

Maximum crown-cut broccoli yield for New York

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The maximum yield of broccoli in California is about 800 boxes per acre, whereas Eastern yields are commonly half that. The lower yield is in part due to production on lighter soils. However, Western New York has highly productive alfisols that can yield much more than those light soils. For broccoli to compete with other crops in New York, the yield needs to be 500 to 600 boxes per acre. This trial was established to determine whether such yields are reasonable and to provide values for use in production budgets.

Will high-fertility vegetable soils in New York support a yield of 600 boxes per acre given a sufficient population and fertility?

Conclusion: Yes. A population of 31,000/ac gave the best performance at 680 boxes per acre. This population allowed the heads to be near maturity at the target 4½” to 5¼” size, and reduced the incidence of hollow stem and blind plants.

The sub-optimal population of 26,000 plants/ac (12” spacing), was harvested four days sooner with the same spread of harvest; the whole harvest could have been done in three cuts, four days apart. A higher population (39,000) was not good. Heads were lighter, and harvest dragged on resulting in the same yield but higher management and harvest cost.

The yields reported here are conservative. Several variations in commercial production could result in more boxes per acre. The Diplomat variety has relatively long branches, so we trimmed the stem short (“1 finger”) to represent crown cut. Had we left an additional inch of stem, the yield would have been about 10% greater. Had we left 2 inches of stem for a bunching type, the yield would have been 20-25% greater. It is possible that more water and fertilizer would have increased the yield in the two higher populations. If the market allows, a box might contain slightly less than 23 lb of broccoli. Growth in a cooler and wetter season could also increase yields. Diplomat was selected as a mid-maturity variety with reasonable yield potential, but other varieties may yield more.

Method. Diplomat transplants were raised in the greenhouse for 4 weeks, hardened in a cold frame for 1 week, and then transplanted on June 21 to one of our more productive fields. It is a Honeoye silt loam that had been in a buckwheat cover crop the previous season. The field was dry, and received no rain for 35 days. Irrigation was supplied at 0.2” six days per week. Temperatures were frequently above 90°F in the daytime.

Fertility was designed to support high yield while keeping hollow stem in check. Fertilizer was applied pre-plant at 40-40-40 lb/ac NPK. An additional 120 lb N was supplied with the drip irrigation in 6 applications.



The planting design had 60-inch, 3-row beds with rows 15 inches apart and an open row. The populations were achieved by planting 6, 8 or 12 inches apart in the row.

Plots were harvested when the largest head in the plot was 5½ in, then all heads over 4½ in were harvested. The same criterion was used for repeat cuts. Heads were cut with half an inch of stem below the lowest branch (Fig. 1). For reporting the yield one box was considered to contain 23 lb.



Figure 1. Cut used for crown evaluation. Cutting half an inch below the lowest branch produced a 5x5 inch head. This head weighed 145 g (5 oz, 0.30 lb).

Hollow stem was scored as positive if there was a discernable hole at the butt of the crown. There was no discoloration, and the holes rarely exceeded 1/2 inch. Some markets would accept this level of defect.

Results. The trial effectively bracketed the ideal population, producing a high yield of crown-cut sized heads with low incidence of hollow stem and the ability to get all the crop in three cuts. Western New York vegetable growers on rich soils should be able to obtain yields of 600 to 700 boxes per acre with proper management, with higher yields possible. This value can be used in calculating crop budgets.

