

**THE FIRST RECORD OF *PROMYIALGES PARI* FAIN, 1965  
(ACARIFORMES: EPIDERMPTIDAE) FROM THE LOUSE FLY  
*ORNITHOMYA AVICULARIA* L., 1758 (DIPTERA: HIPPOBOSCIDAE)  
IN EUROPEAN RUSSIA**

**Aleksandra A. Yatsuk\* and Alexandr V. Matyukhin**

A.N. Severtsov Institute of Ecology and Evolution, Moscow, Russia

\*corresponding author; e-mail: sasha\_djedi@mail.ru

ABSTRACT: A *Promyialges pari* Fain, 1965 (Analgoidea: Epidermoptidae) feather mite was found on the louse fly *Ornithomya avicularia* L., 1758 (Diptera: Hippoboscidae), recovered from Eurasian rook, *Corvus frugillegus* L., 1758 (Passeriformes: Corvidae), in the south of European Russia. This is the first record of *P. pari* in Russia and on the aforementioned bird host.

KEY WORDS: Feather mites, *Promyialges pari*, *Ornithomya avicularia*, Diptera, host associations, fauna, Aves.

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## INTRODUCTION

Feather mites of the family Epidermoptidae (Astigmata: Analgoidea) are permanent and highly specialized ectoparasites of birds. Throughout all of their life stages, epidermoptids live on the skin of avian hosts, slowly moving over the surface or penetrating into the epidermis (Dubinin 1953; Fain 1965; Mironov 1987, 1999; Gaud and Atyeo 1996). Since epidermoptids may cause various mange-like diseases in bird hosts, this feather mite family is of a high veterinary importance (Dubinin, 1953; Fain 1965; Gilardi *et al.* 2001). All representatives of the Myialginae subfamily, as well as of three Epidermoptinae subfamily genera (*Metamichrolichus* Fain, 1965, *Microlichus* Trouessart et Neumann, 1888 and *Promyialges* Fain 1964) have phoretic relationships with louse flies (Diptera: Hippoboscidae) and chewing lice (Phthiraptera) that parasitize birds (Fain 1965; Philips and Fain 1991). Fertilized females of these mites use louse flies and chewing lice to disperse and to infect birds. Females of the Myialginae subfamily and of the *Promyialges* genus lay eggs on the cuticles of the aforementioned insects, around the place of attachment, on the abdomen or on the basal parts of wings. Moreover, the representatives of the subfamily Myialginae are hyperparasites: females gnaw through cuticles with their chelicerae and feed on the hemolymph of insects. While feeding, the hysterosoma of these mites significantly expands, and females begin to lay eggs (Cooreman 1944; Büttiker 1948; Dubinin 1950; Furman and Tarshis 1953; Hiregaudar 1956, 1957; Evans *et al.* 1963; Hill *et al.* 1967; Büttiker and Černý 1974; Madden and Harmon 1998; Mironov *et al.* 2005; Whiteman *et al.* 2006; Macchioni 2007; Valim and

Gazeta 2007; Marcelino *et al.* 2009; Yamauchi and Kuroki 2009; Goater *et al.* 2018).

The genus *Promyialges* Fain, 1964 (Epidermoptinae), whose representatives only disperse with louse flies, was originally established by Fain (1964) for a single species, *Microlichus uncus* Vitzthum, 1934. In the revision of the family Epidermoptidae, Fain (1965) placed this taxon into the genus *Myialges* Trouessart, 1906 as a subgenus with 6 species: *M. (P) cooremani* Fain, 1965; *M. (P) falconis* Fain, 1965; *M. (P) lophortyx* (Furman et Tarshis, 1953); *M. (P) macdonaldi* Evans, Fain et Bafort, 1963; *M. (P) pari* Fain, 1965; *M. (P) uncus* (Vitzthum, 1934) (Fain 1965). Subsequently, *Promyialges* was again elevated to the status of a genus, while two of its species—*M. (P) cooremani* and *M. (P) macdonaldi*—have been moved into separate genera (Mironov *et al.* 2005). Recently, one more species—*P. italicus* Faradonbeh *et al.*, 2019—has been described from Italy (Faradonbeh *et al.* 2019).

Our study presents the first record of the epidermoptid mite *Promyialges pari* in Russia and new data on its host associations and egg laying.

