INSTITUT DE RECHERCHE
ET DE DÉVELOPPEMENT
EN AGROENVIRONNEMENT

GROWING HONEYCRISP APPLES WITHOUT PESTICIDES: LONG-TERM BENEFITS AND CHALLENGES*

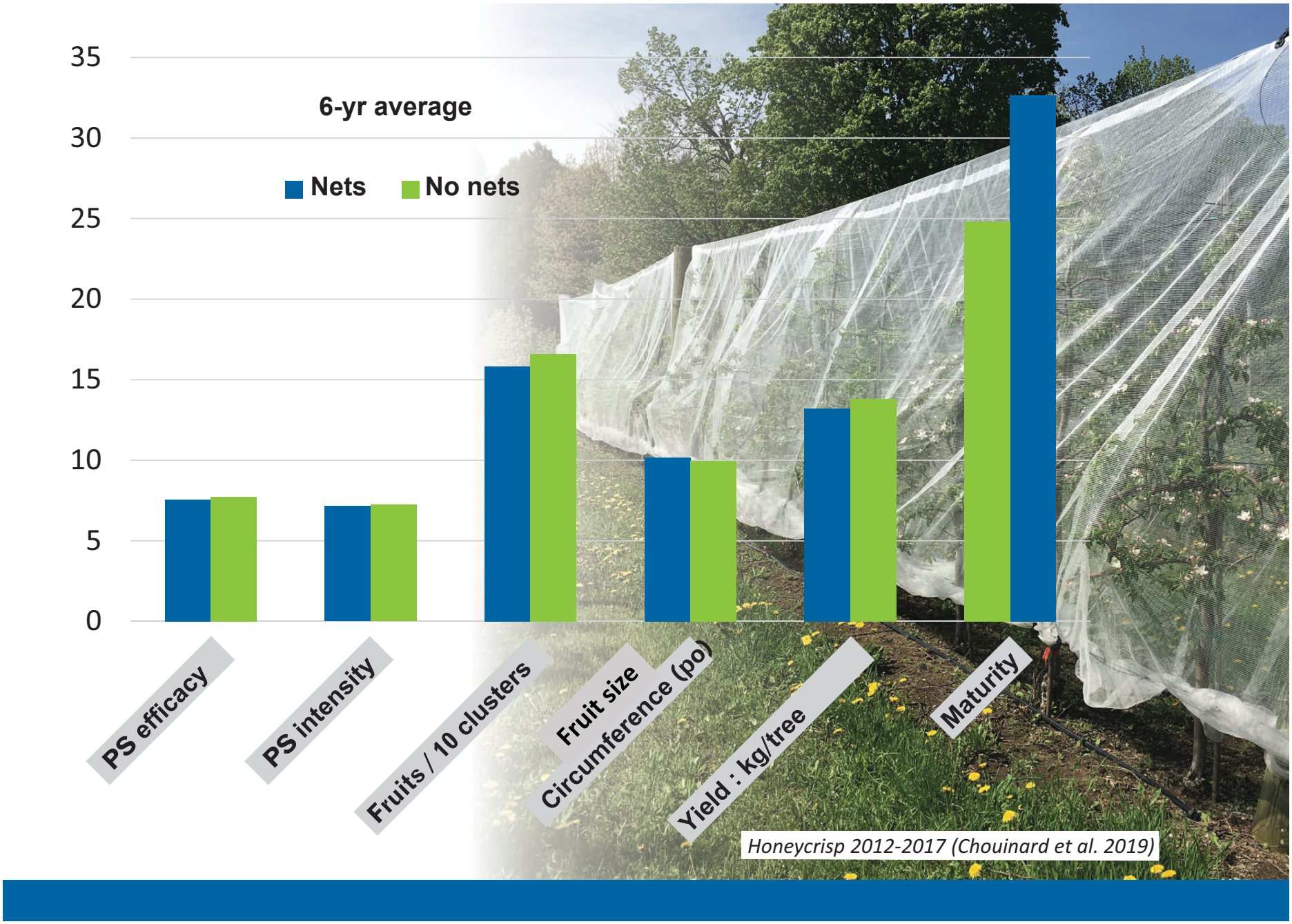
** Based on 6 published papers by Chouinard, Philion, Cormier, Tavares, Bérard, Knoch, Larose, Joubert, Dumont, Mukherjee, Veilleux & Patience (2016, 2017, 2019)*

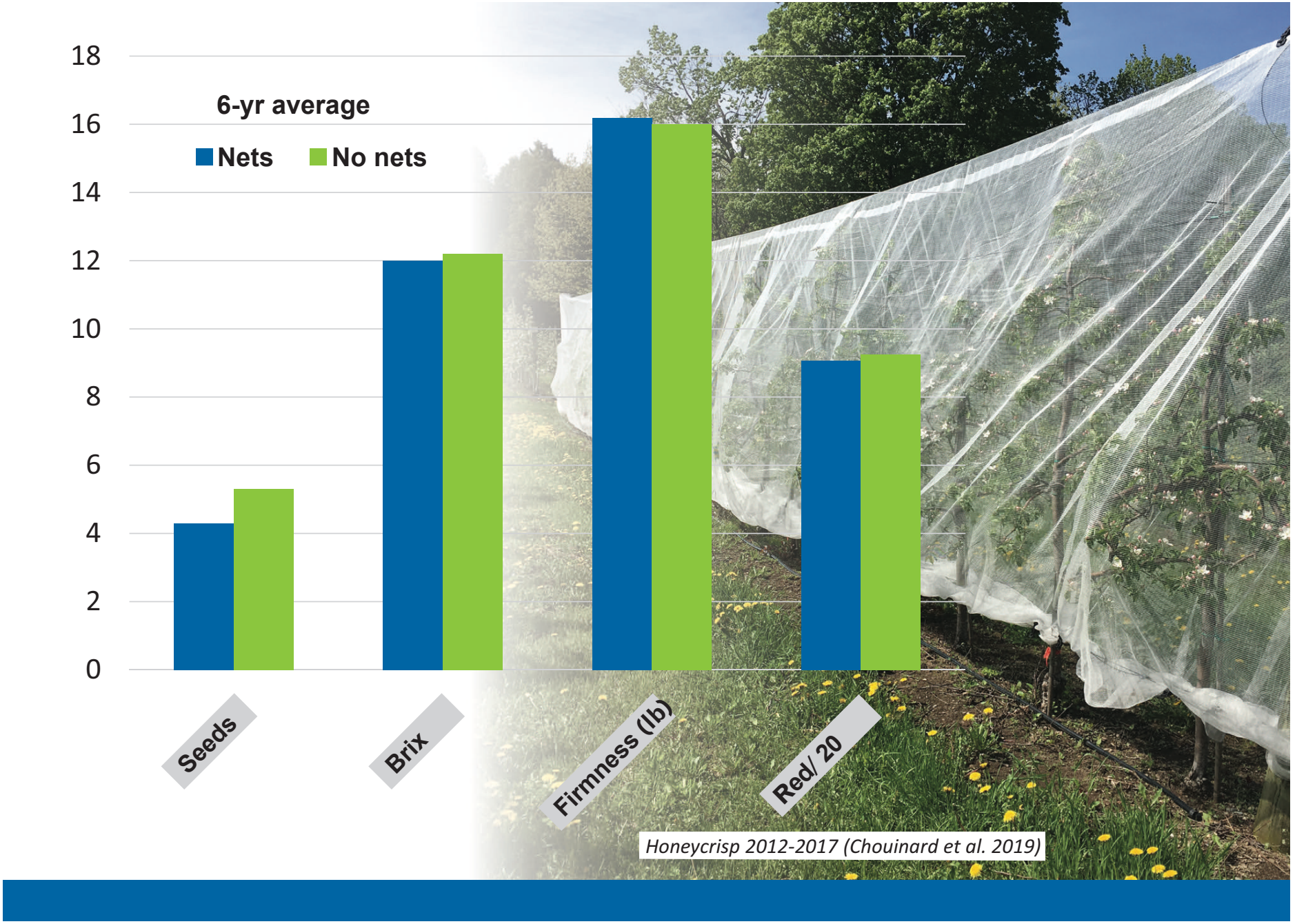
France (apples)

