Genus	Vol. 24(3-4): 403-413	Wrocław, 28 XII 2013

Temnothorax albipennis (Curtis, 1854) in Poland and identification of the *T. tuberum* species complex (Hymenoptera: Formicidae)

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Abstract. The first definite record of *Temnothorax albipennis* from Poland is given. Characters distinguishing this species from its relatives are discussed and high quality photographs of *T. albipennis* and *T. tuberum* are given.

Key words: entomology, faunistics, new record, Hymenoptera, Formicidae, *Temnothorax albipennis*, Poland, Pieniny Mts.

INTRODUCTION

Temnothorax albipennis (Curtis, 1854) is a xerothermophilous species reported from southern England and Wales, The Netherlands, Germany, Switzerland, The Czech Republic, the French and Spanish Pyrenees, Italy (Czechowski et al. 2002), Slovenia (Bračko 2003), Belgium (Dekoninck et al. 2006), Hungary (Csősz et al. 2011), Austria (Steiner et al. 2002) , Slovakia (Wiezik 2005) and Ukraine (Radchenko in Fauna Europea). Ants inhabiting grasslands and light scrub, especially on lime subsoil sometimes are common in dunes. It nests in rock crevices and rubble or in tree stumps and in dry fallen branches. Colonies was reported as monogynous, with up to 200 workers, and may form temporary polydomous systems.

Temnothorax albipennis was recorded from Poland first by Czechowska and Czechowski (1999). Authors noted that several nests of this species were observed in Pieniny Mts. In the area near Trzy Korony Massif (Grabczycha, Podskalnia Góra, Goła Góra, Zamczysko, Cisowiec Duży, Cisowiec Mały, and Długa Grapa). According to those authors it was common on this area with density of nests 1 to 51 on 100 m^2,

selecting a warm habitats of xerothermic meadows (*Origano-Brachypodietum*) and dry grasslands on calcareous substrate. In the first edition of the monograph on Polish ants (Czechowski et al. 2002) the record from Pieniny Mts. was still noted as the only known locality of this species in Poland. Second record of *T. albipennis* was noted by M. Borowiec (2009) who reported this species from the Krakowsko-Częstochowska Upland (Czołowa, "Skałka 502")

In the second edition of the monograph on Polish ants (Czechowski et al. 2012) authors excluded *T. albipennis* from Polish myrmecofauna and noted "A species mis-

1, 2. Worker, dorsal view: 1 – *Temnothorax albipennis*, 2 – *T. tuberum*

takenly reported from the Pieniny Mts. by Czechowska and Czechowski (1999) owing to misidentification of *T. tuberum* (For.) and a hybrid *T. albipennis* x *T. tuberum*; also reported by Borowiec (2009) from the Krakowsko-Częstochowska Upland because of misidentification of *T. unifasciatus* (material examined by B. Seifert in all these cases)".

The finding of *T. albipennis* x *T. tuberum* hybrids in Pieniny Mts. suggested that both species should occur in this area. In July 2013 we explored the Pieniny Mts. in order to find any pure populations of *T. albipennis* and our search ended successfully.

3, 4. Worker, lateral view: 3 – *Temnothorax albipennis*, 4 – *T. tuberum*

5, 6. Worker, head view: 5 –*Temnothorax albipennis*, 6 – *T. tuberum*

MATERIAL AND METHODS

Nest of *Temnothorax albipennis* was found on the southern slope of Góra Wdżar (Mt. Wdżar, 735 m a.s.l., 49°27.330 N/20°19.154 E, 5 VII 2013, leg. S. Salata & L. Borowiec), at the foot of the slope scantily covered with xerothermic grassland, in the rock rubble overgrown by grasses and perennials roots; 34 workers and two gynes were preserved in 75% alcohol then in laboratory prepared on triangle cards.

