



No-Till for Success Cover Crops^a



*Adapted from the Penn State Agronomy Guide (2007 -08) Table 1.10-5
and Managing Cover Crops Profitably, 3rd Ed. SAN, by H. Grant Troop, CPAg/CCA*

Species	Life Cycle ^b	Drilled Seeding Rate (lb/A) ^{c,d,e}	Planting Depth (inches)	Optimum Seeding Date	N-Capture	Avg. cost (\$)	Advantages	Disadvantages
Nitrogen Scavengers -- Grasses								
(Cool season)								
Cereal rye (Secale cereale L.)	WA	112 (2 bu)	.75 - 2.0	Sept to Nov 1	Excellent nutrient and moisture scavenger (esp. N)		Most cold tolerant of commonly used cover crops, late seedings possible, germinates and grows rapidly; tolerates poor soil conditions and drought; rapid growth may provide some weed control; various uses: cover crop to food source; soil improver	Regrowth may occur if not completely controlled (mature rye challenging to manage); possible crop suppression due to allelopathy or nutrient tie-up ; manage to control pests
Winter barley	WA	120 (2.5 bu)	.75 - 1.5	Sept to Oct 15	Very good to excellent		Insect suppression; prevents erosion; suppress weeds; recycle nutrients; add organic matter; tillage improver	Matures after cereal rye
Winter wheat	WA	120 (2 bu)	0.5 - 1.5	Sept to Nov 1	Very good to excellent		Prevent erosion; suppress weeds; cycle nutrients; add organic matter; cash & cover crop; soil builder	Absorbs N and H ₂ O heavily during stem growth; terminate before head emerges from boot; matures after triticale
Winter triticale	WA	120 (2 bu)	0.5 - 1.5	Sept to Nov 1	Very good to excellent		See wheat/rye	See wheat; matures after barley
Spring oats (Avena sativa L.)	CSA	100 (3 bu)	0.5 - 1.5	Early spring or Aug to Sept 20	Good nutrient scavenger (less if fall seeded)		Rapid growth in cool weather; ideal for quick fall cover or nurse crop with legumes; winter kills; various uses: cover crop to food source; late summer seeding excellent set-up for early spring no-till legume seedings	Fall residue not very durable; lodging potential; winter kills; no living root system during winter months
Annual / intermediate / perennial ryegrass (Lolium spp.)	Spp. Variation	20	0.25 - 0.5	Aug to Oct 1	Very good - excellent nutrient and moisture scavenger		Prevent soil erosion; improves soil structure and drainage; add organic matter; suppress weeds; cycle nutrients; tolerant to wide range of soil conditions; rapid establishment; most can be used as feed	May be difficult to control - use high rate of glyphosate and AMS; low heat tolerance; may winter kill; bunch type growth; may harbor insects; living mulch requires high management; annual may re-seed and become a weed especially in small grain



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Brassicas								
Canola / rapeseed / kale / radish	WA / CSA	8	0.25 - 0.5	Aug to Sept 15	30-160 (capture)		Prevent erosion; suppress weeds and soilborne pests; alleviate soil compaction; cycle nutrients	May winter kill; low to very low in amount and durability of residue; cultivar variability; plant early for maximum growth
Nitrogen Fixers -- Legumes^f								
Hairy vetch (<i>Vicia villosa</i> Roth)	WA / CSA	15 - 20	0.5 - 1.5	Aug to early Sept	80 - 160		Cold tolerant and highest yielding of all winter annual legumes; above-average drought tolerance; adapted to wide range of soil types. Mix with cereal rye for more biomass; using named varieties may improve ability to manage	Requires early fall establishment, slow to establish; little winter cover possible; matures in mid-spring; high P and K requirement for maximum growth; can harbor pests; potential weed problem in winter grains; add PGR to glyphosate for burndown
Red clover (<i>Trifolium pratense</i> L.)	SLP (2-3 yr)	8 - 10	0.25 - 0.5	Aug to early Sept	70 - 120		Deep taproot; adapted to humid areas; tolerates wet soil conditions and shade; forage use especially if mixed with grasses; grows best where corn grows well	Initial growth slow; high P and K requirements for maximum growth; hard seed can persist creating volunteer problems; wet pure stand forage causes bloat; vulnerable to some pathogens, insects
Field peas (e.g. winter peas)	CSA / WA	50 - 80	1.5 - 2.0	Aug to Sept 15	90 - 150		Prefer regular winter pea; rapid growth in cool weather; versatile legume; interseed with cereal and brassica spp.; used as food or feed	Austrian winter pea may not overwinter north of MD; shallow root system; sensitive to heat and humidity; susceptible to diseases, insect pests
Crimson clover (<i>Trifolium incarnatum</i> L.)	WA / SA	15 - 20	0.25 - 0.5	Aug to early Sept	70 - 130		Rapid growth; above-average shade tolerance; forage use (no bloat); good nematode resistance	Poor heat and drought tolerance; no-till planting in residue requires management due to steminess
<p>^aSome changes to reflect Southeast and South Central PA growing conditions by H. Grant Troop, CPAg/CCA</p> <p>^bWA = winter annual; SLP = short-lived perennial; SA = summer annual; CSA = cool season annual</p> <p>^cFor broadcast or aerial seedings increase rates by 25%</p> <p>^dFor seedings after the optimum plant dates, increase seeding rates by 25%</p> <p>^eFor seedings with planned forage harvest, increase seeding rates by 40-50%</p> <p>^fInoculate with legume specific rhizobia</p>								