

## **FOR SUPPRESSION OF NORTHERN ROOT KNOT NEMATODE IN SOILS TO BE PLANTED TO EITHER POTATOES, ONIONS, OR CARROTS - COLORADO ETC.**

General Information

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Telone II soil fumigant is a multi-purpose liquid fumigant for preplant treatment of cropland soil. Telone II can be used as part of a nematode management program involving crop rotation, planting of resistant varieties, sanitation, and other cultural practices designed to reduce nematode infestations.

Telone II may be applied as a preplant soil treatment as part of a management program to aid in reducing the damaging effects of certain soil pests; plant parasitic nematodes [citrus, burrowing, cyst formers (golden, sugarbeet, soybean, carrot and wheat), dagger, lance, pin, needle, reniform, ring, root knot, root lesion, spiral, sting and stubby root; symphylans (garden centipedes); and wireworms.

Telone II can also be used to suppress sugar beet Rhizomania disease, Fusarium wilt of cotton and Verticillium wilt of mint, and aid in the control of bacterial canker of peaches.

Soil sampling for the type and number of pests present is recommended before fumigation. In fields where pre-treatment soil samples indicate the presence of high population levels of nematodes, a successful fumigation cannot be expected to eradicate entire populations. Therefore, posttreatment (mid-season and/or preharvest) sampling is recommended to determine the need for additional pest management practices.

Supplemental labels are available for certain crops in selected geographies.

Refer to these supplemental labels for specific use directions. Consult a Dow AgroSciences representative for additional information. Consult State Agricultural Experiment Station or Extension Service specialists for information on other practices such as post-harvest destruction of crop residues, weed control or other cultural practices, and use of nematode resistant crop varieties that may aid in

reducing crop losses from soil borne pests.

### General Use Precautions

Soil fumigation using Telone II should be conducted only according to directions and conditions of use described in this labeling.

**Recontamination Prevention:** Telone II will help manage certain soil borne pests that are present in the soil treatment zone at time of fumigation. It will not control pests that are introduced into soil after fumigation. To avoid reinfestation of treated soil do not use irrigation water, transplants, seed pieces, or equipment that could carry soil borne pests from infested land. Avoid contamination from moving infested soil onto treated beds through cultivation, movement of soil from below the treated zone, dumping contaminated soil in treated fields and soil contamination from equipment or crop remains. Clean equipment carefully before entering treated fields. Cultural practices, which provide post-harvest destruction of crop residues and weeds prior to fumigation and practices which prevent weed infestation following fumigation and prior to planting, will help prevent recontamination.

Do not use containers, pumps or other transfer equipment made of aluminum, magnesium or their alloys, as under certain conditions Telone II may be severely corrosive to such metals.

**Equipment Clean-Up:** Because Telone II is corrosive under certain conditions, flush all application equipment with fuel oil, kerosene or a similar type of petroleum solvent immediately after use. Fill pumps and meters with new motor oil or a 50% motor oil/fuel oil mixture before storing. Do not use water. Dispose of rinsate by incorporation into field just treated or by other approved means. Never introduce rinsate or unused Telone II into surface or underground water supplies.

**Chemigation:** Do not apply Telone II through any type of irrigation system. **Fertility Interactions:** Fumigation may temporarily raise the level of ammonia nitrogen and soluble salts in the soil. This is most likely to occur when heavy rates of fertilizer and fumigant are applied to soils that are either cold, wet, acidic, or high in organic matter. To avoid injury to certain crops including red beets, carrots, corn, radishes, cole crops, legumes (beans), lettuce, onions, and sugarbeets, fertilize as indicated by soil tests made after fumigation. To avoid ammonia injury or nitrate starvation (or both) to crops grown on high organic soils, fertilizers containing ammonium salts are not recommended. When using high rates of Telone II as required by certain

state nursery regulations, liming of highly acid soils before fumigation may stimulate nitrification and reduce the possibility of ammonia toxicity. Certain nursery crops such as citrus seedlings, *Cornus* sp., *Crataegus* sp., spruce, and vegetable crops such as cauliflower have shown evidence of phosphorus deficiency following fumigation. To avoid this possible effect, additional phosphate fertilizer (foliar applied) is recommended where experience indicates a deficiency may occur.

