

A NEW LARVAL MITE OF THE GENUS *STRAELENSIA* VERCAMMEN-GRANDJEAN AND KOLEBINOVA, 1968 (ACARI: LEEUWENHOEKIIDAE) CAUSING NODULAR DERMATITIS OF DOGS IN FRANCE

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ABSTRACT - The larval stage of a new species of the genus *Straelensia* Vercammen-Grandjean and Kolebinova, 1968 (Acari: Leeuwenhoekiidae: Apoloniinae), i.e. *S. cynotis* n. sp., is described here. The larvae were found in small thick-walled nodules developed in the skin of five dogs, belonging to five different breeds in several areas of Central and Southern regions of France. In some dogs, the nodules occurred all over the body. The clinical and pathological aspects of this new dermatological parasitosis of the dog has been briefly described by Le Net *et al.* (1999).

Key words - Acari, Leeuwenhoekiidae, taxonomy, new species, chigger, *Straelensia*, parasitic, skin, dogs, France.

RÉSUMÉ - Une nouvelle espèce du genre *Straelensia* Vercammen-Grandjean & Kolebinova, 1968 (Acari: Leeuwenhoekiidae: Apoloniinae), représentée seulement par sa forme larvaire, *Straelensia cynotis* nov. spec. est décrite ici. Les larves étaient incluses dans des petits nodules à parois épaisses enfouies dans le derme chez 5 chiens, tous de races différentes et provenant de 5 régions bien définies du Centre et du sud de la France. Chez certains chiens les nodules s'étendaient sur tout le corps. Les aspects cliniques et pathologiques de cette nouvelle parasitose cutanée ont fait l'objet d'une note préliminaire publiée récemment (Le Net *et al.*, 1999).

Mots-clés - Acari, Leeuwenhoekiidae, taxinomie, nouvelle espèce, *Straelensia*, parasite cutané, chiens, France.

