



In Search of a Good Meal: Varroa destructor regularly switches between adult bee hosts to feed

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Do the words we use matter?

Phoresis: When one organism attaches itself to another organism solely for the purpose of travel.

In Vector Capacity Models

- Number of bites
- Proportion to host
- Intrinsic and extrinsic incubation periods
- Daily survivorship



Are varroa feeding when it is in between the tergites of a bee?

Are varroa actively switching from one adult bee to another?

Do mites switch from one adult host to another adult host?

- Establish cages of individually painted newly emerged bees.
- Incubate 4 days
- Place one mite in each cage
- Locate the mite each day and record the bee it is on and position.





We record on which bee, and location of the bee:
direct feeding position- between tergites
not feeding position- thorax, visibly on abdomen, between head and thorax

Using fluorescent micro-spheres to track varroa feeding



Inject pupae with fluorescent beads

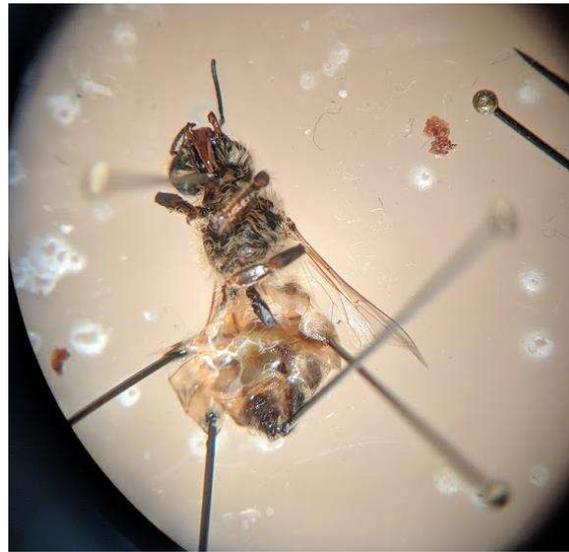
Place pupae with mites in 00 gel cap for 48 hours