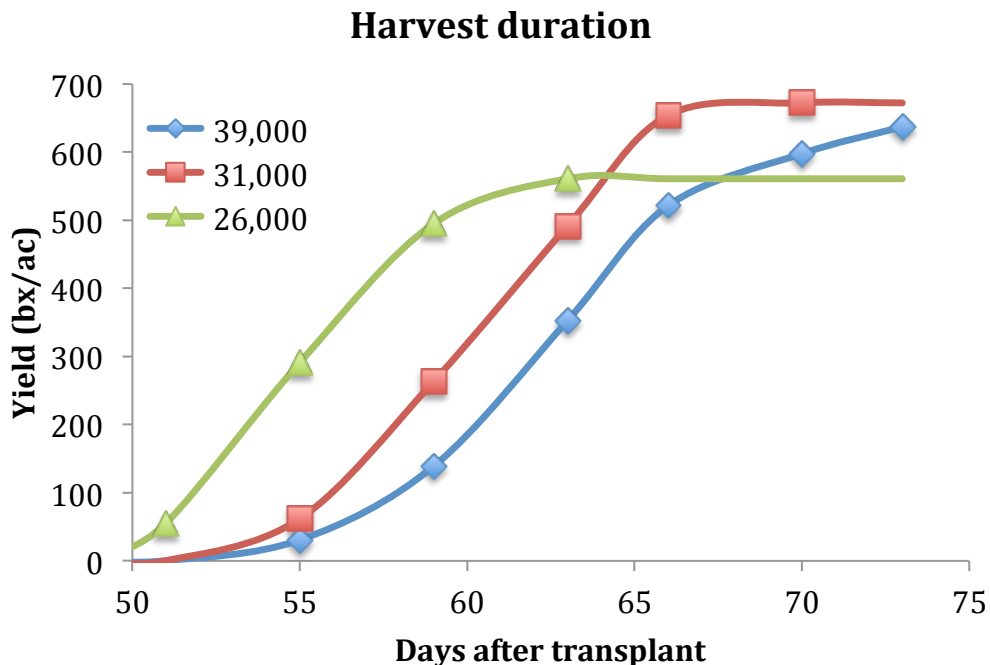


Figure 2. The effect of plant population on time to harvest. The spacing was 6, 8 and 12 inches in row. Each symbol represents a harvest date. Increasing the population delayed harvest slightly, but only the highest population also had a significant number of laggards. The highest yield was in the intermediate population.

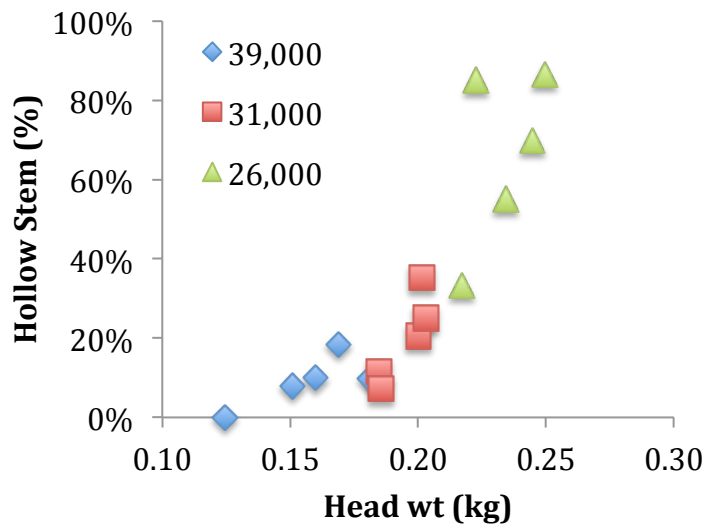


Figure 3. Larger heads suffered from hollow stem. The intermediate population best balanced the head size against hollow stem.

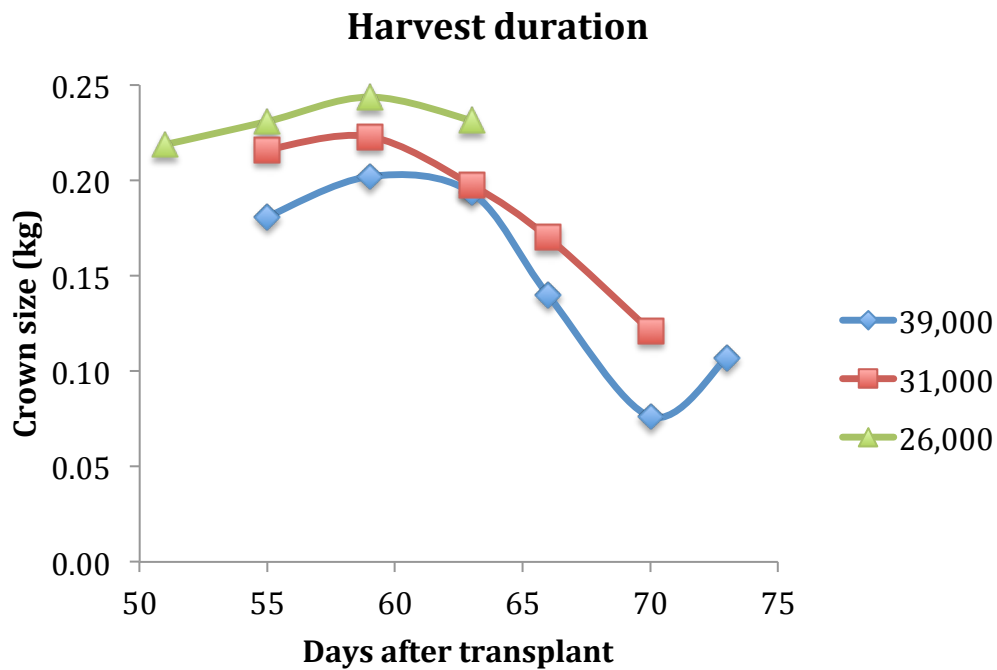


Figure 4. Population effect on crown weight.

