

Introduction to the Helotrephidae (Nepomorpha) in Thailand and adjacent countries

by Herbert Zettel

Abstract: An illustrated key is provided for the seven genera of Helotrephidae occurring in Thailand and adjacent countries. Notes on the habitat preferences are given.

Helotrephidae are small, semiglobular or depressed aquatic Heteroptera of the superfamily Notonectoidea. The main diagnostic character is the "cephalonotum" resulting from a fusion of head and prothorax (Figs. 1, 2, 9-11), which is unique in Heteroptera. For further differences between Helotrephidae and other families of Nepomorpha see the identification key by NIESER (1996). The phylogenetic system of genera was discussed by POLHEMUS (1990) and MAHNER (1993).

Helotrephidae are found in aquatic habitats, preferably in running waters or in small stagnant waters, which are associated with streams. Only a few species (in Thailand *Tiphotrephes indicus*) are found in larger stagnant waters. The most abundant genera (*Helotrephes*, *Hydrotrephes*) live in lentic parts of streams and smaller rivers, and rarely in lakes.

Brachypterous morphs usually predominate. Macropterous morphs are externally characterized by a separation of clavus and corium (Fig. 2).

The majority of species occurring in Thailand are still undescribed. This is mainly due to the fact that Helotrephidae are often not easy to find and were neglected by collectors in former times. Recently collected material deposited in different private and museum collections indicate that there are probably more than 20 species living in Thailand.

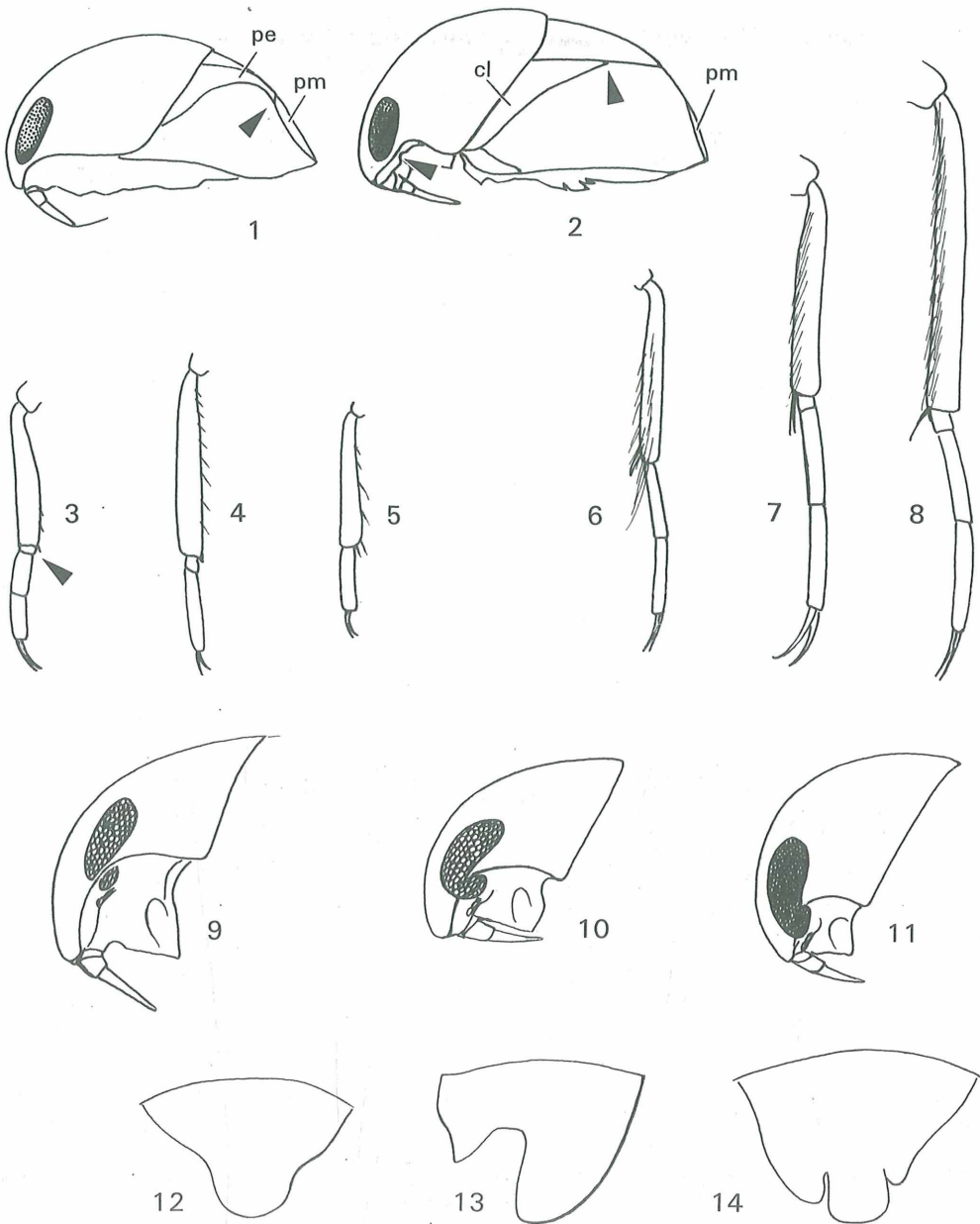
Key to the subfamilies, tribes and genera of Helotrephidae in Thailand and adjacent countries

- 1 Tarsal formula (= number of tarsal segments of fore, middle and hind leg) 3-3-3 (note: the first segment is very short and therefore difficult to see; Figs. 3, 7); very small species (up to 1.6 mm), body depressed (subfamily Fischerotrephinae) **[Fischerotrephes ZETTEL]**

Five species are known from Western Malaysia, Laos, Borneo, and India (ZETTEL 1994, in press, and unpublished); the genus is not recorded from Thailand. *Fischerotrephes depressus* lives in fine gravel sediments of brooks and streams in Sarawak. Because of their small size and their cryptic life *Fischerotrephes* is very rarely collected.

