2001 RAISED BED PLANTING DEMONSTRATION

(Shawn R. Wright, Christie Welch, Lynn Miller and Richard C. Funt)
(Photo credits: C. Welch)

Introduction

Individuals that are planting raspberries are encouraged to established raised beds. The root system of a raspberry is fibrous and relatively shallow (Dana and Goulart 1989). This makes the plants susceptible to moisture extremes. Too much water may kill the roots or make the plants more susceptible to soil-borne diseases. Too little water will stress plants and limit cane growth and fruit production (Goulart and Funt, 1986). The establishment of raised beds by incorporating organic matter will allow the grower to modify soils that are less than ideal (Funt and Bierman, 2001). Organic matter that is added to soils that drain too slowly helps (fine-textured clay soils) improves the soil structure so that excess water drains more quickly. Organic matter that is added to soils that drain too quickly (coarse-textured sandy soils) will help those soils retain moisture in the root zone where it is available for the plant's use (Funt and Bierman, 2000). If additional organic matter is not available, raised beds can be built up from the topsoil in the inter-row areas by plowing the soil to the center of the row. This method is less satisfactory than adding additional organic matter, but on small non-commercial plantings may provide acceptable results. It is important to have soil testing done prior to planting so that any pH or fertilizer needs can be addressed however the beds are constructed. For commercial plantings, nematode testing is also recommended.

Methods

Tissue cultured Bristol and Jewel black raspberries (*Rubus occidentalis* L.) obtained from Nourse Farm⊗ were planted at the Ohio State University South Centers Research and Extension Center (Piketon, OH) on 10 May 2001. Eight plants of one variety were randomly assigned to an individual plot. Final plot size of raised bed plots was 1'x4'x21' (HxWxL) plot with a rounded crown. Flat beds were flush with the inter-row area and were 4'x21' (WxL). Initial plot preparation occurred on April 5, 2000 and included plowing, disking and rototilling the plot area to a depth of 10 inches. Fertilizer was broadcast using a Viacon spreader after mixing at the rate of 300 lbs. 19-19-19/acre plus 15lbs/acre of 10% borax, 26.19 lbs/acre of a 25.2% copper sulfate, and 21.29 lbs/acre of a 31% zinc sulfate as recommended following soil testing. Landscape fabric (tightly woven polypropylene 5 oz. fabric needle punched and UV stabilized, and 98.7% opaque to light purchased from A. M. Leonard) was applied over the plot rows and planting holes 2.5'on center were cut with a propane torch. There was 4' between plots. Plants were hand planted and watered in using Peter's 9-45-15 @ 1 oz/gallon water. Drip irrigation tubing was installed over the landscape fabric and plants irrigated as necessary. Recommended pest management practices were followed to control weed, disease and insect pressure. The inter-row area (8') was mowed as needed. On 30 May 2001, a foliar application of Peter's Excel 20-20-20 @ ½ oz./gallon of water was applied with a hand sprayer until runoff. On 19 June 2001, 10 lbs. actual N/acre was injected through drip irrigation using 28% nitrogen.

A flat plot from the raised bed planting demonstration is visible in the foreground. Four

raised beds, similar to the raised beds in this study, are visible in the background.

