

VI. PESTS AND DISEASES

Under normal conditions very few diseases occur on the beds of paddy straw mushrooms. Moreover fructifications come within 10-12 days after spawning. Management practices, selection of straw and good quality of spawn will help grow healthy crops in the bed. However some diseases which occur on bed are mentioned below.

Garcha (1977), Sharma and Jandaik (1983) and Fletcher et al. (1986) have discussed in detail about the pests and diseases of mushrooms and their control.

(1) Rizoctonia oryzae-sativa

This casual organisms is transferred to Sclerotium oryzae. The sclerotia formed inside the hollow stem or in a large cavities looked brown or brownish grey with a dull surface, rarely round or regularly ovoid. It hinders the normal mycelial growth of the edible mushroom.

Control : At the time of preparation of beds the straw should be dipped into water 0.1% captan and this will protect against the disease.

(2) Inky cap

Casual organism - Coprinus lagopus

The disease can be detected by the appearance of a long slender stalk with a small thin cap which is auto deliquescent and dissolves into black inky liquid. The appearance of the fungus is noticed in straws which are unhygienically stored or rained before preparation of a bed.

Control : Good quality well dried Amon straw is the best protection of Coprinus in the bed, or before preparation of the beds, the straw should be dried in the sun at least 3 days and old straws should not be used for preparation of bed.

(3) Aspergillus niger

It occurs in the damp straws. In the wet straws it is found after 4-6 days as dark green coloured patches. It is characterized by the presence of loosely woven hyphal mass and the presence of mycelial straws. As the beds gradually becomes older the patches spread in areas.

Control : (1) Proper drying in the sun rays for 7 days is the best control method.

(2) Treatment with Agrosan G. N. (0.1%) or wet cerasan (0.1%) or Thiram (0.2%) is also helpful to minimise the disease incidence.

(4) Nematode

Casual organism : Aphelenchoides aesterocaudatus

In the field no visible symptoms are noticed in normal beds and the disease can be detected from the defective fructification which are squeeze type and spongy in appearance. Nematodes also feed on the mushroom, turning them brown, watery and stunted. It remains in association with pathogenic bacteria (Pseudomonas tolassi).

Control : Good quality straw is essential and at the time of preparation of beds the treatment of straw with (0.02%) Furadon may minimize the nematode attack or deeping the straws in 1% formaldehyde for 12 hrs. before preparation of beds will also reduce the nematode infestation.

(5) Ants

Casual organism - Formica rupa

Small red ants are often found to attack the beds and they are noticed to crawl on the floor as well as on beds. They eat the mycelium and growing tips are completely destroyed. The beds are totally damaged and no cropping is noticed.

Control : Spraying of ant ekalux (0.2%) in the floor is very good to control ants or B.H.C. dusting in the floor may also help to some extent.

(6) Mice

Casual organism - Ratus ratus

Mice causes great hazards and destroy the beds. They creat several small holes in the beds and made the bed unsuitable for cultivation.

Control : Ekalux 2% spray in the floor or baiting with zinc phosphide will give good control of mice.

In the Pleurotus cultivation no serious pathogenic damage was observed in the Pleurotus beds both in the plains and hills. The damage was severe in case of mice and spring tails.

(1) Mice

Casual organism - Ratus ratus

When the rice grain was not available in the ground they come back for shelter, usually they search for new place where they can thrive their lives. So they take shelter in the mushroom house. So mice dig the beds for search of wheat grain spawn, and for this they destroy the beds severely.

Control : (1) Lindane dusting in the floor or Malathion 0.05% spraying may resist from the attack of beds for bad smell.

(2) Zinc sulphide bathing will give a good control against mice.

(2) Spring tails

Casual organism - Lepido cyrtus cyaneus

These were observed to be small insect with stout antennae. They could crawl with speed but were often seen jumping and moving by spring mechanism several inches into the air giving a silvery appearance in light. The mycelium was observed disappearing from spawned compost beds, eat the stalk and caps. A careful and close observation revealed presence of spring tails in groups which disappeared immediately, when slightly disturbed.

Control : (1) B.H.C. dusting 5% on the floor will control.

(2) Spraying of Dichloro diphenyl vinyl phosphate at 0.2% will check the population.

During the cultivation of Agaricus several diseases are noticed in the cropping bed and some important diseases are mentioned below.

