

BOCAGIANA

Museu Municipal do Funchal

Madeira

15.XI.1991

No. 143

TWO NEW SPECIES OF *TARPHIUS* ERICHSON, 1848 (COLEOPTERA, COLYDIIDAE) FROM THE AZORES

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With 10 figures

ABSTRACT. Two new species of the genus *Tarphius* are described, *T. pomboi* sp.n. and *T. serranoi* sp.n.. These species were collected during the Zoological Expedition of the University of the Azores (June 1990) to the island of S. Maria, Azores. Some comments on the distribution and origin of the Azorean *Tarphius* are made. A key for the Azorean *Tarphius* is provided.

RESUMO. Duas novas espécies do género *Tarphius* são descritas, *T. pomboi* sp.n. e *T. serranoi* sp.n.. Estas espécies foram capturadas durante a Expedição Zoológica da Universidade dos Açores (Junho 1990) à ilha de S. Maria, Açores. Fazem-se igualmente alguns comentários sobre a distribuição e origem das espécies de *Tarphius* dos Açores. Apresenta-se uma chave para as espécies de *Tarphius* deste arquipélago.

INTRODUCTION

During the recent Zoological Expedition of the University of the Azores (Department of Biology) to the island of S. Maria, Azores (11-19. June .1990), we had the opportunity to collect some specimens of *Tarphius* (Coleoptera, Colydiidae) belonging to the described species *T. rufonodosus* ISRAELSON, 1984 and *T. depressus* GILLERFORS, 1985, and also two undescribed species.

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All the specimens of the new species, *Tarphius pomboi* n. sp. and *Tarphius serranoi* n. sp., described below, were collected by means of pitfall traps using several baits (Turquin, Vinegar and Formalin). The specimens belonging to the other two species were collected mainly by intensive searching (with the addition of two specimens of *rufonodulosus* and thirteen of *depressus* in the pitfalls).

Until 1984 only one species of *Tarphius* had been recorded from the Azores, *T. wollastoni* CROTCH, 1867 described from specimens collected in Faial (?) and Flores and later redescribed by DAJOZ (1977: 118) from the same specimens and another one collected by T. MONOD at Faial (CALDEIRA, 1971) DAJOZ (*op. cit.*), and GILLERFORS (1985) with the designation of a lectotype and 15 paralecto-types.

A recent checklist of the Azorean Coleoptera BORGES (1990 b) lists six species of *Tarphius*. The discovery of *T. pomboi* and *T. serranoi* brings the number up to eight (see Tab. I).

SPECIES	COR	FLO	FAI	PIC	GRA	SIG	TER	SMG	SMR
<i>Tarphius wollastoni</i> CROTCH, 1867		+	+						
<i>Tarphius rufonodulosus</i> ISRAELSON, 1984									+
<i>Tarphius depressus</i> GILLERFORS, 1985									+
<i>Tarphius tornvalli</i> GILLERFORS, 1985				+				+	
<i>Tarphius azoricus</i> GILLERFORS, 1986		+		+			+	+	
<i>Tarphius acuminatus</i> GILLERFORS, 1986				+					
<i>Tarphius pomboi</i> sp. n.									+
<i>Tarphius serranoi</i> sp. n.									+
Number of species=8	0	2	1	3	0	0	1	2	4

Tab. I. - List and distribution of Azorean *Tarphius*

For the description of these new species of *Tarphius* we also studied 2 specimens of *T. wollastoni* (collected during the Expedition of the University of the Azores to Flores, June 1989 (BORGES, 1990 a)), 5 of *T. azoricus* (from Terceira), 26 of *T. depressus* (from S. Maria), 15 of *T. rufonodulosus* (from S. Maria) and 22 of *T. tornvalli* (from S. Miguel (13) and Pico (9)).

Tarphius pomboi sp. n.

Figs. 1, 3, 5, 7, 9

Type locality: The Azores, Santa Maria, Pico Alto.

Type material: Holotype: 1 male, Pico Alto, Santa Maria, 12-18.VI.1990, *Cryp-*

tomeria japonica-plantation (P. BORGES, F. PEREIRA & A. SILVA leg.). Deposited in the University of the Azores in Terceira (UAT); Paratypes: same data as holotype, 15 specs. ; same data but *Laurus*-forest , 8 specs. (P. BORGES, F. PEREIRA & A. SILVA leg.); 2 specs. Paratypes deposited in Museu Municipal do Funchal, Madeira, Portugal; 2 specs. Paratypes deposited in coll. GOSTA GILLERFORS, Varberg, Sweden; 2 specs. Paratypes deposited in coll. GUNNAR ISRAELSON, Lund, Sweden; 2 specs. Paratypes deposited in coll. D. POMBO, Santa Maria; 15 specs. Paratypes deposited in coll. UAT. **Diagnosis:** Recognized by the form of head (fig.1), the protruding eyes, the form of pronotum (fig.3) and the structure of male genitalia (fig.9).