Tarsal formula 2-2-3 or 1-2-2, usually globular, rarely flat species (but then larger) 2

- 2 Hemelytron with "pseudendocorium" reaching pseudomembrane (Fig. 1) in all morphs, and additionally with claval suture in macropterous specimens; tarsal formula 2-2-3 (note: the first segment is very short and therefore difficult to see; Figs. 4, 9), cephalonotum very large, much larger than hemelytra in dorsal and lateral view (Fig. 1). (subfamily Trephotomasinae).....
Trephotomas PAPACEK, STYS & TONNER
- Three species are described from southeast Asia. *Trephotomas compactus* PAPACEK, STYS & TONNER) is reported from Thailand, the larva of a second species was found in Chiang Mai Province (ZETTEL 1996). Inhabitants of brooks and streams.
- Hemelytron without "pseudendocorium", but macropterous morph with a claval suture not reaching pseudomembrane but crossing lateral side of mesoscutellum (Fig. 2); tarsal formula 1-1-2 (Figs. 5, 6), cephalonotum smaller (e.g., Fig. 2) (subfamily Helotrephinae s.l.)..... 3
- 3 Larger species, body length at least 2.5 mm, cephalonotum usually densely punctate and therefore rather dull; postero-lateral margin of cephalonotum continued ventrally of the eye, not dividing or indenting it (Fig. 2); female subgenital plate (sternite 7) symmetrical (tribe Helotrephini) 4
- Smaller species, body length less than 2.0 mm; cephalonotum usually with small scarce punctures and therefore shining; postero-lateral margin of cephalonotum not continuous ventrally of the eye, either dividing or indenting it or pointed to the centre of the eye (Figs. 9-11); female subgenital plate usually more or less asymmetrical (tribe Limnotrephini)..... 5
- 4 Sternite 4 (or 4 and 5) with median keel..... **Helotrephes STÅL**
- Several species have been collected all over Thailand; most of them are undescribed. Species are usually found in quiet areas of streams, especially between leaf litter, sometimes in large numbers.
- Sternite 4 and 5 without median keel..... **Hydrotrephes CHINA**
- Two species, both undescribed, were collected in Thailand in similar habitats like *Helotrephes*. One species is common and widely distributed.
- 5 Eye divided by the lateral margin of cephalonotum, with a separated part ventrally (Fig. 9), or these parts are connected in the anterior fourth in the very rare alate morph; metasternal keel with two rami in posterior half; female subgenital plate (in species from the Asian mainland) with asymmetrical middle lobe (Fig. 12), which is reduced in one species..... **Distotrephes POLHEMUS**
- Three undescribed species are known from North Thailand, but several species (described from China, Viet Nam and Laos) may also occur. Cryptic species, typical inhabitants of brooks and smaller streams.
- Eye not divided by the lateral margin of cephalonotum, but sometimes deeply indented in posterior half (Figs. 10, 11); metasternal keel simple; female subgenital plate with one or two incisions (Figs. 13, 14)



Figs. 1 - 14: (1 - 2) Body in lateral view of (1) *Trephotomas compactus* (brachypterous) and (2) *Hydrotrepes* sp. (macropterous); (3 - 5) Fore tarsi and tibiae of (3) *Fischerotrepes jaechi* ZETTEL, (4) *Trephotomas compactus*, and (5) *Tiphotrephes indicus*; (6 - 8) Hind tarsi and tibiae of (6) *Tiphotrephes indicus*, (7) *Fischerotrepes jaechi*, and (8) *Trephotomas compactus*; (9 - 11) Cephalototum, in lateral view, of (9) *Distotrepes stysi* POLHEMUS, (10) *Idiotrepes* sp., and (11) *Tiphotrephes indicus*; (12 - 14) Female subgenital plate of (12) *Distotrepes stysi*, (13) *Idiotrepes chinai*, and (14) *Tiphotrephes indicus*; cl - clavus, pe - pseudendocorium, pm - pseudomembrane (Fig. 1 modified from ZETTEL 1996; Fig. 12 from ZETTEL 1995).

- 6 Lateral margin of cephalonotum clearly extending onto eye surface, deeply indenting the eye (Fig. 10); sternite 5 with median keel; subgenital plate of female very asymmetrical, with one more (Fig. 13) or less deep incision in right half..... ***Idiotrephes* LUNDBLAD**

One species, *Idiotrephes chinai* LUNDBLAD, is reported from Thailand (ZETTEL 1995). Studies on the type series have shown, that these specimens are not conspecific with *I. chinai* (from Sumatra). Further two species are undescribed, and more species may be discovered or recorded (two species were recently described from Viet Nam by PAPACEK 1994, 1995). Inhabitant of stagnant waters, mainly small pools associated with streams.

Lateral margin of cephalonotum not extending onto eye surface, only indistinctly indenting the eye at posterior margin (Fig. 11); sternite 5 without median keel; subgenital plate of female nearly symmetrical, with two narrow incisions laterally of a middle lobe (Fig. 14)..... ***Tiphotrephes* DISTANT**

Only one species is known: *Tiphotrephes indicus* DISTANT has a wide range from India to Malaysia, and was reported from Thailand by ZETTEL (1995). Inhabitant of various types of stagnant waters.

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