## Optimizing the Use of Basamid for *Poa annua* Control in Fairway Renovation

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### Objectives

1. Determine the optimum rate for using Basamid to control *Poa annua* in a fairway renovation project.
2. Determine the optimum method for using Basamid to control *Poa annua* in a fairway renovation project.
3. Determine the delay after application that is needed to safely seed creeping bentgrass.

### Rationale

Basamid is a soil fumigant that is a likely replacement for methyl bromide after it is phased out in 2005. Basamid has been on the market for many years and is used in greenhouse, nursery, and vegetable production. Basamid is a granular product that is normally incorporated through tillage. Upon contact with moist soil, Basamid turns into a gas and diffuses upward through the soil killing living organisms it contacts. However, tillage is rarely a viable option when renovating turf areas, so a non-disruptive method of incorporation of Basamid into turf areas must be found. Additionally, determining the optimum rate of Basamid and the delay for seeding after application are critical in optimizing the use of Basamid.

### How it was done

Virtually identical experiments were run at University of Illinois and Purdue University. Two experiments were initiated in mid-May (17-21) at each University and then repeated in mid-Aug (15-22) in the year 2000. Experiments were located at the University of Illinois Turfgrass Research Center and the Ackerman Golf Course at Purdue, both areas had high populations of *Poa annua* present. All experiments were in split block designs with Basamid and Roundup treatments as main plots and seeding treatments as subplots.

#### May Experiments

*Basamid Rate Experiment.* Plots were aerified with a Ryan Greensaire with 1/2" diam. hollow tines on 2" x 2" spacings. Plugs were broken up with one pass of a power rake. Basamid was applied at 125, 200, 275, 350, and 425 lbs/A with handheld shaker bottles. Roundup was used as a standard treatment and was also applied at 2 qts/A in 2 gals $H_20$/1000 $ft^2$ immediately after breaking up the plugs. The area was watered according to label instructions for seven days.

*Soil Preparation Experiment.* Seven treatments were used in this study including Roundup applied with no aerification, Basamid applied with no aerification, Basamid applied after aerification, Basamid applied after aerification and then rolled, Basamid applied before aerification, Basamid applied before aerification and then rolled, and Basamid applied after vertical mowing and then rolled. Basamid was applied at 275 lbs/A in this study. The methods in this study were identical to that used in the Basamid rate study.

### August Experiments

*Basamid Rate Experiment.* To facilitate the use of a drop spreader to improve accuracy, Basamid rates were changed in this study to 150, 225, 300, 375, and 450 lbs/A. Other methods were consistent with the May study.

*Soil Preparation Experiment.* Six treatments were used in this study including Roundup applied with no aerification treatment, Basamid applied after 1X aerification, Basamid applied after 3X aerification, Basamid applied before 1X aerification, Basamid applied before 3X aerification. Basamid was applied at 300 lbs/A in this study. The methods in this study were identical to that used in the previous studies.

### Evaluation of Poa annua Control and Bentgrass Establishment

Three, 5, and 7 days after application, 'Providence" creeping bentgrass was seeded by hand into subplots at 1.0 lb/1000 $ft^2$. Data recorded included phytotoxicity, % cover of bentgrass and % cover of the original turf. Additionally, cup cutter sized plugs were harvested, separated into 3 depths (0-0.4", 0.4"-0.8", and 0.8-1.2"). These plugs were air-dried and broken up with by gentle grinding. Subsamples were then spread in flats on a mist bench in greenhouses at the Univ. of Illinois, and allowed to germinate. Counts on *Poa annua* seedlings were recorded.

## Preliminary Results

### May Experiments

All May experiments at both University of Illinois and Purdue University produced poor results. We conclude that the spring appears to be a poor time to use Basamid because no treatments produced acceptable control of the established turf, nor acceptable control of *Poa annua* when germinated on the mist benches. We attribute this to a number of factors, primarily to the strong winds following application. Air temperatures reached 80-90$^oF$ for 3-5 days following application and were accompanied by 30-35 MPH winds. We presume that these conditions caused the Basamid to volatilize too quickly reducing its effectiveness.

### August Experiments

August experiments produced much more promising results at both locations with a number of Basamid treatments providing excellent control.

