

HOST PLANTS AND NYMPHAL DESCRIPTIONS OF  
*ACANALONIA PUMILA* AND *CYARDA* SP. NEAR  
*ACUTISSIMA* (HOMOPTERA, FULGOROIDEA:  
ACANALONIIDAE AND FLATIDAE)

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ABSTRACT

In the Florida Keys the fulgoroid species *Acanalonia pumila* Van Duzee (Acanaloniidae) and *Cyarda* sp. near *acutissima* Metcalf and Bruner (Flatidae) were found developing predominantly on the halophytes *Batis maritima* L. (Bataceae), *Salicornia virginica* L. and *Suaeda linearis* (Ell.) Moq. (Chenopodiaceae). The former species was associated with *Batis maritima*, the latter, primarily with *Salicornia virginica*. Inland populations of *Cyarda* developed on a number of common roadside plants. The male genitalia of *Cyarda* sp. near *acutissima* are figured, and the fifth-instar nymphs of both species are described and illustrated.

RESUMEN

En los Cayos de Florida las especies fulgoroides *Acanalonia pumila* Van Duzee (Acanaloniidae) y *Cyarda* sp. prox. a *acutissima* Metcalf y Bruner (Flatidae) se encontraron en desenvolvimiento sobre los halófitos *Batis maritima* L. (Bataceae), *Salicornia virginica* L. y *Suaeda linearis* (Ell.) Moq. (Chenopodiaceae). *A. pumila* fue asociado con *B. maritima* y la otra especie con *S. virginica*. Poblaciones de *Cyarda* en el interior se desarrollaron sobre plantas comunes de las bordes de carreteras. La genitalia del macho de *Cyarda* sp. prox. a *acutissima* se ilustra y la ninfa del quinto estadio de ambas especies se describen y se ilustra.

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As a result of trips to southern Florida and the Keys during March 1980 and April 1981 and 1982, one of us (AGW) was able to associate 2 little-known fulgoroid species with their host plants. The acanaloniid planthopper *Acanalonia pumila* Van Duzee and a flatid, *Cyarda* sp. near *acutissima* Metcalf and Bruner, were found on various halophytes of the families Bataceae and Chenopodiaceae. Because the insect fauna of marine-influenced habitats is poorly known (Davis and Gray 1966) and only sketchy biological data are available for the majority of the Fulgoroidea, it seems worthwhile to record hosts of these 2 species. With few exceptions, nymphal descriptions and illustrations of fulgoroid species are poorly represented in the literature; hence, we provide descriptions and figures (by ERH) of the last-instar nymphs for both *Acanalonia pumila* and *Cyarda* sp. near *acutissima*.

HABITAT AND HOST PLANTS

Collections and observations were made on 19 March 1980 on Crawl Key, a tiny key northeast of Marathon, lying north and east of the narrow neck connecting with Vaca Key (Stephenson and Stephenson 1950). The habitat,

an area referred to locally as "The Crater," is an old quarry that has been blasted on one side to let in water from Florida Bay. Like most of the upper keys, the substratum consists largely of coral rock, the so-called Key Largo limestone of Pleistocene age (Craighead 1971). Although the collecting site is higher than a tidal flat and not normally flushed by the tides, there still is considerable salt stress. The dominant vegetation consists of red mangrove (*Rhizophora mangle* L.) and a few other woody species characteristic of saline environments, plus sea purslane (*Sesuvium portulacastrum* L.) (Portulacaceae) and scattered colonies of the principal fulgoroid hosts, *Batis maritima*, *Salicornia virginica*, and *Suaeda linearis*. Additional observations were made during April 1981 at this same site; in similar habitats on Upper Key Largo, Plantation Key, Lower Matecumbe Key, Big Pine Key, and Key West; and along roadsides in Brevard Co. and on Big Pine Key.

*Batis maritima* is a succulent and spreading shrub with pale green, opposite leaves. It often forms pure stands in salt marshes and mangrove belts. Growing among and intermingled with some of the *Batis* colonies was perennial glasswort, *Salicornia virginica*, another chenopodiaceous halophyte that exhibits optimal growth in marine habitats (Waisel 1972). This decumbent or prostrate, succulent perennial has opposite leaves reduced to minute scales that sheath a jointed stem. *Suaeda linearis* is a herbaceous halophyte having numerous, fleshy, linear leaves that form terminal spikes. Species of the genus generally inhabit the saltiest niches in saline environments (Waisel 1972). All 3 species have similar distributions; *Suaeda linearis* occurs in salt marshes from Maine south to Florida and the West Indies and west to Texas, whereas *Salicornia virginica* ranges from Massachusetts south to Florida and the West Indies and west to Texas and Alaska to California; also in Europe and Africa. *Batis maritima* ranges from North Carolina to Florida and west to Texas; also in the West Indies, Mexico, tropical America and the Pacific Islands (Long and Lakela 1976).

#### *Acanalonia pumila* Van Duzee

Described from Florida by Van Duzee (1907), *A. pumila* is known from North Carolina south to Bermuda, Cuba and the Isle of Pines, and Mona Island off Puerto Rico (Metcalf 1954). Van Duzee (1909a) reported this planthopper as "very abundant" on the salt-tolerant composite *Borrchia arborescens* (L.) DC. and (1909b) recorded this species from a "peculiar succulent plant" near the line of high tides on Estero Island, Florida. At Wrightsville Beach near Wilmington, North Carolina, adults were collected on beach grasses at the level of high tides (Metcalf and Osborn 1920). On Mona Island, Ramos (1947) observed nymphs and adults on sea lavender, *Mallotonia gnaphalodes* (Jacq.) Britton (Boraginaceae); however, repeated attempts to find specimens on this plant in Puerto Rico have failed (Wolcott 1950). Metcalf and Bruner (1930) provided a very brief description of the last-instar nymph.

On Crawl Key in 1980 adults were common on saltwort, *Batis maritima*, along with smaller numbers of last-instar nymphs. Although colonies of saltwort occasionally were mixed with *Salicornia virginica* and *Suaeda linearis*, *A. pumila* appeared restricted to the former plant. Further collections in 1981 supported the observation of *B. maritima* as the primary host;

smaller populations, however, developed on *Salicornia virginica* and *Suaeda linearis*. *Acanalonia pumila* is common along both coasts of Florida and in the Keys. It develops on a variety of plants in the salt marsh community and, unlike the *Cyorda* sp., is more restricted to coastal habitats.

