

SEVERAL SPECIES OF *TRICHOGALUMNA* (ACARINA, ORIBATIDA) FROM JAPAN

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TAXONOMY ABSTRACT : Seven species of *Trichogalumna* are described. Among them is included *T. nipponica* n. comb. which is transferred from *Pergalumna duplicata nipponica*.

TAXONOMIE RÉSUMÉ : Sept espèces de *Trichogalumna* sont décrites. Elles comprennent *T. nipponica* n. comb. qui est transférée de *Pergalumna duplicata nipponica*.

In Japan, *Trichogalumna* species was recorded at first by AOKI (1962) who, later (1966), treated it as a *Pergalumna* species and described it under the name of *P. duplicata nipponica*. Its nominate subspecies was recorded from Bolivia by HAMMER (1958) using the generic name, *Galumna*. The Bolivian mite may well be classified to *Pergalumna* as AOKI (1966) explained. The presence of notogastral setae can separate *Trichogalumna* from *Pergalumna*. As the author considers this division is very important, the Japanese one (*P. duplicata nipponica*) which has notogastral setae is retreated as a member of *Trichogalumna* in the present paper.

Meanwhile, *P. duplicata nipponica* has been thought to be one of most commonly found and most easily identifiable oribatid mites in whole Japan. However, close examination reveals the so-called *P. duplicata nipponica* contains several species which greatly resemble one another.

Almost all of them has been identified as a single species. All the hitherto known record should be re-examined. In reality, the type-series of *P. duplicata nipponica* need to be divided into two species as mentioned after.

In the present paper, each mite is divided mainly by characters of integument. The surface textures of integument are difficult to see under transparent illumination of normal microscope. The incident illumination of minellographic microscope was used for the study. All the type-series are deposited in the collection of National Science Museum (Nat. Hist.), Tokyo.

Genus *Trichogalumna* BALOGH

Each species which is described in the present paper satisfies the generic diagnosis indicated by BALOGH (1960) and ENGELBRECHT (1972). Other

* 2-10, Shibumi-cho, Tsu, MIE 514, JAPAN.

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characters common to the Japanese species are as follows, though they may not always agree with the characters which foreign species possess.

Aspidosoma and lateral part of podosoma. Rostrum with a round protrusion of monolayer (upper layer). The border of lower layer is free from the upper layer and is seen through in a shape of letter M (Fig. 5, G). A pair of faint, narrow grooves (Fig. 4, A) longitudinally situated between lamellar setae; they are only visible under incident illumination. Lamellar and rostral setae straight, having extremely minute spines almost invisible. Interlamellar seta thin, curved inward. Integument roundly thickened internally around the bases of lamellar and interlamellar setae. Light spot *Ad* elongate-oval has not surface structure, situated along dorsosejugal suture.

Bothridium (Fig. 5, F) just behind "cornice" or anterior cover of niche, being a posterior cover of niche. The upper side of bothridial opening surrounded by a round ridge and the lower side by two relatively thin scales. Bothridium much swollen under the scales, having a ridge. Anterior tip of bothridium pointed, mounting on the cornice. Sensillar tip swollen.

Carina *L* makes an edge where the surface of aspidosoma is cornered. Carina *S* somewhat ridge-like. The surface between the two carinae flat and well polished, covered by the anterior part of folded pteromorpha. Ridge *T* departing from the lower end of carina *S*. The surface concaved between carina *S* and ridge *T*. Tutorium pointed backward. The free tip enamelled, strongly protruding like a beak. The anterior surface of tutorium gently sloping with faint, longitudinal wrinkles (Fig. 5, F). Under tutorium runs a low ridge parallel to it. Neither exobothridial seta nor setal pore present. Light spot *Al* faint, not of the external structure. Light spot *Ah* is absent.

External acetabular orifice of leg I bordered anteriorly by a short ridge (Fig. 5, F). The orifice half covered by pedotectum 1. The anterior edge of the pedotectum 1 is a carina which is acutely triangulated at the carina *L*. External acetabular orifice of leg II narrow, protruding laterad. Pedotectum 3 narrow, half covered by a disci-

dium. Discidium triangulated, protruding laterad. External acetabular orifice of leg IV bordered posteriorly by a narrow ridge which is pedotectum-like. Anterior end of carina *cm* mounting on pedotectum 2. Posterior end of carina *cir.p* strongly hooked forward. Epimeral seta *3b* situated on anterior end of discidium. Seta *4b* situated on anterior end of the ridge which surrounds acetabular orifice IV (Fig. 1, E).

Notogaster. Dorsal pteromorph ginglymus straight, weakly sutured, while ventral one is convex, somewhat membranous, and continues to podosoma without suture. Dorsal surface of pteromorpha flat but with a crescent relief at its anterior base. Ventral surface undulates regularly, a deep ditch dividing the pteromorpha into two regions. The outline of pteromorpha constricted at the level of the ditch. The posterior region of pteromorpha about two times larger and more strongly curled than the anterior one. Each region with a vacant, internal room near the base. In transparent illumination a colored zone is observed to separate the two rooms. The zone takes the shape of letter U, J, I or reverse T. This variation depends on the angle at which the ditch is viewed. The anterior or the posterior border of the ditch looks colored, and the ditch strongly hooked downward at the base.

Dorsosejugal suture very faint, continued from the crescent relief of pteromorpha and widely absent medially. Notogastral border suddenly lowered behind dorsal pteromorph ginglymus.

The integument conspicuously two-layered, that is well observed in a crashed specimen. Areae porosae lack lower layer. The contour of area porosa on the external surface is usually not agree with that in lower layer. Under transparent illumination, the former is very faint, while the latter relatively clear. The appearance of two concentric circles in an area porosa (Fig. 3, A, left organ) depends on the upper and lower borders of cylindrical pit which is excavated at the lower layer of integument. Areae porosae broadly oval. Five pairs of lyrifissures complete, each with a linear line on external surface of the integument. Lyrifissure *im* with an internal pore at its one end. Though notogastral surface looks

smooth, it is sometimes verrucous especially near pteromorph al ginglymi.

Ventral region. Camerostome somewhat of curvilinear, equilateral triangle. A carina that connects capitular angle and carina *L* is conspicuous.

Epimeral plate almost flat except faint grooves (Fig. 3, B). These grooves can be seen only under incident illumination. Epimeral borders scarcely developed. Three pairs of light areas seen through at the epimeral plate (Fig. 1, B) : anterior one oval, the smallest, the second one ovate, the largest, and posterior one unshaped but somewhat oval. The formula of epimeral setae : 1-0-2-2. Setae *3b* and *4b* are not on the epimeral plate as explained before.

Genital plate slightly concave, especially at the median two setae. Postanal pit small, usually concealed by notogaster. It lacks lower layer.

Legs. Setal features of legs are almost same as in *T. pumularis* ENGELBRECHT, 1972.

***Trichogalumna arborea* sp. nov.**
(Fig. 1)

Pergalumna sp. : TANIMOTO, 1980, p. 26.

