DIVISION OF AGRICULTURE
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Pest Management News

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Insecticidal Paint Additives for Pest Control or Repellency

John D. Hopkins

The organophosphate insecticide chlorpyrifos was the first material registered as an insecticidal paint additive (1982 Walla Walla Environmental) but, in 1997 the USEPA and Dow AgroSciences agreed to restrict several uses of chlorpyrifos. Among the banned uses included the use of chlorpyrifos as a paint additive. In 1988, diazinon, a second generation organophosphate based insecticide paint additive was registered and was available through 2000 when it to was removed from the market by the USEPA. Currently, the only material on the market registered as an insecticide paint additive is the synthetic pyrethroid deltamethrin in formulations containing 4.75% active ingredient.

Commercially available deltamethrin based insecticidal paint additives include:

1. Walla Walla Environmental's Bug-Juice Insecticide Paint Additive (https://www3.epa.gov/pesticides/chem_search/ppls/047332-00011-20050603.pdf),
2. Sunnyside Corporation's M-1 Advanced Insecticide Paint Additive (https://www.sunnysidecorp.com/pdfs/Use-Safety_76904M.pdf),
3. Control Solutions, Inc. Delta 4.75% SC insecticide (https://www3.epa.gov/pesticides/chem_search/ppls/053883-00276-20140611.pdf).

These materials are liquid paint additives for use in interior and exterior oil-based or water-based paints and stains and provide control of crawling and flying insects and spiders when exposed to treated surfaces. Residual efficacy will be improved if painted surfaces are kept clean. None of the above mentioned additives specifically mention control wasps or dirt daubers on the label.

A paint additive that only acts as a repellent (NOT insecticidal) is CTA Products Group's Outlast NBS 30 Time Release Insect Repellent Additive for **Exterior** paints and stains (http://www.bugspray.net/labels/nbs_30_label.pdf). This product is exempt from registration under FIFRA and contains only exempt plant oils as active ingredients. One difference from the other additives mentioned above is that this product also claims repellency but not control of dirt daubers and wasps. When used as a paint/stain additive, residual repellency lasts considerably longer (up to a year claimed) versus when the material is used as a surface spray (claimed repellency lasts for about 30 days).

Residual control/repellency of wasps and dirt daubers that build nests on surfaces can also be achieved with the use of conventional surface sprays of homeowner labeled insecticides as listed in the current MP144 Insecticide Recommendations for Arkansas:

https://www.uaex.edu/publications/pdf/mp144/m-household-pests.pdf#page=11.

Treat for Horse Bots after Killing Frosts

Kelly M. Loftin

Here is our yearly reminder to treat our horses for bots. After a couple of killing frosts, adult bot flies die and egg laying ceases signaling the best time to treat for these parasites. Even horse owners that diligently remove bot eggs throughout the summer and fall should treat their horses, mules and donkeys for horse bot larvae. Although the adults are free living and do no direct harm to horses, their immature stages (larvae) are internal parasites that can cause severe damage to the stomach lining which can lead to major health issues such as colic.

Fig. 1. Adult horse bot fly, *Gasterophilus intestinalis* (DeGeer). (Kelly M. Loftin)

Horse Bot Flies (Family Gasterophilidae).
Horse bot flies are in the family Gasterophilidae. The larval forms are important internal parasites of equines. The three species considered important in the U.S. are: *Gasterophilus intestinalis* (DeGeer), the horse bot fly; *Gasterophilus nasalis* (L.), the throat bot; and *Gasterophilus haemorrhoidalis* (L.), the nose bot. Adults resemble bees in that they are about the same size and hairy-bodied (Fig. 1). Adult bot flies are short-lived, possess non-functional mouthparts thus do not feed. Adult activity begins in warm weather and ceases at the first frost.

