

## PHYTOSEIIDAE OF PAPUA NEW GUINEA, WITH THREE NEW SPECIES, AND NEW RECORDS OF TETRANYCHIDAE (ACARI)

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**ABSTRACT**—The female of *Typhlodromus dominiquae* n.sp., the female of *Amblyseius armel-lae* n.sp., the female and male of *A. annae* n.sp., and the male of *A. ovaloides* Blommers are described and illustrated. Collection records are given for these species and for eight additional species from Papua New Guinea: *A. deleari* Muma and Denmark; *A. largoensis* (Muma); *A. longispinosus* (Evans); *A. peltatus* Merwe; *A. tamatavensis* Blommers; *Phytoseius hawaiiensis* Prasad; *P. hongkongensis* Swirski and Shechter, and *P. rubiginosae* Schicha. Twelve Tetranychidae were collected in association with these Phytoseiidae, the following ten for the first time from New Guinea: *Eutetranychus africanus* (Tucker); *Panonychus elongatus* Manson; *Oligonychus biharensis* (Hirst); *O. plegas* Baker and Pritchard; *Tetranychus fijiensis* Hirst; *T. kanzawai* Kishida; *T. lambi* Pritchard and Baker; *T. neocaledonicus* Andre; *T. piercei* McGregor; and *T. urticae* Koch.

### INTRODUCTION

L.O. Brun<sup>1</sup> and J. Gutierrez visited Papua New Guinea in May, 1980, and in August, 1982, respectively to study the fauna of phytophagous Tetranychidae and their predators on agricultural crops and native plants. They collected 151 specimens of Phytoseiidae which were, in many cases, associated with Tetranychidae and other leaf-feeding mites, suggesting predator-prey relationships between these species. This paper presents host and distribution records of the three new and nine known species of Phytoseiidae, 12 species of Tetranychidae and one species of Tenuipalpidae, which were found during the two study trips.

Collyer (1980) reported *Amblyseius ovalis* (Evans) in Papua New Guinea from Mt. Hagen and Bulolo on *Eucalyptus deglupta* (although this record is doubtful), while two species of Tetranychidae are known to occur in that country: *Panonychus citri* (McGregor) (Davis, 1968) and *Tetranychus marianae* McGregor (Davis, 1969). Papua New Guinea is associated with Australia through its geological and biological history and better knowledge of phytophagous and phytoseiid mites

from both countries would improve our understanding of the principles governing predator-prey relationships between these groups of mites in the Australian region and lead ultimately to more successful strategies in the biological control of pest mites on agricultural crops.

In the lists of synonymies only the original descriptions & recent complete redescriptions are mentioned.

Abbreviated are BCRI, Biological and Chemical Research Institute, Rydalmere; L.O.B., L.O. Brun; J.G., J. Gutierrez, W.G., W. Gagne.

All measurements are in microns.

