



## External Parasites of Sheep and Goats

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Insect pests limit production in the sheep and goat industry significantly in Afghanistan. External parasites feed on body tissue such as blood, skin, wool and hair. The wounds and skin irritation produced by these parasites result in discomfort and irritation to the animal. Parasites can transmit diseases from sick to healthy animals. They can reduce weight gains and milk production. In general, infested livestock cannot be efficiently managed to realize optimum production levels.

### Lice

Lice are external parasites which spend their entire life on sheep or goats. Both immature and adult stages survive on blood or feed on the skin. Louse-infested animals may be recognized by the dull matted coat or excessive scratching and grooming behavior. Sucking lice pierce the skin of sheep and goats and draw blood. Biting lice have chewing mouthparts and feed on particles of hair, scab and skin exudations. The skin of these animals becomes irritated resulting in scratching and rubbing causing raw areas and loss of fleece and hair.

Lice are generally transmitted from one animal to another by rubbing and body contact. Lice, many times, are introduced into the herd by bringing infested animals from the outside into the herd. Most sucking and biting lice begin to increase in number during the fall and reach peak populations in late winter or early spring. Summer populations are usually low and cause little damage.

### Control Strategies

There are many species of lice that parasitize both sheep and goats. Some are specific to sheep and others to goats. However, the control measures for these pests are often the same. In general, louse control is difficult since insecticides do not kill the louse egg. Most lice populations are low in the fall, grow rapidly in the winter and decline in the summer. Wool harvest removes a large portion of the lice.

- **Biting lice** eggs will hatch in 8 to 12 days. Following the first insecticide application; a second treatment should be applied in 14 days. Biting Lice live on the skin surface feeding on bits of hair and skin surface debris. Biting lice egg hatch in 8 to 12 days and the entire life cycle is complete in one month.

- **Sucking lice** attack sheep and goats and the most common are the *African blue louse* found on the body, head and neck of the animal. Heavy populations have caused death in sheep and goats. Second is the *foot louse* which prefers to attack the feet and legs of goat and sheep. In advanced stages, the foot louse affects the belly area of both sexes and the scrotum of the male animals. An important control difference is that the egg hatching takes longer for sucking lice averaging 7-14 days. Therefore, a second treatment should be given in 21 days.
- One best management practice (**BMP**) for control of biting and sucking lice is a residual spray or dipping in the late fall, before winter insect populations build up. A second insecticide application should be made 14 to 21 days (*for control of newly hatched eggs*) following the first application.
- If **biting lice** are dominant, apply the second treatment in 14 days; if **sucking lice** are dominant apply treatment in 21 days. If **both types** are apparent problems, make the second application in 21 days. A spring application may or may not be justified depending on infestation levels.

### Damage and Economic Loss

Lice infestations are primarily responsible for downgrading wool quality. The wool becomes ragged, torn and may be completely removed in large patches due to rubbing and scratching. African blue louse feeding can leave large patches of blood stained fleece on the rib and shoulder areas. There are reports that the blue louse feeding can cause death in some instances.

### Sheep Keds

**Sheep keds**, also known as louse flies, are large, flattened, usually wingless parasitic flies that attack both sheep and goats. Two species feed on goats, and one reproduces on birds, deer and feeds on sheep. All species in this family are parasitic and both sexes are blood feeders. Sheep ked bites become irritated and prompt sheep and goats to rub, bite, and scratch. Animals often roll on the ground in an attempt to relieve irritation. Keds usually do not cause great damage if the animal is fed high nutritious diet, but sheep grazed throughout the year on pasture or range may acquire heavy burdens of keds during the winter and early spring.

Ked eggs are retained and hatch within the body of the adult female ked. The newborn Ked pupa (immature stage) is attached to the fleece and develops into a mature feeding adult. A female ked is capable of developing only one larva at a time. During the female's life of 100 to 130 days, she produces around 10-15 young, giving birth every 8-9 days. The pupal stage lasts from 18 to 30 days.

## Control Strategies

**Sheep keds** spend their entire life on domestic sheep. They are transferred from animal to animal by direct contact. Ked populations fluctuate seasonally with highest numbers occurring in winter and spring while the lowest populations are in the summer.

