

A C T A Z O O L O G I C A  
C R A C O V I E N S I A

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**Studies on the genus *Abgrallaspis* BALACHOWSKY, 1948,  
(Homoptera, Coccoidea, Diaspididae)**

[Pp. 43—86, 17 text-figs.]

**Studia nad rodzajem *Abgrallaspis* BALACHOWSKY, 1948,  
(Homoptera, Coccoidea, Diaspididae)**

**Исследования рода *Abgrallaspis* BALACHOWSKY, 1948,  
(Homoptera, Coccoidea, Diaspididae)**

Abstract. In the work the definition of the studied genus is formulated and the differences between the genus *Abgrallaspis* BALACH. and some closely related genera: *Hemiberlesia* CKLL., *Diaspidiotus* LEON., *Borchseniaspis* ZAHN., *Ephedrasspis* BORCHS., and *Aspidiella* LEON. are given. It is suggested that the genus closest to *Abgrallaspis* BALACH. is *Diaspidiotus* LEON. Some conclusions are drawn as to the degree of specialization of the genus *Abgrallaspis* BALACH. in relation to the others genera mentioned above. As a result of the revisionary studies 8 new combinations were made and 17 species assigned to the studied genus. Drawings were made for 15 species.

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THE HISTORY OF THE CONCEPTION AND COMPOSITION OF THE GENUS  
*ABGRALLASPIS* BALACHOWSKY, 1948

BALACHOWSKY (1948), in creating the genus *Abgrallaspis*, designated as a type species *Aspidiotus cyanophylli* SING. which was then assigned to *Hemiberlesia* CKLL. He also (l. c.) transferred five other species to this genus: from *Ephedraspis* BORCHS. — *Aspidiotus ephedrarum* LIND., from *Hemiberlesia* CKLL. — *Aspidiotus palmae* MORGAN et CKLL., *Chrysomphalus degeneratus* LEONARDI, and *Aspidiotus seurati* MARCHAL, from *Chrysomphalus* ASHMEAD — *Chrysomphalus insularis* BALACH.

Later (1953), BALACHOWSKY transferred to *Abgrallaspis* BALACH. four further species from *Hemiberlesia* CKLL.: *Aspidiotus howardi* CKLL., *Aspidiotus comstocki* JOHN., *Aspidiotus coloratus* CKLL., and *Hemiberlesia fraxini* MCKENZIE, but simultaneously retransferred from *Abgrallaspis* BALACH. *Aspidiotus palmae* MORGAN et CKLL. and replaced it in *Hemiberlesia* CKLL.

In 1956, the same author assigned to *Abgrallaspis* BALACH. two other species and one subspecies: from *Aspidiotus* BOUCHÉ — *Aspidiotus furcillae* BRAIN, from *Hemiberlesia* CKLL. — *Aspidiotus (Hemiberlesia) rhodesiensis* HALL and *Aspidiotus (Hemiberlesia) rhodesiensis* HALL var. *umtalii* HALL.

BALACHOWSKY (1959), DE LOTTO (1957), DAVIDSON (1964), and KOMOSIŃSKA (1965) each described one new species: *Abgrallaspis kaussarii* BALACH., *Abgrallaspis flavida* DE LOTTO, *Abgrallaspis perseus* DAVIDSON, and *Abgrallaspis gliwicensis* KOMOSIŃSKA.



DAVIDSON (1964) transferred from *Hemiberlesia* CKLL. to *Abgrallaspis* BALACH. three species: *Hemiberlesia quercicola* FERRIS, *Hemiberlesia mendax* MCKENZIE, and *Hemiberlesia flabellata* FERRIS, and two species from *Aspidaspis* FERRIS: *Aspidiotus oxycoccus* WOGLUM and *Aspidaspis ithacae* FERRIS. He also renewed from synonyms *Aspidiotus townsendi* CKLL. as *Abgrallaspis townsendi* (CKLL.); this species was sunk as a synonym of *Hemiberlesia howardi* (CKLL.) by FERRIS (1938).

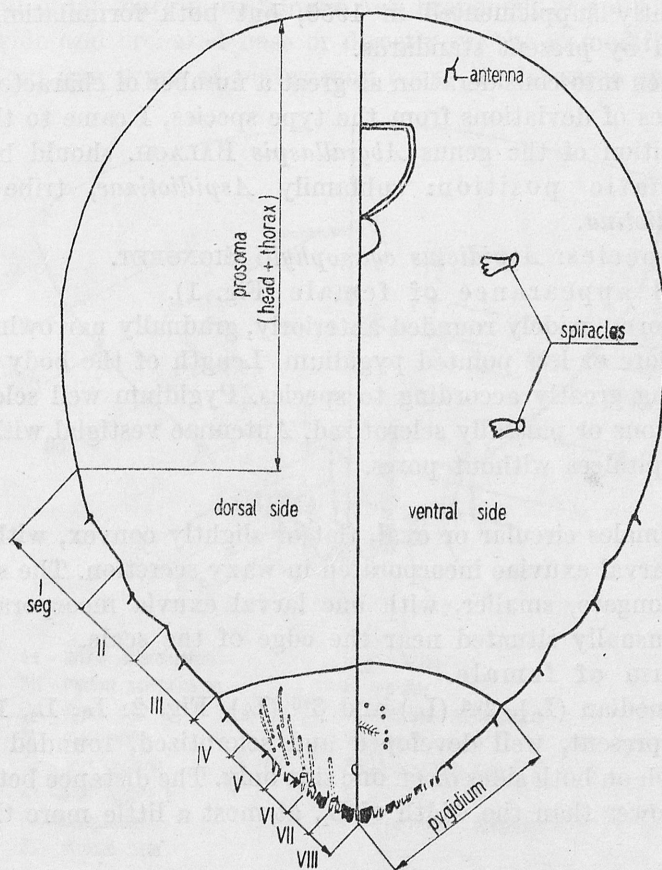


Fig. 1. General aspect of *Abgrallaspis* BALACHOWSKY

STANNARD (1965) synonymized *Abgrallaspis howardi* (CKLL.) and *Abgrallaspis comstocki* (JOHN.) with *Diaspis ancylus* PUTNAM and included it in *Aspidiotus* BOUCHÉ.

BORCHSENIUS (1966) included in *Abgrallaspis* BALACH. 11 species. Besides those which had previously been assigned to this genus he added 4 species from other genera: from *Quadraspidotus* MACGILLIVRAY — *Quadraspidotus caricis* GÓMEZ-MENOR, from *Diclaspis* BALACH. — *Aspidiotus mashonae* HALL, and from *Hemiberlesia* CKLL. — *Aspidiotus mitchelli* MARLATT and *Aonidielal paucitatis* MCKENZIE.

In addition to the above-mentioned authors, the genus *Abgrallaspis* was recognized by EZZAT (1958), KOSZTARAB (1963/64), ZAHRADNÍK (1959, 1959a), SCHMUTTERER (1959) and others. It was not recognized by FERRIS (1953) and MCKENZIE (1956).

#### DEFINITION OF THE GENUS

BALACHOWSKY (1948) gave a short definition of the genus *Abgrallaspis*, which he slightly supplemented in 1956, but both formulations are rather too generalized by present standards.

Having taken into consideration as great a number of characters as possible and their ranges of deviations from the type species, I came to the conclusion that the definition of the genus *Abgrallaspis* BALACH. should be as follows:

1. Systematic position: subfamily *Aspidiotinae*, tribe *Aspidiotini*, subtribe *Aspidiotina*.

2. Type species: *Aspidiotus cyanophylli* SIGNORET.

3. General appearance of female (Fig. 1).

Body pyriform, widely rounded anteriorly, gradually narrowing posteriorly towards the more or less pointed pygidium. Length of the body from 0.75 to 2.5 mm, varying greatly according to species. Pygidium well sclerotized, prosoma membranous or partially sclerotized. Antennae vestigial with one bristle; two pairs of spiracles without pores.

4. Scales.

Scales of females circular or oval, flat or slightly convex, with two central or subcentral larval exuviae incorporated in waxy secretion. The scale of males narrow and elongate, smaller, with one larval exuvia incorporated in waxy secretion and usually situated near the edge of the scale.

5. Pygidium of female.

a) Lobes: median ( $L_1$ ), 2<sup>nd</sup> ( $L_2$ ) and 3<sup>rd</sup> ( $L_3$ ). Fig. 2:  $L_1$ ,  $L_2$ ,  $L_3$ ).

$L_1$  always present, well developed and sclerotized, rounded at the apex and with a notch on both sides or on one side only. The distance between median lobes ( $L_1$ ) narrower than the width of  $L_1$ , at most a little more than 1/2 their width.

$L_2$  always present, well developed and sclerotized; they are not triangular in shape and have a notch on the outer side or on both sides, or they are without notches altogether, in which case they are widely rounded at top.  $L_2$  shorter than  $L_1$ , similar to or of different shape than  $L_1$ .

$L_3$  present or lacking. If present they are usually sclerotized, as a rule smaller than  $L_2$ , with a narrow outer notch, or spiniform.

$L_4$  absent.

The type species has three pairs of sclerotized lobes.  $L_1$  deeply notched on both sides, widely rounded at the top,  $L_2$  notched only on the outer margin, narrowly rounded at the top.  $L_3$  small, spiniform.

b) Plates (Fig. 2: Pl).

Present in all species between lobes. Arrangement of plates is as follows:

2 between  $L_1$ , 2 between  $L_1$  and  $L_2$ , 3 between  $L_2$  and  $L_3$  (if  $L_3$  absent, then between VII and VI pygidial setae which correspond to the position of  $L_2$  and  $L_3$  respectively). Anterior to  $L_3$  (or VI pygidial seta) there may be 2—8 external plates, depending on the species. Only in *Abgrallaspis mammillaris* (LIND.) are there no plates here. Plates between  $L_1$  and  $L_1$  and  $L_2$  are fringed and sometimes branched on the top; those between  $L_2$  and  $L_3$  are fringed on top and on the outer margin. The external plates are of various shapes: fimbriate on the top and outer margin, or fringed and branched, or spinelike. They may be set on a wide and crenated base or directly on the unmodified edge of the pygidium. Often two types of plates may occur in the same species.

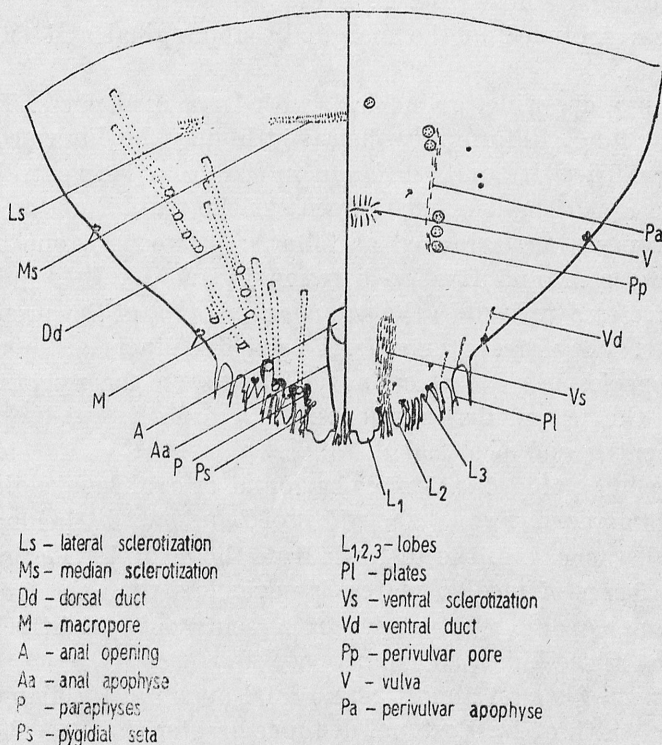


Fig. 2. Pygidial structures of *Abgrallaspis* BALACHOWSKY

The type species usually has 5 plates anterior to  $L_3$ . They are slightly branched and fringed, set directly on the edge of the pygidium.

c) Paraphyses and other sclerotizations (Fig. 2: P).

Paraphyses are always present between segments VIII and VII, and VII and VI; in some species they are also present between  $L_1$ . Between segments VIII and VII they can be either single or double. When double, they are arranged in two pairs one above the other. They may be well or only slightly developed and occur at the basal corner of the lobe or between the lobes. They are elongate, swollen anteriorly and gradually narrowing towards the edge of the pygidium.



Anal and perivulvar apophyses (Fig. 2: Aa, Pa), dorsal (median and lateral) sclerotization (Fig. 2: Ms, Ls), are usually present; ventral sclerotizations (Fig. 2: Vs) are always present extending approximately from the level of the anterior margin of the anal opening to the margin of the pygidium near  $L_2$  or  $L_1$  and  $L_2$ . These sclerotizations are either uniformly narrow, or enlarged anteriorly and narrowing towards the edge of the pygidium, or broad and plate-like throughout.

The type species has well-developed paraphyses, those between segments VIII and VII being double. Dorsal sclerotizations, perivulvar apophyses, and a narrow ventral sclerotizations are present.

d) Dorsal tubular ducts (Fig. 2: Dd).

Dorsal ducts arranged in the marginal, submarginal and submedian area of the pygidium.

Generally they are wide, cylindrical, with large oval pores. They may also be narrow and long, filiform, or their width may be intermediate between these two types. They are quite different in size from the ventral ones (Fig. 2: Vd), which are much smaller and shorter. At the margin of the pygidium the marginal macropores are arranged as follows: between  $L_1$  one or two, rarely none; one between  $L_1$  and  $L_2$ ; two between  $L_2$  and  $L_3$ . In some species large dorsal ducts are also present in the submarginal area of the prepygidial abdominal segments. They are as long as the pygidial ducts or shorter.

The type species has dorsal cylindrical ducts on the pygidium, but they are absent on the prepygidial segments.

e) Anal opening and postanal distance.

The anal opening (Fig. 2: A) may be round or oval longitudinally or transversally. Its diameter may equal the width of  $L_1$  or be a little longer or shorter. The postanal distance, i. e. the distance from the posterior margin of the anal opening to the bases of median plates, is never less than the longitudinal diameter of the anal opening but varies from being only slightly longer (rarely equal) to about three times as long.

The type species has an almost round anal opening. Its diameter is a little larger than the width of  $L_1$ . Postanal distance greater than 1.5 the longitudinal diameter of the anal opening.

f) Perivulvar pores (Fig. 2: Pp).

Present in most species; arranged in four or five small groups. Only *Abgrallaspis coloratus* (CKLL.) has an additional sixth group.

The type species has perivulvar pores arranged in four or five groups.

## REVISION OF THE GENUS

The above definition of the genus was formulated on the basis of detailed study of the morphological features of type species (females) and of the conditions of these features in the related species, most of which were available for my studies.

The following changes in the composition of the genus are necessary:

1. Three species previously included in *Abgrallaspis* BALACH. do not belong to this genus.

2. Five species are transferred from other genera to *Abgrallaspis* BALACH.

3. The assignment of 5 species to *Abgrallaspis* BALACH., specimens of which were not available for my studies, seems to me doubtful.

ad. 1: I transferred *Aspidiotus furcillae* BRAIN from *Abgrallaspis* BALACH. to *Diaspidiotus* LEON., taking into consideration the shape and degree of sclerotization of  $L_2$ , which is not typical for the genus *Abgrallaspis* BALACH., while this feature as well as some others correspond to the features of *Diaspidiotus* LEON. In the specimens which I examined the shape and degree of sclerotization of  $L_2$  wholly agree with the first description and drawing of this species made by BRAIN (1918); on *Accacia* sp., Pretoria (South Africa), available to me from the collection in the British Museum (Natural History).

I transferred from *Abgrallaspis* BALACH., *Aspidiotus (Hemiberlesia) mitchelli* MARLATT to *Borchseniaspis* ZAHRAĐNÍK, taking into consideration the length of the post anal distance and the distance between the median lobes ( $L_1$ ). The specimens of *Borchseniaspis mitchelli* (MARLATT) examined were the type material available to me from the British Museum (Natural History).

