

Brown Manuring for Effective Weed Management and Sustainable Yield in Rice

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SUMMARY

In India, modifying the farming practices and increasing attention towards the development of resource conservation practices is needed. In the current scenario of agriculture, developing ecofriendly approach of weed control is more preferable so as to protect the natural resources such as soil flora and fauna including human being and animals in a holistic manner. Application of inorganic fertilizers in large quantities over a longer period of time results in imbalance in the supply of other nutrients, also destroy soil structure. Low-value bulky organic manures is expensive and option like green manuring may be used to add organic manure but it takes some time to decomposed after incorporation into the soil and also requires more number of tillage operations which leads to loss of soil moisture. So, the applicable option left behind is the brown manuring as a tool for integrated nutrient management and is popular recently for paddy eco-system. Brown manuring is capable of supplying all nutrients to the crops which is also considered beneficial for weed management as well as improving soil properties.

INTRODUCTION

Rice (*Oryza sativa* L.) is the staple food for more than half of the world's population and is grown in at least 95 countries (IRRI, 2002). It is a nutritious cereal crop, provided 20% of the total calories and 15% of protein requirements of world population. In India, Rice was cultivated in an area of 43.5 million hectares with a production of 104.41 million tons and productivity of 3.60 metric tons per hectare (Anon, 2017). The rising cost of cultivation and also less availability of inputs is the present situation of agriculture. As used of chemical fertilizers caused long-term imbalances in soil pH and fertility and due to increasing in the cost of chemical fertilizer, brown manuring would became an alternative approach for higher production and net benefit. Traditionally, farmers grow green manure crops before rice cultivation and incorporate it by ploughing before transplanting rice seedlings and this requires more number of tillage operations for green manuring leads to loss of soil moisture and also it needs additional irrigation water and fuel costs for incorporation and also requires a period of about 45-60 days from seeding to decomposition with proper temperature and optimum moisture conditions after incorporation. So, brown manuring is the alternative possible practice to the green manuring. Brown manuring is simply a 'no-till' version of green manuring, using a post emergence and non-selective herbicide to desiccate the green manuring crops before flowering instead of using cultivation. After spraying, the color of green crops becomes brown due to loss of chlorophyll, hence the process is called as brown manuring (Iliger *et al.* 2017).

Why Brown manuring ?

An advanced efficient nutrient and weed management strategy which has emerged in India is brown manuring, crucial to achieve crop yield sustainability. The practice of brown manuring leads to reduction of weed population by nearly half without any adverse effect on rice yield. It aims at suppressing the weeds by shading. Like green manuring, brown manuring also have positive effects on soil organic matter, enhancing the soil health, improving the soil physio-chemical properties and its associated microbes. Brown manuring can replace 25 per cent of nitrogenous fertilizer with the overall improvement of soil health without affecting the economical attributes and saving the soil health (Sarangi *et al.* 2016). Pest attack was also reduced by the method of brown manuring.

Potential Brown Manuring Crops

Brown manuring can be practiced by raising the crop like sesbania as mixed or inter crop and killing it by applying nonselective herbicide. Other leguminous green manuring crops like sunhemp, dhaincha, cowpea, lentil, etc. are also applicable. Any pulse crop may be grown for brown manuring. Kharif pulses which have good foliage and rapid growth are more suitable for this purpose.

The Main Advantage of Using Legume Crops for Brown Manuring :

- Competes with weeds thus reducing their growth.
- Reduce the nitrogen requirement of plant as legumes fixed nitrogen from the atmosphere through bacteria present in their nodules.
- Preventing the loss of water due to evaporation and thus help in water conservation.

CONCLUSION

Brown manuring in association with pre-emergence herbicides destroy the weeds population and also help in improving the soil physio-chemical properties like organic matter, soil aggregation, available nitrogen, concentration of available nutrients in the root zone and reduces the bulk density, N-losses through leaching, soil erosion and decreases the moisture evaporation from the soil. It will give comparable yield and higher economic returns to rice.

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