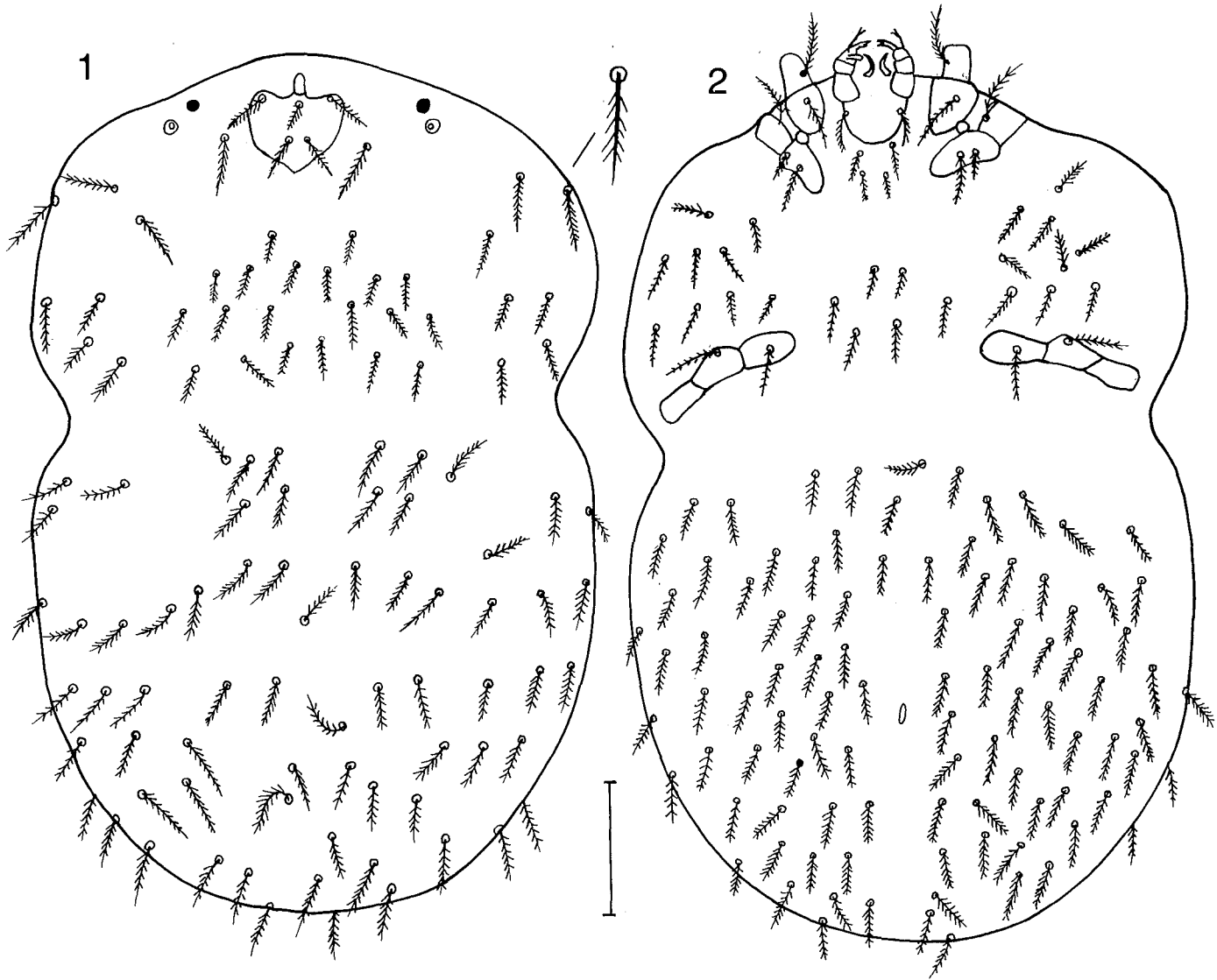
INTRODUCTION

During the period of 1991 to 1999, J.-L. Le Net observed a new clinicopathological entity in five dogs of five different races (Cross breed, Dachshund, Russell Terrier, Brittany Spaniel and Boxer). These dogs originated from five different regions of central and southern France. Clinically the dogs had multiple, small and firm nodules (1-2 mm in diameter) scattered over the head and the trunk. Histological sections of the nodules indicated that they contained larvae of a mite. Careful dissection of the nodules allowed us to obtain free specimens of the parasitic mite for identification. The larvae belong to a new species of chigger in the genus *Straelensia* (Leeuwenhoekiidae) and is described here.

The genus *Straelensia* has been represented by four species described from larvae. They were found either attached to the skin of the host by their chelicerae or free in the fur of the latter. None were enclosed within nodules in the skin. A detailed description of the clinical and pathological aspects of the parasitosis of the new species will be published by Le Net *et al.* in a separate paper.

All measurements are given in micrometers (μm). The nomenclature of the organs and chaetotaxy proposed by Vercammen-Grandjean (1968) is followed.

Abbreviation: I.R.S.N.B. = Institut royal des Sciences naturelles de Belgique.



Figs. 1-2. *Straelensia cynotis* n. sp. (larva) - 1. dorsum, 2. venter (scale line: 100 μ m).

