



NEWSLETTER

of the
MICHIGAN ENTOMOLOGICAL SOCIETY

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Butterfly Farming in Nicaragua

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INTRODUCTION

Plants and insects have co-evolved since the Cretaceous period about 100 million—years ago. There are approximately 43,000 known species of butterflies with the most speciose groups found in the Neotropics (Hogue 1993). Lepidoptera are the subject of much experimental research in the quest for knowledge of general ecological principles and are of medical importance as a source of drug resources (Lamas and Perez 1987). The ubiquitous nature of butterflies has been greatly appreciated and incorporated into the cultures of Latin American people (Beutelspacher 1976). Tropical conservation programs in the United States designed to preserve the rich biological heritage of Central America as well as educate the general public on butterfly ecology have increased directly due to the increase in butterfly houses and museums in the United States and worldwide. Local residents in rural areas of Central America are beginning to realize the value of conservation and organic farming techniques for sustainable land use management and their role in maintaining biological diversity (L. Harkrader Coordinator of the Durham-San Ramón Sister Community Partnership Steering Committee, pers. comm.).

Fragile ecosystems in the tropics have suffered habitat change and loss due to residential, agricultural, and commercial development. Deforestation may have removed some insect species as well as plant species that could have proven to be valuable for pharmaceuticals, plant hybrids or pesticides (Leonard 1987). Ecologically sound agricultural practices promote habitat conservation and sustainable agriculture. The small percentage of remaining forest should be preserved in order to maintain biological processes, biodiversity, and subsequent human benefits as well. The fact that the economies of Central America must increasingly rely on natural resource commodities, while less than 40 percent of the land area of the seven countries within Central America remains forested, stresses the importance of developing suitable natural resource management and tropical conservation educational programs. Nicaragua has followed this trend of rapid forest reduction and it is because of this pattern that local people have and continue to support efforts to reverse this pattern.

The development of butterfly farming for exportation requires a management plan that will assure self-sustainability for years to come. The plan must include the vegetation, forests, animals, and physical and biological processes that maintain the functioning ecosystem. A butterfly farming management program must include the entire community, which



Map of Nicaragua indicating the location of San Ramón within the Department of Matagalpa.

Continued on next page

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in this case involves the people of San Ramón, Nicaragua. We realize that commercializing pristine resources and assigning monetary values to butterfly species raises concerns with some people. However, in the case of San Ramón with its environmentally-minded members, we believe that habitat preservation and ultimately species protection overrides any shortcomings of butterfly farming.

In January 1999, a delegation of students, teachers, and volunteers from several U.S. states traveled to San Ramón, Nicaragua, in support of the Durham-San Ramón Sister Community Partnership. San Ramón, which is in the Department of Matagalpa, is located approximately 90 miles north of the capital city of Managua (See map on page 1).

DURHAM-SAN RAMÓN SISTER COMMUNITY PARTNERSHIP

The partnership between Durham, North Carolina, and San Ramón, Nicaragua, was established in 1993 in order to promote peace and friendship between these two communities. The partnership strives toward an equal distribution of the world's resources through people to people exchanges and through social and economic development projects (L. Harkrader, pers. comm.). This sister community partnership was formed in support of the "campesino-a-campesino" (farmer to farmer) movement initiated in the 1970s to promote organic farming techniques and soil conservation with the goal that many small families working collectively will positively influence societal ideas, policies and ethical practices. Now, more than 270 Nicaraguan families are part of the Campesino-a-Campesino movement and volunteer on a 24-acre model farm located in San Ramón (L. Harkrader pers. comm.).

Local residents of San Ramón and several nearby villages including about 300 families are involved with this partnership. Coop-members are eager to learn and try new ideas that may improve the regional quality of life in addition to overcoming severe environmental and health issues related to Hurricane Mitch, which hit the region in November 1998. The members of the cooperative have had the environmental foresight to utilize the land as a renewable resource for sustenance and prosperity through organic farming and eco-tourism. Increased community comradery was observed as the members worked together to build a house for the flight-house caretaker. The members have worked hard to make this project stand on its own as a model for the future and arrive by the truckload weekly to contribute. Solar-powered lights in the kitchen and teaching facilities, and composting toilets are evidence of their initiative to encourage non-obtrusive living patterns as the nearby area of San Ramón develops.

MILLERSVILLE CONNECTION

Approximately two years ago, John Wallace (a former Michigan State University Entomology graduate student and now a faculty member at Millersville University, Millersville, PA) was invited to lead a team of student entomologists to San Ramón, Nicaragua. The goal of this visit was to initiate a butterfly farming pilot project with the local agricultural cooperative. Laura Lazarus and Alexis Smoluk who were then Millersville University students, were responsible for locating larval host plants and adult butterfly nectar plants as well as construction of the flight house. The entomology team worked closely with the local coop-members to ensure that the project would be self-sustainable upon their departure.

OBJECTIVES

The decision by the sister communities of Durham and San Ramón to initiate a butterfly farming project was two-fold. A butterfly export



Construction of the butterfly house

Notices:

Poster: Darners of North America, 17" x 28"; includes paintings of 8 species of Aeshnidae. Contact: Massachusetts Audubon Society Publications, 208 South Great Road, Lincoln, MA 01773; (781) 259-9506 ext. 7255; edresources@massaudubon.org. Cost \$10 plus \$2 shipping.

