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THALASSOPHILUS PIEPERI N. SP., A NEW CAVERNICOLOUS CARABID BEETLE FROM MADEIRA

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with 5 figures

ABSTRACT. *Thalassophilus pieperi* is described as a new cavernicolous species from Madeira. It is compared with the other European species of the genus.

RESUMO. *T. PIEPERI* N.SP., UM NOVO COLEÓPTERO CARABÍDEO CAVERNÍCOLA DA MADEIRA. Neste trabalho é descrita uma nova espécie cavernícula da Madeira - *Thalassophilus pieperi*. Faz-se também uma comparação com outras espécies do mesmo género.

INTRODUCTION

On 4.VIII.1935 LUNDBLAD collected at Rabaçal, Madeira "sous une pierre dans la forêt d'*Erica arborea* et de *Laurus canariensis*" (JEANNEL, 1938:5) a small Carabid beetle with reduced eyes. This beetle — a female — was described by JEANNEL (1938) as *Thalassophilus coecus*. No further specimen of this species has been found up to date.

In Setember 1988 H. PIEPER discovered in small caves near Machico a second microphthalmic Carabid species, also belonging to the genus *Thalassophilus*, but significantly different from *T. coecus*. It will be described here and named *T. pieperi* in honour of its discoverer.

The holotype and one female paratype are preserved in the Museu Municipal do Funchal (Reg.no. MMF 24307); other paratypes are in the Museum für Naturkunde Stuttgart, the Naturhistoriska Riksmuseet Stockholm and in the author's collection.

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COLLECTING CONDITIONS

The locality: Madeira, Machico, Furnas do Cavalum, about 100 m. above sea-level, 11.-16.IX.1988.

North-west of Machico below the road to Santo da Serra there are four small caves, not easy to detect, because they are hidden in the brushwood. They are extending into the ground nearly horizontally to a maximum of about 100 m. Three of the caves are relatively moist; the fourth, which is the shortest, is dry. The bottom consists of a tough red clayey soil, partly covered with small and some larger rocks.

The caves had been explored by H. PIEPER (guided by COIFFAIT (1959), see also RODRIGUES DE GOUVEIA (1963)) who had already visited them in September 1982. The first beetles described here he found on 11.IX.1988. Altogether we collected seven specimens, which were mainly found on moist soil under stones:

11.IX.	cave II (E → W)	: 1 female	leg. PIEPER
13.IX.	cave I	: 2 females	leg. PIEPER
13.IX.	cave III	: 1 pair of elytra	leg. PIEPER
16.IX.	cave I	: 3 males, 1 female (1 pair of these in copula)	leg. ERBER
16.IX.	cave II	: 2 pairs of elytra and 1 sternite	leg. ERBER

Two additional specimens were found in those caves by H. PIEPER, one in September 1989 and the other in September 1990.

DESCRIPTION

Holotype: Largest male of the specimens collected on 16.IX. in cave I.

Paratypes: All other specimens (see above).

Length 5.3 mm.; width 1.6 mm. (Fig. 1). Wingless. Highly depigmented, head (including mandibles), pronotum and elytra reddish — testaceous, appendages yellowish. Surface shiny, with microscopic reticulated pattern, on head and pronotum polygonal slightly transverse (Fig. 4 B₁, 2), at elytra strongly transverse (Fig. 4 B₃). Setae arranged as in the related species.

Head ovate, slightly narrower than pronotum (1 : 1.3), less slender than in *T. coecus*. Eyes strongly reduced, almost flat, short ovate (0.1 mm. long, 0.14 mm. high), unpigmented, facets hardly visible (Fig. 4 A). Frons convex, with four microsetae, frontal furrows deep, anterior margin of labrum concave, with six setae (Fig. 4 C). Mandibles elongate, sharp-pointed; right mandible with one triangular and one elon-

gated tooth similar to that of *T. longicornis* (JEANNEL, 1926 : 517, Fig. 301) but nearer to the basis; left mandible with three small rounded teeth opposite to that of the right. Palps slender and long (Fig. 2 B), last joint of the maxillary palps slightly longer than the one before the last. Tooth of the mentum furrowed and nearly bifid. Antennae about 0.56 x as long as body length, slightly more slender than in *T. coecus* (0.53 x).

