

on a particular plant, I do not feel one can draw lines of host-plant relationships by casual observation. With this in mind I would urge future workers to be suspicious of host-plant records that are far afield from what we know of coevolutionary relationships (Ehrlich & Raven, 1965, *Evolution* 18:586-618), to double check the identity of host-plant material that is **taken from the plant on which larvae are feeding**, and to record oviposition observations as such. By following such criteria, perhaps future misconceptions and errors can be minimized.

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PERRHYBRIS LYPERA (PIERIDAE) FEEDING ON LAURACEAE:  
A RESPONSE TO DEVRIES

In an earlier paper in the pages of this journal (Young, 1980, *J. Lepid. Soc.* 34:36-47) I reported both oviposition and first instar larval feeding on the young leaves of a tropical rain forest understory tree identified, albeit from vegetative parts alone, by reputable authorities as a species of *Ocotea* in the Lauraceae. I had originally discovered the gregarious pupae of this butterfly on a mature leaf of a tree from Finca La Selva in 1969 and tentatively identified at that time by Dr. William Hathway of the University of Washington as either *Ocotea* or *Nectandra* (both Lauraceae). The subsequent observations, several years later, of oviposition and larval feeding at Finca La Tigra, approximately ten km from the La Selva site but at a slightly higher elevation, also revealed an association with Lauraceae (Young, op. cit.).

Mostly by accident and indirect communication, I learned of the note by Mr. DeVries already submitted to this journal (DeVries, 1982, *J. Lepid. Soc.* 36:229-230), in which he suggested an error in the identification of the oviposition and larval host for *P. lypera* which I reported (Young, op. cit.). At my request, Mr. DeVries very graciously sent me a copy of his note. At the time I was preparing to leave for Costa Rica, and therefore, had the timely opportunity to once again check in the wild the food plant questioned.

I retrieved additional samples of the leaves and stems of the exact same tree, a feat made simple because that tree had been marked for further studies of *P. lypera* behavior and natural history at this locality. This fresh material was taken to San Jose where Dr. Gary Hartshorn, the well-known authority on tropical trees who identified Mr. DeVries's La Selva food plant of *P. lypera*, made an identification of my material. Thus, the opportunity offered a control of sorts, since *P. lypera* food plant materials from two different sources (DeVries and Young) would have been identified by the same authority, something indeed worth doing if an error had been made by other authorities in earlier identifications. Dr. Hartshorn kindly examined my fresh material and gave me his very assured identification of the tree as *Nectandra gentlei* (Lauraceae). He also indicated to me that, while the tree was very clearly lauraceous, the



FIG. 1. Mature leaves of *Nectandra gentlei* (Lauraceae) from "Finca La Tigra" in northeastern Costa Rica possess a thick coating of pubescence. *N. gentlei* is a larval food plant of the pierid *Perrhybris lypera* at this locality (see also Young, 1980, J. Lepid. Soc. 34:36-47).

genera *Ocotea* and *Nectandra* are extremely closely related, and eventually, the former will probably be combined with the latter in a systematic revision. I explained the *P. lypera* debate to Dr. Hartshorn, who then commented to the effect that it is easy to distinguish between Capparidaceae and Lauraceae. Dr. Hartshorn thus confirmed my original identifications of this food plant as being Lauraceae, and I, therefore, conclude that an error in identification in Young (op. cit.) had not been made. Dr. Hartshorn agreed to deposit my pressed material of this tree in the herbarium collections of the National Museum of Costa Rica.

DeVries (op. cit.) offers as proof of an error in identification the stellate pubescence characteristic of the young leaves fed upon by *P. lypera* in my study (my figure 2 in Young, op. cit.). He claims that Lauraceae do not have such a characteristic. Yet, it is common knowledge, particularly in dealing with tropical evergreen floras, that morphological characteristics of young leaves of a tree can be quite different from older leaves on the same tree. Mr. DeVries's claim that the Lauraceae, including the food plant genus reported in my paper, do not possess such pubescence is not substantiated by available data. Fig. 1 shows the pubescence from a mature leaf of the larval food plant from La Tigra. This pubescence, while not as pronounced as in the young leaves of *N. gentlei*, is generally characteristic of older leaves of this plant. One might argue, in the absence of data, that the very pronounced pubescence of the younger leaves of *N. gentlei*, as shown in figure 2 in Young (op. cit.), is an adaptation to deter insect folivores such as larval *P. lypera*. DeVries is incorrect in his use of such a labile characteristic, in this case, for disclaiming the identification of the food plant.

DeVries is certainly to be applauded for making the well-founded assertion that one needs accurate field data on larval food plants, and that the best data, of course, come from complete rearing studies. The incomplete rearing of the larvae in this case, as I

thought was explained in Young (op. cit.), was due to running out of food plant when the material was brought to Milwaukee, and therefore, the larvae died from starvation and not from feeding on the wrong plant. But two events, oviposition, and actual feeding on *N. gentlei* over several days without losses in vigor, together satisfy the criteria for an accurate food plant record (Ehrlich & Raven, 1965, *Evolution* 18:586-608). At the very same time, a food plant record, substantiated by recognized authorities in the field as exemplified by the association of *P. lypera* with *N. gentlei* in northeastern Costa Rica, that does not necessarily fit man-made dogma on the coevolutionary interactions between plants and insects (lest we believe in a T.C.M., "Tropical Coevolutionary Messiah") should not be rejected as an error. Yet I too agree that there is the need to weed out suspect food plant records from the butterfly literature (Ehrlich & Raven, op. cit.), something which, based on the data again presented here, DeVries has failed to demonstrate for the butterfly in question.

I do not question that *P. lypera* is perhaps polyphagous and indeed feeds on Capparidaceae as do some other pierids. DeVries apparently has reared *P. lypera* on this family at La Selva. Dr. Hartshorn and I discussing this possibility very briefly tentatively developed the idea that the greater abundance and density of *Nectandra gentlei* in the premontane tropical rain forest zone encompassing the La Tigra site promotes this tree as a frequent food plant of *P. lypera* at this site, while the interaction may shift toward other groups (i.e., Capparidaceae) in lower elevational areas (La Selva), where *N. gentlei* is far less abundant (Dr. G. S. Hartshorn, pers. comm., 24 February 1981). When a preferred larval food plant becomes very scarce locally and the butterfly has the physiological capacity to exploit another family of plants, the carrying capacity of the environment can be realized, at least in part, by the expression of polyphagous feeding locally in which both families of plants are incorporated into the diet. Depending upon the relative abundance of the two or more plant families exploited by the folivore, the biologist studying such a system may encounter one type of interaction (food plant association) more frequently than another, particularly when repeated samples, as done by DeVries (op. cit.), are taken from the same locality. Current dogma may induce one to assume most Neotropical pierids are strictly monophagous, but there may very well be cases such as *Perrhybris* in which ecological factors promote polyphagy.

I thank the editor of this journal for allowing me the opportunity to make this response. I thank Dr. Gary S. Hartshorn, Tropical Science Center, San Jose, Costa Rica, for identifying the food plant and for the fruitful discussion.

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