Midwest Tiger Beetle WebPage. Wayne Steffens is developing a webpage that lists the species and distribution of the tiger beetles from Minnesota, Wisconsin, and Michigan. If you have additional information, please Email: Wayne at (wsteffen@mr.net). The URL is: <http://webpages.mr.net/wsteffen/>

For Sale: *Light traps*, 12 volt DC or 110 volt AC with 15 watt or 20 watt black lights. The traps are portable and easy to use. Rain drains and beetle screens protect specimens from damage. For a free brochure and price list contact: Leroy Koehn, 6085 Wedgewood Village Circle. Lake Worth, FL 33463. Phone: 561-966-1655, Cellular Phone: 305-582-3183, Email: Leptlaps@aol.com

The Dow Gardens is offering internships for students majoring in horticulture, landscape architecture, urban forestry, limnology, floriculture, botany, and/or entomology. The interns will have opportunity to work with professionals in landscape maintenance, greenhouse plant production, research, and interact with the general public. The rate of pay is \$6.10 per hour for a 40-hour week with time and one-half for overtime.

We will provide safety equipment and cover the cost of work clothes. In addition to filling out an application, a letter of recommendation from the student's major professor is required. The deadline for student applications is March 15, 2000.

Contact: Douglas J. Chapman, Horticulture Director, THE DOW GARDENS, 1018 WEST MAIN STREET, MIDLAND, MICHIGAN 48640-4292

Meeting. The Michigan Mosquito Control Association's 14th Annual Meeting will be held on February 3rd & 4th, 2000 at Shanty Creek, One Shanty Creek Road, Bellaire, MI 49615, 1-800-678-4111, 231-533-8621, www.shantycreek.com. For more information, contact us by Email at: info@mimosq.org

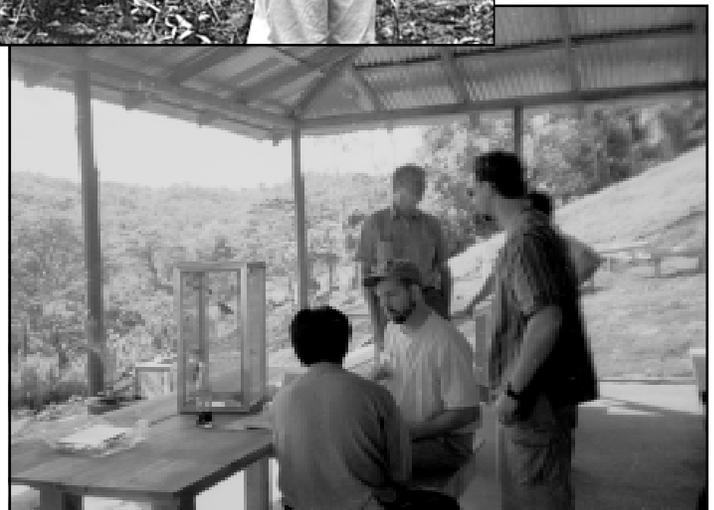
tation project would not only serve as a solution to economic and social problems faced by the farmers, but also represent a diversified economic yet ecologically sound business venture that would reduce negative impacts on local insect diversity by preserving habitat and providing educational opportunities. The primary objectives for this delegation included: (1) construction of a flight house for adult butterflies and larval food plants; (2) identification and collection of larval and adult butterfly species for exportation, and; (3) collection of larval food and adult nectar plants for nursery stock. In addition, the delegation constructed a small trail connecting a 100-foot waterfall to the butterfly flight house to enhance future ecotourism opportunities of the area.

THE PROJECT TAKES FLIGHT

The construction of the flight house was initiated after an appropriate site was selected based on available space and proximity to larval and adult host plants. The house frame, a rounded arc-like structure was erected after construction with 1-inch-diameter PVC piping and fastened with glue and wire. After the house was stabilized with wooden support beams, the shade cloth (made of 50% shade fabric with openings 1-cm in diameter and dimensions of 10 X 8.5 m) was carefully attached with hardware wire. Larval and adult host plants, e.g., banana and passion vines were identified in the field and collected for planting and cuttings in the flight house. Adult nectar plant



Collecting butterflies for the new butterfly house



Examining captured butterflies in field shelter

samples were also collected for nursery cuttings and planting. Nightly training sessions were conducted with a local coop member to discuss insect and host plant identification.

Lepidopteran species were collected with sweep nets and with traps baited with banana. A total of 12 species of butterflies from two families were collected, including 10 species of Nymphalidae (*Heliconius charitonius*, *Heliconius erato*, *Caligo eurilochus*, *Greta andromica*, *Milanaea ettra*, *Napeogenes tolosa*, *Morpho peleides*, *Siproeta epaphus*, *Siproeta stelenes*, and *Titorea tarricina*) and 2 Papilionidae (*Papilio cresphontes*, *Parides iphidamas*) (De la Maza 1987, DeVries 1997). A few butterflies of each species were identified to the species level and used as a reference collection from which to base future exports. Larvae were collected when observed on host plants, i.e., *Papilio cresphontes* and *Morpho peleides*.

The unique nature of the coop's butterfly farming project may have conditioned the project for a few minor setbacks. In this cooperative effort all farm families work together and individuals commit to doing the job that each is best suited. The acceptance of a role in the coop and project is taken as a promise

butterflies certainly represent a new product for export, thereby having a favorable effect on local markets

