

Pest Management News

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Letter #1

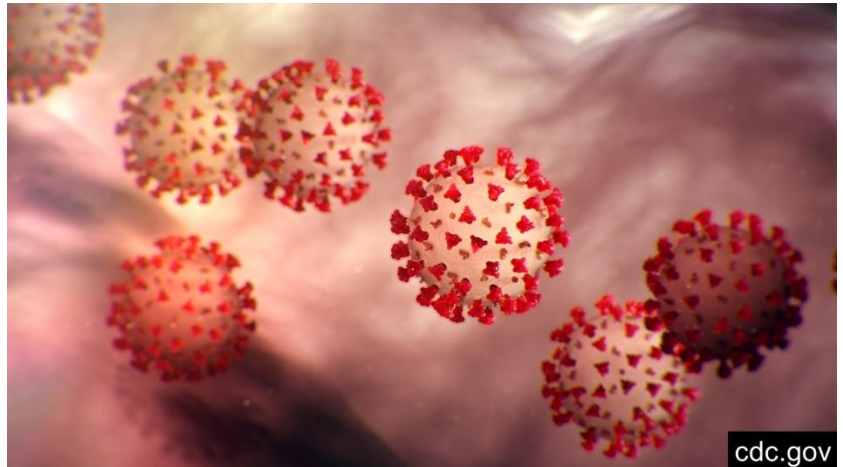
May 31, 2020

The COVID-19 Pandemic and Commercial Pest Control

John D. Hopkins

Pest management professionals (PMPs) are critical to protecting public health. Arthropod and vertebrate pests do not decrease because we have a human crisis. In fact, they can become a more serious problem.

Those in the County Extension Offices may have clients with questions related to companies providing commercial pest control services and the licensed PMPs that can perform these on-site services during the COVID-19 pandemic. The “Commercial Pest Control Industry” was designated as an “Essential Service Provider” as outlined in the Department of Homeland Security CISA document (<https://www.cisa.gov/>). It is critical for pest control companies to analyze the benefits and risks of being declared an essential service. These companies can decide what services they offer and how to offer them, but it is their responsibility to move forward under these new conditions safely. The only way to do that is for pest management companies to analyze as much credible information as possible, then adjust their business’ current standard operating procedures.



If you need to hire a commercial pest control company, you should ask if the company’s employees have been given specific guidelines to follow to meet the CDC recommendations for being protected and to protect their clients during the current environment. The latest COVID-19 updates may be found by visiting the CDC website (<https://www.cdc.gov/coronavirus/2019-nCoV/index.html>).

During this difficult time for businesses that are required to remain closed and those residential customers that are spending more time at home, it is important to keep a pest-free environment. Commercial pest control companies are now concentrating on exterior only services including exterior treatments focusing on entry points, wiping down webs, and keeping rodent stations cleaned and

baited. Technicians are wearing nitrile or equivalent gloves while visiting accounts and practicing non-direct contact by not requiring signatures on receipts or handheld devices.

Pest control companies will generally provide spot applications or bait treatments to specific target areas for customers that have current indoor pest issues. Technicians providing indoor services should wear gloves, masks, and all other appropriate personal protective equipment.

As always, employee and customer safety are the top priority for commercial pest control companies. Things to consider in avoiding COVID-19 infection or unknowingly spreading the virus if you are asymptomatic:

1. Thoroughly wash your hands as if you had a pesticide on them. Pest control company employee training should utilize CDC videos (<https://www.cdc.gov/handwashing/videos.html>).
2. Limit travel and contact with others as much as possible. Practice social distancing. Social distancing is generally defined as limiting contact with persons outside your immediate household and keeping at least 6 feet away from another person when in public.
3. Think about others you live with or come into close contact with that might be susceptible to COVID-19 even if you may be asymptomatic. Think about others that might be in high-risk COVID-19 categories (<https://bit.ly/2V5XFpW>).
4. Consider operating under the assumption that more people are positive for COVID-19 than we know.

Some suggestions for commercial pest control companies trying to weather the storm:

1. Know that you are performing an important and essential service.
2. Offer your customers flexible service options. Adjust service frequency. Allow customers to defer or pause existing service.
3. Offer customers flexible payment options. Allow installment payments. Accept credit cards as an alternate form of payment. Allow bartering for relevant services.
4. Ensure that employees have the required knowledge and safety equipment needed.
5. Employee training and customer communication should be a foremost priority by utilizing and sharing reliable and up to date information.

There is light at the end of the tunnel!

Face Flies on Cattle and Horses

Kelly Loftin

Background: Earlier this month I observed face flies (*Musca autumnalis*) while working cattle in Washington County and on my horses in Crawford County. And if you drive a vehicle into a pasture you may also observe an abundance of face flies landing on the vehicle, especially if it's white. Face flies became common in Arkansas during the late 70's and early 80's after their accidental introduction into North America in the 1950's. Face flies tend to be a bigger issue for cattle producers in the northern half of Arkansas. Although this pest fly does not reach pest status every year like the horn fly, it will be observed almost every year in north Arkansas. Peaks in their populations usually occur in June and often again in late August.

