

NEW RECORDS OF THE RARE ANT SPECIES (HYMENOPTERA, FORMICIDAE) IN POLAND

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Abstract

There are two rare ant's species were found on the northern part of the Wielkie Bagno peat bog in Słowiński National Park. More than 10 workers of *Formica picea* and four dealate gynes of *Myrmica karavajevi* were collected in pitfall traps 2-12 of August 2006.

Key words: rare ant species, Hymenoptera, Formicidae, Słowiński National Park

INTRODUCTION

At present, 104 species of ants from 25 genera of 4 subfamilies are known in Poland (Salata and Borowiec 2011, Czechowski et al. 2012), among which there are a couple of rare species, including *Formica picea* Nylander, 1846 and *Myrmica karavajevi* (Arnoldi 1930). Both of them are known from sporadic finds in various regions of Poland (see below), and one of the authors of this article had collected them on the territory of the Słowiński National Park (Baltic Shore).

STUDY AREA

The Wielkie Bagno (Great Bog) is a raised bog of the Baltic type (UTM XA56; 54°41'44.55"N 17°29'6.90"E). Its northern part located on the territory of the Słowiński National Park (Fig. 1).

It was located directly on the mineral substrate, in a depression with a very high level of groundwater, during the shallowing of the lake during the succession from the low bog through the transitional bog to the raised bog. The rug of moss is made of green

(*Sphagnum* sp.) and red sphagnum (*S. magellanicum* Brid.) mosses forming domes. Cranberry (*Vaccinium oxycoccos* L.), hare's-tail cottongrass (*Eriophorum vaginatum* L.) and bog-rosemary (*Andromeda polifolia* L.), grows on the domes. Strongly acidic peat, $\text{pH} > 5$ and with the domination of acidophilic plants: round-leaved sundew (*Drosera rotundifolia* L.), great sundew (*D. anglica* Huds.), oblong-leaved sundew (*D. intermedia* Hayne), and cross-leaved heath (*Erica tetralix* L.). Part of the bog is degraded and covered with moist moorland with marsh heather.

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METHODS

A total of 20 pitfall traps were in operation from the 3rd of May to the 30th of November 2006. The pitfall traps were 1/3 filled with a 25% aqueous ethylene-glycol solution, with a slight amount of detergent to reduce glycol surface tension. Traps were emptied each 10 days. Each trap, had a plastic, transparent funnel to reduce its opening. The diameters of the funnel opening and the outlet were 10 cm and 2 cm, respectively. Taking into account the ethical aspect of the study, we chose such a modification of the traps that would minimize the mortality of accidentally caught small vertebrates: frogs, mice, shrews and lizards.

