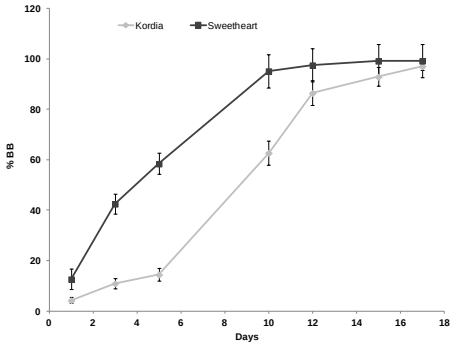
Sustaining production in marginal climates

Chill and bud burst

This study aimed to quantify chill requirements, and explore relationships between bud burst and bud carbohydrates. Field trials were undertaken in Southern Tasmania. In this study sweet cherry varieties Sweetheart and Kordia were found to have significantly different chill requirements needing moderate and high chill respectively. Obtaining specific varietal knowledge of chill requirement helps in developing appropriate orchard practices and optimum site selection. Little variety specific knowledge is available for cherries. It also highlighted that knowledge of the chill models available is essential.

Sweetheart had lower chill requirement both in the lab and in the field, a faster bud burst and more carbohydrate reserves. With possible changes in climate and reductions in winter chill, further understanding of the interactions between carbohydrates and climate may assist management in marginal regions. Chemical dormancy breakers have shown to be effective, however they require significant inputs and increased costs. Assessing the effects of low input orchard practices such as tree pruning or training to manipulate bud carbohydrates and responses to climate warrant investigation. Improved rate of bud burst and bud burst uniformity may also aid management, however depending on region increased uniformity may not surpass the risk of yield loss to frost.



Time to maximum bud burst (%BB) from initial bud break recorded in the field s.. There was a significant difference between varieties in maximum BB achieved in the field ($P<0.05$). Sweetheart needed on average 10.4±0.4 days to reach 100% BB, whereas Kordia required 16.0±1.3 days. Sweetheart reached 50% BB (5.3days) before Kordia (10.2±2.94 days).

Carbohydrates play a vital role in influencing bud development. The concentration of specific sugars at different periods of bud development can influence the success of phenological events such as leaf senescence, bud burst, flowering and final fruit development. With final fruit quality driving cherry production, manipulating carbohydrates can help optimise fruit quality at harvest. Orchard practices involving pruning and crop load can also manipulate the storage and remobilisation of carbohydrates during bud development. This study showed that Sweetheart had more potential carbohydrate reserves as there was a significant relationship between trunk diameter and bud sugars, but also perhaps Sweetheart was more efficient at mobilising stored reserves. The combined effect of chill requirement and carbohydrates on uniformity of bud burst differs between cherry varieties.

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