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## The cockroaches (Dictyoptera) of Glasgow Botanic Gardens with a summary of the known distribution of *Periplaneta americana* (Linnaeus, 1758) and *P. australasiae* (Fabricius, 1775) in Scotland

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This Short Note provides information on the Dictyoptera (cockroaches) of Glasgow Botanic Gardens (GBG), these insects having been omitted from previous papers in the *On the Wildside Revisited* series, and summarises information on the wider distribution of cockroaches in Scotland.

Four cockroach specimens were collected in 2017 and 2018 during arachnid surveys in the Main Range glasshouse of GBG (NS5681367511), using the vacuum mode of a modified petrol-powered leaf blower (Husqvarna 125BVX). Full details of survey methods can be found in Cathrine *et al.* (2022). Although the majority of the specimens were immature and therefore very challenging to confirm reliably to species, two adults collected on 21st September 2017 were identified as *Periplaneta australasiae* (the Australian cockroach) by the author using a stereo-microscope with the aid of Choate *et al.* (2013). Fig. 1 shows a specimen of *P. australasiae* photographed in GBG in 2022.



**Fig. 1.** Australian cockroach (*P. australasiae*), Glasgow Botanic Gardens glasshouse, Scotland, 19th January 2022. (Photo: C. Cathrine)

Prior to the recent surveys, two species of cockroach had been recorded in GBG: *P. americana* (American cockroach) and *P. australasiae* (Hancock, 1999; Glasgow Natural History Society, 2017; Glasgow Museums Biological Records Centre (GMBRC)). *P. americana* was last recorded at GBG in 1902, whereas *P. australasiae* was last found in 1988 and confirmed to still be present during the surveys described in this Short Note (Glasgow Natural History Society, 2017; GMBRC).

Interspecific competition is known to occur between *P. americana* and *P. australasiae*. However, Boyer & Rivault (2004) found that *P. americana*, the larger of the two species, was successful in competition for shelter and food when competing with *P. australasiae*. As such, it seems unlikely that the arrival of *P. australasiae* would have resulted in the exclusion and subsequent replacement of *P. americana* at GBG. The loss of *P. americana* from GBG remains unexplained – it is possible more thorough targeted Dictyoptera surveys may find populations of this species persist at GBG. It is also conceivable that the *Periplaneta* specimens collected from GBG in 1901 and 1902 were misidentified, as *P. americana* and *P. australasiae* can be very similar in appearance. If they have been retained, these specimens should be re-examined to confirm their identity.

Both *P. americana* and *P. australasiae* are known from other locations in Glasgow. Based on GMBRC data, there are five records of *P. americana* from locations outwith GBG including Ibrox (1980), Kelvingrove Museum (1980, 1981, and 1982), and University Avenue (1967). *P. australasiae* has been recorded more frequently, with seven records from elsewhere in Glasgow including Kelvingrove Museum (1980 and 1981), the People's Palace (2015), and Tollcross Park Winter Gardens (1988). Anecdotal evidence suggests that cockroaches may be more widely distributed across the city than these records imply (e.g. Russell, 2017).

Beyond Glasgow, the nearest records of either species are from Paisley where *P. australasiae* has been recorded four times, at various locations (BRC, 2017; GMBRC). There are several records of *P. australasiae* from Edinburgh Botanic Gardens between 1901 and 2015, as well as one of *P. americana* in 1901 – the latter species also having been recorded in Edinburgh Zoo in 2015 (BRC, 2017; Grasshopper Recording Scheme, 2021). In a wider Scottish context, *P. americana* has also been recorded twice in Dundee, in 1971 and 1972 (BRC, 2017). Elsewhere in Scotland, *P. australasiae* has been found in Lochinver, Sutherland in 2010 (specimens found in furniture which had arrived from the Far East via London) and Stenness, Orkney, in 1988 (BRC, 2017; Highland Biological Recording Group, 2021).

All records of *P. americana* and *P. australasiae* relate to synanthropic situations – these species are not native

to Scotland and cannot survive beyond indoor habitats created by humans.

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