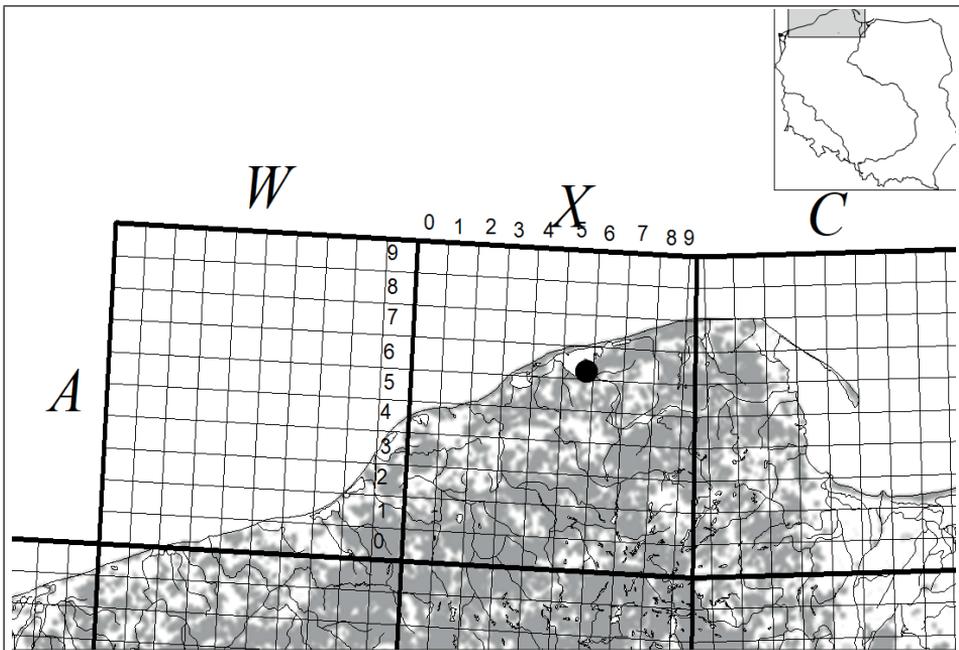


Fig. 1. Place of pitfall traps installation in 2006 (●) in the Wielkie Bagno in Słowiński National Park



Fig. 2. Installed pitfall trap with a funnel, 2006

RESULTS AND DISCUSSION

Formica picea Nylander, 1846

F. picea belongs to the subgenus *Serviformica* Forel, 1913 of the genus *Formica* Linnaeus, 1758. It seems to be (similarly to *Formica uralensis* Ruzsky, 1895) a Pleistocene boreo-montane relict species, distributed from the Pyrenean Mountains to Japan, including Caucasus, Middle Asian Mountain, the Himalaya and Tibet [nevertheless, is accept Seifert's (2004) treatment about division of this species to two ones, east of Yenisei river and in the Middle- and Central Asian mountains occurs a closely related species – *F. candida* F. Smith, 1878]. In any case, east of the Ural Mountains this species inhabits various types of grasslands, but in Europe it lives only in swamps, preferring peat bogs, and subalpine mountain meadows.

In Poland *F. picea* has been recorded from the Podlasie Lowland, Lower Silesia, Upper Silesia, Roztocze Upland, Sandomierska Lowland, Western Sudeten Mts., Bieszczady Mts., Tatra Mts., Mazurian Lakeland and Pomeranian Lakeland (Czechowski et al. 2002, 2012).

This species was found in the latter region only once from the vicinity of Chojna about 50 years ago (Dlussky and Pisarski 1971). Thus, our record is the northernmost of Poland.

The whole body of *F. picea* is shiny black, an occipital margin of the head has no standing hairs, gastral tergites with the very sparse decumbent pubescence, and mesonotum possess several long, somewhat inclined forward standing hairs (Figs 3-4).

There are two other totally black *Formica* species in Poland, *F. fusca* Linnaeus, 1758 and *F. lemani* Bondroit, 1917 but they well differ from *F. picea* by the very dense decumbent pubescence on the gastral tergites, and pronotum is without standing hairs, or they directed somewhat backward (Figs 5-7). At last, one more blackish Polish species, *F. cinerea* Mayr, 1853 well differs from *F. picea* by the presence of numerous standing hairs on the occipital margin of head and on the pronotal dorsum (Figs 8, 9).

