

NEW BRAZILIAN SPIDER MITES (*Acarina: Tetranychidae*)¹Adilson D. Paschoal²

This paper is intended to present the description of eight species of spider mites from the Brazilian fauna. The species in question were described as new when the writer reviewed the family Tetranychidae in Brazil (PASCHOAL, 1970), in a thesis submitted to Escola Superior de Agricultura "Luiz de Queiroz", University of São Paulo, Brazil, on June 13, 1970.

The species treated in this paper, belonging to the subfamily Tetranychinae, were collected in the States of São Paulo and Minas Gerais. Type specimens were deposited in the Acarology Laboratory, Department of Zoology, Escola Superior de Agricultura "Luiz de Queiroz", USP, Piracicaba, São Paulo, Brazil.

The number and arrangement of leg setae are symbolical represented. In the first parenthesis is the total number of setae of a segment; in the second the total number of proximal setae and in the third the total number of distal setae. The first number indicates the tactile setae and the second the sensory setae. For tarsi I and II the duplex setae are included.

I am grateful to Dr. Edward W. Baker, USDA, for his confirmation on the identity of the new species and to Dr. Roger Williams, USAID/B-OSU-ESALQ, for the review of the manuscripts.

Tetranychus (Tetranychus) paschoali Paschoal, 1970
(Plate 1)

Closely related to *Tetranychus (T.) desetorum* Banks, 1900, differs in having: a) female and male empodia bearing a strong spur dorsomedially; and, b) knob of aedeagus with pos-

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² From Department of Zoology.

terior margin not sigmoid.

Female - Terminal sensillum of palpus cylindrical, about one and a half times as long as wide. Stylophore conical, rounded distally and with anastomosed striae at the anterior portion. Peritreme hooked terminally. Tarsus I: (10 + 4 + 2 duplexes) = (4 + 1 + 1 duplex) + (6 + 3 + 1 duplex); proximal duplex setae in line with four tactile setae; tibia I: (9 + 1); tarsus II: (10 + 4 + 1 duplex) = (3 + 1) + (7 + 3 + 1 duplex); tibiae II-IV: (7 + 0); tarsus III: (9 + 1) = (1 + 1) + (8 + 0); tibia III: (6 + 0); tarsus IV: (10 + 1) = (2 + 1) + (8 + 0). Empodium split distally into three pairs of hairs. Empodial spur large and strong, about half length of proximoventral hairs. Dorsal body setae long, slender and tapering. Dorsal striae mostly longitudinal on propodosoma and transversal on hysterosoma; with a diamond shaped pattern in the area between third and fourth pairs of dorso central setae. Lobes of striae triangular, as long as broad. Length of body: 561 micra. Width: 353 micra.

Male - Terminal sensillum of palpus cylindrical, about two times as long as wide. Tarsus I: (10 + 6 + 2 duplexes) = (4 + 3 + 1 duplex) + (6 + 3 + 1 duplex); tibia I: (9 + 4); the others segments as in female. Tarsi I-II with undivided clawlike empodia. Empodial spur as in female. Aedeagus with a short and upturned stem; small knob, with the margins not prominent and on acute angles; posterior margin of knob taller than anterior one; axis of knob straight and in angle with shaft. Length of body: 509 micra.

Types - 10 females and 7 males, on *Arachis prostata*, Pitangueiras, São Paulo, May 19, 1969. Coll. Roger Williams (Nº 20769).

The mite is named in posthumous reverence to my progenitor, Prof. Antonio Dias Paschoal.

Tetranychus (Tetranychus) escolasticae Paschoal, 1970
(Plate 2)

This species closely resembles *Tetranychus (T.) ludeni* Zacher, 1913, differing in having female lobes rounded and wider. The aedeagus has in addition: a) axis of knob straight and approximately parallel to the axis of shaft; b) anterior projection of knob in form of an elongated beak, about one half length of knob; and, c) posterior projection of knob

with a downward turned spinule.

Female - Terminal sensillum of palpus cylindrical, about as long as broad, and with a circular central cleft at the free end. Stylophore approximately straight anteriorly. Peritreme in form of a hook. Tarsus I: (10 + 4 + 2 duplexes) = (4 + 1 + 1 duplex) + (6 + 3 + 1 duplex); proximal duplex setae in line with four tactile setae; tibia I: (9 + 1); tarsus II: (10 + 4 + 1 duplex) = (3 + 1) + (7 + 3 + 1 duplex); tibiae II - IV: (7 + 0); tarsus III: (9 + 1) = (1 + 1) + (8 + 0); tibia III: (6 + 0); tarsus IV: (10 + 1) = (2 + 1) + (8 + 0). Empodium split into three pairs of hairs. With small dorsomedian empodial spur. Dorsal body setae long, pubescent and tapering; clunal setae short. Striation mostly longitudinal on the dorsum of propodosoma and transversal on hysterosoma; with a diamond shaped pattern between third and fourth pairs of dorsocentral setae. Lobes of striae rounded, wider than tall and separated at the bases. Length of body: 629 micra. Width: 371 micra.

Male - Palpus with terminal sensillum cylindrical, about three times as long as broad. Tarsus I: (10 + 6 + 2 duplexes) = (4 + 3 + 1 duplex) + (6 + 3 + 1 duplex); tibia I: (9 + 4); the others segments as in female. Empodium I claw-like and the others split distally. Empodial spur well developed on tarsi I - II. Dorsal body setae as in female. Aedeagus upturned, ended in a small but distinct knob. Posterior margin of knob attends the stem curvature and the anterior one forms an elongated beak, about one half length of knob; posterior projection of knob with a downward turned spinule; axis of knob parallel to the axis of shaft. Length of body; 442 micra.

Types - 21 females and 6 males, on *Caladium bicolor*, Piracicaba, S.Paulo, August 28, 1968. Coll. Max de Menezes (N^o 14768).

Note: This species also occurs in Paraguay where it was collected by Braulio R.A. Centurion, on *Manihot utilissima*, Coronel Oviedo, January 10, 1969. The female exhibits some differences: a) conic stylophore; b) striae well approximated one to the others; and, c) lobes of striae rounded to pointed.

The name of this species was given in posthumous reverence to my mother, Profa. Escolástica dos Santos Dias Paschoal.

