

Revision of the genus *Aspidiotes* Schönherr (Coleoptera: Curculionidae, Tanymecini)

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The genus *Aspidiotes* Schönherr, 1847 is revised; 6 species are recognized as valid. *Amomphus* Schönherr, 1848 is considered to be an unjustified replacement name for *Aspidiotes* Schönherr, 1847. *Phaenognathus* Schönherr, 1847 is retained as a subgenus of *Aspidiotes* although the cladistic analysis failed to find synapomorphies supporting this opinion. One new species, *A. (Aspidiotes) gonzalezi*, is described from NE Spain (Lérida, Tarragona and Zaragoza). A seventh species currently included in the genus, *Amomphus reichei* Desbrochers, 1872, is placed *incertae sedis*; the type specimen has not been traced. Distributional as well as biological data are provided. A cladistic analysis and a biogeographical discussion are provided.

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Introduction

Study of Iberian specimens of the species *Amomphus westringi* Schönherr, 1847 revealed the existence of two allopatric populations (NW and SW Iberian, respectively) which differ significantly. Morphometric and external and internal morphological characters warrant the recognition of two different species (Alonso-Zarazaga & Sánchez-Ruiz 1990). In that communication, we gave a detailed morphometric analysis using UPGMA and principal coordinates analysis. The northern population corresponds to a new species and, given the difficulty to assign it to one of the current subgenera (*Amomphus* and *Phaenognathus*), we decided to revise the genus in order to clarify the status of its constituent species and subgenera.

One of the first findings was that the correct name for the genus is *Aspidiotes* Schönherr, 1847. The genus *Amomphus* (= *Aspidiotes*) has been currently included in a subtribe Prypnina Lacordaire, 1863. However, the Australian genera *Prypna* Schönherr, 1823 and *Prostomus* Schönherr, 1823 must be transferred to the proximity of the tribe Leptopiini Oke, 1951 (R. G. Oberprieler, pers. comm.; unpubl. obs.). The valid subtribal name for

the genera to be retained in Tanymecini is *Tainophthalmina*, based on *Tainophthalmidae* Desbrochers, 1873.

Material and methods

Specimens for this study (including available type specimens) has been made available through the kindness of different institutions and individuals as follows: The Natural History Museum, London, United Kingdom (BMNH), Dr C. H. C. Lyal; Muséum National d'Histoire Naturelle, Paris, France (MNHN), Mlle Hélène Perrin; Museo Nacional de Ciencias Naturales, Madrid, Spain (MNCN), Dr Isabel Izquierdo and Miss C. Martín; Naturhistoriska Riksmuseet, Stockholm, Sweden (NRS), Dr Per Inge Persson; Hungarian Natural History Museum, Budapest, Hungary (HNHM), Dr O. Merkl; Deutsches Entomologisches Institut, Eberswalde, Germany (DEI), Dr Lutz Behne; Museo Civico di Zoologia, Roma, Italy (MCZR), Dr E. Colonnelli and Dr V. Vomero; Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (ZMB), Dr F. Hieke; Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (IRSNB), Dr M. Cludts and Dr K. Desender; Col. Moroder (Museo del Medio Ambiente, Valencia) (MMA), Dr. Alberto Sendra; Universidad Complutense de Madrid (UCM); Coll. M. A. Alonso-Zarazaga (CAZ), Coll. M. Sánchez-Ruiz (CSR), Coll. A. J. Velázquez de Castro (CVC), Coll. A. Pérez Onteniente (CPO).

SEM photographs were made using a Philips XL20 and line drawing illustrations were made using a Zeiss binocu-

lar with a camera lucida by the latter author (A.-Z.). Measurements were taken by the former author (S.-R.) using the same binocular provided with an eyepiece scale. In the descriptions, the following ratios are given: Rr (length of rostrum / width of rostrum including pterygia), Rp (width of pronotum / length of pronotum), Re (length of elytra / width of elytra) and Rep (length of elytra / length of pronotum).

Taxonomic history

Schönherr (1847: 26) described the genus *Aspidiotes* with a single included species, *A. westringii* Schönherr, 1847 (combined description, type species by original designation) for a weevil from Southern Spain. In the same work (1847: 29) Schönherr described the genus *Phaenognathus* similarly for a single species, *P. thalassinus* Schönherr, 1847 (combined description, type species by original designation) for a Greek weevil. The year after (Schönherr 1848), he decided to change the former name into *Amomphus* in the wrong belief that *Aspidiotes* was preoccupied by *Aspidiotes* Bouché, 1844. However, this name is a lapsus for *Aspidiotus* Bouché, 1833 (Homoptera, Coccoidea), as was also noted by Morrison & Morrison (1966: 17). Being a lapsus, Bouché's *Aspidiotes* has no nomenclatural status, and *Aspidiotes* Schönherr remains valid for the weevil genus.

Küster (1849) described two new species in the genus *Amomphus*, namely *A. dohrnii* from Greece and *A. concinnus* from Cartagena (Spain), and also redescribed *A. westringii*, a name which has been erroneously attributed to him because of the lack of a separate description in Schönherr's original paper.

Marseul (1857) synonymized *Amomphus dohrnii* Küster, 1849 with *Phaenognathus thalassinus* Schönherr, 1847.

Lucas (1858) described *Amomphus cottyi* from the outskirts of Lella-Magania (Algeria) and wrongly attributed the genus *Amomphus* to Dohrn.

Lacordaire (1863) synonymized *Phaenognathus* with *Amomphus* since he could not find weighty characters to keep them separate. He used *Amomphus dohrnii* as the valid name for the Greek species, and listed *P. thalassinus* as a synonym, considering it a *nomen nudum*.

In the same year, Marseul (1863) still considered *Amomphus* and *Phaenognathus* as different genera, keeping his previous point of view on the synonymies of the Greek nominal species.

Gemminger & Harold (1871) followed Lacordaire's opinion in their treatment of the genera and species.

Desbrochers (1872) described *Phaenognathus reichei* from Greece, considering this a valid genus. In 1873, the same author described *Amomphus dissimilis* from Cartagena (Spain) and synonymized *A. concinnus* Küster with *A. westringii* Küster.

Marseul (1888) retained *Phaenognathus* as a synonym of *Amomphus* and treated *A. concinnus* and *A. dissimilis* as synonyms of *A. westringii* and *A. thalassinus* as a synonym of *A. dohrni*.

Reitter (1890) described *A. setulifer* from Morocco.

Stierlin (1893) treated *Phaenognathus* as a subgenus of *Amomphus* and *A. concinnus* and *A. westringii* as separate species. *A. westringii* is for the first time recorded from France and *Amomphus thalassinus* from Turkey.

In 1914, Escalera described *Amomphus larbii* from Morocco and sunk *A. setulifer* Reitter as a synonym of *A. cottyi* Lucas.

In the most recent catalogues, Winkler (1932) and Günther & Zumpt (1933) treated *Phaenognathus* as a subgenus of *Amomphus* and both works still give the authorship of *A. westringii* to Küster.

Colonnelli (1978) described *Amomphus anatolicus*, a species which he left unplaced to subgenus because of intermediate features.

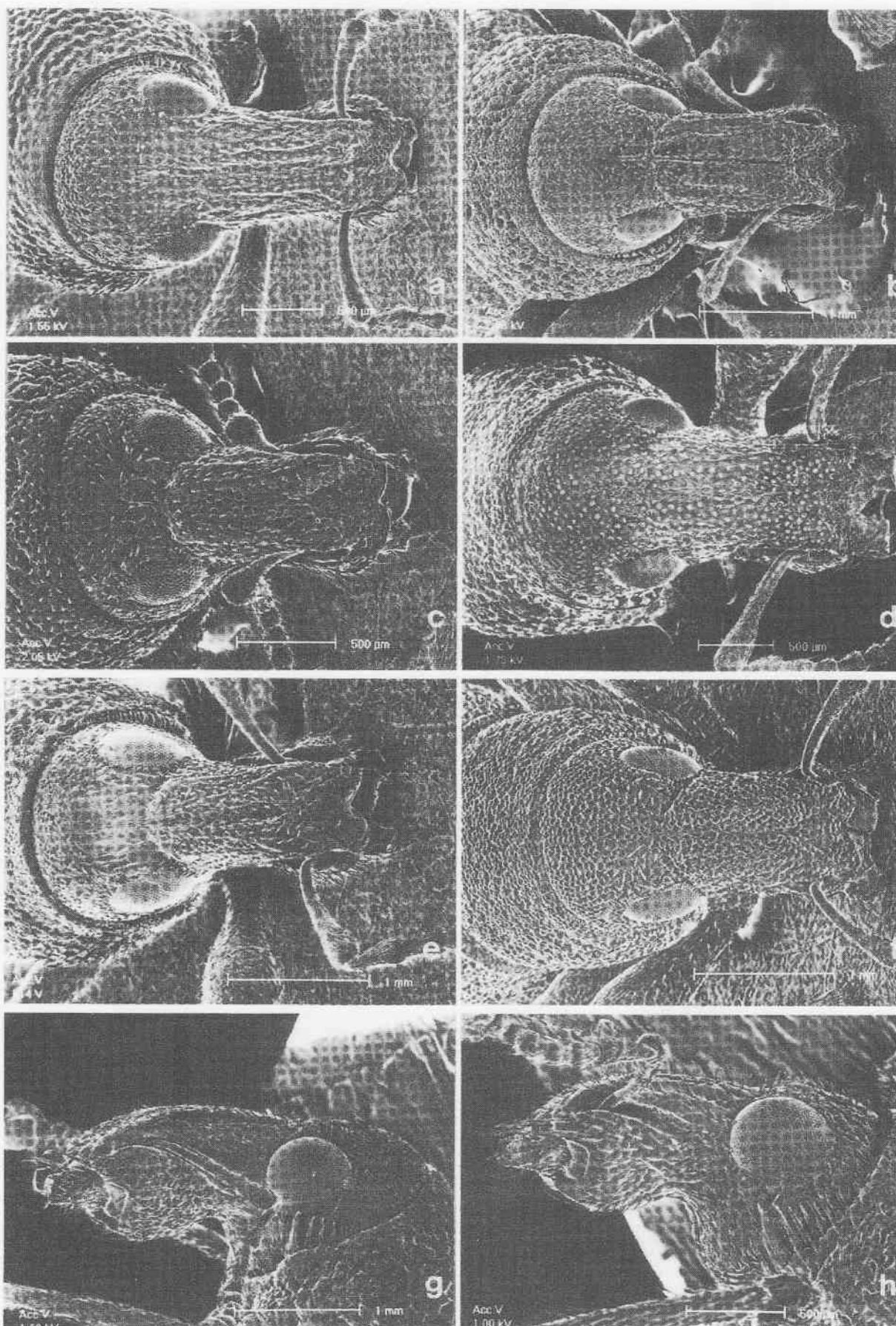
Pesarini (1987) recorded a female of *Amomphus westringii* from Sicily and correctly attributed this species to Schönherr.

Recently, Alonso-Zarazaga & Sánchez-Ruiz (1990) identified and studied a supposed northern population of *Amomphus westringii* and reached at the conclusion that it represents a new species. This is described in the present paper.

Genus *Aspidiotes* Schönherr

Aspidiotes Schönherr, 1847: 26. Type species: *Aspidiotes westringii* Schönherr, 1847, by original designation and combined description.

Fig. 1. *Aspidiotes* spp., head: (a) *A. anatolicus*, dorsal view; (b) *A. thalassinus*, dorsal view; (c) *A. cottyi*, dorsal view; (d) *A. larbii*, dorsal view; (e) *A. gonzalezi*, dorsal view; (f) *A. westringii*, dorsal view; (g) *A. thalassinus*, lateral view; (h) *A. westringii*, lateral view.



