

# CLEMSON UNIVERSITY

## *Turfgrass Program*

([www.clemson.edu/turfornamental/](http://www.clemson.edu/turfornamental/))

### **Nematode Control with Telone II Research on Sod Production Farms**

Jimmy Golden

Pee Dee Research and Education Center

Only in the early 1950's were nematodes recognized as turfgrass pests, when scientist in New England and Florida reported that their presence in association with severe turf stress and decline. The first experimental demonstration of the efforts of nematicides on turf nematodes began in 1953. The discovery of the nematicidal properties of DD 1,3 dichloropropene, 1,2 dichloropropane, and related C3 hydrocarbons, EDB (ethyl dibromide) and DBCP (1,2 -dibromo-3- chloropropane) during the 1940's and early 1950's heralded a new era in plan nematology. The soil fumigants proved relatively cheap and were so effective that their use became standard practice. With increasing nematicide use, attention was diverted from traditional control methods and little effort was made to develop non-chemical alternatives. This situation worsened in the 1960's when a large group of organophosphates and carbonate nematicides were added to the chemical arsenal already available. This highly toxic, water soluble group of chemicals widened the scope of nematicides, as they were applied to situations where there systemic activity could be utilized for both nematode and insect control. The period 1955 to 1975 could be termed the "Golden Years" for nematicides. Their use increased substantially, application technology was improved, new pesticides were developed and there was a general attitude among nematologists that nematode problems in the field could be solved largely with nematicides. The situation has changed dramatically and it is now recognized that nematicides sometimes have adverse effects on the environment and human health. The finding that DBCP was carcinogenic and that it depressed sperm count of workers in manufacturing plants was followed by its discovery at unsafe levels in numerous wells in continental USA and Hawaii. The use of DBCP was suspended in California in 1977 and cancellations of registrations in the USA and other countries followed over the next few years. Subsequent studies in the USA and elsewhere showed that ground water was contaminated with many organic chemicals including the nematicides DBCP, EDB, the 1-2 dichloropropane component of DD, aldicarb, carbofuron and ethoprop. The presence of nematicides in groundwater had serious implications for all citizens, and many environmentalist and people in the chemical industry believed that ground water contamination was the environmental issue of the 1980's.

The groundwater contamination problem has been recognized at a time when there is increasing concern about agricultural chemical residues in food and the

environment. The high mammalian and avian toxicity of the organophosphates and carbonates also contributed to the poor public image of nematicides.

After years of dependence on nematicides, nematode control programs for many crops, including turfgrasses, are now vulnerable. In recent times, the most widely used nematicides on turfgrasses are NemaCur (fenamiphos) and Mocap (ethoprop). Not all states or areas allow their use; most areas limit their use; and each has some specific problems. Enhanced biodegradation of NemaCur has been documented in South Carolina on several golf courses experiencing chronic problems with nematode control. Mocap is not systemic (absorbed into live root tissues) of turfgrasses and therefore cannot reach endoparasitic nematodes that are living inside the roots. Prolonged frequent use of Mocap has allowed endoparasitic lance nematodes to become dominant in many cases. Both NemaCur and Mocap are organophosphate nematicides. The current status of Mocap (ethoprop) is that its use on golf courses has been lifted. The manufacturer will sell Mocap through August 2004. Distributors can sell Mocap through August 2006. The current status of NemaCur (fenamiphos) is that the manufacturer can sell and distribute it through May 31, 2007. Distributors can sell and distribute NemaCur through May 31, 2008. The manufacturer has placed a production cap reduction of twenty percent (20%) of the previous year's production for the next five years. It is known that the turfgrass industry will be losing the use of Mocap and NemaCur over the next three to five years. Methyl Bromide, an ozone depleting chemical and a mainstay of many agricultural industries including turfgrasses for many years, is scheduled for elimination from the market in 2005. The loss of methyl bromide will impact the turfgrass industry immensely. Sod production farms may still use methyl bromide, Vapam (metam sodium), or Basamid. These chemicals are non selective toxicants that have activity against weeds, some insects, and nematodes.

Where do we go from here? Nematodes are still with us. In fact, they are more widespread now than when we first became aware of them. Because of the long period of good control, turfgrass managers now don't accept stress caused by nematodes that went without comment a generation ago.

Dow Agrosiences has shown a keen interest in supporting research evaluations using Telone II (1-3 dichloropropene) soil fumigant for control of nematodes and weeds – especially hard to kill weed – common bermudagrass and nutsedge on sod production farms.

Our research conducted over the last three years period has focused on two main areas:

1. Restoration – Cleaning the site of hard to kill weeds and pests before a new crop is planted on the site. The Telone II restoration treatment will provide a replacement treatment for methyl bromide.
2. Nematode Control on Existing Sod

Restoration: (Targeting common bermudagrass or hybrid bermudagrass in fields to be renovated or planted in another grass cultivar)

- Soil preparation is key
- Spray with glyphosate (i.e. Glyphomax Plus)

- Use deep tillage to turn the soil
- Spray with glyphosate again, if needed
- Continue to till
- This process needs to continue until all plant debris has rotted and disappeared
- Once the soil prep is complete, treat with fumigant

## **Results**

### **Tarped applications**

- Excellent control of bermudagrass and yellow nutsedge was obtained with Telone II at 55 gallons and C-35 @ 50 gallons, tarped. Control of these two problem weeds was good as that obtained with 400 lbs methyl bromide.
- Tarp is needed for consistent results.
- The REI (reentry interval) for Telone is 5 days; therefore leave that tarp on for 5 days, unless the appropriate PPE is worn.
- Test on your varieties, to determine plant back period needed, before using Telone products. To ensure it is safe to plant, wait until all Telone has dissipated.

### **Rolled and irrigated method**

- Soil preparation is critical. Insure that all plant residue is decayed and moisture levels are good to hold in the fumigant.
- Be prepared to follow up with glyphosate or halosulfuron applications for any escaped bermuda or nutsedge.

### **Treating Existing Sod**

- Target nematodes
- Test your sod for nematodes

### **If treatment is needed:**

- Once sod is lifted, clean up all debris
- Insure good soil moisture to allow the application implement to penetrate the soil to the proper depth
- Apply Telone II @ 10 gallons at 12" or greater depth
- Apply to turf that has been recently lifted but no later than 50% ground cover
- The use of the Yetter Maverick reduces soil disturbance
- Test a small area first to insure no long term phytotoxicity to the sod
- A Yetter Maverick rig will be present at Clemson Turfgrass Field Day. The equipment can be demonstrated immediately after lunch for those so desiring, on a site across the pond and back of the Pee Dee REC administration building.