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PRESIDENTIAL ADDRESS 1994: STUDYING BUTTERFLY BEHAVIOR WITH A CAMERA

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My introduction to photography came early. In 1949, at age 10, I won the grand prize in a hobby show in Walnut Creek, California, with my nature display. The prize was a Kodak 126 camera and a film developing kit. My father helped me develop my photographs in our garage. A few years later when I was in the eighth grade, my dad took me to hear a talk on insect close-up photography by Dr. Ed Ross. Later, I bought his small book on insect photography (Ross 1953), but it wasn't until 1961 when I joined the army and purchased a 35 mm single lens reflex that I began to experiment with close-up photography of butterflies. Since then I have gone through a series of 5 or 6 single lens cameras, each with increasing capabilities.

My photography of butterflies took a quantum leap forward when I joined with George Krizek to write a book on butterflies of the eastern United States (Krizek & Opler 1984). George already had excellent slides of many of the eastern butterflies, especially true butterflies, but he lacked photos of many smaller species, especially skippers. I took it upon myself to fill in these gaps. About 40% of the photographs in the book were the result of my efforts. At the same time, I was conducting an intensive walking survey, recording the abundance, seasonality, and behavior of butterflies in Fairfax County, Virginia, and I often had my camera with me.

Based on countless hours of observations of butterfly behavior during my walking surveys, I acquired the patience necessary to take good photographs of unrestrained, free-living butterflies and learned when it is possible and when not to try to approach butterflies with photography in mind.

I now have a Nikon 8008S and have been amassing photographs of

western North American butterflies with which to illustrate a book in preparation by Ray Stanford and myself. I also am using my photographs to illustrate talks to school children, citizen groups, and university classes or seminars. I like the positive feedback and the "oohs" and "aahs" from the audience.

In my presidential address delivered at the 1994 annual meeting of the Lepidopterists' Society in Pine Mountain, Georgia, I presented several series of slides illustrating the kinds of behavior that one may document with a camera. I began with a series of slides of about 20 butterfly species that had taken off just as I snapped the shutter. I had saved these slides but never shown them to an audience previously. They really don't show much except the position taken by butterflies as they "push-off" from flowers.

Next I showed a series of slides to illustrate how one could document the occurrence of rare species or new records by photography. Examples shown include the first record of *Callophrys mcfarlandi* from Colorado, the first spring *Anteos maerula* seen in southern Texas, a rare sighting of *Dione moneta* in Starr County, Texas, and one of the few sightings of *Emesis tenedia* in the United States (see Figs. 1–4).

Flower visitation can be studied readily with the aid of a camera because nectaring butterflies are relatively easy to photograph. As a case study, I showed how one can document the diversity of flowers visited by a single species of butterfly. As examples, I showed a number of slides of *Battus philenor, Papilio multicaudatus,* and *Colias meadii* visiting a series of different flowers. One also may document the position of butterflies while they are nectaring. I also showed that one could compile a list of the number of different butterfly species visiting the same nectar plant species. As a case in point, I showed photographs of 33 different species nectaring at rabbitbrush (*Chrysothamnus nauseosus*) (see Table 1).

Some butterflies assume unusual postures when trying to nectar, and skippers in particular will exert extreme effort to obtain a good meal. I showed slides of *Atrytonopsis hianna* so deep inside the corolla of a *Penstemon* that only the tips of its wings were visible. I also showed a similarly positioned *Lerema accius* inside a *Justicia* flower.

As a case of unusual food sources, I showed a slide of several freshly

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FIGS. 1–6. Butterfly photographs. **1,** First record of *Callophrys mcfarlandi* from Colorado; **2,** First spring *Anteos maerula* seen in southern Texas; **3,** One of few sightings of *Emesis tenedia* in the United States; **4,** Rare sighting of *Dione moneta* in Starr County, Texas; **5,** *Piruna pirus* sipping moisture; **6,** Mating pair of *Euphyes bimacula,* taken at the western limit of its range in Fort Collins, Larimer County, Colorado.


