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On the distribution of *Omorgus suberosus* (Coleoptera: Trogidae) and its presence in the Philippines

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Abstract

Omorgus suberosus (FABRICIUS, 1775) is a widely distributed Trogidae (Coleoptera) with records from the Americas, Africa, Europe, Australia and some Pacific Islands. Its current distribution and *status* in the countries where it is present is reviewed. New records from the Philippines are given; those are the first confirmed records for the Oriental biogeographic region.

Key words: Fauna, Coleoptera, Trogidae, New records, Orient, Philippines.

Zusammenfassung

Omorgus suberosus (FABRICIUS, 1775) ist eine weit verbreitete Art der Familie Trogidae (Coleoptera). Die Art ist derzeit bekannt aus Amerika, Afrika, Europa, Australien und einigen Pazifikinseln. Die weltweite Verbreitung wird diskutiert und neue Daten von den Philippinen werden angeführt, diese sind Erstnachweise für das orientalische Faunengebiet.

Introduction

Omorgus suberosus (FABRICIUS, 1775) was the first Trogidae to be described from South America. It is a versatile species that can live in open, dry environments (SANTOS 2014) as well as pastures and native tropical forests (CORREA et al. 2013). It is known to be able to survive on a range of foods, from dry animal material, to bird manure and fungi (GIANIZELLA & PRADO 1999, YOUNG 2006). It is also a successful predator of locust eggs - *Schistocerca cancellata* (SERVILLE, 1838) - in Argentina (RITCHERT 1958) and possibly of *Schistocerca pallens* (THUNBERG, 1815) and other grasshoppers in Barbados (PECK 2009a). The species also predates iguana eggs in the Galapagos Islands (ALLGOWER 1979, ROSANO-HERNANDEZ & DELOYA 2002) and various sea turtle nests (ALLGOWER 1979, ROSANO-HERNANDEZ & DELOYA 2002, BAENA et al. 2015). The large concentration, millions of specimens, on some nesting beaches has raised conservation concerns, however, there is no evidence to date that it is affecting the survival rate of hatchlings (OCANA et al. 2012)

The species has an extensive, likely continuous, native range covering most of South, Central and North America (SCHOLTZ 1990). It has also been introduced to North Africa, Europe, Australia and some Pacific Islands. This has led to the species being re-described twelve times (ZIDEK, 2017) with a further taxon, *Omorgus triestinae* PITTINO, 1987, being recently re-elevated to valid taxon (HUCHET & DA COSTA, 2018). For details on all synonymies, please see VAURIE (1955, 1962), SCHOLTZ (1990) and ZIDEK (2013, 2017).

In the Philippines, it was re-described as *Trox manilensis* by SCHULTZE (1916) based on three specimens collected from carrion by his wife and was later synonymised by HAAF (1954). No records from the Philippines have since been published and the species was not listed from the Oriental biogeographic region in recent catalogues (e.g. ZIDEK 2013, PITTINO & BEZDĚK 2016, ZIDEK 2017). This article details new records from the Philippines and discusses the current range of the species worldwide.

Material and Methods

Specimen from the Philippines were matched to the re-description from SCHOLTZ (1990) and neighbouring species were eliminated using keys from VAURIE (1955, 1962), SCHOLTZ (1990) and PITTINO (1997). Specimen were sexed and male parameres compared to drawings from VAURIE (1955, 1962) and high-resolution photographs from HUCHET & DA COSTA (2018), the latter reference also includes a clear photograph of the habitus. Specimens were also compared to material from Argentina. Specimens from the Philippines are held in the author's collection (MMC) or in the collection of Angelo & Manuel Santos, London (AMSL) and comparative specimen from Argentina in MMC. Collecting circumstances, when known, and additional observations from the collector are given in curly brackets ({}).

Results and Discussions

Review of Known Distribution

Native Range:

O. suberosus is native of the Americas and specimen remains were found from archaeological sites in Mexico (MUÑIZ VÉLEZ 2001) and Peru (HUCHET & GREENBERG 2010). Its distribution appears continuous from central Argentina to the US.