- **BMPs for Sheep Kids:** Sheep ked populations can be reduced by approximately 75 percent by *shearing prior to lambing*. If ewes are not shorn prior to lambing, keds will move from the ewes and infest their lambs. The infested lambs, will not be shorn until the following spring, and can serve as a reservoir for reinfections of the herd.
- Insecticides are available as body spray, pour-on, dust and dips for sheep ked control. Treating sheep after shearing will give optimum ked control.
- Bio-security of the herd requires that replacement animals and newly purchased breeding rams should be treated before they are brought into the herd. When possible after the new animals are treated, they should be isolated from the herd for a period of 7-10 days allowing the insecticides to kill the adult keds. *Water soluble insecticides appear to work better than oil based insecticides for ked control because water soluble insecticides travel more freely through the fleece.*

## Damage and Economic Losses

Sheep keds have been reported to cause an 8 percent reduction in weight gain, a 15 percent reduction in wool production and a 30 percent reduction in value of sheepskins. The feeding by sheep keds causes dense, hard nodules to develop in the skin a condition known as cockle. These nodules are not easily penetrated by dyes; they weaken and discolor the hide resulting in a downgrade the leather. The quality of wool is also negatively affected due to sheep ked debris. There is no confirmed evidence that keds are vectors of any important disease of sheep.

## Mange Mites

**Itch or mange mites** (Psoroptes, Sorcoptes) feed on the surface or burrow within the skin, making very slender, winding tunnels from 0.25-2.5 cm long. The fluid discharged at the tunnel openings dries to form nodules. A toxin is also secreted which causes intense irritation and itching. Infested animals rub and scratch continuously. Infestations are contagious and treatment of all animals in the herd is essential for control. Delayed egg hatch requires a second retreatment in 14 days. The most common mange mite affecting sheep and goats is Psoroptic ear mite or sheep scab mite. It lives in the auditory canal of goats and temporarily on the body. In sheep these mites infest heavily woolled areas and cause crusting and matting of the wool.

## Control

Mange mites have a 2 week life cycle and can live off the sheep host for as long as 3 weeks. The highest populations of mange mite on sheep and goats is seen in the late fall and winter.

Transmission of mange mite is by body contact and control is by topical application of an insecticide followed by a second application in 14 days.

### **Damage and Economic Losses**

**Mange mite** infestations are primarily responsible for downgrading wool quality due to scabbing and debris accumulation in the wool. The wool may become ragged, torn in patches due to rubbing and scratching. Often weight loss and low productivity is associated with mange mite.

### **Ticks**

**Ticks** are commonly thought of as insects, but they are actually arachnids; a group which includes spiders, mites and scorpions. All adult ticks have 4 pairs of legs, no antennae and two fused body parts, head and cephalothorax. Adult insects have 3 pairs of legs, one pair of antennae and three distinct body parts. However, the young ticks, called “seed ticks” have 3 pairs of legs.

Ticks that commonly infest sheep have 4 distinct life stages: egg, larva, nymph and adult. A larval or seed tick feeds on small vertebrate animals then drop off the host and molts to the nymph. The 8 legged nymph feeds on small vertebrate animals, drops to the ground and molts to the adult. The adult attaches to a third host, (dog, human, and sheep) drops to the ground and lays eggs (1000-5000) and dies. This is termed a 3 host life cycle and usually takes 3 years to complete the cycle. There are also ticks that complete a lifecycle on 1 and 2 hosts.

### **Control**

Many insecticides that control external parasites will control ticks. High pressure sprays are noted as having the best results. Ear ticks can be controlled by applying insecticides to the ear only. Ticks are generally warm or hot weather pests but not always.

### **Damage and Economic Losses**

**Tick** feeding on sheep can damage the skin resulting in buyers downgrading quality and market price of sheepskins. Some ticks can cause paralysis in sheep when a neurotoxin found in the tick’s saliva is injected into the bloodstream of the sheep. Some ticks can transmit tularemia, a bacterial pathogen that circulates between rabbits and sheep. Ear ticks may cause secondary bacterial infections on feeding sites in the ear.

### **Biting Midges (Culicoides)**

**Biting midges** are usually less than 3 mm in length. After taking a blood meal, female midges develop a batch of eggs (400) that is deposited along the margin of aquatic environments including ponds, marshes, swamps, and irrigation channels. In 3-4 weeks, development from

egg to adult can occur. Midges feed on animals in the late afternoon and early in the morning during low light periods.

## Control

**BMPs for Biting Midges:** When possible, drain aquatic areas suitable for midge habitat. Avoid such sites when choosing overnight camps and congregation areas. Spray and dust insecticides may be effective in controlling midges.

## Damage and Economic Losses

Some midges are vectors of bluetongue and epizootic hemorrhagic disease. Economic losses in production and animal health can occur.

## Black Flies

**Black flies** (Family Simuliidae) are small (6.25 mm in length) with an arched or “humpbacked” thorax, sometimes called buffalo gnats. About two-thirds of the black fly species feed on mammal blood. Black flies are associated with moving water of streams, creeks, irrigation ditches and rivers. Eggs are deposited near moving water. Larvae attach themselves to stones; branches, and vegetation near moving water. The black fly larva develops over a few weeks and up to 2 years. Adult flies live for 2-4 weeks while feeding during the day on thinly haired regions of animals. Targeted feeding sites are eyes, nose and the under belly of sheep and goats. Black flies are considered *exophilic and will not enter a building*.

