# Uninvited guests: Asian longhorned ticks, *Theileria orientalis* and New World Screwworm

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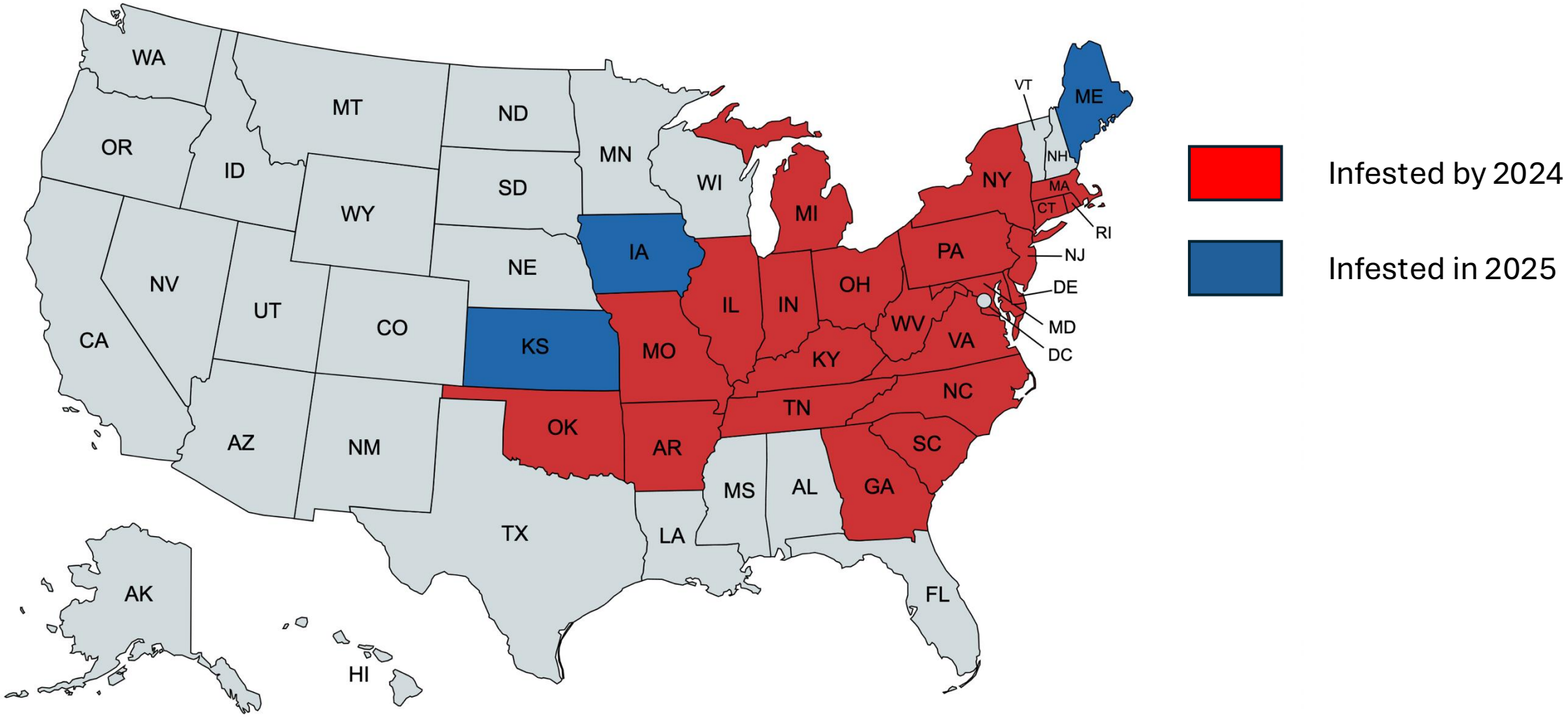
# Topics for today

- Asian longhorned tick
  - Identification
  - Control
- *Theileria orientalis*
  - Symptoms
  - Management of theileriosis
- New World screwworm
  - Biology and life cycle
  - What to be on the lookout for
  - What not to do

# Asian longhorned tick moving rapidly westwards



NEWS

# ASIAN LONG HORNED TICK CONFIRMED IN KANSAS

October 10, 2025 By Kellan Heavican  Filed Under: Kansas, News

The Kansas Department of Health and Environment and the Department of Agriculture has confirmed the state's first occurrence of the Asian long longhorned tick.

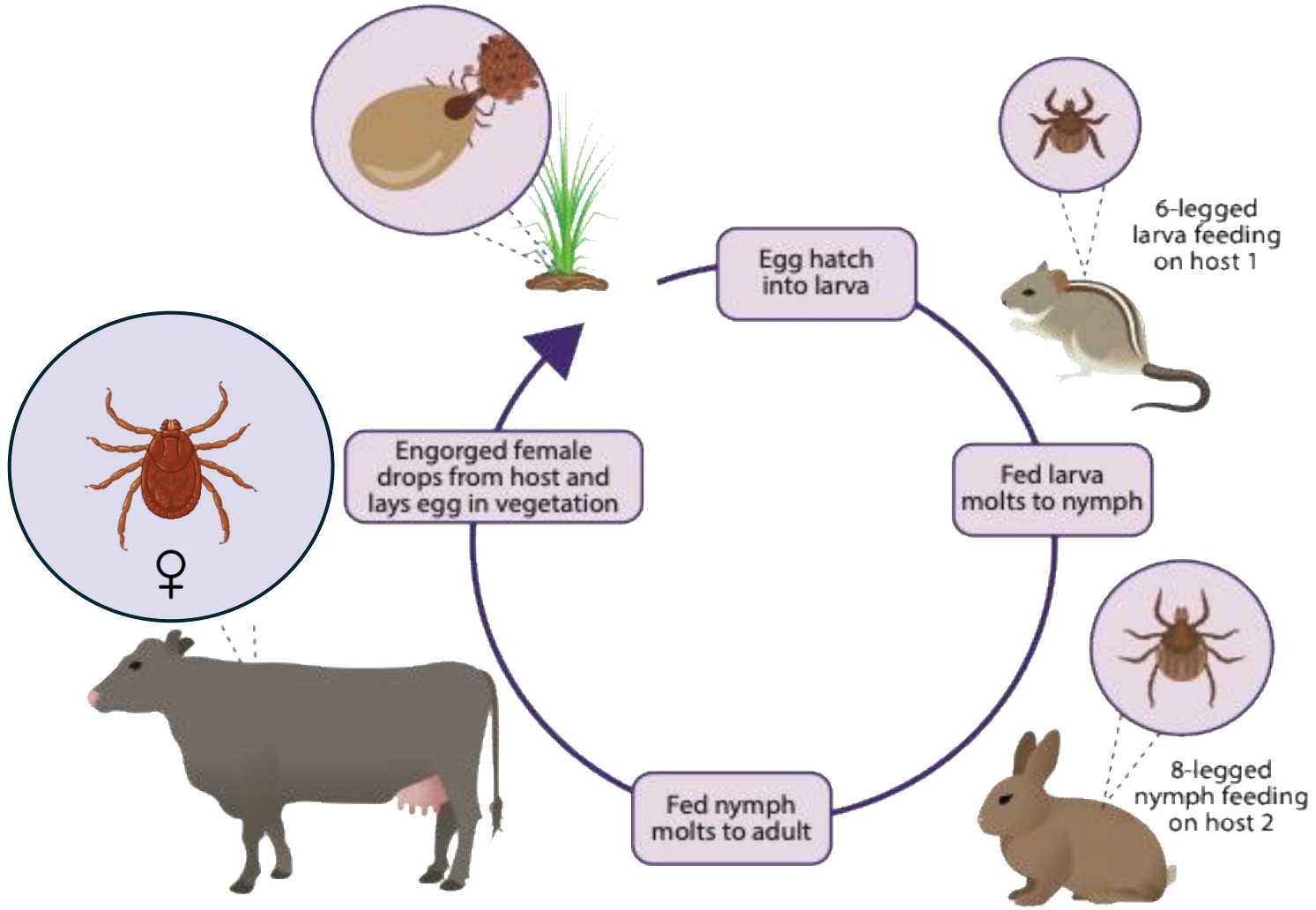
- Single larva collected from a dog in Franklin county
- Dog had no history of travel
- Larval stage => population likely established

