

FEEDING ADULT MONARCH BUTTERFLIES IN CAPTIVITY

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Question:

Are captive adult monarchs more healthy, as measured by mass, if they are fed a varied fruit diet or a sugar solution diet?

Hypotheses:

1. Null hypothesis: Monarch adults fed fruit or sugar solution diets have the same mass.
2. Captive adult monarch butterflies fed a diet of a variety of fruits would be healthier, as measured by mass, than those fed a diet of sugar solution.

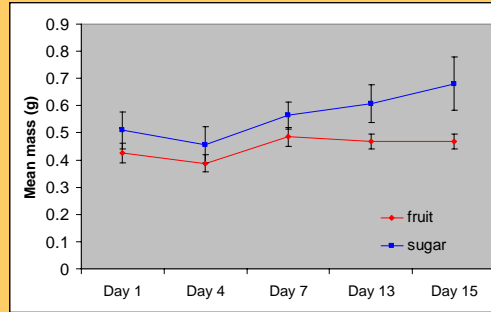
Methods:

I used 14 captive-reared monarch butterflies. Eggs and larvae were obtained from Monarch Watch and Monarchs in the Classroom.

Monarchs were maintained indoors in a 9'x9'x6' tent, 50% humidity, 21°C and 15/9 h light/dark cycle under grow-lights. A variety of plants were added to the "habitat." Monarchs were divided into 2 groups by weight and sex in order to form 2 groups as equal as possible in weight and sex.

I conducted two feedings daily, providing plates of either sugar solution or a variety of fruits (watermelon, cantaloupe, apples and green grapes). Monarchs ate only from their assigned diets.

I weighed the monarchs periodically using a quad beam balance which had been tared for the weight of a glassine envelope used to hold them.

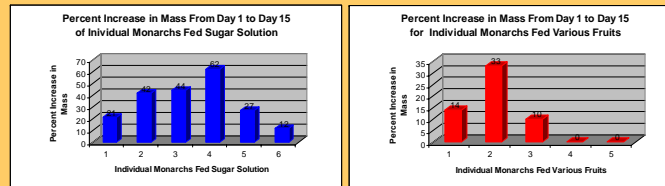


Conclusions:

We can reject the null hypothesis; in our experiment monarchs fed a diet of sugar solution gained significantly more mass than those fed a variety of fruits. Monarchs migrating in the fall have been shown to gain lipid mass during migration. (Borland 2004 and Halpern 2001) Since this experiment was performed in the fall, perhaps these monarchs were increasing in lipid mass also, in spite of the artificial lighting schedule.

Possible reasons why the fruit-nectaring group did not increase in mass as much as the sugar solution group are: 1) perhaps the liquid was more easily accessible to the sugar-nectaring monarchs, 2) perhaps the fruit may have been treated with harmful chemicals that remained in it even after washing and peeling, or 3) perhaps the sugar content in the fruit was not high enough to cause an increase in mass.

Repeating the experiment with monarchs which eclose in spring and/or summer would eliminate possibility of an increase in lipid mass due to the fall season. The experiment should be repeated on a larger population. Additional studies should include options of a commercially produced butterfly "food," fresh flowers and organically grown heirloom fruits.



Results:

Both groups of monarchs increased in mass. However, there are significant differences between the two groups at the end of the experiment. The group fed sugar solution increased by a larger percentage of their initial total weight than the group that was fed fruit. Furthermore, throughout the course of the experiment we saw a larger mortality rate in the fruit-fed group than in the sugar group, with 4 fruit-fed monarchs and 2 sugar-fed monarchs dying within the 15-day experiment.

References:

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