THE ARMORED SCALE INSECTS OF VENEZUELA
(HOMOPTERA: COCCOIDEA: DIASPIDIDAE)

by

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In memory of Alberto Fernandez Yepez

To Flavia, Adriana, Ingrid and Oscar
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INTRODUCTION

Scale insects are among the most serious plant pests throughout the world. The Diaspididae is the largest scale insect family and probably the most important economically.

No comprehensive taxonomic study dealing with the scale insects of Venezuela has been conducted in the past; old reports concerning these insects have been prepared on the species which are important as pest of citrus, Labrador (1958 and 1961) Doreste and Cermeli (1961). Ballou (1945) listed 31 scale insect species of which 16 were Diaspididae. Ferris (1941) reported 3 species of Diaspididae from Venezuela.

Forty-nine species are included in this study, of which 2 are new species (Abgrallaspis nakaharai n. sp., and Odonaspis guadueae n. sp.) and described herein. Twenty-seven additional species are recorded from Venezuela for the first time.

The description of each species is based on females, since males and nymphs were available only in a few species. While this is essentially a taxonomic and faunistic study, the hosts on which the scale insects were found are listed. No meaningful distribution can be made based on collections available, mainly because most of the collection were limited to those made by the author and his coworkers at the Instituto de Zoologia Agricola, U.C.V., in the vicinity of Maracay where the Institute is located, and most of the material borrowed from the U.S. National Museum of Natural History was collected from imported plant material by the U.S.D.A. Plant Quarantine Division Inspectors who gave for locality only
the country of origin "Venezuela".

Ballou (1945), listed *Quadraspidiotus perniciosus* (Comstock), as being present in Venezuela based on a single collection made from an infested apple tree imported from the U.S.A. It is the author's opinion that this species is not present at this time in Venezuela, because of the absence of its primary hosts, the cultivated trees belonging to the Rosaceae family, and also because of the influence of the tropical climate.

It is hoped that this study can be used as a basis for future research in Venezuela. More collecting needs to be made throughout the many ecologically different areas of the country; especially of non-cultivated plants. The accumulation of distributional and biological records will lead to a better understanding of the Venezuelan armored scale insect fauna.
MATERIALS AND METHODS OF STUDY

Diaspididae material examined


2. Fundacion Shell, Servicio Shell para el Agricultor, Departamento de Entomologia. Collections were loaned through the courtesy of Ing. Agr. Mario Cermeli.

3. Ministerio de Agricultura y Cria, Centro de Investigaciones Agronomicas, Departamento de Entomologia. Collections and records of Charles H. Ballou were seen through the courtesy of Ing. Agr. Nestor Angeles.

4. United States Department of Agriculture, Agricultural Research Service, Entomology Research Division. The important and essential material of the National Collection of Coccoidea was made available through the courtesy of Miss Louise M. Russell and Dr. Douglass R. Miller.

Mounting Methods

Specimens were preserved either dry or in 70% ethyl alcohol and were mounted on microscopic slides with the aid of an AO Spencer binocular dissecting microscope.

Both dry and alcohol preserved specimens were mounted according to the following procedure:

1. The specimens were transferred into 10% KOH and heated until the KOH started to bubble.
2. All body contents were expelled while in KOH by slightly pressing the insect.

3. After the specimens became transparent, they were washed in distilled water, from 10 minutes to one hour.

4. The specimens were stained in acid fuchsin from 10 minutes to several hours, depending on the sclerotization of specimens obtained.

5. The specimens were transferred to 95% ethyl alcohol for 5 to 15 minutes or until all excess stain was washed out.

6. The specimens were transferred to clove oil for 10 minutes or more.

7. The specimens were mounted in Canada balsam under 12 or 15 mm cover glass.

8. The slides were permanently marked with a diamond point pencil.

9. Slides were kept in a drying oven at a temperature of around 40°C for 2 weeks before labeling.

Descriptions:

Morphological descriptions of the adult female are as follows:

Prosoma, prepygidial segments and pygidium. For each body area the dorsal surface is described first. In the case of the pygidium, I follow the pattern of description used by most of the earlier authors (Ferris, 1938; Balachovsky, 1954; Kosztarab, 1959), starting from the apex of pygidium toward the anterior part. Records listed on the material studied as follows: scientific name of the host (when available), family of the host, locality, state, date of
collection, (Collector or his initials), (Collection: where the material is deposited). The statement, "Venezuela (Quarantine)", means that it was collected in the U.S. Customs by the Plant Quarantine Service Officers of the U.S.D.A., on plant material imported from Venezuela. The cities of Cagua, El Limon, Las Delicias, Maracay, Palo Negro and Turmero are located in Aragua state and to avoid much repetition, the state's name is not given. In the cases where no depository collection is given, in the second parenthesis after date, the material is deposited in Instituo de Zoologia Agricola Collection, U.C.V. Maracay, Venezuela and duplicated in the V.P.I.&S.U. Collection, Blacksburg, Virginia.

List of abbreviations

1. Collectors:
   AD: Alfredo D'Ascoli
   CHB: Charles H. Ballou
   DV: David Villasmil
   FTY: Francisco Fernandez-Yepez
   JCM: Jose Carlos Marin
   JT: Jorge Teran
   MC: Mario Cermeli
   SC: Santiago Clavijo

2. Collections:
   CIA: Centro de Investigaciones Agronomicas Collection
   IZA: Instituto de Zoologia Agricola Collection
   SSPA: Servicio Shell para el Agricultor Collection
   USNM: U.S. National Museum of Natural History
3. Dates:
   Arabic: day
   Roman: month
   Arabic: Year (last two digits)

Measurements

All measurements are in microns unless stated otherwise. Measurements were made using an ocular micrometer and a Reichert phase contrast microscope. Magnification was from 35X to 1500X. The measurements in the text show the average, followed by the range in parentheses. Averages under 10 microns were rounded off to the nearest tenth of a micron. When many specimens of a species were studied, the range recorded includes the range of variation, but when few specimens were studied, it is possible that the range limits could be expanded with additional material.

Illustrations

Drawings are outlined using a Leitz Prado 500 microslide projector. The details and enlargements were drawn by using a Zeiss RA and a Reichert phase contrast microscope and a Zeiss camera lucida for certain structures. Each figure has a central drawing for the whole specimen with the left half representing the dorsal surface and the right half the ventral surface. All drawings are not made to the same scale, and the enlargements are not in proportion with each other.
KEY TO THE FAMILIES OF COCCIDEA OF VENEZUELA
(The key refers only to adult females)

1. Abdominalspiracles present.................. 2
   Abdominalspiracles absent................... 3

2. Anal ring reduced, without pores and setae ...... MARGARODIDAE
   Anal ring well developed, with many pores
   and 6 long setae......................... ORTHEZIIDAE

3. Legs absent or reduced to sclerotized
   tubercles or plates...................... 4
   Legs well developed.................. 7

4. Eight-shaped pores present................ 5
   Eight-shaped pores absent............... 6

5. Antennae well developed, with 5 to 9
   segments................................ LECANODIASPIDIDAE
   Antennae represented by an unsegmented
   tubercle............................ ASTEROLECANIIDAE

6. Last abdominal segments fused into a pygidium;
   labium 1-segmented; anal cleft absent ....... DIASPIDIDAE
   Pygidium absent; labium 2-segmented;
   anal cleft present..................... ACLERDIDAE

7. Legs with tibia and tarsus fused into a
   single segment........................... CONCHASPIDIDAE
   Legs with tibia and tarsus separated........ 8

8. Anal ring absent; anal opening a
   transverse slit.......................... DACTYLOPIDIDAE
Anal ring well developed and bearing setae;
    anal opening circular. .......................... 9

9. Dorsal ostioles and ventral circuli present.  PSEUDOCOCCIDEA
    Dorsal ostioles and ventral circuli absent. ........... 10

10. Anal cleft and two anal plates present. ............ COCCIDAE
    Anal cleft and anal plates absent ................ ERIOCOCCIDAE
SUBFAMILY AND KEY TO TRIBES OF DIASPIDIDAE IN VENEZUELA

All the species of Diaspididae of Venezuela on this work belong to the subfamily Diaspidinae which is represented by 3 tribes.

Key to the tribes of Diaspidina of Venezuela

1. Median lobes fused into a single lobe; adult female
   without plates or gland spines; microducts not
   segmentally arranged. .................. ODONASPIDINI
   Median lobes never fused into a single lobe;
   adult female with plates or gland spines;
   microducts and macroducts usually showing some
   evidence of segmental arrangement ................ 2

2. Microducts of the one-barred type; second pygidial
   lobe simple; fringed plates normally present;
   adult female antennae with one seta; gland
   tubercles and gland spines absent ............. ASPIDIOTINI
   Microducts of the two-barred type; second pygidial
   lobe bilobed; fringed plates normally absent;
   adult female antennae with two or more setae;
   gland tubercles and gland spines usually present. .. DIASPIDINI
LIST OF SPECIES INCLUDED

The species marked with an asterisk (*) are new additions to the Venezuelan coccid-fauna.

Family: DIASPIDIDAE
Subfamily: DIASPIDINAE
Tribe: ASPIDIOTINI

Abgrallaspis
*cyanophylli (Signoret)
*diffinis (Newstead)
*nakaharai n. sp.
*palmæ (Cockerell)

Acutaspis
*agavis (Townsend & Cockerell)
*perseae (Comstock)
*reniformis (Cockerell)

Aonidiella
*aaurantii (Maskell)
*orientalis (Newstead)

Aspidiella
*bartii (Cockerell)
*sacchari (Cockerell)

Aspidiotus
*destructor Signoret

Chrysonphalus
*aonidium (Linnaeus)
**dictyospermi** (Morgan)

*pinmulifer* (Maskell)

*prosimus* Banks

**Clavaspis**

*herculeana* (Doane & Hadden)

**Furcaspis**

*biformis* (Cockerell)

**Hemiberlesia**

*lataniae* (Signoret)

*rapax* (Comstock)

**Melanaspis**

*aflinea* (Newstead)

*santensis* Lepage

*tenax* McKenzie

**Mycetaspis**

*defectopalus* Ferris

*personata* (Comstock)

**Palinsaspis**

*barbata* Ferris

**Pseudoanidia**

*trilobitiformis* (Green)

**Selenaspis**

*articulatus* (Morgan)

Tribe DIASPIDINI

**Aulacaspis**
rosae (Bouche)

tuberculalis Newstead

*echinocacti* (Bouche)

*Diaspis*

*boisduvalii* Signoret

*echinocacti* (Bouche)

*Howardia*

*biclavis* (Comstock)

*Ischnaspis*

*longirostris* (Signoret)

*Lepidosaphes*

*beckii* (Newman)

*gloverii* (Packard)

*tokionis* Kuwana

*Lopholeucaspis*

*cockerelli* (Grandpre & Charmoy)

*Miveaspis*

*cattleyae* Lepage

*Parlatoria*

*proteus* (Curtis)

*Pinnaspis*

*buxi* (Bouche)

*strachani* (Cooley)

*Pseudaulacaspis*

*pentagona* (Targioni-Tozzetti)
major (Cockerell)

Pseudoparlatoria

*parlatoriodes (Comstock)

Unaspis
citri (Comstock)

Vetalaspis

dentata (Hoke)

Tribe Odonaspidini

Odonaspis

gadua n. sp.

*saccharicaulis (Zuehntner)
MORPHOLOGICAL CHARACTERISTICS OF THE DIASPIDINAE FEMALES

The body is covered with a removable scale, which is composed of first and second instar exuviae, and wax secreted by the adult female. The waxy secretions may extend underneath and completely envelope the female. In Lopholeucaspis, the adult female remains within the cast skin of second molt, and called pupillarial.

Adult female

(Illustrated in Plate 1, unless otherwise stated)

Segmentation of the body

Throughout the Coccoidea, there is a tendency for the segments of the body to become fused. In Diaspididae, this fusion of segments reaches the maximum. For this study, the body will be considered in 3 parts: Prosoma, composed of the head and thoracic segments. In most cases, it is difficult to separate the prosoma from the abdomen, except for the presence of the metathoracic spiracle. The prepygidial segments of the abdomen are composed of segments I through IV. The pygidium is composed of the fused segments V through VIII. Ferris (1941), considered segments IX, X, and XI to be greatly reduced, and represented only by the vulva and the anal opening.

Setae

All the species have setae. These are of primary importance in determining the basic segmentation of the abdomen, since they occupy fixed positions, there is one for each pygidial segment on the dorsal side (Plate 2).

Antennae

In all species, the antennae are reduced to an unsegmented
Plate I. - General morphology of a Diaspidinae female
tubercle bearing one or more setae. This is not of taxonomic value for recognition of genera or species, but may be helpful in determining tribes. The tribe Diaspidini have two or more setae, while the Aspidotini rarely bear more than one.

**Mouthparts**

These are made up of the clypeolabral shield, with the internal framework of the tentorium, and the bases of the mandible and maxillae. The one-segmented labium is usually cup-shaped. For the purpose of this work, the mouthparts have no significance, and only the measurements will be given.

**Spiracles**

Two thoracic pairs only. Illustrations have been for all the species, but because of their similarity, they are of little taxonomic value. The associated pores in Diaspidini are of 2 types, trilocular and quinquelocular. These are of taxonomic value for the separation of genera. In Aspidiotini, with the exception of the genera *Pseudacraeida* and *Purusaspis*, these pores are absent.

**Tubular ducts**

Members of the family Diaspididae form part of the scale covering from secreted wax. This wax is produced by glands that open through tubular ducts. These ducts seem to be of two types: either one-barred ducts, (Plate 2), which are slender, and bear one sclerotized bar as inner closure, are characteristic of the tribe Aspidiotini. Or two-barred ducts, which are relatively short, and their inner closure seems to be formed from two parallel, transverse, sclerotized bars.
They are characteristic of the tribe Diaspidini. In this second type, two forms may be distinguished: Two-barred macroducts, usually restricted to the pygidial area. These are quite broad, and the opening, in most cases, with a sclerotized ring-like structure. The two-barred microducts are short, with minute openings. They may be found throughout the body.

**Gland spines and gland tubercles**

These are present in most of the Diaspidini, as marginal and submarginal structures. They are usually elongated conical processes. One or more slender microduct extends through the length of the process, with the orifice located at the apex. The term "gland spine" is used for the hyaline, elongated ones, usually restricted to the abdomen. The term "gland tubercle" is used for the short, slightly sclerotized ones, usually present on the prosoma and prepygidial segments only.

**Plates:** (Plate 2)

Plates are present in most of the Aspidotini, as marginal pygidial structures. In general, these membranous structures are more or less branched or fimbriate, sometimes may be much reduced and unbranched. They seldom contain microducts.

**Pygidial lobes:** (Plate 2)

In Aspidotini and Diaspidini, the pygidial segments, are in part, produced at their lateral margins into flattened, sclerotized processes, called "lobes". The number of pairs of lobes are variable. Median lobes, or $L_1$, are part of segment VIII. They are always
present, located side by side at the apex of the pygidium. The second pair, or L₂, normally are part of segment VII. L₂ may be bilobed, as in Diaspidini, or simple, as in Aspidotini. If a third pair, or L₃, are present, they are part of segment VI and may be bilobed or simple. In a few species, a definite fourth pair, or L₄, may be found which are part of segment V. In species with reduced lobes, the segmentally arranged setae, which are normally present at the base of the lobes, remain to mark the position of the segment (e.g. Palinaspis barbata).

**Pygidial scleroses:** (Plate 2)

Along the margin of the pygidium, are found some sclerotized structures, commonly referred to as paraphyses. These structures usually arise from the angles of the lobes. In addition, there may be paraphyses in the interlobular spaces, as in Melanaspis and related genera.

**Anal opening**

The anus is a circular or oval opening in the dorsum of the pygidium. The size and position varies with the genus, and has been used as a taxonomic character. A sclerotized area, free of pores and setae, often surrounds the anus.

**Perivulvar pores**

The quinquelocular pores in the region of the vulva are commonly referred to as perivulvar pores. The most common arrangement of these pores is in five groups. In the species descriptions a system of abbreviations is used to show the number of pores in the various
Plate 2. - Morphological details of pygidium
groups. If there are 7 or 8 pores in the posterior 2 groups, 8 to 10 pores in the 2 median groups, and 3 to 4 pores in the anterior group, it would be shown as follows: 7-8, (8-10), 3-4. When only 4 groups are present, the formula will end in 0, meaning that anterior group is absent.
TRIBE ASPIDIOTINI

Key to the genera of the tribe Aspidiotini in Venezuela

1. Fourth pair of pygidial lobes present .................. 2
   Fourth pair of pygidial lobes absent .................. 5

2. Dorsum of pygidium with a large and
   conspicuous reticulation ............................... Pseudoanidia
   Dorsum of pygidium without reticulation ............... 3

3. Two paraphyses in second interlobular
   space ................................................. Chrysomphalus
   Three paraphyses in second interlobular
   space ................................................ 4

4. Cephalic region produced to a lobe-like
   structure; margin of abdomen sculptured ............... Kycetaspis
   Cephalic region without lobe-like structure;
   margin of abdomen not sculptured ..................... Melanaspis

5. Deep constriction between meso and
   metathorax ............................................. Selenaspidus
   No constriction between meso and
   metathoroax ............................................. 6

6. L2 and L3 absent ...................................... 7
   L2 and L3 represented at least by small
   sclerotization of the margin or well developed ........ 8

7. Paraphyses arising from mesal angles of median
   lobes long, wide, and with a terminal knob;
   dorsal bosses absent .................................. Clavaspis
Paraphyses arising from mesal angles of median lobes short and slender without terminal knob; dorsal bosses present.

8. Trilocular pores associated with anterior spiracle; plates chelate.

   9. No pores associated with anterior spiracles; plate never chelate.

9. Paraphyses present.


10. Second interlobular space with 3 paraphyses;

   pygidium acute.

   Second interlobular space with 2 paraphyses;

   pygidium short and broad.

11. L₂ and L₃ small membranous; plates beyond L₃ few short and non-fimbriated.

   L₂ well developed, L₃ tooth-like and sclerotized well developed; plates beyond L₃ fimbriated.

12. L₃ well developed, notched on outer side; mesal paraphyses of median lobes well developed.

   L₃ lanceslate or spiniform; mesal paraphyses of median lobes absent.

13. L₃ well developed and notched on outer side; plates beyond L₃ numerous and fimbriated.

   L₃ poorly developed; plates beyond L₃ absent or non-fimbriated.
Genus *Abgrallaspis* Balachowsky

Type of the genus: *Aspidiotus cyanophylli* Signoret, 1869.


Description of the genus

Referable to the tribe Aspidiotini, with one barred duct, fringed plates. Median lobes well developed and prominent, notched on both sides or one only; L₂ well developed smaller than L₁, triangular or notched on outer side; L₃ smaller than L₂, lanceolate or spiniform. Paraphyses present at base of the interlobular spaces. Prosoma at maturity membranous or very slightly sclerotized. Anal opening conspicuously large and posterior to vulva; its diameter about the same as the length of median lobes.

Key to species of *Abgrallaspis*

1. Perivulvar pores present ................................. 2
   Perivulvar pores absent ................................. 3

2. L₂ notched on the outer side; anal opening removed 1 1/2 times its diameter from the margin .............................. *cyanophylli* (Signoret)
   L₂ lanceolate; anal opening removed less than one time its diameter from the margin .............................. *palmae* (Cockerell)

3. L₁ notched on both margins; dorsal microducts present on prepýgidial segments .............................. *nakaharai* n. sp.
L₁ notched on the outer margin only; dorsal microducts absent on prepygidial segments. . . diffinis (Newstead)

Abgrallaspis cyanophylli (Signoret)

Plate 3


Material studied


Scale of the female

Whitish or gray, elongated oval, flat exuviae central.

Adult female

Body pyriform (fig. a) 767 (605 to 975) long, 411 (502 to 709) wide. Derm at maturity membranous except for the pygidium which is slightly sclerotized.

Prosoma

With a marginal thoracic spine (fig. b) acute and sclerotized.

Ventrum: Antenna (fig. c) a sclerotized tubercle with one seta about
Plate 3. - Abgrallaspis cyanophylli (Signoret)
23 long. Clypeolabral shield 140 long and 110 wide; Anterior spiracle (fig. d) with 1 associated microduct; posterior spiracle same size and shape of anterior spiracle and with 1 associated microduct. Band of submarginal microducts and setae around the entire prosoma.

**Prepygidial segments of abdomen**

**Ventrum:** Segments I to IV with submarginal clusters of microducts and a pair of conical setae (fig. e) submedially.

**Pygidium** (fig. f)

**Dorsum:** Median lobes (fig g) well developed, notched on both sides, 15 wide, separated from each other by a distance about half its width; L₂ smaller than L₁, notched on the outer side, L₃ short, without notches, pointed. Paraphyses short and narrow, on the interlobular spaces and arising from the angles of the lobes. Marginal microducts about 50 long, 1 between median lobes, 2 between L₁-L₂, 1 between L₂-L₃; 1 beyond L₃; rows of 4 submarginal microducts and 6 submedially. Anal opening almost circular, 23 in diameter; placed about 1 1/4 times this diameter from the base of L₁; located posterior to vulva on the venter. Anal apophysis present; area around the anal opening heavily sclerotized.

**Ventrum:** Plates on the interlobular spaces fimbriated, 1 pair between median lobes, as long as the lobes, 2 between L₁-L₂, 3 between L₂-L₃ slightly branched and fimbriated on the sides; 5 or 6 beyond L₃ some of them being spiniform. Submarginal clusters of microducts (fig. h) on segments VI and V. Conical setae (fig. e) 4 pairs submarginally, 3 latera of perivulvar pores, 3 on the anterior margin of the pygidium.
Quinquilocular perivulvar pores (fig. 1) in 4 groups, formula 3-6,(4-7),0. Paravular scleroses slightly developed. Ventral scleroses arising from L₂.

Illustration based on material from Phitecolobium saman, Venezuela (Quarantine).

Recognition characteristics

The 3 pairs of well developed lobes, conspicuously large anal opening, binotched median lobes, L₂ notched on the outer side, Perivulvar pores in 4 groups, acute and sclerotized thoracic spine and anal apophysis makes this species distinct.

Notes

This polyphagous species is very widely distributed; it has been recorded from all regions of the world. It is a new addition for the Venezuelan Coccid-fauna.

Abgrallaspis diffinis (Newstead)

Plate 4


Material studied

One female on Spondias mombin, Anacardiaceae, El Limon, 26-V-66
Plate 4. - Abgrallaspis diffinis (Newstead)
Scale of the female

Gray, somewhat elongate, convex, exuviae submarginal.

Adult female

Body subcircular (fig. a) 1221 long, and 1137 wide; Derm membranous at maturity.

Prosoma

Dorsum: With several marginal setae (fig. b) on the head. Band of submarginal microducts (fig. c).

Ventrum: Antenna (fig. d) a sclerotized tubercle with 1 seta about 23 long. Clypeolabral shield 215 long and 140 wide. Anterior and posterior spiracle (fig. e) without associated ducts or pores of same size and shape. Area between the spiracles with several rows of slightly sclerotized secrrate squamations (fig. f). Row of submarginal microducts from the level of anterior spiracle to the abdomen.

Prepygidial segments of abdomen

Ventrum: Segment I to IV with submarginal clusters of microducts (fig. g). Rows of serrate squamations (fig. f) medially on each segment.

Pygidium (fig. h)

Ventrum: Median lobes (fig. i) well developed, notched on the outer side, 20 wide, separated from each other by a distance less than a half its width; L₂ much smaller than L₁ and lanceolate; L₃ short, in the form of a small, sharply pointed tooth. Paraphyses well developed, 1 pair located between L₁-L₂ and 1 pair between L₂-L₃
in the interlobular spaces. Pygidial microducts about 109 long, 3 on segment VII, 6 on segment VI and 7 on segment V. Anal opening oval, 20 in diameter; placed about 1 time this diameter from the base of \( L_1 \); located posterior to vulva on the venter. Anal apophysis wide and not reaching the apex of pygidium.

**Ventrum**: Plates on the interlobular spaces fimbriated, 1 pair between the median lobes; 2 between \( L_1-L_2 \), 3 between \( L_2-L_3 \) slightly branched; 3 beyond \( L_3 \) slightly branched; 2 beyond the seta of segment V. Submarginal clusters of microducts (fig. j) on segments VII, VI and V. Conical setae (fig. k) 3 pairs submarginally, 2 pairs lateral of paravulvar scleroses, 1 pair anterior to vulva, 4 additional pairs on segment V. Paravulvar scleroses well developed. Ventral scleroses, continuous arising from bases of \( L_1 \) and \( L_2 \).

Illustration based on material from *Spondias mombin*, El Limon, Aragua, Venezuela.

**Recognition characteristics**

The 3 pairs of well developed lobes, conspicuously large anal opening; \( L_1 \) notched on the outer side, \( L_2 \) and \( L_3 \) well developed; absence of perivulvar pores and dorsal microducts on the prepygidial segments of abdomen makes this species distinct.

**Notes**

This polyphagous species is known only on the tropical and subtropical regions of the new world. It is a new addition to the Venezuelan coccid-fauna.
Abgrallaspis nakaharai n. sp.

Plate 5

Material studied

One slide with 2 adult females intercepted in Quarantine at Miami, Fla., on Sobralia sp., Orchidaceae, by A. S. Mills, 7-IX-48. This slide, labeled "Miami 879" and "USNM 49-691", is in the U.S. National Museum of Natural History collection of Coccoidea. Holo-type female is the encircled specimen on the slide. No dry material was available for the study of a larger series and the scale of the female.

