

Plant Growth Regulator Effects on Annual Bluegrass/Creeping Bentgrass Competition

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Plant growth regulators (PGR's) continue to receive a great deal of attention for use in the conversion of annual bluegrass fairways to creeping bentgrass. The following report is a summary of testing completed on the effects of several PGR's on the species composition of a mixed stand of annual bluegrass and creeping bentgrass. All research was conducted on a mixed stand of annual bluegrass/creeping bentgrass located at the Hancock Turfgrass Research Center, Michigan State University. The research area was mowed at a 0.5" height of cut and fungicides were applied as needed to alleviate disease pressure.

RSWO411 & PP-333 Test Results

An experimental PGR supplied by Mobay Chemical (RSW0411) and PP-333 (the active ingredient in Scott's TGR) were evaluated for one year. Both compounds were applied on April 29, 1986 at 82 growing degree days. RSW0411 was applied at 2, 4, & 6 lb/ac and PP-333 at 0.75 and 1.5 lb/ac. Visual estimates of phytotoxicity and turf quality were obtained based on a scale of 1 to 9, a 9 indicating best quality or most phytotoxicity. Data were also collected on the change in annual bluegrass populations from treated plots compared to untreated plots. Annual bluegrass populations were estimated using a grid with 112 intersections which was placed over each plot and the presence of annual bluegrass under an intersection recorded. Populations were estimated before treatment in the spring and again in the fall to evaluate treatment effects.

Phytotoxicity and quality ratings for both compounds are shown in Figure 1. Note that the phytotoxicity ratings are for annual bluegrass only. Neither compound exhibited significant phytotoxicity on creeping bentgrass. As rate increased phytotoxicity also increased. The most severe phytotoxicity was observed from the 1.5 lb rate of PP-333. Both compounds initially decreased turf quality. However, RSW0411 treatments showed an increase in turf quality approximately 50 days after treatment. The PP-333 treatments had the greatest reduction in turf quality on this same evaluation date. The adverse effects on turf quality are more evident with PP-333 than RSW0411. Analysis of data collected on annual bluegrass populations indicated that neither compound significantly reduced annual bluegrass populations.

Embark & Cutless Test Results

Spring applications of Embark at 0.125 lb/ac and Cutless at 1.0 lb/ac were applied in 1984, 85, and 86. Annual bluegrass population was estimated as previously described and data collected in the fall of each year of the study. PGR treatments were applied in combination with irrigation, N-fertility, clipping removal and bentgrass overseeding treatments (for a more detailed description of treatments see 57th Annual Turfgrass Conference Proceedings, Vol. 16, p.62).

Neither compound exhibited a significant difference in annual bluegrass population shift from the control treatments in any one year of the study but when the data are combined over three years the Embark treated plots had significantly more annual bluegrass than the Cutless or control treatments (Figure 2). This response is even more pronounced at when the data are averaged within N-fertility rates (Figure 3). The combination of 6 lb/N/M and Embark resulted in significantly more annual bluegrass

than Cutless or control plots at the same fertility level. This data indicates that treatment of annual bluegrass fairways with Embark in combination with higher N-fertility levels will increase the survival or persistence of annual bluegrass. Additionally, Embark, in combination with clipping removal, increased the survival of annual bluegrass compared to clipping removed plots treated with Cutless or no PGR (Figure 4). The clipping removal plots treated with Cutless did not differ from the no PGR clippings removed treatments. Embark or no PGR plots overseeded with bentgrass did not differ in from their respective not overseeded treatments. However, overseeded Cutless treatments had significantly more creeping bentgrass than not overseeded Cutless treatments (Figure 4). Treatment with Cutless increased the success of the bentgrass overseeding operation.

Summary

Based on the evaluation of RSWO411 and PP-333 for one year and Embark and Cutless for three years the following observations can be made:

1) For control of annual bluegrass, none of the PGR's tested were effective in decreasing populations.

2) Cutless increased the success of bentgrass overseeding.

3) Embark, when clippings are removed or in combination with high N-fertility increased annual bluegrass populations.

4) Turf treated with PP-333 at 1.5 or 0.75 lb/ac exhibited a significant reduction in quality up to 50 days after treatment.

