

Monitoring and Early Detection of Asian Longhorned Beetles, *Anoplophora glabripennis*

Maya Nehme ⁽¹⁾

Melody Keena ⁽²⁾, *Aijun Zhang* ⁽³⁾

(1) PennState University- Entomology Department, University Park, PA

(2) USDA- FS- Northeastern Research Station, Hamden, CT

(3) USDA- ARS- Beltsville, MD

Asian Longhorned Beetle Lifecycle



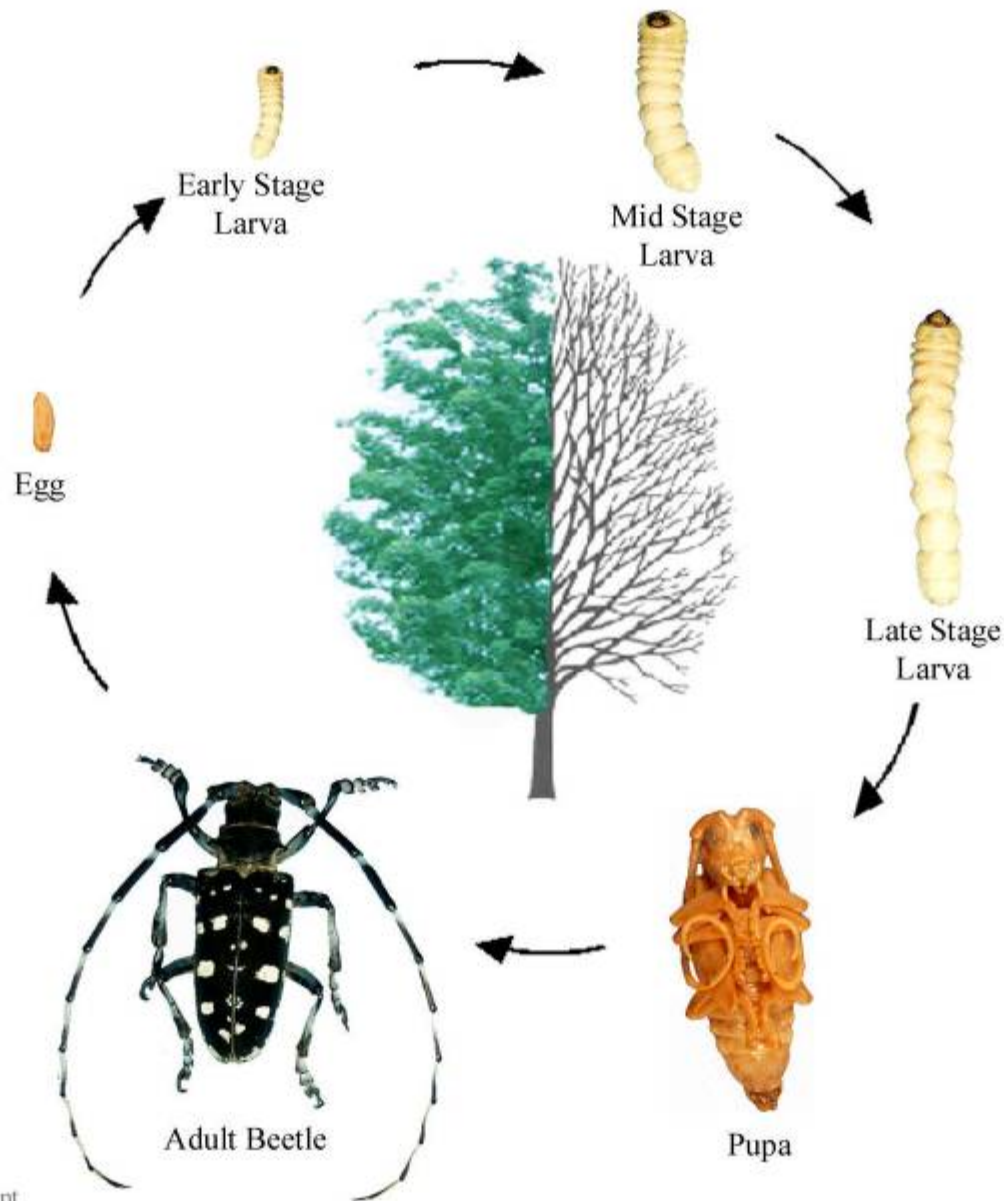
Adults and oviposition scars



Emergence holes



Adult emerging from tree



Larva in tree



Pupal chamber in tree

Survey & Detection





Male Pheromone

Male pheromone is a 1:1 (v/v) blend of
dialkylbenzylacetate

4-(*n*-heptyloxy)benzylacetate (alcohol)

