EUPALOPSIS AND EUPALOPSELLID MITES
(ACARINA: STIGMAEIDAE, EUPALOPSELLIDAE)

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The species to be considered here are little known mites which have been placed in two closely allied families, the Stigmaeidae and the Eupalopellidae. *Eupalopsis Can.*, 1889, appears to belong to the family Stigmaeidae. *Eupalopellus* was separated from its namesake when Willmann (1952) proposed a new family, the Eupalopellidae, and based it on the monotypic genus *Eupalopellus* Sellnick, 1949.

One purpose of this study is to clarify as far as possible the status of the family Eupalopellidae and to add to it new genera and species. The study was undertaken also because it has a bearing on *Mediolata Can.*, an obscure stigmaeid genus already treated in part by the writer.

Berlese's opinion on the synonymy of *Mediolata* with *Eupalopsis* cannot be appraised because their genotypes are not available. His treatment of *M. longirostris* and *M. pini* as congers of *Eupalopsis maseiensi*, the type species, does not quiet the matter, especially since his schematic illustrations of several generic characters of *Eupalopsis* (A. M. S. it., fasc. 51, N.S., pl. 78) are difficult to reconcile with the characters of *E. pini* as re-described here. Nevertheless there is a need for a definition of *Eupalopsis* when the Eupalopellidae are set apart. It is possible now to accomplish only the latter by distinguishing between the species here called *Eupalopsis* and those which are to be described as eupalopellids.

Review of pertinent literature indicates that all of the species formerly included in *Mediolata* have now been accommodated elsewhere. Its type species, *Stigmaeus longirostris* Berl. and a companion species, *Mediolata pini* Can., were transferred to *Eupalopellus* by Berlese (Ordo Prostig., p. 59). Berlese also placed *M. arvensis* Can. in synonymy under *Eupalopsis maseiensi* C. & F. *Mediolata nali* (Ewing) = *M. novae- scotiae* Nesbitt and *M. terminalis* (Quayle) have been removed to other genera (Summers, 1960).

Eight species have been referred to *Eupalopsis* but only three seem to be valid. The gross features of its type species, *E. maseiensi*, are known from its original description by Canestrini and Fanzago (1876) and from illustrations made by Berlese. Less clearly described is *E. longirostris* (Berl.), which Canestrini designated as the type of *Mediolata*. Only a third species is available for this study. This one almost certainly has four names, the earliest of which is *E. pini* Can., 1889 (= *pini* Berl., 1893, = *reticulata* Berl., 1910 = *pinicola* Ouds., 1923 = *punctulata* Ouds., 1923). Oudemans thought that *pini* Can. and *pini* Berl. were distinct but homonyms and he therefore proposed *pinicola* for the latter and *punctulata* for yet another which Berlese (1910) mentioned but did not name. This complication in *pini* arises from the fact that differences in the appearance of the ornamentation on the skeletal plates—dimpling, coarse reticulation, fine punctuation, or simply no obvious pattern—was accepted as the basis for distinguishing between the species in question. Although the true genetic or functional significance of the cuticular dimpling or alveolation is ob-
Plate I

_Eupalopes pini._ Fig. 1, detail of right palptarsus and tibial claw separated; fig. 2, dorsal aspect of female, with reticular pattern on plates illustrated only on a small area of propodosoma; fig. 3, left tarsus I male; fig. 4, venter of female episthosoma; fig. 5, caudal end of male, dorsal view. (Millimeter scale applicable only to nearest figure on this plate and on others which follow).
scure, it is the experience of the writer that, in some of the raphignathoid mites, optical demonstration of a cuticular ornamentation on specimens mounted in various media can be a hit-or-miss proposition. The synonymy given below for *E. pini* rests upon the writer's belief that cuticular patterns encountered in various populations of the same species were evaluated differently by Canestrini, Berlese and Oudemans.

*Eupalopsis pini* (G. Can.)

(Figs. 1-5)


*Eupalopsis pini* R. Can., Berlese, A. M. S. it., fasc. 71, N. 10, pl. 81; Oudemans, 1923, Ent. Ber. 6(130): 149.

*Eupalopsis reticulata* Berl., 1910, Redia 6(2): 208; Oudemans, 1923, Ent. Ber. 6(130): 149.

*Eupalopsis pinicola* Ouds., 1923, Ent. Ber. 6(130): 149. NEW SYNONYMY.

*Eupalopsis punctulata* Ouds., 1923, Ent. Ber. 6(130): 149. NEW SYNONYMY.

