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## C Companion cropping in southwest Manitoba

Understanding the science and economics of companion crops and living systems.

Growers continually look for strategies to fine tune their cropping systems to reduce risk and increase productivity and returns. Recently, some researchers and growers in Western Canada have been looking more closely at companion cropping strategies and other options to increase revenues, reduce input costs and risk, and address pest management challenges.

Companion cropping is a strategy of growing various crop species together to benefit or co-exist for various reasons, and can include intercrops, relay and cover crops. Along with better utilization of available inputs and resources, other benefits include improved fertilizer and water use efficiency, improved soil health and reduced potential for pesticide resistance. Many growers already have flexible seeding and harvesting equipment in place for managing multiple crops and more sophisticated seed cleaning systems are increasingly available.

However, there are also considerations that may make companion crops less suited for some operations, such as harvest and labor considerations, rotations, markets and insurance, and overall interest and courage to trial new cropping systems.

### Pea-canola intercrop

One successful intercrop is peas and canola, which have seeding dates and herbicides that overlap and similar growth stages. The intercrop helps growers save on nitrogen fertilizer and pesticides and we have found some disease and pest benefits. The peas hold on to the canola, improving canola seed shatter tolerance while keeping peas off the ground, reducing disease risk and making combining easier.

The intercrop also provides some insurance against things like an early frost where frost tolerant peas will continue to grow even if a spring frost kills the canola seedlings, eliminating reseeding and still having a crop to harvest.

### Trialling pea-mustard for aphanomyces control

There are several other intercrop trials underway with peas and various crops including oats, wheat, flax, mustard and canola to assess the agronomic potential, yields, diseases and other factors. One trial in partnership with Syama Chatterton from Agriculture and Agri-Food Canada in Lethbridge, Alta., is experimenting with an intercrop of pea and mustard for potentially managing diseases such as aphanomyces in pea, the hypothesis that mustard may prevent disease development. Samples will be assessed and characterized in Lethbridge for diseases and in particular incidence and levels of Fusarium and aphanomyces.

### Adding alfalfa

A pea-canola intercrop is also being included in a relay trial with alfalfa, which staggers the outcomes for harvest and takes it to the next year or stage. In this trial, the alfalfa seed was broadcast first in the spring, followed by direct seeding of the peas and canola. The alfalfa can either be left for forage production the following year or

terminated using a burnoff. One of the benefits that alfalfa can offer, particularly under wet conditions in the fall or spring, is reducing moisture issues by taking up excess water and improving field access. With the alfalfa understory, getting into the field to combine or seed in wet spring conditions may be easier. The alfalfa may also act as a soil splash barrier of disease onto pea plants, reducing disease incidence. Other trials have included spring wheat and sweet clover, hemp and legumes, and a corn and hairy vetch trial. The corn and vetch together provide a forage that is very high quality, with corn providing high energy and vetch providing high protein. The following spring the vetch will usually die off if it has been grazed, or it can be terminated and seeded into. Rye and hairy vetch grow well together and can be harvested for seed together, then separated after harvest. The seed is toxic to livestock, so it can't be used for feed, but hairy vetch can provide a reasonable return as a seed crop selling for about four dollars per pound. Another big benefit of vetch is in its ability to fix 80 to 100 pounds of [nitrogen] in a season, which changes the N economy of the whole system.

Each farm is different and there are different reasons for looking at alternatives from narrowing margins and lowering risk, to reducing the intensiveness of inputs and trying to put the "art of farming" and creativity back into cropping system management. Pesticide or

herbicide resistance to particular weeds or diseases means farmers have to think outside the box to keep up with challenges. Regenerative farmers are also concerned about soil quality and have been trying to enhance soil health with greater carbon sequestration in addition to no-till, in order to build organic matter, a buffer for drought, enhance nutrient storage and availability, improve water infiltration, and other benefits.

Ultimately it is about integrating various options and tools, from no-till, new genetics and herbicides to new crops and systems, new equipment and many other options. Companion

cropping and regenerative agriculture is a very dynamic and quickly changing space with lots of different aspects to follow. Farmers should try to gather as much information as possible from the various research projects, on-farm trials and experiences is a good strategy. The key for making any changes is to take small steps, you can't expect to switch the entire farm over completely, and modify the system until it works for every individual operation.

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The pea-canola intercrop looking at effect of alfalfa in the understory and fungicide use.