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Economic losses related to face flies include reduced weight gain and milk production as well as their potential role in pinkeye. Face flies are mechanical vectors of *Moraxella bovis*, a bacterium responsible for infectious bovine keratoconjunctivitis (IBK or pinkeye). *Thelazia* spp., a nematode eye worm, can be transmitted to horses and cattle by infective face flies. In fact, I own a mare that was diagnosed with thelaziasis last summer. In addition, to being an important livestock pest, face flies can become a significant nuisance to homeowner if they overwinter in their homes.



Face flies feeding on a calf. Photo by Clemson University CES.



Face flies (~30) feeding around the eye of a horse. Photo by Kelly Loftin.

Biology: The face fly is not a blood feeder like the horn fly; instead it feeds on the secretions around the eyes, nostrils or on wounds of animals. Only female face flies feed on the animal; while males feed on nectar. Face flies are intermittent feeders spending a limited amount of time feeding on the animal. The majority of their time is spent resting in vegetation or on fences. Female face flies will only lay eggs in fresh bovine manure that is less than 10 minutes old. Eggs hatch into maggots which continue to develop until they reach the pupal stage. Mature maggots pupate in the soil under and around the manure pat. The lifecycle from eggs to adults takes from two to three weeks. Face flies diapause (overwinter) as adults in protected areas such as barns, attics, uninsulated walls, etc. and emerge in the spring.

Control: Face flies should be controlled on cattle before they reach more than 10 per head. On cattle they are difficult to control for a couple of reasons: 1) flies feed on the face which is difficult to treat and 2) they spend a significant time off the host. Daily insecticide treatment maximizes control. For this reason, self-application devices such as dust bags and back rubbers equipped with face flips or specific insecticide impregnated ear tags are generally more effective. Both cattle and calves should be treated.

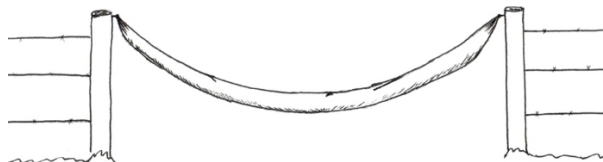
Self-treatment devices should be placed in such a manner that cattle are forced to use the device daily. This is easily accomplished by restricting access to water or mineral which requires cattle to pass through the device daily. Dust bags should be hung in pairs at a height and spacing that results in application to the face (for face flies) and back (for horn flies). Active ingredients used in dust bags include: coumaphos, tetrachlorvinphos, permethrin and zeta-cypermethrin. Back-rubbers charged with an insecticide and fuel or mineral oil mixture and equipped with face flips (burlap or canvas cloth strips affixed around the back-rubber) is a good treatment option for face flies (and also controls horn

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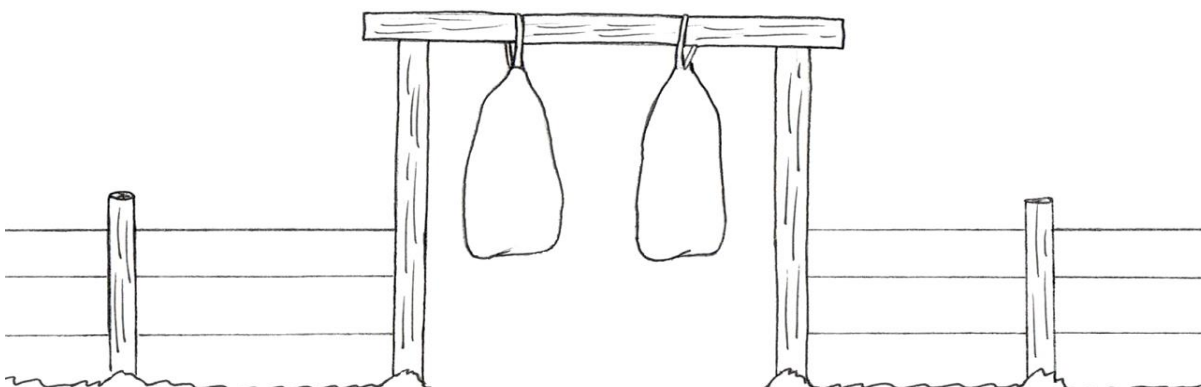
flies). Active ingredients used in back-rubbers include coumaphos, phosmet, tetrachlorvinpho/dichlorvos combination, permethrin and permethrin/piperonyl butoxide combinations.



Drawing of forced use back rubber.



Back-rubber equipped with face flips.



Drawing of forced use dust bag. Bottom of dust bag should be 4-6 inches below the animal's topline.

