A New Locality Record for the Asian Serotine Bat,

Eptesicus pachyomus

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Introduction

Hong Kong's bat fauna is diverse and constitutes almost half of the recorded mammalian species for the territory (Ades 1999). A new species was recently discovered in Hong Kong that brings excitement to both conservationists and bat enthusiasts. The species discovered is the Asian Serotine bat (*Eptesicus pachyomus*).

On November 2014, a bat was discovered trapped in a building in Wan Chai district belonging to the Society for the Prevention of Cruelty to Animal's (SPCA). SPCA staff caught the bat and delivered the specimen to KFBG Wild Animal Rescue Centre. During its health examination, the bat appeared to be fit for a rapid release, however, its morphological features varied from the Brown Noctule Bat, which is a native species and is similar in size and appearance. A closer examination of the bat then took place. Agricultural Fisheries and Conservation Department bat expert Mr. C.T. Shek was by coincidence at KFBG when the bat arrived. He tentatively identified the species as the Common Serotine bat (*Eptesicus serotinus*), and bat expert, Dr. Gary Ades came to the same conclusion independently after receiving a photograph of the bat. Biometric measurements, DNA samples and acoustic recordings were collected, and the bat was subsequently released in a wooded area adjacent to the Wan Chai SPCA centre (Figure 1).

This report shares information regarding the discovery of a new species for the Hong Kong SAR. In fact, as the serotine bat has not been previously recorded for Guangdong Province, it is a useful new location record for the region. We consider the species to be resident in Hong Kong but previously over-looked. It is likely that the serotine roosts in old buildings in urban and rural areas, and future bat surveys should consider the possibility of this species adopting similar localities as the Brown Noctule. The finding adds a 27th species to the checklist of bats of Hong Kong, which will hopefully encourage further exploration for new species, and the protection and appreciation of the unique biodiversity of Hong Kong.

Figure 1. Serotine bat rescued by the Society for the Prevention of Cruelty to Animals (SPCA) in Wan Chai.

Section 1: Description of the adult bat

The healthy female bat weighed 32.3 g and had a forearm length of 51.1mm (Table 1). Dark brown fur covered the head and body, while the face, eyes, ears and wings were black (Figure 2). The ears were large, triangular and similar in length to the snout. The tragus (earlet) was approximately one-third of the ear length, bent slightly inwards and rounded at the top (Figure 3). This is quite different from the Brown Noctule's mushroom shaped tragus. Due to the fairly sedentary nature of the serotine, it is possible that the individual was from an established colony in Wan Chai. This district also includes several small parks and gardens, which are documented as favoured foraging areas for this species.

Table 1. Morphometric measurements of the *Eptesicus pachyomus* (mm).

EL	FA	HBL	TL	TibL	HF
14.3	51.1	77.1	62	21.9	10.8

EL: Ear length, FA: Forearm length, HBL: Head to body length, TL: Tail length, TibL: Tibia length, HF: Hind Foot

Figure 2. Asian Serotine bat (Full body).

Figure 3. Asian Serotine bat (Head) with elongated earlet (tragus).

Section 2: Genetic identification

A small tissue punch was removed from the wing membrane and the Conservation Genetics Laboratory at KFBG carried out DNA analysis to confirm the species as the Serotine bat. With reference to a recent study by Juste *et al.* (2013), Cytb and RAG2 genes of the individual were compared with those of three closely related species of the Common Serotine: *Eptesicus isabellinus, E. serotinus* and *E. pachyomus*. The phylogenetic analysis of Cytb and RAG2 confirmed that the new bat species record belongs to the Asian Serotine Bat - *Eptesicus pachyomus*. The Asian Serotine Bat was previously grouped under *E. serotinus,* however, Juste *et al*. (2013) have distinguished *E. pachyomus* from *E. serotinus* genetically. The former species name refers to the Asian form and the latter refers to the European form.

Figure 4 and figure 5 are the Cytb tree and the RAG2 tree respectively. They show the phylogenetic relation of *Eptesicus isabellinus, E. serotinus* and *E. parchyomus*. The serial number comprises of three components: the GenBank number, the specimen number and the origin. For example, 'EU786841_42Ead CH' indicates that the specimen's GenBank number is EU786841, while the specimen number is 42Ead, and CH (China) is its origin. In both trees, the red clade is *E. pachyomus*, the yellow clade is *E. isabellinus*; the blue, purple and green clades in cytb are 3 subspecies of *E. serotinus*. In RAG2, these subspecies are coloured in black and are not fully resolved.

