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**A review of the Macaronesian species of *Auletobius*  
Desbrochers, 1869  
(Coleoptera, Curculionoidea, Rhynchitidae)**

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RESUMEN: Se estudia material original de museos y colecciones del autor pertenecientes a especies macaronésicas de *Auletobius*, y se realizan redescrpciones, figuras y designaciones de lectotipos, además de discutirse sobre los huéspedes de los gorgojos adultos. Se han resaltado las diferencias sexuales secundarias intraespecíficas. *Auletobius maderensis* de Madeira está muy relacionada con *A. anceps*. *Auletobius cylindricollis* es una especie bien estudiada, y está presente en Tenerife, Gran Canaria, La Palma y La Gomera. *Auletobius convexifrons* ha sido malinterpretada y se conoce sólo en Gran Canaria, asociada a formaciones de *Tamarix canariensis*. *Auletobius. anceps*= '*A. convexifrons* var.  $\beta$ '. *Auletobius anceps* (= *A. freyi*) está presente en todas las islas excepto Lanzarote y Fuerteventura.

Palabras clave: *Auletobius*, Madeira, islas Canarias, redescrpciones, designación de lectotipos, reasignación de especies.

ABSTRACT: Original museum material and the author's collections of Macaronesian species of *Auletobius* were studied. Redescriptions, some figures and lectotype designations have been made, and the hosts of adult weevils discussed. Intraspecific secondary sexual differences have been emphasised. The Madeiran *Auletobius maderensis* is closely allied to the Canarian *A. anceps*. *Auletobius cylindricollis*, a well-understood species, is known from Tenerife, Gran Canaria, La Palma and La Gomera. *Auletobius convexifrons* has been misinterpreted; it is known only from Gran Canaria, associated with *Tamarix canariensis*. *A. anceps* = '*A. convexifrons* var.  $\beta$ '. *Auletobius anceps* (*A. freyi*) occurs in all the Canary Islands (except Lanzarote and Fuerteventura).

Key words: *Auletobius*, Madeira, Canary Islands, redescrpciones, lectotype designations, species reassessments.

## INTRODUCTION

The family Rhynchitidae is sometimes treated as a subfamily of Attelabidae, e.g. by Lawrence & Newton (1995), but the more recent accounts of Alonso-Zarazaga & Lyal (1999) and Legalov (2003) (revising an earlier assessment (Legalov, 2001)) have confirmed family status for the group and are followed here. The rhynchitid tribe Auletini comprises over 200 species currently assigned to 22 genera; they occur in most zoogeographical regions (Legalov, 2003). *Auletopobius* is particularly speciose with 88 recorded species, but only 11 of these are placed in the subgenus *Auletopobius* (s. str.). However, this subgenus includes all the Macaronesian Auletini, with the exception of *Mandelschtamius euphorbiae* (Wollaston, 1867). This species, confined to the Cape Verde Islands, is placed in a separate subtribe (Mandelschtamina) by Legalov (2003) and is not included in the current review.

Little is known about the biology of any species of *Auletopobius*, but the larvae of the few that have been studied feed in the vegetative buds of various trees and shrubs (Prota, 1963; Hamilton, 1983; Lee & Morimoto, 1988). Legalov (2001) gave foodplants for several species, quoting particularly from the Russian literature.

Knowledge of the Macaronesian *Auletopobius* is based mainly on the pioneer work of T. V. Wollaston. He described three species from the Canary Islands (1864) and one each from Madeira (1854) and the Cape Verde Islands (1867), all under the generic name *Auletes* Schoenherr. To these Uyttenboogaart (1940a) added a fourth Canarian species (*A. freyi*). No *Auletopobius* is known from the Azores (Borges, 1990).

Voss (1934) redescribed *Auletopobius maderensis*, *A. cylindricollis* and *A. euphorbiae* but did not know or redescribe *A. anceps* or *A. convexifrons* (Voss, 1935). Legalov (2001, 2003) treated all the Macaronesian *Auletopobius*.

The work of Wollaston and some later entomologists was affected by attitudes prevailing at the time, including:

- 1) A relatively undeveloped type concept, compounded by the fragmentation of Wollaston's collection before and after his death and the very small amount of material used in describing his species.

- 2) Little opportunity for evaluating populations of the species, including those of the different islands, especially in the Canaries. The concept of the population as an ecological and taxonomic entity was poorly developed at this time.

- 3) Only partial appreciation of the range of variation in the species, affected by the few specimens available and Wollaston's opposition to the concept of evolution by natural selection (Cook, 1995). In particular, inability to distinguish secondary sexual characters, among which the length of the rostrum is especially important; discriminating between the species using this character is impossible unless the sexes are treated separately (cf. figs 1, 2).

- 4) An almost complete absence of supporting biological data with the species descriptions, particularly the apparent host plants of adult weevils.

## MATERIAL AND METHODS

The current study is based upon examination of Wollaston's material in the collections of The Natural History Museum, London (BMNH) and the University of Oxford

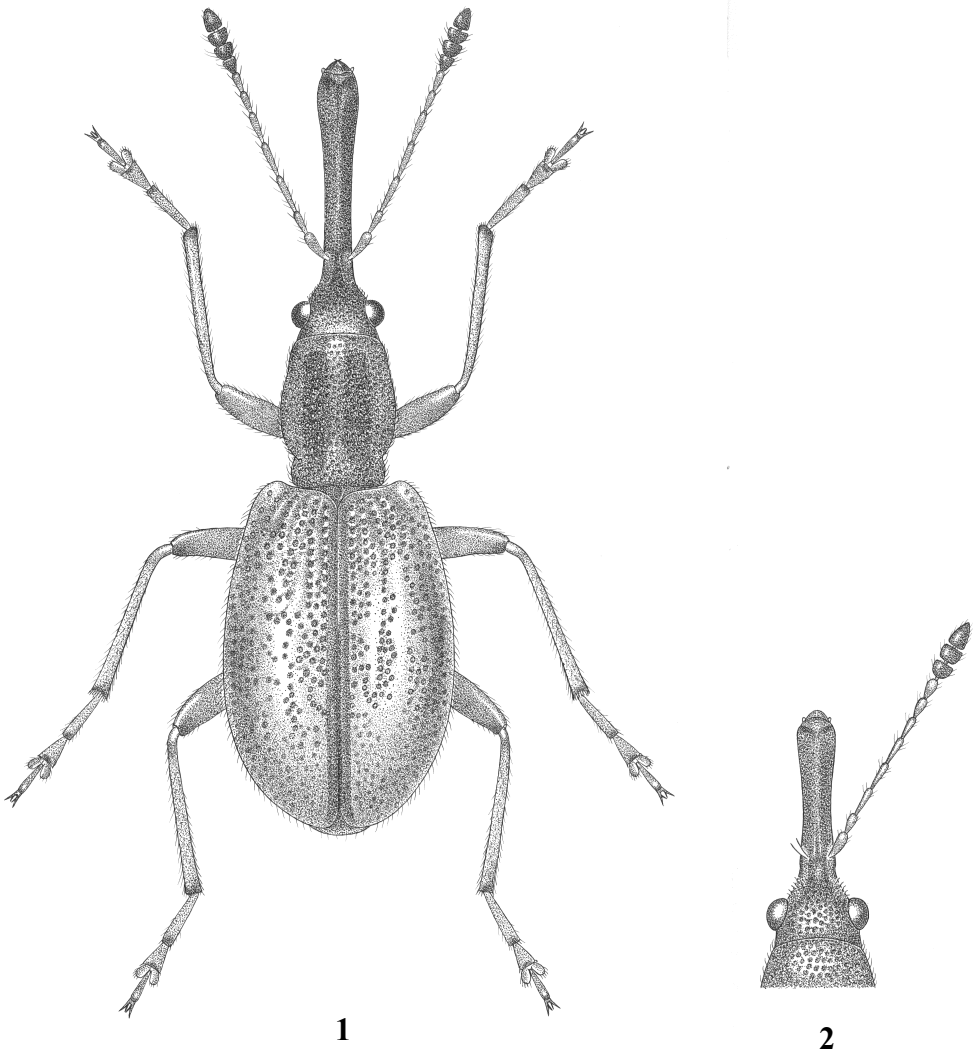


Fig. 1. *Auletobius cylindricollis*, ♀, habitus. Fig. 2. *A. cylindricollis*, ♂, head.

