

## A new genus and two new species of Parholaspididae from Australia and Papua New Guinea (Acarina: Mesostigmata)

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**Abstract** – The mite family Parholaspididae is recorded from the Australasian Region for the first time, on the basis of two new species. *Holaspulus confusus* sp. nov. is described from Queensland and Papua New Guinea, and *Neolaspina rugosa* gen. nov., sp. nov. is described from Queensland. The state of knowledge of the classification and nomenclature of the family world-wide is reviewed.

### INTRODUCTION

The purposes of this paper are to record the family Parholaspididae in Australia and Papua New Guinea for the first time, to contribute to the knowledge of the family by describing a new genus and 2 new species, and to review the state of knowledge of the classification and nomenclature of the family.

In his revision of the genera of Macrochelidae, Evans (1956) erected a new subfamily, the Parholaspidinae, for the genera in which the posterior end of the peritreme is straight rather than looped or elbowed. Krantz (1960) promoted the Parholaspidinae to the family level, and recognised 27 species arranged in 9 genera. Most of these species had been described from Europe and North America, with 8 from Singapore, Malaysia, and Indonesia. Since then, many new species have been described, from the former USSR (Petrova 1967a, 1967b, 1968a, 1968b, 1974, 1977), Hawaii (Tenorio and Marshall 1977), North and Central America (Krantz 1963; Marshall 1964; Hirschmann 1966), Japan and south east Asia (Ishikawa 1966, 1969, 1976, 1979, 1980a, 1980b, 1980c, 1987, 1991; Yin *et al.* 1964; Gu 1984; Tseng 1993), and India (Datta and Bhattacharjee 1989, 1991), and the number of species now known is over 100.

There has also been considerable generic rearrangement. Johnston (1969) showed that *Parholaspulus* Evans, 1956 and *Neoparholaspulus* Krantz, 1960 are junior synonyms of *Holaspina* Berlese, 1916. All 4 species of *Neoparholaspulus* were shown to belong to *Holaspina*, along with the type species of *Parholaspulus*, *P. alstoni* Evans, 1956. Three other species of *Parholaspulus* were transferred to a new genus, *Snaveolaspis* Johnston, 1969. The correct generic placement of the remaining species of *Parholaspulus* is unresolved. Most of them could be accommodated in *Holaspina*,

but it appears likely that at least some should be transferred to *Snaveolaspis* (eg. *P. hiasmaticus* Petrova, 1967b). The synonymy of *Neoparholaspulus* Krantz with *Holaspina* Berlese was also recognised by Krauss (1970) and Farrier and Hennessey (1993). Petrova-Nikitina (1969) recognised that *Parholaspulus* and *Neoparholaspulus* were very closely related, but did not regard them as synonymous, and did not include *Holaspina* in her analysis. More recently Petrova (1977) has re-described the family and constructed a key to the genera, regarding *Parholaspulus* Evans and *Holaspina* Berlese as separate genera, but omitting *Neoparholaspulus* Krantz, *Proparholaspulus* Ishikawa and *Snaveolaspis* Johnston.

Further changes at the generic level have been the relegation of *Tricholaspis* Evans, 1956 into synonymy with *Neparholaspis* Evans, 1956, by Krantz (1960), and the relegation of *Evansolaspis* Bregetova and Koroleva, 1960 into synonymy with *Gamasholaspis* Berlese, 1904, by Petrova (1967b). The most recent keys to the genera of Parholaspididae are those of Datta and Bhattacharjee (1989) and Tseng (1993), but neither of these keys covers all the known genera.

Hennessey and Farrier (1988) found that *Macrocheles muscorum* Ewing, 1909 is actually a species of *Holaspina*, and furthermore, that this name is a senior synonym of both *Neoparholaspulus hurlbutti* Krantz, 1960 and *Holaspina pulchella* Berlese, 1916. Since *H. pulchella* is the type species of *Holaspina*, the type species should now be stated as *H. pulchella* Berlese, 1916 (= *Macrocheles muscorum* Ewing, 1909).

Hennessey and Farrier (1988) incorrectly emended the name *muscorum* to *muscarum*, but later reverted to the original correct spelling (Farrier and Hennessey 1993). There has also been some instability in the spelling of the name of the family, which is correctly rendered as

Parholaspididae and not Parholaspidae as used by some authors (see Steyskal 1970, entry under *Hypoaspis*).

