

# A survey of the *Amerioppia* species (Acari, Oribatei)

By

P. BALOGH\*

**Abstract.** A short diagnosis of the genus *Amerioppia* HAMMER, 1961 is given. Identification keys to eight artificial species groups and 41 known species are added.

The genus *Amerioppia* was established by HAMMER (1961). Generic diagnosis:

Five pairs of genital setae. Nine or ten pairs of notogastral setae: setae  $c_2$  (=  $tu$ ) present or absent. Prodorsum without costula. Notogaster without crista. Sensillus fusiform or lanceolate. Interlamellar setae absent. Exostigmatal setae strong, ciliate. Rostral setae originating on the upper side of the rostrum. Three (or two) pairs of interbothridial sigilla present. Lyrifissurae *iud* in adanal position: near to anal plates. Genital plates smaller than anal plates, slightly narrowing forwards.

Type-species: *Amerioppia rudentigera* HAMMER, 1961.

I have found 41 species in the literature that may be placed in the genus *Amerioppia*. The great majority of the species seems to be well established, still at places the differences are hard to describe and merely quantitative. My opinion is that in the descriptions and drawings of the Oribatida species published in the last 30 years a huge mass of information is hidden that should be brought to light. In case a drawing is made by the help of the Abbé apparatus and good care was taken in tracing, the author fixes such information that will only be used in the future when separating the species. The description in oribatidology is far more important than in any other group of animals. The types, especially those of old authors, have been preserved on permanent slides. With the passing time some are squashed and only fragments are recognizable. In such cases that original description harbours a great deal of information more than the squashed specimen. One of the aims of my contribution is to present an identification key which was constructed on these bases. Although some of the data (e.g. the length of setae, the distance of insertion points) might seem to be uncertain, practice shows that this kind of a key much facilitates identification.

\* Dr. Péter Balogh, ELTE Állattrendszertani és Ökológiai Tanszék, (Department of Systematic Zoology and Ecology of the Eötvös Loránd University), 1088 Budapest, Puskin u. 3.

My other aim is to throw light on some interesting trends of distribution of the *Amerioppia* species. Although the continents are not equally explored from the point of view of oribatid mites, we have such a quantity of information that allows to ascertain, at least, the principal trends of distribution. The picture concerning the 41 *Amerioppia* species is quite surprising. The majority of the species lives in the higher altitudes of the Neotropical and the Ethiopian Regions, as well as in the southernmost parts of the southern continents. There are 31 such species, a total of 75%. The remaining 10 species (25%) are found in the Holarctic and the Oriental Regions, 2 and 5 species, respectively, and in the Pacific region, where 3 species are found. The former 31 species live on the parts of Gondwana while the rest in Laurasia. Out of the 10 species, five live, as do the 31 species, in the Southern Hemisphere. Consequently, we may establish on the basis of the 41 known *Amerioppia* species, that the majority lives in the higher mountains of the Southern Hemisphere; especially in the tropical moss forests and montane forests, where the diversity of the species is the highest. It is quite likely that these were the places where speciation took place at the highest rate in the historical geological epochs.

*Identification keys to the species groups*

- |         |  |   |                           |
|---------|--|---|---------------------------|
| 1 ( 2)  | Sensillus bilaterally ciliate .....  | 1 |                           |
|         |  |   | <b>barrancensis group</b> |
| 2 ( 1)  | Sensillus without cilia (exceptionally with very small and short spines or granula).   |   |                           |
| 3 ( 6)  | Notogastral setae long: as long as or longer than the distance of <i>la-lm</i> .   |   |                           |
| 4 ( 5)  | Sensillus long: as long as or longer than the distance of bothridia ..   | 3 |                           |
|         |  |   | <b>decemsetosa group</b>  |
| 5 ( 4)  | Sensillus medium long or short: shorter than the distance of bothridia   | 2 |                           |
|         |  |   | <b>longicoma group</b>    |
| 6 ( 3)  | Notogastral setae medium long or short: shorter than the distance of <i>la-lm</i> .  |   |                           |
| 7 (12)  | Notogastral setae short: shorter than the half distance of bothridia.  |   |                           |
| 8 ( 9)  | Sensillus long: as long as or longer than the distance of bothridia ..   | 4 |                           |
|         |  |   | <b>longiclava group</b>   |
| 9 ( 8)  | Sensillus medium long or short: shorter than the distance of bothridia.  |   |                           |
| 10 (11) | Sensillus short: with short stalk and globular head .....  | 5 |                           |
|         |  |   | <b>espeletiarum group</b> |
| 11 (10) | Sensillus medium long: with longer stalk and gradually dilated head  | 6 |                           |
|         |  |   | <b>chilensis group</b>    |
| 12 ( 7) | Notogastral setae medium long: longer than the half distance of <i>la-lm</i> (but shorter than the distance of <i>la-lm</i> ). |   |                           |
| 13 (14) | Sensillus long: as long as or longer than the distance of bothridia ..   | 7 |                           |
|         |  |   | <b>lanceolata group</b>   |
| 14 (13) | Sensillus medium long or short: shorter than the distance of bothridia .....   | 8 |                           |
|         |  |   | <b>rudentigera group</b>  |

### 1. *barrancensis* group

- 1 ( 2) Rostral setae originating far from each other, almost parallel. Interlamellar region punctulate. Sensillus setiform, with very slightly dilated distal half. L : 293  $\mu\text{m}$ ; W : 153  $\mu\text{m}$ . — USA .....  
**minuta** (EWING, 1917)
- 2 ( 1) Rostral setae originating near each other, geniculate.
- 3 ( 4) Lamellar lines slightly converging. Apical half of sensillus well dilated. L : 300  $\mu\text{m}$ ; W : 172  $\mu\text{m}$ . — Peru, Mexico .....  
**barrancensis** (HAMMER, 1961)
- 4 ( 3) Lamellar lines parallel. Distal half of sensillus very slightly dilated.
- 5 ( 6) Short median line between the light spots in the interlamellar area present. Setae  $p_1$  only a little shorter than  $r_1$ . L : 260  $\mu\text{m}$ ; W : 184  $\mu\text{m}$ . — Java .....  
**javensis** HAMMER, 1980
- 6 ( 5) Median line between the light spots in the interlamellar area absent. Setae  $p_1$  more than twice shorter than  $r_1$ . L : 256–279  $\mu\text{m}$ ; W : 145–152  $\mu\text{m}$ . — Paraguay .....  
**paraguayensis** (BALOGH & MAHUNKA, 1981)

### 2. *longicoma* group

- 1 ( 2) Lamellar setae long: as long as the distance of *le-ro*. Setae  $c_2$  absent. Setae  $lp$  twice longer than  $r_1$ . Larger species, L : 520  $\mu\text{m}$ ; W : 280  $\mu\text{m}$ . — Bolivia, 4900–5400 m .....  
**longicoma** HAMMER, 1958
- 2 ( 1) Lamellar setae short: distance of *le-ro* more than twice longer than lamellar setae. Setae  $c_2$  present. Setae  $lp$  as long as or only a little longer than  $r_1$ . Smaller species, L : 291–307  $\mu\text{m}$ ; W : 160–168  $\mu\text{m}$ . — Tanzania .....  
**extrusa** MAHUNKA, 1983

