustavuori: HEIKINHEIMO 1966: 1, HULDEN & HEIKINHEIMO 1984: 118, Nylandia, Savonia australis: ALBRECHT 2007: 7); France (Banyuls, Foutainebleau: MNHM Collection); Germany (HILLE RIS LAMBERS 1939: 87, BÖRNER 1952: 53-54); Greece (TSITSIPIS et al. 2007: 35); Hungary (Potharasztupuszta: SZELEGIEWICZ 1966: 183, 1968: 16, 1977: 88-89); Iran (near Sananday, Hadjiabad, Lashgarat, Gatch-i-sar: MNHM Collection); Ireland (WOOD-BAKER 1943-1944: 140); Italy (Sicilia: ROBERT 1990-1991: 130, Sicilia: BARBAGALLO et al. 1995: 21); Kazakhstan (Central Kazakhstan: SMAILOVA 1971:

21); the Netherlands (HILLE RIS LAMBERS 1939: 87); Russia (Pskov, vicinity of Moskva, NARZIKULOV 1962: 217-218; West Siberia-Kulundynski Steppe, Kluczi: IVANOVSKAYA 1958: 127, 1976: 179, 1977: 235; BOZHKO 1959: 22, SHAPOSHNIKOV 1964: 543; Khabarovsk Territory, Yakutia: PASTSHENKO 1988: 83); Slovakia (HOLMAN & PINTERA 1977: 104);



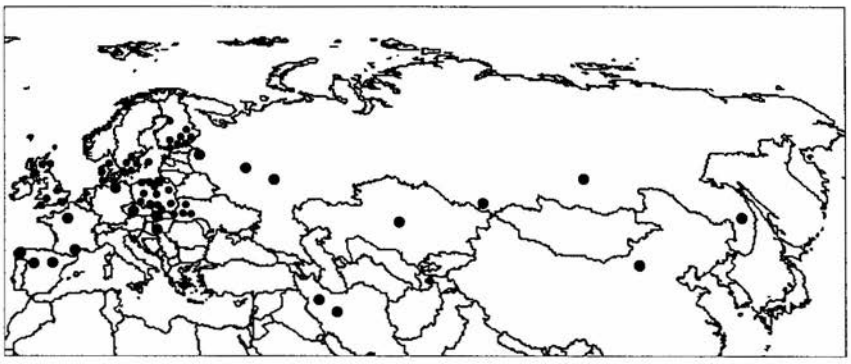
1. *Laingia psammae* – male: a. general feature, b. antenna, c. apical segment of rostrum, d. genitalia

Spain (Pontevedra, Teruel, Zamora Provinces: NIETO NAFRIA & MIER DURANTE 1998: 359-362); Sweden (Falstebro, Angelholm, Halmstad, Tofta, Örebro, Uppsala, Medlker, Näverkärret, Taserud, NÍntuna: OSSIANNILSSON 1959: 389, 1969: 40); Tajikistan (Wahska Valley: NARZIKULOV 1962: 217-218); Ukraine (MAMONTOVA 1959: 68, Berehovo: MAMONTOVA-SOLUCHA 1963: 28, Szaćkyj National Park, Volynska distr.: 1964: 62, CHUMAK 2004: 55); United Kingdom (Littlestone-Kent Type Locality: THEOBALD 1922: 29-43, Gunwalloe, Hayle (Cornwall): WOOD-BAKER 1964: 45; Aberdeen: SHAW 1964: 78; 1977: 34-36, Morlich: STROYAN 1976: 252; Winterton Dunes-Norfolk: WOOD-BAKER & HOPKINS 1998: 271).

In Poland has been collected in: Karwia (SZELEGIEWICZ 1965); Kąty Rybackie, Przebrno, Krynica Morska (SZELEGIEWICZ 1974); Jastarnia, Władysławowo, Gdańsk-Górki Wschodnie (SZELEGIEWICZ 1976); Kalisz Pomorski (PŁACHTA et al. 1996); Olsztyn-Kortowo (HUCULAK 1966); Poznań (ACHREMOWICZ 1967; ZŁOTKOWSKI 1987); Warszawa (SZELEGIEWICZ 1965); vicinity of Dolistowo (CZYLOK et al. 1982); Osola (ACHREMOWICZ 1990); Chrzanów (OLESIŃSKI & SZELEGIEWICZ 1974); vicinity of Huta Katowice (KLIMASZEWSKI et al. 1980); Wojkowice (CZYLOK et al. 1991); Katowice (CZYLOK et al. 1991; WIECZOREK 25.07.2006, US); Siewierska Hill (WIECZOREK 27.06.2008, US.); Błędowska Desert (WOJCIECHOWSKI & WOZNICA 1989); Częstochowska Highland – vicinity of Olsztyn, Brodło Hill, Zamkowe Hill, Lipówka Mt. (HAŁAJ & WOJCIECHOWSKI 1996); Częstochowska Highland – Brodło Hill, vicinity of Ciecierzyna, Potok Złoty (HAŁAJ & WOJCIECHOWSKI 1997); Ojcowski National Park (OSIADACZ 15.07.2005, US); vicinity of Pińczów (CZYLOK 1983); vicinity of Krzyżanowice (CZYLOK & WOJCIECHOWSKI 1987); Kolbuszowa Plateau (DURAK & WOJCIECHOWSKI 2005); Żywiecka Dale – Bierna, Radziechowy-Wieprz (KARWAŃSKA 1991).

Palaearctic species common round the coast (e.g. the North Sea coast, Baltic region) as well as on inland localities (e.g. Central Asia).

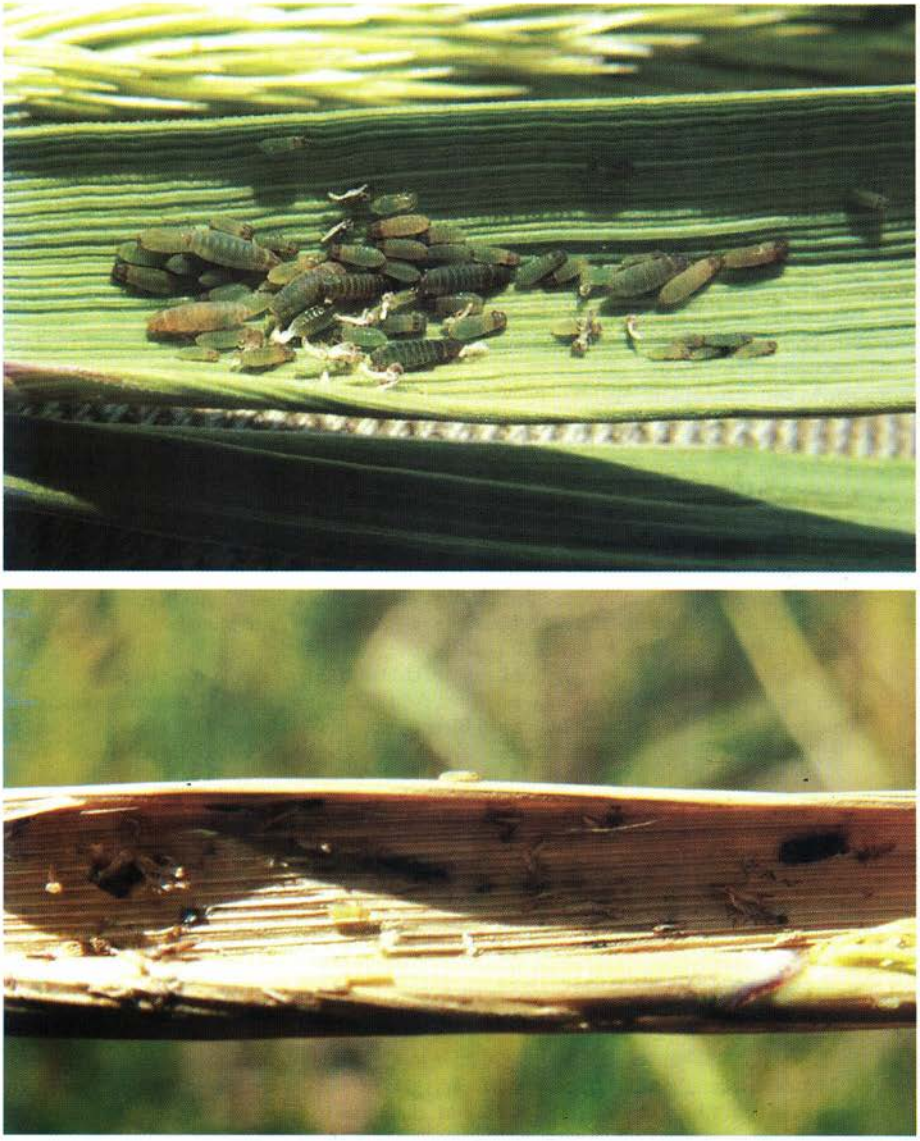
Host Plant: The main host plant of this species is *Calamagrostis epigejos* (L.) ROTH, but also have been collected from: *Agropyron cristatum* (L.) GAERTN., *Alopecurus pratensis* L., *Ammophila arenaria* (L.) LINK, *Calamagrostis arundinacea* (L.) ROTH, *C. villosa* (CHAIX) J. F.GMEL., *Dactylis glomerata* L., *Deschampsia caespitosa* (L.)



2. *Laingia psammae* - geographical distribution

P. BEAUV., *Elymus repens* (L.) GOULD., *Holcus lanatus* L., *Koeleria macrantha* (LADEB.) SCHULT, *Panicum* sp., *Phleum pretense* L., *Setaria* sp., *Carex acutifornis* EHRH.

Life History: Fundatrix is unknown. In spring dense colonies of apterous viviparous females (dirty yellow to greyish green with brown head - Fig. 3) and juvenils (light green – Fig. 3) live on steams, the upper side of leaves or head of grasses. In the mid-



3, 4. *Laingia psammae* – life cycle: 3 – apterous viviparous females and juveniles; 4 – exuviae of apterous viviparous females

dle of the summer colonies on steams and the upperside of leaves are less numerous (black exuviae are visible among the living aphids - Fig. 4), the individuals usually live in head of grasses. Alate viviparous females (with head and thorax dark brown and green abdomen – not shown) are rare, occur at the beginning of June. Oviparous apterous females occur in autumn, but have also been observed in May (Iran) and June (France, Spain); males occur in October (not shown). The aphids are sometimes attended by ants.

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Redescription of sexuales of *Sipha* (*Rungsia*) *arenarii* MORDVILKO, 1921 with remarks on its biology, host plants and distribution (Aphididae: Chaitophorinae)

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ABSTRACT. Oviparous female and male of *Sipha* (*Rungsia*) *arenarii* MORDVILKO, 1921 (Aphididae, Chaitophorinae: Siphini) are redescribed and illustrated in detail. Notes on the biology, distribution as well as host plants are given.

Key words: aphids, Siphini, sexuales, bionomy, taxonomy.

INTRODUCTION

Sipha (*Rungsia*) *arenarii* is a monoecious and holocyclic species belonging to the tribe Siphini and subfamily Chaitophorinae. Short description of apterous viviparous female was given by MORDVILKO (1921) in his key to the aphids of the European part of the USSR. He later added further data on host plant (1929) and distribution (1948). A detailed redescription of apterous viviparous female and description of alate viviparous female was given by NARZIKULOV (1962). These forms have also been redescribed by IVANOVSKAYA (1977), HEIE (1982), SZELEGIEWICZ (1985) and QIAO & ZHANG (2002). Sexuales - oviparous female and apterous male, with the exception of a short description given by HEIE (1982) and SZELEGIEWICZ (1985), have never been described in details.

MATERIAL AND METHODS

Material examined: from Zoological Museum University of Copenhagen: Denmark, Humblebak, 06 X 1966, *Elymus arenarius*, HILLE RIS LAMBERS leg., 3 ovip.; from Department of Zoology, University of Silesia, Katowice: Poland, Bukowno, 12 X 2007, *Leymus arenarius*, K. WIECZOREK leg., 8 ovip., 7 males.

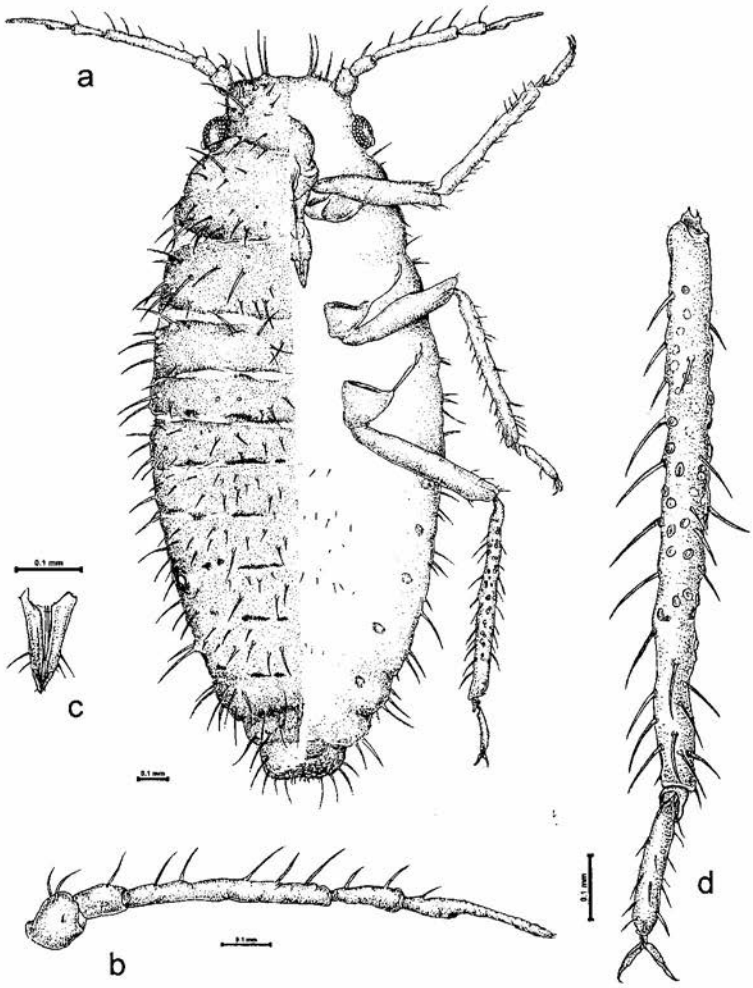
External structures were examined using a light microscope Nikon Eclipse 600. Measurements are given in mm (Table 1 and 2).

Sipha (*Rungsia*) *arenarii* MORDVILKO, 1921

REDESCRIPTION

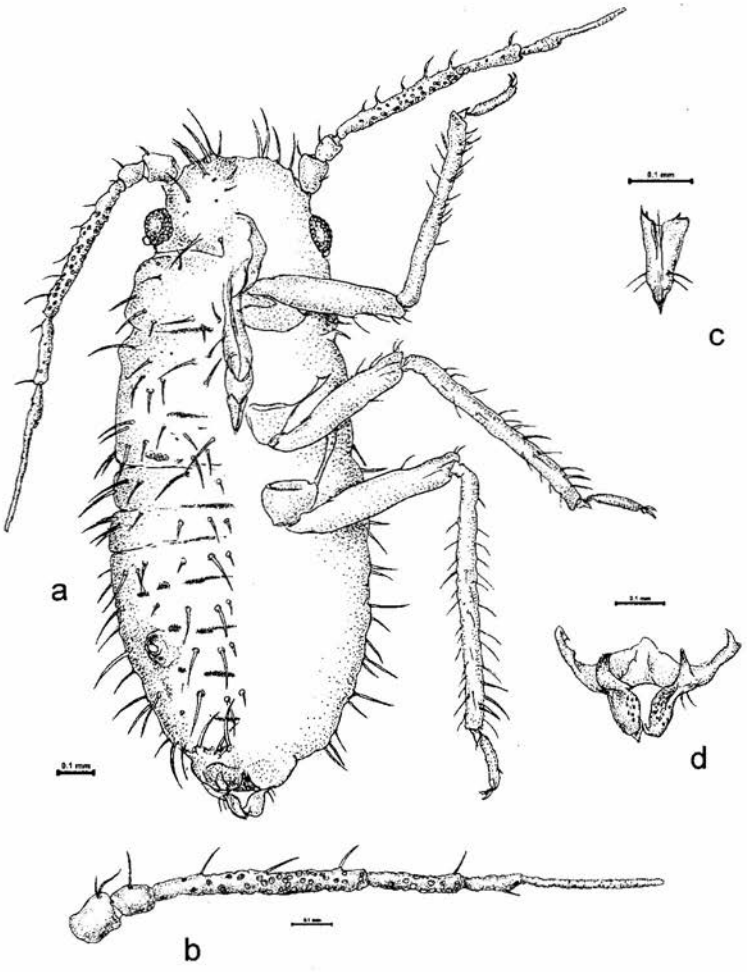
Oviparous female (Fig. 1a). Coloration of live specimens: yellow with dark green stripes; pigmentation when mounted: pale except for apices of tarsi and hind tibiae, which are dusky. Body elongate, ovate, 2.05-2.42 mm long and 0.90-1.1 mm width. Head and prothorax not fused. Abdominal tergites sclerotized, II-VII fused, with small

marginal, pleural and spinal plates. Sculpture not visible, with the exception of abdominal tergites VI-VIII, cauda and anal plate, which are densely covered with rows of minute spinules. Dorsal chaetotaxy: hairs numerous, pointed, not arranged in visible rows; on the margin of thorax and abdomen 0.075-0.1 mm long, segments VI-VIII with spiny 0.12-0.15 mm long hairs; across tergites 0.04-0.06 mm long and 0.075-0.11 mm long hairs. Head chaetotaxy: hairs numerous 0.05-0.10 mm long and 0.12-0.15 mm long. Antennae (Fig. 1b) reaching just to middle of mesothorax, 5-segmented, 0.30-0.37 times the body length. Processus terminalis (Vb) about 2.0-2.2 times the base (Va); other antennal ratios are: Vb : III 0.57-0.68; V : III 0.85-1.0; V : IV 2.2-2.5. Antennal



1. *Sipha* (*R.*) *arenarii* - oviparous female: a – general feature, b – antenna, c – apical segment of rostrum, d – hind tibia and tarsus

chaetotaxy: segment I with 3 hairs; segment II with 1-2 hairs; segment III with 5-9 hairs; segment IV with 1-2 hairs; Va with 0-1 hair and 3-4 small sense-hairs at the tip of the processus terminalis; the longest antennal hair III 2-3 times the basal articular diameter of this segment. Frons subconical. Eyes with distinct ocular tubercles. Rostrum short, reaching second coxae, with an apical segment (RAS) (Fig. 1c), short about 0.10 mm long, 0.28-0.45 times III antennal segment and 0.58-0.62 times II segment of hind tarsus (II HT), with 2 secondary hairs. Legs hairy, hind tibiae slightly thickened with 36-44 roundish or irregularly shaped plates on the whole surface of the tibiae; first tarsal segments with 5 hairs, empodial hairs pointed (Fig. 1d). Siphunculi placed on abdominal segment V, short, conical, 0.045 mm in basal diameter. Cauda 0.15 mm width, broadly rounded, with 3 pointed about 0.10 mm long hairs.



2. *S.* (*R.*) *arenarii* - male: a – general feature, b – antenna, c – apical segment of rostrum, d – genitalia

no.	body	antenna	antennal segments			apical segment of rostrum	hind tarsus
			III	IV	V: (Va+Vb)		
1	2.05	0.63	0.22	0.09	0.07+0.14	0.1	0.17
2	2.32	0.71	0.25	0.10	0.075+0.17	0.1	0.17
3	2.42	0.90	0.35	0.12	0.10+0.20	0.1	0.17
4	2.07	0.67	0.25	0.10	0.075+0.15	0.1	0.16

Table 1. Measurements of oviparous apterous female in mm. (lengths)

Apterous male (Fig. 2a). Coloration of live specimens: brown; pigmentation when mounted: yellowish, genitalia and dorsal sclerites dusky. Body elongate, slender; 1.40-1.60 mm long and 0.55-0.60 mm width. Head, thorax and abdominal segment I free, abdominal segments II-VII fused. Abdominal segments with very small marginal, pleural and spinal sclerites. Dorsal chaetotaxy: hairs arrange in marginal pleural and spinal rows, 0.10-0.12 mm long, pointed. Head chaetotaxy: hairs pointed, frontal ones 0.12-0.15 mm long, discal ones 0.05-0.075 mm long. Antennae (Fig. 2b) long, reaching just to II segment of abdomen, 5-segmented, 0.56-0.67 times the body length. Processus terminalis very long, about 2.10-2.50 times the base, other antennal ratios are: Vb : III 0.45-0.82; V : III 0.67-1.20; V : IV 1.47-2.30. Antennal chaetotaxy: segment I with 2-3 hairs; segment II with 1-2 hairs; segment III with 3-6 hairs; segment IV with 1 hair; Va with 1 hair. Antennal hairs long, the longest antennal hair III about 3.0 times the basal articular diameter of this segment. Segment III with 30-49, segment IV with 12-17 roundish secondary rhinaria. Frons subconical. Eyes with distinct ocular tubercles. Rostrum short, reaching second coxae, with an apical segment (Fig. 2c) short, about 0.10 mm long, 0.27-0.34 times III antennal segment and 0.57-0.73 times II segment of hind tarsus, with 2 secondary hairs. First tarsal segments with 5 hairs, empodial hairs pointed. Siphunculi placed on abdominal segment V, conical, short, 0.025 mm in basal diameter. Cauda broadly rounded, 0.1-0.12 mm width. Genitalia (Fig. 2d) well-developed, strongly sclerotised, dark.