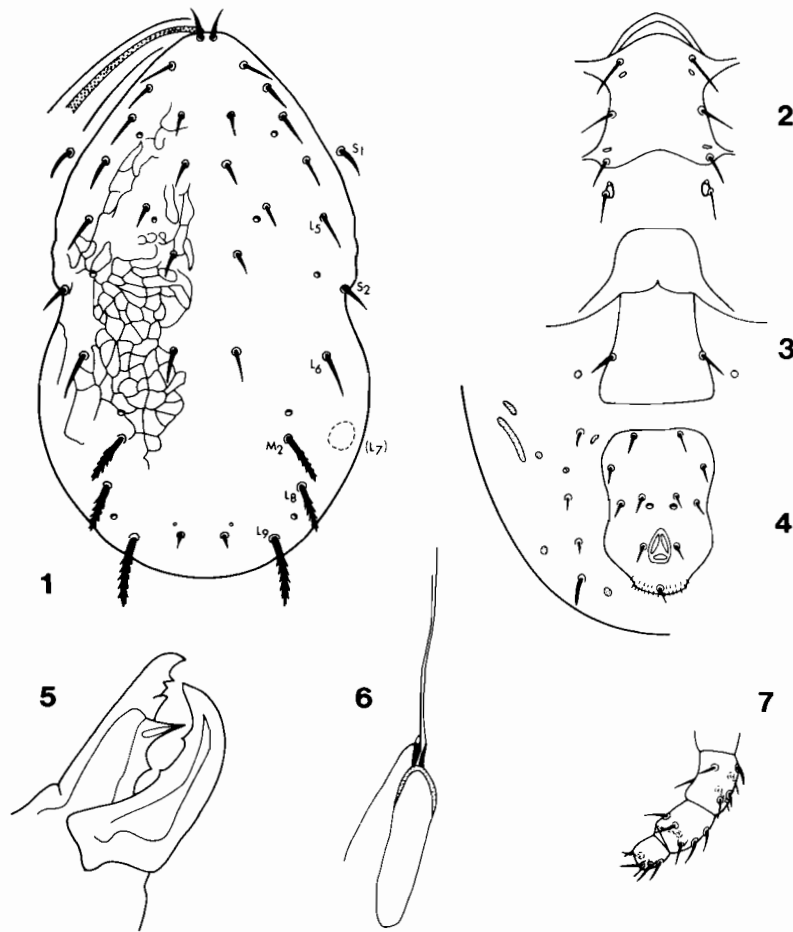
Genus *Typhlodromus* Scheuten

*Typhlodromus* Scheuten, 1857: 111. Type-species by subsequent designation (Oudemans, 1969): *Typhlodromus pyri* Scheuten, 1857.

*Typhlodromus dominiquae* n.sp.  
(Figs. 1-7)

**TYPES** — *Holotype* F (Female), *Tagetes erecta* L., Pt. Moresby, 1.v. 1980, L.O.B. Two *paratype* F, *Mangifera indica* L., Pt. Moresby, 29.iv.1980, L.O.B. One *paratype* F, *Tecoma stans* Juss., Pt. Moresby, 28.iv. 1980, with *Tetranychus neocaledonicus* Andre, L.O.B. All in BCRI.

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Figs. 1-7: *Typhlodromus dominiquae* n.sp. (female) — 1, dorsum; 2, sternal shield; 3, genital shield; 4, ventrianal shield; 5, chelicera; 6, spermatheca; 7, leg IV.

FEMALE  
(Figs. 1-7)

**DORSUM** — Imbricated dorsal shield 312 long (D1-D6), 141 wide (L5-L5), with 17 pairs of setae, 6 dorsal, 2 median, 8 lateral, 1 sublateral: D1 17, D2 14, D3 13, D4 17, D5 20, D6 9, M1 15, M2 31, L1 19, L2 16, L3 19, L4 19, L5 23, L6 27, L7 absent, L8 27, L9 42, S2 17. L1 as long as interspace L1/L2; all other setae shorter than distances between their bases of setae following next in series. M2, L8 and L9 broad and serrated, all other setae setaceous. Five pairs of large pores and one pair of small pores as illustrated. S1 19 on interscutal membrane; S2 19 on edge of dorsal shield. Peritremes reaching forward to bases of D1 (Fig. 1).

**VENTER** — Sternal shield 61 long, 61 wide, smooth, with 3 pairs of setae, 2 pairs of pores and slightly excavated posterior margin. Fourth pair of

sternal setae on oblong metasternal shields, with a pore each on anterior end (Fig. 2). Genital shield 62 wide, smooth, with a pair of setae (Fig. 3). Pentagonal ventrianal shield 113 long, 76 wide, smooth, with 4 pairs of preanal setae, and a pair of crescent shaped preanal pores 19 apart, surrounded by 3 pairs of short setae, 5 pairs of small shields, primary metapodal shield 31 long, secondary metapodal shield 8 long, and stout caudolateral setae 17 (Fig. 4).

**CHELICERA** — Fixed digit 21 long, with 3 teeth anterior, and 1 tooth posterior of pilus dentilis; movable digit 25 long, with 2 teeth (Fig. 5).

**SPERMATHECA** — Cervix cup-shaped; narrow major duct 8 long, slightly widening (where it enters cervix) to accommodate atrium (Fig. 6).

