

Physiological Disorders of Orchids: Oedema¹

R.A. Cating, A.J. Palmateer, C.M. Stiles, P.F. Harmon and D.A. Davison²

Oedema is a physiological disorder of orchids caused by overwatering. The excess water is absorbed by the roots quicker than it is lost by the leaves, which can cause swelling of plant cells and produce a lesion resembling a blister. This condition frequently occurs during periods of cool weather when water quantity and/or frequency is not reduced. The blister-like symptoms can appear on upper or lower leaf surfaces, stems, petals or sepals.

Symptoms

Symptoms of oedema can take on many forms. Generally, small, swollen blister-like structures develop that may become corky with age (Figures 1-8), and are usually round, but may have other shapes (Figure 3). The plant tissue beneath the blister will frequently remain green (Figure 9). Occasionally, blisters may be misidentified as scale insects because of shape and size. However, scale insects can be easily rubbed off, while oedema blisters can not (Figures 13 and 14).

If a cross-section through symptomatic tissue is made, enlarged cells can be seen below the epidermis (outer-most layer of cells on a leaf), which gives the lesion a raised or swollen appearance (Figure 10).



Figure 1. *Phalaenopsis* hybrid leaf with symptoms of oedema. Notice the numerous round spots scattered over the leaf surface. A close-up view can be seen in Figure 2. Credits: R. A. Cating

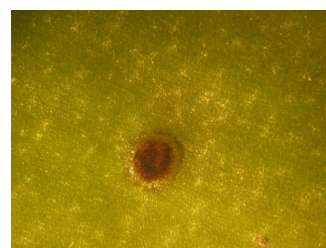


Figure 2. Close-up view of oedema blister on a *Phalaenopsis* hybrid. Credits: R. A. Cating

Diagnosis

Orchid diseases and disorders can be caused by living pathogens (bacteria and fungi), or environmental conditions (heat, cold, light, etc.). Making the distinction between biotic (living

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 2. R. A. Cating, graduate research assistant, Plant Pathology Department; A. J. Palmateer, assistant professor, Plant Pathology Department, Tropical Research and Education Center, Homestead, Florida; C. M. Stiles, assistant professor, Plant Pathology Department; P.F. Harmon, assistant professor, Plant Pathology Department; D. A. Davidson, Biological Scientist III, Plant Pathology Section, Florida Dept. of Agriculture & Consumer Services - Division of Plant Industry; Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, Florida, 32611.

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Figure 3. Oedema on lower surface of a *Phalaenopsis* hybrid leaf. Credits: R. A. Cating



Figure 4. Oedema on the lower surface of a *Rhynchostylis* hybrid leaf. Credits: R. A. Cating



Figure 5. Oedema on the upper surface of a *Cattleya* hybrid leaf. Credits: R. A. Cating



Figure 6. Oedema on the lower surface of a *Cattleya* hybrid leaf. Credits: R. A. Cating



Figure 7. Oedema Blisters on the flower of *Encyclia cordigera*. Credits: R. A. Cating



Figure 8. Oedema on the lower surface of a *Bulbophyllum* hybrid leaf. Credits: R. A. Cating



Figure 9. Oedema blister on *Phalaenopsis* hybrid showing green tissue under neath. Credits: R. A. Cating

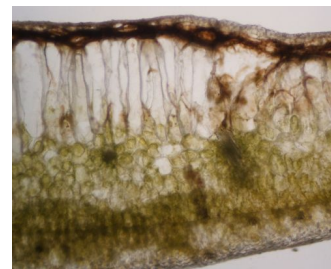


Figure 10. Cross-section trough oedema blister of the same *Bulbophyllum* hybrid in figure 8. Notice how the cells below the upper epidermis have enlarged, causing a swollen or blister like appearance. Credits: R. A. Cating

organism) and abiotic (non-living) causes of the disorder is crucial for effective orchid health management. For example, spraying a chemical fungicide would be a waste of time and money if the cause of leaf damage is sunburn, oedema, etc.

As a general guide, you may have oedema if the following occur:

- Blisters are slightly raised **without** a yellow halo or water soaked margins, which may indicate the presence of a pathogen. Figure 11 shows an example of a lesion with a yellow halo, while water soaking can be seen in Figure 12.
- Blisters are round and/or have a corky layer over the top (Figure 9).

- Green tissue can be seen underneath of top layer (Figure 9).
- Oedema blisters cannot be rubbed off. Scale insects can easily be removed (Figures 13 and 14).



Figure 11. Bacterial leaf spots on a *Vanda* hybrid caused by *Acidovorax* sp. On the left, dark spots can be seen with yellow margins or "halos", while on the right the yellow has become more widespread. Credits: R. A. Cating



Figure 12. Bacterial spot on an *oncidium* hybrid caused by *Burkholderia* sp. Water soaking can be seen as a watery, fluid-filled area surrounding the lesion. Credits: R.A. Cating



Figure 13. Scale insect on the lower side of a *Cattleya* hybrid leaf. Credits: R.A. Cating



Figure 14. This figure shows the same scale insect being lifted with a metal probe. Scale insects can be easily removed, while oedema blisters cannot. Credits: R.A. Cating

Management

Many consumers are unwilling to purchase plants with visible symptoms of an underlying disorder. Therefore, the prevention of oedema can be economically advantageous in certain orchid genera that are prone to oedema, such as *Phalaenopsis* species and hybrids. Once an orchid has oedema, the lesions are permanent. However, symptomatic plants can produce new, healthy growth when more favorable growing conditions return. Because oedema is not caused by a pathogen, no disease control measures are required.

In order to minimize oedema, growers should make sure that plants are being watered correctly and not receiving excessive moisture in the form of rain if left outdoors, particularly during cool weather. The condition of the growing media should also be examined to make sure it is not retaining too much water because of media decomposition. Reducing the amount of organic material in the potting mix may also reduce occurrences of oedema. Improve the flow of air over the leaves by spacing plants farther apart and increasing ventilation.