#### NYPH OF *Acanalonia pumila*

DESCRIPTION OF FIFTH INSTAR: (in alcohol), Fig. 1, 3, 5 and 6.

Head broad, nearly straight across front, prominent marginal carinae in front of eyes; vertex nearly twice as broad as long; frons (Fig. 5) with an irregular row of sensory pits (22-25) near each margin, between eye and marginal carina; eyes large, prominent; ocelli lacking; antenna 3-segmented, antennal segment 1 very short; segment 2 subglobose; segment 3 small, globose with a bristlelike, elongate extension apically.

Pronotum collarlike, shorter than or equal to vertex length along median line; median carina extending entire length of thorax; pronotal disc covered with sensory pits (20-22) on each side of median line; lateral-most pits not visible from above. Mesonotum at least 3 times as long as pronotum along median line, with a pair of convex elevations covered with sensory pits (14-16), one on each side between median line and wing pads; several pits (8-10) scattered on each wing pad. Metanotum 3/4 as long as mesonotum along median line, with a pair of raised elevations covered with sensory pits (15-16), one on each side between median line and wing pads; hump-backed, apex elevated in profile.

Posterior tibia with 2 minute spines on outer edge; 7 small spines near apex tipped with brown; hind tarsus 3-segmented; first segment with 9, second with 2 spines at apex.

Abdomen 9-segmented; segments 8 and 9 small, telescopic and usually not visible in dorsal view. Segments 1 and 2 constricted, narrower than remaining segments; abdomen broadest across segment 3, decreasing in width to apex; sensory pits on each side of median line, along postero-lateral margins of segments 3-7; segment 3 with 4-6 pits; segment 4 with 5-6 pits; segment 5 with 5-6 pits; segment 6 with 4-6 pits and segment 7 usually with 3 pits; segments 8 and 9 telescopic, truncate caudally and not visible dorsally; in caudal view 2 pairs of moderate-sized, roughly ovoid wax plates visible (Fig. 6), one pair associated with segment 7 and one pair with segment 8; segment 9 without wax plates.

*Color*: Generally pale cream to brownish dorsally and ventrally, mottled in appearance. Penultimate instars strongly mottled and marked with light to dark brown.

*Size*: Total length 3.9 mm; greatest width (across mesothoracic wing pads) 2.5 mm.

*Specimens examined*: One fifth instar, collected on Crawl Key, 19 March 1980, and one fifth instar, collected on Plantation Key, 8 April 1981. Three penultimate instars, collected on Upper Key Largo, 9 April 1981. All localities in Monroe County, Florida. Determined by association with adults. Voucher specimens in the collections of Pennsylvania Department of Agriculture and Cornell University.

#### *Cyorda* sp. near *acutissima* Metcalf and Bruner

Species of the flatid genus *Cyorda* Walker occurring in the United States

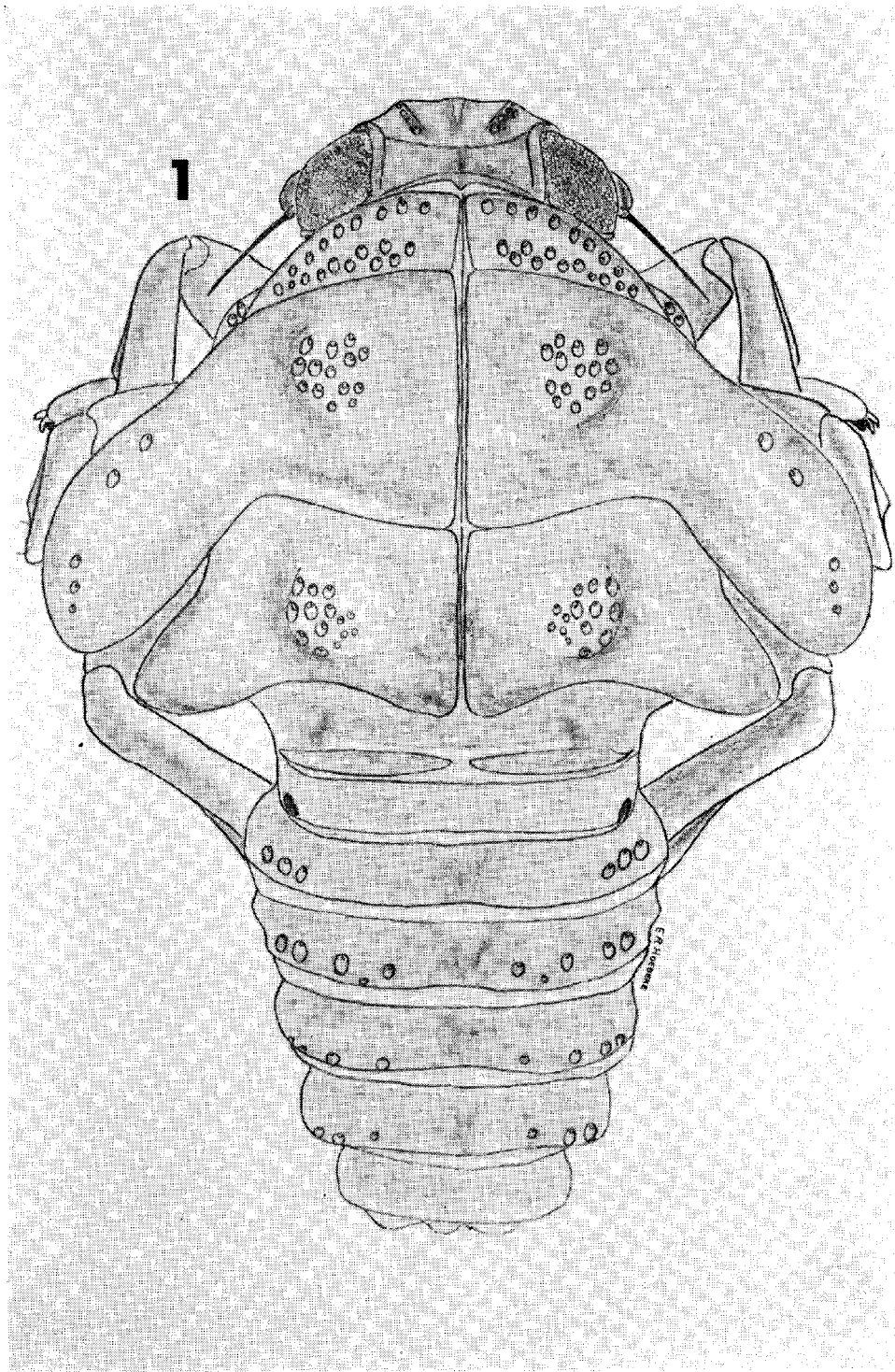


Fig. 1. *Acanalonia pumila* Van Duzee, fifth-instar nymph, dorsal view.

