Optimising crop load and fruit size in sweet cherries

Charlotte Brunt and Steve Chapman

Making cherry growing profitable is at the heart of the Australian cherry industry.

Crop load management is critical to an orchard's success, however it is often hard to predict yield and fruit size distribution. A new program has been initiated to develop a simple model that could be used to aid orchard management decisions and optimise fruit size and yield.

Models used for other tree fruit crops, based on simple conical shapes, trunk circumference, trunk cross sectional area and the more recently developed contour method were recently investigated to determine their applicability to the cherry industry, along with other variables thought to influence fruit size.

Fieldwork was undertaken at orchards in Silvan, Wangaratta, Tatura, Yark and Euroa in 2006 where Lapins on the rootstocks F12/1, Colt and Gisela 6 were assessed.

The first field visit involved estimating the potential crop load, ascertaining the orchard manager's perceptions of the level of crop loading and recording plant growth characteristics. The second field visit at harvest time determined the yield, fruit size distribution and extension growth characteristics.

Of all the plant attributes thought to affect fruit weight (spur and shoot leaf length, short extension growth, trunk circumference, number of spur leaves per spur, number of fruit per spur), shoot leaf length (a proxy for shoot leaf size) was the only factor to contribute significantly and positively to fruit weight, whereas the size of fruit clusters per spur contributed significantly and negatively.

Interestingly, when orchard managers were asked to give a subjective assessment of crop load, the accuracy of their estimations varied considerably, highlighting the need for a tool to aid management decisions (Figure 1).

Optimum yield varied by rootstock, with Gisela 6 having the highest yield and F12/1 the lowest. Of the five canopy volume estimators, trunk circumference was the preferred model because of its simplicity and accuracy. When calculated as trunk circumference (TC) density (fruit per cm of trunk circumference), it explained 73% of the variation in fruit weight in Gisela rootstocks (Figure 2a), 62% in F12/1 (Figure 2b) and 22% Colt (Figure 2c).

Information on optimum crop loading provides many opportunities to improve decision making such as determining the desired average fruit size *a priori* by pruning to precise bud numbers and the prevention of over cropping. Together with information on planting distances when establishing new blocks, this information allows growers to forecast the year in which full production is reached. A ready reckoner outlining the methodology for undertaking crop load assessments, potential yield and planting distances for new blocks was constructed for this purpose and is available with the full report from Horticulture Australia Limited.

