

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/384970159>

A new species to Europe of East Asian aphid, *Longicaudinus corydalisicola* (Tao, 1962) (Aphidinae: Macrosiphini), recorded from Britain and Ireland

Article in *Zootaxa* · October 2024

DOI: 10.11646/zootaxa.5523.3.8

CITATIONS

0

READS

3

11 authors, including:



Lynda J Alderson

Rothamsted Research

9 PUBLICATIONS 199 CITATIONS

[SEE PROFILE](#)



Tracey Kruger

Rothamsted Research

9 PUBLICATIONS 191 CITATIONS

[SEE PROFILE](#)



Dion Garrett

Rothamsted Research

17 PUBLICATIONS 86 CITATIONS

[SEE PROFILE](#)



Christelle Buchard

French National Institute for Agriculture, Food, and Environment (INRAE)

14 PUBLICATIONS 84 CITATIONS

[SEE PROFILE](#)



A new species to Europe of East Asian aphid, *Longicaudinus corydalisicola* (Tao, 1962) (Aphidinae: Macrosiphini), recorded from Britain and Ireland

ALEXANDER F.C. GREENSLADE¹, KATHERINE LESTER², ANTOINE PICHON³, LYNDA ALDERSON¹, TRACEY KRUGER¹, MEGAN MARTIN², HANNA GIZYCKA², DION GARRETT¹, HARRISON WEBB¹, CHRISTELLE BUCHARD⁴ & MAIRI CARNEGIE²

¹Rothamsted Insect Survey, Rothamsted Research, Harpenden, Hertfordshire AL5 2JQ, U.K.

✉ alex.greenslade@rothamsted.ac.uk; <https://orcid.org/0000-0001-8976-0054>

✉ lynda.alderson@rothamsted.ac.uk; <https://orcid.org/0000-0002-3034-3499>

✉ tracey.kruger@rothamsted.ac.uk; <https://orcid.org/0009-0009-6940-8104>

✉ dion.garrett@rothamsted.ac.uk; <https://orcid.org/0000-0001-7350-2763>

✉ harry.webb@rothamsted.ac.uk; <https://orcid.org/0009-0009-2834-2401>

²SASA, Roddinglaw Road, Edinburgh EH12 9FJ, U.K.

✉ katherine.lester@forestresearch.gov.uk; <https://orcid.org/0000-0002-1534-8590>

✉ Megan.Martin@sasa.gov.scot; <https://orcid.org/0009-0009-1344-7008>

✉ Hanna.Gizycka@sasa.gov.scot; <https://orcid.org/0009-0004-7142-0931>

✉ Mairi.Carnegie@sasa.gov.scot; <https://orcid.org/0009-0003-0898-9992>

³Teagasc, Oak Park, Carlow, R93 XE12, Ireland

✉ Antoine.Pichon@teagasc.ie; <https://orcid.org/0009-0000-4891-9014>

⁴INRAE, Domaine de la Motte - BP 35327 - 35653 Le Rheu Cedex, France

✉ christelle.buchard@inrae.fr; <https://orcid.org/0009-0004-7280-6959>

A total of 53 adult alate female specimens of the East Asian aphid *Longicaudinus corydalisicola* (Tao, 1962) were caught in the Rothamsted Insect Survey suction-trap network. Fifty of which were recorded from ten localities in England between 2020 and 2022, with a further three specimens recorded from three localities in Scotland during 2022. 12.2 m high suction-traps of the specification given by Bell *et al.* (2015) were used to systematically catch insects during 2020–2022 at Rothamsted Research and SASA (formerly: Science & Advice for Scottish Agriculture) as a part of the National Bioscience Research Infrastructure. Suction-trap samples were collected over a 24-hour period from 10:00 a.m. and collected the following day (at 10:00 a.m.). A specimen collected from Scotland was analysed by SASA using molecular methods before time was available after COVID-19 restrictions to confirm morphological determinations with museum material. Three specimens from England were subsequently also confirmed using molecular techniques to provide additional evidence. An additional specimen was collected by the third author from a suction-trap of the same specification and trapping regime at the Teagasc Oak Park Crop research centre at Carlow in the Republic of Ireland. Details on when these 54 specimens were caught are as follows with latitude and longitude given in round brackets and the number of specimens in square brackets:

Broom's Barn (52.260681 0.568430) 03/06/2021–26/09/2021 [2]. East Malling (51.287502 0.448429); 01/10/2020 [1], 20/07/2021–25/07/2021 [2], 31/07/2022–27/10/2022 [2]. Hereford (52.124201 -2.638156); 17/10/2021 [1], 16/07/2022–29/10/2022 [5]. Kirton (52.924454 -0.052153); 24/06/2021 [1], 11/05/2022 [1]. Newcastle (55.213254 -1.685083); 06/10/2021 [2], 24/05/2022–03/11/2022 [5]. Silwood Park (51.40941 -0.643357); 26/09/2021–30/09/2021 [2], 04/07/2022 [1]. Starcross (50.629596 -3.454630); 06/04/2020–27/10/2020 [4], 08/06/2021–15/11/2021 [5], 29/06/2022–15/11/2022 [9]. Wellesbourne (52.205975 -1.605017) 11/05/2021–21/08/2021 [3]. Writtle (51.733599 0.429233); 01/06/2021 [1], 17/05/2022–18/05/2022 [2]. York (54.014616 -0.97320532) 19/10/2021 [1]. Inverness (57.438024 -4.232684) 07/08/2022 [1]. Dundee (56.457147 -3.073650) 11/08/2022 [1]. Gogarbank (55.928082 -3.344063) 14/08/2022 [1]. Carlow (52.859578 -6.918367) 21/07/2022 [1].

Three aphid nymphs were removed from the Scottish specimen from Dundee for sequencing at SASA. This enabled the specimen to be retained as a voucher to assist with future determinations. Total genomic DNA was isolated using the Qiagen DNeasy Blood & Tissue kit (Cat. No./ID: 69506, Qiagen) from all three nymphs. The 709 bp Folmer *et al.* (1994) region of the mitochondrial cytochrome c oxidase subunit I (COI) gene was amplified using the primers

LCO1490 (GGTCAACAAATCATAAAGATATTGG) and HCO2198 (TAAACTTCAGGGTGACCAAAAAATCA) and sequenced using a Sanger sequencing platform (3500xL Genetic Analyser, Applied Biosystems). The COI sequence aligned to two BOLD sequences for *L. corydalisicola*; BOLD ID GBMNB30968-20 (GenBank Accession MH821946) and GBMIN66367-17 (GenBank Accession KX631541) at 100% and 99.48% similarity respectively.

Two specimens from Hereford; 17/10/2021 and 29/10/2022 as well as a specimen from Newcastle; 03/11/2022, were also subsequently confirmed at Rothamsted Research using the same molecular methodology with the same results to strengthen the case that this species has spread throughout much of Britain.

The specimens were compared to the description published by Miyazaki (1971) made from Japanese material. Six specimens from England were also compared against the two available specimens in the Natural History Museum in London [NHMUK] to confirm the morphological and morphometric characters. These specimens were selected from six different sites from Starcross in the southeast to Newcastle in the northwest of England, to study the greatest variation in the specimens in the time available for analysis. All of which were undamaged and judged typical of the other specimens captured. The specimen from Carlow was later sent to the first author for morphological identification and was determined to be of the same species.

Material examined: Type material [NHMUK]: CHINA. Tao *leg.*, 29.iii.1937: 2 alates (on one slide). [These bear a label identifying them originally as cotypes of *Hyalopteroides sinensis* Tao, 1963 which were subsequently synonymised with *L. corydalisicola* by Hille Ris Lambers (1965)].

Alate viviparous females have poorly developed antennal tubercles which are of similar height to the medial tubercle, and the ocular tubercles are well developed. Antennae are 6-segmented in all specimens examined with secondary rhinaria arranged in a single row on segment III and absent on other segments. As stated by Blackman & Eastop (2024), the abdomen bears a large dorsal patch. This patch may possess a 'window' between tergites 5 and 6. Siphunculi are parallel sided, black in colour and are relatively short compared to the long pale digitate cauda. All other characters studied are as described below with measurements in mm and the following abbreviations: BL = body length, ANT = antenna, PT = terminal process of antenna, R IV+V = ultimate segment of rostrum and HT II = second segment of hind tarsus.

Co-type specimen 1: BL 1.68; ANT segments (III–VI): 0.47, 0.33, 0.27, 0.14 + 0.33; R IV+V 0.08; HT II 0.14; Siphunculus length obscured; caudal length 0.15; ANT length / body length 1.01; PT / base of ANT VI 2.31; R IV+V / HT II 0.61; Siphunculus / Cauda unavailable; 12–12 Secondary rhinaria on ANT segment III.