**Female.**—Chelicerae protrude prominently, their slender basal segments appressed, partly fused together in mid-line; fixed digits drawn out as slender prongs ensheathing needle-like stylets; both fixed and movable digits (stylets) tend to converge anteriorly. Rostrum slender, conical to truncated tip, overall length approx. equals combined lengths of palp trochanter and femur. Palpus unusually long (116 μ total), diameters of its 5 segments gradually diminishing from trochanter to tarsus; when fully extended, tip of palpus projects almost to pretarsus of leg 1; tibial claw diminutive, with one minute seta near its base to resemble accessory claw of other stigmata. Palptarsus (fig. 1) well developed, not pendant or subordinate to tibial claw; prolongs main axis of palp; without trident sensillum. Setae (including seta-like sensilla) disposed on palp segments as follows: femur 2, genu 2, tibia 3, tarsus 6. Coxal regions of capitulum with only 1 pair long (32 μ), flagelliform setae on ventral aspect, situated well behind baseline of rostrum, their alveoli separated by distance equal to greatest width of rostrum at base. Idiosoma moderately vaulted dorsally, gently tapered to a broadly rounded posterior. Eyes, 1 pair with dioptic apparatus. Anus subterminal. Dorsal plates thinly sclerotized, coarsely reticulated, covering almost entire dorsum but not reflected downward at sides to invade pleural integument; one extensive plate on propodosoma; three on hysterosoma, viz., one covering metapodosoma, a similar one covering most of opisthosoma, one suranal plate forms a caudal endpiece (fig. 2). Humeral platelets not identifiable as discrete elements, those apparently integral with propodosomal plate. Twelve pairs of slender, finely denticulate dorsal setae arranged as follows: 4 pairs on propodosoma including humerals he, 3 pairs on metapodosomal plate, 3 pairs on opisthosomal plate, 2 pairs on suranal plate. Those of pro- and meta-podosoma (except verticals ae) with length range 36-43 μ, lateral pairs lm, li, on opisthosomal plate just noticeably longer (46-49 μ) than all others. Venter without obvious coxal flanges or other plates. Six pairs ventral podosomal setae arranged as follows: 1 pair very long (47 μ), exceptionally slender, between coxae II, their alveoli 36 μ apart; 1 similar pair between coxae III,
48μ apart; 1 pair shorter setae (27μ) on hinder part of metapodosoma, 27μ apart; a longitudinal row of 3 pairs on opisthosoma of which 2 pairs are paragenitals. Ano-genital covers with 4 pairs short setae (fig. 4). Counts of setae, including special sensilla, on podomeres of legs I-IV are: femora 4-4-2-1, genua 2-1-1-1, tibiae 6-6-6-5, tarsi 12-10-8-8. Eupathid dt well-developed on tibia I only. Empodium with at least 2 pairs capitate raylets. Measurements in microns: length idiosoma, vertical setae to posterior end, 308; greatest width, 216; leg I, cox troch. flexion to claw tips, 189; length precocular seta be, 41; intercalary seta ti, 50; dorsomedian seta o, 40.

MALE.—Closely resembles female in organization of gnathosoma, podosoma, legs. Idiosoma width/length ratio 177μ/280μ. Dorsal plates reticulated. Sex differences apparent on modified opisthosoma (fig. 5). Suranal plate invades venter to form a complete annular sclerite around opisthosoma; ano-genital aperture displaced to terminal position behind annulus. All dorsal setae except opisthosomal pair li approx. three-fourths as long as corresponding ones of female; pair ti equally long in both sexes but, in male, appears proportionately longer in relation to those nearby. Two pairs setae on anal part of ano-genital covers reduced, spine-like; one pair only on genital part of covers. Ventral opisthosoma with but 2 pairs setae which may correspond to paragenitals of female, both pairs on ventral face of annular sclerite; anterior pair 25μ long, 18μ apart; posterior pair 31μ long, 50μ apart. Tarsus I with 2 small solenidia situated dorsally, in tandem (fig. 3); tarsus II with 2 similar solenidia, both proximal, almost side by side; tarsi III-IV with one solenidion each, these equivalent in size to those of tarsi I-II but corresponding in location to diminutive solenidion of female tarsi III-IV.


The numerical measurements given above are applicable to one specimen of each sex. Only three specimens are available for this study, two females, one male. The male and one of the females have coarsely reticulated dorsal plates. The third specimen, a female, differs from the other female in two respects: its dorsal setae are about 25 per cent longer and it appears to have no reticulum when viewed with an ordinary microscope. Phase contrast microscopy, however, reveals a coarse, faint reticulum and clusters of alveoli which are arranged in polygonal patterns within each of the cells formed by the reticulum.

The specific descriptions which follow include measurements intended to be descriptive of relations between parts of one favorable study specimen and which do not necessarily express parameters for the species. Whenever possible, some of the measurements are given as means and standard deviations (M ± σ) calculated as for small samples.

