

# NEWS

OF THE

# LEPIDOPTERISTS' SOCIETY

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# NEWS OF THE LEPIDOPTERISTS' SOCIETY

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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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## A Note from the Editor...

As many of you are probably already aware, Charles Lee Remington, co-founder of The Lepidopterists' Society, passed away on May 31st at the age of 85. While I never got the opportunity to meet Dr. Remington, I do get to benefit from the insight and dedication he provided sixty years ago when he and Harry K. Clench founded our organization. From the first issue of the NEWS back in 1947 he stressed the important contributions that the amateur in the field can contribute to the study of lepidoptera. That is still true today.

An extensive obituary will be published in an upcoming issue of the Journal.

Dale Clark, Editor

## Front Cover:

Monarch (*Danaus plexippus*) cluster in the Sierra Chincua colony with the sun on them and their wings spread (Jan 8, 2007). Photo by Ernest H. Williams.



**Conservation Matters:****Contributions from the Conservation Committee**

# Status of the Monarch Sanctuaries in Mexico: March 2007

Ernest H. Williams<sup>1</sup> and Lincoln P. Brower<sup>2</sup>

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The storied aggregations of wintering monarchs in central Mexico are remarkable, as is the entire migratory phenomenon that brings hundreds of millions of these butterflies to sites on a few, select forested mountainsides. Not many people visit the Mexican sanctuaries, but those who do experience magic when the sun warms the colonies, and millions of monarchs flutter upward and surround the visitors. It is distressing that the threats to this entire biological phenomenon continue unabated. Protective actions must be taken.

As far as we know, most monarchs that breed from the Atlantic Coast westwards to the Rocky Mountains migrate southward to pass the winter in very large aggregations on approximately 12 separate mountain ranges west of Mexico City (Brower 1995, Slayback et al. 2007). Recent findings suggest that these may be supplemented by monarchs that have bred in the Great Basin, at least some of which also enter Mexico with as yet unknown fates (Brower and Pyle 2004). The following March, as days lengthen and temperatures rise, the butterflies become active, mate, and begin a return trip northward, laying their eggs on newly sprouting milkweeds along the way, especially in the gulf coastal states. The offspring of the individuals that survived the winter continue the journey northward as far as the southern edge of Canada. Two or more generations are produced over the summer. Unlike migratory birds, the monarchs that complete the return migration are several generations

removed from those that flew southward. This is an inherited behavior pattern that we still understand only vaguely.

Monarchs complete this journey for two reasons. As descendants of a tropical group of butterflies, they cannot tolerate the severe freezes that accompany cold northern winters, so their survival is much higher when they migrate to lower latitudes where temperatures seldom drop more than a few degrees below freezing. They return the following spring, however, because the regrowth of milkweeds, their larval food plants, allows them to breed abundantly throughout Eastern North America.

Threats to monarchs fall into two categories. Those in the summer range are due mainly to the rapidly increasing use of corn and soybean crops that are genetically engineered to be resistant to herbicides. When the emergent corn or soybean seedlings are sprayed with herbicide, all the native plants are killed, including milkweeds and nectar sources. Other genetically modified crops contain genes that produce bacterial toxins that can kill monarch caterpillars.

Threats at the wintering sites are from illegal logging that destroys habitat or degrades it to the point at which monarchs cannot tolerate the resulting extreme climatic conditions. Monarchs make their remarkable two-thousand-mile migratory journey to pass the winter in cool, humid, non-freezing conditions. The sites must be cool because the butterflies burn their fat

reserves too quickly when they are warm and, as a result, they may not have enough energy to survive the winter (little nectar is available within flying distance of the overwintering sites for them to replenish their energy stores). Though cool, the sites must also be subject to minimal freezing and retain enough humidity to prevent the butterflies from desiccating. These conditions occur in very limited locations in the oyamel fir forests of Mexico's Transvolcanic Mountains. Colonies develop very predictably every year at several well-known locations (Slayback et al. 2007).

Seven of the twelve known overwintering enclaves in Mexico were set aside by presidential decree in 1986 and subsequently enlarged by a second decree in 2000 to become the Monarch Butterfly Biosphere Reserve, with complete protection in core areas surrounded by less restricted buffer zones. But the official protection is not working. Illegal logging has increased substantially in both the core and buffer zones, usually during the wet season of April to October when the colonies have dispersed, few tourists are around to witness what is happening, and less official surveillance of the sanctuaries takes place. It is astonishing to find newly clear-cut areas adjacent to the monarch colonies, but every year the surrounding forest is further reduced. Degradation of the sanctuaries has been taking place at a rate greater than 3% per year in the core zone (Brower et al. 2002) and is accelerating (World

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## The Status of the Monarchs in Mexico

**Figure 1:** Monarchs clustering on the oyamel fir trees that form the protective microclimate at the overwintering sites; **Figure 2:** A female monarch taking nectar at Gregg's Mistflower as it passes through north Texas, late October, 2006. **Figure 3:** Lincoln Brower holding a recently cut log from an oyamel fir in the middle of the protected zone at the Cerro Pelon colony (Jan 11, 2007). Threats at the wintering sites are from illegal logging that destroys habitat or degrades it to the point at which monarchs cannot tolerate the resulting extreme climatic conditions. **Figure 4:** Monarchs, warmed by the mid-day sun, take flight by the millions at the Sierra Chincua colony (Jan 9, 2007). **Figure 5:** Monarchs taking moisture at mud at one of the small streams near the overwintering sites. Photos 1, 3, 4, and 5 by Ernest Williams in Mexico, January, 2007. Photo 2 by Dale Clark, Dallas Co., Texas, October 28, 2006.









# Dominican Republic – Notes on Evolution of Butterflies and of our Knowledge about them

By Andrei Sourakov

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Last News issue's article by Wahlberg and Peña "A Dominican Republic Sojourn" awoke a few memories as I traversed the country of the Dominican Republic (DR) often on foot during a number of trips there (combined stay of several months). Still, I can not claim I know the country well enough: the island of Hispaniola is really a miniature continent, with its 13 mountain systems, rising as high as 10,300 feet, and with many isolated valleys. Some valleys are fertile and exploited to the their last extent for agriculture, some are so arid that the original habitat and respective faunas remain practically untouched.

Wahlberg and Peña rightly state that there are many endemics on the island and a great diversity: 200 species of butterflies belonging to 103 genera (Schwartz, 1989). This richness is enormous for an island, if you consider that Madagascar, located at the same distance from the equator, has 280 species, while enjoying 7.6 times larger territory. My interest, however, was and still is in the single satyrine genus *Calisto* that comprises 20% of the fauna.

Of course, collecting and observing butterflies in such a historical location as DR (remember that Christopher Columbus never reached mainland, and died in Santo Domingo) has a long and exciting history, starting with René-Gabriel Rabié in 1742. For details, one is referred to David Kenneth Wetherbee's "Two centuries of exploration for Hispaniolan butterflies" (1991) – a little known, but much deserving work. The best known recent exploration was conducted by Albert Schwartz, whose book "Butterflies of

Hispaniola" (1989) is a good guide for any collector/photographer, while if one is looking for an illustrated though more expensive guide, Smith, Miller and Miller (1994) is highly recommended.

What hampers any exploration efforts is the affinity of explorers to roads, guides, hotels, previously visited by others localities and dates, as well as agenda of collecting. Despite all the positive vibes that one feels while reading Wahlberg and Peña's account, it is obvious that their travel has not escaped that pattern. Schwartz spent 10 years driving around Hispaniola sampling butterflies and creating distribution maps. Tom Emmel visited the country for 20 years though more sporadically. There are many other noted entomologists, such as John Rawlins of Carnegie Museum, who dedicated much of their lives to studying DR Lepidoptera. Yet my experience suggests, that though we have learned much about diversity of the fauna through more or less accidental catches of specimens, we know very little about the species' biology and distribution.

When I first tried in DR to follow Philip Darlington's motto that true explorers should move through terrain in a straight line in order to conduct an impartial sampling of biota, it proved to be painful and not practical. I did not get too far from where I started in the middle of Central Cordillera, and had to camp out in the woods: the terrain proved to be too rugged and overgrown to persist. Yet, by doing so and observing flying butterflies for several days, from dawn to dusk, I was able to rapidly discover life histories of

such endemics as *Greta diaphana* and *Anetia jaegeri* (Sourakov and Emmel, 1995, 1996). I also was able to observe oviposition behavior of Jamaican monarch, *Danaus cleophile*, which laid eggs on *Asclepias nivea*, and of *Anetia pantherata* and *A. briarea*: both oviposited on *Cynanchum* milkweed vines (unpublished). The reason why often the oviposition/mating observations are difficult to make, is because butterfly species (and even subspecies) can be very specific (just like humans) about the time of day and conditions under which they mate and reproduce (e. g., Sourakov, 1995). Spending time in their habitat contemplating or photographing often leads to such discoveries.

Similarly, distribution maps are hampered by our connection with the automobiles: distribution points tend to be along the roads. As a result our perception of rarity and distribution is often biased and even new species escape detection for longer than necessary. For instance, it was not until David Wetherbee decided to "go native" as he puts it, that many "good" new species of *Calisto* were discovered (never mind that they were sometimes described by Al Schwartz with Wetherbee only appearing as a collector - worse things happen in modern science). And though "...the seven-year exile found the "catch" less intriguing than the experience associated with .. safaris," Wetherbee writes, "...it is a sublime thrill to meet a new satyrid on the summit, .. with Jaeger's rare danais flying all about." Here David refers to *Calisto wetherbeeii* (named after him by Schwartz and Gonzalez



(1988), which to date is known only from his three specimens). Wetherbee too is using the word "rare," which in context of Hispaniolan exploration often means "heretofore collected outside its main range." For instance when Wetherbee discovered *C. tasajera* from the mountain which gave this species its name (Gonzalez et al., 1991) it was still so unknown that Hedges and Johnson (1994) almost described it again from the Central Cordillera. However, when a year later I took the time to walk to Valle de Bao located a bit higher than the average valley in Central Cordillera, I found thousands of *C. tasajera* flying there. I observed the same on two other occasions in this valley. Of course, it took three days to get there on foot. Other exciting phenomena were observed only recently and only since scientists started doing more on-foot exploration in the Central Cordillera. Fine example of this is discovery of migration and overwintering colonies of *Anetia briarea* milkweed butterfly in the highlands (Ivie et al., 1990).

### Discovery of *Calisto lyceia*

An interesting illustration of how little we know about distribution of species in DR to this day was my discovery of

*Calistor lyceia* on the main island of Hispaniola in 2002 (unpublished, though Walberg and Peña referred to this finding in their "sojourn" piece). I previously made two attempts to find it on satellite islands of Saona and Catalina, from where it was previously known, but failed. Very possibly it went extinct there, considering hurricanes and droughts that pound habitats in DR, that would not be surprising. Yet I found a viable population of the species in Boca de Yuma, Altigracia, not far from the well-beaten roads walked by millions of tourists. But again, one could not get there by car or horse, thus it went undetected for 200 years. The coastal habitat in this area underwent a dramatic change in the last 20 years (Kelvin Guerrero, pers. com.), thus many other *C. lyceia* populations might have been lost before they were discovered. And though Eugene Monroe in his 1950 *Calisto* revision did not recognize the different populations of *lyceia* species complex as different species (something that was done later by Gali, 1985), the discovery of this species complex from SE part of the island is an exciting event.

Troubling not the state of affairs with exploration of DR fauna, which could

be remedied by future generations of explorers, but the fact is that we are running out of time. The protection offered to the habitats in DR by established parks does not prevent illegal settlers, loggers, and herders from destroying them. Development of new resorts along the coast and pressure for more agricultural land as the population grows claim the last of the habitats very rapidly. I remember the time when I was collecting the last of the *Calisto chrysaoros* population in a mountain system along Haitian border while the patch of its endemic host plant was chopped down from the other side with a machete. It is ironic that 50 years from now, somebody is sure to blame the extinction of this population on the last collector whose name appears under the museum specimen. There are a few conformist species that will survive: for instance, *Calisto pulchella* (illustrated by Wahlberg and Peña) that feeds happily on the sugar cane, and the citrus feeders, among which the new arrival - *Papilio demoleus* originally from Asia. Thus the swallowtail fauna of DR has even grown as of recently (Guerrero et al., 2004).

