drops of distilled water placed in the cup of the cherry surrounding the stem. In no case were the stems themselves immersed. Fig. 3 shows that after 20 hr in water the untreated completely immersed fruit had absorbed significantly more water than the other treatments (SEM = ± 43 mg; P < 0.1%). In each of the 3 immersion systems, water intake was significantly smaller by fruit treated with antitranspirant. Treated fruits in the partial immersion systems had the lowest intake rates. Thus, once again it was shown that: 1) water intake occurs through the entire fruit surface, and not just through the top or apical ends, and 2) coating the surface with a film curtails water intake.

Field study on fruit cracking. The following spray treatments were applied on selected limbs of 'Bing' cherry trees in the orchard: 1) control (distilled water plus 0.1% X-77 surfactant); and 2) ML (1:5 v/v). About 1 liter of each treatment was sprayed only on the fruit on 2 limbs of each of 3 trees. Two days later (May 27, 1970) simulated rain was applied to the 3 trees by spraying them at ½ hr intervals with distilled water at about 20 liters per tree per spray. The simulated rain was sprayed from 0830 to 1945 hr on the first day and from 0800 to 1700 hr on the 2nd day. On the 3rd day the "rain" was applied from 0545 to 1045 hr in the hope that cracking could be more easily induced in the early morning, when plant water potential was greatest. Cracking counts, made after harvesting the experimental limbs, showed that the antitranspirant film significantly (SEM = ± 6%; P < 5%) reduced the % cracked fruit (Table 1). The effects of the film on fruit quality are being investigated along with efforts by the manufacturer

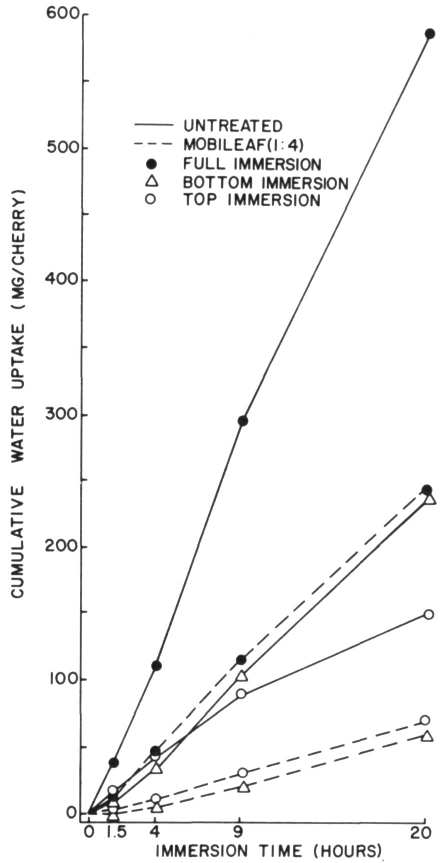

Fig. 3. Effect of water uptake by cherry fruits of ML (1:4, v/v) applied to the entire fruit, followed by complete or partial immersion of the fruit in distilled water.

Table 1. Effect of antitranspirant film on cracking of Bing cherry fruits.

Treatment	No. of fruit Cracked	Total	% cracked fruit
Control	264	458	58
ML (1:5, v/v)	181	502	36

to obtain EPA clearance.

Conclusions. Use of an antitranspirant film in laboratory and field studies suggests that: 1) absorption of external water (the cause of cherry cracking) occurs through the entire surface of the fruit, not simply through the top and/or bottom; and 2) an antitranspirant film on the fruit retards intake of external water (rain) by the fruit, and may thereby reduce cherry cracking.

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A Method for Estimating the Yields of Sweet Cherry[1]

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Abstract. **A method for estimating sweet cherry yields was devised based on the calculation of a yield index value which incorporates estimates of the bearing surface of the tree and density of fruits on limb units. The relationship between yield index and actual yield was determined by regression analysis. The linear regression of yield index (Y) on actual yield (X) accounted for 84.6% of the variation.**

Yield records for research and demonstration plots conducted in commercial orchards are often difficult to obtain because of inadequate labor or financial resources, scheduling arrangements or inconvenience to the grower at a busy time, shortness of the harvest season, weather factors, etc. A method of rapid yield estimation would eliminate many of these difficulties.

Early workers found r values of +.50 to +.75 in correlating trunk circumference and yield in apples (1, 2, 4, 5). Regressions of trunk circumference on yield which might have been used predictively were not calculated. Westwood and Roberts (6) found trunk cross-sectional area to be linearly related to total above ground wt (bearing surface) and suggested that trunk measurements could be used to estimate the bearing surface of any tree which had not been heavily pruned.

Based on the premise that tree yields are a function of bearing surface of the tree, and density and size of fruits on the bearing surface, the following formulas were devised to estimate yields:

A. $$\left[\frac{\sum_{i=1}^{n} \frac{W_i F_i}{L_i}}{n}\right] T = \text{Yield Index (Y)}$$

B. Yield Index (Y) = f [Yield (X)]

Where:

W = wt per fruit (g)
F = no. of fruits
L = limb cross-sectional area (cm^2)
n = no. of limbs
T = trunk cross-sectional area (cm^2)

