



New Brunswick Soil and Crop Improvement Association

Soil-Building Cover Crops in Vegetable Production Systems

Choosing Between Single and Multispecies Cover Crops

Using a diverse mix of species—like grasses, legumes, brassicas, and broadleaf forbs—can offer a wider range of benefits compared to planting a single species. These mixes often complement each other in function, making them more effective in improving soil health and overall system resilience.

Weed Suppression & Quick Cover

Fast-growing species such as oats, winter rye, and radish help outcompete weeds. Slower-growing species like clover and alfalfa should be mixed with quick-growing grains such as oats to improve early-stage weed suppression. Always ensure quick and effective soil coverage after harvest or before planting the cash crop. Make sure cover crops are terminated before they go to seed. Do not reduce the recommended seeding rate, as it may lead to a poor plant stand and increased weed development.



Fig. 1: Single Cover Crop Species

Manage Your C:N Ratio

Including approximately 20% legumes in grain-based mixes helps maintain an optimal carbon-to-nitrogen ratio. This supports organic matter breakdown and provides a nitrogen credit to the next crop.

Plan with Your Crop Calendar

Ensure the soil is always covered—either by a cash crop or a cover crop. Avoid planting cover crops from the same botanical family as your cash crop (e.g., avoid brassicas cover crops before brassicas cash crops) to reduce pest and disease pressure.

Termination Timing

Winter-killed species include oats, peas, beans, radishes, brown mustard, buckwheat, spring barley, annual ryegrass, sorghum-sudangrass, pearl millet, etc. Overwintering species such as fall rye, triticale, and winter wheat will survive the winter and require termination in the spring using glyphosate or mechanical methods.

Effective Veggie Crop Sequences

Rotating vegetable crops with a sequence of fruit, root crops, legumes, leafy greens, and cover crops improves nutrient cycling, soil structure, and organic matter, while helping to control pests and diseases. Some growers, like Alyson Chisholm (Windy Hill Organic Farm), follow a green manure → heavy feeder → light feeder → green manure rotation to support long-term soil health. Crop rotation also accounts for nutrient demand: Low (beans, beet, carrot, herbs, peas, radish), Medium (cucumber, pepper, spinach, squash), and High (broccoli, cabbage, cauliflower, potato, tomato) (Rangarajan 2020, in Mohler, Eds. *Crop Rotation on Organic Farms*). This helps maintain soil fertility and optimize fertilizer use.



Fig. 2: Tomato (Fruit Vegetable)

Cover Crop Quick Guide



Fig. 3: Multispecies Cover Crops

Planting windows:

- Oats, peas, brassicas → Plant before September
- Fall rye → Plant before October
- Buckwheat → Plant after the last frost (frost-sensitive); a short-duration crop that's excellent for weed control
- Sorghum-sudangrass, pearl millet → Require warm soil; plant in the last week of May or first week of June

Rotation Matters

- Short rotations (1 year): Use annual species that are typically winter-killed, making spring management easier.
- Longer rotations: Incorporate perennials such as clover, alfalfa, perennial ryegrass, or timothy to build soil health and store carbon. These species survive winter and will require active termination.

Biomass Builders = Soil Builders

- Sorghum-sudangrass produces high biomass and can be effectively combined with legumes, brassicas, phacelia, millet, etc. Be sure to adjust seeding rates to prevent aggressive species from dominating the mix.

Keep Costs in Check

- Choose species that deliver high biomass per dollar and per acre. Greater biomass supports the faster buildup of organic matter, enhances soil biology, and improves long-term soil fertility.

Cover Crops: Start Small, Learn, Expand

Start small, learn as you go, and expand over time. If you're planting cover crops for the first time, there will be a valuable learning curve—don't hesitate to reach out to us for support along the way.

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Fig 4. Leafy Greens Vegetable