Not all insecticidal ear tags are equal in controlling face flies. Some are effective while others only provide some reduction. Ear tags such as Corathon®, CyGyard®, CyLence® Ultra, GardStar® Plus, Python® and Saber® Extra provide reasonable face fly control. Apply two tags per animal; one in each ear.

Specific pour-on insecticides that allow treatment of the face will provide face fly control but may not provide enough residual activity to maintain low face fly number between the minimum application frequencies. Pour-on insecticides that allow application to the face include specific pyrethroids such as Ultra Boss®, Permethrin® CDS and CyLence®. Insecticide spray formulations are effective in controlling face flies when directed toward the face. However, they may not provide the residual activity necessary to provide control between the minimum spray frequencies.

Insect growth regulators such as methoprene or diflubenzuron applied to feed or minerals and fed to cattle reduce larval development but are not designed to kill adult flies. In circumstances where cattle herds are somewhat isolated from untreated herds and sufficient consumption by the animals can be maintained, IGR feed-through insecticides can be effective against both horn and face flies.

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Although face flies do not use horse manure for egg-laying and larval development, face flies readily feed on horses resulting in severe nuisance and potential transmission of eye diseases. Face fly control on horses is a bit easier than control on cattle. This is simply because horses are companion animals and are accustomed to being handled which allows for daily treatment when needed. Several pyrethroid products can be applied around face (but not in the eyes) of horses. Examples of these paste, ointment or roll-on formulations include War Paint® Insecticide Paste, Swat® Clear fly repellent ointment, Endure® Roll-on for Horses, Flysect® Roll-on repellent face lotion and Farnam™ Roll-on fly repellent.

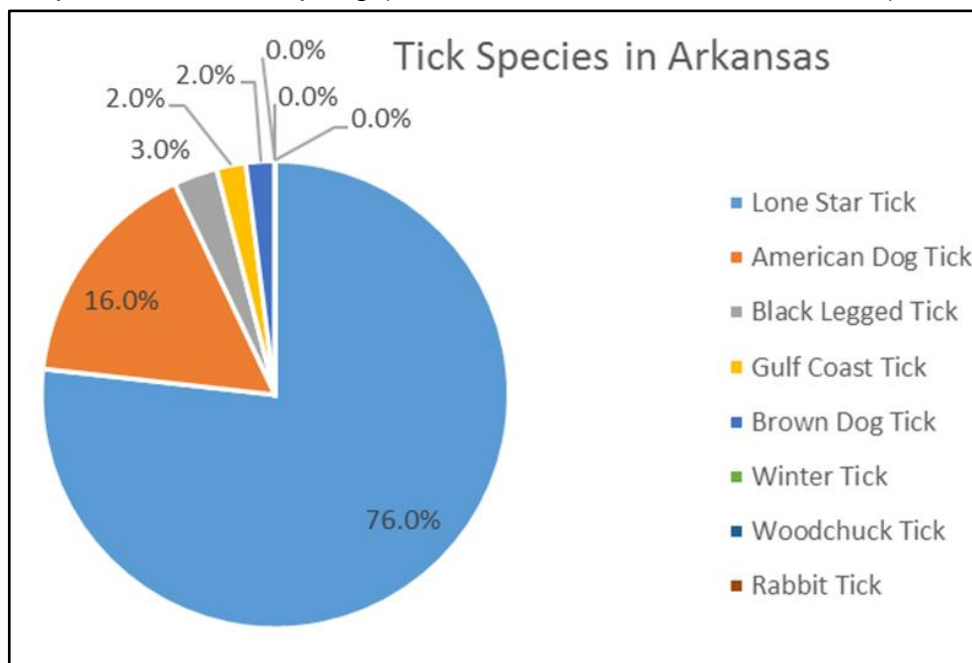
Always read and follow directions on the insecticide label. A listing of insecticides uses to control face flies and other pests of cattle and horses is available in the 2020 Insecticide Recommendations for Arkansas at: <https://www.uaex.edu/publications/mp-144.aspx>.

Ticks and Cattle

Kelly Loftin

Recent surveys showing prevalence of anaplasmosis in Arkansas cattle has renewed interest in tick surveillance and control. Anaplasmosis caused by the bacterium, *Anaplasma marginale*, can be transmitted to cattle by the bite on an infected tick, mechanically by biting flies such as horse flies or through contaminated veterinary equipment (some ear taggers, hypodermic needles, etc.). Transmission by infected ticks is different than transmission through biting flies or contaminated equipment in that ticks are true biological vectors. In a biological vector the causal organism (in this case *A. marginale*) lives, receives nourishment and may multiply within the tick. In addition, *A. marginale* remains in the tick as it molts from one life stage to the next (larval (seed) tick, nymphal tick and adult tick, referred to as transstadial transmission). Some scientific evidence suggests that *A. marginale* can be passed from the parent tick to offspring (known as transovarial transmission) in *Dermacentor* spp. ticks. Most of the scientific evidence suggests that ticks within the genus *Dermacentor* are the primary biological vectors of *A. marginale*. In addition to potential disease transmission, ticks are of economic importance resulting in conditions such as “gotch” ear, tick paralysis, loss of condition, lowered weight gain and in severe cases, anemia.

