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Golanudiplosis japonicus — a new midge attacking comstock mealybug in Japan

(Diptera: Itonididae)

With 15 textfigures

This paper presents a description of the material sent to us for identification by Dr. M. S. MANI, Deputy Director, Zoological Survey of India. Dr. Yozo MURAKAMI of the Horticultural Research Station, Nakahara 1519, Hiratsuka, Japan, found the midge attacking eggs of the comstock mealybug, *Pseudococcus comstocki*. The midge is being described as a new genus *Golanudiplosis* that comes to a place near *Farquharsonia* COLLIN (COLLIN, 1921) in MANI's key (MANI, 1946) to the gall-midges of the Oriental Region.

*Golanudiplosis*¹ gen. nov.

Eyes confluent above; trophi short; palpi quadriarticulate; antennae with 2 + 12 binodose segments, with three whorls of regular loops, the basal whorl of the apical enlargement slightly shorter than other two whorls of circumfila; third and fourth antennal segments confluent; female with cylindrical segments, circumfila low; wing hyaline, with 4 longitudinal veins, vein R_2 absent, vein R_5 reaching beyond the apex of the wing margin, costa interrupted at its union with vein R_5 ; fifth vein forked; claw dentate on all legs; basal segment of male genitalia without basal lobe, terminal segment short and stout with an apical tooth, dorsal plate broad, deeply and narrowly incised, lobes rounded apically, sub-dorsal plate long, narrow basally, broad apically, broadly incised in the middle, lobes divergent, aedeagus long, slender, narrow apically and broad basally, parameres absent; ovipositor short, exserted, with oval lamellae.

Key to genera

1 Compound eyes normal	2
2 Claw dentate	3
3 Claw dentate on all legs	4
4 Palpi quadriarticulate	5
5 Circumfila loops in one whorl nearly all of the same length	6
6 Basal circumfila on the apical enlargements low	7
7 Basal clasp segment lobed basally	8
— Basal clasp segment without basal lobe	<i>Golanudiplosis</i> gen. nov.
8 Trophi normal, basal clasp segment with median basal spine	<i>Serratomyia</i> GROVER
— Trophi prolonged, basal clasp segment with basal lobe	<i>Farquharsonia</i> COLLIN

¹ From *Golanu* Sanskrit word for *Coccus*.

