

A NEW GENUS AND TWO NEW SPECIES OF ASTEROLECANIID
SCALE INSECTS ON PALM FROM COLOMBIA AND TRINIDAD
(HOMOPTERA: COCCOIDEA: ASTEROLECANIIDAE)

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Abstract.—A new genus, *Grammococcus*, and two new species, *G. adetocorymbus* and *G. corymbus*, are described and illustrated. Affinities and a diagnosis of the genus are also provided.

A new genus is described for two new species of unusual palm inhabiting asterolecaniid scale insects. Because both species were found in large populations on their hosts and because palms are frequently grown as ornamentals in the United States, we felt that it was important to describe these potential pest species.

Methods and Depositories

Numbers and measurements were taken from 10 specimens and are the average rounded off to the nearest whole number followed by the range in parentheses. Measurements are given in microns.

Specimens are deposited in: British Museum (Natural History), London (BM); California Department of Agriculture, Sacramento (CDA); Florida State Collection of Arthropods, Gainesville (FSCA); Museo de Historia Natural de la Ciudad de Mexico, Mexico City (MNC); Museum National d'Histoire Naturelle, Paris (MNHN); South African National Collection of Insects, Pretoria (SA); University of California, Davis (UCD); The University of Tennessee, Knoxville (UT); U.S. National Museum of Natural History, Washington, D.C. (USNM); Virginia Polytechnic Institute and State University, Blacksburg (VPI); and Zoological Institute, Academy of Sciences of USSR, Leningrad (ZI).

Grammococcus Miller and Lambdin, new genus

Type-species.—*Grammococcus adetocorymbus* Miller and Lambdin, new species.

Type-locality.—St. Clair, Port-of-Spain, Trinidad.

Affinities.—*Grammococcus* appears to be closely related to *Polea* Green. Similarities shared by adult females in the two genera are: Lack of large 8-shaped pores on submargin, presence of submarginal pore clusters, irregularly spaced minute 8-shaped pores on dorsum and bilocular pores clustered about mouth parts on venter. *Grammococcus* may be separated from *Polea* by the structure of the anal ring, the type of pores in the sub-

marginal pore clusters on the dorsum, the trilocular pores laterad of the spiracles, the number of labial setae, the reduced number of transverse rows of multilocular pores, and the lack of a submarginal band of quinquelocular pores on the venter. For a detailed treatment of *Polea* see Lambdin (1977).

Etymology.—The generic name is from the Greek *gramme* meaning “line” and *coccus* (latinized) meaning “seed or scale insect.” The name refers to the lines of dorsal tubular ducts characteristic of this genus.

Third-Instar Females (Adult)

Diagnosis.—Quinquelocular pores in clusters on dorsosubmargin, large 8-shaped pores absent, minute 8-shaped pores and simple pores present, tubular ducts in 2 longitudinal lines on each side of body. Venter with unsegmented antennae, bilocular pores near mouthparts, legs absent, trilocular pores near spiracle, multilocular pores in 2 or 3 transverse rows near vulva and submarginal 8-shaped pores in a submarginal row.

Adult females differ from other instars by the following combination: With a vulva, unsegmented antennae, ventral multilocular pores, dorsal tubular ducts, dorsal pore clusters, minute 8-shaped pores, row of trilocular pores in each spiracular furrow and bilocular pores; without legs, marginal 8-shaped pores and dorsal multilocular pores. Adult females are similar to the 2nd-instar males but are separated by having a vulva, spiracular furrows and multilocular pores.

Second-Instar Females

Diagnosis.—Dorsosubmargin with quinquelocular pores in clusters, large 8-shaped pores in medial area, simple disc pores irregularly spaced, tubular ducts absent. Venter with bilocular pores, minute 8-shaped pores, and pores near spiracles absent, antennae unsegmented, submarginal 8-shaped pores extending from cephalothorax to posterior abdominal segments.

Second-instar females differ from other instars by the following combination of characters: Without a vulva, dorsal and ventral multilocular pores, dorsal tubular ducts, minute 8-shaped pores, spiracular pores, marginal 8-shaped pores, legs and bilocular pores; with dorsal pore clusters and 2 medial rows of large 8-shaped pores. Second-instar females are similar to 2nd-instar males but differ by lacking dorsal tubular ducts, minute 8-shaped pores and bilocular pores.

First Instars

Diagnosis.—Dorsum with 2 pairs of multilocular pores, 8-shaped pores in medial and submarginal areas, simple disc pores. Venter with sub-

marginal tubular ducts, legs with trochanter and femur fused, antennae segmented.

First instars differ from other instars by the following combination of characters: With 2 pairs of dorsal multilocular pores, legs, segmented antennae, marginal and submedial rows of large 8-shaped pores and a trilocular pore near each spiracle; without a vulva, ventral multilocular pores, submarginal 8-shaped pores, dorsal tubular ducts, dorsal pore clusters and bilocular pores. Well-developed legs separate 1st instars from all others except 3rd to 5th-instar males which have either wing buds or wings.

Fifth-Instar Males (Adult)

Diagnosis.—Penial sheath short (Fig. 4), with 2 pairs of eyes, antennae 9-segmented, reticulate pattern on several areas of head and thorax.

Fifth-instar males differ from other instars by having a well-developed penial sheath, sclerotized thorax, 2 pairs of eyes, and 9-segmented antennae; by lacking mouthparts, pores and ducts. Fully developed wings immediately separate adult males from other instars.

Fourth-Instar Males (Pupae)

Diagnosis.—Pores and ducts absent, antennae 9-segmented, legs 6-segmented, dermal nodules on dorsum.

Fourth-instar males differ from other instars by the following combination of characters: With 9-segmented antennae, 6-segmented legs, wing buds and dermal nodules; without pores, ducts and mouthparts. Fourth-instar males differ from 3rd-instar males by the latter's having 8-segmented antennae and 4-segmented legs.

Third-Instar Males (Prepupae)

Diagnosis.—Pores and ducts absent, antennae 8-segmented, legs 4-segmented, dermal nodules on dorsum.

Third-instar males can be distinguished from all other instars by having characters given in diagnosis and by lacking pores, ducts, and mouthparts. Third-instar males differ from 4th instar males by the latter's having 9-segmented antennae and 6-segmented legs.

Second-Instar Males

Diagnosis.—Dorsum with clusters of quinquelocular pores on submargin, 8-shaped pores in medial area, minute 8-shaped pores and simple disc pores. Venter with unsegmented antennae, bilocular pores near mouth-

parts, pores absent near spiracles and 8-shaped pores in submarginal band. Similar morphologically to adult female but distinguished by absence of vulva, spiracular furrows and multilocular pores.

Second-instar males differ from other instars by the following combination of characters: With dorsal tubular ducts, minute 8-shaped pores, unsegmented antennae and bilocular pores; without a vulva, dorsal and ventral multilocular pores, spiracular pores, marginal 8-shaped pores and legs. Second-instar males are similar to 2nd-instar females but differ by having dorsal tubular ducts, minute 8-shaped pores and bilocular pores.

Grammococcus adetocorymbus Miller and Lambdin, new species

Third-Instar Females (Adult)

