

**First record of infestation of the ghost ant
Tapinoma melanocephalum (FABRICIUS, 1793)
in Belgium (Hymenoptera, Formicidae) -
A new indoor pest problem for the country?**

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Abstract

We report the first record of the 'tramp ant' *Tapinoma melanocephalum* (FABRICIUS, 1793) in Belgium. In February 2006, workers of the species were collected in a building near Liège. Comments on how to recognise this species and further information on behaviour, colony structure and distribution in nearby countries are given. Probably this species is regularly introduced in Belgium and we assume there is a high possibility that more *T. melanocephalum* records will be reported in the near future.

Keywords: *Tapinoma melanocephalum*, first record, Belgium, introduction, pest control

Résumé

Nous signalons la première capture d'une 'fourmi clandestine' *Tapinoma melanocephalum* (FABRICIUS, 1793) en Belgique. En février 2006, des ouvrières de cette espèce sont récoltées dans un bloc d'habitations à Liège. Les critères d'identification de cette espèce ainsi que des informations sur le comportement, la structure des colonies et leur distribution dans des régions avoisinantes sont renseignés tout au long de cet article. Il est probable que *T. melanocephalum* soit régulièrement introduite en Belgique, dès lors, nous supposons qu'elle pourra encore être signalée dans le futur.

Samenvatting

We melden de eerste waarneming van de geïntroduceerde soort *Tapinoma melanocephalum* (FABRICIUS, 1793) in België. In februari 2006 werden werksters van deze soort ingezameld in een appartementsgebouw in de buurt van Luik. Verder halen we aan hoe je deze soort kan herkennen en worden verder informatie over het gedrag, de sociale structuur en verspreiding en verbreiding van de soort in onze buurlanden besproken. Hoogstwaarschijnlijk wordt deze soort geregeld geïntroduceerd in België en we veronderstellen dat er een grote kans bestaat dat in de toekomst nog meer waarnemingen van kolonies van *T. melanocephalum* gemeld zullen worden.

Introduction

Last years various so called invader and/or tramp ant species were reported in heated buildings all over Belgium. Most of these species are cosmopolitan and mostly transported by humans. In most cases plant- and flowerpots or building material are the main ways of transport. Some of these tramp ant species (*Hypoconer*

schauinslandi Emery, 1899, and *Monomorium pharaonis* LINNAEUS, 1758) were reported for the first time already more than 100 years ago by BONDROIT (1911). Others were only recently added to the Belgian ant list (*Camponotus vagus* SCOPOLI, 1763; *Lasius neglectus* VAN LOON, BOOMSMA & ANDRÁSFALVY, 1990; *Linepithema humile* (MAYR, 1868) and *Tetramorium bicarinatum* (NYLANDER, 1846). Two of them *L.*

neglectus and *C. vagus* are able to live outdoors. Nowadays *C. vagus* has probably already disappeared again, although further spread into Belgium from its introduction place is a possibility (DEKONINCK & PAULY, 2002). The other species *L. neglectus* has caused a lot of problems by acting as a real invader and pest species in Ghent. It outcompetes all other ants in the Citadelpark where it constructs huge polygynous nests (DEKONINCK *et al.*, 2002).

However in Belgium most introduced and tramp ant species are only able to survive indoors. Doing so they can cause problems of hygiene and they can be annoying because most of the time they are very persistent and hard to remove. Six introduced ant species can be found in heated buildings in Belgium (DEKONINCK *et al.*, 2002; 2003; 2005; 2006): *Hypoponera punctatissima* (ROGER, 1859) (spread over the country, but rarely found), *H. schauinslandi* (so far only a few records and very rarely found), *L. neglectus* (one locality; Ghent inside buildings of the UGent University), *L. humile* (two records in greenhouses), *M. pharaonis* (commonly found in all types of buildings), *T. bicarinatum* (so far one locality near Liège). All these ant species are human-introduced species. Only a few of them are at present known as real pest species when occurring nearby humans: especially *M. pharaonis*, *L. neglectus* and in a lesser extent *Hypoponera* sp. can cause problems. In most of the cases the problems are really small and negligible and most of their annoying character is only the result of overreacting of the people who are confronted with them. However some of them indeed deserve the status of pest species.

Record of the "ghost ant" *T. melanocephalum* in Belgium

Material examined: 10 workers, Liège (Prov. Liège), FS8212, 07.II.2006, (leg. P. WEGNEZ, coll. RBINS).

