Session A, 2015 Second Place: The Art of War Against Tabanidae, a Survey of Tabanidae at the Cranberry Lake Biological Station

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THE ART OF WAR AGAINST TABANIDAE
A SURVEY OF TABANIDAE AT THE CRANBERRY LAKE BIOLOGICAL STATION

Nate Morse, Chelsie Beard, and Macie Edwards

Photos courtesy of Macie Edwards, Marion Friedrich, Nate Morse (respectively)
Over 4000 species of tabanidae

KNOW THY ENEMY

Life Cycle of Horse Flies

Eggs
(1 - 3 mm long)
Laid in a single mass of 100 - 800 eggs. Eggs of many species laid on the underside of leaves. Eggs hatch in 2 - 3 days; first larval stage drops off leaf.

Pupa
(10 - 30 mm long)
Pupal stage is completed in 1 - 3 weeks. Pupa is 10 - 30 mm long, depending on species.

Larvae
(10 - 30 mm long)
Larvae of most species develop in wet habitats. Number of larval stages range from 6 - 13 (only 6 are shown). Last stage larva 10 - 30 mm long, depending on species. Last stage larva over-winters, molts to pupa the following spring.

Adult
(10 - 30 mm long)
Male and females emerge in late spring-summer, depending on the species. Males and females feed on nectar and mate. Females feed on blood and develop eggs.
REASON FOR WAR

- Female tabanids need a blood meal for their egg production (Herczeg, 2015)

VS

- Blood borne diseases
- Milk production
- Animal stress (Baldacchino, 2014)
- Annoying

PHOTO COURTESY OF SABRINA CAMPAGNA (FLICKR)
KNOW THY ENEMY

- Active from 0700 h to 1900 h (est)
- Most active 89.6° F and 35% humidity (Herczeg, 2015)
THE BLUE CUP HYPOTHESIS

PHOTO COURTESY OF JEFF ZABLOW
Hypotheses

- Hypothesis 1 - More adult Tabanidae will be found at Forsaith Bog than Sucker Brook.
- Hypothesis 2 - Tabanid activity is influenced by temperature, humidity, and time of day, peaking between the hours of 12:00-13:00.
- Hypothesis 3 - There will be a negative correlation between tree branch height and number of egg clutches found on that branch.
BATTLE GROUNDS

Photo courtesy of Google maps
THE PLAN OF ATTACK

- Malaise trap
  - Photo courtesy of Macie Edwards
THE PLAN OF ATTACK

KILL THE OFFSPRING

Egg search

Photos courtesy of Nate Morse
VARIABLES

- Weather
- Weather
- oh and Weather
- Location, location, location
TABANID ACTIVITY

T-test results
P-value = 0.002

Fig 1. Average tabanid activity over a 12 hour period at Forsaith's Bog and Sucker Brook at Cranberry Lake Biological Station
TEMPERATURE AND HUMIDITY

Figure 2: Effect of air temperature on tabanid activity, recorded every two hours over twelve hour period for five days.

Figure 3: Effect of air humidity on tabanid activity, recorded every two hours over twelve hour period for five days.
EGG CLUTCH COUNT

Correlation test results
P-value = 0.843

Fig 4. Egg clutch height (m) above water
CONCLUSIONS

- Blue cup not effective
- Most active at higher temps and low humidity
- Prefer stagnant over fast moving waters
- They tend to lay their eggs between 1.0 – 2.0 meters above the water in Yellow birch and Red maple saplings
FUTURE STUDIES

- Physical
  - Nzi trap
- Biological
  - Horse guard wasp
  - Sand wasp

• Photo courtesy of Rincon-Vitova Insectaries
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