Notes on the Two Species of *Allancastria* Bryk (Lep.: Papilionidae) in Lebanon

By Torben B. Larsen*

I have recently separated at the specific level two distinct species of *Allancastria* which fly sympatrically in the Lebanon range and probably elsewhere on the eastern Mediterranean (Larsen 1973). I have since decided that the correct names for the two entities are, as originally assumed, *A. cerisyi speciosa* Stichel and *A. deyrollei eisneri* Bernardi (Larsen 1974). The former is basically a low level insect, the latter flies at higher altitudes and on more arid ground. By now sufficient additional information has been accumulated to justify the publication of this note which further supports the original conclusions. How the specific status of the two entities escaped detection during more than 120 years of exploration in the Middle East remains something of a mystery.

New points of sympatry

Work and the civil disorders of 1973 hindered the full investigation of the chorology originally hoped for; however dozens of new localities were prospected and sufficient new points of sympatry were found to establish that there is a broad belt of co-existence between the two at altitudes beween 900 to 1,200 metres on the western face of the Lebanon range. Dr. L. G. Higgins has caught a single male of *A. cerisyi speciosa* near Chtaura, 1,000m., Beeqa, 16/21-V-1962, among masses of *A. deyrollei eisneri*. It is possible that the specimen was a vagrant since I have never caught the former species in the Beeqa.

Ecology

The observations of the last two years show that the two species differ in their ecological preferences. *A. c. speciosa* is found in and around the lush river valleys and ravines, and in bushy habitats at middle heights. *A. d. eisneri* is much more at home on open, stony hill-sides. The points of sympatry are normally in intermediate types of terrain, often modified by the activity of man. This is in good accord with our present knowledge of the ecological preferences of the respective food plants. Although *A. c. speciosa* now appears very scarce in Palestine, the same pattern is evident (Nakamura, personal communication).

Early stages

The larvae of both species are similar in form and typical of the tribus *Zerynthini*; rather flat with rows of spiky warts covered with short bristles. Their colouration, however, differs considerably.

The fullgrown larva of *A. c. speciosa* is deep chocolate brown with orange warts on all segments. The bases of the two dorsal rows of warts are yellow, occasionally so prominent as

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to form continuous dorsal stripes. The fullgrown larva of *A. d. eisneri* is light greenish yellow, occasionally with darker dorsal markings. Only the warts of the first four or five segments are orange, the rest being of the ground colour. The differences between the larvae are much more immediately striking than those of the imagines.

I found *A. c. speciosa* feeding on *Aristolochia altissima* Desf., and it might also feed on some of the small *Aristolochia* of the coastal area. The larvae were unwilling to accept *A. maurorum* Linné or *A. paecilantha* Boissier, the normal food plants of *A. d. eisneri* in the mountains. It is, of course, possible that freshly emerged larvae would have accepted these plants.

The findings of this section have also been substantiated by Nakamura.

Breeding experiment

I had hoped to conduct a mass breeding experiment with *A. d. eisneri* during the spring of 1973, but curfew and restrictions on free movement curtailed the full implementation of the project. However, 78 larvae successfully pupated in my house, situated some 200m. above Beirut. There was no excessive mortality, nor signs of viral diseases. In early July thirty pupae were placed in tin boxes under substantial gravel pyramids near the house while a further ten were kept on the terrace. Thirty others were placed under similar conditions near Mdairej at an altitude of 1,500m. All were in batches of ten. Eight were retained for cytological study. With the exception of a clutch of ten from the coast, which had been removed from near the house, the pupae were successfully retrieved in March 1974, leaving thirty from each group ready to hatch. The following results were obtained during late March and early April, with the pupae kept near the coast hatching about a week earlier than the rest.

Table 1
Hatchings of Allancastria deyrollei hibernating on the coast and at 1,500m.

Group	Hatched		Unhatched	
	Perfect	Crippled	Diapause	Dead
Coast (n=30)	9	5	8	8
Mountains (n=30)	27	2	1	0

The series is not large enough for proper statistical treatment and significance testing, but it is strongly suggestive that *A. d. eisneri* is unable to hibernate successfully in coastal localities, and that this is a major factor in explaining the chorological pattern in Lebanon. The fact that eight pupae were still diapausing without hatching indicates that frost may be a necessary prerequisite for hatching. However, in June the nine diapausing specimens were subjected to various degrees of cold shocking without subsequently hatching. In 1972 a series of 24 pupae hibernating on my terrace all failed to hatch.

