Terbacil controls purple nutsedge in Georgia tree nursery

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Purple nutsedge is widely distributed over the earth and is possibly the most troublesome weed in cultivated lands (2). It is certainly the most economically important weed in forest tree nurseries in the southeastern United States.

Cultivation (6) and fumigation (1,3) of the soil have eradicated populations of nutsedge. Repeated and frequent cultivation during 1 year transformed a 10-acre field in the Georgia Forestry Commission's Morgan Memorial nursery from a field with a few areas populated with nutsedge into a densely populated 10-acre field of nutsedge. Soil fumigation in Georgia forest tree nurseries with a mixture of 1,3dichloropropene and methyl isothiocyanate (Vortex) , methyl bromide, sodium methyldithiocarbamate (Vapam), and with tetrahydro - 3,5 - dimethyl - 2H - 1,3,5 - thiadiazine - 2 - thione (Mylone) reduced, but did not eradicate, purple nutsedge infestations. Soil incorporation of S-ethyl dipropylthiocarbamate (EPTC), 2,6-dichlorobenzonitrile (dichlobenil), 1,1 - dimethyl - 3 - (a,a,a, - trifluoro m - tolyl) urea (fluometuron), and toliar applications of (2,4-dichlorophenoxy) acetic acid (2,4,-D),3amino-s-triazole (amitrole), monosodium methanearsonate (MSMA), disodium methanearsonate (DSMA), and 1,1'-dimethyl-4,4'-bipyridinium ion (paraquat) also reduced, but did not eradicate, the nutsedge population in areas of the Morgan Memorial nursery.

This note reports results obtained from soil applications of terbacil (3-tert-butyl-5-chloro-6-methyluracil) for control of purple nutsedge. The persistence and relative phytotoxicity of soils residues of terbacil are also reported.

Materials and Methods

Two studies were established in two areas of the Georgia Forestry Commission's Morgan Memorial nursery near Byron, Ga. Both areas were fairly uniformly infested with high populations of purple nutsedge. The soil in this nursery is classified as a Magnolia sandy loam, and a clay hardpan layer is present 8 to 12 inches below the soil surface in many areas of the nursery. A number of purple nutsedge tubers are found within and below this hardpan layer.

In both studies, terbacil was applied as a soil drench in 2.5 gallons of water per 100 square feet of plot area at rates equivalent to 0, 4, 8, and 16 pounds per acre. (Terbacil is reported to control nutsedge at 5 and 10 pounds per acre (4, 5) .) All treatments were replicated five times in a randomized block design. Plot size in each study area was 4 by 25 feet.

In the first study area, terbacil was applied as a soil drench to soil freshly rototilled to a depth of 8 inches. The population of purple nutsedge and all other weed species were recorded from four random 0.5- by 4-foot areas in each plot 3, 4, 5, 6, 8, and 60 weeks after treatments were applied. Random soil samples were taken to a 6-inch depth to fill two 6-inch clay pots from each plot 3, 5, 6, 8, and 26 weeks after treatments were applied. Each pot was transported to a greenhouse and planted with 25 loblolly pine seed on the day of collection. The number of surviv-

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ing pine seedlings was taken as a measure of the level of phytotoxic residues in the soil. To further evaluate the toxicity of terbacil residues, slash pine, loblolly pine, and common persimmon were planted within the nursery plots 1 year after treatments were applied and survival recorded. Soybeans were also planted in this study area the second and third year after treatment for the purpose of extending the evaluation of the toxicity of terbacil residues.

In the second study area, terbacil was applied 3 months after loblolly pine was planted in order to evaluate its toxicity when applied directly to pine. The toxicity of terbacil residues was evaluated in this area by determining the survival of soybeans planted 1, 2, and 3 years after the treatments were applied.

TABLE 1.—*Populations of purple nutsedge following soil applications of terbacil. The data are the average of five replications and are expressed as the average number of nutsedge plants per square foot in each treatment at each observation date*

Weeks after treatment	Treatment rate (lb./acre) 0	4	8	16
	Number[1]	Number[1]	Number[1]	Number[1]
3	3.8c	0.8cd	0.8cd	0.6cd
4	8.1bc	1.5cd	1.2cd	1.6cd
5	10.1b	1.8cd	1.9cd	2.7c
6	11.5b	1.7cd	1.5cd	1.9cd
8	11.6b	1.7cd	1.5cd	1.5cd
60	33.1a	1.0cd	0.7cd	0.7cd

[1] Numbers followed by a common letter are not significantly different at the 5-percent level (Duncan's multiple-range test).

Results and Discussion

Terbacil eradicated 97 to 98 percent of the purple nutsedge plants and tubers in soil into which it was applied as a soil drench at dosages of 4, 8, and 16 pounds per acre (table 1). Five weeks after the treatments, the population of nutsedge was significantly lower in treated plots than in nontreated plots. Significant increases in nutsedge control were not obtained by treating soil with dosages in excess of 4 pounds per acre, as was indicated by the lack of significant differences between the three terbacil dosage treatments. The weed population consisted mainly of nutsedge and crabgrass. Terbacil and a drought, which occurred during the fifth week after treatments, significantly reduced the number of crabgrass plants in the study area (table 2).

