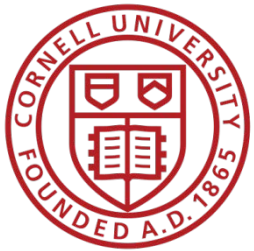


Cornell Cooperative Extension

Hail Netting for Apple Pest Exclusion

Mike Basedow, CCE ENYCHP, Plattsburgh NY

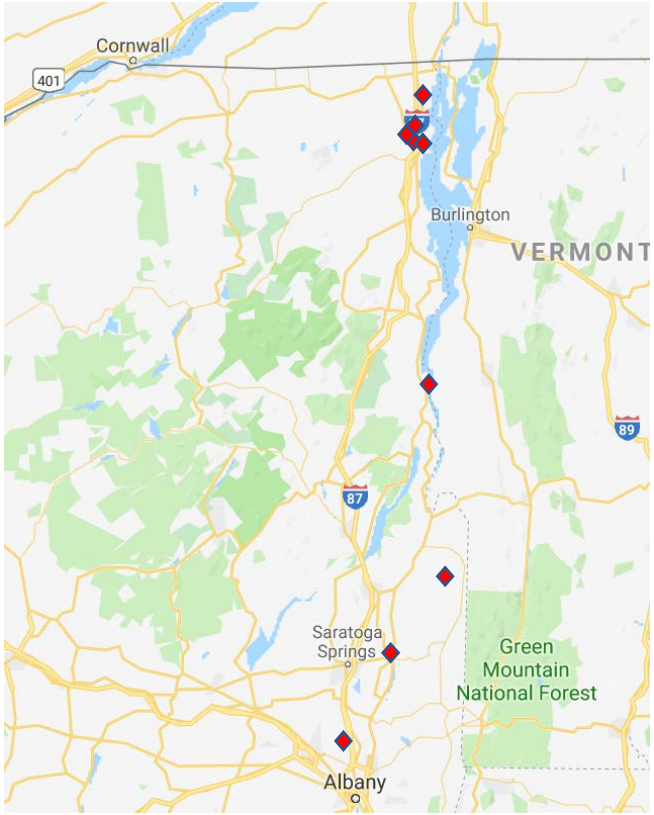
Why hail netting?

- Hail storms damaged apple crop in the Champlain Valley in 2012, 2013, and 2016
- Local orchards began investing in hail netting to reduce risk
- Growers expressed an interest to see the effect netting might have on their pest populations
- Previous studies of a similar netting system in Quebec

Pest dynamics differ in Northern NY compared to Geneva and the Hudson Valley

Worked with funding from Northern New York Ag Development Program to:

1. Continue monitoring the populations of 4 key pests across the Northern NY region
2. Compare 2018 seasonal pest captures to the previous 3 years of monitoring data
3. Determine if pests could be excluded from apple plantings using the hail netting
4. See if netting had an effect on fruit injury



- Monitoring traps installed across the region for:
  - Oriental fruit moth
  - Codling moth
  - Obliquebanded leafroller
  - Apple maggot
- Technicians checked traps weekly May through September
- Results, degree day forecasts, and comments were sent out in weekly e-alerts

Northern New York Trap Catches

Mike Basedow ENYCHP

Date Checked	Site	OFM	CM	OBLR	AM1	AM2	AM3	July 26 DD43BE	5-day DD forecast	Comments
25-Jul	Chazy	0	0	0	1	2	5	2082	2226	Apple maggot captures remain high in some locations. Apple maggot peak flight 2127-2642 DD. CM second flight peak 1954-2684. OFM second flight subsides 2026-2524. OBLR 2nd flight starts 2219-2628.
24-Jul	Peru E	0	1	0	6	14	10	2099	2243	
24-Jul	Peru	1	5	0	5	3	7	2099	2243	
24-Jul	Au Sable	1	2	1	8	27	15	2092	2234	
23-Jul	Crown Point	13	3	0	6	6	3	2399	2545	
23-Jul	Granville	3	3	0	12	6	12	2086	2222	
26-Jul	Schuylerville	0	2	0	6	9	9	2216	2360	
26-Jul	Clifton Park	0	1	0	2	0	0	2388	2539	

2018 Total Trap Captures

Fewer OFM in the Champlain, average in the Capital Region

	Champlain Valley		Capital Region	
Pest	2018 Average Trap Catch/Site	4-Year Average	2018 Average Trap Catch/Site	3-Year Average
OFM	**25.8**	**40.8**	**50**	**56.1**
CM	23.5	22	50.3	45.2
OBLR	29	60.4	22.3	48.7
AM	450	146	153	139

