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## **Description of the larvae of *Hydaticus leander* Rossi (Coleoptera, Dytiscidae) with a key to larvae of european species of the genus *Hydaticus***

by **K. Dettner**

**Abstract:** First to third stage larvae of the water beetle *Hydaticus* (*Guignotites*) *leander* Rossi are described «ex societate imaginis» from Sardinia. Other possible larval descriptions of *H. leander* and *H. grammicus* are critically reviewed and a key for third instars of european *Hydaticus* is presented. The found unique, tridentated labium of the second and third instar larvae of *H. leander* probably represents a derived character of the subgenus *Guignotites* and has not been found in the first stage larva which is characterized by the plesiomorphic condition, a bidentated labium.

Within Europe the determination of greater sized third stage water beetle larvae of the Dytiscinae seems very easy on grounds of detailed data and keys from BERTRAND (1928, 1972), BLUNCK and KLYNSTRA (1929), GALEWSKI (1973, 1975), KLAUSNITZER (1977), NILSSON (1982) and DETTNER (1982).

Therefore it was very surprising when there were found several larvae of the genus *Hydaticus* from Sardinia distinctly different from all *Hydaticus* species hitherto known from this mediterranean island in the larval stage.

Based on the small body length and the peculiar tridentated labium the sardinian larvae have to be integrated in the subgenus *Guignotites* although both european species of this subgenus (*H. leander*, *H. grammicus*) had been described previously «ex societate imaginis» as third stage larvae. Two distinctly different larvae attributed as *Hydaticus grammicus* (Germ.) still have been described by FUKUDA et al. (1959) from Japan on the one hand and by GALEWSKY (1975) from Hungary on the other side. The sardinian larvae were collected from several localities and always co-occurred with adults of *Hydaticus leander* Rossi, an abundant water beetle of the mediterranean area. This species however had been previously described «ex societate imaginis» as third stage larvae by BERTRAND (1976) from Palestine. Now for the two species *H. leander* and *H. grammicus* from the subgenus *Guignotites* four possible distinctly different larvae are known.

In the following contribution all larval stages of the sardinian *Guignotites* larvae are briefly described and compared with the remaining

three larval types ascribed as Guignotites larvae. Evidence is presented that the Italian larvae belong to the species *H. leander* and FUKUDA et al. (1959) probably described the real larvae of *H. grammicus*. For all third stage European *Hydaticus* larvae finally a complete key is given.

***Hydaticus* (Guignotites) *leander* Rossi**

Figs 1–5.