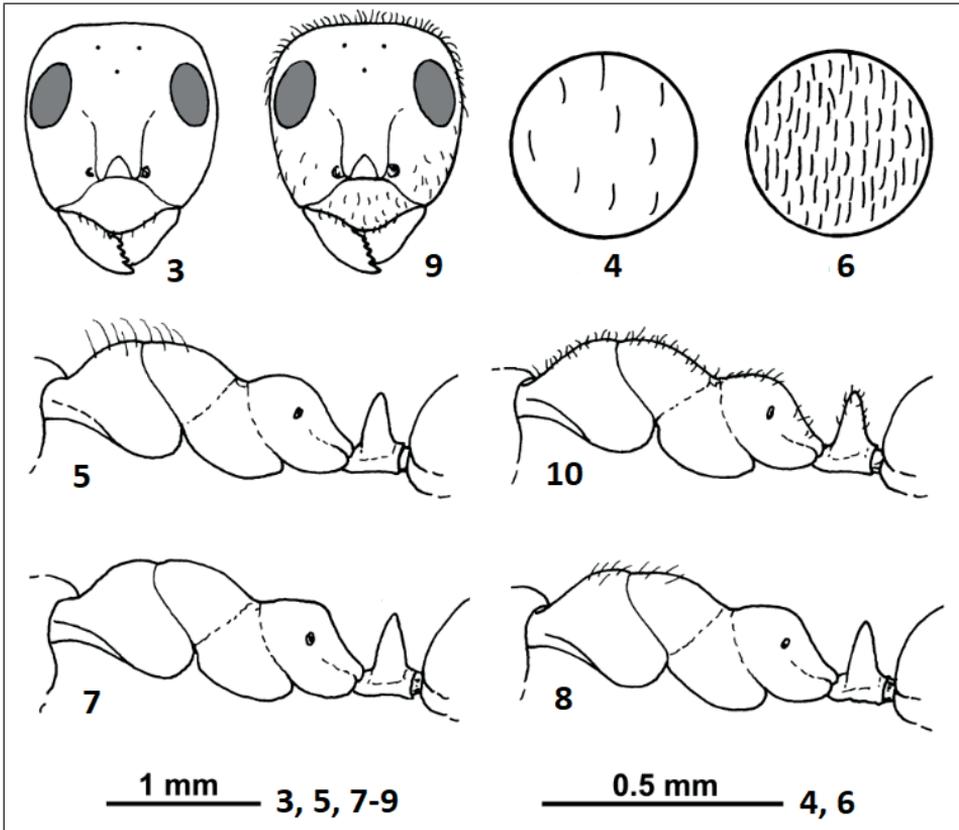


Fig. 3-10. Details of structure of the *Formica* ants (oryg.). 3, 4, 5 – *F. picea*; 6, 7 – *F. fusca*; 8 – *F. lemani*; 9, 10 – *F. cinerea*; 3, 9 – head in dorsal view; 4, 6 – details of pilosity of the first gastral tergite; 5, 7, 8, 10 – mesosoma and petiole in profile.

F. picea inhabits Poland exclusively in mires, even in the mountains. Here it builds nest mounds from fine fragments of moss or sedge. Colonies usually are monogynous or oligogynous, having up to ten or so queens, and several hundred workers. Very rarely colonies may be highly polygynous with many tens of queens and more than ten thousand workers, and form polycalic systems. It is not aggressive species, foraging mainly on small dead insects and other arthropods and collecting honeydew of aphids. Young fertilized gynes found new nest independently, but at the same

time *F. picea* is a host species of temporary social parasite *F. uralensis* and another congeneric temporarily parasitic species. Sexual forms appear in nests in August, but nuptial flight occurs in October.

***Myrmica karavajevi* (Arnoldi 1930)**

Arnoldi (1930) described *Symbiomyrma karavajevi* from the Kharkov Province of Ukraine in 1930 in German, but this socially-parasitic species was described as new in Russian in 1933 (Arnoldi 1933). Later it was transferred to the genus *Sifolinia* Emery, 1907 (Samšić 1964), and then Bolton (1988) synonymized the names *Sifolinia* and *Symbiomyrma* Arnoldi, 1930 with *Myrmica* Latreille, 1804. At last, *Myrmica karavajevi* was placed to the separate species-group in *Myrmica* (Radchenko and Elmes 2010), but based on the molecular genetic analysis it was placed to the *M. scabrinodis* Nylander, 1846 species-group (Jansen et al. 2010).

M. karavajevi is a workerless obligatory social parasite of other *Myrmica* species, particularly, *M. scabrinodis*, *M. sabuleti* Meinert, 1861 *M. lonae* Finzi, 1926 and *M. rugulosa* Nylander, 1849. Its queens differ from other Polish *Myrmica* species by the presence of a wide ventral lamella on the petiole and postpetiole (Fig. 11), and males differ by the 12-segmented antennae (vs. 13-segmented in other species). Additionally, forewings in both queens and males have completely fused cells 1r+2r and rm (Fig. 12), while in all free-living *Myrmica* species forewing is with cells 1r+2r and rm partly separated by short vein (Fig. 13).