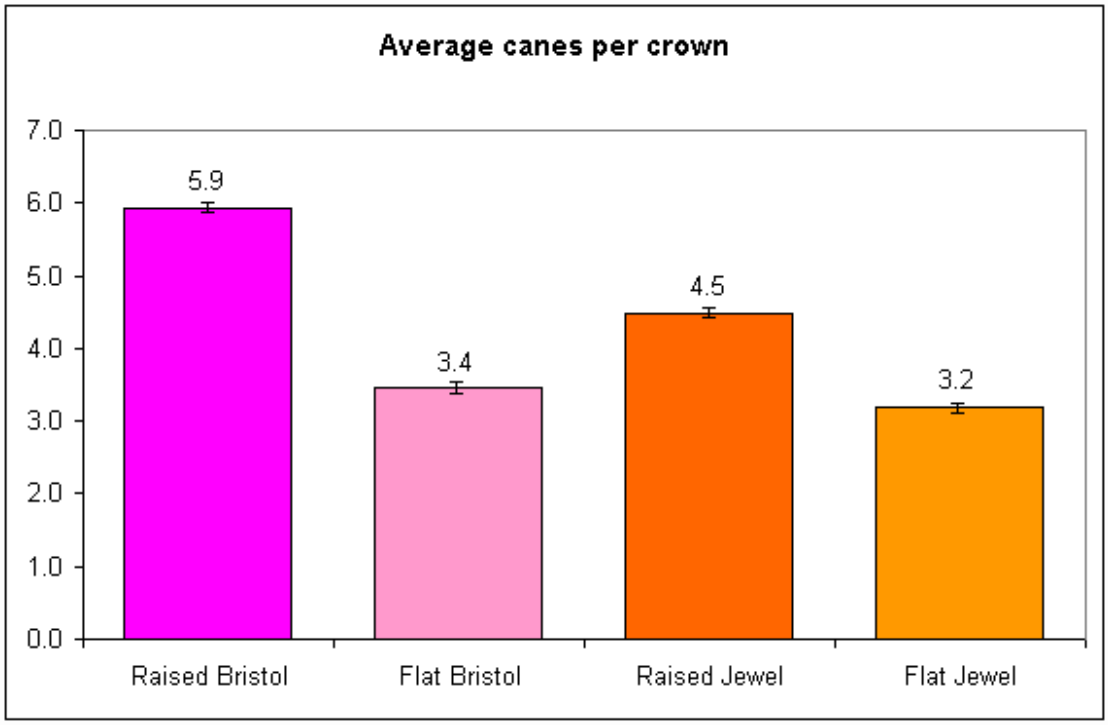
Views of the planting area with a flat beds in the foreground and raised beds immediately behind.

Plants were harvested between 28 September and 9 October 2001. To eliminate transition effects between raised and flat beds, only the center 6 plants from each plot were harvested. Individual canes were cut approximately 2 centimeters above the crown. Diameters of the canes at the cut point were recorded. Laterals were cut from the main cane and the total length of the cane including laterals was measured. Fresh weight and dry weights of individual canes were also recorded. Specific Shoot Length, a measure of "stoutness", was calculated for each cane.

Results

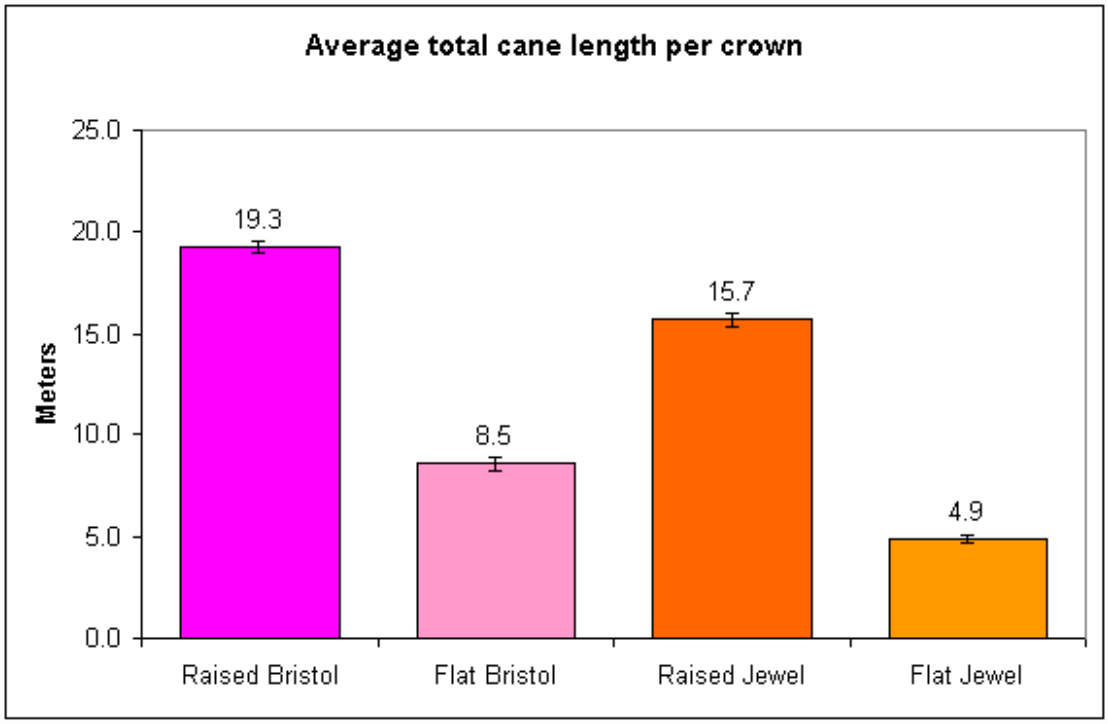
For all figures error bars represent the standard error of the mean.

