Kansas Insect Newsletter

For Agribusinesses, Applicators, Consultants and Extension Personnel

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New Pest Control Materials

Every year, in most cases, a number of new pest control materials (insecticides and miticides) are introduced from companies to deal with the multitude of insect and mite pests that feed on ornamental plants in landscapes, nurseries, and greenhouses; and turfgrass insect and mite pests. In the past two years, we have seen the introduction of a number of new products. Below are brief descriptions of new pest control materials registered for use in landscapes and turfgrass:

1. Provaunt

Provaunt, from DuPont (Wilmington, DE), contains the active ingredient indoxacarb (30%) and is formulated as a water-dispersible granule (WDG). Provaunt is a contact insecticide and is labeled for control of leaf-feeding caterpillars such as bagworm, fall webworm, yellownecked caterpillar, Eastern tent caterpillar; and armyworm, cutworm, and sod webworm. The product is also labeled for control of European pine sawfly and potato leafhopper. Indoxacarb has a similar mode of action as pyrethroid-based insecticides: sodium channel blocker. However, the metabolite (DCJW) binds to certain types of sodium channels and prevents sodium ions from flowing into the axon (transmits information from the cell body). The label rate is 1.25 to 5.0 oz per 100 gallons or 2.0 to 4.0 oz per acre. This same active ingredient is in the homeowner ant control product, Spectracide Ant Shield Outdoor Killing Stakes (0.05% indoxacarb).

2. Ultiflora

Ultiflora from the Gowan Company (Yuma, AZ) is a new miticide with the active ingredient, milbemectin and is formulated as an emulsifiable concentrate (0.0775 lbs per gallon active ingredient). The product has both contact and translaminar activity. Translaminar means that the material penetrates leaf tissues and forms a reservoir of active ingredient within the leaf. This provides residual activity against mites even after spray residues have dried. Ultiflora is active on all life stages (larvae, nymphs, and adults) of spider mites including the twospotted spider mite. The mode of action is similar to abamectin (Avid) as both products are considered a gamma-aminobutyric acid (GABA) agonist (compound that binds to a receptor causing normal ion flux). The label rate is 8.0 to 16.0 oz per 100 gallons. The restricted entry interval (REI) is 12 hours.

3. Acelepyrn

Acelepyrn is the newest product available from DuPont (Wilmington, DE) with the active ingredient, chlorantraniliprole. This product is a foliar and systemic insecticide labeled for control of white grubs (most

species), armyworms, cutworms, sod webworms, billbugs, annual bluegrass weevil, chinch bugs (suppression), and clear-wing borers. Acelepyrn has a very different mode of action by causing insect muscles to flex and not reflex. The results in the ryanidine receptors in the insect's muscles to open, allowing calcium ions to flow out and thus depleting the muscles of calcium necessary for contraction. As such, insects are paralyzed and eventually die.

4. Aloft

Aloft is a combination product from Arysta LifeScience (Cary, NC) with the active ingredients: clothianidin and bifenthrin. This product has both systemic and translaminar activity. Aloft is labeled for control of white grubs, cutworms, sod webworms, armyworms, annual bluegrass weevil, billbugs, aphids, caterpillars, lace bugs, soft scales, and leafhoppers. The product has extended residual activity (up to 100 days).

