Non-infectious plant disorders - Oedema and Intumescences

Introduction

Non-infectious plant disorders where lesions develop on leaves can occur on several different plants including **begonia, ivy geraniums, cactus, cleome, ivy**, **ornamental sweet potato vine**, and **annual thunbergia**. **Broccoli, cabbage, cauliflower,** and **tomato** can also suffer from this disorder. Houseplants with fleshy leaves such a **jade, peperomia** and **schefflera** may be prone to edema during favorable environmental conditions. These lesions have been called a by a variety of names including intumescences, galls enations, oedema, edema and oedemata. Two of the more common names are oedema, and intumescences.

Symptoms vary and depend upon the plant species, and tenderness of the plant tissue. These symptoms may be confused with an infectious disease or insect gall.

Recent research has shown differences between oedema (primarily occurring on ivy geraniums) and intumescences occurring on tomatoes and ornamental sweetpotato vine (*Ipomoea sp.*).

Oedema

This physiological disorder affecting ivy geraniums is thought to be due to a low transpiration rate that can occur when the growing media is warm and wet and the surrounding air is cooler. This results in a build-up of water and solutes in the plant leaves. Blister-like growths develop in the epidermis layer. On ivy geraniums, lesions developed within the leaf mesophyll cells in the middle of the leaf.

Symptoms

Bumps, blisters, or water-soaked swellings form on the underside of leaves. These blisters are at first small, about 1 to 2 mm in diameter. They then turn tan or brown and become corky. Severely affected leaves turn yellow and drop from the plant. Sometimes, stems and petioles become infected.

Ivy geraniums with only mild symptoms of oedema often recover. However, some plants may be so severely infected, with significant leaf drop and distorted growth, that they will not be saleable.

Oedema may be confused with two-spotted spider mite feeding damage or thrips feeding damage on ivy geraniums. As spider mites feed on ivy geraniums, the plants develop “oedema-like” symptoms that often spread to the youngest leaves. Stippling or flecking from spider mite feeding does not occur on ivy geraniums. To distinguish two spotted spider mite feeding injury from oedema, use a 10 x to 20x hand lens, to look on the underside of leaves for the two-spotted spider mites.

Figures 1 & 2: Oedema on ivy geranium (on left) on lowermost leaves contrasted with two spotted spider mite injury on ivy geranium continues on youngest leaves. Photo by L. Pundt

Oedema may also be confused with thrips feeding injury. Use a hand lens to look for the small, yellow thrips larvae on the underside of the leaves. As thrips feed upon the ivy geraniums, white scarring and leaf distortion may be noticeable, especially on the youngest leaves.

Favorable Conditions

Oedema is thought to be caused by an imbalance of the plant's water uptake and water loss. It develops when the plants roots absorb water at a faster rate than it is transpired through the leaf cells. The enlarged leaf cells divide, and then rupture. This rupturing of the leaf epidermis and inner cells causes the raised blisters commonly seen on the underside of leaves.

In the greenhouse, susceptible varieties of ivy geraniums often develop oedema in the late winter or early spring when the air is most humid with poor air circulation that reduces the plant's transpiration rate.

Researchers at Kansas State University found that high growing medium water contents did not increase the incidence of oedema on four cultivars of ivy geraniums but increased overall plant growth. Feeding with supplemental calcium also had no effect on oedema on ivy geraniums.

Selecting less susceptible varieties is probably the best way to manage oedema on ivy geraniums.

Table 1: Susceptibility of Ivy Geranium cultivars to edema		
Most susceptible	**Intermediate**	**Most resistant**
Amethyst	Madeline Crozy	Sugar Baby
Yale	Cornell	Double Lilac White
Balcon Princess	Spain	Salmon Queen
King of Balcon	Pascal	Sybil Holmes
Balcon Imperial	Rigi	Galilee
Balcon Royale	Rouletta	
Beauty of Eastbourne		

Table 1. From: White, J. W. (Ed) 1993. Geraniums IV. Ball Publishing. Batavia, IL. 412 pp. (Some of these varieties may still be available from specialty propagators).

Intumescences

The physiological disorder known as "intumescences" is characterized by individual epidermal cells swelling on the surface of leaves. There are small bumps or protrusions on the surface of leaves and petioles on **ornamental sweetpotato vine, cuphea and tomatoes.** Cultivars vary in their response to this disorder.

On certain cultivars of *Ipomoea* (sweetpotato vine) white, crusty eruptions resembling grains of salt, develop along the leaf veins. Intumescences do not develop on these crops grown outdoors, but only in the greenhouse. Greenhouse coverings have a UVB block inhibitor to extend their life. When plants were grown under supplemental UVB radiation, there was reduced incidence of the intumescences.

Growers should avoid growing the very susceptible cultivars such as 'Blackie', 'Black Heart', 'Desana Bronze', 'South of the Border Chipotle', 'Sweet Caroline Bronze', 'Sweet Caroline Sweetheart Red' and 'Tricolor'.

Figures 3 & 4: Intumescences on susceptible cultivars of ornamental sweet potato vine. Photos by L. Pundt

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References

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