

## *IXODES (AFRIXODES) MATOPI* N. SP. (ACARINA: IXODIDAE): A TICK FOUND AGGREGATING ON PRE-ORBITAL GLAND SCENT MARKS OF THE KLIPSPRINGER IN ZIMBABWE

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### ABSTRACT

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*Ixodes (Afrixodes) matopi* n. sp. is described from females and males collected off twigs bearing deposits of intraspecific communication marks secreted by the pre-orbital glands of the klipspringer *Oreotragus oreotragus* and from laboratory-reared immature specimens. One female was also found on a goat.

The 4 collections were all from Zimbabwe, 3 of them from Matabeleland South Province and the fourth from Inyanga District, Zimbabwe.

### Résumé

*IXODES (AFRIXODES) MATOPI* N. SP. (ACARINA: IXODIDAE): UN TIQUE QUI SE CONCENTRE SUR LES MARQUES DE LA GLANDE ODORIFÉRANTE PRÉ-ORBITALE DE L'ANTILPE KLIPSPRINGER

*Ixodes (Afrixodes) matopi* n. sp. (Acarina: Ixodidae) est décrit à partir de femelles et de mâles récoltés sur des touffes de buissons portant des dépôts de marques de communication intra-spécifiques secrétées par les glandes pré-orbitales du klipspringer, *Oreotragus oreotragus*, ainsi que d'échantillons immatures élevés en laboratoire. Une femelle a également été trouvée sur une chèvre.

Les quatre collections provenaient toutes de Zimbabwe, trois d'entr'elles de la Province Sud du Matabeleland et la quatrième du District Inyanga, Zimbabwe.

### INTRODUCTION

The interesting finding that *Ixodes* ticks were attracted to twigs marked with pre-orbital gland secretions by klipspringers (Rechav, Norval, Tannock & Colborne, 1978) prompted a more detailed study of this species, which had originally been incorrectly identified by Clifford, Walker & Keirans (1977) as *I. (Afrixodes) neitzi*. A study of 2 subsequent collections from marked twigs and one female from a goat has revealed that this tick is a new species, but morphologically similar to *I. neitzi*. All stages of *I. matopi* are herein described and the adults are compared with those of *I. neitzi*.

*Ixodes matopi*, Spickett, Keirans, Norval & Clifford sp. nov.

### MATERIAL EXAMINED

*Holotype* ♀ off twigs, Maleme Dam (20° 25'S, 28° 29'E), Rhodes Matopos National Park, Matabeleland South Province, Zimbabwe, February 1978, Y. Rechav and R. A. I. Norval: Rocky Mountain Laboratory (RML No. 105642).

*Allotype* ♂ data as for holotype.

*Paratypes*, 9 ♂, 9 ♀ (RML No. 105642) with data as for holotype; 7 ♂, 11 ♀ (RML No. 105008; HH 74075) from twigs marked with pre-orbital gland secretion of *Oreotragus oreotragus*, Maleme Dam (20° 33'S, 28° 30'E), Rhodes Matopos National Park, Matabeleland South Province, Zimbabwe, 15.2.1977, R. A. I. Norval; 1 ♂, 1 ♀ (RML No. 105303) from grass on granite outcropping, Rhodes Matopos National Park (20° 33'S, 28° 33'E), Matabeleland South Province, Zimbabwe, 14.2.1977, R. A. I.

Norval; 1 ♀ (RML No. 105321) from goat, Cotswold Farm (18° 17'S, 32° 30'E), Mount Dombo, Inyanga District, Zimbabwe, 3.4.1976, R. A. I. Norval.

Holotype, allotype and some paratypes are deposited in the collection of the Veterinary Research Institute, Onderstepoort. Additional paratypes are in the Rocky Mountain Laboratory and in the British Museum (Natural History).

### DESCRIPTION

All measurements are in millimetres. Specimens were prepared for scanning electron microscopy by the method of Corwin, Clifford & Keirans (1979). All specimens listed under Material Examined were studied. The first measurement given is for the holotype female or allotype male. Those following in parentheses are a range for 5 paratypes.