### 3. *decemsetosa* group

- 1 ( 4) Setae  $h_2$  thrice or more longer than  $h_1$ .
- 2 ( 3) Setae  $p_1-p_3$  short, not longer than  $h_1$ . The five long notogastral setae ( $la$ ,  $lm$ ,  $lp$ ,  $h_2$  and  $h_3$ ) rigid. L : 246  $\mu\text{m}$ ; W : 139  $\mu\text{m}$ . — Columbia, 2700 m. ....  
**sturmi** P. BALOGH, 1984
- 3 ( 2) Setae  $p_1-p_3$  longer than  $h_1$ . The five long notogastral setae with flagellate end. L : 291–295  $\mu\text{m}$ ; W : 162–170  $\mu\text{m}$ . — Fiji Islands .....  
**aelleni** MAHUNKA, 1982
- 4 ( 1) Setae  $h_2$  either as long as or, at most, twice longer than  $h_1$ .
- 5 ( 6) Setae  $h_1$  as long as  $h_2$ . Lamellar line present. L : 281–310  $\mu\text{m}$ ; W : 150–160  $\mu\text{m}$ . — Ethiopia .....  
**polygonata** MAHUNKA, 1982

- 6 ( 5) Setae  $h_1$  shorter than  $h_2$ . Lamellar line absent.
- 7 ( 8) Setae  $c_2$  absent. Alveoli of rostral setae almost touching. The light spots in the interlamellar area of different sizes: the first and second pairs smaller, the third ones larger. Only the distal third of sensillus slightly dilated. L : 265  $\mu\text{m}$ . — Sahara .....  
**flagellata** HAMMER, 1975
- 8 ( 7) Setae  $c_2$  present. Alveoli of rostral setae well separated. The light spots in the interlamellar area almost of the same size. The distal half of sensillus very slightly dilated. L : 370  $\mu\text{m}$ ; W : 199  $\mu\text{m}$ . — Samoa ....  
**decemsetosa** HAMMER, 1973

*4. longiclava group*

- 1 ( 4) Setae  $c_2$  absent. Setae  $p_1$  longer than  $p_2$  and  $p_3$ . Two very similar species.
- 2 ( 3) The end of sensillus with a long and gradually attenuated tip. Vertical separating lines between the light spots of interlamellar area absent. L : 300–320  $\mu\text{m}$ ; W : 180  $\mu\text{m}$ . — Patagonia, New Zealand .....  
**longiclava** HAMMER, 1962
- 3 ( 2) The end of sensillus with short, abruptly attenuated tip. Two vertical separating lines between the light spots of interlamellar area present. L : 245  $\mu\text{m}$ ; W : 149  $\mu\text{m}$ . — Fiji .....  
**vicina** HAMMER, 1971
- 4 ( 1) Setae  $c_2$  very short but present. Setae  $p_1$  to  $p_3$  of the same length. Two very similar species.
- 5 ( 6) Rostral setae geniculate. L : 250  $\mu\text{m}$ ; W : 139  $\mu\text{m}$ . — Java .....  
**ventrosquamosa** HAMMER, 1980
- 6 ( 5) Rostral setae only slightly curved. L : 320–360  $\mu\text{m}$ ; W : 180–208  $\mu\text{m}$ . — Peru .....  
**chavinensis** HAMMER, 1961

*5. espeletiarum group*

- 1 ( 2) Notogaster outside of setae  $c_2$  each with an oblique longitudinal line, resembling a crista. L : 360  $\mu\text{m}$ . — El Salvador .....  
**salvadorensis** (WOAS, 1986)
- 2 ( 1) Notogaster outside of setae  $c_2$  without an oblique longitudinal line. Two extremely similar species.
- 3 ( 4) Prodorsal and notogastral setae smooth. L : 328–414  $\mu\text{m}$ ; W : 189–230  $\mu\text{m}$ . — Columbia, 3700 m, *Espeletia* .....  
**espeletiae** P. BALOGH, 1984
- 4 ( 3) Prodorsal and notogastral setae finely ciliate. L : 340  $\mu\text{m}$ ; W : 180  $\mu\text{m}$ . — Germany (Schwarzwald) .....  
**badensis** (WOAS, 1986)

6. *chilensis* group

- 1 ( 4) Setae  $h_2$  relatively near to each other: distance of  $h_2-h_2$  less than twice longer than distance of  $h_1-h_1$  and always much shorter than that of  $lm-lm$ .
- 2 ( 3) Setae  $c_2$  present. Alveoli of rostral setae almost touching. Lamellar line present. L : 285–299  $\mu\text{m}$ ; W : 152–166  $\mu\text{m}$ . — Columbia, 4000 m . . . .  
**cocuyana** P. BALOGH, 1984
- 3 ( 2) Setae  $c_2$  absent. Alveoli of rostral setae well separated. Lamellar line absent. L : 330  $\mu\text{m}$ ; W : 190  $\mu\text{m}$ . — Bolivia, 4000 m . . . . .  
**notata** (HAMMER, 1958)
- 4 ( 1) Setae  $h_2$  far from each other: distance of  $h_2-h_2$  at least thrice longer as distance of  $h_1-h_1$  and always longer than that of  $lm-lm$ .
- 5 ( 6) Sensillus lanceolate: the lanceolated distal part as long as the stalk. L : 300  $\mu\text{m}$ ; W : 150  $\mu\text{m}$ . — Peru, 3750 m . . . . .  
**paripilis** HAMMER, 1961
- 6 ( 5) Sensillus with a fusiform head: the dilated distal part shorter than the stalk.
- 7 ( 8) Sensillus finely granulate. The three pairs of light spots in the interlamellar area connected with united circular field. Setae  $p_1$  to  $p_3$  medium long, curved ventrally. L : 292–310  $\mu\text{m}$ ; W : 158–176  $\mu\text{m}$ . — Tanzania  
**foveolata** MAHUNKA, 1984
- 8 ( 7) Sensillus smooth. The three pairs of light spots in the interlamellar area well separated. Setae  $p_1$  to  $p_3$  short. L : 320  $\mu\text{m}$ ; W : 180  $\mu\text{m}$ . — Chile, Puerto Montt . . . . .  
**chilensis** HAMMER, 1962

