

Myrmica schenckioides nov. sp., a new socially parasitic ant species (Hymenoptera, Formicidae)

A winged gyne of a new *Myrmica* species was discovered in a roadside verge next to the drift sand Beekhuizerzand, to the east of Harderwijk, Gelderland, The Netherlands. In this paper this species is described. A comparison with resembling species is given. In particular several features of the head make identification easy. We describe the habitat and the ant community in the roadside verge.

Entomologische Berichten 65(4): 120-123

Key words: taxonomy, new species, The Netherlands

Introduction

Recently, several authors investigated and revised the Palaearctic species of the genus *Myrmica* (e.g. Elmes 1978, Seifert 1988, 2003, Radchenko & Elmes 2003). The genus contains a small group of socially parasitic species, all of which are rare. In this paper we introduce a new socially parasitic *Myrmica* species, found in The Netherlands.

Myrmica schenckioides nova species

Description

Several characteristics of the head distinguish the gyne from other *Myrmica* species. The frons of *M. schenckioides* is narrow (figure 1). The anterior clypeal margin is broadly convex and the medial margin is a little emarginated. The antennal scape is relatively short, with a broad and high flange at the dorsoproximal bend site (figure 2) and does not reach the occipital margin. The propodeal spines are short (figure 3). The postpetiolar node is wide and high (figure 4), with a rounded ventral process (figure 3).

The middle and hind tibiae spurs are comparable to other *Myrmica* species, but they are slender and have relative short dentation.

The sculpture of the entire body is quite coarse. The frons has longitudinal rugae on occiput, and sides with sparse reticulation. The clypeus has longitudinal rugae as well (figure 1). The sides and dorsum of the alitrunk have longitudinal rugae. The petiolar node has lateral rugae, without reticulation and with an anteroventral to caudodorsal orientation (figure 3). The petiolar and postpetiolar nodes are dorsally more or less smooth (figure 4). The head and alitrunk have relative short, straight standing hairs (figure 1). The antennal scape has subdecumbent hairs, which are

shorter than the scape width (figure 2). There is no pubescence on the gaster.

Head, dorsal half of the alitrunk and gaster are dark brown. The appendages, nodes and ventral half of the alitrunk are yellowish brown. The antennal scape is even paler. All hairs are thinner than in *M. schencki* and white.

In table 1, several measurements and indices of *M. schenckioides* are compared with the most resembling species: *M. schencki* Viereck, *M. myrmicoxena* Forel, *M. lemasnei* Bernard and *M. karavajevi* (Arnoldi).

Holotype: female. Type locality: Beekhuizerzand, Harderwijk, Gelderland, The Netherlands, 52°20'N 5°40'E. Out of a pitfall, 12.v.2004 - 14.x.2004. The holotype is deposited in the collection of the National Museum of Natural History Naturalis in Leiden.

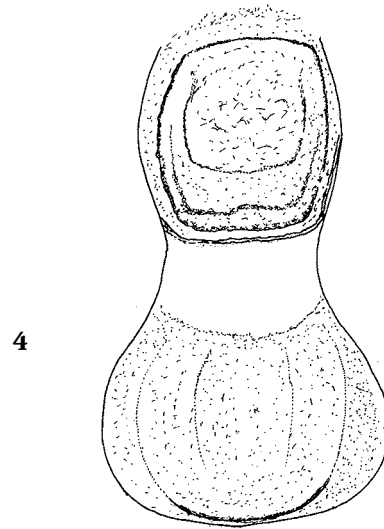
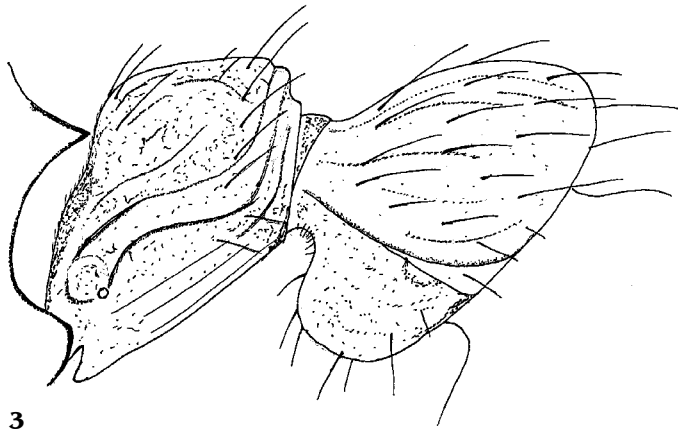
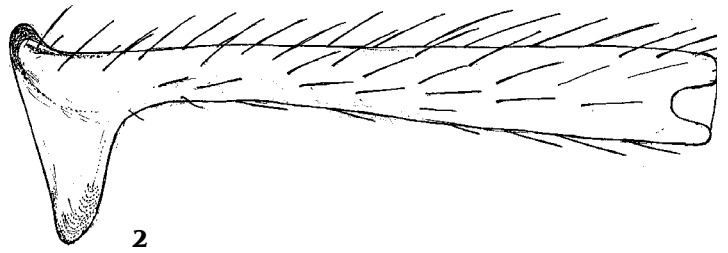
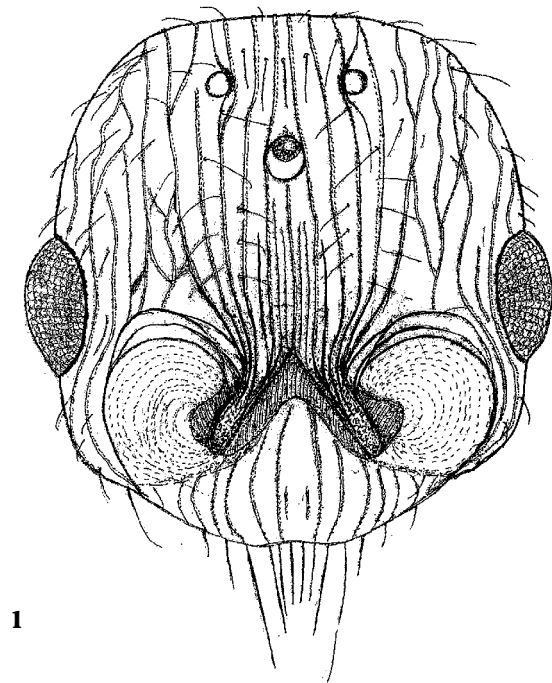
Taxonomic notes

