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RELATIVE EFFICACY OF DIFFERENT ACARICIDES (DICOFOL, ABAMECTIN AND HEXYTHIAZOX) AGAINST MUSHROOM MITES (PYGMEPHOROIDAE)

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Studies on the Relative efficacy of different acaricides against mushroom mites (Pygmephoroidae) were carried out in the Acarology Research Laboratory Department of Agri. Entomology University of Agriculture Faisalabad. The acaricides used included dicofol 18.5 EC with three concentrations (1.5ml/L, 2.0ml/L, and 2.5ml/L), abamectin 1.8 EC (1.5ml/L, 2.0ml/L, and 2.5ml/L) and hexythiazox 10WP (0.25g/L, 0.35g/L and 0.45g/L). All the acaricides used gave significant reduction in the mite population and gave satisfactory results as compared to untreated check. On numerical basis the highest mite population suppression (95.30%) was recorded by the application of abamectin 1.8 EC at 2.5ml/L after 72 hours, followed by (94.68%) and (90.11%) with dicofol 18.5 EC at 2.5ml/L after 72 hours and hexythiazox 10 WP at 0.35g/L after 72 hours.
Key words: Relative efficacy, mushroom, acaricides mite and wheat straw compost.

INTRODUCTION

Mushroom is a very delicate crop with full of protein and minerals. The fresh mushrooms contain 85.90% moisture, 3% proteins 4% carbohydrates, 0.3-0.4 % fats and vitamins (Tewari, 1986). Mites present in the mushroom growing wheat straw compost, not only destroy the mycelia of mushroom but also cause a great loss to quality and production e.g. the pygmephorid *Luciaphorus auriculariae*, described in China, is a destructive mite to the commercial production of mushrooms, causing 10-50% loss of the crop(Zou *et al.*, 1993). Mites directly cause damage to the mushrooms by feeding mycelia and fruiting body. In the past, efforts have been made in some countries on chemical control of mushroom mites. Some scientists who made significant contributions in this regard are Clift and Terras (1989), Heungens and Tirry (2001), Rathiah *et al.* (1997) and Wu and Zhang (1993). In Pakistan no work has been carried out in this regard.

MATERIALS AND METHODS

The experiments were carried out in the Acarology Research Laboratory Department of Agri. Entomology University of Agriculture Faisalabad. Wheat straw compost was prepared under the shade.

Material of compost

1. Wheat straw = 150kg
2. Chicken manure = 60kg
3. Gypsum = 5.25kg

Procedure for preparation of compost

150 kg wheat straw was well moisturized daily up to three days to make it soft for microbial activity. After it 60kg chicken manure was mixed in wet and moist wheat straw , the moisture of compost material was maintained up to 80-90%, then heap was made one meter high and 6 turnings was done according to given schedule. After mixing the chicken manure in the moist wheat straw microbial activity was started and temperature of the compost material was increased due to microbial activity. The turnings were done to maintain the moisture, temperature and aeration to increase the microbial activity in the compost material.

Turning method

First the heap of compost was divided in to three layers
Lower layer (1st layer)
Middle layer (2nd layer)
Upper layer (3rd layer)
Then changed their position by placing 1st layer at the position of 3rd layer, 2nd layer at the position of 1st layer and 3rd layer at position of 2nd layer. This fashion was repeated in the same manner at the time of turning.

Turning schedule

0 day = prepare the heap.
5th day = 1st turning
9th day = 2nd turning
12th day = 3rd turning + half quantity of gypsum.
15th day = 4th turning + next half quantity of gypsum.
18th day = 5th turning
21st day = 6th turning (last turning)

Before last turning 100 g sample of compost was processed through Berlease's funnel for at least 24 hours and mite population was counted. To control the mite three acaricides [dicofol (18.5 EC), abamectin (1.8 EC) and hexythiazox (10WP)] with three concentrations of each acaricide along with control were tested. The data were collected at 24 hours, 48 hours and 72hours after each spray respectively. Two factor factorial experiment under Completely Randomized Design (CRD) was applied. The significance of difference between the treatments means were sorted through the Duncan's Multiple Range Test, after the analysis of variance as given by Steel and Torrie (1980).