7. *lanceolata* group

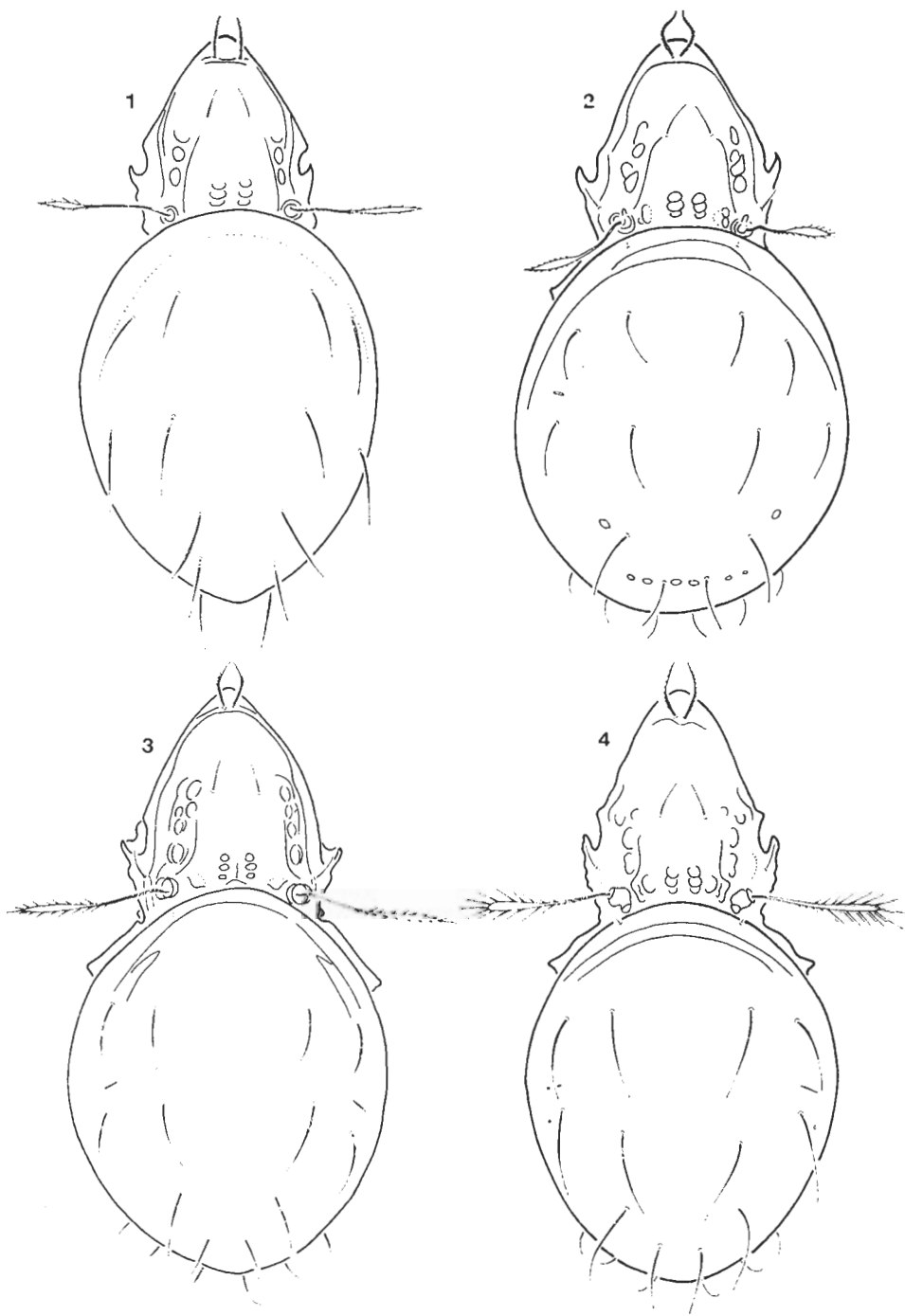
- 1 ( 4) Setae  $c_2$  absent.
- 2 ( 3) Sensillus much longer than the distance of bothridia. Six long notogastral setae ( $la$ ,  $lm$ ,  $lp$ ,  $h_1$ ,  $h_2$  and  $h_3$ ) of the same length. L : 350  $\mu\text{m}$ ; W : 170  $\mu\text{m}$ . — Argentina . . . . .  
**lanceolata** (HAMMER, 1958)
- 3 ( 2) Sensillus as long as the distance of bothridia. Two pairs of notogastral setae ( $la$  and  $lm$ ) long, the remaining ones much shorter. L : 350  $\mu\text{m}$ ; W : 210  $\mu\text{m}$ . — Bolivia, 3180 m . . . . .  
**rotunda** (HAMMER, 1985)
- 4 ( 1) Setae  $c_2$  present.
- 5 ( 6) Sensillus much longer than the distance of bothridia, with a pointed, long tip and with very short, scattered cilia. Setae  $h_2$  twice longer than  $h_1$  and as long as  $p_1$ . L : 366–405  $\mu\text{m}$ ; W : 230–247  $\mu\text{m}$ . — Rhodesia  
**ankae** MAHUNKA, 1974

- 6 ( 5) Sensillus only a little longer than the distance of bothridia, without long and pointed tip. Setae  $h_2$  as long as  $h_1$  and much longer than  $p_1$ .
- 7 ( 3) Setae  $p_1$  to  $p_3$  extremely short, hardly visible. Sensillus with gradually dilated and apically rounded tip. L : 287–353  $\mu\text{m}$ ; W : 172–197  $\mu\text{m}$ .  
– West Africa .....  
**deficiens** (BALOGH, 1959)
- 8 ( 7) Setae  $p_1$  to  $p_3$  not very short. Sensillus only slightly lanceolate.
- 9 (10) Surface of prodorsum finely punctate; the anterior part finely striped. The whole surface is finely punctate. along the borders finely striped. L : 360  $\mu\text{m}$ ; W : 296  $\mu\text{m}$ . – Peru, 3000 m. ....  
**pectigera** HAMMER, 1961
- 10 ( 9) Surface of prodorsum and notogaster smooth. L : 366–379  $\mu\text{m}$ ; W : 223  $\mu\text{m}$ . – East Africa .....  
**meruensis** BALOGH, 1961

### 8. *rudentigera* group

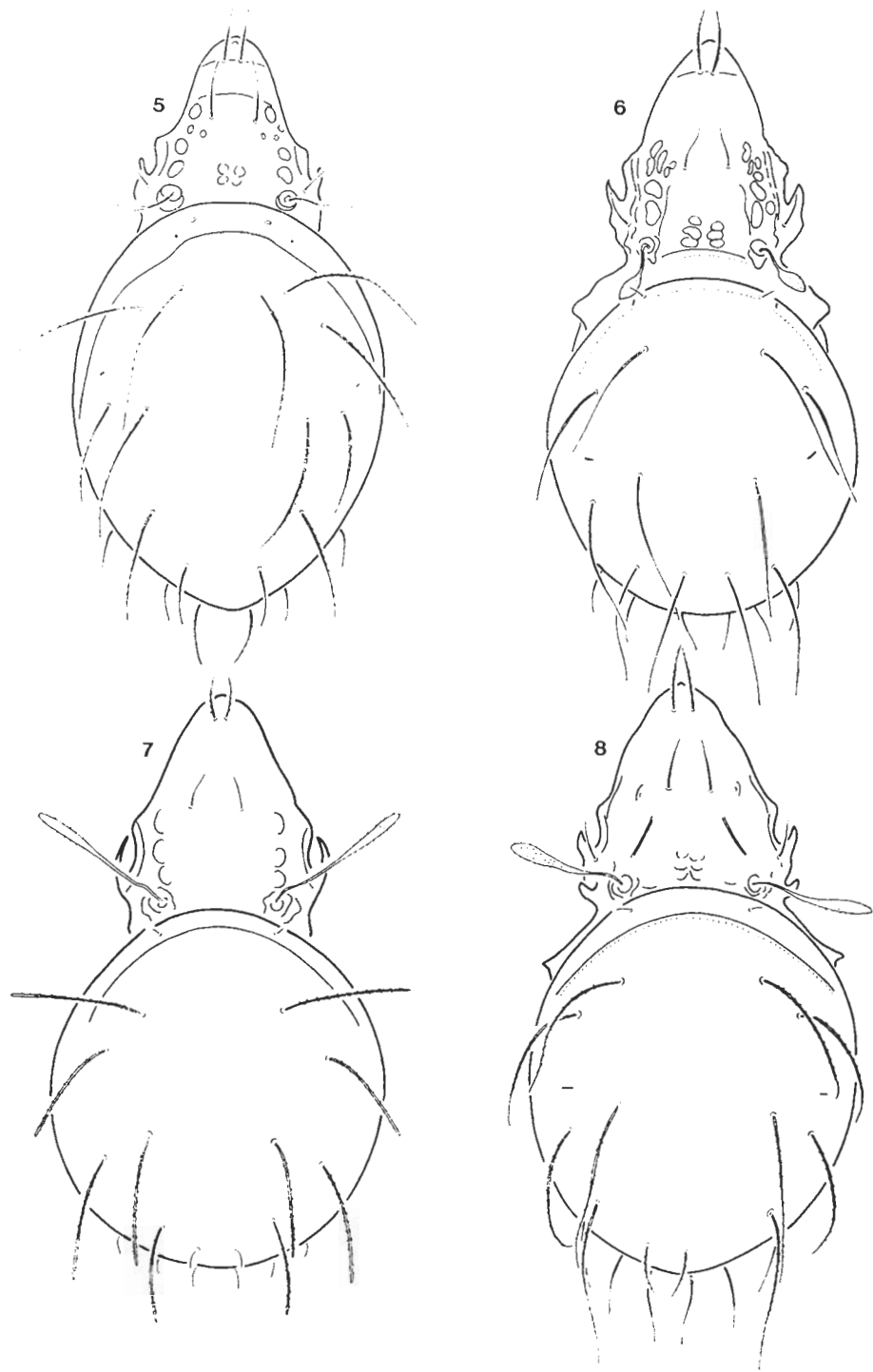
- 1 ( 2) Seven pairs of notogastral setae ( $la$ ,  $lm$ ,  $lp$ ,  $h_1$ ,  $h_2$ ,  $h_3$  and  $p_1$ ) long, with a dilated and fusiform tip. Setae  $c_2$  present, small,  $p_2$  and  $p_3$  a little longer. Sensillus short, with a dilated head. L : 410–424  $\mu\text{m}$ ; W : 236–250  $\mu\text{m}$ . – Antilles: St. Lucia .....  
**extrema** MAHUNKA, 1984
- 2 ( 1) Notogastral setae setiform, normal, without dilated tip.
- 3 ( 8) Setae  $c_2$  absent.
- 4 ( 5) Setae  $h_1$  shorter than  $h_2$ . L : 340  $\mu\text{m}$ ; W : 196  $\mu\text{m}$ . – New Zealand, Fiji .....  
**woolleyi** HAMMER, 1968
- 5 ( 4) Setae  $h_1$  as long as  $h_2$ .
- 6 ( 7) Prodorsum smooth. Smaller species. L : 450  $\mu\text{m}$ ; W : 220  $\mu\text{m}$ . – Bolivia, Peru, 4600 m. ....  
**trichosa** (HAMMER, 1958)
- 7 ( 6) Prodorsum distinctly punctate. Larger species. L : 560–570  $\mu\text{m}$ ; W : 340–350  $\mu\text{m}$ . – Peru .....  
**trichosoides** HAMMER, 1961
- 8 ( 3) Setae  $c_2$  present.
- 9 (10) Rostral setae geniculate. There is an auriculate outgrowth on the medial side of bothridia. Sensillus very finely ciliate. L : 26P–285  $\mu\text{m}$ ; W : 150–170  $\mu\text{m}$ . – Hong-Kong .....  
**interrogata** MAHUNKA, 1976
- 10 ( 9) Rostral setae not geniculate. Bothridia without auriculate outgrowth.