Type-series. Holotype (NSMT-Ac 9425 on slide) and 35 paratopotypes (2 on slides and 33 in spirit) : Takano'o-cho, Tsu, Mie, 29-I-1978, collected and extracted by Y. TANIMOTO, from dead vines on citrus trees.

Measurement. Length : 370 (380) 395 μ .

Color. Brown to light brown.

Rostrum. Rostral tip narrow, strongly protruding. The protrusion U-shaped. Ratio of the width of rostral protrusion (a) to the distance between the protrusion and capitular angle (b), *a/b*, is 0.31 (See Fig. 1, B).

Sensillus. Head completely smooth. It is strongly dilated on one side, having a small arista near the tip. Its shape varied according to the angle at which it is viewed (Fig. 1, D).

Textures. (1) Aspidosoma smooth. (2) Verrucae on notogaster large but inconspicuous. (3) Granulated belt of notogaster wide and conspi-

cuous. Each granule large but its border unclear. (4) External surface of notogastral areae porosae faintly shallowed with flat bottom where fine dots scattered. (5) Mentum smooth. (6) Epimeral plate smooth except along anterior border of genital aperture where fine wrinkles exist. (7) Ventral plate smooth except a granulated belt. (8) Granulated belt of venter wide, more conspicuous than that of notogaster. Each granule large and its border not so unclear. (9) Genital and anal plates smooth. (10) Dorsal surface of pteromorpha smooth except near the anterior base where fine wrinkles exist.

Remarks. Whole *Trichogalumna* species may be divided into two groups, one with rounder sensillar head and the other with fusiform sensillar head. Hitherto known species of the former group differ from the present new species as follows : *T. lunai* (BALOGH, 1958), redescribed by BALOGH (1960), in 1) granulated pteromorphae, 2) somewhat elongated body and 3) bifurcated sensillar tip. *T. seminuda* BALOGH, 1960 in 1) very long interlamellar setae, 2) some degenerated notogastral setae and 3) somewhat elongated body. *T. taeniata* HAMMER, 1971 in 1) a long distance between areae porosae *A*₁ and *A*₂, 2) depressed sensillar heads and 3) short setae in and ta. *T. chitralensis* HAMMER, 1977 in 1) very reduced interlamellar setae and 2) more elongated sensillar head.

***Trichogalumna nipponica* (AOKI, 1966) comb. nov.**
(Fig. 2)

Pergalumna duplicata nipponica AOKI, 1966, p. 264, figs. 16-19 and 21 ; FUJIKAWA, 1972, p. 172, fig. 73.

Type-locality. Tokyo.

Material examined. Ten mites from Sekisui-kei, Kameyama, Mie, 19 and 23-IX-1980, N. OHKUBO, extracted from mosses on a rock at mountain stream. Holotype (NSM-Ac-A28), 3 paratypes (NSMT-Ac-1952 and 1953) and 2 topotypes (NSMT-Ac-1954).

Measurement. Length about 385 μ .

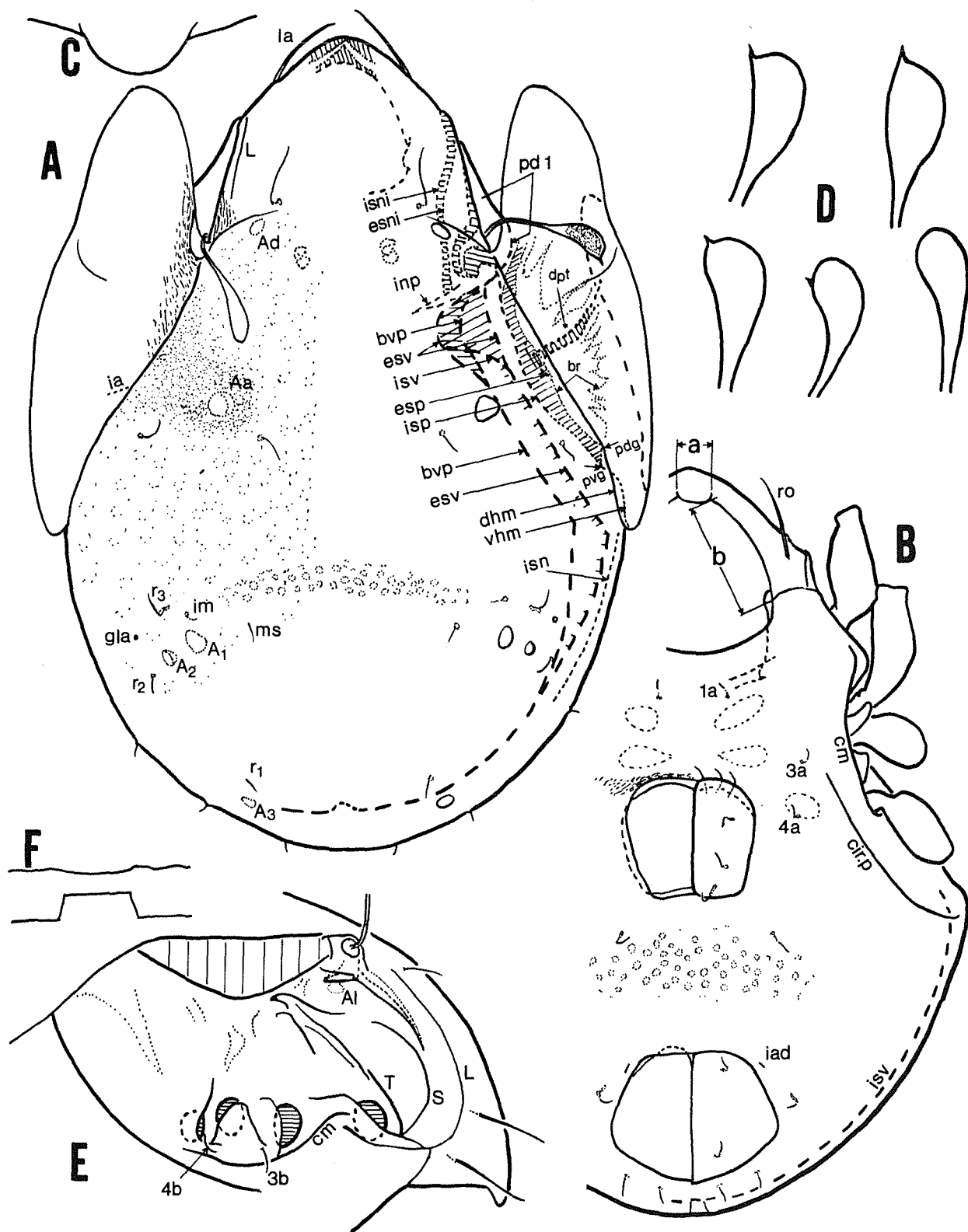


FIG. 1 : *Trichogalumna arborea* sp. nov.