Tetranychus (Tetranychus) zamithi Paschoal, 1970
(Plate 3)

Related to *Tetranychus (T.) urticae* Koch, 1836, differs in the structure of aedeagus, which has the posterior and anterior margins of the knob rounded, and with the anterior margin prominent.

Female - Terminal sensillum of palpus cylindrical, about two times as long as broad. Stylophore conical, broadly rounded anteriorly. Peritreme ended in hook. Tarsus I: (10 + 4 + 2 duplexes) = (4 + 1 + 1 duplex) + (6 + 3 + 1 duplex); tibia I: (9 + 1); tarsus II: (10 + 4 + 1 duplex) = (3 + 1) + (7 + 3 + 1 duplex); tibiae II - IV: (7 + 0); tarsus III: (9 + 1) = (1 + 1) + (8 + 0); tibia III: (6 + 0); tarsus IV: (10 + 1) = (2 + 1) + (8 + 0). Empodium split distally into three pairs of hairs. Empodial spur rudimentary. Dorsal body setae long and tapering, with little pubescence. Dorsal striation mostly longitudinal on propodosoma and transversal on hysterosoma; with a diamond shaped pattern between third and fourth pairs of dorsocentral setae. Lobes of striae rounded, wider than tall and separated at the bases. Length of body: 547 micra. Width: 330 micra.

Male - Terminal sensillum of palpus cylindrical, about three times as long as wide. Tarsus I: (10 + 6 + 2 duplexes) = (4 + 3 + 1 duplex) + (6 + 3 + 1 duplex); tibia I: (9 + 4); the others segments as in female. Empodium I divided only in its distal end, and the others completely divided into three pairs of hairs. Dorsal setae as in female. Stem of aedeagus bent upward and outward; small knob, with posterior and anterior margins rounded, being the anterior one more prominent; axis of knob convex almost parallel to the axis of shaft. Length of body: 373 micra.

Types - 14 females and 3 males, on *Acalypha godsesia* na, Piracicaba, S.Paulo, April 4, 1968, Coll. Adiel P.L. Zamith (Nº 9468).

This species was named in homage to Prof. Adiel Paes Leme Zamith, from the Department of Zoology, E.S.A. "Luiz de Queiroz".

Oligonychus (Oligonychus) anonae Paschoal, 1970
(Plate 4)

This species is closely related to *Oligonychus (O.)*

beeri Estebanes & Baker, 1966, differing in the following features: 1 - female: straight peritremes ending in bulb. 2 - male: a) small terminal sensillum of palpus triangular in shape, and about as long as broad; b) tarsus I with one dorsal tactile seta and three sensory setae proximad to the duplex; c) tibia II with five tactile setae; d) tarsi III-IV with eight tactile and one sensory setae; and, e) knob of aedeagus with a higher posterior projection and without distally indented cleft.

Female - Terminal sensillum of palpus cylindrical, about as long as broad. Stylophore conical, with a moderated cleft in its distal end. Peritreme slender, ending in an elongated chamber. Tarsus I: (9 + 4 + 2 duplexes) = (4 + 1) + (5 + 3 + 2 duplexes); tibia I: (7 + 1); tarsus II: (9 + 4 + 1 duplex) = (3 + 1) + (6 + 3 + 1 duplex); tibiae II-III-IV: (5 + 0); tarsi III-IV: (8 + 1) = (1 + 1) + (7 + 0). Dorsal body setae long, pubescent and tapering, about equal length with the exception of clunal setae; dorsocentral setae longer than intervals between their bases. Dorsal striation almost longitudinal on propodosoma and transversal on hysterosoma. Lobes of striae rounded, wider than tall and separated at the bases. Length of body: 407 micra. Width: 249 micra.

Male - Terminal sensillum of palpus reduced, triangular in shape, about half length of fusiform seta. Tarsus I: (8 + 6 + 2 duplexes) = (3 + 3) + (5 + 3 + 2 duplexes); tibia I: (7 + 4); the others segments as in female. Aedeagus short and upturned; small knob with the anterior margin angulated and the posterior one is elongated, rectangular and upturned, axis of knob in angle with shaft. Length of body: 377 micra.

Types - 17 females and 10 males, on *Anona muricata*, Jaboticabal, S. Paulo, June 2, 1969 (N^o 19469).

Mononychus bondari Paschoal, 1970
(Plate 5)

This species resembles *Mononychus caribbeanae* (McGregor, 1950) and *Mononychus tanajoa* (Bondar, 1938). It differs from the former in having: a) smaller terminal sensillum of palpus; b) tarsi and tibiae I-II with one more proximal tactile seta; c) dorsal body setae long, rodlike and not on strong tubercles; dorsocentral setae not clavate and longer than one half the distance between their bases; and, d) hysterosomal striae anastomosed only between second and fourth pair of dorsocentral setae. Differs from *M. tanajoa* in conformation and

size of the three former dorsocentral setae (female).

Female - Terminal sensillum of palpus cylindrical, about one and a half times as long as broad. Stylophore conical, broadly rounded anteriorly. Peritreme straight or slightly tortuous, ended in a small oval bulb. Tarsus I: (11 + 4 + 2 duplexes) = (5 + 1) + (6 + 3 + 2 duplexes); tibia I: (9 + 1); tarsus II: (10 + 4 + 1 duplex) = (3 + 1) + (7 + 3 + 1 duplex); tibia II: (7 + 0); tarsi III-IV: (10 + 1) = (2 + 1) + (8 + 0); tibiae III-IV: (6 + 0). Empodium split distally into three pairs of hairs, and with a moderately long base before division; the ventral pair of proximoventral hairs being stronger than the others. Dorsal body setae pubescent, on small tubercles and clavated or rodlike. The three former pairs of dorsocentral setae similar to the other dorsal setae and of equal length or shorter than the longitudinal distances between their bases; dorsocentral setae of pair third one and a half times longer than that of first pair and one and one third times longer than that of second pair. Anastomosed striae at the median portion of propodosoma and at the area from second to fourth pairs of dorsocentral setae, on hysterosoma. The striation being more separated at the distal portion of hysterosoma. Lobes of striae rounded, wider than tall and separated at the bases. Length of body: 330 micra. Width: 203 micra.

