Soil Sterilization with Basamid

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Soil sterilization of putting green mixes is a common procedure in the southeastern United States to control nematodes prior to seeding or stolonizing a green. The practice is not widely used in the northeastern United States for a variety of reasons including high cost, difficulty in using most soil sterilants, and lack of serious pest problems.

However, one of the most serious turf pest problems on golf courses is annual bluegrass, a weed many golf course superintendents would like to keep out of their greens, tees, and fairways. Methyl bromide is the most commonly used soil sterilant, but because it has been implicated as a serious environmental problem, methyl bromide is being phased out of use and will no longer be available after the year 2000. Methyl bromide has been found to cause more ozone depletion than the chlorofluorohydrocarbons, or freons, that are in the process of being phased out as refrigerant gases.

There are two other soil sterilants that can be used in turf, VORLEX and BASAMID. While these are two different chemicals they both work in a similar manner and have the same active ingredient. The catalytic action of soil plus water causes both of these products to break down to the active ingredient, methyl isothiocyanate. Methyl isothisocyanate is a highly toxic gas that will kill all weed seeds, fungi, bacteria, nematodes, and soil insects. The main difference between the two products is their form and the manner in which they are applied. VORLEX is a liquid and as such special equipment must be used to inject it into the soil. BASAMID is a granular product which can be spread over and incorporated into the soil. Both products require irrigation to release the active ingredient. Both products have been on the US market for quite some time, however, little work has been done with them on turf.

We see two potential uses for these products although we're sure that innovative golf course superintendents will develop other potential uses. Since these materials result in the killing of the annual bluegrass seed reservoir, it would seem a natural to use these products during renovation of golf course greens and fairways.

We have conducted three studies using BASAMID to control annual bluegrass seed in the soil. The first study was conducted in the fall of 1993 at the Hancock Turfgrass Research Center. This study was designed to approximate the renovation of a golf course green. The sod was stripped off using a sod cutter to remove the existing turf just below the thatch layer while leaving as much soil and surface contour as possible. Factors investigated included BASAMID rate, incorporation method, and the effect of tarping the area after treatment. BASAMID rates investigated were 0, 5, 25, and 100 ozs product/1000 ft^2. Incorporation methods were hand raking, light vertical mowing with a Ryan Ren-O-Thin, and no incorporation. Rates and incorporation methods were put out in duplicate and 1/2 the plots were irrigated with 0.5" of irrigation and then immediately covered with black poly tarp. The other 1/2 of the plots were irrigated with 0.5" of irrigation and then repeatedly irrigated over the next 7 days to try to keep the gas in the soil where it could control the *Poa annua* seeds.

RESULTS

The results of these studies are shown in Figure 1. A major oversight on our part was to cover all the tarped plots with one tarp. This resulted in the gas moving around under the tarp so that the control plot, which did not receive any BASAMID, had a high level of *Poa annua* seed control when

compared to the control plots in the untarped area. However, some very interesting data can still be gleaned from this study. First, the labeled rate for soil sterilization is 100 ozs/M. However, it must be kept in mind that this rate is designed to sterilize an entire 6" soil profile. When tarped, it is clear that a much lower rate can be used to achieve sterilization of the soil surface layers although further studies will be needed to determine what those rates actually are. When untarped, the high rate does provide excellent sterilization even without incorporating the BASAMID. These results are encouraging for use in fairway renovation studies. Incorporation of BASAMID in a fairway situation may be possible using aggressive core cultivation as a means to seal in the gas from the BASAMID. This possibility was tested in trials conducted this spring. Results of these trials are still being gathered.

The data in Figure 1 also shows the depth of sterilization achieved with BASAMID. No soil incorporation was attempted in these studies, so deep sterilization should not be expected. However, at the high rate of BASAMID excellent control of *Poa annua* seeds was seen to a depth below 1". These data are averaged across incorporation methods and tarping and are somewhat compromised by the effects of tarping but the point is clear that a high rate of BASAMID should provide excellent control of *Poa annua* seeds to depths of at least 1". Tarping and/or better methods of surface incorporation will only improve upon these results.

A site that is reestablished to creeping bentgrass with a near zero population of *Poa annua* seeds should remain *Poa annua* free for a long time. With excellent preemergence herbicides to help keep any *Poa annua* in check and a postemergence herbicide, PROGRASS, that has shown good activity on *Poa annua*, one can envision a golf course that can keep *Poa annua* at bay.

Figure 1. EFFECT OF BASAMID ON *P. ANNUA* GERMINATION