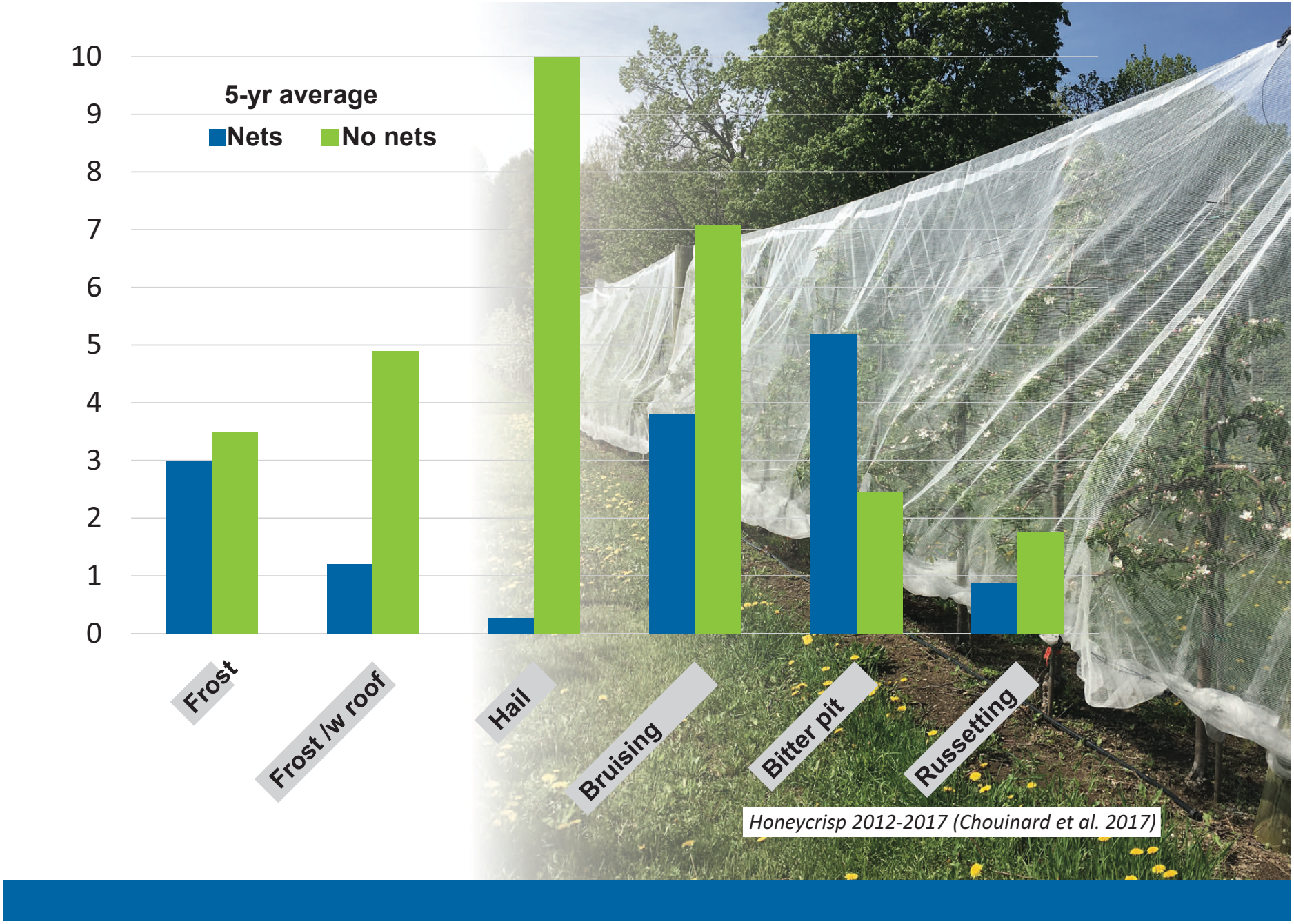
Italy (pears)

