

On the Little Known Philippine Cicadas of the Genus *Psithyristria* (Homoptera, Cicadidae)¹⁾

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Since the "Hemiptera Insularum Philippinarum" was published by STÅL in 1870, in which the genus *Psithyristria* was described, no more detailed study on the genus has been made up to the present. This genus, endemic to the Philippines and composed of five species, is characterized by its unusual venation.

Recently, I was able to examine three species of this interesting group of the Cicadidae, mainly collected by the Philippine expedition 1977 of the National Science Museum, Tokyo. Taking this opportunity, I am going to redescribe these three species, to record their detailed localities, and to give some discussion on the venation and systematic position of the genus.

Before going further, I would like to express my deep gratitude to Dr. Yoshihiko KUROSAWA and Dr. Shun-Ichi UENO of the National Science Museum (Nat. Hist.), Tokyo, Prof. Masataka SATÔ of Nagoya Women's University, Nagoya, and Mr. Nobuo KASHIWAI of Kyushu University, Fukuoka, for the privilege of studying the valuable specimens.

Genus *Psithyristria* STÅL, 1870

Psithyristria STÅL, 1870, Öfv. K. Vet.-Akad. Förh., 27: 712 (type-species: *Psithyristria specularis* STÅL, 1870).

Head narrower than or as wide as base of mesonotum; supra-antennal plate angulately swollen anteriorly; frontoclypeus extending slightly beyond hind coxae; abdomen longer than median length of head plus thorax in ♂♂, and as long as that in ♀♀; tymbal cover so narrow as to make tymbal largely exposed laterally; ♂ abdomen more or less keeled dorsally, and widely concave at the inner lateral parts; ♂ operculum obliquely transverse, widely separated from the opposite one, not reaching the apical margin of 2nd abdominal segment; auditory capsule distinct, laterally globose; ovipositor not extending beyond 9th segment; veins M and CuA of forewing fused towards base, and cells M+CuA and M more or less amplified,

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forming "mirror"; hindwing oblong with vannus very narrow.

Distribution. Philippines.

***Psithyristria specularis* STÅL, 1870**

(Figs. 1, 4, 5, 8–10, 11, 19, 27)

Psithyristria specularis STÅL, 1870, Öfv. K. Vet.-Akad. Förh., 27: 712, pl. 8, fig. 16; DISTANT, 1914, Gen. Ins., (158): 31, pl. 3, fig. 34.

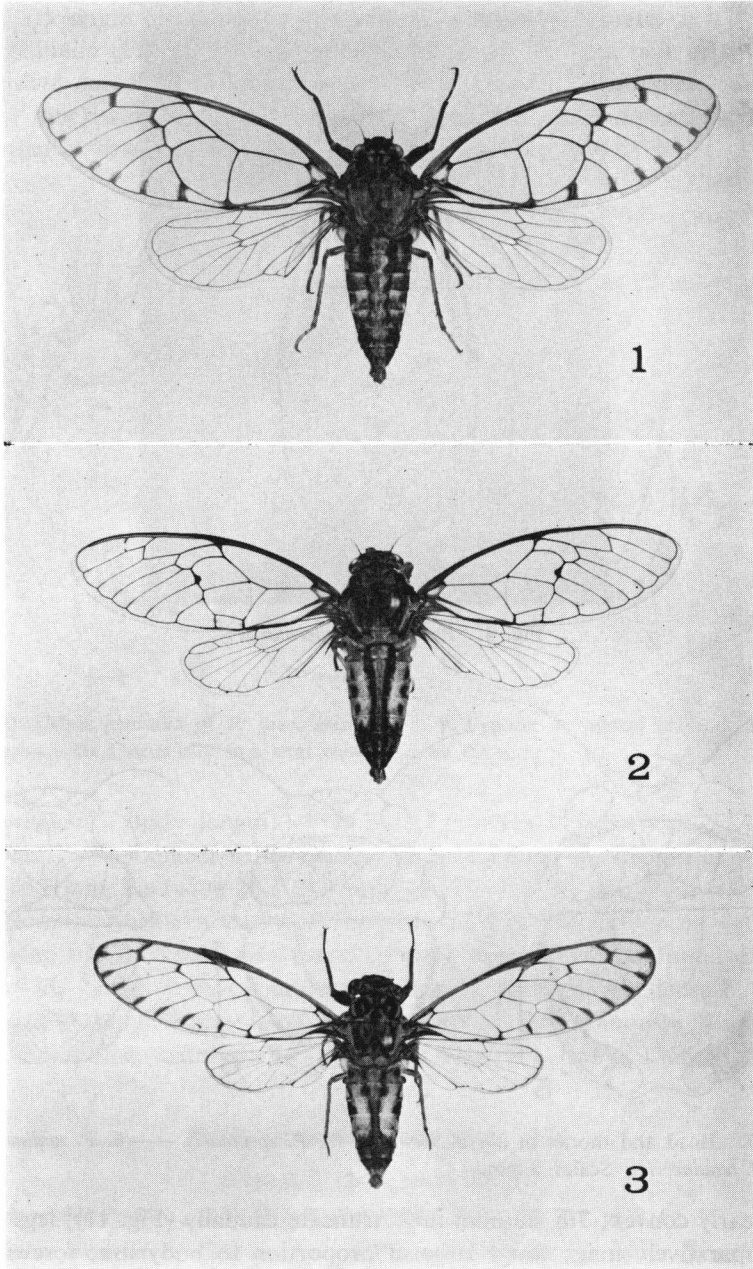
Specimens examined. 1 ♂, Mt. Santo Tomas (1,700–2,250 m), Baguio, Luzon, 12–VI–1977, Y. KUROSAWA leg.; 1 ♂, ditto, M. SATÔ leg.; 3 ♂♂, Baguio, Luzon, X–1977.

