TABLE 2
Activation of latent fusarium infections by pre-planting corm treatments
(25 large Picardy corms per treatment)

Fungicidal mixture applied just before planting	Period of soak (Hours)	Number of spikes harvested	Number healthy corms harvested
N.I.Ceresan ¼ %	¼	19	28
N.I.Ceresan ¼ % (1 day before planting)	¼	18	26
Vancide F845 0.05% emulsified	1	23	30
Crag 974, 0.1%	72	18	33
Crag 974, 0.02%	72	30	36
Hyamine 1622, 0.5%	72	17	26
Hyamine 1622, 0.1%	72	18	21
Hyamine 1622, 0.02%	72	9	9
52-P-76 (Hyman) 0.5%	72	6	5
Vancide F1042, 0.4%	72	0	4
Vancide F1042, 0.1%	72	10	13
Vancide F984W, 0.25%	72	0	0
Penicillin G (Potassium), 0.25%	72	12	9
Penicillin G (Potassium), 0.05%	72	0	0
Control, untreated		16	20
Control, untreated		15	19
Control, untreated		23	15

Satisfactory control of fusarium rot depends on several measures of control. Corm treatment alone is not sufficient. Because of the nature of the disease, it may never be possible to obtain economic control through chemical treatment only. Experience shows that corm treatment is often helpful in control but that maintaining healthy corm stocks is more important. A few growers have discontinued treating their corms and find that their production is not impaired. These and other growers are avoiding heavy losses from the disease by 1) replacing corm stocks every three or four years with the healthiest available corms grown from planting stock; 2) planting cover crops in two out of three years; and 3) using varieties with good disease resistance.

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USE OF DEMETON (SYSTOX) FOR CONTROLLING INSECTS OF ORNAMENTALS

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Entomologists have for some time, either in jest or in imagination, envisioned controlling insect pests by introducing a poison into the plant vascular system. The poison then would be carried to all parts of the plant, thereby making the plant toxic to the insects feeding on it. In 1933 the dream was partially realized when Gnadiger (1) described the results he obtained using selenium for the control of various species of red spider infesting greenhouse plants, including asters, gladioli, and carnations. From this beginning, selenium eventually came to be used by a small segment of nurserymen for controlling mites, thrips, aphids and foliar nematodes. Its use was restricted due to the fact that selenium cannot be used on food crops because of its extreme toxicity to warm blooded animals.

Shortly after World War II, Schrader (2) reported that a number of phosphatic compounds were readily absorbed by growing plants and that these were translocated to all parts of the plant rendering the plant juices and tissues poisonous to insects feeding thereon. One of these compounds is demeton (Systox) and it appears, on the basis of biological assay, although not conclusively perhaps, that it breaks down in 5 to 8 weeks when applied as a spray and in 2 to 3 months when applied to the soil. Because the desired factor is now supplied, a vast new field of insect control is opened having tremendous possibilities.

Several years ago Wolfenbarger (3) reported that he observed a growth response from the use of parathion, a phosphatic insecticide, over and above the response which could be attributed to the control of the insect pests.

During the past several years we have had a number of requests from nurserymen for some means of eliminating the nematode factor in a growing plant such as a gardenia. They also stipulated that the material used should be one which could be applied to the plants in the field and it should be effective in controlling the insect pests normally attacking the plant.

A test was initiated to evaluate the effectiveness of demeton for controlling whiteflies and aphids with control of root-knot being incidental. The insecticide was applied as a soil drench and as a spray.

Technique: In the summer of 1952 some 50 gardenia cuttings were rooted in 4-inch flower pots to obtain plants comparable in size. Early in September some 36 plants were transplanted to 12-inch pots. The potted gardenias were knocked out of the 4-inch pots without disturbing the soil or roots and were then transplanted to the 12-inch pots. The plants were divided into nine lots with four plants in each lot. This permitted a total of eight treatments and a check. The soil used to fill these pots was taken from an area known to be heavily infested with root-knot nematodes. By using this type of soil it was felt that occasional examinations of the root system would indicate the effectiveness of demeton in preventing or controlling root-knot infestations. One-half ounce of a complete fertilizer (4-7-5) was applied to the soil of each pot with the exception of one treatment and a check. The following treatments were applied on September 6, 1952. (The amount of demeton used based on a 48.1 percent emulsifiable concentrate.)

Soil Drench

No. 1 4 ounces/100 gallons plus fertilizer
2 8 ounces/100 gallons plus fertilizer
3 12 ounces/100 gallons—no fertilizer
4 16 ounces/100 gallons plus fertilizer
5 No insecticide—fertilizer

Sprays

No. 6 4 ounces/100 gallons plus fertilizer
7 8 ounces/100 gallons plus fertilizer
8 16 ounces/100 gallons plus fertilizer
9 No insecticide—no fertilizer

One quart of solution was applied to the soil of each pot of the soil drench treatments. Approximately one pint of finished spray was applied to each plant receiving the spray treatments. A 3-gallon pneumatic sprayer was used to apply the spray treatments. A quart of water was applied to the soil of each of the check plants. All treatments were applied in the early afternoon and the temperature was above 85 degrees F.

