Response of Purple Nutsedge to Repeat Applications of Imazaquin Herbicide During 1988

D. M. Kopec, E. S. Heathman, H. N. Moharram, C. F. Mancino, and Kai Umeda.

ABSTRACT

Repeat sequential applications (1 - 4) of imazaquin herbicide were applied to 100% pure stands of purple nutsedge during the summer of 1988. Treatments were applied every two weeks. Maximum suppression for plots receiving only one application was reached 1 month after application (25% control). Two 14-day sequential applications achieved 60% control 2 weeks after the second treatment. Both 3 and 4 sequential applications resulted in 88% and 92% control after 2 and 4 weeks from the third and fourth applications, respectively. Resprouting eventually reoccurred on all plots. This data shows the enhanced effect of repeat applications of imazaquin for purple nutsedge suppression.

INTRODUCTION

During the summer of 1987, nutsedge suppression was greater at the 0.5 than at the 0.38 lb ai/a rates for imazaquin applied to 100% stands of purple nutsedge (Cyperus rotundus). At both rates, repeat applications were necessary, and late season sprouting occurred to various degrees. Based on those observations, an experiment was designed to measure the effect of sequential applications of imazaquin on the suppression of pure stands of purple nutsedge.

MATERIALS AND METHODS

Sequential applications of imazaquin (at 0.5 lb ai/a) in 14-day intervals during the summer of 1988, ranged from 1 to 4 applications. Treatment assignments were as follows:

Treatment 1	applied on 06/20			
Treatment 2	applied on 06/20	07/04		
Treatment 3	applied on 06/20	07/04	07/19	
Treatment 4	applied on 06/20	07/04	07/19	08/01

These treatments allowed for the measurement of nutsedge suppression with either 1, 2, 3, or 4 applications, starting from late spring (treatment 1, June 20).

Treatments were applied to 4- x 6-foot plots of 100% nutsedge. One-half of each plot remained untreated. At 14 days after each treatment (DAT) with the herbicide plots were evaluated for percentage nutsedge ground cover (0 - 100%). Control was determined as 1 - (treated/control) on a per-plot basis. All treatments were replicated 4 times, in a completely randomized design.

Applications were made using a 3-nozzle boom (20-inch spacing) at 3 mph and 40 psi, delivering a solution of 80 gallons per acre (gpa). Plot borders were covered with cardboard to maintain plot integrity. Plots were sprinkler irrigated using a fan nozzle, receiving 0.5" of water within 1 hour after application. Plots were fertilized

in early May and June with 1 lb per 1000 ft^2 of -N- from ammonium phosphate each time. Plots were mowed every fifth day at 2.5 inches, and flood irrigated once every 7 days.

RESULTS AND DISCUSSION

At 14 DAT from application 1 (6/20), there was no significant effect from the imazaquin treated plots relative to the controls. Weed reduction ranged from 2% - 18%. The herbicide slows growth of the weed, then discolors the nutsedge from yellow to brown, followed by leaf withering and necrosis to various extents. By 14 DAT from the second application, control ranged from 18% - 30% among the treated plots, with no significant difference between those plots receiving 2 sequential, vs. the single application.

At 14 DAT from application 3, there was a highly significant difference between treatments. At this time, treatment 1 (received only 1 application on June 20), mean nutsedge control decreased from 26% to 19%, showing that maximum effect for a single application occurred at 28 DAT. Plots which received 2 sequential applications developed essentially the same level of control (60%) as those receiving 3 applications (64% average).

By 14 DAT after the fourth application, those plots which received 2 sequential applications, (treatment 2) exhibited decreased suppression, from 60% to 41%. In addition, the plots receiving the single application only, had developed slightly more nutsedge than at the beginning of the experiment. Plots receiving 3 and 4 applications had high levels of suppression, 88% and 92%, respectively.

A final rating was conducted on 26 September, 5 weeks after the last evaluation, to assess the effect of the herbicide treatments without further applications. At that time, only plots receiving the 4 sequential applications maintained suppression (50%). The other plots tended to increase in nutsedge, with treatments 1, 2, and 3 having -15%, 1.5%, and -11% control. The resprouting is more or less random for the regrowth phenomenon, but it does occur.

CONCLUSIONS

Based on the conditions experienced during this test, it appears that:

1. A single application of imazaquin at 0.5 lb ai/a reached a level of 25% suppression 1 month after application, which declined to less than 20% at 6 weeks after application, and finally returned to a level equal to or greater than the original stand.

2. Two 14-day sequential applications at 0.5 lb ai/a resulted in over 60% control by 2 weeks after the second application, which then decreased to 40% suppression 1 month after this second application.

3. Both 3 and 4 sequential applications greatly reduced nutsedge (88% to 92%, respectively) after 2 and 4 weeks from a third and fourth application, respectively.

4. After these effects were realized, nutsedge resprouted at the soil surface and was not eliminated, showing suppression, rather than elimination.

5. By September 26, 1988, mean suppression was 50% for treatments receiving 4 sequential applications, while those receiving 3 or less showed sporadic but noticeable regrowth.

These results are from a replicated test conducted on 100% stands of purple nutsedge of long standing, and the mechanism of regrowth remains undetermined. Competition from turfs should affect suppression (or control) and investigation is warranted.

NUTSEDGE CONTROL
IMAZAQUIN 1988