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GREEN MANURES & COVER CROPS: PRACTICAL INFORMATION

This factsheet contains complementary information to the Best4Soil video on Green manures & cover crops: Practical information.

INTRODUCTION

The use of cover crops and green manures has some potential to control soil-borne diseases of field and horticultural crops. But as their immediate efficacy is lower compared to more radical methods, such as chemical soil disinfestation or heat treatments, they have to be used in a more preventive and strategic manner.

Cover crops and green manures are grown with no intention of harvesting their biomass, either partly or completely, at the end of the cropping season. The difference between these two types of crops is their final use. The above-ground part of green manures is incorporated into the soil at the end of the growing period with the aim of returning accumulated nutrients (e.g., nitrogen) or useful secondary metabolites (e.g., glucosinolates) to the soil. Cover crops are grown for different reasons, such as to reduce leaching of nutrients (e.g., nitrate, then also designated as catch crops), avoid erosion, improve soil structure or suppress weeds. A combined use is also possible, a crop can serve first as cover crop (e.g., for weed control) and then be incorporated as green manure (e.g., for nutrient input) (Campiglia et al., 2009).

CONTROL OF NEMATODES

For the control of certain nematode species, nematode-resistant cover crops can be used. An important group for cooler regions are Brassica species such as oil radish (*Raphanus sativus*) (fig. 1) and white mustard (*Sinapis alba*). Special selected varieties are able to reduce beet cyst nematodes (*Heterodera schachtii*) by interruption of the gender differentiation in the nematodes life cycle. Also different marigold species (*Tagetes* spp.) are known to have a suppressive effect on some nematode species such as Pratylenchus penetrans (fig. 2) (Marahatta et al., 2012). Some radish varieties are able to disturb the transmission of tobacco rattle virus, which cause the corky ringspot in potato and is transmitted by *Trichodorus* nematodes. This negative effect on the nematode is also observed with pea early browning virus which is also transmitted by *Trichodorus* spp. Increasingly the ability of radish varieties to reduce *Meloidogyne* ssp. is becoming an important approach. As radish itself is only a very poor host plant for this important nematode, selected resistant varieties inhibit the life cycle of *Meloidogyne* and thus reduce the population. A third group of common cover crop plants which are resistant to different nematodes are sorghum (*Sorghum bicolor*) and sorghum-sudangrass (*S. bicolor x S. sudanense*) (fig. 3) (Dover et al., 2012). This group is more adapted to warmer regions. For all groups, important differences in the resistance level to the targeted nematodes exist between species and even between cultivars. Therefore, the final choice should be based on information from the seed provider and information from reputable internet sources. On a local level, the creation of a community of practice i.e., a group of people and practitioners who share knowledge on a specific topic, can help to find the best choice of cover crops or green manures to control specific nematodes. The setup of such a community of practice is supported by the Best4Soil network by organizing a workshop dealing with the concerned topic. If you are interested, then contact Best4Soil (contact form is on www.best4soil.eu).

Fig. 1: Oil radish (*Raphanus sativus*) cover crop

Fig. 2: Marigold (*Tagetes* sp.) cover crops

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FAST GROWING SPECIES

Fast growing species are valued as cover crops, as they suppress the growth of weeds by rapidly covering the soil surface. An alternative to the fast growing Brassica species is buckwheat (Fagopyrum esculentum) which germinates and grows very fast as long as temperatures are not too low. It is also an interesting crop as it belongs to the Polygonaceae family as the only other cultivated species of this family is rhubarb (Rheum rhabarbarum). Another fast growing plant is phacelia (Phacelia tanacetifolia), which has the advantage of belonging to the Boraginaceae family. As no cultivated species belong to this family and phacelia is an excellent plant for honey bees, it is an interesting cover crop. Both of these plants, buckwheat and phacelia, should be grown in summer – early autumn, as they need warm temperatures for good growth and are not winter hardy.

A REAL CROP

Sometimes, green manures or cover crops are not considered as a valuable crop, as they do not generate a direct profit and theireffect is not immediately visible. But to generate a positive effect on soil health, the establishment and growth of the crop has to be successful. Therefore, the use of healthy seed with a high germination rate, good seedbed preparation, sowing in favourable conditions, with sufficient nutrients, and if needed irrigation, have to be applied. Attempting to saving money by reducing inputs on a such a crop is wasting money.

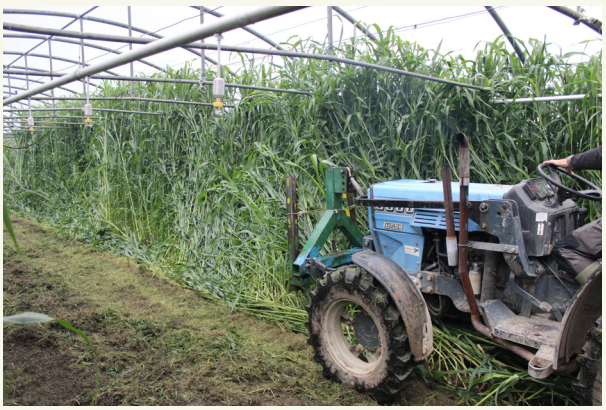

Fig. 3: Sorghum sudangrass (*S. bicolor x S. sudanense*) green manure (image from C. Wohler, LZ Liebegg, Switzerland)

Additional information on green manures and cover crops are published as a EIP-AGRI minipaper:

https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/6_eip_sbd_mp_green_manure_final_0.pdf

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