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# INSECT MIGRATION STUDIES

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*Volume 29 1992*

**Annual Report**

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UNIVERSITY OF TORONTO . SCARBOROUGH CAMPUS

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Annual Report to Research Associates

*Insect Migration Association*  
1992

UNIVERSITY OF TORONTO SCARBOROUGH CAMPUS

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# TABLE OF CONTENTS

To the Associates -----	1
Membership Renewal Form-----	3
The Monarch Butterfly: International Traveller-----	4
Recapture Records-----	5
Monarch-Viceroy Mimicry and Bird Predation-----	6
Accurate and Prompt Submission of Reports Necessary-----	7
First Eggs of Monarchs Observed-----	
Last Eggs of Fall Observed-----	8
First Larvae of Monarchs Observed-----	
Last Monarchs of the Season Sighted-----	
Fall Migration Observations-----	
The Monarch Butterfly in Research, Education and Conservation--	9
Sighting of Spring Migrants-----	10
Number of Monarch Butterflies tagged in 1991-----	10
Milkweed:A commercial Plant-----	11
Publicity-----	12
Special Activity of Associates-----	12
Please Keep Your Leftover Tags-----	15
Defective Tags-----	15
Peak Abundance-----	16
Do Monarch Butterflies Migrate?-----	16
Special Donors-----	17
Fast-flying Monarchs-----	18
Monarch Conservation in Mexico-----	18
Crease alar tag before removing from backing-----	19
Gene Flow between Eastern and Western Populations-----	19
Be Sure to Remove All Scales From Discal Cell -----	20
Tags Coming Loose from Backing-----	20
Growing Milkweed in Your Vegetable Garden-----	21
The Monarch Butterfly" International Emissary-----	21
Polyhedrosis Virus Infestation-----	21
Research Associates-----	22

## TO THE ASSOCIATES

Fred and Norah Urquhart

## TAKE A BOW:

When we first started to investigate the migrations of the monarch butterfly we had no conception that not only would it be possible to trace the movements of this butterfly, with great accuracy, from breeding grounds to overwintering sites in Mexico, but that the discovery would result in the protection of this species from possible extermination or at least marked reduction in the number of the Eastern Population. This could have happened as a result of lumbering operations removing trees in Mexico at a time when the monarchs were clustered on the trees. Nor did we anticipate that as a result of the dedication of members of the Insect Migration Association that this butterfly would be brought to the attention of the lay public-articles appearing in newspapers, magazines along with personal appearance on television programs. The monarch butterfly is now the best known species of butterflies in the world and, as one associate wrote: "the best beloved." Concerning the latter statement: Norah and I recall an incident when we were alar tagging monarchs migrating along the shore of the Gulf of Mexico. They were feeding on a species of goldenrod. We would capture them in our insect nets, remove them, apply an alar tag and release them. While we were thus engaged a motor car containing four young boys stopped, leaned out of the car windows and, in unison declared in angry tone: "Why dont you leave the monarchs alone?" They drove off before we had an opportunity to explain our activities. The monarch has indeed entered the hearts of the general public so much so that it is now being given consideration by the United States Congress to name it the "National Insect."

As a result of the combined efforts of the members of the Insect Migration Association, conservation areas have been set aside for the primary purpose of growing milkweed. Members of the lay public interested in the conservation of the monarch have established milkweed plants in their flower gardens. Teachers have established milkweed gardens in school yards. Members of the IMA have given numerous talks to local nature and horticultural clubs and have appeared on television programs. Numerous interviews have been given to newspapers and magazines. The monarch butterfly is now a major part of natural science programs. Some of our members have scattered milkweed seeds along roadways, vacant fields and railway lines to assure a plentiful supply of milkweed for the monarch larvae. We realize that having obtained protection for the monarchs while on the overwintering sites it is also necessary to assure a plentiful supply of food for the larvae on the breeding grounds.

The study of the monarch has been and continues to be a research program involving volunteers referred to as "Research Associates."

But unlike other research groups our Insect Migration Association is more a family of researchers. We deal with each other on a first name basis and discuss family matters that have little or no bearing on the life of the monarch butterfly, topics one would discuss within the family. This attitude towards the research has done much to make it such a great success, as well as giving us considerable pleasure.

When a newspaper, magazine or book gives credit to Professor Urquhart for working out the migration pattern of the monarch butterfly from breeding grounds to overwintering sites, it would be far more accurate to give credit to Fred and Norah Urquhart and all members of the Insect Migration Association present and past.

We can collectively take a bow!

This report is printed on recycled paper



A fascinating new book by the scientist  
who discovered the monarch's overwintering site  
in the mountains of Mexico

## *The Monarch Butterfly: International Traveler*

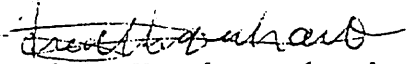
FRED A. URQUHART

I have made arrangements with the publisher of my book to allow a 10% discount to our Research Associates. If you wish a copy please make payment of \$36.00 U.S. to me personally: I purchase copies of the book out of my personal account - the University can not be involved in this transaction.