Adult female

Body oval (fig. a) 768 to 1063 long, 428 to 738 wide; Derm membranous at maturity except for the pygidium which is slightly sclerotized.

Prosoma

With a marginal thoracic spine (fig. b) acute and sclerotized. Dorsum: Row of 3 submarginal microducts (fig. c) on the metathorax; several marginal setae scattered from the head to the abdominal segments.

Ventrum: Antenna (fig. d) a sclerotized, cylindrical tubercle with 1 seta about 23 long arising from the side; on the top of the antenna is a pit with 2 small short setae. Clypeolabral shield 180 long and 112 wide. Anterior spiracle (fig. e) surrounded by stripped sclerotization and 1 associated microduct (fig. f); posterior spiracle same size and shape of anterior spiracle. Area between anterior
Plate 5. - Abgrallaspis nakaharai n.sp.
spiral and clypeolabral shield with a row of 4 or 5 microducts. Submarginal area of the prosoma with a band of microducts (fig. f) and few scattered setae.

Prepygidial segments of abdomen

Dorsum: Segments I to III with 2 pairs of submarginal microducts, about 31 long, and one marginal seta; segment IV (fig. g) with a cluster of 4 microducts submarginally and 1 seta.

Ventrum: Segments I to IV with a cluster of 6 to 10 microducts submarginally, additional clusters of 1 to 3 microducts submedially associated with 1 conical seta (fig. h); segments III and IV with 2 pairs of submarginal conical setae.

Pygidium

Dorsum: Median lobes (fig. i) well developed, prominent, margins straight and parallel, notched on both sides, 20 wide; separated by a distance shorter than the width of one of them; \( L_2 \) smaller than \( L_1 \) and notched on the outer side; \( L_3 \) smaller than \( L_2 \), in the form of a small, sharply pointed tooth. Paraphyses short and narrow, on the interlobular spaces arising from the angles of the lobes. Marginal pygidial microducts, about 31 long, 1 between the median lobes; 3 between the paraphyses of \( L_1-L_2 \); 1 between the paraphyses of \( L_2-L_3 \); additional rows of 6 or 7 pygidial microducts submarginally and submedially. Anal opening oval, 21 in diameter; placed 1 1/2 times from the base of \( L_1 \). Anal apophysis present and surrounding the anal opening.

Ventrum: Plates fimbriated mainly on the sides (figs. j & k), located
1 pair between the median lobes; 2 between $L_1$-$L_2$; 3 between $L_2$-$L_3$ and 6 beyond $L_3$. Clusters of 2 to 8 microducts submarginally on segments VII, VI, and V; 2 additional microducts on the anterior margin. Conical setae, 3 pairs submarginally; 2 lateral of paravulvar scleroses and anterior to vulva. Perivulvar pores absent. Paravulvar scleroses present. Ventral scleroses arising from the base of the lobes. Several rows of slightly sclerotized serrate squamatosus (fig. 1) anterior to vulva.

Illustration based on material from Sobralia sp., Orchidaceae, Venezuela (Quarantine).

Recognition characteristics

A. nakaharai can be separated from the closely related species, those lacking perivulvar pores and with dorsal microducts on the prepygidial segments, by the following characteristics: A. seurati (Marchal) and A. kaussarii Balachowsky all lacking $L_3$, while A. nakaharai has those well developed. A. amygdalicola (Borchsenius) has more than 10 submarginal microducts on each prepygidal segment, A. nakaharai has only 2 to 4. A. marmillaris (Lindinger) lacks plates beyond $L_3$ while A. nakaharai has 6 well developed plates beyond $L_3$.

Notes

A. nakaharai n. sp. is named after Mr. Sueo Nakahara of the Plant Quarantine Division, USDA, who aided me in many ways during the preparation of this work.
Abprallaspis palmae (Cockerell)

Plate 6


Material studied


Scale of the female

Not seen, described by Ferris, 1938, as "white, somewhat oval, quite convex, exuviae subcentral and very dark".

Adult female

Body circular (fig. a) 443 long, 384 wide; Derm membranous at maturity.

Prosoma

With a marginal thoracic spine (fig. b) acute and sclerotized, with 2 associated marginal setae.

Dorsum: With a pair of dorsal bosses submedially on the head; a row of marginal setae (fig. c) and another row of submedian setae
Plate 6. - Abgrallaspis palmae (Cockerell)
on the head.

**Venterm**: Antenna (fig. d) reduced a sclerotized tubercle with 1 seta about 20 long. Clypeolabral shield 164 long and 136 wide; Anterior spiracle (fig. e) without associated ducts or pores; posterior spiracle similar in size and shape to anterior spiracle. Several scattered microducts (fig. f) on the head continuous row of submarginal microducts from the thoracic spine to the pygidium.

**Prepygidial segments of abdomen**

**Dorsum**: Segments I to IV with 1 pair of marginal setae (fig. c) each.

**Venterm**: Segments I to IV with submarginal clusters of microducts and a pair of conical setae (fig. h) submedially.

**Pygidium** (fig. f)

**Dorsum**: Median lobes (fig. j) well developed, prominent, straight, parallel, notched on both sides, 20 wide, separated by a distance equal to the width of one of them; $L_2$ smaller than $L_1$, lanceolate; $L_3$ smaller than $L_2$, in the form of a small, sharply pointed tooth. Paraphyses short and narrow, on the interlobular spaces arising from the angles of the lobes. Marginal microducts about 58 long, 1 between median lobes; 2 between $L_1$-$L_2$; 2 between $L_2$-$L_3$; 1 beyond $L_3$; a row of 4 microducts submedially. Anal opening circular, conspicuously large, 23 in diameter; placed by less than its diameter from the base of $L_1$. Anal apophysis absent.

**Venterm**: Plates unusually large, all exceeding the median lobes in length, extremely fimbriated and many of them branched and fimbriated laterally; 1 pair located between median lobes; 2 between $L_1$-$L_2$; 3
between \( L_2-L_3 \); 3 larger ones beyond \( L_3 \). A row of 4 microducts submarginally; between this row of microducts and the margin there is a row of 3 conical setae (fig. h), 2 more laterad of perivulvar pores. Quinqueloculinar perivulvar pores (fig. k) in 4 groups, formula \(-,(-),0\).

Illustration based on material from *Maximiliana* sp., Palmae, "Catalina Lower Orinoco" Venezuela.

**Recognition characteristics**

The unusual large and fimbriated plates, conspicuously large anal opening and 3 pairs of well developed lobes makes this species distinct.

**Notes**

This species is known from many countries in the tropical and subtropical regions of the world, especially on palms but is also found in a wide variety of plants. This is a new addition for the Venezuelan coccid-fauna.

**Genus Acutaspis** Ferris

Type of the genus: *Aspidiotus persea* Comstock, 1881.


**Description of the genus**

Referable to the tribe Aspidotini; one-barred ducts, \( L_2 \) not bilobed; Prosomatic region subcircular, pygidium strongly acute, angle subtended by the apex of pygidium being less than 90 degrees.
Lobes very small, 3 pairs present. Plates minute, only on the inter-lobular spaces. Paraphyses present and numerous; 3 present between L₂ and L₃. Dorsal pygidial microducts long and slender. Perivulvar pores present. Anal opening circular or oval, located toward the middle of pygidium. Prosoma with a protuberance or sclerotized point on each side.

Key to the species of *Acutaspis*

1. Cephalic margin of prosoma with a
   median notch; pygidium long and acute...................... *reinformis* (Cockerell)

     Cephalic margin of prosoma without
     a median notch; pygidium relatively short......................... 2

2. Lateral margin of thorax produced into
   a rounded umbo; margin of pygidial and pre-pygidial segments heavily sclerotized
   at maturity; plates present between median lobes.................. *perseae* (Comstock)

   Lateral margin of thorax without umbo;
   margin non-sclerotized; body at maturity membranous; plates absent
   between median lobes........................................... *agavis* (Towsend and Cockerell)
Acutaspis agavis (Townsend and Cockerell)

Plate 7


Material studied


Scale of the female

Body subcircular, (fig. a) 935 (827 to 1196) long, 745 (605 to 1004) wide; Derm at maturity membranous except for a slight sclerotization of pygidium.

Prosoma

Thoracic margin with a small, sclerotized tubercle (fig. b).

Dorsum: With a submarginal continuous band of microducts from the head to the pygidium.

Ventrum: Antenna (fig. c) a sclerotized tubercle with 1 lateral seta, about 16 long. Clypeolabral shield 183 long and 152 wide; anterior spiracle (fig. d) with 3 associated microducts; posterior spiracle same size and shape, but without associated microducts.

Prepygidial segments of abdomen

Dorsum: Segments I to IV with a submarginal row of 3 or 4 microducts and a submedian cluster of 2 or 3 microducts.
Plate 7 - Acutaspis agavis (Townsend and Cockerell)
**Ventrum**: Segments I to IV with a continuous submarginal band of microducts. Segmentation not well defined.

**Pygidium** (fig. e)

**Dorsum**: Median lobes (fig. f) almost semi-circular in form; L₂ about same size as L₁, slightly notched on the outer margin; L₃ same size of L₂ and slightly binotched. Margin beyond L₃ sclerotized and crenulated. Paraphyses present, strongly developed and arranged as follows: median lobes with a paraphysis arising from the mesal angle; first interlobular space with a long paraphysis arising from the outer angle of L₂, followed by a short one, and the shorter one from the mesal angle of L₃. Third interlobular space with a long paraphysis arising from the outer angle of L₃. Beyond L₃, from the sclerotized margin, several small paraphysis-like sclerotization are present. Dorsal microducts slender, about long; 1 microduct with the opening between the mesal paraphyses of median lobes; 2 between the paraphyses of first interlobular space; 6 between the paraphyses of second interlobular space; 5 lateral of paraphysis of L₃. Between the paraphysis-like scleroses beyond L₃ numerous opening of microducts on segment VII. Anal opening oval, 23 in diameter; placed about 6 times this diameter from the base of L₁, located posterior to vulva on the venter.

**Ventrum**: Plates never longer than the lobes, bifid or slightly fimbriated; absent between the median lobes, 2 between L₁-L₂; 3 between L₂-L₃; 2 beyond L₃. Margin of pygidium close to setae of segment V varies from a simple folding (fig. e) to an evagination
of the margin (fig. h) to a tubercle-like formation (fig. i); in
the material examined only one side of the pygidium with this unusual
formation. Submarginal clusters of microducts on segments VI and V.
Conical setae (fig. j) 3 pairs, submarginally, 2 laterad of perivul-
var pores, 1 anterior to vulva and 2 posteriorly. Quinquelocular
perivulvar pores (fig. k) in 4 groups, formula 6-13, (8-11), 0.

Illustration based on material from Agave cocui, Amarillidaceae,
Ejido, Merida, Venezuela.

Recognition characteristics

The 3 paraphyses in the second interlobular space, 3 pair of
lobes, acute pygidium, minute plates, absence of plates between
median lobes, membranous body and the association with Agrave spp.
makes this species distinct.

Notes

This New World species is restricted to plants on the genus
Agave, the distribution so far is restricted to U.S.A., Mexico and
Venezuela.

_Acutaspis perseae_ (Comstock)

Plate 8

_Aspidiotus perseae_ Comstock, 1881a:301. _Aspidiotus_ (Chrysomphalus)
_perseae_ Cockerell, 1897:22. _Chrysomphalus perseae_ Leonardi 1899:
223; Fernald, 1903:292; MacGillivray 1921:420. _Acutaspis perseae_
Ferris, 1941:SIII-332; Balachowsky 1951:594; Schmutterer 1959:110;
Borcherdenius, 1966:355. _Chrysomphalus_ (Acutaspis) _perseae_ Merrill,
1953:38.
Plate 8. - Acutaspis perseae (Comstock)
Material studied

On Anthurium sp., Araceae, Venezuela (Quarantine), 7-IX-48 (USNM).
Cattleya sp. Orchidaceae, Venezuela (Quarantine), 2 slides. Epidendrum
sp., Orchidaceae, Venezuela (Quarantine), 2 slides. Laelia sp.,
Orchidaceae, Venezuela (Quarantine), 2-IX-41. Oncidium sp., Orchid-
aceae, Venezuela (Quarantine), 3 slides. Schomburgkia humboltia,
Orchidaceae, Maracay, 17-V-65 (Horowitz).

Scale of the female

Reddish brown, circular, flat, exuviae central and black.

Adult female

Body form broadly turbinate (fig. a) 1120 (886 to 1270) long,
1050 (783 to 1211) wide. Derm of prosoma membranous at maturity;
submarginal area from the umbo to the pygidium and across the
abdominal segments sclerotized.

Prosoma

Lateral margin of thorax on each side with a conspicuous blunt
lobe or umbo (fig. b), this umbo can be well developed as shown on
fig a or reduced on the young adult females, the material examined
shows variation from no umbo and membranous margins to heavily
developed and sclerotized umbo.

Dorsum: Submarginal band of scattered microducts on the thorax.

Ventrum: Antenna (fig. c) a sclerotized tubercle with 1 lateral
seta, about 16 long. Anterior spiracle (fig. d) without associated
ducts or pores; posterior spiracle same shape and size as anterior
spiracle.
Prepygidial segments of abdomen

Dorsum: Segments I to IV with a submarginal band of microducts (fig. e) and a submedian row of 4 or 5 microducts; segmentation is not well defined.

Ventrum: Submarginal area sclerotized with a few scattered microducts throughout the segments.

Pygidium: (fig. f)

Dorsum: Median lobes (fig. g) almost semicircular in form; L₂ about same size as L₁, slightly notched on the outer side; L₃ same size of L₂ and binotched. Margin beyond L₃ sclerotized and crenulated. Paraphyses present, strongly developed and arranged as follows: median lobe with a short paraphysis arising from the mesal angle; first interlobular space with a long paraphysis arising from the outer angle of L₁ and a short one from the mesal angle of L₂; second interlobular space with a long paraphysis arising from the outer angle of L₂, followed by 2 short ones; third interlobular space with a long paraphysis arising from the outer angle of L₃; beyond L₃ several paraphysis-like sclerotizations present. Dorsal microducts slender, about long; 1 microduct with the opening between the mesal paraphyses of median lobes; 2 or 3 between paraphyses of first interlobular space; 3 or 4 between the paraphyses of second interlobular space; 3 or 4 laterad of the mesal paraphysis of L₃. Between the paraphysis-like scleroses, beyond L₃, numerous openings of microducts present. Submedian band of long microducts on segment VII. Anal opening oval, 20 in diameter; placed about 5 times this diameter from the base of L₁, located posterior to
vulva on the venter.

**Ventrum:** Plates never longer than the lobes, bifid or slightly fimbriated; absent between the median lobes; 2 between $L_1-L_2$; 3 between $L_2-L_3$; 3 beyond $L_3$. Submarginal microducts (fig. h) scattered throughout segments VI and V. Conical setae (fig. i) 3 pairs submarginally, 2 lateral of perivulvar pores, 1 anterior to vulva and 2 posterior. Quinquelocular perivulvar pores (fig. j) in 4 groups, formula: 4-6, (6-8), 0.

Illustration based on material from *Schombergia humboldtia*, Orchidaceae, Maracay, Aragua, Venezuela.

**Recognition characteristics**

The 3 paraphyses on second interlobular space, 3 pair of lobes, acute pygidium, minute plates, presence of umbos on both sides of the thorax, heavy sclerotization on the submargin makes this species distinct.

**Notes**

This New World species, is found on many hosts, but primarily on orchids. After examination of numerous specimens of *A. persea*, I found this very closely related to *A. umboniferus* (Newstead), and perhaps it is the same species, but because the lack of live material from which series of different stages of the females could be studied, it is impossible in the present work to make any definite conclusions about the validity of both species or the presence of a new synonymy.

**Acutaspis reniformis** (Cockerell)

Plate 9
Plate 9. - Acutaspis reniformis (Cockerell)

Material studied

One female on Sapotaceae, Puerto Ayacucho, Territorio Amazonas, 20-V-40 (Pittier) (USNM).

Scale of the female

Not seen, described by Ferris, 1941, as "pale reddish brown or straw colored, circular, flat, exuviae central".

Adult female

Body strongly turbinate; 1033 long and 886 wide. The cephalic margin of the body with a median notch (fig. a). Derm at maturity membranous.

Prosome

Thoracic tubercle small and inconspicuous (fig. b) located on the margin between the spiracles.

Dorsum: Several submarginal setae (fig. c) scattered on the head. Row of submarginal microducts (fig. d) posterior to thoracic tubercle.

Ventrum: Antenna (fig. d) a sclerotized tubercle with 1 lateral seta, about 20 long. Clypeolabral shield 2 3/4 long and 140 wide. Anterior spiracle (fig. f) without associated ducts or pores; posterior spiracle same shape and size as anterior spiracle. Band of microducts submarginally from the head to the abdomen.
Prepygidial segments of abdomen

Dorsum: Segments I to IV with a submarginal row of 3 to 6 microducts (fig. d).

Ventrum: Segments I to IV with a submarginal row of 2 or 3 microducts.

Pygidium: (fig. g)

Elongate and very acute.

Dorsum: Median lobes (fig. h) very low and inconspicuous semicircular in form; \( L_2 \) longer than \( L_1 \) and not notched; \( L_3 \) longer than \( L_2 \) and not notched; margin beyond \( L_3 \) sclerotized and coarse by serrate. Paraphyses present, thin but well developed, arranged as follows: median lobes with a short paraphysis arising from the mesal angle; first interlobular space with a long paraphysis arising from the outer angle of \( L_1 \) and a short one from the mesal angle of \( L_2 \); second interlobular space with a long paraphysis arising from the outer angle of \( L_2 \), followed by two short paraphyses; third interlobular space with a long paraphysis arising from the outer angle of \( L_3 \); beyond \( L_3 \) several paraphysis-like sclerotizations present. Dorsal microducts slender, about long; 2 microducts with the opening between the paraphyses of first interlobular space; 6 between the paraphysis of second interlobular space; 3 laterad of outer paraphysis of \( L_3 \). Submedian rows of 12 to 15 long microducts on segments VII and VI. Anal opening oval, 39 in diameter; placed about 3 times this diameter from the base of \( L_1 \), located posterior to vulva on the venter.

Ventrum: Plates slightly longer than the lobes, bifid or slightly
fimbriated; 2 between median lobes; 2 between L₁-L₂; 3 between L₂-L₃; 3 beyond L₃. Submarginal cluster of microducts (fig. i) on segment V. Conical setae (fig. j) 3 pairs submarginally, 2 laterad of perivulvar pores and 2 posterior to vulva. Quinquelocular perivulvar pores (fig. k) in 4 groups, formula 3-5,(8-9),0.

Illustration based on material from Sapotaceae, Puerto Ayacucho, Territorio Amazonas, Venezuela.

**Recognition characteristics**

The 3 paraphyses in the second interlobular space, 3 pair of lobes, acute and elongate pygidium, minute plates, notch on the cephalic region makes this species distinct.

**Notes**

This species was previously known only from the original record, on an unidentified plant from Oaxaca, Mexico. This new addition to the Venezuelan coccid-fauna extends the range of the species to Northern South America.

**Genus Aonidiella** Berlese and Leonardi

Type of the genus: *Aspidiotus aurantii* Haskell, 1879.


**Description of the genus**

Referable to the tribe Aspidiotini; one-barred ducts, fringed plates, L₂ not bilobed. Prosmatic region at maturity tending to be
much enlarged and sclerotized, lateral region produced into lobes, 3 pairs of lobes well developed, $L_4$ merely a slight point on the margin. Paraphyses small but well developed not present beyond $L_3$. Anal opening small, anterior to vulva.

Key to species of *Aonidiella*

Perivulvar pores present; dorsal cluster of microducts on prepygidial segments of abdomen .......... orientalis (Newstead)

Perivulvar pores absent; no dorsal microducts on prepygidial segments of abdomen .......... aurantii (Maskell)

*Aonidiella aurantii* (Maskell)

Plate 10


Material studied


Scale of the female

Body turbinate on the young adult females (fig. a), at maturity the prosoma tends to be reniform (fig. b), its lobes crowding against
Plate 10. - Aonidiella aurantii (Maskell)
the retracted pygidium; 911 (797 to 1122) long and 1089 (797 to 1476) wide. Derm at maturity highly sclerotized.

**Prosoma**

**Ventral:** Antenna (fig. c) a sclerotized tubercle with one seta about 27 long. Clypeolabral shield 176 long and 129 wide. Anterior spiracle (fig. d) without associated pores or ducts; posterior spiracle same size and shape as anterior spiracle.

**Prepygidial segments of abdomen**

**Ventral:** Segment IV with a submarginal cluster of microducts.

**Pygidium:** (fig. e)

**Dorsum:** Median lobes (fig. f) large and prominent, about 12 wide, notched on both sides; L₂ and L₃ smaller than L₁, notched on the outer side; L₄ reduced to a slight sclerotization of the margin. Paraphyses short and slender a pair arising from the mesal angles of median lobes; first and second interlobular spaces with 2 in each. Microducts 93 long, located 1 between mesal paraphyses of median lobes, 2 between paraphyses of first interlobular space, 1 between paraphyses of second interlobular space, 4 on a submedian furrow on segment VI, 7 or 8 on a submarginal furrow on segment V. Anal opening circular, 16 in diameter; placed about 2 times this diameter from the base of L₁; located posterior to vulva on the venter. Anal apophyses well developed.

**Ventral:** Plates on the interlobular spaces fimbriated, 2 between median lobes; 2 between L₁-L₂; 3 between L₂-L₃; 3 branched and fimbriated ones beyond L₃. Three clusters of microducts on segments
VI and V. Conical setae (fig. g) 3 pairs submarginally, 3 laterad of paravulvar scleroses and 2 anterior to vulva. Perivulvar pores absent, paravulvar scleroses well developed. A group of 3 small scleroses (fig. h) anterior to vulva on each side.

Illustration based on material from Rosa sp. Cumana, Sucre, Venezuela.

Recognition characteristics

The heavy sclerotization of the prosoma at maturity, 3 pair of lobes, small anal opening, 5 pairs of paraphyses, absence of perivulvar pores and the 3 scleroses anterior to vulva makes this species distinct.

Notes

This extremely polophagous species is known from many countries of the tropical and subtropical regions of the world. It is a new addition to the Venezuelan coccid-fauna.

Aonidiella orientalis (Newstead)

Plate 11

Material studied


Scale of the female

White to straw color, circular, flat, exuviae central and dark brown.

Adult female

Body pear shaped (fig. a) but at full maturity and the pygidium become retracted into the prosoma; 1178 (1063 to 1255) long, 1026 (900 to 1255) wide. Anterior part of the body heavily sclerotized at maturity.

Prosoma

**Dorsum:** Several marginal setae (fig. b) on the head. Row of submarginal microducts (fig. c) on the meso and meta thorax.

**Ventrum:** Antenna (fig. d) a sclerotized tubercle with one seta about 27 long. Clypeolabral shield 191 long and 117 wide. Anterior spiracle (fig. d) with an associated sclerotized area; posterior spiracle same size and shape as anterior spiracle but without a sclerotized area.

Prepygidial segments of abdomen

**Dorsum:** Segments II to IV with a submarginal cluster of 12 to 18
microducts, which are about half long of those on the pygidium.

**Ventrum:** Segments I to IV with submarginal clusters of 3 to 5 microducts (fig. f).

**Pygidium:** (fig. g)

**Dorsum:** Median lobes (fig. h) large and prominent, about 16 wide, notched on both sides; L₂ smaller than L₁ and notched on outer margin; L₃ smaller than L₂ and notched on the outer side only; L₄ absent. Paraphyses short and slender, a pair arising from the mesal angles of median lobes; first and second interlobular spaces with 2 each. Microducts 66 long, located 1 between the median lobes, the rest in 3 furrows, one on segment VII with 3; segment VI with 7 or 8 microducts; segment V with 8 or 9. Anal opening circular, 16 in diameter; placed about 1 1/2 times this diameter from the base of L₁; located posteriorly to vulva on the venter.

**Ventrum:** Plates on the interlobular space fimbriated, 2 between median lobes; 2 between L₁-L₂; 3 between L₂-L₃; 3 beyond L₃, these sword shaped, with a pointed process. Cluster of submarginal microducts on segment V. Conical setae (fig. i) 3 pairs submarginally; 2 laterad of perivulvar pores; 1 anterior to vulva; 3 on the anterior margin of pygidium. Quinquelocular perivulvar pores (fig. j) in 4 groups, formula 3-5, (4-7), 0. Ventral scleroses arising from L₁ and L₂.

Illustration based on material from *Rosa* sp. Rosaceae, Maracay, Aragua, Venezuela.

Recognition characteristics
The heavy sclerotization of the prosoma at maturity, 3 pairs of lobes, small anal opening, 5 pairs of paraphyses, 4 groups of perivulvar pores, and dorsal microducts on prepygidial segments of abdomen makes this species distinct.

Notes

This polphagous species is known from many countries of the tropical and subtropical regions of the world. It is a new addition to the Venezuelan coccid-fauna.

Genus Aspidiella Leonardi


Description of the genus

Referable to the tribe Aspidiotini, one barred ducts, fringed plates and L₂ not bilobed; two pairs of well developed pygidial lobes; L₃ represented by a slight sclerotized point; paraphyses absent; perivulvar pores present; spiracle without associated pores.

