

NEWS

OF THE

LEPIDOPTERISTS' SOCIETY

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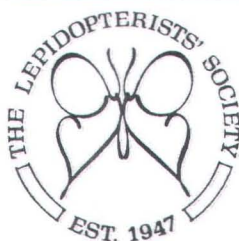
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NEWS OF THE LEPIDOPTERISTS' SOCIETY

Volume 46, No. 4 Winter 2004



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The Lepidopterists' Society is a non-profit educational and scientific organization. The object of the Society, which was formed in May 1947 and formally constituted in December 1950, is "to promote internationally the science of lepidopterology in all its branches; to further the scientifically sound and progressive study of Lepidoptera, to issue periodicals and other publications on Lepidoptera; to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field; to compile and distribute information to other organizations and individuals for purposes of education and conservation and appreciation of Lepidoptera; and to secure cooperation in all measures" directed towards these aims. (Article II, Constitution of The Lepidopterists' Society.)

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Reminder:

The 2005 Annual Meeting of the Lepidopterists' Society will be held in Sierra Vista, AZ, August 2-7, 2005. Details will be published in the Spring issue of the News. Contact Paul Opler (paulevi@webaccess.net) or Hank Brodtkin (hbrodtkin@earthlink.net) for early details...

Front Cover: Texas Wasp Moth

A Texas Wasp Moth, *Horama panthalon texana* (Arctiidae), rests on a leaf of *Passiflora foetida* (Passifloraceae) at the Stengl "Lost Pines" Biological Station near Smithville in Bastrop Co., central Texas, on November 6th, 2004. Both a county and station record, this lovely day-flying mimic of *Polistes critinus* (Hymenoptera), was still being seen at the station four days later. Photo by Phil Schappert.

Behavior of *Pterourus appalachiensis* Pavulaan & Wright

George O. Krizek

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It is well known that freshly emerged males of many patrolling species of butterflies are often seen taking up moisture at wet spots along streams, margins and mud puddles. Often a large number of males can be observed tightly clustered within a remarkably small area. Previously, we have photographically documented these "mud-puddle-clubs" in *Papilio glaucus*, *P. palamedes*, *P. troilus* and *Eurytides marcellus* (Opler & Krizek, Butterflies East of the Great Plains, 1984).

In mixed "puddles" of these species, the individual butterflies literally touch each other while competing for space within a small, confined patch of the salty resources which they crave. While mineral salts (sodium chloride and

others) are the acknowledged cue for such behavior, the function of the behavior is not fully understood.

On April 30th and May 15th, 2004, I was able to observe and photograph (see pp. 108) mud-puddling behavior of *Pterourus appalachiensis* along with three other swallowtail species (*P. glaucus*, *P. troilus* and *E. marcellus*) in the Transition Life Zone of the Blue Mountains of northwest Virginia. Along a roadside crossing a stream running through a pasture close to the edge of broadleaf deciduous forest, I found many places where cow and deer excrement and urine had attracted many papilionids of various species. The butterflies appeared to congregate at those places where most of the animal waste and

urine had been deposited but they did not stay too long at any one place. I could not see any females among them.

With no understandable reason they suddenly erupted into a cloud of butterflies that began to disperse about the area, seeming to resume a normal patrolling behavior. After a short while they returned and again began to form very tightly packed multi-species "mud-puddle clubs" at three different places, about 8 to 10 meters apart, along the dirt road.

At one spot there were several wings of *P. appalachiensis*, apparently the remnants of at least 2 individuals possibly devoured by a bird (?) predator. These

continued on pp. 110

New Locations for Mitchell's Satyr (*Neonympha mitchellii*) in Alabama.

Vitaly Charny

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On June 7 of 2002 I visited butterfly populations in a couple of localities in Bibb and Hale Counties in Central Alabama near Birmingham. I found Mitchell's Satyr (*Neonympha mitchellii*) in both counties, however, due to the species' endangered status I wouldn't specify exact locations.

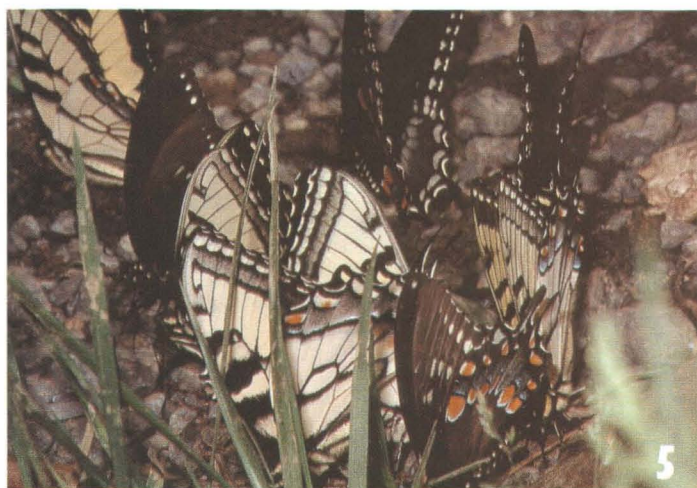
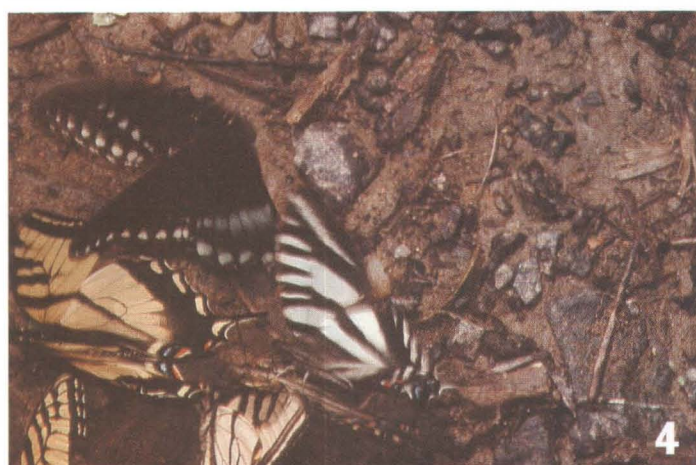
The location in Bibb Co. (1 adult seen, see photos on pp. 109) was a thin line of bushes that separate a dirt road from a swampy slow moving creek area. At the same location I also found a Carolina Satyr (*Hermeuptychia sosybius*) at the edge of the woods about 20 m away from *N. mitchellii*, a couple of

American Snouts (*Libytheana carinenta*) and Azure sp. (*Celastrina neglecta*) on the road. The *N. mitchellii* was found resting on the bushes from the road side and when startled it flew along the bushes about 1 m–1.5 m high above the ground and did not attempt to move deeper into the vegetation.

The location in Hale Co. (3 adults seen) is about 12 miles away from the Bibb Co. location. It is a bottomland hardwood drainage with small openings overgrown mostly by canes (cane breaks). One of adults that I observed from a short distance away was very fresh but the others also didn't look

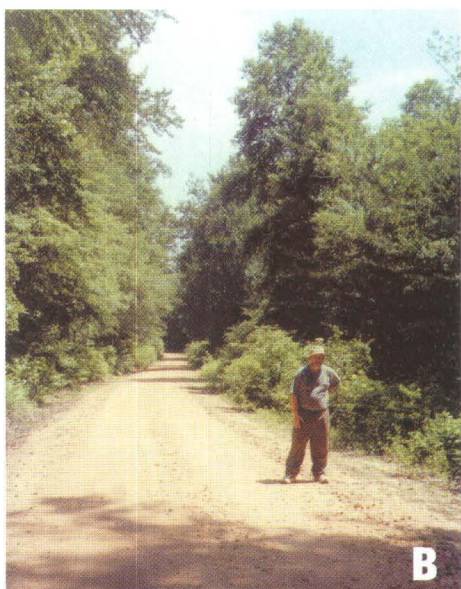
very worn. Along with the Mitchell's Satyrs along about 100 m of trail I found very fresh Southern Pearly-eye (*Enodia portlandia*), Carolina Satyr (*Hermeuptychia sosybius*), Gemmed Satyr (*Cyllopsis gemma*) and Little Wood Satyr (*Megisto cymela*). Since they were flying together it was easy to distinguish the species without binoculars. The largest were *E. portlandia*, smaller butterflies of similar size were either *N. mitchellii* and *M. cymela*; and the smallest were *H. sosybius* and *C. gemma*. The last two were the most difficult to distinguish from each other from a distance. The *N. mitchellii* were

continued on pp. 110



Behavior of *Pterourous appalachiensis*

1. *Pterourous appalachiensis*, May 15, 2004, Blue Mountains, NW Virginia. 2. as 1. Note that on the right side is a forewing underside of *P. appalachiensis* that may be responsible for attracting the living butterfly. 3. as 2. 4. *Papilio troilus*, *Eurytides marcellus* and *P. appalachiensis* compete for space at a urine soak along the road. April 30, 2004, Blue Mountains, NW Virginia. 5. *Papilio troilus* and *Pterourous appalachiensis* puddle together. May 15, 2004, Blue Mountains, NW Virginia. 6. *Papilio troilus* apparently attracted to the wing of a dead *Pterourous appalachiensis*. May 15, 2004, Blue Mountains, NW Virginia. All photos by George O. Krizek. See his account beginning on pp. 107.



Mitchell's Satyr in Alabama



A. Swamp and slow creek habitat of Mitchell's Satyr in Bibb Co., AL, **B.** Dirt road side at same location as A, **C.** *Neonympha mitchellii* at Bibb Co., AL site, **D.** Bottomland hardwood drainage with canebrake habitat of Mitchell's Satyr in Hale Co., AL, **E.** *Neonympha mitchellii* at Hale Co., AL site. Photos by Vitaly Charny, Canon Rebel G 35mm SLR camera with Sigma 70-300mm zoom at 300mm. See the article beginning on pp. 107.



Female *Protographium leucaspis*

Left: The first photo of the female of this South American species. Male (left), Female (right). Note the more falcate forewing tips of the male and the generally more rounded forewing tips of the female. Photo by Rick Rozycki. See his description on pp. 110.



The Female of *Protographium leucaspis* *leucaspis* (Godart 1819)

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The female of *Protographium leucaspis leucaspis* (Godart 1819), which ranges from the East Andean slopes of Colombia to Bolivia is here described and illustrated (see pp. 109) for the first time. Since its original description in 1819, this species (along with a few other *Protographium*, such as *P. lacandones*, *P. dioxippus*, and *P. obertheuri*) were known only from the males. The females and early stages of the other species are still unknown at this time. The female of *P. leucaspis leucaspis* was taken at Caranavi, Bolivia at 800 meters. I was able to examine 24 male specimens from various collections and localities throughout its range to make the comparisons.