In North America, it has been recorded from Canada, the United States, Mexico and the Caribbean islands. SCHOLTZ (1990) mentioned it from Canada, however, it is not included neither by VAURIE (1955) in her revision of North American Trogidae, nor by BOUSQUET and colleagues (2013) in their checklist of Canadian Coleoptera, and it remains unclear if the species is native or not from this country. The species occurs throughout the United States apart from New England, the Pacific Northwest and Alaska (VAURIE 1955, BAKER 1968, SCHOLTZ 1990) and throughout Mexico (BLACKWELDER 1944, VAURIE 1955, VAURIE 1962, DELOYA 2000) including the Pacific Islands of the Islas Marías of the state of Nayarit (BLACKWELDER 1944), with only four (out of 31) states currently without published records (Aguascalientes, Hidalgo, Guanajuato and Zactecas). *O. suberosus* is also present in Bermuda (VAURIE 1962).

O. suberosus is widely distributed throughout the Caribbean Islands. Although VAURIE (1962) lists it from the Bahamas (Andros and New Providence islands), it was not included by TURNBOW & THOMAS (2008) in their recent list of Coleoptera. The species is present on all the large islands of the Greater Antilles; Jamaica (VAURIE 1962), Hispaniola, Cuba and Puerto Rico (BLACKWELDER 1944, VAURIE 1962). In the lesser Antilles, it is recorded from all French islands, including Guadeloupe and neighbouring Islands (VAURIE 1962, TOUROULT 2005, PECK et al. 2014), Martinique (MARQUET & ROGUET 2003, PECK 2011b) and St Martin (PECK 2011a), and is also present on the islands of Dominica (PECK 2006), Barbados (VAURIE 1962, PECK 2009a), Guana, Mona, Montserrat, (BLACKWELDER 1944, PECK 2011a) and the Virgin Islands (BLACKWELDER 1944, VAURIE 1962). In fact, according to PECK (2011a, 2011b), the species is likely to be present throughout the Lesser Antilles, although he did not list it from St Lucia (PECK 2009b).

The species is present throughout Central America; it is widespread and common in Costa Rica (DELOYA & SOLIS 1995, VARGAS 2016) and was also recorded from Guatemala, Belize, Nicaragua (BLACKWELDER 1944), Costa Rica (DELOYA & SOLIS 1995, VARGAS 2016), El Salvador, Honduras (VAURIE 1962) and Panama (RATCLIFFE 2002).

The species is recorded from most South American countries. It was originally described from Brazil and it is widespread throughout the country with only 3 (out of 26) smaller coastal states – Amapá, Alagoas and Sergipe – without published records (VAURIE 1962, GIANIZELLA & PRADO 1999, LÓPES et al. 2007, CORREA et al. 2013, HUCHET & DA COSTA 2018). In Argentina, it is absent from the most southern provinces (Santa Cruz and Tierra del Fuego) but has been recorded or is likely to be present in all others (SCHOLTZ 1990, DIÉGUEZ & GÓMEZ 2004, GOMEZ 2005, HUCHET & DA COSTA 2018). The species has been recorded from Colombia, Venezuela (BLACKWELDER 1944, VAURIE 1962, SCHOLTZ 1990), Bolivia, Paraguay, Uruguay (VAURIE 1962, SCHOLTZ 1990, HUCHET & DA COSTA 2018), Peru (VAURIE 1962, SCHOLTZ 1990), French Guiana (MORAGUES 2010, HUCHET & DA COSTA 2018) and Guyana (VAURIE 1962). It is also present in continental Ecuador (VAURIE 1962, SCHOLTZ 1990, HUCHET & DA COSTA 2018) and on the Galápagos islands of Isabela, Floreana, Pinta, San Cristóbal, San Salvador, Santa Cruz, Santa María and Santiago (VAN DYKE 1953, VAURIE 1962, SCHOLTZ 1990). It is not present on Española Island where it is replaced by the similar looking *Omorgus indigenus* (SCHOLTZ 1990). Although cited from Chile by VAURIE (1962) and SCHOLTZ (1990), DIÉGUEZ (2008) argued that those two records are from the central American country of El Salvador and not the Chilean town of the same name in the Atacama region and consequently, he removed it from the Chilean list. The only other south American country without record is Suriname.