A. — Dorsal aspect. B. — Ventral aspect. C. — Rostrum in anterodorsal view. D. — Sensillus. E. — Lateral aspect of anterior region. F. — Schematic cross section of Aa. (br, border of internal room in pteromorpha; bvp, border of ventral plate; dhm, dorsal hind margin; dpt, ditch on pteromorpha; esni, esp and esv, external shadow of niche, pteromorpha and ventral plate, respectively; inp, internal projection; isn, isni, isp and isv, internal shadow of notogaster, nich, pteromorpha and ventral plate, respectively; pdg and pvg, posterior end of dorsal and ventral ginglymus, respectively; vhm, ventral hind margin).

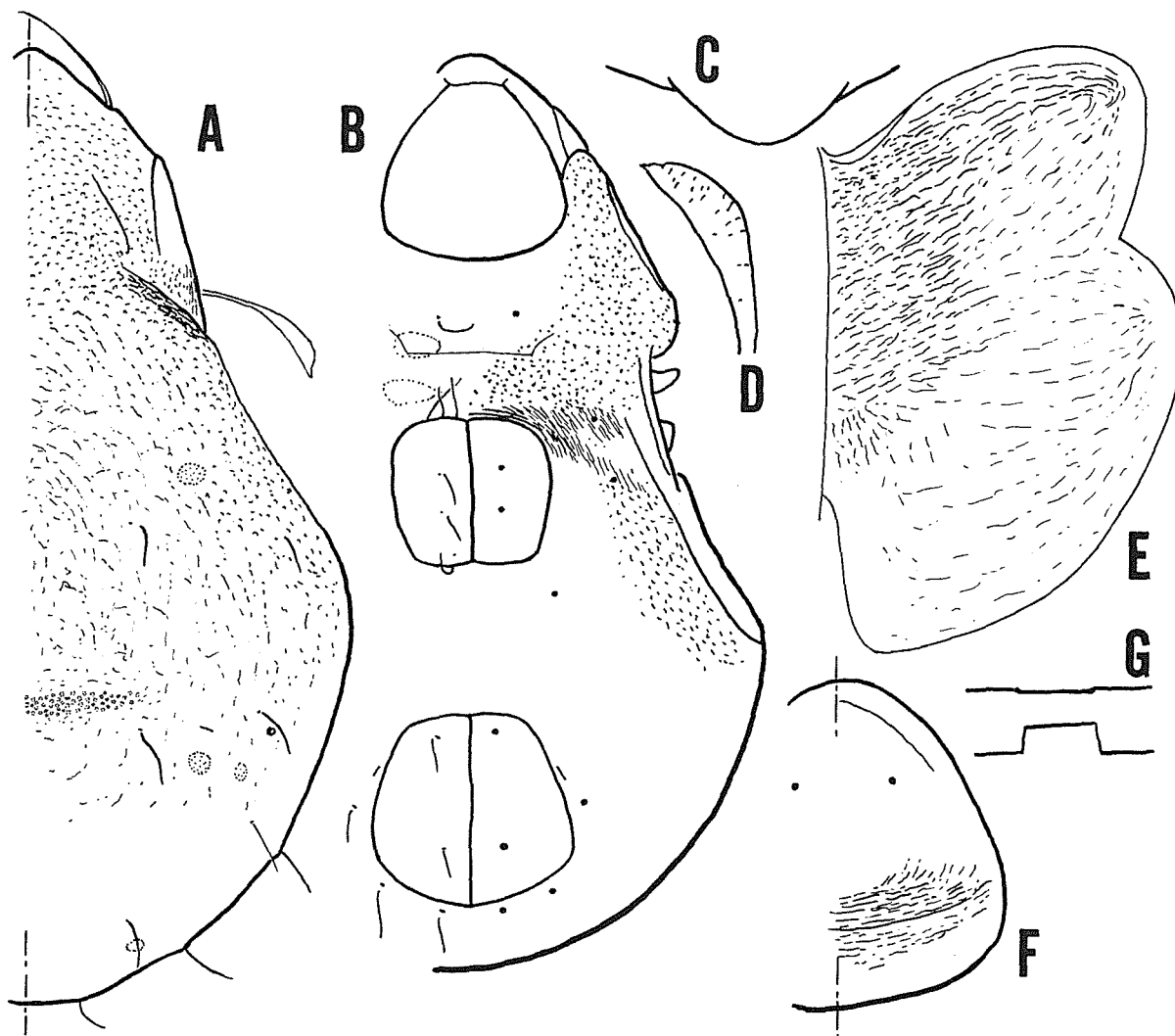


FIG. 2. : *Trichogalumna nipponica* comb. nov.

A. — Dorsal aspect. B. — Ventral aspect. C. — Rostrum in anterodorsal view. D. — Sensillus. E. — Pteromorpha. F. — Mentum. G. — Schematic cross section of Aa.

Color. Brown to reddish brown.

Rostrum. Rostral tip wide, weakly protruding. The protrusion round. $a/b = 0.56$.

Sensillus. Head spindle-shaped, that is weakly dilated on one side, pointed at tip. It is covered by sparse, thin scales.

Textures. (1) Aspidosoma minutely granulated at posterior half. Granules clear near dorsosejugal but obscure near the lamellar setae. Inside corner of carina *L* with many thick, conspicuous wrinkles. (2) Verrucae on notogaster small and

inconspicuous. (3) Granulated belt of notogaster narrow and inconspicuous. Each granule small. (4) External surface of notogastral areae porosae scarcely shallowed with flat bottom where fine dots scattered. (5) Mentum with a few, very fine wrinkles posteriorly. (6) Epimeral plate smooth in median part, minutely granulated near lateral sides. Fine wrinkles extends laterad from the anterior border of genital aperture. (7) Ventral plate granulated laterally and smooth posteriorly. (8) Granulated belt of venter absent. (9) Genital

and anal plates smooth. (10) Dorsal surface of pteromorpha having dense, short wrinkles just near the anterior base and longer ones anteriorly. Wrinkles very obscure posteriorly.

Remarks. Some measurements in the original description indicate false values of *T. nipponica*, because two species were contained in the type-series. The measurements of type-series of true *T. nipponica* are as follows : 1) the length of holotype is about 380 μ (The body length and width never takes such a small values 320 μ and 230 μ , respectively), 2) length of lamellar, interlamellar and rostral setae of one female paratype on a slide NSMT-Ac-1952 are about 55 μ , 38 μ and 44 μ , respectively, and 3) seta *ta* about 20 μ long and the other notogastral setae about 10 μ long for the paratypes.

Hitherto known species with spindle-shaped sensillar head are characterized as follows : *T. montana* BALOGH, 1962 by 1) smooth sensillar head and 2) degenerated aggenital and adanal setae. *T. microseta* WALLWORK, 1965 by 1) weakly continued dorsosejugal suture, 2) barbed interlamellar setae, 3) more numerous epimeral setae and 4) closely situated aggenital setae. *T. duoporosa* HAMMER, 1971 by 1) a long distance between areae porosae *A*₁ and *A*₂, 2) very large body size, 3) two pairs of areae porosae *Aa*, 4) punctuation on notogaster, 5) absence of lamellar and rostral setae, 6) peculiarly situated adanal lyrifissures, 7) presence of median pore in males and 8) wide circumpedal ridge. *T. pumularis* ENGELBRECHT, 1972 by 1) short lamellar setae, 2) presence of epimeral setae *Ic*, 3) medially punctated pteromorphae and 4) smaller body size.