Pronotum convex (more so than in the related species) and transverse (1.3 x as broad as long); greatest width in the anterior third; side-margins in front strongly curved, in the rear less curved and more narrowed; front corners distinctly rounded, basal corners nearly rectangular, slightly protruding; basal margin less truncated than in *T. coecus*; lateral fovea less developed than in *T. longicornis* and *T. whitei* (Fig. 2 E).

Elytra oblong, 1.6 x longer than combined width of pair, greatest width in the middle, 1.3 x the width of the pronotum. Side margins evenly, slightly rounded (slightly more than in *T. coecus*) (Fig. 2 D), in front evenly rounded without protruding corners, apex rounded; marginal border continuing into the basal border and nearly reaching the scutellum (Fig. 4 D). Discus more convex than in the related species, not depressed beside the suture. Striae conspicuous, indistinctly punctured, the eighth ending in the anterior third, the others obliterated near the basal margin. Recurrent stria (*Trechus*-stria) bending forward to the third stria, but before reaching it, then curving sideways and connecting to the seventh; striae two to six obliterate within the field restricted by the recurrent stria; striae three and four and also five and six joined together. Interstriae more convex than in the related species; interstriae seven and eight each with a slight swelling near the apex (Figs. 1; 4 E).

Form of legs normal, bearing hairs and setae, as in the related species.

Penis (Fig. 3) formed as in *T. longicornis* and *T. whitei*, but slightly larger. Parameres each with seven setae at the apex.

VARIATION

The described holotype is the largest of the type series. The lengths of the male paratypes are 5.25 mm. and 4.9 mm., of the female paratypes 5.5 mm., 5.3 mm., 5.25 mm. and 4.55 mm. The proportional lengths of the elytra relative to their combined widths vary from 1.62 x to 1.5 x. The widths of the pronota relative to their lengths vary from 1.2 x to 1.5 x. The size of the eyes vary very little: in comparison with the holotype only one female has eyes which are minimally higher (0.15 mm.), but consequently slightly shorter (0.09 mm.). The smallest eyes are found in the smallest animal of the series (0.105 mm. high, 0.068 mm. long).

The patterns of the striae are fairly uniform in the series. In some paratypes the second stria is prolonged nearly up to the apex; behind the last seta it makes an outward curve (Fig. 4 E). In one female the recurrent stria is connected to the third

stria, but only at one elytron.

Thalassophilus pieperi shows all characteristics of the genus with the exception of the recurrent stria, which is connected to the third stria in all other European species. Considering, that one female shows the typical *Thalassophilus* - pattern — although only at one elytron —, we can assume, that the pattern of *T. pieperi* has evolved recently. Whether it is justifiable to erect for *T. pieperi* its own genus based on the deviating stria-pattern had better be decided on the basis of a greater series of specimens than currently available.

THE EUROPEAN SPECIES OF THE GENUS *THALASSOPHILUS*

With the description of *T. pieperi* the number of *Thalassophilus* - species known from Europe has increased to five, with one subspecies:

- | | |
|--|---|
| <i>T. longicornis</i> STURM, 1825 | - Europe (from Spain to Poland, Great Britain, Mediterranean Region) Balkans, Crimea. |
| <i>T. whitei</i> WOLLASTON, 1854 | - Madeira Archipelago, |
| <i>T. w. brevicornis</i> JEANNEL, 1930 | - Canary Islands, |
| <i>T. breuili</i> JEANNEL, 1926 | - Spain, Prov. Alicante, |
| <i>T. coecus</i> JEANNEL, 1938 | - Madeira, |
| <i>T. pieperi</i> n. sp. | - Madeira. (1) |

When JEANNEL (1938:3) described *T. coecus* he expressed astonishment at the criterion that even a genus belonging to the Trechodinae had a microphthalmic species, because "toutes les espèces aveugles jusqu'ici connues dans la région méditerranéenne sont des Trechini, et il semblait que l'évolution souterraine soit le propre de cette tribu, car on n'en connaissait aucun cas ni chez les Trechodini, ni chez les Homaloderini, groupes cependant bien plus anciens que les Trechini". Meanwhile, however, two new genera of the Trechodinae with a total of three anophthalmic species were recorded by MACHADO (1987) from the Canary Islands.

