两栖爬行动物学报 1987年2月; 6(1): 43-47
Acta Herpetologica Sinica

EVIDENCE FOR THE RESURRECTION OF Goniurosaurus BARBOUR (REPTILIA: EUBLEPHARIDAE) WITH A DISCUSSION ON GEOGRAPHIC VARIATION IN Goniurosaurus lichtenfelderi

(Plate V)

L. Lee Grismer

(*Department of Biology, San Diego State University, San Diego, CA* 92182)

Eublepharis lichtenfelderi was described by Mocquard (1897) on the basis of two specimens from the Iles de Norway, in the Gulf of Tonkin. Shortly afterwards, Barbour (1908) described *Goniurosaurus hainanensis* from a single specimen collected on the island of Hainan, China. Schmidt (1927) noted that the descriptions of these two forms were very similar and placed *G. hainanensis* in the synonymy of *E. lichtenfelderi*. This arrangement was followed by Pope (1935), Smith (1935), and Kluge (1967, 1986). Borner (1981), however, resurrected the genus *Goniurosaurus* and presented the new combination *G. lichtenfelderi*. Furthermore, he went on to propose an entirely new generic name (*Amamisaurus*) for the closely related species, *E. kuroiwae* from the Ryukyu Islands of Japan.

Although Borner (1981) provided absolutely no evidence for the revival of *Goniurosaurus*, recognition of this genus, and the inclusion in it of *Eublepharis kuroiwae* is well supported. *Goniurosaurus* is unique among squamates in that it has teeth with expanded occlusal margins that are inlaid with several crests (plate V). It is unique among eublepharids in having an ulnare with a sharp elongated crest along its entire length that extends parallel to the long axis of the limb; sharply tuberculate dorsal scales of the upper eyelids, limbs, and body; and, with the exception of *Coleonyx switaki* and *C. fasciatus*, an adult caudal color pattern that consists of distinct dark-brown to black and white rings (Grismer, 1986). Furthermore, it lacks a flat basi-occipital bone and deep axillary pockets which are derived features diagnosing the genus *Eublepharis*, as well as several other derived features that group *Eublepharis* with the African genera *Hemitheconyx* and *Holodactylus* (Grismer, 1986). Therefore, if *G. lichtenfelderi* and *G. kuroiwae* are considered species of *Eublepharis*, then *Eublepharis* becomes a paraphyletic or a non-natural group which

would clearly be a mis-representation of history (fig. 1).

Owing to the distinctiveness of *Goniurosaurus* among other eublepharid genera, the similarities between *G. lichtenfelderi* and *G. kuroiwae*, and the differences between *G. lichtenfelderi* from Hainan and those from the Iles de Norway, the following classification is proposed:

Gouiurosaurus Barbour 1908

1908 *Goniurosaurus* Barbour, Bull. Mus. Comp. Zool., Harvard, 51:316. Type species (by monotype): *Goniurosaurus hainanensis* Barbour 1908= *Eublepharis lichtenfelderi* Mocquard 1897 *fide* Schmidt 1927.

1929 *Gonyurosaurus* Barbour and Loveridge(invalid emendation of *Goniurosaurus* Barbour 1908, Bull. Mus. Comp. Zool., Harvard, 51:316)69: 270.

1981 *Amamisaurus* Borner, Misc. Art. Saurol., 9:4. Type species (by original designation): *Eublepharis kuroiwae* Namiye 1912.

Diagnosis *Goniurosaurus* differs from all other eublepharid genera in that it has expanded occlusal tooth margins inlaid with several crests; a sharp elongated crest running along the entire length of the ulnare; and sharply tuberculate dorsal scales of the upper eyelids, limbs, and body.

Distribution Isles de Norway in the Gulf of Tonkin; Hainan, China; Tokunoshima, Kume-Jima, Tonaki-shima, Tokajiki, and Okinawa of the Ryukyu Islands, Japan.

Goniurosaurus kuroiwae (Namiye)

1912 *Gymnodactylus albofasciatus kuroiwae* Namiye, Zool. Mag., Tokyo, 24: 444. Type locality: Kungami-gun, Okinawa-Ken, Japan (Holotype: none designated).

1930 *Eublepharis orientalis* Maki (syn. *fide* Nakamura and Ueno, 1963 Osaka, Jap., p. 100) Annot. zool., Japan, 13:9. Type locality: Tonaki-shima, Ryukyu Islands, Japan (Holotype: in Zoological Institute College of Science, Kyoto Imperial University, Japan. Cat. no. not given).

1936 *Gymnodactylus yamashinae* Okada (syn. *fide* Nakamura and Ueno 1963, Osaka, Jap., p. 100), Proc. Imp. Acad., Tokyo, 12:53. Type locality: Kumejima, Okinawa group, Japan (Holotype: none designated).

1959 *Eublepharis splendens* Nakamura and Ueno (syn. *fide* Nakamura and Ueno 1963, Osaka, Jap., p. 101), Mem. Coll. Sci. Univ. Kyoto, ser. B., 25:47. Type locality: Jindegumi Cave, Kametsu, Tokuna-shima, Japan (Holotype: 23-Ⅷ-1958, in Zoological Institute, Kyoto, Japan).

