

***Ctenolepisma (Ctenolepisma) lineata* (Fabricius, 1775) and
Thermobia domestica (Packard, 1873) new to Belgium
(Zygentoma: Lepismatidae)**

Koen LOCK¹, Bert DERVEAUX², Alain DOORNAERT³, Bart HANSSENS⁴, Kurt VAN DAMME⁵,
Christof DELBAERE⁶ & Stéphane CLAEREBOU⁷

¹ Merelstraat 27, B-9000 Gent, Belgium (e-mail: Koen_Lock@hotmail.com).

² Pasteelsblokweg 28, B-3010 Kessel-Lo, Belgium (e-mail: Bert_Derveaux@hotmail.com).

³ Avenue Maurice Maeterlinck, 25, B-1030 Schaerbeek, Belgium (e-mail: adoornaert@scarlet.be).

⁴ Stroobantsstraat 35, B-1140 Evere, Belgium (e-mail: Bart.Hanssen@skynet.be).

⁵ Dennendreef 20, B-8300 Knokke-Heist, Belgium (e-mail: Kurt.Vandamme@Knokke-Heist.be).

⁶ Doorniksesteenweg 32A/205, B-8580 Avelgem, Belgium (e-mail: Christof.Delbaere@gmail.com).

⁷ Chemin de Macon 11, B-6460 Bailièvre, Belgium (e-mail: stephaneclaerebout@yahoo.fr).

Abstract

The Four-lined Silverfish *Ctenolepisma (Ctenolepisma) lineata* (Fabricius, 1775) and the Firebrat *Thermobia domestica* (Packard, 1873) were observed for the first time in Belgium. *Ctenolepisma lineata* has already been found in Evere, Braine-l'Alleud, Sint-Amandsberg, Avelgem, Westkapelle and Chimay. Just like *Ctenolepisma (Ctenolepisma) longicaudata* Escherich, 1905, *C. lineata* is not very sensitive to drought and it will probably also become abundant in Belgian houses. *Ctenolepisma lineata* might even be found outdoors, especially near human settlements, although no sustainable populations are expected under natural conditions. *Thermobia domestica* was found in a rice processing factory in Wijgmaal. The species is not expected outdoors in Belgium.

Keywords: Belgian fauna, Firebrat, Four-lined Silverfish, synanthropic species

Samenvatting

Het Vierstreepzilvervisje *Ctenolepisma (Ctenolepisma) lineata* (Fabricius, 1775) en het Ovenvisje *Thermobia domestica* (Packard, 1873) werden voor het eerst in België waargenomen. *Ctenolepisma lineata* werd al gevonden in Evere, Braine-l'Alleud, Sint-Amandsberg, Avelgem, Westkapelle en Chimay. Net zoals *Ctenolepisma (Ctenolepisma) longicaudata* Escherich, 1905 is *C. lineata* niet zo gevoelig voor droogte en de soort zal waarschijnlijk ook algemeen worden in Belgische huizen. *Ctenolepisma lineata* kan misschien zelfs buiten gevonden worden, vooral nabij menselijke nederzettingen, maar duurzame populaties worden niet verwacht onder natuurlijke omstandigheden. *Thermobia domestica* werd gevonden in een rijstverwerkend bedrijf in Wijgmaal. De soort wordt in België niet verwacht in de vrije natuur.

Résumé

Le Cténolépisme ligné *Ctenolepisma (Ctenolepisma) lineata* (Fabricius, 1775) et la Thermobie des boulangers *Thermobia domestica* (Packard, 1873) ont été observés pour la première fois en Belgique. *Ctenolepisma lineata* est actuellement connue d'Evere, de Braine-l'Alleud, de Sint-Amandsberg, d'Avelgem, de Westkapelle et de Chimay. Comme chez *Ctenolepisma (Ctenolepisma) longicaudata* Escherich, 1905, *C. lineata* n'est pas très sensible à la sécheresse et devrait probablement aussi devenir abondante dans les habitations en Belgique. *Ctenolepisma lineata* pourrait même être trouvée en extérieur, en particulier à proximité de constructions humaines, bien qu'aucune population viable ne soit attendue dans des conditions naturelles. *Thermobia domestica* a été trouvée dans une usine de transformation du riz à Wijgmaal. L'espèce n'est pas attendue dans des conditions naturelles en Belgique.

Introduction

Until recently, *Lepisma saccharina* Linnaeus, 1758 was the only species of the order Zygentoma that was known to Belgium. Since 1998, *Ctenolepisma* (*Ctenolepisma*) *longicaudata* Escherich, 1905 has been observed in Belgian houses as well (LOCK, 2007) and it is now a common species, which has already been captured in all Belgian provinces. *Atelura formicaria* Heyden, 1855, which lives in ant nests and is Belgium's only indigenous species, was discovered in Dinant in 2012 (PARMENTIER *et al.*, 2013). *Nicoletia phytophila* Gervais, 1844 was found in the botanical garden of Ghent University in 2016, but this species cannot be expected outside tropical greenhouses (LOCK, 2017). Here, the Four-lined Silverfish *Ctenolepisma* (*Ctenolepisma*) *lineata* (Fabricius, 1775) and the Firebrat *Thermobia domestica* (Packard, 1873) are reported for the first time for the Belgian fauna.