2018 Total Trap Captures

Average CM populations across both regions

	Champlain Valley		Capital Region	
Pest	2018 Average Trap Catch/Site	4-Year Average	2018 Average Trap Catch/Site	3-Year Average
OFM	25.8	40.8	50	56.1
CM	**23.5**	**22**	**50.3**	**45.2**
OBLR	29	60.4	22.3	48.7
AM	450	146	153	139

2018 Total Trap Captures

Fewer OBLR in the Champlain and Capital Region

	Champlain Valley		Capital Region	
Pest	2018 Average Trap Catch/Site	4-Year Average	2018 Average Trap Catch/Site	3-Year Average
OFM	25.8	40.8	50	56.1
CM	23.5	22	50.3	45.2
OBLR	**29**	**60.4**	**22.3**	**48.7**
AM	450	146	153	139

2018 Total Trap Captures

Very high counts of apple maggot in the Champlain Valley!

	Champlain Valley		Capital Region	
Pest	2018 Average Trap Catch/Site	4-Year Average	2018 Average Trap Catch/Site	3-Year Average
OFM	25.8	40.8	50	56.1
CM	23.5	22	50.3	45.2
OBLR	29	60.4	22.3	48.7
AM	**450**	**146**	**153**	**139**

2018 First Captures by Degree Day

OFM showed up late in the Champlain, on time in Capital Region

CM on time in both locations

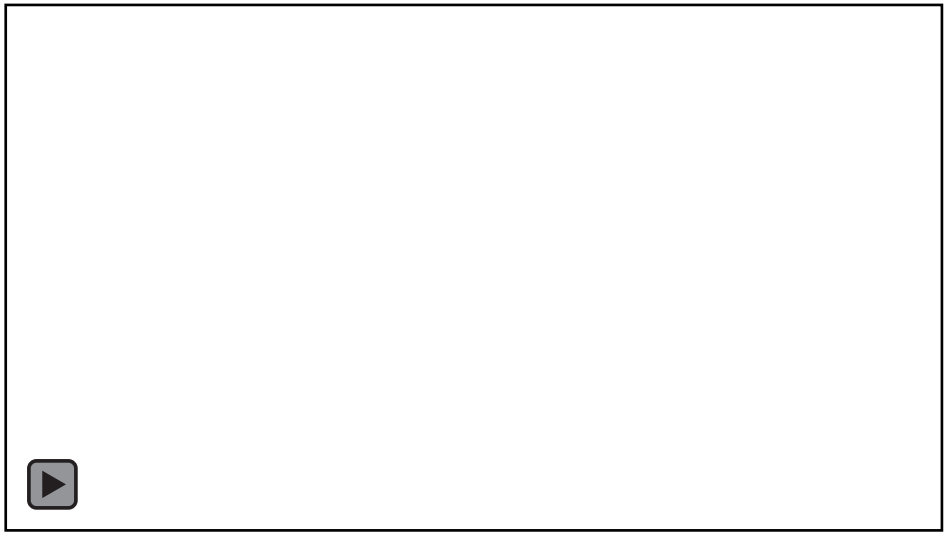
OBLR later in both regions

AM early in Champlain, slightly early Capital Region

Compared to Geneva, Capital Region fairly close, Champlain a bit later

	Champlain Valley		Capital Region		Geneva
Pest	2018 First Catch $DD43_{BE}$	4-Year Average	2018 First Catch $DD43_{BE}$	4-Year Average	33-Year Average
OFM	756	471	290	368	223-323
CM	508	566	559	525	398-566
OBLR	1065	863	877	660	797-980
AM	1466	1718	1496	1654*	1226-1690

