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April 21, 1993

Hello Monarch Taggers:

Wow! What a year. When we sent out news releases requesting help in tagging monarchs, we had no idea how much of a response we would get. We were overwhelmed! We were absolutely inundated with your generous offers of assistance. In just 10 short and very busy weeks we had names of 500 adults who were working with more than 4000 children on this tagging project! What a terrific response. We want to thank each and every one of you, especially the children, for helping us with this project.

In our original letter, we promised to have a summary of the results of the tagging ready by April. We anticipated that it would take a long time to obtain the data sheets from all the cooperators, and we wanted to wait through the winter to see if any of our tags were collected at the overwintering roosts in Mexico. None were, unfortunately, but we still have some interesting tagging information to report.

We sent out over 32 thousand tags. We estimate that approximately 5 - 6 thousand of these tags were applied to butterflies. There were 6 significant recoveries (see below). This seems like a small number, but is actually a higher percentage of recoveries than are obtained in most bird banding studies. Records of previous monarch tagging programs, i.e. those of Dr. Fred Urquhart (University of Toronto) and his associates, yielded recapture rates of 1 per 1000 tags within the United States and Canada, but nearly 5000 butterflies had to be tagged to obtain a single recovery at the roost sites in Mexico. It is because of this low recapture rate that we need so many of you to help in the tagging. A lot of effort has to be expended for every bit of information. But tag recoveries are only part of the information we are obtaining from your records and observations. We have learned a great deal about the arrival dates for major flights of monarchs in each region, and how long monarchs remain in these areas after the main flight has moved further south.

In addition, we are beginning to learn the locations of some of the major pathways and roosting areas through your observations. Some of these observations are summarized below, but first we would like to review the rationale for this project and give you a brief status report on the monarch population.

Monarch Populations

Summer 1991

Butterfly counts on the 4th of July indicated good numbers of monarchs in many northern areas. In some cases, the numbers recorded were unusually high relative to those from previous counts. In general, the population numbers were normal or higher than normal, and a good fall migration was expected.

Fall 1991

The fall migration was excellent, and large numbers of monarchs were counted passing given points by observers along the East Coast and in the Midwest. In mid November ORT saw tens of thousands of monarchs flying in a southeasterly direction parallel to the mountains near Linares, Nuevo Leon in northern Mexico. Apparently normal numbers of monarchs reached the roosting areas in the Transvolcanic mountains west of Mexico City. In January, which is usually the middle of the winter dry season, a weather pattern attributed to "El Niño" created a two week period of cold, wet conditions in the roosting areas, followed by freezes and even snowfall. Lincoln Brower and Bill Calvert estimated mortality to be 70% at several roosts. According to Bill Calvert, mortality at the roost sites is normally 15-20%, so a 70% loss was very alarming. This loss, coupled with usual threats to the integrity of the roosting sites, such as deforestation, once again drew considerable media attention to the problems of monarch conservation.

Spring 1992

Very few monarchs were reported along the Texas and Louisiana coasts in March and April, and the number of monarchs reaching the eastern third of the United States was extremely low. Conditions in the Midwest were much better. Dick Walton reported seeing good numbers of monarchs in the vicinity of Uvalde, Texas in mid April, and in May, there were reports from Minnesota, Wisconsin, and Michigan of the appearance of monarchs earlier and in larger numbers than usual. In retrospect, it appears that substantial numbers of monarchs moved northward through Texas west of San Antonio; from there, they fanned out to colonize the upper Midwest.

Summer and Fall 1992

The summer of 1992 was one of record low temperatures through most of the northern states. Cloudy and rainy weather was such a memorable feature of the summer that many "ol' swimmin' holes" were hardly visited, berry crops failed and bears went hungry, and so on. Nevertheless, the monarchs did well, and the fall migration in the Midwest, at least, was excellent. In the East, where systematic monarch counts were made by Dick Walton and his colleagues at Cape May, the number of monarchs was approximately 5% of what it had been the previous year. Clearly, from this report and many others, the number of monarchs in the northeastern United States was unusually low in 1992.