**Female** (Fig. 1-6). *Body* 2.08 long (excluding capitulum), 1.20 wide (2.13-2.35 long; 1.20-1.38 wide). *Body setae* numerous, white, range 0.162-0.187 long, evenly distributed. *Capitulum* (Fig. 1, 2). Length from palpal apices to posterior margin of basis 0.750 (0.750-0.850); greatest width 0.412 (0.425-0.487). *Basis capituli* dorsally (Fig. 1) with lateral margins very slightly diverging; porose areas indiscernible under ordinary microscopy, extremely diffuse and lacking any defined depressed areas, separated by about the width of one area; cornua lacking, posterior margin moderately concave. Ventrally (Fig. 2 & 3) slightly constricted at mid-length; auriculae as mild lateral bulges, transverse suture absent; posterior margin gently convex. *Palpi* c. 4 times longer than wide, 0.637 (0.637-0.700) long, 0.162 (0.150-0.175) wide, segments 1 and 4 small, 2 longer than 3, their combined length 0.537 (0.562-0.625), external palpal margins distinctly concave. *Hypostome* (Fig. 2 & 4) situated on a median extension of the basis capituli, elongate, pointed, length of toothed portion 0.475 (0.487-0.525), dental formula 4/4 at apex, then 3/3 for most of shaft length, 2/2 at base. *Scutum* (Fig. 5) shape as figured, 1.30 (1.350-1.400) long, 1.025 (1.025-1.150) wide. *Emargination* wide and shallow. *Scapulae* short, sharply pointed. *Lateral carinae* almost straight,

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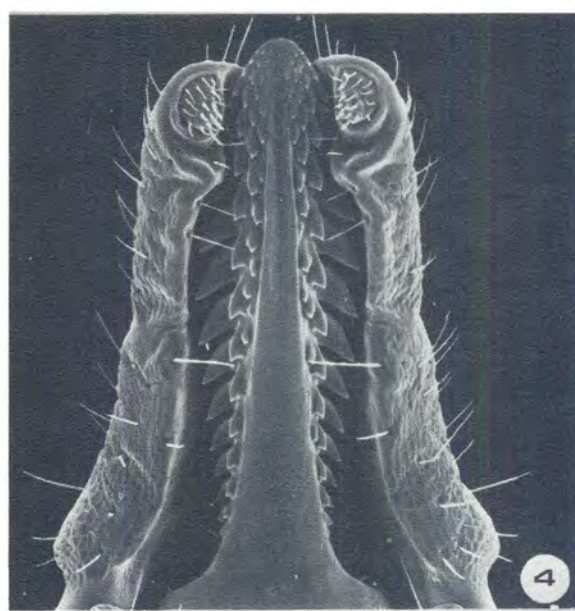
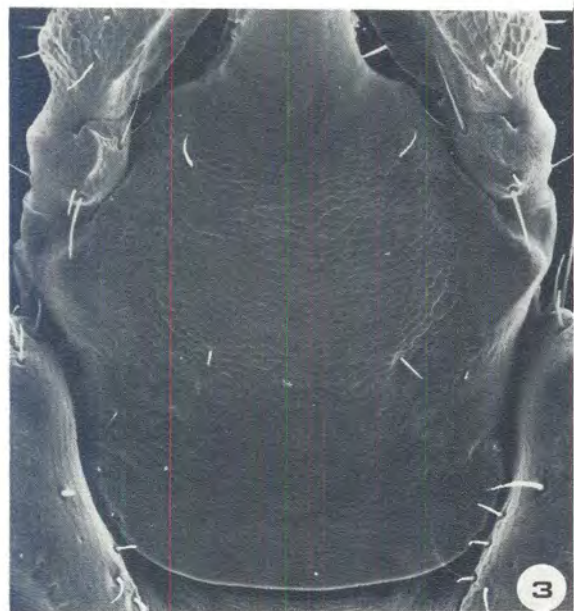
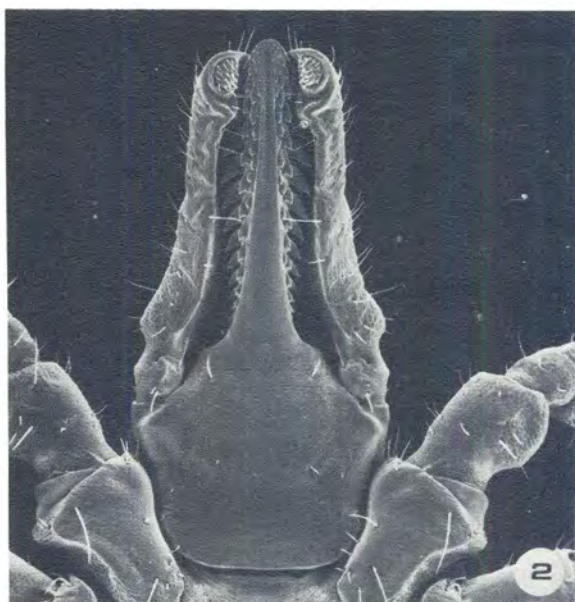