Museum of Natural History (Hope Collections, HC). Wollaston's material in the University Museum of Zoology, Cambridge, includes no *Auletobius* (Dr. W. A. Foster, *in litt.*). It was not possible to study Wollaston specimens in other collections. Also examined is a range of *Auletobius* material collected by the author from 1993 to 1998 in Madeira and all the main Canary Islands (excluding Lanzarote and Fuerteventura, in which no *Auletobius* is known). Material in the general collection of BMNH was also examined.

The author's material was specially prepared for measurement of important characters, such as the length of antennae and tarsomeres. The length of the rostrum (from antennal insertion to apex unless otherwise stated) of each specimen was measured,

compared with body length, and equilibrated with the number of proximal antennomeres (counted from the apex of the pedicel). All measurements are in millimetres (Wollaston used lines) and are expressed as means with their standard errors; ranges are given in some cases. The problem of multiple comparisons was not addressed. Body lengths are given, by convention, as without the rostrum except when stated. Wollaston apparently quoted overall lengths in his descriptions. In the redescriptions diagnostic, or key, characters are italicised.

#### KEY TO SPECIES

- 1 Pronotum slightly transverse to quadrate (fig. 8); smaller species on average, 1.5 – 3.7 mm. .... 2  
 - Pronotum elongate, 1.10 – 1.15 × as long as broad (fig. 1); larger species on average, 2.6 – 4.9 mm; ..... *cylindricollis* (Wollaston)
- 2 Onychium longer (fig. 4), without claws longer than first tarsomere; smaller species, 1.5 – 2.6 mm [on *Tamarix*]. ..... *convexifrons* (Wollaston)  
 - Onychium shorter (fig. 6), without claws shorter than, or at most subequal to, first tarsomere; larger species on average, 2.2 – 3.7 mm [on *Rubus*, *Myrica*, *Cistus* etc., not on *Tamarix*]. ..... 3
- 3 Antennae finer, all segments narrower, segment 8 more than twice as long as broad (fig. 7). ..... *anceps* (Wollaston)  
 - Antennae more robust, all segments broader, segment 8 only about 1.5 × as long as broad (fig. 3). ..... *maderensis* (Wollaston)

#### REVIEW OF SPECIES

##### *Auletobius maderensis* (Wollaston, 1854)

Wollaston's description is brief and could apply to any Macronesian species in the absence of material in his collection; however, this was the first species of the genus that he described. Despite having only four specimens to study he also described two colour varieties (<sup>2</sup> and <sup>3</sup>) of *A. maderensis*; these appear to have little taxonomic value. However, there are eight specimens of the species (4♂, 4♀) in BMNH (some presumably collected after publication of Wollaston's description), including examples marked ± ('type, ♀), <sup>2</sup> (spec. figured' [i.e. in Wollaston 1854], ♀) and <sup>3</sup> (♂) which are presumably three of his original four specimens.

##### *Redescription*

Length 2.65 ± 0.05 mm (♂♂, n = 19), 2.64 ± 0.06 mm (♀♀, n = 27). Width across elytra 1.16 ± 0.02 mm (♂♂, n = 18), 1.20 ± 0.03 mm (♀♀, n = 23). In neither dimension do the sexes differ significantly (length  $t_{(43)} = 0.21$ ,  $p = 0.83$ ; width  $t_{(37)} = 1.16$ ,  $p = 0.25$ ). Head transverse, strongly and coarsely punctured on disc, vertically and finely striate at sides and ventrally, with a narrow, inconspicuous stria between eyes; eyes large, protuberant, circular and

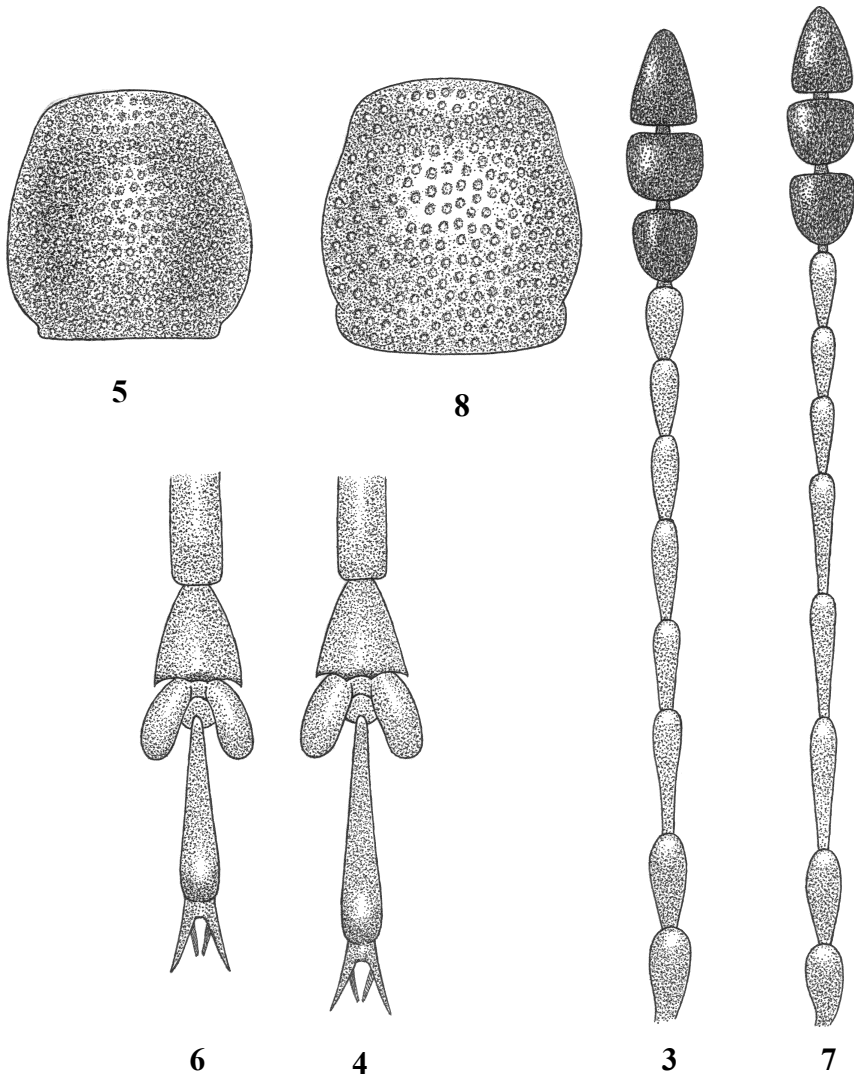


Fig. 3. *A. maderensis*, antenna. Fig. 4. *A. convexifrons*, tarsus. Fig. 5. *A. convexifrons*, pronotum.  
 Fig. 6. *A. anceps*, tarsus. Fig. 7. *A. anceps*, antenna. Fig. 8. *A. anceps*, ♀, pronotum.

