



TARGETED MYIASIS INSPECTION PROCEDURES

Screw-Worm Fly Surveillance And Preparedness Program

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INTRODUCTION

The Old World Screw-worm Fly (OWS) and New World Screw-worm Fly (NWS), *Chrysomya bezziana* and *Cochliomyia hominivorax* respectively, are exotic to Australia and suspicion of infestation in animals is notifiable under state and territory animal health legislation¹. The OWS and NSW are obligate parasites of warm-blooded animals including humans. They have similar biology and fill similar ecological niches in Africa and Asia, and the Americas respectively². The OWS is a significant production disease of livestock throughout its range and is considered a greater threat to Australian livestock industries than NWS due to the proximity of its distribution to Australia and traffic of livestock export vessels returning from Asia to Australian ports.

The screw-worm fly is attracted to wounds on injured animals to lay eggs. Their larvae can only develop in living tissue. In contrast, secondary myiasis is occasionally caused by other *Chrysomya* species endemic in Australia, for example the sheep blowfly. These flies do not normally infest fresh open wounds.

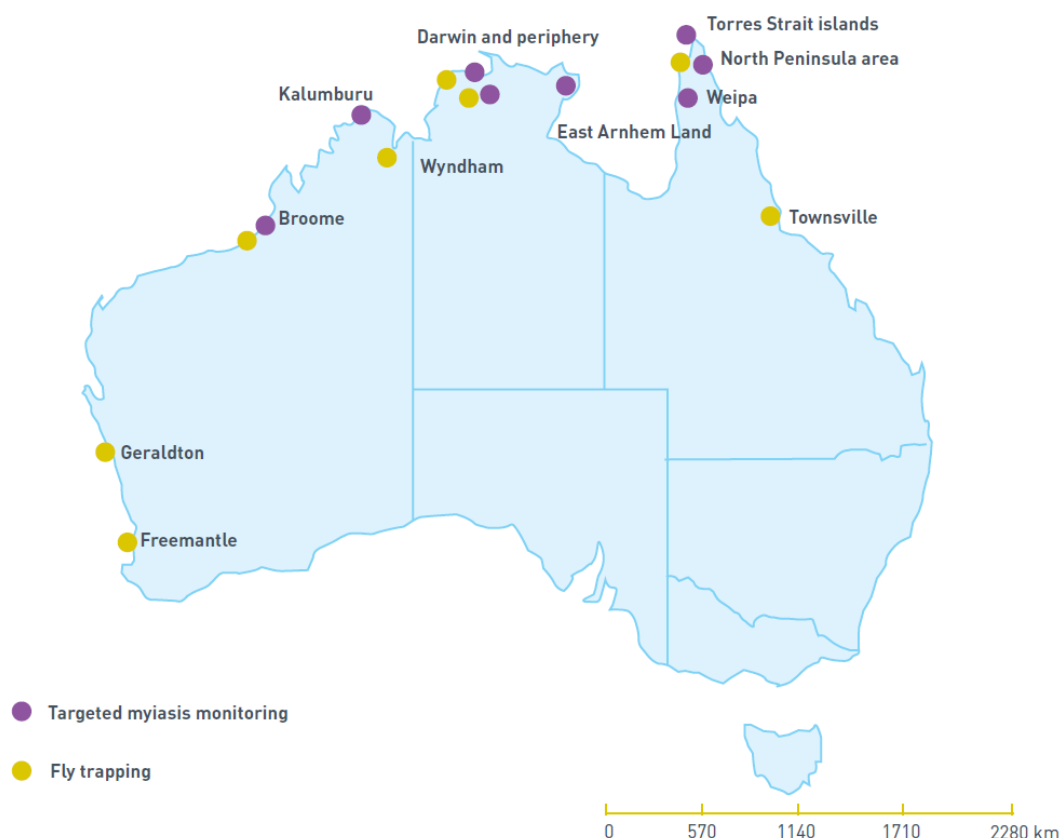


Figure 1 Map showing the location of targeted myiasis monitoring and fly trapping in the revised SWFSPP

¹ Australian Government Department of Agriculture, Fisheries and Forestry. National List of Notifiable Animal Diseases. 2019 [updated April 2019; cited November 2022]. Available from: <http://www.agriculture.gov.au/pests-diseases-weeds/animal/notifiable>.

