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EFFECT OF FUNGICIDES ON THE SEED GERMINATION, SEEDLING LENGTH, DRY MATTER PRODUCTION AND VIGOUR INDEX IN RICE

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ABSTRACT

The influence of tricyclazole and other fungicides on the seed germination, seedling length, dry matter production and vigour index in rice was studied under slurry and dry conditions. Slurry treatment of seeds with carbendazim and tricyclazole (2 g/kg) significantly increased the seed germination, seedling length, dry matter productioin and vigour index than the other fungicides like mancozeb, thiram and captan. Slurry treatment was better than dry seed treatment. Tricylazole at 2 g/kg favourably increased all the parameters compared to 4 g/kg under slurry treatment. Under dry seed treatment both levels had more or less an uniform influence.

Seed treatment with fungicides is known to offer protection against diseases and promote seed germination and vigour of the seedlings. The nature of fungicides and the method of seed treatment have been reported to influence extent of disease incidence (Chakrabarti and Mohanty, 1975; Khatua *et al.*, 1978; Kauraw, 1986). In the present investigation effect of tricyclazole (5-methyl 1,2,4- triazolo (3,4-b) benzothiazole) at 2 levels 2 g/kg on seed germination, seedling length, dry matter production and vigour index was assessed in comparison with other fungicides.

MATERIALS AND METHODS

The fungicides tricyclazole (2 and 4 g/kg), carbendazim (2 g/kg), mancozeb (4 g/kg), capten (4 g/kg) and thiram (4 g/kg) were used for this study. In dry seed treatment, the seed-fungicides mixture was shaken in a wrist action shaker for 30 minutes and screened to remove excess fungicide. In wet seed treatment, (10 g of seeds + 1 ml water and respective fungicide) seeds were slurry treated after moistening overnight and kept in excess slurry till sowing. Four replications were maintained (khatua *et al.*, 1978). The germination test was conducted by adopting the roll towel method (Anon., 1985) at 25 æ 3°C and 95 æ 3 per cent relative hymidity. At the end of 14 days, number of normal seedlings, diseased ones, deformed seedlings and dead seeds were counted and percentage of germination was calculated. Ten seedlings were taken at random from each replication from each replication from standard seed germination test and the length of root and shoot length of each seedling was measured. The seedlings were then dried in a hot air oven at 85°C for 24 hours, cooled in desiccator and weighed. Vigour index was calculated using the following formula and expressed as whole numbers (Abdul Baki and Anderson, 1973).

Vigour index = Germination percentage x Dry matter production (mean of ten normal seedlings in mg)

RESULTS AND DISCUSSION

Slurry treatment of seeds with carbendazim and tricyclazole (2 g/kg) significantly increased the seed germination to the maximum extent. Trichclazole was more effective when applied as slurry than as dry seed treatment, while carbendazim was equally effective both as slurry and dry seed treatment. Mancozeb and thiram were less effective when compared to tricyclazole and carbendazim. Captan as both slurry and dry seed treatment did not improve seed germination.

The seedling height (root length + shoot length) was increased significantly by

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Table 1. Effect of fungicides on rice seed germination, seedling height, dry matter production and seedling vigour

