

New records of the shining guest ant *Formicoxenus nitidulus* (Nylander, 1846) (Hymenoptera: Formicidae) in Belgium

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Abstract

We report new records of the shining guest ant *Formicoxenus nitidulus* (Nylander, 1846) from ten sites across Belgium. The species was found in association with *Formica rufa* Linnaeus, 1761, *Formica polyctena* Förster, 1850 and *Formica pratensis* Retzius, 1783 nests across six provinces (Antwerp, Flemish Brabant, Liège, Limburg, Luxembourg, Namur). Records were obtained using selective traps, placed on the margins of host mounds as well as by direct observations on host nests. These observations indicate that *F. nitidulus* is more widespread in Belgium than previously thought.

Keywords: *Formicoxenus*, *Formica*, ant, myrmecophile, trap

Samenvatting

We melden nieuwe waarnemingen van de glanzende gastmier *Formicoxenus nitidulus* (Nylander, 1846) op tien locaties in België. De soort werd aangetroffen in associatie met nesten van *Formica rufa* Linnaeus, 1761, *Formica polyctena* Förster, 1850 en *Formica pratensis* Retzius, 1783 in zes provincies (Antwerpen, Vlaams-Brabant, Luik, Limburg, Luxemburg, Namen). Waarnemingen werden gedaan met behulp van selectieve vallen, geplaatst aan de randen van de nestkoepels van gastheermieren, en directe observaties van individuen op de nesten. Deze waarnemingen tonen aan dat *F. nitidulus* in België meer verspreid is dan eerder werd gedacht.

Résumé

Nous rapportons de nouvelles observations de la fourmi brillante *Formicoxenus nitidulus* (Nylander, 1846) sur dix sites à travers la Belgique. L'espèce a été trouvée en association avec des nids de *Formica rufa* Linnaeus, 1761, *Formica polyctena* Förster, 1850 et *Formica pratensis* Retzius, 1783 dans six provinces (Anvers, Brabant Flamand, Liège, Limbourg, Luxembourg, Namur). Les individus ont été recensés à l'aide de pièges sélectifs disposés à la lisière des fourmilières hôtes, ainsi que par des observations directes sur les nids hôtes. Ces observations indiquent que *F. nitidulus* est plus répandu en Belgique qu'on ne le pensait auparavant.

Introduction

The shining guest ant *Formicoxenus nitidulus* (Nylander, 1846) is a small species that lives exclusively in close association with wood ants of the *Formica rufa* group (ROBINSON *et al.*, 2016) (Fig. 1 A-B). Its colonies occupy small chambers, sometimes in small branches, logs or pinecones, in the host mound, and workers can be seen foraging on the mound surface. *F. nitidulus*

is considered a xenobiont: it lives freely within the host colony and, unlike many other social parasites, tends its own brood (BUSCHINGER, 2009). Several *F. nitidulus* colonies may coexist within a single host mound (ROBINSON *et al.*, 2025). Thanks to chemical deterrents in its cuticle (MARTIN *et al.*, 2007), the shining guest ant is largely ignored by its hosts. High densities of host nests and large mounds are known to favour *F. nitidulus* presence (HÄRKÖNEN & SORVARI, 2017).

Due to its cryptic lifestyle and very small body size, the species is easily overlooked and likely under-recorded across its range (WEGNEZ *et al.*, 2011; DEKONINCK *et al.*, 2015). In Belgium, *F. nitidulus* has long been considered rare, with only a few scattered records, mostly from Wallonia (DEKONINCK *et al.*, 2012). Before 2000, the species was known from only three sites, one each in the provinces of Liège, Namur, and Luxembourg. More recent surveys revealed eight additional sites in Wallonia (WEGNEZ *et al.*, 2011; Observation International and local partners, 2025), and six sites have been reported from Flanders (DEKONINCK *et al.*, 2015). In addition, these records were primarily based on visual searches of the mounds during the brief nuptial flight, when males are visible on the host nests. Together, these findings suggest that the species may be more widespread than previously assumed.

Here, we report new records of *F. nitidulus* from Belgian sites where the species had not been documented before. We confirm its presence from three other sites where reports were made more than a decade ago. We further describe an effective, standardized, non-destructive trapping method for detecting this rarely encountered ant species.

