Utah Lepidopterist

Bulletin of the Utah Lepidopterists' Society

Utah Lepidopterists' Society

Volume 12 - Number 1 **March 2005**

Extreme Southwest Utah Could See Iridescent Greenish-blue Flashes A Little Bit More Frequently

by Col. Clyde F. Gillette

Battus philenor (blue pipevine swallowtail) flies in the southern two-thirds of Arizona; in the Grand Canyon (especially at such places as Phantom Ranch 8/25 and Indian Gardens 12/38) and at its rims [(N) 23/75 and (S) 21/69]; in the low valleys of Clark Co., Nevada; and infrequently along the Meadow Valley Wash 7/23 which parallels the Utah/Nevada border in Lincoln Co., Nevada. Since this beautiful butterfly occasionally flies to the west, southwest, and south of Utah's southwest corner, one might expect it to turn up now and then in Utah's Mojave Desert physiographic subsection of the Basin and Range province on the lower southwest slopes of the Beaver Dam Mountains, or sporadically fly up the "Dixie Corridor" along the lower Virgin River Valley. Even though both of these Lower Sonoran life zone areas of Utah offer potentially suitable, "nearby" living conditions for *Bat. phi. philenor*, such movements have not often taken place. Or, more accurately, there has been only minimal proof that such sporadic, transient probing has occurred. Presently, there are only two reliable records of proof that *Bat. phi. philenor* has been taken in Utah [first established by Kilian Roever 2 May 1981, with a follow up record by seven year old (at the time) Scott W. Wardrop 30 June 1988. Both records were of males.]. There could be many reasons why *philenor* is not a habitual resident of Utah's Dixie. But I think there is basically only one, and that is a complete lack of its larval foodplants in the region.

Battus philenor **Blue Pipevine Swallowtail**

Photo courtesy of Randy L. Emmitt www.rlephoto.com

The blue pipevine swallowtail absolutely requires Aristolochiaceae (pipevine family) plants for its larval foodplants, and there are no known occurrences of native pipevine in Utah. Cultivation of pipevines as ornamentals in Utah is practically nonexistent. Even in Arizona where *Bat. philenor* is fairly prevalent, there is only one indigenous species of pipevine. (In Texas, there are several pipevine species.) Arizona's interesting plant is *Aristolochia watsonii* (indianroot pipevine), which has alternate leaves shaped like a slightly curved, long-pointed arrowhead, and has a thick root supposedly used by Indians and white settlers as a remedy for snake bites. This plant is the larval foodplant (LF) for *philenor* in the greater Southwest wherever they occur together.

Aristolochia californica (california pipevine/california dutchmans pipe) is the LF for *Bat. phi. hirsuta* in the great Central Valley of California, as proven by Emily C. Dial and myself

in Placer Co., California June 1979. *Aristolochia macrophylla* (dutchmans pipevine) is often used as an introduced ornamental in areas where it does not occur naturally, and *philenor* takes advantage of this species and other pipevine introductions in some instances.

An interesting side note is the meaning of the generic plant name *Aristolochia*. It is Greek derived from: aristos-best + locheia-childbirth, named for its legendary effectiveness in aiding human childbirth. *Aristolochia* is one of ten genera of the mostly tropical Aristolochiaceae (pipevine/birthwort family) containing approximately 600 species in both the Eastern and Western hemispheres, nearly 500 of which are in *Aristolochia*. Aristolochiaceae is quite an isolated family of plants, not very closely related to any other family of dicots. Its nearest relatives are probably in the complex of orders Magnoliales and Ranunculales. A curious feature of Aristolochiaceae is that its floral parts are trimerous (occurring in threes or multiples of threes), which is a common feature of the class Monocotyledoneae (monocots) rather than the Dicotyledoneae (dicots) of which it is a part. Many bizarre or exotic species of this family are cultivated as greenhouse curiosities. The showy tropical *Ari. grandiflora* (pelicanflower pipevine), for example, has flowers with diameters of 51 cm/20 in which have a tail-like appendage 89 cm/ 35 in long!

I have long conceived of a plan to encourage and aid people in Utah's Dixie to cultivate various species of *Aristolochia* in their gardens. (I once gathered seeds of a species of *Aristolochia* from Guadalupe Co., Texas for the purpose of transplanting them into Utah.) The hope would be that once enough growing pipevine plants are scattered around in such potential sites as Leeds, La Verkin, Hurricane, Washington, Gunlock, Santa Clara, St George 8/27, Bloomington, and especially such places as the Lytle Ranch Nature Preserve (along the Beaver Dam Wash, Washington Co., Utah) and at the old Beaver Dam Lodge area south of the Utah/Arizona line and Littlefield, Mohave Co., Arizona, that *Battus philenor* would be able to maintain viable populations of itself in Utah. Local garden clubs could help in the establishment of the plants. Hopefully, these adventive pipevines would be able to survive in the more mild "Dixie" winters. It would be necessary, of course, to caution participating gardeners against spraying the plants or squashing the black and red larvae (which some people incorrectly and annoyingly call "worms") with their prominent 9 mm pair of anterior filaments. For promoting repeated life cycles of this very beautiful greenish-blue, tailed pipevine butterfly would be one of the primary reasons for growing the pipevines in the first place.

All of the three *Aristolochia* species mentioned - *watsonii, californica* and *macrophylla* would be suitable for transplant into southwestern Utah. With *Ari. californica*, however, care must be taken not to bring in the early stages of *Bat. phi. hirsuta* when *Bat. phi. philenor* would be the subspecies which might take hold naturally. This brings up the important issue of complete biological naturalism vs. biological intervention by human beings. Nearly everyone agrees that there have been numerous cases of biological disasters which have occurred by man's intervention, whether unintended or purposeful. The direct cause of some of these biological disasters is the introduction of new species of viruses, bacteria, plants and animals into new regions or areas where they had not existed previously.

My thinking in this situation is this: I cannot see any negative biological effects from the introduction of *Aristolochia watsonii* and *macrophylla* plants into southwest Utah and the extreme northwest corner of Arizona. But, that is usually where all the serious trouble comes from in those cases which go wrong. The full biological effects of new introductions are often not recognized at the outset. Therefore, pipevine-plant introductions may not be so completely innocuous as I believe they are. Nevertheless, I am in favor of the purposeful introduction of pipevines into southwest Utah. Beyond that, I would not personally bring in ova, larvae, or gravid females, but I would be most pleased if these wonderful butterflies were able to make it on their own. It would be greatly satisfying to more frequently see their iridescent greenish-blue flashes throughout the southwestern corner of Utah.