M. karavajevi sporadically found on the territory from the Moscow Province of Russia on the east up to the Pyrenees on the west, and from the northern Italy in the south to southern Finland, Sweden and Norway on the north.

In Poland *M. karavajevi* was recorded from Mazovian Lowland, Bieszczady Mts, Pieniny Mts, Roztocze Upland, Lubelska Upland, Krakowsko-Częstochowska Upland, and Pomeranian Lakeland (Czechowski et al. 2002, 2012, Witek et al. 2013). In the latter region it was found in the mid-1970th in Tucholskie Forest, i.e. much to the south of our records. This species is included in the Red List of threatened animals in Poland with the category DD (Data Deficient) (Głowaciński et al. 2002).

As mentioned above, *M. karavajevi* is a workerless obligate socially parasitic inquiline of other *Myrmica* species. Its queen coexists with the queen(s) of the host species, but it inhibits the production of the sexual castes of the host species using pheromones, and only gynes and males *M. karavajevi* and workers of the host species emerge in the infested colony. More than 15 queens of *M. karavajevi* may occur in the host nest (Arnoldi 1933, Pisarski 1962).

In general, *M. karavajevi* is the most common and the most widespread of all the socially-parasitic *Myrmica* species in Europe, however, despite its wide range, it is nowhere abundant.

Usually in one locality with intensive searches, one can find no more than 1-2 nests containing *M. karavajevi*, but sometimes the infection level of the nests of host species may be higher. Thus, in the vicinity of Krakow, more than 10% of *M. scabrinodis* nests were infected with this social parasite (Witek et al. 2013). Males and gynes emerged in the nests in August-September.