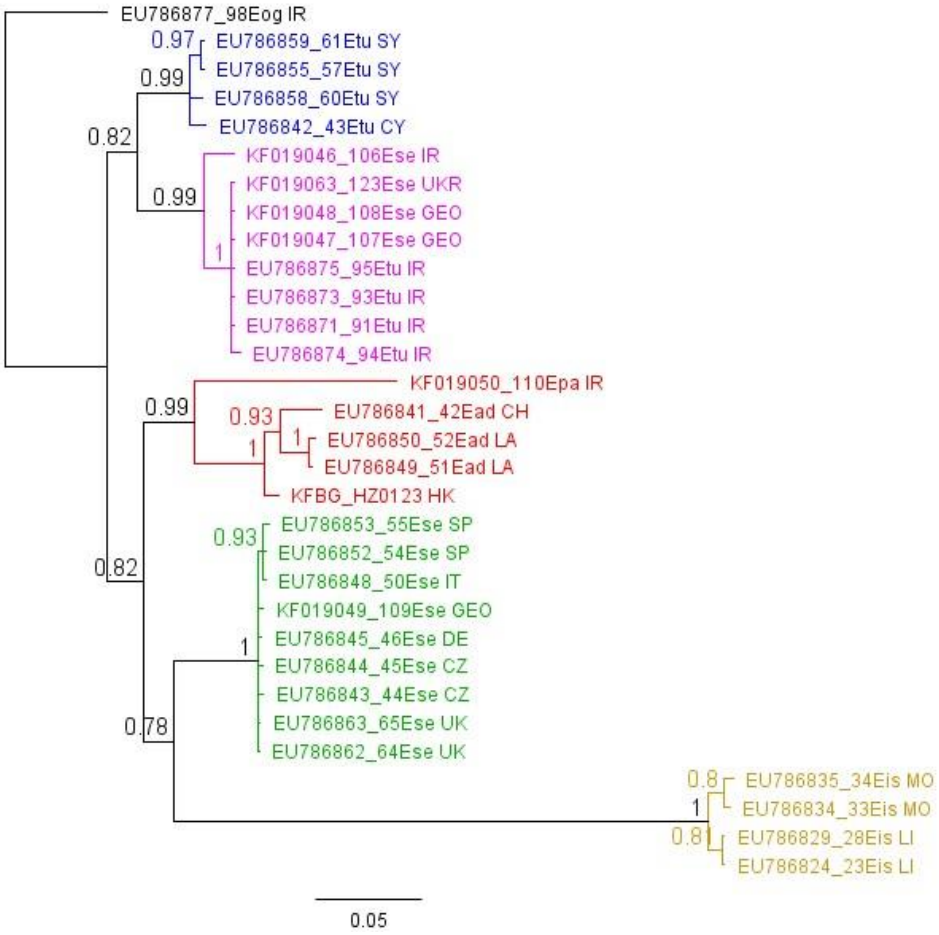

Figure 4. Genetic identification using Cytb gene. The specimen (KFBG HZ0123) is coloured red above and is closely related to *E. pachyomus andersoni* from Laos and *E. pachyomus pallens* from north China.