Key to species of Aspidiella

Plates present beyond L₃; median lobes without basal scleroses; associated with Dioscorea . . . . . . . hartii (Cockerell)  
Plates absent beyond L₃; median lobes with a conspicuous basal scleroses; associated with Gramineae. . . . . . . . . . . . . . . . . . . . . . . . sacchari (Cockerell)
Aspidiella hartii (Cockerell)

Plate 12


Material studied

5 females on Discorea rotundata, Discoreaceae, El Limon, 13-X-69 (Barrios).

Scale of the female

Brownish, circular, flat, exuviae central; occurring only on the tubers.

Adult female

Body circular or turbinate (fig. a), 698 (620 to 768) long, 596 (531 to 590) wide; derm at maturity membranous. Margin of the body sculptured.

Prosoma

Dorsum: Band of numerous microducts on submarginal area (fig. b); row of setae submedially.

Ventrum: Antenna (fig. c) as a sclerotized tubercle with one seta about 23 long. Clypleolabral shield 206 long and 132 wide. Anterior spiracle and mouth parts with numerous rows of squamosael plates (fig. e); posterior spiracles same size and shape as anterior spiracle, with 4 to 6 associated microducts; area between the spiracles
Plate 12. - Aspidiella hartii (Cockerell)
with several rows of squamose plates.

Prepygidial segments of abdomen

Dorsum: Segments I to IV with several marginal microducts in addition to the row of microducts extending from the margin toward the submedian area on each segment.

Ventrum: Segment I, with few marginal microducts and several rows of squamose plates medially; segments II to IV with few marginal microducts.

Pygidium: (fig. f)

Dorsum: Median lobes (fig. g) well developed, notched both sides in apex and about 16 wide; L₂ smaller than L₁, rounded some specimens with a small notch on the outer margin; L₃ represented by a point. Band of microducts, 46 long, along the margin and submargin of the pygidium; one pair of microducts submarginally on segment VII; also 3 rows of microducts on segments VII; VI, and V, reaching the level of the anus; opening of microducts surrounded by sclerotized ring open on the posterior end; anal opening circular, 20 in diameter; placed about 3 times its diameter from the base of L₁, located posterior to the vulva on the venter; area around the anal opening more sclerotized than the rest of the pygidium.

Ventrum: Plates in the interlobular spaces are fimbriated, 2 between median lobes; 2 between L₁-L₂; 3 between L₂-L₃; 5 or 6 simple plates beyond L₃. A band of microducts submarginally, some of the microducts open in an invagination at the margin, especially on segments VI and V. Quinquelocular perivulvar pores (fig. i) in 4 groups, formula
- ,( - ), 0; paravulvar scleroses slightly sclerotized; conical setae in a submarginal row in addition to 4 pairs laterad of perivulvar pores and one pair posterior to vulva.

Illustration based on material from *Dioscorea rotundata*, Dioscoreaceae, El Limon Aragua, Venezuela.

**Recognition characteristics**

The sculptured margin of abdomen, plates beyond L3, the numerous rows of serrate squamations being median lobes without basal scleroses always associated with *Dioscorea* makes this species distinct.

**Notes**

Originally described from Trinidad this species is found only on plants of the genus *Dioscorea*. It is distributed in the West Indies, and the tropical areas of the Pacific. This new addition to the Venezuelan coccid-fauna extends the range of the species to Northern South America.

*Aspidiella sacchari* (Cockerell)

Plate 13


**Material studied**

On *Panicum barbinoides*, Gramineae, Urena, Tachira, 18-V-49 (FFY) (IZA & USNM).

**Scale of female**

Not seen; described by Ferris, 1938, as "pale brown, circular,
Plate 13. - Aspidiella sacchari (Cockerell)
thin, flat, with exuviae central".

Adult female

Body turbinate (fig. a) 1073 (797 to 1520) long, 782 (502 to 856) wide. Derm at maturity membranous. Margin of the body sculptured.

Prosoma

Dorsum: With 3 or 4 marginal setae (fig. b); few submarginal microducts on the posterior end of the prosoma.

Ventrum: Antenna (fig. c) as a sclerotized tubercle with one seta about 23 long. Clypeolabral shield 195 long and 136 wide; anterior spiracle (fig. d) with numerous associated microducts; area between the anterior spiracles and mouthparts with numerous rows of sclerotized squamosa plates (fig. e); posterior spiracle same size and shape 25 anterior spiracles, with less numerous associated microducts; area between the posterior spiracles with rows of serrate squamations. A cluster of microducts between the spiracles and margin; continuous marginal row of microducts from the head to the abdomen.

Abdomen: Prepygidial segments

Dorsum: Segments I to IV with a cluster of marginal microducts (fig. f); one marginal seta on each segment.

Ventrum: Segment I with several marginal microducts and a small cluster of microducts submedially; two rows of squamose plates medially. Segments II to IV with the margin sculptured and a cluster of microducts extending from the margin toward the submarginal area. A cluster of microducts submedially.
Pygidium (fig. g)

Dorsum: Median lobes (fig. h) well developed, notched on the outer side and about 16 wide; L₂ smaller than L₁, notched on the outer side; L₃ represented by a sclerotized point on the margin. Beyond L₃ the margin sculptured. A band of submarginal microducts, 50 long each. An additional band extending anteriorly from the base of L₃, and a short and non-continuous band extending anteriorly from the base of L₂. The openings of the microducts are surrounded by a half-moon like sclerosis. Anal opening oval, 11 in diameter; placed about 6 times this diameter from the base of L₁, located posterior to the vulva on the venter; area around the anal opening more heavily sclerotized than the rest of the pygidium.

Ventrum: Plates in the interlobular spaces bifurcated or with an additional tooth in the middle of the fork (fig. i), 2 between median lobes; 2 between L₁-L₂; 3 between L₂-L₃; no plates beyond L₃. Median lobes with a conspicuous elongate sclerosis extending into the pygidium from its base. Margin beyond L₃ heavily invaginated in some places, usually associated with a microduct opening. A wide band of microducts (fig. j) submarginally. Quinquelocular perivulvar pores (fig. k) in 4 groups, formula 6-9,(2-5),0. Paravulvar scleroses slightly sclerotized; conical setae (fig. l) in a submarginal row in addition to 2 pairs laterad of perivulvar pores and one pair posterior to vulva.

Illustration based on material from Panicum barbinoides, Gramineae, Tachira, Venezuela.

Recognition characteristics
The sculptured margin of abdomen, absence of plates beyond L₃, the numerous rows of serrate squamatous, the median lobes with basal sclerosis, and the association with Gramineae, makes this species distinct.

Notes

Originally described from Jamaica but probably of oriental origin; it is found principally on sugar-cane. This is a new addition to the Venezuelan coccid-fauna.

Genus *Aspidiotus* Bouche

Type of the genus: *Aspidiotus nerii* Bouche, 1833.


*Evaspidiotus* Leonardi, 1898:74.

Description of the genus

Referable to the tribe Aspidiotini, one-barred ducts; L₂ not bilobed; plates strongly developed, 2 between median lobes; 2 between L₁ and L₂; 3 between L₂-L₃ and in variable number beyond L₃. Intersegmental scleroses or paraphyses entirely lacking. Perivulvar pores present. Anal opening very large.

*Aspidiotus destructor* Signoret

Plate 14

*Aspidiotus destructor* Signoret, 1869a:120; Fernald, 1903:257; MacGillivray, 1921:396; Ferris, 1938:SII-191; Ballou, 1945:90; Balachowsky,
Plate 14. - Aspidiotus destructor Signoret

**Material studied**


**Terminalia cattana**, Combretaceae, Las Trincheras, Carabobo, 8-XI-40 (Muller) IZA & CIA).

**Scale of the female**

Circular, flat, exuviae central, white or pale color; usually on the underside of the leaves.

**Adult female**

Body circular (fig. a), 844 (694 to 1019) long, 705 (606 to 857)
wide. Derm at maturity membranous.

**Prosoma**

**Dorsum:** Eye spot marginal, varies from a flat sclerotization (fig. b) to a protuberance on the margin (fig. c); few setae located submarginally.

**Ventrum:** Antenna (fig. d) as a sclerotized tubercle with a single seta, about 20 long, and a small terminal pit with 2 small setae; 3 or 4 small microducts found near each antenna. Clypeolabral shield (192 to 160) long and (106 to 125) wide. Anterior spiracles (fig. e) without associated pores or ducts; posterior spiracles same shape and size. An irregular row of microducts (fig. f) submarginally from the head to the abdomen.

**Prepygidial segments of abdomen**

Few scattered microducts (fig. g) on the ventrum found on all these segments.

**Pygidium** (fig. h)

**Dorsum:** Median lobes (fig. i) non-zygotic, well developed about 12 wide, notched on each side at the apex; length of these lobes varies from shorter than L₂ to almost the same length (fig. j); L₂ well developed, notched on each side and rounded at the apex; L₃ smaller than L₂ and notched on the outer side; L₄ absent. A marginal row of long microducts, about long; one located between the median lobes; one between L₁ and L₂; 2 between L₂ and L₃; 5 beyond L₃. Three rows of long microducts, extending from the margin anteriorly on the pygidium; these rows in furrows. Anal opening oval, 23 in diameter, placed about twice this diameter.
from the base of \( L_1 \); area around anal opening more sclerotized than the rest of the pygidium.

**Ventrum:** Two apically fringed plates (fig. k) between median lobes; two of the same type of plates between \( L_1 \) and \( L_2 \); 3 fringed plates (fig. 1) between \( L_2 \) and \( L_3 \); usually 8 plates laterad of \( L_3 \). A submarginal row of conical setae (fig. m); 2 pairs laterad of perivulvar pores, 1 pair anterior to vulva and 1 pair posteriorly. Ventral median sclerosis of the form of a V, extending from the margin toward the perivulvar pores. Quinquelocular perivulvar pores (fig. n) in 4 groups formula, 4-7,(8-11),0. Paravulvar scleroses present.

Illustration based on material from *Musa sapientum*, El Limon, Aregua, Venezuela.

**Recognition characteristics**

The numerous and well developed plates, lack of microducts on the dorsum, the 3 pairs of lobes, V-shaped dorsal sclerotization and the presence of perivulvar pores makes this species distinct.

**Notes**

This polyphagous species is found in almost all the countries in the tropical and subtropical regions of the world, especially on palms.

**Genus Chrysomphalus Ashmead**

Type of the genus: *Chrysomphalus ficus* Ashmead 1880 (= Coccus aonidum Linnaeus, 758).

*Chrysomphalus* Ashmead, 1830:268; Leonardi, 1899: 198; Fernald, 1903:

Description of the genus

Referable to the tribe Aspidiotini, one-barred ducts; fringed pygidial plates; 3 pairs of well developed lobes; L₂ not bilobed; paraphyses present arising from the angles of the lobes or from the interlobular spaces; but none present anterior to L₄; perivulvar pores present; spiracle without associated pores.

Key to species of Chrysomphalus

1. Segment II of abdomen with dorsal submarginal clusters of numerous microducts ................. 2

Segment II of abdomen with only 2 pairs of dorsal submarginal microducts .................. 3

2. Dorsal bosses present on the head and segments I and II of abdomen, thoracic spine blunt and slightly sclerotized. .............. pinnulifer (Haskell)

Dorsal bosses absent, thoracic spine small, acute and sclerotized ............... aonidum (Linnaeus)

3. Segments I to III of abdomen with dorsal submarginal microducts; thoracic spine weakly sclerotized and slightly fimbriate dictyospermri (Horgan)

Only segment II of abdomen with dorsal submarginal microducts; thoracic spine acute and sclerotized .............. prospimus Banks
Chrysomphalus aonidum (Linnaeus)

Plate 15


Material studied


Scale of the female

Dark red or brown, circular, flat, exuviae central and pale.

Adult female

Body tubinate (fig. a), 1475 (1388 to 1580) long, 1277 (1211 to 1368) wide; Derm at maturity membranous.

Prosoma

With a marginal thoracic spine (fig. b) acute and sclerotized.

Dorsum: Few submarginal setae; row of submarginal microducts (fig c)
Plate 15. - Chrysomphalus aonidum (Linnaeus)
on the meso and metathorax.

**Ventrum:** Antenna (fig. d) a sclerotized tubercle with one seta about 39 long, and 2 short sensory setae. Clypeolabral shield 180 long and 109 wide, several parallel rows of short derm spines (fig. e) around the mouthparts. Anterior and posterior spiracles similar (fig. f) without associated pores or ducts. A row of microducts on the meso and metathorax. Several submarginal setae on the head region.

**Prepygidial segments of abdomen**

**Dorsum:** Segment I with 2 pairs of submarginal short microducts (fig. c) and 2 marginal setae; Segment II (fig. g) with a large cluster of submarginal microducts; segments III and IV without microducts, and 2 pairs of marginal setae.

**Ventrum:** Segments I to IV with submarginal clusters of short microducts (fig. h); segments III and IV with a pair of submedian conical setae.

**Pygidium**

**Dorsum:** Median lobes (fig. i) well developed but rather small about the same size of L₂ and L₃; all lobes notched on outer angle, margin beyond L₃ sclerotized for some distance and twice notched. Paraphyses arising from each of the mesal angles of the lobes and 2 more on the interlobular spaces. Furrows of dorsal microducts, first furrow with 3 microducts, somewhat shorter and noticeably broader than those of the second and third furrows having 18 to 22 and about 97 long; anal opening oval, 16 in diameter; placed about 2 1/2 times this diameter from the base of L₁; area around the anal
opening sclerotized.

_Ventrum:_ Plates in the interlobular spaces fimbriated, 2 between median lobes; 2 between \( L_1 - L_2 \); 3 between \( L_2 - L_3 \); 3 between \( L_3 - L_4 \). The latter differently shaped, the mesal 2 each with a pair of small clavate processes, the third very raggedly divided. A cluster of microducts on segment V. Conical setae (fig. j) 3 pairs, submarginally, 2 laterad of perivulvar pores, a pair anterior to vulva and a pair posterior. Quinquelocular perivulvar pores (fig. k) in 5 groups, formula 4-6,(5-7),0; ventral scleroses arising from the bases of \( L_1 \), \( L_2 \) and \( L_3 \).

Illustration based on material from _Citrus aurantium_, Rutaceae, Kanarakuni, Bolivar, Venezuela.

**Recognition characteristics**

The small size of pygidium 3 pairs of well developed lobes, presence of perivulvar pores, large cluster of microducts on segment II of abdomen and the acute and sclerotized thoracic spines, makes this species distinct.

**Notes**

This polyphagous species is found in many countries of the tropical and subtropical regions of the world in the citrus growing areas is considered a very important pest.

_Chrysemaphalus dictyospermi_ (Morgan)

_Plate 16_

_Aspidiotus dictyospermi_ Morgan, 1889:352. _Aspidiotus dictyospermi_ v. arecae Newstead, 1893:185. _Aspidiotus mangiferae_ Cockerell, 1893b:
Plate 16. - Chrysomphalus dictyospermi (Morgan)

**Material studied**


**Scale of the female**

Pale reddish-brown, circular, flat, exuviae central and paler than the rest of the scale.

**Adult female**

Body subcircular or turbinate (fig. a), 916 (850 to 1033) long and 764 (664 to 886) wide; Derm membranous at maturity.

**Prosoma**

With a marginal thoracic spine (fig. b) weakly sclerotized and slightly fimbriate.
Dorsum: Several marginal setae; 3 pairs of submarginal microducts on the metathorax.

Ventr um: Antenna (fig. c) a sclerotized tubercle with one seta about 35 long, on the opposite side a pit with 2 short sensory setae. Clypeolabral shield 156 long and 97 wide; Anterior and posterior spiracle (fig. d) similar, without associated pores or ducts. A row of submarginal microducts (fig. e) on the thorax.

Prepygidial segments of abdomen

Dorsum: Segments I to III with 2 pairs of submarginal short microducts and 1 pair of marginal setae; segment IV (fig. f) with a pair of marginal setae and without microducts.

Ventr um: Segments I and II with 2 pairs of submarginal microducts; segment III without microducts; segment IV with 4 pairs of submarginal microducts (fig. g).

Pygidium

Dorsum: Median lobes (fig. h) well developed but rather small about the same size of L₂ and L₃, all notched on outer margin; margin beyond L₃ sclerotized for some distance; two paraaphyses arising from each interlobular space; 3 furrows of dorsal microducts, first furrow with 3 microducts, somewhat shorter and broader than those of the second and third furrows which are 7 to 9 and about 117 long; anal opening oval, 12 in diameter; placed about 2 1/2 times this diameter from the base of L₁. Area around the anal opening slightly sclerotized.

Ventr um: Plates in the interlobular spaces fimbriated, 2 between
median lobes; 2 between L₁-L₂; 3 between L₂-L₃; 3 beyond L₃, these bearing conspicuous club-shaped appendages, which are slightly serrate. A row of microducts submarginally on segment V; conical setae (fig. 1) 3 pairs, submarginally, 3 pairs laterad of perivulvar pores and 2 pairs just anterior to vulva. Quinquelocular perivulvar pores (fig. j) in 4 groups, formula 2-3,(306),0. Paravulvar scleroses well developed; ventral scleroses arising from L₁ and L₂.

Illustration based on material from Rosa sp. Rosaceae, El Limon, Aragua, Venezuela.

Recognition characteristics

The 3 pairs of well developed lobes, dorsal furrows of microducts; the few microducts on the submargin of the abdomen, the fimbriated thoracic spine, and 4 groups of perivulvar pores, makes this species distinct.

Notes

This polyphagous species is found in many countries of the tropical and subtropical regions of the world, usually associated with palms.

Chrysomphalus pinnulifer (Maskell)

Plate 17

Plate 17. - Chrysomphalus pinnulifer (Maskell)
Material studied

On unidentified Gramineae, Venezuela (Quarantine) 12-XII-50 (USNM).

Scale of the female

Not seen, described by McKenzie (1939) as "reddish-brown, with the margin somewhat lighter, rather thin, circular, exuviae central."

Adult female

Body turbinate (fig. a), 1011 (989 to 1033) long and 804 (797 to 812) wide; derrn at maturity membranous.

Prosoma

With a marginal thoracic spine (fig. b), weakly sclerotized and blunt.

Dorsum: With a pair of dorsal bosses (fig. c) submedially on the head. Few marginal setae; 4 pairs of microducts on the submargin of meso and metathorax.

Ventrum: Antenna (fig. d) a sclerotized tubercle with one seta about 35 long, and with 2 short setae. Clypeolabral shield 175 long and 117 wide; several parallel rows of short derrn spines (fig. e) around the mouth parts; anterior and posterior spiracles (fig. f) similar, without associated pores on ducts.

Prepygidial segments of abdomen

Dorsum: Segment I with a pair of submarginal dorsal bosses (fig. c) and a pair of microducts; segment II with a cluster of 5 to 7 submarginal microducts and a pair of dorsal bosses. Segment III with
a pair of submarginal microducts. Segment IV without microducts; each of the segments with a marginal seta.

**Ventrum**: Segments III and IV with 1 to 4 pairs of submarginal microducts (fig. h) and 2 pairs of conical setae submedially.

**Pygidium**

**Dorsum**: Median lobes (fig. i) well developed but small about the same size of \( L_2 \) and \( L_3 \); notched on the outer margin; two paraphyses arising from each of the interlobular spaces. First furrow of dorsal microducts with 3 ducts, somewhat shorter and broader than those of the second and third furrows which are 15 to 20 and about 109 long; anal opening oval, 12 in diameter; placed about 3 times this diameter from the base of \( L_1 \); located posterior to vulva on the venter; area around the anal opening slightly sclerotized.

**Ventrum**: Plates of the interlobular spaces are fimbriated, 2 between median lobes; 2 between \( L_1-L_2 \); 3 between \( L_2-L_3 \); 3 beyond \( L_3 \) different; the first 2 with a club-shaped appendages and the third divided into 2 smaller slightly serrate processes. Cluster of microducts (fig. h) submarginally on segment V; conical setae (fig. j) 3 pairs, submarginally, 3 pairs laterad of the perivulvar pores, 2 pairs on the anterior margin of the pygidium, 1 pair anterior to vulva. Quinquelocular perivulvar pores (fig. k) in 4 groups, formula 4-5, (5-6)0. Paravulvar scleroses slightly developed; ventral scleroses arising from \( L_1 \) and \( L_2 \). On the anterior margin of the pygidium 2 slightly sclerotized rows of serrate squamations.

Illustration based on material from Gramineae, unidentified,
Venezuela (Quarantine).

**Recognition characteristics**

The 3 pairs of pygidial lobes, dorsal furrows of microducts, 3 pairs of dorsal bosses, 4 groups of perivulvar pores and the cluster of microducts on the sulmargin of segment II makes this species distinct.

**Notes**

This polyphagous species is found on many countries of the tropical and subtropical regions of the world; this is a new addition to the Venezuelan coccid-fauna.

**Chrysomphalus propsimus** Banks

Plate 18


**Material studied**

Three females on palm leaves, Venezuela (Quarantine), 14-VI-55 (USNM).

**Scale of the female**

Not seen, described by McKenzie (1939), as "dark chocolate color, flat and circular, exuviae subcentral."

**Adult female**

Body subcircular (fig. a), 620 long and 516 wide; Derm at maturity membranous.
Plate 18. - Chrysomphalus propsimus Banks
**Prosoma**

With a marginal thoracic spine (fig. b) acute and sclerotized.

**Dorsum:** Without ducts and only a few marginal setae.

**Ventrum:** Antenna (fig. c) as a sclerotized tubercle with one setae about 23 long, with 2 short sensory setae. Clypeolabral shield 16½ long and 12½ wide; anterior and posterior spiracles similar (fig. d) without associated pores or ducts.

**Prepygidial segments of abdomen**

**Dorsum:** Segment II (fig. e) with 2 pairs of submarginal microducts, no trace of microducts on the other segments. Each segment with a marginal seta.

**Ventrum:** Segments I to IV with 2 pairs of submarginal microducts (fig. f); segments III and IV with 2 pairs of submedian conical setae.

**Pygidium**

**Dorsum:** Median lobes (fig. g) well developed by small about the same size as $L_2$ and $L_3$; margin of segment V sclerotized, and with tooth-like projections. Two paraphyses arising from each interlobular space. Furrows of dorsal microducts, first furrow with 3 microducts, somewhat shorter and broader of those of the second and third furrows which are 13 to 16 and about 8½ long; anal opening oval, 12 in diameter; placed almost 2 times this diameter from the base of $L_1$; located posterior to vulva on the venter; are a around the anal opening slightly sclerotized.

**Ventrum:** Plates of the interlobular spaces small and fimbriated,
2 between median lobes; 2 between L₁-L₂; 3 between L₂-L₃; 3 beyond L₃, these larger, deeply branched and fringed; cluster of microducts (fig. f) submarginally on segment V; conical setae (fig. h) 3 pairs submarginally, 2 pairs laterad of the perivulvar pores, 2 pairs on the anterior margin of the pygidium and 1 pair anterior to vulva. Quinquelocular perivulvar pores (fig. i) in 4 groups, formula 2-3,(3-5),0. Paravulvar scleroses weakly developed; ventral scleroses arising from L₁, L₂ and L₃.

Illustration based on material from palm, Venezuela, (Quarantine).

Recognition characteristics

The absence of dorsal microducts, with the exception of segment II, on the prepygidial segments, 4 groups of perivulvar pores, dorsal furrows of microducts on the pygidium, and acute and sclerotized thoracic spines makes this species distinct.

Notes

This species is restricted to palms and the previous records are from the asiatic region. It is a new addition to the Venezuelan coccid-fauna and for the New World.

Genus Clavaspis MacGillivray

Type of the genus: Aspidiotus subsimilis var. aniae Houser, 1918 = Aspidiotus hirculeanus Doane and Iladden, 1909.

pidiotus MacGillivray, 1921:391.

Description of the genus

Referable to the tribe Aspidiotini, one-barred ducts and without gland spines. Median lobes well developed; L₂ and L₃ absent. Paraphyses between VI-VII and VI-VIII strongly developed; paraphysis arising from the outer angle of median lobes being long and terminating in a circular knob. Plates small, when fimbriated, lateral processes very short. No pores associated with spiracles; anal opening posterior to the vulva.

Clavaspis herculane (Doane and Hadden)

Plate 19


Material studied

On Spondias mombin, Anacardiaceae, El Limon, 26-V-66 (AD).
Unidentified tree, Parque del Este, Caracas, 20-VII-69 (AD).

Scale of the female

Gray or whitish in color; circular, exuviae central, usually beneath the bark of the host.

Adult female
Plate 19. - Clavaspis herculeana (Doane & Hadden)
Body turbinate (fig. a), 1069 (1241 to 576) long, 801 (576 to 1019) wide. Derm at maturity membranous except the pygidium which is slightly sclerotized.

**Prosoma**

**Dorsum:** Numerous marginal setae (fig. b). A continuous submarginal band of microducts (fig. c) extending from the head region toward the abdomen.

**Ventrum:** Antenna (fig. d) as a sclerotized tubercle with 1 seta about long. Clypeolabral shield 169 long and 112 wide. Anterior and posterior spiracles (fig. e) similar, normal, without associated pores.

**Prepygidial segments of abdomen**

**Dorsum:** Segments I to III with a continuous band of microducts submarginally. Segment III with a row of microducts submedially.