Adult female bot flies attach eggs to the hairs of the host's body similar to lice (Fig. 2). The site of egg attachment is specific to the bot fly species. Horse bot flies attach eggs on the forelegs between the knee and hock; throat bot flies attach eggs under the jaw; and the nose bot flies attach eggs to the upper lip. Horse and throat bot fly eggs are stalkless; and nose bot fly eggs are stalked. For the horse bot fly, egg hatching is stimulated by moisture and friction from the animal's licking. Larvae gain access to the host's mouth by this licking, and burrow into the tongue or gums. They remain there for about a month then pass to the stomach attaching to its mucous membrane where they remain for about 9 months (Fig. 3). In the

spring larvae (Fig. 4) detach from the stomach and are passed with feces and pupate (Fig. 5) outside their host. Adults emerge from pupae in about a month to 6 weeks. Horse bot flies may cause significant damage to the stomach lining and possibly stomach rupture or colic if the passageway between the stomach and small intestine becomes blocked. The life cycle of the throat and nose bot flies are similar to the horse bot fly, except mature nose bot fly larvae attach to the rectum near the anus; and the mature throat bot fly larvae attach in the duodenum (first section of small intestine) near the pylorus.

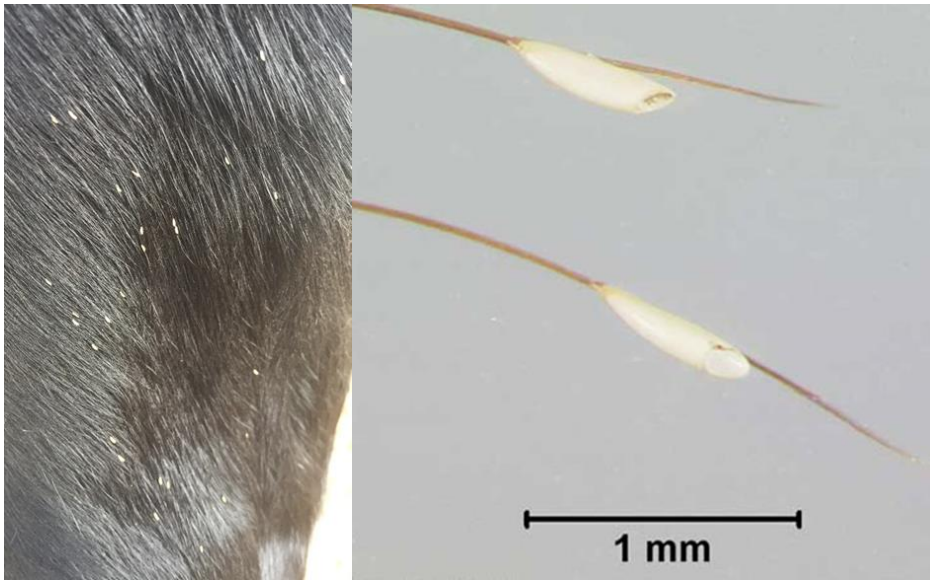


Fig. 2 a. & b. Eggs of the bot fly, *Gasterophilus intestinalis* (DeGeer), deposited on the hairs of a horse's foreleg. (a. Kelly M. Loftin b. Univ. of FL)

Fig. 3. Bot fly larvae, *Gasterophilus nasalis* (L.), attached to the pyloric region of horse stomachs. *(Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/)*

Fig. 4. Bot fly larva, *Gasterophilus intestinalis* (DeGeer). *(Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/)*

Chemical control of bot flies is aimed at the parasitic stage within the horse. Avermectin formulations containing products such as ivermectin or moxidectin are available for bot fly control in equines. These products are relatively easy to use, fall treatments should be administered after fly activity

ceases (generally after the second killing frost). The “Insecticide Recommendations for Arkansas - 2017“(MP 144 http://www.uaex.edu/Other_Areas/publications/PDF/MP144/MP-144.asp) provides a listing of products available for controlling bots in equines. “Arthropods Pests of Equines” (MP 484 http://www.uaex.edu/Other_Areas/publications/PDF/MP484.pdf) provides biology and control information on major arthropod pests of equines including horse bots. “Livestock Health Series: Internal Parasites of the Horse” (FSA 3096 http://www.uaex.edu/Other_Areas/publications/PDF/FSA-3096.pdf) is available for more information on other internal parasites of equines including bots.

