

**BE VECTOR
AWARE**



MOSQUITO

MANAGEMENT

FOR HORSES

Integrated Mosquito
(vector) Management
Principles for Horses





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This management guide was developed in May 2022 by the Japanese Encephalitis vector management group (horses) – consisting of representatives from agriculture and health agencies, and the horse industry.



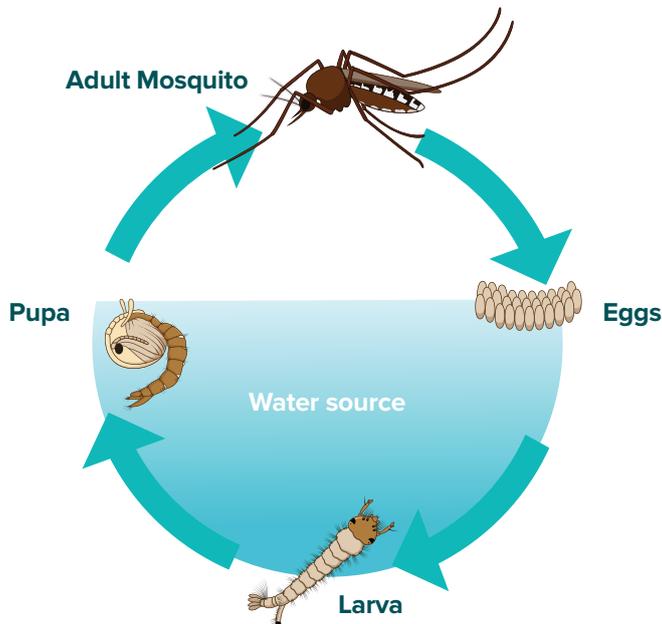
INTEGRATED

MOSQUITO (VECTOR)

MANAGEMENT PRINCIPLES

FOR HORSES

Mosquito Life Cycle



Management of mosquitoes is recommended because they bite and transmit diseases.

On farm, and in stable, mosquito management that targets adult mosquitoes is not effective or sustainable.

An effective mosquito management program targets all stages of the mosquito life cycle using a combination of methods. This is called integrated mosquito management.

Integrated mosquito management is the best way to reduce mosquitoes to protect people and horses.

It involves a combination of:

1. Environmental management to reduce breeding and resting sites both inside and outside
2. Larviciding
3. Adultciding
4. Ongoing monitoring and surveillance
5. Record keeping



MOSQUITOES

Adult (Culex annulirostris)



Adult mosquitoes are most active at dawn, dusk, and into the evening but can also be active during the day.



Eggs (Culex annulirostris)

Mosquito eggs are laid on or around any source of fresh, waste or stagnant standing water in natural or constructed places including:

- Ponds
- Dams
- Water troughs
- Automatic waterers
- Rainwater or septic tanks
- Tires
- Old drums
- Farm equipment
- Roof gutters
- Buckets
- Puddles
- Creeks
- Ditches
- Marshy areas

- When they hatch, larval mosquitoes, known as wrigglers, live in the water where they hatched and can complete their development and emerge as adults within 7-10 days.
- Adult mosquitoes prefer sheltered, cool, and dark places to rest, and tend to be on the underside of objects or plant foliage to avoid getting wet.
- Adult mosquitoes generally don't live longer than 3 weeks but will bite and blood feed every 3-4 days.
- During their life adult mosquitoes may travel up to 5km from where they hatched.

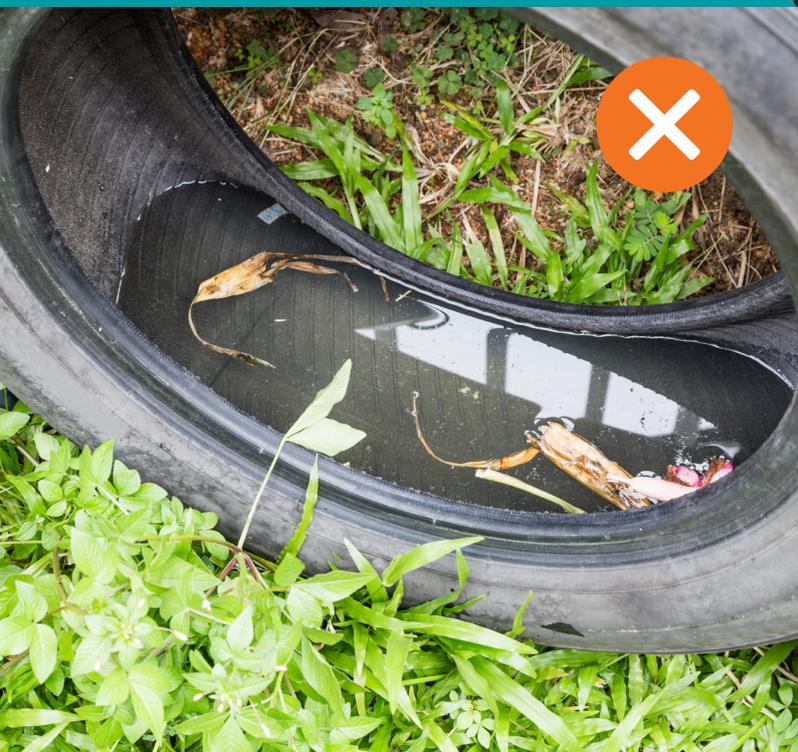


Larvae (Culex annulirostris)

Photos: Stephen Doggett

ENVIRONMENTAL

MANAGEMENT



- Reduce standing water sources in vessels from uncovered areas that have potential to hold water e.g. equipment, tyres, drums, buckets.
- Fill potholes or other areas that collect water around the farm, stable block or anywhere your horse spends time regularly that collects water.
- Ensure gutters, downpipes, and drains around buildings are free flowing and clear of debris that creates pooling water. Trim overhanging branches.

- Ensure effluent drainage is free flowing, flushed regularly and does not pool.
- Where practical seal uncovered water storage such as tanks or other large containers, or screen with 1mm mesh.
- Reduce vegetation around stables and ponded areas to minimise areas where adult mosquitoes can congregate.
- Ensure all window screens and screen doors are covered by well-maintained mosquito-proof screens.



CHEMICAL

MANAGEMENT

Chemical use for mosquito control should be conducted by people authorised to use chemicals in accordance with state/territory training and licensing requirements.

Wash bays and surrounds can hold stagnant water so ensure drains are free flowing when washing your horse.



- **Always** use chemicals **strictly** as per the product label or permit to protect horses, people and the environment.
- **Seek professional advice** if you are unsure about how to use a chemical.
- Preferably use a **licensed pest control operator**.
- **Keep records** of pest control activities on your property and around your stables.
- **Restrict** chemical use strictly to areas requiring treatment. **AND Unless products are registered for direct application, limit to surfaces which cannot be accessed by horses.**

- Restraints on the use of some mosquito insecticides on horses intended for human consumption **must be complied with**.
- The following guidance provides recommendations for products that are registered for use around horses. Product lists are not exhaustive.
- **Always** ensure you read and comply with product labels and directions for use.



LARVICIDE TREATMENT IN WATER



Location

Waste-water structures around stables

e.g. drains, septic tanks, retention tanks, ponds, basins



Treatment

Frequency and Timing

Reapply as per the label or permit instructions.

Products

- **Vectolex WG Biological Larvicide Water Dispersible Granule** (APVMA #55919; active ingredient Bacillus sphaericus)
<https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=55919>
- **Vectobac WG Biological Larvicide Water Dispersible Granule** (APVMA #52642; active ingredient Bacillus thuringiensis subsp. Israelensis)
<https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=52642>
- **Aquatain AMF Liquid Mosquito Film via APVMA Permit**
<https://permits.apvma.gov.au/PER92210.PDF>
- **Various (S)-Methoprene Larvicides via APVMA Permit**
<https://permits.apvma.gov.au/PER92209.PDF>

Release of water treated with Methoprene:

- Release of treated water off-farm involves a duty of care to consider environmental consequences.
- No retention period is required for the release of treated water off-farm when using solid methoprene formulations as these release methoprene over an extended period and concentrations are expected to remain below the ANZECC guidance value of 0.2 µg/L.

