Plant disease - corm rots of gladioli

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CORM ROTS OF GLADIOLI
By OLGA M. GOSS, B.Sc., (Hons.), Plant Pathologist

Several diseases of gladioli now present in Western Australia can be very damaging to the plants under certain conditions. The diseases referred to in this article attack not only the above-ground portions of the plant, but the corms also, and their introduction to new areas usually results from the planting of infected corms. When such corms are planted the disease spreads to the developing shoots and leads to inferior growth and flower production, and in some cases to the death of the plant. An even more serious feature of the disease is that the soil becomes contaminated with the organisms for an indefinite period, making future plantings extremely hazardous unless expensive soil disinfection is carried out.

For the prevention of soil-borne diseases of gladioli, the planting of healthy stocks in clean ground is the most important requirement and to achieve this, growers should be familiar with the symptoms of the disease on the corms.

The chief purpose of this article is to describe the symptoms of the main diseases both on the corms, and in the field during growth, so that in the first place planting of infected corms may be avoided and secondly, where necessary, the spreading of the disease in the field may be prevented.

The diseases causing corm rots are of two main types—(a) bacterial, (b) fungal. The latter are usually more serious and harder to control. Virus diseases may also be present in the corm but the symptoms would not be visible at this stage.

Fig. 1.—Bacterial Scab (Pseudomonas marginata.) Corm showing crater-like lesions on surface of corm, particularly at base. Note charred appearance of scale leaves at top of corm.

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1.—BACTERIAL SCAB AND NECK ROT  
(Pseudomonas marginata)
This bacterial disease is very common in most gladiolus plantings. Under normal conditions it does not cause much damage but, when conditions are excessively moist, a neck rot may develop causing the plant to topple over. Neck rot however, is rare under West Australian conditions.

Corm Symptoms.—The corm lesions are most frequently found at the base of the corm and are very characteristic in form, being crater-like, usually rounded, and with a definite raised rim (see Figs. 1 and 2). In colour the lesions vary from a honey yellow to dark brown and almost black but in all cases they present a lacquer-like appearance due to the exudation of gum by the bacteria. The "scabs" as they are called, are only superficial on the corm and can be lifted out quite easily with a pen-knife. The scale leaves covering the corm may be infected, when they appear to have gummy patches which gradually turn black and appear to be charred. The soil becomes contaminated when diseased corms are planted.

Field Symptoms.—Small reddish-brown spots with darker margins occur on the leaves. They appear gummy due to the exudation of bacteria which may be spread from plant to plant by rain splash.

2.—HARD ROT  
(Caused by Septoria gladioli)
This disease is fairly common in Western Australia and is usually most severe when the plants are poorly grown and during wet seasons.

Corm Symptoms.—This fungus forms sunken, dark brown, irregular lesions on the corm (Fig. 3). These lesions do not have raised margins like the scab lesions but are merely shallow pits. The diseased tissue extends fairly deeply into the corm—frequently a quarter of an inch or more. The surface of the pits may be wrinkled and sometimes black dots (the fruiting bodies or spore-producing bodies of the fungus) occur.

In the early stages, the lesions are usually on the side and lower portions of the corms but later, particularly during storage, they may extend to cover the whole corm and reduce it to a withered "mummy." It does not spread from corm to corm during storage.

Field Symptoms.—The leaf spots are very easily recognised. They are buff-
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coloured with a brownish margin and bear numerous black spots like pin pricks (see Fig. 4). Each of these black spots is capable of producing hundreds of needle-like spores (fungus seeds) which can give rise to new infections on adjacent plants or by being washed down between the scale leaves to give corm lesions. The leaf spots vary in size from about a tenth of an inch to large coalesced areas involving most of the leaf.

3.—DRY ROT
(Sclerotinia gladioli)
This appears to be the most serious disease of gladioli occurring in Western Australia and it seems to be becoming very common.

Corm Symptoms.—These are rather similar to the hard rot lesions but are usually smaller, more rounded, darker in colour and appear on the rims where the scale leaves join the corms. The disease may progress considerably during storage.

Field Symptoms.—The first signs of disease usually appear when the plants are from six to eight weeks old when the leaves begin to turn yellow from the tips downward. If such a plant is examined more closely it will be seen that a “neck rot” is developing at ground level and extending from the outer leaves inward. Plants so infected may topple over at ground level.

This disease may be distinguished from all others by the shredding of the leaf tissue at the neck region and the development on the shredded tissue of small black bodies called sclerotia which are very resistant and serve to carry the fungus through unfavourable conditions (see Figs. 5 and 6). In the soil the fungus may survive for at least
four years and it thrives best in soil that is rich in organic matter.

In a wet soil the fungal strands may spread out for a distance of nine to 18 inches from the corm thus infecting new plants in an area surrounding the original infection.

4.—CORE ROT
(Caused by Botrytis or grey mould)

Corm Symptoms.—Two forms of this disease occur locally.