Exclusion Study



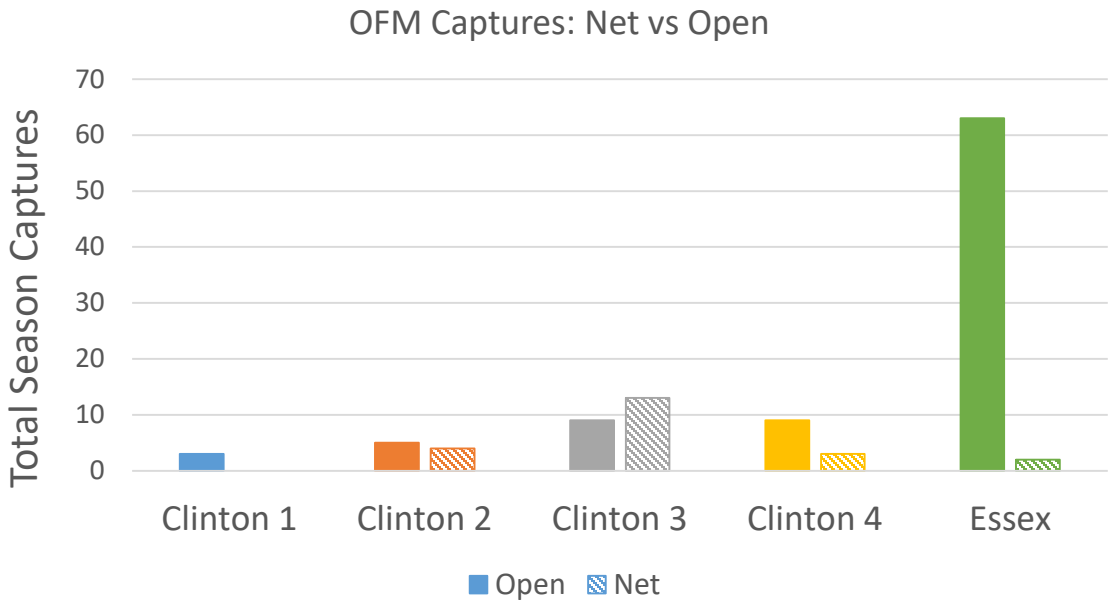
- Drape Net hail netting installed at five sites in mid June
  - Netting mesh size is 1.5x3mm
- Two treatments at each site
  - One netted row, one uncovered
  - Four full ‘Honeycrisp’ sites
  - One site ‘Sweetango’ (netted) and ‘Honeycrisp’ (uncovered)
  - Monitored two full set of traps at each site weekly
  - Compared treatments using a general linear model in R
- Fruit ratings were conducted at the four Honeycrisp sites at the end of July and August
  - 300 fruit inspected for pest and disease damage

Weekly Trap Capture Results

Oriental fruit moth
Statistically, fewer OFM caught under the netting.

All but one netted site caught fewer OFM over the course of the growing season.

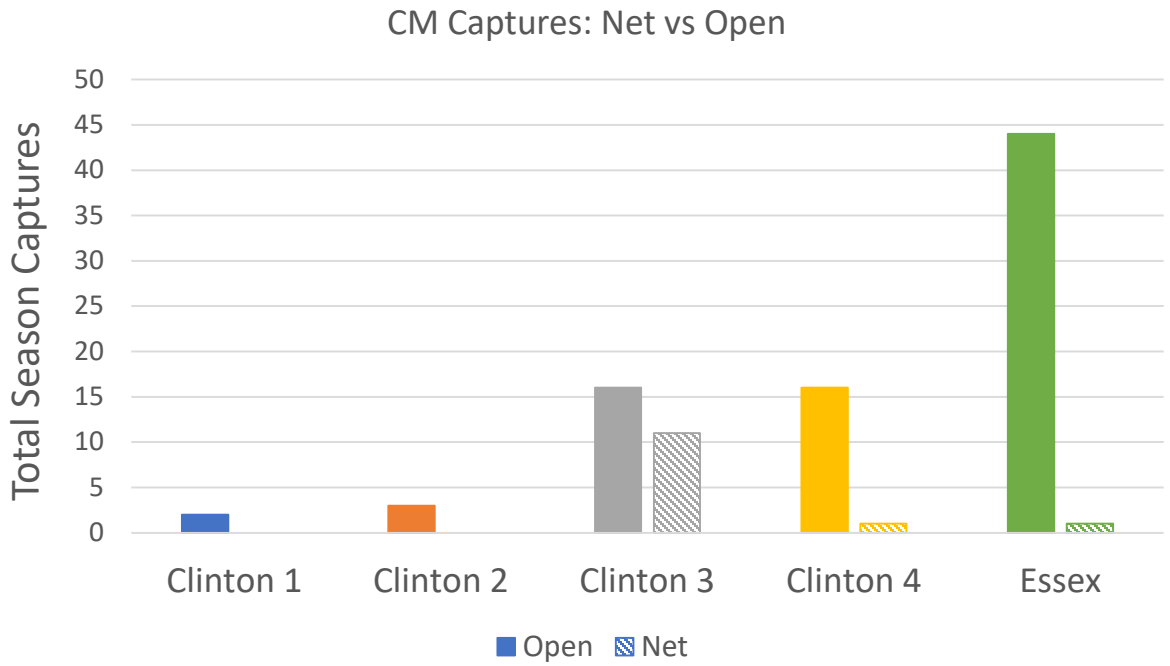
Clinton 3 did not have netting secured to the trees as tightly as some of the other sites.