Several observers reported that extremely large numbers (perhaps millions) of monarchs reached the United States/Mexican border area near Del Rio, Texas, in the last few days of September. This occurred at the same time that large numbers of monarchs reached Austin, and were sighted in southeastern Texas. Reports from Austin indicate that monarchs were abundant from the end of September until the first week of November. Overall, the pattern of reports from Texas seems to indicate that the fastest-moving front to the southward migration is in west Texas, and that monarchs funnel into the region from the North and East over much longer periods. If we obtain funds to continue this study, one of our objectives will be to determine the time course of the monarch migration as it converges on and moves through Texas to Mexico.

Winter 1992-1993

Observations made by Mexican authorities and other observers indicated that some monarchs reached the roosts by the first week of November.

In February, a team of scientists and Mexican authorities visited all the known monarch roosting areas. Members of this group estimated that 85-93 million

monarchs overwintered at these roosts in '92-93. Whether these are high or low numbers is not clear, because in previous years not all the roosts were surveyed at the same time. Estimates of population sizes at the best known roosts, "El Rosario" and "Chincua," seemed to indicate that the overwintering population was of "normal" size. Even though the monarch population was low in the eastern United States, this reduced population did not have a clear impact on the number of monarchs overwintering.

Spring 1993

In each of the last two years most monarchs have dispersed from the roosts by the end of February. This breakup of the roosts is a month earlier than usual. Factors such as warm winters or drifting smoke from spring fires might cause monarchs to leave the roosts early. The effects, if any, of this early migration northward are not yet clear.

Normally, a few overwintering monarchs have reached Lawrence, Kansas, by this date (18 April) but so far, they have not. This has been a cold, wet spring, and it seems possible that overwintering monarchs will die out before reaching the lower Midwest (Kansas, Missouri, Nebraska, southern Iowa and Illinois). Once again, it will be of value to record when monarchs arrive in each area and observe how the summer population develops.

Tagging in 1993

Many of you have inquired as to whether there will be a tagging program in 1993. The answer is yes--if we obtain funding from a foundation or corporation that will underwrite the environmental and science education aspects of this project. Last year we financed the project with our own funds. (This became known to some of you, and you dipped into your own pockets to help us out with mailing costs, etc. We really appreciated these contributions.) As we mentioned at the outset, we were overwhelmed by the responses to our requests for assistance and the project has already become much bigger than it was last year. We are, therefore, looking for funds, and have prepared a proposal "Monarch butterflies: Research and Science Education," which, if funded, will provide us with the resources to produce educational materials on monarch conservation, migratory biology, reproductive biology and physiology, methods of rearing monarchs on host plants and artificial diets, and outlines for how to study monarchs in the field and the laboratory. Wish us luck. If we are successful, we will be in touch by the end of August with information on tagging (we will have a new system) and field methods for 1993.

Thanks again for all your help in 1992. We sure learned a bunch and had a lot of fun, and hope you enjoyed the project as well.

Watch those monarchs!

Sincerely,

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Lawrence, Kansas 66045
913-864-4051

Brad Williamson
Olathe East High School
Olathe, Kansas
913-764-6036

Useful Sources

We have received many requests for information about sources of supplies, publications on monarchs, and information on butterflies in general.

Equipment and Supplies

BioQuip Products
17803 LaSalle Avenue
Gardena, CA 90248
(213) 324-0620

Price list upon request.

Carolina Biological Supply Company
2700 York Road
Burlington, NC 27215
(800) 632-1231 (in NC)
(800) 334-5551 (rest of U.S.)

Catalog: \$15.75 (free to schools, companies, and libraries)

Insect Lore Products
P.O. Box 1535
Shafter, CA 93263
(800) LIVE-BUG

Free catalog upon request.

Ward's Natural Sciences Establishment
5100 West Henrietta Road
P.O. Box 92912
Rochester, NY 14692

Organizations

The Lepidoptera Research Foundation
c/o Santa Barbara Museum of Natural History
2559 Puesta Del Sol Road
Santa Barbara, CA 93105
(805) 682-4711

Publishes The Journal of Research on the Lepidoptera.

