

First record of *Xenopsylla gratio* Jordan & Rothschild, 1923 from the Maltese Islands (Siphonaptera: Pulicidae)

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ABSTRACT. *Xenopsylla gratio* is reported for the first time from the Maltese Islands. The species was found in an abandoned nest of a Cory's Shearwater, *Calonectris diomedea* on the island of Filfla. Brief notes are included on previous records of fleas from the Maltese Islands and taxonomic, distributional and ecological notes are provided for *Xenopsylla gratio*.

KEY WORDS. Malta, Filfla, flea, Siphonaptera, *Xenopsylla*, Cory's Shearwater.

INTRODUCTION

Siphonaptera (fleas) represent an order of insects with some 2,400 described species. They are highly modified, apterous, laterally compressed, holometabolous ectoparasites, with mouth parts modified for piercing and sucking; without true mandibles, with an elongate, serrate lacinial blade within a sheath formed by the maxillary and labial palps; epipharynx forming a long spine; gut with salivary pump to inject saliva into wounds and cibarial and pharyngeal pumps to suck up blood.

Eggs are laid predominantly into the host's habitat, where free-living, worm-like larvae develop on material such as shed skin debris from the host. High temperatures and humidity are required for development by many fleas, including those of domestic animals. The pupa is exarate and adecticous in a loose cocoon. Only few species are restricted to one host, with the majority of taxa being, more or less, polyxenous. Fleas predominantly use mammalian hosts.

The fleas of the Maltese Islands are very poorly known with only 11 recorded species scattered in the entomological literature. Probably the first flea records for Malta were due to ZAMMIT (1918) who recorded the following species: *Pulex irritans* Linnaeus, 1758, *Leptopsylla segnis* (Schönherr, 1811), *Xenopsylla cheopis* (Rothschild, 1903) and *Nosopsyllus fasciatus* (Bosc d'Antic, 1800). SAVONA-VENTURA (2002) reported that fleas were always closely monitored since they were considered as a valuable index in the spread of plague epidemics. BERNARD (1937) cited *Xenopsylla cheopis* and *Nosopsyllus fasciatus* for Malta. Both these species are mainly associated with rats and hence their importance in connection with the plague outbreak in Malta at the time when Bernard was reporting. BEAUCOURNU & LAUNAY (1990) questioned the record of *N. fasciatus* for Malta, but a recent record of this species is now known from the island (BEAUCOURNU *in litt.*, vii.08), whereas they confirmed the presence of *X. cheopis* with material from Gozo. TRAUB *et al.* (1983)

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mentioned Malta in the global distribution of *Notopsyllus barbarus* (Jordan & Rothschild, 1912) a flea which is mainly associated with rats and mice. BEAUCOURNU & LAUNAY (1990) in their monograph of the fleas of France and the West Mediterranean Basin cited two additional species. *Echidnophaga murina* (Tiraboschi, 1903), a species which is also mainly associated with rats and mice, and *Archaeopsylla erinacei maura* Jordan & Rothschild, 1912, which is mainly associated with the Algerian hedgehog, *Atelerix algirus* (Lereboullet, 1842), which is locally common. A new subspecies of flea, *Leptopsylla algira vogeli* Beaucournu, 1990, was described from material collected from Gozo on the Sicilian shrew, *Crocidura sicula calypso* Hutterer, 1991 (BEAUCOURNU, 1990). MIFSUD (2000) mentioned three cosmopolitan fleas which were all collected from the Maltese Islands. These include the cat flea, *Ctenocephalides felis felis* (Bouché, 1835), the dog flea, *Ctenocephalides canis* (Curtis, 1826) and the human flea, *Pulex irritans*. In a semi-popular article, MIFSUD (2007) mentioned two fleas associated with a wild rabbit which was collected from the limits of Mellieha (25.vi.2007): the rabbit flea, *Spilopsyllus cuniculi* (Dale, 1878) and the cat flea *Ctenocephalides felis felis*.

Recently, flea material collected from the island of Filfla and handed over to the senior author for identification proved to represent a new record for Malta. The island of Filfla is situated about 5 km south of Malta. It has a surface area of about 350 m² and its flat-topped plateau is 60 m above sea-level. For over a century the island was used as a target practice for air and naval gunners, but all bombing was stopped in 1971. Filfla holds the largest known colony of Storm petrel, *Hydrobates pelagicus* (Linnaeus, 1758) in the Mediterranean (c.a. 8,000 breeding pairs), some 50-80 pairs of Cory's Shearwater, *Calonectris diomedea* (Scopoli, 1769) and about 150 pairs of Yellow-legged Gulls, *Larus michahellis* Naumann, 1840 (BORG & SULTANA, 2002). In view of its ornithological and ecological importance the island was declared a nature reserve.

Xenopsylla gratiosa Jordan & Rothschild, 1923

Material examined: MALTESE ISLANDS: FILFLA: south eastern side, 10.ix.2007, 4 exs., from a recently abandoned nest of a Cory's Shearwater, *Calonectris diomedea* situated under a boulder, leg. J.J.Borg.

Taxonomic notes: The genus *Xenopsylla* Glinkiewicz, 1907 (Pulicidae: Xenopsyllinae) is mainly distributed in the Afrotropical Region with few representatives in the South Palaearctic, Oriental and Australasian Regions. In the Mediterranean Basin, this genus is represented by 11 species and of these only *X. gratiosa* is associated with birds while all the others are associated with mammalian hosts (BEAUCOURNU & LAUNAY, 1990). *X. gratiosa* is readily distinguished from its congeners occurring in the said region by the following morphological characteristics: unique tarsal chaetotaxis, the presence of 4 spines on tarsal segment I (in males), a ventral 'tooth' on femur III and characteristic male and female genitalia (BEAUCOURNU & LAUNAY, 1990).

Global Distribution: Southern France (including Corsica), Portugal, Greece, Canary Islands, Tunisia and Malta.

Ecology: *Xenopsylla gratiosa* is mainly a specific parasite of the Cory's Shearwater. However the species can also be found on the Storm petrel and on the Yelkouan Shearwater, *Puffinus yelkouan* (Acerbi, 1827) and accidentally it can also be found on humans.

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