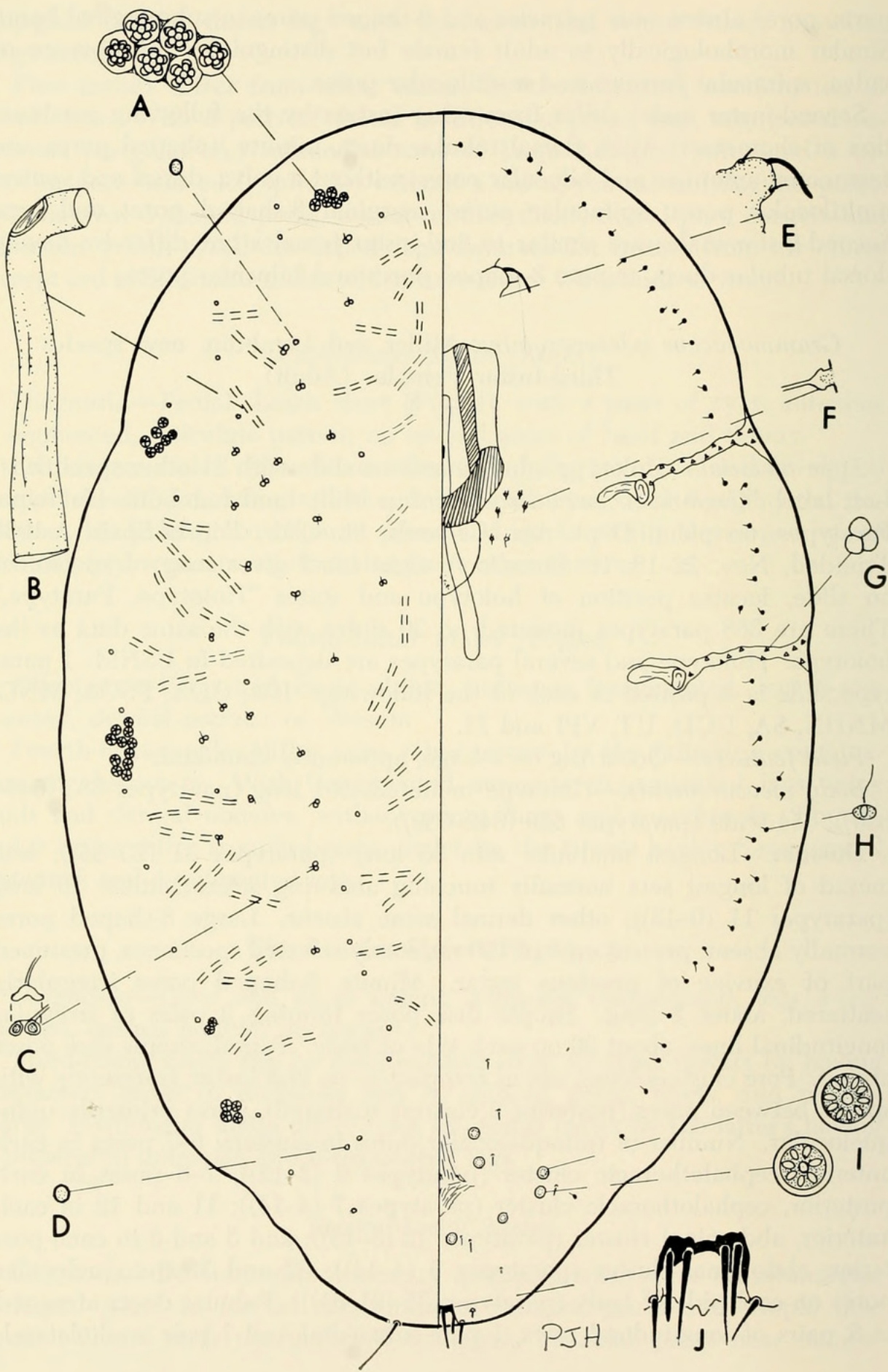
Fig. 1

Type material.—Holotype adult female on slide with 31 other specimens: Left label, "*Grammococcus adetocorymbus* Miller and Lambdin, Holotype, Paratypes; on palm, Dept. Agr. Grounds, St. Clair, Port-of-Spain A-1035 Trinidad, Nov. 22-18, H. Morrison"; right label gives map of specimens on slide, locates position of holotype and states "Holotype, Paratype." There are 368 paratypes mounted on 30 slides with the same data as the holotype. Holotype and several paratypes are deposited in USNM; 1 paratype slide is deposited in each of the following: BM, CDA, FSCA, MNC, MNHN, SA, UCD, UT, VPI and ZI.

Field features.—Occurring on foliage, apparently abundant.

Body measurements.—Holotype mounted, 561 long (paratypes 683 (549-830)), 354 wide (paratypes 529 (342-639)).

Dorsum.—Longest anal-lobe seta 33 long (paratypes 31 (23-35)); seta mesad of longest seta normally touching anal-ring sclerotization, 10 long (paratypes 11 (9-13)); other dermal setae absent. Large 8-shaped pores normally absent, present on 8 of 100 randomly selected specimens, presumed part of exuviae of previous instar. Minute 8-shaped pores irregularly scattered, about 2 long. Simple disc pores forming 2 pairs of irregular longitudinal lines, about 30 on each side of body. Paired, simple disc pores absent. Pore clusters loose, not as compact as on 2nd instar, frequently with spaces between pores (posterior 2 clusters scattered), pores primarily quinquelocular. Number of quinquelocular pores in clusters; 6-7 pores in each anterior, cephalothoracic cluster (paratypes 6 (2-12)); 7-8 pores in each posterior, cephalothoracic cluster (paratypes 7 (4-14)); 11 and 12 in each anterior, abdominal cluster (paratypes 12 (8-18)); and 5 and 6 in each posterior, abdominal cluster (paratypes 9 (4-14)); 32 and 30 quinquelocular pores on each side of body (paratypes 35 (21-51)). Tubular ducts arranged in 2 pairs of longitudinal rows, 1 pair submedial and 1 pair mediolateral;



40 and 46 on each side of body (paratypes 50 (41–66)); longest duct 33 long (paratypes 35 (23–43)).

Venter.—Antennae 10 long (paratypes 10 (8–13)); each with 1 long, fleshy seta and 2 short, slender setae. Clypeolabral shield 90 long (paratypes 94 (88–105)), 63 wide (paratypes 68 (63–75)). Labium nearly square, 40 long (paratypes 41 (38–48)), 40 wide (paratypes 44 (40–50)); with 2 pairs of minute setae. Setae in transverse rows on posterior abdominal segments. Spiracles with associated trilocular pores in spiracular furrow from spiracle to body margin, 10 and 16 pores in posterior furrows (paratypes 12 (9–14)). Bilocular pores laterad of mouthparts near junction of labium and clypeolabral shield, 6 and 7 pores on each side of shield (paratypes 7 (5–9)). Submarginal 8-shaped pores arranged in band extending from anterior of antennae to abdominal segment VIII or IX, 40 and 52 on each side of body (paratypes 52 (37–62)). Multilocular pores normally 10-locular, rarely 9-, 8-, or 7-locular; 13 pores (paratypes 12 (9–13)) on abdominal segments VI–VIII. Anal ring “C” shaped, lateral sclerotized areas without central clear area, lateral sclerotizations joined by anterior sclerotized bar; 2 pairs of robust setae of equal length, about 20 long (paratypes 21 (18–23)).

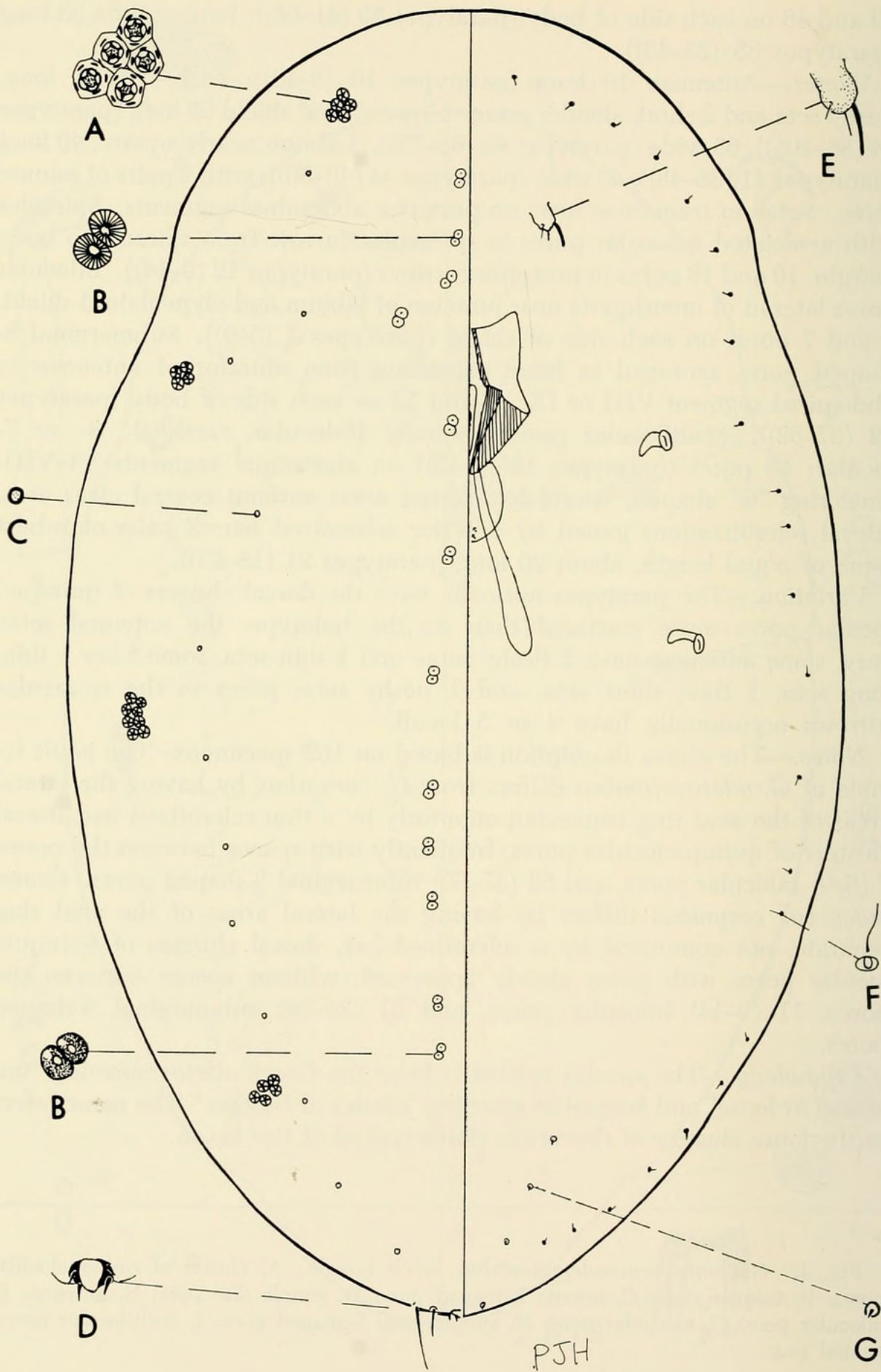
Variation.—The paratypes normally have the dorsal clusters of quinquelocular pores more scattered than on the holotype; the antennal setae vary, some antennae have 2 fleshy setae and 1 thin seta, some have 1 thin, long seta, 1 thin, short seta, and 1 fleshy seta; pores in the spiracular furrows occasionally have 4 or 5 loculi.

