African horse sickness

Guidelines for the practical control of viral transmission through reducing vector-host contact in the Asian context

John Grewar
Consultant

26 January 2023

World Organisation for Animal Health
Founded as OIE

Organisation mondiale de la santé animale
Fondée en tant qu'OIE

Organización Mundial de Sanidad Animal
Fundada como OIE

Index

Introduction and Context

Introduction

- AHS (AHSV) is transmitted by vectors – *Culicoides* biting midges
- Main host – Domestic horse
- Other hosts – Zebra and donkeys
- 2020 – Thailand outbreak: first incursion into Asia

vector

refers to *Culicoides* midges that transmit African horse sickness virus from infected to susceptible equines. The virus does replicate in the midge.

Introduction

- Manual: practical options for the control of AHSV transmission by decreasing contact between the *Culicoides* vector and the equine host
- Control measures reduce risk but…
  - Form part of an integrated control program
    - Vaccination
    - Zoning
    - Movement control

Culicoides midges in the Asian context

- Competent vectors occur in Asia
- Lack of information in general regarding species distributions and importance in AHS transmission
- Vector surveillance will assist in deciding on specific control measures and vector ecology impacts control

WOAH Legislative framework

CHAPTER 1.4.

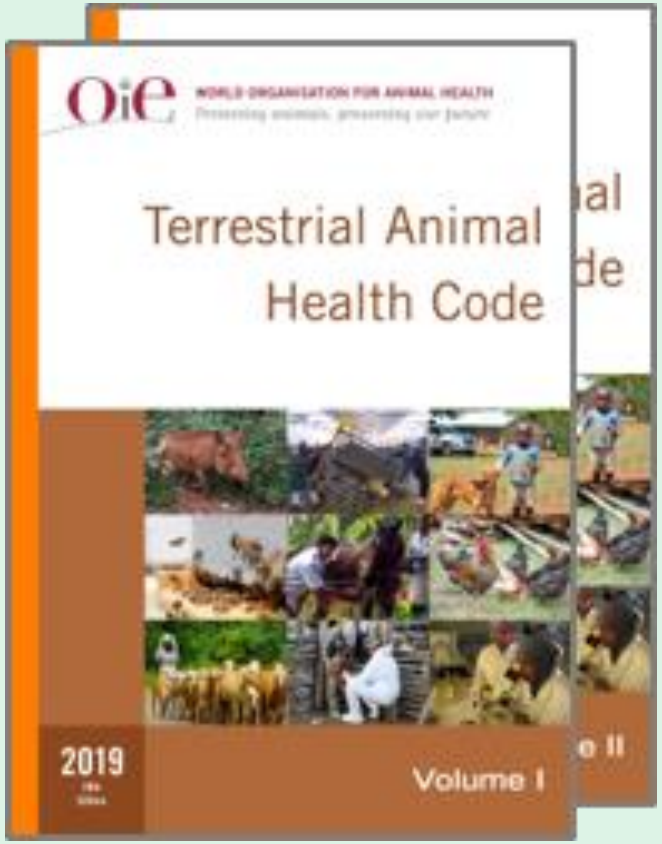
ANIMAL HEALTH SURVEILLANCE

CHAPTER 1.5.

SURVEILLANCE FOR ARTHROPOD VECTORS OF ANIMAL DISEASES

CHAPTER 12.1.

INFECTION WITH AFRICAN HORSE SICKNESS VIRUS



Mechanisms for Control

Framework

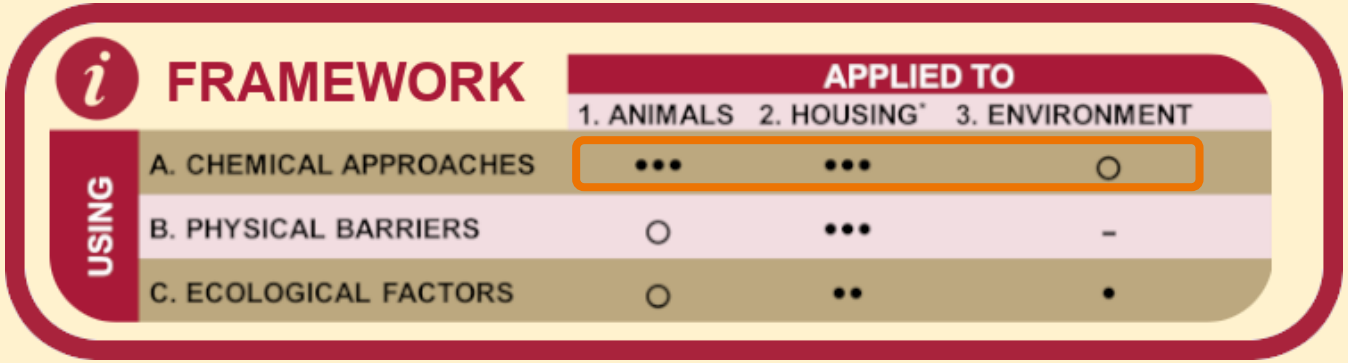
1. Chemical means of control
2. Physical barriers assisting control
3. Ecological and biological factors that supplement control