Examinations made 24 hours after treatment showed that all aphid infestations were controlled in all treatments. The whitefly infestations apparently had not been affected. Examinations made three and five days after treatment indicated that the adult whitefly population was considerably reduced on the treated plants. A gradual decrease in the whitefly population occurred on all plants, including the check, during the first three weeks following application. It is assumed that the adult whiteflies moved about from plant to plant and that feeding took place indiscriminately to bring about this reduction in the population as a whole.

There was a slight browning of the margins of some leaves on plants receiving the 12 ounces and 16 ounces soil drench applications after two weeks. The brownish area in the affected leaves increased in size and the leaves became twisted and distorted. There was appreciable leaf drop after a period of six weeks had elapsed. This same type of leaf scorching was observed in some of the check plants and is attributed to the plants failing to receive sufficient moisture. As the leaf scorching was most severe on the plants receiving the two high rates of application it is assumed that some of the browning is the result of phytotoxicity. The foliage of the plants receiving the four and eight ounce soil drench treatments was bright green in color and had a waxy luster after six weeks. This condition continued for six months after treatment. (Figures 1 and 2)

The root systems of several plants were examined on April 18, 1953. Plants were taken from the following treatments: (1) 4 ounces of demeton applied as soil drench plus fertilizer; (2) No insecticide plus fertilizer; (3) No treatment. Plants were removed from the pots and the soil removed from the roots by washing in water carefully. Considerable difference in root development was found and

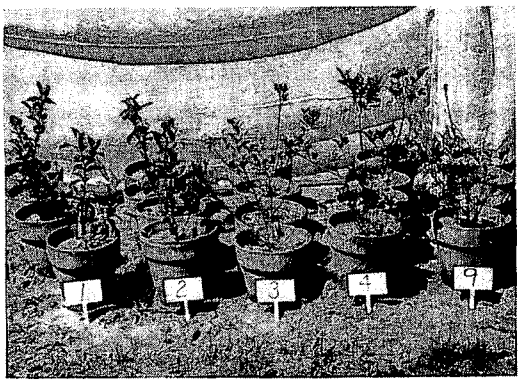

Figure 1. Soil Drench Treatments after six months. No. 9 No Treatment.

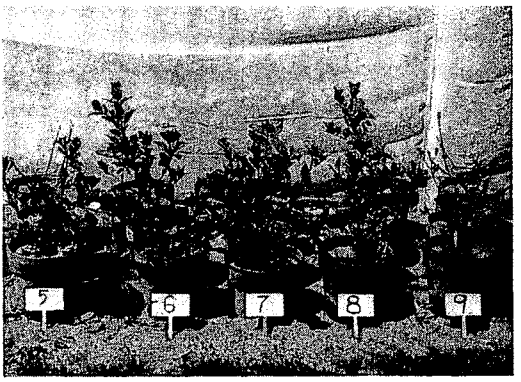

Figure 2. Spray Treatments after six months. No. 5 Fertilizer with no Insecticide. No. 9 No Treatment.

there was a definite correlation between the amount of roots and the shoot system. The plant receiving the demeton and fertilizer had an extensive root system and the roots appeared healthy. Some of these roots were more than two feet in length and these had penetrated throughout all of the soil. The plant receiving only fertilizer had a mass of roots but these were confined within a zone which roughly corresponded to the original 4-inch core from which the rooted cutting had been planted. Most of the roots were short and somewhat thickened although there was but little evidence of root-knot. A poorly developed root system was found on the plant which was not treated. Again the roots were confined within a zone which corresponded to the original 4-inch pot core from which the rooted cutting had been planted (Figure 3).

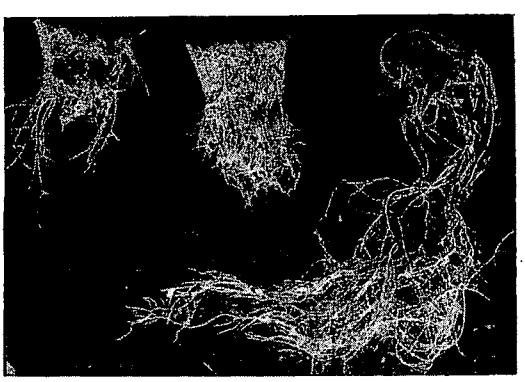

Figure 3. Root Systems six months after Treatment, Left: no Treatment, Center: Fertilizer, Right: Demeton (4 ounces) plus fertilizer.

Summary and Conclusions

Gardenia cuttings were rooted in 4-inch pots and then transplanted to 12-inch pots filled with soil taken from an area known to be infested with root-knot nematodes. Applications of demeton 48.1 percent emulsifiable were made at 4, 8, 12 and 16 ounces per 100 gallons as a soil drench and 4, 8 and 16 ounces per 100 gallons as a spray. One quart of diluted material was added to the soil of each pot receiving the soil application and approximately one pint of diluted material was applied to each plant receiving the spray treatment. Fertilizer was added uniformly to all plants with the exception of one treatment and the check. Excellent control of aphids resulted after 24 hours. Examinations made five days after treatment indicated good control of adult whiteflies. Six weeks after application considerable burning of foliage was observed on plants receiving the two high rates.

Roots of the plants in the pots which were not treated generally remained in the original core and the failure of the roots to penetrate into the surrounding soil was attributed to the presence of nematodes. The demeton treatment could have controlled the nematodes directly, it may have been absorbed by the plant, thus making the plant resistant to the nematodes, or it may have had some nutritional effect.

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