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Veterinary Entomology

Special Interest Articles:

- Internal Parasites
- Preparing Cattle against Ectoparasites
- Pesticide Update

Individual Highlights:

Internal Parasites
Of Beef and Dairy Cattle

Internal parasite control needs will exist as long as grazing pastures do. Parasite levels vary by pastures and cattle. Heavily stocked pastures generally have higher parasite numbers. Young cattle are more susceptible to internal parasites than older cattle.

Deworming successfully long with good herd management, increases milk production in cows and increasing weaning weights of calves.

Parasitism can be separated into two types – subclinical and clinical. Subclinical effects include losses in animal productivity (milk production, weight pain, altered carcass composition, conception rate, etc.); whereas, visible, disease-like symptoms (roughness of coat, anemia, edema, diarrhea) are clinical effects. Subclinical effects are of major economic importance to the producer.

Cattle can be infected by worms (helminthes), roundworms (nematodes), tapeworms (cestodes), and flukes (trematodes); along with protozoan such as coccida.

The two best ways to control internal parasites is by pasture management and anthelmintics (dewormers). Pasture management includes moving young cattle to safe pastures; place mature, less susceptible cattle on more contaminated pastures; prevent overgrazing of pastures; drag manure pats in dry weather and cut forage for haylage.

Dewormers provide an excellent tool for controlling parasites. Apply dewormersin a timely manner to reduce infection before symptoms of disease occur.

Beef Cattle Parasite found in Northern NY

The large liver fluke has been positively identified in beef livers at 2 of 5 slaughter plants in Northern New York.

The 1-inch wide and 2-to 3-inch long, reddish brown leech-like liver flukes have been found in dead or slaughtered cows. The liver must be condemned and removed from the food supply if the fluke is found. The rest of the carcass is safe.

It is not known at this time how the liver fluke will impact cattle health and authorities are developing ways to reduce exposure among herds.

The eggs of the liver fluke are shed into warm, moist grasslands and pastures by white-tailed deer. The eggs migrate into freshwater snails (the intermediate host), then a tadpole-like pastures. Here beef cattle and other grazing animals ingest the parasites and become dead-end hosts for the large liver flukes.

Diagnosis of the fluke is impossible until post-mortem examination of the livers at the slaughter plants.

Currently, there are no good control methods for the parasite. Also at risk are dairy cattle, sheep, goats, elks, moose, and camelids – camels, alpacas, and llamas.

Cattle Care - Preparing for spring

With spring just around the corner, it is time to get prepared for horn flies and how to control them.

Although it is easier to rush out and tag all your cattle as soon as it starts to feel like spring, that is not always a good idea. It is best to hold off tagging animals until horn fly numbers are at an economic level of 200+ per animal.

In order to get the most out of the ear tags and your money there are a few other guidelines to follow: 1) rotate insecticides at least yearly, a phosphate with a pyrethroid; 2) provide alternate treatment methods when ear tag efficacy declines; 3) treat only animals in a weight gain mode, i.e., cows with calves and yearlings; 4) remove ear tags at the end of the fly season.

Upcoming Program: FINAL NOTICE

"Managing Urban Wildlife"

Open to anyone interested in wildlife populations.

When: March 4, 2009
8:30 AM – 4:00 PM
Lunch provided

Where: Texas AgriLife Research & Extension Center Pavilion
17360 Coit Rd.
Dallas, TX 75252

$25 / person seating limited
Pre-register by Feb. 25

Contact Fred Burrell @ (214)904-3050 for more information.

www.flycontrolcenter.com

Drovers Cattle Network, an online news service of food 360, Vance Publishing Corporation, and Bayer Healthcare announced the launch of the Fly Control Center, an all encompassing, new consumer-oriented website dedicated to fly control.

The site is informative, providing access to news, articles and insect updates. The site also provides descriptions of the four most damaging flies: horn, face, stable and house with insecticides from Bayer that help control.