Within the Palaearctic region, only the members of the *M. schencki*-group (Seifert 2003) and those of the *M. lobicornis*-group (Seifert 1988) have a comparable, characteristic shape of the antennal scape. The members of the *M. lobicornis*-group have a less narrow frons. From the *M. schencki*-group only *M. schencki* and *M. lacustris* Ruzsky have a broad and high flange at the dorsoproximal bend site of the scape. However, these two species differ in four major characters compared to *M. schenckioides*, as illustrated by drawings from a *M. schencki* gyne from the same roadside verge. *Myrmica lacustris* has generally the same characteristics: it possesses longer propodeal spines (figure 5), petiolar and postpetiolar nodes are dorsally strongly rugose instead of almost smooth (figure 6), the maximum length of the hairs on

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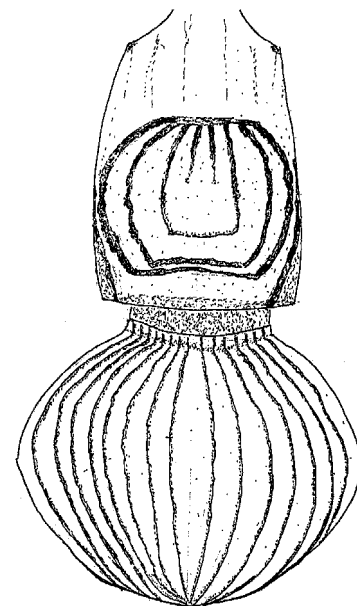
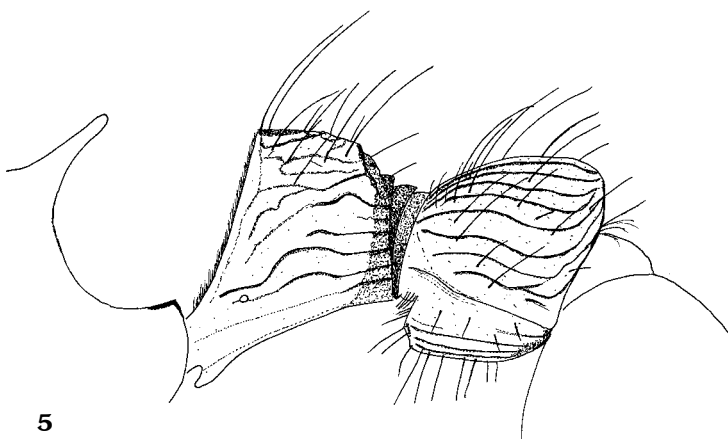
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Figures 1-4. Details of the *Myrmica schenckioides* gyne. **1** Head in frontal view without antenna and mandibles, **2** antennal scape in profile, **3** propodeal spine and nodes in profile, **4** nodes from above, without hair. Illustrations: Peter Boer.

Detailstructuren van het vrouwtje Myrmica schenckioides. 1 Kop van voren, zonder antennen en kaken, 2 scapus van voren, 3 propodeaaldoorn en knopen van opzij, 4 knopen in bovenaanzicht, zonder beharing.