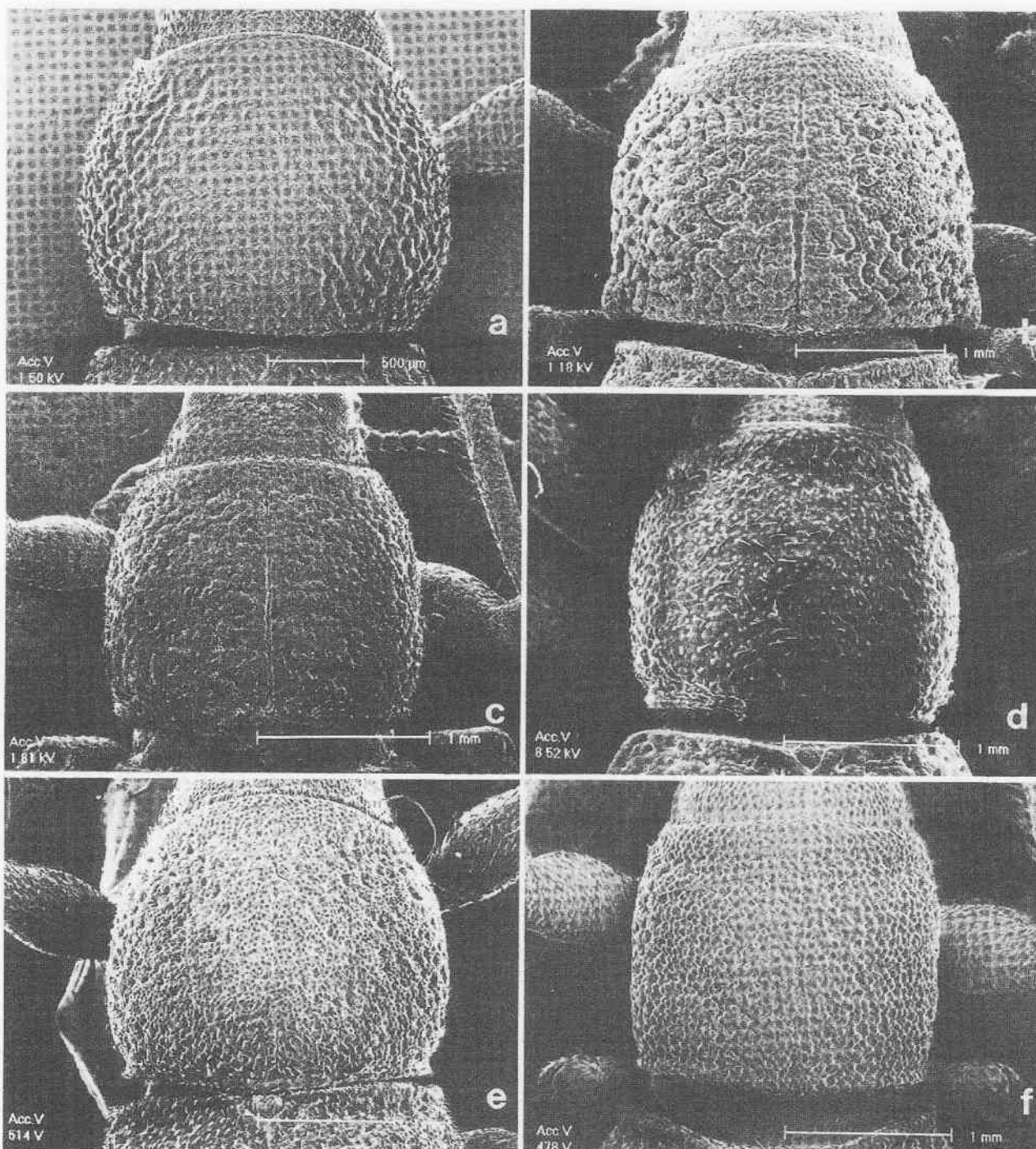


Fig.2. *Aspidiotes* spp., pronotum, dorsal view: (a) *A. anatolicus*; (b) *A. thalassinus*; (c) *A. cottyi*; (d) *A. larbii*; (e) *A. gonzalezi*; (f) *A. westringii*.

Amomphus Schönherr, 1848: 359. Unjustified replacement name for *Aspidiotes* Schönherr, 1847, non *Aspidiotes* Bouché, 1844 (unavailable name, lapsus for *Aspidiotus* Bouché, 1833).

Subgenus *Phaenognathus* Schönherr, 1847: 29. Type species: *Phaenognathus thalassinus* Schönherr, 1847, by original designation and combined description.

Description. – Length (pronotum + elytra): 4.73 - 9.69 mm. Width (elytral maximum): 2.09 - 4.64 mm. Vestiture more or less dense, formed by appressed, metallic, tessellate scales and non-metallic imbricate scales, the latter usually present only on sides of elytra but sometimes extending to disc (in-

dividually variable), type and sculpturing of the scales specifically variable (Fig. 4). Interstriae of elytra with setiform to lanceolate, striolate scales (Fig. 4). Strial punctures each with one minute scale borne by a minute socket on the fore margin (Fig. 4). Other setae present and variously distributed on other parts of the body. Appendages scaly and setose, protibiae with stiff, suberect setae on inner margin, usually shorter than median width of tibia, in some species longer; outer margin with variable, specifically different, setal arrangement (Fig. 3).

Rostrum longer than wide; sides almost parallel; 4-keeled and 5-sulcate longitudinally, sulci and keels variously developed, median sulcus usually the widest and deepest of all, in some species reaching or surpassing middle of frons (Fig. 1). Preocular sulcus more or less developed, arcuate or V-shaped, in some species only indicated at sides (Fig. 1). Scrobes linear, widening slightly posteriorly, dorsal margin directed towards lower third of eye (Fig. 1). Pterigia weak. Epistome V-shaped, not marginate basally, deeply incised apically. Mandibles variously developed, plurisetose, scar prominent. Labium incompletely adelognathous, maxillar stipes visible. Prementum more or less hexagonal to cordiform, oblong to transverse, with 2 (rarely 3) setae on apical half (Fig. 7).

Frons wider than rostral dorsum between the pterigia. Eyes rounded, moderately convex. Antennae (Fig. 10, a-f) slender, scape incrassate in apical half, squamose. Funicle setose, not squamose, first two desmomerites oblong, longer than any of the other five. Club oval, 3-segmented, segments about equal in length.

Pronotum (Fig. 2) isodiametric to transverse, with postocular lobes well to not developed, bearing long cilia. Discal punctures weaker and sparser than the lateral ones.

Scutellum present, rounded.

Elytra with humeri absent, coadunate, oblong to ovate. Base raised as a more or less prominent flange (except in *A. cottyi* where it is obsolete) and steeply declivous to the mesonotum (in *A. cottyi* the declivity is weak and present only near humeri). Striae at apex join 1+10, 2+9, 3+8, 4+5, 6+7, 9 and 10 very approximate in apical two thirds, 10th interstria in apical two thirds with 1-2 rows of scales only. Interstriae 3 and 5 usually wider than others, 7 and 9 fused into a common portion at base, 8 shortened before reaching base for a more or less long distance. Inner epipleural margin apically with parallel wrinkles in both sexes (Fig. 5).

Legs robust, femora unarmed, tibiae straight to slightly arcuate in apical third, tarsi with 3rd tarsomere bilobed and wider than the rest. Claws simple, free.

Male genitalia (Figs 6, 8, 9): Penis tubular, apical plate well developed, acute to truncate, tube long or short, temones variously developed. Internal sac with specifically variable tubular to strongly distorted flagellum, sometimes other pieces present.

Female genitalia (Fig. 10, g-p): 8th sternite (Fig. 10, j) subtriangular with sides strongly curved upwards, apex setose, spiculum ventrale robust, longer than plate. Ovipositor (Fig. 10 g-i) with short bi- or trisetose styli, coxites apically with setae and sensilla, a dorsal fold allowing the coxite to bend apically. Spermathecae (Fig. 10 k-p) very different specifically, corpus slender, subcylindrical, cornu hooked,

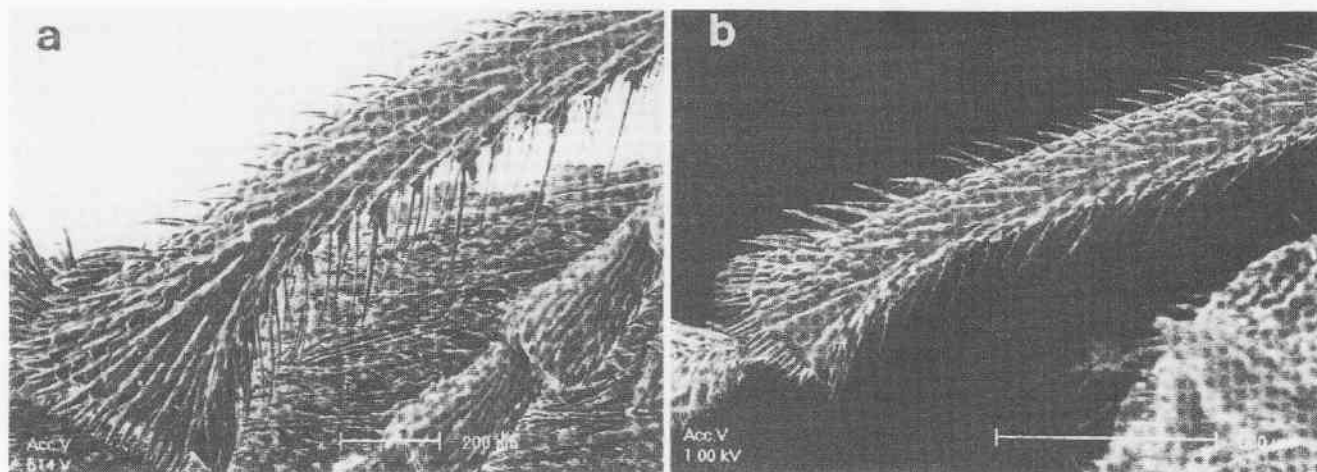


Fig. 3. *Aspidiotes* spp., protibia: (a) *A. gonzalezi*; (b) *A. westringii*.

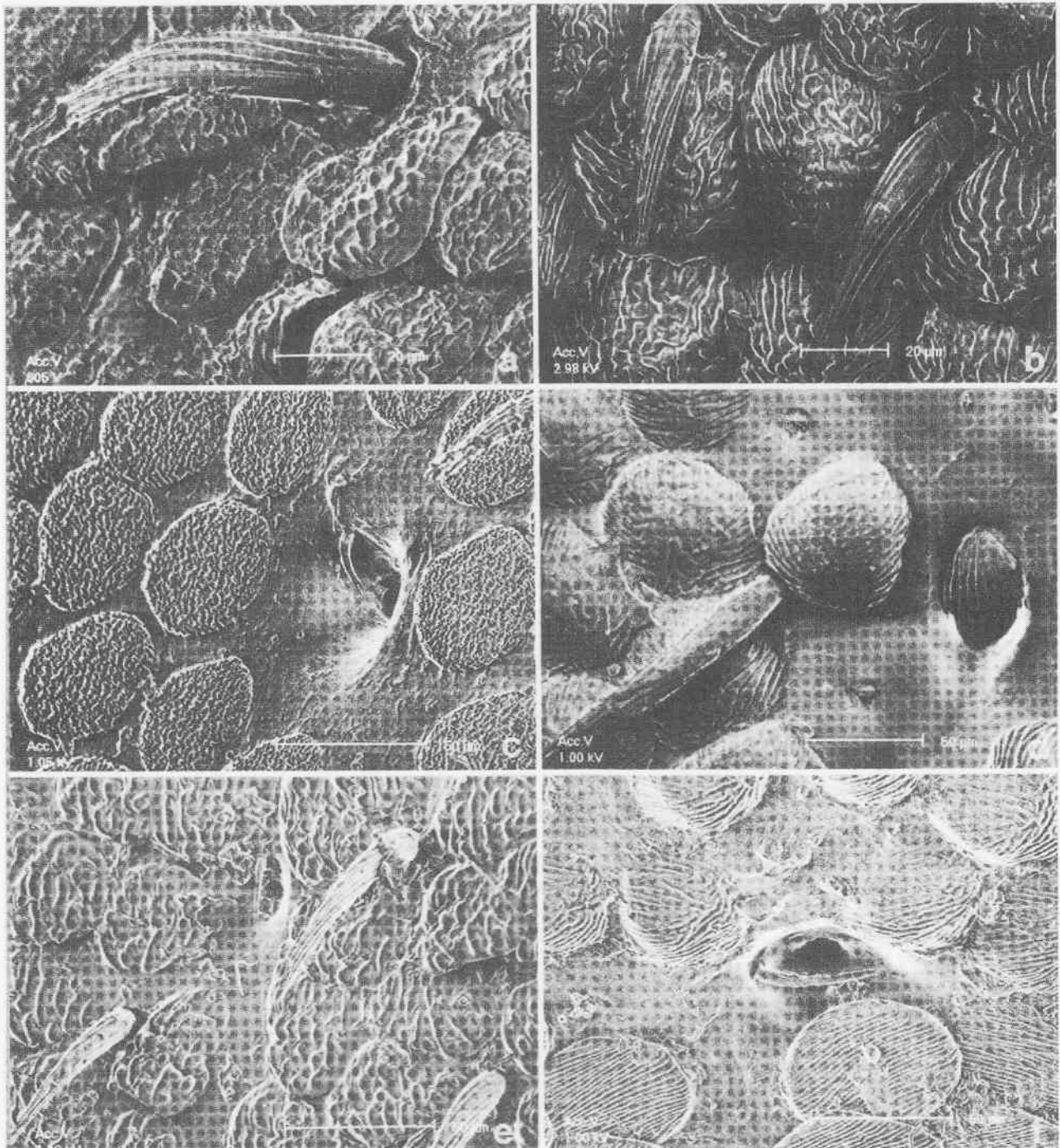


Fig. 4. *Aspidiotes* spp., scales on disc of elytra: (a) *A. anatolicus*; (b) *A. thalassinus*; (c) *A. cottyi*; (d) *A. larbi*; (e) *A. gonzalezi*; (f) *A. westringii*.

ramus short or long (subgenus *Phaenognathus*), collum short or long (three species of subgenus *Aspidiotes*).

