

Description of the mature larva of *Hydrothassa fairmairei* (Brisout) (Coleoptera: Chrysomelidae: Chrysomelinae) and key to the larvae of the genus

ANDRÉS BASELGA¹ & FRANCISCO NOVOA²

¹Departamento de Biodiversidad y Biología Evolutiva, Museo Nacional de Ciencias Naturales - CSIC, c/ José Gutiérrez Abascal, 2, 28006 Madrid. Spain. E-mail: baselga@mncn.csic.es

²Departamento de Biología Animal, Facultad de Biología, Universidad de Santiago de Compostela, 15706 Santiago de Compostela. Spain. E-mail: bapaquit@usc.es

Abstract

Mature larva of *Hydrothassa fairmairei* (Brisout) is described and illustrated for the first time, based on specimens collected on *Ranunculus* spp. (Ranunculaceae) in Spain. A key to known larvae of genus *Hydrothassa* Thomson is provided. Diagnostic characters for the identification of species within this genus are number and size of abdominal dorsal tubercles, size of prothoracical setae and number of setae of anterior dorsal meso- and metathoracical tubercles. The larva of *H. fairmairei* is similar to that of *H. marginella* (Linné), but is clearly separated by the number of setae of dorsal anterior tubercle of meso- and metathorax. Notes on distribution and host plants are included.

Key words: Chrysomelidae, *Hydrothassa fairmairei*, larva, key

Introduction

The genus *Hydrothassa* Thomson (Coleoptera: Chrysomelidae: Chrysomelinae) is distributed in the Holarctic region (Seeno & Wilcox, 1982) and contains 7 western Palearctic species classified into two subgenera (Warchalowski, 2003). Among these taxa only three species of *Hydrothassa* are known at larval stage (Hennig, 1938; Steinhausen, 1994; 1996). This value is similar in other Chrysomelidae: larval stages of leaf beetles are still poorly known in the west Palearctic region: about 22% of known larvae within Chrysomelidae and 37% within Chrysomelinae (Steinhausen, 1996).

Hydrothassa fairmairei (Brisout) is an Iberian endemic with several striking features (i. e. tarsal claws seemingly toothed) that have obscured its taxonomic relationships due to its apparent similarity with *Phratora* Chevrolat. In fact, the taxon was described as a

species of *Phratora* and this mistake has recurred (Marseul, 1883; Warchalowski, 1995). However, the position of this species within genus *Hydrothassa* is currently well established (Warchalowski, 2003). Both adult morphological and trophic data strongly support this conclusion and, as we show in this paper, larval features confirm this taxonomic position. The aims of this paper are (i) to describe the mature larvae of *H. fairmairei*, and (ii) to provide diagnostic characters allowing the identification of the known larvae within this genus.

Materials and methods

Mature larvae were collected along with adults by sweeping their host plants. Specimens were attributed to genus *Hydrothassa* following Steinhausen (1994). After determination of adults collected from the same plants, the specific identity of larvae was assigned because only a single different species of this genus, *H. glabra* (Herbst), occurs in the sampled localities and its larvae are clearly different. To ensure this larval identification some specimens were reared until pupation and adult emergence, confirming the assignation of larvae here described to *H. fairmairei*. All the specimens were collected by A. Baselga and deposited in the collection of the Departamento de Biología Animal, Universidad de Santiago de Compostela, Spain. Larvae were preserved in 70% ethanol. Some specimens were cleared in warm 10% KOH and the tegument was mounted on microscope slides, as well as dissected cephalic and thoracic appendages. Slide mounts were prepared using dimethyl hydantoin formaldehyde resin (DMHF). Drawings were traced using CorelDraw 11 software, from images captured with a Nikon Coolpix 4500 digital camera attached to a Zeiss 475057 stereomicroscope and a Zeiss 473011-9901 compound microscope. The morphological terminology was taken from Kimoto (1962) and Cox (1982), and the classification follows that of Warchalowski (2003).

