

PARASITISM OF *POLYPORUS GRAMMOCEPHALUS* BERK. ON *ZIZYPHUS MAURITIANA* LAMK.

The different symptoms developed in the infected trees have already revealed the pathogenic nature of the test-fungus. As much it is considered desirable to ascertain whether the fungus can infect living trees by artificial inoculation in the field, inoculation experiments have, therefore, been performed as have been done by previous workers while proving the pathogenicity of the parasites on other tree diseases. A number of healthy young trees of *Z. mauritiana*, about 4 years old, have been selected for the present study which are actively growing in the garden of University College of Science, Calcutta, inoculation experiments have been started in early October, 1972.

Thirty six plants have been inoculated in all, twelve with primary mycelium, and twelve with secondary one. Twelve other healthy plants of same age have been maintained as controls.

Prior to inoculation, the bark of the main stem is wiped out with 95 per cent alcohol following the washing with sterilized distilled water. The stems have been inoculated by making cross cuts open towards the base (Heald, 1937). The flap of the bark is then raised up with a sterile scalpel and the inoculum is placed under it in contact with the living tissue, the phellogen. The inoculum is a small bit of agar with actively growing mycelia taken from a test-tube culture. The raised flap is then placed in position, covered with moist, adsorbent, sterile cotton-wool, wrapped with a piece of thick surface sterilized oil-paper and firmly tied with string at both ends. In case of controls, without any inoculum under the flap of the bark, similar procedure is done. To prevent the drying out of the injured portion of the plant and the inoculum, the moist cotton has been used. During the month of October 1972, the average temperature has been 23–30°C and the humidity ranged between 50–60 per cent.

After one month of inoculation the cut surfaces of the plants are exposed by removing the overlying materials. It has appeared that, in all cases, the plants took up the infection. The bark in the region underwent shrinkage. The controls are, however, found to be on process of healing. After 3 months, the wounded portion has shown the formation of small cankers measuring about 6.8×4.5 cm with callus ridges. The inner wood is getting exposed in every case with the destruction of the internal tissues. The colour of the infected portion change to light brown which is very different from that of the bark, in both transverse and

longitudinal sections of the stem through wounds, the fungal penetration has been noticed upto depth of 1–2 mm while in the longitudinal direction, the mycelium has traversed about 1.3–1.7 cm both upwards and downwards along the axis of the stem. Lateral spreading of the fungus is insignificant. In controls, the living tissue and internal wood remain unaffected.

Freehand transverse, radial-longitudinal and tangential longitudinal sections of the stem have been made and the sections are suitably stained with picro-aniline blue (Cartwright, 1929), then these are carefully observed under the microscope. Extensive hyphal growth is found just below the bark in the cambium and underlying cells. The presence of the mycelium has been noticed in the phellogen, the phelloderm, the phlœm and the xylem but not in the bark. The hyphæ has penetrated mainly through the bore-holes in passing from cell to cell, though passage of the hyphæ through the pits are not uncommon. There is no protoplasmic content in the infected cells. The cells of the phellogen at places have been completely penetrated by the mycelium and they have become dead. The hyphæ passes through the ray cells and through the vessels also. During the path of progress, they destroy the gummy deposits and the fibres. The fungus advances in two ways, one laterally through the tissue elements and the other centripetally through the phlœm the cambium and the xylem tissues. It is remarkably noticed that the test-fungus invades at first the phlœm and xylem rays. These facts have shown that the pathogen has established itself within the host tissue. In case of woody elements numerous bore-holes have been found and it has been found that hyphæ passes through the cell wall. Due to the deposition of gummy substances in the cells bordering the infected region a brown zonation in the stem has been formed.

The infected trees are later examined after one year and various confirming symptoms are, however, noted regarding the establishment of the test-fungus within the host tissues. The trees, inoculated with both the primary and the secondary mycelium, have the wounds swollen considerably with the apperance of a canker which are elongated and oval and measuring 15–30 × 10–12 cm. Transverse and longitudinal sections of the cankers revealed that the mycelia have progressed within the woody tissue to a considerable distance. Numerous small rot-pockets were found to be formed along the periphery of the woody tissues. At some places, discolouration of the wood has been noticed.

The fungus has been re-isolated from the infected plant tissues at various stages of infection. All the isolates agree closely with the original mycelia in cultural and microscopic details.

Polyporus grammacephalus is a wound-parasite which has been confirmed by the inoculation experiments. It is assumed that in nature, the pathogen has entered the host-tissues through some wounds, viz., pruning ends of branches, accidentally broken ends of branches or other wounds. The pathogen infects the

healthy plants, invade the wood to a considerable extent and ultimately kill the living tissues.

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