Correction of the Status of Speyeria atlantis and S. hesperis

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Hammond et al. (2013) incorrectly represented the writing of Grey (1951), a casual note in one of the original Lepidopterists' News, in an attempt to justify the hypothesis that eastern U.S. *Speyeria atlantis* are the same species as western U.S. *S. hesperis*. Grey actually wrote that ssp. *atlantis* & *canadensis* "are not sharply different races" and wrote that some Colorado specimens are "so exactly like Appalachian individuals that nobody…could tell them apart.", then on p. 34 he wrote "in the Riding Mts…we meet again with eastern *atlantis* in the dark phase *hollandi*." The intergradation that Grey noted and found in his decades of study, was within the ssp. of western butterflies that we now know as *S. hesperis*, as ssp. *hesperis* gradually changes into *irene* for instance in a roundabout journey hopping from one mountain range to another. Grey's major failure was his lumping of the two species *S. atlantis* and *S. hesperis*, which was corrected by Scott et al. (1998), who split them into the two species that are now generally recognized (including in the Pelham catalogue), based on numerous traits of adults and larvae and the intergradation of ssp. *atlantis* with ssp. *hollandi* (Klassen et al. 1989 also demonstrated that eastern *S. atlantis atlantis* is conspecific with western *S. atlantis hollandi* in Manitoba), and named three western ssp. *S. atlantis pahasapa* and *S. atlantis sorocko* and *S. hesperis brico* that were previously unrecognized in the area of sympatry of *S. atlantis* with western *S. hesperis*. The mature larvae of West Virginia ssp. *atlantis* and western ssp. *hollandi* and ssp. *sorocko* are identical with "crocodile skin" dorsal stripes and complex lateral white markings (Allen et al 2005, James & Nunnallee 2011, Scott et al. 1998), while *S. hesperis* and other *Speyeria* larvae differ. The mtDNA study of McHugh et al. (2013) found that *sorocko* and *hollandi* are a monophyletic sister group in the "mitochondrial, the nuclear and the full concatenated analyses (Fig. 2, 4)." The barcoding mtDNA phenogram made by two of us (Guppy and Kondla, unpublished) likewise found that *S. atlantis atlantis* specimens (4 from Virginia, 1 from Nova Scotia) were thoroughly mixed together with specimens of *hollandi* (6 from British Columbia, 4 from Manitoba) on that same monophyletic branch, while 20 specimens of *S. hesperis* (ssp. *lais, beani, brico, nausicaa*,) were clustered together on the other side of the phenogram as the sister group of 13 specimens of *S. aphrodite* from Virginia and British Columbia. There are no consistent diagnostic mtDNA differences between Virginia *S. a. atlantis* and BC and Manitoba *S. a. hollandi*, compared to 25 differences between those and *S. hesperis*. The minimum distance between *S. atlantis* and *S. hesperis* in this study was 4.25% (using standard genetic data analysis tools available on the BOLD systems workbench at http://www.boldsystems.org/), which is twice the distance commonly considered to indicate different species. In contrast, the genetic distance within specimens of each species was less than 1% and there was no consistent difference between Va./N.S. *atlantis* and *hollandi*. (Dunford [2007] found 4.5% gene difference between Vermont *S. atlantis* and Wyoming "*atlantis*" based on one male, but photos of it prove that the specimen is actually *S. hesperis hesperis*. McHugh et al. [2013] also misidentified some specimens, including a "*S. callippe elaine*" whose photo suggests it is *S. zerene picta*.) So *S. atlantis* and *S. hesperis* are not even closely-related species; *S. zerene* is closer to *S. hesperis* than is *S. atlantis*, while *S. aphrodite* is nearest to *S. hesperis* on the phenogram.

Literature Cited

Allen, T. J., J. P. Brock, & J. Glassberg. 2005. Caterpillars in the field and garden. A field guide to the butterfly caterpillars of North America. Oxford Univ. Press, New York. 232 p. (p. 83).

Dunford, J. C. 2007. The genus *Speyeria* and the *Speyeria atlantis/hesperis* complex: species and subspecies accounts, systematic, and biogeography (Lepidoptera: Nymphalidae). Ph.D. thesis Univ. Florida. 245 p.

Grey, L. P. 1951. The subspeciation of *Speyeria atlantis*. Lepid. News 5:31-35.

Hammond, P. C., D. V. McCorkle, W. Bergman. 2013. Hybridization studies of genomic compatibility and phenotypic expression in the greater fritillary butterflies (Nymphalidae: Argynnini). J. Lep. Soc. 67:263-273.

James, D. G., & D. Nunnallee. 2011. Life histories of Cascadia butterflies. Oregon State University Press, Corvallis. 447 p.

Klassen, P., A. R. Westwood, W. B. Preston, W. B. McKillop. 1989. The butterflies of Manitoba. Manitoba Museum of Man and Nature, Winnipeg Manitoba. 290 p.

McHugh, A., P. Bierzychudek, C. Greever, T. Marzulla, R. Van Buskirk, G. Binford. 2013. A molecular phylogenetic analysis of *Speyeria* and its implications for the management of the threatened *Speyeria zerene hippolyta*. J. Insect Conserv. Online DOI 10.1007/s10841-013-9605-5.

Scott, J. A., N. G. Kondla, and S. M. Spomer. 1998. *Speyeria hesperis* and *Speyeria atlantis* are separate species. Papilio (New Series) #8:1-31.

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