Definitions:

indigenous - [L. indigena-native] native species originating, developing, or living naturally in a particular region or environment. (Indigenous is nearly synonymous with endemic derived from the Greek word endēmia.)

adventive - nonnative, inadvertent or purposeful introductions of species from other places which have not become fully naturalized.

Battus philenor hirsuta
Larvae Are Very Cannibalistic

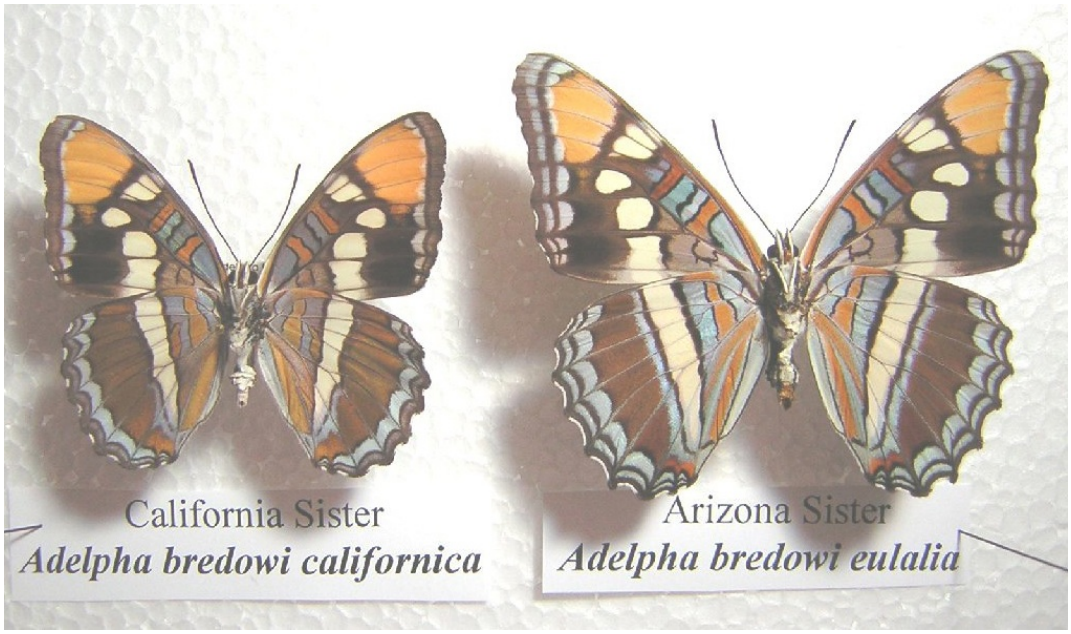
In June 1979, when Emily C. Dial and I discovered *Bat. phi. hirsuta* larvae crawling all over *Ari. californica* near Roseville, ½ Placer Co., California, we brought back a good number of them to Salt Lake City for rearing. Unfortunately, we underestimated the voracity of our charges and by the time our rearing neared completion, our refrigerated LF stocks were precariously low. Most of our potted plants took hold and were growing, but the last larvae devoured the new tender leaves before the leaves could grow to a fourth of their normal size. Then the ravenous larvae ate the stems. When the stems were consumed, to our surprise the remaining rapacious larvae turned on each other. It seemed the first by-chance bite taken out of a larva automatically designated that larva as a cannibalistic victim. The victim

see **Larvae** p 3

Fundamental differences between the California Sister and the Arizona Sister

(Adelpha bredowi californica vs. *Adelpha bredowi eulalia)*

by Todd L. Stout



Adelpha bredowi californica **California Sister**

Adelpha bredowi eulalia **Arizona Sister**

Photo courtesy of Todd L. Stout

Over the years, there have been several butterfly enthusiasts who have inquired about the differences between the california sister and the arizona sister. The purpose of this article is to discuss as well as to illustrate their most basic, consistent differences.

As shown on the images above, the ventral hindwing of the california sister (*Adelpha bredowi californica*) has a lavender background as opposed to the blue background of the ventral hindwing of the arizona sister (*Adelpha bredowi eulalia*).

Furthermore, if you look at the basal area of the ventral hindwing, you'll see clearly that *A. b. californica* has two orange bars (one smaller than the other) while *A. b. eulalia* only has one longer orange bar in the same basal area.

Also, if you take a look at the ventral hindwing cream-white bands of both taxa, the arizona sister clearly shows a continuous slim blue line on the outer edge of the band. If you look at the same area of the california sister, you will see that the same lavender line is only intermittent. After studying long series of both taxa, these differences appear to be diagnostic as opposed to being individual variation.

Larvae

continued from p 2

was then completely consumed by the remaining larvae. Two such occurrences were noted. The last few larvae pupated before reaching full growth and the pupae were undersized. This may be another instance illustrating that larvae which normally feed only on their LFs, resort to cannibalism when faced with strong hunger and have the opportunity for doing so. (It also illustrates that one has to be cautious and not bring back more ova and/or larvae than can be supported by your readily available food supply.) We do not know if these "hyper" *Bat. phi. hirsuta* larvae would occasionally be cannibalistic in their natural setting, but we wouldn't be too surprised if it proved to be so. These larvae were very active and strongly aggressive**!** It could well be they had a heightened sense of LF shortage which made them noticeably more so. *Bat. philenor* ova are laid in rows in a loose mass on the underside of leaves. Their larvae are strongly gregarious until about half grown. This gregarious feeding pattern allows their larvae a natural opportunity to develop cannibalistic habits not available to species whose larvae feed in isolation.

