Are the Earth's Insects Disappearing?

By Peter J. Bryant,
University of California, Irvine
Number of species in different animal groups

3/4 of all animals (>1 million species) are insects!

28,000 species of Butterflies ~83 in Orange County
Where have butterflies gone?

A decline in several species appears to be drought-related.

By ALEX BARON
The Orange County Register

Butterfly counters combing the bluffs, fields and foothills of Orange County are finding them emptier of normally abundant species than at any time in at least two decades.
Annual Variation in Butterfly Abundance and Richness - Limestone Canyon

Number of Species Observed

Ave. Total Count per Month

2012 2013 2014 2015 2016 2017 2018
Where have all the butterflies gone?

Butterfly species around the world are being threatened by climate change and loss of habitat.

Around the world, butterfly species are in trouble. Climate change, habitat destruction, drought, and poaching are just a few factors causing numbers of some species to drop as much as 90% in some regions.
A cabbage white butterfly on a flower in Hampshire last year. Photograph: Geoffrey Swaine/REX/Shutterstock

Not only have I not seen a single cabbage white butterfly this year but no red admirals, no peacocks and no tortoiseshells. Very worrying.
WHERE HAVE ALL THE BUTTERFLIES GONE?

PACIFIC STANDARD STAFF • OCT 31, 2016

Butterflies in the U.K. have been in decline for decades, and climate variability—a side effect of global warming—may be to blame.

By Nathan Collins
Figure 2: Location of monitored sites in 2015. UKBMS sites producing a site index (red circles), WCBS squares walked (blue circles), sites and squares not walked in 2014 (grey circles)
From the Big Butterfly Count:
More than three-quarters of the UK’s butterflies have declined in the last 40 years, with some common species suffering significant slumps.
Large Blue Butterfly, *Maculinea arion*. Larval foodplant is Wild Thyme *Thymus polytrichus*. The conservation program that helped revitalize the large blue required the establishment of *M. sabuleti* ants in addition to the butterflies.
Butterfly lovers have noticed an alarming trend—butterfly numbers are down over 50 percent this year.

The North American Butterfly Association (NABA) has sponsored butterfly counts since 1992, and has noted significant drops in butterfly populations this year.
Where have all the butterflies gone?

Washington, DC.

About the author: Lina Younes has been working for EPA since 2002 and chairs EPA’s Multilingual Communications Task Force. Prior to joining EPA, she was the Washington bureau chief for two Puerto Rican newspapers and she has worked for several government agencies.

Lea la versión en español a continuación de esta entrada en inglés.

Some links exit EPA or have Spanish content. [EXIT DISCLAIMER]

For all those garden enthusiasts—whether you have a green thumb or not—have you noticed anything different this season?

The reason I’m asking the question is that I’m yet to see any butterflies in my backyard. Don’t know if I just haven’t seen them or if something else is going on.

I’ve tried to create a healthy natural setting that will encourage regular visits from beneficial insects and wildlife. I normally use greenscaping techniques to protect the environment. I have specifically planted several shrubs and perennials that supposedly attract bees, butterflies and birds—aster, yarrow, butterfly bush, and daylilies, to name a few. Overall, the flowering plants are blossoming as expected this year. Currently, I’ve noticed that my birdhouses already have their share of regular tenants. The hummingbirds have already made an early appearance—but no butterflies.

I was hoping to enjoy the colorful scenery with those fluttering visitors while leisurely resting at my deck, but I suppose I’ll have to be patient. Nonetheless, I have two other options in the DC metropolitan area at this time to see butterflies from around the world. The Smithsonian Institution’s National Museum of Natural History has an exhibit on Butterflies + Plants: Partners in Evolution through the 10th of August and the Brookside Gardens South Conservatory in Wheaton, MD has a live butterfly exhibit called “Wings of Fancy” through September 21st. I highly recommend them to anyone who wishes to learn more about these colorful insects. If you’re traveling through DC, they exhibits are definitely worth a couple hours of your time.
Where have all the butterflies gone?

