Effect of LED lighting in autumn on arthropods on remontant strawberry and primocane raspberries

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Background/ Approach

- Rolf Nestby is testing the effects of LED light on late season berry production in tunnels here at Kvithamar
  - Yield and quality

- As part of subtask 2.3.1 (Improved biocontrol and IPM), we wanted to monitor the arthropod community in the different light treatments

- The predatory mite *N. cucumeris* was released, no other plant protection measures 2011-2012
- Leaf sampling 2-3 times per year

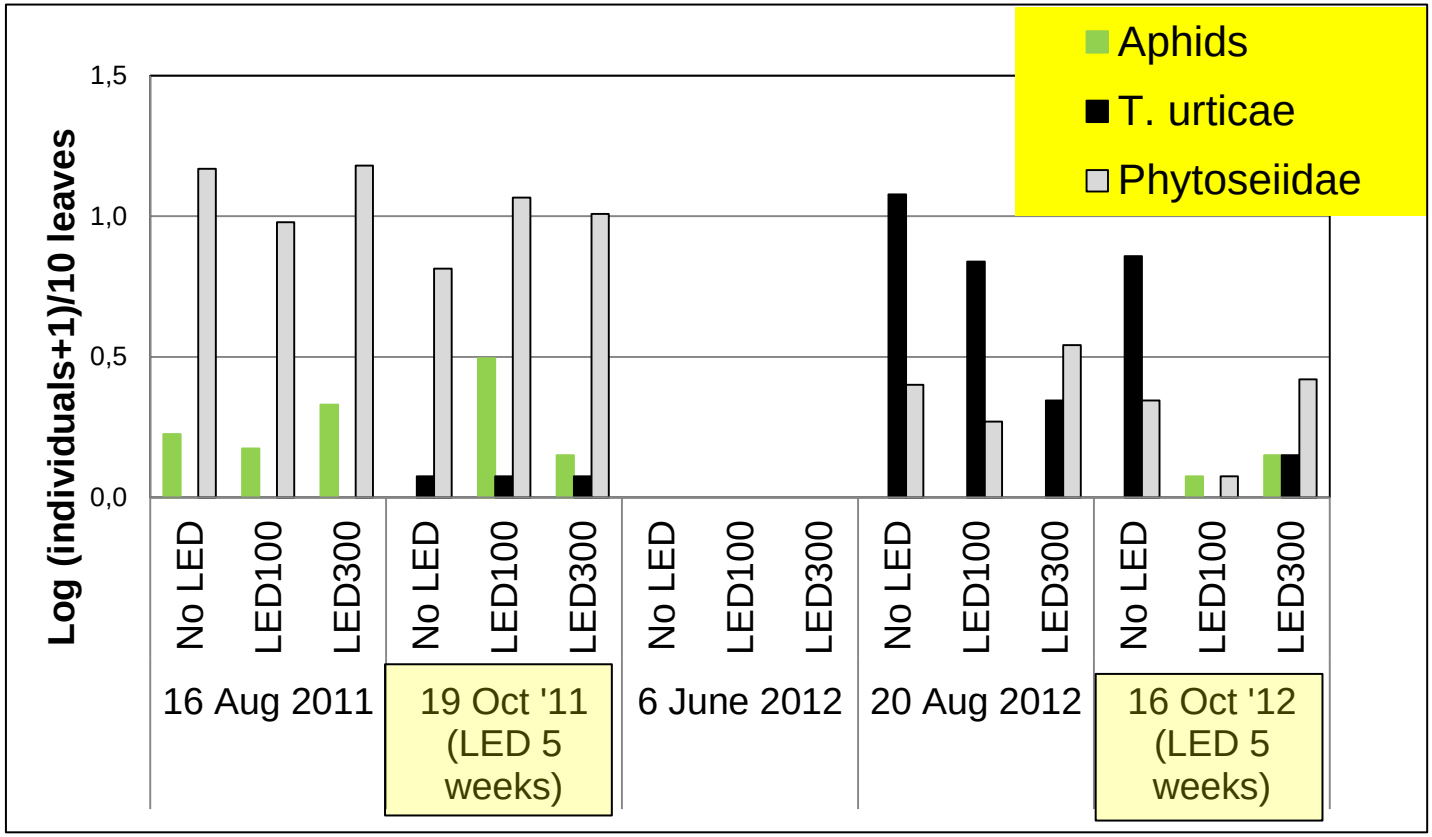
5 Aug. 2011

Set-up

- Strawberry (‘Rondo’) 4 reps:
  1. No additional light (control)
  2. LED 100W (1:4) from September
  3. LED 300W (1:8) from September
  - 10 leaves per plot sampled
- Raspberry (‘Polka’) 3 reps:
  1. No additional light (control)
  2. LED 300 (1:8) from September
  3. Ordinary SON from September
  - 6 leaves per plot sampled