4-(*n*-heptyloxy)benzylacetate (alcohol)



3rd Phomone



Male-produced
volatile pheromone

Laboratory
assays

1- Tubes
2- Y-olfactometer

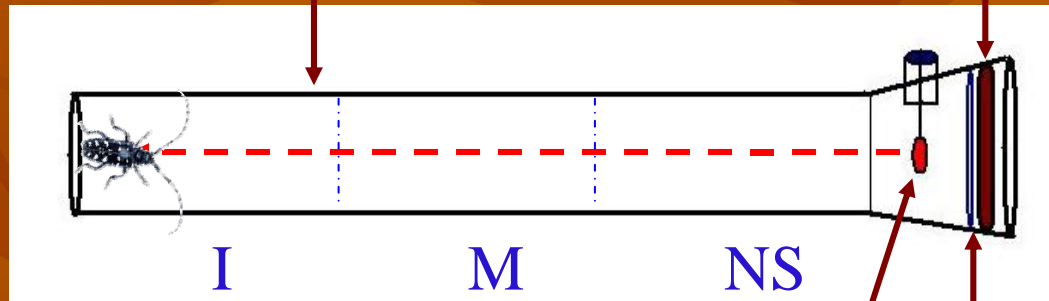
Trapping
Experiments

1- Greenhouse
2- China

Laboratory bioassays

150 x 10 cm
glass tube

12 V Fan



Cotton
wick

Fine screen



Laboratory Results

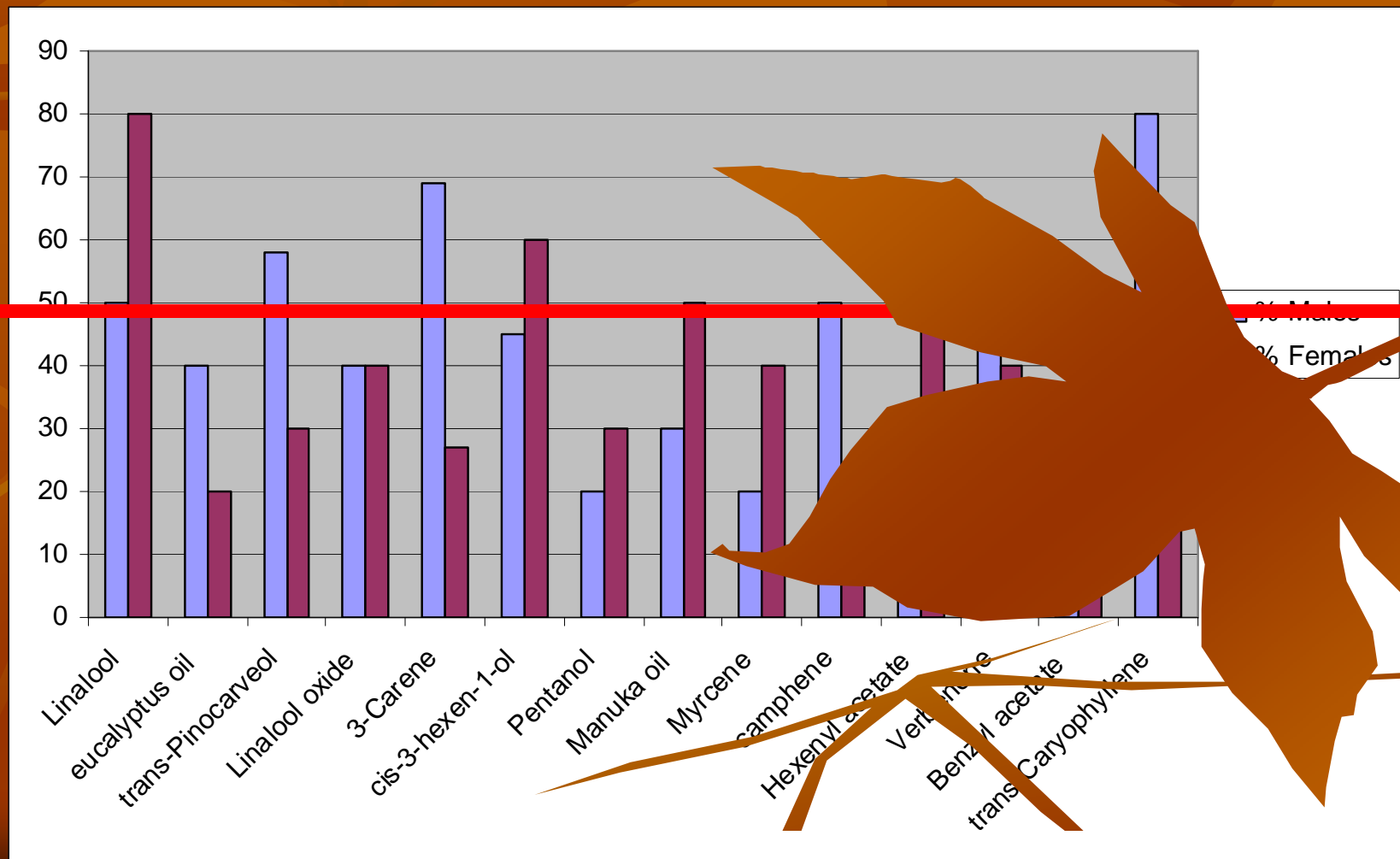
Activity	Virgin	Mated
Males	A	C
Females	B	D