Description of Female

Antennae, frons and abdomen as in male. Very similar to male in markings, however, the outer margin of the forewings are much more rounded, not falcate as in males (although in two of the males examined, the falcate forewings were not as pronounced as the others). Hindwings are also slightly more rounded in the female.

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Behavior...cont'd from pp. 107

wings became the focus of attention of other butterflies that were trying to land in their immediate vicinity. Interestingly, the predominately black *P. troilus* was also attracted to the yellow wings along with the two yellow species (*P. appalachiensis* and *P. glaucus*), suggesting that both chemical and visual stimuli could play a role in the assembly of the puddle clubs.

The strong visual stimulus of a perched butterfly, or in this case the wings of dead individuals, might be a factor in the designation of suitable resource sites, that is a place with the rich salts

and other breakdown chemicals present in animal wastes. It is likely that the two unusual species (*P. troilus* and *E. marcellus*) were attracted to the activity of the other two species along with the combination of the visual attractiveness of the wings upon the ground and possibly at least two or more different chemical signals that serve to multiply the attractiveness of the situation for male papilionids (Tom Emmel, pers. comm.).

Several photos of my encounters with these butterfly aggregations are on pp. 108. Species determinations verified by Harry Pavulaan (pers. comm.).

Satyr...continued from pp. 107

obviously darker than *M. cymela* and was also the easiest species to approach. Flight of *N. mitchelli* was similar to *H. sosybius*—a little bit higher and less bobbing than *C. gemma*—but they perch more often than *H. sosybius* or *C. gemma* and do not fly far away when startled from a perch. Mostly they perched and flew about 1–1.5 m above the ground, as I had noted in Bibb Co.

In 2004 I visited another location in Bibb Co. just a mile down the same creek. I encountered 4 *N. mitchelli* on June 5 and 2 more on June 12. On the first visit all of the adults were active flying males but only females were seen on the second visit. All were found in alder bushes along the side of a dirt road. Again, they did not come out of the bushes but did not move into the thicket either—just flying along the edge. During these two trips there weren't many other Satyrs or other butterflies that could distract me from observation. Along with these 6 Mitchell's Satyrs I only encountered 4 Carolina Satyrs and 1 Northern Pearly-eye.



Toms Place...cont'd from pp. 114

lodging from the inexpensive to the luxurious. Dining is equally available, and while in the area, try some local ribs or steaks. Access either place on the Internet for specifics.

While in the area, do not miss out on the sightseeing. The Owens River Valley is truly one of the beautiful spots left in California, and the sight of Mono Lake, north of Mammoth, is one few people forget. The area has a history of water wars, Indian tribes live in many areas, and the natural history is incredible. The gold mining ghost town of Bodie lies to the north, and lost mines of gold lie near Mammoth. Taken together, the upper Owens River Valley and Toms Place are unique and very desirable areas for a lepidopterist, naturalist, or geologist to visit.

***Antigonus erosus* Hübner (Hesperiidae, Pyrginae), A New US Record from South Texas.**

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On October 17, 2004—the last day of the Texas Butterfly Festival in Mission, Texas—the senior author was looking at roadside flowers southeast of town, when an unusual looking skipper came into view. Upon close examination, the skipper appeared to be a male *Antigonus erosus* (Hübner, 1812), a species with which he was familiar from several trips to Mexico about 30 years previously. The initial impression was correct and the skipper proved to be a slightly worn male of this common Mexican species (see photos on pp. 112). This is the first report of this species from within the United States of America.

As noted by Austin (2000), *A. erosus* is seasonally dimorphic, with dry-season adults being paler than wet-season individuals. The male of *A. erosus* has a distinctive vestiture of gray hair-like scales on the upper surface of the wings, which may appear bluish in sunlight. There may or may not be one to four small hyaline apical spots on the forewing. Dry-season males may also have one or two hyaline discal spots on the forewing. There is a well developed costal fold on the forewing and an elongate apiculus on the antenna. The undersurface of the hindwing has a banded pattern reminiscent of *Carrhenes canescens* (R. Felder, 1869). The female of *A. erosus* is similar to the male, but has much less gray vestiture and is paler brown (Dry-season females may be quite pale.) There are three or four well developed discal hyaline spots on the forewing, as well as four (usually) well developed apical hyaline spots. Other Mexican species which may resemble females of *A. erosus*, can be differentiated by having a more

conspicuous pattern of dark bands on the wings, different wing shape, and a shorter antennal apiculus.

Antigonus erosus, which has been called the “Dusted, Gray, or Common Spurwing” in recent publications (e.g. Warren & Llorente, 1999), occurs from extreme southern Texas to Paraguay (Evans 1953). It is very widely distributed in Mexico, having been recorded in the states of Campeche, Chiapas, Coahuila, Colima, Guerrero, Jalisco, Michoacan, Morelos, Nayarit, Nuevo Leon, Oaxaca, Puebla, Quintana Roo, San Luis Potosi, Sinaloa, Sonora, Tabasco, Tamaulipas, Veracruz, and Yucatan (Godman & Salvin, 1897-1901, Hoffmann, 1941, de la Maza, 1976, de la Maza & de la Maza, 1993, Stanford & Opler, 1993, Vargas *et al.*, 1996, Warren *et al.*, 1998, Pozo *et al.*, 2003, Salinas, 2003, Llorente *et al.*, in press, Warren, unpublished data.)

The genus *Antigonus* Hubner, 1819, falls into the *Antigonus* sub-group of the *Telemiades* group of the *Pyrginae* (Evans, 1953, see also Austin, 2000). The closest relatives in southern Texas are *Carrhenes canescens*, *Xenophanes tryxus* (Stoll, 1780), and *Systasea pulverulenta* (R. Felder, 1869). Another species in this genus, *Antigonus emorsa* (R. Felder, 1869), has been recorded from southeastern Arizona (Bailowitz & Brock, 1991). *Antigonus emorsa* is a seasonally dimorphic species with a broad white band on the upperside median area of both wings during the rainy-season, which is replaced with gray mottling above during the dry-season.

There are three other *Antigonus* species in Mexico, one of which also might stray into extreme south Texas, on

occasion. This would probably be *Antigonus nearchus* (Latreille, 1824), a much larger species with an elongate, sharply pointed “spur” on the hindwing and a well-defined dorsal pattern (see Austin, 2000). Males and females of *A. nearchus* are sexually dimorphic, as in *A. erosa*, and are powerful fliers.

Lepidopterists in south Texas, who are not familiar with *A. erosus*, might mistake the male for a faded example of the ever-present *Eantis tamenund* (WH Edwards, 1871) which is slightly larger, with hooked forewing apices; or the female for *Carrhenes canescens* which lacks the hindwing spur). *Antigonus erosus* was illustrated by Austin, (2000) Bordelon & Knudson, (2002), older versions, but was deleted by Bordelon & Knudson (2003) to make way for an illustration of *Achylodes pallida* (R. Felder, 1869, see Warren, *et al.*, 2003), but has now been recently reinstated by Bordelon & Knudson (2004).

Antigonus erosus has been reared in Mexico by Kendall in Tamaulipas and San Luis Potosi, from larvae found on *Guazuma ulmifolia* Lam. (Sterculiaceae) (Kendall & McGuire, 1975.) This plant does not occur in southern Texas, but there are several others in this family that do occur in the region. These include several sub-shrubs such as *Ayenia* sp., *Hermannia texana* Gray (Mexican Mallow), *Melochia pyramidalata* L. (Pyramid Flower), and *Waltheria indica* L. (Hierba del Soldado). Additionally, the Chinese Parasol Tree (*Firmiana simplex* W. Wright) and Cocoa Tree (*Theobroma cacao* L.) are occasionally cultivated in extreme

continued on pp. 113



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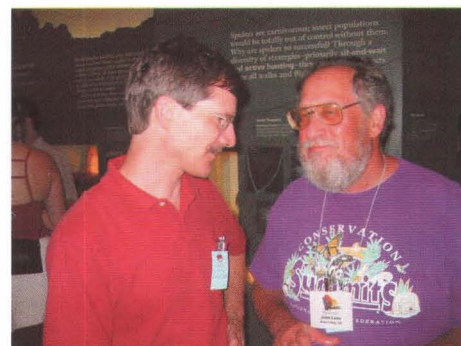
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Antigonus erosus, new to Texas and U.S.

1. *Antigonus erosus*, male, dorsal, Mission, TX, 17 Oct. 04, (Knudson). 2. As 1, ventral. 3. *Antigonus erosus*, male, dorsal, Cd. Mante, Tamps. Mex., 12 Oct 76 (Knudson). 4. As 3, ventral. 5. *Antigonus erosus*, female, dorsal Gomez Farias, Tamps., Mex., 12 Oct 1976 (Knudson). 6. As 5, ventral. Photos by Ed Knudson. See article beginning on pp. 111.



Lep Soc 2004...

More photos from the 2004 Maryland Meeting. **Left:** Astrid Caldas, one of the meeting organizers, with Louise Fall (Bioquip) in the background, at the Banquet. **Center:** Alan Rultyniewicz and Stephanie Kelly at the Smithsonian mixer. **Right:** Larry Gall and John Lane, also at the Smithsonian reception. Photos by "Ranger" Steve Mueller. More photos on the back cover.

Antigonus...cont'd from pp. 111

south Texas (Correll & Johnston, 1970). In Costa Rica, *A. erosus* has been reared many times on *G. ulmifolia*, and the larvae and pupae were illustrated by Janzen & Hallwachs (2004). As noted by Janzen et al, (1998), *A. erosus* reared from Guanacaste, Costa Rica, are frequently parasitized by *Bassus brooksi* Sharkey (Braconidae), a species also recorded from Texas.

The occurrence of *Antigonus erosus* in south Texas is not surprising and has been anticipated for some time (hence its inclusion in Bordelon & Knudson (2002). Assuming the climate remains warm and the species is able to utilize local members of the host-plant family, there is a possibility that *A. erosus* will become locally established.

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**Classic Collecting Campaigns:**

Toms Place

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California is home to a variety of different habitats, and in a few special places these habitats merge together to form rather unique collecting areas. One such area lies where the Sierra Nevada range merges with the desert basin and range province in areas wet enough to support a variety of plant life. A long stretch of this area is known collectively as the Owens River Valley, and it combines beautiful vistas of desert scenery to the east with the

rugged tree covered slopes of the Sierra Nevada on the west. A uniquely accessible spot in this range is known as Toms Place.

