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# SOME OBSERVATIONS ON SEED GERMINATION OF KALLAR GRASS (*LEPTOCHLOA FUSCA*)

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Extensive studies have been conducted on *Leptochloa fusca* (L.) Kunth (kallar grass) regarding its salinity/sodicity tolerance, nutrition and productivity on saline lands (Malik *et al.*, 1986). This grass easily propagates from root-stock and stem cuttings, thus information regarding its seed production and germination is scanty in the literature. Sinha *et al.* (1982) reported that germination of kallar grass seeds was adversely affected by osmotic tension but not by alkalinity; the viability of seeds used was very low (ca. 20%), and suggested the need for improving seed fertility/ viability of this promising species. The present paper reports some observations on germination of kallar grass seeds.

Effects of different levels of salinity: electrical conductivity (EC) of solution = 3, 5, 10, 15, and 20 dS/m, and soil moisture: 25, 50, 75, 100, and 125 % of water holding capacity (WHC) were investigated in separate experiments on germination of kallar grass seeds collected from the field at NIAB, Faisalabad (Pakistan) and seed obtained from Germany collected under green house conditions. Both seed-lots showed optimum germination in control (3 dS/m) and increase in salinity caused gradual decrease in germination (Fig. 1). A significant decrease in germination percentage compared to control was observed in salinity level of 10 dS/m. Higher salinity had even more adverse effects, however some seeds could germinate at 20 dS/m level. Percentage germination of German seed-lot was relatively higher particularly at low salinity.

Soil water content greatly affects germination of seeds; germination takes place only if a net gain in water content is possible. Percentage germination of both seed-lots was significantly higher at soil moisture levels ranging between 50 - 125 % WHC compared to that at 25 % WHC (Fig. 1). Optimum germination was obtained at 75 % WHC level for NIAB seed-lot and at 100 % WHC for German seed-lot.

In another study, seeds of kallar grass were collected in the first week of each month (June to December 1988) from saline fields near Lahore. Germination percentage was investigated, and number of total and viable seeds per g was determined for different months. Germinability of seeds collected during July to September (monsoon period) was relatively lower than those collected in other months for which germination percentage was not very different (Fig. 2). Total number of seeds per g (an indirect measure of seed size) varied between seed-lots collected in different months; however seed size showed a slightly increasing trend from June to December. Further, the seed size did not have any correlation with germination percentage and thus the viability of seeds (Fig. 2). Post-monsoon period seems appropriate time for seed collection with respect to size and viability.