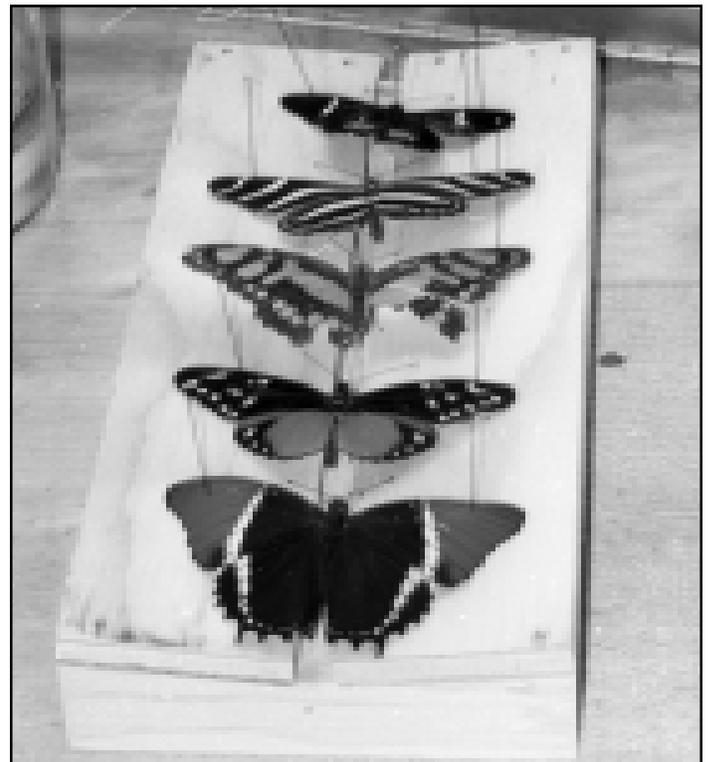
of commitment to teamwork for the duration of the project. Failure to keep such a commitment jeopardizes the strength of the coop and the effort's success in general. During the last week of the Millersville University party's stay in Nicaragua, a potential crisis was surmounted. The coop member trained for the position of butterfly house caretaker backed out and left San Ramón without telling the other members. Initial disappointment and panic felt by those who invested their life savings and sweat in the success of the coop gave way to remarkable resourcefulness of the members. The caretaker's replacement was soon found and was sent to a butterfly farm in Costa Rica for training.

Export and import of Nicaraguan butterflies was made possible after a few stringent guidelines were followed. In Nicaragua, it was necessary to obtain a verification of each species and a statement of health of each pupa from the Ministry of Agriculture. The quarantine inspector of the Ministry of Agriculture must examine the pupa to make sure they are healthy. An export license was obtained from CETREX (Centro de Tramites de Exportaciones, translated as the Exportation Transaction Center), at a cost of \$40 per inspection, after which a shipment was immediately sent via airmail to the U.S. For import into the U.S., each institution (e.g., butterfly house, museum, etc.) must send a formal request to the coop listing the species and quantity desired of each butterfly. In addition each importer must be in charge of establishing proper quarantine arrangements.

WHAT DOES THE FUTURE HOLD?

Butterfly farming contributes jobs to the rural economy, thereby helping to stem rural to urban migration, which is especially important in Nicaragua where the overall urban unemployment rate is nearly 75%. For many developing countries, butterflies certainly represent a new product for export, thereby having a favorable effect on local markets which traditionally have relied heavily on agricultural commodities such as coffee, sugar, or beans. Butterflies can generate foreign exchange income for hard-currency starved economies, such as Nicaragua. This type of economic development is not only non-obtrusive but it also can contribute intellectual stimulation and aesthetic value to the targeted and surrounding communities. The technological simplicity of butterfly farming therefore minimizes the strain on a dollar-starved community to establish a butterfly-breeding program. This fact furthermore eliminates the dependence of the butterfly farmer on the availability of scarce imported materials and the technological expertise to maintain sophisticated equipment. The rich diversity of the Nicaraguan low-montane broadleaf deciduous forests provide the necessary adult and larval host plants as well as all exportable butterfly species for this project. The only substantial start-up costs would be the netting, PVC piping, tools, shovel, and wire needed to construct the flight house.

The San Ramón-Durham Sister Community Partnership is currently working on a way to link this coop to others in the area to form an ecotourism site that is similar to those currently established elsewhere in Central America where tourists (mostly backpackers) travel through the Latin American countryside and



Examples of pinned butterfly specimens

stay briefly in each community. The San Ramón hiking trails, organic shade-grown coffee plantation, waterfall, and butterfly house offer a unique learning experience to all.

Already, progress has been attained regarding the flight house import-export program. Nine *Opsihanes tamarindi* pupae (a morpho) have successfully been transported to the Durham Science Museum in Durham, North Carolina. The Durham museum is now awaiting further shipments of other butterfly species that the San Ramón partnership will provide. In addition to the recent success of the butterfly project, local farmers also experienced significant benefits of organic farming as evidenced by a 3-fold increase in the coffee harvest of this past season (L. Harkrader, pers. comm.). With rewards such as these, it is hopeful that support will grow for the farming cooperative as well as for the widespread acceptance of organic farming techniques promoting sustainable land use management.

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Michigan Odonata Database Now on the Web

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One of my goals has been to make the Michigan Odonata Survey database available over the Internet. Now that we are over 19,000 records, the data should be quite useful to natural heritage agencies and other Odonatists, as well as MOS participants. Since the MOS Database is kept in FileMaker Pro 4.1, it only made sense to use Filemaker's built-in web server features to make the data accessible via the web. After an initial fling with Filemaker Pro 5.0, I pulled it off the web server, and installed FileMaker Pro 4.1 (FMP 4). It turns out that FileMaker Inc. must be fed an additional \$1000 for the version that allows us to serve up more than 10 guests in a 12-hour period. That's a downgrade, not an upgrade, in my (and many others) opinion, so I suggest anyone contemplating sharing data via the web and Filemaker, use version 4.1, not 5.0.

After some initial tweaking, we now have the MOS database available on the web at <http://insects.ummz.lsa.umich.edu:591>. For a link to the database, you can go to: insects.ummz.lsa.umich.edu/michodo/mos.html.