Alcohol	Virgin	Mated
Males	B	C
Females	A	D

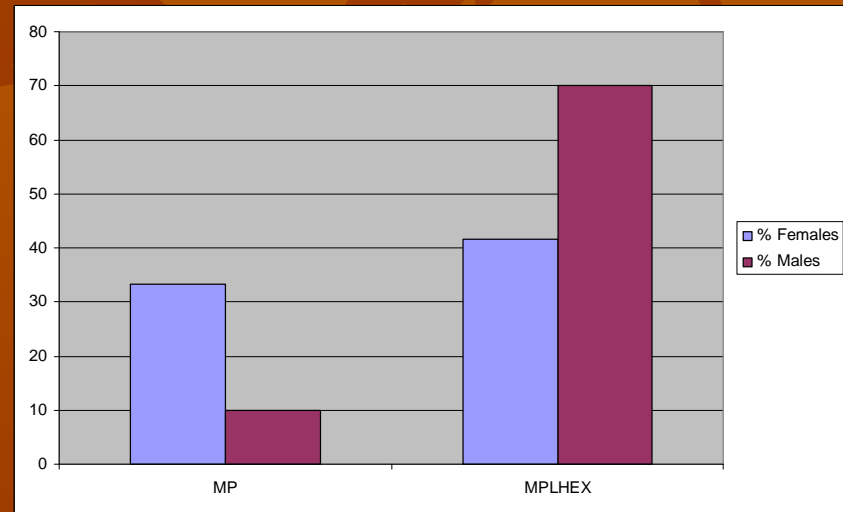
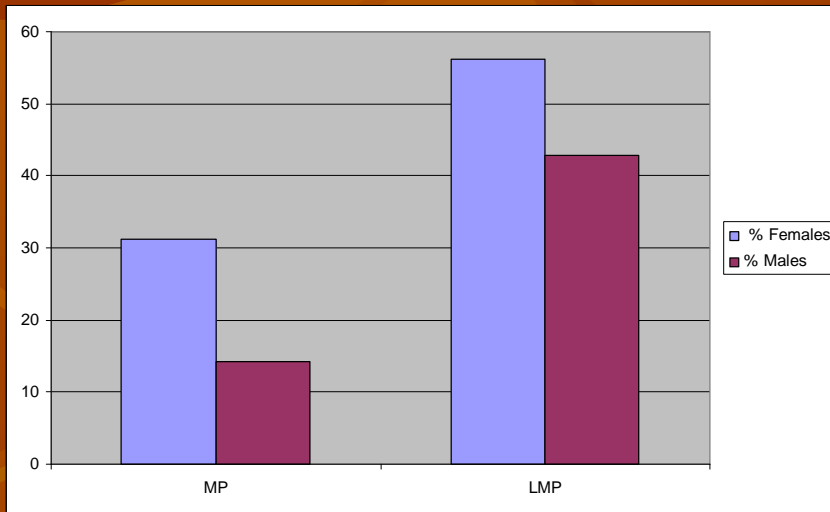
Virgin females significantly attracted to 1 μg alcohol