Material and methods

One specimen of *C. lineata* was present in the entomological collection of the Gembloux Agricultural University and another one was deposited to the entomological collection of the Royal Belgian Institute of Natural Sciences (RBINS, I.G.: 33.731). Nine specimens of *T. domestica* were deposited to the entomological collection of the Royal Belgian Institute of Natural Sciences (RBINS, I.G.: 33.731).

Results

Ctenolepisma (*Ctenolepisma*) *lineata* (Fabricius, 1775)

The Four-lined Silverfish *C. lineata* is characterised by its dark brown and yellowish scales, which form a distinct pattern with dorsally four dark longitudinal stripes (Figs 1-2), while *C. longicaudata* has no pattern of dark lines. In addition, adults of *C. lineata* have three pairs of styli (Fig. 1, appendages on the underside of the abdomen tip), whereas adults of *C. longicaudata* only have two pairs. Furthermore, *C. lineata* has three pairs of bristle-combs on urotergites II-VII, while *C. longicaudata* has three pairs of bristlecombs on urotergites II-VI and only two pairs on urotergite VII.

RECORDS OF *C. LINEATA* IN BELGIUM. On 16.X.2005, Alain Doornaert photographed the species in a cellar in a house in Evere (Brussels-Capital Region); on 22.III.2009, 16.VIII.2012 and 1.IV.2013, Bart Hanssens found the animal also in Evere (Brussels-Capital Region) on a beam, in a bathtub and in a bee hostel, respectively; on 8.IV.2016, Karabalis collected one specimen in a house in Braine-l'Alleud (Province of Brabant Wallon); on 27.IX.2017, Koen Lock observed one adult on a roof in Sint-Amandsberg (Province of Oost-Vlaanderen); on 15.I.2018, Kurt Van Damme found one in a villa in Westkapelle (Province of West-Vlaanderen); on 28.I.2018, Christof Delbaere observed one in an apartment in Avelgem (Province of West-Vlaanderen); on 21.II.2018, Stéphane Claerebout found one in a house in Chimay (Province of Hainaut).

Thermobia domestica (Packard, 1873)

In contrast to *Ctenolepisma*, *Thermobia* has maximum two pairs of bristle-combs on the urotergites (Fig. 3). In addition, the maxillary palps of the Firebrat *T. domestica* consist of 6 segments, whereas only 5 segments are present in *Ctenolepisma*. Adults of *T. domestica* possess two or three pairs of styli. The species has a complex pattern of pale and dark scales, often with a dark transversal band running over some of the segments (Fig. 3).

RECORDS OF *T. DOMESTICA* IN BELGIUM. From 24.IX.2014 till 2.III.2018, Bert Derveaux has been observing hundreds of individuals in an old rice processing factory in Wijgmaal (Province of Vlaams Brabant).



Fig. 1. *Ctenolepisma (Ctenolepisma) lineata* (Fabricius, 1775) from Sint-Amandsberg (photo Koen Lock).



Fig. 2. *Ctenolepisma (Ctenolepisma) lineata* (Fabricius, 1775) from Chimay (photo Stéphane Claerebout).



Fig. 3. *Thermobia domestica* (Packard, 1873) from Wijgmaal (photo Koen Lock).

Discussion

The Four-lined Silverfish *C. lineata* is native to Southern Europe, but is now considered to be a cosmopolitan species due to accidental introductions. However, MOLERO BALTANÁS *et al.* (2012), who redescribed the species, indicated that material from other continents probably also contains other related species. *C. lineata* was expected in Belgium (LOCK, 2007) and the Netherlands (BEIJNE NIEROP & HAKBIJL, 2002), because the species was already observed in Germany and Southern Europe. The species was already mentioned for Germany by ESCHERICH (1904), but it was long known from only four locations (KINZELBACH & KINZELBACH, 1968). Only recently, much more observations were done in Germany (RENKER *et al.*, 2008). Last year, the species was also found in the Netherlands: it was found by Ben Delbaere in Udenhout (Province of Noord-Brabant) on 14.II.2017 (<https://waarneming.nl/waarneming/view/134802680>) and 20.V.2017 (<https://waarneming.nl/waarneming/view/138658890>) and identified by Arp Kruithof and later also by Herralld Damen in Hoogblokland (Province of Zuid-Holland) on 5.II.2018 (<https://waarneming.nl/waarneming/view/148352640>). The species has clearly been extending its distribution area and sightings are becoming more frequent in, amongst others, the German federal states Rheinland-Pfalz, Hessen and Baden-Württemberg (RENKER *et al.*, 2008) and all over Austria (ZIMMERMANN, 2016). Some of these observations were done outdoors, although most were in the neighbourhood of human settlements (RENKER & REDER, 2014; ZIMMERMANN, 2016). This suggests that *C. lineata* can more easily colonise new places due to the warmer climate of the last decades, but it is unlikely that sustainable populations can occur outdoors in our current climate.