Diagnosis This species differs from *Goniurosaurus lichtenfelderi* in that it has tuberculate gular scales; six to nine scales as opposed to four scales surrounding the claws; the terminal lateral scales of the digits do not sheath the claws; the subdigital lamellae are reduced and not as wide as the digit; it has an enlarged scale at the base of each

digit; the enlarged dorsal tubercles are not as flattened; the ventral scales are small and granular and not large and flat; males lack preanal pores; and it lacks a well-defined nuchal loop.

Distribution Found on the islands of Okinawa, Tonaki-shima, Kume-Jima, Tokuno-shima, and Tokajiki of the Ryukyu Islands, Japan.

Goniurosaurus lichtenfelderi (Mocquard)

1897 *Eublepharis lictenfelderi* Mocquard, Bull. Mus. nat. Hist., Paris, 3:213. Type locality: Iles de Norway, in the Gulf of Tonkin (Syntypes: MHNP/91-92).

1929 *Gonyurosaurus lichtenfelderi* Barbour and Loveridge (invalid emendation of *Goniurosaurus* Barbour 1908, Bull. Mus. Comp. Zool., Harvard, 51:316)69:270.

1981 *Goniurosaurus lichtenfelderi* (in part) Borner, Misc. Art. Saurol. 9:3.

Diagnosis This species differs from *Goniurosaurus kuroiwae* in that it has smooth gular scales; four scales as opposed to six to nine scales surrounding the claws; sheathed claws; subdigital lamellae are equal in size to the width of the digit; lacks an enlarged scale at the base of each digit; the enlarged dorsal tubercles are sharp and conical; the ventral scales are large and flat as opposed to small and granular; males have preanal pores; and has a well-defined nuchal loop.

Distribution Found on the Iles de Norway, in the Gulf of Tonkin, and Hainan, China.

Goniurosaurus lichtenfelderi lichtenfelderi (Mocquard)

1897 *Eublepharis lichtenfelderi* Mocquard, Bull. Mus. Hist. nat., Paris, p.213. Typs locality:Iles de Norway, in the Gulf of Tonkin (Holotype: none designated).

1929 *Gonyurosaurus lichtenfelderi* Barbour and Loveridge(invalid emendation of *Goniurosaurus* Barbour 1908, Bull. Mus. Comp. Zool., Harvard, 51:316)69:270.

Diagnosis *Goniurosaurus lichtenfelderi lichtenfelderi* differs from *G. l. hainanensis* in lacking a prenasal scale that prevents contact between the rostral scale and extenal nares; the first supralabial not contacting the external nares; light-colored body bands that are one-half the width of those of *G. l. hainanensis*; and no ontogenetic change in color pattern.

Distribution Known only from the Iles de Norway, in the Gulf of Tonkin.

Goniurosaurus lichtenfelderi hainanensis Barbour

(new combination)

1908 *Goniurosaurus hainanensis* Barbour, Bull. Mus. Comp. Zool., Harvard, 51:316. Type locality: Mt. Wuchi, Central Hainan, China (Holotype: MCZ 7104).

Diagnosis *Goniurosaurus lichtenfelderi hainanensis* differs from *G. l. lich-*

tenfelderi in having a prenasal scale that prevents contact between the rostral scale and the external nares; the first supralabial contacting the external nares; light-colored body bands that are twice the width of those of *G. l. lichtenfelderi*; and an ontogenentic change in color pattern going from a hatchling with uniformly darkcolored interspaces between the body bands to an adult with mottled appearing interspaces.

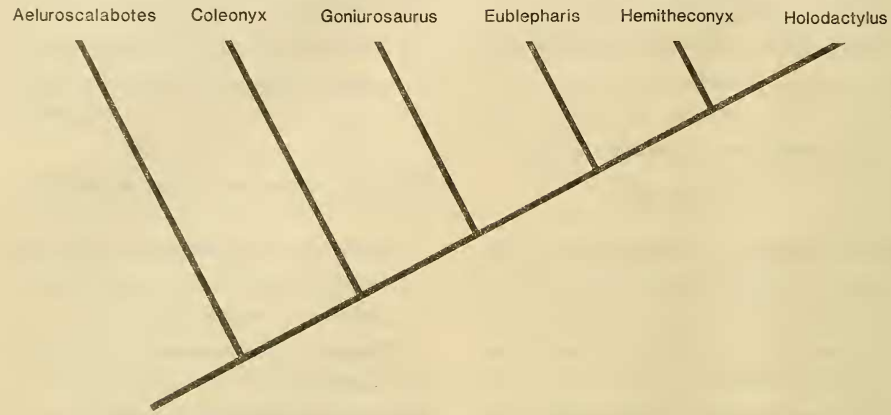

Figure 1. Phylogenetic relationships of eublepharid genera after Grismer(1986).

