

Red Currant Production in a High Tunnel Greenhouse

Jason Fischbach, Emerging Crops Outreach Specialist, UW-Madison, Division of Extension

Introduction

Red currants (*Ribes rubrum*) remain largely a niche fruit crop in the United States. American consumers are accustomed to eating sweet fruit (blueberries, strawberries, raspberries) and red currants are tart. However, health conscious consumers pursuing natural food diets present an opportunity to increase sales and production of red currants. An easy to grow plant, the bush fruit can be a good option for small diversified farms selling direct to customers or small retail outlets.

The challenge with small-scale red currant production is harvest. In Europe, red currants are grown in hedgerows and harvested mechanically, but such harvesting equipment (or scale) isn't practical for small producers, so hand-harvest is the only option. Production trials in Bayfield, WI measured the hand-harvest rate of 'Rovada' grown as multi-stemmed shrubs outdoors at 17.7 lbs/hr (Fischbach, 2014). Yield of 5 year old 'Rovada' was measured at 14.8 lbs per plant, meaning it can take nearly an hour per bush to harvest! The hand-harvesting is such a slow process because the berries are produced on short strigs at each node of the fruiting wood, which requires digging through the shrub. Growing red currants on a trellis in a cordon system can make harvesting much easier.



Photo 1. 'Rovada' red currants harvested from a cordon system in a high tunnel greenhouse (left) and from bushes grown outside (right).

High Tunnel Cordon Production

In Europe, red currants are often grown with a cordon system where a few stems per plant (cordons) are grown upright on a trellis with side branches pruned each year to short spurs where the fruit clusters are produced. This tends to make hand-harvest easier and can result in longer strigs with larger individual berries. By growing the cordon currants in high tunnel greenhouses, production is often higher and clusters are even larger. Photo 1 illustrates the difference of red currants grown on cordons in a high tunnel (left) to those grown on a shrub outside (right).

As a first step in evaluating the greenhouse cordon option for Wisconsin, a preliminary study was conducted with 'Rovada' grown in three different systems in a high tunnel greenhouse near Ashland, Wisconsin. This bulletin reports the results from the second and third bearing years.

Want to learn more? Check out the pruning demonstration video at:

<https://youtu.be/raMsVPn4PCc>

Methods

'Rovada' red currants were planted in spring of 2019 in a high tunnel greenhouse near Ashland, WI. Plants were bareroot dormant with 1-3 stems each 6-12" long (Photo 2). A single bed (4' x 44') was divided into thirds with the first third planted in a single row with plants spaced 18" apart and trained to a cordon system with the upright cordons spaced 6" apart. The middle third was planted with two rows with 18" between plants and 24" between rows. The plants were trained to the cordon system as in the first third but with each trellis angled out at roughly 30 degrees. The last third was planted in a single row with 18" between plants and each plant grown as a multi-stem shrub (Photo 3).

In the planting year (2019), the multi-stemmed shrubs were allowed to grow free, but for the cordon systems all but three stems were removed periodically from the base. At the end of 2019, the three main stems from each plant were attached to the trellis with stems spaced 6" apart.

In 2020, prior to breaking dormancy, all lateral stems from the three main stems of the cordon plants were pruned to 2-3 buds. In addition, the top of each cordon was headed back to roughly 6" from the apical most spur. This heading cut removes apical dominance and allows the lateral buds along the leader to grow (Photo 4). As in 2019, the plants were allowed to grow free, except that all new stems from the base were removed periodically during the growing season. The bush-type plants were again allowed to grow free. The mature fruit was harvested and weighed during the last two weeks of July. Once the fruit was harvested no additional actions or pruning were done in 2020.

In 2021, the same pruning system as in 2020 was implemented: all lateral branches were pruned back to 2-3 buds and the leader was headed back in April prior to breaking dormancy (Photo 3). The plants being grown as shrubs were pruned to remove the lower branches that were bending to the ground and the upright stems were thinned. Basal shoots were removed periodically from the cordon plants and fruit was again harvested over a two week period from July 11 to July 26.

Results

Table 1 shows the 2020 (yr 2) and 2021 (yr 3) yields for the single-row cordon, double-row cordon, and bush-type plants. High tunnel growers generally compare cropping options on a yield or



Photo 2. Single-row cordon system on May 3, 2019, one month after planting. Planting stock was bareroot dormant and all stems were left intact.



