Pacific Insects 9 (3): 481-500 20 August 1967

PAPUAN WEEVIL GENUS GYMNOPHOLUS: SUPPLEMENT AND FURTHER STUDIES IN EPIZOIC SYMBIOSIS[1]

By J. L. Gressitt and Josef Sedlacek

BISHOP MUSEUM, HONOLULU

Abstract: This genus was increased in 1966 from 14 to 47 kinds, including a new subgenus with most of its species bearing plant growth of a number of families of cryptogamic plants, with oribatid mites, rotifers and nematodes living among the plants. In this supplement, 11 new species are added, as well as some observations on the biology or ecology of weevils and the plant association. Some additional types of plants have been found on the weevils.

The genus *Gymnopholus* (subfamily Leptopiinae) recently attained considerable interest because of the discovery of a complex association of plants and animals living on the backs of the weevils.[2] *Gymnopholus* is only known to occur on the mainland of New Guinea, above 750 meters in altitude. In the preceding paper on the genus, the known species were increased in number from 14 to 47. A new subgenus was proposed for nearly half of the species, including rougher species which occur at higher altitudes, in moss forest or on its fringes. These latter are, with a few exceptions, the species which bear the plant association. This association is considered to represent mutualistic symbiosis, as the weevils appear to be specially adapted for the encouragement of plant growth. Initially, the existence of fungi, algae, lichens and liverworts was observed on the beetles. At least 13 families of these groups were detected. Within these plants, abundant phytophagous mites, *Symbioribates papuensis* Aoki[3], representing a new family, were observed. In addition, rotifers and nematodes occur in the plant association. Another genus of weevils, *Pantorhytes*, as well as others, also support similar associations.[4]

During 1966, J. L. Gressitt with his wife and three daughters, or with O. R. Wilkes, visited some little-known mountain areas in NE New Guinea, and collected at least 5 new species. Also, J. Sedlacek visited the Leiden Museum, and borrowed the material

---

1. Partial results of a grant to Bishop Museum from the National Science Foundation (GB-3245, GB-5864). We are grateful to Dr J. T. Wiebes, for the loan of material from the Leiden Museum, and to G. A. Samuelson, Carolyn Gressitt, Ellyn Gressitt, Margaret Gressitt, Rebecca Gressitt and O. R. Wilkes for helping to collect additional material.

2. J. L. Gressitt, J. Sedlacek & J. J. H. Szent-Ivany, 1965, Science **150**: 1833-35, 4 figs.; J. L. Gressitt, 1966, Pacif. Insects **8** (1): 221-80, 15 figs.; J. J. H. Szent-Ivany, 1965, Papua New Guinea Sci. Soc. Trans. **6**: 15-36.

3. J. Aoki, 1966, Pacif. Insects **8** (1): 281-89, 13 figs.

4. J. L. Gressitt, 1966, Pacif. Insects **8** (1): 294-97, 1 fig.; **8** (4): 915-65, 22 figs.

from the Netherlands-Indian—American (Third Archbold) Expedition, which produced 6 new species, helping to fill a conspicuous gap in the known distribution of the genus.

Recent collecting by G. A. Samuelson on the Huon Peninsula and along the Bulldog Road provided additional interesting plant-bearing material, and the largest known specimens of the genus.

Among these recent collections, particularly those from the Kubor and Saruwaged Ranges, are specimens which have demonstrated the occurrence of mosses, and other additional groups of plants, growing on these weevils. Some observations on behavior and feeding habits on the weevils have also been made. Some preliminary notes are included here, and further field studies are in progress.

One of the striking characteristics of members of this genus is the extreme local speciation, with populations from different mountain ranges usually being different, within the same species-groups. Speciation appears to be progressing at a rapid rate.

In 1914 Heller (Nova Guinea, Zool. **9**: 645-47) described from SW New Guinea 2 species which might be referable to this genus. One, *wichmani*, was made the type of a subgenus, *Niphetoscapha*, of *Rhinoscapha*, and the other, *lorentzi*, was made the type of a genus, *Penthoscapha*. The type-specimens will have to be examined before it can be established for certain that these are *Gymnopholus*. *G. wichmani* might be near *audax*, and *lorentzi* might be related to *toxopei*.

In this paper one new species-group is added. The new species are added to the key, and the augmented portions of the key, only, are presented here. The new species are asterisked.

Measurements in the descriptions mention length from front of head in vertical position to apex of elytra, as well as maximum length with rostrum extended forward. Breadth given is maximum width of body including tubercles, unless otherwise stated.

In the following list the species-numbers of the preceding paper (Gressitt, 1966, Pacif. Insects **8** (1)) are retained, for cross-reference.

List of species of Gymnpholus Heller, 1901, by species-groups

Subgenus Gymnopholus s. str.

Nothofagi: 1. nothofagi Gressitt—1a. ellynae*—1b. toxopei*—1c. setosus*—1d. subnacreus*—1e. rostralis*—2. urticivorax Gress.

Marquardti: 3. marquardti Hllr.—4. mammifer Gress.—5. muscosus Gress.—5a. vetustus*—6. gressitti Mshll.—7. ajax Gress.—8. splendidus Gress.—9. gemmifer Gress.—10. carinatus Hllr.—11. angustus Mshll.—12. perspicax Gress.

Fulvospretus: 13. fulvospretus (Hllr.)—14. cyphothorax (Hllr.)—15. marshalli Gress.—16. suturalis (Hllr.).

Interpres: 17. interpres Hllr.—18. brandti Gress.—19. divaricatus Gress.—20. glochidionis Gress.—21. integrirostris (Hllr.)—22. ludificator Gress.

Weiskei: 23. weiskei Hllr.—24. regalis Gress.—25. sedlaceki Gress.

Magister: 26. magister Gress.—27. hornabrooki Gress.—28. szentivanyi Gress.

Seriatus: 28a. seriatus*

Subgenus Symbiopholus Gressitt

Audax: 29. audax Gress.—29a. nitidus*—30. praecox Gress.
Fallax: 44. fallax Gress.
Kokodae: 31. kokodae Mshll.
Cheesmanae: 32. cheesmanae Mshll.—33. algifer Gress.—33a. rebeccae*—34. symbioticus Gress.—35. zoarkes Gress.
Reticulatus: reticulatus Mshll.—37. botanicus Gress.—38. vegetatus Gress.—38a. carolynae*—39. rugicollis (Hllr.)—39a. schuurmannsiae*—40. fungifer Gress.—41. lichenifer Gress.—45. h. herbarius Gress.—45a. h. oribatifer Gress.
Acarifer: 42. acarifer Gress.—43. senex Gress.—46. hepaticus Gress.

REVISED PORTIONS OF KEY TO GYMNOPHOLUS SPECIES

4 (3). Pronotum with distinct median groove and scattered shallow punctures; elytra fairly smooth, with scattered weak wrinkles and punctures; elytral apex rounded obtuse 5a
Pronotum with weak median groove and scattered small nodes, elytron with obtuse raised lines longitudinally and to some extent transversely, forming shallow irregular depressions, with scattered oblique bristles; elytral apex forming approximately a right angle; length 14–20.5 mm ..... **praecox**

5a (4). Pronotum with small nodes; dorsum dull; length 19–25 mm ..... **audax**
Pronotum without nodes, smooth; dorsum shiny; length 18–25 mm ..... **nitidus***

9 (6). Pronotum without wrinkles between tubercles; elytron widest at base; dorsum fairly smooth. Length ♀ 22–27 mm..... **rebeccae***
Pronotum with a few weak wrinkles between tubercles; elytron fully as broad at middle as at base, with extreme apex barely extending beyond hind tubercle; dorsum with small short green scales with fine, seta-like apices; length 23–32 mm ..... **algifer**
Pronotum coarsely wrinkled between tubercles; elytron widest at base, with extreme apex extending well beyond hind tubercle; dorsum with dense short recumbent setae; length 18–28 mm .....**cheesmanae**

10 (5). Side of pronotum fairly even, or vermiculate.....11(10)
Side of pronotum with an anterior and a posterior depression, both large, and furnished with long fine hairs (in type appearing to bear sulphur-yellow granular wax or fungi); length 23 mm ..... **carolynae***

