DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

Pest Management News

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Letter #2 **June 30, 2014**

Homeowner Control of Bed Bugs Infesting Small Items

John D. Hopkins

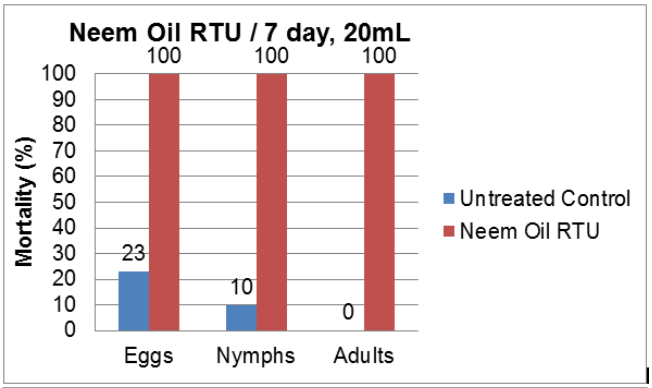
Research conducted by Dr. Dini M. Miller, Department of Entomology, Virginia Polytechnic Institute and State University, has demonstrated an effective and simple method for managing bed bug infestations in small household items. Dr. Miller's recent study evaluated a commercial neem oil formulation applied to cotton rags and then sealed in large plastic bags containing a few household items plus bedbugs confined in nylon stockings.

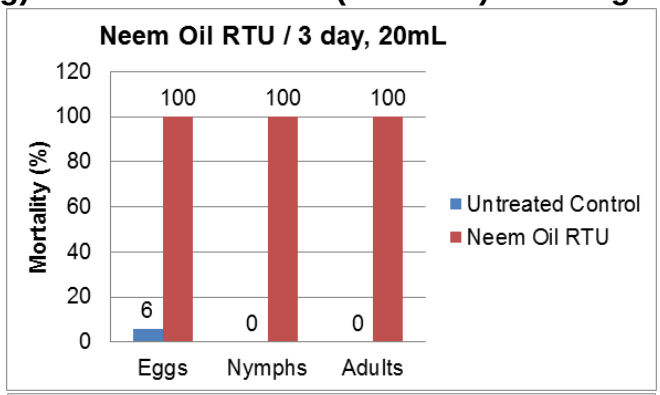
Two strains of lab reared bed bugs were used. The susceptible Harlan strain was tested for pyrethroid resistance using 0.6% deltamethrin and found to have a LT_{50} (time to 50% mortality) of 61 minutes. The Richmond strain was tested for pyrethroid resistance using 0.6% deltamethrin and found to have a LT_{50} of 13.3 days (315 times longer than for the susceptible strain.). The method tested by Dr. Miller for controlling bed bugs in small household items was effective in controlling both the pyrethroid susceptible and pyrethroid resistant bed bug strains.

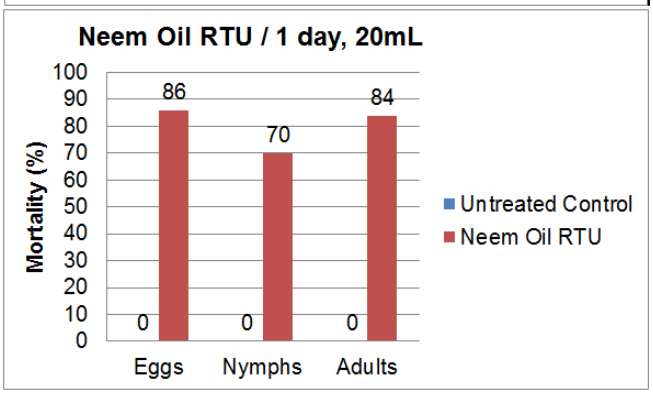
Groups of 10 bed bug nymphs, adults, and up to 94 eggs, were confined in nylon stockings and included with household items in large plastic bags. A commercial 5.5% cold pressed neem oil ready-to-use (RTU) formulation was dispensed onto a cotton rag (20 mL, 40 mL, or 60 mL per rag) and placed on top of a protective plastic sheet covering the bagged household items. The large plastic bags containing a treated rag and the household items were then sealed for 1-7 days. There were 5 treated bags per test. The household items placed in the test bags included consumer electronics, stuffed toys, electronic toys, picture frames, shoed, purses, and books.

