Kansas Insect Newsletter

For Agribusinesses, Applicators, Consultants and Extension Personnel

Department of Entomology
123 West Waters Hall
K-State Research and Extension
Manhattan, Kansas 66506
785-532-5891
http://www.entomology.ksu.edu/extension

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EPA Pesticide Program Updates from EPA's Office of Pesticide Programs 05/01/09 List of Disinfectants Registered for Use Against Influenza A Viruses

In response to the emerging threat posed by the spread of the 2009-H1N1 Flu, disinfecting hard surfaces is one way to help stop the spread of this virus. A list of over 500 antimicrobial products registered by EPA for use against influenza A viruses on hard surfaces is available at http://www.epa.gov/oppad001/influenza-disinfectants.html.

EPA emphasizes the importance of following label instructions to ensure the safe and effective use of these products in specific sites, including hospitals and other health care settings, homes, schools, offices and farms. Registered disinfectant products are for use on hard, non-porous surfaces, such as door knobs, handles, tables, floors, etc. EPA also emphasizes that these products are not to be used on the skin or to be taken orally. EPA-registered products have label information that states they are effective against "Influenza A virus."

For more information about EPA-registered antimicrobial products, please visit EPA's Web site at http://www.epa.gov/pesticides/antimicrobials/.

As the CDC stresses, the first line of defense should be to wash your hands frequently with soap and water or use an alcohol-based cleaner. For more information on what you can do to stay healthy, visit www.cdc.gov.

Sharon Dobesh

Potato Psyllid Survey

I am currently monitoring three potato fields near Garden City, KS for psyllids in cooperation with USDA-ARS-Weslaco, TX and plan to be posting the results to the web at: http://www.entomology.ksu.edu/PsyllidSurvey.

The project was started to learn more about a new potato disease call Zebra chip. Zebra chip was first identified in 1994 near Saltillo, Mexico. The disease causes unsightly black lines in potato chips resembling the stripes of zebras that render the chips un-sellable. Researchers have correlated the presence of the tomato/potato psyllid, *Bactericera cockerelli*, which infests both potatoes and tomatoes, to the occurrence of Zebra chip.

If any of you know of producers in your area that are growing chipping potatoes please let them know about the website.

Phil Sloderbeck

Russian Wheat Aphid Update.

We reported back in early April that Russian wheat aphids were apparently more common than normal in parts of southwest Kansas. Apparently this continues to be the case. I have received several reports of fields being treated and some reports of serious damage to fields that were not treated. The most recent questions have been on what to do with fields that have noticeable infestations now that wheat is in the boot stage, but are generally below the generally excepted treatment levels.

First off, let me say that Russian wheat aphid damage is very distinctive and one can often detect very low levels of infestation at this time of year that often will have little or no impact on yields. On the other hand if populations reach levels to where 10 to 20% of the tillers are infested then treatments would still probably be justified at least through the flowering stage. According to information from Colorado State University, the economic threshold during the flowering stage can be estimated using the formula: **ET = (CC*500)/(EY*MV)** *Where* ET = Economic Threshold or the percent of tillers that needs to be infested to justify treatment. CC = Control Cost per acre EY = Expected Yield per acre *and* MV = Market Value per bushel. Some examples of the

results of this equation are given in the document Russian Wheat Aphid Treatment Threshold which is on the web at: http://www.oznet.ksu.edu/library/entml1/RWAThres.pdf . These calculations were based on $3 wheat. If you have contracted wheat for more than that you can use the equation to refigure the threshold. For example I plugged in $6 wheat, $5 treatment cost and 80 bushel wheat and the threshold fell to around 8%.

For fields that have detectable levels of aphids, but remain below the treatment threshold I don't think it is time to panic. Now that the flag leaf has emerged in many fields it will be hard for the Russian wheat aphid to colonize new plants and we would hope that with warmer temperatures that the beneficial insect populations will be on the increase. For fields below treatment thresholds it would be prudent to watch fields closely to determine if populations are increasing or decreasing over time. Make sure and check tillers for aphids, because some damaged tillers may no longer be infested.