Figure 1.



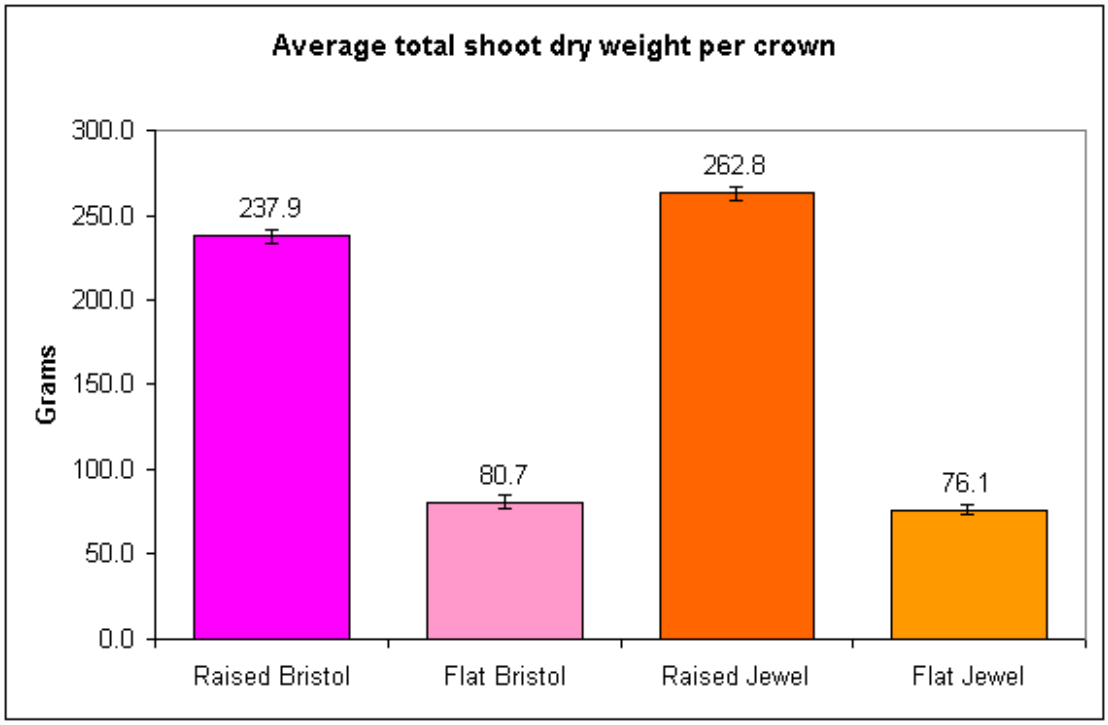
Bristol on raised beds averaged 2.5 more canes per crown. This is almost 75% more than on the flat beds. Jewel on a raised bed produced on average 1.3 more canes per crown, almost a 41% increase in cane number.

Figure 2.



For Bristol, the total cane length per crown, on raised beds, was more than 11 yards longer on average than those raised on flat beds. This is more than double than cane length. Total cane length per crown of Jewel, on raised beds, was also more than 11 yards longer on average than those raised on flat beds. This was more than triple the length. We did not determine leaf area, but it is a safe assumption that total leaf area was significantly greater on these longer canes. More leaf area in turn would provide more energy for the growing plant.

Figure 3.



