

Do Mosquito, Butterfly and Grasshopper Eat Food in the Same Way?

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Grade level targeted. 3rd and 4th grade

Observations:

Mosquito, butterfly and grasshopper eat different foods. Check out the different food these insects eat. Mosquitoes (females) feed on blood¹, butterflies feed on flower nectar and grasshoppers eat leaves².

Question:

Can these three insects eat food in the same way?

Hints to form hypothesis: Look at the different types of mouth structures in these insect heads under microscope or magnifying glass and look at figs. 1-4

Hypothesis:

Selected insects (mosquito, butterfly and grasshopper) have different types of mouthparts to eat food.

Materials needed:

- 1) Pictures of mosquito, butterfly and grasshopper mouthparts (figs. 1-4)
- 2) Dead specimens of mosquito, butterfly and grasshopper
- 3) One light microscope if available in the school or 8 inch magnifying glass
- 5) List of items to make models to try feeding from different food sources (Table.1)

Table. 1: List of models that can be used to demonstrate feeding of selected insects

	Food models (original food)	Mouthpart model	Food source model
Female Mosquito	Red colored juice (Blood)	Drinking straw with sharp end (eg: straw that comes with Tropicana fruit cans)	Juice containing plastic cup covered with thin muslin cloth

Butterfly	Uncolored sweet juice (nectar)	Long thin ordinary drinking straw with blunt end	Sweet juice containing plastic cup covered with lid. Lid should have a hole (can place model of flower in the hole to make it more attractive)
Grasshopper	Green candies (grass/leaf)	Not needed as you can use teeth to take a bite	Assume these green candies are green leaves from the plant

6) A sheet of paper to write down following observations (table. 2)

Table 2. Observations (Circle yes or no depending on the way you ate the food)

	Drinking straw with sharp end	Long thin drinking straw without sharp end	Bite and chew
Red juice in bottle covered with muslin cloth	Yes/No	Yes/No	Yes/No
Uncolored sweet juice in bottle covered with center hole lid	Yes/No	Yes/No	Yes/No
Green candies	Yes/No	Yes/No	Yes/No

The Experiment:

1) Take the three different food items and try each food using proper tools available without spilling. (As you know these insects do not hold the food while eating. So do not use your hands while eating or drinking. That means if you choose to use straw, then just put the straw in food source model but while drinking/eating, do not use hands)

Hint: these foods can be eaten by one of the three different tools available (i.e. using your teeth or two different drinking straws).

2) Circle yes or no in table. 2 (provided) depending on the tool you use to eat each food

3) Look at the real mouthparts of insect specimens kept under microscope or use a magnifying glass.

Result:

Present the results in sheet of paper with table. 2 and write down whether you could eat each food using all the tools or using one particular tool.

Discussion:

What do you think about the hypothesis (accept or reject) based on the activity and observation under microscope? Can these three different insects feed on all the three different foods?

Estimated time required- one hour if you have insect specimens and the list of materials.

Cost to conduct the experiment- ~\$25/ (to buy drinking straws and magnifying glass) (if you can use a simple microscope in school, you don't need to buy magnifying glass)

Teachers can explain about the other different types of feeding in insects using pictures and ask different questions relating to types of feeding showing different types of leaf or plant damage.

