Lab Identification of New World Screwworm

LIFE CYCLE AND BIOLOGY

The larvae (maggots) of the New World Screwworm Fly, *Cochliomyia hominivorax,* are obligate parasites of living flesh in warm-blooded animals, occasionally including humans. Female flies oviposit on or near pre-existing wounds or on mucous membranes inside the nose, mouth, and ears. Eggs hatch into larvae which burrow into the tissue and feed on the living flesh for approximately 7 days, after which they drop from the host and pupate. The adult screwworm fly emerges from the soil after 7 – 54 days depending on temperature and humidity.

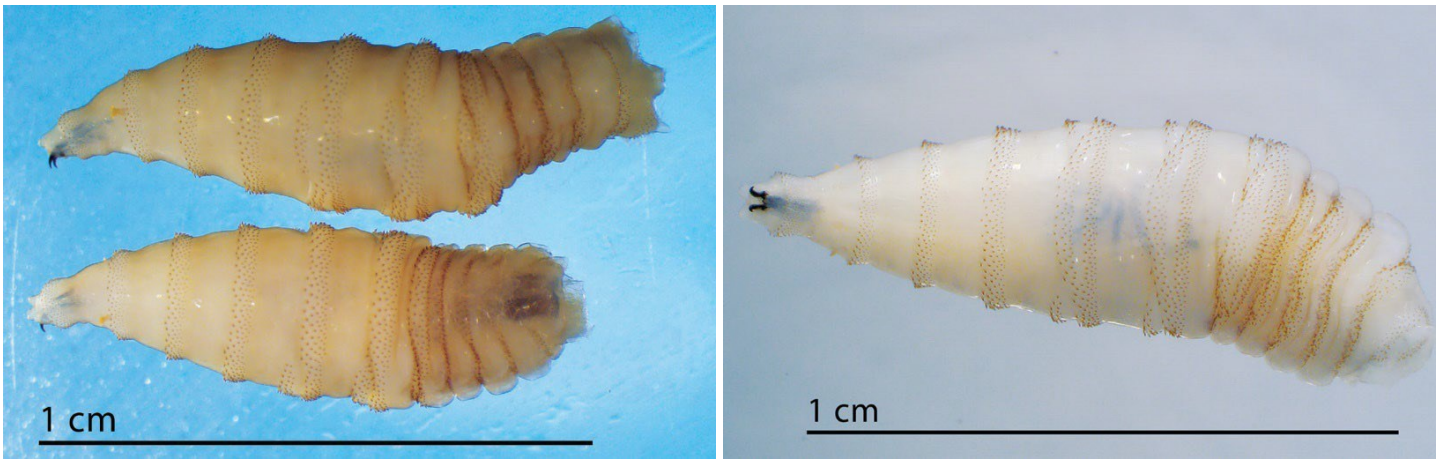
NWS is endemic in South America, parts of southern Central America, and some Caribbean islands. NWS primarily infests animals; human cases are uncommon. However, human cases can occur among people who tend livestock in endemic areas, and in travelers to these regions, particularly among people with open wounds who sleep outdoors. Untreated infestations can result in severe tissue destruction and are potentially fatal.

DIAGNOSTIC FEATURES OF THE THIRD-INSTAR LARVA

Distinguish *C. hominivorax* larvae from other species associated with incidental, facultative wound myiasis. Identify third-instar larvae to species level using a few key features shown below:

General appearance

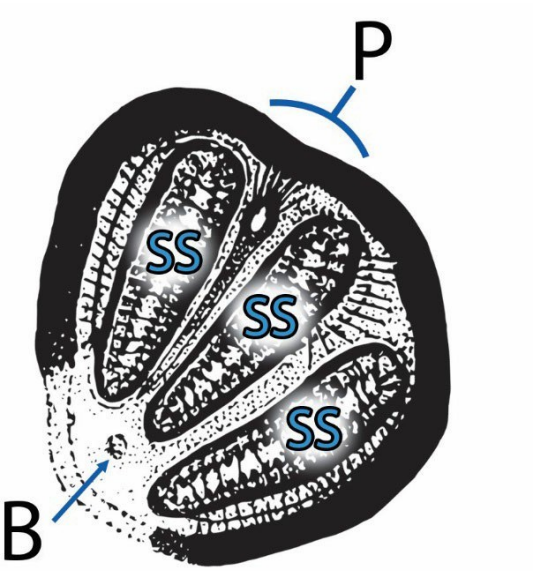
Maggots are usually 6.5 – 17 mm long, muscidiform (tapering anteriorly and truncate posteriorly) in shape, with encircling bands of short 1- 2- and 3-pointed spines on each body segment.