Family LEEUWENHOEKIIDAE Womersley, 1945
Subfamily APOLONIINAE Wharton, 1947

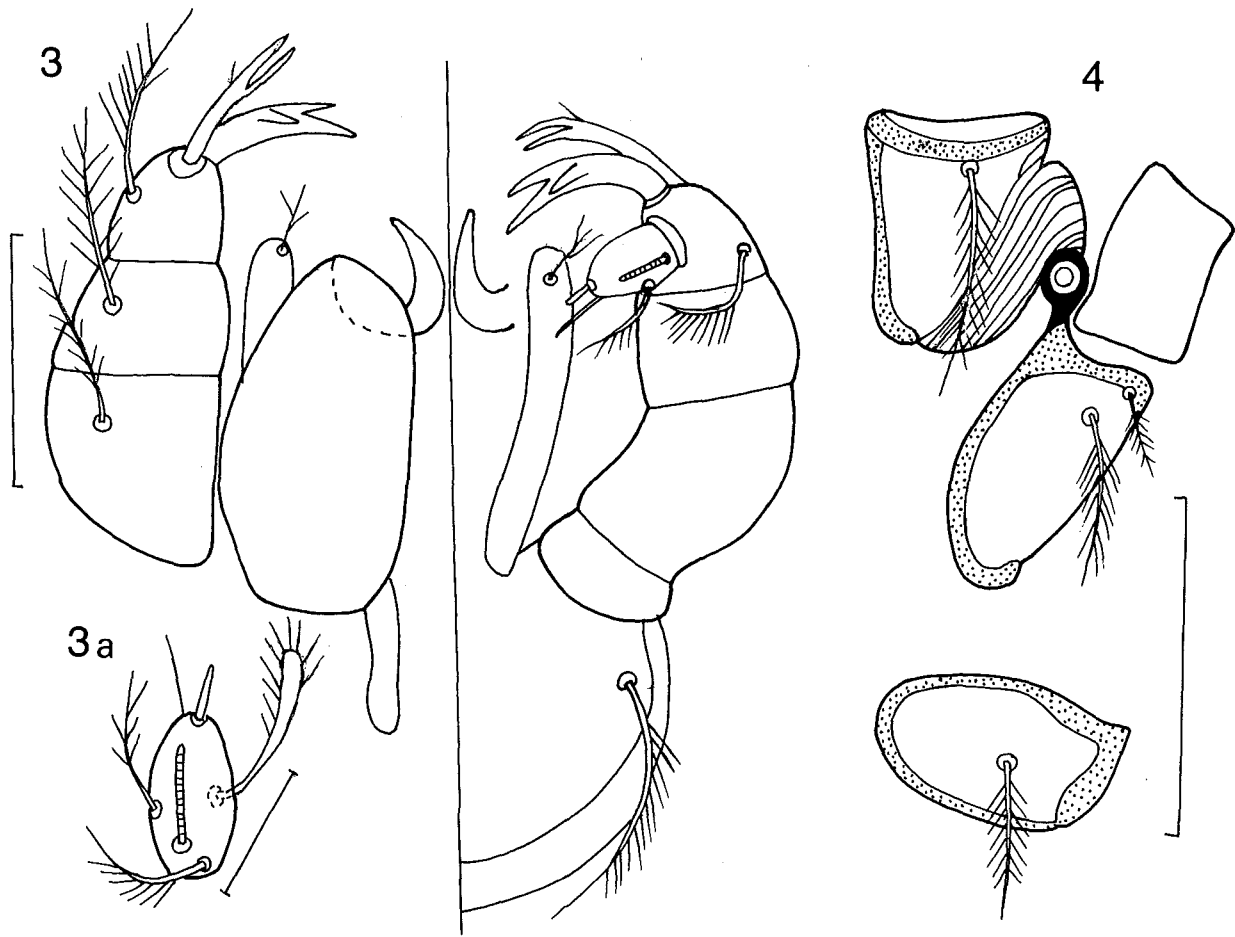
Genus *Straelensia* Vercammen-Grandjean and Kolebinova, 1968

The type species of this genus is *Straelensia europaea* Vercammen-Grandjean and Kolebinova, 1968. This species was described from a single larva found attached on the eyelid of a wolf from Bulgaria.

***Straelensia cynotis* n. sp.**

Larva (holotype and paratypes) (Figs 1-9) - Standard measurements are given in Tables 1 and 2. The SIF differs slightly from that of type species of genus in that

palp tarsus bears 3 B.N.S. instead of 4 B.S. as in *S. europaea*. Soft cuticle of idiosoma finely striated. **Dorsum** (Fig. 1) - Penisutum cordiform, wider (62) than long (48); nasus 11 long, 5 wide. Sensillae and PL missing in holotype. All dorsal setae with thin barbs, 22 to 43 long. Setae arranged in more or less distinct transverse rows except in area anterior to sejugal furrow where several (3-4) rows close to each other and partly overlapping present. This area bears a total of 34 setae (excluding scutal and PI). Rows more distinct posterior to sejugal furrow with 8 recognizable transverse following rows: 5+5, 3+3, 7+7, 5+5, 4+5, 4+3, 5+5, 3. Total number of dorsal setae 34+69 = 103. Length 21 to 42. **Eyes** - Anterior pair convex, very dark, with diameter of 7.2 to 8; posterior pair flat, oval or rounded, with a small (3.5) central pigmented area, diameter variable, from 6 to 8.5. **Venter**