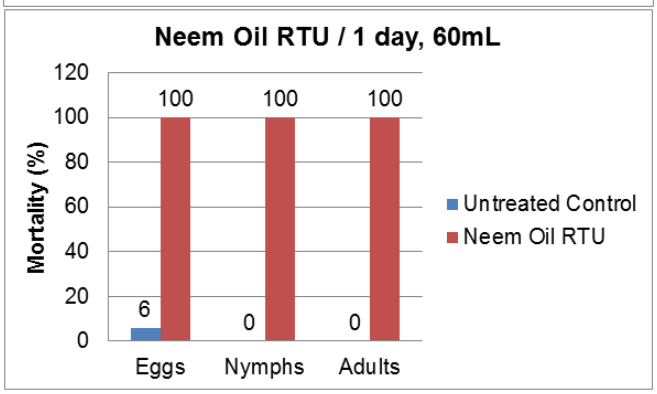
Selected results are illustrated in the charts below:

Bag Study with Electronic Devices (2 per bag) & Richmond Strain (resistant) Bed Bugs

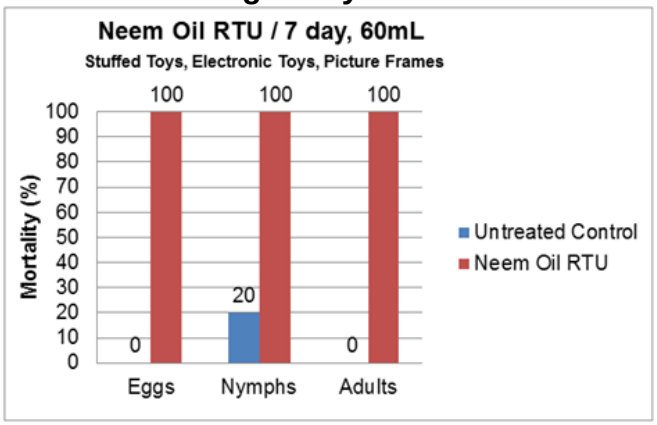


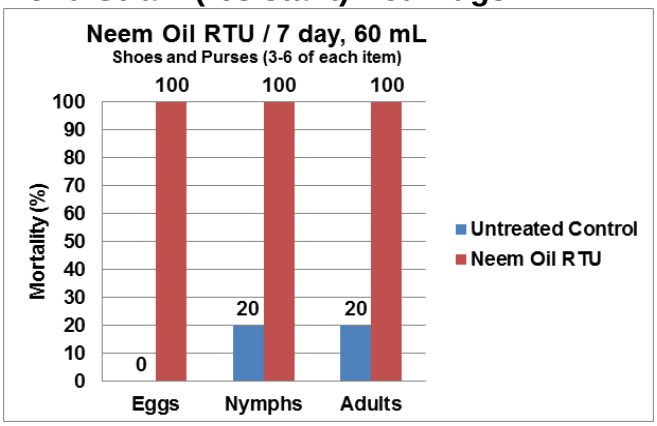




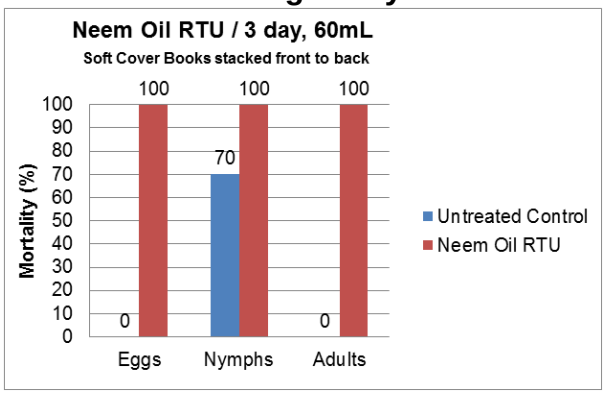


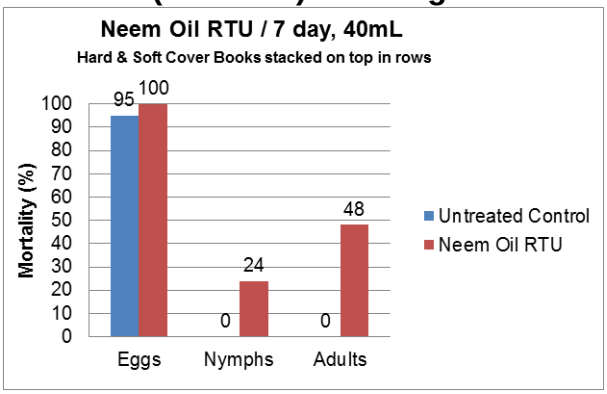
Bag Study with Mixed Items & Richmond Strain (resistant) Bed Bugs