I also transferred from *Abgrallaspis* BALACH., *Aspidiotus townsendi* CKLL. to *Diaspidiotus* LEON. for the following reasons: DAVIDSON (1964) stated that in this species the shape and degree of sclerotization of  $L_2$  is changed and that those specimens with extremely reduced lobes are so similar to *Diaspidiotus ancyclus* (PUTNAM) that their distinction is difficult. He noted the same variation of  $L_2$  in *Abgrallaspis howardi* (CKLL.). On the basis of biological investigation, STANNARD (1965) synonymized *Aspidiotus howardi* CKLL. and *Aspidiotus comstocki* JOHN. with *Diaspis ancyclus* (PUTNAM), which he retained in *Aspidiotus* BOUCHÉ. This generic transfer does not agree with the diagnosis of *Aspidiotus* BOUCHÉ, given by FERRIS (1941a) and BALACHOWSKY (1956) and accepted by other coccidologists. The differences between *Aspidiotus* BOUCHÉ and *Diaspidiotus* LEON. concern: paraphyses, plates, and development of  $L_2$  and  $L_3$ . Moreover this transfer results in another complication. The type species of *Diaspidiotus* LEON. is *Diaspidiotus ancyclus* (PUTNAM)<sup>1</sup> and therefore, transfer of this species to *Aspidiotus* BOUCHÉ could be understood as synonymizing *Diaspidiotus* LEON. with *Aspidiotus* BOUCHÉ. There is no reason for this at least in the present state of knowledge of systematics and biology concerning these genera, especially as they are well separable. Hence in this work I retransferred *Aspidiotus ancyclus* PUTNAM to *Diaspidiotus* LEON. as *D. ancyclus* (PUTNAM).

<sup>1</sup> *Diaspidiotus ancyclus* (PUTNAM) is generally considered to be the type of *Diaspidiotus* LEON. but DE LOTTO (1964) established that *Aspidiotus patavinus* BERLESE, 1896 is the type species; the latter was synonymized with *Aspidiotus pyri* LICHT., which is a *Quadraspidotus* MACGILLIVRAY, thus the name *Diaspidiotus* LEON. would to be have sunk as a synonym of *Quadraspidotus* MACGILLIVRAY. The problem requires further clarification and was beyond the scope of the present work.



As was previously mentioned, *Aspidiotus comstocki* JOHN. and *Aspidiotus howardi* CKLL. were synonymized with „*ancylus*“. I transferred *Aspidiotus townsendi* CKLL. to *Diaspidiotus* LEON. because, according to DAVIDSON'S (1964) observations, it is morphologically closest to *Aspidiotus howardii* CKLL. and some specimens of *Aspidiotus townsendi* CKLL. are very similar to *Diaspidiotus ancylus* (PUTNAM). It is possible that further biological investigations might prove that *Diaspidiotus townsendi* (CKLL.) should be synonymized with *Diaspidiotus ancylus* (PUTNAM) as well.

ad 2: I transferred to *Abgrallaspis* BALACH. from *Hemiberlesia* CKLL. — *Aspidiotus diffinis* NEWST., *Aspidiotus mammillaris* LIND. and *Hemiberlesia sinensis* FERRIS; from *Aspidiella* LEON. — *Aspidiotus latastei* CKLL.; from *Diaspidiotus* — *Diaspidiotus amygdalicola* BORCHS. The data concerning these species are given with the descriptions of the species.

ad 3: Species which in my opinion are probably not congeneric with *Abgrallaspis* BALACH.: *Aspidaspis ithacae* FERRIS, *Aspidiotus oxycoccus* WOGLUM, *Aspidiotus mashonae* HALL, *Hemiberlesia quercicola* FERRIS and *Aonidiella paucitatis* MCKENZIE.

#### Key to some genera closely related with the genus *Abgrallaspis* BALACH.

1. —  $L_1$  well developed,  $L_2$  and  $L_3$  reduced or lacking . . . . . 2  
     —  $L_1$  and  $L_2$  well developed,  $L_3$  well or slightly developed or lacking . . . . . 3
2. — Anal opening removed from the bases of median plates by a distance shorter than its longitudinal diameter; it is wider and longer than  $L_1$  . . . . . ***Hemiberlesia*** CKLL.  
     — Anal opening removed from the bases of the median plates by a distance considerably longer than its longitudinal diameter; it is narrower and shorter than  $L_1$  . . . . . ***Diaspidiotus*** LEON.
3. — Paraphyses present between segments VIII and VII, VII and VI . . . . . 4  
     — Paraphyses present only between segments VII and VI, or paraphyses entirely lacking . . . . . 5
4. — The distance between  $L_1$  narrower than the width of  $L_1$ , anal opening is removed from the bases of the median plates by a distance usually longer than its longitudinal diameter . . . . . ***Abgrallaspis*** BALACH.  
     — The distance between  $L_1$  equal or wider than the width of  $L_1$ . Anal opening removed from the bases of median plates by a distance shorter than its longitudinal diameter . . . . . ***Borchseniaspis*** ZAHR.
5. — Paraphyses present only between segments VII and VI, dorsal ducts on pygidium distinctly larger than the ventral ones . . . . .  
     . . . . . ***Ephedrasis*** BORCHS.  
     — Paraphyses entirely lacking, dorsal ducts on pygidium about the same size as the ventral ones . . . . . ***Aspidiella*** LEON.



Table I  
List of the species names used in genus *Abgrallaspis* BALACH. This list includes the names of species previously assigned to *Abgrallaspis* BALACH. and the species which were assigned to this genus, giving their present generic position

species	original generic position	author	year	assigned to <i>Abgrallaspis</i> by	present generic position	notes
<i>amygdalicola</i> <i>ecricis</i> **	<i>Diaspidiotus</i> <i>Quadraspidiotus</i>	BORCHSENIUS GÓMEZ-MENOR	1952 1954	BORCHSENIUS, 1966	<i>Abgrallaspis</i> (comb. n.)	no author's opinion
<i>coloratus</i>	<i>Aspidiotus</i>	COCKERELL	1893		<i>Abgrallaspis</i> , BALACHOWSKY, 1953	
<i>comstocki</i>	<i>Aspidiotus</i>	JOHNSON	1896	BALACHOWSKY, 1953		synonymized under <i>Diaspidiotus ancyclus</i> (P.)
<i>cyanophylli</i>	<i>Aspidiotus</i>	SIGNORET	1869		<i>Abgrallaspis</i> type, BALACHOWSKY, 1948	
<i>degeneratus</i>	<i>Chrysomphalus</i>	LEONARDI	1896		<i>Abgrallaspis</i> , BALACHOWSKY, 1948	
<i>diffinis</i> <i>ephedrarum</i>	<i>Aspidiotus</i> <i>Aspidiotus</i>	NEWSTEAD LINDINGER	1893 1912	BALACHOWSKY, 1948	<i>Abgrallaspis</i> (comb. n.) <i>Ephedraspis</i> type, BORCHSENIUS, 1949, 1966	
<i>flabellata</i> <i>flavida</i> <i>fraxini</i>	<i>Hemiberlesia</i> <i>Abgrallaspis</i> <i>Hemiberlesia</i>	FERRIS DE LOTTO MCKENZIE	1938 1957 1944		<i>Abgrallaspis</i> , DAVIDSON, 1964 <i>Abgrallaspis</i> <i>Abgrallaspis</i> , BALACHOWSKY, 1953	
<i>fureillae</i>	<i>Aspidiotus</i>	BRAIN	1918	BALACHOWSKY, 1956	<i>Diaspidiotus</i> (comb. n.)	
<i>glivicensis</i> <i>howardi</i>	<i>Abgrallaspis</i> <i>Aspidiotus</i>	KOMOSÍNSKA COCKERELL	1965 1895	BALACHOWSKY, 1953	<i>Abgrallaspis</i>	synonymized under <i>Diaspidiotus ancyclus</i> (P.)
<i>insularis</i> **	<i>Chrysomphalus</i>	BALACHOWSKY	1937		<i>Abgrallaspis</i> , BALACHOWSKY, 1948	
<i>ithacae</i> **	<i>Aspidaspis</i>	FERRIS	1938		<i>Abgrallaspis</i> *, DAVIDSON, 1964	

Table I (continued)

species	original generic position	author	year	assigned to <i>Abgrallaspis</i> by	present generic position	notes
<i>kaussarii</i> **	<i>Abgrallaspis</i>	BALACHOWSKY	1959		<i>Abgrallaspis</i>	
<i>latastei</i>	<i>Aspidiotus</i>	COCKERELL	1894		<i>Abgrallaspis</i> (comb. n.)	
<i>mammillaris</i>	<i>Aspidiotus</i>	LINDINGER	1910		<i>Abgrallaspis</i> (comb. n.)	
<i>mashonae</i> **	<i>Aspidiotus</i>	HALL	1929		<i>Abgrallaspis</i> *, BORCHSENIUS, 1966	
<i>mendax</i>	<i>Hemiberlesia</i>	McKENZIE	1943		<i>Abgrallaspis</i> , DAVIDSON, 1964	
<i>mitchelli</i>	<i>Aspidiotus</i>	MARLATT	1908	BORCHSENIUS, 1966	<i>Borchseniaspis</i> (comb. n.)	
<i>oxycoccus</i> **	<i>Aspidiotus</i>	WOGLUM	1906		<i>Abgrallaspis</i> *, DAVIDSON, 1964	
<i>palmae</i>	<i>Aspidiotus</i>	MORGAN, CKILL.	1893	BALACHOWSKY, 1948	<i>Borchseniaspis</i> type, ZAHRA-DNÍK, 1959	
<i>paucitatis</i> **	<i>Aonidiella</i>	McKENZIE	1942		<i>Abgrallaspis</i> *, BORCHSENIUS, 1966	
<i>perseus</i>	<i>Abgrallaspis</i>	DAVIDSON	1964		<i>Abgrallaspis</i>	
<i>quercicola</i> **	<i>Hemiberlesia</i>	FERRIS	1941		<i>Abgrallaspis</i> *, DAVIDSON, 1964	
<i>rhodesiensis</i>	<i>Aspidiotus</i>	HALL	1928	BALACHOWSKY, 1956	<i>Ephedraspis</i> , BORCHSENIUS 1966	
<i>seurati</i>	<i>Aspidiotus</i>	MARCHAL	1911		<i>Abgrallaspis</i> , BALACHOWSKY, 1948	
<i>sinensis</i>	<i>Hemiberlesia</i>	FERRIS	1955		<i>Abgrallaspis</i> (comb. n.)	
<i>townsendi</i>	<i>Aspidiotus</i>	COCKERELL	1896	DAVIDSON, 1964	<i>Diaspidiotus</i> (comb. n.)	
<i>untalii</i>	<i>Aspidiotus</i>	HALL	1929	BALACHOWSKY, 1956	<i>Ephedraspis</i> , BORCHSENIUS, 1966	

\* species which in my opinion are probably not congeneric with *Abgrallaspis* BALACH.

\*\* species known to me from the literature only

## DESCRIPTION OF SPECIES

The lettering used in the figures is as follows: A. Adult female, general aspect, B. Pygidium. C. Dorsal margin of pygidium.

The number of plates and dorsal ducts are given for only one side of the body.

***Abgrallaspis amygdalicola* (BORCHSENIUS), (comb. n.)**

Synonym: *Diaspidiotus amygdalicola* BORCHSENIUS, 1952.

(Fig. 3)

The scale of the female almost circular, flat, brownishgray or light brown, with brighter margin part. Larval exuviae central, the first brown, the second yellow (BORCHSENIUS, 1952).

Pygidium.  $L_1$  sclerotized, nearly as long as wide, slightly notched on the outer margin, inner notch lacking. The distance between  $L_1$  equal to one half

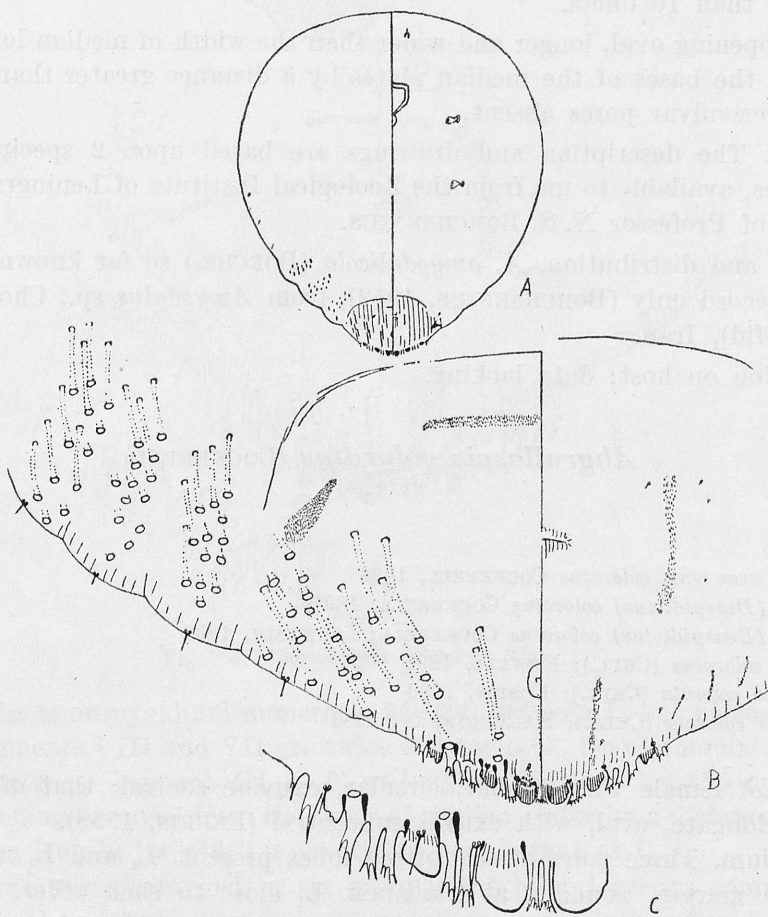


Fig. 3. *Abgrallaspis amygdalicola* (BORCHS.)



of its width.  $L_2$  sclerotized, with no clear outer notch, nearly as long as wide, outer margin shorter than the inner one: widened apically, shorter than  $L_1$ .  $L_3$  weakly sclerotized, variable in form, may have the apex crenated or with one lateral notch and rounded apically. BORCHSENIUS (1952) described this species as having three or two pairs of lobes.

Plates with fringed tops, present between the lobes and anterior to VI pygidial seta; the latter 1—3 in number.

Paraphyses short and narrow, present between lobes and at the outer and inner angles of  $L_1$  and  $L_2$ .

Ventral sclerotization narrow.

Dorsal ducts cylindrical, 24—28 in number. Between segments VIII and VII there may be 2—4 ducts; they are more than five times longer than  $L_1$ . In the submarginal dorsal area of II, III, and IV prepygidial segments the ducts are in groups; these ducts are a little shorter than one half of the pygidial ducts but their macropores are as wide as those of the pygidial ducts. Each group has more than 10 ducts.

Anal opening oval, longer and wider than the width of median lobes, removed from the bases of the median plates by a distance greater than twice its length. Perivulvar pores absent.

Notes. The description and drawings are based upon 2 specimens from type series, available to me from the Zoological Institute of Leningrad, by the courtesy of Professor N. S. BORCHSENIUS.

Hosts and distribution. *A. amygdalicola* (BORCHS.) so far known from the original record only (BORCHSENIUS, 1952), from *Amygdalus* sp., Choras-Abad (Kuh-i-Sefid), Iran.

Location on host: data lacking.

### *Abgrallaspis coloratus* (COCKERELL)

(Fig. 4)

Synonyms:

*Aspidiotus uvae* var. *coloratus* COCKERELL, 1893

*Aspidiotus (Diaspidiotus) coloratus* COCKERELL, 1897

*Aspidiotus (Evaspidiotus) coloratus* COCKERELL; LEONARDI, 1898

*Aspidiotus coloratus* (CKLL.); NEWELL, 1899

*Hemiberlesia colorata* (CKLL.); FERRIS, 1938

*Abgrallaspis colorata* (CKLL.); BALACHOWSKY, 1953

Scale of female whitish, flat, circular, exuviae central; that of the male slightly elongate, oval, with exuvia subcentral (FERRIS, 1938).