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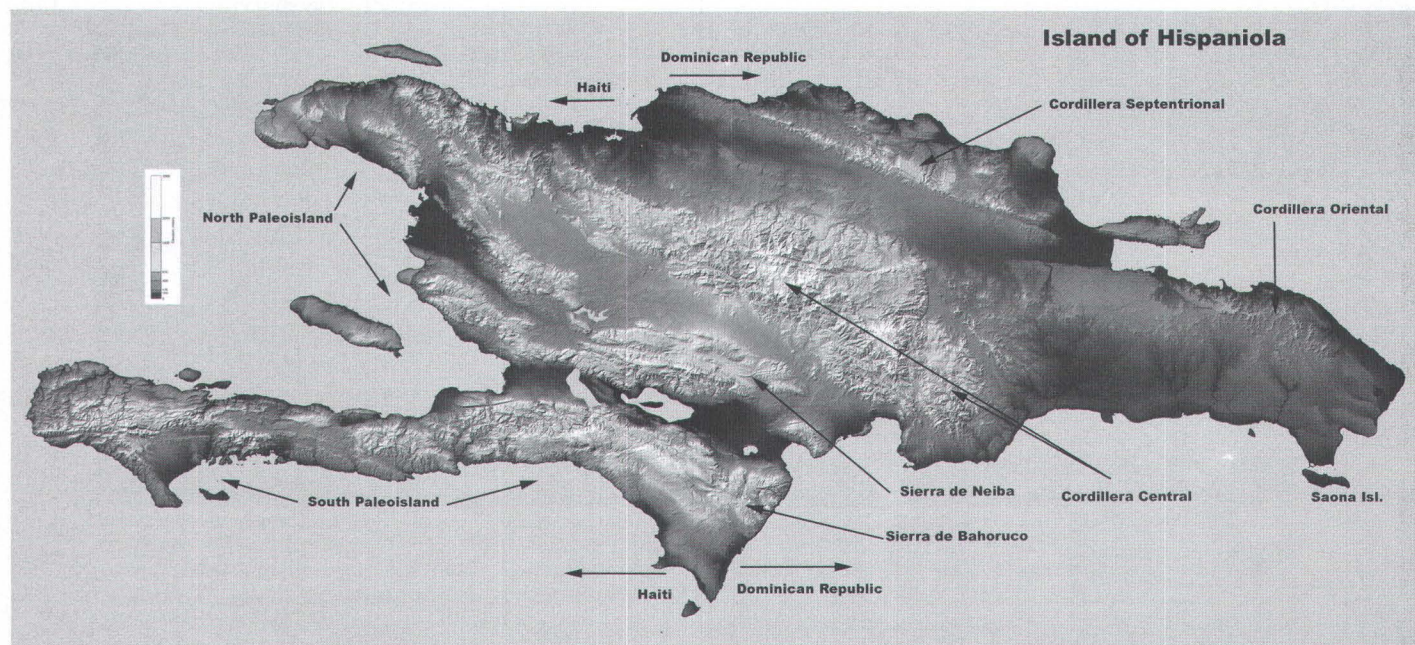


Fig. 1. Geography of Hispaniola island (after NASA satellite image (<http://eob.gsfc.nasa.gov/>))





**Fig. 2.** Butterflies of the Dominican Republic: (A-C) *Anetia jaegeri* in Sierra de Neiba; (D) *Greta diaphana* nr. Manabao, Cordillera Central; (E) *Calisto grannus dilemma* nr. Constanza, Cordillera Central; (F-G) Female and male of *Calisto lyceia* nr. Boca de Yuma, Altigracia; (H) Female of *Calisto chrysaoros*, nr. Valle de Bao, Cordillera Central; (I) Female of *Calisto tasajera*, Valle de Bao, Cordillera Central; (J) Female of *Calisto chrysaoros*, Jarabacoa, Cordillera Central; (K) Citrus feeding swallowtail, *Heracles androgeus epidaurus*, Jarabacoa, Cordillera Central; (L) Logger, Sierra de Neiba; (M) Habitat and host plant of *Calisto lyceia*, Boca de Yuma; (N) *Hamadryas amphichloe diasia*, Altigracia; (O) *Danaus cleophile*, Mata Grande, Cordillera Central; (P) Female of *Daxocopa thoe*, Altigracia; (Q) *Paratrytone batesi* skipper, Sierra de Neiba; (R) *Marpesia petreus*, Altigracia; (S) *Phoebis philea thalestris* at Lago Enriquillo; (T) *Polygonus leo lividus*, Altigracia; (U) Valle de Bao and surrounding Cordillera Central. (All photos © Andrei Sourakov).



*Continued from pp. 47*

On the last trip, visiting the forests on top of Sierra de Neiba, I was especially disturbed by the sight of the park land there. Shrunken to the very last patch of cloud forest, the habitat was cleared right behind the thin line of trees along the road even inside the park. I met a number of people that were openly carrying logs on their shoulders away from the park on the only road that leads to the forest. This forest is a habitat for a number of cross-island highland species, such as *Anetia jaegeri* and *Paratrytone batesi*, but also to the endemics, such as *Calisto clydoniata*. The nearest relative of the latter species, *Calisto neochma*, was, like *C. clydoniata*, discovered by Wetherbee but only from Central Cordillera (Schwartz, 1991). The *Calisto* species are so extremely local not only because of their isolation in the mountain top or valley habitats (which created them in the first place), but also because they are associated with various endemic grasses that are quite sensitive to habitat change. One year, I saw all the climbing *Artrostyloidium* grass in the Armando Bermudes park being dead and dry, and the normally accompanying it *Calisto chrysaoros* was absent. One should be aware that the very diversification in the genus *Calisto* was shown to be due to hostplant switch, with bamboos, bunch grasses, canes, and common grasses all being part of the play (Sourakov, 1996, 1997, 2000). The origin of the genus remains a work in progress, and collaboration between geneticists and traditional taxonomists should soon shed light on the issue. For more discussion of *Calisto* evolutionary history, one also is referred to Monroe (1950) and Wetherbee (1992).

**Nocturnal roosting in *Hamadryas***

Other advantages of collecting/observing butterflies in DR should be noted: unlike, for instance, the Florida Keys, where these days an occasional butterfly is a rare site in the otherwise pretty sterile environment, similar tropical hammock habitat along the DR

coast is swarming with butterflies (pers. observ.). The explanation for that is simple: they are not as advanced in mosquito spraying down there yet, and the tourists that go to DR (largely European) seem to be capable of tolerating certain level of mosquito bites. As a result, at dusk, long pants and sleeved shirts are a good idea along the coast, but by day one can see great variety of butterflies and some interesting phenomena. In 2002 in Altagracia, I observed at dawn large aggregations of *Hamadryas* butterflies, which though can not qualify as roosts, nevertheless seem to have similar purpose (whatever it is, most likely defense). Up to 20 butterflies were gathered on a small area of the tree trunk. When one was disturbed, the communication probably through wing cracking moved the entire group into flight (unpublished). Young and Borkin (1985) previously also documented three species of *Hamadryas* butterflies roosting together in Costa Rica. There are more and more species (in addition to the well known *Heliconius* example) that show circadian roosting behavior, so it might be more wide spread than we think (e.g. Benson and Emmel, 1973; Devries et al., 1987). *Heliconius* roosts consist of aposematically colored and distasteful individuals, but the communal roosts of the butterfly *Smyrna karwinskii* give the appearance of dried moss or lichen clusters (Muyshondt and Muyshondt, 1974) and thus might serve cryptic rather than aposematic function. For review of roosting behaviors one is referred to an excellent review by Adams (1999).

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# Dead Bugs Do Tell Tales

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The recent news article (NEWS, Volume 49, Number 1) "Edmund Selous and the Wisdom of the Great Morpho" was laden with messages that I found to be frustratingly myopic and misguided. I can't help but wonder who else felt offended or at least bewildered by the article's concluding paragraph. As one concerned with retaining and growing our membership, I write to share a modern and more informed view of insect collections and those of us who make them.

The article ends with a paragraph admonishing us not to kill insects (and never for collections) because "dead insects have no habits," a conclusion so obvious that it borders on being a truism, and one certainly not unexpected from such a gifted behaviorist as Selous. But entomology is about much more than behavior. Darwin's formulations about evolution were greatly influenced by his collections made in the Galapagos and elsewhere (not an insignificant number of which were beetles). Collections are the fabric of taxonomic studies and our accompanying classifications and nomenclature. I am currently studying the life history stages of *Concana mundissima* Walker (which suggest the moth is not a catocaline noctuid as presently classified but a noline)—genitalic dissections of adults (and COI mitochondrial data) suggest that no less than three and as many as five species are currently lumped under this name in collections. One can only imagine how rudimentary and erroneous our existing species circumscriptions would be had collectors not made their collections for study. Natural history collections are used routinely for evolutionary and morphological research, and less commonly for ecological, toxicological,

and even behavioral studies, e.g., determining mating number by counting spermatophores or pollinator behavior by examining specimens for pollen. Selous' view is simplistic and unscientific.

I appreciate Selous sentiments that living insects are more interesting than dead ones—I study caterpillars. Caterpillars are marvelous to watch; many of my favorite species accounts were written with live individuals in view. Not only are their behaviors lost but much to my consternation, their coloration as well, often within minutes of preservation. Nevertheless, I consistently make an effort to preserve larvae for later examination and comparison—my chaetotaxy and ultrastructural studies are dependent on the availability of vouchered material.

I have a perennial concern that those who label insect collections (and collectors) as "bad" may be stemming the number of taxonomists and systematists in the next generation. My career in entomology was largely scripted when my parents bought me an inexpensive microscope and a handful of glass slides of a disarticulated honey bee (a non-native species in the United States). Under the lenses, I discovered another world. At about age seven, I started keeping bugs that I caught. At night I would open my cigar box collection of insects and pore over the specimens, with Herbert S. Zim's *Golden Guide to Butterflies and Moths* beside me. This was my entry into entomology. I would hope that that door would remain open for others....so much remains to be discovered and described. I venture that many, if not most, of the Xerces Society Board members began their careers with a net in hand. And as Robert Pyle (2006) has

pointed out, imagine if E. O. Wilson had been discouraged from collecting ants and other insects as a child...we might not have the theories of island biogeography, sociobiology, and biophilia. Still worse, far fewer people, governments, and corporations, would be espousing an interest in biodiversity—Wilson has brought the word and concept into the world's consciousness and legislative agendas.

Edward Selous's focus on collecting as a threat to the Morpho and other insects is misguided, ill-informed, and counterproductive—it takes our focus off of the real targets. In the recently completed atlas of Connecticut's butterflies, one-quarter of the state's resident species (26/102) are regarded to be extirpated, imperiled, or in decline (Nature Serve Ranks of SX, SH, S1, S2, or S2S3 species) (O'Donnell et al. 2007). Perceived threats to these 26 species are tallied in Figure 1. In the Northeast primary threats to butterflies are afforestation and development. Second-tier threats include deer, invasive species, global warming, and the flooding of insularized wetlands by beaver. The newly published atlas lists insect collecting, pollution, pesticide drift, and road kill as tertiary threats of comparatively little consequence; stated differently, none of these tertiary factors was felt to be a significant threat to the state's 26 conservation targets.

Great conservation battles are being fought now on a planetary scale. We (and butterflies) have much to gain if we can stand together: collectors and watchers, amateurs and professionals, entomologists and botanists to carry forward a common message to change land use policies and practices at local, regional, national, and global



levels...this should be our focus; the need is urgent. Perhaps in the next century or the one after we will have time to return to a discussion of Selous' Utopian views of the morality of insect collecting.

Increased global temperatures and changes in precipitation patterns are expected to bring about sweeping changes in organismal distributions over the next few decades. Needs are great for the documentation of present biotas—all forms of occurrence data are needed including, records based on collections of specimens, images, trip lists and other field notes, etc. Fully documented and labeled specimens are especially needed for undersampled regions and taxa; threatened biotas, e.g., Haiti, Madagascar, and the Atlantic palm forests of Brazil; and lands where habitat loss is both imminent and inevitable—in the US alone the United States Forest Service has estimated the loss of land to development to be 6000 acres per day (9.37 square miles) and 2.2 million

acres per year.

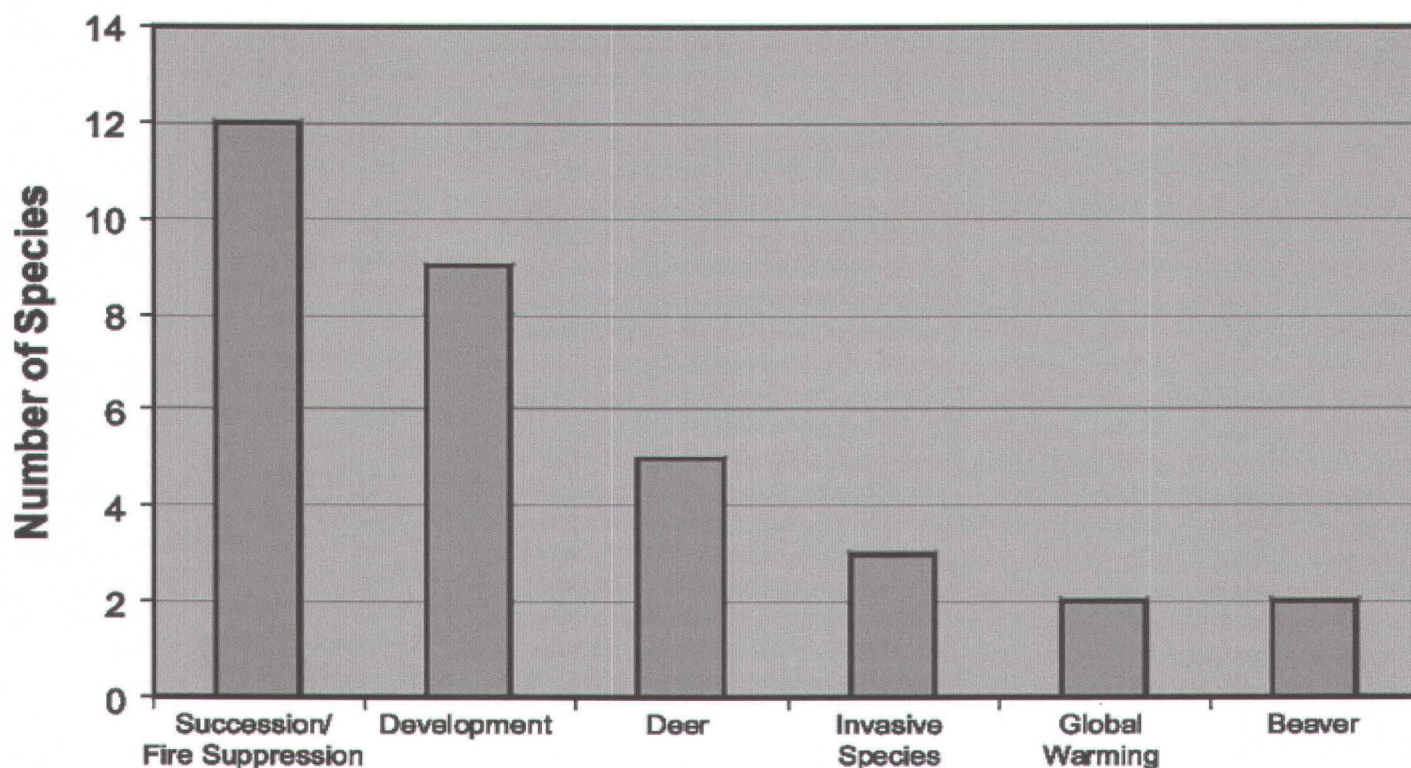
In these times of increasing scrutiny and responsibility, it is important that collectors be especially careful not to engage in activities that might push an imperiled species closer to the brink. Much can be lost by a single reckless individual or poorly considered bout of collecting. Members of the Society must be, demonstrably, part of the solution, not the problem. Takes must be carefully considered, even if for scientific purposes, and fall fully within legal, ethical, and perhaps most importantly, population genetic guidelines. Once a population's numbers fall below a 100 individuals, theory tells us that even single individuals (with rare alleles) may be important to the long-term evolutionary welfare of that population<sup>1</sup>. Conversely, both theory and practice tell us that removing a small fraction of males will have negligible impacts on a population and that insect numbers can rebound quickly. The recent reversal of fortune of the monarch is

but one example: in 2004 monarch numbers across much of eastern North America were the lowest on record, some taggers were reporting numbers in the vicinity of 5% of normal. Two years later, monarch numbers across much of the East reached unprecedented highs.