**Use Restrictions for Certain Florida Counties:** For application of this product in Brevard, Broward, Charlotte, Citrus, Collier, Dade, DeSoto, Glades, Hardee, Hendry, Hernando, Highlands, Hillsborough, Indian River, Lake, Lee, Manatee, Martin, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Sarasota, Seminole, St. Lucie, Sumter, and Volusia counties, applicators must have labeling for FIFRA Section 24(c) Special Local Need (SLN) FL990003 in their possession and comply with stated requirements.

**Use Restrictions for Certain New York Counties:** This product is prohibited from sale, use or distribution in Nassau and Suffolk counties.

## Application Directions

### Application Timing

Telone II soil fumigant can be applied at any time of the year when soil conditions permit. Conditions that allow rapid diffusion of the fumigant as a gas through the soil normally give best results. Because Telone II does not provide residual control of soil pests, it should be used as a preplant application before planting each crop. The following soil temperature and moisture conditions should exist at time of treatment. Failure to meet these conditions may result in unsatisfactory product performance:

### Soil Conditions

Soil temperature at the depth of application must be between 40°F and 80°F. In areas where the soil temperature in the spring may not reach 40°F in time to allow application of Telone II prior to planting, late summer or early fall treatment is recommended.

### Soil Moisture

It is critical to manage soil moisture properly before fumigation. Plan fumigation for

seasons, crop rotations, or irrigation schedules which leave moisture in the soil. For application depths greater than 18 inches, the soil should be moist within a 16-inch radius upwards from the point of injection as determined by the feel method (see below). For all other applications, the soil must be moist from 2 inches below the soil surface to at least 12 inches deep as determined by the feel method (see below).

The amount of moisture needed in this zone will vary according to soil type. The surface soil generally dries very rapidly and should not be considered in this determination. If there is insufficient moisture at the 2 to 6 inch depth, the soil moisture must be adjusted. If irrigation is not available and there is adequate soil moisture below 6 inches, it may be brought to the surface by disking or plowing before or during the injection. To conserve existing soil moisture, pretreatment or treatment tillage practices should be done as close to the time of application as possible. For fields with more than one soil texture, soil moisture content in the lightest textured (most sandy) areas must comply with this soil moisture requirement. Whenever possible, the field should be divided into areas of similar soil texture and the soil moisture of each area should be adjusted as needed. Coarser textured soils can be fumigated under conditions of higher soil moisture than finer textured soils; however, if the soil moisture is too high, fumigant movement will be retarded and effectiveness of the treatment will be reduced. Previous and/or local experience with the soil to be treated or the crop to be planted can often serve as a guide to conditions that will be acceptable. If you do not know how to determine the soil moisture content of the area to be treated, consult your local extension service or soil conservation service specialist or pest control advisor (ag consultant) for assistance. In general, no irrigation should immediately precede subsoiling or fumigation; however, when irrigation is available and surface soil moisture conditions are not likely to provide an adequate seal against fumigant loss, a very light sprinkler irrigation to wet the top 1 to 2 inches of soil is recommended before and/or immediately after fumigation. The following descriptions will aid in determining acceptable soil moisture conditions by the "feel method." For coarse soils (sand and loamy sand), there must be enough moisture to allow formation of a weak ball when compressed in the hand. Due to soil texture, this ball is easily broken with little disturbance. In loamy, moderately coarse, or medium textured soils (coarse sandy loam, sandy loam, and fine sandy loam), a soil sample with the proper moisture content can be formed into a ball which holds together with moderate disturbance, but does not stick between the thumb and

forefinger. Fine textured soils (clay loam, silty clay loam, sandy clay, silty clay, sandy clay loam and clay), should be pliable and not crumbly, but should not form a ribbon when compressed between the thumb and forefinger.

