

Redescription of *Atractides neumani* (LUNDBLAD, 1962) and
description of larvae
(Acari: Hydrachnidia)

EUGENIUSZ BIESIADKA & MARIA CICHOCKA

University of Warmia and Mazury in Olsztyn, Faculty of Biology, Department of Ecology and
Environment Protection, Olsztyn, Poland; e-mail: ebies@uwm.edu.pl

ABSTRACT. Based on the material collected in Poland, a redescription of *Atractides neumani* is given, including a description of a previously unknown larva of the species.

Key words: acarology, taxonomy, Hydrachnidia, *Atractides neumani*, male, female, larva, description.

INTRODUCTION

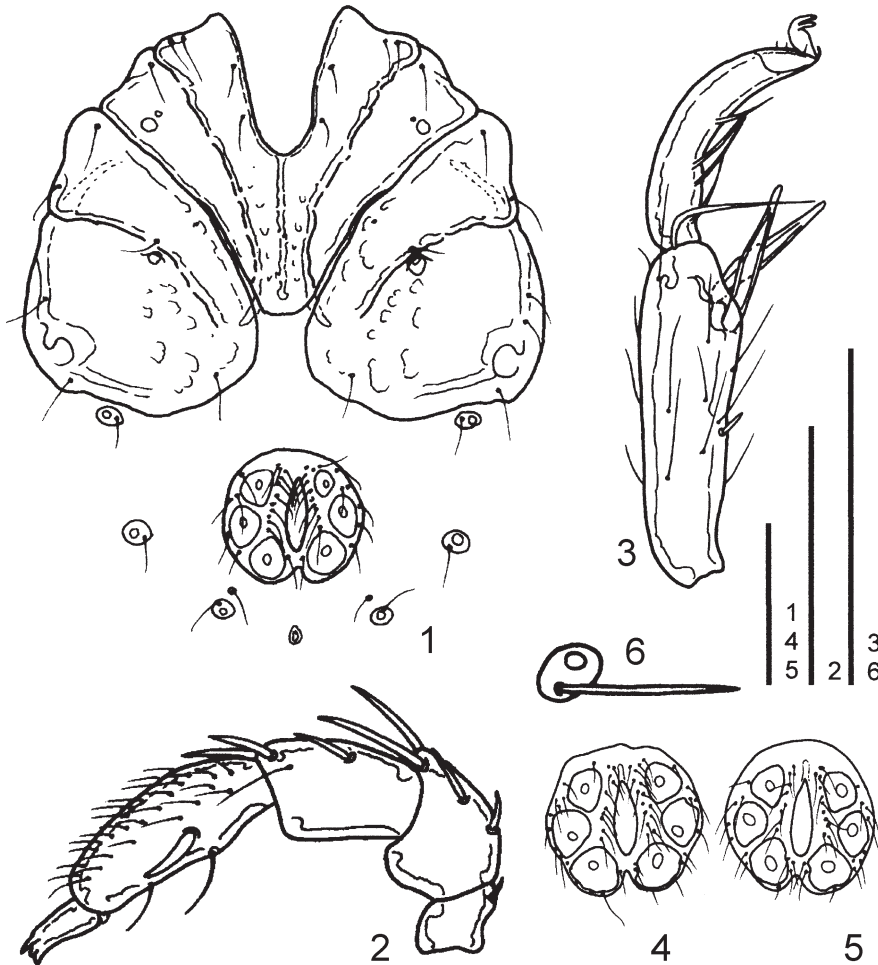
Atractides neumani (LUNDBLAD) has been described based on observations of two individuals (1 ♂, 1 ♀) collected in 1923 in central Sweden, the Hälsingland province, in the Spartan stream near Kilbo, as a form of *Atractides nodipalpis* (THOR) (LUNDBLAD 1962). A short description of the species was illustrated with figure drawings of palps and terminal sections of the first pair of legs. According to LUNDBLAD (1962), the species is highly similar to *A. issajewi* (SOKOLOW) found in Uzbekistan and *A. valencianus* (VIETS) reported from Spain. Based on the specimens preserved in the collections of the Swedish Museum of Natural History, GERECKE (2003) gave a more comprehensive description of *A. neumani*.

