

BOOK REVIEWS

THE BUTTERFLIES OF COSTA RICA AND THEIR NATURAL HISTORY: PAPILIONIDAE, PIERIDAE, NYMPHALIDAE, by Philip J. DeVries (illus. by P. J. DeVries, Jennifer Clark and R. Cubero). 1987. Princeton Univ. Press. xxii + 327 pp. Hardback, ISBN 0-691-08420-3, \$60.00; paperback, ISBN 0-691-02403-0, \$22.50.

Costa Rica is an exceptionally delightful Central American country with a happy and friendly people (they abolished their military some years ago and used the money recovered for education), gorgeous landscape, and a surprisingly complete complement of beautiful Neotropical butterflies which are ably described, discussed, and made known in intimate detail in this book.

For the three families covered, this is a *very* good book on Neotropical Lepidoptera, and will be most useful (especially at the low price for the paperback edition) to anyone interested in these families from central México southwards. It could be a better book still; it contains a rather high density of errors of nomenclature, fact, writing, and interpretation which should be corrected in the second edition (which surely will be necessary as several thousand copies have already been sold). A list of these has been given to the author; only some more important facets can be commented on here, probably most usefully to those who have already bought the book. If you haven't, you should as soon as you plan to work on the Neotropical fauna in the three families.

DeVries has lived for almost 10 years in Costa Rica, working at the National Museum of Natural History with top Costa Rican scientists, and maintaining ties with many foreign scientists studying natural history in this Country (mostly through the Organization for Tropical Studies; a general volume entitled *Costa Rican Natural History*, edited by Daniel Janzen, recently appeared, and covers many aspects of this work), and also in other Central American countries (especially the Muysshondts, active in El Salvador). He is responsible for the discovery of many species in Costa Rica, verification of their habitats and foodplants, and description of their early stages, and is surely well qualified to produce this book. The text was written mostly during periods in Austin, Texas, and the British Museum; the color plates, of high quality but reduced a little too much for optimal usefulness, were prepared in the latter institution, at times using non-Costa-Rican or older specimens, with faded colors or tattered wings.

Strong points of the book include maps of the Country with roads, cities, topography, and parks (but with a wrong scale; 50 km on the scale given are actually 82 km on the map), a refreshing emphasis on natural history and juvenile biology with much valuable new data, a useful list of butterfly-enemy groups (p. 18), a sensible and eclectic position on systematics (p. 32), a recommendation for taking notes rather than specimens in the field (p. 33) and use of binoculars and simple camera equipment to increase the value and number of observations (p. 37), a good grasp of the Costa Rican faunal regions showing much first-hand experience (though perhaps not enough yet in cloud-infested Atlantic coastal forests), recognition of certain behavioral traits such as "only new males visit wet sand", an excellent job of correlating illustrations with types in difficult groups like *Memphis*, *Adelpha*, *Phyciodes* (s.l.), and *Euptychiini* which will be useful to many (if all are correct), and palatability data on many species. Line drawings of juveniles are strikingly clear and correct.

DeVries' youthful enthusiasm, which made this book possible and contributed greatly to its notable authority, style, grace, and the breadth and interest of its natural history accounts, gets the best of him in diverse parts of the book. His statement in the Preface that, when he began to work in Costa Rica in the 1970's, "nobody was willing to do a detailed study of the Neotropical butterfly fauna" is bound to earn some grumbles from the many "nobodies" who have willingly and tirelessly labored in this task since Müller (1870's) and Moss (1900's) started doing broad work on natural history of Brazilian Lepidoptera; several dozen are now active, many in fact quoted in the large Bibliography (382 references). An unexpected unfamiliarity with recent work in Mexico, such as that on *Parides* (mostly published in the *Rev. Soc. Mex. Lepid.* mentioned on p. 53 but cited only 3 times in the Bibliography), and in South America since Müller and Moss, sometimes

