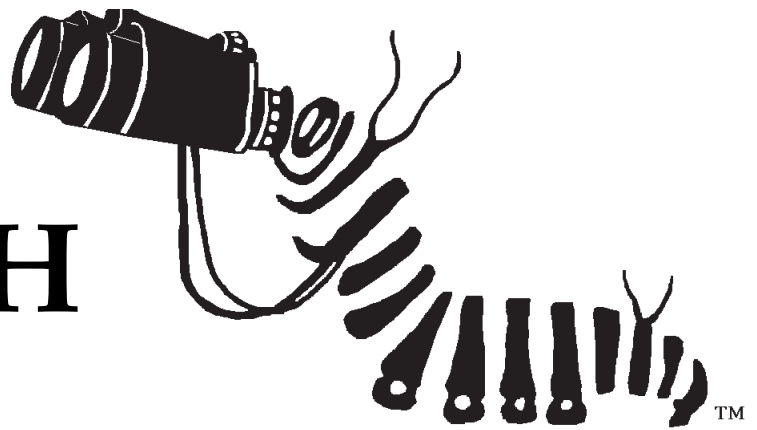


# MONARCH WATCH



“Dedicated to conservation, education and research.”

May 1995 • Vol. 3 • No. 1

**Monarch Watch** is a collaborative network of students, teachers, volunteers and researchers investigating aspects of the monarch butterfly (*Danaus plexippus*) migration phenomenon and its biology. The project is directed at the University of Kansas by Dr. Orley R. Taylor (Professor), Julie C. Ellis (Program Assistant) and Brad Williamson (Olathe East High School). Regional Monarch Watch coordinators Bill Calvert (director of Texas Monarch Watch in cooperation with Texas Parks and Wildlife) and Ken Brown (Lake Placid, New York) assist by recruiting and coordinating volunteers in their areas. The **goals** of Monarch Watch are to further science **education**, particularly in primary and secondary schools, to promote **conservation** of monarch butterflies, and to involve thousands of students and adults in a cooperative **study** of the monarchs' fall migration.

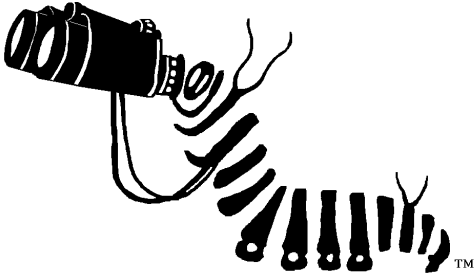
## 1994 Season Summary

**What a year!** Thank you all for your enthusiastic participation in our outreach program that we now call the Monarch Watch. Each year our project grows and we are able to involve more students and adults in monarch studies. In the fall of 1994 we sent out 75,000 tags in 1400 tagging kits and estimate that at least 20,000 students in 30 states tagged and studied monarchs through this program. The Monarch Watch received a great deal of publicity in 1994. It was covered by National Public Radio through a program called “Field Notes;” in many markets, a short video promoting the Monarch Watch was shown on PBS stations. There were articles in numerous newspapers as well. The response to these announcements and news releases was exceptional! A new release that appeared in a Des Moines, IA newspaper resulted in over 500 calls, faxes and electronic mail requests for tags and information.

**Monarch Watch** was initiated as a research project; however, as the project matured its educational potential became obvious. The students involved in the project were learning science through active participation in real research. As we explored migration with the help of hundreds of volunteers, the findings generated more questions than answers regarding monarch migration. These studies led to further cooperative projects such as monarch culturing, life history studies, flight direction analysis, etc., and to our current efforts to raise funds to develop a K-12 science curriculum based on the monarch butterfly.

# Welcome to the Monarch Watch!

University of Kansas, Department of Entomology



**Welcome**, this is the fourth year of an outreach program we now call the Monarch Watch. Our goals are to further science education, particularly in primary and secondary school systems, to promote conservation of monarch butterflies and to involve thousands of students and adults in a cooperative study of the monarch's fall migration.

- **A Brief Introduction**
- **Who are We?**
- **1994 Tagging and Observation Summary**
- **1993 Tagging and Observation Season** See an example of a season summary from last year.
- **Tag Recovery Data for Last Three Years**
- **Monarch Populations** Learn about monarch population changes from 1991-1994.
- **Monarch Sightings: Spring 1995**
- **Monarch Life History**
- **Monarch Conservation** Why is the migration endangered?
- **A Milkweed Handbook** Great pictures and descriptions of various milkweed species
- **Why Tag Monarchs?**
- **Some frequently asked questions about monarchs and their answers**
- **How to Raise Monarchs**
- **Ideas for Butterfly Cages**
- **Monarch Migration Mysteries**
- **Kit 1 Instructions** Monarch larvae (caterpillar) kits, so you can raise larvae in class or at home.
- **Kit 2 Instructions.**
- **Monarch Resources** Good literature on monarchs along with curriculum ideas.
- **Where Do Monarchs Go For The Winter?** The story of the migration.
- **Do Monarchs Have Enemies?** We just added more text to this!

A male monarch sunning himself in a roost in Chinqua, Mexico, Fall 1994



This is the index to our WorldWideWeb homepage on the Internet  
(URL= [http:// 129. 237. 246. 134](http://129.237.246.134)).  
Please come visit!  
We'll be adding more to it  
as the project progresses.

# Monarchs Take the Information Highway!

Yes, even monarchs can travel the information highway. As you know, the last few years have produced a surge in communication technology. We intend to use these electronic means of communication to exchange information with Monarch Watch participants and to distribute educational materials. Monarch information can be viewed and/or exchanged using the following media.

## World Wide Web(WWW)

This fall, we began an archive of monarch biology and information about Monarch Watch on World Wide Web. WWW is an information service on the Internet that supports text, pictures, sound and movies. Our archive is called a "homepage" and is a document on WWW that has text and pictures (no movies or sounds yet, but there will be!). You can access WWW while you are connected to the Internet by using a "browser," which is a program that allows you to view homepages served by remote computers all over the world! Browsers read "hypertext" which is a method of presenting information where selected words in the text are links to other documents. You simply click your computer mouse or use your keyboard to select highlighted words or phrases and the word or phrase will be "expanded." For example, if you are viewing a page on the monarch lifecycle and you see the word "migration" in highlights, you could click on "migration" and a page about the monarch migration will appear.

Some browsers allow you to view text only, while others display images as well as text. If you are connected to the Internet via a modem, the software you use is supplied by companies such as America On Line and Compuserve as well as Delphi and Prodigy. Check into your Internet service provider to find out how to access WWW and which browser they provide. Some browsers are Lynx, Slip, Netscape, and Mosaic.

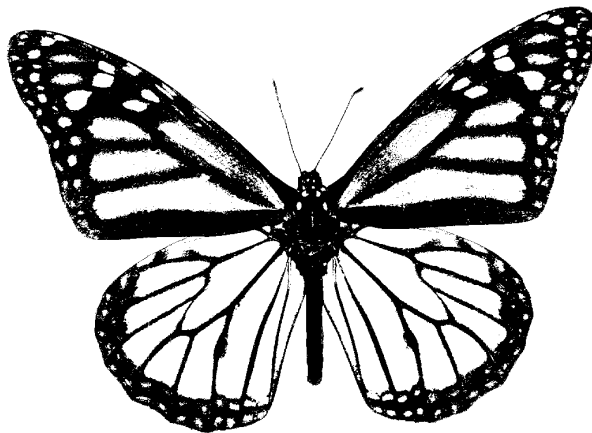
Universities sometimes give "courtesy accounts" to teachers (and maybe individuals) that include an electronic mail (e-mail) account as well as WWW browsers.