- 11 (12) Minute species, 260  $\mu\text{m}$  long. Setae  $p_1$  about twice longer than  $p_2$ . L: 260  $\mu\text{m}$ ; W: 150  $\mu\text{m}$ . — Peru .....  
**minima** HAMMER, 1961
- 12 (11) Larger species, 320–770  $\mu\text{m}$  long. Setae  $p_1$  to  $p_2$  of the same length.
- 13 (14) Giant, chestnut brown species, 770  $\mu\text{m}$ . Notogastral setae rough and equally thick throughout. Prodorsum punctate. L: 770  $\mu\text{m}$ ; W: 477  $\mu\text{m}$ . Peru, 3550 m. ....  
**rudentigera** HAMMER, 1961
- 14 (13) Smaller and lighter species: 320–520  $\mu\text{m}$ .
- 15 (16) Three pairs of notogastral setae:  $la$ ,  $lm$  and  $lp$  longer than setae  $h$ . L: 450  $\mu\text{m}$ ; W: 248  $\mu\text{m}$ . — Peru, 3300 m. ....  
**hexapilis** HAMMER, 1961
- 16 (15) Five or six pairs of the notogastral setae of the same length.
- 17 (18) Setae  $h_1$  shorter than  $h_2$ , thus only five pairs of notogastral setae of the same length. L: 420  $\mu\text{m}$ ; W: 226  $\mu\text{m}$ . — Pakistan, 3000 m. ....  
**asiatica** HAMMER, 1977
- 18 (17) Setae  $h_1$  as long as setae  $h_2$ , thus six pairs of notogastral setae of the same length.
- 19 (20) Sensillus short, with short stalk and a broad, fusiform pointed head. L: 357–385  $\mu\text{m}$ . W: 197–217  $\mu\text{m}$ . — Columbia, 4640 m. ....  
**senecionis** P. BALOGH, 1984
- 20 (19) Sensillus longer, with a medium long stalk and gradually dilated fusiform head.
- 21 (22) Rostral setae near to each other: alveoli almost touching. Lamellar setae far behind: distance of *le-ro* much longer than lamellar setae. L: 320–352  $\mu\text{m}$ ; W: 184–212  $\mu\text{m}$ . — South Africa .....  
**africana** KOK, 1967
- 22 (21) Rostral setae well separated. Lamellar setae ahead: distance of *le-ro* as long as lamellar setae. L: 520  $\mu\text{m}$ ; W: 323  $\mu\text{m}$ . — Chile .....  
**similis** COVARRUBIAS, 1967