The question may arise as to whether there should be an apostrophe in the name, but apparently the map location has no apostrophe, so that is how it will be spelled here. The source of the name is beyond the scope of this work. The location is along Route 395 between

Bishop to the south and Mammoth Lakes to the north. Toms Place lies at the southern edge of the Long Valley Caldera, an area of seismic and volcanic activity that most scientists agree may continue activity for some time in the future. Just northeast is Crowley Lake, and excellent fishing streams abound in the area, although they are heavily fished and visited.

continued on next page

Toms Place...cont'd from pp. 113

Before you jump in your car and head to Toms Place to collect butterflies or moths, remember that in this area terms like "readily accessible" are relative. Toms Place is remote by any standard of an east coast collector, and most west coast collectors know that it will take five hours or so from a major metropolitan area like Los Angeles or San Bernardino to reach it. Collectors from the middle part of the country or Midwest know that these kinds of distances are not unusual, so be aware that from the north only the Reno area is remotely near, and to the east there is nothing but Death Valley and more basin and range province all the way to Salt Lake City. The area is remote even by California standards.

Toms Place, which is really only a few buildings and a store, lies at an elevation of roughly 7,200 feet (2,195m). However, it is just north of the valley in which Bishop lies, and that elevation is 5,800' (1,768m). Turning west and going up Rock Creek Road the elevation rises to well over 8,000' (2,438m). Therefore within a range of a very few miles, one can collect in the lower valley, near Bishop, in higher or lower desert areas to the east where the White Mountains lie (all the way up to 10,000 feet (3,048m) accessible by road) and the Sierra Nevada range to the west. All these seemingly come together at Toms Place, just to the west of Route 395 at the north end of the grade down to Bishop.

If a person has a week to spend in the area, get a fishing license, and find a camping spot in one of the many campgrounds along Rock Creek. Collect during the day, and at night, and in the wee hours of the morning and just at sundown, fish for trout in the creek. Sleeping is optional.

Specific locations are best for certain target species. Round Valley is the

historic area for *Speyeria nokomis apachiensis*, a beautiful dimorphic fritillary. Get a local or topo map and avoid fenced areas wherever you can, as they are privately owned. At the lower elevations around Bishop, such as Pleasant Valley Reservoir Road, there are areas to pull off for incredible desert moth collecting from September to mid October. Look along Rock Creek itself for any swallowtail species—it might be an *indra* species.

Most of the best butterfly collecting is around the Independence Day holiday time frame to late August. Moth collecting will change with elevation, temperature, and the date, but collecting starts in June and continues through October. Moth collecting right



Ron Leuschner explores a site where he has collected many times just northwest of the store at Toms Place. Looking northwest, with the stream to the left. Photo by Kelly Richers.

at Toms Place is usually best in one of two areas. On the sandy area just north of the store to the east of the store, there is a small open space where one can set up, and collect desert species such as *Schinia*, and find three or four of just that genus at light in one night. Across the access road from this, just north of the store on the west side is a Los Angeles Water piece of property which is open and provides a set up place. Just north of the stream, it seems to bring in both riparian and mountain species.

Higher on Rock Creek Road, the wind can be a major factor in collecting, as the valley is rather narrow and the wind

blows strongly. However, a low sheet will bring in interesting moths even on the windiest nights. They magically appear, and you may never even see them fly in, they come so hard with the wind. At these higher elevations, more geometrids appear, as well as some unusual high elevation noctuids.

Some unique records from the area include:

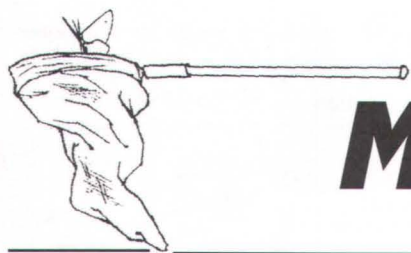
For microlepidopterist specialists, seven different species of *Lita*, three *Chionodes* species, five species of *Eucosma* and at least three species of *Diorictria*, including *D. westerlandi*, recently described. In the Geometrids, *Nacophora utahensis* and *N. aetha*, three green *Nemoria* species, (*N. unitaria*, *N. darwinata*, *N. oblique hennel*), several nice *Dysstroma* and *Hydriomena* species from the higher altitudes, and at least seven *Eupethicia* species.

For saturnid or noctuid collectors, *Phyllodesma cornutrix*, *Pheosia rimosa*, and in the fall, *Arachnis verna* occur there. Two *Catocala*, (*C. erichia*, *C. briseis minerva*) are found, and seven *Euxoa* are present. At least three *Protorthodes* are in the area, three *Protophygia*, and three *Abagrotis*, including *A. nana* are at Toms Place. And, as mentioned, *Schinia biundulata*, *S. walsinghami*, and *S. separata* come in from the desert side.

The grassy areas around Crowley Lake itself provide some flower sources for butterflies during the day, and the creek, where accessible, provides areas which we consider flyways in the west. Rock Creek has an upper section, by the road, and a lower section, by the long grade down to Bishop. Hilltopping butterflies also will go along the road as Rock Creek Road climbs.

Places to stay abound. There are campsites, especially available weekdays, along Rock Creek itself. Bishop and Mammoth Lakes offer a variety of

continued on pp. 110



Mailbag...

Dear Editor,

Due to my continuing interest in phytochemicals and their potential role in butterfly diets (see my articles in *News of the Lepidopterists' Society*, 45(3), Autumn 2003, and 46(2), Summer 2004), I was delighted to read Gerald Einem's recent "Attraction of male queen butterflies to cardenolide- and alkaloid-containing plants during fall migrations" (46(3), Autumn 2004). Einem's careful observations and research log in one more species of butterfly that is apparently sequestering phytochemicals from the inflorescences of flowers to enhance their own metabolism—and hence, survival. Kudos!

With such detailed field observations coupled with increased cutting-edge quantitative/qualitative chemistry, I predict that we soon will discover an interplay between the world of plants and butterflies that will boggle our minds. As I mentioned in one of my papers, "for evolutionary biologists, a brave new world is about to dawn."

Gary Noel Ross

GNR-butterfly-
evangelist@juno.com



Dear Editor,

The High Country Lepidopterists had their 2004 meeting recently and I thought it would be great if you could include this picture and a little note about it. We met at CU in Boulder, and had 4 great presentations by Mary Jamieson (Effect of Exotic plant, Canada Thistle, on Butterfly Diversity,

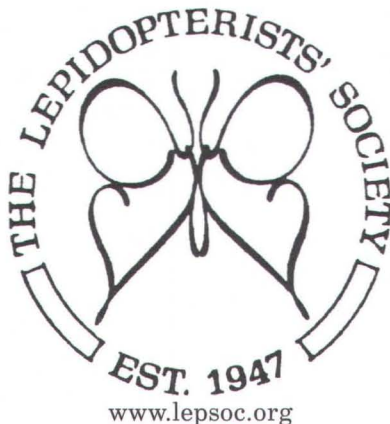
Community Disposition, and Foraging Activity), Barbara Bartell (Field Study of *Boloria selene tolladensis* in Golden Gate Canyon State Park 2004), Lynn Monroe (Some Butterflies and Moths of the Anza-Borrega area), and Paul Opler (Searching for Blues—Continuing Adventures). The meeting will be held again next year at CSU in Ft Collins in early Oct 2005.



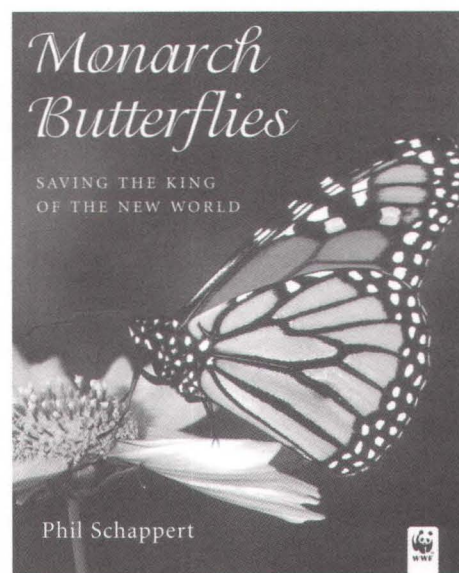
I did not catch all attendees, but here is the list of those pictured (from the left): Charles Slater, Paul Opler, Mike Fisher, Barbara Bartell, Cathy + Don Cook, Chuck Harp, Lynn Monroe, Deane Bowers, Jan Chu, and Steve Armistead...and I am taking the picture! Others not pictured: Mary Jamieson, Jerry Bartell, Amy Wilkinson.

Evi Buckner-Opler

evi_bavaria@webaccess.net



www.lepsoc.org



New Book...

Monarch Butterflies: Saving the King of the New World

by Phil Schappert, 2004. ISBN 1-55263-405-1, trade paperback, 128 pp., color throughout, 8 x 10 (20 x 24.5 cm), Key Porter Books (www.keyporter.com), Toronto, Ontario, Canada, \$25 CDN.

The *raison d'être* of this book is that conservation of the Monarch cannot be ensured only by efforts at the overwintering roosts but must include their breeding grounds and migratory flyways. The text, wonderfully illustrated with more than 50 photos and maps, explores the trials and tribulations that Monarchs must undergo during its seasonal journey from the winter roosts to its breeding range and back again.

From living cathedrals in Mexico and surviving the northward journey to living in America before migrating southward again, the life of the Monarch serves as an enjoyable lesson in ecological conservation. Explore the mystery, complexity and beauty of the Monarch butterfly in this book.

Author's Note: While this book is available under an unauthorized title in the US, I would prefer that you purchase the Canadian edition to ensure that the profits go to World Wildlife Fund, Canada. Thank you.

Interactions Between *Saturnia* and *Antheraea*: Convergence or a Million Years of Stasis?

Some Thoughts on the Evolution of Moth Pheromones

Michael M. Collins

Research Associate, Carnegie Museum of Natural History,
11901 Miwok Path, Nevada City, CA 95959, CollinsDchnc@aol.com

I've never accepted Emerson's premise that 'you murder to dissect.' With the exception at the extremes of falling in love or the making of sausages, discovering essential structure and function in nature rewards the effort with a knowledge of nature's complexity; whole phenomena can then be viewed with increased reverence. If Newton and Emerson, with their respective knowledge of spectra and introspection, could have sat down together during an afternoon thunderstorm, wouldn't both have come to a better appreciation of the ensuing rainbow? The evolution of pheromones can be wedged into this metaphor. Understanding the underlying physics and chemistry of pheromones should not diminish the enchantment of watching *luna* males seeking a calling female.

