perforations in the shelter lid, created by larval feeding damage. Later instars built a Group II Type 6, one-cut fold by making a single large cut near the distal portion of the leaf. This cut extended from the leaf margin, directly to the midvein. This side of the cut was then drawn together with the opposite leaf margin creating a large, flattened pocket (Fig. 1f). Heavy feeding damage around the area where the larvae rested often resulted in this portion of the shelter being nearly isolated from the surrounding leaf (Fig. 1g). If the original shelter had not been seen, the final product could easily be mistaken for a Group II, Type 9, two-cut unstemmed fold.

While there has been too little published concerning the details of larval shelter construction to make comparisons between and among taxa, these data provide evidence that the classification system provided by Greeney & Jones (2003) is a useful tool in a variety of geographic regions. We hope this note encourages others to publish similar details so that such architectural features may be used in the development and testing of phylogenetic hypothesis.

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Literature cited

DeVries, P. J. 1987. The butterflies of Costa Rica and their natural history, Vol. 1,
Papilionidae, Pieridae, Nymphalidae. Princeton Univ. Press, Princeton, New Jersey. 327 pp.

DeVries, P. J. 1997. The butterflies of Costa Rica, Vol. 2, Riodinidae. Princeton Univ. Press, Princeton, New Jersey. 288 pp.

Eubanks, M.D., K.A. Nesci, M. K. Petersen, Z. Liu & H. B. Sanchez. 1997. The exploitation of an ant-defended host plant by a shelter building herbivore. Oecologia 109: 454-460.

Greeney, H. F. & M. Jones. 2003. Shelter building in the Hesperiidae: A classification scheme for larval shelters. Journal of Research on the Lepidoptera. 37: 27-36.

Greeney, H.F. & A. D. Warren. 2003. Notes on the natural history of *Eantis thraso* (Hesperiidae: Pyrginae) in Ecuador. Journal of the Lepidopterists Society 57:43-46.

Greeney, H.F. & A. D. Warren. 2004. Natural history and shelter building behavior of *Noctuana haematospila* (Hesperiidae) in Ecuador. Journal of the Lepidopterists Society (in press)

Hensen, W. R. 1958. Some ecological implications of the leaf rolling habit in *Compsolechia niveopulvella*. Canadian Journal of Zoology 36: 809-818.

Jones, M. T., I. Castellanos, & M. R. Weiss. 2002. Do leaf shelters always protect caterpillars from invertebrate predators? Ecological Entomology 27:753-757.

Loeffler, C. C. 1996. Caterpillar leaf folding as a defense against predation and dislodgment: staged encounters using *Dichomeris* (Gelechiidae) larvae on goldenrods. Journal of the Lepidopterists' Society 50: 245-260.

Moss, A. M. 1949. Biological notes on some "Hesperiidae" of Para and the Amazon. Acta Zoologica Lilloana 7: 27-29

Scoble, M. J. 1992. The Lepidoptera. Form, function, and diversity. Oxford Univ. Press, New York. 404 pp.

Scudder, S. H. 1889. The butterflies of Eastern United States with special reference to New England. Vols. 1-3. Cambridge, Mass.

Stehr, F. W. 1987. Immature insects, Vol. 1. Kendall/Hunt Publishing Company, Dubuque, IA.

Young, J. J. 1997. A brief note on the life history of *Celaenorrhinus leucocera* (Kollar) in Hong Kong, China (Lepidoptera: Hesperiidae). Entomological Reports of Futao-Kai no. 26.

Young, J. J. & X. C. Chen. 1999. A brief note on the life history of *Capila translucida* (Leech) (Lepidoptera, Hesperiidae) in Ru Yang, Guandong, China. Entomological Reports of FUTAO-KAI no. 31.

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An interspecific mating attempt between a male *Siproeta epaphus* Latreille and a female *Anartia amathea* Linnaeus (Lepidoptera: Nymphalidae).

Interspecific mating attempts between lepidopterans are not uncommon (eg. Davies *et al.* 1997, Deering & Scribner 2002). Here we report an attempted copulation between two nymphalid species, *Siproeta epaphus* (Latreille 1819) and *Anartia amathea* (Linn. 1758) in western Ecuador. Observations were made a the Sachatamia Lodge (0.01. 35 S 78.45.34 W) near the town of Mindo, Pichincha Province, at 1700 m elevation.

On 6 July 2004, at approximately 11:30 am, a male *S. epaphus* was seen and photographed in copula with a female *A. amathea* (Figure 1). Upon closer examina-

Fig. 1. Male *Siproeta epaphus* in copula with a female *Anartia amathea* at 11:30 am, northwestern Ecuador. Photo by H. F. Greeney.

Fig. 2. Close up of coupling of a male *Siproeta epaphus* and a female *Anartia amathea* in northwestern Ecuador. Inset shows resulting damage to female abdomen. Photo by H. F. Greeney.

tion, it could be seen that, rather than being joined at the genitalia, the male's claspers were attached to the side of the female's abdomen around segment 7 or 8. The exoskeleton of the female was ruptured, and fluids and internal organs were pushing out around the male's claspers (Figure 2). Damage was so severe, it is likely that the female had lost her reproductive capacity, and we doubt sperm transfer was possible. Both individuals were collected and deposited in the Museo Ecuatoriano de Ciencias Naturales in Quito.

The close relationship between *Anartia* and *Siproeta* is well supported (Freitas & Brown 2004, Wahlberg *et al.* 2005), and both genera feed on plants in the family Acanthaceae (DeVries 1987). As plant-derived compounds may be used to derive intraspecific communication pheromones (eg. Conner *et al.* 1981, Schultz *et al.* 1993), similarities in sex attractants may have resulted in the observed mistake.

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Literature cited

Conner, W. E., T. Eisner, R. K. Vander Meer, A. Guerrero, D. Ghiringelli, & J. Meinwald. 1981. Precopulatory sexual interaction in an arctiid moth (*Utetheisa ornatrix*): role of a pheromone derived from dietary alkaloids. Behavioral Ecology and Sociobiology 9: 227-235.

Davies, N., A. Aiello, J. Mallet, A. Pomiankowski, & R. E. Silberglied. 1997. Speciation in two Neotropical butterflies: extending Haldane's Rule. Proceedings of the Royal Society of London B 264: 845-851.

Deering, M. D. & J. M. Scribner. 2002. Field bioassays show heterospecific mating preference asymmetry between hybridizing North American *Papilio* butterfly species (Lepidoptera: Papilionidae).

DeVries, P. J. 1987. The butterflies of Costa Rica. Volume 1. Papilionidae, Pieridae, and Nymphalidae. Princeton University Press, Princeton, N. J.

Freitas, A. V. L. & K. S. Brown Jr. 2004. Phylogeny of the Nymphalidae (Lepidoptera). Systematic Biology 53: 363-383.

Schultz, S., W. Frank, M. Boppre, T. Eisner, & J. Meinwald. 1997. Insect pheromone biosynthesis: stereochemical pathway of hydroxydanaidal production from alkaloidal precursors in *Creatonotus transiens* (Lepidoptera: Arctiidae). Proceedings of the National Academy of Sciences, USA 90: 6834-6838.

Wahlberg, N., A. V. Z. Brower, & S. Nylin. 2005. Phylogenetic relationships and historical biogeography of tribes and genera in the subfamily Nymphalinae (Lepidoptera: Nymphalidae). Biological Journal of the Linnean Society 86: 227-251.

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