Emily C. Dial and
Col. Clyde F. Gillette

Utah Lepidopterists' Society Co-Founder Receives Prestigious Highest Award

Emily C. Dial, co-instigator in the original founding of the Utah Lepidopterists' Society (on 6 Nov 1976) and founder and director of the Pet Samaritan Fund (PSF), recently received the 2004 "Award for Excellence", the highest honor given by No More Homeless Pets in Utah for her organization's achievements of success on behalf of companion animals. Emily's commitment to the overall well being of animals is extremely deep and of long duration in her life. Her personal philosophy regarding animals has long been that all dogs and cats deserve to have and should be guaranteed having loving, care-giving homes, and that we should work to become a no-kill state and nation**!** Her Pet Samaritan Fund organization sponsors sick and injured pets - quite often in cases where there is no one, or no other animal organization, to help. (Emily's email address is mlepfs@aol.com)

Before letting Emily tell her own Pet Samaritan Fund and Award for Excellence story (in her own words), I want to relate part of her lepidopterous story. Back when she was much too young to know differently in Hicksville, Defiance Co., Ohio, right next to Indiana - MLE (Emily) thought that she had discovered the beautiful *Eurytides marcellus* (zebra swallowtail). MLE's favorite butterfly has always been *Danaus plexippus* (monarch) which she lovingly and personally relates to. This is so because she knows that monarchs like to stay up late and MLE is consistently the greatest "nite-owl" I have ever known. That is quite understandable because with her it is genetic - even her historical English, Battershell family crest is covered in owls.

In late June 1974, along US Hw 189 a little north of Frontier, Lincoln Co., Wyoming, MLE and I stopped for a moment beside the road. *Neominois ridingsi* (banded greyling) were concentrated there in such large numbers, and it surprised her so much that she dropped her popsicle. I truly wish that more butterfly collectors were somewhat like MLE regarding their collecting habits. I have been with her during nearly all of her butterfly collecting. Believe me - MLE is no threat to butterfly populations no matter how special or difficult the species might be to get. When collecting our first *Coenonympha haydeni* in Montpelier Canyon, June 1974, those silveredge ringlets were fairly common, but MLE would collect only a couple of them. In the summer of 1989, when MLE hiked almost to the Canadian border with me in the Pasayten Wilderness of the Okanogan Highlands of central, northern Washington (Okanogan Co.), even when the butterfly was *Colias nastes* (clouded tundra sulfur) - MLE wouldn't collect more than two. When looking at other butterfly collections, Emily's now most famous statement is "I've got one of those."

Naturally, I attended the "8th Annual, Utah Awards for Distinguished Service to Animals and End of the Year Gala," put on by No More Homeless Pets in Utah and helped by Best Friends Animal Society (of Kanab, Utah), all of whose efforts, like Emily's PSF, have saved thousands of innocent pets' lives. But Emily will tell her own story.

Pet Samaritan Fund

"On 10 June 1990 two outdoorsmen rushed in to Central Valley Emergency Clinic with five seriously injured kittens. They had apparently been sealed in a cardboard box and thrown over a 200 foot cliff in an old rock quarry. The box had burst open upon impact and the kittens lay scattered among the rocks. Their story appeared in the veterinary newsletter entitled "Samaritans of the 90's" and many readers called the editor volunteering to help this Samaritan cause. So Pet Samaritan Fund was born to help needy animals**!**

For approximately 10 years Pet Samaritan Fund worked out of the veterinary hospital helping owners who could not afford to save their sick or injured pets, adopting animals that would have been euthanized by animal control agencies, and by helping owners who could not keep their pets. The fund was supported by fund raisers and contributions from clients who loved helping the unfortunate animals. PSF obtained its 501(c)(3) non-profit status in October 1994.

Then Central Valley was sold to a Corporation, which focused totally on the bottom line and wanted no part of charity work. Now PSF animals are kept in foster homes in the Salt Lake City and Vernal areas and receive their medical attention from other veterinary hospitals. Pet Samaritan Fund works with the No More Homeless Pets (NMHP) in Utah coalition whose goal is to make Utah a no-kill state.

Every year the number of rescued animals adopted increases. In 2003, PSF adopted out 1167 homeless pets, and as of June 2004, 894 animals have been placed in responsible homes. All the animals are given medical attention (if needed), spayed/neutered, vaccinated, and micro-chipped. PSF also helps owners who cannot afford the veterinary care necessary to save their sick or injured animals.

On 27 June 2003, PSF was presented the Award for Excellence by NMHP; and on 25 June 2004, the organization received the highest honor given by NMHP, Non-Profit Organization of the Year**!** (We feel like we won an Oscar**!**) [MLE was so thrilled and was so absolutely elated

see **Award** p11

The Challenge of Raising Northern Utah Orangetips

(*Anthocharis stella browningi* and *Anthocharis sara thoosa*)

by Todd L. Stout

Figure 1. Top Row: male, female and male (ventral) utah stella orangetip (*Anthocharis stella browningi*)
Bottom Row: male, female and male (ventral) southwestern orangetip (*Anthocharis sara thoosa)*
Photo courtesy of Todd L. Stout

Introduction

The purpose of this paper is to review strategies in order to facilitate the lab rearing of two northern Utah orangetips–*Anthocharis stella browningi* (utah stella orangetip) and *Anthocharis sara thoosa* (southwestern orangetip) (Figure 1). To effectively rear these butterflies in the lab, it is necessary to overcome certain obstacles as well as learn certain helpful tips in the field. There is little doubt that this group--the *Anthocharis sara* complex--is one of the more difficult groups of pierids to raise.

Obtaining Ova From Hostplants

Like other pierids, there are basically two ways of obtaining ova. The first method is to harvest ova from their larval hostplants, and the second method is to collect live females and set them up in a cage to oviposit. Both methods can be productive with the latter probably being the more productive.

Females of *Anthocharis sara thoosa* and *Anthocharis stella browningi* prefer to oviposit on the inflorescens and stems near siliques of spotty montane mustards such as *Arabis sparsiflora* var. *subvillosa* (sicklepod rockcress), *Arabis perennans* (pretty rockcress), *Arabis holboellii* (holboels rockcress), *Arabis microphylla* (little-leaf rock cress), and *Descurainia pinnata* (pinnate tansymustard). In fact, any species of *Arabis* serves as a suitable lab hostplant for the *Anthocharis sara* complex.

While females of ***Pieris sisymbri nigravenosa*** (dark-veined spring white) and ***Pieris sisymbri sisymbri*** (spring white), prefer to lay their eggs in quantities of one to seven or more on the young basal leaves of ***Arabis*** spp., females of the *Anthocharis sara* complex usually lay their eggs as singletons on the top of the plant (Figure 2). The only other northern Utah pierid that utilizes the same oviposition strategy as *Anthocharis* on *Arabis* is *Euchloe ausonides coloradensis* (large marble). Because *A. s. browningi* and *E. a. coloradensis* are sympatric and synchronic in the Wasatch Range, there is a chance that an orange ovum found on the tip of an *Arabis* plant could be that of either species. However, in the Basin and Range province, if you find an ovum on top of an *Arabis* plant, it is more likely to be *Anthocharis sara thoosa* since *Euchloe ausonides coloradensis* flies quite sparingly there.