FIG. 1-6 *Ixodes (Afrixodes) matopi* n. sp., female, (1) capitulum, dorsal view 130 $\times$ ; (2) capitulum, ventral view 140 $\times$ ; (3) basis capituli, ventral view 234 $\times$ ; (4) hypostome 195 $\times$ ; (5) scutum 91 $\times$ ; (6) coxae I-IV 104 $\times$

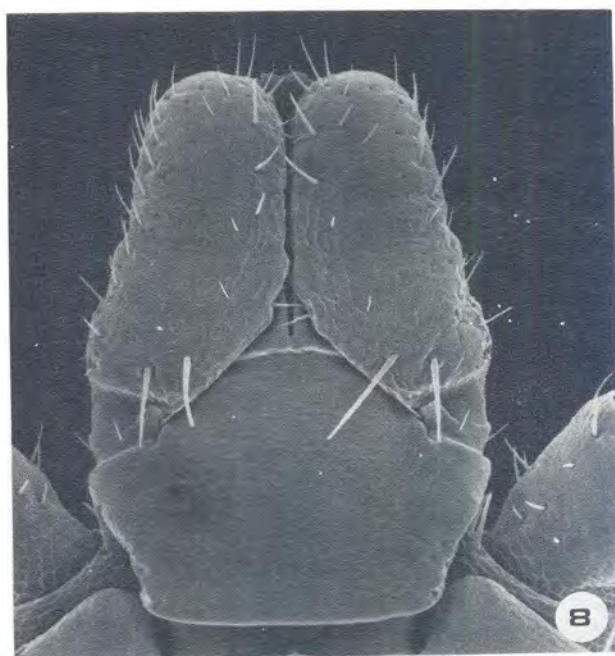


FIG. 7-10 *Ixodes (Afrixodes) matopi* n. sp., male, (7) scutum 75 $\times$ ; (8) capitulum, dorsal view 225 $\times$ ; (9) capitulum, ventral view 200 $\times$ ; (10) basis capituli, ventral view 375 $\times$

extending to posterolateral margin. *Cervical grooves* convergent anteriorly, then divergent to slightly beyond scutal mid-length. *Cervical fields* depressed to posterior scutal margin. *Punctations* small, shallow, evenly distributed. *Setae* minute, unevenly scattered over scutal surface, inapparent under light microscopy. *Legs* (Fig. 6). Coxae I and IV with small external spurs; all coxae lacking internal spurs; coxae I-III with prominent syncoxae; each coxa with a few long white setae. Trochanters with small spurs on I and II, absent on III and IV. Tarsus I 0,687 (0,662-0,750) long; tarsus IV 0,675 (0,612-0,725)

long. *Spiracular plate* nearly round, c. 0,250. *Genital aperture* situated at level of coxa IV. *Anal groove* horseshoe-shaped, open posteriorly.

**Male** (Fig. 7-12). *Body* (Fig. 7) length from apices of scapulae to posterior body margin 2,272 (2,125-2,500), width 1,225 (1,75-1,400); outline oval, inner margin of marginal body fold smooth. *Capitulum* (Fig. 8 & 9) length from palpal apices to posterior margin 0,537 (0,500-0,562). *Basis capituli* dorsally (Fig. 8), width greatest at insertion of palpal article I, 0,300 (0,312-0,375). Lateral margins divergent,