**LEGS** — No macrosetae on any leg. Leg IV see Fig. 7.

**NOTES** — In Merwe (1968) *T. dominiquae* n.sp. keys out to the subgenus *Diadromus* Athias-Henriot,

1960 of the genus *Typhlodromus* with the type species being *T. contiguus* Chant, 1959, because of its similar dorsal setae pattern: "...six pairs of dorsal setae, two pairs of median setae, five pairs of prolateral setae, and three pairs of postlateral setae" and "...the second pair of median setae is not transversely paired with any of the postlateral setae." However, in *T. contiguus* the first pair of postlateral setae (L6) is transversely paired with the second pair of sublateral setae (S2) which are on the interscutal membrane, while in *T. dominiquae* L6 is not transversely paired with S2 which is on the dorsal shield. In addition, D1, L1, L3, L6, L8 and M2 of *T. contiguus* are long, the remaining setae minute, while in *T. dominiquae* all dorsal setae are subequal in length, with M2, L8 and L9 flat and serrated. Thus *T. dominiquae* might be assigned to a new subgenus.

#### Genus *Amblyseius* Berlese

*Amblyseius* Berlese, 1914: 143. Type-species by original designation: *Zercon obtusus* Koch, 1839.

#### *Amblyseius annae* n.sp. (Figs. 8-16)

TYPES — *Holotype* F and *paratype* F, *Morus* sp., Mt. Hagen (Kuk station), 26.viii. 1982, J.G. Both in BCRI.

#### FEMALE (Figs. 8-14)

DORSUM — Laterally creased dorsal shield 322 long (D1-D6), 172 wide (L4-L4), with 19 pairs of setae, 6 dorsal, 2 median, 9 lateral, 2 sublateral: D1 12, D2 + D3 8, D4 10, D5 13, D6 12, M1 8, M2 16, L1 to L5 12-13, L6 + L7 15, L8 10, L9 64, S1 + S2 12-13. All setae shorter than distances between their bases and bases of setae following next in series. L9 long, stout, and serrated, all other setae relatively short, thin and smooth. 6 pairs of large pores and 7 pairs of small pores as shown. S1 and S2 on dorsal shield. Peritremes reaching forward to near bases of D1 (Fig. 8).

VENTER — Sternal shield 52 long, 65 wide, smooth, with 3 pairs of setae, 2 pairs of pores and slightly excavated posterior margin. Fourth pair of sternal setae on oval metasternal shields with a pore each on anterior end (Fig. 9). Genital shield 80 wide, smooth, with a pair of setae (Fig. 10). Pentagonal ventrianal shield 105 long, 76 wide, smooth, with 3 pairs of preanal setae and a pair of crescent-shaped preanal pores 23 apart, surrounded by 3 pairs of short setae, 3 pairs of small shields, primary metapodal shield 24 long (secondary metapodal shield attached to

it), and caudolateral setae 22 (Fig. 11).

CHELICERA — Fixed digit 21 long, with 11 teeth plus pilus dentilis; movable digit 24 long, with 3 recurved teeth (Fig. 12).

SPERMATHECA — Sack-like cervix 10 long, 2 wide; atrium incorporated into base of cervix; thin major duct 19 long (Fig. 13).

LEGS — Leg IV with 3 macrosetae: knobbed on genu 23, stout on tibia 21 and basitarsus 31 (Fig. 14).

#### MALE (Figs. 15-16)

DORSUM — Chaetotaxy of dorsal shield, 228 long (D1-D6), 138 wide (L4-L4), similar to that of female, but most setae shorter: D1 12, D2 to D6 8-9, M1 8, M2 15, L1 12, L2 10, L3 12, L4 15, L5 10, L6 14, L7 15, L8 9, L9 41. S1 12 and S2 10 on dorsal shield.

VENTER — Ventrianal shield 100 long, 151 wide, with 3 pairs of preanal setae and a pair of crescent shaped preanal pores 18 apart (Fig. 15).

SPERMATODACTYL — Shaft 13 long, foot 7 long terminating in a thin-walled toe (Fig. 16).

LEGS — Leg IV with 3 macrosetae: knobbed on genu 19, stout on tibia 18 and basitarsus 27.

NOTES — *A. annae* is similar to *A. neomarkwelli* Schicha, 1980, but differs in the anatomy of the spermatheca. In *A. annae* a small atrium is incorporated into the base of the symmetrical sack-like cervix. In *A. neomarkwelli* the large atrium protrudes from the base of the asymmetrical horn-like cervix.

