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SEED DORMANCY IN RICE WITH SPECIAL REFERENCE TO COASTAL ECOSYSTEM

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Seed dormancy is defined as the incapability of seeds to germinate in spite of prevalence of favorable conditions for the process of germination such as availability of water and oxygen. (Finch-Savage and Leubner-Metzger, 2006). Dormancy in paddy seed is mainly imposed by chemical as well as physical factors of the hull and pericarp. It has been stated that the influence of the hull in imposing dormancy was stronger and more prolonged than that of the pericarp. Dormancy is also a genetically controlled trait but upto a certain extent also depends on the environmental factors especially at the time of harvest. The ratio of hormones such as Gibberellic acid (GA) and Abscisic acid (ABA) in the seed antagonistically control the processes of seed germination and seed dormancy (Chen *et al.*, 2020).

Rice and Seed Dormancy

Rice (*Oryza sativa* L.) is the major food crop grown globally over a range of different ecosystems. In India, rice cultivation provides livelihood and is a major source of daily caloric intake. Seed dormancy is an important physiological trait for varieties cultivated in the wet season especially in the irrigated coastal ecosystem where monsoons coincide with the harvest time of the crop. In case dormancy doesn't exist, would prone the seed to preharvest sprouting especially when it reaches the maturity stage which is undesirable as it results in reduction in the production and grain quality as well (Marzougui *et al.*, 2012). The loss of yield can go upto the extent of 80-85%. Hence, there is a need for seed dormancy. However, prevalence of higher seed dormancy in paddy results in poor seedling germination as well as establishment resulting in non-uniformity. Hence, suitable period of seed dormancy is needed and knowledge on the underlying molecular mechanisms that is required to improve seed quality for further utilization in plant breeding programmes.

In coastal regions, generally during the wet season the chances of coincidence of cyclonic storms at the time of harvest is high. During the dry season there are chances of occurrences of summer showers. Hence, dormancy period of the variety is one of the essential criteria while selecting the variety for cultivation. So, it is advisable to select varieties having minimum of 2-3 weeks of seed dormancy. In case it becomes imperative to use varieties with dormancy period of more than 3 weeks then it is essential to break dormancy before sowing in those varieties to attain good seedling percentage of atleast 80 per cent.

In case the standing crop or harvested seed on threshing floor get wet by rains, the standing crop can be sprayed with 5 percent of salt solution and in case the produce is on the threshing floor, one kg of salt mixed with 20kg bran can be broadcasted for one quintal of seed and should be piled up. By doing this germination can be arrested upto certain extent.

Breaking of Seed Dormancy

Seed dormancy can be broken by subjecting the seeds to a temperature of around 50°C for 3-4 days. But this method is applicable only to laboratory conditions and not so readily available to farmers. In field, where dormancy has to be broken for a large amount of seed, chemical treatment with concentrated nitric acid solution can be adopted. It is recommended that in paddy varieties possessing 2-3 weeks dormancy, 0.63% concentrated nitric acid solution (i.e., 6.3 ml of concentrated acid in 1 liter of water) can be used by soaking the seeds for 24h and then incubated for a day and further use them for nursery. In varieties possessing strong dormancy as in the case of MTU 1001 (Vijetha), where dormancy can last upto 6-7 weeks, 1 percent concentrated nitric acid solution (10 ml of concentric nitric acid per liter of water) can be used. Breaking the dormancy will ensure a good germination percentage of the seed.

Conclusion

Seed dormancy is a vital trait of a variety. In coastal areas, it is advisable to select genotypes having minimum 2-3 weeks dormancy to avoid preharvest germination in case of rains coinciding during the maturity phase. If the gap between the seasons is less to ensure minimum 80 percent seed germination to break the seed dormancy it is advisable to treat the seeds with conc. nitric acid and then use the seed for sowing.

References

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