It is clear that a comprehensive revision of the family is overdue. That revision has not been attempted here. Instead, this paper presents the first records of Parholaspididae from Australia and Papua New Guinea, so that a future revision of the family can incorporate information from all biogeographic regions. The need for this type of information was demonstrated in a recent study that analysed the phylogeny and biogeography of *Holaspulus* in southeast Asia, but did not include any species from the Australasian region (Ishikawa 1991).

The system of notation used for the dorsal shield setae is that of Lindquist and Evans (1965), as applied to the Parholaspididae by Tenorio and Marshall (1977). The system of notation for the leg setae is that of Evans (1963). All specimens are in the Australian National Insect Collection, CSIRO Division of Entomology, Canberra.

## SYSTEMATICS

### Genus *Holaspulus* Berlese

*Holostaspis* (*Holaspulus*) Berlese, 1904: 265.

#### Type species

*Holaspulus tenuipes* (Berlese, 1904), by monotypy (= *Parholaspis pachylaelapsoides* Schweizer, 1932).

### *Holaspulus confusus* sp. nov.

Figures 1–8

#### Material Examined

##### *Holotype*

♀, McNamee Creek, Queensland, Australia, 17°40'S, 145°48'E, 8 July 1971, R. W. Taylor and J. Feehan coll., rainforest, alt. 400m., ANIC365.

##### *Paratypes*

**Australia: Queensland:** 1 ♀, 1 ♂, same data as holotype; 1 ♂, Crawford's Lookout, 5 July 1971, R. W. Taylor and J. Feehan coll., rainforest, alt. 320m, ANIC361; 2 ♂, 12 km SE. of Milla Milla, 5 July 1971, R. W. Taylor and J. Feehan coll., rainforest, ANIC362; 1 ♀, 2 ♂, Noah Creek, 16.07S, 145.25E, 21 June 1971, R. W. Taylor and J. Feehan coll., rainforest, alt. < 50m. **Papua New Guinea:** 1 ♂, Vanimu, 10 July 1972, R. W. Taylor coll., rainforest, alt. 50m; 3 ♀, Kokoda, 1 June 1972, R. W. Taylor coll., rainforest, alt. 500m.

#### Diagnosis

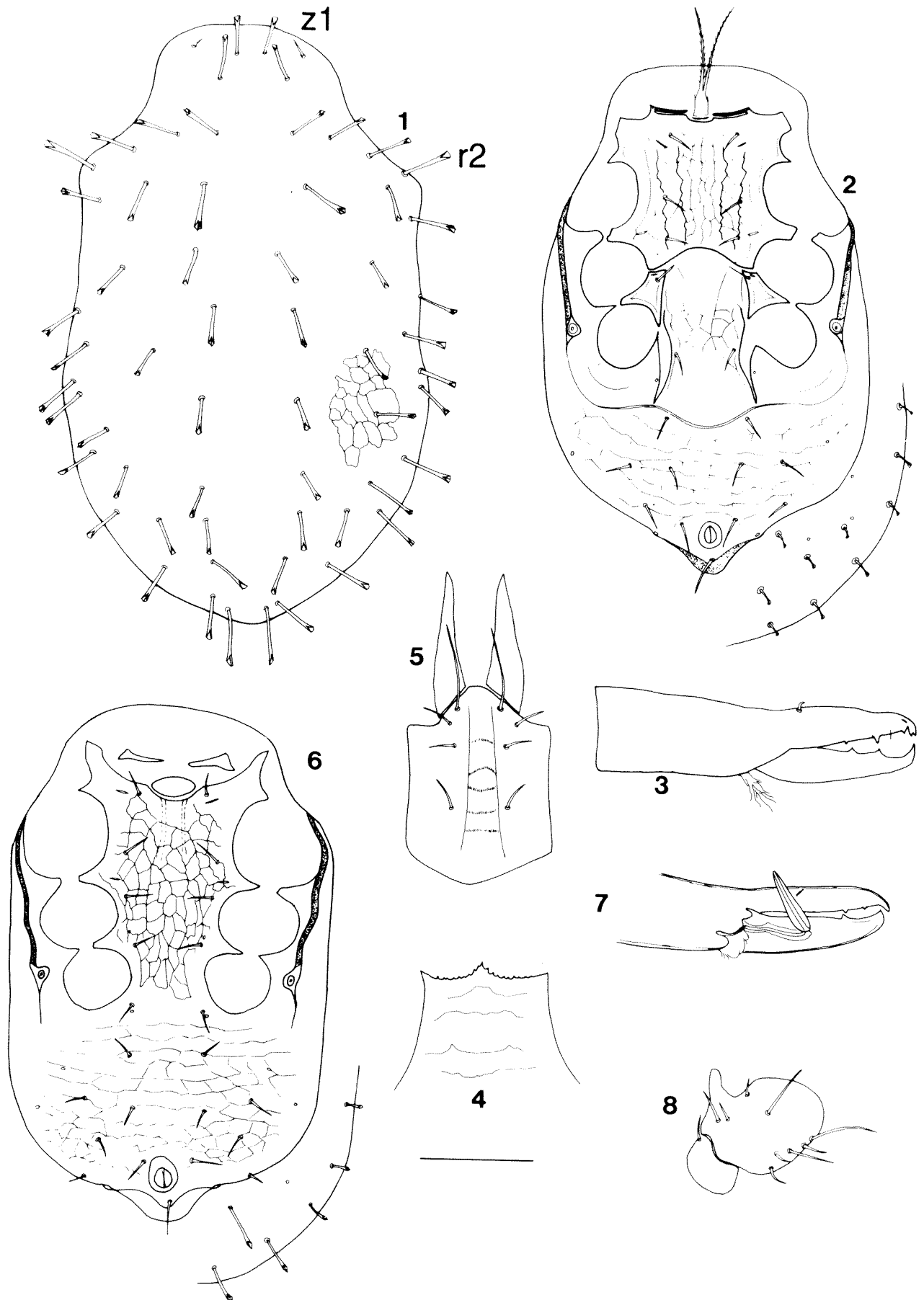
Dorsal shield with 30 pairs of setae, z1 fine, smooth, pointed, others long, distally expanded, spatulate to trifurcate; metasternal plates fused with endopodal plates; ventri-anal shield with 4 pairs of pre-anal setae; peritrematal shields fused with exopodal and ventri-anal shields; epistome irregularly serrated, with weakly developed lateral and central projections; setae *al1* and *al2* on femur II heavy and spinelike. Leg I without claws. Sternal, genital, ventri-anal, peritrematal, and metasternal shields of male all fused to form a single holovertral shield; spermatodactyl short and thick, erect, much shorter than cheliceral digits.