## MATERIALS AND METHODS

The primary material (louse flies *Ornithomya avicularia* L., 1758) (Diptera: Hippoboscidae) has been collected in June, 2013 near Rostov-on-Don, Russia (47°13.881'N, 39°43.3968'E) from the Eurasian rook *Corvus frugillegus* L., 1758 (Passeriformes: Corvidae) and fixed in vials with 96% ethanol. The flies were identified and examined for the presence of epidermoptids. The mites, after being removed from flies, were mounted on slides

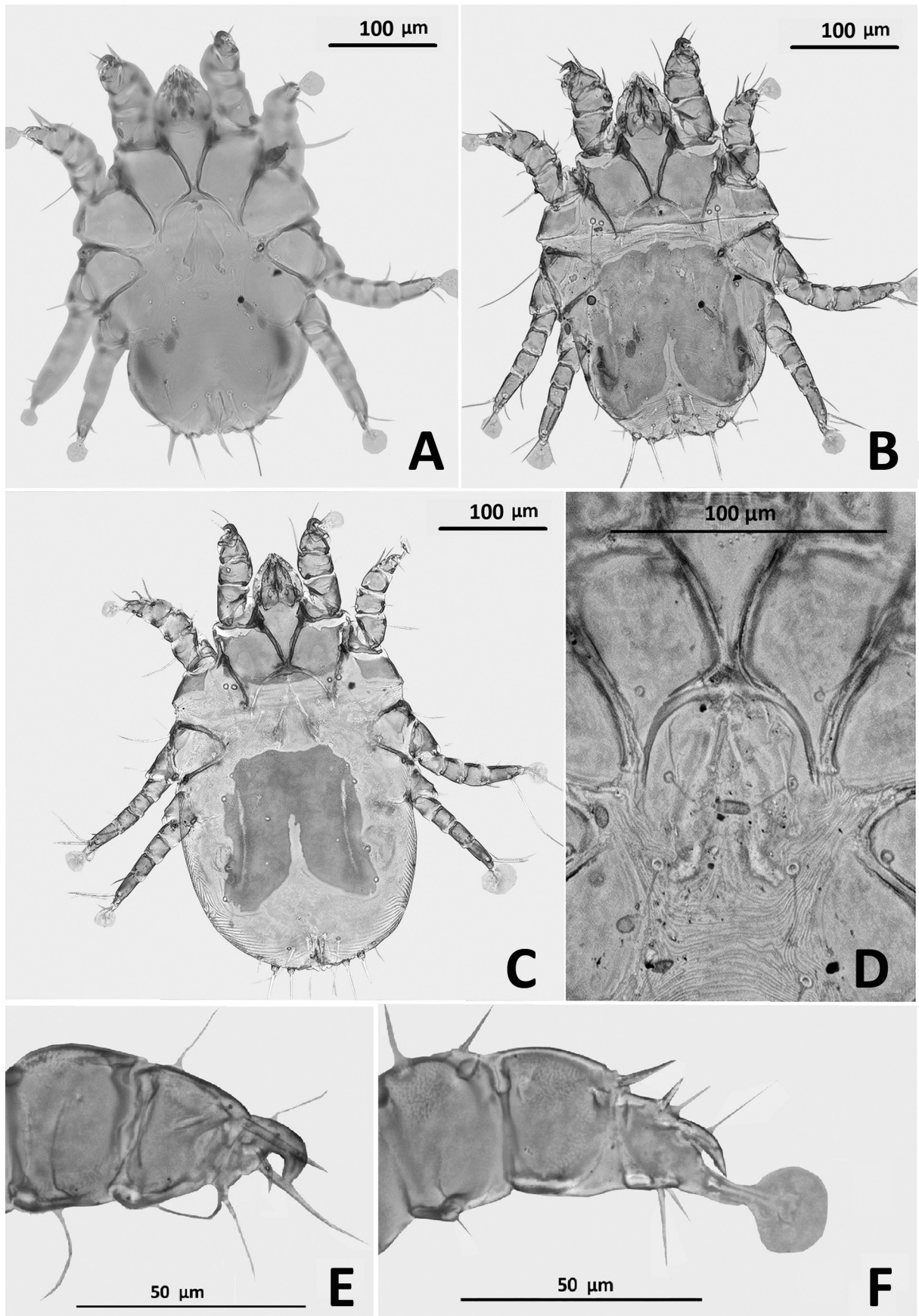


Fig. 1. *Promyalges pari*, female. A—non-engorged female, ventral view; B—non-engorged female, dorsal view; C—engorged female, dorsal view; D—epigynum and oviporus; E—tibia and tarsus I; F—tibia and tarsus II.

in Hoyer's medium according the standard technique used for small mites (Krantz and Walter 2009) and examined with a Keyence microscope BZ-9000 (Keyence, Japan).

The identification of mite species was made using a key by Fain (1965) and the identification of flies species was based on the keys by Maa (1969a) and Doszhanov (1980; 2003). All mite and fly specimens have been deposited in the collection of A. N. Severtsov Institute of Ecology and Evolution (Moscow, Russia).

## RESULTS AND DISCUSSION

A total of 13 *Ornithomya avicularia* louse fly females, bearing epidermoptid mites have been collected. On each fly, one *Promyialges pari* female (Fig. 1) surrounded by a wreath of eggs was found attached to the cuticle, on the ventral surface of the basal part of the wing. The number of eggs in each wreath varied from 3 to 13 (Table 1).