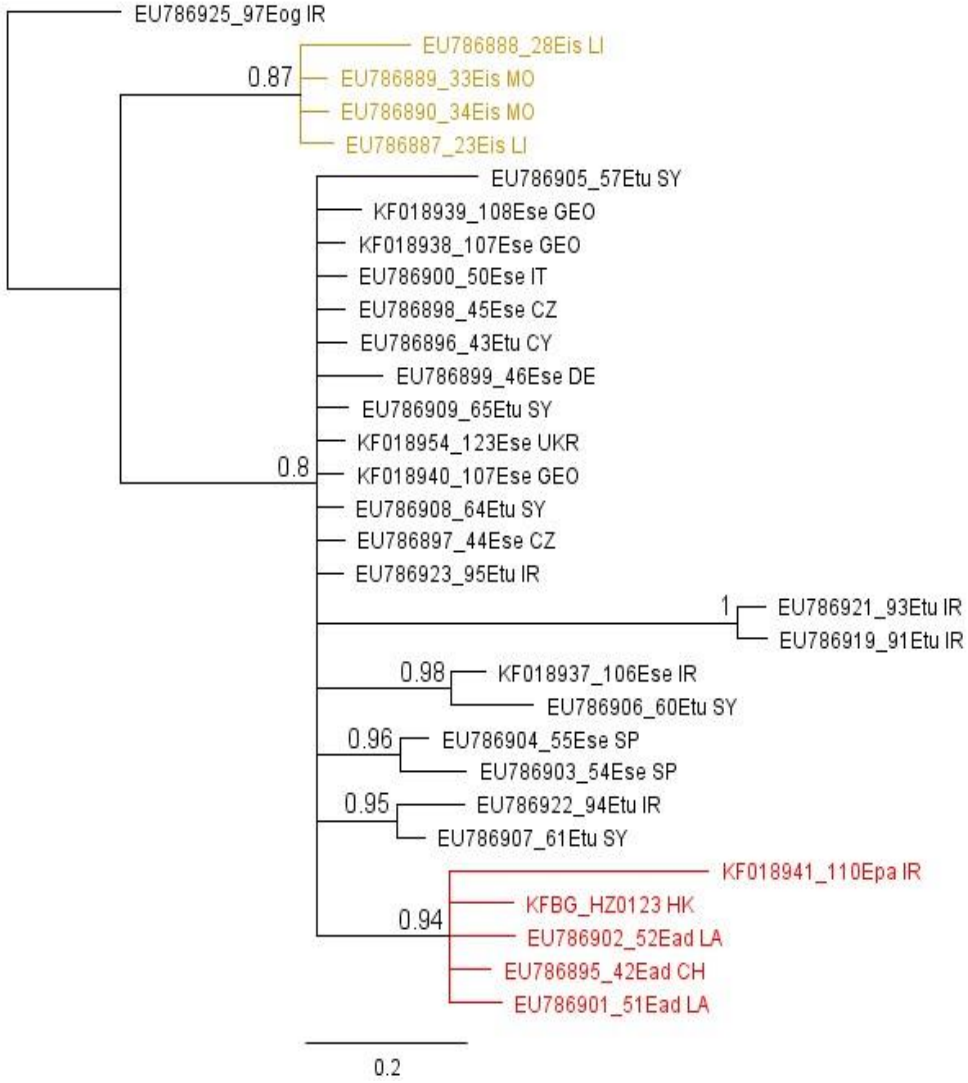

Figure 5. Genetic identification using RAG2 gene. The specimen (KFBG HZ0123) is coloured red above and is closely related to *E. pachyomus* from Laos and *E. pachyomus pallens* from north China.

Section 3: Distribution and Habitat

Serotine bats are adaptive species that forage in a wide range of habitats, including disturbed and urban anthropogenic environments. The insectivorous serotine is associated with lightly wooded and open vegetated areas and will forage around street lamps that attract insects (Catto *et al*. 1996). Being a philopatric species (showing site affinity), the bat rescued by SPCA inspectors is likely to be resident in the Wan Chai district of Hong Kong and further Serotine records might be expected from this area (Figure 6).

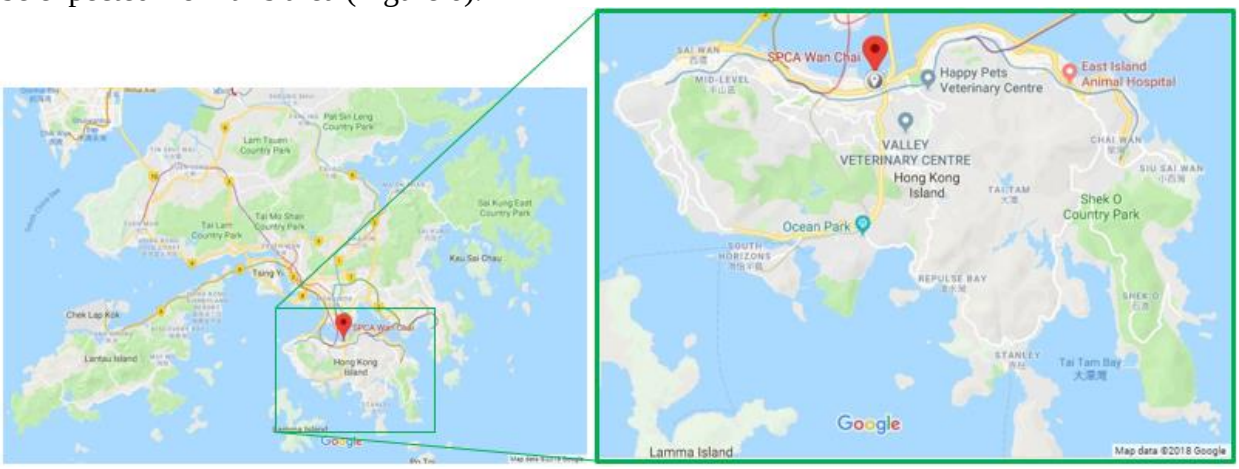

Figure 6. Location of SPCA Wan Chai Centre where the Asian Serotine was discovered. Map of Hong Kong SAR (left), enlarged map of Hong Kong Island (right).