#### Description

##### *Female*

**Dorsal shield** (Fig. 1). Length 447–573 mm, maximum width 239–295 mm (n=6). Surface ornamented with a pattern of short irregular curved ridges, indistinct medially. Lateral margins of shield almost parallel, somewhat indented behind seta r2. Shield carrying 30 pairs of setae. Seta z1 short, smooth, pointed; all other setae long, distally expanded, spatulate to trifurcate.

**Ventral idiosoma** (Fig. 2). Base of tritosternum distinctively shaped, with a pair of small lateral projections; laciniae long and pilose. Pre-sternal plates long, narrow, granular, lateral ends fused to sternal shield. Sternal shield covered with a polygonal network of distinct ridges; surface inside each polygon smooth; anterior margin of shield invaginated behind tritosternum. Shield carrying 3 pairs of smooth pointed setae and 2 pairs of slit-like pores; bases of st2 lying only slightly outside a line joining the bases of st1 and st3; st1 and st2 equal in length, st3 10% shorter. Metasternal plates fused with endopodal plates to form a pair of sub-triangular shields, each carrying a smooth, pointed seta and a lyriform pore. Anterior corners of these shields adjacent to, but not fused with, the sternal shield. Genital shield sub-rectangular, with sinuate lateral margins, indistinct anteriorly, fused posteriorly with ventri-anal shield; ornamented in the anterior half with a distinct polygonal pattern of ridges, posterior half smooth. Genital setae smooth and pointed. Genital pores located on the edges of the peritrematal shields behind coxae IV. Ventri-anal shield wide, triangular, fused with genital and peritrematal shields. Shield with irregular polygonal ornamentation, carrying 4 pairs of pre-anal setae, a pair of para-anal setae, and a post-anal seta, all setae smooth and pointed, circum-anal setae slightly longer than pre-anal setae. Anus circular, with a distinct crescent-shaped cribrum bearing a pair of pores at its extremities. Lateral unsclerotised integument with 10 pairs of setae, all distally expanded, each



Figures 1–8 *Holaspulus confusus* sp. nov. 1, dorsal shield of female; 2, ventral idiosoma of female; 3, chelicera of female; 4, epistome of female; 5, hypostome of female; 6, ventral idiosoma of male; 7, chelicera of male; 8, femur II of male, ventral aspect. Scale: 100  $\mu$ m (Figs 1, 2, 6), 72  $\mu$ m (Figs 3, 4, 5).

mounted on a small circular platelet. Peritrematal shields expanded, fused anteriorly with dorsal shield, and posteriorly with exopodal and ventri-anal shields; peritreme slightly undulating, extending from coxa I to the stigma at the level of coxa IV. Genital and spermathecal structures not evident, except for a pair of large elongate masses between coxae III and IV, in which detailed structure could not be resolved.