# Tick does not need to mate to lay eggs

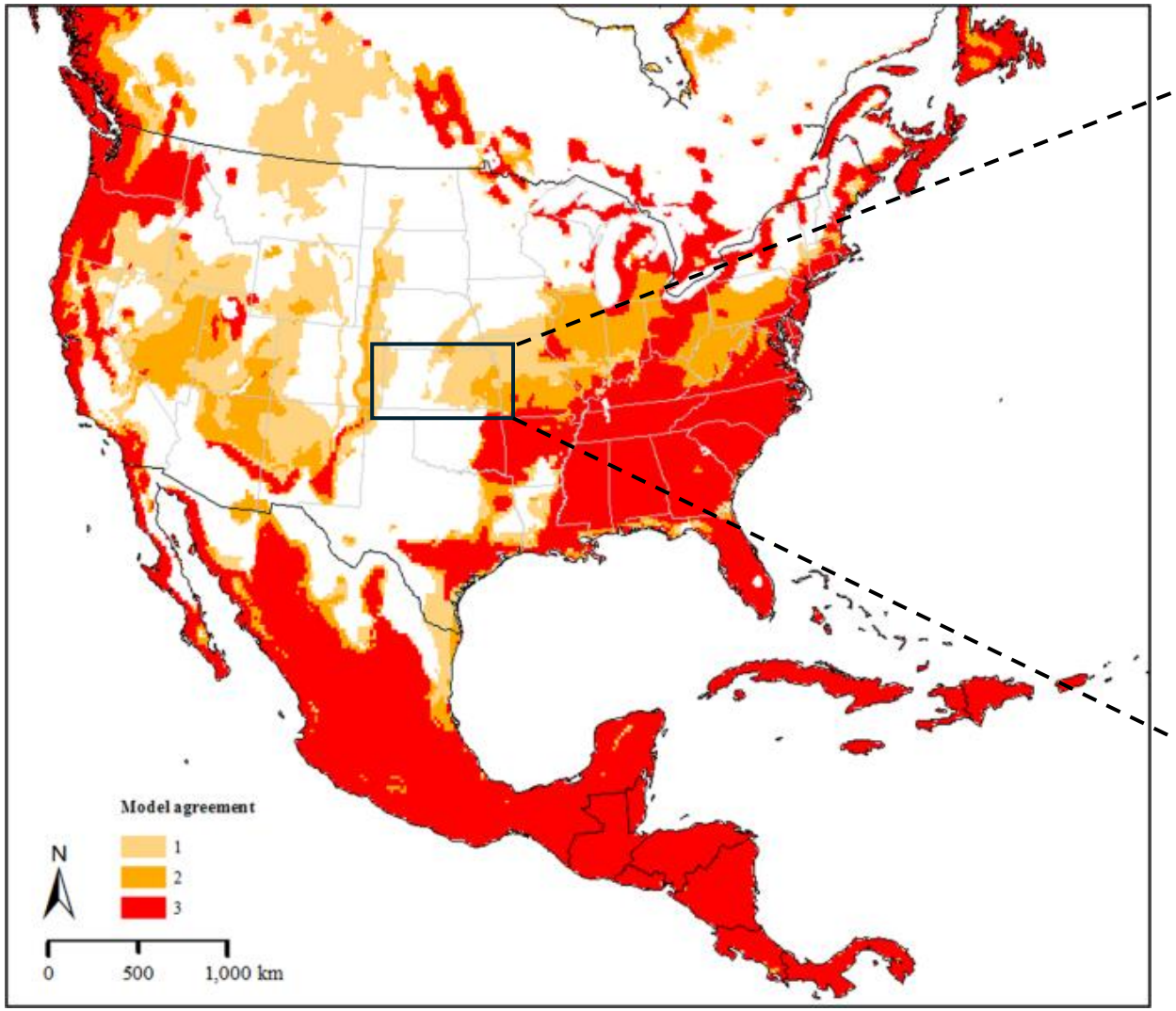
Every tick is a female

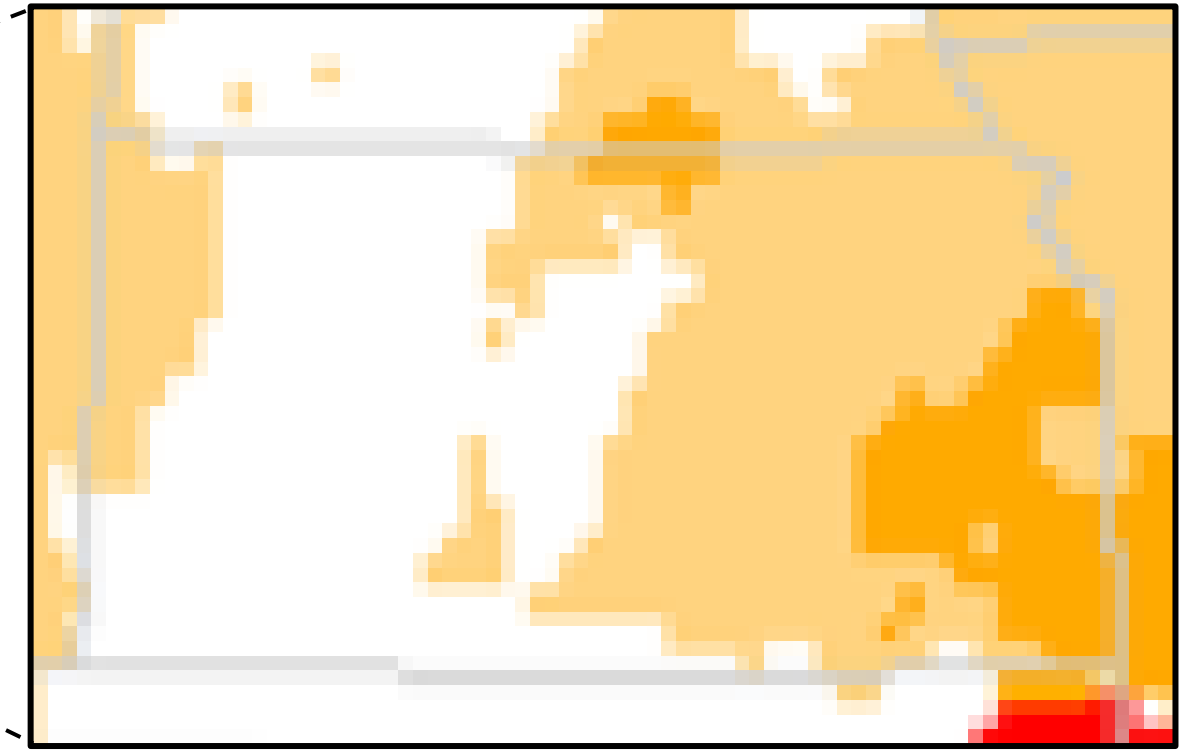
Wide host range

All you need is one



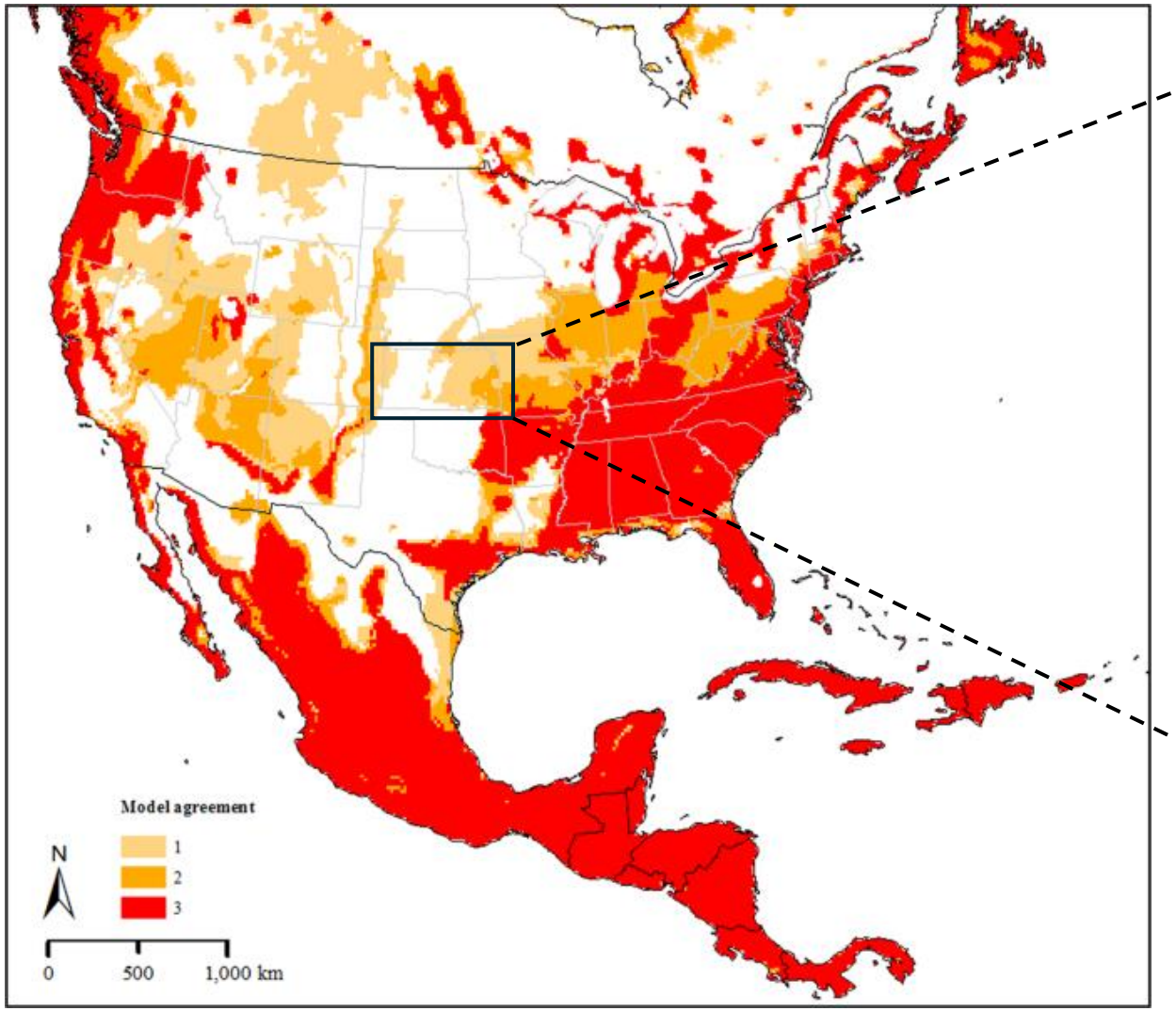
# Climate suitability for ALT in Kansas

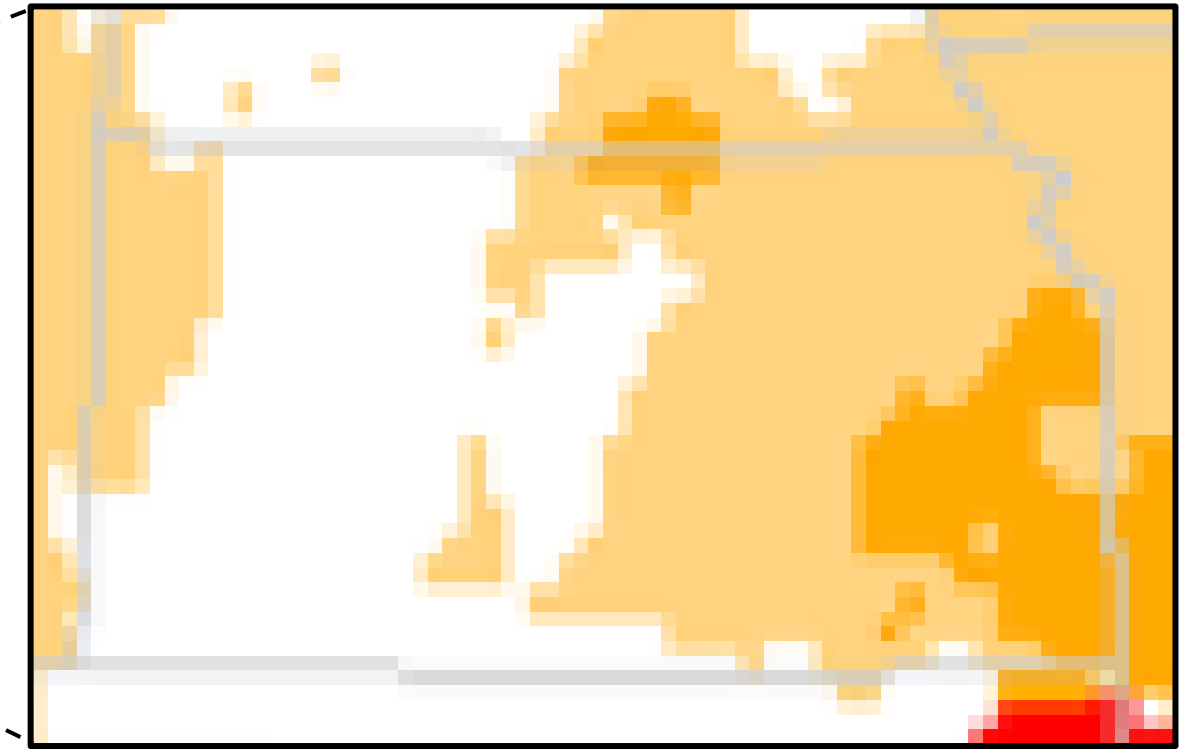


https://doi.org/10.1038/s41598-018-37205-2

# No tick, no problem?



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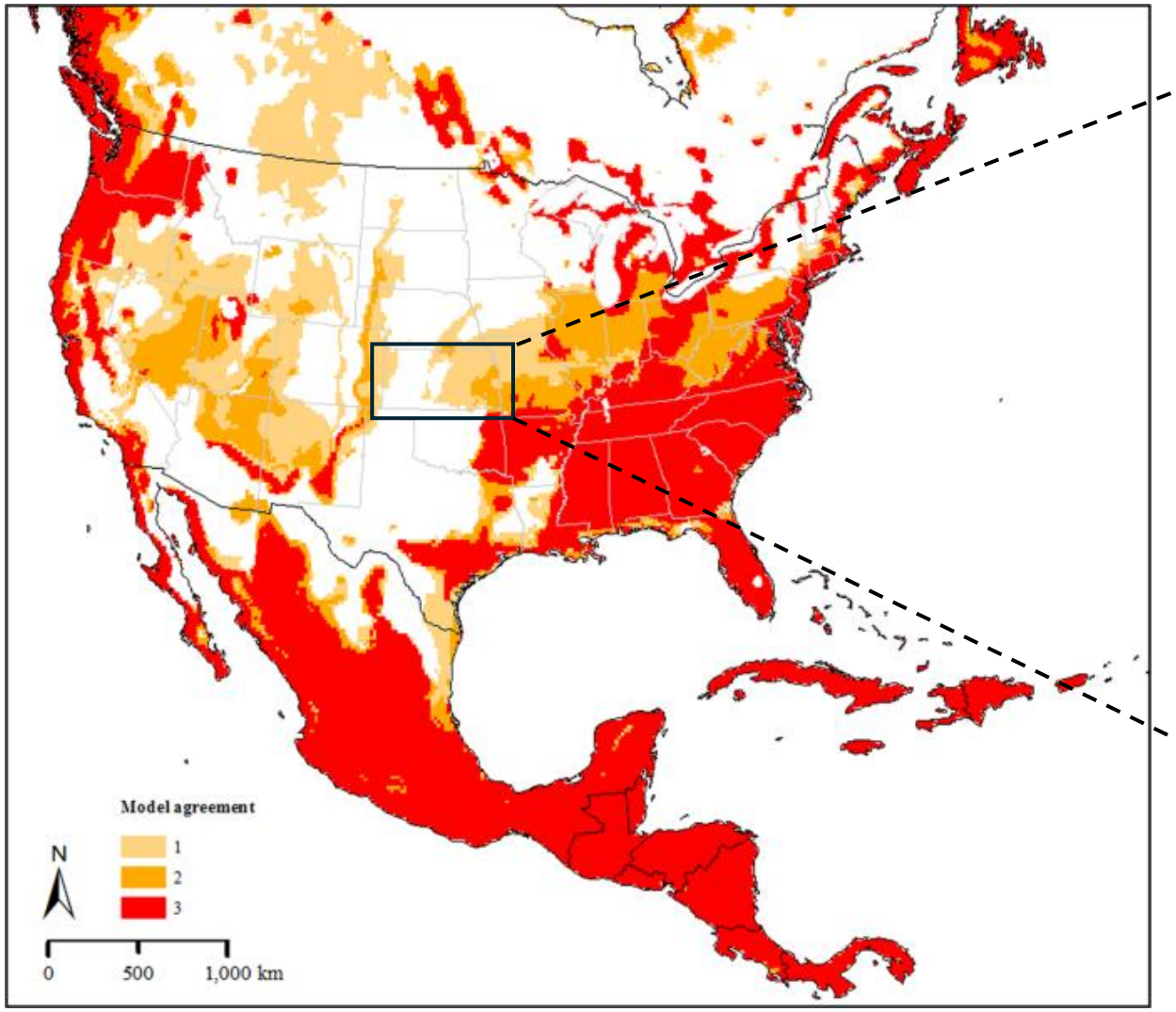