Olive Green Mould

Casual organism - Chaetomium olivaceum Cooke and Ellis

Usually found in the compost before casing. The mycelium is white at first, then greyish in masses. Dense masses of mycelium take up bright or orange colour later after the formation of fruit bodies. Perithecia are opaque, globose, light green colour in masses but dark brown colour individually. Ascospores are light green in colour. Spores of this mould are extremely heat resistant and vary abundantly in nature. Most frequent source of infection are air, and soil. Spores germinate and the mycelium of the mould grows rapidly through compost, damage by over heating under low levels of oxygen. The fungus is usually found in plains during sudden rise of temperature in winter season and in the hills during July to September. Predisposing factor is compost pasteurized to a temperature exceeding 70°C in the absence of adequate fresh air predisposes the crop to infection.

It may be controlled by adequate ventilation during peak heat period decreases the incidence of mould to a minimum.

Brown Plaster Mould

Casual organism - Papulospora byssina (Fig. 43)

It occurs on spawned and cropping trays. First it is white with a cloudy appearance, later the colour change to brown. This fungus spreads very fast and causes heavy reduction in yield.

Fig.43 - Brown Plaster Mould (Papulospora byssina)
spreading in the compost of Agaricus sp
(Ca X 1/3)

Fig.44 - Attack of white plaster mould (Scopulariopsis
fumicola) in the compost of Agaricus sp.
(Ca X 1/3)

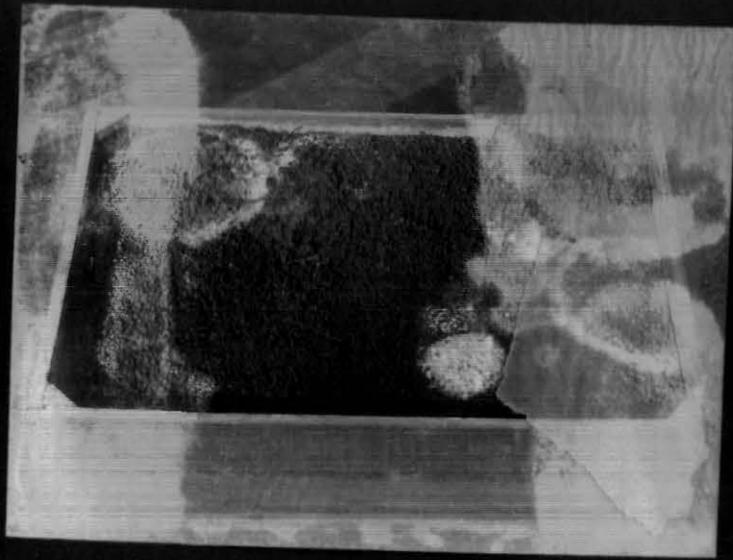


Fig. 43



Fig. 44

Originally the fungus is present in the compost. The wet compost, high temperature (28 to 32°C) during spawn run and cropping at more than 18°C encourage infection.

Control : Properly prepared compost, proper watering, maintaining suitable temperature during spawn run and cropping, as also 2 percent formalin spray of 0.05 captan can control the disease.

White Plaster Mould

Casual organism - Scopulariopsis fumicola (Fig. 44)

It is a common competitor which has been reported to occur on the spawned and cropping mushroom trays. Dense white patches on this fungus invade the mushroom trays which on maturity turn pink. There is a tendency for small patches of this fungus to become bigger, covering large areas of the compost surface and hindering the proper development of the spawn and fruiting bodies. Too much water in the compost during composting or an anacrotic peak heat are the main contributory factors for the growth of this fungus. Inoculum is carried by pests or air.

Control : It is suggested that properly made compost, adequate watering and suitable temperature during spawn running and cropping should be provided to control this antagonistic fungus which depletes the nutrients and grows at the cost of the

mushrooms. Even then, if infected patches of the fungus appear, treatment with 2% formalin or 0.2% captan gives the complete control of the disease.

Bacterial Spot, Bacterial Blotch or Brown Blotch

Casual organism - Pseudomonas tolaasi

Circular or irregular yellowish spots appear on the caps at first, becoming chocolate brown blemishes after enlarging and coalescing later on. The underlying mushroom tissue gives a water soaked appearance.

Control : The infection is initiated through the casing soil and other contaminated articles used in mushroom cultivation. It spreads through the splashing of water (during winter), through flies, mites, nematodes, during picking etc. For the control of the disease, sterilize the soil properly and provide good ventilation after watering, so that the caps of the mushrooms do not remain wet. The use of chlorinated water (1000-2000 ppm) also reduces the incidence of this disease to a great extent.