Please inform me if you wish an autographed copy.  
All royalties on sale of the book go to the Monarch Research Fund.  
Please add \$2.65 to cover mailing charges.

The reduced price applies only to the Research Associates;  
Non-Associates should deal directly with the publisher or the  
local book store.

Associates may purchase any number of copies at the reduced price.

  
Fred A. Urquhart, (author)

### SPECIAL NOTICE TO RESEARCH ASSOCIATES

I have recently been informed by the Editor of Nelson-Hall that the first run of my book is about exhausted. In case further copies will not be available in the future, I have purchased a number of copies for our Associates.

Requests for a copy or copies will be filled in the order in which they are received until my copies are no longer available.

## RECAPTURE RECORDS FOR 1991

We have been fortunate this past year to have many interesting reports of recaptured butterflies: these are listed below. However, we have also had many reports of recaptured butterflies which were recaptured in the same urban area where they were tagged and therefore did not make a significant flight. This is why we encourage associates to release tagged butterflies out in the country, if possible, so that the flight record will be a significant one by the time it is reported to us.

All of those whose tagged butterflies have been reported to us have already been notified. When possible we send a photocopy of the letter sent to us by the captor. In the case of a telephone report, we send a form letter re the flight.

ASSOCIATE	TAGGED AT	RECAPTURED AT
James Brazil	Braham, Mn.	Dexter, Mo.
Dale Clark	Dallas, Tx.	Plano, Tx.
Don Davis	Presquile, On.	Erie, Pa.
" "	" "	Pierceton, In.
" "	" "	Sadieville, Ky.
" "	" "	Galveston, Tx.
" "	" "	El Rosario, Michoacan, Mexico
Pearl Eslinger	Vigo County, In.	Loogootee, In.
Robert Hinkle	Garfield Heights, Oh.	Columbia Station, Oh.
Island Science School	Toronto Island, On.	Friedens, Pa.
Marion Lopina	Wauwatosa, Wi.	Cudahy, Wi.
Donna Pratt	Brookline, Ma.	East Providence R.I.
Doris Stifel	Maumee Bay State Park Oh.	Indianapolis, In.
" "	" " " "	Kenton, Oh.
Larry Totton	Des Moines, Ia.	El Rosario. Michoacan, Mexico

## MONARCH-VICEROY MIMICRY AND BIRD PREDATION

## FACT OR FICTION

(See: The Monarch Butterfly: International Traveller (pp:185-195))

Note to teachers: Read the part of the book dealing with this subject to your students. Discuss this as an example of how scientists can be lead astray when attempting to interpret nature through human senses instead of through those of the animal being considered. Discuss the word "anthropomorphic" by reading its meaning from the dictionary. Students should learn to use a dictionary at as early an age as possible. It is one of the most fascinating of books.

In a recent scientific publication (Nature:vol.350. pp:497-498) David Ritland and Lincoln Brower discovered that the viceroy butterfly is more distasteful to birds than is the monarch. Lincoln Brower, Junior Author, has been the most ardent supporter of the hypothesis that the monarch butterfly is distasteful to birds and that the viceroy, being tasteful, is protected because it looks like the monarch. This hypothesis is anthropomorphic based on human vision, not that of birds. Jim Miller, curator of insects at the American Museum of Natural History in New York states: "It kind of shows how some of the obvious things we've assumed have never been tested."

Having found that the hypothesis as applied to Batesian Mimicry is incorrect, the authors now propose that it is a case of Mullerian Mimicry, a hypothesis invented by Dr. Muller. This hypothesis suggests that when a number of different species of butterflies resemble each other, some of which are distasteful, all are protected because the birds, having sampled one of the distasteful members, are now confused and so they do not attempt to eat any of them. This simply changes from one anthropomorphic interpretation to another.

One might ask the question: If both Batesian and Mullerian hypotheses are anthropomorphic and hence have no rightful place in scientific conclusions, then how may one account for the presence of such obvious (to humans) similarities.

As emphasized in The Monarch Butterfly: International Traveller, insects have evolved over millions of years. During these eons of time, butterflies, as well as other insects, have produced a plethora of shapes, colours and sizes. With a multitude of colours of various hues available some members began to resemble each other. These changes in colour and pattern might have evolved to protect them by looking somewhat like various objects in nature. This look alike brought about by similar changes over long periods of time is referred to as "CONVERGENT EVOLUTION." A coming together through the processes of evolutionary changes.



Many species of insects, including butterflies, evolved to resemble various objects in nature: The leaves of trees of bushes (no particular species); the bark of trees (no particular species of tree); the petals of flowers (no particular species of flower). This resembling such objects offered protection from the watchful eyes of predators, particularly reptiles (lizards etc.) and amphibians (toads and frogs) in the early stages of evolution before the advent of birds. This has been referred to as PROTECTIVE RESEMBLANCE. This could result in distinct species resembling each other (again, to the human eye - what they look like to the predator we do not know).