When using liquid formulations the following periods should be considered prior to releasing treated water off-farm:

Average Water Depth	Retention Period
20cm	14 days
40cm	7 days
60cm	4 days
80cm	2 days
100cm	1 day

LARVICIDE TREATMENT IN WATER

 Location	 Treatment
Natural wetlands, water bodies and floodwaters on your property	<p>Frequency and Timing Reapply as per the label or permit instructions.</p> <p>Products Use products that have no withholding period for livestock drinking treated water.</p> <ul style="list-style-type: none">• Prolink Liquid Larvicide Mosquito Growth Regulator (APVMA #58063; active ingredient 50g/L s-methoprene) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=58063• VectoPrime FG Biological Larvicide Fine Granule (APVMA #82315; active ingredient 1g/kg s-methoprene, 400ITU/mg Bacillus thuringiensis) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=82315• Vectobac WG Biological Larvicide Water Dispersible Granule (APVMA #52642; active ingredient bacillus thuringiensis subsp. Israelensis) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=52642• Culithor Granular Mosquito Growth Regulator (APVMA #69802; active ingredient 12g/kg s-methoprene) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=82315• Biopren 50 Liquid Mosquito Larvicide (APVMA #62020; active ingredient 50g/L s-methoprene) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=62020• Biopren 4GR Mosquito Larvicide (APVMA #62018; active ingredient 4g/kg s-methoprene) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=62018• Aquatain AMF Liquid Mosquito Film via APVMA Permit https://permits.apvma.gov.au/PER92210.PDF <p>Release of water treated with Methoprene: See above for water retention periods prior to off farm release.</p>

LARVACIDE TREATMENT IN WATER

 Location	 Treatment
<p>Open constructed water storage where water sits for more than 8 days without being disturbed</p> <p>e.g. open water tanks, troughs, portable waters for human or livestock consumption</p>	<p>Preferably seal open water storage sources such as tanks, or screen with 1mm mesh.</p> <p>If not possible to seal, manage water flow so that the same water does not sit undisturbed for more than 8 days.</p> <p>Frequency and Timing</p> <p>Reapply as per the label or permit.</p> <p>Products</p> <ul style="list-style-type: none">• Aquatain AMF Liquid Mosquito Film https://permits.apvma.gov.au/PER92210.PDF• Various (S)-Methoprene Larvicides via APVMA Permit https://permits.apvma.gov.au/PER92209.PDF <p>Release of water treated with Methoprene:</p> <ul style="list-style-type: none">• No retention period is required for the release of treated potable waters for human or livestock consumption.

RESIDUAL TREATMENT FOR ADULT MOSQUITO CONTROL IN AND AROUND HORSE STABLES AND INFRASTRUCTURE

 Location	 Treatment
<p>Residual coarse spray treatment of animal housing</p> <p>e.g. solid exterior walls, eaves, boot change areas, workshops, and other cool, dark areas outside areas where horses are housed or handled</p>	<p>Frequency and Timing</p> <p>High infestation – apply weekly.</p> <p>Medium to Low infestation – one treatment then as required pending surveillance of adult mosquito activity.</p> <p>Products</p> <p>Use products that include label directions for use in and around agricultural/farm buildings or animal housing. e.g.</p> <ul style="list-style-type: none">• Fendona Plus 60 SC Insecticide (APVMA #80739; active ingredient 60g/L cypermethrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=80739• Prolong Ultra Fly and Litter Beetle Insecticid (APVMA #66483; active ingredient 25g/L betacyfluthrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=66483• Solfac Duo Residual Insecticide (APVMA #68410; active ingredient 50g/L imidacloprid, 25g/L betacyfluthrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=68410• Seclira WSG Insecticide (APVMA #83011; active ingredient dinotefuran 400g/kg) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=83011