Record location of varroa each day

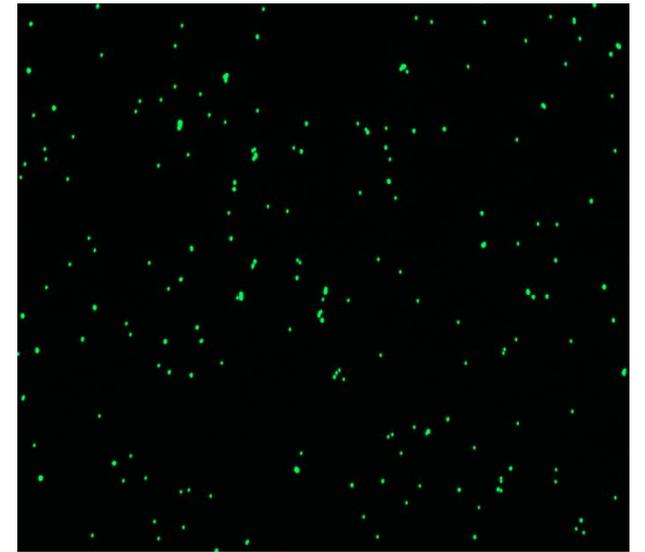
Finding the fluorescent spheres



Record where the mite is feeding

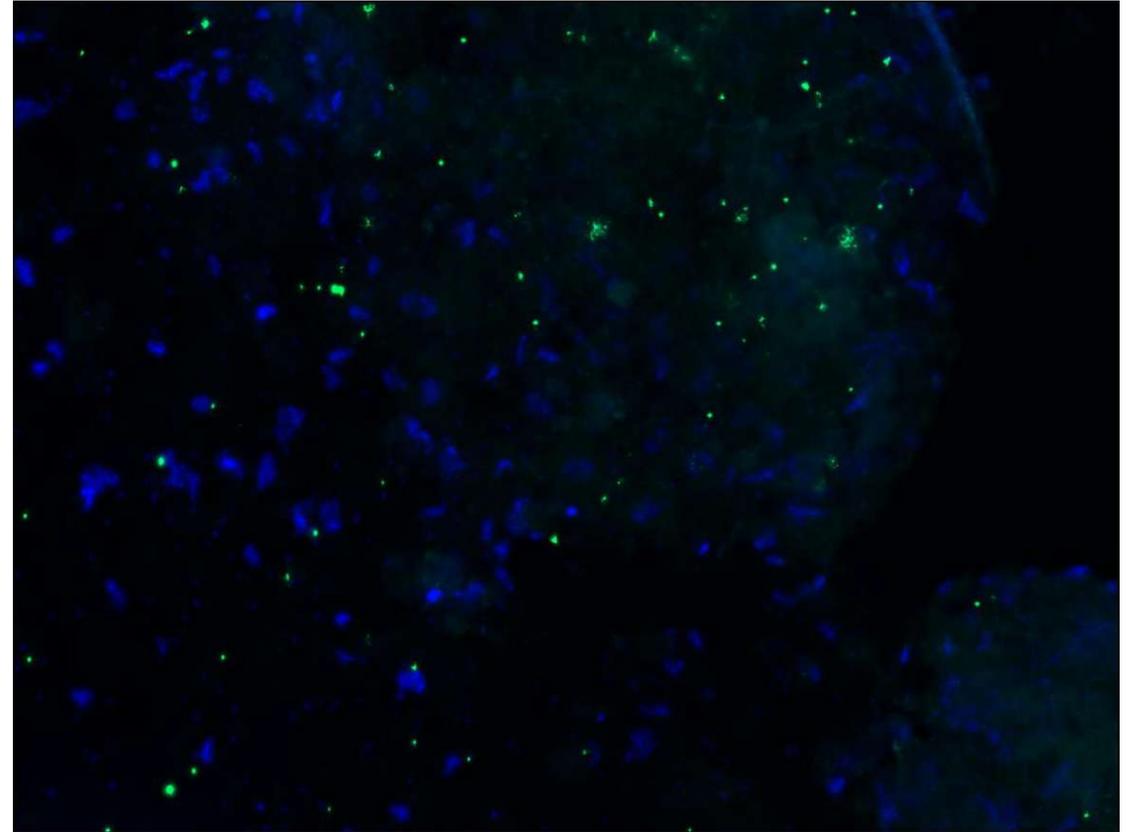
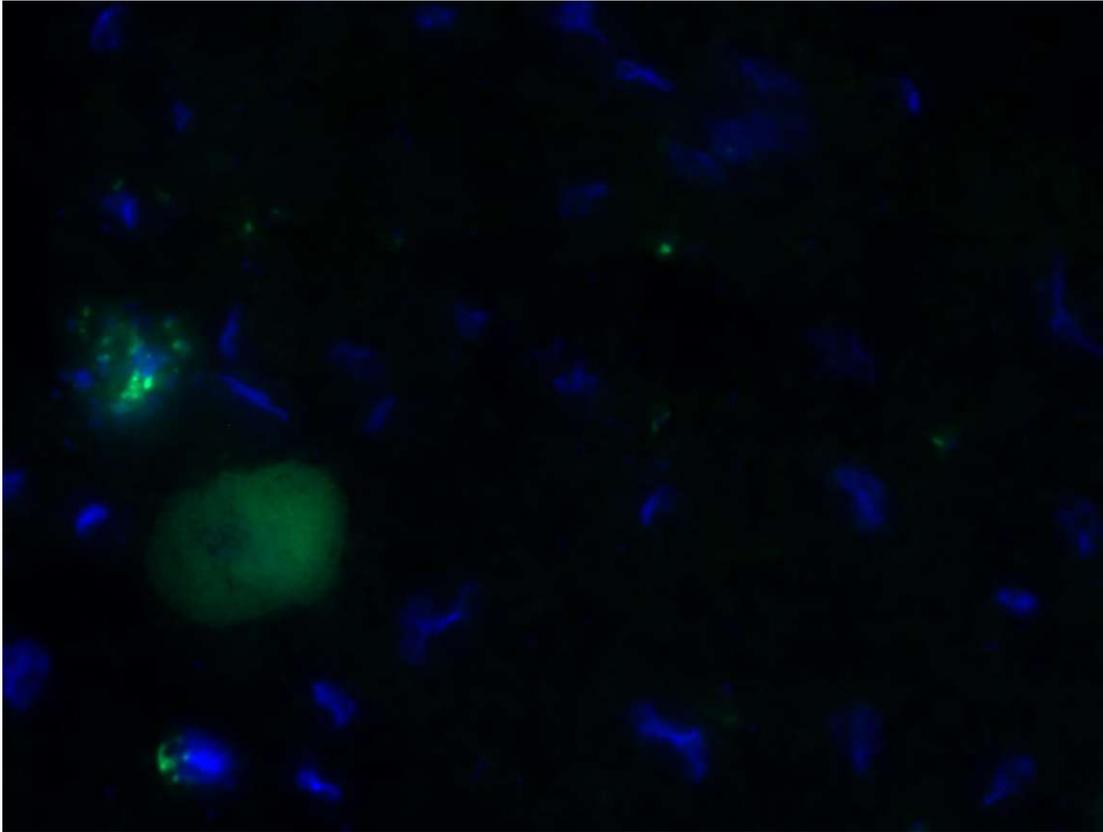


