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SPINTURNICID MITES FROM SOME NIGERIAN BATS

(ACARINA, SPINTURNICIDAE)

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ABSTRACT

Five species of mites belonging to three genera of the family Spinturnicidae are reported from six species of bats in Nigeria. The species are *Meristaspis kenyaensis* (Radford), *Ancystropus aethiopicus* Hirst, *Spinturnix walkerae* Zumpt & Till, *S. scotophili repens* ssp.n., and *S. intectus* sp.n. Male and female specimens of the two new taxa are fully described and figured. Zoogeographical and taxonomical implications of the results of this study are discussed.

INTRODUCTION

While collecting bats in Nigeria, in 1976 (Bergmans, 1977) the junior author also collected bat parasites, among which a small collection of mites of the family Spinturnicidae. This material, taken from six species of bats, includes three genera and five species of mites, two of which proved to represent new taxa. The results of the study of this material are presented in this paper. Identifications of bats are by the junior author. Holotypes, allotypes, and the major part of the paratypes and of other specimens are deposited in the collection of the Zoölogisch Museum, Amsterdam. The remainder, including some paratypes, is in the collection of the Institute of Parasitology of the Czechoslovak Academy of Sciences, Prague.

In the following descriptions all measurements are given in µm. The minimum and maximum measurements of a specified number of paratypes are given between brackets.

TAXONOMIC SECTION

1. *Meristaspis kenyaensis* (Radford, 1947)

Material examined.-

3 ♂♂ and 40 ♀♀, from 23 specimens of *Eidolon helvum helvum* (Kerr, 1792), Ife, Nigeria, 13-VIII-1976, collector W. Bergmans.

2. *Ancystropus aethiopicus* Hirst, 1923

Material examined.-

1 ♀ from *Micropteropus pusillus* (Peters, 1867), Ibadan, Nigeria, 6-VIII-1976; 3 ♂♂, 7 ♀♀ and 5 immatures from 4 specimens of the same host, Ife, Nigeria, 17-VIII-1976; 3 ♂♂, 1 ♀, and 1 immature from *Hypsignathus monstrosus* Allen, 1861, Ibadan, Nigeria, 4-VIII-1976; all collected by W. Bergmans.

3. *Spinturnix walkerae* Zumpt & Till, 1954

Material examined.-

3 ♂♂, 4 ♀♀ and 5 immatures from *Myotis bocagei cupreolus* Thomas, 1904, Pandam, Nigeria, 1-VII-1976, collector W. Bergmans.

4. *Spinturnix scotophili* Zumpt & Till, 1954

This mite species was originally described from *Scotophilus murinoflavus* (Heuglin, 1861) in Sudan, which lately has been synonymized with *Scotophilus nigrita* (Schreber, 1774) (e.g. Kock, 1969), and interpreted by Anciaux de Faveaux (1971) as *S. nigrita colias* Thomas, 1904. It was also reported from *Scotophilus nigrita nigrita* and *S. gigas* Dobson, 1875, in Zaire, and from *S. leucogaster* (Cretzschmar, 1830) in Cameroon (Benoit, 1958 a-b; Anciaux de Faveaux, 1965). Robbins (1978), who studied the taxonomic histories of *S. nigrita* and *S. gigas*, indicated that many misunderstandings occur in the identification of these two taxa. He concluded that bats previously called *Scotophilus gigas* are in fact *S. nigrita* and that for the specimens previously called *S. nigrita* the next available name *S. dinganii* (A. Smith, 1833) should be applied. Following these conclusions the type host of *Spinturnix scotophili* appears to be *Scotophilus dinganii* and as other hosts *S. nigrita* and *S. leucogaster* can be registered.

By courtesy of Dr. F. Zumpt of the South African Institute for Medical Research in Johannesburg we had the opportunity to study the mite from the type host *S. dinganii* (1 ♀ from Ngaouyanga, Cameroon, the host originally designated as *S. nigrita*) and to compare it with mites from our material, taken from *S. nigrita* (designated as *S. gigas* by Bergmans, 1977). We have found some morphological differences between mites of these two hosts, which permit us to separate specimens from *S. nigrita* as a new taxon on the subspecific level.