Non-chemical bot fly control is aimed at the eggs. Equine owners can frequently sponge the horse with warm water or to stimulate hatching of bot fly eggs. New hatched bot fly larvae quickly die especially if done on a cool day. For the horse bot fly, concentrate efforts on the animal’s legs between the hock and knee. Also, applying insecticidal washes to egg laying sites can reduce the number of larvae ingested by the animal. Bot combs or pumice bot stones can also be used to scrape away the eggs. These remedies should reduce the number of bot fly larvae ingested by the animal, but will not control any larvae that were unaffected and ingested. Because of the seriousness of bot fly infestations, treatment with a boticide to control the parasitic stages is recommended.

Fig. 5. Pupa of bot fly, *Gasterophilus nasalis* (L.) *(Marcelo de Campos Pereira, http://www.icb.usp.br/~marcelcp/)*

Very rarely, horse bots fly can cause ocular myiasis in humans. Ocular myiasis is an invasion of the eye by first stage larvae. These cases are rare and can occur in individuals handling horses that have bot fly eggs on their hair. On these rare occasions, bot fly larvae will enter the eye possibly as a result of rubbing their eyes. In other rare instances, hatched larvae enter the human skin causing cutaneous myiasis which can result in visible, inflamed tracks, irritation and itching from the larva’s burrowing. People working with horses during bot fly season should not rub eyes after combing or washing animals and thoroughly wash their hands.

Preventing Stable Fly Problems Next Spring

Kelly M. Loftin

With hay feeding just around the corner, we should remember to minimize hay wastage to prevent stable fly problems next year. Moisture, rotting hay, livestock manure and warm temperatures are the ingredients necessary for a healthy stable fly population. All these ingredients come together anywhere hay is wasted.

Ways to avoid a buildup of stable fly breeding material:

1. Modify hay feeding techniques to prevent a stable fly problem.
    a. Unroll hay (in large round bales) in a different location for each feeding.
    b. Distribute “flakes” of small hay bales in different locations in the pasture
    c. Feed hay only in well drained areas.
    d. Do not feed more than the animals will clean up during a single feeding.
2. Clean up wasted hay around hay rings before stable flies become a problem.
3. If you cannot clean up around a hay ring, run a farm implement (disk, etc.) through the area. This will kill some stable fly larvae and pupae and dry out the breeding material to inhibit larval development.

The stable fly, *Stomoxys calcitrans* (L.), is both a nuisance to companion livestock and an economic pest in traditional livestock production. This fly is a filth fly that breeds in decaying organic matter, manure, spilled feed, and wet hay or grass. The male and female are both blood feeders that cause painful bites and irritation for pets, livestock, and humans. Stable flies are persistent feeders and will continue to take a blood meal even after being disturbed. Sunny outdoor areas are the preferred resting site for adult stable flies; however they will enter buildings such as in horse stables, dairy calf pens or poultry houses, often for breeding habitat. They also breed outside in decaying organic matter such as wasted hay mixed with urine and feces.

Adult stable fly, *Stomoxys calcitrans* (Linnaeus). (Whitney Cranshaw, Colorado State University, Bugwood.org)

Because a single stable fly will take multiple blood meals per day, stable flies are both a serious nuisance and an economic pest. Feeding usually occurs on the lower regions of the body such as the lower half of the livestock’s legs. Stable fly feeding is readily apparent by the stomping of animal’s feet. Flies that do not move around on the animal, particularly the legs, are likely to be stable flies.


Typical stable fly breeding site.

