

Occurrence of *Demodex* spp. (Acari, Demodecidae) in the striped field mouse *Apodemus agrarius* (Rodentia, Muridae) in Poland

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ABSTRACT. The hair follicle mites (Acari, Demodecidae) are obligatory and specific parasites of mammals, important in human and veterinary medicine. The family is represented by more than 100 species worldwide and 30 in Poland, therein 11 species (and 3 subspecies) were discovered from 10 species of native rodents. Fifty two striped field mice *Apodemus agrarius* from eastern Pomerania (Poland) were examined in 2006–2007; the presence of mites was confirmed by the standard method of digesting skin fragments (from head, belly, groin, limbs, genital-anal region, neck and back). Two demodectic mites were found: *Demodex agrarii* and *D. arvicolae* – specifically the form *D. a. apodemi*, previously recorded in the wood mouse (*Apodemus silvaticus*). *Demodex* spp. were noted in 53.8% of the examined mice; *D. arvicolae* was the dominant species (prevalence 48.1%, mean intensity 12.5), whereas *D. agrarii* was found in only a few hosts (prevalence 13.5%, mean intensity 7.6); these mites were more frequently found in males. *D. a. apodemi* were found mainly in skin of head and very few in skin of genital-anal region. *D. agrarii* lives in the ducts of the auricular sebaceous gland, in which all its developmental stages have been found; it is precisely the specific habitat of *D. agrarii* that determines its large size and its strongly elongated shape.

Key words: hair follicle mite, *Demodex agrarii*, striped field mouse, *Apodemus agrarius*, infestation, rodents

Introduction

The Demodecidae are a family of highly specialised, obligate, stationary and specific (monoxenic) mites parasitising mammals. They consist of over 100 species in seven genera and have so far been recorded in mammalian species from thirteen different orders. Hair follicle mites exhibit a range of specific adaptations to life on the host's skin; even more interesting, however, is the existence on the same host of different synhospitolic species that display diverse topographic preferences and diverse adaptations to the microhabitats they have colonised.

So far, the greatest number of demodectic mites, including the synhospitolic ones, has been described in rodents (over 30%). Paradoxically, however, these are the least known species, as detailed studies of the Demodecidae, both in Poland and worldwide, have tended to concentrate on a few species of the greatest medical/veterinary significance. Indeed,

until recently, only 14 *Demodex* species parasitising humans, farm animals and pets had been mentioned in the Polish literature [1,2]. To this number have since been added the representative of a new genus – *Soricidex dimorphus* Bukva, 1982 – which was found in the common shrew [3], as well as further species of the nominative genus parasitising various rodent species: house mouse, brown rat and Eurasian red squirrel [4–8]; yellow-necked mouse, wood mouse, bank vole, common vole, field vole and water vole [9,10]; coypu, Guinea pig and golden hamster from breeding stations and zoological gardens [9].

To the Polish list of Demodecidae we can now add the synhospitolic species parasitising the striped field mouse, which is also a new host of this group of mites in the Polish fauna.

Materials and methods

Fifty two (27 ♂♂ and 25 ♀♀) striped field mice

Table 1. Body size of *Demodex* spp. from striped field mouse

Body size		<i>D. a. apodemi</i>	<i>D. agrarii</i>
Total length of male [μm]	on average	149	504
	range	118–172	474–531
Total length of female [μm]	on average	136	593
	range	107–169	471–617

Apodemus agrarius (Pallas, 1771) from eastern Pomerania (Poland) were examined in 2006–2007. The presence of mites was confirmed by the standard method of digesting skin fragments [5,11–13]. Skin samples were removed from the head (eyelids, cheeks, chin, ears), and also from the belly, groin, limbs, genital-anal region, neck and back. The hair-follicle mites found were examined under a phase-contrast microscope and, where necessary, some were mounted in Faure's medium.

Results and discussion

Two species of the hair-follicle mites were found in the striped field mouse: *Demodex agrarii* Bukva, 1994 and *D. arvicolae* Zschokke, 1888 – specifically the form *D. a. apodemi* Hirst, 1918, previously recorded in the wood mouse *Apodemus sylvaticus* (only fragmentary results were published, [9]). *Demodex* spp. were found in 53.8% of the examined mice (males – 59.3%, females – 48.0%); *D. arvicolae* was the dominant species (prevalence

48.1%, mean intensity 12.5), whereas *D. agrarii* was found in only a few animals (prevalence 13.5%, mean intensity 7.6). These mites were more frequently found in males – this appears to be a rule for many rodent species. This is probably due to the greater mobility of males and their more frequent contact with other members of the species, which favours the transmission of parasites [5].