Body densely pilose; head and pronotum olivaceous-green (sometimes infuscated) with frontoclypeus, a transverse fascia on vertex, which includes ocelli-area and is much widened laterally, a central longitudinal fascia on pronotum, which is widened both anteriorly and posteriorly and has a testaceous central line, diagonal grooves of pronotal inner area and two spots at posterolateral corner of pronotum dark brown; mesonotum dark brown with a pair of central longitudinal stripes, divergent posteriorly, an irregularly shaped spot on lateral surface and cruciform elevation olivaceous-green; abdomen dark brown with tymbal cover much infuscated and with each central part of 2nd to 5th terga (sometimes tinged with green) narrowly and each inner lateral part of 2nd to 6th (basal 2/3) terga widely lightened.

Ventral part of body olivaceous, more or less infuscated, with apical 1/2 of frontoclypeus, clypeus, tip of labium, each inner lateral margin of 3rd to 6th abdominal pleura and a central longitudinal linear fascia on 7th and 8th sterna black or dark brown; ♂ operculum pale ochreous or pale green.

Wings transparent; forewing tinged with brown, with fuscous spots on 1st, 2nd and 3rd cross veins, those on the latter two being connected with each other, forming a zigzag marking, and on an area along vein CuA_2 and an apical area along each longitudinal vein, forming an apical series of fuscous spots; hindwing with a fuscous area along cross vein M_4-CuA_1 ; veins of forewing fuscous brown with bases of veins $Sc+R$ and CuP and cross vein $R-1M$ pale ochreous, while those of hindwing are fuscous, paler towards base.

Head narrow, distinctly narrower than base of mesonotum; frontoclypeus roundly swollen anteriorly (Fig. 5); clypeus strongly keeled at middle; supra-antennal plate angulately expanded; vertex as long as wide; pronotum almost trapezoidal in shape, much widened posteriorly, with posterior margin nearly straight; mesonotum distinctly longer than pronotum in median length; abdomen long, longer than distance between tip of head and cruciform elevation, more or less keeled at middle and broadly concave at inner lateral part; tymbal cover narrow and tymbal largely exposed; ♂ operculum wide with apical margin obliquely rounded; auditory capsule distinct and spherical, expanded laterally; 4th–6th abdominal sterna distinctly concave on each side along the basal margin; each inner lateral margin of 4th to 6th abdominal



Figs. 1-3. Three species of the genus *Psithyristria*. — 1. *P. specularis*. — 2. *P. nodinervis*.
— 3. *P. tenuinervis*.

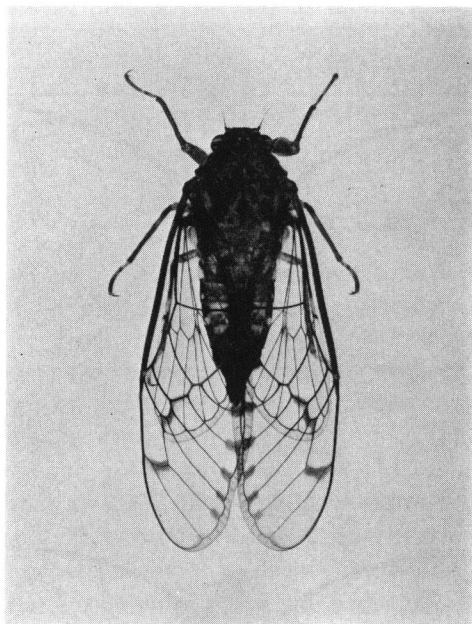
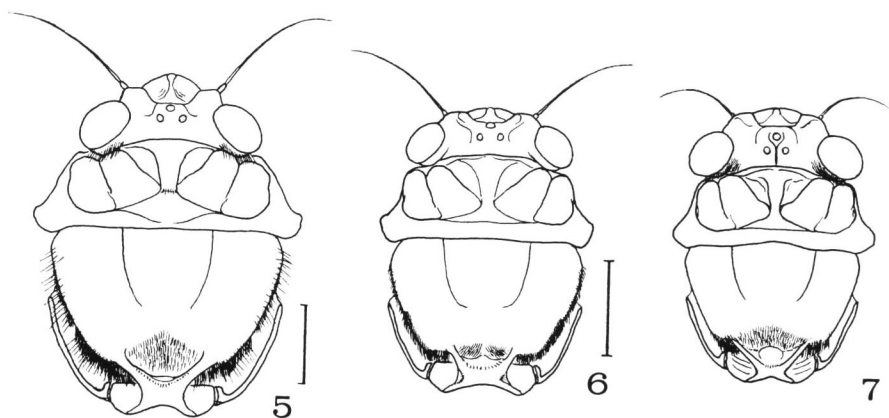