Framework

		APPLIED TO		
		1. ANIMALS	2. HOUSING*	3. ENVIRONMENT
USING	A. CHEMICAL APPROACHES	●●●	●●●	○
	B. PHYSICAL BARRIERS	○	●●●	–
	C. ECOLOGICAL FACTORS	○	●●	●

●●●	**Beneficial and main means of control**
●●	**Useful and should be considered alongside primary means**
●	**Might be useful and should be considered if feasible**
○	**Unknown benefits and unlikely to be feasible/useful**
-	**No established/conclusive benefits/mechanisms of control**
*	**includes housing/holding facilities and transport vehicles**

Chemical means of control



FRAMEWORK	APPLIED TO		
USING	1. ANIMALS	2. HOUSING*	3. ENVIRONMENT
A. CHEMICAL APPROACHES	•••	•••	○
B. PHYSICAL BARRIERS	○	•••	-
C. ECOLOGICAL FACTORS	○	••	•

Chemical application on animals

Chemical mechanisms for use in structures housing equids

Chemical control of midges in the environment

Chemical application on animals

•••

- Cost effective, easy
- Works by decreasing contact between midges and equines
- Repellent
  - Prevent midges biting equines
- Insecticidal
  - Kills midges after feeding

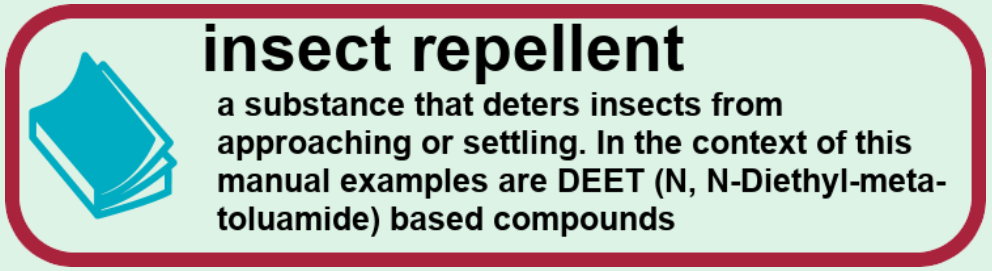
Ideally daily application of a registered topical insect repellent & insecticide on equines

Applying a topical diethyltoluamide-based insect repellent to a horse
(source: Camilla Weyer)

Chemical application on animals

•••

- Repellents
  - Often DEET at ~ < 15% concentration
  - Generally apply at least daily
    - Check for allergy
  - Citronella, kerosene or liquid paraffin not shown to be effective



Chemical application on animals

•••

- Insecticides
  - Most often a pyrethroid product – cypermethrin
  - Preferred landing/feeding sites unknown so animal coverage important
  - Systemic (in-animal) treatments (avermectins) in equines may be effective but requires environmental/consequence assessment due to contamination/resistance

insecticide

a substance used for killing insects. In the context of this manual likely to be a pyrethroid based compound, and typically cypermethrin, a synthetic pyrethroid

Chemical mechanisms for use in structures housing equids

●●●

- Insecticidal (pyrethroids)
- Course spray on surfaces and netting
- Safety must be established for equines housed in facility

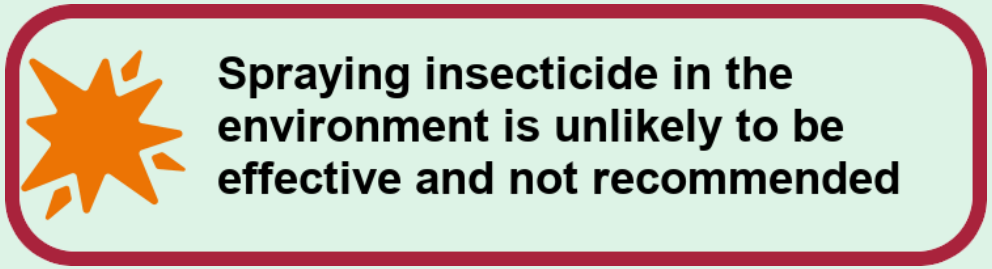
Insecticidal use (ideally daily) on surfaces and netting provides a residual control effect

Spraying insecticide on the netting protecting a stable
(source: Cambodia Pony Welfare Organisation in association with World Horse Welfare)