Figs. 3-4. *Straelensia cynotis* n. sp. (larva) - 3. gnathosoma (holotype) in dorsal view (to the left) and in ventral view (to the right), 3a. palp tarsus in ventral view, 4. coxae I, II and III (scale lines, Figs 3, 4: 25 μ m, Fig. 3a: 10 μ m).

(Fig. 2) -Coxae I with 1 B seta, 40 long; coxae II with 2 B setae, external 18, internal 30; coxae III with single B seta, 30 long. *St1* 2+2, more rarely 3+3, 18-20 long. *St2* 3+3, 24 to 28 long. Lateral regions posterior to coxae II and III with 9 pairs of B setae (rarely 11 pairs), 24 to 28 long. Posterior to coxae III 123 B setae, 18-35 long. NDV 226. Uropore 14 long, 185 from posterior margin of body.

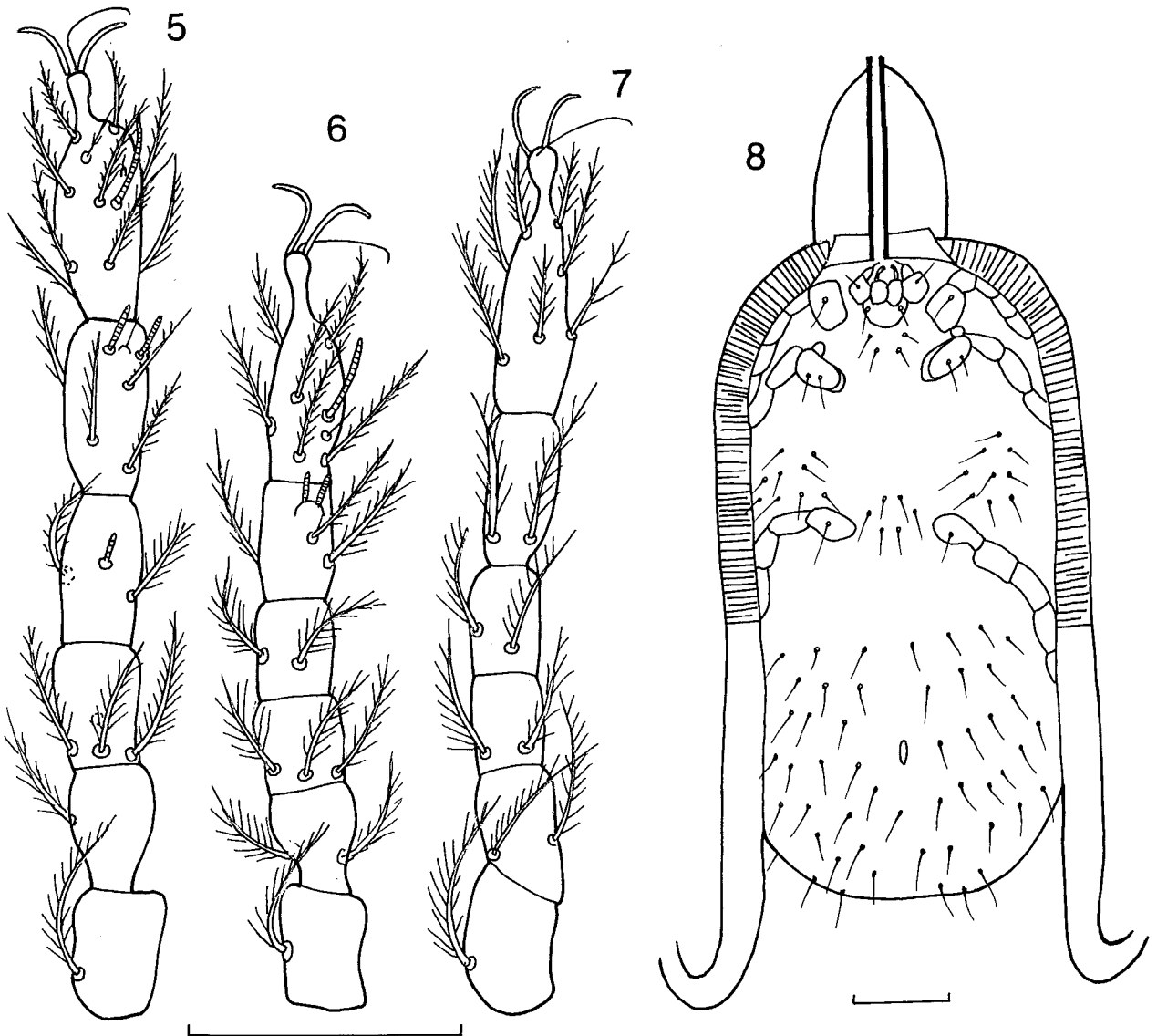
Gnathosoma (Fig. 3) - Length along chelicerae 72, maximum width at level of palp femora 75, minimum width at level of gnathobase 46. Palps 45 long, palp tarsus about 13, palp tibia 12-14. Palp tarsus with 3 barbed setae, 2 ventral and 1 dorsal, and 2 nude apical setae; a solenidion, 8-9 long, near base and ventrally. Palp tibia with an apical trifid claw, 2 barbed setae and a curved spine 15 long divided apically into 2 prongs (thinner than those of the claw) and a third very thin and short and located at base of former. This trifid spine is dorsally close to base of palpal claw. Each genu and femur with a well-developed dorsal barbed seta. **Legs** - All legs composed of 7 segments (femur with a basi and a telofemur). Number of barbed setae - trochanters 1-1-1, basifemora 1-2-2,