The collection of more than ten *A. neumani* specimens in Poland as well as larvae of the species has prompted a redescription of adults to account for the existing variations as well as a description of an unknown larva.

MATERIAL AND METHODS

The material has been collected in the Pasłęka River (north-eastern Poland): Pasłęka River near Pelnik (N: 53°47'36.55"; E: 20°9'7.93"), 23.02.1984, 1 ♂, 2 ♀♀, 26.05.2010, 1 ♂, 1 ♀; Pasłęka River near Kalisty (N: 53°55'8.08"; E: 20°11'46.94"), 12.09.1984, 1 ♂; Pasłęka River near Pityny (N: 54°0'37.71"; E: 20°8'41.12"), 16.07.1986, 4 ♂♂, 6 ♀♀. In all sites, *A. neumani* occur in lotic habitats, on a stony bottom overgrown by moss.

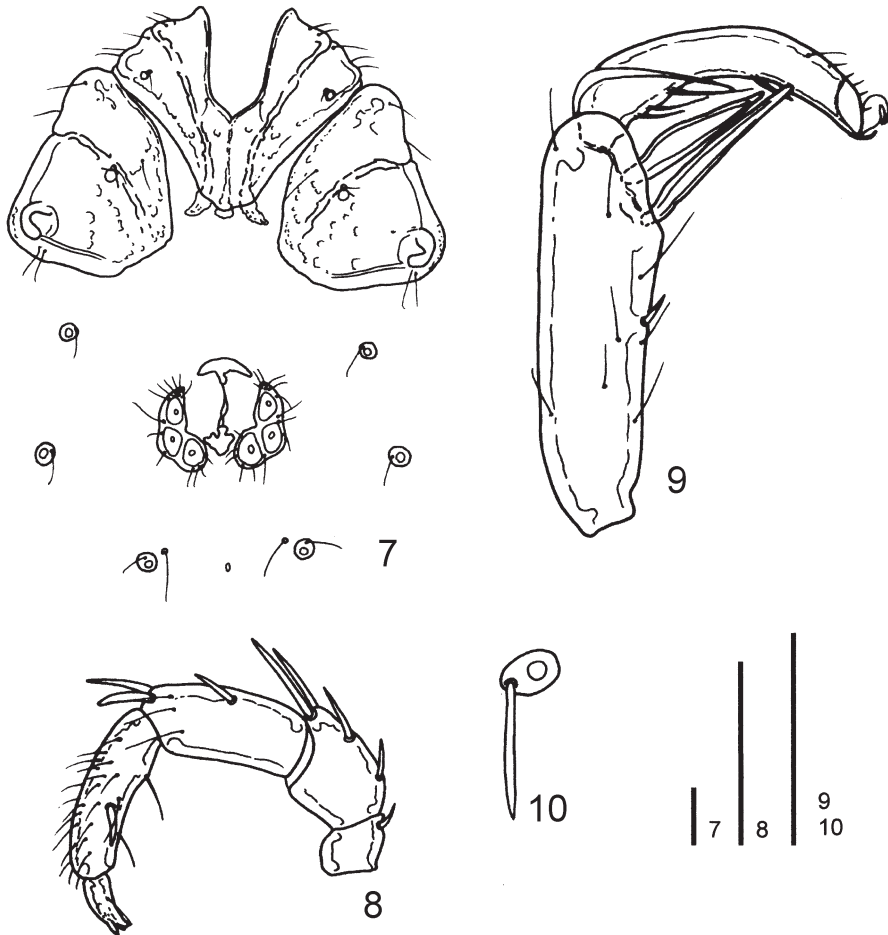
The female harvested on 26 May 2010 was transported to a breeding site in a 50 ml vessel. On 9 June, it laid eggs, and the 8 larvae that hatched on 19 June constitute the experimental material described in this paper.