The web version differs from our master database and data-entry templates in several ways. First, I only included the fields for family, genus, species, county, locality, date, collector, and MOS number. My reason for that was that the web users need only that much information. The MOS number provides a way to ask for more data for a specific specimen if necessary. In another iteration of the web database, I'll include whether the specimen is an adult, larva or exuviae. For now, the web database allows searching and viewing the data in a table or form format. When I learn how to do some fancier HTML coding, I'll make the web database look and act a lot more like the actual Filemaker database views that we use.

I have also put up the Larval Odonata database, which is based upon the specimens in our fluid collection, and has about 3300 records as of Nov. 1, 1999. That database originally started in 1996 as a means of curating our exuviae from the Kennedy and Williamson collections, and evolved into a database of all our Odonata specimens in alcohol. Ethan Bright has identified the majority of the specimens in the database, and Ellie Shappirio has contributed a lot of volunteer hours in databasing records in the past few months. Most of the records databased thus far are from the Great Lakes region. This database is also in Filemaker Pro, and each vial is assigned a number by the database as a record is entered. I estimate that our current catalog is about 1/3 of the total number of vials of Odonata that we have, with much of the remaining material coming from the SW and NW USA, some southeastern states, Mexico, Central America, and some from Africa. A lot of

Upcoming MES Events

Breaking Diapause Meeting

18 March 2000

244 Natural Science Building
Michigan State University, East Lansing, MI
Contact: Mo Nielsen
nielsen4@pilot.msu.edu

MES Annual Meeting

Friday 2 June 2000

Kellogg Biological Station, Hickory Corners, MI
Theme: Insect Photography
Guest speaker: David Ahrenholz
Awards for Student Competition and Photo Salon

Contact: George Balogh
Email: bugdr@net-link.net

More details will be printed in the next
MES Newsletter

Continued on page 6-

Hine's Emerald in Michigan

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I just completed my third year of a U.S. Fish and Wildlife Service-funded Hine's emerald (*Somatochlora hineana*, Odonata: Corduliidae) survey in Michigan. This was an exciting summer, especially after the dismal season in 1998. After last year I began to wonder if any new populations would be found, despite the relative abundance of potentially suitable habitat in Michigan.

Although found historically in Ohio, Hine's emerald hasn't been seen there in nearly 4 decades. Between the early 1960's and the late 1980's, it wasn't seen anywhere and some thought it may have gone extinct. From 1987 to 1996, this species was re-discovered at several sites in Illinois and in Door County, Wisconsin. All of these sites have shallow carbonate bedrock and groundwater discharge in common. Since this type of habitat is abundant in Michigan, surveys were begun in the Michigan Upper Peninsula (UP) in 1997.

During 1997-98, 7 new sites were found in Mackinac County Michigan, north of St. Ignace. All new sites were in extremely rich fens and conifer swamps, with numerous seeps and marl deposits. All 7 sites are within 10 miles of each other, which gives an indication of just how habitat-specific this species is. Surveys were conducted all over the eastern UP.

The most exciting find of the 1999 summer was in Alpena County, where I observed several Hine's emeralds in a privately owned wetland several miles from Alpena. This is a range extension of nearly 100 miles from the UP sites, and its very good news for this federally endangered species. A few days later I was surveying some nice looking habitat a few miles from Roger's City in Presque Isle County. I had finished surveying several of the best looking sites with no luck. I decided to check out one more wetland before giving up, and saw two Hine's emeralds feeding along a trail and another

feeding in the nearby seepage fen! Later, I found yet another site on Bois Blanc Island.

Michigan now has 10 known Hine's emerald sites in 3 counties, almost as many total sites as Wisconsin, and I suspect there are several more sites waiting to be found. New sites will probably be found in proximity to the 10 known sites, because that is where the most suitable habitats are found. Mackinac, Alpena, and to a lesser degree Presque Isle Counties seem to have the highest quality habitat, but parts of eastern Chippewa County and some of the UP islands look very good too.

I also surveyed several sites in Ontario this year. Although I did not find Hine's emerald there, some of the habitat looked pretty good and the hydrology looked promising. There are many seep-fed wetlands on both Manitoulin Island and the Bruce Peninsula, all underlain by carbonate bedrock that the species seems to require. I only had time to survey a few of the highest quality potential habitats. I think there is a good chance they will be found there eventually but they will probably be quite localized as they seem to be in other areas. I hope other people will follow up and get out to look for Hine's emeralds in Ontario. If they have been hiding in the Lower Peninsula all this time, they just might be hiding in Canada too.

- Continued from page 5

those specimens were collected by UMMZ Fish Division expeditions, and undoubtedly represent a lot of new locality records for many species. This database also contains a subset of the fields in the working database, and is available at the same URL as the MOS database.

Either one of these projects could not have succeeded without financial support from the UMMZ Insect Division's Ammermann fund, generosity of donors, volunteer efforts of MOS participants, and U.S. Forest Service Grant 23-98-21-RJVA.

If you do use the data from either database, please let me know. If the data is used in any studies or publications, please acknowledge the proper source of the MOS data as: Data provided by the Michigan Odonata Survey at the University of Michigan Museum of Zoology.