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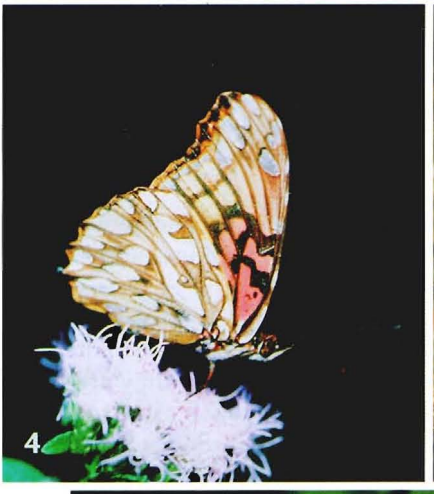
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TABLE 1. Butterfly species photographed at flowers of rabbitbrush, *Chrysothamnus nauseosus*.

Family Pieridae	Family Nymphalidae (cont'd)
Pontia occidentalis	*Nymphalis antiopa*
Colias eurytheme	*Vanessa atalanta*
Family Lycaenidae	*Vanessa cardui*
Lycaena helloides	*Vanessa annabella*
Lycaena editha	*Vanessa virginiensis*
Lycaena heteronea	*Junonia coenia*
Satyrium fuliginosum	*Limenitis weidemeyerii*
Satyrium titus	*Cercyonis oetus*
Strymon melinus	*Cercyonis meadii*
Leptotes marina	*Danaus plexippus*
Family Nymphalidae	Family Hesperiidae
Euptoieta claudia	*Pyrgus communis*
Speyeria zerene	*Hesperia leonardus*
Speyeria aphrodite	*Hesperia comma*
Speyeria mormonia	*Hesperia uncas*
Speyeria edwardsii	*Hesperia juba*
Phyciodes campestris	*Polites coras*
Polygonia zephyrus	*Polites themistocles*

emerged *Speyeria egleis* feeding at mammal dung. Of course we know that many butterflies will feed at dung, bird droppings, and animal carcasses.

An unusual behavior not completely explained is that of butterflies exuding moisture droplets from the tip of their abdomen, and then taking up the moisture with their proboscis. Presumably they are using the moisture to take up salts or other food sources, such as nitrogenous compounds, possibly in dried spots of animal urine. Slides illustrating this behavior showed individuals of *Piruna pirus* and *Amblyscirtes aenus* (Fig. 5).

The perching positions of males, with their anterior end elevated and the antennae at a 45 degree angle, can be documented on film. I showed slides of a few examples, including *Papilio zelicaon, Papilio indra, Feniseca tarquinius, Erynnis martialis,* and *Stinga morrisoni.*

Next in the sequence of behavioral steps leading to mating and reproduction, I showed slides of females being courted by males. These included *Lycaena helloides, Poladryas arachne, Chlosyne lacinia, Hesperia comma, Poanes zabulon,* and a male *Anthocharis sara* circling a female.

Mating pairs of butterflies are easy to photograph and can document which sex is the "carrier." I showed photographs of mating pairs of 26 butterfly species, the most spectacular of which was a mating pair of

Euphyes bimacula, taken at the western limit of its range in Fort Collins, Larimer County, Colorado (Fig. 6).

Photographing female butterflies is usually a difficult trick except for those species that lay batches of eggs or take a long time to insert their eggs into plant parts. I showed slides of ovipositing females of *Pieris napi*, *Celastrina argiolus*, *Celastrina* undescribed species, and *Polygonia interrogationis*. Females of *P. interrogationis* were observed to lay stacks of 3 to 5 eggs under leaves of plants adjacent to their host (Opler & Krizek 1984).

After the slides of butterflies exhibiting various behaviors leading to reproduction, I showed short sets of butterflies roosting, a possible defense display by *Ancyloxipha numitor*, and butterflies being taken as prey by various predators.

I highly recommend butterfly close-up photography not only as a way to study butterflies, but as a way to learn about their complex behavior. Butterfly photography is certainly a good way to augment either your butterfly collecting or your butterfly observations.

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