**Pygidium** (fig. f)

**Dorsum:** Median lobes (fig. g) non-zygotic, well developed about 20 wide, notched laterally at the apex. L₂, L₃ and L₄ absent. First pair of paraphyses with the mesal member greatly elongated and terminating in an almost detached large knob; other smaller and slender. Second pair likewise small. Microducts of the pygidium long and slender, each about in length; these scattered along the submarginal area. Anal opening small, circular, in diameter, placed about 3 1/2 times its diameter from the base of L₁; posterior to the vulva on the venter.

**Ventrum:** Plates, 2 short between the median lobes; those beyond the
median lobes vary from fimbriate (fig. h) to bifid (fig. i), there are 6 or 7 present beyond L1. A cluster of microducts (fig. j) on submarginal area of segment V. Perivulvar pores lacking; paravulvar scleroses well developed. Serrate squamations (fig. k) surrounding paravulvar scleroses. Conical setae (fig. l) in a submarginal row; 2 pairs laterad of paravulvar scleroses and one pair anterior to vulva.

Recognition characteristics

The unusually large and nail-shaped intersegmental scleroses; absence of L2, L3 and L4; submarginal band of microducts on the dorsal surface and the small plates makes this species distinct.

Notes

This polyphagous species is found in many countries in the subtropical and tropical regions of the world. This is a new addition to the Venezuelan coccid-fauna.

Genus Furcaspis Lindinger

Type of the genus: Aspidiotus biformis Cockerell, 1893.


Description of the genus

Referable to the tribe Aspidiotini, with one-barred ducts, fringed plates; second pygidial lobe not bilobed; three pairs of well developed lobes; dorsal microducts extremely slender, plates of a peculiar type, chelate, with intersegmental scleroses.
**Furcaspis biformis** (Cockerell)

Plate 20


Material studied


Scale of female

Reddish-brown, circular, exuviae central or subcentra; about 1 mm in diameter.
Plate 20. - Furcaspis biformis (Cockerell)
Adult female

Body turbinate (fig. a), 1005 (841 to 1167) long, 757 (605 to 915) wide; Derm at maturity membranous except for the pygidium.

Prosoma

Dorsum: Row of numerous microducts, 20 long, in submarginal area (fig. b); 8 to 10 marginal setae, 58 long.

Ventrum: Antenna (fig. c) as a sclerotized tubercle with 4 setae, each about 20 long. Clypeolabral shield 187 (180 to 196) long, and 122 (117 to 129) wide; numerous seta on the head, these of two sizes, marginal 58 long, submarginal 30 long. Anterior spiracle (fig. d) with approximately 12 (8 to 18), associated trilocular pores (fig. e). Posterior spiracle same size and shape but without associated pores. About 20 to 25 gland tubercles (fig. f) in a submarginal, elongate cluster, in the area between the spiracles. Two parallel rows of conical setae (fig. g) extending posteriorly from prothorax toward abdomen.

Propygidial segments of abdomen (fig. h)

Dorsum: Segments I to IV with a row of 5 or 6 marginal microducts, 35 long, and with one seta on the margin, about 35 long.

Pygidium

Dorsum: Median lobes (fig. i) well developed; straight, rounded at the apex, and about 16 wide. L₂ and L₃ about the same size and shape; L₄ appears as a prominent tooth-like sclerotization, and beyond this the margin shows two more of these projecting sclerotizations. Three pairs of paraphyses present, one at the base of each
interlobular space; between each of these, 2 or 3 openings of microducts. A discontinuous row of microducts along the submargin; the rest of the dorsum of the pygidium is sclerotized with 3 well defined rows of slender microducts, and about 90 long; opening of the microducts surrounded by a sclerotized area. Anal opening circular, 16 in diameter, placed about 6 times this diameter from the base of \( L_1 \). Area around the anal opening more sclerotized than the rest of the pygidium.

**Ventrum:** Plates on the interlobular space of a very particular type (fig. j) described by Ferris (1938) as chelate; 2 between the median lobes; 2 between \( L_1-L_2 \); 3 between \( L_2-L_3 \) and a slightly large one at the base of \( L_4 \); few microducts in a row along the submargin. Quinquelocular (fig. k) perivulvar pores in 4 groups, formula 4-6,(2-3),0. Paravulvar scleroses weakly sclerotized. Conical setae 5 pairs lateral of the perivulvar pores; and 3 pairs posterior to vulva.

Illustration based on material from *Cattexa gaskeliana*, El Limon, Aragua, Venezuela.

**Recognition characteristics**

The chelate plates, 3 pairs of well developed lobes and the very slender microducts, makes this species distinct.

**Notes**

*F. biformis* seems to be limited to Orchidaceae and Amaryllidaceae; distribution is restricted to the neo-tropical region with the exception of some records from Hawaii as introduction from the American continent.
Genus Hemiberlesia Cockerell

Type of the genus: Aspidiotus rapax Comstock, 1881.


Description of the genus

Referable to the tribe Aspidotini, one-barred ducts. Body circular or subcircular; median lobes well developed and close together; \( L_1 \) and \( L_2 \) reduced to sclerotized points on the margin; plates elongated, fimbriated, except the ones beyond \( L_3 \); anal opening circular, conspicuously large; 4 paraphyses present; pygidial dorsal ducts few, long and slender, no definitive furrows formed.

Key to species of Hemiberlesia

Perivulvar pores present; anal apophyses present. lataniae (Signoret)
Perivulvar pores absent; anal apophyses absent... rapax (Comstock)

Hemiberlesia lataniae (Signoret)

Plate 21.


Material studied


Scale of the female

Grayish, circular, convex, exuviae submarginal.

Adult female

Body subcircular (fig. a); 1140 (974 to 1181) long, 889 (827 to 1107) wide; Derm at maturity membranous except for the pygidium.

Prosoma

Dorsum: Several marginal and submarginal setae (fig. b); 2 microducts (fig. c) submarginally on metathorax.

Ventrum: Antenna (fig. d) as a sclerotized tubercle with one seta about 31 long. Clypeolabral shield 175 long and 117 wide. Anterior and posterior spiracle (fig. e) similar, without associated pores or ducts. Margin between the spiracle with a small invagination bearing a short thoracic spine (fig. f).

Prepygidial segments of abdomen

Dorsum: Segments I to IV with 2 submarginal microducts (fig. c) each. Segments II and III (fig. g) with 2 or 3 microducts submedially.

Ventrum: Segments I to IV with 2 or 3 submarginal microducts and 1
submedially.

Pygidium

Dorsum: Median lobes (fig. h) large and prominent, about 20 wide, notched on outer angle; \( L_2 \) and \( L_3 \) reduced to non-sclerotized points on the margin. Paraphyses moderately developed, 2 in each interlobular space. Microducts 55 long, located 1 between median lobes, 2 in the first interlobular space, 5 in a furrow arising from the second interlobular space and 8 to 12 on segment V. Anal opening circular, conspicuously large, 20 in diameter; placed about \( 1 \) \( \frac{1}{2} \) times this diameter from the base of \( L_1 \); located posterior to vulva on the venter. Anal apophyses well developed, area between these sclerotized.

Ventrum: Plates in the interlobular spaces fimbriated, 2 between median lobes; 2 between \( L_1 \)-\( L_2 \); 3 between \( L_2 \)-\( L_3 \) and 2 to 4 non-fimbriated beyond \( L_3 \). Clusters of microducts (fig. i) submarginally on segments VI and V. Conical setae (fig. j) 3 pairs submarginally, 3 laterad of perivulvar pores and a pair anterior to vulva. Quinquelocular perivulvar pores (fig. k) in 4 groups, formula 2-4(3-4),0. Paravulvar scleroses well developed. Several rows of serrate squatious (fig. l) anterior to vulva.

Illustration based on material from \textit{Helia azederach}, Heliaceae, Maracay, Aragua, Venezuela.

Recognition characteristics

The reduced \( L_2 \) and \( L_3 \), prominent \( L_1 \), large anal opening, presence of 4 pairs of paraphyses, well developed anal apophyses and 4 groups
of perivulvar pores, makes this species distinct.

Notes

This cosmopolitan species is found on a lye variety of hosts, especially on Palmae, Leguminosae and Rosaceae.

**Hemiberlesia rapax** (Comstock)

**Plate 22**


**Material studied**

Two females on orchids, Venezuela (Quarantine), 28-X-36 (USDA).

**Scale of the female**

Not seen; described by Ferris, 1938, as "Gray, circular, highly convex, exuviae submarginal".

**Adult female**

Body subcircular (fig. a), 915 long, 738 wide; derrn at maturity membranous.
Prosoma

Dorsum: Several marginal and submarginal setae; scattered microducts (fig. b) along the submarg in of the thorax.

Ventr um: Antenna (fig. c) as a sclerotized tubercle with one seta about 23 long. Clypeolabral shield 183 long and 117 wide; anterior spiracle (fig. d) with 1 associated microduct; posterior spiracle same size and shape as anterior spiracle but without associated microduct. Submarginal band of microducts (fig. e) from the head to the prepygidial segments. Margin between the spiracles with a small invagination bearing a short fimbriated thoracic spine (fig. f).

Prepygidial segments of abdomen

Dorsum: Segments I to IV with a row of submarginal microducts and marginal setae.

Ventr um: Segments I, III and IV with a small cluster of microducts submarginally.

Pygidium (fig. g)

Dorsum: Median lobes (fig. h) large and prominent, about 16 wide; L₂ and L₃ reduced to non-sclerotized points on the margin. Paraphyses moderately developed, 2 in each interlobular space, except median. Microducts long, located 2 between the paraphyses of first interlobular space, 1 between second pair of paraphyses, and 5 more pairs on the submarginal area of the pygidium. Anal opening circular, conspicuously large, 23 in diameter; placed about 1 1/2 times this diameter from the base of L₁; located posterior to vulva on the venter. Area anterior and posterior to the anal opening more
sclerotized than the rest of the pygidium. Anal apophyses absent.

**Ventrum:** Plates in the interlobular spaces fimbriated, 2 between median lobes; 2 between \( L_1 - L_2 \); 3 between \( L_2 - L_3 \) and 3 to 5 non-fimbriated beyond \( L_3 \). Cluster of microducts (fig. j) submarginally on segments VI and V. Paravulvar scleroses well developed. Conical setae (fig. i) 3 pairs submarginal, 3 laterad of paravulvar scleroses and a pair anterior to vulva. Several rows of serrate squamations (fig. k) anterior to vulva.

Illustration based on material from orchids, Orchidaceae, Venezuela (Quarantine).

**Recognition characteristics**

The relatively large anal opening, weakly developed \( L_1 \) and \( L_2 \), fringed plates, large median lobes, few microducts dorsally on the pygidium, absence of anal apophyses and perivulvar pores makes this species distinct.

**Notes**

This cosmopolitan and extremely polyphagous species is a new addition to the Venezuelan coccid-fauna.

**Genus Melanaspis Cockerell**

Type of the genus: *Aspidiotus obscurus* Comstock, 1881.

Description of the genus

Referable to the tribe Aspidiotini, one-barred ducts, L₂ not bilobed; body form oval or curcular; apex of pygidium forming an obtuse angle; 4 pair of lobes; paraphyses well developed; 3 in the interlobular space between L₂-L₃. Dorsal pygidial ducts few, very long and slender. Plates minute, slightly fringed, or not at all, bearing the orifices of microducts, present only in the interlobular spaces. Margin usually crenulated and bearing a series of minute microducts. Dorsum of pygidium with a defined pattern of sclerotization: a median area which extends across between the members of the second pair of lobes and forward into the pygidium; a pair of small areas which arises from the base of L₄ and expands laterally for a short distance.

Key to the species of Melanaspis

1. Perivulvar pores present ................................................................. 2
   Perivulvar pores absent. ................................................................. tenax (Mackenzie)

2. Plates slightly fimbriated; dorsal microducts absent on prepygidial segments. ........................................ santensis Lepage

   Plates not fimbriated; dorsal microducts present on prepygidial segments ........................................ alinea (Newstead)

Melanaspis alinea (Newstead)

Plate 23

Aspidiotus alineus Newstead, 1901:81. Chrysoomphalus alineus Hernald, 1903:286; MacGillivray, 1921:413. Pseudischnaspis alineus Houser,

**Material studied**

On *Cattleya* sp. Orchidaceae, Venezuela (Quarantine) (USNM) 8 females. Orchids, Orchidaceae, Venezuela (Quarantine) (USNM) 8 slides with 12 females.

**Scale of female**

Not seen, described by Ferris (1941), as "brown, circular, flat; exuviae central and black."

**Adult female**

Body oval (fig. a); 1388 (866 to 1731) long, 1024 (812 to 1240) wide; Derm at maturity membranous except for the pygidium which is as described for the genus.

**Prosona**

**Dorsum:** With a pair of dorsal bosses (fig. b) on the head. Submarginal row of 3 microducts (fig. c) on the pro and mesothorax. Submarginal cluster of microducts on the metathorax. Several submarginal setae on the head.

**Ventrum:** Antenna (fig. d) as a sclerotized tubercle with 1 lateral seta about 23 long, and a terminal pit with 2 short setae. Several setae around the antennae and submarginally on the head. Clypeolabral shield 195 long and 117 wide. Anterior and posterior spiracles (fig. e) similar, surrounded by stippled sclerotization and without associated pores or ducts. Area between the posterior spiracle and
the margin with 4 microducts (fig. f).

**Prepygidial segments of abdomen**

**Dorsum:** Segments I and II with submarginal clusters of 5 or 6 microducts (fig. c); Segment III with a pair of dorsal bosses submarginally.

**Ventrum:** Segments I to IV with submarginal clusters of 3 to 6 microducts (fig. f).

**Pygidium** (fig. g)

**Dorsum:** Median lobes (fig. h) well developed notched on the outer side, 8 wide; L₂ similar to L₁; L₃ broader than L₂ and minutely serrate, L₄ similar to L₃; margin beyond L₄ sclerotized with tooth-like projections. Paraphyses present, strongly developed and arranged as follows: median lobes with a small paraphysis arising from the mesal angle; first interlobular space with a long paraphysis arising from the outer angle of L₁ and a smaller one from the mesal angle of L₂; second interlobular space with a short paraphysis arising from the outer angle of L₂, followed by a very long paraphysis and a short one from the mesal angle of L₃. Thrid interlobular space with a long paraphysis arising from the outer angle of L₃, from the mesal angle of L₄ arise a very short paraphysis; beyond L₄ several but small paraphyses-like sclerotization present.

Dorsal microducts slender, about 136 long numbering about 30 pairs; 2 microducts arise from between the bases of paraphyses in the first interlobular space; 4 between the paraphyses of second interlobular space; 5 between the paraphyses of third interlobular
space; 4 between the paraphyses-like sclerotizations beyond $L_4$; a submarginal row of microducts on segment $V$; a submedian row of 3 to 5 microducts on segments $VI$ and $VII$. Anal opening circular, 20 in diameter; placed about 6 times its diameter from the base of $L_1$; located posterior to vulva on the venter. Area around the anal opening sclerotized.

Ventrum: Plates (fig. i) never longer than the lobes, non-fimbriated, and bearing apical pores leading into long microducts; 2 between median lobes, 2 between $L_1-L_2$, 2 between $L_2-L_3$, 3 between $L_3-L_4$ and 3 beyond $L_4$. Submarginal clusters of 6 microducts on segments $VI$ and $V$. Conical setae (fig. j) 3 pairs submarginally, 2 laterad of perivulvar pores, 1 anterior to vulva and 2 posterior. Quinquelocular perivulvar pores (fig. k) in 4 groups, formula 4-7,(5-9),0.

Illustration based on material from Cattleya sp., Orchidaceae, Venezuela (Quarantine).

Recognition characteristics

The 3 paraphyses in second interlobular space, 4 pairs of lobes, plates minute and nonfringed, dorsal microducts on the prepygidial segments and presence of 4 groups of peri-vulvar pores makes this species distinct.

Notes

This species is restricted to orchids and has been reported from Mexico to Panama, the Antilles and Florida, this new addition to the Venezuelan coccid-fauna extends its range into northern South America.
Melanaspis santensis Lepage

Plate 24


Material studied


Scale of the female

Black, circular, flat; exuviae central and black.

Adult female

Body subcircular (fig. a), 619 (531 to 768) long, 557 (472 to 738) wide. Derm at maturity slightly sclerotized especially toward the margin; pygidium as described for the genus.

Prosoma

Dorsum: Marginal area somewhat crenulated and with stippled sclerotization (fig. b).

Ventrum: Antenna (fig. c) as a sclerotized tubercle, with 1 lateral seta about 24 long and a terminal pit with 2 short setae. A cluster of setae (fig. d) submarginal at the same level of the antennae, 4 or 5 more in a row submarginally on the head. Clypeolabral shield 187 long, 115 wide. Anterior spiracle (fig. e) without associated pores or microducts, a row of 4 microducts between the atrium and the margin; posterior spiracle same size and shape as anterior spiracle. Row of microducts (fig. f) submarginally from the area of the spiracle to the abdomen.

Prepygidial segments of abdomen
Plate 24. - Melanaspis santensis Lepage
**Dorsum**: Each segment with a marginal seta and more sclerotized than the prosoma.

**Ventrum**: Segments I to IV with 4 or 5 submarginal microducts (fig. f) and a submarginal pair of conical setae (fig. g).

**Pygidium** (fig. h)

**Dorsum**: Median lobes (fig. i) well developed notched on the outer side, 8 wide; L₂ similar to L₁; L₃ broader than L₂ and double notched on the outer margin; L₄ weakly developed and minutely serrate, margin beyond L₄ sclerotized and serrate. Paraphyses present, strongly developed and arranged as follows: median lobes with a small paraphysis arising from the mesal angle; first interlobular space with a very long paraphysis, club-shaped, arising from the outer angle of L₁ and a short one from the mesal angle of L₂; second interlobular space with a medium size paraphysis arising from the outer angle of L₂, followed by a very long paraphysis in the middle and a short one from the mesal angle of L₃. Third interlobular space with a medium size paraphysis arising from the outer angle of L₃. Beyond L₄ several small paraphysis-like sclerotizations present.

Dorsal microducts slender, about 1/40 long numbering about 20 pairs; 2 microducts arise between the base of paraphyses on the first interlobular space, 3 between the paraphyses of second interlobular space; area between the paraphyses-like scleroses beyond L₄ with 10 openings of microducts, about long. Submedian rows of 4 to 6 microducts on segments V to VII. Anal opening oval, 12 in diameter; placed about 7 times this diameter from the base of L₁; located
posterior to vulva on the venter. Anal apophysis present, area around the anal opening sclerotized.

**Ventrum:** Plates longer than the lobes, slightly fimbriated, and bearing apical pores leading into a long microduct; 2 between median lobes; 2 between L₁-L₂ with a tooth-like formation close to the apice and fused at the base (fig. j); 3 between L₂-L₃ being the first trifurcate (fig. k) and the others non-fimbriated; 3 between L₃-L₄ similar to the preceeding group; 3 non-fimbriated beyond L₄. Submarginal microducts, 2 on segment VI and 7 on segment VII. Conical setae (fig. g) 3 pairs submarginally, 3 pairs laterad of perivulvar pores, 1 pair anterior to vulva and 1 pair posteriorly. Quinquelocular perivulvar pores in 4 groups, formula 2-3,(3-4),0. Area anterior to vulva and lateral to perivulvar pores with several rows of weakly sclerotized serrate squamations (fig. 1).

Illustration based on material from *Harmeea americana*, Caracas, D. F., Venezuela.

**Recognition characteristics**

The 3 paraphyses in second interlobular space, 4 pairs of lobes, plates slightly fimbriated, absence of dorsal microducts on the prepygidial segments, presence of 4 groups of perivulvar pores and the margin being somewhat crenulate, makes this species distinct.

**Notes**

This species was previously known from Brasil only; this new addition to the Venezuelan coccid-fauna extends the range of the
species to northern South America.

*Melanaspis tenax* McKenzie

Plate 25


**Material studied**

On orchid, Orchidaceae, Venezuela (Quarantine), 2–XI–49.

**Scale of the female**

Not seen, described by McKenzie (1944), as "chocolate brown, circular, with exuviae subcentral."

**Adult female**

Body subcircular (fig. a); 763 long, 753 wide; derm of prosoma membranous, pygidiom as described for the genus.

**Prosoma**

**Dorsum:** Band of microducts submarginally extending from the head to the abdomen. A pair of dorsal bosses submarginally on the head.

**Venter:** Antenna (fig. c) a sclerotized tubercle, with 1 lateral seta about 27 long. Band of microducts (fig. d) submarginally extending from the head to the abdomen. Clypeolabral shield 242 long and 156 wide. Anterior spiracle (fig. e) with an associated sclerotic spot anteriorly; area between the spiracles and clypeolabral shield with numerous microducts (fig. f) and several rows of serrate squamations. Two parallel bands of microducts are extending from the spiracle to the margin. Posterior spiracle similar to the anterior but without associated scleroses and with
only 1 band of microducts from this to margin.

Prepygidial segments of abdomen

Dorsum: Segment I with 2 pairs of submarginal microducts; segment II with 2 pairs of submarginal microducts and 1 pair of dorsal bosses; segments III and IV without microducts, the submarginal area more sclerotized than the rest of the segment.

Ventrum: Segments I to IV with submarginal clusters of 4 or 5 microducts and several scattered microducts submedially.

Pygidium (fig. g)

Dorsum: Median lobes (fig. h) well developed notched on outer side, L 2 wide; L 3 same size of L 1 and double notched on the outer side; L 3 broader than L 2 and minutely serrate; L 4 similar to L 3 ; margin beyond L 4 sclerotized and minutely serrate. Paraphyses present, strongly developed and arranged as follows: median lobes with a strong paraphysis arising from the mesal angle; first interlobular space with a long, strong and club-shaped paraphysis arising from the outer angle of L 1 and a short and slender from the mesal angle of L 2 ; second interlobular space with a small paraphysis arising from the outer angle of L 2 , followed by a long paraphysis and a medium-sized one from the mesal angle of L 3 ; third interlobular space with 2 short and 2 medium-size paraphyses and a medium-size one arising from the mesal angle of L 4 ; beyond L 4 3 small paraphyses present. Dorsal microducts slender, about 46 long, numbering about 15 pairs; 1 opening between the paraphyses on the first interlobular space; 2 between the paraphyses of second interlobular space; 4 between the
paraphyses of the third interlobular space; 3 between the paraphyses beyond $L_4$. Submedian rows of 3 microducts on segments V and VI. Anal opening oval, 12 in diameter; placed about 5 times this diameter from the base of $L_1$; located posterior to vulva on the venter.

**Ventral**: Plates same length of the lobes, with a tooth-like formation laterally, and bearing apical pores leading into a short microduct; 2 between median lobes; 2 between $L_1-L_2$; 2 between $L_2-L_3$; 3 between $L_3-L_4$. Clusters of 4 to 6 microducts submarginally on segments V and VI, 2 pair submedially on segment V. Conical setae (fig. j), 3 pairs submarginally and 5 pairs lateral to vulva. Perivulvar pores absent. Numerous rows of well developed squamosae plates (fig. k) on each side of vulva.

Illustration based on material from orchid, Orchidaceae, Venezuela (Quarantine).

**Recognition characteristics**

The 3 paraphyses in second interlobular space, 4 pair of lobes, plates non-fimbriated and with a lateral tooth-like formation, absence of perivulvar pores, and the numerous microducts submarginally on both sides of the prosoma make this species distinct.

**Notes**

This species seems to be restricted to orchids and has been previously known from Colombia and Guatemala. It is a new addition to the Venezuelan coccid-fauna.
Genus *Mycetaspis* Cockerell

Type of the genus: *Aspidiotus personatus* Comstock 1883.


**Description of the genus**

Referable to the tribe Aspidiotini, one-barred ducts, fringed plates and \( L_2 \) not bilobed; body form circular with the cephalic region produced into a broad lobe-like structure, which at maturity is heavily sclerotized; 4 pairs of pygidial lobes; conspicuous paraphyses in the interlobular spaces; no pores associated with spiracles; margin of the ventral surface of the abdomen sculptured.

**Key to the species of *Mycetaspis***

Each median lobe with an elongate sclerosis,

extending entirely across the base of the lobe; no microducts around the mouthparts... *personata* (Comstock)

Median lobes with the basal sclerosis arising from the mesal angle; ocular spot absent;

large number of microducts around the mouthparts... *defectopalus* Ferris

*Mycetaspis defectopalus* Ferris

Plate 26

*Mycetaspis defectopalus* Ferris, 1941:369; Merrill, 1953:62; Borchsenius, 1966:357.
Plate 26. - Mycetaspis defectopalus Ferris
Material studied

On unidentified tree, Parque del Este, Caracas, 20-VIII-69 (AD).

Scale of female

Black or dark brown, circular, hemispherical, exuviae central.

Adult female

Body somewhat circular (fig. a), 945 (842 to 1004) long, 892 (753 to 1019) wide; derm at maturity membranous; cephalic process prominent, moderately acute, without setae.

Prosoma

Ventrum: Antenna (fig. b) a sclerotized tubercle with one seta about 20 long. Rows of numerous setae (fig. c) across the venter on the area between the mouthparts and cephalic process. Clypeolabral shield 199 long, 137 wide; band of micropores (fig. e) from the mouthparts diagonally toward the margin. Anterior spiracle (fig. d) without associated pores, but there is a sclerotized protuberance laterad of the basal scleroses; posterior spiracle same size and shape. Area between the spiracles with numerous microducts (fig. f).

Prepygidial segments of abdomen

Dorsum: Derm with a pattern of sclerotization which gives the appearance of plates.