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  and  $L_2$  notched on the outer margin, rounded at the apex.  $L_1$  close to each other. The apex of  $L_2$  a little above the line of the notches of  $L_1$ .  $L_3$  considerably smaller than  $L_2$ , pointed.

The plates between the lobes fringed apically. Those between  $L_1$  very narrow, as long as  $L_1$ : anterior to  $L_3$  four or five plates of two different forms: some are spiniform and some branched with fringed apex and lateral margin.

Paraphyses slightly developed, present between segments VIII and VII, and VII and VI. Ventral sclerotizations rather wide.

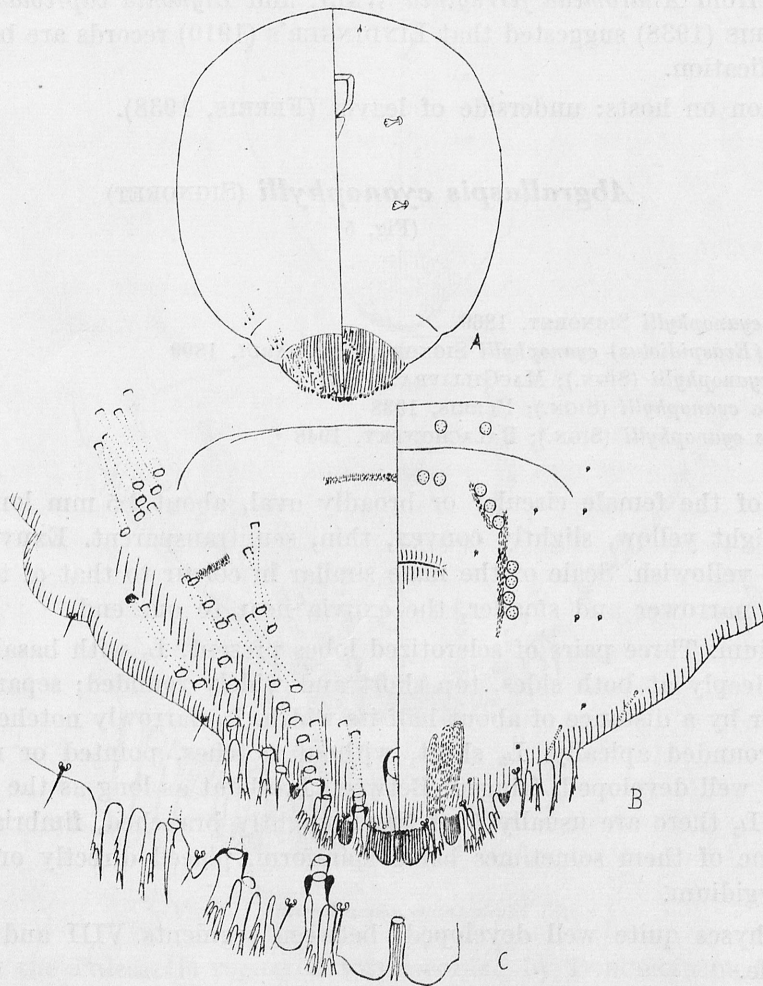


Fig. 4. *Abgrallaspis coloratus* (CKLL.)

Dorsal ducts on pygidium numerous, 24—34: between  $L_1$  one or two. Those between segments VIII and VII are twice as long as  $L_1$ . On abdominal segment IV 4—9 ducts, on segment III 3—6, as long as the ducts on the pygidium.

Anal opening removed from the bases of median plates by a distance greater than its own length; its width is greater or equals that of  $L_1$ .

Perivulvar pores arranged in six groups; the lateral groups composed of 5—10 pores, the fifth 2—3, and in the supernumerary sixth, whose pores are arranged parallel to the fifth group, there are 1—5 pores.

Notes. I examined 9 specimens, from *Chilopsis* sp., Las Cruces, New Mexico, in the collection of the British Museum (Natural History).

Hosts and distribution. Originally described from *Chilopsis linearis* Sweet, Las Cruces, New Mexico, it was recorded later on the same host from Texas (FERRIS, 1938). LINDINGER (1910) recorded it from *Quercus obtusiloba* MICHX., Carolina; from *Andromeda ferruginea* WALT. and *Bignonia capreolata* L., Florida. FERRIS (1938) suggested that LINDINGER'S (1910) records are based upon misidentification.

Location on hosts: underside of leaves (FERRIS, 1938).

### *Abgrallaspis cyanophylli* (SIGNORET)

(Fig. 5)

#### Synonyms:

*Aspidiotus cyanophylli* SIGNORET, 1869

*Aspidiotus (Evaspidiotus) cyanophylli* SIGNORET; LEONARDI, 1899

*Furcaspis cyanophylli* (SIGN.); MACGILLIVRAY, 1921

*Hemiberlesia cyanophylli* (SIGN.); FERRIS, 1938

*Abgrallaspis cyanophylli* (SIGN.); BALACHOWSKY, 1948

Scale of the female circular or broadly oval, about 2.5 mm long, whitish gray or light yellow, slightly convex, thin, semitransparent. Exuviae placed centrally, yellowish. Scale of the male similar in colour to that of the female, distinctly narrower and smaller, the exuvia near to one end.

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  with basal scleroses, notched deeply at both sides, top short and widely rounded; separated from each other by a distance of about half its width.  $L_2$  narrowly notched at outer margin, rounded apically.  $L_3$  short, without notches, pointed or not.

Plates well developed, fringed. Between  $L_1$  about as long as the lobes. Anterior to  $L_3$  there are usually 5 of them, slightly branched, fimbriate on the sides, some of them sometimes being spiniform, placed directly on the edge of the pygidium.

Paraphyses quite well developed: between segments VIII and VII they are double.

Dorsal tubular ducts cylindrical, 16—19 in all; they are nearly three times longer than  $L_1$  (without taking into consideration the basal scleroses); two ducts between segment VIII and VII, and between  $L_1$  one or two ducts are present.

Anal opening almost circular, a little wider than  $L_1$ ; the distance separating it from the bases of median plates nearly 1.5 its diameter.

Perivulvar pores present in four or five groups. In lateral groups there are 15—23 together and in the fifth group only 1—3 pores.

Notes. I examined 20 specimens, from *Cereus giganteus* ENGELM., in green-houses, Sosnowiec, Poland.



Hosts and distribution. *A. cyanophylli* (SIGN.) is very widely distributed. It has been recorded from all zoogeographical regions<sup>1</sup> and is a common greenhouse pest in cooler areas.

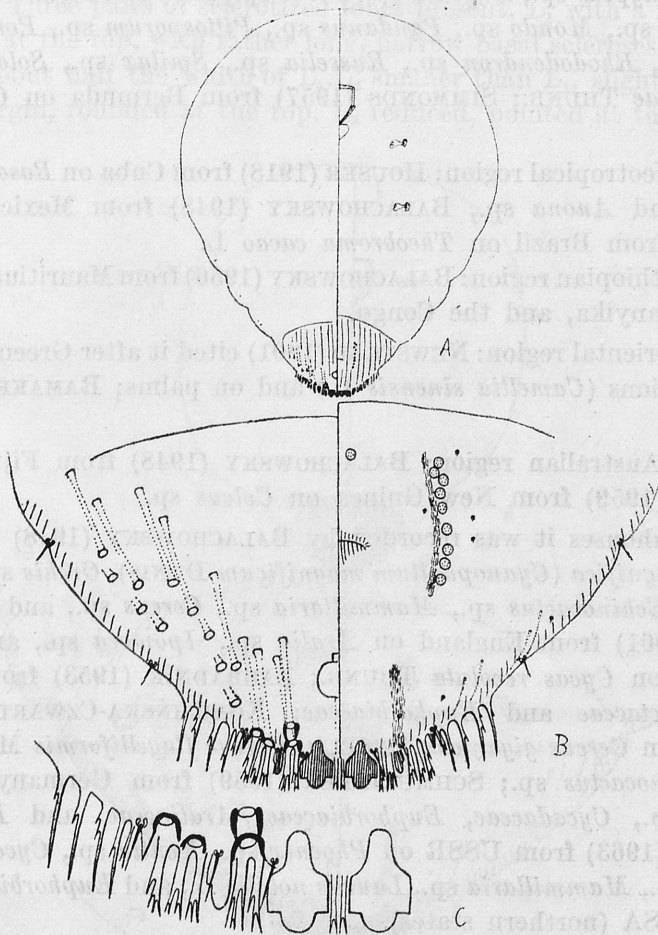


Fig. 5. *Abgrallaspis cyanophylli* (SIGN.)

From the Palearctic region it was recorded by BORCHSENIUS (1963) from USSR (Transcaucasia, Caucasus on tea plantations, *Laurus camphora* L., *Laurus nobilis* L., and on palms; TAKAHASHI, TACHIKAWA (1956) from Japon on *Camellia japonica* L.; EZZAT (1958) from Egypt; KORONÉOS (1934)<sup>2</sup> from Greece on *Musa* sp., and *Opuntia* sp., LEONARDI (1920)<sup>2</sup> from Italy on *Guaiacum officinale* L., *Anona muricata* L., and *Brachychiton acerifolium* F. MUELL.

<sup>1</sup> In this work I took the zoogeographical division by SCLATER, 1858 (cited by URBAŃSKI, 1962).

<sup>2</sup> KORONÉOS (1934) and LEONARDI (1920) did not mention that this species was found in greenhouses, but BALACHOWSKY (1948) recorded this species from the same places and he noted that it was collected there from greenhouses.

From the Nearctic region: FERRIS (1938) from Florida and Texas on *Portiera angustifolia* A. GRAY and on *Ficus* sp., MCKENZIE (1956) from *Anona* sp., *Anthericum* sp., *Anthurium* sp., *Cereus* sp., *Chrysalidocarpus lutescens* H. WENDL., *Cocos* sp., *Eucalyptus* sp., *Eugenia* sp., *Ficus* sp., *Inga* sp., *Kentia* sp., *Magnolia* sp., *Mangifera* sp., *Mondo* sp., *Pandanus* sp., *Pittosporum* sp., *Portiera angustifolia* A. GRAY, *Rhododendron* sp., *Russelia* sp., *Smilax* sp., *Solanus* sp., and *Strelitzia reginae* THUNB.; SIMMONDS (1957) from Bermuda on *Cycas revoluta* THUNB.

From the Neotropical region: HOUSER (1918) from Cuba on *Rosa* sp., *Psidium guajava* L., and *Anona* sp., BALACHOWSKY (1948) from Mexico and Chile; SILVA (1950) from Brazil on *Theobroma cacao* L.

From the Ethiopian region: BALACHOWSKY (1956) from Mauritius, Somaliland, Uganda, Tanganyika, and the Congo.

From the Oriental region: NEWSTEAD (1901) cited it after Green from Ceylon, on tea plantations (*Camellia sinensis* L.) and on palms; RAMAKRISHNA (1919) from India.

From the Australian region: BALACHOWSKY (1948) from Fiji and Tahiti; SZENT-IVANY (1959) from New Guinea on *Coleus* sp.

From greenhouses it was recorded by BALACHOWSKY (1948) from France, on *Miconia magnifica* (*Cyanophyllum magnificum* DENIS), *Orchis* sp., *Euphorbia bojeri* HOOK, *Echinocactus* sp., *Mammillaria* sp., *Cereus* sp., and *Opuntia* sp.; NEWSTEAD (1901) from England on *Aralia* sp., *Ipomoea* sp., and on palms, from Ireland on *Cycas revoluta* THUNB.; ZAHRADNÍK (1953) from Czechoslovakia on *Cactaceae* and *Euphorbiaceae*; KOMOSIŃSKA-CZWARTACKA (1961) from Poland on *Cereus giganteus* ENGELM, *Cereus flagelliformis* MILL., *Opuntia* sp., and *Echinocactus* sp.; SCHMUTTERER (1959) from Germany on *Phoenix* sp., *Howea* sp., *Cycadaceae*, *Euphorbiaceae*, *Araliaceae*, and *Bromelliaceae*; BORCHSENIUS (1963) from USSR on *Phoenix* sp., *Kentia* sp., *Cycas* sp., *Cereus* sp., *Opuntia* sp., *Mammillaria* sp., *Laurus nobilis* L., and *Euphorbia* sp.; FERRIS (1938) from USA (northern states).

Location on hosts and damage: occurring on leaves and branches (BORCHSENIUS, 1963). Recorded as a pest of laurel and tea shrubs in western Transcaucasia (BORCHSENIUS, 1963), and as a pest of cocoa in Brazil (SILVA, 1950).

### ***Abgrallaspis degeneratus* (LEONARDI)**

(Fig. 6)

#### Synonyms:

*Chrysomphalus degeneratus* LEONARDI, 1896

*Aspidiotus (Chrysomphalus) degeneratus* (LEONARDI); COCKERELL, 1897

*Aspidiotus degeneratus* (LEON.); FERNALD, 1903

*Hemiberlesia degenerata* (LEON.); FERRIS, 1941

*Abgrallaspis degeneratus* (LEON.); BALACHOWSKY, 1948

*Diaspidiotus degeneratus* (LEON.); BORCHSENIUS, 1950

The scale of the female is circular, slightly convex, light brown, exuviae subcentral. The scale of the male similar to that of the female, but slightly ovoid (FERRIS, 1941).

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  with a notch on each side, rounded at the top, with rather long, narrow basal scleroses. The distance between  $L_1$  about half the width of  $L_1$ .  $L_2$  smaller than  $L_1$ , slightly notched at the outer margin, rounded at the top.  $L_3$  reduced, pointed at the top.

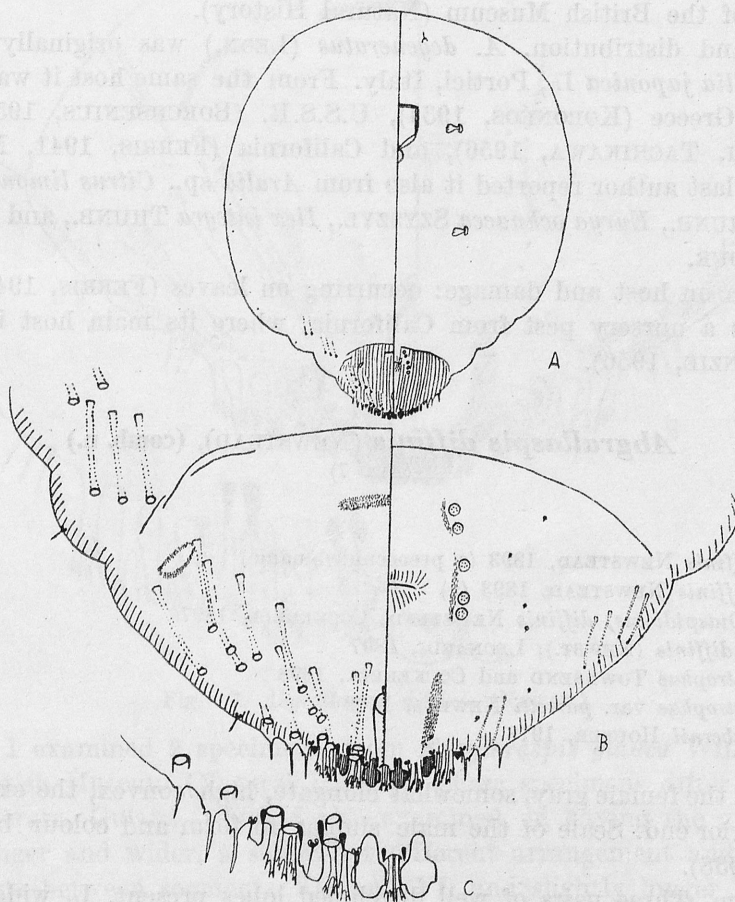


Fig. 6. *Abgrallaspis degeneratus* (LEON.)

Plates between  $L_1$  well developed, slightly longer than the median lobes. Anterior to  $L_3$  there are three or four spiniform plates, widened at the bases.