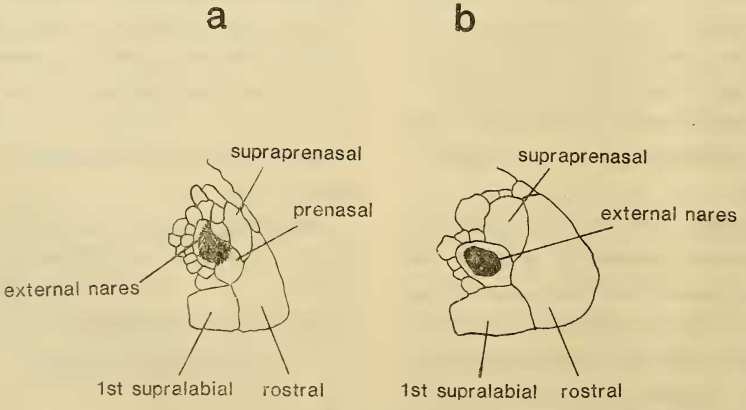

Figure 2. Lateral view of nasal region of a) *Goniurosaurus lichtenfelderi hainanensis* (MCZ 7104) and b) *G. l. lichtenfelderi* (MHNP/91) after Schmidt (1927).

Distribution Known only from the island of Hainan, China.

Discussion

Separate generic recognition of *Goniurosaurus kuroiwae* would not create any non-natural or paraphyletic groups. It is my opinion, however, that the morphological similarities, recent common ancestry, and similar biogeographic history of these two species is worth

emphasizing by considering them congeneric and that the use of *Amamisaurus* would obscure more knowledge than it would reveal. Moreover, the morphological differences observed between *G. lichtenfelderi* and *G. kuroiwae* are equivalent in magnitude to those differences observed between other eublepharid congeners (Grismer, 1986).

The most noteworthy character separating *Goniurosaurus lichtenfelderi lichtenfelderi* from *G. l. hainanensis* is the lack of a prenasal scale in the former which allows the rostral scale to make contact with the external nares (fig. 2). In fact, this taxon is the only eublepharid known that lacks a prenasal scale (Grismer, 1986). A thorough assessment of the geographic variation within this species is hampered by the fact that it is extremely rare and specimens are few (two *Goniurosaurus lichtenfelderi lichtenfelderi* and seven *G. l. hainanensis*). Nevertheless, given the relictual distribution of *Goniurosaurus* and its ancestral relationship to the Old World eublepharines (*sensu* Grismer, 1986), recognition via taxonomic emphasis, of the apparently large amount of variation within this geographically circumscribed species adds credence to the contention that *Goniurosaurus* is a relatively ancient group (Grismer, 1986).

Acknowledgments I would like to thank Richard E. Etheridge for reviewing the manuscript, Zhao Ermi for providing morphological information concerning specimens of *Goniurosaurus lichtenfelderi hainanensis* in his repository, Robert W. Murphy and Eric Sumida for pointing out the tooth condition of *G. kuroiwae* and providing me with an SEM photograph, and Richard C. Goris for providing beautiful color slides of adult *G. l. hainanensis*.

References

Barbour, T. 1908. Some new reptiles and amphibians. *Bull. Mus. Comp. Zool.*, Harvard. 51:315-325.

Borner, A. R. 1981. The genera of Asian eublepharine geckos and a hypothesis of their phylogeny. *Misc. Art. Saurol.*, Cologne, Germany. 2:1-15.

Grismer, L. L. 1986. The phylogeny, taxonomy, classification, and biogeography of eublepharid geckos (Reptilia: Squamata). Masters Thesis, San Diego State University. XV+264pp.

Kluge, A. G. 1967. Higher taxonomic categories of gekkonid lizards and their evolution. *Bull. Amer. Mus. Nat. Hist.* 135:1-60.

——. 1986. Cladistic relationships among the Gekkonoidea. Misc. Pub. Mus. Zool. Univ. Michigan. In press.

Mocquard, F. 1897. "Notes herpetologique." *Bull. Mus. Hist. Nat.*, Paris. pp.211-217.

Pope, C. H. 1935. The reptiles of China. Nat. Hist. of Central Asia. vol. 10. lii+604pp.

Schmidt, K. P. 1927. The reptiles of Hainan. *Bull. Amer. Mus. Nat. Hist.* 54:395-465.

Smith, M. A. 1935. The fauna of Britsh India including Ceylon and Burma. Reptilia and Amphibia. vol. I.-Sauria. Taylor and Francis Ltd., London.

Grismer, L.L.: 恢复 *Goniurosaurus*属(爬行纲：睑虎科)　　图版Ⅴ
的证据。兼论 *G. lic'ntenfelderj*的地理变异

Grismer, L. L.: Evidence for the Resurrectionof *Goniurosaurus* (Reptilia: Eublepharidae) with a Discussion on Geographic Variation in *G. lichtenfelder*　　Plate Ⅴ

Dorsal view of occlusal margin of tooth of (left) *Goniurosaurus kuroiwae*(CAS 117874) and (right) *Coleonyx switaki* (RWM 001).