1-6. *Atractides neumani* (LUNDBLAD), male: 1 – idiosoma, ventral view, 2 – palp, medial view, 3 – terminal segments of leg I, 4, 5 – genital field, 6 – Dgl-1; scale bars: 100 μ m

Four male, four female and eight larval specimens were selected for morphometric analysis. Measurements were performed using a micrometric eyepiece. The dorsal and ventral length of each leg segment was measured with the exception of the modified tarsus of the first pair of legs where, according to the guidelines proposed by GERECKE (2003), a single measurement was performed to calculate the total dorsal and ventral length. Leg length was determined as half the sum of total and ventral length. The coefficient of leg elongation was calculated as the quotient of the total length of all legs and body length. All measurements are given in μm .

ABBREVIATIONS: Cx – coxae numbered 1 to 4, Dgl – dorsoglandularia numbered according to GERECKE (2003), dL – dorsal length, P – palp segments numbered 1 to 5, S-1 = large proximal ventral seta at I-L-5, S-2 = large distal ventral seta at I-L-5, Vgl

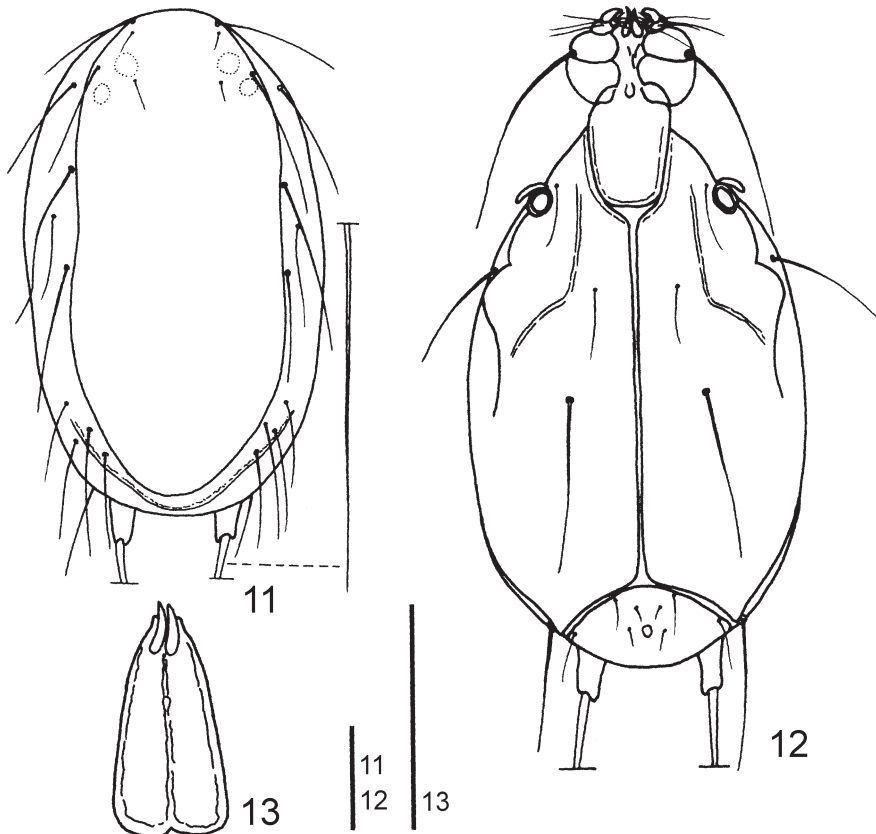


7-10. *Atractides neumani* (LUNDBLAD), female: 7 – idiosoma, ventral view, 8 – palp, medial view, 9 – terminal segments of leg I, 10 – Dgl-1; scale bars: 50 μm

– ventroglandularia numbered according to GERECKE (2003), vL – ventral length, I-L – IV-L – legs numbered I to IV.