This last spring I had mated a pair of *Saturnia pyri*, raised from eggs sent from France by Claude Lemaire, and decided on a whim to cage a remaining unmated female and use her for bait in a funnel trap. Her very distant relative, *Antheraea polyphemus*, was having a big flight in the mid-latitude Sierra Nevada, and I thought perhaps if I could arise in time I might see a male make a tepid pass at her on the assumption the two pheromones might be somewhat similar. Of course I slept through the predawn flight period, but checked at 6:00AM (May 1, 2004, 3000', Nevada Co., CA) to find nine males in the trap (see photo on p. 129). The sight of so many males, so obviously different from the "exotic" female, surprised me.

To reduce it to the essence, sex attraction in moths is all about chemistry. The rule in moths is that pheromones are usually genera-specific in terms of

basic chemical structure and closely related species are typically isolated by subtle differences in the mixture of the pheromone bouquet and by unique mating flight times. To be trapped the *polyphemus* males would have to respond at some distance and follow the *pyri* pheromone trail to the vicinity of the trap, and—according to some models—respond to a secondary pheromone with a second set of antenna receptors that initiate the slow and deliberate flight of close-range search (Tuskes, *et al.*, 1996, pp 13-16). To actually become trapped they would have to respond exactly as they would to a conspecific female.

The next night the *pyri* called in an additional eleven males.

Checking with fellow saturniid enthusiast Ric Peigler, I was reminded that Robert Bryant (1980) had witnessed the same inter-attraction in Maryland. His *pyri*, not isolated in a cage, very sensibly fought off the male *polyphemus* and differences in genitalia size prevented successful coupling. Our combined observations on both coasts (*polyphemus* is the only North American saturniid with a continent-wide distribution) strongly suggest that the bouquet of pheromone types, their relative concentrations, and time of release are all extremely similar or identical in the two species. To my knowledge no one has tried the reciprocal experiment with female *polyphemus*. A search of a pheromone database failed to find a structure for the *pyri* pheromone, although the *polyphemus* system is well-known (a 90:10 blend of trans-6,cis-11-hexadecadienyl acetate and trans-6,cis-11-hexadecadienal; Kochansky, *et al.*, 1975).

If the two species' pheromones are actually or nearly identical, does this mean that the molecules arrived at this state through convergent evolution, like the flying squirrels of the New World and the sugar gliders of Australia, or have the pheromones remained in an evolutionary stasis since the *Saturnia* and *Antheraea* lineages diverged from a common ancestor? One approach to answer this question would be to superimpose a phylogenetic analysis of pheromone chemistry among the species in the *Saturnia* and *Antheraea* clades on top of a corresponding phylogeny based on DNA sequence data, such as that published by Regier, *et al.*, (2002). In their cladogram, *Antheraea* is distinctly basal to the clade composed of *Saturnia* (mostly New World taxa and not including *pyri* or closely related species) and the related genera *Agapema*, *Copaxa*, *Perisomena*, and *Caligula*. In the absence of fossils or other independent means of calibrating the molecular clock of DNA base pair substitution, no one has been able to confidently publish the evolutionary ages of these or other Lepidoptera genera, but the split between *Antheraea* and *Saturnia* certainly must exceed 1 million years.

In the shorter time frame of speciation, two contrasting models of pheromone evolution have been discussed. The traditional view (e.g. Cardé, 1987) is that the two independent systems, the male antenna receptor structure and physiology and the female pheromone chemistry and physiology, are subject to stabilizing selection. Genetic variation causing change in one would disrupt mating and be severely selected against. A corresponding and compat-

ible change in the other sex would be very unlikely, given the independence of the two systems in their structure and function and underlying developmental genes. The trend for species-wide pheromone compatibility—a female from one part of the range can call in males from another region—is cited as evidence for this model.

Phelan (1992) presents a model based on the disparity of parental investment by the two sexes in mating systems in moths where the female releases the pheromone. With a large investment in egg production, the female remains relatively immobile while calling in males, while investing very little energy or mass into the production of nanogram quantities of pheromone. Her reproductive fitness is limited by resources available to her (primarily in terms of larval nutrition, especially in saturniids), but she may exhibit mate choice by rejecting unfit males. Males by contrast expend much energy in mate seeking, with relatively little mass and energy devoted to sperm production, and maximize their reproductive success by mating with as many females as possible. They need not be too choosy about the females they mate with, a phenomenon in nature familiar both to biologists and the general public. Extending this argument, Phelan asserts that females producing novel pheromones, in addition to the main components, are not selected against because on a population level available males are not often a limiting resource; male moths are persistent in mate seeking and can mate with more than one female. Moreover, genetic variation producing a variety of receptor sites would be a selective advantage, and probably at little developmental cost to the male. I wonder if perhaps males of a given species also retain a sample of ancestral receptor types as a fraction of the immense number of antennal sensilla. The high probability of calling in acceptable suitors means that variation in male antenna physiology would not place selective restraints on the evolution of female pheromone. Male antenna response tracks evolutionary

change in female pheromone chemistry, but not vice versa. Should female pheromone variation exceed some limit such that males cease to respond, stabilizing selection would eliminate these genotypes and the system would again come into equilibrium.

Females producing novel pheromone mixtures are perhaps most likely to reach significant numbers in small populations through founder effects following genetic bottlenecks or as a result of colonization. Those males possessing compatible receptor sites will subsequently increase in frequency. Regional variation in the pheromone/receptor system can arise due to this kind of *intraspecific* sexual selection, in contrast to *interspecific* reproductive character displacement, where divergence is selected for the effect of reducing the frequency of unfit hybrids.

The work on *Hemileuca* pheromones by Steve McElfresh (McElfresh & Millar, 2002) at U. C. Riverside tends to support Phelan's asymmetric tracking model. He found considerable variation in within-species pheromone chemistry across a geographic range, with optimal male response to females in their own population, but maintaining the ability to respond to conspecific pheromone from allopatric populations. Nevertheless, such regional differentiation in mating physiology could be the initial stages of allopatric speciation. Interestingly, the geographic variation in pheromone chemistry and male response did not always map congruently on current concepts of geographic subspecies. Another important aspect of Steve's work (McElfresh & Millar, 1999; Millar & McElfresh, 1999) is the finding that reproductive character displacement seems to be in effect. Certain populations of *H. eglanterina* show a pattern of geographic variation that seems to minimize the likelihood of overlapping the pheromone chemistry of *H. nuttalli* in regions where they are sympatric, whereas in other regions where only *eglanterina* occurs the pheromone is more similar to that of *nuttalli*. A similar pattern is seen in the *H. electra* species group. If regional, *intraspecific*

pheromone variation is found to be commonplace it would suggest that pheromone evolution is rather labile, making the stasis explanation for the *Saturnia-Antheraea* inter-attraction seems less likely than secondary convergence.

Phylogeographic investigations of pheromone systems relate directly to speciation studies. How does the pattern of pheromone evolution compare to patterns in other prezygotic mechanisms or to that of postzygotic isolation (Presgraves, 2002)? Do differences in pheromones among closely related species arise primarily in the context of reproductive isolation, or through Phelan's sexual selection model where male receptors track pheromone divergence?

We will have to wait until funding is more generous to do the kind of phylogenetic study I propose. One question would be whether there is enough complexity in the pheromone molecule to clearly distinguish convergence from stasis, even with sophisticated statistical analysis. Useful variants may be limited by both physiological and metabolic factors. The pheromone molecule is constrained by volatility requirements to a relatively short carbon chain. Most pheromones are alcohols, aldehydes or acetates of 15 to 20 carbon atoms in length. Pathways producing the pheromone are integrated with overall metabolic activity, and the evolution of entirely novel pheromone types could be costly and unlikely. If such constraints do limit the potential pool of pheromone candidates, then convergence would be more likely, and an accurate pheromone phylogeny might only be recovered from the relatively short time span of diversification within species groups or genera. Nevertheless, in our discussions Steve was confident that if enough taxa were examined a phylogenetic pattern would emerge from an analysis of New and Old World species. His preliminary impression is that Old and New World saturniids differ in the types of carbon-carbon bonds in their pheromones, even across

continued on pp. 118

Membership Update...

Julian Donahue

This update includes all changes received by 7 November 2004.

"Lost" Members

(publications returned: "temporarily away," "moved," "left no address," or "addressee unknown"):

Raguso, Robert A. (Columbia, SC)
Randall, W.A. (Hamilton, Ontario, Canada)
Villa, Roberto (Bologna, Italy)
Wenzke, John J. (York, PA; "temporarily away")

New and Reinstated Members:

members who have joined/renewed/or rescinded their request to be omitted since publication of the 2002 Membership Directory (not included in the 2002 Membership Directory; all in U.S.A. unless noted otherwise).

New members are listed here by name only; their addresses appear in the 2004 Biennial Membership Directory that is being mailed with this issue of the *News*.

Araújo Duarte, José, Júnior
Arey, Matthew D.
Boucher, David V.
Dockx, Cristina (Ph.D.)
Eastwood, Rod
Ferster, Betty (Ph.D.)
Funk, Richard S. (D.V.M.)
Hinze, Gary J.
Hossler, Eric
Johnson, Robert E.
Laccone, Frank
Nuelle, Robert J., III
Owens, Doug
Roble, Steven
Schrader, James N.
Segebarth, Craig
Segebarth, Ian
Segebarth, Kevin
Taft, William H.
Vice, Lisa
Wilson, W. Herbert, Jr. (Ph.D.)
Zhimin, Pan (Mr.)

Address Changes

(all U.S.A. unless noted otherwise).

New addresses for the following members are found in the Membership Directory being mailed with this issue of the *News*.

