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PROTECTION OF SEEDS OF PEARL MILLET FROM INFESTATION BY THE WEEVIL SITOPHILUS ORYZAE LINN.

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ABSTRACT

The persistant effect of the insecticides and fungicides on S. oryzae was studied for a period of five months by introduction of adults of S. oryzae at the commencement of the experiment and subsequently at monthly intervals. Among the three insecticidal seed treatments, malathion and HCH were significantly superior to activated kaolin in effecting the mortality of the weevil pest over a storage period of five months. Among the three fungicidal seed treatments, thiram and carbendazim + thiram were significantly better than carbendazim in causing mortality of S. oryzae. The standard treatment DDT+thiram was found to be superior to the other treatments in causing greater mortality of S. oryzae by its persistant effect.

INTRODUCTION

The weevil *Sitophilus oryzae* Linn causes severe losses to the pearl millet seeds in storage. Mixing seeds with insecticides or their meterials as methods of protection from damage by insects during storage has been adopted by several workers. Ramakrishnan and Narayanaswamy (1963) reported that sorghum seeds mixed with DDT 10 per cent at 1:300 were protected for a period of one year from redgrain beetle. Pai *et al* (1985) observed that malathion 0.5 to 1.0 per cent used to impregnate jute bags yielded cant per cent kill of *S. oryzae* up to 120 days. Salunk he (1985) reported that sorghum seeds treated with DDT at 50, malathion at 50 and fungicide captan at 200 ppm resulted in good protection against *S. oryzae*. The present study reports the efficacy of insecticides and fungicides as seed protectants by causing mortality of *S. oryzae* during storage.

MATERIALS AND METHODS

Sundried pearl millet seeds of cultivar Co7 were treated with HCH 10% dust malathion 4% dust and activated Kaolin (insecticides) at 10g per kg of seed and carbendazim at 2g per kg, thiram at 6g per kg and and carbendazim at 2g + thiram at 6g per kg (fungicides) alone and in combinations with both insecticides and fungicides. In the combination treatments with insecticides and fungicides were treated first and 24 hours later with insecticides and the seeds were stored in cloth bags. A standard slurry treatment of DDT 5% WP at 200 mg with 2g of thiram per kg of seed as recommended in the crop production guide 1985 of TNAU was also included (Anon. 1985). In the slurry method seeds were treated with chemicals in a flask in which 0.125g of gum and 5ml of water per kg of seed were added and shade dried for one day. One lot of seed was left

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untreated to serve as control. The treated and untreated seeds were stored for five months at laboratory conditions (30 ± 2°C) with a relative humidity varying from 60 to 90 per cent.

Standard cultures of the weevil were maintained in glass trough of 10 cm diameter and 25 cm height at room temperature.

One hundred gram of seed samples were drawn from each treatment out of the treated and untreated and stored seeds and kept in a plastic container, 6.5 cm diameter and 8 cm height. Ten adults of *S. oryzae* were introduced into each container and covered with the lid having perforations. Three replications were maintained. The contents of the container were examined at monthly intervals and the observation on live and dead weevils recorded. Where the weevils were dead and were short of ten liven ones were introduced into the seed at every monthly observation. The analysis on the effect of fungicides and insecticides was done after transforming the data into angles. Prior to transformation wherever 100 per cent mortality and 'O' mortality were observed the same were converted using the formula mentioned below (Snedecor, 1956)

For 100 per cent mortality $100 - \frac{100}{4n}$

O mortality $0 + \frac{100}{4n}$

Where 'n' is the number of observation.

RESULTS AND DISCUSSION

Among the insecticidal treatments, malathion and HCH were significantly superior to activated kaolin in effecting the mortality of the weevil pest over a storage period of five months (Table 1). Among the fungicidal treatments thiram and carbendazin + thiram were significantly better than carbendazim in causing mortailty of *S. oryzae* (Table 2). All the three fungicides though were effective to an appreciable extent against *S. oryzae* their efficacy was not comparable to that of HCH and malathion. However, they were found to be as effective as activated kaolin. Malathion alone or in combination with all the three fungicidal treatments had equal efficacy against *S. oryzae*. HCH alone or in combination with all the three fungicidal treatments had equal efficacy against *S. oryzae*. HCH alone or in combination with thiram was on par with malathion in combination with either thiram or carbendazim + thiram. All other combinations were inferior to the above treatments. No mortality of *S. oryzae* could be noticed in the untreated check (Table 3).

The efficacy of malathion in the control of *S. oryzae* has been observed by Salunkhe (1985) and Pandey *et al.* (1985). It is interesting to note that the seed treatment with thiram and carbendazim + thiram appeared to be efective in causing mortality of *S. oryzae*. Ramadoss *et al.*, (1988) found that seeds of cowpea could be effectively protected from the bruchids *Callosolruchus maculatus* (F.) during storage by the use of fungicides *viz.*, carbendazim and thiram as seed treatment.

The standard treatment DDT + thiram was found to be significantly superior to all other treatments in causing greater mortality of *S. oryzae* by its persistant effect. The utility of DDT in the protection of sorghum seeds from *S. oryzae* has been recorded by Ramakrishnan and Narayanasamy (1963) and Radha *et al.* (1969).

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EFFECT OF DEPTHS AND LAND SHAPING METHODS FOR IRRIGATION IN MAIZE

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ABSTRACT

Field experiments were conducted at the Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore, during Kharif '86 and rabi 1986-87 to study the effect of depths and land shaping methods for irrigation on growth and yield of Co 1 maize. Irrigations were given at critical stages of the crop growth.

Irrigation with full depth (5 cm) in normal furrows (60 cm) produced the highest grain. Irrigating the crop with 50 per cent depth (2.5 cm) upto grand growth stage reduced the grain yield irrespective of the land shaping methods and the magnitude to reduction was greater under flat bed system. Irrigating the crop through narrow furrows (30 cm) upto grand growth stage and thereafter resorting to full depth by widening furrows resulted in 99.3 per cent of grain yield produced under flat bed system with full depth of irrigation resulting in a saving of 38.5 per cent of irrigation water.

When other factors being equal, the consumptive use of water increases with age of the crop till maturity stage. In maize moisture stress during tasseling, silking and milky stages significantly reduced the grain yield and however, stress at seedling stage did not appreciably reduce the yield (Thiyagarajan, 1981). Adoption of a particular system of irrigation depths on the method of land shaping (Minchael, 1978). Grain yield reductions to the tune of 33 per cent were observed with flood irrigation as against the furrow irrigation in maize (Mosier et al., 1986). Irrigations through wide based bed furrow resulted in comparable grain yield and higher water use efficiency as against normal furrows and check basin systems (SWC, 1987). The present investigation was taken up to study the effect of reduced depth of irrigation water upto grand growth stage under different methods of land shaping on growth and yield of maize.

MATERIALS AND METHODS

Field experiments were conducted during *kharif* 86, and rabi 1986-87 at the Department of Agronomy, Tamil Nadu Agricultural University, Coimbatore. There were five

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