Now, about the word "MIMICRY": It is a most unfortunate choice of a term in science. Butterflies do not "mimic" one another. To mimic is a conscious act. Certainly, one butterfly, looking at a member of another species, does not change its colour and colour pattern so as to look like it. The two species simply evolved over long periods of time to look somewhat alike to the human eye. One must bear in mind that such hypotheses based upon colour and colour pattern are as seen through the human eye and the brain's response to the various light waves entering the eye. For example: If you photograph a monarch butterfly and a viceroy using an ultraviolet filter the pattern appears quite different. Birds can see ultraviolet light which we cannot. Therefore they do not look alike.

In a review of the work of Ritland and Brower Tim Walker, writing in Science News, sums it up nicely: "New research indicates, however, that the viceroy has successfully deceived scientists, not birds."

For further information consult: The Monarch Butterfly; International Traveller.

#### ACCURATE AND PROMPT SUBMISSION OF REPORTS NECESSARY

A research project must be carried out as accurately as possible. In following the movements of a marked animal the records must clearly and accurately show where and when the animal was so identified by tag or other methods. We keep accurate and permanent records of every tag issued. Before we can accurately record all information about a re-captured specimen we must have the accurate report from the associate. Occasionally an Associate fails to submit a report. In this case we send a follow-up letter asking the Associate to send in his or her report or to inform us if the report has been lost in the mail. If we fail to obtain a report then we question the validity of the recapture and "tentatively" show a release-recapture line. It is most disappointing to have a meaningful recapture and no tagging report. Fortunately this is of rare occurrence. This year we had a few significant recaptures with no tagging report.

Occasionally an associate loses his or her tagging report or it is lost in the mail. When you have spent considerable time tagging and recording your tagged specimens, along with observational notes, it is worth while to make a copy of it keeping one in your files and sending us the original.

It is important for you to add up the total number of monarchs tagged and report that in your report. This helps in making our final count of monarchs tagged which we then report in our annual IMS.

## FIRST EGGS OF MONARCHS OBSERVED

Marion Hill	Lyndhurst, N.J.	April 20, /91
Lee Darst	Brecksville, Oh.	May 20/91
Marilyn Ortt	Washington County, Oh.	May 20/91
Fred Armstrong	Red Bank, N.J.	May 29/91
Vince Shane	Lauderdale, Mn.	May 29/91
Patricia Lovallo	Rochester, N.Y.	May 31/91

## LAST EGGS OF THE FALL OBSERVED

Marion Hill	Lyndhurst N.J.	Sept. 22/91
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## FIRST LARVAE OF MONARCHS OBSERVED

Marilyn Ortt	Washington County, Oh.	May 20/91
Vince Shane	Lauderdale, Mn.	May 30/91
Melanie Perry	Atlantic, Ia.	June 8/91
Mary Banet	Calumet City, Il.	June 11/91

The dates of observation of the first larvae of the monarch butterfly in 1991 are significantly earlier than those reported in 1990- a harbinger of a very warm spring and unusually hot summer.

## LAST MONARCHS OF THE SEASON SIGHTED

Millicent Scott	Casper, Wy.	October 2/91
Melanie Perry	Atlantic, Ia.	October 8/91
Lee Darst	Brecksville, Oh.	October 9/91
Dorothy Yeager	Pearsall, Tx.	November 21/91

## FALL MIGRATION OBSERVATIONS

Dorothy Yeager, Pearsall, Texas, observed the first monarch of the fall migration on September 2, 1991. On September 5 she caught a gravid female which laid eggs.

Larry Wade reported, "the number of monarchs in our area were lower and they left earlier than last year. - - - - On August 31, the number of monarchs was already starting to drop".

## THE MONARCH BUTTERFLY IN RESEARCH, EDUCATION, AND CONSERVATION

**Research:** In the beginning our research concerned the questions: Where do the monarchs of the Eastern Population go when they leave the breeding grounds; Where did the monarchs come from when they arrived in Mexico and along the coast of California? Using the alar tagging method carried out by members of the IMA over many years it was possible to join the answers to these questions into a complete migration picture. However, many questions still remain unanswered as outlined in the last year's annual report. In addition to solving the mystery of the monarch's migrations many facts concerning the life of this butterfly have been studied and the results published in numerous journals. These have been discussed in The Monarch Butterfly Book.

**Education:** A study of the monarch butterfly has become an important part of natural science courses in many schools throughout the United States and Canada. Some schools, as members of the IMA, take an active part in alar tagging thus introducing the students at an early age to a research project in entomology. Teachers have drawn up excellent programs involving the monarch butterfly in their natural science course. As a result of the enthusiasm of the teachers many students have carried their interest in the monarch to university studies and have taken up positions in various government departments and university staff. Many students have won prizes and scholarships as a result of their interest in studies of the monarch. This outgrowth of the original research on migration is most commendable.