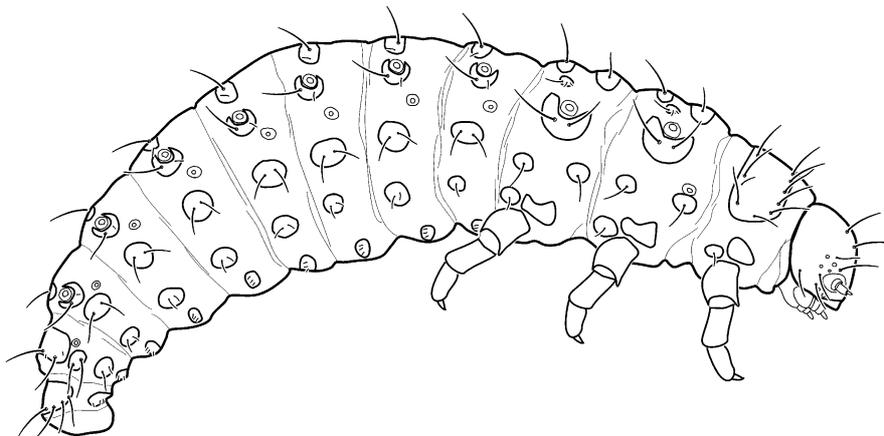


FIGURE 1. Habitus of *Hydrothassa fairmairei*, mature larva from Valdeinfernos. Length = 6.4 mm.

Hydrothassa (Hydrothassa) fairmairei (Brisout, 1866), mature larva
(Figs. 1–6)

Material examined. SPAIN. A Coruña, Oroso, Sigüeiro, (UTM 29TNH4457), 250 m, 5 May 2004, 2 mature larvae; Lugo, Sierra de Xistral, Abadín, Valdeinfernos (UTM 29TPH2109), 600 m, 17 July 2002, 9 mature larvae.

Description. Habitus as in Fig. 1. Length: 5.7–6.6 mm. Body eruciform, moderately convex and slightly arched in preserved specimens. Inter-tubercular plates and tubercles concolor, red brown in dorsal region, light brown in ventral region. **Head.** Hypognathous, well sclerotized. Color red brown. Epicranial suture well developed and long, frontal arms distinct, V-shaped and almost straight (Fig. 2). Endocarina present, extending to clypeus. Vertex bearing 3 pairs of setae (v1, v3, v6). Frons with 3 pairs of setae (f3, f4, f6). Antennae short and well sclerotized, three-segmented: first joint highly transverse, bearing 4 placoid sensilla (only 2 visible in frontal view, Fig. 3); second joint 1.5 times longer than wide, bearing a large conical membranous sensillum and 6 minute setae; distal joint narrow, bottle-shaped, with membranous apex bearing 5 highly minute setae (central one three times larger than the others) and 1 placoid sensillum (not visible in frontal view). Stemmata arranged in two groups, 1 pair located below the base of antenna and 2 pairs behind the antenna. Clypeus with 2 pairs of setae. **Mouthparts.** Labrum (Fig. 2) bearing 1 pair of placoid sensilla and 2 pairs of setae on upper surface, one near middle, the other near lateral sides; anterior border with a median wide U-shaped notch and 3 stout setae on each side. Mandibles symmetrical, 4-toothed, bearing 2 setae on external face and 1 placoid sensillum on dorsal side. Maxillae (Fig. 4): cardo transverse, without setae; stipes elongate, with 2 large setae near base of maxillary palp; mala bearing 9–11 setae on internal margin and apex, basal setae longer than apical ones; maxillary palpi 4-segmented, first joint almost as long as wide, bearing 2 long setae basally in ventral side and a placoid sensillum in dorsal side (not visible in Fig. 4), second joint transverse with 1 minute seta on external side, third joint longer than wide with 1 seta and 1 placoid sensillum on internal face, and two setae on external side, and fourth joint conical with 1 minute seta on internal face and membranous apex bearing 9–11 highly minute setae. Labium (Fig. 4) with postmentum membranous, bearing 3 pairs of setae, anterolateral one very short; prementum with 4 pairs, 2 posterior and 2 anterior to labial palpi, one of the former much longer than the others; labial palpi 2-segmented, first joint transverse, distal joint conical with membranous apex bearing 8–9 highly minute setae. **Thorax.** Tubercles poorly delimited. Prothorax with tubercles D (dorsal), DL (dorsolateral) and EP (epipleural) fused together in a pronotal sclerite (Fig. 6), pronotum (D-DL-EP) bearing 9 pairs of primary setae along with 1 pair of shorter setae and 3 pairs of extremely minute ones; tubercle P (pleural) with 1 setae; ventral region with midventral tubercle ES (eusternal) separated in two halves, each one fused with tubercle SS (sternellar). Each fused tubercle SS-ES bears 2 setae. Meso- and metathorax with 4 tubercles on each side of dorsal region: Dai-Dae (dorsal anterior interior and dorsal anterior exterior fused together,