Ventrum: Margin crenulated with numerous microducts about long. These crenulations extend from the area opposite to the spiracles to L₄.
**Pygidium** (fig. h)

**Dorsum:** Median lobes (fig. i) well developed in most, rounded at the apex; about 16 wide; L₂ slightly smaller than L₁ with a notch on lateral margin; L₃ and L₄ are shorter and broader. Paraphyses arranged as follows: median lobes with small paraphysis arising from the mesal angle of first interlobular space, with a long stout paraphysis from the outer angle of L₁, followed by a shorter one arising from the mesal angle of L₂; second interlobular space with short paraphysis arising from outer angle of L₂; followed by a long and stout and a shorter one arising from the mesal angle of L₃; third interlobular space with 2 small paraphyses; beyond L₄ there are some small and inconspicuous scleroses set at some distance from the lobe; between the paraphyses there are always 1 or 2 openings of microducts of about 117 long; a row of microducts submarginally. Anal opening oval, 12 in diameter, placed about 10 times this diameter from the base of L₁; located posterior to the vulva on the venter.

**Ventrum:** Plates short and bifid, 2 in each interlobular space; submarginal area heavily sclerotized; perivulvar pores and paravulvar scleroses lacking. Conical setae, in a submarginal row, and 2 pairs laterad of the vulva, one pair anterior and 2 pairs posteriorly.

Illustration based on material from an unidentified tree, Caracas, Venezuela.

**Recognition characteristics**
The cephalic process, numerous microducts around the mouth-parts and plate-like sclerotizations on the derrm of dorsum makes this species distinct.

Notes

This species was previously known only from U.S.A. and Panama, this new addition to the Venezuelan coccid-fauna extends the range of the species into South America.

Mycetaspis personata (Comstock)

Plate 27


Material studied

Three females on palm leaves, Venezuela (Quarantine), 14-VI-55 (USNM).

Scale of female

Not seen, described by Ferris, 1941, as "black, almost hemispherical with the exuviae central."

Adult female

Body almost circular (fig. a); 428 (384 to 472) long, 398 (354 to 443) wide; derrm at maturity membranous except for the pygidium;
Plate 27. - Mycetaspis personata (Comstock)
cephalic process (fig. b) heavily sclerotized, low, almost rectangular with 8 conical setae (fig. c) on the ventral surface.

**Prosome**

**Ventral:** Antenna (fig. d) as a sclerotized tubercle with one seta about 27 long. Eye spot marginal, sclerotized and surrounded by numerous conical setae (fig. c). Clypeolabral shield 144 long, 101 wide. Anterior and posterior spiracle (fig. e) similar, without associated pores. From the area of the posterior spiracle to the segment V of abdomen a band of submarginal microducts on a crenulated area (fig. f).

**Pygidium** (fig. g)

**Dorsum:** Median lobes (fig. h) well developed, rounded at the apex; about 8 wide; L2 smaller than L1 and with a lateral notch; L3 and L4 broad, low and notched; a large broad tooth just beyond L4; paraphyses arranged as follows: median lobes each with a broad paraphysis; first interlobular space with one long and slender paraphysis accompanied by a smaller one; second interlobular space with a large paraphysis accompanied by 2 short ones arising from L3; third interlobular space with 2 small paraphyses; 3 arising from L4; beyond L4 a series of short paraphyses along the margin. Openings of marginal microducts (fig. i) between the paraphyses; a row of microducts submarginally; anal opening oval, 12 in diameter, placed about 4 times this diameter from the base of L1; located posterior to the vulva on the venter; anal paraphyses present.

**Ventral:** Plates short and bifid, 2 in each interlobular space, except
the third, this with 3 plates. Submarginal area heavily sclerotized; perivulvar pores and paravulvar scleroses lacking; conical setae in a submarginal row, and 5 or 6 more pairs scattered later of vulva.

Illustration based on material from palm leaves, Venezuela (Quarantine).

**Recognition characteristics**

The cephalic process with short conical setae; paraphyses of the median lobes; eye spot surrounded by conical setae and the submarginal row of microducts on the abdomen makes this species distinct.

**Notes**

This polyphagous species is known from many countries in the tropical and subtropical regions of the world. It is a new addition to the Venezuelan coccid-fauna.

**Palinaspis Ferris**

Type of the genus: *Taphionia quohogiformis* Merrill, 1923.


**Description of the genus**

Referable to the tribe Aspidiotini, one-barred ducts, without gland spines. Body fusiform with the prosoma well developed. Median lobes well developed, \( L_2 \) represented by scleroses on the margin, anal opening close to the apex of the pygidium and posterior to vulva; ventral scleroses extending from \( L_1 \), and almost reaching the paravulvar scleroses. Plates beyond \( L_2 \) only. Perivulvar pores
absent.

**Falinaspis barbata** Ferris

**Plate 28**


**Material studied**

Two females on unidentified host, Venezuela (Quarantine), April 1946 (USNM).

**Scale of the female**

Not seen; described by Ferris, (1942) as "more or less circular, white in color, the wax of slightly granular texture, exuviae central."

**Adult female**

Body fusiform (fig. a), 1080 (842 to 1240) long, 716 (620 to 812) wide. Derm at maturity sclerotized. Margins of the body sculptured.

**Prosoma**

**Dorsum:** A pair of dorsal bosses (fig. b) submarginal on the head.

**Ventrum:** Antenna (fig. c) sclerotized tubercle with one seta, 24 long. Eight to 10 submarginal setae each about 12 long. Clypeolabral shield 174 long and 125 wide. Two pairs of short microducts, between the antennae and the clypeolabral shield. Anterior spiracle (fig. d) with no associated pores but surrounded by a stippled sclerotization with 3 associated microducts (fig. e). Posterior spiracle same shape and size with only 1 associated microduct. Row of microducts in submarginal area.
Plate 28. - Palinaspis barbata Ferris
Prepygidial segments of abdomen (figs. a & f)

Dorsum: Segments I to IV with a marginal seta. Segments I and III with a pair of submarginal bosses (fig. b).

Ventrum: Segments I to IV with 2 pairs of marginal microducts each about 27 long; 2 pairs of small microducts, about 12 long, submarginally; and one small microduct and one conical spine submedially.

Pygidium

Dorsum: Median lobes (fig. g) short, fused at the base but separated apically, outer margin with a notch; L₂ is reduced to small sclerotized area on the margin; L₃ and L₄ absent. Marginal setae of segments VIII and VII about 20 long; of segment VI about 40 long and V about 50 long. Two short paraphyses 2 or 3 openings of microducts are present. Submarginal row of 3 long microducts, in segment V; row of long microducts extends from the paraphyses to the dorsal scar. Anal opening circular, 20 in diameter, placed about twice its diameter from the base of L₁, posterior to vulva on the venter.

Ventrum: Marginal setae of segments VII, VI and V approximately the same size as those on the dorsal side. Plates only beyond L₂; one long and forked at the apex located close to L₂; segment VI with a basally broad and three-branched plate. Cluster of marginal microducts (fig. h) on segment V. Three small microducts submarginally. Ventral scleroses are plate-like broad and extending toward the parvulvar scleroses which is well developed and continuous.

Conical setae (fig. i) 3 pairs anterior to the ventral scar, 2 pairs
between the paravulvar scleroses and ventral scar and 1 pair anterior to the vulva.

Illustration based on material from an unidentified host, Venezuela (Quarantine).

**Recognition characteristics**

The peculiar plates and fused median lobes makes this species distinct.

**Notes**

This species was described from Panama in 1938. This seems to be the second time that it has been recorded; it is a new addition to the Venezuelan coccid-fauna.

**Genus Pseudoonidia Cockerell**

Type of the genus: *Aspidiotus duplex* Cockerell, 1896.


**Description of the genus**

Referable to the tribe Aspidiotini, one barred ducts and plates present, second pygidal lobe not bilobed. Adult female with a strong constriction on the prosoma. Derm on the dorsum sclerotized except for few membranous areas. Quinquelocular pores associated with the anterior spiracle. Pygidium with 4 pairs of well developed lobes. Dorsal derm with a large reticulated area. Perivulvar pores present.
Pseudonidia trilobitiformis (Green)

Plate 29


Material studied

Plate 29. - Pseudoonidia trilobitiformis (Green)

Scale of the female

Brown, semi-circular or irregular, flat, exuviae central or subcentral.

Adult female

Body tubinate (fig. a); 1268 (1063 to 1344) long, 865 (709 to 960) wide. Derm at maturity sclerotized especially on the dorsum with the exception of some membranous areas on the prosoma (fig. b).

Prosoma

Ventrum: Antennae (fig. c) as a small sclerotized tubercle with one seta about 20 long, clypeolabral shield 236 (203 to 273) long and 125 (117 to 136) wide. Anterior spiracle (fig. d) with approximately 13 (12 to 15) associated quinquelocular pores (fig. e) and four microducts (fig. f). Posterior spiracle same size and shape but without associated pores and with only one microduct.

Prepygidial segments of abdomen (fig. g)

Dorsum: All the segments with a large submarginal cluster of microducts about 35 long, and 2 marginal setae.

Ventrum: Segments I and II with a submarginal row of slender microducts about 25 long and a submedian row of 4. Segments III and IV
with 2 submarginal rows of slender microducts. Serrate squama-
tions (fig. h) on a medial row.

**Pygidium**

**Dorsum:** Median lobes (fig. i) well developed, straight, with two small notches at the apex, and about 12 wide. L₂, L₃ and L₄ about the same size and shape. Pygidial setae one the base of each lobe about 20 long. Paraphyses short, all about same length, located one pair between L₁-L₂ and L₂-L₃ and one pair at the base of L₄; opening of a microduct between each pair of paraphyses. Rows of microducts, each about 82 long, from the margin toward the middle of the pygidium; large cluster of microducts on segment V. Anal opening circular, 16 in diameter, placed about 6 times its diameter from the base of L₁, area around the anal opening is slightly more sclerotized; located posterior to the vulva on the venter. A large reticulated area anterior to the anal opening which makes this genus characteristic.

**Venter:** Plates in the interlobular spaces bifurcate. Two between the median lobes; 2 between L₁-L₂; 3 between L₂-L₃ and 3 between L₃-L₄; at the base of each of these plates is the opening of a slender and long microduct, 70 in length. A V-shaped row of slender microducts in segment V. Conical setae (fig. j) 8 pairs submarginally, 2 pairs anterior to vulva and posteriorly. Four groups of quinquelocular perivulvar pores (fig. k) formula, 13-15,(22-27),0. Paravulvar scleroses weakly sclerotized. Rows of serrate squamations anterior of the large groups of perivulvar pores.

Illustration based on material from *Anacardium occidentalis,* &l
Limon, Aragua, Venezuela.

Recognition characteristics

The large reticulated area on the pygidium, 4 pairs of well developed lobes, numerous microducts on the dorsum and the quinquilocular pores associated with the anterior spiracle make this species distinct.

Notes

This polyphagous species is known from many countries on the tropical areas of the world. It is a new addition for the Venezuelan coccid-fauna.

Genus *Selenaspidus* Cockerell

Type of the genus: *Aspidiotus articulatus* Morgan 1889.


Description of the genus

Referable to the tribe Aspidotini, with one-barred ducts, fringed plates, L₂ not bilobed; median lobes non-zygotic; L₂ and L₃ well developed. Strong constriction between meso and metathorax. No pores associated with the spiracles; anal opening posterior to the vulva.

*Selenaspidus articulatus* (Morgan)

Plate 30
Aspidiotus articulatus Morgan, 1889:352; Hewstead, 1901:127.

Aspidiotus (Selenaspis) articulatus Cockerell, 1897:14;
Hempel 1900:499. Selenaspis articulatus Fernald, 1903:284;
Ferris, 1938:STI-265; Ballou, 1945:96; Lamot, 1958:370. Borch-

Aspidiotus rufescens Lindiger 1932:204.

Material studied

On Archras zapota, Sapotaceae, Palo Negro, 4-VII-68 (AD & SC).
Allamanda cathartica, Apocynaceae, Las Delicias, 20-VI-68 (AD & SC).
Anacardium occidentale, Anacardiaceae, El Limon, 22-V-68 (AD & SC);
Turmerito, D. F., 5-12-38 (CHB) IZA & CIA). Annona muricata,
Annonaceae, El Limon, 8-VI-68 (AD & SC). Caneilla japonica,
Theaceae, Caracas, 18-V-43 (CHB) (CIA); Palo Negro, 4-VII-68 (AD &
SC). Canna generalis, Cannaceae, Maracay, 3-IV-67 (CJR). Cassia
siamea, Leguminosae, El Limon, 19-XII-68 (FFY); Maracay, 22-IV-69
(JT). Cedrella fissilis, Heliaceae, Maracay, 3-IV-67 (CJR).
Chrysocidocarpus lutescens, Palmae, Cumana, Sucre, 25-V-43 (CHB)
(CIA). Chrysobalanus icaco, Rosaceae, Las Delicias, 20-VI-68
(AD & SC). Citrus aurantium, Rutaceae, El Limon, 15-V-58 (FFY);
22-V-68 (AD & SC). Citrus grandis, Rutaceae, El Limon, 16-V-68
(FFY). Citrus reticulatus, Rutaceae, El Limon, 22-V-63 (AD & SC).
Coffea arabica, Rubiaceae, Borburata, Carabobo, 3-IX-68 (Requena);
Guatire, Miranda, 18-VI-42 (Ponte) (IZA & CIA). Cocos nucifera,
Palmae, El Limon, 8-VI-68 (AD & SC). Cycos cincinnalis, Cycadaceae,
Maracay, 19-I-62 (CJR). Diospyros kaki, Ebenaceae, Palo Negro,


*Mangifera indica*, Anacardiaceae, Palo Negro, 4-VII-68 (AD & SC).


**Scale of the female**

Circular, flat, exuviae central, white with the exuviae yellowish.

**Adult female**

Body with a very deep constriction between the meso and metasthorax (fig. a) 1357 (1211 to 1477) long and 1270 (1078 to 1383) wide; dorsum at maturity heavily sclerotized specially on the dorsal surface.
**Proscia**

**Dorsum:** Margin sculptured with an irregular row of microducts (fig. b); thoracic tubercle, small and conical (fig. c).

**Ventral:** Antenna (fig. d) as a sclerotized tubercle with a single seta about 16 long; clypeolabral shield 246 long and 145 wide.

Anterior and posterior spiracles (fig. e) without associated pores.

**Prepygidial segments of abdomen**

**Dorsum:** Scattered marginal microducts (fig. f) throughout the 4 segments.

**Ventral:** Few scattered microducts submarginally without a definitive arrangement.

**Pygidium (fig. g)**

**Dorsum:** Median lobes (fig. h) non-zygotic, well developed, about 16 wide, apex rounded; L2 smaller than L1 but about the same shape; L3 well developed, elongated, spur-like; L4 absent. Marginal microducts with opening located, between median lobes, 1 between L1-L2 and 2 between L2-L3. Microducts in a submarginal band extending forward up to the area of the anal opening. Anal opening oval, 16 in diameter, placed about 2 1/2 times its diameter from the base of L1, and posterior to the vulva on the venter; anal paraphysis well developed.

**Ventral:** Plates fringed apically 2 between the median lobes; 2 between L1-L2; 3 between L2-L3, these with broad base; 4 to 6 plates of varying shapes beyond third lobe; beyond these the pygidial margin bears few spine-like projections. Segment V with a submarginal row
of microducts (fig. 1). Two compact groups of 4 to 9 quinquelocular perivulvar pores (fig. j) in the paravulvar scleroses which are heavily sclerotized. Ventral scars well defined. Conical setae (fig. k) 2 pairs laterad of paravulvar scleroses and 3 posterior to vulva. Vulva conspicuous, broadly V-shaped. Several rows of serrate squamations (fig. l) anterior to the vulva.

Illustration based on material from *Persea americana*, El Limon, Aragua, Venezuela.

**Recognition characteristics**

The deep constriction between the meso and metathorax, conspicuous V-shaped vulva, spur-like L3, and the heavy sclerotizations on the dorsal surface makes this species distinct.

**Notes**

This polyphagous species is known to occur in most of the countries in the tropical and subtropical regions of the world.
TRIBE DIASPIDINI

Key to the genera of the tribe Diaspidini in Venezuela

1. Perivulvar pores present ........................................ 2
   Perivulvar pores absent ........................................ 11

2. Trilocular or quinquelocular pores
   associated with anterior spiracle .............................. 3
   No pores associated with anterior spiracle .................. Pseudoparlatoria

3. Pores associated with anterior spiracle
   quinquelocular .................................................. 4
   Pores associated with anterior spiracle
   trilocular ....................................................... 6

4. L₂ not bilobed; gland spines fringed and
   plate-like ....................................................... 5
   L₂ bilobed; gland spines normal ............................... Vetalaspis

5. Adult female pupillarial; cluster of
   quinquelocular pores ventrally on
   segments III and IV of abdomen .............................. Lopholeucaspis
   Adult female not pupillarial; no
   quinquelocular pores on prepygidial
   segments ....................................................... Parlatoria

6. Dorsum of pygidium with a coarse reticulation ................ Ischnaspis
   Dorsum of pygidium without trace of reticulation ........... 7

7. L₃ bilobed, about same size of L₂ ............................ 8
   L₃ absent or minute ............................................ 9
8. Body elongated; $L_4$ absent; trilocular pores associated with posterior spiracle. ....... \textit{Aulacaspis}

Body subcircular or circular; $L_4$ present; no pores associated with posterior spiracle. ................. \textit{Diaspis}

9. Median lobes zygotic; anal opening at the level of vulva. .................... 10

Median lobes non-zygotic; anal opening anterior to vulva ................. \textit{Lepidosaphes}

10. Mesal margin of median lobes very close and fused in part; no submedian rows of microducts and very few on submargin ................. \textit{Pinnaaspis}

Mesal margin of median lobes divergent; submedian and submarginal rows of microducts numerous ........ \textit{Pseudaulacaspis}

11. Paraphyses from mesal angles of median lobes club-shaped; spiracle associated pores quinquelocular; body turbinate. ........ \textit{Howardiae}

Paraphyses absent; spiracle associated pores trilocular; body elongate ............. 12

12. $L_3$ bilobulated; area between antennae smooth; gland spines on prepygidial segments ........ \textit{Unaspis}

$L_3$ absent; area between antennae with a lobe-like process; gland spines absent from prepygidial segments ........ \textit{Divcaspis}
Genus *Aulacaspis* Cockerell

Type of the genus: *Aspidiotus rosae* Bouche, 1833.


**Description of the genus**

Referable to the tribe Diaspidini, two-barred ducts; median lobes zygotic and divergent; L₂ and L₃ well developed, bilobed; body elongated, prosoma swollen and exceeding the postsoma. Dorsal ducts arranged in sharply defined rows, composed of submarginal and submedian areas.

**Key to the species of Aulacaspis**

Microduct in submedian row 1 or 2; microducts in

- submarginal row 2 or 3.
- tuberculatis Newstead

Microducts in submedian row 3 to 8; microducts in

- submarginal row 4 to 6.
- rosae (Bouche)

*Aulacaspis rosae* (Bouche)

Plate 31


*Diaspis rosae* Signoret 1869:41; Comstock 1881b:312; Lupo 1938:157.

*Aulacaspis rosae* Fernald 1903:236; Dietz and Morrison 1916:284;

Plate 31. - Aulacaspis rosae (Bouché)
Material studied


Scale of the female

White to grayish, circular, flat; exuviae subcentral.

Adult female

Body elongated (fig. a) with prosoma slightly broader than the postoma; 1129 (1078 to 1181) long; 669 (644 to 694) wide.

Derm at maturity membranous or slightly sclerotized.

Prosoma

Dorsum: Dorsal tubercle (fig. b) small sclerotized protuberance at the margin of the head; small cluster of microducts medially on the head; a row of microducts (fig. c) marginally on the meso and metathorax.

Ventrum: Antenna (fig. d) is a sclerotized tubercle, with 1 seta about 15 long; clypeolabral shield 196 long and 117 wide. Anterior spiracle (fig. e) with 20 to 21 associated trilocular pores (fig. f); posterior spiracle same size and shape, with 6 associated pores.

Preantralial segments of abdomen

Dorsum: (fig. g) Segment I with a cluster of microducts submarginally; segment II with three microducts marginally; segment III with a row of microducts marginally, a continuous row of microducts on the posterior limit of the segment that is formed by the submedian and submarginal rows, there are about 14 to 18 macroducts; on segment IV the submarginal and submedian rows are better defined and with 4 or 6
and 3 to 8 macroducts respectively, on the anterior marginal with 2 macroducts.

**Ventrum:** Segment I with 3 pairs of microducts submedially; segment II with a cluster of 5 or 6 short gland spines submarginally and 3 pairs of microducts on submarginal-submedian area; segment III with a cluster of 7 gland spines submarginally, 4 pairs of microducts at the submargin; segment IV with 3 larger gland spines marginally and a pair of microducts.

**Pygidium**

**Dorsum:** Median lobes (fig. h) well developed, zygotic, inner side slightly crenulated; about 12 wide; $L_2$ and $L_3$ bilobed; $L_4$ absent. Marginal macroducts, about 20 long, located 1 between $L_1-L_2$; 1 between $L_2-L_3$; 1 between the lobes of $L_3$; 4 beyond $L_3$ on segments VI and V; a submarginal row of microducts and a submedian row on segment V of 4 microducts each; 3 submedian microducts at the level of the anus. Anal opening circular, 12 in diameter, placed about 6 times this diameter from the base of $L_1$; located at the same level of the vulva on the venter.

**Ventrum:** Gland spines (fig. i) present 1 on segment VII, 1 on VI and 2 beyond $L_3$; cluster of 6 microducts submarginally. Quinquelocular perivulvar pores (fig. j) in 5 groups, formula 21-31,(26-28), 6-17. Conical setae (fig. k) 2 pairs submarginally, 3 pairs laterad of the perivulvar pores and 2 pairs anterior to vulva.

Illustration based on material from *Rosa* sp., El Valle, D.F., Venezuela.
Recognition characteristics

The zygotic $L_1$, bilobed $L_2$ and $L_3$, presence of perivulvar pores and the numerous microducts on the submarginal and submedian areas of segments IV to VI make this species distinct.

Notes

This species is restricted to plants of the family Rosaceae and principally to the genera Rosa and Rubus; it is world wide distribution.

Aulacaspis tubercularis Newstead

Plate 32


Material studied

On Mangifera indica, Anacardiaceae, Caracas, D. F., 25-X-61 (AD); El Limon, 22-V-68 (AD & SC); El Valle, D. F., 23-VIII-38 (CJB) (CIA & USMii); La Victoria, Aragua, 14-V-69 (Geraus) (SSPA & IZA); Karacay, 15-II-60 (H.C.) (SSPA & IZA); 3-IV-67 (CJR); Turmero, Aragua, 5-IV-60 (H.C) (SSPA & USMii). Persea americana, Lauraceae, Caracas, D.
Plate 32. - Aulacaspis tubercularis Newstead

Scale of the female

White with a brownish area around the exuviae, circular, flat, exuviae subcentral.

Adult female

Body elongated (fig. a) with prosoma broader than the post-soma; 1119 (990 to 1344) long; 601 (502 to 783) wide. Derm at maturity membranous.

Prosome

Dorsum: Dorsal tubercle well developed at the anterior margin but membranous. Small cluster of microducts medially on the head; row of short gland tubercles (fig. b) marginally on the pro and mesothorax; metathoraxic segment separated from the rest of the prosoma, with a marginal row of short gland tubercles; submarginal and submedian row of microducts (fig. c). Several sclerotized areas on prosoma submarginally.

Ventrum: Antenna (fig. d) is a small sclerotized tubercle, with 1 seta about 25 long. Clypeolabral shield 196 long, and 106 wide; anterior spiracle (fig. e) with 10 to 20 associated trilocular pores (fig. f); posterior spiracle same size and shape, with 3 associated pores.

Prepygidial segments of abdomen

Dorsum: Segment I, with 2 or 3 short gland tubercles marginally; a pair of dorsal bosses with few associated microducts. Segment II (fig. g) with a row of 5 submarginal microducts larger than the
ones found on prosoma and segment I. Segment III with a row 5 or
6 marginal microducts; a pair of submarginal dorsal bosses;
submarginal row of 3 microducts and sub medial group of 4 microducts.
On the intersegmental area of segments III and IV and on the margin
a large macroduct. Segment IV with 2 submarginal microducts and 2
submedially.

**Ventral:** Segment II with 5 short gland spines submarginally; Seg-
ment III with 8 or 9 short gland spines submarginally; segment IV
with 2 larger gland spines marginally and 2 pairs of short micro-
ducts submarginally.

**Pygidium**

**Dorsum:** Median lobes (fig. h) well developed, zygot ic, inner side
slightly serrate, about 16 wide; L₂ and L₃ bilobed and about same
size; L₄ absent. Marginal macroducts about 23 long, located 1
between L₁-L₂; 1 between L₂-L₃; 1 between the lobes of L₃, and
4 beyond L₃ on segments VI and V; 2 pairs of submarginal macroducts
at the level of the anus; 2 pairs of submedian microducts on the
anterior end of the pygidium. Anal opening circular, 12 in diameter,
placed about 10 times its diameter from the base of L₁, located
about the same level as the vulva on the venter; area around the
anus slightly sclerotized.

**Ventral:** Gland spines (fig. i) 1 present on segment VII; 1 on
VI and 4 after L₃; 3 pairs of microducts submarginally. Quinque-
locular perivulvar pores (fig. j) in 5 groups, formula 18-24, (23-29),
13-16. One pair of microducts between the posterior group of peri-
vulvar pores. Conical setae (fig. k) 3 pairs submarginally, 2 pairs laterad of perivulvar pores and 2 pairs anterior to vulva.