*Basamid Rate Experiment.* Basamid applied at 300 lbs/A and higher produced 95% or better cover of creeping bentgrass when rated 18 Nov at Purdue which was about 3 months after application (Fig. 1). This compares with about 65% creeeping bentgrass cover produced by the industry standard Roundup treatment. All Basamid treatments dramatically reduced the number of viable *Poa annua* seeds compared to Roundup, but it appears that 225 lbs/A may be the threshold rate for significant control of *Poa annua* seeds (Fig. 2).

*Soil Preparation Experiment.* Judging from the results in rate experiment, the Basamid rate used in this experiment (300 lbs/A) was so effective that meaningful differences among soil preparation treatments were not observed. Regardless, it appears that there is no meaningful difference between applying

Basamid prior to or after application (Fig. 3). This is favorable because Basamid can most practically be applied only after aerification in a golf course renovation setting. As expected there appears to be a significant difference between aerifying only 1X and aerifying 3X. The increased number of aerification holes in the 3X treatment allowed the Basamid to penetrate the soil better, plus the increased soil on the surface produced a better "seal" holding the Basamid gas in place. In a practical sense, increased aerification will also improve the seed-soil contact resulting in improved establishment of the desirable grass. The most effective treatment for reducing viable *Poa annua* seed was Basamid applied after 3X aerification (Fig. 4). It appears that it is safe to seed creeping bentgrass 5 days after Basamid application (Fig. 5).

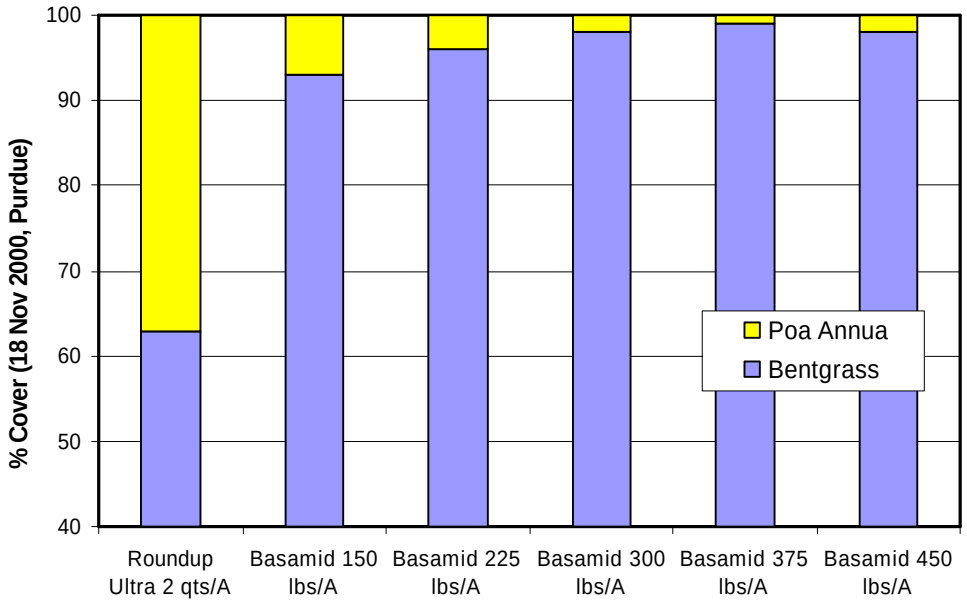


Figure 1. Effect of Roundup and various rates of Basamid on % cover of creeping bentgrass and *Poa annua* rated 18 Nov at Purdue, which was three months after application.

