

PAPUAN WEEVIL GENUS *GYMNOPHOLUS*: THIRD SUPPLEMENT WITH STUDIES IN EPIZOIC SYMBIOSIS¹

By J. Linsley Gressitt²

Abstract: Eleven new species and 1 new subspecies of *Gymnopholus* are described as follows: *rennii*, *rubi*, *howcrofti*, *suturalis angularis*, *engabena*, *harti*, *piorae*, *didiman*, *euryae*, *nodifer*, *huttoni* and *magnus*. The first 6 belong to the nominate subgenus and the second 6 to the subgenus *Symbiopholus*. The latter 6 all support plant growth on their backs. Further observations on marked or caged individuals of *G. lichenifer* have resulted in several individuals being observed for more than 3 years, and demonstration that plant growth during long periods has been very limited. This indicates that life-span of some individual adults must considerably exceed the 5 years estimated earlier.

Studies on the weevil genus *Gymnopholus* (subfamily Leptopiinae) continue to bring to light many new facets of interest (Gressitt 1966, 1969, Gressitt & Sedlacek 1967, 1970). The growth of algae, diatoms, fungi, lichens, liverworts and mosses on the backs of the living weevils has raised interesting questions, first of all on the habitat, habits and longevity of the weevils. Furthermore, the presence among these plants of protozoans, rotifers, nematodes, more than 1 group of phytophagous mites, as well as occasional bark lice, makes this small association of still further fascination. Moreover, this group is biogeographically of considerable interest.

Biogeography: These weevils are limited to mainland New Guinea (the island) above 900 m altitude (1500 m for the plant-bearing *Symbiopholus*), making them especially interesting subjects for biogeographical consideration. The flightlessness and sedentary nature, together with their fairly strict altitudinal zonation, means that most individual species do not form actual interbreeding populations over very great areas. Only 2 species appear to have broad ranges. These are *G. weiskei* Heller which occurs from the Chimbu Valley to the Owen Stanley Mts, and *G. gressitti* Marshall which occurs from Mt Otto to Mt Giluwe. The former has the greatest altitudinal range (900-2800 m) and can thus easily span mid-mountain valleys and most passes between the main ranges. The latter species occurs from 1800 to 2750 m in the Western Highlands and adjacent Southern Highlands to northern Chimbu and western edge of the Eastern Highlands, where there are continuous mountains in this altitudinal span. *G. gressitti* is replaced to the east, including the Saruwaged, Ekuti, Kuper and Owen Stanley ranges, by related local species. In this group there is strongly marked sexual dimorphism, and also often 2 or more quite different-appearing sorts of females within a species.

Aside from the above 2 somewhat widespread ones, most species are of very limited known occurrence. They may occur on a single mountain or range. It is assumed that their vagility is so weak that speciation is achieved within a relatively short period, with genetic drift proving highly significant, and influx of genes from parent or sister populations being negligible.

If these assumptions are correct, the genus has been evolving rapidly, and more so than its more generalized relative *Eupholus*, which occurs largely at lower altitudes. In actual

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fact, there are a few species which seem to bridge the presumed gap between *Gymnopholus* and *Eupholus*. The collection of additional material in several areas suggests that *G. nothofagi* Gress. may not be a member of *Gymnopholus*. This puzzling situation seems to be characteristic of the island of New Guinea, whereby related genera appear to merge, one into the next. This appears to be indicative of the active state of evolution on the island, because of the rather recent proliferation of the environment, such as elevation of large areas, producing many ranges of medium to high altitude. This has apparently happened without large-scale extinction in recent time. The general situation of the speciation suggests that Pliocene islands have been united into a large landmass with extensive uplifts of sea bottom. The Ekuti-Aseki area, where a number of the new species here described were collected in 1974, displays striking raised marine limestone, in part strongly suggestive of raised atolls and other reefs.

The older Owen Stanley Mountains appear to be richest in species of *Gymnopholus*, with great diminution of species west of the Eastern Highlands. Only a very few species are known from the western 1/2 of the island (Irian Jaya). None are known from the Vogelkop. There appear to be more species in the lower mountains between the Owen Stanleys and Eastern Highlands than in the Chimbu, Western Highlands and Southern Highlands.

In the mountains between the Eastern Highlands and the Owen Stanleys there are cases where different closely related species occur in adjacent areas without obvious altitudinal or vegetational barriers between them. This is also true in the upper medium altitude range (2200-2900 m) on the south side of the Owen Stanleys.

For the area between the Eastern Highlands and Owen Stanleys, the different geological ages of the mountains may partly explain species differences in adjacent areas. Populations have certainly colonized some mountains more recently than others.

Habitat: These weevils inhabit middle and upper rainforest and moss forest zones, up to the tree limit (where it occurs). The range is from about 900 to at least 3600 m altitude. In general, the weevils are more abundant on the forest fringes and in somewhat disturbed forest. They are often found in natural clearings resulting from action of lightning or of very large fallen trees. This suggests that they prefer areas of more light to dense forest shade. This is of course true of most insects, but probably to a little less degree with *Gymnopholus* than with many others. These weevils are not active, and seem to try to avoid strong sunlight, usually resting on undersides of leaves. This habit, together with their general sedentary nature, flightlessness, longevity, and occurrence in the cloud forest, closely relates to the epizoic symbiosis having developed to such a striking degree.

Feeding habits: The adult weevils are leaf-feeders. The host plants of *Gymnopholus* are varied, but seem to be entirely trees and vines for the adult weevils. Younger trees seem to be most commonly attacked. Weevils have been seen at the very tops of trees 8 or more m tall, so they probably do occur still higher, where they might be detected with difficulty. They do have the habit of climbing as high as possible, on young trees at least. This is noticed more in foggy weather. The weevils may walk over the ground for considerable distances, even when preferred food plants are close at hand. Families of plants fed upon by adult weevils include Fagaceae, Ulmaceae, Urticaceae, Cunoniaceae, Pittosporaceae, Rosaceae, Leguminosae, Rutaceae, Euphorbiaceae, Elaeocarpaceae, Saurauiceae, Ochnaceae, Theaceae, Melastomaceae, Araliaceae and Ericaceae. Little is known about larval feeding habits, but the larvae apparently feed on roots fairly deep in the soil. Some feed on roots of kunai grass (*Saccharum*, *Themeda* or *Imperata*). Some high-altitude species occur as larvae under tundra or alpine grassland. For discussion of behavior see Szent-Ivany (1970).

Abundance; longevity: *Gymnopholus* weevils are often quite abundant locally in favorable situations, such as natural clearings, forest edges and certain disturbed situations. In other

seemingly appropriate locations, they are exceedingly rare or appear to be absent. The reasons for the disparities are not readily apparent. In the experiment of marking (Samuelson 1970) and releasing individuals of *G. lichenifer* Gress., several weevils have now been observed for 3 years or slightly more. The extent of growth of plants on these individuals during that time has been rather limited. This suggests that the life-span of an individual adult may be of much more than 5 years duration. On the top of Mt Kaindi (2360 m) near Wau, *G. lichenifer* has become considerably scarcer in recent years. The number of recoveries of marked individuals has been steadily declining, and unmarked individuals are becoming more difficult to find. On the other hand, the individuals in the large outdoor cage on the summit are for the most part living for long periods. The suspected reasons for the decline in the local population, very high a decade ago, are as follows:

(1) Populations may have been abnormally high at the initiation of the study as a result of forest clearing and other activities in connection with leveling the peak for the repeater station earlier, and then enlarging the flat area shortly after the start of the study. These activities provided much loose soil, new slopes, young plants, and grassland. Probably these circumstances favor larval development and emergence from the ground. (Along the nearby wartime Bulldog Road, the same species and another, *G. acarifer* Gress., are often abundant. There are old and new landslides along the road, with resulting grassland, tundra, and young trees and shrubs—many of them rhododendrons or other Ericaceae—and other successional aspects.)

(2) Visiting collectors and children have taken weevils away. Some have been killed in the studies.

(3) Predation may have increased, perhaps partly because the color-code markings of the released weevils may have facilitated detection by predators of the generally quiescent weevils. The assumed predators are *Antechinus* or other predaceous marsupial mice; *Petaurus* (sugar glider), a marsupial equivalent of a flying squirrel; and *Eudromicia* (pygmy possum).

Recent visits to other mountains in the Morobe District show that the related weevils are quite abundant in some localities and less abundant in others.