## Controls

**BMP for Black Flies:** Avoid grazing or congregating sheep and goats around running water areas for long periods of time. Move sheep and goats into barns to escape black fly feeding. Insecticides for biting flies may be effective on black flies.

## Damage and Economic Losses

Black flies can cause sheep to bunch up and refuse to feed or move to water. Their bites are irritating and can result in lesions that persist for days up to months. Often rubbing and scrubbing can occur.

## Sheep Nose Bot

The **sheep nose bot** is a large grayish fly 15 mm in length that deposits live larvae in the nostrils, of sheep and goats during the summer. Sheep react to the larvae by laying, running or walking with their noses close to the ground or huddling in groups. Once deposited, the larvae migrate to the sinuses where they live on mucous of the nasal passages and sinuses. Larval development takes 6 to 8 months to complete. In the spring, larvae migrate back down the nasal passages, drop to the ground and pupate. The adult fly emerges several weeks later.

## Control

Ivermectin is the only insecticide for control of the nose bot. It can be applied with standard animal drenching equipment.

## Damage and Economic Losses

Membranes of the nasal passages and sinuses are irritated by feeding of the bot larvae. This may result in a bacterial infection which can lead to pneumonia and death in some cases. Lamb weight gain can be reduced by as much as 4 percent.

## Flies and Fly Maggots

Infestations of **Fly maggots**, (Myiasis), are the presence of fly larvae in living host. Several kinds of maggots infest the wounds of warm-blooded animals; however, the only one that feeds exclusively on live flesh is the primary screwworm.

Other species, such as the secondary screwworm and other blowflies may also infest wounds. These species normally lay their eggs on carcasses of dead animals and may occasionally occur in open wounds. The eggs take 8-24 hours to hatch and develop into a feeding larva. These larvae feed for 4-7 days, fall to the ground; and form an encased pupa stage which develops into an adult fly in 10-20 days. Although these species may worry livestock, they will not consume living flesh and will feed only on dead flesh and wound secretions. Infestations of secondary screwworm usually occur following an injury which produces untreated wounds. Wounds must be cleaned and protected in order to prevent secondary screwworm infestations.

## Control

**BMPs for Fly Control:** Control flies by maintaining a clean environment in which sheep and goats are housed. Move animal waste and carcasses immediately away from sheep and goat congregation areas. Animal waste can be composted or spread on crop fields and carcasses should be placed in the ground and covered with at least 30-50 cm of top soil or composted in deep sawdust or wood shavings. Insecticides can be applied to animals. Force-use-dust bags may be effective in controlling flies. (*Force-use-dust bags are doubled burlap bags 2/3 filled with a dust formulation of an insecticide placed in a location that forces the animal to come in contact with the dusting bags.*)

## Damage and Economic Losses

Flies in general cause sheep to bunch up, go off feed and stop grazing. As a result, growth and weight gain are drastically reduced. Fly sticks can cause skin injury and reduce wool quality.