The ghost ant, *T. melanocephalum* was recorded for Belgium the first time in Liège, rue Natalis, 73 in February 2006. The common name ("ghost ant") is truly descriptive: they run faster than the pharaoh's ant and, because of the striking colour pattern that renders the gaster nearly invisible when running, they do not look like other ants. Specimens of the persistent colony were collected by the second author when disinfecting the building. First complaints of the inhabitants of the building go back to June 2005. Different professional pest control operators tried

to control the building from what they called a huge nest of the pharaoh's ant. In February trails of foraging workers wandering from the kitchen to the bath-room using small cracks along the baseboard and floor were observed and sampled. Workers were also found in the drawer and kitchen closets. Treatment by vaporizing insecticide (deltamethrine 25g/l and chlorpyrifos-ethyl 208g/l) was conducted at all floors of the entire building and also baits with the same insecticide were placed. During a new visit on 22.V.2006 *T. melanocephalum* was still present in two flats of the building (first and 4th floor) along the same side of the apartment block. On the first floor only a small number of workers were observed in the bathroom. On the other hand, great numbers were found in the dishwasher and on the pipes of this machine in the kitchen. Probably the species uses the passages of the pipes to spread in and along the building.

Identification

The species can easily be distinguished from the other Belgian *Tapinoma* species *Tapinoma ambiguum* EMERY, 1925 and *Tapinoma erraticum* (LATREILLE, 1798) by its smaller size (2-3mm) and its distinct bicoloured habitus. The yellowish abdomen, legs and antenna contrast with the dark head and thorax (see Fig. 1). At first sight and to the naked eye, *T. melanocephalum* can be misidentified as another small and common Belgian tramp ant: *M. pharaonis* because of the same size. However each of them belongs to a different subfamily: *M. pharaonis* is a Myrmecinae (petiolus and postpetiolus present) and *T. melanocephalum* is a Dolichoderinae (only a small and hidden petiolus present). We suggest each new record of small annoying yellow-dark coloured ants to be verified.

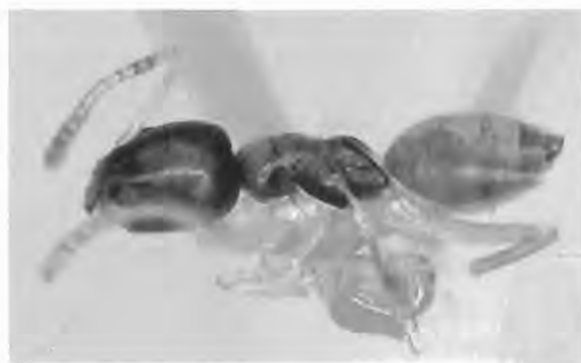


Fig. 1 Habitus of a *Tapinoma melanocephalum* worker.

Its current distribution

According to WILLIAMS (1994) and COLLINGWOOD *et al.* (1997) the ghost ant is a widely distributed and well known tramp species throughout tropical regions and has also been detected in the climatically drier Arabic region. In the Indo-Australian and Afrotropical regions ghost ants are widespread. In Europe they are frequently imported with plant material and products from the tropics.

Outside the tropics the species has always been found inside heated buildings (DUBOIS & DANOFFBURG, 1994), inside buildings (KLOTZ *et al.*, 1995) and in greenhouses (OSBORNE *et al.*, 1995). In 1995 the species was first discovered in Finland inside buildings and probably introduced by tourism from the Seychelles (SOVARI, 2002). In the Netherlands until 2002 the species was recorded 9 times when disinfecting buildings and houses (VIERBERGEN, 2003). In the subtropical Canary Islands, ghost ants nest outside, in gardens (HÖGMO, 2003; ESPADALER, 2006). Across Europe the species is generally found in places with high humidity and temperature: i.e. kitchens, bathrooms hospitals, restaurants, zoological gardens and greenhouses. According to ESPADALER (2002) this species seems to be currently extending its range. Table 1 gives a list of the records for Continental Europe, published so far.

Table 1. Published records of *Tapinoma melanocephalum* in continental Europe.

Country	Reference
Germany	SCHEURER, 1984
Germany	STEINBRINK, 1987
Germany	SCHEURER, 1998
Great Britain	WILLIAMS, 1956
Great Britain	SHAH & PINNIGER, 1996
Russia	KUNASHEV & NIYAZOVA, 1998
Switzerland	DORN <i>et al.</i> , 1997
Spain	ESPADALER, 2002
Sweden	DOUWES, 1995
The Netherlands	VIERBERGEN, 2003
Finland	SORVARI, 2002

Control of the infestation: another pest ant for Belgium?