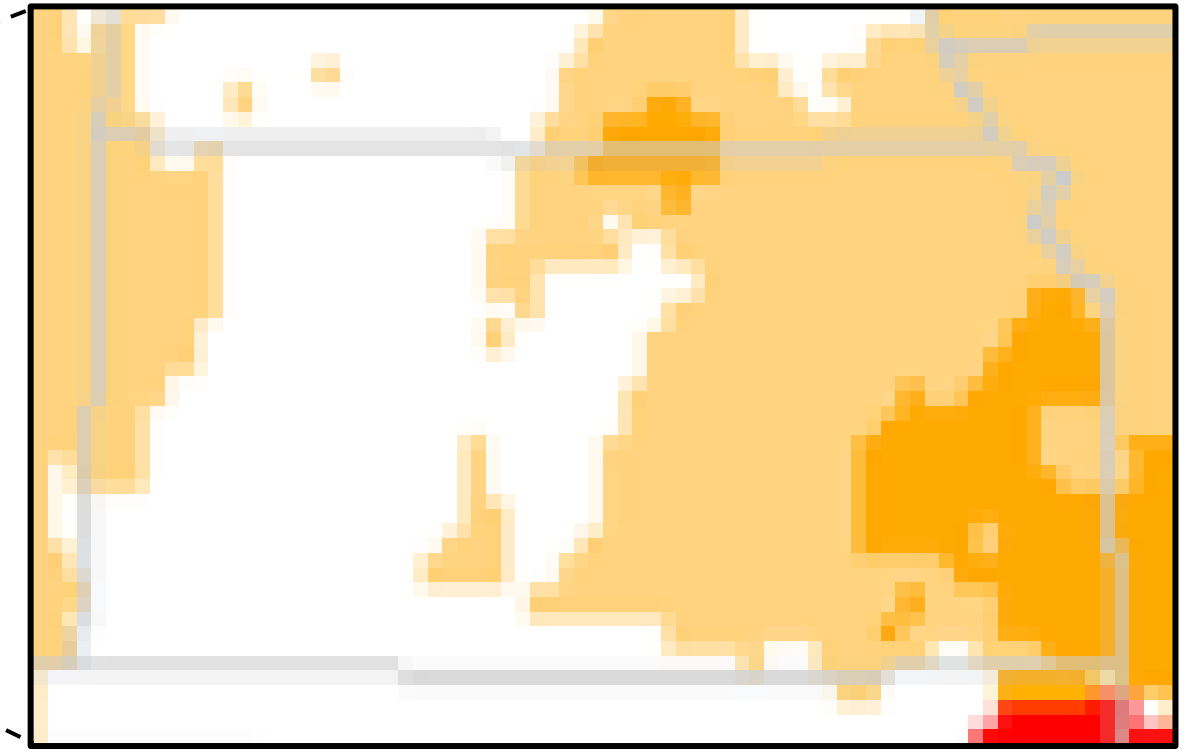

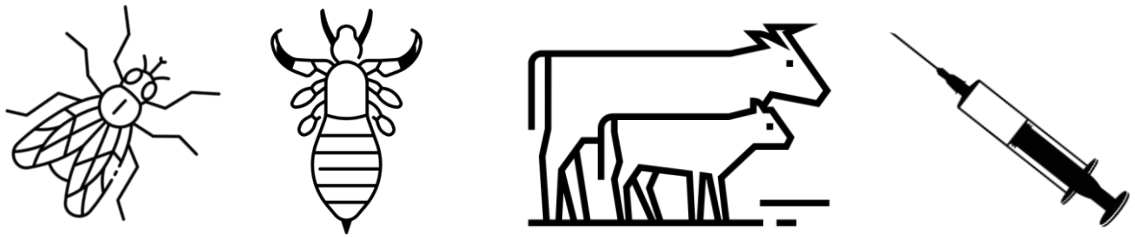

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# What does it look like?

Ticks may go unnoticed until infestation levels are reached

# Pasture infestations can be very high

# Animal infestations

Photo credit: Dan Goehl

# Animal infestations

Infestations may be difficult to detect in long haired breeds

If unsure, send me your ticks ☺

# Tick control in pasture

- Burning (especially in the spring)

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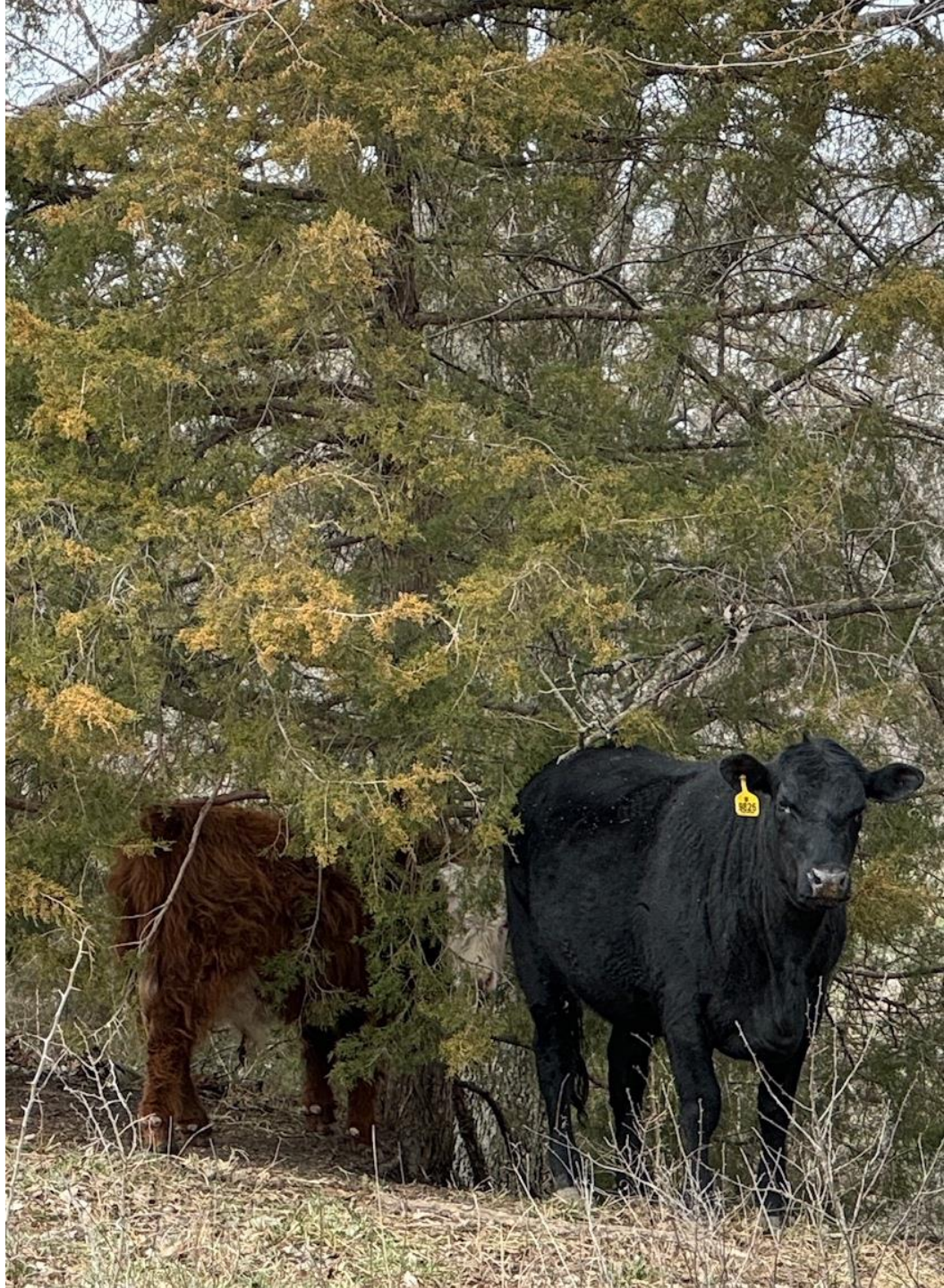
- Clear brush and hedge areas
  - Pay attention to high humidity areas (trees, cedar trees, waterways)



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# Spraying

- Resist the urge to spray pastures
  - Evidence suggests it is not effective – even if grass is short
  - Will impact all the insects in the area, some of which are beneficial

# On animal tick control

- Integrate fly and tick control
  - Horn flies cause significant losses
  - Potential threat of New World screwworm invasion

# Rotation strategies to reduce insecticide resistance

| | Option 1 | Option 2 |
|---|---|---|
| Year 1 | Organophosphate | Organophosphate |
| Year 2 | Organophosphate | Pyrethroid |
| Year 3 | Pyrethroid | Macrocyclic lactone |

Reach out if you need help!

# On animal tick control

- Ear tags
  - Only effective if ticks are in the ears

# On animal tick control

- Sprays
  - Must spray whole animal

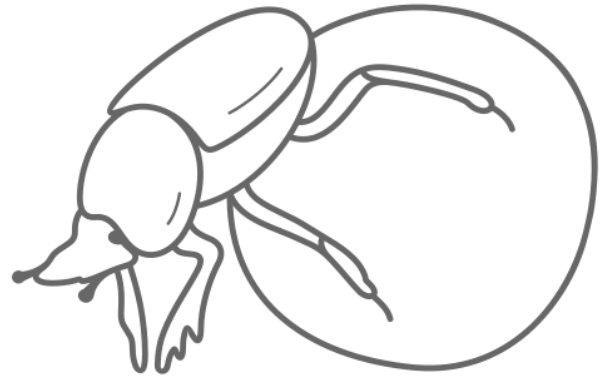
# On animal tick control

- Pour-on
  - Macrocyclic lactones are absorbed into body and available to ticks not along top line
    - Only use if you have a high infestation
    - Get good weights and pour along the whole back
  - Do not use pyrethroid pour on for high infestations
    - Will only protect topline