DESCRIPTION

Size. Body length 2.45-3.60 mm. (mean=3.03 mm.); Width 1.12-1.72 mm. (mean= 1.42 mm.).

Integument. Colour not uniform and variable from reddish yellow to reddish brown. Some specimens all black and others with central portion of pronotum more or less extensively black, sides of pronotum reddish yellow and elytra more or less dark brown. Vestiture of head, pronotum and elytra with yellow scales. Appendages reddish-yellowish.

Head. The form is different from the other Azorean species, with the front margin not rounded and with protruding and sharply acuminate angles (fig.1). Similar to *tornvalli* in the occurrence of somewhat elevated callosities, delimited by curved fine furrows, in front of the eyes. Surface with sculpture as in *tornvalli* but with a peculiar vestiture, the hair-like setae being curved towards the head and almost recumbent. Eyes small and protruding.

Antennae. Segment 3 longer than 2 and 1.3 times longer than 4, 4 and 5 of almost equal length, 6-8 of equal length and all longer than 9, which is broader than all previous ones except 2.

Pronotum. Length 0.74-1.23 mm. (mean=0.94 mm.); Width 1.04-1.58 mm. (mean= 1.27 mm.); 1.35 x as wide as long. Widest part in middle. Index width in middle / width at hind angles on an average= 1.04 [in *wollastoni* 1.30 and in *azoricus* 1.14 (GILLERFORS, 1986); in *depressus* 1.08, *tornvalli* 1.20 and in *rufonodulosus* 1.23]. Index width in middle / width at front angles on an average= 1.49 (in *wollastoni* 1.56, *azoricus* 1.74, *depressus* 1.72, *tornvalli* 1.76 and in *rufonodulosus* 1.85). Hind width of pronotum 1.44x wider than front angles of pronotum (1.29x in *wollastoni*, 1.58x in *azoricus* , 1.59x in *depressus* , 1.58x in *tornvalli* and 1.45x in *rufonodulosus*). Front margin strongly bisinuate with protruding and acuminate angles (fig.3). Side margins weakly rounded anteriorly (as in *tornvalli*) and posteriorly subparallel (as in *depressus*). Hind margin bisinuate, in middle broadly produced backwards, angles almost 90° as in *depressus*. Disc convex transversely with a median longitudinal

furrow. At base a fine transverse furrow. Sides explanate, broader than in the other Azorean species and somewhat similar to *tomvalli*. Upper surface with distinct, apically rounded granules, more scattered on sides, each with a semi-erect and obtuse (similar to *depressus*) small seta. Side margins with a dense fringe of more acuminate setae.

Elytra. Length 1.47-1.96 mm. (mean=1.65 mm.); Width 1.12-1.72 mm. (mean=1.42 mm.). About 1.76 x as long as pronotum (measured in middle as in GILLERFORS (1985, 1986)) and 1.12x as wide as pronotum. Distinctly longer (1.16x) than broad, at shoulders also broader than pronotum at hind angles. Base bisinuate, sides almost parallel in the anterior half as in *tomvalli* but distinctly crenulated and visible up to middle. Humeral angle sharply pronounced, anterior margin near shoulder markedly sinuate (fig.5) as in *azoricus*. Disc strongly arched, deeply and coarsely punctured and fainter towards apex. Interspaces at base near shoulders with a deep and parallel impression (in *tomvalli* this impression is more oblique). Setae yellow, semi-erect, small and narrow (fig.7), with acuminate apex (as in *wollastoni*). Nodules setiferous, well developed. Subapical nodule of interstria 3 is present, but small. The apical nodule of interstria 9 is indistinct in the great majority of the specimens and very small even in the larger ones.

Aedeagus (fig.9). Different from the other Azorean species. About 4.1 times as long as the widest part. The free portion of parameres is 2.7x as long as remainder. The flagellum is as in the other Azorean species.

Derivatio nominis. Named in dedication to Mr. D. T. POMBO (Centro dos Jovens Naturalistas - CJN, S. Maria), a dedicated Azorean naturalist and a friend.

Bionomics. Collected using pitfall traps with several baits (Turquin, Vinegar and Formalin) in a natural forest consisting mainly of *Laurus*-trees and in a *Cryptomeria japonica* plantation.

