



Fig.1. *Aedes vexans*

# Prevalence of *Mycoplasma haemofelis*, 'Candidatus *Mycoplasma haemominutum*' and 'Candidatus *Mycoplasma turicensis*' in feral cats and mosquitoes in Northern Colorado

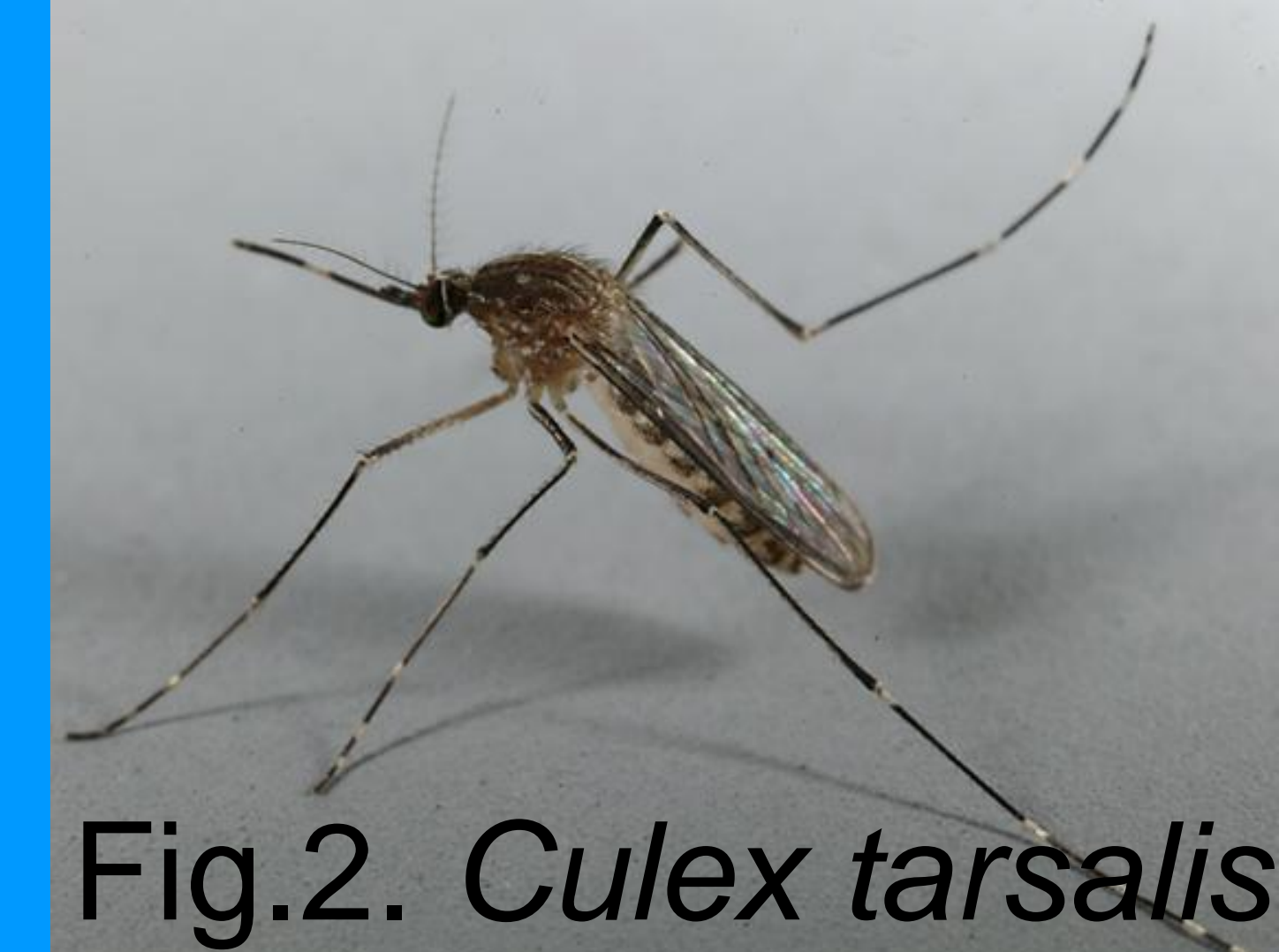


Fig.2. *Culex tarsalis*

Clarke, LL, Eisen, LM, Lappin, MR. Department of Clinical Sciences, Colorado State University, Fort Collins, CO

## Abstract:

The method of transmission for feline hemoplasma species is as of yet unknown. Mosquitoes are found world wide and are known to feed on cats, suggesting that they might act as an arthropod vector. 76 pools of 50 mosquitoes were captured near known feral cat colonies around Ft. Collins, CO during July 2009. DNA was extracted from pools and analyzed for presence of mammalian blood and *Mycoplasma* spp. Cats were then trapped from these sites and had blood samples taken. Blood was analyzed using PCR for presence of *Mycoplasma* and *Bartonella* DNA. Approximately 12% of feral cats samples were positive for *Mycoplasma* DNA, 0% for *Bartonella*. None of the mosquito pools were positive for *Mycoplasma* DNA or mammalian blood.

