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Crop diversity - a crucial remedy for weed management in organic cropping

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A wide variety of crop species in crop rotations has turned out an essential means to obtain diversification in organic cropping systems. Moreover, the potential of cover crops to assist the main crop in weed suppression has been studied in Denmark, Finland and Latvia. Long-term field experiments in Denmark and Latvia demonstrated that crops with different life cycles and life spans in crop sequence resulted in a relatively low and manageable pressure of annual weeds. Soil samples taken in Denmark after 20 years of organic cropping showed that when grass-clover was grown as a green manure for 25 % of the time or more, the weed seed bank was more than halved as compared to the rotation without grass-clover. Moreover, for the efficient suppression of perennial weeds, such as *Cirsium arvense* and *Sonchus arvensis*, periods with grass-clover for mowing were required. In contrast, grass-clover rather contributed proliferations of *Elytrigia repens* in Danish experiments. Also legumes and cereal-legume mixtures promoted the growth of *E. repens* and cover crops obstructed the possibility for mechanical post-harvest control. As shown in Finnish experiments, cover crops (clover species and grasses) undersown with spring cereals in early spring, were too slow to effectively hamper the emergence and early growth of annual weed species but later in the growing season they interfered with weeds. Therefore, cover crop termination by tillage should be delayed until late autumn or next spring to benefit from this late suppression. In Latvia, the weed density in grassland, one year after barley with undersown clover-timothy, was significantly lower than without undersowing. Even *E. repens* was suppressed by including undersown red clover, clover mulch and winter rye in crop rotation. The study was part of the PRODIVA project (Core Organic Plus) in which crop diversification for better weed management has been studied.