leads to unnecessary affirmations or contradictions; in species ranges, 10 genera and 58 species common in southeastern Brazil are indicated as reaching only the Amazon Basin, 10 others have their southern limits shrunken appreciably (sometimes all the way to Central America) and many groups are indicated as "reaching their maximum diversity in the Amazon Basin" when in fact this occurs on the lower Andean slopes (as indicated correctly in *Prepona*)—Amazonian to be sure but only a small, special part of the Basin, over almost all of which butterfly diversity is quite low. Peterson's classic 1948 work on larvae is not mentioned (p. 6), and the list of parasites omits mites (p. 17). The affirmation that "the effects of parasitoids on populations of tropical butterflies are unstudied" (p. 17) makes one wonder what the author accepts as a study (there are dozens of purported scientific papers published in this area). Likewise, the generalization that "toxins in adult butterflies are probably entirely directed at vertebrate predators" (p. 23) is indefensible. That Neotropical diversity "remains one of the great challenges in evolutionary biology" (p. 57) again ignores much serious work done recently by many Neotropical and other scientists. In a perhaps Freudian slip, several medicinal (officialinal) plant species are spelled "officionale", and misspelled plant families (new synonyms?) include Vochysiaceae ("Vouchysiaceae", p. 66, 68), Canellaceae ("Cannelaceae", p. 61), Quiinaceae ("Quiiniaceae", p. 109, but correct on p. 112), and Verbenaceae ("Verbenaceae", p. 76). Ithomiinae venations on p. 215 are so poorly drawn that they will confuse, not help the reader. The late Walter Forster would surely be disappointed at DeVries' summary dismissal of almost all his Euptychiine genera, many of which are sound natural groupings. Nomenclatural corrections and changes necessary (*) or suggested include at least the following (which should be noted also on the check-list, pp. 291 ff):

Page	Name given	Should be	Comments
18	*Tyranidae	Tyrannidae	—
41	* <i>Hamadryas iphthime</i>	<i>H. iphthime</i>	—
65	* <i>Parides alopius</i>	(delete)	Nicaraguan record an error.
	* <i>P. dares</i>	(delete)	A unique hybrid (<i>photinus</i> × <i>montezuma</i>).
67	* <i>P. arcas</i>	<i>P. eurimedes</i>	<i>Arcas</i> a homonym.
69	* <i>Battus belus varus</i>	<i>B. latinus</i>	<i>B. varus</i> is Amazonian, female <i>latinus</i> monomorphic throughout range.
70	<i>B. crassus</i>	<i>B. crassus lepidus</i>	Transandean subspecies.
75	<i>Papilio victorinus</i> , <i>P. cleotas</i>	(probably one species)	Would be useful to hybridize these in Costa Rica.
77	<i>Eurytides ilus</i> , <i>E. brachus</i>	(probably one species)	—
78	* <i>E. protesilaus dariensis</i>	(includes <i>E. macrosilaus</i>)	Should separate.
89	* <i>Archonias eurytele</i>	<i>Charonias eurytele</i>	Well differentiated genera; also Fig. 7.
97	* <i>Perrhybris pyrtha</i>	<i>P. pamela</i>	<i>Pyrtha</i> a homonym; also Fig. 7.
99	<i>Ascia limona</i>	<i>A. buniae limona</i>	Probably conspecific.
113	* <i>Prepona omphale</i>	(includes <i>P. laertes</i>)	Should separate.
115	* <i>P. meander amphimachus</i>	(two different species)	Separate.
116	<i>Zaretis ellops</i> , <i>Z. itys</i>	(probably one species)	Widespread polymorphism all over Neotropics; seasonal.
144, 145	<i>Dynamine hecuba</i> , <i>D. sosthenes</i>	(probably subspecies of South American species)	—

	<i>D. glauce</i>	<i>D. artemisia glauce</i>	—
142	* <i>Myscelia orisis</i>	<i>M. orsis</i>	—
153	<i>Eunica venusia</i> , <i>E. augusta</i>	<i>E. volumna venusia</i> , <i>E. caelina augusta</i>	—
154	* <i>Cantonephele</i>	<i>Catonephele</i>	—
161	* <i>Haematera pyramus</i>	<i>Callidula pyrame</i>	Senior synonym, same species.
162	* <i>Pseudonica</i>	<i>Nica</i>	Senior synonym, <i>Nica</i> used on p. 156.
163	<i>Diaethria marchallii</i>	<i>D. clymena marchallii</i>	—
182	* <i>Turnera ulmnifolia</i>	<i>T. ulmifolia</i>	—
183	* <i>Actinote leucomelas</i>	<i>Altinote ozomene nox</i>	Well separated genus, older name.
185	* <i>A. melampeplos</i> , <i>A. guatemalensis</i>	<i>A. pellenea</i> subspecies (both)	—
186	* <i>Heliconius sappho</i>	<i>H. sappho</i>	—
188	<i>Dione juno</i>	<i>D. juno huascuma</i>	Central American subspecies.
191	* <i>Eueides lybia lybioides</i> (first mention, (Fabr.))	<i>E. lybia olympia</i>	—
193	<i>Heliconius doris</i>	<i>Laparus doris</i>	Well differentiated genus.
192	* <i>Eueides isabella zoracon</i>	<i>E. isabella zorcaon</i>	—
207	* <i>Napeogenes peredia</i>	<i>N. peridia</i>	See also p. 46, fig. 7.
221	* <i>Callithomia hexia</i>	<i>C. hezia</i>	—
224	* <i>Ithomia diasia</i>	<i>I. diasia</i>	—
226	* <i>Prestonia portabellensis</i>	<i>P. portobellensis</i>	—
230	* <i>Godyris zavaleta sorites</i>	<i>G. zavaleta caesiopicta</i>	Senior synonym.
240	* <i>Hyaliris</i>	<i>Hyaliris</i>	Popular misspelling.
241	<i>Antirrhaea miltiades</i> , <i>A. tomasia</i>	(should be one species)	Reason for separation not convincing.
249	<i>Brassolis isthmia</i>	<i>B. sophorae isthmia</i>	Probably monotypic genus.
257ff	Euptychiini (esp. <i>Euptychia mollina</i> , <i>Cissia terrestris</i>)	(many Amazonian names pulled in incorrectly for Central American species. Nomenclature here a big step forward but still lacks refinement)	—
262	* <i>Callitaera</i> (for <i>polita</i>)	<i>Cithaerias</i>	Older synonym, correct on p. 260.
275	* <i>Cissia libye</i>	<i>C. libyoidea</i> (Butler) (or <i>Magneuptychia</i>)	Transandean species has different chromosomes from Guianan type.
276	* <i>Cissia hesione</i>	<i>Pareuptychia ocirrhoe</i>	<i>Hesione</i> a homonym.