posterior margin nearly straight, cornua absent. *Basis capituli* ventrally (Fig. 9) with lateral margins divergent, posterior margin nearly straight, mesial lobe of transverse ridge slightly larger than lateral lobes and indentations between these lobes deep, disrupting ridge line. *Palpi* about twice as long as wide, shape dorsally as in Fig. 8; 0,300 (0,337-0,375) long, 0,150 (0,150-0,175) wide, suture between palpal articles 2 and 3 barely discernible. *Hypostome* (Fig. 11) toothed portion 0,225 (0,225-0,262) long, dentition from apex arranged in 7-8 rows of 5/5-4/4 crenulations plus one row of crenulations anterior to the large pair of basal teeth. *Scutum* (Fig. 7) oval, 2,175 (2,000-2,325) long, 1,050 (1,025-1,225) wide. *Pseudoscutum* and *lateral carinae* absent. *Cervical grooves* slightly converging, then diverging for first ¼ of scutal length. *Punctations* small, shallow, evenly distributed over scutal surface. *Setae* few, minute,

inapparent under light microscopy. Ventral plates typical of the subgenus. Punctations small, shallow, on all plates except pregenital. *Setae* short, white, present on all plates. Length and width of plates: pregenital 0,400 × 0,162 (0,337-0,437 × 0,150-0,212), median 1,137 × 0,612 (1,062-1,450 × 0,587-0,700), adanal 0,500 × 0,200 (0,625-0,712 × 0,225-0,250), anal 0,362 × 0,237 (0,337-0,375 × 0,225-0,312). *Legs* (Fig. 12) coxa I with a very small internal thickening which can be considered a small internal spur; coxa IV with a minute external spur; coxae II and III spurless, coxae I-III with prominent syncoxae; each with a few long white setae. Trochanters with a very small spur on I and II, absent on III and IV. Tarsus I 0,637 (0,600-0,662) long; tarsus IV 0,575 (0,512-0,650) long. Spiracular plate oval, greatest diameter 0,312 (0,225-0,300). *Anal groove* horseshoe-shaped, open posteriorly.



FIG. 11, 12 *Ixodes (Afrixodes) matopi* n. sp., male, (11) hypostome 437,5 ×; (12) coxae I-IV 137,5 ×

FIG. 13 *Ixodes (Afrixodes) neitzi* Clifford, Walker & Keirans, 1977, male hypostome 425 ×



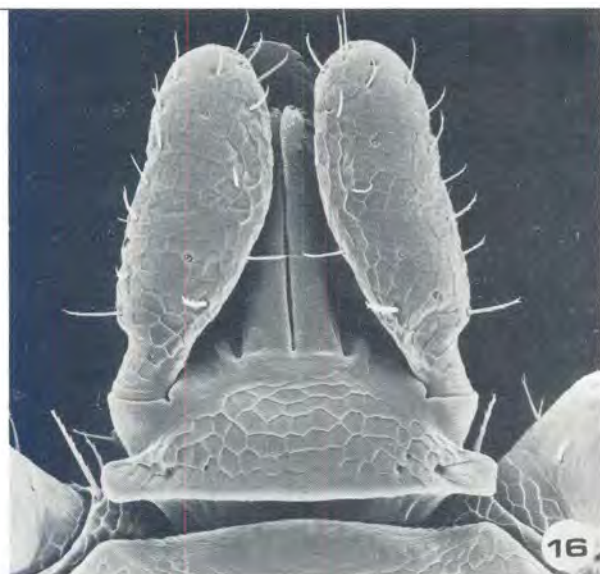


FIG. 14-17 *Ixodes (Afrixodes) matopi* n. sp., nymph, (14) dorsal view 112,5 $\times$ ; (15) ventral view 112,5 $\times$ ; (16) capitulum, dorsal view 375 $\times$ ; (17) capitulum, ventral view 375 $\times$

**Nymph** (Fig. 14-20). Measurements from 5 unengorged, laboratory cultured specimens (1 slide mounted). A range is given followed by a mean in parentheses. **Body** (Fig. 14) length from anterior scutal border to posterior body margin 1,07-1,15 (1,126), width 0,54-0,64 (0,61), widest just posterior to leg III. **Capitulum** length from palpal apices to posterior margin of basis 0,15-0,17 (0,16), width 0,17-0,18 (0,17). **Basis capituli** dorsally (Fig. 16) with posterior margin straight, lateral margins slightly diverging anteriorly; cornua absent. **Basis capituli** ventrally (Fig. 17) with auriculae in the form of slight, rounded, shelf-like projections, external margins posterior to auriculae deeply constricted; posterior margin convex. **Palpi** c. 2½ times longer than wide, 0,15-0,16 (0,16) long, 9,057-0,060 (0,059) wide, segment 1 and 4 small, suture between segments 2 and 3 indistinct. **Hypostome**. Prolongation of a medial anterior extension of basis, elongate, bluntly rounded anteriorly; length 0,108-0,120 (0,117). Dental formula 2/2 throughout length, a few minute denticles apically; 9 teeth in file 1, 8 in file 2. **Scutum** (Fig. 18) length