The "Mediterranean Wasp" Invades Michigan (Hymenoptera: Vespidae)

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If you live in southeastern lower Michigan, you may have seen a recent invader, and not realized it. *Polistes dominulus* (Christ), also known as the Mediterranean wasp, is a paper wasp that was first reported from Massachusetts in 1981 (Hathaway 1981), and has since spread across the Northeastern United States. It was first sighted in Oakland County, Michigan in 1995 (Judd & Carpenter 1996), and an additional record was reported from Wayne County in 1996 (O'Brien 1996). In 1997, I found another individual in Monroe County (27 September 1997; Erie State Game Area). In 1998, I started seeing numerous individuals in Ann Arbor, Washtenaw County

This paper wasp is related to our native paper wasp, *Polistes fuscatus* (F.), but is quite different in coloration. Whereas our native wasp is usually a walnut brown with red and yellow markings, the "medwasp" is black and bright yellow, looking more like a yellow jacket than a paper wasp (Figures 1 & 2).

Polistes dominulus has the same life cycle as our native species. Fertilized females



Figure 1. *Polistes dominulus* female - lateral view.

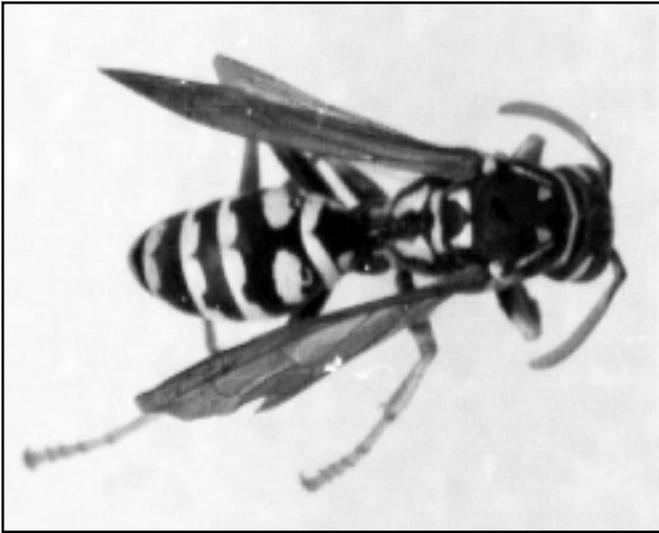


Figure 2. *Polistes dominulus* female - dorsal view.

(queens) overwinter in protected places and emerge in late spring to start new nests. After a queen has reared several offspring from her small nest, the workers take over most of the nest building and larval feeding, and the queen controls the workers and lays eggs. In late summer, males are produced, and they eventually mate with virgin queens and the process starts all over again. *Polistes dominulus* builds its combs under eaves (Figure 3), inside the open ends of horizontal pipes, and other protected areas such as ventilation access covers. Like other paper *Polistes*, it does not build an outer protective envelope over the comb.

In Ann Arbor, this species has become very noticeable in only two years, and nests are quite common in urban and suburban areas. In the Ann Arbor area, nests have been abundant at the University of Michigan Matthaei Botanical Gardens. In late July 1999, over 50 nests were sprayed and removed from inside greenhouses, many of which were in semi-concealed places. Other nests were also found outside. Nests varied from 10-100 cells, with most nests having less than 40 cells. Queens also overwinter inside greenhouses and are often active throughout the winter months (A. O'Brien, pers. comm.). In late November 1999, I found 8 females overwintering in an attic where they were resting on the old comb of that year's nest as well as beneath it where there was some space between the comb and

the substrate. Since the nest was built on a vented opening, it is likely that the wasps could survive the winter as long as temperatures did not get well below freezing.

Unlike our native *Polistes*, this species builds its nests in protected areas that are less permanent and subject to artificial movement. I know of two instances in Ann Arbor where small nests of less than 25 cells have been found in the space between the front door and body of a

less than 1-month old minivan (mine) and another person's small truck. Nests built in such situations can explain the rapid spread of this species into the mid-west, and also now into Michigan's Upper Peninsula. On 19 August 1999, I collected a female *P. dominulus* from the parking area of the west side of Indian Lake State Park, Schoolcraft County, MI. This is the first record for the Michigan Upper Peninsula (UP), and is about 300 miles from the known southern Michigan populations. With vehicles traveling from southern Michigan to northern areas, nests of this wasp can easily be hidden in all types of recreational vehicles and trailers. Therefore, I would expect this species to become established in other areas of the state within a very short time. It is unknown however, if overwintering adults will survive UP winters.

It is unknown how much *P. dominulus* will impact populations of our native *P. fuscatus*. I have seen much higher density of nests in this species than

P. fuscatus, but the two species do not seem to compete for nesting spaces. However, both species take larval Lepidoptera, other insects, and nectar for food for larvae and adults. Obviously, further research should reveal whether or not this wasp is yet another problem species assaulting our ecosystem.

Acknowledgments

I thank Adrienne O'Brien for her observations on wasps at Matthaei Botanical Gardens, as well as friends and neighbors in Ann Arbor who have seen these increasingly common wasps.

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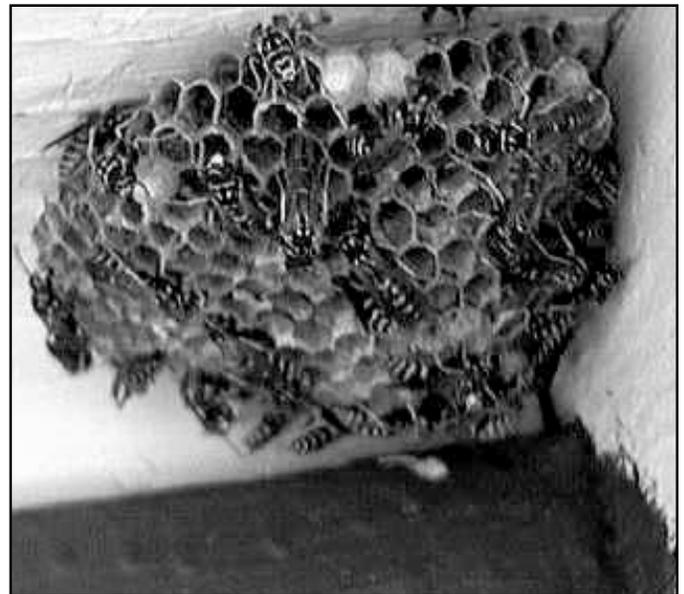


Figure 3. *Polistes dominulus* nest under the south-facing eave of a garage, Ann Arbor, MI.

