

Pollination Biology of Alaska Bog Blueberry, *Vaccinium Uliginosum*

Tina M. Buxbaum, University of Alaska Fairbanks
 Dr. Patricia S. Holloway, University of Alaska Fairbanks



Objectives

- Pollen Transfer
 - Is transfer necessary?
 - What is pollinating?
 - Management practices?
- Flower Biology
 - How long is bloom?
 - How is pollen released?
 - Length of stigmas receptivity?
 - Floral nectar and how much?



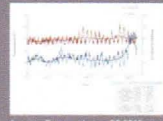
Insect Capture & 24-hour Video Observation

Top 5 Upland Pollinator Species	Top 5 Lowland Pollinator Species
<i>A. ruficeps</i> Smith	<i>A. ruficeps</i> Smith
<i>A. mellifera</i> L.	<i>A. mellifera</i> L.
<i>A. lucorum</i> Kollar	<i>A. lucorum</i> Kollar
<i>A. flavipes</i> Curtis	<i>A. flavipes</i> Curtis
<i>A. dorsata</i> Halictus	<i>A. dorsata</i> Halictus
<i>A. ventralis</i> Smith	<i>A. ventralis</i> Smith

*Activity observed between 8am-midnight
 *More activity at lowland sites compared to upland sites.
 **Apis mellifera* at lowland sites only.

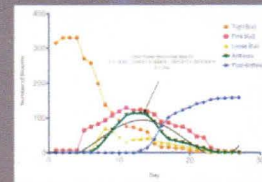


Greenhouse Environmental Conditions



Average Temperature = 59.85°F
 Average Relative Humidity = 28.42%

Bloom Progression Under Greenhouse Conditions



1. Tight bud stage



2. Pink bud stage



3. Loose bud stage

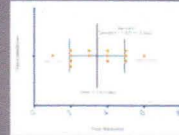


4. Anthesis stage - open bloom

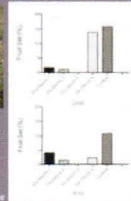


5. Post-anthesis stage

Stigma Receptivity Under Greenhouse Conditions

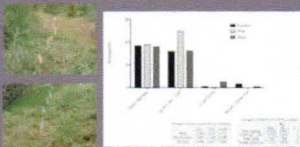


Fruit Set Under Open and Restricted Pollination Conditions



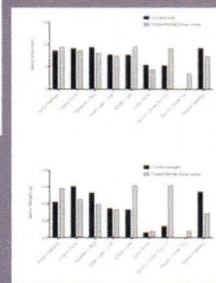
Methods:
 • Insect Visitation restricted
 • Fruit set recorded
 Results/Discussion:
 • Entomophilous plant
 • Fruit set possible in the absence of pollinators

Attracting Bumble Bees: Year 1



Methods:
 • 10m plots with blue and pink flagging
 • Fruit set was recorded
 Results/Discussion:
 • Significant variation between locations

Attracting Bumble Bees: Year 2

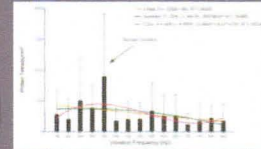


Methods:
 • 1m plots with and without blue vane traps
 • Fruit set recorded
 Results/Discussion:
 • Locations, climatic and environmental conditions varied
 • Impossible to locate controls outside of foraging range
 • All locations had native pollinator (*Bombus* spp.) habitat

Nectar Observed Under Greenhouse Conditions



Vibration and Pollen Release Under Greenhouse Conditions



Resonance digitally recorded at 250-300Hz



Overall Conclusions

- In the field:
 - Bumble bees and honey bees (*Apis mellifera*) visit blueberry bushes
 - Bumble bees carry highest pollen loads
 - Variation between upland and lowland species
 - Can set fruit without pollinators
 - Fruit set better under open pollination
 - No success in attracting bumble bees (*Bombus* spp.)
- In the Greenhouse:
 - Will bloom for ~ 3 weeks
 - Peak bloom ~ 12:13pm day
 - Stigmas receptive for average of three days
 - Produces floral nectar
 - Quantity inconclusive
 - Pollen released from flowers by vibration



Recommendations: Management and Future Experimentation

- Ensures adequate natural habitat close to blueberry fields:
 - Natural attractant properties of the blueberry can be most effective
 - *Apis mellifera* could be used to ensure fruit set
- Further study on nectar quantity:
 - Improved methodology and technique
 - Replication with plants grown under field conditions
- Replication of bloom progression and stigma receptivity experiment under field conditions