The location of our World Wide Web page is:

<http://129.237.246.134/>

## Mailing list: DPLEX-L

DPLEX-L is the name of our electronic mailing list/discussion group on the Internet. In order to participate in DPLEX-L, you need an electronic mail account on the Internet. The list is a way to post email messages to a group of other subscribers who share interest in monarchs and/or the Monarch Watch. Subscribers post messages to the group and can discuss topics related to monarchs and butterflies in general or even other insects. To receive information about DPLEX-L, just send an e-mail message to:



[listserv@ukanaix.cc.ukans.edu](mailto:listserv@ukanaix.cc.ukans.edu)

In the body of the message, write:

**INFO DPLEX-L**

You will receive an e-mail message that summarizes the goals of the list in addition to listserv commands you need to know in order to participate. To subscribe, you simply send this message to the same address:

**subscribe DPLEX-L <first name last name>**

After subscribing, you will receive a message confirming your subscription, and from then on you will receive all messages that are posted to the list. To post messages to the group, you then use the address:

[DPLEX-L@ukanaix.cc.ukans.edu](mailto:DPLEX-L@ukanaix.cc.ukans.edu)

We hope that subscribers will announce monarch sightings and observations as well as pose questions, record data, exchange ideas for curriculum, etc. If you have any questions, please drop us an email at:

[MONARCH@falcon.cc.ukans.edu](mailto:MONARCH@falcon.cc.ukans.edu)

# Monarch Populations: Fall 1994- Spring 1995

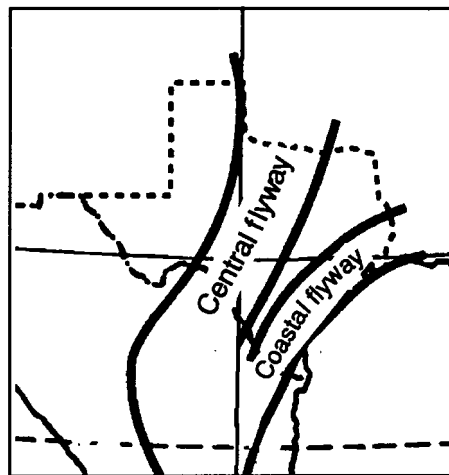
**Fall 1994** This year monarch populations were up in most places. In the northeast, there were extraordinarily high numbers of monarchs, and several observers reported that milkweed plants were being defoliated. In the upper midwest (Minnesota and Wisconsin) high numbers were observed in mid-July, and the fall populations were typical of those of other good years. In spite of these high numbers, taggers were less successful in some states such as Kansas, due to the rapid movement of the migration through some areas. Probably because of warm fall conditions and the presence of many monarch larvae late in the season, we received numerous reports of monarch sightings as late as November. In Kansas, the last sighting occurred on 12 November.

**Winter 1994-1995** Dr. Lincoln Brower and Alfonso Alonzo (Univ. of FL), Dr. Bill Calvert (Austin, TX), and Eneida Montesinos and Eduardo Rendon (Univ. of Mexico) have been working with the Wildlife Conservation Society to obtain yearly estimates of monarch population sizes at the overwintering roosts. This year they found 13 colonies that were relatively small in area. No colony was over a hectare (1 ha = 2.47 acres), although the sum of the three colonies on the mountainside in Chincua was 2.32 ha, which is half of the entire overwintering butterfly population. The sum of all the areas was 4.4 ha, and the total population size was estimated at 60,000,000 monarchs. Calvert reported that there were more monarchs at Chincua than at El Rosario this year. However, this year the El Rosario roost occupied 0.91 ha which is less than the maximum 5 ha reported for this roost. Nevertheless, the estimate of 60 million is much lower than anticipated by several monarch biologists. Previous estimates of overwintering populations have ranged from 80-200 million. Although 60 million is still a lot of butterflies, these lower numbers suggest that the populations are more vulnerable to catastrophic mortality than we had previously thought. In some winters, mortality at the roosts has been as high as 70%.

Fortunately some progress is being made in the area of conservation. There does not appear to be any new logging in the past three years, the time period that Profefa (environmental police) has been operating. However, before Profefa, much lumbering was done and one colony is still in bad

shape. The trees at this site are all second growth – barely 40' high – leaving the monarchs with no overstory (canopy) to reradiate heat downward at night. Under these conditions many monarchs die on the coldest nights, and this year large numbers of dead monarchs were found at the bases of trees at this location. If the forest continues to be protected as it is now, soon these trees will be large enough to protect the colony.

**Spring 1995** From the **Texas Monarch Watch**, Dr. William Calvert wrote: "Reports to the Monarch Hotline of the Texas Monarch Watch indicate that by mid-March monarchs have spread along the coast and up into the interior of Texas as far north as Dallas. This year monarchs were being reported a few days earlier than last year. This may have been a result of an extremely mild winter in Texas during 1994-95. (No hard freezes were evident over the central prairie regions.)"

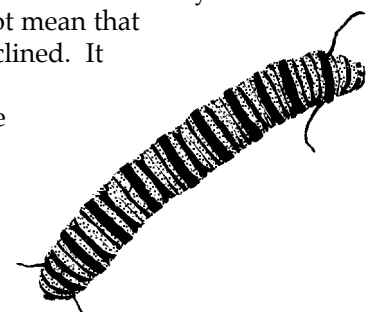


**Major Texas Flyways**

Central: 1 October – 20 October  
Coastal: 21 October – 1 November

**Flyways in Texas** In the 1993 season, Texas observers reported that monarchs use two separate flyways during their migration through Texas: a broad **central flyway**, through which the majority of the monarchs migrate, and a narrower coastal flyway with fewer migrants. This season, observations confirmed the existence of the central flyway but raised questions about the **coastal flyway**. Apparently,

monarchs moved rapidly through the central Texas flyway last fall. The coastal flyway was less predictable and more of a mystery. The "mystery" lies in the numbers. In 1993, thousands were seen flying in many parts of the coastal belt. In 1994, numbers reported were only in the hundreds. Where were the monarchs this year? Do they have another route to Mexico that is not along the Texas coast? Or did they fly by at altitudes too high to be seen? Perhaps this variation is due to the way monarchs use winds and thermals to help them fly long distances. Since these factors are variable, their absence in any particular year may not mean that the population has declined. It may simply mean that monarchs overflowed the area and were less visible during a particular migration.



# Monarchs in 1995

## Populations cont'd.....

Another mystery about monarch populations this year regards populations of wild milkweed. Milkweeds are almost impossible to find in early spring (March). The only eggs being deposited now (March/April) are on the garden milkweed *A. curassavica* and those must represent a minuscule portion of the milkweed biomass. Where are the monarchs putting their eggs?

Another paradox is that monarchs apparently don't begin to vacate the Mexican overwintering colonies en masse until 15 March. How did the monarchs reach central Texas so fast this year? Did these monarchs overwinter on the coast and disperse in advance of those coming from Mexico? Taking note of the difference in condition between monarchs appearing in Texas prior to 30 March and those that appear later (after 1 April) might help solve this mystery.

Bill Calvert reported another interesting observation. A mating pair of monarchs was observed in Inez, Texas (near Victoria along the coast) on 8 April. These butterflies had been raised from eggs collected in the wild in March. This observation establishes that the first spring generation completes its development in early April. It may also mean that a second generation of monarchs can complete development in Texas before hot summer conditions dry up the host plants. These early emergences might also explain the occasional occurrence of "fresh" monarchs seen in Kansas in late April.