*Gnathosoma*. Fixed digit of chelicera with a minute proximal tooth, a larger medial tooth, pilus dentilis, and a tridentate terminal hook; dorsal seta short and curved. Movable digit with 2 small teeth, a long terminal hook, and a conspicuous arthroal brush (Fig. 3). Epistome irregularly serrated, with weakly developed lateral and central projections, dorsal surface with a series of weak, irregular transverse ridges (Fig. 4). Corniculi long and robust, reaching past distal end of palp femur, length of inner margin 66–78  $\mu\text{m}$  ( $n=5$ ). Internal malae very fine, lightly pilose on outer margin only, slightly shorter than corniculi. Hypostomal groove with 5 transverse rows of very weak, indistinct, denticles, *ca* 20 denticles in posterior row, decreasing to *ca* 15 in anterior row. Anterior hypostomal setae very long, more than 3 times as long as posterior hypostomal setae and palp coxal setae (Fig. 5). Palp chaetotaxy normal (2–5–6–14), *al1* and *al2* setae on palp genu short, thick, spine-like, *al1* 2x length of *al2*, palp tarsal claw with 3 distinct tines, subequal in length, the posterior 2 tines distally spatulate.

*Legs*. Chaetotaxy : Leg I : coxa 0 0/1 0/1 0, trochanter 1 1/1 0/1 1, femur 2 3/2 2/1 2, genu 2 3/2 2/1 2, tibia 2 3/2 2/1 2. Leg II : coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/2 1, genu 1 3/1 2/1 2, tibia 2 2/1 2/1 2, tarsus 3 3/2 3/2 3 + *mv*, *md*. Leg III : coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 1 1/2 0/1 1, genu 2 2/1 2/0 1, tibia 1 2/1 2/1 1, tarsus 3 3/2 3/2 3 + *mv*, *md*. Leg IV : coxa 0 0/1 0/0 0, trochanter 1 0/1 0/2 1, femur 1 2/1 1/0 1, genu 2 2/1 2/0 1, tibia 1 2/1 2/1 1, tarsus 3 3/2 3/2 3 + *mv*, *md*. All leg setae fine, smooth, pointed, except *al1* and *al2* on femur II, which are heavy and spinelike. Leg I without claws. Legs II–IV each with a pre-tarsus consisting of a pair of claws, a rounded, membranous pulvillus, shorter than the claws, and a pair of long, pointed operculi, projecting considerably beyond the claws.

#### Male

*Dorsal shield*. Length 434–452  $\mu\text{m}$ , width 274–297  $\mu\text{m}$  ( $n = 4$ ). Structure and chaetotaxy as for female.

*Ventral idiosoma* (Fig. 6). Pre-sternal plates bigger than in female, not fused with sternal shield. Sternal, genital, ventri-anal, peritrematal, and metasternal shields all fused to form a single holovertral shield. Genital plate oval, fitting into

an invagination in the anterior margin of the sternal shield. Sterno-genital region with 5 pairs of smooth pointed setae and 4 pairs of pores. Lines of ornamentation polygonal in the sternal region, tending to longitudinal between coxae III and IV. Ventri-anal region with 5 pairs of pre-anal setae, a pair of para-anal setae, and a post-anal seta. Circum-anal setae longer than pre-anal setae. Ventri-anal region ornamented with a weak polygonal pattern of ridges. Postero-lateral interscutal membrane with approximately 6 pairs of setae, all distally expanded, each inserted on a small platelet, setae increasing in length posteriorly.

*Gnathosoma*. Epistome, corniculi, palp, and hypostome as in female. Fixed digit of chelicera with 2 minute teeth and a terminal hook. Movable digit with 1 large blunt tooth and a terminal hook. Spermatodactyl short and thick, erect, posteriorly directed, much shorter than cheliceral digits, with a blunt tip (Fig. 7).

*Legs*. Chaetotaxy as for female, except that femur II with a thumb-like ventral spur and only 10 setae (Fig. 8), and genu II and tibia II each armed with a very small ventral protuberance. Leg IV unarmed.

