### American Association of Zoo Veterinarians Infectious Disease Committee Manual 2013

**OLD WORLD SCREWWORM (Chrysomya bezziana)**

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<th>Animal Group(s) Affected</th>
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<th>Clinical Signs</th>
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<td>All warm blooded animals, including birds</td>
<td>Flies are attracted to open wounds. Gravid female flies deposit eggs either into wounds or directly onto intact mucous membranes</td>
<td>Severe myiasis in open wounds; associated discomfort and decreased appetite</td>
<td>Severe infestations that remain untreated may result in the death of the host in a short time</td>
<td>Removal and killing of the larvae in lesion. Treatment of the wound with approved insecticide. Ivermectin 200-300 mcg/kg</td>
<td>Monitoring wounds and treating infested wounds with insecticides.</td>
<td>Yes</td>
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**Fact Sheet compiled by:** Carlos R. Sanchez  
**Sheet completed on:** 19 December 2010; updated 27 July 2013  
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**Susceptible animal groups:** All mammals (domestic and many species of wildlife) are affected potentially; problem is rare in birds.

**Causative organism:** *Chrysomya bezziana*

**Zoonotic potential:** Yes, humans can be hosts for screwworm larvae but it is primarily a veterinary pest.

**Distribution:** The distribution of Old World screwworm is confined to the Old World. *Chrysomya bezziana* is widely distributed throughout tropical areas. It is most prevalent in Southeast Asia, and throughout much of Africa (from Ethiopia and sub-Saharan countries to northern South Africa), some countries in the Middle East (reports confirmed from Iran, Iraq and recently Yemen), India, the Malay Peninsula, the Indonesian and Philippine Islands, and Papua New Guinea. *C. bezziana* has never become established in Europe, Australia, New Zealand or the Western Hemisphere. Because of its distribution, the most likely potential port of entry into the US is Hawaii.

**Incubation period:** Eggs hatch within 8-24 hrs after being laid. Once the larvae emerge, they immediately begin to feed on the wound fluids and underlying tissues, burrowing as a group, head-downwards into the wound. The entire larval stage lasts 5-8 days, followed by larvae leaving the wound and pupating in the soil. Maturation of pupae to adult is temperature dependent and ranges from 7 days at 28°C to 60 days at temperatures of 10–15°C.

**Clinical signs:** Animals with screwworm infestations often display discomfort and appear unthrifty and depressed; other non-specific clinical signs include: separation from group and anorexia. Screwworms can infest a wide variety of wounds, from tick bites to cuts and dehorning or branding wounds. Infestations are very common in the navels of newborns, and the perivulvar and perineal regions of their dams. If a screwworm deposits its eggs on mucous membranes, the larvae may enter any orifice including the nostrils, sinuses, mouth, orbits of the eye, ears or genitalia. Infested wounds often have a serosanguineous discharge and sometimes a distinctive odor. By the third day, the larvae may be easily found; secondary bacterial contamination is also common. The wound can enlarge due to multiple infestations and if not treated animal could die within 2 weeks.

**Post mortem, gross, or histologic findings:** The larvae of *C. bezziana* are obligatory wound parasites that...
OLD WORLD SCREWWORM (*Chrysomya bezziana*)

never develop in carcasses or decomposing organic material. Larvae are unlikely to be found on post-mortem examination unless the animal died recently. Larvae of different ages are normally found on wounds or natural openings and mucous membranes in live animals. Other fly larvae may be present in lesions making gross diagnosis difficult. Microscopic lesions are not useful for the diagnosis of screwworm.

**Diagnosis:** Before collecting or sending any samples from animals with suspected screwworm infections, federal and state authorities should be contacted. Clinical presentation of screwworm is always associated with a variety of pre-established wounds and should be considered in the event of any myiasis. Definitive diagnosis can be made after observation, extraction and identification of typical larvae along with history of travel to an area endemic for *C. bezziana*. Larvae must be removed from the deeper areas as well as superficial regions to be sure all species present are examined. Fully mature larvae develop a reddish-pink tinge over the creamy white color of younger larvae. Screwworm species have prominent rings of spines around the body and these spines appear large and conspicuous under a microscope when compared with most non-screwworm species. If a wound is considered to be infested with Old World screwworms samples should be collected and sent to eradication officials.