The summer flowers have bloomed, but there are very few butterflies in the garden. In fact I have only seen one Monarch butterfly in the past three weeks. We had a very early spring in Minnesota and that encouraged early emergence of overwintering butterflies, like the Red Admiral, the Eastern Comma, the Mourning Cloak, and the Tortoiseshells in March (see "Spring has Sprung"). The warmer weather in the central part of the US also encouraged migrants to move up to the northland, well before their favorite host plants were leafed out enough to support their larvae. I wrote about this earlier on May 12 (see "Ridiculously Early").

While the swamp milkweed plants were putting on height and leaves, I looked for monarch larvae and found only one, on the smallest stem of the bunch, on June 11.
Where Have All The Butterflies Gone?

ScienceDaily (May 8, 2006) — Cold, wet conditions early in the year mean that 2006 is shaping up as the worst year for California’s butterflies in almost four decades, according to Art Shapiro, professor of evolution and ecology at UC Davis.

That’s a turnaround from last spring, when millions of painted lady butterflies migrated through the Central Valley. But other species have seen steep declines in recent years and could disappear from the region altogether.

"It has been the worst spring for butterflies of my 35 in California," Shapiro said. "There will probably be long-term repercussions, especially for species already in serious decline."
Northern California, 2006

Where Have All the Butterflies Gone?
by nicholas.schwarz on May. 17th, 2006

The number of butterflies migrating through California has dropped to a forty year low, according to researchers at the University of California, Davis. One-half of the usual species of butterflies have not appeared this season, and other species have been observed in very low numbers. Climate change related to global warming and habitat destruction may be the cause.
The race is not to the swift: Long-term data reveal pervasive declines in California’s low-elevation butterfly fauna

Matthew L. Forister,1,3 Joshua P. Jahner,1 Kayce L. Casner,2 Joseph S. Wilson,1 and Arthur M. Shapiro2

1Program in Ecology, Evolution and Conservation Biology, Department of Biology, University of Nevada, Reno, Nevada 89557 USA
2Center for Population Biology, University of California, Davis, California 95616 USA

Decline starts ~ 1995
Patterns of Long-Term Population Trends of Three Lupine-Feeding Butterflies in Wisconsin

Ann B. Swengel * and Scott R. Swengel

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Received: 5 February 2018; Accepted: 13 April 2018; Published: 4 May 2018

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Figure 2. Mean Frosted Elfin individuals per km at the long-term monitoring sites in central Wisconsin, by site type: R = reserve (six sites), PH = permanency of habitat (four sites), SM = shifting mosaic (seven sites). Some values are missing 1992–1993; no values missing 1994–2014.

Figure 3. Mean Persius Duskywing individuals per km at the long-term monitoring sites in central Wisconsin, by site type: R = reserve (five sites), PH = permanency of habitat (five sites), SM = shifting mosaic (seven sites). Some values are missing 1991–1993; no values missing 1994–2014.
Regal fritillary relative abundance (individuals/km) in Wisconsin prairies on the peak survey per site per year, smoothed as three-year running average (plotted in middle year) since no missing years occur in each time series. (An eighth site, Pine Island 2, is not graphed because during 1993-2009, positive values occurred only in 1995-96.) Regal fritillary had 5/8 negative trends (a non-significant distribution), none significant, while one positive trend was significant (Hogback).

Aphrodite fritillary relative abundance (individuals/km) in Wisconsin prairies on the peak survey per site per year, smoothed as three-year running average (plotted in middle year) since no missing years occur in each time series. Aphrodite fritillary had no significant trends, with 5/8 negative.

Karner blue (Lycaeides melissa samuelis, male shown above) relative abundance (individuals/km) in central Wisconsin pine barrens on peak survey per site per brood (two broods per year). Sites are Fort McCoy, R (reserve), PH (permanency of habitat), and SM (shifting mosaic), smoothed as three-brood running average (plotted in the middle brood) since no missing broods occur in each time series. Swengel data are adjusted down by the calibration constant of 2.4 to be comparable to Fort McCoy surveys.
Mean relative abundance (individuals/hr) in Iowa prairies in the earlier period (1989-96) and later (2004-07), for target species (prairie species of conservation concern) and outgroup species (not of conservation concern). Included sites have at least one survey result in each period, using whichever survey team produced the peak in as many years as survey data were available.