telofemora 5-4-3, genua 4-4-3, tibiae 8-6-6, tarsi 20-18-14. Solenidiotaxy: Tarsus I with ω and a very small ϵ , more apical than solenidion. Tarsus II bearing ω , with a very thin basal famulus ϵ . Length of ωI and ωII 18 and 16 respectively. Tibia I with 2 solenidia ϕ , 15 and 16 long respectively, and between them a thin and short seta *k*. Tibiae II also with 2 solenidia ϕ , about 6 long. Genu I with a solenidion σ , 8 long.

Host and locality - Holotype (larva no. 8), larvae no. 1-7 and 10, all paratypes, in variable conditions. We have also 3 nodules containing a larva and mounted in Hoyer's medium. Holotype (no. 29043) and paratypes in the collection of I.R.S.N.B.

We think that the natural host of this larva is not the dog but the fox.

Location and mode of feeding of the larvae of *Straelensia cynotis* - The histological lesions in dogs caused by these larvae have been briefly described by Le Net *et al.* (1999). The larvae were enclosed in "a markedly dilated follicular ostium containing an arthropod. The



Figs. 5-8. *Straelensia cynotis* n. sp. (larva) - 5. leg I, 6. leg II, 7. leg III, 8. dilated hair follicle containing a larva. A stylostome is visible at the internal extremity of the follicle and in contact with the mouth parts of the larva (scale lines, Figs 5, 6, 7: 50 μ m, Fig 8: 100 μ m).

