

Bug of the Month

by Jim Revell / October 2015

Tiger Swallowtail Butterfly

TIGER SWALLOWTAIL BUTTERFLY	
Order:	Lepidoptera
Family:	Papilionidae
Genus:	Papilio
Species:	glaucus



One of our retired Master Gardeners, Jill Heller, sent Scott a great picture (at right) of an unusual butterfly found in her garden. Scott relayed the picture to Eric Day, our Virginia Tech Entomologist, who identified it as a rare Hermaphrodite Tiger Swallowtail Butterfly.

Hermaphrodite is a general term referring to an organism possessing gender-ambiguous sexual organs, which typically includes both types of gonads. Specifically, as in this case, the Tiger Swallowtail Butterfly is an example of a rare genetic condition called “gynandromorph” where the insect literally has physical characteristics (traits) of both genders, usually displaying a bilateral difference, hence referred to as “bilateral gynandromorph.”

As an aside, a distinct difference in the “condition” of “hermaphroditism” (not to be confused with using the term “hermaphrodite” in its general sense) is the insect has two sets of sex organs, i.e., both male and female reproductive organs, but has external characteristics of only one gender.

The word “gynandromorphy” comes from the Greek “Gyn” (meaning female) and “Andro” (meaning male). In bilateral gynandromorphy, male and female characteristics are divided evenly on either side of the body as seen in Jill’s picture above, i.e., one side female and one side male. Although this is a rare condition, scientists don’t actually know how rare due to the fact gynandromorphy can be overlooked in species where the two sexes look very similar.

Gynandromorphy comes about due to a genetic malfunction during the early stages of cell division after fertilization (typically, but not always, when the organism has between 8 and 64 cells). The bottom line is that, on a rare occasion, one of the dividing cells does not split its sex chromosomes in a normal manner. Instead of the standard “XY” cell, the cell divides into an “X” cell and an “XYY” cell. This leads the developing organism to have a large portion of “X” and a large portion of “XYY” cells. The organism then has tissue that is female and tissue that is male. This condition has been seen not only in butterflies, but also fruit flies, cardinals, finches, even chickens, lobsters and crabs.

In July 2011, several news outlets carried the story of a gynandromorph butterfly seen at the Natural History Museum in London (photo at right). In that case, it was a Great Mormon Butterfly that was spotted after it emerged from its chrysalis. The left wings are darker (male colorings) while the right wings are paler with flecks of red, blue and tortoiseshell (female coloring). Luke Brown, Manager of Sensational Butterflies at the museum, said he had seen only two other gynandromorphs in his career.





In early January of this year, at a butterfly exhibit hosted by Drexel University in Philadelphia, a Common Archduke Butterfly was discovered to have the condition as well. A volunteer spotted it as he was cleaning out the butterfly exhibit's pupa chamber. An Entomology Collection Manager was contacted, and a butterfly expert later confirmed the rare condition. One article also referred to this as a "half hermaphrodite" butterfly, meaning the butterfly had half male and half female traits. In this case, the right wings bear the

female traits – larger, colored normally with brown and yellow with white spots – while the left wings bear the male traits, i.e., smaller and darker, with shades of green, blue and purple.

Jill was, obviously, at the right place at the right time – *and* with her camera!! Thank you, Jill!
Nature – and God's handiwork – is absolutely gorgeous!

Research References / Resources:

<http://www.theguardian.com/science/2011/jul/12/half-male-half-female-butterfly>
<http://www.iflscience.com/plants-and-animals/bilateral-gynandromorphs-animals-are-quite-literally-half-male-and-half-female>
<http://mysteriousuniverse.org/2014/12/half-male-half-female-cardinal-and-other-gynandromorphs/>
<http://www.capitalberg.com/half-hermaphrodite-butterfly-spotted-butterfly-exhibit/23034/>
<http://the-difference-between.com/gynandromorph/hermaphrodite>
<http://www.wired.com/2011/07/butterfly-both-sexes/>
<http://www.livescience.com/49364-half-male-half-female-butterfly.html>
<http://www.bugguide.net/node/view/491>
https://en.wikipedia.org/wiki/Papilio_glaucus

Photo References:

Tiger Swallowtail Butterfly: Jill Heller, retired Master Gardener
Great Mormon Butterfly: <http://www.wired.com/2011/07/butterfly-both-sexes/>
Common Archduke Butterfly: <http://www.livescience.com/49364-half-male-half-female-butterfly.html>

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Read more of his articles on the "Jims Bugs" page @ www.BedfordMasterGardeners.org