

Basamid® G for Weed Control in Forest Tree Nurseries

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Abstract: Basamid® G is a granular soil fumigant containing dazomet, which has activity on weeds, insects, nematodes, and diseases. Basamid® G was compared to methyl bromide:chloropicrin and was equally effective as a weed control material in forest tree nurseries. Pine and hardwood plantings were treated with both materials in replicated and nonreplicated trials with various weed species, and both fumigants were highly effective. The recommended rate for Basamid® G is 350 to 530 lb/ac (390 to 595 kg/ha), and plant-back interval for tree seeds is 14 to 28 days. These may vary slightly due to local environmental conditions (rainfall, soil type, percentage organic matter, available soil moisture). Basamid® G gives the grower an alternative to methyl bromide, which has equal efficacy and grower-friendly application procedures. Basamid® G is halogen free with no ozone depleting components and will give the nursery grower effective, easily applied, and environmentally safe weed control for the future.

Keywords: dazomet, MITC gas, soil fumigant, methyl bromide alternative

Introduction

In 2003, Kanesho Soil Treatment (a joint venture between Agro-Kanesho Co., Ltd. and Mitsui and Company, Ltd.) acquired several soil disinfestation products from BASF Corporation, including Basamid® G granular soil fumigant, which contains the active ingredient dazomet. Certis USA, a wholly-owned subsidiary of Mitsui and Company, has assumed marketing and development responsibility for Basamid® G in the United States and Mexico.

Unlike most other fumigants, Basamid® G (dazomet) is inactive until it comes in contact with soil moisture and decomposes to release methylisothio-cyanate (MITC) gas. MITC gas diffuses through the air spaces between soil particles, killing soil-dwelling organisms such as weeds, nematodes, insects, and fungi. MITC gas breaks down into safe soil nutrients with no halogen or ozone depleting components. Basamid® G can be user-applied without the extensive equipment, containment, and safety requirements of other soil fumigants and has no detrimental impact on the environment. Plastic tarping is not required, although it may improve fumigation performance in some cases.

Basamid® G has been in use outside the United States for over 20 years, most extensively in Japan and Europe. It is registered in the United States for control of weeds, nematodes, and diseases, and has been used in forest tree nurseries for the production of pine and broadleaf seedlings since the early 1990s. The fumigant is easily applied by nursery staff on their own schedule, with no need to cover the field with plastic. A clean start can be achieved for a new seedling crop without the logistical challenges of custom application or disposal of used plastic tarps.

A power tiller is the preferred method for incorporating Basamid® G. A well prepared seedbed with a moisture content of at least 50 percent of field capacity is necessary. The power tiller incorporates Basamid® G to an 8 to 10 in (20 to 25 cm) depth after it is metered onto the soil surface from a Gandy® type spreader. A roller towed behind the tiller compacts the soil to seal in MITC gas. Overhead irrigation should be applied immediately after incorporation and for 7 days to further seal the MITC gas in the soil. One inch (2.5 cm) of irrigation water should be applied the first day to wet the soil to a depth of 6 to 8 in (15 to 20 cm) to seal the soil and release the MITC gas. On the second day, 0.5 to 0.75 in (1.3 to 1.9 cm) of water should be applied, with 0.25 to 0.5 in (0.6 to 1.3 cm) applied on subsequent days to maintain the soil seal and contain the gas. The soil should be allowed to dry out after 7 days to release the MITC gas. To test for the presence of MITC gas, a sample of the soil from the surface to 6 in (15 cm) deep can be taken and placed in a sealed Mason jar with moistened lettuce seeds. If the seeds germinate,

the gas has dissipated. A light soil aeration will speed the release of gas if planting is to be made within 14 to 28 days of Basamid® G application.

Our objective in the nursery trials was to determine the effectiveness of Basamid® G for control of weeds in pine and broadleaf plantings. Comparisons with methyl bromide and untreated plots were made where possible.

