

# Comments on a Phylogeny of Iguanid Lizards

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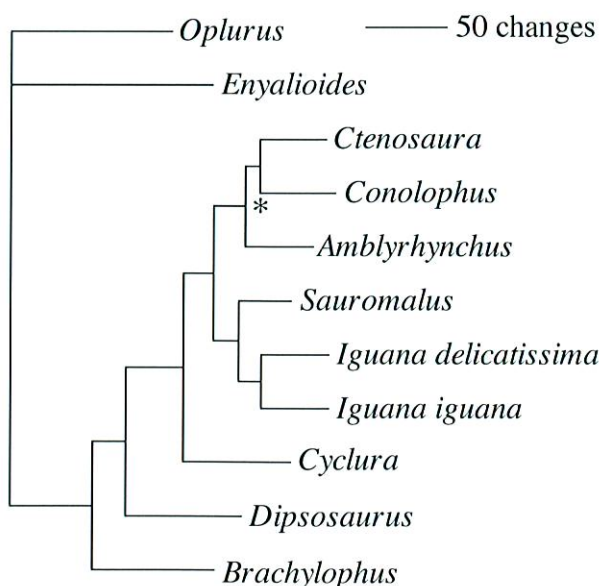
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In a recent study of the phylogeography of *Cyclura*, Malone et al. (2000) presented a phylogram (Figure 1) that resulted from an analysis of mitochondrial DNA sequence data. In concurrence with other recent molecular studies (Sites et al., 1996; Norell and de Quieroz, 1991; Petren and Case, 1997), these data strongly support the monophyly of the Iguanidae (*sensu strictu*) and the antiquity of *Brachylophus*. *Dipsosaurus* resolved as the sister group to a clade composed of *Cyclura*, *Ctenosaura*, *Conolophus*, *Amblyrhynchus*, *Sauromalus*, and *Iguana*. *Cyclura* also is supported as a monophyletic lineage, equally related to *Ctenosaura*, *Conolophus*, *Amblyrhynchus*, *Sauromalus*, and *Iguana*. Within the latter assemblage, the data strongly support that *Iguana* and *Sauromalus* are sister taxa, contrary to the conclusions of Wiens and Hollingsworth (2000, and references therein), who suggested that *Iguana* and *Cyclura* were so related. Within *Iguana*, lineages from different geographical areas were highly differentiated (not shown here), and may result in taxonomic distinctions with further study.

As expected, endemism was extremely high within *Cyclura*, with each lineage restricted to one island or island group. Hispaniola is the only

island that supports two distinct lineages, possibly reflecting separate origins on the two paleoislands that joined to form the current island. The distinct lineages cluster geographically (Figure 2). An "eastern" clade is composed of *C. pinguis*, the oldest extant lineage, which historically inhabited most of the Puerto Rico Bank. A "central" clade is composed of *C. cornuta* from Hispaniola and Isla Mona and its sister group, containing *C. ricordii* from Hispaniola and *C. carinata* from the Turks and Caicos Islands. A "western" clade is composed of *C. collei* from Jamaica, *C. rileyi* from the western Bahamas, *C. cyathura* from the eastern Bahamas, and *C. nubila*, as traditionally defined, from Cuba and the Cayman Islands. This contradicts the topology of Schwartz and Carey (1977),