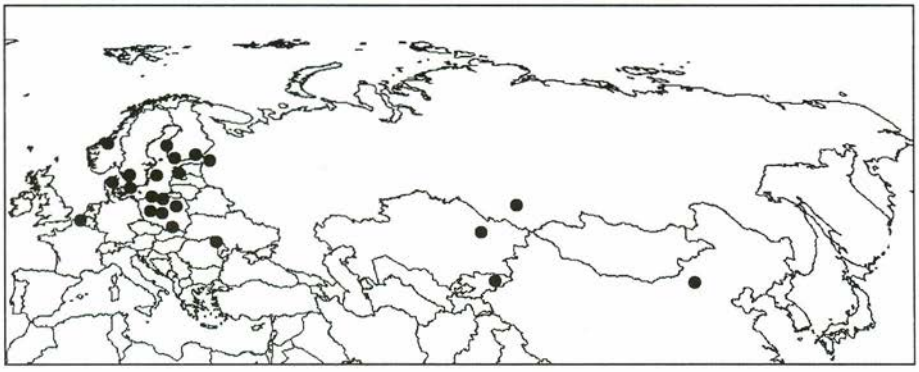
no.	body	antenna	antennal segments			apical segment of rostrum	hind tarsus
			III	IV	V: (Va+Vb)		
1	1.60	0.90	0.37	0.17	0.075+0.17	0.11	0.15
2	1.55	0.96	0.29	0.15	0.11+0.24	0.10	0.175
3	1.57	1.0	0.36	0.15	0.10+0.25	0.11	0.15
4	1.40	0.95	0.32	0.15	0.01+0.22	0.11	0.16

Table 2. Measurements of apterous male in mm. (lengths)

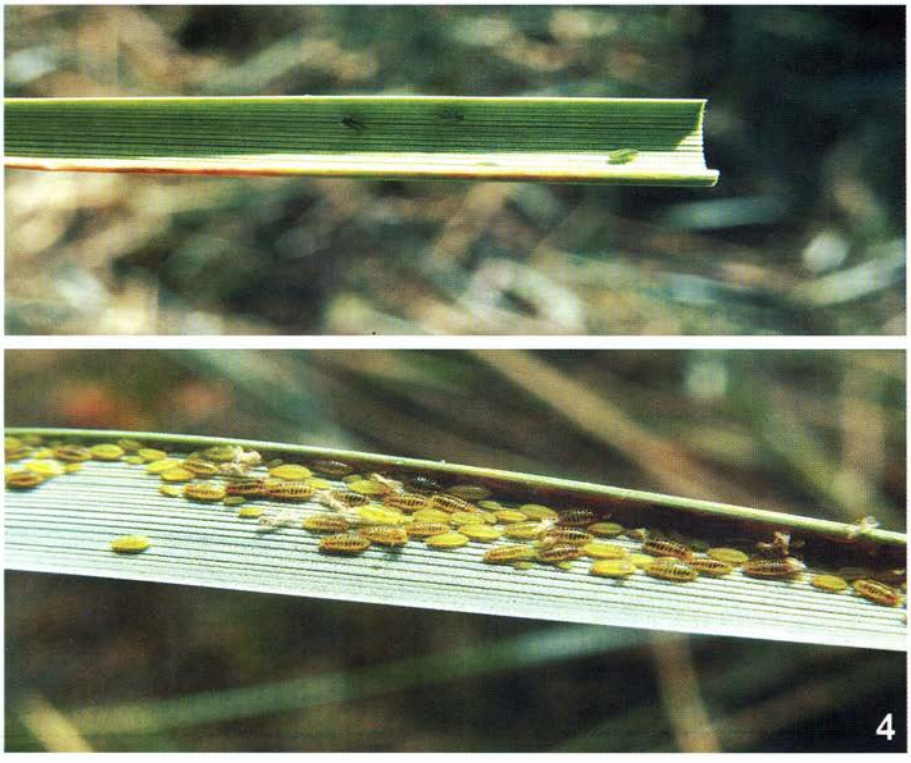
DISTRIBUTION AND BIOLOGY

Geographical Distribution (Fig. 3): Belgium (NIETO NAFRIA et al. 1999); China (QIAO & ZHANG 2002), Denmark (Humblebaek: HEIE 1982); Finland (HULDEN & HEIKINHEIMO 1984, Nyland, Karelia, Satakunta: ALBRECHT 2007), Kazakhstan (SHAPOSHNIKOV 1964;

JUCHNEVITH 1968), Latvia (Garciems: RUPAIS 1989), Moldova (Tuzora: BOZHKO 1957, VERESHAGIN et al. 1985), Norway (Bř: OSSIANNILSSON 1962); Russia (St. Petersburg: MORDVILKO 1948, SHAPOSHNIKOV 1964, West Siberia - Ust-Tshurulka: IVANOVSKAYA 1977), Sweden (Skĺne, Halland, Gotland: OSSIANNILSSON 1969) Tajikistan (Wahzska Valley: NARZIKULOV 1962).



3. *S.* (*R.*) *arenarii* - geographical distribution



4. *S.* (*R.*) *arenarii* - life cycle: above – fundatrix, below – apterous viviparous females

In Poland has been collected in: Władysławowo (SZELEGIEWICZ 1968); Sztutowo, Kąty Rybackie, Przebrno, Krynica Morska (SZELEGIEWICZ 1974) Karwia, Jastarnia (SZELEGIEWICZ 1976), Olsztyn-Dajtki (SZELEGIEWICZ 1975), Bydgoszcz (SZELEGIEWICZ 1965), Poznań (ACHREMOWICZ 1972; SZELEGIEWICZ 1985), Warszawa (SZELEGIEWICZ 1965), Błędowska Desert (WOJCIECHOWSKI et al. 1989), Bukowno (WIECZOREK, 23.06.07, US).

Host Plant: The main host plant of this species is *Leymus arenarius* (L.) HOCHST., however, in Tajikistan, Vahzska Valley (NARZIKULOV 1962:222) apterous and alate viviparous females were collected from *Avena ludoviciana* DUR., whereas in Moldova from *Agropyrum intermedium* (HOST) P. BEAUV.

Life History: Fundatrix (green - Fig. 4 above) and its offspring appear in the middle of April. The colonies of apterous viviparous females (yellow with greenish longitudinal stripes - Fig. 4 below) live on the uppersides and undersides of leaves until the end of

5. *S.* (*R.*) *arenarii* - life cycle: above – apterous viviparous females and alate viviparous female, below – oviparous apterous female and male

October. Alate viviparous females (with head and thorax dark and green abdomen - Fig. 5 above), less numerous than apterous females, occur in the middle of June and have been observed until August. Sexuales (Fig. 5 below) – oviparous apterous females (yellow with dark green stripes) and apterous males (brown) occur in September and have been observed until the end of October. The aphids are usually attended by ants.

This species is connected with very arid environments; in Poland with dune areas on Baltic-Sea Coast, as well as inland dunes and sand-pits (e.g. Bukowno).

ACKNOWLEDGEMENTS

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The appearance and changeability of *Balclutha calamagrostis* OSSIANNILSSON, 1961 in the area of Częstochowa (Hemiptera: Cicadomorpha)

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ABSTRACT. During many years of the research on planthoppers and leafhoppers (Hemiptera: Cicadomorpha), non-typical specimens of *Balclutha calamagrostis* OSSIANNILSSON, 1961 have been found. These unique forms had the characteristic feature of strong curved top of aedeagus. Also found was one, little, damaged specimen, very similar to species *Balclutha saltuella* (KIRSCHBAUM, 1868). Additionally, on the basis of results gathered during the research of species *Balclutha calamagrostis* OSSIANNILSSON, 1961, it seems that it occurs in a larger amount than it was earlier considered. It can be found in many different ecosystems, both in the natural habitat and the one changed and destroyed by man.

Key words: Insecta, Hemiptera, Cicadomorpha, dominance structure, untypical aedeagus, *Balclutha calamagrostis, Balclutha saltuella.*

INTRODUCTION

Balclutha calamagrostis OSSIANNILSSON, 1961 was found in Poland for the first time in Upper Silesia in a grassland in the area of the sand mine between Jaworzno-Szczakowa and Bukowno (SZWEDO 1996). This species is one of the eight occuring in Europe. At the same time, only four species representing the genus *Balclutha* KIRKALDY, 1900 (NAST 1972; NAST 1987; NAST & CHUDZICKA 1990; SZWEDO 1996; BOGDANOWICZ et al. 2004) are known from Poland.

During the research in the area of Częstochowa in the collected material, three species of genus *Balclutha* have been fand. Species *B. calamagrostis* was recognized as a very rare type in Poland. It was also found that *B. calamagrostis* was the most popular species among the representatives of genus *Balclutha*. Moreover, it manifested the greatest changeability of external structure and of the male copulatory organs.

THE AREA OF THE RESEARCH

Planthoppers and leafhoppers were collected in the following places in Częstochowa (Map):

– Termophilous grassland *Festuco-Brometea* and *Trifolio-Geranietea sanguinei* class inhabiting limestone bedrock soil: plot 1 (Kamieniołom Hill), plot 2 (Ossona Hill), plot 3 (Sołek Hill).

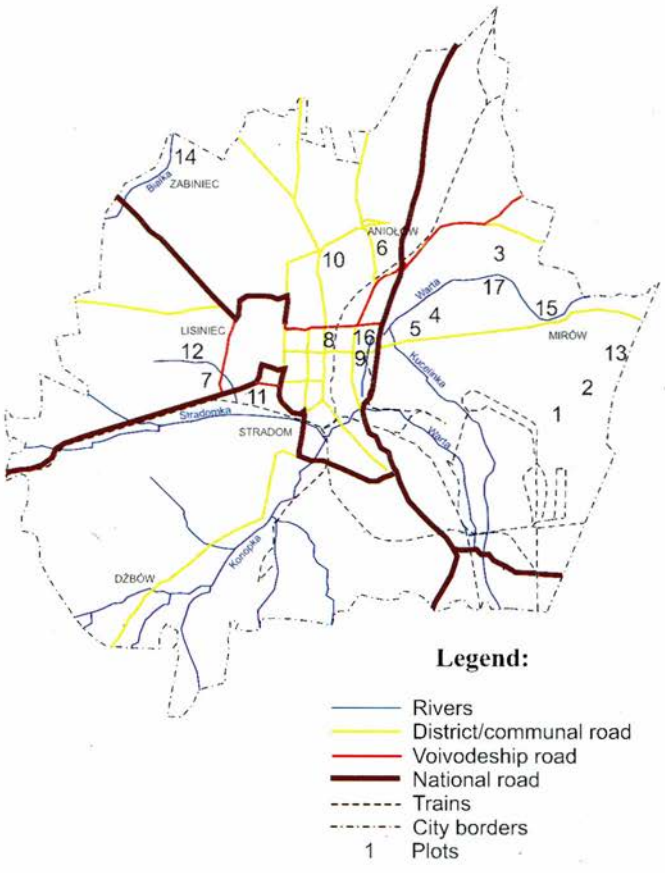
– Termophilous assemblage of *Koelerio glaucae-Corynephoretea canescentis* class on sandy soil: plot 4 (District Mirów, Srebrna street).

– Waste grounds in the city: *Agropyretea intermedio-Repentis* class on limestone bedrock soil plot 5 (District Mirów, Złota Street) and meadow with species of plants from class *Molinio-Arrhenatheretea* and *Artemisietea vulgaris* class – plot 6 (District Kule).

– The urban greenery representing the *Plantaginetea-Majoris* class with dominating *Lolio-Plantaginetum* community: sidewalk lawns plot 7 (District Lisiniec), plot 8 (Armii Krajowej Avenue) parks lawn (plot 9 – Narutowicza Park, as well as plot 10 – Tysiąclecia Park).

– Ruderal habitats with vegetation from class: *Agropyretea intermedio-Repentis*, as well as *Artemisietea vulgaris* – plot 11 (railway embankment on District Stradom).

– Areas of deciduous and spruce forests: plot 12 (Lisiniec Park – field-layer vegetation representing *Molinio-Arrhenatheretea* class with *Arrhenatherion elatioris* community), plot 13 (Kokocówka Hill – *Carpinus betulus-Quercus robur* forest with field-layer vegetation of *Trifolio-Geranietea sanguinei* class), as well as plot 14 (District



Map. Distribution of examined plots within Częstochowa city

Żabiniec – mixed pine forest by Ikara Street *Querceto-Pinetum* class).

– Humid habitats: termofilous margin vegetation representing *Artemisietea vulgaris* class with *Urtico-Aegopodietum podagrariae* located on the Warta River bank (plot 15 – District Mirów Mirowska Street, plot 16 – the Old Town), and swamp vegetation of *Phragmitetea* class *Magnocaricion* community (plot 17 – northern part of District Mirów). Floral vegetation nomenclature follows MATUSZKIEWICZ (2001).

THE MATERIAL AND THE RESEARCH METHODS

The research of planthoppers and leafhoppers (Hemiptera: Fulgoromorpha and Cicadomorpha) within the administrative boundaries of Częstochowa was conducted in 2005-2007. The specimens were collected using an entomological net. Classic quantitative and qualitative methods used, the same as in the previous researches of Hemiptera (GĘBICKI et al.1977; KLIMASZEWSKI et al. 1980a, 1980b). The quantitative method was employed in the assemblage of grass and green communities in the forest areas. The samples consisting of 100 sweeps (4 x 25) were taken at each site with a circular net (30 cm in diameter) along 4 estabilished transects. The material was collected from the beginning of May to the first half of October every fortnight, however, because of uncertain weather conditions, the date of the collection was sometimes postponed one or two days.

Moreover, bounties of planthoppers and leafhoppers were collected using a qualitative method. The data connected with the presence of genus *Balclutha* was formulated on the basis of analytical and synthetical indexes, such as domination and persistence of appearance (KASPRZAK & NIEDBAŁA 1981). There are 6 classes of dominations: SD superdominant (participation of 40.01% of individuals), ED – eudominant (30.01-40%), D – dominant (20.01-30%), sD – subdominant (7.51-20%), R – recedent (2.51-7.5%), sR – subrecedent (under 2,5%). Four constancy classes, which is used as the criteria to define the degree of the species' attachment to a given environment, were determined: euconstant species – 75.1-100% samples (absolutely fixed) constant species – 50.1-75% samples, accessory species – 25.1-50% samples, accidental species under 25% samples (Tab. 1). For the purpose of the discussion of the species *B. calamagrostis* and preparing the ecological analysis of the gathered material, information from the publications of NICKEL & REMANE (2002), DLABOLA (1954), LAUTERER (1995), NICKEL (2003), OSSIANNILSSON (1983) and REMANE (1987) was used.

The material was determined on the basis of the build of the males' copulatory organs according to the publications of RIBAUT (1952), OSSIANNILSSON (1983), KNIGHT (1987), BIEDERMANN & NIEDRINGHAUSE (2004).

The species of genus *Balclutha* are difficult to distinguish between because of their close resemblance. Especially *B. rhenana* species WAGNER, 1939 is similar to *B. calamagrostis*. It may be the reason why the species *B. calamagrostis* was found very late in Poland (SZWEDO 1996).

THE KEY TO DETERMINATION OF POLISH SPECIES OF *BALCLUTHA* KIRKALDY, 1900 (FROM: OSSIANNILSSON, 1983, WITH SOME CHANGES)

1. Pronotum distinctly wider than head. Fore wings usually opaque. Hind wings apically fumose (around vein R + M) ..... **2.**
-. Pronotum are equal or only slightly wider than head. Fore wings hyaline. Hind wings not pigmented ..... **3.**
2. Smaller, 3.6-4.1 mm. Shaft of aedeagus very slender, apically almost straight. Second apical cell in fore wing 2.5-3 times as long as wide.
..... ***B. punctata* (FABRICIUS, 1775).**
-. Larger, 4.0-4.9 mm. Shaft of aedeagus strongly curved. Second apical cell in fore wing 3.5-4.3 times as long as wide.
..... ***B. boica* WAGNER, 1950.**
3. Larger, 3.7-3.9 mm. Shaft of aedeagus strongly and evenly curved.
..... ***B. rhenana* WAGNER, 1939.**
-. Smaller, 3.3-3.65 mm. Shaft of aedeagus less strongly curved, apical part almost straight.
..... ***B. calamagrostis* OSSIANNILSSON, 1961.**

B. calamagrostis has a small, extended body of dark-yellow or yellow-green colours. On the front pair of wings it has light yellow veins, and 6-8 small dark spots. The abdomen site is usually black.

B. calamagrostis is a xerophile and a heliophile which usually prefers sandy localities and a first degree monophage connected with *Calamagrostis epigeios*. It produces one generation in a year, which winters in the adult stage (OSSIANNILSSON 1983). The North European species is known from Scandinavia, Estonia, Lithuania,

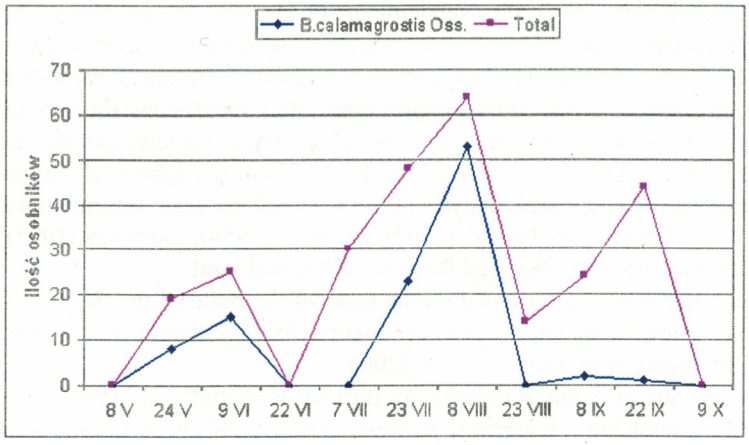


Fig. 1. Percentage % of *Balclutha calamagrostis* OSSIANNILSSON, 1961 among dynamics of planthoppers and leafhoppers on plot 11

Latvia, German, Austria, Czech and Slovakia (DLABOLA 1954; OSSIANNILSSON 1983; REMANE 1987; NAST 1987; LAUTERER 1995; NICKEL & REMANE 2002, NICKEL 2003), in Poland it was found on several posts in the Southern part of the country (SZWEDO 1996; ŚWIERCZEWSKI & GĘBICKI 2004; SIMON & SZWEDO 2005; WALCZAK 2005).

RESULTS AND DISCUSSION

After examining the material collected in 2005, it seemed at first that all collected specimens belonged to *Balclutha rhenana* species. However, detailed study revealed that there are some individuals which are much smaller than the key description given by OSSIANILSSON (1983), so more insects were collected for thorough analyses. According to these, most investigated specimen were identified as *B. calamagrostis*, only a few represented *B. rhenana*. Morover, some species belonged to *B. punctata* (FABRICIUS, 1775). Summing up, 32 specimens of *B. punctata* species were collected, 33 of *B. rhenana* and 215 specimens of *B. calamagrostis*.

Tab. 1. Species of genus *Balclutha* KIRKALDY, 1900, in accordance to dominancy, premium % grade and constancy classes in the communities of particular plots (ED – eudominant, D – dominant, sD – subdominant, R – recedent, sR – subrecedent, EC – euconstant species, C – constant species, Ac – accessory species, Ad – accidental species)

plots	*Balclutha punctata* (FABRICIUS, 1775)			*Balclutha rhenana* WAGNER, 1939			*Balclutha calamagrostis* OSSIANNILSSON, 1961		
	accordance to dominancy	premium % grade	constancy classes	accordance to dominancy	premium % grade	constancy classes	accordance to dominancy	premium % grade	constancy classes
1	-	-	-	-	-	-	sR	1.42	27.3
2	-	-	-	-	-	-	R	3.87	45.4
3	-	-	-	-	-	-	sR	0.77	18.2
4	-	-	-	-	-	-	sR	0.40	18.2
5		-	-	-	-	-	R	5.63	45.4
6	sR	0.11	9.1	-	-	-	sR	0.74	27.3
7	-	-	-	-	-	-	sR	0.71	54.5
8	-	-	-	-	-	-	sR	0.70	27.3
9	-	-	-	-	-	-	sR	0.22	36.3
10	sR	0.03	10.0	-	-	-	sR	0.13	20.0
11	-	-	-	-	-	-	ED	38.1	54.5
12	R	7.24	54.5	-	-	-	-	-	-
13	R	3.13	9.1	-	-	-	-	-	-
14	D	29.20	54.5	-	-	-	-	-	-
15	-	-	-	R	3.16	18.2	-	-	-
16	-	-	-	sR	0.60	18.2	-	-	-
17	-	-	-	sD	7.99	72.3	-	-	-

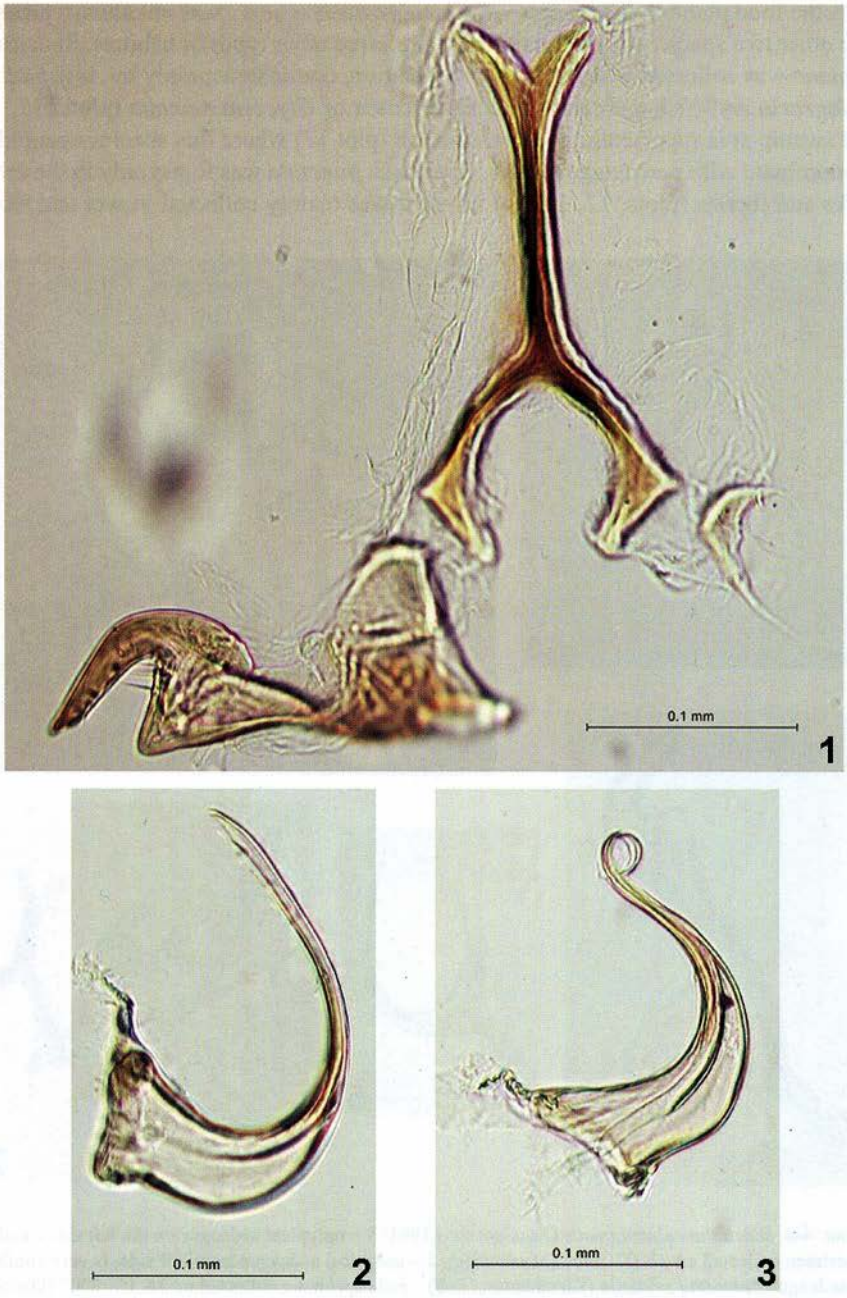
The results of the research also show significant connection of the *Balclutha* species with particular habitats. Unexpectedly, *B. calamagrostis* inhabits different ecosystems and the species was found both in dry grasslands and urban lawn sites. On one hand, it was the eudominant (38,1%) in the material collected from the vegetation covering

Tab. 2. The size of the representatives of genus *Balclutha* KIRKALDY, 1900 from Częstochowa area, with considering the typical and changeable specimens that belong to species *Balclutha calamagrostis* OSSIANNILSSON, 1961 (considering specimen from Mysłowice, 2002).