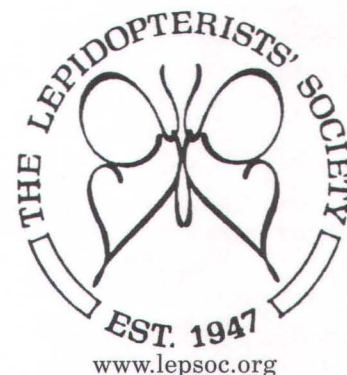
Amarillo-Suarez, Angela R.
Badgero, Dwayne
Conlan, Christopher
Covell, Charles V., Jr. (Dr.)
Coyle, Raymond
Dawn, Douglas D.
DeVries, Philip J. (Dr.)
De Benedictis, John (Dr.)
Descimon, Henri (Dr.)
Douglas, Matthew M. (Dr.)
Duarte, Marcelo
Forister, Matthew
Goodden, Robert Crane
Gorodenski, Stanley A. (Ph.D.)
Grinter, Chris
Harry, Jack L.
Hayden, Jim
Heddle, Mandy L.
Henderson, Lauren (Ms.)
Hilton, Donald F.J. (Prof.)
Kaufman, Kenn
Kudrna, Otakar (Dr.)
Kuji, Ichiei
Miller, Jacqueline Y. (Dr.)
Miller, Lee D. (Dr.)
Mouw, James
Nielson, Dale C.
Norris, Dave
Osipov, Ilya N. (Ph.D.)
Pechan, Gary
Penz, Carla M.
Pinel, Harold W.
Quinter, Eric L.
Rhodes, William E. (Bill), III
Selfridge, Jennifer
Simmons, Rebecca (Ph.D.)
Thompson, Paul M.
Winer, Adam
Zaspel, Jennifer M.

Pheromones...cont'd from p. 117

subfamilies. I wish him and other pheromone researchers interested in such evolutionary topics good luck and fortune in their funding pursuits!

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The Marketplace

IMPORTANT NOTICE TO ADVERTISERS: If the number following your advertisement is "462" then you must renew your advertisement before the next issue! Remember that all revisions are required in writing.

Books/Videos

For Sale: **Moths of North America North of Mexico**. 20 uniformly well-bound volumes: Checklist; fasc. 5.1; 6.1; 6.2; 7.1; 13.1A,B; 13.1C; 13.2A,B; 15.2; 15.3; 15.4; 18.1; 20.1; 20.2; 21; 22.2; 25.1; 26.1; 27.2; 27.3. Available only as set. \$2000 (surface shipping included). Paul R. Ehrlich, Center for Conservation Biology, Department of Biological Sciences, Stanford University, Stanford, CA 94305-5020, Ph 650-723-3171, Fx 650-723-5920, pre@stanford.edu ⁴⁶³

For Sale: **Butterflies** by D'Abrera. All mint condition. Neotropical Region Vol 3 part I (near mint), Vol 3 part III, also Vol 3 part IV and Vol 3 part V \$ 120.00 each. Claude Lemaire: **Attacidae of America** Vol 1, 2, and 3, mint condition, \$50.00 each. Haugum, J. and A. M. Low: **Monograph of the Birdwing Butterflies**, Vol 1 Part I, II, and III, all mint condition. \$175.00 for the

set. Vol 2 part I, II and III, all mint condition. \$175.00 for the set. John G. Filiatrault, 4600 De La Fabrique, Laval, Quebec, H7C 1C8, Canada, 450-975-8169, beaufil37@aol.com ⁴⁶²

Livestock

For Sale. Captive-bred Philippine butterfly pupae, year round. Imogene Rillo, P.O. Box 2226, Manila 1099, Philippines, (fax) 63 2 824-02-22, clasinse@mindgate.net ⁴⁶⁴

For Sale or Exchange. Many species from Iran. *Parnassius*, *Allancastris louristana*, *A. deyollei*, *Hypermnestria helios*, *Archon apollinaris*, *Anthocharis*, *Euchloe*, *Zegris*, *Colotis*, *Colias*, *Melitaea cast*, *M. consulis*, *M. arduinna*, *Coenonympha*, *Hypolephele*, *Erebia*, *Melanagia*, *Satyrus*, *Agrodiaetus* and others. Want S. Amer. and Afr. sp. Ahmad Karbalaye, P. O. Box 11495-175, Tehran, Iran, Tel&Fax: 0098-21-7635025, karbalaye@yahoo.com ⁴⁶⁴

For Sale (US Only). Cocoons and ova of *Hyalophora cecropia*. Send SASE to: Alan M. Vosefski, 3320 Old Kirkwood Dr., Virginia Beach, VA 23452, (757) 498-3168, alanv@peoplepc.com ⁴⁶⁴

For Sale. Live pupae of *Coloradia pandora lindseyi* B. & Benj. (a one-time offering) and *Hemileuca eglanderina* Bdv. (coastal ssp.), both for 2005 emergence. Frank Sala, 3493 Greenfield Place, Carmel, CA 93923, (831) 624-5677, fps@redshift.com ⁴⁶⁴

For Sale (USA only): Cocoons of *Antheraea polyphemus*, *Callosamia promethea* and *Hyalophora cecropia*. Ova available in spring. Send SASE to Karl Ploran, 110 Route 20, Chester, MA 01011-9642 or call (413) 354-7852 any evening, 6-9pm Eastern time. ⁴⁶³

Specimens

For Sale: Wide selection of insects from the whole world. Low prices for hard

The aim of the Marketplace in the **News of the Lepidopterists' Society** is to be consistent with the goals of the Society: "to promote the science of lepidopterology...to facilitate the exchange of specimens and ideas by both the professional worker and the amateur in the field..." Therefore, the Editor will print notices which are deemed to meet the above criteria, *without quoting prices*, except for those of publications or lists.

No mention may be made in any advertisement in the **News** of any species on any federal threatened or endangered species list. For species listed under CITES, advertisers must provide a copy of the export permit from the country of origin to buyers. **Buyers must beware and be aware.** Advertisements for credit, debit, charge cards or similar financial instruments or accounts, insurance policies and those for travel or travel arrangements cannot be accepted because they jeopardize our nonprofit status.

Only members in good standing may place ads. All advertisements are accepted, in writing, for two (2) issues unless a single issue is specifically requested and must be renewed before the deadline of the following issue to remain in place. All ads contain a code in the lower right corner (eg. 386, 391) which denote the volume and number of the **News** in which the ad. first appeared.

Advertisements must be under 100 words in length, or **they will be returned for editing**. Ads for Lepidoptera or plants must include full latin binomials for all taxa listed in your advertisement.

Send all advertisements to the Editor of the News.

The Lepidopterists' Society and the Editor take no responsibility whatsoever for the integrity and legality of any advertiser or advertisement. Disputes arising from such notices must be re-

solved by the parties involved, outside of the structure of The Lepidopterists' Society. Aggrieved members may request information from the Secretary regarding steps which they may take in the event of alleged unsatisfactory business transactions. A member may be expelled from The Lepidopterists' Society, given adequate indication of dishonest activity.

Buyers, sellers, and traders are advised to contact your state department of agriculture and/or PPQAPHIS, Hyattsville, Maryland, regarding US Department of Agriculture or other permits required for transport of live insects or plants. Buyers are responsible for being aware that many countries have laws restricting the possession, collection, import, and export of some insect and plant species. Plant Traders: Check with USDA and local agencies for permits to transport plants. Shipping of agricultural weeds across borders is often restricted.

*Hostplants of the Moth and Butterfly
Caterpillars of America North of Mexico*
by

Gaden Robinson, Phillip Ackery, Ian
Kitching, George Beccaloni, and Luis
Hernández

**Memoirs of the American Entomologi-
cal Institute 69 [2002; 824 pp.; ISBN 1-
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parasitoid wasps, ants, mosquitoes,
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Marketplace...cont.d from 119

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From the Editor's Desk

Phil Schappert

Well, folks? This issue marks the 32nd—and finishes the 8th volume—that I have edited and produced since taking over the editorship from the Minno's back in 1997 (Volume 39). For those of you doing mental addition, that puts me at the end of the 2nd year of my 3rd 3-year term as editor.

I don't know about you but I'm getting pretty tired of me.

I think that it's time for some new blood. It's not that I don't enjoy doing the **News** ('cause I do, especially the interaction that I have with most of the authors that regularly submit items)

but wouldn't you like to see some new ideas, perhaps a new layout, maybe some new columns. I know I would!

It's not that I don't have lots of ideas (design and otherwise), just that I no longer have time to even think about implementing them. Situations change (or should I say "evolve"?) and mine certainly has. Those 8 years have seen the completion of my PhD in Canada, a major move to Texas, two (count 'em, two) books—with a 3rd and 4th in planning—and now a position managing one 208 acre biology station and assuming administration of

another, together with continuing (and expanding) a phytochemical research program, and teaching and undergraduate mentoring demands taking more and more of my time.

Yeah, I know it sounds like a sob story but, to be succinct, I just don't have the time to give anymore. I hope that some enterprising member will read the below and respond to it. I'm committed to finishing this three year term (that is, one more volume of 4 issues) but after that I'd like to enjoy just reading the **News**. I'd love some assistance for Vol. 47 and would welcome your help...

Phil

News Editor Search...

Associate/Future Editor Needed for News

The current Editor of the **News of the Lepidopterists' Society** is in the middle of his third three year term as Editor and feels that it is about time to pass the torch to someone new. The Society is seeking a volunteer Associate Editor to assist the current Editor for Volume 47—with the intent that the Associate assume the Editorship for Volumes 48-50, a three year term—as a means of easing the transfer of duties from one Editor to another.

Editing the **News** is an excellent way to become active in your Society. Suitable candidates might include graduate students (the current editor suggests that doing the **News** is a great way to get to know the "deans" of lepidopterology), motivated amateurs with an interest in computers, or professionals that need to "get back in the trenches."

Needed skills include the ability to communicate effectively, knowledge of computers, graphics, DTP, and word

processing software, and willingness to learn. You will need to own a recent good quality (fast) computer (a 19" or larger monitor is recommended and you will also need a decent color printer and access to flatbed and slide scanners) and have access to a fast internet connection. Needed software includes typical word processing (e.g. Word), high-end graphics (e.g. PhotoShop), scanning engines (e.g. OCR, slide or photo), additional output options (e.g. Acrobat), and email/FTP applications.

Typical work-flow has submissions (arriving on disk, via email, or written submissions needing scanning or keyboarding) being edited and formatted in Word, photos or graphics being scanned and/or processed in PhotoShop, and then the component parts are assembled in PageMaker (any high-end DTP program will work). Final resizing and color conversions of photos are done in PhotoShop. The finished publication

file, together with all necessary source files and fonts, is then sent to the commercial printer.