D. a. apodemi is very minute but fairly elongated species [11] (Table 1, Fig. 1). These mites were found mainly in skin of head and very few in skin of genital-anal region.

Demodex agrarii is a species only recently discovered – it has so far been found only in the Czech Republic [14]. At the same time it is one of the largest of the Demodecidae (Table 1, Fig. 2),

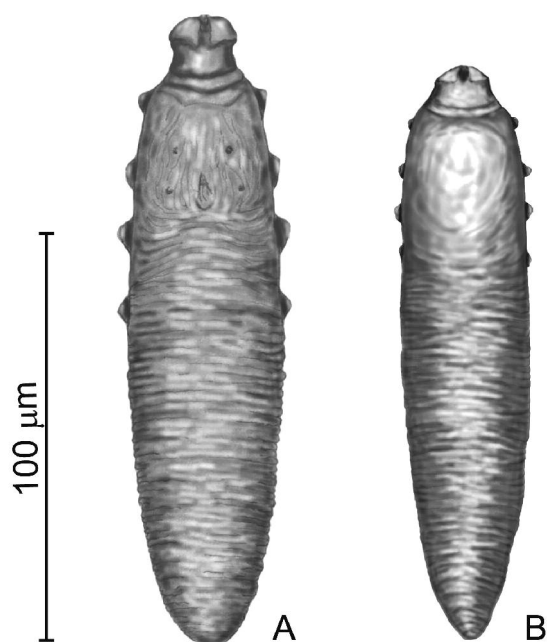


Fig. 1. *Demodex arvicolae apodemi* (dorsal view): A–male, B–female

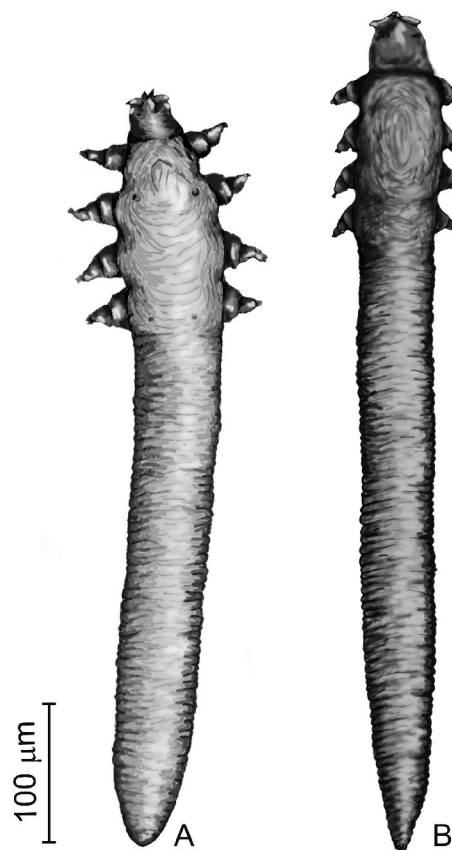


Fig. 2. *Demodex agrarii* (dorsal view): A–male, B–female

with an interesting localisation on the host: it lives in the ducts of the auricular sebaceous gland, in which all its developmental stages have been found. This is in contrast to the typical habitat of most known demodectic mites, namely, hair follicles and the associated sebaceous glands of the skin, the outer layer of the epidermis, or modified glandular organs such as the Meibomian glands [11,15]. It is precisely the specific habitat of *D. agrarii* that determines its large size and its strongly elongated shape. These are features associating it with the species from the Meibomian glands, described in exotic bats for example, rather than the usually smaller and stocky mites from typical sebaceous glands. Nonetheless, if we take into consideration the different morphological structures specific to the large demodectic mites living in glandular ducts of bats, *D. agrarii* is redolent of *D. flagellurus*, another strongly elongated species living in the genital regions of the house mouse [14].

The discovery of a further species of hair follicle mite extends the checklist of Polish Demodecidae to 30, of which 11 (and 3 subspecies) parasitise 10 species of native rodents.

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