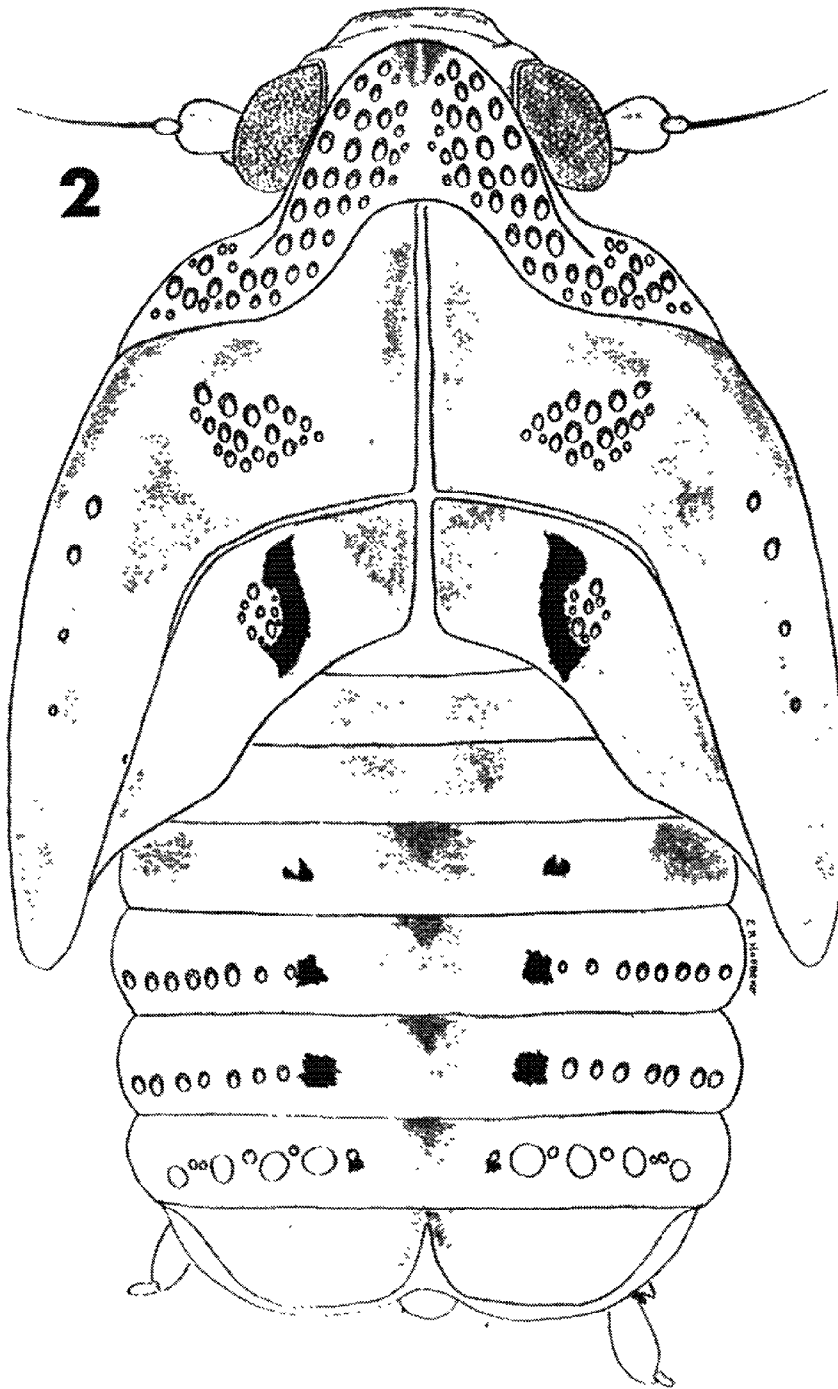


Fig. 2. *Cyarda* sp. near *acutissima* Metcalf and Bruner, fifth-instar nymph, dorsal view.