Epizoic symbiosis: All the new species of *Symbiopholus* described in this paper have obvious plant growth and at least some of the associated fauna. As with previously described species of the subgenus, in every case there appear to be structural modifications of the dorsum (and sometimes upper surfaces of femora) to facilitate establishment of plants and to protect them from being scraped off. These modifications include the various tubercles, ridges, pits, depressions, reticulations of the surface cuticle plus various modified hairs and scales. The modified hairs may be fur-like, arborescent, or peg-like, and the modified scales may bend at right angles so that terminally they are erect, like blades of grass or setae. The scales may also occur in rosettes like flowers, with 1 or more pegs in the center. These hairs, branching hairs, pegs and erect portions of scales obviously serve as attachments for the initial plants, just as do the pits, etc., which may or may not have hairs or scales. In some species only certain portions of the dorsum are hairy, and individuals may be seen with plant growth coinciding with the pattern of the hairy portions.

Often, eroded-looking weevils are seen which have lost their plant covering together with the scales to which the plants were attached. In such scaly species, fresh individuals may be recognized by having the scales intact, without plant growth, whereas all other individuals will have plant growth in various stages, or will be naked without their scales.

It is assumed that most of the spores of the plants are air-borne, but that some spread of the plants is fostered by the movements of the phytophagous mites from one weevil to another. For instance, a male weevil may rest on the back of a female for long periods, even for days, and a 2nd male may also try to mate with the same female or fight with the 1st male.

There is a waxy secretion exuded from underneath the hind margin of the pronotum which may serve to aid the adherence of the plant spores.

In the distributional information, PNG refers to Papua New Guinea. New Guinea (NE) refers to the northeastern 1/4 of the island which is the northern 1/2 of Papua New Guinea.

Systematics: In the following treatment, descriptions of 11 new species and 1 new subspecies are presented, besides notes or records of other species. All the species of the genus are listed below, in approximate phylogenetic order, by species-groups. There are some rearrangements, and the original numbers of the old species have been retained. G = Gressitt; H = Heller; M = Marshall; S = Sedlacek.

Subgenus *Gymnopholus* s. str.

Nothofagi: 1. *nothofagi* G.—1a. *ellyni* G. & S.—1b. *toxopei* G. & S.—1c. *setosus* G. & S.—1d. *subnacreus* G. & S.—1e. *rostralis* G. & S.

Marquardt: 3. *marquardt* H.—3a. *rennii*, n. sp.—4. *mammifer* G.—4a. *pulcher* G. & S.—5. *muscosus* G.—5a. *vetustus* G. & S.—6. *gressitti* M.—7. *ajax* G.—7a. *rubi*, n. sp.—8. *splendidus* G.—9. *gemmifer* G.—9a. *howcrofti*, n. sp. 10. *carinatus* H.—11. *angustus* M.—12. *perspicax* G.

Fulvospretus: 13. *fulvospretus*(H.)—14. *cyphothorax*(H.)—14a. *biformis* G. & S.—14b. *tricolor* G. & S.—15. *marshalli* G.—2. *urticivorax* G.—16. *suturalis*(H.)—16a. *suturalis angularis*, n. ssp.

Interpres: 17. *interpres* H.—17a. *engabena*, n. sp.—18. *brandti* G.—19. *divaricatus* G.—20. *glochidionis* G.—21. *integrrostris* (H.)—21a. *harti*, n. sp.—22. *ludificator* G.

Weiskei: 23. *weiskei* H.—24. *regalis* G.—25. *sedlaceki* G.

Magister: 26. *magister* G.—27. *hornabrooki* G.—28. *szentivanyi* G.

Seriatus: 28a. *seriatus* G. & S.

Subgenus *Symbiopholus* G.

Audax: 29. *audax* G.—29a. *nitidus* G. & S.—30. *praecox* G.

Fallax: 44. *fallax* G.

Kokodae: 31. *kokodae* M.

Cheesmanae: 32. *cheesmanae* M.—33. *algifer* G.—33a. *rebecca* G. & S.—33b. *shungolus* G. & S.—34. *symbioticus* G.—35. *zoarkes* G.—45. *herbarius herbarius* G.—45a. *herbarius oribatifer* G.

Reticulatus: 36. *reticulatus* M.—36a. *piorae*, n. sp.—37. *botanicus* G.—38. *vegetatus* G.—38a. *carolynae* G. & S.—39. *rugicollis* (H.)—39a. *schuurmansiae* G. & S.—39b. *didiman*, n. sp.—41. *lichenifer* G.—41a. *huttoni*, n. sp.—41b. *nodifer*, n. sp.—41c. *euryae*, n. sp.

Acarifer: 40. *fungifer* G.—42. *acarifer* G.—42a. *magnus*, n. sp.—43. *senex* G.—46. *hepaticus* G.—47. *schefflerae* G. & S.

Subgenus GYMNOPHOLUS s. str.

Marquardt-group

3a. *Gymnopholus* (s. str.) *rennii* Gressitt, n. sp.

FIG. 1b, 2a, 3b

♂. Black, largely glabrous above, a red scale-patch on side of humerus and some smaller patches at intervals behind it along side; venter and legs with scattered oblique pale hairs and some fine greenish

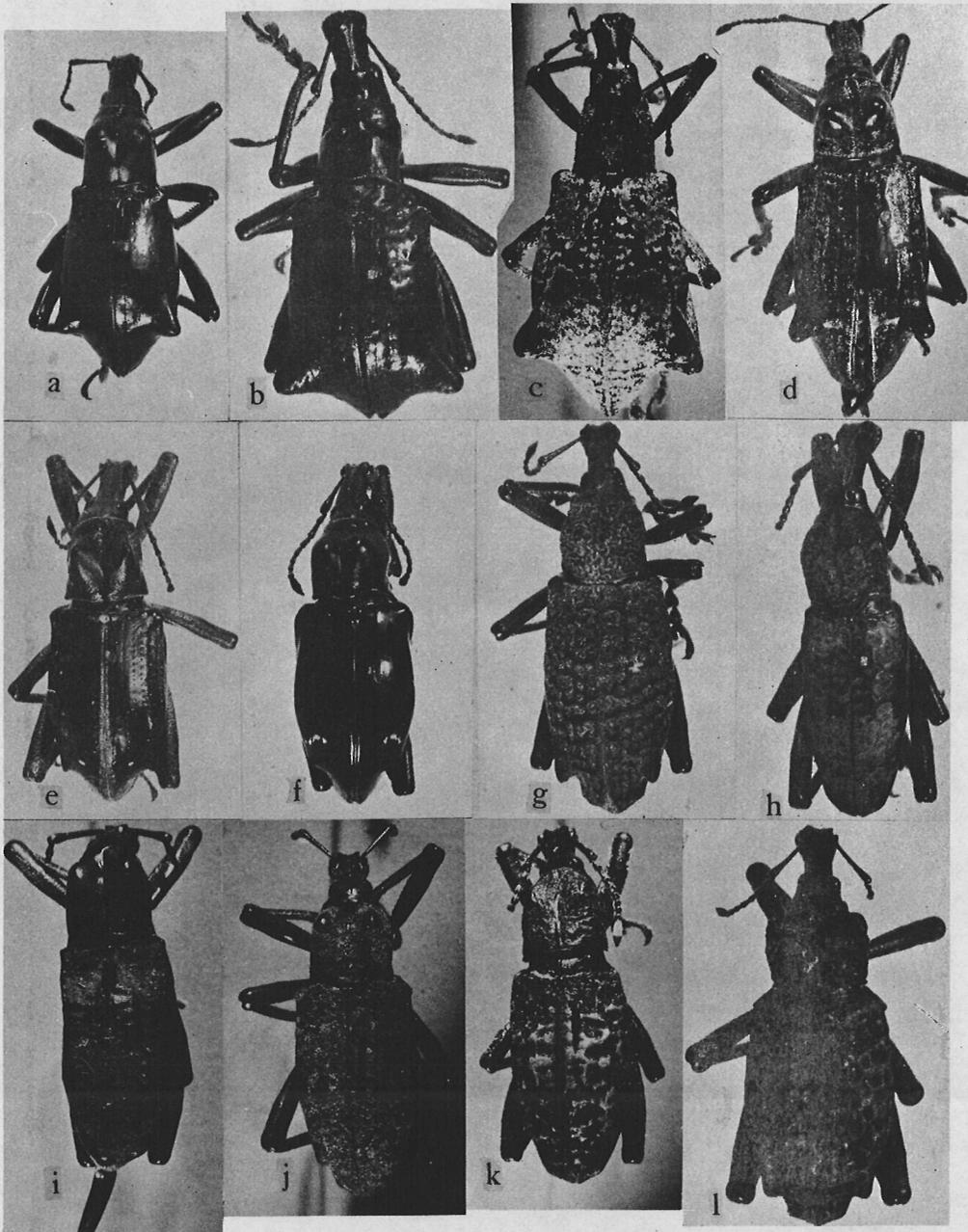
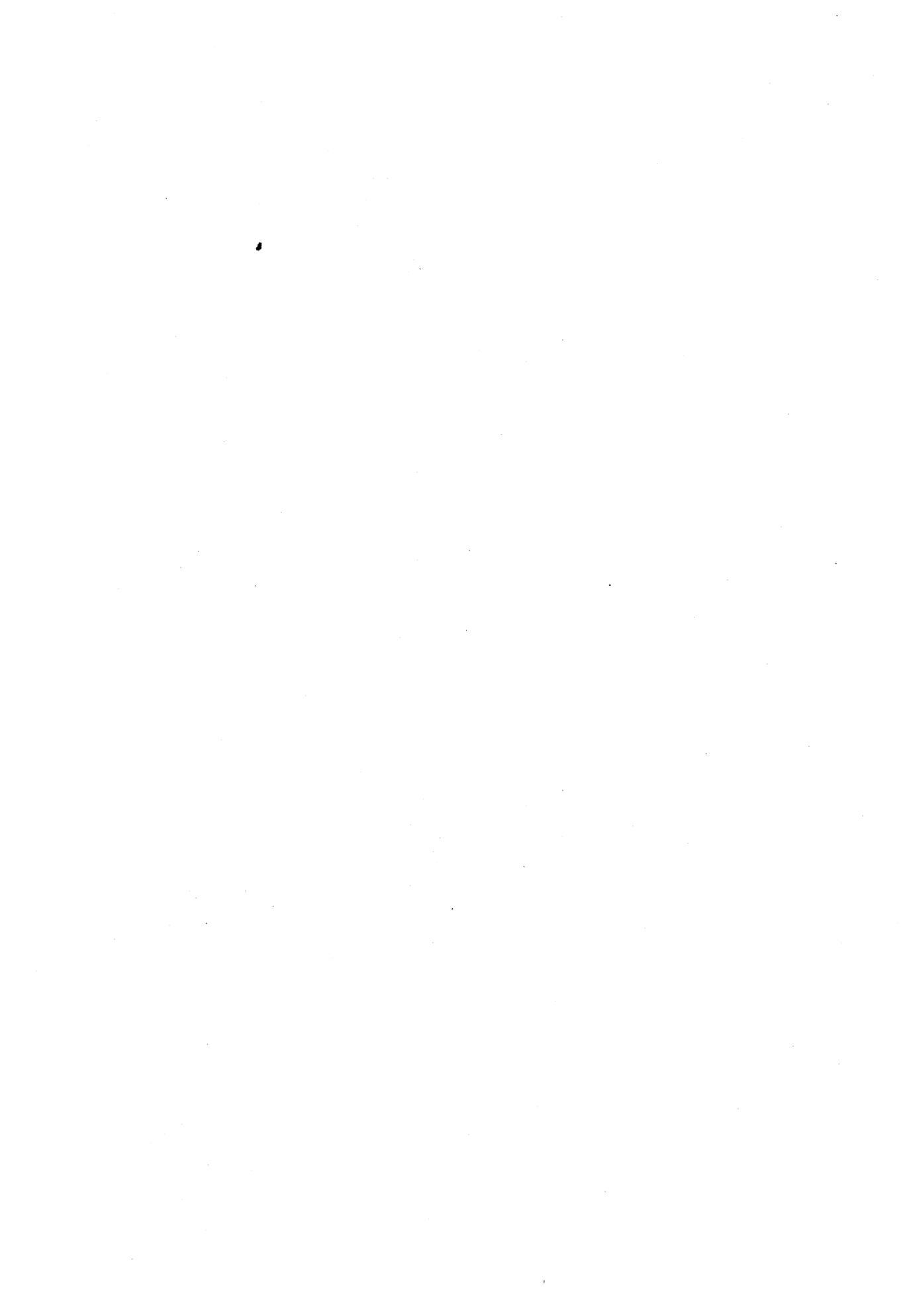