Although *Euchloe hyantis lotta* (desert marble) also uses *Arabis* spp. as well as *Descurainia pinnata,* they tend to fly roughly two weeks after *A. sara thoosa.* Therefore, the best time to find *A. sara thoosa* ova, depending

upon elevation and other seasonal factors, is probably the latter part of April. On the other hand, the best time to find *E. hyantis lotta* ova is likely the first or second week of May.

The other larval hostplant that northern Utah *Anthocharis* uses is *Descurainia pinnata*. Similar to their oviposition preference on *Arabis* spp., female *Anthocharis sara thoosa* and *Anthocharis stella browningi* tend to oviposit on the upper leaflets or flower heads of *D. pinnata*; assuming flower heads are yet visible. At the same time, females of all Utah subspecies of *Pieris sisymbri* tend to oviposit toward the middle or bottom leaflets of the plant. However, sometimes the distinction of oviposition preference between these two butterfly groups is not so cut and dry with *Descurainia pinnata* as it is with *Arabis*. On *D. pinnata*, sometimes you might find an ovum on leaflets right in the middle of the plant where it could be either *P. sisymbri*, *A. sara* or *A. stella*. One tip that might differentiate these ova is that *P. sisymbri* eggs tend to be more elongate than those of the *A. sara* complex. But this difference can be quite subtle to the naked eye. Also, *P. sisymbri* often scatters more ova on a single plant than *A. sara* complex species.

Figure 2. Computer-graphic enhanced orange ova shows typical oviposition preference of females of the *A. sara* complex on hostplant *Arabis perennans*. Ova normally are solitary in nature.
Photo courtesy of T. Beth Kinsey and Wildflowers of Tucson
http://www.fireflyforest.com/flowers/index.html

Another field tip that might be helpful in distinguishing ova of orangetips, marbles, and spring whites is that newly laid ova are different in color (Figure 3). For example, the color of a newly laid orangetip ovum is white, whereas the color of newly laid spring white, large marble, and desert marble ova are green, yellow and light-bluish white, respectively. From the time of oviposition, it generally takes these ova about four days to eclose under artificial conditions at room temperature and about five days under natural conditions.

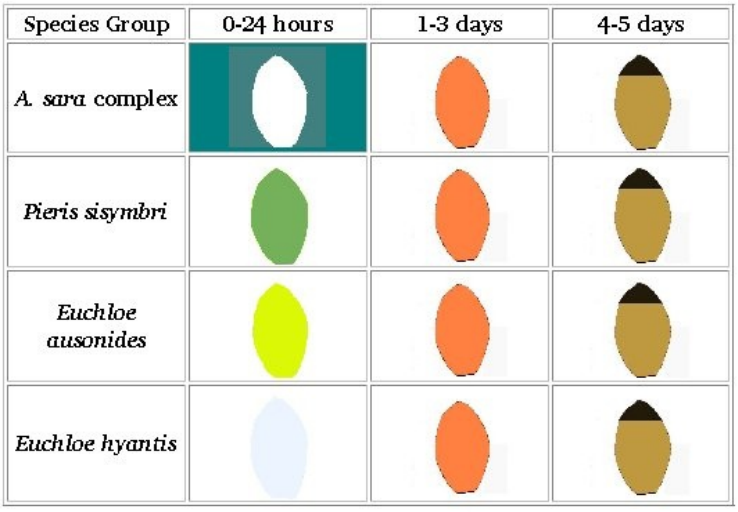


Figure 3. Ova coloration for northern Utah *Anthocharis sara* complex, *Pieris sisymbri*, *Euchloe ausonides* and *Euchloe hyantis*.

Obtaining Ova From Wild-collected Females

Because of the potential challenge of locating ova of the *A. sara* complex out in the field, a more productive approach might be to collect a few females in the wild and set up a cage with the larval hostplant inside in order to induce oviposition. Since females of the *A. sara* complex lay their eggs quite quickly in nature, it is advisable to collect females that are relatively fresh. Orangetip females seem to start flying about five to seven days after the males have started their flight. (For instructions on how to set up an oviposition cage, see Figure 4.)

Once eggs have been harvested, it is absolutely critical to separate them from each other. First instar orangetip larvae (as well as most all other Pierinae larvae) are highly cannibalistic and will feed on other ova if it finds them. Place them into small individual containers such as solo cups until they hatch. Remember to check the cups regularly for newly-hatched larvae. Gently transfer a first instar larva

Figure 4. In order to obtain ova from wild-collected females, consider a setup where a bottled plant is nestled inside a cage adjacent to the side receiving filtered sunlight. Place wild-collected females inside the cage. *Anthocharis* females also use *Arabis* as a nectar source and can stay fed on the same plant while laying eggs. Photo courtesy of Todd L. Stout

Figure 5. The Open Terrarium Method: With a screen lid, this particular setup consists of 2 ten gallon terrariums taped together (the bottom glass hammered out of one) in order to accommodate taller growing larval foodplants. For most applications, a regular 10 gallon terrarium with screen lid should work fine.
Photo courtesy of Todd L. Stout

with a teasing needle onto a flower head of the larval hostplant at a reasonable distance from any other larvae. This should alleviate one's concerns with cannibalism.

Setting Up Your Rearing Apparatus

Experience has shown that the open terrarium method, with a screen top, is an effective strategy for rearing all Utah Pierinae species including orangetips (Figure 5). The idea behind the open terrarium method is that the top is composed of a screen lid creating free air flow allowing caterpillar frass to dry. Similar to swallowtail caterpillars, pierid larvae can get sick if overexposed to its own undried frass in a high humid microenvironment.

If set up correctly, the mustard plants should last for about six to seven days before the hostplant needs to be replaced. Remember to place larvae on the siliques of the hostplant. Before placing freshly cut hostplant into a bottle similar to what is shown in Figure 5, it is best to remove the lower one third to one half of all basal leaves. This is advisable because, after a few days, these leaves are always the first to turn yellow and become unusable.

As is true with many other Pierinae mature larvae, *Anthocharis* larvae "tip their hand" letting you know that they have finished eating by becoming conspicuously darker just before setting up their prepupa. This would be a good time to transfer these larvae to a suitable place to pupate.

