



Cover Crop Species Selection in Field Crop Systems

Introduction

Inclusion of cover crops in field crop rotations can reduce soil erosion and increase soil health and productivity, suppress weeds, capture nutrients, and increase biodiversity. However, cover crop selection is dependent on field location and planting timing. Selecting appropriate species for a specific farm field is essential for successful establishment and growth of cover crops.

The first step in the selection of a suitable cover crop is identifying its hardiness zone of the location and crop tolerance to cold temperatures. Fields in New York fall into one of four hardiness zones, with most of New York's cropland being listed as hardiness zones 4, 5 or 6 (Figure 1). For a successful cover crop program, farmers will need to select cover crop species that tolerate the temperatures characteristic for the hardiness zone.

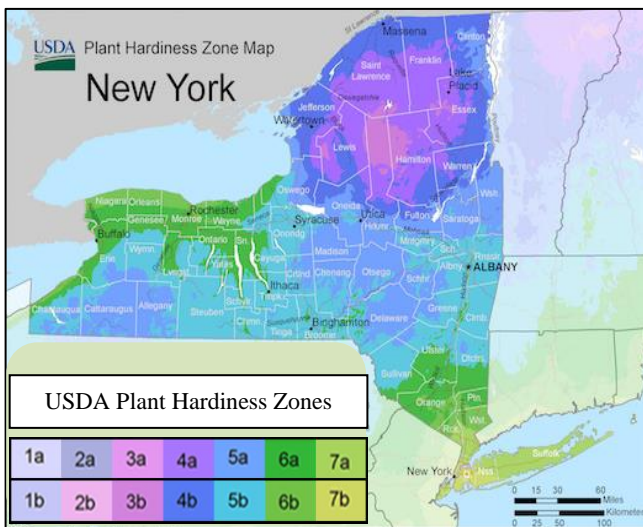


Figure 1: Plant hardiness zones for New York regions (source: [USDA Plant Hardiness Zone Map](https://www.planthardiness.com/)) are used to classify which plants can survive cold temperatures. New York has hardiness zones 3b to 7b.

Additional information required for species selection includes producer preference for establishment and termination windows, the need to contribute nitrogen (N), prevention of soil erosion, suitability for grazing, soil conditions and soil compaction.

Species commonly considered for use in field crop systems in New York include cereal rye (*Secale cereale*), annual ryegrass (*Lolium multiflorum*), wheat (*Triticum aestivum*) and triticale (x *Triticosecale*). Cereal rye seed tends to be the cheapest. This cool season annual cereal also has the benefit of reliable establishment in the fall (early September through late October). Annual ryegrass is competitive winter annual cool season grass with relatively cheap seed as well. It can be reliably established through late September. Triticale seed is more expensive and can be established through mid-October. This cross between wheat and rye can also be used as a double crop, harvested for forage late spring.

For general information on establishment and termination methods of winter cereal cover crops in field crop rotations, see [Agronomy Fact Sheet 93](#). Here we describes two tools developed by the [Northeast Cover Crop Council](#):

- Cover Crop Explorer <https://covercrop.tools/>
- Species Selector Tool <https://covercrop.tools/species-selector>

Cover Crop Explorer

This tool allows users to identify the plant hardiness zone for a specific location and subsequently narrow down species options based on selection criteria. Users can specify cover crop type (broadleaf, brassica, grass, or legume), tolerances for environmental stresses (drought, flooding, excessive heat, etc.), the relative cost of seed, seeding method (frost seeding, aerial seeding, inter-seeding, broadcast or drilling), ease of establishment, the active growing window of the species, rooting depth, potential termination method (tillage, chemical termination, mowing, roller crimping), and the species' weed suppression potential and persistence. The Cover Crop Explorer tool will show a user which cover crop species could be good options to consider and describes the cover crop species in more detail (including planting and growth windows, seeding rates, termination options, etc.).