**Conservation:** As a result of our studies of the monarch and locating the overwintering site in Mexico, large areas in Mexico have now been set aside as conserved areas. In addition to the conservation areas in Mexico, members of the IMA have been responsible for having small parcels of land set aside for the protection of wild plants including milkweed. In conserving land primarily for the monarch all animals and plants in the area are also given protection. Faye Sutherland, one of our most active members, was primarily responsible for having a large area in Pacific Grove, California set aside as an overwintering roosting site for migrant monarchs. This, along with the activities of one of her students was reported in last year's report.

Members of the IMA will continue their activities in the above adding to our knowledge of the monarch butterfly as well as protecting it from becoming an endangered species.

If you have been involved in setting aside conservation areas please let us know so we may include such information in the next volume of INS.

## SIGHTING OF SPRING MIGRANTS

Thanks to associates who observe and record the dates of sighting the first migrants we can get a very vivid picture of the fanning out of the migrants northward from the overwintering site responding to the relentless urge to reproduce the next generation of monarch butterflies.

The following list indicates the fanning out as discussed in The Monarch Butterfly: International Traveller pp.159 161. It is possible that the individual spring migrants are returning to the approximate area where they spent the early part of their as larvae. As of yet we have not obtained definitive data such as an alar tagged fall migrant being recaptured the following spring or early summer in the same area. This is the kind of data that we hope we shall be able to obtain in the future as the result of tagging migrants during the fall migration.

Dorothy Yeager	Pearsall, Tx.	March 17/91
Pearl Eslinger	Dauphin Island, Al.	April 9/91
Blanche Emerson	Jackson, Th.	April 21/91
Bill Thomas	Springfield, Mo.	April 23/91
Fred Armstrong	Dividing Creek, N.J.	April 27/91
Sally Baumgardner	Franklin Grove, Il.	April 28/91
Marion Hill	Lyndhurst, N.J.	April 30/91
Melanie Perry	Atlantic, Ia.	April 30/91
James Brazil	Braham, Mn.	May 15/91
Doris Stifel	Toledo, Oh.	May 16/91
Lee Darst	Brecksville, Oh.	May 20/91
Lee Ann Landstrom	Osseo, Mn.	May 20/91
Don Davis	Presquile, On.	May 24/91
Millicent Scott	Casper, Wy.	May 24/91
Vince Shane	Lauderdale, Mn.	May 24/91
Patricia Lovallo	Rochester, N.Y.	May 25/91
Judy Van Hook	Keego Harbour, Mi.	May 28/91
Vicky Preston	Whiteford, Md.	May /91
Leslie Siegel	Danbury, Ct.	June 6/91
Mary Henshall	Nampa, Id.	June 7/91

## NUMBER OF MONARCH BUTTERFLIES TAGGED IN 1991

This year we received many excellent reports of tagging from hard working associates whose combined efforts resulted in a total of 24,494 butterflies being tagged this past season.

This number tagged during 1991 is much higher than in 1990 when there were 19,820 tagged and triple the number tagged in 1988.

Please remember, however, that each tag should be carefully placed on the part of the front wing that has been cleared of scales. Those associates working with groups should be sure that their assistants know how to handle the butterfly gently before placing the tag on the wing.

## MILKWEED: A COMMERCIAL PLANT

Milkweed has had a taste of commercialism in the past (see Monarch book, p. 37).

In 1814 the French employed milkweed in the manufacture of "cloth and velvets more lustrous than silk." This material was sold under the trade name, "Ozone." Later an English company attempted to market a similar material under the trade name "Cotine."

In addition to the above, comforters, pillows and comforter covers are stuffed with milkweed down. The company, under the trade name "Ogallala Down Comforter Company, is located in Ogallala, Nebraska. We have ordered one of the pillows and will report on it in the next annual IMS.

During World War II children were asked to pick milkweed pods working under the slogan, "pick a weed, save a life" the down used in the airforce and navy for stuffing life belts. Each filament of the milkweed parachute that carries the milkweed seed aloft is an air-enclosed tube that is waxy on the outside, closely resembling kapok. During the last two years of the war, the children collected 25 million pounds of pods, enough to fill 1.2 million life vests with milkweed down.

In addition to the above commercial properties of milkweed, a paper was recently published in France dealing with the anti-fungal properties of milkweed sap. Studies on the medicinal properties of milkweed sap are now being carried on at the School of Pharmacy, University of Colorado at Boulder, Colorado.

PLEASE SUBMIT REPORTS BY DECEMBER, 15, 1992

In order that we may include the information that you have gathered re the tagging and observations in our annual report, please submit your data not later than December 15, 1992. This is necessary in order that we may verify release-recapture records.