Paraphyses narrow and short, present between  $L_1$  and between segments VIII and VII, and VII and VI. Ventral sclerotizations narrow.

Dorsal ducts cylindrical, 12—18 in all. Those between segments VIII and VII are nearly four times longer than  $L_1$  (without taking into consideration the basal scleroses). One duct present between  $L_1$ . On abdominal segment



IV there are 2—5 dorsal ducts, on segment III 2—3; they are as long as the pygidial ducts.

The anal opening is removed from the base of median plates by a distance a little greater than twice its own length.

The anal opening is generally a little wider than  $L_1$ . Perivulvar pores arranged in four groups; on the whole area of the pygidium there are 5—10 pores.

Notes. I examined 6 specimens, from *Camellia* sp., Portici, Italy, in the collection of the British Museum (Natural History).

Hosts and distribution. *A. degeneratus* (LEON.) was originally described from *Camellia japonica* L., Portici, Italy. From the same host it was recorded also from Greece (KORONÉOS, 1934), U.S.S.R. (BORCHSENIUS, 1950), Japan (TAKAHASHI, TACHIKAWA, 1956), and California (FERRIS, 1941, MCKENZIE, 1956). The last author reported it also from *Aralia* sp., *Citrus limon* L., *Eurya japonica* THUNB., *Eurya ochnacea* SZYSZYL., *Ilex integra* THUNB., and *Osmanthus fragrans* LOUR.

Location on host and damage: occurring on leaves (FERRIS, 1941). It was recorded as a nursery pest from California, where its main host is *Camellia* sp. (MCKENZIE, 1956).

### *Abgrallaspis diffinis* (NEWSTEAD), (comb. n.)

(Fig. 7)

#### Synonyms:

*Aspidiotus affinis* NEWSTEAD, 1893 (a preoccupied name)

*Aspidiotus diffinis* NEWSTEAD, 1893 (a)

*Aspidiotus (Diaspidiotus) diffinis* NEWSTEAD; COCKERELL, 1897

*Hemiberlesia diffinis* (NEWST.); LEONARDI, 1897

*Aspidiotus jatrophae* TOWNSEND and COCKERELL, 1898

*Aspidiotus jatrophae* var. *parrotti* NEWELL, 1899

*Aspidiotus fabernii* HOUSER, 1918

Scale of the female gray, somewhat elongate, high convex, the exuviae close to the anterior end. Scale of the male similar in form and colour but smaller (FERRIS, 1938).

Pygidium. Three pairs of well developed lobes present.  $L_1$  wide, close together, notched only at the outer margin, basal scleroses lacking.  $L_2$  considerably smaller than  $L_1$ , with distinct outer notch, widest at the bases.  $L_3$  well developed, about as long as  $L_2$ , spiniform.

Plates between  $L_1$  very narrow, weakly developed, as long as  $L_1$ . Plates between  $L_1$  and  $L_2$ , and  $L_2$  and  $L_3$  somewhat branched and fimbriate on outer margin; plates are the widest anterior to  $L_3$ , they are branched and deeply fringed to nearly half their length; they do not reach the level of the apices of  $L_1$ . Anterior to pygidial seta V there are 2—4 spiniform plates.

Paraphyses long and wide, present between segments VIII and VII, and VII and VI.

Dorsal ducts long, filiform with small macropores, 16—26 in all. One duct present between  $L_1$ . Ducts between segments VIII and VII are more than four times longer than  $L_1$ .

Anal opening a little wider than  $L_1$  and removed from the bases of median plates by a distance a little longer than its length. Perivulvar pores lacking.

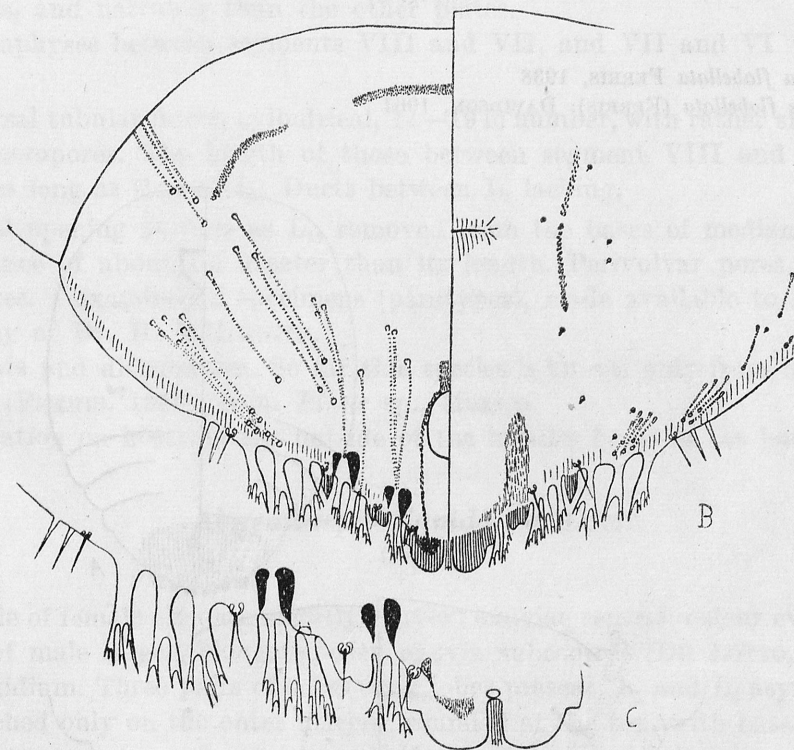


Fig. 7. *Abgrallaspis diffinis* (NEWST.)

Notes. I examined 9 specimens, from *Eurythraspis glauca* WILD., Guiana, in the British Museum (Natural History); these specimens differ from those from Demerara, Guiana, which I also examined, in having the anal opening a little longer and wider, a somewhat different arrangement and number of dorsal ducts between segments VII and VI, and slightly longer  $L_3$ .

Hosts and distribution. Originally described from undetermined plant, Demerara, Guiana; described as *Aspidiotus jatrophae* TOWNSEND and COCKERELL, from *Jatropha* sp., Frontera Tabasco, Mexico; as *Aspidiotus jatrophae* var. *parrotti* NEWELL from undetermined host from the same place, and as *Aspidiotus fabernii* HOUSER, from *Faberna* sp., Havana, Cuba. FERRIS (1938) recorded it from the following places: London, Canada, on *Tilia americana* L., Washington D. C., on *Syringa* sp.; New Jersey on *Liriodendron tulipifera* L.; Raleigh, North Carolina on undetermined host; La Paz, Baja California, Mexico on *Psidium* sp.; Baton Rouge, Louisiana on *Magnolia* sp., Pass Christian, Mississippi on *Ficus* sp.; Sherman, Texas on *Cornus* sp.

Location on hosts and damage. Occurring on bark (FERRIS, 1938). It caused damage to *Tilia americana* L. and *Syringa* sp. in North America (MARIATT, 1900).

***Abgrallaspis flabellata* (FERRIS)**

(Fig. 8)

**Synonyms:**

*Hemiberlesia flabellata* FERRIS, 1938

*Abgrallaspis flabellata* (FERRIS); DAVIDSON, 1964

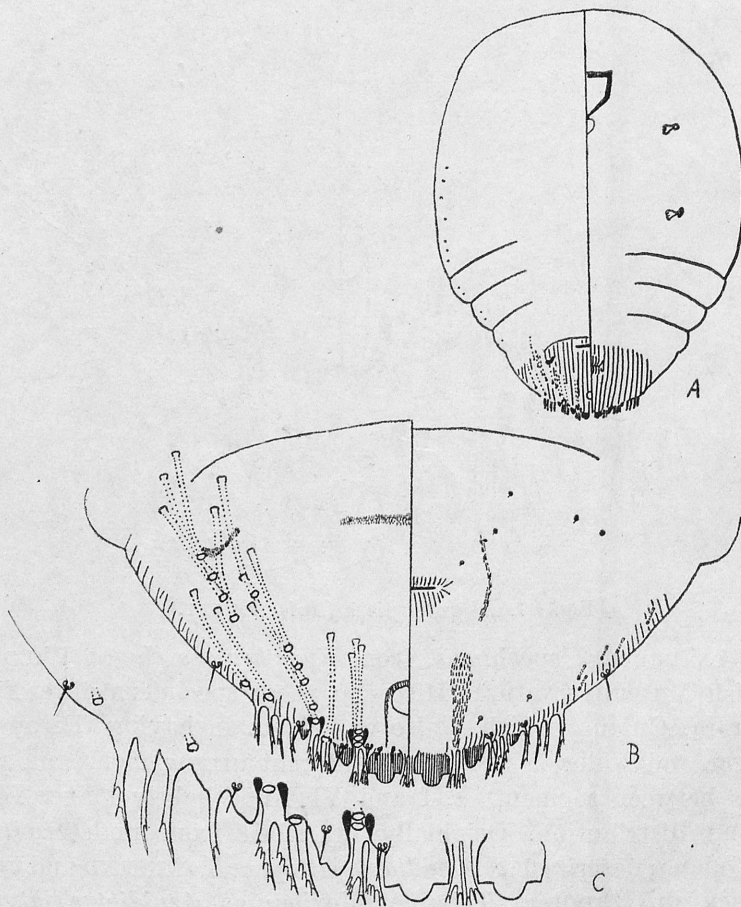


Fig. 8. *Abgrallaspis flabellata* (FERRIS)

Scale of the female circular or oval, slightly convex, white, exuviae central. Scale of the male elongate, oval, white, exuvia central (FERRIS, 1938).

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  a little broader than long, with fairly wide notch on each side and rounded apex. The distance be-



tween  $L_1$  smaller than half  $L_1$ .  $L_2$  with outer notch only and with rounded top; widest at the base.  $L_3$  much smaller than  $L_2$ , without notches.

Plates between  $L_1$  and  $L_2$  a little longer than the median lobes, branched with fringed tops. Plates between  $L_2$  and  $L_3$  fimbriate on lateral sides. Anterior to  $L_3$  there are 3—5 plates, which are long, slightly fimbriate on outer or inner margins, and narrower than the other plates.

Paraphyses between segments VIII and VII, and VII and VI well developed.

Dorsal tubular ducts, cylindrical, 14—19 in number, with rather small, rounded macropores. The length of those between segment VIII and VII three times as long as that of  $L_1$ . Ducts between  $L_1$  lacking.

Anal opening as wide as  $L_1$ , removed from the bases of median plates by a distance of about 1.5 greater than its length. Perivulvar pores lacking.

Notes. I examined 2 specimens (paratypes), made available to me by the courtesy of Dr. H. MCKENZIE.

Hosts and distribution. So far this species is known only from the original record (FERRIS, 1938), from *Pinus* sp., Mexico.

Location on host: on the outside of the needles beneath the basal sheath.

### *Abgrallaspis flavida* DE LOTTO

(Fig. 9)

Scale of female circular, slightly convex, exuviae central, colour even yellow. Scale of male larger, elongate, with exuvia subcentral (DE LOTTO, 1957).

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  and  $L_2$  asymmetrical.  $L_1$  notched only on the outer margin, rounded at the top, with basal scleroses. The distance between  $L_1$  about one half of  $L_1$ .  $L_2$  notched only on outer margin with narrow, rounded top.  $L_3$  symmetrical, spiniform, much smaller than  $L_2$ .

Plates fimbriate and branched. Between  $L_1$  they are very narrow and not longer than  $L_1$ . The plates anterior to  $L_3$ , three in number, are the longest and widest, reaching beyond the top of  $L_1$ , and are branched from about half their length. Anterior to pygidial seta V there are 3 short triangular plates.

Paraphyses between segments VIII and VII, and VII and VI well developed.

Dorsal tubular ducts long, filiform, 6—8 in number, with small, round macropores. One duct present between  $L_1$ ; those between segments VIII and VII almost reach the vulva.

The anal opening elongate and as wide or slightly wider than  $L_1$ ; it is removed from the bases of median plates by a distance equal or a little greater than its longitudinal diameter. Perivulvar pores absent.

Notes. I examined 6 specimens (1 holotype, 5 paratypes) in the British Museum (Natural History).

Hosts and distribution. So far this species is known from the original record (DE LOTTO, 1957) on *Elaeodendron stuhlmannii* LOESNER, *Aberia caffra* HARV., and *Elaeodendron* sp., Nairobi, Kenya.

Location on hosts: small branches and leaves (DE LOTTO, 1957).

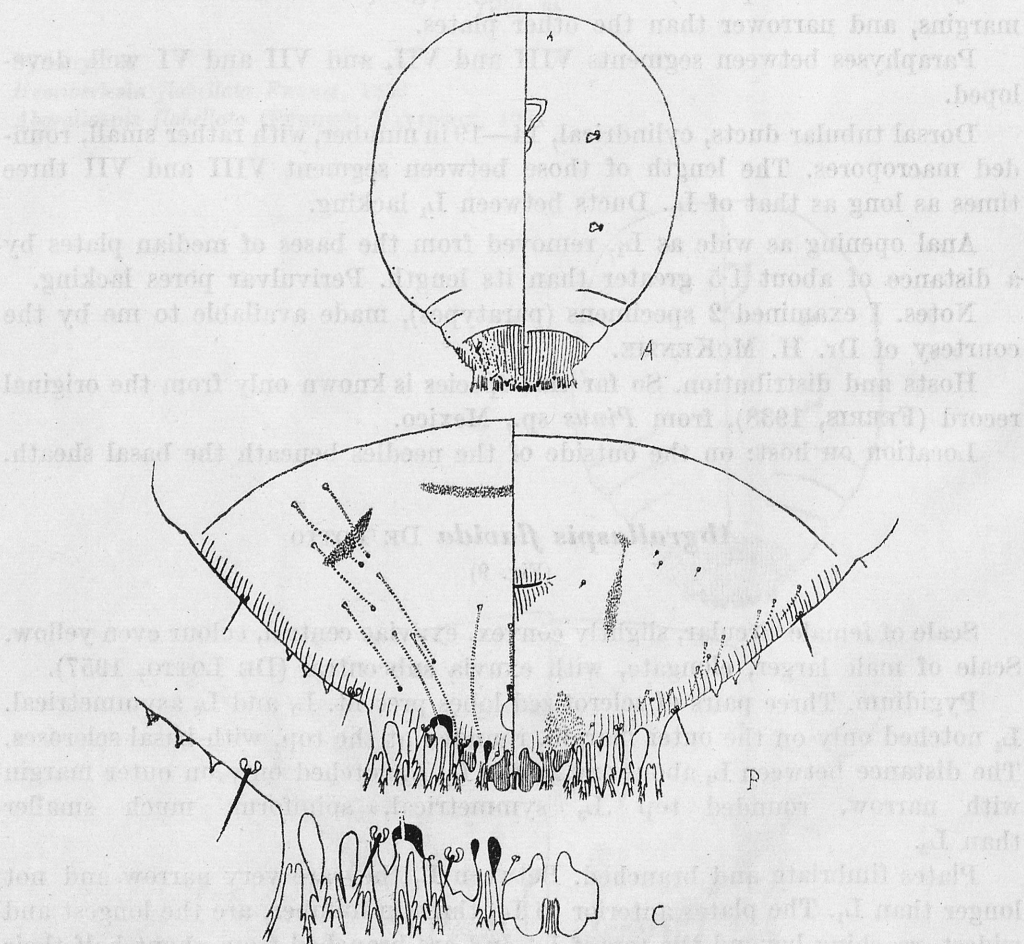


Fig. 9. *Abgrallaspis flavida* DE LOTTO

### ***Abgrallaspis fraxini* (McKENZIE)**

(Fig. 10)

#### **Synonyms:**

*Hemiberlesia fraxini* McKENZIE, 1944

*Abgrallaspis fraxini* (McKENZIE); BALACHOWSKY, 1953

Scale of the female almost circular, flat, yellowish, exuviae subcentral. Scale of the male smaller, similar in colour to that of the female, elongate, exuvia towards one end (McKENZIE, 1944).