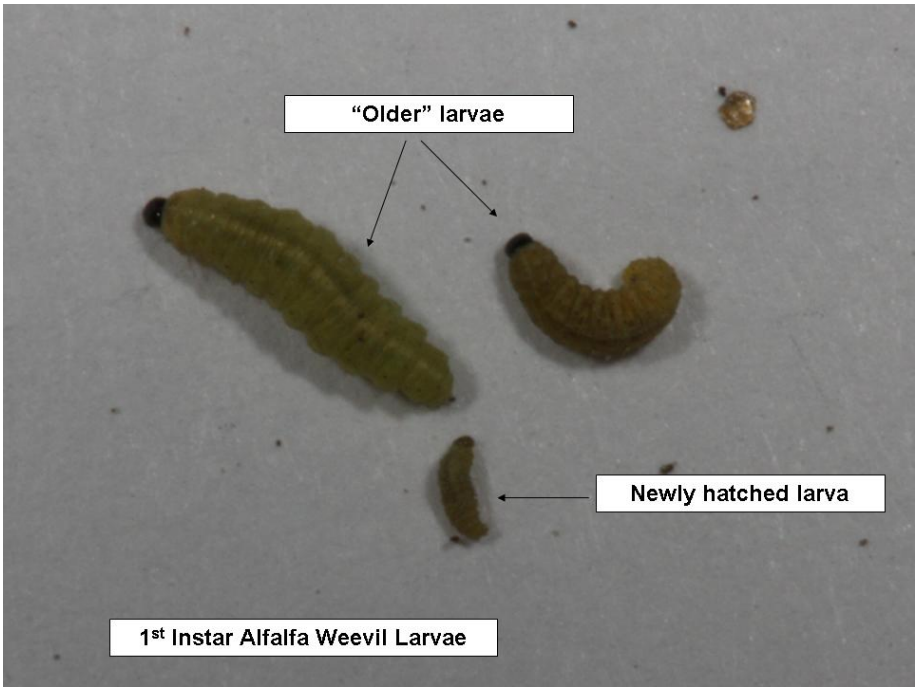
New Active Ingredient for Homeowners

Homeowners now have a new active ingredient to deal with certain insect pests: acetamiprid. Products available include Ortho Rose Pride Insect Killer; and Flower, Fruit, & Vegetable Insect Killer. Both of these products contain acetamiprid at 0.006%. This is the same active ingredient as the commercial product, TriStar. Acetamiprid is a neonicotinoid-based insecticide with the same mode of action as imidacloprid (Merit and other generics) and dinotefuran (Spectracide Rose & Flowering Shrub Insect Control). Neonicotinoid-based insecticide products are most effective against phloem-feeding insects (aphids, whiteflies, mealybugs, and soft scales) and on leaf-feeding beetles. Always read the label thoroughly before using and pest control material.

Raymond A. Cloyd

Alfalfa Weevil

Several alfalfa fields were sampled on 8 April (two days after the record-breaking freezing temperatures in north central KS). All alfalfa weevil larvae collected were still 1st instars, however ca. 1/3 were dark brown to black and dead. Several lighter brown individuals were still alive. However, many larvae were apparently just hatching, or had recently hatched, as indicated by the photo. This photo shows the disparity in size, although all three are 1st instars, between the larvae which probably hatched a week or two previously vs. the one which probably hatched on 8 April (temps. in the 60 °F range). The cool-cold temperatures have recently slowed weevil development and consequent feeding. Hatching will probably continue intermittently during warmer temperatures (above 48 °F) for the next couple of weeks, thus extending the scouting / treatment window. Remember, insecticides are not as effective below 50 °F, so as temperature fluctuations continue these alfalfa fields need to be closely monitored for weevil infestation and insecticide effectiveness.



Jeff Whitworth Holly Davis

Bird Cherry-Oat Aphids

Several wheat fields were sampled on 8 April. Very few early season pests were detected. However, a few bird cherry-oat aphids (BCOAs) were collected (see photo). These are normally not a problem in spring but in 2007, after the April freeze which is similar to this year's, BCOA populations increased dramatically. This was probably due to the freezing conditions being very detrimental to many of the beneficial insects that usually help to regulate these aphid populations. Live lady beetle adults were noted on 8 April but there were

also some dead adults on the ground. So, just a "heads up" regarding the fact that, at least in north central KS, the recent freezing temperatures did kill some of the beneficial insects which we normally count on to help keep the pest populations in check.

Bird Cherry-Oat Aphid

Jeff Whitworth Holly Davis

The Kansas Rollercoaster…….