***Trichogalumna hygrophila* sp. nov.**
(Fig. 3)

Type-series. Holotype (NSMT-Ac 9329 on slide) and 5 paratopotypes (on slides) : Mt. Kyôga-mine, Age-gun, Mie, 1-I-1980 (holotype) and 22-III-1976, N. OHKUBO, extracted from mosses on a rock at mountain stream.

Measurement. Length : 370 (388) 400 μ .

Color. Reddish brown to fairly dark reddish brown.

Rostrum. Rostral tip relatively narrow, strongly protruding. The protrusion round. $a/b = 0.33$.

Sensillus. Head spindle-shaped, covered by sparse, thin scales.

Textures. (1) The textures of aspidosoma are alike *T. nipponica*. (2) Verrucae on notogaster small but conspicuous. They are altered by minute granules near dorsosejugal suture. (3) Granulated belt of notogaster absent. (4) External surface of notogastral areae porosae faintly shallowed with flat bottom where fine dots scattered. (5) Mentum strongly granulated medially. (6) Epimeral plate minutely granulated. Wrinkles extend laterad from the anterior border of genital aperture. (7) Ventral plate minutely granulated. (8) Granulated belt of venter absent. (9) Genital and anal plates densely striated longitudinally in median part. (10) Dorsal surface of pteromorpha having dense, unshaped granules anteriorly and basally ; dense, long striation in the middle part ; and sparse, short wrinkles exteriorly. Posterior part relatively smooth.

Remarks. The present new species most closely resembles *T. nipponica*. If only transparent illumination is available, the differences between them can be observed in 1) texture of genital as well as anal plates, 2) texture of mentum, 3) texture of pteromorphae and 4) body color.

***Trichogalumna lineata* sp. nov.**
(Fig. 4)

Pergalumna duplicata nipponica : AOKI, 1966, p. 264, fig. 20.

Material examined. Holotype (NSMT-Ac 9435 on slide) and 3 paratopotypes (on slides) : Kusucho, Mie, 12-I-1980, N. OHKUBO, extracted from litter and dead leaves at grassy bank of a river. Twelve paratypes (NSMT-Ac-1953) of *P. duplicata nipponica*.

Measurement. Length : 325 (336) 345 μ .

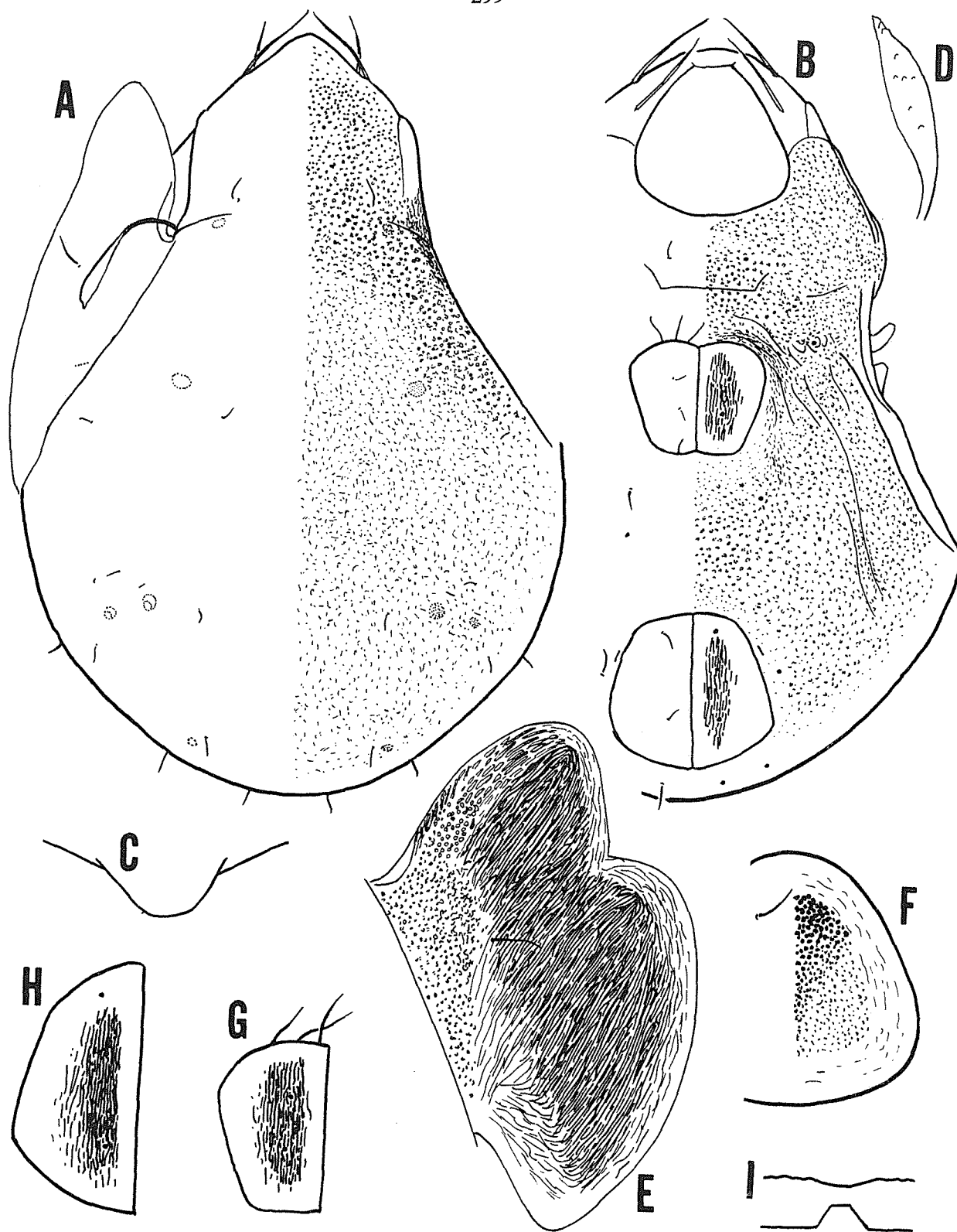


FIG. 3 : *Trichogalumna hygrophila* sp. nov.

A. — Dorsal aspect. B. — Ventral aspect. C. — Rostrum in anterodorsal view. D. — Sensillus. E. — Pteromorpha. F. — Mentum. G. — Genital plate. H. — Anal plate. I. — Schematic cross section of Aa.

