Vermicompost amendment to field soil for bare root grape production, 2008

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Background:

The production of bare root grape plants for the wholesale wine industry and nursery market is a high value agricultural enterprise in NY State. Vine cuttings are planted in high densities and are sold after one season if plants root successfully. Price per plant depends on variety; Concord $0.50 - 1.25 and wine varieties $2 - 4. Price per plant also depends on root biomass, a higher root biomass being more valuable because of the increased chance of establishment. At the farm participating in this study, rooting of cuttings is highly variable and salable plants per season are at around 60-70%. The goal of this on farm field trial was to evaluate the use of vermicomposted dairy manure as a soil amendment in this production system. We measured the effect of three rates of vermicompost amendment on cutting stand, number of leaves per plant, biomass and retail grade.

Methods:

Grape vine cuttings are buried under soil over the winter and then are planted upside down with the cut end in the air in the spring. After callus formation, each cutting is flipped so that the callus will begin to root in the soil. Vermicomposted dairy manure (Worm Power ™ Avon, NY) was added at 2, 4 and 8 tons per acre in a randomized complete block design in May of 2008. Drip tape and plastic were laid down and cuttings were fertilized. Cutting stand and number of leaves per plant were measured in July and stand, biomass and retail grade were assessed in November at harvest. Retail grades were as follows: 1) cull (dead or too small to sell), 2) 1-1 (good root development), 3) 1-x (superior root development). 45 plants were assessed in each of 5 blocks for each treatment. Data were analyzed with SAS v 9.1.3 (Cary, NC) using logistic regression (proc logistic) for stand and grade and ANOVA (proc glm) for number of leaves per plant and biomass.

Results & significance:

A significant effect of vermicompost amendment was found on the number of leaves per plant at the 8 ton per acre amendment rate in July (Figure 1.). No significant differences were found for cutting stand in July. The mid-season difference in plant growth did not translate into measureable effects on cutting biomass (Figure 2.) stand, or retail grade (Figure 3.) at harvest in November.

This trial is part of a larger project on vermicompost use funded by the NYFVI. While we have found vermicompost to be a valuable organic nutrient amendment in

potting media (see tomato, cauliflower and cabbage transplant results[1]), field applications of vermicompost for this crop may not be the best use of this material. Other field applications currently being investigated as a part of this study are in organic and conventional strawberry production and organic garlic production. The cause of high variability of rooting success in this production system remains unclear.

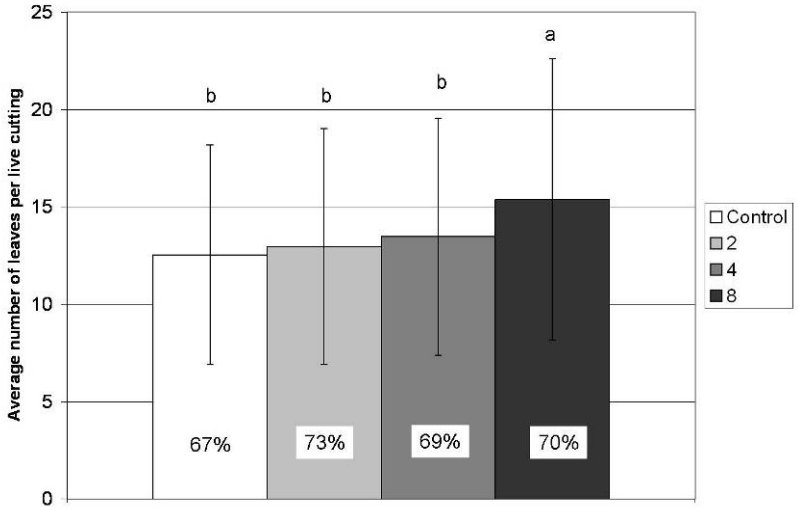
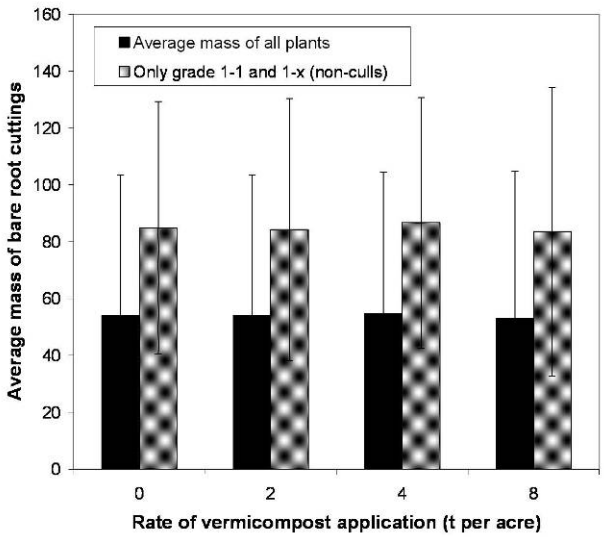