Spinturnix scotophili repens ssp.n.

Material examined.-

♀ holotype, ♂ allotype and 11 ♀♀, 6 ♂♂ and 5 immatures, paratypes, from *Scotophilus nigrita* Schreber (sensu Robbins, 1978) (= *Scotophilus gigas gigas*, Bergmans, 1977), Agege, 20 km north of Lagos, Nigeria, 7-VIII-1976, collector W. Bergmans.

Description.-

♀ (holotype): Idiosoma length 1512 (1401-1790 in five paratypes), width 1165 (1071-1212).

Dorsum (fig. 1 A): Dorsal plate broadly lanceolate with rounded antero-median projection, with numerous oval fossae and very fine punctation, 880 (861-906) long and 698 (695-716) wide. Eight pairs of microsetae and 3 pairs of small circular pores situated on the plate. Two pairs of large rounded pores situated in propodosomal part of idiosoma, the first outside, the second inside of the plate. Uncovered integument with fine scale-like pattern, without teeth. A fine punctation along the plate discernible under or in the integument, but not on its surface. Five pairs of rough dorsal propodosomal setae 136-189 (113-177) long, the second pair the shortest, the fourth and fifth the longest. 42 (44-50) rough dorsal opisthosomal setae 101-167 (108-179) long. Peritreme terminates ventrally with small circular pore.

Venter (fig. 1 B): Tritosternal plate small,

of irregular oval form, 28 (20-33) long and 48 (30-45) wide, without lateral emargination as described in *S. scotophili scotophili* by Zumpt & Till (1954) or Rudnick (1960). Sternal plate 157 (154-167) long, 172 (169-179) wide, pentagonal, with pronounced blunt apex, reticulated, with only two pairs of small circular pores. Three pairs of sternal setae situated outside of plate measure 28 (28-33). Metasternal setae of same length. Genital plate elongated, finely longitudinally sculptured, 103-126 long and in middle part 40-45 wide in some paratypes. Genital setae posterior to plate. Two pairs of intercoxal platelets situated between coxae I-II and II-III. Metasternal platelets divided into two small distinct parts. Anal plate 60 (50-60) long, 40 (40-45) wide, anus with two pronounced lobes situated terminally. Only 14 (16-18) very short (20-23) setae posteriorly to the genital pair.

Gnathosoma: Base of gnathosoma 176 wide, gnathosomal setae 23-28. Fixed digit of chelicerae with 6 distinct teeth.

Legs: All dorsal setae, including proximal seta on femur I, long, rough and stout. In holotype, proximal dorsal seta on femur I 270, other dorsal femoral setae 371-503. Postero-ventral seta on legs I and II and antero-ventral setae on legs III and IV long, and rough to dentate. Lengths of legs as follows: I - 1134 (1023-1039), II - 1008 (886-929), III - 945 (811-913), IV - 1102 (992-1008).

♂ (allotype): Idiosoma 1055 (1102-1134 in five paratypes) long, 882 (882-960) wide.

Dorsum (fig. 2 A): Dorsal plate lanceolate, with antero-median projection only slightly defined, 867 (842-897) long, 660 (660-679) wide, of similar structure as in ♀. It bears 8 pairs of microsetae and 3 pairs of small circular pores; two pairs of greater rounded propodosomal pores in lateral part of plate. Uncovered integument with elongated scale-like pattern, without teeth or punctation. Five pairs of rough propodosomal setae 116-152 (93-144), the second the shortest, the fourth and fifth the longest. There are 26 (25-29) rough dorsal opisthosomal setae, length 101-126 (71-136), from which seta nearest to stigma the longest, reaching 126-146. Peritreme terminating ventrally with small circular pore.

Venter (fig. 2 B): Tritosternal plate broadly oval-shaped, 20 (18-28) long and 40 (40-61) wide. Genito-ventral plate 320 (308) long, 217 (222) wide, strongly reticulated. Only first pair of genito-ventral setae situated on plate; second and third pairs lie on border or outside plate. Two pairs of small circular pores on plate. Two pairs of intercoxal and one pair of divided metasternal platelets present. Anal plate similar to that of ♀. Posteriorly to genito-ventral plate 12 (10-13) short setae. Ventral integumentation pattern broadly scale-like.