Distribution (Fig. 11). – The genus has a Mediterranean distribution in the the Western Palaearctic region. The species are thermophilous weevils

mostly associated with coastal scrub or steppe vegetation. Only a few species have been found in non-coastal areas (*A. gonzalezi* sp. n. in the Ebro basin, *A. anatolicus* (Colonnelli) in central Anatolia). The two subgenera presently recognized occur allopatrically in the western and eastern parts of the Mediterranean subregion.

Key to subgenera and species

1. Flagellum long and slender (Fig. 8 a, b). Pronotal surface granular or variolate on disc (Fig. 2 a, b). Spermatheca with long ramus (Fig. 10 k, l). Outer protibial pubescence erect. Eastern Mediterranean species. (Subg. *Phaenognathus* Schönherr) 2
- Flagellum short, robust, in one or two pieces (Figs 8 c, 9). Pronotal surface more or less densely and finely punctate on disc (Fig. 2 c-f). Spermatheca with short ramus (Fig. 10 m-p). Outer protibial pubescence appressed (exception: *A. westringii* with pubescence erect). Western Mediterranean species. (Subg. *Aspidiotes* Schönherr) 3
2. Surface of pronotum granular (Fig. 2 a). Postocular lobes of prothorax obsolete. Transverse sulcus of rostrum wide, depression-like (Fig. 1 a). Frons depressed (Fig. 1 a). Disc of elytra with long, suberect setae on apical half, more than twice as long as the diameter of one scale (Fig. 4 a). Scales of elytra irregularly and coarsely tuberculate, with intervening granules (Fig. 4 a). Protibiae not or hardly toothed on the inner margin (cf. Fig. 3 b). East Anatolia *A. anatolicus*
- Surface of pronotum coarsely punctate, variolate, sometimes with cerebroid appearance (Fig. 2 b). Postocular lobes of prothorax visibly developed (Fig. 1 g). Transverse sulcus of rostrum fine, deep (Fig. 1 b). Frons convex (Fig. 1 b). Disc of elytra with short, suberect curved setae on apical half, less than $1.5 \times$ as long as diameter of one scale (Fig. 4 b). Scales of elytra coarsely striate and irregularly tuberculate (Fig. 4 b). Protibiae strongly toothed on the inner margin (cf. Fig. 3 a). Greece, West Anatolia and Israel *A. thalassinus*
3. Median longitudinal sulcus of pronotum well marked, complete (Fig. 2 c). Common basal part of 7th and 9th elytral interstriae clearly prominent, forming a callus which is fused to the obsolete basal rim of elytra. Base of elytra weakly declivous to mesonotal peduncle, declivity only visible near humeri. Scales of elytra minutely and irregularly granulate (Fig. 4 c). Spermatheca with collum short (Fig. 10 m). Algeria and Morocco *A. cottyi*
- Median longitudinal sulcus of pronotum either weak and incomplete or absent (Fig. 2 d-f). Common basal part of 7th and 9th elytral interstria not prominent. Basal flange of elytra prominent, more or less vertically declivous to mesonotal peduncle even near suture (Fig. 2 d-f). Scales of elytra either striate (Fig. 4 d, f) or coarsely tuberculate (Fig. 4 e). Spermatheca with long collum (Fig. 10 n-p) 4
4. Disc of elytra with appressed setae (Fig. 4 d). Scales irregularly striate (Fig. 4 d). Scale on front margin of stria punctures flabellate (Fig. 4 d). Outer protibial pubescence appressed, short. Transverse sulcus of rostrum obsolete, at most visible on sides in front of eyes (Fig. 1 d). Apical plate of penis rounded, almost truncated (Fig. 6 d). Western Morocco *A. larbii*
- Disc of elytra with curved setae (Fig. 4 e-f). Scales either regularly striate (Fig. 4 f) or coarsely tuberculate (Fig. 4 e). Scale on front margin of stria punctures lanceolate (Fig. 4 e-f). Outer protibial pubescence curved, short or long. Transverse sulcus of rostrum fine and deep (Fig. 1 e-f). Apical plate of penis acute (Fig. 6 e-f). Spain 5
5. Pronotum more strongly punctate on sides than on disc, sides strongly curved (Fig. 2 e). Outer protibial pubescence shorter (Fig. 3 a). Protibiae arcuate, strongly toothed on inner margin (Fig. 3 a). Scales of elytra coarsely tuberculate (Fig. 4 e). Second desmome more than $250 \mu\text{m}$ long. Penis elongate, slender (Fig. 9 b). Flagellum in one piece (Fig. 9 b). North-eastern Spain *A. gonzalezi*
- Pronotum with punctures similar all over, sides weakly curved, subparallel (Fig. 2 f). Outer protibial pubescence longer (Fig. 3 b). Protibiae straight, minutely toothed on inner margin (Fig. 3 b). Scales of elytra regularly striate (Fig.

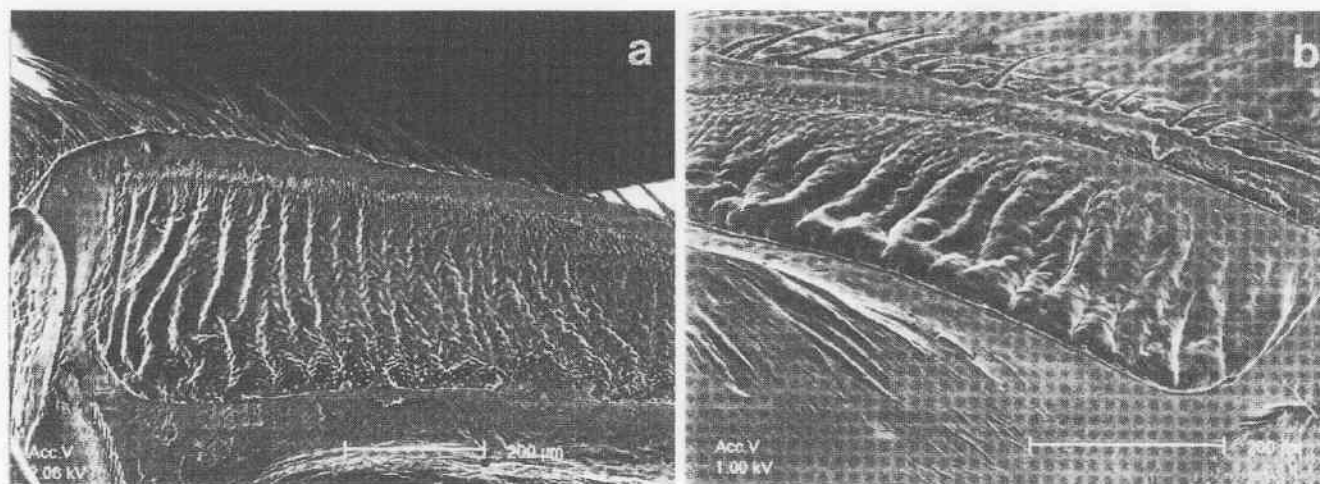


Fig. 5. *Aspidiotes* spp., parallel wrinkles on underside of apex of elytra: (a) *A. thalassinus*; (b) *A. westringii*.

4 f). Second desmomer less than 250 μ m long. Penis short, robust (Fig. 9 c). Flagellum in two pieces (Fig. 9 c). South-eastern and South Spain *A. westringii*

Description of species

Aspidiotes (Phaenognathus)

anatolicus (Colonnelli, 1978), **comb. n.**

(Figs 1a, 2a, 4a, 6a, 8a, 10a, g-h, k, 11)

Amomphus anatolicus Colonnelli, 1978: 3.

Type material. – Described from the holotype and 58 paratypes from Yozgat (Turkey), mostly in the author's collection, although some paratypes were distributed to different institutional and private collections (Colonnelli 1978). All of the examined specimens agree with the original description.

Description. – Body length (pronotum + elytra): σ : 5.26 - 6.52 mm; φ : 5.63 - 7.81 mm. Maximum width: σ : 2.29 - 3.05 mm; φ : 2.70 - 3.95 mm.

Colour black, tarsi dark ferrugineous, body completely covered with metallic greenish blue to brownish adpressed scales, those on disc of elytra irregularly and coarsely tuberculate, with intervening granules (Fig. 4 a). Elytral interstitial setae (Fig. 4 a) lanceolate, curved on basal half, suberect on apical half, as long as 2 \times the diameter of adpressed scales; elytral striae scales (Fig. 4 a) on front margin of punctures similar but smaller.

Rostrum (Fig. 1 a) elongate ($Rr = 1.44 - 1.66$, $\sigma \varphi$), separated from frons by a sulciform depression (not a deep sulcus), dorsum declivous at apex, median sulcus deep, constricted at middle, reaching level of front margin of eyes, limited on each side by a keel, each keel having a slight sulcus on the outer side. Frons depressed. Eyes rounded, large, moderately convex. Antenna: see Fig. 10 a.

Prothorax (Fig. 2 a) in dorsal view slightly transverse ($Rp = \sigma: 1.14 - 1.29$; $\varphi: 1.24 - 1.35$), hind margin wider than fore margin, sides rounded, maximum width a little behind middle. Median sulcus at most slightly marked. Postocular lobes obsolete. Vestiture similar to that of the elytra but sparser and setae minute. Dorsal surface granular, minute setiferous punctures interspersed among granules.

Elytra oval, elongate, acuminate ($Re = 1.51 - 1.68$, $\sigma \varphi$; $Rep = \sigma: 2.36 - 2.91$; $\varphi: 2.83 - 3.19$). Striae formed by a row of separate punctures. Interstriae more or less flat, setae in three irregular rows.

Fore tibiae slightly incurved at apex in male,

straight in female, internal denticulation obsolete; outer margin with short, suberect setae.

Genitalia: Male penis (Fig. 8 a) elongate, in dorsal view sides converging to ostium, apical plate uniformly ogival (Fig. 6 a), in side view curved, with apex slightly recurved. Internal sac with a slender, curved flagellum ca. $0.42 \times$ length of tube of penis (Fig. 8 a).

Female spermatheca with ramus $1.5-2.0 \times$ as long as wide (Fig. 10 k). Ovipositor: see Fig. 10 g-h.

Biology. – According to Colonnelli (1978), the type series was taken on white-flowered plants of the genus *Althaea* (Malvaceae). The weevils become active at twilight. The only capture was made in July.

Material examined. – TURKEY: 20 σ , 16 φ Turkey, Yozgat, road E 23, 62 km East from Kirikkale, 9-VII-1975, E. Colonnelli (MCZR); 1 σ , ditto (DEI); 1 σ , ditto (HNHM).

Distribution (Fig. 11). – This species is known only from the type locality.

Aspidiotes (Phaenognathus) thalassinus

(Schönherr, 1847), **comb. n.**

(Figs 1b, g, 2b, 4b, 5a, 6b, 7a, 8b, 10b, l, 11)

Phaenognathus thalassinus Schönherr, 1847: 31.

Amomphus dohrnii Küster, 1849: nr. 75.

Type material. – *Phaenognathus thalassinus*: Described from an unspecified number of specimens from Greece, in combination with the generic description. In the Schönherr Collection there is a single specimen coincident in all respects with the original description. We have selected it as lectotype. It bears the following labels: (white, Schönherr's handwriting): *Brachyderes* ?, Graecia Germar / (dark red label) / LECTOTYPUS σ , *Phaenognathus thalassinus*, Schönherr 1847, Sánchez-Ruiz & Alonso-Z. des. 1991. This is the type species of *Phaenognathus* Schönherr, 1847. It is widespread although rare in Greece and Near East.

Amomphus dohrnii: No type material of this species has been located. However, from the description and the type locality given (Greece) it is clear that it is a synonym of *Phaenognathus thalassinus* Schönherr, 1847, as it has been given by the previous authors (Marseul 1857, 1863; Lacordaire 1863; Jacquelin du Val 1868; Gemminger & Harold 1871; Marseul 1888; etc.).