## Introduction:

The hemotropic *Mycoplasma* species *M. haemofelis*, 'Candidatus *M. haemominutum*', and 'Candidatus *M. turicensis*' have been shown to cause infectious anemia in cats<sup>3</sup>. *M. haemofelis* and 'Candidatus *M. haemominutum*' have a worldwide prevalence rate of 18.5-27%<sup>5</sup>. It is yet unknown, however, how the organism is transmitted between cats. Previous studies using fleas have failed to yield conclusive evidence of transmission, by neither fleabite nor ingestion<sup>6</sup>. Mosquitoes are found nationwide in the United States, with the species of the genera *Aedes* and *Culex* most widespread. There is preliminary evidence to suggest that mosquitoes are capable of carrying hemoplasmas<sup>4</sup>, but no data suggesting that they can transmit the organisms between cats.

## Hypothesis:

Mosquitoes are a biological or mechanical vector for *Mycoplasma* spp. infections in cats. *Mycoplasma* spp. DNA will be amplified from 20% of the sampled cats and some of the trapped mosquitoes.



Fig.3. Mosquito trap similar to those used in study

## Materials and Methods:

**Mosquitoes:** Mosquitoes were trapped using CO<sub>2</sub>-baited traps near 2 different feral cat colonies in Ft. Collins, CO. They were then analyzed by species, selecting for *A. vexans* & *C. tarsalis*, and separated into pools of ~50. Mosquitoes of neither target species were pooled separately. DNA extraction was done using a modified protocol from the Qiagen DNeasy Blood and Tissue Kit. PCR analysis for mammalian cytochrome B<sup>2</sup> and *Mycoplasma*<sup>1</sup> was done on each pool. *Mycoplasma* positive pools will be sequenced.

**Cats:** Blood was collected from cats at each location by a trap-neuter-release operation. 0.5mL blood was collected in an EDTA tube and 1.0mL blood collected in a clot tube while the cats were sedated. Blood samples were then analyzed by PCR for *Mycoplasma* and *Bartonella* DNA. A PCR assay for GAPDH proteins served as a positive control.

## Summary and Conclusions:

Of the 38 feral cats sampled, ~13% were *Mycoplasma* spp. positive by PCR and sequencing. All were *Bartonella* negative. All 76 mosquito pools collected so far have tested negative for *Mycoplasma* DNA and cytochrome B. The cytochrome B assay was found to be sensitive to at least 1.75x10<sup>-4</sup>ng/ul, indicating that most of the mosquitoes caught likely had not recently fed on mammals. These results may suggest that mosquitoes are not biological vectors for hemotropic *Mycoplasma* spp, but possibly mechanical vectors. Further studies are being planned using experimentally infected cat blood to determine if the organisms are taken up in the blood meal.

## Results of Feral Cat Blood Collection:

|            |  |
|------------|--|
| Amplicon 1 | DQ825441.1 <i>Mycoplasma haemofelis</i> isolate 14 16S ribosomal RNA gene, partial sequence  |
| Amplicon 2 | AM691834.1 Candidatus <i>Mycoplasma haemominutum</i> partial 16S rRNA gene   |
| Amplicon 3 | EU839985.1 Candidatus <i>Mycoplasma haemominutum</i> strain IT238_17 16S ribosomal RNA gene, partial sequence  |
| Amplicon 4 | DQ825441.1 <i>Mycoplasma haemofelis</i> isolate 14 16S ribosomal RNA gene, partial sequence<br>EU839985.1 Candidatus <i>Mycoplasma haemominutum</i> strain IT238_17 16S ribosomal RNA gene, partial sequence |
| Amplicon 5 | DQ825441.1 <i>Mycoplasma haemofelis</i> isolate 14 16S ribosomal RNA gene, partial sequence  |

Table 1. Sequencing results for *Mycoplasma* infected cats positive by PCR

## References:

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## Funded by:

