

TWO NEW SPECIES OF *TYPHLOCHARIS* DIECK, 1869 (COLEOPTERA, CARABIDAE) FROM PORTUGAL: DESCRIPTION AND NOTES ON RELATED SPECIES

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ABSTRACT

The present study describes two endogean carabid species of *Typhlocharis* Dieck, *Typhlocharis rochapitei* n. sp. and *Typhlocharis crespoidi* n. sp., belonging to the *T. diecki* species group and to the *T. outereloi* species group, respectively. The work provides diagnostic characters and in particular, the structure of male genitalia. Affinities to putative relatives and keys for the identification of the *diecki* (all species) and *outereloi* (Portugal) species groups are also given.

Key words: Coleoptera, Carabidae, Anillina, *Typhlocharis*, *diecki* and *outereloi* groups, new species, Portugal.

RESUMEN

Dos nuevas especies del género *Typhlocharis* Dieck, 1869 de Portugal y notas sobre especies relacionadas (Coleoptera, Carabidae)

Se describen dos nuevas especies de carábidos Anillini endogeos (Coleoptera: Carabidae) de Portugal, *Typhlocharis rochapitei* n. sp. y *Typhlocharis crespoidi* n. sp., pertenecientes a los grupos *diecki* y *outereloi*, respectivamente. Se destacan los caracteres que las definen y, en particular, la estructura de la genitalia masculina. Se discute la afinidad con las especies más relacionadas y además se aportan datos ecológicos. Por último, se incluyen claves de todas las especies conocidas del grupo *diecki* y de las especies del grupo *outereloi* conocidas en Portugal.

Palabras clave: Coleoptera, Carabidae, Anillini, *Typhlocharis*, grupos *diecki* y *outereloi*, nuevas especies, Portugal.

Introduction

Within the subtribe Anillina and according to the catalogue of the ground beetles of the Iberian Peninsula (Serrano, 2003) plus some more recent

works (Ortuño, 2005; Serrano *et al.*, 2005; Serrano & Aguiar, 2006a, 2006b; Andújar *et al.*, 2008) the genus *Typhlocharis* Dieck, 1869 (Coleoptera: Carabidae: Trechinae: Bembidiini) is the richest one in this Peninsula with 46 known species. Species of

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Typhlocharis are distributed throughout the Iberian Peninsula (Europe), Morocco and Tunisia (North Africa) (Jeannel, 1963). Representatives of this genus have been found in the vestiges of the Lusitanian, the Lionigurian, the Betic Riffian and the Numidian Massifs and the genus is considered a very old one (Jeanne, 1973). According to Jeannel (1963) the ancestral lucicolous of the *Typhlocharis* expanded from Africa to the Betic Riffian Massif. Taking into account the more recent knowledge of the structure of the Western Mediterranean from the end of the Mesozoic to the end of the Pleistocene (Oosterbroek & Arntzen, 1992; Andeweg, 2002), the land connections between the Iberian Peninsula and North Africa occurred during the Oligocene and most probably during the Miocene. So, the present distribution of *Typhlocharis* may be dated from 25-30 MY onwards. Some comments on the origin and evolution of this genus can be found also in the recent work of Andújar *et al.* (2008).

All species of this genus are endogean carabids, wingless (apterous) and eyeless (anophtalmous), occurring and moving very slowly in soil. They may also be collected on the bottom surface of stones more or less deeply buried in the soil. The majority of species of *Typhlocharis* are local or regional endemisms with restricted distributions, probably because of isolation by physical barriers and low dispersal ability. Thus, taking into account their present distribution, they represent a great potential for phylogeographic studies.

In recent years the knowledge related to the systematics and distribution of representatives of the genus *Typhlocharis* from Portugal has considerably increased (Serrano & Aguiar, 2000, 2001, 2002, 2006a, 2006b; Serrano *et al.*, 2005). So far there are twelve known species recorded for Portugal (Coiffait, 1968, 1971; Serrano & Aguiar, *op. cit.*; Serrano *et al.*, *op. cit.*), belonging to four species groups (*sensu* Zaballos & Ruiz-Tapiador, 1997).

The aim of this work is to describe two new species of the genus *Typhlocharis* for Portugal, one in the *diecki* group and the other in the *outereloi* group. Representatives of both groups were already

known from Portugal (e.g. Coiffait, 1968; Serrano & Aguiar, 2000, 2006a). We also provide notes about relationships of these species with the closest forms. Moreover we give keys to all known species of the *diecki* species group and to the *outereloi* species group from Portugal.

