

First observation of *Myrmica gallienii* BONDROIT, 1920 for Belgium (Formicidae, Hymenoptera)

François VANKERKHOVEN¹, Jaak EVENS² & Wouter DEKONINCK³

¹ Wolvenstraat 9, B-3290 Diest (e-mail: francois.vankerkhoven@formicidae.be).

² Deusterstraat 86, B-3990 Peer (e-mail: jaakevens@hotmail.com).

³ Royal Belgian Institute of Natural Sciences, Department Entomology, Vautierstraat 29, B-1000 Brussels (e-mail: wouterdekoninck@hotmail.com or wouter.dekoninck@natuurwetenschappen.be).

Abstract

We report the first record of *Myrmica gallienii* BONDROIT, 1920 in Belgium in a heathland on the edge of the military training field in Peer (province of Limburg). We describe the locality and take notice of the accompanying species in the same plot where *M. gallienii* was discovered. We discuss how to recognize *M. gallienii* from other *Myrmica* species and we present an identification key in which we explain the possible useful morphometric characteristics to discriminate this species from morphologically very similar other Belgian *Myrmica* species. The newly discovered species *M. gallienii* is added to the checklist of the Belgian ant fauna which increases the total number of ant species in Belgium to 85. On the provisional Red List of ants of Flanders this species is added to the list of critically endangered species.

Keywords: Formicidae, faunistics, *Myrmica gallienii*, first Belgian record, Limburg.

Samenvatting

We melden de eerste vondst van de zeggensteekmier *Myrmica gallienii* BONDROIT, 1920 in België in een heideperceel aan de rand van het militair schietveld in Peer (provincie Limburg). We zoomen in op de vindplaats en geven een lijst van de andere mierensoorten die op hetzelfde perceel werden waargenomen. We bespreken hier hoe we *M. gallienii* van alle andere Belgische *Myrmica*-soorten kunnen onderscheiden. In een identificatiesleutel geven we bovendien de kenmerken weer die van belang zijn om deze soort te onderscheiden van morfologisch nauw verwante andere bij ons voorkomende *Myrmica*-soorten. Door toevoeging van *M. gallienii* aan onze soortenlijst telt de Belgische mierenfauna nu 85 soorten. Op de voorlopige Rode Lijst van mieren van Vlaanderen wordt deze soort in de categorie van met uitsterven bedreigde soorten geplaatst.

Introduction

During the last decennium several investigations have been carried out on the invertebrates in the province of Limburg with special attention to the soil and leaf litter insects. These intensive studies resulted in the discovery of some new Belgian ant species and the rediscovery of species once thought lost for the Belgian ant fauna. (Cfr. infra: DEKONINCK *et al.*, LAMBRECHTS *et al.* and VANKERKHOVEN). Due to the high potential of undisturbed natural habitats in this province, especially dry heathland associated with areas of wet heath, we noticed 52

ant species, which is 61,2% of the total Belgian ant fauna. Most rare (parasitic) ants and ants of our Provisional Red List of threatened species can be found in the province of Limburg (DEKONINCK *et al.*, 2003b).

During the summers of 1999 and 2000, special attention was given to the entomofauna in wet heathlands (typical habitat for *M. gallienii*) not only in the province of Limburg but also in the province of Antwerp covering the whole geographic region known as the Campine region (MAES *et al.*, 2003). Direct nest searching and sampling with pitfall traps on 23 sites in this



Fig. 1. Head of *Myrmica gallienii* worker.



Fig. 2. Picture of the wet heathland habitat in Peer where *Myrmica gallienii* was collected (27 of April 2008).

particularly habitat resulted in a list of 28 ant species and the discovery of *Myrmica lonae* FINZI, 1926 for the first time in Belgium. Despite all these and other investigations *Myrmica gallienii* was not noticed until 2007.