Introduced Range:

In Australia, it was first described as a new species by BLACKBURN (1904): *Trox tricolor*. The species is now well established in the east and south-west of Australia and has been recorded from Queensland, New South Wales, Victoria and Western Australia (SCHOLTZ 1986, CASSIS & WEIR 1992). It is also present in Fiji and in New Caledonia (SCHOLTZ 1986) where it was originally re-described by BALTHAZAR (1966) as *Trox novaecaledoniae*. Furthermore, it is established on the Hawaiian Islands of Kauai, Oahu and Maui, on Guam (DUNLAP et al. 2015), the neighbouring Micronesian island of Rota and the Mariana island of Aguijan (CARTWRIGHT & GORDON 1971).

In Africa, the species has been introduced on the islands of Cape Verde (LANDIN 1963) and Fuerteventura in the Canary (ZIANI et al. 2015). *O. suberosus* is also present in Morocco where numerous specimens were collected under a dog carcass near Rabat airport (ZIANI et al. 2015). It was wrongly listed as "frequent in large parts of Africa" by MARTÍN-PIERA & LÓPEZ-COLÓN (2000).

In Europe, the first records date back from the 19th century when CANDÈZE (1871) reported on lamellicorn beetles found in wool shipments from Argentina to the linen factories of Verviers (Belgium). His list of 42 species includes four species of Trogidae: *O. suberosus*, *Polynoncus aeger* (GUÉRIN-MENEVILLE) (as *Trox leprosus* BLANCHARD), *Polynoncus pilularius* (GERMAR) and *Trox scaber* (as *Trox trisulcatus* CURTIS). Those were indoors records and the species did not establish itself and was not subsequently included in the Belgian fauna (e.g. JANSSENS 1960, BARAUD 1977). This also appear to be the case for the introductions in the Czech Republic (MUÑOZ BATET 1995) and Hungary (ÁDÁM 1993). Oppositely, *O. suberosus* is now well-established in the south of Spain (COELLO GARCIA & VERDUGO PÁEZ 1999, BERCEDO PÁRAMO & NAVARRO GARCÍA 2000, COELLO & BAENA 2008). Originally described by BÁGUENA (1959) as a new species – *Trox torres-salei* – from a single specimen from Alicante, subsequent records were all costal which led BERCEDO PÁRAMO (1997) to suggest that they were due to recurring introductions from North Africa, either through direct flight or linked to the poultry industry, despite the fact that the species was not included in the North African fauna at the time (BARAUD 1985).

New records from the Philippines

M a t e r i a l e x a m i n e d : In total, 16 specimens from the Philippines were studied: Luzon, Zambales, Subic, VIII.2018, local collector, 1♂ (MMC)| Luzon, Cagayan, Tuguegarao env., 08.VIII.2003, M. Santos leg., 5♀♀ + 3♂♂, (AMSL), {15-20 specimens in chicken coop, larvae also observed}| Negros Occidental, Murcia, Mambukal Road near Barangay Lopez Jaena, 15.XI.1999, A & M. Santos leg., 2♀♀ + 1♂, (AMSL), {under dead dog}| Mindanao, Laneo del Sur, Wao, local collector, 13.VII.2017, 1♂ (MMC)| Mindanao, Bukidnon, border San Fernando/Cabanglasan, IX.2018, local collector, 1♂ (MMC)| Oriental Mindoro, near Baco, forest clearing, 08.VIII.2003, local collector, 2♀♀, (MMC), {at light}.

The distribution of the specimens is given in Figure 1. Specimens were collected both from the wild and locations linked to human activities (road, small scale poultry farming). The species appears to be well established and widespread, with records on four of the main islands and the two records furthest north and south over 1100km apart. In one case, on the island of Luzon, larvae were observed, providing further evidence that *O. suberosus* is well-established in the Philippines. Apart from this location, other records are for small numbers of individuals (1-3).

It is worth noting that the superficially similar *Omorgus costatus* (WIEDEMANN, 1823) is present in the Philippines where it was re-described as *Trox montalbanensis* based on specimens from Luzon, also by SCHULTZE (1916). However, both species can easily be distinguished from the tomentose tubercles, only present in O. *costatus*, and the differences in elyral sculpture, pronontum and parameres shapes; see SCHOLTZ (1986) for further details.

