GROWING KNOWLEDGE

Series content is coordinated by Dr. Jay Pscheidt, professor of botany and plant pathology at Oregon State University in Corvallis, Oregon.

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Figure 1: Effects of a 2" (left), 1.25" (center), and 0.625" (right) mowing height on annual bluegrass populations within stands of perennial ryegrass (annual bluegrass plants are the lightcolored spots). PHOTOS COURTESY OF OREGON STATE UNIVERSITY

Keeping lawns healthy

Research points to certain practices for minimizing invasive annual bluegrass

BY ALEC KOWALEWSKI, CLINT MATTOX, AND ALYSSA CAIN

DESIRABLE TURFGRASS SPECIES in western Oregon include, but are not limited to, perennial ryegrass and tall fescue. Perennial ryegrass will produce a dense, dark green lawn when regularly mowed, irrigated, and fertilized. Tall fescue, on the other hand, will persist with minimal fertilization and irrigation.

Annual bluegrass is an invasive weed that plagues perennial ryegrass and tall fescue lawns in western Oregon. The cool, wet weather in this part of the state from October to May is conducive to the growth and development of this weedy grass species.

Historically, herbicides have been used to manage annual bluegrass in western Oregon lawns. However, in recent years, annual bluegrass herbicide resistance has become a growing concern. There has also been increased social pressure to reduce the use of pesticides, including herbicides, in the landscape.

In response to these concerns, researchers within the Oregon State University (OSU) Turfgrass Program have been exploring the optimum mowing, fertilization, and irrigation practices for annual bluegrass mitigation in stands of perennial ryegrass and tall fescue. These research projects are currently ongoing at the Oregon State University Lewis-Brown Horticulture Farm in Corvallis, Oregon.

While the proper implementation of these practices will not provide complete annual bluegrass control, they will help to reduce annual bluegrass pressure, thereby providing tools for an integrated management approach.

Mowing

As early as 2014, OSU research found that raising the mowing height on stands of tall fescue will reduce annual bluegrass populations (Figure 1). For instance, research evaluating four different perennial ryegrass cultivars determined that a mowing height of 2 inches had the lowest annual bluegrass population (13% annual bluegrass cover) four years after establishment. This was followed by a 1.25-inch height, which had an annual bluegrass population of 22.7% cover, and finally a height of 0.625 inches which had 41.2% annual bluegrass cover after four years.

Subsequently, research initiated in 2020 suggests that raising the mowing height from 2 inches to 3 inches will produce a slight decrease in annual bluegrass populations observed in tall fescue. These preliminary findings are further supported by research conducted from 2017 to 2020 at Oregon State University, which documented reduced broadleaf populations when mixed stands of cool-season turfgrass (tall fescue and perennial ryegrass) were mowed at 4 inches in comparison to stands mowed at 2 inches (Braithwaite et al., 2021).

Fertilization

Research initiated on perennial ryegrass in 2019 has determined that increasing nitrogen (N) rates from 0 to 6 pounds of N per 1,000 square feet annually will increase annual bluegrass pressure. However, if nitrogen rates are reduced to low levels,


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Figure 2: Irrigation being applied at 0.25" to a stand of perennial ryegrass at the OSU Lewis-Brown Farm in Corvallis, Oregon.
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the combined encroachment of moss and broadleaf weeds will overtake the perennial ryegrass, resulting in lawns that look worse than those with annual bluegrass.

Considering the dynamics between annual bluegrass, moss, and broadleaf weeds, a moderate nitrogen program is recommended (3 pounds N per 1,000 square feet annually). These preliminary findings are supported well by research conducted from 2017 to 2020 at OSU, which found that no nitrogen resulted in the highest broadleaf weed populations (17% weed cover) when compared to 2 and 4 pounds of N per 1,000 square feet annually, which resulted in 1.4% and 0% weed cover, respectively (Braithwaite et al., 2021).

Preliminary findings from research initiated in 2020 suggests that avoiding late fall (after September) applications of nitrogen to tall fescue will reduce annual bluegrass infestations by as much as 50%, when compared to fall heavy tall fescue fertilization programs. Current fertilization recommendation for tall fescue are applications in the spring and early fall months (before October) totaling 2 to 4 pounds N per 1,000 square feet per year.

Irrigation

Research conducted on perennial ryegrass in 2019 determined that irrigation applied four times per week resulted in heavy annual bluegrass populations (23% annual bluegrass cover) compared to irrigation applied once per week, which resulted in very little annual bluegrass cover (7%) (Figure 2).

While infrequent irrigation reduces annual bluegrass cover, it also produces significant perennial ryegrass drought stress between irrigation events. Considering this research and other recent projects completed at OSU, current irrigation recommendations for perennial ryegrass are ¼ inches per application applied two to four times per week depending on weather conditions, with the more frequent applications being made during periods of peak drought stress (August).

Preliminary research on tall fescue has determined that minimal amounts of irrigation applied once per week can keep tall fescue green while reducing annual »

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Figure 2: Evapotranspiration replacement irrigation being applied to stand of tall fescue at the OSU Lewis-Brown Farm in Corvallis, Oregon. PHOTO COURTESY OF OREGON STATE UNIVERSITY

bluegrass populations (Figure 3). Current irrigation recommendations for tall fescue are 0.3 inches applied twice a week during the summer months. Early findings from this resasearch also suggested that minimal irrigation of tall fescue will limit encroachment of summer annuals like woodsorrel, spurge, and crabgrass.

Conclusion

Preliminary findings from this collection of projects suggest that perennial ryegrass and fall fescue stands will have less annual bluegrass when mowed at taller heights (2 to 3 inches), fertilized with moderate levels of nitrogen (2 to 4 pounds N per 1,000 square feet annually), and irrigated a few times per week. Irrigation applied at two to four times per week at 0.25 inches was best for perennial ryegrass, while tall fescue has done well with 0.3 inches applied twice a week.

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Reference

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