

EXOTIC Screw-worm fly

Fact sheet

Introductory statement

Screw-worm fly is a major cause of disease in warm blooded animals around the world (Allan 2001; Bowman et al. 2003). These flies lay their eggs on wounded or infected skin of the host, causing myiasis. Screw-worm fly is not present in Australia but *Chrysomya bezziana* (old screw-worm fly) is present in Papua New Guinea and Indonesia, posing a potential risk to Australia (Spradbery et al. 1989). Modelling has shown that if introduced into Australia screw-worm fly could colonize large areas resulting in severe livestock losses and unknown detrimental effects to native wildlife (Sutherst et al. 1989; Atzeni et al. 1994). It is important that screw-worm fly is included in the list of differentials for myiasis in both livestock and wildlife, especially in northern Australia.

Aetiology

Screw-worm myiasis is caused by larvae from *Chrysomya bezziana* (old world screw-worm fly) and *Cochliomyia hominivorax* (new world screw-worm fly). Maggots feed on living flesh causing severe tissue damage.

Family (*Calliphoridae*), genus (*Chrysomya* and *Cochliomyia*).

Natural hosts

All warm blooded mammals are hosts for the larvae of screw-worm flies. Screw-worm fly is largely recognised as a threat to livestock, but disease in wild mammals has been reported (Allan 2001; Bowman et al. 2003). Australian native species have been shown to be susceptible to infection (Animal Health Australia 2007).

World distribution

- *Chrysomya bezziana* (old world screw-worm) occurs in Africa, the Middle East, the Indian subcontinent, Southeast Asia and Papua New Guinea (Spradbery et al. 1989).

- *Cochliomyia hominivorax* (new world screw-worm) occurs in parts of Central America and throughout South America (Allan 2001). Screw-worm had been eradicated from the USA more than 30 years ago but in October 2016, *C. hominivorax* was diagnosed in key deer (*Odocoileus virginianus clavium*) in the Florida Keys. An eradication program, including sterile fly release, surveillance, monitoring and response was implemented (APHIS 2017).
- Screw-worm fly infections have been recorded in agile wallabies and a red kangaroo at a Malaysian zoo (Spradbery and Vanniasingham 1980).

Occurrences in Australia

The only known introduction of *C. bezziana* into Australia was recorded from a returning live export vessel from Brunei (Rajapaksa and Spradbery 1989). This was quickly contained and eradicated.

A study found an incursion of screw-worm fly was most likely to occur on the north coast, eastern seaboard or south-east coast of Australia. Modelling suggests that climatic conditions would limit screw-worm fly survival to the northern areas of Australia should it be introduced and become established (Fruean and East 2014).

Epidemiology

Screw-worm flies lay eggs in the open wounds or orifices of warm blooded mammals. The larvae feed on the wounds causing extensive tissue damage and can result in high morbidity and mortality rates within the host population (Allan 2001). The flies prefer warm moist conditions with temperatures of 16-30 °C and larvae usually spend 4-7 days on the host before dropping off to pupate within the soil (Rodriguez and Raphael 2008).

It is likely that both feral and native animal populations will be important hosts in the spread of screw-worm fly should it enter and establish in northern Australia.

Clinical signs

Clinical signs are related to the site and severity of infection. Some infections can display no or negligible clinical signs while others can display:

- Skin wounds infected with maggots
- Foul smelling oozing lesions
- Fever, lethargy, loss of appetite, anaemia and hypoproteinemia of the host (Animal Health Australia 2007).

Diagnosis

- Larvae present in the wound of infected animals.

Pathology

Lesions, often with irregular ragged edges containing larvae immersed in necrotic, liquefied tissue and blood. Larvae are usually deeply imbedded in tissue causing deep cavities extending laterally and deeply into subcutaneous tissue and muscle.

Differential diagnoses

Screw-worm fly should be included in the differential diagnosis list when fly strike is involved.

Laboratory diagnostic specimens

- Larvae from the wound of the infected animal.
- Larvae (10 to 20) fixed in hot water then placed into vial(s) with 70% ethanol.

Treatment

- Remove as many larvae as possible and clean the wound.
- Apply topical insecticide to kill remaining larvae.
- Prophylactic treatment with long-acting insecticides.

Prevention and control

C. hominivorax (new world screw-worm fly) was eradicated from the southern United States and Mexico by treating wounds of all infected animals with insecticidal smears and releasing billions of sterile flies known in a program known as the Sterile Insect technique (SIT). Trials have shown that SIT can also be used to control *C. bezziana* (old world screw-worm fly), which poses the greater risk to Australia (Spradbery et al. 1989). Australia's response to screw-worm fly incursion would include initial suppression of screw-worm fly populations through a variety of management strategies, followed by SIT, the only proven method of eradication (Animal Health Australia 2007).

Surveillance and management

Surveillance for screw-worm fly is conducted through the Northern Australian Quarantine Strategy (NAQS) and the Ports Surveillance Program. These programs use sentinel animals, adult fly trapping and investigation of maggots from human cases as detection tools. Surveillance is also conducted at all northern export abattoirs and livestock export facilities. In wildlife, any cases of screw-worm myiasis would be captured as part of reporting for Australia's general wildlife and National Animal Health Surveillance Systems.

Screw-worm is included in AUSVETPLAN (Animal Health Australia 2007).

Statistics

Wildlife disease surveillance in Australia is coordinated by Wildlife Health Australia. The National Wildlife Health Information System (eWHIS) captures information from a variety of sources including Australian government agencies, zoo and wildlife parks, wildlife carers, universities and members of the public. Coordinators in each of Australia's States and Territories report monthly on significant wildlife cases identified in their jurisdictions. NOTE: access to information contained within the National Wildlife Health Information System dataset is by application. Please contact admin@wildlifehealthaustralia.com.au.

There are no cases of screw-worm myiasis listed in the National Wildlife Health Information System.

Research

Research is mainly involved in improving surveillance and control strategies for screw-worm fly for Australia (Hall et al. 2001; Rodriguez and Raphael 2008). A 2014 study found that surveillance for screw-worm fly at Australian sea ports could be improved (Fruean and East 2014). Given that it is likely that feral animal populations will be important hosts in the spread of screw-worm fly should it enter and establish in northern Australia, it is important that reasonable estimates of feral animal densities and distributions are determined for use in modelling and incursion response.

Human health implications

Screw-worm flies are considered zoonoses. Humans can be infected by the larvae of both species.

Conclusions

Screw-worm fly is a major cause of disease in warm blooded mammals around the world. Introduction of screw-worm fly into Australia could threaten the livestock industry and cause unknown levels of disease in native wildlife. It is important that animal health personnel are aware of the potential impact of screw-worm fly and it is included in the differential list for myiasis in both livestock and wildlife, especially in northern Australia. Accurate estimates of feral animal densities and distributions are required for northern Australia.

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