***Tarphius serranoi* sp. n.**

Figs. 2, 4, 6, 8, 10

Type locality: The Azores, Santa Maria, Pico Alto.

Type material: Holotype: 1 male, Pico Alto, Santa Maria, 12-18.VI.1990, *Laurus*-forest (P. BORGES, F. PEREIRA & A. SILVA leg.). Deposited in the University of the Azores in Terceira (UAT); Paratypes: same data as holotype, 6 specs.; 1 spec. Paratype deposited in Museu Municipal do Funchal, Madeira, Portugal; 1 spec. Paratype deposited in coll. A. SERRANO, Lisboa; 1 spec. Paratype deposited in coll. GOSTA GILLERFORS, Varberg, Sweden; 3 specs. Paratypes deposited in coll. UAT.

Diagnosis: Recognized by its rather small body, the form of pronotum (fig.4), the humeral angles (fig.6) and the structure of male genitalia (fig.10).

DESCRIPTION

Tarphius serranoi n. sp. is somewhat similar to *T. pomboi* n. sp., for which reason we describe here only the characters which separate the two species.

Size. Body length 2.45-3.17 mm. (mean=2.82 mm.); Width 1.05-1.47 mm. (mean= 1.25 mm).

Integument. As in *pomboi* but with no black specimens and colour more reddish yellow.

Head. Form more or less as in the other Azorean species (fig.2), with the front margin rounded. Eyes small and not protruding as in *pomboi*.

Antennae. Segment 3 shorter than in *pomboi*, and of almost equal length of 2, 3 longer than 4, 4 longer than 5, 6-9 of equal length, 9 is broader than all previous ones except 2.

Pronotum. Length 0.75-0.95 mm. (mean=0.86 mm.); Width 1.02-1.33 mm. (mean= 1.17 mm.); 1.36 x as wide as long. Widest part in middle. Index width in middle / width at hind angles on an average= 1.14. Index width in middle / width at front angles on an average= 1.50. Hind width of pronotum 1.30x wider than front angles of pronotum. Side margins more rounded anteriorly and posteriorly than in *pomboi* (fig.4). Hind margin not so bent backwards and sides less explanate than in *pomboi*.

Elytra. Length 1.30-1.79 mm. (mean=1.55 mm.); Width 1.05-1.47 mm. (mean= 1.25 mm.). About 1.80x as long as pronotum (measured in middle as in GILLERFORS (1985; 1986)) and 1.07x as wide as pronotum. Distinctly longer (1.24x) than broad, at shoulders also broader than pronotum at hind angles. Convexity of elytra somewhat different from *pomboi*, less vaulted. The humeral angle more rounded (as in *wollastoni*) with the margin more oblique and only faintly sinuate (fig.6). Setae yellow, small, erect (fig.8) and somewhat broader than in pronotum with more obtuse apex (as in *azoricus* and *depressus*), of about same shape as in the former species.

Aedeagus (fig.10). Similar to that of *rufonodulosus* and *acuminatus*. About 3.3 times as long as the widest part. The free portion of parameres is 2.8x as long as the remainder (2.0x in *rufonodulosus* and *acuminatus*). The flagellum as in the other Azorean species.

Derivatio nominis. Named in dedication of Prof. A.R.M. SERRANO (Fac. de Ciências de Lisboa), a dedicated portuguese coleopterologist and a friend who kindly assisted my past work.

Bionomics. Collected as in the former species but only in a natural forest consisting mainly of *Laurus*-trees.

REVISED KEY TO THE AZOREAN SPECIES OF *TARPHIUS*

1. Body surface sparingly covered with short and broad obtuse setae about twice as long as broad. Elytra with pale pattern enclosing nodules. Aedeagus as in GILLERFORS (1985) (Fig. 7)..... *rufonodulosus* ISRAELSON
 -- Body surface densely covered with rather long, more acute setae, at least 3 times as long as broad. Elytra more or less unicoloured2
2. Body depressed. Elytral setae almost decumbent. Aedeagus as in GILLERFORS (1985) (Fig. 5)..... *depressus* GILLERFORS
 -- Body convex. Elytral setae semi-erect or erect..... 3
3. Only two elytral nodules in the third interval, the subapical is missing 4
 -- With three elytral nodules in the third interval..... 5
4. Body with needle-like setae. Pronotum distinctly narrower than elytra. Aedeagus as in GILLERFORS (1985) (Fig. 6)..... *tornvalli* GILLERFORS
 -- Body with rather broad setae. Pronotum only faintly narrower than elytra. Aedeagus as in GILLERFORS (1986) (Fig. 7)..... *azoricus* GILLERFORS
5. Elytral nodules small and indistinct. Hind angles of pronotum sharply protruding. Aedeagus as in GILLERFORS (1986) (Fig. 8)..... *acuminatus* GILLERFORS
 -- Elytral nodules well developed and distinct. Hind angles of pronotum not sharply protruding.....6
6. Front margin of head with protruding and sharply acuminate angles. Pronotal sides straight behind middle, only slightly narrowed posteriorly. Humeral angles of elytra distinctly protruding. Aedeagus as in Fig. 9..... *pomboi* sp. n.
 -- Front margin of head rounded. Pronotal sides more rounded. Humeral angles of elytra rounded 7
7. Elytral nodules all present and large. Aedeagus as in GILLERFORS (1985) (Fig. 4)..... *wollastoni* CROTCH
 -- Elytral nodules small and apical nodule of interstriae 9 indistinct in the great majority of the specimens. Aedeagus as in Fig.10..... *serranoi* sp. n.