evenly rounded; rostrum slightly curved in both sexes, gradually dilated to base and apex, in ♂ duller, with coarser, elongate punctures, in ♀ more shining, punctures finer and more obscure. Length of ♂ rostrum  $0.264 \pm 0.002$ , of ♀  $0.336 \pm 0.003$ ,  $\times$  body length; difference between sexes significant ( $t_{(39)} = 20.22$ ,  $p < 0.001$ ). Equivalence of ♂ rostrum  $5.41 \pm 0.03$ , of ♀  $7.21 \pm 0.07$ , proximal antennomeres; difference between sexes significant ( $t_{(36)} = 24.98$ ,  $p < 0.001$ ). Antennae robust, inserted at anterior rim of a deep, semicircular fovea, at about an eye's length from anterior margin of eyes; segments 1 and 2 barrel- to spindle-shaped, 3-8 clavate, progressively shorter to apex, segment 3 about 4 $\times$  as long as

broad; segment 8 very short and broad, length:width about 3:2 (fig. 3). Pronotum slightly transverse: length:width ratio  $0.92 \pm 0.01$  ( $\sigma\sigma$ ,  $n = 19$ ),  $0.94 \pm 0.01$  ( $\text{♀♀}$ ,  $n = 27$ ), coarsely and closely punctured, strongly rounded at sides, distal margin narrower than basal, more abruptly narrowed basad than anteriorly, broadest at, or slightly behind, middle. Elytra moderately shining, about 1.5× as long as broad in both sexes, puncturation less deep and less close than that of pronotum, non-seriate: sutural stria distinct, evanescent apically and basad to varying amounts. Scutellum fairly small, an equilateral triangle, sides sometimes slightly curved. Legs moderately long and robust, tibiae straight, tarsi with tarsomere 1 longer than 5 (onychium), 2 broadly triangular, only a little longer than broad, vestiture of dorsum of copious, long, pale, curved, fine semi-recumbent setae; legs with finer, straighter, darker setae. Coloration variable, some examples uniform pale yellowish-orange, others with variable darkening of pronotum, elytral base and disc, rostrum, femora and antennal clubs.

### *Lectotype designations*

Wollaston (1854) specified four specimens in his description of *A. maderensis*. Three of these syntypes are extant in BMNH. The specimen marked '±' and 'type' (a female) is selected by the current author as the lectotype, and has been so labelled. The designation is necessary because of the 'varieties' described by the author which are included among his syntypes of the species.

### Additional and biological notes

*A. maderensis* is very closely allied to the Canarian *A. anceps* (see below). It differs in the characters of the antennae, which are more robust and have segment 8 considerably shorter and broader than in *A. anceps*. Osella & Zuppa (1998) and Legalov (2001) also found the two species to be distinct but closely related, though, like other authors, they assumed *A. anceps* to be *A. convexifrons*. Legalov (2001) found the ♀ rostrum of *A. maderensis* to be considerably broader than that of *A. anceps*, but this character is not very obvious in the series examined by the current author. Markin *et al.* (1995) stated that they collected *A. convexifrons* in Madeira as well as the Canaries, but the Madeiran record must correctly refer to *A. maderensis*.

Remarkably, Wollaston (1854) wrote of *A. maderensis* 'It would seem to be excessively rare...', and this would seem to be borne out by the material he accumulated. However, the current author collected 46 specimens 21-26 November 1994 from seven localities in the western half of Madeira. That the species is actually common is confirmed by 11 carded specimens and 19 in a single gelatine capsule in BMNH (general collection). They stand under the name *A. convexifrons* var.  $\beta$  Wollaston (see below) with data: leg. N. C. H. Krauss, November 1960, on leaves of *Myrica faya* Aiton. The specimens were apparently collected for assessment of possible control agents against *M. faya* in Hawaii, where it is a pest (Krauss, 1964; Markin *et al.*, 1995). However, 34 of the authors's specimens occurred on *Rubus* sp., the remainder being taken by 'general beating' of trees and shrubs, with the exception of one specimen collected from *Ulex europaeus* L. There is thus some uncertainty as to the range of hosts of adult *A. maderensis* and no information on larval foodplants.

*Auletobius cylindricollis* (Wollaston, 1864)

This is the most distinctive and least controversial of the Canarian species of *Auletobius*. Although Wollaston stated that his three species (*cylindricollis*, *convexifrons* and *anceps*) ‘are very closely allied *inter se*, and I do not feel altogether satisfied that they should be regarded as more than varieties of a single very plastic species’, he added that *A. cylindricollis* ‘is remarkable for its rather elongate, subcylindrical prothorax...’. This character is diagnostic and subsequent authors have been in no doubt about the identity and distinctness of the species, in marked contrast to the positions of *A. anceps* and *A. convexifrons* (see below).

*Redescription*

*A large species*, length  $3.30 \pm 0.06$  mm ( $\sigma\sigma$ ,  $n = 28$ ),  $3.41 \pm 0.07$  mm ( $\text{♀♀}$ ,  $n = 24$ ); difference between sexes not significant ( $t_{(47)} = 1.29$ ,  $p = 0.20$ ). Width across elytra  $1.30 \pm 0.19$  mm ( $\sigma\sigma$ ),  $1.48 \pm 0.13$  mm ( $\text{♀♀}$ ); difference between sexes significant ( $t_{(47)} = 4.00$ ,  $p < 0.001$ ). Head strongly transverse, strongly, deeply and somewhat confluent punctured on disc, vertically striate at sides, somewhat rugose longitudinally between and immediately behind eyes, fovea behind antennal insertion only moderately deep; eyes large and moderately protuberant, short-oval, evenly rounded. Rostrum very slightly curved in both sexes, almost straight, dilated at base and apex, antennae inserted at rather more than an eye’s length from anterior margin of eye; in  $\sigma$  somewhat dull, confluent punctured, punctures elongate basad, more nearly isodiametric towards apex; in  $\text{♀}$  slightly more shining, punctures smaller, shallower and less confluent, rostrum with a fine longitudinal furrow, often deepened and widened towards antennal insertion; length of  $\sigma$  rostrum (fig. 2)  $0.280 \pm 0.003$ , of  $\text{♀}$  (fig. 1)  $0.357 \pm 0.004 \times$  body length; difference between sexes significant ( $t_{(41)} = 15.09$ ,  $p < 0.001$ ). Equivalence of  $\sigma$  rostrum  $5.27 \pm 0.03$ , of  $\text{♀}$  rostrum  $6.82 \pm 0.07$ , proximal antennal segments, difference between sexes significant ( $t_{(33)} = 20.74$ ,  $p < 0.001$ ). Antennae fine and slender, segment 1 asymmetrically curved at sides, 2-8 clavate, 3 and 4 very elongate, subequal, 5-8 progressively shorter, 8 nearly twice as long as broad. (Voss (1934) stated that the third segment is twice as long as the fifth, but in all the specimens measured, including the lectotype, the ratio is never more than 1:1.4). Pronotum coarsely, closely and somewhat confluent punctured, *distinctly elongate* (fig. 1); ratio of length:breadth  $1.11 \pm 0.01$  ( $\sigma\sigma$ ),  $1.13 \pm 0.01$  ( $\text{♀♀}$ ); difference between sexes not significant; slightly and uniformly rounded at sides, broadest at about middle, anterior margin broader than basal, with a deep lateral sub-basal sulcus. Elytra moderately shining, about  $1.5 \times$  as long as broad, but narrower in  $\sigma$ ; puncturation somewhat variable, close and rather deep to more remote and shallow, non striate, generally with conspicuous pale, smooth ‘marbling’, especially at apex; sutural stria usually entire. Scutellum fairly small, triangular, base slightly longer than sides. Legs, especially tarsi, long and slender, first tarsomere 4-5  $\times$  as long as broad, distinctly longer than fifth (onychium). Vestiture of dorsum of moderately dense and fine, long, pale setae, curved and semi-recumbent on head and pronotum, straighter and more nearly erect on elytra, intermixed with infrequent darker, longer, slightly coarser setae; setae of legs coarser, darker and a little less recumbent than those of dorsum. Coloration generally pale yellowish orange, head, pronotum, suture and antennal clubs often obscurely darker (but darkening of suture sometimes absent or

