

Bacterioses

Biology

Erwinia carotovora subsp. *carotovora* [Jones] Bergey et al

Erwinia cypripedii [Hori] Bergey et al

Acidovorax avenae subsp. *cattleya* [Pav.] Will. (= *Pseudomonas cattleya* [Pav.] Savul.)

Bacteria are unicellular rod-like organisms that move actively in the water with the help of flagella. Reproduction is done by division and only takes a few minutes in a humid and warm environment.

Bacteria are not able to infest a healthy plant surface, they always need open parts such as wounds or gaps.

Most bacteria reach their optimum in high temperatures between 25°C and 30°C and high humidity, so repeated explosion-like infestation usually has to be expected during the summer. But even in the darker and cooler seasons they can cause severe damage to orchids, even if the pest develops considerably slower.

Damage

Erwinia carotovora and *Erwinia cypripedii* are soft rot pests, they cause soft hazy yellow spots on the leaves. Decomposition usually starts at the base of the leaf; in humid conditions it spreads across the entire leaf leaving nothing but a pulpy mass. On the infested areas a yellow bacterial slime often occurs. When the disease reaches the apical point, it spreads to other leaves and finally the whole plant rots.

Bacterioses on young plants in high temperatures, bad light conditions and high humidity can occur during the whole year, but mainly during the winter months and can make the plant die within several days.

Erwinia sp. has a very broad spectrum of host plants, among which nearly all orchid varieties are found.

Acidovorax mainly occurs on *Phalaenopsis* and *Cattleya*. However, *Cymbidium*, *Dendrobium*, *Zygopetalum* and *Epidendrum* are also mentioned as being host plants. At the beginning of an infestation with *Acidovorax* usually small dark spots appear on the leaf blade. With a backlight a marked yellow circle around the infection can be seen. Small spots unite to form larger spots and the tissue shrinks while turning black. Decomposition can be limited to individual leaves or spread across the entire plant. In contrast to infections with the anthracnose pathogen *Colletotrichum*, no ring-formed grouped fruit bodies are found in the infested areas. Infestation with *Acidovorax* may also occur on blossoms.

There may be several bacterioses on orchids at the same time. Usually the degree of infestation of the host plant is therefore not directly connected with the respective bacterium, but rather with the conditions of cultivating and climatic conditions and the condition of the plant. Thus, only microbiologic examinations can reveal the type of bacterium that causes a certain disease.

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Control of bacterioses

Bacteria cannot be controlled directly. Severe adequate cultivation and hygiene measures must be taken, especially against *Erwinia* during the darker winter months and against *Acidovorax* in high temperatures in the summer to prevent infections spreading.

- Water is the most common source of spreading bacterioses on plant populations. The plants must be watered carefully, keeping the leaves as dry as possible, the plants should not be placed too close to each other.
- Wounds are open doors for bacterioses and must be avoided.
- All plants with visible symptoms must be removed from the greenhouse immediately and destroyed. Cutting off individual infected leaves hardly improves the situation and only slows down the course of the disease. In the case of an infection in young thinned out plants, the whole box should be removed.
- Stress situations such as marked temperature or light changes or increased nitrogen fertilisation have to be avoided at all costs.
- Cultures should be cultivated as regularly as possible.
- Hygiene must have top priority for all cultivation: washing your hands, changing or disinfecting work materials.
- Cultivation vessels, shelves, greenhouse desks and tools that were in contact with infected plants or water must be disinfected.
- In order to decrease spreading of the intruder in the stand, regular and repeated prophylactic spraying with copper-containing products can be done. Copper hydroxide or copperoxichloride crystals have the effect of mechanical barriers on the plant surface. However, treatment with copper over a longer period might result in phytotoxicity on leaves and air roots.
- Common benzoic acid can also be used for disinfection in gardening when carefully poured over the plants, however, this product may not reach the roots. Most other disinfectants are phytotoxic and are not suitable.
- Excellent results are achieved using chloride dioxide. As an oxidating agent, it takes effect on the organic parts of the water. Chloride dioxide can be mixed with the water for watering.