Gnathosoma: Base of gnathosoma 177 wide, gnathosomal setae 33 (30-34) long. Fixed chela with 8 fine teeth, movable digit with two subapical teeth only.

Legs: As in ♀; lengths as follows: I - 992 (1008-1055), II - 819 (787-866), III - 771 (787-882), IV - 882 (913-1012).

Discussion.-

The new subspecies differs from the nominate one primarily in the greater body measurements of the ♀ (only 1260 x 929 in *Spinturnix scotophili scotophili* examined), in greater measurements of sternal plate (only 149 x 141 in nominate subspecies) and in shorter propodosomal 1-3 and opisthosomal setae (both 157-195 in *Spinturnix scotophili scotophili* examined). In the ♀ of *Spinturnix scotophili repens*, dorsal opisthosomal setae clearly separated in a central group of 8 setae (4 pairs) and two lateral groups of remaining setae (in the nominate subspecies these setae are regularly dispersed on the posterior margin of body). Tritosternal plate of a different shape in the new subspecies, as it is without lateral emargination.

In ♂♂ the measurements of body and plates are also greater in the new subspecies if compared with data of Zumpt & Till (1954).

5. *Spinturnix intectus* sp.n.

Material examined.-

♀ holotype, ♂ allotype and 3 ♀♀ and 7 immatures, paratypes, from *Scotophilus dinganii* (A. Smith) (sensu Robbins, 1978) (= *S. nigrita*, Bergmans, 1977), Ibadan, Nigeria, 9-VIII-1976;

1 ♀, 1 ♂ and 1 immature, paratypes, from the same host and locality, 6-VIII-1976; all collected by W. Bergmans.

Description.-

♀ (holotype): Idiosoma length 1528 (1512-1638 in four paratypes), width 1134 (1134-1228).

Dorsum (fig. 3 A): Dorsal plate 842 (835-858) long, 732 (693-740) wide, of broadly rhombic shape with narrow antero-median and postero-median projection and irregular, generally longitudinally reticulated patterns mainly in antero- and postero-lateral part of plate, finely punctated. Numerous fossae, 8-9 pairs of microsetae, and 4 pairs of small circular pores on plate, the propodosomal pair of pores being different in its structure. Another pair of large propodosomal pores situated outside of the plate. Integument along plate with fine scale-like pattern, and without teeth. Five pairs of rough dorsal propodosomal setae, 152-227 (170-243) long, the first pair being the longest, the second and third the shortest. About 20 (20-26) setae on dorsal side of opisthosoma, 207-258 (188-270) long, forming two lateral groups of 8-11 setae near each stigma and one central group of only 4 setae posteriorly. Peritreme relatively short (358-377), terminating ventrally with small circular pore.

Venter (fig. 3 B): Tritosternal plate 23 (23) long and 38 (33) wide, but completely absent in three paratype specimens. Sternal plate small, 144 (144-148) long, 104 (106-141) wide, irregularly finely grooved and scratched, with only two pairs of small rounded pores. Three pairs of sternal setae 20-23 (18-25) long outside of the plate. Genital plate 164 (164-187) long, 106 (98-106) wide in anterior arch, and 50 (38-58) in the middle. Genital and metasternal setae subequal to sternal setae. Two pairs of intercoxal and one pair of metasternal platelets regularly developed. Anus terminally, with two pronounced anal lobes and a pair of anal and unpaired postanal setae. Uncovered opisthosoma with about 16 (12-16) setae 17-23 (17-25) long, the first immediately posteriorly to genital setae being a little shorter (14-16).

Gnathosoma: Base of gnathosoma 194 wide, gnathosomal setae 25-28 long. Fixed digit of chelicerae with about 6-7 distinct teeth.

