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Nitrogen Supplying Plants as a Companion of Kharif-rice in dual cultivation

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Introduction

Rice is the staple food in most of the tropical and some temperate regions of the world. Farmers now almost dependent on chemical fertilizers to meet this huge demand. Nitrogenous fertilizers are the most commonly used chemical fertilizer, which is extremely harmful to the soil and the environment. The use of excess nitrogen fertilizer usually reduces the structural strength as the cell wall of the plant becomes thinner. The stems of the tree are longer and softer than usual and the leaves are heavier than the stems. As a result, the tree tilts easily. In this condition the resistance of the plant is reduced and diseases and insects can attack easily. So the amount of chemical fertilizer can be reduced by using eco-friendly organic sources. It is a common practice to cultivate nitrogen supplying plants before planting paddy and mix it with soil or cultivate it elsewhere and take it from there and mix it with soil (green manure). Here we will discuss the new method of mixing nitrogen deficiency. In this case, like green manure, symbiotic plants, azolla or blue green algae are cultivated with rice as a nitrogen supplier. Organic manures can play an important role in efficient nutrient management. But these manures are bulky in nature and low in nutrient content, hence the substitution is highly required. Green manure, another possible option of providing nutrients to crops from organic sources, but it has got some limitations. The viable option left behind that is brown manuring & dual culture of Azolla with transplanted rice as a tool for integrated nutrient management. These two methods are capable of supplying all nutrients to the crops which is also considered beneficial for weed management as well as improving soil properties.

Brown manure

In this method, legumes (such as Dhaincha) are cultivated with paddy and mixed with soil at regular intervals to provide nitrogen and other organic matter.Dhaincha (*Sesbania* sp.) is cultivated with kharif rice, sown in rows. It does not require separate land preparation or interim work. That is why after two to three days of paddy transplanting, Dhaincha seeds are broadcasted at the rate of 15-20 kg per ha at 3 DAT of rice. After 30 DAS, when the Dhaincha plants are two to three feet tall and dark green in color, they are sprayed with a herbicide called 2,4-D Ethyl Ester 1.0kg/ha (Samant, 2017). As a result, the whole plant gradually turns brown and falls to the ground. That is why it is called brown manure.

Fig 1.Brown manuring

Fig 2- Azolla in paddy field

Azolla

Azolla is a type of aquatic fern. In their leaf arrangement, a type of blue green algae called Anabaena lives in a mutually beneficial symbiotic relationship. This bluish green algae has nitrogen binding capacity, which is exchanged with azalea which has photosynthesis ability. Azolla can be easily grown in paddy fields all year round. For this purpose, 10 to 10 cm deep water should be left in the paddy field and 270-350 kg azolla should be spread per ha. They will cover the entire land in 25-30 days by growing organelles. Azolla will turn into decomposed organic manure in 2-3 days as soon as the water is removed from the soil. This method can add 35-40 kg nitrogen per ha and azolla also improves soil health (Singh *et al*., 1984).

Some beneficial effects of these two methods

They increase the amount of organic matter in the soil along with nitrogen. As a result soil structure is improved and water holding capacity is increased.
Paddy can accumulate adequate amount of food for a long time as the present plant food is gradually released.
The cost is extremely low.
Weed infestation is much less.
Paddy yield may increase by 32-36%.

References

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