



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

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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.

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