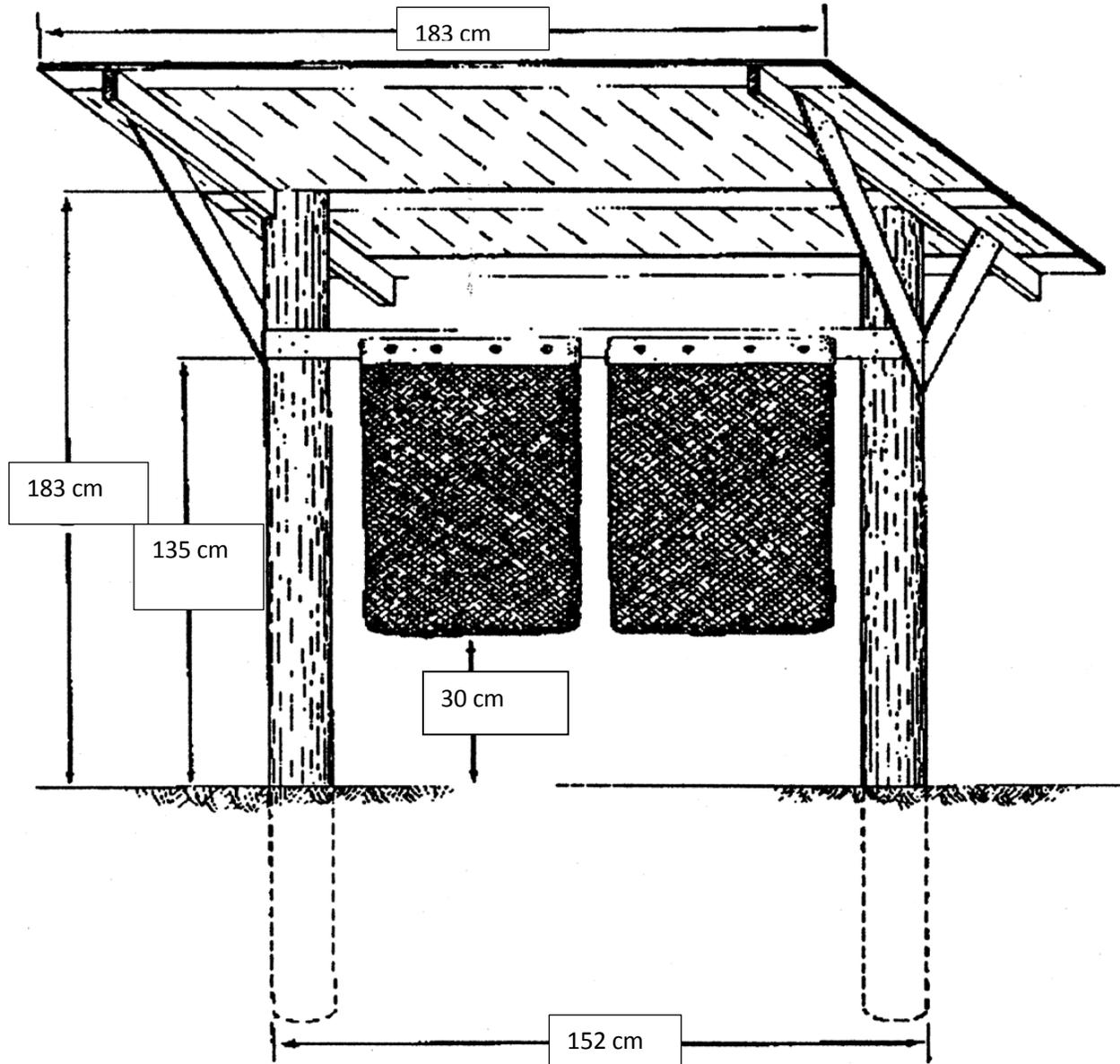
### Keys to Pesticide Safety

1. Before using any pesticide, stop and read the precautions.
2. Read the label on each pesticide container before each use. Heed all warnings and precautions.
3. Store all pesticides in their original container away from food or feed.
4. Keep pesticides out of the reach of children and livestock.
5. Apply pesticides only as directed.
6. Dispose of empty containers promptly and safely.

Insecticide	Application Method	Pest(s) Controlled	Restrictions and comments
Alphacryprin-50 EC (Alpha-cypermethrin 5%)	Spray	Lice, Keds, ticks, biting flies	Spray to back and to the crutch in a semicircular sweep
Atroban 11% EC (11% permethrin)	Spray	Keds, lice, ticks biting flies	Spray to thoroughly wet animal.
Cyprin-100 EC (Cypermethrin)	Dip or spray	flies, lice mites, ticks, mange mites	Dilute with clean water using at least 100 times the volume of clean water, mixing well until a milky stable emulsion is produced
Delttox-50 EC Deltamethrin	Dip or spray	flies, lice mites, ticks, mange mites	Follow label directions for treatment of specific pests.
Diason-600 EC (Diazinon)	Dip	flies, lice mites, ticks, mange mites	Mix 1000 ml Diason-600 with 2400 liters of water. Two treatments may be necessary for some pests.
GardStar 40% (40% permethrin)	Spray	Keds, lice, ticks biting flies	Spray midline to tailhead until wet.
Ivomec, Privermectin (0.08% ivermectin)	Oral drench	Nasal bots	Product formulated specifically for use in sheep only.
Prozap Insectrin X (10% permethrin)	Spray	Lice, ticks, biting flies	Spray to thoroughly wet animal.
Python Dust (0.075% zeta-cypermethrin + 0.15% PBO*) *Piperonyl butoxide	Dust	Keds, lice, ticks biting flies	Apply by hand or shaker can evenly over the back.

## Force-Use-Dust Bags

Illustration 1



Dust bags are simply heavy burlap sacks filled with an approved insecticide dust. When an animal bumps against the bag a small quantity of dust sifts through the bag and is deposited on the animal. To construct a dust bag use two burlap bags, one inside the other, with four grommets affixed equally spaced apart in the open end. For greater strength, place a piece of sized leather between the burlap and grommet halves. So constructed, this grommet end can be opened for filling. Each bag should be about one-third full.

**References:**

Gregory Johnson, Managing Ectoparasites on Sheep, Montana State Univ., Extension Pub., 300-1111SA, Nov. 2011

P.E. Kaufman, P.G. Koehler and J.J. Butler, External Parasites of Sheep and goats, Univ. of Florida, Extension Pub., ENY-273, Revised- May 2009, Reviewed- June 2012