



## How Can Cover Crops Benefit my Nutrient Management Plan?

### *// What are cover crops?*

Cover crops are generally grown between cash crop cycles. However, they can be intercropped with cash crops to cover bare ground, and when the planned crop cannot be planted. Cover crops can be annual, winter annual, biennial, or perennial species. Grass cover crops include rye, wheat, triticale, barley, oats, and annual ryegrass. Winter rye is one of the most common cover crops because it is winter-hardy and can be planted late into the fall. Legume cover crops include hairy vetch, clovers, and field peas. Other broadleaf plants that can be used as cover crops include the Brassicas (mustards, radishes, and rapeseed), buckwheat, and sunflowers.

### *// What are the benefits and purposes of cover crops?*

Cover crops are generally planted for one or more of the following purposes or benefits:

- To reduce erosion.
- To maintain or increase soil health and organic matter content.
- To minimize soil compaction.
- To improve soil moisture, use efficiency.
- To suppress weeds.
- To provide nutrient management:
  - Help to build reserves of nitrogen.
  - Help to scavenge nutrients from soil.
  - Help to minimize nutrient losses from leaching or runoff.

### *// How can grass cover crops benefit my nutrient management plan?*

Cereal grains or grasses are generally recommended if the cover crop is planted to capture residual nitrogen from the soil profile. This capture contributes to the accumulation or maintenance of soil nitrogen. Grasses can recycle existing soil nitrogen and other nutrients and reduce leaching losses. They can prevent nitrates from reaching nearby streams and rivers by scavenging and holding onto nitrates in the soil. Grass cover crops also help to retain phosphorus in the soil by reducing soil erosion.

### *// How can legume cover crops benefit my nutrient management plan?*

Legumes are more appropriate cover crops for nitrogen-deficient situations. Legumes can capture nitrogen from the air and transform it into soil nitrogen. Cover crops in the legume family produce nitrogen for subsequent crops to use.

### *// How can other non-legume cover crops benefit my nutrient management plan?*

Non-legume cover crops, like the Brassicas, work much like the grasses to scavenge or gather nutrients that are already present in the soil. They scavenge nitrogen and can make potassium and phosphorus more available. The roots of radishes can penetrate deep into the ground so that the plant can pull nutrients closer to the surface where cash crops can use them.

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## // Why is it important to consider the carbon to nitrogen (C:N) ratios of cover crop residues?

All cover crops can provide nutrients and organic matter to the soil. Cover crops help to increase soil organic matter by adding residue above and below the ground. Understanding the C:N ratios of crop residues is important to manage soil cover and nutrient cycling. Cover crop residue with a low C:N ratio will decompose much faster than residue with a high C:N ratio. Residues with a 24:1 C:N ratio provide a perfectly balanced diet for soil microorganisms, considered a nitrogen-neutral level. A rye cover crop in its vegetative stage has a C:N ratio of 26:1. When rye begins to flower, the plants increase their carbon content, increasing the C:N ratio to a more difficult-to-decompose level of 37:1. At C:N ratios above 30:1, microbes need to find additional nitrogen to consume the residue, depleting soil nitrogen levels. Terminating growth of a grass cover no later than the late joint to early boot stage and 2 to 4 weeks before planting the next crop permits maximum growth and uptake of residual nutrients by the cover crop, while allowing sufficient time for the decomposition of the vegetation and release of nutrients. Legume cover crops are very rich in nitrogen. Hairy vetch has a C:N ratio of 11:1, allowing soil microbes to deposit excess nitrogen in the soil as they quickly break down the soft stems and leaves. Legumes killed while succulent decompose more rapidly than grasses, so killing a legume cover crop 1 to 2 weeks before planting the next crop is usually sufficient. Radishes have a fleshy composition and a low C:N ratio so that the plant material easily decomposes, and the nutrients become available for the following cash crop. Therefore, a low C:N ratio cover crop containing legumes and/or Brassicas could follow a high C:N ratio crop like corn to help the residue decompose and allow nutrients to become available to the next crop.

## // How do you select the best cover crop(s) to plant?

The selection of a cover crop depends on when it can be planted, the previous crop, and the goal for its use. A combination of cover crops may be beneficial for diversity, quick establishment, and improved nutrient utilization. When trying cover crops for the first time, selecting one that winter kills, may reduce the stress associated with termination of the crop. Since growing conditions, requirements, and performance of cover crops vary widely among regions, growers should consult their local extension office to determine the best cover crops and appropriate planting times for their area.

### Sources:

(Sources Verified 8/30/2019)

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