The Lepidopterists' Society
Dr. William D. Winter, Secretary
257 Common Street
Dedham, MA 02026-4020
(617) 326-6053

Annual dues: \$25.00; open to anyone interested in Lepidoptera. Publishes News of the Lepidopterists' Society, Journal of the Lepidopterists' Society.

The Xerces Society
10 Southwest Ash Street
Portland, OR 97204
(503) 222-2788

Annual dues: regular membership, \$25.00. Publishes Wings: Essays on Invertebrate Conservation three times a year, the results of the North

American Fourth of July Butterfly Count, and Atala, a journal of invertebrate ecology, published occasionally.

Young Entomologists' Society
International Headquarters
1915 Peggy Place
Lansing, MI 48910
(517) 887-0499

Annual dues: \$10.00. Publishes Young Entomologists' Society Quarterly. (The "Trading Post" column in Young Entomologists' Society Quarterly includes live stock offered for sale and exchange.)

Monarch Migration Association of North America
c/o R. Walton
35 Stacey Circle
Concord, MA 01742

Members of this organization monitor fall monarch populations at selected sites (Cape May, NJ).

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

Publishes a monthly newsletter from October through May. Subscription \$15.00.

References on Monarchs and other Lepidoptera

We have received many requests for literature on monarchs and other butterflies. This list should get you started. If you should become interested in any of the scientific literature concerning Lepidoptera, you can usually find numerous journal articles devoted to this subject in college and university libraries.

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Brower, Lincoln P. "Ecological Chemistry." *Scientific American* 220, no. 2 (1969): 22-29.

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Covell, Charles V., Jr. *A Field Guide to the Moths of Eastern North America*. Boston: Houghton Mifflin, 1981.

Douglas, Matthew M. *The Lives of Butterflies*. Ann Arbor: University of Michigan Press, 1986.

Ehrlich, Paul R. and Anne H. Ehrlich. *How to Know the Butterflies*. Dubuque, Iowa: William C. Brown, 1961.

Howe, William H., ed. *The Butterflies of North America*. Garden City, N.Y.: Doubleday, 1975.

Klots, Alexander B. *A Field Guide to the Butterflies of North America, East of the Great Plains*. Boston: Houghton Mifflin, 1951.

Norman, Colin. "Mexico Acts to Protect Overwintering Monarchs." *Science* (September 19, 1986): 1252-3.

Opler, P. A. *A field guide to eastern butterflies*. Houghton Mifflin Company, Boston, 1992.

Scott, James A. *The Butterflies of North America: A Natural History and Field Guide*. Stanford, Calif.: Stanford University Press, 1986.

Urquhart, Frederick A. *The Monarch Butterfly*. Toronto: University of Toronto Press, 1960.

_____. *The Monarch Butterfly: International Traveller*. Chicago: Nelson, Hall, 1987.

Xerces Society. *Butterfly gardening*. Sierra Club Books, San Francisco. 1990.

Zuckerman, Jim. "Monarchs by the Millions: Crowds of Monarch Butterflies Make 2,000-Mile Migrations between Mexico and the United States Twice a Year." *Americas* (September-October 1986): 16+.