Material and methods

Surveys were conducted between 2022 and 2025. Nest mounds of the red wood ants (*Formica rufa* Linnaeus, 1761 group), *Formica rufa* Linnaeus, 1761, *Formica polyctena* Förster, 1850 and *Formica pratensis* Retzius, 1783 were sampled in Belgium across six provinces (Antwerp, Flemish Brabant, Liège, Limburg, Luxembourg, Namur). *Formicoxenus nitidulus* was detected using elongated plastic traps (Fig. 2A; Sunware Q-Line Box: 27 × 8.4 × 9 cm, volume: 1.3 L) equipped with plastic roofs and placed on the margins of host mounds for 48 hours (Fig. 2B). These plastic traps are efficient in collecting arthropods associated with red wood ants, known as myrmecophiles (PARMENTIER *et al.*, 2021). Myrmecophiles are unable to escape due to the slippery trap walls, whereas red wood ants and *F. nitidulus* can readily climb out. However, *F. nitidulus* often temporarily remains in the traps, particularly when organic material has accumulated inside. Trap contents were collected and sorted under a stereomicroscope. In addition to trap sampling, individuals were observed and collected directly during visual searches on host mounds. In this study, a site is defined as a distinct forest or nature reserve, each representing a spatially and administratively separate unit. A site may contain one or several ant mounds.

Most collected specimens have been deposited in the RBINS collection under the general inventory number I.G.: 34.991, which covers myrmecophiles and red wood ants sampled during the MonitAnt project.

COLLECTIONS ACRONYMS

RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium
 Coll. FVK = Collection of François Vankerkhoven, Diest, Belgium

Results

Formicoxenus nitidulus (Nylander, 1846)

Figs 1, 3

NEW RECORDS

BELGIUM – Antwerp • 3 ♂♂, 2 workers; Vosselaar; 51.32180° N, 4.89982° E; 21 Sep. 2022, 12. Feb. 2024, 3 Sep. 2024; <https://www.inaturalist.org/observations/140800426>, <https://www.inaturalist.org/observations/199107590>, <https://www.inaturalist.org/observations/183537239>; on mound; host species: *F. rufa*; based on pictures, not collected • 1 ♂; Vosselaar; 51.32181° N, 4.90001° E; 20 Aug. 2025, 11 Oct. 2025; <https://www.inaturalist.org/observations/307776954>, <https://www.inaturalist.org/observations/320143567>; on mound; host species: *F. rufa*; based on pictures, not collected • 1 ♂; Vosselaar; 51.32514° N, 4.90243° E; 11. Oct. 2025; <https://www.inaturalist.org/observations/320143706>; on mound; host species: *F. rufa*; based on pictures, not collected • 1 ♂, 2 workers; Vosselaar; 51.32370° N, 4.89849° E; 11 Oct. 2025; <https://www.inaturalist.org/observations/320143657>; on mound; host species: *F. rufa*; based on pictures, not collected • 1 ♂; Turnhouts Vennengebied; 51.37024° N, 4.93812° E; 31 Aug. 2025; <https://www.inaturalist.org/observations/240058538>; on mound; host species: *F. polycytena*; based on pictures, not collected • 1 ♂; Averbode Bos en Heide - Gerhagen (Laakdal); 51.04617° N, 4.98793° E; 11 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; on mound; host species: *F. polycytena*; **RBINS. – Flemish Brabant** • 1 ♂; Averbode Bos en Heide - Gerhagen (Averbode); 51.02596° N, 4.95736° E; 14 Sep. 2025; R. Verhofstede leg.; on mound; host species: *F. rufa*; **RBINS** • 1 ♀; Averbode Bos en Heide - Gerhagen (Averbode); 51.033661° N, 4.954694° E; 14 Sep. 2025; R. Verhofstede leg.; on mound; host species: *F. rufa*; **RBINS** • 1 ♂; Averbode Bos en Heide - Gerhagen (Averbode); 51.036621° N, 4.955033° E; 14 Sep. 2025; R. Verhofstede leg.; on mound; host species: *F. rufa*; **RBINS** • 1 ♂; Averbode Bos en Heide - Gerhagen (Averbode); 51.036713° N, 4.955174° E; 14 Sep. 2025; R. Verhofstede leg.; on mound; host species: *F. rufa*; **RBINS. – Liège** • 1 ♂; Huy; 50.51786° N, 5.28552° E; 1 Jul. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; Host species: *F. rufa*; **RBINS. – Limburg** • 1 ♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.05083° N, 5.00499° E; 11 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; host species: *F. polycytena*; **RBINS** • 1 ♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.05068° N, 5.00530° E; 11 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; host species:



Fig. 1. *Formicoxenus nitidulus* (Nylander, 1846). **A**, on a twig. **B**, in association with its host, large *Formica* workers, illustrating the size difference between guest and host species. © P. Hoenle.



