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Three new species of the feather mite subfamily Ingrassiinae (Acariformes: Xolalgidae) from shearwaters and petrels (Procellariiformes: Procellariidae)

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Abstract

Three new species of the feather mite subfamily Ingrassiinae (Acariformes: Astigmata: Xolalgidae) are described from shearwaters and petrels (Procellariiformes: Procellariidae) in the North-East of Atlantic Ocean: *Ingrassia calonectris* sp. n. from *Calonectris borealis* (Cory) (type host) and *Calonectris edwardsii* (Oustalet), *Ingrassia micronota* sp. n. and *Opetiopoda bulweriae* sp. n. from *Bulweria bulwerii* (Jardine and Selby).

Key words: Acariformes, feather mites, Xolalgidae, Ingrassiinae, systematics, Aves, Procellariiformes

Introduction

Feather mites (Acariformes: Astigmata) are a very diverse and abundant group of astigmatan mites that live permanently on the body of birds. They are highly specialized ectosymbionts adapted to inhabit well-defined host microhabitats including flight feathers, down, skin and even feather quills (Gaud & Atyeo 1996; Proctor 2003; OConnor 2009). Feather mites have been reported from all avian orders, including penguins, which were traditionally believed to be mite-free because of their strongly modified plumage and subaquatic lifestyle (Mironov & Proctor 2008). Despite their great diversity and wide distribution among hosts, only about 2500 species of feather mites have been described until now, which likely represent only a very small part of the true world mite fauna. It is assumed that the potential number of feather mite species could be twice as great as the number of recent avian species (Peterson 1975).

In the present paper we described three new species of the feather mite subfamily Ingrassiinae (Analgoidea: Xolalgidae), two from the genus *Ingrassia* Oudemans, 1905 and one from the genus *Opetiopoda* Gaud and Atyeo, 1981, from three species of Procellariiformes.

The representatives of the subfamily Ingrassiinae, as for all Xolalgidae, are relatively small-sized and generally weakly sclerotized feather mites that mainly inhabit the downy parts of covert feathers and feed on uropygial gland secretions (Gaud & Atyeo 1996; Mironov 2005). Mites of this subfamily have been recorded from hosts belonging to 16 avian orders (Gaud & Atyeo 1981a, 1996; Mironov & Proctor 2008). In a generic revision of the family Xolalgidae, Gaud and Atyeo (1981a, 1981b) gave uniform diagnoses for genera and listed all valid species that were known up to that time. Within the subfamily Ingrassiinae these authors recognized 57 species in 14 genera. Subsequent investigations of the systematics and biodiversity of ingrassiines were mainly dedicated to mites from Charadriiformes (Chirov & Mironov 1990; Dabert & Ehrnsberger 1991; Vasyukova & Mironov 1991; Dabert 2000; Mironov & Palma 2006) and Psittaciformes (Aty eo & Gaud 1987; Mejía-Gonzalez & Pérez 1988; Pérez 1995, 1996; Dabert *et al.* 2007) and to much less extent to those from other avian orders, such as Falconiformes, Pelecaniformes, Strigiformes and Sphenisciformes (Mironov 1997; Mironov & Galloway 2002;