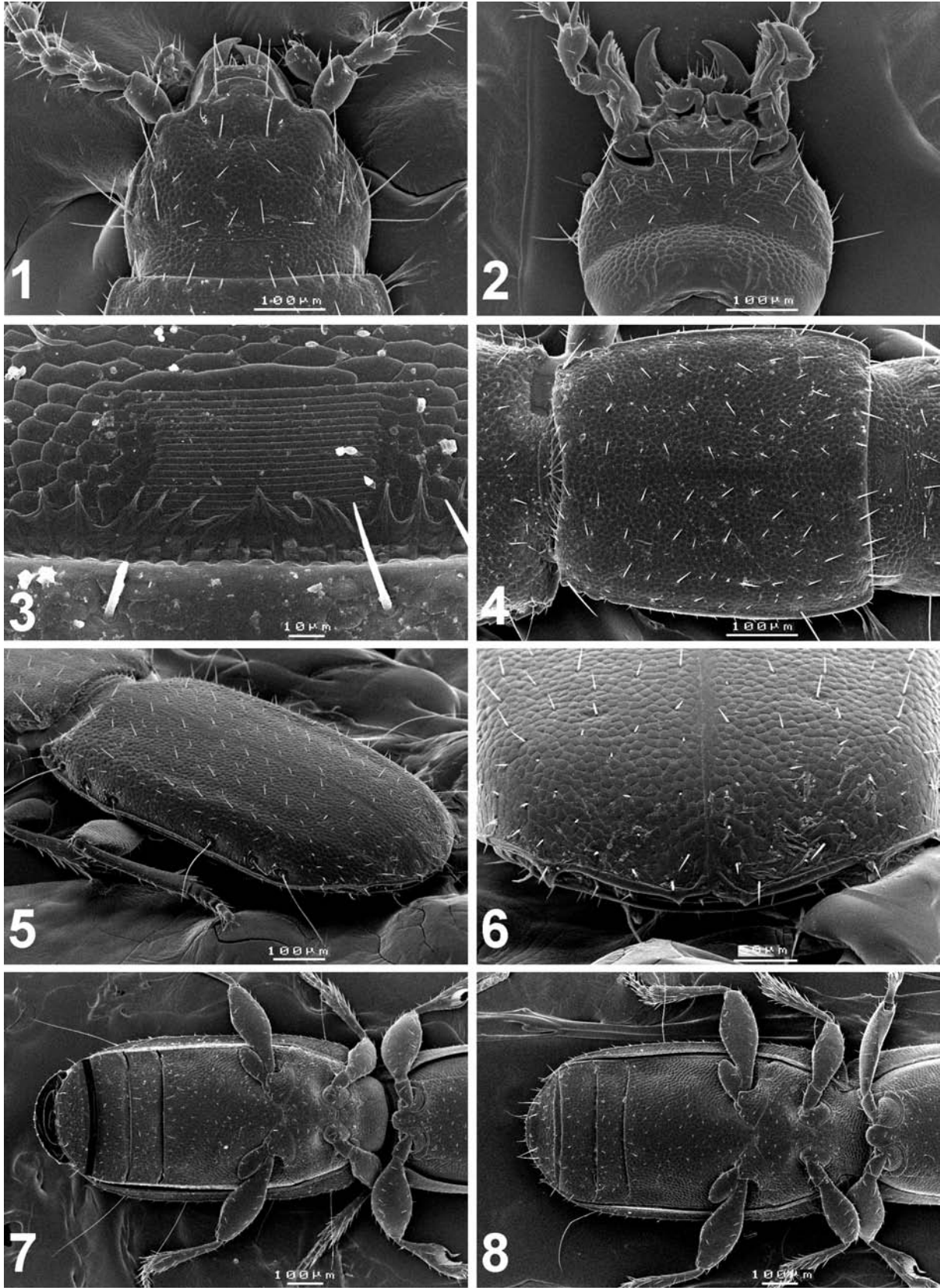
According to Zaballos & Ruiz-Tapiador (1997) the adults belonging to the species of the *diecki* and *outereloi* groups are recognized by the following combination of characters: *diecki* group, a) umbilicate series of elytra with four setae in the anterior group and three setae in the posterior group (4+3) and b) apical edge of elytron with no more than two teeth; *outereloi* group, a) umbilicate series of elytra with four setae in the anterior group and one-two setae in the posterior group (4+1 or 4+2) and b) apical edge of elytron with no more than two teeth. The eight known species of the *diecki* Group were found in Spain, Tunisia and Portugal (Andújar *et al.*, 2008). On the other hand, the fifteen known species of the *outereloi* group can be found in several regions of Portugal and Spain (e.g. Serrano, 2003).

Material and methods

Field work was conducted within the Province of Estremadura in the vicinity of Lisbon region and in some localities throughout the Province of Algarve (both Provinces of Portugal); this resulted in the collection of specimens of endogean beetle species of the subtribe Anillina in two localities (Alcabideche and Pincho, respectively in Estremadura and Algarve Provinces). After a careful study, we concluded that the specimens represent two new species of the genus *Typhlocharis*, belonging to the *diecki* and *outereloi* groups. The specimens were collected by direct hand collecting on the bottom surface of deeply buried stones in fragments of pristine-type Mediterranean forest habitats dominated by holm-oak bushes (*Quercus coccifera* Linnaeus) (Alcabideche) or in fragments of habitats dominated by lentisk bushes (*Cistus ladanifer* Linnaeus) (Pincho). Additional specimens were obtained from samples

Figs. 1-8.— *Typhlocharis rochapitei* n. sp.: 1) head and anterior part of pronotum (dorsal view), 2) head (ventral view), 3) stridulatory organ (*pars stridens*), 4) head (part), pronotum and anterior part of elytra (dorsal view), 5) elytra (left latero-dorsal view), 6) elytra (apical view), 7) thorax (part) and abdomen (male, ventral view), 8) thorax (part) and abdomen (female, ventral view).

Figs. 1-8.— *Typhlocharis rochapitei* n. sp.: 1) cabeza y parte anterior del pronoto (vista dorsal), 2) cabeza (vista ventral), 3) órgano estridulador (*pars stridens*), 4) cabeza (parte), pronoto y parte anterior de los élitros (vista dorsal), 5) élitros (vista izquierda latero-dorsal), 6) élitros (vista apical), 7) tórax (parte) y abdomen (macho, vista ventral), 8) tórax (parte) y abdomen (hembra, vista ventral).



of soil taken from the above-mentioned localities using Berlese apparatus.

The morphological study of adult specimens was done using a scanning electron microscope JEOL JSM-5200 LV. Measurements and drawings were done with a Wild M5 stereoscopic microscope equipped with a dissecting microscope ocular micrometer and a drawing tube.

The distribution of species in the descriptions is given in U.T.M. coordinates (1 km x 1 km).

Taxonomic description

Typhlocharis rochapitei n. sp.

(Figs. 1-8, 17A and B, 18A)

TYPICAL SERIE. Holotype ♂: Portugal, Alcabideche (Estremadura Province) (UTM: 29SMC6288), 7.IV.2006. Paratypes: same locality, 7.IV.2006, 3 ♂♂ and 2 ♀♀ (2 ♂♂ and 1 ♀ gold coated), 28.V.2008, 2 ♀♀. Holotype and paratypes deposited in the collection of the senior author, Department of Animal Biology (Lisbon).

DIAGNOSIS: Anophtalmous, body parallel, depressed, brown, with integument microreticulate, with scattered pubescence. Elytron with six discal rows of setae, impair rows with setae bigger than the ones of the pair rows; seven (4+3) marginal umbilicate setae; apical edge not sinuate, with one tooth at the ending of seventh stria region, one slightly parasutural tooth (males and females). Hind trochanters round-shaped in both sexes. Abdominal female sterna II and III with one common faint lateral fovea on each side. Aedeagus (Figs. 17A and B) with the median lobe sickle-shaped, basal lamina markedly arcuate, the apex bent to left (dorsal view); internal sac diffuse, with a twisted sclerite and tangled membranes; left and right parameres with two apical seta.