The biology of *Tapinoma melanocephalum* is poorly known. However it seems to have some of the main biological characteristics of tramp ants. The colonies are polygynous, unicolonial, with intranidal mating and colony founding by budding (BUSTOS & CHERIX, 1998). Swarming

like most indigenous ants do, is lacking. It is mostly dispersed by commercial shipping and this can happen in many ways. In most cases the species can be transported by isolated queens or small parts of the polygyne colonies and it is suspected that they are carried with plant material or products from the tropics (ESPADALER, 2002; SORVARI, 2002).

Control of this pest species is very difficult because they can change feeding preferences and sometimes unsatisfying exterminations make it difficult to control the species and mostly result in increasing problems. The trophic regime of the ghost ant is wide: For instance, they consume animal foods in the Zoo of Zurich and when reared in the lab they feed on larvae of Coleoptera and Lepidoptera and even other ant species (BUSTOS & CHERIX, 1998). According to HARADA (1990) the species is omnivorous and feeds on sweets, sugar, cakes, honeydew excreted by Homoptera, dead and living insects. In the Netherlands also honeydew is suggested to be an important food source (VIERBERGEN, 2003). Nests are difficult to locate which makes an adequate treatment difficult. It is suggested to use hydramethylnon based baits or boric acid powder with a continuous monitoring system protocol of inspection, to control the pest species. The use of such baits seemed to be most effective in reducing the presence of this ant (ESPADALER, 2002). In Brasil methoprene and hydramethylnon baits were not successful to control the species in hospitals and boric acid based baits had a mixed result (BUENO & FOWLER, 1994).

This tropical and subtropical ant will probably never become a widespread and persistent pest in Continental Europe. The ghost ant is especially sensitive to low levels of environmental humidity (APPEL *et al.*, 2004). High humidity and temperature are only to be realized in artificial, human-maintained situations, such as permanently irrigated gardens in the south, Mediterranean coast. As a residential home indoor pest or in glasshouses it may have an opportunity to establish and this should, if detected, be properly noted to public agencies. Early detection, as in the case here reported can lead to a feasible eradication that is the following step in the control of possible pest invasive ants. However more research is needed to obtain more specific results and information on how this species can be treated successfully when causing problems. As the species is extending its range we suggest a careful monitoring and follow up of the ghost ant in Western-Europe.