It was, unfortunately, not possible to secure sufficient numbers of pupae of *A. c. speciosa* for the converse treatment.

Cytology

It was possible to study some clear karyotypes in cells of the male gonads about 20 days before the expected day of hatching. Spermatogenesis is very precocious in the species and many imagines had been studied in vain. *A. d. eisneri* has a haploid chromosome count of n=30 and a typical lepidopterous karyology. The modal number for the Papilionidae is n=30; *A. c. speciosa* has not yet been studied but it would be very surprising if it were to differ.

Allancastria outside of Lebanon

I have had the opportunity of making a few incidental observations on other populations of *Allancastria* in the Middle East. Mr. W. Schmidt Koehl kindly sent me some Cappadocian specimens which in morphology and genitalia of the male completely match the Lebanese *A. d. eisneri.* The females are rather lighter and the population may be intermediate between *eisneri* and nominate *deyrollei.* Dr. L. G. Higgins showed me a slide of the Bulgarian race of *A. cerisyi,* ssp. *ferdinandi* Stichel. The genitalia are very close to *A. c. speciosa.* Specimens of the morphologically rather distinct Cretan race of *A. cerisyi,* ssp. *cretica* Rebel, caught by Dr. Higgins in May 1974 also have genitalia close to *speciosa.* A drawing by Dr. Higgins of the genitalia of the curious ssp. *louristana* from S.W. Iran shows some peculiar traits and probably deserves further study.

Conclusion

Further studies on *Allancastria* in Lebanon have fully confirmed the initial findings of the author, and incidental observations from elsewhere seem to confirm also the broader interpretation of the data (Larsen 1973). Research on the dozen or so described forms of *Allancastria* is a must and could shed considerable light on the zoogeography of the region and the entire process of speciation in butterflies.

Postscript

The chromosome number of Beirut *A. cerisyi speciosa* has since been determined as n=30. The two entities are also sympatric in parts of South Turkey. There is an unmistakable male *A. deyrollei eisneri* among a long series of *speciosa* in coll. Colin Wyatt, labelled Asia Minor, Cilician Taurus, 900m., 29.v.1964, Dennelt leg.

References

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Current Literature

Insect Biochemistry and Function. Ed. **D. J. Candy and B. A. Kilby.** xii + 344 pp. £8.50. London, Chapman & Hall.

The natural history of insects is nowadays described increasingly in the analytic terms of genetics, physiology, chemistry and physics. Written from that point of view a book on insect biochemistry and function could be a fascinating book for the entomologist. Gowland Hopkins' classic work on the function of waste products in the ornament of insects, in which it was claimed that uric acid and other, coloured, derivatives of purine were the basis of pigmentation in Pieridae, blazed a trail into this territory. It is realised now that the greater part of these pierid pigments is based on the closely similar pterine ring, which had not been recognised in Hopkins' day. But the principle remains; indeed Pierids will utilise pteridines as end products of nitrogen exretion in lieu of purines. And the other great family of insect pigments, the ommochromes, which furnish many of the eye colours, and the reds and browns of Nymphalids and of other butterflies, are harmless waste products of excess tryptophane, an amino acid which is toxic when liberated in excess from protein breakdown. Likewise, the entomologist cannot fail to be interested in the energy supply of migrating insects. It is not surprising that they mostly lay up stores of fat, which is a far more economic means of storage than is sugar or glycogen. But it is surprising that most butterflies, unlike the honey bee, convert nectar into fat before using it even in small local flights.

But the reader must be warned that such considerations form only a by-product of *Insect Biochemistry and Function.* This book consists of four detailed technical reviews: two, by B. Sacktor and E. Bailey respectively, on the biochemistry of insect flight; one on excretion in insects by D. G. Cochran and a brief one on chemical transmitters in the insect nervous system. These are all good, well written reviews, but they cover only a small part of insect biochemistry and they are intended more for the biochemist who plans to study the cycles of metabolism and the properties of specific enzymes in the tissues of insects, rather than the entomologist who wants to know in simple terms how the body of the insect works. — SIR VINCENT WIGGLESWORTH.