With *T. pieperi* we now have two microphthalmic species in this genus. Both species show distinct adaptations to the hypo-endogean life: depigmentation and

(1) Another microphthalmic species of *Thalassophilus* was found on La Palma (Canary Islands), which has been described by MACHADO (1989) as *T. subterraneus*.

strongly reduced eyes. In comparison with the eyes of the surface ground dwelling species *T. longicornis* and *T. whitei*, their eyes are only half the length and half the height, with a reduction of about a quarter of the surface (Fig. 2 C). In addition the eyes are almost flat and their facettes are hardly visible (Fig. 4 A). The eyes of *T. coecus* are slightly smaller than those of *T. pieperi* of the same body size:

	Length of		Depth of eye (mm.)
	body (mm.)	eye (mm.)	
<i>T. coecus</i> female	5.14	0.068	0.119
<i>T. pieperi</i> female	5.25	0.094	0.145
<i>T. pieperi</i> male	4.90	0.085	0.128
<i>T. pieperi</i> female	4.55	0.068	0.105

Whether this can be interpreted as more highly evolved, cannot be decided now, since only one female of *T. coecus* is known up to date.

The depigmentation of the two hypo-endogean species is evident in comparison with *T. whitei*, which is dark brown (among the material of this species I have seen), but less evident in comparison with *T. longicornis*, which is yellowish like the hypo-endogean species, excluding one dark specimen (among the material of this species I have seen).

Though *T. breuili* was also found in a cave (two specimens), its adaptations to a cavernicolous mode of life are not very marked. The eyes are only slightly reduced, the colour is dark (JEANNEL, 1926).

In the length of the antennae no significant difference between the hypo-endogean and the surface dwelling species can be noted. The antennae are in all species slightly longer than half the body length; only those of *T. whitei* are compact and shorter than half the body length (Fig. 2 A).

Comparing the five species of the genus with one another, *T. pieperi* resembles *T. coecus* more than it does the other species. This is evident (apart from the above mentioned characters that are related to the hypo-endogean mode of living) in the following characters: (a) the side margins of the elytra of both species are less parallel than in the other species; (b) the elytra discus is less flattened (*T. coecus*) — or not at all so (*T. pieperi*) — than in the other species which have a distinct flattened one;

(c) their palps are more slender than those of the other species; (d) the teeth of their mandibles are more basal than in *T. longicornis* and in *T. whitei*.

Summing up, *T. pieperi* shows fewer similarities to *T. longicornis* than to *T. coecus*. *T. whitei* and *T. breuili* are more similar to *T. longicornis*, less so to *T. coecus* or least so to *T. pieperi*.

The penes are, at present, not suitable for differentiating the species. They are not known for *T. breuili* and *T. coecus* at present. Those of the three other species hardly differ from one another. Possibly there is a difference in the number of setae that are inserted at the apex of the parameres. In *T. pieperi* I found seven on each paramere (Fig. 3); in *T. longicornis* I found eight (the figure given by JEANNEL (1926), however, shows only six); in *T. whitei* there appear to be nine. It may be possible that the number also varies within the different species.

KEY TO THE MADEIRAN *THALASSOPHILUS* SPECIES

- 1 Beetle hardly 4 mm. long, dark brownish, eyes large and prominent, facets distinctly visible *T. whitei* WOLL.
- 1* Beetle about 5 mm. long, yellowish brown or reddish testaceous, eyes strongly reduced, flat, unpigmented, facets hardly visible.
- 2 Pronotum backwards nearly straight narrowed, posterior corners obtusely angled, not protruded, elytra beside the suture slightly depressed, recurrent stria connected to the third stria *T. coecus* JEAN.
- 2* Pronotum backwards rounded narrowed, posterior corners rectangular, slightly protruded, elytra more convex, discus not depressed, recurrent stria connected to the seventh stria *T. pieperi* n.sp.