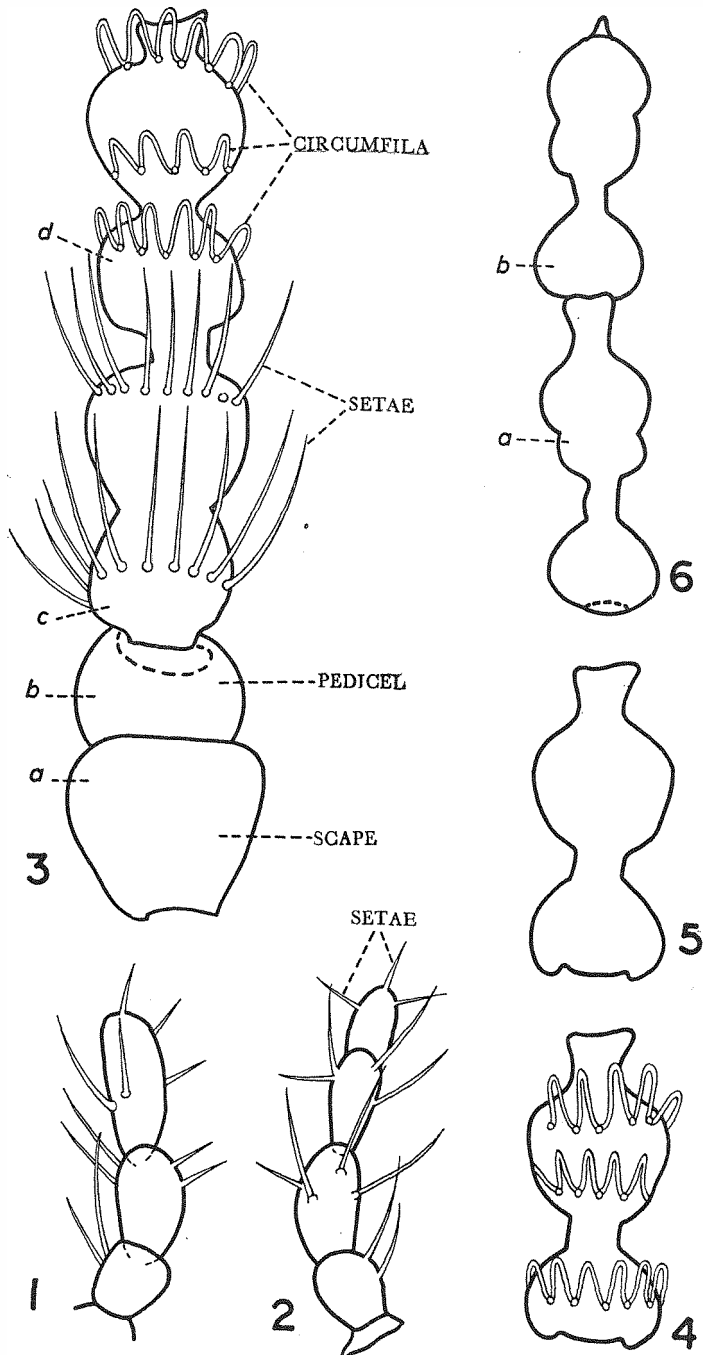


Fig. 1. Palpus of male, abnormal-triarticulate. — Fig. 2. Palpus of male, normal quadrarticulate. — Fig. 3. a, Scape. b, Pedicel. c, Third antennal segment. d, Fourth antennal segment. — Fig. 4. Sixth antennal segment. — Fig. 5. Seventh antennal segment. — Fig. 6. a, Penultimate segment. b, Terminal antennal segment

