Elderberry Cultivar Performance in Illinois[1]

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The elderberry (*Sambucus canadensis* Linn.) has traditionally been a crop that is gathered from the wild and processed at home to yield pies, jellies, and wine. The fruit is rarely eaten raw by man, but can reportedly be eaten in the dried state (2). Because elderberries will tolerate low soil fertility they are frequently found growing on waste land. However, the ever-increasing use of tillable soil for crop production coupled with the use of herbicides has somewhat reduced the availability of wild sources of elderberries in certain parts of Illinois and throughout the Midwest. The possibility of growing elderberries as a fruit crop for the poorer soils of Illinois, coupled with shortages of wild sources, prompted these investigations of various elderberry cultivars for Illinois.

Planting

The elderberry variety trials were conducted at the University of Illinois Horticultural Research farm in Urbana-Champaign. The site was near the top of a small rise of land which provided good air and water drainage. Hardwood cuttings of 2-3 nodes each were taken from 1- to 2-year-old wood of 7 elderberry cultivars ('Adams #1,' 'Adams #2,' 'Johns,' 'Kent,' 'NY 21,' 'Victoria,' and 'York'). These were rooted in the greenhouse and planted into the field with a spacing of 2.4 meters between plants and 3.0 meters between rows. An eighth cultivar, 'Nova,' was obtained from the New York State Fruit Testing Association. Three replicates, each consisting of 3 plants of each of the 8 cultivars, were placed as a completely randomized planting. One plant did not survive and it was replaced. By fall of 1973, a satisfactory planting had been established.

All cultivars produced handsome flower clusters in mid-June and harvest commenced in August. Several pickings were required to harvest the entire crop. Yield data were taken for 3 consecutive years through August, 1976.

Yields

The average yields per replicate produced by the various cultivars was rather remarkable, particularly when translated to a per acre estimate (Table 1). The first year's yield (1974) was predictably lower than subsequent years, but it was further reduced that year by a plague of birds. Even with this problem, yields were rather high for certain cultivars with 'Adams #2' far outyielding the other cultivars by a factor of at least 2.5X.

In 1975, the yields of each of the various cultivars at least quadrupled from 1974. The varieties 'Nova' and 'Adams #2' produced significantly higher yields than the other 6 cultivars, outyielding their nearest competitor, 'York,' by about 50%.

In 1976 yields were essentially the same as 1975 with 'Adams #2' and 'Nova' again the top yielders with crops about twice that of the other cultivars.

Cultivar Descriptions

'Adams #1 and #2.' These cultivars were selections from the wild, introduced by the New York Agricultural

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Experiment Station at Geneva in 1926. For many years these cultivars were the only important cultivated elderberry varieties available. The plants are reported to be strong, vigorous, and productive with large berries and fruit clusters. They are slightly later than most cultivars with 'Adams #2' a day or so later than 'Adams #1.' 'Adams #2' reportedly produces slightly more yield than 'Adams #1.' Although these 2 plants are morphologically very similar, they can be distinguished by the presence of reddish color on the canes of 'Adams #2' (1, 4).

In our studies, we found that these 2 cultivars behaved essentially as described above except in yielding ability: 'Adams #2' outyielded 'Adams #1' by at least 50% each year of our testing. Both plants were observed to sucker and spread excessively.

'Johns.' 'Johns' was an introduction made by E. L. Keaton of the experiment station in Kentville, Nova Scotia in 1954. It is reported to be *very* vigorous producing canes up to 3.3m in height. Its fruit is supposed to be matured about 10 days earlier than the Adams varieties. It also is reported to have larger flower clusters and fruit size than the Adams types although it produces about the same yield (4).

In our Illinois tests we found the yield of 'Johns' to be much less than 'Adams #2' and about equal to that of 'Adams #1.' The vigor of 'Johns' was about the same as the Adams cultivars and spread excessively.

'Kent.' 'Kent' (Adams x O.P.) was introduced from the experiment station at Kentville, Nova Scotia in 1957. The plant is reported to be vigorous and productive. Its fruit quality and size is about equal to Adams but is 7-10 days earlier (1).

In our tests, 'Kent' produced the most upright canes of all the cultivars tested. Its yield was not significantly different from that of 'Adams #1' (Table 1) but was considerably less

Table 1. Yields of 8 elderberry cultivars in Illinois during a 3-year test.

Cultivar	Projected yield[3] (kilograms/acre)[2] 1974	1975	1976
Adams #1	345.3 ab[1]	3468.3 a	3059.9 a
Adams #2	1694.4 c	6121.4 b	6242.3 b
Johns	153.5 a	3435.4 a	2972.5 a
Kent	696.4 b	3081.8 a	3174.2 a
Nova	350.8 ab	5373.9 b	6280.6 b
NY 21	660.8 b	3144.7 a	3114.6 a
Victoria	372.8 ab	3076.2 a	3073.6 a
York	137.1 a	3791.8 a	3230.9 a

[3]Projected yield = (average yield per replicate/3 [number of plants per replicate]) × 544 [number of plants per acre @ 2.4 × 3.0 meter spacing].
[2]Tons per acre = (yield) × (2.2 [lbs/kilogram])/2000.
[1]Projected yields within columns followed by different letters are significantly different at the 5% level by Duncan's Multiple Range Test.

than 'Adams #2.' Its fruit ripened later than Adams.

'Nova.' 'Nova' ('Adams #2' x O.P.) was originated from the experiment station at Kentville, Nova Scotia in 1959. The plant reportedly suckers easily and is readily propagated from dormant wood cuttings. Its fruit is large and matures early and uniformly. It is supposed to be sweeter than 'Kent' and 'Victoria' which it resembles (1).