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  widely notched at both sides, rounded apically; the distance between  $L_1$  less than half its width.  $L_2$  with a narrow notch on each side, reach the level of the notch on  $L_1$ .  $L_3$  vestigial, pointed.

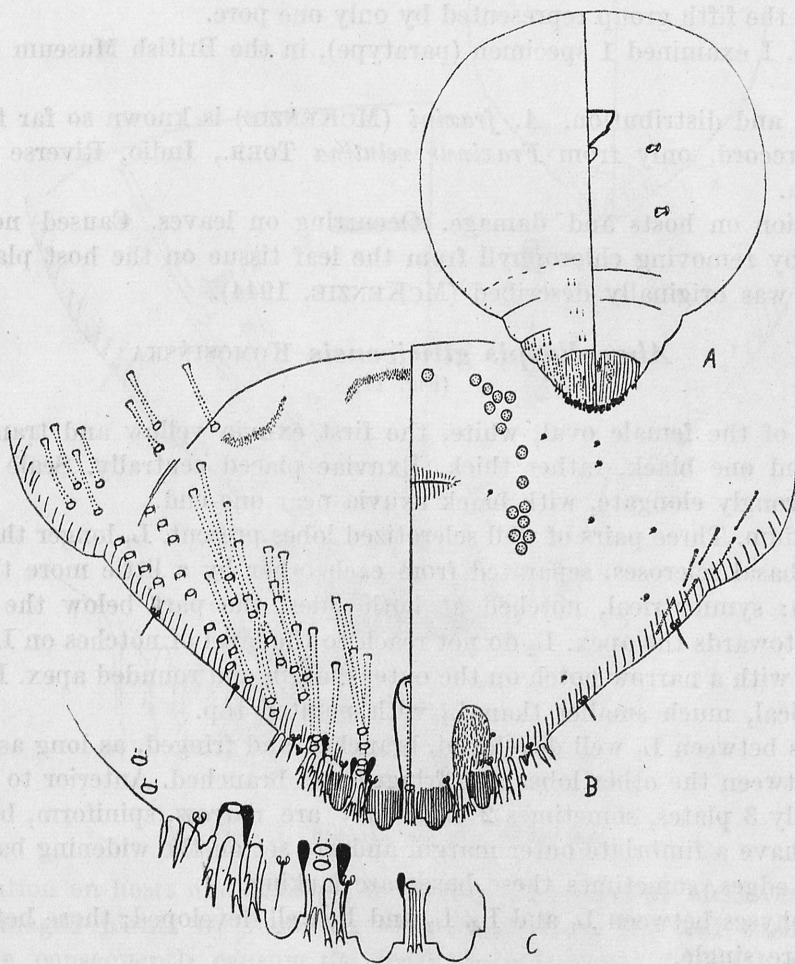


Fig. 10. *Abgrallaspis fraxini* (McKENZIE)

Plates between  $L_1$  narrow, a little shorter than  $L_1$  itself. The outer plate in the group between  $L_1$  and  $L_2$  is nearly twice the width of the inner one. Anterior to  $L_3$ , 2—4 very short spiniform plates (McKENZIE, 1944).

Paraphyses well developed, present between segments VIII and VII, and VII and VI.

Dorsal ducts on pygidium arranged along the whole area, 30 in number. Those between segments VIII and VII are more than three times longer than  $L_1$ . One duct is present between  $L_1$ . In the submarginal area on prepy-



gidial segment I there are 7 ducts which are about half as long as the pygidial ones.

Anal opening elongate, narrower than  $L_1$ , removed from the bases of median plates by a distance nearly twice its own length. Perivulvar pores arranged in five groups. In lateral groups on the whole area of the pygidium there are 29 pores, the fifth group represented by only one pore.

Notes. I examined 1 specimen (paratype), in the British Museum (Natural History).

Hosts and distribution. *A. fraxini* (McKENZIE) is known so far from the original record, only from *Fraxinus velutina* TORR., Indio, Riverside County, California.

Location on hosts and damage. Occurring on leaves. Caused noticeable damage by removing chlorophyll from the leaf tissue on the host plant from which it was originally described (McKENZIE, 1944).

***Abgrallaspis gliwicensis* KOMOSIŃSKA**  
(Fig. 11)

Scale of the female oval, white, the first exuvia yellow and transparent, the second one black, rather thick. Exuviae placed centrally. Scale of male white, strongly elongate, with black exuvia near one end.

Pygidium. Three pairs of well sclerotized lobes present.  $L_1$  longer than wide, without basal scleroses, separated from each other by a little more than half its width; symmetrical, notched at both sides, the part below the notches tapering towards the apex.  $L_2$  do not reach to the level of notches on  $L_1$ ; asymmetrical, with a narrow notch on the outer margin and rounded apex.  $L_3$  nearly symmetrical, much smaller than  $L_2$  with pointed top.

Plates between  $L_1$  well developed, branched and fringed, as long as  $L_1$ . The plates between the other lobes also fringed and branched. Anterior to  $L_3$  there are usually 3 plates, sometimes 2 or 4: they are narrow, spiniform, but some of them have a fimbriate outer margin and are set on the widening bases with crenated edges, sometimes these bases are lacking.

Paraphyses between  $L_1$  and  $L_2$ ,  $L_2$  and  $L_3$  well developed; those between  $L_1$  and  $L_2$  are single.

Dorsal ducts cylindrical, 6—12 in number. Those between segments VIII and VII are nearly three times longer than  $L_1$ . Between  $L_1$  and  $L_2$  there is one duct, rarely two; ducts between  $L_1$  lacking.

Anal opening oval, a little longer and wider than  $L_1$ , removed from the bases of median plates by a distance greater than its length. Perivulvar pores arranged in four groups; on the whole area of the pygidium there are 2—14 pores.

Notes. I examined 45 specimens from the type material.

Hosts and distribution. *A. gliwicensis* KOM. is known so far from the original record (KOMOSIŃSKA, 1965), from *Billbergia nutans* WENDL., from greenhouses, Gliwice and Kraków, Poland.

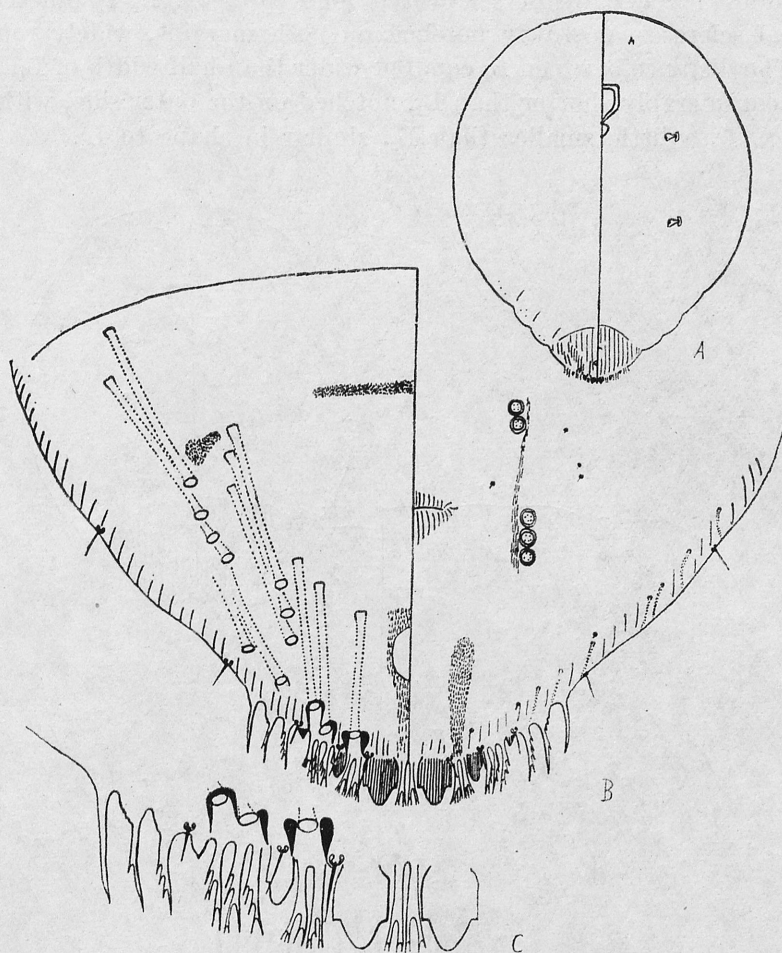


Fig. 11. *Abgrallaspis gliwicensis* KOM.

Location on hosts and damage. Occurring on both sides of leaves. It severely damaged plants by removing chlorophyll from the leaf tissue around the scale, consequently causing the death of whole plants. The author observed many plants which had died following a heavy attack by this species.

***Abgrallaspis latastei* (COCKERELL), (comb. n.)**

(Fig. 12)

Synonyms:

*Aspidiotus latastei* COCKERELL, 1894

*Aspidiotus (Evaspidiotus) latastei* (CKLL.); LEONARDI, 1898a

*Aspidiella latastei* (CKLL.); MACGILLIVRAY, 1921

Scale of the female circular, strongly convex, white with yellow-orange exuviae. Scale of the male smaller than that of the female, elongate, exuvia placed centrally (COCKERELL, 1894).

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  symmetrical with short basal scleroses, narrowly notched on both margins, widely rounded on the top. The distance between  $L_1$  equal or wider than half width of  $L_1$ .  $L_2$  asymmetrical, considerably shorter than  $L_1$ , notched on the outer side, with narrow, blunt apex.  $L_3$  a little smaller than  $L_2$ , similar in shape to  $L_2$ .

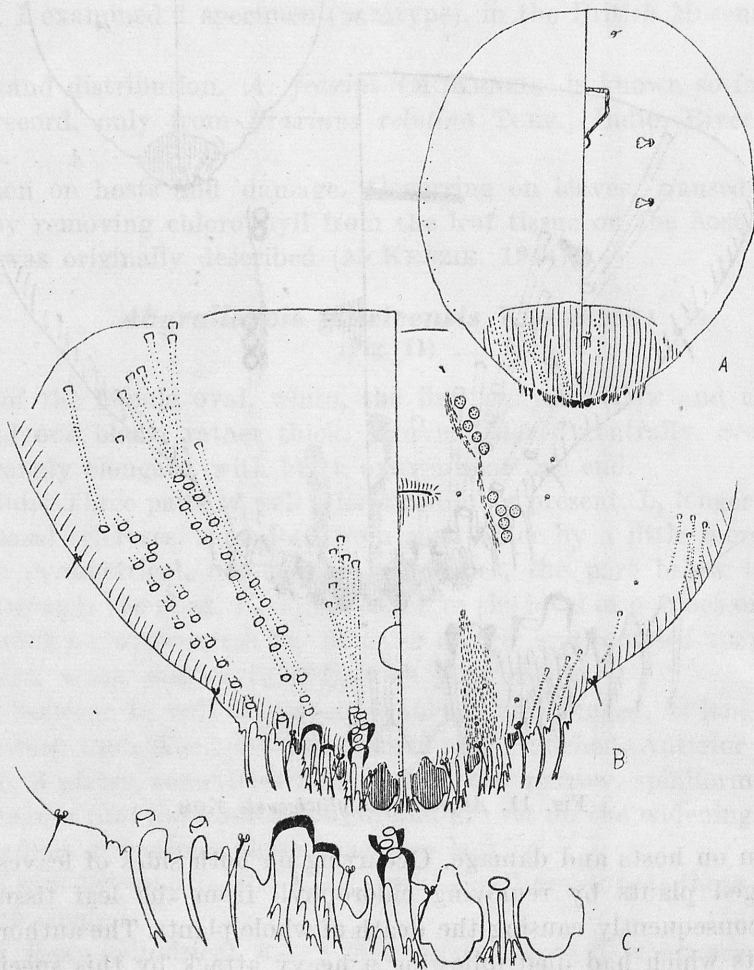


Fig. 12. *Abgrallaspis latastei* (CKLL.)

Plates between  $L_1$  well developed, deeply branched and fimbriate, a little longer than  $L_1$ . Plates between  $L_1$  and  $L_2$  and between  $L_2$  and  $L_3$  fimbriate on the tops and outer sides. The plates anterior to  $L_3$ , 3 in number, are long and reach to the level of the notches of  $L_1$ ; some of them are spiniform, others are furcate apically, placed on widening crenated bases.

Paraphyses between segments VIII and VII, and VII and VI well developed; between segments VIII and VII they are double.



Dorsal ducts more than four times longer than  $L_1$  (without taking into consideration basal scleroses), arranged in three regular rows, 38—54 in number. Between segments VIII and VII there are 4—6 ducts.

Anal opening round, a little wider than  $L_1$ , removed from the bases of median plates by a distance a little more than twice its length.

Perivulvar pores present in four or five groups. In lateral groups on the whole area of the pygidium there are 18—23 pores. In the fifth group there is only one pore.

Notes. I examined 4 specimens, from type material, in the British Museum (Natural History).

Hosts and distribution. So far *A. latastei* (CKLL.) is known from the original record from undetermined host, Benos de Cangueues, Chile.

Location on host: upper side of leaves.

### ***Abgrallaspis mammillaris* (LINDINGER), (comb. n.)**

(Fig. 13)

#### Synonyms:

*Aspidiotus mammillaris* LINDINGER, 1910

*Hemiberlesia mammillaris* (LIND.); BALACHOWSKY, 1956

Scale of the female gray, circular, somewhat convex, exuviae placed centrally, brown, (BALACHOWSKY, 1956).

Pygidium. Two pairs of well developed and sclerotized lobes present.  $L_1$  a little wider than long, deeply notched on outer side, widely rounded at top, some specimens also have narrow inner notch; the distance between  $L_1$  is narrower than half the width of  $L_1$ .  $L_2$  smaller, similar in shape to  $L_1$ .  $L_3$  represented only by slight unsclerotized points, or lacking.

Plates between  $L_1$  narrow, as long as  $L_1$ , fimbriate on the apices. Between  $L_2$  and pygidial seta VI there are 3 plates with outer sides deeply fringed almost to half their length. Anterior to pygidial seta VI the plates are lacking.

Dorsal ducts short, cylindrical, not much longer than  $L_1$ . They are distributed on the submedian and submarginal parts of the pygidium, 21—25 in number. There is one duct between  $L_1$ .

Anal opening round, removed from the bases of median plates by a distance equal or slightly greater than its longitudinal diameter; it is a little narrower than  $L_1$ . Perivulvar pores absent.

Notes. I examined 6 specimens, from *Aloe percrassa* TOD., Asmara, Eritrea (DE LOTTO coll.) in the British Museum (Natural History).

*A. mammillaris* (LIND.) is similar to species of the genus *Tsugaspidotus* TAKAGI. Morphologically it differs from them in the arrangement in submarginal and submedian series of dorsal ducts, while in *Tsugaspidotus* the dorsal ducts are arranged only on the submarginal area of the pygidium.

Hosts and distribution. *A. mammillaris* (LIND.) was originally recorded from *Aloe eru* E. BERGER, Harar, Ethiopia. DE LOTTO collected it from *Aloe* sp. and *A. percrassa* TOD., Asmara, Eritrea, Ethiopia (BALACHOWSKY, 1956). Location on hosts: upper side of leaves (BALACHOWSKY, 1956).