New Insect and Spider Zoo Opens in Michigan

Gary A. Dunn

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Lansing MI 48906-9131
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The Minibeast Zooseum and Education Center of the Young Entomologists' Society (Y.E.S.) opened to the public this past spring after three years of extensive planning and fund-raising. The Minibeast Zooseum and Education Center is located in a 6,000 square foot building situated on 7 acres of land located at 6907 West Grand River Ave., in Watertown Twp., just 1/2 mile east of I-96 exit 90 and I-69 exit 81.

The "zooseum" is a unique concept of an educational facility, one that has all the best attributes of a zoo (live animals), a natural history museum (educational exhibits), and a nature center (outdoor classroom and informative outreach programs). The Minibeast Zooseum and Education Center features a minibeast zoo, interactive displays and exhibits, resource center and library, instructional facilities, outdoor gardens and trails, a gift shop, and Y.E.S. administrative offices. In the six months that the Zooseum has been open more than 4,500 people have visited the facility.

Minibeast Zoo Exhibits. Over 15 species of minibeasts are on display (with more in the rearing room), including insects, spiders and tarantulas, scorpions, millipedes, centipedes, crustaceans, worms, and slugs, all in beautifully landscaped habitat tanks.

Interactive Exhibits and Displays. Visitors can try their hand at our exclusive Insect Rollerbug Course and experience the many other hands-on, interactives; there are dozens of other displays too, including exotic and local insect specimens, arthropod artifacts, posters and pictures, arthropod cultural memorabilia, microscopic minibeasts, and butterfly gardening information.

Indoor Instruction. A 900 square foot multipurpose room is available for conducting educational outreach programs, includ-

ing workshops, local bug club, adventure camps, school tours, programs and special events for the general public, and training opportunities for docents and student interns.

Outdoor Classroom (gardens and trails). The Minibeast Zooseum is surrounded by 7 acres of fields, wetlands, and woods. These areas serve as an extension of our indoor classroom, and provide a place for visitors to see and study minibeasts in their natural environments. There are more than a mile of trails through a variety of interesting habitats. A wide variety of flora and fauna has been recorded on Zooseum grounds, including 34 trees, 40 wildflowers, 15 mammals, 6 reptiles, 4 amphibians, and more than 150 insects (including 14 butterflies).

Resource Center and Library. The Zooseum also houses one of the largest collections of books, posters, videos, software, databases, online resources, educational handouts, photographs, artifacts, collecting equipment, and insect toys anywhere in the world. These resources are available to Zooseum members and researchers.

Minibeast Merchandise Market (Zooseum gift shop). No museum would be complete without a gift shop. The Minibeast Merchandise Market offers an incredible variety of educational materials, novelties and gifts on invertebrate animals and is a great place to shop.

Y.E.S. Administrative Office. The international headquarters of the Young Entomologists Society, the world's premiere entomology youth organization, are located at the Zooseum. The group has more than 750 members in over 3 dozen different countries.

Traveling Outreach Programs. The award-winning staff of the Y.E.S. visits more than 10,000 young people annually in the Great Lakes region and beyond.

You Can Be a Volunteer at the Minibeast Zooseum and Education Center. Minibeast Zooseum Volunteers are Important! Volunteers play a vital role in the operation and education mission of the Zooseum. As part of our volunteer staff, you will join us in helping others discover, explore and enjoy the wonder and beauty of minibeasts. Visitors' interests in our facil-

ity and minibeasts are greatly enhanced by volunteer's enthusiasm, knowledge, handling, and genuine friendliness towards our animals and visitors. In addition to "front-line" contact with visitors, volunteers provide invaluable behind-the-scenes support and assistance to staff members. Volunteers are the Zooseum's most valuable natural resource.

No matter what your personal interest or talents, a variety of volunteer jobs await you at the Minibeast Zooseum, including opportunities in all facets of the Zooseum's operations. Since each volunteer will receive an orientation to the Zooseum, prior knowledge is not necessary for most positions. In a few cases you may be asked to provide references or demonstrate skills before beginning volunteer service in certain jobs. Time commitments can be tailored to meet your schedule and vary from a few hours a month to several hours per week. All positions include days and/or weekends, and a few positions include evenings for special events and programs.

Benefits of Volunteering include: Meet other interesting people (staff, other volunteers, and visitors); Challenging new experiences; Exercise both old and newly acquired skills; Ongoing training and workshop; Use the Zooseum for future references; Attend annual holiday party.

Requirements for volunteering are simple: volunteers are asked to be members of the Zooseum (and to agree with its mission and be willing to uphold them), to meet certain minimum ages (there are jobs for both teens and adults), to be willing to learn and continue learning (attend orientation session and periodic volunteer meetings), and to make a sincere effort to keep commitments. If you have an interest in macroinvertebrate animals (minibeasts), enjoy working with people of all ages, and have a cheerful disposition, then we have a place for you at the Minibeast Zooseum and Education Center.

If you are interested in volunteering your time and talents, or would like more information, contact the Young Entomologists' Society by phone (517-886-0630) or e-mail (YESbugs@aol.com), or stop in and speak to a Zooseum staffer.