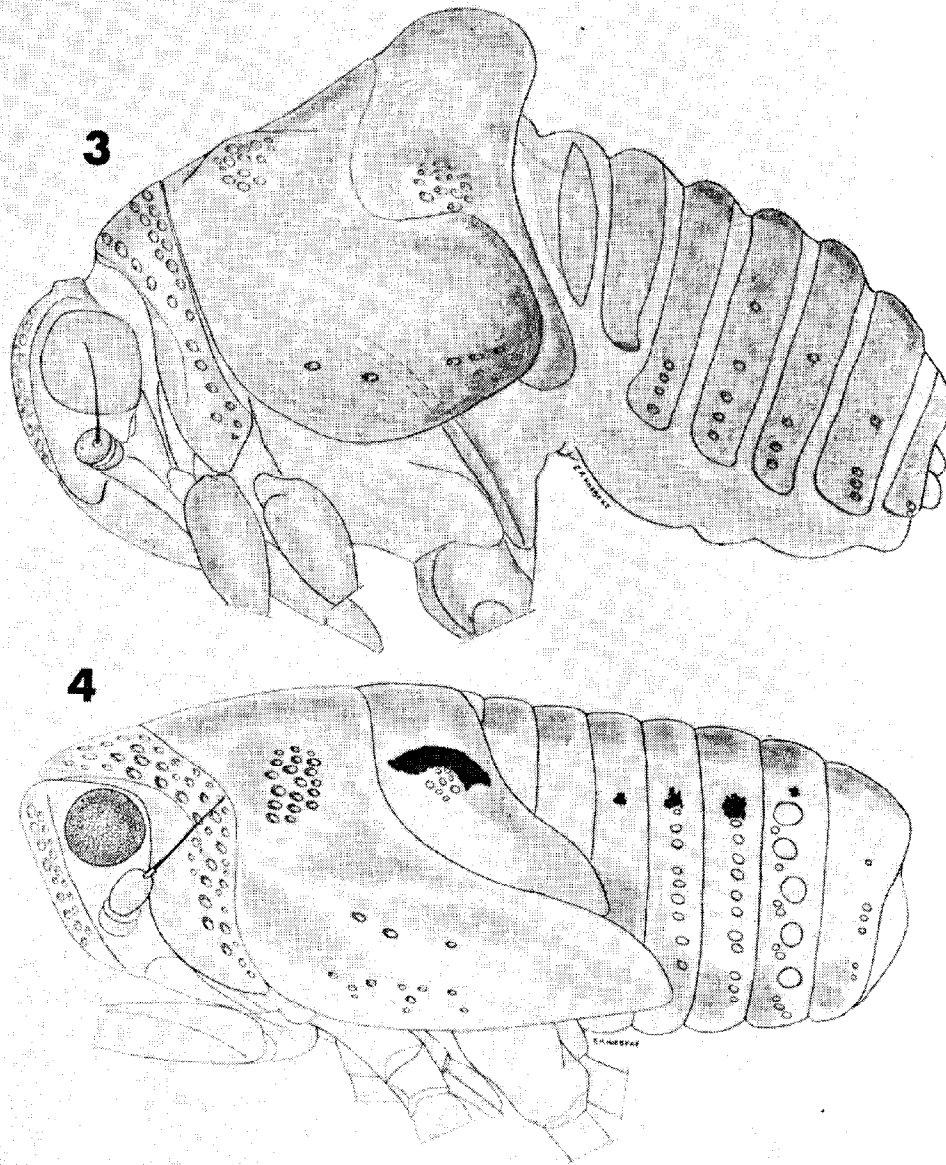


Fig. 3-4. Fifth-instar nymphs, lateral view. 3) *Acanalonia pumila*; and 4) *Cyarda* sp. near *acutissima*.

are poorly known; inadequate taxonomic knowledge of the group precludes a positive identification of the taxon observed in southern Florida. Specimens fit closest the description of *C. acutissima*, a species known only from Cuba. The male genitalia (Fig. 9) of the southern Florida material agree somewhat with the illustration for that of *C. acutissima* in Metcalf and Bruner

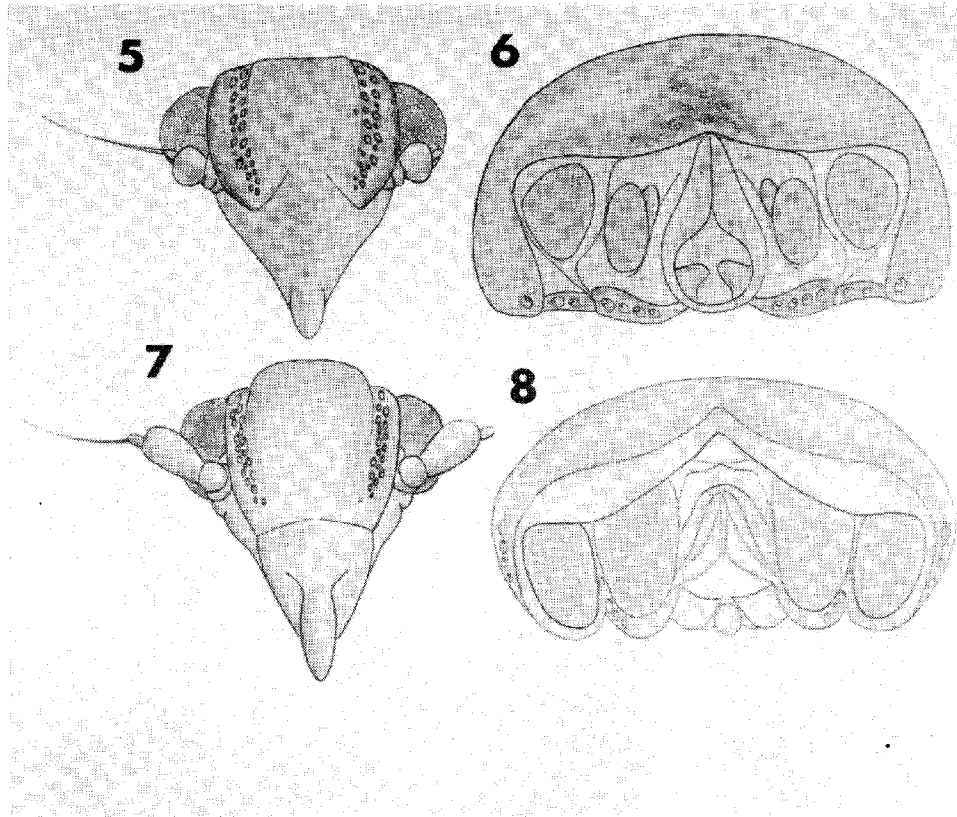


Fig. 5-8. Structural features of fulgoroid nymphs, fifth instars. 5) frons, frontal view: *Acanalonia pumila*. 6) abdominal segments 7-9 and wax plates, caudal view: *A. pumila*. 7) frons, frontal view: *Cyarda* sp. near *acutissima*. 8) abdominal segments 7-9 and wax plates, caudal view: *Cyarda* sp. near *acutissima*.

(1948, Pl. XVII, Fig. 5), but the aedeagus differs in several respects. The aedeagus (Fig. 9, ae) is characterized as follows: 2 pairs of spinose processes arising dorsally at apex, directed cephalad; inner pair short, broadened at base; outer pair more than twice as long as inner pair, only slightly curved, broadened at base; ventral spines long, broadly curved, parallel to ventral margin of aedeagus nearly throughout their length, curved more strongly towards apex; ventral spines reaching basal 1/2 to 3/4 length of aedeagus. Pending further work on the systematics of the genus, we tentatively refer our specimens to *Cyarda* sp. near *acutissima*; voucher material has been deposited in the collections of Pennsylvania Department of Agriculture and Cornell University.

Nearly all specimens of the genus collected from the southeastern states have been referred to *C. melichari* Van Duzee. The common coastal forms stand under that name, as well as those forms occurring further inland; *C. melichari* has been recorded in stands of *Lespedeza cuneata* (Dumont) G. Don at Aiken, South Carolina (Menhinick 1963), and in southern Illinois (Wilson and McPherson 1980). *Cyarda acuminipennis* Spinola and *C. walkeri* Metcalf also have been recorded from the eastern U.S. (Metcalf 1954), and recently Fennah (1965) described a new species, *C. sordida*, from Florida.