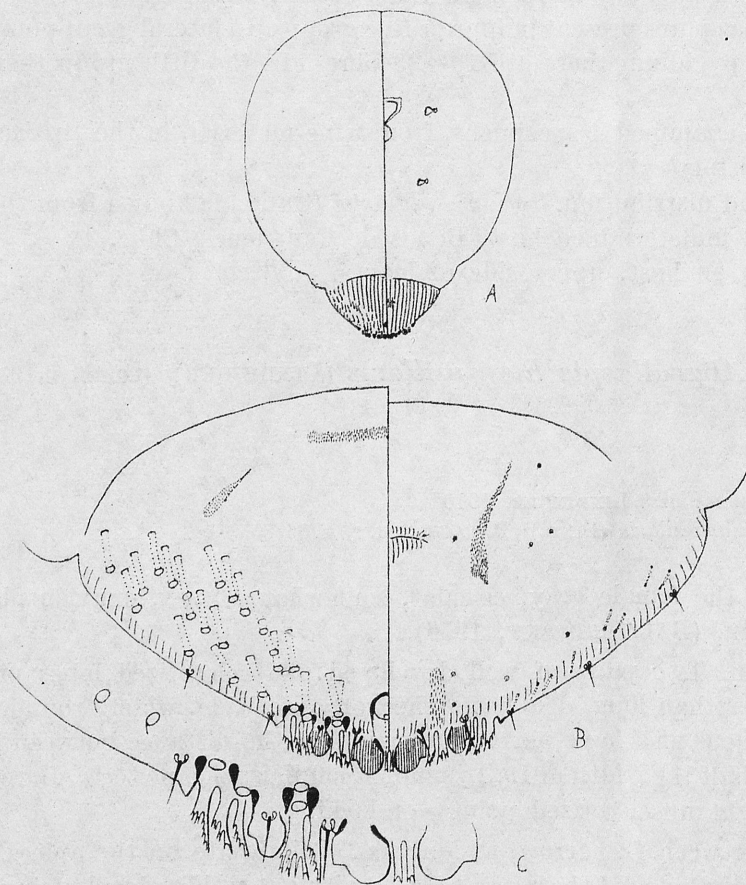


Fig. 13. *Abgrallaspis mammillaris* (LIND.)

***Abgrallaspis mendax* (McKENZIE)**  
(Fig. 14)

Synonyms:

*Hemiberlesia mendax* McKENZIE, 1943

*Abgrallaspis mendax* (McKENZIE); DAVIDSON, 1964

Scale of the female reddish brown with black, subcentrally placed exuviae. Scale of the male unknown (McKENZIE, 1943).

Pygidium. Three pairs of well developed and sclerotized lobes present.  $L_1$  symmetrical, notched on both sides, widely rounded apically. They are separated from each other by more than half their width.  $L_2$  and  $L_3$  asymmetri-

cal with narrow notch on the outer side.  $L_3$  similar in shape to  $L_2$  but a little shorter than  $L_2$ .

Plates between  $L_1$  very well developed, deeply branched and fringed on tops, distinctly longer than  $L_1$ . The plates anterior to  $L_3$ , 4 in number, are as long as the inner ones; they are spiniform with fringed outer sides and are set on widening crenated bases.

Paraphyses between segments VIII and VII short, wide, and single. Paraphyses between segments VII and VI slightly developed. Small paraphyses also present between  $L_1$ .

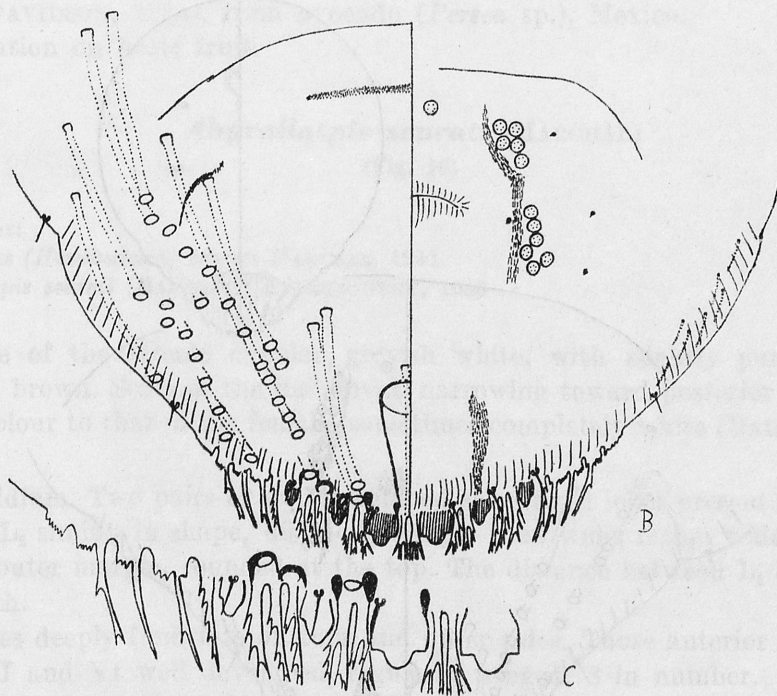


Fig. 14. *Abgrallaspis mendax* (McKENZIE)

Dorsal ducts wide, cylindrical, nearly five times longer than  $L_1$ , 30 in number. Two ducts present between  $L_1$  and two between segments VIII and VII.

Anal opening transversally oval, wider than the median lobes. Removed from the bases of median plates by a distance about 3 times its length.

Perivulvar pores arranged in five groups. In lateral groups on the whole area of the pygidium there are 23 pores, in the fifth group there are 2 pores.

Notes. I examined 1 specimen (paratype), made available to me by the courtesy of Dr. H. McKENZIE.

Host and distribution. So far this species is known from the original record, from *Orchis* sp., Guatemala.

Location on host: leaves.



*Abgrallaspis perseus* DAVIDSON

(Fig. 15)

Scale of the female circular, light brown, exuviae placed subcentrally (DAVIDSON, 1964).

Pygidium. Three pairs of sclerotized lobes present.  $L_1$  without basal scleroses, a little wider than long, with a narrow lateral notch on each side and rounded apex; the distance between them wider than half its width.  $L_2$  similar in shape to  $L_1$  but shorter and narrower.  $L_3$  in the shape of a small pointed process.

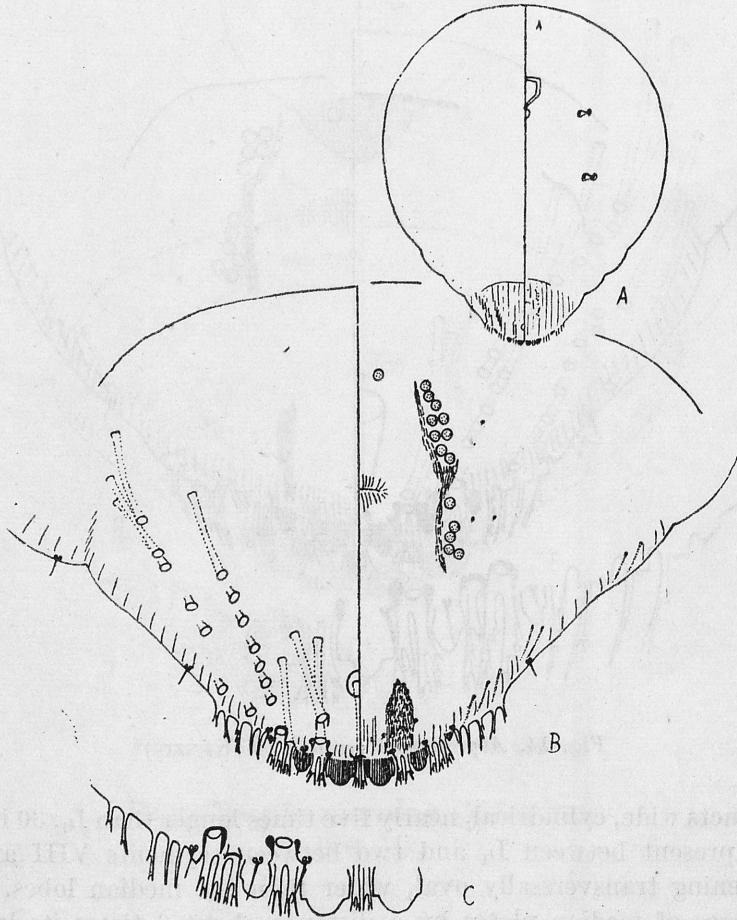


Fig. 15. *Abgrallaspis perseus* DAVIDSON

Plates between lobes and anterior to  $L_3$  well developed. Anterior to  $L_3$  there are 3—5 plates (DAVIDSON, 1964). They have different shapes: spiniform and with fimbriate margin.

Paraphyses small, present between segments VIII and VII, and VII and VI. Those at the inner corner of  $L_2$  are distinctly swollen at the anterior end.

Dorsal tubular ducts cylindrical. Their length a little greater than three times that of  $L_1$ . They are 15—25 in number (DAVIDSON, 1964).

Anal opening nearly round, as wide as  $L_1$ , removed from the bases of median plates by a distance almost equal to twice its length.

Perivulvar pores arranged in five groups. In each of the paired groups there are 5—11 pores, in the fifth there are 2 pores.

Notes. I examined 1 specimen (paratype), borrowed from the Smithsonian Institution, Washington D. C., by the courtesy of Miss M. L. RUSSELL and Mr. R. C. FROESCHNER.

Hosts and distribution. So far this species is known from the original record (DAVIDSON, 1964), from avocado (*Persea* sp.), Mexico.

Location on host: fruit.

### *Abgrallaspis seurati* (MARCHAL)

(Fig. 16)

#### Synonyms:

*Aspidiotus (Hemiberlesia) seurati* MARCHAL, 1911

*Abgrallaspis seurati* (MARCHAL); BALACHOWSKY, 1948

Scale of the female circular, greyish white, with slightly purple shade; exuviae brown. Scale of the male oval, narrowing toward posterior part, similar in colour to that of the female, sometimes completely white (BALACHOWSKY, 1948).

Pygidium. Two pairs of well developed sclerotized lobes present.  $L_3$  lacking.  $L_1$  and  $L_2$  similar in shape, distinctly longer than wide, rather widely notched on the outer margin, rounded at the top. The distance between  $L_1$  is less than its width.

Plates deeply fimbriate on tops and outer sides. Those anterior to pygidial seta VII and VI well developed, regularly fringed, 8 in number.

Paraphyses moderately developed, present between segments VIII and VII, and VII and VI,  $L_1$  with small paraphyses at the bases of the outer and inner sides.

Dorsal ducts narrow, cylindrical, a little longer than  $L_1$ , with oval openings, 40—63 in number, including segment IV. On abdominal segments III and II in the marginal and submarginal area there are also dorsal ducts with macropores. They are a little shorter than the pygidial ones. On segment III there are 10—19 ducts and on segment II, 5—6.

Anal opening oval, almost as wide as  $L_1$ , removed from the bases of median plates by a distance greater than its own length. Perivulvar pores lacking.

Notes. I examined 7 specimens, from *Zilla macroptera* Coss, Morocco (BALACHOWSKY'S coll.) in the British Museum (Natural History).

Hosts and distribution. Originally recorded from *Zilla macroptera* Coss, South Algeria, Oasis de Figuig, South-East Morocco; *Randonia africana* Coss,

Goulmina, Moroccan Sahara; *Zilla spinosa* PRANTL from Tamanrasset and Taabor (Hoggar), central Sahara, *Moricandia arvensis* D. C., Tamanrasset. BALACHOWSKY (1956) recorded it also from *Trichodesma africana* R. BR., Tas-

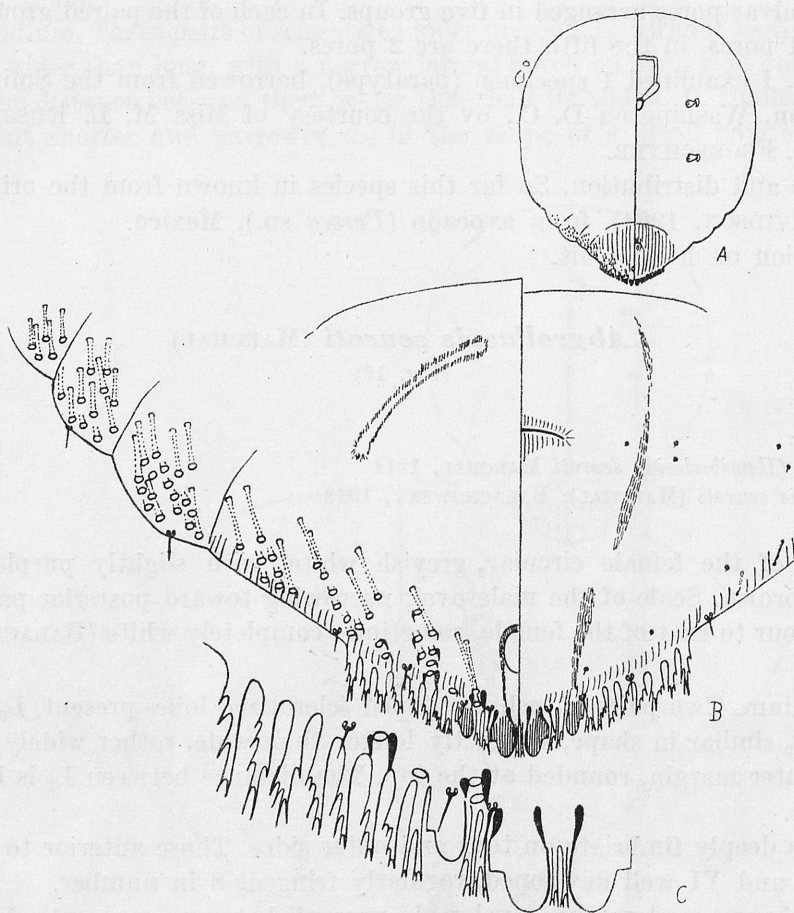


Fig. 16. *Abgrallaspis seurati* (MARCHAL)

sih N'Ajers, central Sahara; the specimens collected there were characterized by a smoky scale instead of a bright violet one as it is in the type form.

Location on host: stem (BALACHOWSKY, 1956).

***Abgrallaspis sinensis* (FERRIS), (comb. n.)**

(Fig. 17)

Synonym:

*Hemiberlesia sinensis* FERRIS, 1953

Scale of female white or gray. Scale of male unknown (FERRIS, 1953).

Pygidium. Three pairs of well developed and sclerotized lobes present.  $L_1$  symmetrical, longer than wide, with a rather deep notch on each



side and rounded at the top; the distance between  $L_1$  is a little more than half their width.  $L_2$  symmetrical, parallel side, with a lateral notch on each side.  $L_3$  asymmetrical, notched only at the outer margin, tapering towards the apex.

Plates between  $L_1$  well developed, fimbriate at the tops, as long as  $L_1$ . Anterior to  $L_3$  there are two or three wide plates, deeply furcated, the sides of their branchings are smooth or fringed. In some specimens one of the plates of this group may be so deeply furcated that it looks like two narrow plates.

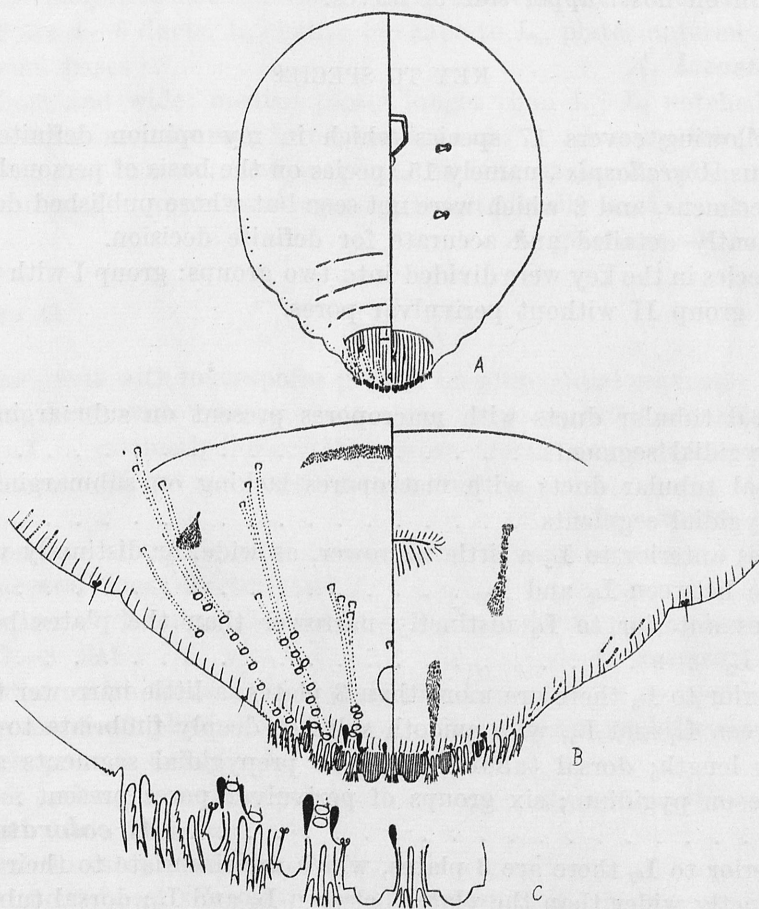


Fig. 17. *Abgrallaspis sinensis* (FERRIS)

Paraphyses well developed, present between segments VIII and VII, and VII and VI.

