

Butterfly Identification

by Jeffrey Glassberg

Butterflies have wings. These flight appendages are often splendidly colored and patterned, causing human heads to turn and human eyes to widen. In the excitement generated by this visual feast, the heads and eyes of the butterflies are often ignored. As we've seen before (Fritillary eyes, *American*

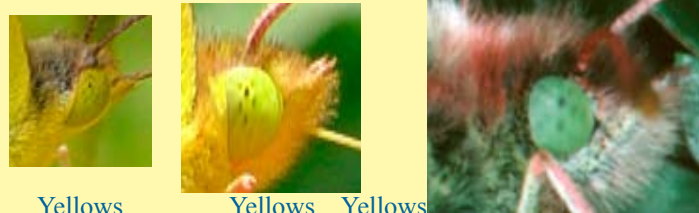


Swallowtails Swallowtails Swallowtails



Whites Whites

Butterflies, 8, No. 3, page 14; Carolina Satyr, *American Butterflies* 7, No. 4, page 37) the eyes of butterflies, besides being interesting in their own right, can help us to identify a butterfly and can provide additional characters for caring taxonomists who not only



Yellows Yellows Yellows

wanna have fun but who crave all the information they can get.

Once one begins looking, using good quality close-focusing binoculars, one can see many details of butterfly eye color and other head details in the field. One can also see butterfly eye color in good quality photographs of live butterflies. Of course, the eyes of dead butterflies, museum specimens, for example also have colored eyes. But because the eye color of butterflies changes radically soon after death, usually fading to a uniform brown,

one must examine living butterflies in order to gather useful information.

The dark spot near the center of the eye and scattered around it are called pseudopupils. According to Rutowski (*American Butterflies* 8, No. 4, pg. 18), these dark spots are caused because we are looking right down these photoreceptors and thus no light is reflected. The pattern of pseudopupils is to some extent different in different groups of butterflies. Gossamerwings and metalmarks usually have only one pseudopupil (near the center of the eye). In contrast, species in the whites and yellows family and species in the brushfoot family usually have multiple pseudopupils visible when viewed from the side. Brushfoots in the owl-butterfly, satyr, ticlear and monarch subfamilies often have pseudopupils arranged vertically, yielding a vertically striated appearance to the eye.

In contrast to the dark area created by pseudopupils, says Rutoswski, "photoreceptors that are not pointed at us reflect light off their sides and so those parts of the eye appear to be colored." In my experience, the apparent eye color is not greatly influenced by external light conditions, such as whether it is cloudy or sunny, or the color of the environment surrounding the butterfly. In addition, usually, photo flash

does not seem to change the apparent color, although the flash may create a bright spot in the eye. Yet, deciding whether the eye color is gray, gray-green or yellow-green, or pale gray vs pale tan, may be a close call and one affected by the available light conditions, by the individual



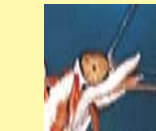
Yellows Yellows



Blues Blues



Metalmarks



Heliconians



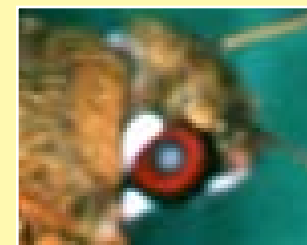
Brushfoots



Brushfoots



Brushfoots



Skippers

butterfly and by the perception of the individual observer.

Still, some eye colors are dramatically different and, as stated earlier, can provide help for identification and potentially for taxonomic inquiries. Here I endeavor to provide something of a baseline regarding eye color and pattern in different groups of butterflies. I examined photographs of many species of New World butterflies, including multiple individuals of most species, and including many

species from Mexico and some from elsewhere in the Neotropics. Photo-

graphs examined included ones by Jim Brock, Will and Gill Carter, Lizee Cavazos, Kim Garwood, Rob Gill, Dave Hanson, Tony Hoare, Richard Lehman, Eileen McDonnell, Naomi Murphy,

Jane Ruffin, Jim Springer, Ellie Thompson, Dan and Kay Wade, Ro Wauer and myself, as well as other photographs posted at various websites. Here is what I found.

Swallowtails

Although swallowtail wing patterns and wing shapes are richly varied, their eyes are quite uniform — all 44 species examined had black eyes.

White and Yellows

White subfamily

In contrast to the black-eyed swallowtails, the great majority of whites have gray eyes. Some species of marbles and orange-tips, groups that are closely related, have green eyes while green-eyed whites (genus *Leptophobia*) have bright green eyes. The few tilewhites (*Hesperocharis*) that I have examined have dark brown eyes or eye-color that is a mixture of brown and gray.

Yellows subfamily

The majority of these species have green or yellow-green eyes. All the *Colyas* sulphurs have green eyes, except that the dogfaces (Southern and California), which are placed in their own genus by some, have yellow-green eyes. Interestingly, the eyes of the large sulphurs, the giant-sulphurs (genus *Phoebis*), Lyside Sulphur and the angled-sulphurs (*Anteos*) are distinctly two-toned — darkish maroon on the top and golden or gray-green on the bottom. Exceptions to this are the species in the *Phoebis* subgenus *Aphrissa* (treated as a full genus by some), including Statira Sulphur, straight-lined sulphur (*Phoebis trite*) and Swainson's sulphur (*Phoebis godardtiana*) (from the Antilles) which have only a hint of two-toneness, being mainly gray-green (Statira and straight-lined) or yellow-green (Swainson's). Oaxacan sulphur (*Prestonia clarki*) is also yellow-green and not two-toned.