



The thorny subject of insular endemic taxonomy: morphometrics reveal no evidence of speciation between *Coenonympha corinna* and *Coenonympha elbana* butterflies (Lepidoptera: Nymphalidae)

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Abstract

Species demarcation between mainland and island endemic populations is often subjective according to the biological concept of species. However, the recognition of the specific status of island endemics is decisive for biogeography and conservation studies. In this paper we applied rigorous morphometric analyses instead of subjective visual evaluation to solve the long debated question whether the endemic butterfly from Tuscany *Coenonympha elbana* should be considered as a separated entity from the endemic *C. corinna* from Sardinia and Corsica. We carried out traditional and geometric morphometric analyses of wing pattern and male genitalia comparing the populations from Corsica, Sardinia, Tuscan Archipelago and Tuscany. We found that Sardo-Corsican *C. corinna* and Tuscan *C. elbana* can be distinguished only on the basis of the dimension of ventral wing ocelli. However, this characteristic shows a clinal pattern from Sardinia to Tuscany. Moreover, there is not any clear diversification in the shape of male genitalia between the two entities and each islet population can not be unambiguously attributed to one of the two taxa. In conclusion, we found no decisive evidence for a specific diversification between these two entities and the *Coenonympha corinna/elbana* complex, occurring both in Sardinia-Corsica and in the Italian mainland, should not be strictly considered as an endemic insular taxa.

Key words: Endemic butterflies, West Mediterranean, *Coenonympha corinna*, *Coenonympha elbana*, geometric morphometrics, wing pattern

Introduction

In a recent review Agapow *et al.* (2004) affirmed that “species are the currency of biology”. Actually, in conservation biology and biogeography, species inventories represent the basal data to compile red lists of threatened species and to identify biogeographical patterns, biodiversity hotspots and areas of endemism (Agapow *et al.* 2004; Isaac *et al.* 2004; Whittaker *et al.* 2005). However, species definition has troubled biologists for a long time and over twenty different species concepts exist (Mayden 1997; Agapow *et al.* 2004; Isaac *et al.* 2004; Bock 2005). Among these, the biological species concept defined as “groups of interbreeding natural populations that are reproductively isolated from other such groups” (Mayr 1942) has been widely accepted. According to this definition, however, island populations represent a particular challenge to this species concept and the consequent identification of species. Island biogeography and conservation plans are often assessed on the basis of occurrence and proportion of endemic species (Whittaker *et al.* 2005). However, the biological species concept is difficult to apply in spatially isolated taxa (which are *de facto* reproductively isolated) and the attribution of insular taxa to being endemic species is often subjective (Mallet 1995; Bock 2005). Generally, taxonomists identify species using operational methods, mainly based on phenotypic mor-