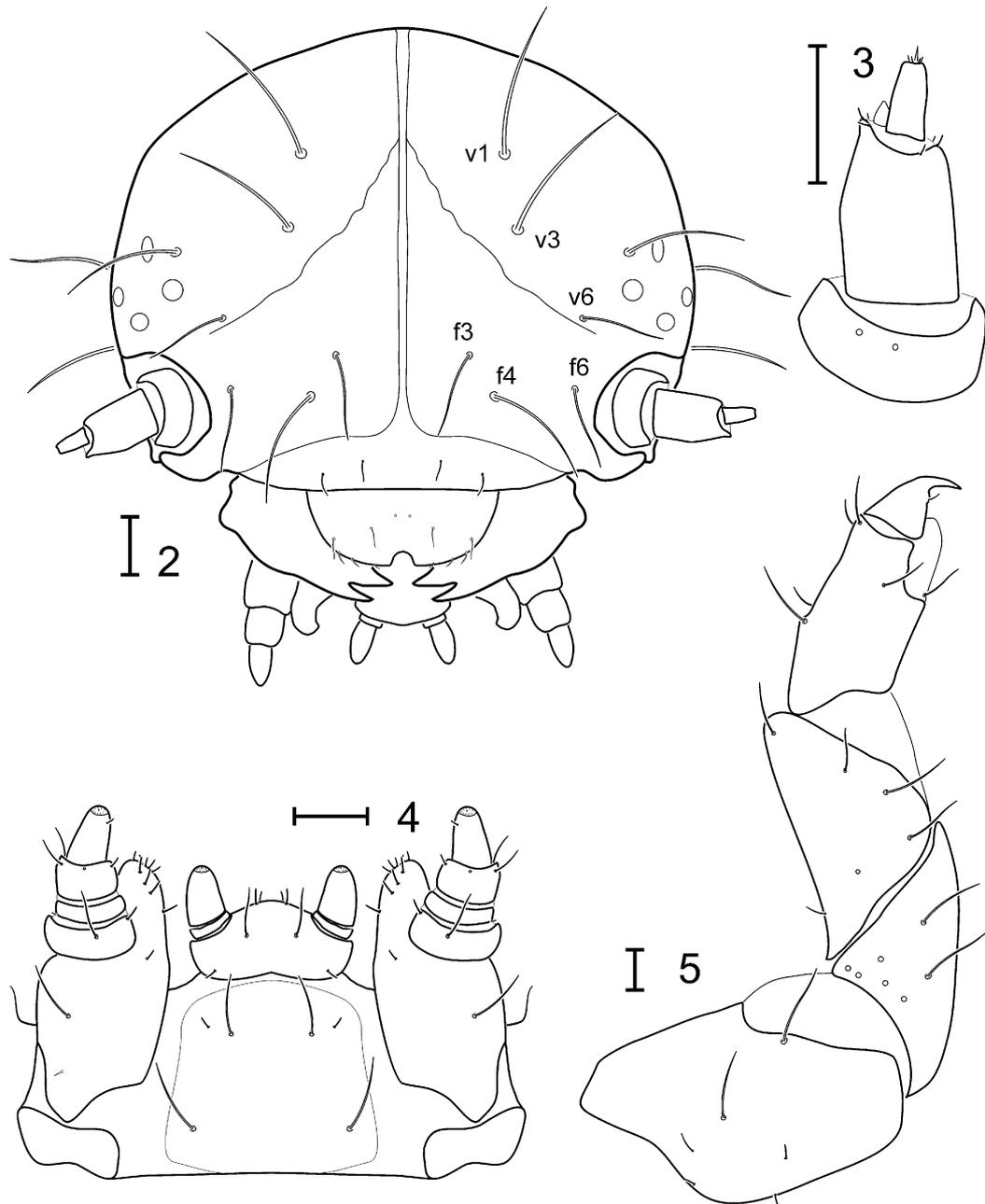


FIGURE 2–5. *Hydrothassa fairmairei*, mature larva from Valdeinfernos. (2) Head, frontal view. (3) Antenna, frontal view. (4) Maxillae and labium, ventral view. (5) Leg, lateral view. Scale bars = 0.1 mm.