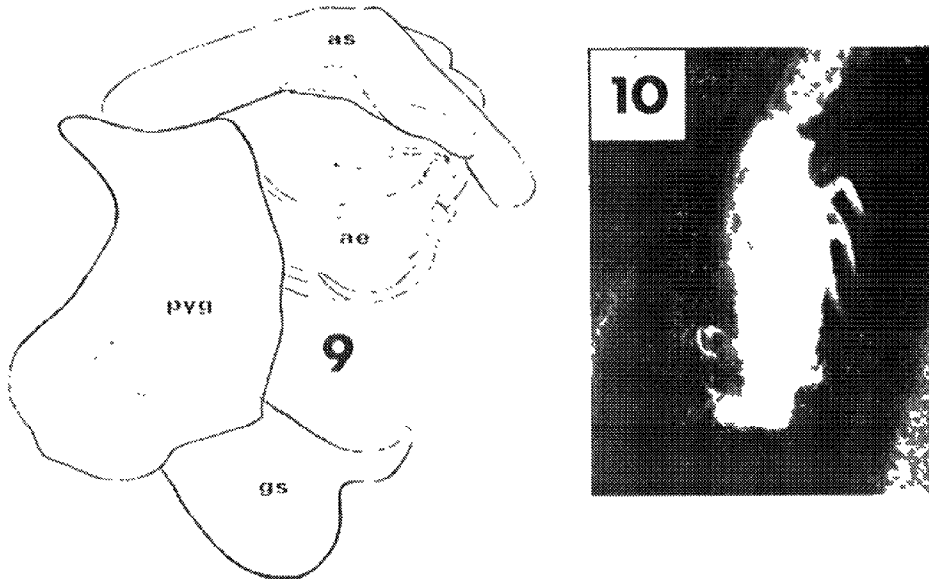


Fig. 9-10. *Cyarda* sp. near *acutissima*. 9) male genitalia (pyg, pygofer; as, anal segment; ae, aedeagus; gs, genital style), left side; and 10) fifth-instar nymph on host plant, *Salicornia virginica* L.

It seems likely that some specimens identified as *melichari* may indeed refer to any of these 3 other species or else taxa not yet recorded from the U.S.

Adults and late-instar nymphs of *Cyarda* sp. near *acutissima* were more abundant in March 1980 than those of *A. pumila*. White wax secreted by nymphs (Fig. 10) made it easy to associate this flatid with the host, *Salicornia virginica*. Basal stems were often wax-coated, and nymphs were found beneath the plants after stems had been tapped over a tray. Our observations in 1981-82 showed that this species of *Cyarda* has a broad host range. Populations developed on other halophytes, including *Batis maritima*, *Suaeda linearis* and *Sesuvium portulacastrum*. Further inland, but within a mile of the coast, *Cyarda* appears to feed on numerous roadside plants. The largest populations occurred on the composites yellowtop, *Flaveria linearis* Lag. and hairy beggartricks, *Bidens pilosa* L., and a milkweed, *Cynanchum scoparium* Nutt. Nymphs also were observed on seagrape, *Coccoloba uvifera* (L.) L. (Polygonaceae); capeweed, *Lippia nodiflora* Michx. (Verbenaceae); ladder brake, *Pteris longifolia* L. (Pteridaceae); climbing hempweed, *Mikania scandens* (L.) Willd. (Asteraceae); locustberry, *Byrsonima lucida* (Sw.) DC (Malpighiaceae); and buttonwood, *Conocarpus erectus* L. (Combretaceae). In Brevard Co. a more inland population developed on common ragweed, *Ambrosia artemisiifolia* L. (Asteraceae).



NYMPH OF *Cyrtoda* SP. NEAR *acutissima*

DESCRIPTION OF FIFTH INSTAR: (in alcohol), Fig. 2, 4, 7 and 8.

Head moderately broad, projecting slightly beyond eyes, straight across front, covered above by pronotum; frons (Fig. 7) broad, 2 carinae present, each closer to lateral margin (or keel) than to each other, with row of numerous sensory pits (18-20) between marginal carinae and lateral keels, extending to or slightly below antennal insertions; eyes large, prominent; ocelli lacking; antenna 3-segmented, elongate; segment 1 short, cylindrical; segment 2 elongate, globose; segment 3 bulbous basally, with an elongate bristlelike extension apically.

Pronotum produced forward over vertex, deeply and broadly emarginate behind, longest medially; pronotal disc, on each side of median line, covered with numerous sensory pits (25-30) (lateral-most pits not visible dorsally). Mesonotum longest medially, 2 times as long as pronotum along median line, with 2 convex areas covered with sensory pits (10-18), one on each side between median line and wing pads; median groove (or carina) extending length of thorax; wing pads extending to fourth abdominal segment. Metanotum less than 1/2 as long as mesonotum, with a few pits (2-6) on each side between median line and wing pads; usually a large, somewhat linear blackish patch on each hind wing pad, adjacent to pits.

Posterior tibia with 3 well-developed spines tipped with brown along outer edge, and with ca. 8 small apical spines tipped with brown; hind tarsus 3-segmented; first segment with 8, second with 2 apical spines.

Abdomen 9-segmented, very broad basally and throughout to apex, cylindrical, slightly dorsoventrally flattened; segments 8 and 9 not visible dorsally, telescopic and truncate caudally; lateral aspects of segments 4-7 with sensory pits; segment 4 with 5-9 pits; segment 5 with 9-11 pits; segment 6 with 5-9 pits and segment 7 with 3-6 pits; in addition to sensory pits, segment 6 with 5 large, round wax plates on each side of median line. Two pairs of large, ovoid wax plates (Fig. 8) on truncated apices of segments 7 and 8, seen only from a caudal view; segment 9 without wax plates.

*Color:* Generally pale white background with varying brown infuscations. Usually a pair of black linear spots on metanotum, one on each side between median line and wing pads; however, these spots vary in intensity among specimens and may be absent. Small black spots on abdominal segments 3-6, one on each side of median line; these may also vary in intensity among specimens.

*Size:* Total length 2.9 mm; greatest width (across mesothoracic wing pads) 1.7 mm.