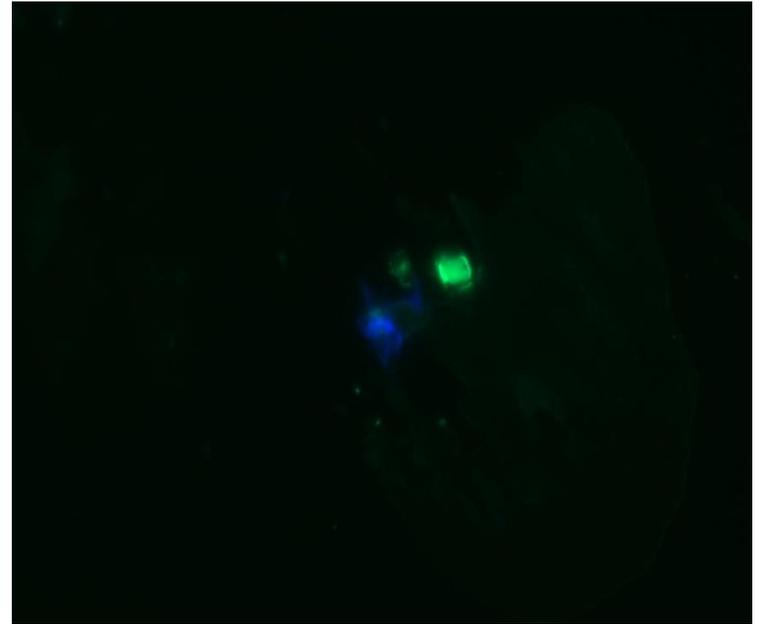
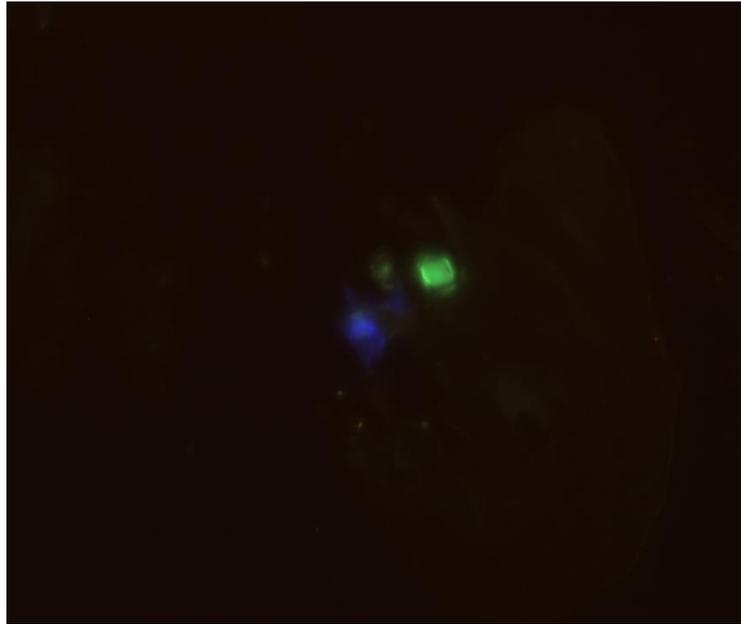
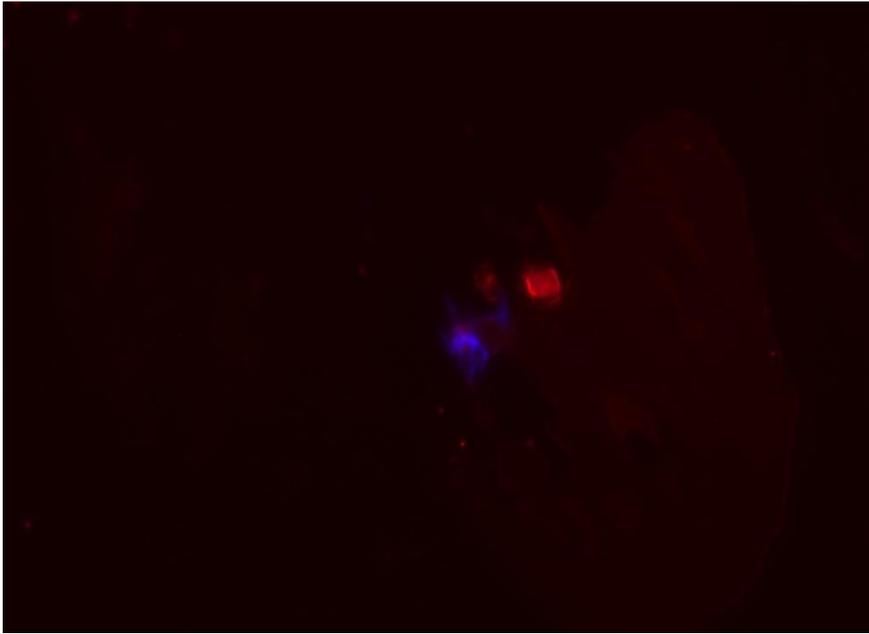
Dissect the bee, and collect tissue from that region; avoid the digestive tract



Locate beads via fluorescent microscopy

FITC (GFP) Microspheres with DAPI (Blue) Counter Stain



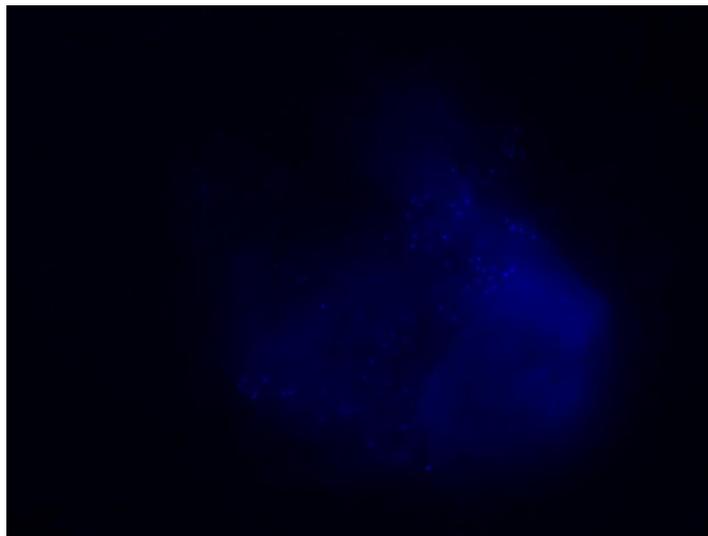


False Positives and auto-
fluorescence

Control and DAPI Microspheres in varroa destructor



control



With DAPI spheres



Control and DAPI Microspheres in adult bee (post varroa feeding)