Description. – Body length (pronotum + elytra): σ : 6.81 - 8.66 mm; φ : 7.80 - 9.69 mm. Maximum width: σ : 3.00 - 3.86 mm; φ : 3.64 - 4.64 mm.

Colour black. Vestiture dense, appressed scales metallic green, sometimes brownish, those on disc of elytra coarsely striate and irregularly tuberculate (Fig. 4 b). Interstitial scales of elytra (Fig. 4 b) short, slightly curved in basal half, more erect in apical

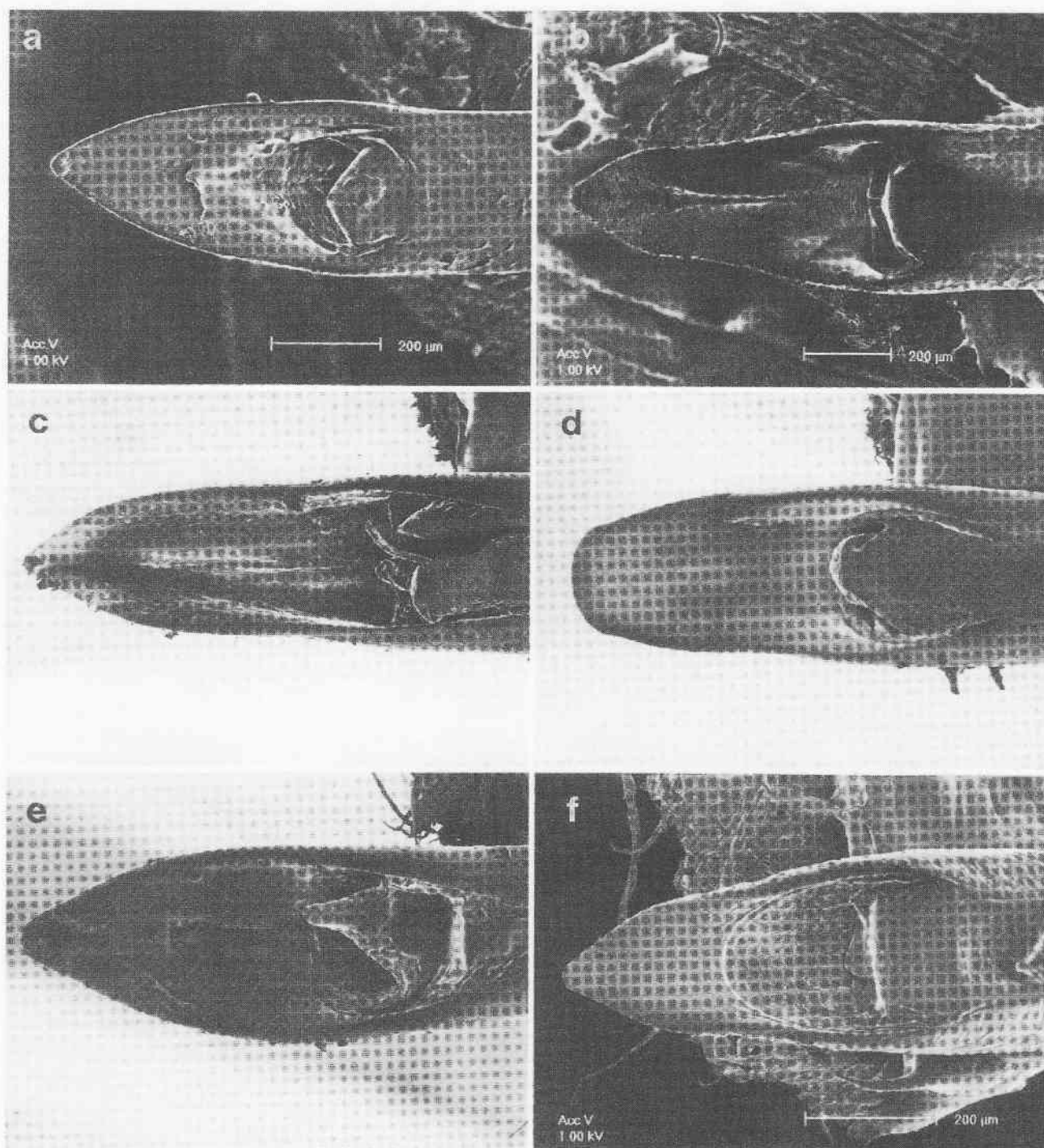


Fig.6. *Aspidiotes* spp., apical plate of penis, dorsal perpendicular view: (a) *A. anatolicus*; (b) *A. thalassinus*; (c) *A. cottyi*; (d) *A. larbii*; (e) *A. gonzalezi*; (f) *A. westringii*.

half, less than $1.5 \times$ as long as diameter of one appressed scale. Strial setae (Fig. 4 b) similar to those of interstriae.

Rostrum (Fig. 1 b) more robust ($R_r = 1.22 - 1.43$, σ \varnothing), separated from frons by a deep, fine transverse sulcus, with deep median longitudinal sulcus and one adjacent keel on each side, the outer sulci

deeper, another short sulcus in front of each eye. Frons convex. Eyes rounded to subtriangular, barely convex. Antenna: see Fig. 10 b.

Prothorax (Fig. 2 b) transverse ($R_p = \sigma: 1.22 - 1.40$; $\varnothing: 1.30 - 1.43$), wider at base than at apex, widest point usually at base (more frequently in males), sides subparallel in basal two thirds, apical

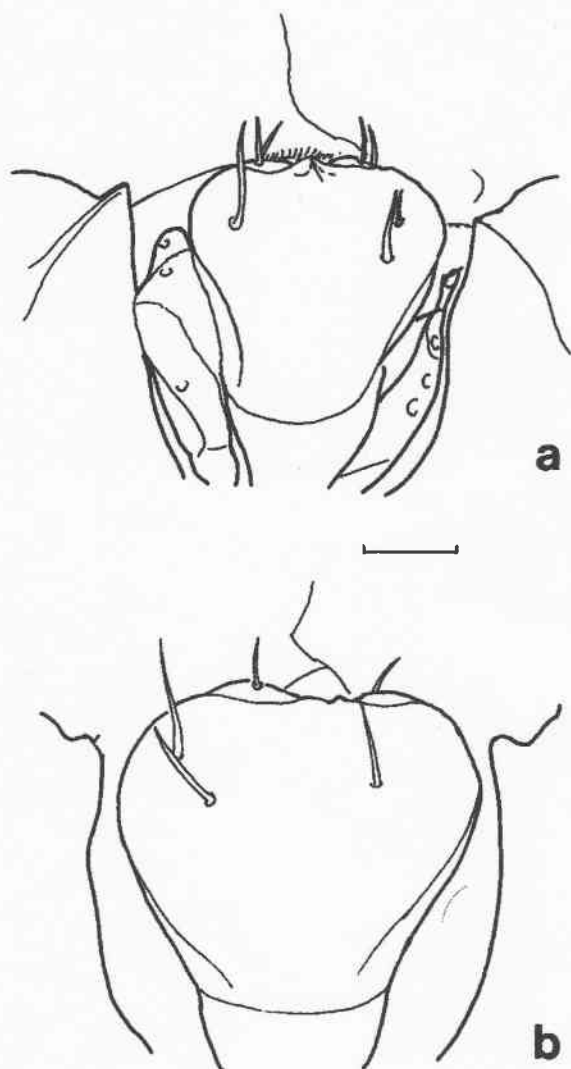


Fig. 7. *Aspidiotes* spp., labium: (a) *A. thalassinus*, maxillary setae omitted; (b) *A. westringii*, maxillae omitted. Scales: (a) 200 μ m; (b) 145 μ m.

third abruptly narrowed to apex, bell-shaped, males usually with posterior angles callose and prominent. Dorsal surface with well marked median sulcus, punctures coarse, variolose, sometimes with cerebroid appearance. Postocular lobes (Fig. 1 g) well developed, limiting an emargination in the anterior prosternal margin.

Elytra ovate, elongate, acuminate ($Re = 1.59 - 1.74$, σ \varnothing ; $Rep = \sigma: 2.67 - 3.32$; $\varnothing: 3.16 - 3.44$). Striae linear, punctures very close. Interstriae wide, barely convex, setae on 2-3 irregular rows on each interstria.

Fore tibiae slightly curved in male, straight in female, strongly dentate on inner margin; outer margin with short, suberect setae, more visibly in apical third.

Genitalia: Male penis (Fig. 8 b) elongate, in dor-

sal view sides converging to ostium, apical plate elongate triangular with sides sinuate (Fig. 6 b), in side view curved, with apex almost straight. Internal sac with a slender, sinuously curved flagellum with widened base, a little shorter than tube of penis (Fig. 8 b), and two fin-like structures.

Female spermatheca (Fig. 10 l) with subpyriform ramus ca. $2.0 \times$ as long as wide, proportionally larger than in *A. anatolicus*.

Biology. – According to label data, specimens from Thermi (Greece) were collected while feeding on *Centaurea solstitialis* L. (Asteraceae). Adults have been collected in May and June.

Material examined. – GREECE: 1 σ Graecia, Germar (type of *Phaenognathus thalassinus*) (NRS); 1 σ , 2 \varnothing (MNCN); 1 ex., Griechenland, Reitter (BMNH); 14 ex. Greece (BMNH); 3 \varnothing , 1 σ Graecia (HNHM); 2 \varnothing , 2 σ Graecia (ZMB); 5 σ Graecia (DEI); 39 σ , 26 \varnothing Grèce (IRSNB); 1 σ , 1 \varnothing Graecia (ZMB); 2 \varnothing , 1 σ Grèce, Athènes (IRSNB); 1 \varnothing Athen (DEI); 1 σ , 1 \varnothing Graecia, Attika (DEI); 1 \varnothing Grèce, Attika (IRSNB); 3 \varnothing , 1 σ Attika (ZMB); 2 σ , 1 \varnothing Attika (HNHM); 1 σ Chalkidiki, Iraklia (DEI); 1 σ Graecia, Laetús (ZMB); 2 ex. Piraeus (BMNH); 2 \varnothing , 1 σ Salonick, C. Müller (DEI); 2 \varnothing , 1 σ Grèce, Salonique (IRSNB); 12 ex. Salonica (BMNH); 11 ex. Salonica, G. C. Champion (BMNH); 6 \varnothing , 4 σ Greece, Thermi (Th.), P. H. Dunn (MCZR); 3 σ , 1 \varnothing Greece-Macedonia, Thermi Thessaloniki, 07-VI-1982 (MCZR); 2 \varnothing Greece, prov. Thessaloniki, Thermi, June 28, 1987, L. Fornasari (MCZR); 1 σ , 1 \varnothing Greece, Thermi, 18-V-83 (MCZR); 1 σ , 1 \varnothing Greece, Thermi, 6-28-1987, Dunn (MCZR). ISRAEL: 1 \varnothing , Jerusalem (IRSNB). RUSSIA: 2 σ , S. Russl, Nebel (HNHM). Without locality: 1 σ , 1 \varnothing (DEI); 1 \varnothing (HNHM); 1 σ (Brullé) (DEI); 2 \varnothing (ZMB); 2 ex. (BMNH).

Distribution (Fig. 11). – The available material shows that the species is present in most of continental Greece, Western Anatolia and Israel. Two specimens from the Budapest Museum show one label stating that they come from Southern Russia. This precedence is suspect and must be confirmed. It has been also recorded from Turkey: Meandron River, Seraikiöi, 30.v.1904 (Sahlberg 1913), material not seen.

Aspidiotes (Aspidiotes) cottyi
(Lucas, 1858), **comb. n.**

(Figs 1c, 2c, 4c, 6c, 8c, 10c, m, 11)

Amomphus cottyi Lucas, 1858: cxxiv.

Amomphus setulifer Reitter, 1890: 157.