Materials and Methods

The field trials took place in 2004 to 2005 on tree nurseries in South Carolina, Georgia, and Missouri. All Basamid® G plots were applied by a power tiller with a modified Gandy® spreader attached to meter the granules in front of the tiller. Soil temperatures were 65 to 75 °F (18 to 24 °C) and soil moisture was 50 to 60 percent. A roller was pulled behind the tiller to seal the soil surface. Water was applied through overhead irrigation for 7 days beginning immediately after application at rates of 1 in (2.5 cm) on day 1, 0.5 in (1.3 cm) on day 2, and 0.25 in (0.6 cm) on the remaining 5 days. Post emergent herbicides were applied throughout the trial period as part of the standard weed control programs at the nurseries. Plots were hand-weeded as necessary during the

summer of 2005, and data was collected to include person-hours of weeding and weight or number of weeds. Randomly selected square meter blocks from each plot were taken for weed counts in the South Carolina and Missouri trials. All three plots were used in the Georgia trial. Primary weed species for each site were recorded.

Basamid® G rates were 400 lb/ac (450 kg/ha) in the South Carolina and Missouri trials and 490 lb/ac (550 kg/ha) in the Georgia trial. The methyl bromide used in all trials was 98:2 methyl bromide:chloropicrin at 350 lb/ac (390 kg/ha).

All plots were fall-fumigated well in advance of planting and allowed to remain idle until bed formation and seed planting in spring of 2005. Winter annual weeds were controlled by postemergent herbicides, as needed, before planting.

Results and Discussion

The trial in South Carolina by MeadWestvaco was a large plot nonreplicated trial planted with loblolly pine (*Pinus taeda*). Basamid® G (400 lb/ac [450 kg/ha]) was an effective weed control and equivalent to methyl bromide (350 lb/ac [390 kg/ha]) in numbers of weeds per square meter and weeding times per acre (figure 1). Both treatments were much more effective than the untreated control.

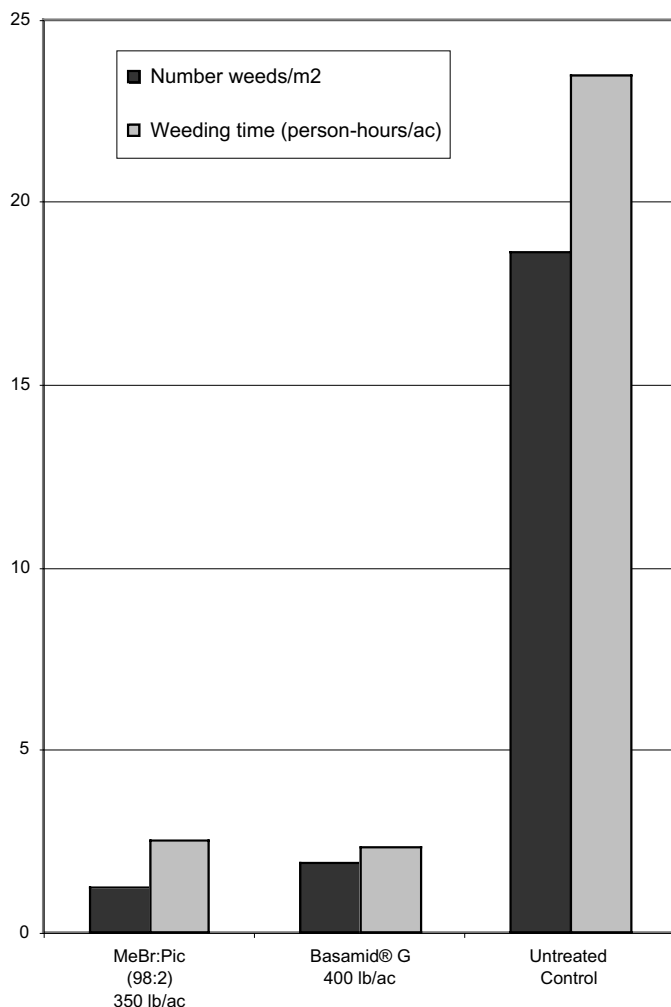


Figure 1—Weed control with Basamid® G in the MeadWestvaco forest tree nursery, 2004 to 2005 (1 lb/ac = 1.1 kg/ha).