The serotine is widely distributed across China (Smith & Xie 2008), with 4 subspecies recognised (Table 2). There is apparently no record for the species in Guangdong Province adjacent to Hong Kong SAR. If the bat species is resident locally, it is almost certainly native to Guangdong but this is yet to be confirmed. Further studies on local and regional Chiroptera will no doubt shed more light on the status of the serotine in the region.

Table 2. Locations of the four serotine subspecies in China.

Subspecies names	Location found
E. s. andersoni	Anhui, Fujian, Guizhou, Hunan, Jiangsu, Jiangxi, Shanghai, Sichuan, Yunnan, Zheijang
E.s. horikawai	Taiwan
E.s. pallens	Anhui, Beijing, Heilongjiang, Henan, Hubei, Gansu, Hebei, Jiangsu, Jilin, Liaoning, Nei Mongol, Ningxia, Shanxi, Shaanxi, Shandong, Sichuan, Tianjin
E.s. turcomanus	Xinjiang

Although nine subspecies have been recognized by the IUCN (Table 3), recent studies have suggested that the serotine may be a polyphyletic species (derived from more than one ancestor), with *E. serotinus* (including *turcomanus*), found in most of Europe and western Asia, *E. pachyomus* in eastern Asia, and *E. isabellinus* in southern Iberia (*boscai*) and North Africa (Juste *et al* 2013).

Table 3. Locations of the global sub-species of the Serotine Bat

Global sub-species	Location found
Eptesicus serotinus andersoni	Eastern Asia
Eptesicus serotinus boscai	Southern Iberia, Morocco
Eptesicus serotinus isabellinus (sometimes considered a separate species)	North Africa
Eptesicus serotinus horikawai	Taiwan
Eptesicus serotinus pachyomus	India, Nepal, possibly Myanmar
Eptesicus serotinus pallens	Western China
Eptesicus serotinus pashtonus	Pakistan, Afghanistan
Eptesicus serotinus serotinus	Northern and eastern Europe, western Asia
Eptesicus serotinus turcomanus	Central Asia and Xinjiang[5]

Acknowledgement
The new record of the Asian Serotine Bat was achieved by the combined effort of multiple parties. KFBG Fauna Conservation Department are grateful for the contribution of SPCA inspectors who delivered the bat safely to KFBG. Thank you for the important contribution of bat expert Mr C.T. Shek who helped with the initial ID of the bat and provided the published photographs of the specimen. We also appreciate the help of the Conservation Genetic Laboratory at KFBG for developing the genetic map of the rescued bat, and the care provided to the bat by members of the Wild Animal Rescue Centre prior to its release was also highly valued.

Further Reading

Catto, C. M. C., Hutson, A. M., Raccey, P. A. and Stephenson, P. J. (1996). Foraging behaviour and habitat use of the serotine bat (*Eptesicus serotinus*) in southern England. *Journal of Zoology*, 238: 623–633.

Gary, W.J.A. (1999). The species composition, distribution and population size of Hong Kong bats. *Memoirs of the Hong Kong Natural History Society* 22: 183 – 210.

Juste, J., Benda, P., Garcia-Mudarra, J. L., & Ibáñez, C. (2013). Phylogeny and systematics of Old World serotine bats (genusEptesicus, Vespertilionidae, Chiroptera): an integrative approach. *Zoologica Scripta*, 42(5): 441–457.

Shek, C.T. (2006). A field guide to the terrestrial mammals of Hong Kong. *Agriculture, Fisheries and Conservation Department, Cosmos Books Ltd. Hong Kong.* 408

Smith, A. T., Xie, Y., Hoffmann, R. S., Lunde, D., MacKinnon, J., Wilson, D. E., & Chris Wozencraft, W. (2008). *A Guide to the Mammals of China*. Princeton University Press.

Zongfu, D. (2018) Common serotine (*Eptesicus serotinus*). Retrieved from

Website link:
http://www.bio.bris.ac.uk/research/bats/China%20bats/eptesicusserotinus.html#status

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