Type material. – *Amomphus cottyi*: The original description does not state the number of specimens of this species, described from Lella-Magnia (Algeria), but at least both sexes are represented. In Lucas's Collection in the

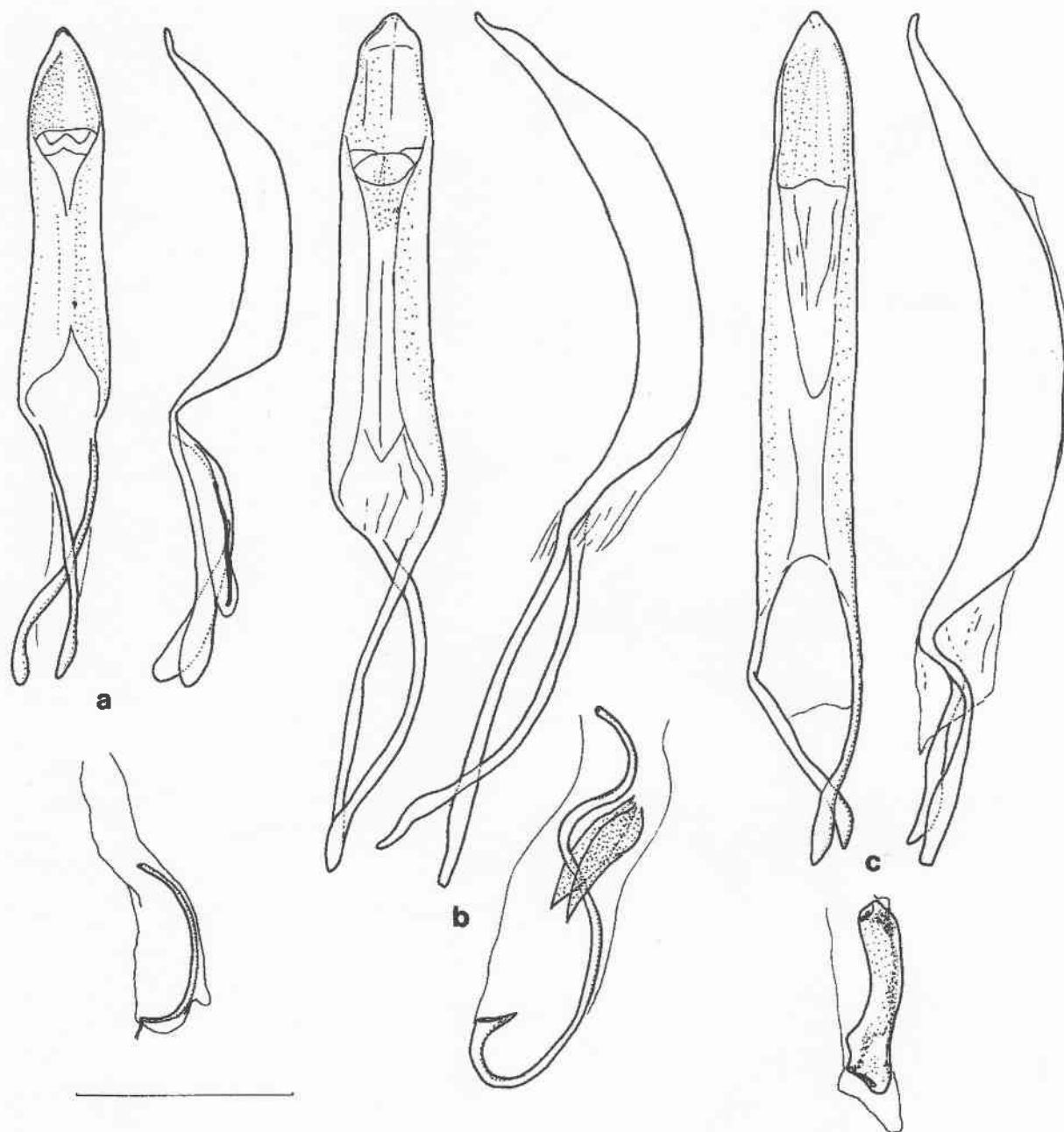


Fig. 8. *Aspidiotes* spp., dorsal and lateral view of penis and flagellum of internal sac: (a) *A. anaticus*; (b) *A. thalassinus*; (c) *A. cotti*. Scale for penis: 1000 μ m; for flagellum: 792 μ m.

Paris Museum are preserved four specimens which agree with the original description. One of us (A.-Z.) selected as lectotype a male specimen labelled as follows: blue disc with 'cotti, Algerie, 1857' written on underside; 'Aspidiotes σ cotti, Lucas'; orange, printed and handwritten 'LECTOTYPUS σ , Amomphus cotti Lucas, Alonso-Z. des. 1990'. The other three specimens are paralectotypes: one female with a blue disc as lectotype, and one male and one female bearing a blue disc with '958, 58' written on the underside. All these have been provided with paralectotype labels.

Amomphus setulifer. The original description is based on an unspecified number of specimens from Morocco, collected by Quedenfeldt and housed in Reitter's collection,

presently in the Budapest Museum. In this collection there is now a single specimen, which we have designated as lectotype. It is a female, carrying the following labels: printed 'Marocco, Casablanca, Reitter'; 'Marocco, Casablanca, leg. Quedenfeldt'; red bordered, handwritten and printed museum label 'Holotypus 1890., Amomphus setulifer Reitter'; whitish, underside in Reitter's handwriting 'Amomphus aut n. gen...' (rest illegible); blue, underside in Reitter's handwriting 'Amomphus setulifer m 1889'; printed 'Coll. Reitter'; red, printed 'LECTOTYPUS σ , Amomphus setulifer, Reitter, 1890, Sánchez-Ruiz & Alonso-Z. des. 1991'; printed 'Aspidiotes cotti (Lucas, 1858), Sánchez-Ruiz & Alonso-Z. det. 1991'. This specimen is *Aspidiotes cotti*, as established by Escalera (1914).

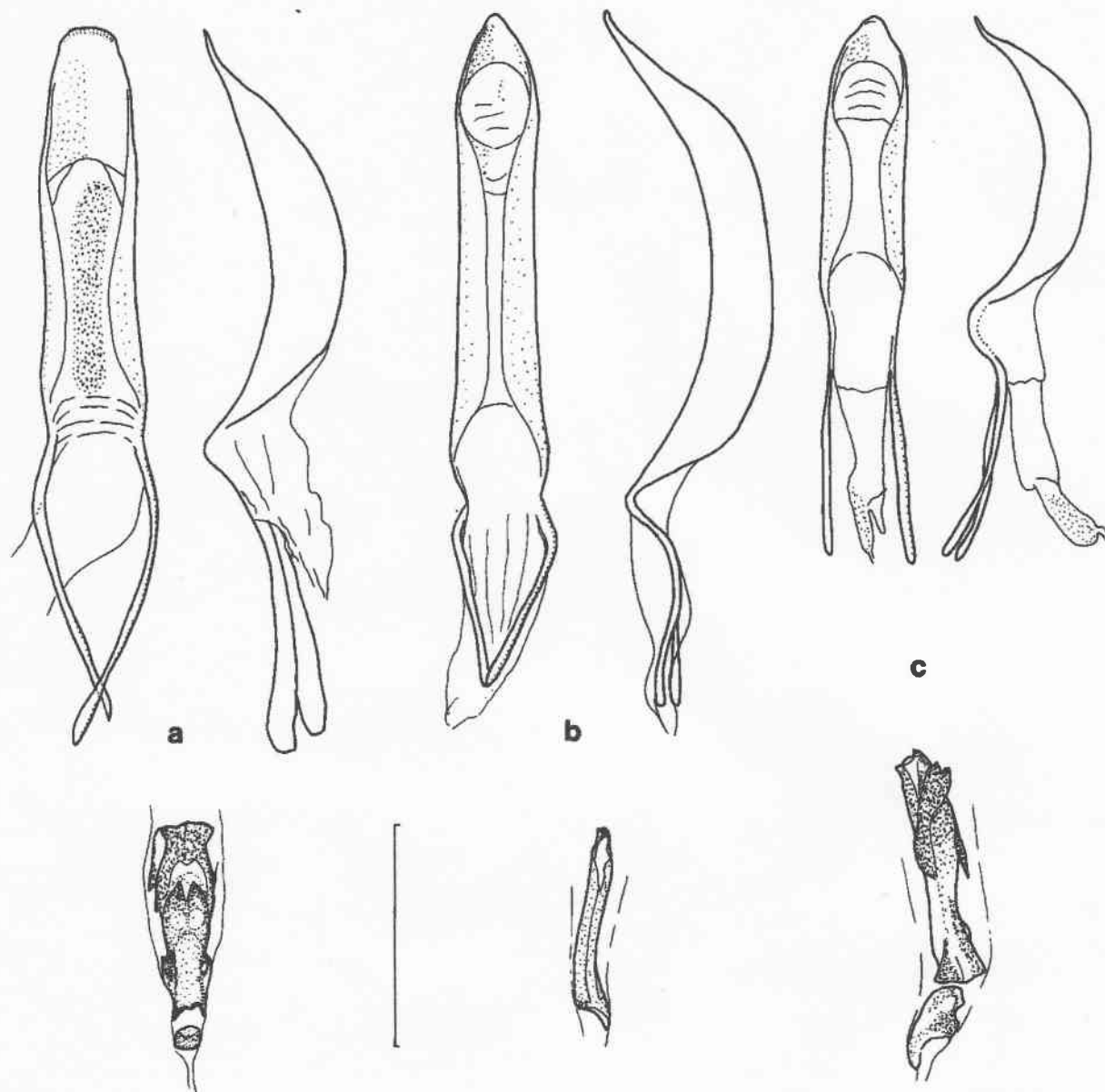


Fig. 9. *Aspidiotes* spp., dorsal and lateral view of penis and flagellum of internal sac: (a) *A. larbii*; (b) *A. gonzalezi*; (c) *A. westringii*. Scale for penis: 1000 μ m; for flagellum: 792 μ m.

Description. – Body length (pronotum + elytra): σ : 5.92 - 7.51 mm; φ : 6.55 - 8.89 mm. Maximum width: σ : 2.32 - 2.91 mm; φ : 2.62 - 3.65 mm.

Colour black. Vestiture dense, appressed scales metallic green, sometimes coppery, those on disc of elytra minutely and irregularly granulate (Fig. 4 c). Interstrial scales of elytra long, erect, more than 2.0 \times as long as diameter of one appressed scale (Fig. 4 c). Strial setae piliform to lanceolate, minute (Fig. 4 c). Head and pronotum with shorter erect setae.

Rostrum (Fig. 1 c) robust ($R_r = 1.21 - 1.48$, $\sigma \varphi$), separated from frons by a well marked but wide transverse sulcus, with shallow to deep medi-

an longitudinal sulcus, adjacent keels obsolete to marked, outer sulci usually obsolete. Frons flat to convex. Eyes rounded to almond-shaped, slightly convex. Antenna: see Fig. 10c.

Prothorax (Fig. 2 c) more transverse ($R_p = 1.30 - 1.43$) in σ than in φ ($R_p = 0.99 - 1.22$), wider at base than at apex, widest point usually at middle, sides gently and uniformly convex. Dorsal surface with well marked median sulcus from base to apex, punctures moderately deep and large, leaving some naked sinuate lines.

Elytra ovate, elongate ($R_e = 1.64 - 1.95$, $\sigma \varphi$; $R_{ep} = \sigma: 2.40 - 2.83$; $\varphi: 2.51 - 3.22$), acuminate,

slender with sides uniformly curved in male, conspicuously widened in apical half in female, base of 9th interstria callose and continuous with the obsolete basal elytral flange. Striae with deep, almost continuous, round punctures. Interstriae wide, hardly convex, setae on 1-2 irregular rows.

Fore tibiae straight in both sexes, hardly dentate on inner margin (cf. Fig. 3 b), setae ca. 1.5 × as long as median width of tibia (male) or a little shorter (female); outer margin with suberect setae, more visibly in the apical third.

Genitalia: Male penis elongate (Fig. 8 c), in dorsal view sides subparallel to ostium, apical plate elongate triangular with sides curved (Fig. 6 c), in side view gently curved, with apex slightly recurved (Fig. 8 c), temones short. Internal sac with a small, robust, irregular flagellum, a little shorter than apical plate of penis (Fig. 8 c).

Female spermatheca (Fig. 10 m) with short, conical ramus wider than long, ramus and cornu variable in shape and proportions across its distribution area.

Biology. – This species was taken by J. Péricart near Agadir on *Cladanthus arabicus* Cass. (Asteraceae).

