

Cordon Trellis Method for Currants and Gooseberries

Chris McGuire, Two Onion Farm • twoonionfarm@gmail.com • February, 2023

In Wisconsin and adjacent states, currants and gooseberries (two closely related fruit crops) are generally grown without trellises, as extension publications recommend. However, in untrellised plantings harvest is very time-consuming, fruit size is small, fruit often lay on the ground causing them to rot or be dirty, and weed control is complicated. In the Netherlands, where there is a large commercial gooseberry and currant industry, fresh-market growers use a cordon trellis system to train their plants. In this system, each plant is trained to 1-3 permanent vertical stems (the “cordons”), with fruit borne on short branches from the cordons. The fruiting branches are replaced annually. This method requires extra labor and cost to establish a trellis and train the plants, but it reportedly reduces the labor needed for harvest and weeding, keeps fruit off the ground, and increases fruit size and quality. However, the cordon trellis system is not well known in the United States and it has not been systematically trialed here.



Steven Mackay, then with Cornell Cooperative Extension in New York State, travelled to the Netherlands to learn about the cordon trellis method used there. His observations were published in the New York Fruit Quarterly Summer 2005 issue, available online at <https://nyshs.org/summer-2005/>, and we recommend that article to anyone interested in the technique.

We have established plantings of four currant varieties and four gooseberry varieties using both cordon-trellised and untrellised systems. Our goals are to compare the material costs, labor time, and yield for both systems. This report summarizes observations during the first three growing seasons of the trial. We will continue the trial for one additional season.

Experimental Design and Field Layout. This research is being conducted using organic growing methods on our certified organic farm in Belmont, Lafayette County, Wisconsin. The soil type is an Ashdale silt loam.

We planted eight rows, each 300' long: four rows of currant and four of gooseberry. Each row has six feet of border plants at each end, from which data was not collected. The remaining 288' of each row is divided into 12 plots, each 24' long. The entire experimental area is divided into 3 equal sized blocks based on topography and fertility differences, with one-third of each row in each block, as shown in Table 1. We planted four varieties each of currant and gooseberry, shown in Table 2. We chose these varieties for fresh market growing based on our past experience and recommendations from nurseries, researchers, and other growers in the Upper Midwest. There are two experimental treatments: cordon-trellised and untrellised. Within each block, varieties and treatments were assigned randomly to plots. For each crop, there are 48 plots (16 plots per block). Each combination of variety and treatment is represented twice in each block.



Rows are spaced 10' apart, with a 4' sod aisle (creeping red fescue and white clover) between rows. After planting the berry plants, we laid a three foot wide, 3.2 oz/square yard, woven landscape fabric on each side of each row (for weed control) and anchored it with sod staples, forming a mulched strip six feet wide in total. We laid a 15 mil drip tape along each row on top of the landscape fabric. Plants were planted 3 feet apart in untrellised plots and eighteen inches apart in trellised plots.

Commercial availability of *Ribes* planting stock is limited, and we were forced to obtain our stock from two different sources, as shown in Table 2. We purchased Black Velvet and Captivator gooseberries as bareroot bushes from Indiana Berry and Plant Company, but we purchased the other six varieties as plugs from Nourse Farms. The plugs from Nourse Farms were much smaller than the bareroot plants from Indiana Berry; and we received and planted the Nourse plants several weeks later than those from Indiana Berry and Plant Company. The Black Velvet and Captivator plants remained larger than the other gooseberry varieties throughout the first growing seasons.

Table 1. Experimental Plot Layout (Not to scale). Each plot is 24' in length, with the exception of border plots at the end of rows, which are 6' in length. The abbreviation in each cell refers to the variety (B=Blanka, JVT=Jonkheer van Tets, PC=Pink Champagne, R=Rovada, BV=Black Velvet, CAP=Captivator, HR=Hinnomaki Red, TIX=Tixia) and treatment (T=Trellised, UT=Untrellised)

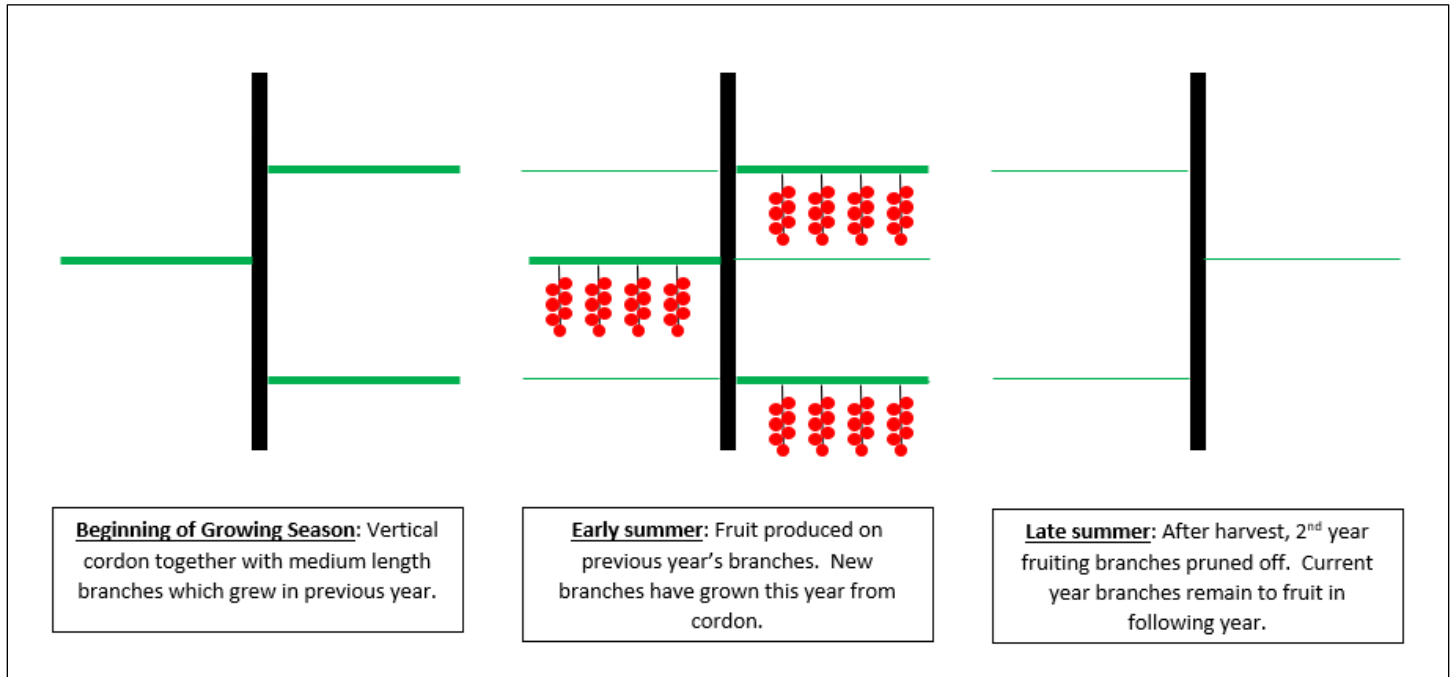
Row:	Crop:		Block 1				Block 2				Block 3				
1	Currant	Border	PC-T	B-UT	PC-T	JVT-UT	B-UT	PC-T	R-T	R-UT	JVT-UT	R-T	JVT-T	PC-T	Border
2		Border	B-T	R-UT	B-T	PC-UT	JVT-UT	PC-UT	PC-UT	JVT-T	R-UT	R-T	PC-UT	B-UT	Border
3		Border	R-T	PC-UT	B-UT	R-UT	B-T	R-T	R-UT	PC-T	JVT-T	B-T	R-UT	JVT-UT	Border
4		Border	JVT-T	R-T	JVT-T	JVT-UT	B-T	JVT-T	B-UT	JVT-UT	B-UT	PC-T	PC-UT	B-T	Border
5	Gooseberry	Border	BV-T	HR-T	HR-T	BV-UT	HR-T	CAP-T	TIX-UT	CAP-UT	HR-T	TIX-UT	BV-UT	TIX-UT	Border
6		Border	TIX-UT	CAP-T	TIX-UT	CAP-UT	BV-T	BV-UT	TIX-T	BV-T	BV-T	BV-T	CAP-T	HR-UT	Border
7		Border	HR-UT	TIX-T	HR-UT	BV-UT	CAP-UT	HR-UT	CAP-T	HR-T	HR-T	TIX-T	CAP-T	CAP-UT	Border
8		Border	BV-T	TIX-T	CAP-UT	CAP-T	TIX-T	HR-UT	BV-UT	TIX-UT	TIX-T	BV-UT	CAP-UT	HR-UT	Border

