

Drill sowing of pregerminated rice seed: effect of rainfall on plant stand

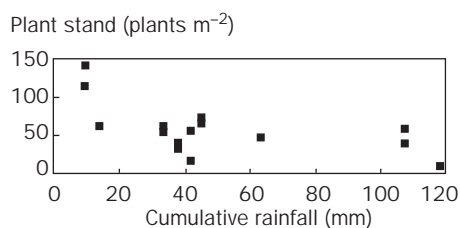
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In recent years, wet seeding of rice (*Oryza sativa*) has gained in popularity throughout Asia, primarily because of the scarcity of available labor. With this system, rice is usually broadcast, but drill-seeded rice in rows above or below (anaerobic) the soil is an option that has the advantage of facilitating manual weed control. During the 1995 dry season (DS), the anaerobic seeding method was used on 32 fields covering 8 ha at the IRRI experiment station. Results were promising—stand establishment was visually rated as good and the average yield of 5.4 t ha⁻¹ was reasonable.

Given the success in the 1995 DS, the anaerobic seeding method was again used on 19 fields during the 1995 wet season (WS). Fields were prepared by wet disk harrowing and puddling using tractors before a final land leveling using hand tractors. Seed was germination-tested, presoaked (24 h), and then incubated for 24 h. Seed was sown at a rate of 80 kg ha⁻¹. After emergence, crop establishment in all except two fields was considered extremely poor, with less than 100 plants m⁻². (Fifty percent emergence would equate to approximately 160 plants m⁻².) Germination was not a factor because all seed had a germination percentage above 95%. This result was particularly worrisome given the success of the method in the previous season.

When rainfall results for the 1995 WS were compared with planting dates and emergence, it was apparent that rainfall at planting had a serious negative effect on stand establishment (see figure), with the relation described by the equation:

$$\begin{aligned} \log(\text{crop establishment [plants m}^{-2}\text{]}) \\ = 1.97 - 0.0058(\text{cumulative rainfall [mm]}); \\ r^2 = 0.44 \end{aligned}$$



Plant stand (plants m⁻²) vs cumulative rainfall (from day prior to sowing to day 3 after sowing).

We include rainfall on the day prior to sowing because this will affect soil consistency at the time of sowing. Small amounts of rain at planting clearly had strongly negative effects on crop establishment, with the effect appearing to be significant at rainfall rates as low as 10 mm (see figure). This study supports the work of others on the importance of good water management at planting.

Field observations suggested that at least three factors were involved: (1) rainfall buries seed under a layer of mud and water, (2) rainfall trapped in a field hinders germination, and (3) seed washed to the top of the soil was more prone to be eaten by birds. One possible response to the first two factors is to improve field drainage, including the use of small canals or canalettes. Because anaerobic seeding seems to function in some regions even under rainy conditions, we speculate that soil texture and drainage that will affect the development of anaerobic conditions around the seed are important to the success of the technology.

Although broadcast wet seeding was not included in this study, the negative effect of rain on germination in that system has been observed in other fields. ■



Effect of planting geometry and N levels on grain yield of hybrid cultures

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The influence of planting geometry (20 × 15, 15 × 15, and 20 × 10 cm) and N levels (90 and 150 kg ha⁻¹) on the productivity of two rice hybrids (TNH1 and TNH2) was evaluated in comparison with Rasi and Jaya as standard checks during the 1992 wet season. Planting densities of 0.33–0.50 million hills ha⁻¹ did not significantly influence the productivity of the test hybrids and varieties. The yield response to N application was significant up to 150 kg N ha⁻¹. The interaction effects among treatments were nonsignificant. Jaya produced the highest grain yield (5.1 t ha⁻¹). Rasi and TN1 were on a par in grain yield, but TNH2 recorded the lowest grain yield of 3.1 t ha⁻¹. Our results indicate that maintaining a plant population of 0.33–0.50 million hills ha⁻¹ and a higher N application (150 kg ha⁻¹) are required to achieve higher grain yields in hybrid rice. ■

Farm machinery

An improved suction apparatus for sampling invertebrate communities in flooded rice

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Arida and Heong (IRRN 17(6):30–31, 1992) invented a petrol-driven suction apparatus (hereafter called the original Blower-Vac sampler) to replace the battery-powered FARMCOP for sampling invertebrates in flooded rice. In this note, we report on several design and performance improvements in the original Blower-Vac sampler.

The improved suction apparatus (see figure) shortens (by 0.6 m) the path that air, water, and invertebrates travel through, beginning with a 1.5-m-long rubber hose (2 cm diam), an inverted plastic soft drink bottle with its bottom removed, and a pair of open-ended glass vials glued end-to-end with a fine mesh strainer in between that permits only water to pass. The water trap attaches to a 12-cm rubber stopper and fastens underneath the machine blower. Elastic cords, hooked to the