Go to any theme park, and the primer ride is a "rollercoaster". While most modern rollercoasters are engineering marvels that take the rider up and down, upside down, loop-d-loop, twist and turn, the old standard "woodies" are more akin to early season temperatures in Kansas: simply, up and down, up and down. Last week's cool spell had people asking, "When will spring really spring?" And, "Has this been an abnormally cool spring?"

We all tend to forget what previous years' weather was like. When it comes to defining normal, one would have to look at weather records over extremely long periods of time in an attempt to determine what is "historically normal"? In comparing **Manhattan's** March 1 through April 6 high and low temperatures for the last 3 years, there does not appear to be a "normal". The following accumulated growing degree days to the base 50 (GDD_{50}) values (for the aforementioned 32 day period) are 219, 17 and 98 for 2007, 2008 and 2009, respectively. "Are we ahead of last year?" Yes. Far ahead!" "Where are we compared to 2007?" "Waaaaay behind!"

The two following graphs show the comparative high and low temperatures for 2007, 2008 and 2009. Follow any of the lines and you will experience the Kansas Rollercoaster! Daily high (Figure 1) and low (Figure 2) temperatures each display the unpredictable up and down swings of early spring weather.

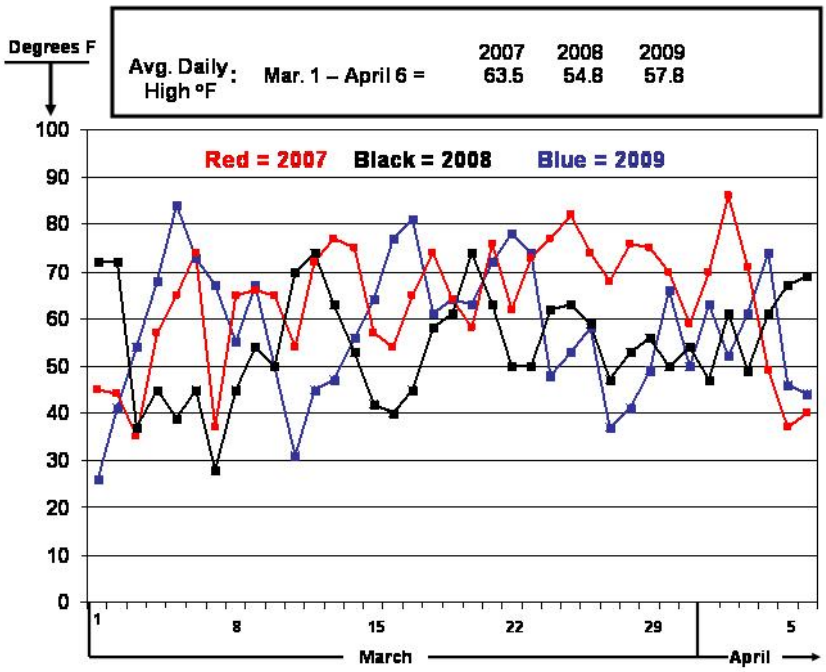


Figure1.

