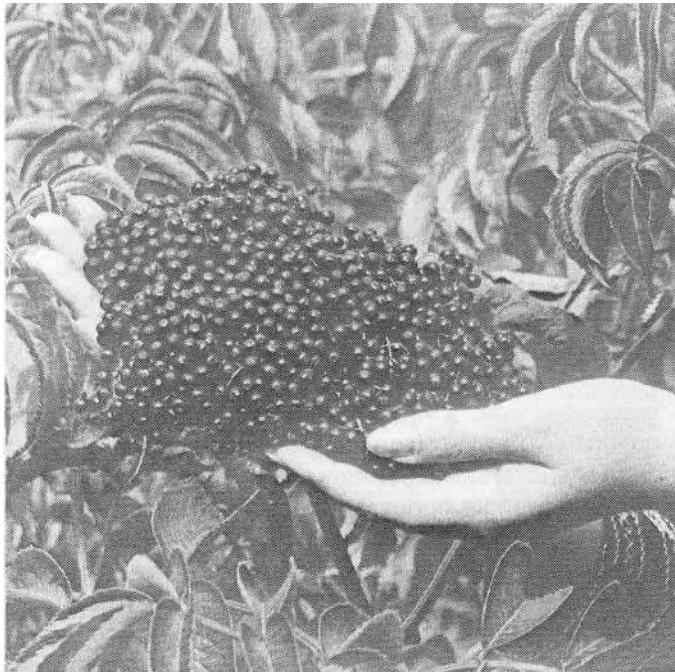


# New York's Food and Life Sciences Bulletin

New York State Agricultural Experiment Station, Geneva, a Division of the New York State College of Agriculture and Life Sciences, a Statutory College of the State University, at Cornell University, Ithaca

## Elderberry Culture in New York State

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Elderberries have been grown commercially on a small scale in New York, Ohio, and Oregon. Most of the crop is sold to processors and made into jellies or used in the manufacture of pie mixes. Elderberries are also a suitable fruit crop to grow in the home garden. Although the uncooked fruits are astringent and unpleasant to eat out of hand, the fruit can be made into excellent homemade juice, jelly, jam, pies, or wine. Elderberry bushes are sometimes used as ornamental shrubs in lawn plantings. They grow rapidly, becoming 8 to 12 feet tall. The plants have a few long canes and grow into large, coarse-appearing shrubs. Bushes are winter hardy throughout most of the State. Flowers and fruits are attractive.

Anyone considering commercial elderberry production should be aware that their use is limited and that they are only likely to be profitable as a crop if there is a prearranged market. Furthermore, there are serious virus problems commonly encountered in growing this crop.

### VIRUS PROBLEMS ON ELDERBERRIES

Tomato ringspot virus (TomRSV) which is spread by nematodes in the soil and by pollen is a devastating disease on elderberries. While it was originally discovered on the tomato, it is a very destructive disease on a variety of fruit crops, including elderberry, apple (union necrosis), peach (stem pitting), and raspberry (crumbly berry). Dandelions and some other weeds can also carry this virus.

After elderberry plants become infected with TomRSV, they gradually become weakened and debilitated. Although several years may be required for the virus to kill a bush, infected plants may never produce good crops. TomRSV in elderberry often shows no clearly visible virus symptoms, although frequently yellowish rings are conspicuous on the leaves. Virologists have also discovered other viruses which can infect elderberries, including tobacco ringspot virus and a rod-shaped virus similar to the potato X virus.

**Control of TomRSV:** (1) Before elderberries are planted, the soil must be fumigated to kill the nematodes. (2) Plants purchased from the nursery must be certified as virus free. Nursery plants can be certified by New York State Department of Agriculture and Markets, if the cutting-source mother plants have previously been tested for absence of viruses. Mother plants are tested by rubbing sap from their leaves onto the leaves of young plants of the common weed, lamb's-quarters. If the test is properly administered and the indicator plants do not show symptoms, then the mother elderberry plant is presumed free of viruses. (3) Wild elderberry plants which can shed virus infected pollen must be eradicated at least 100 feet from the area surrounding the field which is to be planted.

In elderberry plantings which have not received special attention for control of viruses, we have found that plant growth and fruit production are unsatisfactory. The devastating effect of TomRSV on plants, combined with the strict procedures required to control the virus, can make the growing of elderberries very difficult. For this reason, anyone who is contemplating elderberry as a cash crop

should first thoroughly acquaint himself with the nature and seriousness of this virus problem.

Breeding efforts at the Geneva Experiment Station have been aimed at producing elderberry hybrids which are tolerant of viruses. The European black elderberry (*Sambucus nigra*) has been used as a parental source for partial virus tolerance, since it often crops well even when infected. Several superior selections have performed well even when infected but none of these has yet been introduced as a new variety.