*Eupalopsis acus* new species

(Fig. 6)

FEMALE.—A very delicately sclerotized form with 3 pairs marginal indentations which mark sulci between dorsal plates. Basal articles of chelicerae apparently adnate but with separating walls retained. Palpi not
Plate II

*Eupalopsis acus*. Fig. 6, dorsal view of female; fig. 7, ventral opisthosoma, *Eupalopsellus olandicus*, male; fig. 8, venter of opisthosoma, *Eupalopsellus truallis*, male.
uniquely slender or elongate; tibial claw well-developed; palptarsi not longer than palpifolia, carried as in usual claw-thumb arrangement. Setae on palp segments as follows: femur 2, genu 2, tibia 2, tarsus 6. Gnathosoma with but 1 pair ventral, flagelliform setae. Arrangement of dorsal plates diagnostic: propodosomal plate circumscribes area occupied by 3 pairs propodosomal setae, posterior margin submerged or invaded by striae; humeral plates isolated in usual position; metapodosoma almost completely covered by a single large plate; opisthosoma with 2 unpaired plates over tergum and a terminal end plate (euryonal). Dorsal setae: 12 pairs, all relatively fine, slender, faintly denticate; majority short, of uniform length (ca. 22μ); numerals be somewhat longer (34μ); intercalary pair li longest (40μ); posteriormost setae of opisthosoma noticeably longer, more robust than those on propodosoma. Ventral setae on podo soma very long, flagelliform; individuals of anterior pair not appreciably longer than distance apart (31μ); middle pair longer but not overreaching bases of first pair; third pair between coxae IV shortest (15μ) and closest together (27μ). No genital plate surrounding ano-genital covers. Counts of setae and sensilla on legs I-IV: femora 4-4-2-1, genua 3-1-1-1, tibiae 6-6-6-6, tarsi 12-10-7-7. One inflated solenidion on all tarsi; those on tarsi I-II stubby, each about 5 times as long as its greatest diameter; those on tarsi III-IV similar to each other, smaller than on forelegs. Distal eupathid dt well developed on all tibiae; proximal solenidion p nearly identical on all tibiae, each solenidion with truncated tip, length not greater than solenidion of tarsus I. Measurements in microns: length idiosoma, vertical setae to posterior extremity, 280; greatest width, 165; leg I, coxo-troch. artic. to claw tips, 134; length preocular seta be, 93; intercalary seta li, 38; dorsomedian e, 18.

MALE.—Not known.


OTHER SPECIMENS.—Female, Iran (intercepted at Washington, D. C.), Mar. 4, 1954 (H. Y. Gouldman), ex Prunus, budwood.

The peculiarities of the species are found in the pattern of the hysterosomal plates. The metapodosoma is covered by one large hexagonal plate having 3 pairs of setae. The opisthosomal armature comprises 2 tergal plates, an anterior rectangular plate with 2 pairs of setae and a posterior lenticular plate having but one pair of setae (li); this unit plate undoubtedly corresponds to a pair of intercalary plates commonly present in other Stigmaeidae (Summers, 1960).

It is suspected by the writer that this species is a very close relative of Eupalopsis longirostris Bcr., the type species of Mediolata G. Can.

BASIS FOR SEPARATING THE STIGMAEIDAE AND EUPALOPSELLIDAE

It is sufficient for present purposes to regard Eupalopse pini and E. acus as congeners. The essential problem is to distinguish these and other stigmoids from the eupalopseids.

Although Willmann (1952) proposed the Eupalopseidae as a new family, he did not particularize the basis for separating it from the Stigmaeidae. Separation can be achieved on the basis of three characters. (1) The Stigmaeidae, including the above species of Eupalopse, possess a
characteristic empodium. This consists of an erect rod-like axis on which arise directly or indirectly at intervals several pairs of empodial raylets, usually 3 pairs. Although the point requires further study, it often appears that the axial blade or rod branches into 3 unpaired secondary axes, all in the same plane, and these in turn bifurcate into right and left raylets. 3 pairs for each empodium. The Eupalopsellidae have at least 2 pairs of raylets which are sessile on a median knob of the tarsus; the erect axial rod is not present (c.f., fig. 11). (2) A terminal sensillum or trident is present on the palp-tarsus in most but not all of the Stigmaeidae. Grandjean (1946) typed this specialized structure as a multiple eupathid. It is well-developed in many stigmaeids (e.g., Stigmaeus, Ledermuelleria, Cheylostigmaeus), barely discernible as a trident in some (e.g., Zetzellia, Agiotomaus), supplanted by several independent eupathids (Apostigmaeus), or single and unbranched (Eupalopsis). The eupalopsellids have only a single unbranched sensillum on the apex of the palp-tarsus. (3) The Eupalopsellidae possess a pair of posterior dorsocentral setae pm on the propodosoma (fig. 10), the individuals of which tend to lie close together. Stigmaeids do not have this particular pair, although there may be uncertainty when pairs almost in this position are homologized between Macrostigmaeus and Apostigmaeus (Stigmaeidae) and one of the new genera described in the Eupalopsellidae (fig. 22).

