



Fusarium wilt of potatoes

Roger Osborn, Knoxfield

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Keeping potato plants free from fusarium diseases requires strict attention to detail on the part of the potato grower.

It is quite common to see a large proportion of plants in a crop yellow and die as they approach maturity, despite an abundance of soil moisture. The stresses that these plants have incurred is due to a complex of fungal diseases referred to by the industry as "Fusarium wilt".

Field symptoms

In the absence of abundant soil moisture, affected plants wilt, showing drooping leaves and soft stems, while healthy adjacent plants remain turgid.

Irrigated crops do not usually become sufficiently dry for these symptoms to be well developed. Instead of a moisture stress, affected plants show a slower growth rate and rolling and yellowing of leaves. The youngest leaves may turn purple in some varieties and develop a rosette appearance. Aerial tubers can develop, giving symptoms that resemble rhizoctonia damage.

Infected plants have discoloured vascular tissues in the stem, usually extending from below ground level. As the disease progresses, sections of the stem may become black and split open as soft-rot bacteria invade the infected plant. However, the strongly pungent odour associated with the once prevalent blackleg disease is not present. The lack of this odour helps to distinguish fusarium wilt from this bacterial disease.

Disease organisms involved

The fungi that cause this disease belong to the genus *Fusarium*. *Fusarium oxysporum* is the most common species isolated from diseased plants, but other species such as *Fusarium sulphureum*, *Fusarium tabacinum* and *Fusarium solani* are also found.

Importance of the disease

Fusarium wilt occurs in all potato-growing districts in Victoria. The fungi involved are present in the soil before planting and can occur in areas that have never been cropped with potatoes.

If plants show wilt symptoms at or before flowering few tubers will form. The varieties Sebago and Coliban often emerge poorly because of this disease. Later development

of symptoms is more common, so a modest yield of tubers will usually be obtained. It is estimated that in some seasons as much as 10% of the crops in a district may be significantly affected by wilt disease.

How infection occurs

Although the symptoms of the disease do not normally appear until late in the growing season, infection usually occurs at very early stages of plant growth. Fungi may gain entry through the cut surface of the seed piece, thin walls of the emerging shoot and damaged root and stem tissue of the young plant.

While the initial infection may be sufficient to cause death of the young shoot, more often it emerges, although a little retarded, and grows into an apparently normal and healthy plant. It is only late in the season, when active growth slows down, that the fungi start to block the water- and nutrient-carrying tissues.

As a result the plant is unable to move starch from the leaves to the tubers, and to absorb water and nutrients from the soil.

The excess of starch causes leaves to roll, aerial tubers to develop and purple pigments to be formed.

The lack of water and nutrients causes yellowing and wilting of leaves. The debilitated plant is then easily attacked by weaker pathogens, causing soft-rot breakdown.

Conditions that lead to infection

The fungi that cause this disease are weak pathogens and the potato tuber or plant has to undergo some form of stress or damage for infection to occur. The health and state of the seed piece, soil conditions at the time of planting and treatment of the crop at and following emergence are important.

Management practices recommended for the prevention and control of the disease

Use only seed in good physical condition. Seed with storage rots, multiple sprouting or excessive moisture loss is slower to heal its cut surfaces and is more prone to delayed emergence and attack by these fungi. Planting certified seed reduces the risk of planting tubers carrying a high incidence of *Fusarium* and other organisms.

Bring seed potatoes from cool storage to ambient air temperatures from 10 to 14 days before cutting and planting.

Regularly clean and disinfect the seed cutting machine with steam or an appropriate disinfectant. Use sharp blades on the cutting knives.

Cure the cut sets at a temperature of around 15°C with a relative humidity of from 85% to 95% and ensure that ventilation is adequate. Once cured, cut seed will hold for quite long periods in good condition. The fungicide Mancozeb may afford some control of the disease if applied to the cut sets prior to planting.

Avoid planting in cold wet soils. Sets should not be planted at depths greater than 125 mm. They should be planted shallower if the sets are in poor condition and breakdown is likely or if areas in the paddock are wetter than desirable.

Prevent damage to seed sets. Fertiliser contacting cut sets can cause burning of shoots and provide entry points for disease organisms. Fertiliser should never be placed in contact with the set; it should be banded below and to either side of the tuber piece. Planters can also damage seed by chafing and bruising if they are operated too quickly.

Reduce the build-up of fungi in the soil by avoiding the planting of successive potato crops in the one paddock.

Do not damage shoots. Avoid running harrows over the ridges just as the crop is emerging. Use of post-emergent herbicides can give equal or better weed control.

Use a well balanced fertiliser with adequate levels of potash. Soil tests will reveal what level of potash is required.

Avoid heavy, early watering. In dry soil conditions it is better to irrigate before planting than to water the crop before it has emerged.

Provide adequate moisture at other times, especially as the crop matures.

Some levels of resistance exist in certain varieties.

Coliban, Sebago and Sequoia are the most susceptible varieties to this disease.

If you adhere to these points and still have significant problems with fusarium wilt consult with your local officer from DPI.

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