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Terminal Chlorosis on Landscape Plants

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Among the possible causes of chlorosis (yellowing) of the terminal leaves are

- deficiencies of calcium, sulfur, and minor elements (except molybdenum)
- feeding by broad mites and aphids
- infection by certain virus diseases
- toxicity from excessive soil manganese
- toxicity caused by certain pesticides.

Most of the time, when no insects or symptoms of diseases are found, terminal chlorosis symptoms are caused by minor element deficiencies.

Disease causes

One disease symptom that can be confused with nutrient deficiency is the flecking (leaf spots) on tips of young leaves of *Dracaena marginata* caused by *Fusarium momliforme*. Other disease symptoms described by A. R. Chase (1987) include several viruses on foliage plants: tobacco mosaic virus causes the terminal leaves of oyster plants (*Rhoeo spathacea*) to be chlorotic and distorted, dasheen mosaic virus causes distortion of new leaves of *Dieffenbachia maculate* 'Perfection', and bidens mottle virus causes chlorosis and distortion of *Fittonia verschaffeltii* leaves. If disease is suspected, samples can be submitted for analysis, for a small fee, to CTAHR's Agricultural Diagnostic Service Center via Cooperative Extension Services offices statewide.

Insect causes

Broad mites attack the apical tips of new leaves, resulting in distorted, heavy textured mature leaves. Broad mites are most prolific during the wet, cool, winter season in Hawaii. (Spider mites, on the other hand, multiply rapidly during the hot, dry, summer weather.) Broad mites are tiny and difficult to see by the inexperienced observer, even with a hand lens. The females are largest and therefore easiest to see with a lens. If no adults are present, look for eggs or the skeletons of hatched eggs. In Hawaii, broad mite damage is common during the winter season on the new foliage of impatiens (Fig. 1), allamanda (Fig. 2), papaya (Fig. 3), pepper (Fig. 4), mock orange, true kamani (Fig.5), and Chinese leea (Fig. 6). The general symptoms of broad mite damage are similar on all plants.

On papaya leaves, papaya ringspot virus symptoms are similar to those caused by broad mite feeding, but the latter makes the leaves thicker and distorted. It takes experience to tell the difference.

Broad mite damage on impatiens is often so bad during the winter that some hotel landscape managers remove impatiens during that season, substitute with a short-term annual, and replant impatiens in the spring.

Aphids can commonly be found on the new foliage of hibiscus, dwarf rubber plants, citrus, pritchardia palms, African tulip trees, roses, and mock orange. Aphids are large enough to see without the aid of a hand lens. The aphid that attacks the young leaves of pritchardia palms looks more like a black scale than an aphid (Fig. 7). But a close inspection of this damage reveals the typical characteristics of aphids. Aphid damage on young dwarf rubber leaves may at first look like broad mite damage, but inspection of the undersides of the leaves commonly reveals the aphid culprit.

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1 Broad mites on impatiens

2 Broad mites on allamanda

3 Broad mites on papaya

4 Broad mites on pepper

5 Broad mites on true kamani

6 Broad mites on Chinese leea

7 Palm aphid on *Pritchardia pacifica*

Nutrient toxicities

Manganese toxicity can occur on low-pH soils naturally high in manganese. Low pH means that the soil is very acidic. The soils in Oahu's central valley became acidic because of the constant use of ammonium fertilizers for sugarcane. Sugarcane, along with rice, field corn, and tomato, is tolerant of high levels of manganese. In contrast, beans, lettuce, potato, and roses are sensitive to manganese toxicity. That is why sugarcane continued to grow well in the Oahu's central valley despite high soil manganese levels. On young, expanding leaves, manganese toxicity resembles calcium deficiency (Hue et al., 1988). This symptom is sometimes called crinkle leaf. It is possible to alleviate this problem by increasing the soil pH and calcium level.

Physiological and other causes

Raising of the temperature from 60˚ to 95˚F can cause flecking of new leaves of *Monstera deliciosa*, *Philodendron hastatum*, *Ficus elastica*, and *Dracaena fragrans* (Chase 1987). Pesticides can sometimes cause the new foliage to become chlorotic. For example, vinclozolin damage can result in severe chlorosis of new leaves of *Aphelandra squarrosa* (Chase 1987).

Literature cited

Chase, A.R. 1987. Compedium of ornamental foliage plant diseases. American Phytopathological Society. 3340 Knob Road, St Paul, Minnesota 55121, USA.

Hue, N.V., et al. 1988. Managing manganese toxicity in former sugarcane soils on Oahu. University of Hawaii at Manoa, College of Tropical Agriculture and Human Resources, publication SCM-1. http://www.ctahr.hawaii.edu/oc/freepubs/pdf/SCM-1.pdf