Tagged monarchs: Summary of sightings, recaptures and recoveries

Tag No.	Tagger	Location	Date Tagged	Date Recovered	Location	Observer	Interval	Distance
658 M	Ken Highfill c/o Lawrence High School, 921 W. 28th Terrace, Lawrence, KS 66046	Lawrence, KS (Baker Wetlands)	14 Sep 92	1 Oct 92	Lawrence, KS (Baker Wetlands)	Kelly Kindscher, KU, 2041 Constant, Lawrence, KS 66047	17 days	--
806 C	Jim Liebherr, Ent. Dept., Cornell Univ., Ithaca, NY 14853	Ithaca, NY		1 Oct 92	Ithaca, NY	C. Cooley, 321 Biotech, Cornell Univ., Ithaca, NY 14850		--
852 W	Letitia Keenan, 615 E. 6th, Oakley, KS 67748	Oakley, KS	30 Sept 92	3 Oct 92	Oakley, KS	Donald M. Moore, 218 S Smokeyhill, Oakley, KS 67748	3 days	--
914 H	Pam Russell, 1219 Andrews, Winfield, KS 67156	Winfield, KS		23 Oct 92	Roff, OK	Matt Gayler, Rt. 2, Box 78, Roff, OK 74865		374 miles
761 K	Charles Johnson, 769 Westridge, Wichita, KS	Wichita, KS	9 Oct 92	11 Oct 92	Catoosa, OK	Chase Bagley, 26587 E. 17th St., Catoosa, OK 79015	2 days	100 miles
873 W	Leticia Keenan, 615 E. 6th, Oakley, KS 67748	Oakley, KS	5 Oct 92	9 Oct 92	Oakley, KS	Dustin Klein, Oakley High School, Oakley, KS 67748	4 days	--
592 AK	Glenn Jacobson, 8808 Slayton, Austin, TX 78753	Austin, TX	30 Oct 92	31 Oct 92	Zilker Park, Austin, TX	Brian Hurt, 712 Red River, Austin, TX 78701	1 day	--
656 AF	Matthew Peña, Austin, TX	Austin, TX	30 Oct 92	31 Oct 92	Zilker Park, Austin, TX	Brian Hurt, 712 Red River, Austin, TX 78701	1 day	--
673 AF	Matthew Peña, Austin, TX	Austin, TX	30 Oct 92	31 Oct 92	Zilker Park, Austin, TX	Brian Hurt, 712 Red River, Austin, TX 78701	1 day	--

Tagged monarchs (continued)

Tag No.	Tagger	Location	Date Tagged	Date Recovered	Location	Observer	Interval	Distance
971 AD	Paul Eckhardt, 8211 Wexford, Austin, TX 78759	Austin, TX	17 Oct 92	31 Oct 92	Austin, TX	Mike & Nancy Haskins, 8316 Wexford Drive, Austin, TX 78759	14 days	--
592 AK	Glenn Jacobson, 8808 Slayton, Austin, TX 78753	Austin, TX (Zilker Park)	30 Oct 92	31 Oct 92	Zilker Bot. Garden, Austin, TX	Joe Fisher, 5709 Coventry Ln, Austin, TX 78723	1 day	--
034 M	Spencer Clark, 19476 182nd, Tonganoxie, KS 66086	Tonganoxie, KS		6 Nov 92	Matagorda, TX	Barbara Slaten, PO Box 404, Matagorda, TX 77457		1030 miles
758 Z	John Wachholz, 2311 Applewood Ln., Salina, KS 67401	Salina, KS		7 Oct 92	Salina, KS	Mrs. Bengtson, 830 S. 9th St., Salina, KS 67401		--
991 J	Dan Beck, 225 N Poplar, Wichita, KS 67214	Wichita, KS	1 Oct 92	27 Oct 92	Wichita, KS	Christine Price, 717 Kansas Ct., Wichita, KS 67211	26 days	--
489 AL	Catherine Stryer, Corpus Christi, TX 78413	Corpus Christi, TX	6 Nov 92	6 Nov 92	Corpus Christi, TX	Catherine Stryer, Corpus Christi, TX 78413	same day	--
701 A	Suzette Slocumb, Kansas City, MO	Kansas City, MO	3 Sep 92	10 Sep 92	Kansas City, MO	Bob Savino, 316 E. Gregory Blvd, Kansas City, MO 64114	7 days	10 miles
742 B	Walter Knapp, 1629 1/2 Medford, Topeka, KS 66604	Topeka, KS (Shunga Park)	27 Sept 92	7 Oct 92	Austin, TX	Nancy Jewell, Austin, TX 78735	10 days	620 miles
744 B	Walter Knapp, 1629 1/2 Medford, Topeka, KS 66604	Topeka, KS (Shunga Park)	27 Sep 92	7 Oct 92	Austin, TX	Nancy Jewell, Austin, TX 78735	10 days	620 miles
744*	Jim Lockard, 5908 Fontana, Fairway, KS 66205			7 Oct 92	Austin, TX	Nancy Jewell, Austin, TX 78735		635 miles

*Sample was reported as "744S" but in all likelihood was probably 744B.