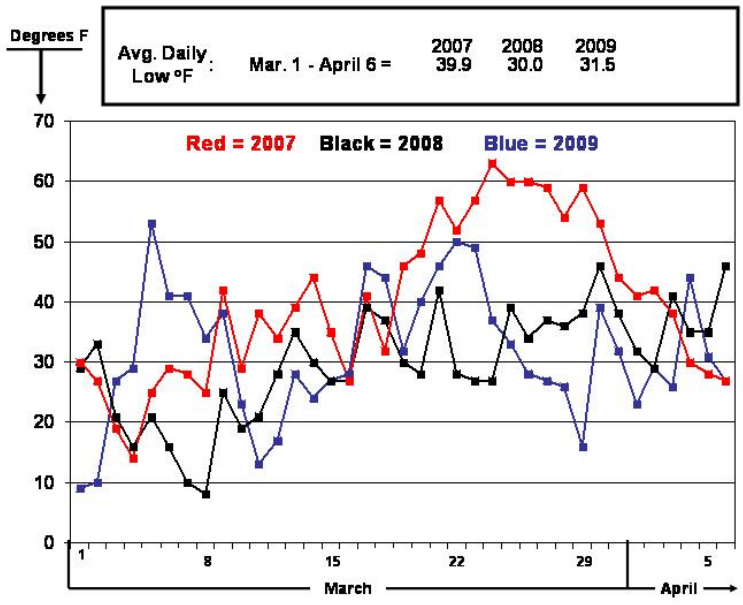


Figure 2.

It is apparent that on some days, data points and temperature trends seem to coincide, only to go in entirely different directions the next day. By looking at average high and low temperatures, it is apparent why (again, for the March 1 – April 6 time frame) 2007 was "warmest", 2008 was "coolest" and this year is at the lower end of "in between". The bottom line is that as we progress into late spring and early summer, temperatures will be more consistent, and the springtime roller coaster ride will be over and soon forgotten.

The effect of cold weather on insect survival.....

Two common questions: "Have we had a hard enough winter to reduce/eliminate insect pests in 2009?" "What about those insects that "got started" before the latest cold snap ----- did they survive?"

Actually, the second question more-or-less answers the first question. Generalizing, insects native to Kansas are adapted to withstand the harsh winter elements. A lengthy discussion could follow if attempting to analyze how the many different species overwinter. However several "common" examples will serve to illustrate.

Bagworm eggs are well protected in the female bag. The bag is virtually air-tight. Its thick-wall construction provides insulation. The eggs are further protected within the "spent" pupal case. And the female moth used her body scales to nestle/snugly protect the eggs as they were being deposited. The eggs of **tent caterpillars** are covered with a protective shellac-like substance. **European pine sawfly** eggs are protected within the needles into which they were inserted. **Mantid** eggs are encased within a protective foamy material. **Grasshopper** egg cases are deposited in the soil.

The immature stages of many species are the overwintering stage. **Aquatic insects** are adapted to survive in their water habitats. Larval stages of some beetles (grubs of **May/June beetles** and **masked chafers**, and wireworms and false wireworms of **click beetles** and **darkling beetles**, respectively) overwinter (in a dormant state) underground. The larvae of **wood boring insects** are protected beneath tree bark and deep in the heartwood. The caterpillars of several species of **cutworms** actively feed through out the winter when temperatures are sufficient to warm the soil surface and them ---- during cold spells they seek refuge and protection beneath surface trash/debris.

Some noted pests overwinter in pupal form. **Imported cabbageworm** chrysalids survive often times in piles of surface trash and debris. **Tomato/tobacco hornworms** survive underground as pupae within earthen cocoons. **Fall webworms** pupate within loosely constructed silken cocoons under trash and debris. **Walnut caterpillars** and **yellownecked caterpillars** overwinter as pupae in the soil.

Many adult insect species survive the winter extremes by seeking protection in secluded locations. Trash and debris piles, stacked wood, sheds, garages, houses …….. any site offering protection. Once secreted away, some go into a semi-dormant state but become active during winter warm spells (**boxelder bugs** being a prime example), while most other species remain dormant through the entire winter before regaining their active status

with the return of warm springtime weather --- i.e. **squash bugs, flea beetles, Colorado potato beetles, striped cucumber beetles, lady beetles, lacewings, damsel bugs, lace bugs……**

What about insects which had already begun their 2009 activities? **Eastern tent caterpillars** and **European pine sawflies** continue to develop (albeit slower) despite recent "frosty"/cold/windy conditions. Such is the nature of our native insect species to withstand occasional bouts of temporarily cool dips in the temperature.

Dandruff? ……..

With the advent of consistently warmer weather, people spend more time out in their yards and on their properties. Possibly, when inspecting their pine plantings, they will notice "white flecks" on pine needles (Figure 3). Unlike irregularly-shaped "human dandruff", these white flecks have a definite shape/form and characteristics (Figure 4). These are the coverings (called "tests") of the **pine needle scale**.