18 (17). Prothorax slightly narrowed above at side; depression between pronotal tubercles weak or moderately deep..... 18a
Prothorax vertical at side; depression between pronotal tubercles deep and obtuse or subacute; elytral depressions mostly gradual, without distinct ridges or reticulations ..... **fungifer**

18a (18). Prothorax somewhat expanded at upper part of side, but narrowed at top of tubercles; depression between tubercles weak, shallowly obtuse; elytron with fairly regular depressions in rows ..... **schuurmannsiae***
Prothorax narrowed on upper part of side; depression between tubercles moderate, somewhat arcuate; elytral depressions fairly deep and abrupt, with distinct ridges or reticulations in part, some larger depressions near

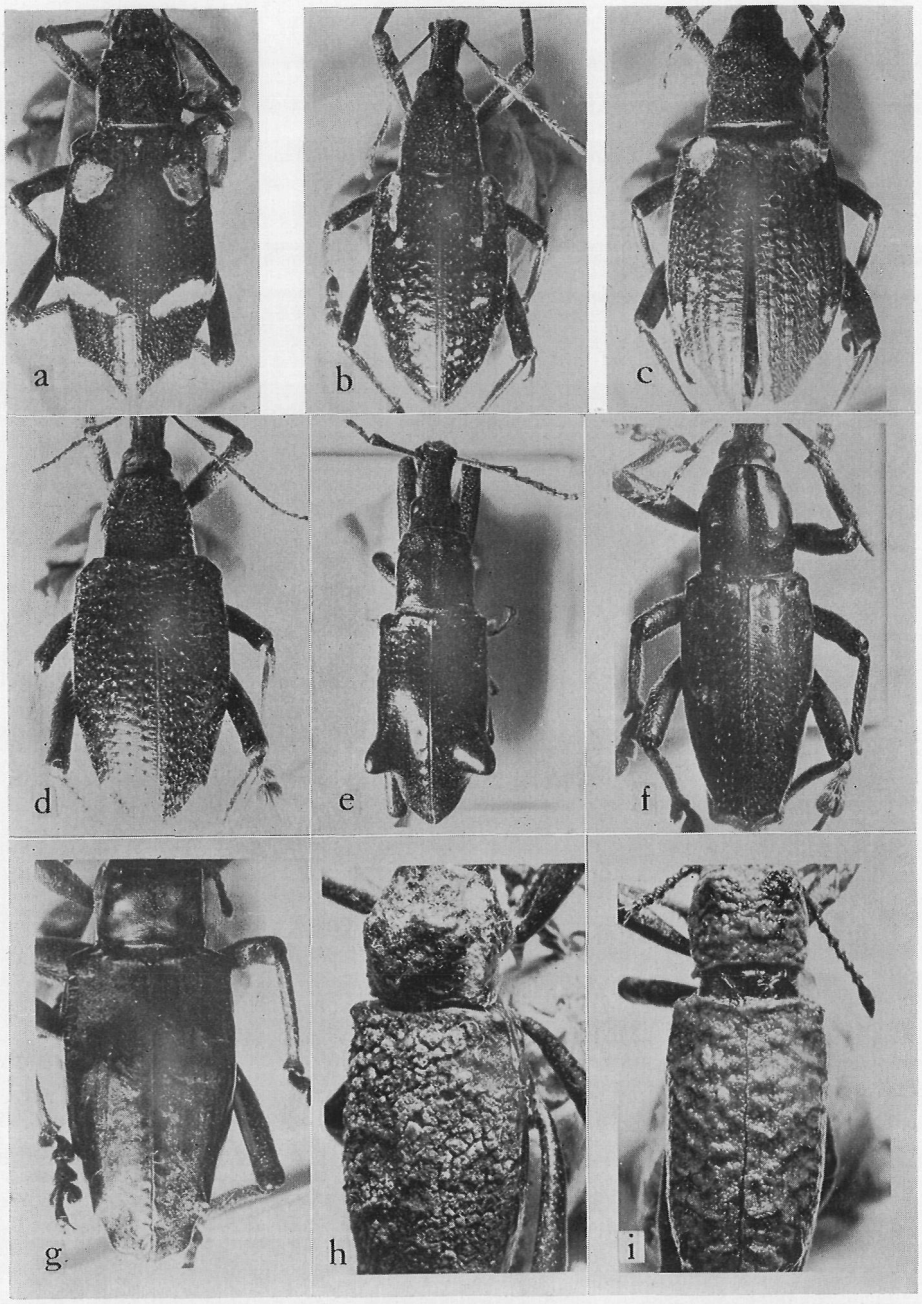

Fig. 1. a, *Gymnopholus ellynae* n. sp.; b, *G. subnacreus* n. sp.; c, *G. setosus* n. sp. ♀; d, *G. rostralis* n. sp.; e, *G. vetustus* (?) ♂ n. sp.; f, *G. nitidus* n. sp.; g, *G. rebeccae* n. sp. ♀; h, *G. carolynae* n. sp.; i, *G. schuurmannsiae* n. sp.

base..... **lichenifer**

21 (20). Dorsum without pubescent areas, generally very shiny and smooth..... 21a
Dorsum often with some pubescent areas, and some hairs; elytron with punctures 23a

21a (21). Dorsum very smooth, without strong punctures; elytron in part transversely wrinkled 22
Dorsum with strong punctures in regular longitudinal rows on elytron; length 19–21 mm ..... **seriatus***

23a (21). Dorsum with some more or less long erect hairs, as well as scales..... 23b
Dorsum usually with some scales but no long erect hairs, except on extreme apex of elytron 23d

23b (23a). Dorsum usually with whitish patches of scales; rostrum lacking dense reddish-brown hair-scales..... 23c
Dorsum with no scales except for reddish-brown hair-scales on rostrum (as well as elytral outer margin and legs), rarely a patch on elytral base ..... **rostralis***

23c (23b). Pronotum fairly smooth; elytron with few setae, often many small scale-patches; punctures irregular..... **subnacreus***
Pronotum subrugose; elytron with many long setae and dense white scale-patches at base and side; punctures in regular rows..... **setosus***

23d (23a). Pronotum quite smooth; elytron with relatively small punctures and pale patches of scales..... 23e
Pronotum wrinkled and rugose; elytron with coarse, subseriate punctures, without patches of scales; rostrum only slightly longer than prothorax; length 19–21 mm ..... **toxopei***

23e (23d). Pronotal punctures about 1/4 as wide as interspaces; elytral punctures about 8× as large as pronotal punctures; elytral patches red, hind patch 1/3 as wide as elytron ..... **nothofagi**
Pronotal punctures about 1/2 as wide as interspaces; elytral punctures 2–3× as wide as pronotal punctures; elytral patches sulphur yellow, hind patch 2/3 as wide as elytron..... **ellynae***

31 (26). Elytron with some patches or discal stripes of scales 32
Elytron smooth, glabrous in ♂ or with a straight sutural stripe, rarely with some discal areas with scales 33
♀: Elytron very uneven, with high elevated disc, elytral tubercles large and blunt. Length ♀ 24–26 mm..... **vetustus***

Subgenus **Gymnopholus** s. str.

Nothofagi-group

1a. **Gymnopholus (Gymnopholus) ellynae** Gressitt and Sedlacek, new species
Figs. 1a, 6a.

♂. Body entirely black, moderately shiny. Head and pronotum glabrous except for whitish pubescence on posterior margin of latter, and a few pale hairs on underside of head; scutellum somewhat pubescent; elytron with 3 areas of dense greenish to sulphur

yellow scales, 1 near base, another at side just below it, the 3rd much narrower, subtransverse, extending across most of upper portion of disc slightly behind middle; ventral surfaces and legs with a few fine hairs, some bluish hair-scales on tarsi; antenna with some oblique hairs and with fine auburn pubescence on club.