Table 2. Varieties Grown in our Trial

Crop	Variety	Source	Material	Date Planted In Field
Gooseberry	Black Velvet	Indiana Berry & Plant Company	Bareroot bush	4/22/2020
	Captivator	Indiana Berry & Plant Company	Bareroot bush	4/22/2020
	Hinnomaki Red	Nourse Farms	Small Plug	5/13/2020
	Tixia	Nourse Farms	Small Plug	5/13/2020
Currant	Blanka	Nourse Farms	Small Plug	5/13/2020
	Jonkheer van Tets	Nourse Farms	Small Plug	5/13/2020
	Pink Champagne	Nourse Farms	Small Plug	5/13/2020
	Rovada	Nourse Farms	Small Plug	5/13/2020

Trellis Construction and Plant Training. The overall premise of the cordon trellis system is that each plant is trained to one or more permanent vertical stems (the cordons). Fruit are produced on short horizontal branches off the cordon.

There are two main methods for pruning currants and gooseberries: the English and Dutch techniques. In the Dutch technique fruit are produced on longer horizontal branches which grew from the cordon in the previous year. Immediately after harvest, these fruiting branches are pruned off, and new branches will fruit in the following year.

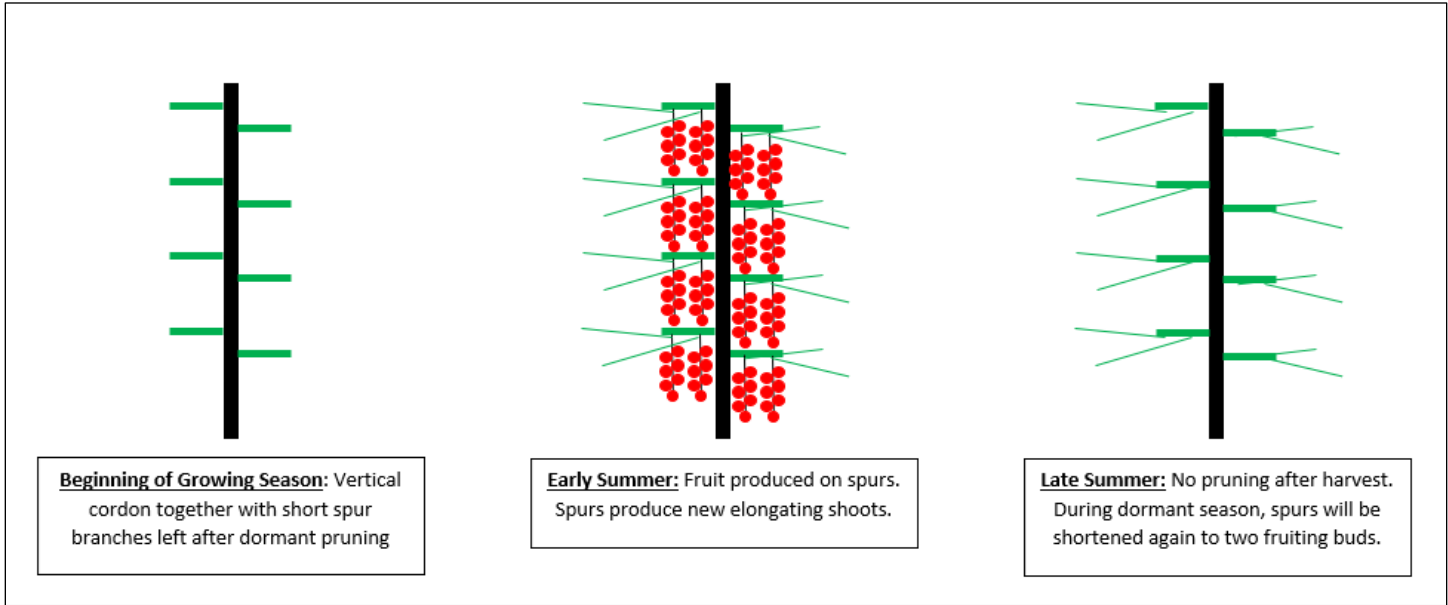


Dutch Pruning Technique



Fruiting branch of Captivator Gooseberry pruned with Dutch technique. Notice long fruiting branches.

