

First record of the genus *Dorypteryx* Aaron, 1883 (Psocoptera: Psyllipsocidae) in South America: *Dorypteryx domestica* (Smithers, 1958) in Arequipa, Peru

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Abstract: *Dorypteryx domestica* (Smithers, 1958) previously known from Africa, Europe, North America, and Australia is recorded from an urban area in southern Peru. This is the first record of the genus *Dorypteryx* Aaron, 1883 in continental South America. The species was found in a private building, recently constructed.

Key words: psocids; introduced species; domestic pests

The psocid genus *Dorypteryx* Aaron, 1883 is a small group in the family Psyllipsocidae, comprising only four species (Li and Liu 2009). This genus is characterized by brachypterous adults with forewings reduced to slender straps with simple venation; vein R unbranched or subdivided into R1 and a simple Rs; vein M unbranched; forewing with margin and veins hairy; hindwing reduced to a tiny flap; fourth segment of maxillary palp elongate; epiproct simple, paraproctal spine present and unmodified in both sexes; external valve of female gonapophyses distally with three heavy setae, dorsal and ventral valves smooth and weakly developed; hypandrium with apically curved margin, more or less sclerotized; and phallosome with two simple parameres, more or less curved (Mockford 1993). The genus is known from Europe, North America, Central America, Africa, Australia, and recently, reported from China (Li and Liu 2009).

Dorypteryx domestica was described by Smithers (1958) from dwellings in Southern Rhodesia (now Zimbabwe), as the only species of the new genus. However, this genus was later synonymized with *Dorypteryx* by Lienhard (1977). The species was collected for the first time in Europe in 1973 (Lienhard 1977), and since then, it has been reported from several European countries (Lienhard and Smithers 2002; Lienhard 2011, 2012, 2013, 2014, 2015, 2016). It was recorded from North America by Mockford (1993), based on two specimens

from domestic habitats, and recently, it was recorded in Australia (Barrow Island), in a domestic situation, by Gunawardene et al. (2012) (Figure 1). This species is characterized by the presence of five longitudinal veins in the forewing, the subtrapezoidal epiproct, and the broad nearly quadrate external valve of the female gonapophyses (Li and Liu 2009).

On 10 March 2016 a series of psocids, from a private building, located in an urban area of Arequipa city (16°24' S, 071°32' W), southern Peru (Figure 1), was brought to be identified to the Museo de Historia Natural Universidad

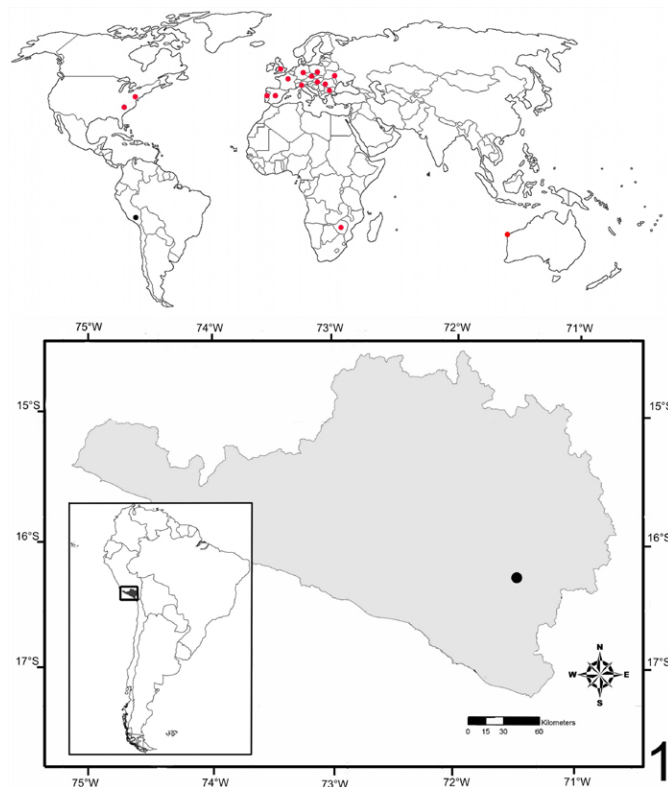


Figure 1. Distribution map of *Dorypteryx domestica* (Smithers). Red circle: record areas in Africa, Europe, North America and Australia. Black circle: new record, Arequipa city, Departamento Arequipa, southern Peru.