The Firebrat *T. domestica* is native to Africa, but is now a cosmopolitan species due to accidental introductions. The species prefers high temperatures and requires some humidity and in Western Europe, the species can only be found in heated places, usually near boilers or furnaces. Firebrats feed on a variety of carbohydrates and starches that contain protein, including dog food, flour and book

bindings. In Western Europe, the species used to be quite common in bakeries, however, due to increased hygiene, the species has almost disappeared. In the past, the species was found in the Netherlands (BEIJNE NIEROP & HAKBIJL, 2002) and Germany (STURM, 2001), but it has not been observed in these countries recently. The species is not yet known from the Grand Duchy of Luxembourg (MEISCH, 1977).

Recently, *Ctenolepisma calva* (Ritter, 1910) has been observed in houses in the German federal states Saksen and Hessen (PRPIC, 2017). This small, almost transparent whitish species was previously only known from Central America and Asia. Maybe, this tropical species can also be expected in Belgian houses.

Acknowledgements

This publication was made possible by the online data portal www.waarnemingen.be, which brought us together. We would like to thank Jeannine Bortels for her help during the study of the collection present at the Gembloux Agricultural University.

References

- BEIJNE NIEROP B.M. & HAKBIJL T., 2002. - *Ctenolepisma longicaudatum* heeft ongemerkt bebouwd Nederland veroverd. *Entomologische Berichten*, 62(2): 34–42.
- ESCHERICH K., 1904. - Das System der Lepismatiden. *Zoologica*, 43: 1–164.
- KINZELBACH B. & KINZELBACH R., 1968. - Neue Oberrheinische Funde von *Ctenolepisma lineatum* var. *piliferum* Lucas 1842 (Thysanura, Lepismatidae). *Mainzer Naturwissenschaftliches Archiv*, 7: 126–130.
- LOCK K., 2007. - Distribution of the Belgian Zygentoma. *Notes fauniques de Gembloux*, 60(1): 25–27.
- LOCK K., 2017. - *Nicoletia phytophyla* Gervais, 1844 new to Belgium (Zygentoma: Nicoletiidae). *Bulletin S.R.B.E./K.B.V.E.*, 153(1): 21–22.
- MEISH C., 1977. - Faune des Thysanoures du Grand-Duché de Luxembourg. *Archives de l'Institut grand-ducal de Luxembourg, section des sciences naturelles, physiques et mathématiques*, 37: 103–135.
- MOLERO BALTANÁS R., GAJU RICART M. & BACH DE ROCA C., 2012. - New data for a revision of the genus *Ctenolepisma* (Zygentoma: Lepismatidae): redescription of *Ctenolepisma lineata* and new status for *Ctenolepisma nicoletii*. *Annales de la Société Entomologique de France (n.s.)*, 48(1–2): 66–80.
- PARMENTIER T., VAN KERCKVOORDE M. & DEKONINCK W., 2013. - First record of the myrmecophilous silverfish *Atelura formicaria* Heyden, 1855 in Belgium (Zygentoma: Nicoletiidae). *Bulletin S.R.B.E./K.B.V.E.*, 149(1): 27–28.
- PRPIC N.M., 2017. - Das Geisterfischen *Ctenolepisma calva* in Frankfurt am Main (Zygentoma: Lepismatidae). *Nachrichtenblatt der Bayerischen Entomologen*, 66(3/4): 101.
- RENKER C. & REDER G., 2014. - Neue Fundorte von Urinsekten‘ in Rheinland-Pfalz. *Mainzer naturwissenschaftliches Archiv*, 51: 283–287.
- RENKER C., WEITMANN G. & KINZELBACH R., 2008. - Aktueller Kenntnisstand zur Verbreitung des Kammfischchens - *Ctenolepisma lineata* (Fabricius, 1775) in Deutschland. *Mainzer naturwissenschaftliches Archiv*, 46: 263–268.
- STURM H., 2001. - Verzeichnis der Silberfischenartigen (Zygentoma) Deutschlands. *Entomofauna Germanica*, 5: 7–8.
- ZIMMERMANN K., 2016. - Kammfischchen (*Ctenolepisma lineata* Fabricius, 1775) und weitere synanthrop lebende Lepismatidae (Zygentoma) in Österreich. *Inatura – Forschung online*, 31: 1–6.