Weekly Trap Capture Results

Codling moth

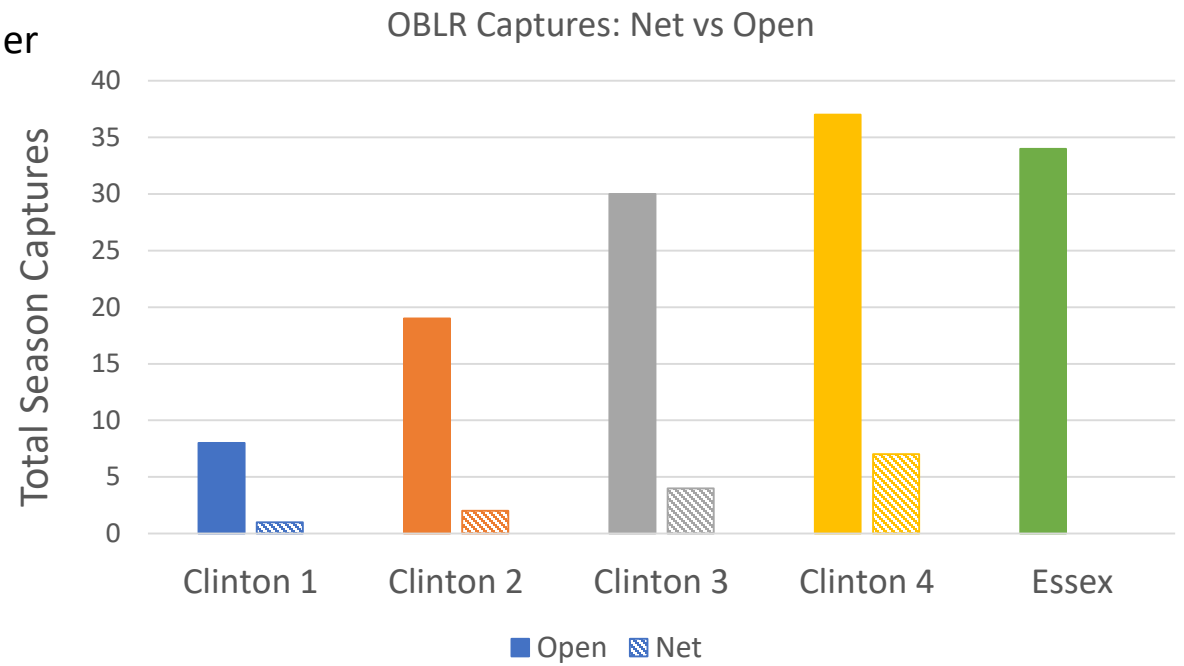
Statistically, fewer CM caught under the netting.



Weekly Trap Capture Results

Obliquebanded leafroller

Statistically, fewer OBLR caught under the netting.