## PUBLICITY

Many thanks to all of you who sent us clippings from newspapers and magazines about the monarch butterfly. The clippings are from a wide range of publications in the U.S.A. and Canada and demonstrate the very lively interest that many people have in the monarch butterfly and its remarkable life history. We hope that public awareness of this unique insect will help to increase interest in the preservation and the growing of the food plant-the milkweed-so that there will always be a plentiful supply available.

Listed below are the associates who kindly sent us the clippings and the names of the publications from which they were derived:

Billy Allenbaugh, Sally Baumgardner, Bruce Beerbower, Cheryl Benyi, Ann Burns, Lee Darst, Don Davis, Pearl Eslinger, David Faber, Pat Fairless, Gregory Glovas, Barbara Hagenson, Mary Henshall, Dorothy Hoskins, Woody Keeney, Steven Lee, Judi Levicoff, Mary Lyons, Tami Nielsen, Sally Rollins, Joan Senghas, Jean Sinclair, Donna Southard, Doris Stifel, Faye Sutherland, Edna Sutton, Larry Wade, Audrey Wilson, Dorothy Yeager, Cyril Zewe.

The Reynoldsville Star, Time, Hickory Daily Record, East Side This Week, Telegraph Herald, Clinton Herald, Maquoketa Sentinel-Press, Alternatives, Discover, Commercial Appeal, Life and Land Together, Vineyard Gazette, Record-Courier, The Morning Call, Today's Post, St. Petersburg Times, Idaho Press Tribune, The Union Leader, Cape Cod Times, Business Week, California Parklands, Dayton Daily News, The Globe, Times Chronicle, The Philadelphia Inquirer, The Leefanlau Enterprise, Miami News-Record, Detroit Free Press, National Wildlife, Focus, Missouri Conservationist, The Blade, Washington Post Magazine, Day Butterfly Center Brochure, The Idaho Statesman, The Cobourg Daily Star, Oshawa Times, Southern Living, San Antonio Light, San Antonio Focus, National Tattler.

## SPECIAL ACTIVITIES OF ASSOCIATES

Although the basic activities of our associates are the rearing, tagging and recording observations about monarch butterflies, many associates express their special interest and enthusiasm by taking the initiative in activities that are in addition to the basic research on the monarch.

The following are excerpts from letters indicating the breadth of interest evoked by the monarch butterfly research:

Gene and Darlene Barman sent a postcard from Pacific Grove, California, "We drove up to see the monarchs it was a beautiful site".

Sally Baumgardner and students were pictured in "Time" magazine showing them scattering several species of milkweed seeds in an effort to restore native prairie plants to Illinois.

Bruce Beerbower held a special day for tagging monarch butterflies at Catawba Science Center, Hickory, N.C.-the event was open to the public.

activities cont'd

Nancy Bires gave a presentation on the monarch butterfly to nearly 1,000 students (every 20 minutes for 2 days) to classes from kindergarten through fourth grade. All of Nancy's students wrote to their Senators and Representatives supporting the naming of the monarch butterfly as the national insect of the U.S.A. This event was reported in the local newspaper.

Alice Davis found that Tickseed sunflowers attract monarch butterflies.

Eve Dingus helped to prepare a pamphlet on "Gardening for Butterflies in Mississippi" for distribution to the public to encourage butterfly gardening and to discourage the use of insecticides.

Mary Beth Eberwein writes, "the monarchs loved the Mexican sunflowers (Tithonia) in my garden".

Margaret Elliott was presented with a Certificate of Special Recognition for Butterfly Preservation by the National Council of State Garden Clubs Inc. because of her writing, lectures, slide shows, and workshops for the past six years in support of butterfly protection in the midwestern U.S.A.

Pat Fairless held two special days for studying and tagging monarch butterflies during the fall migration at Brady Lake, Ohio.

Mary Henshall wrote, "Besides schools, I had more adult groups than ever----I always encourage them to raise milkweed, don't spray. I get excited calls from people who found and raised them on milkweed they had planted---I sent chrysalids to my small grandchildren in Washington, D.C. Such excitement at home and school!". Mary was named "outstanding community citizen" by the grange in Nampa, Idaho where she showed her own slides of the monarch butterfly.

Ann Hughes could not find any milkweed plants in an area where she normally found them. She belatedly realized that she and other teachers had removed all of the plants in the area in order to take them to their classrooms!  
Moral: When removing milkweed plants from the wild be sure to leave some plants to reproduce themselves.

Franne Jackson writes that her Christmas present from her husband was a trip to see the overwintering site of the monarch butterflies at Anganguero, Michoacan, Mexico. "The trip to see the butterflies was certainly one of the most thrilling experiences I have ever had. Many thanks to you for locating that spot and making it possible for me to see it".