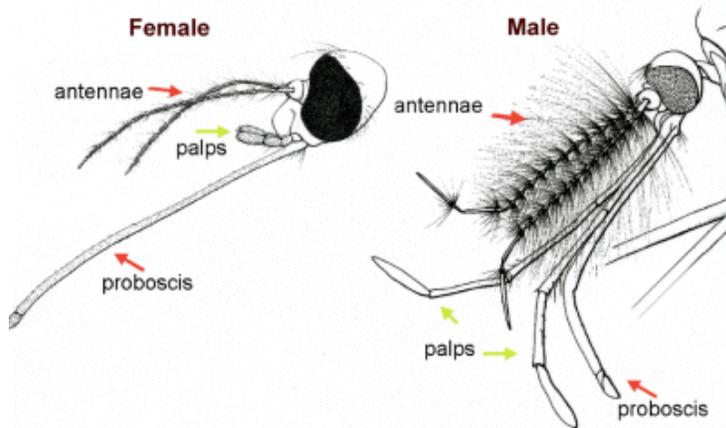


Fig. 1. Mosquito mouthparts³

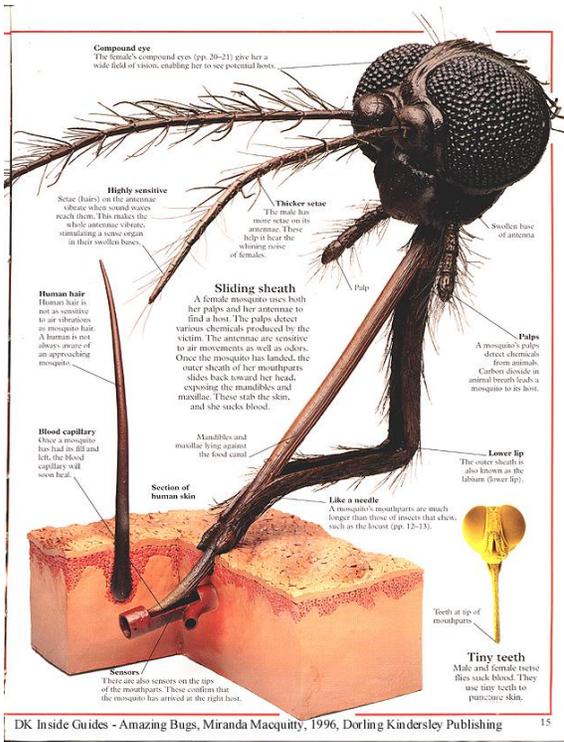


Fig. 2. Mosquito mouthparts ⁴

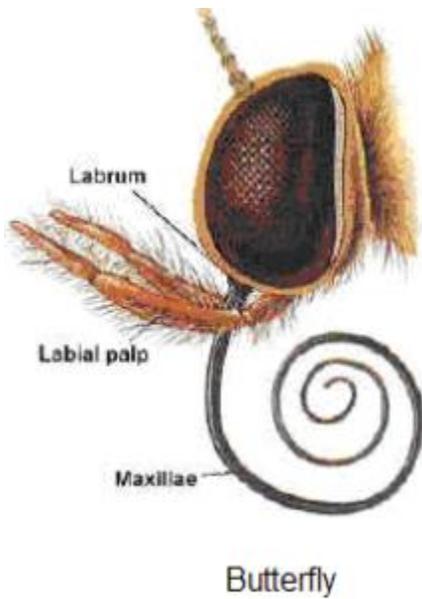


Fig. 3. Butterfly mouthparts ⁵

Grasshopper

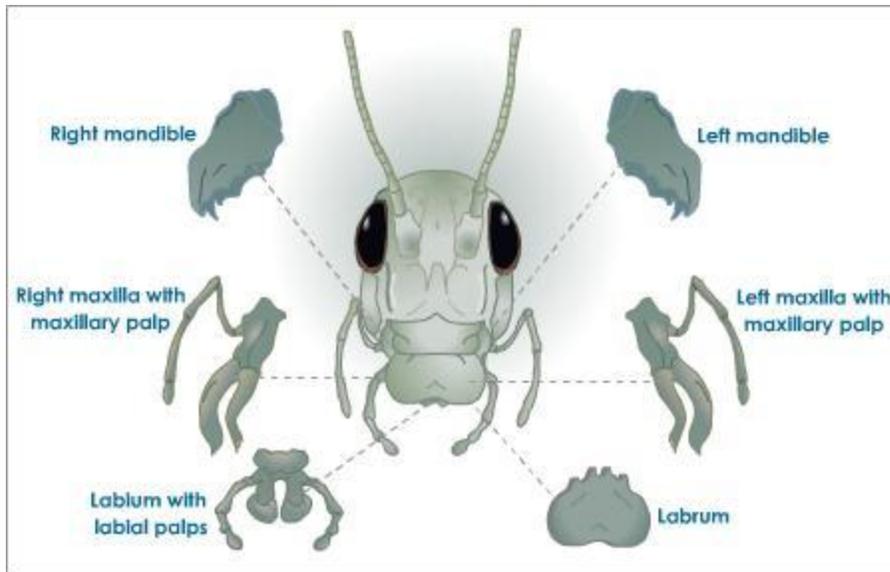


Fig. 4 Grasshopper mouthparts⁶

References

1. http://www.mosquito-pictures.com/mosquito_feeding_habits.htm
2. <http://ipm.illinois.edu/fieldcrops/insects/grasshoppers/index.html>
3. http://www.health.gov.on.ca/english/public/pub/pubhealth/west_nile/wnv_mosquito.html
4. http://www.bugs.org/BUGQuiz/answers/Mosquito_answer.shtml
5. http://homeworks-edsci.blogspot.com/2009/09/insect-mouth-parts_14.html
6. <http://www.tutorvista.com/topic/mouth-type-in-grasshopper>

Contact

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