## Curriculum Development

In the fall of 1992, O.R. Taylor and B. Williamson initiated the monarch tagging project and quickly became aware of the monarch's powerful educational potential. Teachers and students who received living monarchs during the project and who participated in tagging were very enthusiastic about the program. The most common request we received was for help in integrating this material into teachers' curricula. The monarch has an extraordinarily rich and accessible biology which provides an inexhaustible source of classroom and research questions that allow students to participate in the scientific process. Recently, Taylor, Williamson and Dr. Karen Oberhauser, a biologist from the University of Minnesota who studies monarchs, obtained funding (NSF) to develop a K-12 curriculum based on the monarch.

The goals for the monarch curriculum include 1) involving many students in scientific research on monarch biology with a special emphasis on migration, 2) instilling in students an appreciation for

science as a process, 3) providing monarch larvae to classrooms for in-depth exploration of biological principles and concepts, and 4) providing teachers and students with basic biological and ecological information. The objective is to increase student understanding of basic biological and ecological principles, help increase student interest in science, and facilitate science education partnerships between educators and researchers.

Topics to be covered in the curriculum fall into three major categories: 1) monarch life cycle and physiology, 2) monarch ecology and behavior, and 3) monarch conservation. For each topic there will be background information, including a bibliography and other sources of information, and suggestions for classroom activities, experiments and research projects. Some of the questions will require library research (e.g. How do monarchs receive protection from their host plant, the milkweeds? Why do monarchs migrate?, and Are butterflies appropriate 'canaries' for environmental problems?) while others lend themselves to experimentation in the classroom.

Although monarchs will be the subject, the activities, lessons and open-ended inquiry will be developed to give students a basic understanding of concepts that go beyond monarchs. For example, students learning about conservation of the overwintering grounds in Mexico will be able to apply this directly to the importance of habitat conservation in general. The monarch can be used to introduce students to elements of a broad range of subjects — from simple math to modeling, from morphology to physiology and biomechanics, and from populations, to genetics and natural (and human-imposed) selection. Classroom activities will be centered around 1) monarch larvae, 2) the migration study, or 3) basic biological concepts. Lists of curriculum activities will make it clear which activities would be most valuable if students have larvae available or are participating in the migration study. Teachers will be able to choose activities and research projects that best fit their own curriculum needs. Most importantly, this curriculum will reach almost all students, not just those with an "aptitude for science." These materials will not be designed as a "pull-out" program, nor will they require previous success in science: all students will be equally involved.

The products of this effort will be a Monarch Handbook which will be distributed as a hard-copy text and on CD-ROM. The CD-ROMs will incorporate quick-time videos, animations, sound, and interactive multi-level texts designed so that students can pursue subjects to a level with which they are comfortable. Many of these materials will be made available for testing by teachers and students as soon as they are developed.

# Some Fascinating Facts

## Monarch Enemies

Many types of life forms contribute to mortality (death) of monarch eggs, larvae, pupae and adults. Viruses, bacteria, protozoa, various insects such as flies, stink bugs, ambush bugs and wasps as well as mice and some birds use monarchs as food.

One of the most important organisms that interacts with the monarchs is a parasitic neogregarine, *Ophryocystis elektroscirrha*. This protozoan parasite has only been found on the monarch and the closely related queen butterfly, *Danaus gilippus*. The parasite develops inside the monarch larva and pupa and is transmitted from generation to generation via spores which are shed

from the scales of the adult female to her eggs during oviposition (egg laying). The spores are also transferred between males and females during copulation (mating). But, are there other means of spore transmission? Adult butterflies carrying the most spores, which they acquired as larvae, do not live as long as uninfested adults and seem less likely to survive the winter on the roost to carry the spore northward again in the spring. So, how does the spore persist? One possibility is that spores are transmitted passively through close contact between infested and uninfested adults as they roost together during the migration. All the monarchs which had been infested as larvae might die during the winter, but the spore could survive by adhering to the scales of the wings and abdomen of otherwise healthy individuals.

## Control of Protozoan Parasites

Protozoan parasites can become a serious problem for those wishing to rear more than one generation of monarchs per year. Methods to control these parasites have been worked out by Karen Oberhauser, Sonja Altizer, Chip Taylor, and Danel Vickerman. These methods are available through the Monarch Watch homepage on the WWW. However, we would be pleased to mail them to interested persons. Please provide a self-addressed envelope with postage (32 cents).

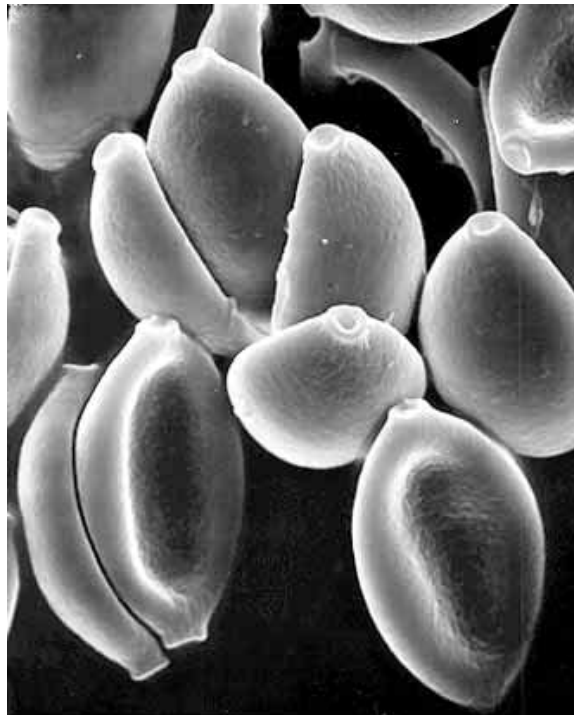
## Monarch Conservation

The monarch migration had been called an “**endangered phenomenon**” by Brower and Malcolm. To these authors an endangered phenomenon is “a spectacular aspect of the life history of an animal or plant species involving a large number of individuals that is threatened with impoverishment or demise; the species per se need not be in peril, rather, the phenomenon it exhibits is at stake.”

How can the migration be threatened? The entire monarch migration phenomenon is threatened by human activities. In Canada, milkweed, the host plant of the larvae, is considered a noxious weed and destroyed. Herbicides and insecticides affect monarch

numbers in the United States and in some areas, milkweed plants are being severely damaged by ozone,

Monarch populations are particularly vulnerable in their overwintering sites in the high-altitude fir forests of the Transvolcanic Range in Mexico; until recently only two of the eleven known roosting sites were well protected from logging. The oyamel trees on which the monarchs cluster are valuable timber sources, and local people need additional sources of income. If the roost sites are destroyed, monarch populations are likely to decline precipitously. Protection of the roost sites will be difficult since preservation of the sites and the monarch butterfly will conflict with the increasing needs and changing priorities of a growing Mexican population.



A scanning electron micrograph (SEM) of *Ophryocystis elektroscirrha* spores.

**Knowledge** serves as our best guide in preserving and protecting our natural resources. As our knowledge of the monarch increases, so does our ability to ensure that future generations will enjoy its magical flight!

## Did You Know?

Early settlers who came to North America from Europe, particularly those from Holland and England, were so impressed by the sight of the butterfly that they named it “monarch” after King William, Prince of Orange, stateholder of Holland, and later named King of England. The monarchs’ color suggested the name. From William, we get the vernacular “Billy,” and hence the name “King Billy,” which has also been applied to the butterfly.

# Monarch Mysteries

## FAQs

Part of the monarch curriculum to be incorporated into our homepage and in our Monarch Handbook are FAQs, that is "Frequently Asked Questions" about monarchs. Here is a short sample of some frequently asked questions and their answers.

How much does a monarch weigh?

Monarchs range in weight from 0.25 to 0.75 grams (a dime weighs 2.3 grams). The average weights for males are usually higher than those for females (0.56 vs. 0.53 grams). (Why do males have longer wings and weigh more than females?)

How fast does the migration advance, and how fast do monarchs fly when they are migrating?

