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DEMODEX BISONIANUS SP. NOV. (ACARI, DEMODICIDAE) A NEW PARASITE OF THE BISON (*BISON BONASUS* L.)

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DEMODEX BISONIANUS SP. NOV. (ACARI, DEMODICIDAE) NOWY PASOŻYT ŻUBRA (*BISON BONASUS* L.)

Abstract. *Demodex bisonianus* sp. nov. (Acari, Demodicidae) and its stages of development has been described. It was found in the Meibomian glands of the *Bison bonasus* L. from the Puszcza Białowieska (Poland).

INTRODUCTION

Knowledge of the follicle mites of wild hoofed mammals is unsatisfactory; this also includes the bison. So far, internal parasites of the bison have been studied (DRÓŻDŻ 1967, DRÓŻDŻ et al. 1989), and some ectoparasites, including Ischnocera, Ixodidae and Psoroptidae (BLAGOVEŠČENSKIJ 1967, KADULSKI 1977, 1989, DEMIASZKIEWICZ 1991). There is, however, a lack of data concerning the occurrence of representatives of the family Demodicidae in *Bison bonasus*, which would seem strange, considering the successful cross-breeding of the bison and domestic cattle.

Material and methods

Material was collected in the years 1991–1993. Samples of skin were taken from the heads of 30 *Bison bonasus* L. from the Puszcza Białowieska and fixed in a 70% solution of ethyl alcohol; isolated Meibomian glands from the eyelids were treated with 8% KOH, then centrifuged twice and placed in ethyl alcohol.

The *Demodex* specimens obtained were studied by means of a phase-contrast microscope and placed in permanent mounts.

Type material (holotype, paratype) come from a host specimen collected by J. IZDEBSKA at Białowieża on December 14, 1992. Types are deposited in the collection at the Chair of Invertebrate Zoology, University of Gdańsk, Gdynia.

Results

Female (holotype) (Fig. 1a, b). Body length: 545.6 μm, width 69.8 μm (average measurements for 20 specimens are given in Table 1).

