

In search of the perfect Brussels sprout

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Brussels sprouts (*Brassica oleracea* var. *gemmifera*) are getting more attention among consumers, in part due to their nutritional characteristics. They have high water content and low fat and carbohydrate content (which makes them low in calories), a relatively high protein content (4% of fresh edible part), high levels of vitamins (especially the two carotenoids anti-oxidants and vitamin C) and Lutein, and the highest amino acid content among vegetables (Gómez-Campo, 1999).

One advantage of this crop is its cold hardiness, which extends harvest into November or later. In retail markets in New England, Brussels sprouts are often sold on the stalk, and this method of 'packaging' could be used to distinguish locally grown sprouts in the wholesale marketplace. Selling on the stalk has the advantage of reducing labor costs but also requires that the stalk as a whole look consistent, healthy, and appealing. USDA market standards require that buds be >1 inch and that > 90% be firm and free of damage from insects or diseases. "Topping", the practice of removing the growing point to stimulate bud growth, is used to promote more uniform bud size along the stalk.. Brussels sprouts are a long-season crop ranging from 80-140 days to maturity from the date of transplanting in the field. They are typically transplanted from early June to early July in New England, depending on the target harvest date and days to maturity.

Some growers who are trying to produce for the wholesale market have struggled with losses to diseases. Brussels sprouts are subject to several diseases including black rot, *Alternaria* leaf spot, downy mildew, club root, and white mold. *Alternaria* (*Alternaria brassicicola* or *A. brassicae*) progresses later in the season, starting on the old leaves and moving up to the new leaves and onto the older sprouts as they grow. *Alternaria* may be seed borne, may move from other Brassica crops or weeds, or be transported by movement of people and machinery. Symptoms begin as small (<1/4 in) dark lesions on undersides of leaves, which expand into the classic target-like lesion of an inch across. Bud infections generally occur later and also start as small dark lesions on the outer wrapper of the bud. Black rot (*Xanthomonas campestris* pv. *campestris*) generally originates in infected seed, and can be introduced on one seed lot and spread to other varieties. Symptoms are V-shaped yellow or gray lesions that originate on the leaf margin and extend inward. Since both of these diseases are seed-borne, purchasing hot water treated seed could prevent or reduce infections.

Insect problems include foliar-feeding caterpillars (imported cabbageworm, cabbage looper, diamondback moth) which can feed on leaves or buds. Cabbage aphid is generally held in check by natural enemies with no effort from the farmer, but outbreaks can occur especially in late season or following use of non-selective insecticides.

Lodging of the stalks causes a 'gooseneck' shaped stalk, makes spray coverage and harvest more difficult and may increase disease. Height for a wholesale packout of stalks should be adequate to achieve a stalk length of 18-24 inches with sprouts that are 1-2 inches in size.

This variety trial was undertaken to evaluate seven varieties of Brussels sprouts for resistance to diseases and for market characteristics that are key for selling on the stalk, including :

- 1) weight, firmness, size and uniformity of buds
- 2) disease occurrence and intensity on buds,
- 3) response to mechanical topping
- 4) time from transplanting to maturity.

Methods: The experiment was laid out as a randomized complete block split-plot design, with variety as the main effect and topping treatment (topped and non-topped) as the sub-effect, and with five replicates. Fertilizer (60 N, 100 P, and 100 K lb/A from 5-4-8 CPS organic blend, bonemeal and potassium sulfate) was broadcast and incorporated before plastic and drip were laid over raised beds. Seedlings of Brussels sprouts were transplanted to the field in Mid June. Each main plot consisted of a double row of ten plants of one variety on 4' plastic with 17 " between plants in the row; each block was 90 feet long. When the lowest buds reached approximately 1/2" (approximately 1 month before harvest), 5 random plants from each plot were mechanically topped. No fungicides were used. Spinosad was applied 7/15 to control caterpillars.

Data collection: All plants were rated for the degree of lodging in the field. Each variety was harvested when most sprouts were between 1 and 2 inches in diameter. Measurements were taken only from the marketable part of the stalk (where most buds were between 1" and 2") and included the length of the stalk, total weight of buds, and number of buds. On 1 random spiral row per plant we measured were the diameter of the buds (using a digital caliper) to determine uniformity, firmness (estimated by touch), and the number and severity of diseased buds to determine disease intensity. Disease ratings on the buds were 0 (clean), 1 (up to 10% of bud surface covered with *Alternaria* symptoms), or 2 (>10% disease symptoms = unmarketable). Only three varieties were harvested before the NEVFC proceedings were prepared.

2009 Brussels Sprout Variety Trial			
UMass Research Farm, South Deerfield, MA			
Variety (seed source)	Transplant Date	Days to Maturity (as listed)*	Actual Date of Harvest according to market desirable size (sprouts (1"- 2"))
Vancouver (STO)	June 17	105-120	<i>Not harvested before Nov 1</i>
Nautic (BEJ)	June 25	115-140	<i>Not harvested before Nov 1</i>
Diablo (JSS)	June 17	110-125	<i>Not harvested before Nov 1</i>
Dimitri (BEJ)	June 17	103	Oct 28
Roodnerf (TSC)	June 17	100	<i>Not harvested before Nov 1</i>
Oliver (JSS)	June 17	90-100	Oct 19
Franklin (TSC)	June 17	80-100	Oct 26

Seed Sources: Stokes (STO), Bejo (BEJ), Johnny's Selected Seeds (JSS), and Territorial Seed Company (TSC). All varieties are hybrids except Roodnerf which is open pollinated.

*Days to harvest listed for the same variety can vary with different seed companies; the full range of the listed maturity time is given.

References: Gómez-Campo, C. and S. Prakash. 1999. Biology of Brassica coenospecies. Elsevier Science. B.V. Amsterdam. The Netherland.