Results from the statewide tick survey (2017-2018) identified eight tick species. The top two species



Tick species collected during statewide survey (2017-2018). Figure prepared by Elizabeth Smith.

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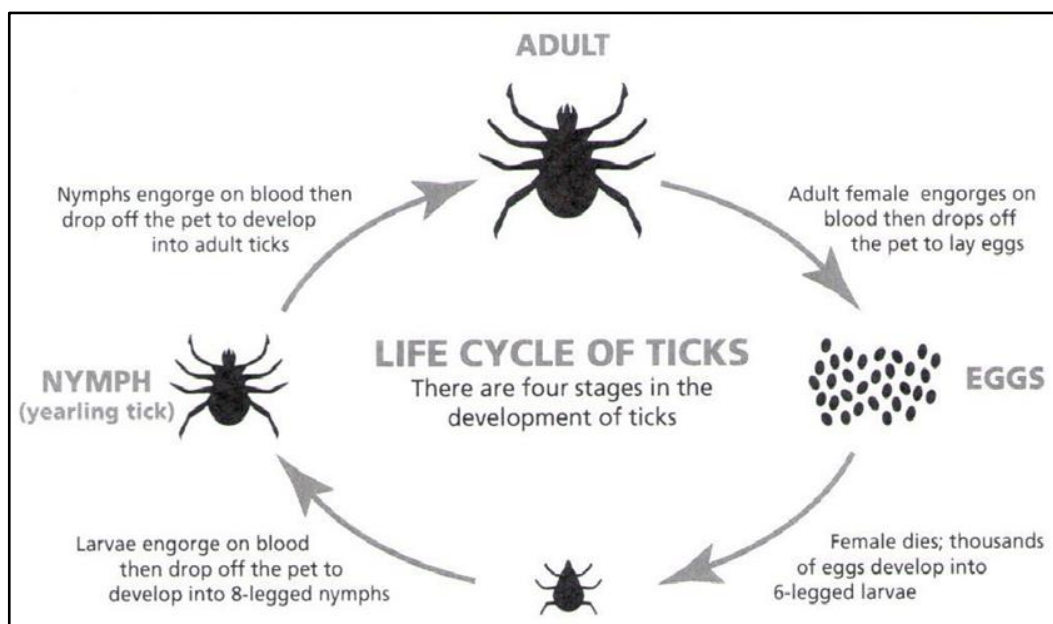
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collected were the lone star tick, *Amblyomma americanum*, taking the lead with 76% followed by the American dog tick, *Dermacentor variabilis*, comprising 16% of the total ticks collected. Tick species making up the remaining 8% were the black-legged tick, *Ixodes scapularis*, the Gulf Coast tick, *Amblyomma maculatum*, the brown dog tick, *Rhipicephalus sanguineus*, the winter tick, *Dermacentor albipictus* and the woodchuck tick, *Ixodes cookei*. More recently, March 1, 2020 through May 30, 2020, an intensive survey effort was conducted in the four county NW Arkansas region. Ticks were collected from cattle herds, livestock auctions, vet clinics, animal shelters, feral hogs and from the environment. The primary goal of this survey was to determine the presence of the Asian longhorned tick (*Haemaphysalis longicornis*) in this region. Although ticks are still being processed, lone star (most prevalent in the survey), American dog and blacklegged ticks were identified. So far, no Asian longhorned ticks were collected. Tick species routinely found infesting cattle include lone star, American dog, blacklegged, Gulf Coast and winter ticks. On rare occasion, we will collect the spinose ear tick, *Otobius megnini*, on Arkansas cattle.

Life cycle: Most tick species infesting cattle are three host ticks.

This means that each stage (larva, nymph and adult) feeds on a different host. This is an important factor in tick-borne disease transmission because the pathogen that causes disease is usually acquired by a previous stage feeding on an infected host or from the tick's mother that had fed on an infected host. Each tick stage is fairly

distinctive. The larval tick is the tiny six-legged tick known by many as the “seed” tick. The tick nymph is the stage following the larval stage and is small (but bigger than the “seed” tick) and has eight legs. The nymph is also referred to as the “yearling” tick by some folks. The adult tick is larger than the nymph, has eight legs and is the reproductive stage. The figure below describes a generalized three-host hard tick life cycle.



Generalized life cycle of a three-host hard tick.