REDESCRIPTION OF MALE AND FEMALE

Male (Figs 1-6). Ovoid body, body length (including coxa) 560-610, width 440-480; integument striated (sensu GERECKE 2003). Dgl-1 seta short and thick. Length of the coxal field 331-355, maximal width 434-450, Cx-1 length 260-270, length of suture between Cx-1 142-150, Cx-1 width 221-268, Cx-2 width 308-355, Cx-3 width 387-418, distance between Cx-3+4 39-43. Posterior end of Cx-1 truncated or curved, central apodema does not reach the posterior margin of Cx-1. Genital field nearly round with a deep incision at the posterior margin. Length of the genital field 95-102, width 102-108. Genital furrow widening in the posterior section. Excretory pore well visible, posterior from Vgl-1; Vgl-1 separated from Vgl-2.

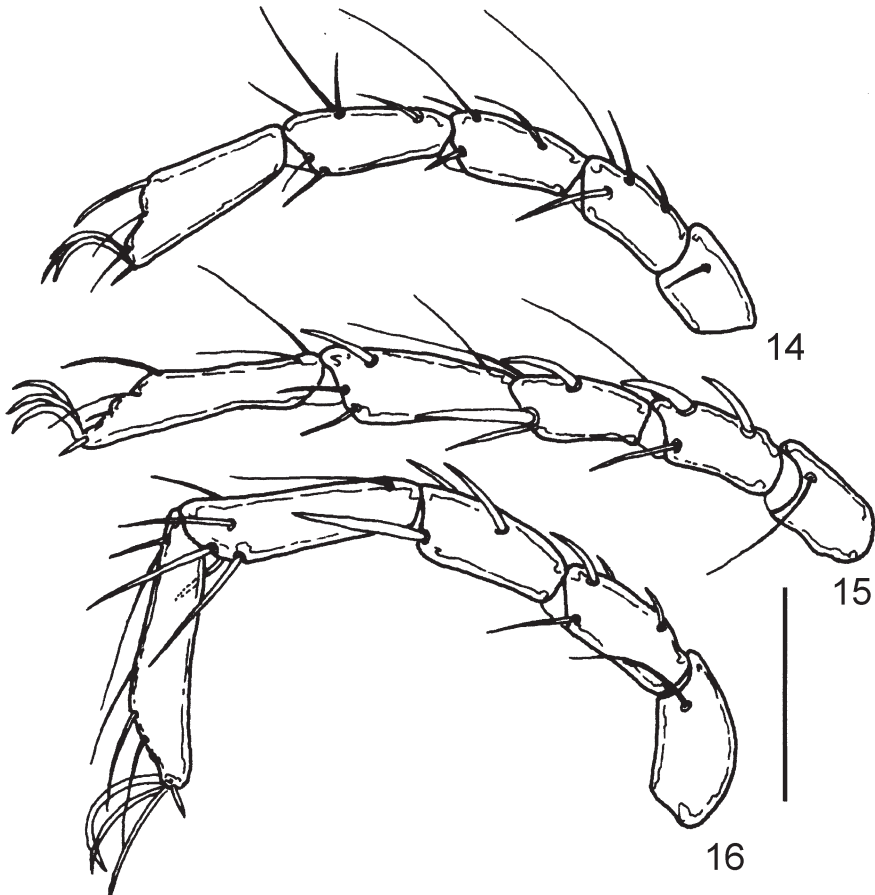


11-13. *Atractides neumani* (LUNDBLAD), larva: 11 – idiosoma, dorsal view, 12 – idiosoma and gnathosoma, dorsal view, 13 – chelicerae, dorsal view; scale bars: 50 μ m

Palp total dorsal length 258-266; dorsal length of individual segments: P-1 25.5-28.9, P-2 59.5-60, P-3 61.2-62.9, P-4 83.3-84.5, P-5 28.9-29.3; relative length of individual segments (given as % of total length): P-1 9.88-10.9, P-2 22.64-23.06, P-3 23.72-23.73, P-4 31.88-32.28, P-5 11.05-11.2; ventral margin of P-2 visibly convex, P-3 enlarged distally, distance between P-4 ventral hairs 22.1-23.8; sword seta curved and inserted between ventral hairs, near to proximoventral hair.