Recent records and information on the habitat of *M. gallienii* in Central Europe (SEIFERT, 2007) made us suspect that an adequate sampling in its suitable habitats in Belgium might indeed result in a first Belgian record of this species (SCHOETERS & VANKERKHOVEN, 2001; DEKONINCK *et al.*, 2006). In Germany *M. gallienii* is only known from habitats where the water level reaches constantly, or at least for short periods in spring, near to the surface and where the height of vegetation layer is rather limited (SEIFERT, 1988). Typical habitats are meadows and swamps with comparably low

vegetation at the margin of flat waters or flat lakes (SEIFERT, 1988; 2007). More rarely, *M. gallienii* nests also in the wet and warm *Sphagnetalia* of open peat bogs where the humidity and temperature requirements of the species are satisfied.

In the Netherlands, more than 100 specimens of *M. gallienii* were collected with pitfall traps along a marsh dominated by *Scirpus lacustris* L., *Juncus effusus* L. and *Molinea caerulea* (L.) MOENCH, with small fragments of *Erica tetralix* L. and *Calluna vulgaris* (L.) HULL (BOER, 2000; 2001). Later *M. gallienii* was also recorded in two other places: firstly several nests were found in *M. caerulea* mounds in a wet, grazed, dune slack on Texel island and secondly it was collected using pitfalls in the Hallse heide in the north of the province Drenthe between Smilde

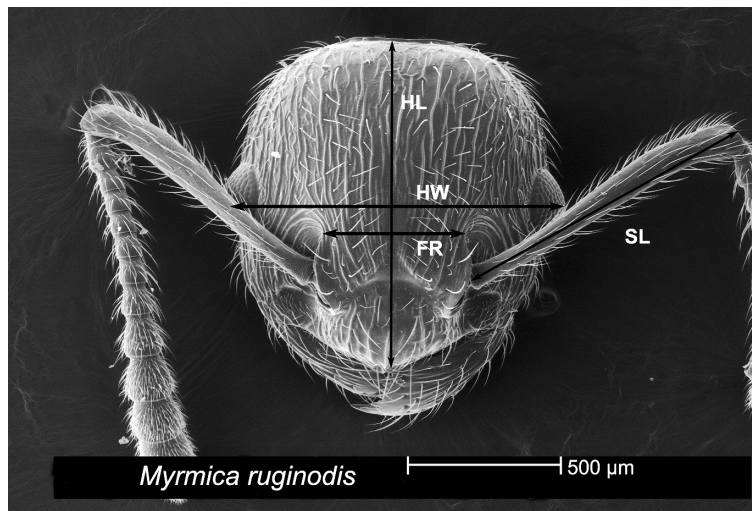


Fig. 3. Head of *Myrmica ruginodis* worker with HW (head width), HL (head length), SL (scapus length) and FR (frontal ridges).

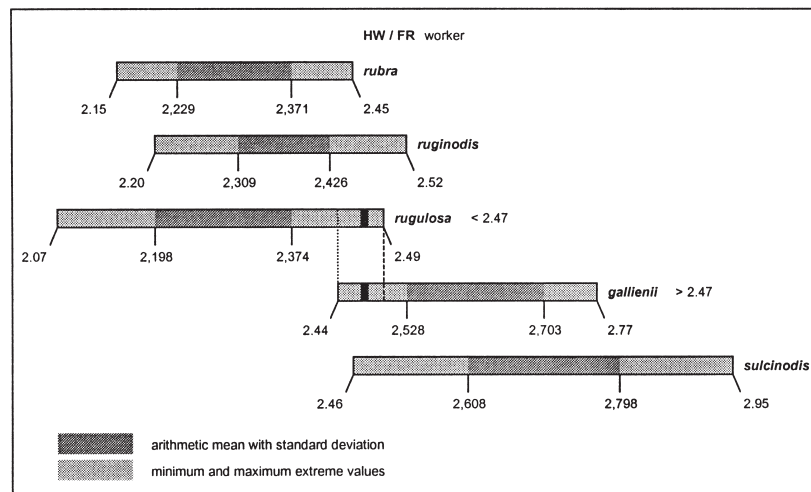


Fig. 4. Frontalindex of workers of 5 *Myrmica* species (SEIFERT, 1988)

and Hooghalen in a *M. caerulea* dominated vegetation near a bog (BOER, 2005; BOER, pers. com.).