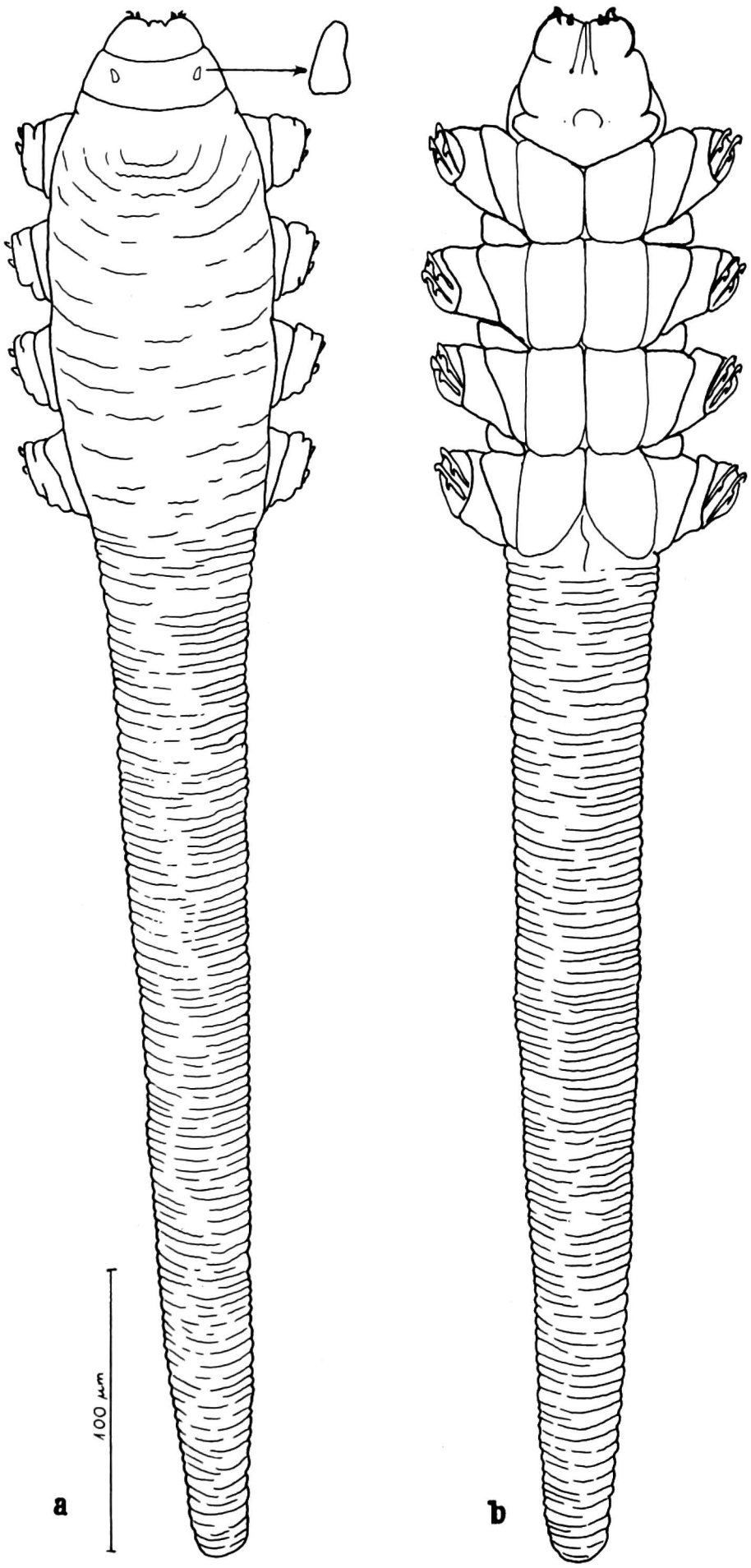

Fig. 1. *Demodex bisonianus* sp. n., female. a – dorsal view (arrow: right supracoxal spine), b – ventral view

The trapezoid gnathosoma wider than longer. Palpi composed of two segments, there being two denticles on the second: the larger double and the smaller one single. Supracoxal spines situated post-laterally.

TABLE 1

Body measurements and standard deviations for 20 specimens of various stages and sexes *Demodex bisonianus* sp. n. (μm)

D. bisonianus sp. n.		Female	Male
Gnathosoma	length	31.9±3.8	29.8±1.6
	width	35.7±4.4	33.0±2.7
Podosoma	length	130.5±11.1	131.1±13.2
	width	68.1±8.7	63.1±8.9
Opisthosoma	length	369.6±17.3	351.4±20.7
	width	48.5±5.4	42.8±5.0
Vulva		22.4±1.8	–
Aedeagus		–	33.3±6.6
Overall length		533.5±19.7	517.3±22.6

	Ovum	Larva	Protonymph	Nymph
Length	109.9 ±4.3	182.6 ±20.3	297.1 ±25.1	415.0 ±15.3
Width	35.7 ±1.9	38.4 ±3.7	53.8 ±6.0	63.0 ±4.2

The podosoma almost twice as long as wide. Feet large, four-membered, protruding distinctly beyond the external edge of the podosoma. Each foot terminates in two claws. Epimera longer than wide; II and III pairs of epimeral plates rectangular and differ from the I and IV pairs, in which the upper edge of I pair and lower edge of IV pair are triangularly indented.

The sexual aperture is situated in the indentation of the IV pairs of epimers. The opisthosoma constitutes 70% of the body length; it is transversely striated and narrows gradually posteriorly (Bison No BPN 1085, 4/12/1992).

Male (paratype) (Fig. 2a, b). Body length 517.7 μm, width 62.0 μm. Body shape and structural details as in the female.

Gnathosoma shorter than width of base, slightly smaller than that of the female; particular related structures similar. The podosoma slightly narrower and longer than that of the female. Legs and epimera as in the female. The opisthosoma proportionally slightly narrower and shorter than that of the female, also transversely striated.

