

# Just the Facts...

## Ocular Myiasis

### Q. What is ocular myiasis (OM)?

A. Myiasis (my-EYE-uh-sis) is defined as the invasion of living animal tissue by fly larvae (maggots). When larvae invade the eye, this condition is termed ocular myiasis (OM) or ophthalmomyiasis (op-THAL-mo-my-EYE-uh-sis). Larvae most commonly attack the lids or conjunctiva (external ophthalmomyiasis). In rare instances they may penetrate into the eyeball itself (internal ophthalmomyiasis). External OM can usually be remedied without complications; however, internal OM is very serious and often results in serious damage including blindness.



Sheep nose bot fly (*Oestrus ovis*) larvae  
University of Pennsylvania

### Q. What causes ocular myiasis (OM)?

A. In the majority of cases, OM is caused by larvae of the sheep nose bot fly (*Oestrus ovis*), although other species such as the human bot fly (*Dermatobia hominis*) are occasionally involved. The sheep nose bot fly is a large, hairy, yellowish-brown, bee-like fly. It resembles a honey bee, but is slightly smaller in size. Unlike most flies, *O. ovis* gives birth to live young (larvae) which are capable of parasitizing hosts immediately. In its normal life cycle, the adult female fly deposits larvae around the nostrils of sheep and goats and the larvae migrate into the sinuses. There, they mature by going through three progressively larger larval stages (instars). After a few months, the fully mature larvae (third instar) pass out of the nostrils and pupate on the ground. Adult flies emerge from the pupae approximately 3 – 6 weeks later and live for about a month.



Sheep nose bot fly (*Oestrus ovis*) adult  
Universität Rostock, GE

### Q. How do you get ocular myiasis (OM)?

A. Occasionally, the sheep nose bot fly deposits larvae near the eyes of humans living or working in close proximity to livestock. In humans, *O. ovis* larvae generally do not develop past the first instar stage, although other species may grow much larger. An interesting feature of *O. ovis* is that it can deposit larvae while still in flight. The fly darts close to the eyes or nostrils and ejects a stream of larvae into the target area.

### Q. What is the geographic distribution of ocular myiasis?

A. OM can occur in most regions of the world, particularly in underdeveloped or rural areas where livestock are prevalent. It is most common in the Middle East, Africa, and Central America. Few cases occur in the United States. Several cases have recently been reported among military personnel serving in Iraq.

### Q. What are the symptoms of ocular myiasis?

A. OM is characterized by a condition similar to conjunctivitis, marked by pain, burning, itching, redness, and tearing in the affected eyes. Often these symptoms are accompanied by the sensation of a foreign body moving in the eye. Many patients report having had an insect buzzing around their face or striking them in the eye immediately prior to the onset of symptoms. In extreme cases the larvae may penetrate the mucosal sinus causing swelling, pain, and frontal headaches, or may invade the globe of the eye, causing retinal damage and blindness. Occasionally, if a larva dies in the eye, a permanent nodule resembling a sty may develop.

### Q. How is ocular myiasis diagnosed and treated?

A: The larvae of the sheep nose bot fly are grey-white in color and measure about 1 mm long. They have eleven body segments, each with spines or hooks which allow them to maintain their hold on the host tissue while moving about by means of peristaltic contractions. A pair of enlarged oral hooks on the anterior end (mouth) anchors the larva firmly while it feeds on eye secretions and bits of broken tissue. The larvae are readily visible to physicians examining the eye. In some cases they can be seen traveling through the cornea. Early growth stage larvae can often be carefully extracted from the eye with fine forceps. Anesthetic drops may be useful to immobilize the larvae during removal. Antibiotic ointments have also been used to help suffocate the larvae, thereby facilitating removal. Antibiotic ointments or drops, as well as topical corticosteroids, can be used to prevent secondary bacterial infection and reduce inflammation. Follow-up examination is advisable to rule out complications or the existence of additional larvae. If the larvae have burrowed more deeply into the conjunctiva, sinuses, or eyeball, surgery may be required.



Extraction of a late-stage larva of *Dermatobia hominis* (human bot fly), another fly species that can cause ocular myiasis. This case was in a 5-yr-old Honduran boy. The surgery was performed by the Air Force Mobile Ophthalmic Surgical Team.

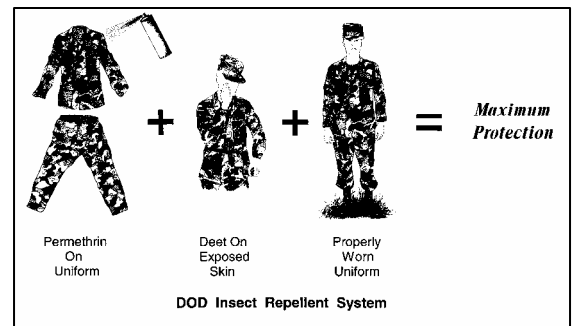
**Q. Can ocular myiasis be prevented?**

**A.** The *best* way to prevent OM is to avoid locations where livestock are housed or where they congregate, especially in areas of the world where OM is most common. In addition, using the standard military skin and clothing repellents (DEET and permethrin, respectively) will reduce the ability of flies to get close enough to your face to deposit larvae. Head nets are effective in preventing attack by flies, but may not be practical in certain hot environments or deployment situations. It is also important that medical personnel be familiar with OM so that they can diagnose and treat the condition effectively.

- Use both skin and clothing repellents that have been approved by the Environmental Protection Agency (EPA). They are safe and effective.
  - For your skin, use a product that contains 20-50% **DEET** (N,N-diethyl-meta-toluamide). **DEET** in higher concentrations is no more effective.
  - Apply **DEET** lightly and evenly to exposed skin; do not use underneath clothing. Avoid contact with eyes, lips, and broken or irritated skin.
  - To apply to your face, first dispense a small amount of **DEET** onto your hands and then carefully spread a thin layer.
  - Use **DEET** sparingly on children, and don't apply to their hands, which they often place in their eyes and mouths.
  - Wash **DEET** off when your exposure to flies, ticks, mosquitoes, and other arthropods ceases.
  - For your clothing, use a product that contains **permethrin**. **Permethrin** is available commercially as 0.5% spray formulations.
  - **Permethrin** should only be used on clothing, never on skin.
  - When using any insect repellent, always FOLLOW LABEL DIRECTIONS.
  - Do not inhale aerosol formulations.

- For optimum protection from flies and other disease-bearing arthropods (such as mosquitoes and ticks), soldiers should utilize the **DOD INSECT REPELLENT SYSTEM**. In addition to proper wear of the battle dress uniform (BDUs)(pants tucked into boots, sleeves down, undershirt tucked into pants), this system includes the concurrent use of both skin and clothing repellents:

- Standard military skin repellent: 33% **DEET** lotion, long-acting formulation, one application lasts up to 12 hours, **NSN 6840-01-284-3982**.
- Standard military clothing repellents: either aerosol spray, 0.5% **permethrin**, one application lasts through 5-6 washes, **NSN 6840-01-278-1336**; or impregnation kit, 40% **permethrin**, one application lasts the life of the uniform (approximately 50 washes), **NSN 6840-01-345-0237**.



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