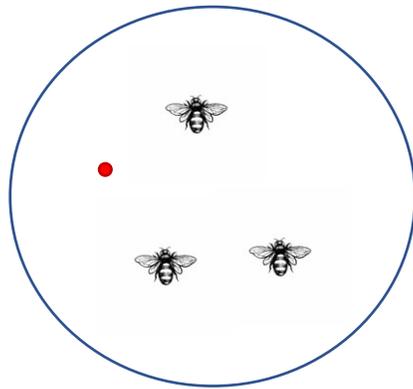
Groups

No Mite
Mite + PBS
Mite + DWV-A/B
Mite + DWV-A
Mite + DWV-B

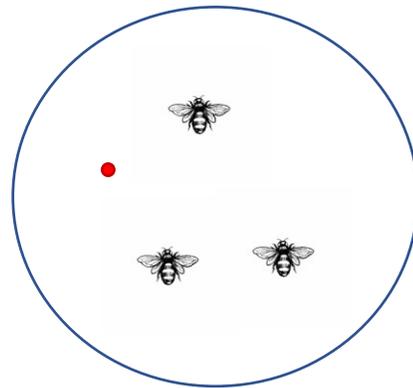
N= 10 per group

50 total cages
8 bees per cage

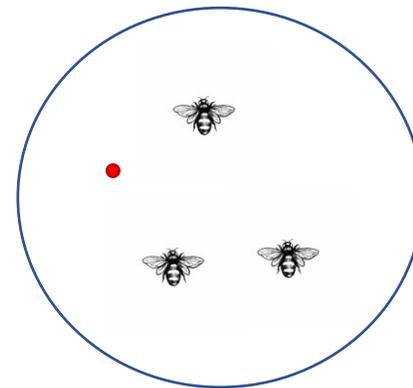
Examining direct feeding and host switching with virus