Legs: Dorsal setae rough, stout and long, proximal seta on femur I 340, other dorsal femoral setae 358-522, in holotype. Postero-ventral setae on legs I and II, and antero-ventral setae on legs III and IV long, rough to dentate. Coxae I relatively narrow, width in excavation of medial margin 150-170. Length of legs as follows: I - 945 (913-1024), II - 787 (756-787), III - 708 (718-819), IV - 866 (850-913).

♂ (allotype): Idiosoma 1102 long (1149 in one paratype), 858 (890) wide.

Dorsum (fig. 4 A): Dorsal plate broadly rhombic with anterior and posterior projection, 766 (787) long, 630 (669) wide, of similar structure as in ♀. Numerous fossae, 8 pairs of microsetae and 3 pairs of small circular pores on plate. Uncovered integument with scale-like pattern, without teeth. Five pairs of dorsal propodosomal setae, 126-164 (126-185) long, the second the shortest, the first and fifth the longest. Setae of first and second pair similarly as setae of third and fourth pair relatively near to each other. Only 6 rough dorsal opisthosomal setae, length 144-202 (144-162), posteriorly to the stigma; four of these (two pairs) near the stigma, only one pair on posterior body margin. A circular pore on end of peritreme.

Venter (fig. 4 B): Tritosternal plate developed in both specimens examined, of irregular broadly oval shape, 14 (16) long and 40 (40) wide. Genito-ventral plate relatively narrow, with irregular margins, 295 (314) long, 169 (154) wide, with two pairs of small circular pores. Only the first pair of genito-ventral setae, 20-21 long, appears to be situated on the plate, the remaining two pairs lie along the plate (sternal region in allotype and paratype specimens unclear, obscured by blood meal remnants in intestine). Two pairs of intercoxal and a pair of metasternal platelets. Anal plate situated postero-terminally. One pair of metasternal setae, and apparently only three other pairs of ventral setae, posterior to the genito-ventral plate.

Gnathosoma: Base of gnathosoma 201 (214) wide, gnathosomal setae 25 (23) long. Fixed digit of chelicerae with 10-12 or more fine teeth.

Legs: As in ♀, coxae I about 150 wide in excavation of antero-medial margin. Length of legs as follows: I - 960 (992), II - 756 (793), III - 724 (740), IV - 866 (882).

Discussion.-

The new species appears to be closely related to *Spinturnix abyssinicus* Hirst, 1927, which is known from some unidentified bats in Ethiopia (Addis-Abeba). The specimen recorded by Aellen (1952), from *Scotophilus leucogaster* in Cameroon, belongs, according to Benoit (1958 a-b), to *Spinturnix scotophili*. The new species differs considerably from *S. abyssinicus* (based on descriptions of Hirst, 1927, and Rudnick, 1960), mainly in the presence of a tritosternal plate, in the smaller number of dorsal opisthosomal setae (only 10-13 pairs in ♀ and 3 pairs in ♂), and in the form of the dorsal plate, characterized by narrow antero-median and postero-median projections. The shape of the male genito-ventral plate is also different.

DISCUSSION

The only species of *Spinturnix* hitherto identified from African bats of the genus *Scotophilus* are *Spinturnix scotophili* Zumpt & Till, 1954, and *S. walkerae* Zumpt & Till, 1954. *S. walkerae* has been recorded only once, from *Scotophilus dinganii* at Tiwi (25 km SSE Mombasa), Kenya (Whitaker & Mumford, 1978). *S. scotophili* is known primarily from Katalure, near Torit, Sudan, from *Scotophilus dinganii colias* (see Zumpt & Till, 1954; Anciaux de Faveaux, 1971), the type host of this mite. It was also found on *Scotophilus dinganii* in Cameroon (the specimen studied in relation to the present paper), and in southeast Zaire (Anciaux de Faveaux, 1965; Benoit, 1958a, b); here, *S. dinganii* is probably represented by the nominate race (see Hayman & Hill, 1971). Other records are known from *Scotophilus nigrita*, also from southeast Zaire, and from *Scotophilus leucogaster* from Cameroon (Aellen, 1952; Benoit, 1958a, b).