Male - Terminal sensillum of palpus minute, about as long as broad. Tarsus I: (10 + 6 + 2 duplexes) = (4 + 3) + (6 + 3 + 2 duplexes); tibia I: (9 + 4); the other segments as in female. Empodium I split into two clawlike appendages; moreover empodia as in female. Dorsal body setae rodlike to slightly clavated, pubescent, and on small tubercles; dorsocentral setae longer than the distances between their bases. Aedeagus with straight shaft and with short and thin stem; knob small, triangular, downturned and with the margins angulated; axis of knob at a small angle to the shaft. Length of body: 320 micra.

Types - 19 females and 4 males, on *Manihot utilissima*, Poços de Caldas, Minas Gerais (radioactive area), July 5, 1968 (Nº 12768).

This species is named in posthumous homage to Dr. Gregorio Bondar, ancient zoologist from E.S.A. "Luiz de Queiroz".

Mononychus chemosetosus Paschoal, 1970
(Plate 6)

This species is closely related to *Mononychus planki* (McGregor, 1950), form which it differs in the following characters: 1 - female: a) two more sensory setae on tarsus I ; b) three more sensory setae on tibia I; c) dorsocentral setae smaller or equal to the distances between their bases; and, d) reticulations on the dorsum of body reduced. 2 - male: knob of aedeagus with anterior projection not so acute, and with a small cleft near distal projection.

Female - Terminal sensillum of palpus cylindrical, about as long as broad. Peritreme short and straight, ended in an oval bulb. Stylophore conical, rounded anteriorly. Tarsus I: (10 + 6 + 2 duplexes) = (4 + 3) + (6 + 3 + 2 duplexes); tibia I: (9 + 4); tarsus II: (10 + 4 + 1 duplex) = (3 + 1) + (7 + 3 + 1 duplex); tibia II: (7 + 0); tarsi III-IV: (10 + 1) = (2 + 1) + (8 + 0); tibiae III-IV: (6 + 0). Empodium with a moderately long base before division into three pairs of hairs; the ventral pair of proximoventral hairs stronger than the others. Dorsal body setae rodlike to clavate, pubescent and on tubercles; dorsocentral setae similar to the others and smaller or equal to the distances between their bases; dorsolateral setae similar to the dorsocentrals'. Reticulated areas at the median portion of propodosoma and at the setae bases. Lobes of striae rounded, as long as broad to wider than tall, and separated at the bases. Length of body: 501 micra. Width: 319 micra.

Male - Terminal sensillum of palpus conical, about a quarter length of fusiform setae. Chaetotaxy of legs equal to the female. Empodia I - II clawlike. Dorsal body setae rodlike, pubescent and on tubercles; dorsocentral setae shorter than dorsolateral setae and equal or longer than distances between their bases. Aedeagus upturned; stem long and at an obtuse angle to the shaft; knob triangular, with posterior margin rounded and the anterior one angulated and backturned; axis of knob with a small cleft near distal projection. Length of body: 333 micra.

Types - 4 females and 6 males, on *Ricinus communis*, Jaboticabal, S. Paulo, March 3, 1969, (Nº 18969).

Allonychus reisi Paschoal, 1970
(Plate 7: A, B, C, D, E)

This species differs from all other species of the ge nus in the form of aedeagus, which exhibit a long stem, about three times as long as the shaft.

Female - Terminal sensillum of palpus semicircular, about as long as broad. Palpal claw bifid at distal portion. Stylophore conical, broadly rounded anteriorly. Peritreme with a short base, tapering distally and ended in a small bulb. Tarsus I: (11 + 4 + 2 duplexes) = (5 + 1) + (6 + 3 + 2 duplexes); tibia I: (9 + 1); tarsus II: (10 + 4 + 1 duplex) = (3 + 1) + (7 + 3 + 1 duplex); tibia II: (8 + 0); tarsi III - IV: (10 + 1) = (2 + 1) + (8 + 0); tibia III: (6 + 0); tibia IV: (7 + 0). Dorsomedian empodial spur strong; proximoven-tral hairs dissimilar in length. Dorsal body setae long, pubescent, tapering distally; clunal setae straight, short and with a "V" disposition. Dorsal striation mostly longitudinal on propodosoma and transversal on hysterosoma; with longitudi-nal striae between third and fourth pairs of dorsocentral se-tae. Lobes of striae sharp-pointed, taller than wide. Length of body: 640 micra. Width: 373 micra.

Male - Terminal sensillum of palpus cylindrical, about three times as long as broad. Tarsus I: (10 + 6 + 2 du-plexes) = (4 + 3) + (6 + 3 + 2 duplexes); tibia I: (9 + 4); the others segments as in female. Empodia I-II with short and strong proximoventral hairs; the ventral pair being stron-ger than the others; moreover empodia as in female. Dorsal body setae long, pubescent, tapering distally. Shaft of aede-agus short and thick; stem narrow and very long, about three times length of shaft, and at right angle to the shaft; the stem ends in a small outward hook. Length of body: 479 micra.

Types - 14 females and 8 males, on *Rhododendron indi-cum*, Campinas, S.Paulo, May, 1968, Coll. Paulo R. Reis (N^o 17068).

This species named in homage to Eng^o Agr^o Paulo R. Reis, from Instituto Agronomico de Campinas.

Allonychus braziliensis (McGregor, 1950) Pritchard & Baker, 1955.

(Plate 7: F, G, H)

A. braziliensis is closely related to *Allonychus dores*

tei Baker & Pritchard, 1962 and was considered a synonym of this species. However the male of *A. braziliensis* shows the following differences: a) tarsus I with free proximoventral hairs; b) palpus with small terminal sensillum; and, c) aedeagus with straight stem. The female of *A. dorestei* is still unknown.

Male allotype - Terminal sensillum of palpus cylindrical, about two times as long as broad. Palpal claw bifid distally. Stylophore conical, rounded at its anterior portion. Peritreme narrow and straight, ending in an oval chamber. Tarsus I: (10 + 6 + 2 duplexes) = (4 + 3) + (6 + 3 + 2 duplexes); tibia I: (9 + 4); tarsus II: (10 + 4 + 1 duplex) = (3 + 1) + (7 + 3 + 1 duplex); tibia II: (8 + 0); tarsi III-IV: (10 + 1) = (2 + 1) + (8 + 0); tibia III: (6 + 0); tibia IV: (7 + 0). Dorsomedial empodial spur very developed and with dorsal hairs; proximoventral hairs of all legs free. Empodia I-II with proximoventral hairs of different length, the median pair being stronger than the others; empodial spur about less than one and a half times the greatest length of hairs. Empodia III-IV with three pairs of hairs of equal length and one pair reduced; empodial spur less than two times the greatest length of hairs. Dorsal body setae long, slender, pubescent and sharp-pointed. Aedeagus with short shaft, tapering distally; stem narrow, of equal diameter, ending in a short hook, and at right angle to the shaft. Length of body: 544 micra.