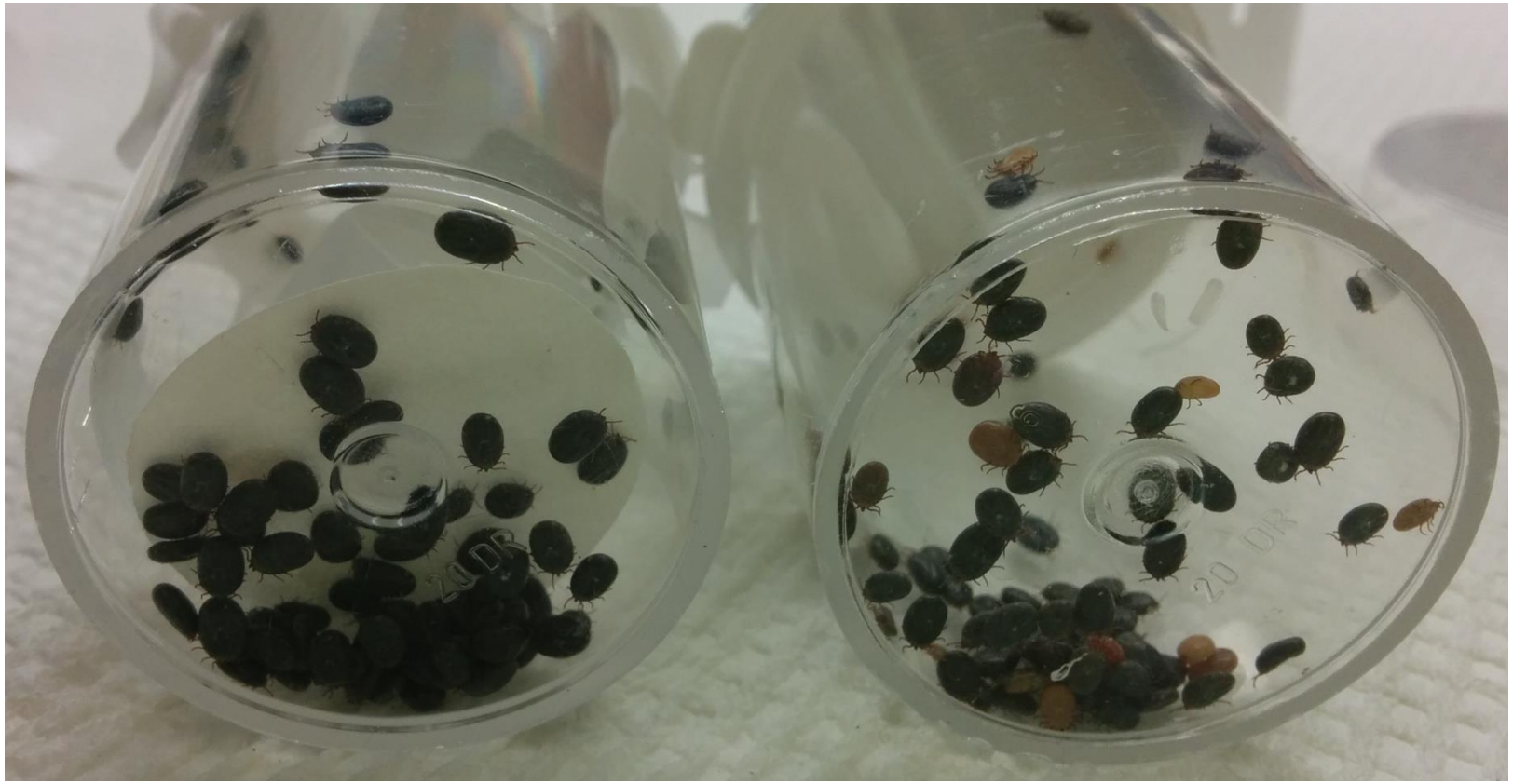
Photo: Dr. A.J. Tarpoff

# Think of the long game

- Macrocyclic lactones are fat soluble – long excretion time
  - 1-5 months (oral –injectable)
- Will kill all adult and larva dung beetles
- Avoid injectable products, will cause nematode and horn fly resistance



# Immunity to ticks will build over time

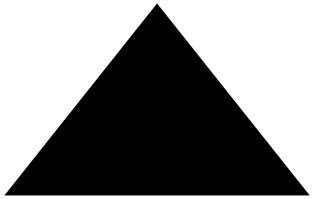


Well fed ticks collected from calf never exposed to ticks

Poorly fed ticks collected from previously infested calf

# Bovine theileriosis in herds

**Outbreak** **Endemic stability**



- All animals at risk
- Severe disease symptoms
- High mortality rates
  - 5-20%

# Iowa outbreak

- 20 % mortality
- WY heifers brought into IA
- Put onto pasture with high tick burden

| | | Herd infection rate | | | | |
|---|---|---|---|---|---|---|
| Pasture | State | Adult | Calf | Ticks identified | Stage | Number |
| Ted's (n=40) | IA | 100% | NA | *A. americanum* | Adult | 1 (12.5%) |
| | | | | *A. americanum* | Nymph | 1 (12.5%) |
| | | | | *D. variabilis* | Adult | 6 (75%) |
| Geraldines (n=94) | IA | 95.74% (June 2025) | 45.65% (June 2025) | *A. americanum* | Adult | 11 (3.42%) |
| | | | | *D. variabilis* | Adult | 10 (3.11%) |
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| West Payne (n=48) | IA | 90.91% | NA | *A. americanum* | Adult | 6 (3.75%) |
| | | | | *D. variabilis* | Adult | 1 (0.625%) |
| | | | | *H. longicornis* | Adult | 160 (95.80%) |

# Bovine theileriosis in herds

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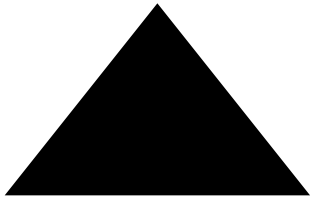

- Calves highest risk
- Little to no disease symptoms
- Low mortality

# Outbreaks can still occur

# Iowa outbreak

- 7 herds with high infection rates but no history of disease
- 7/8 herds were fine
- Likely circulating in the area for years

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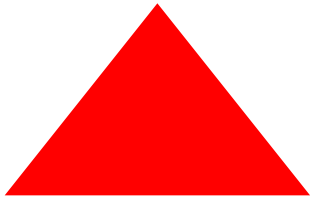
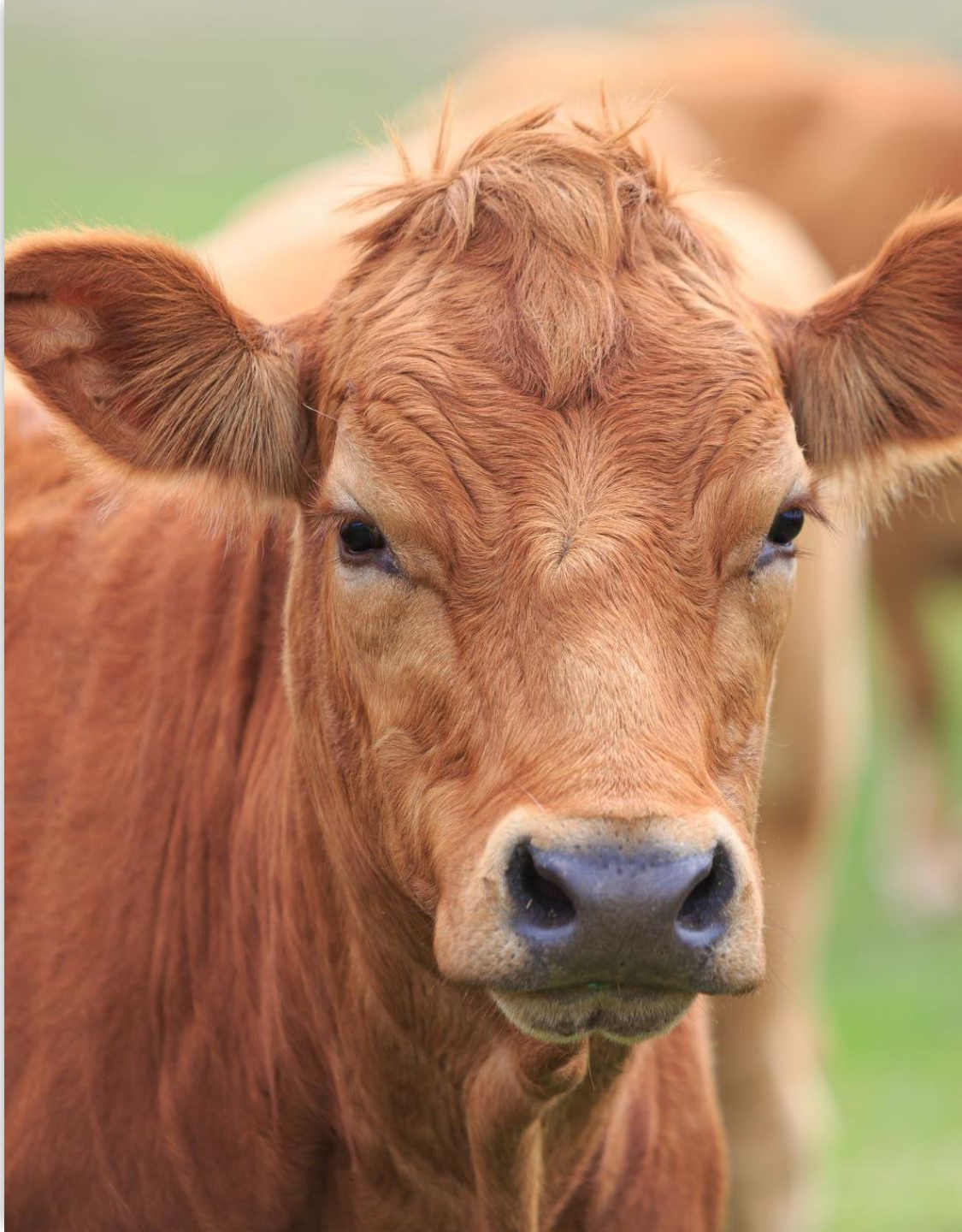


- Mature naïve animals moved into positive herd
- Movement of stocker calves
- Any high stress event (pregnancy, calving, weaning)

# Identifying outbreaks

- Continuously evolving as we get more reports
- Disease presents differently in mature vs younger animals



# Disease symptoms in mature animals

Similar to anaplasmosis but animals will not respond to treatment

- Loss of appetite and weight loss
- Lethargy and exercise intolerance
- Fever
- Anemia (pale membranes, may have yellow tint, PCV <=15%)
- Coughing, head hanging and labored breathing
- Late-stage abortions

# Disease symptoms in calves/weaners

- Presents like pneumonia not responding to treatment
  - Persistent elevated temperature (103/104°F)
  - Appetite loss => weight loss
  - Elevated respiratory rate
  - Anemia

# Treatment

- No approved anti-theilerial drug
- All our evidence is anecdotal
- Supportive care
  - Keep animals eating!
  - Have a good relationship with your veterinarian
  - Long-acting tetracycline may help with secondary infections
  - Steroids may reduce inflammation/misdirected immune response
  - Banamine may reduce fever and improve appetite

Correlation vs. causations

# Weathering the storm and moving forward as a community

- Remove the stigma of having the tick or pathogen
- Vigilance not panic
- Buy and sell cattle as usual – resist the urge to not purchase infected cattle (esp. breeding stock etc)

# Developing and maintaining endemic stability

- Know your herd status ($30/sample)
  - No magic number for how many to test
  - Small herd test as many as possible
  - Large herd (50-100 cows) test 10-20%
- Once animal is positive will remain infected for life
- Test new animals coming into herd

# New World screwworm… The wolf at the door

# Public perception driven by the media

Newsletters

The Atlantic

SCIENCE

## The ‘Man-Eater’ Screwworm Is Coming

After a decades-long campaign to beat the parasites down to Panama, they’re speeding back up north.

NATION

U.S. Department of Agriculture

Add Topic +

## Flesh-eating parasite with 'sharp mouth hooks' prompts action from US

Mike Snider

USA TODAY

May 6, 2025 | Updated May 8, 2025, 7:03 a.m. ET

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CBS NEWS

U.S. Israel-Iran Conflict War Powers Vote World Politics HealthWatch MoneyWatch Entertainment Crime Sports

U.S.

## Texas officials warn of "maneater" screwworm that burrows into open wounds, eyes and mouths to lay eggs

By Li Cohen

Updated on: January 6, 2025 / 10:39 AM EST / CBS News

sciencealert

## Flesh-Eating Fly Invasion Could Cause Devastation Across America

ENVIRONMENT 19 June 2025 By HANNAH ROSE VINEER, THE CONVERSATION

New World screwworm fly. (Judy Gallagher/Animalia/CC-SA-4.0)

# The media also gets it wrong...

USA TODAY

MOSQUITO SEASON
Hotspots ranked

NEWS TO YOUR INBOX
Start the day smarter

GRADUATION TIME
Funniest cap messa

U.S. Politics Sports Entertainment Life Money Travel Opinion Crossword

The New World screwworm is a species of parasitic fly that is well known for the way in which its larvae (maggots) eat the living tissue. *Ramdan Fatoni, Getty Images*


USA Today
https://www.usatoday.com › news › nation › 2025/05/12

New World Screwworm: What is the flesh-eating parasite?