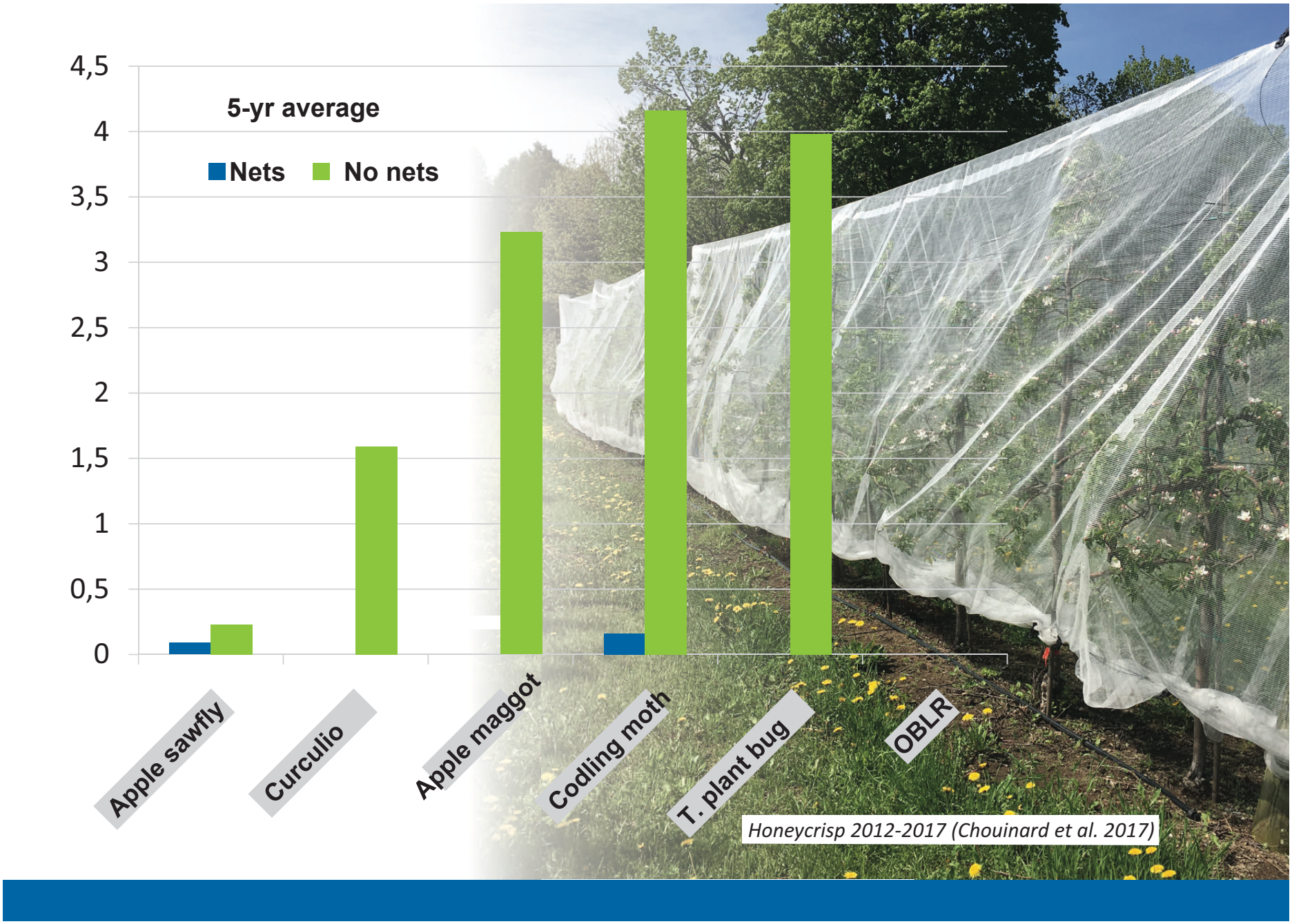
Italy (apples)