It is both ironic and ill-considered that Selous would choose the morpho butterfly as his symbol to attack collectors with the threat that their want could drive a species to extinction. The fate of morpho butterflies has nothing to do with Neotropical insect collectors—these are large, strong-flying insects, wary of net, that fly in the canopy or along rivers with great reaches inaccessible to the collector. Selous has chosen the wrong target. I have traveled to the Neotropics on more than a dozen occasions, and witnessed deforestation on unimaginable scales. The population demographics and evolutionary fate of morpho butterflies will be determined by deforestation,

*Continued on pp. 67*

## Threats to Connecticut's 26 Imperiled Butterflies





# Reveries of Holarctic Montane Butterflies

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Along coastal beaches, the last Monarchs drifted south some time ago; in a pine barrens wood, a soon to be hibernating Mourning Cloak was spied on the second to last day of October; now with the winter solstice approaching apace, reveries are what remain of adult butterflies here on Long Island, NY just as in other northern parts of our temperate region. Part of my recent reveries were spurred on by a week long backpacking trip in August with my girlfriend Danusha among the northern reaches of Wyoming's incomparable Wind River Range. Not too far south of the Grand Tetons and continuing southward from where they merge with the geologically different Gros Ventre Range, the granitic ramparts of the Wind River Range stretch roughly 110 miles along a northwest-southeast axis. Surrounded by Wyoming's ubiquitous rolling, high sagebrush plains to the east and west, the Wind River Range's meadows and forest openings harbour a phenomenal Nearctic montane butterfly fauna.

On another continent, reveries encompass remoteness and mystery: Tien Shan, Pamir-Alai, Altai, Sikhote-Alin, Sayan, Hengduan, Min, Qin Ling, Changbai, Himalaya, Karakoram, Hindu Kush. The allure of Palaearctic Asia's central and eastern mountains grows ever stronger with age. In our modern information age, mystery has been infused with knowledge, reveries combined with concrete ecstasies. In the case of the Altai Mountains of Central Asia, a fantastic web-site is a great gift to naturalists/lepidopterists.

## Kingdom of Boloria

More than anything else, the greatest spur as a youth to what eventually

would become world-wide lepidoptera exploration, was the knowledge through books, that high in the alpine reaches of Wyoming's Wind River Range, there existed a population of butterflies, *Boloria alaskensis halli* Klots (at that time *B. napaea halli* Klots), which was isolated a huge distance from the closest population far to the north in northern British Columbia. Later in life, the excitement of seeing this *Boloria* in nature came to fruition during a number of backpacking trips to the alpine zone of the Wind River Range, the first of these trips to the type locality, Green River Pass (ca. 10,500 ft.) where Alexander B. Klots had collected the type series many years previously.

Of the half dozen or so backpacking trips made in the 1980's, only one was on the east slope of the Wind River Range. How fortuitous, before the start of my journey on the east slope, I stopped in at the Field Research Station run by Dr. Karolis Bagdonas. During a lengthy and warm conversation, Karolis informed me of the incredible recent discovery of a colony of *Boloria improba* Butler (*Boloria improba harryi* Ferris) high up on the alpine tundra of this great mountain range. Along with another Ice Age relict population (*Boloria improba acrocnema* Gall & Sperling) discovered a few years earlier and found high above timberline on Mt. Uncompaghe in Colorado's San Juan Mountains, they are separated a great distance from their closest relatives far to the north in the Rockies of central British Columbia and Alberta. That the glorious Winds have two such distant, relict *Boloria* subspecies will always remain a source of great wonder.

Circumstances prevented Danusha and I from making it above treeline this past trip. The only *Boloria* we saw was

*B. titania ingens* Barnes & McDunnough in an upper Canadian zone streamside meadow. In this meadow, a large fresh *Boloria* among others of its kind, a gorgeous fresh male Blue Copper (*Lycaena heteronea* Boisduval) along with other males and females and a few Mariposa Coppers (*Lycaena mariposa* Reakirt) of both sexes, imbibed for long periods on the bright yellow blossoms in an extensive patch of the common Arrowleaf Groundsel (*Senecio triangularis*). Though only seeing one *Boloria* species on this trip, both during and after the trip, the great array of Wind River Range *Boloria* diversity was on my mind: *B. alaskensis halli*, *B. improba harryi*, *B. titania ingens*, *B. eunomia ursadentis* Ferris & Groothuis, *B. selene tollandensis* Barnes & Benjamin, *B. frigga sagata* Barnes & Benjamin, *B. kriemhild* Strecker and *B. freija browni* Higgins. Nowhere else in the surrounding Rocky Mountains of the western USA does *Boloria* reach such diversity and though the Rockies of Alberta, British Columbia, Yukon, N. W. T. and Alaska, along with some Eurasian montane regions, may equal or even surpass the Wind's *Boloria* diversity, Wyoming's Wind River Range still can justifiably be given the moniker "Kingdom of Boloria".

Not surprisingly, the Wind River Range exhibits an equally rich diversity in other northern temperate/arctic/alpine butterfly groups. Among the satyrines, *Erebia* and *Oeneis* are richly represented. All four *Erebia* species that are found in the Rockies of the lower 48 states inhabit the Wind River Range: *E. epipsodea* Butler, *E. magdalena* Strecker, *E. callias* W. H. Edwards and *E. theano ethela* W. H. Edwards. Of *Oeneis*, there are six species: *O. jutta reducta* McDunnough, *O. chryxus* Doubleday, *O. uhleri* Reakirt and the



arctic/alpine *O. melissa beani* Elwes, *O. polixenes brucei* W. H. Edwards and *O. bore edwardsi* dos Passos. Scott (1986) reports that in the Wind River Range, *O. polixenes* and *O. bore* occur together, a very rare occurrence in the species' partial ranges of the high Rocky Mountains from Alberta to New Mexico/Colorado.

The world over, barring the Australian biogeographic region, the magnificent genus *Colias* is an important component of many high montane butterfly faunas, especially in the Holarctic region. In the Wind River Range, besides a few wide ranging more temperate species, the following northern/arctic/alpine species occur: *C. meadii* W. H. Edwards, *C. pelidne skinneri* Barnes and the willow bog species *C. gigantea harroweri* Klots. In the western USA, Coppers are predominantly montane; the Wind River Range has a marvelous assortment: *L. mariposa penrosae* Field, *L. xanthoides montana* Field, *L. cupreus snowi* Edwards, the anomalous and abundant *L. heteronea* Boisduval, *L. helioides* Boisduval/dorcas Kirby, *L. nivalis browni* dos Passos and most probably *L. rubidus sirius* Edwards and *L. phlaeas arethusa* Wolley-Dod are also resident. Some other Rocky Mountain northern/arctic/alpine butterflies found in the Winds include, not surprisingly, some Blues (Polyommatainae), *Parnassius phoebus smintheus* Doubleday - the Smintheus Parnassian (*P. clodius* - the Clodius Parnassian, also resident?) and *Chlosyne damoetas* - the Rockslide Checkerspot.

The aforementioned *B. kriemhild* is one of a trio of butterflies, *Euphydryas* (*Hypodryas*) *gillettii* Barnes and *Coenonympha haydeni* W. H. Edwards being the others, whose ranges are predominantly restricted to the northern Rockies of the U.S. (*E. gillettii*'s range also includes the Rockies of southern Alberta). *E. gillettii* and *C. haydeni* (*B. kriemhild* also?) are also very interesting in that they are more closely related to

Palearctic species than they are to their congeners, sympatric and otherwise, found in the Nearctic. This fact necessitates interesting evolutionary histories for their groups as the face of the earth changed across the eons. All three fascinating species are home in the Wind River Range's montane meadows.

As if the preceding faunal account is not excitement enough, among more temperate groups and species, the Wind River Range hosts at least seven *Speyeria* species, many more Blues, *Anthocharis sara* Lucas, *Euchloe ausonides* Lucas, two *Pontia* species, two *Papilio* species,... As I was inspired so many years ago by the knowledge of a disjunct population of *Boloria* in a far away mountain range with that romantic name - Wind River Range, I hope this brief account can inspire some young (and not so young!) lepidopterists to explore for themselves this preeminent Nearctic montane butterfly haven.

It will be duly noted that this manuscript has no accompanying photos. I possess some very good landscape and wildflower pictures from various trips to the Winds but no lepidoptera photos. I hope that a lepidopterist(s) with more experience and knowledge of the Wind River Range fauna and who possesses both better photography skills and lepidoptera photos from these mountains, will create a photo essay for our Society News. If this does not come to pass, God willing, I will do my best to oblige on the next trip to these sublime mountains.

### The Remote Altai

One of the great mountain ranges of Central Asia, the Altai Mountains is encompassed where southeastern Siberia, western Mongolia and northwestern China meet. Who of us who has wielded nets or simply watched mesmerized, as myriad butterflies swarmed over a wildflower spangled subalpine or arctic/alpine meadow in the Rockies, Sierra Nevada, Cascades

or one of the lesser high ranges of western North America, has not dreamed of visiting distant realms in Palearctic Europe and Asia where we could share a similar experience? There would be found both in flora and fauna, a marvelous combination of both the familiar and exotic: a good number of Holarctic species, many congeners and the entirely new, all encompassed among the most glorious mountain scenery.

With his simply spectacular web-site, Russian scientist Oleg Kosterin takes us on such a journey into the wilds of the Altai; a stunning visual feast of approximately 260 photos: vast Altai landscapes and plentiful wildflower and butterfly photos, the butterflies often on flowers. Clicking on any photo both enlarges it and gives extra information, i.e. geographical and scientific; in the case of the butterfly photos, the treatment is often fairly extensive. The photos are separated into 11 Pages and though all are worth visiting, the crux of the site, in my opinion, are Pages 1-6 from Oleg's expeditions in the more distant past (1998, 1999). Though only Pages 1-5 (1998 expedition) contain butterfly photos, please also visit Page 6 (1999 expedition) which includes the deep blue-purple Columbine, *Aquilegia glandulosa*.

As for the butterfly photos, what a collection of the Altai fauna, especially from the arctic/alpine and subalpine zones. Starting with *Boloria* (including *Clossiana*), there are five species shown including *B. napaea altaica* Grun-Grshimailo (photo of a pair in cupola) which is a very close relative of the above mentioned *B. alaskensis halli*. Of great interest is the host of *Oeneis* and *Erebia* species photographed; five *Oeneis* species, four strictly Palearctic, only *O. bore ammon* having Nearctic relatives. Not surprisingly, as the Palearctic is much richer in *Erebia* than the Nearctic, seven Altai *Erebia* species are featured including *E. callias altaiana* Staudinger, the Altai race of this most interestingly distributed species, and the exquisite *E. maurisius*



## Montane Butterflies

*Continued from pp. 53*

Esper. Other satyrines included are single representatives of strictly Palaearctic genera: the distinctive *Triphysa* (close relative of *Coenonympha*), *Hyponephele* and *Hipparchia*.

Among the nymphalines besides *Boloria*, there are a couple of species from Palaearctic genera closely related to *Boloria*: *Brenthis* and *Issoria* and also a more temperate, Palaearctic larger Fritillary, *Fabriciana* and a host of Melitaeini photos and species. There are a few Skippers and Blues, two *Colias* species and two Parnassians: *P. eversmanni* Menetries and *P. phoebus* Fabricius, both nomotypical races of our Nearctic species. The five super *P. eversmanni* photos include both wing surfaces of both sexes and besides an equally fine photo of an adult *P. phoebus*, there are a couple of larva photos.