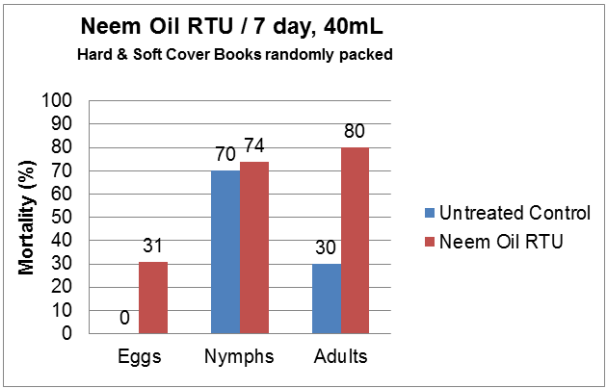




Bag Study with Books & Richmond Strain (resistant) Bed Bugs







Based on the results of this study, the application of a ready-to-use 5.5% neem oil formulation to an absorbent substrate and placed in a sealed plastic bag containing bed bug infested small household items will provide near perfect control of bedbug eggs, nymphs, and adults.

In this test, less than perfect control was observed for hard-cover books and it was felt that the book bindings were providing shelter to bed bugs that reduced treatment mortality. Additional tests are to be conducted to see if leaving hard-cover books in the bag for an additional week can improve the level of control.

A published recommendation for this control method by the manufacturer of the commercial neem oil formulation may be accessed through the following website. (click here).

If you have additional questions concerning bed bugs, click on the following links for information on bed bugs from the U.S. Environmental Protection Agency (EPA Bed Bug Questions and Answers) and (EPA Do-It-Yourself Bed Bug Control).

Fall Armyworm Alert

Kelly M. Loftin

Les Walz in Cleveland County recently emailed pictures of a recently-harvested hayfield with about 10-12 fall armyworms per square foot. Les indicated that the worms were of mixed sizes and in a well-fertilized field. An abundance (8 caterpillars per square foot) of fall armyworms of mixed sizes was also found in hayfields at SEREC in Monticello. Although late June is much earlier than we

normally see fall armyworms at this level of infestation in pastures, these infestations are significant, so please remind your producers to scout their pastures and hayfields for fall armyworms. Early detection of fall armyworms can help prevent significant yield loss. The treatment threshold for fall armyworms is three or more worms per square foot. Also, remember that cutting for hay is an option, especially, if the grass is mature enough to cut. Below are some tips for scouting and management that I'm sure most of you have seen in previous Pest Management Newsletter articles.

Fig. 1. Fall armyworm larvae.

Control decisions should be based on treatment thresholds derived from sampling the field (Fig. 1). In general, insecticide treatment is warranted if three or more half-grown armyworms per square foot are present. The best way to conduct sampling is to make at least 10 random samples across the field. Also remember that moths often lay eggs in the lushest part of the field, so include a few samples from these areas. A sampling device constructed of ½ or ¾ PVC pipe that covers one square foot makes the sampling much easier (Fig. 2). Also, early signs of armyworm damage by small caterpillars include leaves that are chewed on the underside only and fields with a slight "frosted" appearance. Another sign that fall armyworms may be present are birds feeding in the pasture or hayfield.

Fig. 2. Fall armyworm sampling device.

Factors such as the size of the caterpillars and maturity of the hay crop should be considered before making an insecticide application. For example, if a field is heavily infested and the grass is ready to harvest, consider cutting and baling as soon as possible rather than making an insecticide application. In contrast, if the field is not ready to cut and you have about three or four very small (from1/8 to ¼ inch) fall armyworm caterpillars per square foot, continue scouting and if their abundance does not decline below threshold by the time they reach ½ inch, then treat with an insecticide. Don't wait until the armyworms are 1 ½ inches long because they are about ready to pupate and have likely already caused most all of the damage that they will do, and because, large worms are hard to kill. Additional information on armyworms can be found in "Managing Armyworms in Pastures and Hayfields" and is available at: http://www.uaex.edu/publications/PDF/FSA-7083.pdf.