May 12, 2025 — The New World Screwworm is a parasitic fly, **about the size of a common housefly**. They have orange eyes, a metallic blue or green body and ...

# New World vs Old World screwworm

*Cochliomyia hominivorax*

USDA - APHIS

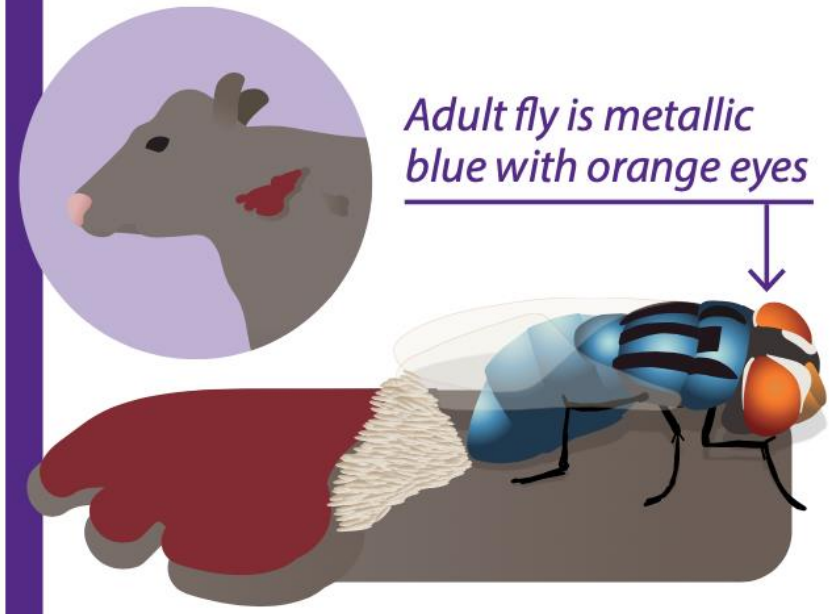
*Cochliomyia macellaria*


Matt Aubuchon, University of Florida

# Some key differences between species

| | *Cochliomyia hominivorax*<br>NWS | *Cochliomyia macellaria*<br>OWS |
|---|---|---|
| **Abundance** | Low densities in the environment | Can be commonly found in the environment |
| **Larval feeding** | Living, warm-blooded animals | Carrion and sometimes late-stage infections in living animals |

# New World Screwworm Life Cycle




**EGGS HATCH IN 12-24 HOURS**

Fly lays eggs in and around an open wound or mucous membrane.

**Female will only mate once**

**Males will mate multiple times**

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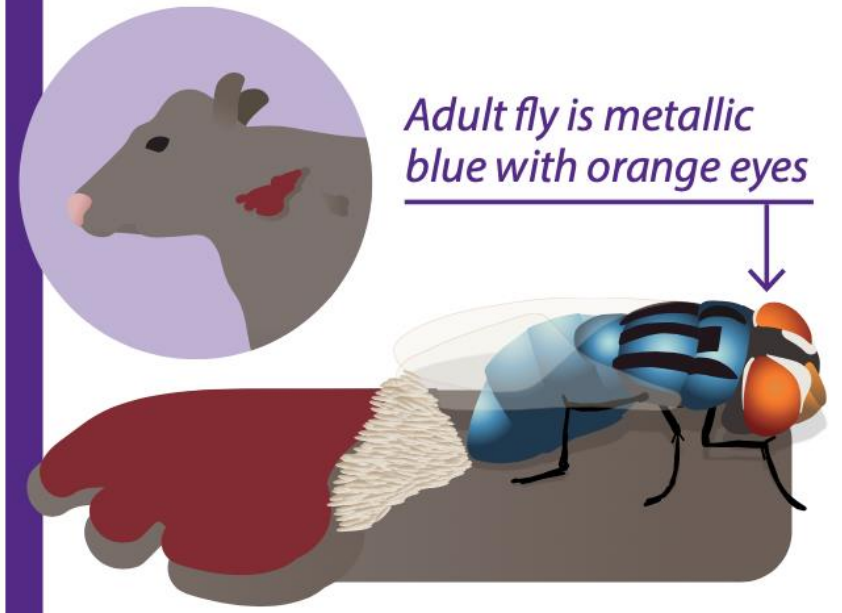


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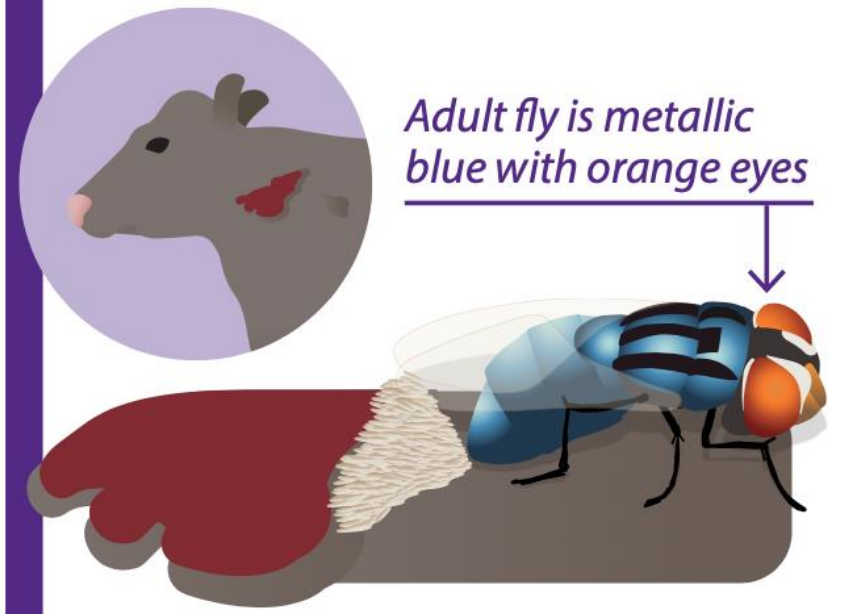


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Samantha Gibbs, U.S. Fish and Wildlife Service

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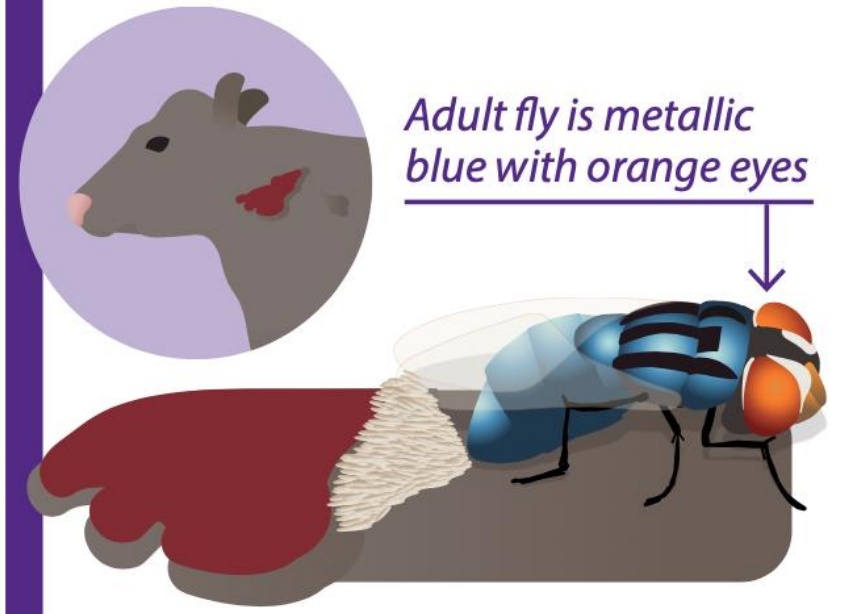


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Wounds can be small!

- Tick and other insect bites
- Animal husbandry can cause wounds
  - Branding (especially hot), dehorning, castration etc.
  - Birth trauma
- Intact mucous membranes can also be targeted

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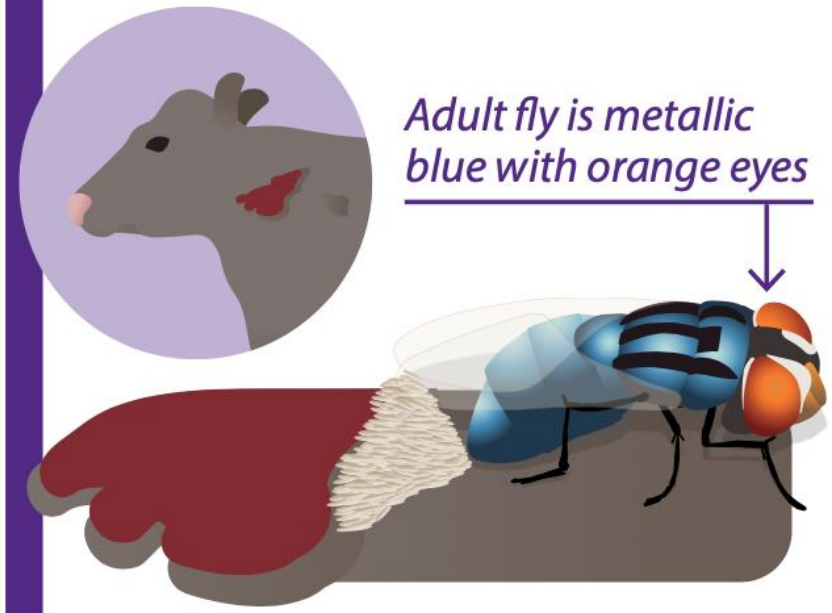

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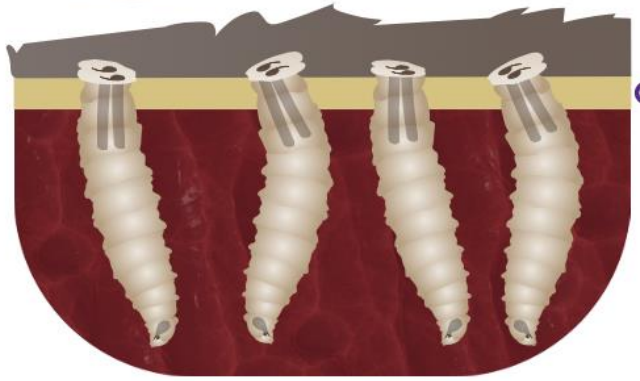
*Straw-colored liquid (can also be bloody) oozes from wound with a distinctive putrid smell*



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**FEEDS FOR 5-7 DAYS**

Larvae burrow into the wound to feed causing significant pain.