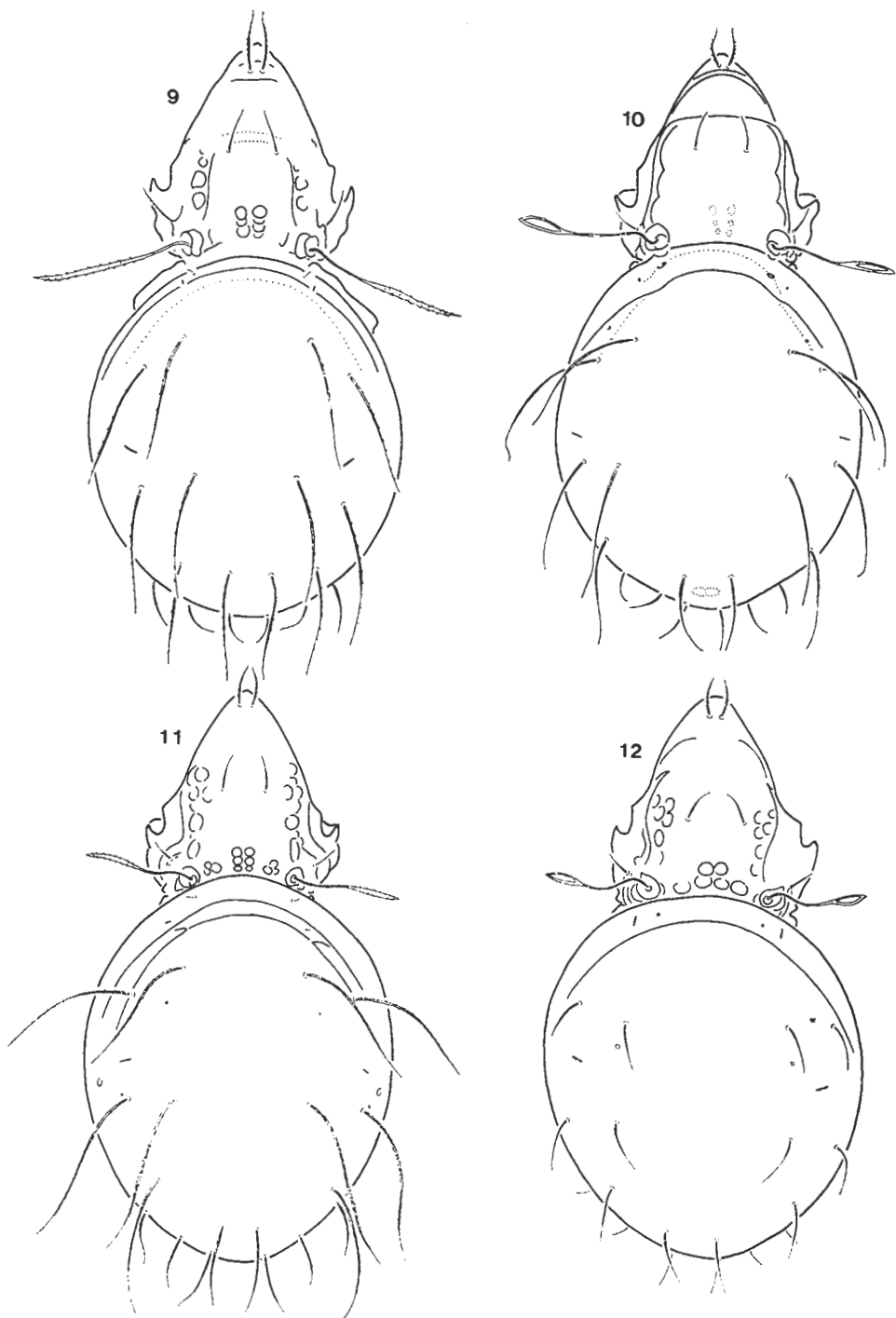


Figs. 1—4. 1: *Amerioppia minuta* (EWING, 1917); 2: *A. barrancensis* (HAMMER, 1961); 3: *A. javensi*-HAMMER, 1980; 4: *A. paraguayensis* (BALOGH & MAHUNKA, 1981)

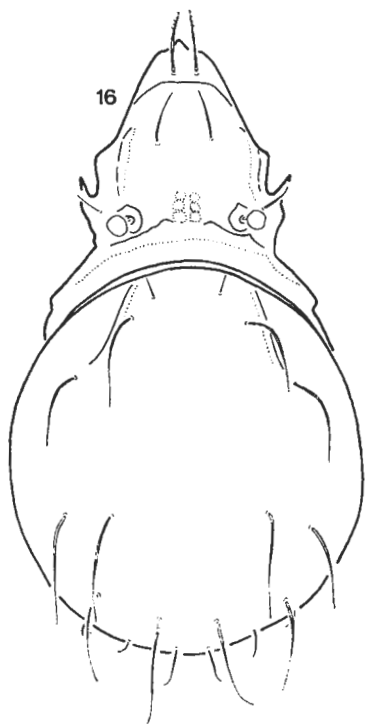
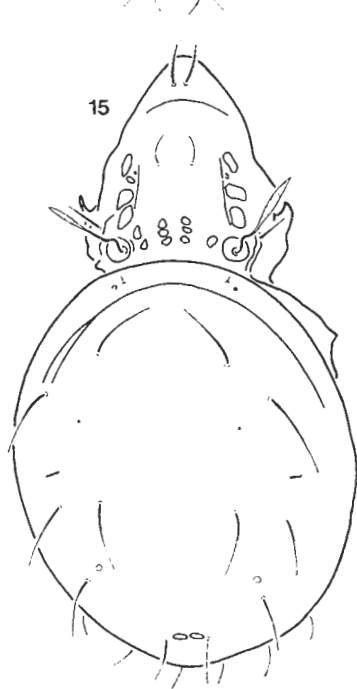
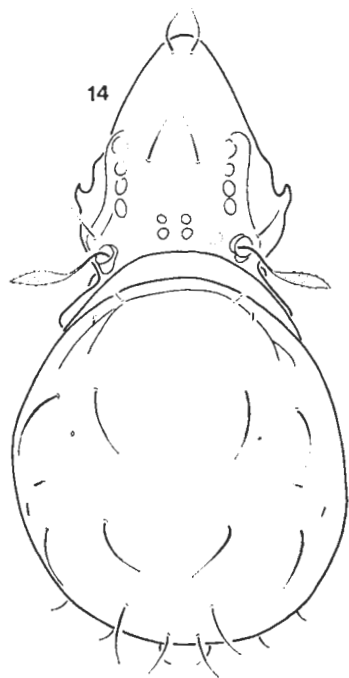
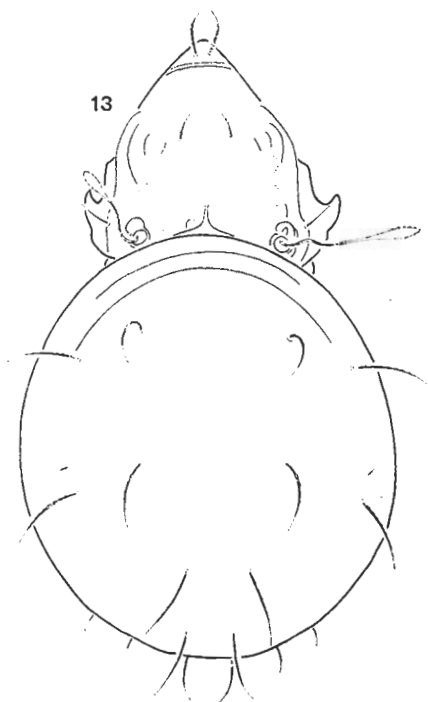




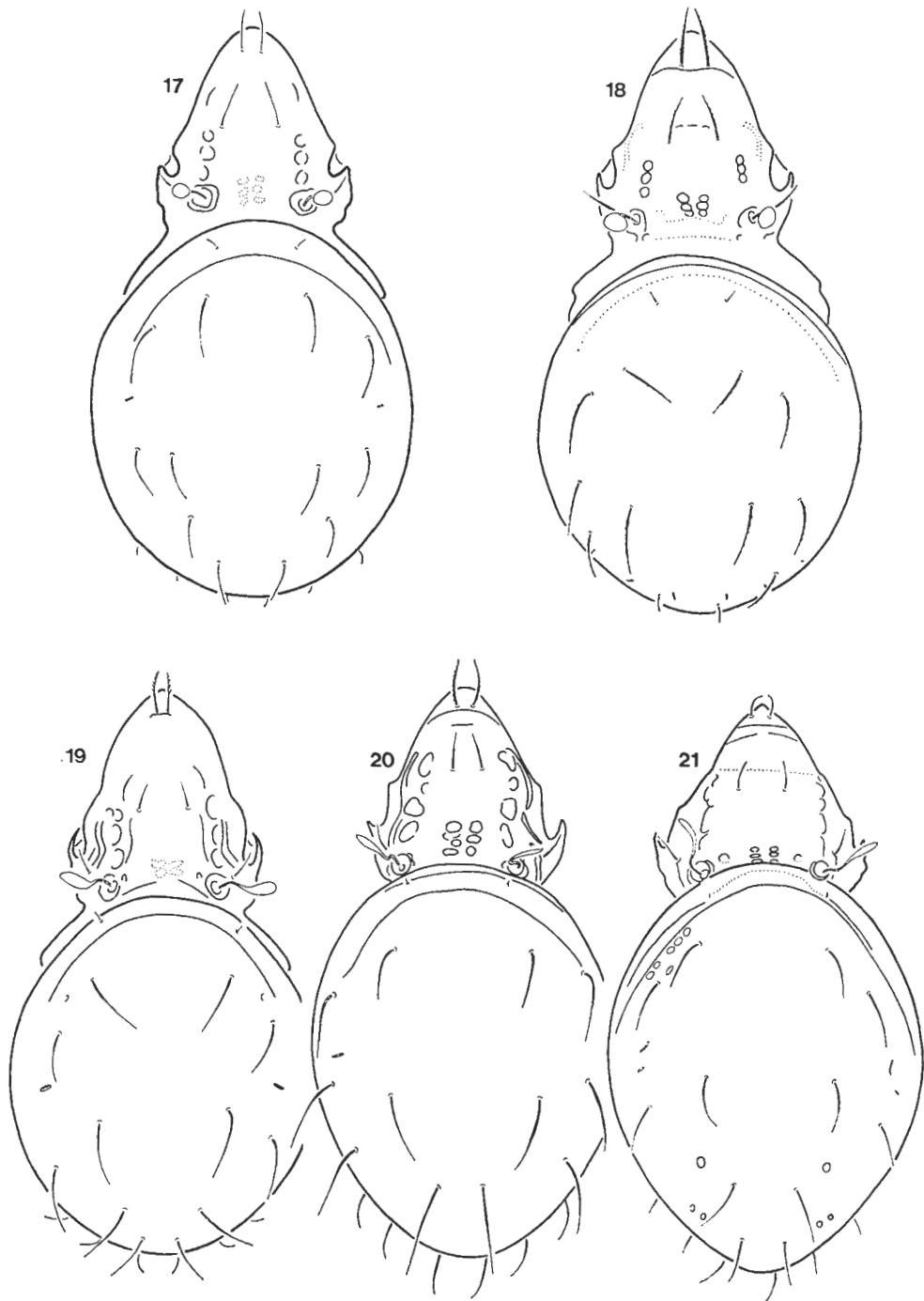
Figs. 5-8. 5: *Amerioppia longicoma* (HAMMER, 1958); 6: *A. extrusa* MAHUNKA, 1983; 7: *A. sturni* P. BALOGH, 1984; 8: *A. aelleni* MAHUNKA, 1982