Material examined. – ALGERIA: 4 ♂ Algier (DEI); 1 ♂, 1 ♀ Algeria, Tournier (DEI); 4 ex. Algeria, Lella-Magnia (type series of *Amomphus cotti*) (MNHN); 1 ♀ Lall. Margh. (MNHN); 2 ex. L. Marnia, C. H. Martin (MNHN); 1 ex. L. Magnia, mai-88 (BMNH); 5 ♀, 1 ♂ Lella Maghnia, mai (MNCN); 1 ♀ L.-Magnia (DEI); 2 ex. Oran (BMNH); 1 ex. Oran, Lepitre (BMNH); 1 ♂ Oran (MNHN). CANARY IS.: 1 ♂, Tenerife, Fuente fría, 10-V-1927, E. Appenhagen (BMNH) (doubtful). MOROCCO: 4 ♂, 2 ♀ (MNCN); 1 ex. (BMNH); 3 ♀, 1 ♂ Morocco, Rolph (DEI); 1 ♂, 2 ♀ Morocco (HNHM); 1 ♂ Morocco (MNHN); 2 ex. Morocco, Reitter (BMNH); 1 ♂ Morocco, V-1936, Antoine (MNHN); 2 ♀, 2 ♂ Maroc, 40-60 Km. N. d'Agadir, 23, 24-IV-71, J. Péricart (CAZ); 1 ♂ Maroc, Sud Agadir, Pardo Alcaide (MNHN); 4 ♂, 5 ♀ Marruecos, Aglú, Sus, Escalera (MNCN); 1 ♀ Beni Buyahi, Ych Usuga, R. Candel (MNCN); 2 ♂, 1 ♀ El Borouj, 24-5-76 (CAZ); 1 ♀ Boulauane, 26-5-1950 (MCZR); 1 ♂, 1 ♀ Caid Hida, 4-1912, F. Escalera (MNCN); 1 ♀ Morocco, Casablanca, Quedenfeldt (type of *Amomphus setulifer*) (HNHM); 7 ex., 1898 Casablanca (MNHN); 1 ♂, 3 ♀ Casablanca 1919, M. Primot (MNHN); 3 ♂, 3 ♀ Casablanca, 1897 (MNCN); 1 ♂ Casa Judida (HNHM); 1 ♂, 1 ♀ Essaouira, Taftech östl, H. Franz (MNHN); 1 ♂, 1 ♀ Igli, 4-1912 (MNCN); 1 ♀ Kouribga, 1-5-78 (CAZ); 1 ♂, 1 ♀ El Kureimat, 1-1907, Escalera (MNCN); 3 ♀, 3 ♂ Larache, M. Escalera (MNCN); 1 ex. Learid (BMNH); 1 ♂ Mechra ben Abbou (MNHN); 1 ♀ Maroc, Marrakesh, 23-5-1967, Vázquez (CAZ); 1 ♂ Marrakech, Kocher (MNHN); 74 ♂, 56 ♀ Marrakesh, 1-1907, Escalera (MNCN); 39 ♂, 36 ♀ Marrakesh, IV-1907, Escalera (MNCN); 7 ♂, 2 ♀ Marrakesh, III-1907, Escalera (MNCN); 35 ♂, 29 ♀ Marra-

quesh, 1909, Escalera (MNCN); 1 ♂ Melilla, El Garma Kebdana, Pardo Alcaide (MNHN); 3 ♂, 1 ♀ Melilla, Muley Rechid, VI-1952, J. Capilla (MNCN); 2 ♀ Melilla, Muley Rechid, Ulad Setut, Pardo Alcaide (MNCN); 1 ♀ Melilla, Granja Muluya, 1-VI-1952, Juan Capilla (MNCN); 1 ♀ Melilla, Granja Muluya, Kebdana, 19-IV-1963, Pardo Alcaide (MNCN); 1 ex. Morocco, Mogador, 5-IV-1952, A.M. Easton (BMNH); 5 ♂, 2 ♀ Mogador, Escalera (MNCN); 1 ♂ Mogador (BMNH); 1 ♀ Mogador, Boucard (IRSMB); 3 ♂ Mogador (DEI); 3 ♂ Saïd Mâachou, 7-5-1972, Olivella (CAZ); 2 ♀, 3 ♂ Morocco, Settât, Quedenfeldt (ZMB); 1 ♂ Skhour. des. Reana, n. Marrakech, 19-5-1972, H. Kostenbader (DEI); 1 ♀ Tanger, Vaucher (MNHN); 3 ex. Tanger (MNHN); 1 ♂ Tanger (MNHN); 3 ex. Morocco, Tangiers (BMNH); 1 ex. Tanger (BMNH); 1 ♂ Tanger (HNHM); 2 ♀, 1 ♂ Tanger (DEI); 13 ♀, 9 ♂ Taourirt, 9, 10-6-1975 (CAZ); 1 ♀ Taourirt, 10-6-1975 (CVC); 3 ♂, 3 ♀ Tarudant, 4-1912 (MNCN); 9 ♀, 7 ♂ Zoco l'arba de Hacha (MNCN). SPAIN: 1 ♀ Espagne (IRSMB) (doubtful). Without locality: 2 ♂, 1 ♀ (IRSMB); 1 ♂ (MNHN); 2 ♂, 1 ♀, Gougelet (DEI).

Distribution (Fig. 11). – Known with certainty from the Atlantic coast and close hinterland of Morocco and the Mediterranean coast of Morocco and Algeria up to the city of Oran. Its southern limit seems to be the mountainous foothills of the Atlas and Rif ranges. Adults have been collected between January and June.

In the Collection of the IRSNB there is one female labelled 'Espagne'. We have not seen any other specimen coming from an exact Spanish locality. The Spanish provenance of this specimen is therefore doubtful.

In the BMNH collection, there is one male labelled 'Canary Is., Tenerife, Fuente fría, 10-V-1927, E. Appenhagen'. We regard this as a doubtful record.

Remarks. – This is the most variable species with respect to colour, general shape and development of the rostral keels and sulci.

Aspidiotes (Aspidiotes) larbii (Escalera, 1914), comb. n.

(Figs 1d, 2d, 4d, 6d, 9a, 10d, n, 11)

Amomphus larbii Escalera, 1914: 439.

Type material. – Described on a unspecified number of specimens from Mskala (Morocco) stated by the the author to be deposited in his own collection and in the Madrid Museum. From these sources we have been able to gather six specimens, five males and one female. The only label they carry says 'Mskala' in Escalera's handwriting. We have designated one male as lectotype, adding a red, printed label 'LECTOTYPUS ♂, *Amomphus larbii*, Escalera 1914, Sánchez-Ruiz & Alonso-Z. des. 1991'. The

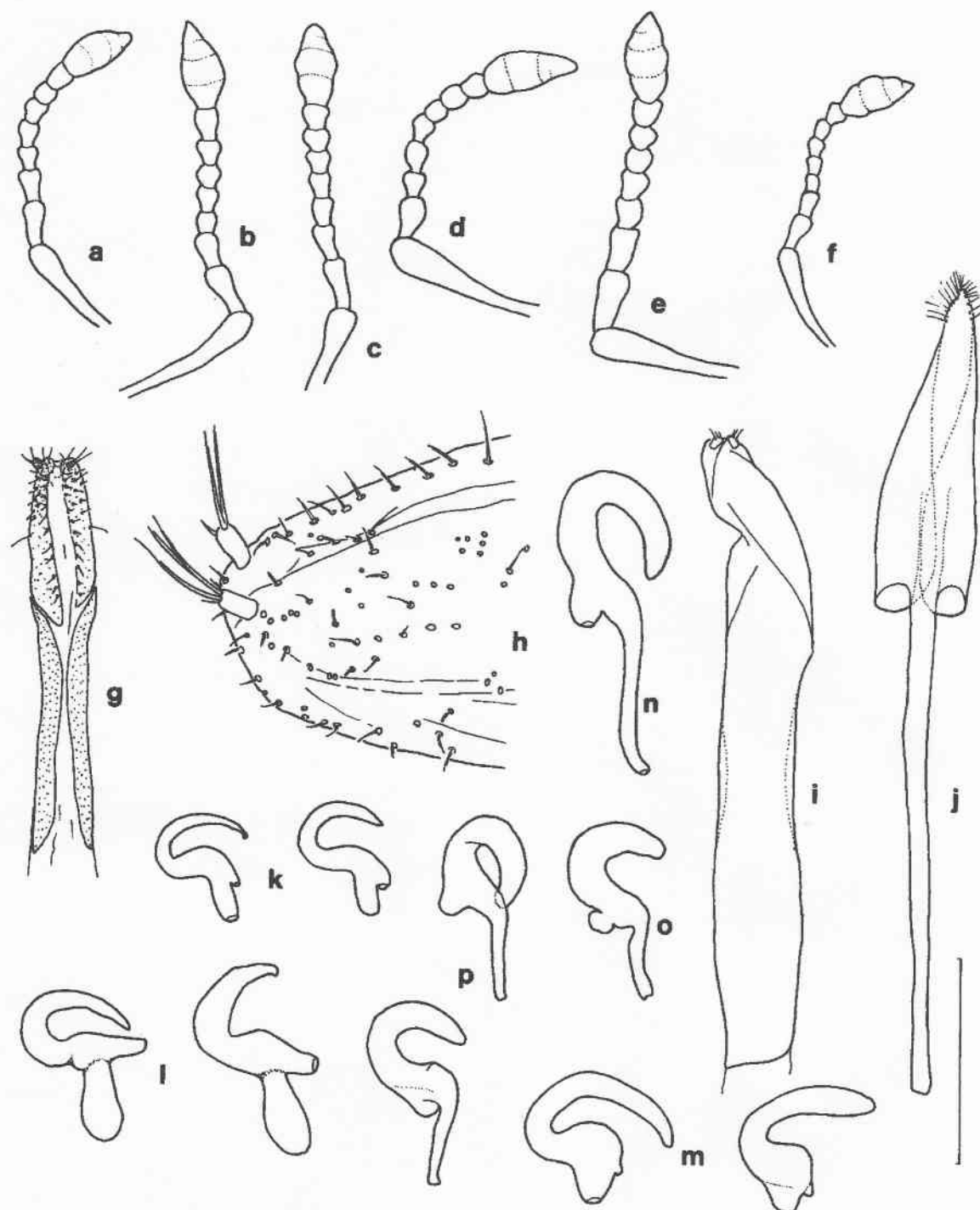


Fig. 10. *Aspidiotes* spp., antennae: (a) *A. anatolicus*; (b) *A. thalassinus*; (c) *A. cottyi*; (d) *A. larbii*; (e) *A. gonzalezi*; (f) *A. westringii*, ♀ genitalia; (g) *A. anatolicus*, ovipositor, dorsal view; (h) *A. anatolicus*, detail of apex of coxites and styli, lateral view; (i) *A. larbii*, ovipositor, lateral view, dorsal margin on the left; (j) *A. cottyi*, 8th sternite and spiculum ventrale, ventral view; spermathecae: (k) *A. anatolicus*; (l) *A. thalassinus*; (m) *A. cottyi*; (n) *A. larbii*; (o) *A. gonzalezi*; (p) *A. westringii*. Scales: (a-f): 1574 μ m; (g, i-p): 792 μ m; (h): 230 μ m.

five remaining specimens have been similarly labelled as paralectotypes.

Description. – Body length (pronotum + elytra): ♂: 5.94 – 7.42 mm; ♀: 8.06 mm. Maximum width: ♂: 2.54 – 3.22 mm; ♀: 3.43 mm.

Colour black. Vestiture rather sparse, appressed scales whitish, silvery, golden or green, general appearance greyish to greenish (more or less dark depending on the abundance of scales), sometimes with coppery glint, those on disc of elytra irregular-

ly striate (Fig. 4 d). Scales on front margin of striae punctures flabellate (Fig. 4 d). Interstriae scales of elytra short, appressed, ca. $2.0 \times$ as long as diameter of one appressed scale. Head and pronotum with shorter appressed setae.

Rostrum (Fig. 1 d) very robust in σ ($R_r = 1.19 - 1.28$) to robust ($R_r = 1.35$, φ), separate from frons by a very shallow, obsolete depression, only visible near the eyes, with moderately deep median longitudinal sulcus, adjacent keels and outer sulci obsolete. Frons moderately convex. Eyes rounded to almond-shaped, moderately convex.

Prothorax (Fig. 2 d) slightly transverse ($R_p = 1.07 - 1.20$, σ φ), wider at base than at apex, widest point usually at middle, sides gently and uniformly convex, weakly constricted behind fore margin. Dorsal surface with no sulcus, punctures dense, deep and small, giving the surface a rugose appearance.

Elytra ovate, elongate ($R_e = 1.63 - 1.78$, σ φ ; $R_{ep} = \sigma: 2.48 - 2.61$; $\varphi: 3.08$), acuminate, widest a little in front of middle. Striae deep, linear, punctures large, deep. Interstriae wide, hardly convex, rugosely punctate, setae on 2-3 irregular rows.

Fore tibiae straight in both sexes, strongly dentate on inner margin (cf. Fig. 3 a), setae borne by the teeth stronger and longer; setae on outer margin small, arcuate.

Genitalia: Male penis (Fig. 9 a) short, in dorsal view sides concave to subparallel to ostium, apical plate elongate trapezoidal with sides curved and rounded, subtransverse apex (Fig. 6 d), in side view gently curved, with apex straight (Fig. 9 a), temones slightly shorter than tube. Internal sac with a short flagellum divided into two pieces, the basal anular, the distal irregularly lamellate, robust (Fig. 9 a).

Female spermatheca (Fig. 10 n) with short, conical ramus wider than long and collum slender, longer than rest of the spermatheca.