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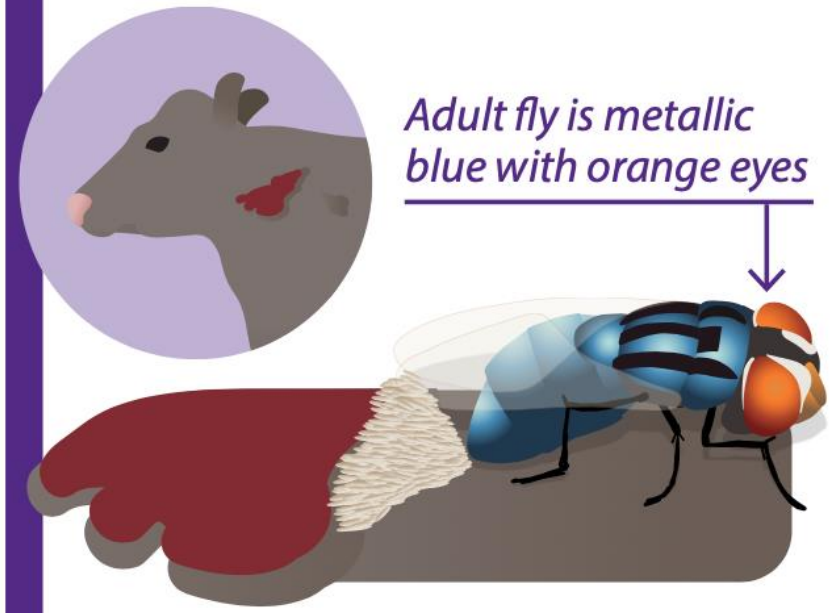

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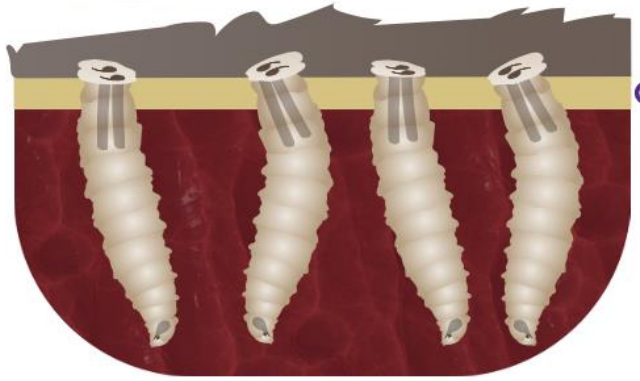

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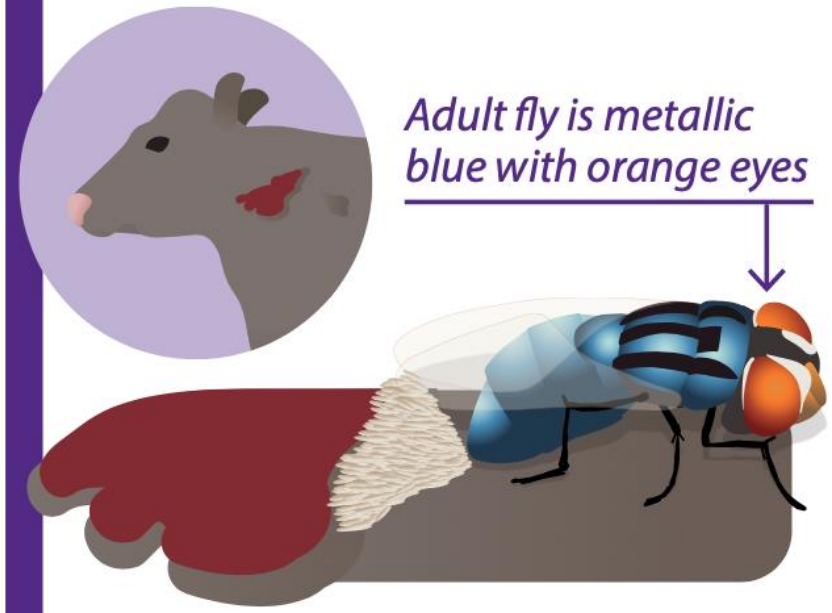

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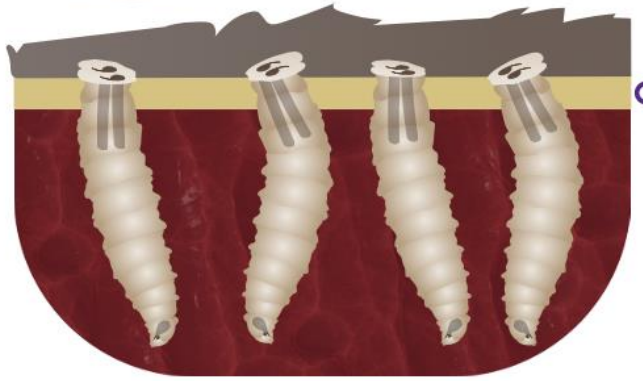

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https://www.gamosquito.org/resources/2014Meeting/Brown.pdf

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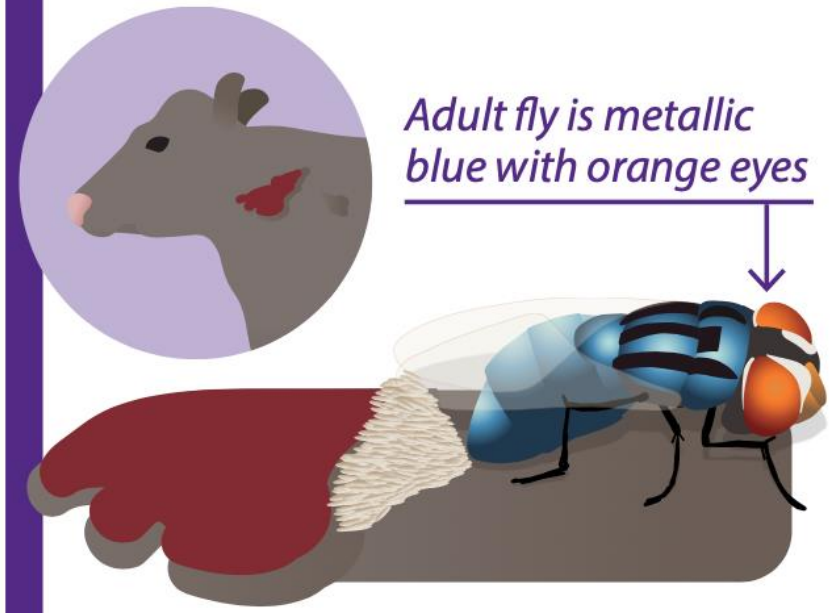

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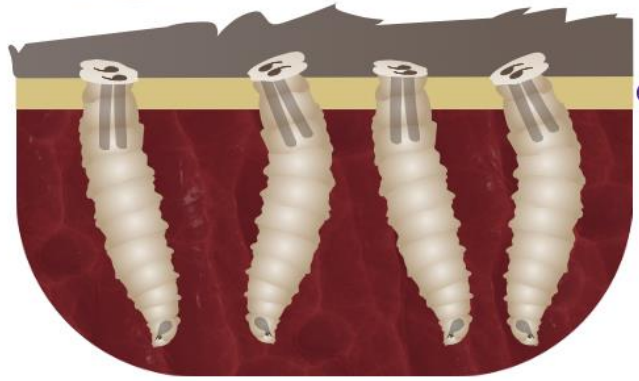

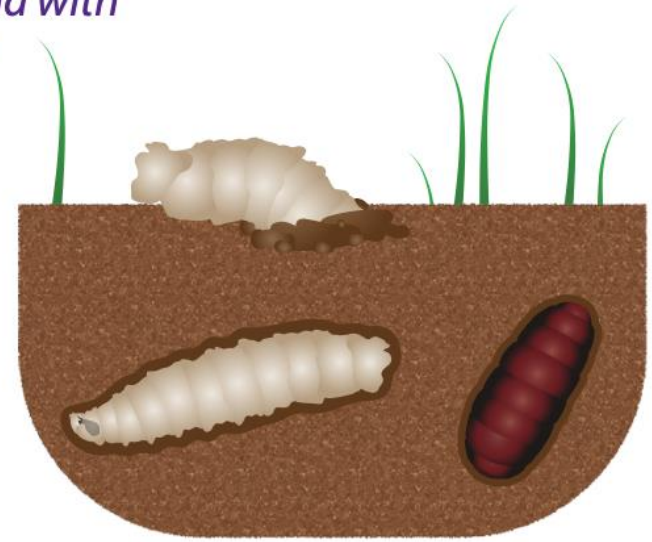

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Fly lays eggs in and around an open wound or mucous membrane.

**FEEDS FOR 5-7 DAYS**

Larvae burrow into the wound to feed causing significant pain.

**AT LEAST 7 DAYS**

Fully grown larvae drop from the wound and burrow into the ground where they pupate.

# Signs of infestation

- Maggots in the wound
- Lethargic animals
- May have reduced appetite, signs of pain
- May rub, lick affected area
- Can result in animal death

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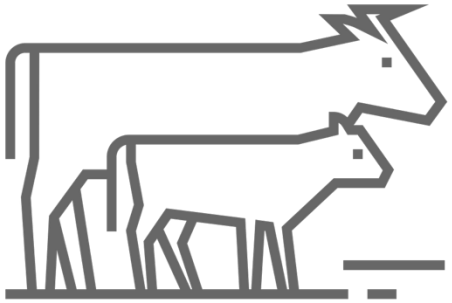
DOI: 10.1093/jme/tjy049

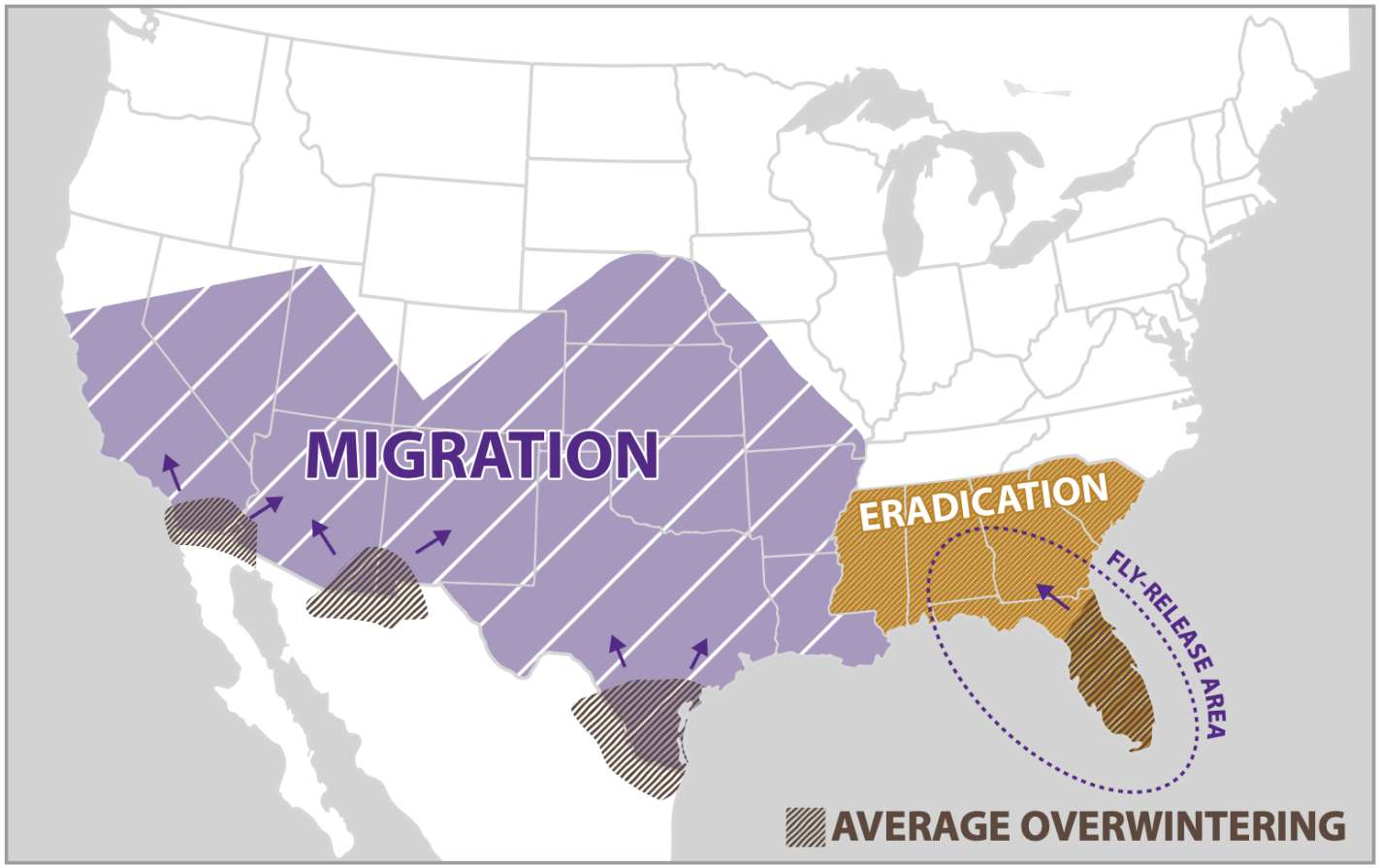
# Host range

- Alive, warm-blooded animals
- Commonly infests livestock and wildlife
  - While we control and monitor livestock, wildlife more difficult
- Pets can be targeted – small animal clinics are very important!
  - Pets travel
- Humans are hosts in endemic areas
- Can infest birds although less common

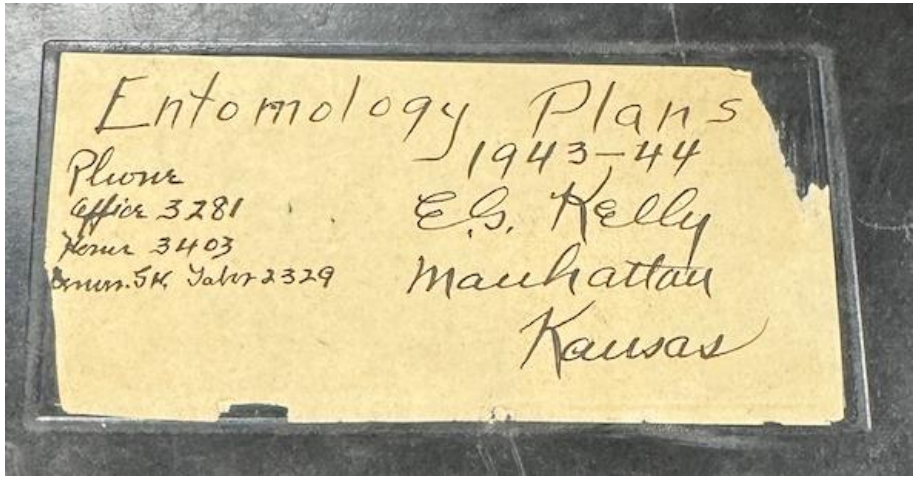


# NWS fly historic range and eradication

- Historically present in the US
- Overwintering in regions with winter temperatures above 46 ºF occurred
- Annual expansion northward during warmer months



# What infestation levels were like before eradication in the Midwest




‘Kansas: In the southwestern portion, which was not scouted earlier in the season when the first survey was made, light infestations were found in Seward, Finney, Scott, Ness, and Ford Counties. Reports from livestock owners, county agents, and others indicated that the peak of infestation, involving at least 2 to 2-1/2 percent of the total animal population in this area, occurred during September. The decrease in screw-worm infestations at the time of the survey was undoubtedly due to the low temperatures which prevailed early in the season.’