Species	length - from top of the head to end of scutellum	width pronotum	the complete length
Balclutha punctata (F.) – ♂	0.82-0.94 mm	0.94-0.98 mm	3.50-3.80 mm
Balclutha punctata (F.) – ♀	0.90-0.98 mm	0.96-1.00 mm	3.65-3.90 mm
Balclutha rhenana WAG. – ♂	0.94-0.98 mm	0.90-0.92 mm	3.80-3.90 mm
Balclutha rhenana WAG. – ♀	0.96-0.98 mm	0.94-0.96 mm	3.85-3.95 mm
Balclutha calamagrostis Oss. – ♂ (typical specimens – Phot.: 1, 2)	0.76-0.86 mm	0.80-0.82 mm	3.25-3.45 mm
Balclutha calamagrostis Oss. – ♀ (typical specimens)	0.88-0.94 mm	0.82-0.90 mm	3.50-3.70 mm
Non-typical specimens from *Balclutha calamagrostis* OSSIANNILSSON, 1961:			
Balclutha calamagrostis Oss. male specimen collected on 21. 08. 2007 (plot 6) (Phot. 3, Fig. 2B, 2G-H)	0.78 mm	0.80 mm	3.30 mm
Balclutha calamagrostis Oss. (?) male specimen collected on 16. 07. 2007 (plot 7) (Phot.: 5, 6, 7, 8, Fig. 2A, 2C-F)	0.68 mm (!)	0.70 mm (!)	–

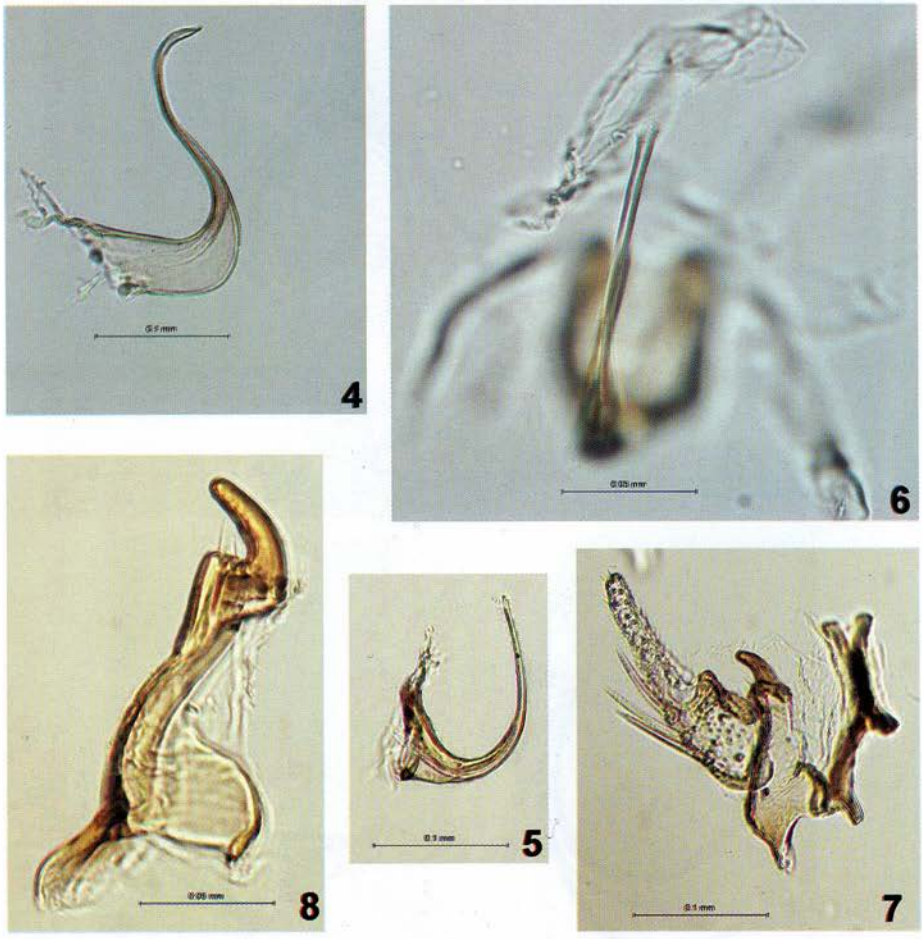
the railway embankment in the Stradom district (plot 11 – Tab. 1, Fig. 1), on another - the lowest number of specimens was noted from the park lawns (plots 9 and 10) and plot 4 in the Mirów district (Tab. 1). The share of species *B. calamagrostis* in the dynamics of the planthoppers and leafhoppers community on plot 11 is represented on chart (Fig. 1).

To sum up, it was discovered that *B. calamagrostis* inhabited the following vegetation: termophilous grasslands on limestone bedrock (plots: 1, 2, 3) and sandy soils (plot 4), wastelands vegetation (plots: 5, 6), urban lawns (plots: 7, 8, 9, 10) and the plants of the railway embankment (plot 11) (Map). It is worth mentioning that on the established



Phot. 1-3. *Balclutha calamagrostis* OSSIANNILSSON,1961:
1 – right genital style and connective (male specimen collected on: Ossona Hill, plot 2);
2 – standard aedeagus from left side (male specimen collected on: Ossona Hill, plot 2);
3 – untypical aedeagus from left side - male specimen collected on 21. 08. 2007 (District Kule, plot 6)

plots the food plant of this species – *Calamagrostis epigeios* - was not always present. The other two species were rarer and they preferred other types of habitats. Species *B. rhenana* was collected from bank river vegetation, dominated mainly by *Aegopodium podagraria* and *Urtica dioica* with a small cover of *Glyceria maxima* (plots: 15, 16) and swamp area representing *Magnocaricion* (plot 17) where this species occured as subdominant with percentage of 3.16. Species *B. punctata* was found only in the urban parks and forests (plots: 12, 13, 14) where it was mainly collected in wet and shady



Phot. 4-8. *Balclutha calamagrostis* OSSIANNILSSON,1961: 4 – untypical aedeagus on the left side - male specimen collected on 22. 07. 2002 (Mysłowice); 5 – untypical aedeagus from left side, is very similar to aedeagus *Balclutha saltuella* (Kirschbaum,1868) - male specimen collected on 16. 07. 2007 (District Lisiniec, plot 7); 6 – same aedeagus in ventral aspect - male specimen collected on 16. 07. 2007 (District Lisiniec, plot 7); 7 – genital plate, genital style, connective - male specimen collected on 16. 07. 2007 (District Lisiniec, plot 7) (connective fragment chipped during the process of preservation, from the right side); 8 – same genital style on male specimen collected on 16. 07. 2007 (District Lisiniec, plot 7)

places. The bulk of it was discovered on plot 14, having where it was dominant with percentage of 29.20. Only a few were found on sunny sites (plots: 10, 6). However, it may be an incidental phenomenon, because plot 10 is situated near a shady park and plot 6 not far from an old orchard. On the mentioned plots *B. punctata* occured together with *B. calamagrostis* (Tab. 1).

The morphometric studies of *B. calamagrostis* specimens revealed significant variability both in terms of body size (Tab. 2) and the characters of the male copulatory organs.

Most of them possess a properly formed aedeagus, genital style and connective (Phot. 1, 2). The most difficult was the interpretation of the changes in the structure of the male genitalia, as some specimens had abnormal deformations of the aedeagus.

In the male specimen collected on 21.08.2007 (plot 6) (Phot. 3, Fig.2G, H), a characteristic hook-like top of the aedeagus was observed. Another characteristic trait, as viewed from the front, was the extended base of the aedeagus, similar to the aedeagus of *B. rhenana* species (Fig. 2H). It is worth of notice that a similar deformation was earlier found in the male collected on 22.07.2002 from the area of Mysłowice (Phot. 4, Fig. 3C, D) (WALCZAK 2005) but this change was not as strong as in the specimen from Częstochowa. Unfortunately, this variation was not described in WALCZAK (2005). Apart from the mentioned features, there were no other visible changes in the examined individuals. Both the remaining elements of male copulatory organs and the body size

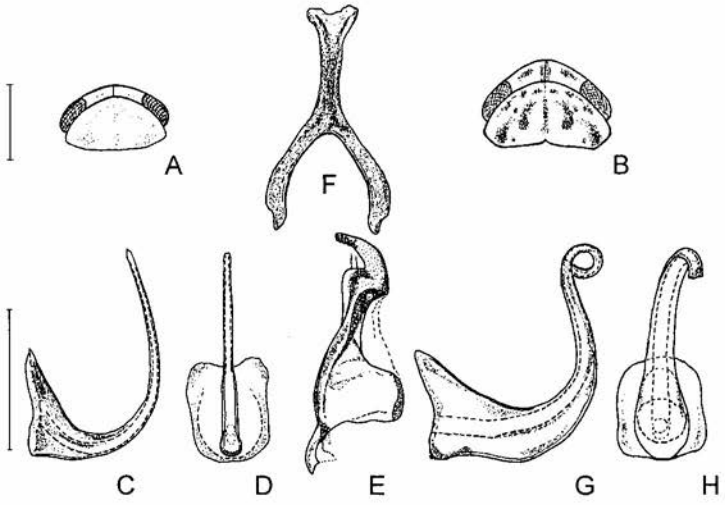


Fig.2. The differences in the shape and the propotions in the specimens from genus *Balclutha* from Częstochowa area, but also the elements of males copulatory organs. A: male specimen collected on 16.07.2007 (plot 7) (similarity to *B. saltuella*); B: *B. calamagrostis* male specimen collected on 21.08.2007 (plot 6). The elements of male copulative organs on 16.07.2007 (plot 7); C: aedeagus from the left; D: same aedeagus in ventral aspect; E: right genital style from above; F: connective from above. *B. calamagrostis* male specimen collected on 21.08.2007 plot 6 - G: aedeagus from the left, H: same aedeagus in ventral aspect. Scale: 0.5 mm for A, B; 0.1 mm for the rest

and proportions of the insects follows the measures given for *B. calamagrostis* (Tab. 2, Fig. 2B, 3A, B).

The most unique male specimen was found on 16.07.2007 on plot 7. Surprisingly, it was extremely small with the pronotum width – 0.68 mm and length from head top to the end of scutellum – 0.64 mm. In other males of *B. calamagrostis* species, the mentioned parameters were as follows: pronotum width 0.80-0.82 mm, length from top head to the end of scutellum 0.76 – 0.86 mm (Tab. 2). Unfortunately, the overall length of the specimen has not been determined because the specimen was damaged (the fore wings are lost). However, comparing the body proportions of the other species from the genus *Balclutha* it can be assumed that the overall length of the specimen is about 2.80 mm. Apart from this, there were also significant changes in the structure of the male copulatory organs: aedeagus both in the lateral view (Phot. 5, Fig. 2C) and in ventral aspect (Phot. 6, Fig. 2D) was very similar to the aedeagus of the *Balclutha saltuella* species (KIRSCHBAUM 1868) (RIBAUT 1952; KNIGHT 1987; BIEDERMANN & NIEDRINGHAUSE 2004), which occurs in warm places of Europe, Middle and Southern Asia and Nearctic and Neotropic Regions (NAST 1972; KNIGHT 1987). Additionally, the shape and proportions of the head and pronotum were more similar to *B. saltuella* species

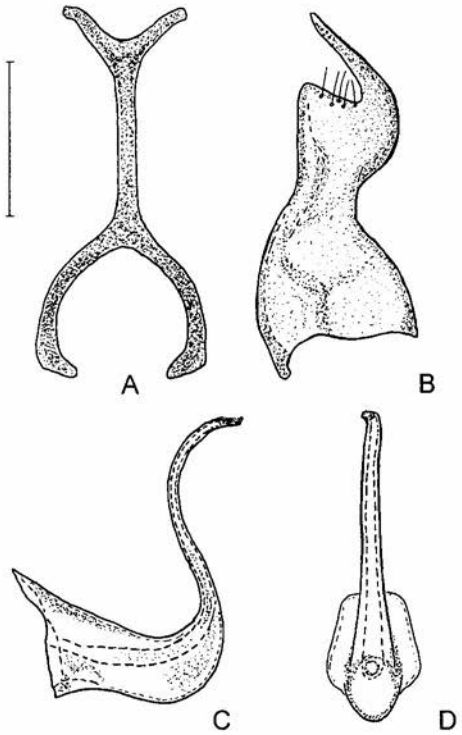


Fig. 3. *Balclutha calamagrostis* OSSIANNILSSON,1961: non-typical male specimen collected on 22. 07. 2002 (Mysłowice): A – connective; B – right genital style; C – aedeagus from the left side; D – same, aedeagus in ventral aspect. Scale: 0.1 mm

than to *B. calamagrostis* (Fig. 2A, B) The remaining elements of the male genitalia are shown in Phot. 7 and 8 as well as Fig. 2E, F.

The occurence of *B. saltuella* in Poland is very probable, as it has been found in Czech Republic, Slovakia and in Germany (NAST 1972; BIEDERMANN & NIEDRINGHAUS 2004). Thus, it is essential to collect more specimens to prove that the described changes are not caused by parasitism or pathological development. This is why the specimen was finally classified as belonging to *B. calamagrotis* and not to *B. saltuella* species. Only after collecting a series of well-preserved specimens will we be able to clarify the problem.

Regarding the changes of *B. calamagrostis* copulatory organs, it is clear that further studies covering other *Balclutha* species should be taken into consideration. Moreover, it would be interesting to discover the reasons of this phenomenon.

All specimens collected in the area of Częstochowa city were deposited in the collection of Department of Zoology, University of Silesia in Katowice. The specimen collected in the area of Mysłowice city belongs to the collection of Department of Ecology and Nature Conservation, Jan Długosz University of Częstochowa.

CONCLUSIONS

1. As a result of investigations it can be stated that *B. calamagrostis* is connected with the vegetation occurring on limestone and sandy soils. Moreover, this species also inhabits the habitats of human origin such as railway embankments, urban lawns, park lawns and wasteland areas.

2. There were also observed some biometric differences of both genders (males and females) and the characters of the male copulatory organs. In this aspect the species seems the most variable among all the species of the genus *Balclutha* KIRKALDY, 1900 that were reported from the investigated area.

3. There were found unique, not earlier described forms of *B. calamagrostis*, with the characteristic trait of a strongly curved top of aedeagus.

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A new species of *Lestomerus* AMYOT & SERVILLE, 1843 from Cameroon (Heteroptera: Reduviidae: Peiratinae)

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ABSTRACT. *Lestomerus villiersi*, a new species of reduviid of the subfamily Peiratinae from Cameroon, is described on the basis of a single specimen from the Muséum National d'Histoire Naturelle, Paris, France. The drawings of the dorsal habitus and male genitalia are given.

Key words: *Lestomerus*, Peiratinae, Reduviidae, Heteroptera, Cameroon, new species.

INTRODUCTION

Genus *Lestomerus* was established by AMYOT & SERVILLE in 1843. 25 species have been described so far (MALDONADO CAPRILES 1990) and almost half of the known species was described by VILLIERS (1948, 1949, 1954, 1958, 1962, 1963, 1964, 1968, 1969, 1973). Apart from the 25 mentioned species there are still 17 other species belonging to the genus *Brachysandalus*, which some authors treat as a subgenus of *Lestomerus*. By JEANNEL (1919), VILLIERS (1948), PUTSHKOV & PUTSHKOV (1985) and COSCARÓN & LINNAVUORI (2007) the genus *Brachysandalus* STÅL is considered a subgenus of *Lestomerus*. However, MALDONADO CAPRILES (1990) used *Brachysandalus* at generic rank.

During the examination of an Afrotropical Peiratinae deposited in the General Collection of the Muséum National D'Histoire Naturelle in Paris among material collected in Cameroon, a remarkable new species has been found. The specimen was labelled by VILLIERS as a new species, but it has never been described.

MATERIAL AND METHODS

External structures were examined using a stereoscopic microscope Olympus SZX9. All drawings were made using a camera lucida. Genitalia were macerated in 10% KOH for 16 hours in 38°C, rinsed in distilled water, and dissected under the stereoscopic microscope. Measurements are given in millimeters.

TAXONOMY

Genus *Lestomerus* AMYOT & SERVILLE, 1843

Lestomerus AMYOT & SERVILLE, 1843: 322. Type species: *Pirates spinipes* SERVILLE, 1831: 23:216 (by monotypy).

For the synonyms of the genus, see MALDONADO CAPRILES 1990.

Lestomerus villiersi sp. nov.

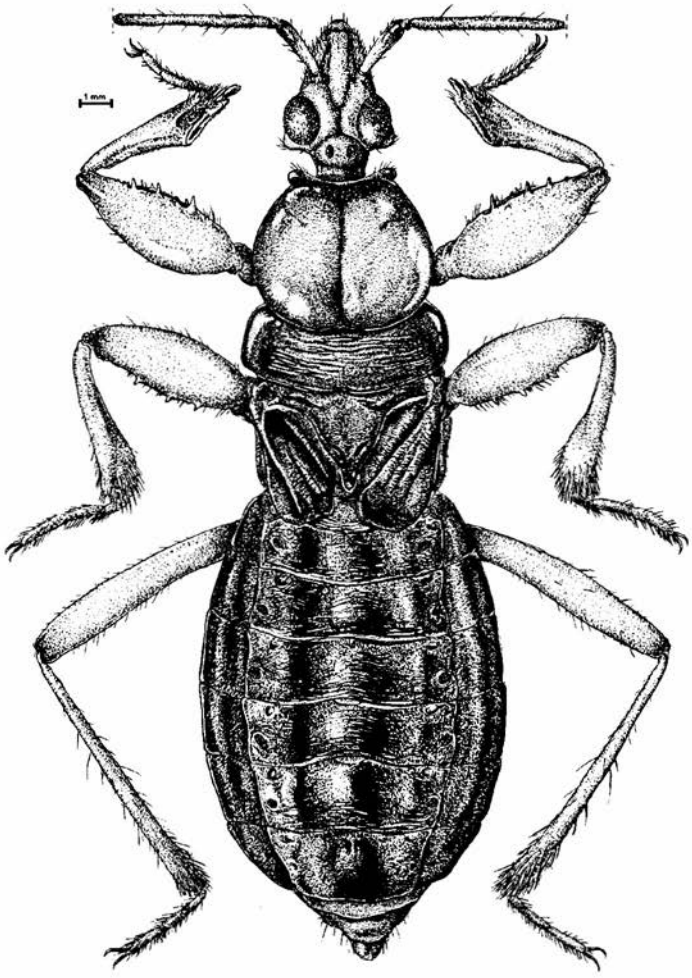
(Figs. 1-9)

TYPE MATERIAL

Holotype – Female: Cameroun Dschang. V. 1971. J. F. VILLIERS; Museum Paris; *Lestomerus* n.sp. A. VILLIERS det. 195.

DIAGNOSIS

This species can be easily distinguished from other representatives of the genus by the coloration: light brown head, anterior pronotal lobe of pronotum light brown with dark margins and light brown legs.

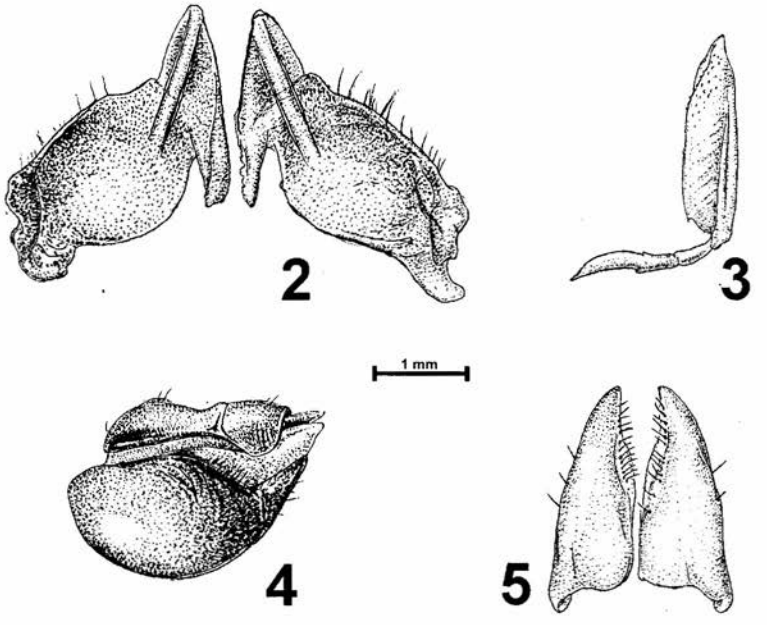


1. *Lestomerus villiersi* sp. nov., holotype, dorsal habitus

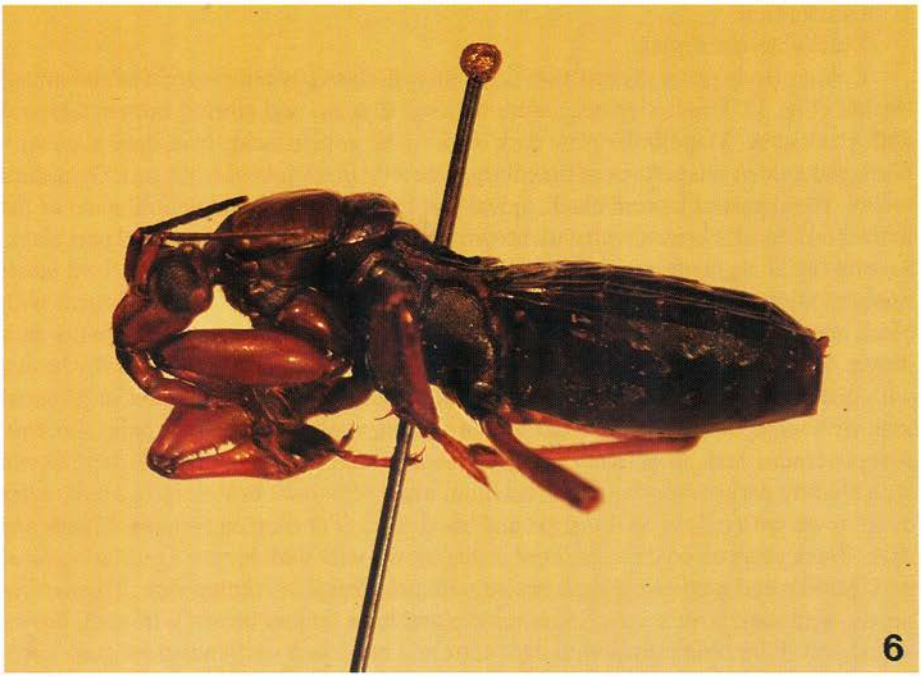
DESCRIPTION

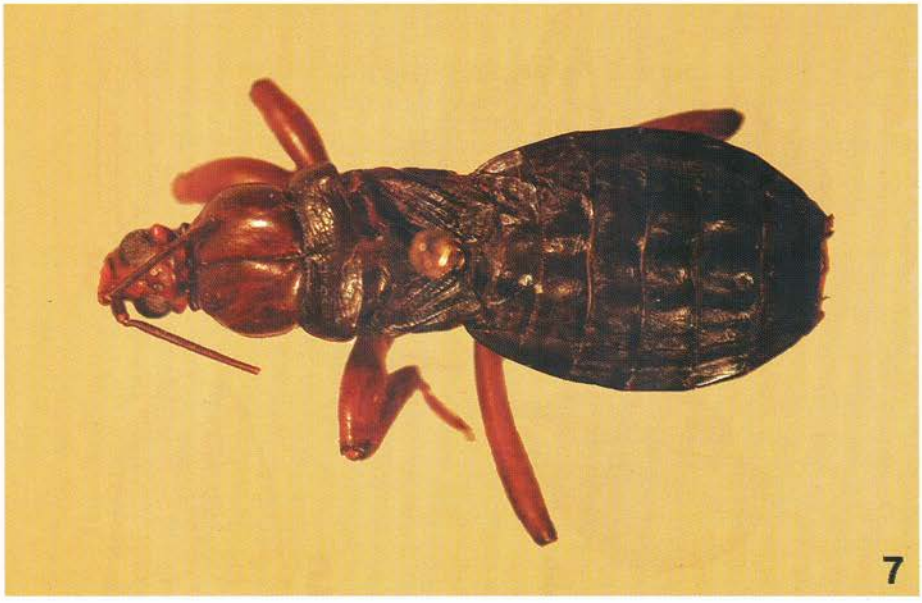
Brachypterous female.