RESIDUAL TREATMENT FOR ADULT MOSQUITO CONTROL IN AND AROUND STAFF FACILITIES

 Location	 Treatment
<p>Residual coarse spray treatment of animal housing</p> <p>e.g. solid exterior walls, eaves, boot change areas, workshops, and other cool, dark areas outside areas where horses are housed or handled</p>	<p>It is recommended that licensed pest control operators are engaged to treat these areas.</p> <p>Frequency and Timing</p> <p>High infestation – weekly. Medium to Low infestation – one treatment then as required pending surveillance of adult mosquito activity.</p> <p>Products</p> <p>Use products that include label directions for use in and around agricultural/farm buildings or animal housing, e.g.</p> <ul style="list-style-type: none">• Fendona Plus 60 SC Insecticide (APVMA #80739; active ingredient 60g/L cypermethrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=80739• Prolong Ultra Fly and Litter Beetle Insecticide (APVMA #66483; active ingredient 25g/L betacyfluthrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=66483• Solfac Duo Residual Insecticide (APVMA #68410; active ingredient 50g/L imidacloprid, 25g/L betacyfluthrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=68410• Seclira WSG Insecticide (APVMA #83011; active ingredient dinotefuran 400g/kg) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=83011

RESIDUAL TREATMENT FOR ADULT MOSQUITO CONTROL IN AND AROUND STAFF FACILITIES

 Location	 Treatment
<p>Controlled release devices for staff facilities away from food or food preparation areas and areas where horses are stabled or handled e.g. toilet/shower facilities, office areas</p>	<p>Frequency and Timing Plug in or install as directed and leave in place. Service as directed on label.</p> <p>Products These are consumer products available from retail outlets or can be supplied and installed by pest control operators. Other brands are suitable too.</p> <ul style="list-style-type: none"> <p>Mortein Mozzie Zapper & Fly Control (APVMA #64992; active ingredient 7.13g/L transfluthrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=64992</p> <p>Mortein Odourless Mozzie Zapper 30 Nights Protection Low Irritant (APVMA # 50749; active ingredient 44.0/L Allethrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=50749</p> <p>Mortein Powergard The Expert's Multi-Insect Automatic Spray Odourless Indoor & Outdoor (APVMA # 69866; active ingredients: 8.0g/kg permethrin 6.0g/kg transfluthrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=69866</p> <p>OUTDOOR USE ONLY – Thermacell Zone Mosquito Repellent (APVMA # 89453; active ingredients: METOFLUTHRIN 43.8g/L) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=89453</p>

FOGGING FOR ADULT MOSQUITO CONTROL OUTSIDE STABLES AND FARMING INFRASTRUCTURE

 Location	 Treatment
<p>Fogging OUTSIDE stables and other farming infrastructure</p>	<p>There is significant risk of off-target impacts associated with fogging applications, due to the potential for fine droplets and mist to drift while airborne. Some chemicals formulated for fogging can persist in animal tissues and the environment. This represents a degree of trade and environmental risk. Particular care is recommended if fogging insecticides which contain deltamethrin, cypermethrin, bifenthrin or dinotefuran.</p> <p>Frequency and Timing</p> <p>High infestation incidence of mosquito borne diseases – daily treatments. Apply early in the morning before temperature starts to rise.</p> <p>Medium to Low infestation – weekly treatment pending surveillance for adult mosquitoes. Apply early in the morning before temperature starts to rise.</p> <p>Products</p> <p>Use products have no withholding period when applied as directed to outside areas associated with animal production e.g.</p> <ul style="list-style-type: none"> • Py-Bo (Scintex) Natural Pyrethrum Insecticidal Concentrate (APVMA #53738; active ingredient 320g/L piperonyl butoxide, 80g/L pyrethrins) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=53738 • Py-Omni Insecticide with Natural Pyrethrum (APVMA #65321; active ingredient 160g/L piperonyl butoxide, 40g/L pyrethrins) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=65321 • Py-Zap Insecticide with Natural Pyrethrum (APVMA #60610; active ingredient 160g/L piperonyl butoxide, 40g/L pyrethrins) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=60610 • Pyrate Natural Insecticide (APVMA #88596; active ingredient 160g/L piperonyl butoxide, 40g/L pyrethrins) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=88596 • Pyzap Insecticide (APVMA #61779; active ingredient 160g/L piperonyl butoxide, 40g/L pyrethrins) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=61779 • PROFESSIONAL USE ONLY – Stryker Insecticide (APVMA #87533; active ingredient 590g/L piperonyl butoxide, 60g/L pyrethrins) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=87533