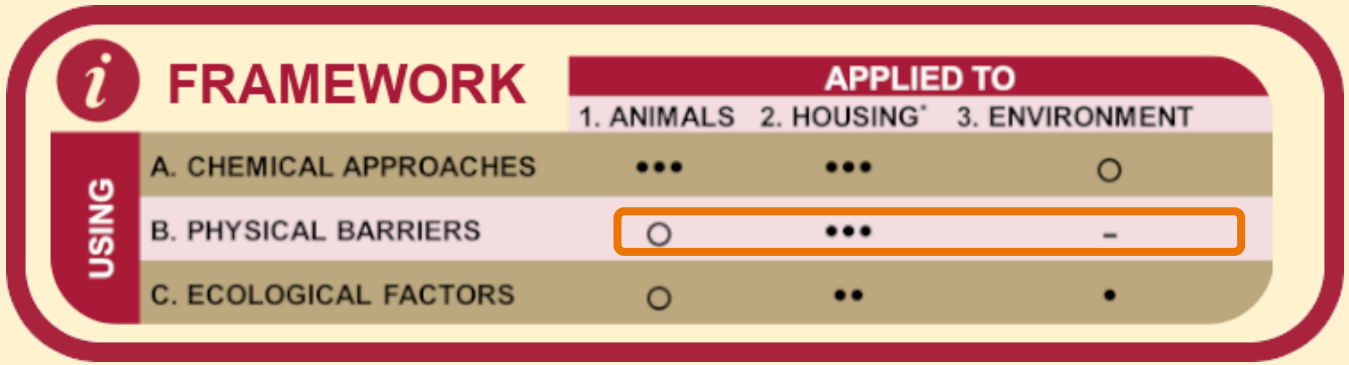
- Residual effect differs but daily application advised
- Organophosphate products not advised
- Automatic dispensers can be used inside facilities

Chemical control of midges in the environment

- Environmental spraying (ultra-low volume fogs) using pyrethroids or organophosphates
- Can lead to environmental contamination/chemical resistance and safety concerns
  - Aquaculture (incl. fish)
  - Cats
- Mosquito control ≠ Midge control



Physical barriers assisting control



FRAMEWORK		APPLIED TO		
		1. ANIMALS	2. HOUSING*	3. ENVIRONMENT
USING	A. CHEMICAL APPROACHES	•••	•••	○
	B. PHYSICAL BARRIERS	○	•••	–
	C. ECOLOGICAL FACTORS	○	••	•

Physical barriers to midges on animals

Physical barriers to midges in housing structures, including transportation vehicles

Physical barriers to midges in the environment

Physical barriers to midges on animals

- Preferred landing sites not well defined
- Lack of research makes this difficult to justify
- For owners that want to, this can be an option though

Physical barriers to midges in housing structures, including transportation vehicles

...

- Very feasible and effective
- Any stabling is generally considered worthwhile

If feasible cover stables with appropriate netting and treat netting and housing/transport structures with residual insecticide daily to increase protection

Example of a double door added to an existing stable (source: SAEHP NPC)

- Use of netting (1.6 mm^2) reduces entry
- Adding insecticide to netting further benefits
- Double door system advantageous
- Sealing any small holes in structures with foam/silicone

Physical barriers to midges in housing structures, including transportation vehicles

●●●

- Adding physical barriers can impact ventilation so always bear the welfare of equines in mind
  - Fans/Air-con
    - Wind and positive pressure further benefit
      - Monitor for distress in housed animals
- Chemical spray on netting may decrease ventilation further (dust build-up)

Physical barriers can impact ventilation and measures may be needed to maintain the welfare of equids

Stable-associated measures like double-door entry/exit, automated insecticide dispensers, midge traps and positive pressure are other options to consider

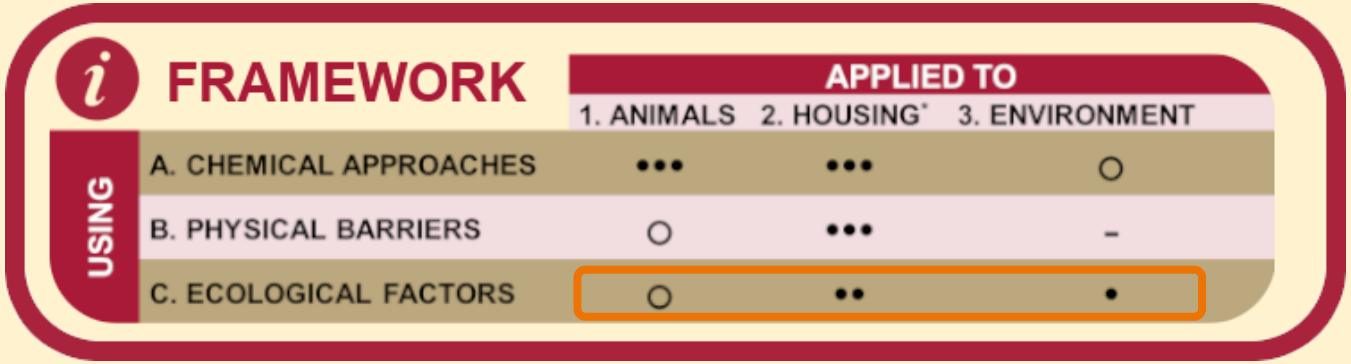
Use of fans and an air purifier to improve air circulation and general welfare of horses with regard to temperature and ventilation
(source: PPBJ Club Bangkok)