DESCRIPTION: Length of Holotype: 1.8 mm. Length of paratypes: 1.6 mm (males), 1.7-1.8 mm (females). Head (Figs. 1-2) slight wider than long [length: 0.31-0.34 mm (males) and 0.32-0.34 (females), width: 0.34-0.39 mm (males) and 0.40-0.43 mm (females)] with penta and hexagonal microsculpture; vertex with transversal microsculpture arranged in parallel ridges to form a file (*pars stridens*) in the area below the anterior margin of pronotum (Fig. 3). Cephalic chaetotaxy (large setae): Labrum with three pairs of setae (those on sides longer), one pair on sides of clypeus and one pair close to frontal sulcus, two pairs of supraocular setae (anterior and posterior) and 1-2 pairs of setae on the posterior region between vertex and

lateral carinae. Antennae moniliform, mouth-parts (Fig. 2) with no special features, as for other members of the genus. Pronotum rectangular (Fig. 4), slightly longer than wide (1.0-1.1 times) [length: 0.43-0.50 mm (males) and 0.50-0.54 (females), width: 0.42-0.46 mm (males) and 0.47-0.50 mm (females)], with hexagonal microsculpture, slightly narrowed towards posterior angles which are dentate; disk flattened, with one central and one lateral slight sulcus on each side; anterior margin slightly arcuate; lateral margins with 2 or 3 minor denticles near the posterior angles; disk faintly depressed near the posterior margin, this slightly expanded on each side and strongly arcuate in the middle region. Chaetotaxy: 3-4 irregular longitudinal series of minute setae between midline and lateral margins directed anterior and inward; one anterior seta on each side in anterior quarter, one posterior seta on hind angle; five-six pairs of setae near the anterior margin. Elytra (Fig. 5) 1.8-1.9 times longer than wide [length: 0.80-0.91 mm (males) and 0.90-0.96 mm (females)], width: 0.43-0.50 mm (males) and 0.50-0.53 mm (females)], with hexagonal microsculpture, parallel and oval posteriorly, with a faint longitudinal carinae at the beginning of seventh stria; flattened on the disk; transverse scutellar organ present near the base of suture; scutellar region not punctured; humeral angles well marked and rounded, with a tooth in the base of carinae; lateral margins serrate, teeth decreasing in size posteriorly; apical margin not sinuate after the end of longitudinal carina, with one tooth coinciding with end of seventh stria, presence of a small parasutural denticle (Figs. 5-6). Chaetotaxy: part of the pubescence of the disk is arranged in six lines since the sutural region, setae of impair rows are bigger than the ones of pair rows, all these setae are erect and slightly directed anterior; none large discal setae are present; umbilicate series with 4 setae in the front group and 3 in the hind group (4+3) (Fig. 5). Legs with robust femora; males with inner margin of intermediate femur very slightly dentate (Fig. 7); trochanters of third pair similar in male and female, without special features (Figs. 7-8), protarsus of male without dilated segments. Abdomen (Figs. 7-8) with sternum II of male without trace of lateral fovea (Fig. 7), female sterna II and III with one faintly joint lateral fovea on each side (Fig. 8). Male genitalia (Figs. 17A and B) in lateral aspect with median lobe strongly sickle-shaped, basal lamina markedly arcuate (Fig. 17A); median lobe in dorsal aspect (Fig. 17B) with apex acute, bent to left; internal sac with one twisted sclerite and tangled membranes; left paramere with two apical

Table 1.— Species of *Typhlocharis* of *diecki* group: comparison of total length and of some diagnostic character states from pronotum, legs, elytron and abdomen (including male and female genitalia).Tabla 1.— Especies de *Typhlocharis* del grupo *diecki*: comparación de la longitud total y de algunos caracteres del pronoto, patas, élitro y abdomen (incluso de las genitalias de los machos y de las hembras).

Species (<i>diecki</i> group)	Total length (mm)	Pronotum: sulci, L/W	Profemora: n° ventral teeth (♂♂)	Hind trochanters: sexual dimorphism	Elytron: discal long setae, discal fovea, n° apical teeth	Foveae (n°): II & III abdominal sterna (♀♀)	Median lobe: lateral view, apex (dorsal view)	Spermatheca	Gonocoxite: n° apical setae, n° medium setae
<i>T. diecki</i>	1.0-1.1	Median sulcus, 1 x	0	♂♀: ovoid elongate	Absent, absent, 1 (carina) + 0 (parasutural)	0?, 0?	strongly arcuate at basal bolb, ?	?	2, 0 ?
<i>T. sanschii</i>	1.4-1.5	Median sulcus, almost 2 x	0	♂♀: ovoid elongate ?	Present, absent, 0 (carina) + 0 (parasutural)	0?, 0?	unknown	?	?, ?
<i>T. besucheti</i>	1.45	Median sulcus + one lateral fovea basal (third), 1.1 x	0	♂♀: ovoid elongate	Absent, absent, 0 (carina) + 1 (parasutural)	0, 0	strongly arcuate at basal bolb, ?	Spheroid	2, 0
<i>T. carmenae</i>	1.6	Median sulcus, 1.1 x	0	♂: thorn-shaped, ♀: ovoid very elongate	Absent, present, 1 (carina) + 1 (parasutural)	1 double big, 0	strongly sickle-shaped, narrow and long	Spheroid	2, 0
<i>T. farinosae</i>	1.7-2.1	Median sulcus, 1.1 x	0	♂: thorn-shaped ♀: ovoid elongate	Absent, absent, 1 (carina) + 1 (parasutural)	1 double big, 1 big + 1 small	strongly Sickle-shaped, narrow and long	Spheroid	1, 1
<i>T. gonzaloi</i>	1.19-1.20	Median sulcus, 1 x	?	♂?, ♀: ovoid elongate	Absent, absent, 1 (carina) + 0 (parasutural)	1 ?, 0	unknown	Spheroid	2, 1
<i>T. lunai</i>	1.5-2.2	Median sulcus + one lateral sulcus, 1.1 x	1	♂♀: ovoid elongate	Present, absent, 0 (carina) + 1 (parasutural)	1, 0	Strongly arcuate with apex stand up, truncate	Spheroid	1, 0
<i>T. martini</i>	1.6-1.8	Median sulcus, 1.1 x	0	♂♀: ovoid elongate	Absent, absent, 0 (carina) + 1 (parasutural)	0, 0	Slight arcuate with ventral side straight, ?	Spheroid	2, 0
<i>T. rochapitei</i> n. sp.	1.6-1.8	Median sulcus + one lateral sulcus, 1 - 1.1 x	0	♂♀: ovoid elongate	Absent, absent, 1 (carina) + 1 (parasutural)	1 slight, 0	Sickle-shaped, short and bent left	Barrel shaped	1, 2

setae, dorso-basal edge expanded; right paramere with two apical setae. Female genitalia (Fig. 18A) with gonocoxites of ovipositor weakly sclerotized, each one in ventral aspect with one apical seta and two medium setae, the proximal bigger than the basal one; internal genital tract with spermathecal duct short and spermatheca barrel shaped, spermathecal gland long, with proximal region membranous and apical region more or less sclerotized.

ETYMOLOGY: This new species is dedicated to Professora Maria Teresa Rocha Pit e, a Portuguese entomologist and evolutionary ecologist, who greatly contributed to the taxonomic and ecological knowledge of the Diptera Drosophilidae, mainly of Portugal.