*Specimens Examined:* Sixteen fifth-instar nymphs, collected on Crawl Key (2), 19 March 1980; on Big Pine Key (10), 14 April 1981; and on Upper Key Largo (4), 13 April 1981. All localities in Monroe County, Florida. Determined by association with reared adults. Voucher specimens are deposited in the collections of the Pennsylvania Department of Agriculture and Cornell University.

## ACKNOWLEDGMENTS

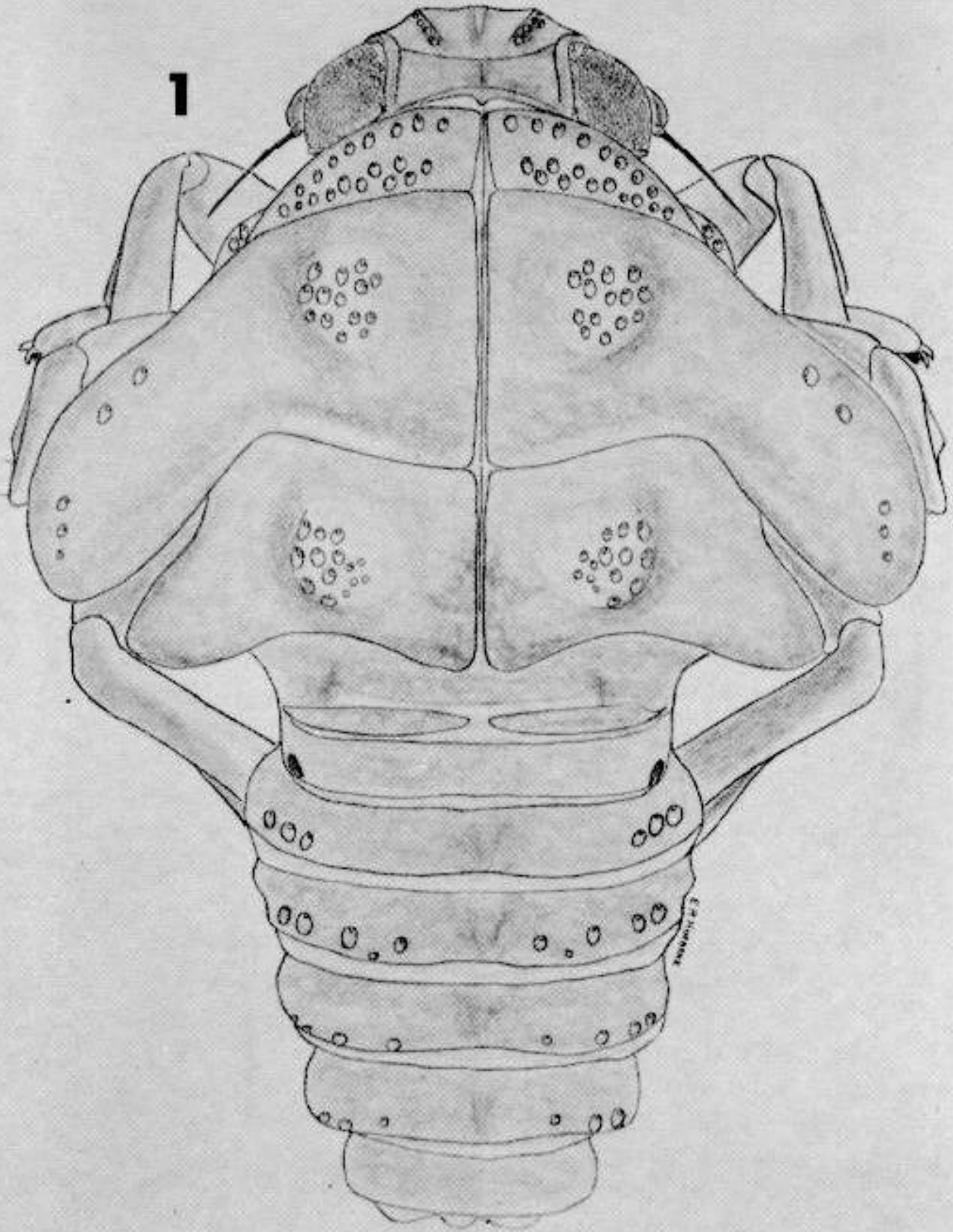
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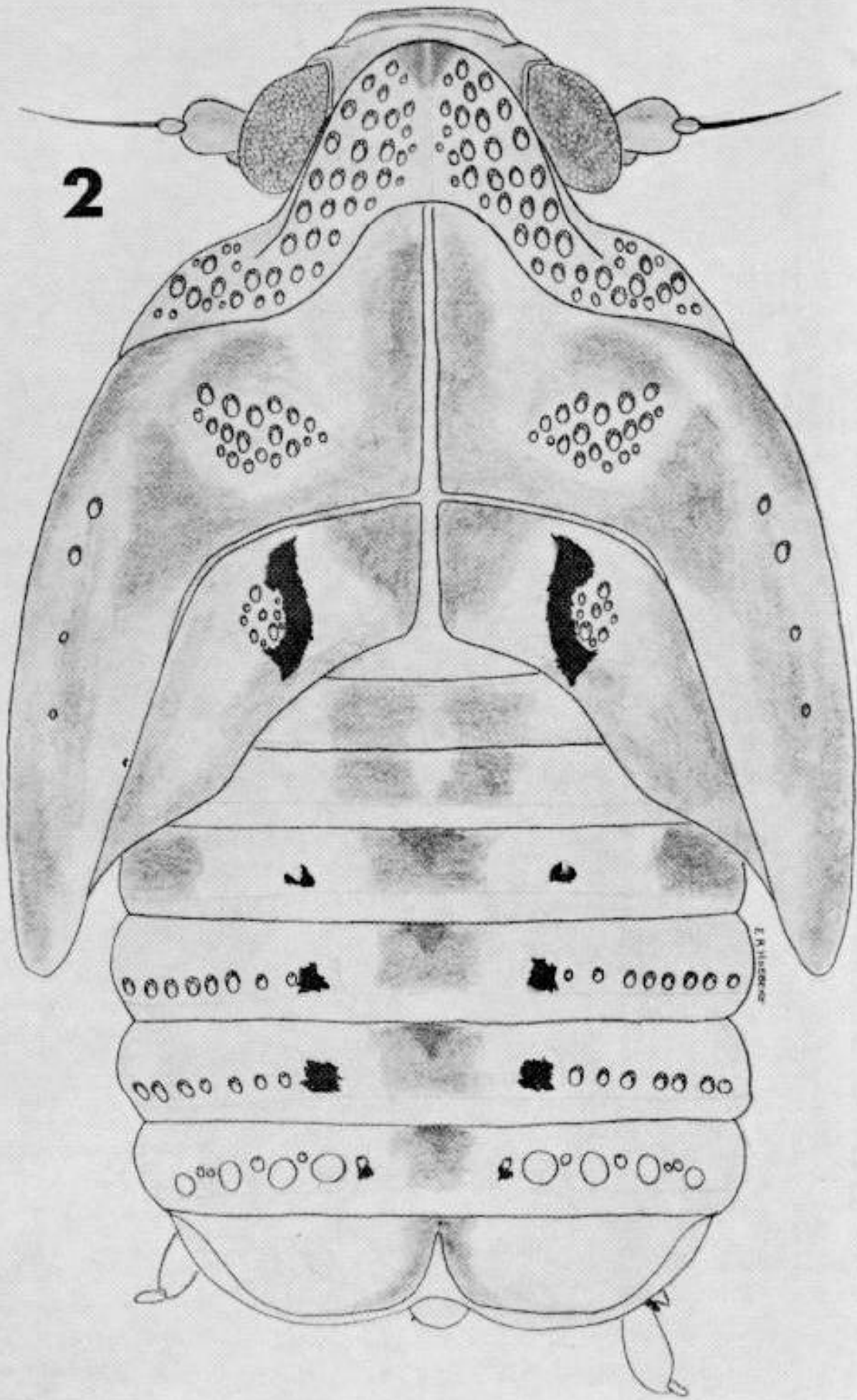
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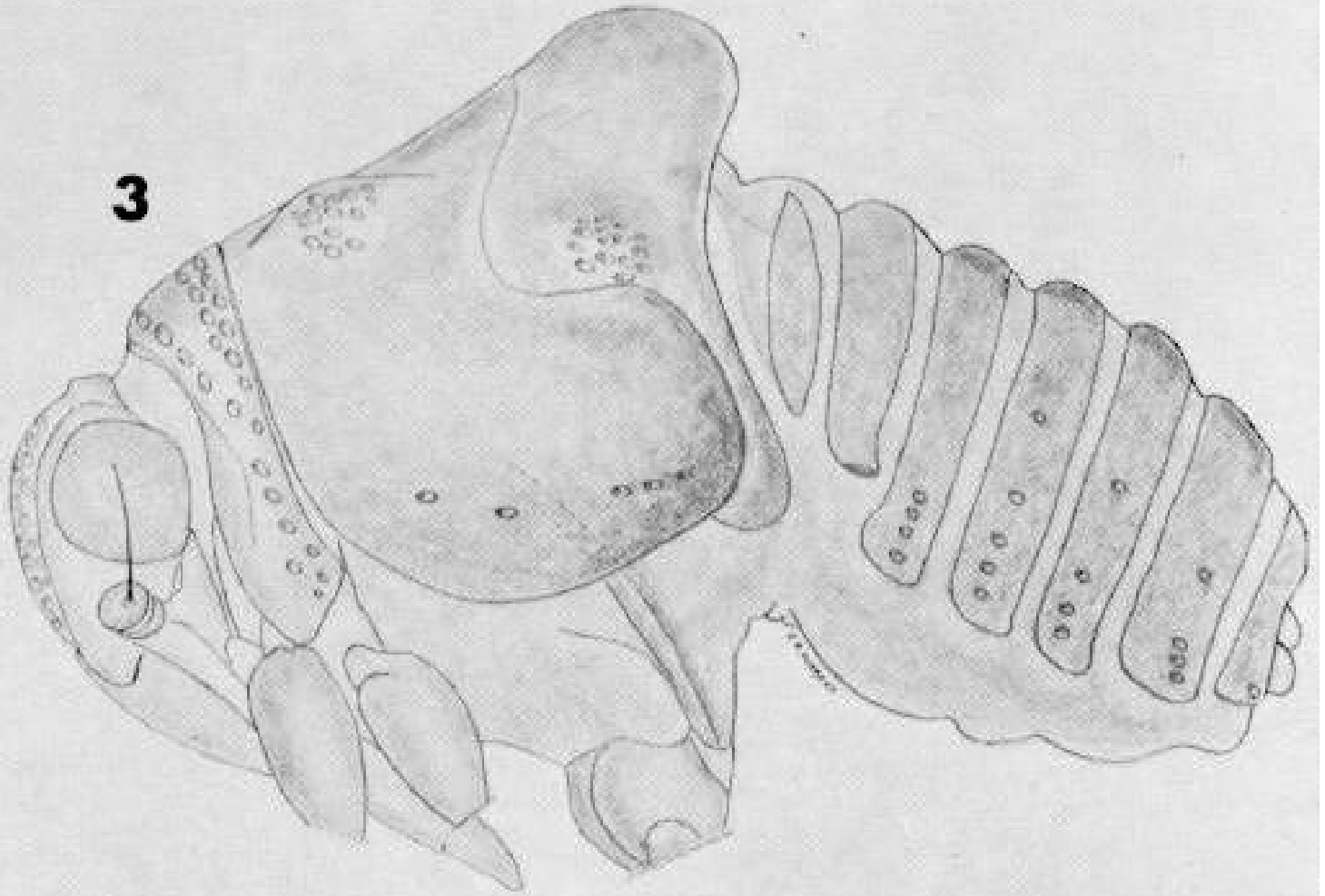