In cattle, stable fly populations of ten or more per animal can result in a potential 10-15% loss of body weight. This loss is from blood loss and the disturbance caused by the fly's feeding. Loss in milk production resulting from extreme stable fly abundance has been reported to be 40% or more. Recent research has estimated that stable flies cost the U.S. livestock industry $2.2 billion. Stable flies are also implicated in the transmission of livestock diseases such as equine infectious anemia, anthrax, and surra.

Life Cycle and Identification - Adult stable flies are about the same size as the adult house fly, *Musca domestica* L. The stable fly blood-feeding proboscis (resembles a bayonet) is very prominent and a good characteristic to distinguish it from the house fly with sponge-like mouth parts. The adult fly is gray in color with four dark stripes on the thorax and three dark spots on the abdomen creating a "checkerboard pattern".

The adult female can lay eggs after having several blood meals. The white eggs are usually laid in decaying vegetative matter such as wet hay or straw mixed with manure. The female stable fly lays eggs in batches of 25-50. The larvae hatch from the eggs in about 1-2 days. Larvae are typical white maggots that feed on the same type of material where the eggs were laid. The larvae stages last for 8-26 days and then develop into a brown pupa from which the adult emerges after about 5-26 days. The duration of the stable fly life cycle is temperature dependent, for example in warm weather (75-85°F) the cycle from egg to adult can be completed in 13-18 days. At cooler temperatures the stable fly can take several weeks to complete its life cycle. Overwintering of stable flies is not completely known, but larvae likely develop slowly during winter months under the frost line and move toward the soil surface to pupate as temperatures rise.

Control Methods - The best method to reduce stable fly abundance is practicing good sanitation. Removing manure, spilled feed, and wet hay or straw at least once a week (preferably every 2 to 3 days) will help reduce the stable flies' breeding. Concentrate sanitation efforts around stables, feeding areas, corrals and barns. The aim of sanitation is to reduce and/or eliminate habitat for larval development. Accumulated manure and wasted feed should be removed and/or thinly spread. Vegetation management in areas where manure, hay and dead organic matter accumulate is also recommended. Excess moisture around the barnyard should be reduced or eliminated. Reduce or eliminate hay wastage as this becomes ideal breeding habitat when the hay becomes wet and soaked with manure and urine. A Kansas study indicated that almost 60,000 stable flies could be produced weekly from a typical round bale feeding site.

Insecticides applied directly onto the animal are often used to provide immediate relief for the animal. Animal insecticide treatments for stable flies are normally directed toward the lower regions of the body, primarily the legs. For cattle, stable fly counts should be carried out by counting the number of stable flies present on the legs of each animal. Application of the animal sprays should be considered when stable flies reach an average of 10 flies per animal.

Another chemical control method is application of residual sprays on surfaces where the flies rest (fences, walls and vegetation). These sprays may remain effective for 10 days when temperatures are not too high or rainfall is limited. When using residual sprays, do not allow runoff to create a puddle beneath the application site and do not contaminate feed or water.

Area space sprays can also be used where flies are congregating in abundance. Remember space sprays offer little residual activity, thus direct contact is necessary to kill the fly. These types of sprays

can be used in combination with residual sprays and may require 2-3 applications a week, when stable fly abundance is high.

Consult the Animal Section of the MP 144 “Insecticide Recommendations for Arkansas” - https://www.uaex.edu/publications/mp-144.aspx for a listing of insecticides labeled to control stable flies on livestock or livestock premises. Addition information on stable flies and other pests of horses is available at: http://www.uaex.edu/Other_Areas/publications/PDF/MP484.pdf.

Fall Anthracnose Management in Strawberry

Aaron Cato

We’ve had a lot of questions this year about the potential for anthracnose to cause issues in the fall. Anthracnose is not generally an issue during this time, but if your plant source has confirmed that anthracnose issues were present, you may need to apply a fungicide to limit potential losses. Anthracnose crown rot, *Colletotrichum gloeosporioirdes*, is the species of anthracnose that most commonly cause issues to transplants in the fall. Plants that are infected can receive severe damage in the fall months, or damage can be hidden until after plants start growing again after the dormant period. Anthracnose crown rot will continue to harm plants after dormancy, so it is very important that control measures are taken if risk is evident in the fall.

