AVOIDING DISEASE CARRY-OVER ON CARNATION CUTTINGS

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DISEASES ARE COMMONLY CARRIED ON CUTTINGS

Nearly all of the serious diseases of carnations can be, and very commonly are, carried from one season to the next on the cuttings. In fact, to the best of our knowledge it is unlikely that any of the diseases listed will be carried over in any other way provided field and greenhouse plantings are made on new or sterilized soil and are far enough from any old plantings so that they are not splashed directly by rain or by the washing of soil. These provisos, fortunately, are the same good cultural practices usually followed by the best carnation growers anyhow. Although other diseases are carried on carnations, at present the following appear to be the most important in New York State.

▶ Alternaria leafspot and Branchrot appear first as small light-colored spots on the leaves. These increase in size, and eventually become covered with a black crust of the fungus spores. The leaves finally die and turn straw-colored. Infection may work back into the stem and cause the death of individual branches or of the entire plant.

Spores are spread almost exclusively by splashed water, rain, syringing, or careless watering. The disease is carried from one season's crop to the next as slight infections or as spores on cuttings or may survive the winter in the soil of old field plantings.

Heaviest losses appear soon after benching field-grown plants, particularly when the season has been wet or benching has been delayed.

▶ Rust appears first as light flecks on the leaves. These soon break open, revealing the powdery masses of dark-brown spores. In heavy infections, the foliage and stems become disfigured and the plants may be weakened.

Spores are spread by air currents and by splashed water. If field-planting is practiced and the houses are completely emptied in the summer, rust can be carried over only as spores or infections on the cuttings. If some old plants are kept in the house until the new plants are benched, some rust may also be spread from the old plants.

▶ Fusarium wilt is first shown by a paling and yellowing of an individual branch or two. If the bark of such a branch is cut away, the water-conducting tissues are found to be brown rather than the normal white. Infected plants eventually die.

Little, if any, spread of this disease is by air-borne or splashed spores. The disease spreads from diseased to healthy plants by growth of the Fusarium fungus through the soil. Carry-over from one season to the next is very often through infected cuttings, since any cutting taken from an infected plant may carry the fungus internally. Healthy young plants may also pick up the disease from infected greenhouse or field soil.

▶ Bacterial-wilt symptoms are much the same as those of Fusarium wilt. The chief differences are these: (1) with bacterial wilt, the discolored water-conducting tissues contain a sticky fluid formed by the bacteria; with Fusarium, there is no sticky fluid; (2) with bacterial wilt, the roots are soon rotted; with Fusarium wilt, the roots may remain sound until the plant is nearly dead. Despite these differences, the net result is the same with both diseases - death of the infected plants.

We do not know how much current-season spread of bacterial wilt results from splashed water, but we do know that it spreads locally through the soil. It spreads most rapidly during hot weather. Carry-over from one crop to the next may be through infected cuttings or by planting in old infected soil. As with Fusarium wilt, any cuttings taken from diseased plants may carry the infection internally. Furthermore, with bacterial wilt the infective bacteria may easily be carried on a cutting knife or on the fingernails. Obviously, the use of a knife or of the fingernails to pinch out or trim cuttings is a decidedly dangerous practice. Also, the practice of soaking cuttings in water is almost certain to spread the wilt bacteria from diseased to healthy cuttings.

▶ Virus diseases - mosaic, yellows, and streak of carnations, cause mottling, spotting, and streaking of the foliage and mottling and bleaching of blossoms, have become impertant in recent years. While only one of these diseases is known to be transmissable on the cutting knife, all of them are transmitted through cuttings taken from diseased plants.

PROPAGATION PROGRAM FOR DISEASE CONTROL

These brief descriptions of carnation diseases provide the facts upon which each of the following recommendations is based. Each step in the program should be studied carefully, and the entire program adopted if disease control is to be assured.

▶ 1. Keep the foliage of the parent plants

dry at all times. This is particularly important from now on to prevent spreading Alternaria spores, rust spores, wilt bacteria, and the like, to the developing cuttings. Use the hose carefully this year and plan on sub-irrigation for the future. Use D-N dust, Fulex, Sodium Selenate, or Azofume for spider control. Do not syringe.