Illustration based on material from Mangifera indica, La Victoria Aragua, Venezuela.

Recognition characteristics

The zygotic $L_1$, bilobulated $L_2$ and $L_3$, presence of perivulvar pores and few microducts on the submarginal and submedian areas of segments IV to VI make this species distinct.

Notes

This species is found on several plants in the tropical areas, but it is economically important on mango trees since this is the primary host.

Genus Diaspis Costa

Type of the genus: Diaspis calyptroides Costa, 1835 = Aspidiotus echinocacti Bouche, 1833.


Description of the genus

Referable to the tribe Diaspidini, two-barred ducts; median lobes non-zygotic; $L_2$ and $L_3$ bilobed; body circular or subcircular, derrn at maturity membranous, anterior spiracle with associated trilocular pores; dorsal bosses present; gland spines well developed; anal opening posterior to vulva; thoracic tubercle usually present;
perivulvar pores present in 5 groups.

Key to species of *Diaspis*

Submedian cluster of microducts on segments II to V
  of abdomen; median lobes parallel; thoracic tubercle
  small or absent ..................................... *echinocacti* (Bouche)

Submedian cluster of microducts absent; median
  lobes divergent; thoracic tubercle well
devolved ............................................ *boisduvalii* Signoret

*Diaspis boisduvalii* Signoret

Plate 33


Material studied


Scale of the female

  White, circular and flat; exuviae clear yellow, central or subcentral.

Adult female

  Body subcircular or turbinate (fig. a); 946 (797 to 1196) long;
723 (590 to 797) wide. Derm at maturity membranous.

**Prosoma**

Thoracic tubercle (fig. b) normally well developed, although these are variable and sometimes lacking.

**Dorsum:** Head with a pair of dorsal bosses; meso and metathorax with a submarginal row of gland tubercles (fig. c).

**Ventrum:** Antenna (fig. d) as a sclerotized tubercle, with one seta about 16 long. Clypeolabral shield 183 long and 117 wide; anterior spiracle (fig. e) with 5 to 24 associated trilocular pores (fig. f); posterior spiracle same size and shape without associated pores, with some microducts (fig. g) below and lateral of the atrium.

**Prepygidial segments of abdomen**

**Dorsum:** Segment I with a pair of submarginal dorsal bosses (fig. h) and a submarginal row of gland tubercles (fig. c); segment II (fig. i) without dorsal bosses and with only few submarginal microducts; segment III with a pair of dorsal bosses and a cluster of submarginal microducts; segment IV without dorsal bosses and few submarginal microducts.

**Ventrum:** Segment I and II with 3 pairs of small gland spines (fig. j); segment III and IV with 4 to 5 pairs of marginal gland spines (fig. k).

**Pygidium**

**Dorsum:** Median lobes (fig. l) well developed, 20 wide, narrow, not hoked, the bases close together forming a deep median notch, inner side slightly crenulated; L₂ and L₃ bilobed; L₄ reduced to a sclero-
tization on the margin. Marginal macroducts 18 long, located 1 between median lobes, 1 between $L_1-L_2$, 1 between $L_2-L_3$, 1 between the lobes of $L_3$, one on each side of $L_4$ and 1 on segment V, 2 pairs of submarginal macroducts between $L_2-L_3$; 3 parallel rows of microducts extending from the margin forward on segments V, VI and VII plus a pair close to the anus on segment VIII; anal opening circular, 16 in diameter, placed about 4 times this diameter from the base of $L_1$; located posterior to vulva on the venter.

**Venter:** Gland spines present, 1 pair between median lobes; 1 between $L_1-L_2$; 1 between $L_2-L_3$; 1 between $L_3-L_4$ and 5 or 6 pairs on segment V. Row of 3 conical setae submarginally, one pair laterad of perivulvar pores and 2 pairs anterior to vulva. Quinquelocular perivulvar pores (fig. m) in 5 groups, formula 9-17,(11-23),6-11. Several microducts scattered on the pygidium.

Illustration based on material from *Cattleya* sp., El Limon, Aragua, Venezuela.

**Recognition characteristics**

The bilobulated $L_2$ and $L_3$, macroduct between the median lobes, divergence of median lobes, absence of submedian groups of microduct, well developed thoracic tubercles and subcircular body makes this species distinct.

**Notes**

This polyphagous species is found in many countries of the tropical and subtropical regions of the world. In Venezuela it is found principally on orchids and palms.
**Diaspis echinocacti** (Bouche)

Plate 34


**Material studied**

On *Opuntia* sp. Cactaceae, Turmero, 16-IV-69 (Quevedo) (IZA & SSPA); Venezuela (Quarantine) 17-I-45 (USNM).

**Scale of the female**

White, circular and flat; exuviae yellow, central.

**Adult female**

Body subcircular (fig. a); 1196 (1033 to 1344) long; 1056 (915 to 1122) wide. Derm at maturity membranous.

**Prosoma**

Thoracic tubercle (fig. b) when present small and membranous.

**Dorsum**: Metathorax with a cluster of microducts (fig. c).

**Ventrum**: Antenna (fig. d) is a sclerotized tubercle, with one seta about 20 long. Clypeolabral shield 187 long and 117 wide. Anterior spiracle (fig. e) with 4 to 6 associated trilocular pores (fig. f); posterior spiracle same size and shape without associated
Plate 34. - Diaspis echinocacti Bouché
pores, with a numerous microducts (fig. g) below and lateral of the atrium.

**Prepygidial segments of abdomen**

**Dorsum:** Segment I and III with a pair of dorsal bosses (fig. h) submarginally; segments I to IV (fig. i) each with a cluster of submedial microducts which makes this species distinct.

**Ventrum:** Segment III with 2 pairs of gland spines (fig. j) submarginally; segment IV with 4 pairs of gland spines and 2 pairs of microducts submarginally.

**Pygidium**

**Dorsum:** Median lobes (fig. k) well developed, about 16 wide, non-zygotic, both margins smooth; L₂ and L₃ bilobed; L₄ well developed; marginal macroducts, about 16 long, located 1 between median lobes; 1 between L₁-L₂; 1 between L₂-L₃; 1 between the lobes of L₃; 1 between L₃-L₄; 1 at base of L₄ and 1 on segment V associated with a marginal sclerotization or gland spur. Two submarginal macroducts between L₂-L₃. Numerous microducts scattered on the rest of pygidium. Anal opening circular, 16 in diameter, placed about 4 times its diameter from the base of L₁; located posterior to vulva on the venter.

**Ventrum:** Gland spines (fig. j) present, 1 short pair between median lobes; 1 between L₁-L₂; 1 between L₂-L₃; 1 between L₃-L₄ and 2 on segment V. Row of 3 conical setae submarginally, 2 pairs laterad of perivulvar pores, and 2 pairs anterior to vulva. Quinquelocular perivulvar pores (fig. l), in 5 groups, formula 11-15,(13-20),8-11.
Several microducts scattered on the pygidium.

Illustration based on material from *Opuntia* sp., Turmero, Aragua, Venezuela.

**Recognition characteristics**

$L_2$ and $L_3$ bilobed, $L_4$ well developed, macroduct between the median lobes, presence of submedian groups of microducts dorsally on the abdomen, weak development of the thoracic tubercle and the subcircular body makes this species distinct.

**Notes**

This species is restricted to plants of the family Cactaceae and is found in many countries of the tropical and subtropical regions of the world where cactae are cultivated. It is a new addition to the Venezuelan coccid-fauna.

**Genus Howardia** Berlese and Leonardi

Type of the genus *Chionaspis biclavis* Comstock, 1883.


**Description of the genus**

Referable to the tribe Diaspidini; two-barred ducts; median lobes well developed and non-zygotic, but close together basally; club-shaped paraphysis arising from mesal angle of median lobes; $L_2$ and $L_3$ absent; quinquelocular pores associated with spiracles; perivulvar pores absent; gland spines and gland tubercles numerous.
Body form turbinate.

Howardia biclavis (Comstock)

Plate 35


Material studied


Scale of the female

White, circular up to 3 mm in diameter, flat; exuviae submarginal.
Adult female

Body turbinate (fig. a) 2214 (1802 to 2924) long, 1623 (1403 to 2009) wide. Derm heavily sclerotized at maturity especially on the dorsum.

Prosome

Dorsum: Microducts lacking, few small setae, 12 long, on the submarginal area.

Ventrum: Antenna (fig. b) a crenulated sclerotization, with 5 or 6 setae, each about 20 long, and surrounded by a few thorn-like sclerotizations. Clypeolabral shield 310 long and 160 wide. Numerous thorn-like sclerotizations and openings of microducts (fig. c) on derm, around mouthparts and between antennae and spiracles. Anterior spiracle (fig. d) with 10 (8 to 15) associated quinquelocular pores (fig. e). Posterior spiracle same size and shape as anterior spiracle, with 4 (3 to 6) associated quinquelocular pores. Two bands of numerous microducts extending from spiracles toward the margin; in the metathoracic band, in addition, 5 or more small gland spines present.

Prepygidial segments of abdomen (fig. g)

Dorsum: Segment II to IV with clusters of microducts submarginally and submedially. First segment more sclerotized than the others.

Ventrum: Segment I with a band of numerous microducts and 10 or more small gland spines, this band extends from the margin toward the submedian area. Segments II to IV with spur-like sclerotization (fig. h) on the anterior margin; posterior of this structure 7 or 8
gland spines. Clusters of 6 or 7 microducts submarginally. Segment IV with median rows of serrate squamations (fig. i) weakly sclerotized.

**Pygidium**

**Dorsum:** Median lobes (fig. j) prominent dentate each with a club-shaped paraphysis extending diagonally inward from the mesal angle. Other pygidal lobes absent, indicating their position by sclerotizations on the margin. A continuous row of microducts, 20 long, along the margin. Rows of microducts extending anteriorly from pygidal margin. First row between L₁-L₂, made of few microducts, never extending over the club-shaped paraphyses. Second row longer and narrow, reaching the level of anal opening. Third row is wide and longer extending close to anterior margin of pygidium. Anal opening circular, 23 in diameter, placed about 11 times this diameter from the base of L₁; slightly anterior to the vulva on the venter. Area around the anal opening more sclerotized than the rest of pygidium.

**Ventrum:** Gland spines, 1 pair between median lobes; 2 between L₁-L₂; beyond L₂ gland spines much longer, located 3 on segment VII, 4 on VI and 5 on V. Clusters of minute gland spines (fig. k) submarginally on Segments VII, VI and V. Perivulvar pores lacking; paravulvar scleroses well developed. Conical setae, 3 pairs submarginally, 1 pair anterior to vulva and 2 posteriorly. Row of serrate squamations (fig. i) anterior to vulva.

Illustration based on material from *Tabernamontana coronaria*, 
Caracas, D. F., Venezuela.

Recognition characteristics

The large body size, prominent median lobes with the pair of club-shaped paraphyses and the absence of perivulvar pores makes this species distinct.

Notes

This polyphagous species is found in many countries in the tropical and subtropical regions of the world.

Genus *Ischnaspis* Douglas


Description of the genus

Referable to the tribe Diaaspidini, two-barred ducts; median lobes well developed and non-zygotic; L₂ bilobed. Body elongated. Antennae one-segmented with a single seta. Trilocular pores associated with the anterior spiracle. Only two pairs of macroducts, one between L₁ and L₂, other between L₂ and L₃. Gland spines present, none between median lobes. Anal opening surrounded by a coarse reticulation. Perivulvar pores present.

*Ischnaspis longirostris* (Signoret)

Plate 36
Plate 36. - Ischnaspis longirostris (Signoret)
**Mytilaspis longirostris** Signoret, 1882:35. **Ischnaspis filiformis**
Douglas, 1887:21; Newstead, 1901:210; **Ischnaspis longirostris**
Hempel, 1900:509; Fernald, 1903:37; MacGillivray, 1921:291;
Hall, 1922:37; Ferris, 1937:SI-67; Costa Lima, 1942:273; Ballou,
1945:93; Zimmerman, 1948:404; Balachowsky, 1954:135; Fernández-
Yepez et. al., 1957:2; Schmutterer, 1959:170; Borchsenius, 1966:78.

**Material studied**

On **Allamanda catharica**, Apocynaceae, Las Delicias, 20-VI-68
(AD & SC). **Asparagus** sp., Lilaceae, Venezuela (Quarantine), 4-IV-41.
**Citrus aurantium**, Rutaceae, Las Delicias, 20-VI-68 (AD & SC). **Coffea
arabica**, Rubiaceae, El Limon, 29-VIII-69 (AD); Venezuela (Quarantine),
18-XII-41 (USNM). **Elaeis guineensis**, Palmae, Cagua, 2-V-61 (MC)
(SSPA & USNM); **El Limon**, 4-XII-65 (FFY); **El Limon**, 4-VI-69 (Notz).
**Ficus prionoides**, Moraceae, Las Delicias, 20-VI-68 (AD & SC); **Maracay,**
**Livistonia chinensis**, Palmae, El Hatillo, Miranda, 6-IV-41 (GdH) (IZA
& USNM). **Lonchocarpus sericus**, Leguminosae, El Limon, 30-VIII-69
(AD). **Mangifera indica**, Anacardiaceae, Las Delicias, (AD & SC),
Valera, Trujillo, 8-III-43 (Rendon). **Monstera** sp. Araceae, Venezuela
(Quarantine), 9-XI-48 (USNM). **Musa sapientum**, Musaceae, Maracay, 14-
VIII-68 (JCh). **Persea americana**, Lauraceae, El Limon, 8-VI-68 (AD &
SC); El Limon, (Notz). **Philodendron** sp. Araceae, Cagua, 30-VIII-69
(AD); El Limon, 10-XI-58 (FFY). **Phoenix dactylifera**, Palmae Ciudad
Universitaria, Caracas, 23-XI-66 (FFY). **Roystonea regia**, Palmae,
Caracas, 19-X-66 (FFY). **Strychnia candollei**, Meliaceae, Caracas, 28-
VIII-69 (AD).

**Scale of the female**

Black, elongated, very slender, exuviae terminal.

**Adult female**

Body elongate (fig. a), 1282 (1182 to 1492) long 279 (251 to 295) wide. Derm membranous at maturity except for a weak sclerotization on the pygidium.

**Prosoma**

**Ventrum:** Antenna (fig. b) reduced to a small flat sclerotized tubercle with one seta, 15.6 long. Clypeolabral shield 175 long and 74 wide. Anterior spiracle (fig. c) with one associated trilocular pore (fig. d); posterior spiracle of same size and shape, without associated pore. A continuous marginal row of 20 to 22 microducts, from the area of the anterior spiracle to the posterior spiracle, with 4 or 5 gland tubercles (fig. e) close to this row of microducts. Derm of the venter with a row of spine-like sclerotization (fig. f) giving a striated appearance.

**Prepygidial segments of abdomen**

**Dorsum:** Segments II and III with submarginal clusters of 4 to 6 microducts.

**Ventrum:** Segment I with a submarginal cluster of 10 to 12 microducts and 5 to 7 gland tubercles (fig. e); median row of slightly sclerotized serrate squamations (fig. h). Segment II and III with clusters of 5 to 7 marginal gland spines (fig. i) and median rows of sclerotized serrate squamations; segment IV with 3 marginal
gland spines; submarginal group of 3 microducts and 1 conical seta (fig. j); a pair of conical setae submedially and median rows of serrate squamations.

Pygidium

Dorsum: Median lobes (fig. k) well developed, semicircular, non-zygotic, 16 wide; separated from each other about the distance of their width. $L_2$ bilobed, its shape resembl a fishtail; $L_3$ reduced to small sclerotization on the margin. Two marginal microducts, one between $L_1$-$L_2$ other beyond $L_2$. Two rows of microducts, one submarginally, the other submedially. Area around anal opening with a coarse reticulation. Anal opening circular, 12 in diameter, placed about 4 times its diameter from the base of $L_1$; located at the level of vulva on the venter.

Ventrum: One robust gland spine between $L_1$-$L_2$, 4 beyond $L_2$. A horse-shoe-shaped invaginated sclerotization, extending into the pygidium from $L_2$. Concial setae (fig. j) 3 pairs submarginally, 2 pairs anterior to vulva and 1 posteriorly. Five groups of quinquelocular perivulvar pores (fig. l), formula 2-3,(4-5),2. Paravulvar scleroses well defined. Rows of serrate squamations anterior and posterior to vulva, latter ones larger and heavily sclerotized.

Illustration based on material from *Elaeis guineensis*, Cagua, Aragua, Venezuela.

Recognition characteristics

The elongated body, coarse reticulation on the dorsum of pygidium, large and widely separated median lobes and the invaginated ventral
scleroses at the base of L_2, make this species distinct.

Notes

This extremely polyphagous species is found in most of the countries of the subtropical and tropical regions of the world.

Genus Lepidosaphes Shimer

Type of the genus: Lepidosaphes conchiformis Shimer 1868 = Coccus ulmi Linnaeus 1758.


Description of the genus

Referable to the tribe Diaspidini; with two-barred ducts; median lobes well developed and non-zygotic: L_2 bilobed; L_3 reduced to sclerotization on the margin or absent; anal opening anterior to vulva on venter and located close to anterior margin of pygidium; trilocular pores associated with the spiracles; perivulvar pores present; gland spines and gland tubercles numerous. Body form elongated.

Key to species of Lepidosaphes

1. Abdominal segments I, II and IV with dorsal bosses on the submargin; pygidium with a submedian
row of 18 or more microducts. .......... *beckii* (Newman)

Abdominal segments without dorsal bosses;
pygidium with a submedian row of 4 or
5 microducts. ................. 2

2. Segments II, III and IV with a sclerotized spur
at each anterior lateral angle; dorsum of
prosoma sclerotized at maturity, this
sclerotization forming plates ........ *gloverii* (Packard)

Abdominal spurs absent; dorsum of prosoma
membranous; associated with Croton and
Codiaeum. ....................... *tokionis* (Kuwana)

*Lepidosaphes beckii* (Newman)

Plate 37


*Mytilococcus pinniformis* Lindinger, 1936:10. *Mytilicoccus beckii*

Lupo, 1939:30; Costa Lima, 1942:273. *Cormispis beckii* Borch-
Material studied

On Citrus aurantifolia, Rutaceae, Caracas, D. F., 7-II-40 (CHB). Citrus aurantium, Rutaceae, Baruta, Miranda, 4-V-40 (CHB) (CIA); Caracas, D. F., 7-VI-39 (CHB) (IZA & CIA); Cumana, Sucre, 9-VII-43, (FFY); El Hatillo, Miranda, 4-V-40, (CHB) (CIA); El Limon, 10-V-65 (FFY); 10-V-68 (AD); Maracay 1-IX-39 (CHB) (CIA); 5-X-65 (AD); Palo Negro, 22-V-68 (AD & SC). Citrus limonia, Rutaceae, Caracas, D. F., 5-IV-41 (Gonzalez). Citrus nobilis, Rutaceae, Cumana, Sucre, 19-VI-43 (FFY). Murraya paniculata; Rutaceae, Caracas, D. F., 23-IV-39 (CHB) (USNM & IZA).

Scale of the female

Brown or purplish; elongated, oystershell-shaped, broadening posteriorly; exuviae terminal and yellow.

Adult female

Body fusiform (fig. a); 1172 (871 to 1447) long; 590 (502 to 703) wide. Derm at naturity slightly sclerotized.

Prosoma

Slightly 3 segmented, into head and prothorax, mesothorax and metathorax.

Dorsum: Head with a submedian pair of dorsal bosses. Mesothorax, with a submarginal row of microducts (fig. b). Metathorax with a submarginal band of microducts.

Venter: Antenna (fig. c) as a flat, sclerotized tubercle, with 2 setae about 23 long. Clypeolabral shield 203 long and 109 wide;
anterior spiracle (fig. d) with 6 to 8 associated trilocular pores (fig. e); posterior spiracle same size and shape as anterior spiracle, without associated pores. Head and prothorax with an irregular row of submarginal microducts. Mesothorax with a band of microducts (fig. f) which extends across the anterior margin of the segment and submarginally. Metathorax with a submarginal band of microducts on the anterior margin of the segment and below the spiracle 5 or 6 gland tubercles (fig. g) present, a cluster of microducts medially.

Prepyridial segments of abdomen

Dorsum: Segment I with a submarginal cluster of microducts and a pair of dorsal bosses on the anterior half of the segment. Segment II (fig. h) with a pair of dorsal bosses, (fig. i) a band of microducts submarginally and a row on the posterior margin of the segment. Segment III usually without dorsal bosses; with a submarginal band of microducts and a row on the posterior margin. Segment IV with a pair of dorsal bosses, a band of submarginal microducts, and two rows of microducts on the posterior margin, one submarginal the other submedian.

Ventrum: Segment I with a cluster of gland tubercles (fig. g) submarginally and a submedian row on the anterior half. Segments II to IV with 3 or 4 marginal gland spines (fig. j) and a pair of conical setae (fig. k), submedially.

Pyridium

Dorsum: Median lobes (fig. l) well developed and separated, subtriangular, longer than wide; the margins slightly crenulated on both
sides; $L_2$ bilobed being the inner lobe the larger; $L_3$ and $L_4$ represented by a small sclerotization on the margin; 6 marginal macroducts, about 23 long, with oral scleroses located 1 between $L_1-L_2$; 2 between $L_2-L_3$, 2 between $L_3-L_4$ and 1 on segment V. The pygidium with 3 parallel rows of microducts each from 10 to 20 microducts, these rows can be considered on segments V, VI and VII.

Anal opening circular, 16 in diameter, placed about 10 times this diameter from the base of $L_1$; located anterior to vulva on the venter; the area around the anus is somewhat more sclerotized than the rest of the pygidium.

**Ventrum:** Gland spines (fig. j), located 1 pair between median lobes; 1 between $L_1-L_2$; 2 between $L_2-L_3$; 2 between $L_3-L_4$ and 2 on segment V. A row of 3 conical setae (fig. k) submarginally, 2 pairs anterior to vulva and 2 pairs laterad of perivulvar pores. Three groups of slender microducts submarginally on segments VII, VI and V. Quinquelocular (fig. m) perivulvar pores in 5 groups, formula 6-11,(10-16),4-8. Ventral scleroses extending forward from the base of $L_1$, $L_2$ and $L_3$.

Illustration based on material from *Murraya paniculata*, Caracas, Venezuela.

**Recognition characteristics**

The bilobed $L_2$, reduction of $L_3$, 4 pairs of dorsal bosses, numerous microducts on the dorsum of pygidium, and the fusiform body makes this species distinct.

**Notes**
This polyphagous and cosmopolitan species is usually one of the important pests of *Citrus* sp. throughout the world; it is usually found associated with *Lepidosaphes gloverii* to be described next.

*Lepidosaphes gloverii* (Packard)

Plate 38


Material studied

On *Citrus aurantium*, Rutaceae, El Limon, 4-V-66 (AD & SC); 10-V-68 (AD); Maracay, 5-X-65 (AD). *Citrus reticulata*, Rutaceae, El Limon, 22-V-68 (AD & SC).

Scale of the female

Brown, elongated not broadening posteriorly; exuviae terminal and yellow.

Adult female

Body elongated (fig. a); 1169 (989 to 1225) long; 345 (339 to 354) wide. Derm at maturity heavily sclerotized on the thoracic region and segment I of the abdomen, all the intersegmental lines
Plate 38. - Lepidosaphes gloverii (Packard)
remaining membranous as distinct joints.

**Prosome**

Half or more of the body length comprised by the prosoma.

**Dorsum:** Head with a distinct lobe-like process, few scattered setae (fig. b) on the submedian area of the head.

**Ventralus:** Antenna (fig. c) is a flat, sclerotized tubercle, with 2 or 3 setae about 23 long. Clypeolabral shield 183 long and 105 wide. Anterior spiracle (fig. d) with 3 or 4 associated trilocular pores (fig. e); prothorax and metathorax with a band of microducts (fig. f) on the sclerotized area of the segment. Metathorax, with a band of microducts parallel to the anterior margin of the segment and a submarginal cluster of the same type of microducts; posterior spiracle same size and shape as the anterior spiracle, without associated pores.

**Prepygidial segments of abdomen** (fig. g)

**Dorsum:** Segment I with sclerotized area in the middle of the segment, row of microducts submarginally on the anterior portion of the segment, a submedian row along the posterior margin of the segment; segment II to IV membranous; each with a marginal sclerotized spur in the anterior lateral angle, row of microducts submarginally at the anterior portion of the segment, a continuous row of microducts on the posterior margin of each segment.

**Ventralus:** Segment I with a band of submarginal microducts; segment II with a small cluster of microducts submarginally; segments III and IV with 2 pairs of marginal gland spines (fig. i) and a submarginal
cluster of microducts.

**Pygidium**

**Dorsum:** Median lobes (fig. j) well developed and separated, sub-triangular, longer than wide; the margins are smooth; \( L_2 \) bilobulate, mesal lobe larger; \( L_3 \) and \( L_4 \) represented by a small sclerotization on the margin; 6 marginal microducts, about 20 long with oral scleroses, located 1 between \( L_1-L_2 \), 2 between \( L_2-L_3 \), 2 at base of \( L_4 \) and 1 on segment \( V \). The pygidium with 2 parallel rows of microducts, the inner row with only 4 to 5 microducts. Anal opening circular, 16 in diameter, placed about 10 times this diameter from the base of \( L_1 \); located anterior to the vulva on the venter; area round the anus is somewhat more sclerotized than the rest of the pygidium.