# Then vs now

USDA - Scott Bauer

More animals moving more…..

# What are our risks in the Midwest?

1. Movement of animals from outbreak regions during months with average daily temp above 46 ºF
    - No domestic animal movement from current outbreak areas
    - No control over wildlife

2. **IF** populations establish in southern states – annual spread during months with average daily temp above 46 ºF
    - Modern outbreaks have been calculated to spread at a rate of 0.75 to 1.25 miles per day (Zaldivar-Gomez et al. doi: 10.1016/j.vprsr.2025.101220)

# Sterile Insect Technique (SIT)

- Female flies only mate once while males will mate multiple times
- Flies can be raised on artificial diet under laboratory conditions
- Flies are irradiated to sterilize them and then mass released
- Females lay sterile eggs and population collapses

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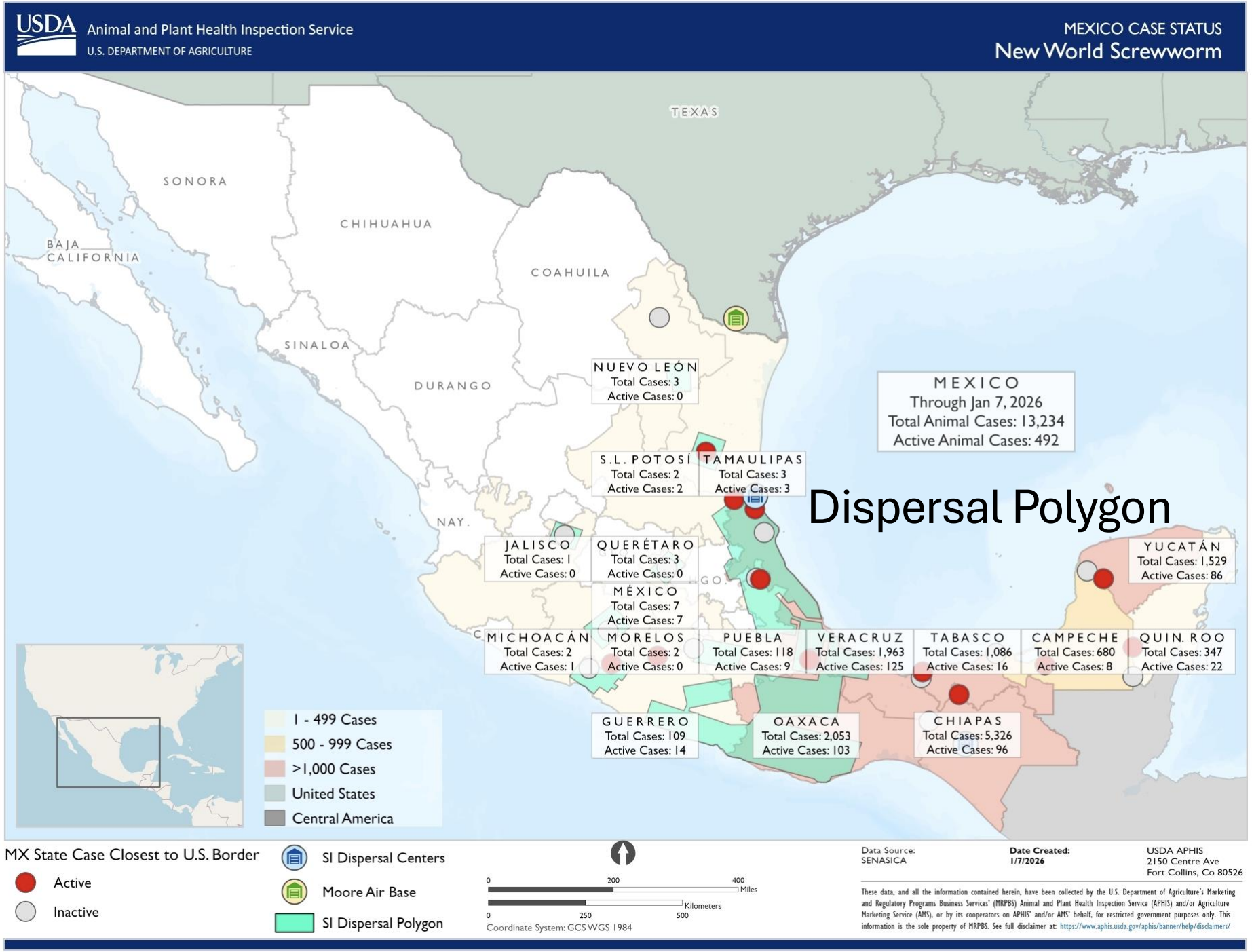
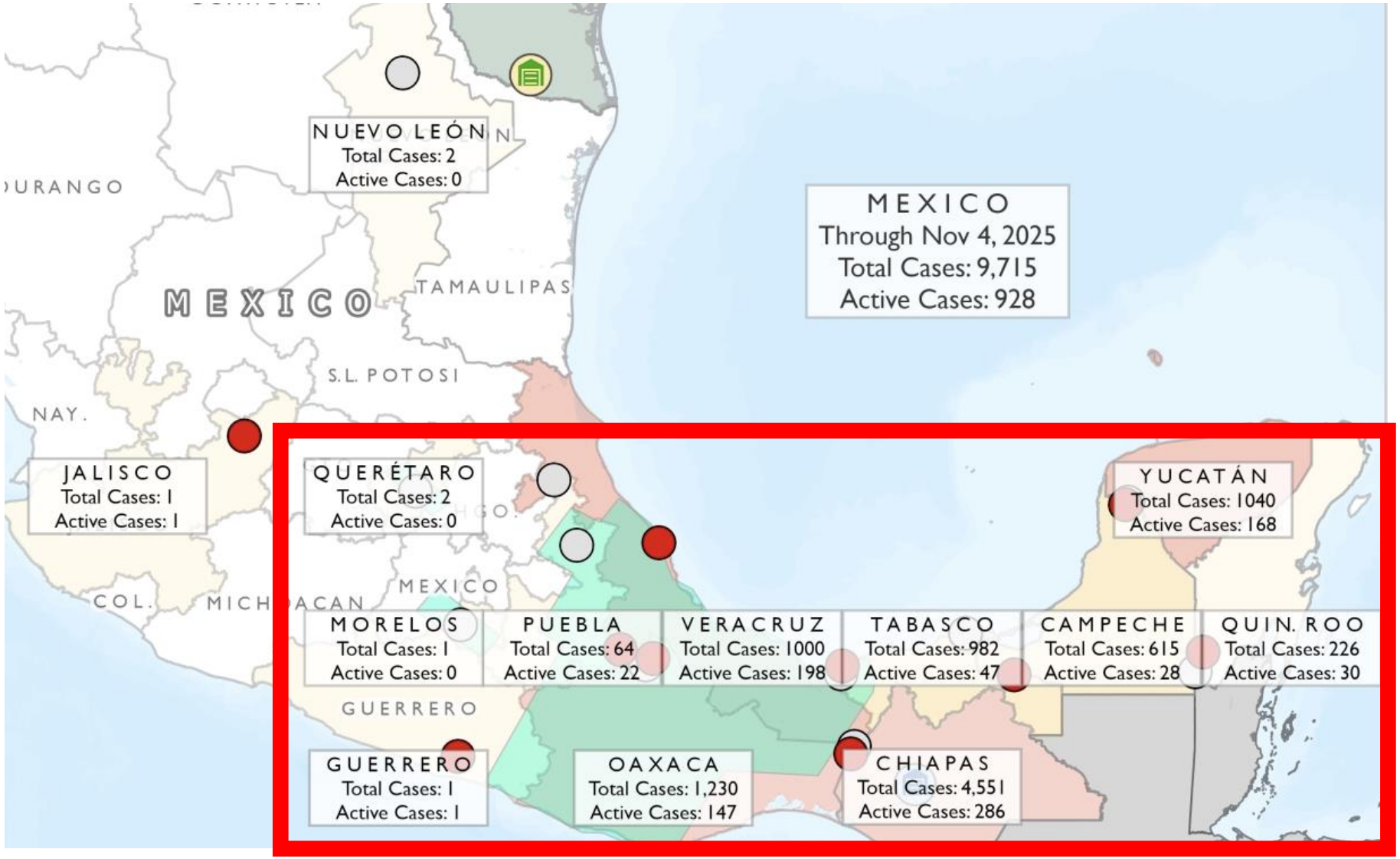
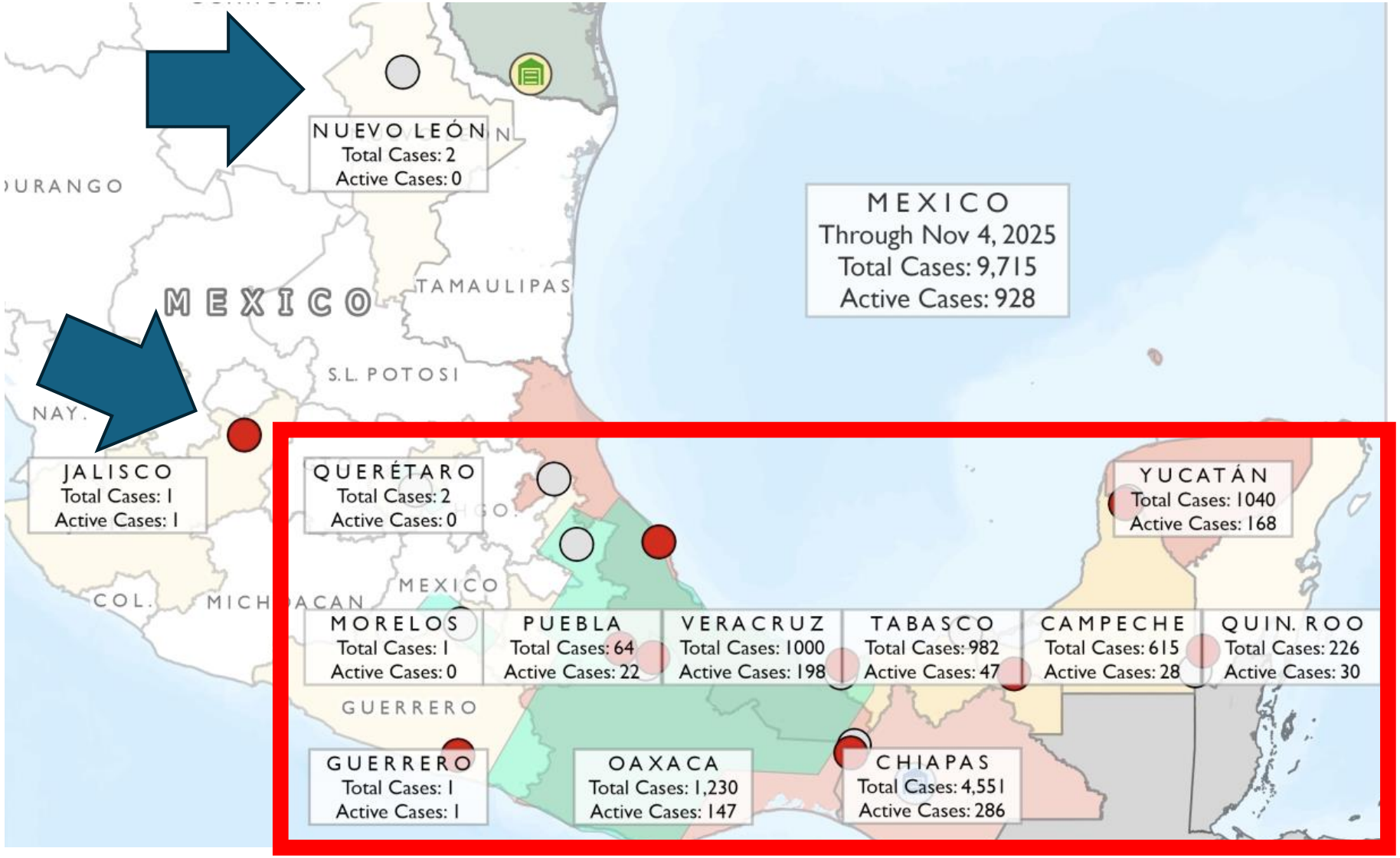
# No cases on US soil