Even more numerous and at least as exquisite, are Oleg's Altai wildflower photos, many are of genera familiar to the Nearctic naturalist, many not. To single a few out from so many jewels is certainly a subjective task. For those who have thrilled to see the incomparable Blue Columbine, *Aquilegia coerulea*, high in the Rockies, there is the Columbine from the Altai mentioned above. The Gentians, *Gentiana*, nearly cosmopolitan and so ubiquitous in many of the world's high montane regions, are represented on Page 2 by *G. uniflora* and the gorgeous and aptly named *G. grandiflora* and on Page 5 by *G. decumbens*. Whoever has marveled in seeing the glowing magenta bunches of Parry's Primrose (*Primula parryi*) adorning boggy areas or brooksides high in the Rocky's subalpine and arctic/alpine zones, must certainly be ecstatic to learn of a very similar species found in the same habitats in the Altai and other northern Central Asian and Siberian mountains. Pages 2 & 3 have a few sublime photos of *Primula nivalis* (Snow? Primrose) whose blossoms, unbelievably, seem

even more intense in hue than those of *P. parryi*.

The landscape photos are equally awe-inspiring. Here Oleg shows us vast, wild, remote montane tundras, Siberian Larch (*Larix sibirica*) forests, subalpine parklands with scattered Siberian Larch and/or Siberian Stone Pine (*Pinus sibirica*), mountain rivers, jagged peaks, flower-spangled meadows,... So many awesome photos, the bulk of Pages 2-5 representing the south slope of the Yuzno-Chuiskii Mt. range, beckoning the naturalist/explorer/lepidopterist to follow in Oleg's footsteps. On Page 3, in the upper Dzhazator River basin at 2500m, a lush, turfy meadow, dominated by orange Altai Globeflowers (*Trollius altaicus*) and white *Schultzia crinita*, lies in a cirque surrounded by steep peaks. On Page 2, in the same river basin at 2400m, an equally lush but taller forb meadow dominated by the spectacular blue-purple *Dracocephalum grandiflorum*, a plant genus unknown in the Nearctic mountains. What ardent naturalist/lepidopterist would not want to explore these glorious, remote alpine meadows; would not want to gaze at other remote peaks in the upper Dzhazator River basin: Page 2 - Dzhaniktu Mt. (3716m), Page 4 - Ilyas Pk. (3748m) high above a small tarn? Finally, gazing from the upper slopes of the Yuzno-Chuiskii Mt. Range, a vast mountain panorama lies before us: high montane tundra, a semiforested subalpine valley, beyond, more extensive high alpine tundra of the dissected Ukok Plateau, culminating on the horizon with the lofty, snowy peaks of the Tabyn-Bogdo Ola Range, high point the mountain Nairamdal or Kiyty (4374m) - these mountains described by Oleg as "the orographic centre of the Altai Mountains, where meet Russia, Mongolia and China" (Pages 2,4). With all this sublime beauty: butterflies, wildflowers, mountain grandeur, it is also worth noting that the Altai Mts. are the haunts of that paragon of nature's beauty, the Snow Leopard, and on a much smaller scale, another gorgeous

feline, the unusual, flat-headed and long-furred Pallas's Cat.

In this modern age, reveries have been merged with the most utter sublimities in the remote, mysterious Altai, thanks to Oleg Kosterin's web-site. Don't bother with the inordinately long web-site address (<http://pisum.bionet.nsc.ru/kosterin/chronolog/altchron.htm>), just Google in Altai Mts (not mountains) and on the the first page click on "Wildlife images of 1998-2004 of the Altai Mts. by Oleg Kosterin". Anyone who follows my advice to look through this web-site will discover for themselves that my superlatives are not overstated. By no means is this the end of Oleg's Altai lepidoptera photos or nature photos in general. On the Altai images opening page or any of the individual pages, click on the link "Back to the front page". Here, including the Altai image site, are nearly 3,000 photos!, all taken in nature: Butterflies & Moths (Lepidoptera) - 1212 photos!, Plants, Landscapes, Dragonflies (Odonata) - 843 pictures! and some other categories.

Having Moths, as a part of the category title Butterflies & Moths, is a bit of a misnomer as only 42 of the 1212 are moth photos! Approximately 500 (12 moth photos) of the lepidoptera photos (including associated information) are from Palaearctic Asia, the bulk of these from Siberia. Included among these photos are additional Altai butterfly photos, among these, additional *Erebia* species. Among the Pieridae is a photo of a female *Colias heos* Herbst & Jablonsky which is among the largest and most magnificent of the *Colias* species. Oleg's photo is from south Transbaikalia; the species is also found in the Altai Mts as part of its eastern Palaearctic range. In fact, the AMNH collection includes a glorious fresh male from the Altai (as *C. aurora* Esper *alpina* Verity, both names synonyms), the spread specimen showing the males' flaming red-orange dorsal surface. Whoever has thrilled to see orange *C. meadii* course over alpine meadows high in the Rockies, imagine seeing this



incredible *Colias* traversing over Altai meadows; though despite the synonymous name *alpina*, this species' habitat would be foothill meadow steppes and not high arctic/alpine tundra.

Beyond the other Altai butterfly photos and the *C. heos* photo, I am compelled to mention a few others, again a very subjective effort. Under the category "Coenonymphini + Erebiini + Maniolini (Satyrinae)(55 Pictures)" with its associated representative photo of the above mentioned *E. maurisius* and from the equally remote, mysterious and even more spectacular Tien Shan Mountains - two highly distinctive species: the endemic *Coenonympha sunbecca* Eversmann and *Erebia turanica* Erschoff. Finally, a last butterfly to point out, the photo used to represent the category "Lycaenidae (+Riodinidae)(88 pictures)" is of the gorgeous Copper, (*Thersamonolycaena violaceus* Staudinger = *T. splendens* Staudinger *violaceus* = *Lycaena violaceus*), photographed in a Transbaikalia mountain region; one more reason to hopefully get Nearctic lepidopterists excited about the incredible Palaearctic fauna.

**Author's Note:** Though I have an interest in taxonomy, I certainly am not a taxonomist. The nomenclature used in the 'Kingdom of Boloria' section is based on taxonomy found in the references listed below. If it differs from more modern revisionary works or the latest word, there still should be no problem discerning which taxa I refer to. As for the Palaearctic taxa, I have every confidence in the taxonomic skills of Oleg Kosterin and his colleagues; though through personal correspondence, Oleg informed me that involvement in many other projects has prevented him from having the time to update and correct some parts of his web-site (including the older part of the Altai section). This should have no bearing on this text, as after Oleg scrutinized my manuscript, a few subsequent nomenclature changes were made to his web-site and this manuscript.

Being a Nearctic naturalist/lepidopterist, this manuscript is based on that perspective. The majority of our membership should easily be able to understand and appreciate that perspective. Hopefully, our lepidopterist members from other regions may also understand and appreciate this perspective. I am fully aware that the Wind River Range and other Neartic mountains, seem more remote and possibly more mysterious, to lepidopterists like Oleg Kosterin and others who have spent a great deal of time exploring Palaearctic Asia's mountains!

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*the authors themselves, in the above referenced and so many other fine works. The older I become, the more I appreciate the passion and diligent efforts of all these people and the great gifts they have given to us all. I certainly thank Oleg Kosterin for his passion, hard work and superlative aesthetic vision and also for his comments concerning this manuscript, the subsequent changes have made it more accurate and a better manuscript. To him and a few colleagues who helped him with his web-site, you may not realize how great a gift you have given to ardent naturalists/lepidopterists and yes, to dreamers as well. For Glory beyond Infinite Glory, to a physical universe exploding with a Divine Beauty, I Thank our Great God!*



## Dominican Republic - Notes on Evolution

*continued from pp. 49*

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# Analysis of Population Densities of Saturniidae

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An ecological upset was manifest at Pena Blanca, Arizona 21 July 2001 when an estimated up to 5,000 *Automeris cecrops pamina* (Neumoegen) and 800 *Eacles oslari* Rothschild were attracted to the blacklight of Bill Mooney. Another 2,000 *pamina* came in 2 days later, totaling ca. 7,000. Massive populations such as this are of rare occurrence. At the other extreme saturniids are rarely seen in some areas. This article will analyze 4 expressions of population densities.

**First Scenario.** Strays. A locale that has no breeding population is occasionally visited by a stray. Daniel Janzen (1984a) an eco-biologist of the Santa Rosa Park of Costa Rica uses the term "waif" to describe males that fly into areas devoid of females. A striking example of long distance wind blown strays was reported by Steve Stone (pers. comm.). Over a 4 year period 4 or 5 male *Hyalophora columbia gloveri* (Strecker) were carried by spring storms 30 miles from their habitat at 6,000 feet in the Rocky Mountains and deposited in the environs of Aurora, Colorado. Stone's caged *H. cecropia* females attracted the *gloveri*. Another remarkable discovery was told to me by Duke Downey of Sheridan, Wyoming, who took a gravid female *H. gloveri* 15 miles from its habitat.

When I deliberately jettison adults into the wind in daylight, most quickly take shelter in nearby vegetation, but those that ascend over tree tops and encounter high winds are carried away, disappearing as small dots high in the sky. I have observed this many times. There is little doubt they were translocated miles away.

Males can become strays in just minutes. In still air their flight speed varies from 5 to 12.40 mph. Rau and

Rau (1929) and I (1989) recorded separately males of *Callosamia promethea* (Drury) flying 1 mile in 10 minutes to calling females. Janzen (1984a) records *Rothschildia lebeau* (Guerin-Meneville) males flying at 12.40 mph. He clocked an *Eacles imperialis* (Dr.) male flying parallel to his car at an astonishing 37.20 mph in the dim light of early dawn.

Here are a few recorded flights of marked males, all of which would be strays had they flown into non-habitat areas. Janzen (1984a) 2 *Rothschildia orizaba* (Westwood) 6.20 and 9.30 miles; *R. lebeau* 8.06 miles; Rau & Rau *Antheraea polyphemus* (Cramer) 2.25 miles; *Samia cynthia* (Dr.) 2.25 miles; 15 *H. cecropia* at 3 miles; Waldauer & Sternberg (1982) *H. cecropia* 4.2, 6.2 and 7.8 miles; Weast, *H. cecropia* 6 miles, *Callosamia promethea* 13 miles; Toliver & Jeffords (1981) *C. promethea* 8.78 and 22.6 miles. Craig Skowronski (pers. comm.) tells of a battered male *C. promethea* that flew 5 miles from its habitat to his female in Saginaw, Michigan. The male mated and then dropped dead. The eggs were fertile.

Both Daniel Sblendorio of New Jersey and Robert Vuattoux of France (pers. comm.) each have, separately, taken *Samia cynthia* cocoons in new habitat areas 2 miles from their population. Young females are heavily laden and slow flyers, but after their initial ova deposits they become progressively lightweight, fast and vigorous flyers and can easily fly 2 miles or more.

Rex Moore (2005) reports that in Oklahoma Co., Oklahoma several *Sphingicampa hubbardi* (Dyar) were taken 435 miles from their nearest known, original habitat. Their host, mesquite, is now established in parts of Oklahoma. This leads me to suspect ova

or larvae may have been on mesquite trees that were shipped from wholesale dealers to local retail nurseries. I cite (1961) a parallel example when I collected over a dozen viable cocoons of *R. lebeau forbesi* Benjamin at a nursery in Corpus Christi, Texas, which is 120 miles north of their habitat. The owner said these trees were raised and shipped from the Rio Grande Valley.

**Second Scenario.** The mysterious presence of a species. Many collectors are perplexed because after hours, days or even years of searching, they cannot find any cocoons, but when they blacklight or tether a female, males appear out of nowhere. *Eupackardia calleta* (Westwood) provides a model example. In 10 years I have found but a single cocoon of *E. calleta* in Harlingen, Texas, yet tethered females usually attract 1 to 4 males.

Dr. Michael Collins postulates the total of adult moths in Scenario 2 to be in the mid to upper tens per square mile. Consider a hypothetical in which the adult population is 80 per square mile. At this low density cocoons are extremely difficult to locate and nigh impossible when hosts number in the thousands. Should the population be concentrated in just half or a quadrant of that square mile, one might be searching the "empty" portion. Example: the host for *E. calleta* in SE Arizona is Ocotillo (*Fouquieria splendens*) which occurs for miles in wide bands along the mountain foothills. In Texas the species' prime host is Ceniza (*Leucophyllum frutescens*) which occurs in stands of hundreds to thousands. En route to Monterrey, Mexico in 2005 at a rest stop, I viewed Ceniza ranging as far as the eye could see. Hopeless it is to expect collecting success in such habitats.



Evidence is abundant that there is no corollary between large numbers of hosts and the size of a moth population.

**Third Scenario.** When a population is high – in the 100s per square mile – cocoons become visible and collectable. Numerous are the reports of collectors taking good numbers of saturniids. Moore, at blacklight on 21 July at Pena Blanca, Arizona took 40 *Citheronia splendens sinaloensis* Hoffmann and 99 *H. gloveri* in 2 nights. On 7 August 2005 at California Gulch, Atacosa Mts., Arizona he took 40 *Rothschildia cincta cincta* (Tepper) with a total of 85 for the season. Andrew Spicer (pers. comm.) with Mooney collected 64 *Automeris patagoniensis* Lemaire, Smith and Wolfe at Harshaw Creek, Patagonia Mts. Arizona on 27-28 July 2002. Spicer, on 9 April 2003 reports 30 *A. polyphemus* taken at 0200 and 0300 hours north of Galleria, Texas and 52 male *A. polyphemus* in one night at a park in Houston. Gregory Muise (pers. comm.) attracted 13 male *E. calleta* to a female in a single morning at Concan, Texas, 79 miles due west of San Antonio. John Hasenauer (pers. comm.) states that on April, 2004 at 11:30 in Thonassassa, Florida, a female *Callosamia securifera* (Maassen) attracted 19 males and more would have arrived had he not allowed the female to be mated. He has seen as many as 10 males a day cruising in Sweet Bay (*Magnolia virginiana*) habitat seeking pheromone plumes. In Des Moines, Iowa one morning I counted 55 male *H. cecropia* circling my mating cage.