Photo 3. Single-row cordon system on March 8, 2021 showing the three cordons per plant with lateral branches pruned to 2-3 bud spurs. The cordons are attached to trellis wire and upright posts (metal, wood, willow, etc.) with ties or rubber bands.

revenue per square foot basis. The bush-type and double-row cordon systems produced a bed roughly 4 feet wide, while the single-row cordon bed was only 2 feet wide. In the first bearing year, the bush and single-row cordon systems had the highest yields at 1.1 lbs/sq ft. In the second bearing year, both the double-row and single-row cordon systems had higher yields than the bush-type system, due mainly to the taller plants. At 1.6 lbs/sq ft in the 2nd bearing year, it appears the single-row cordon system is the best option. It is also the easiest to maintain and to harvest.

	<u>2020 (yr 2)</u>			<u>2021 (yr 3)</u>		
	lbs/lineal			lbs/lineal		
	lbs/plant	foot	lbs/sq ft	lbs/plant	foot	lbs/sq ft
Bush	6.0	4.2	1.1	4.4	3.1	0.8
Single-Row Cordon	3.7	2.2	1.1	5.6	3.3	1.6
Double-Row Cordon	2.1	2.6	0.7	4.1	4.9	1.2

Table 1. Second and third year yields of ‘Rovada’ red currants grown in a high tunnel greenhouse.

Economics

Red currants can be sold as a fresh-eating crop. The most efficient harvesting and packing method is to pick directly into clam shells and leave the berries on the strigs. Shelf life in the cooler can be two weeks or longer. Currants can also be sold as a processing crop, in which case they should be de-stemmed, either before or after freezing. Prices for any direct marketed product are highly variable, but in northern Wisconsin, growers report selling frozen processing currants for \$4/lb and fresh-eating currants for \$4/pint (roughly \$6/lb). Thus, at 1.6 lbs/sq ft, revenue can be \$9.60/sq ft by year 3. This compares favorably with the most common high tunnel crop, tomatoes, which generates around \$9.00/sq ft (Langenhoven, 2016).

Currants require far less labor than tomatoes, but there is no revenue in the first year. This can be mitigated somewhat by planting a low growing crop, like lettuce, within the currant bed the first year.

Future Work

This preliminary project suggests red currant high-

(Continued on page 5....)

Photo 4. Single-row cordon system on April 8, 2020 before (top) and after (bottom) pruning. The trellis was installed in June of 2019 and the three dominant canes tied to the uprights to form the three cordons. In the spring prior to the plants breaking dormancy, (in this case April 8, 2020), all laterals are pruned back to 2-3 buds and the cordon is headed back to stimulate more branching. This process is repeated each year.





Photo 5. The double-row cordon system on April 8, 2020, pruned and ready for the year.



Photo 6. Currants grown as multi-stemmed bushes on May 4, 2020.



Photo 7. During the growing season shoots growing from the base of the plant are removed periodically, as was done here on May 27, 2020. The shoots should be removed earlier than was done here. In later years, some of these shoots will be retained to replace the older cordons. Removing the shoots is key to maintaining plant size and a somewhat open canopy. No pruning was done elsewhere on the plant during the growing season.



Photo 8. Currants flower early in the spring as shown here on May 13, 2020 in the second year. In a double-row system each row is angled away from the center of the bed. This allows the clusters to hang out away from the stems plants and results in slightly earlier ripening and easier harvest. However, the two rows take up more space in the high tunnel and yields on a per square foot basis were lower compared to the single-row system.

tunnel production is a viable option for Wisconsin growers. The rapid sprawling growth of currants, in general, and especially in the high tunnel, favors a cordon system. Multi-stemmed bushes just get too big and unmanageable even with annual pruning.

A number of questions remain on this production system. Disease and pest management in a high-tunnel is a crucial component that is not well understood. 'Rovada' is resistant to powdery mildew, but not all red currant varieties are. It should be possible to extend the harvest season by adding earlier or later varieties, but resistance to powdery mildew and white pine blister rust is essential. Imported currant worm is a serious pest with the larvae feeding on the foliage in mid-summer. In this trial, a single application of Bt was highly effective. However, the pest has been present each year and, thus, it'll be important to rotate chemistries to minimize the chances of resistance. Spotted wing drosophila has not been observed in these plants to-date, likely because the fruit is harvested by the end of July before populations can build. The effectiveness and timing of summer pruning in the canopy also requires additional research. In Europe, the canopy is thinned during the summer to hasten currant ripening, but what effect the pruning has on plant vigor and successive year production is unknown. Fertilization is also important to maintaining long-term productivity, but determining what and when to apply was not the focus of this preliminary work.



Photo 9. High tunnel cordon production of red currants is a viable option. The fruit ripens roughly two weeks before currants grown outdoors, the clusters and berries are larger, and harvesting from the upright cordons is fast and easy on the body. However, many fertility, pest management, and long-term pruning questions remain. Though revenue from high tunnel red currants can rival that from tomatoes, an open question is how red currants grown with an outdoor cordon system compare. In other words, which is more important, the high tunnel or the cordon system?