**Ventrum:** Gland spines (fig. i), located 1 pair between median lobes; 1 between \( L_1-L_2 \); 2 between \( L_3-L_4 \) and 2 on segment \( V \); a row of 5 conical setae (fig. k) submarginally, 3 pairs lateral of perivulvar pores, 2 pairs anterior to vulva and 1 pair posteriorly. Quinquelocular perivulvar pores (fig. l) in 5 groups, formula \( 3-4, (5-10), 3-4 \); ventral scleroses extending anteriorly from \( L_1, L_2 \) and \( L_3 \).

Illustration based on material from Citrus reticulata, El Limon, Aragua, Venezuela.

**Recognition characteristics**

The bilobed \( L_2 \), reduction of \( L_3 \), sclerotized band of the prosoma, spurs on the margin of segment II, III and IV of the abdomen and elongated body makes this species distinct.
Notes

This polyphagous and cosmopolitan species is usually one of the important pests of Citrus sp. throughout the world. It is usually found associated with Lepidosaphes beckii, from which is easily differentiated by the characters mentioned above.

Lepidosaphes tokionis (Kuwana)

Plate 39


Material studied

On Codiaeum variegatum, Euphorbiaceae, El Limon, 8-IV-59 (FFY & JC; 23-V-68 (AD); Guataparo, Carabobo, 19-III-69 (JT); Los Ocunitos, D.F., 25-IX-67 (FFY & DV); Maracay, no date (CHB).

Scale of the female

Brown, elongated, not broadening posteriorly; exuviae terminal.

Adult female

Body elongated (fig. a); 945 (842 to 1241) long; 401 (354 to 473) wide. Derm at maturity membranous.

Prosorona

Dorsum: Head with a lobe-like process, few submarginal microducts (fig. b) on the mesothorax, metathorax with a band of microducts
Plate 39. - Lepidosaphes tokionis (Kuwana)
submarginally.

_Ventrum_: Antenna (fig. c) as a sclerotized tubercle with 2 setae about 18 long, few microducts close to antennae. Clypeolabral shield 164 long and 82 wide; anterior spiracle (fig. d) with 2 to 4 associated trilocular pores (fig. e); posterior spiracle same size and shape, without associated pores; mesothorax with a submarginal row of microducts; metathorax with a submedian row of gland tubercles (fig. f) and some microducts associated.

_Prepygidial segments of abdomen_

_Dorsum_: Segment I with a submarginal cluster of microducts (fig. b); segments II to IV (fig. g) with a submarginal and a submedian cluster of microducts; margin of segment IV with a spur-like sclerotization (fig. h) and a microduct associated.

_Ventrum_: Segment I with a submarginal cluster of gland tubercles (fig. f); segments II to IV with 3 submarginal gland spines (fig. i), a submedian row of microducts and 2 or 3 pairs of conical setae submedially.

_Pygidium_

_Dorsum_: Median lobes (fig. j) well developed and separated, longer than wide, inner margin slightly crenulated; $L_2$ bilobed lobe inner larger; $L_3$ and $L_4$ represented by a small sclerotization on the margin. Marginal macroducts, about 23 long, located 1 between $L_1$-$L_2$; 2 between $L_2$-$L_3$; 2 marginal at base of $L_4$, and 1 on segment V; 2 parallel rows of microducts submedially, these rows with 2 to 4 microducts each. Anal opening circular, 8 in diameter, placed
about 15 times this diameter from the base of L₁; located anterior to vulva of the venter; area around the anus is somewhat more sclerotized than the rest of the pygidium.

_Ventrum_: Gland spines (fig. i) located, 1 pair between median lobes; 2 between L₁-L₂; 2 between L₃-L₄ and 2 on segment V. A row of 3 conical setae (fig. k) submarginally, 3 laterad of perivulvar pores, 2 pairs anterior to vulva. Quinquelocular pores (fig. 1) in 5 groups, formula 4-5, (6-8), 3-4; ventral scleroses extending from the base of L₁, L₂ and L₃.

_Illustration based on material from Codiaeum variegatum_, El Limon, Aragua, Venezuela.

_Recognition characteristics_

The bilobed L₂, reduction of L₃, few macroducts on the pygidium, membranous derm and the association with _Codiaeum_ and _Croton_ makes this species distinct.

_Notes_

This species is found in many countries of the tropical and subtropical regions of the world. It is a new addition to the Venezuelan coccid-fauna.

_Genus Lopholeucaspis_ Balachowsky

_Type of the genus: _Lecaspis japonica_ Cockerell, 1897._


_Description of the genus_

Referable to the tribe Diaspidini with short, two-barred ducts.
Pupillaril species, the adult female being retained within the
ealrged and sclerotized exuviae of the second instar. Body
elongate; median lobes lanceolate, widely separated, \( L_2 \) not bilobed.
Perinvar pore present in 5 groups, in addition quinquelocular
pore groups are found on segments III and IV of abdomen. Numerous
short gland spines in a continuous row from the head to the pygidiun.
Derm at maturity membranous.

*Lopholeucaspis cockerelli* (Grandpre et Charmoy)

Plate 40

**Fiorinia cockerelli** Grandpre and Charmoy, 1899:37; Fernald, 1903:246.

*Leucaspis cockerelli* Leonard, 1906:15; Lindinger, 1908:122; Mac-
Gillivray, 1921:267; Ferris 1941:8III-289; *Lopholeucaspis cockere-
lli* Balachowsky 1953:758; 1958:336; Schmutterer, 1959:152; Borch-

**Material studied**

On *Livistonia chinensis*, Palmae, El Hatillo, Miranda, 6-IV-41
(CHB). Bromeliad, Venezuela (Quarantine), 9-IX-46 (USNM). Palm
fruit, Venezuela (Quarantine) ?-III-1902 (USNM).

**Scale of the female**

Not seen, described by Ferris, 1941, as "very elongate and
slender, composed almost entirely of the greatly elongated and
sclerotized second exuvia which is covered merely by a thin film of
wax. Color some shade of brown."

**Adult female**

Body elongate (fig. a), 640 (576 to 723) long, 260 (251 to 265)
Plate 4O. - Lopholeucaspis cockerelli (Grandpre & Charmoy)
wide. Derm at maturity membranous.

**Prosome**

**Ventrum:** Antenna (fig. b) a sclerotized tubercle with 5 or 6 setae, about 20 long. Clypeolabral shield 195 long and 97 wide. Anterior spiracle (fig. c) with 8 to 12 associated quinquelocular pores (fig. d); posterior spiracle same size and shape as anterior spiracle, without associated pores. Cephalic region anterior to the antennae with 2 small sclerotizations (fig. e) on each side, each of these being produced into a minute point. Submarginal row of closely set short gland spines (fig. f) with minute ducts among them, extending from the antennae to the pygidium.

**Prepygidial segments of abdomen**

**Dorsum:** Segments III and IV with 2 or 3 marginal microducts.

**Ventrum:** Segments I to IV with the continuous row of gland spines and microducts described above. Median rows of weakly sclerotized serrate squamations (fig. h). Segments III and IV with a submarginal cluster of 3 to 7 quinquelocular pores (fig. i), typical of this genus.

**Pygidium**

**Dorsum:** Median lobes (fig. j) tooth-like, with 1 or 2 lateral notches, very slender, 8 wide, and widely separated. $L_2$ same shape of $L_1$, but smaller, with 1 notch. $L_3$ represented by a minute marginal sclerotization. Microducts very few, 1 with the opening between median lobes, a group of 3 submarginally between $L_1-L_2$, group of 6 submedially on the pygidium. Area around the opening of macroducts is sclerotized.
Anal opening circular, 20 in diameter; placed about 4 times this diameter from the margin, located at the level of vulva on the venter. Area around the anal opening sclerotized.

*Ventrum:* Plates slender, apically brush-like, longer than the lobes, located, a pair between median lobes, and 1 pair between $L_1-L_2$. Between $L_2-L_3$ 3 plates of varying form and length. Beyond $L_3$ starts a row of gland spines which extends to the head. Conical setae (fig. k) 3 pairs submarginally, 3 pairs laterad of perivulvar pores and 3 pairs anterior to vulva. Quinquelocular perivulvar pores (fig. i) in 5 groups, formula 7-8,(8-10),17-22. A row of serrate squamations anterior to perivulvar pores.

Illustration based on material from *Livistonia chinensis*, El Hatillo, Miranda, Venezuela.

**Recognition characteristics**

Pupillarial female; rows of gland spines from the antennae to the pygidium; quinquelocular pores on prepygidial segments; and the tooth-like lobes and brush-like plates makes this species distinct.

**Notes**

This species is restricted to monocotyledons; known from various tropical countries of the old and new world.

**Genus** *Miveaspis* MacGillivray

Type of the genus: *Hytilaspis argyrotata* Cockerell, 1899.

Description of the genus

Referable to the tribe Diaspidini, two-barred ducts, L₂ bilobed. Body elongate and slender, half or more comprised by the prosoma. All known species with a fold or lobe-like process between the antennae. Pores associated with spiracles, trilocular. Median lobes non-zygotic and well developed. Gland spines few, confined to the pygidium. Marginal macducts arranged in a row. Anal opening anterior to the vulva on the venter. Perivulvar pores lacking; two pairs of elongate well defined dorsal sclerotizations.

Miveaspis cattleyae Lepage

Plate 41


Material studied

Two females on Cattleya sp., Orchidaceae, Venezuela (Quarantine) 15-IV-48 (USNM). One female on wild orchid, Orchidaceae, Venezuela (Quarantine), 28-III-36 (USNM).

Scale of the female

Not seen, described by Lepage (1942) as "long and straight sometimes slightly curved, white in color, exuviae terminal, of a yellowish color, 1.5 to 2.0 mm long, .15 to .20 mm wide."

Adult female

Body narrow, elongate (fig. a), 1730 (1550 to 2082) long, 310 wide. Derm at maturity membranous except for areas of the pygidium.
Plate 41. - Niveaspis cattleyae Lepage
Prosoma

**Dorsum:** Eye spot marginal well defined and sclerotized, no other structure on the dorsal side of the prosoma.

**Ventrum:** Antenna (fig. b) a sclerotized flat tubercle with 1 seta about 20 long, and a small pit with 2 small setae. Area between the antennae with a lobe-like process (fig. c) about 40 wide at the base, about 20 long. The process is round, with 3 pairs of conical setae (fig. d) anteriorly and 2 pairs posteriorly.

Clypeolabral shield 156 long and 78 wide. Anterior spiracle (fig. e) with 2 associated trilocular pores (fig. f). Posterior spiracle same shape and size with one associated trilocular pore. Metathorax with a cluster of 12 to 14 microducts (fig. g) extending from the posterior spiracle toward the margin; rows of submedian weak serrate squamations (fig. h) give a striate appearance.

**Prepygidial segments of abdomen (fig. i)**

**Dorsum:** Segments I and II with 3 marginal microducts on each side. Segments III and IV with one marginal macroduct about 20 and 28 long respectively. Marginal setae one on each segment.

**Ventrum:** Segment I with a submarginal cluster of microducts and a ventral scar. Segment II with a submarginal cluster of microducts and ventral scar, medially with 2 microducts and 2 conical setae. Segment III with 2 submarginal and 2 submedian microducts. Segment IV with 2 microducts submarginally, 3 conical setae anterior of the scar and a median cluster of microducts.
Pygidium

Dorsum: Median lobes (fig. j) non-zygotic, well developed, about 16 wide, apex rounded; L₂ bilobed; L₃ and L₄ absent. Marginal macroducts about 27 long, one in each segment of the pygidium.

Two pairs of microducts about 20 long with unusually long inner filament (fig. k), which is about the same length as the microduct. Anal opening circular, 12 in diameter, placed about 10 times this diameter from the base of L₁ and slightly anterior to the vulva on the venter. Anal apophyses well sclerotized extending posteriorly almost to the margin.

Ventrum: A single serrate gland spine between the median lobes; one between L₁ and L₂ and one laterad at L₂, all serrate on the outer margin. A pair of submarginal microducts on segment VI.

Submarginal row of 3 conical setae. Two ventral scleroses, extending from the lobes anteriorly to the middle of the pygidium.

Ventral scar large, with 2 conical spines anteriorly. Paravulvar scleroses well developed and continuous, 3 pairs of conical setae between the scar and the paravulvar sclerosis. One pair of conical setae anteriorly to the vulva and one pair posteriorly.

Illustration based on material from Cattleya sp. Venezuela (Quarantine).

Recognition characteristics

The elongate body, lobe-like process between the antennae, the unusual macroducts in the submedial area of the pygidium and ventral scars on all the prepygidial segments makes this species
distinct.

Notes

This species is restricted to Orchidaceae; previously known only from Brazil. This new record for the Venezuelan coccid-fauna, extends northward the range of the species.

Genus Parlatoria Targioni-Tozzetti

Type of the genus: Parlatoria orbicularis Targioni-Tozzetti, 1868.


Description of the genus

Referable to the tribe Diaspidini, two-barred ducts with a sclerotic oral ring; gland spines short, broad and fimbriate; gland tubercles present; body usually broadly oval.

Parlatoria proteus (Curtis)

Plate 42

Plate 42.- Parlatoria proteus (Curtis)

Material studied

On Cattleya sp., Orchidaceae, Venezuela (Quarantine), 16-XI-65 (USNM). "Orchids", Orchidaceae, 3 slides with 4 females, Venezuela (Quarantine), 1934 to 1953 (USNM).

Scale of the female

Translucent whitish; elongated oval; exuviae terminal, large, yellow.

Adult female

Body broadly oval (fig. a); 630 (516 - 723) long; 510 (443 - 561) wide. Derm at maturity membranous with the exception of the pygidial area.

Prosoma

Dorsum: Thoracic tubercle (fig. b) sclerotized, marginal and bifid; few setae submarginally.

Ventrum: Antenna (fig. c) as a sclerotized tubercle with one seta about 12 long. Clypeolabral shield 156 long and 98 wide. Anterior spiracle (fig. d) with 2 associated quinquelocular pores (fig. e); posterior spiracle same size and shape, without associated pores. Submarginal row of setae (fig. f) extending from the antenna to the thoracic tubercles; a continuous submarginal row of microducts and gland tubercles (fig. g) extending from the first spiracle to the abdomen, being more abundant in the meso and metathorax.
Prepygidial segments of abdomen (fig. a & h)

Dorsum: Segment I with 1 or 2, segment II with a row of marginal microducts. Segment III in addition to the marginal row of microducts with some submarginal ducts. On segment IV the submarginal microducts become a cluster of 8 to 12; additional row of microducts, submedially.

Ventrum: Segment I with a marginal row of microducts and few gland tubercles; one flat and broad gland spine (fig. j). Segment II with 1 or 2 of the same type of gland spines. Segment III with 5 to 7 flat and broad gland spines (fig. j); two pairs of conical setae (fig. k) and a pair of microducts submedially. Segment IV with 6 or 7 gland spines slightly fimbriated; one pair of submarginal microducts, 2 pairs of submedian conical setae and a pair of microducts.

Pygidium

Dorsum: Median lobes (fig. 1) well developed, and notched at the apex; L₂ notched on outer margin; L₃ tongue-like; L₄ absent. Marginal microducts about 12 long, located 1 between median lobes; 1 between L₁-L₂; 1 between L₂-L₃ and 4 beyond L₃. Five to 10 submarginal microducts. A row of 4 or 5 microducts submedially toward the anterior part of the pygidium. Anal opening circular, 12 in diameter, placed about 6 times its diameter from the base of L₁, located slightly posterior to the vulval on the venter; area around anal opening more sclerotized than the rest of the pygidium. Anal apophysis present. Anterior to anal opening a horse shoe-shaped
membranous area.

_Ventrum:_ Gland spines on the interlobular spaces flat and fimbriate (fig. m). Two between median lobes; 2 between \( L_1 \) and \( L_2 \); 3 between \( L_2 - L_3 \); 6 beyond \( L_3 \), flatter and more fimbriate (fig. n) than the latter. Conical setae, 3 pairs submarginally. A row of microducts laterad of perivulvar pores and 2 anterior to vulva. Quinquelocular perivulvar pores (fig. o) in 4 groups, formula 4-6,(506),0. Para-vulvar scleroses present.

Illustration based on material from Orchidaceae, Venezuela (Quarantine).

**Recognition characteristics**

The very peculiar flat and fimbriated gland spines, 3 pairs of lobes and the body form make this species distinct.

**Notes**

This polyphagous species is found in many countries of the tropical and subtropical regions of the world.

_Genus Pinnaspis_ Cockerell

Type of the genus: _Hytilaspis pandani_ Comstock 1881 = _Aspidiotus buxi_ Bouche, 1851.

Description of the genus

Referable to the tribe Diaspidini, with two-barred ducts; lateral margins of the prepygidial segments of the abdomen strongly lobed; median lobes partially fused, strongly zygotic; L₂ bilobed; marginal macroducts present on the pygidium; gland spines always present; perivulvar pores present in 5 groups; trilocular pores associated with spiracles.

Key to species of Pinnaspis

Dorsal submarginal ducts reduced in number, 1 on segments V and IV; gland spines reduced in number on the prepygidial segments, 1 or 2 on segments IV and III entirely lacking on II and I. .......... buxi (Bouche)

Dorsal submarginal ducts more numerous, 2 on segment V, 2 or 3 on segments IV and III; gland spines more numerous, 3 pairs on segments IV, III, and II. ............ strachani (Cooley)

Pinnaspis buxi (Bouche)

Plate 43


Plate 43. - Pinnaspis buxi (Bouché)
1916:58.

**Material studied**

On *Livistonia chinensis* Palmae, El Hatillo, Miranda, 6-IV-41 (CHB) (IZA & USNM); Bromeliaceae, Venezuela (Quarantine), 9-IX-46 (USNM) Araceae, Cagua, 18-V-68 (HC) (IZA & SSPA); 28-VIII-69 (AD).

**Scale of the female**

Brown, elongate, exuviae terminal; about 1 mm long.

**Adult female**

Body somewhat fusiform (fig. a), 505 (472 to 561) long, 289 (265 to 324) wide; derm at maturity membranous except for some sclerotization on the pygidium.

**Prosoma**

**Dorsum:** Few small setae (fig. b) on cephalic area; one marginal microduct on mesothorax; 2 marginal microducts on metathorax.

**Ventral:** Antenna (fig. c) as a sclerotized tubercle with one seta about 39 long, and a small pit with 2 short sensory setae. A lobe-like projection (fig. d) in the area between the antennae. Clypeolabral shield 144 long, and 97 wide; anterior spiracle (fig. e) with associated trilocular pores (fig. f); posterior spiracle same size and shape but with no associated pores; from the anterior spiracle a band of microducts (fig. g) extends toward the margin; the band of microducts arising from the posterior spiracles do not reach the margin.

**Prepygidal segments of abdomen (fig. a and h)**

**Dorsum:** Segments I and II with 3 marginal microducts. Segment
III with one marginal microduct. Segment IV with 3 marginal microducts and one submarginally.

**Ventral**: Segment III with one marginal gland spine (fig. i); 2 submarginal microducts and 2 submedian conical setae with an associated microduct; segment IV with 2 marginal gland spines; 2 submarginal microducts and 2 submedian conical setae with an associated microduct.

**Pygidium**

**Dorsum**: Median lobes (fig. j) with their mesal margin contiguous, yoked at the base, strongly zygotic, about 8 wide; \( L_2 \) bilobed with the mesal lobe larger. Marginal macroducts about 20 long with oral sclerotization, located one between \( L_1-L_2 \); 2 on segment VI and on segment V; no other ducts are found on the dorsum of the pygidium. Anal opening circular, 12 in diameter, placed about 5 times this diameter from the base of \( L_1 \); located at the level of the vulva. Area around anal opening more sclerotized than rest of pygidium; ventral scar present.

**Ventral**: Gland spines (fig. h) located, one between \( L_1-L_2 \), segments VII, VI and V with one each; a submarginal row of microducts; 5 groups of quinquelocular perivulvar pores (fig. k), formula 11-12, (10-11), 3-4. Paravulvar scleroses weakly sclerotized. Conical setae (fig. l) located in a submarginal row; 2 pairs laterad of perivulvar pores and 2 pairs anterior to vulva.

Illustration based on material from Bromeliaceae, Venezuela (Quarantine).
Recognition characteristics

The reduction of submarginal ducts on the dorsum of the pygidium, median lobes yoked basally and lobe-like projection between the antennae, makes this species distinct.

Notes

This polyphagous species is known from many countries in the world; this is a new addition to the Venezuelan coccid-fauna.

**Pinnaspis strachani** (Cooley)

Plate 44


Material studied


**Scale of the female**

White, opaque; elongated and broad posteriorly; exuviae terminal.

**Adult female**

Body somewhat fusiform (fig. a), 862 (709 to 1241) long, 435 (384 to 532) wide; derm at maturity membranous except for some sclerotization on the pygidium.

**Prosoma**

**Dorsum:** Few small setae (fig. b) on cephalic area; 3 marginal microducts (fig. c) on each margin of metathorax.

**Ventrum:** Antenna (fig. d) as a sclerotized tubercle with one seta about 20 long, and a small pit with 2 short sensory setae. Few setae in area between antennae; clypeolabral shield 172 long, and
93 wide. Anterior spiracle (fig. e) with 7 to 9 associated trilocular pores (fig. f); posterior spiracle same size and shape, with no associated pores; a band of microducts (fig. g) extends toward the margin from the anterior spiracle; band of microducts from the posterior spiracle with 2 or 3 gland tubercles (fig. h).

Prepygidial segments of abdomen (fig. i)

Segments I and II with 3 marginal microducts (fig. c). Segment III with 2 or 3 marginal microducts and a row of 5 or 6 submarginal microducts. Segment IV with 2 marginal microducts and two submarginal microducts.

Venter: Segment I with 2 or 3 gland tubercles (fig. h) submarginally. Segments II and III with 3 marginal gland spines (fig. j). Two microducts submarginally; segment IV with 2 marginal gland spines, 3 microducts submarginally; 2 conical setae submedially.

Pygidium

Dorsum: Median lobes (fig. k) large and conspicuous, mesal margin contiguous, basally yoked, their outer margins with four notches, about 12 wide; \( L_2 \) bilobed, the size of the components varies from small sclerotized points to well developed, spatulate lobes. Marginal macroducts about 20 long, located one between \( L_1 - L_2 \); 2 on segment VI and 2 on segment V; 2 submarginal macroducts on the pygidium; anal opening circular, 12 in diameter, placed about 6 times this diameter from the base of \( L_1 \); located at the level of the vulva. Area around the anal opening more sclerotized than rest of pygidium; ventral scar present; in addition a pair of
crescent-shaped scleroses anterior to the anal opening.

_Ventrum_: Gland spines (fig. j) located one between L<sub>1</sub>-L<sub>2</sub>, and one each on the other segments; a submarginal row of microducts. Quinque locular perivulvar pores (fig. 1) in 5 groups, formula 18-21,(20-23),8-12. Paravulvar scleroses weakly sclerotized. Conical setae (fig. m) located in a submarginal row, in addition 2 pairs laterad of the perivulvar pores and 2 pairs anterior to the vulva.

Illustration based on material from palm seed, Venezuela (Quarantine).

**Recognition characteristics**

The crescent-shaped scleroses on the pygidium submarginal microducts on segments III, IV and V, yoked median lobes and the gland tubercles, make this species distinct.

**Notes**

This polyphagous species is known from many parts of the world.

Genus _Pseudaulacaspis_ MacGillivray

Type of the genus: _Diaspis pentagona_ Targioni-Tozzetti, 1886.


**Description of the genus**

Referable to the tribe Diaspidini, two-barred ducts; median lobes zygotic, large; L<sub>2</sub> bilobed or reduced to 2 sclerotized points. Gland spines large and numerous, some are bifid and bear more than
one microduct. Perivulvar pores in five large groups.

Key to the species of *Pseudaulacaspis*

Second pygidial lobe reduced to a sclerotized point; microducts with an oral rim. . . . . . . . . . . . . major (Cockerell)

Second pygidial lobe well developed, distinctively bilobed; microducts without oral rim . . . . . . . . . . . . . . . . . . . pentagona (Targioni-Tozzetti)

*Pseudaulacaspis major* (Cockerell)

Plate 45


Material studied

On *Salix humboldtiana*, Salicaceae, Caqua, 5-I-68 (AD); El Matillo, Miranda, 6-VIII-40 (CHB); Haracay, 3-V-48 (FFY).

Scale of the female

Straw colored, circular, convex, exuviae submarginal.

Adult female

Body broadly oval (fig. a); 1329 (1108 to 1477) long; 1194 (931 to 1285) wide. Derm at maturity membranous except for the pygidial area.

*Prosonia*
Plate 45. - Pseudaulacaspis major (Cockerell)
Dorsum: Head with a small cluster of microducts submarginally.
Clusters of microducts (fig. b) submarginally on the intersegmental
areas between meso and metathorax, and metathorax and first abdo-
minal segments. Three or more bosses in the submarginal area on
each half.

Ventrum: Antenna (fig. c) a sclerotized tubercle, with 1 seta
about 16 long. Clypeolabral shield 250 long and 129 wide. Anterior
spiracle (fig. d) with 19 to 26 associated trilocular pores (fig. e);
posterior spiracle same size and shape, without associated pores.
Submarginally on the head a cluster of small microducts. Each
segment of the thorax with a submarginal cluster of short gland
spines (fig. f).