Arkansas is home to a single one-host tick species, *Dermacentor albipictus*, known as the winter tick. A one-host tick spends its entire lifecycle on a single host. Basically, eggs hatch in to larval (seed) ticks in the summer and eventually find a host (usually a large host – bovine, etc.). Larval ticks feed on the host for about 10 days then molt into a nymph. Nymphs feed and become dormant on the host before molting into an adult. Adults completely engorge, then drop off the host and lay eggs to begin a new generation.

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The **American dog tick** is considered a potential biological vector *A. marginale*, the causal organism of anaplasmosis in cattle. It is also the primary vector of Rocky Mountain Spotted Fever (RMSF) in humans and can also transmit *Francisella tularensis*, the organism causing tularemia. In addition, it may cause tick paralysis. Tick paralysis can occur when the tick attaches the base of the skull and feeds for several days. The tick is thought to release a salivary gland protein into the body that causes the paralysis. If the tick is not removed, respiratory failures can cause fatality. Normally once the tick is properly removed, recovery occurs within hours to a few days. Tick paralysis may occur in cattle, dogs and humans. However, human cases are rare and are usually in children when tick attachment goes unnoticed.



American dog tick female (left) and male (right). This tick is a vector of anaplasmosis in cattle as well as RMSF and tularemia in humans. (Photo by Gary Alpert, Harvard University, Bugwood.org).

The **winter tick** is a one-host tick that is encountered on Arkansas cattle. This tick also feeds on other large mammals such as horses, mules, deer, elk and moose. The winter tick is considered a potential vector of *A. marginale*, the causal organism of anaplasmosis. This may occur through transstadial survival of the pathogen and vector transmission either by ticks whose feeding cycle was interrupted and a second host acquired, or by trans-host migration during grooming.



Male (left) and female (right) winter tick. Winter ticks are a pest of large animals and a potential vector of anaplasmosis of cattle. (Photo by Matt Pound, USDA Agricultural Research Service, Bugwood.org)

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In areas where **lone star ticks** are abundant, they can reach intense densities on cattle, especially in areas with high white-tailed deer densities. High tick densities on cattle can adversely impact production through lowered weight gains and loss of condition.

Human diseases potentially transmitted by the lone star tick include ehrlichiosis, southern tick-associated rash illness (STARI), tularemia and Heartland virus. It has also been associated with spotted fever group rickettsiosis. In addition to tick-borne disease associated with bacterial pathogens, the lone star tick has been implicated in a condition called Alpha-gal allergy. Alpha-gal allergy is the delayed anaphylaxis after consuming red meat. This condition is related to serum IgE antibodies to alpha-gal (or oligosaccharide galactose-alpha-1,3-galactose, a sugar found in red meat). The first reported case of alpha-gal occurred in 2008 and since that time other cases from the U.S. have been reported, primarily from regions where the lone star tick occurs (Arkansas, Tennessee, Kentucky, Virginia, and southern Missouri).

The **Gulf Coast tick** is a three-host tick that is now established across the state. This tick feeds on large and small mammals as well as birds. On cattle, it tends to feed inside the ears causing a condition referred to as “gotch” ear. This condition results in swollen, deformed, curled, drooping and sometime necrotic ears. In addition, the Gulf Coast Tick transmits *Hepatozoon americanum* to dogs and coyotes which is an often fatal, tick-borne protozoal disease of dogs in the United States. In humans, Gulf Coast ticks are capable in transmitting *Rickettsia parkeri*, one of the spotted-fever Rickettsial diseases.

Control: Tick populations on cattle vary widely and densities are influenced by habitat and abundance of alternate hosts in the area such as white-tailed deer. Woodland pastures are often associated with higher populations of American dog ticks, lone star ticks and blacklegged ticks. Gulf coast ticks are more often associated with grass



Lone star tick (male left, female right) can severely infest cattle. It is also a primary vector of human ehrlichiosis, STARI, Heartland Virus, spotted fever group Rickettsia and one of the vectors of tularemia. This tick is also associated with Alpha-gal Allergy. (Photo by Matt Pound, USDA Agricultural Research Service, Bugwood.org)



Male (left) and female (right) Gulf Coast ticks. This tick is associated with “gotch” ear in cattle. (Photo by Mat Pound, USDA Agricultural Research Service, Bugwood.org)

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prairies. The abundance of most tick species is also influenced by the availability and abundance of alternate wildlife. Generally, the greater the abundance of suitable wildlife hosts the greater the tick density. Habitat modification such as brush control can reduce the humidity necessary for ticks to thrive and reduce tick populations in localized areas. Wide-area use of acaricides applied to pastures is not feasible or practical for most production systems. In specific situations such as small horse lots or cattle working areas with an abundance of ticks, acaricides applied to the environment can provide temporary relief.