FIG. 1. Dorsal views of adult *Gymnopholus* n. spp.: a, *engabena* ♀; b, *rennii* ♀; c, *rubi* ♀; d, *howcrofti* ♀; e, *suturalis angularis* ♀; f, *harti* ♀; g, *piorae* ♀; h, *didiman* ♂; i, *euryae* ♂; j, *nodifer* ♀; k, *huttoni* ♂; l, *magnus* ♀.



hairs; head with a few hairs anteriorly and at side; antenna with some long oblique pale hairs on scape and funicle, short oblique pale hairs in 3 rings on club, and also fine adpressed greenish hairs on funicle. *Head* distinctly longer than prothorax, broad apically, subparallel in middle, shallowly grooved medially above, finely but distinctly punctured, a small fovea between anterior portions of eyes, another median one behind level of hind margins of eyes and nearly impunctate between; eye deeper than long, narrowed beneath. *Antenna* with base of club reaching to base of elytron; scape straight, slender, thick apically, reaching to a little behind hind margin of eye; funicle considerably longer than prothorax; segments 2 and 3 long, subequal; 4 shorter; 4-7 decreasing slightly in length; 8 slightly longer than 7; club slender, tapering similarly basally and distally, subacute. *Prothorax* about 5/6 as long as broad, subparallel-sided, narrowed at apex and slightly widened at base, smooth, finely punctured, shallowly depressed medially before and behind center, 2 slight swellings on each side of center. *Scutellum* small, arched. *Elytron* of moderate length, subparallel, wrinkled at side, smooth to broadly wrinkled above, with a few weak punctures, and a prominent, rounded-subacute tubercle at 3/5 from base, suture slightly raised between tubercle and apex, and a low ridge parallel to external margin in apical 1/4. *Legs* fairly stout, moderately smooth and punctured. *Ventral surfaces* shiny and moderately punctured. *Aedeagus* (FIG. 2a). Length 17 mm; breadth 7.5.

♀. Broad, black. Glabrous above, shiny or with vague brown basal and postmedian scale-patches, plus some scales on apical declivity. Length 23 mm; breadth 11.6.

Paratypes. Dorsum of ♀ sometimes with rusty brown scales in depressed areas; dorsum of ♂ always glabrous. Length 16-23 mm; breadth 7-11.7.

Holotype ♂ (BISHOP 10,454), PNG: New Guinea (NE): Watut-Aseki divide, Ekuti Range, Morobe Distr., 2000 m, 10.IV.1974, Gressitt; allotype ♀ (BISHOP), Engabena, 1700 m, between Watut Valley and Aseki, 14.IV.1974, Gressitt; 37 paratypes: 8 paratopotypes, same data as holotype, or 26.XI.1974, Gressitt & Renni; 1, Hiakwata, nr Engabena, 1600 m, 11.IV.1974; 1, Aseki; 4, ridge N of Aseki, 1900 m, 11.IV.1974; 23, same data as allotype, or 27.XI.1974, Renni.

Differs from *G. ajax* Gress. in having aedeagus not notched in side view, less narrowed apically and turned up instead of down at apex. Differs from *G. marquardtii* Hllr. in having pronotum grooved medially and with tubercles obsolete, and dorsum glabrous in ♂, often glabrous in ♀.

6. *Gymnopholus* (s. str.) *gressitti* Marshall

3 specimens, Dalad Pass, 8100 ft (2470 m) (DASF).

7a. *Gymnopholus* (s. str.) *rubi* Gressitt, n. sp.

FIG. 1c, 2b, 3f

♂. Shiny black, elytron marked with colorful scale-patches; a few small patches of scales elsewhere; head largely glabrous, with some oblique pale hairs on broadened apex of rostrum, especially at side, and a few along underside of rostrum; antenna with sparse oblique pale hairs; prothorax with a few narrow green scales in posterior portion of median depression and on lower side anterior to middle of side of coxal cavity; elytron with 2 postbasal sub rounded scale-patches, 1 dorsal, 1 lateral, and 2 subtransverse postmedian ones, 1 dorsal, 1 lateral-anterior ones largely of reddish ochreous scales, interspersed and partly bordered with gold-green scales, posterior patches of paler ochreous scales with more gold-green scales bordering; about 9 flecks of scales of same 2 colors along posterior 1/2 of outer margin; hind portion of disc with 1 or 2 minute hair-scales in each punctural depression (vestigial); ventral surface with sparse oblique pale hairs—very few at side of hind thorax, with a few ochreous scales on side of metasternum anterior to coxa; legs with a few minute greenish or pale adpressed hairs on femora, and longer oblique pale hairs on tibiae and tarsi. *Head* smooth above, minutely punctured; frontoclypeal depression flat and finely punctured but with a slight swelling behind center; side of rostrum with upper groove obsolete, antennal groove strongly oblique; eye slightly prominent, slightly oval-oblique. *Antenna* fairly long; scape extending beyond hind margin of eye, swollen at end; segments 2-4 decreasing very slightly in length; 5 slightly shorter than 4; 5-8 decreasing very slightly in length; club slender, acute, slightly unevenly fusiform. *Prothorax* 3/4 as long as head to hind margin of eye; smooth, minutely punctured, depressed medially, weakly raised along each side of middle, obliquely depressed anterior to this; sides straight and parallel for basal 3/4, then evenly narrowed, not collared. *Scutellum* small, widened behind middle, broadly rounded posteriorly. *Elytron* straight-sided and slightly widened from humerus to the strong nipple-like preapical tubercle, narrowed and obtusely rounded apically; disc with spaced punctures of varying size in subregular rows to tubercle, vestigial posteriorly. *Legs* with femora slightly swollen beyond middle; tibiae fairly straight and feebly toothed internally. *Aedeagus* (FIG. 2b). Length 16.8 mm; breadth 7.6 at elytral tubercles, 5.8 at humeri.

