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Compact Sweet Cherries[1]

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Many breeding programs throughout the world have the objective of developing compact sweet cherry varieties. The advantages of them are precosity, efficiency of picking, smaller size than standards and a thick canopy of leaves which shields the fruit from sun and rain. Several compact varieties are being tested commercially and may soon be widely grown. This article describes the origin and growth habit of a number of compact varieties and selections.

The term 'compact' is used in the title of this report but other words have also been used to describe varieties with restricting growth habit. Compact varieties sometimes refers to those originating from induced mutations; spur varieties, those originating from natural mutations. Genetic dwarfs occur in most seedling populations but are of little interest because of extreme stunting, sterility and leaves which are rugose and chlorotic. Brachytic (3) and dwarf are other terms which have been used.

Breeders have used several approaches to obtain compact cherries, the most successful involving irradiation to induce mutations artificially. Programs using this technique are active or being considered in several European countries and in North America. Several varieties have been developed using mutation breeding, and other selected mutants have been used for conventional breeding. Induced cherry mutants have been unstable in the past but advances in methodology should reduce or eliminate this problem.

Conventional cherry breeding methods (2) have also been used. The genetic variability of *Prunus avium* and related species is considerable and compact seedlings have been selected, however, no compact varieties have been developed this way. Seedlings have the advantage of allowing

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the compact growth habit to be transferred from one generation to the next through seed, something which cannot be done dependably with known induced mutants. Reversions to standard growth type are less common in seedling material.

Collecting compact natural mutants, as has been done so successfully with Delicious apples, is another approach but to date no natural mutants have become well known. Compact natural mutants appear to be uncommon in sweet cherry but do occur occasionally (1). An advantage of natural mutants is that the fruit is usually identical to the parent.

Four distinct types of compact cherries are known. They vary in growth habit as follows:

Group 1. Stronger apical dominance than standards ('Compact Stella').

Group 2. Weaker apical dominance than standards ('L-252,' 'Garden Bing').

Group 3. Normal apical dominance but reduced vigor ('Compact Lambert').

Group 4. Weeping ('Stella 2S-76-33').

Within each group, vigor as indicated by growth/shoot/year can vary from low to high. Vigor is not necessarily related to leaf number, often selections with low vigor have short internodes and small shoot length: diameter ratios.

'Compact Stella' (6) has an upright growth habit with sturdy branches, few side shoots and uniformly distributed fruit spurs. Apical dominance is stronger than in the parent variety 'Stella' (5). Vigor in 'Compact Stella' is fifty percent less than 'Stella's' resulting in a mature tree about half standard size. 'Compact Stella' is also self-fruitful and a universal pollen donor. The fruit is large and black resembling 'Lambert.'

'Compact Lambert' (4) is an induced mutant developed from 'Lambert.' Growth habit is normal but vigor is very much reduced. This results in a mature tree one-quarter as large as 'Lambert.' The internode distance is reduced and the length:diameter smaller, resulting in a thick canopy and bushy appearance. 'L-252' is a natural mutant at the Summerland Research Station. It has reduced apical dominance resulting in many side branches and a "witches broom" appearance.

'Garden Bing' is the first compact cherry introduced by Zaiger's Nursery, Modesto, California and grows to less than one-quarter standard size. It has somewhat weaker apical dominance than normal with much reduced vigor. Internodes are very close resulting in a thick canopy. 'Garden Bing' is partially self-fruitful producing fruit similar to 'Bing.'

Three weeping cherries are known, an induced mutant of 'Stella' and two selections from the Long Ashton mutation breeding program. The Summerland selection was procumbent and grew upright only when staked. Later the trunk stiffened but branches remained weeping.

Present compact sweet cherries are characterized by reduced size which results from a different growing and branching habit. This results in a narrower and more compact tree. Reduced vigor of the established compact tree is also a common characteristic as is a thick canopy of leaves which protects the fruit from sunburn and short rain showers. High fruit quality of compact varieties requires that vigor be maintained at an optimum level by pruning and good growing conditions.

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Mahaleb x Mazzard Hybrid Cherry Stocks

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About two dozen *Prunus mahaleb* x *P. avium* (Mazzard) (M x M) clonal rootstocks have been tested for sweet cherry in Oregon by R. L. Stebbins and the author since 1965. Results have varied considerably from plot to plot. Only clone 14 is as dwarfing as Stockton Morello stock, while clones 3, 39, and OCR-2 result in moderate growth control. Other M x M clones appeared about as vigorous as Mazzard controls.

Flowering and fruiting varied considerably with the different rootstocks. Yield efficiency was best with clones 2, 39, 46, 49, 54, 88, and OCR-2. Efficiency was good on Mazzard, Stockton Morello, and M x M clone 14.

When used as trunkstocks, the M x M clones appear not to be injured severely by bacterial canker (*Pseudomonas* spp.).

Mineral nutrient uptake varied somewhat among the M x M clones, but in most cases, did not affect general performance (Table 1).

Table 1. Effect of rootstock on mineral nutrient levels of sweet cherry (4 cvs) leaves (Corvallis, OR 1975).

Rootstock	Percent dry wt.					ppm dry wt.					
	N	P	K	Ca	Mg	Mn	Fe	Cu	B	Zn	Al
M x M 2	2.76	.28	1.98	1.00	.58	53	227	14	48	30	153
M x M 3	2.32	.29	1.70	1.98	.64	48	293	13	66	17	210
M x M 14	2.34	.28	1.65	1.58	.54	36	227	13	64	15	143
M x M 18	2.52	.28	1.91	1.69	.50	35	169	12	60	15	126
M x M 44	2.18	.28	1.79	1.87	.54	40	248	10	64	11	153
M x M 46	2.60	.27	1.96	1.47	.51	44	283	10	60	14	188
M x M 49	2.43	.31	1.93	1.89	.53	42	247	15	63	13	151
M x M 60	1.88	.26	1.96	1.22	.38	34	293	9	52	14	190
M x M 79	2.47	.24	1.89	1.66	.46	35	246	10	58	12	174
M x M 88	2.66	.26	1.55	1.50	.48	36	173	12	50	15	93
M x M 94	2.41	.24	1.85	1.53	.48	39	249	12	54	14	148
M x M 97	2.16	.21	1.87	1.22	.38	48	300	9	54	12	216
M x M 100	1.94	.24	1.83	1.66	.46	35	256	10	54	12	138
Stockton Morello	2.52	.28	1.68	1.73	.52	48	211	10	50	22	139
F 12/1 Mazzard	2.20	.24	1.20	1.74	.61	49	212	10	47	16	118

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