

GREEN MANURING, A TOOL FOR SUSTAINABLE AGRICULTURE

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Intensive production and crop rotations containing few species reducing the organic matter content of soils. Significant soil degradation processes occur at a time of year when the soil is not covered with vegetation. The use of green manure crops has several advantages for the soil and for the next crop. The most commonly used green manure plants are leguminous and cruciferous species, and species which has large root system and develops great biomass. The most commonly used leguminous green manure species are common vetch (*Vicia sativa*), hairy vetch (*Vicia villosa*), white lupine (*Lupinus albus*), egyptian clover (*Trifolium alexandrinum*) and crimson clover (*Trifolium incarnatum*). Cruciferous green manure species are oil radish (*Raphanus sativus* conv. *Oleiformis*), white mustard (*Sinapis alba*) and tillage radish (*Raphanus sativus*). Other commonly used green manure plant species are phacelia (*Phacelia tanacetifolia*), buckwheat (*Fagopyrum esculentum*), black oat (*Avena strigosa*) and rye (*Secale cereale*). Leguminous green manure plants provide a source of nutrients for the subsequent plant, while some green manure plants loosen the soil with their deep-rooted roots and improving infiltration and hydraulic factors of the soil. Correctly chosen mixtures can reduce the need for fertilizers and pesticides in crop production. By taking advantage of these benefits, we can increase the yield of the next crop in an environmentally friendly and sustainable way. In an experiment set up by the Research Institute of Nyíregyháza (RINY) Institutes for Agricultural Research and Educational Farm University of Debrecen, we examined the effects of four green manure plants (lupine, common vetch, oil radish, buckwheat) on soil moisture content and yield of the subsequent crop. Green manure crops incorporated into the soil had a long-term effect on soil moisture content. In the growing season of the next crop, the moisture content of soils that treated with green manure proved to be more favorable during the drought compared to the areas without green manure treatment. The green manure value of lupine, spring vetch and oil radish proved to be equivalent to the yield-increasing effect of 80 kg N ha⁻¹ fertilizer in case of maize and triticale. In the case of oats the green manure value of spring vetch exceeded the effect of fertilization containing 80 kg N ha⁻¹ in terms of yield. The insertion of green manures into crop rotations could be a justified and well-founded alternative to sustainable nutrient replenishment methods, furthermore the use of green manure reduce CO₂ footprint and also contribute to the protection of soils.