Judith Levicoff has developed "an audio-visual, Hands-on program, 'Magical Migrating Monarchs' which introduces children of all ages to the mystery of the monarch butterfly.----This also provides the children with a way to actively contribute to their own communities"

special activities cont'd

Marion Lopina writes "since we had a chilly end of October and beginning of November, I took- ----the butterflies with me (via airplane) to Florida and released them there. I did give a number of lessons on butterflies to various schools and also to adults." Marion was also involved in a fall hike at Wehr Nature Center.

Helen Millward visited Pacific Grove, California in the spring of 1991.

Shari Morkin was among three candidates selected in the first phase of the 1991 Presidential Award for Excellence in Science Teaching. She will also receive a Citation of Merit. She wrote, "I am doing a workshop in the butterfly garden I created-----at Oakland School. The workshop is for 33 science teachers throughout Illinois-----funded mainly through the National Science Foundation-----. In June I did nine workshops about the monarchs and butterfly gardening(which is) rising to the surface and becoming a 'hot item'. Now milkweed plants are growing in the Oakland School garden. The second graders monarch butterfly eggs were 'home-grown' ". Shari has been hired as a butterfly garden consultant by a school district in Walnut, Illinois.

Kay Palmcook gave a program and slide presentation at the Iowa State Teachers Convention about the Monarch Butterfly Tagging and Science Process Skills.

Emily Pendleton gave monarch butterfly programs to scouting groups, enrichment classes and garden clubs. As a result of her speech to a gardenclub we now have a new associate, Suzanne Nichols.

Joan Scancarelli who lives in Hollywood, Florida from January to April has planted milkweed in her garden there in order to attract monarch butterflies.

Millicent Scott has planted milkweed along the irrigation ditches in Casper, Wyoming.

Doris Stifel distributed forms re the monarch butterfly as national U.S.A. insect at meetings that she attended.

Doris also arranged to have monarch butterflies transported by airplane from Toledo, Ohio to Atlanta and Jonesboro, Georgia. The release of the butterflies was filmed and reported by the Blade newspaper.

Faye Sutherland who is a fifth grade teacher at Cole Elementary School, was nominated for the Idaho Statesman 1991 Citizen of the Year Award. According to the newspaper nomination "She has earned national recognition and honors teaching her class the fine art of raising and releasing monarch butterflies".



special activities cont'd.

Bill Thomas wrote that he had given 10 talks re the monarch to elementary school classes and 5 to service clubs and churches; he was scheduled to give 3 more talks at the time of writing.

Walter Zimmerman holds a seminar in April of each year for teachers and others who want to learn more about monarch butterflies. This is held in conjunction with the showing of an excellent video prepared by the Mesquite Independent School District. This program reaches schools at all levels in the Mesquite and Richardson Districts.

Walter wrote, "I have also carried newly hatched monarch(butterflies) to persons in the hospital and they keep them a couple of days (on their flowers) and release them. Without exception, it has been an amazing experience for the person and a thing that has perked them up unbelievably".

#### PLEASE KEEP YOUR LEFTOVER TAGS

We would like you to keep any tags that you have left over at the end of the season for use next year.

The reason for this is that the tag numbers that are sent to you are kept on permanent record here at our office and will not be reissued to anyone else.

Since the adhesive on the tags is permanent and will remain sticky for many years there should be no problem with their drying out. However, if you live in a dry climate we recommend that you keep them wrapped in plastic film.

When you renew your membership in our group, please list the numbers of your leftover tags so that we may verify the numbers on the tags of recaptured butterflies that are reported to us.

#### DEFECTIVE TAGS

Although most of the tags that we issue are clearly printed, occasionally some are sent that do not have clearly printed numbers. This may happen especially when large numbers of tags are issued to one associate.

In any case, please examine your tags carefully before using them in order to be sure that all of the numbers are easy to read.

If you have been given any defective tags, please return them to us and we shall send you replacements.

## PEAK ABUNDANCE

With only three exceptions, all the associates reported an unusual abundance of monarchs this past summer. This increase resulted from spring migrants arriving in the breeding grounds two or more weeks ahead of normal, giving rise to an extra generation. In addition, the very high temperatures in June and July in most parts of the breeding areas hastened development thus sponsoring still another extra generation.

Although climatic conditions were responsible for the increased population there is one other important factor. Far more monarchs returned from the overwintering site in Mexico than ever before. In our area many more badly faded and slightly tattered vernal migrants arrived in early May, visiting our milkweed plants and depositing eggs. We believe that this marked increase in the numbers of the vernal migrants is due to a considerable extent on the protection being given to the monarchs on the overwintering sites. The members of the IMA can take considerable credit for making this possible and for the activities of the members in providing more areas for the growth of milkweed plants through scattering of seeds in fields, along railway lines, etc. And the increase in the amount of milkweed in home and school gardens.