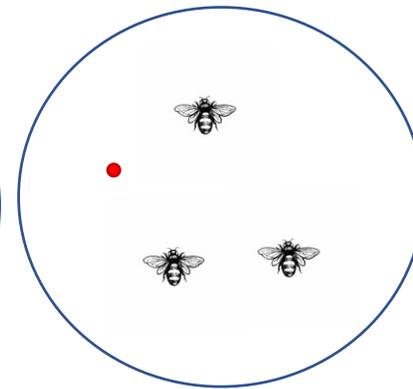
No Mite
N=10



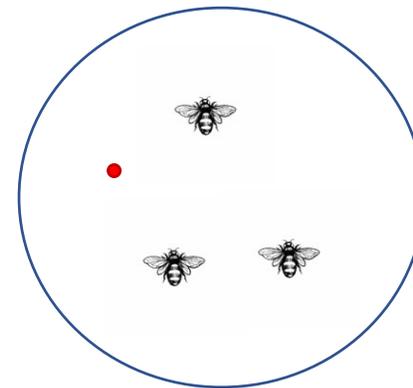
Mite + PBS
N=10



Mite + DWV-A/B
N=10

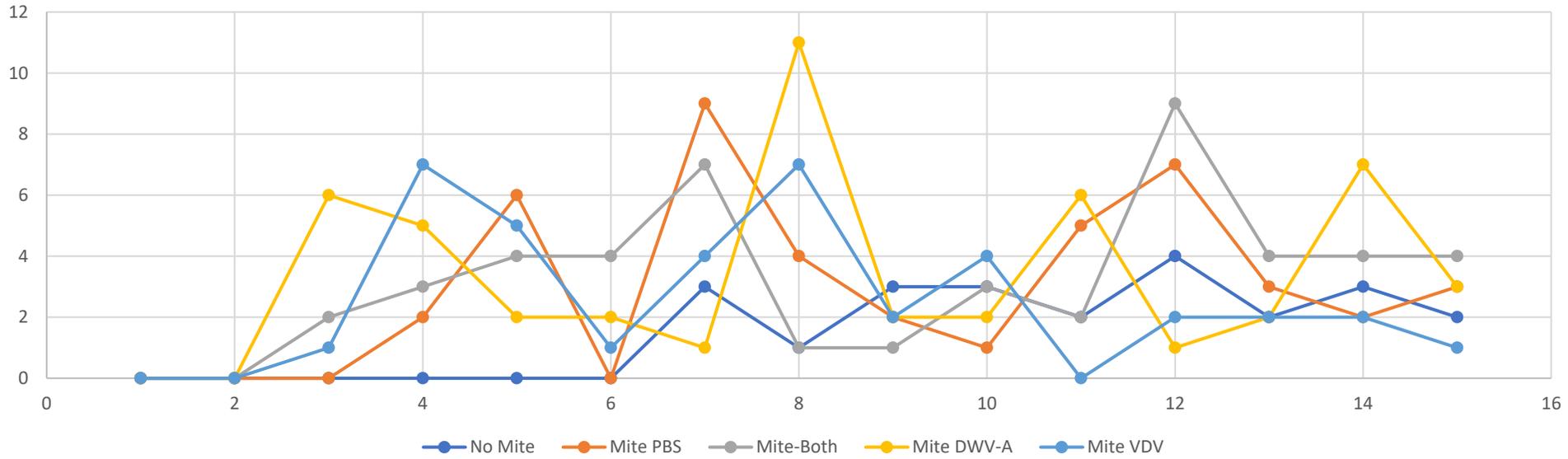


Mite + DWV-A
N=10

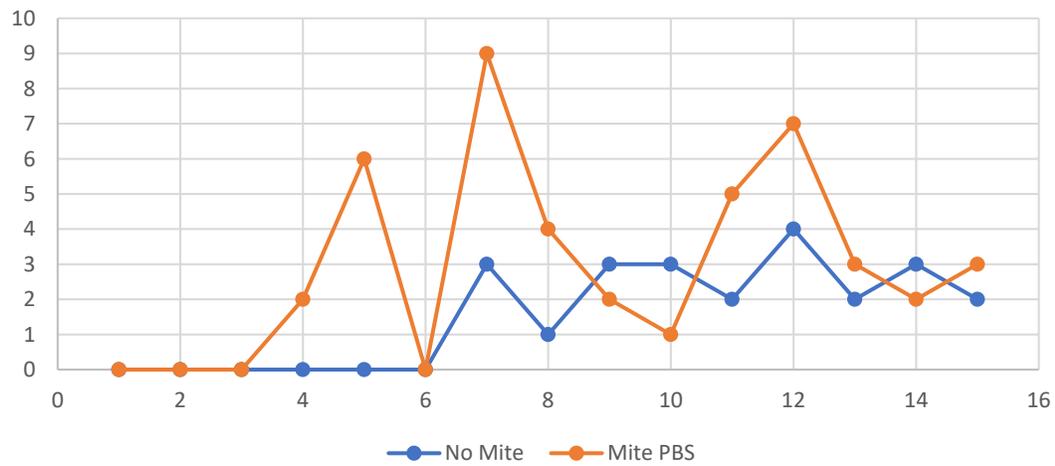


Mite + DWV-B
N=10

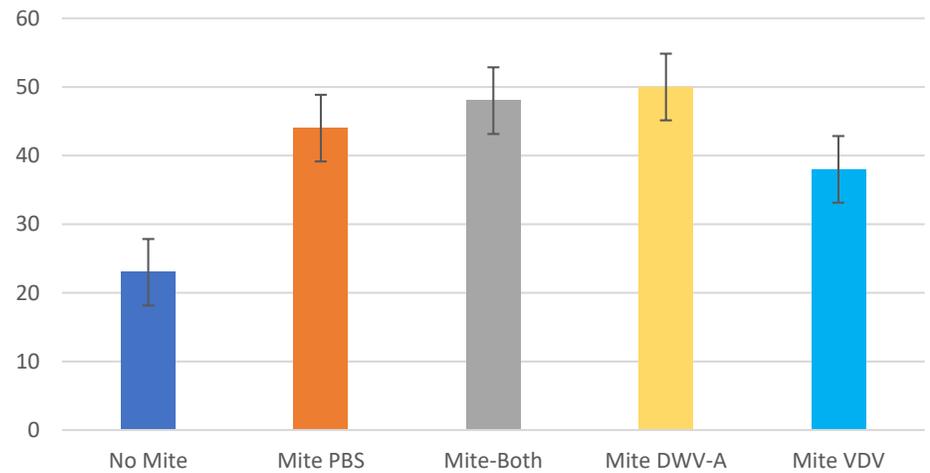
Bee Mortality per day



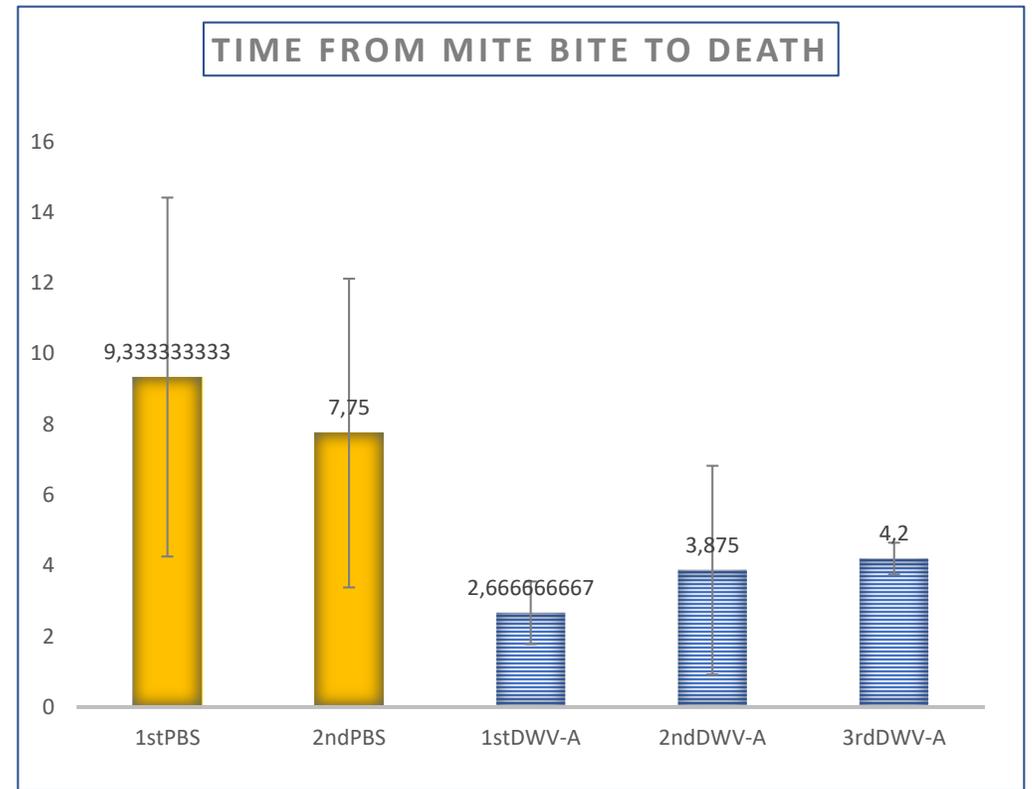
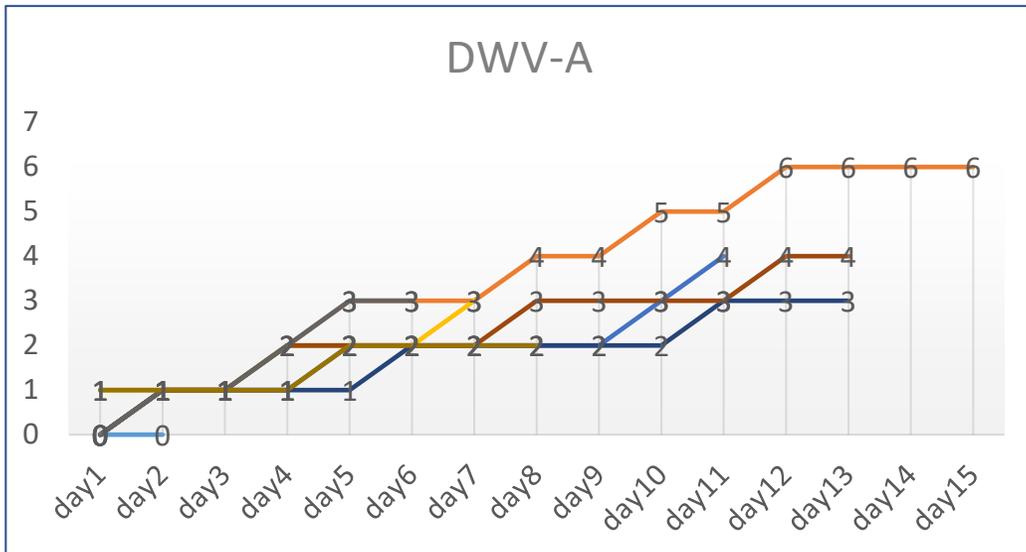
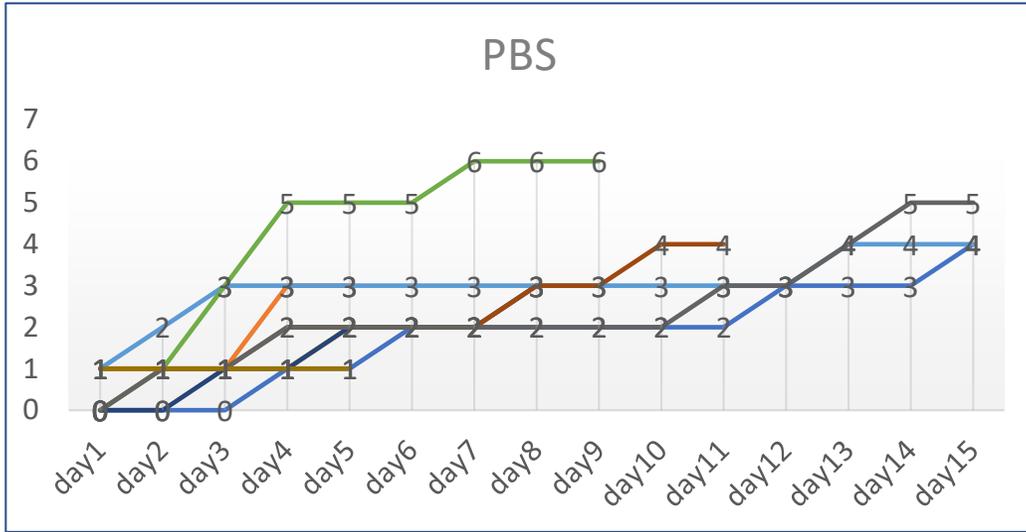
Mite vs No Mite