Time commitments vary from issue to issue but each issue generally takes 5-10 days to complete. The Editor is responsible for 4 issues per year, plus a cover for the SS supplement(s). The Supplements (SS each year and MD in even-numbered years) are edited by others. Actual "real" editing is minimal, mostly correcting spelling/language use and ascertaining that submissions are suitable for the **News**. Most of the time involvement derives from the use of color and photo/graphic elements, reformatting submissions (which invariably arrive overly-formatted), and correspondence. Some software (e.g. PageMaker) may be provided by the Society.

Interested applicants should contact the current Editor or President to volunteer.

New Species from Mt. Roraima

Steve Fratello

11 First St., W. Islip, NY 11795

During the course of a number of expeditions to learn about the virtually unexplored butterfly fauna of Guyana's montane regions, much of interest has been discovered including a number of species new to science. While the author of this article explored the Iwokrama Mts. (see *News of the Lepidopterists' Society*, 45(4): 109-111, 116-121), Romeo Williams, a Guyanese national and indispensable team member of previous montane expeditions, did some limited collecting while a member of a Smithsonian ornithology expedition to the Guyana side of Mt. Roraima (2772m) in Mar/Apr 2001. Helping Romeo in this collecting effort were Wiltshire Hinds, a University of Guyana biology student at the time, and Chris Milensky, Museum Specialist for the Smithsonian's Division of Birds. Though well less than 100 specimens of butterflies and moths were collected, this small yield provided very exciting results: a male and female of a new *Oxeoschistus* Butler sp. (pronophiline satyrine), and two species, a *Euptychia* Hubner sp. (satyrine) and *Brevianta* sp. (thecline hairstreak), that are probably new species but await further study.

Mt. Roraima is in the Guiana Highlands, a large region of mountainous tablelands predominantly in southeastern Venezuela, but also occurring in adjoining areas of Guyana and northern Brazil. This area is also called the Pantepui region for the tepuis, which are its most prominent geological feature. Tepui is an AmerIndian word for the sheer-sided table mountains, which are composed largely of sandstone layers. Mt. Roraima is perhaps the most famous tepui and its sides and summit are shared by three nations: Guyana, Venezuela and Brazil. Though the Guyana side (Fig. 1, 2 on pp. 125) is remote and difficult to access,

there have been a small number of scientific and climbing expeditions to this side in the past. Though none of these expeditions were solely lepidoptera expeditions, some important contributions to understanding the tepui butterfly fauna were made with the specimens collected. The Venezuela side has an easier (though not easy) access, their even being a tourist route to the summit. Though I know a number of exciting discoveries have come from the Venezuelan side, I am not familiar with the extent of the exploration on that side. I have no knowledge as to whether the Brazilian side has been explored scientifically. Though my knowledge of Mt. Roraima's exploration and fauna is sketchy, it is plainly obvious from the results of this latest expedition, how much more work needs to be done even on this famous and 'relatively' well-explored tepui.

The question may arise, why figure and write about these butterflies before they are officially described in a scientific journal? I will answer with what I believe are very satisfactory answers. First, it will give this Society, some of the people most interested in the subject, a glimpse into a largely unknown fauna. The *Oxeoschistus* species is being described by pronophiline expert Tomasz Pyrcz—*Oxeoschistus* n. sp. (Pyrcz & Fratello, in press). Though this manuscript should be published in our journal in the not too distant future, the excellent color figures in the present manuscript will provide our membership another opportunity to see this exciting discovery. As for the *Euptychia* and *Brevianta* specimens, it could be many years before they are figured. The reasons for this are many: lack of other specimens, remoteness and difficulty of access to get more specimens, lack of interest in lepidopterists to go

to these places, unresolved systematics of their groups (especially true of *Euptychia*), etc. As one who strongly believes the butterflies (and knowledge of their existence) are paramount and extensive scientific knowledge about them of secondary importance; I happily share these exciting discoveries with our members, especially as they are presented in a faunal context.

Following from what was written in the first reason, especially to the lack of adequate interest in lepidoptera exploration of the tepuis, is the second reason for this manuscript: that it may inspire some young lepidopterists to continue the quest and further explore these remote and spectacular mountains. I don't want anyone to quit their computers and erudite study, just put them aside for a while and spend more time in the 'wild'. What awaits you is trips and scenery never to be forgotten and many amazing discoveries! Remember, the butterflies in this manuscript came from less than 100 specimens collected from an expedition that explored one tiny corner of a huge tepui massif: Mt. Roraima, most famous of all tepuis and explored to some extent previously!

The third, but certainly not least, reason is to honor and give credit to my friend Romeo Williams for heading the lepidoptera collecting effort on Mt. Roraima while I was in the Iwokrama Mts. That I asked Romeo to do this collecting in no way diminishes the credit he is due. On a more recent (2002) ant expedition to Mt. Ayanganna (ca. 2050m), Romeo collected lepidoptera of his own accord. The results included 3 males of a spectacular new riodinid known only from 4 females we had collected previously on Mt. Ayanganna, plus, another spectacular

new riordinid species! On these two expeditions, on all our joint montane expeditions, on botany, ornithology and other scientific expeditions, Romeo's navigation and bush skills, his collecting efforts, his work ethic and determination have all contributed greatly to a much better understanding of the biota of Guyana's hinterlands. If I could have found the same explorer spirit and determination in some of our museum and other institution 'leaders', as found in my 'bushman' friend, the montane regions of Guyana would be much less of an entomological blank spot than they are at present.

Having been part of two tepui expeditions in Guyana, Mt. Wokomong (ca. 1675m) and Mt. Ayanganna, with no pronophilines collected or definitively seen; it was with great elation that I first saw the male and female of the new *Oxeoschistus* species (Fig. 3-6, pp. 125) taken on Mt. Roraima. Andrew Neild, expert on Venezuelan and northern S. American butterflies, and Tomasz have both verified that *Oxeoschistus* was unknown in the Pantepui region before this discovery. This new species can be easily separated from all its congeners by the extremely irregular inner margin of the FW orange median band, marked by two large, dark dentate intrusions. Excellent photos of most of the known taxa (including *Dioreste* Thieme, now included in *Oxeoschistus* following Lamas *et al.* (in press)) can be seen in Bernard D'Abrera's Neotropical satyrine volume (pg. 808-812). Tomasz discusses this new species in depth in the future manuscript.

The genus *Euptychia* (in the strict sense) has yielded some exciting discoveries from our Guyana montane expeditions including a number of new/undescribed species: good series of two species close to *E. picea* Butler, three specimens of a very unique phenotype (collected previously by Andrew Neild in southern Venezuela) from the Acarai Mts. that may not belong to *Euptychia* and this single unique specimen (Fig. 7, 8, pp. 125) from Mt. Roraima. This species will also need further study to ascertain if it is a 'true' *Euptychia*,

though its facies seem to indicate a close relationship. If this species is a true *Euptychia*, it is the darkest of any species I have seen. The dark brown upperside is matched in darkness of ground color only by one of the new/undescribed species close to *E. picea*. In both of these species only the marginal underside markings show through on the upperside. In other species of *Euptychia*, the wings are more translucent with the median bands also showing through, often prominently. The ground color on the underside is darker than on other Guyana species or any *Euptychia* species I am aware of. A very notable feature of the underside pattern is that the HW and FW marginal line (not submarginal band) is very prominent and undulate, differing markedly from other *Euptychia* species. In the other *Euptychia* species with an undulate marginal line, it is much narrower and less prominent. The dark median bands are also narrower (especially the more basal of the two) than on other brown *Euptychia* species and the HW tornal ocellus is smaller than on most other brown species.

After examining the Smithsonian's magnificent Neotropical hairstreak collection, it is easy to see that this Mt. Roraima hairstreak is a very close relative of two very similar species: *Brevianta undulata* Hewitson and *Brevianta undulella* Strand. Both species are well represented in the Smithsonian collection: *B. undulata* from west of the Andes in the mountains of Costa Rica and Panama (premontane/lower montane), *B. undulella* from east of the Andes—east slope of the Ecuadorian Andes (probably to be found also, if not already, in Columbia) and the Cordillera de Costa (most specimens) and Andes of Venezuela (premontane/lower montane). The females (and males) of these two species resemble each other very closely with only subtle facies differences. The Mt. Roraima female (Fig. 9, 10, pp. 125) has some marked differences from these two species. It is purplish-blue on the upperside, especially on the FW. The females (without exception) of the other two species are

greenish-blue, more greenish in *B. undulella*. I strongly believe that the purplish-blue color of this new hairstreak is a true color and was not caused by a change in the reflective properties of the structural scales during the preparation/spreading process.

Though there is some variability in the white underside markings of *B. undulata* and *B. undulella*, when looked at in series, subtle differences between the species can be discerned. Subtle differences can also be discerned in this regard between the Mt. Roraima specimen and the other two species' females. One facies difference of note between the Mt. Roraima specimen and the other two species occurs with the FW median white band in the cell between veins Cu2 and 1A+2A (modified Comstock system). In all Smithsonian specimens of *B. undulata* and *B. undulella*, the band exhibits a chevron with the tip pointing basally in this cell, especially prominent in *B. undulata*. This can be easily seen in Bernard D'Abrera's Neotropical lycaenid volume (pg. 1129), though if the specimen shown is *B. undulata* and not *B. undulella*, the locality given (Ecuador, ? loc.) could be mistaken or the specimen could have been taken in western Ecuador. That the Mt. Roraima specimen's band lacks the prominent chevron shape in that cell is easily seen in the photo here. The median band is also more uniform in the Mt. Roraima specimen, especially compared to *B. undulata*. The Smithsonian Ecuadorian *B. undulella* also have a more uniform median band but still show the chevron in the above mentioned cell.

If *B. undulata* and *B. undulella* are considered separate species as they are in the Smithsonian, it is logical and consistent to consider the Mt. Roraima specimen as a separate species also, especially considering its facies differ more from the other two species than they do from each other. Though I neglected to take notes on the subject, I remember the males of *B. undulata* and *B. undulella* also having subtle facies differences: the width of the thin black margin on the dorsal FW and the

appearance of the androconial patch on the dorsal FW. I assume that the male tepui *Brevianta* sp., when discovered, will show more significant differences. Future study should show, at the least, three geographically isolated races: *B. undulata* and *B. undulella* separated by the northern Andean highlands and *B. undulella* separated from the tepui *Brevianta* by the extensive Orinoco lowlands. Or if the present taxonomy is maintained, there would be three very closely related allopatric species—a superspecies. The taxonomic status of these hairstreaks must be left to the experts.

