

MAJOR PESTS AND DISEASES OF MUSHROOMS

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ABSTRACT

Mushroom are a group of fungi endowed with ability to convert in edible plant east into palatable food that is praised for characteristics biting texture and flavour among which cholesterol free mushroom have cholesterol properties. Mushroom grows independent of sunlight without fertile land. They do not complete with field or fruits crops and provide an additional avenue for increasing food supply. They suffer from various phenomenal diseases as such viral diseases, bacterial diseases, fungal diseases including mushroom insects. The incidence and severity of the pest problems are directly related to the degree of control of the growing environment. The available technologies of air-conditioning, air movement, humidity, air filtration, insulation, and post harvest storage have made pest management much easier. The ability to pest-free, and high quality mushrooms at a reasonable cost.

Keywords- Mushroom, Pest, Environment, Diseases, Prevention.

INTRODUCTION

Bacteria, fungi, nematodes, mites and insects are most suffered biotic causes of disorders. The involved organism/ cause should essential to understand the biology of the organism, wherever involved (how is gained entry, how it spreads, how it can be controlled) and after this, a best method of controlling the pest and pathogen should be devised. Normally, farm hygiene is the best method to the control of mushroom disorders.

The incidence and severity of the pest problems are directly related to the degree of control of the growing environment. The available technologies of air-conditioning, air movement, humidification, air filtration, insulation, and post harvest storage have made pest management much easier. The ability to precisely control the production environment can lead to the production of pest-free, pesticide-free, and high quality mushrooms at a reasonable cost.

Mushroom are a group of fungi endowed with ability to convert in edible plant east into palatable food that is praised for characteristics biting texture and flavour. The most nutritious mushroom are almost equal in nutritional value to meats and milk. The low calorie and cholesterol free mushroom diets also display certain medicinal properties.¹ These diets are effective against hyperlipemia, hypertension, diabetes and Tumors.²

Mushroom are reproductive structures of edible fungi that belong to Ascomycotin and Basidomycotina. These may be epigeal or hypogaeal. Like any other fungus, the vegetative part of mushroom consist of thread like thin mycelia which under suitable conditions from fruit bodies (sprocraps). Mushrooms occur under a large heterogeneous group with different shapes, sizes, colour and edibility of the 20,000 known edible species, only 30 are commercially cultivated. Some important mushrooms grows in India:

¹M.T.Hasan, M.H.A.Khatun, M.A.M.Sajib, M.M.Rahman, M.Roy, M.N.Miah, K.U.Ahmed

Effect of Wheat Bran Supplement with Sugarcane Bagasse on Growth yield and proximate composition of pink oyster Mushroom (*PLEUROTUS DJAMOR*), American Journal of Food Science and Technology, Vol. 3 No. 6, 2015

²Mushroom Production and Processing Technologies

- 1- Button Mushroom (*AGARICUSBISPORUS*)
- 2- Hot weather a Mushroom (*A. BITROQUIS*)
- 3- Oyster Mushroom (*PLEUROTUS SPP.*)
- 4- Paddy straw Mushroom (*VOLVARIELLA VOLVACEA, V. DISPLASIA*)
- 5- Black ear mushroom (*AURICULARIAPOLYTRICHA*)
- 6- White milky Mushroom (*CALOCYBE INDICA*)
- 7- Brown cap (*STROPHARIARUGUSO-ANNULATA*)

IMPORTANCE OF MUSHROOMS

Mushroom can produce highest quantity of protein per unit area and time from the Agro waste. These are good source of high quality protein and rich in vitamins and minerals. Mushroom have 25-30% protein, which is higher than any vegetables and fruits and it is of superior quality. Mushrooms are rich in lysinetryptophan and the two essential amino acid that are deficient in cereals. They contain good amount of vitamins C and B complex (thiamine, riboflavin and niacin), potassium and phosphors and sodium also low but available form of iron. In mushrooms, potassium sodium ratio is very high which is ideal for patients of hypertension.³ They are a low calorie food with very little fat and sugar and without starch and cholesterol.