DISCUSSION

All the Azorean species of *Tarphius* seem to belong to the subgenus *Atlantotarphius* FRANZ, 1967, which has several Madeiran and Canarian representatives (ISRAELSON, 1984), and are almost certainly neo-endemics (*sensu* LINDROTH, 1960).

In spite of this, the presence of the nodules is not regular in all the eight Azorean species (Tab. II). We should expect on the interstriae 3, 5, 7, and 9 respectively three, three, two and one nodules, but this facies seems to occur only in *wollastoni* and *depressus*; the nodules are larger in the former species. In *tornvallii* and *azoricus* there are only two in the third interval, the subapically one is missing and only sometimes the apical nodule of interstria 9 is indistinct. In *pomboi* and *serranoi* the apical nodule of interstria 9 is always indistinct, being very small in the larger specimens. In *rufonodulosus* and *acuminatus* the nodules are weak and often somewhat indistinct.

SPECIES	INTERSTRIAE			
	3	5	7	9
<i>Tarphius wollastoni</i> CROTCH, 1867	3	3	2	1
<i>Tarphius rufonodulosus</i> ISRAELSON, 1984	2 (3)	3	2	0 (1)
<i>Tarphius depressus</i> GILLERFORS, 1985	3	3	2	1
<i>Tarphius tornvallii</i> GILLERFORS, 1985	2	3	2	(0) 1
<i>Tarphius azoricus</i> GILLERFORS, 1986	2	3	2	(0) 1
<i>Tarphius acuminatus</i> GILLERFORS, 1986	3	2	1	0
<i>Tarphius pomboi</i> sp. n.	3	3	2	0 (1)
<i>Tarphius serranoi</i> sp. n.	3	3	2	0 (1)

Tab. II. - Number of setiferous nodules on the interstriae 3, 5, 7, and 9 in the Azorean *Tarphius* - (numbers in () signify: possible occurrence).

As pointed out by previous authors (ISRAELSON, 1984; GILLERFORS, 1985) the Azorean species have a distinctive aedeagus, especially the median sclerite where a sort of flagellum occurs, different from the Madeiran and Canarian species, because of the presence of an apical carina on the ventral side.

Almost certainly, the ancestor of the Azorean *Tarphius* gave rise to a species-swarm, because all have similar nodular and aedeagus patterns. As can be seen from Tab. I some species occur on more than one island, which is unusual (ISRAELSON, 1990).

It is also interesting that there is a curious relationship between the nodular pattern and the known distribution of some *Tarphius* species in the Azores. Two

species that occur in more than one island, *tornvalli* and *azoricus*, have the same nodular and aedeagus patterns and are probably sister species; *T. wollastoni* and *depressus* have nodular and aedeagus patterns in common: *depressus* lives in the older and easternmost island (S. Maria) and is probably the older species, while *wollastoni* lives in the western islands of Faial and Flores, being a younger species and therefore more similar to the ancestor species.

According to GILLERFORS (1986), the support of this theory could be the size of elytral nodules, generally less developed in *depressus* than in *wollastoni*. Three species have in common the aedeagus pattern (*acuminatus* (Pico), *serranoi* and *rufonodulosus* (S. Maria)), and two of them have the same ecology, *acuminatus* (Pico) and *serranoi* (S. Maria), living among litter and debris (the same seems to occur with *pomboi*); the third species, *rufonodulosus* lives under bark and decaying wood and because of their poorly developed nodules is probably an older species.

As regards the ecology of the other four Azorean *Tarphius*, most of the populations live as *rufonodulosus* (under bark and decaying wood). The most interesting fact is that *depressus* and *rufonodulosus* live together in the same island and habitat.