Head much longer than prothorax, distinctly narrower at widest portion of rostrum than at eyes; interocular area smooth and weakly convex; rostrum somewhat gradually widened from eyes to middle and then more strongly widened to apex; upper portion of rostrum fairly smooth, finely punctured, slightly depressed along middle of upper surface, and weakly depressed at side above antennal groove. *Antenna* slender, reaching well posterior to base of prothorax; scape slightly arched, distinctly swollen apically; funicle with segment 2 distinctly longer than 1 and 3, following ones shorter; club slender-elliptical and subacute. *Prothorax* about as long as broad, widest about 1/3 from apex, distinctly narrowed to apex; disc smooth, fairly even, slightly depressed on median line before and behind center, minutely and somewhat sparsely punctured. *Scutellum* small, narrow. *Elytron* slightly more than 3× as long as width at widest point just behind middle, distinctly narrower at base; margin somewhat gradually narrowed, subrounded apically; side subevenly convex, somewhat overhanging; humerus slightly swollen, with a short ridge behind it: disc moderately even and somewhat convex, depressed in area of scale-patch just behind base, with about 9 rows of fairly weak punctures, a few larger ones at base and around depressed scale-patch; a very weak tubercle at side above posterior declivity, and without a distinct sutural tubercle. *Ventral surfaces* fairly smooth, in part finely punctured. *Legs* fairly slender. Length 16 mm (18.5 including rostrum); breadth 5.8.

♀. Body stouter; elytral scale-patches more whitish sulphury; head, scape and posterior portion of elytron with more suberect hairs. Length 22 mm (26 including rostrum); breadth 9.

Paratypes. Very similar to holotype and allotype, measurements intermediate.

Holotype ♂ (BISHOP 7454), Schrader Range, at 1850 m, NW of Simbai, 3°44′S, 144°30′E, NE New Guinea, 27.V.1966, Ellyn E. Gressitt and J. L. Gressitt; allotopotype ♀ (BISHOP), same data but Ellyn Gressitt; 2♀ paratopotypes, same data, partly on *Glochidion*, Ellyn & J. L. Gressitt; 4 paratypes, 3♂♂, 1♀, Schrader Range, 1900 m, N of Simbai, 28. V.1966, Carolyn Gressitt & J. L. Gressitt. Named for Ellyn Elizabeth Gressitt who collected the first specimens, at age of 13 years.

Differs from *nothofagi* Gress. in having pronotal punctures stronger and elytral punctures weaker, rostrum more concave medially, and elytral patches sulphur-yellow instead of red and with posterior band more extensive.

1b. **Gymnopholus** (**Gymnopholus**) **toxopei** Gressitt and Sedlacek, new species

♂? Entirely black, somewhat shiny. Dorsum very sparsely clothed with subadpressed pale scales which taper apically; antenna with bluish hairs and some oblique longer hairs on funicle, and with dense, short, blackish pubescence on most of club; legs with scattered bluish scale-hairs, mostly on tarsi and apical portions of tibiae, and with oblique or recumbent paler hairs in addition; a small group of suberect hairs on preapical sutural tubercle of elytron; ventral surfaces with scattered scale-hairs and a few suberect hairs.

Head a little longer than prothorax, rostrum slightly narrower at apex than width of

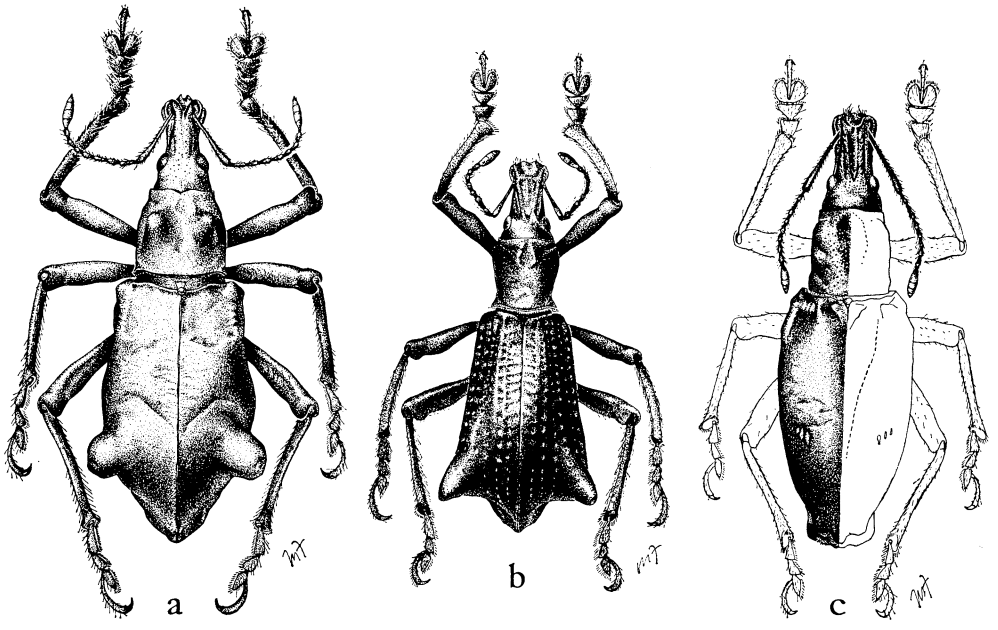

Fig. 2. a, *Gymnopholus vetustus* n. sp. ♀ ; b, *G. seriatus* n. sp. ♀ ; c, *G. nitidus* n. sp. ♀.

head at eyes, subparallel-sided in middle portion which is no longer than apical swollen portion, and hardly longer than eye ; upper surface of rostrum, behind antennal insertions and between eyes, somewhat flattened, irregular, more or less with 2 parallel grooves with some punctures, and a short deep groove at side above antennal groove. *Antenna* reaching to base of elytron, fairly slender ; scape straight, thickened at apex, reaching to base of eye ; funicle segments 1 and 2 subequal, distinctly longer than each of following ; club not very stout, slender-elliptical, and subacute apically. *Prothorax* as long as broad, subcylindrical, very slightly wider anterior to middle and very weakly constricted just behind middle ; surface more or less transversely corrugated at side, irregularly wrinkled to punctate and subrugose on central portion with a depression just anterior to center. *Scutellum* minute, rounded behind. *Elytron* more than 3× as long as width at base but less than 3× as long as width at widest part just behind middle ; side rather gradually narrowed and narrowly obtuse apically, somewhat evenly convex and overhanging ; disc somewhat raised in central portion, with fairly regular coarse punctures but with interstices rather strongly wrinkled, making the punctures less distinct, particularly on basal portion and center. *Ventral surfaces* partly smooth, with moderate punctures. *Legs* moderately slender ; 1st tarsal segment, particularly of mid and hind leg, distinctly asymmetrical. Length 20 mm (22.5 including rostrum) ; breadth 7.6.

Paratype. Dorsum more glabrous ; pronotum more transversely wrinkled and less rugose ; elytron strongly punctured but less irregularly wrinkled. Length 21 mm (24) ; breadth 8.

Holotype ♂ (BISHOP 7455), Mist Camp, 1700 m, NW New Guinea, 7.II.1939, L. J. Toxopeus, Neth. Ind.-Amer. Exped. ; paratype (LEIDEN), 1800 m, I.1939, Toxopeus,

Differs from *nothofagi* Gress., in being much more rugose on pronotum and coarsely punctured on elytron, and in lacking patches of dense scales.

1c. **Gymnopholus (Gymnopholus) setosus** Gressitt and Sedlacek, new species
Fig. 1c.

♂. Black, largely dull, but slightly shiny on head, pronotum and central portion of abdomen. Body extensively clothed with stiff oblique pale hairs, conspicuous and fairly regular on elytron, shorter and finer on head and prothorax, fairly long on venter and legs; antenna with numerous moderate hairs, and close round pubescence on club, some bluish hairs on remainder of antenna and on legs, particularly anterior borders of femora and on tarsi; pronotum with a narrow oblique strip of white and bluish scales near posterolateral angle, and lower side with dense white or blue scales; elytron with a patch of dense white scales bordered with a few greenish ones on extreme base beside humerus, and 2 elongate spots of the same at side near middle; venter with lateral margins densely clothed with white to bluish or nacreous scales.