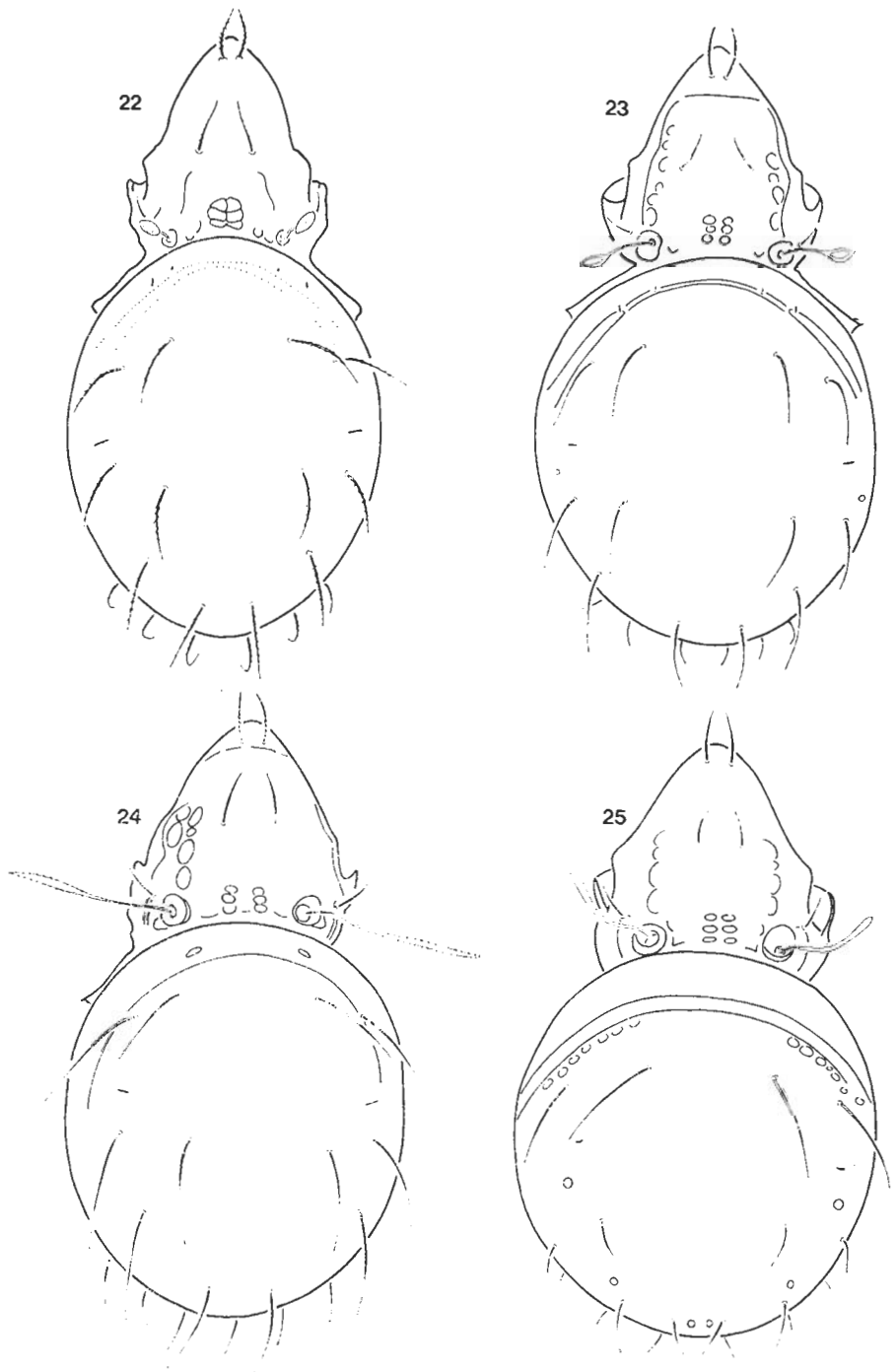
Figs. 9–12. 9: *Amerioppia polygonata* MAHUNKA, 1982; 10: *A. flagellata* HAMMER, 1975; 11: *A. decemsetosa* HAMMER, 1973; 12: *A. longiclava* HAMMER, 1962



