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First record of the permanent social parasitic, slavemaking ant *Harpagoxenus sublaevis* (NYLANDER, 1852) for Belgium (Hymenoptera, Formicidae)

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Abstract

We report the first record of the permanent parasitic ant *Harpagoxenus sublaevis* (NYLANDER, 1852) in Belgium. A nest of the species was discovered on 3.V.2006 in Nahtsief in the Hautes Fagnes. In the nest workers of its frequently used host *Leptothorax acervorum* (FABRICIUS, 1793) were found. This paper presents the locality, coexisting ant fauna and possibilities where to rediscover this species.

Keywords: first record, Belgium, *Harpagoxenus sublaevis*, faunistic.

Résumé

Nous signalons la première capture d'*Harpagoxenus sublaevis* (NYLANDER, 1852) une fourmi esclavagiste obligatoire en Belgique. Un nid de cette espèce a été trouvé le 3.V.2006 à Nahtsief dans les Hautes Fagnes, dans lequel se trouvaient également des ouvrières de *Leptothorax acervorum* (FABRICIUS, 1793), une des espèces cibles d'*Harpagoxenus sublaevis*. Ici on commente la localité, les différentes fourmis avoisinantes et les possibilités de retrouver l'espèce en Belgique.

Samenvatting

We melden hier de eerste waarneming van de permanent, parasitaire slavenjaagster *Harpagoxenus sublaevis* (NYLANDER, 1852), de nijptangmier in België. Een nest van deze soort werd ontdekt op 3.V.2006 in Nahtsief in de Hoge Venen. In het nest werden ook werksters van de vaak door deze soort gebruikte gastheer *Leptothorax acervorum* (FABRICIUS, 1793) gevonden. Hier worden de vindplaats, de er voorkomende mierenfauna en mogelijkheden om deze soort op andere plaatsen in ons land te vinden, besproken.

Introduction

Recently an update of the checklist of the Belgian ant fauna listed 82 species (DEKONINCK *et al.*, 2006). Some other species were mentioned as "soon to be discovered and to be expected in the near future" because they are known from neighbouring countries and the habitats where they were found there, are also present in Belgium. A region where large areas of some of these habitats are present, is the Hautes Fagnes, a region where already very rare species were discovered (BONDROIT, 1912; 1918; VAN BOVEN, 1949; 1970; VAN BOVEN & MABELIS, 1986). A lot of those species are nowadays considered extinct in Belgium because records during the last 50 years are lacking (DEKONINCK *et al.*, 2006). However, recently one of those species, *Myrmica lobicornis* NYLANDER, 1846, was rediscovered at several localities in the Hautes Fagnes region (DEKONINCK *et al.*, 2004; BOER, unpublished records).

In this myrmecological interesting region a new species for the Belgian ant fauna was discovered. At 'Nahtsief' near the "Natur-

schutzgebiet Hohes Venn" close to the German border in a large area with intact bogs and wet heathland vegetations, *Harpagoxenus sublaevis* was found for the first time in Belgium.

Harpagoxenus sublaevis a permantent social parasitic slavemaking ant

(see BUSCHINGER, 1966a;b; 1968; 1974; BUSCHINGER & WINTER, 1975; BUSCHINGER, 1980; BUSCHINGER *et al.*, 1980; FISCHER & FOITZIK, 2004)

Harpagoxenus sublaevis is a permanent social parasite in nests of species from the genus *Leptothorax* (Fig. 1). Workers of the colony depend on their hosts for food and all necessary tasks of colony maintenance. Workers of the parasite can be seen during raids on nearby nests of *Leptothorax* species. The orientation during these raids is exclusively visual. A successful scout does not lead a column as do *Myrmoxenus* or other slavemaking species. Instead, *H. sublaevis* makes use of tandem running. The scout leads one nestmate, they both return and each of them leads another nestmate and this goes on and on in a snowball system. Normally larvae are little attractive except for the largest ones and for prepupae; the main booty are worker pupae that will become slaves without further investment. In a nest of *H. sublaevis*, slaves of different species can be found.

The gyne of *H. sublaevis* uses a pheromone to confuse host workers and then enters the host-colony. Next the gyne uses her strong and pincer-like mandibles (Fig. 2) to attack the gyne and workers of the host by cutting the antennae and legs. A colony of *H. sublaevis* is monogynous, having only one mated and egg-laying female in the nest. This one reproductive may be a dealate female which is however rarely the case. Normally an intermorphic queen (a queen that never had wings) is responsible for reproduction. Colonies can have 40 to 50 exceptionally up to 110 workers. The number of slaves can be 1 to 10 times as great as the *H. sublaevis* workers (up to about 400 slaves) and sometimes also gynes of *Leptothorax* species can be used as slaves. When they hatch from raided pupae, *H. sublaevis* workers bite off the wings of such gynes, preventing their flying off for mating. Normally workers forage only 1 meter away from their nest and slavery raids are held only a few meters from the nest. *Leptothorax acervorum* slaves forage up to 5 meter away from the *Harpagoxenus* nest.

