



approach based on scoring 243 characters for more than 200 representative taxa using MX, an on-line content management system, with the help of numerous collaborators worldwide. Results of the independent and combined results will be presented in an attempt to resolve the family level relationships in the superfamily.

Evolution of egg parasitism under water in parasitoid Hymenoptera

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Parasitoid Hymenoptera are species-rich in nearly all terrestrial ecosystems, but the richness of hymenopterous parasitoids of aquatic insects is rather limited, given the species richness of potential aquatic hosts. Clearly, the aquatic habitat has been a barrier to parasitism by parasitoid Hymenoptera. However, subsurface egg parasitism of aquatic insects is not so rare. In the evolution of this type of egg parasitism, there are four reproductive strategies for parasitoid females that lack adaptations to dive and attack eggs of aquatic insects. Such parasitoids can exploit aquatic hosts in the following ways: (1) when the host's eggs are laid on plants and other substrates above water, (2) when the host's eggs are exposed above water at some point in their life cycle, (3) if the females walk down among the plants bearing these hosts under water (i.e., when the hosts are always under water), and (4) by swimming in search of hosts that are always under water. The last step is highly evolved, and is found in at least three families, Trichogrammatidae, Mymaridae and Scelionidae. Thus, females of species of some genera belonging to these families are well adapted to searching the hosts under water, but their searching by swimming might be largely limited to the hosts in ponds rather than those in streams. Such parasitoid females must have a difficulty in searching the hosts in flowing water because of their small size. Evolution of egg parasitoids also is under the ecological constraints of their small size since their hosts are usually smaller than those of larval or pupal parasitoids.

Parasitoids of *Choristoneura* spp. (Lepidoptera: Tortricidae) in the Nearctic region

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The genus *Choristoneura* (Lepidoptera: Tortricidae) includes several economically important pests in North America. The Eastern spruce budworm, *C. fumiferanae* is the most devastating pest of conifers in eastern North America but six others are also important in forestry (*C. biennis*, *C. conflictana*, *C. pinus*, *C. occidentalis*) or agriculture (*C. rosaceana*, *C. parallela*) in many parts of the continent. Decades of biological studies have resulted in literature records for 230 parasitoids in 106 genera from 11 of the 16 Nearctic species, including 50 species of Braconidae in 18 genera, 113 species of Ichneumonidae in 45 genera, 51 species of Chalcidoidea in 29 genera (9 families), 1 species of Bethyidae, and 15 species (13 genera) of Tachinidae. Illustrated identification keys to most of the species and all of the genera were produced over the past 15 years by four taxonomists (J. Huber, A. Bennett, J. O'Hara, J. Fernández-Triana) based at the CNC, Ottawa. An additional 36 species (14%) of parasitoids are erroneous associations.