In the English technique, all branches are cut back to several inches in length during dormant pruning, and these short branches produce fruit each year.



English Pruning Technique



Trellised currants immediately after dormant pruning using the English technique. Notice the numerous, short, stub-like branches which will produce fruit this year. Photo courtesy of Jason Fischbach, UW-Extension.

We used the Dutch pruning technique in our study, and we also followed the Dutch practice of training gooseberry plants to a single cordon, but currant plants to three cordons.

Our trellis was constructed in June 2020, after planting, using Best Angle brand angle iron stakes (1-1/2" wide x 1-1/2" wide x 8' tall; Best Angle model PB496-OR) each driven 2.5 feet into the ground and spaced six feet apart within the row. Two rows of 12.5 gauge high-tensile wire run down the row, one about 5-1/2 feet above the ground, and the other at six inches above the ground, and are fastened to the stakes with wire ties. At each end of each row, the trellis is braced with an angled stake and a ground screw as shown in Figure 1. At the location of each vertical cordon, a vertical 1/2-inch bamboo stake is placed between the two wires and fastened to the wires using pole clips (purchased from Peach Ridge Orchard Supply). We fastened the cordons to the bamboo stakes using plant tie tape applied with a Max-Tapener tool.



Untrellised and trellised currant plants, June 2021



Trellised Jonkheer von Tets Currant plants after pruning, June 4, 2021. Note absence of branches below bottom wire and cordons trained to bamboo stakes.

Table 3 shows the specific dates and activities performed during the first two growing seasons. In trellised plots, the overall goal was to develop the vertical cordons and allow branches to grow from the cordons, while removing any new shoots which originated near the soil surface and devigorating or removing long branches off the cordon which competed with the cordon leader.

Trellis Construction, showing one end of a row of trellised gooseberry plants. Trellis for currant plants is identical except there are three bamboo stakes per plant, and each plant has three upright cordons, one trained to each stake.