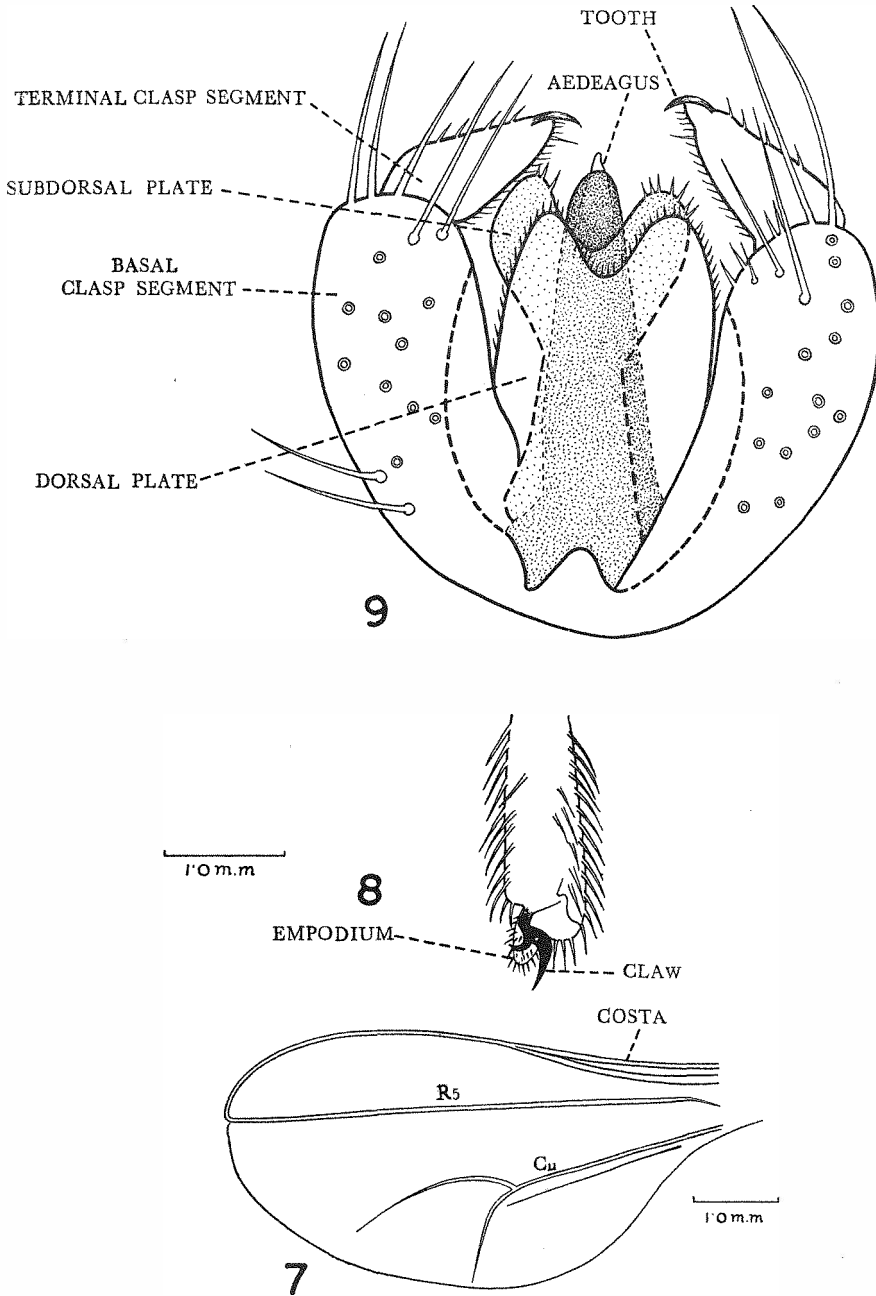


Fig. 7. Wing. — Fig. 8. Hind claw. — Fig. 9. — Genitalia, dorsal view. (Read $\frac{1}{10}$ mm for 1.0 mm under magnification).