What is certain is that this hairstreak and the two satyrines are exciting discoveries from one of the least explored regions in the world. Beyond sharing the enjoyment of these discoveries, if this small manuscript excites further exploration of the fantastic Pantepui, it will have served a dual purpose. Continuing this dual purpose will be the next manuscript on butterflies of Guyana montane regions—up to six new/undescribed (two collected previously in different locales in the Guyana Pantepui) riordinids from one tepui, Mt. Ayangannna, a couple/few with very unique phenotypes. If anyone has further knowledge (i.e., pertaining to the new *Euptychia* and *Brevianta* species) on what was written

in this manuscript, please contact the author and I will include it in a future manuscript.

Acknowledgements

Members of the Smithsonian Institution Division of Birds graciously allowed Lepidoptera collecting on their Mt. Roraima expedition. Chris Milensky, Museum Specialist, helped in the collecting and made sure the specimens and data got back to the Smithsonian Dept. of Entomology. We in the Lepidoptera community should all be thankful for his time and effort. My friend Romeo Williams and Wiltshire Hinds did the bulk of the collecting and thanks to Romeo again for one more superb effort. My friend Andrew Neild and Tomasz Pyrcz, with their great knowledge, gave a biogeographic perspective to the discovery of the new Oxeoschistus species. Dr. Scott Miller, then Director of the Smithsonian Dept. of Entomology, generously allowed Smithsonian staff time and equipment for the specimen photos. Patricia Gentili-Poole, Museum Specialist, once again took the excellent digital photos of the specimens. The awesome Mt. Roraima photos were taken and provided by Chris Milensky. And our awesome God has blessed us with the majesty of his Works.

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Sandbur...continued from pp. 127

that are being sought by these butterflies. In particular, a wide variety of alkaloids, including caffeine (Bogo & Mantle, 2000) and many ergot specific compounds (including ergocornine, ergocryptine, ergocristine, ergosine and ergotamine; Pažoutová, 2002) are known chemical products of *Claviceps* sp.

Perhaps the grasses or their fungi also produce PAs? Or the butterflies perceive the produced alkaloids as PAs? Or perhaps the butterflies may utilize them as—or in place of—these compounds? But why did *Mestra amymone* seek them? Are *Mestra* sp. known PA users? As per usual, one interesting problem often begets a whole bunch...ah, a phyto-chemist's work is never done!

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Announcement...

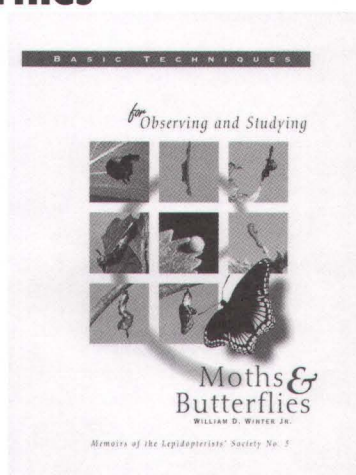
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New Species from Mt. Roraima...

1. NE slope of Mt. Roraima taken from approx. 1450m. 2. NE slope of Mt. Roraima taken from clearing at 1300m. 3. *Oxeoschistus* n. sp. (Pyrz & Fratello, in press), Male, Upperside, 1300m. 4. Same as 3, Underside. 5. *Oxeoschistus* n. sp. (Pyrz & Fratello, in press), Female, Upperside, 1300m. 6. Same as 5, Underside. *Euptychia* sp., Male, Upperside, 800m. 8. Same as 7, Underside. 9. *Brevianta* sp., Female, Upperside, 1300m. 10. Same as 9, Underside. Photos 1, 2 by Chris Milensky, all others by Patricia Gentili-Poole.

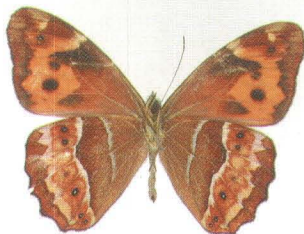
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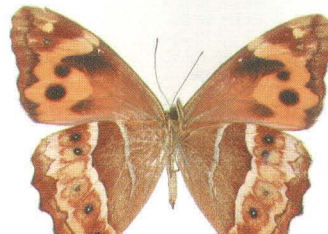
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New Butterflies & Moths at the Stengl "Lost Pines" Biological Station

1. Below left: *Urbanus dorantes* (10/31/04); Below center: *Melanchroia chephise* (11/06/04); Below right: *Chlorostrymon simaethis* (11/8/04); Front Cover: *Horama panthalon texana* (11/06/04). Photos by Phil Schappert.



Strange Attractors: Coastal Sandbur, *Cenchrus spinifex* (Poaceae)

Phil Schappert

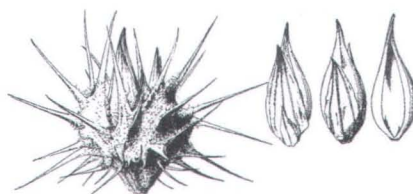
Stengl "Lost Pines" Biological Station, University of Texas,
401 Old Antioch Rd., Smithville, TX 78957, philjs@mail.utexas.edu

Butterflies "doing things" have always attracted me far more than the—in my view—simplistic expediency of assembling a list of species seen. In fact, it has become something of an amusement that, after publishing two books on butterflies, people that I meet in the field are startled when I ask "what's that?" "Well, don't you know?" they always ask, "after all, aren't you the expert?" At about this point I launch into my usual explanation that, like a cat, I'm attracted to movement and have become more of a behavior watcher as a consequence. "Thus," I explain (I really do talk thusly), "I only really care about what it is after it does something interesting." This is often followed by quizzical frowns or polite nods of not-really-understanding.

On November 15, 2003, I watched and photographed a butterfly "doing something" that I thought was quite interesting. Actually, it was more along the lines of perplexing but you get the idea. Now, I have to say right off that the reason I was attracted to this particular butterfly is that it was a very unusual butterfly at the Stengl "Lost Pines" Biological Station near Smithville in central Texas. It was only the second Mestra or bagwing, *Mestra amymone* (Nymphalidae), that I had seen here in 7 years although, notably, another two were seen the same day as this one. It was actually quite an annoying sighting because it was flying about in a field of coastal or field sandbur (grassbur), *Cenchrus spinifex* Cav. (formerly *C. incertus* M. A. Curtis but also now including *Cenchrus parviceps* Shinnery and *Cenchrus pauciflorus* Benth., USDA-NRCS (2004)), (Poaceae).

If you've not had occasion to know this particularly nasty grass then count

yourself lucky. The burs are like something out of a mediaeval nightmare— $\frac{1}{4}$ " (6mm) diameter miniature models of the business end of a mace. To say they're painful is an understatement.



Burs and seeds of *Cenchrus*. From USDA-NRCS PLANTS Database/Hitchcock, A.S. (rev. A. Chase). 1950. Manual of the grasses of the United States. USDA Misc. Publ. No. 200. Washington, DC.

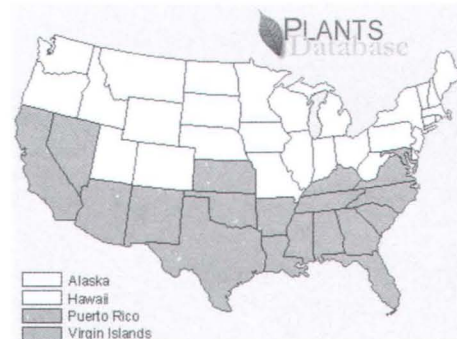
They catch in anything and everything—fingers, toes and other exposed skin included—and are something of a fall hazard to all and sundry through much of the southern U.S. (see distribution map).

The odd thing about this encounter with the Mestra was that it appeared to be specifically seeking-out the spikelets of the grassburs. When I eventually got close enough to get a decent photo (see pp. 128) it was readily

apparent that it was probing the surface (or possibly the interior) of the burs themselves. What the attraction was is a puzzle, but amidst all of the other puzzles that I encounter on an almost daily basis, it was all too quickly forgotten. It is important to note, however, that I have not forgotten the hour that it took to remove all of the burs from the lower half of my body (and I eventually ended up just discarding my net bag as irretrievably damaged). Pat will be happy to tell you that I "turned the air blue" with all my fussing and cussing.

Flash forward now to November 9, 2004. Once again the grassburs have taken possession of the northwest corner of the station house yard. Both of our dogs are smart enough (but then Australian Shepherds are not known for being dumb dogs) to avoid the area—even a tasty treat is not enough to overcome the trepidation that they have for that end of the yard—but at least one of their owners is, apparently, pretty stupid (but, I'm getting ahead of myself).

This fall season has been an eye-opener because we've had quite a number of new county records and new Station records of southern species being found in the last weeks of October and through the past weekend. Included among these have been Lantana Scrub Hairstreak, *Strymon bazochii*; Silver-banded Hairstreak, *Chlorostymon simaethis* (see pp. 125); Soldier, *Danaus erisimus*; White-patched Skipper or Duskywing, *Chiomara georgina*; and an influx of previously known (but not at all common) species like Dorantes Longtail, *Urbanus dorantes* (see pp. 125); White-striped Longtail, *Chiodes catillus*; and Sickie-winged Skipper,



Distribution of *Cenchrus spinifex* in the United States. From plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=CESP4

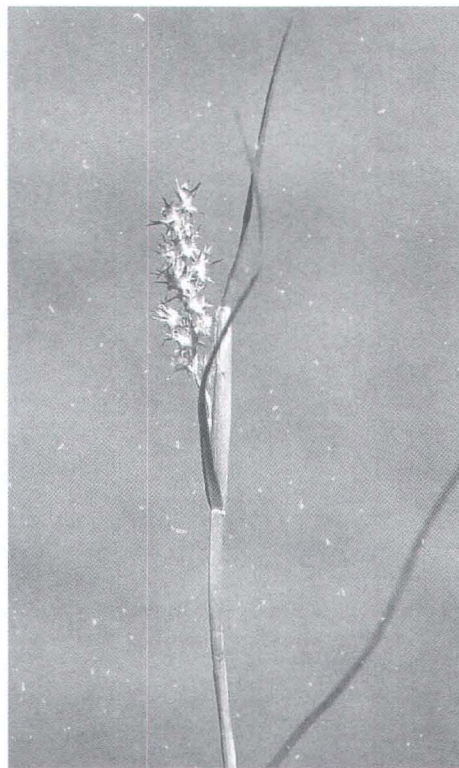
Eantis tamenund. Not to be excluded, even some of the day-flying moths have been new and/or unusual, including Melonworm Moth, *Diaphania hyalinata* and new county records for Texas Wasp Moth, *Horama pantholon texana* (see Front Cover) and White-tipped Black, *Melanchroia chephise* (see pp. 125). The common name of the last doesn't do this lovely little moth any justice—it would be much better to call it the White-tipped “Deep Royal Blue.”