Sexual aperture dorsal, commencing on a level with the epimeral stria between the I and II pair of epimeral plates (Bison No BPN 1084, 3/2/1992).

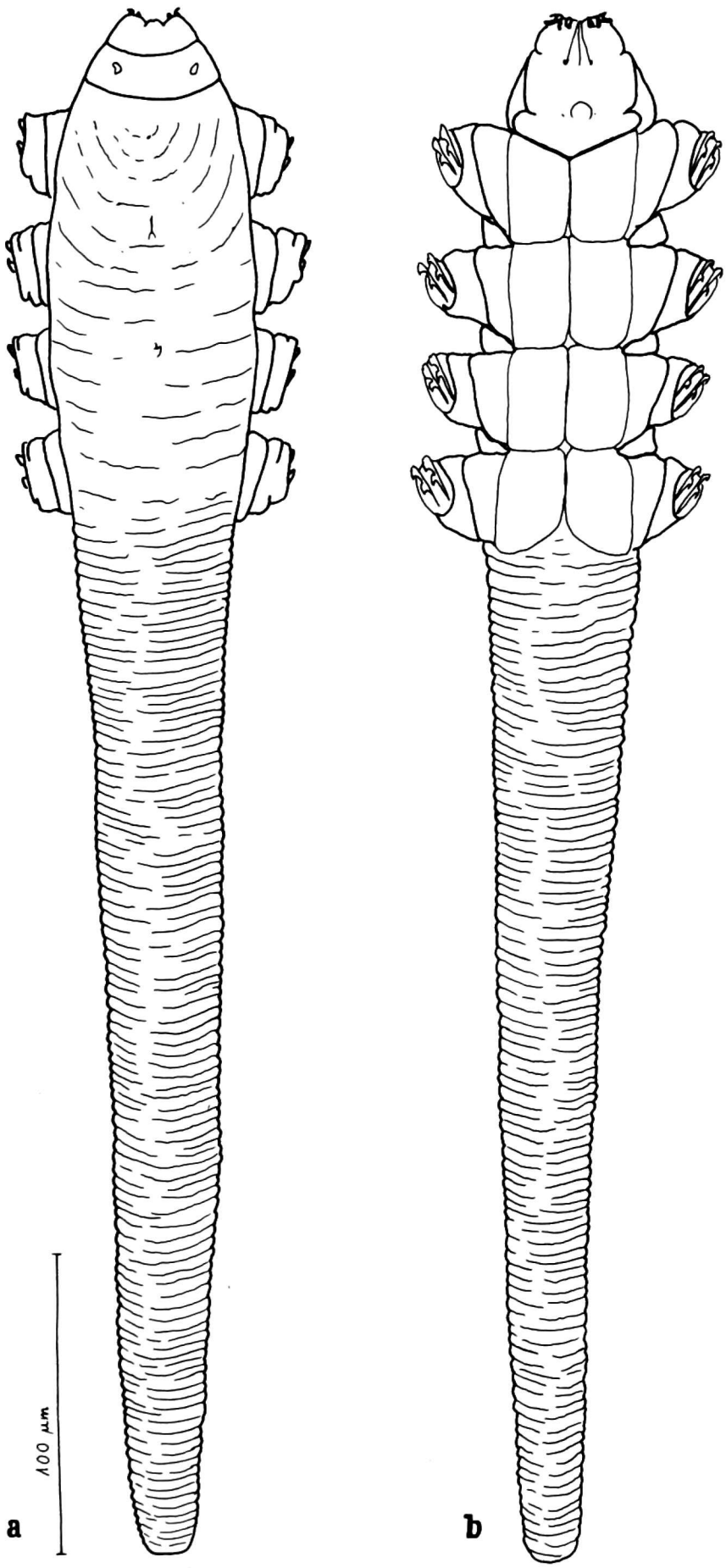

Fig. 2. *Demodex bisonianus* sp. n., male. a – dorsal view, b – ventral view

Ovum (Fig. 3a, b). Fusiform; average length 109.9 µm, width 35.5 µm. Length to width ratio 3.1 : 1. Theca thin, transparent.