## DO MONARCH BUTTERFLIES MIGRATE?

Wenner and Harris of the Los Angeles County Museum recently published the results of their investigations on the monarch butterflies in southern California. Their studies concerned monarch oviposition and the presence of larvae during the year; they were not concerned with the adults. Their results confirmed what we of the IMA had established many years ago (see: The Monarch Butterfly; International Traveller, pp 98-101). However, our studies were more definitive being based on the alar tagging method. Such non-migrating populations occur in southern California, Florida and Mexico as well as in New Zealand, Australia and Hawaii. A possible explanation for these occurrences is given in the book. It should be mentioned, however, that we have authentic records of mass migrations of monarchs flying in great numbers in a north-westerly direction between Holtsville and El Centro in southern California which are marked on the map in the monarch book. It is possible that the situation in southern California will be found to be similar to that in Mexico and that migrating monarchs overwinter in the Coast Range mountains. It is hoped that eventually field expeditions will be carried out in the mountains during the winter months.

In reporting on this research the newspapers unfortunately stated: "Scientists Find Monarchs do not Migrate" a grossly inaccurate conclusion of the published research.

## SPECIAL DONORS

Listed below are the associates who have contributed more than the suggested donation to the research fund. These extra funds allow more latitude to use long distance telephone calls to verify data: special delivery postal services when necessary to send tags quickly during the fall migration; and Spanish translation services as required from time to time.

Our thanks to the following for their generous help:

Jim and Susan Anderson  
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## ANSWERING MAIL

Since the preparation of the Insect Migration Studies requires our undivided attention we must postpone answering your letters until the report is ready to go to the printer. This period lasts from January 1 for 6 weeks. We shall answer any mail received during this period as soon as we can do so.

## FAST-FLYING MONARCHS

Many Associates reported experiencing more difficulty in capturing monarchs by net this past summer than "ever before." They were more easily alarmed and flew much faster.

Monarch butterflies, as in all insects, are poikilothermic (from the Greek meaning various heat) which means that the body temperatures of insects varies directly with the ambient temperature. When temperatures are high so are the body temperatures of monarchs. When the temperatures are low so also are the body temperatures of monarchs. High temperatures speed up physiological reactions, including nerve responses. Visual response is more acute; nerve reactions from eyes to brain to muscles; and muscles response is speeded up thus increasing increase flight speed..

## MONARCH CONSERVATION IN MEXICO.

The monarchs are getting along very well in Mexico at the present time, despite false reports to the contrary. One realizes, however, that if any area on the earth is found to have a financial return to investors, such as lumbering operations or drilling for oil, then, we fear, butterflies, or any other animal, may be given short shrift. Such economic pressures are very difficult to control or eliminate as we are witnessing at the present time.

In a recent discussion with the Director of Monarca, Dr. Carlos Gottfried, we were impressed by the amount of protection the monarchs are now receiving in Mexico. As a result of donations from World Wildlife Fund, Canada, and fees charged to visitors, a total of \$180,000 is used to hire a staff of twenty-five local Mexicans; raise hundreds of oyamel trees to replace those that had been removed; and police restricted areas. In a recent letter received from Carlos Espinosa, Managing Director of the Angangueo-Rosario locus, he writes: "Sierra Chincua and El Rosario, Michoacan are sanctuaries that are located within the Angangueo zone. Sierra Chincua is currently a zone of Federal property which is well protected because no profitable activities are being carried out and access is not allowed other than to scientists."

Perhaps such protection helped to contribute to the mass spring migration that resulted, in part, to the unusual peak of abundance witnessed on breeding areas and the fall migration. Members of the IMA made it possible to locate the Mexican overwintering site and as a result contributed to the protection of this butterfly in Mexico. It is most fortunate that the site was discovered before lumbering operations might have removed trees while the monarchs were clustered on them.

# CREASE THE TAG BEFORE REMOVING FROM BACKING

If you bend the alar tag in half before removing it from the backing you will find that, having produced a crease, it is much easier to place the tag over the edge of the wing. Mary Lyons brought this method to our attention to inform the associates. This is the method we have used with considerable success. Another method is to place half of the tag on the underside of the wing and then bend it over. This, however, often leaves too much of the tag protruding from the margin of the wing. Whatever method you use, always be sure that all scales have been removed from the wing membrane in the area to which the tag will be applied.

## GENE FLOW BETWEEN EASTERN AND WESTERN POPULATIONS.

As our Associates realize, there are two populations of monarch butterflies in North America: The Western Population breeding in the valleys of the Rocky Mountains and overwintering along the coast of California; and the Eastern Population breeding in areas east of the Rocky Mountains and overwintering in the Neovolcanic Plateau of Mexico (The Monarch Butterfly: International Traveller: pp 127-128). It would appear from our distribution maps that there is a gene flow between the two populations in the Snake River area of Wyoming thus preventing the establishment of two separate subspecies. As yet we have not been able to analyze this possible situation due in part to the limited monarch populations in this area and the lack of research associates.