I-L visibly modified, terminal segment curved and distally narrowed, S-1 length 74.8-78.2, S-1 length/width ratio 8.8-9.2, S-2 length 68-68.2, S-2 length/width ratio 5.7-6.6. Interspace between S-1 and S-2 11.4-13.3. Leg measurements shown in Table 1. Total length I-L – 545-564, II-L – 460-487, III-L – 536-571, IV-L – 788-804. Coefficient of leg elongation 4.0-4.1.

Female (Figs 7-10). Ovoid body, length (with coxal plates) 750-790, width 590-615; Dgl-1 seta short and thick (Fig. 10). Length of coxal field 355-387, maximal width



14-16. *Atractides neumani* (LUNDBLAD), larva: 14 – leg I, 15 – leg II, 16 – leg III; scale bar: 50 μ m

513-553, length of Cx-1 260-268, length of suture between Cx-1 134-142, length of Cx-2 324-347, length of Cx-3 466-474, distance between Cx-3+4 142-165. Posterior margin of Cx-1 curved, central apodema slightly protruding beyond the Cx-1 margin. Length of genital field 192-229, width 189-213. Genital plates arcuate, with accessory

Table 1. Leg measurements (in μm) of *Atractides neumani* (males)

Measurements		Leg segments						Total length
		1	2	3	4	5	6	
I-L	dl	48-49	59-68	95-97	142-143	148-153	110-115	602-625
	vl	24-27	68-69	65-66	119-122	102-105	-	488-504
II-L	dl	42-55	52-58	78-79	108-109	114-116	87-89	481-506
	vl	26-42	61-68	52-53	93-94	100-102	107-109	439-468
III-L	dl	42-59	51-59	87-92	128-136	144-146	104-108	556-600
	vl	20-25	56-58	63-68	116-122	134-139	127-131	516-543
IV-L	dl	93-105	85-86	136-138	170-177	195-196	134-136	813-838
	vl	71-72	85-87	115-117	160-161	176-177	156-157	763-771

Table 2. Leg measurements (in μm) of *Atractides neumani* (females)

Measurements		Leg segments						Total length
		1	2	3	4	5	6	
I-L	dl	58-62	86-98	125-136	187-207	191-199	133-130	780-832
	vl	19-27	86-98	86-89	156-172	136-140	-	616-656
II-L	dl	58-59	66-70	105-113	144-156	144-160	107-133	624-691
	vl	19-23	74-86	74-75	125-133	129-148	136-156	557-621
III-L	dl	66-70	70-74	117-121	172-183	183-199	136-152	744-799
	vl	23-24	74-82	32-89	152-155	168-175	172-175	621-700
IV-L	dl	136-140	101-107	179-195	226-246	250-265	172-187	1064-1140
	vl	98-99	101-107	140-160	199-214	230-238	191-210	959-1028

Table 3. Leg measurements (in μm) of *Atractides neumani* (larvae)

Measurements		Leg segments					Total length
		1	2	3	4	5	
I-L	dl	21-23	24-26	28-30	33-37	32-34	138-150
	vl	12-15	16-17	20-22	27-29	35-39	110-122
II-L	dl	23-25	25-26	28-29	39-42	34-35	149-157
	vl	18-19	16-17	20-22	28-30	45-50	127-138
III-L	dl	34-35	28-30	27-29	45-51	37-40	171-185
	vl	16-18	20-23	27-30	35-38	59-63	156-172

concavity in medial margin. Excretory pore well visible, posterior to Vgl-1; Vgl-1 separated from Vgl-2.

Palp total dorsal length 301-326; dorsal length of individual segments: P-1 28.9-30.1, P-2 62.9-68.0, P-3 83.3-91.8 P-4 93.5-102.0, P-5 32.3-34.1; relative length of individual segments (given as % of total length): P-1 9.23-9.63, P-2 20.85-20.96, P-3 28.03-28.68, P-4 31.28-32.27, P-5 10.46-10.76; ventral margin of P-2 convex, distance between P-4 ventral hairs 35.4-35.8; sword seta inserted between ventral hairs, approaching to distoventral hairs.