#### Relationships

The female of *H. confusus* can be distinguished from all other described species in the genus by the fact that the metasternal plates are fused with the endopodal plates. This fusion has however been recorded for 7 undescribed species of *Holaspulus* by Ishikawa (1991). *H. confusus* may be distinguished from undescribed species 1, 3, and 6 by its possession of claws on leg I, and from undescribed species 2, 4, 7, 8 by the fact that dorsal shield seta *z1* in *H. confusus* is fine, smooth and pointed.

The spermatodactyl in the males of *Holaspulus* appears to be very variable in structure. In *H. tenuipes* (Berlese, 1904) (= *Parholaspis pachylaelapsoides* Schweizer, 1932), it is very long, slender, and straight (Schweizer 1932; Tenorio and Marshall 1977; Ishikawa 1979), while in *H. tweedei* Evans, 1956, the spermatodactyl is short, and directed posteriorly (Evans 1956; Ishikawa 1979). In both *H. schusteri* Hirschmann, 1966, and in *H. confusus*, the spermatodactyl is also short, but appears to be held almost perpendicular to the movable digit. This feature allows the male of *H. confusus* to be distinguished from all of its congeners except *H. schusteri*. This separation may be made by the pattern of ornamentation on the anterior portion of the holovertral shield – polygons in *H. confusus*, parallel longitudinal lines in *H. schusteri*.

*H. confusus* does not agree with any of the described or undescribed species discussed by Ishikawa (1991). In his cladistic analysis, *H.*

*confusus* has the apomorphic character states for characters 1 (claws present on leg I), 2 (seta z1 minute), 3 (epistome without central process) and 4 (sternal shield reticulate), and the plesiomorphic states for characters 5 (metasternal shield fused with endopodal shield), 6 (sternal shield seta st2 / st3 less than 2.1), 7 (metapodal shields absent) and 8 (tarsus I / tibia I less than 2.2). It most closely resembles Ishikawa's undescribed species numbered 4 and 7, but differs from both of them in the form of dorsal shield seta z1 and the epistome.

### *Neolaspina* gen. nov.

#### Type species

*Neolaspina rugosa* gen. nov., sp. nov.

#### Description

Dorsal shield with 29 pairs of setae, anterior edge of dorsal shield rounded. Ventral shields consisting of separate pre-sternal, sternal, metasternal, endopodal, genital, ventri-anal, metapodal, and peritrematal shields; peritrematal shields not fused to ventri-anal shield; metapodal plates very large. Ventri-anal shield wide, extending laterally beyond coxae IV, with 5 pairs of pre-anal setae. Peritreme extending beyond coxae I. Expulsory vesicles absent. Fixed digit of chelicera multidentate, dorsal seta simple, recumbent, movable digit tridentate. Epistome irregularly serrate, lacking central process. Hypostome with 8 rows of denticles. Palp tarsal claw 2-tined. Legs with 3 ventral setae on femur I, 6 setae on trochanter I, 2 antero-laterals on tibia III, 9 setae on genu III, 10 on tibia IV. Legs I-IV all with a pair of claws, a rounded, membranous pulvillus, opercula not projecting beyond claws.

### *Neolaspina rugosa* sp. nov.

Figures 9-14

#### Material Examined

##### Holotype

♀, Iron Range, 3 km ENE. of Mt. Tozer, Queensland, Australia, 1-4 July 1986, rainforest with palms, leaf litter, T. Weir coll., ANIC1055.

##### Paratypes

**Australia: Queensland:** 14♀, same data as holotype; 8♀, Iron Range, 9 km ENE. of Mt. Tozer, 5-10 July 1986, rainforest leaf litter, T. Weir coll., ANIC 1057; 2♀, Mt. Lewis, 16.35S, 145.17E, 30 Oct. 1976, alt 960 m, rainforest, R. W. Taylor and T. A. Weir coll., ANIC547; 2♀, 1.6 km SW of Yungaburra, 27 April 1973, rainforest litter, R. W. Taylor coll., ANIC 465; 4♀, 1.6 km SE. of Crawford's Lookout, 10 July 1971, rainforest, alt

300 m, Taylor and Feehan coll.; 1♀, McNamee Creek, 17.40S, 145.49E, 8 July 1971, alt 300 m, rainforest, Taylor and Feehan coll., ANIC364; 1♀, McNamee Creek, 17.40S, 145.48E, 6 July 1971, rainforest, Taylor and Feehan coll., ANIC363.