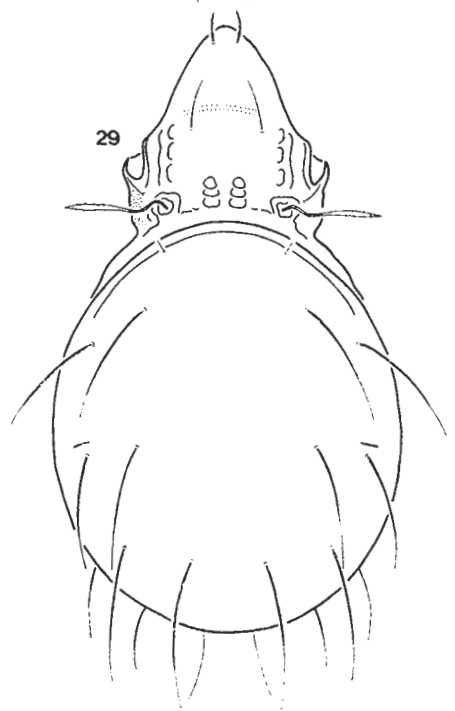
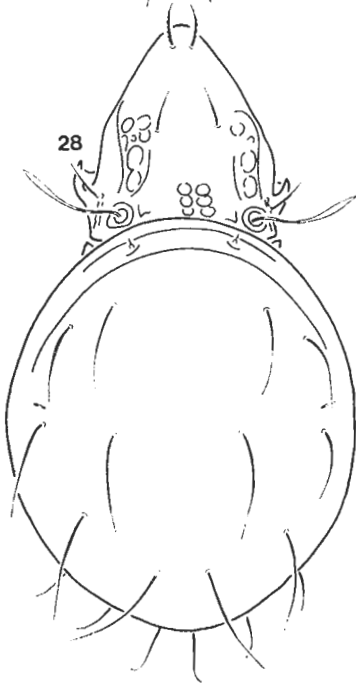
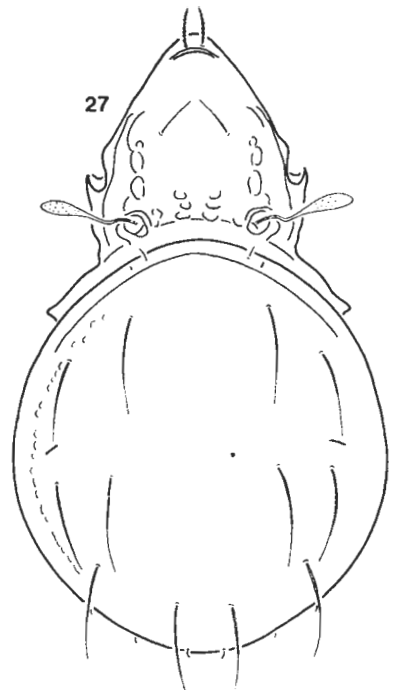
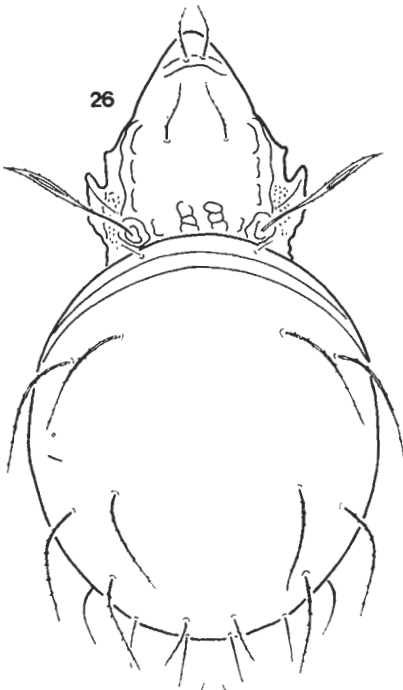
Figs. 13–16. 13: *Amerioppia vicina* HAMMER, 1971; 14: *A. ventrosquamosa* HAMMER, 1980; 15: *A. chaviensis* HAMMER, 1961; 16: *A. salvadorensis* (WOAS, 1986)



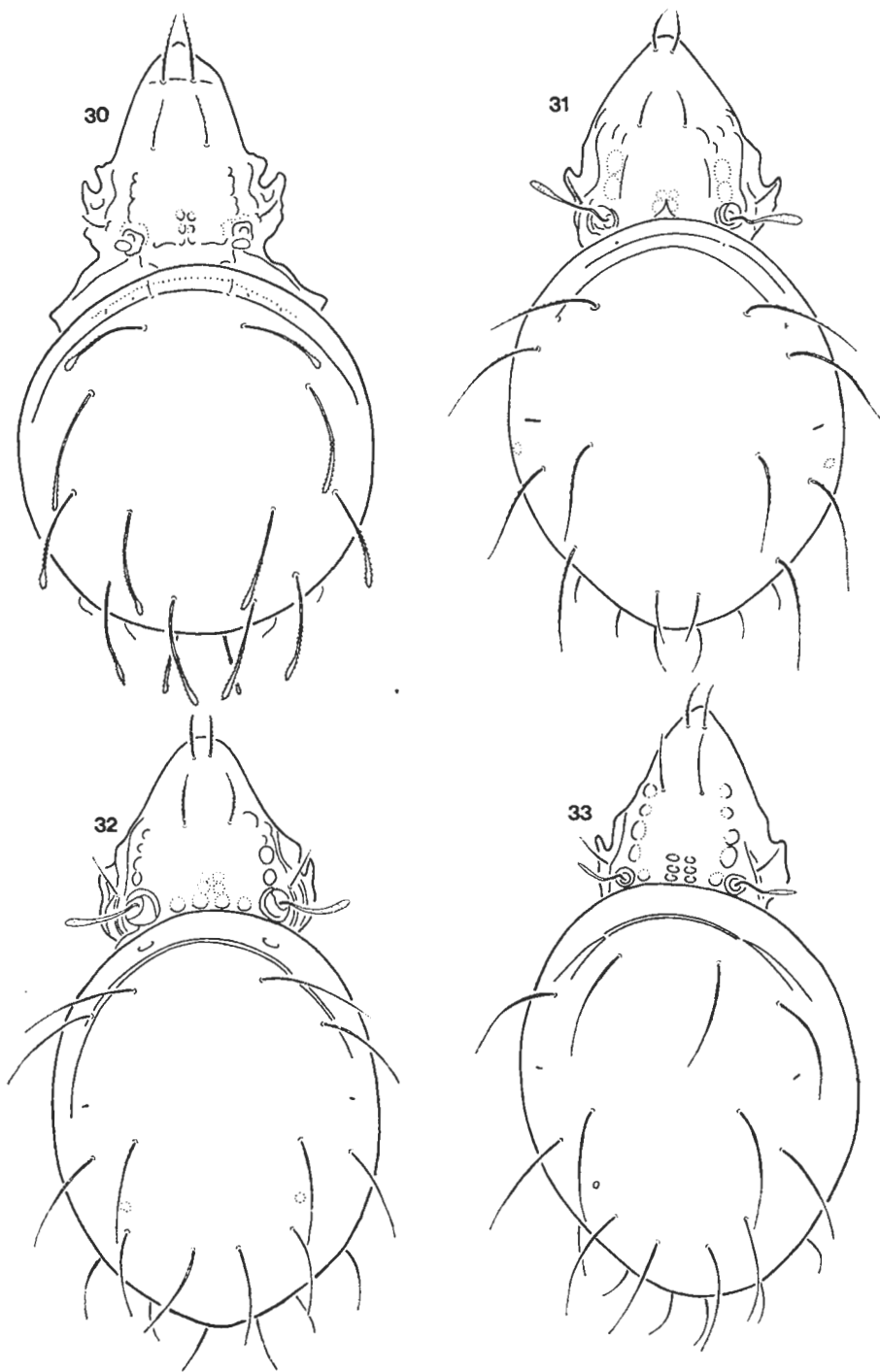
Figs. 17–21. 17: *Amerioppia espeletiae* P. BALOGH, 1984; 18: *A. badensis* (WOAS, 1986); 19: *A. cuyana* P. BALOGH, 1984; 20: *A. notata* (HAMMER, 1958); 21: *A. paripilis* HAMMER, 1961