Fig. 4. *Psithyrystria specularis*, ♂.

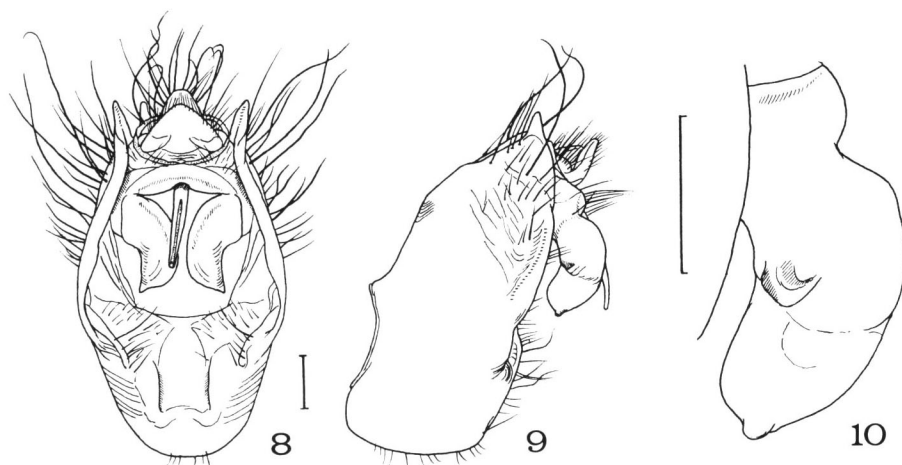


Figs. 5-7. Head and thorax in dorsal view. — 5. *P. specularis*. — 6. *P. nodinervis*. — 7. *P. tenuinervis*. Scales, 3 mm.

pleura linearly convex; 7th sternum in ♂ truncate caudally (Fig. 11); legs (especially tarsi) comparatively long; wings large in proportion to body-size; forewing oblong with rounded apex; vein CuA nearly perpendicular to vein M+CuA (base of cell M nearly right-angled) (Fig. 19); cells M+CuA and M unusually developed as "mirror" with numerous furrows; cell CuA₁ very narrow; veins 1M and CuA₁

arcuate outwards; 3rd cross vein situated basally, appearing at $1M-M_3$; hindwing oblong, ca. $3/5$ length of forewing, with vein 1A outwardly arcuate.

Male genitalia (Figs. 8–10): Pygofer barrel-shaped with a pair of caudolateral lobes, furnished densely with long hairs (some of them curled at apices); uncus lobe (or anterior lobe) wide and stout with acute apex directed outwards, widely apart from the other at base and becoming closer towards apex.



Figs. 8–10. Male genitalia of *P. specularis*. — 8, 9. Pygofer in ventral (8) and lateral (9) views. — 10. Uncus lobe in lateral view. Scales, 0.5 mm.

Measurement. Body length: ♂ 24.2–25.7 mm (excl. forewing); 37.4–40.0 mm (incl. forewing) — Expanse of forewings: 72.2–75.3 mm — Length of wing: forewing 32.0–35.3 mm, hindwing 20.3–21.8 mm.

Distribution. Northern Luzon, Philippines (cf. Fig. 26).