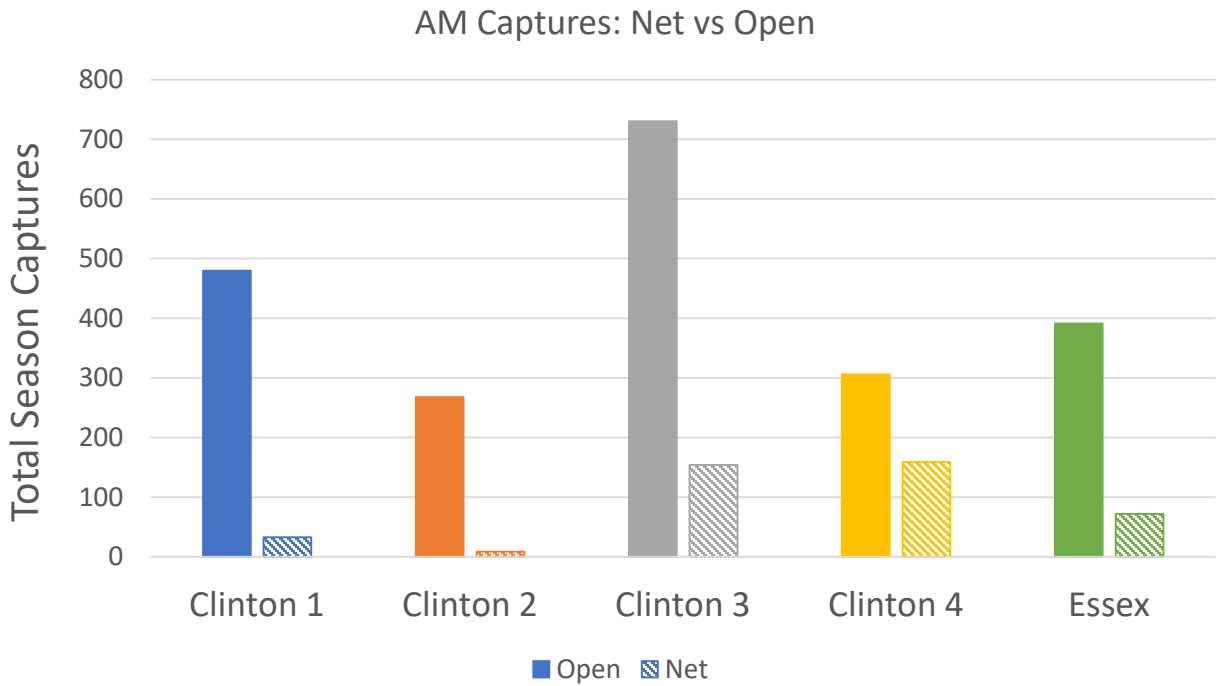


Weekly Trap Capture Results

Apple maggot
Statistically, fewer AM caught under the netting.

Maggots still got in at all sites.

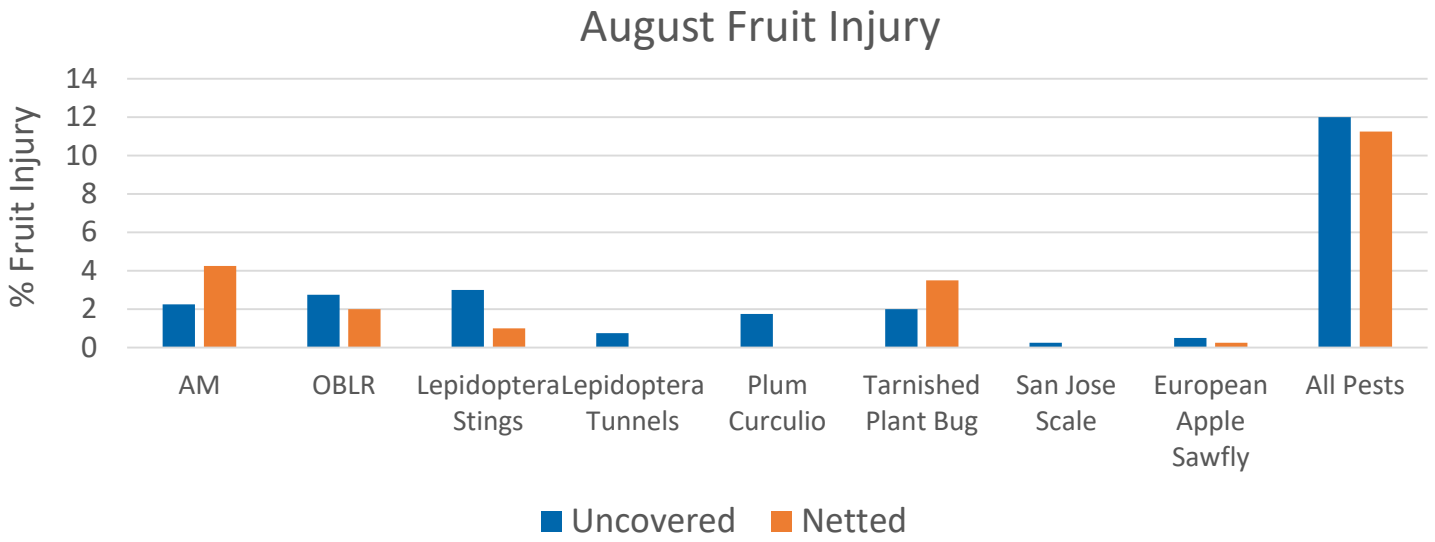
Nets more loosely secured at sites 3 and 4.



Netting had no effect on fruit injury

We observed no statistical differences in fruit injury between the netted and uncovered sites at either survey date.

Plots were being commercially managed, so overall low pest damage.



Takeaways

- While statistically significant, OFM likely present in the orchard prior to net installation, so impacts on first generation might be somewhat negligible.
- Netting reduced CM, OBLR, and AM numbers more consistently across the five sites.
- Sites with the best pest exclusion appeared to secure the netting to lower limbs and trunks at more frequent intervals.
- Be careful when passing through the netted rows with equipment, nets can tear!
- Relatively light OFM and OBLR pressure in the Champlain Valley in 2018.

Acknowledgements

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Grower Cooperators:

- Chazy Orchards
- Forrence Orchards
- Northern Orchards
- Gunnison Lakeshore Orchards
- Hicks Orchard
- Saratoga Apple
- Bowman Orchards