**Material required for laboratory analysis:** Before collecting or sending any samples from animals with suspected screwworm infections federal and state authorities should be contacted. Screwworms can infest humans; samples should be collected and handled with all appropriate precautions. Larvae, eggs or flies can be conserved in vials containing 80% ethanol or isopropyl alcohol; formalin should not be used. Larvae should be removed from the deepest part of the wound to reduce the possibility of collecting non-screwworm species; optimal preservation of larvae, in their natural extended state, can be made by killing them in boiling water (15–30 seconds immersion) before storage in 80% ethanol. Suspect screwworm eggs or flies may also be submitted for diagnosis; eggs are best collected using a scalpel as a scraper.

**Relevant diagnostic laboratories:**

USDA-APHIS-VS-NVSL
1920 Dayton Ave. (for packages)
P.O. Box 844 (for letters)
Ames, IA 50010
(515) 337-7266
Fax: (515) 337-7397

USDA-APHIS-VS-NVSL-FADDL
40550 Route 25 (for packages)
Orient Point, NY 11957
P.O. Box 848 (for letters)
Greenport, NY 11944-0848
(631) 323-3256
Fax: (631) 323-3366

**Treatment:** Removal and killing of the larvae present in any wound or lesion. Immediate treatment of all detected wounds with an approved insecticide (organophosphate insecticides, carbamates and pyrethroids) should be followed by a precautionary spraying or dipping of the animals before transport. For residual protection against re-infestation, insecticides must be applied at 2–3-day intervals until the wound has healed; animals with screwworm-suspect wounds should be quarantined until treated and wounds have clearly healed. A single subcutaneous injection of ivermectin (200 mcg/kg) has been effective against OWS in preventing navel strike of newborn calves and scrotal strike of castrated calves and also prevented re-strike of treated wounds of adult cattle.

**Prevention and control:** The OIE International Animal Health Code stipulates that is necessary to follow strict
observation of the requirements for international trade:
When importing domestic and wild mammals from countries considered infested with New World or Old World screwworm, veterinary administrations should require presentation of an international veterinary certificate attesting that:

1) Immediately prior to loading, the animals have been inspected on the premises by an official veterinarian and that any infested animal has been rejected for export;

2) Immediately prior to entering the quarantine pens in the exporting country:
   a) each animal has been thoroughly examined for infested wounds by an official veterinarian and that no infestation has been found in any animal; and
   b) any wounds have been treated prophylactically with an officially approved larvicide at the recommended dose; and
   c) all animals have been dipped, sprayed, or otherwise treated, immediately after inspection, with a product officially approved by the importing and exporting countries for the control of New World or Old World screwworm, under the supervision of an official veterinarian and in conformity with the manufacturer's recommendations;

3) At the end of the quarantine and immediately prior to shipment for export:
   a) all animals have been re-examined for the presence of infestation and all animals have been found free of infestation;
   b) all wounds have been prophylactically treated with an approved larvicide under the supervision of an official veterinarian;
   c) all animals have been prophylactically treated again by dipping or spraying as in point 2) above.

The floor of the quarantine area and transport vehicles must be thoroughly sprayed with an officially approved larvicide before and after each use. The transit route must be the most direct, with no stopover without prior permission of the importing country. On arrival at the importation point, all animals must be thoroughly inspected for wounds and possible New World or Old World screwworm infestation under the supervision of an official veterinarian. The bedding material of the vehicle and the quarantine area should immediately be gathered and burned following each consignment.

In addition: any imported animals from areas where screwworms are endemic must be thoroughly inspected for wound and infestations before they are allowed to enter premises. Wounds that do not appear to be infested are treated with an insecticide as preventative measure. Any infestations that become apparent after an animal enters the country must be treated promptly.

Suggested disinfectant for housing facilities: Facilities where screwworm was diagnosed and vehicles that may contain adults or immature screwworms should be sprayed with insecticides; any bedding material used in the area where the animal was quarantined should immediately be gathered and burned.

Notification: Any presumptive screwworm infestation must be reported to both state and federal (Area Veterinarian In Charge - AVIC) authorities.

Measures required under the Animal Disease Surveillance Plan: Because Old World screwworm has never been reported in the US, the National Animal Health Surveillance System (NAHSS) does not have a program for active surveillance. However, as this a reportable disease, state and federal (AVIC) authorities should be notified of any presumptive screwworm infestation.

Measures required for introducing animals to infected animal: In non-endemic regions, any infected animal is quarantined until treatment is complete and the wounds have healed. Treatment of the environment, as explained above, may also be necessary.

Conditions for restoring disease-free status after an outbreak: Old World screwworm has never been reported in the US and therefore if there is any indication of Old World screwworm infection in the US, the USDA-APHIS must be notified immediately.

Experts who may be consulted:
OLD WORLD SCREWWORM (*Chrysomya bezziana*)

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