0,42-0,45 (0,44), width 0,46-0,49 (0,48). Shape as figured, broadly rounded posteriorly. Lateral carinae running parallel to lateral scutal margins, diverging from scapular area to reach posterior scutal borders; cervical grooves distinct, converging in scapular area then diverging to reach c. ¾ scutal length. Punctations few, evenly distributed. Setae few, short, evenly scattered. Scapulae very blunt apically. **Dorsum** (Fig. 14) and **ventral** (Fig. 15) as figured. **Spiracular plate** (Fig. 19) nearly circular, longest dimension 0,077-0,082 (0,080), sharp projections along perimeter, goblets large. A small ovoid plate situated mesial to spur of coxa I. Anal valves with 3 pairs of setae. Anal groove horseshoe-shaped, open posteriorly. **Legs** (Fig. 20). Coxa I with a moderately large, pointed, triangular internal spur; internal spurs absent on II-IV. Coxae I-III with large, sharp, triangular external spurs. Coxa IV with moderate rounded external spur. Trochanters without spurs. Tarsus I 0,240-0,272 (0,25) long; 0,095-0,103 (0,097) wide. Tarsus IV 0,275-0,310 (0,292) long; 0,098-0,107 (0,100) wide.



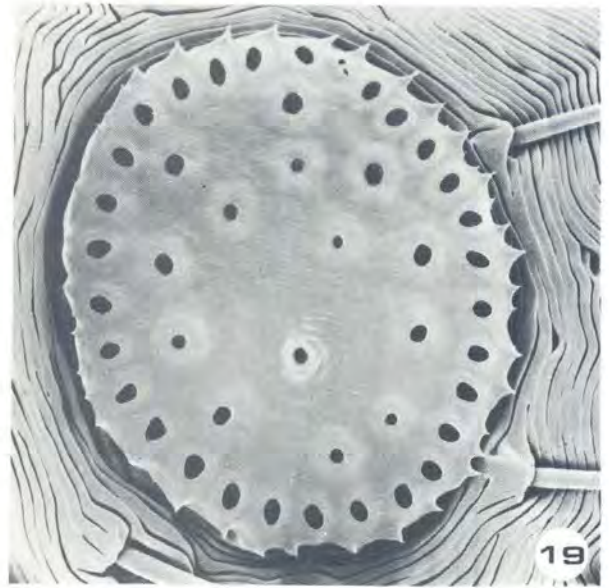
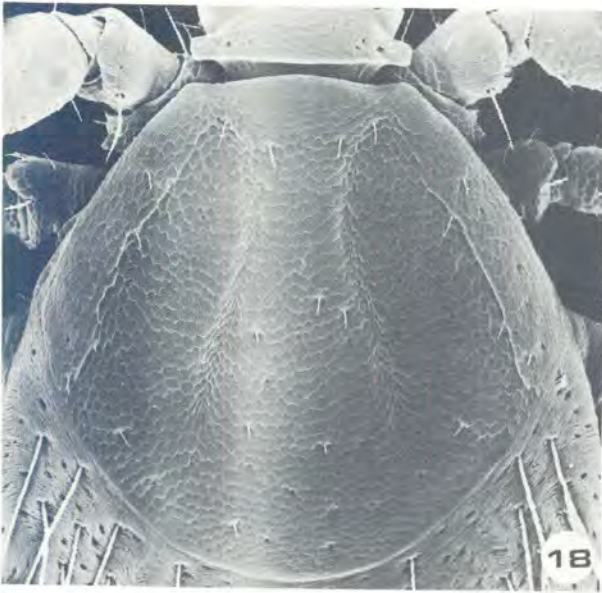


