

Susceptibility of Cider Apple Varieties to Foliar Feeding Insects

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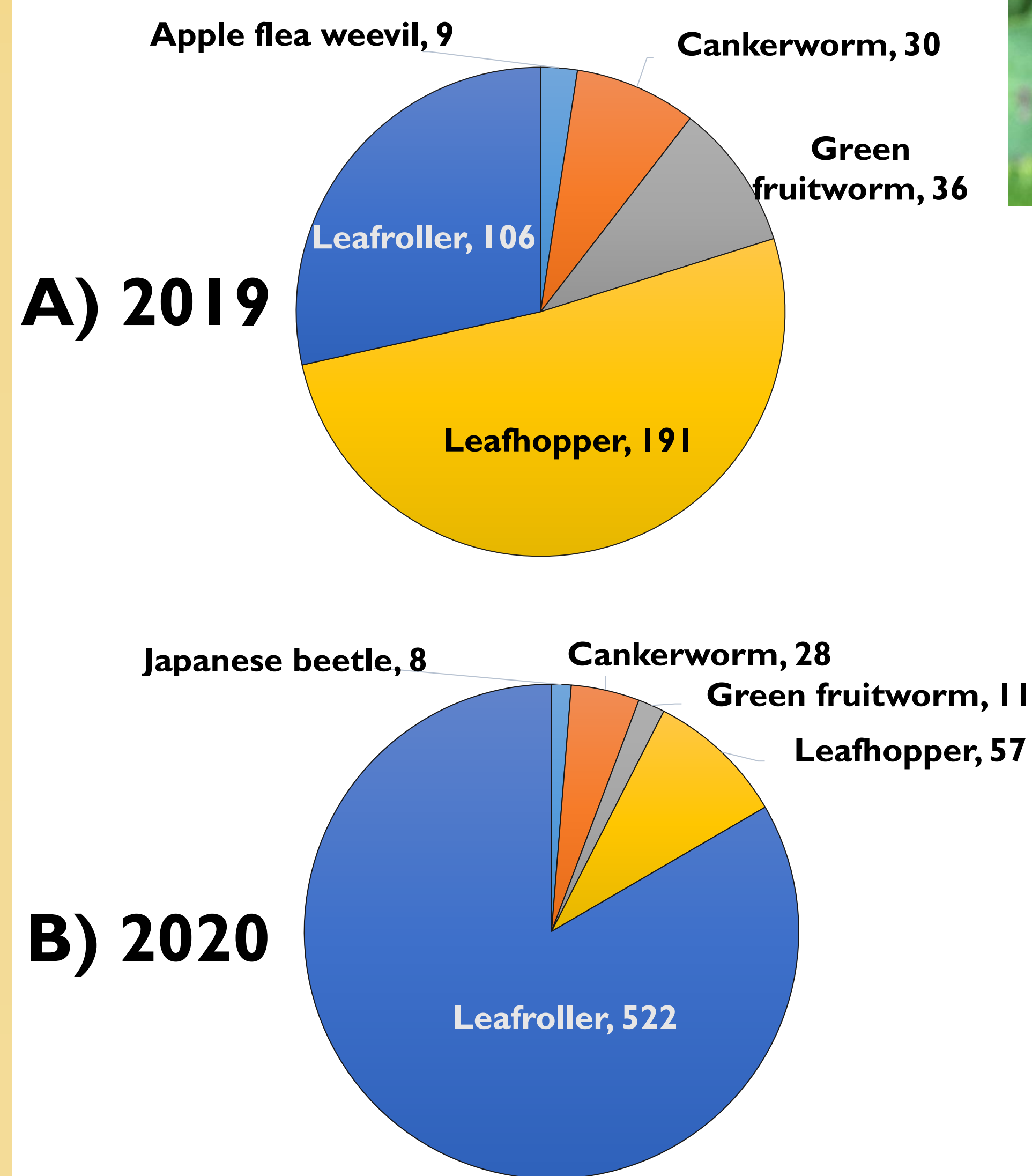
Vernon County, WI

Why 'cider' apples, and what can you expect from foliar-feeding insects?

The production of hard cider is a rapidly growing industry in the North Central region of the United States and, even though there are many apple producers there, few are growing historic apple varieties specific to hard cider production. The purpose of this study was to provide new information on the susceptibility of hard cider specific apple tree varieties to foliar-feeding insects for the driftless region of Midwest, one of the largest apple producing regions in the region. Foliar-feeding insect pests can pose a major threat to young apple trees, stunting them and impacting fruit size, yield and sugar content. Foliar-feeding insect pests of higher concern today in apple orchards of the North Central region include leafhoppers, leafrollers, cankerworms, green fruitworms, leaf miners, and Japanese beetles. While there was a considerable number of leafhoppers and caterpillars in the orchard of this study, we observed only a few Japanese beetles and virtually no leaf miners. Of course, that is subject to change since our data only represents the first two years of tree establishment—insect populations rise and fall and translocate from year to year depending on weather and other factors.