#### Diagnosis

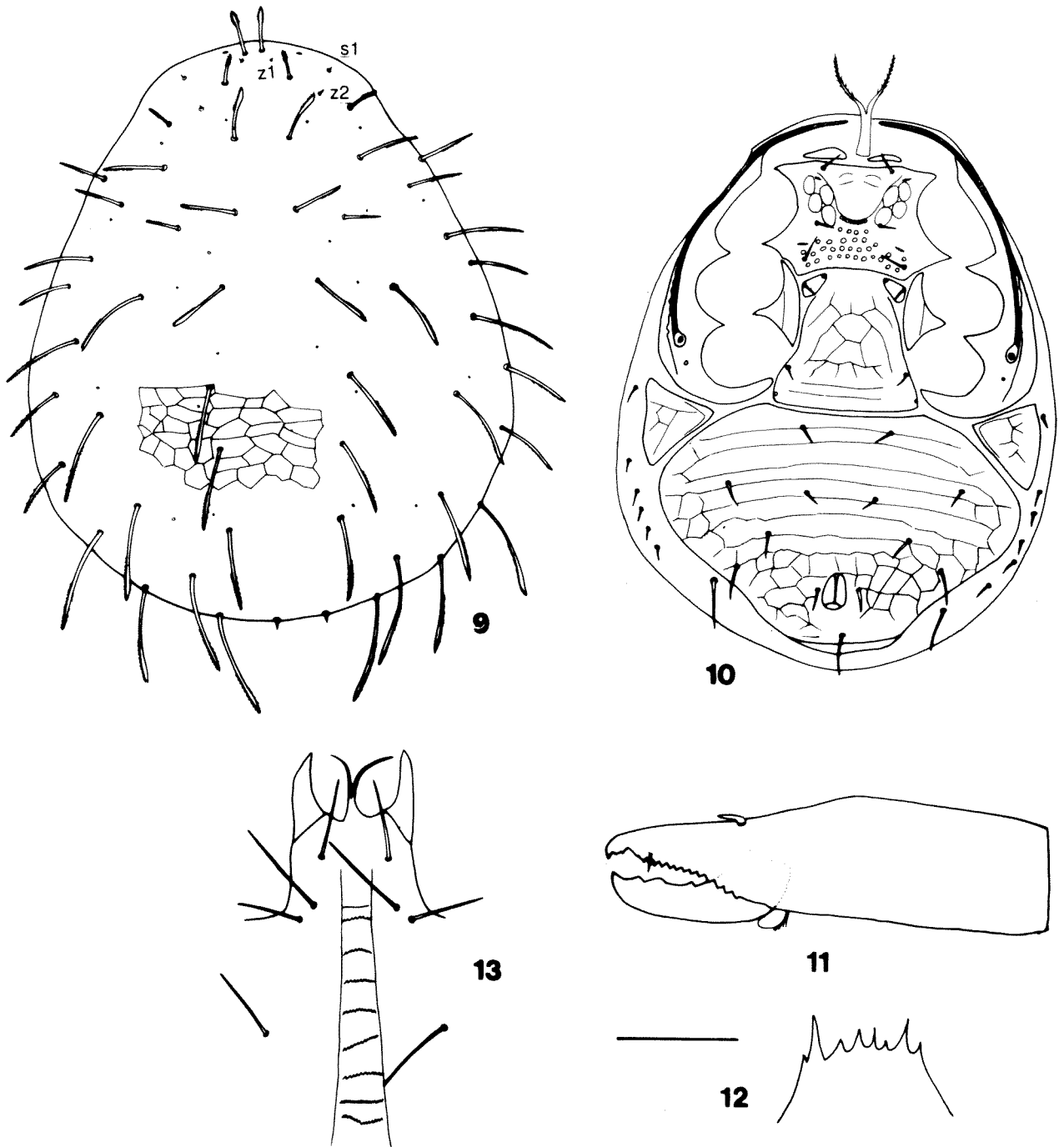
Dorsal shield with 29 pairs of setae, z1, z2, s1, J5 minute, pointed, others distally expanded and pilose; sternal shield with distinctive ornamentation consisting of a U-shaped anteromedian line, large antero-lateral ovals, and small circular posterior markings; fixed digit of chelicera with 12 triangular proximal teeth, 2 small distal teeth and terminal hook, movable digit with 3 teeth and terminal hook; epistome irregularly dentate, penultimate point on each side longest; inner setae on palp femur spatulate, strongly expanded distally, inner setae on palp genu also slightly spatulate.

