Does Captive Breeding of Monarch Butterflies Affect Yearly Migration Patterns?

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BACKGROUND

Monarch butterfly populations have been on the decline for several decades. Between 1980 and 2010, there was a sharp decline in abundance of monarchs, one of the most probable causes being loss of overwintering habitat as well as breeding habitat. (Pelton EM, et.al) One conservation approach to help increase monarch populations has been captive breeding and release of monarchs. Some studies have shown, however, that this approach could have negative implications on yearly migration patterns.(Tenger-Trolander, Ayşe, et al)

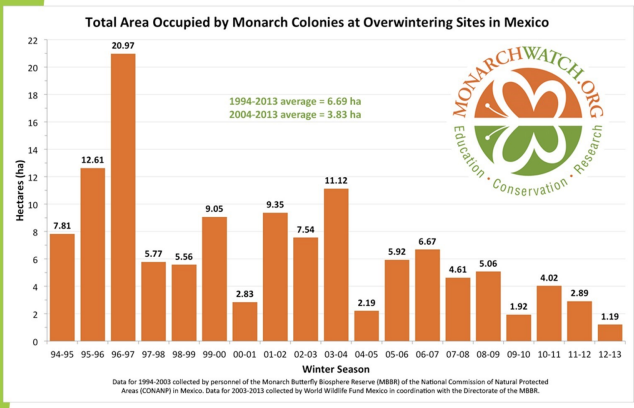

Figure 1. This graph shows the total area occupied by monarch colonies in overwintering site in Mexico (Monarchwatch.org)

Hypothesis

Captive breeding and release of monarch butterflies may lead to loss of normal yearly migration patterns.

Prediction

Normal migration orientation for monarchs is southward, but for monarchs not having been exposed to natural circumstances, they may not orient in the correct direction of migration.

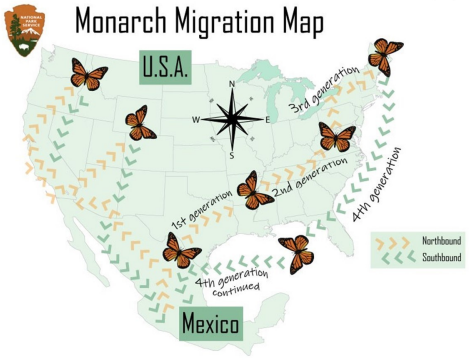

Figure 2: This map shows yearly migration patterns of monarchs in North America. (NPS graphic/ S. Sparhawk)

Study Design

To asses flight orientation of monarchs, flight orientation will be assessed using flight simulators.
The two groups assessed will be wild caught bred and commercially bred monarchs.
Both groups would be bred over two successive generations and flight orientation during time of migration in the fall will be assessed.

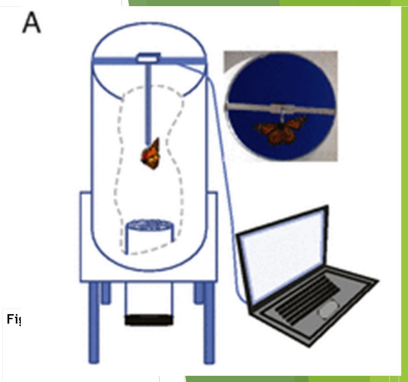

Figure 3: This graphic illustrates the method of flight simulation. The butterfly is attached to a rotating pin that also captures orientation data and records video at the same time. There is a fan right under the butterfly that provides airflow. (Tenger-Trolander, Ayşe, et al)

Intended Analysis

With the data collected of mean flight orientation, we will determine whether a certain amount of time of captive breeding affects orientation behavior for migration.

Expected Benefits

Monarch butterflies are an important pollinator and assessing the impacts of captive rearing of monarch populations can indicate whether this practice is beneficial in population management in the long term.

The monarch butterfly is currently listed as a candidate for the U.S. Endangered Species Act but not officially listed under it. With the continued decline of monarchs populations, it is vital that beneficial approaches to monarch conservation are implemented in order to help increase populations of this species as well as help the species be officially listed under the U.S Endangered Species Act .

Literature cited:
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Tenger-Trolander, A., Lu, W., Noyes, M., & Kronforst, M. R. (2019). Contemporary loss of migration in monarch butterflies. *Proceedings of the National Academy of Sciences*, *116*(29), 14671–14676. https://doi.org/10.1073/pnas.1904690116