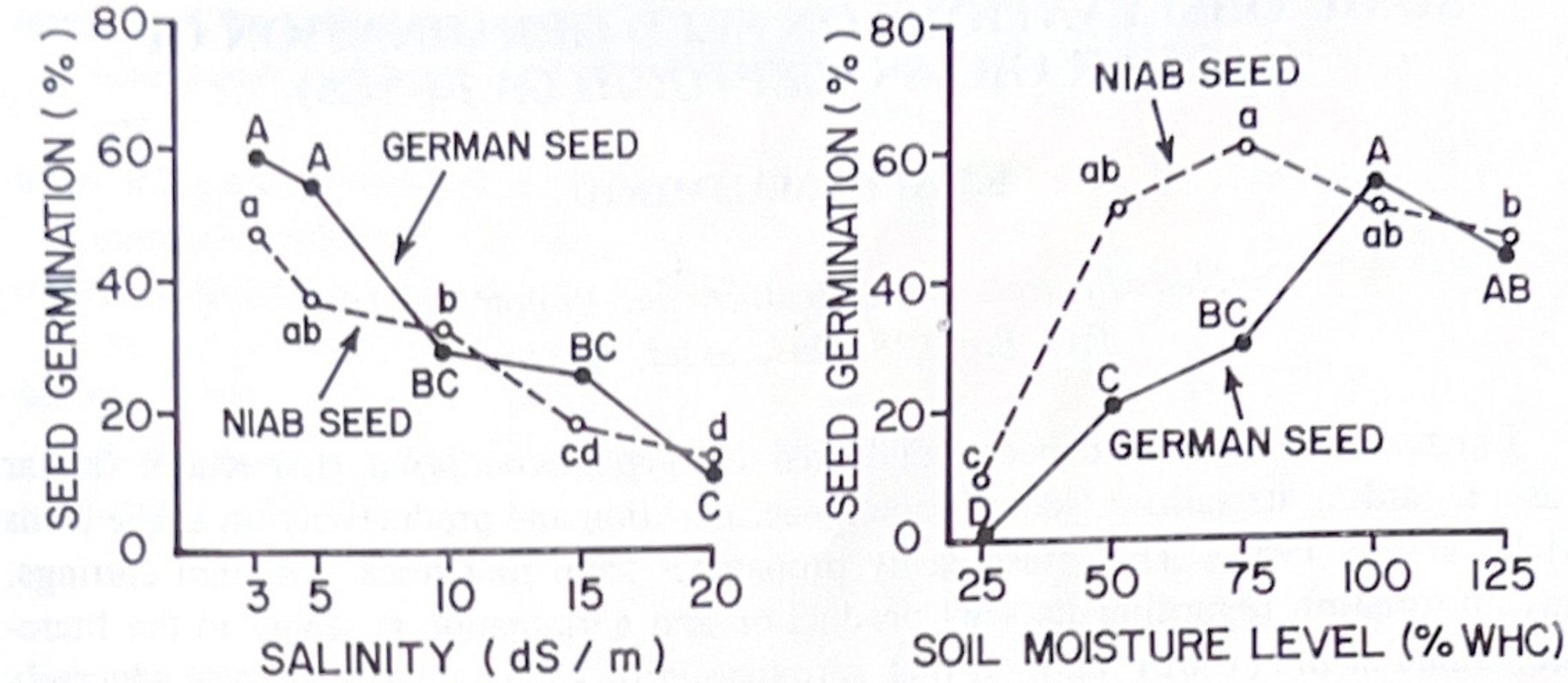


Fig.1. Effects of different levels of salinity (left) and soil moisture (right) on seed germination of kallar grass. Values shown are means of 4 replicates each with 20 seeds. Values sharing same letters are not significantly different at $P = 0.05$.