RESULTS AND DISCUSSION

Table 1 represents the interaction values of dicofol. The mean values of data reveal that there was a strong correlation between time intervals and concentrations of dicofol. Maximum mortality (94.68%) was observed at 2.50ml/L after 72 hours. While minimum mortality (7.28%) was observed at 1.5ml/L after 4 hours

Table 2 indicates the interaction values of abamectin. The mean values of data reveal that there was a strong correlation between time intervals and concentrations of abamectin. Maximum mortality (95.30%) was observed at 2.5ml/L after 72 hours. While minimum mortality (53.47%) was observed at 1.5ml/L after 24 hours.

Table 3 shows the interaction values of hexythiazox. The mean values of data reveal that there was a strong correlation between time intervals and concentrations of hexythiazox. Maximum mortality (90.11%) was observed at 0.35g/L after 72 hours. While minimum mortality (15.72%) was observed at 0.25ml/L after 24 hours.

The present studies were carried out on Relative efficacy of different acaricides against mushroom mite (Pygmephoroidae). Acaricides including abamectin (2.50ml/L) after 72 hours gave maximum mortality (95.30%) followed by dicofol (2.50ml/L) and hexythiazox (0.35g/L) which gave mortality (94.68s%) and (90.11%) respectively against (Pygmephoroidae) mites.

Clift and Terras (1993) carried out experiments on the relative efficacy of acaricides against mushroom mites. They used acaricides diazinon, malathion, pyrethrins and dicofol, and concluded that only dicofol gave a useful mortality (95%) when tested against *Histiostoma feroniarum.* dicofol (0.04%) was most effective causing 81.38% reduction in mite population (Patel *et al.* 1999). Many scientists proved the efficacy of dicofol, abamectin and hexythiazox [Rathaiah *et al.* (1997), Patel *et al.* (1999) and Heungens and Tirry (2002)]. In the present studies two parameters time intervals and concentrations of acaricides were studied, which were different from the parameters of previous scientists [Zou *et al.* (1993), Wu (1995), Reis *et al.* (1998), and Heungens and Tirry (2001). In this project the use of dicofol, abamectin and hexythiazox are line with the

Table 1. Comparison of means of the interaction of exposure time regarding the percent mortality of mite (Pygmephoroidae) at different concentrations of dicofol.

Concentrations	Time			
	24 hours	48 hours	72 hours	Means
C1 (1.5ml/L)	7.283 G	62.95 D	93.00 A	54.41 C
C2 (2.0ml/L)	11.01 F	67.23 C	93.92 A	57.39 B
C3 (2.5ml/L)	14.06 E	69.76 B	94.68 A	59.50 A
Control	3.557 H	1.100 I	0.150 I	1.602 D
Means	8.978 C	50.26 B	70.44 A	

Table 2. Comparison of means of the interaction of exposure time regarding the percent mortality of mite (Pygmephoroidae) at different concentrations of abamectin.

Concentrations	Time			
	24	48	72	Means
C1 (1.50ml/L)	53.47 H	85.59 E	93.17 B	77.41 C
C2 (2.00ml/L)	59.79 G	87.97 D	94.31 AB	80.69 B
C3 (2.50ml/L)	65.12 F	90.82 C	95.30 A	83.75 A
Control	9.797 I	2.260 J	0.706 K	4.254 D
Means	47.04 C	66.66 B	70.87 A	

Table 3. Comparison of means of the interaction of exposure time regarding the percent mortality of mite (Pygmephoroidae) at different concentrations of hexythiazox.

Concentrations	Time			
	24	48	72	Means
C1 (0.25g/L)	15.72 F	42.23 D	87.28 B	48.41 B
C2 (0.35g/L)	20.59 E	46.46 C	90.11 A	52.39 A
C3 (0.45g/L)	16.77 F	40.77 D	88.10 AB	48.54 B
Control	9.680 G	3.103 H	1.077 H	4.620 C
Means	15.69 C	33.14 B	66.64 A	

work of previous scientists Zhang *et al.* (1993), Rathaiah *et al.* (1997) and Smith *et al.* (1998). Efficacy of acaricides used in this project can be summarized as followed:

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