#### Description

##### Female

*Dorsal shield* (Fig. 9). Length 449-479 µm, maximum width 344-386 µm, pear-shaped, widest behind coxae IV, edges smooth, ornamented with curved transverse lines anteriorly and polygons posteriorly. Shield carrying 29 pairs of setae, z1, z2, s1, J5 minute, smooth, pointed, all other setae distally expanded and pilose, increasing in length and thickness posteriorly.

*Ventral idiosoma* (Fig. 10). Base of tritosternum long, constricted, distally spiculate; laciniae with long, fine pilosity. Pre-sternal plates long, narrow, granular. Sternal shield with distinctive ornamentation consisting of a U-shaped anteromedian line, large antero-lateral ovals, and small circular posterior markings. Shield carrying 3 pairs of smooth pointed setae and 2 pairs of lyrifiform pores. Metasternal plates free in integument, often overlapping but not fused with, endopodal plates, oval, carrying an anterior pore and a smooth lateral seta. Endopodal plates well-developed, subtriangular, free in integument. Genital shield indistinct anteriorly, truncate posteriorly, with polygonal ornamentation; genital setae smooth and pointed; genital pores located at postero-lateral corners of shield. Ventri-anal shield large, anterior margin slightly invaginated behind genital shield, postero-lateral margins also slightly invaginated; ornamented with anterior and median transverse lines and lateral and posterior polygons. Shield carrying 5 pairs of pre-anal setae, para-anal setae and post-anal seta, post-anal seta considerably longer than para-anal setae; anus elongate oval; cribrum narrow. Metapodal plates large, triangular, with irregular polygonal ornamentation. Lateral unsclerotised integument



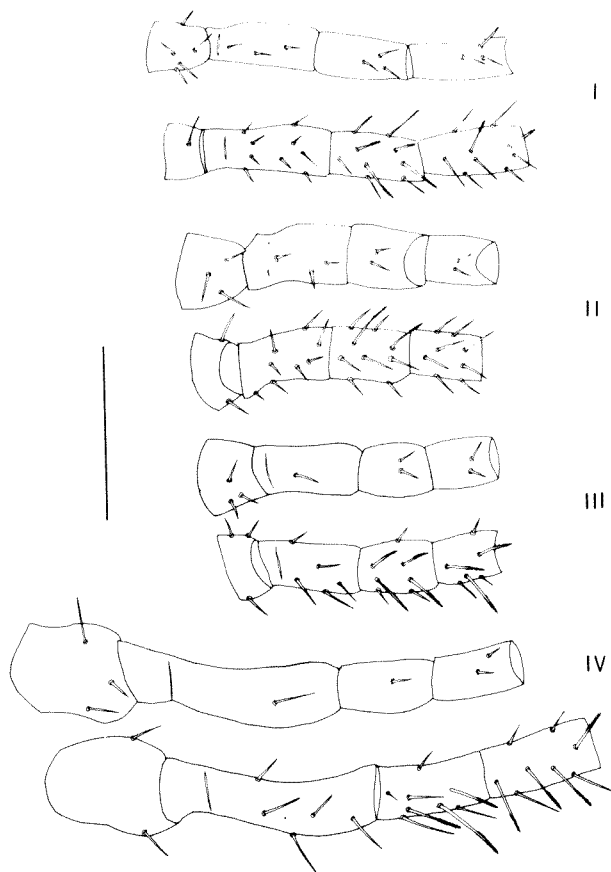
Figures 9–13 *Neolaspina rugosa* gen. nov., sp. nov. ♀: 9, dorsal shield; 10, ventral idiosoma; 11, chelicera; 12, epistome; 13, hypostome. Scale: 100  $\mu\text{m}$  (Figs 9, 10), 25  $\mu\text{m}$  (Figs 11, 12), 35  $\mu\text{m}$  (Fig. 13).

with 6 pairs of short pointed setae, and a pair of much longer setae at level of anus. Peritrematal shields expanded, fused to exopodal shields, peritremes narrow, beginning anterior to coxae I.

*Gnathosoma*. Fixed digit of chelicera with a row of 12 uniform triangular teeth proximal to the pilus dentilis, 2 small distal teeth and a terminal hook; dorsal seta simple, recumbent. Movable digit with 3 low, blunt triangular teeth and a terminal hook; arthrodistal brush with only a few short filaments and a membranous flap (Fig. 11). Epistome irregularly dentate, penultimate point on each side

longest (Fig. 12). Corniculi reaching to mid-level of palp femur, length of inner margin 13–18  $\mu\text{m}$ . Hypostomal groove with 8 rows of denticles and a smooth anterior groove, 8–15 short robust denticles per row (Fig. 13). Internal malae fine, very lightly pilose, slightly longer than corniculi. Palp chaetotaxy normal (2–5–6–14), *al* on palp femur spatulate, strongly expanded distally, *al1* and *al2* on palp genu also slightly spatulate.

