Bacterial Slow Wilt or Stunt of Carnations

Paul E. Nelson, Robert S. Dickey, and L. P. Nichols
Departments of Plant Pathology
Cornell University and The Pennsylvania State University

Bacterial slow wilt or stunt, a serious disease of carnation in Europe, was first found in the United States in 1954-55, on carnation plants grown in western New York. In April 1962 it was found on carnations in southeastern Pennsylvania and again in November 1967 in the same range.

The disease is caused by a bacterium which has been designated as a strain of Erwinia chrysanthemi. The disease and bacterium were first described in England and Denmark.

We studied the disease by inoculating rooted carnation cuttings and growing them in the greenhouse for periods of 7 to 9 months. The symptoms described below and illustrated in the accompanying photographs are from these plants. We have also observed most of these symptoms on infected carnation plants growing in a commercial range.

Two general types of symptoms develop on infected carnation plants. These are rapid wilting or a combination of wilting and stunting. Rapid wilt symptoms consist of a general wilting and gray-green coloration of the foliage followed by collapse and death of the plant (Fig. 1). In other plants the initial symptoms consist of wilting, "crook-neck" side shoots, and twisting, curling, stunting and wilting of lower leaves and side shoots. (Fig. 2, 3, 4). In some plants this is followed by a general wilting of the plant and firing of the basal foliage. Plants may wilt and recover several times before permanent wilting occurs or plants may collapse and die at the onset of general wilting symptoms. Plants often exhibit this severe wilt-collapse symptom at the time the second flower crop is cut.

In plants that become stunted the initial symptoms are followed by stunting and upright growth habit of existing shoots. (Fig. 5). Leaves on stunted shoots are narrower than those on healthy shoots and are light-green to yellowish-green in color in comparison with the dark-green color of healthy leaves. This is followed by severe stunting, wilting, and firing of foliage (Fig. 6, 7).

Initial symptom expression in Improved White Sim occurred over a period of 4-15 weeks after inoculation. In (continued on page 2)
Pelargonium Rust

(continued from page 1)

the diseased plants brought only the information that they
were purchased at a supermarket. Shortly after our dis-
covery of the disease, its presence in the Monterey Bay
area of California was officially reported by the California
Department of Agriculture, and it was recently mentioned
in the January 18 issue of The Florists Review (p. 75).
Relatively unheard of until a few years ago, pelargonium
rust has spread with astonishing rapidity throughout the
European continent, New Zealand, Australia and the
Hawaiian Islands, but had never been reported in the con-
tinental United States until last year.

Pelargonium rust is a typical rust, similar to snap-
dragon rust, producing brown, powdery, spore pustules
on leaves, petioles and stems. Yellowish, chlorotic areas
develop about the infections and infected leaves turn yel-
low, dry up, and drop prematurely. Not only are the
brown, dusty spots objectionable, but loss of leaves makes
the plants unsightly. A heavy infection could result in
serious financial loss to the grower.

Very limited tests indicate that if there is a supply of
spore inoculum, infection of susceptible plants may occur
very readily under conditions favoring moisture on the
plant tissues. Spores of the fungus are effectively spread
by splashed water but they may also be disseminated by
air currents in the absence of any splashing. A small
source of infection thus may endanger plants at consider-
able distances, not just those in the immediate vicinity.

Since this disease is potentially very serious the pri-
mary control emphasis should be on absolute exclusion.
Incoming plants, particularly from areas where the dis-
ease is known to be present in the field, should be exam-
ined very carefully and rejected if the true rust disease is
found. If a single plant in a shipment is definitely in-
fected, the odds are very high that many other plants have
incipient infections that have not yet produced symptoms.

If the disease is already established in a greenhouse
before being discovered, the infected plants should be de-
stroyed and the remaining plants thoroughly sprayed at
weekly intervals with a good rust-control fungicide.
Treatment should be continued until it is certain that no
further rust infections are present. We have not been able
to test fungicides specifically for pelargonium rust, but
ferbam, zineb or maneb materials should be fully effective
if applied thoroughly and with sufficient wetting agent to
insure coverage of the hairy geranium leaves.

FIGURE 1. Upper and lower side of Geranium leaf showing rust infec-
tions.

FIGURE 2. A whole plant showing rust infections on the leaves.