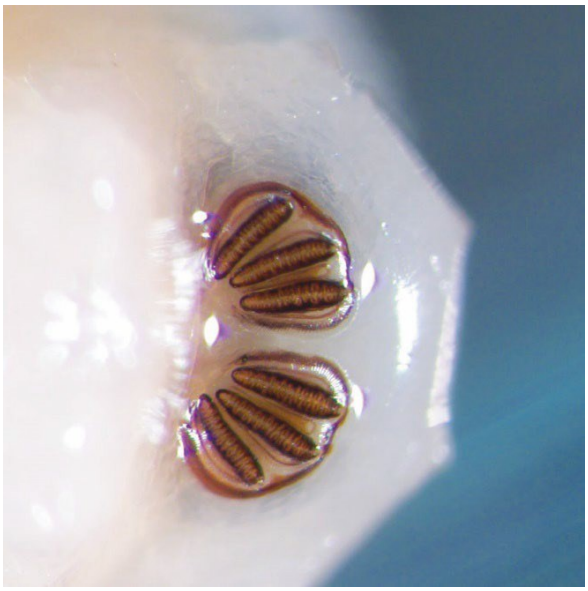


Gross appearance of *C. hominivorax* third-instar larvae; Lateral view (left image, top), dorsal view (left image, bottom), and ventral view showing mandibles (right image).

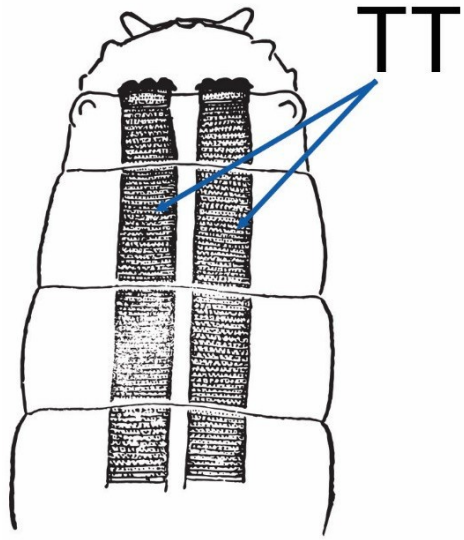
Specific features

- Tracheal trunks leading from posterior spiracles pigmented (dark brown to black), with pigmented portion extending anteriorly across at least two full body segments.
- Peritreme of posterior spiracle incomplete, not enclosing the button (which is usually indistinct).





The spiracular plate of a third-instar *C. hominivorax* larva, showing the peritreme (**P**) becoming indistinct ("incomplete") in the region of the button (**B**), which may be very indistinct. The three spiracular slits (**SS**) are roughly parallel and straight. Illustration: Adapted from D.G. Hall, *The Blowflies of North America* (1948).



Dorsal posterior view of the darkly pigmented tracheal trunks (TT) which extend internally from the spiracular plates. In other myiasis-associated fly species these tubes are clear or translucent. Illustration: Adapted from M.T. James, *The Flies That Cause Myiasis in Man* (1947).

ASSISTANCE WITH CONFIRMING NEW WORLD SCREWWORM

Collect all suspected New World screwworm larvae and place in a leak-proof container with 70% ethanol. The volume should be sufficient to fully submerge larvae to kill and preserve them for confirmatory morphological examination. If 70% (or greater) ethanol is unavailable, 70% (or greater) isopropanol or 5 – 10% formalin are acceptable alternatives, although not preferred.

CONTACT INFORMATION

Please contact **dpdx@cdc.gov** for laboratory testing inquiries and instructions for telediagnosis image submissions and physical specimen submissions. Direct clinical inquiries and patient management questions to **parasites@cdc.gov.**

Report both human and animal infestations immediately. Human infestations can be an indication of infestations in animals. Clinicians and laboratory professionals should report any suspected cases immediately to their local or state health department. Veterinarians should report any suspicious animal cases immediately to their state animal health official and APHIS office.