

2019 WORKING REPORT (YR 2)

FNE18-912 Effectiveness of Mixed Perennial Groundcovers in Establishing Hazelnut Hedgerow Systems in the Northeast

Nutwood Farm

SUMMARY

This is the second year of a three year study of perennial groundcovers in a hazelnut orchard. Overall we observed a good spread of groundcovers in the first year that exceeded our expectations, followed by vigorous second year regrowth of several notable species including yarrow, oregano, comfrey, and chives. We collected baseline soil chemistry data in May 2018, and took subsequent samples in October 2018 and October 2019. We also collected leaf tissue samples from the hazelnuts in August 2019. In summer and fall of each project year we recorded representative growth measurements of the hazelnuts in each repetition of our polyculture treatments. We also made observations on beneficial insect presence in our trial area. Next year we will collect our final rounds of soil, leaf tissue, and measurements and draw conclusions on the effects of a mixed perennial groundcover polyculture in our hazelnut orchard.

REPORT FROM 2019

In the second year of our study, we focused on observing the interspecific traits of the groundcovers and hazelnuts with a less managed approach. In late-spring we observed vigorous regrowth of the following species:

Soil Builders/Mineral Accumulators

<i>Mentha x piperita</i>	Peppermint
<i>Symphytum officinale</i>	Comfrey
<i>Allium schoenoprasum</i>	Chive
<i>Achillea millefolium</i>	Yarrow

Beneficial Insect & Nectaries

<i>Origanum vulgare</i>	Oregano
<i>Geranium macrorrhizum</i>	bigfoot geranium

These groundcovers exhibited favorable traits such as dense clumping and/or vigorous spreading beneath the hazelnuts.

In June we spent about 12 person-hours hand weeding the trial plots of any brambles, wild lettuce, meadowsweet, black locust, and buckthorn emerging in the rows. The rest of the season we spent just 20 person-hours on weeding - the rest of our time and manual labor was

spent on data collection and mowing the alleys between the rows as part of a regular field maintenance schedule.

At the end of June we took our first measurements to compare summer hazelnut growth and groundcover spread. Again we recorded information on four points:

- 1) Diameter of primary hazelnut cane at 4" up from ground - to the nearest 1/32 (using calipers)
- 2) Primary and secondary shoot growth on hazelnuts
- 3) Number of suckers growing at the base of each hazelnut
- 4) Groundcover coverage on a scale of 0-5 (0 being unchanged; 5 being complete coverage) on either side of each hazelnut with the tree in the center (a 3' span, 18" on each side). For the control plots, N/A was recorded for coverage.

By mid-summer, we observed that some of the perennial groundcover species had not performed well in their second year. The following species were either difficult to locate or missing altogether:

Soil Builders/Mineral Accumulators

<i>Mentha arvensis</i>	field mint
<i>Allium tuberosum</i>	garlic chives

Beneficial Insect & Nectaries

<i>Symphotrichum oblongifolium</i>	aromatic aster
<i>Ceratostigma plumbagenoides</i>	Plumbago

N-Fixers

<i>Lupinus perennis</i>	perennial lupines
<i>Vicia sativa</i>	common vetch

In mid-August we did our first leaf tissue sample analysis. We used a method similar to taking soil samples to randomly collect ten hazelnut leaves from the middle four hazelnut plants in each trial plot and combined the leaves receiving the same groundcover treatment into separate bags. This resulted in a total sample size of fifty leaves from each of the four treatment types, which was sent to the UMass Leaf Tissue Lab.

In mid-October we took our second round of soil samples using the same method as the previous fall. The soil samples were sent to Logan Labs, LLC. The following week we took our second round of measurements of the hazelnuts and groundcover spread in the second year, with one difference: because the hazelnuts had mostly lost their foliage, identifying and counting suckers became a difficult and time consuming task. Since we had already collected this data in June we opted not to include this number in our data set for October, assuming that no new

suckers would have grown since June and any dieback (or new growth) of suckers would be captured in our data next season.

Unfortunately we were unsuccessful in collecting data on the yellow sticky cards in our second year on the presence of pollinator and insect diversity in the trial plots. However, anecdotal observation supported an increased presence of beneficial insects due to the abundant supply of flowering species, starting with the geranium, followed closely by the chives, and continuing for the rest of the season with the yarrow and oregano. The comfrey and mountain mint also flowered abundantly for several weeks mid-season.

In our experimental design we also intended to re-woodchip the control beds; this did not occur as planned, and some soil erosion was noted in areas where the original woodchip layer had already broken down. A new layer of woodchip mulch will be re-applied in the spring of 2020.

Lastly, at the end of October, we offered a field trip opportunity to the Smith College students in Professor James Grogan's Biological Economics class in their module on fruit and nut trees. During the field trip we discussed our SARE research and the observations we have made so far on the interspecific relationships between the hazelnut and the perennial groundcover polycultures.