

TWO NEW SPECIES OF THE GENUS *PSOROBIA*, FAIN 1959  
(PSORERGATIDAE : PROSTIGMATA) FROM TWO NEW HOST ORDERS,  
LAGOMORPHA AND INSECTIVORA

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TAXONOMY      ABSTRACT : Two new species of the genus *Psorobia* are described. *Psorobia elephantuli* sp. nov. ex *Elephantulus rozeti* (Duvernay 1833), an elephant shrew from Tunis, and *Psorobia lagomorphae* sp. nov. ex *Sylvilagus floridanus* (Allen), the Eastern Cottontail from Indiana, USA. Measurements are given in  $\mu\text{m}$ . A key to the ten species of *Psorobia* is given.

TAXONOMIE      RÉSUMÉ : Deux espèces nouvelles du genre *Psorobia* sont décrites. *Psorobia elephantuli* sp. nov. ex *Elephantulus rozeti* (Duvernay, 1833), musaraigne éléphant de Tunis, et *Psorobia lagomorphae* sp. nov. ex *Sylvilagus floridanus* (Allen), "Eastern Cottontail" de l'Indiana, U.S.A. Des mesures sont données en microns. Une clé des dix espèces de *Psorobia* est établie.

#### INTRODUCTION

Species of the genus *Psorobia* are tiny, white, disc-shaped mites, which parasitize different orders of Mammalia. FAIN (1959a and b) divided the family Psorergatidae Dubinin, 1955 into three genera : *Psorergates*, *Psorobia* and *Psorergatoides*. *Psorobia* has four pairs of well developed lateral shield setae and parasitizes rodents, carnivores, artiodactyls and primates. Two new species are described in this paper, from two new host orders, Lagomorpha and Insectivora.

#### *Psorobia elephantuli* sp. nov.

(Figs. 1-6)

■ DIAGNOSIS : With characteristics of the genus *Psorobia*. Legs I-IV with two femoral

setae and a single pointed tibial spine present on leg IV. Lateral shield setae and terminal setae relatively short in comparison to those of *P. bos* Johnston, 1964 and *P. ovis* Womersley, 1941. In the male the penis is extraordinarily long and curved. Tibial spines single pointed in *P. elephantuli* sp. nov. and bifid in *P. bos* and *P. ovis*.

■ FEMALE (holotype). Venter (Fig. 1) with striations laterad of the central venter, rostrad of the epimera and caudad of the gnathosoma and opisthosomal lobes. Epimera I strongly recurved, II-IV straight, directed to the central venter. One pair of median ventral setae ( $v$ ) and a pair of very long terminal setae on each protruding opisthosomal lobe. Genital opening between these lobes. Anus absent.

*Legs*. Trochanters with an antero-lateral acute spur and a long seta at its base. Femora with

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two subequal ventro-lateral setae, these much longer on legs IV than on legs I-III, and a ventro-posterior acute spur. Genua I-III with a short seta and genu IV with a very long and heavy ventro-lateral seta. All tibiae with a heavy ventro-lateral spine and a median dorsal seta (Fig. 2). Tarsi ventrally each with a relatively small spine, two apical one-pointed claws and a bilobed empodium. The smaller part of this empodium is situated dorsally between the claws, the larger rounded part is ventral to the claws. Dorsally two lateral subequal setae are present (*da* and *dp*, Fig. 2); the posterior one is lacking on leg IV. On legs I and II two solenidia (*so*) are present on the dorso-apical part of the tarsus. The smaller of these two is enveloped by a skin-fold (Fig. 2).

**Gnathosoma.** Ventrally in front of the pharyngeal bulb is a pair of small setae. Palpal tarsi with apical claws, which are difficult to see, both in holotype and in the paratypes. The chelicerae are between the palps and have dorsally directed teeth. Dorsally on the basal part of the gnathosoma is a pair of tri-segmented gnathosomal setae (Fig. 3), on the palpal tibiae a strong, serrated seta and just anterior a thick short seta.