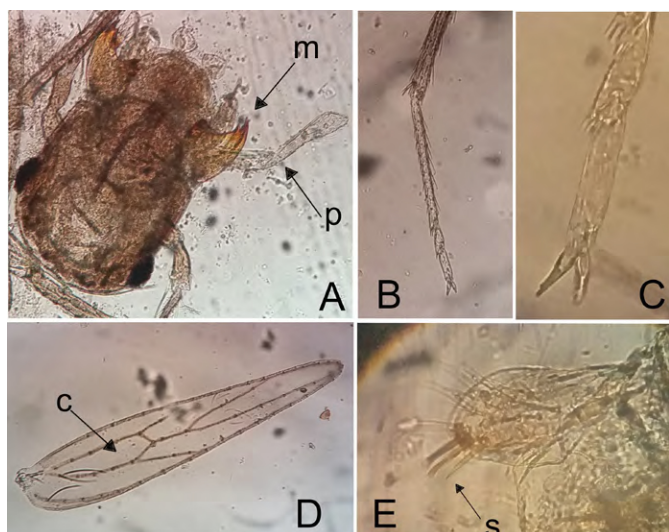


Figure 2. *Dorypteryx domestica* (Smithers) collected in March 2016, Arequipa city, Peru. **A:** head; **B:** 3-segmented fore tarsus; **C:** distal tarsal segments and pretarsal claws; **D:** forewing with aberrant venation: R1 not reaching wing margin; **E:** dorsal view of female gonapophyses. m: mandible; p: maxillary palp; c: cell closed; s: spinous setae.

Nacional de San Agustín, Arequipa. The specimens, all adults, were examined using standard stereo and light microscopy techniques, and were identified as belonging to *Dorypteryx domestica* (Figure 2).

A visit to the building was conducted in order to collect other specimens and confirm the location. The building, with five floors all recently built and furnished, is located in a residential area. The second floor was newly inhabited. The walls and the floors of the whole building were examined and several adults and nymphs were collected. The insects were noticed in corners on walls and, in a great number, behind the wooden skirting boards in the rooms on all five floors. All specimens collected, are preserved in alcohol and deposited in the Museo de Historia Natural Universidad Nacional San Agustín (MUSA), Arequipa, Peru, under registration numbers JCG0001- JCG0020.

The identification key presented by Li and Liu (2009) and important references for genus and species identification (Smithers 1958, 1990; Mockford 1991, 1993; New 2005) were used to determine the species presented here.

A total of 20 specimens were collected, 15 adults and 5 nymphs, all adults presented diagnostic characters for the species *Dorypteryx domestica*: brachypterous, forewing with margin and veins hairy, forewing spear-shaped longer than wide, usually 5 veins reaching wing margin, although in some specimens the vein R1 not reaching wing margin (Figure 2D), tarsi 3-segmented (Figure 2B), each pretarsal claw with a small subapical tooth (Figure 2C), fourth segment of maxillary palp elongate (Figure 2A), external valve of female gonapophyses broad, nearly quadrate (Figure 2E).

Based on the contribution by Lienhard and Ferreira (2015), two genera and 20 species of Psyllipsocidae

are known from South America (*Psyllipsocus* Selys-Longchamps, 1872 and *Psocathropos* Ribaga, 1899). This discovery of *Dorypteryx* represents the first record of this genus in Peru, and also in South America.

Dorypteryx domestica is a synanthropic insect usually found in buildings and glasshouses and this dispersal process has been through glass vectors (vehicles, plants, etc.) (Schneider 2010; Mockford 1993). According to the building owner, the elevator that was installed few months ago is from Spain, a country where *D. domestica* is recorded (Lienhard and Smithers 2002). Therefore, it is presumed that the unintentional introduction of this species was via the shipment of the elevator from Europe. This dispersal phenomenon is discussed by Lindroth (1957).

Psocids have traditionally been viewed as scavengers and mould feeders and of little importance as domestic pests (Mockford 1991, 1993). However, several infestations of *D. domestica* in European urban areas were brought to the attention of the authorities when many cases of allergic reactions were recorded (Limonta and Locatelli 2000). A similar situation could also pose problems for public health management in Arequipa, and eventually increase allergic problems, given that climatic conditions of Arequipa (temperature and humidity stable throughout the year) are optimal for the development and rapid outbreak of populations of this species. So far, human allergic reactions due to this species were not reported in Arequipa. Recognizing a potential serious infestation, the owners employed a company to eradicate these insects.

Invasive insects are being unintentionally moved around the world at unprecedented rates (Roques 2010) as contaminants in cargo of international trade. Invasive species impact ecosystems, agriculture, forestry and human health and result in billions of dollars in economic losses annually (Drake et al. 1989; Pimentel et al. 2001). According to Bacon et al. (2012), there is no method to evaluate the performance of existing border controls for alien insect invasions, mainly because pathway management, invasions of insects, and optimal detection strategies have been understudied thus far, and border controls have only been analyzed on a stand-alone basis using interception data.

As this is the first record of *D. domestica* in Peru and South America, it is important to conduct surveys in neighboring regions of Arequipa. In addition, the public health system of Peruvian government should be alerted about this species and include *D. domestica* as a domestic pest and potential threat, already present in the country, but with restricted distribution.

ACKNOWLEDGEMENTS

I am very grateful to Aaron Quiroz who provided the specimens to Museo de Historia Natural Universidad Nacional de San Agustín, Arequipa.

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Received: 24 March 2016

Accepted: 3 September 2016

Academic editor: Marcus Guidoti