Notes.—The above description is based on 182 specimens. The adult female of *G. adetocorymbus* differs from *G. corymbus* by having the lateral areas of the anal ring connected anteriorly by a thin sclerotized bar, dorsal clusters of quinquelocular pores, frequently with spaces between the pores, 7 (5–9) bilocular pores, and 52 (37–62) submarginal 8-shaped pores. *Grammococcus corymbus* differs by having the lateral areas of the anal ring separate, not connected by a sclerotized bar, dorsal clusters of quinquelocular pores with pores closely appressed, without spaces between the pores, 11 (9–14) bilocular pores, and 31 (24–36) submarginal 8-shaped pores.

Etymology.—The species epithet is from the Greek *adetos* meaning “unbound or loose” and *korymbos* meaning “cluster of flowers.” The name refers to the loose clusters of flowerlike pores typical of this taxon.

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Fig. 1. *Grammococcus adetocorymbus*, adult female. A, cluster of quinquelocular pores; B, tubular duct; C, minute 8-shaped pore; D, simple disc pore; E, antenna; F, bilocular pore; G, trilocular pore; H, submarginal 8-shaped pore; I, multilocular pores; J, anal ring.



Second-Instar Females

Fig. 2

Body measurements.—Mounted, 473 (397–591) long, 286 (226–366) wide.

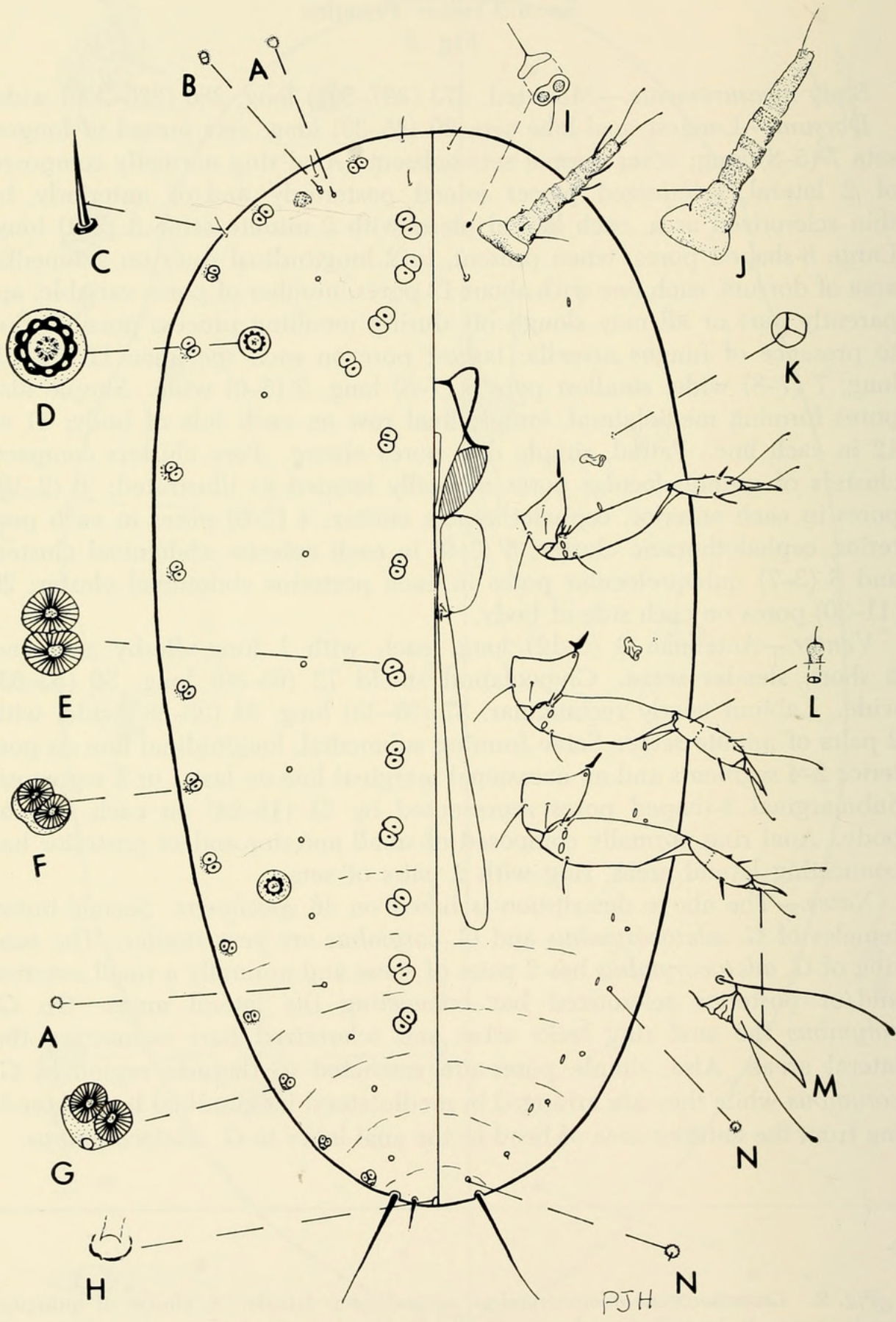
Dorsum.—Longest anal-lobe seta 29 (25–33) long; seta mesad of longest seta 7 (5–8) long; other dermal setae absent. Anal ring normally composed of 2 lateral, sclerotized pieces joined posteriorly and/or anteriorly by thin sclerotized area, each lateral piece with 2 minute setae 3 (2–4) long. Large 8-shaped pores, when present, in 2 longitudinal rows on submedial area of dorsum, each line with about 12 pores; number of pores variable, apparently part or all may slough off during moulting process possibly due to presence of fungus mycelia; largest pore on each specimen 11 (10–12) long, 7 (7–8) wide; smallest pore 8 (7–8) long, 5 (5–6) wide. Simple disc pores forming mediolateral, longitudinal row on each side of body; 11 or 12 in each line. Paired, simple disc pores absent. Pore clusters compact, clusters of quinquelocular pores normally located as illustrated; 6 (2–10) pores in each anterior, cephalothoracic cluster; 4 (2–6) pores in each posterior, cephalothoracic cluster; 5 (3–9) in each anterior abdominal cluster; and 5 (3–7) quinquelocular pores in each posterior abdominal cluster; 20 (11–30) pores on each side of body.

Venter.—Antennae 9 (8–12) long; each with 1 long, fleshy seta and 2 short, slender setae. Clypeolabral shield 72 (65–80) long, 56 (53–63) wide. Labium nearly rectangular, 37 (35–38) long, 34 (33–38) wide; with 2 pairs of minute setae. Setae forming submedial, longitudinal line on posterior 2–4 segments and an occasional marginal line on last 1 or 2 segments. Submarginal 8-shaped pores represented by 21 (18–24) on each side of body. Anal ring normally composed of small anterior and/or posterior bar connecting lateral areas, ring with 2 pairs of setae.

Notes.—The above description is based on 46 specimens. Second-instar females of *G. adetocorymbus* and *G. corymbus* are very similar. The anal ring of *G. adetocorymbus* has 2 pairs of setae and normally a small anterior and/or posterior sclerotized bar connecting the lateral areas. On *G. corymbus* the anal ring lacks setae and sclerotized bars connecting the lateral areas. Also, simple pores are restricted to thoracic region in *G. corymbus* while they are arranged in mediolateral longitudinal lines extending from the anterior area of head to the anal lobes in *G. adetocorymbus*.

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Fig. 2. *Grammococcus adetocorymbus*, second-instar female. A, cluster of quinquelocular pores; B, large 8-shaped pore; C, simple disc pore; D, anal ring; E, antenna; F, submarginal 8-shaped pore; G, seta.



First Instars

Fig. 3

We have been unable to separate 1st instars of *G. adetocorymbus* and *G. corymbus* and have included only one description.

Body measurements.—Mounted, 329 (293–360) long, 157 (140–183) wide.