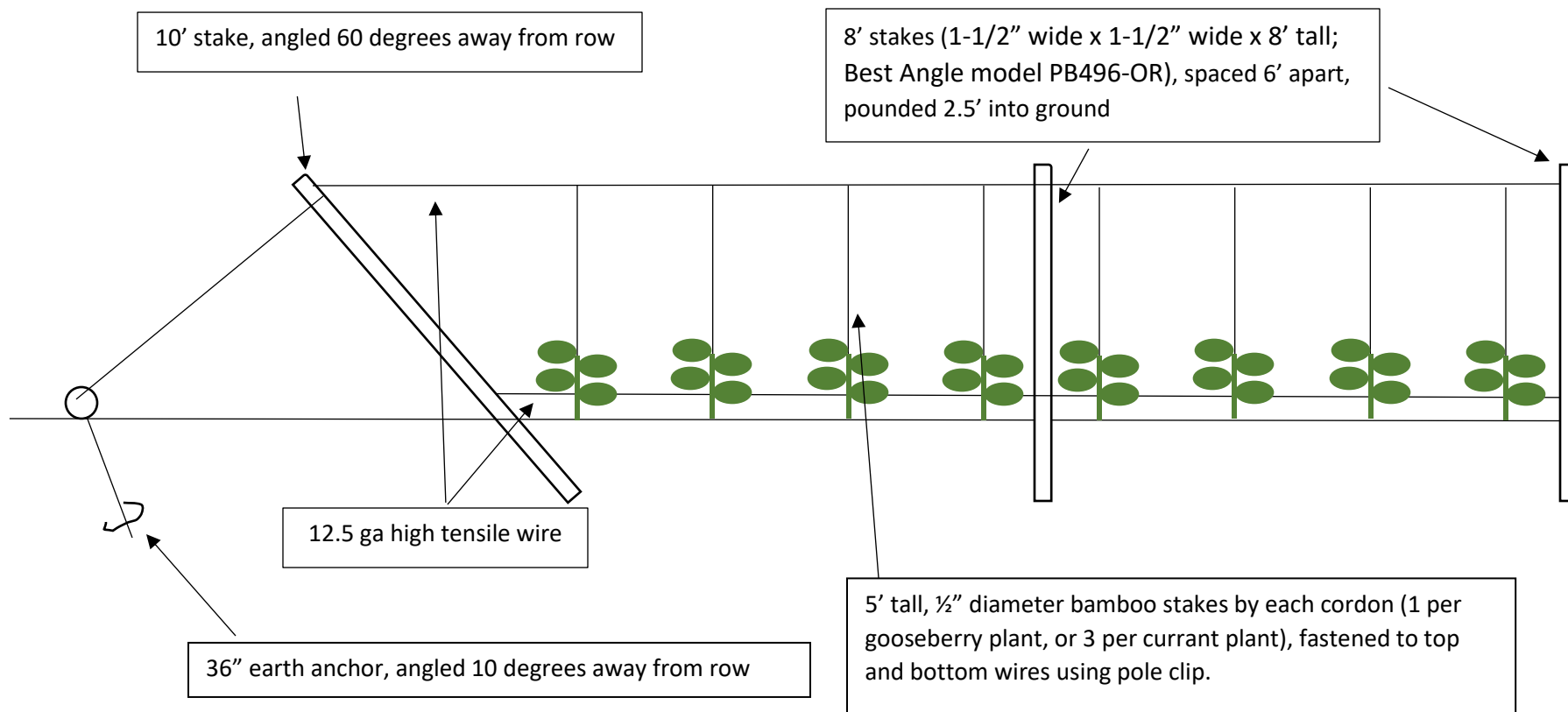


Table 3. Training and trellising activities performed in 2020

Date	Which Plantings	Activity
4/27/2020	Trellised Gooseberry	Black Velvet and Captivator gooseberries only: Shortly after planting, pruned to 1 cordon (vertical stem) per plant and remove any larger branches from the cordon (but left very short branches)
6/2/2020	Trellised Currants	Pruned to four shoots per plant (three cordons plus one backup shoot)
6/4/2020	Trellised Gooseberry	On Black Velvet and Captivator, pruned off any new shoots competing with the cordon. Tixia and Hinnomaki Red plants were barely breaking bud at this time.
7/2/2020	Trellised Currant & Gooseberry	Tied cordons to bamboo stakes.
7/6/2020	Trellised Gooseberry	Black Velvet and Captivator gooseberries only: Pruned off vigorous shoots originating below or near the soil surface.
7/21/2020	Trellised Currant & Gooseberry	Tied cordons to bamboo stakes.
8/11/2020	Trellised Currant & Gooseberry	Tied cordons to bamboo stakes.
8/11/2020	Trellised Gooseberry	Pruned off vigorous low branches originating near the soil surface that were competing with cordon; also tipped back upper branches competing with leader.
8/17/2020	Trellised Currant	Pink Champagne had many vigorous branches growing from the cordons. We cut back these branches to short stubs
4/3/2021	Trellised Currant	Currants: Pruned off 4 th (extra) cordon where it was present
5/25/2021	Trellised Currant	Currants: Pruned to 3 cordons per plant and removed all other long branches originating below bottom wire. Some shoots were up to 8-16" long at this point and should have been pruned earlier.
6/1/2021	Trellised Gooseberry	Gooseberries: removed all elongated branches originating below bottom wire. Taped cordons to stakes and removed vigorous upper branches which were competing with cordon leader.
6/1/2021	Trellised Currant	Taped cordons to stakes, removed vigorous upper branches from the cordons which were clearly competing with the cordon leader, or devigorated those branches by bending them down aggressively so that they cracked slightly at the base but did not break off. Follow-up observations in 2022 showed that these broken branches did develop into weak, devigorated, fruiting branches,
6/29/2021	Trellised Currant	Cut off branches originating below bottom wire, tied cordons to stakes
8/2/2021	Trellised Gooseberry	After harvest was complete, pruned off all branches with >6" of 2 nd year growth (i.e., growth made in 2020), leaving a dormant bud at the base of the branch or a weak secondary branch of current year's growth (i.e., a branch which had grown in 2021).
4/4/2022	Untrellised Currant	Pruned. Although the general goal in pruning bush currants is to prune to 4 shoots each of 1, 2, and 3 year ages, in this pruning we mainly removed canes and secondary branches which were lying prostrate on the ground. Rovada

		plants were small with a few generally upright canes and little secondary branching. Jonkheer van Tets planted had few canes, often prostrate, with very long and well developed secondary branches. Blanka plants had few canes, often prostrate, and mod-high secondary branching. Pink Champagne plants had many long canes, and many secondary branches.
4/8/2022	Trellised Currant	Pruned. Singulate forked branches where needed. Cur back long branches to 10-12" length, shorter if they were competing with cordon in height. Remove or tipped back low, drooping branches so they were not close to the ground. Removed some branches in Jonkheer van Tets because of high branch density – but observations in 2022 suggested that we should have removed more – canopy density was high in 2022 and there was little new branch growth from portions of the cordons which grew in 2021. Removed new canes as needed and singulated cordon leader when it was forked. Extent of branching varied among varieties, with Jonkheer van Tets having the most branches and Rovada the least.
4/13/2022	Untrellised Gooseberry	Pruned off dead canes (mostly present on Black Velvet. Pruned off canes lying on ground, sometimes leaving the base of the branch base up to a vigorous upright secondary branch. We did leave some canes lying on bare ground between strips of landscape fabric, where the canes were rooting. In plants with dense canopies, pruned off secondary branches or occasional entire weak cane.
4/13/2022	Trellised Gooseberry	Pruned off suckers and branches below bottom wire. Cut back occasional upper branch competing with cordon leader. Tipped back low branches lying on ground. Hinnomaki Red suckers heavily from ground and requires more pruning.
5/24/2022	Trellised Currant	Pruned low branches and and new canes below the bottom wire. Blanka produces few new shoots from the crown of the plant. Jonkheer Van Tets has shorter low branches than other varieties and few new shoots from the crown. Pink Champagne has many shoots below wire, growing both from the crown and from the base of cordons, but few long branches above the bottom wire. Rovada has many low branches although less than Pink Champagne.
6/6/2022	Trellised Currant	Tied cordons to stakes. Cracked upright vigorous branches as we did last year on 6/1/2021. Jonkheer van Tets had strong new growth and many upright branches competing with the cordon leader. Rovada had strong vegetative growth. Blanka had very tall cordons. Pink Champagne had weak new growth and few branches competing with the cordon leader.
6/6/2022	Trellised Gooseberry	Tied cordons to stakes. Cracked upright vigorous branches as we did last year on 6/1/2021. Gooseberries in general show vigorous new growth, but have few branches competing with cordon leaders.
7/29/2022	Trellised Gooseberry	After harvest was complete, pruned off all branches with >6" of 2 nd year growth, leaving a dormant bud at the base of the branch or a weak secondary branch of current year's growth.
8/1/2022	Trellised Currant	After harvest was complete, pruned off all branches with >4" of 2 nd year growth, leaving a ¾" stub at the base of the branch.

Varietal Differences. We noted significant differences among varieties in their growth habits and amenability to trellising. Among the currants, Blanka plants were tall and readily reached the top wire of the trellis in their second season; however they branched sparsely and some plants were reluctant to produce

three strong basal shoots which could be trained as cordons. Jonkheer Van Tets grew vigorously with strong dominant leaders but also abundant branches. In spring, this variety often grows a number of upright of vertical branches near the growing tip of the cordon, resulting in a “witches broom” type growth habit. We found that bending these branches down in early June far enough to crack them at the base but not break them off was very effective in devigorating them. We also suspect that Jonkheer’s cordon branches should be aggressively thinned in dormant pruning to reduce canopy density and shading and also to promote new branch growth, since the cordon trellis method relies on annual growth of branches from the cordon. Pink Champagne grew vigorously in the first season, but in the second and third seasons they flowered heavily and were slow to produce new vegetative growth. Rovada was overall the weakest, least vigorous variety in the first two years but thereafter grew vigorously although it did not branch abundantly.



Pink Champagne Plants on June 5, 2021. Note dense short, spur-like branches on last year's growth, but scarcity of vigorous current year shoots



Rovada Currant Plants on June 5, 2021. Note relatively weak, small plants with poorly developed cordons

Among the gooseberry varieties, Hinnomaki Red and Tixia produced small, non-vigorous plants. Untrellised, they tended to produce dense, low, mat-like canopies. Trellised, they produced weak, stunted leaders which did not elongate greatly. Captivator was extremely vigorous and fruited abundantly in 2021 and 2022. Trellised Captivator plants often reached the top wire in the second season and had abundant long branches. Untrellised plants were dense and large. Black Velvet was somewhat less vigorous than Captivator but grew well. Black Velvet frequently suffered death of branches or entire cordons (perhaps from some unidentified pathogen, or from winter injury).



