New records of the feather mite *Pterolichus obtusus* Robin, 1877 (Acariformes: Astigmata: Pterolichidae) parasitizing chickens *Gallus gallus domesticus* (L.) (Galliformes: Phasianidae) in Brazil

José Dantas Araújo Lacerda, Henri Castro Pacheco, Magno Chagas Souza, Nasly Cristianna Gonçalves Xavier, Wilton Pires da Cruz, Fabio Akashi Hernandes

*University Campus of Parauapebas, Universidade Federal Rural da Amazônia (UFRA), Via de acesso para a UFRA, Rodovia PA 275, Km 08, Zona Rural, mailbox 3017, zip code 68515-000, Parauapebas City, Pará, Brazil.

*Departamento de Ecologia e Zoologia, CCB/ECZ, Trindade, Universidade Federal de Santa Catarina, 88040-970 – Florianópolis, SC, Brazil.

**Short note**

**ABSTRACT**

The feather mite *Pterolichus obtusus* Robin, 1877 (Astigmata: Pterolichidae) is associated with *Gallus gallus domesticus* (L.) worldwide. Here, we report new records of this species from rustic chickens in Brazil after a gap of 45 years, and for the first time in a northern area of this country. The major role of Brazil as one of the main chicken meat producers and exporters highlights the importance of these new findings. Knowing and keeping track of the distribution of this ectoparasitic species might offer valuable information for the development of animal health programs and policies aimed at mitigating mite pest infestations, in addition to support decision-making processes regarding research funding to study the damage caused by *P. obtusus* in domestic and wild fowl populations, contributing to the advancement of aviculture.

**Keywords** feather mite; rustic chickens; Minas Gerais; Pará; Eastern Amazon

**Introduction**

In addition to the prominent role of Brazil as one of the leading producers and exporters of chicken meat in large-scale facilities (Aquino 2021; Uzundumlu & Dilli 2023), the practice of raising chickens in small rural areas for subsistence is widespread across all regions of the country, particularly among low-income populations. Referred to as domestic poultry (“galinha caipira” in Brazilian Portuguese) (Feitosa Jr. *et al.* 2020), these rustic chickens are commonly bred in urban areas of rural towns. However, this situation can contribute not only to the spread of ectoparasites but also to the dissemination of other significant disease-causing agents. The chickens are often allowed to roam freely and come into close contact with other domestic and wild birds (Arends 1997; Cunha *et al.* 2020).

Feather mites (Acariformes: Astigmata) are a substantial group of ectoparasitic arthropods permanently and exclusively associated with birds. They encompass over 2500 species, classified into 34 families and two superfamilies: Analgoidea and Pterolichoidea (Gaud & Atyeo 1996; Proctor 2003; Klimov & O'Connor 2008; Mullen and O'Connor 2019). A number
of feather mite families from both the Analgoidea and Pterolichoidea have been documented in association with chickens worldwide. Mironov (2013) listed nine families of analgoidean mites, which representatives reside on the feathers, skin, in the quill cavities and respiratory tract of chickens, and of two families of pterolichoidean mites living on the feathers and in the quills.

In the family Pterolichidae, two species have been documented in association with domestic chickens, *Pterolichus obtusus* Robin, 1868 and *Epistomolichus reticulatus* Mironov, Pérez et Palma, 2009; the former worldwide (e.g. Kaschula & Stephan 1947; Gaud 1965; Manuel & Siore 1967; Rosen et al. 1985; Corpuz-Raros 1993; Sangvaranond 1993, 1994, 2003; Alekseev 1998; Wang & Fan 2010; Jankovska et al. 2012; Lakyat et al. 2022) and the latter from Galápagos Islands (Mironov et al. 2009). In the New World, *P. obtusus* has been reported in various countries, including the USA (Hirst 1922), Cuba (Černý 1970; Rodríguez et al. 2016; Santana & Pineda 2019), Costa Rica (Hernandez-Divers et al. 2008, Hernandez et al. 2013), Argentina (Roveda & Boero 1962), Peru (García et al. 2021), and Brazil (Hipólito & Freitas 1943; Oba et al. 1978).

In the present paper, we report the presence of *P. obtusus* on rustic chickens in two regions of Brazil, marking a significant rediscovery of this mite after a gap of 45 years since its last reported occurrence in the country.

**Materials and methods**

The mites reported herein came from small backyard chicken houses of two Brazilian administrative regions: 1) North: Marabá and Parauapebas, Pará State; 2) Southeast: Pains, district of São Lourenço, Minas Gerais State. In the case of the rustic chickens from Parauapebas, it was noticed that they appeared uncomfortable, and hardly gained weight – it was later shown that their wing feathers were full of parasitic mites. In the chickens from Marabá, the presence of mites was also observed. In the latter, the breeding conditions were more technical, with chickens resulted from cross breeds between rustic and Indian giant breed, in addition to being fed with a balanced diet, regularly vaccinated and dewormed – in these, the number of mites observed was visibly lower and there was no evidence of mite-related stress in the chickens.