inconspicuous); elytra with variable pale, smooth ‘marbling’; legs generally uniformly pale, femora slightly darkened in some individuals. The ♂ median lobe and tegmen were figured by Legalov (2001).

#### *Lectotype designation*

Only one specimen standing under the name *cylindricollis* in Wollaston’s BMNH collection is actually that species. It bears labels ‘type’ and ‘*Auletes cylindricollis* Woll. type’, but these are subsequent to Wollaston’s description and anonymous. This specimen is hereby designated lectotype and has been so labelled; the designation is required because of the mixed series representing the species in Wollaston’s BMNH collection.

#### *Distributional and biological notes*

*A. cylindricollis* was recorded from La Palma and La Gomera (as well as Tenerife) by Wollaston and the Crotch brothers respectively (Wollaston, 1865) but later workers have found it mainly in Tenerife, where it is fairly common (Lindberg & Lindberg, 1958). Of three specimens of *Auletobius* standing under the name *A. cylindricollis* in BMNH only one is that species, as noted above; one of the others is considered below under *A. convexifrons*; the other, discussed under *A. anceps* below, has the card mount marked with a light green basal line indicating capture in La Palma (information in BMNH). Misplacements by later workers appear to be common in Wollaston’s BMNH collection and it is hardly conceivable that he could have regarded this specimen as conspecific with *A. cylindricollis*. Although the current author found the species only in Tenerife during the period covered in this account (1994-1998) he has subsequently found it in Gran Canaria, La Palma and La Gomera, so that the statement of Wollaston (1865) that *A. cylindricollis* is ‘Sparingly, though widely diffused over the central and western islands of the Canarian archipelago...’ would seem to be broadly correct. This distribution is given by Machado & Oromí (2000).

Wollaston (1865) stated only that *A. cylindricollis* ‘occurs amongst herbage at intermediate altitudes’. Uyttenboogaart (1940b) reported it ‘on *Rubus canariensis* at las Mercedes, Ten, Sept. 1935’; this plant may be *R. inermis* Pourr. (Hansen & Sunding, 1993). All but five of the author’s specimens were also beaten from *Rubus* sp., which is likely to be a host, at least of the adult weevil. The other specimens were collected by ‘general beating (3) or on ‘laurels’ (2). Osella & Zuppa (1998) found *A. cylindricollis* on *Cistus* spp., and these were accepted as foodplants by Legalov (2001).

#### *Auletobius convexifrons* (Wollaston, 1864)

This species has apparently been misinterpreted by authors (e.g. Lindberg & Lindberg 1958) subsequent to Wollaston’s description (1864) of its ‘normal state’ and a ‘var. β’. There are three specimens of the species in BMNH (all ♀♀) and three in HC (1♂, 2♀). A further specimen standing under the name in BMNH is a ♀ *A. cylindricollis* as currently understood. It is improbable that Wollaston could have misidentified it; it was probably misplaced by a later worker.



None of these six specimens in Wollaston's collections (BMNH and HC) can be referred to his 'var.  $\beta$ ', but one of the two specimens standing under the name *A. cylindricollis* in BMNH (but which are not that species) is marked '2' at the right side of the base of the card mount. Wollaston described no 'var.  $\beta$ ' of either *A. cylindricollis* or *A. anceps*. Moreover, the underside of the card mount of this specimen is marked (in pencil) 'A M'; this is surely significant, as Wollaston (1864) referred to var.  $\beta$  as '...a single example captured at the Agua Mansa in Tenerife...'. There seems little doubt that this specimen is the exponent of Wollaston's '*A. convexifrons* var.  $\beta$ ', and the current author treats it as such.

All six of Wollaston's other specimens of *A. convexifrons* have the purple line at the base of the card mounts indicating that they were collected in Gran Canaria (information in BMNH). Wollaston (1864) stated: 'The normal state [i.e. excluding var.  $\beta$ ] I have observed hitherto only in Grand Canary (principally in the Barranco of Mogan)'. One of the BMNH ♀♀ (specimen no. 2) has the pencilled locality Mogan on the underside of the card mount.

Wollaston gave the length of *A. convexifrons* as  $1\frac{1}{4}$  -  $1\frac{1}{2}$  lines (2.7 - 3.2 mm) but, as stated earlier, this must be overall length. He stated that *A. convexifrons* was smaller than *A. anceps* (2 lines = 4.2 mm) or *A. cylindricollis* ( $1\frac{3}{4}$  -  $2\frac{1}{4}$  lines = 3.8 - 4.8 mm). *A. convexifrons* is indeed a small species, the mean length of the Wollaston specimens (sexes amalgamated because of the small numbers) being only  $1.86 \pm 0.13$  mm (n = 6). The mean lengths of specimens of this species collected by the author in Gran Canaria are: ♂♂  $2.01 \pm 0.05$  (n = 18), ♀♀  $2.10 \pm 0.04$  (n = 35). There is no significant difference in length between the sexes ( $t_{(37)} = 1.30$ ,  $p = 0.20$ ), nor between that of Wollaston's ♀♀ and those of the author ( $t_{(4)} = 1.29$ ,  $p = 0.67$ ).

However, the most characteristic feature of *A. convexifrons* is not mentioned by Wollaston. The fifth (claw-bearing) tarsomere (onychium) of all the legs is distinctly longer than the first (proximal) tarsomere of the corresponding leg in all of Wollaston's and the current author's specimens (fig. 4). In no other specimen of Macaronesian *Auletobius* seen so far is this the case.