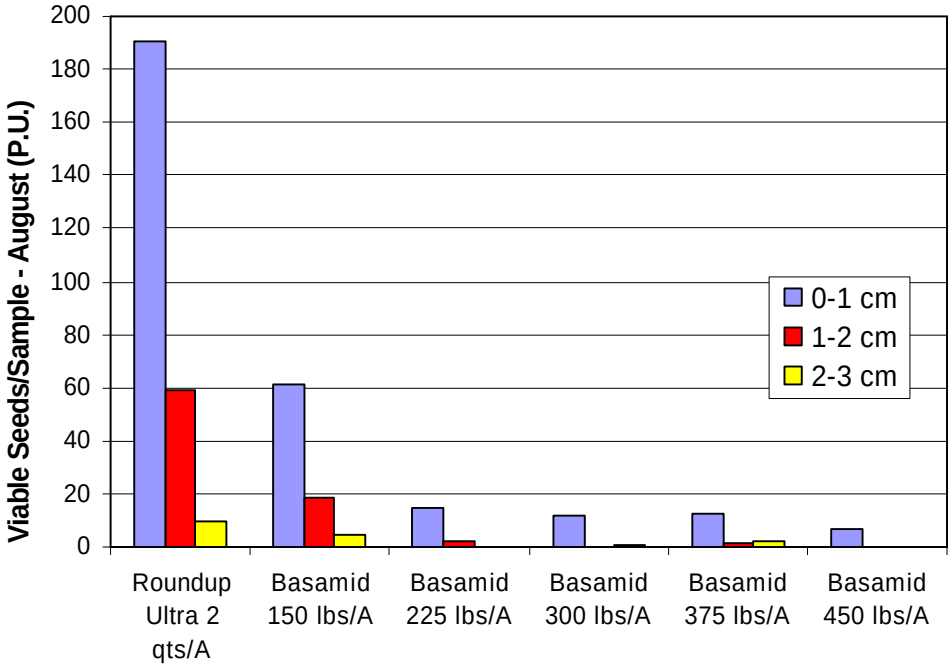


Figure 2. Effect of Roundup and various rates of Basamid on number of viable *Poa annua* seeds in the August study at Purdue.

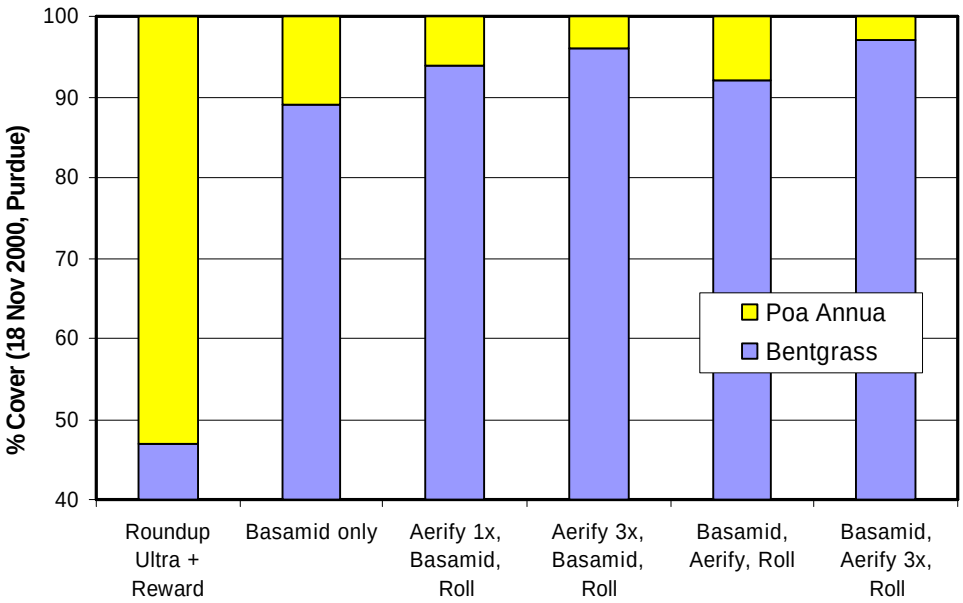


Figure 3. Effect of various soil preparation methods and Basamid at 300 lbs/A on % cover of creeping bentgrass and *Poa annua* rated 18 Nov at Purdue.

