SARE FARMER GRANT - #FNE95-101

"Organic Hardy Kiwi Production"

Klaas and Mary-Howell Martens.

1996 REPORT

This is the second and final report for : **#FNE95-101, "Organic Hardy Kiwi Production" by Klaas and Mary-Howell Martens.** Because of factors beyond our control, we were unable to complete our stated grant goals in 1995, and were given an extension. In 1996, we were able to further the project, and feel that our knowledge of the growth patterns and requirements of hardy kiwi has greatly improved.

Aesthetically marketable fruit is one commodity that is difficult to grow under organic farming systems. The hardy kiwi fruit, Actinidia arguta, is a smaller-fruited, fuzz-less relative to the highly successful kiwifruit (A. deliciosa) of California. It shares many of the flavor, appearance, and nutritional characteristics (extremely high in Vitamin C) that makes A. deliciosa so popular, but is much hardier and is reportably not attacked by any of our common pests - fungal, insect or bird. Testing in the Pacific Northwest indicates that this should be a viable crop for New York, but, to the best of our knowledge, it has only been marginally evaluated here and is mostly unknown.

Our goal for this SARE project was to develop a trial of hardy kiwi vines with two main variables. First, we were testing several kiwi varieties for suitability to Northeast production and second, we were testing organic cultural practices that included different mulching techniques for weed control.

Results and Observations in 1996

In 1995, as part of the SARE grant , we purchased 5 additional kiwi vines to add to our planting of hardy kiwi that we had propagated from vines at the NY Experiment Station, we constructed a sturdy trellis, and we established an organic weed control system of horticultural fabric ('Weed Mat'), wood chip mulch, and regular mowing with a standard riding lawn mower of the already established alfalfa cover crop.

In early Spring 1996, we pruned and trained the vines. In most cases, the vines were large enough to bring one sturdy trunk shoot up to the top wire (5 ft). At this point, we choose 2 branches that originated at or near the point where the trunk met the top wire, and gently twisted each branch in either direction along the top wire to form cordons, securing them with Twistems (Figure 1). All other side and trunk branches were removed. Tying kiwi vines must be done carefully because we observed that girdling and subsequent death could occur on shoots that were tied too tightly with

Twistems or twisted too tightly around the wire - but, shoots tied too loosely tended to slump or fall off the trellis.

As the vines began growing, they produced vigorous shoots from the two cordons which required frequent training to encourage them to grow evenly up and over the 2 side wires. Kiwi shoots have a strong tendency to coil very tightly around anything within reach, so they often had to be untwisted from each other and rearranged to allow for uniform light interception and to tie the new shoots to the trellis. Prolific shoots also formed on the trunk and at the base of the vines, all of which were removed. The growth pattern of hardy kiwi is significantly different from that of grape in that the trunk remains delicate and only lightly woody, totally unable to support itself without training. The cordons too remain thin and mostly herbaceous, and we anticipate the possible need to renew the cordons annually.

Also early in the Spring, we fertilized the vines with composted sheep and chicken manure, shoveled around the base of the vines. This was obtained from either our own sheep flock or from an egg farm nearby.

In 1996, we continued the mowing regime for heavy weed control, grateful that the Weed Mat and wood chips reduced the amount of growth close to the vines since it was difficult mowing everywhere else! If we had to plan the trellis over again, we extend the Weed Mat further from the vines and perhaps not start with such a vigorous cover crop. Mowing was needed every few weeks and it was difficult maneuvering the mower underneath the trellis. Larger farm mowers would be useless in this situation. We never conducted the soil water tests as planned with our collaborators because of recurrent droughts in both 1995 and 1996 and also occasional flood conditions in 1996, but fortunately we did not need to use the irrigation equipment in 1996 as we had in 1995.

The biggest problem we had in 1995 in completing the grant was that we had no fruit production. The winter of 1995-96 was a severe one in New York, and as the Spring of 1996 came, it was obvious that at least 4 of our vines had died. After reviewing our planting map, we realized that all of the male vines were among those that had died and therefore, we would again have no pollen to pollinate the female flowers. The mature female vines bloomed profusely in early June, and we obtained a small bag of male flowers from a friend who is growing hardy kiwi as an ornamental arbor vine. Very carefully, we hand pollinated the female flowers with the male flowers, and waited. While the male and female vines are similar in appearance (except that the males seem to be consistently less vigorous) the male and female

flowers are distinctly different. The operation was a success! Within 3 weeks, numerous small fertilized fruit began to swell. In July, a period of drought caused many of the young fruit to drop, but we still were able to mature about 3 quarts of ripe fruit in mid-late September from about 15 vines - not all of the vines bore fruit, but some were fairly heavily loaded (Figures 2 & 3). This amount is somewhat inaccurate since following one windy mid-September storm, we noted that a fairly large number of ripe or nearly ripe fruit fell to the ground and were lost.