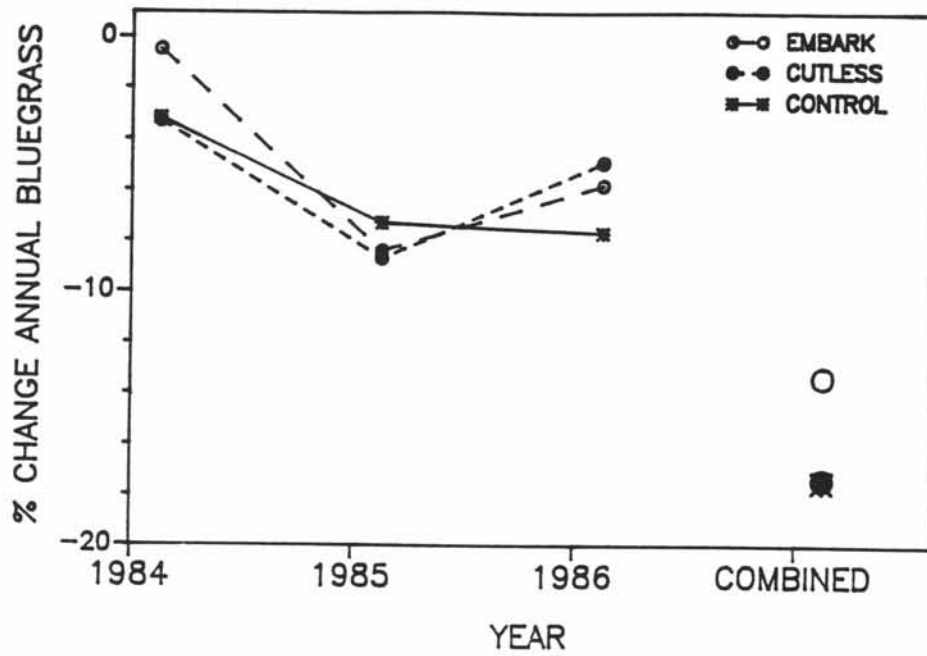


Figure 2. Plant growth regulator yearly and combined year effects on annual bluegrass populations. Hancock Turfgrass Research Center. Michigan State Univ. 1984-1986 test results.

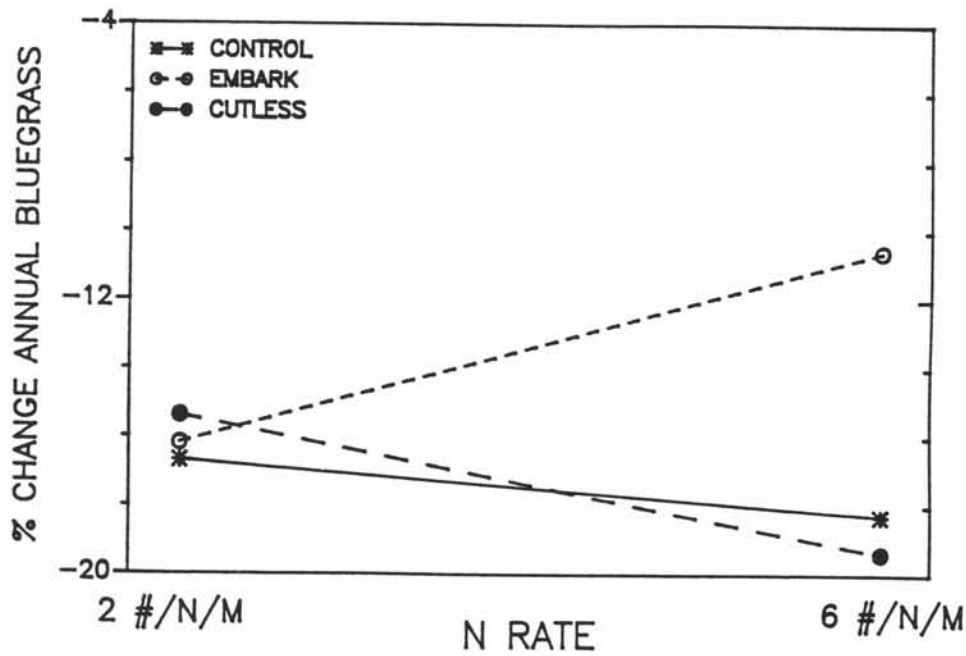


Figure 3. N-fertility by plant growth regulator interaction. Hancock Turfgrass Research Center. Michigan State Univ. 1984-1986 test results.