Representatives of *P. pari* were initially found on the skin of the Great tit *Parus major* L., 1758 (Passeriformes: Paridae) in Belgium by Fain (1965). Later on, this mite species was found in different parts of the world, mainly in the Eastern Hemisphere from a wide spectrum of birds belonging to the orders Coraciformes, Cuculiformes, Falconiformes, Galliformes and Passeriformes (Table 2). It is necessary to note that in some cases (Philips and Fain 1991), researchers doubted their identification of mites as *P. pari*, in particular, the specimens collected in Colombia, Papua New Guinea and Central Africa. Herein, *P. pari* is recorded for the first time in European Russia, as well as from *C. frugilegus* as an avian host.

*Ornithomya avicularia*—a common insect host of *P. pari* in western Europe—is a polyhostal fly species, distributed widely in the Palearctic region from western Europe to the Russian Far East and from central Karelia to northern Africa. It parasitizes a wide spectrum of Northern Palearctic birds, including various Corvidae (Thompson 1936, 1939; Maa 1969a, 1969b; Doszhanov 1980, 2003; Matyukhin 2010; Matyukhin *et al.* 2016, 2017). In particular, according to Maa (1969b), *O. avicularia* parasitizes 65 genera of birds, distributed across 23 families and 9 orders. In Israel, this louse fly was recorded on *Turdus merula* L., 1758 (Bear and Freidberg 1995); in Kazakhstan, Central Asia, and Western Siberia—on 81 species of birds from 24 families and 9 orders (Doszhanov 2003); in the Middle Volga region (Russia)—on 42 species from 19 families (Boyko *et al.* 1973). In the Pa-

laearctic region, *O. avicularia* parasitizes 67 bird species, distributed across 59 genera, 28 families and 11 orders. Nine of the 67 species are from the Corvidae family: *Corvus corax* L., 1758, *C. corone* L., 1758, *C. cornix* L., 1758, *C. frugilegus* L. 1758, *C. monedula* L., 1758, *Nucifraga caryocatactes* (L., 1758), *Pica pica* (L.), 1758, *Garrulus glandarius* (L., 1758) and *Perisoreus infaustus* (L., 1758) (Matyukhin *et al.* 2014). Therefore, the finding of *P. pari* in the Rostov Region (European Russia) shows that this species is distributed in Europe much further to the east than was previously thought. This fact encourages further studies of epidermoptids, which disperse with louse flies and are potentially able to infect a wide spectrum of hosts, including domestic poultry.

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Table 1

Number of *Promyialges pari* females and the number of eggs in their clutches.

Eggs in clutch, n	Females, n
3	3
5	4
9	4
11	1
13	1

Table 2

Host associations and distribution of *Promyialges pari*.

Louse fly species	Bird species	Bird family	Locality	Reference
<i>Ornithomya avicularia</i> L., 1758	<i>Parus major</i> L., 1758	Paridae	Belgium	Fain 1965
“	<i>Periparus ater</i> (L. 1758)	Paridae	Belgium	Fain 1965

“	<i>Turdus philomelus</i> Brehm, 1831	Turdidae	Belgium	Fain, 1965
“	<i>T. viscivorus</i> L., 1758	Turdidae	Belgium	Fain 1965
“	<i>T. merula</i> L., 1758	Turdidae	Belgium	Fain and Grootaert 1996
“	unknown	unknown	Germany	Walter, 1989
“	<i>Corvus frugilegus</i> L. 1758	Corvidae	Russia	Present study
<i>O. fusciventris</i> Wiedemann, 1830	<i>Tangara arthus aurulenta</i> Lafresnaye, 1843	Thraupidae	Colombia*	Philips and Fain 1991
<i>Ornithoica exilis</i> Walker, 1861	<i>Halcyon chloris tristrami</i> Layard, 1880	Alcedinidae	Papua New Guinea: New Britain*	Philips and Fain 1991
“	<i>H. cinnamomina reichen- bachi</i> Swainson, 1821	Alcedinidae	FS of Micronesia: Pohnpei	Philips and Fain 1991
<i>Ornithophila metallica</i> Schiner, 1864	<i>Ammoperdix</i> sp.	Phasianidae	Turkey	Philips and Fain 1991
“	<i>Falco tinnunculus</i> L., 1758	Falconidae	Cyprus	Philips and Fain 1991
“	<i>Halcyon chloris tristrami</i> Layard, 1880	Alcedinidae	Papua New Guinea: New Britain*	Philips and Fain 1991
“	<i>Lonchura cucullata</i> Swainson, 1837	Estrildidae	Congo*	Philips and Fain 1991
“	<i>Corvus corone</i> L., 1758	Corvidae	Egypt	Philips and Fain 1991
“	<i>Cuculus solitaries</i> Stephens, 1815	Cuculidae	Congo*	Philips and Fain 1991
“	<i>Motacilla alba</i> L., 1758	Motacillidae	Afghanistan	Philips and Fain 1991
“	<i>Malaconotus blanchoti</i> Stephens, 1826	Malaconotidae	Uganda	Philips and Fain 1991

\*Researchers doubted their identification of mites from this locality as *P. pari*.