Dorsal ducts with small macropores, narrow, cylindrical, 18—25 in number; ducts between segments VIII and VII are nearly four times longer than  $L_1$ , ducts between segments VII and VI generally being longer than the former, one duct present between  $L_1$ .

Anal opening longitudinally oval, removed from the bases of median plates by a distance equal or a little longer than its length. It is wider than the median lobes. Perivulvar pores lacking.

Notes. I examined 3 specimens from type series, made available to me by the courtesy of Dr. H. MCKENZIE.

Hosts and distribution. So far *A. sinensis* (FERRIS) is known only from the original record, on an undetermined shrub from *Apocynaceae*, An-lin-wenchin, near Kunming, Province Yunnan, China.

Location on host: upper side of leaves.

#### KEY TO SPECIES

The following covers 17 species which in my opinion definitely belong to the genus *Abgrallaspis*, namely 15 species on the basis of personal examination of specimens, and 2 which were not seen but whose published descriptions are sufficiently detailed and accurate for definite decision.

The species in the key were divided into two groups: group I with perivulvar pores and group II without perivulvar pores.

##### Group I

1. — Dorsal tubular ducts with macropores present on submarginal area of prepygidial segments . . . . . 2
  - Dorsal tubular ducts with macropores lacking on submarginal area of prepygidial segments . . . . . 5
2. — Plates anterior to  $L_3$  a little narrower, as wide, or distinctly wider than those between  $L_2$  and  $L_3$  . . . . . 3
  - Plates anterior to  $L_3$  distinctly narrower than the plates between  $L_2$  and  $L_3$  . . . . . 4
3. — Anterior to  $L_3$  there are more than 3 plates, a little narrower than those between  $L_2$  and  $L_3$ , with smooth sides or deeply fimbriate to about  $1/2$  their length; dorsal tubular ducts on prepygidial segments as long as those on pygidium; six groups of perivulvar pores present . . . . . *A. coloratus* (CKLL.)
  - Anterior to  $L_3$  there are 3 plates, which are fimbriate to their bases and distinctly wider than the plates between  $L_2$  and  $L_3$ ; dorsal tubular ducts on prepygidial segments are considerably shorter than the pygidial ones; five groups of perivulvar pores present . . . . . *A. insularis* (BALACH.)
4. —  $L_2$  notched on both sides; plates anterior to  $L_3$  not widened at the base; dorsal tubular ducts on prepygidial segment in submarginal area almost one half as short as the pygidial ones . . . . . *A. fraxini* (MCKENZIE)
  - $L_2$  notched only at the outer side; plates anterior to  $L_3$  widened at the base, dorsal tubular ducts on prepygidial segments almost as long as the pygidial ones . . . . . *A. degeneratus* (LEON.)

5. —  $L_2$  distinctly longer than wide, paraphyses well developed . . . . . 6  
 —  $L_2$  nearly as wide as long, paraphyses slight . . . . .  
 . . . . . *A. perseus* DAVIDSON
6. — Paraphyses between  $L_1$  and  $L_2$  double . . . . . 7  
 — Paraphyses between  $L_1$  and  $L_2$  single . . . . . 8
7. —  $L_1$  deeply notched on both sides; between segments VIII and VII there are two ducts,  $L_2$  quite different in shape from  $L_3$ , plates anterior to  $L_3$  without widened bases . . . . . *A. cyanophylli* (Sign.)  
 —  $L_1$  narrowly notched on both sides, between segments VIII and VII there are 4—6 ducts,  $L_2$  similar in shape to  $L_3$ , plates anterior to  $L_3$  with widened bases . . . . . *A. latastei* (CKLL.)
8. —  $L_1$  short and wide; median plates longer than  $L_1$ ;  $L_3$  notched, rounded at the apex; anal opening transversally oval . . . *A. mendax* (McKENZIE)  
 —  $L_1$  long and narrow; median plates as long as  $L_1$ ;  $L_3$  without notches, pointed at the apex; anal opening longitudinally oval . . . . .  
 . . . . . *A. gliwicensis* KOMOSIŃSKA

## Group II

1. — Dorsal ducts with macropores present on prepygidial segments . . . . . 2  
 — Dorsal ducts with macropores, lacking on prepygidial segments . . . . . 4
2. —  $L_1$  and  $L_2$  distinctly longer than wide, dorsal ducts between segments VIII and VII are not much longer than  $L_1$  . . . . .  
 . . . . . *A. seurati* (MARCHAL)  
 —  $L_1$  and  $L_2$  as long as wide; dorsal ducts between segments VIII and VII are several times longer than  $L_1$  . . . . . 3
3. — Pygidium with only two pairs of lobes, anterior to pygidial seta VI there are 7—8 plates . . . . . *A. kaussarii* BALACH.  
 — Pygidium with three or two pairs of lobes, anterior to pygidial seta VI there are 1—3 plates . . . . . *A. amygdalicola* (BORCHS.)
4. — Plates present anterior to  $L_3$  . . . . . 5  
 — Plates lacking anterior to  $L_3$  . . . . . *A. mammillaris* (LIND.)
5. — Dorsal ducts filiform . . . . . 6  
 — Dorsal ducts cylindrical . . . . . 7
6. —  $L_1$  without basal scleroses, plates anterior to  $L_3$  do not reach the level of the apex of  $L_1$ ;  $L_3$  a little shorter or a little longer than  $L_2$ ; anterior to pygidial seta V there are 2 or 4 spiniform plates as long as this seta . . . . . *A. diffinis* (NEWST.)  
 —  $L_1$  with basal scleroses; plates anterior to  $L_3$  reach below the level of the apex of  $L_1$ ;  $L_3$  are considerably shorter than  $L_2$ ; anterior to pygidial seta V there are 3 triangular plates, their length equal to about  $1/4$  of the length of this seta . . . . . *A. flavida* DE LOTTO
7. —  $L_1$  longer than wide;  $L_2$  notched on both sides, with parallel lateral sides; plates anterior to  $L_3$  considerably wider than the others and branched



- almost to their bases . . . . . *A. sinensis* (FERRIS)
- $L_1$  a little wider than long;  $L_2$  notched only on outer side, their outer margins sloping; plates anterior to  $L_3$  a little narrower than those between  $L_2$  and  $L_3$  and not branched but fimbriate . . . . . *A. flabellata* (FERRIS)

#### GENERAL DISCUSSION ON THE GENUS *ABGRALLASPIS* BALACH.

The following discussion refers to 17 species which I have assigned to the genus *Abgrallaspis* BALACH. as a result of my revisionary studies (see Table I, p. 51—52).

A general feature which is shared by all included species and defines the genus is the presence of the following:

1. well developed median ( $L_1$ ) lobes; the distance between them narrower than the width of  $L_1$ ,
2. well developed 2<sup>nd</sup> ( $L_2$ ) lobes; not triangular in shape,
3. plates between the lobes (in groups of 2, 2, and 3 plates respectively),
4. paraphyses (two pairs at least),
5. post-anal distance (not less than the longitudinal diameter of the anal opening),
6. shape of ventral scleroses.

It was interesting to find that the different detailed conditions of these structures, i. e. the actual shape, size, position etc., show very little individual variation within the species and represented the most constant and stabilized group of characters differentiating species.

A relatively wide range of individual variation within the species is exhibited by such characters as:

1. the actual number of dorsal ducts and perivulvar pores,
2. the degree of sclerotization, shape, and size of  $L_3$ , particularly if in altogether rudimentary condition,
3. the number and shape of external plates,
4. to some degree, the shape and location of the anal opening.

These represent a „variable“ group of characters also very useful for separation of the species.

The characters of the two groups together provide a series of combinations which morphologically define the individual species. In the material studied the morphological differences between the species are quite small and concern the arrangement, number, absolute, and relative development of certain structures (ducts, pores, lobes, plates, paraphyses, ventral sclerotizations, anal opening, etc.), or their presence or absence (pores, some groups of ducts, some paraphyses, apophyses, dorsal sclerotizations).

The species thus defined show different degrees of morphological relationship between each other. They can be arranged in a cluster around the centrally

situated type species, those with the greater number of „typical“ characters in a more central position and the aberrant species scattered on the periphery. The aberrant species often exhibit characters of another genus, the closely related ones, and represent the links with these genera. However, as the conception of a genus is a rather arbitrary one, the position of the dividing line would be very much a question of personal opinion and interpretation. Among the 17 species ascribed by me to the genus *Abgrallaspis* BALACH. as here understood there are several aberrant species which show some affinities to other genera. Two species closely related to each other, *A. diffinis* (NEWST.) and *A. flavida* DE LOTTO, appear to represent a link between *Abgrallaspis* BALACH. and *Hemiberlesia* CKLL. by having (among some other minor characters) the filiform dorsal ducts which are characteristic of *Hemiberlesia* CKLL. and are absent in all other species of *Abgrallaspis* BALACH. *A. mammillaris* (LIND.), which exceptionally has no external plates, appears to link *Abgrallaspis* BALACH. with some species of *Tsugaspidotus* TAKAGI, though it differs from them conspicuously in the arrangement of the dorsal ducts.

In this work 5 genera closely related to *Abgrallaspis* BALACH. were discussed of which *Diaspidiotus* LEON. appears to be the closest. Some species of *Diaspidiotus* LEON. differ from certain species of *Abgrallaspis* BALACH. only in one character, which concerning the shape, degree of development, and sclerotization of the 2<sup>nd</sup> lobes ( $L_2$ ). Moreover, one of the species *Diaspidiotus ancyclus* (PUTNAM) is dimorphic (STANNARD, 1965) the occurrence of the one form or the other, depending on the host and the part of the host on which they live (twigs or leaves); one form shows the features characteristic of *Diaspidiotus* LEON. while the other displays the characters of *Abgrallaspis* BALACH. (particularly the well developed  $L_2$ ). This example illustrates well the arbitrary character of the conception of the genus (probably any genus) and demonstrates the serial continuity of the forms which at some points, when sufficiently different, are for convenience divided into separate taxa.

The genus *Abgrallaspis* BALACH. belongs to the subfamily *Aspidiotinae* which, according to BORCHSENIUS (1965), is the most progressive (after *Diaspidinae*) in the genealogical tree of the family *Diaspididae*. This is shown in the large number of species and genera, wide geographical distribution, and adaptation to a considerable variety of host-plants and to various parts of the hosts themselves. The ability of free adaptation to various hosts and easy invasion of new territories readily leads to development of new biological races and, subsequently, of morphological ones. Considering the phylogeny of the female *Diaspididae*, BORCHSENIUS (1965) saw the most important manifestation of their evolutionary trend in the development of the sclerotized pygidium and its structures, particularly in the specializations of the lobes, plates, and the dorsal ducts. He considered *Diaspidinae* more specialized on account of the subdivided lateral lobes into two lobules, and *Aspidiotinae* with undivided simple lateral lobes less specialized. The presence of the full number of similar or identical lobes, plates, or ducts is less specialized than the condition in which



the reduction in numbers and differentiation in size and shape is shown. I consider that a constant and stabilized condition of a character represents a higher degree of specialization than a variable one.

The studied material is insufficient for any valid generalizations but a limited assessment of the degree of specialization of the genus *Abgrallaspis* BALACH. relative to the studied closely related genera may be possible and justified. The usual difficulty is that in a given genus (taxon) one character may show a specialized condition and another one a not specialized condition, while in another genus (taxon) the opposite may be true. On the whole it appears that, compared with *Hemiberlesia* CKLL. and *Diaspidiotus* LEON., *Abgrallaspis* BALACH. is more specialized owing to the constant presence and shape of  $L_2$  and the better development of a definite type of plates. *Abgrallaspis* BALACH. is also more specialized than *Aspidiella* LEON. which has the generalized condition of not differentiated large tubular ducts evenly distributed over the dorsal and also the ventral side of the pygidium. *Ephedrasspis* BORCHS. and *Borchseniaspis* ZAHR. seem to show the same degree of specialization as *Abgrallaspis* BALACH.

At the present state of knowledge the genus *Abgrallaspis* BALACH. has only one prevalent species — *A. cyanophylli* (SIGN.). It dominates over the other species by being common, having the widest distribution (cosmopolitan) and the longest list of hosts, which include representative of all angiosperms and gymnosperms, monocotyledons and dicotyledons. From this may be concluded that this species is the oldest among the species of this genus but that its wide distribution is at least partly due to man's activity.

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#### REFERENCES

- BALACHOWSKY A. S. 1948. Les cochenilles de France, d'Europe du Nord, de l'Afrique et du Bassin Méditerranéen, IV, Paris.
- BALACHOWSKY A. S. 1953. Sur un *Hemiberlesia* CKLL. nouveau des montagnes du Camérout (Homoptera: Coccoidea). Beitr. Ent., Berlin, 3: 111—115.
- BALACHOWSKY A. S. 1956. Les cochenilles du continent Africain Noir. Vol. I, *Aspidiotini*. Ann. Mus. Congo belg., n. s., 4<sup>e</sup>, Sci. zool., Tervuren, 3: 1—142.
- BALACHOWSKY A. S. 1959. Sur un nouvel *Aspidiotini* (Coccoidea) de l'Iran. Rev. Pathol. veg. Ent. agr. France, Paris, 38: 211—213.
- BORCHSENIUS N. S. 1949. Novye rody ščitovok iz fauny Centralnoj Azii. Dokl. Akad. Nauk. SSSR, n. s., Leningrad-Moskva, 64: 735—738.
- BORCHSENIUS N. S. 1950. Červecy i ščitovki SSSR. Moskva-Leningrad.
- BORCHSENIUS N. S. 1952. Novyj rod i novye vidy ščitovok iz Irana (Homoptera: Coccoidea). Ent. Obozr., Moskva-Leningrad, 32: 261—263.