The specificity of spinturnicid mites to their hosts is of phylogenetical origin and it is very clearly defined on the level of monoxeny or oligoxeny (Dusbábek, 1972). It is therefore not surprising that Nigerian mites of the genus *spinturnix* collected on *Scotophilus nigrita* differ morphologically in some respects from specimens collected on the type host *Scotophilus dinganii*. These two bat species are taxonomically very distinct and, although they do occur sympatrically (Kock, 1969; Bergmans, 1977), their reproductive and probablt also ecological isolation is assumed to have caused differentiation of parasites as well. This is evident from the marked morphological differences between mite populations on the subspecific level. The subspecific affiliation of mite specimens collected from *Scotophilus nigrita* in Zaire and from *Scotophilus leucogaster* in Cameroon cannot be studied because of absence of material.

Rather more surprising is the find of the new species *Spinturnix intectus* in Nigeria on *Scotophilus dinganii*, the type host of *Spinturnix scotophili*. It is the more surprising, because in the adjacent Cameroon the association of *Spinturnix scotophili* with *Scotophilus dinganii* has been confirmed by direct findings. It should be remembered here, however, that the subspecific identities of *Scotophilus dinganii* populations in southeast Nigeria and north Cameroon (the two regions involved) have not yet been established. With the geographical latitudes and associated vegetation belts in mind, the north Cameroon animals may be found to represent *S.d. colias*, and the southwest Nigeria specimens either *S.d. nux* Thomas, 1904, or an undescribed race. Because of the clearly defined specificity of mites of the genus *Spinturnix* and the relatively strong infestation of the Nigerian population of *Scotophilus dinganii* by *Spinturnix intectus*, an accidental transfer of mites from another bat host to *Scotophilus dinganii* can hardly be considered. More likely explanations would be either the substitution of *Spinturnix scotophili* in the West African population of *Scotophilus dinganii* by *Spinturnix intectus*, or the sympatric occurrence of both these species on the same host. The admittedly hardly documented absence of *Spinturnix scotophili* on *Scotophilus dinganii* in southwest Nigeria, and the possibly new subspecific status of these bats would support the substitution theory. (A similar situation occurs in the case of the bat *Miniopterus schreibersii* (Kuhl, 1819) and the palearctic mite *Spinturnix psi* (Kolenati, 1856), substituted on this host in Africa by *Spinturnix semilunaris* DeMeillon &

Lavoipierre, 1944, in the Oriental Region by *Spinturnix verutus* Delfinado & Baker, 1963, and in Australia by *Spinturnix loricata* Domrow, 1972. In the greater part of its range *Spinturnix psi* occurs parallel with these species on the same host.)

The revision of African *Scotophilus* in preparation by Robbins (Robbins, 1978) will certainly help to solve this and related problems.

