

FLOOD DAMAGE OF FRUIT TREE ORCHARDS

By Denis Roe, Technical Manager

The recent floods in Queensland, NSW and Victoria have had devastating effects on fruit production in these areas. In many cases whole orchards have been lost due to flooding and subsequent water-logging. We at Birdwood nursery would like to express our sympathy with all fruit growers who lost their crops, fruit trees or material possessions during these events and would like to support them by suggesting ways of managing their trees before, during and after flooding events. We also invite you to contact us for advice on the subject and to discuss any tree replacement options with us.

1. Before flooding

Preparation for flooding or water-logging should begin at the orchard soil preparation phase. Pre-plant preparation should include ripping to break up any compacted layers in the soil and to improve drainage. Trees sensitive to water-logging (e.g. avocados) should be planted on ridges at least 0.5m above the lower inter-row orchard floor. The lower orchard floor should drain into drainage canals or drainage lines. Preference should be given to rootstocks which are able to withstand water-logging and/or the subsequent root diseases.

Consideration should be given to the installation of an underground piped drainage system in poorly drained soils, although this may be costly, initially. Mole drains can also be put in before an expected flooding event. Mole drains are unlined channels formed in the clay subsoil with a ripper leg and cylindrical foot or ball dragged through the soil, sometimes with an expander to help compact the channel wall. (<http://www.tgdrains.com.au/page5.htm>). The mole drain may be pulled down the centre of the inter-row in the downhill direction and should be channeled into existing drainage ditches or should be brought gradually to the surface somewhere outside the orchard. Subsequent tractor movement should not compact the mole drain, so the positioning of the drains should take this into account.

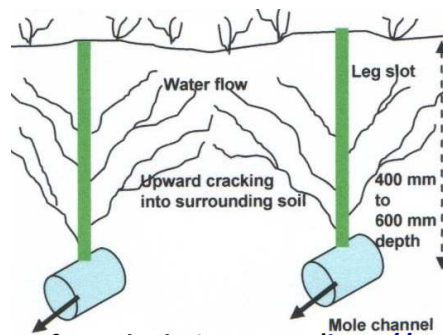


Fig 1: Schematic representation of a mole drain system (<http://www.tgdrains.com.au/page5.htm>)

2. During Wet Events

During water-logging events, there is very little that one can do except to trust that the preparations made during orchard establishment will be able to handle the excess water without damaging tree roots. In the case of extreme flooding events which saturate the soil, trees are not planted on ridges and an underground drainage system is absent, it may be necessary to dig emergency drainage ditches to drain the worst areas in the orchard. This can be done by using a small, tracked excavator which applies low ground pressure to minimise soil compaction. Frequently check dam wall for soundness. Mole drains can be put in during moderate wet events preceding major flooding.

3. After the event

Following a flooding event, some sensitive tree crops (e.g. avocados) will start to show symptoms of water-logging soon after the soil has become saturated. Within 48 hours of the start of water-logging leaf yellowing and fruit drop will start and leaves will start to wilt soon after. Within a few days the whole tree will start to die, sometimes with leaves intact. This will happen in the lower-lying and poorly drained areas. More tolerant crops such as mangos and citrus will take longer to show symptoms.

There are a few things which should be done after flooding for extended periods:

- **Wash silt off leaves:** In the case where whole trees were covered in water, silt should be washed off the leaves with a pressure cleaner to allow sunlight to fall on leaves so that photosynthesis can resume.
- **Alleviate water-logging:** Use excavators or any machinery available to dig drainage ditches where necessary. If one has access to a tracked vehicle and the soil dries sufficiently, growers could pull a mole drain through the soil to get rid of excess water. The application of humates could be of benefit to assist in root system recovery. Phosphorous acid sprays could be sprayed on avocados to limit *Phytophthora* infection and help protect the already stressed root systems from subsequent root rot.
- **Pruning:** If die-back of branches is observed within 1-3 weeks after the flood subsides, prune dead growth back to sound branches. The application of Seasol or some other foliar tonic should be applied to leaves /branches which may help new shoot growth
- **Protect against root-rotting diseases:** Root rot caused by *Phytophthora* spp. will usually follow a water-logging event and protective sprays and/or tree injections should be applied as soon as possible.

A few weeks after the event, careful analysis of the areas on the farm where trees have been affected needs to be carried out, especially for crops sensitive to water-logging such as avocados.

Decisions need to be made whether to install more permanent drainage systems to take care of future events. Decide also whether dead trees need to be replanted or whether these areas should be avoided for future cropping. Bearing in mind that the next decade is likely to be relatively wet, it may be prudent to leave low-lying areas, where trees have drowned, as drainage areas and left unplanted with trees. Alternatively, consider replanting these areas with a more water-logging-tolerant crop such as mangoes or citrus, especially limes.

Bear in mind that many other growers would have gone through similar trauma and will need to place orders with their nursery tree suppliers. Therefore, speedy re-ordering of replacement trees will put one at an advantage by either obtaining trees already in stock or getting into the queue early for new season trees.

For further information on flood affected products or for help with alternative stock information please don't hesitate to call us on 07 5442 1611.