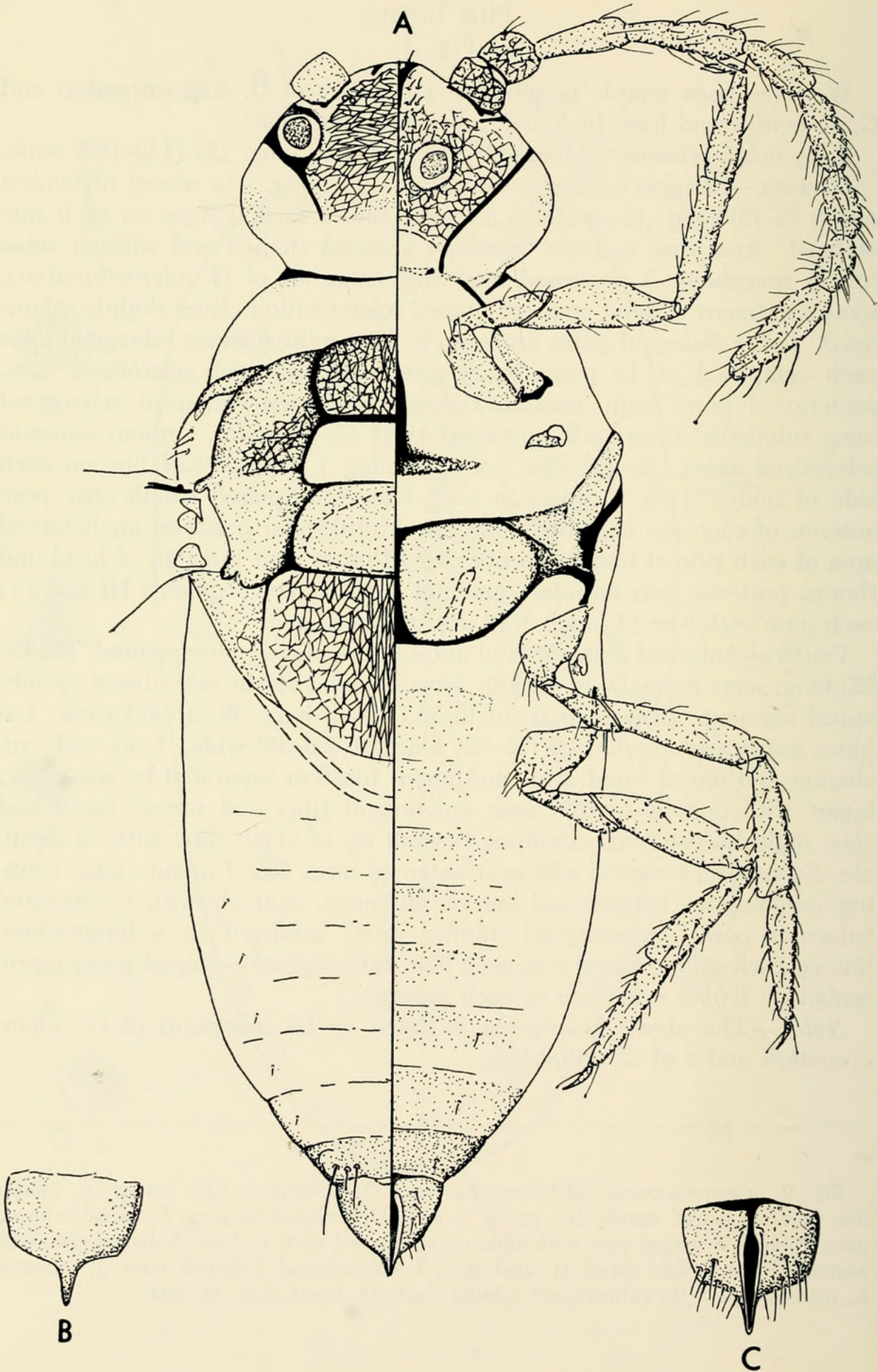
Dorsum.—Longest anal-lobe seta 31 (30–33) long, seta mesad of longest seta 9 (8–13) long. Normally 3 marginal and 1 medial setae on each side of head. Anal ring variable, normally crescent shaped and without setae (of 70 specimens, 3 possessed anal-ring setae, all of *G. adetocorymbus*), some specimens without crescent-shaped sclerotization. Eyes slightly sclerotized. Large 8-shaped pores arranged in longitudinal lines: Marginal lines each composed of 14 pores, each pore with adjacent sclerotized area, posterior 3 pores with associated simple pore near adjacent sclerotized area; submedial rows each composed of 11 (7–13) pores, without adjacent sclerotized areas. Simple disc pores forming 1 mediolateral line on each side of body, 11 or 12 pores in each line. One paired simple disc pore anterior of each eye near body margin. Multilocular pores on mediolateral area of each side of body; anterior pair of pores near junction of head and thorax, posterior pair on intersegmental line between segments III and IV; each pore with 9 or 11 loculi, 9 (8–10) in diameter.

Venter.—Antennal segmentation unclear, apparently 6-segmented, 48 (45–52) long; setae normally as on Fig. 3, occasionally fleshy seta absent on subapical segment. Clypeolabral shield 52 (48–55) long, 39 (37–42) wide. Labium nearly rectangular, 29 (26–32) long, 31 (29–36) wide. Legs with trochanter and femur fused; tibia and tarsus fused or separated by weak line; tarsus with deltoid sensilla near junction of tibia and tarsus; tarsal and claw digitules capitate, extending beyond tip of claw; claw without denticle. Setae rare, 1 medial seta near antennal base, 6 or 7 minute setae forming submarginal, longitudinal line on abdomen. Spiracle with 1 associated trilocular pore. Submarginal tubular ducts arranged in a longitudinal line on each side of body, 8 in each line; submarginal 8-shaped pores represented by 1 pore near base of each antenna.

Notes.—The above description is based on 68 specimens of *G. adetocorymbus* and 2 of *G. corymbus*.

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Fig. 3. *Grammococcus adetocorymbus* and *G. corymbus*, first instar. A, simple disc pore; B, paired simple disc pores; C, seta; D, multilocular pore; E, large 8-shaped pore; F, large 8-shaped pore with adjacent sclerotized area; G, large 8-shaped pore with associated simple disc pore; H, anal ring; I, submarginal 8-shaped pore; J, antenna; K, trilocular pore; L, submarginal tubular duct; M, tarsal claw; N, seta.



Fifth-Instar Males (Adult)

Fig. 4a

Body measurements.—Mounted, 689 (647–738) long, 298 (262–329) wide.

Description.—Dorsum with several hairlike setae in each tegular area, single seta in sublateral area of segments III, IV, or V–VII, 2 or 3 setae in each sublateral area of segment VIII. Ventrally setae on ocular sclerite anterior of ventral eye forward to lateral arm of midcranial ridge, and on mediolateral area of abdominal segments IV or V–VII. Penial sheath with setae scattered near ventral slit, setae absent dorsally.

Head subcircular; midcranial ridge with lateral and ventral arms, ventral arm extending from lateral arms to level of preocular ridge. Preocular ridge short, extending from dorsal eye to articulatory process of antenna. Postocular ridge well developed, originating near postoccipital sclerotization dorsally, extending to posterior margin of head ventrally. Postoccipital ridge weakly sclerotized or absent. Ocular sclerites and genae weakly sclerotized. Dorsal head pores 4 (1–7), near base of each antenna. Posterior tentorial pits present. Dorsal eye 30 (28–33) in diameter, ventral eye 31 (25–33) in diameter. Reticulation on both surfaces of head.

Antenna 435 (421–451) long, about $0.6\times$ as long as body length; apical segments broader than other segments and $1.5\times$ (1.4–1.6) as long as 3rd segment. Antennal setae predominately of thin, fleshy type; scape and pedicel with hairlike setae; apical segment with 1 or 2 antennal bristles and 1 (1–3) subapical sensory seta. Antennae apparently without placodic or basiconic sensillae.

Front pair of legs shortest, middle pair normally slightly longer than hind pair. Total length of trochanter, femur, tibia, tarsus and claw of each leg as follows: Front 338 (313–368), middle 368 (345–390) and hind 363 (338–375). Each trochanter with 3 pairs of campaniform sensillae. Hind tibia/tarsus 1.1 (1.1–1.2). Tarsi unsegmented, campaniform sensilla near base of tibia, and with pair of capitate digitules which extend to tip of claw. Claws without denticle; digitules of same size and shape as on tarsus. Legs setae hairlike, without tibial spurs.

Prothorax separated from genae by constriction. Pronotal ridge conspicuous, occasionally dorsomedial area lightly sclerotized, nearly touching proepisternum + cervical sclerite laterally; pronotal sclerites lightly sclerotized or absent. Posttergite apparently absent. Proepisternum + cervical sclerite with anterior ridge articulating with postocular ridge; propleural ridge well developed. Prosternum conspicuous, heavily sclerotized medially, less definite laterally.

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Fig. 4. *Grammococcus adetocorymbus*, adult male. A, dorsoventral view; B, *G. corymbus* n. sp., dorsal view of penial sheath; C, ventral view of penial sheath.

Mesothorax with prescutum surrounded by well-developed prescutal ridges, covered by reticulation pattern. Membranous area posterior of prescutum. Small area of scutum adjacent of membranous area reticulated. Scutellum with large internal foramen. Large membranous area between scutellum and postnotum with noticeable reticulation. Mesopleural ridge well developed. Episternum incompletely divided by membranous area, subepisternal ridge weakly sclerotized, not reaching level of membranous area. Lateropleurite well developed, bounded anteriorly by weakly sclerotized extension of marginal ridge of basisternum. Epimeron absent. Basisternum lightly reticulated, divided by well-developed median ridge connecting marginal and precoxal ridges; furca large and well developed.

Metathorax without suspensorial sclerites and postnotum. Episternum and epimeron composed of irregularly sclerotized areas on each side of short pleural ridge; precoxal ridge absent. Metasternal plate composed of weakly sclerotized area.