Virus

A number of disorders, the "La France Complex" which include La France disease, infections watery stipe, brown disease, Mummy disease and X-disease whose causes were until recently unknown although some and possibly most are the manifestations of

virus infection. Mushroom develop a range of stalk and cap abnormalities. Under dry conditions infected mushrooms usually produce small brown leathery sporophore, under more humid conditions water-logged stipes occur. Stalks may be excessively long in relation to the size of the cap, forming drumsticks or the mushrooms may remain stunted. The La France Group are associated with the degeneration and death of the mycelium with the compost reflected in the premature end to cropping. Infection at the time of casing causes symptoms in the first flush, a characteristic barren area. The consistent feature of the virus disease is the progressive decrease in the cropping and sometimes the degeneration or death of mycelium in the compost.

Control : Mushroom viruses can be eliminated by

- (1) Heating of growing room and compost at the end of a crop for 12 hours at 70°C;
- (2) Treatment of wood (spraying or dipping) with a 4% sodium pentachlorophenate solution to which soda has been added as a wetting agent (0.5 to 1.0%);
- (3) Disinfection of machines (spraying machine, press) with 2% formaldehyde solution;
- (4) Protecting the mycelium in the compost by covering the compost with paper, immediately after spawning. Twice a week a diluted formaldehyde solution should be sprayed on the paper until casing.

Non-Pathogenic Maladies

(i) Rose comb : In this case the cap is malformed and gills or lamella formed on its upper surface. On top of the cap

of the mushroom appears pink, waft like out growth composed of a mass of irregular and ill formed gills. Frequent pesticidal spraying, use of coal or kerosene oil stove to heat the mushroom house are the causes of this.

Control : These things should be avoided in the mushroom house. The fumes of oil gas should not circulate in the mushroom house.

(ii) Long-Stalked Mushrooms

It was observed in the year 1980, 1984 in our mushroom house when poorly ventilated mushroom house, this type of abnormality is common. The stalk become very long, whereas the cap remains small.

Control : In the morning atleast 15 minutes cross ventilation is required in the mushroom house.

(iii) Stroma

This appear a thin white scumming mycelial growth on the casing soil in the mushroom beds, hindering the formation of buttons. This growth, in turn, changes into thick compact masses which are characteristic of stroma formation.

Control : It is advisable to recase such portions of trays with fresh sterilized casing soil, otherwise there may be a great reduction in yield.

(iv) Sealy and Cracked Mushroom

This deformity is due to draught or cold air or less humidity in the production room.

Control : Suitable water spraying is required at the same time wet gunny bag should be spread in the mushroom house floor and time to time spraying is required.

Insects Pests

Mushrooms are also attacked by insect pests. It is better to prevent the entry of these. Once mushrooms are infected with insects it is difficult to control them, therefore, absolute cleanliness at each stage of cultivation is essential if damage to the crop by such trouble is to be prevented. Preventive measures against pest are important. Spring tails, mushroom flies, mites, bore the fruit bodies and cause rotting. Some pests cause damage to the spawn and hence lead to reduction in yield.

(1) Spring Tails

Casual organism + Isotoma simplex and Proisotoma minuta

These are quite tiny and cannot be seen with the naked eyes. These have stout antennae. They can crawl with speed, but they move by springing several inches into the air. When

they are in a mass they look like gun powder on beds. They mostly feed on the mycelium and may sometimes attack the stalks and cap also.

(2) Cecid

Cecid flies or gall gnats have long been regarded as serious pests of the mushroom crop. The larvae are pinky yellow or white, pointed at both ends and very often have a dark 'anchor process' structure in the neck. The larvae eat mycelium but are much more frequently seen making their way slowly up the stalks and into the gills.

(3) Mites

These are found in the mushroom house. They do not cause damage to the mushroom but are the carrier of the inoculum. They eat mycelium and also make holes in the mushroom caps and stalks, and sometimes they chew the mycelial strands around the bases of the stalks.

Control Measures

(1) The process of sterilization of casing soil at 70-72°C for 6 hours to kill insect is necessary before its use for casing the beds.

(2) Lindane during (0.65 percent) 80 g/quintal of straw to be mixed at the 7th turn during compost preparation.

(3) Spraying of DDVP (Dichloro Diphenyl Vinyl Phosphate) at 0.2% or Malathion 0.05% spray will check the population of the above mentioned insect pests.