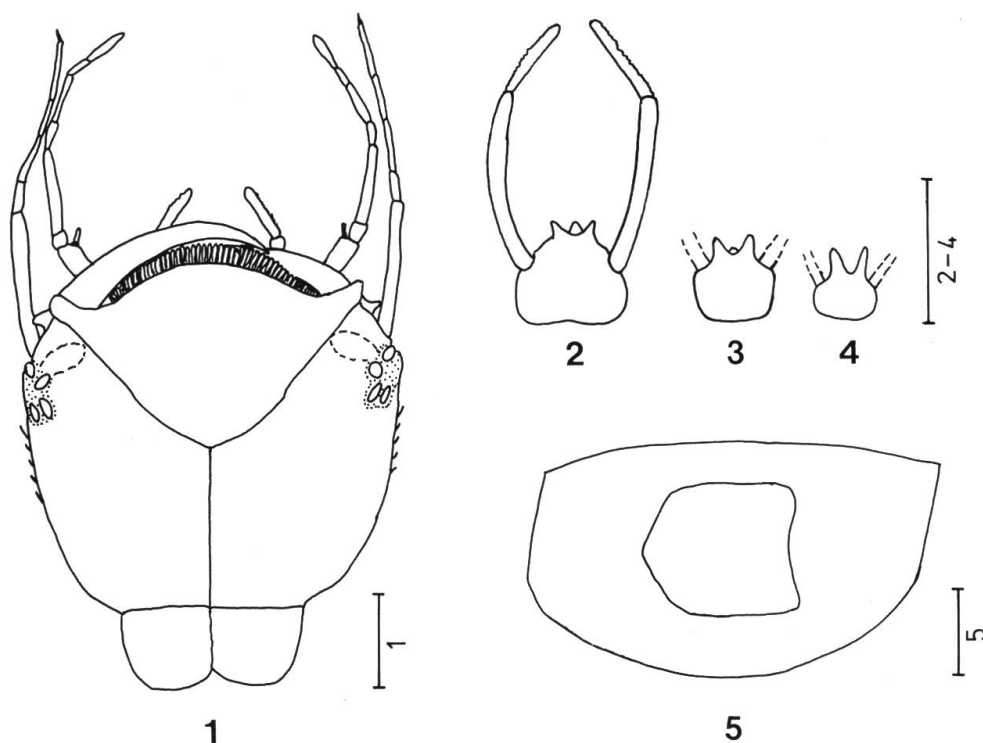
Material Studied: Sardinia: Fiume Pelau southward of Bari Sardo (Arbatax), 1 third instar larva together with 10 adult specimens of *Hydaticus leander*, 23.VIII.1980; Rio Mannu westward of Sassari, 2 third instar larvae together with four adult specimens of *H. leander*, 14.IX.1982; small lake near Ploaghe, 6 first, 1 second and 1 third instar larva together with three adults of *H. leander*, 11.IX.1982; Stagno de Vivagna, Isola di San Pietro, 1 third instar larva together with 56 adult specimens of *H. leander*, 29.IX.1982; material deposited in the author's collection; 1 third stage larva is deposited in the Natural History Museum Basle.

Description of the third instar larva: Body colour pale to bright brown dependent on the degree of sclerotization; dark brown areas confined to mandibles, anterior margin of clypeus, ocellar areas and basal parts of coxae; anterior borders of meso- and metathorax and anterior and lateral borders of tergal plates brown; meso- and metathorax laterally with 6 to 10 brown irregular often ovoid spots; abdominal tergal plates with at least 4 groups of brown marks per lateral half: one small spot near to the center, one laterally situated complete longitudinal band and two further more laterally situated groups of spots forming two further interrupted bands.

Body length from anterior margin of clypeus to terminal abdominal segment (without pseudocerci): 15–20 mm; head laterally rounded, strongly curved towards the neck (Fig. 1); head length without neck: 1.8–2.0 mm; head width at ocelli: 2.0–2.2 mm; length of neck: 0.5 mm; width of neck: 1.0–1.2 mm; labium with three distinct appendages (Fig. 2) which originate close by the anterior border of the labium; the lateral appendages project downwards, the central labial appendage projects upwards; lateral margins of pronotum distinctly rounded (Fig. 5); length of pronotum: 1.9–2.3 mm; prosternum broad and short (Fig. 5); terminal abdominal segment shorter (1.8–1.9 mm) as compared with the penultimate segment (1.9–2.2 mm); pseudocerci shorter (1.5–1.7 mm) than terminal abdominal segment.

Description of the second instar larva: Body colour pale; dark brown areas confined to the anterior margin of clypeus, ocellar areas,

basal parts of coxae and pseudocerci; meso- and metathorax and tergal plates of abdomen framed dark brownish. Body length (as in stage III): 12 mm; head laterally only feebly curved towards the neck; head length: 1.35 mm; head width: 1.5 mm; length of neck: 0.35 mm; width of neck: 0.75 mm; labium with two distinct downwards projecting lateral appendages and a very small and indistinct centrally situated upwards projecting appendage (Fig. 3); lateral margins of pronotum distinctly rounded; length of pronotum: 1.3 mm; length of penultimate

