

## Original papers

## New for the fauna of Poland species of *Psorergates* spp. with the data of occurrence of mites from Psorergatidae family (Acari, Prostigmata) in native mammals

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**ABSTRACT.** Five species of skin mites from Psorergatidae family have been found in four rodent species (*Apodemus flavicollis*, *A. sylvaticus*, *Mus musculus*, *Myodes glareolus*) coming from northern part of Poland. Three species (*Psorergates microti*, *P. musculus*, *P. simplex*) appeared to be new ones for the fauna of Poland. Moreover *A. sylvaticus* and *M. glareolus* are a new hosts for *P. apodemi*, *P. muricola*, *P. microti* and *P. musculus* from Poland. All developmental stages with immature stages predominance were found within particular species. The mites were found in skin fragments from different body areas, however they preferred head skin. The paper presents the list of species observed so far in Poland taking into consideration their hosts – currently the Psorergatidae fauna in Poland includes 10 species noted in eleven mammals species among rodents, bats and insectivores.

**Key words:** skin mites, Psorergatidae, *Psorergates*, Rodentia, Poland

### Introduction

The family of Psorergatidae (Acari, Prostigmata) includes small disc-like mono- or oligoxenous parasitic mites of mammals skin noted so far in insectivores, bats, treeshrews, primates, predators, rodents, lagomorphs, elephant shrews and even-toed ungulates [1,2]. That group is considered to be closely related with Demodecidae, however it maintained more archaic features like setae on idiosoma or non-specialised immature stages [3]. Over 70 species belonging to three genera have been described in Psorergatidae family [1]. In Poland, seven species connected to rodents, insectivores and bats have been noted so far [4–10]. Currently that list has been completed with subsequent species and hosts new for Poland.

### Materials and methods

As many as 50 house mice *Mus musculus* Linnaeus, 1758, 20 wood mice *Apodemus sylvaticus* Linnaeus, 1758, 20 yellow-necked field mice

*A. flavicollis* (Melchior, 1834) and 25 bank voles *Myodes glareolus* (Schreber, 1780) were studied. Rodents came from the north of Poland (*M. musculus* – Gdańsk, site I, 54°19'N/18°37'E; other – Hopowo, site II, 54°15'N/18°14'E) and were obtained in September 2009 (site I) and from August to September 2010 (site II). Sections of skin from various parts of body, including head (regions of eyes, ears, nose, vibrissae, lips, chin), abdomen, back, legs, genital-anal region, were analyzed for the presence of topical mites with the use of method of digesting skin fragments [11]. Digested fragments 1 cm<sup>2</sup> of skin were decanted and analyzed with the use of phase contrast microscope. *Psorergates* specimens were measured and permanent specimens were prepared in Faure's solution.

### Results and discussion

Five species of Psorergatidae family have been demonstrated in the present study, including two in fragments of skin of bank vole and wood mouse,

and one in house mouse and yellow-necked field mouse. Three species: *Psorergates microti* Fain, Lukoschus and Hallmann, 1966; *P. musculinus* (Michael, 1889) and *P. simplex* (Tyrrell, 1883) are new for the fauna of Poland. In turn, *P. muricola* Fain, 1961 was previously noted only in the house mouse, and has been now found in the wood mouse. Also *P. apodemi* Fain, Lukoschus and Hallmann, 1966 has been found in *A. sylvaticus* for the first time. Moreover *A. sylvaticus* and *M. glareolus* are a new hosts for the psorergatid mites in Poland (Table 1). All developmental stages with predominance of immature stages were mostly found within particular species. The mites were found in skin fragments from different areas of the body, however the most often in head region (Table 2). Psorergatid mites do not cause lesions in host. Meanwhile, in earlier studies were observed scabs on the front and hind legs of rodents caused by *P. apodemi*. [4]. The *P. dissimilis* Fain, Lukoschus and Hallmann, 1966 found on the ears and abdomen, near the hind legs of *M. arvalis* [4]. The *P. olawaensis* Haitlinger,

1987 was found within the epidermis of the ear concha [9].

*P. simplex* is connected to house mouse (also laboratory one) where it can cause the occurrence of skin lesions: nodules in skin, dermal cysts, sometimes scabby dermatitis of ears [12]. Clinical symptoms are very often difficult to diagnose in live animals, but characteristic white nodules on internal skin side are often observed during dissection. That species was demonstrated so far in France, Holland, Canada, Germany, Russia, Ukraine, USA, Italy and Great Britain [1,13], however it is probably cosmopolitan species similarly like its typical host. *P. musculinus* in turn was noted in *Microtus agrestis* (Linnaeus, 1761) in England, in *Myodes glareolus* in Holland and in *Apodemus sylvaticus* in France [1], and in Poland it was presently observed only in bank vole. The third of species demonstrated in Poland for the first time, *P. microti* also coming from bank vole, was previously described in Arvicolinae (*M. agrestis*, *M. glareolus*) in Holland [14].