For fields that do exceed treatment thresholds, treatment options can be found at:
http://www.oznet.ksu.edu/library/ENTML2/MF745.PDF

More information on the Russian wheat aphid can be found on our website at:

http://www.entomology.ksu.edu/DesktopDefault.aspx?tabindex=191&tabid=490

And in the publication: MF 2666 -- Russian Wheat Aphid --
http://www.oznet.ksu.edu/library/entml2/mf2666.pdf

Phil Sloderbeck

Pine Tortoise Scale

We have received an inquiry regarding the presence of pine tortoise scale, *Toumeyella parvicornis* on pine. Pine tortoise scale feeds on many types of pine trees, including Scots, Austrian, and red. Immature females, which are round, brown, and wrinkled in appearance, overwinter on twigs. Eggs are laid underneath the body of adult females. Eggs may hatch into young crawlers from May through June, depending on temperature. Crawlers eventually establish in suitable locations and initiate the feeding process. Crawlers may spread to other plants via wind currents or by birds. Females are capable of producing up to 500 crawlers. Males, similar to most scale species, develop into winged individuals, which fly and mate with females. The males cannot feed and eventually die. There is usually one generation per year.

Pine tortoise scale feeding causes yellowing of needles, stunted needle growth, and under extensive populations may even result in pine death. In general, young pine trees are more susceptible to pine tortoise scale than mature trees, and foliage closer to the ground tends to support higher populations of pine tortoise scale than foliage higher in the tree canopy. In addition, pine tortoise scales producer large quantities of

honeydew, which serves as a growing medium for black sooty mold fungi. Under heavy infestations, entire trees may appear black in color.

Insecticides that may be useful for control of pine tortoise scale include acephate (Orthene), acetamiprid (TriStar), bifenthrin (Talsar), cyfluthrin (Tempo), dinotefuran (Safari), imidacloprid (Merit), insecticidal soap, and horticultural (=summer) oil. These insecticides need to be applied when crawlers are active in order to achieve maximum control of pine tortoise scale and alleviate problems next year.

Raymond A. Cloyd

Mulches and Living Organisms

Mulches are widely used in urban landscapes throughout the USA due to the multitude of benefits associated with mulching including:

- Weed suppression
- Conserve soil moisture
- Increase moisture infiltration
- Reduce soil erosion
- Stabilize soil temperatures
- Reduce soil compaction
- Decrease injury to plants (trees and shrubs from lawn mowers and string trimmers

Furthermore, mulches enhance the aesthetic (cosmetic) appeal or appearance of landscapes and gardens, and assist plants in establishing.

A. Mulch Types

There are two types of mulches: organic and inorganic. Organic mulches are derived from a variety of materials including tree bark, woodchips, recycled wood and paper, grass clippings, pine needles, straw, sawdust, leaf litter, and animal manure. Typical organic mulches incorporated into landscapes include cypress bark, pine bark, and pine straw. Organic mulches restore essential nutrients that are beneficial to soil microflora during the decomposition process; however, this means that organic mulches need to be replaced periodically. Inorganic mulches are derived from non-living sources and include crushed stone, gravel, landscape fabric, plastic sheeting, and recycled tire chips. Inorganic mulches do not need to be replenished since they don't decompose; however, inorganic mulches fail to contribute organic matter to the soil.

The recommended depth for organic mulches is 2 to 3 inches because too much mulch may decrease air circulation, result in water-logging during rains, encourage root rot diseases, and provide shelter for hibernating insects and chewing rodents such as mice and voles during the winter. Furthermore, mulch texture (course vs. fine) and depth may influence the abundance and types of arthropods such as insects and mites and/or invertebrates (organisms with no backbone) that reside in both organic and inorganic mulches.

B. Mulches and Arthropods/Invertebrates

Arthropods (insects and mites) and/or other invertebrates require food, shelter, and moisture for survival and many types of mulches (both organic and inorganic) provide all three requirements. The abundance of arthropods and/or other invertebrates is primarily influenced by mulch type. Mulches are also a food source, as are the fungi or algae that proliferate in the mulch for a wide-range of invertebrates. In fact, bagged mulches that are purchased from garden centers or nurseries may already contain bacteria and fungi that serve as a food source for many invertebrates. A concern associated with applying either organic or inorganic mulches to landscapes, particularly near the foundation of homes, is that mulches may attract nuisance and/or structural pests such as centipedes, millipedes, earwigs, ants, and termites. These arthropods or other invertebrates may seek-out more favorable conditions in homes when outdoor environmental conditions such as temperature and moisture (rainfall) change or become inhospitable. This may result in potential damage to wooden structures due to feeding by ants or termites. Ants, for example, will nest in organic landscaping mulches such as pine straw, pine bark, cypress bark, and hardwoods, which are typically placed near building foundations. This may expedite entry into buildings, which may then increase insecticide use in order to deal with ants entering homes. There are also issues associated with transporting mulches within or among states, which may contribute to moving arthropod pests to new regions of the USA. It should be noted, however, that the use of mulches may actually increase populations of spiders and ants, which are predators, thus reducing problems associated with certain arthropod pests.