Y-olfactometer bioassays for plant volatiles

- 14 plant volatiles tested



Combining plant volatiles to ALB male-produced pheromone



Greenhouse Trapping

- 1- Test attraction to field-produced pheromone
- 2- Test attractiveness of lures
- 3- Determine the most efficient trap design



Intercept PT



Screen sleeve

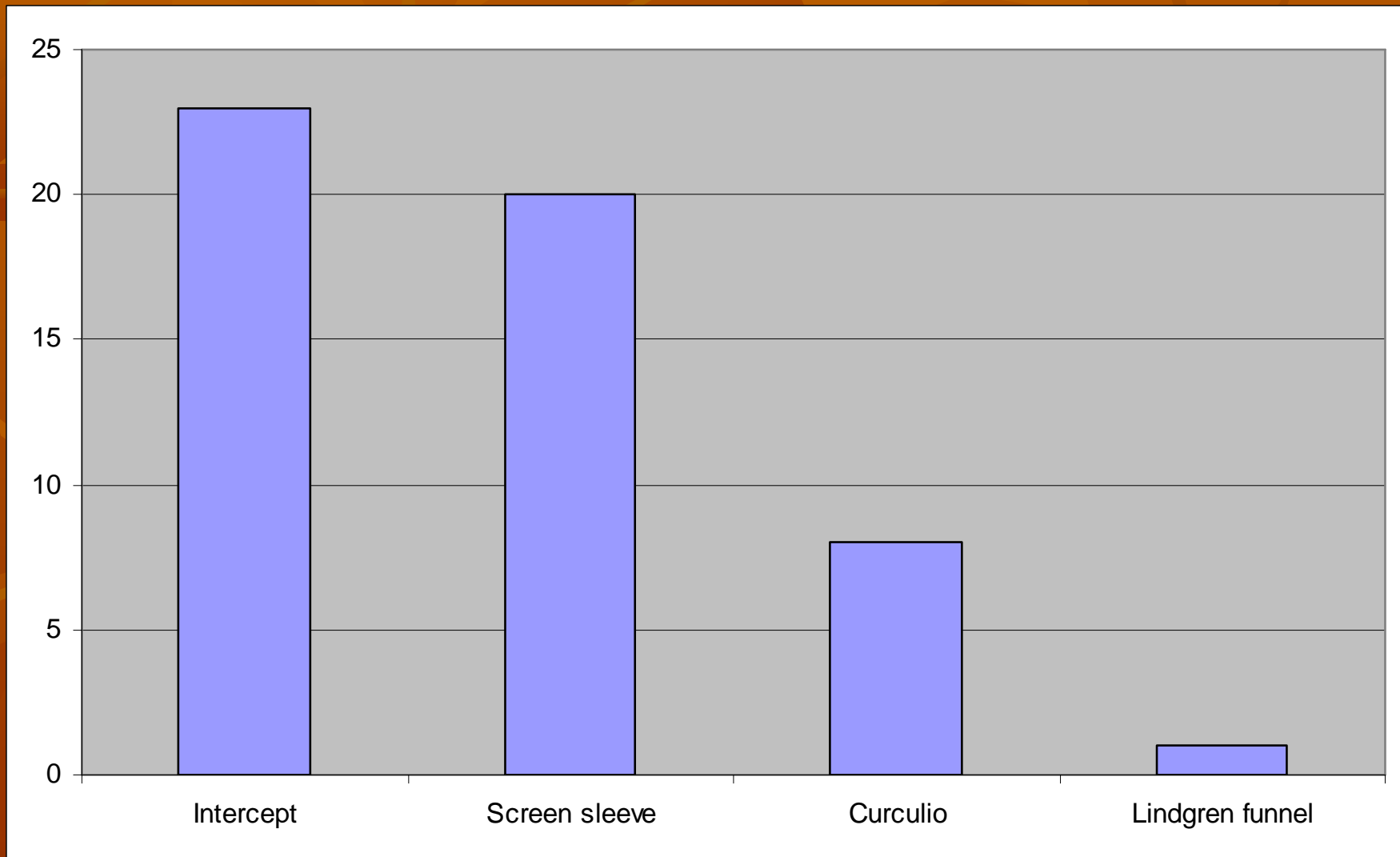


Curculio

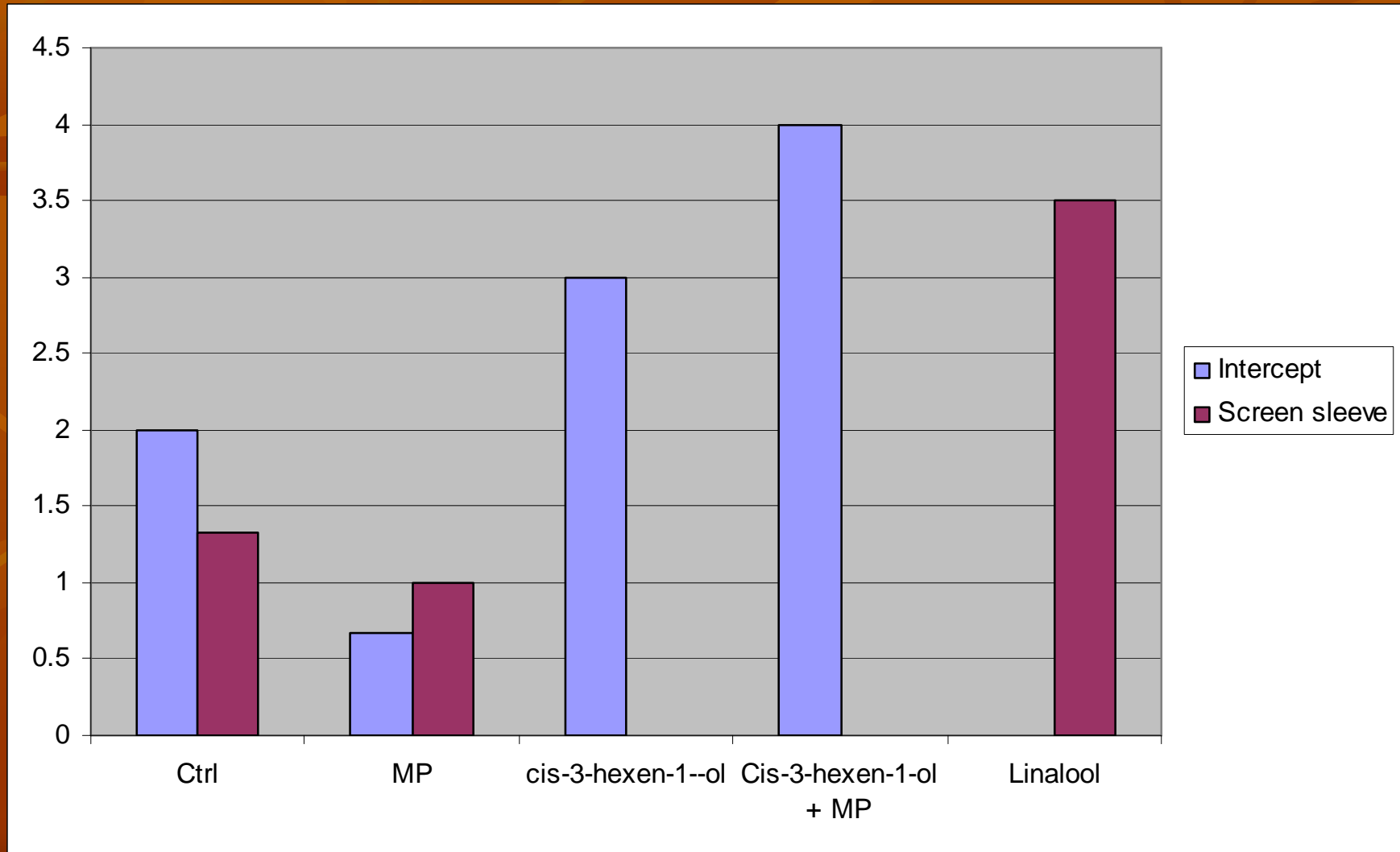


Lindgren
funnel

Total trap catches/trap design



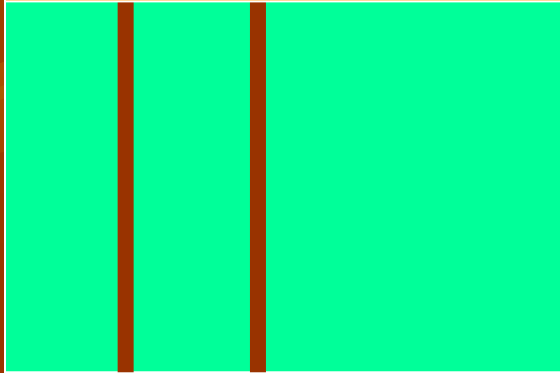
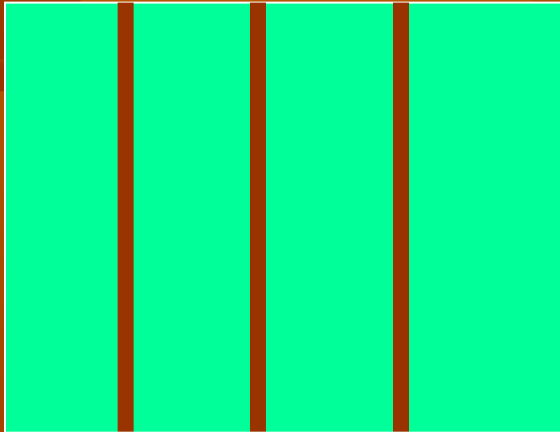
Mean trap catches/week/lure