Other tendencies which approach extreme condition in the Eupalopsellidae are: pronounced elongation of the mouthparts, complete adnation of the cheliceral bases, long palp-tarsi, and reduction or absence of the palp claw. The dorsal plate patterns are not diagnostic for the family.

**Eupalopsellidae Willmann, 1952**

Right and left basal articles of chelicerae completely coalesced to constitute a stylophore. No obvious peritrema on gnathosoma. Palps notably slender, attenuated. Tibial claw reduced or obsolete. Palptarsus at least as long as tibia, usually much longer, carried as a forward extension of the main axis rather than as a pendent lobe or “thumb”; its terminal sensillum a minute spike or pointed brush, not a trident. Fixed cheliceral digits attenuated, completely ensheathing long, sharply-tipped styloids. Dorsum with 13 pairs setae, including a posterior dorsomedian pair pm on propodosoma. Dorsal plates, when present, may be continuous over entire back or subdivided as a series of unpaired plates of which 3 cover hysterosoma; sclerotization appears to be continuous when setae are elaborated blades or spines with basal tubercles, subdivided or almost absent when setae are delicate, flexible. Venter of female without plates. Ventral podosomal setae exceptionally long, flagelliform. Empodium rudimentary, present as a rounded elevation of tarsus from which roots of tenent raylets take origin; usually 2 pairs raylets, much longer than claws, individuals of each pair unequally long, all tipped with concave adhesive pads.

The family is amended to include the two new genera and five new species described below.

*Eupalopsellus* Sellnick, 1949

Gnathosoma and associated appendages delicate, slender, elongate. Palptarsus approximately as long as tibia plus genu. Idiosoma incompletely
covered with 4 unpaired dorsal plates: propodosomal, metapodosomal, opisthosomal, suranal. Species for which males have been identified have distal seta of palp fémur modified as a short, peculiar, brush-like blade, and lateral suranal seta is absent.

**Type Species:** *Eupalopsellus olandicus* Sellnick.


**Female.** Gnathosoma with appendages slender, total length from idiosomal union to palp tips close to 0.7 as long as idiosoma, vertical setae to anus. Chelicerae with fine, straight, fixed and movable digits set close together at proximal ends, convergent at tips; length of needles (79 μ) exceeds length of fused basal pieces (67 μ). Rostrum as long as fixed digits, basal half conical, distal half with parallel margins to notched tip. Palpus gradually tapered from trochanter to pointed tarsus, total length 0.75 as long as corresponding parts leg I; ratio lengths genu/femur = 0.7. Palptibia with a very short seta-like structure at position normally occupied by claw, this one-sixth as long as seta next adjacent. Palptarsus 32 μ to end of terminal sensillum, slightly longer than combined lengths of genu and tibia (45 μ). Sensilla and setae on palp segments: femur 3, genu 1, tibia 3, tarsus 7. Ventral setae of gnathosoma long, flagelliform, anterior pair at least 32 μ long, 9 μ apart, on rostral cone; posterior pair at least 43 μ long, 14 μ apart, on basis capitulum. Idiosoma an elongate oval; flattened, mounted specimens without emphatic humeral constriction, anus terminal, visible from above. Dorsum partly covered by 4 median plates—propodosomal, metapodosomal, opisthosomal, suranal—as illustrated (fig. 10). Each humeral seta is originates on its own separate humeral platelet. Metapodosomal, opisthosomal plates roughly quadrilateral, each wider than long. Major plates with small punctations. Dorsal setae normal, pointed, finely denticulate; 11 of 13 pairs subequal, intercalaries li longer, verticals as shorter than others. Ventral setae of podosoma whip-like; anterior pair at least 75 μ long, 34 μ apart, between coxae I; middle pair at least 76 μ long, 68 μ apart, between front margins of coxae III; posterior pair at least 41 μ long, 50 μ apart, between coxae IV. Legs subequal; inclusive counts of setae and sensilla on individual podomeres: femora 4-4-2-1, genua 2-1-0-0, tibiae 6-5-5-5, tarsi 11-9-7-6. Seta dt a long eupathid on tibia I only; this seta absent on tibiae II-IV. Solexion p of tibiae I-II unusually tiny (5-6 μ long), corresponding sensilla on tibiae III-IV further reduced to minute pegs. Spine k on genu I set close to base, almost directly behind dorsal seta. Sample measurements in microns (M±s,n=9): length idiosoma, vertical setae to end suranal plate, 276±18; greatest width, 205±19; leg I, coxotroch. flexion to claw tips, 189±5; length preocular seta he, 34±3; intercalary seta li, 55±3; dorsomedian c, 36±3.