Figure 1: Agreement between objective and subjective measures of crop load

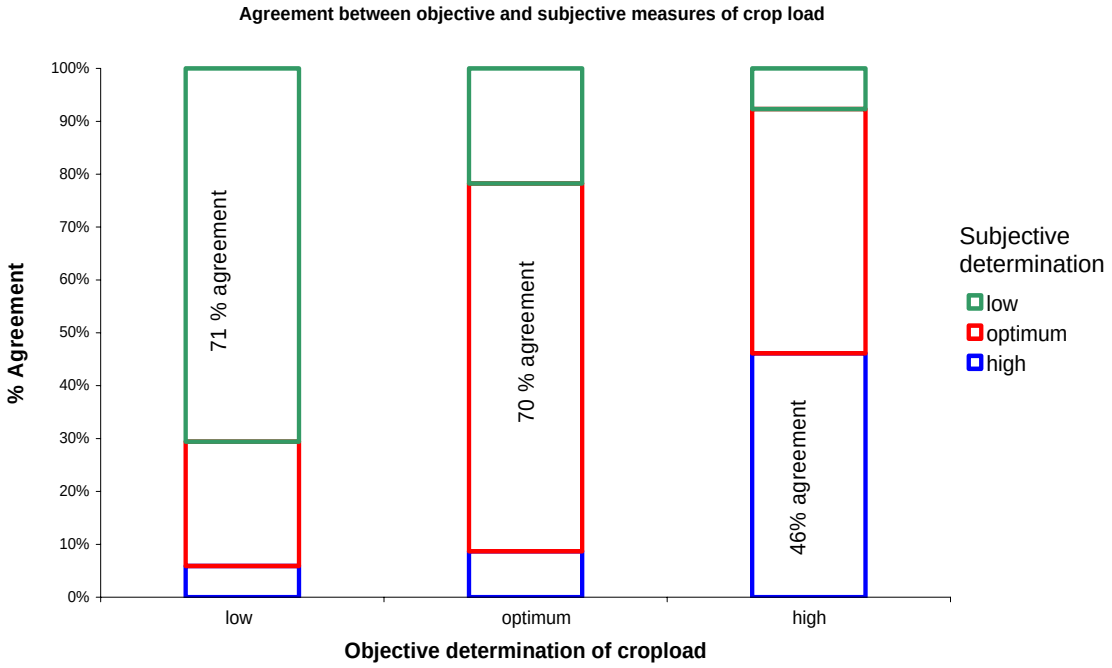

Figure 2a: Crop load and fruit size for Gisela 6

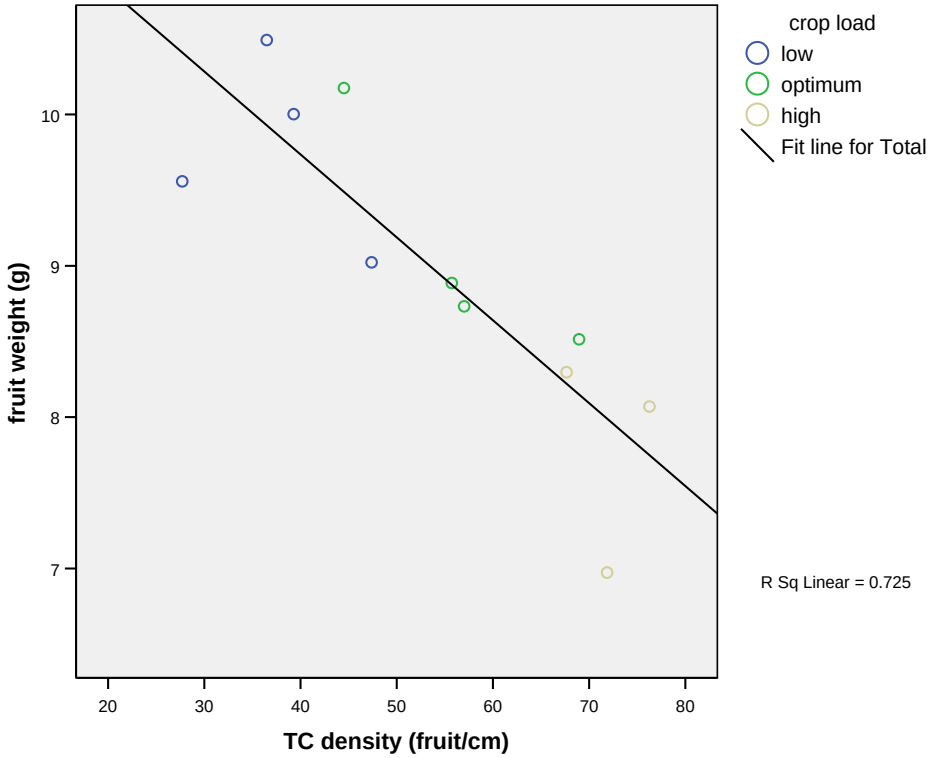

Figure 2b: Crop load and fruit size for F12/1

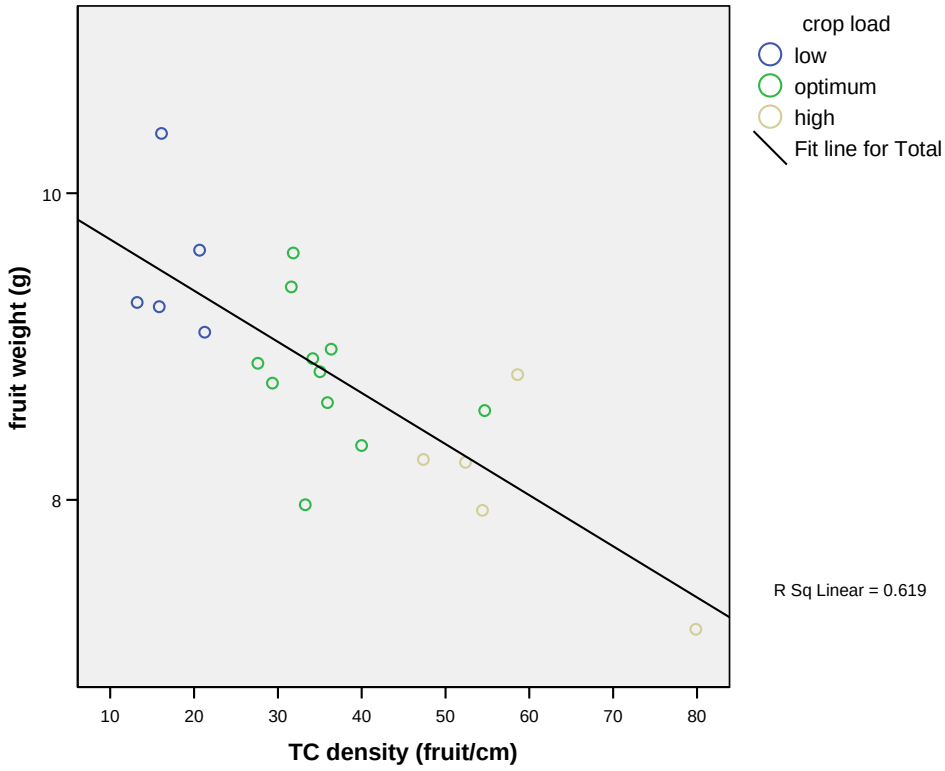

Figure 2c: Crop load and fruit size for Colt