For Bristol, the average total cane shoot dry weight on raised beds (approximately ½ pound), was almost triple the average weight per crown on flat beds. For Jewel, the average total cane shoot dry weight on raised beds (over 9 ounces), was 3.5 times the average weight per crown on flat beds. Because we did not separate out leaves from the canes, we cannot determine the percentage of additional weight that is in leaf weight or cane weight. We did not observe any differences in allocation between leaf tissue and cane tissue within varieties.

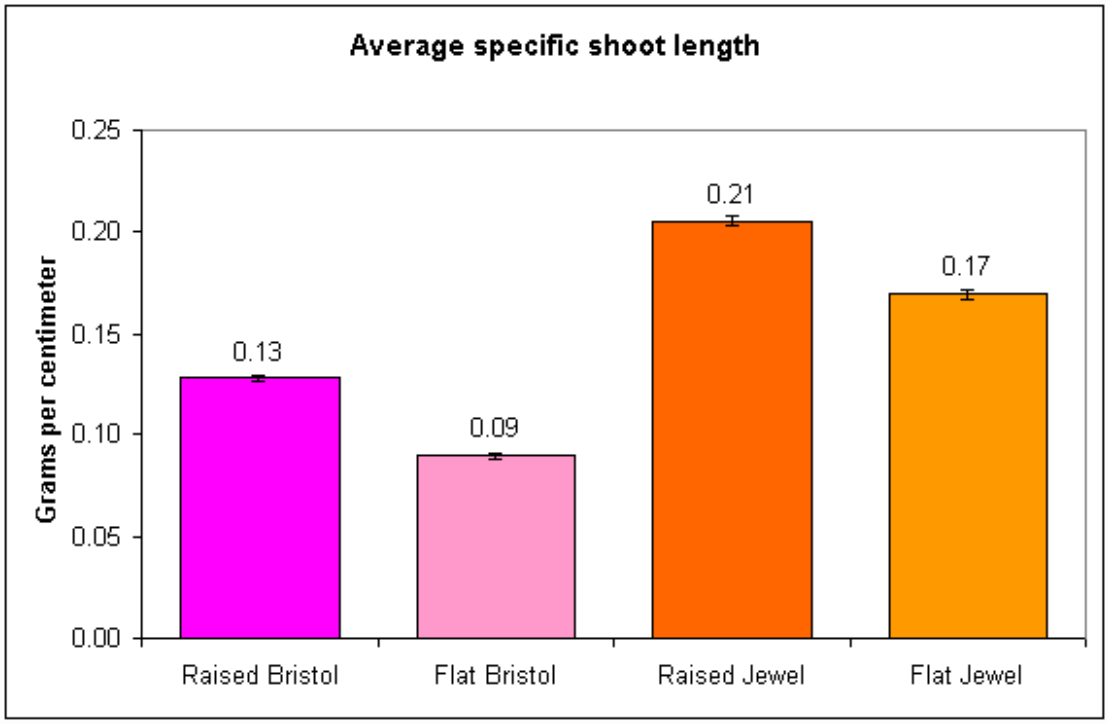
Table 1. Average cane diameter at 2 cm from crown.

	Raised Bristol	Flat Bristol	Raised Jewel	Flat Jewel
Average	7.8 mm	6.0 mm	8.5 mm	6.7 mm
Std. Deviation	1.6 mm	2.1 mm	1.8 mm	1.6 mm

Because we saw a large variation in cane diameter, but we did not observe any clear differences in allocation of material between canes and leaves when comparing within a

variety, we calculated the average specific shoot length (SSL) Figure 4. SSL is a measure of the "stoutness" of the plant and is a measure of weight per unit length. We can't compare across varieties, but the same trend is observable in both varieties.

Figure 4



The plants grown on raised beds have higher SSL. This does not necessarily mean that the stouter canes are healthier or less erect, but it does raise some interesting questions and provides a point of reference for further research.

Conclusion

Because it is not difficult to create raised beds, and because raspberry beds are usually in place for 10 years, we believe that the benefits provided are worth the time and effort it takes to create them. Careful consideration should still be given to the economics of creating raised beds and to site selection. Raised beds can be less expensive than the installation of tile drainage.

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⊗ Mention of a specific variety or supplier does not constitute endorsement of materials or suppliers to the exclusion of other varieties or suppliers that may be suitable.