CONTROLLING ADULT MOSQUITOES AROUND PEOPLE, HORSES, HORSE RUGS, STABLE NETTING AND FABRIC

 Location	 Treatment
People	<p>Wear loose-fitting, long-sleeved shirt with long pants, and covered shoes.</p> <p>Use registered repellents that contain diethyltoluamide (DEET), picaridin, or oil of lemon eucalyptus.</p> <p>Apply insect repellent on all exposed skin during your workday.</p> <p>Read the label for reapplication interval.</p>
Horses	<p>Frequency and Timing</p> <p>Refer to individual product labels for frequency. If irritation occurs discontinue use and seek the advice of a veterinary practitioner.</p> <p>Products</p> <p>The following product may be applied to horses.</p> <ul style="list-style-type: none"> • Flyscreen Pour-On Insecticide for Horses (APVMA #90589; active ingredients 87g/J permethrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=90589 • Absorbine ULTRASHIELD Insecticide & Repellent Ready for Use Spray for Horses (APVMA #86134; active ingredients 10g/L piperonyl butoxide, 5g/L permethrin, 1g/L pyrethrin) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=86134 • Shield 40MG/ML Pour-On Solution for Horses (APVMA #64870; active ingredients 40g/L permethrin, 925 g/L diethylene glycol monobutyl ether) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=64870 • David Kuritch Assists in the control of Allergic Skin Conditions in Horses caused by Insect Bites (APVMA #41235; active ingredients 89g/L citronella oil, 51g/L diethyltoluamide) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=41235 • Troy Repel-X Insecticidal and Repellent Spray (APVMA #52274; active ingredients 20g/L diethyltoluamide, 5g/L citronella, 2g/L pyrethrins, 8g/L piperonyl butoxide) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=52274 <p>Seek veterinary advice before applying any other product directly to horses.</p>

CONTROLLING ADULT MOSQUITOES AROUND PEOPLE, HORSES, HORSE RUGS, STABLE NETTING AND FABRIC

Location	Treatment
Horse rugs, fabric and/or netting treatments	<p>Products</p> <p>The following products may be used to treat horse rugs, fabric and/or netting.</p> <ul style="list-style-type: none">• Perigen Defence Residual Insecticide (APVMA #57184; active ingredients 500g/L permethrin, 342 g/L hydrocarbon liquid) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=57184• EnviroMax Permethrin 500EC Residual Insecticide (APVMA #63598; active ingredients 500g/L permethrin, 457g/L liquid hydrocarbon) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=63598• Permethor Shield Liquid Insecticide (APVMA #87254; active ingredients 500g/L permethrin, 361g/L hydrocarbon liquid) https://websvr.infopest.com.au/LabelRouter?LabelType=L&Mode=1&ProductCode=87254 <p>Horse rugs pre-treated with insecticides may be commercially available. These pre-treated horse rugs making a claim of efficacy require approval by the APVMA. Check products for the APVMA approval number before purchasing.</p>

For more information call the national
Emergency Animal Disease Watch Hotline
on **1800 675 888**.

EMERGENCY ANIMAL
DISEASE WATCH HOTLINE
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