TWO NEW NON-NATIVE MEDITERRANEAN ANT SPECIES TO BRITAIN COLLECTED FROM IMPORTED CORK BARK

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ABSTRACT

Ants are notorious for their ability to be transported by human commerce and in some cases establish populations outside their native ranges. The means by which ants are transported is often not addressed, mostly due to poor association between individuals and their transportation vector. Here we add two new non-native ants of Mediterranean origin to Britain, *Camponotus lateralis* (Olivier) and *Temnothorax recedens* (Nylander). Both species were transported via cork bark, a popular and widespread décor of reptile vivariums, illustrating a worrisome transportation avenue for non-native species to enter Britain.

INTRODUCTION

With over 500 species known to be recorded outside their native ranges, ants are well-known for their ability to stowaway and be transported by human commerce (Wong, Economo & Guénard, 2023). Some ant species are notorious for their invasiveness, whereas others are seemingly benign, non-destructive, and often short-term introductions. This is particularly the case in northern Europe, where non-native ants are often restricted to climatically buffered environments, such as homes and greenhouses (Blatrix *et al.*, 2018; Hamer, unpublished data). Often these species do not enter the wider ecosystem where they are introduced, and subsequently often expire (but see Fox & Wang, 2016; Hamer & Cocks, 2020). Nevertheless, such seemingly benign records need to be outlined to further our understanding of the ever-increasing number of non-native species around the world, the biogeographic origins of such non-native species, and importantly, if possible, the means by which they are transported. Here, we outline two non-native ant species of Mediterranean origin to Britain, *Camponotus lateralis* (Olivier) and *Temnothorax recedens* (Nylander), and the means by which they entered Britain. Both species were collected within the outer cork bark of *Quercus suber* (L.) frequently used as reptile vivarium décor across Britain. Measurements and high-resolution images of each species are provided, alongside a discussion on cork bark entering Britain.

METHODS

Standard ant measurements and indices were used to help confirm the identification of each species. Specimen images and measurements were obtained using a DMC5400 Camera attached to a Leica M205C Stereomicroscope and processed in Leica Application Suite (LASX). Measurements are given in millimetres (mm) accurate to 0.01 mm.

Measurements and indices are defined as follows:

Head length (**HL**): maximum length of head from anterior clypeal margin to the posterior margin of the head.

Head width (**HW**): maximum width of the head, excluding the eyes.

Antennal scape length (**SL**): the length of the antennal scape excluding basal neck and condyle.

Weber's (mesosomal) length (**WL**): the diagonal length of the mesosoma from anterior most point of the pronotal shield to the posterior most point of the propodeal lobe.

Cephalic head index (**CI**): = HW/HL × 100

Scape index (**SI**): = SL/HW × 100

New records

Camponotus lateralis

Material examined

Two workers. UK; Wales, VC 49, Bangor, Garth Road, SH 58461 73001 (53.2349, –4.1221), 26 September 2018, coll. T. D. Hughes, det. M. T. Hamer, inside vivarium nesting within cork bark.

Measurements (n = 2); HL 1.15–1.17; HW 1.06–1.09; SL 1.08–1.13; WL 1.54–1.56; CI 92.2–93.9; SI 101.8–103.3.

Remarks

Numerous individuals were found inside a vivarium housing several corn snakes within student accommodation on Garth Road, Bangor. Cork bark lined the vivarium as decorative material and for the snakes to hide underneath. Two workers were taken for examination and identified as *C. lateralis* (Fig. 1 a–b). As far as the authors are aware, the ants were rapidly eradicated following identification. *Camponotus lateralis* is found within the Mediterranean region, extending to Asia Minor (Janicki *et al.*, 2016). The species is relatively common and can be observed in urban areas and forests where nests are built within dead wood, dry stems of bushes, soil, and underneath rocks (Marko, Ionescu-Hirsch & Szaz-Len, 2009; Borowiec & Salata, 2021). This species is thought to mimic the colouration of two unpalatable *Crematogaster* species (C. *scutellaris* (Olivier) and *C. schmidti* (Mayr)) across its range (Seifert, 2019). This is the first reported case of this species from Britain, but it may not be the first ever introductory event considering the popularity of cork bark in Britain and likely misidentification with *C. scutellaris*.

Temnothorax recedens

Material examined

One worker. UK; England, VC 38, Leamington Spa, Warwickshire Event Centre, SP 36389 63684 (52.2701, –1.4684), 19 May 2018, Coll. T. D. Hughes. Det M. T. Hamer. Inside cork bark.