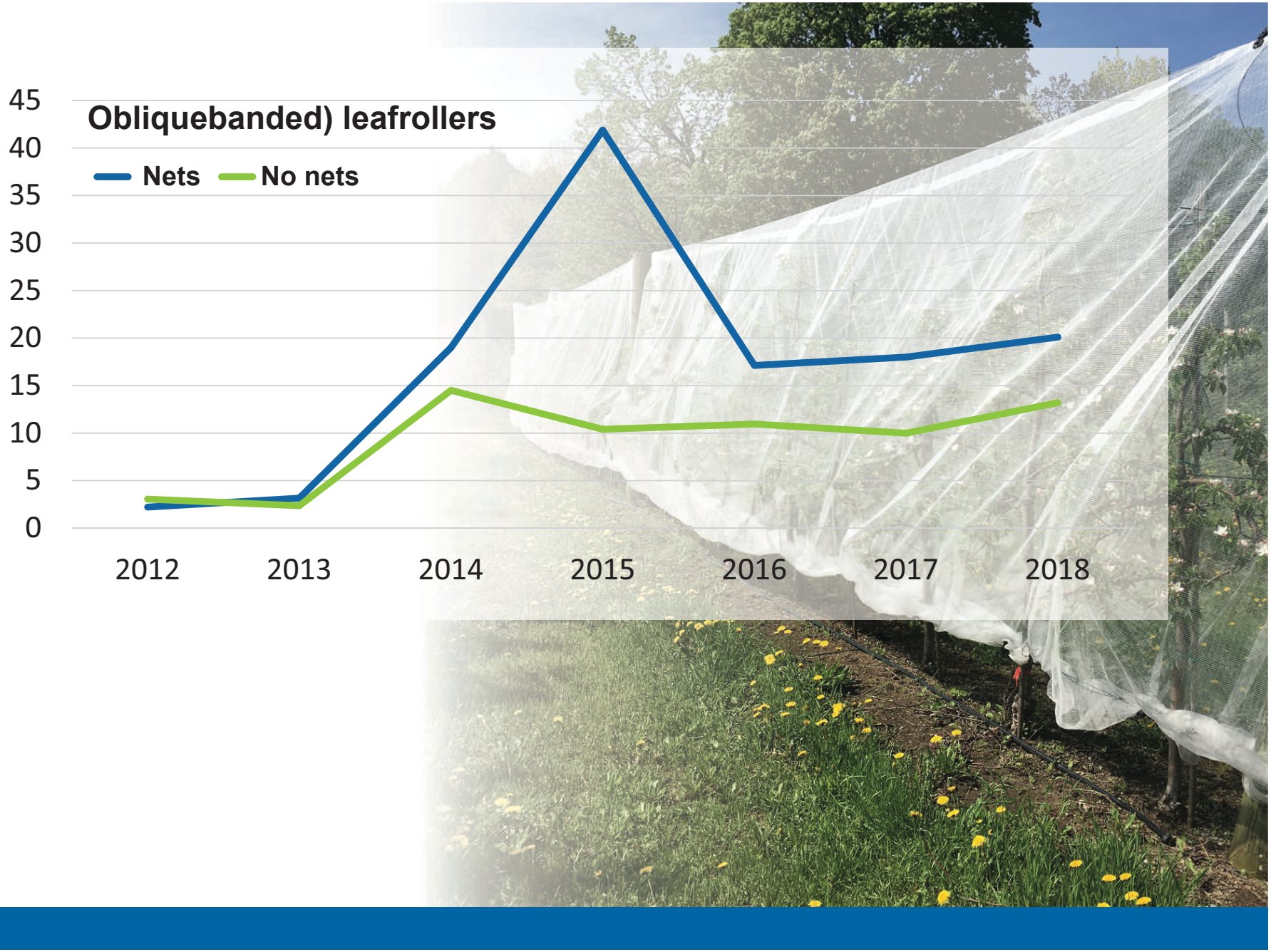
Alberto Dorigoni, san Michele

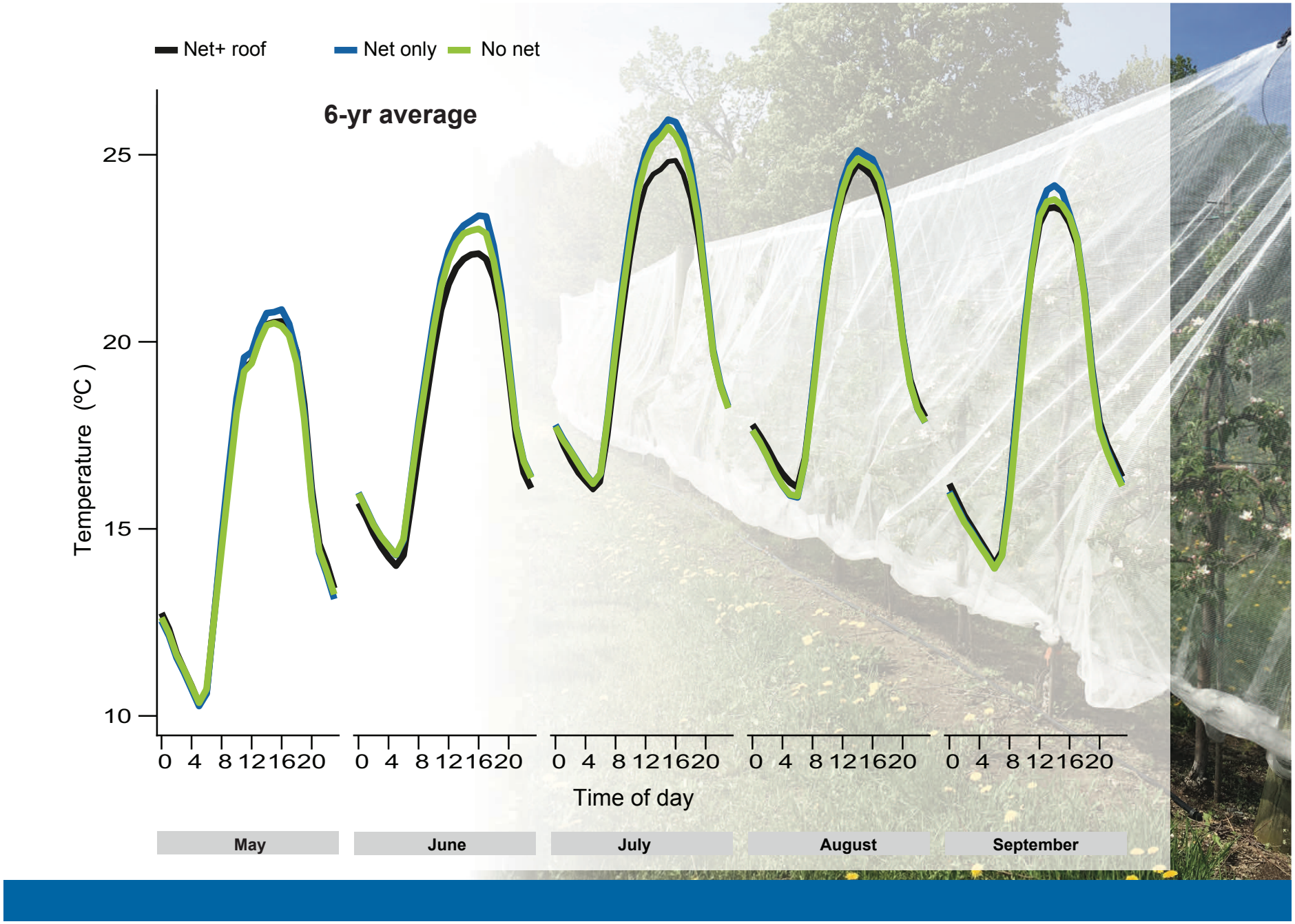

6-yr average
Nets
No nets
35
30
25
20
15
10
5
0
PS efficacy
PS intensity
Fruits / 10 clusters
Fruit size
Circumference (po)
Yield : kg/tree
Maturity
Honeycrisp 2012-2017 (Chouinard et al. 2019)