- Leaf-washing to collect arthropods

Common arthropods, 'Rondo' strawberry



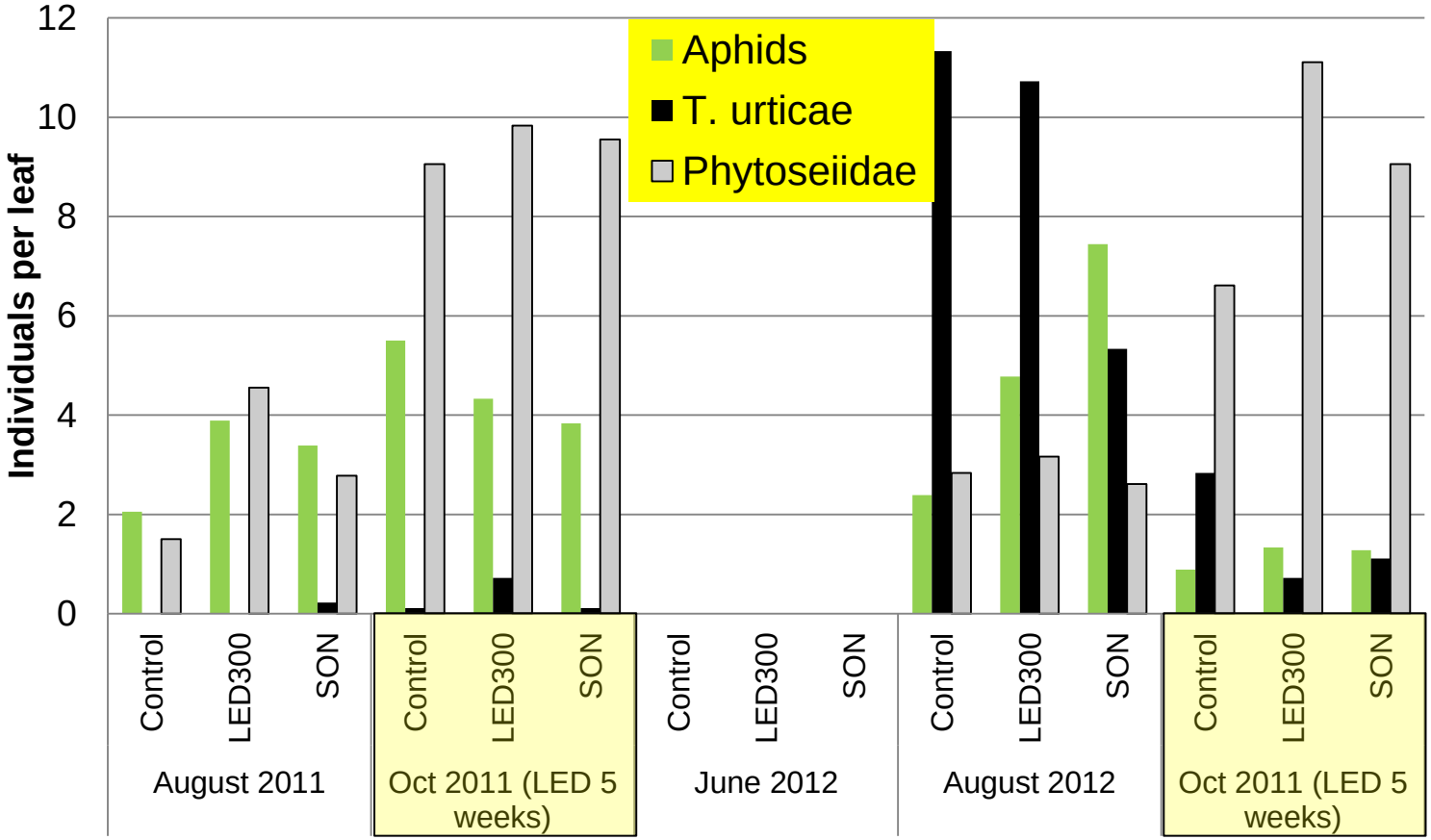
T. urticae

Phytoseiidae = *N. cucumeris* (released, 1 bag per 1.5 m)

Unidentified aphid species

Spider mites significantly less common in LED plots than in control plots. An opposite trend for aphids. No trend for *N. cucumeris*

Common arthropods, 'Polka' raspberry



T. urticae

N. cucumeris (released , 1 bag per 3 plants?)

Aphid *=Amphoro-phora idaei*

Spider mites less common in light treatments plots than in control plots. No other trends.

Summing up results

- In **both crops:**
  - predatory mites were the most common group in the first year (new plants)
  - spider mites increased in year 2 (raspberry trial continues: even more spider mites in 2013)
  - there were less spider mites on light treated plants than on control plants (October of year 2)
- In **both years:**
  - predatory mites on raspberry leaves increased in the autumn (on strawberry no change)
  - none of the 3 groups were found in June samples

Why less spider mites in the autumn on light-treated plants? (Preliminary theories)

- Production of diapausing females (orange) starts in August.These females leave the leaves.
- Would expect extra light in the autumn to
  - decrease diapause induction (?)
  - increase the leaf quality

  $\Rightarrow$ i.e., to increase spider mite populations on leaves
- Why does the opposite happen?
- Somehow the light inhibits spider mites or promotes predation?

Why does *N. cucumeris* continue to increase on raspberry leaves - and not on strawberry leaves - in the autumn?

The commercial *N. cucumeris* strain does not diapause

Some possibilites:

- More food sources on raspberry (spider mites, honeydew, pollen?)
- Raspberry better environment in general? (phytochemistry, hairs, etc)
- Better climate/ microclimate (Temp, RH) ?

Pattern found in 2013 as well? A second phytoseiid, *P. persimilis*, was released.

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