In Belgium, however, up to summer 2006 several attempts to discover this ant failed although a considerable number of myrmecological excursions were done in suitable *M. gallienii* habitats. This is not surprising, as this ant is also very difficult to find in Germany (SONNENBURG, 1996) and the Netherlands (BOER, 2001). In the summer of 2007 we finally collected *M. gallienii* in Belgium with pitfall traps in a wet heathland in Peer.

Description of the habitat

The study which resulted in the discovery of *Myrmica gallienii* was performed by the workgroup 'Werkgroep Ongewervelden', a

branch of LIKONA (Limburgse Koepel voor Natuurstudie). Our specimens were detected in one of its typical habitats: wet heathland with a constantly high water table. From the beginning of April until the end of November 2007, 5 sets of 3 pitfall traps (sets numbered from PT16 up to PT20) were used to make an inventory of the soil and leaf litter invertebrates in a heathland plot on the edge of the military training field in Peer (province of Limburg), specified as Maastrichterheide in the UTM-grid FS7359. The three pitfalls of the same set were placed at an intermediary distance of 10 m.

The habitat where three sets of pitfalls (PT16, PT17 and PT20) were installed, can be described as dry *Calluna* heathland with patches of lichens (on site PT16), sandy places with oak and birch (site PT17) and dry thermophilic grassland (site PT20). The other two sets (PT18 and PT19) are situated in lower parts of wet heathland covered

with *Molinia caerulea* (L.) MOENCH and the area of one set PT18 was sod-cut on 1-II-2007, two months before our sampling period. The traps were emptied on fortnightly intervals and ants, spiders and beetles were sorted out by J. Evens. In the latter set of pitfall traps, (PT18) 73 specimens of *Myrmica gallienii* were collected. Besides *M. gallienii* also 12 other ant species were collected at the same site (see Table 1).

Table 1. Other ants that have been found in the same plot.

Species
<i>Formica cunicularia</i> LATREILLE, 1798
<i>Formica fusca</i> LINNAEUS, 1758
<i>Lasius fuliginosus</i> (LATREILLE, 1798)
<i>Lasius platythorax</i> SEIFERT, 1991
<i>Lasius umbratus</i> NYLANDER, 1846
<i>Leptothorax acervorum</i> (FABRICIUS, 1793)
<i>Myrmica sabuleti</i> MEINERT, 1861
<i>Myrmica scabrinodis</i> NYLANDER, 1846
<i>Myrmica schencki</i> VIERECK, 1903
<i>Stenamma debile</i> (FÖRSTER, 1850)
<i>Temnothorax nylanderi</i> (FÖRSTER, 1850)
<i>Tetramorium caespitum</i> (LINNAEUS, 1758)

Some of these accompanying ants such as *Formica cunicularia* are not typical for wet heathlands with *Molinia* but are probably foraging individuals from the surrounding habitats with a different vegetation composition. The same reason can be postulated for the two males and one gyne of *Stenamma debile* found after nuptial flight at the same site.

Identification

A total of 30 specimens of the ant *Myrmica gallienii* collected in set PT18, were morphometrically studied. This resulted in 4 primary data and 3 indices. The species was evaluated for 3 characters: SL/HW, HW/FR and HL/HW. All measurements were made on dried and mounted specimens. An Olympus SZX12 stereomicroscope equipped with a 1.2 x PF objective was used at magnifications of 96-216 times.

The following characters were measured (see Fig. 3):

HW : maximum head width including the eyes.
 HL : in median line the maximum head length.
 SL : maximum scapus length.
 FR : minimum distance between frontal carinae.

The frontal index (FI) is a typical discriminant used for the identification of ants of the genus *Myrmica*. It represents the ratio HW/FR and can be useful as a good indication in the keys for the workers and the females. In the graphic presentation of Fig. 4, we compare as well the extreme minimum and maximum values as the mean values with their deviation for the five *Myrmica* species which can be confused with each other.