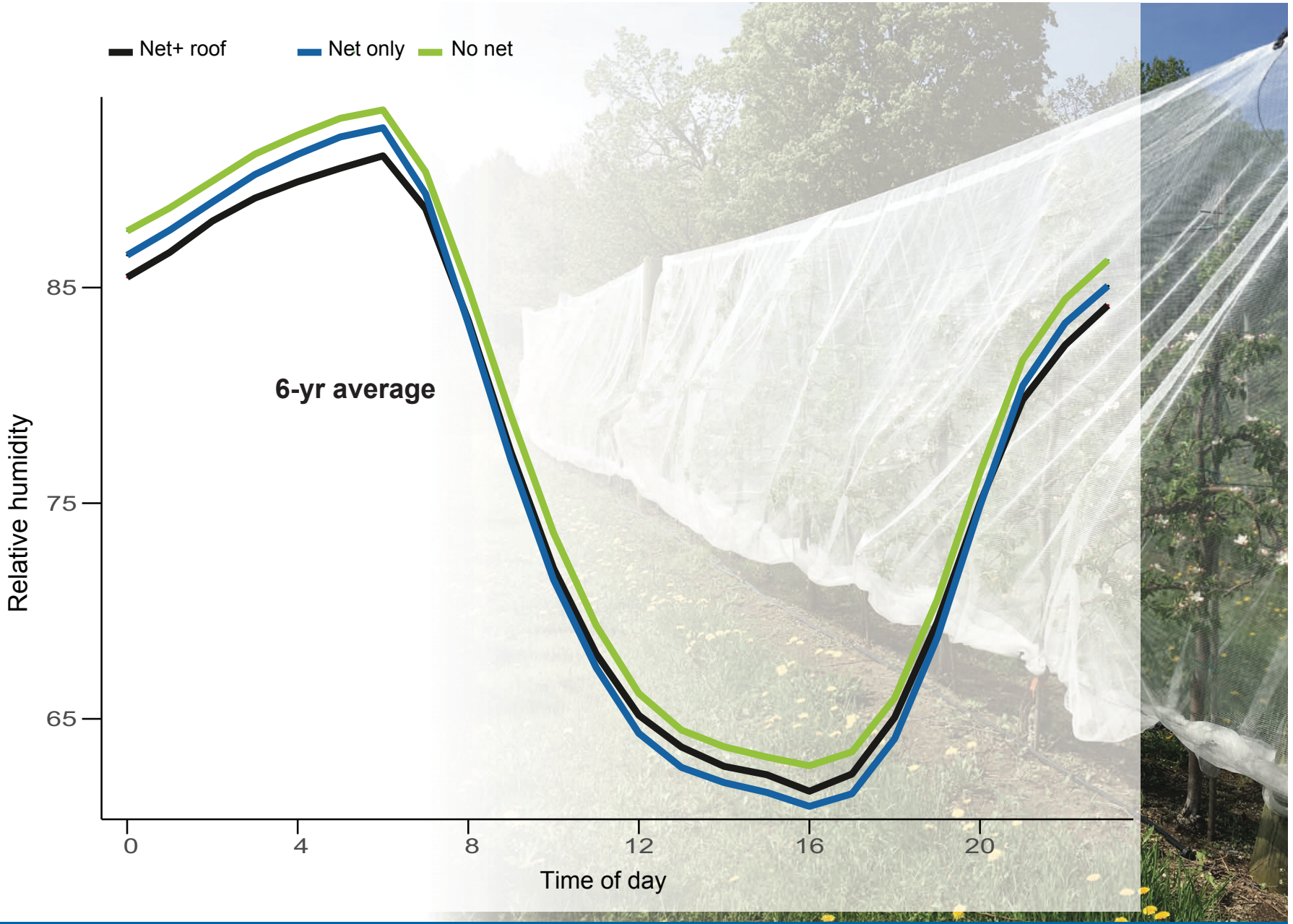

6-yr average
Nets
No nets
18
16
14
12
10
8
6
4
2
0
Seeds
Brix
Firmness (lb)
Red/ 20
Honeycrisp 2012-2017 (Chouinard et al. 2019)


10
9
8
7
6
5
4
3
2
1
0
5-yr average
Nets
No nets
Frost
Frost /w roof
Hail
Bruising
Bitter pit
Russetting
Honeycrisp 2012-2017 (Chouinard et al. 2017)


4,5
4
3,5
3
2,5
2
1,5
1
0,5
0
5-yr average
Nets
No nets
Apple sawfly
Curculio
Apple maggot
Codling moth
T. plant bug
OBLR
Honeycrisp 2012-2017 (Chouinard et al. 2017)


Obliquebanded) leafrollers
Nets
No nets
45
40
35
30
25
20
15
10
5
0
2012
2013
2014
2015
2016
2017
2018


Net+ roof
Net only
No net
6-yr average
Temperature (°C)
25
20
15
10
0 4 8 12 16 20
Time of day
May
June
July
August
September


Net+ roof
Net only
No net
6-yr average
Relative humidity
85
75
65
0
4
8
12
16
20
Time of day

OTHER HIGHLIGHTS

Nets No nets

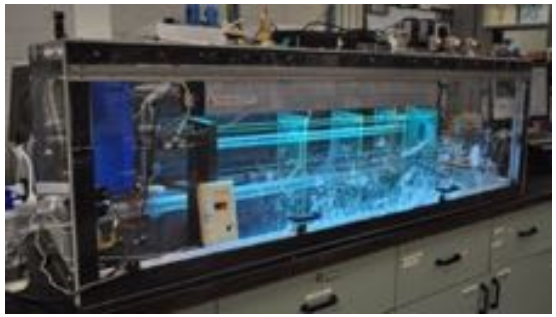
- **Scab (fruit):** 0% vs 1.4%. (2013)
- **Scab (foliage)** : 0.2% vs 2.3%. (2013)
- Aphids: 7% vs 4% (3-yr assessment)
  Leafhoppers: 2.5% vs 15.7% (2012)
- **SBFS complex:** 1.0% vs 7.3% (2015-2016)
- Spider mites: 0.5 vs 0.5 (3-yr assessment)
  (motiles/leaf)

