

SACCULINA: A HIGHLY MODIFIED PARASITE

Barnacles of the order Rhizocephala are parasites. Many are very similar to free-living barnacles, but others, such as *Sacculina*, are some of the most highly modified of all animal parasites. Not only do adults not look like barnacles, they are difficult to recognize as animals and more closely resemble a fungus. Larval stages, however, disclose the true identity of this parasite.

The life cycle of *Sacculina* begins when a cypris larva attaches by its first antennae to a seta on a limb of a crab. The larva moves to a membranous area and bores through the crab exoskeleton. Once inside the body, the larva loses its exoskeleton, and differentiated cells move through the blood to the midgut. The parasite then grows throughout the hemocoel and branches into a mycelium-like mass of parasite tissue. When the crab molts, a brood sac (externa) containing the parasite's eggs forms in the

flexed abdomen of the crab—in the same position that the female crabs normally brood their own young.

Early research indicated that all crabs parasitized by *Sacculina* were females. Later, investigators found the *Sacculina* also parasitizes males and transforms them into females by destroying the androgenic gland! Just as experimental removal of the androgenic glands transforms males into females, so does parasitization.

The crab cares for the parasite's brood sac as if it were its own. Fertilization occurs when a male cypris larva introduces sperm-forming tissue into the parasite's brood sac. Nauplius larvae are released from the brood sac, and they metamorphose into cypris larvae. Parasitism prevents further molting by the crab, results in sterility, and usually causes the crab's death.