These are two commonly asked but slightly different questions. The first question is easier to answer, but the answer is still very general. In the Midwest, we have observed that 5-6 days after masses of monarchs assemble in Minneapolis/St. Paul (late August) the front of the migration reaches Des Moines, Iowa (4-6 Sept.) – a distance of 390 km. It takes another 5-6 days for this wave, or front to reach Lawrence, Kansas (usually 9-10 Sept.) – another 350 km. However, from Lawrence, KS to Austin, TX, a distance of 1130 km, the interval varies from 6-14 days. The first masses of monarchs usually reach the Texas/Mexico border (Eagle Pass, etc.) in the last days of September. In the Midwest, if we assume the migration starts in NW Minnesota, the distance to the border is 2400 km. Therefore, the migration advances at roughly 80 km per day (2400/30 migrating days from 28 Aug. to 28 Sept.). How fast do individual migrating monarchs fly? Get out your stop watches and your measuring tapes, note the wind conditions (i.e. speed and direction), and give us a report!

Do monarchs occur outside of North America?

Yes. Monarchs are found at middle elevations in many places in central and south America. Although not well studied in these areas, there are some indications that monarchs migrate to drier areas when the wet season begins and then back to wetter areas when the dry season becomes so severe the host plants die back. In the last century monarchs were introduced, evidently by ship traffic, to the Azores, Australia, New Zealand, Hawaii, and many Pacific islands. More recently, a limited population of monarchs has become established in southern Spain.

How long do monarchs live?

In captivity, reproductively active monarchs can live up to 6 weeks. In the wild, they live various lengths of time depending on the time of year. Summer monarchs probably live 2-6 weeks; overwintering monarchs live up to 8 months!

## Questions for young scientists....

What is the preferred sugar concentration of nectars used by monarchs?

If given a choice of colors associated with feeding dishes, will monarchs show a preference for a particular color?

How much leaf tissue (in weight) does a monarch larva consume through all of its larval stages?

Since male monarchs are larger and heavier than females, do male larvae eat more leaf tissue?

What is the ground speed of a migrating monarch in the absence of wind?

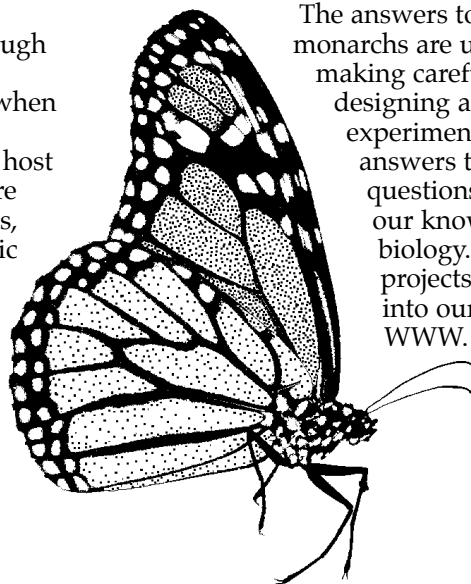
How does wing beat frequency change with wind speed and direction?

How do monarchs use thermals (rising masses of warm air) to reduce the energetic cost of flight?

Milkweed species vary greatly in leaf toughness and chemistry. Do monarchs reared on different milkweed species all grow at the same rate and reach the same size?

Each year there are reports of monarchs that wash up on the shores of large lakes in substantial numbers. Usually these observations are made in late September or early October. Cold fronts and sudden storms are associated with some of these deaths but often the weather is moderate (65-75°F) when this occurs. Why? Think physics and muscle physiology! For those with some skills in physics and math, it shouldn't be too difficult to develop a predictive model that would explain the conditions under which monarchs drown while attempting to cross lakes.

The answers to these questions about monarchs are unknown, but by making careful observations and/or designing appropriate experiments, students can obtain answers to these and many other questions that will contribute to our knowledge of monarch biology. Results of student projects will be incorporated into our student journal on the WWW.



# Ideas for Monarch Projects

## Keeping a Butterfly Garden

Why not start a butterfly garden so that monarchs and other butterflies will visit you! Butterflies are sunlovers, so the best gardens are located in spots that are sunny all day. Good butterfly plants are: asters, zinnias, bluebells, lantana, tithonia, blue mist spirea, butterfly bush, pentas, dillweed, goldenrod, and milkweeds. After you've planted the garden, keep a journal of which butterflies and other insects come to visit. Which flowers do they go to? If you have milkweeds, keep an eye out for monarch eggs and caterpillars.

To protect caterpillars you find in the garden from predators and parasites such as stinkbugs, ants, flies, wasps and spiders, you can purchase a 5 gallon latex paint strainer from the local paint store for about \$1.50. These strainers are made of fine netting and have an opening on one end. Just invert the strainer over a plant to cover the caterpillar, tie the bag at the bottom, and the caterpillar is protected. Make sure that there are enough leaves under the netting to feed the caterpillar! Once the caterpillar has formed a chrysalis it can be moved to an emergence cage.

## Monarch Taste Tests....

Cassie Reyell of Saranac Lake, New York wanted to find out if adult monarchs have food preferences. She raised 250 monarchs and kept them in rearing cages and flight cages in her house. What did she feed the newly emerged adult butterflies? Ken Brown suggested she continue an experiment conducted by Katrina Brown, his 7 year old daughter. Katrina had used a diluted mixture of pure juice and water. Cassie began experimenting with "Juicy Juice" a 100% natural fruit juice sold in grocery stores. She diluted the juice with water to about 10% and presented it to the monarchs in plastic bowls in which she had placed plastic pot scrubbers ("Chore Boys") so the monarchs could keep their feet dry as they sipped the "nectar."

What did she find? Cassie's monarchs, raised in the Adirondack Mountains, preferred Juicy Juice "Mountain Berry Blend." More butterflies flocked to this blend than to 10% sugar solution or other Juicy Juice flavors. Cassie hopes to continue her experiments with juice flavors and blends next year when she raises monarchs again. Once she determines the monarchs' favorite blend, she wants to investigate which color the monarchs prefer. Do they prefer their "nectar" served in a blue, yellow, or red bowl? A color preference might indicate that they also prefer flowers with similar colors.

Cassie's simple experiments illustrate how monarch biology can be used to introduce students to experimentation and the rewards of discovery in the classroom and at home. Sometimes the things that seem most obvious are worth re-examining. So, don't be afraid to experiment! Let us know what you find out. In the future we will establish an electronic student journal on the WWW homepage for these experiments.

## Get to Know the Butterflies in Your Area!

Conduct a neighborhood **butterfly survey**. Which butterflies live in your hometown? Take some surveys and find out! Butterflies serve as a good indicator of the ecological health of a community. Yet, few communities actually know the diversity of plant and animal species within their neighborhoods. As you walk through neighborhood parks, meadows, or other potential butterfly habitats, record the different species sighted and their numbers in a notebook. Repeat the same walk at different times of the day, in different weather conditions, and throughout the seasons.

How are the activities of butterflies affected by weather conditions? What changes occur in the numbers of species seen through the season? Do extreme weather conditions affect the populations of certain butterfly species? How has the development of housing and commercial properties changed the distribution and abundance of butterflies in your town? Only by knowing what you have in your community now will you be able to observe changes and determine if species or habitats need protection.

## Mapping Monarchs

A useful classroom exercise is to map out the tag recoveries by drawing lines connecting the origins and recovery sites for tagged monarchs. This provides a geography lesson, but also raises some questions about the migration. If you compare a vegetation map of the eastern United States in 1800 with one at present, the older map will show forests covering the eastern states. Where do milkweeds grow? They grow in plains, not in forests. So, where did monarchs go when there was a forest in their path? Speculate about the path of the monarch prior to the deforestation of the eastern U.S. and Canada. You can start this exercise by using the data from the recoveries of butterflies tagged in 1994. The data for 1992 and 1993 are presented on our WWW homepage (<http://129.246.237.134/>).