Hinnomaki Red Trellised April 2021



Tixia Untrellised April 2021



Captivator Trellised June 2021



Captivator Untrellised June 2021

Fruiting. In spring 2020, the year of planting, we removed flowers and developing fruitlets from all plants. In 2021, we elected to remove all flowers and developing fruitlets from the currant plants to encourage them to fill their space. In the gooseberry plantings, we deflowered Tixia and Hinnomaki Red plants, but not Captivator and Black Velvet. The Tixia and Hinnomaki Red plants were very small and we wished to encourage more growth. Although we did not remove flowers or fruits from Black Velvet, the plants set few fruits and we did not record yield.

Captivator yielded abundantly in 2021, and we picked 1486 half-pints per acre from untrellised plants and 721 half-pints per acre from trellised plants. Fruit maturity was more rapid and uniform on trellised plants than on untrellised plants.

In 2022, we allowed all plants to fruit freely. All four currant varieties yielded 2-4 times as much from trellised plots as from untrellised plots. We suspect that the lower yield in untrellised plots was partially caused by the heavy dormant pruning in April 2022, when we removed many low-lying prostrate canes. Blanka and Jonkheer van Tets significantly outyielded Pink Champagne, which in turn significantly outyielded Rovada. Rovada had smaller plants and fewer flowers in spring, so its low yield was not surprising, although the variety is notable for its dense, well-filled strigs of large berries. Pink Champagne flowered very heavily, but sets very loose, poorly-filled strigs and its modest yield was therefore not surprising.

In the gooseberries, the effect of trellising method on yield was generally less, and differed by variety. Captivator far outyielded the other varieties, with Hinnomaki Red in turn far outyielding Black Velvet, and Tixia produced no significant yield. Overall, we felt that the difference in yield between Captivator and Hinnomaki Red was proportionate to the difference in plant size between the two varieties. The low yield of Black Velvet was surprising, because the plants were large and flowered abundantly, but fruitset was uneven and generally low, with occasional branches setting heavy crops and most branches setting few or no fruit.

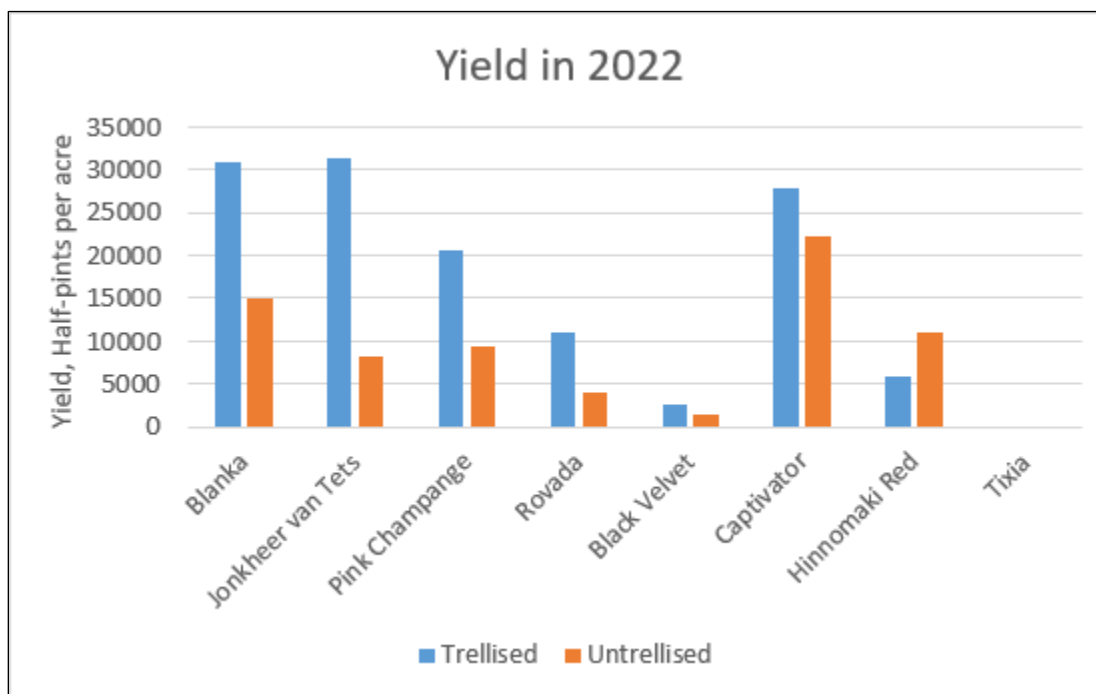


Table 4. Yields in 2022

	Yield (Half-pints per acre)		
	Trellised	Untrellised	Average
Blanka	30826	14966	22896
Jonkheer van Tets	31342	8207	19774
Pink Champagne	20488	9248	14868
Rovada	10977	3982	7480
Currants, average of all varieties	23408	9101	16255
Black Velvet	2639	1388	2014
Captivator	27925	22226	25076
Hinnomaki Red	5842	10922	8382
Tixia	0	0	0
Gooseberries, average of all varieties	9101	8634	8868

Pickers enjoyed picking from trellised plants more than untrellised, because the fruit were more accessible within an open canopy on trellised plants, whereas trellised plants bore many of their fruit within a dense canopy. Pickers found untrellised gooseberries particularly unpleasant to harvest because it was hard to avoid thorns within the dense canopy.

In 2021, harvest of Captivator gooseberries was slightly quicker from trellised plants: we picked 14.1 half-pints per hour from trellised plants, but only 12.2 half-pints per hour from untrellised plants.

In 2022, there were no consistent differences in harvest speed between trellised and untrellised plantings.

In both years we noted more consistent uniform ripening in trellised plants. This appeared to be because sunlight promotes ripening and trellised plants had smaller canopies with more uniform distribution of light.



Berries on Trellised Captivator Plants



Berries on Untrellised Captivator Plants

Other Planting Care. We mowed aisles between the rows approximately weekly during the growing season. We drip irrigated plants as needed. We hand weeded as needed when weeds emerged between the two strips of landscape fabric laid next to each row.

Pollination. In both years, we introduced purchased bumblebee colonies to augment wild pollinators. On 4/7/2021, 2 Natupol Excel Startup bumblebee colonies were installed in high tunnels located approximately 200-300 feet away from the *Ribes* planting. *Ribes* bloom began around 4/16/2021. These high tunnels had sidewalls which were opened for ventilation on most days, and bumblebees were frequently seen flying out of the tunnels. On 5/3/2022, 2 quads of bumblebee colonies from Koppert were installed approximately 125' from the *Ribes* planting, and *Ribes* bloom began on 5/7/2022. Note that the currants and gooseberries were planted adjacent to 2 acres of apples whose bloom overlapped with the *Ribes* bloom.



