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Rearing Dytiscid Beetles (Coleoptera, Dytiscidae)

by **Y. Alarie, P.P. Harper & A. Maire**

Abstract: An "ex ovo" technique for rearing dytiscid larvae is described. The main peculiarity of this method is that no food is given to the adults. In 1986 and 1987, 38 species and approximately one thousand larvae were obtained.

Key words: Coleoptera Dytiscidae – methods – larvae rearings.

Although Dytiscidae are among the most common beetle inhabitants of freshwaters, knowledge of their larval morphology is still in need of much research, especially in the subfamily Hydroporinae. The main problem seems to be the difficulty in rearing larvae (MATTA & PETERSON, 1985). In this note, we present a very easy method for obtaining eggs from adults in the laboratory.

The vast majority of the world dytiscid larvae which have been described have been from reared larvae or "ex societate imaginis". However, these approaches may tend to erroneous identifications. Dytiscid larvae are superficially very similar and it is not always possible to be sure that two specimens belong to the same species. Also, the presence of adults in a pond, even in abundance, does not guarantee the identity of the larvae, particularly in North America where larvae of most species are still undescribed. The larvae described by NEEDHAM & WILLIAMSON (1907) as *Coptotomus interrogatus* (Fabricius) and by WILSON (1923) as *Hydroporus niger* Sharp and *Acilius semisulcatus* Aubé were erroneously associated due to such a technique. More recently, DETTNER (1984) suggested that GALEWSKI's (1975) description "ex societate imaginis" of a larva of the Palearctic *Hydaticus grammicus* Germar was wrong and that it was probably based on a small larva of *H. seminiger* De Geer.

Rearing of larvae "ex ovo" provides certain association of larvae and adults. PERKINS (1980) and NILSSON (1983, 1985, 1986, 1987) reared larvae of some hydroporine species from adults maintained in the laboratory. The methods presented in these studies are similar in that they attempt to recreate natural habitat conditions in the laboratory. Beetles are kept in aquaria in which a layer of sand and tufts of aquatic plants are deposited on the bottom and live food is given to the adults. Although the beetles may eat much of the food by day, accumulation of

uneaten material and dead prey bodies, rapidly causes the development of a bacterian film at the water surface especially at room temperature. It then becomes necessary to change the water often increasing considerably the time required for the experiments.

Our approach for obtaining larvae from eggs is simpler in that adult beetles are not fed. Considering the number of species reared, it gives good results with relatively little effort.

Field collected adults are brought into the laboratory for identification and then placed in breeding containers. A breeding container consists of a 125 ml polypropylene disposable specimen jar containing about 80 ml of filtered pond water and a small piece of moss which serves as an oviposition site. Because of their large size, specimens of Dytiscinae are kept in Pyrex storage dishes (diameter 100 mm × height 80 mm) half filled with pond water and also containing a piece of moss. The number of specimens in each breeding container may vary from a single female to more than 20 adults Hydroporinae, the number depending upon the size and availability of specimens. No food is given to the adults.

Eggs are collected daily from each jar. Most specimens lay eggs within two days of their capture. If after five to seven days no eggs are obtained, the beetles are killed.

Eggs removed from the breeding containers are placed in separate but similar jars. Eggs deposited on the sides and bottom of the container are detached with a fine brush and collected with a pipette while those fixed on plants are transferred with the plant. Near the end of the incubation period, eggs of Dytiscinae and Colymbetinae are isolated to avoid cannibalism among young larvae. The water of the incubation containers does not need to be changed except for eggs with a long incubation period in which case it can be renewed every three to four days (Dytiscinae and some Colymbetinae).

Hatchlings are isolated in separate rearing containers ⅔ filled with pond water and provided with a small piece of moss or a pebble as a resting site. The larvae are fed daily generally with mosquito larvae of an appropriate size. *Dytiscus* larvae are fed with tadpoles. The water is changed daily.

The breeding, incubating and rearing containers are kept at room temperature and the photoperiod adjusted to natural conditions.

During 1986 and 1987, 38 species and approximately one thousand larvae were obtained by our "ex ovo" rearing method. Best results were obtained with Hydroporinae species (23) but larvae of 15 other species

distributed between Colymbetinae (13) and Dytiscinae (2) were also obtained. Considering the difficulty in collecting Hydroporinae larvae in the field and the great species diversity in genera like *Hygrotus* Stephens and *Hydroporus* Clairville, our technique of rearing is an easy way to obtain reliably identified larvae of this subfamily.

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