Prepygidial segments of abdomen

Dorsum: Segments I to III with clusters of microducts submarginally
in the intersegmental areas, additional rows of 4 to 6 submedian
microducts in the posterior intersegmental areas. Segment IV with
2 rows of numerous microducts along the intersegmental membrane
bordering the pygidium, one submarginal, other submedian.

Ventrum: Segment I to III with submarginal clusters of short gland
spines (fig. f) and marginal rows of gland spines (fig. g), which
are progressively longer toward the posterior. Segment IV with 8
or 9 long gland spines and a submarginal cluster of microducts.

Pygidium (fig. h)

Dorsum: Median lobes (fig. i) well developed, prominent, zygotic
slightly crenulated on both margins, about 32 wide. Other lobes
reduced to sclerotizations on the margin. Marginal macroducts openings 1 at the base of L₁; 2 at the base of the remnant of L₃; 1 at the base of the remnant of L₄. In the intersegmental area of segments V and VI, 2 rows of microducts, a submarginal with 12 and a submedian with 6. Anal opening circular, 16 in diameter, placed about 12 times this diameter from the base of L₁; located at the level of vulva on venter.

**Ventrum:** An opening for 4 microducts laterad of the base of L₁.

This is the vestige of gland spine usually present between L₁ and L₂ in the Diaspidini. Two large gland spines each bearing 4 or 5 microducts on segments VII and VI. Segment V with 6 long gland spines, bearing 1 microduct each. Conical setae (fig. j) 3 pairs submarginally, 1 pair laterad of perivulvar pores, 2 pairs anterior to vulva and 2 posteriorly. Quinquelocular perivulvar pores (fig. k) in 5 groups, formula 30-50, (31-50), 32-54. Ventral scleroses arising from L₁, wide and reaching the level of posterior groups of perivulvar pores.

Illustration based on material from *Salix humboldtiana*, Maracay, Aragua, Venezuela.

**Recognition characteristics**

The zygot L₁; reduction of L₂ and L₃; long and conspicuous gland spines; numerous short gland spines on the prepygidial and thoracic segments; and the large number of dorsal microducts makes this species distinct.

**Notes**
This tropical species is known from the representatives of a few plant families in Venezuela. It was collected only from *Salix* in the past.

**Pseudaulacaspis pentagona** (Targioni-Tozzetti)

Plate 46

*Diaspis pentagona* Targioni-Tozzetti, 1886:1. *Aulacaspis pentagona*

Fernald, 1903:234, Bellou, 1945:91. *Pseudaulacaspis pentagona*


**Material studied**


Valencia, Carabobo, 6-VI-66; *Pelargonium zonale*, Geraniaceae, Caracas, 25-II-50 (FFY); Maracay, 15-VI-68 (AD); Valencia, Carabobo, 15-XII-68 (J.C.M.). *Prunus persica*, Rosaceae, Caracas, D. F. 24-VI-62 (AD).


**Scale of the female**

White to yellowish white, circular or subcircular, flat, exuviae marginal or submarginal.

**Adult female**
Plate 46.- Pseudaulacaspis pentagona (Targioni-Tozzetti)
Body broadly oval (fig. a); 1052 (886 to 1167) long; 972
(679 to 1004) wide. Derm at maturity membranous except for the
pygidial area.

Prosome

Dorsum: Meso and metathorax with small group of two-barred micro-
ducts (fig. b).

Ventrum: Antenna (fig. c) a sclerotized tubercle, with 1 seta
about 20 long. Clypeolabral shield 235 long and 133 wide. Anterior
spiracle (fig. d) with to associated trilocular pores
(fig. e); posterior spiracle same size and shape as anterior
spiracle but without associated pores. Metathorax with a submarginal
cluster of small gland spines (fig. f), and 1 boss.

Prepygidial segments of abdomen

Dorsum: Segment I with a submarginal row of microducts (fig. g),
those slightly wider than those on prosoma. Segments II to IV
with 2 rows of microducts on the posterior intersegmental areas,
one submarginal, the other submedial.

Ventrum: Segments I and II with submarginal groups of 5 or 6 short
gland spines (fig. f). Segments III and IV with 5 marginal gland
spines (fig. f). Segments III and IV with 5 marginal gland spines
about twice as long as the ones on the preceding segments.

Pygidium (fig. h)

Dorsum: Median lobes (fig. i) well developed, prominent, zygotic,
crenulated on both margins, about 24 wide. L2 and L3 bilobed,
sclerotized, but slightly developed. Marginal macroducts openings,
1 between $L_1-L_2$, 2 at the base of $L_3$ and one beyond the remnant of $L_4$. On the intersegmental area of segments V and VI, 2 rows of microducts, a submarginal with 7 to 10 and a submedian with 3 to 6. Anal opening circular, 16 in diameter, placed about 10 times this diameter from the base of $L_1$; located at the level of vulva on the venter. Area around the anal opening sclerotized.

**Venterum:** Gland spines reduced in number, bearing 2 or 3 microducts, most bifurcate or trifurcate (fig. j); 1 located between $L_1-L_2$; 1 between $L_2-L_3$; 1 single and 1 trifurcate beyond $L_3$. Gland spines on segment V are similar to the ones on prepygidial segments. Submarginal cluster of microducts on segment VI. Conical setae (fig. k) 3 pairs submarginal, 2 pairs laterad of perivulvar pores, 1 pair on each side of vulva. Quinquelocular perivulvar pores (fig. 1) in 5 groups, formula $32-45,(22-42),15-22$. Sometimes a 6th group present with 6 to 16 pores, on the prepygidial segment. Ventral scleroses arising from base of median lobes and $L_2$.

Illustration based on material from *Pelargonium zonale*, Maracay, Aragua, Venezuela.

**Recognition characteristics**

The zygotic $L_1$; reduction of $L_2$ and $L_3$; small number of microducts and gland spines on prepygidial and thoracic segments, and the bifurcate and trifurcate gland spines on the pygidium makes this species distinct.

**Notes**

This cosmopolitan species is found on a large variety of hosts,
and is an important pest on several economic plants, including papaya, peaches and ornamentals.

Genus *Pseudoplarotaria* Cockerell

Type of the genus: *Pseudoplarotaria ostreata* Cockerell, 1892.


Description of the genus

Referable to the tribe Diaspidini, two-barred ducts, L₂ and L₃ bilobed; median lobes non-zygotic, with a pair of gland spines between them; marginal macroducts of the pygidium present, gland spines present but very short; perivulvar pores present; no pores associated with the spiracles.

*Pseudoplarotaria parlorioides* (Comstock)

Plate 47


Material studied

On *Cattleya fascelliana*, Orchidaceae, Venezuela (Quarantine),

**Scale of the female**

Circular or oval; flat; yellow or yellowish brown; exuviae submarginal.

**Adult female**

Body turbinate (fig. a), 1033 (945 to 1137) long 753 (546 to 901) wide. Derm at maturity membranous except for the **pygidium**.

**Prosoma**

**Dorsum**: Eye spot marginal (fig. b) well developed and sclerotized.

One pair of dorsal bosses submarginally. Few setae (fig. c) of about 8 long on the submarginal one of the head.

**Ventral**: Antenna (fig. d) is a sclerotized tubercle with 1 or 2 setae about 16 long. Clypeolabral shield 168 long and 106 wide. Anterior and posterior spiracles (fig. e) similar, without associated pores.

**Prepygidial segments of abdomen** (fig. f)

**Dorsum**: Segments II and III with a pair of dorsal bosses (fig. g) each. Segment IV with 1 to 3 submarginal microducts about long.

**Ventral**: Segments II and III with 2 or 3 microducts which end in
a very short gland spine (fig. i). All the prepygidial segments with 2 pairs of submedian conical setae (fig. j).

**Pygidium**

**Dorsum:** Median lobes (fig. k) non-zygotic, well developed about 16 wide, notched on each margin; L₂ bilobed and well developed; L₃ bilobed but very reduced; L₄ absent. Marginal macroducts about long, one between L₁-L₂; 2 between L₂-L₃; 3 or 4 beyond L₃. There is a submarginal macroduct on segment VII. An irregular row of 5 to 10 microducts submarginally on each half. Anal opening oval, 24 in diameter, placed about twice its diameter from the base of L₁, posterior to the vulva of the venter. Area around anal opening more sclerotized than rest of pygidium, also some other areas sclerotized.

**Ventrum:** A pair of serrate gland spines (fig. l) between the median lobes; one between L₁ and L₂ and one between L₂-L₃. A row of submarginal microducts from segment VII to V. Ventral scleroses arising from the base of L₁ and L₂. Quinquelocular perivulvar pores (fig. m) in 4 groups, formula 10-15,(15-20);0. Paravulvar scleroses well developed. Conical setae (fig. i) in a submarginal row; 3 pairs anterior to the perivulvar pores and 2 pairs posterior to the vulva. Two pairs of microducts on segment VIII, between the paravulvar scleroses.

Illustration based on material from Cattleya sp. Venezuela (Quarantine).

**Recognition characteristics**
The small number of dorsal microducts restricted to the pygidium and abdominal segment IV; the bilobed $L_2$ and $L_3$; the presence of perivulvar pores and short gland spines make this species distinct.

Notes

This polyphagous species is found in most of the tropical and subtropical regions of the new world, and these are a few records from other areas. It is a new record for the Venezuelan coccid-fauna.

Genus Unaspis MacGillivray

Type of the genus: Chionaspis acuminata Green, 1896.

Unaspis MacGillivray, 1921:303; Ferris, 1936:91; 1937:51-128;


Description of the genus

Referable to the tribe Diaspidini; two-barred ducts, numerous in the dorsum, especially on pygidial area; median lobes non-zygotic, $L_2$ and $L_3$ bilobed; trilocular pores associated with the spiracles; body fusiform.

Unaspis citri (Comstock)

Plate 48

Chionaspis citri Comstock, 1893:100; Fernald, 1903:214; Lindinger,

Material studied


Scale of the female

Brown or purplish; elongated, broadening posteriorly; exuviae terminal; with a slightly central ridge.

Adult female

Body fusiform (fig. a); 1460 (1033 to 1772) long; 570 (472 to 664) wide. Derm at maturity heavily sclerotized, especially the prosoma.

Prosoma

Dorsum: Eye spot (fig. b) on a protuberance at the margin of the head; a continuous row of microducts (fig. c) submarginally.
Ventrum: Antenna (fig. d) as a sclerotized tubercle, marginal, with one seta about 25 long. Clypeolabral shield 175 long and 85 (78 to 97) wide. Anterior spiracle (fig. e) with 12 to 14 associated trilocular pores (fig. f); posterior spiracle same size and shape, with 3 associated pores. Gland tubercles (fig. g) 2 submarginally on the mesothorax; a cluster of 5 submarginally on the metathorax.

Prepygidial segments of abdomen (fig. h)

Dorsum: Segments I and II with a submarginal cluster of microducts (fig. c) about 16 long; segments III and IV with numerous microducts scattered over the segment.

Ventrum: Segments I and II with a cluster of gland tubercles (fig. g) submarginally. Segments III and IV with a cluster of marginal gland spines and one microduct each, submarginally.

Pygidium

Dorsum: Median lobes (fig. j) well developed, non-zygotic, inner side serrate, about 12 wide; \( L_2 \) and \( L_3 \) bilobed; \( L_4 \) absent. Marginal macroducts about 20 long with oral sclerotization, located 1 between \( L_1-L_2 \), 2 between \( L_2-L_3 \), 2 on segments VI and V. Numerous microducts scattered on the rest of pygidium. Anal opening circular, 16 in diameter, placed about 7 times this diameter from the base of \( L_1 \); located at the same level of the vulva on the venter. Anal apophysis well developed, extends from anterior of the anal opening to the apex of the pygidium.

Ventrum: Gland spines present, 1 on segment VII, 1 on segment VI and 3 on segment V. Row of 3 conical setae (fig. k) submarginally and
4 pairs anterior to vulva. Perivulvar pores and paravulvar scleroses absent.

Illustration based on material from Citrus medica, El Limon, Aragua, Venezuela.

Recognition characteristics

The bilobed L₄ and L₃, sclerotization of the body at maturity and the absence of perivulvar pores make this species distinct.

Notes

This species is restricted to plants of the family Rutaceae and principally to the genus Citrus; it is found on almost all the areas of the world in which citrus is cultivated.

Genus Velataspis Ferris

Type of the genus: Scobinaspis dentata Hoke, 1921.


Description of the genus

Referable to the tribe Diaspidini, two-barred ducts; L₂ bilobed. Body elongate. Median lobes non-zygotic, marginal macropores large, perivulvar pores present, gland spines and gland tubercles present, sclerotic tubercles of different shapes on the head between the antennae.

Velataspis dentata (Hoke)

Plate 49
Plate 49. - Velataspis dentata (Hoke)
Scobinaspis dentata Hoke, 1921:340. Lepidosaphes dentata

Merrill and Chafin, 1923:242. Veletaspis dentata Ferris, 1937:
SI-133; Borchsenius, 1966:60.

Material studied

Three females on Spondias mombin, Anacardiaceae, El Limon, 26-V-66 (AD) (IZA).

Scale of the female

Yellowish or silvery-brown, elongate; exuviae terminal; up to 2mm long.

Adult female

Body elongate (fig. a), 1363 (1256 to 1431) long, 380 (340 to 399) wide. Derm at maturity membranous, except for areas of the pygidium.

Prosoma

Dorsum: Row of few microducts, 8 long, in the submarginal area of the head. Eye spot well defined and sclerotized. Few small setae, on the margin of the prosoma. Few microducts in the submarginal area of the meso and metathorax.

Ventrum: Antennae (fig. b) a sclerotized tubercle with 2 setae each about 12 long. Between antennae and just anterior to these a number of irregular sclerotic tubercles (fig. c), 6 or 7 small microducts associated with these tubercles. Clypeolabral shield 195 long, and 86 wide. Anterior spiracle (fig. d) with 1 or 2 associated quinquelocular pores (fig. e); posterior spiracle same shape and size without associated pores; from latter spiracle a
cluster of microducts and gland tubercles extend toward the margin of metathorax.

Prepyridial segments of abdomen (fig. e)

Dorsum: Segment I with few marginal microducts of about 16 long; segments II, III, and IV in addition to the marginal microducts with scattered microducts on the rest of the segment.

Ventrum: Segment I with a cluster of 10 to 15 gland tubercles (fig. f); segments II, III, and IV each with a pair of well developed gland spines (fig. g).

Pygidium

Dorsum: Median lobes (fig. h), well developed, about 27 wide, with both margins dentate, apex rounded; L₂ bilobed; L₃ and L₄ absent; marginal macroducts (fig. i) 20 long, one between L₁ and L₂; 2 on segment VII; 2 on segment VI; 1 on segment V. Each macroduct with its opening in a small evagination on margin. Two macroducts submarginally on segment VII and VIII; in the rest of the pygidium few scattered microducts. Anal opening circular, 16 in diameter, placed about 7 times this diameter from the base of L₁; located anterior to vulva on venter. Anal apophysis well sclerotized, around anal opening and extending posteriorly almost to the margin.

Ventrum: Two gland spines between the median lobes; 1 between L₁ and L₂; 1 beyond L₂ on each segment of pygidium. Median lobes with a conspicuous, inverted-V-shaped sclerose; a pair of microducts submarginally in segment V. Quinquelocular perivulvar pores
in 5 groups, formula 4-5, (6-8), 2-3. Conical setae, 3 submarginally; 3 pairs lateradly of perivulvar pores, 2 pairs anterior to vulva.

Illustration based on material from *Spondias mombin*, El Limon, Aragua, Venezuela.

**Recognition characteristics**

The elongated body, tubercles between the antennae, narrow sclerotized areas of the pygidium and the inverted-V-shaped scleroses on the ventral side of the median lobes make this species distinct.

**Notes**

This polyphagous species was previously known only from the United States and Panama. This new addition for the Venezuelan coccid-fauna, extends the range of the species to South America.
TRIBE ODONASPIDINI

Genus Odonaspis Leonardi

Type of the genus: Aspidiotus secretus Cockerell, 1896.


Description of the genus

Referable to the tribe Odonaspidini; plates and gland spines absent; short-two-barred microducts very abundant dorsally and ventrally; perivulvar pores very numerous and forming a continuous arch; abdominal segments sharply divided on paratergal and mesotergal areas; paired median lobes never present in the adult female, the eight segment being entirely fused across the meson. Intersegmental scleroses on the pygidium present. Derm membranous except for the pygidium and marginal paratergal areas.

Key to the species of Odonaspis

Submarginal cluster of dorsal microducts present on thoracic segments; 20 or more quinquelocular pores associated with anterior spiracles. ... saccharicaulis (Zehntner)

Submarginal cluster of dorsal microducts absent from thorax; 9 or less quinquelocular pores associated with anterior spiracle . . . . . . . . . . . . . quaedae n. sp.
**Odonaspis quaduae** n. sp.

**Plate 50**

**Material studied**

On *Bambusa* (*Quadua*) *latifolia* Gramineae, San Juan de Loba, Dept. Bolivar, Colombia, Hay, 1916 (H. M. Curran) (3 slides). *Guadua* probably, *latifolia*, Gramineae, Orinoco river above Lapire, Guarico, Venezuela, 14-X-43 (F. A. McClure). Quarantine material: On Bamboo Costa Rica, 31-VII-42 (P. Gladish) (San Pedro 4037); Mexico at Laredo, 29-VIII-46 (Trotter) (Laredo 40861); Mexico at Nogales, 2-XII-44 (Algert) (Nogales 60735); Venezuela at San Juan, 10-X-41 (Chapman) (San Juan 8016). All the above material is deposited in the Collection of Coccoidea, USNM. N. H. Holotype female is the marked centrally located specimen on the slide from Mexico at Nogales (Nogales 60735). No dry material was available for the study of larger series and the scale of the female.

**Adult female**

Body oval (fig. a); 1077 (886 to 1343) long, 841 (664 to 930) wide; derr membranous except for the pygidium and marginal paratergal areas.

**Prosoma**

**Dorsum:** No microducts present on this surface, segmentation visible.

**Ventrum:** Antenna (fig. b) as a sclerotized tubercle with 1 seta, about 23 long. Clypeolabral shield 222 long and 140 wide. Anterior spiracle (fig. c) with 5 to 11 associated quinquelocular pores.
Plate 50. - Odonaspis guaduae n.sp.
(fig. d); posterior spiracle same size and shape as anterior
spiracle, but with 3 to 8 associated pores. Area between the ant-
erior spiracle and mouthparts with numerous microducts arising
from this area and following the intersegmental membrane to the
margin, 2 bands of microducts present, one on each side of
anterior spiracle. Submarginal clusters of 8 to 16 gland tubercles
(fig. e) on the pro and mesothorax. From the areas of atrium of
posterior spiracle toward the body margin extends a band of
microducts and gland tubercles.

Prepygidial segments of abdomen

Dorsum: Paratergal areas sharply separated from mesotergal areas;
intersegmental membranes with series of small scleroses (fig. f).
Segments I to IV with numerous microducts (fig. g) on the paratergal
areas; mesotergal areas without microducts.

Ventral: Segments I to III with numerous microducts on the submargin,
and a continuous row of serrate squamations (fig. h) medially. Seg-
ment IV with numerous submarginal microducts, changing to gland
tubercle toward the submedial area.

Pygidium (fig. i)

Dorsum: Median lobes (fig. j) fused as characteristic of the genus,
margin with several indentations up to segment VI. Intersegmental
scleroses, one well developed between segments VII and VIII, a short
and sometimes absent between VI and VII. Microducts (fig. k) short,
extremely numerous, present on all the pygidial segments, especially
on segments V and VI. Anal opening circular, 12 in diameter; placed
20 times from the margin; located at the level of vulva of the venter. Area around anal opening clerotized.

Ventrum: Microducts covering the submarginal area of each segment; submedian clusters of gland tubercles on segments V and VI. Conical setae (fig. 1), 3 pairs submarginally, 1 pair anterior to vulva and 2 posteriorly. Band of 130 to 166 quinquelocular perivulvar pores (fig. m). Rows of serrate squamations (fig. h) anterior to vulva on segments V and VI.

Illustration based on material from bamboo, Mexico at Nogales.

Recognition characteristics

O. guaduæ can be separated from the closely related species O. saccharicaulis by the absence of dorsal microducts on the thorax, fewer pores associated with spiracles, short development or absence of intersegmental scleroses between segments VI and VII of pygidium.

Notes

Harold Morrison, while studying the adult females of this material, found them distinct, and suggested the manuscript name, O. gadua, probably because the host on which is found; this manuscript with minor change is kept to be used for this new species.

Odonaspis saccharicaulis (Zehnbacker)

Plate 51

Plate 51. - Odonaspis saccharicaulis (Zehntner)
Material studied

On *Panicum barbinoides*, Graminea, Urena, Tachira, 18-V-49 (FFY) (IZA & USNM).

Scale of the female

Not seen, described by Balachowsky, 1958, as "white, bivalve circular, exuviae central or subcentral."

Adult female

Body oval (fig. a); 1104 (1048 to 1211) long, 797 (694 to 812) wide. Derm at maturity membranous except for the pygidium and marginal paratergal areas.

Prosome

**Dorsum**: Submarginal cluster of microducts (fig. b) on the meso and metathorax. Few scattered setae (fig. c) submarginally on the head.

**Ventrum**: Antenna (fig. d) a sclerotized tubercle with 1 seta, about 23 long. Clypeolabral shield 236 long and 162 wide. Anterior spiracle (fig. e) with 22 to 31 associated quinquelocular pores (fig. f); posterior spiracle same size and shape as anterior spiracle, but with 15 to 20 associated pores. Area between the anterior spiracle and mouthparts with numerous microducts; 2 bands of microducts are extending from this area toward the margin, one on each side of anterior spiracle. Submarginal clusters of 5 to 12 gland tubercles (fig. g) on the prothorax. From the atrium of posterior spiracle toward the margin a wide band of microducts present.

Prepygidial segments of abdomen
Dorsum: Paratergal areas sharply separated from mesotergal areas, intersegmental membranes with series of small scleroses (fig. h). Segments I to IV with numerous microducts (fig. i) on the paratergal areas.

Ventrum: Segments I to IV with numerous microducts in the submarginal areas with continuous rows of serrate squamations (fig. j); medially and series of small scleroses (fig. h) on intersegmental membranes.

Pygidium (fig. k)

Dorsum: Median lobes (fig. l) low and rounded, on each side a small point, beyond this the margin is slightly crenulated up to seta of segment VI. Intersegmental scleroses long and slender, one pair between segments VII and VIII, other between segments VI and VII. Microducts short, numerous present on all pygidial segments. Anal opening circular, 12 in diameter; placed 20 times from the margin; located at level of vulva of the venter. Area around anal opening sclerotized.

Ventrum: Submarginal microducts on segments VII and VIII restricted to a few rows, more numerous on segment V and VI. Conical setae, 3 pairs submarginally, 1 anterior to vulva and 2 posterior. Band of 150 or more quinquelocular perivulvar pores (fig. m). Rows of serrate squamations (fig. j) anterior to vulva on segments V and VI.

Illustration based on material from Paricium barbinoides, Urena, Tachira, Venezuela.

Recognition characteristics
The fused median lobes, many perivulvar pores, numerous quinquelocular pores associated with spiracles, presence of dorsal microducts on thoracic segments and the 2 well developed inter-segmental sclerosis of pygidium make this species distinct.

**Notes**

This species is restricted to Gramineae, known previously from the Oriental Region and U.S.A. It is a new addition to the Venezuelan coccid-fauna.
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VITA

The author, son of Alfredo and Rosa D'Ascoli, was born in Caracas, Venezuela, on May 18, 1942. He graduated from Santiago de Leon High School in July, 1959 and in September of that year he enrolled in the Universidad Central de Venezuela, from where he received the degree of Ingeniero Agonomo in December, 1964. He accepted a research position at the Departamento de Ecologia, Instituto Venezolano de Investigaciones Cientificas, in January, 1965. In February, 1965, he was employed as Instructor in Entomology at the Facultad de Agronomia, Universidad Central de Venezuela. In August 1968 he was granted a leave of absence from the Universidad Central de Venezuela and enrolled in the Graduate School, Department of Entomology, Virginia Polytechnic Institute and State University.

On December 21, 1963 the author married Flavia, daughter of Jesus and Alicia Erinceno of Maracay, Venezuela. The author and wife have two daughters, Adriana and Ingrid, and one son, Oscar.

Alfredo D'Ascoli
THE ARMORED SCALE INSECTS OF VENEZUELA
(HOMOPTERA: COCCOIDEA: DIASPIDIDAE)

by

Alfredo D'Ascoli

ABSTRACT

Scale insects are among the most serious plant pests throughout the world. The Diaspididae is the largest scale insect family and probably the most important economically. No comprehensive taxonomic study dealing with the scale insects of Venezuela has been conducted in the past.

Forty-nine species are described and illustrated in this study, of which 2 are new species. Twenty-seven additional species are recorded from Venezuela for the first time. Keys are provided for determination of the 49 species. The material studied was borrowed from several institutions. Mounting techniques are given.

The description of each species is based on females, since males and nymphs were available only in a few species. While this is essentially a taxonomic and faunistic study, the hosts on which the scale insects were found are listed.

It is hoped that this study would be used as basis for future research in Venezuela. More collections need to be made throughout the many ecologically different areas of the country; especially from non-cultivated plants. The accumulation of additional
distributional and biological records, and will lead to a better understanding of the Venezuelan armored scale insect fauna.