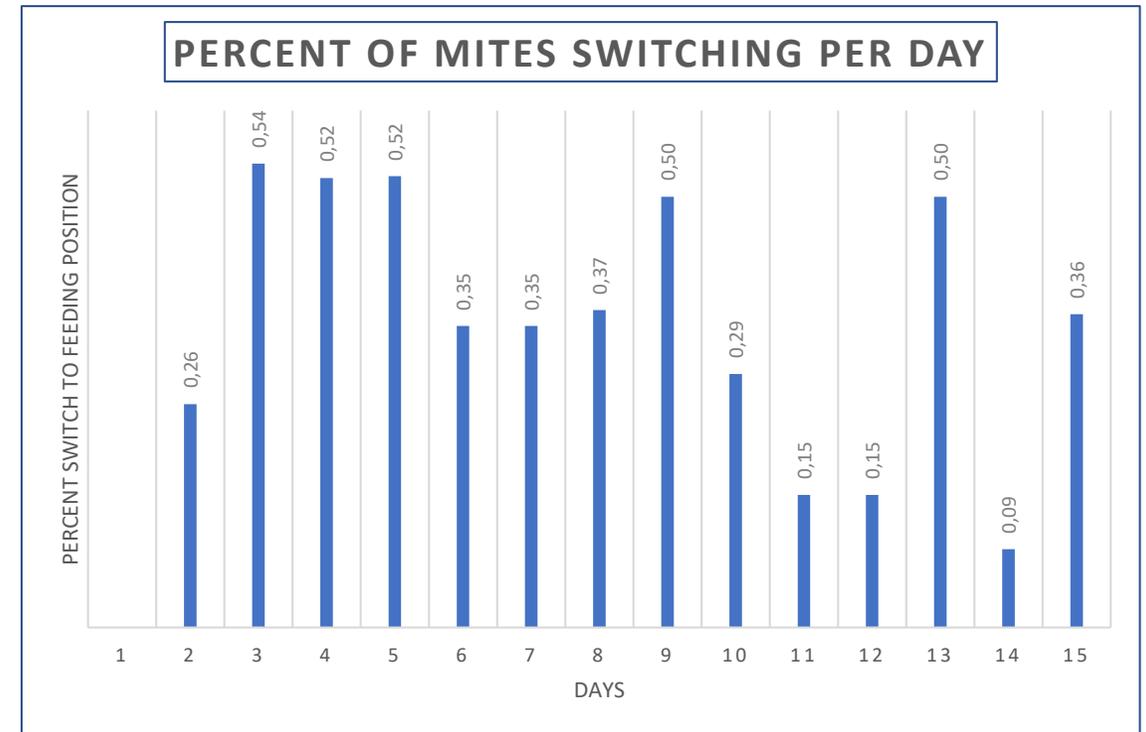
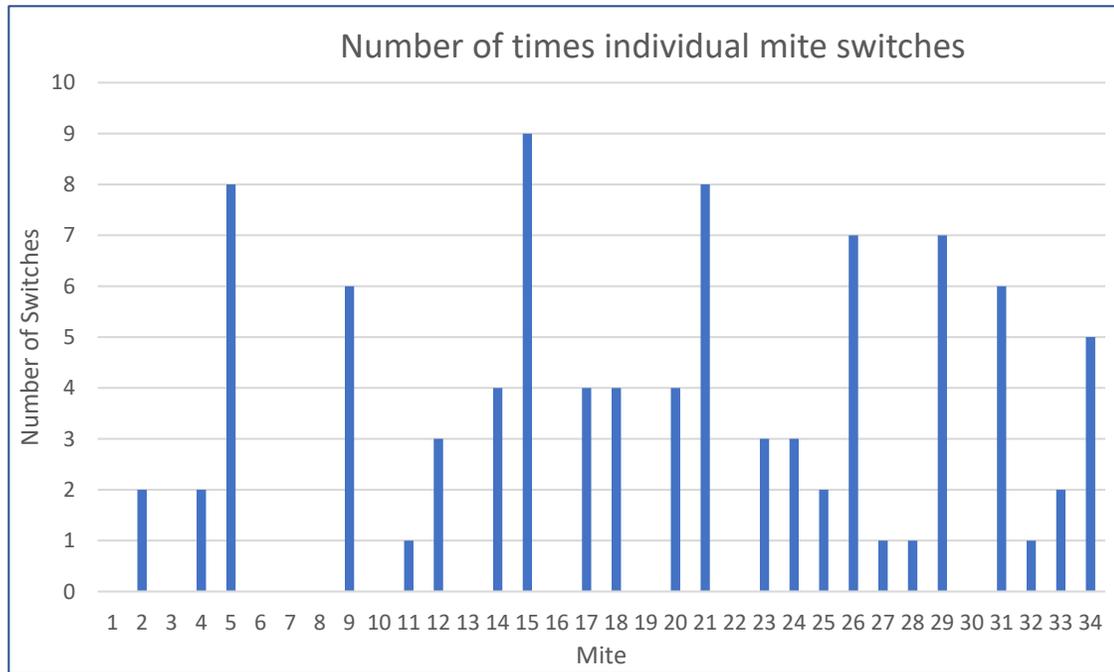
Total Bee Loss per Treatment Group