Colour: Body generally brown-black with yellowish posterior margin of abdominal tergites (Fig. 1). Head, clypeus, sutura between clypeus and labrum brown. Clypeus with black apex. Mandibular plate dark brown with golden setae, maxillary plate with black and golden setae. Apex of maxillary plate with black lateral markings. Gena dark brown. Basal part of labrum black, apical part brown. Lateral and ventral parts of the first labial segment brown with dark brown annulus in the apical part, dorsal part black. Second labial segment brown with dark brown apex (except dorsal part), third labial segment with brown base and dark brown apex. First antennal segment brown with black annulus (wider on the ventral side) in the apical part. Intercalar segments dark brown. Second antennal segment dark brown. Anterior pronotal lobe generally brown with distinctly black margin and black medial sutura. Apical part of anterior pronotal lobe with wide, dark band and dark brown margin, ventral part of calli paler (brown). Proepisternum and proepimerion dark brown. Posterior pronotal lobe dark brown with slightly darker anterior part. Scutellum black with dark brown apex. Hemielytra dark brown with paler costal margin and basal parts of corium and clavus. Membrana dark. Black setae on costal vein. Fore coxae brown with dark brown annulus in apical part. Middle and hind coxae dark brown with paler spots on ventral side. Trochanters brown with dark brown apex. Fore, middle and hind femora brown with dark brown apical part. Fore tibia brown with dark apex and basal part with indistinct, dark spots



2-5. *Lestomerus villiersi* sp. nov., holotype: 2 – gonocoxites and gonapophyses of VIII segment, inner view; 3 – gonocoxites and gonapophyses of IX segment, outer view; 4 – tip of the abdomen, lateral view; 5 – styloids, outer view





6, 7. *L. villiersi* sp. nov., holotype: 6 – lateral view, 7 – dorsal view

8, 9. *L. villiersi* sp. nov., holotype: 8 – lateral view of head and pronotum, 9 – dorsal view of head and pronotum

in apical part. Tarsi brown, first segment and apical part of the last segment darker. Prosternum, mesepisternum and metepisternum dark brown. Abdomen beneath dark brown with slightly paler middle part. VII abdominal sternite with small brown spot, pale setae and several longer, dark setae. Posterior margin of VII abdominal sternite black. II abdominal tergite brown with black markings, tergites III-VI brown with black posterior part and yellowish posterior margin. Connexives dark brown with irregular, weakly visible black spots. Inner margins of II-VI connexives brown. Very small, pale area on outer side of anterior and posterior margin of each connexivum. Tip of the abdomen black in dorsal view and dark brown with black margin of gonocoxites of VIII segment in lateral view (Fig. 4).

Structure: Large-sized, body robust and shining with variable sculpture. Area of maxillary plate along mandibular plate and clypeus with robust setae, as well as area between oculi and antennifer. Mandibular plate with thin setae and only one or two short robust setae. Long robust setae near ventral and hind margin of oculi and outer margin of ocelli. Two rather long and robust setae on vertex near the base of clypeus and several robust, short setae on postocellar region of the head. Thin setae only on anteocular region, mostly on mandibular and maxillary plate. Short, dark, robust setae visible in the apical part of clypeus as well as labrum and dorsal surface of first labial segment. Distinct calli behind oculi in dorsal view - calli wider than oculi (Fig. 1). Oculi with distinct, semicircular curvature in the lateral view. First antennal segment reaching apex of head, slightly curved on outer side with short, robust setae. Second antennal segment with dense, short setae and several, robust, various-sized setae. Apical part of first rostral segment with distinct callus in ventral side. Second rostral segment surpassing posterior margin of head. Anteocular part of head 3.3 times as long as postocular part. Eyes and ocelli large. Pronotum with several various-sized setae. Anterior pronotal lobe shining with long setae and very small shining spots. Small, dense granulations on darker apical part, weakly visible sulci and small lateral depressions near apical part (Fig. 1). Apical part of anterior pronotal lobe with two lateral calli. Each calli with several robust and short setae. Posterior pronotal lobe distinctly hollow in the middle near posterior margin, with distinct sculpture and visible medial sutura (Fig. 1). Scutellum with short setae, distinct granulations in basal part and with lateral calli. Very small granulations on lateral and apical parts. Apex bent dorsally. Proepisternum with numerous setae. Meso- and metathoracic sterna with distinct sculpture and granulations. Ventral side of coxa as well as trochanters with robust, rather short setae. Femora, tibia and tarsi with short, thin and robust setae, mostly on ventral and dorsal surface. Ventral side of fore and middle femora with two lines of spines and a distinct depression between them. Fore femora with inner line of spines with three large but various-sized spines and a few smaller (the biggest in basal part), outer line of spines with three similar, medium-sized spines and several smaller spines. Each line with three big, similar spines and several much smaller spines. Hind femora with short robust setae on dorsal side, dense thin setae in apical part and longer, erect, robust setae on ventral side of femora. Inner, apical part of tibia with small area of very dense and short hairs. Ventral side of third segment of fore tarsi and apical part of second segment of fore tarsi with very dense setae. All segments of middle and hind tarsi in ventral

side with short and dense setae. Apical part of third segment of each tarsi with robust, long setae, bent between claws. Hemielytra shining, with distinct sculpture, slightly surpassing second abdominal segment. Costal vein with very short setae. Abdomen beneath shining with very short setae and very delicate sculpture near anterior and lateral region of each sterna. Posterior margin of VII abdominal sterna with several long setae and delicate scupture. Dorsal part of abdomen with very short setae, distinct sculpture visible mostly on posterior part of each tergite. Two rounded, weakly hollow areas (with small raised middle area) in lateral parts of tergite. Middle and outer side of each tergite and middle part of connexives distinctly raised (Fig. 1).

Genitalia: Gonocoxites of VIII segment triangular (Fig. 2). Outer side with distinct sculpture, numerous, small setae and a few longer setae. Right gonapophyse of VIII segment with straight margin, left gonapophyse with curved and serrate margin (Fig. 2). Styloids on inner side with sharp apical part, several setae on the inner margin and a few setae on the outer margin. Inner apical margin parallel, in 1/3 of long curved and gradually narrow into basal part (Fig. 5). Basal part of gonocoxites of IX segment with process convolute inwards (Fig. 3). Gonapophyses of IX segment narrow in the basal part (Fig. 3).

Measurements (in mm): Body length: 26; maximum width of abdomen: 8.9; head length: 4.3; head width: 3.25; length of anteocular part: 2; length of postocular part: 0.6; length of synthlipsis: 1; interocellar distance: 0.3; length of antennal segments I: II:III:IV: 2.25: 4.7: missing: missing; length of rostral segments I:II:III: 2.15: 2.65: 1.2; maximum length of anterior pronotal lobe: 4.35; maximum length of posterior pronotal lobe: 1.85; maximum width of anterior pronotal lobe: 5.2; maximum width of posterior pronotal lobe: 6; length of scutellum: 2.8; length of hemielytra: 4.9.

Male: Unknown.

Distribution

Cameroon.

Etymology

It is a great pleasure to dedicate the name of this new species to Andre Villiers, who has contributed so much to our knowledge of the Afrotropical Reduviidae.

Acknowledgements

I am grateful to E. Guilbert and D. Plutot-Sigwalt for all their help during my visit in the Collection of the Muséum National D'Histoire Naturelle in Paris. I also wish to express special thanks to Ł. Junkiert for drawings.

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A new species of *Sirthenea* SPINOLA from Vietnam (Heteroptera: Reduviidae: Peiratinae)

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ABSTRACT. *Sirthenea caiana*, a new species of the reduviid subfamily Peiratinae from Vietnam, is described on the basis of a single specimen deposited in the National Museum in Prague, Czech Republic. Drawings of the dorsal habitus and male genitalia as well as a key and distribution of the Vietnamese species of the genus *Sirthenea* are given.

Key words: *Sirthenea*, Peiratinae, Reduviidae, Heteroptera, Vietnam, new species.

INTRODUCTION

Sirthenea SPINOLA, 1840 is a medium-sized genus distributed in almost all zoogeographical regions. At present, nine species of *Sirthenea* have been recorded from the Oriental Region (SUCHETA & CHOPRA 1988; CAI & LU 1990; MALDONADO CAPRILES 1990; MURUGAN & LIVINGSTONE 1990; CAI & TOMOKUNI 2004; CHŁOND 2008) and only two species: *S. flavipes* (STÅL) and *S. nigra* CAI & TOMOKUNI have been reported from Vietnam so far (CAI & TOMOKUNI 2004). Moreover, one of the Oriental species - *S. nigronitens* (MILLER) was originally described in the genus *Sirtheneana* (MILLER, 1958), but later WILLEMSE (1985) synonymized it in his excellent revision of the genus *Sirthenea* of the New World.

Among the unidentified material collected in Vietnam, housed in the Collection of the National Museum in Prague, Czech Republic, a single specimen of *Sirthenea* was found. Comparison with the type specimens and descriptions of other species from the Oriental Region shows that this specimen belongs to an undescribed species. New species described in the present paper is the second known from the northern part of Vietnam (Fig. 14).

KEY TO THE VIETNAMESE SPECIES OF *SIRTHENEA*

1. Hemielytra without pale markings.
..... ***S. nigra* CAI & TOMOKUNI.**
-. Hemielytra with pale markings. ..... **2.**
2. Clavus partially pale, femora, tibiae and apical part of membrana pale.
..... ***S. flavipes* (STÅL).**
-. Clavus without pale markings, femora, tibiae and apical part of membrana dark.
..... ***S. caiana* sp. nov.**

MATERIAL AND METHODS

External structures were examined using a stereoscopic microscope Olympus SZX9. All drawings were made using a camera lucida. Genitalia were macerated in 10% KOH solution for 16 hours in 38°C, rinsed in distilled water and dissected under the stereoscopic microscope. Measurements are given in millimeters.

TAXONOMY

Genus *Sirthenea* SPINOLA, 1840.

Sirthenea SPINOLA, 1840: 100. Type species: *Reduvius carinatus* FABRICIUS, 1798: 545 (by monotypy).

For the synonyms of the genus, see MALDONADO CAPRILES, 1990.

Sirthenea caiana sp. nov.

(Figs. 1-13)

TYPE MATERIAL

Holotype – Male: N Vietnam 1986 / prov. Vinh phu / Tam dao 27.5.-2.6. / V ŠVIHLA lgt; Collectio / National Museum / Praha, Czech Republic.

DIAGNOSIS

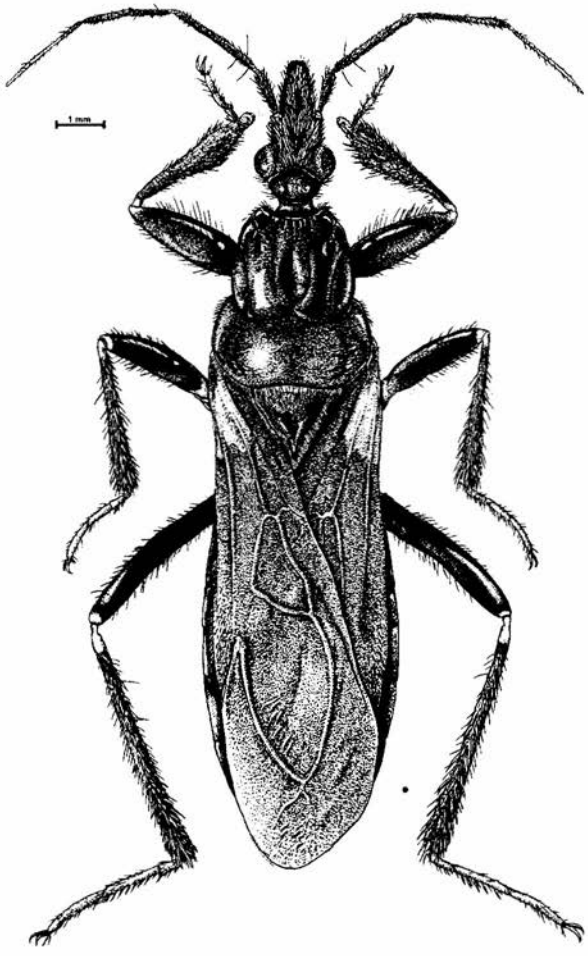
This species can be easily distinguished from other representatives of the genus from the Oriental Region by different coloration of the body - dark legs with pale tarsi and small pale areas in the basal part of hemielytra.

DESCRIPTION

Macropterous male.

Colour: Body generally brownish black with yellowish markings on basal part of hemielytra (Fig. 1). Head and scutellum with pale and bicoloured (brownish in basal part and pale in apical part) setae. Head black. Clypeus and sutura between mandibular and maxillary plate dark brown. Oculi dark brown with paler marginal facets (form pale marginal ring). Around ocelli paler annulus. First and second antennal segments brown, first segment paler in basal part. Third segment of antennae bicoloured – basal part brown, apical part yellowish with brown apex. Fourth segment yellowish with brown basal part. Intercalar segments pale. All rostral segments with yellowish dorsal surface and pale setae. First rostral segment black with pale annulus in apical part. Second rostral segment brown with paler apical and basal part, third rostral segment light brown and yellowish in lateral parts. Anterior pronotal lobe black. Posterior pronotal lobe dark brown with paler lateral parts. Scutellum black with paler apex and black, pale and bicoloured setae. Hemielytra generally brownish with rather short, black and pale setae. Basal part of corium yellowish, with darker and shining base. Clavus bicoloured – basal and lateral part (adherent to scutellum) black. Part of clavus adherent to anal vein brown, except thin black line with black setae (directly on anal vein). Costal vein

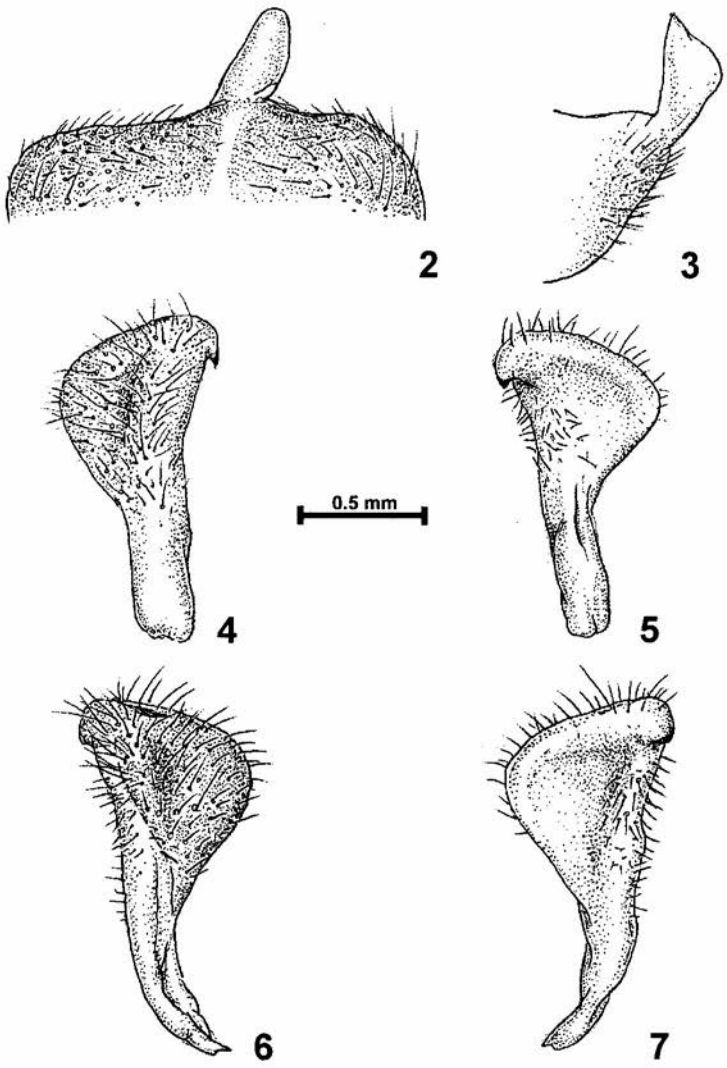
vein). Costal vein shining and paler than costal margin. Coxa dark brown, with pale outer apical part. Trochanters dark brown, middle trochanter with pale apical part. Fore femur brown with paler apex. Middle femur dark brown with paler basal and apical part. Hind femur dark brown (almost black) with paler apical part. Fore tibiae brown with pale apical part and brown to yellowish stripe on ¾ length of dorsal surface (irregularly developed on each tibia). Middle and hind tibiae dark brown with pale basal part. Tarsi yellowish. Ventral side of thorax black with pale setae. Apical half of mesepimeron, apex of mesepisternum (adherent to mesepimeron) and apex of metepisternum pale. Connexives dark brown with darker external margin and pale setae. Anterior margin of second abdominal sternum pale. Small, brown spot in lateral part of posterior margin of III abdominal sternum and anterior margin of IV abdominal sternum. Pygophore



1. *Sirthenea caiana* sp. nov., holotype, dorsal habitus

black with paler claspers. Dorsal margins of claspers dark (Fig. 8).

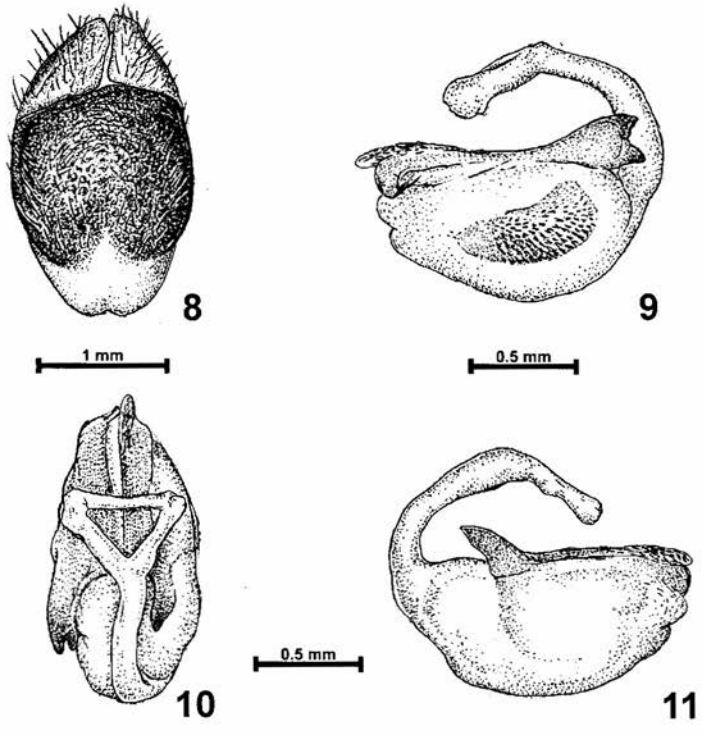
Structure: Body medium-sized, slender. Head with various-sized setae and a few trichobothria. The area from hind margin of ocelli into the base of clypeus without hairs. Hairless area distinctly narrow behind eyes and forked at base of clypeus. Two trichobothria on both sides of narrower part of hairless area and two behind the oculi. Apical part of clypeus with two trichobothria, middle part without setae. First antennal



2-7. *Sirthenea caiana* sp. nov., holotype: 2 – pygophore middle process, ventral view; 3– pygophore middle process, lateral view; 4 – right clasper, outer view; 5 – right clasper, inner view; 6 – left clasper, outer view; 7 – left clasper, inner view

segment almost reaching apex of head, thickened distally with rather long, adherent setae and a few erected setae. Second antennal segment slightly thickened in basal part. Second, third and fourth antennal segments with dense, adherent, short setae and a few regularly arranged, erected setae. In basal part of second antennal segment a few trichobothria. Second rostral segment reaching apical part of anterior pronotal lobe. Anteocular part of head 2.8 times as long as postocular part. Eyes and ocelli large. Scutellum with rather long setae, and distinct granulations in the middle. Lateral calli occupying over 2/3 of width of scutellum. Pronotum, meso- and metathoracic sterna, legs and abdomen beneath with rather long pale setae. Anterior pronotal lobe sculptured with distinct, granulated, pilose sulci. Sulci of anterior pronotal lobe with long setae. Anterior and lateral margins of anterior pronotal lobe with dense, short setae. Basal part of anterior pronotal lobe distinctly hollowed (depression extends to 2/3 of length of lobe). Posterior pronotal lobe weakly hollowed in the middle of anterior margin. Ventral side od fore femur with several long trichobothria. Tibiae and tarsi with spine-like setae (very dense in apical part of tibiae). Hemielytra dull with rather short setae, surpassing apex of abdomen. Lateral parts of abdominal sternites with distinct sculpture.

Genitalia: Pygophore asymmetrical (Figs. 2, 8). Middle process of pygophore long (Fig. 3), bent on right side (Fig. 2). Both claspers triangular with many, various-sized



8-11. *Sirthenea caiana* sp. nov., holotype: 8 – pygophore, ventral view; 9 – phallus, right lateral view; 10 – phallus, left lateral view, 11 – phallus, dorsal view

hairs and distinct dilatation on outer side (Figs. 4, 6). Right clasper broader than left clasper, narrow in basal part and rounded in apical part, with distinct, sharp curved process on inner side (Figs. 4, 5). Left clasper (Figs. 6, 7) rounded in apical part and gradually narrower into the basal part, with tubercular process on inner side. Phallosoma bent laterally in basal part (Fig. 10). Basal lobe of the dorsal phallotecal sclerite enlarged on both sides (Figs. 9, 11) - much bigger on right side (Fig. 9).

Measurements (in mm): Body length:17.3; maximum width of abdomen: 4.2; head length: 3; head width: 1.65; length of anteocular part: 1.7; length of postocular part: 0.6; length of synthlipsis: 0.65; interocellar distance: 0.45; lengths of antennal segments I:II: III:IV: 0.95: 1.95: 1.6: 2.05; lengths of rostral segments I:II:III: 0.9: 2.2: 0.8; maximum length of anterior pronotal lobe: 2.4; maximum length of posterior pronotal lobe: 1.6; maximum width of anterior pronotal lobe: 2.5; maximum width of posterior pronotal lobe: 3.55; length of scutellum: 1.45; length of hemielytra: 11.3.

Female: Unknown.

12, 13. *S. caiana* sp. nov., holotype: 12 – lateral view, 13 – dorsal view

DISTRIBUTION

Vietnam: prov. Vinh Phu, Tam Dao (Fig. 14).