Head more than 1/2 again as long as prothorax, nearly as broad at apex of rostrum as at eyes; interocular area somewhat uneven, with some coarse punctures and a pit near center; rostrum narrow anterior to eyes, subparallel and then gradually widened to base of distal portion which is very suddenly widened and rounded at side, upper surface between eyes and antennal insertions somewhat flat, parallel-sided with a ridge on each side of a slight depression with both large and small punctures, a very deep groove at side undercutting lateral ridge. Antenna reaching nearly to end of basal 1/5 of elytron; scape nearly straight, gradually thickened to apex; funicle with segment 2 a little longer than 1 which is barely longer than 3, following shorter; club slender, subacute at tip. *Prothorax* slightly longer than broad, subparallel in basal 1/2, slightly widened anterior to middle and distinctly narrowed to apex which is emarginate above; disc moderatly even, slightly depressed on central portion of upper side and on median strip anterior to center; surface with numerous coarse punctures partly as large as interspaces, or larger, with fine punctures on interspaces. *Scutellum* subrounded. *Elytron* slightly over 3 × as long as broad, widest anterior to middle and very slightly narrowed to base, gradually narrowed to the fairly narrowly rounded apex; side slightly convex but uneven, with pubescent patches partly depressed, and a very weak posterolateral tubercle; suture distinctly raised on posterior declivity; disc otherwise moderately even, depressed behind raised basal margin, and with fairly regular rows of punctures, but with interstices also with fine punctures. *Ventral surfaces* with fairly coarse, sparse punctures, finer on last sternite. *Legs* fairly long and moderately stout; basal tarsal segment asymmetrical, particularly in mid and hind leg. Length 18.5 mm (23 including rostrum); breadth 6.6.

♀. Body broader, otherwise largely similar to ♂, but with oblique pronotal scale-strip less complete, and elytron with 3 additional small scale-patches, 1 just behind basal patch and other 2 forming oblique line towards suture behind scutellum from hind end of posterolateral patch. Length 24.6 mm (28.5); breadth 9.5

Paratype ♀. Similar to allotype, slightly smaller, and with pronotal scale-strip complete and broader, and with a few scattered scales on elytron.

Holotype ♂ (LEIDEN Mus.), Araboebivak, 1750 m, NW New Guinea, 8.X.1939, K. N. A.

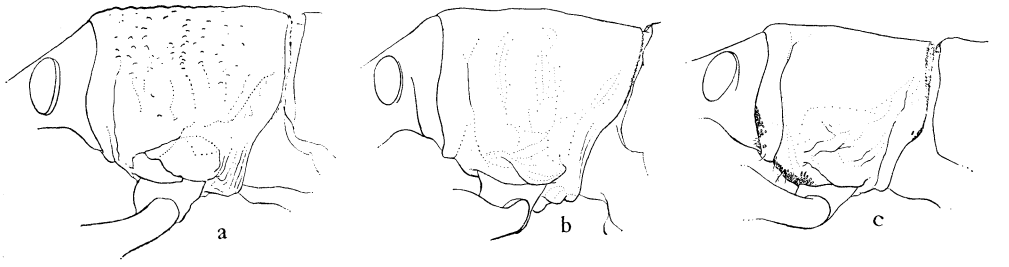

Fig. 3. Oblique-side view of prothorax; a, *Gymnopholus audax* Gressitt; b, *G. nitidus* n. sp.; c, *G. seriatus* n. sp.

G. Exped., Leiden Museum; allotopotype ♀ (BISHOP), 9.X.1939; paratopotype ♀ (LEIDEN); 22.X.1939.

Differs from *nothofagi* in having dorsum largely covered with strong suberect setae, with much heavier elytral punctures, more coarsely punctured pronotum and pubescent patches white and differently located, particularly with some along side of middle of elytron.

1d. **Gymnopholus (Gymnopholus) subnacreus** Gressitt and Sedlacek, new species
Figs. 1b, 7b.

♂. Black, slightly shiny. Body with sparse oblique pale hairs of moderate length above, very few on upper portion of pronotum and posterior portion of head; moderately dense on venter and legs; some scattered patches of dense pink to greenish or white nacreous metallic scales on basal half of elytron, in more or less continuous stripe along lateral margin of elytron, and on parts of sides of venter; antennal club with adpressed brownish pubescence; legs with some nacreous scales, particularly on anterior border of hind femur, with finer scattered bluish and greenish hair-scales on tarsi.

Head nearly 1/2 again as long as prothorax, nearly as broad near apex of rostrum as at eyes; rostrum fairly slender and parallel-sided anterior to eyes, gradually narrowed to base of apical portion which is strongly swollen and rounded at side; interocular space slightly raised, feebly punctured, with a fovea just anterior to center of interocular space; upper surface of rostrum slightly raised medially, subcarinate anteriorly, with a row of moderate punctures at each side and interstices finely punctured, a very deep lateral groove undercutting lateral margin of upper surface. *Antenna* reaching to end of basal 1/6 of elytron; scape nearly straight, distinctly thickened apically; funicle with segment 2 distinctly longer than 1 which is barely longer than 3; 4 nearly as long as 3; following slightly shorter; club slender, subacute apically. *Prothorax* barely longer than broad, somewhat constricted between middle and base, widest somewhat anterior to middle, distinctly narrowed to apex, sinuate and emarginate on upper portion of anterior margin; disc slightly uneven, both wrinkled and punctured at side, somewhat flat above with a distinct depression between middle and apex, with scattered punctures mostly a little smaller to much smaller than interspaces. *Scutellum* small, swollen above. *Elytron* 3× as long as broad, widest somewhat anterior to middle, slightly narrowed to base; humerus slightly projecting and obtuse; side subvertical, gradually narrowed and rounded-obtuse apically; disc with a ridge projecting backward to middle from humerus and a weak posterolateral tubercle;

suture moderately raised on apical declivity; disc otherwise fairly even, slightly depressed behind raised basal margin, with fairly regular rows of punctures which are mostly 1/4 to 1/2 as wide as interspaces, and with very few punctures on interstices. *Ventral surfaces* with widely spaced distinct punctures, closer on last sternite. *Legs* fairly long; basal segment of hind tarsus distinctly asymmetrical. Length 17.5 mm (20.5 including rostrum); breadth 6.6.

♀. Body stouter, prothorax stouter at base, a little more wrinkled; elytron more swollen, with punctures less regular, and with larger scale-spots which are principally white, but with blue-green hair-scales or scales on antenna and legs. Length 20.5 mm (23.5 including rostrum); breadth 7.7.

Holotype ♂ (BISHOP 7457), Baliem Camp, 1700 m, NW New Guinea, 16-27.XI.1938, L. J. Toxopeus, Neth. Ind.-Amer. Exped. (Third Archbold); allotopotype ♀ (LEIDEN) same data; 5 paratopotypes, same data; one questionable, same data. Two from Mist Camp may be different.

Differs from *nothofagi* Gress. in having erect hairs on dorsum, larger punctures on pronotum and elytron, less difference between sexes, and a number of nacreous scale-patches instead of 2 or 3 red ones on elytron.

1e. **Gymnopholus (Gymnopholus) rostralis** Gressitt and Sedlacek, new species
Figs. 1d, 7a.

♂. Body black, fairly shiny. Rostrum and interocular area almost entirely covered with bright reddish-brown scales; most of lower side of elytron with similar scales, in part purplish to metallic reddish; venter with lateral borders having largely similar scales; femora in large part clothed with reddish to greenish or purplish scales, becoming smaller and more greenish on tibiae and tarsi; antenna with numerous oblique brownish hairs; club with fine gray-brown pubescence; elytron with suberect reddish-brown hairs, particularly on posterior half and along suture; pronotum with much smaller partly erect hairs.

Head about 1/3 longer than prothorax, slightly narrower at widest point of end of rostrum than at eyes; rostrum parallel-sided in basal 1/2, then gradually widened anteriorly and suddenly widened and rounded in apical portion; interocular area with some fairly strong punctures; upper surface of rostrum somewhat flattened, with 3 ridges, median ridge subcarinate apically, depressed areas between ridges moderately punctured; a deep lateral groove. *Antenna* reaching nearly to end of basal 1/5 of elytron; scape straight, strongly thickened apically, reaching to beyond eye; funicle with segment 2 much longer than 1 which is slightly longer than 3; 4 as long as 3 and only slightly longer than following; club slender-elliptical, subacute apically. *Prothorax* slightly longer than broad, subcylindrical in basal 3/4, distinctly narrowed apically, very slightly widened at extreme base; surface somewhat uneven, transversely wrinkled and partly punctured at side, slightly rugose and moderately punctured on central portion, with median line slightly raised at center and depressed anterior to center; most of punctures about as large as interspaces. *Scutellum* fairly small and smooth, rounded behind. *Elytron* more than 3× as long as broad, widest at end of basal 1/4, moderately narrowed to base, with humerus obtuse and very slightly projecting; side more or less vertical, gradually narrowed posteriorly and obtuse apically; a fairly distinct posterolateral tubercle; suture distinctly raised on apical declivity; disc

otherwise weakly swollen, very slightly depressed behind raised basal margin, with partly regular punctures which are stronger and subfoveate basally, becoming gradually smaller posteriorly where they are 1/4 to 1/5 as large as interspaces; interstices with very few punctures but with some wrinkles and grooves basally. Venter fairly even, with widely spaced punctures which become smaller and closer on last sternite. *Legs* fairly stout. Length 19 mm (23 including rostrum); breadth 6.4.

