APHID CHARACTERISTICS AND PLRV

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INTRODUCTION -- Green peach aphid, as a vector of potato leafroll virus (PLRV) is a major pest player in the production of potatoes. Despite advances in pest management, the industry is far from free of the aphid. Adding to the problem is the fact that the aphid can sometimes be found in seed production areas. Green peach aphid populations can be highly variable between seasons and across areas. Systemic insecticides provide early season protection (ca. 7-12 weeks), while foliar-applied materials, if timed properly, control the aphid during the summer growing period.

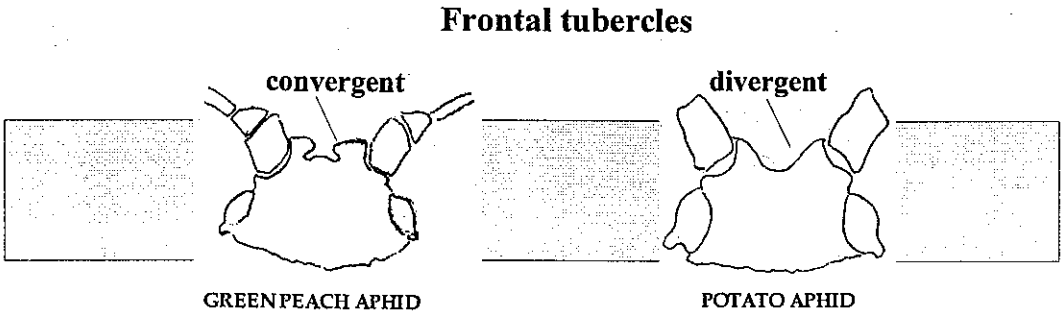
GREEN PEACH APHID BIOLOGY -- One of the ways green peach aphid overwinters is in the egg stage on peach. In the spring, eggs hatch in March or April. The offspring are wingless, known as stem mothers. These are the beginning parents from which subsequent generations stem. The stem mothers upon reaching maturity reproduce without mating. This is known as asexual reproduction. All of the aphid generations through the spring and summer reproduce asexually. The stem mothers, together with their offspring (F_1 generation, all wingless), feed together on the peach -- in the blossoms or on newly developing leaves. F_2 or F_3 generation aphids develop wings and leave the peach in search of suitable herbaceous summer hosts. The departure from peach is known as the spring migration. This occurs between May and early June.

The summer host plants of green peach aphid are numerous. The aphid can feed and reproduce on more than 150 different plants -- potato being one of these. Some of the spring migrants will alight in potatoes, but a majority will land and feed on other suitable hosts. At the end of June or the first of July, as some of these plants begin to dry and mature, a second major flight of green peach aphid occurs -- this is known as the summer flight. At this time all potatoes or potato fields will incur green peach aphids. Some of the summer flight is comprised of aphids that originated from short season potatoes.

The number of generations of green peach aphid during the growing the season can vary, but more than ten. The generation time, i.e., newborn to reproducing adult is rapid, requiring only 7-8 days in mid-summer. The number of offspring produced per female is between 30 and 80. If there is no natural or man-induced controls, a 100 aphids can reach a population of 2 million aphids in three generations, or about 30 days. In the autumn, winged forms (including some males) are produced that migrate to peach. Here sexual reproduction occurs for the first and only time during the year. Eggs are then deposited on the peach that carry through to the spring.

Another way that green peach aphid overwinters successfully is as adults and nymphs on selected winter annuals and other plants. Tumble mustard, shepherd's purse, storksbill, flixweed, and mallow are among plants on which the green peach aphid (also potato aphid) currently reside. It's theorized that in years of mild winters when overwintering is common on mustards or other suitable hosts, higher than average aphid numbers may occur on potatoes in the ensuing summer. This may be one of the key factors contributing to the increase in aphids and associated PLRV problems. Volunteer potatoes, mustards, flixweed, storksbill, mallow, and nightshades are all plants that should be eliminated where potatoes are produced.

APHID IDENTIFICATION -- In the Pacific Northwest there are only two species of aphids of real importance in potatoes, green peach aphid and potato aphid. Both transmit PLRV. On average, green peach aphids comprise about 98% of the aphids in potatoes; the potato aphid makes up the remaining percentage. When one steps into a potato field in the Columbia Basin and finds aphids, it is likely green peach aphid. For control purposes, it is not necessary to distinguish between species, since both are pests. However, it is easy to tell the two apart in the field with a hand lens by the shape of the head (see illustration below).



APHID TREATMENT AND TREATMENT THRESHOLD -- Treat potatoes at planting using a systemic insecticide with a long residual. In early to mid-season when the systemic activity is no longer effective, scout fields twice weekly for aphids; ideally check at least 10 locations per field. Commence treatment promptly if aphid populations reach an average of one aphid per two plants, or aphid flights are predicted in your area (for current information on aphid flights and field status during the growing season, check the toll-free Aphid Hotline at 1-888-673-6273). Use either Monitor applied at the full label rate (2 pints) or Fulfill (2.75 oz). Monitor is effective for 14 days against aphids when plants are erect, actively growing, and the canopy is open; effectiveness drops to 10 days when the canopy closes and is dense, and to 7 days when it begins to compact. Aphid control programs in potatoes grown for storage should have no gaps in residual control. If aphids are allowed to build in numbers, particular when the canopy is closed, it is very difficult to reestablish good control. Once a field is treated with a foliar insecticide, it's important to watch for aphid reoccurrence; aphids frequently build back due to chemical disruption of natural enemies, winged migrants moving into fields, and because foliars are seldom completely effective. It is not possible to keep fields fully free of aphids or virus, but properly timed treatments greatly minimize the problems.

COLORADO POTATO BEETLE CONTROL -- Pyrethroid insecticides, such as Ambush, Pounce, Asana, or Baythroid, are not recommended for control of Colorado potato beetle on early or mid-season potatoes. Such materials are hard on insect predator complexes and invariable flare aphids. Use Success applied at 3-4 oz product by ground, air, or chemigation (in 0.25 acre inches of water or less) for light larval populations, or 5-6 oz product for moderate to heavy populations. Success lasts for upwards of 2-3 weeks. Beneficial insects and other arthropods that directly or indirectly impact aphids in potatoes are important -- they are not always adequate, but they are definitely helpful and worth protecting. Most chemical treatments are disruptive to some degree to beneficials, some more than others.

GREEN PEACH APHID RESISTANCE TO MONITOR INSECTICIDE -- Some failure and dissatisfaction with Monitor was reported in 1999. It's possible that chemical resistance is developing in the aphid or in certain populations of the aphid. Research is underway to determine the extent of resistance, if any. The work is based on green peach aphid populations taken from across the Columbia Basin. The results are expected to be available before the start of the spring growing season.