- Nonreplicated field trial.
- Individual plots 0.25 to 0.33 ac (0.10 to 0.13 ha).
- Sandy soil not fumigated for 2 years.
- Basamid® G applied 10/12/04; methyl bromide applied 10/04.
- Water seal maintained for 7 days by overhead irrigation.
- Plots weeded in June 2005.
- Major weeds included carpetweed, pusley, and hardwoods.
- Goal® herbicide applied as needed during the year.

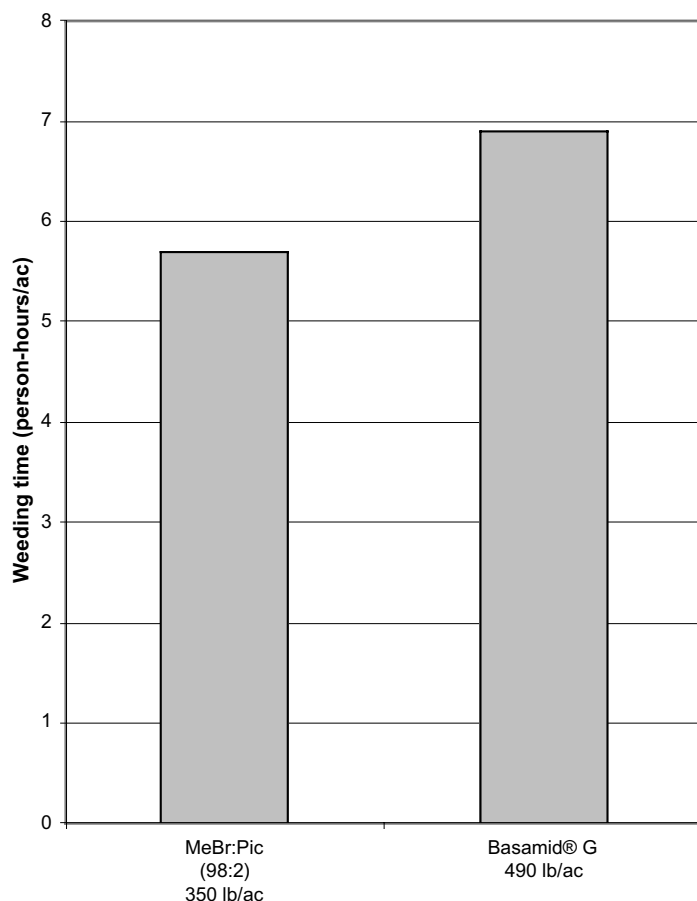
Rayonier, Incorporated in Georgia installed a field trial with three replications in a randomized complete block design comparing methyl bromide (350 lb/ac [390 kg/ha]) and Basamid® G (490 lb/ac [550 kg/ha]) planted with loblolly and slash pine (*P. elliottii*) in alternating rows. Weeding time in person-hours per acre was slightly higher in the Basamid® G plots, but overall weed control was similar and acceptable to the grower (figure 2). Six rows of the methyl bromide plots did not receive post-emergent herbicides and these were omitted from the comparison.

A large plot nonreplicated trial was installed by George O. White Nursery in Licking, MO. Two broadleaf species were planted in this trial. Pin oak (*Quercus palustris*) was planted in the methyl bromide treated plot and pecan (*Carya illinoensis*) in the Basamid® G treated plot. Weeding times were similar in both plots but the Basamid® G treated plot had more weeds per square meter (figure 3). This may be due to the closed canopy and large size of the pin oak (methyl bromide) and the open canopy and much smaller size of the pecan (Basamid® G). The nurseryman considered the weed control by both fumigants to be effective.

since the early 1990s and has efficacy equal to methyl bromide. Field trials in several States have shown that Basamid® G is highly acceptable to the nursery growers and is applicator and environmentally friendly. Basamid® G is easily applied by nursery staff on their own schedule with no need to cover the field with plastic. Maintaining a water seal for 7 days is critical for successful weed control. To further assure effective weed control, soil moisture should be maintained at optimum levels for 1 to 3 weeks prior to Basamid® G application to allow for seed and nutsedge germination. If application is necessary within 14 to 28 days of planting, be sure that all MITC gas is out of the soil before planting by using the lettuce seed germination test. Light aeration of the soil will remove the soil crust and help remove residual MITC gas. MITC gas contains no halogens and no primary or secondary ozone depleting components. Do not apply Basamid® G to dry or improperly tilled soil. Do not apply within 3 to 4 ft (0.9 to 1.2 m) of growing plants or within the dripline of trees. Do not use Basamid® G when soil temperatures are below 43 °F (6 °C) or if ambient air temperature is 103 °F (39 °C) or above.