Figure 3

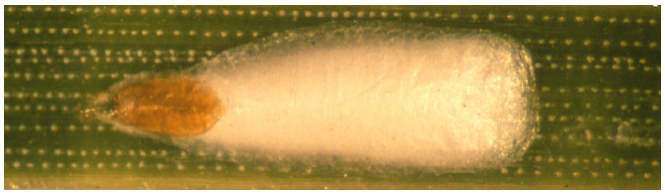


Figure 4

In Kansas, pine needle scale overwinter as maturing/matured females. The softbodied female scale is protected beneath the aforementioned white scale covering (Figure 5).

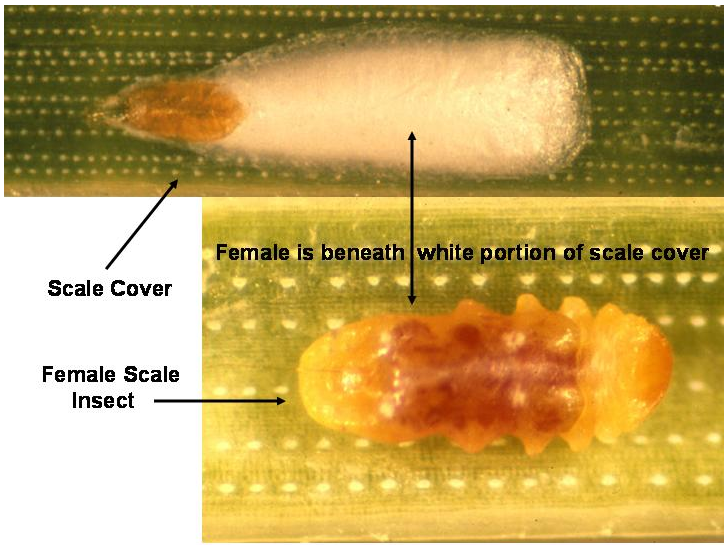


Figure 5

In late winter and early spring, eggs develop in the female (Figure 6) and are subsequently deposited. As eggs are deposited, the female's body shrinks, thus providing room for the eggs within the narrow confines beneath the scale cover (Figure 7).

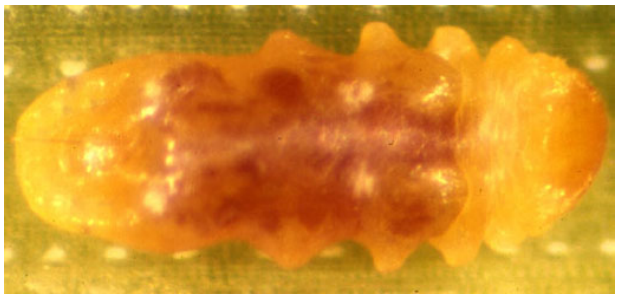


Figure 6

Figure 7

When eggs mature, the "baby scale" (termed crawler) hatches, moves out from under the scale cover, picks a spot on the needle "to settle", inserts its piercing-sucking mouthparts into the needle and begins feeding. As it reaches the end of this feeding stage, it prepares to molt (Figure 8).