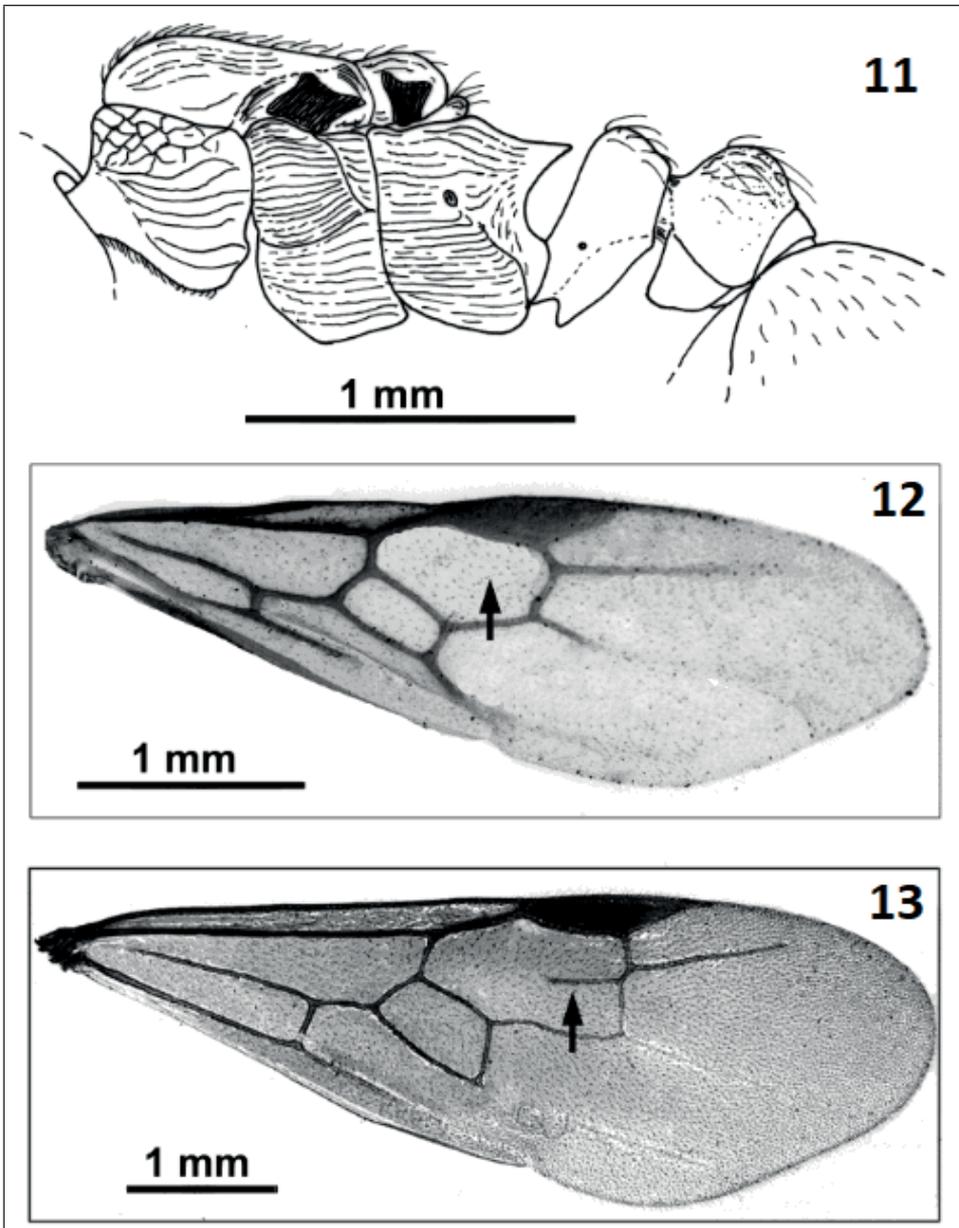


Fig. 11-13. Details of structure of the *Myrmica* ants (oryg.). 11, 12 – *M. karavajevi* (11 – gyne, 12 – male); 13 – *M. rubra* (male); 11 – mesosoma and waist in profile; 12, 13 – forewing.

CONCLUSIONS

Thus, two rare species *Myrmica karavajevi* and *Formica picea* were found in raised bog Wielkie Bagno in Słowiński National Park. This is the first study on the ants in Słowiński National Park (N Poland). The results of the study will serve as an inventory of the National Park's entomofauna.

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NOWE DANE DOTYCZĄCE RZADKICH GATUNKÓW MRÓWEK
(HYMENOPTERA, FORMICIDAE) W POLSCE

Streszczenie

W artykule przedstawiono nowe dane dotyczące występowania w Słowińskim Parku Narodowym dwóch rzadkich gatunków mrówek: *Formica picea* i *Myrmica karavajevi*. *Formica picea* występuje w Polsce wyłącznie na torfowiskach. *F. picea* notowano na Podlasiu, Dolnym i Górnym Śląsku, Roztoczu, Nizinie Sandomierskiej, w Sudetach Zachodnich, Bieszczadach, Tatrach, na Pojezierzu Mazurskim i Pojezierzu Pomorskim (Czechowski et al. 2002, 2012). Gatunek ten został wykazany na Pojezierzu Pomorskim tylko raz, w okolicach Chojny około 50 lat temu (Dlussky and Pisarski 1971). Podano cechy morfologiczne do odróżnienia bliskich gatunków z grupy *picea*. *M. karavajevi* jest obligatoryjnym socjalnym pasożytem gniazd innych gatunków *Myrmica*. W Polsce obecność *M. karavajevi* odnotowano na Nizinie Mazowieckiej, w Bieszczadach, Pieninach, na Roztoczu, Wyżynie Lubelskiej, Wyżynie Krakowsko-Częstochowskiej i Pojezierzu Pomorskim (Czechowski et al. 2002, 2012, Witek et al. 2013). Na Pojezierzu Pomorskim gatunek ten został znaleziony w połowie lat 70. XX wieku w Borach Tucholskich. W artykule po raz pierwszy opisano występowanie mrówek na terenie Słowińskiego Parku Narodowego.

Słowa kluczowe: rzadkie gatunki mrówek, Hymenoptera, Formicidae, Słowiński Park Narodowy