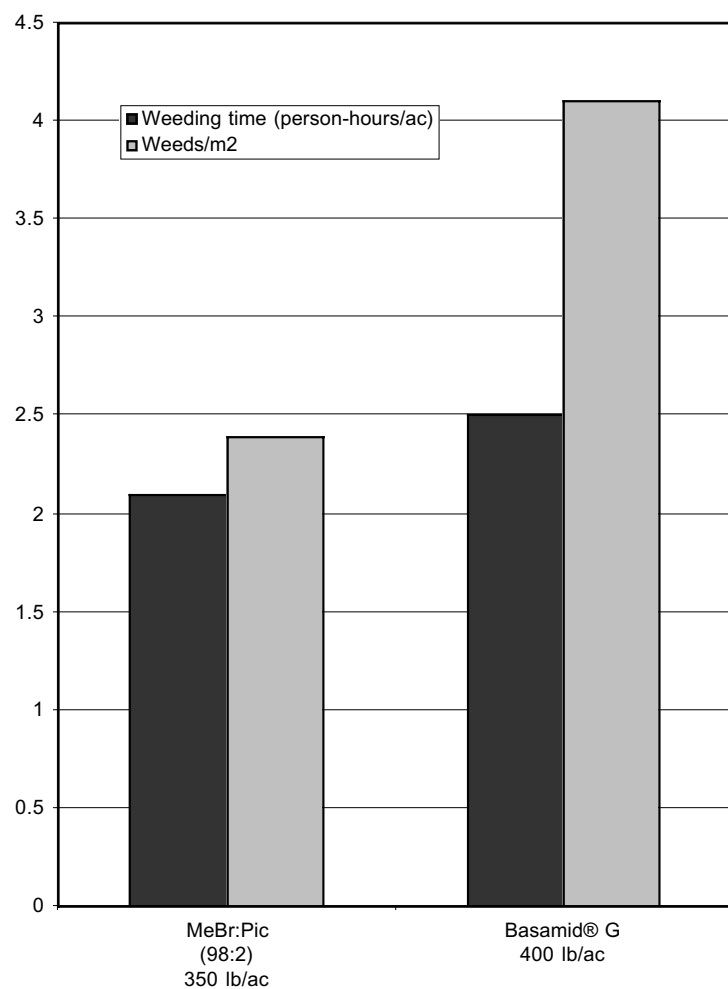
Summary

Basamid® G has been successfully used in forest tree nurseries for the production of pine and broadleaf seedlings



- Randomized complete block, 3 replications.
- Sandy loam soil, not fumigated for 2 years.
- 1.4 ac (0.57 ha) Basamid® G treated, 0.95 ac (0.38 ha) methyl bromide treated.
- Basamid® G applied 11/19/04, methyl bromide applied spring 2005.
- Water seal maintained for 7 days by overhead irrigation
- Plots weeded summer 2005.
- Major weeds included morning glory and coffee bean.
- Glyphosate, Prowl®, and Goal® applied as needed during the year.

Figure 2—Weed control with Basamid® G in the Rayonier, Incorporated forest tree nursery, 2004 to 2005 (1 lb/ac = 1.1 kg/ha).



- Nonreplicated field trial.
- Large individual plots 1.2 ac (0.5 ha).
- Clay loam soil, not fumigated for 2 years.
- Basamid® G and methyl bromide applied 9/21/04.
- Water seal maintained for 7 days by overhead irrigation.
- Plots hand weeded summer 2005.
- Major weeds included wild mustard and lespe-deza.
- Glyphosate, Prowl®, and Goal® applied as needed during the year.

Figure 3—Weed control with Basamid® G in the George O. White Nursery, 2004 to 2005 (1 lb/ac = 1.1 kg/ha).