² Spradbery P (1994). Screw-worm fly: a tale of two species. *Agric Zool Rev.* 1994; 6:1-62

Animal Health Australia (AHA) manages the Screw-worm Fly Surveillance and Preparedness Program in consultation with a committee of industry and government stakeholders. Surveillance is conducted by targeted fly trapping³ and livestock myiasis monitoring in cattle, in addition to unplanned investigation of myiasis in livestock and wildlife⁴. Surveillance is complemented by public awareness promotion of SWF in rural and coastal northern Australia. Surveillance activities are conducted at locations suitable for local OWS establishment following a potential incursion, in areas neighbouring livestock export ports and the Northern Peninsula Area. The purpose of surveillance is to detect and incursion of SWF sufficiently early to enable a successful eradication response.

Modelling has indicated that most of tropical northern Australia and part of the eastern seaboard offer a suitable climate for OWS survival, but extremes of temperature and moisture would limit survival in the south of Australia⁵. Feral animals would be important hosts in Australia as would livestock; targets for infestation being husbandry wounds, fighting induced wounds, tick bite wounds, and the navels of newborns. With large feral animal populations in the north, large numbers of both extensively and intensively reared livestock along the eastern seaboard, there is a significant possibility of screw-worm fly spreading widely if it managed to gain entry into Australia and establish.

Biosecurity practices and prompt recognition and reporting (Emergency Animal Disease Watch Hotline) of an incursion are critical to Australia's preparation for screw-worm fly and other exotic diseases and pests. Further information on the screw-worm fly program is available on the Animal Health Australia web site⁶.

³ Reported in Animal Health Surveillance Quarterly, Quarterly Statistics, Screw-worm Fly Surveillance and Preparedness Program.

⁴ Reported in Animal Health Surveillance Quarterly, Quarterly Statistics, Investigations for suspected national notifiable animal diseases.

⁵ Beckett S. Review of Risk of Entry of Old World Screw-Worm Fly into Australia and Surveillance Requirements. Canberra: Animal Health Australia; 2014. 211 p.

⁶ Animal Health Australia. Screw-worm Fly Program. 2021 [updated 2022; cited 2022]. Available from: <http://www.animalhealthaustralia.com.au/SWF>.

PURPOSE

The purpose of this document is to guide the inspection of livestock for screw-worm fly myiasis in order to support a higher degree of confidence in the absence of SWF in areas at higher risk.

SCOPE

This procedures document has been produced by AHA for the distribution and use by the state and territory governments in the surveillance of screw-worm fly myiasis. Permission is permitted to adapt document to include state and territory logos, artwork location-specific information where appropriate.

DEFINITIONS

WORD	DEFINITION
Manually clean inspection:	A manual inspection done by a stock inspector or approved person that satisfies the stock inspector or approved person that all of the stock are free of myiasis.
Positive inspection:	A positive inspection is one where one or more live fly larvae or eggs are detected on one or more animals in the group being inspected.
Visually clean inspection:	A visual inspection of all stock in a consignment by an inspector or approved person during which no evidence of myiasis is detected.

RESOURCES & EQUIPMENT

AHA periodically prepare maggot collection kits. Kits are available through the jurisdictional/agency coordinators and a check of requirements is undertaken as part of the SWFSPP Steering Committee Annual Meeting. The collection kit consists of:

- Examination gloves
- 2x 5ml specimen jars each with 2ml of 80% ethanol or pre-packaged alcohol-based hand sanitiser
- Tweezers
- Absorbent material (paper towel)
- 1 small and 1 large zip lock bag
- Padded mailing bag pre-addressed with Reply Paid address to NT/Qld/WA laboratories
- Brochure with instructions⁷
- Specimen advice form.



Figure 2 Contents of the maggot collection kit

In addition to this it is advisable to have facilities to safely inspect livestock and have a pen and paper available.

⁷ Animal Health Australia. Screw-worm Fly Program. 2021 [updated 2022; cited 2022]. Available from: <http://www.animalhealthaustralia.com.au/SWF>.

INSPECTION

The number of animals required for inspection at a monitoring site depends on the proportion wounded.^{8,9} More or fewer animals need to be inspected if the wounding rate is less or more respectively.

Table 1 Sampling requirements for 95% confidence

Herd size	Sampling method
Less than 300	Every animal in a race
Greater than 300, less than 1,000	Every second animal in a race
Greater than 1,000	Every third animal in a race

- 1) Ensure the animals are adequately restrained for inspection.
- 2) Examine the animal looking for evidence of wounding, castration, dehorning etc.
- 3) Commence inspection at head and work towards the rear of the animal.
- 4) In neonatal animals pay particular attention to the umbilicus.
- 5) After examining one side, repeat the procedure on the other side.