*Legs*. Chaetotaxy: Leg I: coxa 0 0/1 0/1 0, trochanter 1 0/1 1/2 1, femur 2 3/1 2/2 2, genu 2 3/1 2/2 2, tibia 2 3/2 2/1 2. Leg II: coxa 0 0/1 0/1



**Figure 14** *Neolaspina rugosa* gen. nov., sp. nov. ♀: Chaetotaxy of left legs (coxae and tarsi omitted). For each leg the upper figure shows the ventral setae and the lower figure shows the dorsal and lateral setae. Posterior face upward. Scale: 100  $\mu$ m.

0, trochanter 1 0/1 0/2 1, femur 2 3/1 2/2 1, genu 1 3/1 2/1 2, tibia 2 2/1 2/1 2, tarsus 3 3/2 3/2 3 + *mv*, *md*. Leg III: coxa 0 0/1 0/1 0, trochanter 1 0/1 0/2 1, femur 1 2/1 1/0 1, genu 2 2/1 2/1 1, tibia 1 2/1 2/1 1, tarsus 3 3/2 3/2 3 + *mv*, *md*. Leg IV: coxa 0 0/1 0/0 0, trochanter 1 0/1 0/2 1, femur 1 2/1 1/0 1, genu 2 2/1 3/0 1, tibia 1 2/1 3/2 2, tarsus 3 3/2 3/2 3 + *mv*, *md*. Most dorsal and postero-lateral setae on genua and tibiae long and distally pilose, pilosity more strongly developed in larger specimens, other setae fine, smooth, pointed (Fig. 14). Legs I-IV all with a pre-tarsus consisting of a pair of claws, a rounded, membranous pulvillus, opercula not projecting beyond claws.

#### Male

Unknown.

#### Relationships

*Neolaspina* may be distinguished from all other genera of Parholaspididae by the fact that its sternal, metasternal, epigynial, endopodal, ventri-anal, peritrematal, and metapodal shields are all

separate.

The absence of fusion of the ventral shields in *Neolaspina* places it close to *Gamasholaspis* Evans and *Parholaspis* Berlese. In these 3 genera the peritrematal shield is not fused to the ventri-anal shield, and the metasternal shield is not fused to the sternal shield. They also share the absence of expulsory vesicles posterior to coxae IV, the smoothly rounded shape of the anterior margin of the dorsal shield, and opercula that do not project beyond the claws. *Neolaspina* differs from *Gamasholaspis* and *Parholaspis* by having 5 pairs of pre-anal setae on the ventri-anal shield.

*Neolaspina* has several character states that require an expansion of the family as defined by Krantz (1960) – most dorsal shield setae pilose, pilus dentilis distinct, arthro-dial brush of chelicera indistinct, incorporating a membranous flap.

Because the leg chaetotaxy of *N. rugosa* contains some features not usually found in the Eviphidoidea, it is illustrated in full (Fig. 14). Its distinctive combinations are: 3 ventral setae on femur I, 6 setae on trochanter I, 9 setae on genu III and genu IV, and 10 setae on tibia IV. Seta *ad1* on tibia III is often displaced somewhat anteriorly, almost to an antero-lateral position (2 1/1 2/1 1).

#### Discussion

The key of Krantz (1978) specifically mentions 8 setae on genu IV in the Parholaspididae, but *Neolaspina* has an additional proximal *pd* seta, much shorter than the other *pd* setae. This requires an expansion of the family to accommodate 8 or 9 setae on genu IV. The two new species described here will run easily to the Parholaspididae in identification keys.

The generic level instability in the family will remain unresolved until all 100 species are subjected to a formal phylogenetic analysis. The quality of the results will be improved if species and genera from all biogeographic regions are covered, including those described here.

#### ACKNOWLEDGEMENTS

I would like to thank Mark Harvey for recognising that mites are arachnids, Kathleen Strong and Andrew Calder for their constructive comments on the manuscript, and Glenn Hunt for bringing Tseng (1993) to my attention. This paper is dedicated to Dr. Barbara York Main, in recognition of her enduring contributions to Australian Arachnology.

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