**Male.** Anatomical features of body plates, their surface architecture, mouthparts, chaetotaxy essentially as in opposite sex. Sex differences revealed in slightly reduced dimensions, conical opisthosoma, genitalia, unique sensilla. Opisthosoma a truncated cone, with lateral suranal setae is absent or with uncertain identity on venter. Genital plate covers posterior half of opisthosoma, laterally continuous with suranal plate above to form an annulus; anterior pair genital setae near anterior margin of genital
Plate III

_Eupalopsellus olandicus_. Fig. 9, left palpus of male _olandicus_ (right) and _tridis_ (left); fig. 10, dorsum of female _olandicus_; fig. 11, left tarsus I, male of _tridis_; fig. 12, left tarsus I, male of _olandicus_.

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plate, corresponding in size, location with anterior genitalic of female; other associated setae shortened, closely grouped (fig. 7). Intrument organ a slender tube extending backwards from neck of a drop-shaped vesicle, retracted tip sheathed in a chamber of complex pattern. Male solenidion w appears on tarsi I-IV in proximal position (fig. 12); very small solenidion w and larger w close beside each other on tarsus II. Distal seta of palp femur present as a stubby, brush-like rod (fig. 9, right).


The diagnostic features of *E. ollandicus* are: dimensions, shapes and punctate alveolations of dorsal plates, and the setal modifications on the tibiae. Eupathid dt is well developed on tibia I but is not represented on tibiae II-IV. The proximal solenidion p of tibiae I-IV is abnormally reduced to a minute peg. Supplemental characters include the presence of a seta-like structure instead of a claw on the palptibia, the occurrence of separate humeral platelets, and the peculiar modification of the anterior dorsal seta on the palp femur of the male.

These specimens from western United States appear to be identical with *E. ollandioon* as described by Sollnick (1949) from material collected beneath stones near the coast of Sweden, and with the male described by Willmann (1952) from lichen-covered pine bark. All of the American examples so far examined were taken from *Artemisia* spp. or the mulch thereunder. In one instance the eupalopsellids were found in a population sample of the false spider mite, *Brevipalpus asculus* P. and B.

**Eupalopsellus rostridius** new species

(Figs. 13, 16)

**Female.**—Length gnathosoma, base to palp tarsal sensillum inclusive, approximately 0.7 as long as idiosoma, vertical setae to anus. Rostral width at base of conical section less than one-fourth its total length, margins parallel for most of length. Palp close to 0.85 as long as corresponding parts leg I; ratio length genu/femur = 0.9; tibial claw present but vestigial, less than 0.1 as long as adjacent seta; palp setae otherwise distributed as in *ollandicus*. Ventral gnathosomal setae: anterior pair at least 31μ long, 7μ apart; posterior pair at least 41μ long, 14μ apart, on basis capitulum. Dorsal plates arranged as illustrated (fig. 16), without apparent alveolations; humeral platelets not evident. Dorsal setae fine, very faintly denticulate; preoculars be (23μ) shorter than postoculars ce (31μ). Ventral podosomal setae originate on small tubercles; front pair at least 90μ long, 27μ apart; middle pair at least 81μ long, 41μ apart; posterior pair at least 23μ long, 29μ apart, between coxae IV. Setae and sensilla legs I-IV; femora 4-4-2-1, genua 2-1-1-1, tibiae 6-5-5-5, tarsi 11-10-7-6. Solenidion p on tibia I comparatively long (18μ), progressively diminishing on successive legs to 9μ on tibia IV. Measurements in microns (1 specimen): length idiosoma,
Plate IV

*Eupalopsellus trudis* and *E. rostridius*. Fig. 13, venter of female opisthosoma, *rostridius*; fig. 14, dorsal view, female of *trudis*; fig. 15, venter of opisthosoma, female of *trudis*; fig. 16, dorsal aspect, female of *rostridius*. 
263; greatest width, 167; leg I, 160; preocular seta be, 23; intercalary seta li, 47; dorsomedian c, 25.