2. Select the cuttings carefully, taking only from the healthiest plants. It is particularly important not to take any cuttings from plants showing wilt symptoms.

3. Break out the cuttings - do not cut them with a knife or pinch them with the fingernails. This is an important measure to prevent the spread of bacterial wilt. Bacterial wilt has not yet become wide-spread in New York, but it is potentially one of the most serious of all carnation diseases.

4. Do not trim the cuttings with a knife or the fingernails. In fact, no trimming is needed, so why do it when it may only encourage the spread of bacterial wilt. If any mechanically bruised or injured leaves must be removed, pull them off.

5. Do not soak the cuttings in water. Soaking is not necessary and only serves to spread any disease organisms present to all the cuttings. If cuttings must be held for a period before sticking them in the sand, place them in a container with moist moss or burlap on the bottom, cover them with moist burlap, and place them in the cooler.

6. Immerse the cuttings in Fermate suspension before sticking them in the sand. Make up a suspension by adding 1/3 teaspoonful of a good spreading agent to each gallon of water, then add Fermate powder at the rate of 1 level tablespoonful to each gallon. Shake the Fermate with a little of the water-spreader mixture before pouring it into the container. Put the cuttings in a wire-screen container, stir the Fermate suspension, dip the cuttings up and down a few times - just enough to get them all thoroughly wet - then drain off the excess moisture. The treated cuttings may then be stuck immediately or held in the cooler. If you are going to use a rooting powder, let the treated cuttings dry off a bit before applying the powder. The use of the straight Fermate powder as a dust on the base of the cuttings is not recommended because this does not provide a protective coating on the leaves and an excess of Fermate powder on the ends of the cuttings retards rooting.

7. Sterilize the sand between each batch of cuttings. Disease organisms may be left in the sand and passed from one batch of cuttings to the next. Both steam and hot water sterilization (180°F. for 1 hour) have been used effectively. Sterilization is used not only to control damping-off but to control specific carnation-disease organisms that may be deep in the sand. We do not believe that the Fermate treatment of the sand, which works well enough for some types of cutting rot, will serve the purpose here.

8. Spray once or twice with Fermate while the cuttings are in the sand. This provides an additional safeguard against rust and leaf-spot infection when the cuttings are crowded together in the cutting bed. For these treatments, use Fermate at the rate of 1/2 pound to 100 gallons of water (approximately 1/2 tablespoonful to the gallon).

9. Dip rooted cuttings - tops, roots, and all-in Fermate just as was done before sticking them in sand (see step 7). The plants may be potted or flatted just as soon as they have drained thoroughly. Before dipping the cuttings in the Fermate suspension, dip them briefly in clear water to remove the sand from the roots. Otherwise, the sand will settle out in the Fermate suspension, taking the Fermate with it. If the sand is first washed from thr roots in clear water, however, the Fermate suspension may be stirred and used a number of times.

10. Use only sterilized soil and containers for potting or flatting. Some of the fungi and particularly the wilt bacteria survive for long periods in infected soil or in dirty containers.

11. Spray the young plants in the pots or flats two or three times with Fermate before field planting time. Use Fermate at the rate of 1 pound to 100 gallons of water (1 level tablespoonful to a gallon) for these applications.

Do these 11 steps sound like a lot of work to you? If so, read them again and see how easily they fit in with your regular program. We'll wager that the extra time spent selecting cuttings, for example, would be a lot less than the time many growers spent this year replanting spaces where plants died from diseases carried on last year's cuttings. And the extra time spent dipping and spraying the cuttings is relatively insignificant as compared with other necessary operations. The question is not "Can I afford to follow these suggestions?", but rather "Can I afford to neglect them?".

We have stressed control of diseases on the young plants, leaving the subject of inside culture, rotation of field area, field spraying, and the like, for another time. The most important thing now is to produce a healthy crop of young plants. In many cases this alone will mean the difference between a house full of healthy plants and one full of diseased plants and empty spaces a year from now.

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