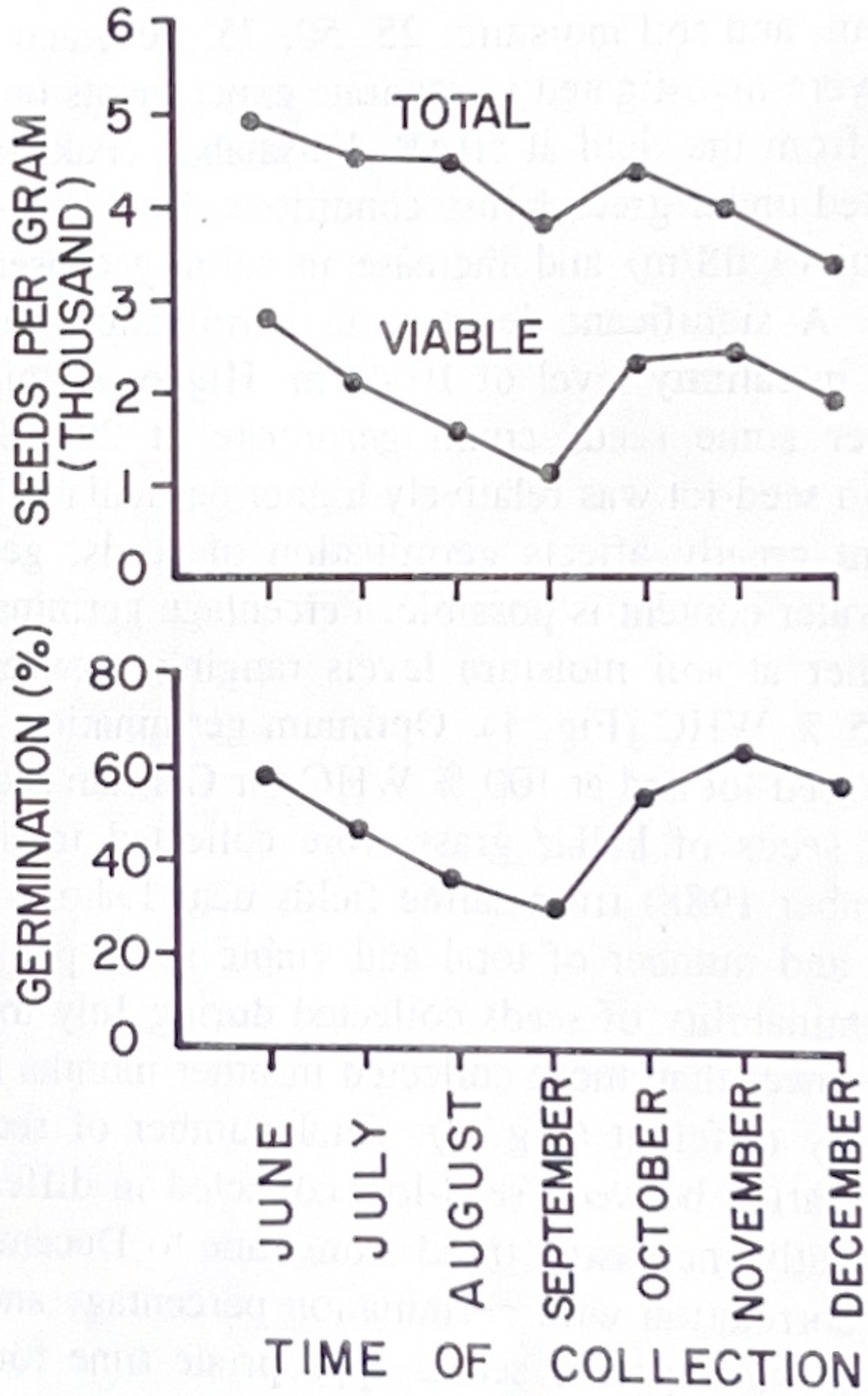


Fig.2. Percentage germination and number per g of kallar grass seeds collected in different months. Values for germination percentage are means of 4 replicates each with 20 seeds and for seed number of 2 replicates.

The seeds of kallar grass gave optimum germination in non-saline medium and in soil having ample moisture, a common response also reported in other species (Mahmood *et al.*, 1996). Despite high salt tolerance during subsequent growth (Sandhu *et al.*, 1981), the grass is sensitive at germination and seedling development stages. Therefore, its propagation from seeds seems difficult under salt and/or water stress conditions. The results suggest that for propagation through seeds, plants may be established under favourable conditions and then be spread vegetatively for introduction in to stress environments. The seeds may be collected at suitable time and mature spikes be picked to obtain better germinability.

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# DETECTION OF *ALTERNARIA PADWICKII* (GANGULY) M.B. ELLIS, THE CAUSE OF STACKBURN DISEASES OF RICE

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*Alternaria padwickii* (Ganguly) M.B. Ellis (Syn., *Trichoconis padwickii* Ganguly) is an important seed-borne fungus which causes stackburn disease of rice (Noble & Richardson, 1968). The fungus occurs widely in the rice-growing countries of the world (Ou, 1985; Khair *et al.*, 1988; Rodriguez *et al.*, 1988; Shetty & Shetty, 1992). *A. padwickii* has also been found widely distributed as a common seed-borne fungus in different rice cultivars in Pakistan (Kamal & Moghal, 1968; Khan *et al.*, 1974). Using blotter and agar plate methods, it has been usually difficult to detect and isolate *T. padwickii* in pure culture due to the growth of other seedborne fungi such as *Pyricularia oryzae, Drechslera oryzae* and species of *Curvularia, Drechslera* and *Fusarium* on rice seeds (*Neergaard*, 1977; Khan *et al.*, 1988). A comparative study of various methods was therefore, carried out to find more suitable method by which *A. padwickii* could be detected and isolated in pure culture from rice seeds.

Seeds of 10 rice varieties collected from different parts of rice growing areas of Sindh and Punjab were examined using blotter, agar plate and deep freezing methods as recommended by ISTA (Anon., 1976). Seeds were disinfected with 1% solution of NaOCl for 5 minutes for the removal of surface fungi. Untreated seeds were kept as control. After incubation for 4 to 8 days each seed was examined under the stereoscopic microscope for the characteristic pinkish coloured colonies of *T. padwickii*. The frequency of occurrence of *T. padwickii* in 10 rice varieties is given in Fig.1. Factorial analysis of variance (FANOVA) showed that all the three isolation methods used viz., deep freezing, agar plate and blotter method differed significantly (p 0.001) in the isolation of *A. padwickii* from different rice cultivars both in surface disinfected and untreated seeds. Interaction of isolation methods, surface disinfection of seeds and rice cultivars were found significant (p.0.001). The frequency of isolation of *A. padwickii* was 1.0-6.7% in agar plate method, 1.0-9.5% in blotter and 1.0-14.5% in deep freezing method. In agar plates the colonies of *A. padwickii* started appearing from the 5th day upto 8th day. *A. padwickii* could be identified on Petri plates with pinkish colour of colony because the conidial formation was poor or scanty. In blotter method, the colonies of *A. padwickii* became evident on 4th day on seed coats and conidial formation was observed after 6th day. In deep freezing method, however, *A. padwickii* produced characteristic pinkish colour around the diseased seeds and conidia were produced abundantly on the blotters earlier than in agar plate method. It could therefore be

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suggested that the deep freezing method was more suitable than the agar plate or blotter method for the isolation of *A. padwickii* from the seeds of various rice varieties and it should be preferred for the detection of *T. padwickii* in seed health testing laboratory.