**MALE.**—Not known.


This new species is very closely related to *ölandicus*. There are a number of quantitative differences between the two species, but some of these may not assuredly aid in defining the new species because measurements for the single specimen do not establish accurate parameters for a population. Several clear-cut distinctions between *rostridius* and *ölandicus* are found in the chaetotaxy of certain podomers. Setae on the genua are 2-1-1-1 in the former, 2-1-0-0 in the latter. Solenidion *p* on tibia I of *rostridius* is well developed and approximately as long as the dorsolateral seta next in front; the corresponding sensillum of *ölandicus* is uncommonly short and stubby. Additional differences occur in the length and spacing of the ventral podosomal setae; preocular seta *be* is shorter than postocular *ce* on *rostridius*, approximately equal in *ölandicus*. The length ratios of palp segments genu/femur are 0.9 (*rostridius*) and 0.7 (*ölandicus*). The peculiarly narrow basal part of the fused chelicerae, as illustrated, may not be characteristic. This grotesque condition is perhaps due to collapse.

_Eupalopsellus trudis_ new species

(Figs. 8, 11, 14, 15)

**FEMALE.**—Slender-bodied, spindle-shaped species with legs in widely separated groups. Legs short in relation to body, approximately equal to greatest body width. Possesses essential features and chaetotaxy of _ölandicus_ but with certain quantitative differences. Palpus 106μ long, approximately 0.6 as long as corresponding segments of leg I; length palp-tarsus 36μ, equal to palp tibia plus genu; seta in claw position on palptibia comparatively long (7μ), equals one-third length adjacent dorsal seta. Ventral setae on gnathosoma: anterior pair 20μ long, 8μ apart, on rostrum; posterior pair 29μ long, 22μ apart, on basis capitulum. Propodosomal plate invaded by striae laterally, such that postocular setae *ce* appear to occur on isolated platelets, one side or both. Humeral platelets absent or represented only by diversications of striae around bases of setae *he*. Dorsal metapodosomal plate barely wider than long; opisthosomal plate almost rectangular, slightly longer than wide. All plates without apparent surface ornamentation. Dorsal setae short, slender, so faintly denticate as to appear almost smooth; setae on propodosoma essentially alike; dorsomedians *a, b, c*, on hysterosoma equal to each other but clearly shorter than dorsolaterals, intercalary seta *li*, median suranal *e* longer than other dorsals, both more than twice as long as dorsomedian *c* on opisthosoma. Ventral setae on podosoma flagelliform, so delicate that accurate measurement very difficult, each arises from a minute tubercle; anterior pair at least 97μ long, 32μ apart, between coxae I; middle pair 95μ long, 52μ apart, anterior to front margins of coxae III; posterior pair 13μ long, 32μ apart, between coxae IV. Special sensilla on appendages not describably different from those of the type species; podomerdes with numbers of setae differing from _ölandicus_ are: femur III—3, genu III—1, tibia IV—1, tarsus II—10.
Sample measurements in microns (M only, n = 3): length idiosoma, verticals to posterior end, 340; greatest width, 168; leg I, 169; preocular setae be, 19; intercalary li, 40; dorsomedian c, 14.

**Males.**—Description of female also applicable to male except opisthosoma and certain sensilla of appendages. Metapodosoma perceptibly constricted at union with conical opisthosoma. Suranal plate enwraps posterior, continuous with expanded genital plate below (fig. 8). Ano-genital covers displaced to terminal position, associated setae shortened, closely grouped. Lateral suranal setae le absent, or with uncertain identity on venter. Male solenidion w in proximal position on all tarsi; distal solenidion w—homo

logue of slender w of female—inflated on male tarsi I-II, identical in size, conformation with w; these sensilla stubby, acorn-like, each not longer than twice its diameter (fig. 11). Upper distal seta on palp-femur transformed into a blunt, brush-like peg (fig. 9, left).


The distinguishing features of *E. trudis* are: slender, elongate body shape, elongate dorsal plate on opisthosoma, alternation of short dorsomedian setae with longer dorsolaterals, and acorn-like inflated sensilla on the tarsi of males.

*Exothorhis* new genus

Dorsal idiosoma entirely covered by a thin skeletal sheath not clearly subdivided into discrete plates. Dorsal body setae and dorsals of proximal leg segments stout, coarsely denticulate, subequal, all originate on tubercles. Numeral setae he displaced upward from pleural position to appear as supers in dorsolateral series. Tibial claw of palp reduced or obsolete.

