Pacific Insects 9 (3): 447-479 20 August 1967

ARADIDAE IN THE BISHOP MUSEUM, HONOLULU (Hemiptera-Heteroptera)[1]

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Abstract: I studied Aradidae from the collections of Bishop Museum in Honolulu. The following subfamilies are treated: Prosympiestinae, Chinamyersinae, Aradinae and Calisiinae. Included are descriptions of 1 new genus and 1 new species from New Hebrides (Chinamyersinae); 1 new species of *Aradus* F. from Viet Nam (Aradinae), and 22 new species of *Calisius* Stål from Australia, New Guinea, and various islands in the South Pacific. Keys are given to genera of Chinamyersinae, and Australian and South Pacific species of *Calisius* Stål.

Due to the large number of new species involved, only the following subfamilies of Aradidae are represented here: Prosympiestinae, Chinamyersinae, and Calisiinae. Other subfamilies of aradids will be treated separately. The present treatment represents material from Australia, New Guinea, Solomon Islands, New Hebrides, New Caledonia, Fiji, Samoa, Tahiti, Rapa Island, Philippines and Viet Nam, and includes one new genus, 24 new species, and 7 new records.

New records of prosympiestines and aradines in New Guinea were to be expected as they both occur in Queensland, but more significant is the discovery of a new chinamyersine genus from New Hebrides which subfamily until now has only been known from New Zealand and Australia.

The Calisiinae are here represented by numerous species from Australia, New Guinea, and various South Pacific islands all but one of which belong to the circumtropical genus *Calisius* Stål, 1860. We may then assume that this genus is distributed across the Pacific from New Guinea, Australia and New Zealand through Micronesia to Rapa Island. The absence of this genus in the Oriental Region, Hawaii and Galapagos is an enigma. One species of *Calisius* was recently described by Blöte from East Java (*spinulosus*, 1965) but no other records occur in Indonesia, Indo-China, India, and the Philippines, though *Calisius* is found in the Seychelles, all through tropical Africa, and tropical and subtropical America.

Most of the specimens of *Calisius* represented here were collected by J. L. Gressitt and E. C. Zimmerman, both of Bishop Museum and both excellent collectors, which they have proved once more by this extraordinary collection of this rare genus. As a result, we may come to certain conclusions.

1. Each group of islands in the South Pacific has its particular species, sometimes as

1. Partial results of fieldwork supported by grants to Bishop Museum from the National Science Foundation (G-2127, 4774, & 10734).

many as three or four on the same island group.

2. Though they may be closely related to species from other island groups, with rare exceptions, they represent different species. On the other hand, species on the same island group are often very diverse systematically.

3. Many species of *Calisius* from the South Pacific show secondary modifications in various stages of intensity. In general, species from far off islands show more intensive modifications. The most common is a reduction in number and size of granulation, particularly on the pronotum and scutellum, which in extreme cases, has disappeared almost completely in some species from Samoa and Tahiti (*Calisius discrepens* new species from Samoa, and *C. brachypterus* new species from Tahiti).

Another modification, observed also on some species from Micronesia, is the expanding, and flattening of the genae, with corresponding reduction of the clypeus, and flattening of the ventral side of the head in front of the rostral base (*C. magdalenae* Kormilev from Fiji, and *C. homalanthi* n. sp. from Rapa Island). An extreme case of this modification is found in the African genus *Paracalisiopsis* Kormilev, 1963).

Still another modification is the abbreviation of the scutellum, with corresponding abbreviation of hemelytra. This was first observed in *Calisius intervenius* Bergroth, 1894, and is now found in *C. brachypterus* n. sp. The former from South Australia, and the latter from Tahiti. The third species with this modification was recently found in Northern Queensland, *Calisius breviscutatus* Kormilev (in press). In *Calisius* the scutellum generally reaches to hind border of tergum VI (♂), or to the middle of tergum VI (♀). In these species it reaches only to the middle or hind border, sometimes only to fore border, of tergum V. Hemelytra are generally seen as frequently granulate, carina along basal half of exterior border of scutellum reaching to the middle, or hind border of connexivum IV. In *C. intervenius* it reaches only to the middle of connexivum III, and in other two species to the middle or hind border of connexivum II. As *C. brachypterus* was represented by a single adult specimen I did not dissect it to see the degree of reduction in the membrane. Flattening of the pronotum and the base of the scutellum as observed in *C. brachypterus* indicates a reduction, or even possibly atrophy of the muscles moving the wings and possible absence of hind wings.

All characters indicated so far represent reduction, or loss of characters present in more normal species, but in *Calisius pilosulus* new species, there is an acquisition of a new character which is absent in other species. Scutellum in this species is covered with distinct, short, semierect, dispersed bristles.

All species of *Calisius* treated here show a constant character in the position of the spiracles. Spiracles II–VI are always ventral, placed far from the border, and progressively nearing to the border from II–VI; VII are always lateral and visible from above, placed on a tip of a granule; VIII, in the male, are terminal, sometimes not visible from above, if paratergites are abbreviated; in the female, they are placed at the tip of one of a double granule, and are visible from above. The position of the spiracles is omitted from the descriptions.

All measurements indicated in descriptions were taken with a micromillimeter eyepiece, 25 units=1 millimeter. First figure in ratios is the length, and the second the width of measured part. To avoid long denominations, some abbreviations were used in keys and descriptions. 1, Anterior process of the head is called "anterior process." 2, Antennal

segment is called "ant. segm." 3, Fore disc of pronotum is called "fore disc", and the hind disc of pronotum "hind disc." 4, Basal triangular elevation of scutellum is called "basal elevation." 5, Visible exterior border of corium is called "corium." 6, Length of abdomen was taken from the line connecting the fore borders of connexiva I to the tip of hypopygium (♂), or segment IX (♀). 7, Width of connexivum is best shown by a ratio between length and width of connexivum IV, what is indicated in descriptions as: connexivum IV-length: width.

Acknowledgments: Thanks are extended to Dr Robert L. Usinger of the University of California, Berkeley, and Dr Peter D. Ashlock of the B. P. Bishop Museum, Honolulu, Hawaii, through whose courtesy unidentified specimens of Aradidae from the Bishop Museum collection were loaned to me. I am also indebted to Dr Ashlock for sending me a photo and some drawings of the type of *Calisius pacificus* Kirkaldy, 1908, and to Dr J. G. Pendergrast of the University of Auckland, New Zealand, for sending me a paratype of his new species *Calisius zealandicus* Pendergrast, and for permission to include this in a key in this present paper.

Subfamily PROSYMPIESTINAE

Genus **Prosympiestus** Bergroth, 1894

Prosympiestus is an Australian genus, and has 4 species. One of them is now recorded from New Guinea.

Prosympiestus constrictus Usinger and Matsuda, 1959, Class. Aradidae, p. 64, fig. 23a.

NE NEW GUINEA: 1♂, 1♀, 6 km W of Wau, Nami Creek, 1700 m, 10.VI.1962, J. Sedlacek.

Subfamily CHINAMYERSINAE

This subfamily involves 4 genera: 2 macropterous, *Chinamyersia* Usinger, 1943, from New Zealand and *Gnostocoris*, new genus from New Hebrides; and 2 apterous, *Tretocoris* Usinger & Matsuda, 1959, from New Zealand and *Kumaressa* Monteith, 1966, from Australia.

Key to genera of Chinamyersinae

1. Macropterous; with some dorsal spiracles.....2
   Apterous; no dorsal spiracles 3
2. Clypeus without crest; spiracles III to V dorsal (New Zealand).....
   ..... **Chinamyersia** Usinger, 1943
   Clypeus with a high crest; spiracles V and VI dorsal (New Hebrides) ..... **Gnostocoris***
3. Mesonotum produced backward as a broad plate, rounded posteriorly; tarsi tri-segmented (New Zealand)..... **Tretocoris** Usinger & Matsuda, 1959
   Mesonotum produced backward in an acute angle; tarsi bi-segmented (Australia)
   .....**Kumaressa** Monteith, 1966

Genus **Gnostocoris** Kormilev, new genus

Type-species: *Gnostocoris gressitti* n. sp.

Elongate ovate; head, pronotum, scutellum, connexivum, and venter, covered with ag-

glomeration of small rounded scales.

Head much longer than width across eyes. Clypeus constricted laterally, forming a high, long, and narrow crest produced apically far beyond tip of ant. segm II. Genae small, short, and barely produced beyond base of ant. segm I. Antenniferous tubercles dentiform, acute, divaricating, reaching over base of ant. segm I. Eye globose, slightly stalked. Postocular borders strongly converging backward, unarmed, except for a small granule placed in middle of border. Vertex depressed and smooth, with 2 erect spicules placed medially one after another. Antenna thin and 2× as long as head; segment I robust, subcylindrical, rounded at base, and truncate apically; II subglobose; III cylindrical, slightly widening toward tip; IV fusiform, with a brush of white hairs on apical 1/2. II 1/2 as long as I, III more than 4× as long as I, IV slightly longer than I. Rostrum arising well behind apex of clypeus from an open atrium, and reaching over fore border of pronotum. Bucculae short, flanking a subtriangular rostral segment I, and not reaching to tip of II; the latter constricted at base, and slightly longer than I; III cylindrical, 2.5× as long as I; IV tapering toward tip, 2× as I. Rostral groove very shallow and narrow, marked only by scales.

Pronotum trapezoidal, 1/2 as long as its maximum width, separated into 2 lobes by a wide and deep depression; fore lobe much narrower than hind lobe, and placed slightly lower. Collar thin, deeply sinuate in front, provided with 4 (2+2) higher, and a few smaller granules. Slightly convex lateral borders diverging backward, and start right from collar, running to lateral notch; in middle with a high, and thin tooth. Lateral notch deep and rounded. Fore disc with 2 (1+1) parallel, granulate, longitudinal ridges, extending from collar to interlobal depression. Between ridges with a median depression. Hind lobe higher and much wider than fore lobe, sloping forward and backward. Lateral borders of hind lobe convex, provided with 6 (3+3) strong, long teeth. Posterior angles rounded, and slightly produced on each side of scutellum. Hind border straight. Hind disc with 4 (2+2) granules placed behind ridges of fore lobe, and with 2 (1+1) more, placed more laterad.

Scutellum pentagonal, longer than wide at base; its basal portion higher than apical, and 1/2 as long; depressed from above, and provided laterally with 6 (3+3) large granules; apical portion much lower, triangular, with flat disc, and high, robust borders.

Hemelytra reaching to fore border of tergum VIII (♀). Corium expanded laterally in basal 1/2 as an irregular trapezium with a short tooth on its hind border, produced far beyond connexivum II. Posterior portion of corium much narrower, leaving connexivum in open; its posterior (postero-interior) border granulate, sinuate in middle, and convex in front and behind sinus. Apical angle of corium rounded, reaching to fore border of connexivum IV; veins of corium either granulate, or covered with scales. Membrane large, opaque, and incrustate; veins forming a few irregular, closed cells, and free branches.

Abdomen (♀) almost rectangular, longer than maximum width across segment V. Lateral

