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A NEW LOCALITY IN SINGAPORE FOR THE CAECILIAN, *ICHTHYOPHIS PAUCISULCUS*

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ABSTRACT. — Two specimens of the caecilian, *Ichthyophis paucisulcus,* were observed in a hill stream at the eastern part of the Bukit Timah Nature Reserve, Singapore. This discovery provides valuable insight to the behaviour and habitat preferences of this locally rare and elusive species.

KEY WORDS. — Amphibian, caecilian, hill streams, Bukit Timah Nature Reserve, Singapore

INTRODUCTION

Very little is known about caecilians owing to their fossorial habits. To date, there have been only four records of caecilians in Singapore and all are dated more than 20 years ago (Lim et al., 1990; Lim & Yang, 1991). Two caecilian species have been recorded in Singapore, namely *Ichthyophis paucisulcus* and *Ichthyophis singaporensis. Ichthyophis singaporensis* is known only from the type specimen collected in Singapore in 1847 (Ng et al., 1988). Its body is uniformly dark brown with no stripe (Ng et al., 1988). The other species, identified as *Ichthyophis paucisulcus,* is distinguished by a prominent yellow stripe along the sides and was recorded in the Bukit Timah Nature Reserve from two juvenile specimens collected at the Jungle Fall Valley in Mar.1984 and Feb.1989. The third record is an unconfirmed sighting at the Nee Soon Swamp Forest within the Central Catchment Nature Reserve in Jul.1990 (Lim & Yang 1991; Ng et al., 1988; Ng, 1989). *Ichthyophis paucisulcus* is listed as Nationally Critically Endangered in the Singapore Red Data Book, 2nd Edition (Lim & Leong, 2008). The current observations represent the 4th record and a new locality for *Ichthyophis paucisulcus* in Singapore.

OBSERVATIONS

Freshwater biodiversity surveys were conducted on various waterways in the Bukit Timah Nature Reserve from Dec.2014–May 2015. The surveys covered several streams including that in Jungle Fall Valley and some of the rarely surveyed areas in the eastern side of the reserve. On 23 Feb.2015, an *Ichthyophis paucisulcus* individual was observed at a hill stream on the eastern side of the reserve. The caecilian was hiding within some submerged leaf litter. When disturbed, it tried to escape by swimming away in an undulating motion, but was eventually captured with a hand net (Fig. 1). The individual had two small, distinct eyes, no scales, a prominent yellow lateral stripe on its dark-brown body, and a laterally compressed tail. From the total length of this individual (11.4 cm) and its aquatic habitat, it is believed to be a juvenile (see Ng et al., 1988; Ng, 1989).

A subsequent survey was conducted on the night of 25 Mar.2015 at the same stream, during which a second caecilian was obtained. This second individual was smaller, measuring 10.9 cm in total length. It was discovered at the same location as the first caecilian, in leaf litter. When disturbed, it did not exhibit any burrowing behaviour, but, like the first caecilian, swam away in an undulating motion.

A survey of the stream habitat was conducted. The distance of the stream surveyed was approximately 139 m and the length of the entire stream was estimated to be 420 m. The shallow hill stream is located under the forest canopy with an elevation of approximately 90 m above sea level. The width of the stream is about 0.82 m, and its maximum depth is 0.07 m. The water flow is moderate (~0.1 m s^{-1}). At the time, the water was clear with high dissolved oxygen (7.74 ppm), acidic (pH 5.88), a temperature of about 25.5°C and the substrate was mostly sand with patches of dense leaf litter. The vegetation at the stream sides is mainly old secondary forest with a dense canopy (Fig. 2) and an abundance of the spiny palm, *Eleiodoxa conferta* (Arecaceae) and the climber, *Byttneria maingayi* (Malvaceae).

The endemic Singapore freshwater crab (*Johora singaporensis*) (Li et al., 2015) and Johnson's freshwater crab (*Irmengardia johnsoni*) were also found in the same stream. Other notable sympatric fauna observed include tadpoles of the Malayan horned frog (*Megophrys nasuta*), Malayan freshwater prawn (*Macrobrachium malayanum*) and Malayan forest betta (*Betta pugnax*).

One specimen of *Ichthyophis paucisulcus* was brought to the laboratory to observe morphological changes during its growth. Over three months, this caecilian grew from 11.4 to 12 cm on a main diet of frozen blood worms. At the time of writing further observations are being made of its behaviour.

Fig. 1. First *Ichthyophis paucisulcus* (11.4 cm) captured in a hand net in a stream at the eastern part of the Bukit Timah Nature Reserve. (Photograph by: Cai Yixiong).

Fig. 2. The locality for *Ichthyophis paucisulcus* in the eastern part of the Bukit Timah Nature Reserve. (Photograph by: Lim Weihao).

DISCUSSION

Many species of ichthyophiid caecilians undergo an aquatic juvenile stage before they metamorphose into terrestrial adults. These juveniles are usually identical in appearance to the adults except for their smaller size and the presence of gill slits and tail fin (Duellman & Trueb, 1994). No adult caecilian was found during the recent survey. This could be because adult ichthyophiids are fossorial, burrowing deep into the soil and do not reside at the surface (Ng et al., 1988). It seems that different survey technique is required to locate the adults, and to better understand their biology, behavior and habitat preferences.

This discovery of a new and third locality of *Icthyophis paucisulcus* after the last sighting about 20 years ago provides an affirmation that this species, regarded as Nationally Critically Endangered in Singapore, is still surviving within a nature reserve. As mentioned above, the same stream is also a new locality for the endemic Singapore freshwater crab, *Johora singaporensis* (Li et al., 2015). This particular hill stream, located deep within the Bukit Timah Nature Reserve, is well protected against human disturbance and serves as an important sanctuary for these critically endangered aquatic fauna. It highlights the important role served by nature reserves in Singapore in protecting and conserving threatened native flora and fauna.

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