In table 2 we compare our morphometric results with the ones cited in SEIFERT, 1988. As is clear from this table our measurements and indices for *M. gallienii* correspond well with those mentioned by SEIFERT.

Although we suspected *Myrmica gallienii* to be a very rare and only locally distributed ant species in Belgium, it is also possible that the species was overlooked in the field and has been confused with other *Myrmica* species (SEIFERT, 1988; 2007; WARDLAW *et al.*, 1998; BOER, 2001; SCHOETERS & VANKERKHOVEN, 2001). Especially confusion with *Myrmica* species with antennal scape curved at the base without angle and carina as *Myrmica rubra* (LINNAEUS, 1758), *Myrmica ruginodis* NYLANDER, 1846, *Myrmica sulcinodis* NYLANDER, 1846 and *Myrmica rugulosa* NYLANDER, 1849 is likely. Therefore we here present a simple key with good illustrations of the typical habitus of the antennal scape and petiolus of some of those *Myrmica* ants. To distinguish *M. gallienii* from other *Myrmica* species we will combine some morphometric characters with other morphologic details.

Table 2. Norm mean values and our measured mean values for 4 primary data and 3 indices (* no reference in existing literature).

<i>Myrmica gallienii</i>	HW	HL	SL	FR	HL / HW	SL / HW	HW / FR
Norm mean value	1123 μm	1148 μm	*	*	< 1,040	< 0,870	2.616
Our measured mean value	1101 μm	1131 μm	932 μm	416 μm	1,028	0,847	2,647

Key for *Myrmica* (workers) species with antennal scape curved at the base without angle and carina

- 1a. Antennal scape, angulate at the base with longitudinal lobe of carina
 other *Myrmica* species no confusion with *M. gallienii* possible.
- 1b. Antennal scape curved at the base without angle and carina **2***
- * If observation at high magnification unveils a very small caudal carina, this could be an indication for *Myrmica hellenica* FOREL, 1913 and then further investigation with SEIFERT 2007 is necessary. So far *M. hellenica* was never observed in Belgium.
- 2a. Antennal scape gently curved near the base (bending max. 40°) – Fig. 5. Mean frontalindex between 2.229 and 2.426. SL/CW > 0,87 **rubra** and/or **ruginodis**
- 2b. Antennal scape clearly curved near the base. The diameter of the scape in caudal view never decreases from distal of the bend to immediately proximal of the bend. Mean frontalindex between 2.198 and 2.7981. SL/CW < 0,87 **3**
- 3a. Antennal scape sharply curved near the base with a sharp dorsal edge at the bend. Thorax, petiole and postpetiole with coarse regular rugae. Mean frontalindex between 2.608 and 2.798 **sulcinodis**
- 3b. Antennal scape obvious less sharply curved near the base and without a trace of an edge. Sculpture much less rugose or finely striate. Mean frontalindex between 2.198 and 2.703 **4**
- 4a. Petiole in lateral view simply angled with nearly straight dorsal surface. Smooth sculpture. Mean frontalindex between 2.198 and 2.374. Head mostly longer than broad; nest means KL/KB > 1.040 **rugulosa**
- 4b. Petiole posterodorsal with a truncate area. Petiole and postpetiole obvious striated. Mean frontalindex between 2.528 and 2.703. Head mostly not longer than broad; nest means KL/KB < 1.040 **gallienii**

There is an obvious difference between the FI (frontalindex) of *M. rugulosa* and *M. gallienii*, the two species in this group that show the most resemblance (see Fig. 4). A combination of the three characters, scapus, petiole and frontalindex will certainly offer a useful tool to separate the resembling species of this group.