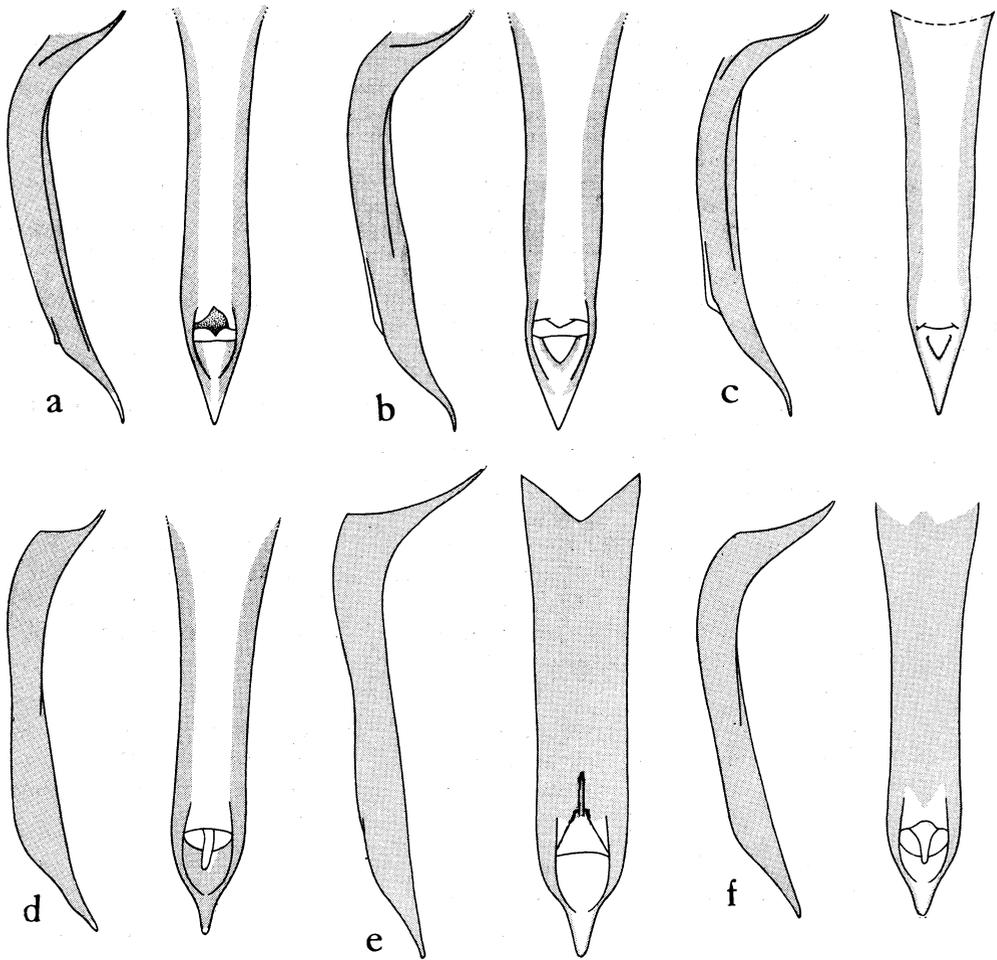


FIG. 2. Aedeagi of ♂ *Gymnopholus* n. spp., side view at left, dorsal view at right: a, *rennii*; b, *rubi*; c, *howcrofti*; d, *suturalis angularis*; e, *engabena*; f, *harti*.

♀. Body largely covered with green-gold scales, with depressions largely with gold-brown scales, and ridges and parts of rostrum glabrous; scales and hairs paler on antenna. Length 23.4 mm; breadth 12.8 at tubercles, 7.5 at humeri.

Paratypes. One ♀ marked like ♂ but with scales nacreous blue to gold above and anterior discal spot transverse. Length 16-24 mm; breadth 8-13.

Holotype ♂ (BISHOP 10,455), PNG: New Guinea (NE): Morobe Distr., 30 km S of Aseki, 1250 m, 8.XII.1974, Renni; allotype ♀, same data; 4 paratypes, 2 ♂♂, 2 ♀♀, same data.

Differs from *G. marquardtii* Heller in having pronotum non-tuberculate, head smoother, elytron less wrinkled and more punctured, and body largely covered with nacreous green-gold scales in ♀ and with more metallic scale-spots in ♂.

9a. *Gymnopholus* (s. str.) *howcrofti* Gressitt, n. sp.

FIG. 1d, 2c, 3c

♂. Black; largely smooth, glabrous and somewhat shiny; moderately hairy on apical portion of rostrum, antenna and tarsi, very hairy on tibiae. Head distinctly longer than prothorax, nearly as broad

at front of antennal insertions as at eyes; narrow in middle, but gradually narrowed behind antennal insertions; frontoclypeal area finely punctured, set off by a depressed line; gena more coarsely punctured; rostrum grooved medially above from antennal insertions almost to between hind borders of eyes, with a small fovea just anterior to middle of eyes, and generally punctured; neck nearly impunctate. *Antenna* reaching to about elytral base; scape gradually thickened, stout apically; funicle fairly robust; segment 3 slightly longer than 2; 4 slightly shorter than 2; 4 and 5 subequal; 6-8 each much shorter, subequal; club long and fairly slender, subacute. *Prothorax* about as long as broad, with a pair of strong tubercles, rounded apically, vertical externally and separated by a rounded right angle; dorsum slightly frosted, middle of side with some weak shiny wrinkles and lower side quite shiny. *Scutellum* small, minutely punctured. *Elytron* subparallel-sided, narrowed and conjointly rounded apically, with a basal carina and subprominent humerus; disc smooth with a few minute punctures; a strong nipple-like tubercle postmedially, a fairly prominent tubercle on suture preapically, and a short oblique ridge above apical margin. *Legs* long, not very stout; femora slightly punctured; tibiae nearly straight, with many fine tubercles internally; tarsi relatively narrow. *Aedeagus* (FIG. 2c). Length 17 mm; breadth 6.7.

♀. Body much broader; elytron widest near middle; dorsum largely covered with metallic scales, more gold-green dorsally and golden coppery laterally and posteriorly, lacking on median groove of rostrum, pronotal tubercles and in narrow lines (puncture-rows) on elytron. Length 23 mm; breadth 10.8.

Holotype ♂ (BISHOP 10,456), PNG: New Guinea (NE): Marafunga, 2550 m, E of Goroka, E. Highlands, IV.1967, on *Pinus* sp., Neville Howcroft; allotype ♀, same data, except on *Rubus* sp.; 12 paratopotypes (Bulolo Forestry; DASF), same data as allotype, except 1 ♀ on *Pinus*. One ♂ paratype, Kamaga, 2250 m, E. Highlands, 17.VIII. 1967, on *Imperata cylindrica*, F. R. Wylie.

Differs from *G. gemmifer* Gr. in being more elongate, in having pronotal tubercle stouter in ♂ and much stronger, taller and glabrous in ♀, with elytron of ♀ smoother with scales interrupted by fine lines and largely green above and coppery at side and posteriorly.

2. *Gymnopholus* (s. str.) *urticivorax* Gressitt

2, 80 km NNW of Tapini, in Morobe Distr., 2200 m, DASF.

16. *Gymnopholus* (s. str.) *suturalis* (Heller)

1, Lungga Village, Komba Census Division, Morobe Distr., Tomot. 2 ♂♂, Wanit Village, Selepet Census Division, Morobe Distr., V.1967, Lavok Kupa; 1 ♀, Melambi River, Zitare Village, 6000 ft (1830 m) (DASF).

16a. *Gymnopholus* (s. str.) *suturalis angularis* Gressitt, n. ssp.