AFFINITIES (see also Table 1): The new species belongs to the *diecki* group based on the umbilicate series setae pattern (4+3), presence of one parasutural tooth and anterior margin of clypeus not dentate. It is well differentiated from all the species within this group, among other features, by the shape of aedeagus (particularly median lobe, including apex in dorsal view). Within the *diecki* group the pronotum of *T. rochapitei* n. sp. presents one lateral slight longitudinal sulcus on each side like *T. lunai* Serrano & Aguiar, 2006. The new species shares with the majority of species except *T. santschii* Normand, 1915 and *T. lunai* the absence of three long discal setae on the elytron. *Typhlocharis rochapitei* n. sp., as well as *T. lunai*, *T. carmenae* Zabalos & Ruiz-Tapiador, 1994 and *T. farinosae* Zabalos & Ruiz-Tapiador, 1997 bear a posteriolateral fovea on each side of abdominal sternum II in females. The hind trochanters of males are ovoid elongate, not thorn-shaped as happens in *T. carmenae* and *T. farinosae*. The form of the spermathecae of *T. lunai*, *T. besucheti* Vigna-Taglianti, 1972, *T. carmenae*, *T. farinosae*, *T. gonzaloi* Ortu o, 2005 and *T. martini* And jar, Lencina & Serrano, 2008 are si-milar (spheroid), while in the new species it is barrel shaped. The number of apical gonocoxite setae is one like in *T. lunai* and *T. farinosae* (2 in *T. besucheti*, *T. carmenae*, *T. gonzaloi* and *T. martini*).

Apparently only *T. farinosae* and *T. gonzaloi* bear one medium seta in the gonocoxite while *T. rochapitei* n. sp. presents two setae (Fig. 18A).

Taking into account the analysed characters, it is very hard to say to which species *T. rochapitei* n. sp. is more akin within the *diecki* group.

The morphological study of adult specimens of the new species, using a scanning electron microscope, allowed us to verify that the internal edge of intermediate tibiae of males does not bear a long seta near the apical margin, as well as the elevation in posterior margin of abdominal sternum IV of females, features that were found in *T. lunai* (Serrano & Aguiar, 2006a). Abdominal sternum II in males are not tuberculate near the posterior margin either.

As a final remark, we would like to point out that *T. rochapitei* n. sp. is the second species recorded for Portugal, belonging to the *diecki* group. This group has a large distribution area that includes most parts of the Iberian Peninsula and Tunisia (Algeria and North Morocco are not yet well known concerning the *Typhlocharis* fauna). The finding of *T. lunai* and now *T. rochapitei* sp. n. in Portugal agrees with this large distribution (see Serrano & Aguiar, 2006a, Figs. 26 and 27).

It is interesting to note that in the locality of Alcabideche, where *T. rochapitei* sp. n. was discovered, lives also a new species of the endogean genus *Geocharis* Ehlers, 1883 (Serrano & Aguiar, in press). Both species are partially syntopic.

***Typhlocharis crespoi* n. sp.**

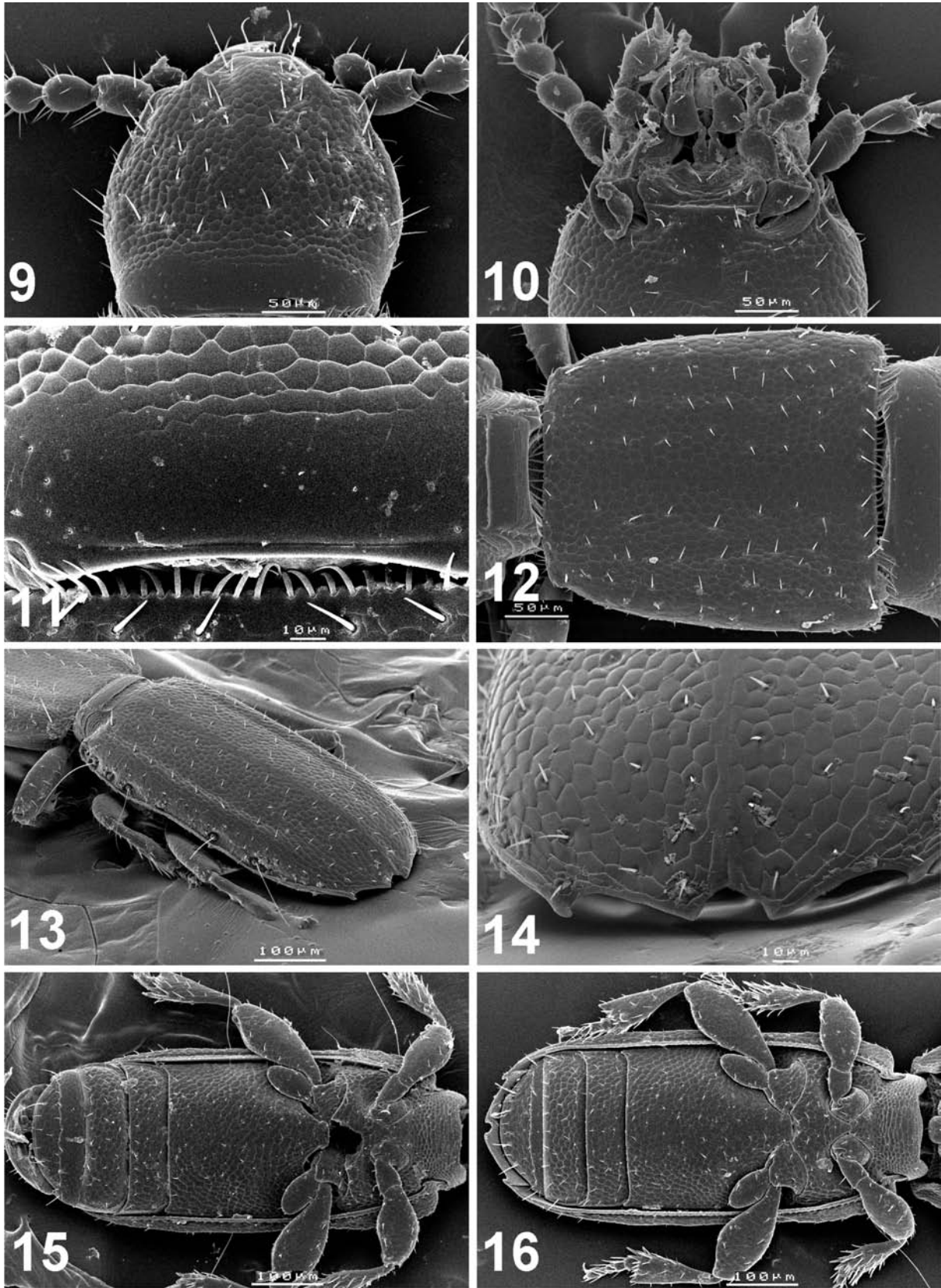
(Figs. 9-16, 17C and D, 18B)

TYPICAL SERIE. Holotype ♂: Portugal, Pincho (Algarve) (UTM: 29SNB2218), 10.III.2004. Paratypes: same locality, 2.II.2006, 1 ♂, 4.V.2006, 3 ♂♂ and 2 ♀♀ (2 ♂♂ and 1 ♀ gold coated). Holotype and paratypes deposited in the collection of the senior author, Department of Animal Biology (Lisbon).