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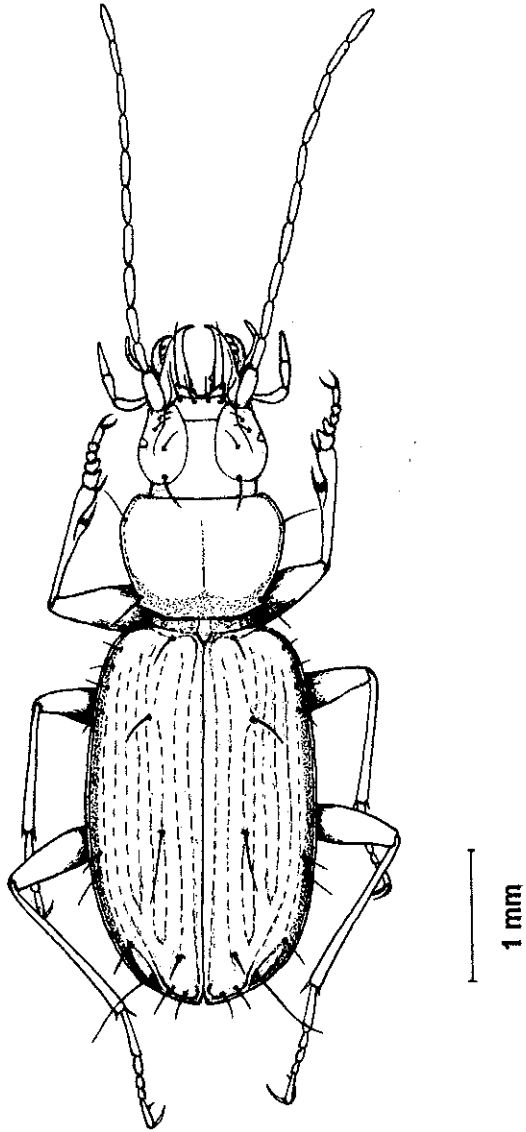


Fig. 1 . - *Thalassophilus pieperi* n. sp., male, (pilosity of legs and antennae not drawn), scale 1mm..

