NON-INDIGENOUS AQUATIC SPECIES OF CONCERN FOR ALASKA

Fact Sheet 14 Tube Dwelling Amphipod

Jassa marmorata

BIOLOGY & PHYSIOLOGY

Physical Description: Adult Tube Dwelling Amphipods ("Amphipod") average 0.24 inches in length and range from 0.12-0.35 inches. Amphipods have large rounded eyes that are located entirely or partially within the lateral lobe of the head and two large antennas that are approximately one-half the body length or greater. They are typically greyish in color with distinct brown markings. Amphipods exhibit morphological dimorphism, which means that its size is a function of the water temperature. Higher water temperatures produce smaller Amphipods. Also, female Amphipods are generally more fertile in colder water. Males do not live as long as females but attain greater size by growing faster through fewer molts. Males come in two forms: "major" and "minor." Majors are about twice as big as minors and females and have an enlarged "thumb." The thumb develops only after the last molt.

Photo by: Marine Biological Laboratory
Woods Hole Massachusetts

Nutrition Requirements: Amphipods inhabit self-constructed tubes from which they extend the anterior half of their bodies to gather plankton, detritus and other materials by filter feeding. They also engage in intraguild predation (the killing and eating of a species that are potential competitors) and cannibalism as feeding strategies. In Amphipods, the proportion of major to minor males is determined by the amount of protein rich food sources in the surrounding habit. Some studies have shown that major males are predominant during the months of June and July, especially if a phytoplankton bloom occurs during the previous spring months. Protein and fatty acid rich diatoms are a major component of the plankton community.

Reproduction: Amphipod males exhibit dimorphic reproductive behaviors (fighting vs. sneaking strategies). Minor males are morphologically more similar to females and thus are able to avoid attacks by major males. On the other hand, major males normally engage in combat with other major males while guarding females. The onset of sexual activity in major males is signaled by the development of the thumb. Field observations have shown that fighting males remain perched upon the tube that females inhabit and wrestle other major males away from the female, whereas minor males slip under their surveillance and engage in sneak matings. The second gnathopod is the prime appendage of use in agonistic encounters, but the thumb is not used as a weapon or a physical means to dislodge the opponent. The thumb may minimize aggressive encounters by signaling dominance and provide access to females. Females accept the proximity of thumbed males more than they do thumbless males. On the other hand, during later molts, minor males are as capable as major males of successfully fertilizing females. The mating system in Jassa in polygynous and both sexes mate multiple times during their lifetimes, but females must mate within 1-2 hours after molting. Females engage in sole parental care.

Lifecycle Stages: In Amphipods, mating occurs after the female molts. The embryos are brooded in a maternal pouch and the offspring hatch and crawl away to build a tube not far from their parents. Females spend their time within their tubes feeding, mating, and tending their young. Several broods of offspring are produced, each potentially fertilized by a different male. Males spend most of their time within their tubes as juveniles, but at the last molt a marked change in morphology and behavior occurs. Strong competition among males for mates is promoted by many of the life-history characteristics of this species including: (1) a sedentary, colonial existence, (2) a polygynous mating system, (3) reproduction by the female that is continuous but not at a consistent phase or

rate (asynchoronous), (4) a brief ovulatory period, (5) lack of sperm storage, and (6) sole parental care by the female.

Habitat: The Amphipod lives within fouling communities such as docks and pilings. It builds tubes among algae, sponges, tunicates, and is found on mid to high-latitude rocky shores in both the southern and northern hemispheres. Amphipods are native to the northwest Atlantic.

DISPERSAL POTENTIAL

Historical and Current Introduction/Spread: The Amphipod is globally distributed. It was first discovered in California in 1941, first recorded in the San Francisco Bay in 1977, and first recorded in Puget Sound in 1990. Its original distribution includes the North Atlantic Ocean and the Mediterranean Sea. Amphipods were first discovered in Prince William Sound in 1999 and have been documented in the University of Alaska collections; however, the magnitude and extent of invasion into Alaskan waters is not well understood at this time.

Dispersal Methods: Amphipods move by crawling and sometimes by swimming, rarely leaving the tube in which they inhabit. Amphipod juveniles, especially the smallest individuals of less than 0.06 inches in length, are responsible for this species' short distance dispersal. Once inoculated into an area, the Amphipod does not tend to disperse very widely, and tends to remain a local invasive species issue at the point of inoculation. In one study conducted, Amphipods captured and released approximately 3 feet from a floating dock, swam directly back to the same dock, regardless of location of release. Possible vectors for the long distance dispersal, and inoculation of the Amphipod is through transportation in ballast water or on the bottom of a ship’s hull.

IMPACTS AND CONTROL

General Impacts: The Amphipod can compete with native marine organisms for food and space. Studies have also shown that Amphipods may play important roles in determining the type and distribution of algal communities, particularly where predation pressure is low.

Management Information: Currently, there is little information on the control and management of Amphipods, once established in a new habitat. However, since Amphipods have been collected in ballast water samples, ballast water treatment may prove successful in limiting the distribution into new habitats.

Key Notes: *Jassa herdmani* and *Jassa falcata* are easily confused, morphologically, with the Amphipod.