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Original Research Article

Chemical Control of Dry Bubble *V. fungicola* and Wet Bubble *Mycogone perniciosa* Magnwas

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A B S T R A C T

Experiments were conducted to evaluate the fungicide against major disease (Dry Bubble and Wet Bubble) of Mashroom during 2017 and 2018. Wet bubble and dry bubble has been reported as one of the serious diseases from almost all the major mushroom growing countries of the world. Bubble or mole, first described from Paris in 1888, was reported in India for the first time in 1978.Fungal diseases are most common and cause maximum loss in yield of white button mushroom. Bacterial diseases caused by Pseudomonas cause loss in yield up to 30 to 80%. Mushrooms can often be affected by some bacterial, mold and virus diseases that rather frequently cause dramatic production loss. Specially fungicides, can help control some mushroom diseases, although the use of many products is strictly limited by official regulations or by the similarity between pathogen and host. Mushrooms are also affected adversely by a large number of biotic and abiotic agents/ factors. Among the biotic agents, fungi, bacteria, viruses, nematodes, insects and mites cause damage to mushrooms directly or indirectly. A number of harmful fungi are encountered in compost and casing soil during the cultivation of white button mushroom. Many of these act as competitor moulds thereby adversely affecting spawn run whereas others attack the fruit bodies at various stages of crop growth producing distinct disease symptoms. The experiment consisted of seven treatments viz. T1- Carbendazim 50% WP., T2- Mancozeb 75% WP, T3- Ridomil MZ 75% WP., T4- Zineb 50% WP, T5- Topsin-M 75% WP T6- copper oxy-chloride and T7- Untreated control.

Keywords

Dry bubble,
Infestation,
Wet bubble

Introduction

In India, the disease was first reported from Chail and Taradevi of Himachal Pradesh and later severe incidence was reported from Haryana, Uttar Pradesh, Uttaranchal, Punjab and in Jammu (J&K), reducing the yield by 40-90 per cent Sarma *et al.,* (1995), Kerni *et al.,* (1997) Kaul *et al.,* (1978). Symptoms of wet bubble at different stages of mushroom development. Mushroom is one of the best diet, which contains protein, minerals and vitamins like Nutritive material in a sufficient quantity. Mushroom is having less quantity of fats due to this reason it is very good diet for heart patients and due to the very less carbohydrates mushroom is most suitable diet for diabetic patients. Mushroom is not

required direct sunlight as it is required in case of vegetables which are having green leaves plants but the beds of the mushroom should be protected from the direct sunlight and rains so the mushroom is grown either in house or in hut or any cover and below the any cover of the root which is having sufficient aeration. Since the stone age, mushrooms served humans as food, medicine and psychoactive drugs, religious symbols, and helpful tools. Mashroom is one of the most important cereal crops supporting the lives of millions of people across the globe and particularly in the developing world (Dida *et al.*, 2007). It is adapted to a wide range of environments and is known for withstanding harsh environmental conditions including high temperature, moisture deficit and water stagnation but it is susceptible to blast (Lenne *et al.*, 2007). Nutritionally, the grains are equal or superior to other staple cereals as they are a good source of quality protein and various minerals. In marginal and medium agricultural zones, finger millets are high priority staples in Ethiopia, Sudan and Uganda (Mendelsohn *et al.*, 2000; Seyfu Ketema, 2008). A mushroom is the fleshy, spore-bearing fruiting body of a fungus, typically produced above the ground on soil or on its food source, mostly in forests. It is perhaps the most well-known and documented edible forest product (Chamberlain *et al.*, 1998). The word "mushroom" means different things for different people in different countries (Chang at el 1992). Since ancient times, man has been interested in mushrooms, which were called "food of gods" by the Romans. The Greeks regarded them as providing strength for warriors in battles. Mushrooms are mysterious, cultural, traditional and legendary (Arora *et al.*, 2008). The global mushroom industry has expanded very rapidly in the last two decades by the addition of newer types of mushrooms for commercial cultivation. However, mushroom as a vegetable is yet to find regular place among the Indian consumers. Despite of favourable agro-climate, abundance of agro wastes, relatively low-cost labour and a rich fungal biodiversity, India has witnessed a lukewarm response in its growth. At present, the total mushroom production in India is approximately 0.13 million tons. From 2010-2017, the mushroom industry in India has registered an average growth rate of 4.3% per annum. Even as the mushroom production and consumption are on the rise in rest of the world, India witnesses a lukewarm response in its growth. Mushroom industry in India is overwhelmingly focused on white button mushroom which is a highly sophisticated and capital-intensive activity.

The recent production data (official data of ICAR-DMR, Solan) showing that, the share of button mushroom in India is maximum amounting to 73% followed by oyster mushroom which contributes about 16%. There are two main types of mushroom growers in India, those who are growing white button mushroom round the year under controlled conditions and seasonal growers who are growing button mushrooms during the winter seasons in north western part of India.