Selecting the Proper Mustard to Feed Orangetip Caterpillars

The key to the successful rearing of orangetip larvae to adults is to only feed them on the northern Utah natural native mustards already mentioned. Period. If you understand that, the following paragraphs, for all intents and purposes, are moot. The purpose of these warnings is to share with readers the many mistakes that the author of this paper has made over the years in working with this group so that they can avoid these same mistakes.

In terms of larval hostplant preference, northern Utah *Anthocharis* are not generalists as are species of *Euchloe* and *Pieris*. For example, in addition to rockcresses and tansymustard, larvae of *Pieris sisymbri*, *Euchloe hyantis*, and *Euchloe ausonides* will also readily accept (in the lab and in nature) other common valley floor mustards such as *Isatis tinctoria* (dyars woad), *Cardaria draba* (white top), *Brassica nigra* (black mustard), and *Sisymbrium altissimum* (tumble mustard). On the other hand, orangetip larvae perish using these mustards under laboratory conditions. The travesty with these common mustards isn't that orange-tip larvae will refuse them, it's more that *Anthocharis* first instar larvae will actually start feeding on them and appear to thrive and do well until they reach fourth or fifth instar at which point they will suddenly perish, probably due to slow poison or some other chemical imbalance. Note:

Euchloe hyantis hyantis larvae do not survive to adult feeding on *Cardaria draba* (white top).

The worst mustard one could choose to feed northern Utah *Anthocharis* is the alien, invasive, poisonous and unfortunately common flixweed (*Descurainia sophia*). It's easy to confuse flixweed with its less-common documented larval hostplant *Descurainia pinnata.* To make matters worse, finding *D. pinnata* is a challenge because the plant seeks shady refuge under an occasional juniper or other canyon tree. In northern Utah, *D. pinnata* is more common during springs following very wet winters. On the other hand, flixweed grows very common throughout northern Utah's valley floor.

A key way to separate *D. pinnata* from *D. sophia* is to look closely at the siliques. On *D. sophia*, the silique is generally slightly thicker than the stem to which it is attached. Also, this same silique is usually about three times longer than this same stem. On the other hand, with *D. pinnata*, the silique is usually to two to three times thicker than the stem to which it is attached, yet is also approximately the same length as its accompanying stem. In other words, *D. pinnata* siliques are shorter and stouter than those of *D. sophia*.

Just as finding *Descurainia pinnata* growing in the wild can sometimes be a challenge to the less-experienced lepidopterist, finding enough *Arabis* spp. (rockcress), can be equally challenging. Although there are several species of *Arabis* growing in northern Utah, they all are, unfortunately, somewhat spotty and difficult to find.

In northern Utah, *Arabis perennans*, is one of the more common rockcresses. It can be found growing in spots along rocky outcroppings of our northern Utah canyons. Another rockcress, which grows in rocky and slate formations in canyons such as Big Cottonwood Canyon, is *Arabis microphylla* (little-leaf rock cress). Although this plant can be quite short and provide less food bulk per stalk, many individual plants can contain dozens of stalks that can be used for lab rearing.

Probably the most frustrating rockcress to rely upon for rearing purposes in the lab is *Arabis sparsiflora* var. *subvillosa* (sicklepod rockcress). Although this plant is considered a perennial, basal rosettes of this variety of rockcress seem to only live for a few years. This can be frustrating as you hike diligently to find a few good spots where this mustard is growing one year, only to find that most plants have died, requiring you to find it growing elsewhere another year.

A helpful tip in finding more rockcresses for lab rearing is that *Arabis sparsiflora* var. *subvillosa* and *Arabis perennans* do tend to grow more abundantly at higher elevations. Since colonies of *Anthocharis stella browningi* fly later at these higher elevations, it may be more prudent to raise *browningi* in May or June as opposed to April when *Arabis* is more plentiful. In northern Utah, some good locations to find *Arabis* at higher elevations are along the Skyline Drive to Bountiful Peak and in Farmington Canyon past Sunset Campground.

Another tip to remember as you harvest hostplant from the wild is that because *Pieris sisymbri* females lay multiple ova on *Descurainia pinnata* and *Arabis* spp., you will likely be bringing home some small, unnoticeable spring white eggs and/or caterpillars that are there just for the ride. As you use this same hostplant, and change it about a week or so later, you will probably find these darker, *P. sisymbri* caterpillars feeding with your orangetip caterpillars. Therefore, whether you planned it or not, you may be raising a batch of *Pieris sisymbri* with your *Anthocharis*. If you intend to push these spring white larvae through, it will then be necessary to take good field notes of when and where you harvested your hostplant in order to have accurate data for your *Pieris sisymbri*. This potential nuisance just seems to be part of the price you pay for rearing northern Utah *Anthocharis*.

With regards to cutting hostplant from the wild, remember that rockcresses are perennials, most of which are sending up spring stalks year after year. Therefore, it is wholly inappropriate as well as pointless to destroy them by pulling them up by the roots. All that one needs to do is prune the plant above the basal leaves taking some stalks and leaving others. Experience has shown that by leaving some stalks intact, the plant has a better chance of surviving.

The same precaution need not apply to *Descurainia pinnata* since they are annuals coming up from seed. If one wants to make sure and conserve colonies of these mustards, it might be fruitful to make sure and leave some plants untouched; so that, when the plant goes to seed, it can produce more in the future.

Finding Caterpillars in the Wild

Although finding *Anthocharis stella browningi* and *Anthocharis sara thoosa* ova is not particularly difficult, it seems that in northern Utah, finding their late instar larvae is (Figure 6). The difficulty of finding larger caterpillars is probably caused by several factors including larval parasitism, predation, as well as competition with larvae of *Pieris sisymbri*. For some reason, almost exclusively, if you find an older pierid larva on rockcresses or pinnate tansymustard, it will invariably be a spring white larva, or even a large marble larva.

Another possible explanation for the author's difficulty in finding late instar orangetip larvae is that most of the searching involved finding plants of *Arabis sparsiflora* var. *subvillosa* growing in canyon bottoms in association with scrub oak as opposed to hiking the steeper rock faces where *A. sparsiflora* and *A. perennans* grow

more consistently. It is possible that the mortality rate of *Anthocharis* immatures is much less in those more protected areas.

