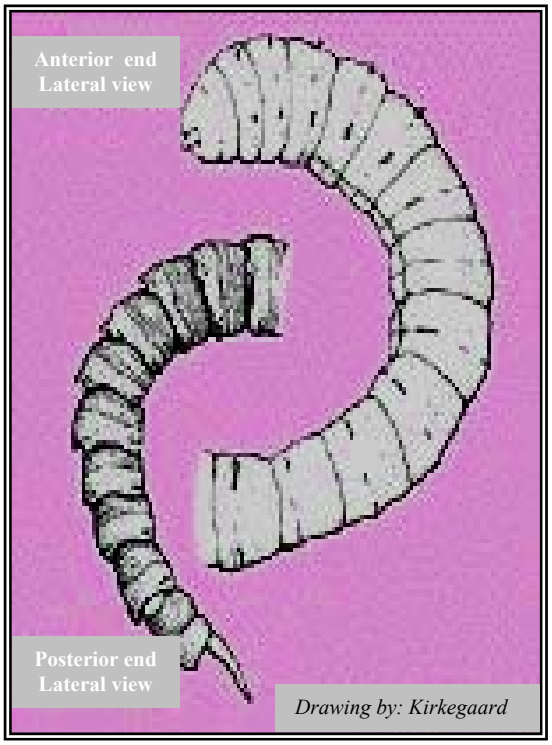
NON-INDIGENOUS AQUATIC SPECIES OF CONCERN FOR ALASKA

Fact Sheet 10 — Capitellid Worm

Heteromastus filiformis

BIOLOGY & PHYSIOLOGY

Physical Description: The Capitellid Worm is a marine worm that belongs to the class Polychaeta. Its body structure is long, thin, cylindrical, and earthworm-like. It has anterior (front end) region that is dull red, the posterior (rear end) is reddish-green to yellow, and the body appears thin in proportion to the length. The segments of the rear end region are long and cylindrical, becoming shorter and more rounded towards the front end. The segments of the rear end are bell shaped with parapodial (foot-like) swellings which increase the width of the posterior end segments. The Capitellid Worm can grow up to 7 inches long and 0.4 inches wide with about 150 segments. Unfortunately, Capitellid Worms have not been extensively studied and there is limited published data on this species.



Nutrition Requirements: The Capitellid Worm is a non-selective deposit feeder. Its food is derived from sediment in the anaerobic layer below the surface. It is a "conveyor-belt feeder", living vertically in the sediment, feeding indiscriminately on smaller sediment particles 4-12 inches below the sediment surface. During the feeding process, it deposits copious quantities of black oval fecal pellets on the sediment surface. The Capitellid Worm possesses a pair of nuchal organs on the posterior side. Nuchals are chemosensory organs that play an important role in searching for and accepting food.

Reproduction: In the second year of maturity, the Capitellid Worm reproduces sexually whereby gametes (sperm and eggs) are formed. Adults become sexually mature through the winter season (December –April) and spawn in early spring. In early spring, eggs are deposited in the bottom sediment wrapped in a cocoon that is then fertilized by the male sperm.

Lifecycle Stages: The Capitellid Worm has a simple life cycle in which spawning occurs at the end of its two-year life cycle. Development proceeds through the larval and juvenile stages. The hatched larvae may either be transported by tidal currents or start their burrowing mode of life immediately.

Habitat: High population densities of the Capitellid Worm can be found in muddy sand areas from the shoreline to shallow marine waters. The Capitellid Worm also thrives in polluted waters. This species builds vertical tubes of fine sediment grains and mucus, and they orient themselves in a head-down position within the sediment at a depth of about 4 to12 inches below the surface. The Capitellid Worm is well adapted to life in the anaerobic zone. It favors muddy sand and tolerates changing salinity grades. The Capitellid Worm is unlike most other tube-dwelling marine worms in that it does not oxidize its burrow wall through irrigation, but takes up oxygen through the gill-like parapods (foot-like structures) at its rear end. It will periodically extend these parapods into the upper few millimeters of the sediment where oxygen is present. The Capitellid Worm is capable of withstanding low oxygen conditions for several days. Adult Capitellid Worms are well protected from disturbance and predation because

they are sheltered by the depth of their burrows. Juveniles, on the other hand, have relatively shallow burrows, and as a result, have a higher mortality rate due to predation and disturbance of the sediment layer in which they live.

DISPERSAL POTENTIAL

Historical and Current Introduction/Spread: The Capitellid Worm is native to the Atlantic Ocean from the Gulf of Mexico to the Arctic. It can also be found in South Africa, New Zealand and Australia. It was first reported in San Francisco Bay in 1936, and is now well established in California, Oregon, Washington and British Columbia. Seven years after the 1964 Alaskan earthquake, the Capitellid Worm was commonly collected in Port Valdez (1971-1972). The 1964 earthquake massively disrupted the benthic system and exposed organisms that were historically unidentified since they resided in the subsurface. The 1971-1972 collections of the Capitellid Worm in Port Valdez confirmed that this worm was well established well before initiation of tanker traffic to the Port in 1977. The Capitellid Worm is now well established throughout Prince William Sound, Alaska.

Dispersal Methods: The Capitellid Worm is often introduced to new habitat from sediments imported by the commercial oyster industry and ballast water. Some researchers have observed that short distance migration does occur, most likely by passive transport.

IMPACTS AND CONTROL

General Impacts: Because the Capitellid Worm is a true deposit feeder, toxins and other pollutants such as DDT tend to bioaccumulate within their body tissues. These toxins are then incorporated into the aquatic food chain through release of fecal pellets at the sediment surface. There is evidence that polychaetes can contain up to 40 times more DDT in their bodies than is present in the surrounding sediment transferring high concentrations of toxins to the next trophic level of the marine food chain. There is also evidence that the Capitellid Worm might displace native worms by competing for resources and space. The Capitellid Worm's feeding behavior results in the intensive reworking of the sediment which can indirectly influence the composition of the benthos, the physical and chemical properties of the sediment, and rate of organic matter mineralization. Deposit feeders also strongly influence the sediment's water content, porosity and compaction properties. The Capitellid Worm has pharyngeal secretions (from the pharynx) that may promote bacterial growth, thereby enhancing organic coatings on sediment particles in the feeding tubes. This enrichment of fine particles provides a habitat particularly suitable for species of microscopic marine animals living in the sediment (e.g. snails, segmented worms) that feed on bacteria. After transport from the deep sediment to the sediment-water interface, the detritus becomes susceptible to further fragmentation and mineralization and becomes more readily available to other benthic organisms. This enrichment of the sediment layer could alter the benthic community by providing a resource for other invading organisms.

Management Information: Once the Capitellid Worm is established, there are no known control measures. Measures to prevent the introduction of the Capitellid Worm into new habitat may include ballast water treatment and ensuring that the sediment transporting oyster spat (larvae) is "clean".

Key Notes: Because the Genus Heteromastus consists of morphologically similar species, the exact identification of the Capitellid Worm in Alaska is uncertain.