- BORCHSENIUS N. S. 1963. Praktičeskij opredelitel kokcid (*Coccoidea*) kulturnych rastenii i lesnyh porod SSSR. Moskva.
- BORCHSENIUS N. S. 1965. Osnovy klasifikacii ščitovok (*Homoptera, Coccoidea, Diaspididae*). Ent. Obozr., Moskva-Leningrad, **44**: 362—376.
- BORCHSENIUS N. S. 1966. Katalog ščitovok (*Diaspidoidea*) mirovoj fauny. Moskva-Leningrad.
- BRAIN C. K. 1918. The *Coccidae* of South Africa II. Bull. ent. Res., London, **9**: 107—139.
- COCKERELL T. 1893. Two new forms on *Diaspinae*. Psyche, Cambridge, **4**: 571—573.
- COCKERELL T. 1894. The twentieth neotropical *Aspidiotus*. Act. Soc. Sci. Chili, Santiago, **4**: 35—36.
- COCKERELL T. 1895. On a new scale insect found on plum. Canad. Ent., Toronto, London, **27**: 16—19.
- COCKERELL T. 1896. Preliminary diagnoses of new *Coccidae*. Psyche, Cambridge, **7**: 18—21.
- COCKERELL T. 1897. The San Jose scale and its nearest allies. U. S. Dept. Agr. Div. Ent. Tech. Bull., Washington, ser. 6, p. 31.
- DAVIDSON J. A. 1964. The genus *Abgrallaspis* in North America (*Homoptera: Diaspididae*). Ann. ent. Soc. Amer., Baltimore, Maryland, **57**: 638—643.
- DE LOTTO G. 1957. New *Aspidiotini* (*Homoptera, Coccoidea, Diaspididae*) from Kenya. Ann. Mag. Nat. Hist. London, **10**: 225—231.
- DE LOTTO G. 1964. The authorship and type of the genus *Diaspidiotus* (*Homoptera: Diaspididae*). J. ent. Soc. S. Afr., Pretoria, **25**: 144—145.
- EZZAT Y. M. 1958. Classification of the scale insects family *Diaspididae*, as known to occur in Egypt. Bull. Soc. ent. Egypte, Le Caire, **42**: 233—251.
- FERNALD M. 1903. A catalogue of the *Coccidae* of the world. Amherst. Mass.
- FERRIS G. F. 1938. Atlas of the scale insects of North America, S. II., Stanford, London.
- FERRIS G. F. 1941. Atlas of the scale insects of North America, S. III, Stanford, London.
- FERRIS G. F. 1941a. The genus *Aspidiotus* (*Homoptera, Coccoidea; Diaspididae*). Microent., Stanford, **6**: 33—69.
- FERRIS G. F. 1953. Report upon scale insects collected in China (*Homoptera: Coccoidea*), part IV (Contrib. No 84). Microent., Stanford, **18**: 59—84.
- GÓMEZ-MENOR J. 1954. Adiciones a los Cócidos de Espana (tercera nota). Eos, Madrid, **30**: 119—148.
- HOUSER J. 1918. The *Coccoidea* of Cuba. Ann. ent. Soc. Amer., Columbus, Ohio, **11**: 157—172.
- JOHNSON S. 1896. Preliminary notes on five species of scale insects. Ent. News, Philadelphia, **7**: 150—152.
- KOMOSIŃSKA-CZWARTACKA H. 1961. On some scale-insects (*Homoptera, Coccoidea*) living in greenhouses in Poland. Fragm. faun., Warszawa, **9**: 221—232.
- KOMOSIŃSKA H. 1965. A new species of *Abgrallaspis* BALACHOWSKY (*Homoptera, Coccoidea, Diaspididae*) from greenhouses in Poland. Frustula Ent., La Spezia, **8**, N. 4: 1—6.
- KORONÉOS J. 1934. Les *Coccidae* de la Grèce. Athènes.
- KOSZTARAB M. 1963/1964. The armored scale insects of Ohio (*Homoptera: Coccoidea: Diaspididae*). Bull. Ohio biol. Surv., Columbus, **2/2**: 1—120.
- LEONARDI G. 1896. Diagnosi di Cocciniglie nuove. Riv. Patol. Veg., Naples, **4**: 345—352.
- LEONARDI G. 1897. Generi e specie Diaspiti. Saggio di sistematica degli *Aspidiotus*. Riv. Patol. Veg., Naples, **6**: 102—134.
- LEONARDI G. 1898. Generi e specie di Diaspiti. Saggio di sistematica degli *Aspidiotus*. Riv. Patol. Veg., Naples, **6**: 48(208) — 78(236).
- LEONARDI G. 1898a. Generi e specie di Diaspiti. Saggio di sistematica degli *Aspidiotus*. Riv. Patol. Veg., Naples, **7**: 38—86.
- LEONARDI G. 1899. Saggio di sistematica degli *Aspidiotus*. Riv. Patol. Veg., Naples, **7**: 173—225.
- LEONARDI G. 1900. Saggio di sistematica degli *Aspidiotus*. Riv. Patol. Veg., Naples, **8**: 298—363.
- LEONARDI G. 1920. Monografia delle Cocciniglie Italiane. Portici.

- LINDINGER L. 1910. Afrikanische Schildläuse III. Jahrb. der Hamburg. Wiss. Anst. 27 Beih., 3: 33—48.
- LINDINGER L. 1910(a). Beiträge zur Kenntnis der Schildläuse und ihrer Verbreitung II. Z. Wiss. Inst. biol. Berlin, 6: 437—441.
- MACGILLIVRAY A. 1921. The *Coccidae*. Illinois.
- \* MARCHAL P. 1911. Sur une cochenille nouvelle d'Algérie (*Homoptera, Coccoidea*). Bull. Soc. ent. France, Paris, 4: 71.
- MARLATT G. 1900. *Aspidiotus diffinis*. Another scale insect of probable European origin recently found in North America. Ent. News, Philadelphia, 11: 425—427.
- MARLATT G. 1908. New species of Diaspine scale insects. Bull. U. S. Dep. Agr. Bur. Ent. Tech. Ser., Washington, 16: 11—32.
- MCKENZIE H. L. 1942. Two new species related to red scale (*Homoptera: Coccoidea: Diaspididae*). Bull. Calif. Dept. Agr. Sacramento, 31: 141—147.
- MCKENZIE H. L. 1943. Miscellaneous Diaspid studies including notes on *Chrysomphalus* (*Homoptera, Coccoidea, Diaspididae*). Bull. Calif. Dept. Agr., Sacramento, 32: 148—162.
- MCKENZIE H. L. 1944. Miscellaneous Diaspid scale studies (*Homoptera, Coccoidea, Diaspididae*). Bull. Calif. Dept. Agr. Sacramento, 33: 53—57.
- MCKENZIE H. L. 1956. The armored scale insects of California. Berkeley, Los Angeles.
- \* NEWELL W. 1899. On the North American species of the subgenera *Diaspidiotus* and *Hemiberlesia* of the genus *Aspidiotus*. Iowa State Col. Dept. Zool. and Ent. Contrib. No 3, 31 p.
- NEWSTEAD R. 1893. Observations of *Coccidae* (No 5). Ent. Monthly Mag., London, 29: 185—188.
- NEWSTEAD R. 1893a. Observations of *Coccidae* (No 7). Ent. Monthly Mag., London, 29: 279—281.
- NEWSTEAD R. 1901. Monograph of the *Coccidae* of the British Isles, London.
- RAMAKRISHNA AYYAR T. V. 1919. A contribution to our knowledge of South Indian *Coccidae*. Bull. Pusa Agr. Res. Inst. 87: p. 50.
- SCHMUTTERER H. 1959. Die Tierwelt Deutschlands, 45 Teil. Schildläuse oder *Coccoidea*. Jena.
- SIGNORET V. 1869. Essai sur les cochenilles ou gallinsectes (*Homoptères — Coccides*). Ann. Soc. ent. France, Paris, 9: 109—138.
- SILVA P. 1950. The Coccids of cocoa in Bahia, Brazil. Bull. ent. Res., London, 41: 119—120.
- SIMMONDS F. J. 1957. A list of the *Coccidae* of Bermuda and their parasites. Bull. Dept. Agr. Bermuda, No 30, 12 p.
- SZENT-IVANY J. H. 1959. Host plant and distribution records of some insects in New Guinea. Pacific Insects, Honolulu, 1: 423—429.
- STANNARD L. J. 1965. Polymorphism in the PUTNAM's scale, *Aspidiotus ancyclus* (*Homoptera: Coccoidea*). Ann. ent. Soc. Amer., Baltimore, Maryland, 58: 573—576.
- TAKAHASHI R., TACHIKAWA T. 1956. Scale insects of Shikoku (*Homoptera: Coccoidea*). Trans. Shikoku ent. Soc., Shikoku, 5: 1—17.
- TOWNSEND C., COCKERELL T. 1898. *Coccidae* collected in Mexico by Messrs. TOWNSEND and KOEBELE in 1897. J. N. Y. ent. Soc., New York, 6: 165—180.
- URBAŃSKI J. 1962. Geografia powszechna, tom I, rozdz. XIV. Warszawa.
- WOGLUM R. 1906. Two new scale insects. Canad. Ent., Toronto, London, 38: 73—75.
- ZAHRADNÍK J. 1953. První příspěvek k poznání červců žijících ve sklenících pražské botanické zahrady. Acta ent. Mus. Nat., Pragae, 28: 125—148.
- ZAHRADNÍK J. 1959. *Borchseniaspis* novum genus, typus *Aspidiotus palmae* MORGAN, COCKERELL 1893. Acta faun. ent. Mus. nat. Pragae, 5, 45: 65—67.
- ZAHRADNÍK J. 1959a. Červci — *Coccinae*. Klíč zvířeny ČSR, Praha, 3: 527—552.

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\* publications known only from reports



W pracy podany jest rys historyczny rodzaju. Podano definicję rodzaju we własnym sformułowaniu, opartą na cechach morfologicznych samiec gatunku typowego z uwzględnieniem zakresu odchyień od tych cech u poszczególnych gatunków. Ujęto w formie klucza różnice między rodzajem *Abgrallaspis* BALACH. a niektórymi rodzajami blisko z nim spokrewnionymi: *Hemiberlesia* CKLL., *Diaspidiotus* LEON., *Borchseniaspis* ZAHR., *Ephedraspis* BORCHS. i *Aspidiella* LEON. W wyniku rewizji wprowadzono następujące zmiany:

1. 3 gatunki wyłączono z rodzaju *Abgrallaspis* BALACH. i zaliczono do innych rodzajów: *Aspidiotus furcillae* BRAIN i *Aspidiotus townsendi* CKLL. do *Diaspidiotus* LEON. oraz *Aspidiotus (Hemiberlesia) mitchelli* MARLATT do *Borchseniaspis* ZAHR.

2. 5 gatunków przeniesiono z innych rodzajów do *Abgrallaspis* BALACH.: z *Hemiberlesia* CKLL. — *Aspidiotus diffinis* NEWST., *Aspidiotus mammillaris* LIND. i *Hemiberlesia sinensis* FERRIS; z *Aspidiella* LEON. — *Aspidiotus latastei* CKLL.; z *Diaspidiotus* LEON. — *Diaspidiotus amygdalicola* BORCHS.

3. Zaliczenie pięciu gatunków do rodzaju *Abgrallaspis* BALACH. dokonane przez innych autorów poddano w wątpliwość. Okazów tych gatunków nie miałam możliwości zbadać i swoją opinię o ich obecnym stanowisku rodzajowym opieram na podstawie literatury. Są to: *Aspidaspis ithacae* FERRIS, *Aspidiotus oxycoccus* WOGLUM, *Aspidiotus mashonae* HALL, *Hemiberlesia quercicola* FERRIS i *Aonidiella paucitatis* MCKENZIE.

W wyniku rewizji przyjęto w badanym rodzaju 17 gatunków: *A. amygdalicola* (BORCHS.), *A. coloratus* (CKLL.), *A. cyanophylli* (SIGN.), *A. degeneratus* (LEON.), *A. diffinis* (NEWST.), *A. flabellata* (FERRIS), *A. flavida* DE LOTTO, *A. fraxini* (MCKENZIE), *A. gliwicensis* KOM., *A. insularis* (BALACH.), *A. kaussarii* BALACH., *A. latastei* (CKLL.), *A. mammillaris* (LIND.), *A. mendax* (MCKENZIE), *A. perseus* DAVIDSON, *A. seurati* (MARCHAL), *A. sinensis* (FERRIS).

Do piętnastu gatunków zrobiono opisy i rysunki. Klucz podano dla wszystkich wyżej wymienionych gatunków.

W uwagach ogólnych o rodzaju *Abgrallaspis* BALACH. podano cechy o charakterze stabilnym, występujące u wszystkich zaliczonych do tego rodzaju gatunków. Podano też cechy, które są zmienne ale również użyteczne dla odróżnienia gatunków. Wskazano na cechy, które mogłyby świadczyć, że *A. diffinis* (NEWST.) i *A. flavida* DE LOTTO są ogniwami łączącymi rodzaj *Abgrallaspis* BALACH. z rodzajem *Hemiberlesia* CKLL. i *A. mammillaris* (LIND.), rodzaj *Abgrallaspis* BALACH. z *Tsugaspidiotus* TAKAGI. Wysłunięto przypuszczenie, że rodzaj *Diaspidiotus* LEON. jest najbliższym spokrewnionym z rodzajem *Abgrallaspis* BALACH. Podano cechy, na podstawie których uznano rodzaj *Abgrallaspis* BALACH. za bardziej wyspecjalizowany od rodzajów *Hemiberlesia* CKLL., *Diaspidiotus* LEON. i *Aspidiella* LEON. Za rodzaje równorzędnie wyspecjalizowane



z badanym rodzajem uznano *Borchseniaspis* Zahr. i *Ephedraspis* Borchs. Wysunięto przypuszczenie, że *A. cyanophylli* (SIGN.) jest najstarszym gatunkiem w tym rodzaju.

## РЕЗЮМЕ

В труде приведен исторический очерк рода, представляющий в хронологическом порядке его развитие. Приведено дефиницию рода в собственной формулировке, обоснованную на морфологических признаках самок типового вида с учетом размеров отклонений от этих признаков у отдельных видов. Разработан ключ различий между родом *Abgrallaspis* BALACH. и некоторыми родами близко с ним породнившимися: *Hemiberlesia* CKLL., *Diaspidiotus* LEON., *Borchseniaspis* Zahr., *Ephedraspis* Borchs. и *Aspidiella* LEON. В результате пересмотра введены следующие изменения:

1. 3 вида исключено из рода *Abgrallaspis* BALACH. и зачислено к другим родам: *Aspidiotus furcillae* BRAIN и *Aspidiotus townsendi* CKLL. к *Diaspidiotus* LEON., а также *Aspidiotus (Hemiberlesia) mitchelli* MARLATT к *Borchseniaspis* Zahr.

2. 5 видов перемещено из других родов к *Abgrallaspis* BALACH.: из *Hemiberlesia* CKLL. — *Aspidiotus diffinis* NEWST., *Aspidiotus mammillaris* LIND. и *Hemiberlesia sinensis* FERRIS.; из *Aspidiella* LEON. — *Aspidiotus latastei* CKLL.; из *Diaspidiotus* LEON. — *Diaspidiotus amygdalicola* BORCHS.

3. Зачисление пяти видов к роду *Abgrallaspis* BALACH. произведенное другими авторами поставлено в сомнение. Представителей этих видов я не имела возможности исследовать и свое мнение об их настоящем месте в роде обосновываю на литературе. Это являются: *Aspidaspis ithacae* FERRIS, *Aspidiotus oxycoccus* WOGLUM, *Aspidiotus mashonae* HALL, *Hemiberlesia quercicola* FERRIS и *Aonidiella paucitatis* MCKENZIE.

В результате просмотра для исследованного рода принято 17 видов: *A. amygdalicola* (BORCHS.), *A. coloratus* (CKLL.), *A. cyanophylli* (SIGN.), *A. degeneratus* (LEON.), *A. diffinis* (NEWST.), *A. flabellata* (FERRIS), *A. flavida* DE LOTTO, *A. jaxini* (MCKENZIE), *A. gliwicensis* КОМ., *A. insularis* (BALACH.), *A. kaussarii*, BALACH., *A. latastei* (CKLL.), *A. mammillaris* (LIND.), *A. mendax* (MCKENZIE), *A. perseus* DAVIDSON, *A. seurati* (MARCHAL), *A. sinensis* (FERRIS).

Для пятнадцати видов разработаны описи и рисунки. Ключ приведен для всех вышеуказанных видов.

В общих примечаниях о роде *Abgrallaspis* BALACH. приведены признаки стабильного характера, выступающие у всех зачисленных к этому роду видов. Приведены также признаки, которые являются изменяющимися, но также полезными для отличения видов. Указаны те признаки, которые могли бы свидетельствовать, что *A. diffinis* (NEWST.) и *A. flavida* DE LOTTO являются звенами, соеди-

няющими род *Abgrallaspis* BALACH. с родом *Hemiberlesia* SKILL.; *A. mammillaris* (LIND.), род *Abgrallaspis* BALACH. с *Tsugaspidiotus* TAKAGI. Выдвинуто предположение, что род *Diaspidiotus* LEON. является наиболее породнившимся с родом *Abgrallaspis* BALACH. Приведены признаки, на основании которых род *Abgrallaspis* BALACH. признан более специализированным чем род *Hemiberlesia* SKILL., *Diaspidiotus* LEON. и *Aspidiella* LEON.

Как равноценно специализированные по сравнению с исследованным учтены: *Borchseniaspis* ZAHN. и *Ephedraspis* BORCHS. Выдвинуто предположение, что *A. cyanophylli* (SIGN.) является самым старшим видом этого рода.

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