Anthracnose crown rot symptoms can present as petiole lesions (black sunken areas), stunting, marbling inside the crown, or plant death. The easiest way to confirm anthracnose crown rot is to look for marbling inside crowns. Contact your plant source to determine if issues have been discovered, and make a fungicide application if you plant source confirms issues. Send samples to the Plant Health Clinic through your county agent to confirm crown rot presence if information can’t be gained from your plant source. Captan is the best option for control followed by Topsin M WSB. Avoid using FRAC 11 fungicides such as Quadris for control of crown rot anthracnose.

Pictures showing symptomology of strawberry anthracnose crown rot, including circular leaf spots and marbling in the crown due to infection. Photo Courtesy of Frank J. Louws, North Caroline State University. Source: https://content.ces.ncsu.edu/anthracnose-crown-rot-of-strawberry.

Trapping Furbearers Causing Nuisance Problems

Becky McPeake

Trapping nuisance wildlife using restraining devices such as leghold and conibear traps is becoming a lost art. Historically, Native Americans and early European inhabitants trapped, traded, and sold pelts used for clothing, rugs, blankets, etc. Today, demand for fur has decreased presumably from a combination of factors including availability of cheaper alternative fabrics, changing fashion trends, a declining global market, and questions about the humaneness of trapping.

Poor financial returns for trappers is commonly attributed to relatively few furbearers (e.g., beavers, raccoons, nutria, opossums, foxes, coyotes) being harvested in Arkansas. Reportedly, a trapper could receive $30 or more per raccoon at a fur sale in the 1980's, compared to 25 cents to $3.75 per raccoon at the 2019 fur sale. Fewer furs are sold in Arkansas today than even just 10 years ago. At the Arkansas Trappers Association Fur Sale, 3,768 furs were sold for $42,090.65 in 2010 compared to 683 furs sold for $8,350.80 in 2019.

As natural wetland builders, beavers construct dams which can flood timber and erode roads by altering waterways. Photo courtesy of Karan A. Rawlins, University of Georgia, Bugwood.org.

As a wildlife management practice, trapping is another tool for removing nuisance animals when live trapping, shooting, and/or hunting is ineffective, impractical, and/or illegal. Such nuisance species can (a) consume and contaminate agriculture crops, (b) kill livestock, (c) alter waterways which erode county roads and flood valuable timber, (d) weaken river/lake/pond levees and drainages, and (d) cause nuisance issues in residential areas.