Current methods of tick control on cattle include whole body sprays, self-treatment devices, pour-on insecticides, ear tags and dips. Plunge dips were a very effective method of tick control used into the 1950's in the cattle fever tick eradication program. This method has been replaced by the spray dip machine that is primarily used in the cattle fever tick eradication program in south Texas. Whole body sprays are also effective for tick control. Care should be taken to treat hard to reach areas such as beneath the body and around the tail. The downside of this method is that cattle must be gathered, handled and may require additional applications during the tick season. Product used for on-animal tick spray applications include permethrin, CoRal® (coumaphos), Prolate/Lintox HD™ (phosmet), Rabon® 50 (tetrachlorvinphos), and Ravap® EC (tetrachlorvinphos/dichlorvos).

Pour-on insecticides exhibit limited effectiveness against ticks. Most all pyrethroid pour-on insecticides are only labeled for horn flies and lice. However, some permethrin pour-ons synergized with piperonyl butoxide, such as Permethrin® CDS and Martin's® Fly-Ban pour-on are labeled for tick control.

All insecticide impregnated ear tags are effective against non-insecticide-resistant horn flies and some are effective against ticks and face flies. Although most insecticide ear tags are effective against ear ticks such as Gulf Coast and spinose ear ticks, only a few will aid in the control of other tick species such as the lone star tick and American dog tick. For example, XP 820® is labeled to control ear ticks, American dog ticks, cattle fever ticks and lone star ticks.

Self-treatment devices such as dust bags can be effective against horn flies, face flies and ticks if properly used and maintained. Dust bags should be hung in pairs at a height and spacing that results in as thorough an application as possible so that a good portion of the neck, back and sides are treated. Dust bags should be placed in an entryway so that only way the animal can gain passage to feed, minerals or water is by passing through the dust bags (restricted access). Although multiple dust formulations are available, Python® (zeta-cypermethrin) dust is labeled to control horn flies, ticks and lice and will aid in the control of face flies and stable flies.

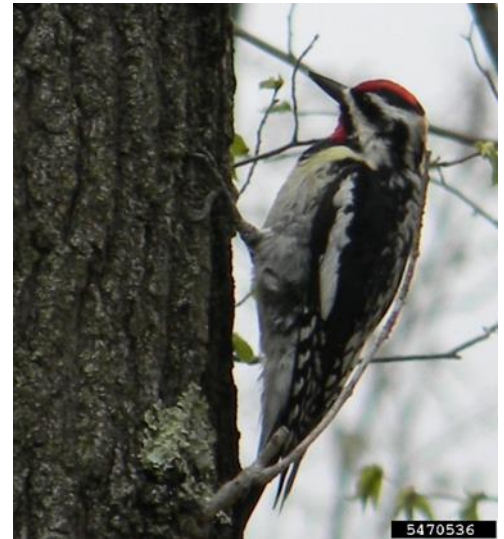
Products and methods used to control ticks usually provide good control of horn flies as long as the horn fly population is not resistant or tolerant to the product. Consult MP 144 – “2020 Insect Recommendations for Arkansas” at <https://www.uaex.edu/publications/mp-144.aspx> for products listed to control pests on cattle or other livestock. Always read and follow all directions on the label.

Woodpecker Damage to Homes

Becky McPeake

Nine species of woodpeckers in Arkansas can cause property damage to homes. Woodpeckers make holes in siding and other wood structures resulting in costly repairs. Woodpeckers drill holes in wood to feed on insects, and build nesting and roosting cavities. Typically, holes constructed in early spring are for nesting cavities, and those constructed in late summer and fall are for roosting cavities.

Certain types of housing materials are more susceptible to woodpecker damage. These include cedar clapboards, grooved plywood, resawn cedar shakes, and stained cedar shakes or shingles. Houses painted in bright colors tend to be less prone to woodpecker damage than stained homes. Homes made of tongue-and-groove or board-and-batten timber may have damage if located in woods or near a woodpecker “hot spot.” Those sided with painted hardboard are damaged less often, though they can still be prone in certain circumstances. Least susceptible are homes with aluminum or vinyl siding, and those built of wood composite.



Yellow-bellied sapsucker. Photo courtesy of Elmer Verhasselt, Bugwood.org.

Preventing damage from woodpeckers is challenging. The international Migratory Bird Species Act and state law makes it illegal to harm or kill native songbirds, or destroy nests with eggs, including woodpeckers. The objective of damage control efforts is to make the environment as unappealing as possible to woodpeckers, so they will move elsewhere. Options for controlling woodpecker damage include:

- Apply an insecticide to remove insects from siding which may attract woodpeckers to make holes.
- Cease feeding bird seed and suet to avoid attracting woodpeckers near residences, especially in spring through fall seasons.
- Place visual deterrents near woodpecker activity, and randomly move or change the type of visual deterrents as frequently as possible to prevent birds from becoming habituated to their presence.
 - A study which tested the effectiveness of life-sized plastic owls, reflective streamers, plastic eyes on fishing line, roost boxes, and woodpecker distress calls played from a sound system found only streamers worked with any consistency.
 - Hang strands of Mylar or reflective tape in sunlight. It's believed the refracted sunlight and random motions from the wind cause woodpeckers to leave.
 - A new, unstudied product which combines features of several visual deterrents is the “Bird Banisher;” its effectiveness has yet to be proven.
- Combine auditory with visual deterrents. Bang metal trashcan lids, clap hands, blow metal whistles, and make other loud noises when woodpeckers are seen.
- Place a temporary physical barrier by covering repaired holes with metal mesh or screen, painted to match the side of the home. Remove barriers once woodpeckers have left.