### Redescription

*A generally small species* (though variable); length 1.65 - 2.27 mm (♂♂), 1.48 - 2.60 mm (♀♀) (see also above). Width across elytra  $0.86 \pm 0.03$  mm (♂♂),  $0.98 \pm 0.03$  mm (♀♀), difference between sexes significant ( $t_{(45)} = 3.24$ ,  $p = 0.002$ ). Head strongly transverse, fairly strongly and closely, but not deeply or confluent, punctured on disc and sides with the latter vertically striate, fovea behind antennal insertion moderately deep; eyes moderately large and protuberant, circular or obliquely short-oval in lateral view, evenly rounded. Rostrum slightly curved in both sexes, dilated at apex, but scarcely so at base, in ♂ slightly more robust and with closer, shallow, isodiametric to slightly elongate punctures, in ♀ more slender with more remote, generally more elongate, punctures, rostrum shining in both sexes, slightly impressed or with an obscure shallow furrow between antennal insertions; length of rostrum  $0.246 \pm 0.013 \times$  body length (♂♂),  $0.312 \pm 0.003 \times$  body length (♀♀); difference between sexes significant ( $t_{(19)} = 4.81$ ,  $p < 0.001$ ); equivalence of ♂ rostrum  $5.63 \pm 0.09$ , of ♀  $6.89 \pm 0.07$  proximal antennomeres; difference between sexes significant ( $t_{(41)} = 11.13$ ,  $p < 0.001$ ). Antennae moderately robust, segments 1 and 2 slightly broader than remainder (except club), barrel-shaped, rounded at sides, 3-8 clavate, 3, 4

and 5 subequal in length, 6-8 progressively shorter, 8 about twice as long as broad. Pronotum (fig. 5) closely and strongly, but somewhat shallowly, punctured, slightly transverse, length: breadth ratio  $0.92 \pm 0.01$  ( $\sigma\sigma$ ,  $n = 16$ ),  $0.94 \pm 0.01$  ( $\text{♀♀}$ ); difference between sexes not significant; sides strongly rounded, broadest behind middle, rather abruptly narrowed to base, more gradually to apex, apical margin narrower than basal. Elytra moderately shining, remotely and rather shallowly punctured, punctures fairly large, without a tendency to be seriate; broadest at about middle in  $\sigma$ , behind middle in  $\text{♀}$ ; ‘marbling’, if present, mainly at apex; sutural stria evanescent basad and sometimes also apicad. Scutellum small, triangular, base slightly longer than sides. Legs moderately long, *tarsi very long*, subequal to tibiae on meso- and meta-thoracic legs, *tarsomere 5 (onychium, excluding claws) evidently longer than 1* (see above) (fig. 4)), tarsomere 2 broadly triangular, a little longer than broad. Dorsal vestiture of rather sparse, long, pale, curved, semi-recumbent setae, straighter and more upstanding on legs; with occasional coarser, darker, more nearly erect, setae on elytra at sides. Coloration orange- to yellow-brown; sides of pronotal disc, head, rostrum, antennal clubs, extremities of tibiae and tarsomeres (sometimes all of tarsomere 5) and suture often obscurely darker; legs generally pale yellow.

#### *Lectotype designations*

Although one of Wollaston’s Gran Canarian specimens in BMNH bears a ‘type’ label, with another label reading ‘convexifrons, Woll.’, it seems preferable to select the specimen with the pencilled ‘Mogan’ on its card mount as lectotype, and this has been done and the specimen so labelled. The specimen labelled ‘type’, together with the third BMNH specimen from Gran Canaria, have been labelled paralectotypes. The fourth BMNH *Auletobius* standing under the name *convexifrons* is actually *A. cylindricollis*. The designations are required because of misinterpretation of the species subsequent to Wollaston’s description and his own misinterpretation of ‘var.  $\beta$ ’.

#### *Wollaston’s var. $\beta$*

The identity of this taxon can be judged from the description (Wollaston, 1864), consideration of other Canarian species, inferences from Wollaston’s later publication (1865), as well as the specimen assumed to be his original ‘type’ in BMNH but which currently stands under the name *A. cylindricollis*. The description is meagre: ‘Rostro vix longiore, prothorace angustiore, magis cylindrico; tarsi omnino pallidis. – Long. corp. lin.  $1\frac{1}{4}$ - $1\frac{1}{2}$ ’. As stated previously, assertions as to the length of the rostrum are valueless unless the sexes are distinguished. Nor is the colour of the legs sufficient to associate ‘var.  $\beta$ ’ with any other Canarian *Auletobius*. Although the shape of the thorax – ‘narrower and more cylindrical’ – could indicate *A. cylindricollis*, the size of the insect – only 2.7-3.2 mm – is far too short for the overall length of that species. Wollaston’s quoting of an apparent size range for var.  $\beta$  is denied by his text which clearly states that the description is based on ‘a single example captured at the Agua Mansa in Tenerife’. The only additional information in Wollaston (1865) is that *A. convexifrons* was ‘taken by the Messrs. Crotch in Gomera’. The inference, such as it is, is that this capture refers to ‘var.  $\beta$ ’.

‘Var.  $\beta$ ’ is not conspecific with *A. convexifrons*, as it lacks the long fifth tarsomeres characteristic of that species (fig. 6, cf. fig. 4). Some additional information on the problem

of its identity is given by a series of 13 specimens (6♂, 6♀, 1 headless, sex not determined) of *Auletobius* standing under the name *A. convexifrons* in the general collection, BMNH. One ♂ specimen bears a label ‘Tenerife, Agua Mansa, 8.2.49 Lindberg’ and Harald Lindberg’s determination label as *A. convexifrons*. The other 12 specimens, some damaged, were taken by N. C. H. Krauss in the Las Mercedes Forest, Tenerife, in 1962 from *Myrica faya* Aiton. Two of them were determined as *Auletobius convexifrons* var. β Wollaston by R. T. Thompson. None of these specimens has the long onychium characteristic of Wollaston’s six examples and the author’s 53 of *A. convexifrons*, all from Gran Canaria.

In the author’s opinion ‘var. β’ is conspecific with *A. anceps* (Wollaston, 1864) (below).

The inclusion of *anceps* Schrank, 1798, as a synonym of *convexifrons* (sensu Legalov) (Legalov, 2001, ‘Katalog’) is apparently an error. This is important because of the reinstatement of *A. anceps* (Wollaston) as a good species (below).

#### *Distributional and biological notes*

From the evidence adduced it appears that *A. convexifrons* is known definitely only from Gran Canaria, and that records of the species from other islands require confirmation. Besides the Crotch record from La Gomera and Wollaston’s from Barranco Mogan (Gran Canaria), which they repeated, Lindberg & Lindberg (1958) gave records from La Palma, Tenerife and Tamadaba (Gran Canaria).

All the author’s specimens of *A. convexifrons* were collected from *Tamarix canariensis* Willd. at Puerto San Nicolás (Puerto de la Aldea) in March 1994 and February–March 1997. *T. africana* Poir. also occurs in the Canaries (Bramwell & Bramwell, 1974, 1994; Hansen & Sunding, 1993), but the putative host of *A. convexifrons* appears to be *T. canariensis*. This shrub occurs in all the main Canary Islands except El Hierro, whereas *T. africana* has been found only in Gran Canaria and Tenerife (also Lanzarote and Fuerteventura) (Hansen & Sunding, 1993). If, as seems likely, *Tamarix* is a host, at least of adult *A. convexifrons*, the weevil should be looked for on other islands, in other localities, and on *T. africana* as well as *T. canariensis*. *Tamarix* plants on the Maspalomas dunes, Gran Canaria (27 February 1997), and at Punta Negra, Tenerife (2 December 1998), were worked by the author with negative results. Adults of a Mediterranean species, *Auletobius maculipennis* (Jacquelin du Val, 1854), are known to occur on *Tamarix*, including *T. africana* (Hoffmann, 1958), although the biology of the early stages is unknown. *A. maculipennis* is a distinctive species, quite unlike *A. convexifrons*, and is placed in a different subgenus, *Auletinus* Desbrochers, 1908, (Legalov, 2001).

None of the localities mentioned by Lindberg & Lindberg (1958) is coastal, and the limited collection data include only one specimen taken ‘auf *Laurus*’ from Las Mercedes. This sparse information suggests that the specimens did not occur in association with *Tamarix*, while the statement by Lindberg & Lindberg (1958) that *A. convexifrons* is more abundant than *A. cylindricollis* in Tenerife suggests that the small *Auletobius* species occurring there is not *A. convexifrons*.