bearing 1 seta), Dpi-Dpe (dorsal posterior interior and dorsal posterior exterior fused together, 1 seta), DLai-DLpi (dorsolateral anterior interior and dorsolateral posterior interior fused together, 1 long seta and 2 smaller ones), and DLae-DLpe (dorsolateral

anterior exterior and dorsolateral posterior exterior fused together, 3 setae, one of them extremely minute) enclosing the eversible gland; epipleural region with 2 tubercles, EPa (epipleural anterior, 1 seta) and EPp (epipleural posterior, 1 seta); mesothoracic spiracle very close to EPa tubercle; P tubercle bearing 1 seta; SS well developed, bearing 1 seta; ES tubercle bearing a pair of setae. **Legs.** All pairs similar in size; trochantin (Tr) located in front of P tubercle (Fig. 6), bearing 2 extremely minute setae in anterior half; prothoracic trochantin also with 1 larger seta in postero-ventral angle; coxa 1.5 times longer than wide in lateral view (Fig. 5), with 3 large setae on dorsal face and 3–4 shorter ones in lateral declivities; trochanter triangular, with 2 setae on each side, 5 placoid sensilla near coxal articulation on anterior side and 2 on posterior side; femur wider apically than basally in lateral view, with 2 setae dorsally, 3 ones on each lateral declivity and 1 placoid sensillum on anterior side; tibio-tarsus twice longer than wide, bearing 4 setae dorsally, 1 on each side and 1 ventrally; unguis wide basally, curved apically, bearing 1 seta on lower side. **Abdomen.** Segments 1–6 with only 2 large tubercles on each side of dorsal region (Fig. 6): Dpi-Dpe (2 setae, one of them minute) and DLae-DLpe (2 setae, one of them minute) enclosing the eversible gland; Dai-Dae and DLai-DLpi lacking; epipleural region with tubercle EP bearing 2 setae; spiracle located between EP and DLae-DLpe tubercles; P tubercle with 2 setae, one of them minute (lacking in segment 1); sternal region presents the following tubercles: SS (3 setae, excepting segment 1 with only 2 setae), ES (1 pair of setae). Segment 7–9 with tubercles SS and ES fused together; segment 8 and 9 also with dorsal and dorsolateral tubercles fused together; segment 10 forming anal pseudopod.

Distribution and ecology. *Hydrothassa fairmairei* (Brisout) is an Iberian endemic distributed in the northern half of the peninsula reaching central mountains of Spain to the south (Marseul, 1883; Petitpierre, 1981; Petitpierre & Doguet, 1981; García-Ocejo, *et al.*, 1992; García-Ocejo & Gurrea, 1995; Baselga & Novoa, 2000a; 2000b; Vives, 2000; Baselga & Novoa, 2006), reaching also Portugal (Oliveira, 1893) and the French Pyrenees to the north (Tempère, 1971). The recorded host plants are Ranunculaceae belonging to the genera *Caltha* L. and *Ranunculus* L.: *Caltha palustris* L. (Baselga & Novoa, 2000a and other personal observations in Galicia, unpublished), *Ranunculus aquatilis* L. (García-Ocejo & Gurrea, 1995). We have also collected this species on other species of *Ranunculus* (unpublished) especially *Ranunculus repens* L., including the larvae described in this paper.

Discussion

The mature larva of *H. fairmairei* agrees with the definition of the genus given by Cox (1982) and Steinhausen (1994) by the following combination of characters: body dorsally not strongly convex, labrum with 2 pairs of setae on upper surface, pronotum bearing a low number of setae on disc, dorsolateral tubercles of meso-, metathorax and abdomen with eversible glands, abdominal segments 1–6 with only one posterior dorsal tubercle on