In Des Moines *H. cecropia* has a seven to eight year cycle of abundance. When the population peaks cocoons appear along boulevards and parking lots, only to disappear as the cycle diminishes. My daughter, Janine Weast Searcy, in 2004 easily collected 130 *A. polyphemus* on willow oak along boulevards and in parking lots of Marietta, Georgia. The following year cocoons were scarce. Saturniid populations rise and fall, alternating between Scenerio 2 and Scenerio 3 but seldom descending to Scenerio 1 or exploding to Scenerio 4.

**Fourth Scenerio.** Huge Populations. The confluence of low predation, parasitism, disease, plus favorable weather and quality hosts may set the stage for a population explosion. While pressure is always present to exploit and suppress a population, the population itself always strives to reproduce itself to the maximum. A rupture in the fabric of checks and balances allows a population to reach very high numbers, which may range into the upper hundreds to the lower thousands per square mile.

R.W. Dawson (1914) in 1905 observed thousands of *H. cecropia* larvae badly defoliating trees in Gordon, Nebraska.

One winter in the early 1970s along the southern border of Wisconsin, I observed from my car mile after mile many hundreds of *C. promethea* cocoons on wild cherry. This road was but a single strip in the habitat, but indicated that a huge population was present. A large *H. cecropia* population was reported by Waldbauer and Sternberg who trapped 1,069 males from May 14 to July 10, 1969 in the vicinity of Champaign and Urbana, Illinois. Rau and Rau collected 791 males in one season on their rooftop in St. Louis, Missouri. One morning alone 93 males flew to caged females on their roof deck. Andrew Spicer tells that a friend blacklighted and attracted ca. 400 *Actias luna* between 20:00 and 03:00 near Huntsville, Texas.

Moore on 25 July 2005 took hundreds of *Sphingicampa montana* (Packard) and hundreds more on 7 August at California Gulch, near Ruby Road, Atacosa Mountains, Arizona.

One late July at Pena Blanca I had a swarm of *Antheraea oculatea* (Neumoegen) males flying frantically around 2 cages of female *A. polyphemus*. I became terrified when, in the near total darkness, a large animal pounced on me. Was it a cougar? At daybreak I saw the culprit, a huge, friendly dog prowling the area.

One morning while playing golf at Egg Harbor Resort, on the peninsula of

northern Wisconsin I was astonished to see innumerable *A. luna* wings scattered everywhere over the fairways. I suspected bats or nighthawks. I handily found many cocoons under birch trees that surrounded the course.

Janzen (1984b) reports his blacklight attracted 1,486 *Hylesia lineata* (Dr.) from 6 July to 15 August in 1979 at Santa Rosa National Park of Costa Rica. That October "...the forest was a living sheet of caterpillars." By late October the forest "...was festooned with corpses of caterpillars that had been killed by a virus."

In 1955, while a trumpet player in the U.S. Army Band in Fort Bliss, Texas, I witnessed a massive display of thousands of mature larvae of the sphingid *Celerio lineata* (F.). The desert west of El Paso was teeming with larvae and some of the highways were slick with crushed bodies.

Disease usually supervenes and quickly decimates colossal populations.

### The economy of searching isolated hosts or along the edges of large stands of hosts

It is well known that saturniid females are compelled to oviposit after a certain amount of time in flight and that they will lay on the first host they come upon. Richard Peigler (2005) says, "... thousands of hectares (of Ceniza) can be seen south of the town(s) of George West and Alice (Texas)..... these fields ... certainly support large reservoir populations of *E. calleta* and that females commonly fly...into distant towns (Beeville, George West Goliad and Three Rivers).... A female flying into Beeville or Goliad would probably be very inclined to oviposit on the first Ceniza encountered after many kilometers of searching."

Here is a good example: On a visit to Laguna Atacosa National Wildlife Refuge, Texas on 12 January, 2006, I discovered a *E. calleta* cocoon and a second instar larva each on separate, isolated roadside patches of Ceniza. I knew it would be futile to search within

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# Aberrations of *Euphydryas* Checkerspot Butterflies (Lepidoptera: Nymphalidae: Melitaeini)

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For unknown reasons, aberrations in the butterfly genus *Euphydryas* Scudder, 1872, are fairly common, and many of these have been figured and/or named (e.g., Hulst 1881, Strecker 1878, Barnes 1900, Ellsworth 1902, Wright 1905, Coolidge 1908, Oberthür 1914, Comstock 1918, 1925, 1926, 1927, Gunder 1924, 1925, 1926, 1927, 1928a,b, 1929, 1931, 1932, 1934, Clark 1927, Hower, 1935, Fender 1945). Even though such aberrations are no longer given formal names (quadrinomials are unavailable; ICZN 1999), they may be of considerable scientific interest, and can provide insight into the homology of certain wing pattern elements. Figured herein (see pages 68, 69) are a number of aberrant *Euphydryas* specimens, pertaining to the taxa *E. editha taylori* (W. H. Edwards, 1888), *E. colon colon* (W. H. Edwards, 1881), *E. colon wallacensis* Gunder, 1928, *E. anicia eurytion* (Mead, 1875), and *E. phaeton phaeton* (Drury, 1773).

On April 27th, 2003, I visited the population of *Euphydryas editha taylori* in Benton County, Oregon (see Pyle 2002, Warren 2005), specifically in search of aberrant individuals. Two striking aberrations were found that day, including one melanic specimen (Figs. 1-2) that almost entirely lacks whitish scales; these are present only on the ventral forewing near the apex and along the wing fringes. This individual somewhat resembles the "allotype" female of Gunder's (1928) *E. e. taylori* transition form "barnesi," described from Victoria, British

Columbia, but has more extensive red maculation on the dorsal and ventral hindwing. The second aberrant individual (Figs. 3-4) taken on April 27th has increased whitish scaling above and below, and closely matches Gunder's (1926) *E. e. taylori* transition form "victoriae," also described from Victoria (several similar aberrant individuals have been taken at this site by Dana N. R. Ross, of Corvallis, Oregon).

About two months later, on June 26th, 2003, David McCorkle (of Monmouth, Oregon) and I surveyed the butterflies on Rickreall Ridge, 2400', Polk County, Oregon. Shortly after arriving, we encountered two aberrant individuals of *E. colon colon*. One of these, collected by Dave (Figs. 5-6), has essentially normal forewings and highly aberrant, asymmetrical hindwings, with very unusual ventral hindwing patterns. The second aberration, collected by myself a few moments later (Figs. 7-8), is somewhat melanic and has reduced pale markings on the dorsal surface of both wings. Below, the forewings are essentially normal, while the hindwings show a slight increase in dark scaling along the submarginal row of pale crescents.

In the course of fieldwork in northeastern Oregon in 2001 and 2002, four aberrant individuals of *E. colon wallacensis* were encountered. One aberrant female (Figs. 9-10), with increased pale scaling on the dorsal forewings and ventral fore- and

hindwings, was encountered in the Blue Mountains of Grant County, along NFD 3940, 1-2 rd. miles NW of the S Jct. with Hwy. 395, SE of the community of Beech Creek, 4200', on June 17th, 2001. This individual is a fairly close match to Gunder's (1929) *E. c. wallacensis* transition form "idahoensis," but with reduced red maculation on the dorsal surface. On June 25th, 2002, three aberrant individuals of *E. c. wallacensis* were taken in the Blue Mountains of Umatilla County, at three different sites. One male aberration (Figs. 11-12) was collected along Camas Creek, 2 rd. miles SE of Lane Creek Campground, ca. 14 rd. miles NE Ukiah, 4000', by A. D. Warren. This individual is a fairly close match to Fender's (1945) *E. c. colon* aberration "bakeri," with increased pale scaling on the dorsal forewing, and melanic dorsal hindwings. One striking melanic female aberration (Figs. 13-14) was collected by Sally J. Warren along Lake Creek, at the N end of Lane Creek Campground, ca. 12 rd. miles NE of Ukiah, 4000'. This individual is superficially similar to Gunder's (1928) "holotype" of the "barnesi" transition form of *E. editha taylori*, but differs in details of wing shape, and the ventral surface is not as melanic. A male aberration (Figs. 15-16), remarkably similar to the second aberration of *E. c. colon* taken in Polk County on June 26th, 2003 (Figs. 7-8), was taken along Frazier Creek, at Frazier Creek

*Continued on pp. 61*



# The Aggressive Defence Mechanism of a Himalayan Moth

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## Abstract:

The remarkable defensive behaviour practiced by the Himalayan moth *Dudusa sphingiformis* Moore is reported. The shortcomings of the strategy are discussed.

## Introduction

The Notodontid *Dudusa sphingiformis* Moore occurs at moderate elevation in the Himalaya. West of Nepal, there is a single annual brood during July, at the height of the southwest monsoon. Both sexes of the moth are attracted to artificial light.

All members of the genus bear, on the abdomen, a pair of terminal tufts of long, dark spatulate scales interspersed with shorter, rufous hair-like scales. In *D. sphingiformis*, these tufts together measure 8 mm in width and 8 mm in length.

The moth is palatable to birds and we have seen them eaten by Blue Whistling Thrushes (*Myiophonus caeruleus*), White-crested Laughing Thrushes (*Garrulus leucolophus*) and Tits (*Parus* spp.)

We have bred the moth on a maple, *Acer oblongum* Wallich (Aceraceae), which was chosen over soapnut (*Sapindus mukorossi* Gaertn., Sapindaceae) by the larvae. Holloway (1983) suggested that *Dudusa* Walker may prove to be restricted to the Sapindaceae. Earlier, the maples (*Acer* L.) were included in Sapindaceae.

## Observations

In the earlier instars, the larvae were docile and did not react to being disturbed. In the final instar, the larvae were aggressive and used their heads to butt whatever touched them. If touched from the underside on the

prolegs, they immediately twitched elastically and butted the object touching them repeatedly. Having done so, the prolegs would be lifted off the substrate.

If the moth is prodded on the thorax or near the head, the tufts of scales at the end of the abdomen are immediately expanded into a sphere 18 – 30 mm in diameter and the abdomen, curled over the thorax like a scorpion's stinger, is repeatedly jabbed at the disturbing object, but rarely touching it (see fig. 2, pp 69). Each jab is accompanied by a stridulatory sound, which can be transcribed roughly as "crick", rather like an uncoiled hinge of a door upon being opened with a jerk. (See photos pp. 69.)

The whole performance is quite startling initially, exactly the impression created by a jack-in-the-box on the unwary. After each jab, the abdomen may or may not be brought back to its normal position, although the terminal tufts are usually kept expanded.

Normally, it does not react to attacks from behind, to the extent that the expanded tufts can be fondled without eliciting any response. In a semi-circular area in front of the head, however, it is alert. The antennae are held along the costae of the forewings. At rest, the eyes face downwards and are covered by the antennae so that if the moth sits on a flat, opaque surface, it probably cannot see very much.

It responds to any disturbance up to 10 cm from the head but there is no reaction beyond that, no matter how vigorously the attacking object is waved. It reacts to sound and, when in an agitated state (with the abdominal tufts expanded), will respond with its

abdominal jabs if the substrate is tapped even several feet away, out of the line of vision of the moth. The tufts are sometimes kept expanded long after (5 minutes +) the disturbance ceases. The moth can easily jab over a hundred times at a session with no signs of exhaustion, even though the element of surprise may have worn thin by then.

It also reacts to breath from even 60 cm away, but there is no reaction to fanning with a piece of paper from a similar distance.

At the base of the abdomen is a pair of ochreous hair pencils 7 – 8 mm long. When the terminal abdominal tufts are expanded, these ochreous pencils are also fanned out. They protrude from below the center of the forewings when the abdomen is lowered and disappear behind the forewings when the abdomen is raised over the thorax.

The abdomen moves in one plane and cannot be waved about. At the extremity of a jab, the base of the terminal hair tufts reaches above the head of the moth (see Fig. 1).

At rest, the hindwing is folded along the base of the cell proximally and along vein 2 distally. The stridulations appear to be produced when the lateral chitinous serrations along the abdomen are rubbed against these veins. Perhaps this is one of the reasons for the extra veinlet in the hindwing cell of this moth and other members of the genus. The rubbing is produced when the abdomen is jabbed forward, in the course of which the serrations are dragged across the wing veins.

After spending a night in a cage, a male *D. sphingiformis* expanded its abdominal tufts and made a strike over

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## Monarch Status in Mexico

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Wildlife Fund 2006). We've recently returned from the sanctuaries (January-March, 2007), where we walked through freshly cut acreage in the core reserve and heard chainsaws in the background. Logging takes place both by family groups seeking wood to burn for cooking as well as by well-organized illegal groups that supply the regional timber industry (World Wildlife Fund 2006, Aridjis 2006). Cutting is exacerbated by the common practice of loggers bribing local authorities for access (Toone & Hanscom 2003). Without an end to logging in the core zone of the sanctuary, the monarch migratory phenomenon is severely and increasingly threatened.