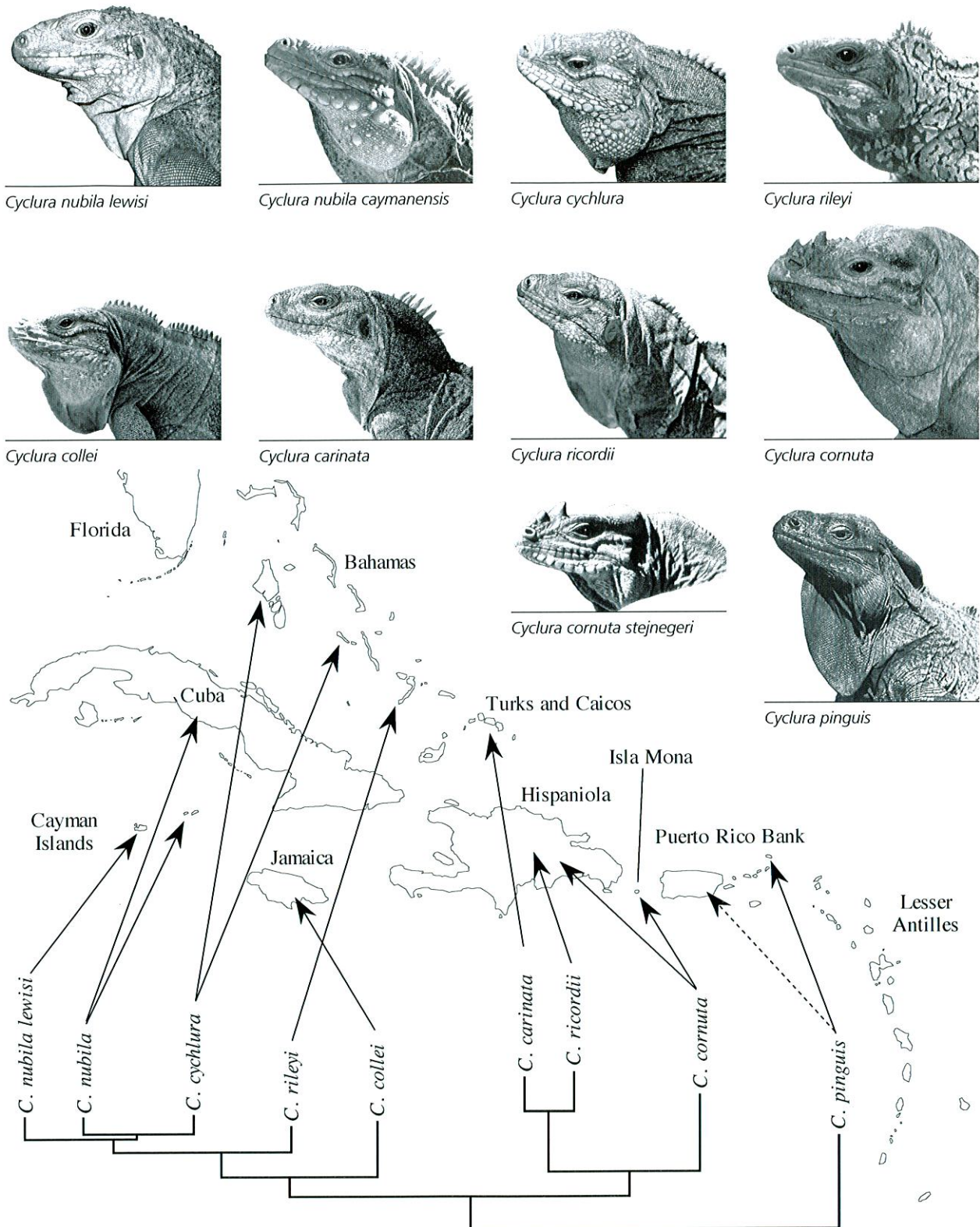
who considered the *C. ricordii* + *C. carinata* group basal and clustered *C. cornuta* with *C. rileyi*, *C. collei*, *C. nubila*, and *C. cyathura*. This data set also brought to light the need for further inquiry into the relationship between *Cyclura nubila lewisi* from Grand Cayman and populations presently considered to be conspecific, *C. n. nubila* from Cuba and *C. n. caymanensis* from Little Cayman and Cayman Brac. Also noteworthy are the very close associations between populations currently recognized as



**Figure 1.** The maximum-likelihood estimate of relationships among iguanid lizards represented as a phylogram. The asterisk (\*) indicates that support for this node is weak and that, pending further data, the relationship between *Ctenosaura*, *Conolophus*, and *Amblyrhynchus* might be considered a trichotomy.



## Phylogeography of *Cyclura*



**Figure 2.** A phylogeographic distribution of the genus *Cyclura*, with the maximum likelihood estimate of historical relationships within *Cyclura* superimposed onto a map of the Greater Antilles, Bahamas, and Turks and Caicos Islands. The dotted arrow represents the probable historic range of *C. pinguis* on Puerto Rico proper. Photographs by John Binns (*Cyclura nubila*, *C. collei*, *C. carinata*, *C. ricordii*), Carl Fuhri (*C. cyclura*, *C. rileyi*), Robert Powell (*C. nubila lewisi*, *C. cornuta*, *C. c. stejnegeri*), and Glenn Gerber (*C. pinguis*).