(a) The central core region rots, then becomes corky (see Fig. 7) and finally falls out, leaving the corm ring-shaped. This condition develops mostly during storage and is not serious. Normal corms may be grown from these, especially if the cavity is filled with a weak fungicide.

(b) A softish brown rot extends into the core region, spreads out along the water-conducting strands to the surface of the corm, where brownish lesions develop (see Fig 8). Corms so affected

Fig. 5.—Dry Rot (Sclerotina gladioli). Early stages of neck rot. Note numerous tiny black structures (sclerotia) on leaf sheaths. These bodies are very resistant and tide the fungus over unfavourable conditions.

Fig. 6.—Dry Rot (Sclerotinia gladioli). Advanced stage of neck rot. Note shedding of leaf tissues and black sclerotia attached to the shredded tissue.

Field Symptoms.—Botrytis in the grey mould stage occurs on dead flowers. It spores prolifically, the spores being distributed to the leaves by wind and rain causing reddish-brown spots to de-
6.—**FUSARIUM YELLOWS**  
*(Fusarium orthoceras)*

Fusarium yellows is a disease that has been recorded only once in Western Australia. On this occasion it occurred in plants grown from imported corms, which were subsequently destroyed and the area quarantined. However, it is such a serious disease in other parts of the world that growers should make themselves familiar with the symptoms in order that they can take adequate precautions to prevent its entry and establishment in this State.

**Corm Symptoms.**—These are not usually visible until the external surface of the corm is sliced as in Fig. 10 when a number of brown discoloured spots are visible. These are the water-conducting strands, the disease having spread from the core region (see Fig. 11).

**Field Symptoms.**—The first sign of this disease in the field is the yellowing of the foliage. When such a plant is pulled up it will be seen that the old corm is rotted and that the roots of the new corm are developing rot and may even disappear altogether.

Prior to planting any imported corms a small slice should be cut from the surface and the corm examined for brownish spots.

**GENERAL CONTROL MEASURES**

1. Carefully examine corms for any signs of the diseases mentioned. Dis-
Fig. 9.—Fusarium Rot (F. Oxysporum). External view of corm infected with Fusarium. Note concentric ridges on the surface of the lesion.

card and burn any showing the deep seated rots. In slightly infected valuable corms, the lesions may be removed with a sharp knife, being sure to get down into healthy tissue as dipping treatments have little or no effect on deep seated rots. Where practicable, scales should be removed from the corms to facilitate detection of disease.

Dip the remaining corms in a fungicidal solution such as:

- Corrosive sublimate—1 oz. in 6½ gallons of water for 12 to 24 hours.
- Calomel 1oz. in 1½ pints of water for 5 to 10 minutes.
- Lysol 1 tablespoonful in 1 gallon of water for about 6 hours.
- Proprietary preparations such as Aretan, Mercury "E" etc., may be used according to the makers’ recommendations.

(2) If possible plant in ground in which gladioli have not been grown previously and adopt a rotation so that the plants are not grown in any particular area more than once in every three to four years.

Fig. 10.—Fusarium Yellows (F. Orthoceras). Cross-section of corms showing varying degrees of core rotting and vascular discoloration.

Fig. 11.—Fusarium Yellows. Corm from which slice has been cut, revealing vascular browning. Note that externally the corm appears healthy.

(From Agricultural Gazette, N.S.W.)

(3) Carefully examine plants during growth for any foliage symptoms of disease. If these occur, rogue out and burn plants showing disease then spray the remainder with bordeaux mixture 4:4:40 plus spreader, or Cuprox (1 oz. in 2 gallons of water) to prevent spread to adjacent plants and resultant infection of corms. It should be noted that there are a number of new spray materials now coming on to the local market and although as yet these have not been tested locally on gladioli they may be worth a trial.

Fig. 10.—Fusarium Yellows (F. Orthoceras). Cross-section of corms showing varying degrees of core rotting and vascular discoloration.

(From Agricultural Gazette, N.S.W.)
Rigorous rogueing during growth will pay dividends in reduction of soil contamination. Insecticidal sprays such as DDT should be applied regularly during growth as insects, such as thrip and aphides, not only mar the quality of the blooms but also transmit virus diseases. Any dead unwanted flowers should be removed to avoid the risk of grey mould infection.

(4) Immediately after digging, the tops should be removed and burnt and the corms may be washed and dipped in one of the following preparations to prevent the spread of any disease which may be present in the scale leaves.

Corrosive sublimate—1 oz. to 6½ gallons of water for 2 minutes.

Arétan 4 oz. in 10 gallons of water for 15 minutes.

Mercury “E” 1 pint in 12½ gallons of water for one minute. (Or other suitable proprietary preparations.)

(5) Corms should be stored in a cool well-ventilated place to minimise the occurrence of storage rots. At this stage they may be dusted with spergon plus 5 per cent. DDT to prevent spread of any disease or insect pests.

ISOLATION OF INTRODUCED STOCKS

Under commercial conditions, new material for trial purposes should be planted in an isolated bed to minimise the risk of any introduced disease spreading to the growers’ own stocks.

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