COLLECTION OF SAMPLES

- 1) If an open wound is detected, it should be examined for evidence of myiasis.
- 2) Myiasis may include eggs or larvae of any fly species.
- 3) Samples of up to 10 larvae, of different sizes where possible, should be collected and placed in a specimen jar in alcohol-based hand sanitiser or 80% ethanol and submitted to your government animal health laboratory for identification.
- 4) Label samples with the date collected, premise name and submitter name, animal number and Property Identification Code (PIC).
- 5) Send the sample with the completed documentation to your laboratory
- 6) Further general information about laboratory submission is available via the laboratory website.

⁸ Annually, 500 animals need to be inspected if the wounding rate is 11%. Note that members of the Steering Committee have observed that wounding rates are lower than 11%.

⁹ Urech et al. 2013 as in Beckett S. 2014. Review of Risk of Entry of Old World Screw-Worm Fly into Australia and Surveillance Requirements. Canberra: Animal Health Australia

REPORTING

The following data must be permanently recorded and are required for reporting targeted myiasis inspection results into the National Animal Health Information System. An inspection record sheet is provided at Appendix A.

Field	Description
Site description	As per NAHIS SWF reporting template. Specific site and general location of inspection
Inspector	Name of inspector
Inspection date	Date myiasis inspection was conducted
Animal Type	Choose from: buffalo, camel, cattle, donkey, goat, horse, pig, sheep
Animal source	Choose from: abattoir, export, sentinel, survey, other
Number inspected	Number of animals inspected as per protocol
Number wounded	Number of animals with wounds
Number positive	Number of wounded animals that have myiasis based on visual inspection
Number sampled	Number of wounded animals with myiasis that are sampled and results.

If SWF is identified by the agency laboratory, the jurisdictional CVO must notify the Australian CVO and samples must be submitted to ACDP for definitive identification.

The outcome of the laboratory investigation must be permanently recorded.

Quarterly reports must be entered into the NAHIS database by the state/territory program coordinator as per the following schedule.

Quarter	Due Date
January – March	End of week 1, May
April – June	End of week 1, August
July – September	End of week 1, November
October – December	End of week 1, February

ROLES AND RESPONSIBILITIES

Roles	Responsibilities
State/Territory Program Coordinator	• Specification of inspection sites and inspection frequency • Verification and review of procedures • Reporting results of targeted myiasis inspections to the National Animal Health Information System • Coordinate inspection and entomology schedule • Provision of sample collection materials • Receive and process inspection record sheets • Supervise targeted myiasis inspections conducted
State/Government Field Officer	• Completion and sending of Targeted Myiasis Inspection record sheet • Packaging and sending of samples to the laboratory
State/Territory Government Entomologist	• Exclusion detection of SWF • Completion of identification records

APPENDIX 1: INSPECTION RECORD SHEET

Please print and use one record sheet per inspection site and/or per animal type inspected

Inspector name		Inspection date	
Site description		Site location	
Animal type inspected		Animal source (please tick) ☐ Abattoir ☐ Export ☐ Survey ☐ Sentinel ☐ Other	
Number of animals inspected			
Number wounded	Number with myiasis	Number of animals sampled	
Comments			