Where trees have been removed, monarch colonies have had to relocate. Where the forest has been thinned, climatic conditions fluctuate much more without the thermal buffer provided by a dense canopy. Open forests allow temperatures to fall further below freezing, and when the butterflies become wet and freeze, few survive (Anderson & Brower 1996). A notable example took place in a single storm in January, 2002, during which an estimated 74 - 80%, or nearly half a billion monarchs, were killed in the overwintering region (Brower et al. 2004), leaving a layer of death on the forest floor. In a one-square-meter sample, observers estimated that there were more than 58,000 dead monarchs in a layer that was over a foot deep (Brower et al. 2004). While natural storm events can cause severe mortality, their negative effect is greatly exacerbated where the forest has been thinned.

The climatic needs of overwintering monarchs have been studied well enough to specify which areas must be protected (Bojorquez-Tapia et al. 2003), even under changing global climate (Oberhauser & Peterson 2003). Given the state of the remaining oyamel forests, one hope for recovery of the monarch sanctuaries is vegetative

succession; if an area is left undisturbed, oyamel firs will grow back. There are serious questions whether areas that have been logged can be protected well enough to give the forest the 50 years needed to recover and where the monarchs will pass the winter in the meantime.

We see the following as necessary:

1. The Mexican government must fulfill its recent promise to take actions that will effectively enforce the law and stop all logging in the core zone of the sanctuaries. The permanent installation of military police check points on the few major roads that the loggers must traverse could easily stop this appalling violation. President Felipe Calderon has recently stated (February, 2007) his intention to increase the presence of federal police in the reserve, and we agree that this action is vital. The logging must cease.

2. Improvements to the local economy must be part of the solution so that people surrounding the sanctuaries can become less dependent on income from the harvesting of trees. Ecotourism is currently in a state of infancy but could be developed to become a lucrative and substantial source of income. The opportunity is ripe for someone to create attractive facilities and provide ecotours for travelers to witness the magical appearance of clusters of millions of monarchs. Expanding the focus to operate year round, these facilities could also support birding, geological, and archeological investigations, and perhaps even horseback adventures. Wonderful opportunities exist for all these activities in central Mexico. The topography of the area is so diverse that a tropical zone with *Morpho* butterflies is nearby to the southeast, while hot springs and fabulous obsidian deposits are a few miles to the northwest. Increased ecotourism could spur the local economy and elevate the local importance of the monarch sanctuaries.

3. UNESCO has the opportunity to designate the monarch sanctuaries of Mexico as a World Heritage Site,

putting them on a par with 162 other recognized natural wonders, including the Galapagos Islands of Ecuador, the Great Barrier Reef of Australia, the Giant Panda Sanctuaries of China, and Everglades National Park of the U.S. A proposal for this designation has just been submitted and a great poet and friend of the monarchs, Homero Aridjis, has just been appointed as the Mexican ambassador to UNESCO. If accepted, international recognition of the monarch overwintering grounds will increase, and additional funding for protection will certainly become available.

It is disheartening to witness the current degradation of the overwintering sites. Our goals are long term, however. Michael Soule (1991) has likened conservationists to the builders of cathedrals during the Middle Ages, who, even though they would not see the finished forms, were not deterred from their work. We, too, must keep working for effective protection of the monarch overwintering colonies so that the biological phenomenon of monarch migration can continue for many centuries yet to come.

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## Populations of Saturniidae

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the expansive fields so instead I examined an edge along the bay facing South Padre Island where I discovered 3 *H. calleta* cocoons at a rest stop. Females flying over the bay are apt to circle back and lay upon the first Ceniza they encounter, those along the edge. Others may attempt the 2-mile flight across the bay and lay their last few ova on the numerous Ceniza on Padre Island.

Scientific study of flight behavior and dispersal of Saturniidae is long overdue. Martin Marietta Energy Systems of Oak Ridge, Tennessee developed microchips which emit infrared transmissions which are picked up by ground based receivers. Apicultural researchers attached these chips to drone honeybees to trace their mating flights. Riley (1996) used harmonic radar and attached electronic tags to bumblebees to chronical their nectar gathering flights. Riley states "Applications...to many other insect species seems feasible...." Perhaps graduate student researchers could pursue a grant and adapt these techniques to Lepidoptera.

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## Aberrations of *Euphydryas*...

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Campground, ca. 10 rd. miles S of Hwy. 244, 4300', by A. D. Warren.

Two additional aberrations of *Euphydryas* are figured herein. One (Figs. 17-18) is a striking individual of *E. anicia eurytion*, collected near the type locality of that taxon, 2.1 rd. miles W of US Hwy. 285, off USFS Fourmile Ck. Rd., 1.3 air miles S of Fairplay, 9860', Park County, Colorado, on July 4th, 1991, by A. D. Warren. This specimen has increased pale scaling on the dorsal and ventral forewings, and increased black scaling on the dorsal (especially) and ventral hindwings, combined with a general reduction of

wing pattern elements, most pronounced ventrally. The second aberration (Figs. 19-20) is of *E. phaeton phaeton*, collected by Irwin Leeuw at the Spring Creek Preserve, nr. Barrington, Cook County, Illinois, on June 6th, 1991. This individual is a close match to the "holotype" of Gunder's (1927) *E. p. phaeton* transition form "superba," but is slightly darker above and below.

For now, all specimens figured herein are housed in the collection of the author, Castle Rock, Colorado. Special thanks are extended to Jonathan P. Pelham (Seattle, Washington) for reviewing this note and for providing copies of cited literature on short notice.

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For Sale: Noctuidae Europaeae Vol. 1, 2, 4, 5, 6, 7, 10. Books are new, for sale for 3/4 the price of current value. Price Euro 892, - for sale: 670. - plus postage. Henry Hensel, 145 Bellevue Str., Edmundston, N.B. Canada E3V 2E2, Tel. 507-735-2332. 491

Wanted: C.A. Bridges (1988, 2nd ed.) Catalogue of Family-Group and Genus-Group Names (Lepidoptera: Rhopalocera). C.A. Bridges (1988)

Bibliography (Lepidoptera: Rhopalocera) 576p. C.A. Bridges (1988) Catalogue of Lycaenidae ^ Riodinidae (Lepidoptera: Rhopalocera). The three volumes were printed by the author. Jean Hanus, 2 rue de Belgrade, 38000 Grenoble, France Tel/Fax: +33 4 76 43 33 96, [jean.g.hanus@wanadoo.fr](mailto:jean.g.hanus@wanadoo.fr) 491

For Sale: Butterflies of the Australian Region (Vol. 1), Bernard D'Abrera (1977), Lansdowne Press, Melbourne. 415 pp. Extensive color plates and photos. This edition is out of print. This copy is in excellent condition, with marginal discoloration only. \$160.00 plus \$6.95 shipping. Glenn A. Gorelick, 360 Toyon Road, Sierra Madre, CA 91024-1147 email: [butterflyguy44@verizon.net](mailto:butterflyguy44@verizon.net) 492

## Livestock

For Sale: North American lepidoptera. Many reared with full data. USA and Canada only please. Frank Bodnar

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.**

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.**

**Note: All advertisements must be renewed before the deadline of the third issue following initial placement to remain in place.**

All ads contain a code in the lower right corner (eg. 481, 483) which denote the volume and number of the **News** in which the ad. first appeared. **Renew it Now!**

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 resolved 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 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.



1211 Ridge Road, Apollo, PA 15613  
 bodnar@akvalley.net 484

For Sale: Captive bred Philippine butterfly pupae, year round. Imogene Rillo, P.O. Box 2226, Manila, 1099 Philippines. [clasinse@mindgate.net](mailto:clasinse@mindgate.net) 484

For exchange: Pupae and ova of the following livestock: *C. angulifera*, *C. promethea*, *S. bicolor*, *E. imperialis*, *C. regalis*, *S. cynthia*, *A. io*, *A. polyphemus*, *H. cecropia*, *P. cresphontes*, *B. philenor*, *P. troilus*, *E. marcellus*, and possibly others. Send SASE to Mark Schmidt, 8780 Red Lion-Five Points Road, Springboro, OH 45066 484

Wanted: I am looking for eggs of several eastern North American species of Sphingidae: *Manduca rustica* (Rustic Sphinx), *Ceratomia amyntor* (Four Horns Sphinx), *C. catalpae* (Catalpa Sphinx), *C. undulosa* (Waved Sphinx), and *Sphinx kalmiae* (Fawn Sphinx). Jessica Vargas, University of Colorado, E an dE Biology, UCB 334, Ramaley N122, Boulder, CO 80309. Shipment costs will be reimbursed. Please contact before shipping at [Jessica.Vargas@colorado.edu](mailto:Jessica.Vargas@colorado.edu) 484

Wanted: Michigan lepidopterists only; would like to exchange lepidoptera livestock. Contact: Ken Knight 1022 Widdicomb N.W., Grand Rapids, MI 49504, or call 616-459-4598. 491

For Sale: (US only) Cocoons and ova of *Hyalophora cecropia*. Send SASE to: Alan M. Vosefski 3320 Old Kirkwood Drive., Virginia Beach, VA 23452 492

### Specimens

Purchase/Exchange: Want to buy all butterflies from South America and Africa, also exchange butterflies of Iran with all butterflies in the world. Ahmad Karbalaye P. O. Box 11495-175 Tehran Iran email:[karbalaye@yahoo.com](mailto:karbalaye@yahoo.com) 491

For Sale/Exchange: Offered for sale or exchange: Charaxes, Papilionidae and many more African lepidoptera. Numerous aberrations, sexual mosaics and gynandromorphs also available. List and pictures on request. Giancarlo Veronese, viale Venezia 138, 33100 Udine (Italia). [gc.veronese@virgilio.it](mailto:gc.veronese@virgilio.it)

Fax: ++39/0432-23 26 54. 491

Wanted: To buy or trade the following North American papilios: *P. p. palamedes*; *P. eurymedon*, *P. multicaudatus*, *P. oregonia*. Also Asian *P. ulysses* ssp., *P. p. paris* ssp., *P. memnon* tailed form and African *P. hornimanni*, *P. charopus*. Send offers to: Jorge R. Montero - Moreno P. O. Box 1913 - 1000, San Jose, Costa Rica. 491

Wanted: Will pay cash for *Dynastes hercules* (18cm), *Titanus giganteus* (18 cm). Yoshiaki Furumi, 97-71 Komizo-Iwatsuki-Shi, Saitama-Ken 339-0003, Japan. 491

### Miscellaneous

For Sale: 4 Lane Cornell style insect cabinets, 2 - 25 drawer at \$500 each, and 2 12 drawer at \$250 each. The cabinets are without drawers. Buyer to arrange and pay for the shipping. David H. Kistner, 3 Canterbury Circle, Chico, CA 95926-2411. Phone: 530-345-3555. Email: [dkistner@csuchico.edu](mailto:dkistner@csuchico.edu) 491

Wanted: I will be donating a very large specimen collection to museums over the next several years. I desire a business partnership with person (or persons) with substantial Federal Income Tax obligation to make the donations under IRS 8283 Charitable Contributions Regulations and share the tax exemption. Confidentiality is assured, and absolutely no up front money or any kind of expenses involved. Serious inquires only. Carl Cook, Phone: 270-565-3795 or email: [bugman@scrtc.com](mailto:bugman@scrtc.com) 491

Wanted: Donation of papered Lepidoptera, particularly tropical, singles or series welcomed, undetermined or not, but with data. Also interested in other "showy" insects. I am building a small museum for educational purposes. I may be able to help with postage but due to limited funds, donations of postage will be appreciated. Please contact: Jorge R. Montero-Moreno, P. O. Box 1913-1000, San Jose, Costa Rica. 491



### MEMBERSHIP UPDATE...

Julian Donahue

INCLUDES ALL CHANGES RECEIVED BY 12 May 2007.

**New and Reinstated Members:** members who have joined/renewed/ been found/or rescinded their request to be omitted since publication of the 2006 Membership Directory (not included in the 2006 Membership Directory; all in U.S.A. unless noted otherwise)

**Grazulis, John E.:** 4489 South Lincoln Street, Englewood, CO 80110-5730.

**Haussler, Gregory D.:** P.O. Box 116, Capitan, NM 88316-0116.

**Levesque, Brandon C.:** [address omitted by request]

**Lewallen, Joshua:** P.O. Box 1446, Fort Davis, TX 79734-1446.

**Macaulay, Douglas:** 9713 85 Avenue, Unit #1, Peace River, Alberta T8S 1G4, Canada.

**Nunnallee, Dave:** 2820 196<sup>th</sup> Avenue SE, Sammamish, WA 98075-9658.

**Piot, Debra:** 231 Reach Road, Sedgwick, ME 04676-3011.

**Schmidt, Rhiannon** (Mrs.): 407 West Douglass Avenue, Houghton, MI 49931-2324.

**Treadaway-Martin, Linda:** 142 Moonlight Drive, Murphy, TX 75094.

**Address Changes** (all U.S.A. unless noted otherwise)

**Manton, Paul:** 34 Longfellow Avenue, Apt. 8, Levittown, NY 11756-5797.

**Morris, John W.:** 117 Hidden Pines Drive, Richmond, VT 05477-9027.

**Oemick, Donald A.:** 918 Wildwood Glen, Villa Rica, GA 30180-2431.

**Schaefer, Paul W.** (Dr.): 4 Dare Drive, Glen Farms, Elkton, MD 21921-2024.

**Schmidt, Chris** (Ph.D.): 3 Abingdon Drive, Ottawa, Ontario K2H 7M5, Canada.

**Shank, Stephanie:** 1750 East Parada del Sol, Cottonwood, AZ 86326-6990.

**Sochor, W.P.:** 566 Kings Highway, Mickleton, NJ 08056-1405.



**Conservation Matters:****Contributions from the Conservation Committee**

# Emerald Ash Borer Update

A recent report by the Ohio Department of Natural Resources estimates that the Emerald Ash Borer (*Agrilus planipennis*) (see color figures pp. 65) will cost tax payers close to three billion dollars over the next decade. As of this spring, this Asian buprestid beetle has killed or will be responsible for the removal of some 20 million ash trees in the Midwest. The ecological consequences of this invasive pest are expected to be grave: in many eastern forests and woodlands susceptible ash species account for more than 10% of the canopy. In a few specialized communities, e.g., *Fraxinus nigra* swamps, ash is a dominant or co-dominant tree.