DIAGNOSIS: Anophtalm, body parallel, depressed and brownish-yellow; integument microreticulate, with scattered pubescence. Elytron with 6 (4+2)

Figs. 9-16.— *Typhlocharis crespoi* n. sp.: 9) head (dorsal view), 10) head (ventral view), 11) posterior region of head amplified (dorsal view), 12) head (part), pronotum and anterior part of elytra (dorsal view), 13) elytra (left latero-dorsal view), 14) elytra (apical view), 15) thorax (part) and abdomen (male, ventral view), 16) thorax (part) and abdomen (female, ventral view).

Figs. 9-16.— *Typhlocharis crespoi* n. sp.: 9) cabeza y parte anterior del pronoto (vista dorsal), 10) cabeza (vista ventral), 11) region posterior de la cabeza ampliada (vista dorsal), 12) cabeza (parte), pronoto y parte anterior de los  litros (vista dorsal), 13)  litros (vista izquierda latero-dorsal), 14)  litros (vista apical), 15) t rax (parte) y abdomen (macho, vista ventral), 16) t rax (parte) y abdomen (hembra, vista ventral).



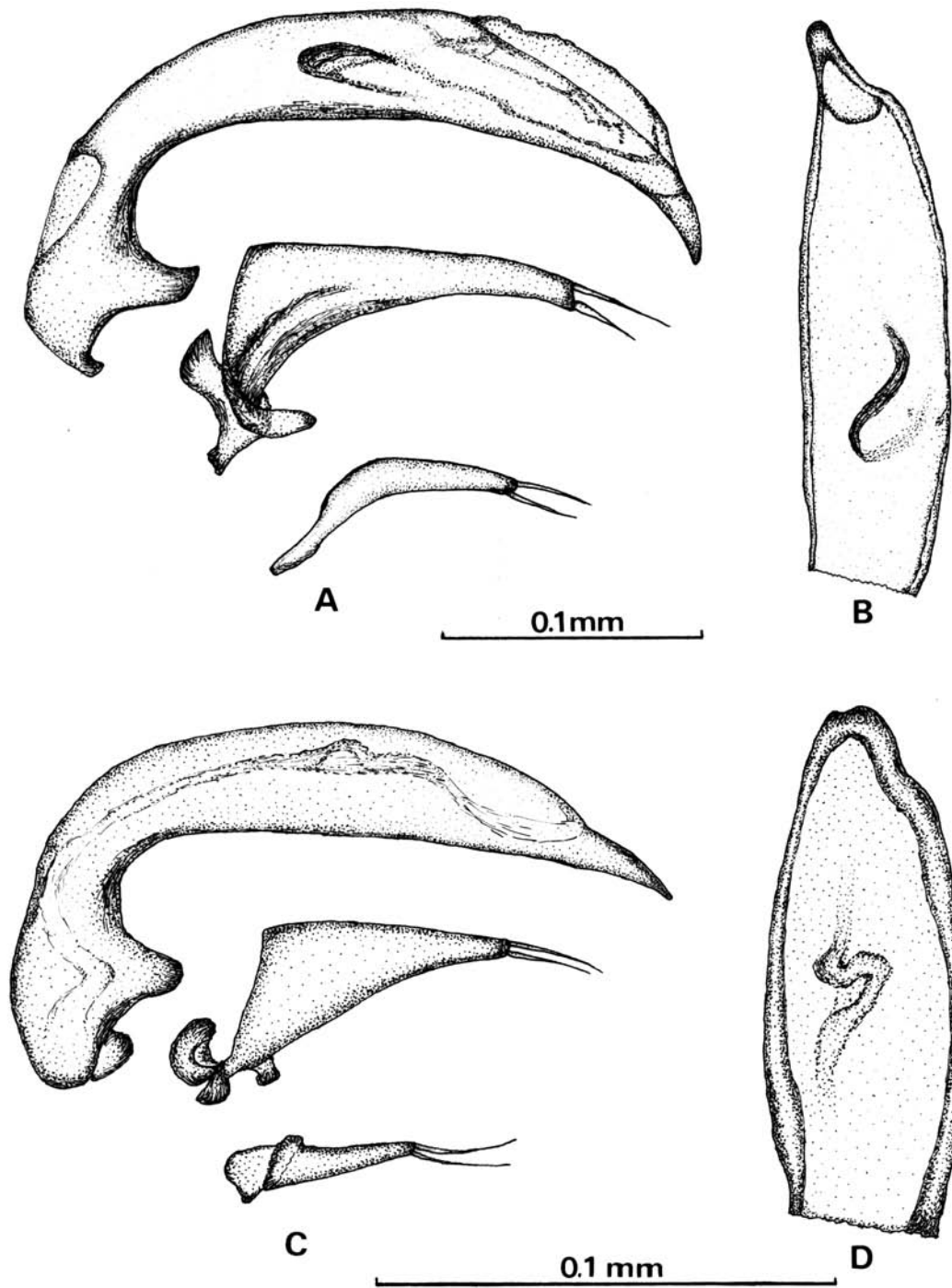


Fig. 17.— *Typhlocharis rochapitei* n. sp.: median lobe of aedeagus and left paramere in lateral view (A) and median lobe of aedeagus in dorsal view (B); *Typhlocharis crespoi* n. sp.: median lobe of aedeagus and left paramere in lateral view (C) and median lobe of aedeagus in dorsal view (D).

Fig. 17.— *Typhlocharis rochapitei* n. sp.: lóbulo mediano del eedeago y parámero izquierdo en vista lateral (A) y lóbulo mediano del eedeago en vista dorsal (B); *Typhlocharis crespoi* n. sp.: lóbulo mediano del eedeago y parámero izquierdo en vista lateral (C) y lóbulo mediano del eedeago en vista dorsal (D).