Figures 5-6. Details of a *Myrmica schencki* gyne. **5** Propodeal spine and nodes in profile, **6** nodes from above, without hair. Illustrations: Peter Boer.

Detailstructuren van vrouwtje Myrmica schencki. 5 Propodeaaldoorn en knopen van opzij, 6 knopen in bovenaanzicht, zonder beharing.

Table 1. Biometrical data of gynes of four related *Myrmica* species (minimum and maximum values, in mm or indices).
Biometrische gegevens van vrouwtjes van vier verwante Myrmica-soorten (minimum- en maximumwaarden, in mm of indices).

	<i>M. schencki</i> ^a	<i>M. schenckioides</i> ^b	<i>M. karavajevi</i> ^c	<i>M. lemasnei</i> ^d	<i>M. myrmicoxena</i> ^e
head length (mm) ¹	1.24- 1.35	1.27	0.78-0.89	0.88-0.90	1.02-1.05
head width (mm) ²	1.30-1.44	1.30	-	-	-
head width (mm) ³	-	1.17	0.73-0.84	0.82-0.85	0.94-0.97
alitrunk (mm) ⁴	-	1.98	1.16-1.44	1.40-1.44	1.52-1.58
HW/frons ⁵	4.34 - 5.29	4.56	-	-	-
frons/HW ⁶	-	0.24	0.42-0.49	0.45-0.49	0.45-0.46
frons index ⁷	1.44 - 1.71	1.67	1.03-1.07	1.03-1.05	1.16-1.21
scape/HL ⁸	0.72 - 0.78	0.75	0.83-0.92	0.86-0.90	0.65-0.66
postpetiole/HW ⁹	0.41 - 0.48	0.48	-	-	-
postpetiole/HW ¹⁰	-	0.53	0.55-0.62	0.56-0.60	0.56-0.57

^a n = 23 (Seifert 1988), ^b n = 1, ^c n = 31 (Radchenko & Elmes 2003), ^d n = 3 (Radchenko & Elmes 2003), ^e n = 6 (Radchenko & Elmes 2003),

¹ head length in dorsal view, measured in a straight line from the anterior point of median clypeal margin to mid-point of occipital margin,

² maximum head width including eyes,

³ maximum head width in dorsal view behind eyes,

⁴ diagonal length of alitrunk seen in profile from anteriodorsal point of alitrunk to posterior margin of metapleural lobes,

⁵ maximum head width including eyes/minimum frons width between frontal lobes,

⁶ maximum head width in dorsal view behind eyes/minimum frons width between frontal lobes,

⁷ maximum width between external borders of frontal lobes/minimum frons width between frontal lobes,

⁸ maximum straight-line length of antennal scape seen in profile/head length in dorsal view, measured in straight line from anterior point of median clypeal margin to mid-point of occipital margin,

⁹ maximum width of postpetiole from above/maximum head width including eyes,

¹⁰ maximum width of postpetiole from above/maximum head width in dorsal view behind eyes.

the antennal scape is much longer than the scape width instead of much shorter (figure 7), and it does not have a ventral process at the postpetiole node. Other *Myrmica*'s from both groups do not have that either.

The most closely resembling European socially parasitic ants (*M. lemasnei*, *M. karavajevi* and *M. myrmicoxena*) are smaller and have a slightly broader postpetiolar node, but none of the socially parasitic *Myrmica* species has such a narrow frons as *M. schenckioides*.

Socially parasitic species

Many socially parasitic ants have a ventral process at the postpetiole node, like *Formicoxenus nitidulus* (Nylander), *Harpaxogenus sublaevis* (Nylander) and some socially parasitic *Myrmica*'s. There are two other characteristics for socially parasitic *Myrmica*'s: the gynes are smaller than non-parasitic *Myrmica* queens, and seven out of ten obligate socially parasitic *Myrmica*'s have relatively short propodeal spines (*M. myrmicoxena*, *M. karavajevi*, *M. bibikoffi* Kutter, *M. hirsuta* Elmes, *M. lemasnei*, *M. erepatrix* Bolton and *M. microrubra* Seifert). *Myrmica schenckioides* has all these features and it seems obvious that it is socially parasitic.

Of the fourteen Palaearctic socially parasitic *Myrmica* species, six have a distinct process at the ventral side of the postpetiolus, like *M. schenckioides*. These six species are all workerless. The species of which workers are known do not have such a process. Possibly, this adapted postpetiolus contains pheromone-producing glands; the pheromone may play a role in the social interaction between parasite and workers of the host species. This could implicate that *M. schenckioides* is workerless as well.