Physical barriers to midges in the environment

–

- Surrounding midge breeding sites with netting fences (or similar) unlikely to be feasible

Ecological and biological factors that supplement control



FRAMEWORK		APPLIED TO		
		1. ANIMALS	2. HOUSING*	3. ENVIRONMENT
USING	A. CHEMICAL APPROACHES	•••	•••	○
	B. PHYSICAL BARRIERS	○	•••	–
	C. ECOLOGICAL FACTORS	○	••	•

Animal level biological mechanisms of control

Using vector ecology when considering housing and transport

Using vector ecology to use environmental mechanisms to facilitate control

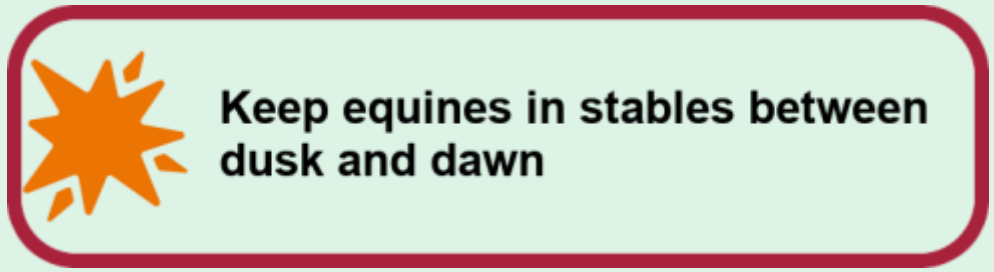
Animal level biological mechanisms of control

- No known animal level factors facilitating control
- Use of ‘bait’ mammals discussed but midge populations generally overwhelming

Using vector ecology when considering housing and transport

••

- Sunrise and sunset activity of midges
- Generally daylight lower risk for midge-host contact than evening and early morning
- Add this factor to other control methods (like stabling times and transportation)
- Facilitates welfare (activity) of animals impacted by outbreaks

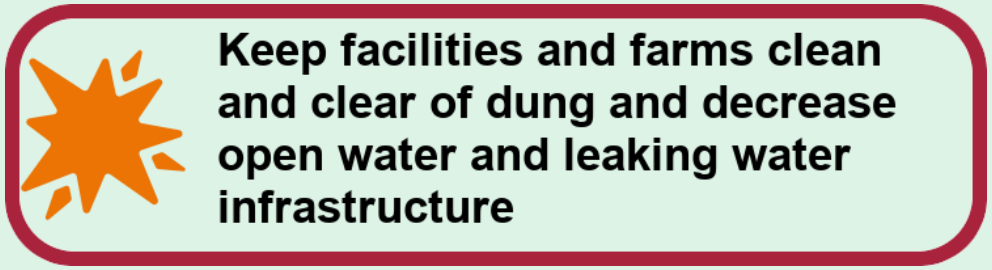


Using vector ecology when considering housing and transport

- Turn off lights in stables
- High risk situations – immerse bedding/feed prior to entry into stables to decrease midge introduction
  - Steam treatment

Using vector ecology to use environmental mechanisms to facilitate control

- All midges require solid moist habitat to breed in
  - Leaking taps/troughs/ irrigation
  - Maintain water sources
- Some use dung as a breeding habitat
  - Remove cattle/dung if feasible (depends on situation)



Case studies

1. Protecting working, traditionally managed or other equids that are not stabled?
2. Moving out of an AHS affected area to a non-affected area
3. Moving through AHS infected areas

Other resources

1. WOAH webinar series
2. Online resources
   - Webinar 3 extras
   - GNATWORK

Thank you

12, rue de Prony, 75017 Paris, France
T. +33 (0)1 44 15 19 49
F. +33 (0)1 42 67 09 87

woah@woah.int
www.woah.org

Facebook
Twitter
Instagram
LinkedIn
YouTube
Flickr

World Organisation for Animal Health
Founded as OIE

Organisation mondiale de la santé animale
Fondée en tant qu'OIE

Organización Mundial de Sanidad Animal
Fundada como OIE