Wings 337 (325–368) long; hamulohalterae absent; without setae, circular sensoria, or alar lobe.

Abdominal terga inobvious except on segment VIII; sterna irregular, lightly sclerotized on segments II–VI, well developed on segments VII and VIII. Dorsal setae on segment VIII on small protuberance, without glandular pouch.

Genital segment unusually short for asterolecaniid (Giliomee, 1968; Giliomee and Munting, 1968; Borchsenius, 1960; Russell, 1941); length 60 (58–63), width 63 (60–65); length/width 1.0 (0.9–1.0). Basal rod well developed. Ventral margin of capsule with conspicuous ridge, dorsal margin unsclerotized, anus inconspicuous.

Notes.—The above description is based on 29 specimens; of the 29, 7 are in the exuviae of the previous instar. The most conspicuous difference between *G. adetocorymbus* and *G. corymbus* is the shape and chaetotaxy of the genital segment.

Fourth-Instar Males (Pupae)

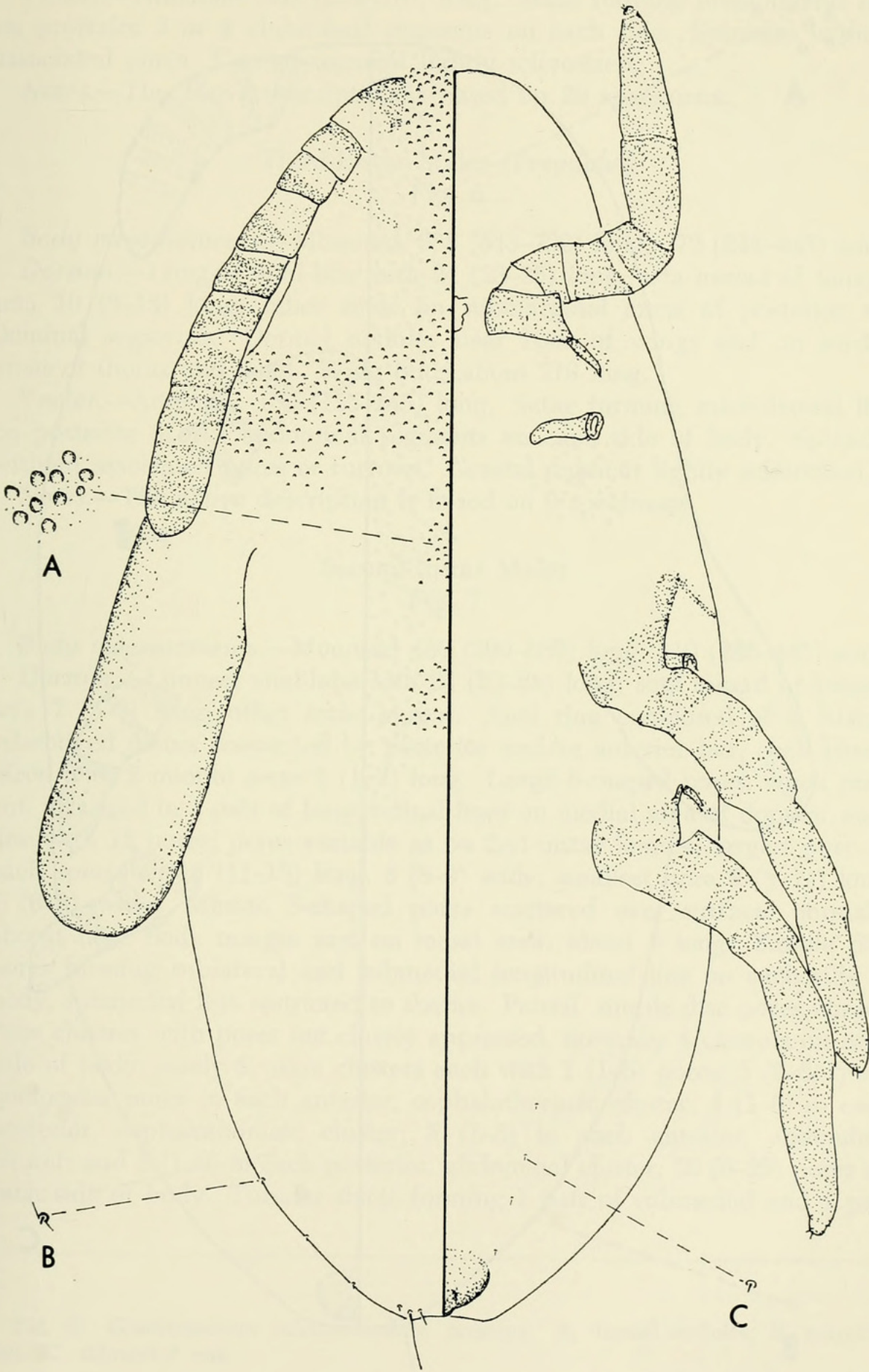
Fig. 5

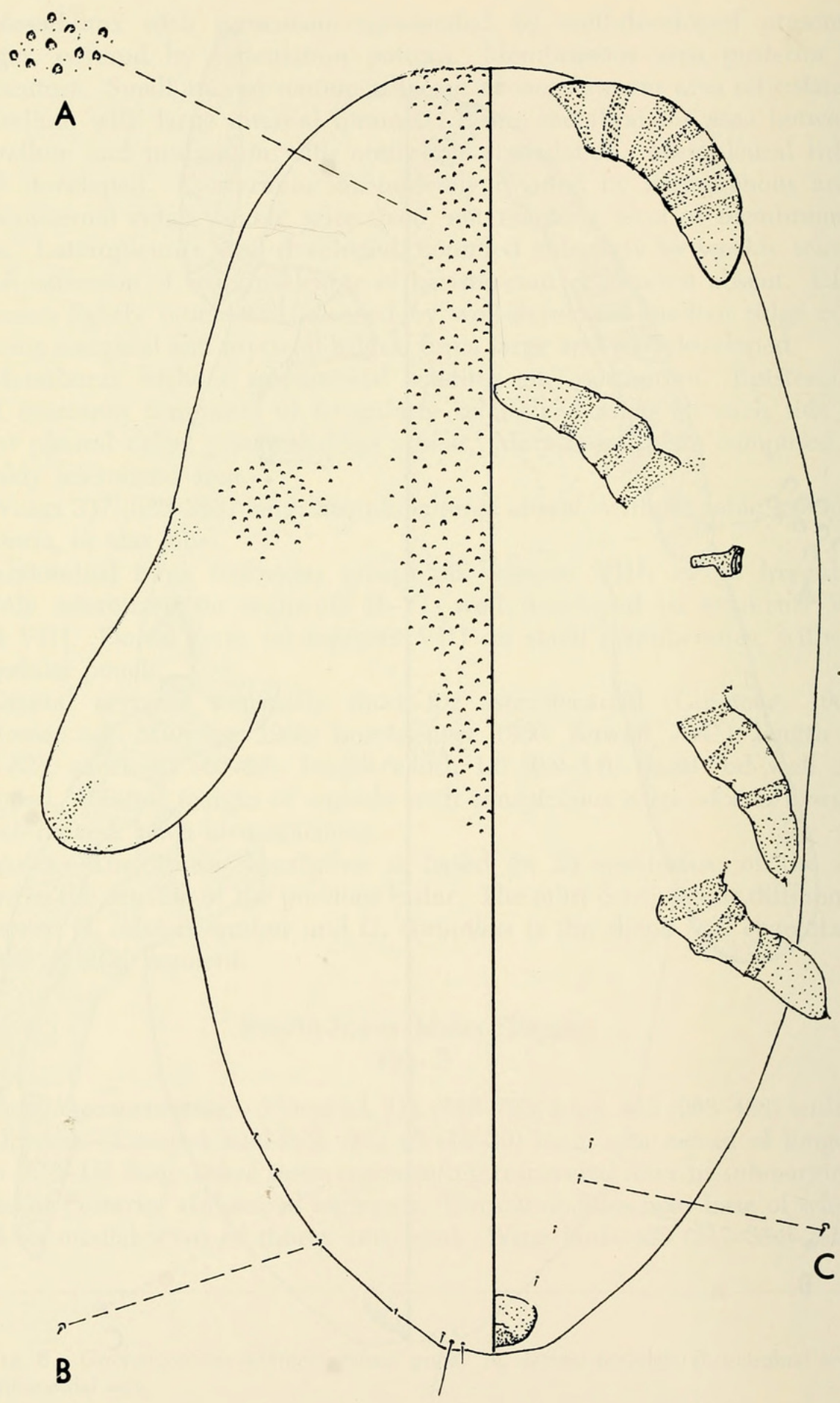
Body measurements.—Mounted, 711 (519–793) long, 422 (268–488) wide.

Dorsum.—Longest anal-lobe seta 25 (18–30) long; seta mesad of longest seta 9 (5–15) long; other setae representing transverse rows in submarginal areas of posterior abdominal segments. Dermal nodules near base of wings and on medial areas of thorax and head. Wing buds 339 (317–354) long.

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Fig. 5. *Grammococcus adetocorymbus*, pupa. A, dermal nodules; B, marginal seta; C, submedial seta.