Millipedes are one of the predominant arthropod groups present in mulches. Additional arthropods and/or invertebrates prevalent in mulches included centipedes, isopods (pillbugs and sowbugs), earwigs, spiders, ants, and beetles. In fact, 60% of the invertebrates present in most mulches are saprophytes (organisms that live on dead or decaying organic matter) that feed on organic matter and fungi. It has been demonstrated that a mulch of pea gravel had the fewest total number of invertebrates whereas the highest invertebrate numbers were present in organic mulches containing hardwood and/or recycled wood. In addition, predatory arthropods and invertebrates including ants, centipedes, spiders, rove beetles, and ground beetles were commonly present in the mulches. This is likely due to the abundance of small invertebrates such as springtails, which feed on microbes that decompose mulch, and serve as a food source for most large predatory invertebrates. Furthermore, invertebrates may quickly establish in new mulches although this may be affiliated with the presence of bacteria

and fungi that accumulate in bagged (sealed) mulch before being applied to landscapes. This would inoculate landscapes with micro-organisms, which serve as a food source for the diversity of invertebrates. Additionally, bagged mulch may also contain an abundance of large invertebrates that are introduced when mulch is applied.

It should be noted that not all organic mulches are conducive for establishment of arthropods or invertebrates. For example, both the Argentine ant (*Linepithema humile*) and odorous house ant (*Tapinoma sessile*) tend to avoid aromatic cedar mulches for nesting. In fact, prolonged exposure to aromatic cedar mulch is detrimental to Argentine ants. Additionally, mulches containing *Melaleuca* spp. (honey myrtle) are not consumed by populations of the subterranean termite (*Reticulitermes flavipes*), which may be due to the repellent or toxic properties of melaleuca wood.

C. Mulches and Termites

Inorganic mulches, in general, are supposedly less attractive to termites and thus discourage harborage whereas organic mulches may be more attractive to foraging termites due to their potential as a food source as well as the favorable temperatures and moisture conditions that are created beneath the underlying soil. Decay fungi may also contribute to termite activity by enhancing wood decomposition, which makes the wood more digestible to termites. Moisture underneath wood mulches may attract termites, and encourage foraging or consumption. This may lure termites closer to residential structures. As such, termites foraging in mulch residing on the top of treated soil may use mulch as a bridge across soil termiticide barrier treatments and attack the foundation of structures. This is a concern because termites, particularly subterranean termites, cause approximately $5 billion in structural damage annually in the USA.

There was initial concern, based on an e-mail circulated in early March, 2006 that the movement of mulch from New Orleans, LA after Hurricane Katrina was contaminated with Formosan termite, *Coptotermes formosanus*, which is the most destructive termite species infesting structures in the USA. However, this was untrue; the Louisiana Department of Agriculture and Forestry placed quarantines on parishes devastated by the hurricane in October 2006, thus preventing the movement of any wood or cellulose materials. In addition, it is doubtful that Formosan termites could survive the mulching process, which includes shredding, packaging, and transportation. Furthermore, the possibility of introducing termites into a site with infested mulch are unlikely because reproductive queen termites that are responsible for establishing new colonies only live in the soil and are not located in mulch. Mulches may also be an inadequate nutritional source to support termite populations. For example, bark mulches, which contain indigestible lignin, may be an insufficient food source for termites. Gravel mulches may be more preferred by the subterranean termite, *R. virginicus*, primarily due to moisture retention. In fact, this mulch is actually more attractive than pine bark, hardwood, and eucalyptus mulches. The subterranean termite has been reported to consume pine sapwood and cypress sapwood mulches. The decomposition rate of mulches may vary depending on mulch type, moisture, and placement in landscapes. Mulches that decompose rapidly are consumed more by termites. It is apparent that both temperature and moisture are important in influencing termite activity in mulches.

D. How To Minimize Living Organisms Residing In Mulch

There are a number of practices associated with applying mulch in landscapes and gardens that may be implemented in order to avoid problems with arthropods and/or other invertebrates. These include the following:

● Use no more than a 2 to 3 inch mulch depth.

- Disturb mulch routinely, which reduces the ability of arthropods and/or other invertebrates to set-up residence, or establish.
- Locate wood-based mulches away from the foundation of buildings in order to minimize the abundance of occasional invaders that may enter homes.
- Use inorganic mulches near foundations with the possible exception of gravel.

