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B.Sc HONS - Part 1 Paper-1

Topic - structure and life history of Sacculina

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**Q. Describe the structure and life history of Sacculina.**

**Ans.** It lives as a parasite on crab. The parasite habit caused much degeneracy of different structures in the adult. different structures like mouth and anus are absent. It is seen as soft round tumour on the abdomen of the crab. From this tum numerous branched filaments are ramified in all the parts

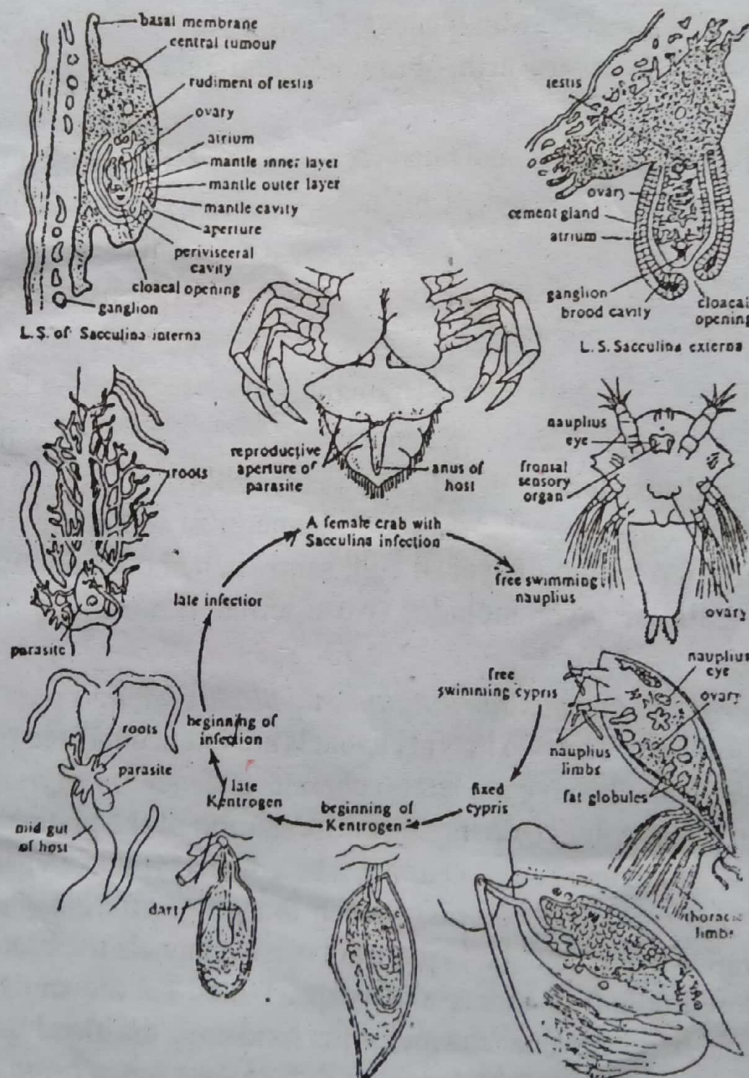


Fig. A Sacculina and its life cycle. Note that the changes due to the parasitic mode of life have attained climax in this crustacea. The adult has lost all the identifying features which are retained only by the free-swimming larvae (after Sidgwick).

of the body of the host except the heart and the gills. The adult Sacculina (Sacculina externa) is characterised by loss of segmentation and appendagen.



All the organ systems are degenerated except the reproductive organs. There is a pair of elongated testes and a pair of ovaries with accessory genital glands, genital atrium and collateral glands. There is a single nerve ganglion. The adult Sacculina is difficult to recognise as an arthropod. The study of its developmental history justifies its inclusion as a crustacean. The life history of Sacculina is extremely interesting. An adult female produces numerous eggs. The mechanism of fertilization is not actually known. There are diverse opinions regarding the process of fertilization. Fertilization in Sacculina, in all probabilities, is internal.

**I. Nauplius larva :** The youngs are hatched from the eggs as free-swimming Fauplius larvae. This nauplius larva is more or less triangular in shape and is peculiar in having two frontolateral 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).

**II 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 abdominal biramous appendages and numerous germ cells. Single eye persists. A pair of frontolateral 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.

**III. Kentrogen larva :** It then discards its thoracic appendages with muscles along with the bivalved shell. The contents of the body become detached and is 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. The phase is called the Sacculina externa.

### **Effects of Parasitism :**

The parasitic mode of living exerts tremendous effects on the parasite as well as on the host.

#### **On the host :**

The host crab shows great disturbance in the metabolic processes. The process of moulting ceases when the parasite becomes central. In both the sexes of the crab, the infection of sacculina cases reproductive activities resulting into the atrophy of gonads. The males, in addition, lose distinctive male features, i.e., shapes of the chelate legs. They develop various degrees of secondary sexual characters proper to the females. The chelipeds remain in the form of non breeding phase. The abdomen becomes more or less flattened and may assume the female form. The copulatory styles are greatly produced and small pleopods may appear on the third to fifth abdominal pleopods. It has also been reported that a completely modified scale, when recovers from the parasitic infection, may be able to regenerate gonads in some cases. Thus the individual becomes hermaphroditic producing both ova and sperms. The female crab, after infection with Secculina, shows great reduction in the size of the pleopods and the gonads show reduction in size.

#### **On the Parasite :**

Most of the organs lead to a high degeneration excepting the genital organs and the organ for adhesion.