

**Some interesting discoveries growing Brussels sprouts:
Choosing varieties and deciding whether or not to top**

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Background & Objectives:

We have conducted experiments at the NH Agricultural Experiment Station to compare Brussels sprout varieties and to research the effects of topping Brussels sprouts. The full research report, with photographs, is available

at http://extension.unh.edu/resources/files/Resource003914_Rep5563.pdf.

Cultural Details. Fertilizers were applied based on soil tests. Cultivars were planted in a randomized blocked design with four reps; twelve plants per plot. Plants were spaced 18 inches apart in a single row on 30 inch raised beds covered with black plastic embossed mulch. Plants were seeded in 98-cell plug trays into ProMix BX and transplanted into the field 3-4 weeks later. *Bacillus thuringiensis* (Dipel) was applied throughout both growing seasons to manage caterpillar pests. Cabbage aphids infested plantings in both years, but infestation was earlier and more severe in 2014. Lower leaves were trimmed from all plots once in 2013 and twice in 2014, to improve air circulation.

I. VARIETIES. We evaluated nine (9) cultivars of Brussels sprouts in 2013 and 2014 at Woodman Farm in Durham NH (Zone 5B). Six varieties were included in both years. **In 2013**, plants were seeded on June 3, transplanted into the field on July 8, and harvested on Nov 6. **In 2014**, plants were seeded in May 12, transplanted on June 6, and harvested on Oct 19 and Nov 18. For each plot, we estimated the percentage of total sprouts unmarketable because they were too small (less than 0.75" diameter), too large or loose (over 2" diameter), or due to excessive *Alternaria* symptoms. For each plant, we measured **number and weight of marketable sprouts** (0.75-2" diameter).

Results. For those cultivars grown in both years, performance was generally similar in both years. In 2013, **Gustus, Early Marvel and Nautic** produced the highest marketable yield (all >11 oz per plant). Roodnerf, Catskill and Falstaff produced the lowest yields. In 2014, **Jade Cross E, Octia and Nelson** produced the highest marketable yield (all >16 oz per plant). **Churchill and Nautic** also produced high yields, with >13 oz per plant. Doric and Catskill produced the lowest yields.

In a nutshell. Of the five cultivars grown in both years, **Nautic, Diablo and Jade Cross E** yielded well (over 8 oz per stalk). While tall and vigorous, Doric was very late to mature, and most sprouts did not reach marketable size. Catskill was also very late, showed considerable variability in growth habit, and yielded poorly in both years.

For those cultivars evaluated in only one year, **Gustus, Early Marvel and Octia** were promising, with high yields on quality stalks. Nelson and Churchill had high yields but both showed excessive lateral branching and a tendency for bottom sprouts to become oversized.

Falstaff and Roodnerf had poor yields, and Falstaff was highly variable with a number of off-type plants.

Prevalence of defects and comments on stalk quality

Cultivar	Reported days to maturity	Relative observed maturity	Too small*	Too large	Alt	Space between sprouts	Comments on stalk quality
Catskill	85	Late	4, 4	0, 0	0, 1	4	Highly variable
Churchill	90	Early	1	1	1	1	Lateral branching
Diablo	110	Mid	2, 3	0, 0	1, 0	2	
Doric	120	Very Late	3, 4	0, 0	0, 0	4	
Early Marvel	85	Mid	2	0	1	3	
Falstaff	98	Late	4	0	0	4	
Gustus	99	Early	1	0	2	1	
Jade Cross E	85	Early	2, 2	1, 1	2, 1	0	
Nautic	105	Mid-Late	2, 2	0, 0	1, 0	3	
Nelson	90	Early	1	2	2	2	Lateral branching
Roodnerf	96	Late	4	0	1	2	Highly variable
Octia	78	Mid-Late	1	1	0	4	