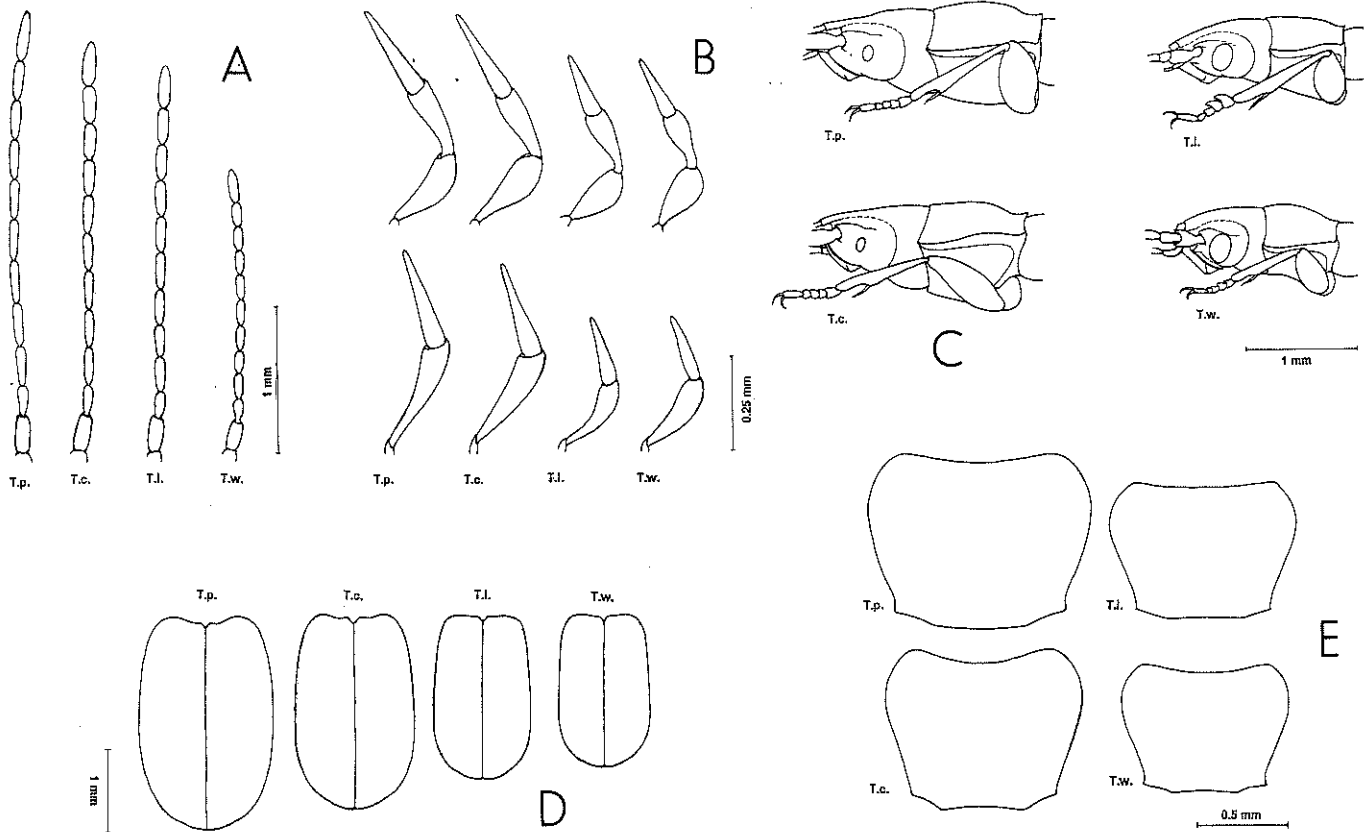


Fig. 2. - A = elytra, B = lateral views of head and prothorax, C = maxillary palps (above) and labial palps, D = antennae, E = pronota of *Thalassophilus pieperi* (T. p.), *T. coecus* (T. c.), *T. longicornis* (T. l.) and *T. whitei* (T. w.), scale bars: A, B, D = 1mm., E = 0,5 mm., C = 0,25 mm..

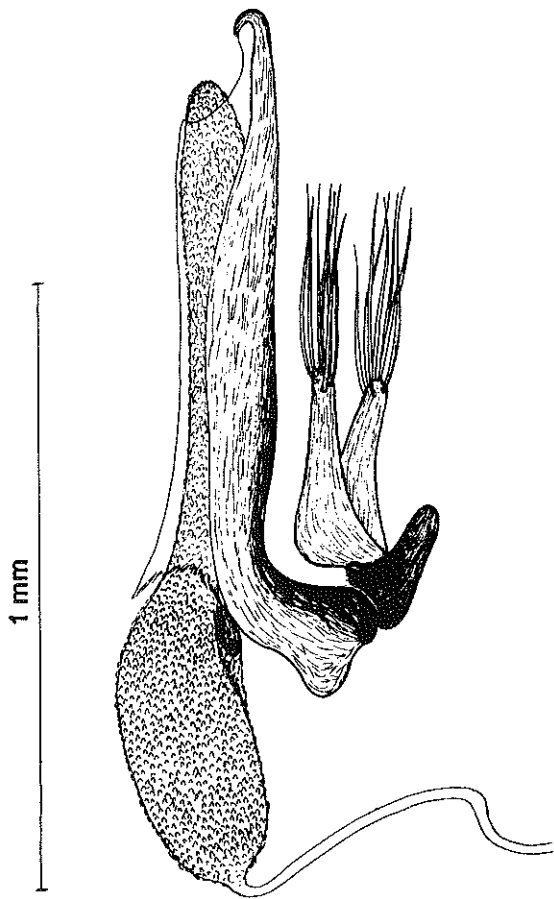


Fig. 3. - Penis of *Thalassophilus pieperi*, scale 1mm.