♀. Similar to ♂ but stouter and with a few reddish brown scales at extreme base of elytron and more erect bristles on elytron. Length 24 mm (28 including rostrum); breadth 9.4.

Paratypes. Mostly similar to type but sometimes with a moderate-sized patch of red-brown scales at base of elytron beside humerus. Length 18–25 mm (26–30 including rostrum); breadth 6.5–9.8.

Holotype ♂ (BISHOP 7458), Iebele Camp, 2250 mm, NW New Guinea, XI–XII.1938, Neth. Ind.-Amer. Exped. (Third Archbold), L. J. Toxopeus; allotopotype ♀ (LEIDEN), same data; many paratopotypes, same data.

Differs from *nothofagi* Gress. in having long erect hairs on dorsum, in having rostrum with dense tan scales, and with pronotum and elytron more strongly punctured, and elytron more completely black, with only occasionally a patch of brown scales, besides outer margin with brown scales.

3. **Gymnopholus marquardti** Heller

ADDITIONAL MATERIAL: NE New Guinea: Many, Mt. Kaindi, 2350 m, III, IV, VI, Gressitt, 2, Bulldog Rd., 2400 m, 4–10.VII.1966, G. A. Samuelson; 1, Edie Ck., 2100–2250 m, 2.X. 1964, Sedlacek; 2, Wau, 1600–1700 m, 28.XII.1961, J. & J. H. Sedlacek & G. Monteith; 1, Edie Ck., 2050–2300 m, 3.XI.1966, Samuelson. (♂ occasionally seen climbing on house on mountain). QUESTIONABLE SPECIMENS: 2, Murray Pass-Voitape, 2060–2550 m., 11.XI.1965, M. Sedlacek.

Marquardti-group

5a. **Gymnopholus** (**Gymnopholus**) **vetustus** Gressitt and Sedlacek, new species

Figs. 1e, 2a, 6c.

♀. Shiny black. Dorsum, except basal rim of elytra, humerus and scutellum, entirely densely covered by minute irregularities possibly formed by microscopic scales; antenna with moderately long, white, somewhat transparent sparse hair; femora with very few minute hairs, tibiae irregularly clothed with white, pale hairs and densely with short reddish hair on apex; tarsi with sparse pale hairs.

Head slightly longer than prothorax, irregularly punctured; rostrum with dorsal groove very shallow, starting between eyes, and a short shallow groove at side above antennal groove. *Antenna* reaching to base of elytron, slender; scape slightly arched, reaching hind rim of eye; segment 2 of funicle distinctly longer than 1 which is only slightly longer than 3 or 4. *Prothorax* slightly broader than long, slightly narrowed to apex, partly and slightly wrinkled at sides, moderately densely, almost regularly punctured; tubercles conspicuous, almost vertical in front, sloping gently to base of pronotum, with median groove between them distinct through the whole length of pronotum. *Scutellum* strongly convex, densely punctured, rounded apically, as broad as long, almost 2× as broad behind middle as at

base. *Elytron* uneven, gradually broadening posteriorly, broadest behind the middle just where tubercles begin, with a broad shallow depression at base, highest in center of disc; tubercle stout, rounded, placed posteriorly and at sides of elytron, overhanging sutural swelling forms a distinct tooth 3 mm above apex; similar swellings on both sides of suture 1 mm above apex and posterior elytral rim; basal rim of elytron elevated, humerus projecting anteriorly and to side. *Venter* with very few punctures. *Legs* long, slender, weakly punctured. Length 23 (26.5 with rostrum); breadth at shoulders 8.5, at elytral tubercles 12 mm.

♂ questionably of this species; more slender, more shiny, without pronotal tubercles and without dorsal groove on rostrum; elytron less uneven, without conspicuous elevation of disc, with sparse small regular punctures in rows and sparse microscopic hairs. Venter densely punctured and sparsely clothed by minute hair; scutellum longer than broad with moderately dense minute hairs. Length 18 mm (21); breadth at shoulders 6, at tubercles, 7 mm.

Paratypes ♀. Length 24.5–26 (28–29.5 with rostrum); breadth 11 mm.

Holotype ♀ (BISHOP 7459), Mt. Piora, 3200 m, NE New Guinea, 6°45′S, 146°E, 12.VI.1966, J. L. Gressitt; 1 paratype ♀ same data; 1 paratype ♀, same data but 2400 m, on host G-6498; 1♂, possibly of this sp., same data as holotype but 1900 m; 1♂, possibly of this sp., same data but 2400 m, on G-6498.

Differs from *gressitti* in having dorsum more dull, elytra very uneven, elytral tubercles more stout and blunt.

9. **Gymnopholus (Gymnopholus) gemmifer** Gressitt

ADDITIONAL MATERIAL: 1, NE New Guinea, Mt. Michael, 2750 m, 20.I.1966, M. Sedlacek.

13. **Gymnopholus (Gymnopholus) fulvospretus** Heller

ADDITIONAL MATERIAL: NE New Guinea: 14, E. end of Saruwaged Ra., 20 km SSW of Kabwum, 2550 m, G. A. Samuelson; 10, Kalalo, 750 m, 20–30.VIII.1966, Samuelson.

14. **Gymnopholus (Gymnopholus) cyphothorax** Heller

ADDITIONAL MATERIAL: 1, NE New Guinea, Wau, Coviak Ck., 763 m, 7.XII.1963, H. Clissold.

17. **Gymnopholus (Gymnopholus) interpres** Heller

ADDITIONAL MATERIAL: NE New Guinea: Mt. Kaindi-Edie Ck. area, 2050–2500 m, III, IV, VI, 1966, Gressitt, 22.XI.1963, Gressitt, 1,13.XI.1966, Samuelson; 1, Wau, 1600–1700 m, 28.XII.1961, J. & J. H. Sedlacek, G. Monteith; 1, Wau, 2400 m, 9–12.I.1962, J. & J. H. Sedlacek & Monteith; 1, Wau, Nami Ck., 1700 m, 22.III.1963, J. Sedlacek.

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

ADDITIONAL MATERIAL: 3, NE New Guinea, E. end of Saruwaged Ra., 20 km SSW of Kabwum, 2550 m, 5–12.VIII.1966, G. A. Samuelson.

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

ADDITIONAL MATERIAL: 1, NE New Guinea, Wau, Coviak Ridge, 763 m, 7.XII.1963, H. Clissold.

25. **Gymnopholus (Gymnopholus) sedlaceki** Gressitt

ADDITIONAL MATERIAL: 13, NE New Guinea, Tomba, 2700 m, 5.VI.1966, Gressitt.

Seriatus-group

This new species-group is established for the following single new species. It is quite distinct in having a long narrow seriate body with strong posterior elytral tubercle, and strong elytral punctures in regular longitudinal rows, and smooth, flat pronotum.

28a. **Gymnopholus (Gymnopholus) seriatus** Gressitt and Sedlacek, new species
Figs. 2b, 3c, 4c, 7c.