APPENDIX 2: TARGETED MYIASIS INSPECTION SITES

Site Description	Agency	Site Code
NT: Adelaide River - Bridge Creek Export Yards (BCEY)	NT	BCEY
NT: Adelaide River area - Mount Bunday Station (MTBS)	NT	MTBS
NT: Arnhem Land - Gunbalanya (T121)	NT	T121
NT: Beatrice Hill - CPRS (108)	NT	108
NT: BERRIMAH - BARC (190)	NT	190
NT: BERRIMAH - BARC2 (T028)	NT	T028
NT: Daly River - Douglas Daly R S (107)	NT	107
NT: Darwin periphery - Berrimah Export Yards (BEY)	NT	BEY
NT: Darwin periphery - Cedar Park Export Yards (CPEY)	NT	CPEY
NT: Darwin periphery - Coomalie Holding Depot (COOM)	NT	COOM
NT: Darwin periphery - Glenluckie Park (formerly Albany Park) (GLEN)	NT	GLEN
NT: Darwin periphery - Melaleuca Station (MLST)	NT	MLST
NT: Darwin periphery - Noonamah Export Yards (NEY)	NT	NEY
NT: Darwin periphery - Santavan Export Yards (SEY)	NT	SEY
NT: Darwin Rural Area - Feral Goat stud (FGST)	NT	FGST
NT: Douglas Daly District - Douglas Station (T122)	NT	T122
NT: East Arnhem - Garrithiya Station (T080)	NT	T080
NT: Flood Plain - Swim Creek Station (SWCK)	NT	SWCK
Qld: Coen - Merapah (Q295)	Qld	Q295
Qld: Coen - Wolverton Station (Q380)	Qld	Q380
Qld: Northern Peninsula Area - Bamaga (BAMA)	Qld	BAMA
Qld: Northern Peninsula Area - Injinoo (INJI)	Qld	INJI
Qld: Northern Peninsula Area - New Mapoo (NMAP)	Qld	NMAP
Qld: Northern Peninsula Area - Seisia (SEIS)	Qld	SEIS
Qld: Northern Peninsula Area - Umagico (UMAG)	Qld	UMAG
Qld: Seisia - Seisia Meatworks (Q335)	Qld	Q335
Qld: Torres Strait Communities - Badu Island (BADU)	Qld	BADU
Qld: Torres Strait Communities - Boigu Island (BOIG)	Qld	BOIG
Qld: Torres Strait Communities - Dauan Island (DAUA)	Qld	DAUA
Qld: Torres Strait Communities - Erub (Darnley Island) (ERUB)	Qld	ERUB
Qld: Torres Strait Communities - Friday Island (FRID)	Qld	FRID
Qld: Torres Strait Communities - Hammond Island (HAMM)	Qld	HAMM
Qld: Torres Strait Communities - Horn Island (HORN)	Qld	HORN
Qld: Torres Strait Communities - Iama (Yama Island) (IAMA)	Qld	IAMA
Qld: Torres Strait Communities - Igab Island (Marsden islet) (IGAB)	Qld	IGAB
Qld: Torres Strait Communities - Kubin (Moa Island) (KUBI)	Qld	KUBI
Qld: Torres Strait Communities - Mabuiag Island (MABU)	Qld	MABU
Qld: Torres Strait Communities - Masig (Yorke Island) (MASI)	Qld	MASI

Qld: Torres Strait Communities - Mer (Murray Island) (MERI)	Qld	MERI
Qld: Torres Strait Communities - Muralug (Prince of Wales Island) (MURA)	Qld	MURA
Qld: Torres Strait Communities - Ngurupai (Horn Island) (NGUR)	Qld	NGUR
Qld: Torres Strait Communities - Poruma (Coconut Island) (PORU)	Qld	PORU
Qld: Torres Strait Communities - Saibai Island (SAIB)	Qld	SAIB
Qld: Torres Strait Communities - St Pauls (Moa Island) (SPAU)	Qld	SPAU
Qld: Torres Strait Communities - Thursday Island (THUR)	Qld	THUR
Qld: Torres Strait Communities - Ugar (Stephen Island) (UGAR)	Qld	UGAR
Qld: Torres Strait Communities - Warraber (Sue Island) (WARR)	Qld	WARR
Qld: Weipa - Bertiehaugh (Q379)	Qld	Q379
Qld: Weipa - York Downs (Q145)	Qld	Q145
WA: Broome - Broome Common (W131)	WA	W131
WA: Kalumburu - Kalumburu Mission (W012)	WA	W012

APPENDIX 3: LABORATORY DETAILS

Western Australia	Northern Territory	Queensland
DPIRD Diagnostics and Laboratory Services Delivery address: DPIRD Diagnostics and Laboratory Services DDLS, Interim Lab, Building 102, 3 Baron-Hay Court, South Perth, WA, 6151	Berrimah Veterinary Laboratory, Delivery address: Department of Industry, Tourism and Trade Berrimah Veterinary Laboratory 29 Makagon Rd Berrimah, NT, 0828	Biosecurity Sciences Laboratory Delivery Address: Specimen Receipt (Loading Dock 12) Biosecurity Sciences Laboratory Health and Food Science Precinct 39 Kessels Road Coopers Plains, Qld, 4108
Phone: (08) 9368 3351 Email: DDLS@dprid.wa.gov.au	Phone: (08) 8999 2249 Fax: (08) 8999 2024 Email: bvl@nt.gov.au	Phone: (07) 3708 8762 Fax: (07) 3708 8860 Email: bslclo@daf.qld.gov.au



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