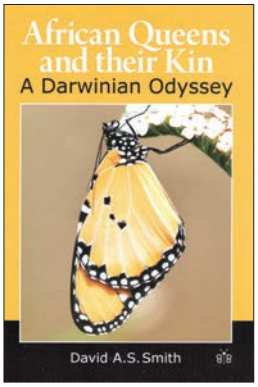
BOOK REVIEW

'AFRICAN QUEENS AND THEIR KIN – A DARWINIAN ODYSSEY' by DAVID A. S. SMITH. Hardback, 2014, xxxiii + 812 pp., 53 colour plates, numerous b/w photographs and diagrams. Published by Brambleby Books. ISBN 978-1908241-153. Price: £90.00.



Danaus chrysippus (Linnaeus, 1758) or the African Queen has been described as 'one of the world's most interesting butterflies, being the model in several mimicry complexes, having four distinct forms, the proportion of which varies seasonally and geographically, and having been the subject of many studies on toxicology and behaviour' (Larsen, 1996, *The Butterflies of Kenya and their Natural History*, Oxford). It is this ubiquitous and abundant, though enigmatic, butterfly that is the main character in David Smith's intriguing book: *African Queens and their Kin – A Darwinian Odyssey*. He first encountered *D. chrysippus* in Sierra Leone in July 1967. In attempting to solve various problems posed by the African Queen's appearance and behaviour, David Smith's 'thirst for answers became an addiction' and led to a love affair with *D. chrysippus* that he describes as 'unrequited after more than 40 years'.

The book's central hypothesis is that *D. chrysippus* is not, as traditionally regarded (e.g. see the opening quote to this review), a single polymorphic species but four hybridising semispecies: *chrysippus* (Linnaeus), *dorippus* (Klug), *orientis* (Aurivillius) and *alcippus* (Cramer), forming a superspecies in which incipient speciation is underway. The species is 'a complex of actively evolving populations, reproductively isolated to a greater or lesser extent, many of which are known to hybridise in nature'. In its 812 + pages, the book captures the passion that David Smith and colleagues have for this butterfly. It provides evidence based on 40 years of painstaking and extensive museum, laboratory and field work in many countries to support his hypothesis, and cast light on the mechanisms underlying it both in time and space. In fact, this book shows that that the author's love affair with the African Queen has been far from unrequited.

The author dismisses any nominative determinism (the idea that a name exercises an influence on the character and life experiences of its bearer) but there are some remarkable parallels between the biology of the butterfly genus *Danaus* Kluk, 1802, and its mythological Greek human namesake Danaus and his dynasty. Male killing is prevalent in both *D. chrysippus* populations and myth. In the butterflies it is caused by an intracellular symbiotic bacterium, *Spiroplasma*, and is a main cause of hybridism between populations. In the myth 49 sons of Aegyptus where murdered on their wedding night by their brides, the daughters of Danaus. And there's a plethora of other behavioural parallels between the biology of African Queens and their kin and the mythological intrigue surrounding the Danaans that would enliven any drama. These include deception, use of poison, lesbianism, pederasty, rape, fratricide and cannibalism, not to mention immigration issues and competition for scarce resources.

The book has two main sections: Part I reviews the biology and classification of the genus *Danaus*. Part II focusses on *D. chrysippus* as model in both Batesian and

Müllerian mimicry rings and those aspects of its biology, phylogeography and biogeography that influence its evolution. It is the author's view that a range of phenomena including frequency-dependent selection, balancing selection, disruptive selection, assortive mating, microhabitat differentiation and selection against hybrids are evidence that *D. chrysippus* is a superspecies undergoing incipient speciation into several new species. *D. chrysippus* appears to be a paraphyletic assemblage, rather than an orthodox biological species, and repetitive cycles of isolation followed by reticulation over the last million years have created the paradoxical shifting 'polymorphisms' in the African Queen.

Well written and produced, this is a long book with numerous plates, photographs, tables and diagrams. It is not a light read and written mainly for professional biologists. The author's hope is that amateur lepidopterists will also find something to enjoy. And indeed there are anecdotes and biographical sections that do just that. But full appreciation of the book's contribution requires more than just a passing familiarity with a number of disciplines including genetics, evolutionary biology, ecology and statistics. A glossary defines many of the technical terms used, and there is a helpful list of abbreviations and their meanings. The Reference section (76 pages) is thorough and there are Geographical, Subject and Taxonomic indexes.

African Queens and their Kin – A Darwinian Odyssey inspired me to reconsider my *D. chrysippus* vouchers and their geographical distribution in the light of the book's hypothesis. And these specimens fit perfectly with the distribution of *D. chrysippus* colour forms as shown in Figure 2.34. *Danaus chrysippus dorippus* from the Kenya Coast (Mombasa Club, 23.v.2000; Villa Buzzar, Kalifi, 27.v.2000); *Danaus chrysippus* f. *albinus* from the hydrid zone (Kenya, Nairobi, Muthaiga Club, 20.v.2000), flying with its mimic *Hypolimnas misippus* f. *inaria-alcippoides*; *Danaus chrysippus alcippus* (worn specimen) also from the hybrid zone: Lake Naivasha, 03.vi.2000; and *Danaus chrysippus orientis* from Ascension Island (Green Mountain, 11–17.vii.2012), although Ascension is not shown on the map, while its nearest neighbour St Helena is.

D. chrysippus ranks among the most abundant and best studied of all butterflies and David Smith's excellent book reveals even more reasons to continue studying this iconic superspecies. This is a fascinating book for all biologists.

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