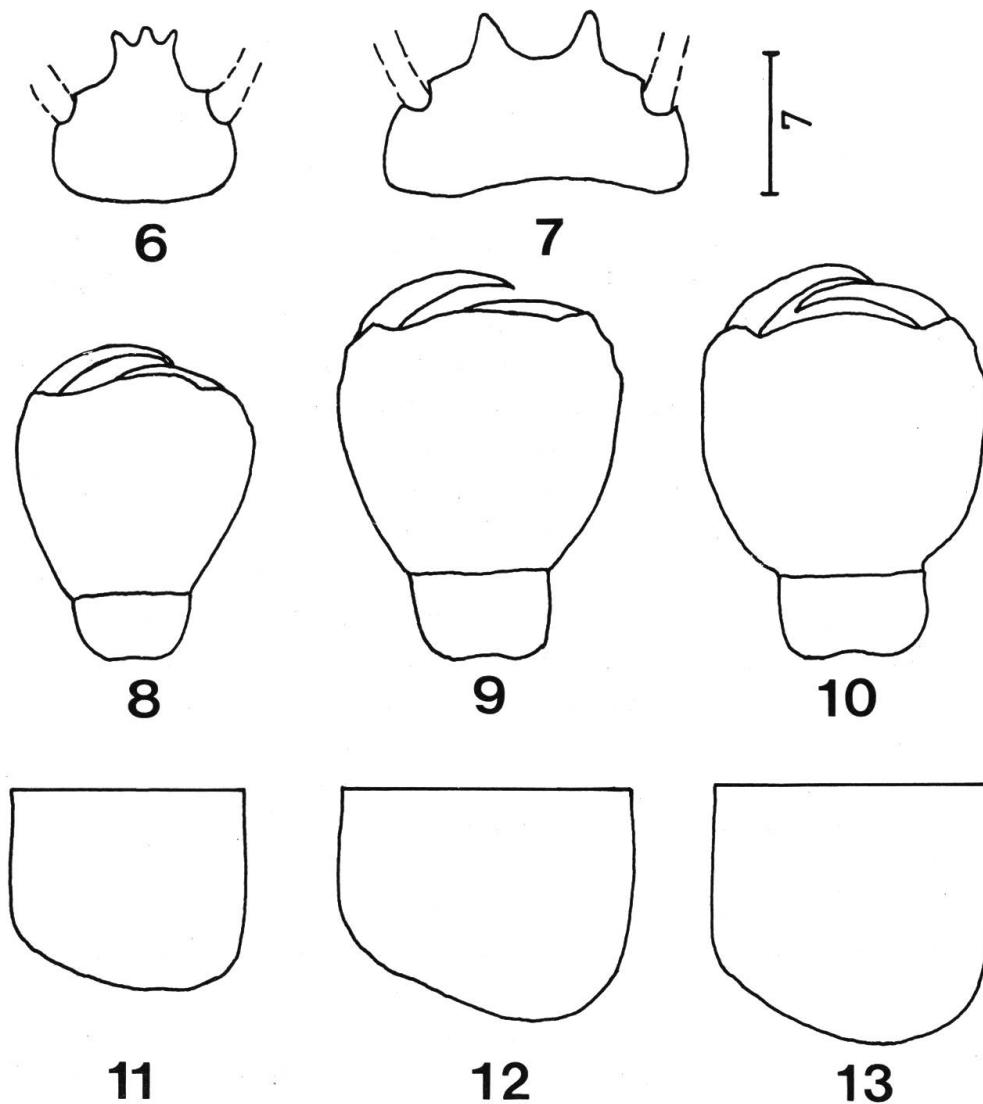


Figs 1–5: *Hydaticus leander* Rossi: 1. Head of L III from above. 2–4. Labium in ventral view: 2, L III. 3, L II. 4, L I. 5. Prothorax (lateral view of L III), pronotum and ventral view of L III prosternum as an inset figure; anterior ends are to the right side. Vertical bars: 0.5 mm.

abdominal segment: 1.5 mm; length of terminal abdominal segment: 1.6 mm; length of pseudocerci: 1.0 mm.