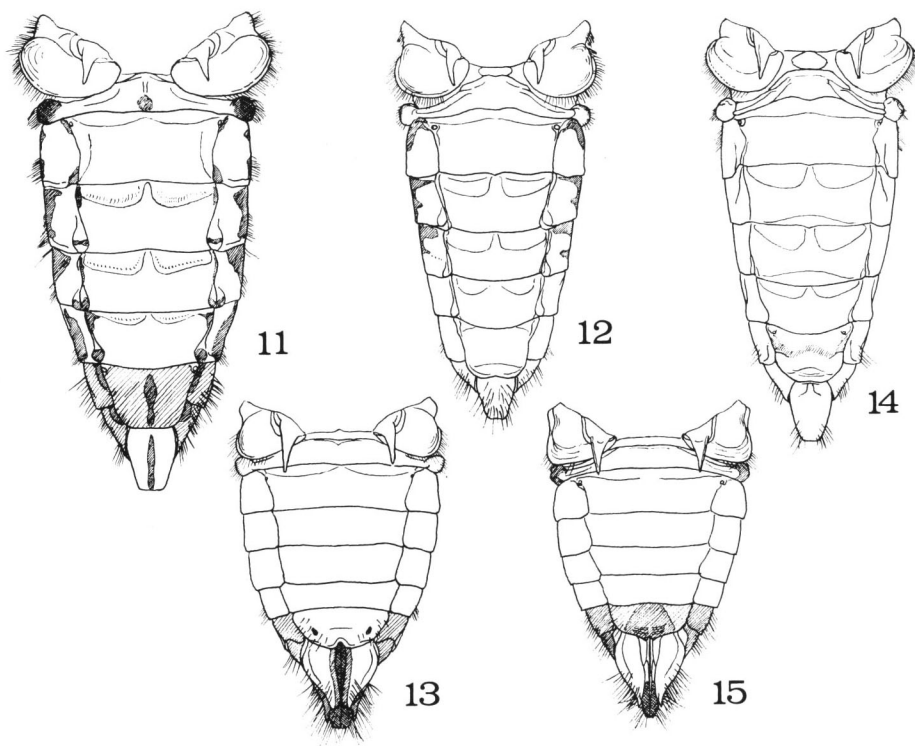
According to Dr. KUROSAWA (pers. comm.), this cicada was found only in the vicinities of Mt. Santo Tomas southwest of Baguio, and inhabits dense bushes composed of trees and higher grasses on road-side, noting a continuous and monotonous sound in the daytime, mainly in late morning, when it is fine and shining.

Psithyristria nodinervis STÅL, 1870

(Figs. 2, 6, 12–13, 16–18, 20–21)

Psithyristria nodinervis STÅL, 1870, Öfv. K. Vet.-Akad. Förh., 27: 713, pl. 8, fig. 18.

Specimens examined. 2 ♀♀, Acops Place (1,400 m), en route from Baguio to Sayangan, Benguet Prov., Luzon, 26–V–1977, M. SATÔ leg.; 2 ♂♂, Suyoc Creek (1,400–1,500 m), nr. Abatan, Benguet Prov., Luzon, 29–V–1977, M. SATÔ leg.; 7 ♂♂, Guinaoang (1,400–1,500 m), nr. Abatan, Benguet Prov., Luzon, 29–V–1977, S. UÉNO



Figs. 11–15. Abdomen in ventral view (11, 12, 14: ♂; 13, 15: ♀). —11. *P. specularis*. —12, 13. *P. nodinervis*. —14, 15. *P. tenuinervis*.

leg.; 14 ♂♂, ditto, Y. KUROSAWA leg.; 1 ♀, Mt. Data~Bontoc, Bontoc Prov., Luzon, 1–VI–1977, Y. KUROSAWA leg.; 1 ♂, Ambayoan (ca. 1,000 m), Bontoc (Bontoc Prov.)~Banaue (Ifugao Prov.), Luzon, 2–VI–1977, M. SATÔ leg.; 1 ♀, ditto, Y. KUROSAWA leg.; 1 ♂, Mt. Polis (1,730–1,900 m), Ifugao Prov., Luzon, 4–VI–1977, Y. KUROSAWA leg.; 1 ♀, Sagada, Bontoc Prov., 7–VI–1977, Y. KUROSAWA leg.; 1 ♀, ditto, M. SATÔ leg.

Small species. Head and thorax ochreous to brown with dorsal part of frontoclypeus, a transverse fascia on vertex, including ocelli-area (sometimes interrupted outside of the area), a pair of central longitudinal narrow fasciae on pronotum, lateral margin of pronotal inner area, posterior margin of pronotum and two pairs of anterior obconical spots on mesonotum, the outer pair of which is much longer, fuscous brown; abdomen brownish ochreous with a pair of central longitudinal stripes, lateral spots on 3rd to 6th terga and most parts of 7th and 8th terga fuscous; lateral margin of mesonotum and lateral part of abdominal terga (widely) clothed with dense short silvery hairs.