**Specialist butterfly declines in Minnesota**

The target species in Schlöcht et al. (2009), summarized here as additional context, were prairie-specialist species (*Dakota skipper Hesperia aescucae* shown at right, otter *P. otus*, and argos skippers *Agrionteen argus P. poweshiek*; regal fritillary *Speyeria glauca*) and the outgroup of five “common” species (most frequently recorded non-specialist) species (*Aphrodite frilliary *E. aphrodite*, meadow fritillary *Boloria bellona*, common wood-nymph *Cyaniris papilio*, monarch *Danaus plexippus*, long dash *Polites mystaceus*).

Proportion of negative and positive trends (correlations of relative abundance with year), regardless of significance, for prairie specialists (excluding 3/3 negative trends for Otter skipper, covered elsewhere). For the four target species, 22/27 trends were negative (binomial $P = 0.001$), while the five outgroup “common” species had an even (random) distribution of positive and negative trends (Schlöcht et al. 2009).
Canada: Karner Blue Butterfly, 2003:

Karner blue butterfly (*Lycaeides melissa samuelis*), has declined by 99% over the past 100 years,
India, 2005:

Where have all the butterflies gone?
17 May 2005, 2126 hrs IST, Divya Khanna, TNN

When was the last time you saw them in your garden? Delhi Times on the vanishing species...

The warning bells are ringing. India's butterfly population is dwindling fast. Thanks to a thriving smuggling industry, the Atlas moth of the Khasi Hills is almost extinct, and exotic species like the Copper Butterfly, Swallowtail, Purple Emperor, Bhutan Glory and Malabar are in danger.

* The economic value of pollination by butterflies to agriculture is $200 billion dollars per year

* Stuffed in suitcases or envelopes, butterflies are smuggled to Japan, Germany, Hong Kong, the UK, Taiwan, Singapore.
Where have all the butterflies gone?

A CAUSE FOR CONCERN: A reality check by an expert has revealed that butterflies may soon become endangered in Dharwad district — PHOTOS: SPECIAL ARRANGEMENT

As against 28 species spotted 12 years ago, only five species of butterflies are seen now
English Title: Causes of butterfly decline in Japan.
Personal Authors: Inoue, T.
Author Affiliation: Insect Ecology Laboratory, Forestry and Forest Products Research Institute, Matsunosato 1, Tsukuba, Ibaraki 305-8687, Japan.
Document Title: Japanese Journal of Entomology (New Series), 2005 (Vol. 8) (No. 2) 43-64

Abstract:
A literature survey was conducted to analyse the factors affecting the decline of butterflies in Japan. As a result, deforestation and the conversion of natural forests were found to be the main causes of the decline of forest butterfly species, and the recent cessation of traditional mowing of habitat has severely affected grassland butterfly species. The major causes of decline vary from district to district in Japan and from habitat type to habitat type of
South Australia:

People remember seeing large numbers of beautiful coloured butterflies everywhere. However it is difficult to know if the number of butterflies has changed without population studies. Butterflies have a special relationship with their habitat which enables them to complete their life cycle and survive. They lay their eggs on particular host plants which also provide food for their larvae. Butterflies also need to protect themselves from predators.

Butterfly habitats have been changed by land clearance for housing and farming. Introduced plants and animals have also had a dramatic impact upon their habitats. Many butterflies cannot survive in these changed habitats while others are doing very well. In this exhibition you will discover which host plants are important for butterflies. There is an urgent need to protect habitats where host plants are found. This will help ensure the continuing survival of the extraordinary diversity of butterflies in South Australia.

Whether you live in the city or in the country you can help preserve the habitats and host plants needed by the butterflies from your area.
NEW ZEALAND

Where have all the butterflies gone?

5 Mar, 2007 8:47am
Delicate creatures

Across the globe, butterflies are under threat. According to the German Wild Animal Foundation, the number of butterfly and moth species present in Germany has halved over the last 30 years. For diurnal butterflies, that decline is nearer 70 percent. This photo shows Colias hyale, which was selected as Germany’s "butterfly of the year" in 2017.
Where Have All the Monarch Butterflies Gone?

by Kristina Chew | March 15, 2013 | 1:00 pm

Male
Female
Total Area Occupied by Monarch Colonies at Overwintering Sites in Mexico

1994-2017 season average = 5.65 ha
2004-2017 season average = 3.28 ha

Data for 1994-2003 collected by personnel of the Monarch Butterfly Biosphere Reserve (MBBR) of the National Commission of Natural Protected Areas (CONANP) in Mexico. Data for 2004-2017 collected by World Wildlife Fund Mexico in coordination with the Directorate of the MBBR.