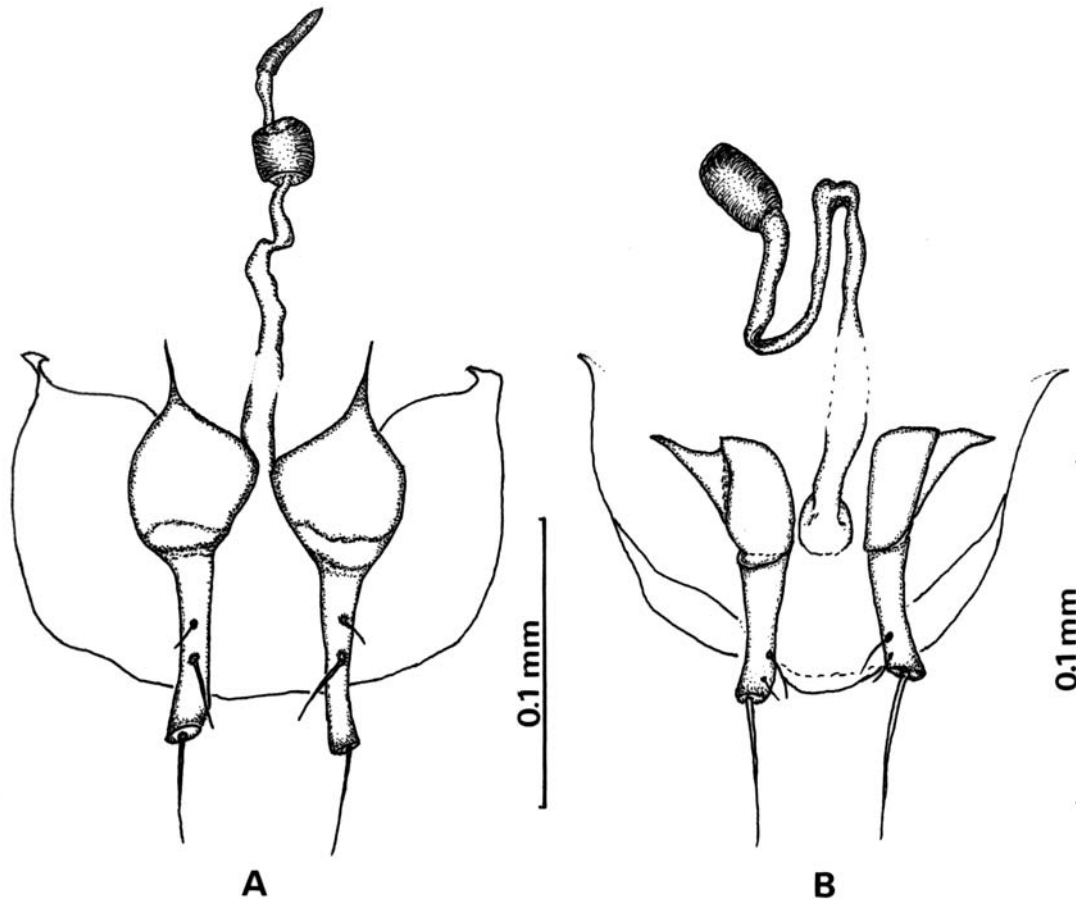


Fig. 18. — Female genitalia (ventral view): *Typhlocharis rochapitei* n. sp. (A) and *Typhlocharis crespoides* n. sp. (B).

Fig. 18. — Genitalia de la hembra en vista ventral: *Typhlocharis rochapitei* n. sp. (A) y *Typhlocharis crespoides* n. sp. (B).

marginal umbilicate setae; apical edge with one tooth at the ending of seventh stria region (males and females), parasutural one present. Hind trochanters round-shaped in both sexes. Hind femora robust, strongly expanded in the middle region of the inner margin. Abdominal sterna (male and female) without any fovea on each side. Aedeagus (Figs. 17C and D) with median lobe slightly sickle-shaped, basal lamina markedly arcuate; internal sac without sclerotized sclerites, with one diffuse tube-like membrane.

DESCRIPTION: Length of Holotype: 1.2 mm. Length of paratypes: 1.0-1.2 mm (males and females). Head (Figs. 9-10) slightly longer than wide [length: 0.22-0.26 mm (males) and 0.27-0.29 mm (females), width: 0.20-0.26 mm (males) and 0.26 mm (females)] with hexagonal microsculp-

ture, not depressed in the middle of the frons; vertex without transversal microsculpture, absence of a file (*pars stridens*) (Fig. 11). Cephalic chaetotaxy (large setae): Labrum with three pairs of setae (those on sides longer), one pair on sides of clypeus and one pair close to frontal sulcus, a pair of supraocular setae present over each eye and one posterior pair of setae between vertex and lateral carinae. Antennae moniliform, mouth-parts (Fig. 10) with no special features, as for other members of the genus. Pronotum quadrangular (Fig. 12), as long as wide [length: 0.26-0.30 mm (males) and 0.29-0.31 mm (females), width: 0.24-0.29 mm (males) and 0.27-0.29 mm (females)], with hexagonal microsculpture, slightly narrowed towards posterior angles which are marked; disk flattened, with one central and two lateral slight sulci on each side; anterior margin slightly arcuate; lateral mar-

gins slightly rounded, without minor denticles near the posterior angles; disk faintly depressed near the posterior margin, this slightly arcuate. Chaetotaxy: three longitudinal series of minute setae between midline and lateral margins directed anteriorly and inward; one anterior seta on each side in anterior quarter, one posterior seta on hind angle; five-six pairs of setae near the anterior margin. Elytra (Figs. 13-14) twice longer than wide [length: 0.48-0.55 mm (males) and 0.56-0.59 mm (females), width: 0.25-0.29 mm (males) and 0.26-0.29 mm (females)], parallel and oval posteriorly, with hexagonal microsculpture and a slightly longitudinal carinae at the beginning of seventh stria; depressed on the disk; transverse scutellar organ present near the beginning of suture (Fig. 13); scutellar region not punctured; humeral angles rounded, with a minor tooth at the beginning of carinae; lateral margins slightly serrate, teeth decreasing in size posteriorly; apical margin (Fig. 14) with one tooth coinciding with end of seventh stria, presence of a parasutural tooth. Chaetotaxy: Part of the pubescence of the disk arranged in three lines, these short setae are erect and slightly directed anteriorly; umbilicate series with 4 setae in the front group and 2 in the hind group (4+2) (Fig. 13). Legs with robust femora, mace shaped, tibiae dilated distally in both sexes; trochanters of third pair round-shaped, similar in both sexes (Figs. 15-16), protarsus with segments not dilated. Abdominal sternum II and III (males and females) without fovea on each side (Figs. 15-16). Male genitalia (Figs. 17C and D) in lateral aspect (Fig. 17C) with median lobe almost right, basal lamina markedly arcuate; median lobe in dorsal aspect (Fig. 17D) with apex more or less large; internal sac in central area without sclerites, presence of a tubiforme membrane (Fig. 17C); parameres bisetulose apically. Female genitalia (Fig. 18B) with ovipositor gonocoxites weakly sclerotized, each one in ventral aspect with 1 apical seta and 1 medium seta; internal genital tract with spermathecal duct short and spermatheca barrel shaped.