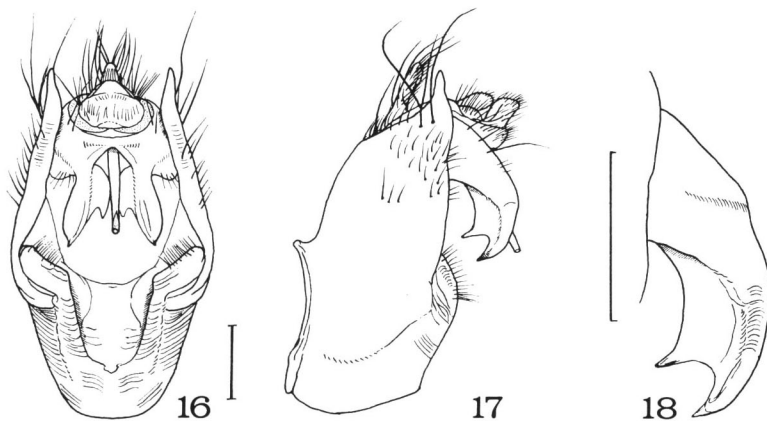
Ventral part of body pale ochreous with tip of labium, caudal part of 7th

abdominal sternum in ♂, ovipositor and its sheath fuscous.

Wings transparent without tinge; veins fuscous with vein Sc+R paler towards base; fuscous spots of forewing faintly appearing on cross vein R_3 – R_{4+5} , basal part of vein M_1 before cross vein R_{4+5} – M_1 , and each apical part of every longitudinal vein, forming a series of spots towards apical part of forewing.

Head narrower than base of mesonotum; frontoclypeus not swollen anteriorly, rather depressed (Fig. 6); ocelli compactly arranged, distinctly more apart from eyes than from each other; lateral margin of pronotum more or less sinuate; cruciform elevation wide, especially across the central part; ♂ operculum short and rather rounded; auditory capsule expanded laterally; 7th abdominal sternum in ♂ with apical margin truncate and slightly emarginate at middle; caudal margin of 7th sternum in ♀ sharply incised at middle (Figs. 12–13); forewing wider in ♂♂ than in ♀♀, with wide marginal area; veins M and CuA_1 of forewing fused towards base, at angle of ca. 80° in ♂♂ and ca. 60° in ♀♀ (Figs. 20–21); veins 1M (confined to ♂♂) and M_4 strongly arched upwards; 3rd cross vein (1M– M_4) much thickened to form stigma (variable in size according to sexes and individuals); vannus (cell 2A) of hindwing very narrow.

Male genitalia (Figs. 16–18): Pygofer narrower than that of the foregoing species, clothed with long hairs towards apex, with a central dorsal beak (stylus) densely pilose and caudolateral lobe acute; uncus lobes narrowly separated at base, long and divergent apically, with tips acutely bifurcated.

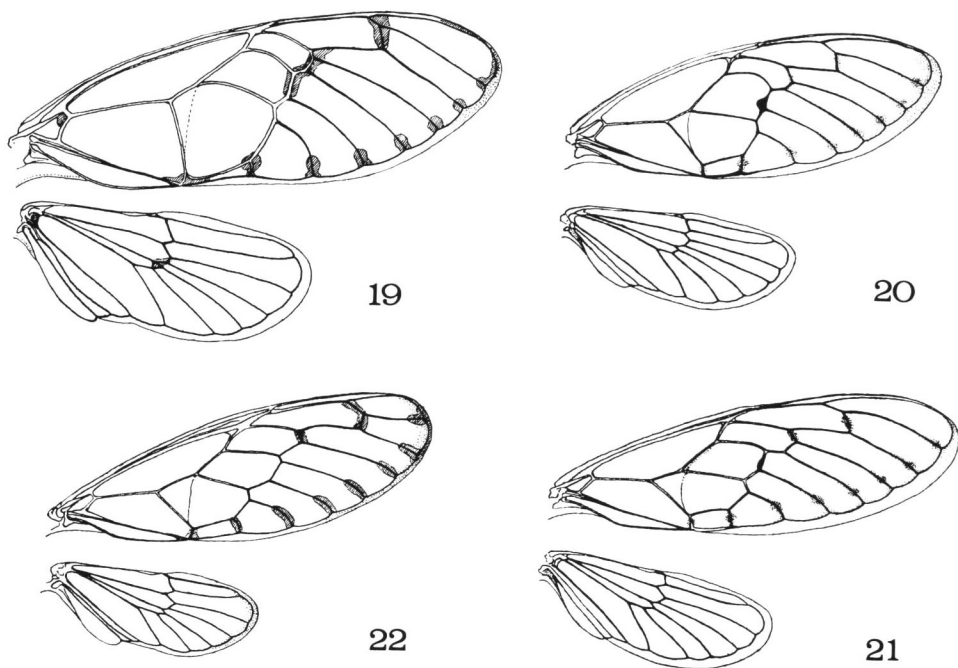


Figs. 16–18. Male genitalia of *P. nodinervis*. — 16, 17. Pygofer in ventral (16) and lateral (17) views. — 18. Uncus lobe in lateral view. Scales, 0.5 mm.