The tighter spacing resulted in slightly smaller heads, with the main effect on weight being that stragglers were lighter (Fig. 4). All heads had a diameter of 4½ to 5¼ in, so the weight difference is largely due to stem thickness. The target head weight for optimizing yield versus hollow stem was 0.2 kg (Fig. 3).

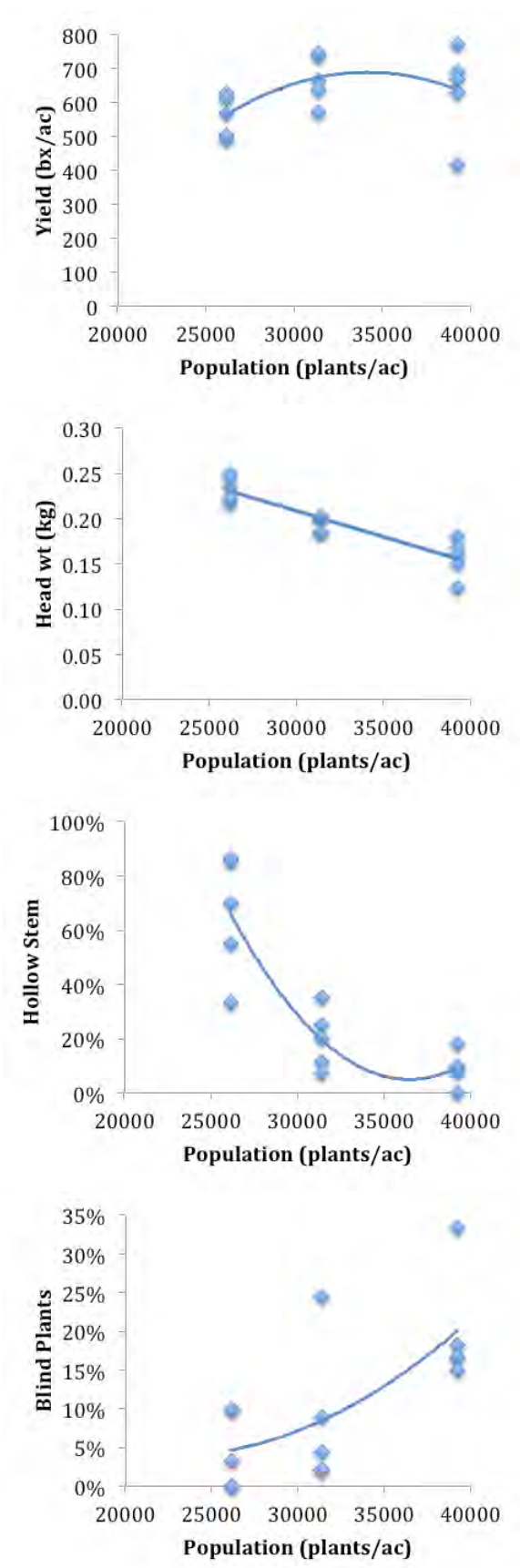


Figure 5. Summary of population effect on parameters of importance. Each point is the mean for the cumulative harvests in one replicate plot.

A population around 31,000 plants per acre gave maximum yield, while keeping the head size on target (0.2 kg) and the number of hollow stems as well as blind plants low (Fig. 5). This population was obtained with a 15 by 8-inch spacing in each bed, producing a solid stand (Fig. 6).

Comparable yields may be expected elsewhere on the East Coast. A similar population produced over 600 boxes per acre for fall harvest in Tifton, GA (Kelly, W.T and D. Bertrand. 2007. Greater plant populations may increase broccoli yield. UGA extension report. [www.caes.uga.edu/commodities/fruits/veg/pubs/2006 Ext Rpt/documents/CM3-Kelley.pdf](http://www.caes.uga.edu/commodities/fruits/veg/pubs/2006%20Ext%20Rpt/documents/CM3-Kelley.pdf)).



Figure 6. Intermediate spacing (8 by 15 inches) at first cut. This arrangement covered the ground well but the plants did not interfere with each other.