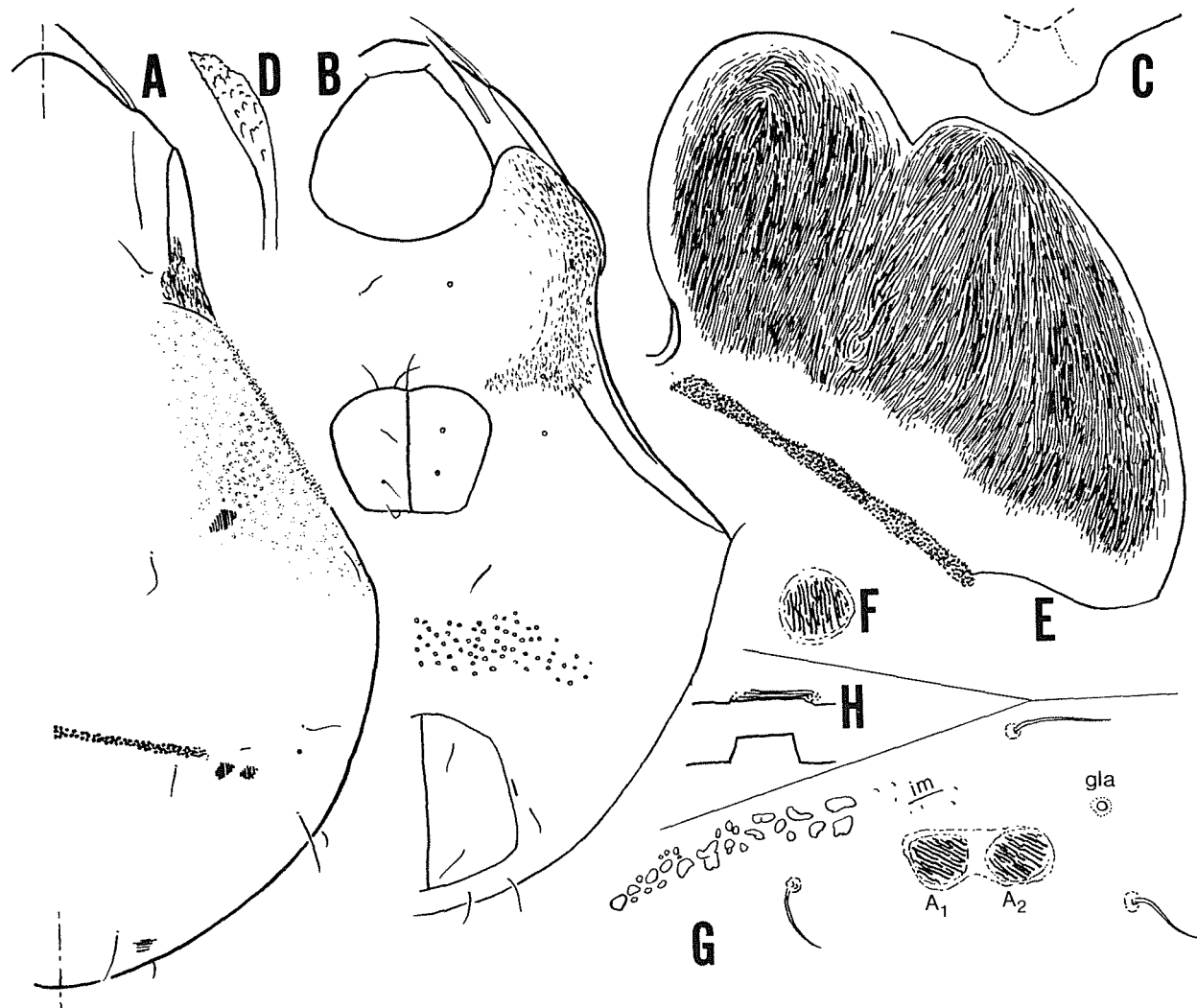


FIG. 4 : *Trichogalumna lineata* sp. nov.

A. — Dorsal aspect. B. — Ventral aspect. C. — Rostrum in anterodorsal view. D. — Sensillus. E. — Pteromorpha. F. — Area porosa Aa. G. — A region around areae porosae A₁ and A₂. H. — Schematic cross section of Aa.

Color. Brown to dark brown.

Rostrum. Rostral tip weakly protruding. The protrusion round. $a/b = 0.49$.

Sensillus. Head spindle-shaped, covered by relatively dense, short scales.

Textures. (1) Aspidosoma smooth except between bothridium and interlamellar setae where fine wrinkles and granules scattered. (2) Verrucae on notogaster inconspicuous, scattered only near pteromorphal ginglymi. (3) Granulated belt of notogaster very narrow but fairly conspicuous. It consists of one to three rows of dense granules.

Each granule very small, having clear border. Granules sometimes fused to each other. (4) External surface of notogastral areae porosae finely and densely striated. Each porosa elevated from the dorsal surface. (5) Mentum smooth. (6) Epimeral plate smooth at median part, faintly wrinkles at lateral side and granulated at tectopodia I. (7) Ventral plate smooth. (8) Granulated belt of venter moderately wide, conspicuous. The granules nearly round, small and conspicuous, sparsely scattered. (9) Genital and anal plate smooth. (10) Dorsal surface of pteromor-

pha minutely and densely granulated just along ginglymus, smooth near ginglymus and wholly striated at the other part.

Remarks. This species was partly used to describe *P. duplicata nipponica* by AOKI (1966). The fig. 20 of the original description is undoubtedly *T. lineata*, the present new species. Among the type-series of *P. duplicata nipponica*, the holotype and three paratypes (two on a slide NSMT-Ac-1952 and one on a slide NSMT-Ac-1953) become *T. nipponica*, while 12 paratypes (on slide NSMT-Ac-1953) become *T. lineata*. As the author newly designates his own specimens as the holotype and paratypes of *T. lineata*, AOKI's specimens of *T. lineata* in the paratypes of *P. duplicata nipponica* are not contained in the type-series of *T. lineata*.

The differences between *T. lineata* and *T. nipponica* are observable even under transparent illumination as follows : 1) body size, 2) clearness of granulated belts of notogaster and venter, 3) texture of areae porosae, 4) texture of pteromorphae and 5) shape of rostrum.

Among seven species treated in the present paper, the former three ones, *T. arborea*, *T. nipponica* and *T. hygrophila* are larger than the remainder. The smaller species are a little difficult to be separated from one another unless incident illumination can be used for observation. If only transparent illumination is available, the differences between them can be more easily found in the following textures : 1) notogastral areae porosae, 2) pteromorphae and 3) granulated belts of notogaster and venter. The most distinguishing character of the present new species lies in striated notogastral areae porosae which are not possessed by the other Japanese species in the present paper.

***Trichogalumna chimaera* sp. nov.**

(Fig. 5)

Type-series. Holotype (NSMT-Ac 9439 on slide) : Ejima-cho, Suzuka, Mie, 27-II-1980, N. OHKUBO, extracted from humus of pine wood on

a hill. Three paratypes (in spirit) : Tsuga-cho, Suzuka, Mie, 22-VIII-1981, N. OHKUBO, extracted from litter and dead leaves of a wood.

