

## The “Benlate Syndrome” and What To Look For

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There is an epidemic in the ornamental horticulture industry just as real as any health crisis. It's just as real as the AIDS epidemic.

For the past three years, plants have been exhibiting a variety of abnormalities that have been described by researchers and Florida's Division of Plants Industry as the “Benlate Syndrome.” The cause of the problem is elusive and baffling. The number of explanations is as varied as the people expressing views. Countless hours are being spent trying to find the cause and to develop mitigation techniques, so far without any real success. All concerned agree that there are plant abnormalities and that the impact is widespread.

The symptoms of the syndrome are lack of plant growth; failure to flower or if they do flower, failure of fruit or seeds to mature properly; distortion of foliage shape and color; chlorosis; cabbage-head growth; lack of sturdiness of plant stems; club-like growth of root tips; dead areas in roots behind healthy tips; excessive proliferation of roots, root growth toward the top of soil surfaces; and a lack of insect population.

In identifying the Benlate syndrome, it is important to look for patterns of symptoms and repetition of these patterns. The symptoms are often subtle. Every plant does not show all the signs, and each species may show the symptoms a little differently. Definitely, there is a difference in the reaction of monocots and dicots. In dicots, the root symptoms are very pronounced. For example, Indian hawthorn may look healthy and have reasonable symmetry and good color. Plants in my nursery were fertilized the week of April 1st with a 12-week fertilizer. No apparent growth of the shoots has occurred nor has there been any other noticeable change in appearance since April.

When you look at the roots, the reason for lack of growth is apparent. It is not uncommon to find the roots breaking the soil surface and growing into the air. Often, the roots grow toward the top of the container.

On close examination of the roots, several other abnormalities are evident. The tips are large and brittle and snap off easily. Behind the tips, the size of the root diminishes—leaving the appearance of a club head. Often dead areas occur in the middle of the root. Tips on the damaged roots remain white and the area behind the dead spot continues to appear healthy.

The immediate reaction when you see the dead areas is root fungus. However, many times new roots are seen growing from the dead area. In samples I have sent to labs, root pathogens always have been described as secondary in nature. It appears only the phloem is damaged initially. However, after several weeks, pathogens often invade the rest of the root.

Fruiting and flowering also are adversely affected. Many plants just fail to flower. Feijoa, pittosporum, and *Viburnum suspensum* have consistently failed to produce some flowers. These species have always produced some flowers in the nursery. The plants have shown very little growth in the past six months.

Plants that do flower often do not produce mature fruit. We failed to produce a significant number of cucumbers of normal shape and size in our test blocks. While

there are many environmental factors affecting cucumber pollination, we had a half dozen normal cucumbers out of a harvest of several hundred. Area farmers reported a good harvest of our test cultivar during the same time frame. When the fruit was cut, there was an amazingly small number of seeds. Flowering occurred at an extremely small plant size, and the vines failed to grow normal length.

Chlorosis in foliage is a common symptom. Marginal yellowing, interveinal yellowing, and a general unhealthy appearance are often seen. While these symptoms are sometimes indicative of nutritional problems, tissue analysis and soil analysis indicate "not this time."

Distortion of foliage is another symptom. It ranges from cabbage heading, when tight apical growth gives a cabbage-like appearance, to leaf deformity. It is not uncommon to find dinner plate shapes, shapes like a scimitar, strap leaves, and other irregular shapes, which would leave a mathematician at a loss to describe.

On some species of plants, the stems seem to have lost their rigidity. I have dogwood and viburnum which were growing vertically in the early spring that later in the summer were lying over in the containers.

We do not raise many types of monocots, but the effect of the Benlate syndrome does not seem to appear as dramatically. Root symptoms are much less pronounced than in dicots. However, brittleness of the tips and clubbing often are still found. Distortion of the foliage is dramatic. I have seen blades of African iris and liriope folded to accordion-shaped pleats. Many of these pleats are in the middle of leaves. More common is a rippling of the foliage in one or more places on the blade. A majority of the leaves also will grow spiraled into a corkscrew form or in a crescent shape.

Palm fronds emerge and often fail to separate and fan out normally. The fronds remain attached at the tip. I have seen several plants with this type of frond exhibited on more than two growth whorls. Some of the same frond pleating seen in iris occurs on palm fronds, too.

Throughout the nursery, we have seen a disappearance of insects. Before the appearance of the Benlate syndrome, we were forced to spray continually for sweet potato whitefly. We have not seen any in more than a year. Aphids like sweet viburnum so much it seems they get passports from nearby Latin American countries just to come eat. We haven't seen any significant population in months. In central Florida, scales are one of the most significant insect problems. Populations of false oleander scale have decreased to nearly nothing and other species are just not found in my nursery.

One of the most significant observations is the absence of fire ants. Two years ago, mounds popped up everywhere. We constantly had to battle fire ants. The only areas where I have been able to find mounds lately are in our parking lots.

The effect of the Benlate syndrome will be felt for a long time. It has had significant economic impact on nurseries in central and south Florida, and probably many other areas. The problem is very real, and if you buy plants from other producers, don't discount the severity of this problem.