The recent sighting of Soldiers at the Station (at least 2 different individuals over more than two weeks—in fact, this past Saturday we had, for the first time ever, all three Texas Danaiids (4 Monarchs, a soldier and a few Queens) here together) have made me somewhat sensitive to large brown-orange butterflies. So I had to go and investigate the Danaid that I saw a bit before 10am yesterday morning out the north-facing kitchen window. The stupid (but also serendipitous) thing is that I could have used my binoculars from the window to determine that it was a Queen and then just gone back to the computer to work on the Winter issue of the **News**, but, no, instead I grabbed my camera and headed out there—in my sweats and sandals—to investigate. What can I say? Even walking into a field of sandbur was more enticing than going back to sit at the computer.

To my surprise, it was a male Queen, *Danaus gilippus* (of the usual southwestern *strigosus* variety) doing exactly what the Mestra had done the year before: probing the spikelet and burs with its proboscis for who knows what. I took some photos, thinking “ah ha! Now I have something to fill that empty plate!” (even out in that “field of nightmares” it seemed that I couldn't escape the task awaiting me), and came back inside. An hour later, the butterfly was still there, presumably doing the same thing it had been doing previously, but then I noticed that there were now three of them! This was fast becoming a real conundrum...

Even more surprising to me, and with respect to the recent article by Jerry

Einem (2004), was that one of them was a female (see photos on pp. 128). Of note is that the photos were remarkably easy to obtain because the butterflies seemed inured to disturbance, that is the task at hand, so to speak, was more important than the looming vertebrate with the big black camera. Whatever is going on here is not, apparently, related to male-only acquisition of pheromone precursors as discussed by Einem, nor does it seem to involve migrating Queens but the usual build-up of fall residents common here at the Station every year. The recent influx of southern species at the Station, including Soldiers, suggests that just the opposite is happening: these Queens may be “starved” for resources in the south and have been forced to seek elsewhere.



Spikelet of Coastal Sandbur, *Cenchrus spinifex*. Photo by Larry Allain @ USDA-NRCS PLANTS Database.

Intriguingly, there is foliage of young milkweeds (*Asclepias oenotheroides*) present among the sandbur and at times I watched both sexes visit grass spikes directly over or immediately adjacent to potential host plants (see photos on pp. 128) while two varieties of *Asclepias currasavica* are available

in the gardens (of note is that at this time last year I was in danger of losing the garden milkweeds to Queen caterpillars). Also, a number of potential PA (pyrrolizidine alkaloid) sources, including *Heliotropium indicum* (Boraginaceae), *Conoclinium* (*Eupatorium*) *greggii* and *Ageratina* (*Eupatorium*) *havanense* (Compositae), are in bloom in the butterfly gardens.

Two of the Queens (both of the males) were still performing the same “flit, sit and probe” ritual on the spikelets at 3 pm that day and the following day, November 10th, one of the two males was present again through most of the afternoon (at least from 2 through 4 pm). Unlike the day before, however, when I tried to photograph the behavior the butterfly was pretty flighty, disturbing easily, and at one point nectaring at the nearby Lantana. Still, it returned to its task with alacrity and not a little persistence.

A preliminary literature search has turned up a remarkable dearth of information on the phytochemistry of grasses in the genus *Cenchrus*. Ramirez, *et al.*, (2004) report that *C. incertus* (a.k.a. *C. spinifex*) has very high levels of Phosphorus, Magnesium and Potassium but that it is unremarkable in the other 6 trace minerals tested. Much of the *Cenchrus* literature is devoted to buffelgrass, *C. ciliaris* (see, for example, Light, *et al.*, 2002), and its use as fodder for range animals, or, as in McKinney & Fowler (1991), is devoted to the adverse effects of the burs of *C. incertus/spinifex* on grazers.

A far-more intriguing line of investigation might be the occurrence of endophytic fungi—and their chemical products—in these burs. For example, San Martín, *et al.*, (1997) report that tropical ergot, *Claviceps fusiformis*, infects *Cenchrus* grasses in geographically-nearby Tamaulipas, Mexico. Fungal endophytes of grasses, including *Claviceps* sp., have complex chemistries (Clay, 1990, Pažoutová, 2002) that may provide the resources

continued on pp. 124



Coastal Sandbur: A strange attractor for butterflies...

1. *Mestra amymone*, 15/XI/03, probing burs of *Cenchrus spinifex* at the Stengl "Lost Pines" Biology Station (SLP). 2. Male Queen, *Danaus gilippus strigosus*, probing burs in the SLP yard on 9/XI/04. 3. Male (lower) and female (upper) Queens visiting sandburs, 11am, 9/XI/04. Note the foliage of *Asclepias oenotheroides* at center right. 4. Close-up of female Queen probing burs. 5. Second male exploring burs, 11am, 9/XI/04. 6. Male Queen at burs, 3 pm, 10/XI/04. All photos by Phil Schappert. See the article beginning on pp. 126.



A Picture that Inspires Thoughts on the Evolution of Moth Pheromones...

(Left) An un-mated female *Saturnia pyri*, raised from eggs sent from France by Claude Lemaire, used as bait in a funnel trap. At 6:00am, May 1, 2004 (3000', Nevada Co., CA), there were nine male *Antheraea polyphemus* in the trap. The author writes, "The sight of so many males, so obviously different from the "exotic" female, surprised me." Photo by Michael M. Collins. See his account and speculations about the implications of this event beginning on pp. 116.

A Hot Day in the Field...

(Below) Another page from Liam O'Brien's notebook about participating in the 5th Annual N.A.B.A. 4th of July Butterfly Count at Pinnacles National Monument, San Benito Co., CA. Amongst other things, Liam learned the true meaning of the word "xeric." Looking to one day publish his notebook artwork, Liam writes that he is "collecting magazine rejections like badges of honor." Most respondents tell him that his work is "just a little too dark and edgy" but Liam believes it's important to include people in the picture and that nature art should be an "in-your-face, slam dance assault on the senses. Nature + Humans + Bugs = Chaos."



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The Lepidopterists' Society is open to membership from anyone interested in any aspect of lepidopterology. The only criterion for membership is that you appreciate butterflies or moths! To become a member, please send full dues for the current year, together with your current mailing address and a note about your particular areas of interest in Lepidoptera, to:

Kelly Richers,
Assistant Treasurer,
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Submissions are always welcome! Preference is given to articles written for a non-technical but knowledgeable audience, illustrated and succinct (under 1,000 words). Please submit in one of the following formats (in order of preference):

1. Electronically transmitted file and graphics—in some acceptable format—via e-mail.

2. Article (and graphics) on diskette, CD or Zip disk in any of the popular formats/platforms. Indicate what format(s) your disk/article/graphics are in, and call or email if in doubt. Include printed hardcopies of both articles and graphics, a copy of the article file in ASCII or RTF (just in case), and alternate graphics formats. Media will be returned on request.

3. Color and B+W graphics should be good quality photos or slides suitable for scanning or—preferably—electronic files in TIFF or JPEG format at least 1200 x 1500 pixels for interior use, 1800 x 2100 for covers. Photos or slides will be returned.

4. Typed copy, double-spaced suitable for scanning and optical character recognition. Original artwork/maps should be line drawings in pen and ink or good, clean photocopies. Color originals are preferred.

Submission Deadlines

Material for Volume 47 must reach the Editor by the following dates:

| Issue | Date Due |
|-----------------|----------------------|
| 1 Spring | Feb. 18, 2005 |
| 2 Summer | May 20, 2005 |
| 3 Autumn | Aug. 19, 2005 |
| 4 Winter | Oct. 28, 2004 |

Reports for Supplement S1, the Season Summary, must reach the respective Zone Coordinator (see most recent Season Summary for your Zone) by Dec. 15. See inside back cover for Zone Coordinator information.

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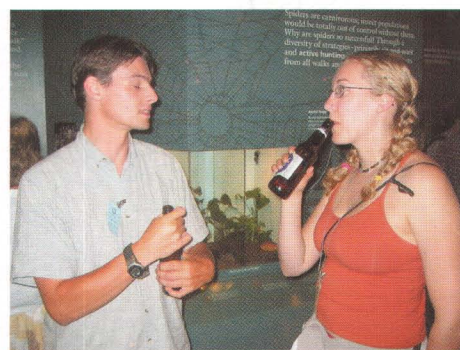
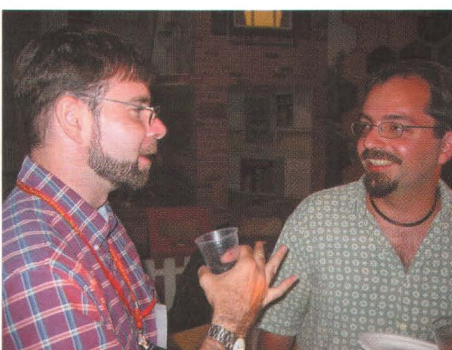
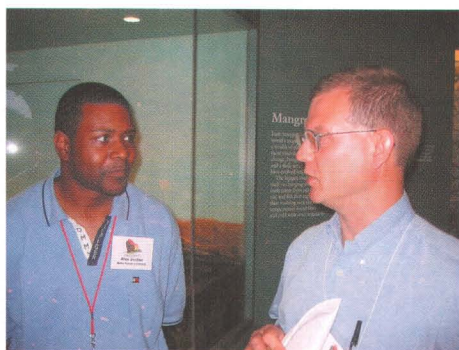
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Lep Soc 2004...

More photos from the 2004 Maryland Meeting. **Left to right, from top down:** Alax Jordan and John Beck, John Lill and Tiago Questnal, Erik Runquist and Amanda Roe (Smithsonian mixer); Pat and Phil Schappert, Austin Platt, Jackie Miller and Lincoln Brower, Charlie Covell presents Anne Lott with an impromptu gift (Banquet); Jane Ruffin, Bob Robbins and "Ranger" Steve Mueller, Kevin and Becky Simmons with Mindy and Bill Conner (BBQ). Top 3 photos by "Ranger" Steve Mueller, all the rest by Kit Stanford. See you in AZ in 2005?!?!