♂. Black. Dorsum shiny with sparse minute hairs, mostly on apical 1/3; antenna with scape covered by minute adpressed hair with a few longer white hairs, more toward apex; funicle covered densely by minute hairs and moderately with white long hairs in addition; club pitchy black; scutellum with adpressed hair-scales, more dense near apex. Venter densely covered on central parts of sternites by pale recumbent hair, sides of sternites with scattered hairs, apical rim of 1st sternite with few white oval scales, sides with denser pale brown scales, apical rim of sternites 2–4 with dense brown oval scales, metasternum with short silvery recumbent hair, scale-hairs, white scales and oval brown scales, in profusion in central portion, brown scales formng dense patches more on sides; mesosternum with narrow white scales and other scales in central portion and striking patches of pale brown scales at side; prosternum with white scales and sparse minute hair; scattered brown scales on front prosternal rim; coxae with silvery adpressed hair, and some pale brown scales on 1st coxa; legs with minute bluish scale-hairs and longer white silvery hairs, sparser on femora, denser on inner side of tibiae and on tarsi; mid and hind legs have tarsal segment 3 with paler brown hairs beneath; pygidium with short reddish hair.

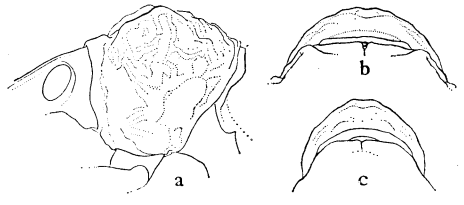

Fig. 4. Oblique-side view of prothorax: a, *Gymnopholus fungifer* Gress.; dorsal outline of pronotum viewed from behind: b, *G. nitidus* n. sp.; c, *G. seriatus* n. sp.

Head slightly longer than prothorax, finely punctured, rostrum broad, nearly as broadat apex as width of head at eyes, punctured more distinctly than head behind eyes; dorsal groove broad, shallow, densely punctured; lateral groove deep and short, antennal groove very deep. *Antenna* not reaching base of prothorax; scape reaching to center of eye; segment 1 of funicle almost equal to 2, longer by 1/3 than segment 3. *Prothorax* slightly longer than broad, without swellings or tubercles, with irregular shallow, mid-longitudinal depression, finely and sparsely punctured, with a few side wrinkles and deeper groove at side, close to the front rim. *Scutellum* longer than broad, densely punctured, convex. *Elytron* narrow at base, only slightly broader than prothorax, sharply widening in basal 1/15, then gradually gently broadening till apical 1/3, then narrowing to rounded apex; deep, regular punctures arranged in 9 longitudinal rows, row 3 forming deeper longitudinal depression stretching from the base of elytron to the base of tubercle; elytron slightly depress-

ed close to elevated basal margin, broadest just at the beginning of tubercles; tubercles situated in last third of elytron, conspicuous, blunt, protruding more back and sidewards than vertically. *Venter* with punctures of different sizes. *Legs* long, slender, moderately punctured; punctures more pronounced on 1st tibia and 3rd femur. Length 21 mm (24.8 with rostrum); breadth at elytral base 5, at shoulders 6.7, at tubercles 9.7.

♀. Prothorax more slender; body stouter, more broadened towards tubercles; rostrum shorter; legs without deeper punctures. Length 21 (24); breadth at tubercles 10.3.

Holotype ♂ (BISHOP 7460), Araucaria Camp, 800 m, NW New Guinea, III.1939, L. J. Toxopeus, Neth. Ind.-Amer. Exped.; allotopotype ♀ (LEIDEN), Mist Camp, 1800 m, NW New Guinea, I.1939, Toxopeus, Neth. Ind.-Amer. Exped.; 1 paratype, same data as holotype; 1 paratype, Rattan Camp, 1150 m, NW New Guinea, II–III.1939, Toxopeus, Neth. Ind.-Amer. Exped.

Differs from *weiskei* in having long narrow body, elytron with deep punctures, tubercles placed more posteriorly, pronotum flat, venter densely covered by hair.

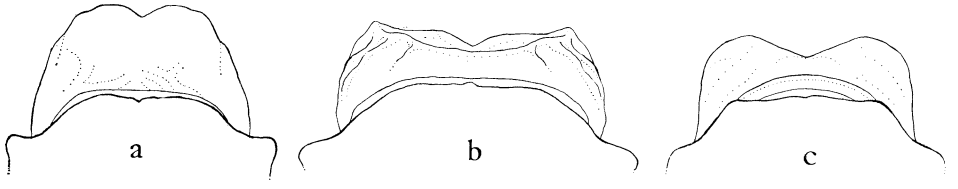

Fig. 5. Dorsal outline of pronotum viewed from behind: a, *Gymnopholus carolynae* n. sp.; b, *G. schuurmansiae* n. sp.; c, *G. rebeccae* n. sp.

Subgenus **Symbiopholus** Gressitt

Examination of hundreds of additional specimens of this subgenus has further verified the fact of specialization of dorsal scales for fostering plant growth. The plants clearly commence establishment where scales or hairs are more numerous. After the plant growth becomes heavy and the weevil aged, the mass of plants may be detached from the weevil's body, taking the scales with them. Thus some old eroded weevils may be found without plants, or with blank patches missing scales as well. This has not been adequately verified for hairs. It appears as if the scales are more easily detached than hairs. In dry museum specimens the plant growth may shrink and crack, pulling up scales near the cracks.

Audax-group

29. **Gymnopholus (Symbiopholus) audax** Gressitt Figs. 3a, 8a.

ADDITIONAL MATERIAL: NW New Guinea: 1, Wisselmeren, Enarotali, 1900 m, 25.VI.1962, J. Sedlacek; 22, Araboebivak and Paniai, 10.IX–4.XI.1939, Museum Leiden New Guinea Exped.

29a. **Gymnopholus (Symbiopholus) nitidus** Gressitt and Sedlacek, new species
Figs. 1f, 2c, 3b, 4b 8b.

♂. Shiny black. Elytra with suberect pale shiny hair, denser along suture and toward

apex, with only a few scattered hairs on sides; sparse minute hair on side of prothorax and on rostrum; dense, longer, reddish hair in antennal groove; antenna with minute white hairs and sparse longer pale hairs; legs with golden hairs, sparser on femora, more even and dense on tibiae; venter with sparse minute hair and reddish pubescence on last abdominal sternite.

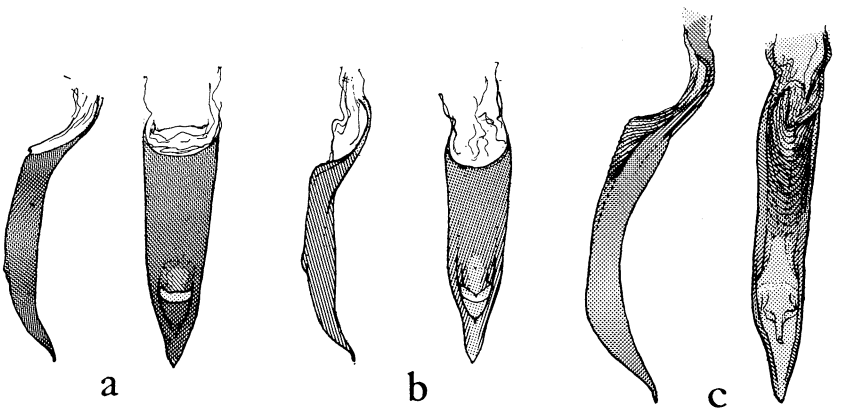

Fig. 6. Aedeagi, side view left, hind (dorsal) view right: a, *Gymnopholus ellynae* n. sp.; b, *G. nothofagi* Gress.; c, *G. vetustus* n. sp.

Head slightly longer than prothorax, densely and deeply punctured on rostrum and between eyes; dorsal groove starting between eyes, deep and broad, broadening gradually anteriorly; no other groove or depression between dorsal groove and antennal groove. *Antenna* reaching base of elytron; scape straight, long, slender, slightly swollen apically, almost reaching to base of eye; segment 1 of funicle equals 2 and slightly longer than 3. *Prothorax* longer than broad, evenly wide from the base to start of apical 1/5, then sharply constricted toward anterior rim; surface fairly evenly punctate, corrugated at sides; a shallow depression on disc. *Scutellum* broader than long, round, convex. *Elytron* weakly punctured, densely wrinkled along suture, with central and lateral depression at base and weak tubercle separated from suture by anteriorly extended concave apical declivity. *Legs* fairly stout with femora slightly asperate. *Venter* densely and almost evenly punctured. Length 21 (24.5); breadth 7 mm.

♀. Similar to ♂ only stouter. Length 24.5 (28), breadth at shoulders 9.5 mm.