The total white button mushroom produced in India from both seasonal and high tech cultivation units is estimated at 94676 metric ton. Mushrooms are considered as a potential substitute of muscle protein on account of their high digestibility (Pavel, 2009). In addition to protein, mushroom is an excellent source of vitamin-D which is not available in other food supplements (Pehrsson *et al.*, 2003). Potential chemical risks of several fungicides commonly used in wheat production in Serbia were evaluated for *A. bisporus*, regarding fungicide medium effective concentration (EC50) (Potočnik 2006, 2009; Potočnik *et al.*, 2009a, 2009b).

Materials and Methods

The morphological characteristics of the causal organism on host and in artificial culture were studied in the laboratory. The important characters studied were the cultural characters such as mycelial colour and growth and the morphological characters such as shape, size, colour and septation of hyphae, conidiophores, conidia and chlamydospores. The morphological characteristics of the causal organism on host and in artificial culture were studied in the laboratory. The important characters studied were the cultural characters such as mycelial colour and growth and the morphological characters such as shape, size, colour and septation of hyphae, conidiophores, conidia and chlamydospores. The morphological characteristics of the causal organism on host and in artificial culture were studied in the laboratory. The important characters studied were the cultural characters such as mycelial colour and growth and the morphological characters such as shape, size, colour and septation of hyphae, conidiophores, conidia and chlamydospores. The pathogen *V. fungicola* (Dry bubble) and Wet bubble *Mycogone perniciosa* Magn was isolated following the standard procedure using Malt extract agar medium8. Mushroom sporophores showing typical symptoms of dry bubble and wet bubble disease were collected and used for isolation of the pathogen. The important characters studied were the cultural characters morphological characters such as shape, size, colour and septation of hyphae, conidiophores, conidia, chlamydosporesand yield data was recorded for up to days cropping period per bag per treatment was maintained and yield data was expressed as kg mashroom per kg compost. The difference was calculated from the replicate data using factorial experiment and common complete randomized design. Most common fungal diseases of mushroom are cobweb, dry bubble, wet bubble, false truffle and green mould (Sharma, 1995).

Results and Discussion

It is apparent from Table 1 to 4 that the results with various treatments were significantly different from the untreated check. That during the both years of study incidence of dry bubble and wet bubble at appearance on cut mushroom disease was observed significantly higher. Infestation of dry bubble and wet bubble was higher in 2017 then 2018.

The treatment Inoculated cut mushroom on dry bubble significantly higher infected percentage 72 hours in 90 and Uninoculated cut mushroom on 0%. Inoculated cut mushroom on wet bubble significantly higher infected percentage 72 hours in 100 and Uninoculated cut mushroom on 0%.

Table.1 Dry bubble disease appearance on cut mushroom

Treatment	**No. of fruit bodies**	**No. of fruit bodies infected After hours**			**Infected (%)**		
		24	48	72	24	48	72
Inoculated cut mushroom	20	0	12	18	0	60	90
Uninoculated cut mushroom	20	0	0	0	0	0	0

Table.2 Wet bubble Disease appearance on cut mushroom

Treatment	No. of fruit bodies	No. of fruit bodies infected After hours			Infected (%)		
		24	48	72	24	48	72
Inoculated cut mushroom	20	0	14	20	0	70	100
Uninoculated cut mushroom	20	0	0	0	0	0	0

Table.3 Effect of fungicide on yield

Test fungicide	Swapn run (days)		Yield (kg/100 kg compost		Mean	Percentage increase yield over control	
	First year	2nd year	First year	2nd year		First year	2nd year
T1-Carbendazim 50% WP	12	13	13.38	14.40	13.89	193.42	207.69
T2-Mancozeb 75% WP	14	15	10.20	9.80	10.00	123.68	109.40
T3-Ridomil MZ 75% WP	16	15	9.36	9.56	9.46	105.26	104.27
T4-Zineb 50% WP	15	16	9.18	8.80	8.99	101.31	88.03
T5-opsin-M 75% WP (Thiphanate Mathyl)	17	15	7.56	7.90	7.73	65.78	68.80
T6- copper oxy-chloride	16	14	8.10	9.42	8.76	77.63	101.28
T7-Control	20	20	4.56	4.68	4.62	-	-

The highest mean yield (kg/100 compost) 13.89 was observed from the treated Carbendazim 50% WP followed Mancozeb 75% WP 10.00, Ridomil MZ 75% WP 9.46, Zineb 50% WP 8.99, copper oxy-chloride 8.76, opsin-M 75% WP (Thiphanate Mathyl 7.73. The untreated yield was observed 4.62. Gandy (1985) was reported that Carbendazim fungicide was less toxic to basidiomycetes then to other pathogen.

The results of present investigation have reasonably led to conclusion that dry bubble and wet bubble can be manage by the use Carbendazim 50% WP with out any phytotoxic effect.

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