* Represents colony sizes measured in November of 2003 before the colonies consolidated. Measures obtained in January 2004 indicated the population was much smaller, possibly 8-9 hectares. CT
Patterns of widespread decline in North American bumble bees

Sydney A. Cameron\textsuperscript{a,1}, Jeffrey D. Lozier\textsuperscript{a}, James P. Strange\textsuperscript{b}, Jonathan B. Koch\textsuperscript{b,c}, Nils Cordes\textsuperscript{b,d}, Leellen F. Solter\textsuperscript{d}, and Terry L. Griswold\textsuperscript{b}

\textsuperscript{a}Department of Entomology and Institute for Genomic Biology, University of Illinois, Urbana, IL 61801; \textsuperscript{b}United States Department of Agriculture-Agricultural Research Service Pollinating Insects Research Unit, Utah State University, Logan, UT 84322; \textsuperscript{c}Department of Biology, Utah State University, Logan, UT 84321; and \textsuperscript{d}Illinois Natural History Survey, Institute of Natural Resource Sustainability, University of Illinois, Champaign, IL 61820

Edited\textsuperscript{*} by Gene E. Robinson, University of Illinois, Urbana, IL, and approved November 24, 2010 (received for review October 3, 2010)

Historical range maps from museum collections in grayscale shading; Data from current collections in pie charts
• One of the most common species of bumble bee in southern Ontario as recently as the 1980s
• Now on the brink of extinction throughout its large range.
• Has not been observed in Canada since 2009.

Rusty-patched bumble bee
(Bombus affinis)
Use of common pesticide linked to bee colony collapse

For immediate release: Thursday, April 5, 2012

Boston, MA – The likely culprit in sharp worldwide declines in honeybee colonies since 2006 is imidacloprid, one of the most widely used pesticides, according to a new study from Harvard School of Public Health.

Wildlife: Where Have All the Bumble Bees Gone?

By Bryan Walsh  @bryannwalsh Jan. 03, 2011  Add a Comment

Scientists call it the Beepocalypse. (OK, not scientists, but I like to call it that.) In late 2006, whole hives of honey bees began dying overnight for reasons that are still unclear. Scientists called it colony-collapse disorder (CCD), and it’s as scary as it is mysterious. Adult bees simply leave the hive, ostensibly in search of pollen, only to die somewhere in the open. Reported death rates in bee colonies in the U.S. were 25% in 2009 and rose to 34% in 2010. (Data from the Department of Agriculture’s CCD Progress Report—download a PDF here.) It’s still unclear what’s behind CCD—recent studies have suggested that it might be due to a combination of viral and fungal infections—but there’s no doubt about the impact that sustained bee loss would have on the agricultural sector. About 130 crops in the U.S. are worth some $15 billion a year—depend on pollination from the honeybee alone in the U.S., and it’s scary to think what might happen to the world food supply if CCD can’t be curbed.

Get ready for more bad news—it’s not just the honeybees that are disappearing. North American bumble bees have been steadily dwindling, vanishing from their long-established habitat. Bumble bees aren’t as well-known as honeybees, but they’re important pollinators as well, especially for tomatoes and berries. While there have
Insects in general: Malaise trap

A large, tent-like structure used for trapping flying insects, particularly Hymenoptera and Diptera. Insects fly into the tent wall and are funnelled into a collecting vessel attached to highest point.
Researchers used malaise traps at 63 sites across western Germany, including grasslands, swamps, sand dunes, wastelands, shrub land and along the margins of human settlement.

All of the locations were protected areas.

They recorded a 76 percent decline in insect mass from 1989 to 2016.