Although terbacil residues were not toxic to loblolly pine when nursery soil was placed in clay pots in the greenhouse 26 weeks after the treatments (table 3), toxic levels were still present in the undisturbed nursery soil in field plots 1 year after treatment (table 4). This discrepancy was probably caused by the leaching of terbacil from the potted soil when the pots were irrigated. Slash and loblolly pine apparently are more susceptible to injury by terbacil than is persimmon (table 4). Applications of terbacil directly onto loblolly pine seedlings 3 months after planting completely eliminated the stand of seedlings. Severe mortality of soybeans occurred when they were planted in soil 1 year after treatments (>98 percent), and in soil 2 years after treatments (>90 percent), indicating that soybeans are more susceptible to injury by terbacil than is slash pine. Survival of soybeans was excellent (>97 percent) when they were planted 3 years after the treatments in the two study areas, indicating that soil residues of terbacil had leached or degraded to a nontoxic level.

These experiments indicate that terbacil will effectively control populations of purple nutsedge but

TABLE 2.—*Populations of all weeds except purple nutsedge following soil applications of terbacil. The data are the average of five replications and are expressed as the average number per square foot in each treatment at each observation date*

Weeks after treatment	Treatment rate (lb./acre) 0	4	8	16
	Number[1]	Number[1]	Number[1]	Number[1]
3	5.1ab	1.9a	0.7a	1.3a
4	31.5d	12.4abc	11.7bc	9.1abc
5	13.6abc	1.4a	0.4a	0.9a
6	15.1abc	0.0a	0.0a	0.0a
8	20.0bcd	0.4a	0.1a	0.3a
60	60.8e	23.0cd	20.1cd	19.2bcd

[1] Numbers followed by a common letter are not significantly different at the 5-percent level (Duncan's multiple-range test).

TABLE 3.—*Residual toxicity of terbacil in soil from nursery plots tested in greenhouse pot culture. The data are the average percentage of loblolly pine seedlings surviving 6 months in duplicate pots of each of five replicates of each treatment at each observation*

Weeks after treatment	Treatment rate (lb./acre)			
	0	4	8	16
	Percent[1]	Percent[1]	Percent[1]	Percent[1]
3	78.4h	0.0a	0.0a	0.0a
5	77.6h	16.0cd	12.0bc	0.0a
6	78.4h	20.0d	16.0cd	8.0b
8	75.2h	60.0g	40.0f	32.0e
26	79.2h	78.4h	78.4h	76.8h

[1] Percentages followed by a common letter are not significantly different at the 5-percent level (Duncan's multiple-range test).

TABLE 4.—*Relative toxicity of residues of terbacil in nursery soil 1 year after treatment. The data are the average percentages of survival of each of three tree species planted in the nursery plots*

Species	Treatment rate (lb./acre)			
	0	4	8	16
	Percent[1]	Percent[1]	Percent[1]	Percent[1]
Slash pine	46.0bcd	47.5bcd	30.4ef	18.9g
Loblolly pine	52.3b	48.6bc	36.9e	21.5fg
Persimmon	74.8a	69.1a	51.2b	37.9cde

[1] Percentages followed by a common letter are not significantly different at the 5-percent level (Duncan's multiple-range test).

will not completely eradicate infestations under the conditions used in these studies. These results also indicate that soil residues of terbacil are relatively slow to decay and may persist at phytotoxic levels for 2 years when the herbicide is applied to poorly drained soils or to soils with hardpans near the surface.

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News & Reviews

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cause the trees are weakened to a point where they become quite susceptible to attack. They are killed by pests which would not bother them greatly if they were in good condition.

Scale insects are among the most deadly, not only for trees but for many kinds of shrubs. There are approximately 150 kinds of scales that attack trees and shrubs in urban areas and it is believed that a high percentage of all trees may be infested to some degree.

Many scales closely resemble the bark of the tree or shrub to which they are attached. They are hard to detect unless you are looking for them specifically (it helps to use a magnifying glass) . For this reason they are likely to be overlooked until the infected plant is completely encrusted or the twig or plant has died.

An important weapon against many kinds of scales is the dormant oil spray because it is one of the least harmful (to people and the environment) that can be used. It is effective against a number of overwintering insects, including aphids, mites and scales. Dormant oils will only control overwintering eggs.

Dormant oils should be applied only in late winter or early spring, when temperatures are above 40 degrees and are not likely to go below freezing for 24 hours. Do not apply when the wind is blowing, follow directions on the label for mix and application.

It is not recommended that spraying be clone unless the insects are definitely known to be present. A close inspection of trees and shrubs should first be made. In the case of large trees, professional equipment and knowhow are necessary. (Continued on p. 32)