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A NOTE ON THE PHILIPPINE FROGS RELATED TO *RANA MACRODON*

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In my review of the Philippine amphibians (Inger, 1954), several large aquatic forms of *Rana* were treated as subspecies of *macrodon* of Borneo, Sumatra, and the Malay Peninsula. Since that publication appeared, Chicago Natural History Museum has received much additional material from the Philippine Islands and from Borneo. Study of these specimens suggests revision of my previous opinion.

That the Philippine forms, *acanthi*, *magna*, *macrocephala*, and *visayanus*, differ from *macrodon* of Borneo and the Malay Peninsula in the possession of vocal sacs has long been known (Boulenger, 1920; Inger, 1954). That difference, taken by itself, did not seem sufficient reason for separating *macrodon* from the Philippine frogs at the specific level. The other differences between *macrodon* and certain of the Philippine populations were not significant to this problem because the characters involved (for example, size, rugosity of skin, ventral coloration) varied from population to population.

However, a character of *macrodon* not noted before re-enforces the difference in vocal sacs. Mature ova of all the Philippine frogs related to *macrodon*, including the distinct species *woodworthi* Taylor, have a densely pigmented hemisphere and thus resemble the great majority of their congeners. But the ova of *macrodon* have no dark hemisphere and are uniformly yellow. A new Bornean member of this group (to be described in a separate publication), a species living with *macrodon* along forest streams in eastern North Borneo and resembling *macrodon* in lacking a vocal sac, also has pigmented ova. *Rana macrodon* is thus the only form in this species group¹ without pigmented ova.

¹ The *Rana doriae-macrogathus* series is excluded from consideration here as it is clearly distinct from *macrodon* and its Philippine relatives.

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In view of this additional distinction, it seems best to separate the Philippine frogs from *macrodon* at the specific level.

Earlier, I considered the relationship of *modesta* Boulenger to these Philippine frogs to be no closer than that of *modesta* to *microdisca* (Inger, 1954). Two seemingly trivial characters (among others) differentiate *modesta* and the *macrodon-magna* group. A dark, inverted V appears on the back in about half the individuals of *modesta* but not in the *macrodon-magna* group, which often has a dark W, especially in juveniles. Another pattern element, a pair of broad, yellowish, dorsolateral bands, occurs in about one-fourth or one-fifth (three out of fourteen seen) of *modesta* but never in the others. Conceivably each of these distinctions could be accounted for by single gene differences so that they might not represent significant divergence. However, the issue here is a decision as to which relationship is closer, that of *modesta* to *microdisca* or that of *modesta* to the *macrodon-magna* group, and the significant point is that the two trivial characters of *modesta* crop up in *microdisca* and not in *magna* and its allies.

If phylogenetic affinity is a measure of the similarity in genetic composition, the more closely two species are related the more likely they are to hold genes in common and, as a corollary, to show similarities in trivial characters. Therefore, in the absence of evidence to the contrary, these two minor characters indicate that the relationship of *modesta* to *microdisca*, which is sympatric with the *macrodon-magna* group over much of their ranges, is closer than the relationship of either to *macrodon* or *magna*. Consequently, the separation of *magna* and *modesta* at the specific level should be retained.

Since *magna* Stejneger is the oldest-named of the Philippine frogs concerned, its name is applied here to the polytypic species that includes the following forms:

Rana magna magna Stejneger—Mindanao, Basilan.

Rana magna acanthi Taylor—Busuanga, Culion, Palawan, Balabac.

Rana magna macrocephala Inger—Luzon, Polillo.

Rana magna visayanus Inger—Panay, Bohol, Negros, Leyte, Siquijor, Dinagat.

Since zoogeographic discussions are based on taxonomic conclusions, the effect of this modification of taxonomy should be considered. *Rana macrodon* alone of the Philippine species was placed in a category of non-endemic species distributed from Sundaland to Papua (Inger, 1954). Now, of course, *Rana magna* must be placed in the

category of endemic species of western affinity. No other changes in my previous zoogeographic conclusions are necessary, because the relationships of the Philippine populations to one another and to species besides *macrodon* remain the same.

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