### Soil Preparation

The soil should be free of clods. Large clods can prevent effective soil sealing and reduce effectiveness of Telone II. Plant residues should be thoroughly incorporated into the soil prior to treatment to avoid interfering with application. Non-decomposed plant material may harbor pests that will not be controlled by fumigation. Little or no crop residue should be present on the soil surface. Crop residue that is present should lie flat to permit the soil to be sealed effectively. Compacted soil layers within the desired treatment zone should be fractured before or during application of the fumigant. Deviation from the above conditions may result in unsatisfactory results.

### Placement of Fumigant

Telone II may be applied as either a broadcast (overall) or row treatment. It must be placed at least 12 inches below the final soil surface. When soil conditions allow, placement at a minimum of 14 inches below the final soil surface is recommended. Deeper placement is required when fumigating soil to be planted to deep-rooted plants, such as perennial fruit and nut crops, or to control deeply distributed pests. For row application, the fumigant must be placed at least 12 inches from the nearest soil/air interface (e.g., furrow or bed top).

### Application Methods and Equipment

Broadcast Application: Use chisel (shank) or coulter (e.g., Yetter 30-inch Avenger), offset wing shank, Nobel (sweep) plow, or plow-sole application equipment. For best results when using chisel equipment, use ripper-type, forward-swept shanks. Nobel plow equipment is particularly useful for fall fumigation when the soil still contains some non-decomposed standing plant material. Subsoiling may be necessary before application as described under Soil Preparation. Choose application equipment that allows the deepest application and best soil seal under existing conditions. The fumigant outlet spacing varies with the type of application equipment used.

With chisel and coulter equipment, a fumigant shank spacing of 12 to 24 inches is recommended. Do not exceed the maximum shank and outlet spacing of 24 inches.

The outlet spacing for this equipment may be up to 1½ times the application depth but generally should be equal to the application depth and should not exceed the soil-shattering capability of the chisels.

With plow-sole equipment, a 12-inch outlet spacing is recommended.

Do not exceed an outlet spacing of 18 inches.

With Nobel (sweep) plow equipment, use an outlet spacing of 9 to 12 inches along the sweeps. Application should be made to a depth of at least 15 inches.

Broadcast application can be made in the same direction or at an angle to the direction of row planting. Refer to Table 1 for broadcast treatment rates for various crops.

Row Application (for row spacing greater than 24 inches): Use chisel equipment to treat a band of soil where the crop is to be planted, i.e., the plant row. When multiple chisels per plant row are used, space the chisels (fumigant outlets) no more than 12 inches apart. Regardless of the number or spacing of chisels used, the fumigant must be placed at least 12 inches from the nearest soil/air interface (e.g., furrow or bed top).

With certain deeper rooted crops such as potatoes and sugarbeets, higher rates may be necessary to ensure adequate treatment of the zone of soil where primary root growth occurs.

To prevent seed germination problems caused by improper seed-to-soil contact or improper planting depth regardless of application method, do not place the seed directly over the furrow left by the applicator chisel(s)/coulter(s). When 1 chisel is used per plant row, place the seed about 4 inches to one side of the chisel furrow. When 2 chisels are used per plant row, plant the seed offset from the chisel trace.

### Sealing the Soil After Application

For broadcast treatment (flat fumigation), immediately after chisel application of Telone II, the soil must be "sealed" to prevent fumigant loss and ensure that an effective concentration of fumigant is maintained within the soil for a period of several days. To create an effective seal it is important that the shank traces be disrupted and the soil surface compacted. Disruption of shank traces can be accomplished with equipment that will uniformly mix the soil to a depth of 3 to 4

inches to eliminate chisel or plow traces which can allow direct escape of the fumigant. A tandem disc or similar equipment may be used for this purpose. To maximize soil sealing, steps should also be taken to compact the soil surface to further retard the rate of fumigant loss by following with a ring roller or cultipacker in combination with the aforementioned tillage equipment. Compaction of the soil surface alone does not effectively disrupt chisel or plow traces. When using coulters (e.g., Yetter 30-inch Avenger) applications, additional sealing may not be necessary when soil moisture conditions are optimal and a beaver tail is used.