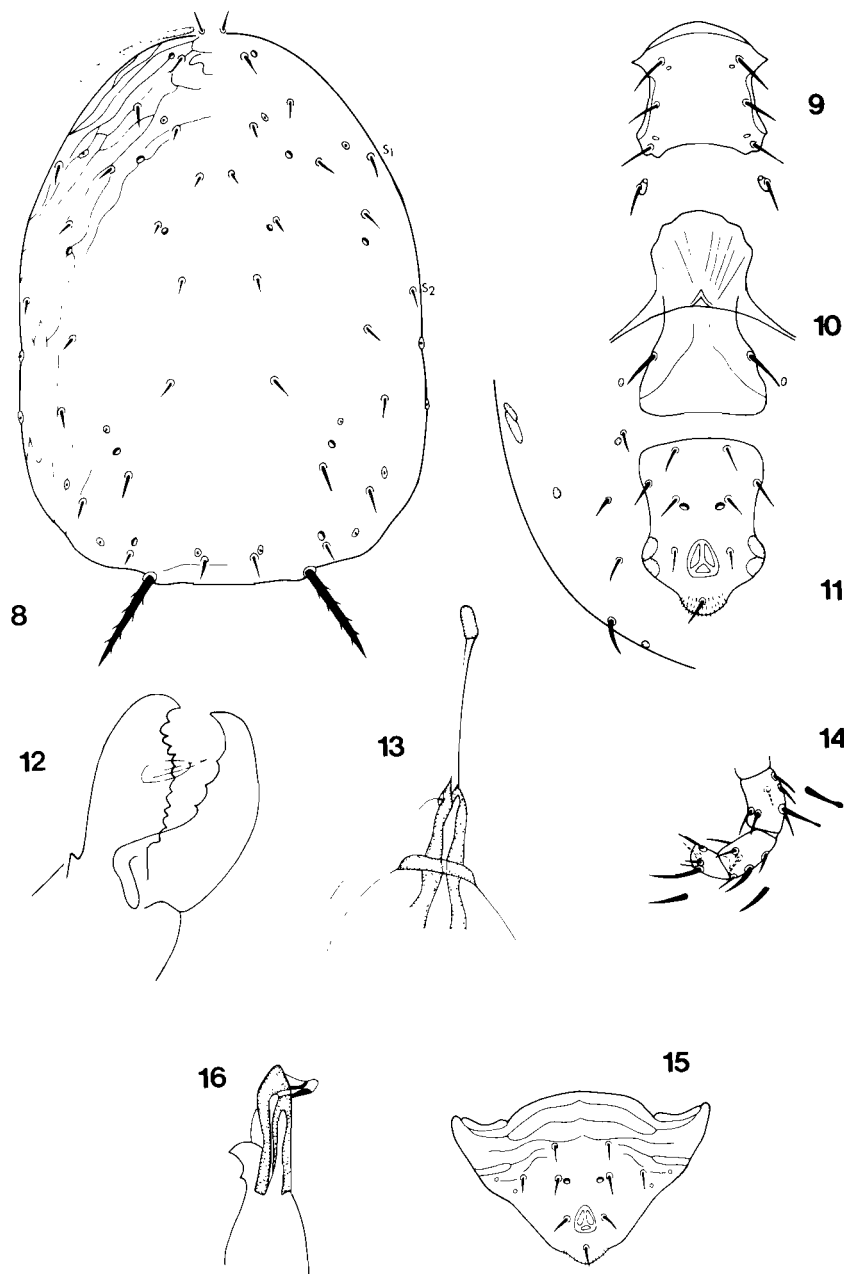
#### *Amblyseius armellae* n.sp. (Figs. 17-21)

TYPES — *Holotype* F, *Musa* sp., Wau, 21.viii. 1982, J.G. In BCRI.