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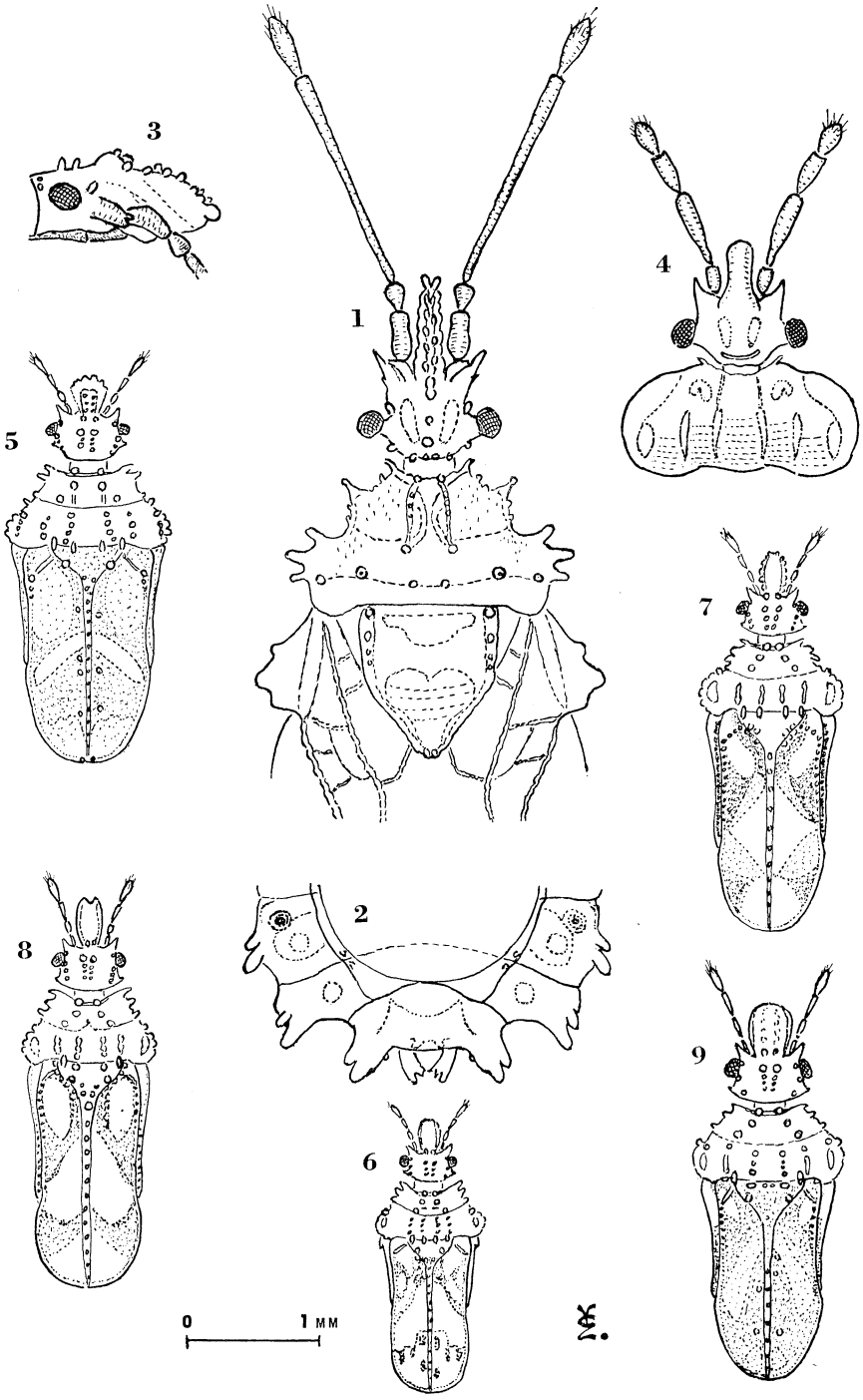
Figs. 1-9. 1, *Gnostocoris gressitti*, n. sp., (♂), head, pronotum, scutellum, and base of hemelytra; 2, same, tip of abdomen from above; 3, same, head in profile; 4, *Aradus vietnamensis*, n. sp. (♂), head and pronotum; 5, *Calisius fuscus*, n. sp., (♀), head, pronotum, scutellum and corium; 6, *C. ornatus*, n. sp. (♂), head, pronotum, scutellum and corium; 7, *C. ashlocki*, n. sp. (♂), head, pronotum, scutellum and corium; 8, *C. nasutus*, n. sp. (♂), head, pronotum, scutellum and corium; 9, *C. montanus*, n. sp. (♀) head, pronotum, scutellum and corium.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borders from connexivum II - VI slightly convex, at VII sinuate, between VII and VIII cut out much deeper. Posterior border of tergum VIII deeply notched, hanging over segment IX, which is placed at a lower level. Connexivum gradually widening from II - VII; connexivum II very small, triangular, placed behind lateral expansion of hemelytra; other connexiva rectangular. Connexivum III with 2 large, vertical, blunt tubercles, placed laterally on hind 1/2 of exterior border, and with 2 others, placed in middle of front and hind borders; a round callous spot placed near interior border. Connexivum IV with similar tubercles, only the round, callous spot larger. Connexivum V at exterior border with 2 small, and behind them 2 large tubercles, the latter almost horizontal, obliquely inclined posteriorly; mesad of smaller tubercles with a large, round tubercle bearing a large spiracle. Connexivum VI similar to V, also with a dorsal spiracle. Connexivum VII without tubercles, only PE-VII with a double, blunt, horizontal tooth, directed obliquely backward. Spiracle II lateral, III and IV ventrolateral, V and VI dorsal, VII and VIII ventral, placed near border. Tergum VIII large, convex in front, with 2 (1+1) large, long, diverging lobes (paratergites), terminated with a double, blunt tooth. Segment IX placed at much lower level, and slightly notched apically. Venter moderately convex; sterna III-VI each with an elongate ovate depression medially, and laterad of it with 4 (2+2) rows of large, rounded, callous spots: 2 on each segment in outer rows, and 1 in inner rows. (The single specimen of *Gnostocoris* is glued on a cardboard and cannot be taken off without danger of damaging it, so I could not examine the metathoracic scent gland openings).

Legs unarmed; trochanters completely fused with femora; latter subcylindrical, slightly widening toward tip. Tibiae also cylindrical; tarsi with 1st segment very small, 2nd much larger. Claws with distinct areolia.

Gnostocoris gressitti Kormilev, new species Figs. 1-3.

♀. *Head* much longer than width across eyes (35 : 25). Clypeus in shape of a crest, with a double row of blunt granules; 2 (1+1) spicules placed just in front of eyes, and 2 (1+1), smaller ones in middle of posterolateral borders. Relative lengths of ant. segm. I-IV are: 10 : 5 : 43 : 12. Relative lengths of rostral segments I-IV are: 4 : 6 : 10.5 : 8. *Pronotum* shorter than width across fore lobe (26 : 33), or hind lobe (26 : 52); actual width of fore lobe narrower than width across teeth (46 : 52). Scutellum longer than width at base (28 : 25). Basolateral borders roughly granulate, posterolateral with semiobliterated granulation. Abdomen longer than its maximum width across segment V (73 : 69).

Color grayish brown; antenna, exterior borders of connexiva IV-VII paler, pale ochraceous. Femora with pale subapical rings; tibiae with pale subapical and subbasal rings.

Total length: 6.52 mm; width of pronotum: 2.08 mm; width of abdomen 2.36 mm.

Holotype ♀ (BISHOP 7432) NEW HEBRIDES, Espiritu Santo I. (SW) Above Namatasopa, 600 m 31.VIII.1957, J. L. Gressitt.

It is a pleasure to dedicate this extraordinary species to its collector, Dr J. L. Gressitt, of Bishop Museum, who collected so many new species published in this paper.

Subfamily ARADINAE

Genus **Aradus** Fabricius, 1803

Aradus australis Erichson, 1842, Archiv Naturg. **8**: 281.

This is the commonest Australian species of the genus *Aradus* F. It belongs to the "lugubris group", all species of which are very good flyers, and could be expected in New Guinea.

NE NEW GUINEA: 4♂♂, 7♀♀, Wau, Morobe Distr., 1200 m, 10-19.V.1962, 11.I., 4-5.II, & 9.IV.1963, J. Sedlacek.

Aradus vietnamensis Kormilev, new species Fig. 4.

♂. Broadly ovate; black, ant. segm. III white.

Head shorter than width across eyes (23 : 25). Anterior process with sides parallel, reaching 1/4 of ant. segm. II. Antenniferous tubercles acute, parallel, not toothed laterally, reaching a little over middle of ant. segm. I. Preocular and postocular tubercles absent. Eyes globose, very protruding, almost stalked. Vertex 2× (1+1) depressed mediad of eyes, and with a white, curved streak posteriorly. Antenna moderately robust, 1.5× as long as head (34.5 : 23); ant. segm. III cylindrical; relative length of segments I-IV are: 5 : 15 : 8 : 6.5. Rostrum reaching to fore coxae. *Pronotum* less than 1/2 as long as its maximum width (20 : 43.5). Collar narrowed laterally, more robust in middle. Anterior angles produced as small teeth; lateral borders evenly rounded from anterior to posterior angles, and very finely serrate. Posterior angles slightly, and roundly produced laterad of scutellum. Disc with 4 (2+2) parallel carinae, and laterad of them with 2 (1+1) short ridges. Transverse interlobal sulcus narrow and moderately deep. Disc strongly depressed in front of short, lateral ridges, and transversely rugose behind interlobal sulcus. *Scutellum* triangular; lateral borders slightly convex, and reflexed; apex narrowly rounded, reflexed; disc moderately raised on basal 1/3; transversely rugose on apical 2/3. *Hemelytra* not reaching tip of abdomen, leaving hind border of genital lobes in open. Corium slightly reaching over base of connexivum V. *Abdomen* longer than maximum width (measured on ventral side) (63 : 47); genital lobes contiguous, their posterior borders slightly convex. PE-angles of connexiva slightly produced from II-V; PE-VI produced backward as triangular, apically rounded lobes.

Color: black; ant. segm. III, and tip of PE-angles of connexiva II-V white.

Total length: 4.8 mm; width of pronotum 1.74 mm; width of abdomen 1.88 mm.

Holotype ♂ (BISHOP 7433), VIET NAM: Dalat, 1500 m, 29.IV-5.V.1960, S. Quate.

Aradus vietnamensis n. sp. also belongs to "lugubris group", and may be separated from other Oriental species by its relatively wide robust body, rounded lateral borders of pronotum, and color.

Subfamily CALISIINAE

Calisiinae are represented here by 2 genera: *Aradacanthia* Costa, 1864, and *Calisius* Stål, 1860. The former is distributed in the Oriental Region, and the latter across the Pacific, and in Australia.

Genus **Aradacanthia** Costa, 1864.

This genus has a single species, *Aradacanthia multicalcarata* Costa, 1864, which is the most advanced of all Calisiinae.

Aradacanthia multicalcarata Costa, 1864, Ann. Mus. Zool. Nap. **2**: 142.

PHILIPPINES: 1♂, Mindanao, Agusan, Esperanza, 4-11.XI.1959, C. M. Yoshimoto; 1♀, Mindanao, Zamboanga de Sur, Lemesahan, 600 m, 8.IX.1958, H. E. Milliron.

Genus **Calisius** Stål, 1860.

A. Species from Australia and Tasmania.

Until now only 7 species were recorded from Australia and Tasmania. I am able to add two more, which are included in the following key.

REVISED KEY TO AUSTRALIAN SPECIES OF CALISIUS

1. Anterior process of head narrowly trapezoidal, tapering toward base; its lateral borders straight 2
   Anterior process obovate, its lateral borders convex 3
2. Lateral borders of anterior process smooth, without granulation; process reaching to middle of ant. segm. III; the latter longer than II (3.5 : 3); pale testaceous ..... **grossi** Kormilev, 1966
   Lateral borders of anterior process distinctly granulate; process almost reaching to tip of ant. segm. III; latter as long as II (3 : 3); grayish brown ..... **fuscus***
3. Larger species, over 4.0 mm; ant. segm. III whitish, other segments brown, or dark brown; segment III distinctly longer than II (5.5 : 4) ..... **annulicornis** Bergroth, 1913
   Smaller species, less than 3.5 mm; ant. segm. III concolorous with I and II, and as long as or only slightly longer than II 4
4. Scutellum short, leaving tergum VI exposed in both sexes..... **intervenius** Bergroth, 1894
   Scutellum longer, always covering tergum VI 5
5. Scutellar carina with small, but sharp, erect granules 6
   Scutellar carina with rounded, and somewhat blurred granules 7
6. Lateral borders of scutellum with a row of erect granules on frontal 1/2; scutellum testaceous, with a white band in shape of 2 (1+1) divergent hooks ..... **australis** Kormilev, 1959
   Lateral borders of scutellum without erect granules; scutellum pale yellow, lateral borders of basal elevation infuscate, frontal 1/2, and apex, of disc mottled with brown, leaving in the middle a wide, inverted "V", pale yellow..... **ornatus***
7. Antenna slender, and shorter, at most as long as width of head across eyes; white band of scutellum yellowish, and less conspicuous..... 8
   Antenna robust, longer than width of head across eyes; white band of scutellum clear white, very conspicuous..... **tasmanicus** Kormilev, 1963
8. Side strips of white band narrower; its tip placed at 1/4 of scutellum's length..... **septimus** Kormilev, 1966
   Side strips of white band wider; its tip placed more posteriorad, at 1/3 of scutellum's length ..... **hackeri** Kormilev, 1959

Calisius hackeri Kormilev, 1959, Proc. U. S. Nat. Mus. **109** (No. 3413): 219, figs. 13-14.

AUSTRALIA: 1♂, N. Queensland, Kuranda, 200 m, 13.III.1956, J. L. Gressitt.

Calisius fuscus Kormilev, new species Fig. 5.

♀. *Head* as long as width across eyes (16 : 16). Anterior process trapezoidal, with lateral borders straight, granulate, and converging backward; tip granulate, and slightly incised in middle, reaching almost to tip of ant. segm. III; antenniferous tubercles slightly divaricating. Eyes reniform, protruding. Infraocular carinae with 2 spaced granules; postocular tubercles minute, by far not reaching to outer border of eyes. Vertex with 8 (4+4) granules in 2 subparallel rows. Antenna shorter than width of head across eyes (13.5 : 16); relative length of segments I–IV, 2.5 : 3 : 3 : 5; I cylindrical; II ovate, III tapering toward base, IV fusiform. Rostrum not reaching hind border of head by length of its apical segment. *Pronotum* less than 1/2 as long as its maximum width (14 : 31). Collar with 2 (1+1) erect, round granules in apical front row, and 2 (1+1), placed more laterad, in back posterior row. Lateral borders of fore disc with 2 strong spicules, and sometimes, with 1 small granule behind them on each border. Hind disc with 4 (2+2) rows of round tubercles; lateral borders each with a double row of round, or subspiculoid tubercles. *Scutellum* much longer than maximum width (42 : 23); basal elevation with 4 (2+2) spicules, and between them with 2 (1+1) round granules, along basal border; 2 (1+1) large granules placed near middle of lateral borders. Carina with a double row of smaller granules on first 1/4 of its length, then with a single row of more spaced granules. From basal elevation toward lateral borders with 2 (1+1) oblique carinae, but lateral borders without granulation. *Corium* without granulation. *Abdomen* longer than maximum width (48 : 43). Connexivum wide; connexivum IV shorter than its maximum width (7 : 8). Lateral borders with a double rows of granules, as large as those of pronotum. *Paratergites in this, and in all other described species* (♀), *are bicuspidate, formed by 2 large granules, one of them bearing spiracle; segment IX almost always is tricuspidate and in the following descriptions mention will only be made when it is not tricuspidate.*

Color: grayish brown, partly a little darker, or paler; scutellum with 2 (1+1) oblique, convergent anteriorly, narrow, white strips, not reaching to lateral borders; femora infuscate; venter, tibiae, and tarsi, pale grayish brown; venter with whitish incrustation.

Total length: 3.52 mm; width of pronotum: 1.24 mm; width of abdomen: 1.72 mm.

Holotype ♀ (AUSTRALIAN MUS.), Australia, N. Queensland, Kuranda, 200 m, 14.III.1956, J. L. Gressitt (type deposited in Australian Museum in exchange for new type from New Caledonia being deposited in Bishop Museum).