Extended Pupal Diapause

One thing to remember when rearing northern Utah *Anthocharis* is that pupae may not necessarily emerge the next spring. In the western U.S., some groups of overwintering papilionid and pierid pupae are especially sensitive to the aridity of the region from which they fly. This sensitivity can extend their pupal diapause a certain number of years proportional to the overall dryness of the region–even if pupae are exposed to ideal lab conditions. This innate self-protection defense mechanism actually is a good thing and helps protect against population crashes.

This scenario is applicable to northern Utah *Anthocharis stella browningi* and *Anthocharis sara thoosa* in differing magnitudes. Because of the significance of the average yearly rainfall in the Wasatch Mountains, pupae of *A. s. browningi* generally emerge after one to two winters of diapause depending upon lab conditions. At the same time, because of the more arid nature of the Basin and Range province, pupae of *A. s. thoosa* generally emerge after two to four winters of diapause (Figure 7). Within a certain margin of error, these same time frames also seem to apply to the other *Euchloe* and *Pontia* species that fly in these same regions. For example, like *A. s. browningi* in the Wasatch range, pupae of *E. ausonides* and *P. s. sisymbri* generally take one to two years to emerge, whereas, like *A. s. thoosa* in the Basin and Range province, pupae of *E. h. lotta* and *P. s. nigravenosa* generally take two to four years to emerge. Even more extreme examples of this general phenomenon are evident when comparing average lab emergence times of Mojave Desert populations of *Anthocharis cethura pima* (three to nine years) with southern Ohio colonies of *Anthocharis midea annickae* (one year). This probably tells us how arid the Ohio "desert" is.

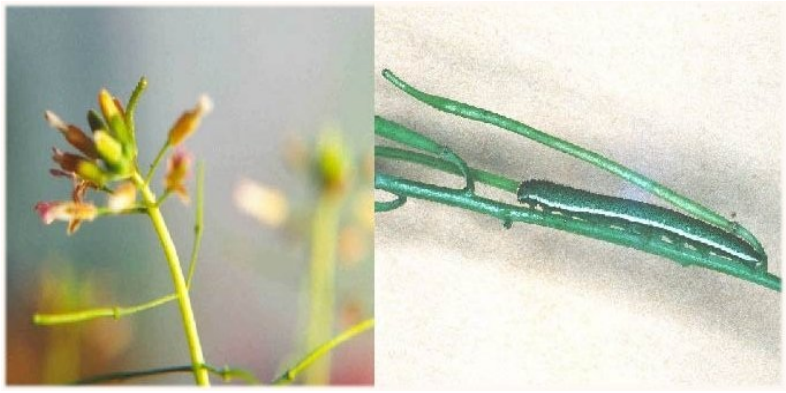


Figure 6. Left: Third instar larva of *Anthocharis sara thoosa* camouflaging itself as a silique on *Arabis sparsiflora* var. *subvillosa*. Right: Fifth instar larva of *Anthocharis sara thoosa* on common southern Utah hostplant *Streptanthella longirostris*.

Photos courtesy of Todd L. Stout (left) and Jack L. Harry (right)

Conclusion

The best approach to rearing northern Utah *Anthocharis stella browningi* and *Anthocharis sara thoosa* is to collect females in the wild and set them up in a cage along with cuttings of their larval hostplant in order to entice them to oviposit. Collecting ova in the field can also be somewhat productive, although

see **Orangetips** p13

Figure 7. Pupae and recently-emerged female of *Anthocharis sara thoosa* from the Oquirrh Mountains, in the vicinity of Cedar Fort, Utah Co., Utah. The time frame between finding the ovum and emergence of this adult was nearly three years.

Photos courtesy of Todd L. Stout

Collecting Alpine Butterflies in the Uinta Mountains of Northeastern Utah

by Alan R. Myrup

For many years (1985-2000), I backpacked with my scout troop into the High Uintas Wilderness Area in northeastern Utah seeking the beautiful scenery and excellent trout fishing in the clear mountain lakes and streams. Usually these trips were during the second week of July and took us through forests of lodgepole pine and engelmann spruce interspersed with wet boggy meadows, *Oeneis jutta* (forest arctic) country. My scouts always seemed to get a laugh watching me with my net in hand and back pack strapped on, stumbling after the butterflies as they bobbed and bounced through the dead fall along the trail. It is amazing that I never became impaled on one of the many broken branches jutting out from the fallen tree trunks crisscrossing the forest floor. Each trip, I usually came up with a couple of worn males or an occasional fairly fresh female. I never seemed to have the time to stop and do some serious collecting. The timing also seemed to be just a little late for collecting fresh *Oeneis jutta*.

Oeneis taygete (white-veined arctic) perched in the short alpine grasses near Leidy Peak 9 July 2004. Photo courtesy of Alan R. Myrup

One of my goals for the summer of 2004 was to collect fresh specimens of *Oeneis jutta*. So when ULS member Todd L. Stout invited me to collect with him on the Red Cloud Loop in the Uinta Mountains north of Vernal, I gladly accepted. On 26 June, we drove up Dry Fork Canyon on the Red Cloud Loop road to an area just north of Charleys Park, approximately 2700 meters (9000 ft.) in elevation. We collected in a clear cut surrounded by lodgepole pines about 400 meters west of the road. We kicked up a few *Oeneis chryxus* (common arctic) in the open areas before the clouds, as they often do in the Uintas, shut down the butterfly collecting for the day. Disappointed, we headed for home in a driving rain but vowed to return. On 6 July, I returned to the area with my daughter Shanna. She was willing to go with me as long as we included some fishing into the mix. We stopped at the same location that Todd and I had visited previously and came up with three *O. jutta* among the deadfall under the trees. They just seemed to be very sparse at that particular location. We returned to the truck and drove further up the road in search of new *O. jutta* habitat.