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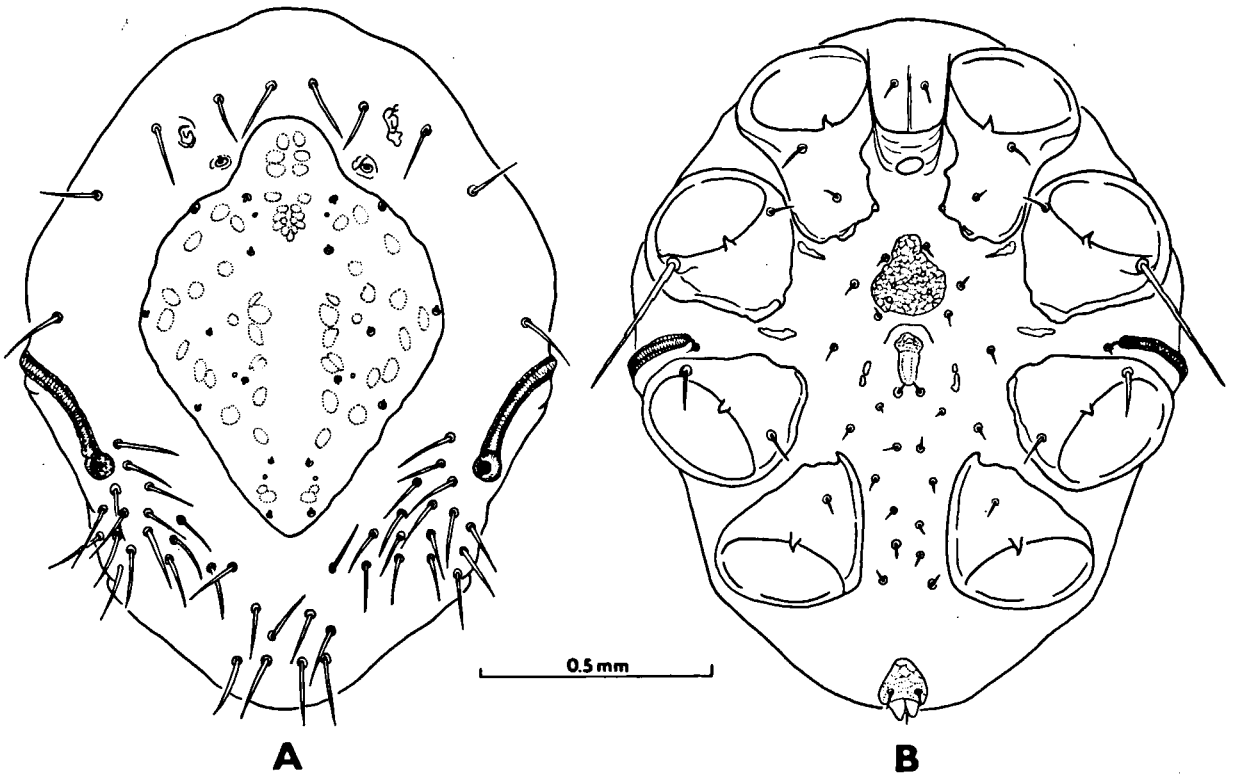

Fig. 1. *Spinturnix scotophili repens* ssp.n., ♀. A: dorsal view; B: ventral view.