Redescription of the female - Terminal sensillum of palpus semicircular, less than one and a half times as long as broad. Palpal claw bifid. Stylophore and peritreme as in male. Tarsus I: (11 + 4 + 2 duplexes) = (5 + 1) + (6 + 3 + 2 duplexes); tibia I: (9 + 1); the others segments as in male. Dorsal empodial spur developed as in the male; with four pairs of proximoventral hairs. Empodia I-II with hairs of different length, the median pair being stronger. Empodia III-IV similar to the male. Dorsal body setae long, pubescent and sharp-pointed; clunal setae short, straight and with a "V" disposition. Striation mostly longitudinal on propodosoma and transverse on hysterostoma; longitudinal striae between third and fourth pairs of dorsocentral setae. Lobes of striae sharp-pointed, taller than broad. Length of body: 614 micra. Width: 363 micra.

Examined material - 4 males and 6 females, on *Pyrus communis*, Piracicaba, S. Paulo, February 12, 1967 (Nº 2067); 5 males and 10 females, on the same host, Jaboticabal, S. Paulo,

May 26, 1968 (Nº 18068); 1 male and 7 females, on *Mangifera indica*, Jaboticabal, S.Paulo, June 2, 1969 (Nº 20469).

SUMÁRIO

Sete espécies de ácaros da família Tetranychidae são descritas. São elas: *Tetranychus (T.) paschoali* Paschoal, 1970, *Tetranychus (T.) escolasticae* Paschoal, 1970, *Tetranychus (T.) zamithi* Paschoal, 1970, *Oligonychus (O.) anonae* Paschoal, 1970, *Mononychus bondari* Paschoal, 1970, *Mononychus chemosetosus* Paschoal, 1970 e *Allonychus reisi* Paschoal, 1970. O alótipo macho de *Allonychus braziliensis* (McGregor, 1950) é descrito e a fêmea redescrita, em base aos novos caracteres taxonômicos em uso atualmente. Estas espécies foram descritas como novas em uma tese que submetemos à Escola Superior de Agricultura "Luiz de Queiroz", da Universidade de São Paulo, em 13 de junho de 1970.

SUMMARY

Seven species of spider mites namely, *Tetranychus (T.) paschoali* Paschoal, 1970, *Tetranychus (T.) escolasticae* Paschoal, 1970, *Tetranychus (T.) zamithi* Paschoal, 1970, *Oligonychus (O.) anonae* Paschoal, 1970, *Mononychus bondari* Paschoal, 1970, *Mononychus chemosetosus* Paschoal, 1970, and *Allonychus reisi* Paschoal, 1970, are described. The male allotype of *Allonychus braziliensis* (McGregor, 1950) is described and the female redescrbed. These species were described as new in a thesis submitted to Escola Superior de Agricultura "Luiz de Queiroz", University of São Paulo, Brazil, on June 13, 1970.

REFERENCE

- PASCHOAL, A.D., 1970 Contribuição ao conhecimento da família *Tetranychidae* no Brasil (*Arachnida: Acarina*). Doctoral thesis E.S.A. "Luiz de Queiroz", Piracicaba, S.Paulo, June 13, 1970, 116 p., 7 plates.