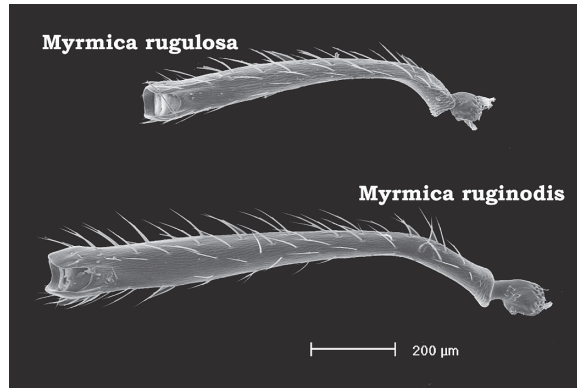


Fig. 5. Antennal scape of *Myrmica rugulosa* and *Myrmica ruginodis* worker.



Fig. 6. Spines, petiolus and postpetiolus of a worker of *Myrmica rubra*.

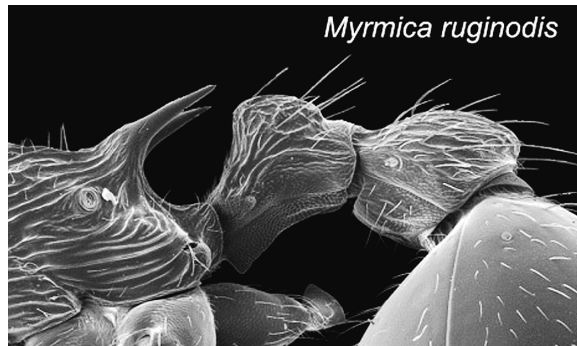


Fig. 7. Spines, petiolus and postpetiolus of a worker of *Myrmica ruginodis*.

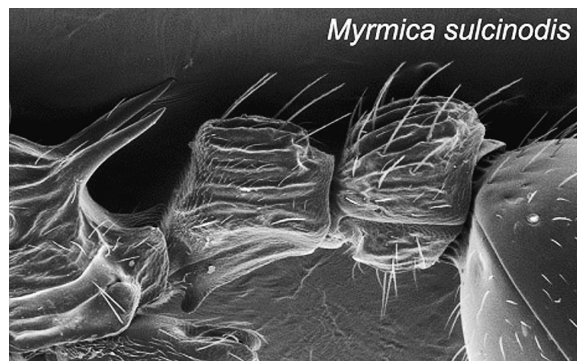


Fig. 8. Spines, petiolus and postpetiolus of a worker of *Myrmica sulcinodis*.

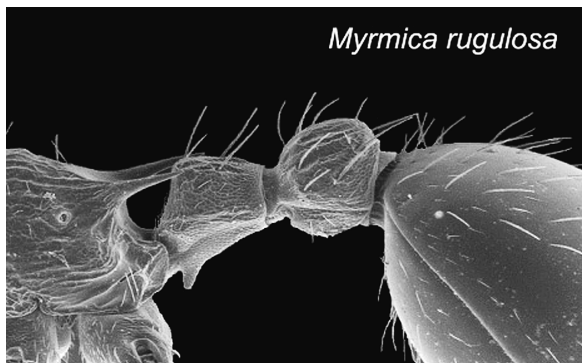


Fig. 9. Spines, petiolus and postpetiolus of a worker of *Myrmica rugulosa*.

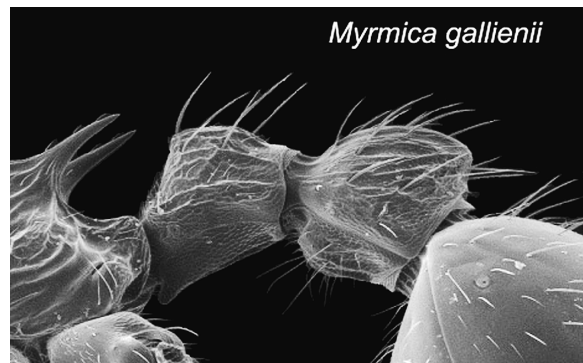


Fig. 10. Spines, petiolus and postpetiolus of a worker of *Myrmica gallienii*.

Discussion and possibilities to rediscover *M. gallienii* in Belgium

The 27 of April 2008 we visited the location and searched for the nest of *Myrmica gallienii*. In the sod-cut area we found a lot of foraging ants of the species *Formica fusca* and *Lasius platythorax*. We did not find a single *Myrmica* worker. In the surrounding vegetation we found several nests of the foraging species and one of *Formica cunicularia* but none of *Myrmica gallienii*.

