Assessing Watermelon Pollination in the East

We have provided a data sheet that can be taken into the field. Observe your crop during full bloom, on sunny, calm days between 9-11am. There should be little to no wind and the temperature should be above 65°F. Try do the assessment two or three times during bloom.

1.) Observations

Choose 5 open flowers close enough to each other so you can watch them all at the same time. Make sure that your shadow doesn't fall over the flowers. Start a timer and for 1 minute and record the number of times a bee visits any of the 5 flowers. Separate visits into the four groups of bees using the photographs on the "Types of bees" page. You do not need to record other non-bee visitors (e.g. wasps, flies). The goal is to count the number of visits to the 5 flowers by each type of bee. Because you are counting the number of visits to the 5 flowers, not the number of bees, if the same bee moves from one flower to a second flower it counts as two visits.

- Record the number of visits by each type of bee during the first 1 minute observation in the "Observation 1" row of the data sheet.
- Next move to a new area of the field, select a different set of 5 open flowers that you can watch all at the same time, and start a new 1-minute observation. Record the number of visits by each type of bee during this second 1-minute observation in the "Observation 2" row of the data sheet.
- Repeat the process until you have done 10 observations (each 1 minute) and filled in each of the rows "Observations 1-10" on the data sheet. Move to new parts of the field for each observation so that you cover the edges and center of the field and different rows. 10 observations (50 flowers total) are required for the final calculation.

2.) Calculations

Once you have completed ten 1 minute observations and have filled in "Observation 1-10" in the table:

- For each bee type, add up the numbers in each column (Observation "1-10") and put the total for each type of bee in the "TOTAL visits" row A underneath. This gives a measure of the flower visitation rate by each type of bee in your farm.
- In each column in row C "% pollen deposition", multiply the numbers from the same column in row A "TOTAL visits" and row B "Single visit % pollen deposition". This gives you the percent of the pollen necessary for a flower to set a fruit deposited by that bee group, given how often they visit the watermelon flowers in your field.
- Finally, add up the four numbers in row C "Group % pollen deposition" and put the total in row D "Farm level pollination". This gives you an estimate of the percent of pollination flowers are receiving in your watermelon field.

Types of Bees Visiting Watermelon in the East

Below we list the bees that most commonly visit watermelon in your region. They are grouped into four types of bees and these groupings are used in the pollination assessment.

Honey bee

Honey bees are medium-sized bees, approximately ½-⅔ inch long, with stripes on their abdomen. They range in color from orange-brown to nearly black. They have enlarged flattened plates on their hind legs that they use to carry moist clumps of pollen.

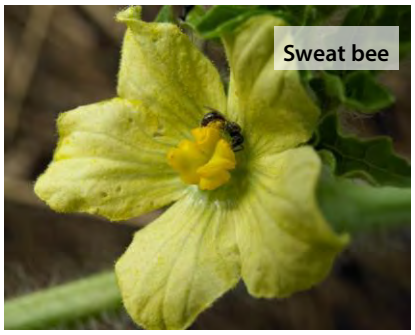

Honey bee


Honey bee

Small bees

Smaller than a honey bee.

Includes: sweat bees, small carpenter bees


Sweat bee


Sweat bee


Small carpenter bee

Types of Bees Visiting Watermelon in the East

Continued

Large bees

As large as or larger than a honey bee.

The bee that could be most easily mistaken for a honey bee is the squash bee (pictured below right). The squash bee can be similar in size and color to a honey bee but they have very hairy legs, the hairs form combs for carrying pollen. Honey bees have flattened plates on their hind legs surrounded by strong bristles for carrying pollen.

Includes: the common eastern bumble bee, long-horned bees, squash bees


Common eastern bumble bee


Long-horned bee


Squash bee

Photo: Nancy Adamson

Green bees

Metallic green, may be infused with gold or red.

Including: green sweat bees


Green sweat bee

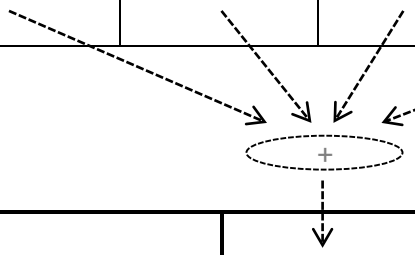
Watermelon Monitoring in the East

DATA SHEET: EASTERN U.S.A.

Site Name _____ Date_____

Start Time _____ End Time _____ Observer_____

Each row below is for a 1 minute observation of a group of 5 flowers	Total visits during 1 minute observation by each bee type			
	Honey bee	Native bee large	Native bee small	Native bee green
Observation 1				
Observation 2				
Observation 3				
Observation 4				
Observation 5				
Observation 6				
Observation 7				
Observation 8				
Observation 9				
Observation 10				
A= sum Obs 1-10: "TOTAL visits" (sum of Obs 1-10 for each column)				
B: "Single visit % pollen deposition" (% of pollen deposition per visit needed to produce a fruit)	2.11	2.73	0.72	2.83
C=AxB: "% pollen deposition" (% of pollen deposition needed to produce a fruit by each bee group)				



D= sum of C: "Farm level pollination" % pollen deposition needed to produce a fruit provided by pollinators in your farm (≥100% means each flower receives sufficient pollination to set a fruit)	

DATA SHEET : EASTERN U.S.A.

Site Name Smith Farms Date July-15-2013

Start Time 10:15 End Time 10:35 Observer M. Smith

Each row below is for a 1 minute observation of a group of 5 flowers	Total visits during 1 minute observation by each bee type			
	Honey bee	Native bee large	Native bee small	Native bee green
Observation 1	0	2	1	0
Observation 2	1	3	1	2
Observation 3	0	3	2	0
Observation 4	3	1	1	0
Observation 5	0	3	1	2
Observation 6	3	2	2	0
Observation 7	0	0	0	3
Observation 8	2	0	3	0
Observation 9	0	1	1	0
Observation 10	1	0	1	0
A= sum Obs 1-10: "TOTAL visits" (sum of Obs 1-10 for each column)	10	15	13	7
B: "Single visit % pollen deposition" (% of pollen deposition per visit needed to produce a fruit)	2.11	2.73	0.72	2.83
C=AxB: "Group % pollen deposition" (% of pollen deposition needed to produce a fruit by each bee group)	21.10	40.95	9.36	19.81

D= sum of C: "Farm level pollination" % pollen deposition needed to produce a fruit provided by pollinators in your farm (≥100% means each flower receives sufficient pollination to set a fruit)	91.22