## VARIETIES

More than two dozen selections of the common American elderberry (*S. canadensis*) have been given pomological variety names. Some with large clusters and berries were selected from the wild; others originated as hybrids in controlled breeding programs.

The berries on these horticultural varieties are generally larger than those from wild bushes. Berries are often 8 millimeters in diameter (more than 1/4inch). Large berried varieties bear more fruit than small-berried types and the berries can be shelled from the stems more efficiently. Each berry contains only four seeds and consequently pies made from large-berried fruits contain fewer seeds.

**Adams #1 and #2.** These selections were introduced by the New York State Agricultural Experiment Station at Geneva, New York in 1926 and until about 1960 were the only cultivated elderberry varieties of importance. The plants are strong, vigorous and productive and the fruit clusters and berries are large. They ripen somewhat later than most named varieties, around the earlier part of September in central New York State. Adams #2 ripens a day or two later than Adams #1, has smaller berries, and is somewhat more productive. Plants of Adams#1 and #2 are very similar, except the bark on the base of current season's canes of Adams #2 is more reddish in the late fall than that on Adams #1 canes.

**Johns.** Johns is very vigorous, producing canes up to 10 feet in height when grown on fertile soils. The plants are as productive as the Adams varieties; the clusters and berries are larger; the foliage is darker green in color. Johns ripens about 10 days earlier than the Adams varieties. It has been known in the Northeast for a century but was not named until 1954 by E.L. Eaton, Research Station, Kentville, Nova Scotia.

**Scotia.** Scotia juice contains about 14 percent soluble solids, approximately 2 percent more than most other varieties. Scotia bushes are of medium size. It is a productive variety and ripens about four days before the Adams varieties. Scotia originated as an open-pollinated seedling of Adams #2. It was named in 1960 by the Nova Scotia Station.

**York.** York bushes and berries are larger and more

productive than most other varieties. It ripens about three days later than the Adams varieties. York resulted from the cross, Adams #2 x Ezyoff, and was named in 1964 by the Geneva Experiment Station.

**Nova.** This variety was named in 1960 at Kentville. It is a heavy yielder.

Some less important varieties are Kent, Victoria and Ezyoff.

## POLLINATION

In central New York State elderberries bloom in late June, a full month after apple bloom and long after spring frosts have ceased. Research has shown that elderberry pollen is carried by wind and by honeybees.

As elderberries are only partially self-fruitful, provision must be made for cross-pollination by including more than one variety in a planting. Plants of one variety should be located within 60 feet of another. There are no known cases of cross-incompatibility between varieties and it is assumed that any pair of varieties will function as mutual pollenizers.

## PROPAGATION

Elderberry plants can be home-grown, but are usually purchased from a virus-free source. Varieties are easily grown from hardwood cuttings, softwood cuttings, root cuttings or suckers. The dormant stems, about a foot long and with one or more nodes, are cut in early spring. Vigorous, one-year-old canes make the best cuttings. The stems are cut at about mid-point between two nodes. The cuttings are given no additional treatment but are simply planted vertically in the nursery so that one node is below the soil surface. They will take root without any rooting hormone. They are dug from the nursery in the fall after one summer of growth or they can be dug the next spring. Roots of the young plants are buried in sand and stored over winter in a damp root cellar. After one year in the nursery, they are ready for field planting the next spring.

Cuttings can also be planted directly into their permanent field locations but this requires more weed control and some of the cuttings may fail to grow, leaving gaps in the planting.

## SITE AND SOILS

Because elderberries do not bloom until late June, it is not necessary to select a site with good air drainage, as is the case with most of our fruit crops.

It is common belief that elderberries grow best in swampy areas at the edge of streams. This is not true; in fact, elderberries die in wet spots in a field. The plants will grow

in any good soil, from sandy to heavy loams. The best soil pH is somewhat acid, 5.5 to 6.5.

## PLANTING

Planting should be done in early spring. The field should be plowed and well tilled. The usual planting distance is 6 feet apart in the row with rows 10 feet apart, or 726 plants per acre. If the soil is very fertile, or if the grower wishes to use wider tillage equipment, rows can be spaced further apart. The plants can be set in holes which are dug with a post hole auger or shovel or in an opened furrow or with an orchard tree planting machine. The depth at which elderberry plants are set can vary as long as the roots are well covered and the soil firmly packed.