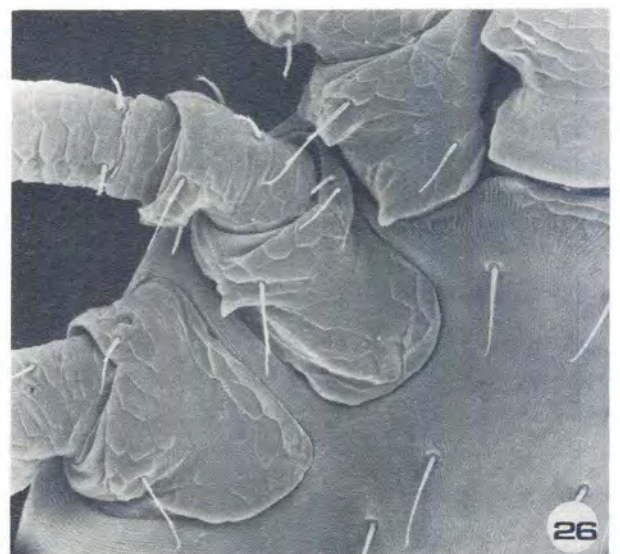
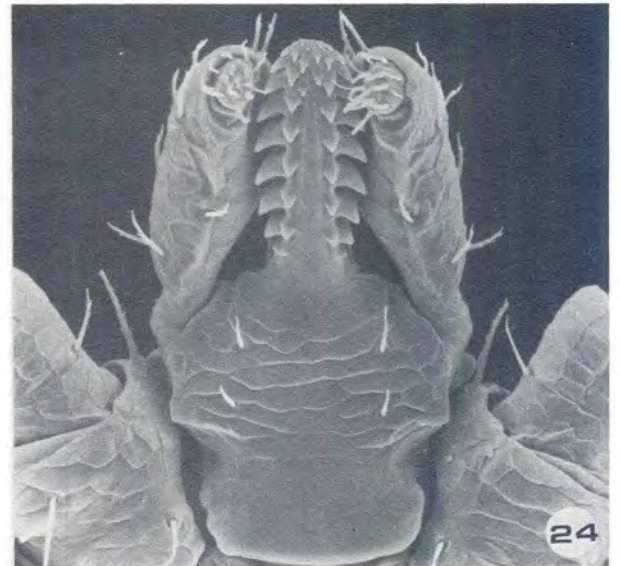
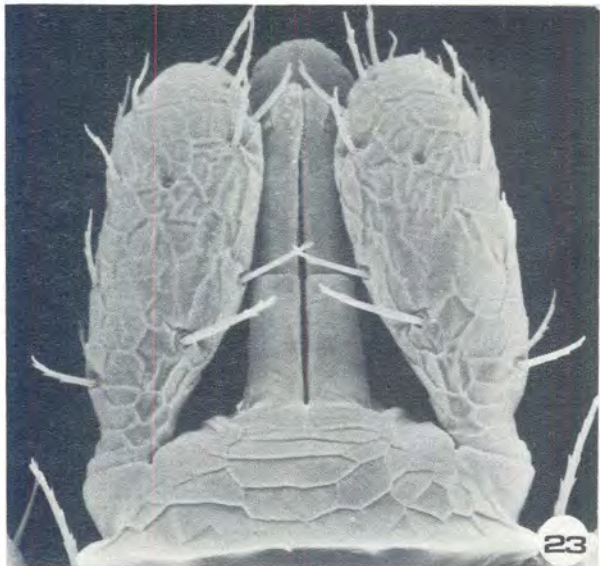
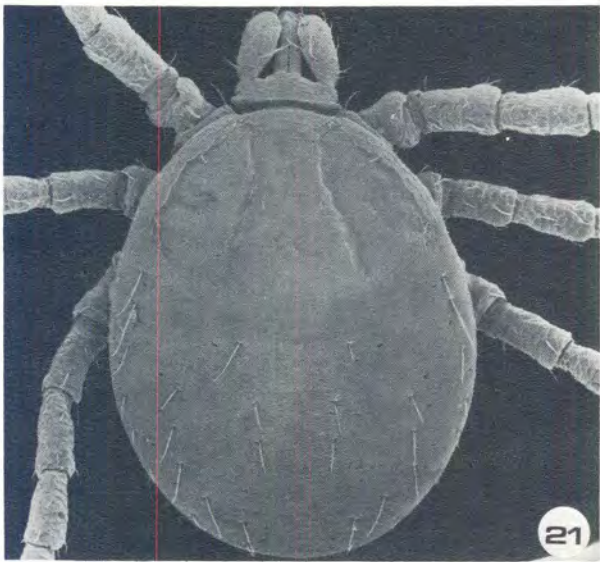
FIG. 18–20 *Ixodes (Afrixodes) matopi* n. sp. nymph, (18) scutum 225 ×; (19) spiracular plate 1125 ×; (20) coxae I–IV 325 ×