For row treatment, forming the beds at the time of application should be accomplished in a manner that places the fumigant at least 12 inches from the nearest soil/air interface (e.g., furrow or bed top). The closest soil/air interface could be the furrow for multiple knife applications or the top of the bed for single knife applications. It is recommended that additional soil sealing be accomplished by going over the bed with a bed shaper, press sealer, rolling cultivator, ring roller, or rolling basket.

Sealing can also be improved by applying non-perforated plastic film, such as polyethylene, over the entire area or in strips. Use of a film to seal the soil surface does not eliminate the need to eliminate chisel traces prior to application of the plastic film. When using coulters (e.g., Yetter prebedder) applications, a beaver tail may be used for sealing. Proper soil conditions at the time of application (see Soil Preparation section) are important to ensure proper placement of fumigant (see Placement of Fumigant section) and obtaining adequate sealing. Prior tillage should be adequate to eliminate clods and thoroughly mix crop residues into the soil.

### Soil Fumigation Interval

Leave the soil undisturbed and unplanted for at least 7 days after application of the fumigant. A longer undisturbed fumigation interval is required if the soil becomes cold or wet, and for deep-rooted tree, shrub and vine planting sites.

Following completion of the fumigation interval, to prevent phytotoxicity, allow the fumigant to dissipate completely before planting the crop. Dissipation is usually complete when Telone II can no longer be detected at the application depth. Under optimum soil conditions for dissipation, a period of 1 week for each 10 gallons per treated acre is generally required for complete dissipation. If virtually impermeable films (VIF) are used a longer dissipation period may be needed. Rapidly germinating

seed (i.e., lettuce or radish) and/or seed or transplants to be grown may be used as a bioassay to determine if Telone II is present in the soil at concentrations sufficient to cause plant injury.

To hasten dissipation especially if heavy rains or low temperatures occur during the treatment period, till the soil to the depth of fumigant application. Use a knife-like chisel without turning the soil to reduce the possibility of recontaminating the treated soil. Dissipation is usually complete when the odor of Telone II is no longer evident at the application depth. Seed may be used as a bioassay to determine if Telone II is present in the soil at concentrations sufficient to cause plant injury. Do not plant if the odor of Telone II is present within the zone of fumigation.

**Buffer Zone:** An application of Telone II shall not be made within 100 feet of an occupied structure, such as a school, hospital, business or residence. No person shall be present at this structure at any time during the seven consecutive day period following application. This buffer zone does not apply to use on soils that will not experience an additional 1,3-D treatment for at least three years. For example, on soils to be planted with fruit trees, nut and nursery crops, perennial vines, hops, mint or pineapple. Note: Telone II shall not be applied to soils more frequently than once each year.

#### Limitations, Restrictions, and Exceptions

#### FOR THE SUPPRESSION OF NEMATODES AND WIREWORMS IN SOILS TO BE PLANTED TO POTATOES, ONIONS OR CARROTS

For Distribution and Use Only in the States of Colorado, Idaho, Nevada, Oregon, Utah, Washington and in Modoc and Siskiyou Counties of California

For suppression of northern root knot nematode (*Meloidogyne hapla*) in soils to be planted to either potatoes, onions, or carrots, apply Telone II as described below at the rate of 11 to 14 gallons per acre in mineral soil.

**Application Methods and Equipment:** Apply Telone II as a broadcast treatment using either chisel (shank), Nobel (sweep) or modified ParaTill application equipment according to the following recommendations: Except in those conditions described in the next paragraph for Nobel plow equipment, use either chisel equipment with ripper-type shanks or ParaTill equipment modified so that outlet spacing is evenly distributed under the tool bar. With chisel and ParaTill equipment, a shank spacing

of 12 to 24 inches is recommended. Do not exceed a shank spacing of 24 inches. Outlet depth should be at least 18 inches below the final soil surface.