A bit bias given the site sponsor, but helpful none the less.

Insect Updates

Cattle Fever Tick

As I mentioned in the last newsletter, cattle fever ticks have been found outside the quarantine zones designated on the border of Texas and Mexico in the Rio Grande Valley. In an effort to prevent further spread of this dangerous tick, Texas state officials are reminding hunters and meat processors in South Texas that additional precautions are required when handling deer carcasses due to concern about spreading the tick further.

I know that deer hunting season is over but it is never too late to discuss the implications deer have on further spreading the cattle fever tick. They are the number one reason the tick has regained staying power in Texas so many years after it was eradicated from the United States.

The tick is still located in southern Texas but it never hurts to be educated about its movement potential.

"This finding might show bees as a totally new biological control method."

Honeybees as plant 'bodyguards'

http://esciencenews.com/articles/2008/12/22/honeybees.plant.bodyguards

Honeybee importance goes further than just pollinators; researchers have found that they act as plant bodyguards from feeding caterpillars. Caterpillars possess five sensory hairs that detect air vibrations which signal approaching predatory wasps or honeybees.

The caterpillars cannot distinguish between a predatory wasp or a harmless honeybee, so when air vibrations are recorded the caterpillars stop moving or drop from the plant.

Prolonged bee buzzing activity causes the caterpillars to become stressed and feed a lot less. This finding might show bees as a totally new biological control method.

Fire Ants Spread to West Texas

Ant movement has prompted the Texas Department of Agriculture to expand its red imported fired ant quarantined area to included the following 29 counties; Archer, Baylor, Callahan, Clay, Coke, Coleman, Concho, Crane, Crockett, Fisher, Haskell, Howard, Irion, Lubbock, Martin, Mitchell, Nolan, Reagan, Runnels, Schleicher, Scurry, Shackelford, Starr, Terrell, Throckmorton, Upton, Ward, Wilbarger and Winkler counties.

The quarantine will slow the artificial spread of red imported fire ants through the movement of hay and nursery-floral commodities to fire ant-free areas.

TDA guidelines prohibit storing hay directly on the ground if it is to be shipped to a non-quarantined county. If shipping out of a quarantined area, contact TDA first for an inspector. Do not sell bottom layer of stored hay.

Another note, researchers at Florida State University discover that the red imported fire ant love disturbance and disperse further due to it. Native ants in a plowed area reduced in numbers; while fire ants alone, without plowing did not displace as many native ants as plowing and addition of fire ants. The researchers suggest that fire ants may be "disturbance specialists" more than invasive species.

"The quarantine impacts both in state and out-of-state movement," Chris Sansone.

Pesticides Update/Outlook

Carbofuran Cancellation Process

http://tinyurl.com/4Zn53a

Carbofuran is an N-methyl carbamate insecticide and nematocide registered to control pests in soil and on leaves in a variety of field, fruit, and vegetable crops. No residential uses are registered.

EPA has concluded that dietary, worker, and ecological risks are of concern for all uses of carbofuran. All products

Containing carbofuran generally cause unreasonable adverse effects on humans and the environment and do not meet safety standards, and therefore are ineligible for re-registration.

FMC Corporation has voluntarily requested to cancel 22 crop uses but 6 uses still remain. The 6 uses that would continue under FMC's request include four food crop uses (corn, potatoes, pumpkins, and sunflowers) and two non-food crop uses (pine seedlings and spinach grown for seed).

Mentioned on Dr. Mike Merchant's blog – EPA is canceling fipronil in the granular form. Go to http://insectsinthecity.blogspot.com/ for more information.

Pets & Pesticides: Let's be Careful Out There

This is a long article worth reading by anyone attempting to control fleas and ticks with spot on pyrethroid over-the-counter treatments.

Several over-the-counter pyrethroid products have caused illness, burning, tremors, hallucinations and even death in several dogs and cats when not applied according to directions.