Co-type specimen 2: BL 1.90; ANT segments (III–VI): 0.46, 0.35, 0.28, 0.14 + 0.28; R IV+V obscured; HT II 0.14; Siphunculus length 0.09; caudal length 0.15; ANT length / body length 0.86; PT / base of ANT VI 1.98; R IV+V / HT II unavailable; Siphunculus / Cauda 0.60; 12–11 Secondary rhinaria on ANT segment III.

The specimens found in the suction-trap network catches closely conform to the above description of these two type specimens.

In the key to alates of the Macrosiphini provided by Blackman (2010, p.94) *L. corydalisicola* runs to couplet 82 into which the following can be inserted:

82a Siphunculi shorter than caudal length ... *Longicaudinus*

- Siphunculi longer than caudal length ... go to couplet 82b (*Ericaphis*, *Myzus*)

This species has subsequently continued to be recorded in both English and Irish traps during 2023. To the authors' knowledge, the current work is the first report of this species in Europe. According to Blackman & Eastop (2024), Hille Ris Lambers (1965), Miyazaki (1971) and Lee *et al.* (2010); this aphid is found in Mainland China, Taiwan, Japan and Korea on *Corydalis* spp. Blackman & Eastop (2024) state that this aphid species is known from *Corydalis heterocarpa* Siebold & Zucc., *C. pallida* Pers. and *C. balansae* Prain (= *Corydalis tashiroi* Makino). Neither of these species are mentioned by Preston *et al.* (2002) nor recorded by the NBN Trust (2024). It is postulated that the rapid spread of this species across much of Britain, and its appearance in Ireland, is likely to be associated with the ornamental plant trade.

Acknowledgements

The Rothamsted Insect Survey, a National Bioscience Research Infrastructure, is funded by the Biotechnology and Biological Sciences Research Council under the award BBS/E/RH/23NB0006.

The authors would like to thank Paul Brown; former senior curator for Sternorrhyncha, Lice & Thrips at the Natural History Museum London for access to the museum's aphid collections. The authors would also like to sincerely thank Dr Sarah Chérasse (ANSES-LSV, Montferrier-sur-Lez, France) as well as an anonymous reviewer for their very useful comments and suggestions which improved the quality of this manuscript.

References

- Bell, J.R., Alderson L., Izera, D., Kruger, T., Parker, S., Pickup, J., Shortall, C.R., Taylor, M.S., Verrier, P. & Harrington, R. (2015) Long-term phenological trends, species accumulation rates, aphid traits and climate: five decades of change in migrating aphids. *Journal of Animal Ecology*, 84 (1), 21–34.
<https://doi.org/10.1111/1365-2656.12282>
- Blackman, R.L. (2010) *Aphids - Aphidinae (Macrosiphini)*. *Handbooks for the Identification of British Insects. Vol. 2. Part 7*. Royal Entomological Society, London, 414 pp.
- Blackman, R.L. & Eastop, V.F. (2024) Aphids on the World's Plants. Available from: https://www.aphidsonworldsplants.info/d_APHIDS_L.htm#Longicaudinus (accessed 21 March 2024).
- Folmer, O., Black, M., Hoeh, W., Lutz, R. & Vrijenhoek, R. (1994) DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology*, 3 (5), 294–299.
- Hille Ris Lambers, D. (1965) On some Japanese Aphididae. *Tijdschrift voor Entomologie*, 108, 189–203.
- Lee, W., Kim, H., Lim, J., Choi, H., Kim, Y., Kim, Y., Ji, J., Foottit, R.G. & Lee, S. (2010) Barcoding aphids (Hemiptera: Aphididae) of the Korean Peninsula: updating the global data set. *Molecular Ecology Resources*, 11 (1), 32–37.
<https://doi.org/10.1111/j.1755-0998.2010.02877.x>
- Miyazaki, M. (1971) A revision of the tribe Macrosiphini of Japan (Homoptera: Aphididae, Aphidinae). *Insecta Matsumurana*, 34 (1), 1–247.
- NBN Trust (2024) The National Biodiversity Network (NBN) Atlas. Available from: <https://ror.org/00mcxye41> (accessed 21 February 2024)
- Preston, C.D., Pearman, D. & Dines, T.D. (2002) *New Atlas of the British & Irish Flora*. Oxford University Press, Oxford, 912 pp.
- Tao, C.C. (1962) Revision of Chinese Aphinae. *Plant Protection Bulletin, Taiwan*, 4 (3), 95–110.
- Tao, C.C. (1963) Revision of Chinese Macrosiphinae (Aphidae, Homoptera). *Plant Protection Bulletin, Taiwan*, 5 (3), 162–205.