Common Flies of Cattle

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Several fly species are considered to be significant pests of both free-ranging and confined cattle. Blood-sucking flies, such as horn flies (*Haematobia irritans*), stable flies (*Stomoxys calcitrans*), horse flies (*Tabanus* sp.) and deer flies (*Chrysops* sp.), can cause severe stress and annoyance to cattle. "Fly worry" can lead to decreased weight gain and milk production because cattle spend time trying to avoid and remove flies rather than feeding. Fly bites may also cause hide damage and spread viral, bacterial, and parasitic diseases. Face flies (*Musca autumnalis*) and houseflies (*Musca domestica*) are mainly a nuisance to cattle, but face flies can cause severe eye irritation and contribute to the spread of *Moraxella bovis*. A variety of flies may be involved in "fly-strike" or secondary myiasis, in which fly eggs are deposited in wounds and maggots develop in and feed on necrotic tissue and wound secretions. Cattle grubs, the larva of heel flies (a.k.a. gadflies) (*Hypoderma lineatum, Hypoderma bovis*), cause a primary cutaneous myiasis that results in hide damage and requires careful timing of insecticidal treatments to avoid anaphalactic reactions.

Horn flies (*Haematobia irritans*)

Description: Horn flies are small (3-4mm), gray-black flies that resemble stable flies, but are more slender and about half the size. When feeding, horn flies are usually in a head-downward position. Horn flies congregate along the back and sides of cattle.

www.oznet.ksu.edu/entomology/medical_veterinary/hornfly.htm

Life cycle: Male and female horn flies spend most of their adult life on the backs and sides of cattle, using cattle as both resting and feeding sites. Females lay eggs in fresh cow manure and the cycle of egg to adult is completed in 10 to 14 days in hot weather. Horn fly populations can reach very high numbers in a short period of time, contributing to control and insecticide resistance problems. In Kansas, there may be 7 to 10 generations of horn flies produced per year.

Pathology and economic impact: Horn flies are considered to be the most economically damaging insect pest of pastured cattle. Heavy horn fly infestations can result in reduced weight gain of up to 0.5 lbs per day and annual losses due to horn flies have been estimated to exceed $730 million.

Control: Control of horn flies should be implemented when 100-200 horn flies per head of cattle are present. Control measures include the use of pyrethroid or organophosphate impregnated ear-tags. Due to resistance problems, a 3-year rotation schedule consisting of organophosphate tags for years 1 and 2 and a pyrethroid tag for year 3 should be used. Ear tags should not be used until horn flies are present and should be removed in the fall to help avoid resistance problems. In addition, supplemental control methods such as sprays, pour-ons, and self-treatment devices (dust bags, back rubbers) should be used in late summer to help control horn flies. Sprays and pour-on insecticides afford some control of horn flies, but require frequent application. Topical ivermectin will provide control for up to 28 days. Back rubbers and dust bags are highly effective ways to treat cattle with insecticides effective against horn flies and do not require handling of cattle. Dust bags and back rubbers should be placed near, but not over, mineral blocks or dust bags or near loafing areas. Several dust bags or back rubbers should be available for use so that less dominant cattle can have access. Oral larvicides mixed with feed or in mineral mixes or blocks kill developing larvae in manure, but do not protect cattle from adult flies. The effectiveness of oral larvicides is also limited by the immigration of horn flies from pastures with untreated cattle.

Stable flies (*Stomoxys calcitrans*)

Description: Stable flies are gray and approximately 7 to 8 mm in length. Stable flies look very similar to house flies, but have a "checkerboard" type pattern on the ventral abdomen and have distinct, biting mouthparts. Both males and females are blood feeders and tend to congregate on the lower legs of cattle. Stable flies are primarily a problem in feedlot and dairy operations, but can also be a significant pest of range cattle, especially when large round bales are placed in pastures. Stable flies feed only during the day, usually in a head-upward position, and are only on their host while feeding.

www.res2.agr.gc.ca/.../kd/pestfigs/stable.jpg
www.osuextra.com/pdfs/F-7000web.pdf

Life cycle: Stable flies are often present from mid-May until September. Female stable flies deposit eggs in old manure or decaying plant material. The life span of stable flies is 2 to 3 weeks long.

Pathology and economic impact: Stable flies are aggressive feeders that inflict a painful bite. Stable flies cause significant "fly worry" in cattle, causing them to spend energy in avoidance behaviors such as foot stamping and tail switching. Range cattle may spend extended periods of time in creeks or ponds to avoid stable flies. Annual economic losses due to stable flies in Kansas feedlots are estimated to be nearly $22 million. Blood loss and disturbance of feeding may result in a 15% loss in body weight of cattle when stable fly populations are high.