**Dorsum** (Fig. 3). Sclerotized oval shield punctate and lateral weak parts striate as figured. At the shield border are four pairs of lateral shield setae, which are relatively short compared to those of *P. bos* Johnston, 1964 and *P. ovis* Womersley, 1941, and a pair of anteromedian (*am*) setae at the anterior part of the shield.

Measurements in table I.

■ **MALE** (allotype), similar to female but with somewhat smaller setal measurements.

**Dorsum** (Fig. 4), with four pairs of lateral shield setae, a pair of antero-median (*am*) setae laterad of the genital opening; genital setae postero-laterad of the *am* setae (arrangement of genital and *am* setae trapezoid-like). Penis (*P*) extremely long and curved, greatly widened at the base; penis sheath (*PS*) short, tube-like (Fig. 5). Dorsum striated laterally. In the middle of the

dorsal shield is a longitudinal furrow ending at the genital opening. Border of genital opening strongly sclerotized.

**Venter** (Fig. 6). Like female but with only one opisthosomal lobe with one pair of terminal setae. The lobe has an inverted cross-like anterior sclerotization.

Measurements in table I.

Developmental stages as in other species of *Psorobia*.

**Host and Locality:** *Elephantulus rozeti* (Duvernoy 1833) (Insectivora: Macroscelididae), Mezuna, Tunis. Summer 1912 and 13-IV-1913. 9°50'E, 34°34'N. Host in collection of NHM Wien, coll. nr. NMW 8899.

**Deposition of types:** Holotype and allotype in coll. of NHM Wien. Paratypes in collection of F. S. LUKOSCHUS, University of Nijmegen, Netherlands.