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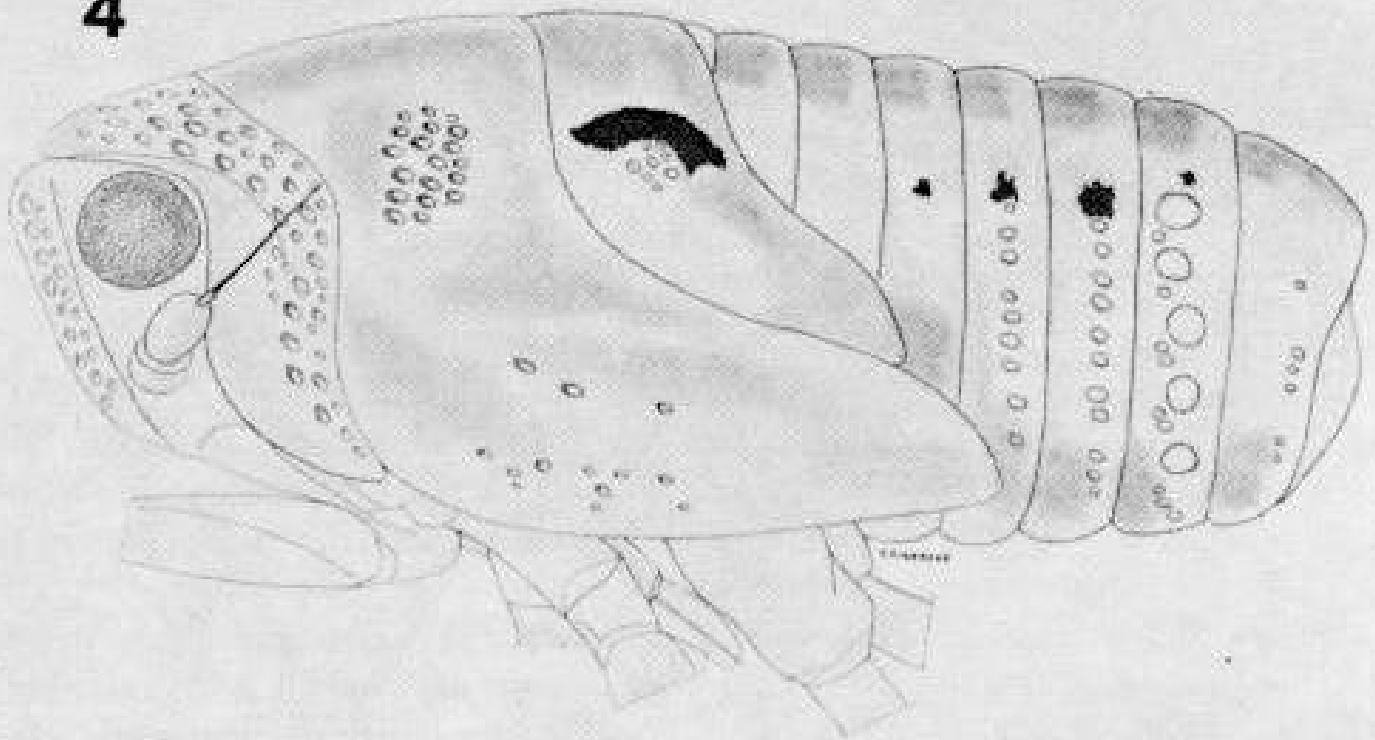