Measurement. Length : 320 (332) 350 μ .

Color. Brown to dark brown.

Rostrum. Rostral tip strongly protruding. The protrusion U-shaped. $a/b = 0.56$.

Sensillus. Head spindle-shaped, covered by relatively dense, short scales.

Textures. (1) Whole aspidosoma with very minute granules. The granules sparser and minuter near dorsosejugal. Inside corner of carina *L* with fine wrinkles. (2) Verrucae on notogaster inconspicuous, scattered only near pteromorph ginglymi and around areae porosae *Aa*. (3) Granulated belt of notogaster narrow but very conspicuous. It consists of two or three rows of dense, very small granule unshaped, having clear border. (4) External surface of notogastral areae porosae excavated by some large elongated ditches. (5) Mentum with wrinkles which are arranged, as a while, in a shape of letter U. (6) Epimeral plate smooth at mentotectum, very faintly granulated at median part and clearly granulated at both lateral sides. Fine wrinkles extend laterad from the anterior border of genital aperture. (7) Ventral plate smooth except at both lateral sides where it is minutely granulated. (8) Granulated belt of venter moderately wide, conspicuous. The granules nearly round, small to minute, and conspicuous. A mass of larger granules are surrounded by smaller granules. (9) Genital and anal plates smooth. (10) Dorsal surface of pteromorpha having dense small granules along ginglymus and at anterior part, dense elongate granules in middle part, and dense fine striation at posterior part. The surface with few striation at the posterior-most part.

Remarks. The present new species is one of the smaller members. Its most distinguishing character lies in deeply ditched notogastral areae porosae which are visible even under transparent illumination.

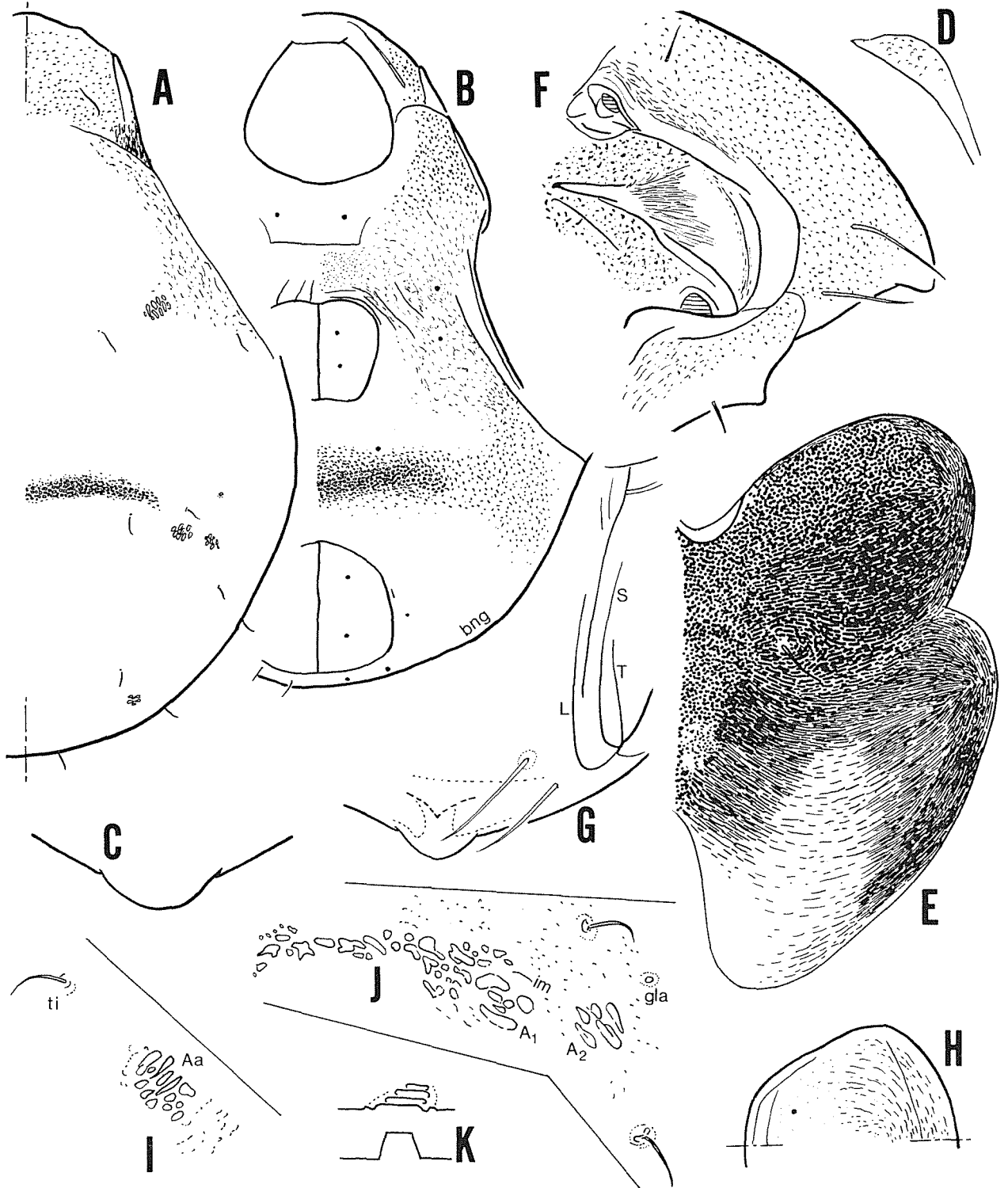


FIG. 5 : *Trichogalumna chimaera* sp. nov.

A. — Dorsal aspect. B. — Ventral aspect. C. — Rostrum in anterodorsal view. D. — Sensillus. E. — Pteromorpha. F. — Lateral aspect of anterior region. G. — Front aspect of anterior region. H. — Mentum. I and J. — Regions around areae porosae. K. — Schematic cross section of Aa.