Paratypes. Length 18.5–25.5 (21.5–29); breadth 6.5–6.8.

Holotype ♂ (BISHOP 7461), Moss Forest Camp, 2600–2800 m, NW New Guinea, 9.X–5.XI.1938, Neth. Ind.-Amer.-New Guinea Exped. L. J. Toxopeus; allotopotype ♀ (LEIDEN), Iebele Camp, 2250 m, NW New Guinea, Toxopeus; 21 paratypes, Moss Forest Camp, 2600–2800 m, NW New Guinea, 9.X–5.XI.1938, Toxopeus; 11, Moss Forest Camp, 2850 m, 23.VIII.1938, Toxopeus; 22, Iebele Camp, 2250 m, NW New Guinea, Toxopeus; 1, Lake Habbema, 3250–3300 m, NW New Guinea, ult.VII-ult.VIII.1938, Toxopeus, all Neth. Ind.-Amer.-New Guinea Exped.

Very close to *audax* from which it is easily distinguished by shiny dorsum and more smooth pronotum and more distinctly punctured venter.

Cheesmanae-group

33a. **Gymnopholus (Symbiopholus) rebeccae** Gressitt and Sedlacek, new species
Figs. 1g, 5c.

♀. Black. Dorsum with sparse minute hairs irregularly scattered in minute punctures; elevated parts smooth, glabrous; antenna and legs with pale hairs, sparse hair on apical borders of last sternite and pygidium.

Head slightly longer than prothorax, finely and in part densely punctured; rostrum with a deep median groove broadened anteriorly with ridges punctured on upper parts; upper lateral groove short, not reaching eye or antennal insertion. *Antenna* not quite reaching base of prothorax; scape nearly straight, punctured, gradually thickened apically, reaching nearly to hind margin of eye; segment 1 of funicle as long as 2, almost 2× as long as 3; club less than 3× as long as broad. *Prothorax* slightly broader than long, subparallel-sided, slightly widened anterior to middle, narrowed in apical 1/5, finely punctured; tubercles prominent, rounded, centered anterior to middle, sloping to base and to collar which occupies apical 1/8, shiny and smooth on top with very fine punctures; a distinct longitudinal groove in the depression between them, except near base. *Elytron* subparallel in anterior 1/2, markedly narrowing posteriorly to rounded-obtuse apex, with 2 tubercles, one just before and above apex, other, slightly more prominent, higher and more antero-lateral; surface slightly irregular, with large depression near base; humeral and lateral ridges prominent, latter subrugose, disappearing gradually just before middle; lateral ridge short, not reaching beyond basal 1/5; sides are smooth with some wrinkles. *Venter* smooth with a few isolated punctures on posterior abdominal sternites. *Legs* stout, fore and mid femora rugulose, hind femur rugulose in middle, punctured on rest. Length 26 mm (30.5 incl. rostrum); breadth 9.6.

Paratypes. Similar to type. Length 22–27 mm (24.5–31.5); breadth 7–10.

Holotype ♀ (BISHOP 7462), Mt. Piora, 2300 m, Kratke Range, 6°45′S, 145°E, NE New Guinea, 12.VI.1966, J. L. Gressitt, on *Evodia*; 2 paratypes, same data; 1, same data but on *Halfordia*. Named for Rebecca Gressitt.

Differs from *cheesmanae* in having pronotal tubercles low and more rounded, less deeply separated and more smooth, scape shorter and thicker, hind femur less corrugated and hind tibia almost hairless on outer side.

37. **Gymnopholus (Symbiopholus) botanicus** Gressitt

ADDITIONAL MATERIAL: 30, NE New Guinea, Mt. Wilhelm-Kegsugl, 2750 m, 17.V.1966, J. L. Gressitt, on *Sauravea*.

38a. **Gymnopholus (Symbiopholus) carolynae** Gressitt and Sedlacek, new species
Figs. 1h, 5a.

♂. Black, fairly dull, but somewhat shiny on abdominal sternites. Dorsum in part with fairly long fine pale hairs, particularly concentrated in 2 depressions, anterior and posterior and side of prothorax; metallic scales of elytron not evident as present in related species; antenna moderately clothed with oblique pale hairs; legs and ventral surfaces rather sparsely clothed with pale hairs.

Head distinctly longer than prothorax, fairly smooth and minutely punctured above, a

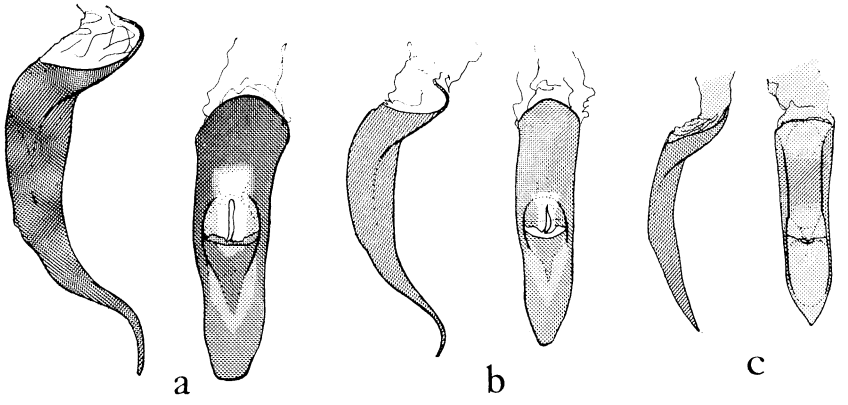

Fig. 7. Aedeagi, side view left, hind (dorsal) view right: a, *Gymnopholus rostralis* n. sp.; b, *G. subnacreus* n. sp.; c, *G. seriatus* n. sp.

weak fovea between anterior margins of eyes, a very weak arcuate groove on side of rostrum; portion anterior to eyes subparallel-sided almost to middle, then gradually and then more suddenly widened towards apex. *Antenna* reaching to just beyond humerus; scape reaching almost to posterior margin of eye, nearly straight, thickened on apex; funicle with segments 1-3 subequal, following shorter; club slender, acute, with middle segment somewhat swollen. *Prothorax* slightly longer than broad, subparallel-sided in basal 3/5, gradually narrowed to apex, with a large swelling on each side of upper portion of disc, at middle, separated by a moderate depression; surface with coarse rugosity and a large depression at side before middle and another behind middle, bearing long fine hairs and apparent bright orange yellow waxy material. *Scutellum* small, slightly longer than broad. *Elytron* just over 3× as long as broad, widest at about 1/3 length from base, with humerus rounded and prominent, and a fairly strong tubercle well before apex followed by a fairly deep depression, and suture raised at top of apical declivity and a raised area between distal tubercle and extreme apex; surface with irregular depressions and reticulate ridges, in general without distinct punctures, but surface in type almost entirely covered with dense plant growth. *Ventral surfaces* fairly smooth, finely punctured along middle of abdominal sternites. *Legs* fairly long and slender, rather weakly punctured. Length 23 mm (28 including rostrum); breadth 7.8.

Holotype ♂ (BISHOP 7463), Kubor Range, 2950 m ("CSIRO Camp No. 1"), S of Minj, Western Highlands, NE New Guinea, on *Weinmannia* sp., 25.V.1966, Carolyn Gressitt.

Differs from *reticulatus* Marshall in being less regularly pitted on elytron, more deeply grooved between pronotal tubercles, and in having 2 depressions at side of prothorax, bearing long fine pale hairs with bright yellow waxy material. Named for Carolyn Gressitt, the collector.

The type has extensive covering of fungal, algal (moss) and other plant growth on the dorsum. The conspicuous yellow patches at side of prothorax appear to represent a granular waxy secretion (but might be plant growth).

39a. **Gymnopholus (Symbiopholus) schuurmannsiae** Gressitt and Sedlacek, new species
Figs. 1i, 5b, 8c.