Calisius fuscus n. sp. at first sight is suggestive of *C. annulicornis* Bergroth, 1913, but is smaller, and may be easily separated from the latter as is indicated in the key.

Calisius ornatus Kormilev, new species Fig. 6.

♂. *Head* as long as width across eyes (12.5 : 12.5). anterior process obovate, and finely granulate; its lateral borders convex, tip rounded, reaching to tip of ant. seg. III. Antenniferous tubercles declivous, and slightly divaricating. Eyes semiglobose, protruding. Infraocular carinae formed by 3 erect tubercles; postocular tubercles tiny, almost reaching to outer border of eyes. Vertex with 8 (4+4)granules. Antenna almost as long as width of head across eyes (12.25 : 12.5); relative length of segments I to IV, 2 : 2.5 : 2.75 : 5; I cylindrical, II ovate, III more slender and tapering toward base, IV fusiform. Rostrum reaching to hind border of rostral groove, which is closed posteriorly. *Pronotum* almost 1/2 as long as its maximum width (11 : 20.5), and declivous forward; collar with 2 (1+1) erect granules; fore disc with 2 (1+1) granules in front row, and 2 (1+1) in hind row,

the latter placed more laterad; lateral borders with 6 (3+3) spicules. Hind disc with 4 rows of smaller granules; lateral borders with a double row of smaller granules, some of which may be obliterated. *Scutellum* almost 2× as long as its maximum width (28 : 14.5). Basal elevation with 4 (2+2) spicules along base, and 2 (1+1) round, smaller granules between them. Two (1+1) large granules in middle of lateral borders, and 2 (1+1) smaller at base of carina. Carina with a row of sharp, densely placed granules. Lateral borders without granulation. *Corium* without granulation. *Abdomen* longer than maximum width (28 : 24); connexivum wide, connexivum IV slightly longer than its width (4.5 : 4). Lateral borders with a double row of granules, slightly smaller than those on hind disc of pronotum.

Color: pale yellow with whitish incrustation; ant. segm. IV, basal elevation of scutellum, some indefinite spots on basal 1/2 and apex of scutellum, middle of connexiva II to VI, femora, and hypopygium, partially testaceous to fuscous. Middle of scutellum with a large inverted "V" whitish spot.

Total length: 2.28 mm; width of pronotum: 0.82 mm; width of abdomen 0.96 mm.

Holotype ♂ (AUSTRALIAN MUS.), AUSTRALIA, N. Queensland, Kuranda, 200 m, 13.III. 1956, J. L. Gressitt (type deposited in Australian Museum in exchange for a new type from New Caledonia to be deposited in Bishop Museum).

Calisius ornatus is related to *C. australis* Kormilev, 1959, and may be separated as is indicated in the key.

Calisius species from Micronesia were keyed out by Usinger & Matsuda in "Insects of Micronesia, Heteroptera: Aradidae" (1957: 125). To my knowledge no other species of *Calisius* were described from that area since then. The key is not out of date. All species of *Calisius* treated in this paper, with the exception of the Australian species which have been keyed out separately, belong to the South Pacific. South Pacific species represent a well defined area, and need a separate key.

KEY TO SOUTH PACIFIC SPECIES OF CALISIUS

1. Scutellar carina without, or with a semiobliterated granulation..... 2
   Scutellar carina distinctly granulate, though granules sometimes may be minute, and placed only on apical 1/2 9
2 (1). Disc of scutellum with 6 (3+3) large, whitish spots..... 3
   Disc of scutellum with a different pattern of white spots 4
3 (2). Anterior process of head reaching tip of ant. segm. III; ant. segm. II and III equal in length (4 : 4); middle pair of white spots elongate (New Guinea), ... **picturatus** Horvath, 1913
   Anterior process reaching only to middle of ant. segm. III; ant. segm. II slightly shorter than III (3.5 : 4); middle pair of white spots ovate (New Guinea) ..... **papuanus** Horvath, 1913
4 (2). Pronotum scabrous, with exception of lateral borders, disc without large granules, or carinae; visible portion of corium reaching only to middle of connexivum II; scutellum abbreviated, leaving tergum VI exposed (Tahiti)..**brachypterus***
   Pronotum always with large granules, or at least with carinae formed by fusion of granules; tergum VI covered by scutellum 5
5 (4). Anterior process distinctly incised in front; basal elevation of scutellum

strongly declivous forward; scutellar carina robust and high, at the base raised over basal elevation, then declivous and tapering backward (Samoa) ..... **discrepans***

Fore border of anterior process entire, rounded; sometimes appearing incised because of granulation, but real border entire 6

6 (5). Clypeus much shorter than genae, which are expanded around it, and flat 7

Anterior process obovate, genae not expanded; tip sometimes appearing incised because of granulation 8

7 (6). Collar and fore disc of pronotum without large granules, only with 2 (1+1) carinae divergent backward, formed by fused granules; scutellum flattened; basal elevation with 4 (2+2) small granules along basal border; carina without granulation (Rapa I.) ..... **homalanthi***

Collar and fore disc of pronotum with rough, round granules; scutellum not flattened; basal elevation with 4 (2+2) spicules and 2 (1+1) round granules along basal border; carina with semiobliterated granulation (Fiji) .... **magdalenae** Kormilev, 1966

8 (6). Larger species, over 3.0 mm; scutellum with 4 pale spots: 2 (1+1) oblique, basolateral; 1 large, subtriangular in middle, and 1 smaller subtriangular, at tip (New Guinea) ..... **ashlocki***

Smaller species, 2.5 mm, or less; scutellum with 2 (1+1) basolateral white streaks, and 2 (1+1) narrow, converging anteriorly, white streaks in middle (Samoa) ..... **parvus***

9 (1). Carina and disc of scutellum with distinct, short, semierect, white dispersed bristles (Samoa) ..... **pilosulus***

Carina and disc of scutellum never with bristles 10

10 (9). Ant. segm. III as long as IV; anterior process of head with subparallel borders (New Guinea) ..... **antennalis** Horvath, 1913

Ant. segm. III always shorter than IV; anterior process with borders convex, or straight, and converging backwards 11

11 (10). Disc of scutellum with 2 (1+1) large, ovate, basolateral, white spots, and with a large, subrhomboid, piceous spot, with concave sides, on apical 1/2 of disc (New Guinea) ..... **cognatus** Horvath, 1913

Disc of scutellum with a different pattern of white and dark spots 12

12 (11). Anterior process with 4 (2+2) protruding granules anteriorly; fore disc of pronotum with 4 (2+2) distinct granules in hind row (Solomon Is.) .... **quadridentatus***

Anterior process different; fore disc of pronotum with only 2 (1+1), or without granules in hind row 13

13 (12). Fore disc of pronotum without granules in hind row 14

Fore disc of pronotum with 2 (1+1) granules in hind row 15

14 (13). Disc of scutellum mostly white; a transverse dark band on apical 1/2; tip of scutellum white; sometimes 2 (1+1) thin, dark streaks extending from basal elevation obliquely backwards and diverging (Fiji) ..... **pallidus***

Disc of scutellum with 2 (1+1) basolateral, subovate white spots; in middle with a wide, inverted "V" band; tip of disc dark 16

15 (13). Exterior borders of connexiva II-V in lower row with a large round granule,

and in front of it with 2 small, sometimes obliterated granules (Fiji)..... ..... **zimmermani***

Exterior borders of connexiva II-V with 3 erect granules of almost the same size (Samoa)..... **varius***

16 (14). Scutellum with a large, dark T-shaped spot at apex (New Guinea) .... **notabilis** Kormilev, 1966

Scutellum with a different pattern of spots..... 17

17 (16). Anterior process distinctly incised in front (New Guinea)..... **nasutus***

Anterior process rounded anteriorly, granulate or not..... 18

18 (17). Body uniformly testaceous; scutellum pale testaceous; without dark or white spots (New Guinea) ..... **testaceus***

Body never uniformly testaceous; scutellum always with dark or pale spots ... 19

19 (18). Carina of scutellum with an obliterated granulation on basal 1/2; with a dense, minute granulation on apical 1/2 (best seen in side view) (Solomon Is.) ..... **liliputianus***

Carina of scutellum with distinct granulation on entire length..... 20

20 (19). Lateral borders of scutellum without granulation, or with obliterated, indistinct granulation (Solomon Is.) ..... **sordidus***

Lateral borders of scutellum with a distinct granulation (though it may be minute) 21

21 (20). Basal elevation of scutellum with 8 (4+4) small granules along anterior border...22

Basal elevation at most with 4 (2+2) spicules, and 2 (1+1) granules along basal border 23

22 (21). Anterior process reaching slightly over tip of ant. segm. II (Norfolk I.) .... **leai** Kormilev, 1966

Anterior process reaching to tip of ant. segm. III (New Caledonia) ..... **pusillus***

23 (21). Basal elevation with 2 (1+1) spicules, and 2 (1+1) granules between them (New Guinea) ..... **montanus***

Basal elevation with 4 (2+2) spicules, and 2 (1+1) granules between them along basal border 24

24 (23). Scutellum with 4 large, white spots: 2 (1+1) basolateral, ovate; 1 subtriangular, in middle, and 1 apical; anterior process trapezoidal, with lateral borders straight, converging backward and roughly granulate (New Guinea) ... **minutus***

Scutellum with different pattern of white spots..... 25

25 (24). Scutellum with 2 (1+1) basolateral, white spots in shape of a boomerang, and with a large, pentagonal spot in middle, angularly produced in front, and straight, transverse posteriorly (New Guinea)..... **distinctus***

Scutellum in middle with an inverted "V" white band, or with 2 (1+1) white bars, converging forward 26

26 (25). Corium distinctly, though minutely granulate..... 27

Corium convex, scabrous, but without granulation 28

27 (26). Anterior process with rough, protruding granulation, reaching to base of ant. segm. III (New Caledonia) ..... **granuliger***

Anterior process granulate, but granulation less rough, reaching to apical 1/2 of ant. segm. III (New Zealand).....**zealandicus** Pendergrast (in press)

28 (26). Scutellar carina roughly granulate on entire length; lateral borders of scutellum

distinctly granulate on fore 1/2; apical 1/2 of ant. segm. IV dark fuscous (Fiji) ..... **pacificus** Kirkaldy, 1908

Basal portion of scutellar carina more finely granulate than the rest of it; lateral borders of scutellum with obliterated granulation, with exception of 2 or 3 minute granules at base; apical 1/2 of ant. segm. IV concolorous with basal 1/2, testaceous, or pale testaceous (Fiji) ..... **excelsus***

Distribution of *Calisius* species in the South Pacific.

No	NAME	NEW GUINEA	SOLOMON Is.	NEW CALEDONIA	NORFOLK I.	NEW ZEALAND	FIJI Is.	SAMOA Is.	TAHITI I.	RAPA I.
1.	*picturatus* Horvath, 1913	*	—	—	—	—	—	—	—	—
2.	*papuanus* Horvath, 1913	*	—	—	—	—	—	—	—	—
3.	*ashlocki* n. sp.	*	—	—	—	—	—	—	—	—
4.	*antennalis* Horvath, 1913	*	—	—	—	—	—	—	—	—
5.	*cognatus* Horvath, 1913	*	—	—	—	—	—	—	—	—
6.	*notabilis* Kormilev, 1966	*	—	—	—	—	—	—	—	—
7.	*nasutus* n. sp.	*	—	—	—	—	—	—	—	—
8.	*testaceus* n. sp.	*	—	—	—	—	—	—	—	—
9.	*montanus* n. sp.	*	—	—	—	—	—	—	—	—
10.	*minutus* n. sp.	*	—	—	—	—	—	—	—	—
11.	*distinctus* n. sp.	*	—	—	—	—	—	—	—	—
12.	*quadridentatus* n. sp.	—	*	—	—	—	—	—	—	—
13.	*liliputianus* n. sp.	—	*	—	—	—	—	—	—	—
14.	*sordidus* n. sp.	*	*	—	—	—	—	—	—	—
15.	*pusillus* n. sp.	—	—	*	—	—	—	—	—	—
16.	*granuliger* n. sp.	—	—	*	—	—	—	—	—	—
17.	*leai* Kormilev, 1966	—	—	—	*	—	—	—	—	—
18.	*zealandicus* Pendergrast (in press)	—	—	—	—	*	—	—	—	—
19.	*magdalenae* Kormilev, 1966	—	—	—	—	—	*	—	—	—
20.	*pallidus* n. sp.	—	—	—	—	—	*	—	—	—
21.	*zimmermani* n. sp.	—	—	—	—	—	*	—	—	—
22.	*pacificus* Kirkaldy, 1908	—	—	—	—	—	*	—	—	—
23.	*excelsus* n. sp.	—	—	—	—	—	*	—	—	—
24.	*discrepans* n. sp.	—	—	—	—	—	—	*	—	—
25.	*parvus* n. sp.	—	—	—	—	—	—	*	—	—
26.	*pilosulus* n. sp.	—	—	—	—	—	—	*	—	—
27.	*varius* n. sp.	—	—	—	—	—	—	*	—	—
28.	*brachypterus* n. sp.	—	—	—	—	—	—	—	*	—
29.	*homalanthi* n. sp.	—	—	—	—	—	—	—	—	*
	Total:	12	3	2	1	1	5	4	1	1

B. Species from New Guinea.

Seven more species of *Calisius* are here added to New Guinea from which only 5 records were heretofore known.

Calisius ashlocki Kormilev, new species Fig. 7.