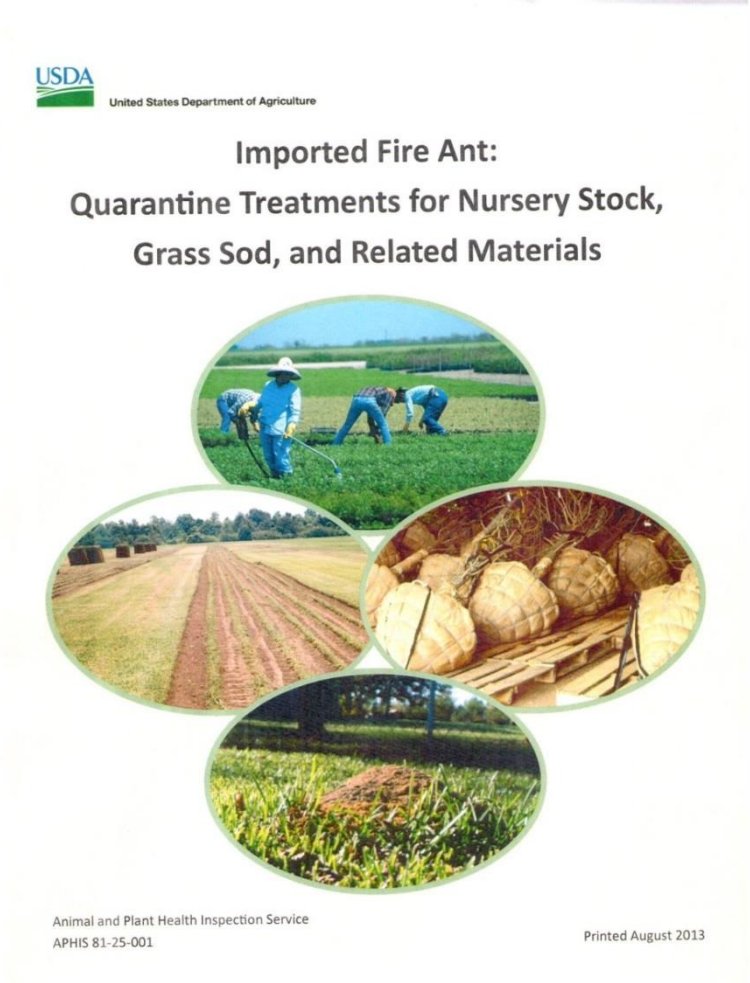
Per-acre insecticide cost will vary from as low as about $3.00 up to over $10.00. When calculating cost, always consider the cost per acre and not the cost per gallon of product. Also consider residual activity of the product especially if you are seeing an overlapping population (all sizes of fall armyworm caterpillars) and heavy armyworm pressure. Remember, pyrethroid insecticides such as Karate® (lambda-cyhalothrin), Mustang Max® (zeta-cypermethrin) and Baythroid XL (beta-cyfluthrin) have shorter-duration residual activity. In contrast, other products such as Prevathon® (chlorantraniliprole), Besiege® (chlorantraniliprole and lambda-cyhalothrin) and Intrepid® (methoxyfenozide)) do have longer-duration residual activity and can reduce the number of

applications necessary to produce a hay crop. A section 2 (ee) label for Prevathon® recommends 10-13 ounces of product per acre for control of fall armyworms, which is considerably lower than the product label rate. Research has shown that this lower rate is effective. For additional information of insecticides labeled for use against fall armyworms in pastures and hayfields, check out the Forages section of the "2014 Insecticide Recommendations for Arkansas" available at: http://www.uaex.edu/publications/pdf/mp144/c-forages.pdf

Updated USDA APHIS Reference Available: "Imported Fire Ant: Quarantine Treatments for Nursery Stock, Grass Sod, and Related Materials"

Kelly M. Loftin and John D. Hopkins

A new reference on treatment options for shipping regulated articles, such as nursery stock, from within the IFA quarantine area to a destination outside the IFA quarantine area is available from USDA APHIS. This reference lists detailed insecticide options, treatment methods, exposure periods and certification periods for items regulated by USDA APHIS through the federal imported fire ant quarantine. The new manual replaces the older edition published in 2007.