**Larva** (Fig. 21–26). Measurements from 5 unengorged slide-mounted laboratory-cultured specimens. A range is given followed by a mean in parentheses. Chaetotaxic terminology according to Clifford & Anastos (1960). *Body* subcircular, widest at level of Coxa III. Length from anterior scutal border to posterior body margin 0,564–0,580 (0,574); width 0,381–0,396 (0,387). Dorsal setae 16 pairs; 3 pairs central dorsals, CD<sub>1</sub> 0,075–0,084 (0,082), CD<sub>2</sub> 0,028–0,035 (0,033); 8 pairs marginal dorsals, MD<sub>1</sub> 0,032–0,036 (0,034), MD<sub>8</sub> 0,021–0,026 (0,023); 5 pairs of supplementaries. Ventral setae 16 pairs and one pair on anal valves; 3 pairs of sternals, ST<sub>1</sub> 0,013–0,018 (0,016); 3 pairs of preanals, 0,026–0,030 (0,029), 7 pairs of premarginals; 3 pairs of marginal ventrals, 0,021–0,026 (0,023). Anal groove indistinct, open anteriorly. *Capitulum* length from palpal apices to posterior margin of basis 0,096–0,104 (0,102); width at level of palpal article I 0,104–0,112 (0,108).

*Basis capituli* dorsally (Fig. 23) with posterior margin straight, lateral margins converging anteriorly; cornua absent. Ventrally (Fig. 24) basis constricted posterior to slight postero-laterally directed auriculae, posterior margin broadly rounded. Post-hypostomal setae 2 pairs, PH<sub>1</sub> 0,021–0,018 (0,022), PH<sub>2</sub> 0,024–0,029 (0,016); distance between PH<sub>1</sub> 0,048–0,056 (0,052), between PH<sub>2</sub> 0,057–0,064 (0,061). *Palpi* elongate 0,093–0,102 (0,095) long; 0,036–0,039 (0,035) wide; suture between segments 2 and 3 indistinct; setae, 0 on segment 1; 10 dorsally, 3 ventrally on 2 and 3; 14 on segment 4. *Hypostome* (Fig. 25) 0,063–0,086 (0,076) long; 0,038–0,048 (0,043) wide; dental formula 2/2 throughout, a few fine denticles at the apex. *Scutum* (Fig. 21) length 0,230–0,256 (0,246); 0,275–0,286 (0,279) wide. Setae 4 pairs. Lateral carinae running parallel with lateral scutal margin to posterior scutal margin. Cervical grooves distinct, parallel anteriorly, then divergent to reach  $\frac{3}{4}$  scutal

FIG. 21–26 *Ixodes (Afrixodes) matopi* n. sp., larva, (21) dorsal view 225 ×; (22) ventral view 225 ×; (23) capitulum, dorsal view 875 ×; (24) capitulum, ventral view 750 ×; (25) hypostome 1500 ×; (26) coxae I–III 625 × →