Owners should take note of this article and compare their flea and tick control options before purchasing an insecticide.

www.publicintegrity.org/investigations/pesticides/articles/entry/1080

Cattle Fever Links

www.aphis.usda.gov/vs-tx/tick.htm

www.tahc.state.tx.us/animal_health/fevertick/fevertick.html#ticks

Home Use Pesticide Database

http://wsprod.colostate.edu/cwis487/hup/

The database is intended to allow homeowners a choice in the best products for their particular pest management problems.

Included on the site are insect, mite, weed, plant disease, and vertebrate and slug/snail control options.

Requiem, Derived from Chenopodium ambrosioides var. ambrosioides

Requiem (previously called Facin or QRD) is a new botanical product that is an indigenous plant to Central and South America. It appears to have insecticidal, acaricidal, and fungal properties.

This botanical insecticide is found to be a good alternative for managing soft-bodied insect pests of various greenhouse and outdoor crops such as the green peach aphid, western flower thrips, citrus mealybug, two-spotted mite, greenhouse whitefly, and fungus gnats.

"The direct lethal and sub-lethal effects of Malathion have been known."

Amphibian population decline linked to Malathion use – www.beyondpesticides.org/dailynewsblog/?p=1092

A paper published in Environmental Toxicology and Chemistry (Vol. 27(12):2496-2500) entitles "Effects of Malathion on Embryonic Development and Latent Susceptibility to Trematode Parasites in Ranid Tadpoles," shows Malathion used as an agricultural insecticide interferes with the normal development of picherel frog embryos, thus leaving them more susceptible to parasite invasion.

Researchers found that tadpole survival rates decreased and malformations and susceptibility to parasite encystment rates increased as a result of exposure to Malathion concentrations mimicking thosed found in actual water sources.

County Extension Educators Survey

www.surveymonkey.com/s.aspx?sm=Y6DF37nvUtE1VeU3k_2b4z2w_3d_3d

If you are interested in volunteering to a survey of County Extension Educators Pesticide Competence please go to the listed website.

A PhD student at the University of Georgia is surveying the current perceived level of educators in the US. The survey should only take about 30 minutes to complete and will help assist Cooperative Extension Service (CES). It is voluntary and all information will be kept confidential.

Human & Animal Disease & Health

"Scientists discover 21st Century Plague"

Heart disease causing bacteria in humans is being spread by rat fleas. Brown rats have been shown carrying more than 20 species of *Bartonella* bacteria which can cause heart disease, endocarditis and neuroretinitis in humans. Brown rats are very common throughout the world and harbor these bacteria that are transferred to humans by fleas. *Ctenophthalmus nobilis*, a flea that lives on bank voles, has been shown to transmit different species of *Bartonella* bacteria.

http://esciencenews.com/articles/2008/11/24/scientists.discover.21st.century.plague

"Transporting broiler chickens could spread antibiotic-resistant organisms"

Researchers at John Hopkins Bloomberg School of Public Health conducted a study on the Delmarva Peninsula that showed evidence of a pathway for potential human exposure to antibiotic-resistant bacteria by driving behind the transport trucks.

Surface samples were collected from cars driving 2 & 3 car lengths behind the poultry trucks for 17 miles. Windows were fully opened and air conditioners turned off. Air samples from inside the cars, showed increased concentrations of bacteria that could be inhaled.

The same bacteria were found on a soda can inside the car and the outside door handle.

Journal Reviews

Effect of rainfall exposure immediately after a single dip treatment with coumaphos on the control of *Rhipicephalus (Boophilus) microplus* on infested cattle. 2009. Davey, Miller, and George. J Med Entomol. 46:93-99.

The efficacy of a single dip treatment of coumaphos was determined against *Rhipicephalus microplus* when cattle are exposed to rainfall immediately after treatment.

