

Saskatoon Berry Water Use Study
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Five saskatoon berry orchards were monitored for crop water use over a four year period, 1992 through 1995. Topp Berry Farm orchard, White City was monitored for four years, Prairieland Orchard, D'Arcy, Last Mountain Berry Farm, Southey, JWD Market Garden, Outlook, for three years and Schultz Berry Farm, Waldheim for two years. Age of the orchards ranged from three **years** to seven years. A seven year old orchard is considered mature although the plants may not have reached their full size at that time.

Approximate water use was determined for each orchard in each year by: determining spring and fall soil moisture gravimetrically; monitoring soil moisture with tensiometers or moisture blocks throughout the growing season; measuring rainfall and irrigation amounts and times; and estimating the amount of rainfall that fell outside or percolated below the root zone. In order to relate natural rainfall to potential trickle irrigation amounts, all rainfall outside the root spread of the saskatoon plants was removed from the calculations.

Lateral root spread was determined by observing soil cores taken during dry periods. The limit of root growth was apparent by visual changes in the color of the dry (within the root zone) versus moist (outside the root zone) soil cores. To improve the accuracy of lateral root growth determination **gypsum** blocks were installed in the Prairieland Orchards orchard in 1994 and 1995. Blocks were placed at 20 cm, 50 cm, 80 cm and 110 cm depths immediately under the row, 1.5 meters from the row and 3 meters from the row. Row spacing is 6 meters. In 1995 Watermark sensors were installed midway between two rows (2 meters) at JWD Market Gardens.

The diameter of lateral root growth was determined to be approximately 2.28 meters (7.5 feet) at age three years, 3.28 meters (10 feet) at four years 3.35 meters (11 feet) at five years and 3.66 meters (12 feet) at six years. There are definitely differences among orchards in the annual growth rate of both the roots and the branches. The instrumentation installed in two orchards confirmed the subjective observations of root growth. Since no instrumentation was installed below 110 cm the maximum depth of root penetration or water extraction is not known.

Annual water use ranged **from 86 mm** on a three year old orchard in 1994 to 294 mm on a seven year old orchard in 1995. A summary of results is given in Table 1. Since the evaporative demand for the years 1992 through 1995 was average or below average in central Saskatchewan, higher water use can be expected in years when evaporative demand is above average. Since only two of the test orchards have reached nominal maturity and we only have one year of data at that age it is expected that maximum water use had not yet been obtained.

able 1 Summary of saskatoon berry water use in millimeters.

Age of orchard in years	Average plant height	Average effective rainfall	Average amount from soil water	Average irrigation amount	Average total water use
3	91 cm	95	0	7	102
4	134 cm	123	+11	18	151
5	177 cm	183	+ 7	20	210
6	192 cm	208	+19	30	257
7	226 cm	231	+	45	285