FIG. 1e, 2d, 3e

♀. Black, with limited marks of white, blue or green pubescence or scales, white on scutellum, pale blue-gray along suture, a green scale-spot low on side of prothorax, another anterior and sutural of elytral tubercle and some more near external margin, some suffused pale pubescence and oblique pale setae on apical declivity; ventral surfaces with pale hairs of varying density and a green scale-patch at side of abdominal sternite 2; legs with mostly short oblique pale hairs and some small blue scales. *Head* closely punctured to rugose, grooved medially and at side, fairly smooth on depressed frontoclypeus, with fine pubescence on most parts. *Antenna* rather slender; scape slender, moderately thickened apically, reaching just beyond middle of eye; funicle with segments feebly swollen distally, 2 shorter than 3, about as long as 4, longer than 5; 5 longer than 6; 6-8 subequal; club slender, not evenly elliptical, blunted apically. *Prothorax* 1/8 broader than long, widest at base, distinctly narrowed from base to just behind middle, then slightly convex and collared apically; disc with a pair of strong, laterally compressed tubercles, rounded apically; surface finely punctured, more coarsely so anteriorly. *Scutellum* short, obtuse behind. *Elytron* moderately broad, weakly convex at side, strongly narrowed behind, with preapical tubercle fairly strong; posthumeral carina well developed, a weaker discal carina parallel to it becoming stronger posteriorly and terminating in preapical tubercle; surface fairly smooth otherwise, with 6 rather regular rows of modest punctures on disc and 3 at side. *Legs* stout; femora with many coarse granules and finer ones on tibiae; tarsi broad. *Ventral surfaces* moderately punctured. *Aedeagus* (FIG. 2d). Length 23 mm; breadth 10.

Holotype ♀ (BISHOP 10,457), PNG: New Guinea (NE): Engabena (Angabena), 2000 m, Morobe Distr., SW of Watut Valley, 14.IV.1974, Gressitt; 2 paratopotypes, 1900 m, same data but on *Glochidion*; 1, Aseki; 1, S of Aseki; 5, divide N of Aseki, 1900 m, 28.XI.1974, Renai.

Differs from *G. suturalis* Hllr. in having the pronotal tubercles higher and the elytra more even and with fewer scale-spots.

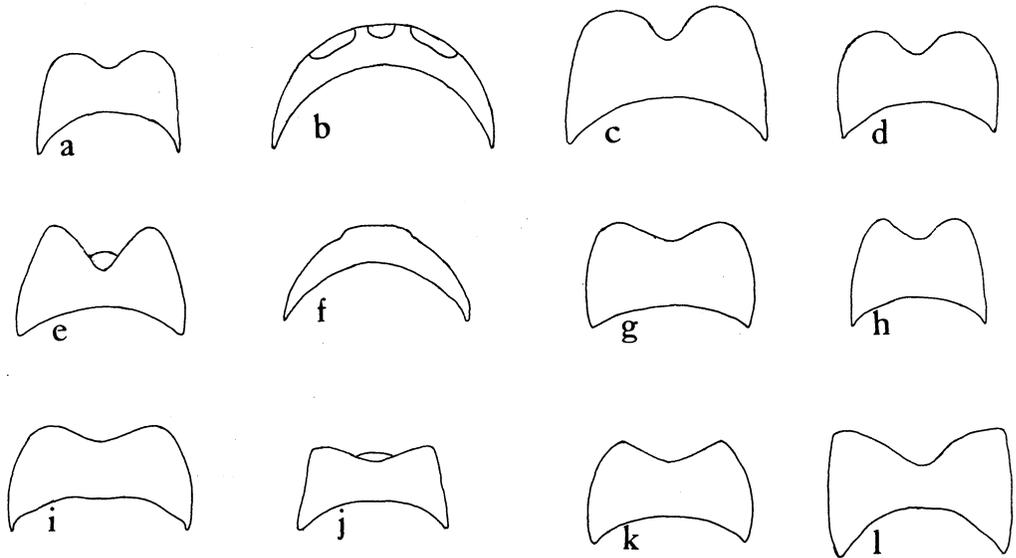


FIG. 3. Dorsal outline of pronotum, *Gymnopholus* n. sp., viewed from behind: a, *engabena*; b, *renni*; c, *howcrofti*; d, *harti*; e, *suturalis angularis*; f, *rubi* ♀; g, *piorae*; h, *euryae*; i, *didiman*; j, *huttoni*; k, *nodifer*; l, *magnus*.

Interpres-group

17a. *Gymnopholus* (s. str.) *engabena* Gressitt, n. sp.

FIG. 1a, 2e, 3a

♂. Entirely black, somewhat shiny. Largely glabrous; a few oblique hairs around mouthparts and on antenna, tibiae and tarsi. *Head* to hind margin of eye as long as prothorax, fairly even above, not grooved medially, with distinct punctures to borders of eyes, nearly impunctate on vertex and occiput; a feeble groove on upper side of rostrum, and large antennal groove; frontoclypeal area depressed, flat and minutely punctured; eye deeper than wide, slightly oblique. *Antenna* reaching middle of body; scape nearly straight, reaching nearly to hind margin of eye, strongly swollen externally at apex; funicle over $2 \times$ as long as club, segments 2 and 4 subequal, 3 distinctly longer; 5 slightly shorter than 4; 6 a bit shorter than 5; 6-8 subequal, all thickened apically; club slender, a bit unevenly fusiform, acute. *Prothorax* $1/3$ longer than broad, very slightly narrowed from base to anterior to middle, more strongly narrowed to the weak anterior collar, which is slightly constricted; surface smooth, slightly shagreened to minutely punctate; side even, not swollen, very slightly narrowed upward to the strong, subevenly convex discal tubercles, which are evenly declivitous to anterior and posterior margins and separated by fairly deep median groove, subangulate in hind view. *Scutellum* minute. *Elytron* narrow, tapered in posterior $2/5$, widest at end of basal $1/4$, slightly narrowed to humeri and to the weak lateral tubercle at end of basal $3/5$; apex conjointly obtuse; surface smooth, slightly shagreened, with long rows of very weak punctures. *Legs* with femora nearly straight, weakly swollen just beyond middle; tibiae straight, with several prominent internal teeth. *Aedeagus* (FIG. 2e). Length 15 mm; breadth 4.5.

♀. Body somewhat broader and more convex at postmedian elytral tubercles. Length 20.5 mm; breadth 8.6.

Paratypes. Length 15.5-21 mm; breadth 5.8-9.5.

Holotype ♂ (BISHOP 10,458), PNG: New Guinea (NE): Morobe Distr., above Engabena, 1900 m, $2/3$ way from Watut NW ridge (Ekuti Dividing Range) to Aseki, 14.IV.1974, Gressitt & Renni; allotype ♀, Ekuti Dividing Range, 2000 m, 10.IV.1974, on *Elaeocarpus*; 30 paratypes: 12, same data as holotype; 6, same data as allotype; 6, Aseki, 1200 m, 1.XII.1974,

Renni; 3, divide N of Aseki, 28.XI.1974, Renni; 1, S of Aseki, XII.1974, Renni; 1, Menyama, R. Stevens (DASF).

Differs from *G. interpres* in having pronotal tubercles more evenly rounded, not bent externally on upper portion.

20. *Gymnopholus* (s. str.) *glochidionis* Gressitt
8, Aiyura, 5400 ft (1650 m), J. Barrett (DASF).

21a. *Gymnopholus* (s. str.) *harti* Gressitt, n. sp.

FIG. 1f, 2f, 3d

♂. Slender, with high pronotal swellings and weak elytral tubercles. Black, somewhat shiny, smooth. Nearly glabrous, with only a few bristles on anterior portion of head, some sparse oblique hairs on antenna and oblique bristles on inner and distal portions of tibiae. *Head* a little longer than prothorax, broad apically, narrow and parallel-sided in central portion, which is distinctly punctured and without median groove, a small pit between eyes slightly anterior to their centers; occiput smooth; gena moderately punctured. *Antenna* slender, with scape quite thick apically; funicle much longer than scape, segments 2 and 3 long, similar; 4 slightly shorter; 4–7 decreasing slightly in length; 8 slightly longer; 2–8 each distinctly thickened apically; club slender, fusiform, subacute apically. *Prothorax* a little longer than broad, gradually narrowed anteriorly from base, to near apex, then narrowed and collared, the collar also narrowed to apex; pronotal swellings large, strongly raised, subevenly convex, subvertical anteriorly, groove between slightly greater than a right angle; surface entirely smooth. *Scutellum* small and blunt apically. *Elytron* long, narrow, narrowed in 3 stages from end of basal 1/3, the apical stage sub rounded at margin, but forming a common obtuse angle, viewed from above, along transverse swelling parallel to margin; suture weakly tuberculate at start of apical declivity; surface smooth. *Legs* slender; tibiae with irregular teeth internally; tarsi not very broad. *Ventral surfaces* fairly smooth; metasternum very short. *Aedeagus* (FIG. 2f). Length 19 mm; breadth 6.