♂. *Head* as long as width across eyes (♂-15 : 15, ♀-17 : 16). Anterior process obovate; lateral borders convex, and granulate; tip rounded, but because of rough granulation looks incised, reaching to middle of ant. segm. III. Antenniferous tubercles short, declivous, their outer borders subparallel. Eyes reniform, protruding, but not pedunculate. Infraocular carinae formed by 3 spaced granules. Postocular tubercles small, dentiform, not reaching to outer border of eyes. Vertex with "V" formed granulation. Antenna relatively robust, shorter than width of head across eyes (♂-12.75 : 15, ♀-14.5 : 16); relative length of segments I-IV, ♀-2.5 : 2.5 : 2.75 : 5, ♀-3 : 3 : 3 : 5.5; I cylindrical, II ovate, III subovate, tapering toward base, IV fusiform. Rostrum reaching to base of head. *Pronotum* 1/2 as long as its maximum width (♂-14 : 28.5, ♀-15 : 30). Collar with 2 (1+1) round granules. Fore disc with 2 (1+1) granules in fore row, and 2 (1+1), placed more laterad, in hind row. Lateral borders with 6 (3+3) spicules. Hind disc with 4 (2+2) carinae formed by tubercles fused together; humeri with a double carinae formed also by tubercles fused together; front of upper carina with a single granule. *Scutellum* 2× as long as its maximum width (♂-40 : 20, ♀-43 : 22). Basal elevation with 4 (2+2) depressed spicules; lateral borders each with a cluster of round granules. Carina with obliterated granulation. Lateral borders with a dense row of granules reaching to 1/4 of scutellar length, behind that carinate. *Corium* without granulation. *Abdomen* longer than its maximum width across segment IV (♂-40 : 32.5, ♀-49 : 37.5). Connexivum moderately wide; connexivum IV longer than wide (♂-6 : 5, ♀-7 : 5.5). Lateral borders with flattened granules in upper row, and mostly obliterated granules in lower row. Hypopygium small, caudal in position, with a small, subtriangular projection on upper side; segment IX of ♀ moderately long.

Color: grayish brown to testaceous; scutellum with 2 (1+1) basolateral, ovate, oblique, white spots, limited from behind and interiorly by black; in the middle a large, triangular yellow spot, crossed sometimes by a streak of white incrustation (in fresh specimens the whole spot is white). Behind yellow spot laterally are placed 2 (1+1) small, triangular dark spots; tip white. Disc, with exception of basal elevation, is densely and roughly punctured. Connexiva testaceous, with infuscate exterior borders and whitish, granulate posterior borders. Rostrum with black tip. Femora with black rings in middle. Venter reddish.

Total length: ♂-3.15, ♀-3.56 mm; width of pronotum: ♂-0.80, ♀-1.20 mm; width of abdomen: ♂-1.30, ♀-1.50 mm.

Holotype ♂ (BISHOP 7434), NW NEW GUINEA, Wisselmeren, Okaitadi, 1800 m, 8.VIII. 1955, J. L. Gressitt. Allotype ♀ (BISHOP), NW NEW GUINEA, Wisselmeren, Enarotadi, 1800 m, 6.VIII.1955, Gressitt. Paratypes: 1♂, 1♀, NW NEW GUINEA, Wisselmeren, Enarotadi, 2000 m, 2.VIII.1955, Gressitt; 1♀, Wisselmeren, Waghete, Tigi L., 1700 m, 17. VIII.1955, Gressitt. 1♀, collected with the holotype was without head and is not counted as a paratype.

It is a pleasure to dedicate this species to Dr P. D. Ashlock, through whose courtesy I have been able to study these specimens.

Calisius ashlocki n. sp. is related to *C. zimmermani* n. sp. from Fiji, but the carina of scutellum is without granulation, and the tip of scutellum is white.

Calisius antennalis Horvath, 1913, Ann. Mus. Nat. Hung. **11**: 629, fig. 6.

NW NEW GUINEA: 1♀, Ifar, Cyclops Mts, 500-600 m, in *Heliconia*, 23.VI.1962, J. L. Gressitt.

Calisius nasutus Kormilev, new species Fig. 8.

♂. Elongate ovate; anterior process of head very long and incised anteriorly.

Head longer than width across eyes (17 : 15). Anterior process long, depressed along lateral borders and in front; its lateral borders convex, granulate; tip incised in middle, reaching to tip of ant. segm. III. Antenniferous tubercles acute, declivous; their exterior border parallel. Eyes semiglobose, protruding. Infraocular carinae formed by 4 small tubercles. Postocular tubercles small, not reaching to outer border of eyes. Vertex with 6 (3+3) granules converging backward. Antenna shorter than width of head across eyes (13.5 : 15); relative length of segments I-IV, 2.5 : 3 : 3 : 5; I cylindrical, II ovate, III tapering toward base, IV fusiform. Rostrum not reaching hind border of head by 1/2× length of apical segment. *Pronotum* 1/2 as long as its maximum width (14 : 27). Collar with 2 (1+1) erect granules. Fore disc with a fine median sulcus, and with 2 (1+1) granules in front rows, and 2 (1+1) in hind row, the latter placed more laterad. Lateral borders each with 3 blunt spicules. Hind disc with 4 (2+2) ridges formed by granules fused together; lateral borders each with a round tubercle, and a semiobliterated ridge behind it. *Scutellum* 2× as long as its maximum width (41 : 20). Basal elevation with 4 (2+2) flattened spicules at base; 4 more (2+2) at lateral borders, and 4 at base of carina. Carina with a dense row of small tubercles, which become semifused on apical 1/2. Lateral borders with a row of semifused small granules on basal 1/4. *Corium* with a dense row of extremely minute granules. *Abdomen* longer than maximum width across segment IV (41 : 33). Connexivum moderately narrow; connexivum IV longer than wide (7 : 5). Exterior borders with a double row of tubercles; each segment with 1 large and 2 small tubercles. Hypopygium very small, placed caudad, and with 1 tubercle in middle of upper border.

Color: pale testaceous; 2 (1+1) curved streaks along basal elevation and base of carina, connected with 2 (1+1) triangular spots at middle of lateral borders of scutellum, 2 (1+1) triangular spots on apical 1/3 laterally, and anterior 2/3 of connexiva II-VI testaceous or dark testaceous. Two (1+1) basolateral spots: 1 large subtriangular in middle, and 1 small at tip of scutellum pale yellow to whitish (probably white in fresh specimens). Femora pale yellow with testaceous ring in middle.

Total length: 3.16 mm; width of pronotum: 1.08 mm; width of abdomen: 1.32 mm.

Holotype ♂ (BISHOP 7435), NE NEW GUINEA, Tsenga, 1200 m, Upper Jimmi Valley, 13.VII.1955, J. L. Gressitt.

Calisius nasutus n. sp. is related to *C. magdalenae* Kormilev, 1966, from Fiji, and may be separated as indicated in the key.

Calisius testaceus Kormilev, new species

♀. Elongate ovate, uniformly testaceous, partly pale testaceous.

Head slightly longer than width across eyes (13.5 : 12.5). Anterior process obovate, with lateral borders convex and granulate; tip rounded and granulate, reaching 1/3 of ant. segm. III. Antenniferous tubercles acute, with parallel exterior borders. Eyes semiglobose, protruding. Infraocular carinae formed by 3 granules. Postocular tubercles consist of 1 large, and 1 small granule, both not reaching outer border of eyes. Vertex with 6 (3+3) granules forming a "V." Antenna slender, shorter than width of head across eyes (11.5 : 12.5); relative length of segments I–IV, 2 : 2.5 : 3 : 4; I and II subcylindrical, III tapering toward base, IV fusiform. Rostrum almost reaching to hind border of head. *Pronotum* 1/2 as long as its maximum width (12 : 23). Collar with 2 (1+1) round granules. Fore disc with 2 (1+1) granules in front row, and 2 (1+1) in hind row, the latter placed more laterad; lateral borders each with 3 fine spicules. Hind disc with 4 (2+2) subparallel rows of 2, or 3 granules each. Humeri with a double row of a small granule and a semiobliterated carina. *Scutellum* 2× as long as its maximum width (32 : 16); basal elevation with 4 (2+2) flattened spicules along basal border, and between them with 2 (1+1) small, round granules. Lateral borders of basal elevation with 2 (1+1) round granules. Carina with widely spaced erect granules. Lateral borders without granulation. *Corium* without granulation. *Abdomen* longer than its maximum width across segment IV (37 : 26.5). Connexivum moderately wide; connexivum IV slightly longer than wide (5 : 4.5). Exterior borders of connexiva with a double row of smaller granules than those of pronotum; each connexivum with 1 large and 2 small granules in each row. Tergum VII with a large granule in middle of hind border; segment IX narrow and long.

Color: uniformly testaceous, partially paler.

Total length: 2.8 mm; width of pronotum: 0.92 mm; width of abdomen: 1.06 mm.

Holotype ♀ (BMNH), NEW GUINEA, Papua, Kokoda, 360 m, IX.1933, L. E. Cheesman.

Calisius testaceus n. sp. is related to *C. antennalis* Horvath, 1913, and differs by its obovate anterior process, different relatively length of antennal segments, and by color.

Calisius montanus Kormilev, new species Fig. 9.

♀. *Head* as long as width across eyes (18 : 18). Anterior process obovate, with lateral borders convex and finely granulate; tip rounded, reaching to basal 1/4 of ant. segm. III. Antenniferous tubercles acute, declivous, and slightly divaricating. Eyes semiglobose, protruding. Infraocular carinae consist of 2 widely spaced large granules, with 2 or 3 minute granules behind. Postocular tubercles minute, not reaching outer border of eyes. Vertex with 8 (4+4) granules. Antenna moderately robust, shorter than width of head across eyes (15.5 : 18); relative length of segments I–IV, 2.5 : 3.5 : 4.5 : 5; I cylindrical, II and III tapering toward base, IV fusiform. Rostrum almost reaching hind border of head. *Pronotum* 1/2 as long as its maximum width (14 : 30). Collar with 2 (1+1) round granules. Fore disc with 2 (1+1) round granules in front row, and 2 (1+1) in hind row, placed more laterad; lateral borders each with 2 contiguous, small granules, and 1 placed more backward. Hind disc with 4 (2+2) rows of small, round granules, 3 to 4 in each row; some granules sometimes fused together, forming a ridge. Lateral borders with a double row consisting of small granule, with a ridge formed by fused granules behind. *Scutellum* 2× as long as its maximum width (39 : 20). Basal elevation with 2 (1+1) flattened spicules along basal border, and between them with 2 (1+1) flattened granules; lateral borders of basal elevation with 2 (1+1) flattened granules in middle. Carina with moderately large,

widely spaced granules, which on basal 1/3 are fused together forming a thin carina. Lateral borders with a row of small, round granules on basal 1/3. *Corium* with a semi-obliterated row of very fine and dense granulation. *Abdomen* longer than maximum width across segment IV (47 : 35). Connexivum wide; connexivum IV slightly longer than wide (7 : 6.5). Outer borders of connexiva with a double row of granules; each connexivum with 1 large, flattened and 2 small granules in each row. Tergum VII with a row of small granules at fore border, and 3 small granules in middle of hind border. Segment IX long, tricuspidate.

Color: testaceous to dark testaceous; scutellum with 2 (1+1) basolateral, small, white spots, and 2 (1+1) pale testaceous near tip; in middle with pale testaceous inverted "V" band.

Total length: 3.44 mm; width of pronotum: 1.2; width of abdomen: 1.4 mm.

Holotype ♀ (BISHOP 7436), NW NEW GUINEA, Wisselmeren, Enarotadi, 1900 m, 19. VIII.1955, J. L. Gressitt.

Calisius montanus n. sp. is related to *C. distinctus* n. sp., but differs as is indicated in the key.

Calisius minutus Kormilev, new species Fig. 10.

♀. *Head* slightly longer than width across eyes (13 : 12). Anterior process obovate, but dense, erect granules on tip and lateral borders give it a subtrapezoidal appearance; lateral borders straight, converging backward and finely, densely granulate; tip rounded, but erect granules making it appear incised in middle; reaching to middle of ant. segm. III. Antenniferous tubercles declivous, and slightly divaricating. Eyes semiglobose, protruding. Infraocular carinae finely denticulate (up to 6 granules in a row). Postocular tubercles tiny, dentiform, not reaching to outer border of eyes. Vertex with "V"—form, fine granulation. Antennae shorter than width of head across eyes (10.5 : 12); relative length of segments I–IV, 2 : 2.5 : 2 : 4; I cylindrical, II ovate, III tapering toward base, IV fusiform. Rostrum not reaching to base of head by length of its apical segment. *Pronotum* less than 1/2 as long as its maximum width (9 : 21). Collar with 2 (1+1) fine granules. Fore disc with 2 (1+1) fine granules in front row, and 2 (1+1) in hind row, placed more laterad. Lateral borders each with 4, or 5 small spicules. Hind disc higher than fore disc, and declivous forward, with 4 (2+2) rows of granules; lateral borders with a double row of fine granules. *Scutellum* 2× as long as its maximum width (30 : 15). Basal elevation with 4 (2+2) basal spicules, and between them with 2 (1+1) small, round granules. Lateral borders of basal elevation with 2 (1+1) granules, placed in middle; base of carina with 4 more granules. Carina with a dense row of fine granules. Lateral borders of scutellum with a row of fine granules reaching 2/3 of scutellum; tip with 6 (3+3) small granules. *Corium* with a row of dense granules which is a little darker than those of scutellum. *Abdomen* longer than maximum width across segment IV (33 : 27). Connexivum wide; connexivum IV as long as wide (4.5 : 4.5). Connexiva with a double row of granules, 3 on each segment. Tergum VII with a triangle formed by round granules. Segment IX moderately long.

Color: pale testaceous, partly testaceous; scutellum with 2 (1+1) large, basolateral, ovate pale spots; 1 large, almost triangular in middle, and 1 large spot at tip.

Total length: 2.48 mm; width of pronotum: 0.84 mm; width of abdomen: 1.08 mm.

Holotype ♀ (BISHOP 7437), NW NEW GUINEA, Bodem, 10-17.VII.1959, T. C. Maa.

