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**Class - B.Sc ( Sem - 5)**

**Batch - CBZ**

**Subject - Zoology Paper Two**

**Topic - Stored grain pest-Rice weevil Simphilies oryzine Linn. (Curculionidae: Coleoptera)**

**Introduction**

The rice weevil Sitophilus oryzae (Linnaeus, 1763) are internal feeders which means the larva develops inside whole grain kernels and prefers warmer climates and so is more prevalent in the southern states. The name is mislead because it may infest other grains besides rice. It is restricted in its habitats, only infrequently breeding in commodi other than cereal grains. Apart from the indirect effects, arising from the production of heat by the insects, the main effect of infestation by Sitophilus spp. is the damage to grain by feeding activities of the adults and the development immature stages within the grain. This not only reduces the grain quality but also produces a considerable amount grain dust mixed with frass.

**Host**

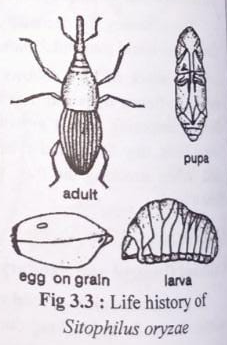
Rice, wheat, barley, sorghum and other raw or processed cereals such as pasta, but not uncompacted products Saphila spp. have been reported to prefer large seeds for oviposition; large seeds are more likely to be parasitized or contain multiple eggs S. oryzae is a common contaminant of processed animal foods but will breed only when whole grains are present and when grain moisture is between 10% and 16% .

**Distribution**

S. oryze originated in India and has been spread worldwide by commerce. It is common in tropical environments, but is also established in temperate environments due to changes in transportation and storage of rice. It is only able to survive winters in colder areas if it has become established in heated situations. It is not successful in regions with very high summer temperatures.

**Life cycle**

**Egg**: Opaque, shining white, ovoid to pear-shaped in form, widest below middle, a broadly rounded, neck narrowing sharply toward top which is somewhat that and bears o berance that fits into a cap or plug that cements the egg in place. Length 0.65 to 0.70 mm, width 0.28 to 0.29mm.



**Larvae**

Cream coloured body and dark head capsule. There are four instars, all of which remain within the grain. Mature 25 to 3 mm. in length, a pearly white, fleshy grub; very thick-bodied, ventral outline being approximately ma deal outline is almost semicircular. Head light brown in color, anterior margin and mandibles much dirker had is longer than broad and somewhat wedge shaped. Epicranial and frontal sutures are distinct and light in editor at triangular and provided with five pairs of large setae. Mandibles stout, triangular, with appreshiced in a cal tooth. Eye represented by a well-defined black spot beneath exoskchaton. Maxilla with vardo presentant et stipes.

**Adult**

Body length 2.3-3.5 mm, reddish-brown to black in colour with four reddish or paler spots on the corners of the prothorax is strongly pitted with round or irregularly shaped pits and the elytri have rows of pits within longitudinal grooves. Rostrum is slender, cylindrical, elbowed antennas, three-fourths is long as thonx. The head with nostrum is as long as the prothorax or the elytra.

Thorax longer than wide, constricted near upex, sides feebly curved, gradually divergent to base dise densely, deeply and coarsely punctured Elytra oblong, slightly narrowed at tip, deeply striate, striae very coarsely and closely punctured intervals slightly convex, narrow, the sutural with a row of coarse punctures; each punctare, both of thorax and elytra, bearing a very short yellowish seta. Hind wings fully developed, the elytral intervals narrower than the statue, the strial punctures large and nearly contiguous, and the pronotal punctures circular to slightly elongate.

The female drills a hole into the kernel deposits the egg, and then secretes a mucilaginous plug to close the egg, and then secretes a mucilaginous plug to enclose the egg is the ovipositor is withdrawn. The plug rapidly hardens, leaving a small raised area above the seed surface, which provides the only external evidence that the kernel is infested. Eggs may be laid anywhere in the kernel but few are laid in the embryo. In wheat, most eggs are deposited at the end farthest from the embryo. Sometimes, more than o may be laid in a single grain but it is rare for more than one larva to develop to maturity, because of cannibalism.

Female Sitophillus spp. do not oviposit into all excavated holes; some are abandoned and others are expanded into feeding holes. Females lay 300-400 eggs during their lifetime, at an average of 4 per day. Ovipesition in S. oryzae is adversely affected by reducing humidity below 60% RH (ie grain moisture -12%) but not eliminated, or increasing the temperature to 35°C.

The newly-emerged adult remains inside the grain for several days for its cuticle to harden. Adult exit holes are smaller rounder and neater exit hole. After emergence, adult females feed on damaged graine, mate and lay eggs immediately. Adults live 4-12 months lifespan is significantly increased by higher humidity and softer grain varieties.

**Control**

* Control of weevils involves locating and removing all potentially infected food source. Rice weevils in all stages of development can be killed by freezing infected food below -17.7 °C (0 °F) for a perind of three days, or heating 60 °C (140 °F) for a period of 15 minutes.
* Control of these insects involves inspection and removal of infested food products, discarding the heavily infested material, repackaging material in new containers, and vacuuming kitchen cabinets, Products that need to be retained may be placed in the freezer for several weeks to kill adults and larvae.