Photos of other species and hybride specimen were prepared from specimens collected in the same locality with *Temnothorax albipennis*: Pieniny Mts, Góra Wdżar, 5 VII 2013, leg. S. Salata & L. Borowiec.

Photos were prepared using a Nikon SMZ 1500 stereomicroscope and Helicon Focus software.

DISCUSSION

Temnothorax albipennis together with *T. nigriceps* (Mayr), *T. tuberum* (F.) and *T. unifasciatus* (Latr.) forms a group of closely related species with a tendency for hybridization and often occurring in the same habitat (Douwes & Stille 1991). Usually there are more or less distinct morphological gaps between the species but hybridization tends to fill these gaps or even produces morphological copies with few hybrid characters. We collected intensively in the vicinity of the nest of *T. albipennis* (150-200 m in diameter) an found all the three related species. Additionally, in one nest of *T. tuberum* we found specimens of intermediate characters between *T. tuberum* and *T. albipennis*, probably similar to those which were the basis for earlier record of *T. albipennis* from Pieniny Mts.

A correct identification of *T. albipennis* is difficult and requires high magnifications. Characters distinguishing all taxa in the popular keys to the Polish ants are not clear and can cause misidentifications of *T. albipennis* as *T. tuberum* and *T. unifasciatum*. The key in the above mentioned monograph of Polish ants (Czechowski et al. 2012) relies solely on gastral colouration does not take advantage of sculpture characters that are often more useful to distinguish between *T. albipennis* and *T. tuberum* (Seifert 2007).

Pure (i.e. not hybrid) specimens of *Temnothorax nigriceps* are easily distinguished from *T. albipennis* by their central portions of femora darkened, brown to almost black, and head distinctly darker than mesosoma. *T. unifasciatus* differs from *T. albipennis* in usually paler yellow coloured head and mesosoma, the first gastral tergite yellow with a brown to black, regular and narrow transverse band (fig. 13), laterally not protruding anterad, and subsequent tergites without dark bands along posterior margins. *T. unifasciatus* specimens from Polish mountains with slightly dark dorsum and head differ from *T. albipennis* in sculpture of head forming more or less distinct regular longitudinal striation and usually without microreticulation between striae (fig. 9). *T. tuberum* is the most similar in general habitus and in colouration practically not distinguished from *T. albipennis* (figs. 1-4) although typical specimens usually have first gastral tergite darker coloured than in *T. albipennis* with more than 2/3 surface brown to black and only with yellow basal spot (fig. 12) while in *T. albipennis* the first tergite is

mostly yellow, only along posterior margin runs dark band, laterally protruding anterad (fig. 11). The sculpture of mesosoma in *T. tuberum* is also usually more developed with more evident longitudinal striae than in *T. albipennis* but this character is obvious only when comparing long series of properly identified specimens. Hybrids of *T. tuberum* often have similar abdominal pattersn (fig. 14) and then are extremely difficult to

7. Sculpture of head of *Temnothorax albipennis*

distinguish from *T. albipennis*. The best character distinguishing pure specimens of *T. albipennis* from *T. tuberum* and its hybrids is sculpture of head. In *T. albipennis* the sculpture is more homogenous and predominately reticulate, with reticulation coarser on sides and fine in the central part of the head without distinct longitudinal striation or with only few irregular striae not distinctly higher than surrounding reticulation (Figs. 5, 7). The central part of the head is usually completely microreticulate or with only a narrow area without sculpture. In *T. tuberum* the sculpture on sides of head is reticulate