Calisius minutus n. sp. is related to *C. montanus* n. sp., but is much smaller, with anterior process appearing trapezoidal, basal border of scutellum with 4 spicules and 2 granules.

Calisius distinctus Kormilev, new species Fig. 11.

♂. Elongate ovate; roughly granulate on head, pronotum, and basal elevation of scutellum.

Head as long as width across eyes (15 : 15). Anterior process obovate; lateral borders sulcate, and granulate; tip rounded, and granulate, reaching basal 1/3 of ant. segm. III. Antenniferous tubercles declivous, with subparallel outer borders. Eyes semireniform, protruding. Infraocular carinae each with 3 large, and between them, with 1, or 2 smaller granules. Postocular tubercles blunt, not reaching to outer border of eyes. Vertex with 2 (1+1) subcontiguous rows of 4 granules each. Antenna moderately robust, almost as long as width of head across eyes (15.5 : 15); relative length of segments I-IV, 2.5 : 3 : 4.5 : 5.5; I cylindrical, II subovate, III tapering toward base, IV fusiform. Rostrum not reaching hind border of head by 1/2 length of its apical segment. *Pronotum* 1/2 as long as its maximum width (14 : 28). Collar with 2 (1+1) rough, erect granules. Fore disc with 2 (1+1) granules in front row, and 2 (1+1) in hind row, placed more laterad. Lateral borders each with 3 rough spicules. Hind disc with 4 (2+2) subparallel rows of 2 to 4 granules in each. Lateral borders with a double row of rough granules. *Scutellum* 2× as long as its maximum width (39 : 20). Basal elevation with 4 (2+2) flattened spicules, and between them with 2 (1+1) flattened granules; lateral borders with 2 (1+1) large granules in middle, and 4 small ones at base of carina. Carina with a distinct, dense, round granulation. Lateral borders of scutellum with round granulation on fore 1/2; tip with 2 (1+1) small granules. *Corium* without distinct granulation. *Abdomen* longer than maximum width across segment IV (40 : 32.5). Connexivum moderately wide; connexivum IV longer than wide (6 : 4). Exterior borders with a double row of granules.

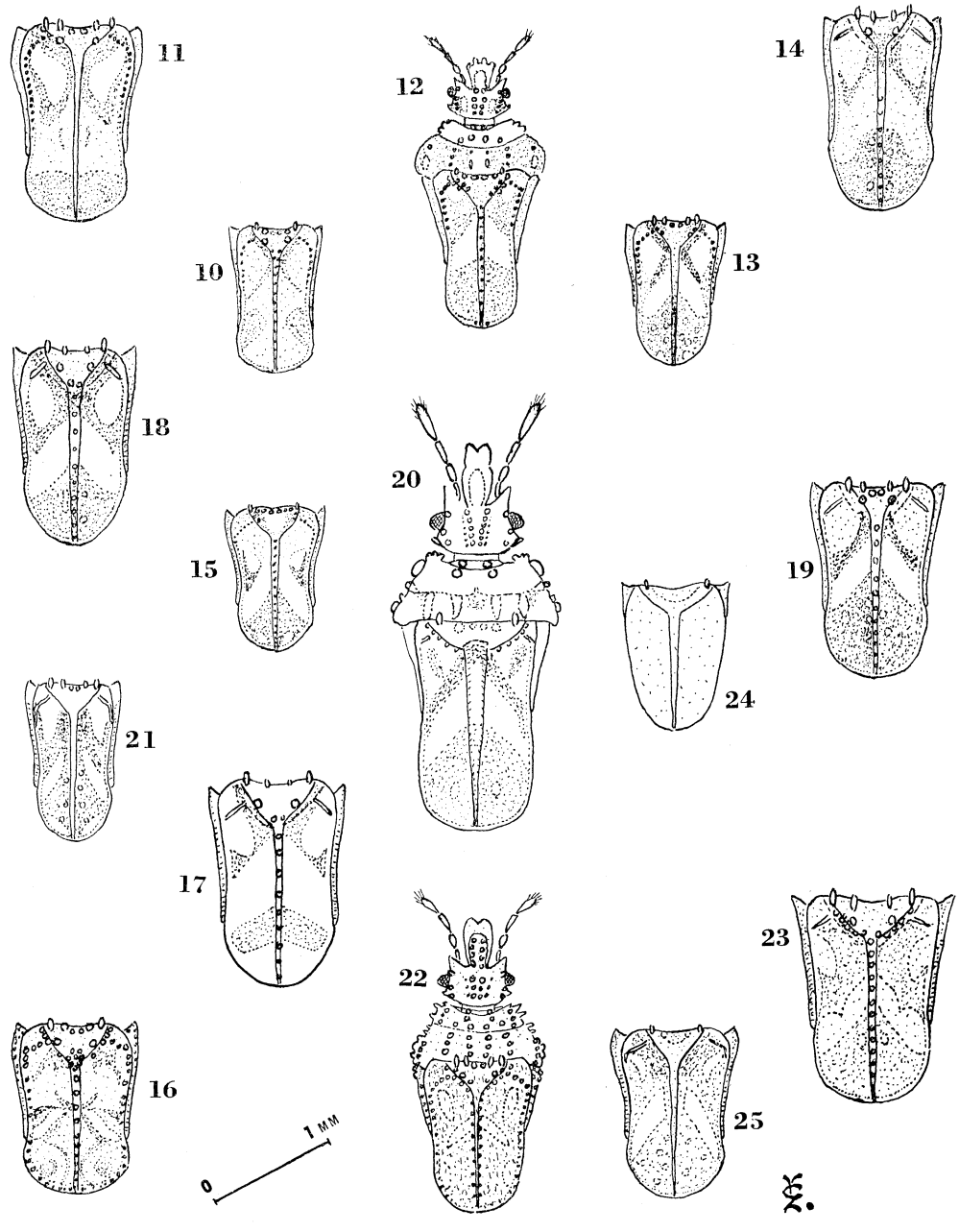
Color: pale testaceous; rostrum, lateral borders of basal elevation connected with a narrow strip extending around basolateral pale spots, then apical 1/4 of disc of scutellum, anterior 2/3 of outer borders of connexiva II to VI, the median line and tip of hypopygium, and rings in middle of femora; all are testaceous to dark testaceous; 2 (1+1) basolateral, curved spots white; subtriangular band in middle of scutellum pale yellow incrusted with white (probably white in fresh specimens).

Total length: 3.10 mm; width of pronotum 1.12 mm; width of abdomen 1.30 mm.

Holotype ♂ (BISHOP 7438), NE NEW GUINEA, Tsenga, 1200 m, Upper Jimmi Valley, 14.VII.1955, J. L. Gressitt.

Figs. 10-25. 10, *Calisius minutus*, n. sp. (♀), scutellum and corium; 11, *C. distinctus*, n. sp. (♂), scutellum and corium; 12, *C. quadridentatus*, n. sp. (♀), head, pronotum, scutellum and corium; 13, *C. liliputianus*, n. sp. (♀), scutellum and corium; 14, *C. sordidus*, n. sp. (♀), scutellum and corium; 15, *C. pusillus*, n. sp. (♂), scutellum and corium; 16, *C. granuliger*, n. sp. (♂), scutellum and corium; 17, *C. pallidus*, n. sp. (♂), scutellum and corium; 18, *C. zimmermani*, n. sp. (♀), scutellum and corium; 19, *C. excelsus*, n. sp. (♀), scutellum and corium; 20, *C. discrepans*, n. sp. (♂), head, pronotum, scutellum and corium; 21, *C. parvus*, n. sp. (♀), scutellum and corium; 22, *C. pilosulus*, n. sp. (♂), head, pronotum, scutellum and corium; 23, *C. varius*, n. sp. (♂), scutellum and corium; 24, *C. brachypterus*, n. sp. (♀), scutellum and corium; 25, *C. homalanthi*, n. sp. (♂), scutellum and corium.

Calisius distinctus n. sp. is related to *C. montanus* n. sp., and differs from it as indicated in the key.



C. Species from Solomon Is.

Calisius quadridentatus Kormilev, new species Fig. 12.

♀. *Head* almost as long as width across eyes (13 : 12.5). Anterior process trapezoidal, sulcate along lateral borders which are almost straight, very fine, and densely granulate; tip with 4 (2+2) granules protruding like teeth, reaching to middle of ant. segm. III. Antenniferous tubercles blunt, slightly declivous, and divaricating. Eyes semiglobose, protruding. Infraocular carinae each with 3 spaced granules. Postocular tubercles tiny, not reaching to outer border of eyes. Vertex with "V"—shaped granulation. Antenna slender, slightly shorter than width of head across eyes (11.75 : 12.5); relative length of segments I–IV, 2.25 : 2 : 3 : 4.5; I cylindrical, II ovate, III tapering toward base, IV fusiform. Rostrum not reaching to hind border of head by length of its apical segment. Head in front of rostral base smooth and flat. *Pronotum* less than 1/2 as long as its maximum width (11 : 23). Collar with 2 (1+1) erect granules. Fore disc with 2 (1+1) granules in front row, and 4 (2+2) granules in hind row; lateral borders each with 3 granules fused together and forming a carina-like, reflexed border. Hind disc with 2 (1+1) rows of 3 granules each, and between them with 2 (1+1) carinae formed by granules fused together; lateral borders with 2 (1+1) small, round granules, and behind them with 2 (1+1) ridges; lower row obliterated. *Scutellum* longer than its maximum width (30 : 17), and tapering backward. Basal elevation with 6 (3+3) granules along basal border; lateral borders each with 3 granules in middle; a few small granules placed near base of carina. Carina with a row of erect granules; similar granules extending along lateral borders to tip of scutellum. *Corium* with obliterated granulation. *Abdomen* longer than its maximum width across segment IV (33 : 25); Connexivum wide; connexivum IV as long as wide (4 : 4). Lateral borders with a double row of round granules. Segment IX long.

Color: orange-yellow; head behind eyes, hind lobe of pronotum, with exception of a wide median band, which is pale, connexiva with exception of hind borders, and segment IX, ferrugineous to infuscate; hind borders of connexiva with whitish granulation; entire ventral side and legs orange-yellow. Scutellum: 2 (1+1) basolateral spots ferrugineous, with a small patch of white incrustation anteriorly; middle of scutellum with a pale yellow inverted "V"; tip ferrugineous with orange-yellow borders.

Total length: 2.50 mm; width of pronotum: 0.92 mm; width of abdomen: 1.00 mm.

Holotype ♀ (BISHOP 7439), SOLOMON Is., Malaita, Auki, 2–20 m, 21.IX.1957, J. L. Gressitt.

Calisius quadridentatus n. sp. may easily be recognised by its protruding granules on the tip of the anterior process, and by the pale median band on the hind lobe of the pronotum.

Calisius liliputianus Kormilev, new species Fig. 13.

♀. *Head* almost as long as width across eyes (11 : 11.5). Anterior process obovate; lateral borders sulcate, convex, and finely granulate; tip rounded, finely granulate, reaching to tip of ant. segm. III. Antenniferous tubercles acute, divaricating. Eyes large, semiglobose, protruding. Infraocular carinae each with 4 granules, the first one being more distant from the others. Postocular tubercles consisting of 3 granules each: first one very small, the middle one the largest, and almost reaching to outer border of eye, the hind one is smaller. Vertex with 10 (5+5) granules forming an "V". Antenna slender, shorter than

width of head across eyes (9.75 : 11.5); relative length of segments II–V, 1.75 : 2 : 2 : 4; I cylindrical, II ovate, III strongly tapering toward base, IV ovate. Rostrum not reaching to hind border of head by 1/2 length of its apical segment. *Pronotum* 1/2 as long as its maximum width (10 : 19.5). Collar with 2 (1+1) small granules. Fore disc with 2 (1+1) granules in front row, and 2 (1+1) in hind row, but between the latter are placed 2 (1+1) ring-shaped granules; lateral borders each with 3 small spicules, sometimes fused together; hind disc with 4 (2+2) rows of granules of different size, sometimes also fused together; lateral borders each with 2 small, spiculoid granules in upper row; lower row with granules which are obliterated. *Scutellum* longer than maximum width (26 : 15). Basal elevation with 6 (3+3) granules along basal border, and 1, or 2 smaller granules in middle of lateral borders. Carina with obliterated granulation on basal 1/2, with a dense, minute granulation on apical. Lateral borders of scutellum carinate, and with very small, round granules up to 3/4 of scutellum. Disc finely punctured. *Corium* with obliterated granulation. *Abdomen* longer than maximum width across segment IV (27.5 : 23). Connexivum wide; connexivum IV as long as wide (3.5 : 3.5). Exterior borders with a double row of fine granules, which are smaller than those of pronotum. Segment IX tricuspidate.

Color: pale yellow to whitish, with yellow granulation. Tip of anterior process, and granulation behind eyes infuscate. Pronotum: fore disc and median band of hind disc white with creamy-yellow granulation; hind disc laterad of median band testaceous, with infuscate lateral borders. Connexivum creamy-yellow; connexivum II anteriorly, and connexiva III to VII in middle of outer borders brown to testaceous. Scutellum brown to testaceous; 2 (1+1) basolateral, trapezoid spots, an inverted "V" band in middle, and a few small, round apical spots white. Femora with fuscous rings.

Total length: 2.20 mm; width of pronotum 0.78 mm; width of abdomen 0.92 mm.

Holotype ♀ (BISHOP 7440), SOLOMON Is., Malaita, Auki, 2–20 m, 22.IX.1957, J. L. Gressitt.

SOLOMON Is.: 1♀ (without head and pronotum), New Georgia, 21.VII.1959, J. L. Gressitt.

Calisius liliputianus n. sp. is related to *C. pusillus* n. sp. from New Caledonia, and may be separated as is indicated in the key.

Calisius sordidus Kormilev, new species Fig. 14.

