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An unexpected finding of mammal mites (Psoroptidia: Sarcoptoidea) on a bird

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Short note

ABSTRACT

The psoroptidian mite *Myocoptes musculus* (Koch, 1844) is the most common species of the family Myocoptidae (Sarcoptoidea), along with its main host, the house mouse *Mus musculus* Linnaeus. The present article reports the first recorded confirmation of *M. musculus* on a bird – the tropical screech-owl *Megascops choliba* (Vieillot). Finding myocoptid mites on a non-rodent host is an additional case of predator-prey contamination.

Keywords horizontal transfer; contamination; ectoparasites; Strigiformes; Myocoptidae; *Myocoptes*

Introduction

Mites of the family Myocoptidae Gunther, 1942 (Astigmata: Psoroptidia: Sarcoptoidea) are permanent ectoparasites associated with rodents (Mammalia: Rodentia) (Bochkov 2010; OConnor 2009). These mites are specialized to live on the skin of their hosts, except for the genus *Trichoecius* Canestrini, 1899, which is specialized for living on fur (Bochkov 2010; Fain 1970; Fain *et al.* 1970). Currently 6 genera and more than 60 myocoptid species have been recognized (Bochkov 2010; Bochkov *et al.* 2016; Bochkov and OConnor 2017; Fain 1970; Fain *et al.* 1970). The genus *Myocoptes* Claparède, 1869 is the most diverse in this family, comprising 23 described species (Bochkov 2010; Bochkov and OConnor 2017), including *Myocoptes musculus* (Koch, 1844) the most common species, distributed worldwide along with its main host, the house mouse *Mus musculus* Linnaeus, 1758 (Rodentia: Muridae). This mite is also the main cause of the myocoptic mange in laboratory white mice around the world (Rice *et al.* 2013).

The two myocoptids recorded on non-rodent hosts are likely contaminations: *M. ictonyx* Fain, 1970 was described from the striped polecat *Ictonyx striatus* (Perry, 1810) (Carnivora: Mustelidae) from Africa (Fain *et al.* 1970), and *M. musculus* was also recorded on the spotted-tailed quoll *Dasyurus maculatus* (Kerr, 1792) (Marsupialia: Dasyuridae) from Australia (Vilcins *et al.* 2008). Samples recovered from these hosts were scarce and both species are known to prey on rodents (Bochkov 2010; Vilcins *et al.* 2008; Fain *et al.* 1970).

In the present study we report the finding of *M. musculus* on a bird, the tropical screech-owl *Megascops choliba* (Vieillot, 1817) (Aves: Strigidae) in Brazil.

Materials and methods

During September of 2015 a tropical screech owl *Megascops choliba* was kept in captivity after being attacked and injured by a dog in Mogi Mirim, São Paulo State, Brazil. The owl was fed daily with live white mice (*Mus musculus*). After a month, the bird died and was taken to the Acari laboratory of the São Paulo State University (UNESP) in Rio Claro, where it was washed for ectoparasites following the technique described by Clayton and Walther (1997). The recovered mites were put in 30% lactic acid for 24 hours, then mounted on microscopic

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slides using Hoyers medium and heated at 50 °C for 5 days. The slides were then sealed with varnish and labeled. The mites were identified by means of a light microscope with differential interference contrast following Fain (1970).

Results and discussion

A total of 5 males, 7 females, 3 nymphs and 1 larva of *Myocoptes musculus* (Figure 1) were recovered from *Megascops choliba*. The bird had no evidence of any harmful effects, such as mange or plucking behavior.

Similar cases of horizontal transfer between psoroptidian mites to new host species often result in severe and harmful effects by the mites (Andriantsoanirina *et al.* 2015; 2016; Hernandez *et al.* 2014; Mironov 2013; Skerratt *et al.* 1998).

The fact that only myocoptid mites were found on the owl might indicate that the bird was previously free of typical bird mites (Astigmata: Analgoidea, Pterolichoidea) and therefore there was no competition between mammalian (Astigmata: Sarcoptoidea) and avian mites. Notwithstanding, the owl's condition (injured, stressed and caged) probably facilitated colonization by the atypical mites.

Other cases in which potential mite transfer can occur involve interspecific interaction between birds, such as feather mites on obligatory brood parasite birds. However, in most of these cases, mites are not transmitted from foster parents to the bird parasitic nestling, but instead are acquired from a conspecific host later in life, probably during copulation or other intraspecific interaction (Atyeo and Gaud 1983; Gaud 1992). Birds of prey (e.g. falcons, hawks and owls), which prey on many bird species, and thus could have a higher probability of acquiring mites from their prey, were rarely reported with mites other than their typical associated taxa. *Proctophyllodes polyxenus* Atyeo & Braasch, 1966 (Analgoidea: Proctophyllodidae), a typical passerine-associated feather mite, was also recorded on three owl species, which certainly represent predator-prey contamination (Atyeo and Braasch 1966; Philips 2000).

On the other hand, a recent cophylogenetic study on feather mites of the genera *Proctophyllodes* Robin, 1877 and *Trouessartia* Canestrini, 1899 (Analgoidea: Proctophyllodidae and Trouessartiidae) concluded that horizontal transfer – i.e. between different host species – is



Figure 1 *Myocoptes musculus* (Koch, 1844), dorsal view of male (left) and female (right).

probably the main cause for speciation in these mites, suggesting that interspecific transfer can occur more commonly in nature than what was previously estimated (Doña *et al.* 2017).

The present finding represents the first record of a mammal mite on a bird; the opposite situation was recorded by Gaud (1992), who reported a few specimens of *Ciconiacarus* Gaud, 1973 (Pterolichoidea: Vexillariidae), typically associated with hornbills (Aves: Bucerotiformes), on two old-world monkey skins of the genera *Colobus* and *Cercopithecus*. The author later discovered that the monkeys and the bird were placed on the same table during the taxidermy process in the field.

Discovering *M. musculus* on an atypical host like a strigid bird is obviously a case of predator-prey contamination. Still, despite the phylogenetic distance between the hosts, the similarity of their symbiotic mites is remarkably close, and it might suggest a possible route from which the lineage of mammal associated psoroptidians (Astigmata: Sarcoptoidea) successfully colonized these new hosts by evolving from bird associated mites (Analgoidea) (Klimov and OConnor 2008; 2013).

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