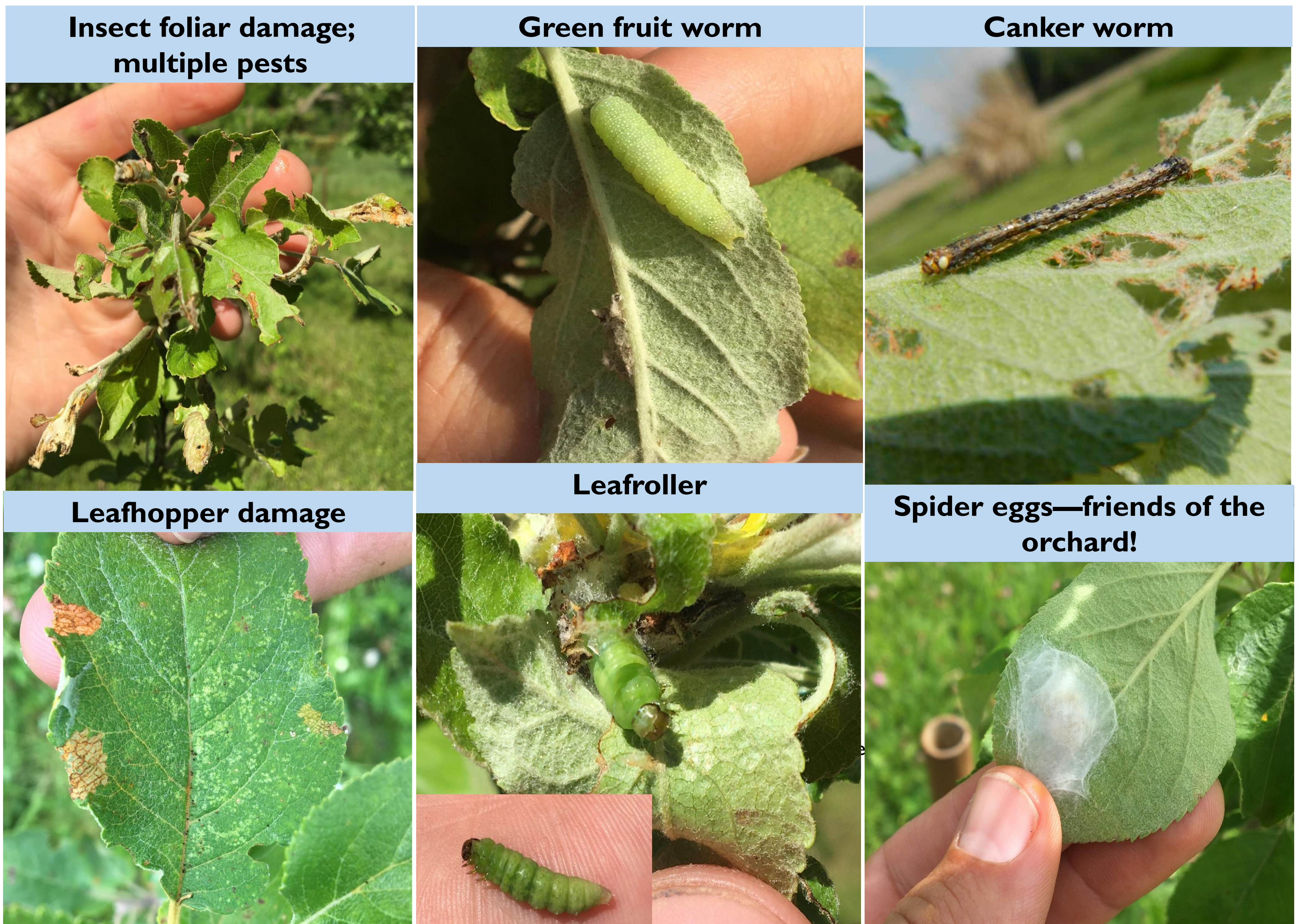
Total insect counts

Figure 1. Total foliar insect pests observed in (A) 2019 and (B) 2020.



Methods

We screened 9 semi-dwarfing cider specific apple tree varieties (with 8 replicates of each) for foliar insects; planted, May 2019, in ridge land soil of an established orchard in Vernon County, WI. No chemical sprays or synthetic fertilizer have been used in the orchard for at least 40 years, pest/disease management consisted of pruning and mowing only for this study. Foliage insect counts were conducted bi-weekly for each tree during the growing season.



Pest count timeline	
Date	Total foliage pests observed
2019 June	108
2019 July	275
2019 August	6
2020 May	405
2020 June	93
2020 July	124
2020 August	23

Table 1. Distribution of pest abundance observed on trees over the growing seasons. It took some time after planting in 2019 (a late planting, due to heavy rains) for the trees to leaf out and then the insects to find them.

Tree Variety	Pest count	
	2019	2020
Franklin	68	42
Whitney crab	59	31
Winecrisp	48	70
Newtown Pippin	42	92
Gravenstein	39	100
Roxbury Russet	35	92
Winesap	35	98
Red Astrachan	34	46
Cox Orange Pippin	29	74

Table 2. The distribution of total insect pests observed, by tree variety.

Which tree variety was most susceptible to foliar damage?

Newtown Pippin was most susceptible to foliar injury from insects (Figure 2), so this tree variety may need additional pest control measures to prevent stunting after planting. Gravenstein trees grew to be slightly larger than most varieties, so they had more foliage to absorb a higher pest count (Table 2) and still had minimal foliar injury.

Figure 2. Susceptibility index of different apple tree varieties for foliar injury from insects. Error bar (standard error of mean) represents variability of foliar injury across months of the year in 2020.