Cattle not exposed to rainfall showed 99.2% mean control of the tick. Effectiveness of coumaphos declined slightly with increased rainfall. Larval ticks were controlled 97% despite rainfall amounts, but nymphs and adult control dramatically declined with increased rainfall.

Results suggest moving cattle from cattle tick zones after a rainfall could pose a high risk of dispersing the ticks into uninfected areas despite coumaphos treatment.

Resistance to insect growth regulator insecticides in populations of sheep lice as assessed by a molting disruption assay. 2008. James, Cramp, and Hook. Med Vet Entomol. 32:326-330.

Testing IGR's triflumuron and diflubenzuron on sheep lice *Bovicola ovis* in the laboratory showed that two native strains of lice collected in the field are showing clear evidence of resistance.

A third filed strain also showed some resistance developing to triflumuron (a product that had been used for 6 years on this strain of lice). The susceptible strain of lice were effectively controlled by both IGR products

Comparative susceptibility of larval stages of *Amblyomma aurelatum, Amblyomma cajennense,* and *Rhipicephalus sanguineaus* to infection by *Rickettsia rickettsii*. 2008. Labruna et al. J Med Entomol. 45:1156-1159.

The study compared larval stage susceptibility of three ticks found readily in São Paulo, Brazil to *Rickettsia rickettsii*, a zoonotic disease that causes severe illness and death to both animals and humans alike.

Results showed that *A. cajennense*, a tick found readily feeding on humans, is less susceptible to *R. rickettsii*, therefore making it an unsuccessful vector. *Amblyomma aurelatum* and *R. sanguineaus* are both highly susceptible to *R. rickettsii*.

Amblyomma aurelatum is rarely found on or near humans, therefore limiting transmission possibilities. While *R. sanguineus* is fairly new to São Paulo, it shows great potential to further spread *R. rickettsii* among humans.

Resistance to benzoylphenyl urea insecticides in Australian populations of the sheep body louse. 2008. Levot and Sales. Med Vet Entomol. 22:331-334.

A bioassay was developed to observe and detect benzoylphenyl urear-resistance in naïve and putative *Bovicola ovis* strains. The laboratory tests consisted of collecting female lice treated with tropical benzoylphenyl from sheep and observing egg laying. The eggs were then observed for nymph production to determine resistance. Naïve strains took over 19 d for eggs to be laid that produced nymphs, time needed to rid bodies of benzoylphenyl. Resistant strains produced viable eggs sooner. The developed laboratory bioassay was very effective for recording resistance but labor intensive and time consuming.

In vitro effectiveness of ivermectin and spinosad flystrike treatments against larvae of the Australian sheep blow fly *Lucilia cuprina* (Wiedemann)(Diptera:Calliphoridae). 2008. Levot and Sales. Aus J Entomol. 47:365-369.

Lucilia cuprina, the Australian sheep blow fly known to strike injured live sheep, exhibit cross-resistance to spinosad and ivermectin. *Lucilia cuprina* documented as either moderately resistant to diazinon and diflubenzuron or, those being moderately resistant to diazinon and extremely resistant to diflubenzuron, were found to be equally cross-resistant to ivermectin and spinosad. Both products are still effective (85% - ivermectin and 40% - spinosad) against *Lucilia cuprina* at full exposure at the highest registered rate.

Transmission of *Babesia caballi* by *Dermacentor nitens* (Acari:Ixodidae) is restricted to one generation in the absence of alimentary reinfection on a susceptible equine host. 2008. Schwint et al. J Med Entomol. 45:1152-1155.

Babesia caballi is one of the etiologic agents of equine piroplasmosis not currently found in the US but otherwise occurs worldwide. Scientist investigated *Babesia caballi*'s ability to survive without the a susceptible equine host. The study showed that the first generation of *Dermacentor nitens* infected with *B. caballi* were viable and transmitted the pathogen. Subsequent generations failed to transmit the pathogen to naïve horses after being fed on calves, thus implying the pathogen needs an equine host.