♀. Body broad, usually shiny; elytron with a narrow transverse-arcuate mark of white pubescence between middle and lateral tubercle, and with a very weak lateral carina. Length 24.5 mm; breadth 9.5.

Paratypes. ♀ often completely glabrous above, like ♂. Length 16.5–21.5 mm; breadth 4.5–9.5.

Holotype ♂ (BISHOP 10,459), PNG: New Guinea (NE): Watut-Aseki Divide, Ekuti Range, 2000 m, 10.IV.1974, Gressitt & Alan Hart; allotype ♀ (BISHOP), Aseki, 1350 m, 11.IV.1974, Gressitt & Hart, on *Cordyline*; 10 paratypes, same data as allotype, or 13–14.IV, Hart, some on *Evodia*; 1, Aseki, Ohlmus collection; 2, Engabena, 1900 m, between Watut and Aseki, 14.IV.1974, Gressitt; 1, Upper Watut Valley, 900–1200 m, 18.III.1962; 1, Coviak Ridge, 1765 m, near Wau, XII.1963, H. Clissold; 2, Yaningya, S. Bulldog Rd, X.1973, Gressitt; 6, same data as holotype.

Differs from *G. cyphothorax* (Hllr.) in lacking a distinct posthumeral carina on elytron and in often having a postmedian white mark on elytron of ♀, smoother side of prothorax and venter more pubescent in ♀. Named for Alan Hart of Bishop Museum, who collected part of the material.

22. *Gymnopholus* (s. str.) *ludificator* Gressitt

1, Wavit Village, Selepet Census Division, Morobe Distr., V.1967, Lavok Kupa.

Weiskei-group

23. *Gymnopholus* (s. str.) *weiskei* Heller

Many, Ekuti Range, Engabena and Aseki, Morobe Distr., 1200–2000 m, IV, XII.1974, Gressitt, Renni & Hart.

Subgenus SYMBIOPHOLUS Gressitt

Cheesmanae-group

32. *Gymnopholus* (S.) *cheesmanae* Marshall

35, Waitape, 8000–9000 ft (2440–2740 m), R. Stevens; Erume, 2000 m, 6.VII.1974,

- T. Fenner; Tapini, 7000-9000 ft (2130-2740 m), K. Pitzz (DASF).
33. *Gymnopholus (S.) algifer* Gressitt
Many, Mt St Mary, 10,000-11,000 ft (3050-3350 m), 15.IX.1966, Rhonda Stevens (DASF).
34. *Gymnopholus (S.) symbioticus* Gressitt
Several, Tapini, 7000-9000 ft (2130-2740 m), K. Pitzz (DASF).
35. *Gymnopholus (S.) zoarkes* Gressitt
Several, Tapini, 7000-9000 ft (2130-2740 m); Waitape, 9400 ft (2760 m), K. Pitzz (DASF).
45. *Gymnopholus (S.) herbarius herbarius* Gressitt
Many, Murray Pass, 9000-12,000 ft (2740-3660 m); Waitape, 10,000 ft (3050 m), R. Stevens; Tapini, 7000-9000 ft (2130-2740 m), K. Pitzz (DASF).
- 45a. *Gymnopholus (S.) herbarius oribatifer* Gressitt
Several, Tapini, 7000-9000 ft (2130-2740 m), K. Pitzz (DASF).

Recticulatus-group

36. *Gymnopholus (S.) reticulatus* Marshall FIG. 4b
Many, Daulo Pass, 2600 m, J. Barrett, A. Hart & L. Gressitt.
- 36a. *Gymnopholus (Symbiopholus) piorae* Gressitt, n. sp. FIG. 1g, 3g, 4a

♂. Black, clothed with fairly close tawny recumbent hairs on pronotum and elytron; legs largely reddish pitchy, sparsely to moderately clothed with tawny oblique bristles; ventral surfaces black and shiny, nearly glabrous, but with a few patches of pale pubescence. *Head* a bit longer than prothorax, nearly 2X as broad near apex as anterior to eyes; frontoclypeal area concave, wrinkled, sides of antennal insertion strongly raised; rostrum unevenly narrowed behind antennal insertions, not grooved medially, finely granulose, 2 moderate grooves on each side; occiput finely granulose; eye obliquely deeper than wide. *Antenna* moderately slender; scape slightly thickened distally, reaching just beyond hind margin of eye; funicle shiny, segment 2 shorter than 3, as long as 4; 4-6 distinctly decreasing in length; 6-8 subequal in length; club slender-elliptical, acute. *Prothorax* slightly longer than broad, convex at side, narrowed and somewhat collared anteriorly, with a pair of subobtusate tubercles with an obtuse depression between them; surface coarsely vermiculate throughout. *Scutellum* narrowed postbasally and broadened preapically, densely pubescent. *Elytron* fairly narrow, widened behind humerus, narrowed posteriorly, suddenly narrowed near postmedian tubercle, obliquely rounded apically, with a preapical tubercle at side and ridge passing through it parallel to margin, besides a slight sutural swelling at top of oblique (lastly vertical) apical declivity; surface coarsely wrinkled, subreticulate, with about 14 ridges reaching suture, and a number of small deep cavities, mostly closely pubescent. *Legs* long; femora weakly swollen; tibiae strongly expanded apically; tarsi not very hairy above. *Ventral surfaces* smooth, shiny, largely impunctate. *Aedeagus* (FIG. 4a). Length 22 mm; breadth 8.

Holotype ♂ (BISHOP 10,460), PNG: New Guinea (NE): Mt Piora, west side, 2800 m, 11-14.VI.1966, Gressitt; allotype ♀, same data.

Differs from *G. reticulatus* Marshall in having pronotal tubercles less rounded in outline and with deeper depression between them, elytron more reticulate and with 14 ridges meeting suture, with postmedian tubercle less acute and elytral apex more oblique.

37. *Gymnopholus (S.) botanicus* Gressitt FIG. 4c
Several, Mt Wilhelm, J. Barrett (DASF).
- 39b. *Gymnopholus (Symbiopholus) didiman* Gressitt, n. sp. FIG. 1h, 3i, 4d

♂. Slender, strongly narrowed posteriorly. Black, clothed with green and blue modified scales (concave, upturned apically) in depressions on dorsum, a few fine pale oblique hairs on antenna, a few longer ones around mouthparts, a few short ones on femora, longer oblique pale hairs on tibiae and more golden hairs on tarsi and apices of tibiae. *Head* slightly longer than prothorax, broad apically and gradually narrowed to eyes; frontoclypeus concave with slightly deeper middle and edges; top of rostrum grooved medially, finely punctured, a fovea between anterior portions of eyes; occiput minutely

punctured; side of rostrum with 2 shallow grooves; eye subvertically ovate, narrower beneath. *Antenna* with scape reaching only to middle of eye, swollen apically, finely punctured; funicle nearly $1/2$ again as long as scape, segment 2 shorter than 3, longer than 4; 4–8 decreasing in length; club strongly tapering in last 2 segments, acute. *Prothorax* a little longer than broad, subparallel in basal $1/2$, strongly narrowed, and barely collared, apically; disc with a pair of broad low tubercles, rounded-obtuse in side view, rounded in view from behind, with shallow obtuse depression between; surface coarsely vermiculate, grooved medially. *Scutellum* small, convex, glabrous. *Elytron* slightly widened behind humerus, subevenly narrowed to rounded apex, a very small tubercle behind end of third $1/4$, followed by depression and then preapical swelling; surface with numerous irregular shallow concavities, nearly lacking on middle of side. *Legs* fairly slender; femora finely punctured or wrinkled; tibiae slightly sinuate, somewhat broadened apically. *Ventral surfaces* smooth, shiny, glabrous and impunctate. *Aedeagus* (FIG. 4d). Length 16.5 mm; breadth 5.6.