Control: Control of stable flies should be implemented when as few as 5 flies per head are detected. Sanitation is the most effective means of control, but the dispersal ability of stable flies may limit the success of any control measure. Stable flies are reported to be able to fly 30 km within a 24 hour period. Removing possible egg-laying sites, such as manure piles and rotting hay and grain, may help decrease stable fly populations. Ear tags, back rubbers, dusters, and pour-on insecticides are not effective in controlling stable flies. Stable flies tend to rest in shaded areas when not feeding and premise spraying may provide some benefit in dairies or feedlots. Biting fly traps that are coated with adhesive and/or insecticides may also help control stable flies. Larvicides are considered to be ineffective in controlling stable fly populations. Mixed benefits have been seen with biological control methods using parasitic wasps. *Spalangia cameroni* is a commonly found parasite of stable flies in Kansas feedlots and may prove to be an effective means of control if wasp populations are maintained in high enough numbers.

Horse flies (*Tabanus* sp.) and Deer flies (*Chrysops* sp.)

Description: Horse flies and deer flies are large bodied flies that are usually dark gray to dark brown. Horse flies are approximately 25 mm in length and have clear wings. Deer flies are 6 to 10 mm in length and have a dark stripe across the wings. Males and females both feed on nectar, but females will also bite and feed on blood. Deer flies and horse flies are both strong fliers and tend to feed along the back, neck, and sides of cattle.

ipm.ncsu.edu/.../ 96PestNews/ News7/deerfly.gif

Life cycle: Females deposit eggs on vegetation near water or moist areas. Eggs hatch in 5 to 12 days and larva develop in aquatic habitats. Larvae require several months to several years to complete development

Pathology and economic impact: Females have cutting and sponging mouthparts that inflict a painful bite. Females feed intermittently and frequently and studies indicate that 20 to 30 flies feeding over 6 hours can result in blood loss of 100ml. Horse flies and deer flies are considered to be a minor to moderate problem for cattle in Kansas, but heavy outbreaks can occur. Horse flies and deer flies can cause significant “fly worry”, leading to decreased weight gain. Dark colored cattle tend to be bothered more than light colored cattle. Horse flies may also be mechanical vectors of anaplasmosis.

Control: Many of the control measures enlisted for horn flies will provide some relief from horse flies and deer flies. Back rubbers and dust bags with permethrin insecticides are effective because horse flies and deer flies tend to attack the upper body and back of cattle. Permethrin sprays and pour-on formulations have some efficacy against horse flies and deer flies, but require frequent re-application. Insecticides may not kill horse flies quickly and in some cases, no control will be apparent.

Face flies (*Musca autumnalis*)

Description: Face flies are dark gray flies that are approximately 6 to 8 mm in length. Face flies resemble houseflies, but are slightly larger and darker. Face flies congregate around the eyes and nostrils of cattle. Face flies tend to be a problem of range cattle whereas houseflies are more of a problem in feedlot or dairy cattle. Male and female face flies feed on nectar, but will also feed on nasal, ocular, vaginal, and wound secretions. Face flies only spend 5 to 10 minutes per day feeding on cattle and are found resting on shaded vegetation for most of the day.

www.uky.edu/Agriculture/ kpn/kpn_04/pn040112.htm

Life cycle: Females deposit eggs in fresh, un-crusted manure. Females require a protein rich meal prior to producing eggs. The time required to develop from egg to adult takes 12 to 21 days and adults are active from April until November. Face flies overwinter as adults in barns, homes, and other protected areas.

Pathology and economic impact: Face flies are mainly a nuisance to cattle, but are vectors of *Moraxella bovis*, the agent of pink eye. Face flies have pre-stomal teeth that have a rasping action upon the conjunctiva of the eye. Damage to the conjunctiva causes tearing and provides entry for *Moraxella bovis*. The major economic impact of face flies is the cost associated with treatment of pink eye. Irritation caused by face flies may also cause cattle to seek shade or water, disrupting normal grazing activities. Face flies may also serve as vectors of other diseases, such as *Thelazia, Brucella abortus*, and infectious bovine rhinotracheitis (IBR).

Control: Effective control of face flies can be difficult because of the limited amount of time the flies spend on cattle. Organophosphate or pyrethroid ear tags can be effective, but two tags per animal are necessary for adequate control. Pyrethroid ear tags are more effective than organophosphate ear tags for face fly control, but the use of pyrethroid ear tags presents a resistance problem in horn fly control. Dust bags and back rubbers can be effective if placed low enough to contact the face.

House flies (*Musca domestica*)

Description: Houseflies are dull gray and approximately 6mm in length. Four dark, longitudinal stripes run along the thorax and the eyes are reddish and separated. Houseflies have sponging mouthparts and do not bite. Houseflies are primarily a problem in feedlot and dairy cattle operations where they congregate in large numbers. Houseflies will stay near feeding and breeding sites and can be found moving back and forth from these sites to sunny

resting sites on fences, walls, and vegetation. Houseflies feed on a variety of substances, including plant material and feces. Houseflies will also feed on ocular and nasal secretions of cattle. Females require a protein rich meal prior to egg laying.

www.sciencenmore.com/ housefly.jpg

Life cycle: Females deposit eggs in old or fresh manure, garbage, sewage, or decaying organic matter. The time required for development from egg to adult is 10 to 14 days. Houseflies overwinter as larva or pupa under manure or decaying organic matter.