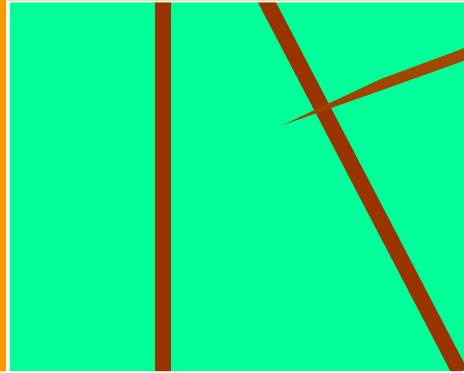
Trapping ALB in China



1 2 3



4 5



6 7

Quang Xia

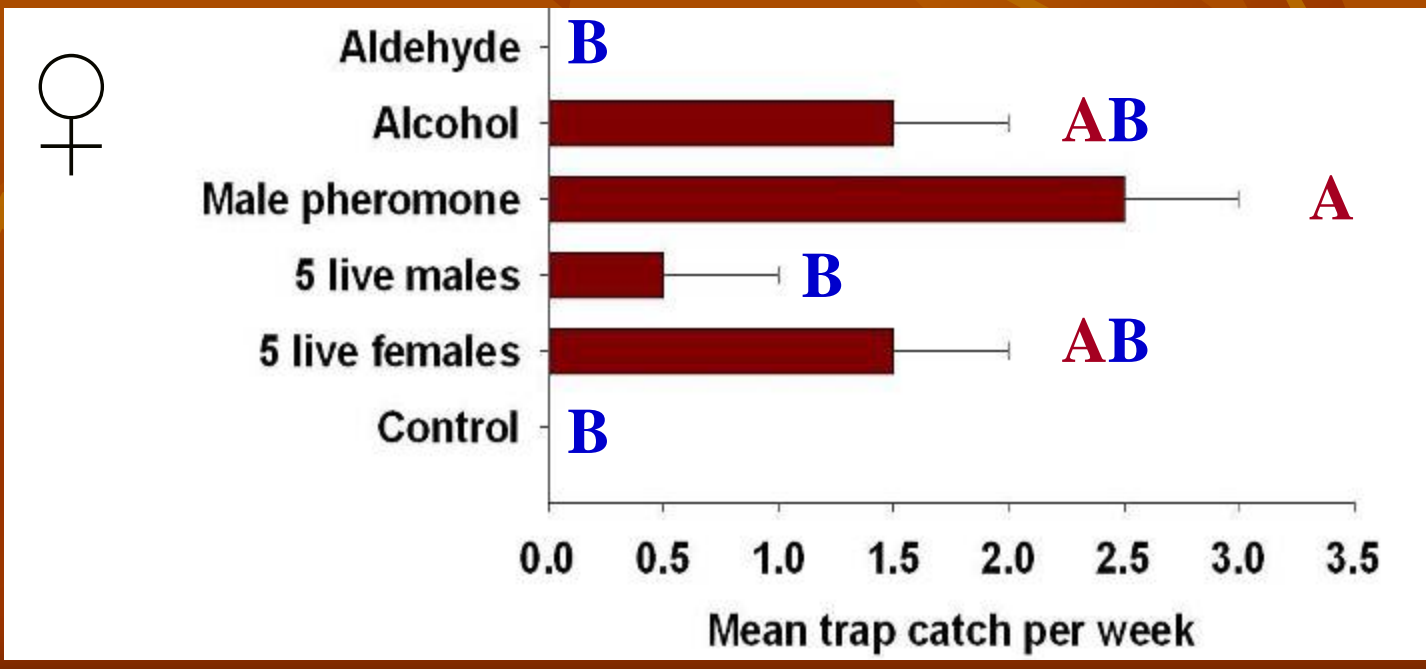
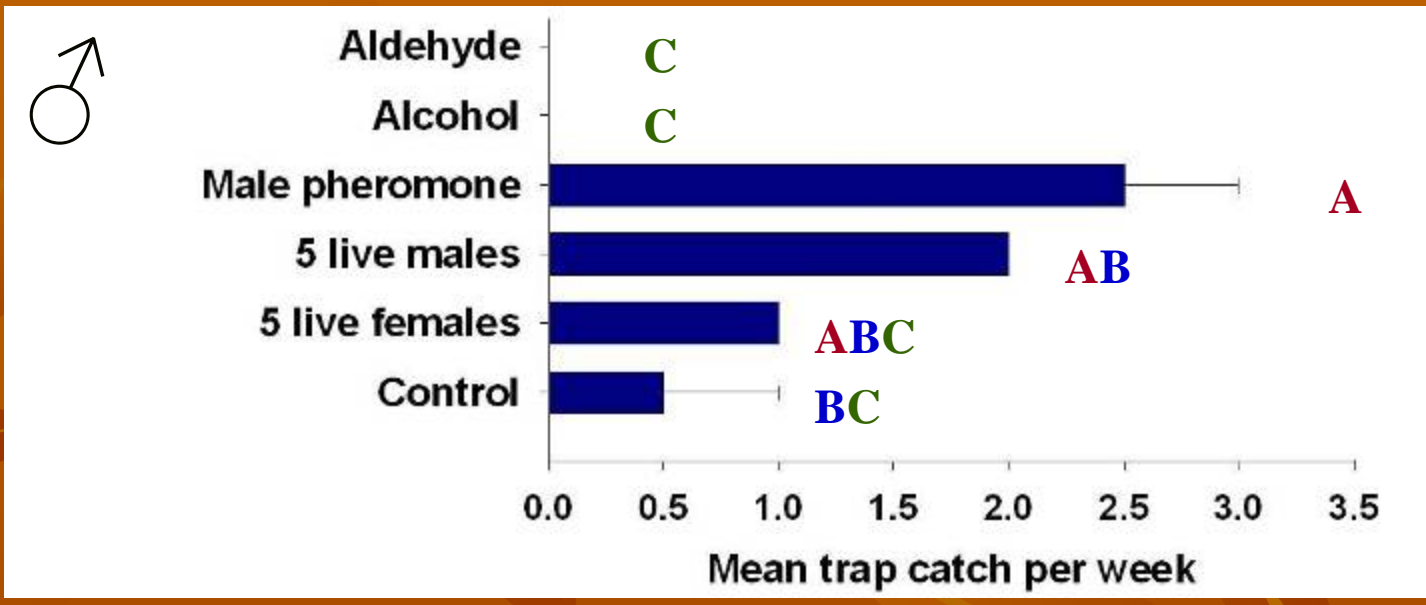
Qingtong X a city

Ningxia

China

Traps





Summary

- The alcohol is the major attractant in ALB male-produced pheromone for females
- Adding the alcohol to the alcohol enhances males' attraction
- Adding plant volatiles to MP increases attractiveness
- Screen sleeve traps and funnel traps are the best trap designs to be used.
- MP can be used for monitoring ALB in the field

Thank you!!!

USFS Lab team- Ansonia
Vic Mastro, Dave Lance
Baode Wang, Joe Francese
ALB program – Amityville
Edwin Rajotte Ann Hajek
Larry Hanks Jacob Wickham
Baker and Tumlinson's labs at
Penn State



Funding:

- Horticultural Research Institute
- Alphawood Foundation
- USDA-APHIS