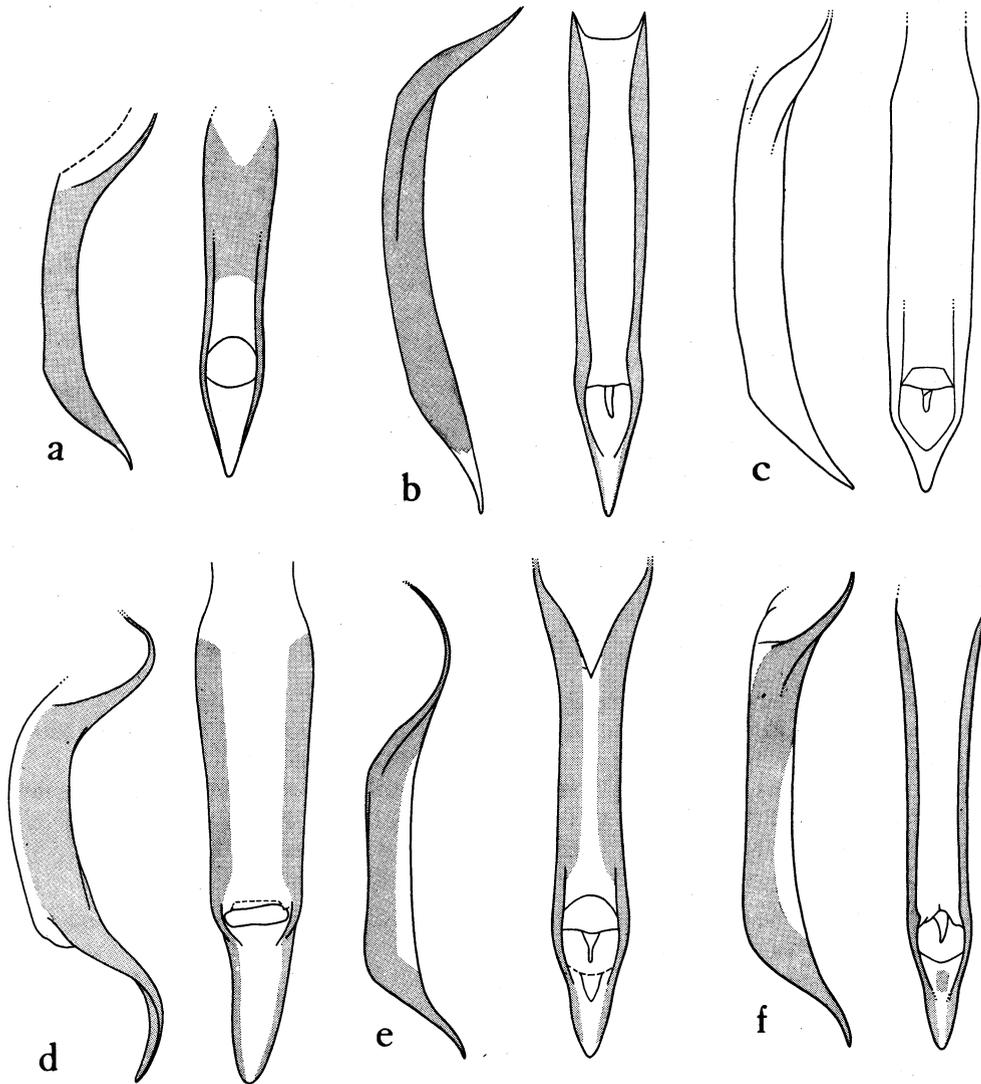


FIG. 4. Aedeagi of ♂ *Gymnopholus* spp., side view at left, dorsal view at right: a, *piorae*, n. sp.; b, *reticulatus* Marshall, cotype; c, *botanicus* Gress., topotype; d, *didiman*, n. sp.; e, *euryae*, n. sp.; f, *nodifer*, n. sp.

♀. Stouter; pronotum more arcuately depressed between broad tubercles, and less closely vermiculate; elytron more irregular, and with stronger tubercles. Length 25 mm; breadth 9.

Paratypes. Length 17.5–23 mm; breadth 5.8–9.

Holotype ♂ (BISHOP 10,461), PNG: New Guinea (NE): Morobe Distr., Wau Subdistr., Mt Missim, S side, 2100 m, 15.III.1968, Gressitt; allotype ♀ (BISHOP), 2400 m, 22-30.IV.1968, Gressitt, R. Rice & J. Sedlacek; 2 ♂ paratopotypes, 2000–2450 m, 21.XII.1967, Sedlacek, 23.IV.1968, Gressitt. 7 paratopotypes, 2500 m, 29.X.1974, Gressitt & Times; a ♀ probably this species, Marpos Village, Snake River, Morobe Distr., Mumeng Subdistr., III.1974, P. Shanahan.

Differs from *G. lichenifer* Gress. in being more slender, with scape shorter, pronotum more vermiculate, elytron with shallower and fewer pits, and less tuberculate and less obtuse apically.

41. *Gymnopholus (S.) lichenifer* Gressitt
Many topotypes (see introduction).

FIG. 5b

41a. *Gymnopholus (Symbiopholus) huttoni* Gressitt, n. sp.

FIG. 1k, 3j, 5a

♂. Black to gray, somewhat dull, with moderate oblique golden tawny hairs on appendages and around mouthparts; sparse hairs on abdomen, denser on last sternite. *Head* no longer than prothorax, distinctly grooved medially, finely punctured; frontoclypeal area depressed, flat and punctured; eye oblique, ovate, much deeper than wide. *Antenna* with scape reaching beyond middle of eye, gradually thickened to apex, moderately punctured; funicle with segment 2 nearly as long as 3 and longer than 4; 4–8 subequal in length, more or less pyriform; club slender, elliptical, subacute. *Prothorax* slightly longer than broad, about as wide just anterior to middle as at base, and slightly concave between, narrowed anteriorly and with somewhat of a narrow collar; disc feebly raised and subvermiculate basally, a moderate, evenly round-topped tubercle on each side anterior to middle, and a somewhat evenly concave longitudinal depression between. *Scutellum* short, rounded-obtuse behind. *Elytron* subparallel-sided in basal 1/2, gradually narrowed posteriorly; apex broadly rounded at margin, obtuse on declivity; disc with numerous small depressions and some low subtransverse ridges meeting suture; preapical tubercle quite small, followed by a slight depression and then a weak swelling slightly closer to margin than suture. *Legs* moderately stout, punctured; femora weakly swollen; tibiae somewhat arched, strongly widened apically; tarsi with last segment a bit longer than 1 + 2. *Ventral surfaces* finely and sparsely punctured but punctures denser and closer on last abdominal sternite. *Aedeagus* (FIG. 5a). Length 21.5 mm; breadth 8.2.

♀. Pronotal depression flatter; disc subvermiculate; elytron more coarsely reticulate. Length 22 mm; breadth 8.6.

Paratypes. Often pale grayish on elytron with subconfluent dull brown spots (vegetation in pits); fresh specimens with short dull pubescence in elytral pits. Length 17–23 mm; breadth 6.7–9.5.

Holotype ♂ (BISHOP 10,462), PNG: New Guinea (NE): S of Garaina, 1800–2400 m, E Morobe Distr., II.1972, Angus Hutton; allotype ♀ (BISHOP), 30 km S of Garaina, 2000 m, 9.I.1968, J. & M. Sedlacek; 13 paratypes (BISHOP, DASF, Bulolo, Ohlmus coll., etc.): 6, at 30 km S of Garaina, 2000 m, 9.I.1968, J. & M. Sedlacek & Abid Beg Mirza; 1, Arabuka, 1500–2000 m, J. Sedlacek; 1, Arabuka-Moime, 1900–2100 m, J. Sedlacek; 2, N slope Mt Strong, 2600–3000 m, 8–10.I.1965, J. H. Sedlacek; 2, near Garaina, 800 m, III.1972, Angus Hutton; 1, near Garaina, 800 m, 16.I.1968, J. & M. Sedlacek.

Differs from *G. lichenifer* Gress. in being a bit smaller, usually more gray and brown than black, with rostrum shorter, dorsum usually less sculptured, and with dull pubescence instead of metallic scales.

41b. *Gymnopholus (Symbiopholus) nodifer* Gressitt, n. sp.