1999 Michigan Surveys for the Tamarack Tree Cricket

David Cuthrell

Michigan Natural Features Inventory, Mason Bldg., P.O. Box 30444, Lansing, MI 48909

Email: cuthreld@state.mi.us

In August and early September 1999, biologists at the Michigan Natural Features Inventory (MNFI) discovered several new locations, that contained the tamarack tree cricket, *Oecanthus laricis* T.J. Walker (Orthoptera: Gryllidae). This tree cricket, currently listed as special concern in Michigan, was known worldwide from less than 10 sites. The populations were known from six sites in southern Michigan and one site in northeastern Ohio. Cantrall (1943) stated that *O. laricis* in Michigan appears to be found only on tamarack (*Larix laricina*) and seems to prefer the upper portions of vigorous, young trees 20 to 40 feet in height. He did not find them in dense stands but in the more open areas on younger trees. E. S. Thomas collected the only two known specimens of *O. laricis* in Ohio and he took them while sweeping hemlock (Walker 1963). Adults can be heard calling from the tops of tamarack trees in August and September. The song is a trill with approximately 39 pulses per second at 27°C, and is almost indistinguishable from the more common four-spotted tree cricket, *Oecanthus quadripunctatus* Beutenmüller (Vickery and Kevan 1985). It is likely that *O. laricis* lays its eggs in the bark of tamarack trees and is wholly dependent on the tree for this part of its life cycle. Essentially nothing else is known about the biology or life history of this particular tree cricket.

In 1999, MNFI biologists visited 24 sites in several southern Michigan counties. We used a typical sweep net but extended the handle by 10 feet by fastening a piece of 3/4 inch conduit onto the handle. A total of 18 new sites were discovered in southern Michigan and we recorded new county records from Barry, Clinton, Ingham, and Lenawee counties. The habitat at newly discovered sites ranged from high quality prairie fens with sparse tamarack, to a thick swamp with towering tamaracks. Although we had great success during 1999 and added several localities, *O. laricis* still has the most confined range of any of the *Oecanthus* species. In addition, the potential habitat at many of the sites is contained in small, localized pockets within a highly fragmented landscape. Habitat destruction or modification currently threatens some *O. laricis* sites in Michigan. In the future, we plan to expand our surveys for the tamarack tree cricket to better assess its range and conservation status.

Acknowledgments

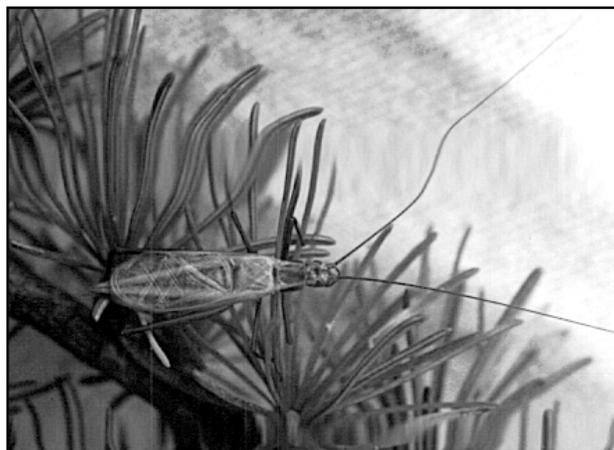
Thanks to Rodger Bland, Central Michigan University, for helping to verify the identification of *O. laricis*.

Literature Cited

- Cantrall, I.J. 1943. The ecology of the Orthoptera and Dermaptera of the George Reserve, Michigan. Misc. Publ. Mus. Zool. Univ. Mich. 54: 1-182.
- Vickery, V.R. and D.K.M. Kevan. 1985. The grasshoppers, crickets, and related insects of Canada and adjacent regions. Biosystematics Research Institute, Ottawa, Ontario. 1777: 1-918.
- Walker, T.J. 1963. The taxonomy and calling songs of the United States tree crickets (Orthoptera: Gryllidae: Oecanthinae). II. The nigricornis group of the genus *Oecanthus*. Ann. Entomol. Soc. Amer. 56: 722-789.



Collecting *Oecanthus laricis*.



Dorsal view of *Oecanthus laricis*.



Lateral view of *Oecanthus laricis*.