In July after the fruit had set and the period of drought set in, we observed an interesting condition, probably due to the increased stress. Two of the best looking, mature vines suddenly collapsed with leaves wilting suddenly, fruit loss, the leaves drying out and within a week, the vines were dead. Suckering had just been done at this time, but throughout the rest of the season, no suckers grew from the base of the dead vines, leading us to believe that the roots had been severely damaged. At the base of both vines, the bark was rough and cracked (see Figure 4 & 5), very reminiscent of Crown Gall disease in grapes that is caused by a bacteria that enters the vines through winter injury cracks. While no other pest problems were observed on the vines, at harvest, many of the fruit bore light brown, hardened scars that were similar to wind abrasion and scarring that is seen in grapes (see Figure 6). We did have several storms with high wind during the period just after fruit set, and this might have caused the damage. Some of the scarring could also have been due to early July hail damage - see Figure 3 for a clear picture of hail damage on a kiwi leaf.

The fruit quality of our vines was quite satisfactory. The fruit from the majority of our vines, the cultivar 'Geneva 1' and 'Geneva 2' are medium to yellow- green, about the size of a large olive. The quality is high, with an attractive appearance, melting flesh, mildly crunchy seeds and quite edible skin, and is sweet, subacid and mild in flavor (see Figure 7). We have one vine of a different cultivar, 'Ananasnaja', that produced larger fruit (on average, 50% larger) with a very attractive red blush, firmer fruit, and a more distinctive, pleasant, almost pineapple-like flavor. (see Figure 8). We are planning to replace some of the missing vines with additional Ananasnaja vines, since the fruit quality of that cultivar seems more desirable. We also intend to purchase a number of additional male vines!

We observed that before significant fruit softening occurs, the flesh may seem sweet but the skin is quite astringent, much like an unripe persimmon. This certainly limits their acceptability at this point. However, as the fruit

softens, the astringency is lost and the sugars rise. The fruit may be picked when not quite ripe and be successfully ripened inside and little quality appears to be lost. This may be of great economic importance since the fruit tends to drop and is quite easily damaged once it has softened. We also noted that the fruit held its quality well in a refrigerator for at least 2 weeks with no apparent deterioration.

Because we had little crop, we did not hold the formal demonstrations showing the fruit. However, we held informal demonstrations and tastings to several interested groups during the summer and at harvest. At each of the meetings, there was considerable interest and inspection of the kiwi planting. One of the farmers, as a result of seeing our vines, has planted some of his own and is propagating additional vines from wood we supplied. Because the location of our planting is next to a major road and because the trellis is so distinctive, we had innumerable people stop during the season to discuss our project. We also were highlighted in a feature article in the Finger Lakes Times (Geneva, NY) newspaper, describing our trial, the SARE program, and our plans for kiwi as a new crop. A copy of the article was mailed to the University of Vermont SARE headquarters in June 1996 for our file. This article attracted many telephone requests for information and other interest.

We plan, after another year of experience and observation, to write a pamphlet on hardy kiwi production in the Northeast, to be submitted to NOFA for publication and distribution.

B. Update on the Farm

Klaas is a full time farmer, growing over 900 acres of corn, soybeans, wheat, alfalfa, dry beans and spelt. We own approximately 130 acres of the land. In 1996, over 500 of the 900 acres were certified organic with OCIA, with the remainder in transition. Mary-Howell assists with all aspects of the farm (in addition to teaching Biology at the local Community College), and is in charge of the farm office bookkeeping and of a small CSA formed on our farm for the 1996 season. In 1995 and in 1996, Klaas was elected President and Mary-Howell was elected Secretary for the Finger Lakes (NY) Chapter of OCIA (Organic Crop Improvement Association) and we are quite active in assisting other farmers in the area who wish to farm organically. We have been and are farmer-collaborators on other SARE projects and proposals submitted by Dr. Bill Cox and by Dr. Thomas Bjorkman, both of Cornell.

Our collaborators on this SARE grant, both for 1995 and 1996, are:

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