Plate errors include illustration of *Papilio paeon* as *P. cresphontes* (Plate 4; *P. paeon* not mentioned in text); inversion of names for *Danaus gilippus* and *D. eresimus* (Plate 33); and illustration of a probable *Caligo oileus* (indicated as "not illustrated" in text) as *C. illioneus* on Plate 46, no. 2. Figure 7 (a "tipped in" plate following p. 26) was missing from the paperback copy purchased for my University library.

A selection of additional irksome errors (unfortunately, there are many more, some quite misleading) includes the following. There is a general lack of detailed information on variation in juveniles (very frequent in my experience), accentuated by sketchy, often inscrutable or generalized, or even wrong (as in *Papilio*, *Hypothyris*) descriptions, and few mentions of the number of replicates of rearing (thereby many opportunities to help

in juvenile field identification lost). There occurs an implicit advocacy of collection in nature reserves (p. 33); recent work on endangered species in Brazil suggests that even limited collecting of adults or juveniles of rare or local species in some kinds of habitats can seriously depress subsequent generations. Species lists for the Carrillo Belt are repeated (pp. 47, 49). Many place names mentioned in text are missing from maps (but usually are present in the gazetteer, pp. 285–287, where only one locality—Rincon, Osa—was found misplaced, 160 km to the NW). Data on canopy faunas are anecdotal, and seem overemphasized, or else are much more important in Costa Rican topography than in the flatter Amazon Basin. Diversity comparisons (p. 52) use only two sites in each of the six regions; only near-asymptotic lists, which these are probably not, can give a reliable picture. A number of generalizations presented in family, tribe or generic accounts are not obeyed by many included taxa, such as “tailless and sexually dimorphic troidines” (not *Parides photinus* or *P. montezuma*) with “white woolly scent scales” (not *P. eurimedes*), and “mimetic Dismorphiines” (not the majority listed). Inference of larval host plant from pupal placement for *Papilio cleotas* (fide W. Haber) would permit *P. anchisiades* to eat my back door, over 30 m from the nearest *Citrus* they actually fed upon; some go much farther. The book’s author doubts that male *Battus* visit sand (normal all over South America), that male *Eutresis* visit pyrrolizidine alkaloid sources (frequent in Venezuela and Colombia), that pterin pigments occur outside Pieridae (present in most butterflies, at times in large quantities), or that mimetic charaxines occur outside *Consul* (he illustrates several without commenting on their mimicry). He mixes up the characters in describing seasonal forms of *Eurema proterpia* (p. 105, compare Plate 10), and uses an-idi ending for “subfamily or tribal status” (p. 127). He indicates 10 species in *Libytheana* (there are 3), 2 in *Baeotus* (there are 3), “a few” in *Eutresis* (probably only 2), 5 in *Brassolis* (probably all 1), 10 in *Cithaerias* (probably 3 or less), 1 in *Dulcedo* (few know about the 2nd high-elevation west Colombian species, *D. mimica*). He restricts *Nessaea* to swamp forests, though it occurs on mesic hillsides in many parts of South America. Female behavior of *Callidula pyrame* (“*Haematera*”) is generalized to both sexes. The red basal dots on the ventral hindwing of *Heliconius* are transferred to the forewing. *Microtia* is placed in the Melitaeini on p. 198, in the Phyciodini on p. 205. A dropped line on p. 213 grows wing-pads on *Lycorea* larvae. The interesting mimicry situations involving *Caligo atreus-Antirrhaea pterocarpha*-female *Catoblepia orgetorix* and *Drucina leodonta-Tithorea tarricina* need comment; the second is simply denied (it occurs in Panamanian Chiriqui), the first involves birds’ wariness at the large size and eyespots of *Caligo* who can even keep birds away from their feeders.