MES Annual Meeting Locations

Year	#	Location	Chairperson
1955	1 st	Michigan State University	George C. Steyskal
1956	2 nd	University of Michigan	George C. Steyskal
1957	3 rd	Wayne State University	Ray Hutson
1958	4 th	University of Michigan	Irving J. Cantrall
1959	5 th	Michigan State University	Irving J. Cantrall
1960	6 th	University of Michigan	Roland L. Fischer
1961	7 th	Wayne State University	David R. Cook
1962	8 th	University of Michigan	Henry K. Townes
1963	9 th	Western Michigan University	Roland L. Fischer
1964	10 th	Michigan State University	Stanley K. Gangwere
1965	11 th	University of Michigan	Mogens Nielsen
1966	12 th	Wayne State University	Henry K. Townes
1967	13 th	University of Michigan	John W. Newman
1968	14 th	Grand Valley State University	Fred B. Knight
1969	15 th	Alpena Community College	T. Wayne Porter
1970	16 th	MSU Kellogg Biological Station	Louis F. Wilson
1971	17 th	Albion College	Richard J. Snider
1972	18 th	Toronto, Canada	Richard J. Snider
1973	19 th	Michigan State University	Richard G. Fleming
1974	20 th	Adrian College	Richard G. Fleming
1975	21 st	Glens Oaks Community College	Robert W. Husband
1976	22 nd	Neithercut Woodland Camp	David C. L. Gosling
1977	23 rd	Calvin College	Al Bratt
1978	24 th	Central Michigan University	Al Bratt
1979	25 th	UM Douglas Lake Biological Station	Daniel K. Young
1980	26 th	MSU Kellogg Biological Station	Gary Simmons
1981	27 th	UM Stinchfield Woods	Gary Simmons
1982	28 th	Chippewa Nature Center	John Witter
1983	29 th	4-H Kettunen Conference Center	Ron Priest
1984	30 th	MSU Kellogg Biological Station	Gary Dunn
1985	31 st	UM Douglas Lake Biological Station	David Cowan
1986	32 nd	UM Matthaei Botanical Gardens	Mark O'Brien
1987	33 rd	MTU Ford Forestry Conference Center	Ken Kraft
1988	34 th	Ferris State University	Phil Watson
1989	35 th	MSU Hidden Lake Gardens	Richard J. Snider
1990	36 th	Chippewa Nature Center	Eugene Kenaga
1991	37 th	Northwestern Michigan College	Fred Stehr
1992	38 th	Michigan State University	Robert Haack
1993	39 th	UM Douglas Lake Biological Station	Cathy Bach
1994	40 th	Fernwood Botanic Garden	Dave Gosling
1995	41 st	Alma College	Richard Roper
1996	42 nd	MSU Kellogg Biological Station	Cathy Bristow
1997	43 rd	Chippewa Nature Center	Daniel Herms
1998	44 th	MSU Hidden Lake Gardens	Leah Bauer
1999	45 th	Ralph A. MacMullan Conference Center	Ron Priest
2000	46 th	MSU Kellogg Biological Station	George Balogh

MES Membership History

Year	Individual members	Library subscribers	Total
1955	22	-	22
1956	62	-	62
1957	86	-	86
1958-63		(no records found)	
1964	76	-	76
1965	108	-	108
1966	225	-	225
1967	400	-	400
1968	501	-	501
1969	570	215	785
1970	614	220	834
1971	517	192	709
1972	437	198	635
1973	445	196	641
1974	436	193	629
1975	405	190	595
1976	444	178	622
1977	412	183	595
1978	446	188	634
1979	478	190	668
1980	552	185	737
1981	465	182	647
1982	422	180	602
1983	404	142	546
1984	380	175	520
1985	423	162	598
1986	415	162	577
1987	418	172	580
1988	438	160	605
1989	461	160	621
1990	461	160	621
1991	477	164	641
1992	484	167	651
1993	438	173	611
1994	409	176	585
1995	440	177	617
1996	460	175	635
1997	390	195	585
1998	348	198	546

MICHIGAN ENTOMOLOGICAL SOCIETY

FINANCIAL STATEMENT-12 MONTHS ENDING DECEMBER 1998

RECEIPTS

Savings account interest	\$481.00
Dues	5,734.00
Subscriptions, THE GREAT LAKES ENTOMOLOGIST	3,905.00
Sale of separates to authors	2,270.00
Sale of back issues, journal, newsletter, entomology notes	172.00
Subsidies (page costs)	6,668.00
Michigan Lepidoptera Survey - MDA Grant	4,860.00
Donations, decals, misc. income	322.00
Annual Meeting-Registration fee	445.00
TOTAL RECEIPTS	\$19,997.00
(1997 receipts	22,101.00)

DISBURSEMENTS

Publication expenses:	
Newsletter, print, mail	\$ 2,202.00
Journal, compose, print, mail	13,276.00
Postage, mailing permit fee	350.00
Graphics, misc. printing/ mailing	507.00
Annual Meeting, "Breaking Diapause" meeting	1,417.00
Misc. (4-H foundation, copyrights, insurance, etc)	568.00
TOTAL DISBURSEMENTS	\$17,813.00
(1997 disbursements	20,323.00)

MICHIGAN ENTOMOLOGICAL SOCIETY STATEMENT OF FINANCIAL CONDITION AS OF 31 DECEMBER 1997

ASSETS

CURRENT ASSETS:	
Cash on hand	\$11,909.00
Accounts receivable	1855.00
Prepayment/ postal fee	85.00

Inventories:

Postage.....	33.00
Supplies/ equipment	150.00
Newsletters (est.)	400.00
Journals (est.)	<u>2,500.00</u>

TOTAL CURRENT ASSETS\$16,932.00

LIABILITIES

CURRENT LIABILITIES:

Life memberships (20)	\$5,400.00
Prepaid subscriptions	3,540.00
Prepaid dues	1,850.00
Dues in arrears	1,200.00
Subscriptions in arrears	540.00
TOTAL CURRENT LIABILITIES	\$12,530.00
SURPLUS	\$4,402.00

MONEYS OF MES AS OF 31 DECEMBER 1998:

Petty cash	\$5.00
Checking account	5,547.00
Savings account (CD)	6,357.00
TOTAL	\$11,909.00

MONEYS OF MES AS OF 31 DECEMBER 1998 \$12,389.00

MEMBERSHIP: As of 31 December 1998, the Society had 348 members in good standing compared to 390 on 31 December 1997.

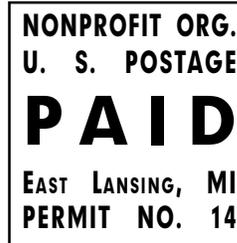
SUBSCRIPTIONS: As of 31 December 1998 there were 198 paid subscriptions to THE GREAT LAKES ENTOMOLOGIST.

Mogens C. Nielsen, Treasurer, 6 May 1999

MICHIGAN ENTOMOLOGICAL SOCIETY



DEPARTMENT OF ENTOMOLOGY
MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN 48823



ADDRESS CORRECTION REQUESTED