Sod-cutting can have a serious impact on the presence of ant nests. Especially species of the genus *Myrmica* are very sensible for disturbing influences and react mostly by displacing their nest from such places. This human intervention can be an explanation for the absence of nests of *Myrmica gallienii* in the investigated plot almost a year after the sampling period. Another explanation can be credited to COLLINGWOOD who stated that this ant species can 'nesting deep in the ground with simple entering holes' (COLLINGWOOD, 1979), giving us the excuse of overlooking its presence for the moment. Nevertheless we confirm the presence of this ant in Belgium and we will keep on searching for this particular discovered and other new populations in similar habitats.

So far, all Dutch (BOER, 2000; 2001; 2005) and German suitable habitats for *M. gallienii* (SEIFERT, 1988; 2007) are in general wet and open marshes and open bogs, fens and wet heathlands (*Erica tetralix*-vegetations and *Sphagnetalia*) where the water table reaches constantly or at least for short periods in spring, near to the surface and where the height of field layer vegetation is rather limited. During high water levels the colony can hide in vegetation above the water and can stay there for days (SEIFERT, 1988; 2007). Because of this

characteristics it can out-compete all other also hygrophilic *Myrmica* species such as *Myrmica ruginodis* and *Myrmica scabrinodis* in this habitat. Where the species is recorded in the Netherlands, it is probably the locally dominating *Myrmica* species (BOER, 2000; 2001).

This species can be expected in other similar wet heathlands elsewhere in Belgium. In less wet vegetations or places where the water table only seldom reaches near to the surface, a strong competition with *Myrmica scabrinodis* or *Myrmica rubra* will probably prevent *M. gallienii* to occur (SEIFERT, 2007). We think that *M. gallienii* has to be searched for in the following habitats and places in Belgium.

First we expect more records in undisturbed wet heathlands and venns all over Belgium, especially all great heathland reserves in Flanders. Secondly, as the species is facultatively halophilous in Russia and Ukraine and in Western Europe moderately thermophilous and rather hygrophilous (COLLINGWOOD, 1979; SEIFERT, 2007), it can probably also be found in the north of Eastern-Flanders where we have a lot of great halophilous-brackish lakes. Moreover and according to COLLINGWOOD (1979) and SEIFERT (1988) *M. gallienii* is likely to occur in coastal sand dunes of the Netherlands and Denmark where it might only nests in those parts of the dunes that are not too high above the water table and so it can probably be found along the Belgian coast dunes.

M. gallienii remained undetected in Belgium for a long time, which we take as a hint for its status as a very rare species in Belgium. Nevertheless, there may exist other populations. Evaluating these results, we perhaps have to give *M. gallienii* a Red List status as critically endangered species if we consider this ant in Belgium as a typical species of undisturbed wet heathlands, meadows and swamps.

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Samenvatting

Volgende 9 soorten kortschildkevers zijn nieuw voor de Belgische fauna: *Gyrophana (Agaricophaena) boleti* (L.), *Thecturota marchii* (Doder), *Lypoglossa lateralis* (Mannh.), *Atheta (Pachyatheta) mortuorum* Thoms., *Atheta (Ceritaxa) dilaticornis* Kr., *Atheta (Alaobia) hybrida* (Sharp), *Acrotona (Strigota) convergens* Strand, *Alevonota egregia* Rye en *Apimela macella* Er. Voor elke soort geven we hier de algeme verspreiding en die in België, alsook vedere commentaar bij de historiek, taxonomie, status, biology... Twee soorten: *Calodera rufescens* Kr. and *Bisnius pseudoparcus* (Brunne), reeds voor België gemeld, zijn aan deze lijst toegevoegd zodoende ook een volledig overzicht van deze soorten te geven. Verder geven we een samenvattende lijst met alle informatie over de 25 soorten kortschildkevers nieuw voor België sinds 1995.