Pathology and economic importance: Houseflies are primarily a nuisance to cattle and may cause cattle to engage in avoidance behaviors that detract from time spent feeding. Movement of flies from manure to cattle and between cattle makes houseflies ideal vectors for certain diseases. Houseflies have been implicated in the transmission of enteric diseases such as salmonellosis and shigellosis. Houseflies may also transport parasitic worm eggs from manure to feed.

Control: Sanitation is the most important aspect of housefly control. Regular removal of manure, spilled feed, and uneaten hay and grain will limit breeding sites for houseflies. Residual sprays applied to walls and fences that serve as resting sites for houseflies are also effective, but must be re-applied frequently. Insecticide baits that lure houseflies with pheromones or sugars have also been useful. Biological control using parasitoid wasps has been shown to be effective in some Kansas feedlots. Attention to the use of appropriate parasitoid wasp species is necessary. *Muscidifurax zaraptor* is an effective and naturally occurring predator of houseflies in Kansas feedlots. Periodic releases of parasitoid wasps are necessary to have any impact on housefly populations.

<u>Heel flies, cattle grubs</u>

Description: Adult heel flies resemble honeybees, both in size and color. The two species occurring in North America include the northern cattle grub (*Hypoderma bovis*) and the common cattle grub *(Hypoderma lineatum)*. The common cattle grub is found more frequently in Kansas. Adults are non-feeding and do not bite cattle, but cause agitation during egg-laying attempts. Cattle grubs are the larvae of heel flies and cause a cutaneous myiasis.

www.paleothea.com/ Gallery2.htm www.entomology.cornell.edu/ Extension/Vet/Pict...

Life cycle: Adult heel flies are active on warm days, from June until September. Adults live for only one week and live only to reproduce. A female heel fly may produce up to 600 eggs. Only 3 to 5% of all eggs laid will develop into adults. Females lay eggs on the lower legs of cattle and eggs hatch in 2 to 6 days. Larvae of the common cattle grub pierce the skin and then migrate through fascial planes of muscles and connective tissue for 4 months. Common cattle grub larva then reach the submucosa of the esophagus where they overwinter. Larvae of the northern cattle grub migrate to areas near the spinal cord. Migration resumes in spring and approximately 9 months after hatching, larvae reach the back of cattle and form a characteristic swelling. Larva cut a breathing hole in the skin and remain for another 30 to 90 days while molting twice and doubling in length. Larvae then work their way out of the skin, fall to the ground, and pupate. Adults emerge in April to May. The life cycle of the northern cattle grub is approximately 2 months behind the common cattle grub. Calves and yearlings are more susceptible than older cattle. Malnourished cattle are also more susceptible to cattle grubs.

Pathology and economic impact: Cattle often become very agitated when heel flies attempt to lay eggs. Cattle will often run from female heel flies. Cattle will seek shade or water to avoid heel flies, and may run through fences in attempts to escape. Interruptions of normal grazing behavior may lead to decreases in weight gain. Cattle grubs also decrease the value of hides due to the large swellings and air holes in the skin. Larval migration can cause damage to tissues and inflammatory reactions may occur if larvae die.

Control: Treatment for cattle grubs should be applied from June until October 1, before grubs appear in the backs of cattle. If cattle are treated after October 1, reactions to dying grubs can occur. Reactions can be due to hypersensitivity from dead larva, or may be due to inflammatory responses to dead larva in tissues near the esophagus or spinal cord. Reactions to dying larvae can involve several different symptoms that may mimic organophosphate toxicity. Larvae that die near the spinal cord can cause paralysis or weakness of the hind legs. Larval death in the esophageal submucosa can cause inflammation that leads to obstruction. Bloat may occur and cattle may salivate excessively or have difficulty breathing. These reactions should be differentiated from organophosphate toxicity for proper treatment. Signs of organophosphate toxicity include staggering, hind limb weakness, excessive salivation and diarrhea.

Sprays and dips using coumaphos or phosmet are effective in controlling cattle grubs. If sprays are used, the entire body should be sprayed until the skin is wet to ensure adequate control. Pour-on formulations of famphur, fenthion, ivermectin, and phosmet are also effective. Doramectin and ivermectin injections are also highly effective in controlling cattle grubs, in addition to round worms, mites, and lice. If cattle must be treated after October 1, do not treat sick or stressed calves less than 3 months old and use the minimum dose on animals older than 3 months. Treat with only one type of medication and read the warning label carefully.