**Type Species:** *Exothorhis caudata* new species.

*Exothorhis caudata* new species

(Figs. 17-20)

**Female.**—Smallest representative of its family. Cheliceral basal piece alternate, about twice as long as separation of digits as greatest width near base; movable digits very long, 45µ proximal flexure to needle tips, slender, converging at tips, sheathed to ends by fixed digits. Rostrum similarly produced, conical to basal third, distal two thirds cylindrical. Ventral gnathosomal setae long, flagelliform; anterior pair 27µ long, 13µ apart, on conical base of rostrum; posterior pair 43µ long, 16µ apart, on maxillapods. Palpi well proportioned, 90µ overall length, or close to one-half length leg I coxa to pretarsus. Tibial claw present but small. Palptarsus slightly less than one-third total palp length. Setae and sensilla on palp segments: femur 3, genu 1, tibia 2, tarsus 7. Idiosoma a blunt spine
Exothorhis caudata, female. Fig. 17, lateral view of opisthosoma to illustrate blunt, down-curved papilla; fig. 18, venter of opisthosoma with ano-genital covers; fig. 19, postocular setae ce of two individuals from one collection; fig. 20, dorsal view of body.
shape, dorsum totally covered with a thin, non-textured skeletal sheath, individual plates not discernible. Dorsal setae very prominent, stout, almost straight, coarsely denticulate; all tapered to pointed tips or (many specimens) of uniform diameter to bluntly rounded ends (fig. 19); vertical setae ac often shorter than pair next adjacent; dorsomedians b, c on opisthosaoma slightly longer than all others; lateral suranals le much shorter, less robust than median suranals e. All heavy setae on tubercles. Humeral platelets and setae bc not surely identifiable—possibly first lateral hysterosomals (supers) represent displaced humeral setae; individual setae of anterior three pairs dorsomedians arise so close together that their tubercles are contiguous; pressure of coverglass on dorsal setae tends to fold cuticula into false sutures. Ano-genital covers subterminal, pendant beneath a papilla-like extension of opisthosaoma; papilla forms a blunt, downwardly curved tailpiece—hence caudata (figs. 17, 20). Anterior pair ventral setae at least 75μ long, 36μ apart on propodosoma; middle pair traced to at least 68μ long, 48μ apart; third pair between coxae IV at least 24μ long, 80μ apart. Anterior pair setae on ano-genital covers much longer, second pair much shorter than posterior 2 pairs nearest anus (fig. 18). Leg I longest, each succeeding leg shorter, leg IV approximately three-fourths as long as leg I. Dorsal setae on femora, genua, tibiae are smaller replicas of dorsal body setae. Distribution of setae and sensilla on leg podomers: femora 4-4-3-1, genua 2-1-1-0, tibiae 6-5-5-5, tarsi 10-9-7-6. Distal sensillum of tibia I (corresponding to eupathid dt of other species) reduced to a minute spine no larger than spine k of genu I, this sensillum absent on tibiae II-IV. Spine k of genu I so close to base of stout dorsal seta that their tubercles are confluent. Proximal solenidion of tarsus III not present on tarsus IV. Sample measurements in microns ($\bar{M}$±s, n=10): length idiosoma, insertion vertical setae to cauda, 261 ± 18; width, 174 ± 18; leg I, exostroch. flexion to claw tips, 190 ± 12; precoccal seta bc, 51 ± 4; intercalary seta li, 54 ± 4; dorsomedian seta c, 60 ± 7.

Male.—Not known.


The identifying characters of E. caudata are: small size, down-curved papilla on the posterior tip of the opisthosaoma, structure of dorsal setae, the minute sensillum on the upper, distal part of tibia I, and absence of this sensillum on corresponding podomer of the other legs.
Plate VI

*Exothorhis armata.* Fig. 21, dorsal view of female with legs folded and right palp omitted.
Exothorhis armata new species

(Fig. 21)

Female.—A comparatively large, armored species. Cheliceral stylets 118 \(\mu\) long, equal to length of slender rostrum. Palptibia with 2 acicular setae, no vestige of claw. Dorsal skeleton an almost continuous sheath or cuirass, with imperfect transverse folds which may or may not represent true sulci; its surface minutely punctate or alveolate. Humeral platelets integral with general skeleton; humeral setae he possibly represented by first pair lateral hysterosomals. Eyes: 2 pairs; anterior pair normal, posterior pair large, prominent. Dorsal setae unique, heavy clubs, cylindrical near bases, flattening near tips to spatula shape; coarsely denticulate; each with prominent tubercle; all subequal except verticale, suranals. Dorsal setae on femora, genua, tibiae similarly fashioned. Middle pair ventral podosomal setae at least 90 \(\mu\) long, their alveoli peculiarly close together (8 \(\mu\)). Tibia I possesses only 5 bristles (solenidion p, 2 spatulate setae, 2 acicular setae); distal solenidion dt absent. Measurements in microns: idiosoma, vertical setae to anus, 375; greatest width, 200; preocular seta be, 79; intercalary seta li, 71; dorsomedian seta c, 80.