Measurement. Body length: ♂ 16.4–19.5 mm (17.6 mm in average), ♀ 14.5–16.5 mm (15.6 mm in average) (excl. forewing); ♂♀ 23.4–28.4 mm (25.6 mm in average) (incl. forewing) — Expanse of forewings: 45.8–54.0 mm — Length of wing: forewing 20.3–23.4 mm, hindwing 12.9–13.8 mm.

Distribution. Northern Luzon, Philippines (cf. Fig. 26).

Dr. KUROSAWA (pers. comm.) observed that "this cicada also inhabits mountainous areas; its note, a continuous buzzing, can be heard at many places on the way from Baguio to Bontoc, in the morning (9–10 a.m.) in bushes composed of lower trees (*Alnus* sp. at Acops Place) and grasses (a kind of mahuang and/or artichoke); it is considerably difficult to find out cicadas resting or singing on grasses."



Figs. 19–22. Right wings. — 19. *P. specularis*. — 20, 21. *P. nodinervis* (20: ♂; 21: ♀). — 22. *P. tenuinervis*.

***Psithyristria tenuinervis* STÅL, 1870**

(Figs. 3, 7, 14–15, 22, 23–25)

Psithyristria tenuinervis STÅL, 1870, Öfv. K. Vet.-Akad. Förh., 27: 713, pl. 8, fig. 19.

Specimens examined. 2 ♂♂, 1 ♀, Quezon National Forest Park, Quezon, Luzon, 19–III–1978, N. KASHIWAI leg. (private collection of M. HAYASHI).

Head and thorax ochreous tinged with green, with dorsal base of frontoclypeus, a transverse arcuate fascia on vertex, including ocelli-area, a pair of central longitudinal fasciae on pronotum, widened posteriorly, diagonal grooves and outer margin of pronotal inner area, a central longitudinal fascia on mesonotum, rhomboidally widened posteriorly, and two pairs of inwardly curved anterior fasciae on mesonotum (a central pair short and narrow) black or fuscous; abdomen olivaceous with tymbal

cover, lateral spots on 3rd and 4th terga in ♂, 7th and 8th terga in ♀ and a pair of spots on lateral base of 9th tergum in ♀ black or much infuscated; inner lateral area of ♂ abdomen (3rd to 6th terga) paler in color.

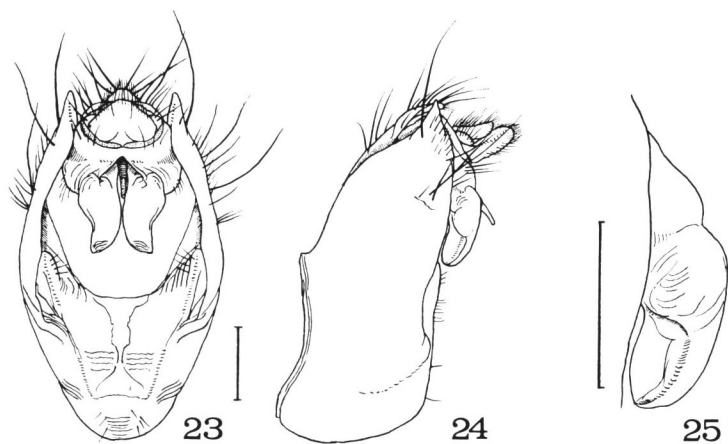
Ventral part of body greenish olivaceous with a central longitudinal fascia on frontoclypeus, tip of labium, auditory capsule, central part of 7th abdominal sternum in ♀, 7th and 8th pleura in ♀ and ovipositor sheath (lat. valvula) black or fuscous.

Wings transparent without tinge; veins of forewing ochreous, infuscated apically; costal vein of forewing greenish; fuscous spots of forewing appearing on cross veins R_3 – R_{4+5} and R_{4+5} – M_1 and on apical part of each longitudinal vein, forming a series of oblong spots near margin of forewing; marginal areas of both wings infuscated.

Head wide and long, as wide as base of mesonotum, eye nearly spherical; frontoclypeus depressed (Fig. 7); vertex (supra-antennal plate) angulately swollen anteriorly; mesonotum rather short, shorter than median length of head plus pronotum, when cruciform elevation is excluded; transverse striations on frontoclypeus well defined; ♂ operculum short and oblique; ♀ operculum rather large, with apical margin nearly straight; auditory capsule globose laterally; 7th abdominal sternum in ♂ with caudal margin rounded (Figs. 14–15); forewing slender with widely rounded apex; costal vein of forewing (veins C and Sc+R) much widened near node; basal angle of cell M of forewing ca. 70° ; marginal area of wing very narrow (Fig. 22).