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Release of piperonyl butoxide and permethrin from synergized ear tags on cattle and effects on horn fly mortatlity. 2008. Li, Miller, and Klavons. J Econ Entomol. 101:1697-1703.

The release rate of piperonyl butoxide (PBO) and permethrin from ear tags were studied. It was found that PBO is released at a higher rate than permethrin. PBO and permethrin release amounts are affected by the ambient temperature. The resistant strain of horn flies demonstrated 7.9-12.8-fold resistance to permethrin at LC_{50} and LC_{90}. A similar decline was also noted in the susceptible horn fly strain that coincided with the reduced release of PBO and permethrin pattern from the ear tags

Effects of ambient temperature and cattle skin temperature on engorgement of *Dermacentor andersoni*. 2008. Lysyk. J Med Entomol. 45:1000-1006.

Ambient temperature and skin temperature of cattle influence engorgement of female *Dermacentor andersoni*. Skin and ambient temperature changes strongly influence the proportion of ticks that become successfully engorged, the time needed for engorgement, and the engorged tick weight. The temperatures also have a slight effect on the proportion of dead ticks.

Temporal and spatial fate of GFP-Expressing motile and nonmotlie *Aeromonas hydrophila* in the house fly digestive tract. 2009. McGaughey and Nayduck. J Med Entomol. 46:123-130.

Green fluorescent protein-expressing motile and nonmotile strains of *Aeromonas hydrophila* were examined within the alimentary canal of house flies. Bacteria adhered in the distal midgut were lysed, compressed into fecal pellets and excreted in 12-24 hours. The viable bacteria in the crop visually exceeded numbers within the fecal pellets. Viable bacteria were recovered from vomit specks 2 hr after feeding but never from feces. This paper suggests that *A.hydrophila* is a transient resident of house fly alimentary canals that is only transmitted orally for a short time after ingestion. Therefore, making regurgitation more significant than fecal transmission in the spread of some house fly transmitted bacterial diseases.

Black soldier fly (Diptera:Stratiomyidae) larvae reduce *Escherichia coli* in dairy manure. 2008. Liu et al. Environ Entomol. 37:1525-1530.

Sterile dairy manure was inoculated with *E. coli* labeled with a green fluorescent protein and then provided as a growing medium for black soldier fly larvae. Larvae were provided different quantities of manure medium as well as different ambient temperatures to grow at. All tests showed that the black soldier fly larvae significantly reduce *E. coli* counts in manure.

Isolongifolenone: A novel sesquiterpene repellent of ticks and mosquitoes. 2009. Zhang et al. J Med Entomol. 46:100-106.

Isolongifolene, a sesquiterpene derivative used extensively as an ingredient in the cosmetic industry was discovered to effectively repel blood-feeding arthropods that are important disease vectors. Isolongifolene deterred *Aedes aegypti* and *Anopheles stephensi* from biting more effectively than DEET in laboratory bioassays. The compound also repelled the blacklegged tick, *Ixodes scapularis* and the lone star tick, *Amblyomma americanum* as effectively as DEET. Isolongifolene is an inexpensive and safe repellent synthesized from turpentine oil feedstock that has potential of protecting large human populations in many areas against blood-feeding arthropods.

Something of Interest - http://esciencenews.com/articles/2009/01/21/native.lizards.evolve.escape.attacks.fire.ants

Penn State Assist. Prof. of Biology Tracy Langkilde has shown that native fence lizards in SE US are adapting to potentially fatal invasive fire ant attacks. The lizards have developed behaviors that cause them to respond to fire ant attacks by running away as opposed to sitting with eyes closed waiting for the ants to stop attacking, which they won't until the lizard is dead. The lizards have also developed longer hind legs which can increase effectiveness of this behavior.

"Not only does this finding provide biologists with an example of evolution in action, but it also provides wildlife managers with knowledge that they can use to develop plans for managing invasive species," said Langkilde.