Biology. – Unknown.

Material examined. – MOROCCO: 2 σ Mogador, Amsmidbis (DEI); 5 σ , 1 φ Mskala (type series) (MNCN).

Distribution (Fig. 11). – Apparently restricted to the westernmost foothills of the High Atlas in the neighbourhood of Essaouira (formerly Mogador).

***Aspidiotes (Aspidiotes) gonzalezi* sp. n.**

(Figs 1e, 2e, 3a, 4e, 6e, 9b, 10e, o, 11)

Description. – Body length (pronotum + elytra): $\sigma: 5.65 - 7.55$ mm; $\varphi: 7.16 - 8.94$ mm. Maxi-

mum width: $\sigma: 2.48 - 3.32$ mm; $\varphi: 2.90 - 4.00$ mm.

Colour black. Vestiture dense, adpressed scales green with a metallic glint, those on disc of elytra coarsely tuberculate. Scales on front margin of striae punctures piliform. Interstriae scale of elytra short, curved, ca. $1.5 \times$ as long as diameter of one adpressed scale. Head and pronotum with shorter curved setae.

Rostrum (Fig. 1 e) robust ($R_r = 1.26 - 1.52$), separate from frons by a deep wide sulcus, more marked on sides in front of eye, with deep median longitudinal sulcus, adjacent keels and outer sulci marked, one more sulcus visible in front of each eye; keels and sulci variable. Frons flat (Fig. 1 e). Eyes weakly oblong, moderately convex. Antenna: see Fig. 10 e.

Prothorax (Fig. 2 e) transverse, usually more strongly in φ ($R_p = 1.18 - 1.33$) than in σ ($R_p = 1.13 - 1.23$), wider at base than at apex, widest point usually at middle, sides convex, subparallel in the middle third, weakly constricted behind fore margin; dorsum more convex in the basal half, basal rim marked. Dorsal surface with fine, faint median longitudinal sulcus, sometimes shortened or obsolete, punctures dense, deep and moderately large, coarser and more irregular on sides.

Elytra ovate, elongate ($R_e = 1.58 - 2.07$; $R_{ep} = \sigma: 2.29 - 2.66$; $\varphi: 2.76 - 3.05$), acuminate, widest point a little in front of middle, basal rim well marked. Striae fine, linear, punctures small, separate. Interstriae wide, slightly convex, finely and densely punctate, setae in 4-5 irregular rows.

Fore tibiae (Fig. 3 a) curved apically in both sexes, more strongly so in males, strongly dentate on inner margin, setae borne by the teeth stronger and longer; setae on outer margin short, suberect.

Genitalia: Male penis (Fig. 9 b) elongate, in dorsal view sides concave to subparallel to ostium, apical plate elongate triangular with sides curved and apex narrowly rounded (Fig. 6 e), in side view gently curved, with apex slightly recurved, temones shorter than tube. Internal sac with short, irregular flagellum (Fig. 9 b).

Female spermatheca (Fig. 10 o) with short, globular ramus wider than long and collum slender, shorter than rest of the spermatheca.

Type material. – Holotype σ 'SPAIN: Tarragona, Cornudella, Río Ciurana, VI-63 (M. Vilella)'; ' σ '; 'ex Col. M. González'; 'HOLOTYPE σ , *Aspidiotes gonzalezi* n. sp., Sánchez-Ruiz & Alonso-Z. det. 1991'. Dissected, pieces and genitalia mounted dry on two cards under the

specimen (MNCN). Paratypes: SPAIN: 2 ♀, Lérida, Sonodell, 2.vi.1963, J. Vives (MNCN); 2 ♂, 5 ♀, Tarragona, Cornudella, Rio Ciurana, vii.1963, M. Vilella (MNCN); 1 ♀, Zaragoza, Pina de Ebro, Retuerta de Pina, 18.vi.1989, J. Blasco Zumeta (CAZ); 1 ♀, same locality and collector, 8.vii.1989 (CAZ); 1 ♀, ditto, 9.vii.1990 (CAZ); 1 ♂, ditto, 4.ix.1990 (CAZ); 1 ♂, 2 ♀, ditto, 6.vii.1991 (CAZ); 7 ♂, 2 ♀, ditto, 6.vii.1991 (CAZ); 6 ♂, 11 ♀, ditto, 13.vii.1991 (CAZ); 1 ♂, Zaragoza, Valmadrid (MNCN); 1 ♀, Zaragoza, Zaragoza, viii.1954, J. Vives (MNCN); 1 ♀, same locality and date, F. Español (CAZ).

Etymology. – We name this species after the Spanish curculionologist Mr Manuel González Gutiérrez (1931-1972), prematurely deceased, in whose collection, housed in the Madrid Museum, we discovered the first specimens of this species.

Biology. – This species has been captured by J. Blasco Zumeta in Pina de Ebro by beating shrubs of *Teucrium capitatum* L., *Gypsophila hispanica* Willk. and *Artemisia herba-alba* Asso in a mixed wood of *Pinus halepensis* Miller and *Juniperus thurifera* L. on gypsaceous soil. They were observed in copula on the shrubs and, when disturbed, immediately fell to the ground in thanatosis. Also found in nearby wheat fields. According to the data, the weevils appear from June to August.

Distribution (Fig. 11). – The known distribution is confined to the Ebro river basin of NE Spain, reaching the hills of the Catalanian coastal range.

Aspidiotes (Aspidiotes) westringii
Schönherr, 1847

(Figs 1f, h, 2f, 3b, 4f, 5b, 6f, 7b, 9c, 10f, p, 11)

Aspidiotes westringii Schönherr, 1847: 28.

Amomphus concinnus Küster, 1849: nr. 77.

Amomphus dissimilis Desbrochers, 1873: 422.

Type material. – *Aspidiotes westringii*: This species is the type species of *Aspidiotes* Schönherr. The author did not indicate the contents of the type material; only the words 'ex Hispania meridionalis' refer to the original type locality. The type material is housed in the Schönherr Collection deposited in the Stockholm Museum. The syntypic series consists of three males and three females. According to the loan form, one couple is 'var. β ' and another is 'var. γ '. However, Schönherr did not distinguish between varieties in the original description nor is this distinction apparent from the specimens' labels. We designate a female bearing the following labels as lectotype: (Schönherr's handwriting) 'Hispania merid. Westring'; dark red tag; red, printed 'LECTOTYPUS ♀, Aspidiotes westringii, Schönherr 1847, Sánchez-Ruiz & Alonso-Z. des. 1991'. The other five specimens, considered as paralectotypes, are labelled: 'Hispania Westring'; 'PARALECTOTYPUS ♂ [or ♀], Aspidiotes westringii, Schönherr 1847, Sánchez-Ruiz & Alonso-Z. des. 1991'.

Amomphus concinnus: The original description states that this species was described on the basis of 'a few' specimens. The whereabouts of Küster's types of Curcul-

ionoidea are not known. However, we have found one specimen in Heyden's Collection (Deutsches Entomologisches Institut, Eberswalde-Finow, Germany) which agrees with the original description. This is the specimen seen by Desbrochers (1873) which Heyden had received as a type from Küster. It is here selected as lectotype, and bears the following labels: blue square, printed '277'; Desbrochers' handwriting 'Amomphus westringi'; printed 'Col. L. v. Heyden, DEI Eberswalde'; red, printed 'LECTOTYPUS ♀, Amomphus concinnus, Küster 1849, Sánchez-Ruiz & Alonso-Z. des. 1991'; printed 'Aspidiotes westringii Schönherr, 1847, Sánchez-Ruiz & Alonso-Z. det. 1991'. This species is considered a synonym of *Aspidiotes westringii* Schönherr, as established by Desbrochers (1873).

Amomphus dissimilis: The type material apparently only included a single female, from 'Carthagène' and in Heyden's collection. We found this female which agrees with the description and bears the following labels: printed tag '28'; Desbrochers' handwriting 'Dubius m.'; printed 'Col. L. v. Heyden, DEI Eberswalde'. Although the handwritten label does not bear the published name, it is well known that Desbrochers was inclined to this type of mistake. Therefore, we consider this female as the holotype. As one may already suspect from the description and the type locality, this species is a synonym of *Aspidiotes westringii* Schönherr, as established by Marseul (1888).

Description. – Body length (pronotum + elytra): ♂: 4.73 - 6.06 mm; ♀: 6.33 - 7.63 mm. Maximum width: ♂: 2.09 - 2.63 mm; ♀: 2.76 - 3.47 mm.

Colour black. Vestiture dense, adpressed scales green, blue, brassy or coppery with a metallic glint or not, sometimes forming stripes of different intensity, those on elytra regularly striate (Fig. 4 f); scales on disc of elytra convex, tessellate, those on sides flat, overlapping, paler. Scales on front margin of striae punctures (Fig. 4 f) piliform. Interstriae scales of elytra (Fig. 4 f) moderately long, suberect, 2.0 × as long as diameter of one adpressed scale or more. Head and pronotum with shorter curved setae.

Rostrum (Fig. 1 f) very robust (Rr = 1.13 - 1.31, ♂ ♀), separated from frons by a deep wide sulcus, more marked on sides in front of eye, with fine, shallow median longitudinal sulcus, adjacent keels and outer sulci obsolete, one more obsolete sulcus visible in front of each eye. Frons gently convex (Fig. 1 h). Eyes weakly oblong, moderately convex. Antenna: see Fig. 10 f.

Prothorax (Fig. 2 f) transverse (Rp = 1.08 - 1.34), slightly wider at base than at apex, widest point usually a little before middle, sides subparallel to weakly rounded, subapical constriction weak; dorsum scarcely convex, basal rim obsolete. Dorsal surface with median longitudinal sulcus absent, or if present, fine and incomplete, punctures dense, deep and fine, hardly coarser on sides.

Elytra ovate, elongate (Re = 1.51 - 1.82; Rep = ♂:



Fig. 11. *Aspidiotes* spp., distribution map: triangle, *A. anatolicus*; squares, *A. thalassinus*; circles, *A. cottyi*; crosses, *A. larbii*; asterisks, *A. gonzalezi*; stars, *A. westringii*.

2.55 - 3.06; ♀: 2.99 - 3.73), acuminate, widest point at middle, basal rim well marked. Striae fine, linear, punctures small, separate. Interstriae wide, flat, finely and densely punctate, setae on 2-3 irregular rows.

Fore tibiae (Fig. 3 b) straight in both sexes, apex slightly projecting outwards, minutely dentate on inner margin; setae on outer and inner margin long, suberect, of similar length on both margins.

Genitalia: Male penis (Fig. 9 c) short, robust, in dorsal view sides subparallel to ostium, apical plate shortly triangular with sides sinuately curved and apex narrowly rounded (Fig. 6 f), in side view moderately curved, with apex slightly recurved, temones about as long as tube. Internal sac with a short flagellum divided into two pieces, the basal irregular, the distal irregularly dentate and lamellate, robust (Fig. 9 c).

Female spermatheca (Fig. 10 p) slightly variable, with short, hemisphaerical ramus wider than long and collum slender, shorter to a little longer than rest of the spermatheca.

Biology. - Adults have been captured on mallows and peach trees; also reported from halophilous plants in coastal areas: *Suaeda vera* J. F. Gmelin, *Salsola vermiculata* L. and *Atriplex* spp. (Velázquez de Castro & Martín-Cantarino 1992). It has been collected from March to June.