#### FEMALE (Figs. 17-21)

DORSUM — Smooth dorsal shield 353 long (D1-D6), 194 wide (L4-L4), with 16 pairs of setae, 6 dorsal, 2 median, 8 lateral: D1 27, D2 to D5 17-19, D6 8, M1 17, M2 23, L1 24, L2 20, L3 19, L4 23, L5 25, L6 23, L7 absent, L8 24, L9 31. All setae shorter than distances between their bases and bases of setae following next in series. All setae smooth and subequal in length. 7 pairs of large pores and 11 pairs of small pores as shown. S1 21 on interscutal membrane, S2 not observed. Peritremes reaching forward to between bases of D1 and L1 (Fig. 17).

VENTER — Sternal shield 72 long, 81 wide, smooth, with 3 pairs of setae and 2 pairs of pores.



Figs. 8-16: *Amblyseius annae* n.sp. (female) — 8, dorsum; 9, sternal shield; 10, genital shield; 11, ventrianal shield; 12, chelicera; 13, spermatheca; 14, leg IV. (male) — 15, ventrianal shield; 16, spermatodactyl.

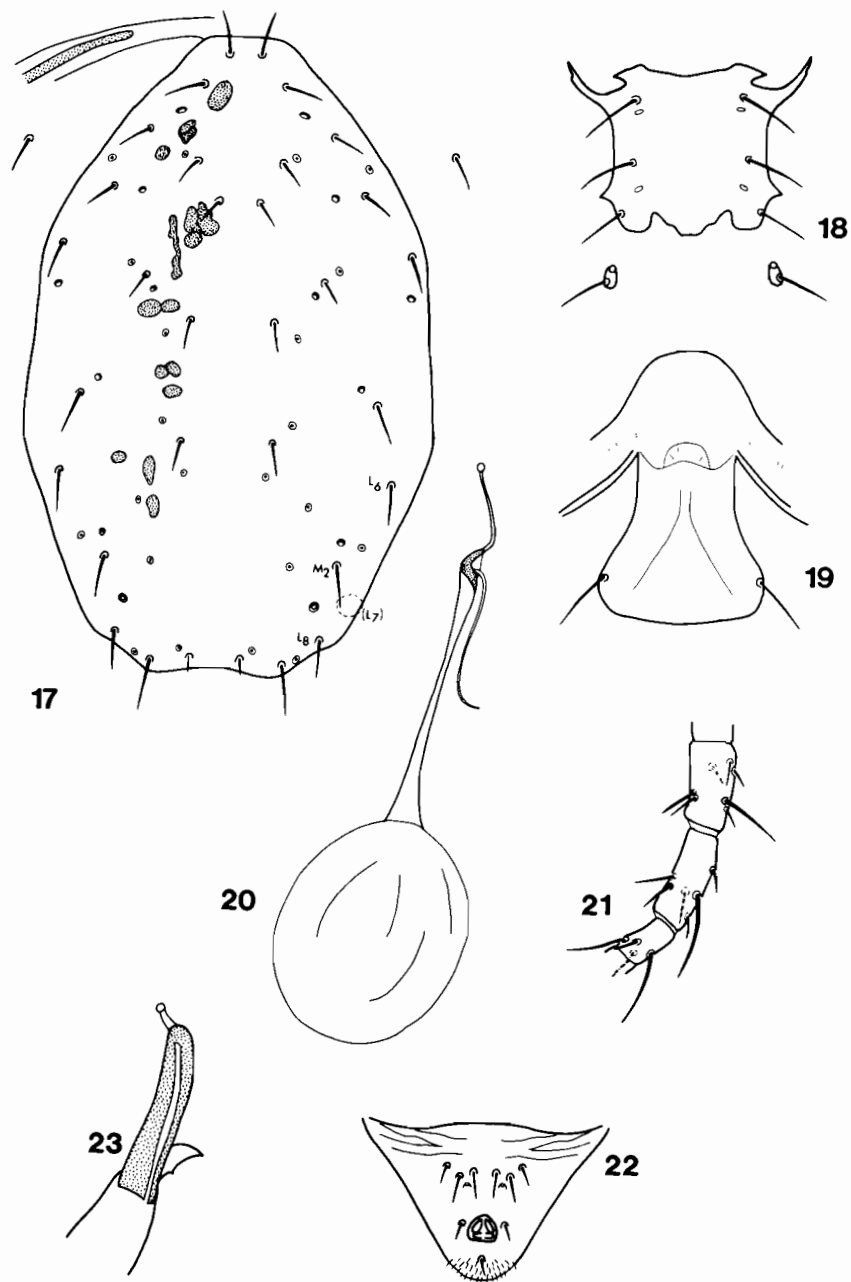
Fourth pair of sternal setae on oval metasternal shields with a pore each on anterior end (Fig. 18). Genital shield 97 wide, smooth, with 2 pairs of setae (Fig. 19). Ventrianal shield with 3 pairs of preanal setae and a pair of crescent shaped preanal pores. Other details not visible.