Venter.—Antennae 333 (252–370) long. Setae forming mediolateral line on posterior 3 or 4 abdominal segments on each side. Spiracles without associated pores. Genital segment lightly sclerotized.

Notes.—The above description is based on 29 specimens.

Third-Instar Males (Prepupae)

Fig. 6

Body measurements.—Mounted, 658 (543–732) long, 372 (244–445) wide.

Dorsum.—Longest anal-lobe seta 24 (23–25) long; seta mesad of longest seta 10 (8–13) long; other setae on submarginal areas of posterior abdominal segments. Dermal nodules near base of wings and on medial areas of thorax and head. Wing buds about 210 long.

Venter.—Antennae 137 (125–145) long. Setae forming mediolateral line on posterior 3 or 4 abdominal segments on each side of body. Spiracles without associated pores or furrows. Genital segment lightly sclerotized.

Notes.—The above description is based on 9 specimens.

Second-Instar Males

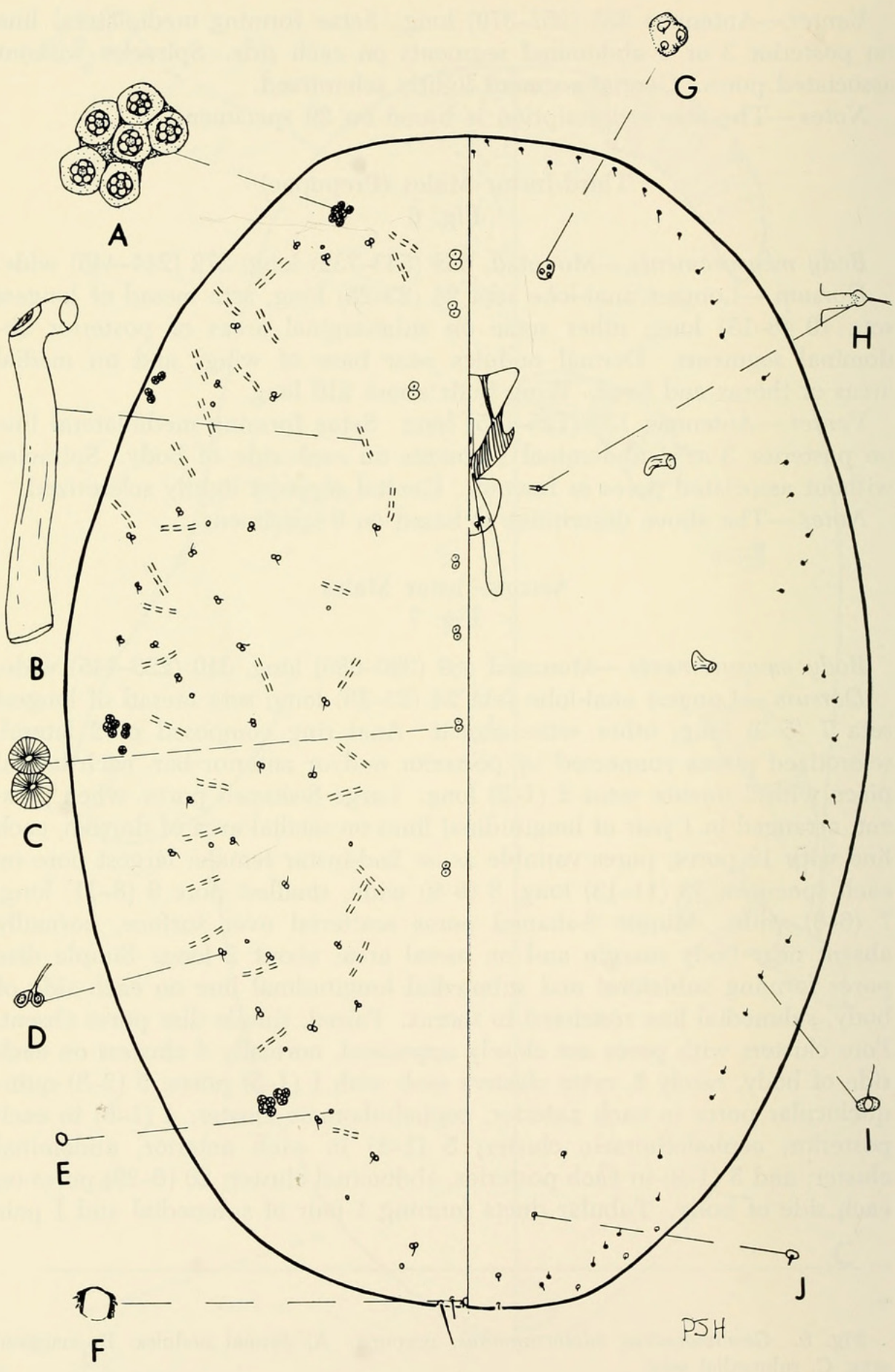
Fig. 7

Body measurements.—Mounted 489 (390–689) long, 310 (226–445) wide.

Dorsum.—Longest anal-lobe seta 24 (23–28) long; seta mesad of longest seta 7 (5–9) long; other setae absent. Anal ring composed of 2 lateral, sclerotized pieces connected by posterior and/or anterior bar, each lateral piece with 2 minute setae 2 (1–2) long. Large 8-shaped pores, when present, arranged in 1 pair of longitudinal lines on medial area of dorsum, each line with 12 pores; pores variable as on 2nd-instar female; largest pore on each specimen 13 (11–13) long, 8 (8–9) wide; smallest pore 9 (8–11) long, 7 (6–8) wide. Minute 8-shaped pores scattered over surface, normally absent near body margin and on mesal area; about 2 long. Simple disc pores forming sublateral and submedial longitudinal line on each side of body, submedial line restricted to thorax. Paired, simple disc pores absent. Pore clusters with pores not closely appressed, normally 4 clusters on each side of body, rarely 5, extra clusters each with 1 (1–5) pores; 5 (2–8) quinelocular pores in each anterior, cephalothoracic cluster; 4 (1–6) in each posterior, cephalothoracic cluster; 5 (1–8) in each anterior, abdominal cluster; and 5 (1–9) in each posterior, abdominal cluster; 20 (6–29) pores on each side of body. Tubular ducts forming 1 pair of submedial and 1 pair

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Fig. 6. *Grammococcus adetocorymbus*, prepupa. A, dermal nodules; B, marginal seta; C, submedial seta.



of submarginal, longitudinal lines on each side of body; 29 (25–32) on each side of body; longest duct 28 (25–30) long.

Venter.—Antennae platelike, difficult to measure; each with 3 small setae. Clypeolabral shield 76 (70–80) long, 58 (55–63) wide. Labium nearly rectangular, 36 (33–38) long, 39 (35–43) wide; with 2 pairs of minute setae. Setae forming submedial and marginal longitudinal line on posterior 3 (2–5) segments. Bilocular pores normally lateral of junction of labium and clypeolabral shield; 1 (0–2). Submarginal 8-shaped pores represented by 36 (30–43) on each side of body.

Notes.—The above description is based on 21 specimens. Second-instar males of *G. adetocorymbus* and *G. corymbus* are very similar. *Grammococcus adetocorymbus* has the anal ring relatively well developed with 2 pairs of small setae, has 1 (0–2) bilocular pore and has the pore clusters with the pores loosely arranged. *Grammococcus corymbus* has a poorly developed anal ring which lacks setae, has 5 (3–6) bilocular pores and has the pore clusters with closely appressed pores.

Grammococcus corymbus Miller and Lambdin, new species

Third-instar Female (Adult)

Fig. 8

Type-material.—Holotype adult female on slide with 13 other specimens: Left label, "*Grammococcus corymbus* Miller and Lambdin, Holotype, Paratypes; on *Elaeis guineensis* Jackq. (Palmaceae), Melgar (Cund.), Colombia, 29-III-1972. F. Mosquera coll."; right label gives map of specimens on slide, locates position of holotype and states "*Grammococcus corymbus* Miller and Lambdin. Holotype, Paratypes; 14 adult ♀." There are 146 paratypes mounted on 19 slides with the same data as the holotype. Holotype and several paratypes are deposited in USNM; 1 paratype slide is deposited in each of the following: BM, MNHN, SA, UCD, UT and ZI.

Field features.—Occurring on foliage.

Body measurements.—Holotype mounted, 573 long (paratypes 526 (445–604)), 549 wide (paratypes 479 (305–586)).

Dorsum.—Same as *G. adetocorymbus* except as follows: Longest anal-lobe seta 28 long (paratypes 28 (25–34)); seta mesad of longest seta not touching anal-ring sclerotization, 13 long (paratypes 10 (8–15)). Large 8-shaped pores on 1 of 94 specimens. About 26 simple disc pores on each side of body. Pore clusters compact, without spaces between pores. Num-

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Fig. 7. *Grammococcus adetocorymbus*, second-instar male. A, pore cluster; B, tubular duct; C, large 8-shaped pore; D, minute 8-shaped pore; E, simple disc pore; F, anal ring; G, antenna; H, bilocular pore; I, submarginal 8-shaped pore; J, seta.