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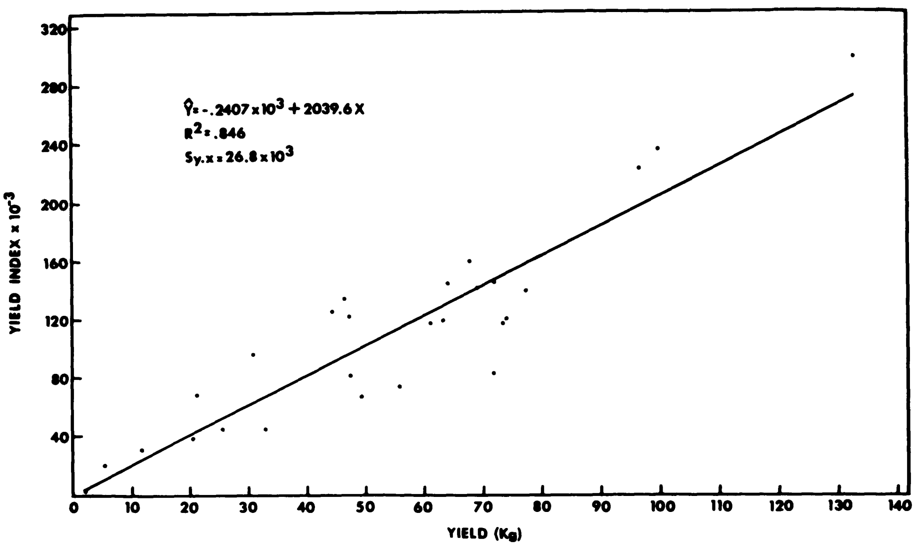

Fig. 1. The relationship between yield (Kg) of sweet cherry fruit per tree and calculated yield indexes.

To test this relationship, 27 'Royal Ann' sweet cherry trees were selected of varying size and age (10 to 40 years), crop density and degree of pruning from none to moderate from 3 commercial orchards and the following measurements were taken:

A. Trunk diam for conversion to trunk cross-sectional area.
B. From each of 10 limbs selected within arm's reach of the ground, an unspecified number of fruits were counted on each limb. In general, the number of fruits counted varied from 10 to 100 depending on limb size and crop density.
C. Limb diam for conversion to cross-sectional area was measured at the point on each limb where counting stopped.
D. Two liters of fruit were removed from each tree, weighed and counted, to obtain average wt per fruit.
E. Actual yield per tree.

The ŷield index was then calculated by substitution into the formula. The linear and quadratic regressions of yield index (dependent variable = Y) on actual yield (independent variable = X) were determined by the method of least squares. Both regressions were highly significant (P=1%) but the quadratic equation did not significantly improve the fit over the linear. The linear equation (Fig. 1), when extrapolated past the lowest point in the sample range, does not pass through the origin, although very close to it. This could indicate a slight degree of curvature in the relationship at very low yield levels.

The R^2 value of .846 indicates that the method approaches the precision required for predictive purposes. This ultimately depends on the amount of error an investigator is willing to accept in exchange for having yield data. Certain changes could be made in the experimental procedure which might improve the R^2 value: more exact measurement of trunk cross-sectional area by measuring circumference rather than diameter, measuring several places along the trunk and averaging, and removal of shaggy bark which interferes with measurement; restriction to trees with little or no pruning; a broader sampling which would include more trees with high and low yields; more sampling to determine the optimum no. of limb units and size of sample used to determine average fruit wt.

In the actual practice of estimating yields, the calculated yield index per tree is substituted into the regression equation as Y and the equation solved for X (yield) (3). Using the equation and selected values of average fruit wt per limb cross-sectional area and trunk cross-sectional area, a yield estimation table can be constructed to facilitate the conversion of the various measurements to estimated yields (Table 1). This technique could possibly be used for other tree crops although different regression equations would be required.

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Table 1. Sample table for yield estimation for 'Royal Ann' sweet cherry.

Avg fruit wt per limb cross section (g/cm²)	Trunk cross-sectional area (cm²)										
	100	150	200	250	300	350	400	450	500	550	600
	Yield estimation (kg)										
100	5.0	7.5	9.9	12.4	14.8	17.3	19.7	22.2	24.6	27.1	29.5
125	6.3	9.3	12.4	15.4	18.5	21.6	24.6	27.7	30.7	33.8	36.9
150	7.5	11.2	14.8	18.5	22.2	25.9	29.5	33.2	36.9	40.6	44.3
175	8.7	13.0	12.3	21.6	25.9	30.2	34.4	38.7	43.0	47.3	51.6
200	9.9	14.8	19.7	24.6	29.5	34.4	39.3	44.2	49.2	54.1	59.0
225	11.1	16.7	22.3	27.7	33.2	38.7	44.3	49.8	55.3	60.8	66.3
250	12.4	18.5	24.6	30.8	36.9	43.0	49.2	55.3	61.4	67.5	73.7
275	13.6	20.3	27.1	33.8	40.6	47.3	54.1	60.8	67.5	74.3	81.0
300	14.8	22.2	29.5	36.9	44.3	51.6	59.0	66.3	73.7	81.2	88.4
325	16.1	24.0	32.0	40.0	47.9	55.9	63.9	71.8	79.8	87.9	95.7
350	17.3	25.9	34.4	43.0	51.6	60.2	68.8	77.3	85.9	94.5	103.1
375	18.5	27.7	36.9	46.1	55.3	64.5	73.7	82.9	92.0	101.2	110.4
400	19.7	29.5	39.3	49.2	59.0	68.8	78.6	88.4	98.2	108.0	117.8
425	21.0	31.4	41.8	52.2	62.6	73.1	83.5	93.9	104.3	114.7	125.1
450	22.2	33.2	44.3	55.3	66.3	77.3	88.4	99.4	110.4	121.5	132.5
475	23.4	35.1	46.7	58.3	70.0	81.6	93.3	104.9	116.6	128.2	139.9
500	24.6	36.9	49.2	61.4	73.7	85.9	98.2	110.4	122.7	135.0	147.2
525	25.9	38.7	51.6	64.5	77.3	90.2	103.1	116.0	128.8	141.7	154.6