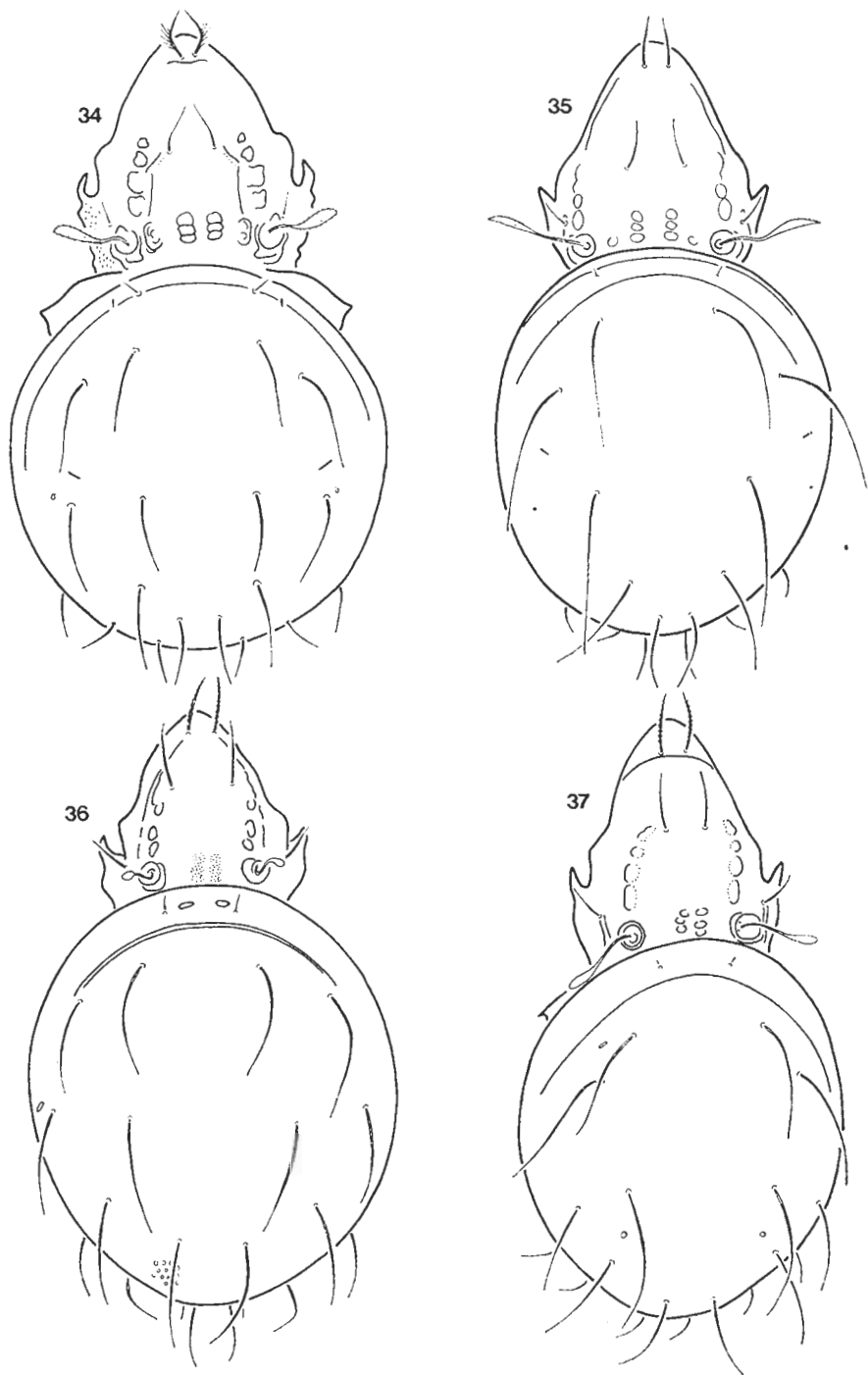
Figs. 22–25. 22: *Amerioppia foveolata* MAHUNKA, 1984; 23: *A. chilensis* HAMMER, 1962; 24: *A. lanceolata* (HAMMER, 1958); 25: *A. rotunda* (HAMMER, 1958)



Figs. 26 - 29. 26: *Amerioppia ankae* MAHUNKA, 1974; 27: *A. deficiens* (BALOGH, 1959); 28: *A. pectigera* HAMMER, 1961; 29: *A. meruensis* BALOGH, 1961

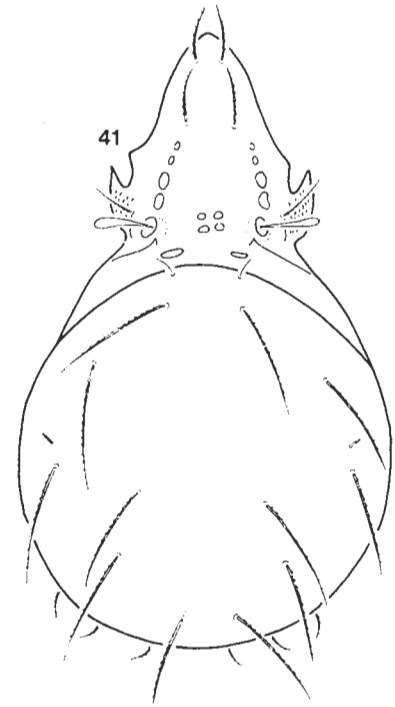
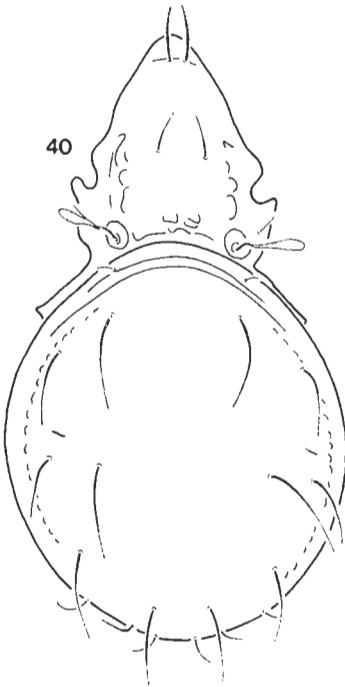
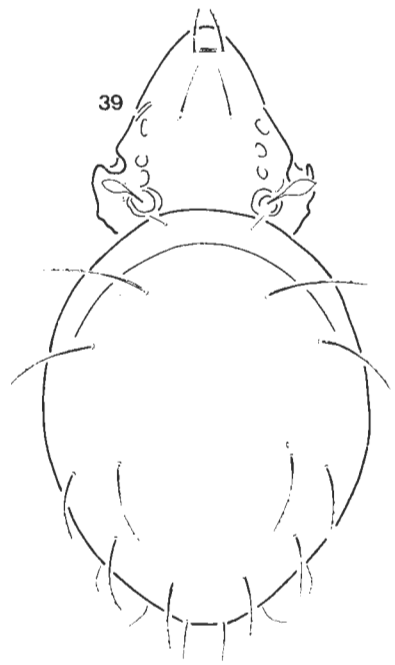
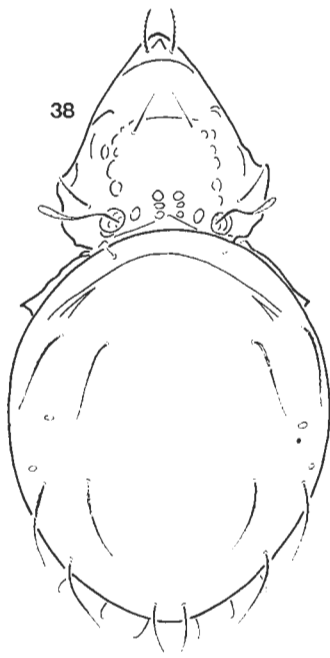


Figs. 30–33. 30: *Amerioppia extrema* MAHUNKA, 1984; 31: *A. woolleyi* HAMMER, 1968; 32: *A. trichosa* (HAMMER, 1958); 33: *A. trichosoides* HAMMER, 1961



Figs. 34–37. 34: *Amerioppia interrogata* MAHUNKA, 1976; 35: *A. minima* HAMMER, 1961; 36: *A. rudentigera* HAMMER, 1961; 37: *A. hexapilis* HAMMER, 1961





Figs. 38–41. 38: *Amerioppia usiatica* HAMMER, 1977; 39: *A. senecionis* P. BALOGH, 1984; 40: *A. africana* KOK, 1967; 41: *A. similis* COVARRUBIAS, 1967

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