One of the changes in the manual is the addition of a new treatment option for commercial grass sod. The new option is bifenthrin EC. According to the manual, two applications of 0.2 pounds a.i./acre bifenthrin applied 1 week apart, followed by a 28 day exposure period, will provide a 16 week certification period. As you may recall, this option has been available for quarantine treatment to ship grass sod from quarantined to non-quarantined areas within Arkansas only. Now, it is available across the federal imported fire ant quarantined area.

"Imported Fire Ant: Quarantine Treatments for Nursery Stock, Grass Sod, and Related Materials" can be assessed on the USDA APHIS website. To view the booklet, select "Imported Fire Ants" under category "Insects" from the following web address: http://www.aphis.usda.gov/planthealth/pests_and_diseases.

Biting Midges: Abundant in Some Areas

Kelly M. Loftin

Fig. 1. Photo of Culicoides by University of California.

Over the last couple of weeks I've been getting biting midge bites; enough bites that I need to either wear long pants or use a repellent. I'm sure I'm not the only one in Arkansas one getting bitten. If you are bitten by something that flies and you can hardly see it, the likely culprits are biting midges also known as no-see-ums or punkies. Biting midges are tiny biting flies in the Family Ceratopogonidae. These almost microscopic biters are a nuisance to campers, fishermen, gardeners or anyone active outdoors in the early morning or late evening. These ferocious biters are also a wildlife and livestock concern. Some members of this family are potential vectors of the bluetongue virus in sheep and cattle. Some species are also capable of transmitting epizootic hemorrhagic disease (EHD) in wild ruminants such as deer. Occasionally, some horses experience equine allergic dermatitis or a localized allergic reaction to biting midges. This dermatitis usually occurs on the withers, main, tail or ears of sensitive horses. The name no-see-um is appropriate because they are difficult to see and their bite is disproportionate to their size.

Adults are less than 1/8 inch (3 mm) sometimes closer to 1/16 of an inch in length (1.5 mm) (Fig. 1). Wings are covered with dense hairs that result in pigmented patterns on the wings. Mouth parts are well developed with elongated mandibles adapted for blood sucking. Both males and females feed on nectar but only the female feeds on blood. She must consume blood for her eggs to mature.

Biting midge eggs are only about 1/100 of an inch (0.25 mm) in length and laid on moist soil. Eggs hatch into wormlike larvae with short brush like breathing structures that allows them to breathe in an aquatic environment. Although larvae are not strictly aquatic or terrestrial, they cannot develop without moisture. After adults emerge from the final immature or pupal stage, they feed and mate. Common breeding areas include along the edges of springs, streams and ponds, swampy areas, tree holes, muddy substrates and sometimes, aquatic or semiaquatic habitats formed by water from air conditioning units (Fig. 2).

These tiny flies are ferocious biters causing painful and irritating bites in some people. Allergic or sensitive individuals may develop long-lasting, painful and itchy lesions. Outdoor enthusiasts can protect themselves with insect repellents. Repellents containing DEET or picaridin, typically used against mosquitoes, are also effective against biting midges. Always follow the label precautions and apply before exposure to these biters. Occasionally, biting midges will also enter houses and screened patios through standard 16 mesh screening or damaged areas of the screen. If this is the case, you can replace damaged screen with tighter mesh screen or treat existing screen with an approved insecticide such permethrin. Also, try turning on the ceiling fan on your porch; ceiling and

window fans will often keep biting midges away because they are weak fliers. When using an insecticide read and follow label directions.

Protection of livestock from biting midges using insecticides or repellents is unlikely to affect the overall biting midge population, but can provide relief. Permanent larval habitat modifications can help to reduce insect populations over the long term, but can be cost prohibitive.

Fig. 2. Typical Ceratopogonidae breeding sites.