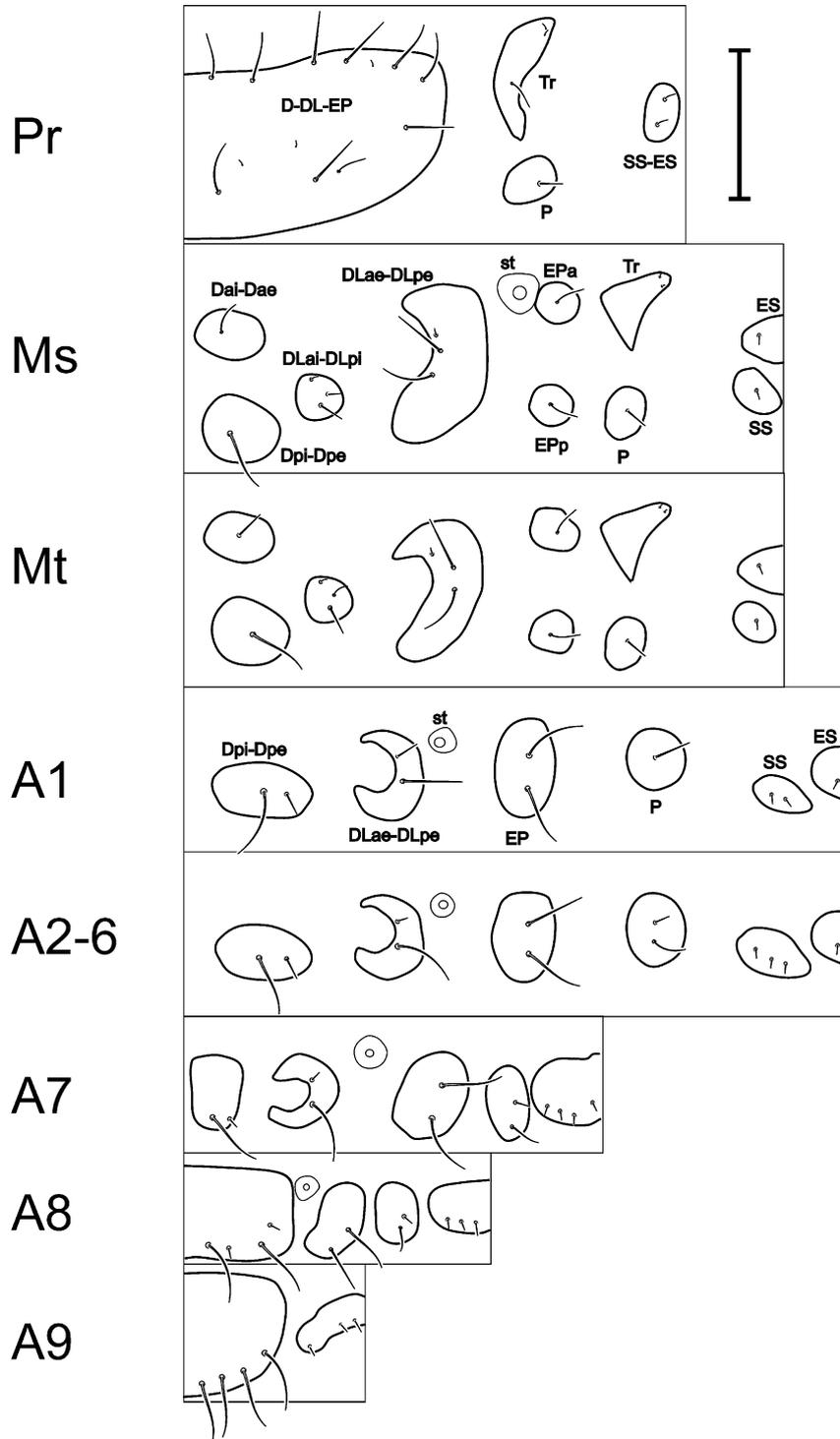


FIGURE 6. *Hydrothassa fairmairei*, mature larva from Valdeinfernos: location of tubercles and body chaetotaxy, right side. Pr, prothorax; Ms, mesothorax; Mt, metathorax; A1-A10, abdominal segments 1–10. See text for definition of tubercles abbreviations. Scale bar = 0.5 mm.

each side, tarsal claws not toothed on lower side. The larval stage was previously known only for 3 of 7 western Palaearctic species (Steinhausen 1996). One of them, *H. glabra* (Herbst), belongs to subgenus *Agrostithassa* Jacobson and the other two, *H. hannoverana* (Fabricius) and *H. marginella* (Linné) are included in the nominotypical subgenus (Warchalowski, 2003). The definitions of these two subgenera are based upon adult features, but considering the known larvae, the presence of a tubercle Dai-Dae in abdominal segments may be regarded as a diagnostic character for subgenus *Agrostithassa*, whereas, the absence of such tubercle seems to define subgenus *Hydrothassa* s. str. However, the study of more larvae of other species, especially of *Agrostithassa*, is needed to confirm the validity of this character as subgenera diagnosis.