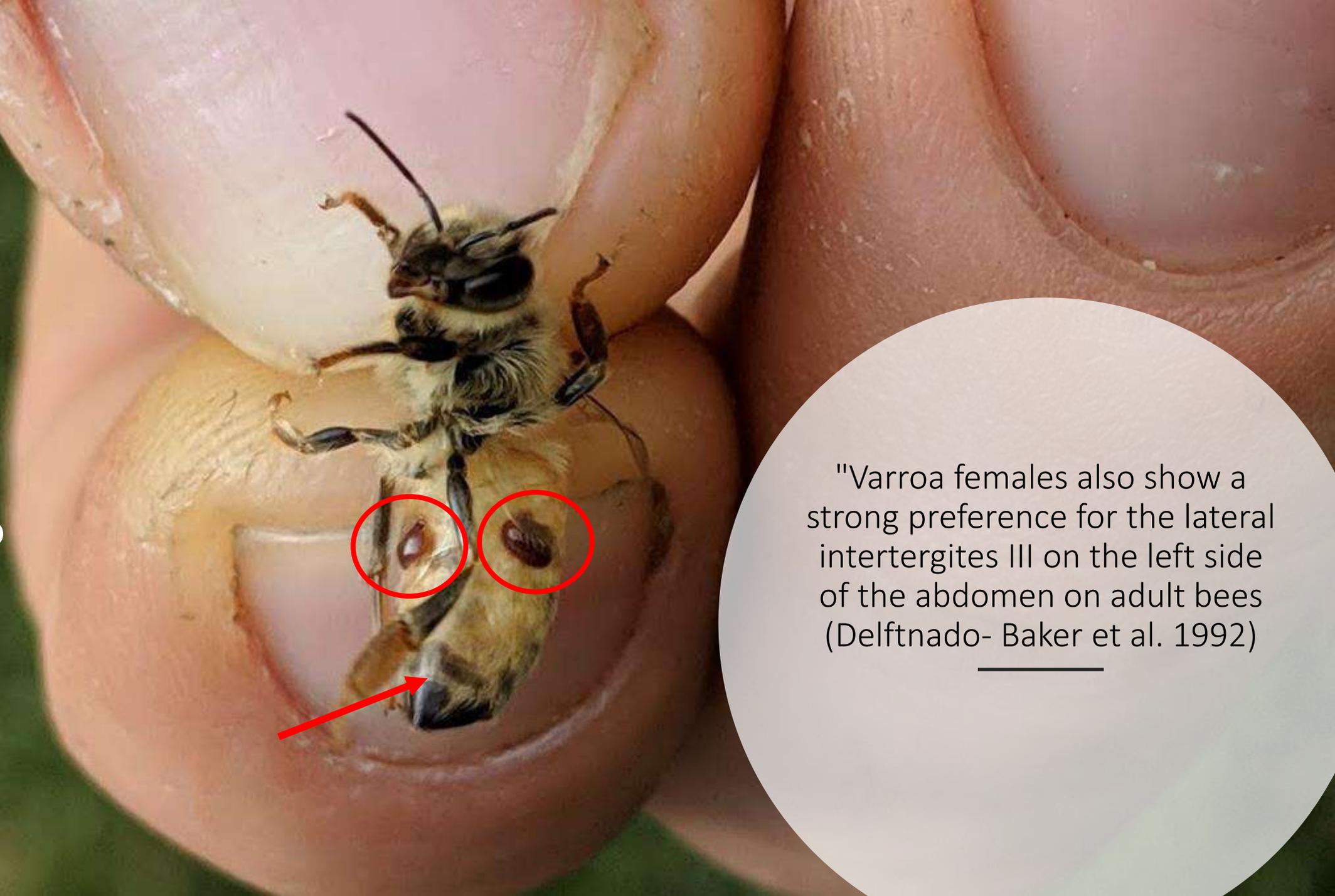
Observing host switches and direct feeding