## Other Monarch Programs

Other monarch programs that we cooperate with are the following:

The **Monarch Program** is directed by David Marriott and Walter Sakai and was established October 15, 1990, as an educational public benefit organization. The program objectives include: preserving monarch breeding and overwintering habitats, monitoring migration of western monarch populations, developing educational curricula, promoting and supporting related conservancy issues, and studying a variety of butterflies and plants. Membership and subscriptions to the monthly newsletter are \$20 per year. To reach the Monarch Program, write:

The Monarch Program  
P.O. Box 178671  
San Diego, CA. 92177

The **Midwest Monarch Project** is directed from Minnesota by Greg Munson. The project's goal is to use the monarch and its amazing life history to captivate the attention of children and adults, emphasizing the interconnectedness and importance of all living things. Memberships are \$5. To receive information about the Midwest Project, write:

Midwest Monarch Project  
3116 Harbor Dr. S.E.  
Rochester, MN. 55904

**Journey North** is a project that tracks the northward migration of various animals in the spring. It is directed by Elizabeth Donnelly from Hamline University in St. Paul, Minnesota. Information on the spring migration is available through the Internet. Written classroom materials are provided for \$15. To receive information, write to:

Journey North  
125 North First Street  
Minneapolis, MN. 55401

The **Western Monarch Migration Project** is a new and relatively small program inspired in part by the declining populations of western monarchs. For information write:

Dan Hillburn  
Oregon Dept. of Agriculture  
635 Capitol St. N.E.  
Salem, Oregon 97310.

### Scientists Concerned

There are two geographically distinct monarch populations in North America. The eastern population overwinters in Mexico and breeds east of the Rocky Mountains. The western population

overwinters along the California coast and breeds in areas west of the Rockies. Contact between eastern and western monarchs is minimal suggesting that there is little exchange, or what scientists call *gene flow*, between these populations. In recent years, several people have transplanted migrating monarchs between east and west to determine, if for example, western monarchs introduced in the east would be found in Mexico. Many scientists are concerned about this practice and cite numerous reasons, such as the potential introduction of diseases from one population into another. This practice should be stopped immediately.

Under the leadership of Dr. Lincoln Brower, 14 scientists have coauthored an article which will appear in the September issue of BioScience and outlines numerous reasons for not mixing eastern and western monarch populations. Teachers may find this article useful for class discussions. The question "why should transfer between eastern and western monarch populations be discouraged?" could be presented to the class. The article could then be used as a guideline to lead students by questioning, through many of the same biological and practice considerations presented by the scientists. If you would like a copy of this article, please send a stamped self-addressed envelope, and we will forward a copy of it in September.

### Ideas for Rearing Monarchs:

Make observation chambers from 2 and 3 liter plastic bottles. To make an observation chamber for larvae, cut off the top of the bottle at the point where the sides begin to slope to the top. Remove the label. Add two inches of potting soil and plant a small milkweed plant, add a larva and cover with a clear plastic deli lid (SOLO #LG8, 11 cm diameter, for 1/2 pint containers). To allow for air passage, cut out the center of the lid and glue a disc of fiberglass window screen over the hole with a hot glue gun. If you don't have small plants, use cut plants but put the stems in a vial of water to keep them fresh. Wrap the stem(s) with a paper towel so that the larvae don't drown.

To make an emergence chamber, cut a bottle completely thru 13cm from the top. The cut-off top makes a domed observation chamber which can be placed over a pupa (or chrysalis). The emerging butterfly needs a rough surface to pull itself free of the pupal skin and to climb upon. To provide a rough surface inside the dome, glue a 3/4 inch strip of fiberglass screen along the seams up to the neck of the bottle. To make the dome completely portable, place a deli lid (with a rough inner surface) on the bottom of the dome.

# Recoveries!

Summary of recoveries of tagged monarchs in 1994. Eight tagged monarchs were recovered at the roosts in Mexico this past winter, 7 in El Rosario and 1 in Chinqua. The recovered butterflies were tagged in Virginia (1), Minnesota (1), Iowa (2), Kansas (4). The most unusual recovery was 217LD. This butterfly was tagged by Rocio Carrera on 27 Oct. at Buena Vista near Saltillo, Coahila, Mexico. It seems likely this individual reached Buena Vista (interior Mexico) by traversing through Texas on the central Texas flyway. On the 31st of March 217LD was found crawling on the ground by Beatrice Baker in Aransas Pass, Texas, a location which is along the coastal flyway. This observation seems to indicate that monarchs do not necessarily return in the spring along the path taken in the fall.

Please return your data sheets! Our objective is to obtain accurate recovery data and to use these data to assess the effectiveness of our program. To obtain information on the numbers of monarchs that were tagged, we need to have the data sheets returned to us. We have found that it is very time consuming and costly to trace down recoveries when the data sheets have not been returned. Please help.

Tag No.	Tagger	Mon Sex	Location	Date Tagged	Date Recovered	Location	Observer	Inter-val	Distance
145LA	K. Yard 5 Melinda Lane Tully, NY. 13084	F	Tully, NY	?	9/29	LaFayette, NY	A.Wickes LaFayette C Grant Grimshaw School 1742 Clark Hollow Rd. LaFayette, NY 13084	?	8m
134LK	Bette Crowningshield's Class Northside Elem.	F	Plattsburgh Air Force Base	9/19	9/25	Plattsburgh Air Force Base	J.Terleski 5316A Mississippi Plattsburgh AFB NY. 12901	6 d	0m
945KX	Stephani Bozek Coralville Central Elem. Students 501 6th St. Coralville, IA	F	Kent Park, Johnson County, IA	9/10	9/29	Mexico, MO	Randy's Meats 310 W. Monroe Mexico, MO. 65265	19 d	170 m
283LJ	Dave Bowman Carroll Middle School 1026 N. Adams Carroll, IA 51401	M	Carroll, IA	9/19	9/20	Carroll, IA	LaVerne Korwes 905 Woodland Dr. Carroll, IA 51401	1 d	0m
237AQ	Donna Cooper 2906 Walnut Hays, KS 67601	M	Hays, KS	9/21	9/21	Hays, KS	Traci Henning 2208 Haney Hays, KS. 67601	0 d	0m
668KY	Mary Cecil 1315 41st DesMoines, IA 50311	M	DesMoines , IA	9/18	9/25	North High School Des Moines, IA	Fisher/Harrop North High 501 Holcomb Ave. Des Moines, IA. 50313-4955	7 d	0m
873LT	Paula Donham Frontier Trail Jr. High School, Olathe, KS	M	Shawnee, KS	9/15	9/18	5mile east of Drexel, MO	Juanita Kimbrough Rt.1 Box 95 Drexel, MO 64742	3 d	40 m
824KF	Lee Zieke Lee 15m N.of Decorah, IA	F/ M*	15m N. Decorah, IA	9/6	9/11	Dyersville, IA	June Naber 139 15th Ave. Dyersville, IA 52040	5 d	100 m
666KO	Bob Barber, Wichita, KS	F	Wichita, KS	9/5	9/6	Wichita, KS	Mary Harris 411 S Bleckley Wichita, KS 67218	1 d	0m
185KX	teachers Kansas City, MO tag issued to Karen Oberhauser	F	Kansas City, MO	?	9/27	Kansas City, MO	Theron and Georgene Swank 4545 Wornell Rd. #407 Kansas City, MO. 64111	?	0m
701ME	Ken Brown Adirondack Park Visitors Interpretive Center, Paul Smiths, NY	NA	Paul Smiths, N.Y.	9/24	9/28	a lake 1m away	Curt Stager Paul Smith College, Paul Smith, NY	4 d	1m
106LY	Jim Monti John F. Horgan Elem. School	NA	West Warwick, RI.	?	10/8	Foster, RI	Jessica Huggett 283 Nipmuc Rd. Scituate, R.I. 02825	?	5m

