Italian Ryegrass Management

Italian ryegrass (*Lolium multiflorum* Lam.), also known as annual ryegrass, is a high-quality, cool-season, winter annual bunchgrass that is closely related to perennial ryegrass (*Lolium perenne* L.). The United States grows about 3 million acres of Italian ryegrass yearly, with 90 percent being used for winter pasture in the Southeast.[1] Italian ryegrass establishes easily and grows rapidly. The attributes that make Italian ryegrass desirable as a cover crop and pasture species have also resulted in it becoming an increasingly weedy and invasive species. Ryegrass has been problematic primarily in wheat because of the plants' similar lifecycles, but ryegrass is becoming more prevalent in corn and soybean, especially with earlier planting dates in the spring.

Identification and Life Cycle

Italian ryegrass is a winter annual weed species found infesting small grain production throughout the US, where it can cause yield losses in excess of 50%, reaching as high as 100% in severely infested fields. In many parts of the south-central US, a second flush of ryegrass seedlings emerges during the spring, making management difficult. Italian ryegrass is very similar in appearance to perennial ryegrass. To further complicate matters, Italian ryegrass and perennial ryegrass easily hybridize, creating a wide range of plants with similar features which include the traits of both species and make identification and management difficult.

Figure 1. Italian ryegrass is a cool-season, winter annual bunchgrass that is closely related to perennial ryegrass. Photo courtesy of Jason Bond, Mississippi State University.

Italian ryegrass is an erect, winter annual grass that can reach up to 4 feet in height with purple coloration at the base. The ligule is a short, flat membrane, and auricles (finger-like appendages) are present at the leaf collar. Leaf blades and sheaths both lack hairs and will display a glossy, dark green coloration due to the waxy surface of leaf blades. The inflorescence of Italian ryegrass is a slender spike about 4 to 16 inches long, with fine awns, and containing five to 38 spikelets arranged alternately on the flowering stem (Figure 2). In contrast, perennial ryegrass spikelets are awnless. Italian ryegrass also has a membranous ligule with clasping auricles, whereas perennial ryegrass auricles are non-clasped. Italian ryegrass can be distinguished from other winter annual grasses such as downy brome (*Bromus tectorum*) and cheat (*Bromus secalinus*) by its lack of hair, and from annual bluegrass (*Poa annua*) by the presence of the auricles at the leaf collar on Italian ryegrass.

Figure 2. Italian ryegrass spike. Note the presence of awns on the spikelet. Photo courtesy of Joseph DiTomaso, University of California, Davis.

Plants germinate from fall through early spring, are highly competitive, grow rapidly in the winter and early spring months, and produce multiple tillers. Flowering occurs during May to July depending on the climatic conditions. Italian ryegrass is a prolific seed producer capable of producing several thousand seeds per plant.

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Italian Ryegrass as a Cover Crop

The use of winter cover crops for soil management and weed suppression is becoming more popular. Cereal rye (***Secale cereale*** L.) and ryegrass have become common species planted for this purpose. Cereal rye can easily be controlled with herbicides, specifically glyphosate, prior to the establishment of the subsequent crop. However, due to herbicide resistance, ryegrass can be extremely difficult to effectively kill. Annual ryegrass or blends should not be used as a cover crop due to the potential of glyphosate-resistant ryegrass being present in the seed stock.

Figure 3. Italian ryegrass plant in flower. Photo courtesy of Joseph DiTomaso, University of California, Davis.

Management

Italian ryegrass is problematic throughout the Southeast, southern Midwest, and far West. In field trials, uncontrolled Italian ryegrass has been shown to reduce corn, cotton, and soybean yields by 65, 85, and 37 percent, respectively.[1] Its control has been chiefly dependent on herbicides due to their effectiveness and practicality and, as result, herbicide-resistant populations have developed. Resistance to five herbicide sites-of-action has been found in the United States.[2] These resistances include:

- Group 1 - ACCase-inhibitors (diclofop, fluazifop, quizalofop, and clethodim)
- Group 2 - ALS-inhibitors (nicosulfuron, mesosulfuron, pyroxsulam, rimsulfuron + thifensulfuron)
- Group 9 - EPSPS-inhibitors (glyphosate)
- Group 10 - glutamine synthetase inhibitors (glufosinate)
- Group 15 - long chain fatty acid elongase inhibitors (S-metolachlor, pyroxasulfone, acetochlor)

Ryegrass samples from fields with ryegrass control failures across various states in the US (primarily from the Mid-South and Southeast) showed 87% had diclofop resistance as of 2011.[3] One-fourth of diclofop-resistant populations were cross-resistant to pinoxaden and 81% were resistant to at least one ALS-inhibiting herbicide. With some populations exhibiting resistance to ACCase-inhibitors, ALS-inhibitors, and glyphosate, limited herbicide options remain for effective control of Italian ryegrass. It's important to notice when populations are showing resistance to herbicides on individual farms. To reduce the hold of resistant populations, multiple tactics will be required, using an integrated weed management approach.

Fall Tillage: If the field has not already been tilled in preparation for next year, then the first flush of ryegrass could be destroyed during this tillage operation. Fall tillage is most effective when the ryegrass seedlings are small. When utilizing tillage to control emerged Italian ryegrass, clods behind the disk must be fully crumbled and turned over. However, fall tillage must be part of a program approach followed by multiple herbicide applications to achieve complete control.

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Fall Herbicide Applications: For those farmers who have known, problematic fields, a fall residual herbicide application is the best strategy. When planning a fall application of a residual herbicide for control of emerging ryegrass, keep the following in mind.

- Applications should done be prior to ryegrass emergence and after crop harvest.
- If ryegrass has emerged, an effective foliar herbicide will be needed to kill emerged ryegrass.
- One of the labeled herbicides should contain metribuzin which can assist in controlling emerged ryegrass, although metribuzin alone should not be relied on for foliar control.

Some ryegrass plants may emerge in the spring, so a spring burndown application should also be planned.

Corn: An early burndown targeting glyphosate-resistant Italian ryegrass is more critical in fields to be planted to corn than in those that will be planted to other crops. Italian ryegrass can be 12 to 24 inches tall during corn planting season, especially in the southeast. When corn is planted into standing Italian ryegrass, the aboveground parts of Italian ryegrass will reduce the light and space available to developing corn seedlings, while ryegrass roots will limit the water and nutrients that can be taken up by corn. There are also limited postemergence herbicide options for control of Italian ryegrass in corn. There are ALS inhibitors that have activity on Italian ryegrass, but there are many populations of Italian ryegrass with resistance to the ALS chemistries, rendering these herbicides ineffective. For corn, a spring burndown program for Italian ryegrass should include the maximum rate of glyphosate plus clethodim applied a minimum of 30 days before planting. Italian ryegrass that escapes the early burndown application of clethodim should be treated with paraquat.

Soybean: As with corn, a spring burndown should include a postemergence herbicide for Italian ryegrass control. Apply clethodim plus glyphosate, surfactant, and ammonium sulfate when Italian ryegrass is no more than 4 to 6 inches tall.

Fields should be scouted 10 to 14 days after burndown for escapes. Paraquat plus a metribuzin-containing product plus surfactant should be applied 21 to 28 days following clethodim for surviving Italian ryegrass.

Winter Wheat: Italian ryegrass is particularly problematic in winter wheat because of the plants' similar germination and growth. Pyroxasulfone is found to provide activity when applied preemergence to annual ryegrass in wheat. If annual ryegrass escapes any treatment, pinoxaden + fenoxaprop-p-ethyl (group 1) or pyroxsulam (group 2) have been successful as a postemergence rescue treatment.

Battling Italian ryegrass will require an integrated management approach including cultural controls as well as herbicides. Crop rotation allows management strategies to be rotated. Management of Italian ryegrass on ditch banks, turn rows, and field borders should also be considered to prevent the further spreading of seed. Research has shown that Italian ryegrass seed is relatively short lived and dies off in undisturbed soil at an average rate of 58 percent per year.[4] Therefore, proactive weed management practices can help minimize long-term impacts of Italian ryegrass.

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Sources

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