In our experiments, 'Nova' was observed to be very vigorous with profuse suckering and canes 2m tall with large clusters of large berries. Its total yields of fruit were low the first year (1974) but increased to significantly higher than all the others except 'Adams #2' in the second and third years of testing.

'NY 21.' 'NY 21' ('Adams #2' x Ezy-off') is an unnamed variety from New York Agricultural Experiment Station in Geneva. Its plant type and growth habit is about the same as 'York,' but its bush size is slightly smaller. Fruits are quite large and ripen about 5 days earlier than 'York' (3).

In Illinois, 'NY 21' was observed to be more vigorous than 'York' and produced canes 1.5-2m tall along with

heavy suckering. The suckers were also vigorous and some grew as much as 2m in a single season. Its fruit ripened earlier than most cultivars but its yield was not significantly different from the others tested excepting 'Nova' and 'Adams #2.'

'Victoria.' 'Victoria' ('Adams #2 x O.P.) was also developed at the experiment station in Kentville, Nova Scotia and was introduced in 1957. The plant is reportedly only moderately vigorous. Although it is less productive than Adams its fruit size and quality is about equivalent. Its fruit ripens 3-6 days earlier than Adams (1).

In Illinois, we found 'Victoria' to be almost as described above. The plant size was the smallest of all the tested cultivars but was very sturdy. It produced few new canes and suckered very little. Its fruit ripened the latest of the 8 cultivars. Total yield was significantly less than 'Adams #2' but it was not significantly different from 'Adams #1.' 'Victoria's' growth habits in the field made it the easiest of the tested cultivars to handle and contain.

'York.' 'York ('Adams #2 x 'Ezyoff) was named by the New York Agricultural Experiment Station in 1964. Its bushes are reported to be large and more productive than most varieties, and its fruit ripens about 3 days later than the Adams varieties (1, 4).

Although in the first year of testing in Illinois, 'York' produced the lowest yield of all tested cultivars (Table 1), its yield in subsequent years was not significantly different from 5 other cultivars (including 'Adams #1') and was exceeded only by 'Adams #2' and 'Nova.' The plant was less vigorous and produced fewer suckers than the other cultivars excepting 'Victoria.'

Discussion

The elderberry is an unusual fruit in that it is almost inedible in the fresh form and must be processed for maximum palatibility. Obviously, therefore in order to sell elderberries in quantity, a market must be located. A limited market may exist near large population centers where wild supplies of elderberries are relatively inaccessible. Of course a more important market for elderberries would be a commercial processing firm interested in producing elderberry products such as jellies and wine, but at present there is no such firm in Illinois and, therefore no large scale demand for the fruit.

Although these variety trials indicate that elderberries have good potential in Illinois, large scale commercial plantings are not recommended at this time.

The cultivars 'Victoria' and 'York' were observed to be less vigorous in total growth and suckering than the other cultivars, and therefore required less care to maintain these plants at a manageable size. Lower total yields of these cultivars were undoubtedly associated with their reduced vigor. Therefore, if yields are a primary concern to the grower, spacing between plants could probably be reduced to give more plants per acre with a concomitant yield increase.

Individuals interested in assuring themselves a steady supply of elderberries should consider the establishment of home plantings of such easy to care for cultivars as 'Victoria' or 'York.'

Summary

Eight elderberry cultivars were tested at the Horticultural Experiment Station in Urbana, Illinois for their relative merit. Yields and other observations were taken for a period of 3 years commencing in 1974. 'Adams #2' and 'Nova' were the heaviest yielders. 'York' and 'Victoria,' were easier to contain than the others and seemed to be well suited for use in small plantings. The other cultivars, in general, were very vigorous and required considerable care to remain in a manageable size.

Extensive elderberry plantings are

not recommended at this time in Illinois due to lack of a significant market for the fruit.[3]

Literature Cited

1. Brooks, R. M. and H. P. Olmo. 1972. Register of new Fruit and Nut Varieties. University of California Press: Berkeley. 708 p.

The Response of Bartlett Pear to Certain Growth Regulants[3]

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The effects of plant growth regulants in fruit trees have been widely studied. Among temperate fruit crops by and large, apple has been the most common crop for such investigations. Study of growth behaviour of fruit trees is important from the management point of view, also because of its direct or indirect relationship with floral initiation and fruiting. Comparatively little work has been done to evaluate the growth effects of plant regulators in pear (3). Therefore, a study was undertaken on pear to assess the effects of gibberellic acid (GA_3), 6 benzylamino purine (BA) and succinic acid 2-2-dimethylhydrazide (Daminozide).

The pear cultivar Bartlett, probably the most important pear cultivar worldwide, was taken for this study. Two-year old trees in pots were taken into the greenhouse in early winter. Soon after the resumption of growth two concentrations of each plant growth regulator were applied to plants as a spray (Table 1). As a wetting agent Tween 20 at 0.1 percent was used. For the sake of comparison a control treatment was also included by spraying 0.1 percent Tween-20.

Four representative shoots in each treatment were tagged before spraying for recording observations. Growth was measured in terms of length of terminal shoot, number of leaves per shoot and thickness of shoot, 30 days after spraying.

Data on the effects of different treatments are presented in Table 1. Gibberellic acid, particularly at 100 ppm, stimulated linear growth of shoot and also increased the number of leaves. However, the thickness of shoot was not significantly affected by GA_3. This kind of response of pear trees to GA_3 is in line with earlier reports on pear and other crops (1, 2, 3, 6).

Growth was unaffected by BA at both 10 and 100 ppm levels. Some stimulating effects of BA on growth have have been reported by earlier workers in apple (4). It is quite likely that BA is effective only at higher concentrations than used in this experiment.

Daminozide sprays significantly retarded length of shoot and to a certain extent the number of leaves especially at higher concentration. However, the girth of shoot was greater in treated plants than in the control. Strong

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