## More recoveries!

196KX	issued to Karen Oberhauser transferred to teacher in St. Paul/Minneapolis, MN	NA	St. Paul/Minneapolis, MN.	?	9/27	Minneapolis, MN	Charlotte Gervais, 3845 Pillsbury Ave. South, Minneapolis, MN. 55409	?	?
828KW	Randy Edmunson Mounds Park Acad. 2051 E. Larpenteur Ave. St. Paul, MN. 55109	F	Maplewood, MN.	9/19	9/17	St. Paul, MN	John Dougherty 2051 E. Fifth St. Saint Paul, MN. 55119	2 d	0m
608LJ	Nancy Smith, Essex Junction High School, Educational Dr., Essex Junction, VT 15452	F	Essex Junction, VT	9/26	10/1	Essex Jct., VT	Randi McCuin 35 Thasha Lane Apt. C3 Essex Jct., VT 05452	6 d	0m
722LJ	same as above	F	Essex Jct., VT	10/4	10/7	Sunset Place Condominiums, Essex Junction, VT	Kurr Mandigo 16 Wrisley Ct. Essex Junction, VT	3 d	0m
425LG	Sam Galoob 11500 Imperial, Norman, OK 73071	F	Norman, OK	9/29	10/14	Amber, OK	Vicki Jackson Amber Pocasset Public Schools P.O. Box 88, Amber, OK 73004	15 d	28 m
374ME	Douglas Heath 4501 Onondaga Blvd. Westhill High School Syracuse, NY 13219	F	Syracuse, NY	10/17	11/3	Jamesville, NY	Linda White, 6465 E. Seneca Turnpike, Jamesville, NY 13078	17 d	5m
636LA	Stephane Le Tirant Insectarium de Montreal, 4581 Sherbrooke, Montreal, Quebec Canada H1X282	M (reared)	Montreal, Quebec, Canada	9/21	10/23	Lake George, NY	Mrs. Frederick P.O. Box 287, Lake George, NY 12845	32 d	150 m
889KW	Randee Edmunson, Mounds Park Academy, 2051 E. Larpenteur Ave. St. Paul, MN. 55109	M	Maplewood, MN	9/16	9/?	St. Paul, MN	J. Gfrerer 5157 Upton Ave. S. Minneapolis, MN 55410	?	10 m
483KH	James Adams 1702 Crow Valley Rd. Dalton, GA. 30720	F	Dalton, GA	10/18	10/20	Dalton, GA	Blake Floyd, 1702 Crow Valley Rd. Apt. 410 Dalton, GA. 30720	2 d	0m
583LG	Denise Everett 1402 Magnolia St., Norman, OK 73072	F	Norman, OK	9/21	10/9	Norman, OK	Mrs. Cantrell's class, Cleveland School 500 N. Sherry, Norman, OK 73069	18 d	0m
290MK	Mary Liz Jameson W436 Nebraska Hall Lincoln, NE. 68588	F	Lincoln, NE	10/10	10/12	Lincoln, NE	Emily Brinton 1626 Arapahoe St., Lincoln, NE 68502	2 d	0m
281MC	Alexandra Gerson 32 Maple St., Rouses Pt., NY 12979	M	Rouses Pt., NY	10/23	10/29	Champlain, NY	M. Bernard 807 Hayford Rd Champlain, NY 12919	6 d	4 m
960KP	Jane McDonald's class Oil Hill School 2700 W. 6th, El Dorado, KS. 67042	M	El Dorado, KS	10/28	11/2	El Dorado, KS	Pat Anderson 520 School Rd., El Dorado, KS 67042	5 d	0m
351LA	Priscilla Hugick RD1Box149 Richfield Springs, NY 13435	F	Richfield Springs, NY	10/4	10/24	Stamford, NY	Barbara W. Walling Stamford Central School, 1 River St., Stamford, NY 12167	20 d	40 m SE
296MG	Rick Mickula 147 W. Carleton Ave. Hazleton, PA 18201	NA	Gettysburg, PA.	10/17	10/31	New Paris, PA	Mark E. Wiley II, RD #1 New Paris, PA 15554	14 d	
960LS	issued to Pat Owen, Botanica Wichita, KS (tag transferred to local tagger)	F	?	?	10/11	Wichita, KS	David Hitchcock 2016 Joann, Wichita, KS 67203	?	0m

## Still more recoveries!

103LX	Ron Marteney Kansas Dept. of Wildlife and Parks Rt. 3, Box 29A El Dorado, KS. 67042	M	Butler County, KS. Butler State Fishing Lake	9/26	Feb. '95	Anganguero, Mexico	found dead at El Rosario roost	5m	1350 m
868LA	Jess George, 173 Willie Rd. Gloversville, NY 12078	M	Gloversville, NY	10/15	?	Nagatuck, Conn.	Wayne Goss 26 Warren Ave. Nagatuck, Conn. 06770	?	130 m
082KZ	Greg Munson Quarry Hill Nature Center, Rochester, MN 55904	F (rear ed)	Rochester, MN	9/8	Mar. '95	Anganguero, Mexico	found dead at El Rosario roost	6m	1970 m
801KF	Lee Ziecke Lee, 15 m north of Decorah, IA.	F	15 m north of Decorah, IA.	9/1	Mar. '95	Anganguero, Mexico	found dead at El Rosario roost	6m	1930 m
687KJ	Carlene Jones, Spotswood Elem., Fredericksburg, VA. 22401	F (rear ed)	Fredericks- burg, VA	9/16	Mar. '95	Anganguero, Mexico	found dead at El Rosario	6m	2210 m
858KU	Ann Burns 201 W. Platt Maquoketa, IA. 52060	M	Maquoketa , IA	9/8	Mar. '95	Anganguero, Mexico	found dead at El Rosario	6m	1850 m
835KQ	John Skuban/ Terry Callender, Wamego High School, 801 Lincoln, Wamego, KS. 66547	F	Wamego, KS	9/8	Feb.- Mar. '95	Anganguero, Mexico	found dead at Chinqua roost	6m	1570 m
842LT	Paula Donham/ Carol Williamson, Frontier Trail Jr. High, Olathe, KS. 66062	M/ F*	Olathe, KS	9/15	Mar. '95	Anganguero, Mexico	found dead at EL Rosario	6m	1550 m
217LD	Rocio Carrera Buena Vista, Coahuila, Mex.	M	Buena Vista, Coahuila, Mexico	10/27	31 Mar. '95	Port Aransas, TX.	Beatrice Baker 2009 E. Wheeler Portobelo Village 121, Aransas Pass, TX. 78336	5m	420 m S*** 650N
986LG	Al Neufeld, Moundridge, H.S., Moundridge, KS. 67107	F	Moundridge e, KS.	9/16	Mar. '95	Anganguero, Mexico	found dead in El Rosario roost	6m	1480 m
382BR**	Patrick Wakeman RR1, Box 81 Tonganoxie, KS 66086	M	3 m W. of Tonganoxi e, KS.	9/27 1993	10/8 1993	Abilene, TX.	Linda Morton 85 Carriage Rd. Abilene, TX. 79605	11 d	500 m

\* This individual was sexed by both the tagger and the observer whose conclusions disagreed (ie. one thought it was a F, the other thought it was a M).

\*\* This tag was reported after the 1993 season summary was completed.

\*\*\* Assumes this individual overwintered near Anganguero, Mexico ie. it went south to Anganguero to overwinter then was found back north in Texas.

