
The Best Practice Guide to UK Plum Production

Brown Rot and Blossom Wilt

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Background

Blossom wilt and brown rot of stone fruit are predominantly caused by species of the fungus *Monilinia*: *M. laxa* causes blossom wilt, shoot tip wilt and fruit rot in plum. *M. fructigena* only causes a fruit rot. *Monilinia laxa* and *M. fructigena* are mainly found in Europe. *Monilinia fructicola* is most prevalent in North America and Australasia (1; 2). However, it is highly likely that *M. fructicola* will reach the UK at some point in the near future as it has already been detected in parts of Europe (3). Of all the diseases that attack stone fruit, blossom wilt and brown rot are considered to be amongst the most important as they can cause **substantial crop losses** (2). The pathogen in severe cases may result in fruit crops being abandoned pre-harvest, or entire shipments being rejected upon arrival (4; 2). Crop losses to blossom wilt and brown rot occur in most seasons (2).

Symptoms and disease cycle

In spring, grey pustules of *M. laxa* appear on mummified fruit and small cankers on the tree in moist weather (**Figure 1**). Spores (conidia) spread to infect flowers, which results in severe and extensive blossom wilt (**Figure 2**) and later shoot tip wilt (**Figure 3**). The fungus grows down infected blossoms to form spur cankers. The fruit can be latently infected from the blossoms and can also be directly infected during fruit development, but the disease can remain latent until the fruit ripens (1; 5). Infected flowers fail to develop or produce fruits, thereby contributing to associated yield loss (2).

In early to mid-summer, buff coloured pustules of *M. fructigena* appear on mummified fruit and small cankers (**Figure 4**). Spores (conidia) spread to infect fruit via wounds. Towards harvest as fruit mature they start to rot both *M. fructigena* (buff coloured pustules) and *M. laxa* (grey pustules) occurring on the same fruit. Finally, overwintering of the inoculum mainly in **mummified fruit** (both on the trees and on the ground) represents the final stage of the life cycle.

Fruit rot initially appears as **small pale-mid brown spots** on the fruit (particularly in clustered fruit), the flesh becoming brown, firm and quite dry (1; 6). The rot can quickly spread to other fruit in the cluster by contact (**Figure 5**). The fruit eventually shrivels and becomes mummified, with groups of fruit sometimes forming “mummy clusters” (6) which serve as overwintering for the following season. Symptomless infected fruit can be harvested and the rot develops later in store or during marketing. The fungal spores can also overwinter in twig cankers, blighted blossoms, and peduncles (1; 6). The optimal temperature for *M. laxa* conidia (asexual spore) production is 10 °C (8) and conidia germination can occur at temperatures between 15 and 25 °C (2). Disease symptoms can occur at any temperatures between 4 °C and 30 °C (6).



Figure 1. Plum fruit infected with *Monilinia laxa*. Note the grey coloured pustules.



Figure 2. Blossom wilt caused by *Monilinia laxa* infection



Figure 3. Tip wilt in plum caused by *Monilinia laxa*



Figure 4. Plum fruit infected with *Monilinia fructigena*. Note the pustules are buff coloured.



Figure 5 Brown rots and mummified fruit (right) (6).

Molecular assays (PCR) can be used to accurately identify and diagnose the species of *Monilinia* using tissue samples from infected trees, whereas differentiating between species based on their morphology under the microscope is difficult (6).

Contributing Factors

Thinned fruit lying on the ground of the orchard can increase fungal spore inoculum density (6), and should therefore be removed as soon as possible after falling. **Rainfall** during bloom development triggers sporulation (6), while warm humid weather is optimal for the growth of the fungus. As *M. fructigena* enters through wounds, control of insects that damage the fruit surface (e.g. plum fruit moth) should be effectively controlled. **Storing fruit in humid, cold conditions** has been shown to significantly increase decay incidence in plums inoculated with *M. laxa* (9).

Control Treatments/Prevention

All infected fruit (rotting and mummified) should be promptly **removed from trees and destroyed** (buried at a minimum depth of 30 cm) since they are both a source of infection and increase humidity in orchards which favours the development and spread of this disease (10; 6). **Weed control** can help reduce humidity and moisture in orchards, which consequently diminishes the chance of sporulation of brown rot fungi (6). At harvest, damage to fruit should be avoided and only healthy fruit should be picked to minimise the spread of brown rot during storage.

Fungicides (e.g. Switch, Signum, Teldor have EAMUs for use on stone fruit) give some control of blossom wilt and brown rot (4). Approved fungicides should be applied at first flower and 7-10 days later with additional sprays 2 weeks before harvest (2).

No biopesticides are approved at present but products based on *Aureobasidium pullulans* have been identified as possible candidates for biological control agents, antagonising the pathogen either by producing inhibitory compounds or via competition for nutrients (15) and may be available in the future.

Decision support systems (DSS) have been developed in the USA to help growers devise management plans of brown rot of prunes and blossom blight of peach (4) and may be available in the future(6).

Caution

The information contained within this Best Practice Guide is correct to the best of the authors' knowledge at the time of compilation but it must be understood that the biological material/systems and the regulatory framework referred to within these guides are subject to change over time. Anyone looking to make use of the information should check it against prevailing local conditions.

All pesticide recommendations and approvals are subject to change over time and the user of this Guide is reminded that it is his/her responsibility to ensure that any chemical intended for use by them is approved for use at the time of the intended application. The user is reminded that they must carefully read and follow the label on each chemical before applying any treatments.

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