

Enhancing Berry Farm Profitability Through Perennial Alley Crops

Research Results Bulletin

The Problem

Most shrub/berry fruits are grown in rows spaced tightly (8-15 feet) to maximize yield while permitting access by mechanical harvesters. While these “alleys” receive plenty of light, their narrow width prevents efficient cultivation of most crops. Consequently, most farmers resort to a simple grass-clover groundcover, which provides neither revenue nor substantial ecological benefits.

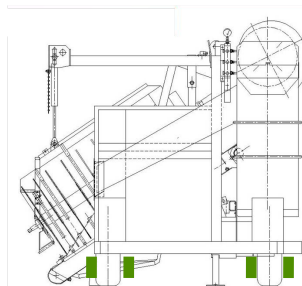
A Potential Solution

Some perennial alley alternatives could improve farm profitability and sustainability while maintaining management/harvest efficiency. Asparagus, rhubarb, and pollinator habitat (prairie) are ideal alley crop candidates because of their complementary harvest seasons compared to most berries, and they can rebound after being driven over by a tractor/harvester.

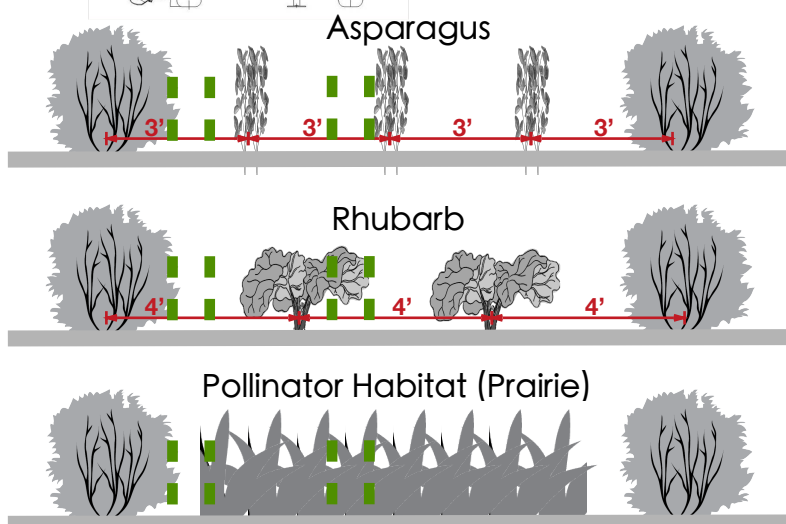
The Experiment

Asparagus, rhubarb, and pollinator habitat (prairie) were established within black currant alleys. The impact of alley crops on black currant growth, yield, and disease incidence were assessed. The alley crops were also evaluated for compatibility with a machine harvester (Weremczuk Joanna-3).

Experimental Design



Green lines indicate where harvester tires drive. Spacing was designed to minimize crop damage. Diagram is a to-scale view from the end of an alley; plant rows go into the page.



This project took place on Saturn Farm in Ogden, Illinois. Saturn Farm is a 21-acre innovative agroforestry farm operated by Midwest Agroforestry Solutions. The farm grows black currants and a variety of other tree crops. For more information, visit MidwestAgroforestry.com



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Results

Berry Yield

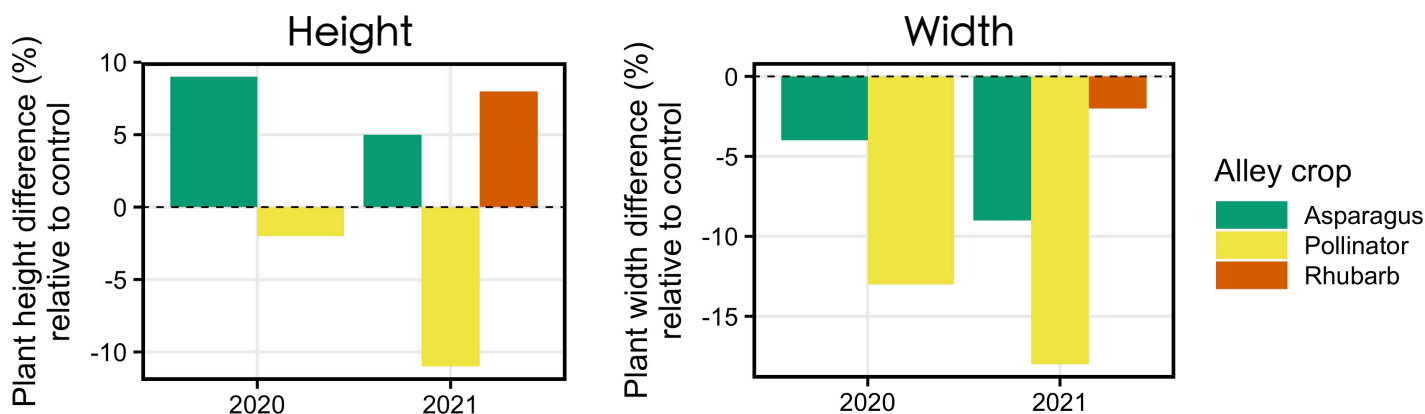
Berry yield was hypothesized to decrease with the addition of alley crops due to above- and belowground competition. However, no significant differences in berry yield were measured across the treatments in either year.

Disease Incidence

Disease incidence, particularly of common foliar fungal diseases, was hypothesized to increase with the addition of alley crops due to reduced airflow. While foliar fungal diseases were found on currant plants in all treatments, no significant differences were observed across treatments. This is likely due to the high and constant winds on the farms and relatively sparse biomass of the alley crops during spring, when fungal spores are most mobile.

Plant Growth

All alley crops cast shade on the currant plants from side. Typically, this type of shading causes plants to increase vertical growth and decrease horizontal (i.e. into the shade source) growth. This phenomenon was clearly observed with both asparagus and rhubarb alley crops — currant plant height was 5-9% greater and width was 2-9% lower relative to the control treatment. In the pollinator habitat treatment, however, while currant plant width was similarly reduced by 13-18%, plant height was also reduced by 2-11%. This reduction in plant height was contrary to our hypothesis but is most likely explained by an overall reduction in vigor in the currant plants with pollinator habitat alleys, as this treatment was the most competitive. Rhubarb plots were only measured in 2021.



Harvester Compatibility

The geometric design of both the asparagus and rhubarb treatments seemed to function as intended — good compatibility with the wheels of the tractor and harvester. However, the rhubarb was more resilient to damage caused by the low ground clearance of the mechanical harvester. Taller asparagus stems frequently snapped at the base rather than bend as the harvester passed over them. It is difficult to say how this will play out in future years as the alley crops reach their mature sizes. The pollinator habitat treatment, as expected, was completely resilient to damage. The increase in currant plant height that occurred in the asparagus and rhubarb treatments may also be a long-term benefit in an unexpected way. The machine harvester is less efficient at harvesting berries that are low to the ground. By stimulating taller stems, these alley crops may also increase the proportion of berries that are higher on stems and, therefore, captured by the harvester.