14. Distribution of *Sirthenea flavipes*, *S. nigra* and *S. caiana* in Vietnam

ETYMOLOGY

It is a great pleasure to dedicate the name of this new species to CAI WANZHI, one of the best specialists of Reduviidae, who has contributed so much to our knowledge about this group of Heteroptera.

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I want to thank P. KMENT for all help during my visit in the Collection of the National Museum in Prague, Czech Republic. I also want to thank Ł. JUNKIERT for drawings.

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Redescription of an African species *Sirthenea angolana* VILLIERS, 1958 (Heteroptera: Reduviidae: Peiratinae)

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ABSTRACT. *Sirthenea angolana* VILLIERS, 1958 has been redescribed and figured on the basis of specimens deposited in the collections of the Museum National D'Histoire Naturelle, Paris and the Natural History Museum, London.

Key words: *Sirthenea*, Peiratinae, Reduviidae, Heteroptera, Angola, redescription.

INTRODUCTION

Sirthenea SPINOLA, 1840 is a world-wide distributed genus containing 40 known species (SUCHETA & CHOPRA 1988; MALDONADO CAPRILES 1990; MURUGAN & LIVINGSTONE 1990; LEE & KERZHNER 1996; CAI & LU 1990; CAI & TOMOKUNI 2004; CHŁOND 2008). This genus has not been fully studied - only species from the New World (WILLEMS 1985) and China (CAI & LU 1990) have been revised. Except the mentioned publications, there is only one paper (HORVÁTH 1909), which contains descriptions of 17 species and 4 subspecies of *Sirthenea* and a key to identification of 15 species and 4 subspecies. HORVATH described 8 new species, but his *S. suturalis* has been synonimized with *S. stria* (F.) and one subspecies has been erected to the species level (*S. pedestris* HORV.) by WILLEMSE (1985). Moreover, on the basis of the length of the first antennal segment, presents of lateral sulci and differences in the size of the legs, HORVÁTH established a new subgenus of *Sirthenea*: *Monogmus*.

Sirthenea angolana is one of 11 known Afrotropical species and it has been described and figured by VILLIERS (1958) on the basis of a single specimen from Angola, and only the type specimen (female) has been known so far. During the examination of an Afrotropical species of the genus *Sirthenea*, two other specimens of *S. angolana* - male and female, have been found in the material deposited in the Collection of the Natural History Museum, London, UK.

MATERIAL AND METHODS

External structures were examined using a stereoscopic microscope Olympus SZX9. All drawings were made using a camera lucida. Genitalia were macerated in 10% KOH for 16 hours in 38°C, rinsed in distilled water, and dissected under stereoscopic microscope. Measurements are given in millimeters.

Abbreviations:

BMNH The Natural History Museum, London, UK;

MNHN Muséum National d'Histoire Naturelle, Paris, France.

TAXONOMY

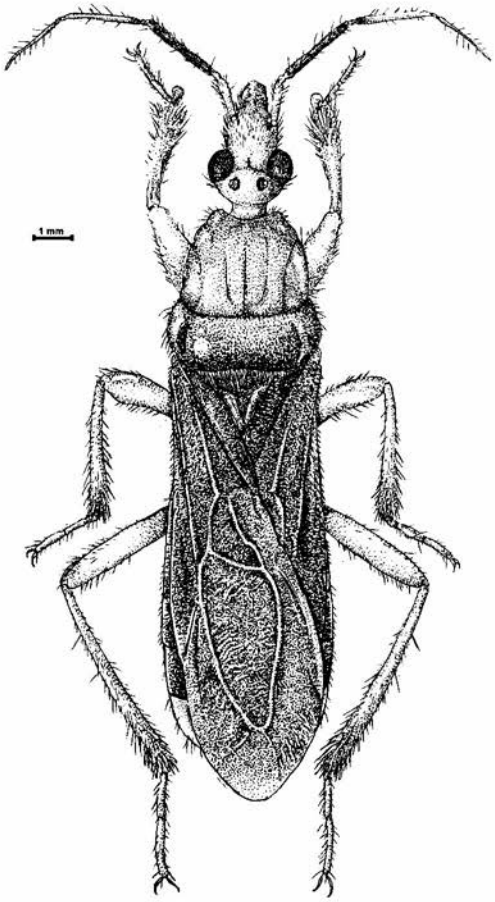
Genus *Sirthenea* SPINOLA, 1840

Sirthenea SPINOLA, 1840:100. Type species: *Reduvius carinatus* FABRICIUS, 1798: 545 (by monotypy).
For the synonyms of the genus, see MALDONADO CAPRILES (1990).

Sirthenea angolana VILLIERS, 1958
(Figs. 1-18)

MATERIAL EXAMINED

Holotype – Female: Ang. 10625, Marco de Canavezes Angola III-56; Type; *Sirthenea angolana* A. VILLIERS det. 1957 (MNHN). Female: Angola, (A26) Salazar,

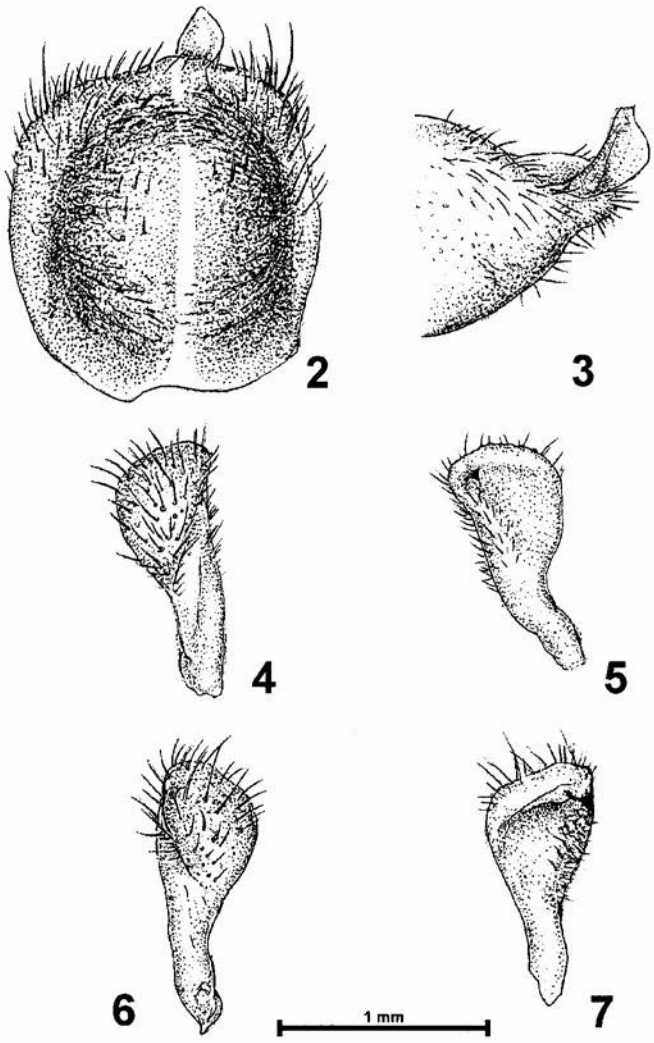


1. *Sirthenea angolana* VILLIERS, 1958: dorsal habitus

I.I.A.A. 9-15.iii.1972; at light; Southern African Exp. B.M. 1972-I (BMNH). Male: Angola (A30) 7 mls. W. GABELA 16-18.iii.1972; at light; Southern African Exp. B M. 1972-I (BMNH).

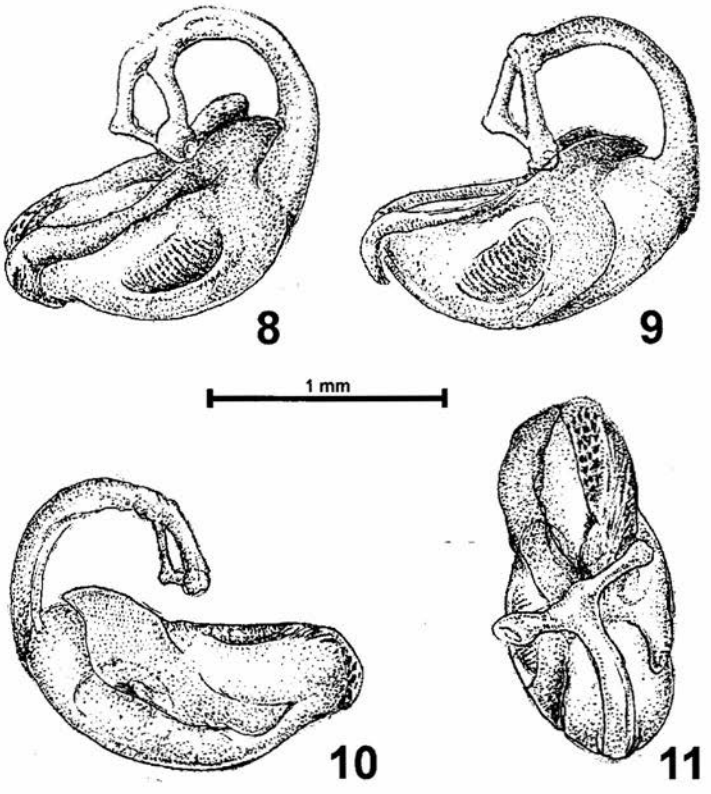
REDESCRIPTION

Colour: Body generally brown and black (Fig. 1). Head pale brown. Around each ocelli a black ring, thicker on the inner side. First antennal segment brown (in the colour of the head) with brown setae, other segments with gold setae. Second antennal segment



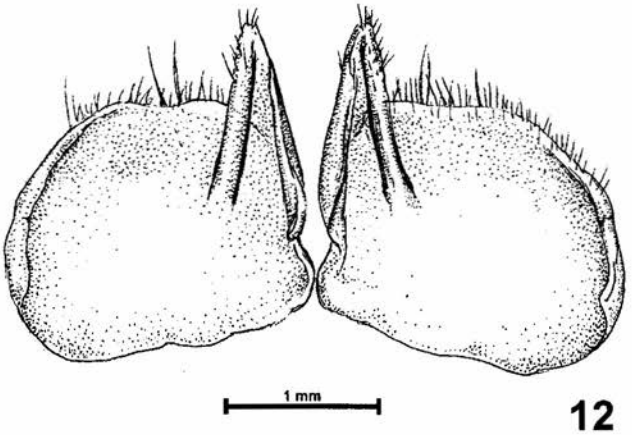
2-7. *Sirthenea angolana*: 2 – pygophore, ventral view; 3 – pygophore, middle process, lateral view; 4 – right clasper, outer view; 5 - right clasper, inner view; 6 – left clasper, outer view; 7 - left clasper, inner view

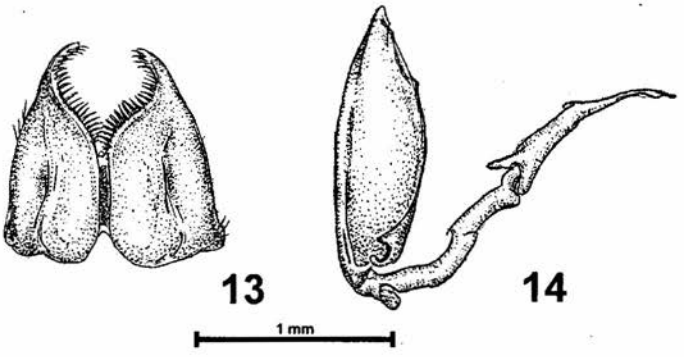
dark brown with paler basal part. Third and fourth segments of antennae pale, third segment with dark basal part and dark ring on the apex, fourth segment with dark ring in the basal part. Intercalar segments pale. Anterior pronotal lobe brown with darker sulci and spots in the apical part. Sulcus transversus dark. Posterior pronotal lobe with darker medio-lateral parts. Rostrum brown. Base of scutellum laterally pale. Medial part of base and middle part of scutellum dark and gradually paler into the apex; apex dark. Hemielytra dark brown to black with distinct black costal margin. Costal vein in lateral view with pale basal part. Claval suture pale in basal part. Coxae pale. Femora, tibiae and tarsi brown with brown and gold setae. Tibiae with brown spines. Ventral side of thorax two-coloured: prosterna brown, meso- and metasterna dark brown. Middle and hind trochanters pale. Abdomen beneath dark brown with pale stigma and pale longitudinal, fusiform spot on ventral side. Connexives dark brown with pale outer margin and small, irregular spots in ventral view. Connexives of seventh segment pale. Tip of the abdomen in dorsal view pale (female) or brown (male) and in ventral view light brown (female). Pygophore dark brown with slightly paler margin.



8-11. *Sirthenea angolana*: 8 – phallus, right dorsolateral view; 9 – phallus, right lateral view; 10 – phallus, left lateral view; 11 – phallus, dorsal view

Structure: Large-sized, female body robust, male body slender. Head, pronotum, scutellum, and Sc vein (in 2/3 length) shining. Head with medium-sized light brown setae and a few trichobothrial setae - distinctly visible on the outer side of ocelli and on the inner side of oculi. The area from hind margin of ocelli into the base of clypeus without hairs. Hairless area forked at base of clypeus. Anteocular part of head 3.25-3.80 times (female) and 2.60 times (male) as long as postocular part. Eyes and ocelli large. Oculi with distinct curvature in the middle of height in lateral view. First antennal segment not reaching apex of head, thickened distally with short, adherent setae and a few erected, robust setae. Second, third and fourth antennal segments with dense, adherent, short setae and a few, regularly arranged, erected setae. Second rostral segment reaching posterior margin of oculi. Pronotum, meso- and metathoracic sterna and abdomen beneath with rather long brown and gold setae. Anterior pronotal lobe sculptured with hairy, distinct sulci. In the middle of apical part of anterior pronotal lobe small, granulated areas. Posterior pronotal lobe slightly hollow in the middle of



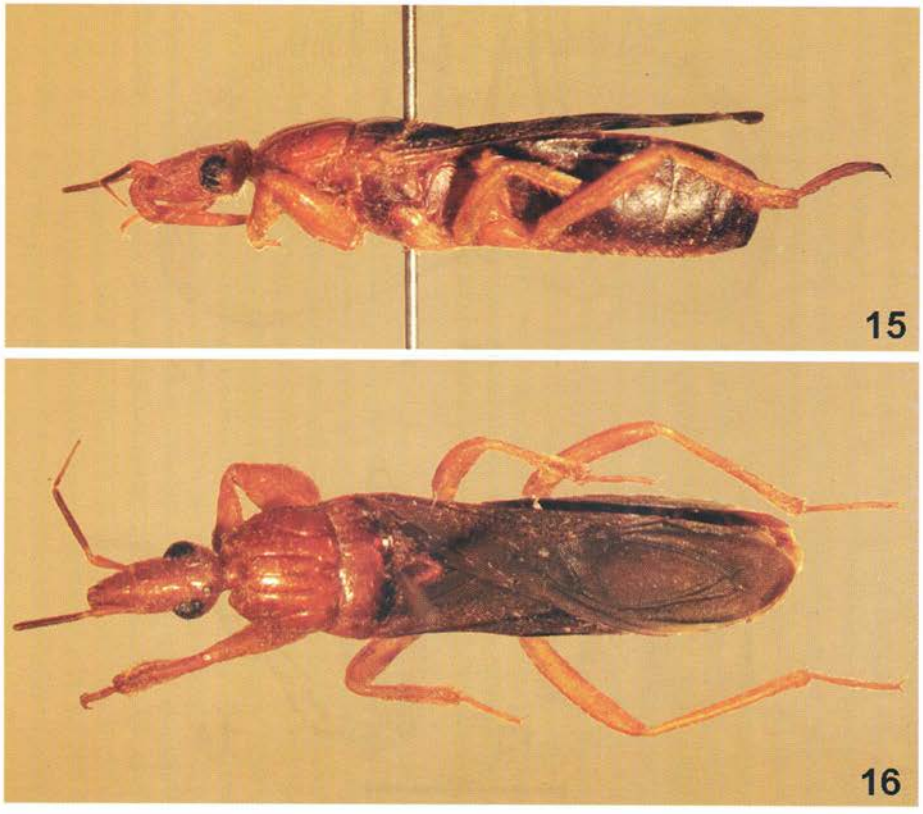


12-14. *Sirthenea angolana*: 12 – gonocoxites and gonapophyses of eighth segment, inner view; 13 – styloids, outer view; 14 – gonocoxites and gonapophyses of ninth segment, inner view

anterior margin. Tibiae and tarsi with spines (mostly on the inner side). Spines formed in a distinct band on apical part of middle tibiae. Corium with dark setae, much more dense in the basal part of corium and costal margin. Hemielytra not surpassing (female) or surpassing (male) apex of abdomen.

Genitalia: Male - Pygophore asymmetric (Fig. 2). Middle process of pygophore bent on right side (Fig. 2), with very small, sharp apex (Fig. 3). Both claspers (Figs. 4-7) robust and rounded (on apical part) in dorsal view. Right clasper on outer and inner view distinctly rounded in apical part and narrowing in the middle of length (Figs. 4, 5). Sharp process on inner side, situated on distinct lateral convex. Left clasper (Figs. 6, 7), gradually narrowing to base, with a tubercular process on inner side. Phallosoma bent laterally (Fig. 11). Basal lobe of the dorsal phallotecal sclerite enlarged on both sides (Figs. 8, 9, 10). Dorsal endosomal sclerite distinctly corrugated (Figs. 8, 10, 11).

Female – Gonocoxites of eight segment quadrangular (Fig. 12), on outer side with numerous, small hairs and a few distinctly longer trichobothria. Gonapophyses of eight segment with straight margin (Fig. 12). Styloids on inner side with rounded apical part



15, 16. *S. angolana*, female: 15 – lateral view, 16 – dorsal view

and dense hairs (Fig. 13). Basal part of gonocoxites of ninth segment with process convolute inwards (Fig. 14). Gonapophyses of ninth segment s-shaped (Fig. 14).

Measurements (in mm, male in parentheses): Body length: 21.5-24.4 (18); maximum width of abdomen: 4.1-4.4 (4.5); head length: 4.1-4.7 (3.3); head width: 2.35-2.65 (2.1); length of anteocular part: 2.3-2.6 (1.85); length of postocular part: 0.6-0.8 (0.7); length of synthlipsis: 1.15-1.3 (0.9); interocellar distance: 0.55-0.75 (0.4); length of antennal segments I:II:III:IV: 1.5-1.6 (1.2): 2.1-2.8 (2.15): 1.7-2.1 (2.05): 2.2 (1.5); length of rostral segments I:II:III: 1.2-1.3 (1.1): 3.15-3.4 (2.85): 1.55-2.2 (1.45); maximum length of anterior pronotal lobe: 3.15-3.8 (2.55); maximum length of posterior pronotal lobe: 1.55 (1.65-1.9); maximum width of anterior pronotal lobe: 3.75-4.55 (3.1); maximum width of posterior pronotal lobe: 4.3-5.3 (4); length of scutellum: 2.15-2.7 (1.9); length of hemielytra: 13.4-14 (12).

DISTRIBUTION

Angola.

17, 18. *S. angolana*, male: 17 – lateral view, 18 – dorsal view

AKNOWLEDGEMENTS

I want to express my gratitude to E. GUILBERT and D. PLUTOT-SIGWALT for all their help during my visit in the Collection of the Muséum National D'Histoire Naturelle in Paris. I also wish to thank M. WEBB, who kindly selected and lent specimens of *Sirthenea* from the Collection of the Natural History Museum in London and my colleague J. BROŻEK for selection of specimens. I also want to express special thanks to Ł. JUNKIERT for drawings.

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POLISH TAXONOMICAL MONOGRAPHS, Vol. 15: 155-162 Wrocław, 28 XII 2008

A new genus and two new species of Cylapinae from the Oriental Region (Heteroptera: Miridae)

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ABSTRACT. A new genus and two new species *Mimofulviella henryi* sp. n. and *Mimofulviella rugosissima* sp. n. are described on the basis of specimens collected in Sri Lanka and Brunei. The keys to genera of Fulviini and species of *Mimofulviella* gen. n. are given. The dorsal habitus and the pictures of male genitalia of *Mimofulviella henryi* sp. n. are provided.

Key words: Hemiptera, Miridae, Cylapinae, Fulviini, *Mimofulviella*, key, new genus, new species, Oriental Region.

INTRODUCTION

The mirid subfamily Cylapinae presently contains about 86 genera with nearly 355 described species worldwide (SCHUH 1995; GORCZYCA 2006). Four tribes are currently recognized within the subfamily, namely Bothriomirini, Cylapini, Fulviini and Rhinomirini (GORCZYCA 2006). However, our knowledge of cylapines still remains very poor. Fourteen genera and 57 species belonging to the tribe Fulviini (*sensu* GORCZYCA 2006) have been described from the Oriental Region (GORCZYCA 2006) so far.

While sorting the material borrowed from the Natural History Museum, London and United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., I found specimens from Brunei and Sri Lanka which are very similar to the genus *Mimofulvius* SCHMITZ (SCHMITZ 1978). Further examinations of the specimens have revealed that they represent a new genus and two new species which are described below.

MATERIAL AND METHODS

Dissections of male genitalia were performed used using the technique described by KERZHNER & KONSTANTINOV (1999). External structures were examined using an Olympus SZX12 stereomicroscope. Male genitalia were examined using an optical microscope Olympus BX50. Measurements were taken using a micrometer eyepiece.

ABBREVIATIONS

BMNH – Natural History Museum, London, UK.

USNM – United States National Museum of Natural History, Smithsonian Institution Washington, D.C., USA.

TAXONOMY

Key to genera of Fulviini of the Oriental Region

1. Hemelytra distinctly punctate; if punctures are less distinct, antennae are very long, third and fourth segments together distinctly longer than second ..... **2.**
-. Hemelytra generally impunctate; third and fourth antennal segments together shorter than second ..... **6.**
2. Hemelytra covered with moderately distributed, shallow punctures; antennae very long, third and fourth antennal segments together distinctly longer than second; head elongated vertically.
..... ***Mycetocylapus*** **Poppius.**
-. Punctuation of hemelytra deep and densely distributed; antennae shorter, third and fourth antennal segments together shorter or the same length as the second; head elongated horizontally ..... **3.**
3. Costal fracture present; length of the body less than 3.0 mm.
..... ***Teratofulvidius*** **Gorczyca & Chérot.**
-. Costal fracture absent or only slightly visible, length of the body more than 3.0 mm. ..... **4.**
4. Pronotal collar absent ..... **5.**
-. Pronotal collar present.
..... ***Teratofulvius*** **Poppius.**
5. Pronotal calli indistinct; costal fracture always absent.
..... ***Cylapofulvidius*** **Chérot & Gorczyca.**
-. Pronotal calli distinct; costal fracture absent, if present only slightly visible (*Fulvidius punctatus* Poppius).
..... ***Fulvidius*** **Poppius.**
6. Myrmecomorphic; gula strongly flattened, protruding, in the form of disc.
..... ***Gulacylapus*** **Carvalho.**
-. Gula not flattened, normal in shape ..... **7.**
7. Frons with distinct spine.
..... ***Rhinophrus*** **Hsiao.**
-. Frons without a spine..... **8.**
8. Claws not toothed subapically, inner surface of claws with distinct spine basally.
..... ***Hemiophthalmocoris*** **Poppius.**
-. Claws generally toothed subapically, inner surface of claws without spine basally.
..... **9.**
9. Body elongate, oval; pronotum elevated laterally; hemelytra usually distinctly wider than the posterior margin of pronotum ..... **10.**
-. Body more or less elongate; pronotum not elevated laterally; hemelytra usually not wider than the posterior margin of pronotum ..... **11.**
10. Third antennal segment longest; genital segment possessing distinct spines posteriorly.
..... ***Sulawesifulvius*** **Gorczyca, Chérot & Štys.**

-. Third antennal segment shorter, second segment the longest.
..... ***Peritropis*** UHLER.