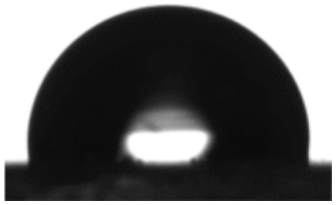
RAINPROOF NETS

PLA wetting

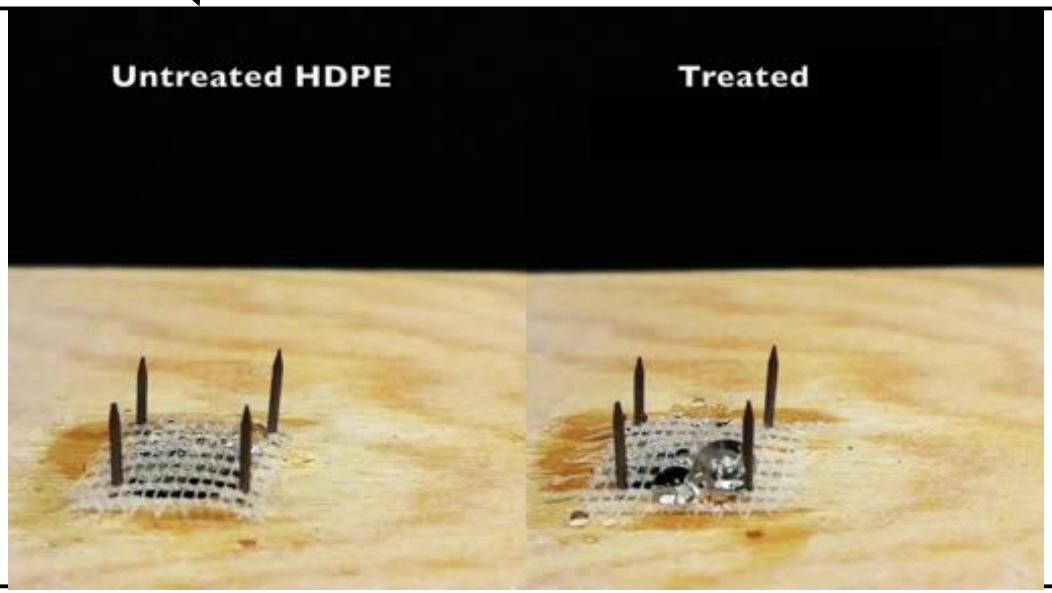
Contact angle = **80°**

Surface chemistry
PICVD treatment





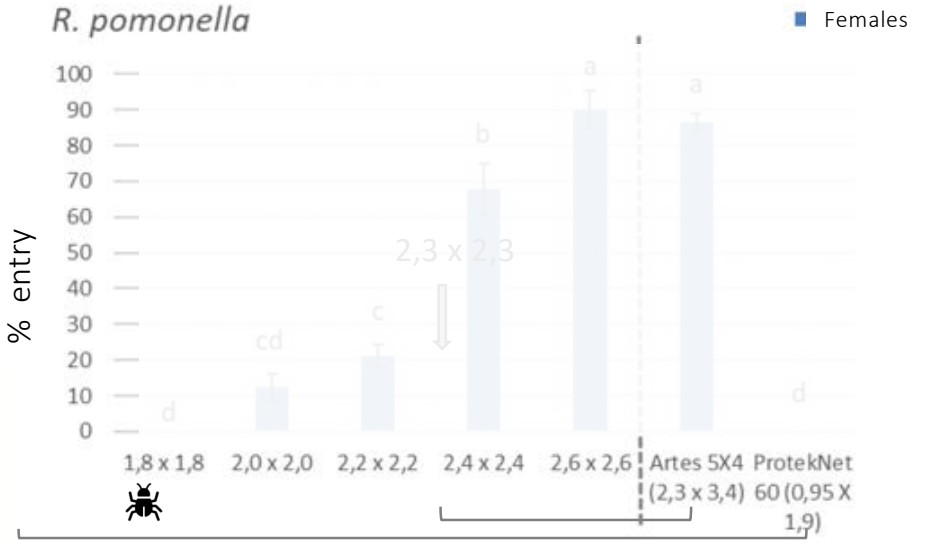
Contact angle = **100°**



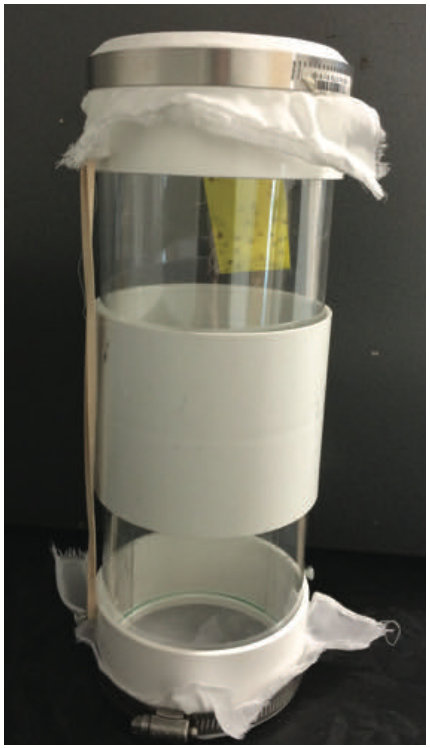
Contact angle = **145°**

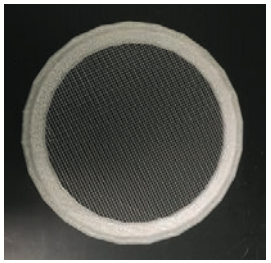
From : Knoch & Tavares, pers. comm

MESH SIZE VS EXCLUSION - LAB TESTS



Thorax : 1,76 ± 0,02 mm (female)