Description of the first instar larva: Body colour pale; dark brown areas confined to the anterior margin of clypeus, ocellar areas, basal parts of coxae and pseudocerci.

Body length (as in stages II, III): 8 mm; head laterally only feebly curved towards the neck; head length: 0.9–1.0 mm; head width: 1 mm; length of neck: 0.2 mm; width of neck: 0.45–0.5 mm; labium with two elongated lateral appendages only (Fig. 4); lateral margins of pronotum



Figs 6–13: 6–7. L III labium in ventral view of: 6, *Hydaticus grammicus* (Germ.). 7, *H. seminiger* De G. 8–10. Head of L III from above of: 8, *H. transversalis* Pontopp. 9, *H. seminiger* De G. 10, *H. continentalis* J. Balf.-Br. 11–13. Lateral view of L III pronoti, anterior ends are to the right side, of: 11, *H. transversalis* Pontopp. 12, *H. seminiger* De G. 13, *H. continentalis* J. Balf.-Br. Vertical bar: 0.25 mm.

Fig. 6 according to FUKUDA et al. (1959); Figs 8–13 according to GALEWSKI (1975).

distinctly rounded; length of pronotum: 0.6–0.8 mm; length of penultimate abdominal segment: 0.7–0.9 mm; length of terminal segment: 1.1–1.2 mm; length of pseudocerci: 0.7–0.9 mm.

### Conclusions

The found *Hydaticus* larvae from Sardinia certainly belong to the subgenus *Guignotites* on grounds of their small body size (length of L

III: 15–20 mm; adults: 9.5–12 mm) as compared with european representatives of the subgenus *Hydaticus* (length of L III: 17.5–25 mm; adults: 12.5–14.5 mm). At the first sight adults of the small sized *Hydaticus leander* may be confused with species of the genus *Rhantus* (Colymbetinae).

*Hydaticus grammicus*, the second european species of the subgenus *Guignotites* is too characterized by a small body size. This species however was never recorded from Sardinia with certainty (ANGELINI, 1978; FRANCISCOLO, 1979). Own water beetle collections at 52 localities (1978, 1980, 1982) showed that adults of *Hydaticus leander* were the only representatives of the subgenus present at 11 sardinian localities with great abundance. The description of larvae «ex societate imaginis» from islands or special localities with a limited and well-known number of species often seems the only possibility in describing new larvae from species where a rearing and pupating of larvae is not successful.

The two descriptions ascribed to be *H. grammicus* larvae were given by FUKUDA et al. (1959) and by GALEWSKI (1975). In his description «ex societate imaginis» GALEWSKI suggested that the larvae described by FUKUDA et al. might belong to another species because of their unusual tridentated labium and the small body size and he doubted whether *H. grammicus* may be found in Japan at all. However Dr. M. Brancucci (Nat. Hist. Mus. Basel) recently confirmed (i. litt.) the presence of *H. grammicus* from Japan. Several measurements using 16 third stage larvae of *Hydaticus seminiger* showed that GALEWSKI (1975) probably described a small specimen of a *H. seminiger* larva as *H. grammicus* (Table 1). Within the own larval material of *H. seminiger* from northern (Kiel) and western (Aachen) Germany there were found some smaller sized specimens (Table 1) which are sometimes characterized by somewhat slender and narrow mandibles, characters of GALEWSKI's *grammicus*-material.

As compared with the japanese larva of *H. grammicus* (FUKUDA et al. 1959) the sardinian larvae are characterized by a labium (Fig. 2) whose three appendages not originate from a distinctly elevated base (Fig. 6). Moreover towards the neck the sides of the head of the sardinian larvae (Fig. 1) are strongly curved as compared with the *H. grammicus* larva from Japan.