Left: A Koppert bumblebee quad installed in 2022. Right: A bumblebee visiting gooseberry blooms on 5/11/2022

Pests. Anthracnose leaf spot affected all gooseberry varieties, but spotting and defoliation was most severe on Tixia. Hinnomaki Red was the most resistant variety. This disease has been common on our farm and others in the region and is a major barrier to gooseberry cultivation. A small amount of cluster cup rust was seen on gooseberry plants in spring 2021, but this disease was infrequent and did not appear to significantly plant health, growth or yield. Powdery Mildew infected several currant plants, particularly in the variety Blanka. Currant spanworms were found on June 12, 2020 on several plants purchased from Nourse Farms; these caterpillars hatch from eggs laid on stems the previous year, and the plants were presumably infested while at the nursery in 2019. A spanworm infestation was also noted on a gooseberry plant in June, 2021. Spanworms have been easy to control on our farm with sprays of Dipel. Oblique-banded leafroller larvae were seen feeding on scattered plants on July 2020. A small amount of Japanese beetle damage was noted in July 2020 and 2021.



*Cluster Cup Rust lesion
on gooseberry leaf*

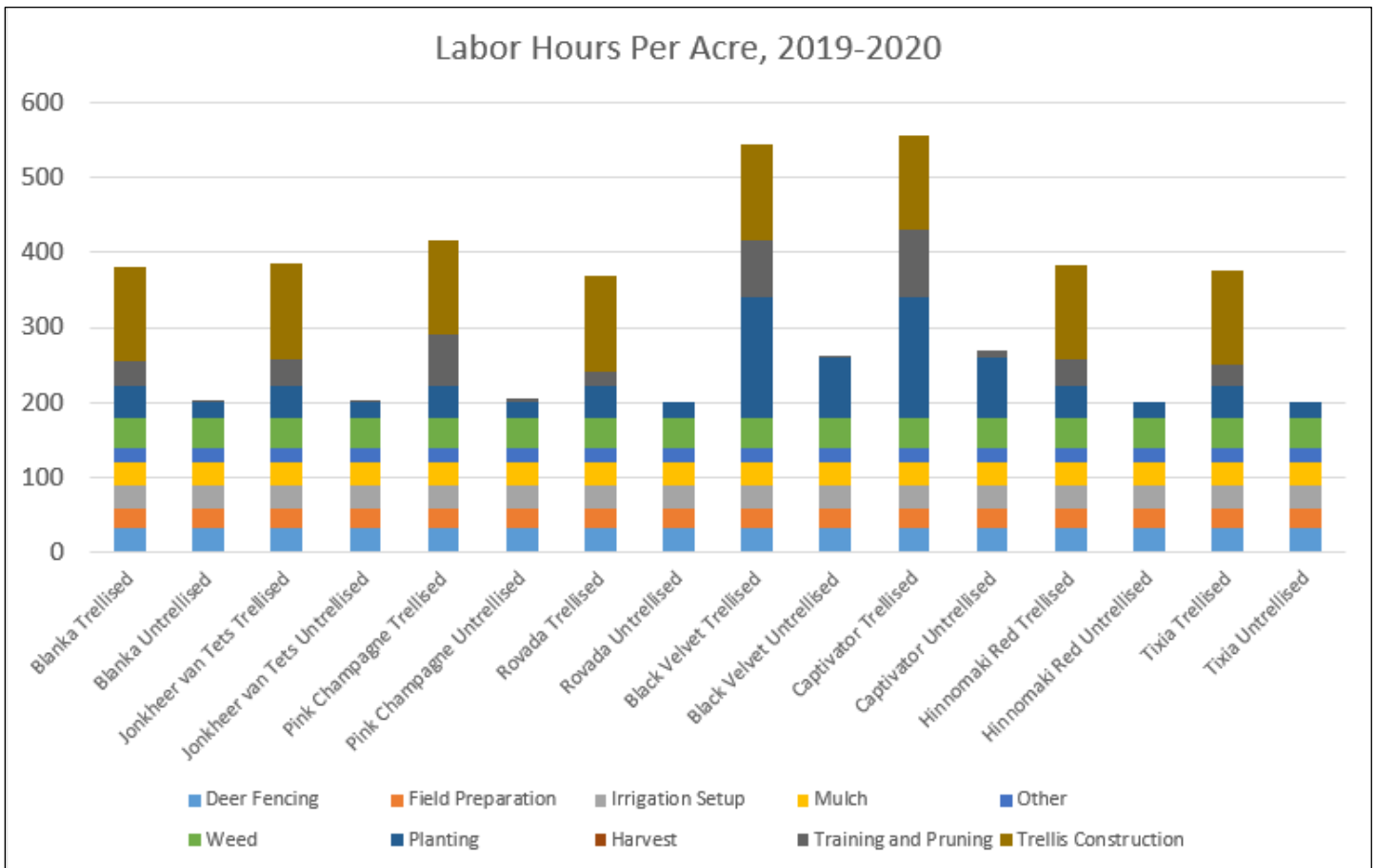


Anthracnose Leaf Spot on Gooseberry