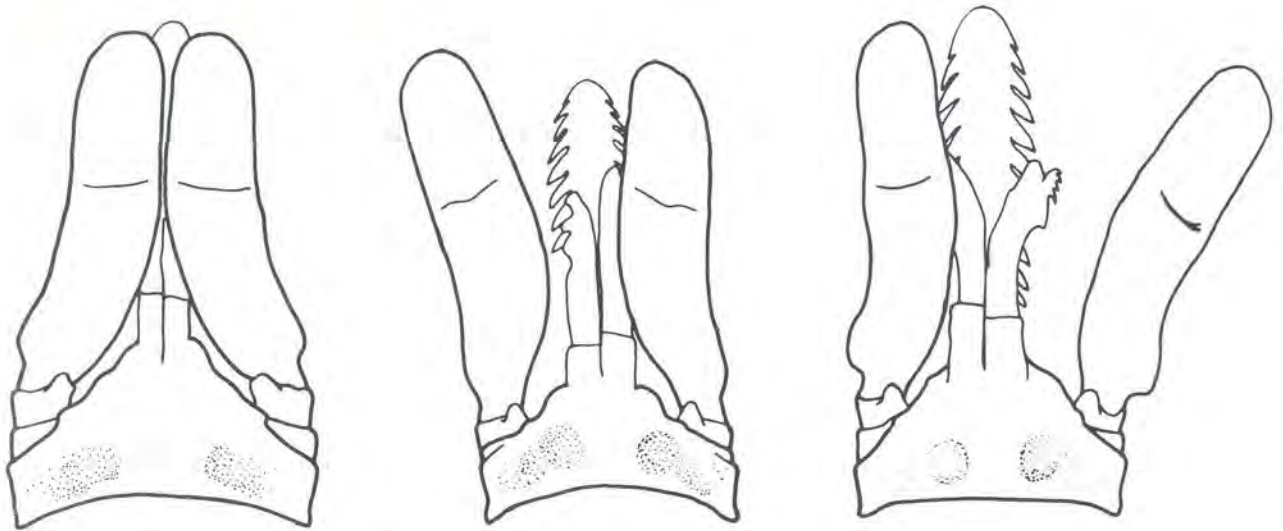


FIG. 27 Female capituli, dorsal view, setae omitted. (a) *Ixodes matopi*; (b) *Ixodes neitzi*; (c) *Ixodes cavipalpus*

length. *Legs* (Fig. 26). Coxa I with moderately large, triangular internal and external spurs; coxa II with pointed triangular external spur; coxa III unarmed. Trochanters without spurs.

DISCUSSION

*Ixodes (A.) matopi* closely resembles *I. neitzi*. In an addendum to the original description of *I. neitzi*, Clifford *et al.* (1977) confused these 2 species and recorded the *I. matopi* collection from Maleme Dam (RML 105008) as *I. neitzi*.

The female of *I. matopi* has a definite external spur, but no internal spur on coxa I; very diffuse porose areas; concave external palpal margins, and a palpal segment 2 which is constricted at the base but otherwise almost the same width throughout its length (Fig. 27a). *I. neitzi* females lack an external spur but possess a very small internal spur on coxa I; have slightly depressed, relatively less diffuse porose areas; subparallel external palpal margins and a palpal segment 2 which is more tapered basally than it is in *I. matopi* (Fig. 27 b). [*I. neitzi* females are described by Clifford *et al.* (1977) as lacking spurs on coxae I-III. However, a small but definite internal spur can be distinguished on coxa I of their specimens and in their Fig. 8].

Because of their palpal configuration, females of *I. matopi* may be confused with those of *I. cavipalpus*, a species that is also found in Zimbabwe. Females of *I. matopi*, however, lack cornua, have very diffuse porous areas, their auriculae are in the form of relatively small lateral bulges and the posterior margin of the basis is concave (Fig. 27 a). *I. cavipalpus* females have small cornua, relatively more concentrated porous areas, auriculae in the form of broad ridges and a relatively straight posterior margin of the basis capituli (Fig. 27 c).

Males of *I. matopi* and *I. neitzi* are more difficult to distinguish. However, ventrally, the mesial lobe of the transverse ridge is much larger in *I. neitzi* than in *I. matopi*, and protrudes further than the lateral lobes. [Compare Fig. 12 & 13 in Clifford *et al.* (1977) and Fig. 8 & 9 in this report]. Coxa IV of the *I. matopi* male is elongate with a minute spur, whereas coxa IV of the *I. neitzi* male is rounded, with a moderately large spur. In the SEM photograph used in Clifford *et al.* (1977), the hypostome of the *I. neitzi* male was damaged. We have therefore included a photograph of an undamaged hypostome (Fig. 13) to show the characteristic laterally flaring teeth in the outer file. These teeth are smaller and more like crenulations in *I. matopi* (Fig. 11).

Males of *I. matopi* have lateral lobes on the transverse ridge and the denticles in the anterior hypostomal rows are in the form of crenulations. *I. cavipalpus* males have no lateral lobes on the transverse ridge and the denticles in the anterior hypostomal rows are in the form of teeth.

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