♀. *Head* as long as width across eyes (16 : 16). Anterior process obovate; lateral borders convex, sulcate along border, and granulate; tip roughly granulate, reaching to middle of ant. segm. III. Antenniferous tubercles acute, slightly declivous, divaricating. Eyes subconical, protruding. Infraocular carina formed by 3 spaced granules. Postocular tubercles consisting of 1, or 2 small granules, by far not reaching outer border of eyes. Vertex with "V"–shaped granulation. Antenna moderately robust, shorter than width of head across eyes (14 : 16); relative length of segments I–IV, 2.75 : 2.75 : 3.5 : 5; I cylindrical, II subcylindrical, III slightly tapering towards base, IV fusiform. Rostrum not reaching base of head by length of its apical segment. *Pronotum* more than 1/2 as long as its maximum width (15 : 28). Collar with 2 (1+1) erect granules. Fore disc with 2 (1+1) granules in front row, and 2 (1+1) in hind row, placed more laterad. Lateral borders each with 3 or 4 strong spicules. Hind disc with 4 (2+2) rows of granules, most of them fused together forming a carina. Humeri with a double row of smaller granules. *Scutellum* much longer than its maximum width (36 : 22), not reaching hind border of tergum VI.

Basal elevation with 2 (1+1) flattened spicules along basal border, and with 2 (1+1) granules between them; lateral borders with 2 (1+1) large granules in middle; base of carina with a few smaller granules; carina with moderately spaced, round granules. Two (1+1) short carinae extending from basal elevation to lateral borders; lateral borders of scutellum without granulation. *Corium* with obliterated granulation. *Abdomen* longer than maximum width across segment IV (45 : 35). Connexivum wide; connexivum IV slightly shorter than wide (6 : 7). Lateral borders with a double row of granules, smaller than on fore lobe of pronotum. Segment IX moderately long.

Color: sordid ochraceous, partly dark, gray testaceous; head behind eyes, hind disc of pronotum laterally, exterior borders of connexiva, with exception of PE-angles, segment IX, and rings on femora fuscous. Scutellum: lateral borders of basal elevation, and base of carina fuscous; 2 (1+1) basolateral, ovate spots, and a large, diffused, inverted "V" band in middle, are sordid ochraceous, separated from each other by a thin, fuscous streak; tip of scutellum brown, with 4 (2+2) small, round, pale spots. Venter with reddish tinge.

Total length: 3.28 mm; width of pronotum: 1.12 mm; width of abdomen: 1.40 mm.

Holotype ♀ (BISHOP 7441), SOLOMON Is., Bougainville (S), Boku, 50 m, 5.VI.1956, J. L. Gressitt. Paratype: NE NEW GUINEA, 1♀, Wum, Upper Jimmi Valley, 840 m, 17.VII. 1955, J. L. Gressitt.

Calisius sordidus n. sp. is related to *C. montanus* n. sp. from New Guinea, and may be separated from it as is indicated in the key.

D. Species from New Caledonia.

Calisius pusillus Kormilev, new species Fig. 15.

♂. *Head* as long as width across eyes (12 : 12). Anterior process obovate; lateral borders convex, and finely granulate; tip rounded, reaching to tip of ant. segm. III. Antenniferous tubercles small, acute, slightly declivous, and divaricating. Eyes large, semiglobose, protruding. Infraocular carinae formed by 5 granules, densely placed. Postocular tubercles formed by a group of very fine granules, arranged as an acute angle, and with its tip almost reaching outer border of eyes. Vertex with an "V"—shaped granulation. Antenna slender; relative length of segments I–IV, 2 : 2 : 2 : 4; I–III subcylindrical, IV fusiform. Rostrum almost reaching to hind border of head. *Pronotum* 1/2 as long as its maximum width (10.5 : 20). Collar with 2 (1+1) erect, round granules. Fore disc with 2 (1+1) granules in front row, and 2 (1+1) in hind row placed more laterad. Lateral borders each with 3 spicules. Hind disc with 4 (2+2) rows of granules, some of them are fused together forming small carinae. Humeri with 2 small granules in upper row, others obliterated. *Scutellum* much longer than its maximum width (27 : 16). Basal elevation with 8 (4+4) small granules along basal border with the 2 inner ones flattened; lateral borders with 2 (1+1) small granules placed before middle; carina with very dense, fine granules fused together on basal 1/3, then become more distinct. Lateral borders of scutellum with a row of very fine granules, progressively diminishing backward, and becoming obsolete; tip with two small granules. *Corium* with an obliterated granulation. *Abdomen* longer than maximum width across segment III (26 : 21). Connexivum narrow; connexivum IV much longer than wide (4 : 2.75). Lateral borders with a double row or granules; granules in lower row are smaller, and difficult to see. Tergum VII short, decli-

vous laterally, with a row of 7 small granules. Hypopygium small, ventrocaudal in position, slightly pointed in middle of upper border.

Color: ochraceous, but looks grayish because of a thin layer of whitish incrustation on head, pronotum, and basal 1/3 of scutellum. Anterior process of head, postocular portion of latter, some granules on pronotum and scutellum black, or fuscous. Connexivum II fuscous; III–VI brown, with ochraceous posterior borders; femora black with yellow tips. Scutellum darker in basal 1/3; 2 (1+1) basolateral ovate spots, and an inverted "V" spot in middle are white; 2 (1+1) small black arrowhead shape spots situated between white ovate spots and inverted "V" spot; 1 larger black spearhead-shaped spot placed behind inverted "V" spot. Antennal segments I–III brown, IV black.

Total length: 2.20 mm; width of pronotum: 0.80 mm; width of abdomen: 0.84 mm.

Holotype ♂ (Bishop 7442), NEW CALEDONIA, 10 km S of Koh, 300 m, 31.I.1963, G. Kuschel. Paratype 1♂, same data as holotype (Kormilev Coll'n).

Calisius pusillus n. sp. is related to *C. leai* Kormilev, 1966, from Norfolk I., but is smaller; anterior process reaching to tip of ant. segm. III, and with pattern of spots on scutellum slightly different.

Calisius granuliger Kormilev, new species Fig. 16.

♂. Body covered with rough granulation on head, pronotum, scutellum, and connexivum.

Head shorter than width across eyes (13 : 15). Anterior process obovate, very roughly granulate; lateral borders slightly convex; tip rounded, but with protruding granulation, reaching to basal 1/3 of ant. segm. III. Antenniferous tubercles strong, barely declivous, and slightly divaricating. Eyes semireniform, protruding. Infraocular carinae formed by a dense row of erect granules, 7 in each carina. Postocular tubercles small, not reaching outer border of eyes. Vertex with 6 (3+3) rough, erect granules, converging backward. Antenna moderately robust; relative length of segment I–IV, 2.5 : 2.75 : 2.5 : 5; I cylindrical, II subovate, III tapering towards base, IV fusiform. Rostrum reaching to hind border of rostral groove, which is closed posteriorly. *Pronotum* less than 1/2 as long as its maximum width (11 : 24). Collar with 2 (1+1) rough granules. Fore disc with 2 (1+1) similar granules in front row, and with 2 (1+1) in hind row, placed more laterad; lateral borders with a double row of spicules, 3 in upper row, and 1 in lower row. Hind disc with 4 (2+2) rows of rough granules; humeri each with a double row of smaller granules. *Scutellum* longer than its maximum width (32 : 19). Basal elevation with 4 (2+2) flattened spicules along basal border, and between them with 2 (1+1) flattened granules; lateral borders with 1 large, and a few small granules; base of carina with a cluster of round granules. Carina with a row of spaced, rough, erect, round granules, which are placed more densely on apical 1/4. Along lateral borders of basal elevation run 2 (1+1) rows of rough granules, which bend outward reaching to lateral borders of scutellum, where they become smaller, and extend along latter on fore 1/2; on hind 1/2 of borders they become broken, uneven, but reaching to tip of scutellum. *Corium* with a row of fine granules. *Abdomen* longer than maximum width across segment IV (35 : 28.5). Connexivum moderately wide; connexivum IV longer than wide (5 : 4). Connexiva with a double row of rough granules on exterior border, and with spaced rough granules at inner border. Tergum VIII without granulation; paratergites bicuspidate as seen from above (♂). Hypopygium moderately large, with a median keel terminating in a point on upper end, and

with a transverse row of small granules below the point.

Color: pale testaceous, partly covered with white incrustation. Humeri and connexiva II and VI infuscate; femora grayish brown with yellow tips. Scutellum pale testaceous, with a few thin, transverse, oblique, dark brown bands, and 2 (1+1) oblique, anteriorly converging white streaks, separated from each other by carina.

Total length: 2.68 mm; width of pronotum: 0.96 mm; width of abdomen: 1.14 mm.

Holotype ♂ (BISHOP 7443), NEW CALEDONIA, Mt de Koghis, 250 m, 5.III.1960, J. L. Gressitt.

Calisius granuliger n. sp. is somewhat related to *C. pacificus* Kirkaldy, 1908, from Fiji, but may be separated as is indicated in the key.

E. Species from New Zealand.

Calisius zealandicus Pendergrast (in press)

NEW ZEALAND: 1♀, Korokoro, 15.I.1922, T. Cockroft (ex Myers coll'n, BMNH 1937-789).

Dr J. G. Pendergrast of Auckland University, Auckland, New Zealand, is making a revision of Aradidae of New Zealand, and in accordance with his letter has described this species under the name of *Calisius zealandicus*, so I am refraining from description.

F. Species from Fiji.

Calisius magdalenae Kormilev, 1966, Rec. S. Austr. Mus. **15**: 288.

FIJI: 1♀, Viti Levu, Raki Raki, I.1955, N. L. H. Krauss.

Calisius pallidus Kormilev, new species Fig. 17.

♂. *Head* shorter than width across eyes (15 : 16.5). Anterior process tapering toward base; lateral borders straight, sulcate along border, and practically without granulation; tip rounded and roughly granulate appearing slightly incised between granules, reaching apical 1/3 of ant. segm. II. Antenniferous tubercles acute, divaricating. Eyes semiglobose, protruding. Infraocular carinae with 3-spaced granules each. Postocular tubercles acute, not reaching to outer border of eyes. Vertex with 2 (1+1) erect granules in front, others obliterated. Antenna moderately robust; relative length of segments I to III (IV missing), 2.5 : 3.5 : 5 :-; I cylindrical, II subcylindrical, III tapering toward base. Rostrum not reaching to hind border of the head by the length of its apical segment. *Pronotum* less than 1/2 as long as its maximum width (13 : 31). Collar with 2 (1+1) small granules. Fore disc with 2 (1+1) erect granules in the first row, without granules in hind row; lateral borders each with 2, or 3 strong spicules. Hind disc with 4 (2+2) rows of 2 granules each, and with low carinae between and in front of granules; humeri each with 3 granules in upper row and 2 in lower row. *Scutellum* much longer than maximum width (40 : 24). Basal elevation with 2 (1+1) larger, and between them with 2 (1+1) minute flattened spicules; lateral borders with 2 (1+1) large granules; base of carina with 2 (1+1) small granules; carina with a row of moderately spaced high, erect granules, or spicules. Two (1+1) thin short carinae extending from basal elevation to lateral borders; lateral borders

without granulation. Disc densely punctured. *Corium* with obliterated granulation. *Abdomen* longer than maximum width across segment IV (42 : 35); connexivum wide; connexivum IV as long as wide (6 : 6). Lateral borders of connexiva with a double row of granules: 2 granules in upper row, and 3 (1 large and 2 small) in lower row. Tergum VII with 3 granules on hind border and 1 more in front of them; tergum VIII with 2 (1+1) larger granules. Hypopygium caudal in position, with a few granules on disc.

Color: ochraceous to ochre-yellow; hypopygium and some granules on connexiva testaceous; femora with testaceous rings in middle. Scutellum whitish; a very thin, inverted "V" band, with its tip at base of carina, and another, much wider and almost transverse band on upper 1/2 of disc brown.

Total length: 3.20 mm; width of pronotum: 1.24 mm; width of abdomen: 1.40 mm.

Holotype ♂ (BISHOP 7444), FIJI, Viti Levu, Nandarivatu, 1110 m, beating shrubbery, 10. IX.1938, E. C. Zimmerman. 1♀ (without head), same data as holotype, differs from the latter by missing fore band of scutellum, in the shape of an inverted "V", and narrower hind band. 1♀, Fiji, Viti Levu, Mt Victoria, Tholo North, West Slope, 900 m, beating, 16.IX.1938, Zimmerman, differs from the holotype by slightly longer head, reaching to the base of ant. segm. III, and was not made an allotype.

Calisius pallidus n. sp. is closely related to the next species, *C. zimmermani* n. sp., but may be separated by its shorter head which reaches only to apical 1/3 of ant. segm. II, or to the base of ant. segm. III; by the high, erect granules on the carina of scutellum, and by the obliterated granulation of corium, and by the pale tip of scutellum.

Calisius zimmermani Kormilev, new species Fig. 18.

