

# *Sprouting* **BROCCOLI**

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Horticulturist (Vegetable crops)

Broccoli, sometimes called sprouting broccoli, Italian broccoli, or green broccoli, is a cultivated variety of wild cabbage originating in western Europe. The name "broccoli" is derived from the Latin name "brocco," meaning a shoot, and it was originally applied to the tender shoots which were thrown out by cabbage and related members preparing to flower. These green shoots have been used as important vegetables by Europeans for a long time.

In England the word "broccoli" is used to designate the winter and spring types of cauliflower, and this wording was likewise used in the earlier days of the growing and shipping of spring cauliflower in Oregon. Since the widespread production and use of the sprouting types of broccoli, however, the word is now used exclusively in speaking of the plants having green, white, or purple central heads and numerous side shoots, namely the sprouting broccoli of Europe.

Figures concerning the actual acreage of broccoli grown in Oregon for the open market and for processing are not available. The increase in production of broccoli in the Northwest for preservation by freezing is shown by the fact that in 1937 only 512,102 pounds of broccoli were grown in Oregon-Washington but in 1948, 5,077,000 pounds were frozen in these two States combined or about one-sixth of the frozen pack of broccoli in the U. S.

California is credited with growing 16,000 acres and 1,440,000 crates of broccoli in 1947.

## **Plant Characters**

The sprouting broccoli plant is somewhat similar to the cauliflower plant in that it produces a central head, though usually smaller, and also resembles a kale plant in that numerous lateral shoots are developed at the axils of the leaves. Types of broccoli plants vary in the color and size of the central head and the number of laterals formed. The stem of the central head is thick and fleshy while the stems of the side sprouts are considerably thinner. The central head varies from three to five inches in diameter while the compact flower bud of the laterals is usually one inch to two inches.

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\* This bulletin supersedes Extension Circular 411, a mimeograph circular on broccoli by the same author.

## Varieties and Strains

While the purple sprouting varieties were an old standby throughout Britain for many years, the most widely grown variety of broccoli in the U. S. is the green type called "green or Italian Calabrese." There are few named varieties of broccoli. Besides Calabrese, the variety Propagena is offered. Other named sorts include offerings by individual strain breeders including Freezers' Sprouting Green, Italian Green Sprouting Early, Green Sprouting Medium, and Green Sprouting Late. According to Knott and Hanna (1)\* the strains of sprouting broccoli fall into four seasonal groups—very early, early, mid-season, and late. Freezers' Green Sprouting, a dwarf type producing numerous side shoots, was developed primarily for freezing. Some strains, such as Green Sprouting Late, produce practically no side shoots but a larger central head. In general, plants of a type producing large central heads will do so at the expense of forming many laterals. Another type with numerous smaller leaves forms a smaller central head and many laterals.

## Climatic Conditions

Like other members of the cabbage family, broccoli prefers a moderately cool condition for its growth and period of development toward a state of harvesting. The compactness of bud formation, which is an important character of broccoli for market and manufacture, is developed best in the cooler months of the fall and early winter season even though prior to that time the plants may have been growing in fairly warm weather. In the Northwest, broccoli is grown mostly as a crop harvested through the fall and early winter. The plants are not injured by light frosts.

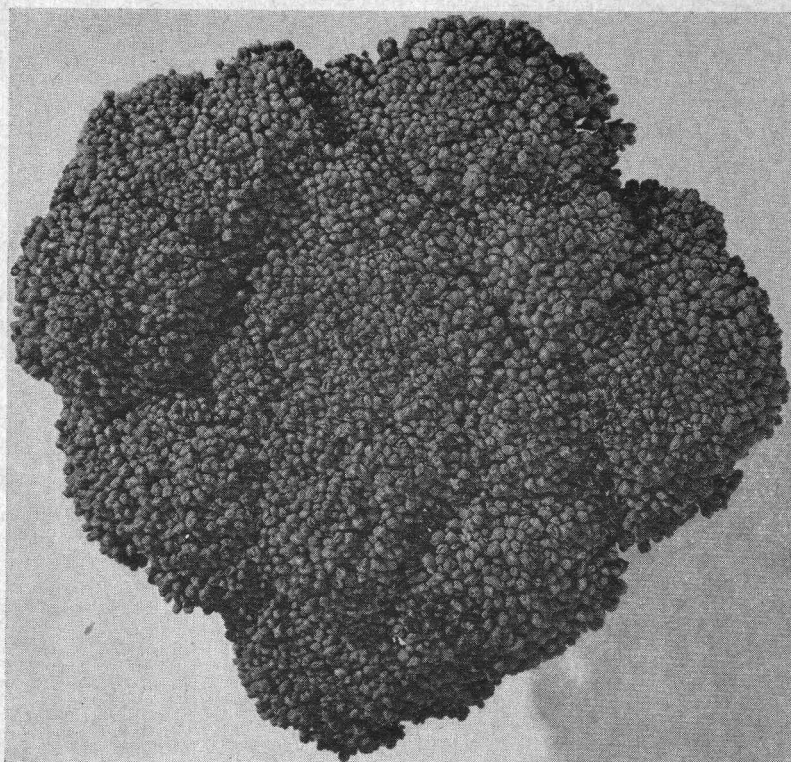
Knott and Hanna (1) found that cool weather at harvesting time for all strains tended to obliterate the differences between strains in reaching a state of harvesting.