Ongoing analysis: varroa switching rate is not uniform or constant



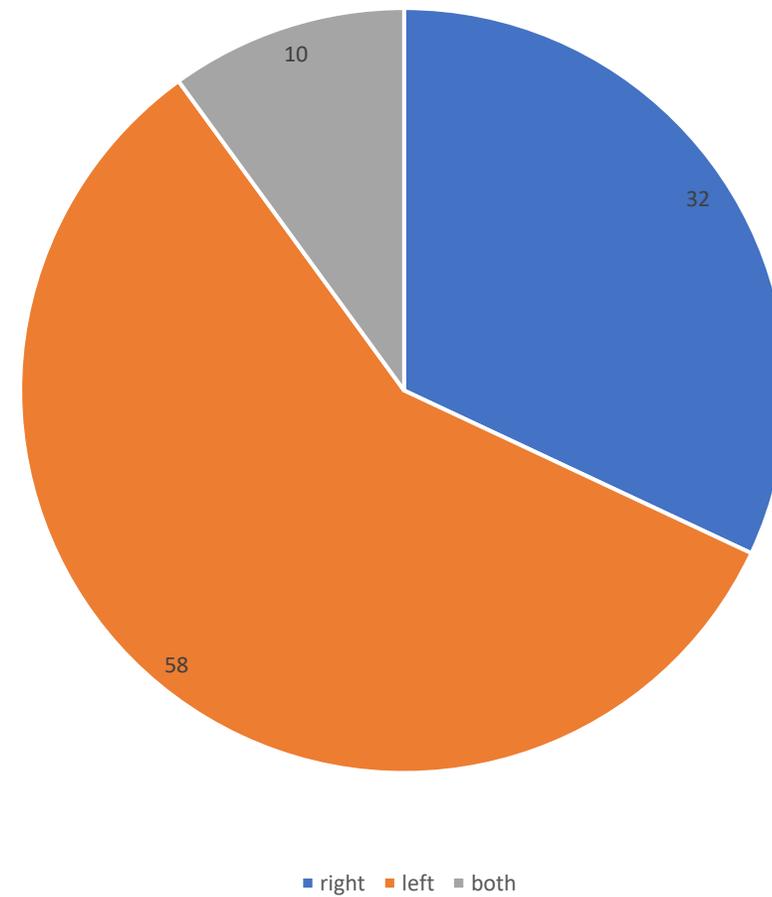
Right or Left Handed?



"Varroa females also show a strong preference for the lateral intertergites III on the left side of the abdomen on adult bees (Delftnado- Baker et al. 1992)

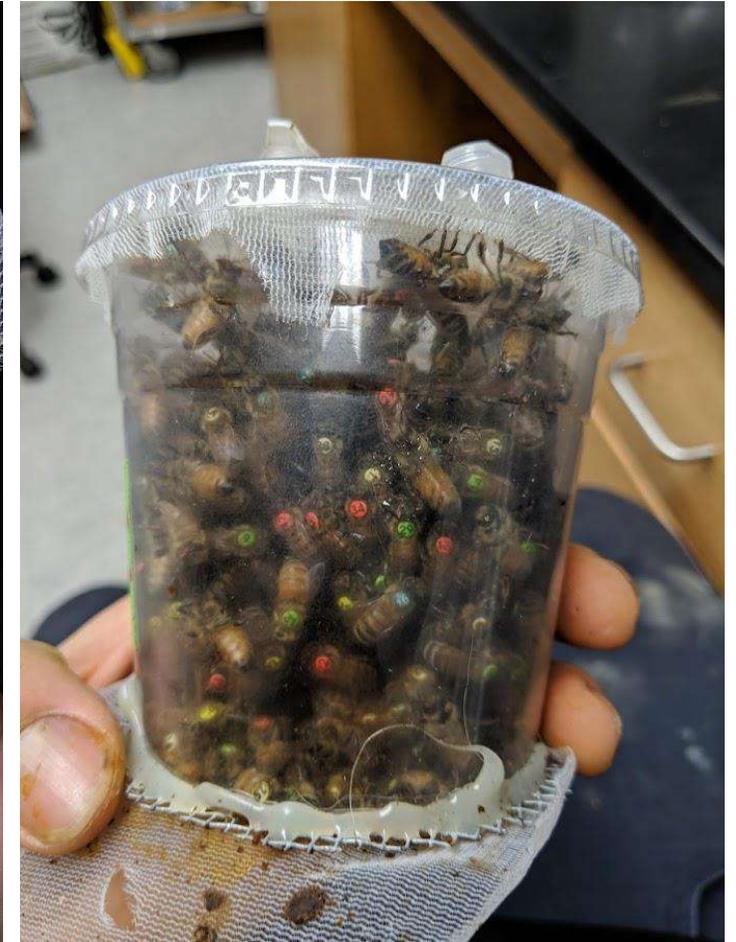
Percent
varroa
selecting one
side of bee

Percent varroa that feed on side of bee



N = 50

Nano colonies-
less removed
from colony
settings





THANK YOU!!!!

- Kirsten Traynor
- Eugene Ryabov
- Matt Heerman
- Daniel Sonenshine
- Serhat Solmaz
- Steve Cook
- David Hawthorne
- Dennis vanEngelsdorp (Advisor)

Project *Apis m.*