Measurements (n = 1): HL 0.615; HW 0.500; SL 0.632; WL 0.768; CI 81.3; SI 126.4

Remarks

A single individual (Fig. 1 c–d) was given to the first author by a member of the Bangor University Society of Entomology after a visit to a live insect trade event in which cork bark was purchased. The single worker was located within the cracks and crevices of the outer layer of cork bark. Whether this was an isolated individual, or more were located within the cork bark was not investigated. *Temnothorax recedens*

Fig. 1. a–b. Head and lateral view of *Camponotus lateralis* (ANTWEB1010083); c–d. head and lateral view of *Temnothorax recedens* (ANTWEB1010082). Antweb numbers relate to individual specimen codes.

is widespread in the Mediterranean region, North-western Africa to Turkey and Iran (Janicki *et al*., 2016). This species utilises a wide variety of nesting locations including soil, under rocks and with litter (Lech & Salata, 2021). An indoor record is also known from Denmark from within a terrarium and thought to be introduced via substrate (Schar, Illum & Stanbak, 2018). This is the first official record of this species in Britain.

Discussion

The use of cork bark within the reptile husbandry community is common and widespread, likely due to its easy availability, low cost and being an ideal, lightweight material, used in the creation of hides and landscaping within vivariums. The perforated and chambered network-like structure of cork bark makes it ideal nesting habitat for many ant species, as well as other arthropods. It is normally common practice for reptile keepers to sterilise cork bark before use within vivariums, typically via baking in the oven or submerging in boiling water. The latter practice may not be thorough enough to remove all trace of potentially non-native species, although such practices of cleaning new cork are likely in general to contribute a reduction in the number of non-native species present within the many tunnels and chambers inside the cork. Freezing cork bark, ideally for long durations and at very low temperatures may also provide adequate sterlisation.

When such precautions are not taken however, non-native species are capable of persisting and becoming a pest within vivariums. A quick search through reptile keeping forums will show many keepers being irritated by ants within their vivariums, affecting their chosen animals. These ants are normally *Crematogaster scutellaris,* which frequently nests within cork bark and can be relatively aggressive. Cork bark is therefore an important vector of southern European ant species to Britain.

In Britain, a number of non-native species can be found regularly in plants and materials imported from southern Europe. These include various ant species such as, but not limited to, *Hypoponera eduardi* (Forel), which has been found in the pots of imported plants (Hamer unpublished data) and *Lasius neglectus* (Van Loon, Boomsma & Andrásfalvy) found in several locations across Britain, associated with anthropogenic transportation particularly in the soil of potted plants resulting in typical find locations noted for botanical exchanges, e.g. botanical gardens and garden centres etc. (Buckham-Bonnett & Robinson, 2017).

Despite well-documented examples from horticulture and private collections of plants, biosecurity risks specifically associated with the importation of cork bark do not appear to have been fully analysed. Only a few records of ants found within '*virgin cork*', which we assume related to cork bark, are known from the early 20th century, including the species *Colobopsis truncata* (Spinola) and *Crematogaster scutellaris* (Donisthorpe, 1915). The majority of world cork exports are from Portugal (49.6%) and Spain (30.5%), with other cork-exporting countries including Morocco, Tunisia, Algeria, Italy and France (Cork Industry Federation, 2023). The dry Mediterranean woodland habitat in which cork oak grows is referred to as the *montado*, and, according to APCOR (2015) is one of the 36 biodiversity hotspots of the world. The high biodiversity of these habitats combined with the natural complexity of the surface of cork bark makes the potential for importing non-native species particularly high from this environment.

There are no readily available statistics regarding the total amount of imported natural cork in the UK, although the widespread availability of the material at pet

shops and online retailers countrywide indicates a frequent and stable importation regime. There are also no reliable statistics for the number of reptiles kept as pets in the UK; recent estimates vary between 7 and 8 million (Wood, 2021). The exact uses of cork within the exotic pet keeping community is not standardised, and the '*sterilisation*' of wood intended for vivariums is not necessarily a universal practice, nor 100% effective. Without specific citizen science data, it is impossible to ascertain the frequency of encounters with non-native species within vivariums, and it cannot be assumed that every exotic pet keeper will recognise small invertebrates as being non-native.

Entomological recorders interested in recording non-native species should pay close attention to unsterilised cork bark. With the recent record of *C. scutellaris* nesting in the wild in Belgium, at an equivalent latitude to most of southern Britain (Dekoninck *et al.*, 2022), future care should certainly be taken to ensure cork bark is fully sterilised before use, not only for the wellbeing of captive animals, but also for the protection of our own native flora and fauna.

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References

APCOR (2015) Biodiversity. Accessed 26/04/2023, available from: https://www.apcor.pt/en/montado/biodiversity/

Blatrix, R., Colin, T., Wegnez, P., Galkowski, C. & Geniez, P. 2018. Introduced ants (Hymenoptera: Formicidae) of mainland France and Belgium, with a focus on greenhouses. *Annales de la Société entomologique de France (N.S.)* **54**: 1–16.

Borowiec, L. & Salata, S. 2021. Notes on ants (Hymenoptera: Formicidae) from Western Greece. *Annals of the Upper Silesian Museum in Bytom Entomology* **30**: 1–23.

Buckham-Bonnett, P. & Robinson, E. J. H. 2017. GB Non-native Species Rapid Risk Assessment: Rapid Risk Assessment of *Lasius neglectus* (Invasive Garden Ant). Research Report. *GB Non-native Species Rapid Risk Assessments* (NRRA). GB Non-native Species Secretariat.