Larva (Fig. 3c). Fusiform; average body length 182.6 µm, width 38.4 µm; body length to width ratio 4.8 : 1. Gnathosoma distinctly separate, has small

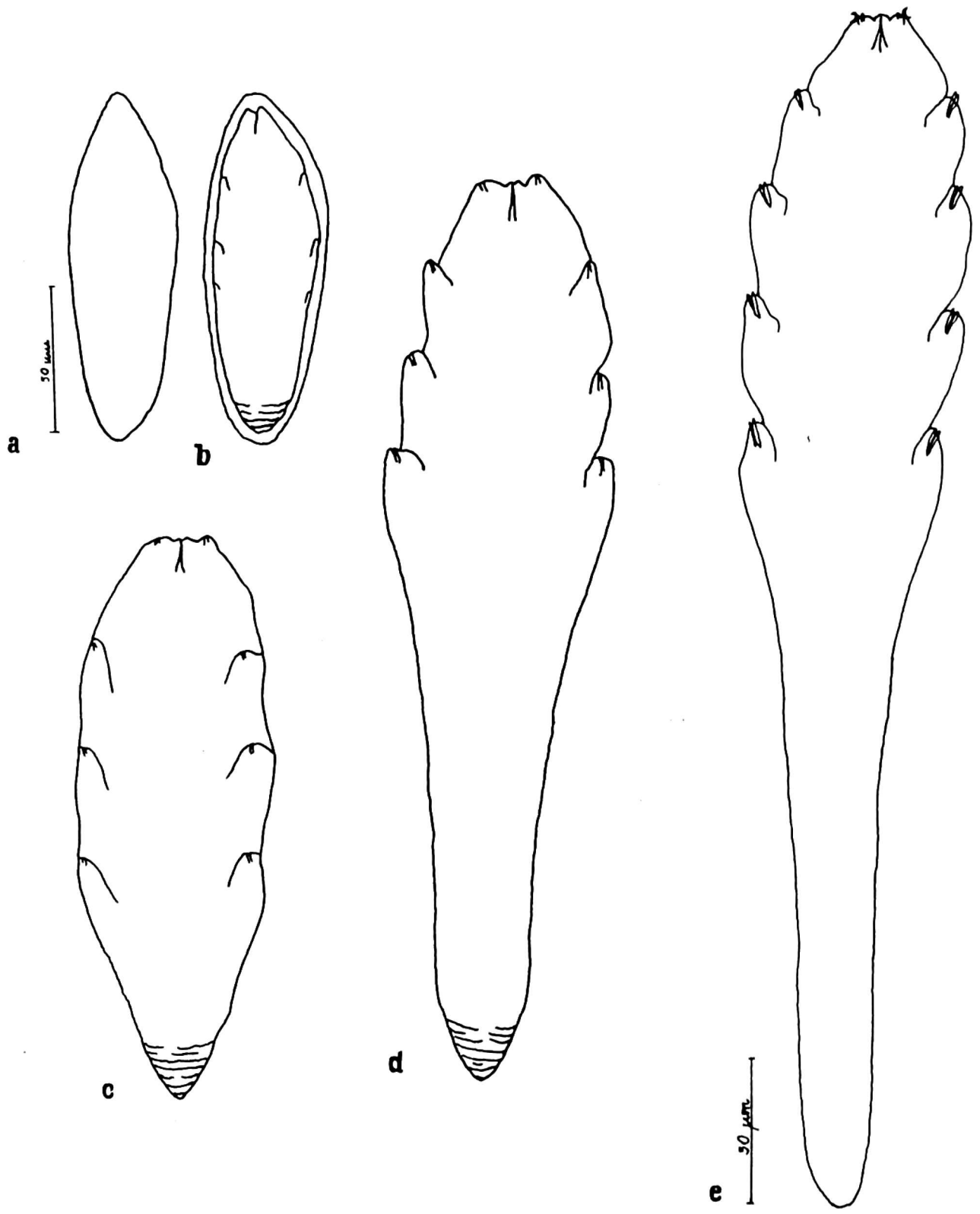

Fig. 3. *Demodex bisonianus* sp. n., a – ovum, shape, b – ovum with developing larva inside, c – larva, ventral view, d – protonymph, ventral view, e – nymph, ventral view