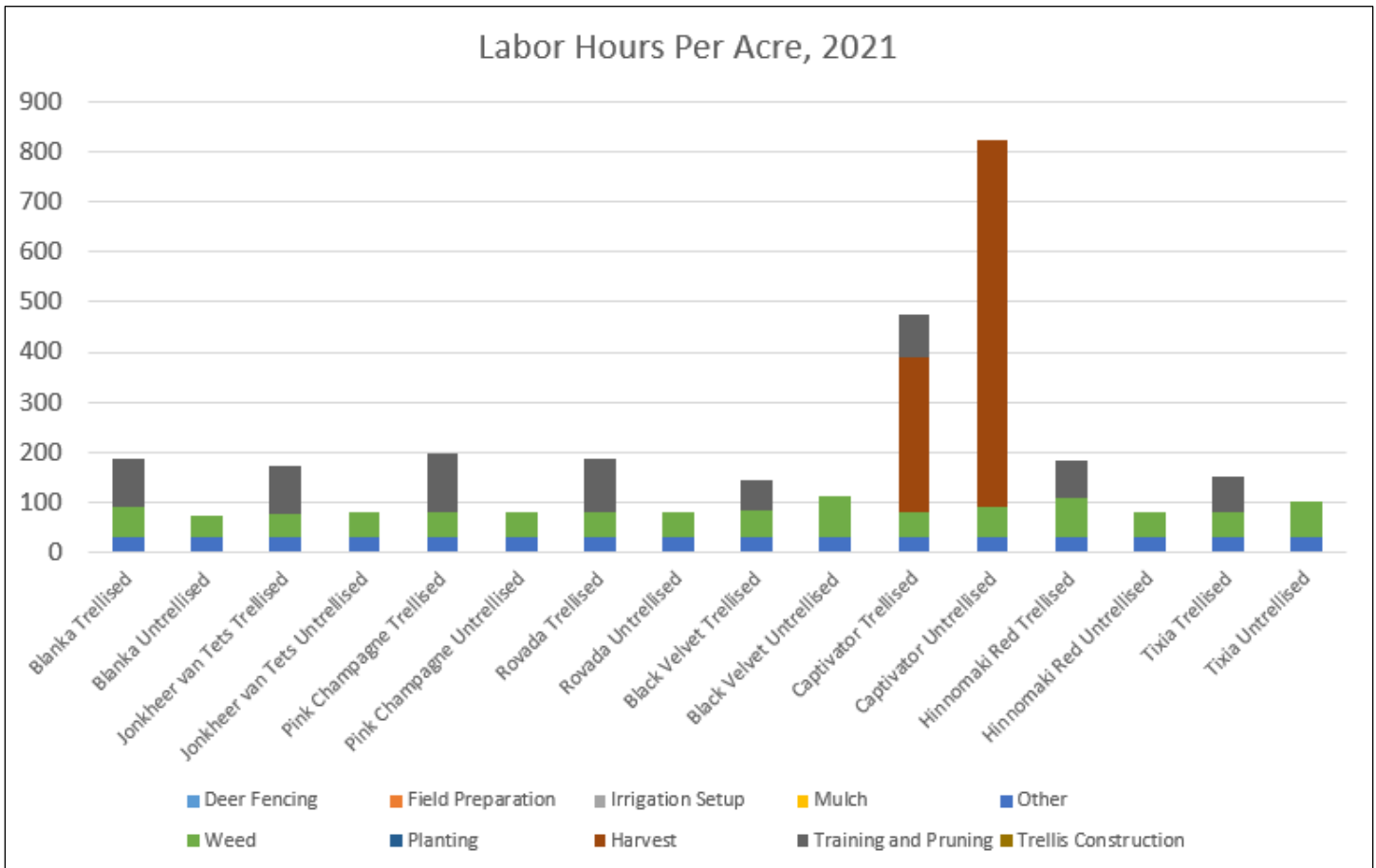
Currant spanworm

Labor and Materials Costs. In 2019-2020, trellised plantings required about twice as much labor time as untrellised plantings: averaged over all varieties, labor needs were 426 hours per acre in trellised plantings vs 217 hours per acre in untrellised plantings. (For simplicity, we have included the small amount of preplant preparation time spent in 2019 together with time spent in 2020.) The additional labor in trellised plantings was for trellis construction (127 hours per acre), training and pruning plants (averaged 47 hours per acre in trellised plantings, but only 2.6 hours in untrellised plantings), and planting (because the trellis plantings had twice as many plants per acre as the untrellised plants, planting required about twice as much time in the trellised plantings).



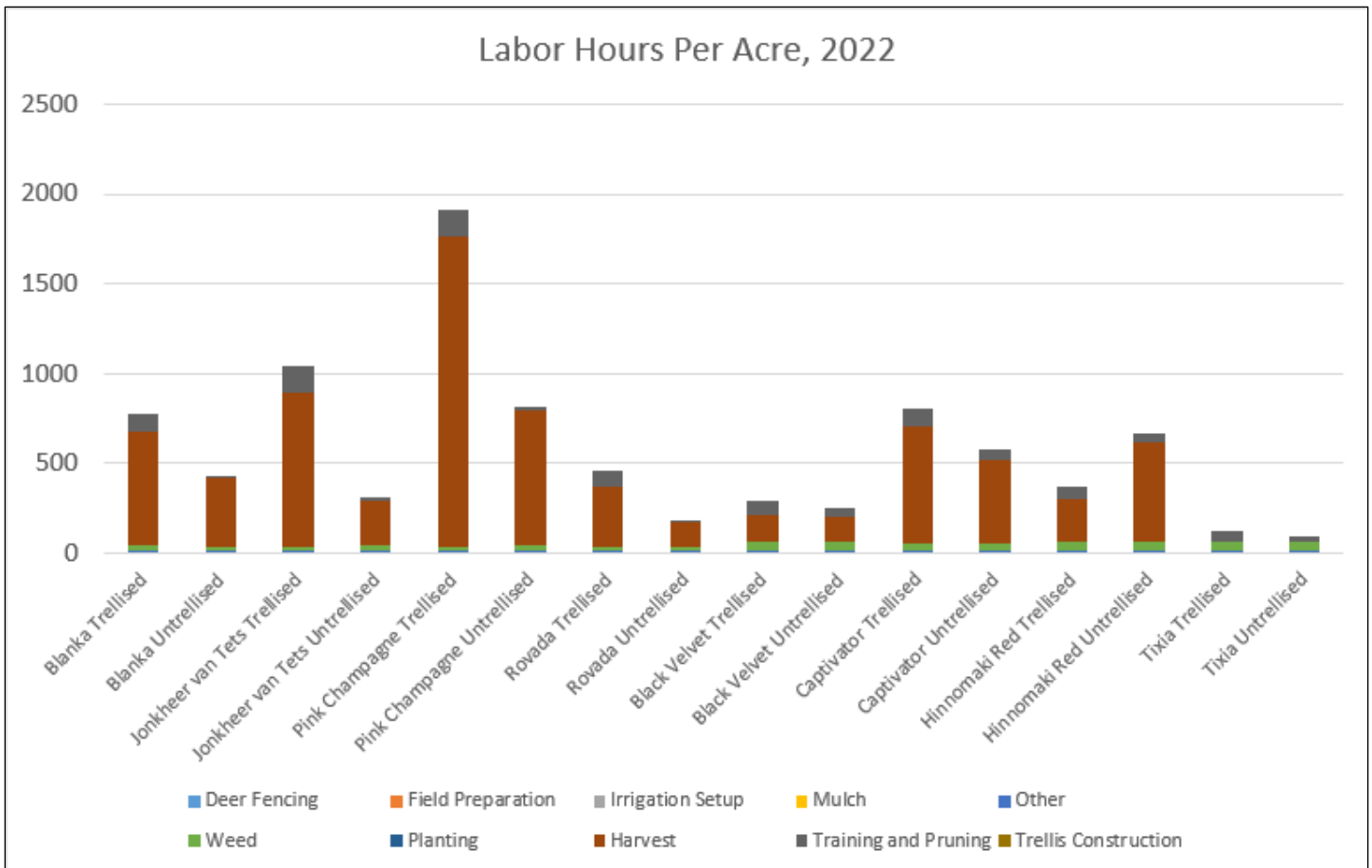
In 2021, trellised plantings continued to require approximately double the time required for untrellised plantings, largely because of time needed for training and pruning, with the exception of Captivator gooseberries. In Captivator, untrellised plantings required more labor because of harvest labor: untrellised Captivator yielded much more than trellised Captivator, and harvesting speed was slightly lower in the untrellised planting.