Raymond A. Cloyd

A Gall Is A Gall Is A Gall Is A Gall…… Well "Yes", and "No"

Galls are defined as abnormal growths caused when plant tissues react to some type of "irritating" growth hormone produced by various organisms. Thus, "Yes" ---- a gall is a gall is a gall is a gall. However, no two galls are alike. Each is unique in terms of the causative arthropod, the plant species attacked, where on the plant the gall formation occurs, and the size, shape, form/texture and color of the gall.

For instance, a person might notice (on a cottonwood leaf) a gall which includes the base of the leaf and the portion of the petiole at the point-of-attachment to the leaf. And on an adjacent leaf, another similar gall is entirely confined to the petiole. The thought might be, "Same type of gall, same insect". However, both are caused by a different aphid species. This is an example of the specificity/uniqueness of individual gall-inciting species.

Most galls are formed by a wide array of insect species including gall midges, gall wasps, sawflies, aphids, psyllids and adelgids. Figures 1 - 6 illustrate the diverse appearance of leaf galls.

Figure 1

Figure 2

Figure 3

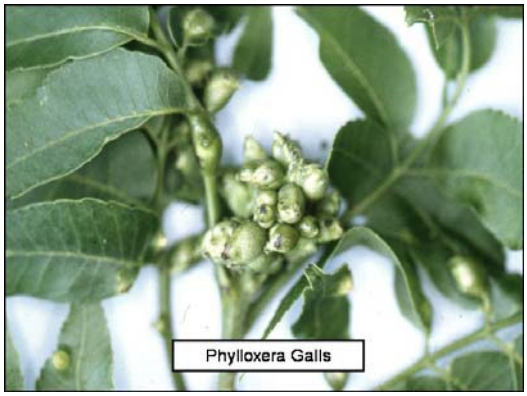

Figure 4

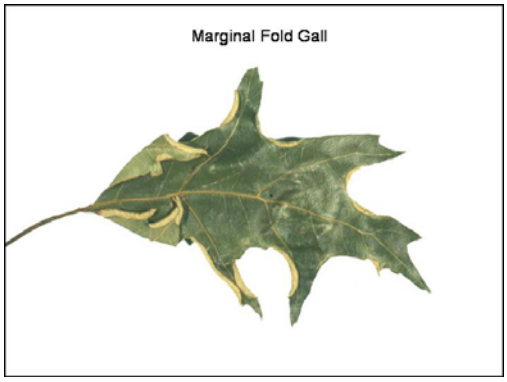

Figure 5

Figure 6

Not all galls are incited by insects. For instance, various mite species are responsible for producing galls. Of particular interest are "flower galls" caused by a type of eriophyid mite. The most common observed "flower gall" is the ash flower gall. Fertile female mites overwinter in protected sites beneath bud scales and bark. In spring, they move to male flowers where they deposit eggs. The newly developing mites cause a proliferation of flower growth and distortion (Figure 7).

Figure 7

These abnormal growths may be masked by the current season's foliage. But after leaf drop in the fall, the then-browned flower galls become apparent (Figure 8) and create a cause-for-concern by homeowners. However, these flower galls are entirely a cosmetic situation ---- of no harm to the tree. They may reoccur in an ensuing year(s), or simply phase themselves out and become nothing more than a faded memory.

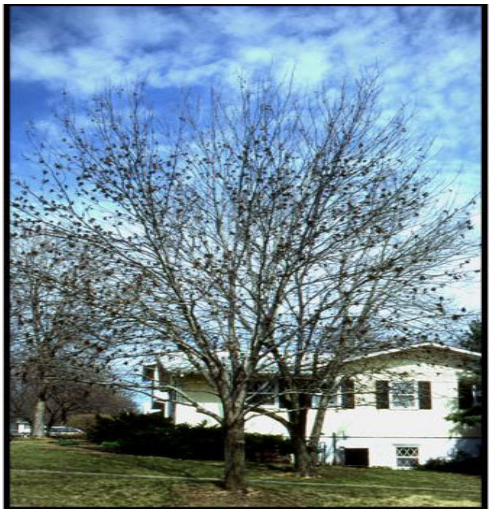

Figure 8

People often assume that "things-out-of-the-ordinary" automatically have deleterious consequences. This is not the situation with leaf galls. The galls provide shelter and food for the offspring of the "parent" insect which initiated the galling process. Depending on the species, a gall may house but a single progeny (Figure 9) or several hundred Figure 10).