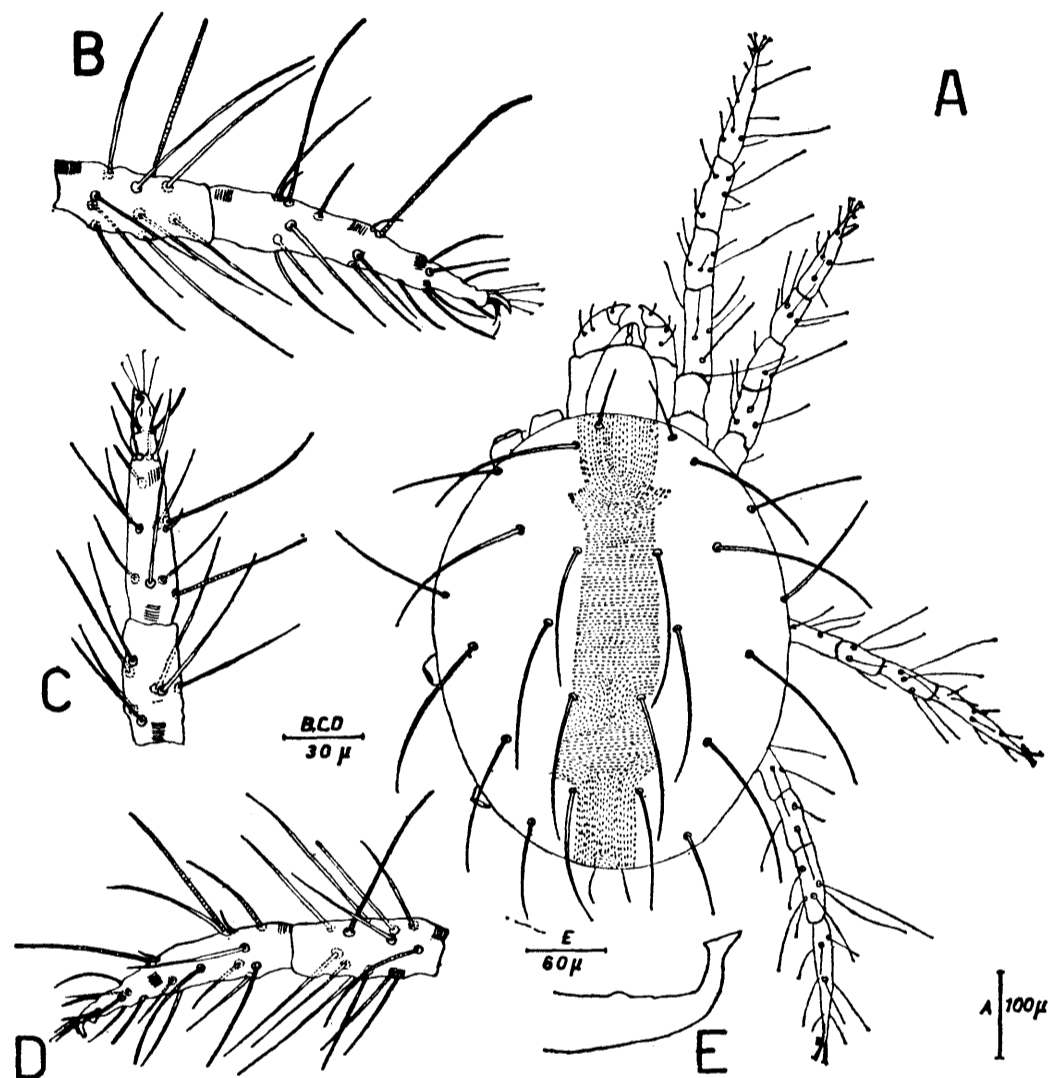


Plate 1 - *Tetranychus (T.) paschoali* Paschoal, 1970. A - Female: dorsal view. B - Female: tarsus and tibia I. C - Female: tarsus and tibia II. D - Male: tarsus and tibia I. E - Aedeagus.

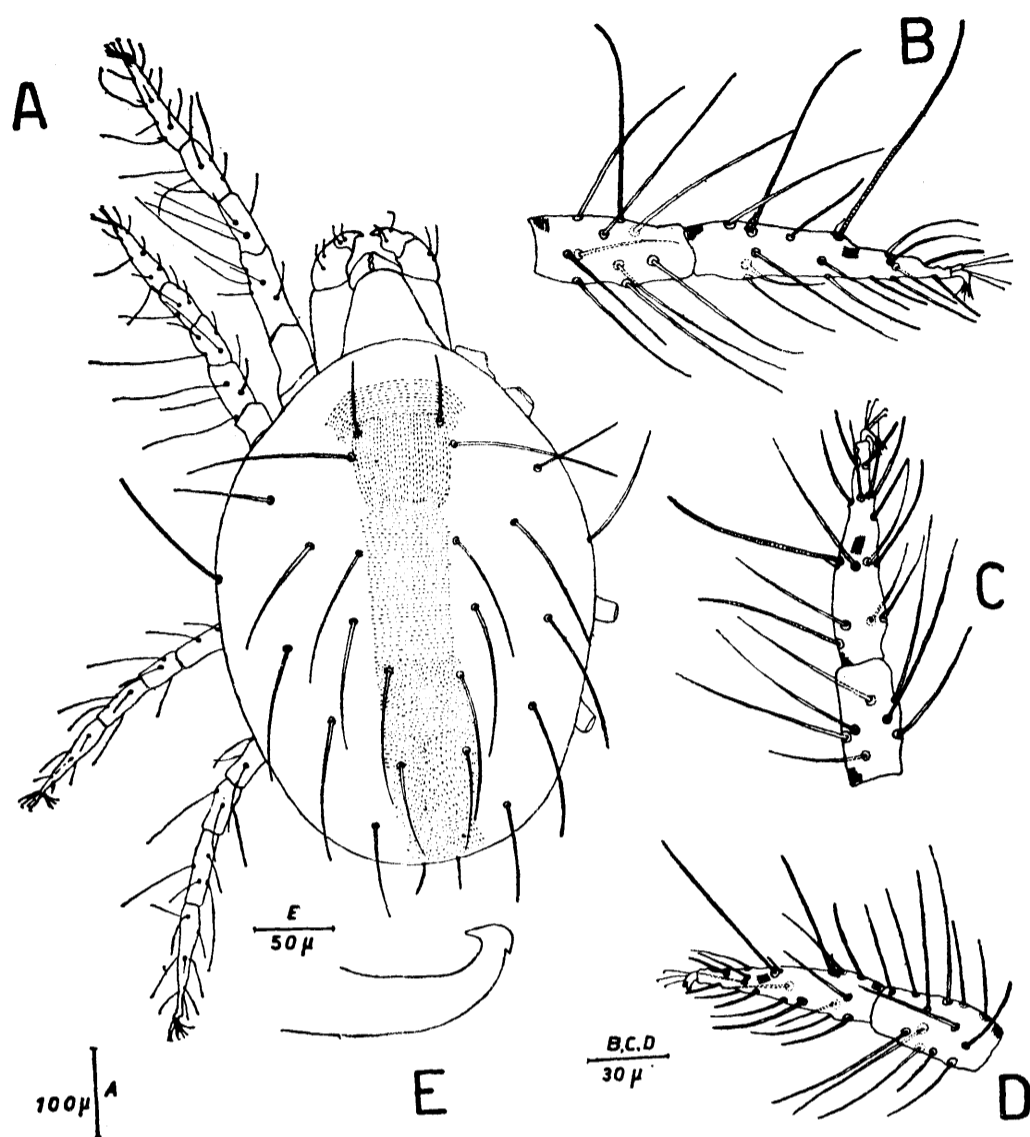


Plate 2 - *Tetranychus (T.) escolasticae* Paschoal, 1970. A - Female: dorsal view. B - Female: tarsus and tibia I. C - Female: tarsus and tibia II. D - Male: tarsus and tibia.I. E - Aedeagus.