ETYMOLOGY: This new species is dedicated to Professor Eduardo Frias Crespo, who has greatly contributed to the taxonomic, phylogenetic and ecologic knowledge of the Portuguese amphibian and reptilian faunas, and become a remarkable academic reference to the senior author.

AFFINITIES (see also Table 2): The new species belongs to the *outereloi* group based on umbilicate series of elytron with four setae in the anterior group and two setae in the posterior group

(4+2) and the apical edge of elytron with two teeth. Within the *outereloi* species group, the new species as well as *T. intermedia* Zaballos, 1986 do not exhibit denticles in lateral margins of pronotum near the hind angles. The new species is akin to *T. quadridentata* Coiffait, 1968, *T. navarica* Zaballos & Wrase, 1998, *T. atienzai* Zaballos & Ruiz-Tapiador, 1997, *T. estrellae* Zaballos & Ruiz-Tapiador, 1997, *T. bullaquensis* Zaballos & Ruiz-Tapiador, 1997 and *T. singularis* Serrano & Aguiar, 2000 because of the presence of two lateral sulci on each side of pronotum, to *T. quadridentata*, *T. belenae* Zaballos, 1983, *T. intermedia*, *T. jeannei* Zaballos, 1989, *T. bullaquensis* and *T. elenae* Serrano & Aguiar, 2002 because of the presence of two teeth in the apical margin of elytron, to *T. outereloi* Novoa, 1979, *T. quadridentata*, *T. belenae*, *T. intermedia*, *T. navarica*, *T. singularis*, *T. gomesalvesi* Serrano & Aguiar, 2002, *T. laurentii* Magrini, 2000 and *T. bazi* Ortuño, 2000 because of the absence of thorn shaped hind trochanters in males, to *T. outereloi*, *T. quadridentata*, *T. belenae*, *T. intermedia*, *T. toriboi* Ortuño, 1988, *T. jeannei*, *T. singularis*, *T. gomesalvesi*, *T. laurentii* and *T. bazi* because of the absence of lateral fovea in abdominal sternum II (one or two) and to *T. intermedia*, *T. jeannei*, *T. atienzai*, *T. estrellae*, *T. bullaquensis*, *T. singularis*, *T. elenae* and *T. gomesalvesi* because of the pattern of apical and medium gonocoxite setae (1+1). *Typhlocharis crespoi* n. sp., *T. outereloi*, *T. singularis*, and *T. laurentii* exhibit a similar pattern of form (slightly arcuate and pointed apex) of the median lobe of the aedeagus in lateral view. However, differences in the shape of the apex of the median lobe (dorsal view), left paramere and internal sac separate the new species from all the other species belonging to this group. The new species together with *T. quadridentata* and *T. singularis*, by the known data (Magrini, 2000; Serrano & Aguiar, 2002), are the smallest ones of the *outereloi* group.

Taking into account the analysed characters, the new species seems to have a closer relationship with *T. intermedia*, *T. quadridentata* and *T. singularis*. The first species was found near Ciudad Real (Spain) and the latter two in several localities of Portugal (Coiffait, 1968; Serrano & Aguiar, 2002).

Note that in the locality of Pincho, where *T. crespoi* n. sp. was discovered, lives also *Geocharis femoralis* Coiffait, 1969 another endogean carabid. Both species are partially syntopic (see also Serrano & Aguiar, 2006c).

Table 2.— Species of *Typhlocharis* of *outerlei* group: comparison of total length and of some diagnostic character states from pronotum, legs, elytron and abdomen (including male and female genitalia).Tabla 2.— Especies de *Typhlocharis* del grupo *outerlei*: comparación de la longitud total y de algunos caracteres del pronoto, patas, élitro y abdomen (incluido de las genitales de los machos y de las hembras).

Species (<i>outerlei</i> group)	Total length (mm)	Pronotum: sulci, n° lateral denticles	Profemora: n° ventral teeth	Hind trochanters: sexual dimorphism	Elytron: umbilicate series, n° apical teeth	Foveae (n°): mesoepisternum, abdominal sternum II	Median lobe: lateral view, apex (dorsal view)	Gonocoxite: n° apical setae, n° medium setae
<i>T. outerlei</i>	1.2-1.3	Median sulcus, 0	♂♀: 0, 0	♂♀: ovoid elongate	4+2, 1 (carina)	♂♀: 0, 0	Weekly arcuate, narrow and short	2, 1
<i>T. quadridentata</i>	1.0	2 lateral sulci, ? present in the last third	♂♀: 0, 0	♂♀: ovoid elongate (?)	4+2, 1 (carina) + 1 (parasutural)	♂♀: 0, 0 (?)	Arcuate, rounded and short	?, ?
<i>T. belenae</i>	1.4-1.7	Median sulcus, ? several in the second half	♂♀: 0, 0	♂♀: ovoid elongate	4+2, 1 (carina) + 0-1 (parasutural)	♂♀: 0, 0	Sickle-shaped, narrow and very long	2, 1
<i>T. intermedia</i>	1.3-1.4	0, 0	♂♀: 0, 0	♂♀: ovoid elongate	4+2, 1 (carina) + 1 (parasutural)	♂♀: 0, 0	Sickle-shaped, wide and short	1, 1
<i>T. toriboi</i>	1.3-1.66	Median sulcus + 1 lateral sulcus, 2-3	♂♀: 0, 0	♂: thorn-shaped ♀: ovoid elongate	4+2, 1 (parasutural)	♂♀: 0, 0	Sickle-shaped, narrow and long	2, 1
<i>T. jeannei</i>	1.2-1.6	Median sulcus, 2-3	♂♀: 0, 0	♂: thorn-shaped ♀: less thorn-shaped	4+2, 1 (carina) + 1 (parasutural)	♂♀: 0, 0	Sickle-shaped, narrow and long	1, 1
<i>T. navarica</i>	1.3-1.5	Median sulcus + 2 lateral sulci, 2-3	♂♀: 0, 0	♂♀: elongate ovoid	4+2, 1 (carina)	♂: 0, 0 ♀: 0, 1	Sickle-shaped, narrow and long	2, 1
<i>T. atienzai</i>	1.35-1.55	Median sulcus + 2 lateral sulci, 2-3	♂♀: 0, 0	♂: thorn-shaped ♀: ovoid elongate	4+2, 1 (carina)	♂: 0, 0 ♀: 1, 2	Sickle-shaped, narrow and long	1, 1
<i>T. estrellae</i>	1.30-1.55	Median sulcus + 2 lateral sulci, 2-3	♂♀: 0, 0	♂: thorn-shaped ♀: less thorn-shaped	4+2, 1 (carina)	♂: 0, 0 ♀: 1, 1	Sickle-shaped, narrow and very long	1, 1
<i>T. bullaquensis</i>	1.35-1.55	Median sulcus + 2 lateral sulci, 2-3	♂♀: 0, 0	♂: thorn-shaped ♀: ovoid elongate	4+2, 1 (carina) + 1 (parasutural)	♂: 0, 0 ♀: 1, 2	Sickle-shaped, narrow and long	1, 1
<i>T. singularis</i>	1.1-1.4	Median sulcus + 2 lateral sulci, 2-3	♂♀: 0, 0	♂♀: ovoid elongate	4+1 or 4+2, 1 (parasutural)	♂♀: 0, 0	Arcuate; slightly rounded and long	1, 1
<i>T. elenae</i>	1.4-1.9	Median sulcus + 1 lateral sulcus, 2-3	♂♀: 0, 0	♂: thorn-shaped ♀: less thorn-shaped	4+1, 1 (carina) + 0-1 (parasutural)	♂: 0, 0 ♀: 1, 2	Sickle-shaped, narrow and long	1, 1 (+2 shorter)
<i>T. gomesalvesi</i>	1.3-1.5	Median sulcus + 1 lateral sulcus, 2-3	♂♀: 0, 0	♂♀: ovoid elongate	4+1, 1 (parasutural)	♂♀: 0, 0	Strongly arcuate; rounded and short	1, 1
<i>T. laurenti</i>	1.5-1.7	Median sulcus, 2-3	♂♀: ?, ?	♂♀: ovoid elongate	1 (parasutural) + 4+2, 0 (carina) + 1 (parasutural)	♂♀: 0, 0	Arcuate, narrow and long	2, 0
<i>T. bazi</i>	1.2-1.4	Slight Median sulcus + 1 slight lateral sulcus, 3-4	♂♀: 1, 1	♂♀: ovoid elongate	4+2, 1 (carina)	♂: 0, 0 ♀: 0, 1	Weekly arcuate, narrow and long	2, 1
<i>T. crespoti</i> n. sp.	1.01-1.2	Median sulcus + 2 lateral sulci, 0	♂♀: 0, 0	♂♀: ovoid elongate	4+2, 1 (carina) + 1 (parasutural)	♂♀: 0, 0	Weekly arcuate, wide and short	1, 1