Golanudiplosis japonicus* spec. nov.*Male:**

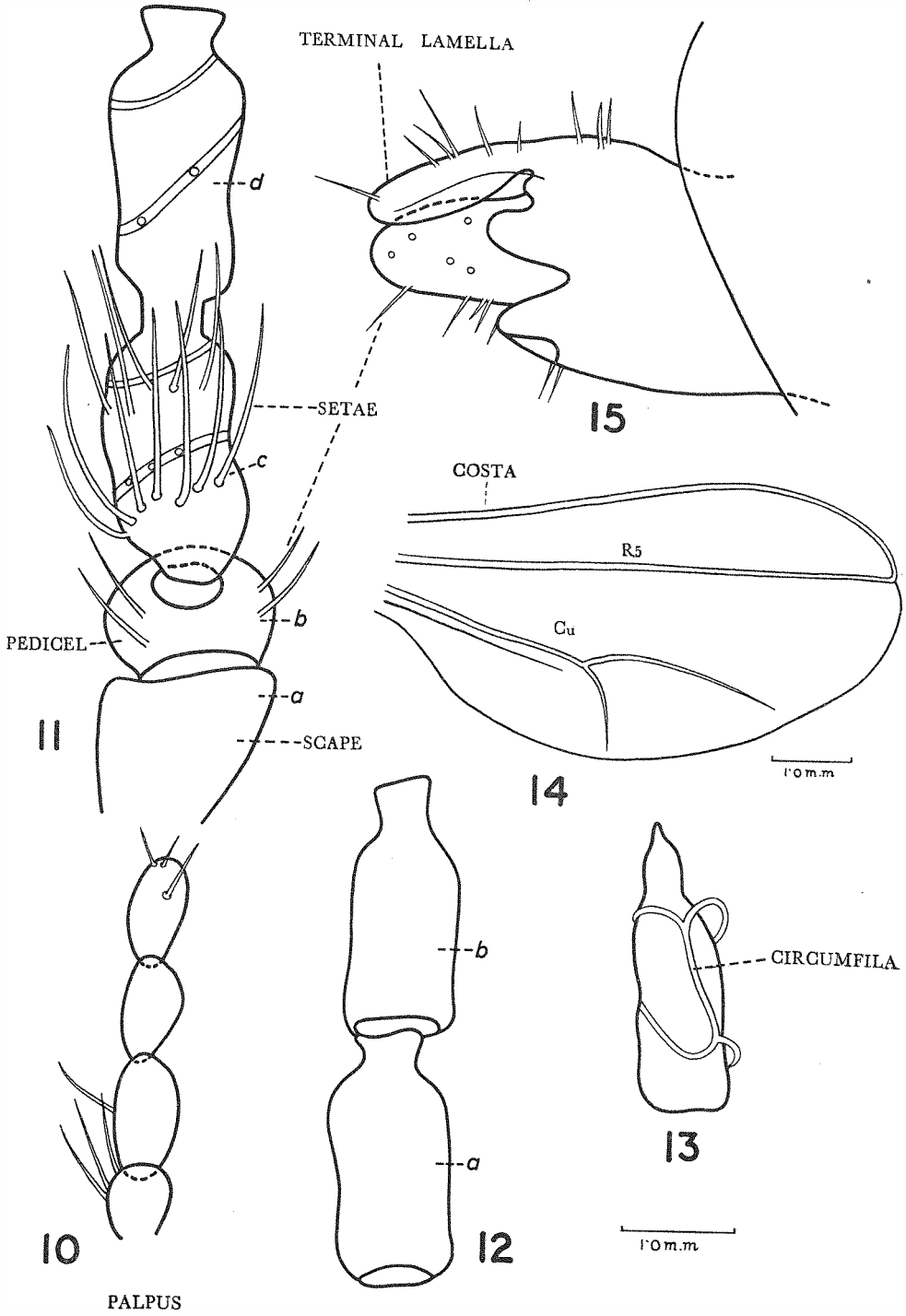
Body 1.3 mm. long, light brown. Head: Eyes confluent above. Trophi short. Palpus (Fig. 1, 2) quadriarticulate, sparsely setose; first segment (6:6) as long as broad; second segment (10:5) $1\frac{2}{3}$ times longer and slightly narrower than the first; third and fourth segments (9:5) similar and slightly longer than second segment. Antennae light brown, slightly shorter than body, with $2 + 12$ segments, flagellate segments binodose with short stems, all segments except the terminal are of equal length, minor variation in length and width of enlargements and stems occur, each circumfila with 10 loops; scape (Fig. 3a) cup-shaped (14:16) apically broader than long; pedicel (Fig. 3b) globose, (10:13) narrower than the scape; third segment (Fig. 3c) confluent with (25) and as long as the fourth segment, basal enlargement (9:12) with small basal prolongation (2:5), enlargement $\frac{3}{4}$ as long as broad, basal stem not prominent, apical enlargement (12:12) longer than basal and as long as broad apically; apical stem (2:4) $\frac{1}{6}$ the enlargement and $\frac{1}{2}$ as long as broad; fourth segment (Fig. 3d) similar to the third except the basal stem (1:4), and apical stem (3:3) $\frac{1}{4}$ the apical enlargement and as long as broad; fifth segment (25), basal enlargement (8:12) $\frac{2}{3}$ as long as broad, little more than $\frac{1}{3}$ the segment, basal stem (2:4) $\frac{1}{4}$ the basal enlargement and $\frac{1}{2}$ as long as broad, apical enlargement (11:12) little less than $\frac{1}{2}$ the length of the segment and slightly broader than long, longer than basal enlargement, apical stem little more than $\frac{1}{3}$ the enlargement and as long as broad; sixth and seventh segments (Fig. 4, 5) similar (25), basal enlargement (7:11) little less than $\frac{1}{4}$ the length of the segment, basal stem (3:4) slightly broader than long $\frac{3}{7}$ the basal enlargement, apical enlargement (10:11) as long as basal enlargement and basal stem combined, apical stem (5:4) $\frac{1}{2}$ the length of the apical enlargement and $1\frac{1}{4}$ times as long as broad; eighth to tenth segments similar except the basal stem (3:3) which is narrower than the preceding segments and as long as broad and apical stem (5:3) is $1\frac{2}{3}$ as long as broad; eleventh to penultimate segments (Fig. 6a) similar, with basal enlargements (7:9), basal stem (3:3), apical stem (5:3); terminal segment (Fig. 6b) shorter than eleventh segment, with apical lobe, basal enlargement similar to that of eleventh segment, basal stem (3:2) $1\frac{1}{2}$ times as long as broad, apical enlargement (11:8) longer and narrower than that of penultimate segment, apical lobe $5\frac{1}{2}$ times longer than apical enlargement.