Fig. 2. A, Illustration of the plastic pitfall trap. © N. Lecocq de Pletinx. B, Pitfall traps equipped with plastic roofs and deployed at the margins of a host mound for the collection of *F. nitidulus*. © W. Dekoninck.

F. polycytena; RBINS • 1 ♂; Averbode Bos en Heide - Gerhagen (Tessenderlo); 51.045419° N, 5.003067° E; 30 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycytena*; RBINS • 1 ♂; Averbode Bos en Heide – Gerhagen (Tessenderlo); 51.046161° N, 4.98786° E; 24 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycytena*; RBINS • 1 ♂; Averbode Bos en Heide - Gerhagen (Tessenderlo - Trektelpost); 51.03989° N, 5.000142° E; 23 Aug. 2025;

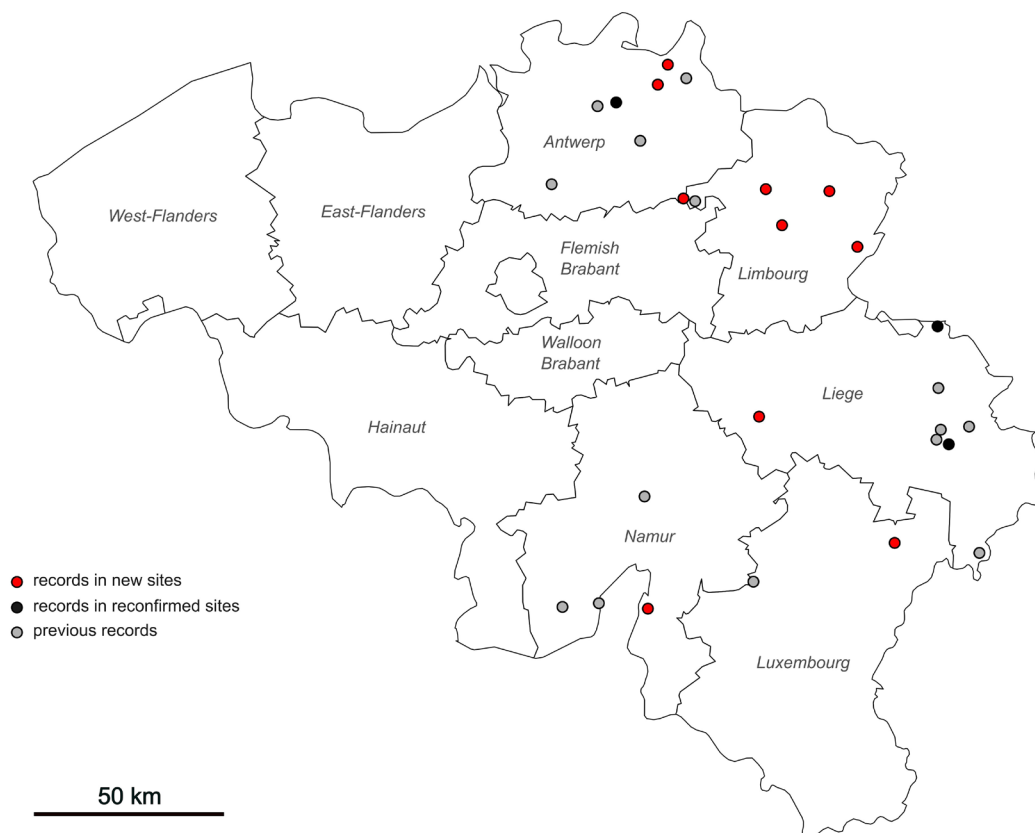


Fig. 3. Distribution map of *F. nitidulus* sites in Belgium, indicating historical records, reconfirmed sites, and sites newly documented in the present study.