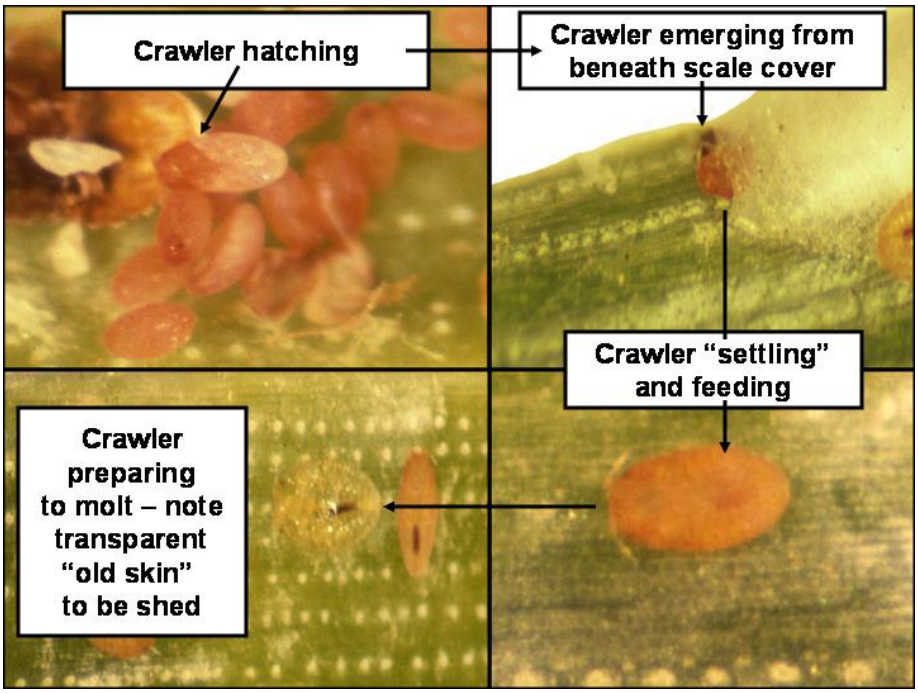


Figure 8

The "new" 2nd instar nymph continues the feeding process. Upon completing its development, it molts into the 3rd and final instar which becomes the adult stage. This is when the white waxy protective "test" is produced from glands on the bodies of the 3rd instar individuals (Figure 9).

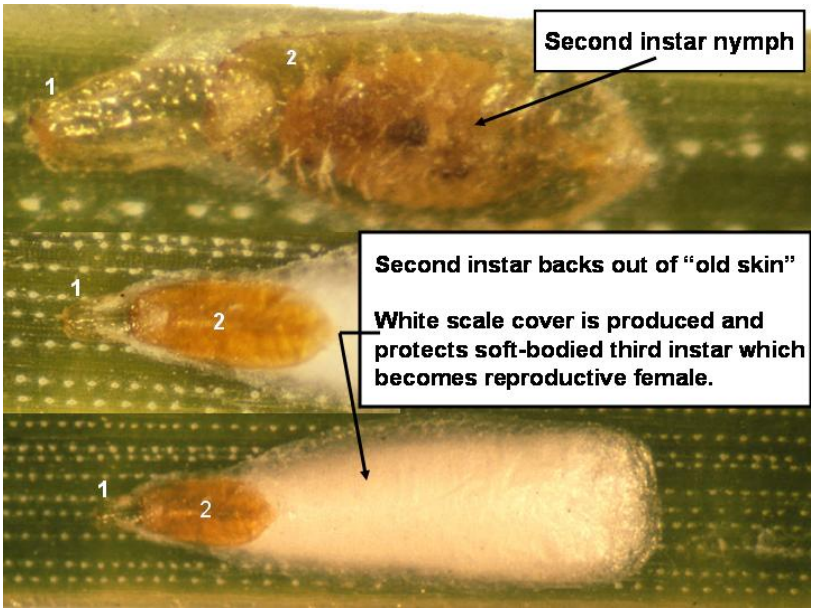


Figure 9

Pine needle scales produce 2 generations a year in Kansas with crawler activities roughly occurring in mid-May and early June, and again in mid to late July. Heavy infestations of pine needle scale may weaken and kill branches or (reportedly) entire trees.

Many sources will recommend the application of "nerve" insecticides at a time coinciding with crawlers emerging from beneath the protective cover of the female test. This requires that people closely monitor scale activities to make determine this timing. While this can be done, horticultural oils offer a less tedious alternative. That is, horticultural oils are active against all scale life stages. Although suffocation is the widely stated mode-of-action for oil treatments, oils also penetrate cellular membranes causing protoplasmic disruptions resulting in cellular/organism death.