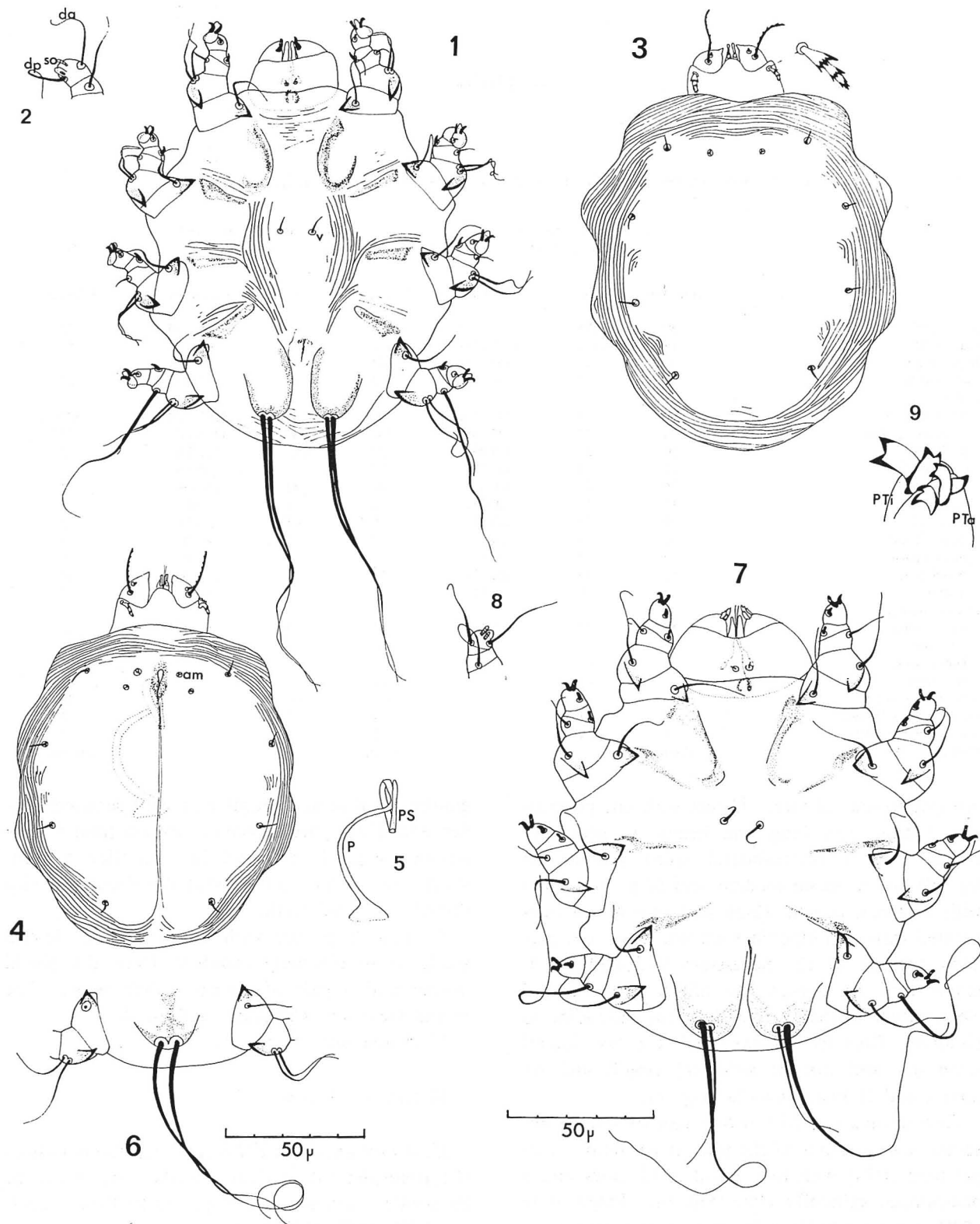
### ***Psorobia lagomorphae* sp. nov.**

(Figs. 7-10)

■ **DIAGNOSIS.** With characteristics of genus *Psorobia*. One seta on femora I-IV and tibial spine IV absent. Terminal setae very unequal in length and strength.

■ **FEMALE** (holotype). Venter (Fig. 7). Epimera I recurved laterally, II-IV straight, directed to venter middle and with sclerotized prolongations along the trochanters. Posterior two lobes each with a pair of terminal setae, the lateral one very long and heavy, the median one much weaker and about one-third the length. One pair of setae in center of venter.

**Legs.** Trochanters with basal acute spur and long, extremely attenuated seta at the base of this spur. Femora with rather slender acute spur and



FIGS. 1-2 : *Psorobia elephantuli* sp. nov.

1. — Female holotype, venter. Ventral seta (v). 2. — Dorsal view of tibia and tarsus leg. I. Dorso-anterior seta (da), dorso-posterior seta (dp), and solenidia (so).

FIG. 3 : *Psorobia elephantuli* sp. nov. Female holotype, dorsum.

FIGS. 4-6 : *Psorobia elephantuli* sp. nov.

4. — Male allotype, dorsum. am : Antero-median setae. 5. — Penis (P) and penis sheath (PS). 6. — Caudal part of male venter.

FIGS. 7-9 : *Psorobia lagomorphae* sp. nov.

7. — Female holotype, venter. 8. — Dorsal view of tarsus and tibia leg I. 9. — Palpal tarsus (PTa) and Palpal tibia (PTi).

TABLE 1. Measurements of *Psorobia lagomorphae* n. sp. and *P. elephantuli* n. sp. in micrometers.

	<i>P. lagomorphae</i> n. sp. female (n = 18)			<i>P. elephantuli</i> n. sp. female (n = 4)			male
	Holotype	$\bar{X}$	min-max	Holotype	$\bar{X}$	min-max	Allotype
body length	129	124	(111-131)	144	145	(135-149)	132
body width	115	113	(107-119)	110	114	(108-122)	95
shield length	98	99	(97-101)	100	100	(95-105)	95
shield width	98	97	(93-101)	83	85	(82-90)	83
setal length :							
terminal (lateral)	99	109	(99-123)	105	107	(105-112)	123
terminal (median)	38	34	(27-38)	105	107	(105-112)	123
trochanter	20	22	(19-26)	23	23	(22-24)	22
femora I-III	25	24	(21-27)	24	26	(24-29)	23
femur IV	26	23	(20-30)	46	40	(34-46)	37
genua I-III	11	10	(9-13)	6	6	(5-6)	5
genua IV	70	71	(62-78)	66	66	(56-73)	55
lateral shield	4	4	(4-5)	7	7	(6-8)	6
gnathosomal	9	9	(8-10)	7	7	(7-8)	8
palpal tibial	15	15	(14-15)	21	19	(17-21)	18
ventral	8	9	(8-11)	7	6	(6-7)	6
distance between :							
ventral setae	12	12	(7-15)	11	12	(11-15)	12
am setae	—	—	—	—	—	—	16
genital setae	—	—	—	—	—	—	23
penis length	—	—	—	—	—	—	83
penis sheath length	—	—	—	—	—	—	23
no. of femora IV setae	1	1	—	2	2	—	2
'no. of femora I-III	1	1	—	2	2	—	2
tibial spine IV	absent	—	—	present	—	—	present

