

Rust and smuts on vegetables

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Rust and smut fungus diseases are rarely serious problems. In favourable conditions, however, they can cause severe damage to susceptible crops.

Q What are rusts and smuts?

A Rusts and smuts are related fungi which produce rusty spotting of leaves or which turn seeds into sooty masses. On leaves they appear as small yellowish spots on the upper surface with yellow, orange, brown or black powdery pustules on the underside. Affected seeds can be badly distorted. Rust life cycles are sometimes very complex - look at the description of mint rust (overpage) for a case in point. Although not serious vegetable diseases in Britain, rusts and smuts can be troublesome if they get established.

Q Which am I likely to see?

A There are many kinds, but the ones you are most likely to come across include:

Asparagus rust (*Puccinia asparagi*) This disease commonly turns up during the summer, causing red spots on stems and ferns. The destruction of foliage reduces the following year's crop. Later, these spots release clouds of reddish-brown uredospores which spread the disease. Later in the autumn, dark streaks appear on the foliage. These streaks are associated with the production of teliospores, tough spores that last the winter. In

spring, these overwintering spores germinate and infect emerging buds. Yet another spore is produced by yellow pustules that infect the foliage where the red summer pustules are formed. Asparagus rust also infects Egyptian or tree onions.

Bean rust (*Uromyces appendiculatus*) A runner- and French-bean problem that appears as dark-brown pustules on leaves, stems and pods. See below for broad bean rust.

Beetroot rust (*Uromyces betae*) Orange/brown spots beneath the leaves indicate the presence of this disease. This is common when cool dewy nights prevail. The disease usually attacks too late to affect the crop badly.

Broad-bean rust (*Uromyces fabae*) Although very common, it usually turns up too late to have a serious effect on the crop. Look out for tiny leaf spots (sometimes cup-shaped) to start with, followed by brown powdery pustules. These can envelop the whole plant, killing leaves. They release a tough 'teliospore' stage that can last through the winter. Soil short of potash encourages this disease. It seems to overwinter on old plant debris, so a thorough clean-up at the end of the year is a good idea. It has also been known to infect peas.

Leek rust (*Puccinia porri*) This is a very common and destructive disease that seems to be on the increase. If your leeks get long bright-orange spots on their leaves in warm (10-24°C), moist weather, where the leaves are wet for at least four hours (usually from August onwards), you have probably got a leek-rust problem. Garlic and chives can also be affected. Similar species attack other onion-family crops but aren't very common. Sometimes the foliage is ruined and the growth of the plant reduced. Even if the plant is not affected like this, the foliage is most unappetising. Later, when the weather turns colder, the leeks slowly recover from the disease, producing unaffected leaves. However, this might not be until December in a mild autumn. Too much nitrogen and too little potash in the soil is said to promote leek rust. The pustules are full of uridinospores that spread the disease to plants by rain splash and wind currents. They also persist in the soil on plant debris for several years. Other kinds of spores in the complicated life cycle of rusts are produced in other alliums.

Lettuce rust (*Puccinia opizii*) A rare lettuce disease producing yellow cup-shaped marks on the upper surface of the leaf and yellow spots beneath.

Mint rust (*Puccinia menthae*)

The most obvious sign of attack occurs at the beginning of summer when new shoots are thickened and distorted. They become covered with tiny cup-shaped blobs called cluster cup or aeciums. These release aeciospores, spores that drift on the breeze to infect new plants. Where they land and cause a new infection, yellow pustules form, which release the summer spores called uredospores. These are highly infectious, spreading the disease very efficiently. Sometimes plants are seriously attacked, losing leaves and even dying. By the autumn, the pustules turn darker as they switch to teliospore production. These spores get washed into the soil, where they end up in the underground buds of next year's mint crop. They germinate in the spring and infect young foliage, causing the cluster cups that start the cycle once again. The fungus can survive the winter inside common mint but not other hosts. Common mint and peppermint are very susceptible. Some other mints are affected and sometimes other plants such as marjoram and savory.

Onion smut (*Urocystis cepulae*) If your seedling onions or salad onions develop dark streaks in their leaves with scales that burst releasing powdery black spores, you have an onion smut problem. Fortunately, it is not a very common disease and is mainly found in cooler, wetter areas. Once the spores get into the soil they remain viable for up to 20 years. Shallots, leeks, garlic and chives can all be affected by onion smut.

Pea rust (*Uromyces pisi-sativi*)

A rare pea disease that shows up as brown pustules on leaves and stems.

Sweetcorn smut (*Ustilago maydis*) This spectacular disease likes warm dry areas and hot summers when it infects ears of sweetcorn. It is rare for losses of sweetcorn to be serious, in spite of the alarming appearance of the ears. It spends the winter as tough teliospores that can lurk in the soil for several years. The following year these teliospores germinate and release clouds of basidiospores that disperse on the breeze or by rain-splash on to young sweetcorn plants. The growths from the fungal spores must mate with compatible types in the host plants if infection is to spread into the plant. Where the fungus threads or hyphae grow, the nearby sweetcorn cells begin to divide and galls are sometimes, but not always, produced. These turn up on the stems, leaves, flowers and ears. Where they infect the ear, as often happens, the whole ear is a mass of swollen distorted gall. The fungus invades the gall and its cells are converted to the tough, dark-coloured teliospores. These are released when the mature gall breaks open, contaminating the soil or occasionally germinating and causing new infections elsewhere on the same or other plants. Once in the soil, they remain infectious for five years or more.

Q Can I cure affected plants?

A There are currently no fungicides approved for use on any vegetable rusts or smuts.

Q Can rust and smut attacks be prevented?

A Lush growth caused by too much nitrogen and too little potassium in the soil is said to promote rust. Go easy on nitrogen-rich fertilisers, and balance those you do use with a potassium-based one. Using a fertiliser such as growmore with at least as much potassium as nitrogen should be about right.

Q How can I avoid attacks next year?

A Good hygiene is the first step. Remove and destroy infected plant material by burning, or consign it to the dustbin. Try to get rid of old crops before the following year's crops emerge. Affected mint beds can be burnt off with a flame gun to get rid of as much contaminated material as possible. There's no need to buy a flame gun for small areas or single uses, as equipment shops hire them out. See Yellow Pages for your nearest hire shop.

Q Are there any resistant kinds?

A Some leeks are claimed to be rust-resistant, but bear in mind that resistance is a relative term - don't expect immunity.

In our most recent leek trial, rust was not a major problem, but these varieties were less affected than others: 'Apollo', 'Bandit', 'Conora', 'Musselburgh' and 'Neptune'.

Crop-wise, we'd recommend 'Apollo' for winter, or the variety 'Neptune' for early winter and 'Bandit' for spring.

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