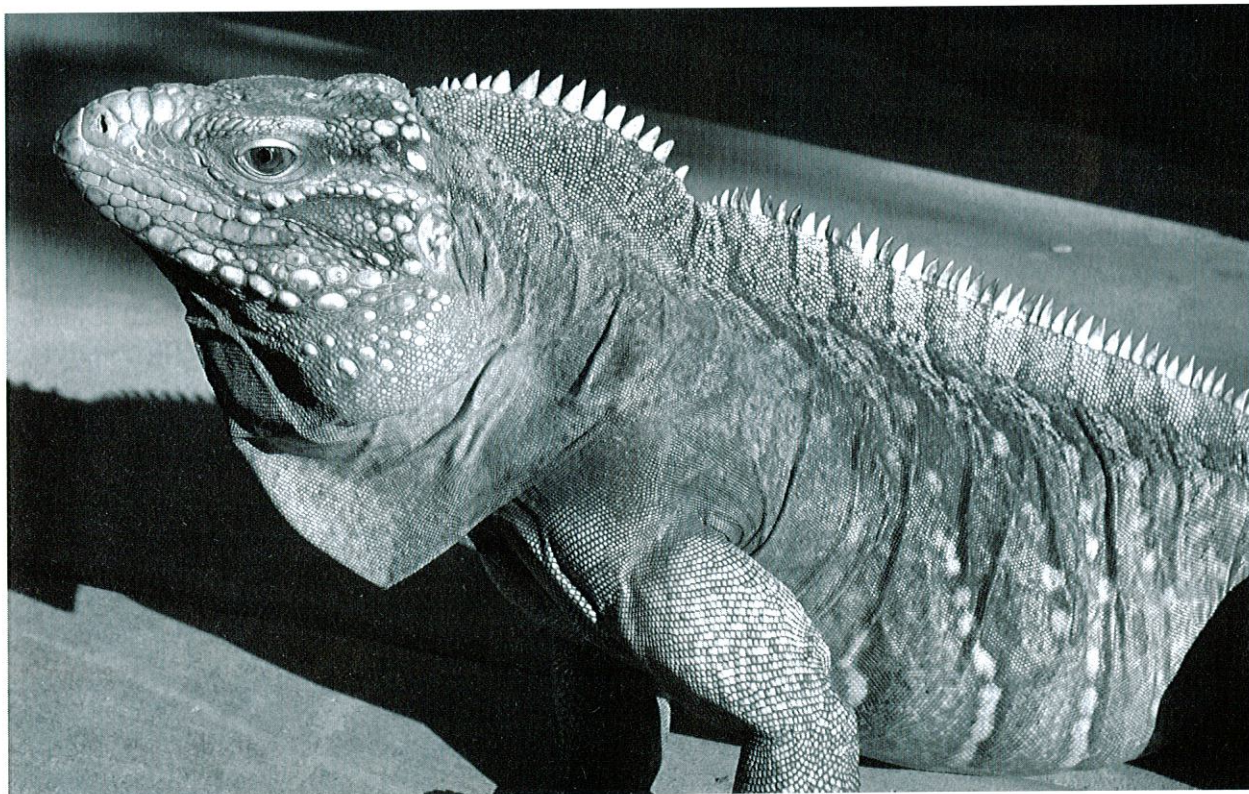
subspecies of *C. cyclura*, *C. rileyi*, and *C. cornuta*; with these data arguing strongly against species-level recognition of populations of the latter from Hispaniola and Isla Mona (e.g., Powell and Glor, 2000).

Forthcoming work involves a closer look at the relationships within the *Iguana iguana* complex, within *Ctenosaura* (C.R. Hasbun, pers. comm.), and between *C. cornuta* from Hispaniola and Isla Mona. Until these data are adequately analyzed, we suggest that the phylogram presented herein constitutes the best currently available representation of relationships among iguanid lizards.



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*Cyclura nubiola nubiola* (above), *C. nubiola caymanensis*, and populations in the *C. cyclura* complex appear to be more closely related to one another than to *C. nubiola lewisi*, which probably is a distinct species. Photograph by John Binns.



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A large male spiny-tailed iguana, *Ctenosaura conspicuosa*, basks atop a cardon cactus, *Pachycereus pringlei*, on Isla San Esteban, a small island in the Gulf of California.  
Photograph: L. Lee Grismer