Finding lots of what we believed to be good habitat but no *O. jutta*, we gave up and decided to try the alpine tundra near Leidy Peak for another early butterfly, *Boloria freija* (zigzag bolorian). I had a few dull, worn specimens *of B. freija* that I had collected in the Chepeta Lake area several miles to the west of Leidy Peak. For the most part, the road to Leidy Peak was in good shape and easily passable in my two-wheel drive Ford Ranger. The elevation at end of the road is approximately 3300 meters (10,800 ft.), very near the treeline and required little hiking to get up into alpine tundra. With the sun shining and yellow flowers in bloom, our timing couldn't have been better. *Boloria freija* was extremely common flying in nearly every open, grassy, alpine meadow between the shrubby, stunted krumholtz vegetation of engelmann spruce. We collected enough for my personal collection, some for the ULS Synoptic Collection and a short series for the Monte L. Bean Museum collection at Brigham Young University, which had very few *Boloria freija*. As we approached the base of Leidy Peak, still covered with intermittent snow banks, we kicked up a few *Oeneis taygete* (white-veined arctic). Their flight period was just beginning, but we managed to collect five very fresh dark brown specimens. After about an hour, the clouds shut down the collecting so we decided to try our luck with fishing at nearby Hacking Lake. Hacking Lake, not much more than a shallow pond at the base of a talus slope, was a mirror of quiet

water dimpled with rings that revealed the presence of trout sipping flies from its surface - all just out of reach of our casts. After a while of futile casting and dragging a fly behind a bubble, a new set of rings appeared within range. I made a perfect cast just beyond the rise and slowly began to reel the fly back over the spot where the fish had surfaced. Just then my daughter managed to tangle her line and asked for my help. I handed her my pole and told her to reel it in, nice and slow, while I began to untangle her line. Within seconds, she had hooked the fish with MY pole on MY cast! I argued with her, in vein, about whose fish it really was while she reeled it in (She wasn't about to give me the pole back.), but she wouldn't budge and proceeded to land the only trout we caught that afternoon.

Later, when I told Todd about the fresh *Oeneis taygete* and especially how easy it was to hike to them when compared to the Chepeta Lake area, he insisted that I take him there and I happily agreed. He also mentioned that Jim P. Brock, from Arizona, wished to find an easily accessible place in Utah to find alpine butterflies. On 9 July, we met Jim in Roosevelt and proceeded to Leidy Peak. The sun was shining and the butterflies were everywhere. We observed a few fresh *Erebia magdalena* (black alpine) dancing over a boulder field. Thankfully, I wasn't in pursuit of them having collected my standard five males and five females from other locations. Besides, the thought of breaking my ankles chasing those "black demons" over the boulders did not appeal to me at all. We hiked past the boulder field into the wide open grassy tundra teeming with dozens of *Oeneis taygete* and an occasional *Oeneis melissa* (smoky arctic). Jim had gone around to the north side of Leidy Peak while Todd and I collected on the east side. When Jim returned, he told us that there were more *Oeneis melissa* on the north side than where we had been collecting. So Todd and I worked our way to the north until we reached a steep talus drop off overlooking the wide open forests and meadows below. Indeed, there were almost as many *O. melissa* there, on the more rocky terrain, as there were *O. taygete* on the grassy flats where we had been collecting. Unlike the *Oeneis taygete*, which were more easily followed over the grassy slopes, *O. melissa* had a nasty habit of rising into the wind and dropping off over the steep talus where we could not pursue without breaking our legs. However, eventually we both managed to collect all that we needed including some for the ULS Synoptic Collection and the Monte L. Bean Museum Collection. Several specimens of *Oeneis taygete* and *O. melissa* were donated to the DNA insect tissue collection at Brigham Young University. The wings of these specimens were clipped, placed in envelopes and cataloged, while their bodies were placed in 100% ethanol and frozen at $^{-}$80°C for long term storage. Dr. Michael Whiting, Associate Professor of Integrated Biology at BYU, and his team have been studying insect phylogeny at the family level by sequencing and comparing their DNA. Their growing DNA tissue collection has been used by many scientists who have obtained material from the collection on loan for their own work on various insect groups.

It would be interesting to compare the DNA of these Utah alpine relict populations with Canadian arctic populations and their Eurasian counterparts. Perhaps DNA evidence would provide some insight into whether we should call our North American populations *Oeneis bore,* as some suggest, rather than *Oeneis taygete,* which others contend is a circumpolar species.

Award

continued from p 4

that she was walking around on clouds, and so cute in accepting her award for PSF**!**]

A recent rescue was Holly, a very lovable small shepherd mix. She had been hit by a car and picked up by West Valley Animal Control. Upon calling on her microchip information they found that her owner had died and the family members did not want anything to do with her. She would need a lot of medical attention; her face was torn open, her jaw was broken, and one eye was destroyed. West Valley Animal Control requested help from rescue groups, but PSF was the only group that volunteered to take her. The prognosis was not very hopeful, but she fooled all the doctors**!** She is now able to eat normally, does fine with one eye, her face has been put back together and she is a happy, sweet gentle girl. She is in a foster home now and soon will be ready to find a new permanent loving home."

Emily has been a past Secretary for the ULS where she performed very well in PR because of her warm, friendly, outgoing personality. In earlier times she attended ULS meetings most regularly. After she created the PSF, her extremely strong dedication to animal welfare required her to quit attending ULS meetings because nearly all the main animal adoption fairs occur on the two-day weekends. Having to lose MLE to such a great, noble, worthy cause as animal welfare makes losing her more palatable. I greatly support the hard, tedious, often frustrating work that she manages for PSF, and am highly appreciative of her successes.

Emily's PSF work is physically demanding, (repeatedly moving all those animals, cages, operating equipment, etc. around) and quite emotionally exhausting at certain times, yet she continues to press on. Congratulations Emily, for receiving that coveted, sought-after special award. The ULS is thankful that you received that well-deserved public recognition.

Col. Clyde F. Gillette
ULS President

The Utah Lepidopterists' Society Synoptic Collection

One of the purposes of the Utah Lepidopterists' Society, as stated in Article II Section 2 of the Constitution and Bylaws, is to create and maintain a synoptic collection of the butterflies, skippers and moths of Utah. The purpose of this collection is to provide a readily available set of reference material of Utah lepidoptera that can be used for comparison and quick identification of Utah collected specimens. For many years, ULS members have donated to this collection which, as of January 2005, contains 520 butterflies, 109 skippers and 325 moths.

Brigham Young University in Provo, Utah, has generously housed the ULS Synoptic Collection in their entomology section at the Monte L. Bean Museum. They have been very helpful in providing space, drawers, computers, printers, references and other materials involved in the curation of this collection. I would like to give a special thanks to Dr. Richard Baumann (Curator of Insects) and Dr. Shawn Clark (Collections Manager) for their personal help and patience; especially for the many times when I have taken over large sections of table space to work on the collection. Dr. Clark has stated, "The ULS Synoptic Collection has been a useful reference on many occasions when questions have arisen involving Utah lepidoptera."