**CHELICERA** — Fixed digit with 12-13 teeth, movable digit with 1 or 2 teeth. Other details not visible.

**SPERMATHECA** — Tube-like cervix 28 long, narrowest part 1 wide; atrium 4 long, 2 wide, attached to less than 2 wide and 10 long major duct (Fig. 20).

**LEGS** — Setaceous macrosetae on genu IV 37, tibia IV 48, basitarsus IV 42, genu III 27, tibia III 31 (Fig. 21).

**NOTES** — In *A. armellae* L7 is considered here to be absent, and M2 has moved near the L7 position. The closest to the new species is *A. irregularis* Evans,



Figs. 17-21: *Amblyseius armellae* n.sp. (female) — 17, dorsal shield; 18, sternal shield; 19, genital shield; 20, spermatheca; 21, leg IV. Figs. 22-23: *Amblyseius ovaloides* Blommers (male) — 22, ventrianal shield; 23, spermatodactyl.

1953 (see redescription in Schicha, 1981). However, there are significant differences between the two species. In *A. armellae* the fixed digit has 12-13 teeth, while in *A. irregularis* it has 3. In *A. armellae* the cervix is long and tube-like, while in *A. irregularis* it is disc-shaped.

*Amblyseius ovaloides* Blommers

*Amblyseius ovaloides* Blommers, 1974: 147.

MATERIAL EXAMINED — 1F, *Artocarpus incisa* L., with *Eutetranychus africanus* (Tucker), Pt.

Moresby, 18.vii. 1982, J.G. 1 M (Male) *Tecoma stans* Juss., with *Tetranychus neocaledonicus* Andre, Pt. Moresby, 28.iv. and 18.viii. 1981, L.O.B. 2 F, *Ipomoea batatas* (L.) Lam., with *Tetranychus marianae* McGregor, Konedobu, 18.viii. 1982, J.G. 1 F, *Zea mays* L., with *Oligonychus plegas* Baker and Pritchard, Buba (Res. Stn.), 3.v. 1980, L.O.B. 2 M, *Euphorbia pulcherrima* Willd., Kainantu, 5.v. 1980, L.O.B. All in BCRI.

#### FEMALE

See Blommers (1974).

#### MALE

(Figs. 22-23)

**DORSUM** — Dorsal shield 247 long (D1-D6), 157 wide (L4-L4), creased laterally, with 17 pairs of setae, 6 dorsal, 2 median, 9 lateral, 2 sublateral: D1 27, D2 to D5 6-8, D6 4, M1 and M2 6, L1 to L3 8-9, L4 12, L5 to L8 7-8, L9 38, S1 9, S2 7. All setae shorter than distances between their bases and bases of setae following next in series. L9 stout and serrated, all other setae smooth.

**VENTER** — Ventrianal shield 90 long, 150 wide, slightly creased, with three pairs of preanal setae arranged in an irregular transverse row, and a pair of oval preanal pores 19 apart (Fig. 22).

**SPERMATODACTYL** — Shaft 18 long, foot with 4 relatively short, toe rounded (Fig. 23).

**LEGS** — Four macrosetae: genu IV 29, tibia IV 27, basitarsus IV 44, genu III 22.

**NOTES** — The female of this species was first described from Madagascar by Blommers (1974) and females are also known from the Seychelles (J.G. coll., in BCRI). The above is the first description of the male. This species belongs to a group of very similar species which include *A. ovalis* Evans, 1953, *A. elinae* Schicha, 1977, and *A. victoriensis* Womersley, 1954.

*Amblyseius deleoni* Muma and Denmark

*Amblyseius deleoni* Muma and Denmark, 1971: 68; Schicha, 1981: 107.

