Western Flower Thrips

Western flower thrips is a pest that is native to western North America. Hosts of western flower thrips include: apple, apricot, peach, plum, nectarine, orange, lemon, alfalfa, potato and numerous weed species. Injury by western flower thrips can be caused by feeding larvae (Figure 1) or oviposition by adult females (Figure 2). The major damage on apples is a surface blemish formed at the oviposition site. The injury is whitish in color and shaped like the petals of a pansy surrounding a small corky, raised scar. The scar and blemish are a reaction to the egg being inserted into the apple skin. On dark red apples the blemish, referred to as a pansy spot (Figure 3), is usually covered with color at harvest, but yellow, pink and green varieties will remain discolored (Figure 4).

Management of Western Flower Thrips

Adult thrips begin appearing in apple buds at about the half-inch green stage of development (mid-April). Both adult and immature thrips can be found in the growing shoots until shoot tips form dormant buds in mid-September. Although thrips adults are abundant during bloom, the best timing to apple control sprays is later. Relatively few thrips eggs are found in fruit during the period that has most often been targeted for sprays (pink through petal fall), although this is the period when adults may be most abundant. Oviposition in fruitlets (as opposed to other flower parts) starts to increase at petal fall to 5 mm fruit size. Applications are most effective in reducing pansy spot injury during the period from the start of petal fall to 5 mm fruit; applications before or after this timing are less effective. When applied at the same timing, there is no difference in control between Success (spinosad) and Carzol (formetanate hydrochloride). Delaying applications until after bee hives are removed from the orchard will reduce potential hazards to pollinators.
Campylomma
(Information derived from Orchard Pest Management Online
(http://jenny.tfrec.wsu.edu:16080/opm/))

Campylomma overwinters as an egg, which is inserted deeply into the tissue of a woody host plant. Eggs hatch in the spring, beginning as early as tight cluster to pink stage of apple tree development and continuing through petal fall. Egg hatch peaks during or shortly after bloom. **One of the most critical periods for sampling is before and during the bloom period, when a control decision should be made.** Either a beating tray or direct visual examination can be used at this time. The beating tray takes less time to cover an area, but direct examination may reveal nymphs (Figures 5-7) that are not jarred from the foliage using a beating tray. Action thresholds for campylomma are currently tied to the beating tray sample method.

**Action thresholds for beating tray sample:**
- Golden Delicious and Cameo is 1 nymph/tap
- Gala, Fuji, and Granny Smith is 2 nymphs/tap
- Delicious is 4 nymphs/tap

**Management of Campylomma**
Campylomma is one of the few tree fruit pests that is also a predator. For a relatively short period around bloom, it feeds on flower parts and developing fruitlets (Figure 7). Early feeding causes a reaction in the fruit, producing a dark, raised corky wart, often surrounded by a shallow depression (Figure 8). Spray timing is the key factor in preventing damage by campylomma.

Petal fall sprays may fail to prevent much of the potential damage, even though they may kill the campylomma present. Pre-bloom and bloom sprays have been more successful in preventing fruit damage. Products recommended for Campylomma are Carzol (formetanate hydrochloride) and Assail (acetamiprid). While these materials will kill Campylomma at any time, **applications need to go on between pink and bloom to prevent damage – petal fall is too late.**
Sampling with a Beating Tray

The beating tray is a sampling tool used to assess the presence and abundance of several kinds of insects. In tree fruit production it is primarily used to assess populations of western flower thrips and campylomma.

The beat tray is typically a square frame covered with either a white or black cloth (Figure 9). The black panel is recommended for campylomma sampling in the spring as the small light green nymphs are easier to see on the contrast of a dark background (Figure 10).

The beat tray is held beneath a limb that is jarred by tapping it with a stiff rubber hose three times (Figure 11). The jarring of the limb dislodges insects on the limb and they fall onto the beat tray surface. The insects on the tray surface are counted and recorded. Usually twenty separate tray samples are taken in an orchard to determine the number of campylomma or presence of thrips. The average number of pests per tray is used to determine the need to apply control treatments. The treatment thresholds for campylomma vary by apple variety, with Golden Delicious being the most susceptible.

The beat tray sampling method is labor intensive but very valuable in assessing the presence and abundance of campylomma and thrips in the spring. The sampling time window for these pests is short. A degree day model for campylomma on the WSU Decision Aid System is helpful to determine when nymphs should be present. The beat tray can also be used to sample several other pest and beneficial insects; however, the relationship between the numbers found in beat trays and their potential impact in the orchard, good or bad, is not clearly understood.