

**Table 1. Characteristics, ability to provide various services, and recommended planting date windows for non-legume winter cover crops commonly used in temperate cropping systems.**

Species	Optimum Termination Timing	Growth Form	Nitrogen retention	Nitrogen supply	Erosion Control	Alleviate Subsoil Compaction	Weed Suppression	Resources for Beneficial Insects	Habitat for Beneficial Insects	Forage Production	Planting date window, weeks before first killing frost <sup>7</sup>	Potential Drawbacks
Cereal Rye ( <i>Secale cereale</i> )	ES to MS	SD to TO	●	●	●	●	●	●	●	●	4 weeks prior to 6 weeks after	Narrow window for spring management due to rapid maturity progression in spring; Mature residues can immobilize nitrogen
Triticale ( <i>x Triticosecale</i> )	MS	SD to TO	●	●	●	●	●	●	●	●	4 weeks prior to 6 weeks after	Mature residues can immobilize nitrogen
Wheat ( <i>Triticum aestivum</i> )	MS to LS	SD to TO	●	●	●	●	●	●	●	●	4 weeks prior to 3 weeks after	Mature residues can immobilize nitrogen
Spelt ( <i>Triticum spelta</i> )	MS to LS	SD to TO	●	●	●	●	●	●	●	●	4 weeks prior to 6 weeks after	Mature residues can immobilize nitrogen
Annual Ryegrass ( <i>Lolium multiflorum</i> )	MS	SD	●	●	●	●	●	●	●	●	3 to 10	Mature residues can immobilize nitrogen
Oats ( <i>Avena sativa</i> )	WK-25°	SD	● <sup>1</sup>	●	●	●	●	●	●	●	3 to 10	Highly competitive against other species in the mix
Sorghum-Sudan grass ( <i>Sorghum bicolor X S. bicolor var. sudanese</i> )	WK-32°	TO	● <sup>1</sup>	●	●	●	●	●	●	● <sup>4</sup>	8 to 12	Highly competitive against other species in the mix; high carbon residues can immobilize nitrogen
Forage Radish ( <i>Raphanus sativus var. longipinnatus</i> )	WK-25°	SD	● <sup>1</sup>	● <sup>2</sup>	● <sup>3</sup>	●	● <sup>5</sup>	●	●	●	3 to 10	Highly competitive against other species in the mix
Canola ( <i>Brassica rapa</i> )	ES to MS	SD to TO	●	●	●	●	● <sup>5</sup>	●	●	● / ● <sup>6</sup>	3 to 10	Highly competitive against other species in the mix; can host pests of brassicaceous cash crops
Sunflower ( <i>Helianthus annuus</i> )	WK-32°	TO	● <sup>1</sup>	●	●	●	●	●	●	●	10 to 14	

ES= Early Spring; MS= Mid Spring; LS= Late Spring; WK-32°= Winter-kills after light frosts; WK-25°=Winter-kills after hard freezes; SD = Short, dense; TO= Tall, open; V= Vining; ● = Excellent ability; ● = Moderate ability; ● = Limited to no ability.

**Notes**

<sup>1</sup>Winterkilled species provide no nitrogen retention in the winter and spring. <sup>2</sup>N released rapidly following winter kill of these species is subject to leaching losses. <sup>3</sup>Forage radish provides excellent erosion control in the fall, but soil is left bare in spring after winterkilled residues decompose. <sup>4</sup>Be aware of potential for prussic acid poisoning. <sup>5</sup>Low soil nitrogen availability can limit the growth of brassicas, reducing their weed suppression capacity. <sup>6</sup>Forage varieties of canola (also known as rape) can have excellent feed value. <sup>7</sup>Planting date recommendations from Cover Crop Solutions, LLC when available and personal experience otherwise.