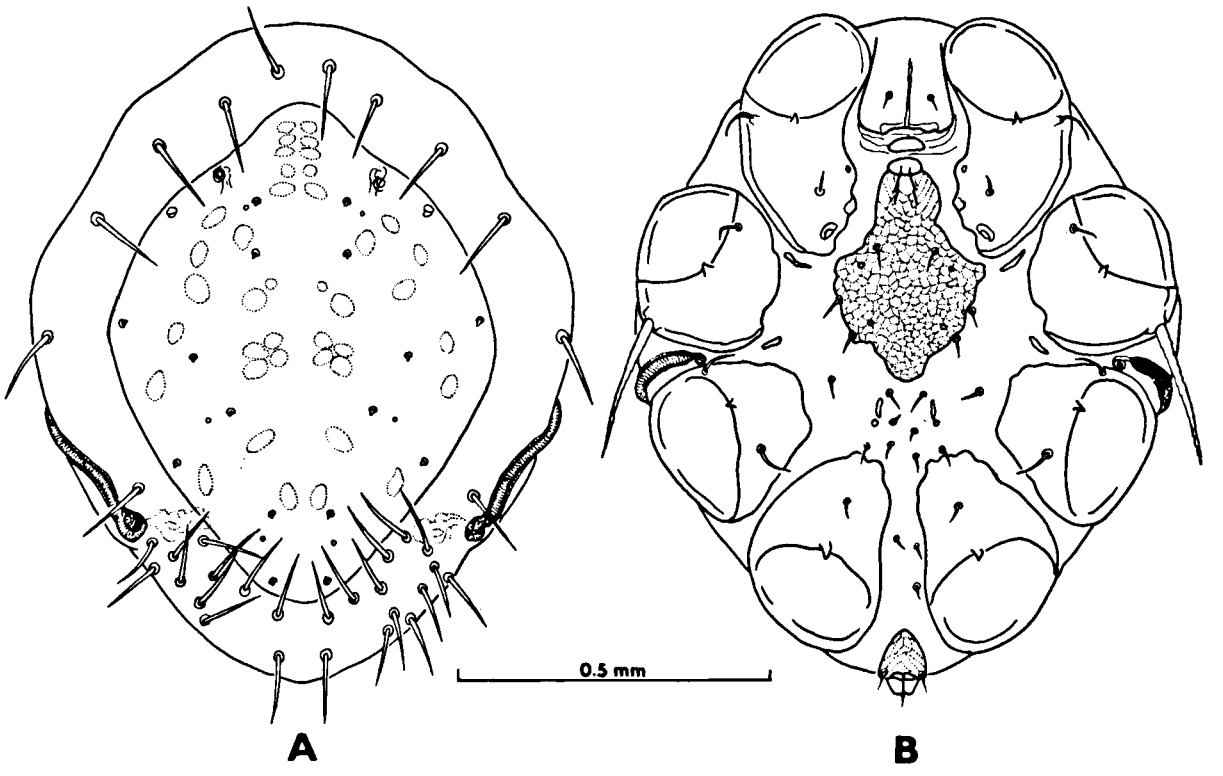

Fig. 2. *Spinturnix scotophili repens* ssp.n., ♂. A: dorsal view; B: ventral view.