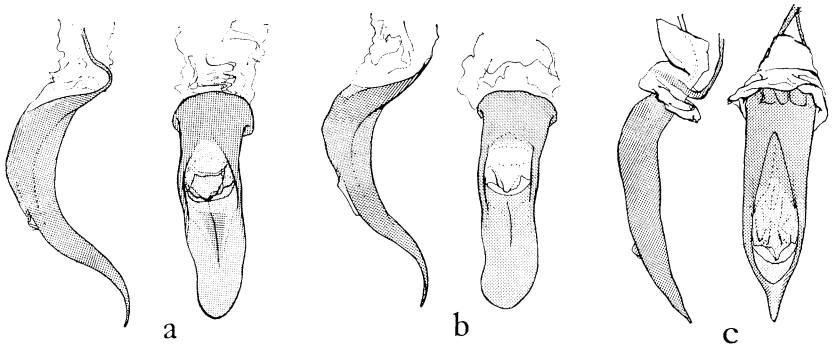

Fig. 8. Aedeagi, side view left, hind (dorsal) view right: a, *Gymnopholus audax* Gress.; b, *G. nitidus* n. sp.; c, *G. schuurmannsiae* n. sp.

♂. Body black, fairly dull; antenna pitchy, partly somewhat reddish; femora somewhat reddish pitchy at bases; ventral surfaces partly shiny. Dorsum with some minute metallic golden reddish scales; antenna with some oblique pale hairs; ventral surfaces and legs with some minute hairs, and a few scattered moderate pale hairs.

Head distinctly longer than prothorax, nearly as broad near end of rostrum as at eyes, widened behind eyes; occiput and interocular area with fine punctures of varying size and density; rostrum gradually narrowed from slightly anterior to eyes, more strongly widened anterior to middle; upper portion of rostrum shallowly grooved, in general minutely to moderately punctured, with a shallow slightly arched depression on each side above and behind antennal groove; a moderate depression on median line between anterior borders of eyes. *Antenna* reaching to base of elytron; scape very slightly arched, distinctly thickened apically; funicle with segments 1–3 subequal in length; 4 slightly shorter; 5–7 distinctly shorter; club elliptical, relatively stout. *Prothorax* slightly broader than long, widest just behind middle, broadened in upper portion of side, then slightly narrowed to tops of dorsal tubercles which are vermiculate, and with a rather weak obtuse depression between them, the depression partly fairly even and partly rugose or subvermiculate. *Scutellum* as broad as long. *Elytron* a little more than 3× as long as broad, widest at end of basal quarter; humerus oblique in front and slightly projecting at side; lateral surface of elytron nearly vertical; disc with about 5 subregular rows of fairly large and deep pits; a moderate tubercle nearly 1/4 length from apex, and a raised area closer to extreme apex than to tubercle, as well as a raised area at suture near top of apical declivity. *Ventral surfaces* largely smooth and sparsely or very finely punctured. *Legs* fairly slender and smooth, weakly rugose or transversely corrugated, particularly on fore femur. Length 23.5 mm (27 including rostrum); breadth 8.7.

Paratypes. Length 22–24 mm (27–29 including rostrum); breadth 9–11 mm.

Holotype ♂ (Bishop 7464), Kratke Range, W side, 2815 m, S of Mt. Piora, on ground in moss forest, 11.VI.1966, Gressitt; 3 paratopotypes, 13–14.VI, Gressitt & O. R. Wilkes, 2 on *Schuurmannsia* (Ochnaceae), 1 on *Decaspermum* (Myrtaceae).

Differs from *lichenifer* Gress. in having prothorax more swollen on upper part of side, and less strongly, and obtusely, concave between pronotal tubercles, and elytron with more

regular depressions above.

40. **Gymnopholus (Symbiopholus) fungifer** Gressitt Figs. 4a, 9b.

ADDITIONAL MATERIAL: NE New Guinea: 63, E end of Saruwaged Ra., 20km SSW of Kabwum, 2550 m, 5-12.VIII.1966, G. A. Samuelson; 4, Kalalo, 750 m. (?) 20-30.VIII.1966, Mena & Samuelson.

41. **Gymnopholus (Symbiopholus) lichenifer** Gressitt

ADDITIONAL MATERIAL: 122 (7 with distinct lichen growth), NE New Guinea, Bulldog Rd., 2400 m, 4-10.VII.1966, Samuelson & Wilkes.

Hosts. Two *Eurya* and an *Euodia* are common hosts on Mt. Kaindi.

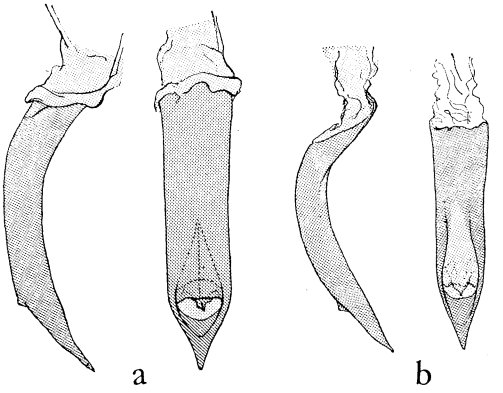

Fig. 9. Aedeagi, side view left, hind (dorsal) view right: a, *Gymnopholus acarifer* Gress.; b, *G. fungifer* Gress.

Behavior. This weevil appears to be concentrated in population on the higher parts of Mt. Kaindi, near Wau, and along the start of the Bulldog Road. Between March and June 1966 an experiment was conducted by Gressitt and family to mark and release individuals in order to start a record of beetle longevity, rate of plant growth, behavior and movement of individual weevils. Sixty-six weevils were marked by various combinations of knotting strong thread around rostrum and various tibiae, and additionally marking with finger-nail polish, including the painting of polish on the knots of the thread rings, to prevent the knots from becoming loose. Although the weevils proved to be fairly sedentary, and some were observed repeatedly, some of the marks wore off, and it became difficult to recognize individual weevils as more time elapsed. Records of reobservation of weevils are presented in Table 1.

This species spends long periods of time resting quietly on the undersides of leaves or branches, particularly in sunny weather. The weevils are more apt to walk around and feed when the weather is foggy. They are observed walking along on the ground, as well as walking up or down trunks or stems. In spite of walking on the ground, they appear to frequently climb to the tops of bushes or young trees, not necessarily their host-plants, and rest at the tips. When weevils were collected below the summit of the mountain, and after being marked and released on *Eurya* bushes around the summit, they often appeared satisfied to stay in the new area, and were even observed a week or more later on the same bush on which they were released. In other cases, they seemed intent on returning in a definite direction. One individual was observed for some time by Margaret Gressitt. It was released (29.IV.1966) on the E side of the S summit of Kaindi, just E of the Repeater Station workshop. It promptly climbed down to the ground and walked to the W, across the flat grassy area, with only occasional brief pauses, and disappeared down the slope. When obstructed in its fairly straight travel, it would take a "fighting pose" and make vigorous attempts to continue in the same direction. The "fighting pose" displayed

Table 1. Record of recoveries among first 40 of 66 *Gymnopholus lichenifer* marked and released.

23-25.III.1966	1.IV.	6,7.IV.	15.IV.	29.IV.	17.VI.	20.XII.
1						
2				X		X
3						
4			X			
5		X	X	X	X	
6						
7		X				X
8						
9						
10					X*	X
11						
12		X				X
	13	X		X*		
	14					
	15					
	16				X	
	17		X			
	18		X			
		19	X			
		20	X			
		21	XX	X		
		22	X			
		23	X			
		24				
		25		X	X	
		26	XX	X		X
		27	XX	X	X	
		28	X	X		
		29	X			
		30				
			31	X		
			32	X		
			33			
			34			
			35			
			36			
			37			
			38			
				39	X*	
				40		
Number recovered		4	13	11	8	5
Percent recovered		22	43	29	21	13

* Mating when observed
XX - indicates observed both on 9.IV. and 15.IV.

consists of raising the forward end of its body, standing on its mid and hind legs, and waving the fore legs in the air, and sometimes also moving the rostrum up and down. This is the weevils' common pose when they are handled. A common alternative action, often following repeated confrontation, is to drop suddenly to the ground. When the bush on which a weevil is resting or feeding is disturbed, the weevil may suddenly drop to the ground, or may grasp the leaf or twig tightly.

42. **Gymnopholus (Symbiopholus) acarifer** Gressitt Fig. 9a.

ADDITIONAL MATERIAL: 9, NE New Guinea, Bulldog Rd., 2400 m, 14 km S of Edie Ck., 4-10.VII.1966, G. A. Samuelson; 5, same data but O. R. Wilkes. (3/14 with lichens).