♀. *Head* shorter than width across eyes (15 : 17). Anterior process obovate; lateral borders convex and sulcate; tip rounded and granulate appearing incised between granules, reaching to basal 1/3 of ant. segm. III. Antenniferous tubercles blunt, slightly declivous, and divaricating. Eyes semireniform, protruding. Infraocular carinae each with 3 spaced granules. Postocular tubercles acute, distant from eyes, not reaching outer border of latter. Vertex with 2 (1+1) erect granules, and with 4 (2+2) almost obliterated behind them. Antenna robust, relative length of segments I–IV, 2.5 : 3.5 : 4 : 5; I cylindrical, II ovate, III slightly tapering towards base, IV fusiform. Rostrum not reaching hind border of head almost by length of its apical segment. *Pronotum* 1/2 as long as its maximum width (15 : 30). Collar with 2 (1+1) round granules. Fore disc with 2 (1+1) granules in front row, without granules in hind row; lateral borders each with 3, or 2, rough spicules. Hind disc with 4 (2+2) carinae, each bearing 2 rough granules on the hind 1/2; humeri with a double row of granules: 2 in the upper row, and 3 in the lower. *Scutellum* longer than its maximum width (35 : 21), reaching hind 1/3 of tergum VI. Basal elevation with 4 (2+2) depressed spicules along basal border. Lateral borders with 2 (1+1) rough granules in middle; 2 small granules at base of carina. Carina with a row of moderately spaced round granules. Two (1+1) short carinae extending from basal elevation to lateral borders; lateral borders without granulation. *Corium* with a dense row of extremely small granules. *Abdomen* longer than maximum width across segment IV (45 : 36). Connexivum wide; connexivum IV shorter than wide (6 : 7). Exterior borders of connexiva with a double row of granules: 2 in upper row, and 3 in lower, exceptionally connexivum VI with 3 granules in upper row also. Segment IX long.

Color: pale testaceous: pronotum, basal elevation of scutellum, and connexivum; pale ochraceous: head and tergum VII; antenna: I to III pale yellow, IV pale testaceous; scutellum: fuscous along basal elevation; 2 (1+1) basolateral streaks and an inverted "V" band in middle of scutellum white, tip of scutellum dark testaceous.

Total length: 3.32 mm; width of pronotum: 1.20 m; width of abdomen: 1.44 mm.

Holotype ♀ (BISHOP 7445), FIJI, Viti Levu, Nandarivatu, Rdg. W of Vatuthera, 780–900 m, 8.IX.1938, E. C. Zimmerman.

It is a pleasure to dedicate this species to its collector, Dr E. C. Zimmerman of Bishop Museum, who collected so many new species of *Calisius* on his trips to the South Pacific.

Calisius excelsus Kormilev, new species Fig. 19.

♀. *Head* as long as width across eyes (15 : 15). Anterior process obovate and finely granulate; lateral borders convex and sulcate; tip rounded, reaches to basal 1/3 of ant. segm. III. Antenniferous tubercles strong, blunt apically, slightly declivous and divaricating. Eyes large, semiglobose, protruding. Infraocular carinae each formed by 3 erect granules, of which the middle one is higher, spiculoid. Postocular tubercles small, not reaching to outer border of eyes. Vertex with 8 (4+4) subparallel granules with first pair higher and spiculoid. Antenna slender; relative length of segments I–IV, 2.75 : 2.75 : 3.25 : 5; I cylindrical, II subcylindrical, III tapering towards base, IV fusiform. Rostrum almost reaching to base of head. *Pronotum* more than 1/2 as long as its maximum width (15 : 27). Collar with 2 (1+1) erect granules. Fore disc with 2 (1+1) spiculoid granules in front row, deeply depressed between them, and with 2 (1+1) smaller granules in hind row, placed more laterad; lateral borders each with 3 spiculoid granules, 2 anterior ones close to each other, the third more distant. Hind disc with 4 (2+2) rows of granules, with granules in inner rows fused, forming carinae; humeri with 1 granule in upper row, and without granules in lower. *Scutellum* longer than maximum width (35 : 20). Basal elevation with 2 (1+1) spicules, and between them with 4 (2+2) smaller granules along basal border; lateral borders with 2 (1+1) granules in middle; carina with a row of moderately spaced granules, which are higher on apical 1/2. Lateral borders of scutellum carinate, but with an obliterate granulation. *Corium* with obliterate granulation. *Abdomen* longer than maximum width across segment III (38 : 31). Connexivum wide and reflexed; connexivum IV shorter than wide (6 : 6.5); exterior borders of connexiva with a double row of elongate flattened granules, 3 in each row. Segment IX short, bicuspidate, almost truncate posteriorly.

Color: yellow to pale testaceous; head and fore disc of pronotum covered with whitish incrustation. Anterior process from above, and on tip, infraocular carinae, hind disc of pronotum with exception of a broad median band, exterior 1/2 of connexiva II to VII, and segment IX testaceous to infuscate. Femora piceous with yellow tips. Scutellum testaceous to dark testaceous; 2 (1+1) large, basolateral, ovate spots, and a narrow inverted "V" band are yellow to whitish, probably white in fresh specimens.

Total length: 2.92 mm; width of pronotum: 1.08 mm; width of abdomen: 1.24 mm.

Holotype ♀ (BISHOP 7446), FIJI, Viti Levu, Rdg W of Nandarivatu, 840 m, beating shrubs, 11.IX.1938, E. C. Zimmerman. Paratype: 1♀, Fiji, Viti Levu, Navai Mill nr Nandarivatu, 750 m, beating, 17.IX.1938, Zimmerman. (Kormilev coll'n).

Calisius excelsus n. sp. is related to *C. pacificus* Kirkaldy, 1908, from which it may be distinguished as is indicated in the key.

G. Species from Samoa.

Calisius discrepans Kormilev, new species Fig. 20.

♂. *Head* slightly longer than width across eyes (21 : 20). Anterior process produced forward as a depressed plate with tip incised in middle and reaching apical 1/3 of ant. segm. III; lateral borders subparallel anteriorly, convex, finely granulate and sulcate in posterior 2/3. Antenniferous tubercles acute, with parallel exterior borders. Eyes semiglobose, protruding. Infraocular carinae each reduced to 2, semiobliterate spaced granules. Postocular tubercles blunt, not reaching to outer border of eyes. Vertex depressed with 4 (2+2) dense rows of fine, depressed granules. Antenna strong, as long as head (21 : 21); relative length of segments I–IV, 4 : 3.5 : 5.5 : 8; I and II cylindrical, III slightly tapering towards base, IV fusiform. Rostrum not reaching hind border of head by 1½ length of its apical segment. *Pronotum* flattened, slightly declivous forward, less than 1/2 as long as its maximum width (14.5 : 33). Collar without granules, but just behind it, in the sulcus separating collar from the disc, are placed 2 (1+1) large, flattened granules. Fore disc with 2 (1+1) smaller, flattened granules in front row, and without granules in hind row; lateral borders with 2 large granules each, with the hind granule formed by fusion of 2 granules. Hind disc with 4 (2+2) depressed carinae, but without granules; humeri with 3, or 4 large granules in upper row, and 2 in lower. *Scutellum* longer than its maximum width (41 : 27). Basal elevation low and declivous forward with 4 (2+2) large, depressed spicules along basal border; middle with 4 (2+2) very small, depressed granules; lateral borders of elevation with 2 (1+1) large, almost obliterated granules. Carina arcuately raised in basal 1/3, then lowers and tapers backward, completely without granulation. Two (1+1) curved rows of small, round granules extend along basal elevation. Lateral borders of scutellum without granulation. Disc with dispersed, deep punctures. *Corium* abbreviated, reaching only to middle of connexivum III; without granulation. *Abdomen* longer than its maximum width across segment IV (45 : 43). Connexivum wide; connexivum IV shorter than wide (7 : 7.5); exterior borders with a double row of semiobliterated granules, 3 in each row. Connexivum VII with large, flattened granules. Paratergites short; hypopygium caudal in position with a large granule in middle of upper border; below this granule are placed 2 (1+1) semiobliterated granules.

Color: pale ochraceous; connexiva brown or fuscous with ochraceous borders. Scutellum pale ochraceous with an inverted "V" brown band, its tip extending across base of carina; behind band with another inverted "V" band, but color pale ochraceous; apical 1/2 of the disc brown with 2 (1+1) diffused, pale spots.

Total length: 3.52 mm; width of pronotum: 1.32 mm; width of abdomen: 1.72 mm.

Holotype ♂ (BISHOP 7447), SAMOA, Upolu, Afiamalu, beating, 3.VII.1940, E. C. Zimmerman.

Calisius discrepans n. sp. shows a gradual disappearance of granulation, and depression of the whole body. Anterior process strongly produced forward, and flattened around clypeus.

Calisius parvus Kormilev, new species Fig. 21.

♀. *Head* almost as long as width across eyes (12.5 : 13). Anterior process obovate, finely granulate; lateral borders convex and sulcate along border; tip rounded, reaching middle of ant. segm. III. Antenniferous tubercles acute, declivous, divergent and with convex exterior borders. Eyes large, semiglobose, protruding. Infraocular carinae each with 3 granules, of which the first 2 are more spaced. Postocular tubercles tiny, not reaching outer border of eyes. Vertex with a double row of 8 (4+4) granules. Antenna slender, relative length of segments I–IV, are : 2.5 : 2.5 : 3 : 4.5; I and II cylindrical, III tapering towards base, IV fusiform. Rostrum almost reaching hind border of head. *Pronotum* 1/2 as long as its maximum width (11 : 21.5). Collar with 2 (1+1) round granules. Fore disc with 2 (1+1) granules in front row, and 2 (1+1) in hind row placed more laterad; lateral borders each with 3 spicules; 2 (1+1) rows of 3 small granules extending along lateral borders. Hind disc with 2 (1+1) longitudinal carinae formed by granules fused together, and laterad of them with 2 (1+1) rows of granules; humeri with a double row of granules: in the upper row they are larger, and semifused together, in the lower much smaller. *Scutellum* longer than its maximal width (28.5 : 16). Basal elevation with 4(2+2) flattened spicules along basal border, and between them with 2 (1+1) round, flattened granules. Lateral borders and base of carina without granulation. Carina with obliterated granulation. Lateral borders of scutellum also with obliterated granulation. Two (1+1) short carinae extending from basal elevation to lateral borders. Two (1+1) rows of spaced granules of different size extending along posterior 1/2 of carina. *Corium* with obliterated granulation. *Abdomen* longer than maximum width across segment III (32 : 24). Connexivum wide and strongly reflexed; connexivum IV as long as wide (4.5 : 4.5); exterior borders of connexiva with a double row of somewhat flattened granules, 3 in each row. Segment IX small.

Color: pale testaceous with whitish incrustation; anterior process in middle, humeri and hind border of pronotum, connexivm II with exception of hind border, exterior borders of connexiva III to VII in middle, and tergum VII, brown or testaceous; ant. segm. IV, tip of rostrum, posterior 1/2 of propleura, acetabulae with exception of inferior border, and rings on femora, also brown. Scutellum: basal elevation pale testaceous with whitish incrustation; disc dark testaceous; 2 (1+1) basolateral crooked streaks, 2 (1+1) anteriorly converging curved streaks in middle of disc, 2 (1+1) small posterolateral spots and granules along carina, are white.

Total length: 2.52 mm; width of pronotum: 0.86 mm; width of abdomen: 0.96 mm.

Holotype ♀ (Bishop 7448), SAMOA, Upolu, Falefa Falls, 3.VI.1940, E. C. Zimmerman. Paratypes 1♀, same data as holotype, and 1♀, Samoa, Tutuila, Utulei, 180 m, 24.VIII.1940, beating dead branches, Zimmerman, (Kormilev coll'n). The last specimen is darker, with semiobliterated white streaks on the scutellum.

Calisius parvus n. sp. belongs to the group with obliterated granulation on the carina of the scutellum, and as such is somewhat related to *C. ashlocki* n. sp. from New Guinea, but differs in its smaller size, different pattern of spots on scutellum, and finer granulation.

Calisius pilosulus Kormilev, new species Fig. 22.

♂. Scutellum with short, dispersed, inclined hairs.

Head slightly shorter than width across eyes (♂–15 : 16, ♀–17 : 18). Anterior process

subtrapezoidal; clypeus much shorter than genae, roughly granulate; genae flattened, and contiguous in front of clypeus; tip rounded and incised in middle, reaching to middle of ant. segm. III. Antenniferous tubercles acute, slightly divaricating. Eyes semireniform, protruding. Infraocular carinae each consisting of 4 granules: 2 large, and 2 small, placed intermittently. Postocular tubercles tiny, blunt, by far not reaching outer borders of eyes. Vertex with "V"-form granulation of 8 (4+4) granules. Antenna moderately strong, slightly shorter than width of head (♂-15.5 : 16, ♀-15.5 : 18); relative length of segments I-IV, ♂-3 : 3 : 4 : 5.5, ♀-3 : 3 : 4 : 5.5; I cylindrical, II ovate, III tapering towards base, IV fusiform. Rostrum not reaching hind border of head by 1/2 the length of its apical segment. *Pronotum* less than 1/2 as long as its maximum width (♂-11 : 26, ♀-15 : 33). Collar with 2 (1+1) round granules. Fore disc with 2 (1+1) granules in front row, and 4 (2+2) in hind row; lateral borders each with 2 large, sometimes 3 small spicules. Hind disc with 4 (2+2) rows of round granules, 3 or 4 in each row; humeri with a double row of fine granules. *Scutellum* longer than its maximum width (♂-31 : 19, ♀-38 : 25). Basal elevation with 4 (2+2) flattened spicules along basal border, and with 2 (1+1) small, flat, round granules between them. Lateral borders with a large granule in middle. Carina with a double row of small granules; basolateral, and lateral borders with a row of small granules diminishing in size posteriorly. Disc with short, inclined, dispersed bristles. *Corium* with a semiobliterated granulation. *Abdomen* longer than maximum width across segment III (♂-32.5 : 31, ♀-46 : 40). Connexivum wide and reflexed, more so in ♀; connexivum IV as long as wide (♂-4.5 : 4.5, ♀-6 : 6); exterior borders of connexiva with a double row of granules: 3 in upper row, and 2 in lower, sometimes lower row with a 3rd, smaller granule between the 2 larger; hind border of connexiva with a row of granules. In ♂: paratergites short; hypopygium caudal in position with a triangular process in middle of upper border, and 2 small granules below. In ♀: segment IX rather long.