indentations on the palps. Supracoxal spines present. There are three pairs of poorly marked, unsegmented legs, supplied with small claws; no epimers. Opisthosoma constitutes about 40% of the body length; transverse striation visible only at the end.

Protonymph (Fig. 3d). Similar to the larva, but larger - average length 297.1 µm, width 53.8 µm - and more elongated; body length to width ratio 5.5 : 1. Gnathosoma and related structures similar to the larva's ones only proportio-

nally larger. The opisthosoma constitutes about 55% of the body length; it is narrower and more elongated than that of the larva.

Nymph (Fig. 3e). The body length 415.0 μm on average and the width 63.0 μm; length to width ratio 6.6 : 1. The opisthosoma constitutes about 60% of the body length. Similar to the protonymph, but has four pairs of distinctly separated legs. The epimers are not visible. The opisthosoma is proportionally longer than in the protonymph, but shorter than in the adult forms.

Discussion

In the light of the hybridization of the bison and domestic cattle, is could be assumed that the same, or similar species of mites would occur in the bison. In cattle, three species of the family Demodicidae were noted: *Demodex bovis* STILES, 1892, *D. ghanensis* OPPONG, LEE et YASIN, 1975 and *D. tauri* BUKVA, 1986. In the meantime, a separate species was noted – *Demodex bisonianus* sp. n. This confirms the assumption recently accepted by many authors (e.g. DESCH et al. 1984, NUTTING 1985), that particular species of the Demodicidae family has a certain specificity in relation to the host.

Described species of *Demodex bisonianus* sp. n. differs distinctly from other species of the genus. The greatest similarity is that in relation to *D. ghanensis* found in cattle in West Africa. It is, however, larger (in the case of adults, almost 100 μm on average) and differs in body proportions (Tab. 2). Apart from this, gnathosoma of *D. bisonianus* differs in shape, the supracoxal spines are also slightly different. The epimeral plates also differ slightly - in the *D. ghanensis* female those of the IV pair are notched in the shape of the letter V,

TABLE 2

Comparisons of body proportions of *Demodex bisonianus* sp. n. and *D. ghanensis* - after OPPONG et al. (1975)

Demodex spp.		*D. bisonianus* sp. n.	*D. ghanensis*
Overall length (μm)	female	533.5	431.6
	male	517.3	448.9
Length/width ratio	female	7.8 : 1	9.0 : 1
	male	8.2 : 1	9.0 : 1
Gnathosoma length/width ratio	female	0.9 : 1	1.0 : 1
	male	0.9 : 1	1.1 : 1
Podosoma/opisthosoma width ratio	female	1.4 : 1	1.1 : 1
	male	1.5 : 1	1.1 : 1

and in *D. bisonianus* the indentation of the last pair of epimers is gentler, i.e. more similar to an obtuse angle. Egg of the *D. bisonianus* is smaller and more elongated. These species are probably similarly located - both were found in the Meibomian glands.

Apart from the representatives of the *D. bisonianus* described in the present paper, the eyelid tissues (apart from the Meibomian glands) of the bison also supplied several specimens of *Demodex* sp. which differed markedly in size, body proportions and structural details. To date, in many mammals, two and more species of *Demodex* specific to particular species have been noted, e.g. in cattle (OPPONG et al. 1975, BUKVA 1986), horses (e.g. DESCH and NUTTING 1979), sheep (DESCH 1986, BUKVA 1990), deer (BUKVA 1987, BUKVA and PREISLER 1988) and man (DESCH and NUTTING 1972). The finding of other species of follicle mites on the bison would thus also seem highly probable.

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