## SOIL FERTILIZATION

No fertilizers should be applied in the year of field planting because of the possibility of burning the plants and because of their small size. However, from the second year onward elderberry plants respond well to fertilization. Fertilizer experiments on elderberries at the Pennsylvania State University indicated that the most desirable growth and yield resulted when fertilizer was applied at the rate of 1/8 pound ammonium nitrate, for each year of the plant's age, with a limit of 1 pound per plant, or this amount of ammonium nitrate plus 1/2 pound 20 per cent superphosphate and 1/10 pound muriate of potash. This is equal to ammonium nitrate applied in the following amounts per acre: 150 pounds at two or three years of age, 300 pound at four and more years. It can be spread with a spreader in bands one foot wide along both sides of the rows. Fertilizer needs are dependent on the quantity of nutrients previously available in the soil. Application rates should also be modified according to the growth rates of the plants. Soils in central New York State are often low in potash and under these conditions elderberries have shown distinctly superior performance when potash was applied.

## CULTIVATION

One of the most difficult problems in the growing of elderberries is the control of weeds and grass, especially between the plants in the rows. No herbicides have label clearance for elderberries.

During the first year, the rows should be cultivated two or three times, using a row cultivator over the row. A light disk or cultivator should be drawn between rows two or three times every year. The roots of elderberry plants grow very clear the surface of the soil and they are easily damaged by tillage implements. In addition to the true roots, elderberry plants send out underground stems which grow in the

same shallow region of the soil. They periodically send up stems, similar to the manner in which red raspberries send up suckers. This habit of growth makes soil cultivation particularly destructive. After the first year, the plants cannot be hand hoed because the slightest injury with a hoe to one of these upright shoots may kill it. A hedgerow of vigorous elderberry plants tends to suppress weeds by its own shade. However, row sections with weak or missing plants are quickly invaded by weeds. Straw mulch can help suppress weed growth.

## PRUNING

Healthy, vigorous elderberry plants send up a number of new canes each year. These new shoots attain full height in one season. New canes do not have side shoots (laterals) the first year, but often bear single, large, late-ripening clusters on their terminals. The most fruitful canes are those in their second year, when they produce several lateral branches. Fruit clusters are borne terminally on the wood of the current season's growth. The older trunks of elderberries lose vigor and become weak after two or three years.

Little pruning is required. All dead, broken and weak canes should be cutoff at round level before growth starts in the spring. An equal number of 1-, 2- and 3-year-old canes may be left; canes older than 3 years should be removed to encourage the emergence of new, more fruitful canes. Bushes are winter hardy and rarely die because of winter injury but the small lateral twigs near the tops of canes often freeze back. Pruning of these small dead twigs can be beneficial. Bushes will live for 30 years or more but it is generally not practical to keep them that long.

Bushes can sometimes serve as ornamentals. However, because of their lanky canes, elderberry bushes generally are not the best type of ornamental shrub. Also because of their open growth habit, they do not perform very well as a hedge.

## PESTS

Birds relish eating elderberry fruits; they can be a serious problem, especially in small plantings. In larger plantings, the percentage loss may be less and the destruction less noticeable. Placing nets over the bushes is the only effective control measure for birds. Small plantings should not be located near wooded areas where birds can hide. Bird lovers sometimes purposely plant elderberries to provide bird food.

Cane borers can cause considerable killing of canes. However, the damage is usually not serious enough to justify spraying. When the top of a cane is broken off by wind or during harvest, the adult borer lays its eggs in the exposed pith. The larvae hatch and bore down the pith to the bottom of the cane causing the cane to die. Burning

these infested canes can discourage the multiplication of the insect and helps greatly in its control.

Mildew on the leaves and berries just before harvest can be a problem, especially if the weather is cool during ripening and if the bushes are planted so closely that air circulation is poor. When mildew grows over the surface of ripening berries, a gray appearance results, but this does not lower the quality of the juice. When mildew is serious, a fungicide spray could control it.

Tiny eriophyid mites, visible only under the microscope, sometimes attack the leaves and cause yellow bands which resemble the symptoms of a mottle virus. These tiny mites can be controlled by dormant sprays but their damage is not usually extensive.

Diseases and insects are not generally serious on elderberries and sprays usually are not applied. No insecticides, fungicides, or herbicides have label clearance for use on elderberries.

### HARVESTING

A few fruits are borne the first year after planting. Plants are in full production at three or four years of age.

Elderberries mature in central New York State during late August and early September. They tend to ripen unevenly over a period of one to two weeks. Uncooked berries have a dark purple juice and are astringent and inedible. They are easily harvested by hand. Large fruit clusters are more ef-

ficiently harvested than small clusters and are a desirable feature of a variety.

The fruit should not be allowed to stand in the picking container long enough to permit internal heating and spoilage. After the fruit is harvested, it may be frozen immediately upon arrival at the processing plant. During slack periods in winter, the fruit is thawed and the juice pressed. A strong healthy elderberry bush can produce 15 pounds or more of fruits. Under good growing conditions, yields of three or four tons per acre can be expected, and maximum yields of three times this have been recorded.



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