Thorax dark brown. Wing (Fig. 7) hyaline, twice as long as broad, fifth vein forked. Legpale brown, long, densely hairy, metatarsus (5) short, $\frac{1}{8}$ the length of the tarsal segment (40) and as long as the terminal tarsal segment (5), proportion of the third and fourth tarsal segment is 16:11. Claw (Fig. 8) bifid, bent at right angle, empodium shorter than claw. Genitalia (Fig. 9) basal clasp segment (36:12) cylindrical, without basal lobe, 3 times as long as broad, terminal clasp segment (16:7) densely setose, short, slender, $2\frac{2}{7}$ times as long as broad medially, less than $\frac{1}{2}$ the length of the basal clasp segment, broad, basally, gradually tapering to apex and ending in a tooth; dorsal plate, nearly $1\frac{3}{5}$ as long as broad, subdorsal plate longer and narrower than the dorsal, narrow basally, broad apically, broadly incised in the middle, lobes divergent, aedeagus long, slender, longer than dorsal and subdorsal plates, broad basally and narrow apically, with small protuberance at the apex; parameres absent.

Female:

Body 2.8 mm. long, light brown. Palpus (Fig. 10) as in male. Antennae $\frac{1}{2}$ the length of the body, light brown, with $2 + 12$ segments, the flagellate segment with short stems and two

Fig. 10. Palpus of female. — Fig. 11. a, Scape. b, Pedicel. c, Third antennal segment of female. d, Fourth antennal segment of female. — Fig. 12. a, Fifth antennal segment of female. b, Sixth antennal segment of female. — Fig. 13. Terminal segment of female. — Fig. 14. Wing of female. — Fig. 15. Ovipositor. Read '05 mm for 1'0 mm under magnification.



whorls of long setae; scape (Fig. 11a) cup-shaped (18:27) broader than long; pedicel (Fig. 11b) sub-globose (12:16) shorter than scape and $\frac{3}{4}$ as long as broad; third segment (Fig. 11c) equal to and confluent with the fourth segment (30), (Fig. 11d) cylindrical, with very little constriction in the middle, enlargement (25:13) $\frac{5}{6}$ the segment and slightly less than $\frac{1}{2}$ as long as broad, stem (5:5) $\frac{1}{5}$ the enlargement and as long as broad; fifth segment (Fig. 12a) shorter (25) than fourth, enlargement (20:12) $\frac{4}{5}$ the length of the segment and $1\frac{2}{3}$ as long as broad, stem (5:5) similar to that of fourth segment; seventh to tenth segments (25) as long as fifth, enlargement (20:11) slightly narrower than that of the fifth segment, stem (5:5); eleventh and thirteenth segments (24) similar and slightly shorter than the preceding segments, enlargements (20:11) similar to that of fifth segment, stem (4:4) $\frac{1}{5}$ the enlargement and as long as broad; penultimate segment (25) as long as tenth segment, enlargement (20:10) twice as long as broad, slightly narrower than that of preceding segments, stems (5:5) $\frac{1}{4}$ the enlargement and as long as broad; terminal segment (Fig. 13) slightly longer (26) than the penultimate segment, enlargement (20:10) with an apical knob (6:3), more than $\frac{1}{3}$ the enlargement and twice as long as broad.

Thorax, wing (Fig. 14) as in male. Legs densely hairy, metatarsus (6) shorter than terminal tarsal segment (11) and little more than $\frac{1}{10}$ the second segment (64), third and fourth tarsal segments with proportion 26:17. Claw as in male.

Ovipositor (Fig. 15) exerted, $\frac{1}{13}$ the length of the body with two elongated, terminal lobes, (20:10) twice as long as broad, sparsely setose, the two basal lobes smaller than the dorsal.

Discussion

Before we discuss the position of the new genus it seems necessary to point out that the present midge displays a remarkable variation in the number of palpal segments. The two males received earlier appeared to have triarticulate palpi, while one of them had a quadriarticulate (Fig. 2). The three palpal segments coupled with the breeding habits of the midge led us to identify it as *Kamptodiplosis* FELT. Recently, however, we have received some more material from Mr. JUNICHI YUKAWA of Kyushu University, Fukuoka, Japan. We have mounted six males and seven females and all show quadriarticulate palpus. Mr. YUKAWA has also written to us that he has encountered a number of specimens with triarticulate palpi. A closer examination of the palpi in both male and female revealed that the length of the distal palpal segment in the triarticulate forms is equal to the length of the third and fourth palpal segments put together. It seems likely that the joint separating the third palpal segment from the fourth disappears leaving only an apparent single palpal segment.