*Auletobius anceps* (Wollaston, 1864) **stat. rev.**

This, the least well-known of Wollaston's species, was described on only two specimens, both from El Hierro. One specimen standing under the name in BMNH, and another in HC, are presumably the insects on which Wollaston based his description. Lindberg & Lindberg (1958) recorded single specimens from El Golfo and Cumbre, El Bresal (Hierro), with no further detail.

Before discussing the identity of Wollaston's *A. anceps* his *Auletobius* material needs to be reviewed (Table I). It is immediately apparent that extremely few specimens of his species exist. Some other material may have been dispersed and lost. Some of the BMNH specimens (though not those in HC) stand under incorrect names, probably because of use and misplacement by later workers.

The material in HC presents no problem: the specimens stand under Wollaston's correct names. Those in BMNH are more difficult. Three *A. convexifrons*, one *A. cylindricollis* and the single *A. anceps* are uncontroversial. One '*A. convexifrons*' is actually a ♀ *A. cylindricollis*. One of the two insects standing under the name *A. cylindricollis* is '*A. convexifrons* var.  $\beta$ ', the identity of which has been discussed; that of the other specimen is considered below.

	BMNH	HC
<i>A. cylindricollis</i>	1 ♂ 2 ♀	3 ♂
<i>A. convexifrons</i>	3 ♀	1 ♂ 2 ♀
<i>A. convexifrons</i> var. $\beta$	1 ♀	
<i>A. anceps</i>	1 ♀	1 ♀

Table I. Material of Canary Islands *Auletobius* standing under the names of species described by Wollaston (1864) in this collections at The Natural History Museum, London (BMNH) and Hope Collections, University Museum of Zoology, Oxford (HC).

Table II summarises numbers and provenance of the *Auletobius* taken in the Canary Islands by the current author from 1993 to 1998. 179 specimens (excluding *A. cylindricollis* and *A. convexifrons*) were collected, but only latterly were host records made with precision. The specimens varied in size and coloration, and to some extent in antennal characters and the shape of the pronotum, but exhibit no consistent morphological differences at the species level. Some of the differences show constancy in individuals taken from particular hosts, but whether these indicate species, host-plant races or only intraspecific variation, is difficult to determine without much better biological detail. For the present, it is proposed to refer the material to one rather variable species, *A. anceps*. This, the rarest of the Canarian species to Wollaston and subsequent workers, especially Lindberg & Lindberg (1958) is now interpreted as the commonest, occurring in all the central and western islands (i.e. all the Canaries except Lanzarote and Fuerteventura).

The material is discussed under each island, partly for zoogeographical reasons, but mainly because the specimens were taken at different times and contributed differentially to overall knowledge of the taxon in the Canaries.

Species	Island					
	T	C	G	P	H	Σ
<i>A. cilindricollis</i> (mostly <i>Rubus</i> sp.)	52	0	0	0	0	52
<i>A. convexifrons</i> ( <i>Tamarix canariensis</i> )	0	54	0	0	0	54
<i>A. anceps</i> total	47	7	17	34	74	179
( <i>Rubus</i> )	4	0	3	6	2	15
( <i>Myrica faya</i> /‘laurels’)	2	0	2	7	72	83
( <i>Cistus monspeliensis</i> )	2	7	0	13	0	22
(general collecting)	39	0	12	8	0	59

Table II. Number of specimens of *Auletobius* collected from the Canary Islands, 1993-1998, with their hosts (T= Tenerife, C= Gran Canaria, G= La Gomera, P= La Palma, H= El Hierro).

### *Tenerife*

All but four of the author's specimens were taken at various localities in the 'Las Mercedes Forest' (or Anaga) region of NE Tenerife, mostly by 'general beating', but with a few specimens recorded from *Rubus* (4) or 'Lauraceae' (2). This material consists of rather uniform, medium-sized, bright orange-brown examples. Three additional specimens were taken in the Esperanza area, which, like Las Mercedes, is an area of woodland with laurels, *Myrica faya*, and other characteristic trees; one of the examples was beaten from *Cistus monspeliensis* L., but in facies is similar to the other two. The final specimen, taken at Santiago del Teide, is somewhat different from all the other Tenerife examples, being paler, duller and slightly larger; but none of these features suggests that it is specifically distinct.

### *Gran Canaria*

Besides the specimens of *A. convexifrons* taken at Puerto San Nicolás, seven examples of another *Auletobius* species were beaten from *Cistus monspeliensis* near Embalse del Mulato on 26 February 1997. They are large, unicolorous (lacking the pale 'marbling' characteristic of the Santiago (Tenerife) specimen), rather dark and similar amongst themselves.

### *La Gomera*

Only 17 specimens of *Auletobius* were taken in this island, though they were well distributed, being collected from six sites, 16-21 December 1995. Five were found on *Rubus* sp., with the remainder being collected by 'general beating'. The specimens are variable in length (♂♂  $2.28 \pm 0.11$  mm,  $n = 9$ ; ♀♀  $2.44 \pm 0.09$  mm,  $n = 8$ ) but exhibit no features suggesting that more than one species was included.

### *La Palma*

The 34 *Auletobius* (12♂, 22♀) collected here from 24-28 February 1998 were taken at five sites, predominantly from *Rubus* and *Cistus monspeliensis* and by general beating. Twelve specimens from near Tijarafe, 9 of which were definitely beaten from *C. monspeliensis* with 3 possibly also coming from the same host, are significantly larger than others from La Palma, both ♂♂ (*ex Cistus* (n = 6)  $2.80 \pm 0.17$  mm, others (n = 6)  $2.14 \pm 0.06$  mm,  $t_{(6)} = 3.68$ ,  $p = 0.010$ ) and ♀♀ (*ex Cistus* (n = 6)  $3.09 \pm 0.04$ , others (n = 15)  $2.45 \pm 0.08$  mm,  $t_{(18)} = 7.00$ ,  $p < 0.001$ ). However, in other respects the examples from *C. monspeliensis* resemble the others.

### *El Hierro*

The large number of specimens beaten from *Myrica faya* are rather uniform, fairly small, rich orange-brown in colour and generally lack the pale marbling characteristic of specimens from other localities and islands. They came from four sites on the main ridge of El Hierro, from Timbarombo to Cruz de los Reyes. The specimens from *Rubus* were taken near Valverde and are somewhat different from the *Myrica* examples, being paler, with obscure darker markings (on the pronotum in particular) and pale marbling on the elytra. Unfortunately, only two examples were taken, insufficient to determine whether the population represents a distinct species, foodplant race or merely intraspecific variation.