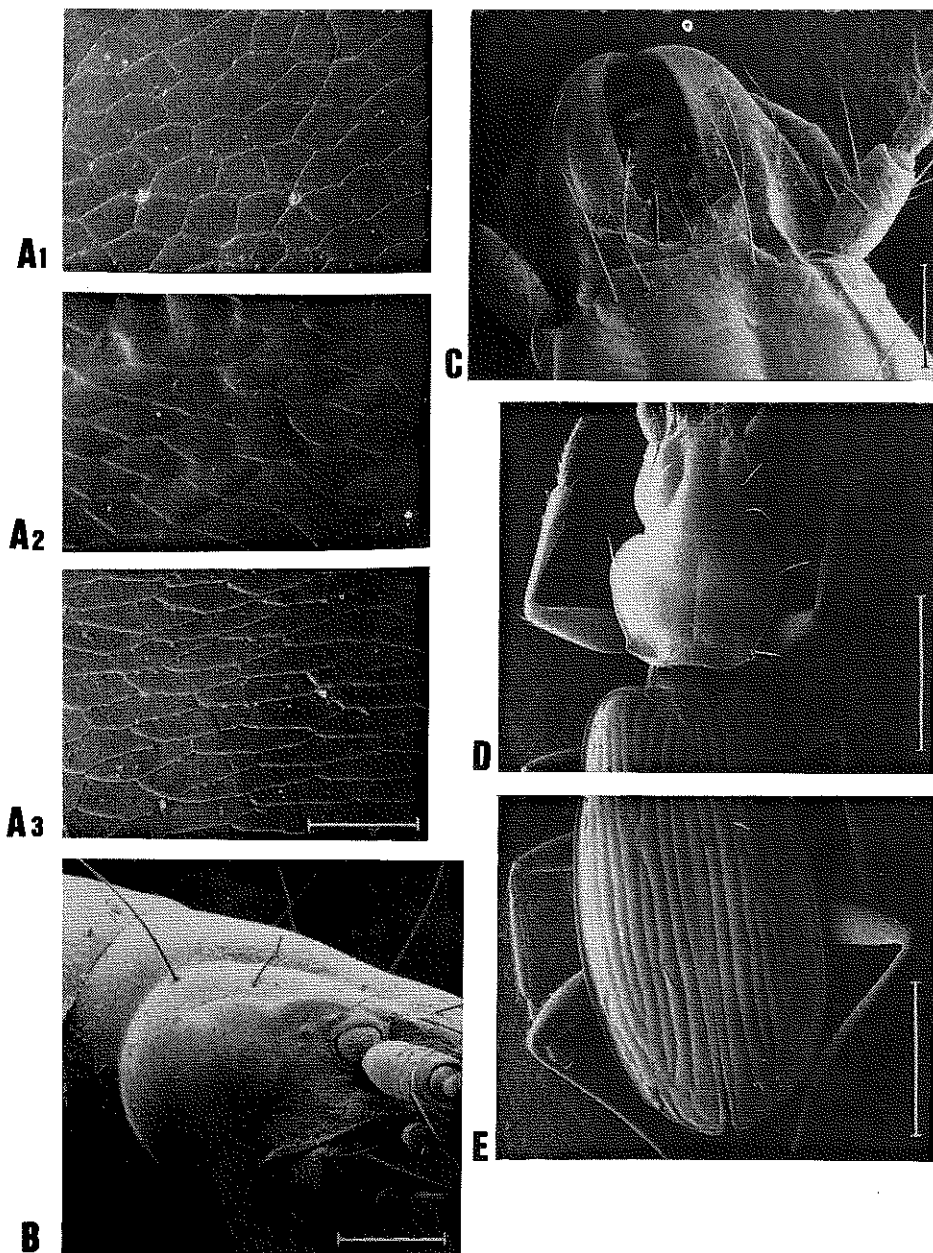


Fig. 4. - *Thalassophilus pieperi*: A = microsculpture of surface: 1 = head, 2 = pronotum, 3 = elytra ; B = lateral view of head (eye hardly visible); C = forehead; D = pronotum; E = elytra scale lines.: A = 0,025 mm., B, C = 0,25 mm., D, E = 1 mm..