F = female / M = male / d = day(s) / m = month(s)

### 1994 Monarch Watch Summary

<b>Number of tagging kits sent out</b> .....	<b>1400</b>
<b>Number of tags distributed</b> .....	<b>75,000</b>
<b>Estimated number of monarchs tagged</b> .....	<b>15,000</b>
(Number based on returned data sheets: 12,400)	
<b>Most monarchs tagged by one group or individual in fall 1994</b> .....	<b>.69</b>
(Terry Callender and students of Wamego High School... GOOD JOB!)	
<b>Number of recovered tags</b> .....	<b>.47</b>
(Recovered in Mexico: 8; Recovered on Spring return flight: 1)	

# Speculation

## How Many Tagged Monarchs Reach the Roosts?

In 1993, we initiated a new tagging system. In this system the tag is glued to the surface of the discal cell on the underside of the hindwing. We adopted this method because we were concerned that too many butterflies were being damaged when the tags were applied using other tagging procedures. Is the new method really better? We think so. Although some experienced taggers complain that our method is slower and others that the glue is hard to use, overall, the method does appear to be easier to teach to participants of all ages. Some of our taggers are as young as 7 and with adult supervision, they can do an excellent job of applying the tags.

If this method is better, there should be an increase in recoveries. This appears to be the case. In Dr. Urquhart's studies, there was usually one recovery in Mexico for every 5,000 tags applied to monarchs in the U.S. and Canada. This year we had 8 recoveries in Mexico and estimate that 15,000 butterflies were tagged – or one recovery per 1875 butterflies tagged.

The monarch roosts are hard to describe; the numbers of butterflies are extraordinary. Once you've seen these areas, with millions of live butterflies in the trees and hundreds of thousands of dead butterflies scattered through the dense vegetation, it's hard to imagine how any tagged butterflies are discovered. The fact that some *are* found may mean that a high proportion of tagged butterflies actually reach the roosts. In other words, since the chances of finding a tagged monarch among thousands without tags are so slim, then the fact that they are found could mean that there is a fairly high proportion of tagged butterflies making it to the roost. But, how many? There is no way to be certain of the numbers of tagged monarchs reaching the roosts; however, some speculation might be instructive.

In order to speculate, we first need to review our assumptions about monarchs that reach the roosts. We will focus on the El Rosario roost since it is the only one open to public visit and the one we know the most about. This year 7 tagged monarchs were found at El Rosario. This roost was 0.91 hectares in area and held approximately 12,600,000 million butterflies according to Bill Calvert and his coworkers. El Rosario is densely forested and has

relatively few trails, and it is along trails that tagged dead butterflies are encountered. We assume that tourists and personnel at El Rosario only encounter 1% of the dead butterflies that litter the forest floor. If only 1% of the tagged butterflies are found in El Rosario and this year 7 were recovered, this would mean that 693 tagged butterflies were not found (7 is 1% of 700, so the left over would be 693). If only half the tagged butterflies died during the winter, perhaps as many as 1400 tagged monarchs (700x2) reached El Rosario. Further, if we assume that tagged monarchs arrive at all the roosts in the same proportions as at El Rosario then, then since the population at El Rosario constitutes 21% of the total overwintering population, we can speculate that 6667 tagged monarchs reached all of the roosts this year. This number could be

much higher or lower since the assumptions (1% recovery, etc.) could be incorrect. Nevertheless, it is an estimate, and it will be useful to compare this estimate with those obtained in subsequent years. Although this approach (speculation from assumptions) has many weaknesses, it still has predictive value and we may be able to use it to learn more about the year to year survival of monarch populations.

Some of you may be disappointed that none of your tagged monarchs were recaptured, and actually the percentage of recaptured butterflies that have travelled at least 60 miles is roughly 1 per thousand (.001). But, all things considered: the vast area, the number of observers and the

masses of monarchs at the roosts in Mexico; the rate of recovery is pretty good. In fact, this recovery rate is higher than that obtained in studies of most other migratory species! So, your chance of having your tagged monarchs recovered is low, but there is a higher chance that one of your tagged monarchs will be recovered than there is that one of your lottery tickets will be chosen!



**Asclepias speciosa:**

“Showy Milkweed” flower.

Blooms May to September in cultivated fields, roadsides and railways, from Southern Manitoba to British Columbia, Minnesota to northwestern Texas, and westward to the Pacific coast.

**Monarchs as House Pets?!...** Jan Elder, director of Word Processing for the Division of Biology at the University of Kansas, received monarchs from our lab in December 1994. One of these monarchs, which Jan affectionately named Methuselah, was still flying around her house as of late April! This old timer has lived in the upstairs spare bedroom, on a plant stand for almost 4 months! According to Jan, Methuselah is tattered and a bit faded, but still manages to fly around and sip nectar from a feeding dish.

# Memberships and Contributions

"Reality Bites" was the title of a recent movie, and reality now confronts the tagging program — it costs money. During the past three seasons, we provided tagging kits at no cost to the participants, but of course there was a cost to us. At the end of last season, we took stock of our costs and realized that each tagging kit costs about \$4 with postage, and each season summary costs another \$1 to produce and mail. These costs do not include the student hourly help needed to collate tagging information, maintain lists, or assist with communications, nor do they cover the costs of our phone bills or other office supplies. The bottom line is that we must recover some of these costs if we are to continue the tagging program; therefore, we have instituted an annual membership program.

The annual membership fee will be \$10, and Monarch Watch members will receive 1) a tagging kit containing 20 tags, 5 practice tags, adhesive, and instructions, 2) the season summary, and 3) a short pre-migration newsletter. If you expect to tag more than 20 monarchs, additional tags will be provided for \$5 per 100 tags. Tagging kits will be mailed in late August.

If you wish to become a member of the Monarch Watch, please fill out the form on the next page, indicating the number of kits, extra tags, and other items you wish to receive, and return it with a check for the appropriate amount. Please mail your responses as soon as possible to help us determine the number of tags needed and thereby avoid delays in shipping the kits in August. If you have any other questions or requests, please contact us by email ([monarch@falcon.cc.ukans.edu](mailto:monarch@falcon.cc.ukans.edu)) or telephone (913-864-4051). We also welcome tax-deductible contributions and offer a choice of educational premiums; we also have several items for sale.

## Monarch Rearing Kits (Educational Premiums)

The Monarch Watch is funded through contributions made by participants and by individuals and organizations interested in promoting science

education in primary and secondary schools. For a contribution of \$25 (\$15 is tax-deductible), we will send a Monarch Rearing Kit to the student or school of your choice. We offer two options: Kit 1 contains six mature larvae which will pupate 2-3 days after arrival, and will require no additional feeding. Kit 2 contains twelve 3-5 day old larvae which should be transferred to milkweed plants and reared in the classroom; these will pupate in about two weeks. (Do not order Kit 2 unless you have plants available!) In both cases, the adult butterflies will emerge 10-14 days after pupation (formation of the chrysalis). The butterflies could be released to join the spring or fall migrating populations or could be used to start a breeding population in the classroom. Instructions are provided in the kits. Please note: we do not ship monarchs to areas west of the Rocky Mountains. However, if you wish to raise western monarchs, please contact us, and we will direct you to suppliers on the west coast.

## Other Items

For \$12 plus \$3 postage, we will send a Monarch Watch "migration" tee-shirt, printed both back and front in black and brilliant monarch orange (the front is illustrated on the back of this newsletter). For \$10 plus \$1 postage, we will send seeds from 3 common milkweed species (common milkweed, swamp milkweed and tropical milkweed); the seeds take approximately 8-12 weeks to grow into mature plants.