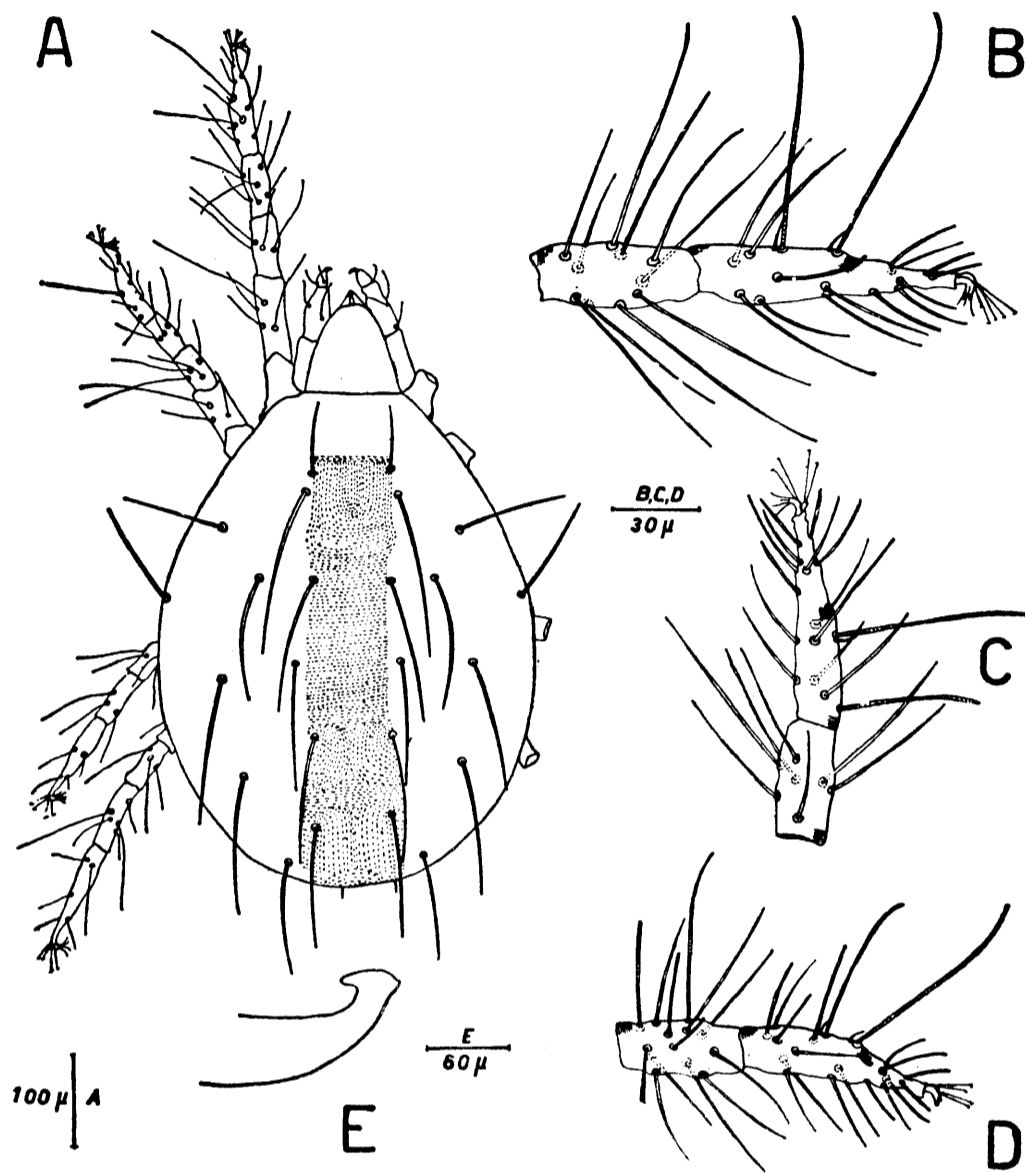


Plate 3 - *Tetranychus (T.) zamithi* Paschoal, 1970. A - Female: dorsal view. B - Female: tarsus and tibia I. C - Female: tarsus and tibia II. D - Male: tarsus and tibia I. E - Aedeagus.

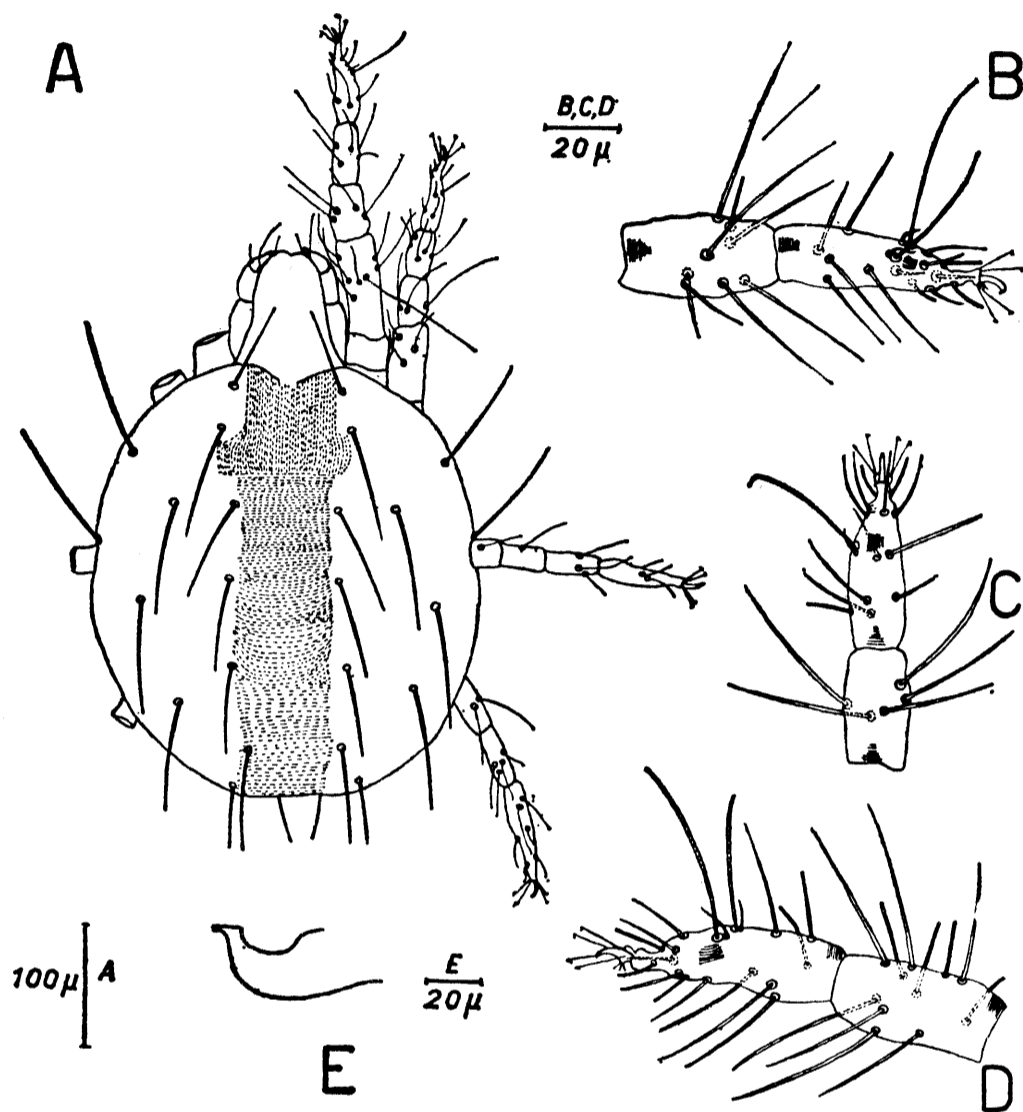


Plate 4 - *Oligonychus (O.) anonae* Paschoal, 1970. A - Female: dorsal view. B - Female: tarsus and tibia I. C - Female: tarsus and tibia II. D - Male: tarsus and tibia I. E - Aedeagus.