one postero-lateral seta. Genua with one postero-lateral seta, very long and heavy on genu IV. Tibiae with a ventro-lateral spine (absent on leg IV) and a dorsal median seta (Fig. 8). Tarsi with a strong conical spine and two apical one-pointed claws. Empodia were not observed, perhaps because of the potassium hydroxide technique used to collect the mites. This caused weak parts, probably including the empodia, to dissolve. Dorsally on the tarsi are two lateral setae (*da* and *dp*) of subequal length and on tarsi I and II two solenidia (Fig. 8).

Gnathosoma ventrally with a pair of subgnathosomal setae in front of the pharyngeal bulb. Palpal tarsi (*PTa*) with two apical bifid claws and a one-pointed spine-like claw (Fig. 9). Palpal tibia (*PTi*) ventro-apically with two very strong two-pointed claws, which have not been previously observed in any of the other species of the family Psorergatidae (Fig. 9). Dorsally (Fig. 10) on the basal part of the gnathosoma, a pair of bilobed

gnathosomal setae. Basal part with serrated border and distal part tapering. Palpal tibia with a strong, serrated seta and just anterior a thin, short seta. Between the palps the chelicerae with dorsally directed teeth.

Dorsum (Fig. 10) with four pairs of lateral shield setae distinctly removed from the shield border and a pair of antero-median setae. The lateral weak parts striated as figured.

Measurements in table I.

■ MALE. Unknown.

*Host and locality* : *Sylvilagus floridanus* (Allen) (Lagomorpha : Leporidae), Parke Co., 8 mi. S. Rockville, Indiana, U.S.A. 10-IV-1974. Coll. nr. JOW 8787 (EJS 434).

*Deposition of types* : Holotype in U.S. National Museum, paratypes in collection of the authors.

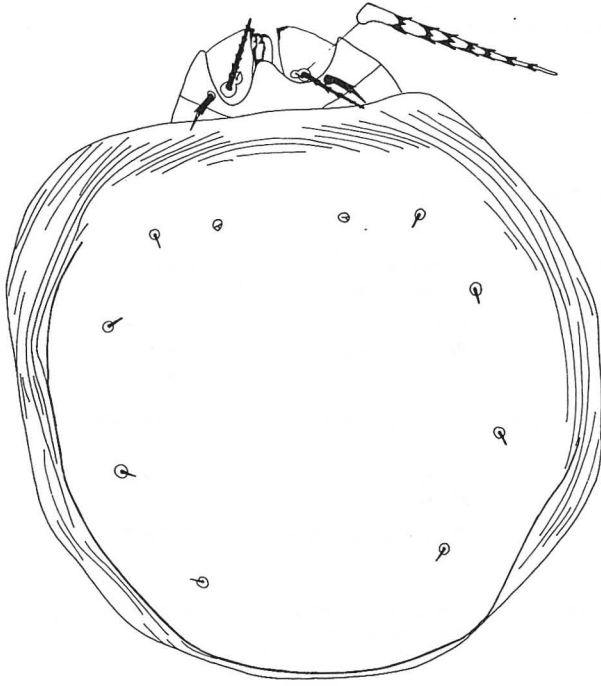


FIG. 10 : *Psorobia lagomorphae* sp. nov. Female holotype, dorsum.

