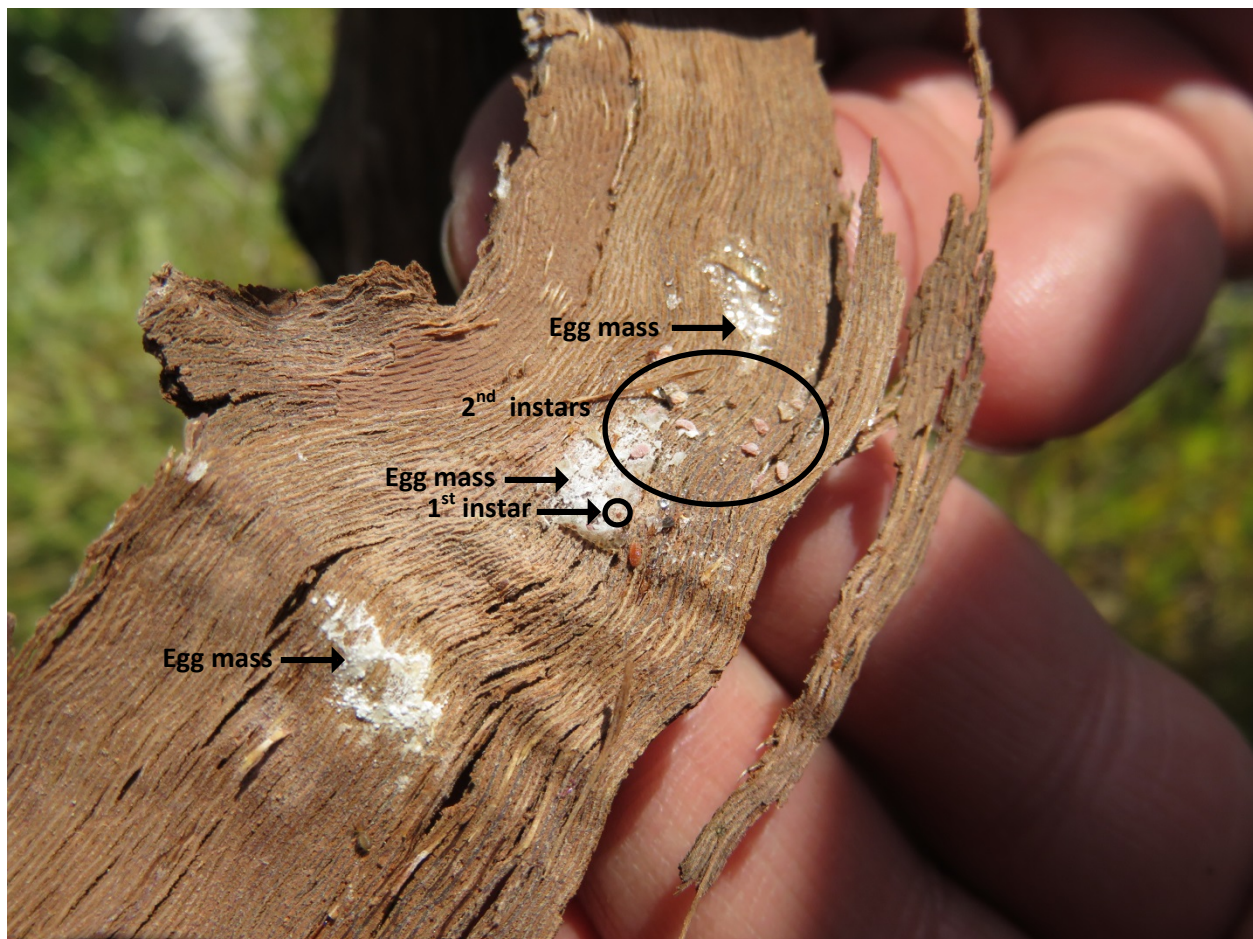


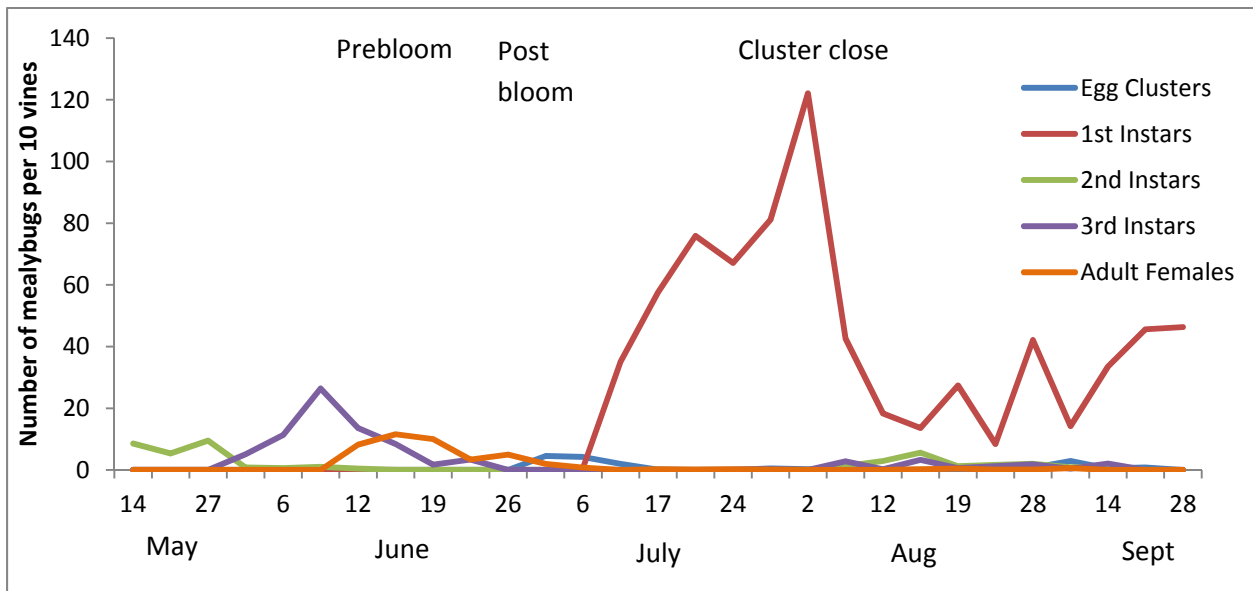
## Management of Mealybugs in Vineyards

Grape mealybug is a vector of grapevine leafroll associated virus. The insect overwinters as young instars under the bark of vines and resumes development in the spring. When a grape mealybug feeds on an infected vine and then moves to an adjacent healthy vine and feeds, it can transfer some of the virus to the healthy vine and infect it.

The best way to determine whether you have grape mealybugs is to peel back the bark and look for them. The first thing to look for is the white egg masses that were laid last year. These are different from spider nests which are more wispy and webby while mealybug egg masses are more clumped in appearance and may have some yellowish-green fungal growth on them. Examine the egg masses for the presence of first instars, which are very tiny and dark salmon orange-pink in colour. You are more likely to see second instars which have moved away from the egg masses. These are a lighter salmon colour and move a lot faster. As the mealybugs go through their stages of development, they become larger and lighter coloured. The adult females are coated in white waxy scales.



The figure below shows weekly counts for mealybugs in a heavily infested Cabernet Sauvignon vineyard in 2014. Under Ontario conditions, it appears that mealybugs go into the winter as 1<sup>st</sup> instars (red line below). These develop into 2<sup>nd</sup> instars by early May and gradually develop into 3<sup>rd</sup> instars (purple line) and then adults (orange line). The adult females lay clusters of eggs (blue line) which hatch to produce a new batch of 1<sup>st</sup> instars (red line). The 1<sup>st</sup> instars are the most efficient vectors of grapevine leafroll virus and are the easiest to kill with insecticide so those are the ones we target. 1<sup>st</sup> instars first started to develop at fruit set with peak populations at cluster close.



Because the majority of mealybugs are deep under the bark of vines, it is difficult to use products with contact activity to control them. Therefore, the most effective product is Movento because it moves in the vascular tissues of the vine. When applied to foliage after bloom, it moves into the trunk where mealybugs are feeding. Applying it before that time will not result in good movement into the vascular tissues in the trunk because the vine is sending most of its sugars into developing leaves. If you are applying Movento to manage both phylloxera and mealybug, use the prebloom timing for phylloxera and make a second application 30-45 days later.

Mealybugs are currently primarily in 2<sup>nd</sup> instar stage with a few straggling 1<sup>st</sup> instars and a few 3<sup>rd</sup> instars. Development of insects is very much dependent on temperature, just as is the growth of grapevines so the cool weather this spring may delay mealybug development: it's best to time the spray relative to vine development rather than the calendar. It takes some time for the Movento to move from leaves to the trunk where the mealybugs are feeding. The best timing for a Movento spray to target the 1<sup>st</sup> instars as they emerge is just after bloom. A second spray should be applied 30 days later to target the remaining 1<sup>st</sup> instars as they emerge.