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Woodpeckers can be an annoyance without causing structural damage to homes. While their hammering on aluminum guttering is loud, typically little physical damage is inflicted. Since woodpeckers do not sing as other songbirds do, it's believed their drumming serves as a territorial signal, and to attract mates. The same visual and auditory deterrents, and physical barriers for controlling woodpecker damage, can be used in these instances.

For information about damage to landscape plantings, see "Sapsucker Damage on Woody Plants," FSA7561.

Rusts on Juniper

Sherrie E. Smith

Although it is too early in the season to see these rusts on fruit and ornamentals, the fruiting bodies of the fungi are evident and sporulating on Juniper hosts. Cedar-quince rust, (*Gymnosporangium clavipes*) and Cedar-apple rust, (*Gymnosporangium juniperi-virginianae*) are two of the most common rusts we see at the Plant Health Clinic. Both rusts have a similar life cycle. In the spring the Cedar-quince rust fungus produces perennial, spindle shaped galls on cedars or junipers. These galls produce masses of gelatinous orange-brown teliospores. Cedar-apple rust galls are large gelatinous balls. In both types of rust, teliospores produce basidiospores which are carried to members of the rose family, such as pear, quince, apple, crabapple, and hawthorn. Both fungi stop producing the basidiospores about 30 days after the apples stop blooming. Galls on both cedar and the alternate host can cause stems to die if they are completely encircled. Cedar-quince rust is more likely to attack the fruit and stems than the leaves of the alternate hosts, whereas Cedar-apple rust commonly attacks leaves, often leading to defoliation. Aeciospores develop in the fruit, leaf, and stem lesions and are blown to cedars where the cycle begins again. Each year the perennial rust galls of Cedar-quince rust become larger and more noticeable, with older galls becoming dark brown to black in color. Fruit from the alternate host infected with Quince rust are covered with protruding off-white aecia of the fungus. Infected fruit eventually dry out and drop from the plant.

Control begins with good sanitation. Prune out any galls found on alternate hosts junipers and cedars. During the winter, prune out all quince galls remaining on branches, and twigs of apples, crabapples,

Cedar-Quince rust on Juniper



Sherrie Smith, University of Arkansas Cooperative Extension

Quince Rust on Pear Fruit



Sherrie Smith, University of Arkansas Cooperative Extension

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quince, hawthorn, and pears. Preventive fungicide applications are necessary in locations where apple and quince rusts are problems. Fungicide timing is similar for all the cedar rusts. Make the first application to valuable orchard and landscape plants when the orange telial galls on junipers become noticeable, (usually at flower bloom on apples and hawthorns), and make additional applications at regular intervals to protect newly developing growth. Applications of a triazole fungicide such as propiconazole, (Banner Maxx), myclobutanil, (Immunox), or triadimefon, (Bayleton, Strike), or Fertlome Liquid Systemic, or Bio Advanced Garden Disease Control for Roses, Flowers, Shrubs are labeled for control of rusts on ornamentals. Begin applications shortly after bloom. Captan is labeled for fruit trees for homeowners.

Cedar apple rust on Juniper



Sherrie Smith, University of Arkansas Cooperative Extension

Cedar apple rust on Apple



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When to Terminate Fungicide Applications in Strawberry

Aaron Cato

Strawberry production across the state is beginning to wind down as it starts to warm up, but there are still many producers hoping to harvest more berries. A question we often get is when you should stop applying preventative fungicides. This is a complex question and there isn't a one size fits all answer. Considering information related to the disease cycle of our two main fruit rot diseases, Botrytis and anthracnose, should give you a good idea of whether you need to continue applying fungicides.

Botrytis (Grey Mold)

Botrytis fruit rot (Grey mold) is usually the most serious disease of strawberries in Arkansas (Picture 1). This disease occurs when botrytis spores infect flowers. Spores cannot infect green or ripe fruit unless they are damaged from another source. Infected flowers then either immediately present the disease, or it can present much later and cause mold formation on green or fully ripe fruit. Considering it takes around 30 days to get from a flower to a ripe fruit, we don't need to be worrying about this disease when we think we are less than 30 days from our last harvest.



Picture 1. Strawberry exhibiting Botrytis fruit rot.