The midsummer loss during the 27-year-period was as high as 82 percent.
A report on the German study: **human populations will also collapse within just a few years**
Climate-driven declines in arthropod abundance restructure a rainforest food web

Bradford C. Lister\textsuperscript{a,1} and Andres Garcia\textsuperscript{b}

\textsuperscript{a}Department of Biological Sciences, Rensselaer Polytechnic University, Troy, NY 12180, and \textsuperscript{b}Estación de Biología Chamela, Instituto de Biología, Universidad Nacional Autónoma de México, 47152 Chamela, Jalisco, Mexico

Edited by Nils Christian Stenseth, University of Oslo, Oslo, Norway, and approved September 10, 2013 (received for review January 8, 2018)

Fig. 2. Mean dry-weight arthropod biomass per 100 sweeps taken in the same sample area in the Luquillo rainforest during July 1976, January 1977, July 2011, and January 2013. One SE around the mean biomass is shown for each bar. Total sweeps taken in each period was 800, except for July 1976.

Fig. 3. Comparison of total dry-weight biomass for the major arthropod taxa captured in sweep samples taken during the summer (A, C, and E) and winter (B, D, and F) seasons 1976–1977 and 2011–2013, within the same Luquillo forest study area. Arn, Araneidae; Col, Coleoptera; Dip, Diptera; For, Formicidae; Hem, Hemiptera; Hom, Homoptera; Hym, other Hymenoptera; La, Lepidoptera adults; Li, Lepidoptera larvae; Ort, Orthoptera.

Fig. 4. Comparison of the average dry-weight biomass of arthropods captured in sweep samples during the summer and winter seasons 1976–1977 and 2011–2013, within the same Luquillo forest study area.
British insect species that have disappeared in the past 50 years include:

- 88 beetles
- 75 butterflies and moths
- 23 bees
- 43 fly species
- 14 bugs and hoppers
- 12 wasps
Native ladybird populations are crashing;
Three quarters of butterfly species – such as the painted lady and the Glanville fritillary – have dropped significantly in numbers;
Bees, of which there are more than 250 species in the UK, are also suffering major plunges in populations, with great yellow bumblebees, solitary potter flower bees and other species declining steeply in recent years.
Other threatened insects include the New Forest cicada, the tansy beetle and the oil beetle.
For moths, the picture is particularly alarming. Apart from the tiger moth, which was once widespread in the UK, the V-moth (Marcaria wauaria) recorded a 99% fall in numbers between 1968 and 2007 and is now threatened with extinction, a fate that has already befallen the orange upperwing, the bordered gothic and the Brighton wainscot in recent years.
Insect population decline leaves Australian scientists scratching for solutions

ABC Far North  By Mark Rigby
Updated 23 Feb 2018, 8:50pm

PHOTO: Entomologists are concerned Australia's insect populations are in decline.
(ABC News: Pennv McClintock)
Of all insects with IUCN-documented population trends, 33% are declining.
According to global monitoring data for 452 species, there has been a 45 percent decline in invertebrate populations over the past 40 years. DIRZO, SCIENCE (2014)
Neonicotinoids

- Systemic insecticides. Examples: clothianidin and imidacloprid (Bayer)
- Cause paralysis by interacting with Nicotinic Acid Receptors in the brain. Highly specific for insects.
- Applied as soil or seed treatments to potatoes and cereal crops
- For control of Colorado potato beetle, leafhoppers, potato psyllids, aphids, and flea beetles.
- Also sold to home gardeners and used at high concentrations
- Very stable (half-life ~1000 days)
- Water-soluble
- Now the most widely used pesticides in the world
- Systemic: taken up inside the plant
- From soil or seed treatments they can cause both nectar and pollen to become toxic.
- Strongly implicated in pollinator declines worldwide.
Fig. 3 Trend in the sales (Sweden), domestic shipment (Japan), use (California) and agricultural use (Britain) of all neonicotinoid insecticides and fipronil. See Figs. 2a – d for further details. All measured in tonnes of active ingredient per year. Note the separate vertical axes for California//Japan, and Britain//Sweden.
Neonicotinoids: Systemic insecticides that make pollen and nectar toxic to insects

How you can help: Do Not Use:
Acetamiprid...Clothianidin...Dinotefuran...
Imidacloprid...Thiamethoxam

These chemicals are killing bees. If you see any of these ingredients listed on products in your home or your local garden center, do not use them.

