

RESPONSE OF 'NEW' APPLE CULTIVARS TO FERTIGATION TREATMENTS

G.H. Neilsen, D. Neilsen, L. Herbert and E.J. Hogue

Agriculture and Agri-Food Research Centre

Pacific Agri-Food Research Centre

Summerland, BC V0H 1Z0 Canada

ABSTRACT

In the Pacific Northwest there has been renewed interest in and increased planting of 'new' apple cultivars. Horticultural management experience with these new cultivars is limited relative to that for standard cultivars, such as 'McIntosh' and 'Delicious'. Several studies were initiated in the 1998 growing season to determine the response of these new cultivars to major cultural management factors including fertilization and irrigation under growing conditions typical of the semi-arid fruit-growing region of the Pacific-Northwest of North America.

A large experimental block (Experiment A) with five subplots of different cultivars (Gala, Fuji, Cameo, Ambrosia and Silken) all on M.9 rootstock was planted in April 1998 at a 3 foot (in row) by 10 foot (between row) spacing in order to investigate the effects of 8 different main plot fertigation treatments on tree performance including fruit quality. The whole block has consistently had atmometer-scheduled irrigation since establishment to minimize water stress. Differential fertigation treatments have been applied during the 1999-2000 growing season. At the same time a new experimental planting of Braeburn on M.26 rootstock (Experiment B) was planted. In 2000, a Ca-spray experiment was established on these trees because of a record of low Ca concentration of harvested fruit at this site. The three foliar spray treatments of CaCl₂ were applied to runoff in a randomised, replicated design, each treatment of 3 trees repeated 6 times. Treatments included check (no spray), five weekly early season CaCl₂ sprays (Jun 22 - July 20) and five weekly late season CaCl₂ sprays (Aug 25 - Sept 22).

In the first two growing seasons, the fertigation treatment involving the annual application of phosphorus with irrigation water early in the growing season, immediately following bloom has resulted in significantly increased cumulative yield over all cultivars and relative to all other treatments (Experiment A). This may indicate a period of high P demand for apple trees when seasonal root growth is being reinitiated for the year and fruit cell division is occurring. Major differences in leaf nutrient concentrations, fruit yield and quality have also been observed among cultivars. In Experiment B, incidence and severity of bitter pit and severity of water core at harvest were significantly reduced by calcium sprays. Early season calcium sprays completely eliminated the occurrence of bitter pit at harvest. Contrary to current recommendations of the effectiveness of late season sprays, early calcium sprays were promising as a pre-harvest treatment for improving quality of early crops of 'Braeburn' apple at harvest.