Keys to all species of *Typhlocharis diecki* Group and to species of *Typhlocharis outereloi* Group from Portugal

The *diecki* species group includes the following known nine species: *T. diecki*, *T. santschii*, *T. besucheti*, *T. carmenae*, *T. farinosae*, *T. gonzaloi* (male unknown), *T. lunai*, *T. martini* and *T. rochapitei* n. sp. On the other hand, the *outereloi* species group includes the following five species from Portugal: *T. quadridentata* (female unknown), *T. singularis*, *T. elenae*, *T. gomesalvesi* and *T. crespoi* n. sp.

T. diecki Group

Taking into account the identification key given by Andújar *et al.* (2008) for the *diecki* group species, the new species can enter in this key, with some modifications, as follows:

5. Sutural angle of elytron rounded. Abdominal sternum II of female with or without lateral fovea. Length 1.2 mm or less 6
- Sutural angle of elytron dentate. Abdominal sternum II of female with lateral fovea. Length 1.5 mm or more 7
6. Base of elytron perpendicular to lateral margin, shoulder evident, antennomeres 1-3 not moniliform. Abdominal sternum II of female without lateral fovea. Species from Pego (Alicante) *T. gonzaloi*
- Base of elytron extended diagonally to shoulder, latter indistinct, antennomeres 1-3 moniliform. Abdominal sternum II of female with lateral fovea. Species from Navarra and Zaragoza *T. diecki*
7. Disc of elytron with a clear fovea between suture and the longitudinal carina, at the level of the posterior group of umbilicate setae. Metatrochanter of female unusually long. Species from Montes de Toledo *T. carmenae*
- Disc of elytron without fovea 8
8. Metatrochanter of male thorn-shaped. Abdominal sternum II of female with a conspicuous posteriolateral fovea on each side. Species from Montes de Toledo *T. farinosae*
- Metatrochanter of male ovoid elongate. Abdominal sternum II of female with slight posteriolateral fovea on each side. Species from Alcabideche *T. rochapitei* n. sp.

T. outereloi Group (Portugal)

1. Lateral margins of pronotum with denticles near the posterior angles. Disk of elytron with four rows of

- setae. Umbilicate series 4+2 and/or 4+1. Internal sac of median lobe of aedeagus with sclerites 2
- Lateral margins of pronotum without denticles near the posterior angles. Disk of elytron with three rows of setae. Umbilicate series 4+2. Internal sac of median lobe of aedeagus diffuse, without sclerites. Spermatheca barrel-shaped. Species from Pincho (Algarve Province) *T. crespoi* n. sp.
2. Apical edge of elytron with two distinct teeth, one in the end of longitudinal carina, other near the sutural angle (parasutural) 3
- Apical edge of elytron with only a distinct parasutural tooth 4
3. Length of body 1.0 mm. Metatrochanter ovoid elongate. Median lobe of aedeagus slightly arcuate, apex largely rounded (lateral view) (Fig. 2D, Coiffait, 1968). Species from Silves, Loulé, Sta Bárbara de Nexe, São Brás de Alportel and Boliqueime (Algarve Province) *T. quadridentata*
- Length of body 1.4-1.9 mm. Metatrochanter strongly thorn-shaped (male) or slightly thorn-shaped (female). Abdominal sternum II with one deep posteriolateral fovea on each side. Median lobe of aedeagus strongly sickle-shaped, apex acute (lateral view) (Fig. 2a, Serrano & Aguiar, 2002). Spermatheca barrel-shaped. Species from Estremoz – Vimieiro, Redondo-Bencatel, Granja and Mértola (Alto and Baixo Alentejo Provinces) *T. elenae*
4. Pronotum with two lateral sulci. Apical edge of elytron strongly sinuate between the seventh stria and the parasutural tooth. Umbilicate series 4+2 (very rarely 4+1). Median lobe of aedeagus with ventral side almost straight, apex acute (lateral view) (Fig. 2a, Serrano & Aguiar, 2000). Species from Montemor-o-Novo, Estremoz – Vimieiro, Redondo-Bencatel, Monte Trigo, Lousal and Mértola (Alto and Baixo Alentejo Provinces) *T. singularis*
- Pronotum with one lateral sulcus. Apical edge of elytron slightly sinuate between the seventh stria and the parasutural tooth. Umbilicate series 4+1. Median lobe of aedeagus with ventral side curved, apex slightly rounded (lateral view) (Fig. 2c, Serrano & Aguiar, 2002). Species from Granja (Baixo Alentejo Province) *T. gomesalvesi*

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