parasite was surrounded by an incomplete amorphous mineralized structure which opens at the epidermal surface..." (Le Net *et al.*, 1999). About 12 of these nodules were dissected by A.F. and the larvae mounted in Hoyer's medium and examined under a microscope. In order to study the exact position of the mouth parts of the larvae in the dilated hair follicle, we mounted 3 nodules containing larvae. We observed that the mouth parts of the larvae in all nodules were directly in contact with the base of the modified follicle. From this site a narrow tube crossed the wall of the follicle and ran freely into the tissues of the host. It represented the feeding tube or "stylostome" (Fig. 8). This mode of feeding by means of a stylostome

was studied by André (1927, 1930) in the larva of *Neotrombicula autumnalis* (Shaw), a very common species in Western Europe. André (1927) described this mode of feeding as a "digestion extra intestinale." The larva attaches to the skin of the host and inserts its chelicerae into the hair follicle. Once attached, it injects its saliva. This secretion is very rich in proteolytic enzymes which causes the digestion of the host-tissues and the formation of the stylostome. The digested material is reabsorbed through the stylostome. This mode of feeding is very common in the larvae (chiggers) of Trombiculidae. Until now it had not yet been reported for the genus *Straelensia*. The stylostome is clearly visible in our whole mounts of

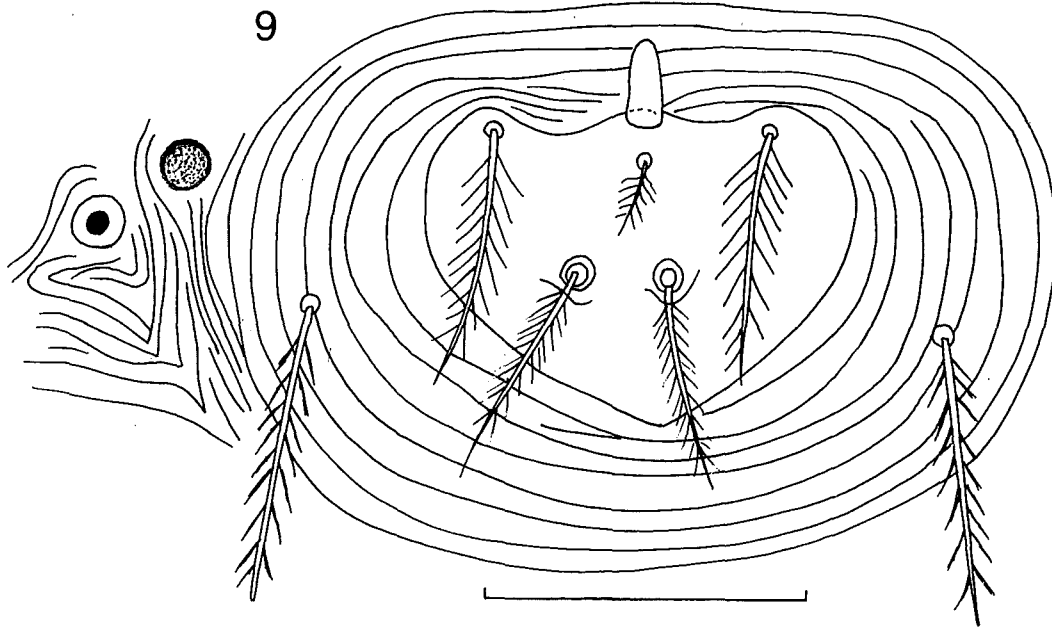


Fig. 9. *Straelensia cynotis* n. sp. (larva) - Peniscutum and eyes (scale line: 50 μ m).

Table 1. Measurements (in $m\mu$) of the larvae of *Straelensia cynotis*.

Characters	Holotype	Paratypes					Range	Mean
	(n°8)	n°3	n°4	n°5	n°6	n°7		
AW	48	48	45	42	45	43	42/48	45.1
PW	102	99	108	100	99	99	99/108	101.1
SB	15	17	15	15	15	15	15/17	15.3
ASB	25	20	24	25	26	24	20/26	24
PSB	22	23	24	28	30	26	22/30	25.5
AP	42	40	36	40	40	40	36/40	39.6
AM	10	20	12	9	12	10	9/20	12.1
AL	30	35	27	31	39	39	27/39	33.5
PL	-	-	29	42	48	43	29/48	40.5
S	-	39	33	27	45	-	27/45	36
pa	250	230	240	234	265	225	230/265	240.6
pm	204	186	189	207	204	204	186/207	199
pp	220	225	219	225	231	231	219/231	225.3
Ip	674	642	648	666	700	660	642/700	665
H	43	45	-	-	48	-		
D	24/43	20/43	21/41	-	23/42	21/42	20/24 41/43	21.8/42.2
V	18/36	18/34	-	-	18/33	21/38	18/21 33/38	18.7/35.2
Scutum W	62	54	51	63	60	-	51/63	57.6
Idiosoma	687 x 460	672 x 348	695 x 450	-	720 x 400	701 x 430	672/720 348/465	695 x 425