* **Ratings explained:** When two numbers are given, separated by commas, these correspond to ratings in 2013 and, 2014, respectively. Noteworthy ratings are highlighted. **Too small:** 4 = >70%, 3 = 40-70%, 2 = 20-40%, and 1 = <20% sprouts per stalk < 0.75 inch diameter. **Too large:** 2 = >15%, 1 = 5-15%, 0 = <5% sprouts per stalk > 2 inch diameter. **Alt (Alternaria):** 2 = >20%, 1 = 6-20%, 0 = <6% sprouts per stalk unmarketable due to severe symptoms. **Space between sprouts:** 4 = wide spacing between sprouts, 0 = very tightly spaced sprouts

II. TOPPING. Sprouts of Brussels sprouts are axillary buds. Auxins produced by the apical meristem (the top growing point) of the plant inhibit the development of the axillary buds below the top of the plant. Removing the apical meristem causes the axillary buds to expand. Therefore, removing the top of the Brussels sprout plant at the right time has been shown to increase the size of the sprouts at the top of the stalk, improving marketable yields.

Topping Treatments. In each plot, half of the plants (6) were topped when lowest sprouts had started to develop, reaching 0.5-1 inch in diameter; and the other half were left un-topped. Because varieties matured at different dates, topping was performed at different dates, according to the chart below:

2013 Topping Dates		2014 Topping Dates	
10 Sept.	Diablo, Early Marvel, Gustus, Jade Cross E	4 Aug.	Jade Cross E
		14 Aug.	Churchill, Nelson
18 Oct.	Catskill, Doric, Falstaff, Nautic, Roodnerf	4 Sept.	Diablo, Nautic, Octia
		23 Sept.	Catskill, Doric

Results. For some cultivars, topping had the desired effect, reducing the number of sprouts that were too small, and increasing the marketable number and weight of sprouts. For those varieties that showed a higher tendency for the lower sprouts to become oversized (Nelson, Jade Cross E, Churchill and Octia, for example), topping did not alleviate this problem.

2013. Overall, topping reduced the average percentage of undersized sprouts from 51% (untopped) to 41% (topped), increased the marketable number of sprouts per stalk from 23 to 27, and increased marketable sprout weight from 7.8 to 9.8 oz per stalk. Topping had the greatest positive effect for Diablo, Early Marvel, Gustus and Jade Cross, which were early and mid-season varieties that were ready to be topped by early September. Topping did not affect yields of Catskill, Doric, Falstaff, Nautic or Roodnerf. These varieties had very small sprouts, and were not ready to be topped until mid-October, just 19 days before harvest.

2014. In 2014, the results of topping were mixed. Yields of the early cultivars (Churchill, Jade Cross E and Nelson) were significantly reduced by topping, whereas yields of the mid- and late-season cultivars (Diablo, Doric, Nautic and Octia) were increased by topping.

Topping dates. For all varieties, topping more than 75 days pre-harvest (dph), even if sprouts were already at marketable size, was counterproductive, reducing stalk height and, in many cases, causing the tops to branch. Topping 75 dph was helpful for some varieties. Later topping might also have been beneficial, but we did not include later topping dates.

Conclusions. The practice of topping has the potential to increase yields of Brussels sprouts, assuming a once-over harvest. It can also increase the attractiveness of a full harvested stalk, if growers are marketing entire stalks. However, topping too far in advance of harvest can reduce yields and marketability by causing plants to spend energy growing new stalks.

In California, Brussels sprouts destined for once-over mechanical harvest are typically topped 50-60 days before harvest ([National IPM Center Crop Profile, 1999](#)). From our study, it would appear that topping somewhere between 24-75 days before harvest could be beneficial. Topping more than 60-85 days before harvest, even if lower sprouts have reached marketable size, was counterproductive and reduced yields.

In the past, we have suggested that topping should be done based on the physiological development of the plant, for example when the largest sprouts are 0.5-1" diameter, rather than on a specific date. Our current thinking is that topping between 30-60 days before harvest, especially once lower sprouts have begun to reach marketable size, will result in the maximum benefit to marketable yields and appearance of Brussels sprouts. If you do not plan to harvest sprouts for at least 60 days, hold off on topping to allow plants to continue to grow.

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