I-L similar to male, S-1 length 85-86.7, S-1 length/width ratio 8.5-10, S-2 length 74.8-81.6, S-2 length/width ratio 5.6-6. Interspace between S-1 and S-2 15.2-17.1. Leg measurements are shown in Table 2. Total length I-L – 698-744, II-L – 590-656, III-L – 682-749, IV-L – 1011-1082. Coefficient of leg elongation 4.3-4.4.

DESCRIPTION OF LARVA

Larva (Figs 11-16). Body elongated, length (with coxal plates) 214-218, width 132-134, coxal plates weakly reticulated, maximal length of coxal field 202-203, common medial length 144-145. Dorsal plate weakly reticulated, elongated in shape, with lateral concavities, length 218-220, width 132-133. Anal plate length 25-26, width 57-59. Anal pore circular and relatively large, situated between posterior anal hairs. Posterior body appendages, length 17-20, length of terminal setae 107-213.

Gnathosoma with basal part relatively narrow and elongated, length 68-70, width 28-29, chelicera length 45-47, width 22-24.

Legs without swimming setae. Measurements of leg segments are shown in Table 3. Total length I-L 124-136, II-L 134-147, III-L 163-178. Coefficient of leg elongation 1.9-2.1.

DISCUSSION

Atractides neumani shows some similarity to *A. nodipalpis*, clearly but differs in the palp structure (the absence of a pronounced protrusion on P-2 in male) and the absence of sexual dimorphism in the structure of the first pair of legs. Both sexes of *A. neumani* differs from *A. nodipalpis* in smaller I-L. LUNDBLAD (1962) compared *A. neumani* to *A. valencianus* and *A. issajewi*, yet the differences between *A. neumani* and *A. valencianus* are clearly manifested, and they have been described by GERECKE (2003). A description of *A. issajewi* based on a single male from a canal near Bukhara, Uzbekistan (SOKOLOV 1928), reveals a high degree of similarity between *A. neumani* and *A. issajewi*, in particular as regards the structure of the coxal field, the genital organ, palps and body size. Small differences are noted in the structure of the terminal segments of the first pair of legs. In *A. issajewi*, the tarsus is clearly narrower, and sword setae are visibly thinner and set further apart than in *A. neumani*. According to LUNDBLAD (1962), the primary distinguishing feature which separates the analyzed species is the number of bristles along the lateral margin of the genital organ, which are more abundant in *A. issajewi* than in *A. neumani*. In the studied *A. neumani* specimens,

the number of bristles on the genital organ varied significantly, therefore, it does not seem to be an important distinguishing feature. Both males and females of *A. neumani* have thick and relatively short bristles on Dgl-1. The species is well morphologically defined by a unique combination of features, and it should be easily distinguished from other species.

The specimens from Poland are slightly larger from those reported from Sweden. According to LUNDBLAD (1962), male individuals were 552 in length and females – 730, whereas the specimens collected in Poland were marked by body length in the range of 560-610 (male) and 750-790 (female). Comprehensive measurements of typical individuals were performed by GERECKE (2003). The dimensions of Polish specimens are generally larger proportionally to differences in body length.

Larvae of the genus *Atractides* remain poorly investigated, and the larval stages of only a dozen species have been well documented to date (VAJNŠTEJN 1980, MARTIN 2003, 2006, TUZOVSKIJ 2008, 2010a, 2010b). The larvae of *A. neumani* differ from the studied species mainly by a very elongated dorsal plate with a clear narrowing in the central part, a narrow and elongated gnathosoma and the structure of the genital plate. The anal pore is large and circular, situated between posterior anal hairs.

The habitats of *A. neumani* suggest that it is a rheobiontic species that colonizes the rocky bottom of clean and pure rivers, possibly only in lowland regions.

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