Fish predation on giant water bug (Heteroptera: Belostomatidae) eggs in an Arizona stream

Robert L. Smith  
*University of Arizona, Tucson*

Chris Horton  
*University of Arizona, Tucson*

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We caught 3 brown trout (*Salmo trutta*) in the White Mountains of east central Arizona just after daybreak on the morning of 20 April 1997. The fish were taken in the South Fork of the Little Colorado River, elevation ca 2350 m, ca 10 km southeast of Springerville, Arizona. The 3 fish ranged in size from 18 to 20 cm TL. The brown or German trout, a European species, has been widely distributed in the United States since its introduction to North America in the late 19th century (Carlander 1969). This species was introduced to the White Mountains of Arizona sometime in the 1920s (Miller 1972). Brown trout are produced in hatcheries and released in Arizona streams including the Little Colorado River to provide a sports fishery.

Pooled stomach contents of the 3 fish contained 27 Trichoptera (Helicopsychidae and Limnephilidae) larvae in their cases, 5 mayfly nymphs (Baetidae), 3 Plecoptera (nymphs and adults), 2 aquatic Heteroptera (a naucorid and an early instar belostomatid), plus a variety of terrestrial insects. In addition to these items, one of the trout stomachs contained 10 giant water bug (*Abedus herberti* Hidalgo) eggs. The eggs, white in color with tan apices, were in good condition and contained mucilage on their distal ends. From this evidence we infer that the ova had recently been laid and, soon after their deposition, consumed by the fish. Brown trout are able to feed at starlight (10^{-4} foot Lamberts) intensities (Robinson 1978); thus, the eggs were probably eaten during the night.

Giant water bugs, aquatic Heteroptera in the family Belostomatidae, are found in tropical and temperate freshwater habitats throughout most of the world. In members of the giant water bug subfamily Belostomatinae, females glue their eggs to the backs of their mates, and the males then actively brood the eggs in a variety of ways (Smith 1997). Most belostomatines inhabit lentic habitats, but species in the New World genus *Abedus* are stream dwellers (Menke 1960). *Abedus herberti* occurs in Arizona streams at elevations of ca 1000–3000 m. Males of this species brood their eggs by exposing them to the atmosphere while resting on vegetation or rocks such that the bug is submersed with the tops of the eggs exposed to the air. When below the surface of the water, encumbered *A. herberti* males aerate their eggs by “brood-pumping,” i.e., rocking longitudinally about once per second to circulate water over the eggs for embryonic respiration (Smith 1976).

When *Abedus* spp. eggs are first laid, they are white in color with tan caps. As the eggs develop, they take on a grayish color and enlarge. Near hatching time the dorsal portion of the chorion becomes ash gray. In all stages of development, eggs are highly conspicuous against the male’s dark brown back. Giant water bug ova are among the largest insect eggs. Fully developed *Abedus herberti* eggs can reach 6 mm in length and 2 mm in width. Adult *Abedus herberti* bugs range from 24.5 to 40 mm in length and 12.5 to 22 mm wide (Menke 1960). Thus, the size of adult bugs substantially exceeded the gape of the small trout we caught.

Prior to this observation there have been no reports of predation or parasitism of any kind on giant water bug eggs, nor have these huge insect eggs ever been noted in the stomach contents of fish. It seems possible that fisheries biologists who routinely sample sports

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1Department of Entomology, University of Arizona, Tucson, AZ 85721.
2School of Renewable Natural Resources, University of Arizona, Tucson, AZ 85721.
fish stomach contents might not have recognized giant water bug eggs for what they are. However, it is not surprising that these conspicuous eggs attached to actively brooding giant water bugs would attract the interest of foraging fish who might regularly snatch eggs from encumbered male bugs’ backs. If this is the case, fish could be significant predators of Abedus spp. eggs throughout the range of the genus from southern Utah through Arizona and Mexico to Central America. It is also possible that the eggs were inadvertently ingested when the small fish attempted to eat a very large bug. The authors would be grateful for any additional accounts of giant water bug eggs found in fish stomachs.

LITERATURE CITED


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