Run on the key the material takes us to a place near *Farquharsonia* COLLIN (couplet 50, page 217) in MANI's key to the gall-midges of the Oriental Region by having eyes confluent above, claws dentate on all legs, circumfila of nearly equal height in each whorl, but those of the basal whorl of the apical enlargement shorter than those of the other two. It, however, differs from *Farquharsonia* in many notable characters of the trophi, antenna and the male genitalia. The trophi are short, not produced as in *Farquharsonia*. The middle whorl of circumfila in the material under discussion is looped while that in *Farquharsonia* is straight forming a ring embracing the basal region of the terminal enlargement. The triangular basal segment of the genitalia is without lobe (not a conspicuous triangular projection). The terminal segment of the forceps is short and stout

(not long and slender); dorsal plate is broad, deeply and narrowly incised (not triangularly emarginate); the sub-dorsal plate is longer and narrower than the dorsal plate with divergent distal lobes (not bottlebase shaped).

The material comes close to *Serratomyia* GROVER (GROVER, 1965), with which it differs in having binodose flagellate segment (not trinodose), basal clasp segment without basal lobe (not with a prominent median spine embracing the dorsal plate), the dorsal plate broad, deeply and narrowly incised (not distinctly bilobed); sub-dorsal plate long, narrow basally, broad apically with divergent lobes (not bilobed, lobes with serrate margins). Aedeagus long slender, broad basally and narrow apically with a small protuberance at the apex (not spatulate apically, narrow medially and broad basally). Parameres absent (not prominent and heavily chitinised).

It is apparent from the above that the material is neither *Farquharsonia* COLLIN nor *Serratomyia* GROVER to which it reaches when run on the key. Therefore it is described as a new genus *Golanudiplosis* with *japonicus* as its species since it has been reared from *Pseudococcus comstocki* in Japan.

Holotype:

One male dissected and mounted on slide labelled „Kuroishi, Aomori Prof., 17–30. IX 1962 Prey: Eggs of *Pseudococcus comstocki*, Coll., Y. Murakami, from the material received for identification from Dr. Yozo Murakami, Horticulture Research Station, Ministry of Agriculture and Forestry, Nakahara 1519 Hiratsuka, Kamagawa, Japan dated 17–25. IX 1962.“

Allotype:

One female dissected and mounted on slide and labelled as the holotype.

Paratypes:

Seven males and nine females mounted on slides labelled „Hibaru, Fukuoka-shi IX, Prey: Eggs and larvae of *Pseudococcus comstocki*, Coll., M. Miyahara“.

Acknowledgments

We wish to thank Dr. M. S. MANI, Deputy Director, Zoological Survey of India, for having sent to us the material sent by Dr. Yozo MURAKAMI of Japan, for identification. We also wish to thank Dr. MURAKAMI for giving us permission to describe his material. Our thanks are due to Mr. JUNICHI YUKAWA of Entomological Laboratory, Kyushu University, Fukuoka-shi, Japan, for having sent more material to us. Finally, we wish to thank Professor M. D. L. SRIVASTAVA for granting us facilities to complete the work in the Zoology Department, University of Allahabad. We are indebted to Mr. MOHAMMAD HUSSAIN for finishing our figures.

Summary

The midge found attacking eggs of the comstocki mealybug, *Pseudococcus comstocki*, in Japan is described as a new genus *Golanudiplosis* with *japonicus* as its type species. Both male and female are described in detail and their systematic position is discussed.

Zusammenfassung

Die Mücke, die in Japan die Eier der Mehlwanze *Pseudococcus comstocki* befällt, wird als neue Gattung *Golanudiplosis* mit der typischen Art *japonicus* beschrieben. Sowohl Männchen wie Weibchen werden deskripiert, und ihre Stellung im System wird erörtert.

Резюме

Комар, который поражает яйца *Pseudococcus comstocki*, описывается как новый род *Golanudiplosis* с типическим видом *japonicus*. Самцы и самки подробно описываются, обсуждается их место в системе.

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