These diverse “gripes” could go on, but will tire the reader. They are not intended to subtract from the value of the book, but to add to that of future editions, avoiding a wide circulation of inconsistencies and misinformation. In relation to most current books covering parts of the Neotropical butterfly fauna, this one stands out in general as carefully written, taxonomically accurate, biologically important, ecologically interesting, and sane. This is, in part, a negative reflection on the others.

It seems interesting to compare this book with the only other well illustrated modern single-country butterfly guide for the Neotropics, Barcant’s 1970 *Butterflies of Trinidad and Tobago*. Prepared by an amateur and lifetime Trinidad resident, and aimed at nature lovers, children, and collectors, this book received such a negative and unfair review in this journal that its author remained deeply embittered until his death last year. It covered the complete lot of families (with rather inscrutable plates for Lycaenidae and an outdated list for Hesperidae); its color illustrations were generally of high quality and esthetic balance, showing recently captured specimens with no damage. Emphasis was likewise on natural history, though with less information on juveniles and foodplants, to the point of using an arrangement based on habitat rather than taxonomy; coverage of historical, traditional and folklore aspects was strong, with common names in Trinidad given for many species. Barcant was not familiar with modern ecological pattern and theory as is DeVries, which sometimes detracted and other times helped his book (many such aspects have notoriously short half-lives). Both books give many specific details on collecting localities, adult habitats, mimicry, seasonality, physical geography and general methods; Barcant is more “folksy” while DeVries is more “objective”.

It is to be hoped that DeVries' book reaches a wider readership today than did Barcant's 18 years ago, and will continue to stimulate and aid those who study the fullness of biological aspects of Neotropical butterflies, and who wish to publish such well illustrated regional accounts in the future. All of these, like the Barcant and DeVries books, should be of immeasurable assistance in biological and ecological studies in the Neotropics, as well as useful and enjoyable to amateurs.

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BUTTERFLIES OF NORTH DAKOTA: AN ATLAS AND GUIDE, by Ronald Alan Royer. 1988. Science Monograph No. 1, Division of Science, Minot State University, Minot, North Dakota 58701. Format 14 × 20 cm, 192 pp., 12 pp. color plates, 1 b/w plate, 30 pp. maps. Plastic spiral binding. Soft cover. \$14.95.

The author has brought together in a single volume a guide and atlas which describes with text, color plates, and distribution maps all 142 species of butterflies known to occur in North Dakota. The book succeeds in fulfilling the author's goal of providing access to the Lepidoptera literature for the state.

The book begins with an Introduction which includes an explanation of the binomial system, North Dakota environments, terminology (wing surface and venation), and scope and use of the book. This is followed by the Guide, which includes a narrative for each species. Each species is introduced with the common and binomial name (including full author name), and corresponding plate number. The Atlas includes a State map with counties named followed by a State map for each species with the counties of record spot marked. There are five maps on the left side of each page with space on the right for notes. Plates are 60% natural size photographs of actual specimens. Opposite each plate, the binomial name, sex, view (dorsal or ventral), collection locality, and date collected are arranged according to how specimens appear in the plate. Next is a Hypothetical and Erroneous Records List followed by a list of names and addresses of lepidopterist organizations and suppliers. The Bibliography follows, then a 121 word Glossary, and finally the Index of Butterflies listed by binominal and common names with page numbers for the Guide, Atlas, and Plate sections.

Some of the nice things about this volume have already been mentioned, but still others are obvious when you pick it up—the sturdy binding and quality paper are suited for years of use. The cover is dominated by a photograph of *Hesperia dacotae* (Skinner), a nice touch. Coverage is complete and you could not ask for more information in the species descriptions. The author follows the 1981 Miller & Brown generic naming system, and there are no taxonomic surprises.

The faults with the book are few considering the wealth of information presented. The map in the Introduction shows only the major life zones. A more detailed map should have named the major rivers, drainage systems, and geographical features. Repeating the named counties map would have been helpful, too. Reading this section makes one feel the book was written for North Dakota collectors already acquainted with the State rather than for collectors who find themselves in North Dakota. The terminology section would have benefited with an explanation of how to distinguish the sexes, and with a generalized diagram of external morphological characters. The chapter might also have included a brief discussion of butterfly evolution, clarifying the hierarchy used in the book. There are no keys except one to the Papilionoidea.

Most of my comments concern the Guide and Plates chapters. The desired information is there, but would have been easier to locate if headings such as Description, Similar