FIG. 1j, 3k, 4f

♂. Black, dull to shiny above, shiny at side and beneath. *Head* glabrous above, with some minute hairs at side, and with longer tawny hairs around mouthparts, below antennal insertion and medially beneath; antenna with fine oblique hairs and close pruinosity on club; prothorax with modified tuft-like scales on most of notum and side, glabrous on upper portions of dorsal tubercles; scutellum glabrous; elytron largely clothed above with tufted scales above, glabrous on much of sides, ventral surfaces glabrous except for sparse minute hairs with more on pro- and meso-sterna and last abdominal sternite; legs with scattered pale tawny hairs plus minute blue hairs on tarsi. *Head* minutely punctured basally, a little

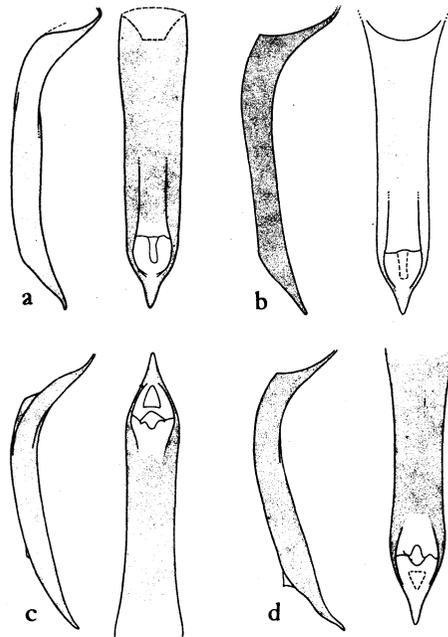


FIG. 5. Aedeagi of ♂ *Gymnopholus* spp., side view at left, dorsal view at right; a, *huttoni*, n. sp.; b, *lichenifer* Gress., topotype; c, *acarifer* Gress., topotype; d, *magnus*, n. sp.

more sparsely and coarsely so on rostrum, which is grooved medially above and beneath and has 3 grooves at side. *Antenna* with scape swollen apically; just over 2/3 as long as funicle, segment 8 just over 1/2 as long as 3; club unevenly elliptical, subacute. *Prothorax* slightly longer than broad, narrowed and slightly constricted near apex, about as wide just behind middle as at base; slightly wrinkled at side; disc of pronotum depressed medially in anterior 2/3, raised on each side to form a pair of subrounded swellings; also a very small glabrous node between each tubercle and base. *Scutellum* smooth, convex. *Elytron* with extreme basal margin narrowly raised and shiny, and somewhat gradually narrowed and subrounded apically; disc depressed behind base, then with a band of 6 (minute 7th) longitudinal nodes, each 2–3 × as long as broad, at end of basal 1/4 and another similar series at middle, with other less distinct unevenness plus modest subapical tubercle, smaller apical tubercle and depression between; side with series of shallow depressions plus 1 row of punctures parallel to margin. *Legs* finely punctured; hind femur hardly swollen; hind tibia straight also; tarsi broad, punctured. *Ventral surfaces* smooth, most sternites convex, with sparse minute punctures. *Aedeagus* (FIG. 4f). Length (excluding head) 19.3 mm; breadth 6.7.

♀. Stouter; elytral nodes less regular in size and position, 2 much larger ones in 2nd rank. Length 23 mm; breadth 9.5.

Paratypes. Length 18.5–28 mm; breadth 7–11.5.

Holotype ♂ (BISHOP 10,463), PNG: New Guinea (NE): Ekuti Range (Aseki-Watut track), south side, SW of Watut Valley, NW of Mt Leahy, 1900 m, 14.IV.1974, J. L. Gressitt; allotopotype ♀ (BISHOP), same data; 36 paratypes: 26.XI.1974, 24 paratopotypes, 10, 14.IV, Gressitt, Hart & Renni, partly on *Lithocarpus*; 3, Hiakwata, 1600 m, 11.IV.1974; 2, Engabena, 2000 m, 28.XI.1974; 3, ridge N of Aseki, 30.XI.1974, Renni; 2, between Menyamya and Bulolo, XII.1966, R. Stevens.

Most of specimens with extensive algal-fungal growth on scaly areas of notum; more perfect lichen and some hepatics on parts of allotype.

Differs from *G. lichenifer* Gr. in having elongate-oval nodes on elytron instead of numerous cavities and a few ridges.

41c. *Gymnopholus (Symbiopholus) euryae* Gressitt, n. sp.

FIG. 1i, 3h, 4e

♂. Shiny black, in part covered with pubescence which may bear plant growth. Head largely glabrous, with some oblique pale hairs around mouthparts, gena and under side; antenna with a few oblique pale hairs; prothorax glabrous; scutellum glabrous; elytron largely pubescent except on sides, apex and weak ridges in central portion or along basal 1/2 of suture; legs with rather few hairs mostly on tarsi and apices of tibiae; ventral surfaces essentially glabrous. *Head* finely punctured throughout; rostrum with moderate median groove, slight groove on upper side and deep antennal groove; frontoclypeus deeply impressed and nearly flat; genae with coarse as well as fine punctures. *Antenna* with scape gradually thickened and reaching to behind middle of eye; segment 2 distinctly shorter than 3; 4 not quite as long as 2; 4-7 decreasing very slightly in length; 8 as long as 7; club unevenly fusiform, subacute. *Prothorax* slightly longer than head to hind margin of eyes, 7/8 as broad as long, very slightly narrowed to middle, then narrowed and weakly convex anteriorly, with a weak collar; surface unusually smooth, minutely punctured; tubercles broad and evenly arcuate above and a similarly arcuate groove between them; side with almost no wrinkles. *Scutellum* short, rounded behind. *Elytron* slightly narrower at humeri than at end of basal 1/5, gradually narrowed and subrounded apically, smooth at side and partly with depressed areas on basal 1/3 of disc and between weak ridges on posterior 1/2, and 2 subapical tubercles, which are not very prominent. *Legs* only moderately stout; femora weakly swollen just beyond middle, finely punctured. *Ventral surfaces* smooth, minutely punctured. *Aedeagus* (FIG. 4e). Length 18.6 mm; breadth 5.8.

♀. Much of median portion of pronotum apparently pubescent, but possibly only covered with plants. Length 26.6 mm; breadth 10.8.

Paratypes. Pronotum bare to varying degrees; elytron largely covered. Length 21.5-26 mm; breadth 8.4-10.5.

Holotype ♂ (BISHOP 10,464), PNG: New Guinea (NE): Morobe Distr., S of Aseki, 1250 m, 8.XII.1974, Renni; allotype, same data; 6 paratypes: 2 paratopotypes, 4, Mt Amde, 1350 m, between Aseki and Kaintiba, near Papua border, 8.XII.1974, Renni.

Differs from *G. nodifer*, n. sp. in having weak longitudinal ridges instead of elliptical nodes on elytron, in having stronger pronotal tubercles, and pronotum usually more extensively bare, and elytron covered more with rusty brown than grayish green.

Acarifer-group

42. *Gymnopholus (S.) acarifer* Gressitt

FIG. 5c

Many topotypes, Bulldog Road, 2400-2700 m, Gressitt, Hart et al.

42a. *Gymnopholus (Symbiopholus) magnus* Gressitt, n. sp.

FIG. 11, 3 1, 5d

♂. Large; black to dark gray, rough and dull above and on legs, and largely smooth and shiny beneath. Body largely glabrous, with sparse oblique pale hairs on antenna, legs and anterior portion of rostrum. *Head* about 12 mm long and 4 mm wide near end of rostrum, somewhat deeply grooved along middle of rostrum and also on each side of middle portion; frontoclypeal area strongly depressed and flattish; surface feebly punctured, nearly smooth on occiput and between eyes. *Antenna* with scape over 6 mm long, reaching to behind middle of eye, somewhat evenly thickened to apex; funicle segments quite unequal in length; 2 barely longer than 3; 3-5 strikingly decreasing in length; 5-8 decreasing slightly in length and more bulbous apically; club subelliptical, gradually tapering in distal 1/2, subacute. *Prothorax* broader than long, broadest at apices of pronotal tubercles which are stout, subacute, overhanging at side and forming a distinct obtuse angle between the pair; surface coarsely vermiculate. *Scutellum* minute, slightly grooved medially. *Elytron* stout, convex in lateral view, with moderate preapical tubercle, obtuse apically; disc with coarse punctures partly in paired rows, but irregular parallel to suture, and with some longitudinal ridges between rows with alternate ridges stronger. *Legs* stout; femora wrinkled and punctured; tibiae slightly sinuate, punctured and slightly ridged longitudinally; tarsi about 10 mm long. *Ventral surfaces* smooth, shiny, finely and sparsely punctured. *Aedeagus* (FIG. 5d). Length 27.5 mm; breadth 10.5.

♀. Length 32 mm; breadth 13.6.

Paratypes. Length 22-28 mm; breadth 9.6-11.5.

Holotype ♂ (BISHOP 10,465), PNG: New Guinea (NE): Mt Missim, 2500 m, Morobe Distr., 29.X.1974, Gressitt & Times; allotype ♀ (BISHOP), 2500 m, 22.IX.1974, Thane

Pratt; 5 paratopotypes, same data as holotype; 1, same data as allotype; 8 paratopotypes, IV.1966, Gressitt & O. R. Wilkes, V.1967, Gressitt & G. A. Samuelson, V.1968, Gressitt, J. Sedlacek & R. Rice.

Differs from *G. acarifer* Gress. in being narrower, with pronotal tubercles more prominent and more angulate, nearly vertical in front, and forming a deeper and sharper angle between them, the tips angulate and projecting instead of rounded. Also, the punctures along elytral suture are irregular, partly merged, and not in 2 regular rows as is often the case with *G. acarifer*. Differs from *G. colmani* in lacking the large confluent pits on elytron and with pronotal tubercles more overhanging at side. Differs from *schefflerae* in having much more angulate pronotal tubercles and less regular elytral punctures.

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