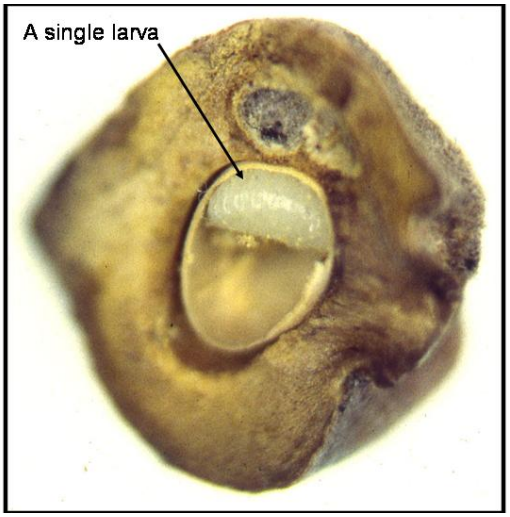

Figure 9

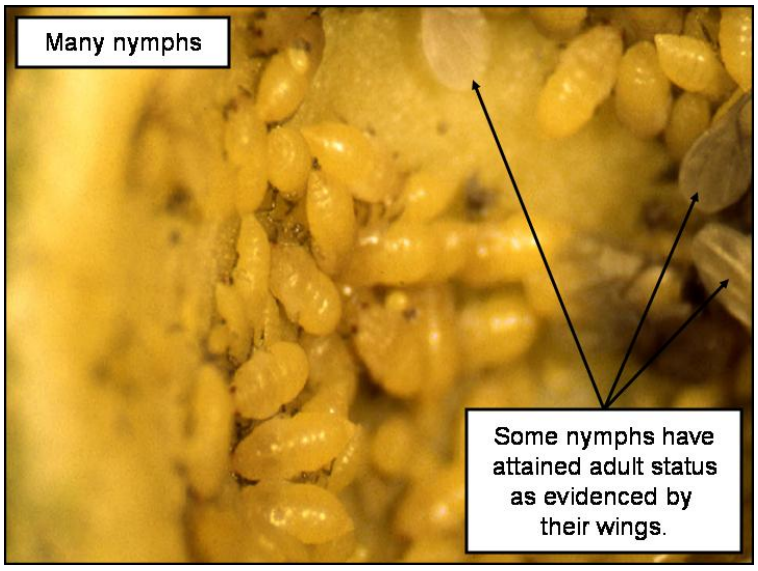

Figure 10

Note that: **THE GALLS PROVIDE SHELTER AND FOOD.** The galls merely reside on leaves. Basically, nothing is taken from the leaves per se. Under certain conditions, extremely heavy numbers of leaf galls may cause premature leaf drop. But this could be viewed as "good", because early in the season, trees (almost

immediately) put out a flush of new leaves which will be gall-free because the egg-laying gall makers have run their course and are no longer present.

With the warmer temperatures of the past couple of weeks, foliage production of most trees has "exploded". Currently, those leaves are devoid of leaf galls. However, that will soon change, because the seasonal life histories of those species responsible for initiating the galling process is synchronized with initial leaf production in spring. This goes unnoticed due to the small size of gall insects and mites in addition to tree foliage being beyond eye-level. But eventually, people may encounter/discover gall-ladened leaves.

Can people take measures to prevent the formation of insect galls? In one breath, Yes! The timely application of insecticide treatments to coincide with the presence of gallmakers could reduce their populations and minimize the extent of gall formation.

HOWEVER: consider the impracticality of control measures. It is impossible to predict when, where and what trees will be affected. Also, there is little wiggle-room in the timing of insecticide applications ---- miss it by a week and the deed-is-done. The size of a tree may prevent thorough spray coverage if attempted by a homeowner. Possibly a commercial applicator could achieve the coverage, but it would be unlikely that they would postpone other contracted jobs to cater to an "emergency request" (to say nothing of having to pay for their services IF they were to accept the job). And again, the bottom line is that leaf galls are not detrimental to overall tree health. See them, and maybe even marvel at them. Make the best of a "harmless" situation.

Bob Bauernfeind

Sincerely,

Robert J. Bauernfeind
Extension Specialist
Horticultural Entomology
phone: 785/532-4752
e-mail: rbauernf@ksu.edu

Raymond A. Cloyd
Extension Specialist
Ornamental Entomology/Integrated Pest Management
Phone: 785-532-4750
Fax: 785-532-6232
e-mail: rcloyd@ksu.edu

Phil Sloderbeck
Extension Specialist- Entomology
Southwest Research and Extension Center
Garden City, KS
Phone: 620/275-9164
e-mail: psloderb@ksu.edu

Sharon Dobesh
Pesticide & IPM Coordinator
Email: sdobesh@ksu.edu