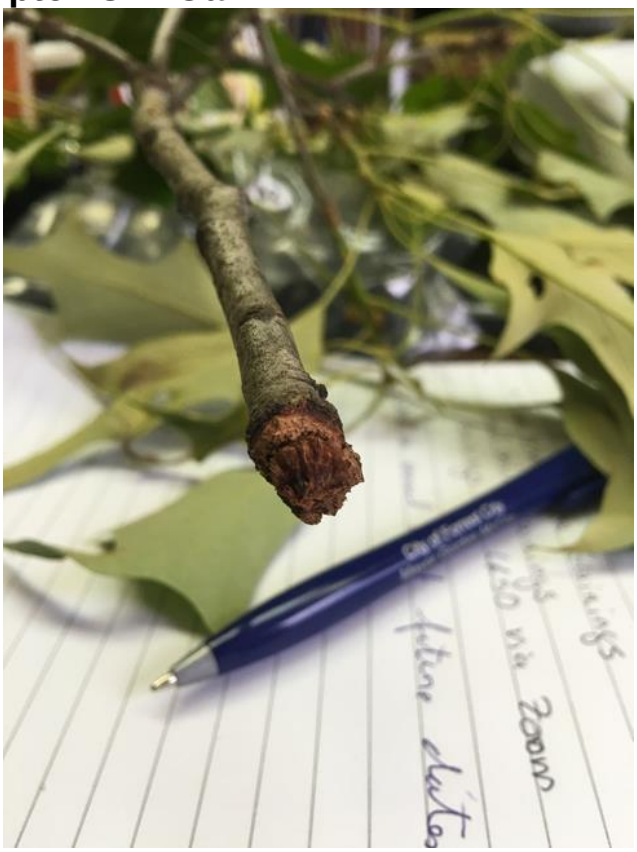
The Arkansas Trappers Association (www.ArkansasTrappers.org) provides workshops and training for using the safest and most efficient traps as well as ethical treatment of all animals. These modern trappers are devoted to improving the image and practice of trapping through educational events such as workshops, seminars, and demonstrations for young and old alike. Annually in late October, the Association offers a weekend trapping workshop at Camp Clearfork outside Hot Springs. Next year, the Southeast Regional Convention will be held at the Garland County Fair Grounds in Hot Springs on May 8 – 9, 2020. Visit the Arkansas Trappers Association's website for more information about these and other educational opportunities.

Cladoptosis: 'Self-Cleaning' or 'Natural Pruning' of Trees

Sherrie E. Smith

Homeowners are sometimes bewildered at finding branches from a mature tree littering the ground. It is not unusual for the Plant Health Clinic to receive tree branch samples that have fallen from the tree with all their leaves still green and healthy looking. Some tree species including larches, pines, poplars, willows, cottonwood, maples, walnut, ashes, bald cypress, and oaks are subject to Cladoptosis, ('self-cleaning' or 'natural pruning') during the growing season as a normal part of their physiology. Although twigs and small branches are usually involved, occasionally large branches may be shed. An abscission layer forms at the base of the branch, shutting off the flow of water and sugars. Cladoptosis often occurs every year in these species. The number of branches shed typically increases with the age of the tree. There is evidence that cladoptosis may occur in order to remove less vigorous foliage or foliage which is disadvantaged. Foliage that is disadvantaged may occur on those branches whose ability to photosynthesize is impeded by too much shade or lack of enough water and nutrients to support the abundant amount of foliage produced in the spring, Disease, drought, and soil compaction may also play a role. These issues are likely more common in mature, older trees or in trees under stress. Cladoptosis is generally not a cause for concern, though it is always recommended that tree stress be minimized through good cultural practices of a regular watering and fertilization regime.

Cladoptosis Symptoms in Oak



Photos by Sherrie Smith

Name That Weed

Tommy Butts

This month's Weed Science contest is "Name that Weed". This weed (Picture 1 & 2) is an erect to ascending cool-season/winter annual plant that can be found in cultivated areas, fields, lawns, flowerbeds, and roadsides. It thrives in cool, moist conditions during the spring months. The plant has elliptical cotyledons, and sessile entire leaves which typically are not pubescent. The leaves are opposite at the bottom, but become alternate moving up the stem and are fleshy. This weed is relatively short, typically growing no larger than 12 inches tall and will bloom solitary white flowers. Another identification characteristic includes the distinctive, heart-shaped capsule that forms as the seedpod (Picture 3).

Picture 1.

Picture 2.

Picture 3.

The pictogram below may also aid in providing the correct common name of this weed.

Competition has shown to be an effective management technique in turfgrass in combination with mowing as soon as first flower heads appear. There is very little information for chemical management of this weed. The USDA Weed Control Compendium indicates poor control from 2,4-D, MCPA, and dicamba. No information is presented on the control achieved using products such as picloram or glyphosate. If chemical control is required, a combination of broadleaf herbicides and testing in small areas may be necessary to achieve satisfactory control.

Be the first to email me at tbutts@uaex.edu with the correct common name and win a prize!

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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