Life History of Sacculina:

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Systematic Position:

Phylum – Arthropoda

Class – Crustacea

Subclass – Cirripedia

Order – Rhizocephala

Genus – Sacculina

Sacculina lives as a parasite on crab and commonly known as root-headed barcle. The parasitic habit has caused much degeneracy of different structures in the adult.

The different structures like mouth and anus are absent. It is seen like a soft round tumour on the abdomen of the crab. From this tumour numerous branched filaments are ramified in all the parts of the body of the host except the heart and the gills which are used as nutrient absorbing root-like system from the crab.

The adult Sacculina (Sacculina externa) is characterised by the following structures.
All the organ systems are degenerated except the reproductive organs. Segmentation and appendages are lost. There is a pair of elongated testes and a pair of ovaries with accessory genital glands, genital atrium and collaterial glands. a single nerve ganglion is present. Sacculina is hermaphrodite. An adult female produces numerous eggs. There are diverse opinions regarding the process of fertilization. Fertilization in Sacculina, in all probabilities, is internal.

The adult Sacculina is difficult to recognise as an arthropod. The life history of Sacculina is extremely interesting.

A degenerated adult female lays eggs in bunches with the help of cementing glands which provides a cuticular covering. The two batches of the eggs are attached in the broad chamber through a minute hood like elevation called retinacula. These retinacula are internal elevations of the brood chamber. The young ones are hatched from the egg as a free-swimming Nauplius larva.

Nauplius larva

The young are hatched from the eggs as free-swimming Nauplius larvae. This nauplius larva is more or less triangular in shape and is peculiar in having two front lateral horns, each containing a pair of gland cells.

It has a median eye and three pairs of appendages for swimming. The second and third appendages are devoid of any masticating process. The body terminates posteriorly into caudal furca. The mouth and alimentary canal are absent in the nauplius and it contains numerous germ cells (ova).

Cypris larva

In course of development the nauplius transforms into a Cypris stage after 3 or 4 months. The free-swimming Cypris bears a bivalved shell, six pairs of thoracic biramous appendages and numerous germs cells. The abdomen is extremely reduced and is without any appendage. The abdomen is terminated in a pair of caudal rami. Single eye persists.

A pair of front-lateral glands opens near the margin of the valves of the shell. A pair of three-segmented antennules is present. The terminal segment of the antennule bears backwardly curved structure—the organ for attachment. After a period of free-swimming life, the cypris larva attaches itself to the body of the crab by the help of its hook-like antennule.

Kentrogen larva:

It then discards its thoracic appendages with muscles along with the bivalved shell. The contents of the anterior region of the body become detached and are enclosed in a new sac remaining in connection with the antennules which are fixed to the host. The old cuticle is replaced by a new one to enclose the rest of the body like a sac. The body consists merely of a ball of cells.

The pointed end of the cuticle of parasite's hook begins to bore the cuticle of the crab. It is then known as Kentrogen stage. Within it a chitinous rod known as dart is differentiated. The point of the dart lies within the fixed antennule. When it is fully formed, it forces its way through the cuticle of the host.

Through this dart, the contents of the sac consisting of a mass of undifferentiated cells surrounded by an ectodermal layer pass into the body cavity of the crab. The cells of the parasite enter within the body of the crab and are carried by the blood stream into the thoracic cavity.

IV. Sacculina interna:

There the cells of the parasite multiply leading into a stage called Sacculina interna. It then sends slender processes throughout the body of the crab to draw nutrition. The main body of the Sacculina interna, as it continues to grow, degenerates the tissues of the host's body wall. Finally the main body of the parasite pushes out as a swelling in the abdomen of the crab. This phase is called the Sacculina externa.

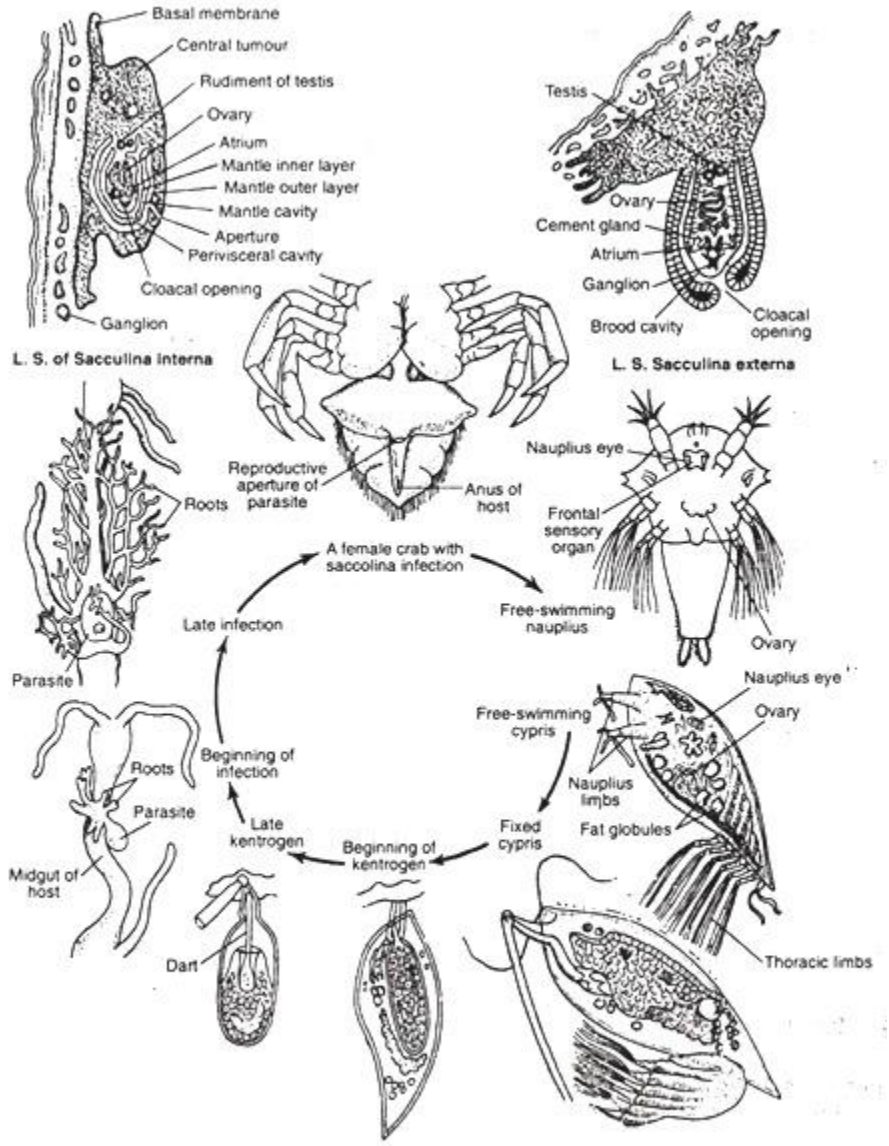

Fig. 18.30: *Sacculina* and its life cycle. Note that the changes due to the parasitic mode of life have attained climax in this crustacea. The adult has lost all the identifying features which are retained only by the free-swimming larva (after Sedgwick).