Distribution of *Harpagoxenus sublaevis* in Europe

Harpagoxenus sublaevis is a rather rare species in western-Europe and is listed on various Red Lists, among others France (ANONYMUS, 2002), Germany (SEIFERT, 1998) and even internationally (IUCN, 2006). It can be found everywhere in Europe and central Siberia. The closest locality of the species near the Hautes Fagnes is the Hunsrueck mountains in Rheinland-Pfalz (HELLER *et al.*, 2000). These

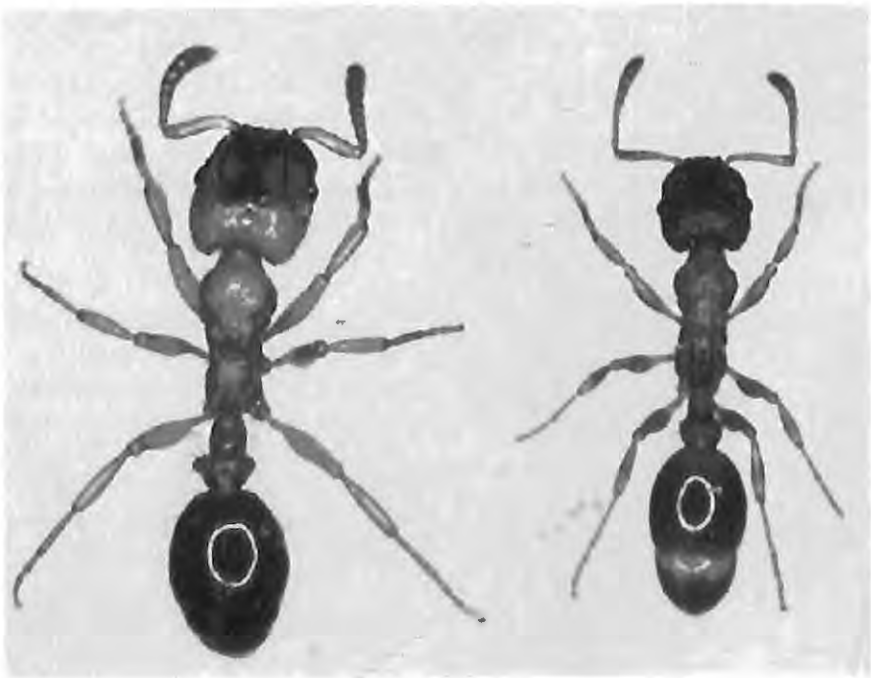

Fig. 1. Habitus of a *Harpagoxenus laevis* worker (left) and its host *Leptothorax acervorum* (right).

Fig. 2. Detail of the head and mandibulae of *Harpagoxenus sublaevis* (copyright picture A BUSCHINGER).

authors suggest that the species is an ice age relict ("nacheiszeitliches Relikt") because of its boreal-alpine distribution. In France the species is only known from the Pyrenees and the Alps (ANONYMUS, 2006). The new record from the Hautes Fagnes might be seen in this boreal-alpine context. However records from lowlands in Niedersachsen (SONNENBURG, 2005) do not confirm this theory.

Comments on the locality and coexisting ant fauna at Nahtsief

Record: 1 nest; Nahtsief (Prov. Liège); UTM: LB0006; Lambert coordinates x=278.100 and y=142.200; 3.V.2006, leg: P. BOER & coll.: RBINS.

Leptothorax acervorum nearly always co-occurs in the immediate surrounding of other ant species, as its species name indicates. During a survey in the spring of 2006 in the Hautes Fagnes *L. acervorum* was found regularly in the immediate proximity of one of the dominant ant species there, *Lasius platythorax* SEIFERT, 1991. *L. platythorax* and *L. acervorum* can be found on almost each m². Nests of *L. acervorum* were always found on or next to *L. platythorax* nests. *L. acervorum* nests were regularly found next to *Formica lemani* BONDROIT, 1917; *Myrmica scabrinodis* NYLANDER, 1846; *Myrmica ruginodis* NYLANDER, 1846 and *Myrmica rubra* (LINNEAUS, 1758) nests too. Also in the Netherlands *L. acervorum* is often found in the immediate proximity of other ant species such as *Formica fusca* LINNAEUS, 1758 and *Formica rufa* LINNAEUS, 1758, but in the Hautes Fagnes at Nahtsief the density of *L. acervorum* nests, was extremely high. Moreover a high amount of *L. acervorum* nests were polygynous and abnormally numerous, with several hundred workers. These high nest densities, high rate of polygyny and huge numbers of workers per *L. acervorum* nest are rather exceptional for the Benelux and probably only present in the Hautes Fagnes region.

Besides *L. acervorum* also a lot of *Leptothorax muscorum* (NYLANDER, 1846) nests were found in the same localities. Notwith-standing the fact that the nests of the latter are more difficult to find, high nest densities of this species were recorded. Nests of *L. muscorum* were always found in vegetation where a nest was expected.

Because of the high nest densities of both *Leptothorax* species, known as frequently used hosts and slaves by *H. sublaevis*, the latter could be expected and was searched for. Parasites mostly live in localities with high densities of their hosts. Nevertheless the discovery of a small colony with some *L. acervorum* slaves was a nice surprise. The nest was discovered in a small hole in compact, partly dead *Spaghnum* vegetation covered with lichens. Surrounding vegetation was dominated by *Molinia caerulea* (L) MOENCH and *Vaccinium myrtillus* LINAEUS, 1753. SONNENBURG (2005) also found the species in

bogs and peat. An intensive search for more nests of *H. sublaevis* remained negative.

Where to search for *H. sublaevis in* Belgium?

A search for the species in The Netherlands in localities with high *L. acervorum* nest densities was unsuccessful so far. The species was especially searched for in sunny places in pine forests because this habitat should give rise to optimal conditions for *H. sublaevis* as suggested by HEINZE (1995) and SEIFERT (1996). In Jutland in Denmark BOER (unpublished) found the species in a chopped pine forest in a humid place covered with mosses and *V. myrtillus*. BUSCHINGER (1966a) found the species in swamps, rocky mountain meadows and dry pine forests. The species seems to be able to live in different types of habitats. Probably not the type of vegetation, but the presence of high nest densities of the hosts is the main factor that determines possibilities to find *H. sublaevis*.

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