Male genitalia (Figs. 23–25): Similar to those of *specularis*; pygofer with a dorsal beak; uncus lobe, narrowly separated at base, slender, becoming narrower towards apex, with acute tip directed outwards.

Measurement. Body length: ♂ 18.0–19.0 mm, ♀ 16.1 mm (excl. forewing); ♂♀ 25.6–27.8 mm (incl. forewing) — Expanse of forewings: 47.0–52.2 mm —



Figs. 23–25. Male genitalia of *P. tenuinervis*. —23, 24. Pygofer in ventral (23) and lateral (24) views. —25. Uncus lobe in lateral view. Scales, 0.5 mm.

Length of wing: forewing 20.9–23.9 mm, hindwing 11.4–12.5 mm.

Distribution. Southern Luzon, Philippines (cf. Fig. 26).

According to STÅL's description and illustration, this species is similar to *P. simplicinervis*, which was described based solely on female specimen(s).

Discussion

As stated before, the genus *Psithyrystria* is characterized by the transformation of the forewing; the veins M and CuA are fused at the basal part, so that the cells M+CuA and M are more or less amplified as large cells called the "mirror" (especially in *specularis*) (Figs. 27–28), which seems to relate to the sound-production, as suggested by the fact that the mirror is more developed in males than in females as shown in *nodinervis* and that the mirror (cells M+CuA and M) is situated over

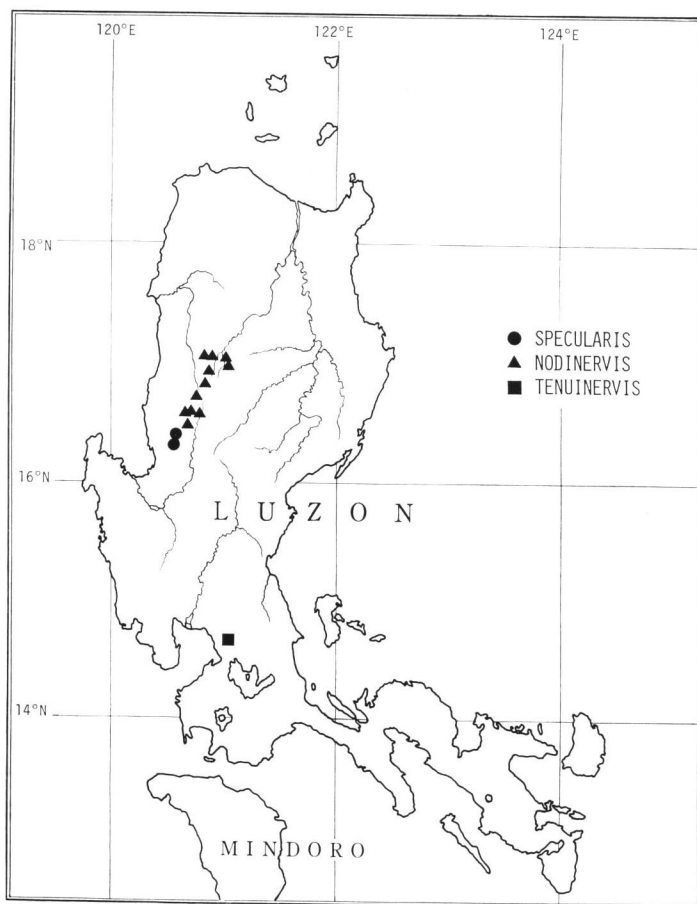


Fig. 26. Distribution of *Psithyrystria* species in Luzon, Philippines.

the inner lateral area of the abdomen largely occupied by the resonant chamber when the wings are folded (Fig. 27). In *specularis*, which shows an unusual development of the mirror, the basal angle of the cell M nearly attains 90° and the vein CuA_1 is arched downwards, becoming close to the marginal vein (Fig. 19). On the other hand, the forewing of *tenuinervis* (as well as *simplicinervis*, *fide* STÅL, 1870) is normal in shape, having the mirror not so developed; the nodal line on the cell M is running across the cell at about $2/5$ from the base (Fig. 22) (in the other species examined, the line on the cell runs across a portion much more basal than in *tenuinervis*). Therefore, the wings of this species seems to show the first step of transformation of the *Psithyristria*-type. In *nodinervis*, the mirror is developed in males and the 3rd cross vein is much thickened as a stigma ("node"), which is variable in size by individuals and is less developed in females (Figs. 20–21).