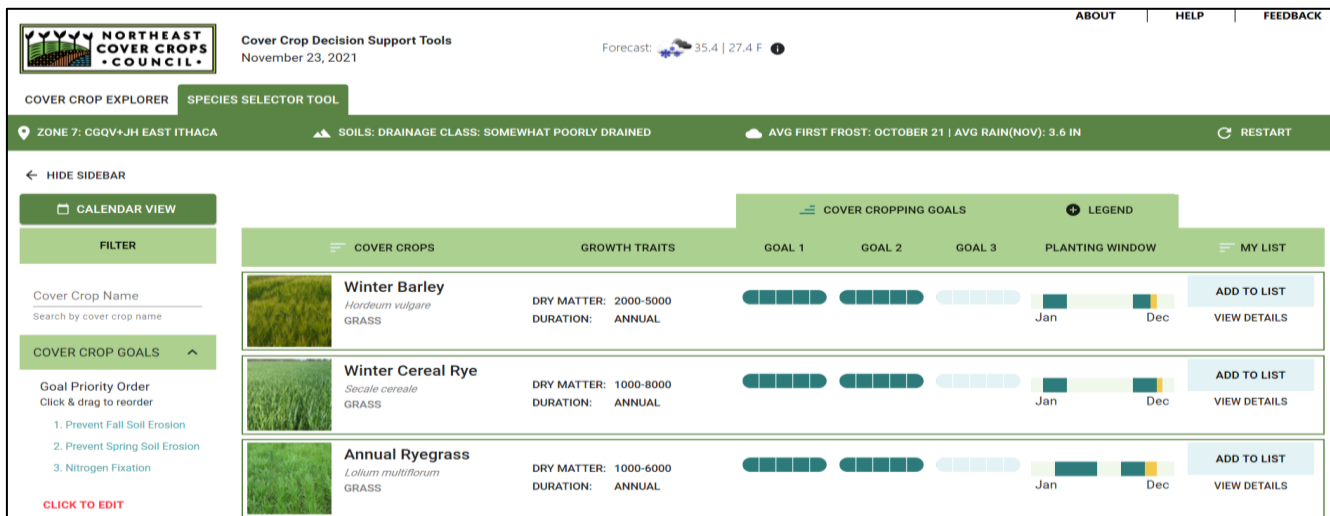


Figure 2: An example of some crop species that can be grown on a field near Ithaca, NY, with the goals of “preventing fall soil erosion”, “preventing spring soil erosion” and “nitrogen fixation”. The Species Selector Tool helps identify options giving a score of 0 (does not address the priority) to 5 (greatly addresses the priority) for each goal and each species selected.

Species Selector Tool

With this tool a user can obtain a list of possible cover crop species appropriate for a specific field location based on a prioritized list of farmer-identified goals. A user can add the location of the field using the address or by clicking on a built-in map. Selection of a field also generates information on drainage class (derived from USDA’s Web Soil Survey), flooding frequency and climate conditions (five-year average weather data from local weather stations).

Once the location is selected, a user is prompted to identify the top three goals for their cover crop program out of 14 possible options, including but not limited to goals such as: improve soil organic matter, increase soil aggregation, prevent fall soil erosion, good grazing, and nitrogen fixation.

Once the top three goals are selected, the tool will generate a list of potential cover crop species that meet the goals (not all species will meet all the goals) and are suitable for the location. This comprehensive list can then be narrowed down using additional requirements such as crop type (grass, legume, brassica or broadleaf), and tolerance to environmental stress (drought, flooding, excessive heat etc.). A user can also narrow down the options by identifying relative seed cost (cheap, expensive, very expensive), seeding methods, and more. The final output (see figure 2 for an example) of the tool is a list of all cover crop species that will accomplish the main goals for the selected location, the months they can be planted, and that meet the additional selection criteria.

In Summary

Cover crops can provide environmental and crop production benefits. As not all species are equally suitable for all fields, selection of the right species is important. The Cover Crop Explorer and Cover Crop Species Selector Tools developed by the Northeast Cover Crop Council can help make informed cover crop decisions.

Additional Resources

- Managing Cover Crops Profitably. 2007. 3rd Edition. SARE <https://www.sare.org/wp-content/uploads/Managing-Cover-Crops-Profitably.pdf>.
- Northeast Cover Crop Council, Cover Crop Decision Support Tools. <https://covercrop.tools/>. This includes the Cover Crop Explorer and the Species Selection Tool.
- USDA Plant Hardiness Zone Map. 2012. <https://planthardiness.ars.usda.gov/>.

Disclaimer

This fact sheet reflects the current (and past) authors’ best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this fact sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of discharge levels from agricultural land.

For more information



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