They have medicinal properties. Pharmaceutical worth \$700 million are produced annually in Japan from *Lentinus*, *Coriolus*, *Schizophyllum*, and *Ganoderma*.⁴ Mushroom extracts have a high amount of retene that has an antagonistic effect on some forms of tumour.⁵ Some mushroom extracts induce formation of interferon, a defence mechanism against viral infection and have hypocholesterolemic activity (lowering cholesterol levels.) Further, compounds extracted from mushroom have anti fungal and anti bacteria properties.

Mushrooms have a huge export potential. There is a World market for 14lakh tonnes mushroom per annum against which India is exporting only about 2600 tonnes. The world demand is likely to go up to more than 60 lakh tonnes by 2019.

They offer vast rural employment potential. Mushroom cultivation involves various technologies. In the instances where limited capital is available, methods that require simple equipment can be used.⁶ Most of these low cost methods, suitable for projects, are labor- intensive and can provide employment in both the semi urban and rural areas. Some methods may use even family labour.

Common Pest of Mushrooms

Bacteria, Fungi, nematode, mites, and insect are most commonly encountered biotic causes of disorders. The involved organism/cause should be correctly identified before attempting to control the problem. It is essential to understand the biology of the organism, wherever involved (how it gained entry, how it spreads, how it can be controlled) and after this, a suitable method of controlling the pest or pathogen should be devised. Basically, farm hygiene is the best approach to the control of Mushroom disorders.⁷

³Baishakhi D, Horticulture in India: Introduction Branches and Production Technology

⁴Mahendra Rai, Girish Tidke, and Soloman P Wasser, Therapeutic Potential of Mushrooms

Received 15 April 2004; Revised 16 March 2005

⁵Seema Patel & Arun Goyal, Recent development in mushrooms as anti-cancer therapeutics

⁶Arulabalachandran Dhanarajan, Sustainable Agriculture towards Food Security

⁷Importance of Mushrooms, Pest and Diseases in Mushroom Cultivation and their Management

Friday May 5, 2017

A- <u>Bacteria</u>	<u>Species Affected</u>	<u>Effect</u>
<i>Bacillus spp.</i>	<i>LENTINUAL EDODES</i>	Spawn growth reduced
<i>Pseudomonas tolaasi</i>	<i>AGARICUSBIOTRQUIS</i>	Discolouration of pileus tissue

B- Fungi

<i>Cladobotrymapiculatum</i>	<i>PLEUROTUS SPP.</i>	Soft rot of basidiocarp
<i>Diehliomucesmicrospora</i>	<i>AGARICUSBITORQUIS</i>	Inhibitory to mycelia growth In natural logs
<i>Fusicoccumquercinum</i>	<i>LENTINUAL EDODES</i>	Competes for nutrients

C- <u>Insects</u>	<u>Species affected</u>	<u>Effects</u>
<i>Achorutes spp.</i>	<i>LENTINUAL EDODES</i>	Feed on Mushroom mycelium And causes the honeycombing of basidiocarp
<i>Bolitophilaspp.</i>	<i>PHOLIOTA NAMEKO AND HYPHOLOMASUBLATERITIUM</i>	Larve burrowing in basidocarp
<i>Lepidocytus spp.</i>	<i>LENTINUAL EDODES</i> and other mushroom growing outdoor	Ingests mycelium and parts of the basidiocarp

D- Viruses

<i>Pleurotuspulmonarius virus</i>	<i>PLEUROTUSPULMONARIUS</i>	Deformed basidiocarp
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PREVENTION AND CONTROL MEASURES

A- VIRTUAL DISEASES

Virus- infected spores can remain viable for many years⁸. Mushroom viruses can also survive in mycelium at the end of the crop and can be transferred to the new crop by hyphal fusion of pasteurisation is not effective. Strict hygiene is essential for the control of virus diseases. Virus- carrying spores should be avoided by the use of virus diseases. Virus carrying spores should be avoided by the use of efficient air filters, especially during spawn running.⁹ Used Woden boxes and wooden side board that harbor fragments of infected mycelium should be treated with proper disinfect before re use. Whenever, possible the mushroom should be picked before they open to prevent dispersal of spores. In the event of a virus outbreak, the strain should be changed.