Figure 1. Means and standard deviations for number of leaves per live cutting (Concord grape) in July 2008 for vermicompost applications of 2, 4, and 8 tons per acre. Bars with the same letter are not statistically different ($p > 0.05$). Percent total cutting stand for each application rate is indicated at the base of each bar (NS $p = 0.7164$).



[1] http://cwmi.css.cornell.edu/vermicompost.htm

Figure 2. Biomass of individual cuttings (Concord grape) in November 2008. 45 cuttings from each of 5 blocks of each treatment were measured. No significant differences were found between treatments (p = 0.8108).

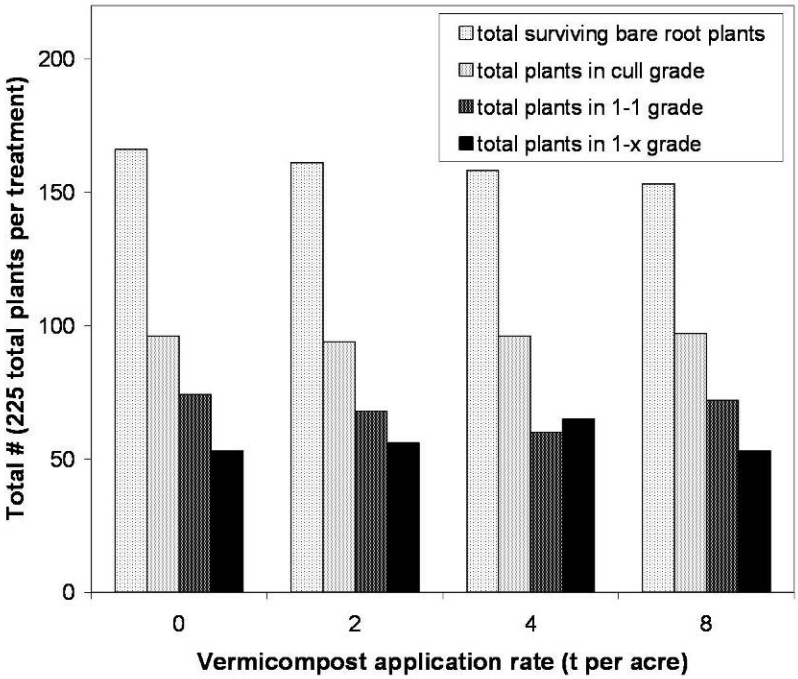


Figure 3. Concord grape cutting stand and retail grade in November 2008. 45 cuttings from each of 5 blocks of each treatment were measured. No significant differences were found between application rates for stand (p = 0.7959) or retail grade (p = 0.4435).

Figure 4. May 2008 Applying plastic to rows before planting grape cuttings.

Figure 5. May 2008 Applying vermicompost in blocks of 0, 2, 4 & 8 tons per acre.

Figure 6. July 2008 Counting leaves on grape cuttings.

Figure 7. November 2008 Labeling individual cuttings for measurements after harvest.

Figure 8. Individual cuttings labeled for retrieval after harvest.

Figure 9. Harvesting of bare root grape plants.

Figure 10. Representative root growth of bare root grape cuttings.

Figure 11. Retail grades of bare root grape plants. L to R: cull, 1-1 and 1-x.

Figure 12. Individually weighing bare root grape plants.