Nobel plow equipment may be used only when either shallow soils (those less than 18 inches deep) or soils containing excessive live root material such as alfalfa or corn stubble prevents the use of shank application. Nobel plow outlet spacing should not exceed 12 inches and application should be made to a depth of at least 15 inches. Fumigant penetration may be limited if a plow pan exists below the depth of the Nobel blade. Do not use plow-sole application.

**Soil Sealing:** Immediately after fumigation application, use a disc, paddle-wheel, or similar device to uniformly mix the top 4 to 6 inches of soil to effectively eliminate chisel traces. Then follow immediately with a ring roller or cultipacker to seal the soil surface. Little or no crop residue should be exposed at the surface following the sealing operation. Any remaining crop residue should lie flat following sealing.

**Soil Fumigation Interval:** Leave the soil undisturbed for 7 to 14 days after application of the fumigant. A longer undisturbed fumigation interval is required if the soil becomes cold or wet. After the fumigation interval, to prevent phytotoxicity, allow the fumigant to dissipate completely before planting the crop. As a guide, under optimum soil conditions for dissipation, 1 week for each 10 gallons per treated acre is recommended. To hasten dissipation, after the proper fumigation interval, till the soil no deeper than the depth of the fumigant application. During this process be careful not to bring in untreated soil which could contribute to a reinfestation of pests. Use a knife-like chisel without turning the soil to reduce the possibility of recontaminating the treated soil. Dissipation is usually complete when Telone II can no longer be detected at the application depth. Seed may be used as a bioassay to determine if Telone II is present in the soil at concentrations sufficient to cause plant injury. Do not plant if Telone II is detected.

#### Special Precautions:

- Use of Telone II does not guarantee pest-free crop at harvest.
- Use of Telone II according to these use directions will suppress only the nematode populations present within the fumigated zone at the time of fumigation. The fumigated zone can vary depending upon a number of factors such as fumigant rate, application methods used, depth of fumigant application, soil moisture, soil type, soil temperature and soil tilth (including soil compaction and soil porosity). Telone II will not control or prevent reinfestation subsequent to the treatment.

Subsequent pest populations may infest the fumigated zone from irrigation water, equipment or other sources of contamination or may invade the fumigated zone from surrounding untreated soil such as from beneath the fumigated zone or from unfumigated pockets within the fumigated zone.

- Use of other nematode management options in conjunction with Telone II should be considered.
- Before fumigation, soil sampling following university soil sampling guidelines for the type and number of pests present is recommended. Fumigation cannot be expected to eradicate the entire pest population. Therefore, post-treatment/preplant soil sampling, again following university soil sampling guidelines, is recommended to determine the need for additional pest management practices.
- Preharvest soil sampling, following university soil sampling guidelines, and preharvest tuber sampling is recommended to detect developing nematode populations or early tuber infection. For best timing and sampling methods, consult your local extension service, pest control advisor, or your local Dow AgroSciences representative for assistance. If the nematode population in the soil is high enough that the crop may be damaged, or if any nematode damage is detected in the tubers, the potatoes should be harvested and marketed immediately. Do not store nematode-infested tubers.
- Do not plow the ground in the spring in such a way that inverts the soil prior to a spring fumigation. Such tillage operations should be conducted in the fall to allow winter-kill of residual nematode populations in the top 1 to 2 inches of the soil profile.
- Following a fall soil fumigation and undisturbed soil interval as described above, a cover crop, such as wheat or grass, can be planted to reduce the potential for soil erosion.
- Refer to the product label affixed to the container for Telone II for recommended soil conditions and additional use precautions for optimum fumigant performance. The user should understand that there is a range of recommended soil conditions under which Telone II may be applied in compliance with the product label affixed to the container for Telone II. Within that range of recommended soil conditions, product performance can be expected to improve as the soil conditions move toward optimum. Use of Telone II under soil conditions outside the recommended range can be expected to yield less than satisfactory performance.

Method

[Broadcast Treatment](#)

[Soil Surface Treatment](#)

Rates

[field rates 0](#)

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Timings

[N.A.](#)