Anthracnose

Anthracnose fruit rot is not always an issue for producers in Arkansas, but I would argue that we have had a very serious anthracnose year in 2020 (Picture 2). This is likely due to the early warm spell we saw this spring and the frequency of rainfall events. Anthracnose spores can infect flowers, green berries, and fully ripened berries. This means fungicides must be used until harvest to get full protection from this disease. Consider two factors when deciding if you should consider protectant sprays for this disease. First, if you have already had issues with this disease this year it is likely that you have a high spore load in your field and are at a higher risk. Second, rainfall events increase the risk of infection, and fungicides should be used to protect fruit when there is rain forecasted.



Picture 2. Strawberry exhibiting anthracnose fruit rot.

Fungicide Product Considerations

I think many people in the state will have to continue to apply fungicides because of the large amount of anthracnose issues we've observed, but we will need to augment our normal programs to move the focus away from Botrytis. Products like Elevate only offer control for Botrytis and should not be used anymore. Single MOA products like Cabrio, Abound, and Intuity work great on anthracnose and are only fair on Botrytis (Picture 3). Any of these products combined with Captan will offer excellent protection of your strawberries at this late stage in production.

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Product	FRAC Group	BFR	Botrytis Resistance	AFR
Captan; Captec	M04	G	None	G
CaptEstate	M04 + 17	E	Prevalent for 'Elevate'	G
Thiram	M03	G	None	G
Fracture	BM01	P	No data	No data
Topsin M	1	Not effective	Widespread	Not effective
Rovral	2	G	Prevalent	Not effective
Tilt; generics	3	Not effective	Not applicable	F
Fontelis	7	E	Prevalent	F
Kenja	7	E	NOT prevalent	Not effective
Scala	9	G	Prevalent	Not effective
Pristine	7 + 11	G	Prevalent	E
Merivon	7 + 11	E	Prevalent	E
Luna Sensation	7 + 11	E	NOT prevalent	E
Cabrio	11	F	Widespread	E
Abound	11	F	Widespread	E
Intuity	11	F	No data	P
Switch	12 + 9	E	NOT prevalent	G
Elevate	17	E	Prevalent	Not effective
Ph-D, OSO	19	G	NOT prevalent	G

Picture 3. Common strawberry fungicides and their effectiveness in controlling Botrytis fruit rot (BFR) and anthracnose fruit rot (AFR). This table is from the 2020 Southeast Regional Strawberry Integrated Pest Management guide.

Product Use Rates

With the extended strawberry fruiting season many have seen this year we need to make sure that late applications aren't above label use rates. Listed below are a few of the commonly used fungicides and use rates. Notice how the number of applications can vary depending on the rate that you've used. Additionally, these product use limits include applications made in both the fall and the spring, starting once plants were transplanted.

Fungicide	Use Limit of Product/acre	Number of Applications per year
Switch	56 oz	4
Luna Sensation	27.1 fl oz	3-4
Captan (80 WDG)	30 lbs	8-16
Elevate	6 lbs	4-6

We need to be thinking about economics on top of everything mentioned here. When we get to this time of the year it is not uncommon to push harvest to when it is no longer profitable, mostly due to the low number of berries we are getting toward the tail-end. Deciding if expensive fungicides are necessary are only one part of a very large equation that should consider labor costs, irrigation costs, etc. If the conditions are ripe for an extra profitable day of harvest, it's generally going to pay to protect these berries from anthracnose.

If you have any questions about this article please call Dr. Aaron Cato at 479-249-7352.

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Name That Weed

Tommy Butts



This month's Weed Science contest is Name that Weed. This weed is an erect, branching, perennial plant that can be found in fields, pastures, roadsides, and waste sites (Pictures 1 & 2). It was native to eastern Asia and was actually introduced to the U.S. as a forage crop and for erosion control/soil improvement. This weed is a legume and part of the Fabaceae (bean) family of plants, as can be seen by the characteristic trifoliate leaf structure (Picture 3). It can grow anywhere from 3 to 6 feet tall with hairy stems and leaves. The trifoliate leaves are in an alternate arrangement and are gray-green to silvery in color. Each leaflet is wedge-shaped at the base, then rounded with a sharp, needle-like point at the tip (Picture 3). The taxonomy of this weed places it in the "*cuneata*" species. All pictures were taken in White County.



Picture 1.



Picture 3.



Picture 2.

Control of this weed can be difficult; an integrated management approach is a must. Repeated mowing and/or grazing of this weed can help to manage it, especially in early spring. Glyphosate, triclopyr, and metsulfuron have shown to be effective herbicide options to successfully manage this weed mid-summer. Late-season burning can be an effective management effort by eliminating seed production. Often, complete control of this weed will require all 3 of these management efforts.

Be the first to email Dr. Tommy Butts at tbutts@uaex.edu with the correct complete 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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