R. Verhofstede leg.; on mound; host species: *F. pratensis*; RBINS • 1 ♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.050343° N, 5.00561° E; 30 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycтена*; RBINS • 5 ♂♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.050819° N, 5.005006° E; 31 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycтена*; RBINS • 1 ♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.050829° N, 5.005295° E; 31 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycтена*; RBINS • 2 ♂♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.050706° N, 5.005325° E; 31 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycтена*; RBINS • 1 ♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.05075° N, 5.004023° E; 31 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycтена*; RBINS • 1 ♂; Averbode Bos en Heide - Gerhagen (Schoterheide); 51.05065° N, 5.00352° E; 31 Aug. 2025; R. Verhofstede leg.; on mound; host species: *F. polycтена*; RBINS • 4 ♂♂; Averbode Bos en Heide - Gerhagen (Pinnekensweier); 51.049835° N, 5.027777° E; 8 Nov. 2025; R. Verhofstede leg.; on mound; host species: *F. rufa*; RBINS • 1 ♂; Koersel Heide; 51.06869° N, 5.31112° E; 5 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; host species: *F. polycтена*; RBINS • 20 ♂♂; Koersel Heide; 51.06814° N, 5.31134° E; 5 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; host species: *F. polycтена*; RBINS • 1 ♂; Lanaken, Vallei van de Ziepbek; 50.92903° N, 5.65970° E; 4 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; host species: *F. polycтена*; RBINS • 1 ♂; Oudsbergen, Domeinbos Ophovenerheide; 51.06385° N, 5.55308° E; 4 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; host species: *F. polycтена*; RBINS • 1 worker; Zonhoven, Kruisheide; 50.98136° N, 5.37279° E; 23 Feb. 2024; L. Crèvecoeur leg.; sieved, host species: *F. polycтена*; Coll.FVK. – **Luxembourg** • 1 ♂; Montleban; 50.21211° N, 5.80151° E; 17 Sep. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall trap; Host species: *F. polycтена*; RBINS. • 1 ♂; Montleban; 50.21033° N, 5.80158° E; 17 Sep. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; Host species: *F. polycтена*; RBINS. – **Namur** • 1 ♂; Felenne; 50.05289° N, 4.86224° E; 28 Aug. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; pitfall; host species: *F. rufa*; RBINS.

RECORDS IN RECONFIRMED SITES

BELGIUM – **Antwerp** • 4 ♂♂; Zoersel; 51.27870° N, 4.74145° E; 16 Sep. 2024; T. Parmentier and W. Dekoninck leg.; on mound; host species: *Formica rufa*; RBINS • 3 ♂♂, 3 workers; Zoersel; 51.27920° N, 4.74039° E; 16 Sep. 2024; T. Parmentier and W. Dekoninck leg.; on mound; host species: *Formica rufa*; RBINS. – **Liège** • 5 ♂♂, 3 workers; Plombières; 50.73655° N, 5.96493° E; 17 Sep. 2025; T. Parmentier and W. Dekoninck leg.; on mound; Host species: *Formica polycтена*, RBINS • 2 ♂♂; Plombières; 50.73657° N, 5.96469° E; 17 Sep. 2025; T. Parmentier and W. Dekoninck leg.; on mound; host species: *Formica polycтена*; RBINS • 9 ♂♂; Stavelot; 50.45088° N, 6.00751° E; 17 Sep. 2025; N. Lecocq de Pletincx, T. Parmentier and W. Dekoninck leg.; on mound; Host species: *Formica polycтена*; RBINS.

We recorded *F. nitidulus* from ten previously undocumented sites across six provinces, and from 31 different nest mounds in total (Fig. 3). Individuals were found in *F. rufa*, *F. polycтена* and *F. pratensis* nests. Individuals were collected in pitfall traps and observed directly on host mounds. Males, workers and a queen were recorded, confirming the presence of established populations.

Surveys at three historically known sites with *F. nitidulus* (Zoersel, Plombières, and Stavelot) produced five additional observations, documenting the persistence of *F. nitidulus* at these locations (Fig. 3). Whether the nests sampled here are the same as those recorded in earlier surveys is not known.

Discussion

Our observations increased the number of known *Formicoxenus nitidulus* sites in Belgium from 17 to 27, substantially expanding the species' documented distribution across six provinces. Notably, five distinct sites were recorded in the province of Limburg, where the species was previously only known for one site (Engsbergen). This confirms that the species is more widespread than previously documented (WEGNEZ *et al.*, 2011; DEKONINCK *et al.*, 2015).

Traditionally, detection of *F. nitidulus* has relied on visual searches and sieving of nest material (WEGNEZ *et al.*, 2011), both of which have limitations. Visual searches depend on ant activity at the time of observation, and *F. nitidulus* is most easily detected during its short mating flight period, typically occurring in September on sunny days, when males are observable on host nests. Outside this brief period, direct observations are challenging. Sieving nest material can be effective, but it has the major drawback of damaging the nests of protected red wood ants. Our results demonstrate that specific pitfall traps placed at the margins of host mounds provide a reliable and efficient alternative. This method allows the detection of *F. nitidulus* alongside other myrmecophiles, without harming the host colony and without being restricted to the narrow timeframe of the mating flight.

Further targeted surveys, combining pitfall trapping and visual searches, would help clarify the distribution, host associations, and ecological requirements of this poorly studied ant.

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