Article 22-6

Competitive Cropping Systems for Weed Control

For farmers, one of the most persistent challenges is dealing with weed pressure. Naturally, weeds are going to be ever present, so it is important to find ways to effectively manage them. Particularly for organic farmers, as they cannot rely on synthetic herbicides. Mark Bernard, owner and operator of Barnyard Organics Ltd. in Prince Edward Island looked to research to improve his on-farm organic weed management practices by participating in research with Dr. Steve Shirtliffe from the University of Saskatchewan in Organic Science Cluster 1, Activity B1.

Dr. Shirtliffe was studying changing weed populations under long-term organic crop production. He was evaluating innovative strategies, such as the effect of diverse cropping rotations on weed populations, along with other management strategies which should be used in combination to give crops a competitive advantage. Weed populations become adapted to management practices that are used repeatedly. Using a diverse crop rotation can disrupt weed patterns and their competitiveness by having different field preparation, timing of planting, nutrient requirements, crop competitiveness, and in-crop weed management. In general, organic farms have more diverse rotations.

Mark collaborated with Dr. Shirtliffe and implemented the innovative weed mitigation strategies on his farm, which grows wheat, soybean, barley, oats, field peas, clover, and alfalfa and raises broilers, laying hens and beef. At the time, the farm had a 5-year rotation but since participating in the research he has shifted to an 8-year rotation. Mark uses cover cropping to maintain soil health and cover.

Mark successfully adopted multiple strategies from the research to give his crop a competitive advantage against weeds including, selecting competitive crops and varieties, narrower seed rows, increased seeding rates, and timely tine weeding after crop emergence.

Mark advises farmers to gain a thorough understanding of problematic weeds on their farm in order to help them develop more effective management strategies. For example, Mark struggles with Quackgrass (a.k.a. Couch grass) which is a perennial with underground spreading stems called rhizomes that can spawn new plants. Knowing this, he tries to understand the dynamics of the rhizome system so he can plan combinations of shallow tillage to pull up the rhizomes without chopping them, so they can dry out, and then crop competition will suppress any remaining plants.

In a separate on-farm trial for Activity B1, it was found in oats that using a combination of competitive cultivars, high planting densities, narrow row spacing, and post emergence weed harrowing resulted in a 71% weed biomass reduction compared to standard practices (Singh, A., 2012).

Mark's involvement in organic research and willingness to experiment with new practices has helped him reduce weed pressure and improve yields. Mark now places great importance on diverse and competitive cropping systems, which was a major objective of the research.

Recommendations: choose varieties well suited to your own growing conditions, reduce time between crops when the soil is left bare, and ensure you have diverse crop rotations to prevent weeds from becoming adapted to specific crops and their planting and tillage patterns. For related research studying combinations of seeding rate and low-intensity tillage visit Dr. Shirtliffe's other research with flax and lentils.

Singh, A (2012). Many little hammers ecologically- based weed management. The Canadian Organic Grower. https://cdn.dal.ca/content/dam/dalhousie/pdf/faculty/agriculture/oacc/en/tcog/TCOG_2012_Many_Little_Hammers.pdf

The Science of Organic Agriculture in Canada

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Photo by Sally Bernard

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