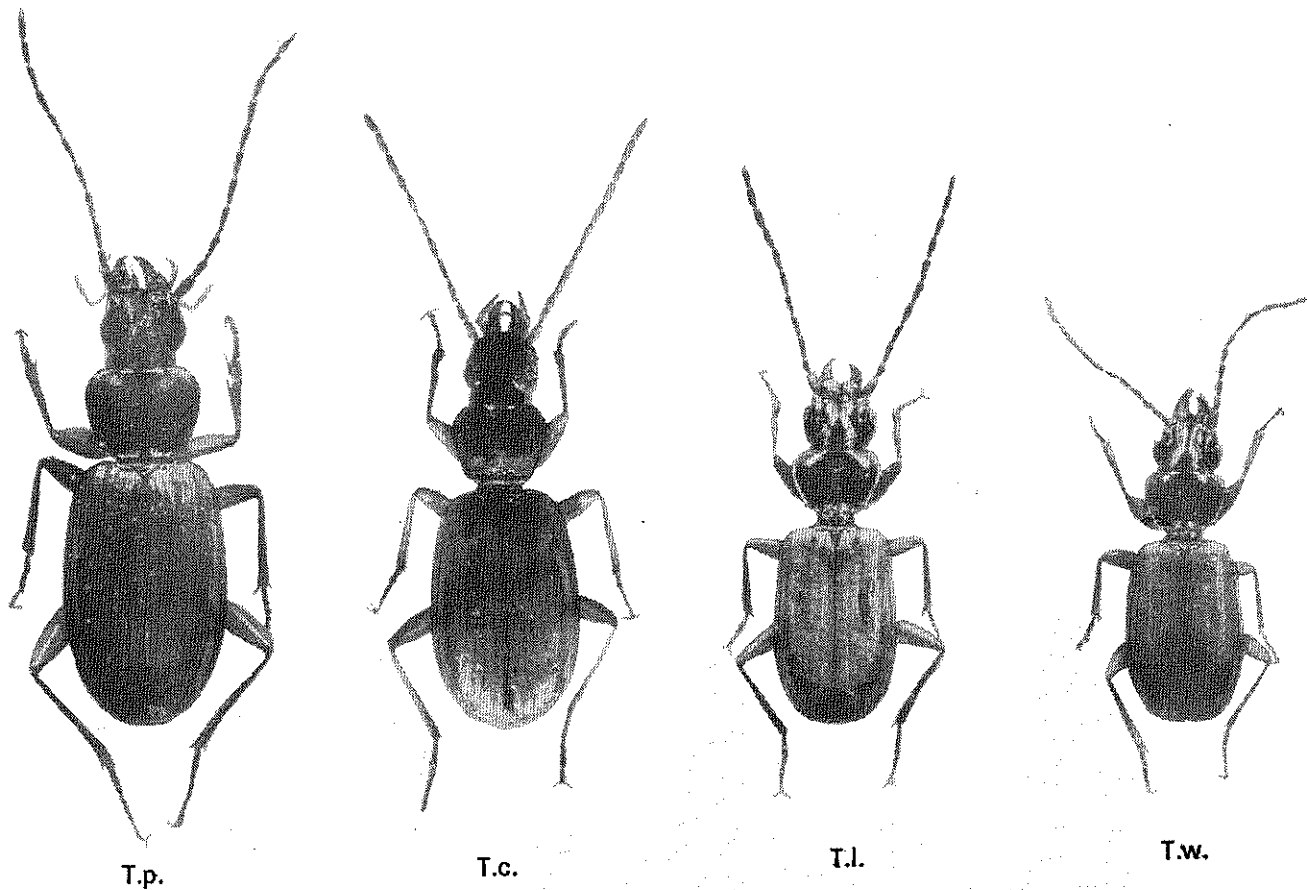


Fig. 5. - *Thalassophilus pieperi*, female, (T. p.), *T. coecus*, female, (T. c.), *T. longicornis*, female, (T. l.),
T. whitei, female, (T. w.), scale line: 4 mm..