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References

- APPEL A.G., NA J.P.-S. & LEE C.Y., 2004. - Temperature and humidity tolerances of the ghost ant, *Tapinoma melanocephalum* (Hymenoptera: Formicidae). *Sociobiology*, 44: 89-100.
- BONDROIT J., 1911. - Fourmis exotiques importées au Jardin Botanique de Bruxelles. *Annales de la Société royale belge d'Entomologie*, 55: 14.
- BUENO O.C. & FOWLER H.G., 1994. - Exotic ants and native ant faunas of Brazilian hospitals. In: WILLIAMS D.F. (Eds.), *Exotic ants. Biology, impact, and control of introduced species*. Westview Press, pp. 191-198.
- BUSTOS X. & CHERIX D., 1998. - Contribution à la biologie de *Tapinoma melanocephalum* (Fabricius) (Hymenoptera, Formicidae). *Actes Coll. Insectes Sociaux*, 11: 95-101.
- COLLINGWOOD C.A., TIGAR B.J. & AGOSTI D., 1997. - Introduced ants in the United Arab Emirates. *Journal of Arid Environments*, 37: 505-512.
- DEKONINCK W. & PAULY A., 2002. - *Camponotus vagus* Scopoli, 1763 (Hymenoptera: Formicidae) a new ant species for Belgium? *Bulletin de la Société royale belge d'Entomologie*, 138: 29-30.
- DEKONINCK W., DE BAERE C., MERTENS J. & MAELFAIT J.-P., 2002. - On the arrival of the Asian invader ant *Lasius neglectus* in Belgium (Hymenoptera Formicidae). *Bulletin de la Société royale belge d'Entomologie*, 138: 45-48.
- DEKONINCK W., VANKERKHOVEN F. & MAELFAIT J.-P., 2003. - Verspreidingsatlas en voorlopige Rode Lijst van de mieren van Vlaanderen. Rapport van het Instituut voor Natuurbehoud 2003.07. Brussel 191 pp.
- DEKONINCK W., MAELFAIT J.-P., VANKERKHOVEN F. & GROOTAERT P., 2005. - Remarks on the distribution and use of a provisional red list of the ants of Flanders (Formicidae, Hymenoptera). In PROCTER D. & HARDING P.T. (Eds.). JNCC Report No. 367 Proceedings of IN Cardiff 2003, Red Lists for invertebrates: their application at different spatial scales - practical issues, pragmatic approaches: 74-85.
- DEKONINCK W., MAELFAIT J.-P., VANKERKHOVEN F., BAUGNÉE J.-Y. & GROOTAERT P., 2006. - An update of the checklist of the Belgian ant fauna with comments on new species for the country (Hymenoptera, Formicidae). *Belgium Journal of Entomology*, 8: 27-41.
- DORN K., LANDAU I. & CHERIX D., 1997. - Einschleppung von *Tapinoma melanocephalum* (Formicidae) in der Schweiz. *Mitteilungen der Schweizerischen Entomologischen Gesellschaft*, 70: 242-243.
- DOUWES P., 1995. - Sveriges myror. *Entomologisk Tidskrift*, 116: 83-99.
- DUBOIS M.B. & DANOFFBURG J., 1994. - Distribution of ants in Kansas: subfamilies Dolichoderinae and Formicidae (Hymenoptera: Formicidae). *Sociobiology*, 24: 147-178.
- ESPADALER X., 2002. - *Tapinoma melanocephalum* (Fabricius 1793), a new exotic ant in Spain (Hymenoptera, Formicidae). *Orsis*, 17: 101-104.
- ESPADALER X. 2006. - The ants of El Hierro (Canary Islands). *Memoirs American Entomological Institute*, 78: (in press).
- HARADA A.Y., 1990. Ant pests of the Tapinomini Tribe. In VANDER MEER R.K., JAFFÉ K. & CEDENO A. (Eds.). *Applied myrmecology. A world perspective*. Westview Press, Boulder, Colorado: 298-315.
- HÖGMO O., 2003. - Some new or interesting ant species from Gran Canaria, Canary Islands (Hymenoptera, Formicidae). *Vieraea*, 31: 197-200.
- KLOTZ J.H., MANGOLD J.R., VAIL K.M., DAVIS L.R. & PATTERSON R.S., 1995. - A survey of the urban pest ants (Hymenoptera: Formicidae) of peninsular Florida. *Florida Entomologist*, 78: 109-118.
- KUNASHEV M.V. & NIYAZOVA M.V., 1998. - On the discovery of *Tapinoma melanocephalum* (Dolichoderinae) in Moscow (in Russian). *Ants and Forest Protection. Materials of the 10th All-Russian Myrmecological Symposium, Peshki, 24-28 August 1988*, pp 153.
- OSBORNE L.S., PENA, J.E. & OI D., 1995. Predation by *Tapinoma melanocephalum* (Hymenoptera: Formicidae) on twospotted spider mites (Acari: Tetranychidae) in Florida greenhouses. *Florida Entomologist*, 78: 565-570.
- SHAH V. & PINNIGER D., 1996. - A new pest problem? An infestation of ghost ants *Tapinoma melanocephalum* in South London. *Proc. 2nd Int. Conf. Insect pests in the urban environment*: pp 601.
- SCHEURER S., 1984. - Erstnachweis des Higienschädlings *Tapinoma melanocephalum* (Hymenoptera, Formicidae) in der DDR. *Angewandte Parasitologie*, 25: 96-99.
- STEINBRINK H. 1987. - Ein weiterer Nachweis von *Tapinoma melanocephalum* (Hymenoptera, Formicidae) in der DDR. *Angewandte Parasitologie*, 28: 91-92.
- SORVARI J., 2002. - *Tapinoma melanocephalum* (Fabricius 1793) (Hymenoptera: Formicidae) an imported ant species new to Finland, with observations and a taxonomic note. *Entomologist's Gazette*, 53: 269-270.
- VIERBERGEN, B., 2003. - *Technomyrmex albipes* en andere exoten in Nederland. *Forum Formicidarum*, 4(2): 4-7.
- WILLIAMS G.C., 1956. - Records of an established infestation of *Tapinoma melanocephalum* F. (Hym. Formicidae) in Great Britain. *The Entomologist's Monthly Magazine*, 93: 329-330.
- WILSON E.O. & TAYLOR R.W., 1967. - The ants of Polynesia. *Pacific Insects Monograph*, 14: 1-109.