

## Fairy Shrimp: Coming Soon to a Wetland near You?

By Mark Ward and Phillip deMaynadier

With spring approaching (one of these days!), we'd like to highlight one of the less widely appreciated joys of spring renewal – the resurrection of fairy shrimp in vernal pools throughout Maine – and to seek your help in tracking the distribution of this poorly understood group.

Fairy shrimp are crustaceans, like crabs and lobsters, but they don't share many other characteristics with our more familiar, marine crustaceans. They are small invertebrates, only 1.5 – 4 cm long (0.6 to 1.5 in), with stalked eyes and swim conspicuously upside-down by synchronously beating their ten pairs of feathery swimming legs (Figure 1). Fairy shrimp are generally found in fish-free, temporary waters and belong to their own order (Anostraca) with most northeastern species belonging to the genus *Eubbranchipus* in the family Chirocephalidae.

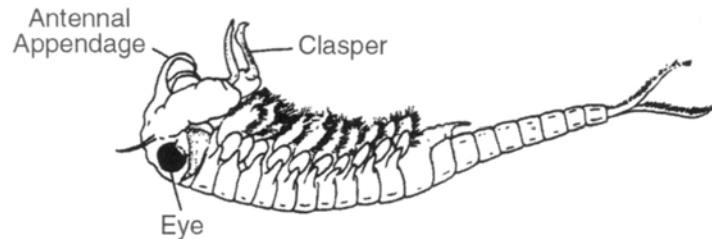


Figure 1. A male *Eubbranchipus* fairy shrimp.

In Maine, fairy shrimp eggs typically hatch in vernal pools in early spring (April – May), shortly after ice-out. Hatched eggs give rise to free-swimming juveniles that over a period of weeks undergo several molts to become reproductive adults. Males use specialized appendages known as clasps to grasp females and fertilize eggs within brood pouches located at the junction of the female's thorax and abdomen. Fertilized eggs are subsequently released into the water and fall to the pool bottom. Adult *Eubbranchipus* fairy shrimp can not tolerate warm waters (above ~70°F) and are typically not found in northeastern pools beyond May or June. Fairy shrimp eggs however can withstand both warm temperatures and desiccation at the bottom of a dried up vernal pool. Eggs may remain in diapause in the sediments for several years before hatching, perhaps explaining why adults may not appear every year. Fairy shrimp rely on the extended dormancy of their eggs for their survival and appear to use a bet-hedging strategy that allows some eggs to remain in the sediment egg bank even while free-swimming adults are producing a new generation. The seemingly magical and unpredictable appearance of adult fairy shrimp gives rise to their name.

Because of their unique life cycle and limited dispersal ability, fairy shrimp are considered permanent residents of a vernal pool in which adults have been observed. Their presence is one of the criteria used to determine whether a vernal pool is "significant" and thus eligible for special habitat protections under the state's Natural Resources Protection Act. Two species of fairy shrimp have been documented in Maine – the Vernal Fairy Shrimp (*Eubbranchipus vernalis*) and the Intricate Fairy Shrimp (*E. intricatus*). However, the Knob-lipped Fairy Shrimp (*E. bundyi*) is known to occur in Massachusetts, Vermont, and southern Canada and could well occur here as well.

Collection of fairy shrimp is not difficult. Specimens can be dip netted and preserved in either a 5-10% formalin solution or in alcohol (50% isopropyl or 70% ethyl alcohol). It's preferable that some formalin be used to allow tissue fixation. Specimens stored in alcohol alone will over time become

soft and easily damaged. Following tissue fixation in formalin, specimens can be stored indefinitely in 50% isopropyl or 70% ethyl alcohol.

Existing keys require males for species identification. So if you are collecting fairy shrimp, be sure that you collect some males to avoid frustration later! Males can be distinguished by antennal appendages on their heads that are absent in females (Figure 2). Mature females also often have visible brood pouches with eggs at the junction of the thorax and abdomen. The antennal appendages of *E. vernalis* are short and inconspicuous, while those of *E. intricatus* and *E. bundyi* are long, reaching to the end of the claspers, resembling curled elephant's trunks or the blow ticklers popular at children's birthday parties. Distinguishing between *E. intricatus* and *E. bundyi* is more challenging and involves examining the labrum on the ventral side of the head by placing the animal on its back. The labrum of *E. bundyi* is larger and includes a distinct tubercle at its anterior end.

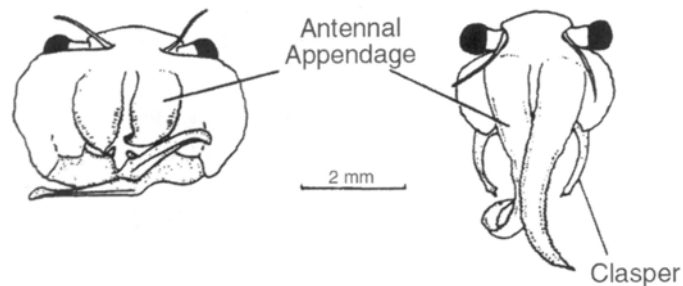


Figure 2. Heads of male *Eubranchipus vernalis* (left) and *E. intricatus* (right).

Perhaps you remember a locale where you have seen fairy shrimp in the past or you have collected specimens that you haven't yet identified. If so, then the Maine Department of Inland Fisheries and Wildlife would appreciate your assistance as it assembles a database of fairy shrimp occurrences in an effort to better understand the status and distribution of this cryptic group. Reports of pools where shrimp have been observed should include detailed location descriptions (preferably with GPS coordinates), observation dates, and a brief description of the habitat. Collected specimens should include town, date of collection, location (again coordinates preferred), collector, and identification information (optional). Please send your data and carefully packaged specimens to Mark Ward (28 Poor Farm Road, Bristol, Maine, 04539) or Phillip deMaynadier (MDIFW, 650 State Street, Bangor, Maine, 04401) and thank you for your help!

### Acknowledgements

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### Sources Consulted

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