For the identification of the species at the larval stage, besides the mentioned presence or absence of Dai-Dae in abdominal segments, other valuable characters are the size of abdominal tubercles Dpi-Dpe, and the chaetotaxy of thoracic and abdominal tubercles (Hennig, 1938; Steinhausen, 1994; and this description). The mature larva of *H. fairmairei* is similar to that of *H. marginella* by the absence of tubercle Dai-Dae in abdominal segments, the big size of abdominal tubercle Dpi-Dpe, and the large primary setae of pronotum easily distinguishable from the secondary setae (that are scarce in number). Both species can be separated by the chaetotaxy of meso-, metathoracic and abdominal dorsal tubercles: (i) meso- and metathoracic tubercle Dai-Dae bearing a single seta in *H. fairmairei*, instead of two large setae in *H. marginella* (Hennig, 1938), (ii) meso- and metathoracic tubercle Dpi-Dpe bearing a single seta instead of two (one primary seta and another shorter one), (iii) abdominal tubercles Dpi-Dpe bearing two setae, whereas *H. marginella* has at least three setae on this tubercle (following Steinhausen 1994: fig.197).

Key to larvae of genus *Hydrothassa*

The following key is mostly based on those of Hennig (1938) and Steinhausen (1994), with the addition of *H. fairmairei* to consider the four species that are currently known at the larval stage.

1. Abdominal segments 1–6 with two dorsal tubercles on each side: Dai-Dae and Dpi-Dpe (Fig. 7). Europe, Morocco and West Siberia. *H. (Agrostithassa) glabra*
- Abdominal segments 1–6 with only one dorsal tubercle on each side: Dpi-Dpe (Dai-Dae lacking) (Figs. 6, 8, 9). 2
2. Abdominal tubercles Dpi-Dpe small, the space between them two times broader than the tubercles wide (Fig. 8). Prothorax with primary setae short hardly distinguishable from secondary setae. Northern and Central Europe. .. *H. (Hydrothassa) hannoverana*
- Abdominal tubercles Dpi-Dpe large, the space between them at most as broad as the tubercles wide (Figs. 6, 9). Prothorax with primary setae long easily distinguishable from secondary setae..... 3
3. Meso- and metathorax with tubercle Dai-Dae bearing 2 primary setae. Northern and

- Central Europe. *H. (Hydrothassa) marginella*
- Meso- and metathorax with tubercle Dai-Dae bearing only 1 seta. Iberian peninsula. .
..... *H. (Hydrothassa) fairmairei*

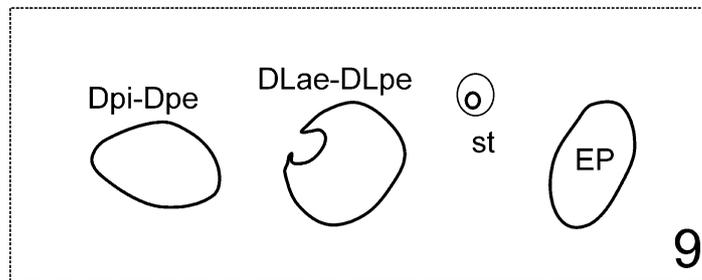
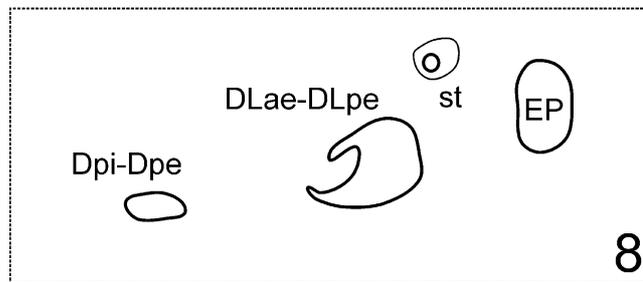
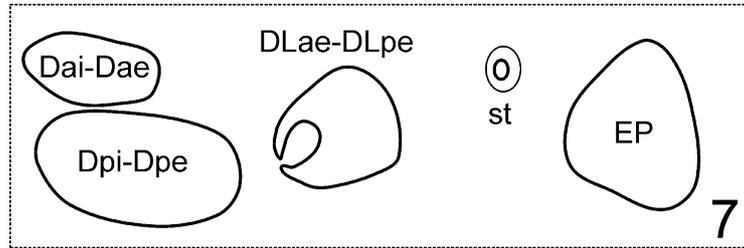


FIGURE 7–9. *Hydrothassa* spp.: schematic representation of abdominal dorsal to epipleural tubercles (after Hennig 1938). (7) *H. glabra*. (8) *H. hannoverana*. (9) *H. marginella*.

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