The goal is to build and maintain a synoptic collection containing every species of lepidoptera found in Utah. Each species is represented by four specimens, two males and two females displayed dorsally and ventrally. Currently, 141 of 159 butterfly species, 35 of 51 skipper species and 181 moth species are represented by at least one specimen in the collection. Specimens collected in Utah are given top priority. For a few accidental species that have been recorded in Utah, such as *Phoebis sennae* and *Chlosyne californica,* specimens collected from bordering states have been used until Utah specimens can be obtained.

The goal of the Utah Lepidopterists' Society Synoptic Collection is to obtain voucher specimens of each species found in Utah illustrating dorsal and ventral surfaces of both males and females.

Few moths have been donated to the collection. When considering the large number of known moth species from Utah, the collection is unlikely to reach even 50% of the known moth species in the foreseeable future. However, we will take as many as we can get. Moth collectors, as you tend your black lights this coming summer, I encourage you to pick a few extra specimens off the sheets, spread and identify them if possible, and bring them in to be added to the collection.

For identification purposes, the ULS Synoptic Collection uses the official ULS checklist of the Lepidoptera of Utah published in Utahensis A Lepidoptera Journal Vol 10 Issue 1, Winter 1990 and revised in July 1996. A taxonomic naming committee made up of interested ULS members is being formed to create a new checklist of Utah lepidoptera. The new revision will be updated with currently accepted taxonomy as well as a complete list of Utah subspecific names. Many Utah subspecies are quite distinctive in their appearance and will be included in the new checklist. Representative specimens for these subspecies can then be added to the synoptic collection.

A list of current specimens found in the ULS Synoptic Collection is accessible on the ULS Website at www.utahlepsociety.org/ulscollection.html. This list is updated at least twice a year. The availability of this list on the ULS website should help contributors know which species are needed and allow them to make arrangements to obtain these specimens during the collecting season.

I encourage all ULS members to carefully study the list of specimens in the synoptic collection. Look for those species that are missing, and keep them in mind as you collect this coming season.

Alan R. Myrup
ULS Synoptic
Collection Manager

Orangetips
continued from p 9

collecting mature larvae generally is not. Ova should always be separated into individual solo cups in order to avoid larval cannibalism. Once newly-hatched larvae have eclosed, they should remain relatively isolated from other hatchlings and carefully placed on the hostplant flower heads in order to start feeding.

The best rearing setup should employ an open terrarium method; pruning the lower basal leaves of the hostplant and placing stalks in a water bottle. Lab hostplant, which should be one of their documented larval foodplants, generally needs to be replaced every six to seven days. Like other Pierinae, orangetip larvae darken right before pupation allowing you to place them in a suitable place for pupation. Because of the average rainfall of northern Utah's Upper Sonoran life zones, *Anthocharis* pupae generally extend their winter diapause from one to four years depending upon subspecies, habitat, and lab conditions.

Editor's Note: The above article is the edited version of a more complete article found online at http://www.utahlepsociety.org/anthocharistips.html. The online version also contains hyperlinks showing pictures of the many plant species mentioned.

A Tiger Moths (Arctiidae) of Utah 2004

by Robert C. Mower

I have always enjoyed looking back over the previous year's collecting experience. During 2004, collecting was done on fifty days between 18 March and 1 October. However, a hard frost basically stopped potential late fall light collecting in the Wasatch Mountains just after mid September. In 2004, a total of thirty species were collected, the earliest on 20 March and the latest on 1 October. For each species, I have listed the date, species name and county of the first specimen I collected in Utah during 2004. (Note: *Ectypia clio*, was collected in Nevada.). *Kodiosoma otero* was collected as a larva and *Parasemia plantaginis,* a diurnal species, was collected during the day. The rest were collected as adults at lights. Our current state checklist contains fifty-three well documented species and six additional ones with limited data.

Tiger Moths (Arctiidae) Species Collected in Utah During 2004

Date	Species Name	County	Date	Species Name	County
20 Mar	*Kodiosoma otero* (larvae)	Wa Co.	2 Jul	*Parasemia plantaginis*	SJ Co.
8 Apr	*Ectypia clio*	NV: Cl Co.	2 Jul	*Hemihyalea labecula*	Gr Co.
8 Jun	*Pyrrarctia isabella*	Ut Co.	2 Jul	*Bruceia hubbardi*	Gr Co.
8 Jun	*Spilosoma virginica*	Ut Co.	2 Jul	*Lophocampa maculata*	Gr Co.
18 Jun	*Grammia williamsii*	Ut Co.	5 Jul	*Cisseps fulvicollis*	Ut Co.
25 Jun	*Hypercompe permaculata*	Sa Co.	8 Jul	*Lycomorpha grotei*	Ui Co.
25 Jun	*Holomelina fragilis*	Sa Co.	8 Jul	*Cisthene barnsii*	Ui Co.
1 Jul	*Crambidia cephalica*	SJ Co.	8 Jul	*Bruceia pulverina*	Ui Co.
1 Jul	*Hypoprepia inculta*	SJ Co.	15 Jul	*Hypanthria cunea*	Ju Co.
1 Jul	*Hypoprepia cadaverosa*	SJ Co.	22 Jul	*Notarctia proxima*	Ut Co.
1 Jul	*Holomelina costata*	SJ Co.	24 Jul	*Grammia parthenice*	Sa Co.
1 Jul	*Grammia f-pallida*	SJ Co.	5 Aug	*Grammia nevadensis*	Pi Co.
1 Jul	*Grammia geneura*	SJ Co.	7 Aug	*Gnophaela vermiculata*	Sa Co.
1 Jul	*Lophocampa argentata*	SJ Co.	12 Aug	*Grammia obliterata*	Ui Co.
1 Jul	*Arachnis citra*	SJ Co.	12 Aug	*Arctia caja*	Ui Co.

Contents of this Issue

Correction Notice: Reference: Utah Lepidopterist Bulletin Volume 10 Number 2, page 2, 13th line up from the bottom: "south of Hogan's Pass along Utah . . " Should read: "north northeast of Hogan Pass on the northwest side of Utah . ." ULS Bulletin Editor

The ULS website address is www.utahlepsociety.org
The Utah Bug Club address is www.utahbugclub.org

Annual Membership in the ULS can be had by sending ten dollars to:
Sec/Tres John L. Richards, MD at 9708 South 2740 West, South Jordan, Utah 84095
Ph: (801) 253-3442

Active members receive our bulletin *Utah Lepidopterist* usually published twice each year.