In 1976 BERTRAND gave a very poor description of a *Hydaticus* larvae from Palestine and he suggested that it might be the larva of *H. leander*. According to his description the larvae from Palestine probably are characterized by a bidentated labium and show body length

from 18–19 mm. It seems probable that BERTRAND's larvae belong to another species.

According to the sardinian larvae of *Hydaticus* (*Guignotites*) *leander* and the description of *H.* (*Guignotites*) *grammicus* by FUKUDA et al. (1959) it seems clear that larvae of the subgenus *Guignotites* may be

	« <i>H. gramicus</i> » GALEWSKI (1975) n=2	<i>H. seminiger</i> Kiel, Aachen n=16
body length (without pseudocerci)	18–20 mm	17.5–24.2 mm
head length (without neck)	2.6 –2.65 mm	2.45–2.7 mm
head width (at ocelli)	2.7 –2.75 mm	2.7 –2.95 mm
pronotum length	2.8 –2.85 mm	2.65–2.90 mm
length of 7th abdominal segment	2.2 –2.25 mm	2.3 –2.6 mm
length of 8th abdominal segment	2.3 –2.4 mm	2.25–2.6 mm
length of pseudocerci	1.6 –1.7 mm	1.8 –2.2 mm

Table 1: Measurements from third stage *Hydaticus* larvae: «*H. gramicus*» according to GALEWSKI (1975) and *H. seminiger* from northern (Kiel) and western (Aachen) Germany.

characterized by the unique tridentated labium. This seems to be a derived character for *Guignotites* to be found only within the second and third larval instars. The bidentated labium of the first instar represents the plesiomorphic condition which is found within all known larval stages of the remaining larvae of the subgenus *Hydaticus*. This is a further derived character supporting the derived position of the subgenus *Guignotites* within the phylogenetic tree of the genus *Hydaticus* given by ROUGHLEY and PENGELLY (1981).

For determining, confirming and improving there is given a key for third stage larvae of the six european *Hydaticus* species. Therefore it was necessary to complete the keys from GALEWSKI (1975) and NILSSON (1982). In accordance with BERTRAND (1976), ROUGHLEY and PENGELLY (1981) and NILSSON (1982) it seems clear that the larva described by WATTS (1970) in reality not represents *Hydaticus stagnalis* (Fab.) but *Hydaticus modestus* Sharp (Syn. *H. aruspex* Clark). Larvae of the seventh european species *Hydaticus debarros-machadoi* Francisc. have not yet been described.

### Key for european third stage larvae of the genus *Hydaticus*

1. Labium with three appendages (Fig. 2, 6) ..... 2
  - Labium with two appendages (Fig. 7) ..... 3
2. Appendages of labium originating from a distinctly elevated base (Fig. 6); towards the neck head laterally feebly curved
  - G. grammicus** (Germ.)
  - Appendages of labium not originating from an elevated base (Fig. 2); towards the neck head laterally strongly curved (Fig. 1) **H. leander** Rossi
3. Body dorsally fairly dark with a pale mesonotum; small head triangular with lateral margins feebly curved (Fig. 8); head length (without neck) from 2.3 mm to 2.5 mm
  - H. transversalis** Pontopp
  - Body dorsally more or less unicolourous; greater head with lateral margins more strongly curved (Fig. 9, 10); head length (without neck) from 2.45 mm up to 2.75 mm ..... 4
4. Head more triangular with less curved sides proximally (Fig. 9); pronotum slightly narrower (Fig. 12)
  - H. seminiger** (De G.)
  - Head more rounded with more curved sides proximally (Fig. 10); pronotum broader (Fig. 13) ..... 5
5. Head broad; width from 2.9–3.0 mm
  - H. continentalis** J. Balf.-Br. (syn. *H. stagnalis* F.)
  - Head narrower; width from 2.5–2.6 mm
    - H. aruspex** Clark (syn. *H. leavipennis* Thoms.)

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