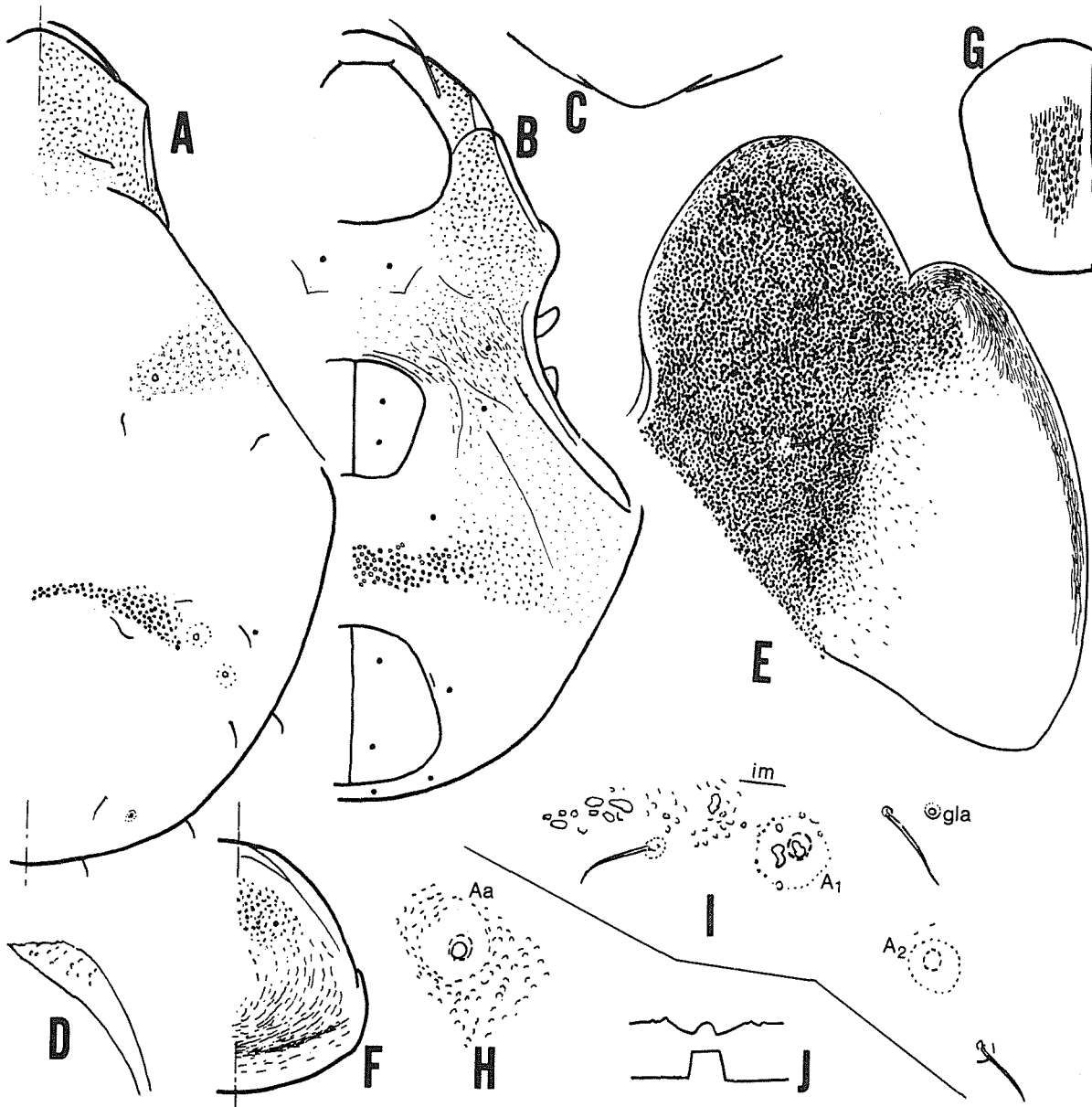


FIG. 6 : *Trichogalumna granuliala* sp. nov.

A. — Dorsal aspect. B. — Ventral aspect. C. — Rostrum in anterodorsal view. D. — Sensillus. E. — Pteromorpha. F. — Mentum. G. — Genital plate. H and I. — Regions around areae porosae. J. — Schematic cross section of Aa.

***Trichogalumna granuliala* sp. nov.**
(Fig. 6)

Type-series. Holotype (NSMT-Ac 9441 on slide) and 5 paratopotypes (in spirit) : Nagakutecho, Aichi, 9-IX-1981, N. OHKUBO, extracted from litter and grasses at roadside.

Measurement. Length : 310 (319) 330 μ .

Color. Brown to dark brown.

Rostrum. Rostral tip weakly protruding. The protrusion round. $a/b = 0.41$.

Sensillus. Head spindle-shaped, covered by relatively dense, short scales.

Textures. (1) Whole aspidosoma with minute

granules. The granules sparser and minuter near dorsosejugal. Inside corner of carina *L* with a few fine wrinkles. (2) Verrucae on notogaster inconspicuous scattered only near pteromorph ginglymi and around areae porosae *Aa*. (3) Granulated belt of notogaster narrow but very conspicuous. It consists of one to three rows of relatively dense granules. Each granule small, unshaped, having clear borders. (4) External surface of notogastral areae porosae deeply concaved, having usually one, occasionally no or two protuberances at the bottom. (5) Mentum having many granules and wrinkles which are arranged in some concentric elongate-ovals. (6) Epimeral plate smooth at mentotectum, very faintly granulated at median part and clearly granulated at both lateral sides. Fine wrinkles extend laterad from the anterior border of genital aperture. (7) Ventral plate with minute granules at both lateral sides. (8) Granulated belt of venter moderately wide, conspicuous. The granules nearly round, small and conspicuous, scattered sparsely. (9) Two types of genital plate are found in a population. One type of smooth surface and the other of sculptured surface. The sculpture made of fine striation and minute granules. Anal plate smooth. (10) Dorsal surface of pteromorpha minutely granulated in the anterior half and near ginglymus, and smooth at posterior half.

Remarks. The present new species is one of the smaller members. Its most distinguishing character lies in granulated pteromorphae which are well visible even under transparent illumination.

***Trichogalumna imperfecta* sp. nov.**

(Fig. 7)

Type-series. Holotype (NSMT-Ac 9443 in spirit) and 3 paratopotypes (in spirit): Shimonoshō, Kameyama, Mie, 29-IX-1981, N. OHKUBO, extracted from fallen pine cones in a wood.

Measurement. Length about 300 μ .

Color. Brown to dark brown.

Rostrum. Rostral tip weakly protruding. The protrusion triangulated. $a/b = 0.47$.

Sensillus. Head spindle-shaped, covered by very short, sparse scales.

Textures. (1) Aspidosoma smooth except between bothridium and interlamellar seta where fine wrinkles are scattered. (2) Verrucae on notogaster relatively conspicuous. (3) Granulated belt of notogaster moderately wide and conspicuous. Granules densely scattered. Each granule small and round, having clear border. (4) External surface of notogastral areae porosae flat, not shallowed, having fine dot. (5) Mentum with fine wrinkles posteriorly. (6) Epimeral plate with fine wrinkles which extend laterad from the anterior border of genital aperture. (7) Ventral plate with minute granules at both lateral sides. (8) Granulated belt of venter moderately wide, conspicuous. The granules nearly round, small and conspicuous, scattered densely. (9) Genital and anal plates smooth. (10) Dorsal surface of pteromorpha minutely and sparsely granulated near ginglymus, very faintly wrinkled near anterior border and posterolateral border.

Remarks. The present new species is one of the smaller members. Under transparent illumination, it is characterized by 1) less granulated pteromorphae and 2) dense, wide granulated belts of notogaster and venter.