NEONICS HIDE IN THESE POPULAR BRANDS:

• Aloft • Arena • Allectus • Atera • Bithor • Caravan
• Coretect • Derby • Dino • Dominion • Equiladonis
• Flagship • Flower, Rose, & Shrub Care
• Gaucho • Grub-No-More • Grubex • Grubout
• Hawk • Imaxxpro • Ima-Jet • Imi Insecticide
• Imicide • Imid-Bifen • Imida-Teb Garden SC
• Imidapro • Imigold • Lada • Malice • Mallet
• Mantra • Marathon • Meridian • Merit
• Nuprid • Optigard Flex • Pasada • Pointer
Insecticide • Premise • Pronto • Prothor • Safari
• Sagacity • Starkle: Bounty • Tandem • Temprid
• Triple Crown Insecticide • Tristar • Turfftor • Xytect
Fig. 1 Worldwide contamination of honey by neonicotinoids.

Pesticides

EU agrees total ban on bee-harming pesticides

The world’s most widely used insecticides will be banned from all fields within six months, to protect both wild and honeybees that are vital to crop pollination

27 April, 2018
Friends of the Earth Calls for US EPA to Ban Neonicotinoid Pesticides

U.S. Fish and Wildlife Service Bans GMOs and Neonicotinoid Insecticides

In support of their mission to conserve wildlife, Jim Kurth, Chief of the Refuge System has boldly made the decision to ban genetically modified crops and neonicotinoid insecticides from being used on national wildlife refuges across the country. This decision was based purely on what is best for wildlife management and the National Wildlife Refuge System’s Policy on Biological Integrity.

For Immediate Release, August 4, 2018

Contact: Hannah Connor, (202) 681-1676, hconnor@biologicaldiversity.org

Trump Administration to Abruptly End Ban on Bee-killing Pesticides on National Wildlife Refuges

Also Reverses Ban on Genetically Modified Crops in Refuges

WASHINGTON— The Trump administration’s U.S. Fish and Wildlife Service has announced it plans to reverse a 2014 national wildlife refuge system ban on the use of bee-killing neonicotinoid pesticides and genetically modified crops that trigger greater pesticide use.
This bill requires the Environmental Protection Agency (EPA) to suspend the registration of members of the nitro group of neonicotinoid insecticides that are registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) for use in seed treatment, soil application, or foliar treatment on bee-attractive plants, trees, and cereals until the EPA determines that the insecticides will not cause unreasonable adverse effects on pollinators. The determination must be based on:

- an evaluation of the published and peer-reviewed scientific evidence on whether the use or uses of those neonicotinoids cause unreasonable adverse effects on pollinators, including native bees, honeybees, birds, bats, and other species of beneficial insects; and
- a completed field study that meets the criteria required by the EPA and evaluates residues, chronic low-dose exposure, and cumulative effects of multiple chemical exposures.

The EPA may not issue new registrations of the neonicotinoid pesticides for any seed treatment, soil application, and foliar treatment on bee-attractive plants, trees, and cereals under FIFRA until it has made the determination with respect to the insecticide.

For purposes of protecting and ensuring the long-term viability of native bees and other pollinators, the Department of the Interior must: (1) regularly monitor the health and population status of native bees, (2) identify the scope and likely causes of unusual native bee mortality, and (3) submit to Congress and make public an annual report on the health and population status of native bees.

Prognosis: 4% chance of passing according to Skopos
Wild Bird Populations in U.K.

Index ($1975 = 100$)

- Water and wetland birds (26)
- All species (130)
- Woodland birds
- Farmland birds (19)
Declines in insectivorous birds are associated with high neonicotinoid concentrations

Caspar A. Hallmann\textsuperscript{1,2}, Ruud P. B. Foppen\textsuperscript{2,3}, Chris A. M. van Turnhout\textsuperscript{2}, Hans de Kroon\textsuperscript{1} & Eelke Jongejans\textsuperscript{1}
Indicators of the national population status of all regularly occurring native bird species in Canada and eight selected subgroups.

