

Irrigating young pears



ANP-0118

The pear field laboratory at Tatura is comparing a range of management practices to increase early bearing or precocity, fruitfulness and fruit quality of new pear varieties. Goulburn valley orchards have historically installed microjet irrigation systems. New research looks at the effects of drip and microjet irrigation and irrigation frequency on the water status and growth of young pear trees.

Vigour versus precocity

Encouraging trees to bear fruit at a younger age, or precocity, is highly desirable for pear profitability. Overly strong vegetative vigour can delay yields. A large wetted root volume under microjet irrigation can stimulate vegetative vigour. Using irrigation water more efficiently may help manage vegetative vigour of young pear trees and encourage precocity, fruitfulness and yield.

The idea is to create a smaller wetted volume by using a pulse of irrigation from a shorter irrigation run time using either drip or microjet irrigation. This study looks at the effect standard versus pulsed irrigation frequencies supplied by either microjet or drip irrigation on the water status and vigour of young pear trees.

Method

The irrigation treatments were applied to an orchard of red blushed pear from the Australian National Pear Breeding Program, planted in 2012. Irrigation volumes were calculated based on tree size, evapotranspiration, soil evaporation estimates and a crop coefficient based on studies of pear water use in the Goulburn Valley. Irrigation frequency was either 'standard' or 'pulsed' and supplied by either microjet (3.6 mm/hour or drip irrigation (0.8 mm/hour), Table 1.

Irrigation treatment	Irrigation run time	Irrigation Frequency (January)
Drip Standard	6 h	Every 2 to 3 days
Drip pulse	2 h	Once to twice daily
Microjet standard	3 h 30 min	Every 3 to 4 days
Microjet pulse	1 h 10 min	Daily

Table 1: Irrigation treatments

The higher volume of water applied to microjet treatments took into account the greater evaporation from the larger wetted surface. The standard treatment was triggered when trees were calculated to have used the readily available water within the root zone.

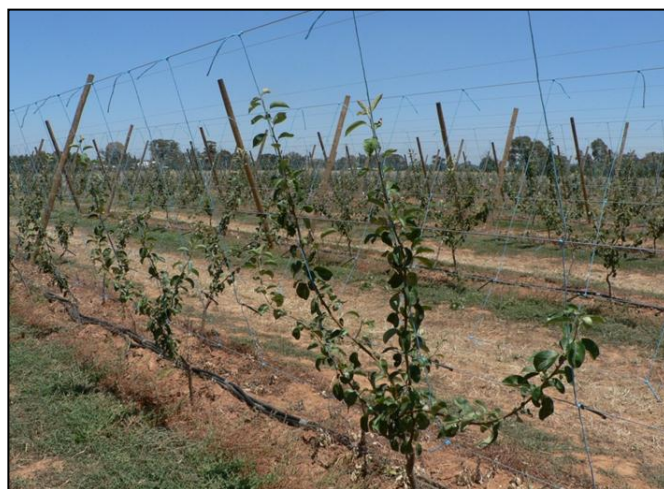


Figure 1: Young pear trees, planted 2012 at 1 m tree spacing x 4.5 m row spacing

Irrigating young pears



Figure 2: Surface wetting pattern of the drip irrigation



Figure 3: Surface wetting pattern of the microjet irrigation

Tree water stress The water status of trees was measured by stem water potential. The lower the stem water potential, the more water stress the tree was experiencing. This was recorded on 9 dates between late January and mid April.

Initially, results indicated that microjet pulse irrigated trees were more stressed than all other treatments. Later measurements showed that there were no significant differences. However, the trend throughout the season was for the microjet pulse irrigated trees to be the most stressed and the drip pulse irrigated trees to be the least stressed.

Tree Vigour

Tree vigour measurements included shoot weights (dry weight of prunings), leader height and leader diameter. Although there was no significant difference between treatments, there was a tendency for the microjet-pulse treatments to have less vegetative vigour. This coincided with greater weed growth in the microjet plots.

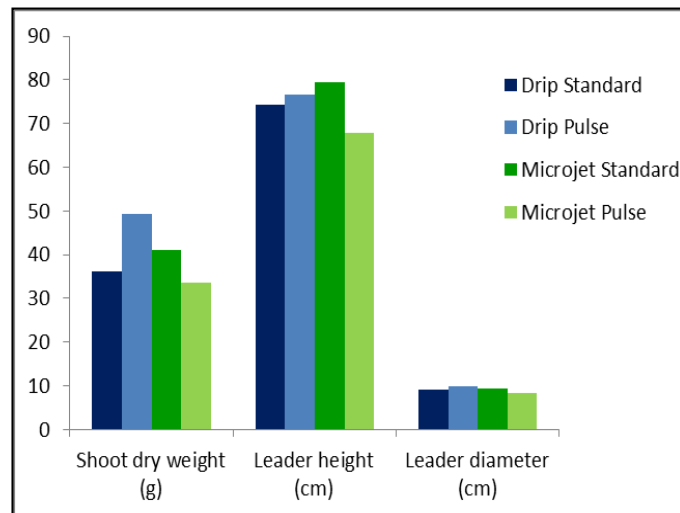


Figure 4: Effect of irrigation on young pear tree growth

Key Messages

- Drip irrigation is a suitable method for irrigating young pear trees, provided irrigation is scheduled to match potential crop water use.
- Microjet-pulse irrigation encouraged greater weed growth and was a likely cause of greater stress and lower vegetative vigour

Contact:

Dr Ian Goodwin

PIPS Irrigation

DEPI, Victoria

ian.goodwin@depi.vic.gov.au