Leaf Spot Issues on Tomato Foliage and Fruit

Sherrie E. Smith

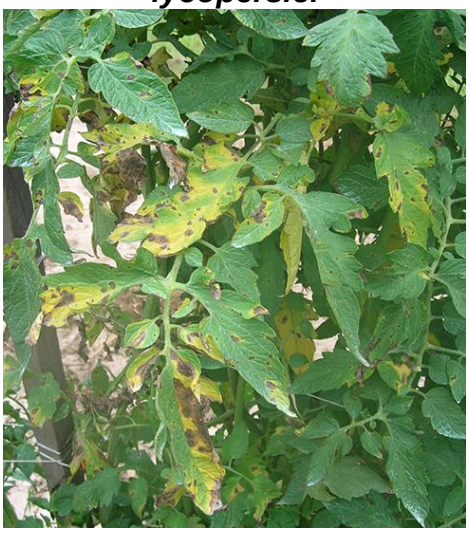
Septoria Leaf Spot caused by *Septoria lycopersici* is one of the most damaging diseases of tomato foliage. It is sometimes confused with Bacterial speck, caused by *Pseudomonas syringae* pv*. tomato.* Bacterial Speck is favored by low temperatures and high humidity. Lesions on leaves and petioles are round, dark brown to black with a halo developing over time. Lesions may coalesce to blight large sections of affected tissue. On fruit the specks are surrounded by distinctly greener tissue. Bacterial speck is seed borne and survives for a time in plant debris. Control of Bacterial Speck relies on the use of clean seed, good sanitation, and crop rotation. Copper-containing bactericides can be useful when applied as protectants to young susceptible plants during cool, wet periods. .Apply at 10-14 day intervals until temperature moves into the 90°F range.

Septoria is favored by warm temperatures and high humidity. Symptoms of Septoria generally appear on the lower leaves after the first fruit sets. Lesions are circular, about 2.6mm in diameter, with dark brown margins with tan to gray centers. A narrow yellow halo may often be observed around the lesion. Small black fruiting bodies of the fungus (pycnidia) may be observed in the centers of the lesions using a hand lens. Lesions may coalesce to form large blighted areas. Badly affected leaves turn yellow, then brown and fall off the plant. There are no resistant cultivars available. Control measures include crop rotation with a non-host, control of weeds in tomato crops, removal of all crop debris, and avoidance of night watering and overhead irrigation. Protective fungicides at regular intervals during the growing season will be necessary for most growers. Quadris, Cabrio, Flint, Bravo, Mancozeb, and Gavel are labeled for Septoria leaf spot control. Homeowners may use Ortho Garden Disease Control, or Fertilome Liquid Fungicide, or Bonide Fung-onil Multipurpose Fungicide Concentrate, or Garden Tech Daconil Fungicide Concentrate, or Bonide Mancozeb Flowable w/Zinc, or Hi-Yield Maneb Garden Fungicide, or Green Light Tomato and Vegetable Spray. Organic Gardeners may try Bayer Advanced Natria Disease Control, or Bonide Liquid Copper Fungicide Concentrate, or Kaligreen, or Bonide Remedy, or Bonide Copper Dust, or Hi-Yield Bordeaux, or AgraQuest Serenade.

Tomato Septoria Leaf Spot-*Septoria lycopersici*

Sherrie Smith University of Arkansas Cooperative Extension

Tomato Septoria Leaf Spot-*Septoria lycopersici*



Keith Gresham University of Arkansas Cooperative Extension

Tomato Septoria Leaf Spot spores-*Septoria lycopersici*

Sherrie Smith University of Arkansas Cooperative Extension

Tomato Bacterial Speck –*Pseudomonas syringae* pv. *tomato*

John Gavin University of Arkansas Cooperative Extension

Tomato Bacterial Speck –*Pseudomonas syringae* pv. *tomato*

John Gavin University of Arkansas Cooperative Extension

Tomato Bacterial Speck on fruit –*Pseudomonas syringae* pv. *tomato*

John Gavin University of Arkansas Cooperative Extension

Additional Restrictions in Rodenticide Use

Becky McPeake

For many years, rodenticides have been scrutinized because of their potential to cause death in non-target species including children, pets and wildlife. The Arkansas Game and Fish Commission currently prohibits the use of toxins, poisons, and fumigants for removing wildlife, except rats and mice near buildings. The EPA recently has cancelled a number of rat and mouse control products sold to consumers. EPA ruled that pellets and other bait forms that cannot be secured in bait stations are prohibited. Bait stations reduce the risk of non-target species from coming into contact with the toxicant. However, it does not reduce the risk from pets or wildlife consuming poisoned rodents and then dying or becoming sick themselves.