Make checks payable to **Monarch Fund** and send to:

Monarch Watch  
c/o O.R.Taylor  
Dept. of Entomology  
University of Kansas  
Lawrence, KS. 66045

Please note: we do not ship monarchs to areas west of the Rocky Mountains. However, if you wish to raise western monarchs, call or write us, and we will direct you to suppliers on the west coast.



## MEMBERSHIP AND CONTRIBUTION/ORDER FORM

- I would like to become a Monarch Watch member for \$10. The membership includes: 1) a tagging kit containing 20 tags, 5 practice tags, adhesive, and instructions (late August 1995), 2) the season summary (early spring 1996), and 3) a short pre-migration newsletter (late summer 1995).
- I expect to tag more than 20 monarchs; please send \_\_\_\_\_ additional tags for \$5 per 100 tags.
- I would like a total of \_\_\_\_\_ Monarch Watch tee-shirt(s) for \$15 each including postage. Please indicate quantity and size: \_\_\_\_\_ XXL \_\_\_\_\_ XL \_\_\_\_\_ L \_\_\_\_\_ M
- I would like three packets of milkweed seeds (common milkweed, swamp milkweed and tropical milkweed) for \$11 including postage.
- I would like to make a \$25 contribution, \$15 of which is tax-deductible. As a premium, please send:  
 Kit One (six mature larvae) - or -  Kit Two (twelve 3-5 day old larvae).
- I would like to include an additional tax-deductible contribution of \_\_\_\_\_ to help fund education and curriculum development.

Total amount included: \_\_\_\_\_. Make all checks payable to **Monarch Fund** and send to:

**Monarch Watch • c/o O.R.Taylor • Dept. of Entomology • Univ. of Kansas • Lawrence, KS. 66045**

**IMPORTANT!** We reformatting our mailing list database and trying to eliminate duplicate mailings in order to reduce waste. Please take a moment to look at your mailing label. Are your name and address complete and correctly spelled? If not, please return it to us with changes. If you've received duplicate mailings, please mail both labels to us and indicate which one you prefer. **If you are an educator**, please indicate what grade(s) you teach and where; if you do not receive mail at school over the summer, please include an alternate summer mailing address. Thanks!

### Notes From the Road...

#### On the road again

**Monarch Watch** travelled to many states and even to Canada this year to present programs at teacher meetings and workshops. Brad Williamson, Dr. Karen Oberhauser, Dr. "Chip" Taylor and Julie Ellis travelled to St. Louis to present **Monarch Watch** to teachers at a regional meeting of the National Association of Biology Teachers. Williamson, Oberhauser, and Taylor also presented the project at the National Science Teachers Association (NSTA) convention in Minneapolis. Williamson recently gave a presentation on the **Monarch Watch** to a standing room only crowd at the National Meeting of NSTA in Philadelphia. At all of these meetings, Monarch Watch was enthusiastically received, and we thank those who attended our presentations.

In March, Taylor and Ellis gave presentations at a National Teacher Training Institute in Paul Smiths, New York. We were hosted by Jo Ann Flick, Director of Education for WCFE (PBS) in Plattsburgh, NY. The Institute was a great success, and we met with many teachers and others interested in the Monarch Watch. On this same trip we visited Montreal where we had the great fortune of presenting the project at the world famous **Insectarium**. There we had the pleasure and honor of meeting the founder of the **Insectarium**, Georges Brossard, as well as the insect curator, Stephane LeTirante. We were very impressed with Insectarium and were happy to become acquainted with Georges and Stephane. We are looking forward to working with them in the future!

#### Contest: Name our logo caterpillar!!

The caterpillar that is a part of the Monarch Watch logo and trade mark, is looking for a name! The caterpillar will be featured as the star in our curricular materials. Please write your suggestion on a postcard and mail it to the Monarch Watch before 1 July. We will announce the name of the logopillar and the winner in a mailing distributed with the tagging kits in August. The contest winner will receive a Monarch Watch t-shirt and a kit with monarch larvae.

#### Monarca

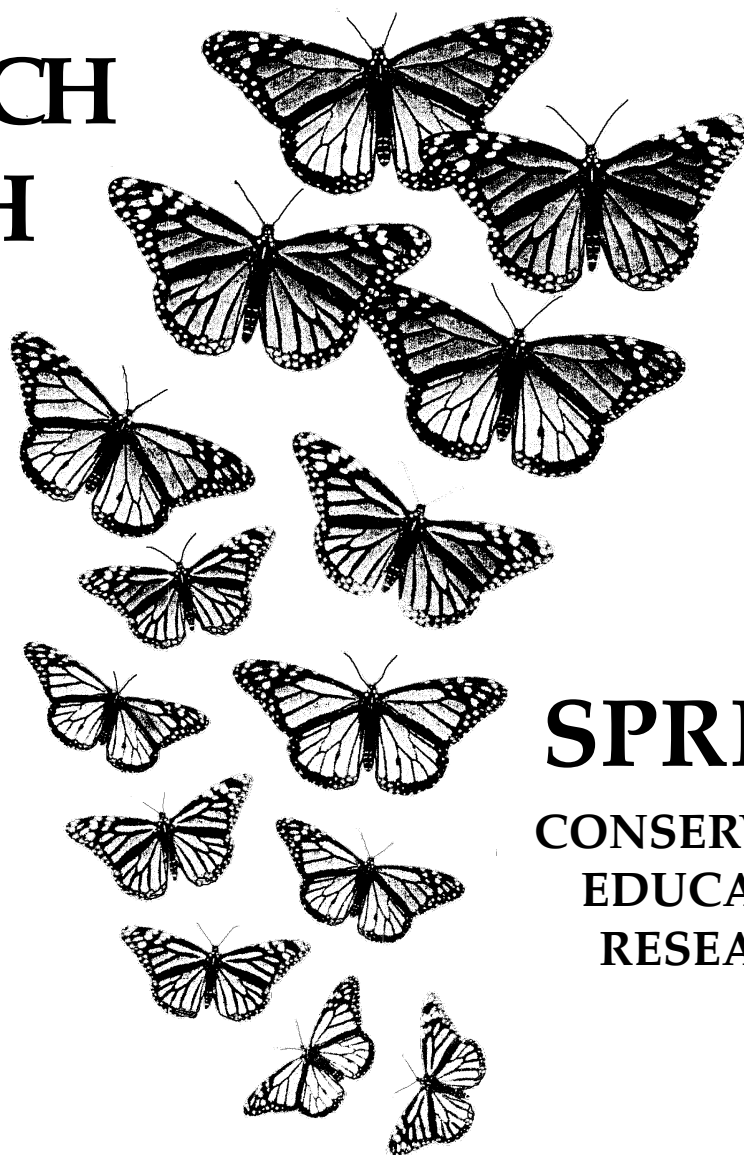
Monarchs also toured the United States and Mexico without lifting a wing- with the **Monarca** exhibit. **Monarca** was created by The Canadian Museum of Nature in collaboration with the Canadian Nature Federation and Monarca A.C. (a Mexican conservation group). The exhibit chronicles the life cycle of the monarch featuring interactive computers, hands-on activities and live butterflies with text in English, French and Spanish. The exhibit was displayed in Ottawa, Canada from June 1993 to April 1994, and then was shipped to the Museo del Nino in Mexico for exhibit between October 1994 and May 1995. In 1995, the exhibit will be refurbished in Ottawa and prepared for display in Dallas at the Dallas Museum of Natural History from 16 January to 30 July 1996.

The University of Kansas  
Monarch Watch  
c/o Orley R. Taylor  
Department of Entomology  
Lawrence, KS 66045

ADDRESS CORRECTION REQUESTED

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# MONARCH WATCH



**SPRING**  
CONSERVATION  
EDUCATION  
RESEARCH