# Animal movement vs fly expansion



# Animal movement vs fly expansion



# What if an outbreak on US soil happens

- This is a foreign animal disease and needs to be reported to federal authorities
- Each state will have their own response plan but will be largely similar (especially within regions)
- We need to communicate the importance of surveillance and reporting even though movement restrictions may be the result

# Why is reporting so critical?

- Flies have exponential growth
  - Females can lay thousands of eggs
  - Short generation times
- Need to limit animal movement so that flies can be released over the smallest area possible (limited number of sterile flies available)

# What to do if you suspect an infestation

- Don’t panic, many other species of flies can cause myiasis
  - Do not let any animals leave the premisis
- Isolate and secure the animal but do not move it from the area
- Call your State Veterinarian/Animal Health Commissioner – they will send someone out to collect the sample or instruct you on how to collect
- Collect and submit a sample according to state protocols

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# Keep in your vehicle

70% alcohol

Sealable tube

Ziploc bags and sharpie

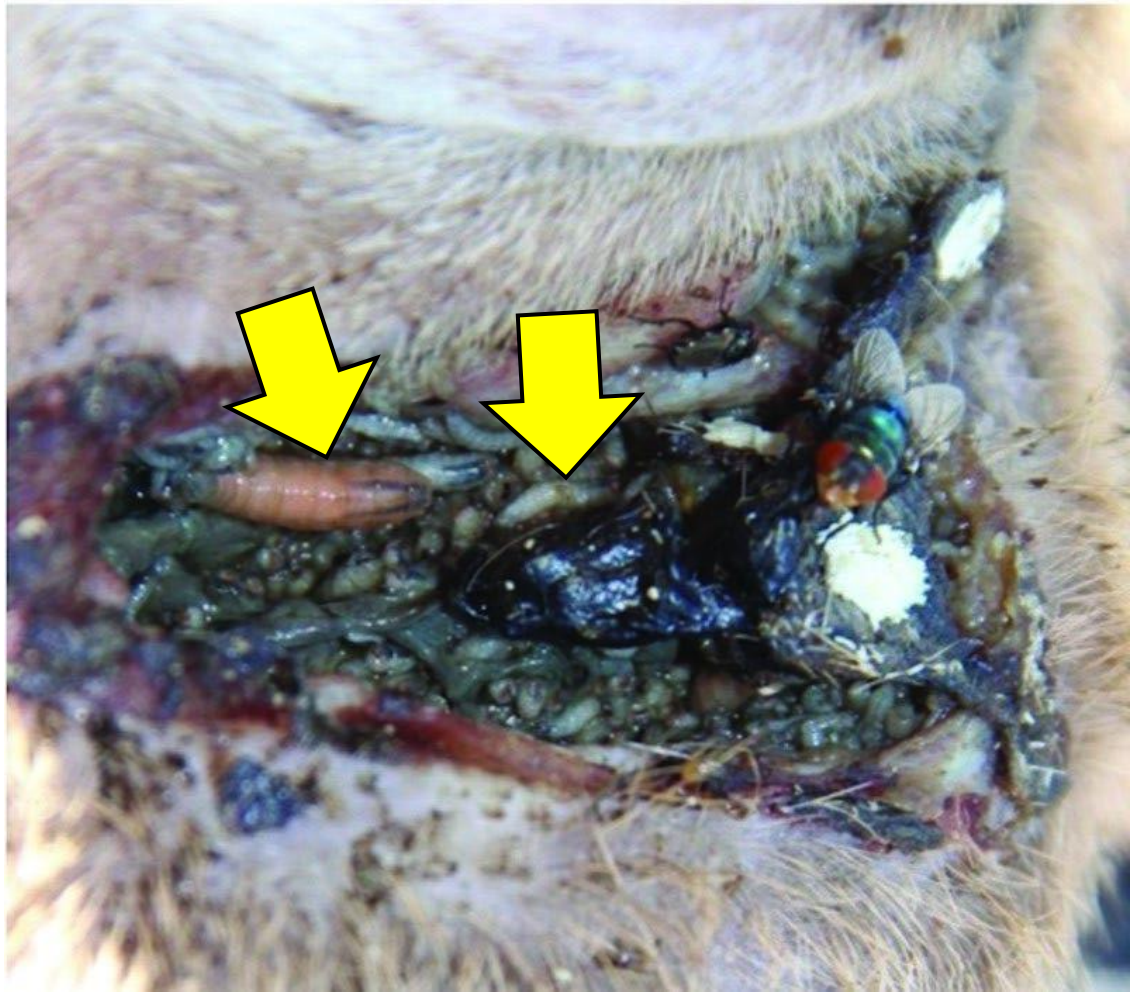
Forceps

Antiseptic for wound care (very important!)

Appropriate insecticide

# How to collect a good sample

- Collect maggots from the center of the wound area
- Collect range of sizes representative of the general population
- Fully submerge in ethanol



Samantha Gibbs, U.S. Fish and Wildlife Service

# After collecting the sample

- Remove and kill any other maggots (alcohol, freeze or incinerate)
- Clean and disinfect and seal the wound with wound spray and apply insecticide around the area
- Dectomax/doramectin has been given emergency approval for use, other's are going through the approval process
- **<u>Do not treat animal unless they have an infestation</u>**
  - Resistance in NWS populations
  - Resistance in nematode populations
  - Resistance in horn fly populations

# Insecticides with labeled use for NWSF

| Product | EPA Registration Number | Manufacturer | Active Ingredient(s) |
|---|---|---|---|
| Claire Bed Bug, Lice and Dust Mite Spray | 706-110 | PLZ Corp | Permethrin |
| Pramex Multi-Use Insecticide Spray | 1021-2685 | Mclaughlin Gormley King Company | Permethrin |
| 887 Multi-Use Insecticide Spray | 10900-86 | Sherwin-Williams Consumer Brands Group | Permethrin |
| Co-Ral Coumaphos Flowable Insecticide | 11556-98 | Elanco | Coumaphos |
| Catron IV Permethrin Insecticide Spray | 11556-171 | Elanco | Permethrin |
| Eradicator II MultiPurpose Insect Spray | 44446-80 | QuestSpecialty Corporation | Permethrin |
| CT Residual Spray | 47000-100 | Chem-Tech LTD | Permethrin |

Any other chemicals need to be registered with the state for use

# Feel free to reach out any time!

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# Draft response playbook

- APHIS has released their Screwworm Response Playbook
  - Outlines agencies and responsibilities
  - Response plan and movement restrictions
- Draft and open for comment FAD.PReP.Comments@usda.gov


- Available for download or google ‘APHIS Screwworm Response Playbook’ https://www.aphis.usda.gov/sites/default/files/nws-response-playbook.pdf

# What happens with a positive ID

- Can come from human, wildlife, domestic animal or the environment
- ‘Infested Zone’ of 20 km/12.4 miles
  - Fly surveillance
  - Animal movement restrictions
  - Release – 3 months past last detection if weather conditions support fly biology
- ‘Adjacent Surveillance Zone’ of 20km/12.4 miles
  - Intensive surveillance
- Fly surveillance area up to 200km/124 miles
  - Range dependent on climate, landscape etc.

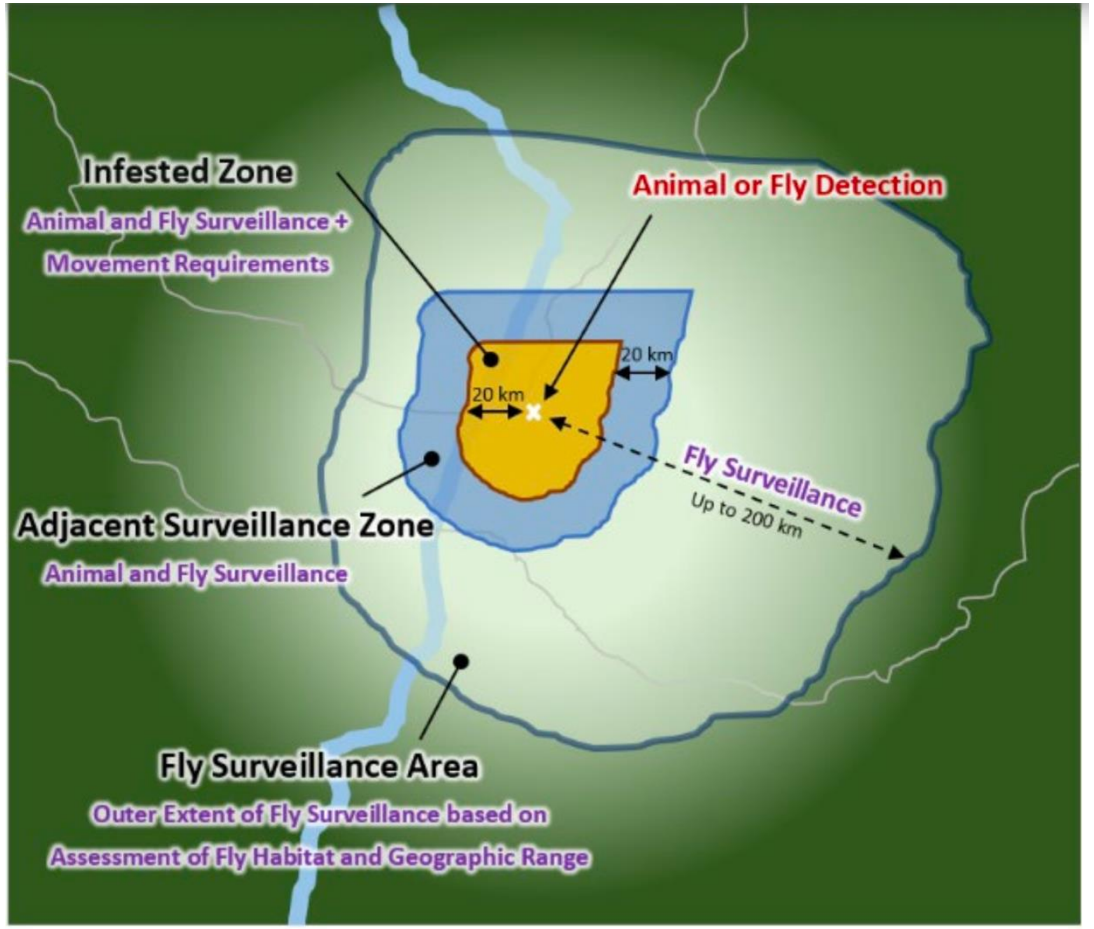


*Figure 1: Animal or Fly Detection in an Infested Zone*