Presently, Illinois, Indiana, Ohio, and Michigan have been placed under federal quarantine [http://www.aphis.usda.gov/newsroom/content/2006/11/eab\\_fed\\_order.shtml](http://www.aphis.usda.gov/newsroom/content/2006/11/eab_fed_order.shtml). The "order restricts the interstate movement of regulated articles that originate within the quarantine area. Regulated articles include ash nursery stock and green lumber; any other ash material including logs, stumps, roots, branches, as well as composted and uncomposted wood chips. Due to the difficulty in distinguishing between species of hardwood firewood, all hardwood firewood, including ash, oak, maple and hickory are regulated articles."

As noted in last issue in the NEWS, no less than 21 species of Nearctic Lepidoptera are believed to specialists or otherwise dependent on ash. Five of these are sphingids: *Ceratomia undulosa*, *Manduca jasminearum*, *Sphinx canadensis*, *Sphinx chersis*, and *Sphinx franckii*. The survival of all ash-feeding insects is threatened by the uncontrolled spread of this tree-killing scourge. Society members observing this metallic green, centimeter-long buprestid, flagging of ash branches, or the mysterious death of ash trees should immediately contact their nearest USDA or extension agency and/or the national EAB hotline 866-EAB-4512.

Conservation Committee

**Aberrations of *Euphydryas*...**

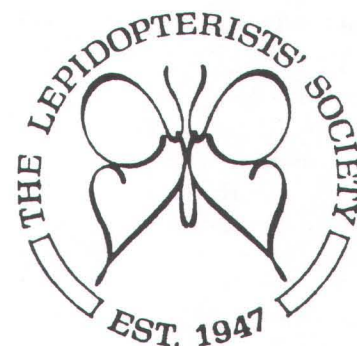
*Continued from pp. 61*

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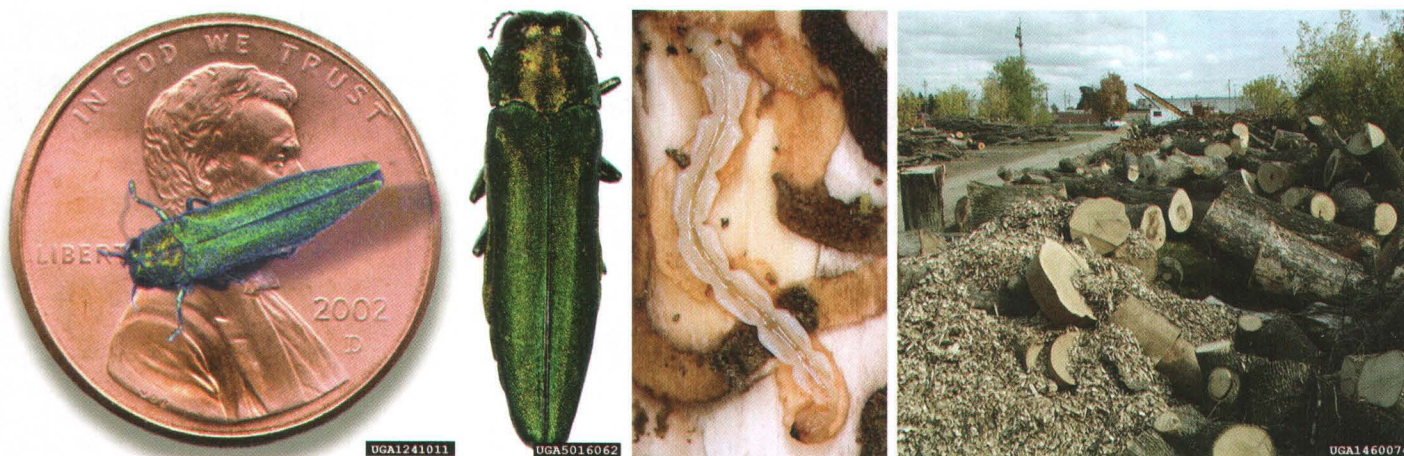
collecting, breeding, preparing, classifying, packing for shipment, etc. A complete synonymical catalogue of Macrolepidoptera, with a full bibliography, to which is added a glossary of terms and an alphabetical and descriptive list of localities. Reading, B. F. Owen. [4] + ii + 283pp., 2pls.

Warren, A. D. 2005. Lepidoptera of North America 6. Butterflies of Oregon: Their taxonomy, distribution, and biology. Contributions of the C. P. Gillette Museum of Arthropod Diversity, Colorado State University. 408pp.

Wright, W. G. 1905. The Butterflies of the West Coast of the United States. Illustrated with 940 figures in colour-photography of butterflies from the west coast, nearly all of which were captured by the author, with accurate data for each specimen. With coloured figures and description of many new species and new varieties now first published. The Whitaker & Ray Company, Inc., San Francisco. viii + 257pp., 32pls.







**Emerald Ash Borer (*Agrilus planipennis*)** (left to right). Adult on penny. Detail of adult. Last instar. Dead ash trees. Images from "Forestry Images" (<http://www.forestryimages.org>). See update on pp. 61.

## *Astalotesia hollandi* Rindge (Geometridae) from Arizona

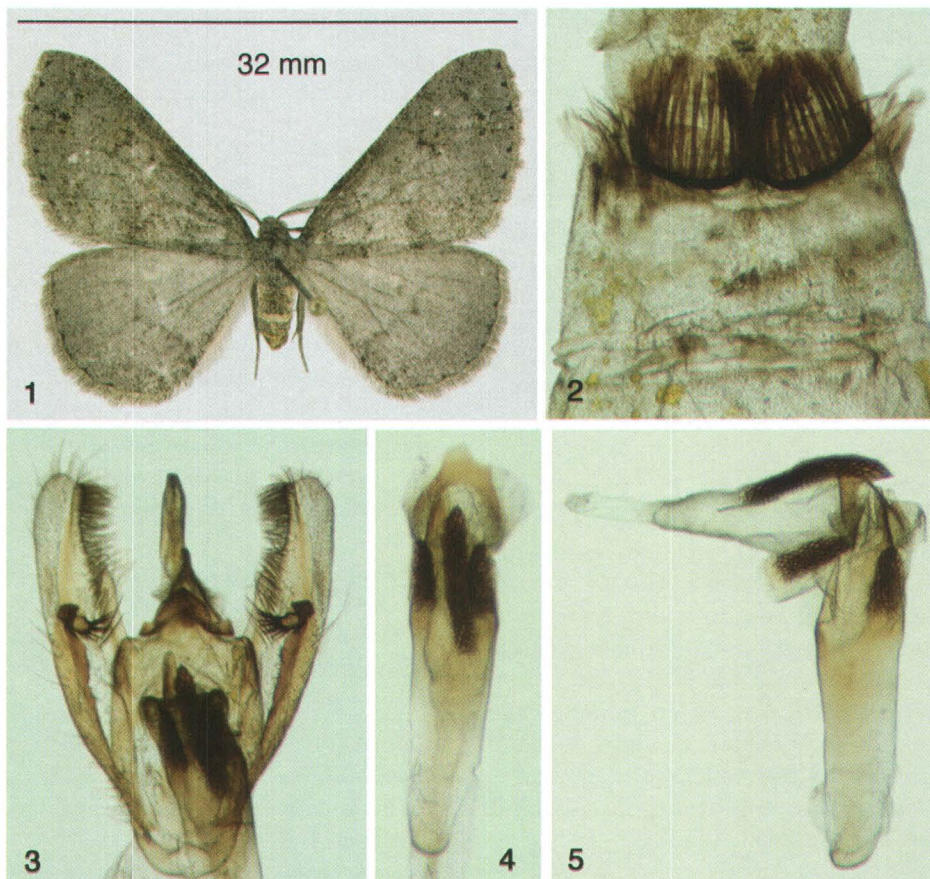
Clifford D. Ferris

5405 Bill Nye Avenue, R.R.#3, Laramie, WY 82070

*Astalotesia hollandi* was described by F. H. Rindge in 1990 from a single male specimen collected by and named for Richard Holland of Albuquerque, NM. The moth was taken on 21 April, 1978 at UV light 23.4 mi. NE of Rancho Tres Rios, on Rio Bavispe, and 6.5 mi. SW of Rancho Gavilan, 5600', Sonora, Mexico. On the night of 20 April, 2004 I collected a second male specimen at UV light in Carr Canyon, Huachuca Mts., 5615', Cochise Co., Arizona. This is the first US record for the moth and apparently only the second known specimen. Subsequent collecting at the same locality in April, 2005 failed to produce additional specimens.

### Reference

Rindge, F. H. (1990) A revision of the Melanolophini (Lepidoptera, Geometridae). Bull. AMNH. 199: 1-148.



**Fig. 1.** Male of *Astalotesia hollandi*, AZ Cochise Co., Huachuca Mts., Carr Canyon, 5615', 20 April, 2004. **Fig. 2.** Abdominal lateral organs. **Fig. 3.** Genitalia. **Fig. 4.** Aedeagus. **Fig. 5.** Aedeagus with vesica everted.



# Three Butterfly Aberrations from Oregon (Lepidoptera: Lycaenidae & Nymphalidae)

Andrew D. Warren

McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, SW 34th Street and Hull Road, P. O. Box 112710, Gainesville, FL 32611-2710 [hesperioidea@yahoo.com](mailto:hesperioidea@yahoo.com)

and

Museo de Zoología "Alfonso L. Herrera", Departamento de Biología Evolutiva, Facultad de Ciencias, Universidad Nacional Autónoma de México, Apdo. Postal 70-399, México, DF 04510 México

Between 1998 and 2006, I conducted intermittent fieldwork throughout Oregon, studying geographic variation in the butterfly fauna (Warren 2005). During this time, a number of strikingly aberrant butterflies were sampled, including those figured here (see pp. 72) in the genera *Callophrys* Billberg, 1820, *Glaucopsyche* Scudder, 1872, and *Boloria* Moore, 1900.

On June 21st, 2002, over 50 individuals of *Callophrys spinetorum* (Hewitson, 1867) were encountered in Rock Creek Canyon, 0 - 1.5 rd. mi. SE of the National Forest boundary, in the Elkhorn Mountains of Baker County, Oregon, 6000-6600'. Most of these individuals were in fresh condition (e.g., Figs. 1-2), and females outnumbered males by approximately 2:1. One female individual sampled on June 21st (Figs. 3-4) is obviously aberrant, with duller blue dorsal coloration (Fig. 3), and gray scales replacing the ventral white submarginal bands (Fig. 4). In addition, the blue marginal scales prominent on the tornal half of the ventral hindwing in typical individuals (Fig. 2) are almost entirely absent on the aberrant specimen (Fig. 4), being represented by just a few grayish scales. In the reduction of ventral white scaling, this aberration somewhat resembles the aberrant individual of *Callophrys gryneus* nr. *chalcosiva* Clench, 1981, taken in Wheeler County, Oregon, figured by Ferris (1992; reported as *Mitoura barryi* K. Johnson, 1976, but see Warren 2005: 125-133).

*Glaucopsyche lygdamus* (E. Doubleday, 1841) shows a great amount of variation in the expression of ventral dark

spotting across its range. Some populations (e.g., *G. l. couperi* Grote, 1873, *G. l. minipunctum* Austin, 1998) typically have a reduced ventral spotting pattern, and individual variants in many other populations have reduced ventral spots. Rare individuals have been reported which almost or entirely lack ventral dark spots (e.g., J. A. Comstock 1926, "ab. sinepunctata"; W. H. Edwards 1869, type of *G. l. orcus*, figured by F. Brown 1970). In western Oregon, *G. l. incognita* Tilden, 1974, typically has well-developed ventral dark spots (Fig. 5). On June 2nd, 2002, a striking individual of *G. l. incognita* was encountered along West Boundary Road (NFD 5821), on the north shore of Lookout Point Reservoir, 880', Lane County, Oregon. This individual (Fig. 6) has highly reduced ventral dark spotting, and increased whitish scaling in the distal half of the wings. The few dark submarginal spots present on this aberrant specimen are highly asymmetrical, with two submarginal spots on the right ventral forewing (separated by a small tear in the wing mostly filled with hardened hemolymph), one submarginal spot on the left ventral forewing, one submarginal spot on the left ventral hindwing, and no submarginal spots on the right ventral hindwing.

On June 24th, 2002, several recently eclosed male individuals (e.g., Figs. 7-8) of *Boloria epithore* (W. H. Edwards, 1864) were collected along Lick Creek, vic. Lick Creek Campground (off Rd. 39), 5600', at the lower elevations of the Wallowa Mountains, Wallowa County,

Oregon. One of these individuals (Figs. 9-10) appeared obviously melanic in flight, with increased dark coloration. This remarkable aberration has almost completely black dorsal forewings (Fig. 9), with only a small orange spot in the discal cell of each wing. The ventral forewings (Fig. 10) are only slightly aberrant, with a darker orange ground color and increased dark scaling surrounding the dark markings. The dorsal and ventral hindwings of this individual are normal, without any additional dark scaling. For now, all specimens figured herein are housed in the collection of the author, Castle Rock, Colorado.

