Strawberry Virus Project

Activity 3: Alternative Treatments

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Investigations did not identify any true alternatives to the current practices of using a limited number of conventional aphicidal products. There were several practices identified that may be used to compliment current practices. There were also a number of products identified as having potential to help combat aphids in strawberries. The majority of these products are not currently registered for this use with PMRA. The assembly of a data package for any type of minor use registration, emergency registration and/or label expansion with PMRA will most likely require additional research; as such these potential alternative products are listed as proposed research trials (see Activity 5).

The use of insecticidal soaps may compliment current aphicide spray programs. There are a number of different brands registered, Safer, Pro, Opal. These products all have potassium salts of fatty acids listed as their active ingredient and may be applied every one to two weeks, as needed. The limitation of these products is that the active ingredient is not systemic nor is the residue particularly detrimental to aphids. Aphids must be sprayed directly with the products in order to be effective. This product may be useful in as field with high aphid counts. A producer may spray insecticidal soap between applications of conventional pesticides. As producers are limited in the number of conventional sprays they can apply each season, this product may help to "stretch out" those conventional sprays, offering some protection between conventional pesticide sprays.

Field orientation and the use of companion plants may also compliment current conventional practices. Certain plants are known to discourage aphids; these include garlic, chives, onions, mint, petunias and chrysanthemums. Producers may consider planting these companion plants as border crops around strawberry plots and/or fields. The companion plants will not have direct aphicidal effects, but may help discourage winged aphids from moving into a field. Discouraging new aphids from moving into a field may help reduce to spread of SMYEV and SMoV between fields. Along with the use of companion plants, producers may consider leaving a buffer around strawberry fields as a means of discouraging winged aphids from moving into a field. There are two trains of thought with regards to buffers for discouraging aphids. The first approach is to leave a strip of bare ground around plots 25 meters in width. This strip should

be kept completely free of any vegetation. The thought behind this is that the bare ground will "starve" any aphids encountering it and they will move onto other areas in search of a food source. Considering how far winged aphids can travel, this may not be particularly effective. Also, producers would need to consider the potential impacts having bare ground within their fields would have with respect to water run-off and soil erosion. This may not be a first choice for attempting to discourage aphids. The second train of thought is to have a vegetative buffer surrounding strawberry fields. The thought process here deals with the fact that aphids register vegetation versus bare ground, but are not able to identify the type of vegetation without sampling it. Producers could plant a 20 to 25 meter strip of a crop less desirable to strawberry aphids, such as barley, immediately surrounding their strawberry fields. Incoming aphids would be able to identify the presence of vegetation as they move into the field. But as they move into the field and sample the buffer crop, rather than moving directly into strawberry plants. Upon sampling the buffer crop, aphids would be discouraged at not finding their desired food source and move on to other fields. These techniques may be more suited to smaller fields or small plots within a larger field.

A practice that may potentially help reduce virus levels in fields is the adoption of an annual production system for several years. The longer plants are held, the more chance there is for virus infection (one or more) to occur. By moving to an annual production system, a producer would be replacing all plant materials each year, eliminating any carryover of potentially infected plants. This may be a means to reduce the virus load in an area with particularly high virus rates.

An alternative to conventional pesticides may be the introduction of beneficial insects into a field. This practice would be of most use in a situation in which reduced pesticide use or being pesticide free would be preferred as many aphicides are also detrimental to beneficial insects. The use of beneficial insects, or insects which prey on aphids and other insects pests that cause damage to crops, has been shown to be effective in a greenhouse setting and has shown varying degrees of effectiveness in small field scale plots. This is a practice which may be implemented in particular fields rather than across an entire operation. The following insects may be effective in combating strawberry aphids.

Parasitoids (*Aphidius colemani*) may be effective on light to moderate aphid infestations. They are tiny, stingless mini-wasps that lay their eggs in aphids; the eggs hatch and the resulting larvae devour aphids from the inside out.

Aphid midges (*Aphidoletes aphidimyza*) may be effective in dealing with light to heavy aphid infestations. Aphid midge larvae are predacious, actively seeking out aphids, even high up in trees. When aphid populations are high, aphid midges will actually kill more aphids than they will eat.

Green lacewing (*Chrysoperla rufilabris*) may be effective on light to moderate aphid infestations.

Ladybugs (*Hippodamia convergens*) may combat moderate aphid infestations. Both ladybug larvae and adults feed on aphids. Larvae will commence aphid consumption immediately upon hatching.