The 12 products affected are:

- d-CON Concentrate Kills Rats & Mice
- d-CON Ready Mixed Kills Rats & Mice
- d-CON Mouse Prufe Kills Mice
- d-CON Pellets Kills Rats & Mice
- d-CON Mouse Prufe II
- d-CON Pellets Generation II
- d-CON Bait Pellets II
- d-CON Ready Mixed Generation II
- d-CON Mouse-Prufe III
- d-CON Bait Pellets III
- d-CON II Ready Mix Baitbits III
- d-CON Bait Packs III

These products will be phased out over the coming year. Production of these products will cease in December 31, 2014, and distribution to retailers ends March 31, 2015.

Classification of Rodent Poisons

Typically mouse and rat poisons are classified into one of three categories:

First-generation anticoagulants generally require multiple feedings by rodents to deliver a lethal dose. Death usually occurs within 5-7 days. Anticoagulants interfere with blood clotting, and death can result from excessive bleeding.

Second-generation anticoagulants are more toxic and persistent than first-generation anticoagulants. Rodents can consume a lethal dose of second-generation anticoagulants in one night of feeding but can consume more because death usually occurs 5-7 days after a lethal dose is consumed. Risk to predators and scavengers is higher because the amount of poison rodents consume over several days is greater, and second-generation anticoagulants persist in rodent carcasses much longer than first-generation anticoagulants. Brodifacoum, bromadiolone, difenacoum, and difethialone are second-generation anticoagulants.

Non-anticoagulants are toxic in other ways, such as affecting the nerves or other body organs.

Consumer Use Products

Products sold directly to consumers cannot contain the pesticide active ingredients brodifacoum, bromadiolone, difethialone, or difenacoum, because of their higher toxicity to people, pets, children and wildlife. Products designed for sale to consumers are either first-generation anticoagulants or are not anticoagulants.

For consumer-purchased rat and mouse poisons:

- Loose poison baits such as pellets are prohibited.
- Each product must include a bait station.
- Products with bait stations can also include bait refills.
- All outdoor above ground products must be placed within 50 feet of a building.

Professional Use Products

Pest control professionals apply pesticides in residential, agricultural, and industrial areas. Pest control professionals must read and follow label directions to ensure that products are used appropriately.

- Rodent control products must have bait stations when used indoors and above ground outdoors if children, pets, or non-target animals can come into contact with the pesticide.
- All products used outdoors and above ground must be placed within 100 feet of a building or other structure.
- Manufacturers may not market professional use products in “consumer” stores including grocery, hardware, and club stores.
- Products containing first generation anticoagulant or non-anticoagulant baits must be sold in quantities that include at least four pounds of poison bait.
- Products containing second generation anticoagulant baits must be sold in quantities that contain at least:
  - 16 pounds of poison bait when labeled for use above ground outdoors.
  - 8 pounds of poison bait when labeled for use around agricultural buildings.

For more information about EPA’s ruling on rodenticides, visit:
http://www2.epa.gov/rodenticides/canceling-some-d-con-mouse-and-rat-control-products

For a complete list of homeowner use rat and mouse products meeting EPA's safety standards, visit:
http://www2.epa.gov/rodenticides/choosing-bait-station-household-use

Name That Weed

Bob Scott

This months weed or wildflower depending on your point of view is in full bloom this time of year. These pictures were taken near Lonoke on June 17th. A member of the composite or sunflower family, it has a distinctive flower that is called by many names. In Arkansas wheat fields it is a weed and goes by one common name in particular.....I think these pictures are enough for you to be able to identify this weed. Be the first to email me at bscott@uaex.edu with the correct common or scientific name and win a prize!!!

All chemical information provided in this newsletter is given with the understanding that no endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned. Individuals who use pesticides are responsible for ensuring that the intended use complies with current regulations and conforms to the product label. Before purchasing or using any pesticide, always read and carefully follow the label directions.

To The Readers

Please offer any suggestions for Urban or Livestock Integrated Pest Management topics (insect pests, plant diseases, weed problems, wildlife control problems) that you would like to see – *OR* – feel free to submit an article that you have prepared. Kelly and I will be glad to include it (subject to editing). Send feedback to jhopkins@uaex.edu or kloftin@uaex.edu

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