Chemicals	Dosage g/kg	Seed germination(%)	Seedling* height(cm)	Dry matter* production(mg)	Vigour index
Slurry treatment					
Tricyclazole	2	90 (71.56)^{ab}	36.44^{ab}	15.1^{a}	1359^{a}
	4	84 (66.59)^{abc}	30.66^{bc}	14.1^{a}	1184^{ab}
Carbendazim	2	90 (71.56)^{ab}	38.72^{a}	14.7^{a}	1322^{a}
Mancozeb	4	76 (60.75)^{cde}	33.27^{abc}	14.44^{a}	1095^{bc}
Thiram	4	70 (56.80)^{de}	33.35^{abc}	14.0^{a}	981^{cd}
Captan	4	68 (55.89)^{ef}	31.58^{bc}	13.6^{ab}	923^{d}
Dry seed treatment					
Tricyclazole	2	82 (64.93)^{bc}	31.35^{bc}	13.5^{ab}	1107^{bc}
	4	82 (64.93)	31.60^{bc}	13.2^{abc}	1082^{bc}
Carbendazim	2	88 (69.99)^{ab}	34.62^{abc}	13.8^{ab}	1213^{ab}
Mancozeb	4	72 (58.11)^{de}	31.12^{bc}	12.8^{abc}	921^{d}
Thiram	4	64 (53.16)^{ef}	32.36^{bc}	11.0^{cd}	704^{e}
Captan	4	64 (52.0)^{ef}	30.41^{c}	11.6^{bcd}	741^{e}
Control	–	54 (47.3)^{f}	30.1^{c}	9.8^{d}	529^{f}

* Mean of 10 healthy seedlings; Figures in parentheses are transformed values; In columns, values followed by same letters on par (P = 0.05) by DMRT

tricyclazole and carbendazim at concentration of 2 g/kg of seed.

By slurry treatment of seeds, dry matter production was significantly increased by all treatments when compared to control. Except captan and thiram all other fungicides significantly increased the dry matter content by dry seed treatment.

Slurry treatment of seeds with carbendazim and tricyclazole (2 g/kg) recorded maximum vigour index values. All the other treatments significantly increased the vigour index value but it was much less in

The seed treatment with mancozeb (Dharam vir *et al.*, 1970; Chakrabarti and Mohanty, 1975), carboxin, PCNB and carbendazim (Kannaiyan *et al.*, 1977), benomyl and panoctine (Viswanathan and Mariappan, 1980), carbendazim and mancozeb (Kauraw, 1986) has been reported to increase seed germination and seedling vigour in rice. Rice variety, method of treatment, fungicide concentration used and extent seed-borne infection are known to influence the results.

Tricyclazole at the rate of 5.3 g/kg of seed as slurry treatment did not cause any phytotoxicity on the seedling. However,

tricyclazole CGA 49104 at 8 g/kg of seed slightly reduced seed germination, especially when seedling population was high in plastic trays (IRRI, 1983).

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NON-DESTRUCTIVE METHOD OF MEASURING VOLUME AND WEIGHT OF PAPAYA FRUIT

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ABSTRACT

An attempt was made in papaya cultivars non-destructive analysis by simple linear regression, Y = + bx. The fruit volume (Y) can be predicted through both by fruit length (X), (Y = - 1167.29 + 147.38 x; r = 0.9627**) Circumference (Y = -1091.99 + 59.21 c) r = 0.9433, and also by the product of height (X) and circumference (C) (Y = -213.0 + 2.01 (X x C); r = 0.9858**). The fruit weight (Y) can also be predicted both by height (X) (Y = - 1170.43 + 151.09 x; r = 0.9402**) and product of X x C (Y = -191.61 + 2.06 X; r = 0.9873**) This sutdy will be helpful to measure the volume and weight of the fruit in situ without destroying the fruit.

INTRODUCTION

The papaya (*Carica papaya* L.) is an important tropical fruit crop in India. It is an usual practice to remove the young fruit the plant for studying the growth and development of papaya fruit. Sometimes the young fruits have also to be removed for studying the relationship between volume and weight of the fruit with the apain produced. This kind of practice lead to the removal of large number of young fruits before ripening. In view of this fact, an attempt has been made in this present study to measure the volume and weight of the payaya fruits *in situ* without removing the fruit from the plants.

MATERIALS AND METHODS

The experiment was laid out under field conditions at Tamil Nadu Agricultural University, Coimbatore. The chosen varieties were namely, Co.1, Co.2, Co.4, Co.5, Sunrise solo, CP-18, Washington, Redflesh, Giant and Pusa 1-45 (V). Five fruits in each variety were removed at 30 days after fertilization upto 150 days with an interval of 30 days. The volume was measured by water displacement

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