Color: pale testaceous with a pinkish tinge, ♀ a little darker, testaceous with a pinkish tinge. Pronotum and connexivum with some testaceous spots. Scutellum: basal elevation pinkish; disc testaceous with 7 pale spots: 2 (1+1) basolateral, ovate, 1 trapezoidal in middle, 2 (1+1) small posterolateral streaks, and 2 (1+1) small, round spots between streaks. In darker specimen pale spots on scutellum are less visible.

Total length: ♂-2.64, ♀-3.40 mm; width of pronotum: ♂-1.04, ♀-1.32 mm; width of abdomen: ♂-1.24, ♀-1.60 mm.

Holotype ♂ (BISHOP 7449), SAMOA, Upolu, Afiamalu, 660 m, 5.VII.1940, by beating, E. C. Zimmerman. Allotype ♀ (BISHOP), same data as holotype. Paratypes: 3♂♂ & 6♀♀, Samoa, Upolu, Afiamalu, or Tiavi, or Malololei Rd., 480-660 m, 13.VI-10.VII.1940, Zimmerman (BISHOP, Kormilev coll'n).

Calisius pilosulus n. sp. differs from all other known species of *Calisius* by its short inclined bristles on the disc of scutellum.

Calisius varius Kormilev, new species Fig. 23.

♂. *Head* shorter than width across eyes (♂-15 : 17.5, ♀-16 : 18). Anterior process obovate; lateral borders convex, granulate and sulcate; tip rounded, granulate, reaching to tip of ant. segm. II (♂), or to basal 1/3 of ant. segm. III (♀). Antenniferous tubercles acute, divaricating. Eyes semireniform, protruding. Infraocular carinae consisting of a few tubercles of different size. Postocular tubercles slender, blunt, not reaching outer border

of eyes. Vertex with a double row of 8 (4+4) tubercles, of which the first pair is much higher. Hind border with a row of small tubercles. Antenna moderately strong; relative length of segments I-IV, ♂-3 : 3 : 5 : 7, ♀-3.25 : 3.25 : 4.5 : 6; I cylindrical, II ovate, III tapering towards base, IV fusiform. Rostrum not reaching hind border of head by length of its apical segment. *Pronotum* 1/2 as long as its maximum width (♂-15 : 30, ♀-15 : 31). Collar with 2 (1+1) round granules. Fore disc with 2 (1+1) granules in front row, and with 2 (1+1) very small granules in hind row, placed more laterad; lateral borders each with 2 or 3 spicules. Hind disc with 4 (2+2) rows of round tubercles, 3 or 4 in a row; humeri with a double row of spiculoid tubercles. *Scutellum* longer than maximum width (♂-39 : 24, ♀-39 : 25). Basal elevation with 4 (2+2) flattened spicules along basal border, a cluster of a few small granules or 1 large granule in middle of lateral borders, and a cluster of granules at base of carina. Carina with a row of sharp, erect granules. Two (1+1) rows of round granules extending along basal elevation, and connected with the row extending from basal elevation to lateral border; lateral borders of scutellum without granulation; tip of scutellum with 2 (1+1) small granules. *Corium* with obliterated granulation. Postero-exterior angles of metapleura tooth-like and produced beyond tip of connexivum I. *Abdomen* longer than maximum width across segment III (♂-42 : 36, ♀-46 : 40). Connexivum wide and moderately reflexed; connexivum IV as long, or almost as long, as wide (♂-6 : 6, ♀-6 : 7); exterior borders of connexiva with a double row of round granules, 3 in each row. Tergum VII densely granulate; tergum VIII with 2 (1+1) granules (♂); paratergites short and robust; hypopygium pointed in middle of upper border; below tip with 2 (1+1) larger granules, and below them 2 (1+1) smaller. Female with terga VII and VIII without granulation; segment IX short.

Color: pale ochraceous; hind disc of pronotum with 2 (1+1) piceous lateral spots; most of connexiva II and VI, exterior of connexiva III to V are piceous; terga VII and VIII, and hypopygium are also piceous. Femora with dark rings in middle. Scutellum with an "X"-shaped spot behind and laterad of basal elevation, and apical 1/3 of disc, dark brown to piceous; 2 (1+1) basolateral, ovate spots, and a wide, inverted "V" band in middle of disc whitish, a small spot behind band also whitish.

Total length: ♂-3.20, ♀-3.40 mm; width of pronotum: ♂-1.20, ♀-1.24 mm; width of abdomen: ♂-1.44, ♀-1.60 mm.

Holotype ♂ (BISHOP 7450), SAMOA, Upolu, Afiamalu, 660 m, 10.VII.1940, beating dead branches, E. C. Zimmerman. Allotype ♀, (BISHOP), SAMOA, Upolu, nr. Tapatapao, 300 m, 13.VII.1940, beating dead branches, Zimmerman. Paratypes: 2♂♂, Samoa, Upolu, Afiamalu, 11.VII.1940, beating dead branches, Zimmerman (BISHOP and Kormilev coll'n).

Calisius varius n. sp. is closely related to *C. zimmermani* n. sp. from Fiji, and may be separated as is indicated in the key.

H. Species from Tahiti.

Calisius brachypterus Kormilev, new species Fig. 24.

♀. With flattened pronotum, and flattened, abbreviated scutellum; corium reduced, reaching only to middle of connexivum II.

Head shorter than width across eyes (13 : 15). Anterior process obovate, finely granulate anteriorly; lateral borders convex; tip rounded, reaching basal 1/3 of ant. segm. III. An-

tenniferous tubercles moderately declivous, blunt, divaricating. Eyes small, semireniform, very protruding, but not stalked. Infraocular carinae each formed by 2 semiobliterated granules. Postocular tubercles very small and distant from eyes. Vertex with obliterated granulation. Antenna slender, almost as long as head (13.5 : 13); relative length of segments I-IV, 2.5 : 3 : 3 : 5.5; I and II cylindrical, III slightly tapering towards base, IV fusiform. Rostrum slightly longer than rostral groove. *Pronotum* flattened, scabrous, less than 1/2 as long as its maximum width (10 : 21). Collar without granules, poorly separated from disc. Fore disc with only traces of very small granules; lateral borders each with 3 or 4 spiculoid granules. Interlobal depression reduced to a thin and shallow sulcus. Hind disc flat, placed in the same level as fore disc, with 4 (2+2) thin and low carinae; humeri with semiobliterated carina in upper row, without granules, or carina in lower row. Propleurae granulate. *Scutellum* longer than its maximum width across base (28 : 18.5), reaching apical 1/3 of tergum V. Basal elevation low, depressed in middle of basal border, and with traces of 4 (2+2) reduced spicules along basal border. Carina very low and thin, without granulation; lateral borders of scutellum also without granulation. *Corium* seen as a very thin, short streak, reaching to middle of connexivum II. I could not dissect the single specimen available, but all characters indicate great reduction of fore wings, and probable absence of hind wings with corresponding reduction of wing's muscularity. *Abdomen* longer than maximum width across segment III (40 : 28). Connexivum very wide and reflexed; connexivum IV shorter than wide (5 : 7); exterior borders of connexiva with a double row of reduced and flattened granules, 3 in each row; only on connexivum VII with distal granules normal. Segment IX small.

Color: uniformly pale testaceous, partially lighter; tips of femora and tibiae yellow.

Total length: 2.68 mm; width of pronotum: 0.84 mm; width of abdomen: 1.12 mm.

Holotype ♀ (BISHOP 7451), TAHITI, Mt Aorai Trail, 1650-1890 m, *Freycinetia*, 15.IX.1934, E. C. Zimmerman. 1 nymph of 5th instar, Tahiti, Mt Aorai Trail, 1350-1650 m, 14.IX. 1934, Zimmerman (BISHOP).

I. Species from Rapa.

Calisius homalanthi Kormilev, new species Fig. 25.

♂. Flat, with mostly obliterated granulation.

Head shorter than width across eyes (♂-14 : 15, ♀-15 : 15.5). Anterior process ovate, flattened around clypeus, reaching middle of ant. segm. III; granulation on clypeus very fine, on borders semifused together. Ventral side of head with portion in front of rostral base flat and smooth, without granulation, similar as in the African genus *Paracalisiopsis* Kormilev, 1963. Antenniferous tubercles short, acute, with convex exterior borders. Eyes moderately large, semiglobose, protruding. Infraocular carinae formed by 3 spaced granules. Postocular tubercles minute, not reaching outer border of eyes. Vertex with a double row of 8 (4+4) granules. Antenna slightly shorter than head (♂-13.5 : 14, ♀-14.5 : 15), relative length of segments I-IV, ♂-2.5 : 2.75 : 3.25 : 5, ♀-3 : 3 : 3.5 : 5; I and II cylindrical, III tapering towards base, IV fusiform. Rostrum reaching to hind border of head. *Pronotum* less than 1/2 as long as its maximum width (♂-10 : 25, ♀-11 : 26), rather flat. Collar without granules. Fore disc with 2 (1+1) semiobliterated carinae, diverging backwards, and a median depression between them; lateral borders each with 3 small, spiculoid gran-

ules. Hind disc with 4 (2+2) carinae formed by granules, sometimes semiobliterated ; humeri with 1 or 2 small granules anteriorly. *Scutellum* flat, longer than its maximum width (♂-32.5 : 20, ♀-33 : 20). Basal elevation small and low, with 4 (2+2) small, flattened spiculoid granules along basal border, rest of basal elevation without granulation. Carina low and thin, without granulation ; lateral borders of scutellum also without granulation. Disc finely punctured. *Corium* with obliterated granulation, but in some specimens is present as a diminute, dense granulation. *Abdomen* longer than maximum width across segment III (♂-33 : 28, ♀-37 : 25). Connexivum wide and reflexed ; connexivum IV shorter than wide (♂-4 : 5, ♀-5 : 6) ; exterior borders of connexiva with a double row of almost obliterated granulation. Hypopygium caudal in position, rather flat (seen from above as a thin margin), with 2 (1+1) small granules laterally. Segment IX (♀) small.

Color : ♂, grayish brown ; ant. segm. IV, head behind eyes, and pronotum laterally, brown; connexiva II, V and VI, with exception of lateral borders, exterior borders of connexiva III and IV, with exception of PE-angles, tergum VII, and rings of femora, piceous. Scutellum : basal elevation orange-yellow ; 2 (1+1) crescent-shaped spots along basal elevation piceous ; 2 (1+1) basolateral streaks, and an inverted "V" band in middle of disc, whitish, rest of disc brown. ♀ paler.

Total length : ♂-2.52, ♀-2.80 mm ; width of pronotum : ♂-1.00, ♀-1.04 mm ; width of abdomen : ♂-1.12, ♀-1.20 mm.

Holotype ♂ (BISHOP 7452), RAPA I. (South Pacific), Maitua, 210-240 m, 2.VII.1934, by beating on *Homalanthus*, E. C. Zimmerman. Allotype ♀ (BISHOP), same data as holotype, except beating dead branches. Paratypes : 2♀♀, same data as allotype ; 1♀, Rapa I., NE Ridge of Mangaoa Pk, 300-360, 25.VII.1934, Zimmerman. The last specimen is darker in color, and with reduced granules on lateral borders of pronotum (BISHOP and Kormilev coll'n).

1♀ without head, 1♂ without tip of abdomen, and 5 nymphs of various instar were not made paratypes.

Last two species : *Calisius brachypterus* n. sp. and *Calisius homalanthi* n. sp. are more advanced in secondary modifications, and their systematic position maybe best seen from the key.

REFERENCES

Bergroth, E. 1894. Forsatta Bidrag till Aradidernas kännedom, *Ent. Tidsk.* **15** (2) : 97-98.
1913. A new species of *Calisius*. *Canad. Ent.* **45**(1) : 9.

Blöte, H. C. 1965. Catalogue of the Aradidae in the Rijksmuseum van Naturlijke Historie. *Zool. Verh.* **75** : 8-9, fig. 2.

Costa, A. 1864. Generi e specie d'insetti della fauna Italiana, *Ann. Mus. Zool. Nap.* **2** : 142, pl. II fig. 3.

Esaki, T. & R. Matsuda 1951. Hemiptera Micronesica III, Dysodiidae. *Mushi* **22** (13) : 84-85, pl. II, figs. M & N.

Horvath, G. 1913. Species Mundi Antiqui generis *Calisius*. *Ann. Mus. Nat. Hung.* **11** : 626-31, figs. 3-7.

Kirkaldy, G. W. 1908. A Catalogue of Hemiptera of Fiji ; Aradidae. *Proc. Linn. Soc. N.S.W.* **33** : 350-51.

Kormilev, N. A. 1958 (1959). Notes on Aradidae in the U.S. National Museum, I Subfam. Calisiinae. *Proc. U. S. Nat. Mus.* **109** (3413) : 218–20, figs. 13–15.

1962 (1963). On some Calisiinae in the British Museum (N.H.). *Ann. Mag. Nat. Hist.* ser. 13, **5**: 604–7, figs. 3–9.

1965. Notes on Australian Aradidae (Hemiptera: Heteroptera). *Proc. R. Soc. Queensland* **77** (3) : 13.

1966. Aradidae in the South Australian Museum, Adelaide, Hemiptera-Heteroptera. *Rec. S. Austr. Mus.* **15** (2) : 280–93, figs. 13–22.

Matsuda R. & R. L. Usinger 1957. Aradidae. *Insects of Micronesia* **7** (3): 125–36, figs. 1b, 3–4.

Stål, C. 1858 (1860). Bidrag till Rio Janeiro-traktens Hemipterfauna. *K. Vet. Akad. Handl.* **2** (7) : 67.

Usinger, R. L. 1946. Heteroptera, Insects of Guam II ; *Bull. B. P. Bishop Mus.* **189**: 37–39, fig. 5.

Usinger, R. L. & R. Matsuda 1959. Classification of the Aradidae ; London, Brit. Mus. (N.H.) VII+410 pp 101 figs.