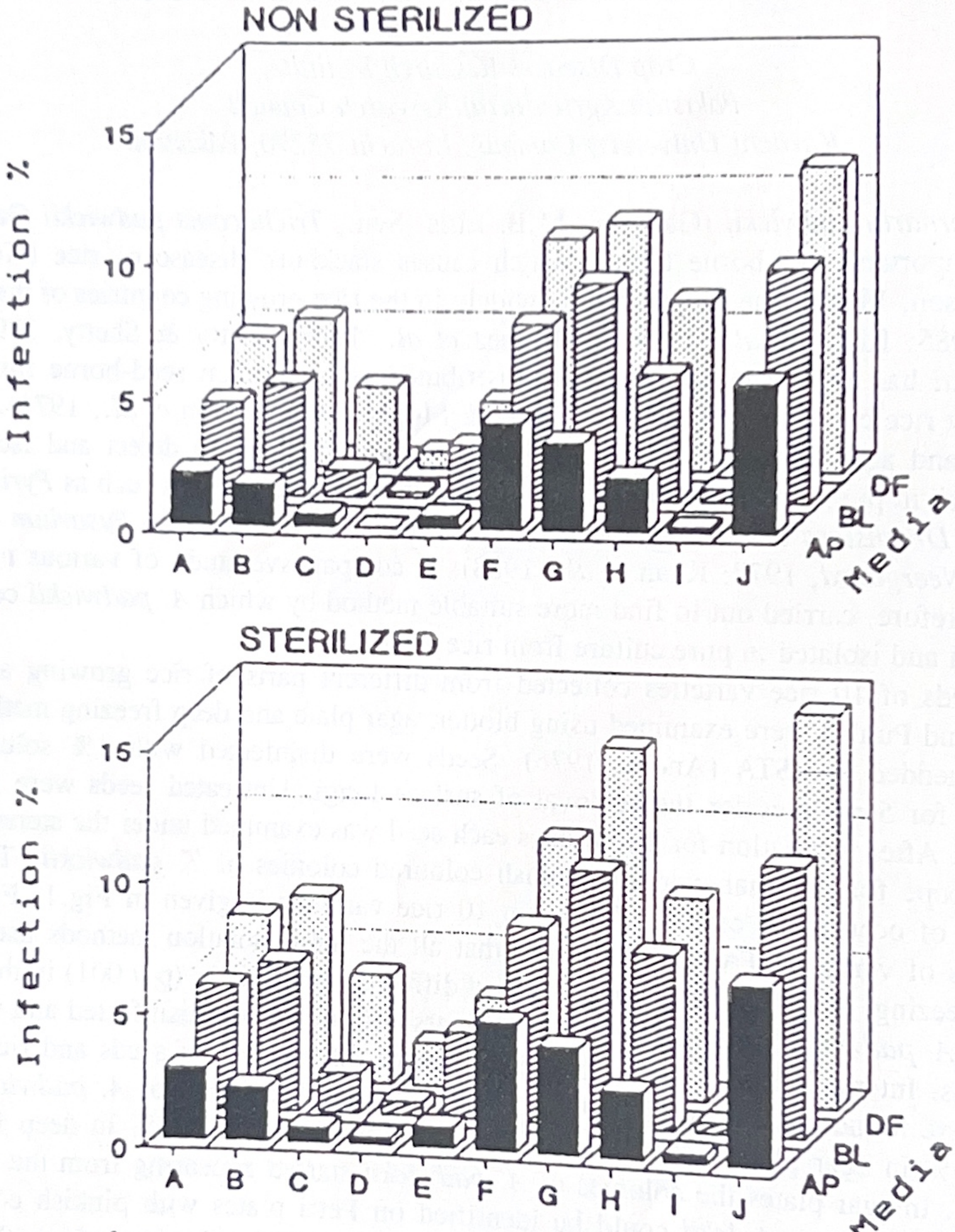


Fig.1. Frequency of occurrence of *Trichoconis padwickii* in 10 rice cultivars using blotter (BL), agar plate (AP) and deep frezing methods (DF) of isolation.
A = DR-82, B = DR-83, C = IRRI-6, D = IRRI = 2053, E = IRRI-72, F = Jajai-77, G = Kangni-27, H = KS-282, I = B-385, J = Son. Sugdasi.
$LSD_{0.05}$ (Isolation methods) = 0.28
$LSD_{0.05}$ (Sterilized condition) = 0.23
$LSD_{0.05}$ (Cultivars) = 0.52.

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