## Literature Cited:

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## Aggressive Defence of a Himalayan Moth

*Continued from pp. 59*

its head even as it was being lifted out, although the hand holding its twig perch was behind it. Subsequently, the tufts were kept expanded.

A gravid female reacted to the disturbance in the same manner as a male. In addition, when the brush end of a paint brush was brought before her, she did not raise her abdomen as the males but attacked it with her forelegs as some Sphingids attack disturbing objects.

After ovipositing, all the scales of the terminal tufts were intact, none adhering to the eggs as in the case of some moths and butterflies with terminal tufts of scales (Ford 1955; Eliot 1973; Nakamura 1976).

In order to achieve flight when the ambient temperature is 25 degrees C, the moth needs a warming up period. In the case of a male moth, after much disturbance and jabbing, it vibrated its wings almost imperceptibly, even as they were held pressed firmly to the body, for 95 seconds before it could fly. In the case of the female, the time required under similar conditions was 175 seconds. However, she vibrated her wings over her thorax, as most moths do. The male probably vibrated them while they were held close to his body to be able to go on stridulating in case of attack.

In the case of the very similarly constructed and closely related *Tarsolepis rufobrunnea* Rothschild, a female reacted to a tap on her abdomen by lifting her wings. Her abdomen was slightly raised but not lifted above the wings in the latter's resting position. If the tapping is continued, the forelegs are raised. Despite tapping and disturbing many individuals of this species and *Tarsolepis fulgurifera* Walker, they never reacted as *D. sphingiformis*. No other members of *Dudusa* occur in the western Himalaya, so we were unable to ascertain whether or not this curious

defense is a generic feature.

## Discussion

Many Arctiids and Lymantrids curl their abdomens under them in order to display warning coloration. A few moths are known to raise their abdomens over their thoraxes. Among these are the Sphingid, *Degma pteris mirabilis* (Rothschild) which, according to Bell & Scott (1937), when handled, bends the long abdomen about as though attempting to sting. Some species of the Limacodid genus *Scopelodes* Westwood curl their yellow and black abdomens over their thoraxes when disturbed. Barlow (1982) has observed this in *S. anthela* Swinhoe and we have seen it in *S. testacea* Butler and *S. venosa* Walker. Although the *Scopelodes* behaviour appears to be the display of warning coloration by a distasteful species, we have seen a bird and geckos eat 3 specimens of *S. testacea*.

*D. sphingiformis* appears to possess no palpable defense like distastefulness, a sting, offensive odor, irritating hair-like scales, etc. Its whole, elaborate defensive behaviour appears to be directed solely towards startling an unwary creature. Having startled its potential opponent its repertoire is exhausted, for it cannot make a quick getaway while the intruder is disoriented, as some butterflies are believed to do; nor can it prove poisonous or even distasteful, nor can the hair like abdominal scales irritate the mouth or gullet of a predator, for the birds that eat these moths show no signs of discomfort whatsoever. In fact, the moth appears to have gone to great trouble to develop what is, to our knowledge, a unique defensive mechanism, with the sole intention of startling unwary creatures. A jack-in-the-box is not the most reliable defense against determined predators and it is no wonder that few, if any, other moth species have followed the evolutionary trend of this practical joker.

## Literature Cited

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Nakamura, I. (1976): Female anal hair tuft in *Nordmannia myrtale* (Lycaenidae): eco-camouflaging function and taxonomic significance. *J. Lep. Soc.* 30: 305 – 309.

## Dead Bugs Do Tell Tales

*Continued from pp. 51*

agriculture, road construction, and other land use decisions. Rather than focus on Jack and his net, the Great Morpho Butterfly and its kin would do well to expend their energy exhorting those at the World Bank—and contrary to the messaging in Selous writings, with Jack, myself, and others within our Society, the Great Morpho Butterfly will find allies in number, people that will know and care enough about morpho butterflies to advocate for their conservation through the preservation of their habitat.

David Wagner  
Membership Committee

## Reference:

Jane O'Donnell, L.F. Gall, and Wagner, D.L. (eds.). 2007. The Connecticut Butterfly Atlas. Connecticut Department of Environmental Protection, Hartford, Connecticut. 368 pp.

NatureServe. 2007. NatureServe Explorer: An online encyclopedia of life [web application]. Arlington, Virginia. (<http://www.natureserve.org/explorer>).

Pyle, R. M. 2006. In praise of butterfly nets: A response to Dan Keane. *Interdisciplinary Studies in Literature and Environment*. 13.2 (Summer): 185-190.

1. All are encouraged to review and adhere to the Society's Statement on Collecting. This thoughtful and wide-ranging document reviews scientific, legal, related environmental issues, and even includes suggestions as to how specimens are to be labeled and their care (see The Society's Statement on Collecting <http://www.lepsoc.org/>).





## Aberrations of *Euphydryas* Checkerspot Butterflies

**Figs. 1-20.** Aberrant individuals of various *Euphydryas* taxa, all in the collection of Andrew D. Warren. **Figs. 1** (dorsal), **2** (ventral), male *E. editha taylori*, Oregon: Benton County: Fitton Green Open Space (Cardwell Hill), ca. 7 air mi. W Corvallis, 900', 27-IV-2003, A. D. Warren. **Figs. 3** (dorsal), **4** (ventral), male *E. editha taylori*, same data as Figs. 1-2. **Figs. 5** (dorsal), **6** (ventral), male *E. colon colon*, Oregon: Polk County: Rickreall Ridge, 2400', ca. 10 air mi. W Dallas, 26-VI-2003, D. V. McCorkle. **Figs. 7** (dorsal), **8** (ventral), male *E. colon colon*, same data as Figs. 5-6, coll. A. D. Warren. **Figs. 9** (dorsal), **10** (ventral), female *E. colon wallacensis*, Oregon: Grant County: Blue Mountains: NFD 3940, 1-2 rd. mi. NE S Jct. with Hwy. 395, SE of community of Beech Creek, 4200', 17-VI-2001, A. D. Warren. **Figs. 11** (dorsal), **12** (ventral), male *E. colon wallacensis*, Oregon: Umatilla County: Blue Mountains: along Camas Creek, 2 rd. mi SE Lane Creek Campground, ca. 14 rd. mi. NE Ukiah, 4000', 25-VI-2002, A. D. Warren. **Figs. 13** (dorsal), **14** (ventral), female *E.*





*colon wallacensis*, Oregon: Umatilla County: Blue Mountains: along Lane Creek, at N end of Lane Creek Campground, ca. 12 rd. mi NE Ukiah, 4000', 25-VI-2002, Sally J. Warren. **Figs. 15** (dorsal), **16** (ventral), male *E. colon wallacensis*, Oregon: Umatilla County: Blue Mountains: along Frazier Creek, at Frazier Creek Campground, ca. 1 rd. mi S Hwy. 244, 4300', 25-VI-2002, A. D. Warren. **Figs. 17** (dorsal), **18** (ventral), male *E. anicia eurytion*, Colorado: Park County: 2.1 rd. mi W US Hwy. 285 on USFS Fourmile Creek Rd., 1.3 air mi. S Fairplay, 9860', 4-VII-1991, A. D. Warren. **Figs. 19** (dorsal), **20** (ventral), male *E. phaeton phaeton*, Illinois: Cook County: Spring Creek Preserve, vic. Barrington, 6-VI-1991, Irwin Leeuw. (See article pp. 58.)

## Aggressive Defence Mechanism of a Himalayan Moth



**Fig. 1:** A male *Dudusa sphingiformis* at rest.



**Fig. 2:** A male *Dudusa sphingiformis* jabs at a finger, showing the full extent to which the abdomen is extended. See article pp. 59.

## Aberrant Caterpillar



Sometimes it isn't just the butterflies that are aberrant. Don Adams of W. Bridgewater, MA, sent this photo of a 'dark form' fifth instar monarch caterpillar with no white banding; just broader black and yellow. James Scott makes reference to this form in "The Butterflies of North America."



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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:

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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 **49** must reach the Editor by the following dates:

Issue	Date Due
3 Autumn	Immediately!
4 Winter	Oct. 26, 2007

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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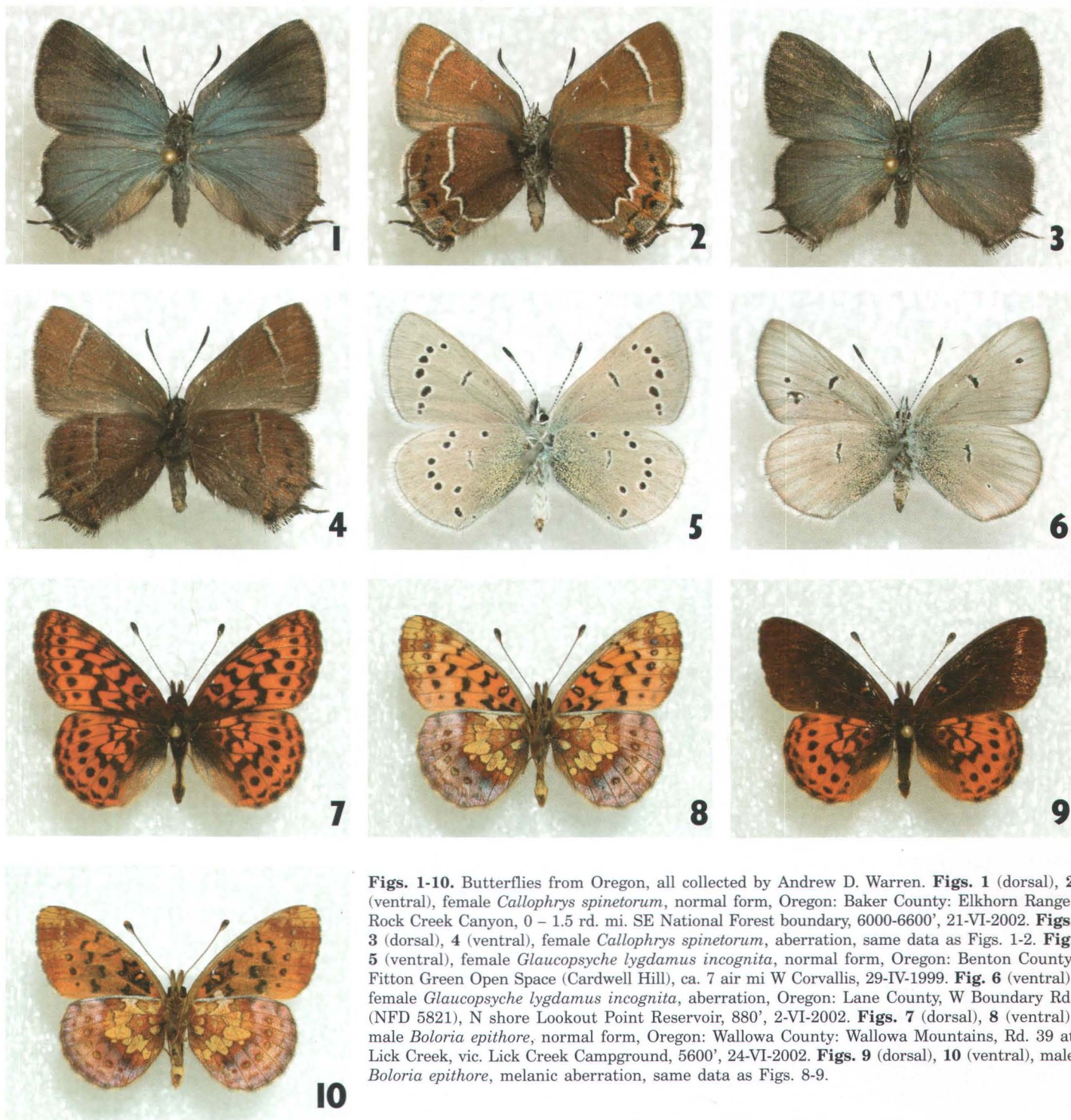
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## Three Butterfly Aberrations from Oregon



**Figs. 1-10.** Butterflies from Oregon, all collected by Andrew D. Warren. **Figs. 1** (dorsal), **2** (ventral), female *Callophrys spinetorum*, normal form, Oregon: Baker County: Elkhorn Range: Rock Creek Canyon, 0 – 1.5 rd. mi. SE National Forest boundary, 6000-6600', 21-VI-2002. **Figs. 3** (dorsal), **4** (ventral), female *Callophrys spinetorum*, aberration, same data as Figs. 1-2. **Fig. 5** (ventral), female *Glaucopsyche lygdamus incognita*, normal form, Oregon: Benton County, Fitton Green Open Space (Cardwell Hill), ca. 7 air mi W Corvallis, 29-IV-1999. **Fig. 6** (ventral), female *Glaucopsyche lygdamus incognita*, aberration, Oregon: Lane County, W Boundary Rd. (NFD 5821), N shore Lookout Point Reservoir, 880', 2-VI-2002. **Figs. 7** (dorsal), **8** (ventral), male *Boloria epithore*, normal form, Oregon: Wallowa County: Wallowa Mountains, Rd. 39 at Lick Creek, vic. Lick Creek Campground, 5600', 24-VI-2002. **Figs. 9** (dorsal), **10** (ventral), male *Boloria epithore*, melanic aberration, same data as Figs. 8-9.