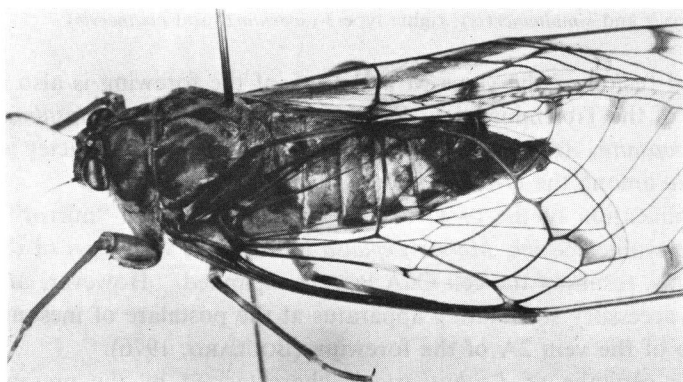


Fig. 27. Amplified basal cells (mirror) shown in *specularis*.

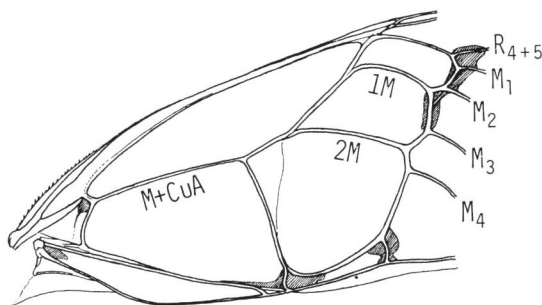


Fig. 28. Basal part of the forewing in *Psithyristria (specularis)*.

The 3rd cross vein of forewing is running at M_2-M_3 in *tenuinervis* as well as most of the other species of the Cicadidae, while it is at $1M-M_3$ in *specularis* and *nodinervis*, and fuses at the forking point of $1M$ (to M_1 and M_2) in *crassinervis* and *simplicinervis* (*fide* STÅL). The shifting of the cross vein seen in *specularis* and

nodinervis seems to be an apomorphic character caused by the development of the mirror; from the normal type (like *tenuinervis*), the 2nd type like *crassinervis* and *simplicinervis* has been derived, and further, the 3rd type like *specularis* and *nodinervis* has become differentiated. It can be concluded that the position of the cross vein is secondarily determined, from the type-1 to the type-2, and further to the type-3 (Fig. 29).

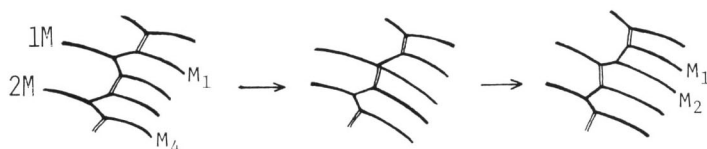


Fig. 29. Shifting of 3rd cross vein in forewing. Left: type-1 (*tenuinervis*); middle: type-2 (*crassinervis* and *simplicinervis*); right: type-3 (*specularis* and *nodinervis*).

The basal fusion of the veins M and CuA of the forewing is also recognized in many genera of the Tibicininae, i.e., *Cicadetta*, *Pauropsalta*, *Amphipsalta*, *Maoricicada*, *Kikihia*, *Rhodopsalta*, *Arcystacia*, *Froggattoides*, etc., and the character is first noticed in *Psithyristria* among the Oriental genera of the Cicadinae.

The amplification of the basal cell(s) of forewing as the "mirror" is known in the Samoan cicadine species, *Moana expansa* MYERS; the vein CuA of the forewing is arched upwards, resulting the cell CuA largely expanded. However, *Moana expansa* possesses the accessory stridulating apparatus at the postalare of mesonotum and the under surface of the vein 2A of the forewing (BOULARD, 1976).

The male genitalia of *Psithyristria* is characterized by the presence of caudo-lateral lobes of the pygofer and the well-separated uncus lobes. Judging from these characters, *Psithyristria* seems to be allied to *Pomponia* STÅL. In comparison with those of *Pomponia* (HAYASHI, 1974), the male genitalia of *Psithyristria* are different in the points that the pygofer possesses no ventral lobe and that the theca protrudes from the extreme base of the uncus and not entirely concealed with the pygofer. The well-separated uncus lobes as seen in this genus are also found in the genera *Haphsa*, *Dundubia*, *Cosmopsaltria*, *Platylomia*, *Oncotympana*, etc. Although I opposed to the views of STÅL and METCALF (HAYASHI, 1978 b), *Psithyristria* may represent an ancestral type of *Pomponia*; the unusual venation and amplified mirror in the former genus seems to be an apomorphic character, probably caused by the effect of sound-production. Furthermore, the narrow vannus (cell 2A) of the hindwing in this genus shows its plesiomorphy: the expansion of vannus probably indicates an apomorphy in the Cicadidae. Consequently, I have to agree with METCALF's arrangement (1963) of the genera in the tribe Psithyristriini, at least for the time being.

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