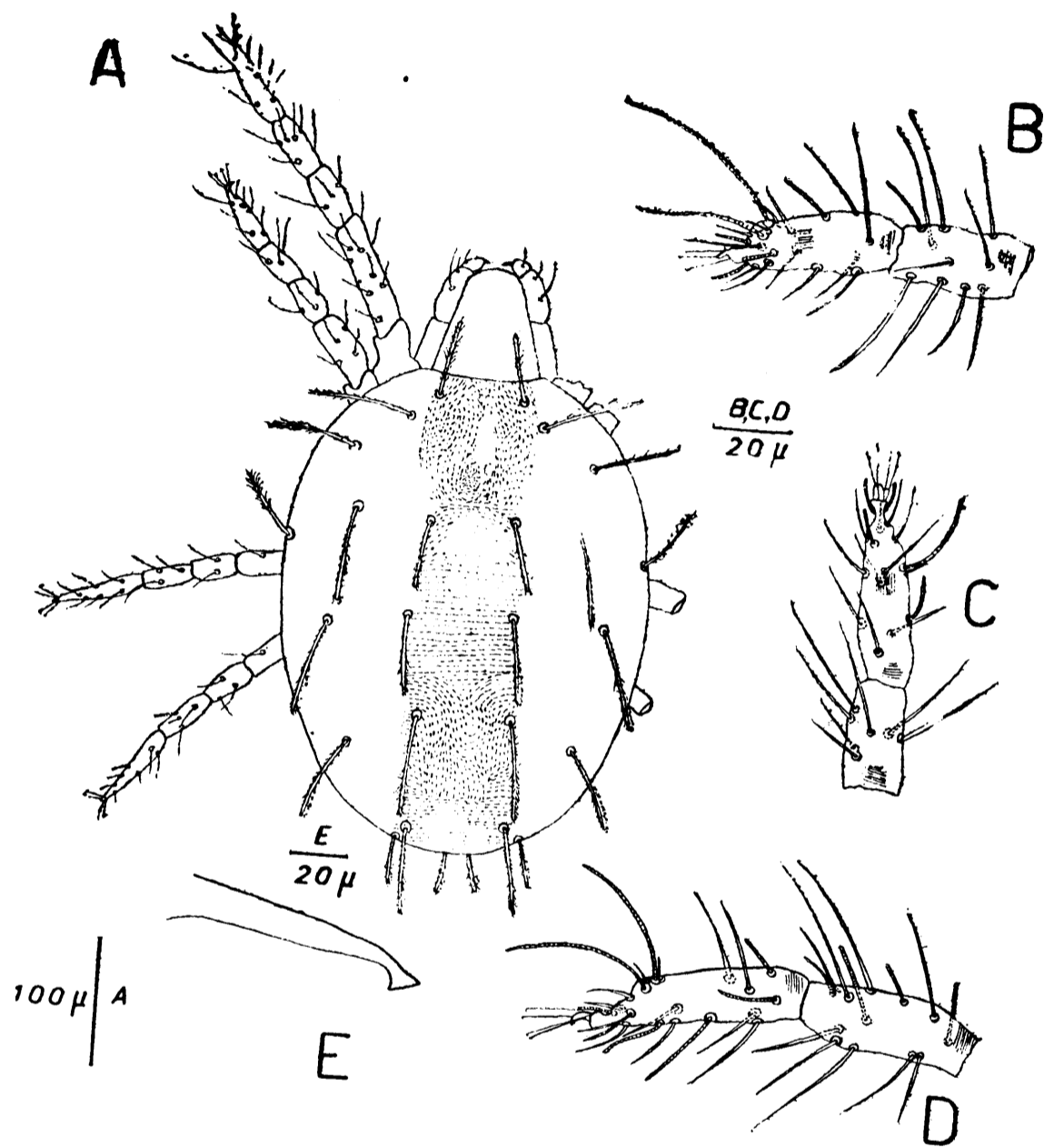


Plate 5 - *Mononychus bondari* Paschoal, 1970. A - Female: dorsal view. B - Female: tarsus and tibia I. C - Female: tarsus and tibia II. D - Male: tarsus and tibia I. E - Aedeagus.