### *Redescription*

*A variable species*; length  $2.32 \pm 0.30$  mm (♂♂, n = 87),  $2.42 \pm 0.30$  mm (♀♀, n = 91), elytral width  $1.03 \pm 0.13$  mm ((♂♂),  $1.10 \pm 0.13$  (♀♀). Differences between sexes significant (length  $t_{(175)} = 2.38$ ,  $p = 0.018$ ; width  $t_{(175)} = 3.65$ ,  $p < 0.001$ ). Head transverse, strongly, deeply and closely punctured, punctures somewhat confluent basad, vertically striate at sides, fovea behind antennal insertion moderately deep; eyes large and rather protuberant, short-oval in horizontal plane, almost circular, evenly rounded. Rostrum very slightly curved, almost straight in both sexes, dilated at base and apex, yellow-brown, darker to black at apex, antennae inserted at about an eye's length from anterior margin of eye (♂) or a little more (♀), puncturation somewhat variable, punctures remote to fairly close, a little closer apicad, shining to somewhat dull, generally a little duller in ♂, with a short furrow between antennal insertions. Length of ♂ rostrum  $0.292 \pm 0.019 \times$  body length, of ♀  $0.363 \times$  body length; difference between sexes significant ( $t_{(174)} = 24.91$ ,  $p < 0.001$ ); equivalence of ♂ rostrum  $5.50 \pm 0.26$ , of ♀  $7.11 \pm 0.45$ , proximal antennal segments; difference between sexes significant ( $t_{(144)} = 29.68$ ,  $p < 0.001$ ). Antennae moderately fine (fig. 7), segment 1 asymmetrically curved at sides, slightly shorter than 2, 3 longer and thinner than 1 or 2, segments 4-8 progressively shorter, *segment 8 1.5 × as long as broad*. Pronotum slightly transverse, almost quadrate, length:width  $0.96 \pm 0.04$  (♂♂),  $0.98 \pm 0.04$  (♀♀; fig. 8); difference between sexes significant ( $t_{(175)} = 3.77$ ,  $p < 0.001$ ), strongly rounded at sides, more abruptly constricted at base than apex, broadest behind middle, strongly, coarsely and closely punctured, punctures somewhat confluent at sides. Elytra moderately shining, about  $1.5 \times$  as long as broad, broader in ♀ than ♂; punctures more remote and shallower

than those of pronotum, generally non-seriate but with a slight tendency to be so in some individuals; sutural stria distinct, usually entire or evanescent only at extreme base and apex, suture darkened in only some individuals. Scutellum small. Legs moderately long and robust, tibiae straight, tarsomere 1 longer than or equal to 5 (onychium) (fig. 6), 2 triangular, slightly longer than broad, claws appendiculate. Vestiture of copious, pale, fine, semi-recumbent setae interspersed with fewer, coarser, darker, erect setae on elytra and legs. Coloration (yellowish to deep mahogany brown), and amount of ‘marbling’, variable; some individuals have obscure dark bilateral patches on pronotum and obscurely infuscated heads. The ♂ median lobe and tegmen were figured by Legalov (2001) (as ‘*A. convexifrons*’).

### *Lectotype designation*

The single specimen of *A. anceps* in BMNH is designated lectotype and has been so labelled. It bears labels ‘type’, ‘anceps, Woll.’ and ‘*Auletobius convexifrons* Woll. A. Legalov det. 1999’. This last label confirms *anceps* as the species common throughout the central and western Canary Islands, although it is wrongly determined according to the current author’s findings. The lectotype designation is required because of the misinterpretation of the species subsequent to Wollaston’s description,

*A. anceps* (Wollaston, 1864)

= *Auletobius freyi* Uyttenboogaart, 1940 **syn. n.**

Legalov (2001) synonymised *A. freyi* with *A. convexifrons* (as understood by him), but with a ?, having based his opinion as ‘likely’ (wahrscheinlich) only on Uyttenboogaart’s description.

In that description Uyttenboogaart (1940a) compared *A. freyi* with *A. convexifrons* (Woll.) (as then interpreted) and *A. cylindricollis* (Woll.). He mentioned two specimens, concentrating on one in the Frey collection because his paper was on Canarian weevils in that collection. This specimen was taken on 22 May 1927 at Monte Aguirre, Tenerife, (Lindberg & Lindberg, 1958, map 1).

The other specimen is mentioned by Uyttenboogaart (1940a) as a ‘further Ex.’ in his own collection. This insect is now in the Nationaal Natuurhistorisch Museum, Leiden, and I have been able to examine it. A data label indicates that it was taken on 1 May 1927 at Agumansa, Tenerife, a locality that is not shown on map 1 of Lindberg & Lindberg (1958).

In a further paper Uyttenboogaart (1940b) speculated whether his *A. freyi* could be synonymous with *A. anceps* (Woll.) from El Hierro (erroneously given as La Palma), the specimens of which he was unable to examine. He concluded that this was very improbable, but Lindberg & Lindberg (1958) thought it not impossible that *A. freyi* was a variant of *A. anceps*.

The distinguishing characters of *A. freyi* as given by Uyttenboogaart (1940a) are:

1. Large size (as large as *A. cylindricollis*); the length is given as 4 mm.
2. Finer and shallower puncturation of the elytra compared with *A. ‘convexifrons’*.

3. Broadly rounded pronotum, without a keel, (contrasting with that of *A. cylindricollis*).
4. More slender legs and antennae than those of *A. cylindricollis*.

In his second paper Uyttenboogaart (1940b), basing his decisions on Wollaston's description of *A. anceps* (1864), emphasised again the rounded pronotum and added two other characters in which the two species differed:

5. Antennae of *A. freyi* inserted exactly at the base of the rostrum.

6. Rostrum of *A. freyi* shorter than in '*A. convexifrons*' or *A. cylindricollis*, whereas in *A. anceps* it is longer.

Re-assessments of these characters, based on examination of the Leiden specimen are:

*Size.* The overall length of the specimen ( $\sigma$ ) is 3.70 mm. compared with 4 mm stated in the description. The overall length of  $\sigma$  *A. cylindricollis* in the author's collection is  $4.22 \pm 0.38$  mm (n = 28), so that the specimen, though smaller than these *A. cylindricollis*, falls within the size range for that species. The specimen is larger than any *A. anceps* taken by the author in Tenerife, but falls within the size range for the species when the larger examples from La Gomera, La Palma and Gran Canaria are included.

*Elytral puncturation.* The elytral punctures of the specimen of *A. freyi* are certainly somewhat finer than those of *A. cylindricollis*, but I can detect no consistent difference with those of *A. anceps*.

*Shape of pronotum.* The sides of the pronotum of *A. freyi* are well rounded, as stated in the description, and it is quadrate (length:width = 1.0). *A. cylindricollis* has a much more weakly rounded pronotum and the length:width ratio of  $\sigma\sigma$  is  $1.11 \pm 0.04$  (n = 28). The pronotum of  $\sigma$  *A. anceps* is almost quadrate (slightly transverse: length:width =  $0.96 \pm 0.04$  (n = 87)).

*Thickness of legs and antennae.* The legs of the specimen of *A. freyi* seem to me to be no finer than those of *A. cylindricollis*, particularly when the small size of the specimen is considered. However, the antennae do appear to be slightly finer.

*Insertion of antennae.* The front of the head of species of *Auletobius* is broadly oblique from the anterior margin of the eyes to the point at which the sides of the rostrum become subparallel. As a consequence, its 'exact base' is difficult to discern. In  $\sigma$  *Auletobius* the antennae are inserted a little closer to the eyes than is the case with  $\sigma\sigma$ , but this distinguishing feature is insignificant when compared to the difference in rostral lengths. When the same sex is compared in the different species no difference in the point of insertion can be detected.

*Length of rostrum.* As the sexes were not distinguished, assertions as to the length of the rostrum in the different species are valueless.

*A. freyi* is clearly distinct from *A. cylindricollis* on the shape and proportions of the pronotum, and from *A. convexifrons* in its size and the shortness of the fifth tarsomeres. It differs from Tenerifean *A. anceps* only in being larger than average. The Leiden specimen falls within the range of variation of *A. anceps* and *A. freyi* is therefore synonymised with that species, as stated above.