B- BACTERIAL DISEASES

Strict hygiene should be observed, especially during cropping. During the early stage of mummy diseases (a bacterial disease) the disease may be localised by digging a trench across the bed on either side of the

⁸TotalMush Forum, Unknown diseases, April 3, 2013

affected area and affected compost should be completely removed. The isolated area may be drenched with 0.5% formalin, then covered with a sheet of polythene. When a disease is prevalent on a farm, the infected mushrooms should be removed or isolated and measures implemented to prevent the spread of the pathogen to healthy mushroom. Picker's should take precautions not to spread the pathogens to non-infested mushrooms. At the end of cropping, the house should be thoroughly steamed. Boxes should be treated with disinfectant before re use.

The use of chlorine as a routine spray to the beds is recommended to prevent bacteria blotch. A chlorine concentration of 140ppm at every watering is recommended (160ml of hypochlorite 10% added to 100l litres of water).

C- FUNGAL DISEASES

Farm management and hygiene are important for control of fungal diseases. Fungicides, should never be used as a routine treatment. Some recommend fungicides for the control of main fungal pathogen of *A. bisporus*.

Benomyl (Benlate50wp) against *Dactylium*, *Mycogone*, *Trichoderma*, and *Verticillium*. Mix 250g/100 m sq. With casing or add in water at 250g/200li / 100m sq during first watering.

Carbendazim (Bavistin) same as for Benomyl.

Chlorothalonil (Bravo orRepulse) against *Mycogone*, and *Verticillium*. Apply as spray 1 week after casing and repeat no less than 2 weeks later at 200 ml in 100-200 li/100m sq.

Prochloroz Manganese (Sporgon) against *Mycogone*, *Verticillium* and *Dactylium*. If single application, apply 310g/100li/100m sq. 7-12 days after casing and then between second and third flushes. For triple application, use 57g/li 100m sq. 7-14 days after casing first and third flushes.

Thiabendazole (Tecto) against *Dactylium*, *Mycogone*, *Geotrichum*, and *Verticillium*. For 7% dust, apply at 360g/100m sq. every week after casing or 140 g/100m sq before watering,. For wettable powder, 1.5kg/1000L at rate of 5 L/10m sq after casing and between flushes.

D-MUSHROOM INSECT

Some insecticide recommended for mushroom pests are as follows-

- Diazinon (Basudin, Diazital) against phorids, sciarids and cecids. Mix with compost at spawning (200g or 30g or 60 ml/tonne) for phorids and (1.5kg or 130g or 280ml/tonne) for sciarids and cecids.
- Dichlorvos against phorids and sciarids. Aerial spray in spawn running rooms (30ml in 300ml water /150m).
- Diflubenzuron (Dimilin) against sciarids. Mix or drench with casing (120g/tonne or 4g in 2.8 li water/m sq)
- Chlorfenvinphos (Sapecron) against sciarids and phorids. Mix with compost at spawning or casing at 210 or 525g ml/tonnes or 125ml or 300g/tonne.
- Malathion (Mal 60) against sciarids. Drench to casing 340ml in 220li/water/100m sq).
- Gamma HCH (Fumite, Lindane) against phorids and sciarids. Aerial smoke during cropping (pellet size 3, treats 85m sq).
- Resmethrin (TurbairResemthirn Extra) against phorids and sciarids. Aerial application during cropping (40ml /100m sq)
- Permethrin (Ambarshfog 2) against phorids and sciarids. Aerial application during cropping (100ml/250m).
- Pirimiphos -methyl (Actellifog) against phorids and sciarids. Aerial fog during cropping (70ml/100m sq).