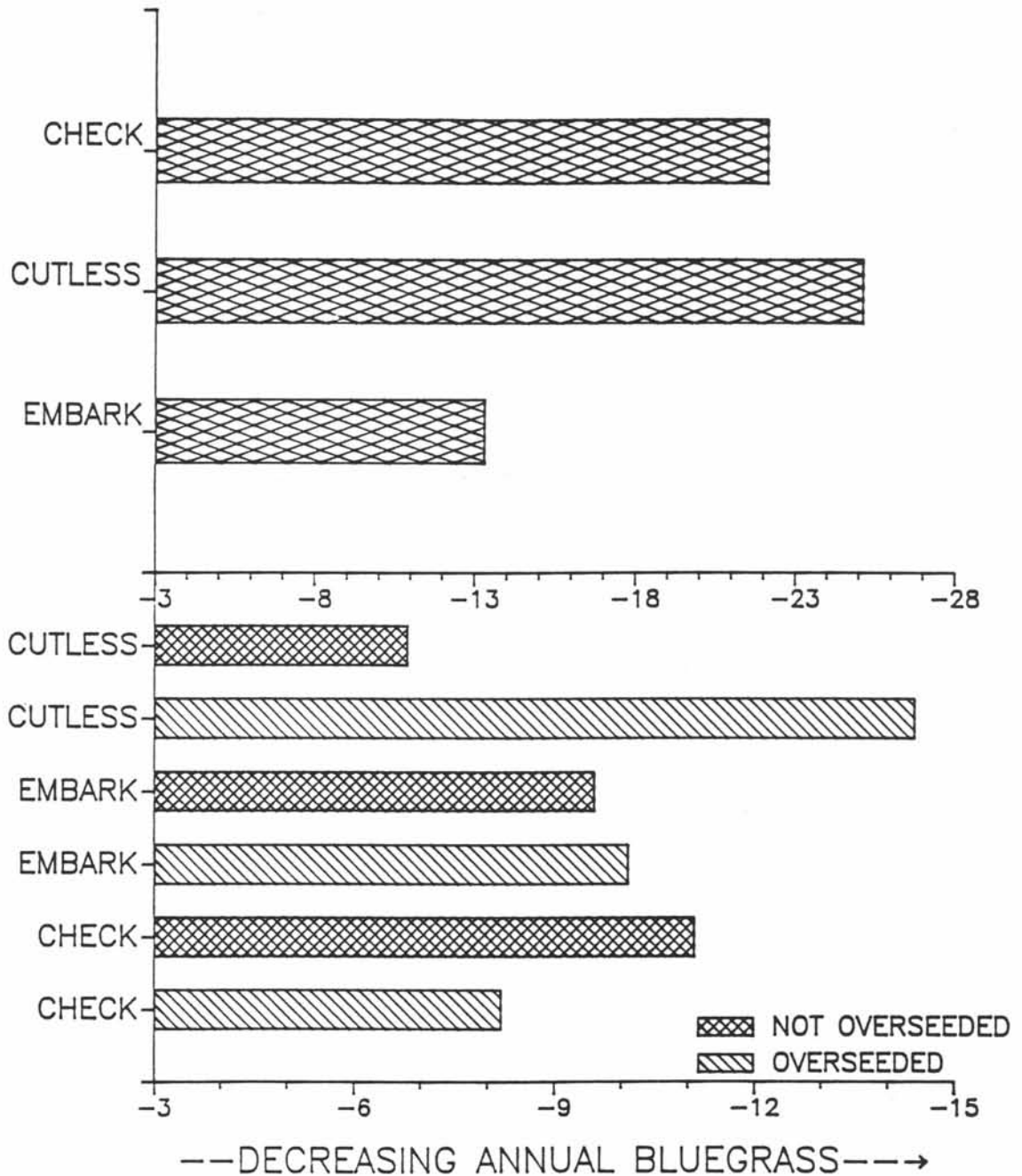


Figure 4. The effects of plant growth regulator treatment in combination with clipping removal (top graph) or bentgrass overseeding (bottom graph) on annual bluegrass populations. Hancock Turfgrass Research Center. Michigan State Univ. 1984-1986 test results.