11. Pronotum carinate laterally; scent-gland evaporatory area apparently absent or very hardly visible; head and pronotum verrucose, covered with broad, scale-like setae; embolium very narrow basally, with a few small tubercles.
..... ***Euchilofulvius*** POPPIUS.

-. Pronotum generally not carinate laterally; scent-gland evaporatory area clearly present; body generally covered with simple setae, scale-like setae, if they appear, are linear; embolium not narrowed basally and without tubercles ..... **12.**

12. Third and fourth antennal segments distinctly thickened, fourth segment divided, appearing as two segments; head wrinkled, pronotum with distinctly raised, broad calli ..... **13.**

-. Third and fourth antennal segments slender, fourth segment not divided; head smooth, pronotal calli not distinctly raised and narrower ..... **14.**

13. Head relatively short; pronotal calli not reaching lateral margins of pronotum.
..... ***Mimofulviella*** **gen. n.**

-. Head longer; pronotal calli reaching lateral margins of pronotum.
..... ***Mimofulvius*** SCHMITZ.

14. Body elongated; eyes strongly removed from pronotal collar; enlarged profemora with spines on ventral surface; phallus with sclerites.
..... ***Carvalhofulvius*** STONEDAHL & KOVAC.

-. Body less elongated, sometimes slightly oval; eyes contiguous with pronotal collar, if slightly removed from pronotal collar aperture of genital capsule oriented laterally, phallus strongly membranous, without a sclerite, parameres distinctly asymmetrical with right paramere greatly reduced.
..... ***Fulvius*** STÅL.

Mimofulviella gen. n.

Type species: *Mimofulviella henryi* sp. n., present designation.

ETYMOLOGY

Named for its overall appearance similar to *Mimofulvius* SCHMITZ. Gender feminine.

DIAGNOSIS

This genus is most closely related to *Mimofulvius* SCHMITZ in sharing thickened third and fourth antennal segments, a wrinkled head and pronotal collar, and the broad and raised pronotal calli. It differs, however, in possessing a shorter head and narrower pronotal calli that do not reach the lateral margins of pronotum.

DESCRIPTION

Body relatively small, brown to blackish brown, covered with densely distributed, long setae. Head short, wrinkled. Eyes dark, covered with dense, relatively long, protruding setae. Eyes contiguous with pronotal collar, reaching gula. Vertex with distinct depression medially and distinct occipital carina. Antennae fuscous or brownish yellow, short and thick, small antenniferous tubercles almost contiguous with margin of each eye. First antennal segment very short, covered with several erect setae; second antennal segment thick, covered with dense, reclining setae; third and fourth antennal segments thick, mixed with dense, reclining and erect setae; fourth antennal segment divided, appearing as two segments. Rostrum pale, reaching beyond metacoxae; first segment divided.

Pronotum covered with long, reclining setae, pronotal collar clearly visible, wrinkled; calli more or less raised, separated by longitudinal sulcus; lateral margins not elevated. Mesoscutum and scutellum unicoloured dark, covered with long setae.

Hemelytra dark, densely covered with long, upright or semi-erect setae. Corium and embolium above cuneus with large, pale patch, inner angle of cuneus paler. Membrane dark grey with two cells, major cell rounded, minor cell clearly visible.

Body dark ventrally; abdomen brown; legs short; tarsi short, two-segmented, second segment divided; claws toothed subapically.

Key to the species of *Mimofulviella* gen. n.

1. Body black; eyes large (diameter 0.23 mm); pronotal calli less raised. ..... ***M. henryi* sp. n.**
-. Body brown; eyes smaller (diameter 0.18); pronotal calli distinctly raised. ..... ***M. rugosissima* sp. n.**

***Mimofulviella henryi* sp. n.**
(Figs 1-4)

TYPE MATERIAL

Holotype ♂: SRI LANKA: Mate. Dist. Sigiriya, 800 feet, black light, 13-14 November 1976; Collected by: G. F. HEVEL, R. E. DIETZ IV, S. KARUMARATNE, D. W. BALASOORIYA. Housed in USNM.

ETYMOLOGY

It is a great pleasure to name *Mimofulviella henryi* sp. n. in honour of Dr. THOMAS J. HENRY (USNM), whom I warmly thank for the loan of the material and his help during my stay in Washington, D.C.

DIAGNOSIS

This species can be readily distinguished from *Mimofulviella rugosissima* sp. n. by darker body, pronotum covered with fine, hardly visible punctures, large eyes and less raised pronotal calli (Fig. 1).

DESCRIPTION

Male. General coloration black blackish, body covered with densely distributed, long setae. Length of the body 2.7 mm, width 1.1 mm. Head uniformly black, covered with relatively long, dense setae. Eyes dark, large, contiguous with pronotal collar, covered with erect, relatively long setae (Fig. 1). Length of head 0.53 mm, width 0.69 mm, diameter of eye in top view 0.23 mm. Antennae fuscous, short, small antenniferous tubercles almost contiguous with the margin of each eye. First antennal segment short, covered with several thick, erect setae; second segment cylindrical, thick, covered with very dense, almost reclining setae; third and fourth antennal segments thick, mixed with dense, reclining and erect setae; fourth segment divided. Length of antennal segments in mm: 0.21: 0.82: 0.32: 0.30. Rostrum pale, reaching the apex of metacoxae; first segment divided. Length of rostral segments in mm: 0.39: 0.43: 0.32: 0.30.

Pronotum black, shining, covered with long, moderately dense setae. Pronotal calli distinct, convex, not reaching lateral margins of pronotum. Pronotum, excluding pronotal collar and calli, covered with fine punctures. Length of pronotum 0.5 mm, length of the anterior margin 0.47 mm, lateral margins 0.56 mm, posterior margin 1.1 mm. Mesoscutum and scutellum uniformly dark brown, covered with long, almost erect setae.

Hemelytra parallel-sided, blackish brown, covered with dense, long, almost erect, dark setae. Corium and embolium with large, pale patch apically. Cuneus black, inner angle strongly tinged with red.

Body dark ventrally; abdomen brown, propleuron black; episternum, epimeron and metasternum brown; scent-gland evaporatory area pale yellow. Legs short, yellow to brown; coxae and trochanters pale; fore- and mesofemora pale yellow, tinged with red apically, metafemora dark brown; tibiae yellow, fore- and mesotibia paler

1. *Mimofulviella henryi* sp. n., holotype, dorsal habitus

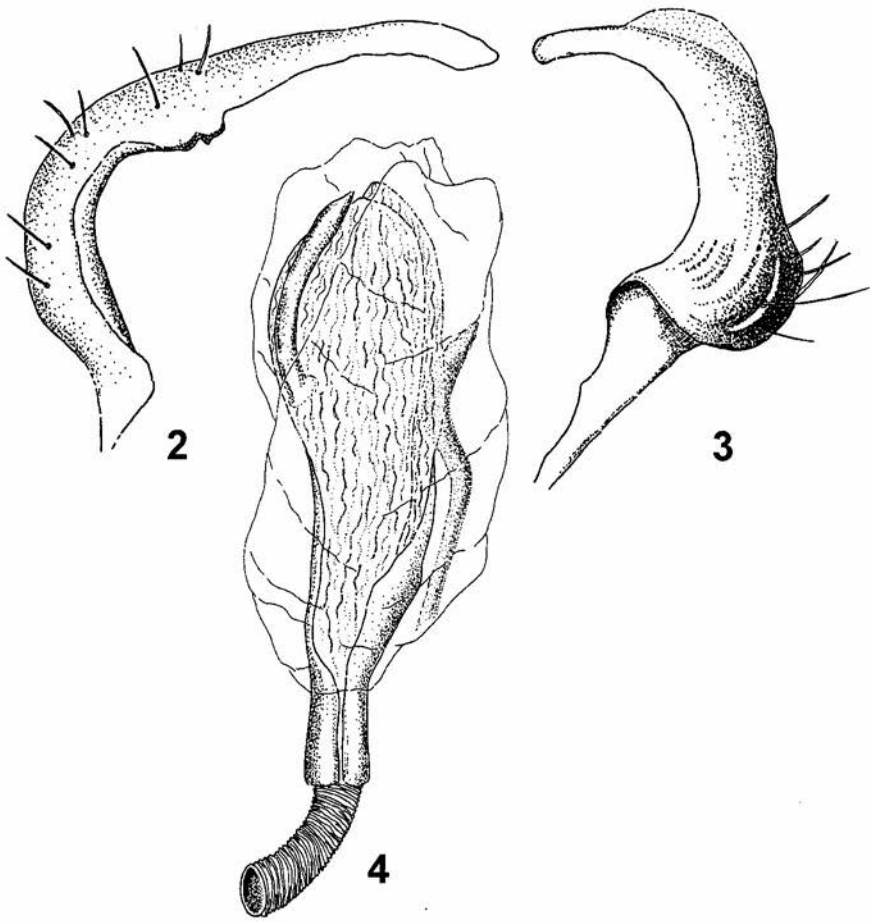
than metatibia, metatibia paler apically; tarsi short, two-segmented, second segment slightly swollen.

Male genitalia (Figs 2-4). Aperture of genital capsule oriented posteriorly, left paramere with elongated apical process, paramere body with distinct spine, right paramere hook-shaped, sensory lobe covered with bundle of long, thick setae. Ductus seminis terminating in sclerotized tube, vesica membranous with long, hook-shaped sclerite basally and curved sclerite distally.

Female: unknown.

DISTRIBUTION

Sri Lanka: Central Province: Matale District: Sigiriya.



2-4. *Mimofulviella henryi* sp. n., holotype, male genitalia: 2 – left paramere, 3 – right paramere, 4 – vesica

Mimofulviella rugosissima sp. n.

TYPE MATERIAL

Holotype ♀: BRUNEI: Bukit Sulang, nr Lamunin, N. E. STORK, 20.viii-10.ix.82, fogging, B. M. 1982-388. Tree 1: *Castanopsis* sp. Fagaceae. Housed in BMNH.

ETYMOLOGY

The specific epithet is taken from the Latin 'rugosus' (full of wrinkles) and Latin '-issimus' (very) and is used to denote strongly wrinkled head and pronotum.

DIAGNOSIS

This species is distinguished from *Mimofulviella henryi* sp. n. by the uniformly brown body, distinctly raised pronotal calli, a more slender second antennal segment, and smaller eyes.

DESCRIPTION

Female. General coloration, body dark brown, covered with densely distributed, long setae. Length of the body 2.7 mm, width 1.2 mm. Head uniformly dark brown, covered with long, dense setae. Eyes dark, covered with dense, relatively long, erect setae. Length of head 0.52 mm, width 0.64 mm, diameter of eye in top view 0.18 mm. Antennae short, ochraceous; first antennal segment short, slightly tinged with red, covered with several thick, erect setae; second segment brown, covered with moderately dense, reclining setae, becomes gradually thicker apically; third and fourth antennal segments thickened, covered with dense, lying setae and erect setae; fourth segment divided. Length of antennal segments in mm: 0.25: 0.84: 0.34: 0.39. Rostrum pale, reaching between metacoxae; first segment divided. Length of rostral segments in mm: 0.44: 0.39 third and fourth segments obscured by glue and immeasurable in the examined specimen.

Pronotum brown, ochraceous posteriorly, wrinkled, covered with moderately dense, long setae. Pronotal calli distinctly raised. Length of pronotum 0.54 mm, length of the anterior margin 0.55 mm, lateral margins 0.62 mm, posterior margin 1.18 mm. Mesoscutum and scutellum uniformly brown, covered with long, semierect setae.

Hemelytra brown, covered with long, dense, semierect setae. Apex of corium and embolium and inner angle of cuneus with large, pale patch. Cuneus slightly tinged with red.

Body dark ventrally; abdomen dark, covered with sparse setae; propleuron brown; episternum, epimeron and metasternum pale brown; scent-gland evaporatory area pale yellow. Coxae pale, forelegs pale, brown yellowish. Remaining legs missing in the examined specimen.

Male: unknown.

DISTRIBUTION

Brunei: Bukit Sulang.

ACKNOWLEDGEMENTS

I thank Dr. THOMAS J. HENRY (United States National Museum of Natural History, Smithsonian Institution, Washington, D.C.) and Dr. MICK D. WEBB (Natural History Museum, London) for loan of the specimens used in this study. I am also very indebted to Dr. THOMAS HENRY and Dr. JACEK GORCZYCA (Department of Zoology, University of Silesia, Katowice, Poland) for kindly reviewing the manuscript and providing many valuable comments and suggestions. I am also very grateful to Dr. JACEK GORCZYCA for his invaluable help with my research on Cylapinae.

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POLISH TAXONOMICAL MONOGRAPHS, Vol. 15: 163-173 Wrocław, 28 XII 2008

New and little known species of the genus *Ampedus* DEJEAN, 1833 from China, India, and Pakistan (Insecta: Coleoptera: Elateridae)

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ABSTRACT. Four new species, *Ampedus almorensis* n. sp. (India), *A. nanpingensis* n. sp. (China), *A. shogranensis* n. sp. (Pakistan), and *A. uttarpradeshensis* n. sp. (India) are described and illustrated. New records of *A. loebli* SCHIMMEL, 1993, *A. mirificus* SCHIMMEL, 1993, and *A. pakistanicus* PLATIA, 1988 are given, and pictures of all mentioned species are provided.

Key words: entomology, taxonomy, Coleoptera, Elateridae, *Ampedus*, new species, China, India, Pakistan.

INTRODUCTION

Little is known about the fauna of the genus *Ampedus* DEJEAN, 1833 from China, India and Pakistan and the ecology of the species and the distribution of their populations are poorly understood. Approximately 40 species have been described so far from China, and about ten from India and Pakistan. In this paper we describe four new species of the genus *Ampedus*, one each from China and Pakistan, and two from India: *A. almorensis* n. sp. from Uttar Pradesh, Northern India; they have yellowish elytra, and a reddish pronotum with a black spot on it, which is reaching from centre up to anterior margin. *Ampedus nanpingensis* n. sp. from Sichuan province in China possess a black pronotum and black elytra, with reddish-brown antennae, legs and abdominal segments. *A. shogranensis* n. sp. from Kagan Valley in Northern Pakistan have brownish elytra, and a reddish-brown pronotum, with a blackish centre. *A. uttarpradeshensis* n. sp. from Uttar Pradesh in Northern India have black elytra and pronotum, with aubergine base and epipleurite. The specimen of the species described here as new to sciences have been collected at an altitude from 1540 to 2750 m a.s.l. This classifies those species as occupants of mountain regions. *A. almorensis* n. sp. and *A. shogranensis* n. sp. are closely related to *A. pakistanicus* PLATIA, 1988, and are therefore compared with this species in the differential diagnosis of this paper. *A. uttarpradeshensis* n. sp. is compared with *A. quercicollis* SCHIMMEL, 1993 and *A. nanpingensis* n. sp., with *A. chifengensis* SCHIMMEL, 2006, as close relations seem to exist between these species. In addition, new records and pictures of habitus and male genitalia of *A. loebli* SCHIMMEL, 1993, *A. mirificus* SCHIMMEL, 1993 and *A. pakistanicus* PLATIA, 1988 are given.

ABBREVIATIONS AND METHODS

Abbreviations

The following abbreviations have been used in this study:

CSV	Coll. Schimmel, Vinningen, Germany
CTW	Coll. Tarnawski, Wrocław, Poland
CWB	Coll. Wrase, Berlin
NHMB	Coll. Natural History Museum, Basel, Switzerland

Methods

The examination of the collected material has been executed using a ZEISS Stemi 2000-C binocular with a micron insert. Photographs were taken with a NIKON E4500 camera with an TV2/3"C 0.63x adaptation to the binocular.

Body length of the specimens has been measured from apical margin of frons up to apex of elytra, and body width along basis angles of pronotum, using the micron insert of the binocular.

The examined specimen are fixed on white pastboard. The genitalia of the males have been pulled out of the abdomen, cleaned and fixed beside the body of the specimen using water-soluble transparent glue.

Types of new species have been marked with red labels indicating the type status (Holotype or Paratype) and the name of the species and of the author.

DESCRIPTION AND REVIEW OF SPECIES

Ampedus almorensis n. sp.

(Figs. 1-2)

Locus typicus

India: Uttar Pradesh.

Type material

Holotypus ♂ (CSV): India: Uttar Pradesh, Almora, 1950 m, 29.VI.-1.VI.2006, leg. E. Kučera.

Diagnosis

Holotypus ♂: Elongate, oblong, slightly raised, and semi-shiny, small species, with a tri-coloured integument; ventral side, head, and scutellum black, legs and elytra yellowish, pronotum reddish, with a medially black, rhomboid macula which is reaching from centre up to anterior margin; pubescence yellowish-brown, short, fine and declined; measurements: length: 5.3 mm, width: 1.5 mm.

DESCRIPTION

Head with very dense puncture, points umbilicate and circular, their interstices reduced to small wrinkles; pubescence short and declined to apex, and lateral sides; eyes semi-spherical, little prominent; frons declined from centre to apex, and slightly raised above the base of antennae; antennae eleven-segmented, short and serrate from fourth antennomere on, just reaching posterior angles of pronotum; second and third antennomere semi-globular, short, slightly longer than wide apically; second and third antennomere combined clearly longer than fourth antennomere, and each of the following antennomeres; those are extended and truncate apically, and densely covered with umbilicate points; last antennomere oval, sub-apically slightly bevelled.

Pronotum campaniform, along median line as long as wide at the posterior angles, slightly and regularly raised at centre, slightly arcuate laterally, and with a relatively prominent dropping at basis; posterior angles of pronotum straight, just slightly divergent, very short, and with a slightly raised carina which is reaching basal eight of pronotum; apices of posterior angles truncate; pronotum without any fovea or mould; puncture of pronotum dense, points circular and umbilicate anterior, and becoming sparser at centre, interstices of points centrally semi-shiny, and once their diameter, and reduced to small wrinkles anterior; pubescence declined from apex to basis.

Scutellum lingulate, constricted sub-basally, and arcuate at apex; surface slightly raised, and edged at basis, puncture dense, points fine and umbilicate; pubescence dense, but fine, and just visible, declined from basis to apex.

Elytra sub-parallel, elongate and cuneate, after apical third narrowed to apex; the latter arcuate, without an inner tooth; base of elytra as wide as that of pronotum and slightly depressed at scutellum, margins raised, shoulders prominent (winged species); striae of elytra covered with fine and dense, simple, oblong points, interstices of striae finely punctate, shiny, flat and micro-reticulate; pubescence short, bristly, and declined to apex, and to lateral sides.

Pro-, meso- and metathorax with dense puncture, interstices of points flat and shiny; pubescence short and declined.

Legs elongate, moderately long and thin, tarsomeres up to claws of decreasing length, ventrally with hardly visible, fine pubescence, and fine upholstery, tibia covered with semi-protruding bristly thorns.

Aedeagus trilobate, with a median lobe, which is slightly extending the apices of the paramere, the latter are uncinate, and covered with a tuft of longer bristles.

Females are unknown.

DIFFERENTIAL DIAGNOSIS

Ampedus almorensis is closely allied to *A. pakistanicus*, but may be easily distinguished from this species by the medially black, rhomboidal macula, and by the denser puncture of the reddish pronotum, as well as by the form of aedeagus.

ETYMOLOGY

Named after the locus typicus.

DISTRIBUTION
India Uttar Pradesh.

Ampedus loebli SCHIMMEL, 1993
(Fig. 3)

Ampedus loebli SCHIMMEL, 1993. Ent. Basil., **16**: 133-134.

LOCUS TYPICUS
Pakistan: Lawari pass.

NEW MATERIAL
Pakistan: Shogran, Kagan valley, 2300-2750 m, 17.VI.1977, 1 spm., leg. W. WITTMER & M. BRANCUCCI; Shogran, Sari, 2750-2900 m, 28.VI.1979, 1 spm., leg. W. WITTMER.

COMMENTS
The abovementioned records are the second of this species ever, and confirm the occurrence of *Ampedus loebli* SCHIMMEL, 1993 in Northern Pakistan.

Ampedus mirificus SCHIMMEL, 1993
(Figs. 4-5)

Ampedus mirificus SCHIMMEL, 1993. Ent. Basil., **16**: 134-135.

LOCUS TYPICUS
Pakistan: Kagan valley.

NEW MATERIAL
Pakistan: Kalash valley, ca. 30 km west of Drosh, Brun village, 29.VII.-6.VIII.1998, 1 spm., leg. ČIŽEK & ČERNÝ.

COMMENTS
This is the second record of this species since the description in 1993, and confirm the occurrence of *Ampedus mirificus* SCHIMMEL, 1993 in Northern Pakistan.

Ampedus nanpingensis n. sp.
(Figs. 6-7)

LOCUS TYPICUS
China: Sichuan.

TYPE MATERIAL

Holotypus ♀ (CSV): China: Sichuan, Juizhazgou to Nanping, 7.-9.VI.2007, leg. E. KUČERA.

Paratypes 4 ♀♀ (CSV, CTW, CWB): Same data as Holotypus, 3 spm.; same province, Daba Shan, 8 km north-west of Muyuping, 1540 m, (mix. For./shady meadow, slopes, under shrubs, moss), 18.VII.2001, 1 spm., leg. D. WRASE.

DIAGNOSIS

Holotypus ♀: Elongate, cuneate, slightly raised, and shiny species, with a bicoloured integument: black, abdominal-segments, legs, and antennae reddish-brown; pubescence yellowish-brown, short, bristly and declined; measurements: length: 10.1 mm, width: 2.8 mm.