Table 2. Character measurements (in $m\mu$) of 5 species of *Straelensia*.

Characters	<i>S. europaea</i>	<i>S. africana</i>	<i>S. taurica</i>	<i>S. tiani</i>	<i>S. cynotis</i>
Palp tarsus	4B.S	4B.S.	4B.S.	4B.S.	3B.NS.
Palp tibia	3B	3B	3B	3B	2B.M.
Galea	B	N	B	B or N	B
AW (range and mean)	38	34	31/37	35/43 (38)	42/48 (45.1)
SB	16	12	11/15	18/21 (19)	15/17 (15.3)
PW	-	-	-	78/105 (95)	99/108 (101.1)
ASB	23	19	19/21	20/25 (23)	20/26 (24)
PSB	25	19	17/19	19/25 (22)	22/30 (25.5)
AM	16	14	11/13	11/16 (13)	9/20 (12.1)
AL	36	24	23/24	24/30 (28)	27/39 (33.5)
PL	42	34	37/41	43/50 (46)	29/48 (40.5)
S	-	41	28/34	29/36 (32)	27/45 (36)
D	42/30	22/32	30/24 - 34/24	35/28 - 40/38 (35/31)	20/24 - 41/43 (21.8/42.2)
V	26/38	18/27	17/19	18/27 - 23/33 (21/29)	18/21 - 33/38 (18.7/35.2)
H	44	32	37/39	35/42 (38)	43/48
Ip	676	532	547/564	631/693	642/700 (665)
NDV	208	130	195	239	226
Idiosoma	500 x 300	180 x 115	525/564 x 270/366	530/689 x 324/516	672/720 (695) x 348/465 (425)
Host	Wolf	Mongoose	Hare	Hare	Dog
Country	Bulgaria	South Africa	Crimea (Ukraine)	China	France

Remarks - 1. Seta *M* on palp tibia is a curved subapical, dorsal, trifold spine. 2. Means are in parentheses.

S. cynotis in Hoyer's medium (Fig. 8). It has not been observed in the histological sections, probably because the walls of the stylostome had been dissolved by the chemical products (aromatic solvents) used in the histological mounting process.

It is noteworthy that "intradermic parasitism" by trombiculid larvae has been reported in rodents by several authors (Jadin and Vercammen-Grandjean, 1954; Brennan and Yunker, 1969; Brennan and Reed, 1974). However, these authors did not specify if the mites were located in the hair follicle (as is the case with this species). Endofollicular parasitism by mites is also very frequent in the family Glycyphagidae, however, it is not the larval stage that invades the follicles but the deutonymph. More than 50 species of glycyphagid deutonymphs belonging to several genera and subfamilies have been described, many of them were found in the tail hair follicles of rodents (Fain, 1969).

Remarks on the taxonomic position of *Straelensia cynotis* - Until now, 4 species have been described in the genus *Straelensia*:

1. *Straelensia europaea* Vercammen-Grandjean and Kolebinova, 1968 (type species) - Described from a single larva attached to the eyelid of a young wolf, *Canis lupus*, from Bulgaria.

2. *Straelensia africana* Vercammen-Grandjean, 1971 - Also described from a single larva collected from an African mongoose, *Herpestes sanguineus* from Gauteng (Transvaal), South Africa.

3. *Straelensia taurica* Hushcha, 1975 - Larvae (5 specimens) collected from a hare, *Lepus europaeus*, from Crimea, Ukraine.