The poverty of the Azorean Coleoptera is not so dramatic now as was thought some years ago, which is a consequence of a more profound exploration of the natural habitats of these islands by several entomologists. The presence of four species of *Tarphius* in S. Maria, all endemic of this island, is remarkable. This is probably related to the geological age of S. Maria, the oldest island of the archipelago (8 MA, ABDEL-MONEM *et al.*, 1975).

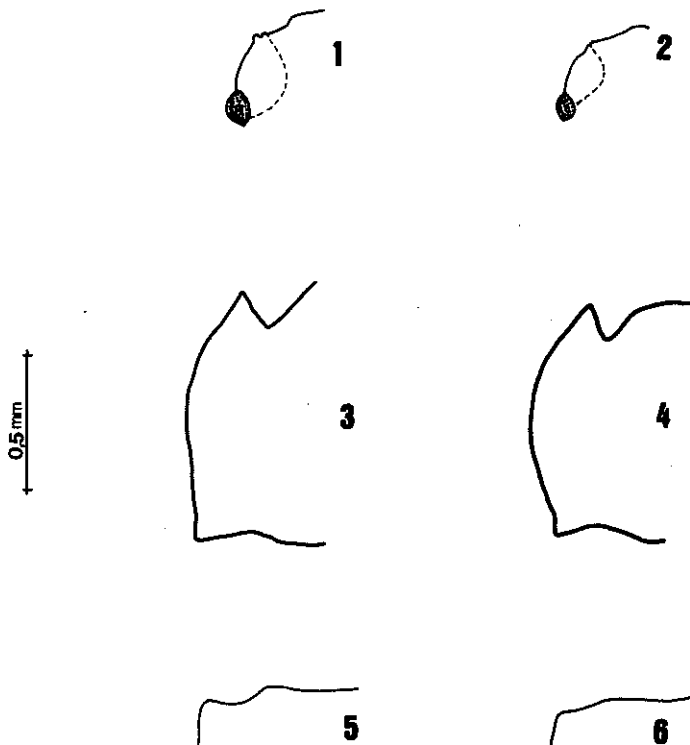
Probably the investigation of the *Laurus*-forest of the Islands of Corvo, Graciosa and S. Jorge, from where no *Tarphius* have been recorded yet (Tab. I), will provide some interesting finds.

ACKNOWLEDGEMENTS

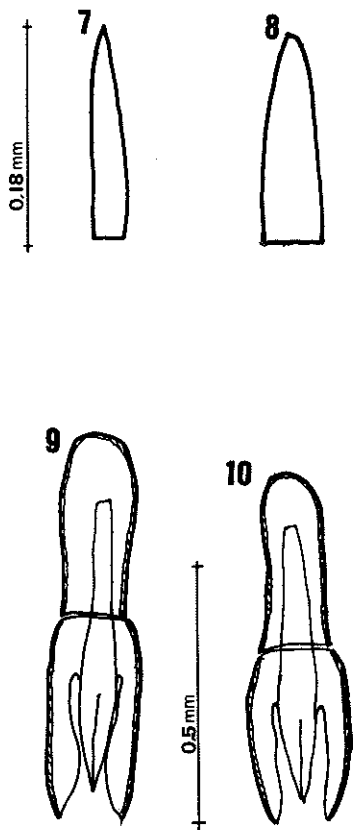
I am most grateful to Dr. G. GILLERFORS, Varberg (Sweden) for discussing some aspects related with the status and systematics of the new species, and Dr. G. ISRAELSON, Lund (Sweden), for reading and enriching the manuscript of this paper.

I would also like to thank my companions Mr. F. PEREIRA, Mr. M. AGUIAR SILVA and Mr. D. T. POMBO for their help in collecting beetles, and MYRTLE ASHMOLE (Edinburgh University) for her help in improving the English of the text. My sincere thanks to Eng. E.B. AZEVEDO for the drawings of the two species described.

My work on Santa Maria in June 1990 was partly supported by the University of the Azores, Department of Biology.



Figs. 1-6. - 1.- Head of *pomboi* sp. n.; 2.- Head of *serranoi* sp. n.; 3.- Pronotum of *pomboi* sp. n.; 4.- Pronotum of *serranoi* sp. n.; 5.- Humeral angle of *pomboi* sp.n.; 6.- Humeral angle of *serranoi* sp.n.



Figs. 7-10. - *Tarphius* spp. - ; 7.- Elytral seta of *pomboi* sp.n.; 8.- Elytral seta of *serranoi* sp.n.; 9.- Aedeagus of *pomboi* sp.n.; 10.- Aedeagus of *serranoi* sp.n..

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