There are noticeable signs that oils are actively working. Within a week's time after application, the normal healthy "white" appearance of pine needle scale covering changes. The oil apparently alters the makeup/structure of the waxy scale cover rendering it transparent --- the eggs and remnant female beneath are visible (Figure 10).

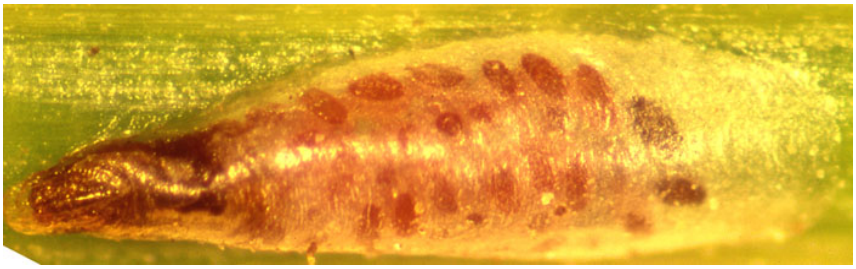


Figure 10

Upon flipping the scale cover, the eggs have a darkened "soaked" appearance and are clumped together (as opposed to healthy eggs which would appear bright pink and loose), and the female scale is also darkened/dead (Figure 11).

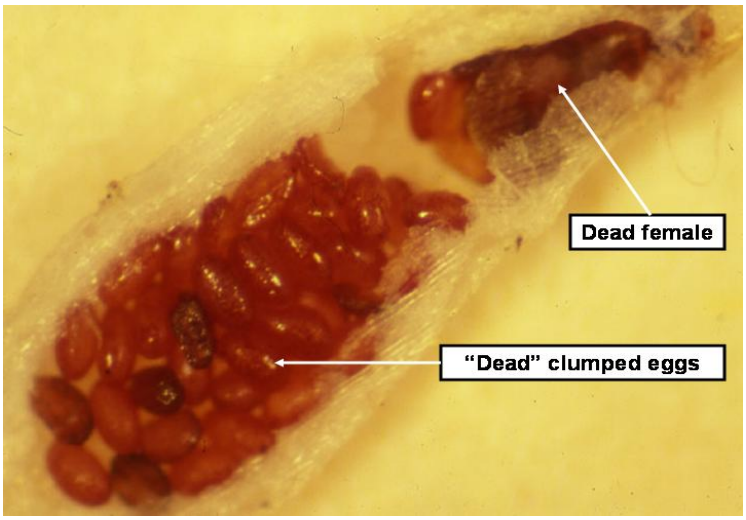


Figure 11

It is important to note that horticultural oils provide no residual control once they have dried. In essence, "What you spray is what you get". Because scales are so small and because needle clusters may be thick, a mere mist-like application will not provide satisfactory control. Rather, it is essential that an adequate amount of spray mixture be applied to guarantee thorough coverage of the foliage to ensure direct contact with the intended targets.

Bob Bauernfeind

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Weekly Report from the Kansas State University Insect Diagnostic Laboratory:

The following samples were submitted to the Insect Diagnostician Laboratory from April1st to April 9th.

April 01 2009 – Pratt County – Pine needle scale on Austrian pine
April 01 2009 –Jackson County – Indoor debris – no insects
April 01 2009 –Cheyenne County – Ants in home
April 01 2009 –Harvey County – Subterranean termites in home
April 03 2009 –Shawnee County – Cockroach nymph
April 03 2009 –Riley County – Varied carpet beetles in home
April 03 2009 –Clay County – Wireworm larvae
April 07 2009 –Johnson County – Carpet beetle larvae
April 07 2009 –Atchison County – Varied carpet beetles in home

If there are any questions regarding these samples or about the identification of any arthropod please contact the Insect Diagnostician at (785) 532-4739 or GotBugs@ksu.edu.

Holly Davis

Sincerely,

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