DESCRIPTION

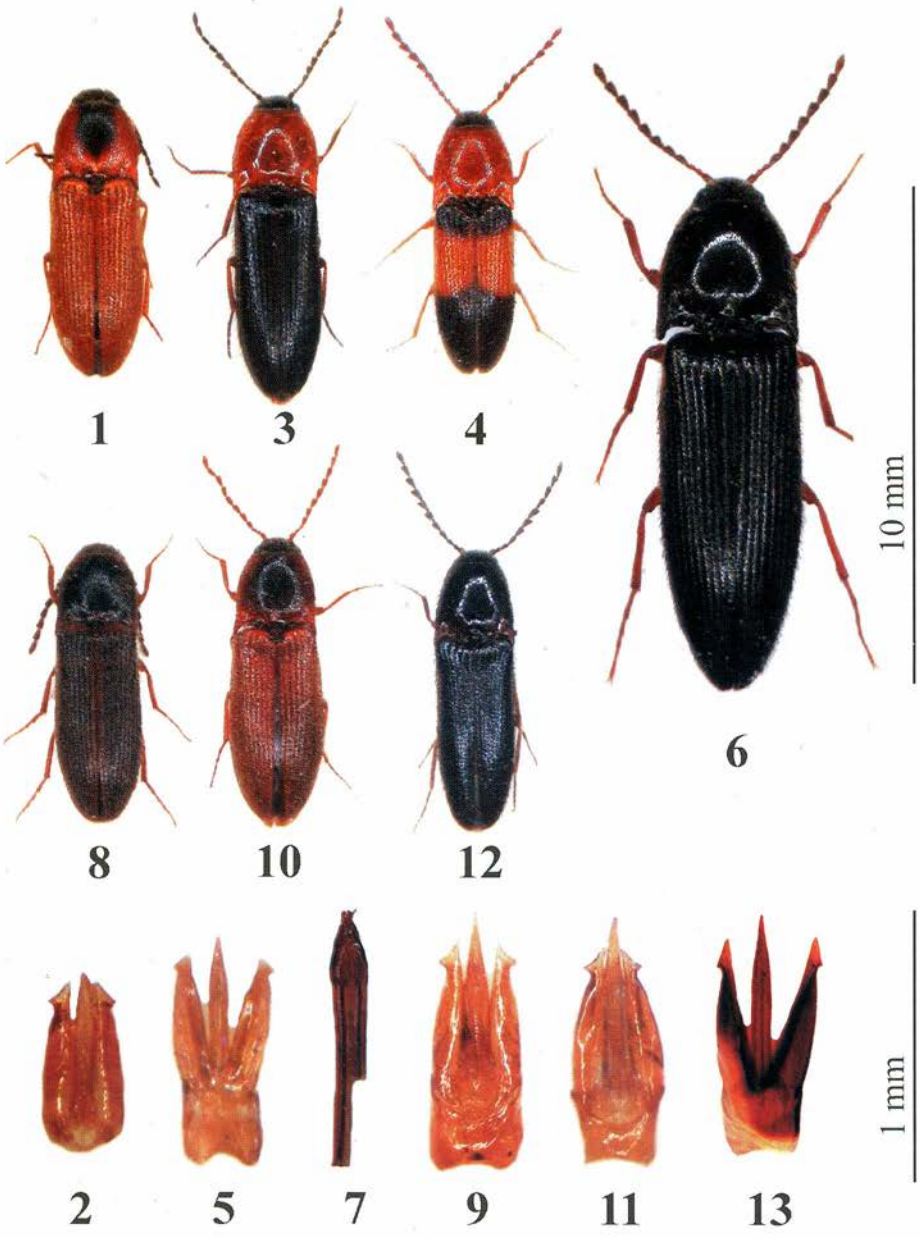
Head with dense puncture, points umbilicate and drop-forming, their interstices half to once their diameter; pubescence short and declined to apex, and to lateral sides; eyes semi-spherical, little prominent; frons declined from centre to apex, and slightly raised above the base of antennae; antennae eleven-segmented, short, and serrate from fourth antennomere on, not reaching the posterior angles of pronotum for the length of the last antennomere; second antennomere semi-globular, short, as long as wide, and slightly extended apically third antennomere of the same length, but slightly more slender than the second antennomere, and truncate apically; second and third antennomere combined as long as fourth antennomere, and each of the following antennomeres; those are extended and truncate apically; last antennomere oval, sub-apical slightly bevelled.

Pronotum campaniform, along median line as long as wide at the posterior angles, slightly and regularly raised at centre, arcuate laterally, and with a relatively prominent dropping at basis; posterior angles of pronotum slightly divergent, and with a prominently raised carina which is reaching basal fifth of pronotum; apices of basal angles truncate; pronotum with a flat but clearly visible fovea which is reaching from basis up to basal third; puncture of pronotum distant, and drop-forming, simple, interstices of points double their diameter, and at the whole surface flat and shiny; pubescence declined from apex to basis, and cuspidate at the fovea.

Scutellum lingulate, slightly crenate sub-basally, and arcuate apically; surface slightly raised, and edged at basis, puncture dense, points fine and umbilicate; pubescence dense, fine, and just visible, declined from basis to apex.

Elytra sub-parallel, elongate and cuneate, after apical third narrowed to apex; the latter arcuate, with a small inner tooth; base of elytra slightly smaller than that of pronotum and slightly depressed at scutellum, margins raised, shoulders prominent (winged species); striae of elytra covered with fine and dense, simple, oblong points, interstices of striae finely punctured, shiny, and slightly raised; pubescence short, bristly, and declined to apex, and to lateral sides.

Pro-, meso- and metathorax with dense puncture, interstices of points flat and shiny; pubescence short and declined.



1-2: *Ampedus almorensis* n. sp., 1 – habitus, 2 – aedeagus. 3: Habiutus of *A. loebli* SCHIMMEL, 1993. 4-5: *A. mirificus* SCHIMMEL, 1993, 4 – habitus, 5 – aedeagus. 6-7: *A. nanpingensis* n. sp., 6 – habitus, 7 – ovipositor. Figs. 8-9: *A. pakistanicus* PLATIA, 1988: 8 – habitus, 9 – aedeagus. 10-11: *A. shogranensis* n. sp., 10 – habitus, 11 – aedeagus. 12-13: *A. uttarpradeshensis* n. sp., 12 – habitus, 13 – aedeagus

Ovipositor thriangular, bi-dentate apically.

Legs elongate, moderately long and thin, tarsomeres up to claws of decreasing length, ventrally with hardly visible, fine pubescence, and fine upholstery, tibia covered with semi-protruding bristly thorns.

Males are unknown.

DIFFERENTIAL DIAGNOSIS

Ampedus nanpingensis is closely allied to *A. chifengensis*, but may be easily distinguished from this species by the reddish-brown abdominal-segments, by the form of hairs on pronotum, by the less dense puncture of pronotum, and by the form of interstices of elytra striae.

ETYMOLOGY

Named after the locus typicus.

DISTRIBUTION

China: Sichuan.

Ampedus pakistanicus PLATIA, 1988

(Figs. 8-9)

Ampedus pakistanicus PLATIA, 1988. G. it. Ent. **4**: 9-10. SCHIMMEL, 1993. Entomol. Basil., **16**: 137.

LOCUS TYPICUS

Pakistan: Kagan valley.

NEW MATERIAL

Pakistan: From Murree to Abbottabad, 2200-2500 m, 3.VI.1973, 1 spm., leg. M. BRANCUCCI & W. WITTNER; India: Kashmir, from Gulmarg to Tangmara, 2650-2300 m, 3.VII.1976, 1 spm., leg. W. WITTMER.

COMMENTS

After the species was described in 1988, it has been recorded in Northern Pakistan by SCHIMMEL (1993). The abovementioned records are the first for Kashmir in India, and confirm the occurrence of *Ampedus pakistanicus* PLATIA, 1988 in Northern Pakistan.

Ampedus shogranensis n. sp.

(Figs. 10-11)

LOCUS TYPICUS

Pakistan: Shogran.

TYPE MATERIAL

Holotypus ♂ (NHMB): Pakistan: Shogran, Kagan valley., 2300-2750 m, 27.VI.1979, leg. W. WITTMER.

Paratypus ♂ (CSV): Pakistan: Naran, Kagan valley., 2370-2750 m, 23.VI.1977, leg. M. BRANCUCCI & W. WITTMER.

DIAGNOSIS

Holotypus ♂: Elongate, oblong, slightly raised, and semi-shiny, small species, with a varicoloured integument: ventral side and head black, legs yellowish, elytra brownish, pronotum reddish-brown with blackish centre; pubescence yellowish-brown, short, fine and declined; measurements: length: 5.6 mm, width: 1.7 mm.

DESCRIPTION

Head with dense puncture, points umbilicate and circular, their interstices reduced to small wrinkles; pubescence short and declined to apex, and to lateral sides; eyes semi-spherical, little prominent; frons declined from centre to apex, and slightly raised above the base of antennae; antennae eleven-segmented, short, serrate from fourth antennomere on, and extending posterior angles of pronotum by the length of the last antennomere; second antennomere semi-globular, short, slightly longer than wide at apex; third antennomere conical, and conspicuously longer than wide at apex, second and third antennomere combined clearly longer than fourth antennomere, and each of the following antennomeres; those are extended and truncate at apex, densely covered with umbilicate points; last antennomere oval, sub-apically slightly bevelled.

Pronotum campaniform, along median line as long as wide at the posterior angles, slightly and regularly raised at centre, slightly arcuate laterally, and with a relatively prominent dropping basally; posterior angles of pronotum slightly divergent, with a very short, just visible, slightly raised carina which is reaching basal eight of pronotum; apices of basal angles truncate; pronotum without any fovea or mould; puncture of pronotum dense anterior, becoming sparser at centre, points circular, and umbilicate, their interstices semi-shiny, once their diameter centrally, and reduced to small wrinkles anteriorly; pubescence declined from apex to basis, centrally declined to median line.

Scutellum lingulate, constricted sub-basally, and arcuate apically; surface slightly raised, and edged at basis, puncture dense, points fine and umbilicate; pubescence dense, fine, and just visible, declined from basis to apex.

Elytra sub-parallel, elongate and cuneate, after apical third narrowed to apex; apex arcuate, without an inner tooth; base of elytra as wide as that of pronotum and slightly depressed at scutellum, margins raised, shoulders prominent (winged species); striae of elytra covered with fine and dense, simple, oblong puncture, interstices of striae finely punctured, shiny, flat and micro-reticulate; pubescence short, bristly, and declined to apex, and to lateral sides.

Pro-, meso- and metathorax with dense puncture, interstices of points flat and shiny; pubescence short and declined.

Legs elongate, moderately long and thin, tarsomeres up to claws of decreasing length, ventrally with hardly visible, fine pubescence, and fine upholstery, tibia covered with semi-protruding bristly thorns.

Aedeagus trilobate, with a thin median lobe, which is slightly extending apices of paramere, the latter are uncinate, and covered with a tuft of longer bristles.

Females are unknown.

DIFFERENTIAL DIAGNOSIS

Ampedus shogranensis is closely allied to *A. pakistanicus*, but may be easily distinguished from this species by the more elongate antennae, by the sparser puncture of pronotum, and by the lighter colour of body; and from *A. almorensis* by the longer antennae, by the darker colour of body, by the pubescence of pronotum, by its colour, and by the form of aedeagus.

ETYMOLOGY

Named after the locus typicus.

DISTRIBUTION

Pakistan: Kagan Valley.

Ampedus uttarpradeshensis n. sp.

(Figs. 12-13)

LOCUS TYPICUS

India: Uttar Pradesh.

TYPE MATERIAL

Holotypus ♂ (CSV): India: Uttar Pradesh, Almora, 1950 m, 29.VI.-1.VI.2006, leg. E. KUČERA.

DIAGNOSIS

Holotypus ♂: Elongate, oblong, slightly raised, and shiny, small species, with a tricoloured integument: black, legs yellowish-brown, base of pronotum and elytra, as well as epipleurite of the latter aubergine; pubescence brownish, short, fine and semi-spreading; measurements: length: 5.1 mm, width: 1.4 mm.

DESCRIPTION

Head with dense puncture, points umbilicate and circular, their interstices once their diameter; pubescence short and declined to apex, and lateral sides; eyes semi-spherical, little prominent; frons declined from centre to apex, and slightly raised above the base of antennae; antennae eleven-segmented, long, serrate from third antennomere on, extending posterior angles of pronotum by the length of the last two antennomere; second antennomere semi-globular, short, slightly longer than wide apically; third antennomere serrate, conspicuously longer than wide at apex, second and third antennomere combined clearly longer than fourth antennomere, and each of the following

antennomeres; those are extended and truncate at apex, bulbous, and densely covered with umbilicate points; last antennomere oval, sub-apically slightly bevelled.

Pronotum campaniform, along median line as long as wide at the posterior angles, slightly and regularly raised at centre, slightly arcuate laterally, and with a relatively flat dropping basally; posterior angles of pronotum slightly divergent, and with a very short, just visible, slightly raised carina which is reaching basal eight of pronotum; apices of basal angles truncate; pronotum without any fovea or mould; puncture of pronotum distant and simple on the whole surface, points circular to drop-forming, interstices semi-shiny, and manifold their diameter; pubescence declined from apex to basis, centrally declined to median line.

Scutellum lingulate, slightly constricted sub-basally, and acute apically; surface slightly raised, and edged basally, puncture distant, points fine and simple; pubescence dense, fine, and just visible, declined from basis to apex.

Elytra sub-parallel, elongate and cuneate, after apical third narrowed to apex; the later arcuate, without an inner tooth; base of elytra as wide as that of pronotum and slightly depressed at scutellum, margins raised, shoulders prominent (winged species); striae of elytra covered with fine and dense, simple, oblong puncture, interstices of striae finely punctured, shiny, flat and micro-reticulate; pubescence short, bristly, and declined to apex, and to lateral sides.

Pro-, meso- and metathorax with dense puncture, interstices of points flat and shiny; pubescence short and declined.

Legs elongate, moderately long and thin, tarsomeres up to claws of decreasing length, ventrally with hardly visible, fine pubescence, and fine upholstery, tibia covered with semi-protruding bristly thorns.

Aedeagus trilobate, with a thin median lobe, which is conspicuously extending apices of paramere, the latter are uncinate, and covered with a tuft of longer bristles.

Females are unknown.

Differential diagnosis

Ampedus uttarpradeshensis is closely allied to *A. quercicollis*, but may be easily distinguished from this species by the very small body, by the sparser puncture of pronotum, by the longer antennae, and by the form of aedeagus.

Etymology

Named after the locus typicus.

Distribution

India: Uttar Pradesh.

Acknowledgements

We would like to express our sincere thanks to Dr. M. Brancucci (Basel), Mr. E. Kučera (Prague), and Dr. D. Wrase (Berlin) for providing material of the genus

Ampedus collected in China, India and Pakistan, to Mrs. P. JUNG (Zweibrücken) and Mr. J. TARNAWSKI (Wrocław) for proof-reading the English and to Prof. Dr. L. BOROWIEC (Wrocław) for the editorial works on this paper.

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Spaminta wanati sp. n. – a new species of mantidflies from New Caledonia (Neuroptera: Mantispidae)

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ABSTRACT. The first record of Mantispidae from New Caledonia is presented. The description of male and female of *Spaminta wanati* sp. n. is given. It is well differentiated by brownish darkening of the basal part of the wings, characteristic pattern of markings on the head and male and female genital structures.

Key words: Insecta, Neuroptera, Mantispidae, Mantispinae, *Spaminta*, new species, New Caledonia.

INTRODUCTION

The genus *Spaminta* LAMBKIN, 1986 is not rich in taxa, comprising only four species. The two species – *S. minjerribae* LAMBKIN, 1986 and *S. pavida* (GERSTAECKER, 1885) are known from Australia. The two remaining species *S. scutellaris* (WESTWOOD, 1852) and *S. strigipes* (WESTWOOD, 1852), placed in this genus, present taxonomic and distributional questions. LAMBKIN (1986b) treated both species described originally by WESTWOOD (1852) in the genus *Mantispa* ILLINGER in KUGELANN, 1798 as *nomina dubia*. Later, NEW (1996: 27) in the catalogue of Australian Neuroptera excluded *Mantispa scutellaris* as present in the area and pointed that *Mantispa strigipes* was included in the Australian fauna on the basis of a hardly legible locality label only. He concluded that "no subsequent specimens have been found in Australia and it seems doubtful that this is an Australian species". However, NEW (2003), in the monograph of the Neuroptera of Malaysia listed the genus *Spaminta* as known from Indonesia, Papua New Guinea and Australia. The most recent World catalogue of Mantispidae (OHL 2004) lists both species in the genus *Spaminta* but the distributional data are given as dubious, with question mark. In his later paper OHL (2007) placed in the genus *Spaminta* only two species known from the Australian Region.

The majority of the specimens of New Caledonian mantidflies kept in the Natural History Department of Upper Silesian Museum in Bytom, and in the Department of Biosystematics of University of Opole (Poland), had been collected by the author and by TOMASZ BLAIK during the second and third Polish entomological expeditions to New Caledonia, but several specimens of the collection come from the first expedition organized by MAREK WANAT (Museum of Natural History, University of Wrocław) and another Polish entomologist – DARIUSZ SKIBIŃSKI.

All measurements are given in millimeters. Positioning of the specimens during measurements, as well as the abbreviations explained below, exactly follow those from Lambkin's monograph (LAMBKIN 1986a).

WBE – width between eyes
WAE – width across eyes
LP – length pronotum
WAM – width at maculae
LFF – length of fore femur
WFF – width of fore femur
LFT – length of fore tibia
LMF – length of mid femur
LFW – length of forewing
WFW – width of forewing
L2R_1 – length of forewing 2R_1 cell
W2R_1 – width of forewing 2R_1 cell
L3R_1 – length of forewing 3R_1 cell

ABBREVIATIONS OF DEPOSITORY INSTITUTIONS
IACP – IAC station, Pocquereux, New Caledonia.
IRD – Institut de Recherche pour le Dévelopment, Nouméa, New Caledonia.
MNHN – Muséum national d'Histoire naturelle, Paris, France.
MNHW – Museum of Natural History, Wrocław University, Poland.
SCMK – Somogy County Museum, Kaposvár, Hungary.
UO - Department of Biosystematics, University of Opole, Poland.
USMB – Upper Silesian Museum, Bytom, Poland.

The male and female terminalia of the new species were macerated in hot 10% sodium hydroxide and after them in cleared in chloralphenol and chloralhydrate. After the examination in transmitted light, the abdomen was put into a genital microvial with glycerine and pinned under the specimen from which it comes. The majority of the specimens are pinned. One specimen has been preserved in absolute ethanol for DNA studies.

***Spaminta wanati* sp. n.**
(Map. 1; Photos 1-8, Figs 1-10)

ETYMOLOGY
This species is dedicated to my friend MAREK WANAT, excellent specialist in Apionidae, who organized the first Polish entomological expedition to New Caledonia.

DIAGNOSIS
The newly described species differs clearly from all others by characteristic color pattern on the head (Phot. 1), wing membrane darkened at base in both sexes, yellow coloration of part of veins and membrane of forewing and in genital structures (Phot. 6; Fig. 1-10).

DESCRIPTION

Body size and wing span strongly variable, as in other species of Mantispidae.

Measurements

Holotype (♂): WBE 0.6; WAE 1.6; LP 2.66; WAM 0.5; LFF 2.85; WFF 0.8; LFT 1.5; LMF 1.8; LFW 9.2; WFW 2.4; L2R_1 1.3; W2R_1 0.7; L3R_1 1.4.

Paratypes (23 ♂♂): WBE 0.5-0.7; WAE 1.4-2.1; LP 2.16-3.3; WAM 0.3-0.6; LFF 2.3-3.6; WFF 0.6-1.0; LFT 1.3-2.1; LMF 1.4-2.4; LFW 7.2-11.1; WFW 2.0-3.0; L2R_1 1.2-1.4; W2R_1 0.5-0.7; L3R_1 1.0-1.7.

Paratypes (19♀♀): WBE 0.6-0.8; WAE 1.9-2.1; LP 3.0-3.33; WAM 0.5-1.0; LFF 2.9-3.65; WFF 0.9-2.0; LFT 1.8-2.2; LMF 2.0-2.4; LFW 10.7-12.4; WFW 2.8-3.0; L2R_1 1.6-1.7; W2R_1 0.8-0.85; L3R_1 1.6-2.1.

Body proportions as in table below.

Proportions	*S. wanati* sp. nov.	*S. minjerribae*	*S. parvida*
WBE : WAE	0.31 - 0.38	0.37 - 0.41	0.33 - 0.40
LP : WAM	**4.43 - 6.54**	4.1 - 5.3	4.3 - 5.5
LFF : WFF	3.22 - 3.83	3.4 - 3.9	3.1 - 3.9
LFF : LFT	1.61 - 1.9	1.8 - 1.9	1.7 - 1.9
LMF : WAE	1.0 - 1.15	1.0 - 1.1	1.0 - 1.1
LFW : WFW	3.6 - 4.13	3.5 - 4.1	3.5 - 3.9
L2*R1* : W2*R1*	1.86 - 2.4	1.6 - 2.3	1.5 - 2.4

COLORATION

General dorsal views of holotype and female paratype are presented on photos (2–5), respectively.

Head yellow with brown pattern on labrum, clypeus and frons as in photo (1). Irregular marking starting at line of antennae base reaching to compound eyes margins, vertex with yellowish or brownish markings, lighter than background, Scapus and pedicellus anteriorly yellow to brown, posteriorly brown to dark brown. Flagellum uniformly dark brown.

Pronotum (Figs 1, 2) dark brown, with distinctly marked tuberculate maculae, with scarce, delicate, short hairs. Prothoracic sternite light brown to narrow yellowish band along. Meso- and metathorax dorsally brown or dark brown, only mesoscutellum and metascutellum yellow (Photo 7). Exceptionally yellowish marking present also outside of scutellum, forming indistinct, dotted line on thorax. Lateral and ventral portions of meso- and metathorax yellow (Photo 3).