8. Sculpture of head of *Temnothorax tuberum*

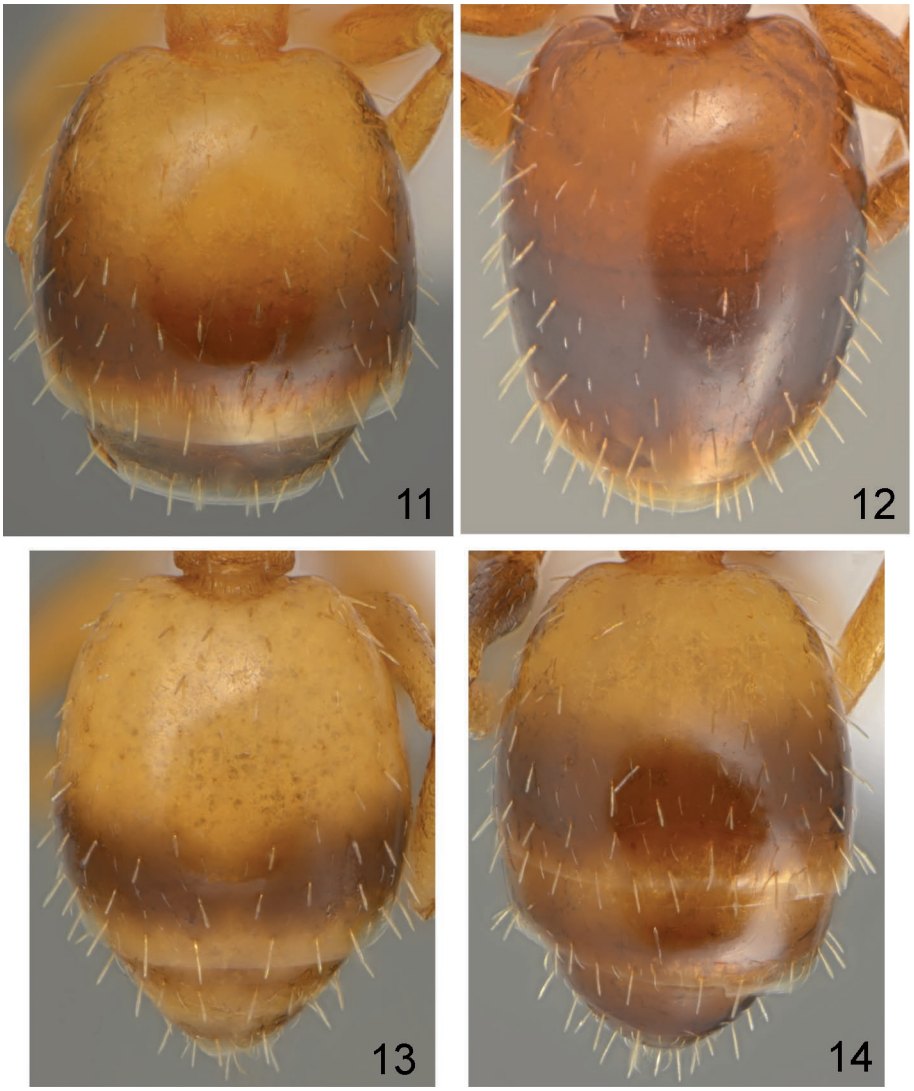
but often the reticulae are more elongate than in *T. albipennis*, central part of head is more or less striated, with or without distinct microreticulation between striae, at least few striae distinctly higher than reticulate sculpture, in many specimens the central part

9. Sculpture of head of *Temnothorax unifasciatus*

of head is shiny, with indistinct sculpture (Fig. 6, 8). Hybrids with *T. tuberum* have the head sculpture not as evident as pure specimens but some longitudinal striae in central part of head are always more or less evident but usually distinct microreticulation occurs between longitudinal striae (fig. 10).

Colonies of *T. albipennis* was reported hitherto as monogynous but we collected two dealate gynes in one nest.

10. Sculpture of the head of *Temnothorax* hybrid of *tuberum* group



11-14. Patterns of abdomen: 11 – *Temnothorax albipennis*, 12 – *T. tuberum*, 13 – *T. unifasciatus*, 14 – *T.* hybrid of *tuberum* group

Acknowledgements

We thank to University of Wrocław for finacial support (project no. 1161/M/KBTE/13). Thanks to Marek L. Borowiec for valuable comments and corrections.

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