DISCUSSION

Though surface texture of integument has much variation in a same species, the fundamental structure of the texture is stable. For example, *T. hygrophila* has always striated anal plates which range much striated to less striated ones. In this species, the structure of striation is fundamental. While its most similar congener, *T. nipponica* shows no striation on the plates. The two species are very similar to each other, but the textures can separate them easily in spite of the variation. The author considers that surface textures of integument are very useful for the classification in *Trichogalumna* species.

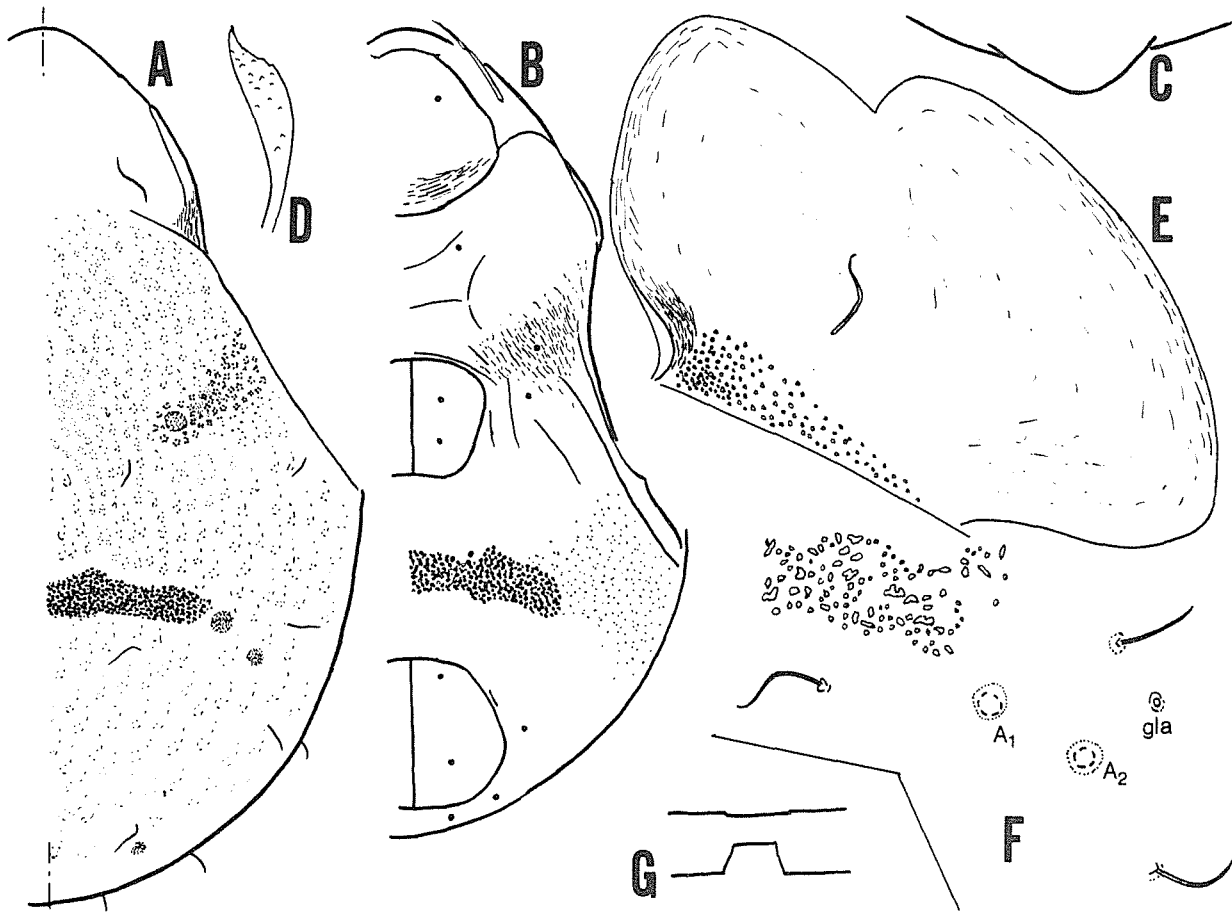


FIG. 7 : *Trichogalumna imperfecta* sp. nov.

A. — Dorsal aspect. B. — Ventral aspect. C. — Rostrum in anterodorsal view. D. — Sensillus. E. — Pteromorpha. F. — A region around areae porosae A_1 and A_2 . G. — Schematic cross section of Aa.

Incident illumination under high magnification is necessary to observe surface textures of integument. Transparent illumination could not detect such characters in many cases. This will indicate a difficult technology of the taxonomy in this genus.

The author divided the so-called *P. duplicata nipponica* into many independent species. It is notable that the present paper could record only a part of the Japanese *Trichogalumna* species. The classification will be troublesome in this genus. All other, hitherto known congeners need precise re-description of the further study. The next key to the world species of *Trichogalumna* is for the practical use of the taxonomic study at the

moment. It is useful unless incident illumination is available.

Key to *Trichogalumna* species of the world

1. Dorsosejugal suture complete 2
- Dorsosejugal suture interrupted medially 3
2. Areae porosae A_2 absent. South Africa
T. punctata ENGELBRECHT, 1972
- Areae porosae A_2 present. Tchad
T. microseta WALLWORK, 1965
3. Areae porosae A_1 and A_2 separated from each other 4
- Areae porosae A_1 and A_2 near to each other 5

4. Sensillar head rounded and depressed. Fiji.....
 T. taeniata HAMMER, 1971
- Sensillar head spindle-shaped. Fiji.....
 T. duoporosa HAMMER, 1971
5. Sensillar head globular 6
- Sensillar head spindle-shaped..... 9
6. Interlamellar setae minute (absent?). Pakistan....
 T. chitralensis HAMMER, 1977
- Interlamellar setae long..... 7
7. Interlamellar setae very long. Some notogastral
 setae absent. Angola.....
 T. seminuda BALOGH, 1960
- Interlamellar setae moderately long. All notogas-
 tral setae present 8
8. Pteromorpha granulated. Angola.....
 T. lunai (BALOGH, 1958)
- Pteromorpha almost smooth..... **T. arborea** n. sp.
9. Body length more than 350 μ 10
- Body length less than 350 μ 12
10. Sensillar head smooth. Tanzania.....
 T. montana BALOGH, 1962
- Sensillar head more or less barbed..... 11
11. Genital and anal plates smooth.....
 T. nipponica (AOKI, 1966) n. comb.
- Genital and anal plates striated.....
 T. hygrophila n. sp.
12. Lamellar seta far shorter than rostral one. South
 Africa..... *T. pumularis* ENGELBRECHT, 1972
- Lamellar seta as long as rostral one..... 13
13. Notogastral areae porosae look smooth..... 14
- Notogastral areae porosae look sculptured..... 15
14. Pteromorpha mostly granulated.....
 T. granuliala n. sp.
- Pteromorpha partly granulated.....
 T. imperfecta n. sp.
15. Notogastral areae porosae with dense striation.....
 T. lineata n. sp.
- Notogastral areae porosae with a few elongate
 ridges..... **T. chimaera** n. sp.

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