We are delighted to have Katy Duffy of Moose, Wyoming and Millicent Scott of Casper, Wyoming on our research team. Millicent has been most active this past summer and alar tagged 135 monarchs captured wild in the fields. The fact that Millicent was able to capture so many specimens is most important since it justifies the conclusion that the members of the western population do enter the eastern section of the northwest east of the Rocky Mountains and thus can intermingle with the Eastern Population. It also explains recorded sightings and collected specimens in Montana and southern Alberta.

We will look forward to receiving recaptures from Millicent's tagged specimens filling in our knowledge of the monarch migrations in this part of North America.

## BE SURE TO REMOVE ALL SCALES FROM THE DISCAL CELL

After removing the scales from the area (discal cell) of the wing to which the alar tag is to be applied, be sure to remove the scales clinging to your fingers as you repeat the process. This can be done by rubbing your fingers on a piece of cloth or on part of your clothing. Lee Darst wrote : "When you go home with orange spots on your pants you know you have tagged a lot of monarchs." Once all scales have been removed, be certain to press the tag firmly against the wing membrane. The presence of scales still on the membrane will destroy the adhesive property of the pressure sensitive glue. Associates anxious to alar tag as many monarchs as possible within a limited time are liable to have few recaptures for the amount of effort expended. The presence of scales on the discal cell will cause the tag to become loose and fall off during flight. It is better to tag a few monarchs carefully than hundreds in a hurry.

## TAGS COMING LOOSE FROM BACKING

A few of our associates have reported that the alar tags occasionally come loose from the paper backing. The latter is wax coated so as to prevent the tags adhering to it. It is possible that the coating may be too thick in some cases or perhaps it is not of the correct texture. We will discuss this matter with the printer. In the meantime, if you encounter this difficulty place the strip, along with any loose tags, in a small box. Tags should be kept in envelopes when not in use, especially when being taken into the field - carried loosely in ones pocket will cause the tags to come loose.

Occasionally the first digit of the number is printed too close to the margin of the tag with the result that an "8" may appear as a "3". If the recaptured monarch tag is returned to us we can consult our files for such an error. In most cases, however, the person capturing a tagged specimen reports the number to us, by letter or by telephone allowing the monarch to carry on its flight which is most desirable. We will discuss the matter with the printer. If you encounter such a discrepancy discard the tag.

In the process of printing the numbers on the tags the printing die occasionally cuts through the backing making it a little more difficult to remove the tags. If you encounter this difficulty, place a strip of scotch tape on the back surface of the paper backing.

## GROWING MILKWEED IN YOUR VEGETABLE GARDEN

If you have limited space for establishing a milkweed patch you might consider Debbie Knutson's answer. Debbie grows milkweed along side her cabbage row. There is very little root competition between most vegetable plants and milkweed since the former have fibrous surface roots whereas milkweed, of most common species, have long tap roots, such as *A. syriaca*. Besides cabbage other vegetable plants suitable are broccoli, cauliflower, lettuce, spinach etc. We have a few plants growing along the margins of our vegetable garden. Fortunately many species of milkweed have a wide tolerance to soil conditions from light sandy soil to heavy clay loam. We have many *syriaca* plants growing along the margins of our pine tree woodlot areas where very few plants can survive.

## THE MONARCH BUTTERFLY : INTERNATIONAL EMISSARY

It is interesting to note, at a time when Canada, United States and Mexico are contemplating a free trade agreement, that the monarch butterfly visits all three countries, recognizing no international boundaries. It raises its young in the United States and Canada and, as adult butterflies, spend the winter in the Trans-volcanic Plateau of Mexico. Some of them prefer living in Mexico and remain the year round (Resident Population: see The Monarch Butterfly: International Traveller: pp. 98-101). Perhaps the committee of politicians discussing such a free trade agreement might adopt the monarch as its emblematic token.

## POLYHEDROSIS VIRUS INFESTATIONS

Larry Lininger and Vince Shane have reported infestations of the polyhedrosis virus in their monarch colonies. Vince attempted to clean his cages, using formalin, but without success. It is virtually impossible to eliminate the virus once it has entered the colony.

Whenever the monarch butterfly population reaches a dramatic peak in abundance, as occurred this past summer, the virus makes its appearance. This results in a drop in population. Eventually the monarchs produce a resistant strain giving rise to an increase in abundance thus establishing population fluctuations (see Monarch Butterfly: International Traveller: pp 94-98; 182).

Since we are dealing with a virus, there are no known methods of eliminating it from rearing containers. It is necessary to wait until the monarchs produce a resistant strain. Such a strain then spreads across the continent causing a gradual increase in numbers. The virus can be transmitted through the egg stage; hence collecting eggs in the field will not eliminate it in your rearing cages.

## RESEARCH ASSOCIATES

If your name does not appear on this list it is because you joined after this issue was sub,itted for printing. If there are other ommissions, please bring them to our attention. Names are removed from the list if we have had not response over a two year period.

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