Feather samples were sent inside dry bags to the Laboratory of Entomology of the Universidade Federal Rural da Amazônia, Campus of Parauapebas, and to the Acarology laboratory of the Universidade Federal de Santa Catarina, Florianópolis, for evaluation. The mite samples were collected from the feathers using a stereomicroscope. The mites specimens were mounted on slides using Hoyer’s medium (Krantz & Walter 2009) and identified using light microscope based on the appropriate taxonomic literature (e.g. Atyeo & Gaud 1992; Gaud & Atyeo 1996; Mironov et al. 2010). Voucher specimens are deposited at the Acari Collection of the Department of Ecology and Zoology, Universidade Federal de Santa Catarina (ECZ-UFSC).

**Results and discussion**

All examined mite specimens were identified as *Pterolichus obtusus* Robin, 1877 (Pterolichidae) (Fig. 1). Three species are currently included in the genus *Pterolichus*: *P. obtusus*, *P. lithodorus* Gaud, 1965, and *P. stenochaetus* Gaud, 1965, the latter two species described from African francolins (*Francolinus* spp., Galliformes, Phasianidae, Gallini). The main diagnostic characters of this genus were outlined by Mironov et al. (2010, table I), and include: in both sexes, dorsal setae *h1* absent; in males, legs III and IV subequal in thickness, subapical claw on tarsus IV absent, both setae *d* and *e* on tarsus IV filiform; and in females, dorsal setae *d2* and *e1* inserted on the main hysteronotal shield.

Material examined. From *Gallus gallus domesticus* (L.): 6♂♂, 6♀♀, 1n, Marabá (5°12′26.75″S; 49°02′46.14″ W), Pará State, 02.V.2022; 4♂♂, 9♀♀, Parauapebas (6°04′39.50″S;
Figure 1 *Pterolichus obtusus* Robin, 1877, dorsal view of adults: A – male, B – female.

*Pterolichus obtusus* was previously reported in Brazil only twice: once in Minas Gerais state (no specific locality mentioned, Hipólito & Freitas 1943) and once in Mogi das Cruzes, São Paulo State, from industrial flocks of laying hens (Oba *et al.* 1978). This current record represents a notable rediscovery of the species, as its last known occurrence in this country dates back 45 years.

Among feather mites known to cause injury to farmed chickens globally, the most significant species include *P. obtusus* (Pterolichoidea: Pterolichidae), *Megninia* spp. (Analgoidea: Analgidae), and *Allopsoroptoides galli* Mironov (Analgoidea: Psoroptoididae) (Gaud *et al.* 2023).
These species can cause dermatitis, leading to reduced performance and significant economic losses in poultry (D’Souza et al. 2001; Mullen & O’Connor 2019). The observed symptoms in the chickens from Parauapebas are consistent with those previously reported in chickens infested with *P. obtusus*, such as bird restlessness, weight loss, reduced egg production and irregular molting patterns (Alekseev 1998). However, without a comprehensive systematic study under controlled conditions, it is not possible to definitively correlate these symptoms with the presence of these mites.

The current findings reveal that *P. obtusus* is more widely distributed in Brazil than previously suggested from the limited literature sources (Hipólito & Freitas 1943; Oba et al. 1978). We reveal that this species has persisted in the country despite the development of industrial rearing of chickens in large facilities, where young chicks are isolated from parental contact. This system impedes the primary mode of feather mite transmission between individuals – the vertical transmission (Doña et al. 2017). As demonstrated, small rural and backyard farms facilitate intergenerational contact between adult chickens and young chicks, maintaining populations of *P. obtusus* and other feather mites associated with chickens. Consequently, these farms can serve as ongoing sources of mite infestation for chickens and other poultry in the region.

The importance of Brazil as a major producer and exporter of chicken meat (Aquino 2021; Uzundumlu & Dilli 2023) underlines the significance of the present findings. By identifying the presence of these mites on chickens in Brazil, this brief communication provides valuable information for the development of animal health programs and policies aimed at controlling mite infestations. Additionally, it provides essential support for decision-making processes related to research funding dedicated to studying the impact of *P. obtusus* in both domestic and wild fowl populations, thus contributing to the advancement of aviculture in the country. Understanding the specific locations where these mites are prevalent enables the implementation of targeted measures to control their spread and prevent outbreaks and transfers between aviaries.

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**Declarations**

**Ethics approval and consent to participate**

Not applicable.

**Consent for publication**

Not applicable.

**Competing Interests**

The authors declare no competing interests.

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ORCID

José Dantas Araújo Lacerda  https://orcid.org/0000-0003-4438-2322
Henri Castro Pacheco  https://orcid.org/0000-0002-4051-9216
Magno Chagas Souza  https://orcid.org/0000-0002-9475-4772
Nasly Cristianna Gonçalves Xavier  https://orcid.org/0000-0003-3379-7872
Wilton Pires da Cruz  https://orcid.org/0000-0001-7962-9108
Fabio Akashi Hernandes  https://orcid.org/0000-0003-3504-2609

References


