



Enriching Agriculture - Brown Manuring

A.Selva Rani, K.Kavitha, S.Nazreen Hassan, R.Latha and S.Suresh

Krishi Vigyan Kendra , Kanyakumari

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Abstract

Brown manuring, a time-tested agricultural practice, involves the incorporation of organic matter derived from crop residues and cover crops into the soil during the fallow period of a field. Brown manuring serves as an eco-friendly and cost-effective approach to improving soil health and fertility. By returning organic matter to the soil, it promotes nutrient recycling, enhances soil structure, and increases water retention capacity. Moreover, it helps suppress weed growth and reduces the need for synthetic fertilizers and pesticides, thereby contributing to the conservation of natural resources and minimizing environmental pollution.

Introduction

An advanced weed management strategy which has emerged in India is brown manuring. It aimed at suppressing the weeds without affecting the soil physico and chemical properties and its associated microbes. It can be achieved through raising green manure crops such as *Sesbania (Dhaincha)*, sunhemp etc. as inter crop and killing the same by application of post-emergence herbicides. The killed manure is allowed to remain in the field along with main crop without incorporation / in-situ ploughing until its residue decomposes itself in the soil aiming to add organic manure beside weed suppression by its shade effect. Given the post-emergence spray on green manure leaves resulting in loss of chlorophyll in leaves showing brown in colour is referred to as brown manuring. Brown manuring also helps in suppressing the weeds upto 50% of total weed population on the account of the shade effect of killed green manure till 45 DAS upto which the critical period of crop weed competition.

Brown manuring

Brown manuring is a 'no-till' version of green manuring, using a non-selective herbicide to desiccate the crop (and weeds) at flowering instead of using cultivation. A follow-up treatment may be required to control survivors. The plant residues are left standing, helping to retain surface cover and soil structure. Generally, brown manuring in rice is the practice of growing *Sesbania* spp. and rice together, and when these *dhaincha* plants overtake the rice plants in height at about 25 days of co-culture, a weedicide 2, 4-D is applied to kill these *Sesbania* plants.

A variation on brown manuring is mulching, where the crop or pasture is mowed, slashed or cut with a knife roller and the residue is left lying on the soil surface. This mulch reduces soil



moisture loss through evaporation. Mulched residues break down more rapidly than for normal brown manuring because of the increased contact with soil and smaller pieces. Green manuring generally refers to the incorporation of a manure crop by tillage prior to seed-set or harvest. Under brown manuring, crops are killed by herbicide application to desiccate the crop and weeds, usually around flowering.



Brown Manuring

Crops used for brown manuring

Leguminous crops provide nitrogen as well as organic matter to the soils. Legumes can acquire nitrogen from the air with the help of its nodule bacteria. The legumes are also preferably used in green manuring crops Example: Sunnhemp, *Dhaincha*, Mung, Cowpea, Lentil etc

Benefits of brown manuring

Farmers typically cultivate green manure crops before the crop cultivation and introduce them by incorporating into soil. This process of green manuring involves a larger number of green manure tillage operations leading to a lack of soil moisture and increased labour cost, irrigation water and fuel costs for cultivation. Since there is no cultural operation during the brown manuring for manure crop incorporation it saves the cost of manuring. Farmers can grow the manure crop in the standing main crops hence, brown manuring is the alternative to green manuring.

Brown manuring increases the soil organic carbon content, there by supplying required nitrogen through biological nitrogen fixation (BNF) to component crop plants. Thus, a part of nitrogenous fertilizer (upto 25%) can be replaced by brown manuring. It increases the yield of the crops thereby improving the economic benefit of the farmers. It improves the soil health parameters like organic carbon content and earthworm population of the soil □ Brown manuring reduces the weed population in the early stage due to its high growth rate and competition with the weeds. Brown manuring has a positive impact on soil Physico-chemical properties viz., soil structure, organic carbon, bulk density and pH of the soil. □ Integration of herbicide/herbicides



with brown manuring markedly improved protein content in grain and protein yield than other management practices .

Conclusion

Considering the increasing cost of chemical fertilizers, brown manuring can be seen as an alternate path to higher production and productivity of the crops and therefore enhancing the income of farmers. Brown manure is the perfect cost-effective way in nutrient management strategy for crops to improve production and to restore soil quality which in need of today's agriculture. brown manuring represents a holistic approach to sustainable agriculture that aligns with principles of environmental stewardship and resource efficiency. By harnessing the power of natural processes, this practice offers multifaceted benefits, ranging from soil fertility improvement to biodiversity conservation, ultimately contributing to the long-term viability of agricultural systems.