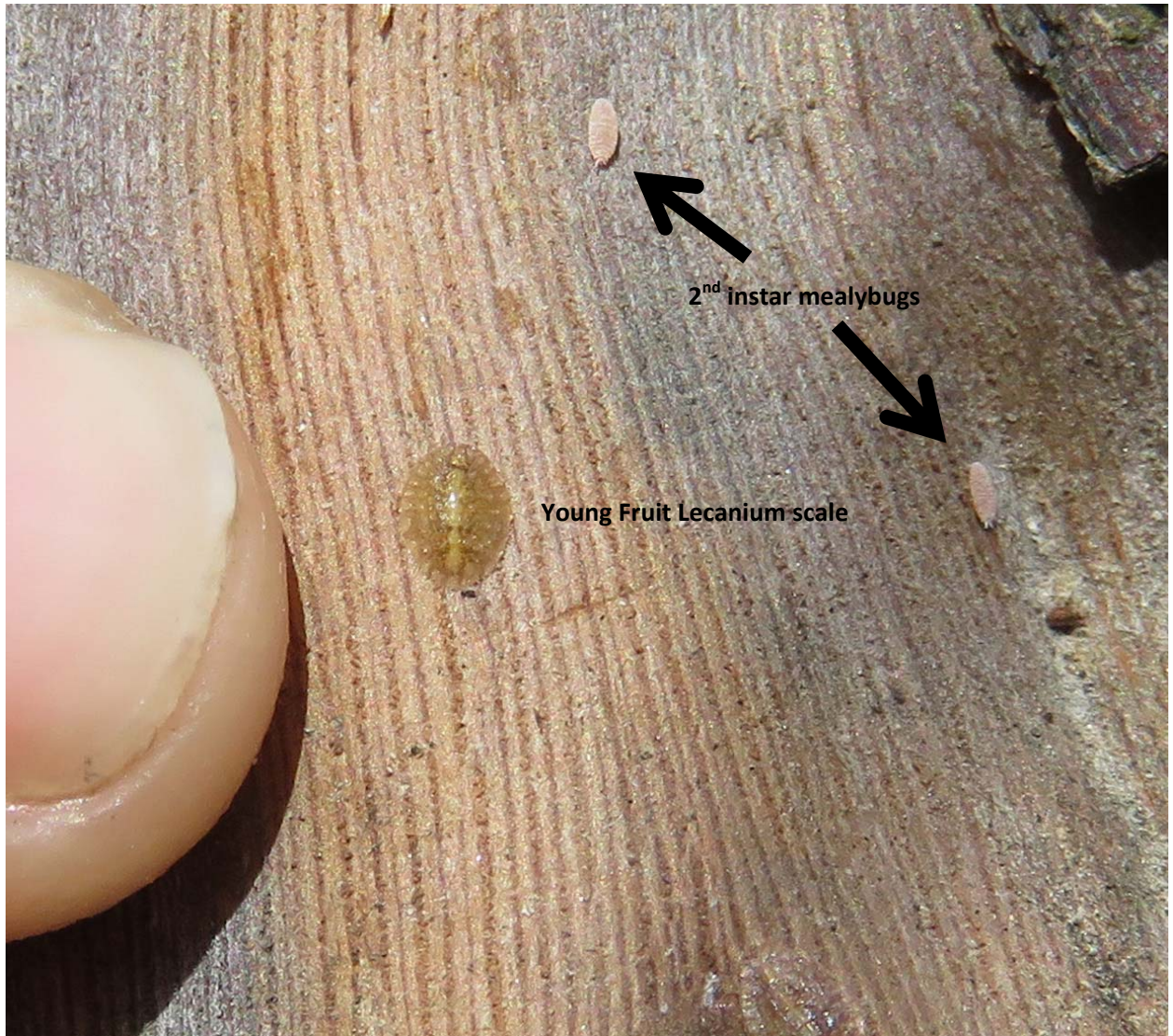
The Movento label states a maximum of 920 mL/ha per season with a rate of 365-585 mL/ha per application. It is registered for control of phylloxera and mealybug and suppression of scales. In trials last year, single full canopy applications of Movento at post bloom at rates of 365, 420 or 460 mL

product per ha did not significantly reduce the number of mealybugs in counts done in August. A single application of 500 mL/ha post bloom reduced the number of mealybugs compared to the untreated check. We also tested double applications post bloom and 30 days later with the following combinations: 365/365 mL, 500/420 mL, 420/500 mL and 460/460 mL. The greatest reduction in mealybug populations was achieved with a seasonal total of 920 mL/ha split over 2 applications. It didn't matter how this was split up post bloom and 30 days later. We will continue to fine tune the rate and timing in research trials in 2016.

<b>Rate of Movento post bloom (mL/ha)</b>	<b>Rate of Movento 30 d postbloom (mL/ha)</b>	<b>Mean # Mealybugs/Vine in August</b>	<b>Maximum # Mealybugs on 1 Vine</b>
0	0	88 a*	396
365	0	79 ab	339
460	0	72 ab	331
420	0	68 ab	268
500	0	41 bc	163
365	365	39 bc	326
500	420	17 c	57
420	500	15 c	82
460	460	11 c	103

\*Values in a column followed by the same letter are not statistically different

Fruit Lecanium scale is the other vector of grape leafroll virus that has been identified in Ontario vineyards. It may be found exposed on canes or under the bark at this time. Young scales are tannish brown and as they mature they become darker brown. Scales are not as good at transmitting grape leafroll virus but they can still contribute to its spread. Some vineyards that were scouted last year had higher populations of scale than mealybug while others were the reverse. Sprays of Clutch, Assail or Malathion will kill exposed scales but there are lots more hiding under the bark so the effect will be minimal. Movento is registered for suppression of scales on grapes. The timing and rate are the same as for mealybug.



2<sup>nd</sup> instar mealybugs

Young Fruit Lecanium scale