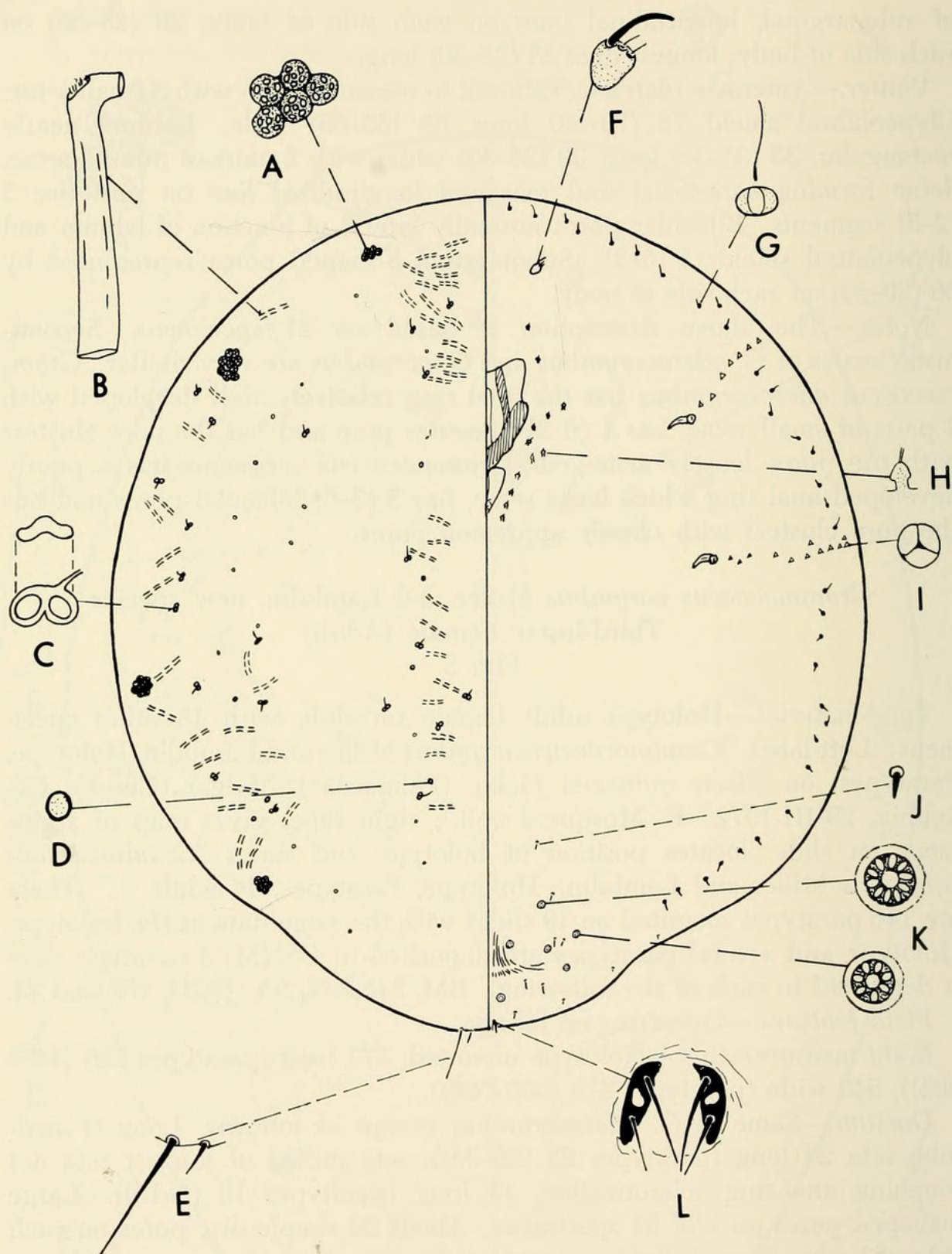


Fig. 8. *Grammococcus corymbus*, adult female. A, pore cluster; B, tubular duct; C, minute 8-shaped pore; D, simple disc pore; E, anal-lobe seta; F, antenna; G, sub-marginal 8-shaped pore; H, bilocular pore; I, trilocular pore; J, seta; K, multilocular pores; L, anal ring.

ber of quinquelocular pores: 8 and 5 in each anterior, cephalothoracic cluster (paratypes 6 (3–13)); 9 and 5 in each posterior, cephalothoracic cluster (paratypes 6 (3–9)); 8 and 8 in each anterior, abdominal cluster (paratypes 7 (3–12)); and 7 and 5 in each posterior, abdominal cluster (paratypes 6 (3–9)); 32 and 23 quinquelocular pores on each side of body (paratypes 26 (18–47)). Tubular ducts in 2 pairs of longitudinal lines; 44 and 48 on each side of body (paratypes 42 (34–53)); longest duct 35 long (paratypes 34 (30–38)).

Venter.—Antennae 8 long (paratypes 9 (8–13)). Clypeolabral shield 83 long (paratypes 82 (80–88)), 63 wide (paratypes 61 (58–68)). Labium 40 long (paratypes 39 (38–43)), 35 wide (paratypes 39 (33–48)). Posterior spiracular furrows with 11 and 13 trilocular pores (paratypes 12 (10–14)). Bilocular pores represented by 9 and 12 pores on each side of clypeolabral shield (paratypes 11 (9–14)). Submarginal 8-shaped pores represented by 28 and 33 on each side of body (paratypes 31 (24–36)). Multilocular pores on posterior abdominal segments near vulva, 11 pores (paratypes 12 (10–14)). Anal ring in 2 separate pieces, not connected by anterior sclerotized bar, each half with central clear area; 2 pairs of robust setae, posterior pair shortest; longest seta 15 (paratypes 14 (8–20)).

Variation.—The paratypes occasionally have an additional cluster of dorsal quinquelocular pores, the anal-ring setae equal in length, ventral setae on the mediolateral areas of segments 4–9, and the pores in the spiracular furrows with 4 or 5 loculi.

Notes.—The above description is based on 94 specimens. For a comparison of *G. adetocorymbus* and *G. corymbus* see "Notes" of the former species.

Etymology.—The species epithet is from the Greek *korymbos* meaning "cluster of flowers." The name refers to the clusters of flowerlike pores typical of this taxon.

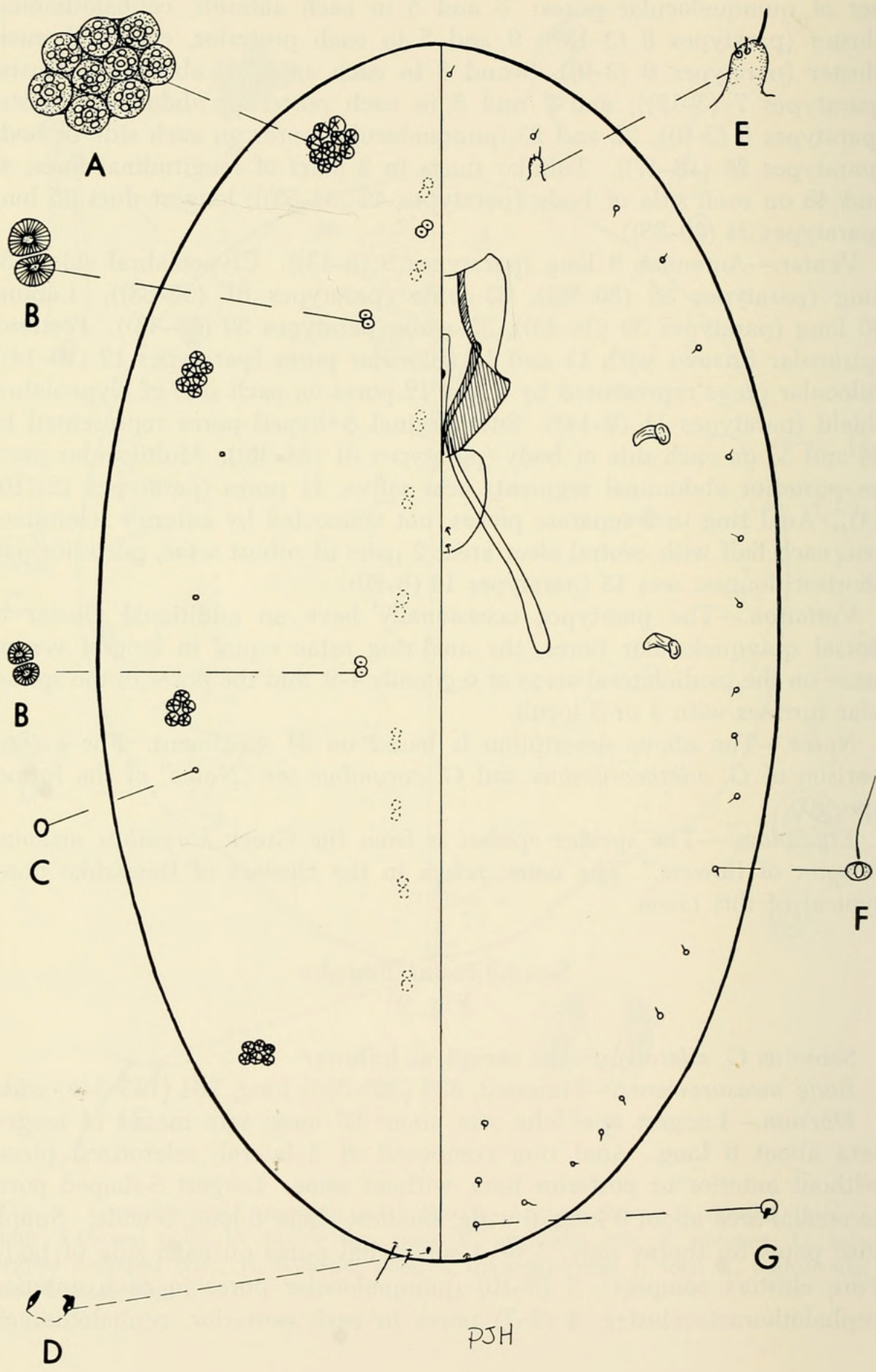
Second-Instar Females

Fig. 9

Same as *G. adetocorymbus* except as follows:

Body measurements.—Mounted, 435 (323–555) long, 264 (195–348) wide.