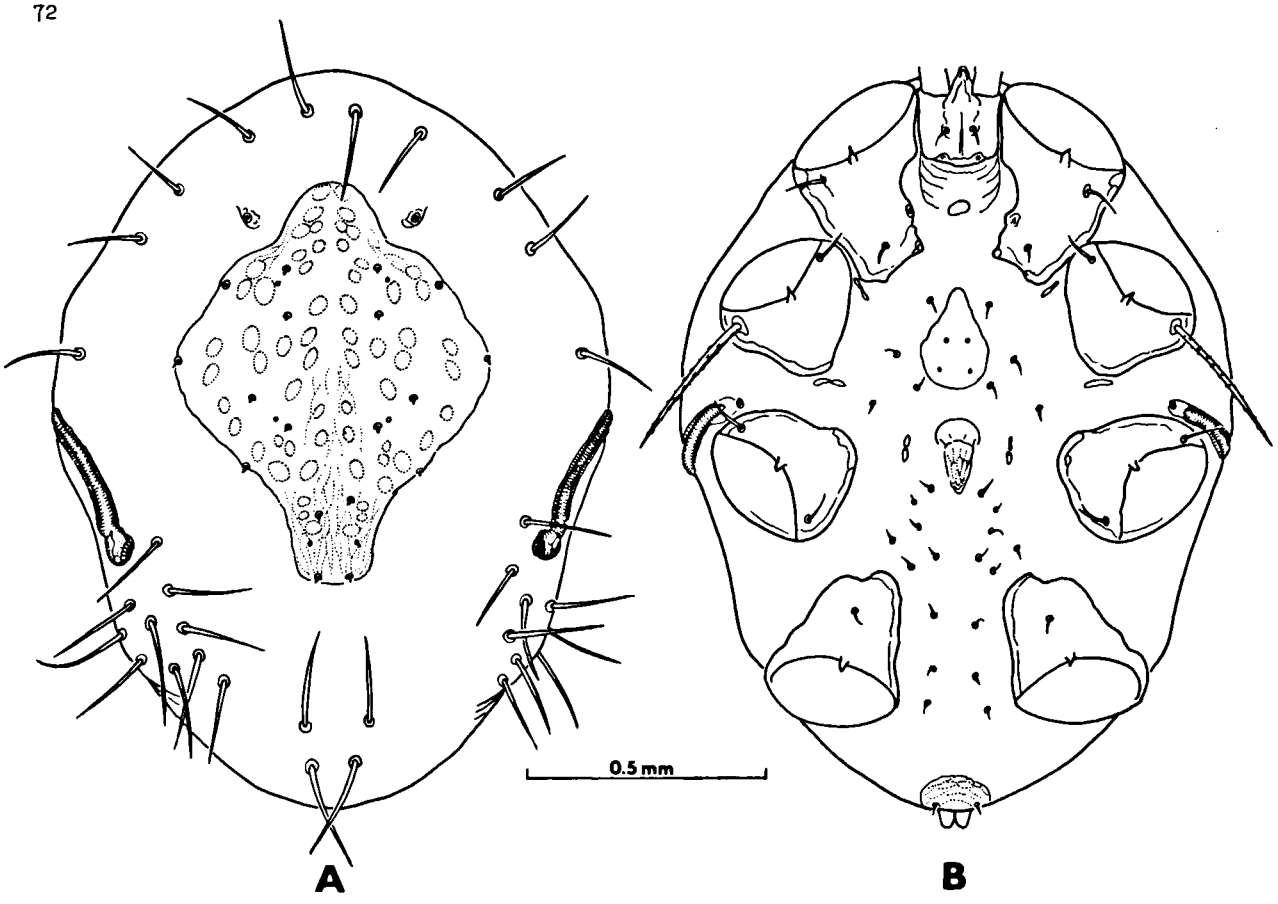

Fig. 3. *Spinturnix intectus* sp.n., ♀. A: dorsal view; B: ventral view.

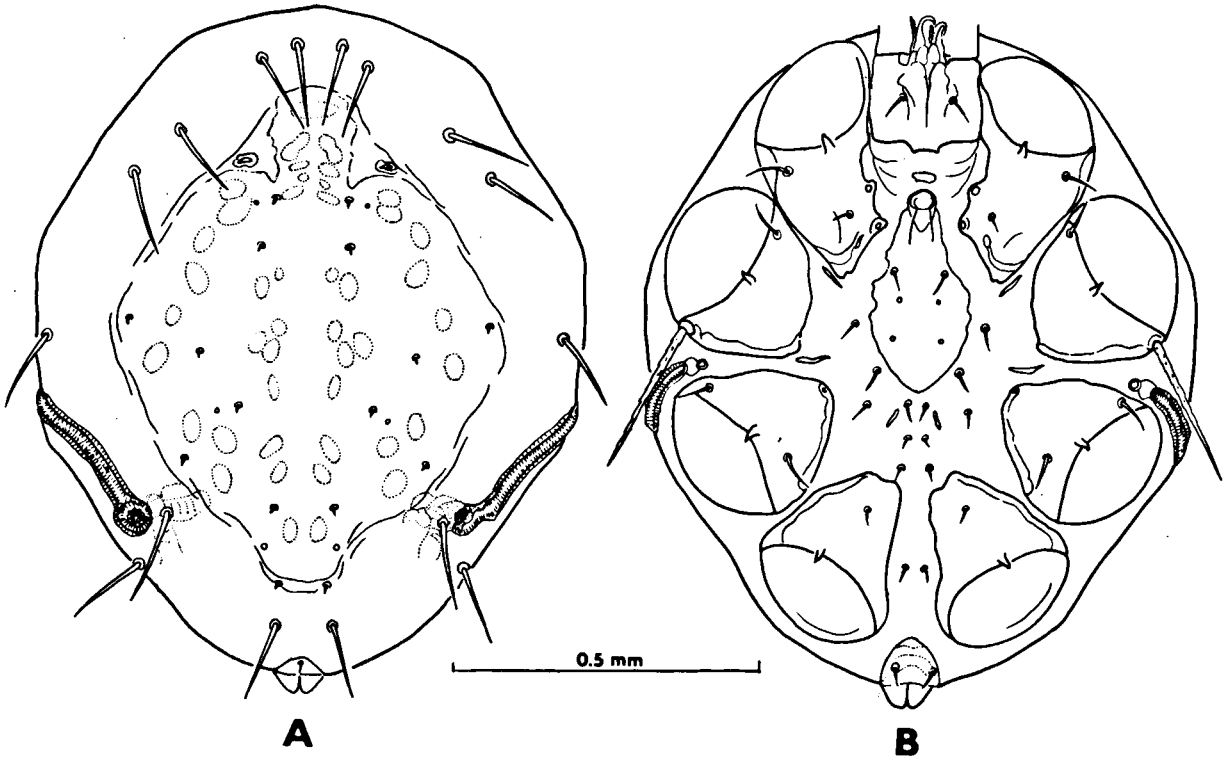

Fig. 4. *Spinturnix intectus* sp.n., ♂. A: dorsal view; B: ventral view.