Male. Not known.

Holotype.—Female, Australia, intercepted at Hawaii, Aug. 6, 1954 (L. M. Chilson), ex cuttings of Macadamia sp., Lot 54-10280. In the collection of the United States National Museum.

The species is readily identified by its heavy, spatulate setae, complete investment of dorsum by skeleton, absence of a claw on palptibia, and absence of solenidion dt on tibia I.

Saniosulus new genus

Idiosoma elongate, fusiform; no dorsal plate armature except for a pair of small, ill-defined plates between the eyes and a narrow suranal plate over tip of opisthosoma.

Type Species: Saniosulus nudus new species.

There is a resemblance between the genera Saniosulus (Eupalopsellidae) and Apostigmaeus Grandjean (Stigmaeidae). Both genera contain long-bodied forms having only small areas of the idiosoma covered with identifiable plates, nondescript dorsal setae, similar positioning of legs, and some points of close similarity in leg chaetotaxy. In the present state of taxonomic organization of the Superfamily Raphignathoidea, the two genera fall into separate families.

Saniosulus nudus new species

(Fig. 22)

Female.—Gnathosoma short, less than one-third length idiosoma, its appendages not attenuate. Palp femur twice as long as genu; genu and tibia short segments with length slightly greater than their diameters; tibia with stout, curved claw plus one minute spine-like seta close beside its longer dorsal seta; palptarsus moderately developed, its overall length barely exceeds tibia plus claw. Setae on palp segments: femur 2, genu 1, tibia 3, tarsus 7. Anterior pair ventral gnathosomal setae 11 \(\mu\) apart, on rostrum; posterior pair 33 \(\mu\) apart on maxillicoxae. Idiosoma pyriform,
eugonate, slightly constricted in mid-section, with coxal groups widely separated; demarcation between propodosoma, hysterosoma indicated by transverse striae across mid section of idiosoma, considerably behind propodosomal setae. Two pairs' eyes. Dorsum without definable plates except for one pair of small, non-striated, comma-shaped areas on propodosoma between first 2 pairs setae, and one small suranal plate. Setae of dorsum finely denticulate; 10 pairs very short, subequal; 3 pairs on posterior opisthosoma longer than others; posterior dorsomedians pm on propodosoma widely spaced, each seta displaced laterally to postocular position; postocular setae ce in marginal position; humeral setae ke displaced backwards and in line with lateral hysterosomals. Venter without plate structures except ano-genital covers; genital, anal setae normal for family. Ventral setae of podosoma very long, flagelliform; anterior pair at least 80μ long, 41μ apart; middle pair at least 72μ long, 95μ apart; posterior pair at least 45μ long, 60μ apart. Inclusive counts of setae and sensilla on podomero of legs I-IV: femora 4-4-2-2, genua 2-1-1-1, tibiae 6-5-5-5, tarsi 11-9-7-6. Solenidion w on tarsi I-II inflated, tapered from base to tip, its length equal to diameter of tarsus; this sensillum reduced to a tiny peg on tarsus III, absent on IV. Solenidion p on tibiae I-IV diminutive, bullet-shaped, slightly longer than its own diameter. Measurements in microns (1 specimen): idiosoma, vertical setae to anus, 378; greatest width, 230; leg I, 155; preocular setae bc, 14; intercalary seta ti, 27; dorsomedian seta c, 15.

Male.—Not known.

Holotype.—Female, Mexico, intercepted at Brownsville, Texas, Sept. 22, 1952 (Anon.), ex orchid plants, lot 52-10695. In the collection of the United States National Museum. Paratype ♀, Valverde, Texas, Oct. 6, 1953 (H. A. Dean), ex orange leaf with diaspid scale, USNM.

The spot characters are: elongation of idiosoma; absence of extensive dorsal plates, extremely short dorsal setae, and wide spacing of dorsomedian setae pm on propodosoma. The occurrence of a substantial palp claw and the diminutive solenidion p on tibia I are helpful combination characters.

Two pairs of dorsal setae on S. nudus intrude a question of homology. The posterior dorsomedians pm of other eupalopsellids are not similarly located in S. nudus. But since the species otherwise conforms with the characters of the family, it is supposed that its setae of the pair pm are displaced laterally to the usual postocular position and that the homologues of the true postoculars ce are located in a more marginal position than usual. The humerals ke in this case seem to be placed near the mid-section of the body, in series with the dorsolaterals of the hysterosoma. The identification of these setae as humerals ke indicated in fig. 22, is supported by the fact that the transverse striae converge behind the setae of this pair. The transverse girdle of striae is taken to be the demarcation between propodosoma and hysterosoma.

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LITERATURE CITED