4. *Straelensia tiani* Wen, Tian, Guan and Wang, 1994 - Described from *Lepus capensis*, from China (Shanxi). The authors collected 41 larvae from the body hairs of the hare.

Straelensia cynotis is distinguished from the 4 species by the chaetotaxy of the palp tarsus and the palp tibia, and several other characters. The palp tarsus in the above 4 species bears 4 barbed setae and 1 smooth apical seta and the palp tibia has 3 barbed setae (2 ventral and 1 dorsal). The palp tarsus in *S. cynotis* bears 3 barbed setae

(2 ventral and 1 dorsal) and 2 apical smooth setae. The palp tibia in these 4 species bears 3 barbed setae, while in our species it bears 2 barbed setae and 1 subterminal dorsal curved spine, ending in 2 narrow prongs and 1 short, needlelike prolongation situated at the base of the prongs (Fig. 3).

Besides these important differences, there are, in addition, several other characters separating this species from the 4 already described species in the genus (Table 2). Finally, the development of the larva within the hair follicle of the host, with production of cutaneous nodules, seems to be unique to the genus *Straelensia*.

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REFERENCES

- André, M. 1927. "Digestion extra-intestinale" chez le Rouget (*Leptus autumnalis* Shaw). Bull. Bull. Mus. Nat. Hist. nat. Paris, 33: 509-516.
- André, M. 1930. Contribution à l'étude d'un acarien : Le *Thrombicula autumnalis* Shaw. Thèse présentée à la Faculté des Sciences de l'Université de Paris. Soc. Zool. France. Série A, 201, No. 225: 39-138.
- Brennan, J. M. and J. T. Reed. 1974. Endoparasitic chiggers. VII The intradermal genus *Interscutrix* Brennan and Yunker, 1966 and three new species (Acarina: Trombiculidae). J. Parasitol. 60: 185-187.
- Brennan, J. M. and C. E. Yunker. 1969. Endoparasitic chiggers: V. New genera, species and records from Venezuela and Brazil. J. Med. Ent. 6: 299-304.
- Fain, A. 1969. Les deutonymphes hypopiales vivant en association phoretiques sur les mammifères (Acarina: Sarcoptiformes). Bull. Inst. r. Sci. nat. Belg., 45, 262 pp.
- Hushcha, G. J. 1975. A new species of the trombiculid mite *Straelensia taurica* sp.n. (Acari Leeuwenhoekidae, Apoloniinae). Parasitologia IX, 6: 526-531 (in Russian, with English summary).
- Jadin, J. B. and P. H. Vercammen-Grandjean. 1954. Deux Trombiculidae larvaire parasites de certains rongeurs. Rev. Zool. Bot. afr. 49: 283-292.
- Le Net, J. L., A. Fain, C. George and L. Longeart. 1999. Dermatitis in dogs induced by a larval mite (Acari) of the genus *Straelensia* (Prostigmata: Leeuwenhoekidae) in France. 24th World Small Animal Veterinary Congress. WSAVA; 5th European Small Animal Veterinary Congress: FECAVA, 23rd-26th September 1999, Lyon, France.
- Vercammen-Grandjean, P. H. 1968. The chigger mites of the Far East. Small Study no. 118. U.S. Army Medical Research and Development Command. Washington DC, 135 pp.
- Vercammen-Grandjean, P. H. 1971. *Straelensia africana* (Acarina: Prostigmata) a new representative of the Apoloniinae subfamily. Z. F. Ang. Zool. 58 : 99-103.
- Vercammen-Grandjean, P. H. and M. Kalebinova. 1968. Revision of the subfamily Apoloniinae Wharton, 1947 (Leeuwenhoekidae; Acarina). Acarologia, 10: 250-268.
- Wen, Ting-huan, Qing-yun Tian, Yan Guan and Wan-li Wang. 1966. First record of Apoloniinae in China-*Straelensia tiani* sp. n. with a revised diagnosis of the genus *Straelensia* (Acariformes: Leeuwenhoekii-dae). Acarologia, 37: 211-215.