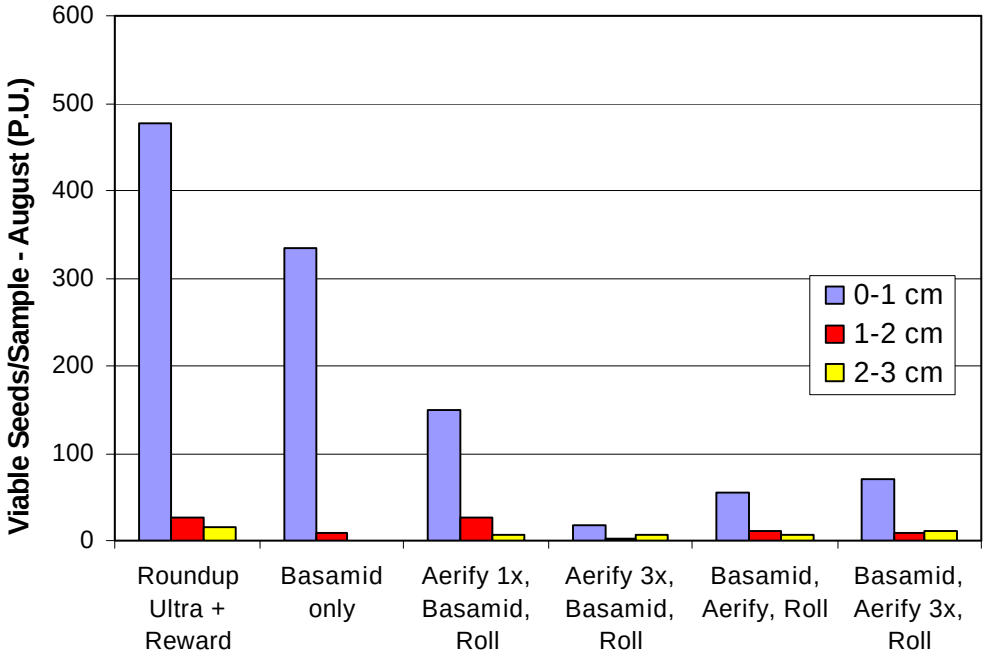


Figure 4. Effect of various soil preparation methods and Basamid at 300 lbs/A on number of viable *Poa annua* seeds in the August study at Purdue.

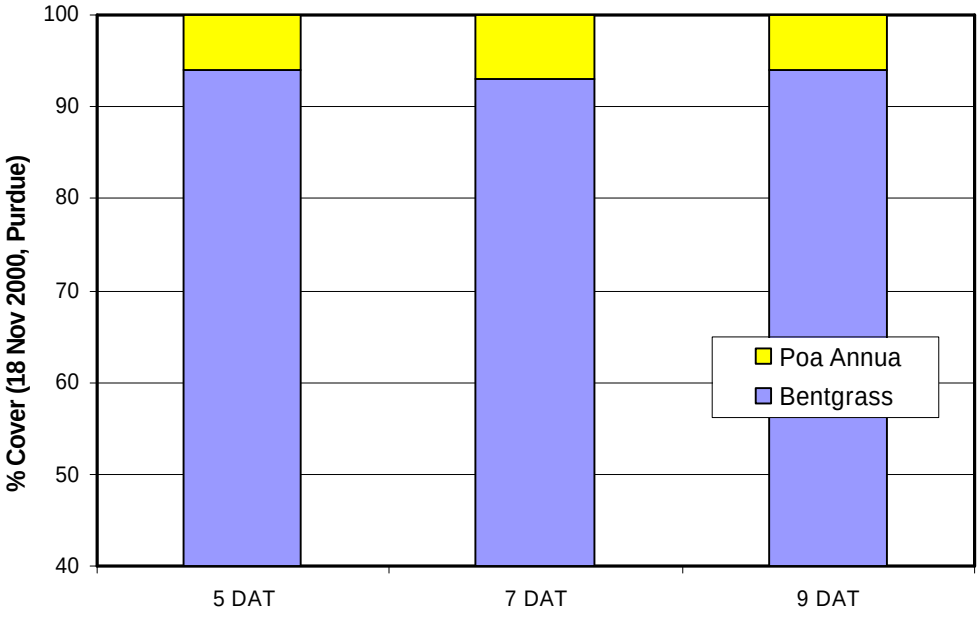


Figure 5. Affect of seeding delay after Basamid application on % cover of creeping bentgrass and Poa annua rated 18 Nov at Purdue. Means presented are averaged over all Basamid treatments in the soil preparation study.