## CHECK LIST

RHYNCHITIDAE Gistel, 1848

AULETINI Desbrochers, 1908

*Auletobius* Desbrochers, 1869

s. *Auletobius* s. str.

*anceps* (Wollaston, 1864)

*convexifrons* auctt., nec (Wollaston, 1854), partim

*convexifrons* 'var.  $\beta$ ' (Wollaston, 1864)

*freyi* (Uytenboogaart, 1940)

*convexifrons* (Wollaston, 1864)

*cylindricollis* (Wollaston, 1864)

*maderensis* (Wollaston, 1854) ['var.  $\pm$ ']

*maderensis* 'var.  $\beta$ ' (Wollaston, 1854)

*maderensis* 'var.  $\beta^3$ ' (Wollaston, 1854)

## DISCUSSION

Wollaston's pioneer work on the Macaronesian *Auletobius* has been the basis of knowledge of the fauna up to the present time. However he was unable to consider populations of his species, or their biology, in his studies. Moreover, his misinterpretation of 'var.  $\beta$ ' as being conspecific with *A. convexifrons* has resulted in subsequent misunderstanding of the distribution of that species and the status of *A. anceps*. Consideration of samples of the populations of the different species, in numbers much greater than those available to Wollaston, and the application of simple statistics, have helped to clarify the current status of the Macaronesian species. However, it is apparent that further progress in assessment of the Macaronesian *Auletobius* fauna, particularly the range of variation in *A. anceps* and the possibility that more than one species is included in the taxon as currently understood, requires much more biological investigation. The early stages and larval hosts are known in none of the species considered, and it is not clear whether the adult hosts that have been recorded represent genuine food plants or not. In the author's opinion, further study of museum specimens will be of only minor importance compared with biological work.

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## REFERENCES

- ALONSO-ZARAZAGA, M.A. & C.H.C. LYAL (1999). *A World Catalogue of Families and Genera of Curculionoidea (Insecta: Coleoptera) (Excepting Scolytidae and Platypodidae)*. Entomopraxis, Barcelona..
- BORGES, P. A. V. (1990) A checklist of the Coleoptera from the Azores with some systematic and biogeographic comments. *Boletim do Museu municipal Funchal* 42 (220): 87-136.
- BRAMWELL, D. & Z. I. BRAMWELL (1974). *Wild Flowers of the Canary Islands*. Stanley Thorne, London.
- BRAMWELL, D. & Z. I. BRAMWELL (1994). *Flores Silvestres de las Islas Canarias* (Edición revisada). Editorial Rueda, Madrid.
- COOK, L. M. (1995). T. Vernon Wollaston and the 'monstrous doctrine'. *Archives of Natural History* 22 (3): 333-348.
- HAMILTON, R. W. (1983). Biological data on two North American rhynchitids (Coleoptera: Curculionidae) associated with the sweet fern, *Comptonia peregrina* L., with descriptions, illustrations, and comparisons of their immature stages. *Journal of the Kansas entomological Society* 56 (4): 511-522.
- HANSEN, A. & P. SUNDING (1993). Flora of Macaronesia. Checklist of vascular plants. 4. revised edition. *Sommerfeltia* 17: 1-295.
- HOFFMANN, A. (1958). *Coléoptères Curculionides (3me partie)*. *Faune de France* 62. Librairie de la Faculte des Sciences, Paris.
- KRAUSS, N. L. H. (1964). Insects associated with Firebush (*Myrica faya* Aiton). *Proceedings of the Hawaiian entomological Society* 18 (3): 405-411.
- LAWRENCE, J.F. & A.F. NEWTON (1995). Families and subfamilies of Coleoptera (with selected genera, notes, references and data on family-group names). pp. 779-1006 in PAKALUK, J. & S.A. ZLIPICÆKI (Eds.) *Papers Celebrating the 80th Birthday of Roy A. Crowson*. Muzeum i Instytut Zoologii PAN, Warszawa.

- LEE, C.-Y. & K. MORIMOTO (1988). Larvae of thre weevil family Attelabidae of Japan. Part 2. Subfamily Rhynchitinae (Insecta; Coleoptera). *Journal of the Faculty of Agriculture, Kyushu University* 32 (3-4): 239-254.
- LEGALOV, A. A. (2001). Revision der holarctischen Auletini (Coleoptera: Attelabidae). *Russian entomological Journal* 10 (1): 33-66.
- LEGALOV, A. A. (2003). *Taksonomiya, klassifikatsiya I filogeniya rinkhitid I trubkovertov (Coleoptera: Rhynchitidae, Attelabidae) mirovoj fauny. Taxonomy [sic], classification and phylogeny of the leaf-rolling weevils (Coleoptera: Rhynchitidae, Attelabidae) of the World fauna*. Novosibirsk, CD-ROM. (733 pp., 640 Mb).
- LINDBERG, H. & H. LINDBERG (1958). Coleoptera Insularum Canariensium. I. Aglycyderidae und Curculionidae. *Commentationes biologicae* 17 (1): 1-97.
- MACHADO, A. & P. OROMÍ (2000). *Elenco de los Coleópteros de las Islas Canarias*. Instituto de Estudios Canarios, La Laguna.
- MARKIN, G. P., L. SILVA & A. M. F. AGUIAR (1995). The insect fauna associated with the tree *Myrica faya* (Myricaceae) in the Macaronesia Islands and on mainland Portugal. *Boletim do Museu municipal Funchal. Supplement* 4: 411-420.
- OSELLA, G. & A. M. ZUPPA (1998). New and remarkable Curculionoidea from Macaronesia (Coleoptera). *Bocagiana* 191: 1-12.
- PROTA, R (1963). Contributi alla conoscenza dell'entomofauna della Quercia da sughero (*Quercus suber* L.). II. Note morfologiche ed etiologiche su *Auletobius politus* (Serv.) (Coleoptera Curculionidae). *Memoria Stazione sperimentale del Sughero, Tempio Pausania* 5: 1-46.
- UYTTENBOOGAART, D. L. (1940a). in UYTTENBOOGAART, D. L. & F. ZUMPT, Curculioniden von den Kanaren in der Sammlung G. Frey (München). *Mitteilungen der Münchner entomologische Gesellschaft* 30: 667-678.
- UYTTENBOOGAART, D. L. (1940b). Voyages de M. Ch. Allaud aux Îles Canaries (1889-90) et a l'Archipel de Madère (1938). Coléoptères Curculionides [Contributions to the knowledge of the Canary Islands, XXIV]. *Revue française d'Entomologie* 7: 49-69.
- VOSS, E. (1934). Monographie der Rhynchitinen-Tribus Auletini. III. Teil der Monographie der Rhynchitinae-Pterocolinae. *Stettiner entomologische Zeitung* 95: 109-135.
- VOSS, E. (1935). *ibid.* 96: 229-241.
- WOLLASTON, T. V. (1854). *Insecta Maderensia; being an account of the insects of the islands of the Madeiran group*. J. van Voorst, London.
- WOLLASTON, T. V. (1864). *Catalogue of the Coleopterous insects in the collection of the British Museum*. British Museum, London.
- WOLLASTON, T. V. (1865). *Coleoptera Atlanticum, being an enumeration of the Coleopterous insects of the Madeiras, Salvages, and Canaries*. J. van Voorst, London.
- WOLLASTON, T. V. (1867). *Coleoptera Hesperidum, being an enumeration of the Coleopterous insects of the Cape Verde Archipelago*. J. van Voorst, London.