Effect of Seed Treatment on the Germination of Rice Seeds Infected by *Trichoconis Padwickii* Gangulay*

ABI CHEERAN AND J. SAM RAJ **

Division of Plant Pathology, Agricultural College & Research institute, Vellayani

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The stackburn disease of rice caused by *Trichoconis padwickii* Gangulay is considered to be seed-borne. The causal fungus has been isolated from discoloured kernels by Tullis (1936) and also by Martin (1939). Padmanabhan (1949 & 1957) found that *T. padwickii* was the predominant fungus occurring internally in rice grains, the percentage infection ranging from 30–70.

Tisdale (1922) reported that surface sterilization of the seeds was of no value in checking seed injury. He suggested hot water treatment which consisted of presoaking the seed in tepid water for about 16 hours followed by immersion in hot water at 54°C for 15 minutes. It was reported from the Central Rice Research Institute, Cuttack, (1950-51) that both healthy and infected seeds of some varieties gave an improvement in germination when treated with Agrosan GN.

The disease is common in Kerala and in heavily affected fields, a very high percentage of the seeds are infected by the fungus, often causing discolouration of the glumes. The germination of such seeds was also found to be low. An attempt was therefore made to determine whether treating the infected seeds with Agrosan GN or hot water could provide significant improvement in germination.

Materials and Methods

Two varieties of seeds, namely, PTB. 12 and *Kunjathikarazhi*, were used in the present studies. Infected seeds of these varieties were collected from fields which were seriously affected by the disease. These samples showed about 80 per cent infection when incubated in moist petri dishes. Noninfected seeds of PTB. 12 collected simultaneously from a disease free locality were used for comparative purposes.

Two treatments were given.

1. *Fungicide treatment.* The seeds were treated with Agrosan GN, a fungicide containing 1.5 per cent mercury at the rate of one part for every 400 parts of seed by weight.

2. *Hot water treatment.* The seeds in this treatment were pre-soaked in cold

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** Research Assistant and Professor respectively.

water for 16 hours and then transferred to water maintained at 54°C for 10 minutes.

The treatments wore given to infected, as well as to healthy seeds. Untreated seeds served as control.

After the treatments, the seeds were put for germination in 15 cm pots and also in 10 cm petri dishes. In pots the seeds were sown 2.5 cm deep at the rate of 20 seeds per pot. Twentyfive seeds were placed in each dish. Eight petri dishes and twenty-five pots were used for each treatment. Observations were taken up to the 10th day after sowing.

Results and Discussion

Untreated, healthy PTB. 12 seeds gave 96 per cent germination in petri dishes while infected PTB. 12 and *Kunjathikarazhi* gave only 63.5 and 70.5 per cent germination respectively. In pots the percentage germination in all three cases was slightly lower for untreated and also for treated seeds (Table 1). The fungicide treatment did not result in any appreciable improvement in germination. The maximum improvement noted was only 1 per cent. Hot water treatment gave an improvement in germination of about 5 per cent from 63.5 to 69 in the case of PTB. 12 and from 70.5 to 75.2 in the case of *Kunjaihikarazhi* (Table 1).

TABLE I

Percentage germination of infected and non-infected Rice seeds treated with agrosan GN and Hot water

Variety	Agrosan GN		Hot water		Untreated control	
	In petri dishes	In pots	In petri dishes	In pots	In petri dishes	In pots
PTB. 12 (infected)	64.5	64.0	69,0	67.0	63.5	63.2
Kunjathikarazhi	72.0	71.2	75.2	73.0	70.5	69.0
PTB. 12 (non-infected)	95,5	95.0	95.6	96.5	96.0	93.6

The differences in germination between the two treatments and between treatments and control are not significant.

In petri dishes, spores of *Trichoconis* and other fungi developed abundantly on the untreated infected seeds of PTB. 12 and *Kunjathikarazhi* but no fungal growth was noted on the seeds treated with Agrosan GN and hot water.

Trichoconis padwickii is known to be internally seed-borne, and the absence of growth of the fungus on the seed treated with hot water indicates that the fungus is killed by the treatment. Whether Agrosan GN was able to eliminate the fungus from the deeper tissues of the seed cannot be said with certainty although no growth was observed on these seeds also because the presence of the fungicide on the surface of the seeds can be expected to inhibit the growth of the fungus.

The failure of hot water treatment to give significant increase in germination cannot be considered due to the impairment of germination as a result of the treatment, because the germination of healthy seeds treated in like manner was not affected.

It is likely that the non-germinated seeds have already lost their viability even before the treatment as a result of infection.

Summary

Infection in rice seeds by *Trichoconis padwickii* was found to reduce germination. Two varieties of seeds showing about 80% infection and giving only 63.5 and 70.5% germination were treated with Agrosan GN and hot water. A maximum of only 1% and 5% improvements in germination were noted in the case of Agrosan and hot water treatments respectively. The differences in germination between the two treatments and also between treatments and control were not significant. It is suggested that the non-germinated seeds would have lost their viability as a result of fungus infection.

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