

Evaluation of EMPIRE Zoysiagrass at Elevated Rates of Herbicides

Introduction

The turfgrass industry has been inundated with many new turfgrasses in recent years. Usually much is known about their disease resistance, color, and growth rate but little may be known about their herbicide tolerance. When a turfgrass is labeled for a specific herbicide, a series of tolerance trials must be performed to determine the optimal rate for a particular grass. However, not all cultivars of a particular species can be tested and included on the label and such is the case with the EMPRESS and EMPIRE zoysiagrasses. Therefore, a study was performed to evaluate the effects that grass herbicides have on these two grasses.

Initially many of today's sod farms were once common bermudagrass pastures or abandoned agronomic fields and as these lands were cleared to make way for turfgrass, weeds were often disposed of improperly. If bermudagrass and other grassy weeds are left untreated, poor quality sod is produced. For example, bermudagrass is a very aggressive turfgrass compared to other warm season turfgrasses, especially centipedegrass and zoysiagrass. When bermudagrass-infested sod is cut from an area, it can quickly reestablish from rhizomes left between sod strips. Unfortunately, labeled rates are not high enough to selectively control bermudagrass and other mature grassy weeds. It is a common practice for growers to exceed the label rate of herbicide to obtain good weed control but often turf injury is a concern. The objective of this study is to evaluate suggested and elevated rates of grass herbicides for possible herbicide injury and unacceptable quality of EMPRESS and EMPIRE.

Materials and Methods

During the summer of 2000 a study was conducted to evaluate the tolerance of EMPRESS and EMPIRE zoysiagrass when treated with labeled and above labeled rates of Acclaim Extra, Fusilade II, and MSMA. Roundup Pro was also included due to the common practice of chemical mowing performed on zoysiagrass. On June 14, 2000, either EMPRESS or EMPIRE plugs (16 in²) were potted in 12" pots containing loamy sand. Two plugs were placed in each pot, leaving small voids to simulate reestablishment. Plugs were allowed to establish for 60 days, to mirror an established field of zoysiagrass sod. Mowing occurred twice monthly, with heights set at 1.0 in. for EMPIRE and 0.5 in. for EMPRESS. On August 18, treatments were applied to three separate pots to create the three replications needed for statistical analysis. Treatments include Roundup Pro at 1, 2, 4 oz/A; Acclaim Extra at 16, 32, 48, 64 oz/A; Fusilade II at 3, 6, 9, 12 oz/A; and MSMA at 1, 2 lb ai/A. Applications were made with a CO₂ backpack sprayer set to deliver 20 gallons per acre. Factors rated were percent herbicidal injury (30% = maximum acceptable) and turf quality (1-9 scale, with 5 = minimum acceptable). With a height prism, vertical height was measured in inches to determine if the herbicide had any affect on shoot growth.

Results – EMPIRE Trial

Like the EMPRESS trial, injury was apparent just one week after treatment with greatest injury at 13.3 % by MSMA at 2 lb ai/a. At two weeks, all treatments had injury ranging between 10-20%. This injury is reflected in the lower quality ratings (Table 2-2). The greatest amount of injury was observed at three weeks after treatment (Table 2-1). Fusilade II at 9 and 12 oz/A providing greatest injury at 20%. Slight recovery was observed by week four but all Fusilade II treatments still had injury greater than 15% and poor quality (Table 2-2). One week later, many treatments had recovered to less than 10% injury with quality ratings statistically similar to the untreated. However, the highest two rates of Fusilade II had approximately 17% injury with 5.5 quality ratings through the remainder of the trial. Acclaim Extra at 64 oz/a rate had its maximum injury (18%) at seven weeks and never restored a healthy appearance.

Conclusion

Earliest injury was observed by MSMA with the 2 lb ai/a rate. It provided significant injury through the first three weeks. Much of the early injury observed by the Acclaim Extra and Fusilade II treatments began as a shoot reddening but later resulted in necrotic tissue. Of all the herbicide sets, Fusilade II provided the greatest amount of injury on both grasses while producing some permanent damage thus never fully recovering by trials end. However, injury was at or less than 20 percent and within the acceptable range. Roundup Pro did provide significant injury (Table 1-1) by four weeks on the EMPRESS, especially at the 4 oz/a rate but research has shown that with higher spray volumes this injury could possibly be reduced. However, Roundup Pro at 2 oz/a did provide minimal injury (Table 1-1) with significant vertical growth reduction on EMPRESS (Table 1-3). No height suppression was observed with EMPIRE (Table 2-3), however, EMPRESS vertical growth was suppressed slightly by all treatments (Table 1-3). Providing greatest reduction were the higher two rates of Fusilade II by reducing vertical shoot growth by nearly 50%. Both grasses seemed highly tolerant to elevated rates of Acclaim Extra. Although injury did occur within four weeks after treatment, turf recovered by seven weeks after treatment. However, EMPIRE treated with Acclaim Extra at 64 oz/a rate still had significant injury (18%) by the conclusion of the trial but was still in the acceptable range.

Increasing herbicides above labeled rates can provide an increase in weed control but expect to deal with turfgrass injury. It is shown that when elevated rates are used expect 5-7 weeks for injury to recover. Although Acclaim Extra and Fusilade II at highest rates had acceptable injury rating at the conclusion of the trial, they never fully recovered and resulted in poor quality ratings, it is advised that these rates be used with extreme caution and in a timely manner. The lateness of applications could have attributed to the fact that these did not completely recover. The last rating date fell on October 5th and we suspect that physiological changes preparing the plant for dormancy due to the cool weather and shorter days could have been a factor for the slow recovery rates. Remember, these results are not recommendations but merely an estimate from the consequences of spraying elevated rates of postemergence herbicides.