## Soils and Fertilizers

As with other members of the Brassica group, broccoli will develop well in any soil of reasonably good friability, depth, drainage, and fertility. It will grow well in a soil capable of producing good cabbage and kale. In view of soil tramping in harvesting during the fall and winter, the land should be well drained. As is the case with all cole crops, broccoli land should have a soil reaction within the range of 6.0 to 7.0; otherwise liming is advisable.

\* See Literature Cited, page 7.





—Photos courtesy Ferry-Morse Seed Company.

Size of the central head in sprouting broccoli varies according to the variety. Larger central heads generally have fewer side sprouts. Broccoli should be harvested while heads are compact and unopened, before the yellow flower petals develop.

Because of the large amount of vegetative growth necessary to make a large plant and a heavy production of shoots, there must be a good level of soil fertility. Land should be manured occasionally or cover cropped. A commercial fertilizer of a 1-2-2 ratio (example 5-10-10) to the extent of 1,000 pounds per acre would provide 50 pounds of nitrogen, 100 pounds of phosphoric acid and 100 pounds of potash. Four hundred pounds of 8-16-12 would provide 32 pounds nitrogen, 64 pounds phosphoric acid, and 48 pounds potash. Added

to this also should be 15 pounds of commercial borax to aid in preventing borax-deficiency indications of scarred or galled stalks.

In some instances there may be an additional side dressing of fertilizer applied at transplanting time. Irrigation assists in helping to establish the plants at transplanting time and later on in providing sufficient soil moisture to make shoots of good yield and quality. However, much of the present broccoli acreage in Oregon is on unirrigated land.

## Culture

Broccoli is grown in a similar manner to a crop of late cabbage, cauliflower, kale, or Brussels sprouts. The plants are grown in an open seedbed in May and June at the rate of about 24 to 30 seeds per foot with a view of having plants about every half inch or so in the row. Plants are in the beds about forty days or so, and transplanting is usually done in late June and into the middle of July, depending on the type of market to be supplied. Knott and Hanna (1) found that the number of side shoots produced by very early and early strains was reduced considerably as the planting date was delayed later in the season. The mid-season strains were not so much affected. The usual time elapsing between seeding and the first harvesting approximates three months but this time varies with the individual strains. Direct seeding in the field and thinning the plants later is sometimes done in growing broccoli.

Transplanting distances for broccoli are commonly 28 inches by 36 to 42 inches between rows. The land should have a good moisture content at transplanting time and if irrigation is available water should be applied at the time of plant setting.

## Maintenance

Weed and insect control are important. Shallow inter-row tillage should be the rule to kill weeds when small.

Insect control (2) is largely concentrated on controlling aphids which are a distinct menace to broccoli for processing. Nicotine and TEPP dusts applied in commercial fields have given satisfactory control.

Root maggots are apt to infest plant beds and unless these are treated maggots may be carried on the plants to the field. DDT is quite toxic to the adult maggot fly but it has not killed rapidly enough to prevent egg laying. If this material is to function it will have to control flies during the pre-egg laying period.

## Harvesting

The edible parts of sprouting broccoli are the central head with a thick, fleshy stem and side shoots with flower buds. The vegetable is considered to be in its prime condition when the heads, large or small, central or side, are well developed but yet are compact and unopened and before there are any indications of the appearance of the yellow flower petals. In harvesting the heads a basket is carried on the back or in front into which the broccoli is placed after it is cut. Side shoot harvesting begins shortly after the cutting of the central heads. Bunching is done with two types of bunchers, one modeled after an asparagus buncher and another machine which bunches, ties with a "Twist-Em" and cuts the bunch for length in one operation.

Oregon standards for sprouting broccoli, obtainable from the State Department of Agriculture, Salem, state that "U. S. Fancy shall consist of well-trimmed stalks with compact heads which are not overmature etc.—*Unless otherwise specified* the minimum diameter of each head shall be not less than 3 inches and the length of stem and head shall be not less than 5 inches—."

"Compact means that the buds in each bud cluster are closely united."

"Overmature means the stage of growth at which the buds generally appear on the verge of opening, many of them having a pronounced yellowish tinge—."

Broccoli for market is packed in flat crates, usually holding 28 1½-pound bunches or a net weight of 42 pounds.

An average yield of market broccoli is about 150 crates. Two to three tons per acre are considered a normal yield of broccoli for processing, but this might easily be modified according to the fertility of the field and the growth of the plants. Four tons have been known to have been obtained.

The season of frozen-pack broccoli begins usually in late August with a peak about October 15 and closing around November 25, depending on the seasonal conditions of the fall and early winter.

## Literature Cited

1. Knott, J. E. and Hanna G. C. The Behavior of Green Sprouting Broccoli Strains Planted at Different Times in the Sacramento Valley. University of California Division of Truck Crops, Mimeo 41, 1947.
2. Crowell, H. H., Morrison, H. E., Thompson, B. G., and Mote, Don C. Vegetable Garden Insect-Pest Control. Oregon State College Extension Bulletin 676 (Revised Edition 1950).



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