Cork Industry Federation. 2023. Accessed 05/04/2023, available from: https://cork-products.co.uk/

Dekoninck, W., De Ketelaere, A., Vandenberghe, M. & Vankerkhoven, F. 2022. First outdoor record of *Crematogaster scutellaris* (Olivier, 1792) in Belgium (Hymenoptera: Formicidae). *Bulletin de la Société royale belge d'Entomologie/Bulletin van de Koninklijke Belgische vereniging voor entomologie* **158**: 175–182.

Donisthorpe, H. S. J. K. 1915. *British Ants: Their Life History and Classification*. Plymouth: Brendon & Son Ltd 1–379.

Fox, M. & Wang, C. 2016. Colony of the Argentine Ant, *Linepithema humile* (Hymenoptera: Formicidae), in Fulham, West London. *British Journal of Entomology and Natural History*, **29**: 193–195.

Hamer, M. T. & Cocks, L. R. 2020. *Linepithema iniquum* (Mayr) (Hymenoptera: Formicidae) found at the National Botanic Garden of Wales. *British Journal of Entomology and Natural History* **33**: 71–75.

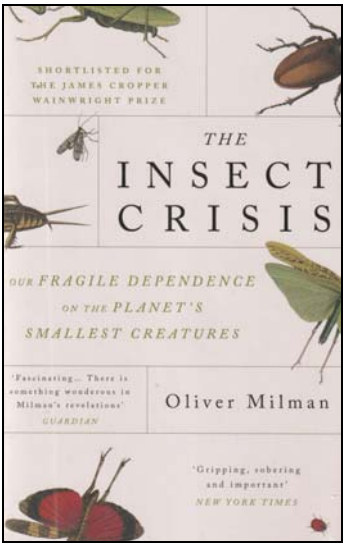
Janicki, J., Narula, N., Ziegler, M., Guénard, B. & Economo, E. P. 2016.Visualizing and interacting with large-volume biodiversity data using client-server web-mapping applications: The design and implementation of antmaps.org. *Ecological Informatics* **32**: 185–19.3

Lech, B. & Salata, S. 2021. Notes on ants (Hymenoptera: Formicidae) from Western Greece. *Annals of the Upper Silesian Museum in Bytom, Entomology* **30** (online005): 123.

Marko, B., Ionescu-Hirsch, A. & Szasz-Len, A. 2009. Genus *Camponotus* Mayr, 1861 (Hymenoptera: Formicidae) in Romania: distribution and identification key to the worker caste. *Entomologica Romanica* **14**: 29–41.
Schär, S., Illum, A. & Stanbak, L. R. 2018. Exotic ants in Denmark (Hymenoptera: Formicidae). *Entomologiske Meddelelser* **85**: 101–109.
Seifert, B. 2019. A taxonomic revision of the members of the *Camponotus lateralis* species group (Hymenoptera: Formicidae) from Europe, Asia Minor and Caucasia. *Soil Organisms* **91**: 7–32.
Wong, M. K. L., Economo, E. P. & Guénard, B. 2023. The global spread and invasion capacities of alien ants. *Current Biology* **33**: 566–571.
Wood, R. 2021. Reptile Trade Views September 2021. PBWNews, Pet Business World. Accessed 04/04/2023, available from: https://www.petbusinessworld.co.uk/columnists/reptile-trade-views/reptile-trade-views-september-2021.html

BOOK REVIEW

The Insect Crisis. Our Fragile Dependence on the Planet's Smallest Creatures by Oliver Milman. 260 pp. Atlantic Books, London 2023. Softback £11.00. ISBN 978-1-83895-119-1.



The award-winning *Guardian* journalist has an infectious writing style as he elaborates on an ever-increasing litany of published reports describing the decline in invertebrate numbers and erosion of the planet's diversity during the Anthropocene. Topics covered include 'Winners and Losers', 'Zero Insect Days' (events commoner in 2023), 'In the Teeth of the Climate Emergency' and the public and governments' combined responses to the emergency in a chapter headed 'The Inaction Plan'. The author mixes a huge wealth of scientific data with lively descriptions of how we interpret and are finally beginning to react politically to the bad news.

Most of the evidence has been obtained from the northern hemisphere, where long term studies have largely been undertaken but the author brings together information from all the continents to present a world view where-ever he can. We are lucky in the UK to have Buglife, Butterfly Conservation and the Bumblebee Trust among others waving the flag for invertebrates and each is quoted frequently.

If I have a criticism – it is that the chapters go on just a bit too long and I have had to refer back to the beginning to remind myself what the aims were. Even so the book is an informative and entertaining read. With so many facts and figures it is not surprising the odd incorrect fact slips through the net – the extinct short-haired bumblebee *Bombus subteranneus* despite repeated releases has not 'come roaring back to Dungeness'. Lighter stories abound and my favourite quote attributable to research at Rothamsted is 'the south-east of England alone hosts 3.5 trillion migrating flying insects a year, a mass of bodies weighing the equivalent of 20,000 flying reindeer.'

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