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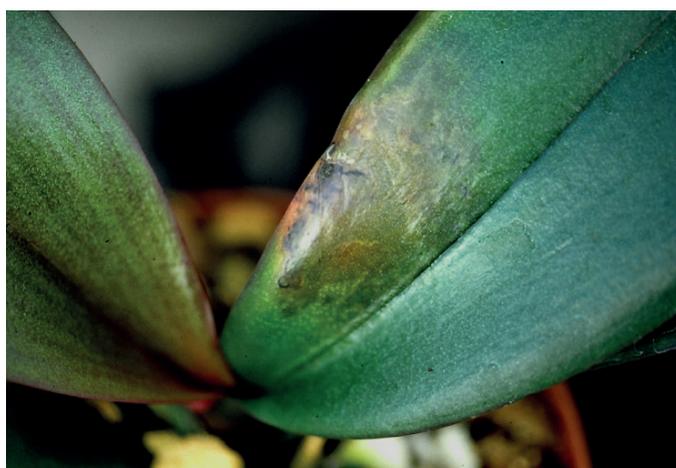
Brassada Mivada: Erwinia leaf rotting



Paphiopedilum: Erwinia cypripedii at leaf base



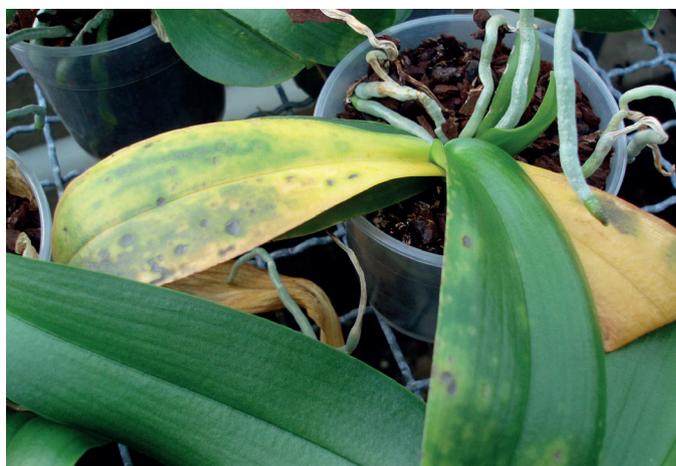
Paphiopedilum: Erwinia cypripedii at leaf base



Phalaenopsis: Erwinia soft rot



Phalaenopsis: Erwinia soft rot with infective bacteria slime



Phalaenopsis: Erwinia leaf rotting

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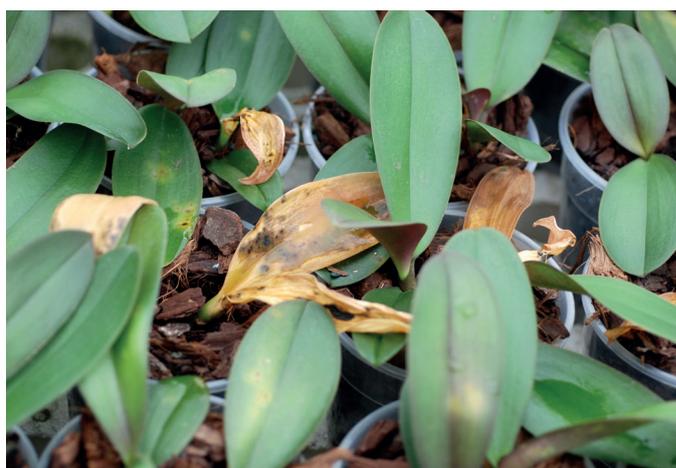
Phalaenopsis: *Acidovorax avenae*, spots at flower



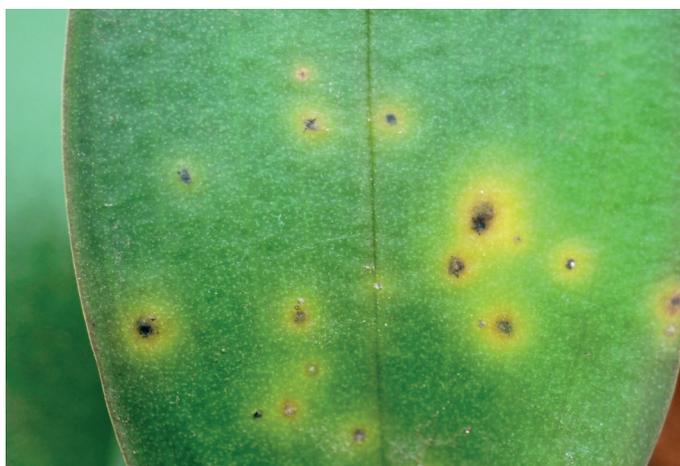
Phalaenopsis: *Erwinia* soft rot



Phalaenopsis: *Erwinia* soft rot



Phalaenopsis: *Acidovorax avenae*, leaf spot



Phalaenopsis: *Acidovorax avenae*, leaf spot



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