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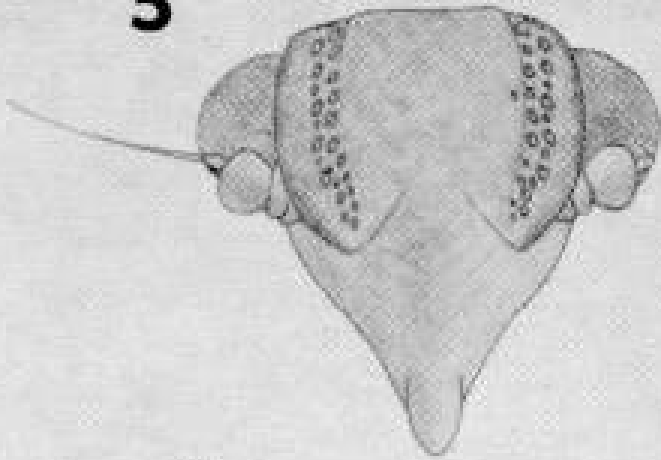
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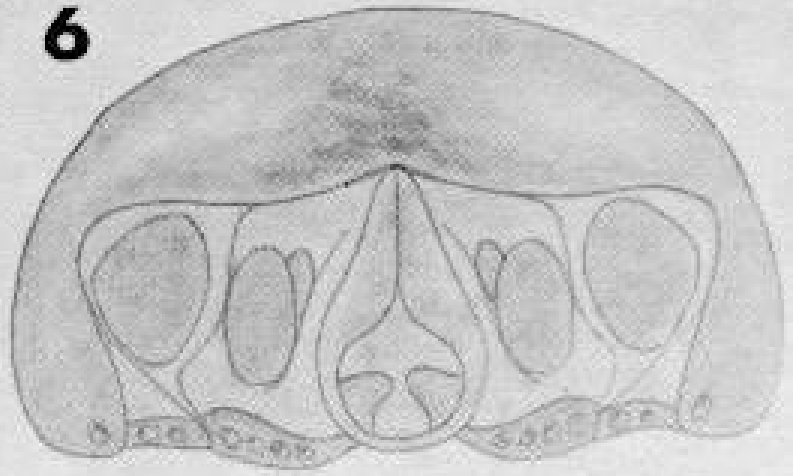
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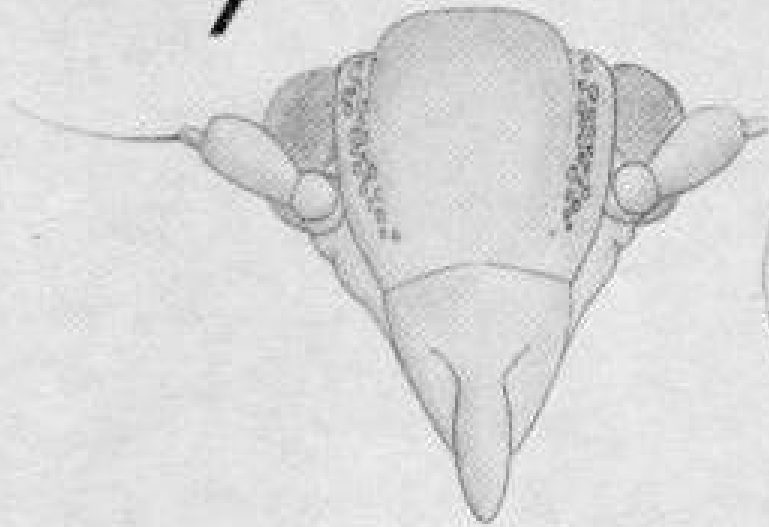
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