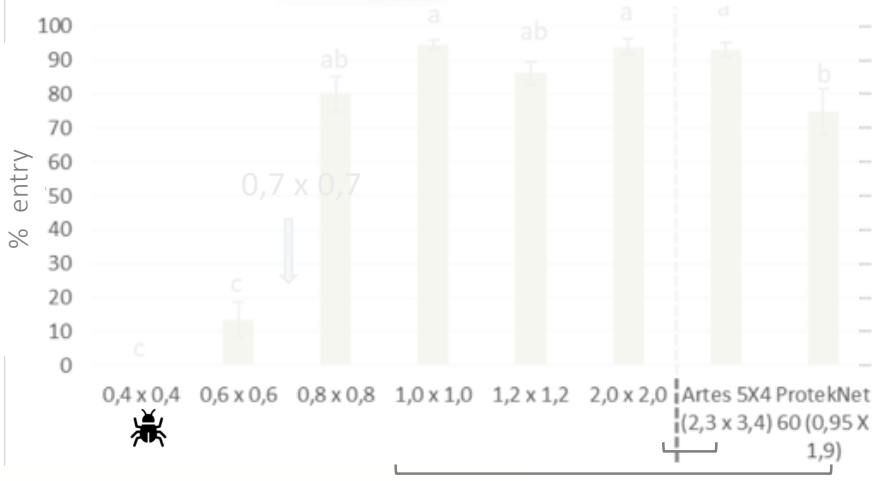




MESH SIZE VS EXCLUSION - BENEFICIALS

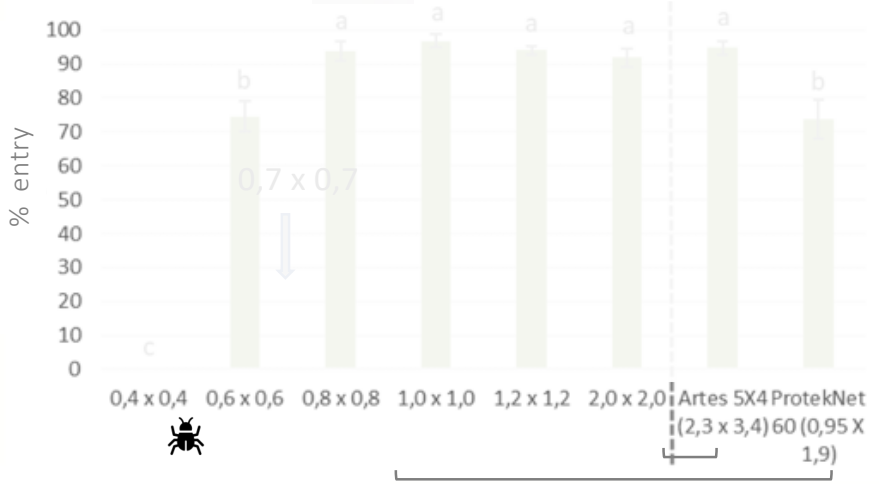
Thorax : 0,43 ± 0,01 mm

A. matricariae

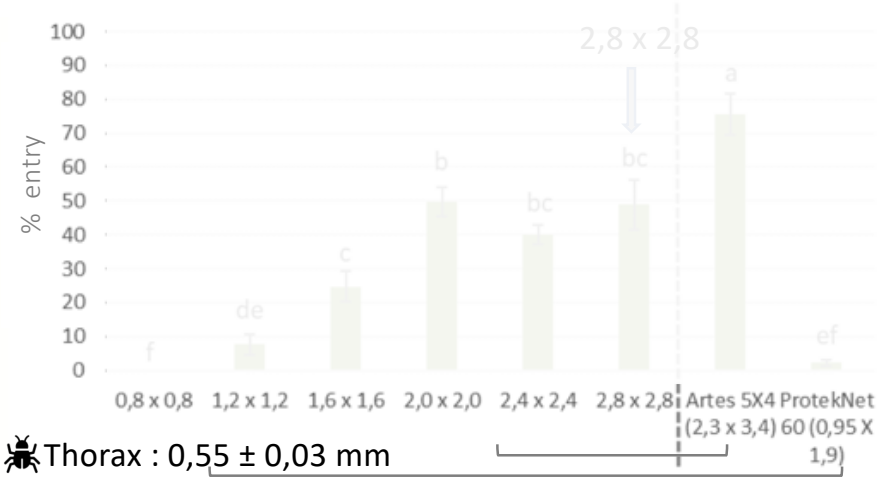


Thorax : 0,50 ± 0,01 mm

A. abdominalis



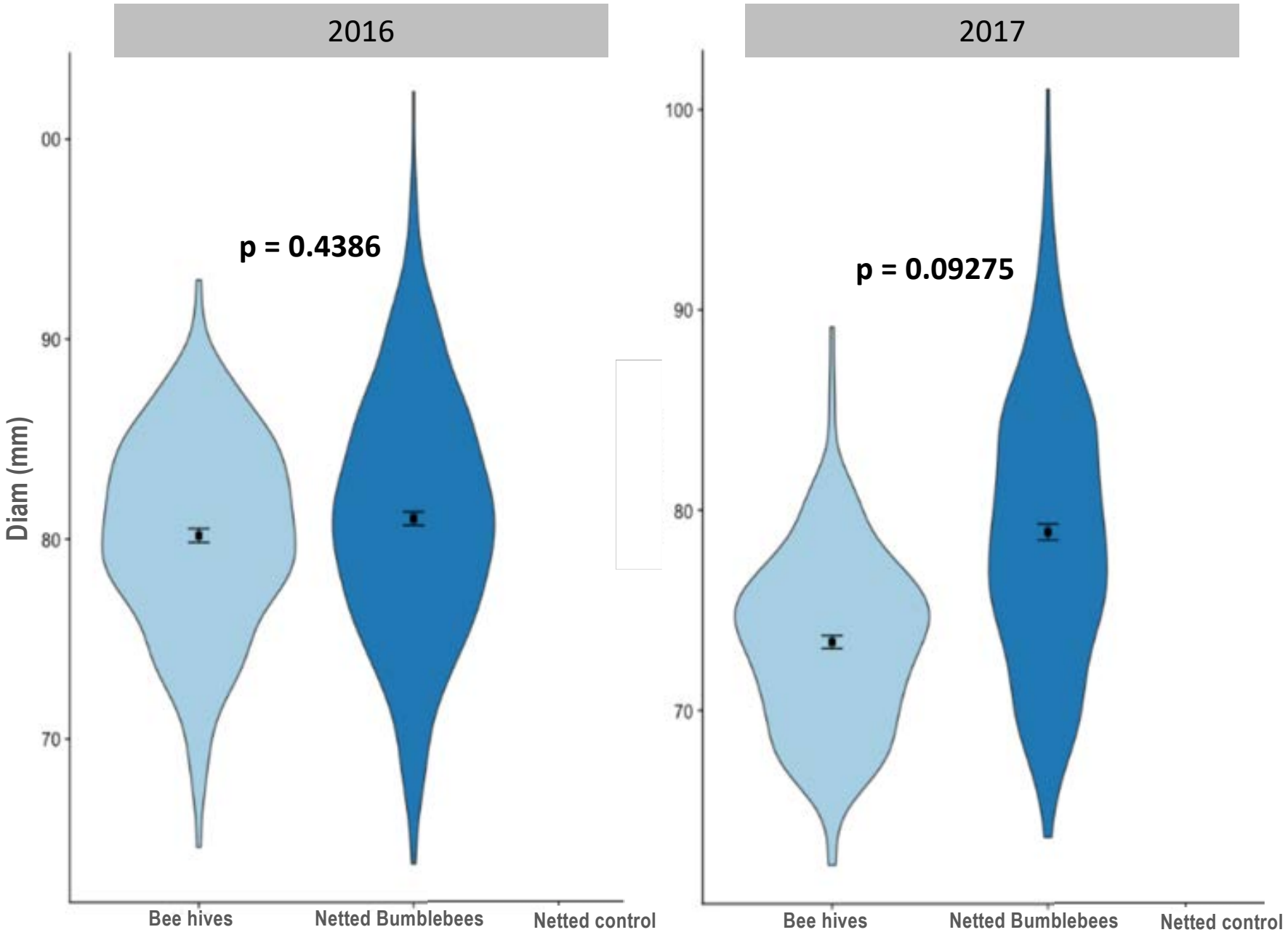
A. aphidimyza



Thorax : 0,55 ± 0,03 mm

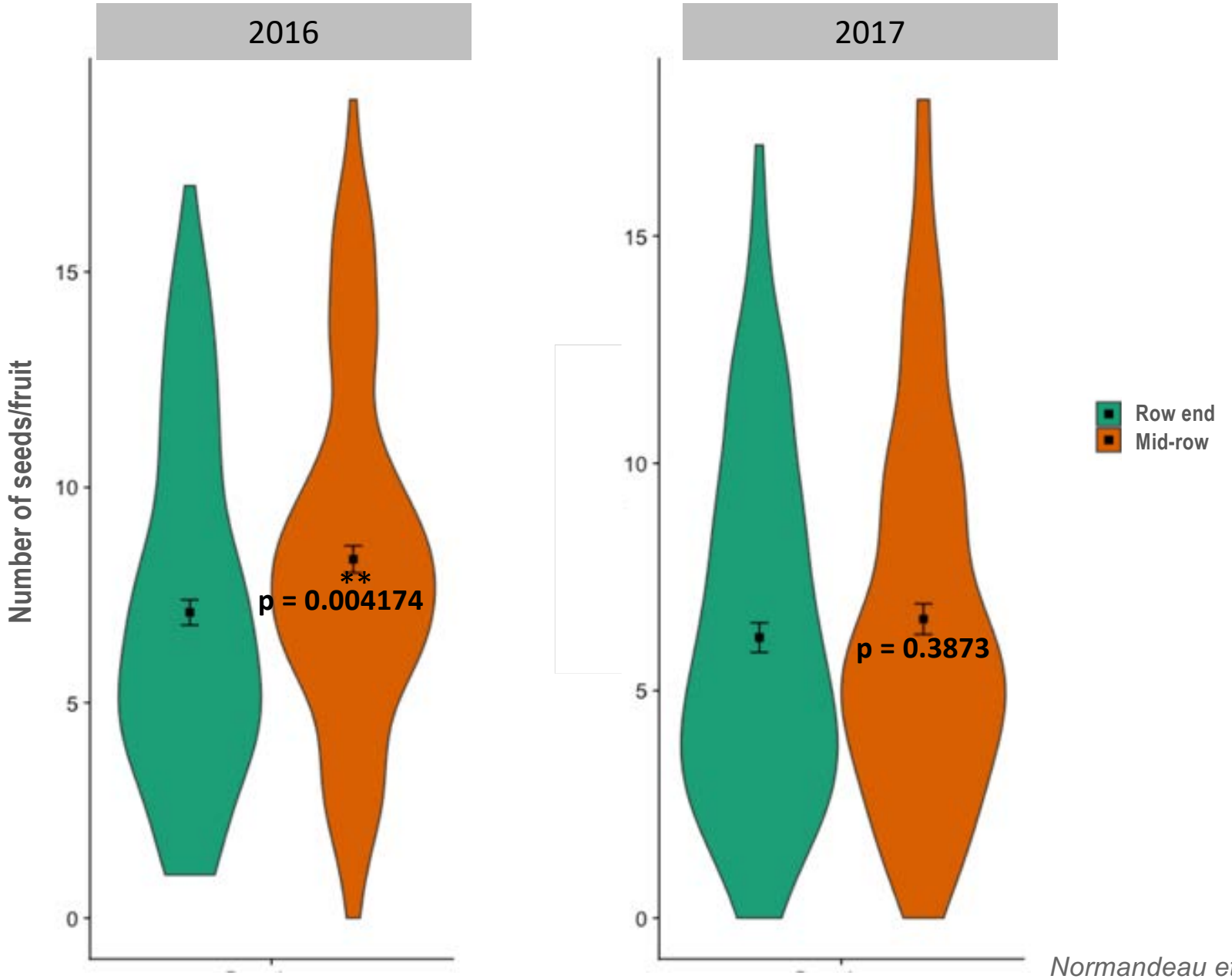
BUMBLEBEE POLLINATION

Fruit size



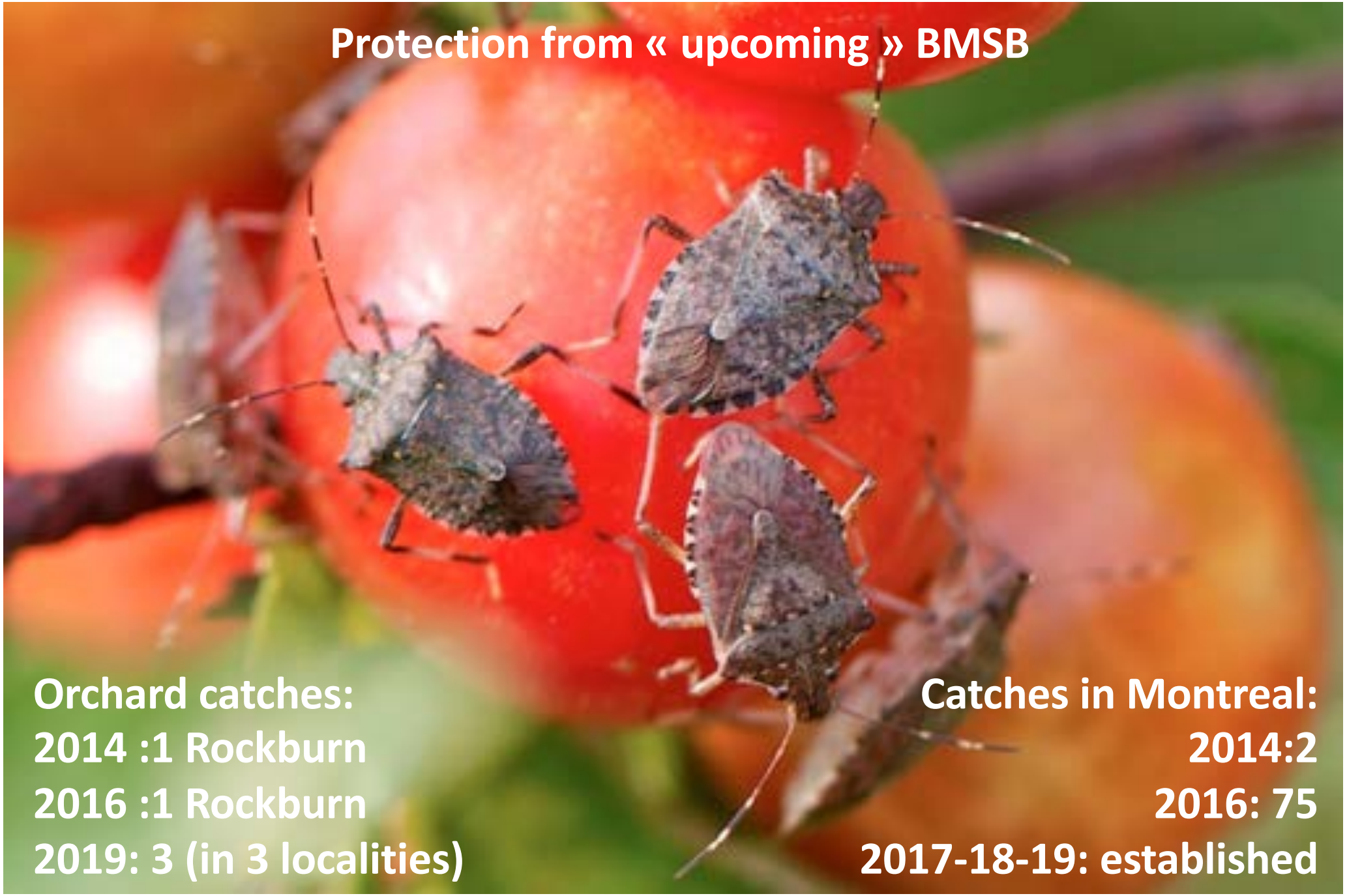
Normandeau et al., submitted

Number of seeds vs bumblebee hive location



Normandeau et al., submitted

Protection from « upcoming » BMSB



Orchard catches:
2014 :1 Rockburn
2016 :1 Rockburn
2019: 3 (in 3 localities)

Catches in Montreal:
2014:2
2016: 75
2017-18-19: established

To be continued…

- Multi-task netting / systems
- Mechanized install /opening/ closing
- Spraying through nets (fertilizers, thinners, pesticides)
- Optimized orchard design + training system
- Varietal suitability
- Full-block systems
- ProtekNet (1 x 2 mm) vs DrapeNet (2 x 7 mm) vs Artes (2.3 x 3.4mm)
- Photoselective netting
- …