Fore leg: coxa yellow, trochanter yellow, posteriorly darker to light yellowish-brown, brownish at femur, with delicate, dense transverse wrinkles. Femur darker, light brown to brown, with yellow margin at spines; internal portion with distinct, darker, brown marking covering at least half of femur length from the knee. Tibia and tarsus light brown. Mid leg: coxa yellow, with irregular brown markings at base, laterad and posteriad. Trochanter yellow, yellowish-brown at base. Femur yellow. Tibia yellow-

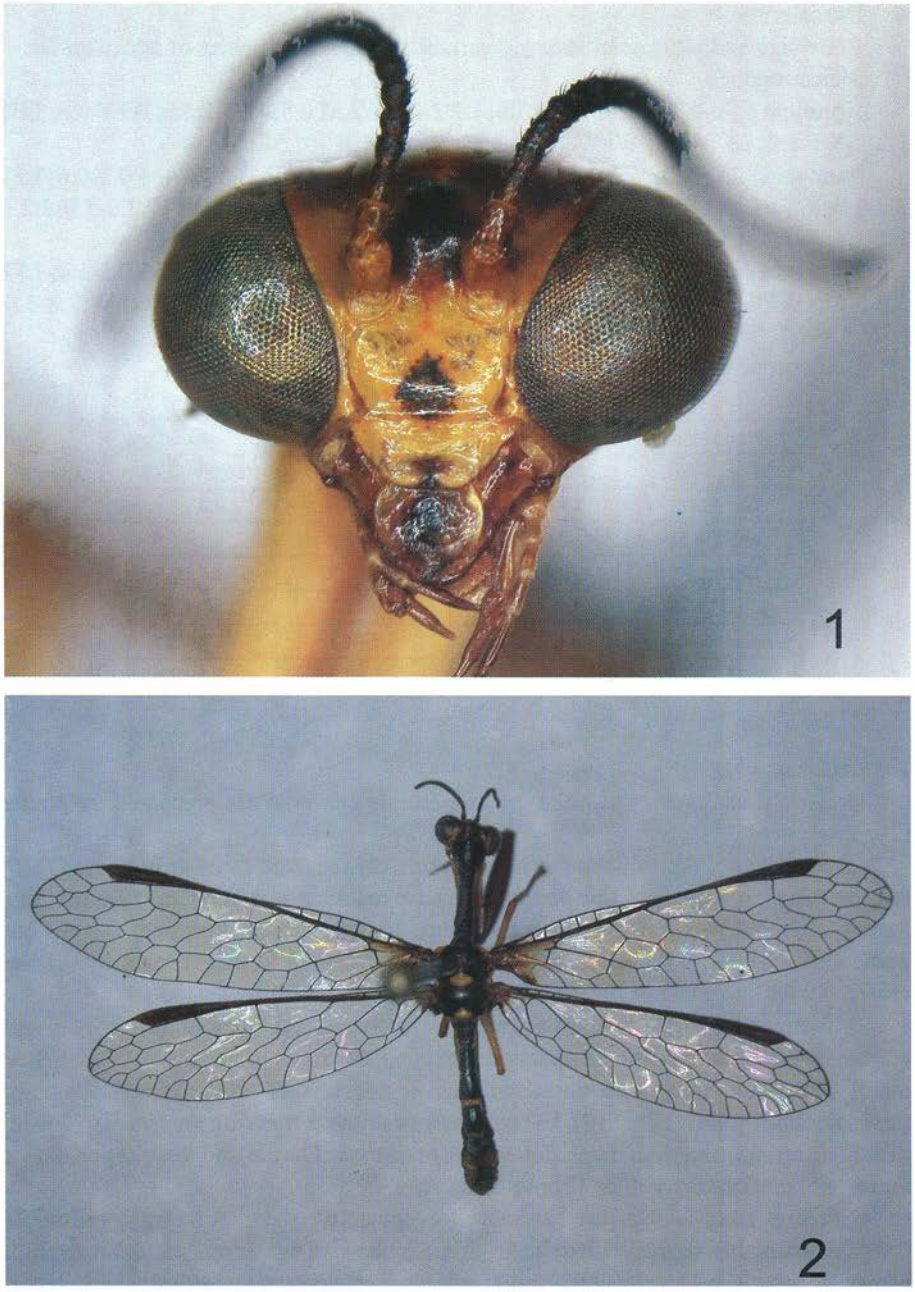


Photo 1, 2. *Spaminta wanati* sp. n.: 1 – head in anterior view, 2 – general in dorsal view (holotype male MNHN)

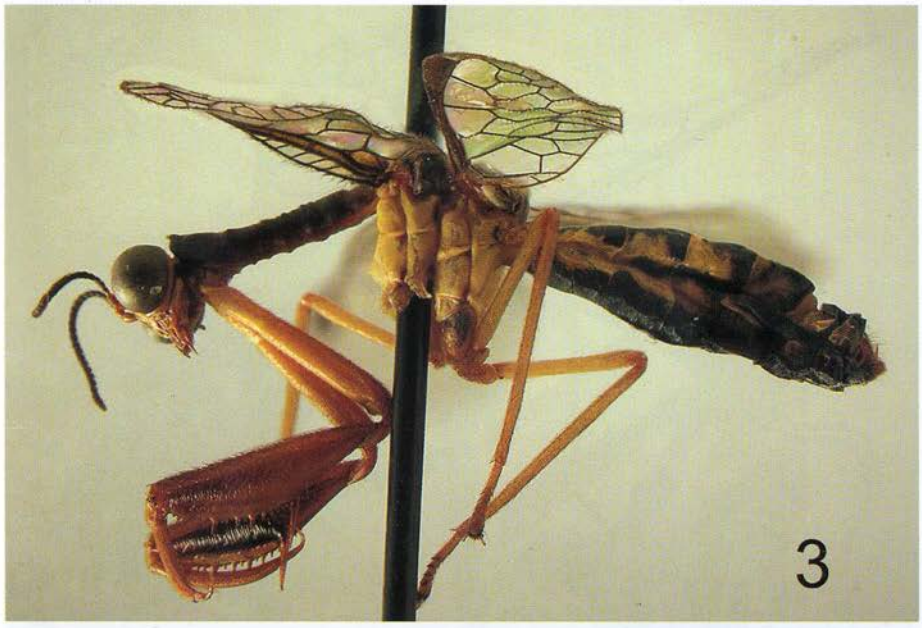
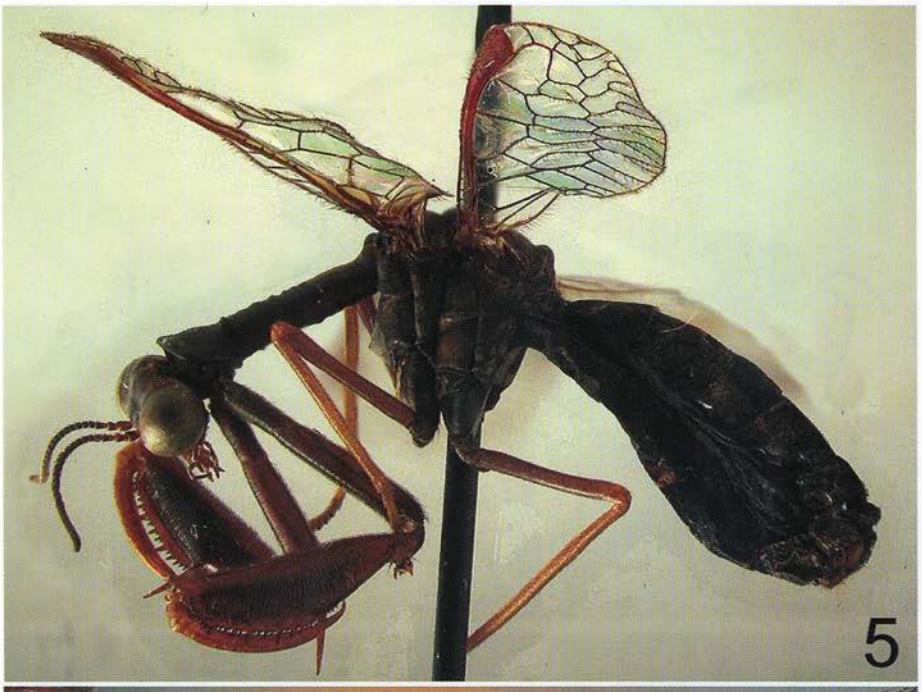


Photo 3, 4. *Spaminta wanati* sp. n.: 3 – general in lateral view (holotype male MNHN), 4 – general in dorsal view (paratype female USMB 5915/181)



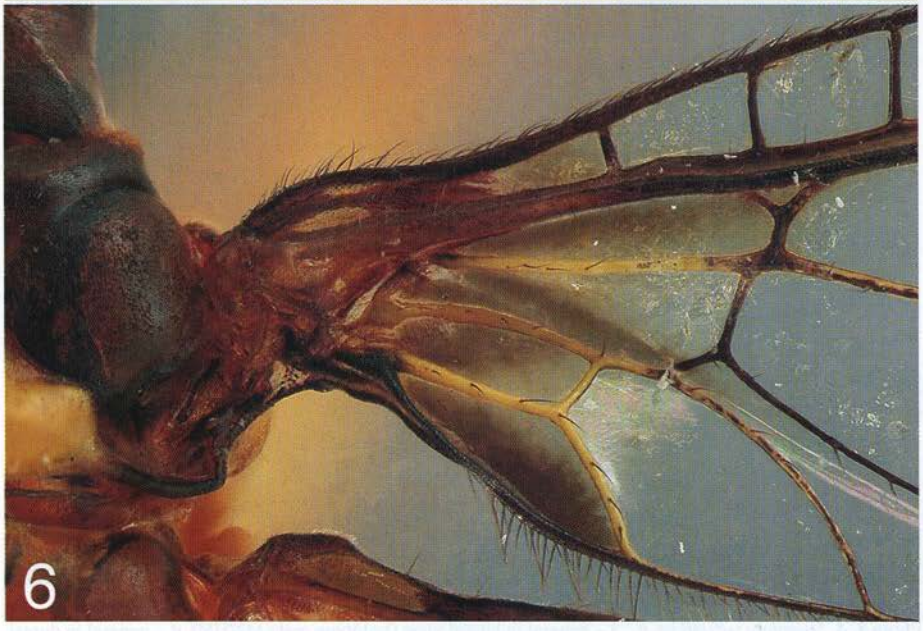


Photo 5, 6. *Spaminta wanati* sp. n.: 5 – general in lateral view (paratype female USMB 5915/181), 6 – basal part of forewing (holotype male MNHN)

ish-brownish. Tarsus yellowish-brownish to brown at narrow portion near tarsal claws bases. Hind leg: coxa yellow, with huge light brown to brown marking, covering sometimes the whole surface; it is more distinct and bigger in size than marking on mid leg. Trochanter, femur, tibia and tarsus colored as the respective mid leg segments.

Fore wings: proximal portion of veins Cu and A1 yellow, vein A2 and transverse vein 1a-2a yellow. Remaining veins brown. Pterostigma brown to dark brown. Basal portion of fore wing (cells 1M, Cu, 1A, 2A) and subcostal space with distinct brownish darkened membrane (Photo 6). Hind wings with same coloration, but lacking yellow coloration of veins and lacking darkening of membrane with exception of subcostal space and cell 1M, which are colored as on fore wings.

Abdomen brown to dark brown colored, with yellow pattern variable among examined specimens (Photo 3). Abdominal segments 1–4, in general, dorsally and ventrally brown, yellowish at sides. Tergites 5 and 6 with fused yellowish markings forming dorsally visible ring; tergite 7 practically yellow. Ventral side of whole abdomen brown, with exception yellow sternite 1. Apical segments of abdomen lighter with yellowish coloration prevailing. Tips of abdomen of male and female as in figures (Figs 3-7 – male, Figs 8-10 – female).

REMARKS

In the series of 43 specimens, among 19 females, 8 are distinctly darker with dominating brown coloration. These specimens lacking yellow markings, light brownish coloration of respective elements is visible (Phot. 4-5). Yellow coloration of veins and brown darkening of wings membrane is preserved as among remaining specimens.

Photo 7, 8. *Spaminta wanati* sp. n.: 7 – meso- and metatorax in dorsal view (holotype male MNHN), 8 – meso- and metatorax in dorsal view (paratype feamle USMB 5915/181)

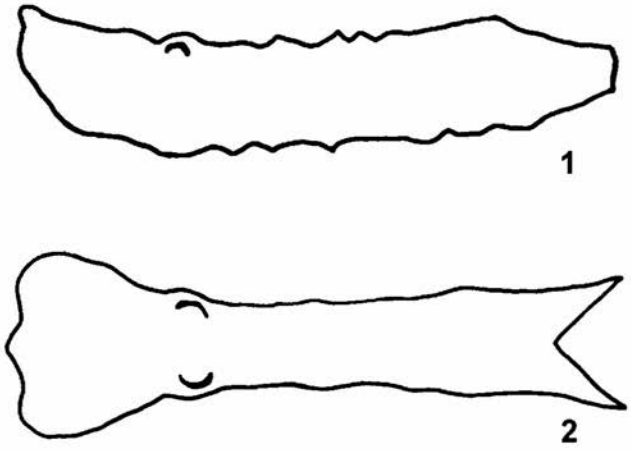
MATERIAL EXAMINED

Holotype ♂. NEW CALEDONIA (S) 21°35.2'S 165°46.4'E, Col d'Amieu 450-470 m (6.5-7.0 km from gate), 6.01.2007 (loc 6) at light, leg. R. DOBOSZ & M. WANAT (MNHN)

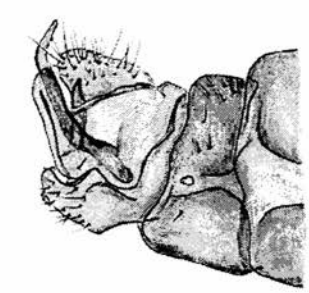
Paratypes (23 ♂♂, 19 ♀♀)

♂♂

1♂ - NEW CALEDONIA (S) 21°37'S 165°49'E, Col d'Amieu (top of hill), at light, 9.02.2004, leg. M. WANAT (coll. USMB 5915/512); 3 ♂♂ - NEW CALEDONIA (S) 21°35.2'S 165°46.4'E, Col d'Amieu 450-470 m (6.5-7.0 km from gate), 5.01.2007 (loc 6) at light, leg. R. DOBOSZ & M. WANAT (MNHW, IACP, USMB 5915/184); 3 ♂♂ - NEW CALEDONIA (S) 21°35.1'S 165°47.7'E, Col d'Amieu 440 m (1 km from gate), 7.01.2007 (loc 1) at light, leg. R. DOBOSZ & M. WANAT (SCMK, IRD, USMB 5915/178); 2♂♂ - NEW CALEDONIA (N) 20°57.2'S 165°17.5'E, Pic d'Amoa 360 m, 14.01.2007, forest, at light, leg. R. DOBOSZ & M. WANAT (coll. USMB 5915/201, 5915/204); 1♂ - NEW CALEDONIA (N) 21°00.3'S 165°14.9'E, Tchamba (Wâo Uni) 400 m, 15.01.2007, refuge, at light, leg. R. DOBOSZ & M. WANAT (coll. USMB 5915/406); 1♂ - NEW CALEDONIA (S) 22°06.0'S 166°38.6'E, Rivière Bleue Parc 180 m, 22.01.2007, scient. refuge, at light, leg. R. DOBOSZ & M. WANAT (coll. USMB 5915/463); 1♂ - NEW CALEDONIA (S) 22°10.648'S 166°30.430'E, Mt Koghi 480 m, 26.02.2008, rainforest, at light, leg. T. BLAIK & R. DOBOSZ (coll. UO); 1♂ - NEW CALEDONIA (S) 22°10.648'S 166°30.430'E, Mt Koghi 480 m, 28.02.2008, rainforest, at light, leg. R. DOBOSZ & T. BLAIK (coll. USMB 5915/2154); 1♂ - NEW CALEDONIA (S) 22°10.443'S 166°45.760'E, Bois du Sud camp 210 m, 03.03.2008 , maquis & rainforest, at light, leg. R. DOBOSZ & T. BLAIK (coll.USMB in 99% alkohol); 1♂ - NEW CALEDONIA (S) 22°10.443'S 166°45.760'E, Bois du Sud camp 210 m, 05.03.2008 , maquis & rainforest, at light, leg. T. BLAIK & R. DOBOSZ (coll. UO); 1♂ - NEW CALE-



Figs. 1-2. *Spaminta wanati* sp. n.: 1 – pronotum left lateral view (holotype MNHN); 2 – pronotum dorsal view (holotype MNHN)



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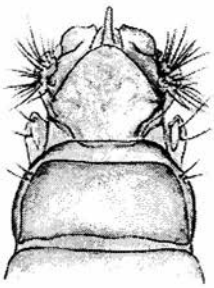

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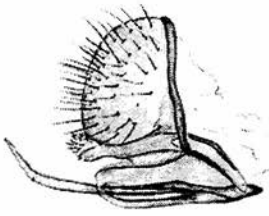

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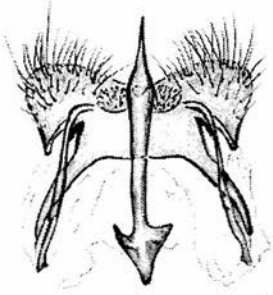

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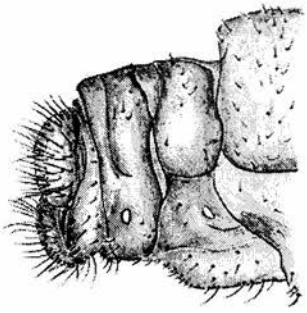

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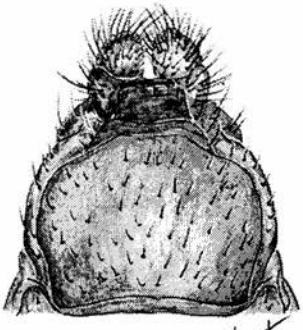
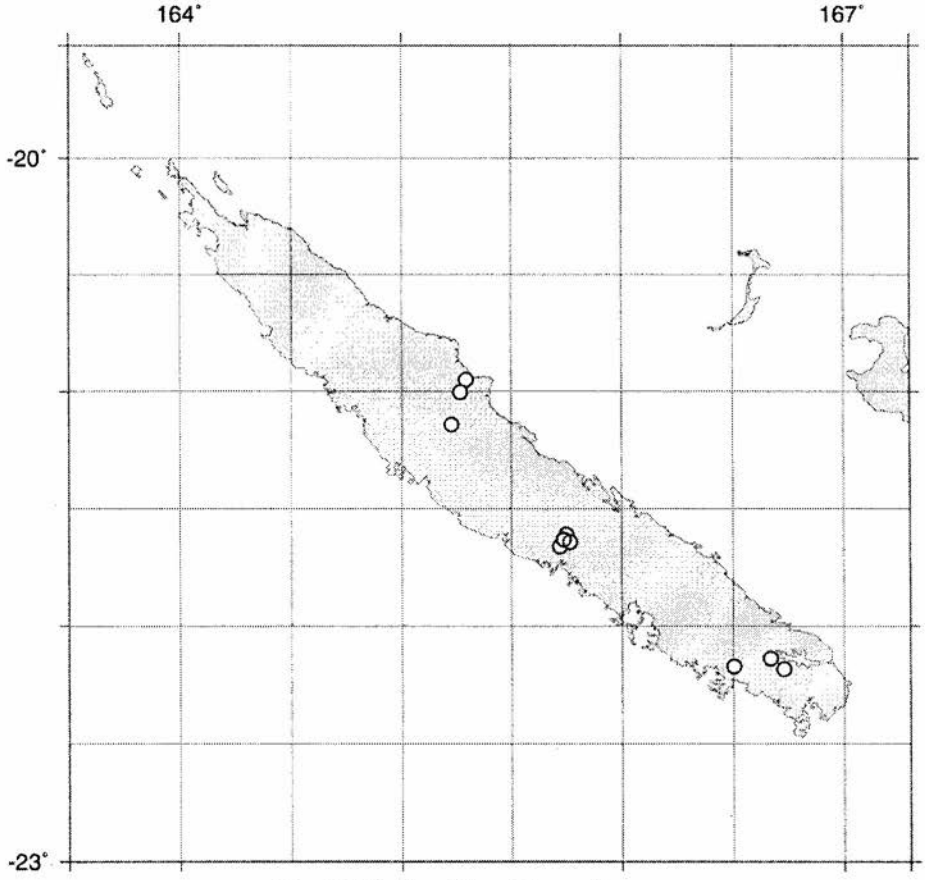


9

Figs. 3-10. *Spaminta wanati* sp. n. : 3 – apex of abdomen (lateral); 4 – apex of abdomen (ventral); 5 – internal genitalia (lateral); 6 – internal genitalia (ventral); 7 – hypandrium internum (dorsal); 8 – apex of abdomen (lateral); 9 – apex of abdomen (ventral); 10 – bursa copulatrix and spermatheca (lateral); (3-7 – male – holotype MNHN, 8-10 – female – paratype USMB 5915/181)

DONIA (S) 21°37.632'S 165°45.830'E, Les Grandes Fougeres 467 m, , Farino env. 12.03.2008, rainforest, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2155); 2♂♂ - NEW CALEDONIA (S) 21°37.632'S 165°45.830'E, Les Grandes Fougeres 467 m, , Farino env. 11.03.2008, rainforest, at light, leg. T. Blaik & R. Dobosz (coll. UO & USMB 5915/2387); 1♂ - NEW CALEDONIA (N) 21°00.332'S 165°14.911'E, Tchamba (Wâo Uni) 396 m, 20.03.2008, refuge, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2163); 1♂ - NEW CALEDONIA (N) 21°08.941'S 165°19.407'E, Aoupinié 400 m, 28.03.2008, refuge, at light, leg. T. Blaik & R. Dobosz (coll. UO); 1♂ - NEW CALEDONIA (N) 21°00.332'S 165°14.911'E, Tchamba (Wâo Uni) 396 m, 31.03.2008, refuge, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2162 & UO); 1♂ - NEW CALEDONIA (N) 21°00.332'S 165°14.911'E, Tchamba (Wâo Uni) 396 m, 01.04.2008, refuge, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2153); 1♂ - NEW CALEDONIA (S) 21°37.632'S 165°45.830'E, Les Grandes Fougeres 467 m, Farino env. 07.04.2008, rainforest, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/1979).



Map. Distribution of *Spaminta wanati* sp. n.

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1♀ - NEW CALEDONIA, Pic du Grand Kaori 250 m, 15-16.02.2004, leg. D. Skibiński (coll. USMB 5915/511); 1♀ - NEW CALEDONIA (N) 21°00.3'S 165°14.9'E, Tchamba (Wâo Uni) 400 m, 16.01.2007, refuge, at light, leg. R. Dobosz & M. Wanat (coll. USMB 5915/413); 2♀♀ - NEW CALEDONIA (S) 21°35.2'S 165°46.4'E, Col d'Amieu 450-470 m (6.5-7.0 km from gate), 5.01.2007 (loc 6) at light, leg. R. Dobosz & M. Wanat (coll. USMB 5915/185 MNHW);1♀ - NEW CALEDONIA (S) 21°35.2'S 165°46.4'E, Col d'Amieu 450-470 m (6.5-7.0 km from gate), 6.01.2007 (loc 6) at light, leg. R. Dobosz & M. Wanat (coll. USMB 5915/163); 2♀♀ - NEW CALEDONIA (S) 21°35.1'S 165°47.7'E, Col d'Amieu 440 m (1 km from gate), 7.01.2007 (loc 1) at light leg.R. Dobosz & M. Wanat (coll. USMB 5915/186; 5915/181); 4♀♀ - NEW CALEDONIA (S) 21°37.632'S 165°45.830'E, Les Grandes Fougeres 467 m, Farino env. 11.03.2008, rainforest, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2151; 5915/2159 & UO); 1♀ - NEW CALEDONIA (S) 21°37.632'S 165°45.830'E, Les Grandes Fougeres 467 m, , Farino env. 12.03.2008, rainforest, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2156); 1♀ - NEW CALEDONIA (S) 21°37.632'S 165°45.830'E, Les Grandes Fougeres 467 m, , Farino env. 12.03.2008, rainforest, at light, leg. T. Blaik & R. Dobosz (coll. UO); 1♀ - NEW CALEDONIA (S) 21°35.179'S 165°46.444'E, Col d'Amieu 450 m, 14.03.2008, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2003); 1♀ - NEW CALEDONIA (S) 21°35.179'S 165°46.444'E, Col d'Amieu 450 m, 15.03.2008, at light, leg. T. Blaik & R. Dobosz (coll. UO); 1♀ - NEW CALEDONIA (N) 21°00.332'S 165°14.911'E, Tchamba (Wâo Uni) 396 m, 20.03.2008, refuge, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2166); 1♀ - NEW CALEDONIA (N) 21°08.941'S 165°19.407'E, Aoupinié 400 m, 28.03.2008, refuge, at light, leg. T. Blaik & R. Dobosz (coll. USMB 5915/2386); 2♀♀ - CALEDONIA (N) 21°00.332'S 165°14.911'E, Tchamba (Wâo Uni) 396 m, 31.03.2008, refuge, at light, leg. R. Dobosz & T. Blaik (coll. USMB 5915/2161; 5915/2164).

Distribution

New Caledonia (see the respective map).

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