Dorsum.—Longest anal-lobe seta about 25 long; seta mesad of longest seta about 6 long. Anal ring composed of 2 lateral, sclerotized pieces without anterior or posterior bars, without setae. Largest 8-shaped pores in medial area about 9 long, 6 wide; smallest about 6 long, 5 wide. Simple disc pores on thorax only, 3 or 4 submedial pores on each side of body. Pore clusters compact: 7 (5–10) quinquelocular pores in each anterior, cephalothoracic cluster; 4 (2–7) pores in each posterior, cephalothoracic



cluster; 6 (5–7) in each anterior, abdominal cluster; and 6 (4–7) in each posterior, abdominal cluster; 23 (18–28) pores on each side of body.

Venter.—Antennae about 8 long. Clypeolabral shield about 64 long, 48 wide. Labium about 34 long, 32 wide. Submarginal 8-shaped pores represented by 20 (16–23) on each side of body. Anal ring without sclerotized bars connecting lateral areas and without setae.

Notes.—The above description is based on 3 poor specimens. For a comparison of 2nd-instar females of *G. adetocorymbus* and *G. corymbus* see “Notes” of the former species.

Fifth-Instar Males (Adults)

Same as *G. adetocorymbus* except as follows:

Body measurements.—Mounted, about 610 long, 262 wide.

Body.—Head without postoccipital ridge; area near base of each antenna with 2 (1–3) head pores: Dorsal eye about 30 in diameter; ventral eye 28 (28–30) in diameter. Antennae about 390 long; apical segment about equal to length of 3rd segment, not noticeably wider than other segments; apical segment with 2 subapical sensory setae. Legs with front pair shortest, hind pair longest. Total lengths of trochanter, femur, tibia, tarsus, claw of each leg as follows: Front 318 (305–330), middle 336 (335–338), hind 340 (338–343). Hind tibia/tarsus length 1.1. Prosternum smaller than on *G. adetocorymbus*. Wings about 350 long. Genital segment 47 (45–50) long, 60 (58–63) wide; length/width about 0.8; setae of penial sheath restricted to posterior half of sheath.

Notes.—The above description is based on 3 specimens. For a comparison of *G. corymbus* with *G. adetocorymbus* see “Notes” of the latter species. Prepupae and pupae of *G. corymbus* are unavailable for comparison.

Second-Instar Males

Fig. 10

Same as *G. adetocorymbus* except as follows:

Body measurements.—Mounted, 445 (420–469) long, 280 (238–323) wide.

Dorsum.—Longest anal-lobe seta 24 (23–25) long; seta mesad of longest seta 4 (3–5). Largest 8-shaped pore on each specimen about 10 long, 6 wide; smallest about 8 long, 5 wide. Minute 8-shaped pores about 3 long. Simple disc pores fewer than on *G. adetocorymbus*. Pore clusters with pores

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Fig. 9. *Grammococcus corymbus*, second-instar female. A, pore cluster; B, large 8-shaped pore; C, simple disc pore; D, anal ring; E, antenna; F, submarginal 8-shaped pore; G, seta.

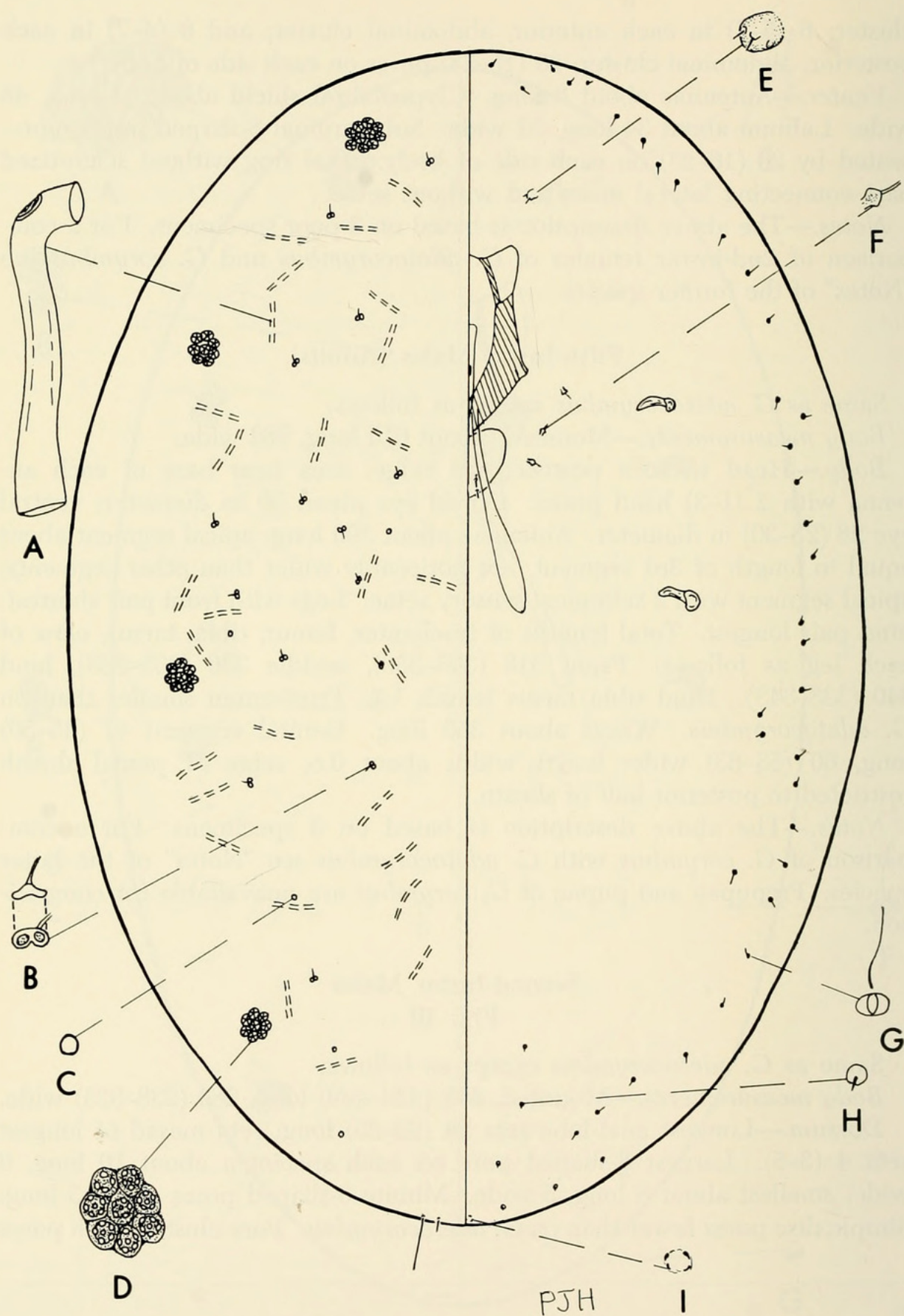


Fig 10. *Grammococcus corymbus*, second-instar male. A, tubular duct; B, minute 8-shaped pore; C, simple disc pore; D, pore cluster; E, antenna; F, bilocular pore; G, submarginal 8-shaped pore; H, seta; I, anal ring.

closely appressed, normally 4 clusters on each side of body, 1 specimen with 1 extra cluster represented by 1 pore; 5 (0–20) quinquelocular pores in each anterior cephalothoracic cluster; 5 (1–8) in posterior cephalothoracic cluster; 6 (1–13) in anterior abdominal clusters; and 4 (1–8) in posterior abdominal clusters; 20 (4–44) pores on each side of body. Tubular ducts 24 (18–27) on each side of body; longest duct about 30 long.

Venter.—Clypeolabral shield 76 (75–78) long, 54 (50–55) wide. Labium 38 (35–40) long, 39 (38–40) wide. Bilocular pores near clypeolabral shield, 5 (3–6) pores. Submarginal 8-shaped pores, 34 (31–38) on each side of body. Anal ring abortive, composed of small, sclerotized spots, without setae.

Notes.—The above description is based on 2 specimens. For a comparison of the 2nd-instar males of *G. corymbus* and *G. adetocorymbus* see "Notes" of the latter species.

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