Material examined. - ITALY: 1 ♂ Sicilien, Grohmann (ZMB) (doubtful). SPAIN: 3 ♂, 3 ♀ Hispania meridionalis (types of *Aspidiotes westringii*) (NRS); 1 ♀ (MNHN);

33 ex., Thomson (MNHN); 1 ♀ Andalousie (MNHN); 1 ♀ Alicante, Bolivar (MNCN); 6 ♀, 6 ♂ Alicante, J. Lauffer (MNCN); 1 ♀ Alicante (MNHN); 1 ♀ Alicante, Lorch, Ceballos (MNCN); 2 ♀, 1 ♂ Alicante, Orihuela, 4-1897 (MNCN); 2 ♂, 2 ♀ Alicante, Tabarca, 11-v-1991, C. Martín (CVC); 4 ♀, 1 ♂ Alicante, Torre Vieja, 20-V-90, A. Perez Onteniente (CPO); 1 ♂ Alicante, Torre Vieja, 23-V-90, A. Perez Onteniente (CPO); 1 ♂ Barcelona, Llimas, 2-5-VI-1962, G. Reiss (DEI); 2 ♂, 3 ♀ Granada, Baza, Bco. del Espartal, 23-VI-90, F.S. Piñero (CAZ); 5 ♂, 4 ♀, id., 13-V-90 (CAZ); 1 ♂, id., 19-V-90 (CAZ); 2 ♂, 4 ♀, id., 31-V-90 (CAZ); 1 ♂, 1 ♀, id., 22-VI-90 (BMNH); 1 ♀ Málaga, Misericordia, 7-3-1941, A. Cobos (CVC); 1 ♀, Murcia, Archena (MNHN); 4 ♀, 1 ♂ Murcia, Cartagena (MNCN); 1 ♂, Murcia, Cartagena (MNHN); 1 ex. Murcia, Casas Nuevas, 14-V-89, C. Rey (MNCN); 2 ♀, 2 ♂ Murcia, Cieza, 20-5-62, E. Laborda (MNCN); 1 ♀ Murcia, Cieza, 20-5-62, E. Laborda (UCM); 3 ♂ Murcia, Cieza, 20-V-62, E. Laborda (UCM); 1 ♀ Murcia, Jumilla, VI-1983, J. Lencina (CSR); 1 ♀, 1 ♂ Murcia, Lorca, Perez (MNCN); 1 ♂, Murcia, Lorca, Perez Arcas (MNHN); 2 ♀, 4 ♂ Murcia, Cap. Palos (MNHN); 1 ♂ Murcia, Yecla, Sierra Salinas, Mayo-1980, J. Lencina (CSR); 2 ♀, 7 ♂ Valencia, Alcira, Moroder (MMA); 1 ♀ Valencia, Alcira, Moroder (IRSNB). Without locality: 1 ♀ (type of *Amomphus concinnus*) (DEI); 1 ♀ (type of *Amomphus dissimilis*) (DEI); 2 ♂ (DEI); 1 ex (BMNH); 4 ♀, 1 ♂ (MNCN).

Distribution (Fig. 11). - This species is restricted to the hot, subarid southeastern parts of the Iberian Peninsula, ranging from Valencia to Málaga.

In the Collection of DEI, there is one male labelled 'Barcelona, Llimas, 300 m., 2-5-VI-1962, G. Reiss leg.'. This northern provenance is suspect, and must be corroborated with new captures. We suspect that a mislabelling has taken place.

In the Collection of the ZMB, there is one male with the label 'Sicilien, Grohmann'. It was recorded, mistakenly as a female, by Pesarini (1987). We suspect that this specimen has been mislabelled. The species is not known from NW Africa. Also the presence of this species in France, recorded by Stierlin (1893), requires confirmation.

Unrecognized species

Phaenognathus reichei Desbrochers, 1872: 246.

This species was described from a single specimen from Greece in Reiche's collection. Mr Marcel Cludts, in a letter of 8 March 1991, stated that he had been unable to find the holotype in the collection of the Institut Royal des Sciences Naturelles de Belgique, Brussels. One of us (A.-Z.) failed to find it in Desbrochers's collection as well.

From the original description, it is doubtful whether this species belongs to the genus *Aspidiotes*. The words 'rostrum tereti, angustiore, supra non impresso, non sulcato' (rostrum cylindrical, more slender, not impressed dorsally, not sulcate) do not agree with the generic characters, because all the known species have a slightly depressed, longitudinally sulcate rostrum. Until the discovery of the type, the status of this species remains doubtful.

Phylogenetic analysis

Methodology. – Selection of an outgroup for establishing character polarity posed problems. The genera *Amystax* Roelofs, 1873 and *Enaptorhinus* Waterhouse, 1853 are evidently closely related to *Aspidiotes*, but the relationships of these three genera to others currently included in the subtribe Tainophthalmina are unclear. Other genera (*Psalidimorphus* Reitter, 1913 and *Pseudotaenophthalmus* Suvorov, 1915) are believed to be related, and were used with *Amystax* and *Enaptorhinus* to construct a hypothetical outgroup with all character states coded 0 (plesiomorphic). A data set of 16 transformation series has been prepared, comprised of 6 genitalic and 10 external characters (Table 1). Other characters used in the descriptions above (e.g. colour, morphometry) have not been used because of the great intraspecific variability.

The cladistic analysis was performed by Hennig86 version 1.5 (Farris 1988), using the implicit enumeration option. All transformation series were treated as additive and binary coded, excepting nr. 9 which has two apomorphic additive characters. The input matrix is shown in Table 2. An outgroup coded with zeros has been included in it.

Results and discussion. – A single most parsimonious cladogram (Fig. 12) was obtained, its statistics

Table 1. Characters used for cladistic analysis with coded transformation series.

0. Collum of spermatheca: short (0); long (1).
1. Ramus of spermatheca: short (0); long (1).
2. Shape of penis: long and slender (0); short and robust (1).
3. Apical plate of penis in dorsal view: pointed (0); truncate (1).
4. Number of pieces of flagellum: one (0); two (1).
5. Shape of flagellum: long and slender (0); short and robust (1).
6. Setae of outer margin of protibia: appressed (0); suberect (1).
7. Setae of outer margin of protibia: short (0); long (1).
8. Median longitudinal sulcus of pronotum: deep (0); obsolete or absent (1).
9. Dorsal surface of pronotum: even (0); granulate (1); variolose (2).
10. Basal elytral flange: present (0); obsolete (1).
11. Basal elytral declivity: steeply vertical (0); weak and oblique (1).
12. Elytral interstitial scales granulate: no (0); yes (1).
13. Elytral interstitial scales tuberculate: no (0); yes (1).
14. Elytral interstitial scales striate: no (0); yes (1).
15. Elytral striae scales: lanceolate (0); flabellate (1).

being: length 21 steps; consistency index 0.80; retention index 0.75. From this cladogram, the relation between *Phaenognathus* and *Aspidiotes* at a subgeneric level is not supported, but it is maintained here until a more complete analysis can be done on the other genera of the group.

Phaenognathus is supported as a monophyletic group on the basis of the following synapomorphies:

1. Ramus of spermatheca long.
9. Dorsal surface of pronotum granulate.

Aspidiotes is supported also as a monophyletic group on the basis of a single synapomorphy:

5. Flagellum of internal sac short and robust.

A sister group relationship between *A. larbii* and *A. westringii* is supported by synapomorphy of characters 2 (penis short and robust) and 4 (flagellum divided into two pieces) and a parallelism of character 14 (shared with *A. thalassinus*). This group is sister group related to *A. gonzalezi* by syn-

Table 2. Data matrix for cladistic analysis.

	0	1	2	3	4	5	6	7	8	9	0	1	1	1	1	1
OUTG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ANAT	0	1	0	0	0	0	1	0	1	1	0	0	0	1	0	0
COTT	0	0	0	0	0	1	0	0	0	0	1	1	1	0	0	0
GONZ	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0
LARB	1	0	1	1	1	1	0	0	1	0	0	0	0	0	1	1
THAL	0	1	0	0	0	0	1	0	0	2	0	0	0	1	1	0
WEST	1	0	1	0	1	1	1	1	1	0	0	0	0	0	1	0

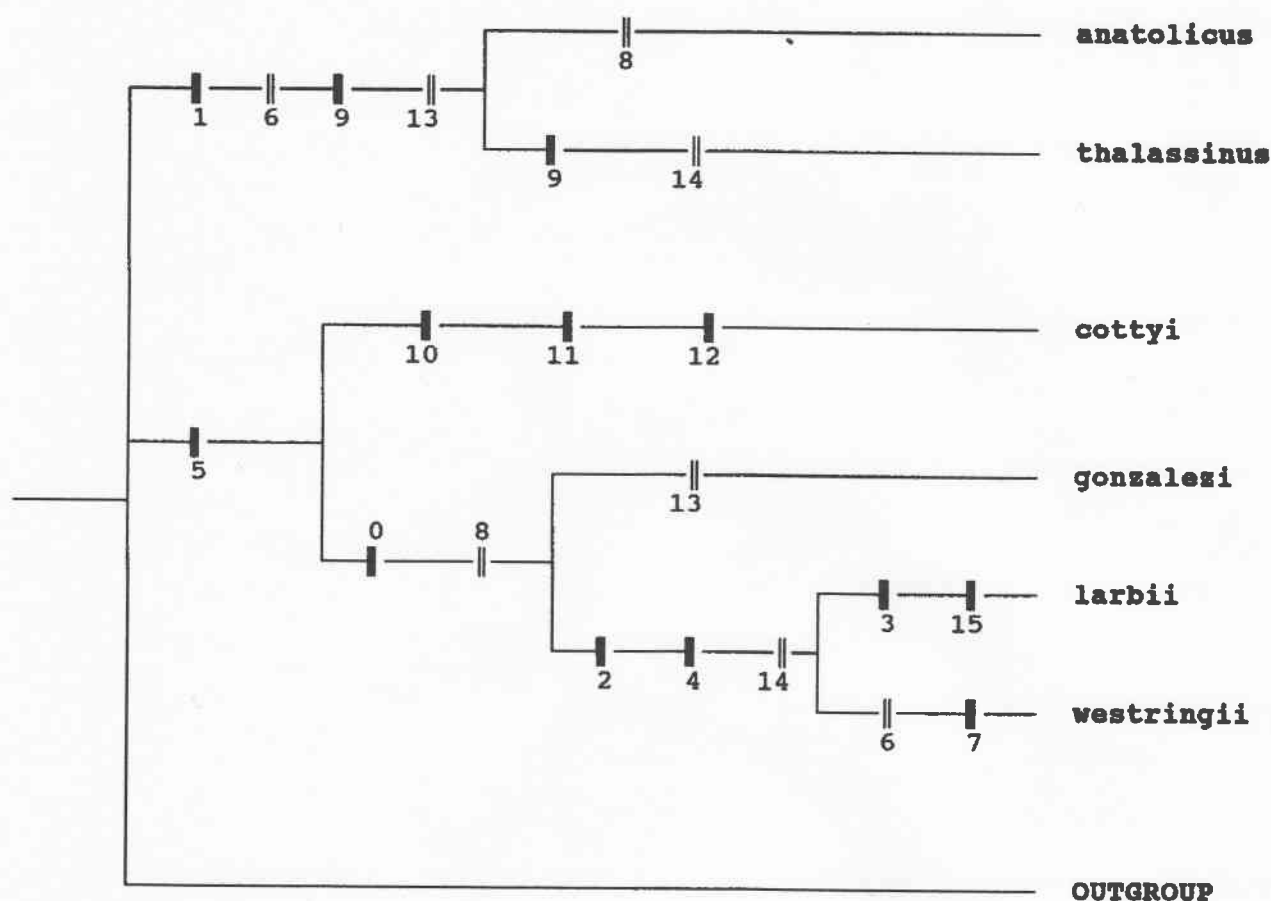


Fig. 12. Dendrogram depicting the hypothesized relationships among the species of *Aspidiotes*. Black rectangles = apomorphies, parallel bars = parallelisms. Numbers refer to characters in Table 1.

apomorphy of character 0 (collum of spermatheca long); there is also a parallelism of character 8 (median longitudinal sulcus of pronotum obsolete or absent), which is shared with *A. anatolicus*. The group (*gonzalezi* (*larbii*, *westringii*)) is sister group related to *A. cottyi*, which seems to be the most plesiomorphic species of the subgenus *Aspidiotes*. The latter species is clearly defined by three autapomorphies: (10) basal elytral flange obsolete, (11) basal declivity of elytra weak and oblique, and (12) scales minutely granulate.

Biogeography

The genus *Aspidiotes*, as presently delimited, shows an East-West Mediterranean disjunction (Fig. 11), well known for other taxa of plants and animals (Keilhack's disjunctions, Margalef 1974). According to Oosterbroek & Arntzen (1992), the ancestors of the subgenera could have originated in the Early Miocene, 20-17 MYBP.

Subsequently, the East Mediterranean ancestor of the subgenus *Phaeognathus* may have given rise

to the two modern species by allopatric speciation events consequent upon the separation of East and West Anatolia back in the Middle Miocene, 17-13 MYBP.

The ancestor of the West Mediterranean subgenus *Aspidiotes* may have speciated when the Alboran plate drifted southwards from the Iberian plate (La Greca 1990a, b). On the former plate *A. cottyi* differentiated and occupied what is called the Kabylia microplate, while the ancestor of the group (*gonzalezi* (*larbii*, *westringii*)) remained on the Iberian plate. This event may have taken place soon after the separation of the two subgeneric ancestors, during the Middle Miocene, 20-17 MYBP.

On the Iberian plate, a speciation event may have given rise to a species, *A. gonzalezi*, remaining in the mainland and another species separated off on the Baetic-Riffan microplate. A subsequent split of this micro-plate led to another speciation which produced *A. westringii* on the Baetic microplate (ca. 5 MYBP joined at the Iberian plate) and *A. larbii* on the Riffan microplate. After the Riffan and Kabylia microplates joined at African plate, *A.*