From “Status of Canada's Birds, 2012”
Decline of aerial insectivores in Canada
(Ontario Breeding Bird Atlas)
Figure 1. (a) Population abundance index for the tree swallow in the province of Québec, Canada, between 1985 and 2009 (data obtained from the Bird Breed-
How you can help:

1: Don’t use neonicotinoids
2: Plant larval food plants!
Monarch, Danaus plexippus (male)

Monarch, Danaus plexippus (female)

Narrow-leaved milkweed
Asclepias fascicularis

Apocynaceae

Back to Apocynaceae of Orange County, California.
Back to Flora of Orange County, California.
Back to Natural History of Orange County, California.
Tropical milkweed

*Asclepias curassavica*

Back to [Apocynaceae of Orange County, California](#)
Back to [Eudicots of Orange County, California](#)
Back to [Natural History of Orange County, California](#)
### Swallowtails (Papilionidae)

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<td>Pipevine Swallowtail, Battus philenor</td>
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<td><img src="image2.png" alt="Butterfly" /></td>
<td>Pale Swallowtail, Papilio eurymedon</td>
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<td>Western Giant Swallowtail, Papilio rutulus</td>
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<td>Anise Swallowtail, Papilio zellicon</td>
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### Sulphurs and Whites (Pieridae)

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<td>Sara Orangetip, Anthocaris sara (male)</td>
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<td><img src="image7.png" alt="Butterfly" /></td>
<td>Sara Orangetip, Anthocaris sara (female)</td>
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<td>Hartford’s Sulphur, Collas alexandra harfordi</td>
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<td>California Dogface, Zerene eurydice (male)</td>
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<td>California Dogface, Zerene eurydice (female)</td>
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<td>Orange Sulphur (Alfalfa butterfly), Collas eurysthe (female)</td>
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<td>Sleepy Orange, Eurema nicippe</td>
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<td>Dainty Sulfur, Nathalis ile</td>
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<td>Large Orange Sulphur, Phoebis agashe</td>
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<td>Cabbage White, Pieris rapae</td>
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<td>Checkered White, Pontia protodice (male)</td>
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<td><img src="image19.png" alt="Butterfly" /></td>
<td>Checkered White, Pontia protodice (female)</td>
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Biggest…

Giant swallowtail
*Papilio cresphontes*

Larval food plant: Citrus, Rue
Larval foodplant: California Sycamore

Western tiger swallowtail
*Papilio rutulus*
California Dogface,
Colias eurydice

Larval Foodplant: False indigo, *Amorpha californica*
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<tr>
<th>Brush-footed Butterflies (Nymphalidae)</th>
<th>Metalmarks (Riodinidae)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf Fritillary, Agraulis vanillae</td>
<td>Painted Lady, Vanessa cardui</td>
</tr>
<tr>
<td>Viceroy, Limenitis archippus</td>
<td>American Lady, Vanessa virginiensis</td>
</tr>
<tr>
<td>California Sister, Aphthalia californica</td>
<td>Behr's Metalmark, Apodemia virgultii</td>
</tr>
<tr>
<td>Gabb's Checkerspot, Chlosyne gabbli</td>
<td>Fatal Metalmark, Calephelis nemesis</td>
</tr>
<tr>
<td>Variable Checkerspot, Puph dynax chlaeriana</td>
<td>Wright's Metalmark, Calephelis wrighti</td>
</tr>
<tr>
<td>Lorquin's Admiral, Limenitis lorquinii</td>
<td>California Tortoiseshell, Nymphalis californica</td>
</tr>
<tr>
<td>Mourning Cloak, Nymphalis antirrhoea</td>
<td>Mylitta Crescent, Physicodes mylitta</td>
</tr>
<tr>
<td>Common Buckeye, Junonia coenia (= Precis coenia)</td>
<td>Coronis Fritillary, Speyeria coronis semiramis</td>
</tr>
<tr>
<td>Callipe Fritillary, Speyeria callipe comstocki</td>
<td>West Coast Lady, Vanessa anabella</td>
</tr>
<tr>
<td></td>
<td>Red Admiral, Vanessa atalanta</td>
</tr>
</tbody>
</table>

**Brush-footed Butterflies (Nymphalidae, cont.)**

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<tbody>
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</tbody>
</table>
Larval Foodplant: California Live Oak
Mourning cloak
Sylvan Hairstreak
Lorquin's admiral

Larval Foodplant: Willow
Buckeye, *Precis coenia*

Bush Monkey Flower
*Mimulus aurantiacus*
California Sagebrush
*Artemisia californica*

Virginia lady,
*Cynthia virginiensis*
Great Purple Hairstreak, *Atlides halesus corcorani*

Larval foodplant: Mistletoe
Larval Foodplant: California Buckwheat
Silvery Blue

Funereal Duskywing

Acmon Blue

Larval Foodplant: Deerweed