

RECOMMENDATIONS FOR ERADICATION OF NEMATODES FROM NARCISSUS

Agreed on at a conference held at Oregon Bulb Farms,
May 26, 1930

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I. GENERAL PLAN OF CONTROL.

Nematode-infested narcissus can be "cleaned up" by careful crop rotation and thorough hot-water treatment. Roguing (removal of affected plants in the field) is not recommended until its usefulness can be demonstrated for the Northwest. Unless extreme precautions are taken to prevent mechanical spreading of the disease, roguing may do more harm than good. For the control of the narcissus nematode, therefore, we recommend, at the present time, a thorough hot-water treatment of planting stock followed by careful crop rotation.

The hot-water treatment when properly applied should not injure the quality of the planting stock.* On the contrary, treating the bulbs with hot water should not only destroy living nemas (nematodes or eelworms) in the planting stock but should give a slight stimulation to root and shoot growth.

II. HOT-WATER TREATMENT RECOMMENDATIONS.

To meet the conditions brought about by the current season's nema infestation we recommend, (1) a special hot-water treatment of all nema-infested planting stocks and (2) regular treatment of those planting stocks in which nematodes have not recently been found. The procedures for these two cases are presented separately.

1. Recommendations for planting stocks in which nematodes have recently been found.

a. Dig the bulbs at least two weeks earlier than the normal digging time. By normal (optimum) digging time we refer to the time when the foliage of the variety in question has yellowed and wilted down. At this time, the upper portion of the "neck" should be dry but the leaves should not be brittle. In the case of nema-infested stock, digging approximately two weeks before the normal (optimum) digging time in Oregon implies around the first of July.

b. Allow the early dug bulbs to cure for a period of not less than two weeks and not more than four before proceeding to treat with hot water. During this period the bulbs should be sorted and all obviously diseased bulbs picked out and burned. Never treat immediately (12-24 hours) after digging.

c. Treat the bulbs in hot water at a temperature of 110-111.5 degree F. for from three to four hours according to the size of the bulbs. If the bulbs are relatively small, or are "slabs" (2 inches in diameter or smaller) treat for three hours. Treat large bulbs (2 inches in diameter or larger) for four hours. Begin timing the treatment in each case as soon as the temperature of the bath,

*The reader is referred to Oregon Station Circular Letter of Information No. 26, on Hot-Water Treatment of Narcissus Bulbs by McKay et al and Western Washington Station Bulletin No. 13 W, on Recommended Dates for Application of Standard Hot-Water Treatment to Hardy Narcissus by Locklin and Newton.

lowered by the immersion of the bulbs, has come back up to 110 to 111.5 degrees F. Discard all obviously diseased bulbs at time of treating. If the treating apparatus does not maintain a constant temperature it should be so handled that the fluctuations will be above 111.5 degrees F. rather than below.

d. The trays used in handling the nema infested stock should be so handled that there is no danger of infesting healthy bulbs with dirt falling from the trays. These trays should be thoroughly hosed out or sterilized with very hot water before treated bulbs or nema-free bulbs are put into them.

e. These early dug bulbs should be thoroughly dried and held for a period after treating. During this time it is desirable to sort out the partially decayed bulbs which may have escaped notice prior to treatment. This sorting process should continue throughout the regular storage period and the bulbs should be planted at the regular planting time.

2. Recommendations for planting stocks in which no nematodes have been found during the current season.

a. Dig the bulbs as near the optimum time as feasible. As defined above the normal or optimum time for digging is the time when the foliage of the variety in question has yellowed and wilted down. In Oregon the recommended time for digging planting stocks in which no nematodes have been found during the current season would be between the middle of July and the middle of August.

b. Bulbs dug during the normal digging period should be treated after two or three weeks of curing. If, for some reason, it is found impossible to dig the bulbs until later (towards the end of August in Oregon) they should be treated after 7 to 10 days of curing. Treat the bulbs in hot water at a temperature of 110-111.5 degrees F. for from 3 to 4 hours according to the size of the bulbs. If the bulbs are relatively small, or are "slabs" (2 inches in diameter or smaller) treat for three hours. Begin timing the treatment in each case as soon as the temperature of the bath, lowered by the immersion of the bulbs, has come back up to 110 to 111.5 degrees F. Discard all obviously diseased bulbs at time of treating. If the treating apparatus does not maintain a constant temperature it should be so handled that the fluctuations will be above 111.5 degrees F. rather than below.

c. Bulbs from non-infested stock may be replanted shortly after treating. We make this statement since the average grower will not have proper space for spreading out and curing large quantities of treated planting stock and, moreover, there appear to be no injurious effects from planting wet bulbs. Such curing is very necessary, however, in the case of planting stock where nemas have been found.

3. Narcissus should not be replanted in fields which have grown nema infested stock.

Rotation is always advisable in narcissus culture but in plantings where nema infestation has occurred, rotation is imperative. During the ensuing year every effort should be made to remove and destroy all of the volunteer narcissus plants in the field in which nema infestation has occurred. Then a period of three years should elapse after all the stray narcissus plants have been removed from the field in question before narcissus bulbs are replanted in the field.

Almost any crop may be used in rotation with narcissus. We do not recommend the planting of onions as this crop is a possible host for the narcissus nematode. Other bulb crops, however, including tulips and hyacinths, may be used with safety.

The above recommendations were agreed on at a conference held May 26, 1930 at the Oregon Bulb Farms for the specific purpose of working out recommendations which would enable the bulb growers of the Pacific Northwest to meet the present nematode emergency.

The following participated in the conference:

- C. F. Doucette, Entomologist, U.S.D.A. of Entomology, Sumner, Washington.
- M. B. McKay, Plant Pathologist, Oregon Experiment Station, Boring, Oregon.
- Geo. A. Newton, Plant Pathologist, Western Washington Experiment Station, Puyallup, Washington.
- C. R. Stillinger, Plant Pathologist, U.S.D.A. Federal Plant Quarantine Administration, Spokane, Washington.
- D. C. Mote, Entomologist, Oregon Experiment Station, Corvallis, Oregon.
- Jos. Wilcox, Assistant Entomologist, Oregon Experiment Station, Corvallis, Oregon.
- Frank P. McWhorter, Associate Plant Pathologist, Oregon Experiment Station, Corvallis, Oregon.