#### DISCUSSION

Ten species of *Psorobia* have been described to date, these from a total of six orders of mammals. Unlike species of the other two genera of the family, *Psorergates* and *Psorergatoides*, species of *Psorobia* parasitize a wide range of hosts. This wide range of hosts is reflected in the marked differentiating characteristics of the known species. Differences in morphology can be seen in the number of femoral setae, the presence of a tibial spine on leg IV and the morphology of the tibial spine.

However, too few species are described and the widespread occurrence geographically and also taxonomically of the species of *Psorobia* leads the present authors to believe that more information is needed before meaningful ideas on phylogenetic relationships can be arrived at in this group.

It is of interest that there is character correlation in the two cases where two different species

of *Psorobia* are known from hosts from the same family. Both *P. bos* and *P. ovis* (Bovidae) have tibial spine IV present, two setae on femur IV, and tibial spine bifid. Contrary to the descriptions and drawings shown in FAIN (1959) and JOHNSTON (1964), *Psorobia ovis* has tibial spines which are two-pointed rather than one-pointed.

Both *P. mustelae* and *P. foinae* (Mustelidae) have tibial spine IV absent, two setae on femur IV and the genual seta IV long (more than 40  $\mu$ m).

#### KEY TO THE SPECIES OF *PSOROBIA*

1. Tibial spine IV present..... 2  
Tibial spine IV absent..... 6
2. Two setae on femur IV..... 3  
One seta on femur IV..... 5
3. Tibial spine one-pointed (Insectivora). .....  
*P. elephantuli*  
Tibial spine bifid. .... 4
4. Shield length of female 153, shield width 142, length  
gnathosomal setae  $\pm$  6. .... *P. ovis*  
Shield length of female 105, shield width 95, length  
gnathosomal setae  $\pm$  14..... *P. bos*
5. Two setae on femora I-III..... *P. hystri*  
One seta on femora I-III..... *P. cercopitheci*
6. Two setae on femur IV..... 7  
One seta on femur IV..... 9
7. Genual setae IV shorter than 25..... *P. castoris*  
Genual setae IV longer than 40..... 8
8. Seta on trochanter  $\pm$  16, distance between ventral  
setae  $\pm$  12..... *P. foinae*  
Seta on trochanter 7-10, distance between ventral  
setae 15-21..... *P. mustelae*
9. Two setae on femora I-III..... *P. zumpti*  
One seta on femora I-III..... *P. lagomorphae*

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SPECIES OF *PSOROBIA* PRESENTLY KNOWN

HOST ORDER	HOST FAMILY	MITE SPECIES	AUTHORS	HOST SPECIES	LOCALITY
Insectivora <sup>1</sup>	Macroscelididae	<i>P. elephantuli</i>	Giesen, Spicka, Whitaker	<i>Elephantulus rozeti</i>	Tunis
Artiodactyla	Bovidae	<i>P. bos</i>	Johnston, 1964	<i>Bos taurus</i> Domestic cow	U.S.A.
		<i>P. ovis</i>	Womersley, 1941	<i>Ovis aries</i> Domestic sheep	Australia, South Africa, U.S.A.
Rodentia	Castoridae	<i>P. castoris</i>	Kok, Lukoschus, Clulow, 1970	<i>Castor canadensis</i>	N. America
	Hysricidae	<i>P. hystri</i>	Till, 1957	<i>Hystrix africae-australis</i>	S. Africa
	Bathyergidae	<i>P. zumpti</i>	Fain, 1965	<i>Cryptomys hottentotus</i>	S. Africa
Primates	Cercopithecidae	<i>P. cercopithec</i>	Zump & Till, 1955	<i>Cercopithecus aethiops</i> and other species	S. Africa
Carnivora	Mustelidae	<i>P. mustelae</i>	Lukoschus, 1969	<i>Mustela nivalis</i> <i>Mustela erminea</i>	Netherlands
		<i>P. foinae</i>	Fain & Lukoschus, 1968	<i>Martes foinae</i>	Belgium
Lagomorpha	Leporidae	<i>P. lagomorphae</i>	Giesen, Spicka, Whitaker	<i>Sylvilagus floridanus</i>	Indiana (U.S.A.)

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