Killer Cows: Zooprophylaxis and Endectocide Use In Mosquito Control

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Symptoms of Malaria

**Central**
- Headache

**Systemic**
- Fever

**Muscular**
- Fatigue
- Pain

**Back**
- Pain

**Skin**
- Chills
- Sweating

**Respiratory**
- Dry cough

**Spleen**
- Enlargement

**Stomach**
- Nausea
- Vomiting
Rural Agriculture

Open-air doors and windows
Zooprophylaxis
Breeding Site

Blood Meal
Insecticidal Zooprophylaxis
LongRange

Active Ingredient: Eprinomectin
Objectives

- What is the **LC50** for LongRange blood-fed mosquitoes in a controlled lab setting?
- Does LongRange effectively kill blood-fed mosquitoes on live hosts?

Anopheles quadrimaculatus
In-Lab Study

- How much of the drug is in the blood?

1 mL LongRange/110 lb of animal

Average Cow Weight: 1300 lbs

~ 40 L of blood/animal

0.3 μL LongRange/1 mL Bovine Blood
Lab-Fed Mosquito Mortality 48 Hrs

$LC_{50} \approx 0.118 \, \mu L \, LR/\mu L \, bovine \, blood$

$LC_{95} \approx 2.183 \, \mu L \, LR/\mu L \, bovine \, blood$
In-Lab Study

- How much of the drug is in the blood?

1 mL LongRange/110 lb of animal

Average Cow Weight: 1300 lbs

~ 40 L of blood/animal

0.3 μL LongRange/1 mL Bovine Blood
Field Study
LongRange Dose

1 dose

2x dose

Control
Field Study
Percent Mortality at 48 Hours Post-Feeding

- **Control**
- **Single Dose**
- **Double dose**
Discussion

• At these rates, not enough eprinomectin was reaching our mosquitoes to cause meaningful mortality.

• Moving forward, a higher rate or different formulation may be tested in attempt to achieve our goals.

• Reasons for negative results may be metabolism, gradual release reducing amount of the drug in the host at one time, etc.
Next Steps

1. Testing for an LC$_{50}$ for technical grade eprinomectin in lab-fed mosquitoes for comparison

2. Plasma Analysis via HPLC
Malaria Is Still Here!

Research

Combined Tactics

Innovation
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Questions?
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