**MATERIAL EXAMINED** — 2 F, *Dioscorea* sp., with *Brevipalpus phoenicis* (Geijskes), 2 F, *Phaseolus* sp., with *Panonychus elongatus* Manson, Wau. 1 F, *Rosa* sp., with *P. elongatus*, Aiyura (Res. Stn.). 4 F, *Carica papaya* L., with *P. elongatus*, 1 F, *Ficus* sp., with *P. elongatus*, 4 F, *Morus* sp., with *P. elongatus*, Mt. Hagen (Kuk Res. Stn.). 2 F, *Crotalaria* sp., with *Tetranychus neocaledonicus* Andre, Wapenamanda.

All collected by J.G. between 22.viii. and 27.viii. 1982. All in BCRI.

**NOTES** — The female and male of this species were first described by Muma and Denmark (1971) from Florida. Only females are known from Madagascar (Blommers 1976), and Australia (Schicha 1981). Females are also reported from South Africa (Blommers 1976), Taiwan (Tseng 1976), and China (Wu, personal communication). Daneshvar and Denmark (1982) consider *A. deleoni* to be a synonym of *A. herbicolus* Chant, but this is not accepted here.

*Amblyseius largoensis* (Muma)

*Amblyseiopsis largoensis* Muma, 1955: 266.

*Amblyseius largoensis* (Muma), Schicha, 1981: 105.

**MATERIAL EXAMINED** — 3 F + 1 M, *Carica papaya* L., with *Tetranychus lambi* Pritchard and Baker, 4 F + 4 M, *Cocos nucifera* L., with *T. fijiensis* Hirst, Pt. Moresby, 15.viii. 1982, J.G. 1 F, *Croton* sp., with *T. neocaledonicus* Andre, 4 F + 1 M, *Hibiscus* sp., 2 F, *Mangifera indica* L., 2 F + 1 M, *Phaenomeria magnifica* Lindl., Pt. Moresby, 30.iv. 1980, L.O.B. 7 F + 1 M, *Abelmoschus manihot* (L.) Medik., with *T. lambi*, 1 F, *Oryza sativa* L., with *Oligonychus plegas* Baker and Pritchard, Konedobu, 17.viii. 1981, J.G. 3 F + 1 M *Ficus benjamina* L., with *Panonychus* sp., 4 F + 2 M, *Passiflora* sp., with *T. marianae* McGregor, Pt. Moresby (Laloki Res. Stn.), 16. and 26.viii. 1982, J.G. 1 F, *Gossypium* sp., Pt. Moresby (Laloki Res. Stn.), 1.v. 1980 L.O.B. 2 F, *Citrus* sp., Buba (Res. Stn.), 3.v. 1980, L.O.B. 1 F, *Manihot utilissima* Pohl., with *T. kanzawai* Kishida, Mutsing, 23.viii. 1982, J.G. 3 F + 1 M, *Acalypha hispida* Burm., Gusap (Res. Stn.), 4.v. 1980, L.O.B. All in BCRI.

**NOTES** — This species is known in Florida (Muma 1955); Japan (Ehara 1959); Madagascar (Blommers and Chazeau 1974); New Caledonia; Tahiti; New Hebrides and U.S. Samoa (Schicha 1981); and Queensland in Australia (in BCRI collection).

*Amblyseius longispinosus* (Evans)

*Typhlodromus longispinosus* Evans, 1952: 413.

*Amblyseius longispinosus* (Evans), Schicha, 1975: 103.

**MATERIAL EXAMINED** — 1 F on *Acalypha hispida* Burm., Port Moresby, 30.iv. 1980, L.O. Brun. *hispida* Burm., Port Moresby, 30.iv. 1980, L.O.B. 1 F + 1 M, *Oryza sativa* L., Konedobu, 17.viii. 1982, 3.v. 1980, L.O.B. 4 F, *Manihot utilissima* Pohl, Mutsing (Res. Stn.), 23.viii. 1982, J.G. All in BCRI.