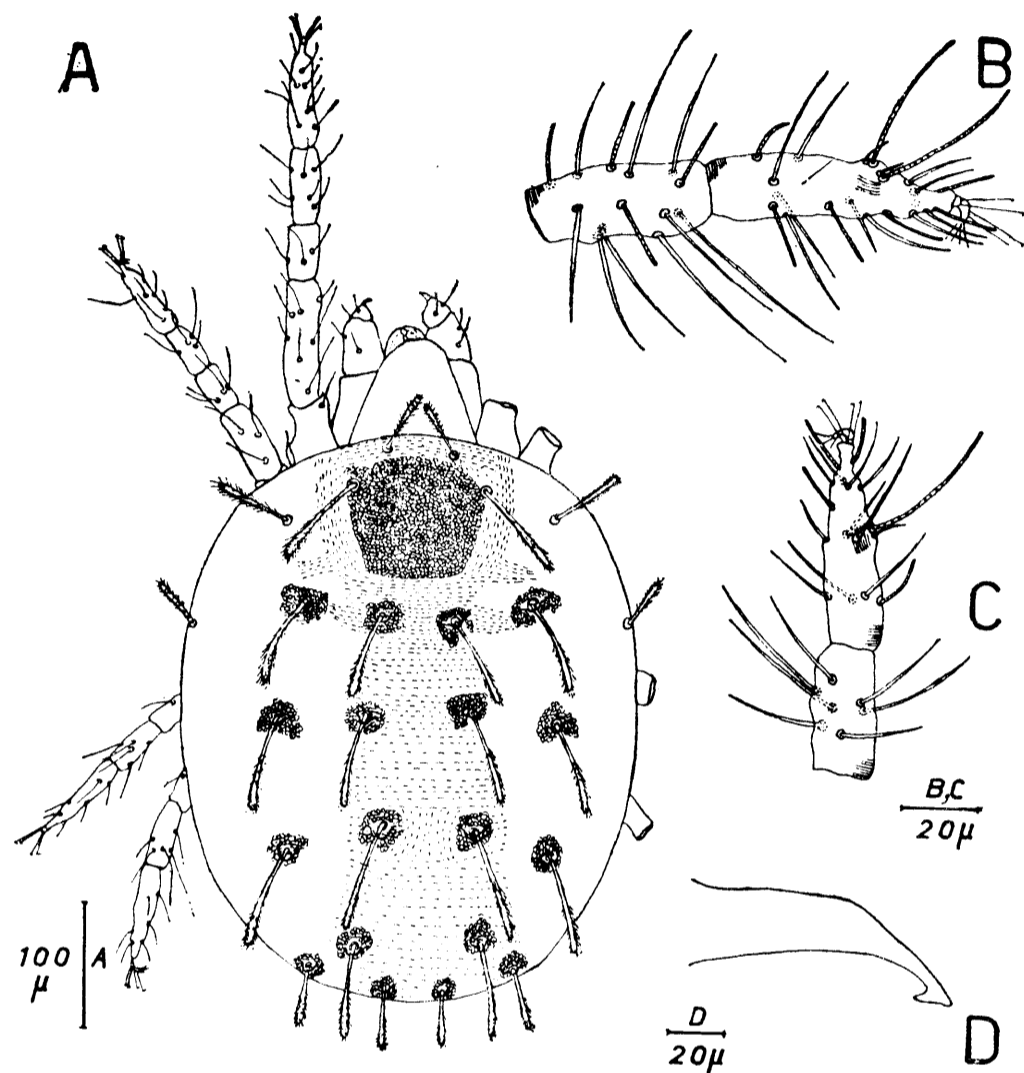


Plate 6 - *Mononychus chemosetosus* Paschoal, 1970. A - Female: dorsal view. B - Female: tarsus and tibia I. C - Female: tarsus and tibia II. D - Aedeagus.

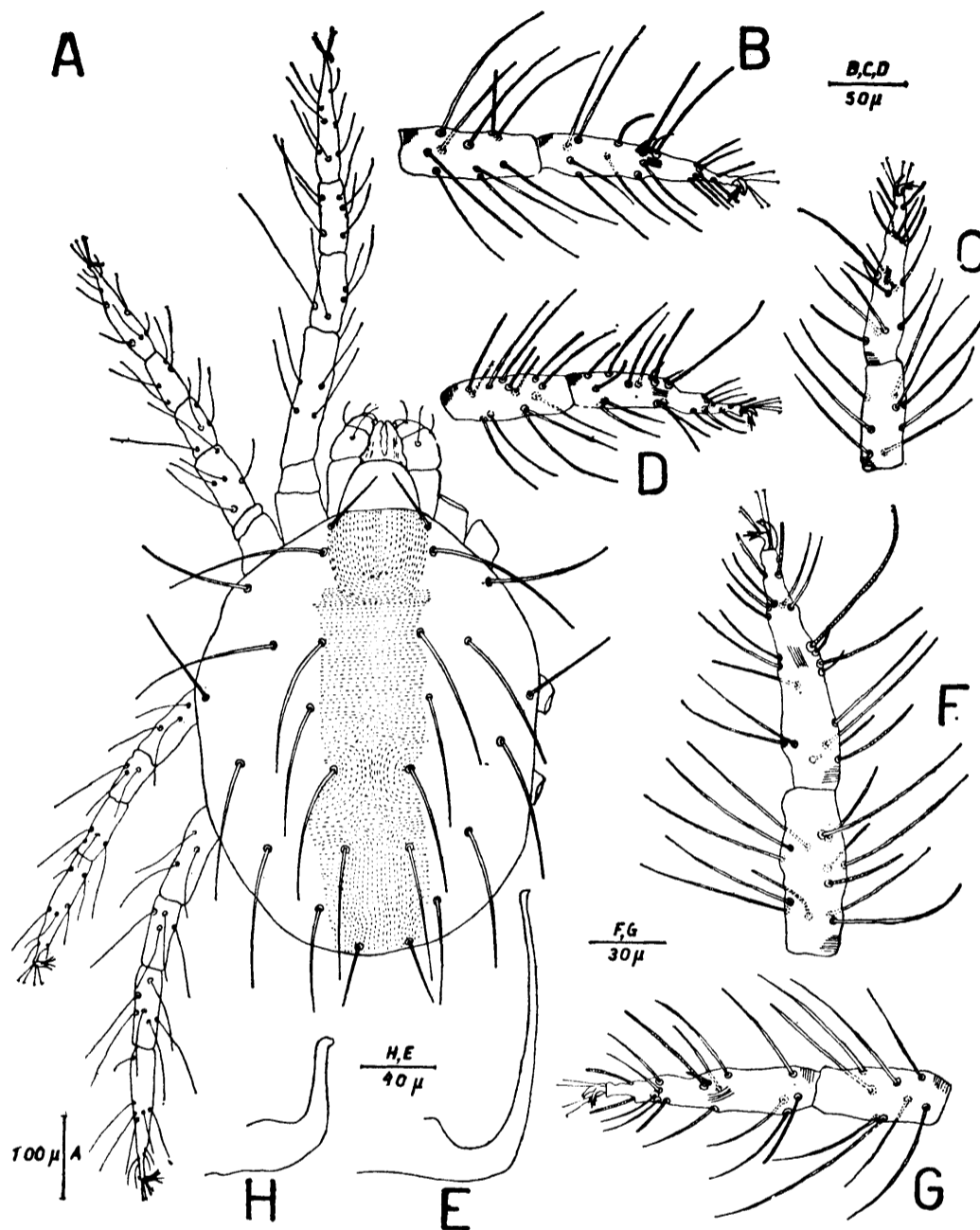


Plate 7 - *Allonychus reisi* Paschoal, 1970. A - Female: dorsal view. B - Female: tarsus and tibia I. C - Female: tarsus and tibia II. D - Male: tarsus and tibia I. E - Aedeagus.

Allonychus braziliensis (McGregor, 1950) Pritchard & Baker, 1955. F - Male: tarsus and tibia I. G - Male: tarsus and tibia II. H - Aedeagus.