In *Myrmica* colonies, little gynes (so called microgynes) can occur in high numbers. Socially parasitic *Myrmica*'s are quite likely derived from these highly polygynous microgyne-

like ancestors (Elmes 1978, Buschinger 1986). This would mean that socially parasitic species look like their host. Because *M. schenckioides* strongly resembles *M. schencki*, it is plausible to suppose that *M. schenckioides* is a social parasite of *M. schencki*. Two closely resembling socially parasitic ants, *M. karavajevi* and *M. myrmicoxena*, have *M. lobicornis* as host. This species is a close relative of *M. schencki*, but is probably not a possible host for *M. schenckioides*. *M. lobicornis* was recently discovered in The Netherlands (Boer 2003) and must be considered as rare. It probably does not occur in the part of The Netherlands where we found *M. schenckioides*, considering of its habitat preferences.

Habitat and accompanying species

The Beekhuizerzand is a drift sand area (with pine forest) in the Pleistocene part of The Netherlands. It is currently a nature reserve belonging to Harderwijk and occupies about 500 hectares. Fixed drift sand areas can form a habitat of the supposed host species, *M. schencki*. The total area seeming suitable habitat for this species is about 200 hectares. Nature restoration management and military exercises with tanks prevent natural succession to forest.

The studied roadside verge of highway A28, where *M. schenckioides* was found, lies at the edge of the drift sand area. Open vegetation of the nature reserve is connected with the vegetation in the roadside verge. In the roadside verge *Cladina portentosa*, several mosses, *Calluna vulgaris* and *Deschampsia flexuosa* are dominant. Bare sand is scarce and several young trees (*Pinus silvestris* and *Quercus robur*) are present. Natural succession will probably change the ant community in this roadside verge in the years to come.

In six pitfalls in the roadside verge we found 22 accompanying ant species, including seven *Myrmica* species. Most abundant in the pitfalls were *M. speciosus* Bondroit, *Tapino-*

ma ambiguum Emery, *Formica rufa* Linnaeus and *Myrmica sabuleti* Meinert. Typical ant species in the central parts of the nature reserve are *Tetramorium caespitum* (Linnaeus), *M. sabuleti*, *T. ambiguum* and *M. schencki*.

Two workers of *M. schencki* were found in the same pitfall in which we found *M. schenckioides*. In the roadside verge and in the nature reserve, this possible host species occurred in 50% of the pitfalls in open vegetation (n=12). We may assume that *M. schencki* is locally common. A high host density is an important condition for the presence of socially parasitic *Myrmica*'s.

Discussion

The description of *M. schenckioides* is based on one individual. Most workerless socially parasitic *Myrmica*'s are rare and local: *M. myrmicoxena* has been found once in the Swiss Alps, *M. lemasnei* has been found a few times in the Pyrenees, *M. kabylica* (Cagniani) has been found once in Algeria, and also *M. ereptrix* is based on a single queen from Kashmir. Only *M. karavajevi* has a widespread distribution, but is very rare (Radchenko & Elmes 2003).

The apparently characteristic lobe at the ventral side of the postpetiole of *M. schenckioides* could be, for example, caused by the nematode *Mermis* (see Radchenko & Elmes 2003). In that case the gyne of *M. schenckioides* could in fact belong to *M. schencki*. However, there are too many differences between *M. schencki*-gynes and the gyne we found for it to be an artefact.

Acknowledgements

The ant survey was part of a study financed by the Road and Hydraulic Engineering Division of the Ministry of Transport, Public Works and Water Management. We thank the local authority of Harderwijk for permission to work in the Beekhuizerzand. Maurits Gleichman, André Schaffers and Louis de Nijs are thanked for helpful assistance.

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Received 26 January 2005, accepted 18 May 2005.

Samenvatting

De kokergaststeekmier *Myrmica schenckioides* nov. sp., een nieuwe sociaal-parasitaire mierensoort (Hymenoptera, Formicidae)

De kokergaststeekmier is een nieuwe soort van het geslacht *Myrmica*. In 2004 is één gevleugeld wijfje gevonden in een vangpot in een berm van de A28. De vindplaats is een heischrale vegetatie langs het natuurgebied het Beekhuizerzand, vlakbij Harderwijk, Gelderland (Amersfoortcoördinaten 174-483). De nieuwe soort is gemakkelijk te onderscheiden van de veronderstelde gastheer de kokersteekmier *M. schencki* en verwante sociaal-parasitaire *Myrmica*'s (*M. myrmicoxena* en *M. karavajevi*). De brede lob aan de onderkant van de postpetiolus, de smalle frons, de witte beharing en de kenmerkende scapus vormen een unieke combinatie van kenmerken en maken deze soort eenvoudig te herkennen.