

## THE NEW BACTERIAL SPOT DISEASE OF ZINNIA IS SEEDBORNE

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Zinnias, like all crops, have some disease problems, but until recently, these problems were not severe, accounting in large part for the popularity of zinnia in the home garden and in more extensive commercial landscapes. The most common disease problems of zinnias are powdery mildew and *Alternaria* leaf spot. Both these diseases become prevalent during mid-season, usually in July, and get progressively worse during the season until most plants, if left untreated, are unproductive, unsightly and have to be removed or replaced. Most home owners have learned to live with these diseases, however, and have come to accept these "late season blights" as "a normal sequence of events with zinnia." After all, these plants have provided an inexpensive source of beauty and enjoyment for several weeks. Moreover, the productive season could be extended considerably by the application of a fungicide on a weekly or biweekly basis (7).

Now, however, zinnias are more difficult to grow successfully because of a new disease called bacterial spot (caused by the bacterium *Xanthomonas nigromaculans zinniae*). Symptoms of the disease (Fig. 1) include an angular spotting of the leaves. Spots are yellowish at first becoming brown with a yellow halo. Many spots coalesce causing leaf defoliation and stunting. Because the disease is seedborne (3,5), it is destructive during germination, plant production, and throughout the season. The disease was first found in North Carolina (3) and in North America (2) in 1972.

Since then, it has become established in many commercial cultivars, including the popular Peter Pan series. It has been shown that a few contaminated seed in a package may be sufficient to give rise to 100% infection of plants in the seed bed or later in the flower bed (5,6). The disease is most severe during warm, wet weather. Bacterial spot is very difficult to control because it is seedborne, because highly resistant cultivars have not been found (1,4), and because chemical sprays have not been effective (7). Control of bacterial spot of zinnia is dependent upon the use of disease-free seed. Until seed producers address and solve this problem, seed should be treated for bacterial spot control.

Three seed treatment measures have been used successfully (6,7):

- 1) Seed may be soaked for 30 minutes in 20% Clorox, air dried, and then planted. (1 part Clorox:4 parts water)
- 2) Seed may be treated with a slurry of captan prepared by mixing with water at the rate of 6 lb. captan 50 W/gal of water. Allow to dry and plant (8). (1 part captan 50 W:1 part water)
- 3) A combination of the two measures above: first treat with 20% Clorox, allow to dry, then coat with the slurry of captan. Allow to dry and plant or seed may be stored.

Treating the seed will aid not only the control of bacterial spot but should also provide a measure of control of two other major diseases of zinnia, namely damping-off and Alternaria leaf spot.

## LITERATURE CITED

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FIG. 1. Naturally occurring symptoms of bacterial leaf spot of zinnia on young cotyledons in the seed bed and on foliage in the field.