Conclusions

Omorgus suberosus (FABRICIUS, 1775) is established on four Philippine islands: Luzon, Negros, Mindanao and Mindoro; those are the first confirmed records from the Orient since the early 20th century when the species was re-described as *Trox manilensis*. Considering the species managed to colonise other island systems in the Pacific, it would not be surprising if it is already present or establishes itself on other islands of the Philippine archipelago.

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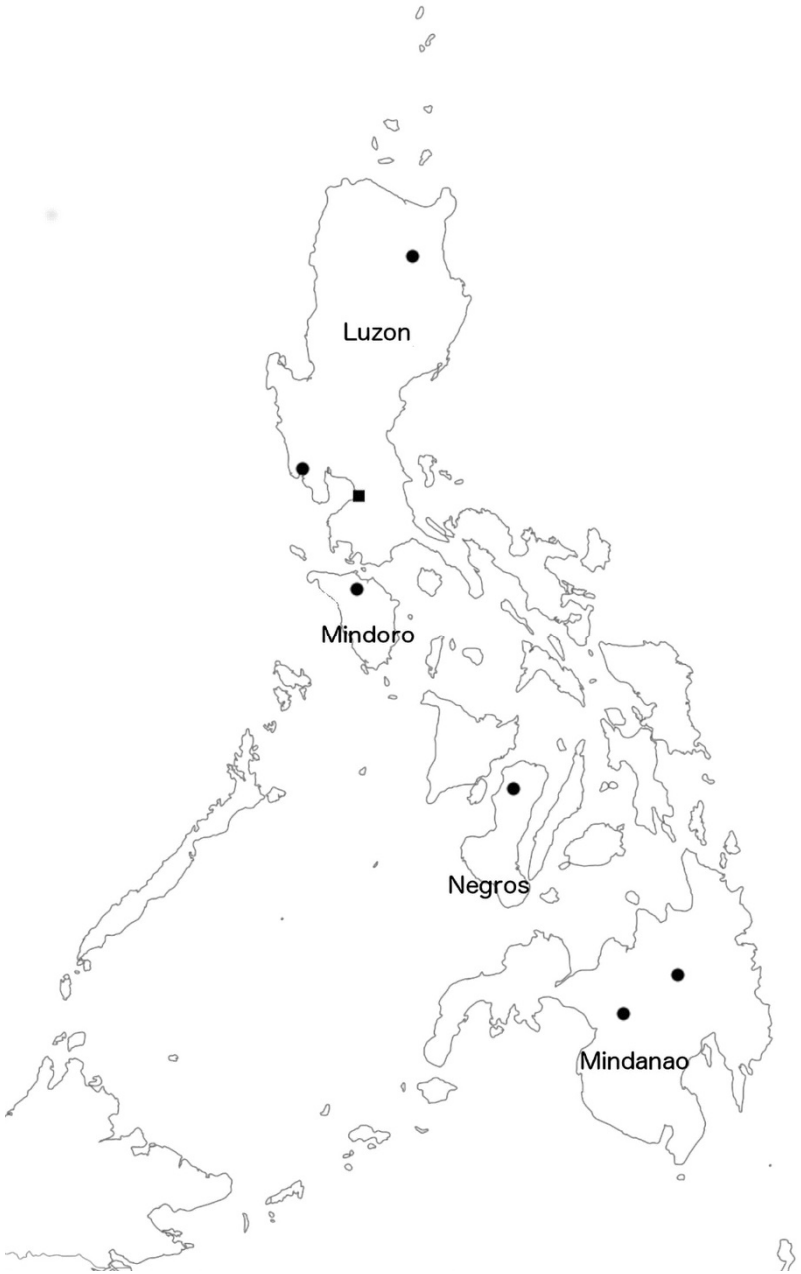

Fig 1: Distribution map of *Omorgus suberosus* (FABRICIUS, 1775) in the Philippines: circles (●) = new records from this article, square (■) = type location of *Trox manilensis* Schultze, 1916. Only islands with records are named.