Table 1. Records of psorergatid mites in Poland

Host	Species of Psorergatidae	Records
<i>Apodemus sylvaticus</i> Linnaeus, 1758**	<i>Psorergates apodemi</i> Fain, Lukoschus and Hallmann, 1966	present
	<i>Psorergates muricola</i> Fain, 1961	present
<i>Apodemus flavicollis</i> (Melchior, 1834) (= <i>Apodemus tauricus</i> Pallas, 1811)	<i>Psorergates apodemi</i> Fain, Lukoschus and Hallmann, 1966	[4], present
<i>Apodemus uralensis</i> Pallas, 1811 (= <i>Apodemus microps</i> Kratochvíl and Rosicky, 1952)	<i>Psorergates apodemi</i> Fain, Lukoschus and Hallmann, 1966	[4]
<i>Mus musculus</i> Linnaeus, 1758	<i>Psorergates muricola</i> Fain, 1961	[8]
	<i>Psorergates simplex</i> (Tyrrell, 1883) *	present
	<i>Psorergates</i> sp.	[7]
<i>Myodes</i> (= <i>Clethrionomys</i> ) <i>glareolus</i> (Schreber, 1780)**	<i>Psorergates microti</i> Fain, Lukoschus and Hallmann, 1966*	present
	<i>Psorergates musculinus</i> (Michael, 1889) *	present
<i>Microtus subterraneus</i> (de Selys-Longchamps, 1836) (= <i>Pitymys subterraneus</i> de Selys-Longchamps, 1836)	<i>Psorergates polonicus</i> Haitlinger, 1986	[6]
<i>Microtus arvalis</i> (Pallas, 1778)	<i>Psorergates apodemi</i> Fain, Lukoschus and Hallmann, 1966	[4]
	<i>Psorergates dissimilis</i> Fain, Lukoschus and Hallmann, 1966	[4]
<i>Crocidura suaveolens</i> (Pallas, 1811)	<i>Psorergates olawaensis</i> Haitlinger, 1987	[9]
<i>Myotis myotis</i> (Borkhausen, 1797)	<i>Psorergatoides kerivoulae</i> Fain, 1959	[5]
<i>Nyctalus noctula</i> (Schreber, 1774)	<i>Psorergatoides nyctali</i> Baker, 2005	[10]
<i>Plecotus auritus</i> Linnaeus, 1758	<i>Psorergatoides kerivoulae</i> Fain, 1959	[5]

\* new species in Poland

\*\* new host of psorergatid mites in Poland

Table 2. Localization and number of *Psorergates* individuals found in rodents

Host	Species of <i>Psorergates</i>	Number of infested hosts	Number of <i>Psorergates</i> specimens*	Localization in skin
<i>Apodemus sylvaticus</i> [N=20], site II	<i>P. apodemi</i>	6	42 ♀♀, 9 ♂♂, 12 Nymphs, 11 Larvae, 22 eggs	mainly head (regions of eyes, vibrissae, ears), in addition abdomen, back, legs
	<i>P. muricola</i>	3	11 ♀♀, 13 Nymphs, 5 Larvae, 15 eggs	head (regions of eyes, vibrissae, nose)
<i>Apodemus flavicollis</i> [N=20], site II	<i>P. apodemi</i>	8	56 ♀♀, 22 ♂♂, 7 Nymphs, 15 Larvae, 36 eggs	head (regions of eyes, vibrissae, nose)
<i>Mus musculus</i> [N=50], site I	<i>P. simplex</i>	12	33 ♀♀, 7 ♂♂, 3 Nymphs, 5 Larvae, 25 eggs	mainly head (regions of eyes, ears, chin), in addition abdomen
<i>Myodes glareolus</i> [N=25], site II	<i>P. microti</i>	3	16 ♀♀, 15 eggs	head (vibrissae), genital-anal region
	<i>P. musculus</i>	2	12 ♀♀, 1 ♂, 5 eggs	head (ears)

\*number of specimens in infested skin fragments

Among the other species, *P. muricola* was noted so far in *M. musculus* in Holland and Poland, in *A. sylvaticus* in Holland, and moreover in Zaire in *Hybomys univittatus* (Peters, 1876), *Lophuromys aquilus* (True, 1892) and *Otomys irroratus elgonis* Wroughton, 1910 [14,15]. *P. apodemi* in turn is typical parasite of wood mouse described in Holland [14].

*P. simplex* was the first species of *Psorergates* genus described by Tyrrell in 1883 in house mouse in Canada [1,14]. After discovery of subsequent species, the Psorergatidae family was separated [13,16], and was next supplemented by Fain [17,18] with two genera *Psorobia* and *Psorergatoides*. The mites of Psorergatidae are relatively seldom the subject of the study, what is connected to their small size and methodical difficulties in their detection in mammals skin. Only seven species connected to their typical hosts have been observed in Poland so far (Table 1). Two of them were concurrently the new ones for the science [6,9]. There is however lack of comprehensive studies – that family has not been even included in the latest lists of animals species in Poland [19,20]. The data from Poland has not been also included in world Psorergatidae elaboration containing among others a list of these mites species and hosts list respecting occurrence all over the world [1].

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