NOTES — This species is known in India (Evans 1953); Thailand (Ehara and Bhandhufalck 1977); China (Xin, Liang, and Ke 1981); Taiwan (Ehara 1970, Tseng 1976); Japan (Ehara 1958, 1959, 1961, 1964, 1967); Hawaii (Prasad 1968); South America (Chant 1959); Philippines (Corpuz and Rimando 1966); Indonesia (Evans 1952); and New Zealand (Ehara 1966). Contrary to Womersley (1954) and Xin, Liang and Ke (1981), it does not occur in mainland Australia or Tasmania (Schicha, 1975). *A. longispinosus* belongs to a group of very similar species, including *A. womersleyi* Schicha, 1975, *A. teke* Pritchard and Baker, 1962, *A. pseudolongispinosus* Xin, Liang and Ke, 1981, and possibly *A. bibens* Blommers, 1973.

*Amblyseius peltatus* Merwe

*Amblyseius (Amblyseius) peltatus* Merwe, 1968: 119; Schicha, 1983: 115.

MATERIAL EXAMINED — 1 F + 1 M, *Carica papaya* L., 2 F, *Zea mays*, 3.v. 1980, Bubia (Res. Stn.), L.O.B. All in BCRI.

NOTES — This species is known in South Africa (Merwe 1968), Thailand (Ehara and Bhandhufalck 1977), and Australia (Schicha 1983).

*Amblyseius tamatavensis* Blommers

*Amblyseius tamatavensis* Blommers, 1974: 144; Schicha, 1981: 40.

MATERIAL EXAMINED — 5 F + 1 M, *Gossypium* sp., Pt. Moresby (Laloki Res. Stn.), 1.v. 1980, L.O.B. 1 F, *Manihot utilissima* Pohl., with *Oligonychus biharensis* (Hirst), Pt. Moresby (Laloki Res. Stn.), 17.viii. 1982, J.G. 1 M, *Tagetes erecta* L., with *T. neocaledonicus* Andre, 21.viii. 1982, J.G. 1 F + 1 M, *Colocasia esculenta* (L.) Schott, with *T. kanzawai* Kishida, Lae, 19.viii. 1982, J.G. 1 F, *Carica papaya* L., with *T. kanzawai*, Bubia (Res. Stn.), 3.v. 1980, L.O.B. 2 F, *Manihot utilissima* Pohl., with *T. kanzawai*, Mutsing (Res. Stn.), 23.viii. 1982, J.G. 1 F, *Basella alba*, Wau, 21.vi. 1979, W.G. 1 F, *Psophocarpus tetragonolobus* DC., with *T. piercei* McGregor, Wau, 1.ii. 1979, W.G. All in BCRI.

NOTES — This species is known in Madagascar (Blommers 1974); Australia (Queensland); and in New Hebrides, Papua New Guinea, and Western Samoa (Schicha 1981).

*Phytoseius hawaiiensis* Prasad

*Phytoseius hawaiiensis* Prasad 1968: 1460; Schicha, 1980: 252.

MATERIAL EXAMINED — 1 F, *Oryza sativa* L. with *Oligonychus plegas*, Konedobu, 17.viii. 1982, J.G. in BCRI.

NOTES — This species is known in Hawaii (Prasad 1968); Tahiti, Australia, and Mauritius (Schicha 1984); and Thailand (Ehara and Bhandhufalck 1977).

*Phytoseius hongkongensis* Swirski & Shechter

*Phytoseius (Phytoseius) hongkongensis* Swirski and Shechter, 1961: 99; Schicha, 1984: 126.

MATERIAL EXAMINED — 1 F, *Elettaria cardamomum* (L.) Maton, Bubia (Res. Stn.), 20.viii. 1982, J.G. 2 F, *Euphorbia pulcherrima* Willd., Kainantu, 5.v. 1980, L.O.B. All in BCRI.

NOTES — This species is known in Hong Kong (Swirski and Shechter 1961), Taiwan (Tseng 1976), Madagascar (Blommers 1976), and Australia (Schicha 1984). Ehara (1972) described *P. hongkongensis* from Japan, but his description appears to be a new species (Schicha 1984).

*Phytoseius rubiginosae* Schicha

*Phytoseius rubiginosae* Schicha, 1984: 120.

MATERIAL EXAMINED — 4 F, *Bambusa* sp., Kainantu, 5.v. 1980, L.O.B. All in BCRI.

NOTES — This species is known in Australia (New South Wales and Queensland) and New Caledonia (Schicha 1984).

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