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FOCUS ON . . . FALL COVER CROPS!

It seems that cover crops are on everyone's mind right now – the vegetable farmer seeking soil cover over the winter, the grain farmer needing help with pesky weeds, the dairy farmer looking ahead for earlier forage next spring. Cover crops make so much sense – they cut fertilizer costs, improve soil health and condition, prevent soil erosion, improve water-holding and infiltration capacity, produce nitrogen, and much more. Many covercrops are allelopathic, which means they exude chemicals from their roots that suppress the growth of other plants - weeds! - around them.

One way to think about cover crops is to determine the ones that are **legumes** (clover, hairy vetch, peas, alfalfa) and can convert nitrogen in the air to a form that plants can absorb, and which are **non-legume** (buckwheat, cereal/small grains, and crucifers like radish, turnip and mustard) that contribute add organic matter and suppress weeds. Both groups are strategically useful tools in our crop rotation line-up. Often you don't have to choose one or the other - mixtures of different cover crops (peas & oats, rye & vetch, winter peas & triticale, oats & radish) are particularly useful.

When planning a cover crop planting in the fall, it is also helpful to divide the available species into **(1)** those that will winter-kill, leaving ground-covering residue over the winter, and will not re-grow in the spring, and **(2)** those that will produce some growth in the fall, go dormant during the winter, and then grow back in the spring.

WINTER-KILLED COVERCROPS

Tillage Radish® – we are excited to carry Steve Groff's Tillage Radish for the first time this fall. Steve is a highly innovative farmer from Holtwood PA who has experimented with non-traditional cover crops for many years. Tillage Radish looks particularly promising. Numerous studies have shown that corn and soybeans, planted after a fall Tillage

Radish cover crop, will have significantly higher yields. Additionally, the Tillage Radish reduces soil compaction by 'punching' holes through compacted layers, improving water infiltration, suppressing weeds and nematodes, and controling erosion in fall and winter months. They scavenge and hold soil nutrients at the surface and increase soil organic matter by up to 5 tons/acre. Dairy farmers particularly like planting the Tillage Radish after manure application, because they effectively hold the nutrients. For best results, plant in the fall, 30-60 days before the first killing frost. Tillage Radish will grow rapidly through the fall, and will winter kill, leaving the soil in great shape the following spring. Tillage Radish can be drilled, or broadcast followed by a light disking. Grazing is also successful. **One caution** - Tillage Radishes don't smell good as they rot in the spring - when planning your fields, please keep your neighbors and family in mind!

Oats make a great fall covercrop that produces vigorous grassy growth through the fall without putting any effort to make grain. Oats' natural allelopathy suppresses weeds while producing lots of biomass. By spring, the oats are gone, leaving the soil mellow and ready to plant. During the fall, oats absorb nitrogen, potassium and phosphorus, holding it in a stable form through the winter. Oats can be grown alone or in combination with peas, turnips, or radishes, and can be used as a nurse crop for the establishment of perennial pastures and hay fields. Generally, fall oats should be planted by the end of August, or at least 40-60 days before first killing frost. Fall oats, especially mixed with turnips or peas, make great grazing.

Buckwheat is a quick-growing covercrop that very effectively suppresses weeds, frees up phosphorus, and softens and loosens the soil. Buckwheat performs better than small grains in poorer soils and therefore is a great 'pioneer' crop when bringing abandoned or neglected land back into production, or when working

on soil structure or persistent weed problems. Buckwheat is most commonly planted in the summer, although it can also be used as a fall cover.

Field Peas are legumes, and therefore produce nitrogen. Forage field pea varieties produce vigorous succulent vines that break down rapidly, releasing accumulated nitrogen in a form that other plants can easily use. When mixed with oats in the fall, or with oats or spring triticale in the spring, the resulting growth is thick and lush, a great source of forage for grazing or chopping, or simply a very effective, high biomass, rapidly growing covercrop.

Yellow Mustard – for the past couple years, we have been experimenting with using yellow mustard as a short-term spring covercrop, frost-seeding it in March and plowing it under in June before planting red kidney beans. We have been amazed how this practice has significantly raised bean yields and feel this will be useful for vegetable farmers to address soil borne disease problems. Like radishes, mustard is a crucifer, producing glucosinolates (or 'hot' flavored chemicals) that suppress root rots and nematodes in the soil. We haven't tried it yet as a fall covercrop, but plan to try it this year.

OVER-WINTERING COVERCROPS

Rye – the hardiest of the cereal small grains, rye can be seeded later and still produce a tremendous amount of biomass, both leaf and root mass, that will reduce erosion and nutrient loss. Rye's strong allelopathy provides exceptional weed suppression, and also controls nematodes and insect pests. It is widely adapted, and can grow on poorer soils or poorly prepared land. Farmers often mix rye with about 10% vetch for nitrogen fixing. **One warning** - rye can be incredibly vigorous in the spring, and if not plowed under fairly early, you may need to mow or chop it before plowing.

Hairy Vetch – vetch is a good example of the old 'truism' that "one farmer's covercrop is another farmer's weed." Vegetable farmers love vetch for its strong nitrogen fixation, soil structure improvement, and weed suppression. Planted as a fall covercrop with rye or wheat, it produces an early spring cover that can be tilled or rolled before planting vegetable seed or transplants. However, hairy vetch is considered a noxious weed in winter small grains grown for milling. Its life cycle almost exactly matches that of winter wheat, and the round black seeds are extremely difficult to separate from wheat using normal grain cleaning equipment. Flour made from wheat contaminated with vetch seed is bitter with unattractive black specks. Because vetch produces 10-20% hard seed each year, getting rid of it on a grain farm is very difficult.

Triticale – a cross between wheat and rye, triticale combines the vigor and wide adaptability of rye with the more 'civilized' growth habit of wheat. Triticale is highly versatile as a covercrop, forage, or grain crop, and it can easily be mixed with other species like peas or vetch. There are both winter and spring versions of triticale, expanding its usefulness.

Austrian Winter Peas – few covercrops are an impressive as Austrian winter peas! Planted in September with barley or triticale, it grows moderately through the fall, and then in the spring it explodes with vigorous viney growth and purple flowers, fixing lots of nitrogen. The small grain is needed for support - without it, winter peas will quickly go down at bloom as they become heavy with leaves and pods. Small grains also help protect against winter kill. We have found that 2 bu barley/A is about the right amount to provide adequate support for the peas without being too competitive. Winter barley or triticale, mixed with winter peas, makes a highly nutritious and palatable spring pasture for grazing.

Medium Red Clover - this is the standard, dependable, widely adapted legume cover crop that organic farmers rely on for much of their nitrogen needs. In the Northeast, we generally frost-seed red clover into our winter small grains in February-March. It grows through the spring, and really takes off after grain harvest. By the following year, the clover can be plowed, providing enough soil nitrogen to grow a healthy crop of corn or a vegetable crop. Clover can also be sown with a spring small grain before grain emergence. Red clover has also been successfully no-till drilled into wheat stubble in the summer, or overseeded into soybeans in the early fall at leaf-yellowing. Be aware that soil diseases affecting beans, peas and soybeans are also hosted by clover, so close rotations of these crops may technically be rotating crop species, but may not be sufficiently rotating root pathogens.