In 2021, currants required less weeding time than gooseberries (47 hours/acre vs 61 hours/acre). We suspect that the thorny branches on the gooseberry plants made workers slower and more cautious in their work. There was no clear difference between trellised and untrellised plantings in time required for weeding.

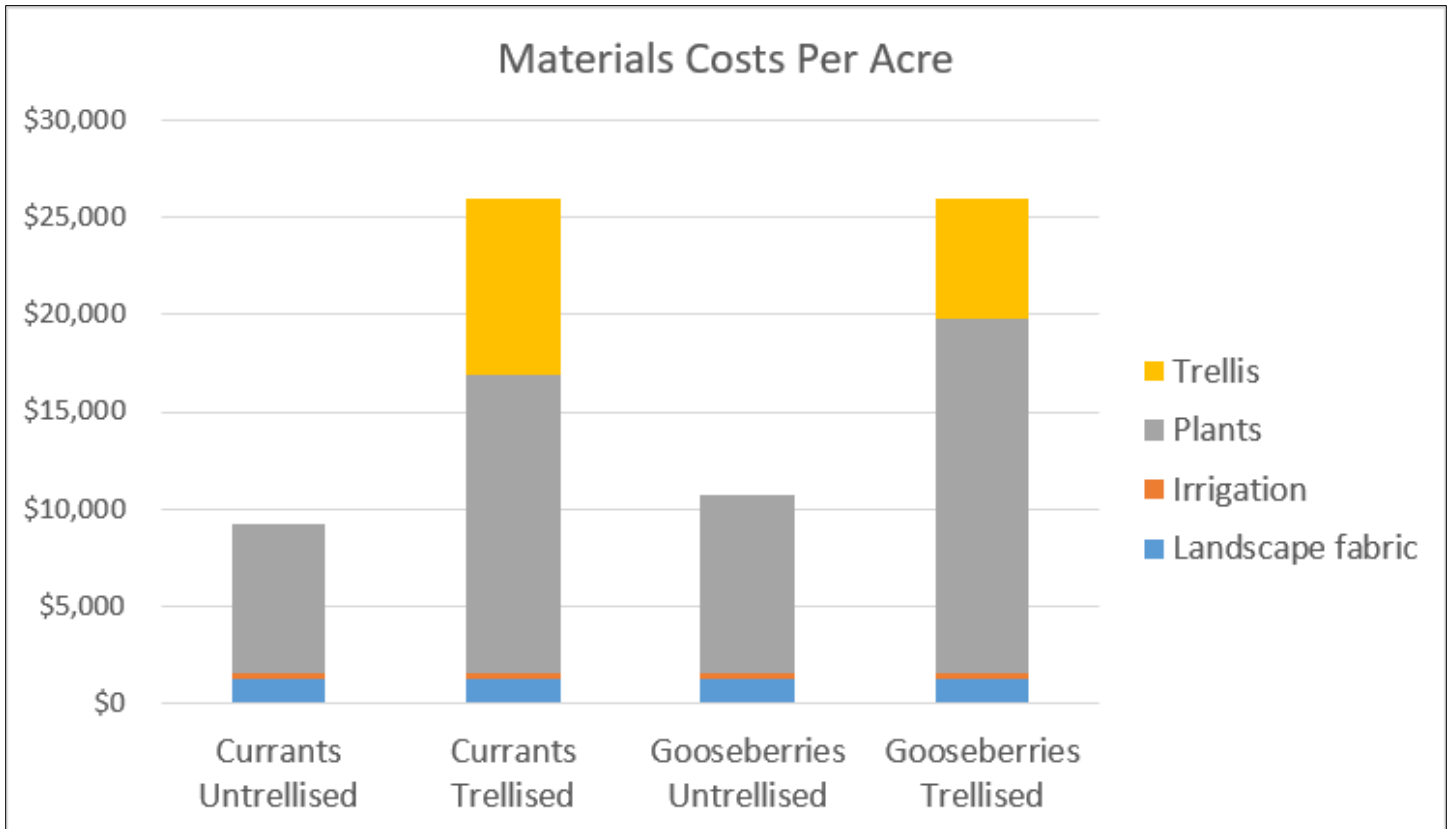


In 2022, total labor needs were largely determined by harvest labor. Plots with higher yields required more labor because of increased harvest labor. Labor required for harvest far exceeded labor required for other tasks, and harvest labor averaged 520 hours per acre. Trellised plantings continued to require more labor in training and pruning (averaged 103 hours per acre in trellised plantings vs 42 hours per acre in untrellised plantings). As discussed above, currants yielded more in trellised than in untrellised plantings, and harvest labor needs were therefore greater in trellised plantings. In the gooseberries, yield patterns were less consistent, but harvest labor time generally was proportionate to yield.

In 2022, currants generally required less weeding time than gooseberries (27 vs. 47 hours/acre), but there was no clear difference in weeding time between trellised and untrellised plantings.



Costs for plants and materials ranged from \$9,263-\$11,399 per acre in our untrellised plots, but were \$23,014-\$27,285 per acre in trellised plots; the additional costs in trellised plots was due to the cost of trellis (\$6,085 per acre) and the higher cost of plants (an additional \$7,665-\$9,801 per acre was required to purchase plants in the trellised system because of the higher plant density).



It remains to be seen whether the future advantages of the cordon trellising method will justify the substantial additional upfront costs in materials and labor.



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