Short Takes

Jim Boodley

Here’s one from Geiger News that is worth passing
on. “We know of one good grower who sells his red ger-
aniums in white 4” LP plastic pots, and his pink varieties
in green pots of the same type. This separates the variet-
ies even when the geraniums are not showing color, saves
times, and prevents embarrassing mistakes. More of the
LP pots are being used every year. If you have not used
them we suggest that you try them as soon as you can.

“Some growers prefer the 4½” LP pot for geraniums, as
it holds more soil, yet takes up no more room than a 4”
pot.”

We have had reports this year that the application of
Dexon-Terrachlor as a drench to the last propagations of
Paul Mikkelsen resulted in absolute stoppage of growth.
Increasing greenhouse temperatures to get some stretch on
the stems did not do the job. We’d like to know if any of
you experienced this with your crops this year. Drop us
a post card if you did.

Easter lily fertilization should be continued up until
the plants are sold. Each year brings more reports of
scorch showing up on the Ace variety so stay away from
phosphorous fertilizers. When buds are about ½ inch
long you can use calcium nitrate at 2 pounds per 100 gal-
rons of water every week. If you are using a proportioner
to feed at each watering (1:100 dilution) use 16.8 ounces
per gallon of stock solution to provide 200 ppm Nitrogen
going on the plants.
Pelargonium Rust

(continued from page 1)

the diseased plants brought only the information that they were purchased at a supermarket. Shortly after our discovery of the disease, its presence in the Monterey Bay area of California was officially reported by the California Department of Agriculture, and it was recently mentioned in the January 18 issue of The Florists Review (p. 75). Relatively unheard of until a few years ago, pelargonium rust has spread with astonishing rapidity throughout the European continent, New Zealand, Australia and the Hawaiian Islands, but had never been reported in the continental United States until last year.

Pelargonium rust is a typical rust, similar to snapdragon rust, producing brown, powdery, spore pustules on leaves, petioles and stems. Yellowish, chlorotic areas develop about the infections and infected leaves turn yellow, dry up, and drop prematurely. Not only are the brown, dusty spots objectionable, but loss of leaves makes the plants unsightly. A heavy infection could result in serious financial loss to the grower.

Very limited tests indicate that if there is a supply of spore inoculum, infection of susceptible plants may occur very readily under conditions favoring moisture on the plant tissues. Spores of the fungus are effectively spread by splashed water but they may also be disseminated by air currents in the absence of any splashing. A small source of infection thus may endanger plants at considerable distances, not just those in the immediate vicinity.

Since this disease is potentially very serious the primary control emphasis should be on absolute exclusion. Incoming plants, particularly from areas where the disease is known to be present in the field, should be examined very carefully and rejected if the true rust disease is found. If a single plant in a shipment is definitely infected, the odds are very high that many other plants have incipient infections that have not yet produced symptoms.

If the disease is already established in a greenhouse before being discovered, the infected plants should be destroyed and the remaining plants thoroughly sprayed at weekly intervals with a good rust-control fungicide. Treatment should be continued until it is certain that no further rust infections are present. We have not been able to test fungicides specifically for pelargonium rust, but ferbam, zineb or maneb materials should be fully effective if applied thoroughly and with sufficient wetting agent to insure coverage of the hairy geranium leaves.

Short Takes

Jim Boodley

Here’s one from Geiger News that is worth passing on. “We know of one good grower who sells his red geraniums in white 4" LP plastic pots, and his pink varieties in green pots of the same type. This separates the varieties even when the geraniums are not showing color, saves times, and prevents embarrassing mistakes. More of the LP pots are being used every year. If you have not used them we suggest that you try them as soon as you can.

“Some growers prefer the 4½" LP pot for geraniums, as it holds more soil, yet takes up no more room than a 4" pot.”

* * * * * *

We have had reports this year that the application of Dexon-Terrachlor as a drench to the last propagations of Paul Mikkelsen resulted in absolute stoppage of growth. Increasing greenhouse temperatures to get some stretch on the stems did not do the job. We’d like to know if any of you experienced this with your crops this year. Drop us a post card if you did.

* * * * * *

Easter lily fertilization should be continued up until the plants are sold. Each year brings more reports of scorch showing up on the Ace variety so stay away from phosphorous fertilizers. When buds are about ½ inch long you can use calcium nitrate at 2 pounds per 100 gallons of water every week. If you are using a proportioner to feed at each watering (1:100 dilution) use 16.8 ounces per gallon of stock solution to provide 200 ppm Nitrogen going on the plants.