

Feature Article

A Review of the Status of the IUCN Red List of Threatened Plants in Hong Kong

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Plant Working Group

世界自然保護聯盟瀕危物種紅色名錄用以評估動植物的保育狀況的評估方法，一向被認為是最全面和客觀的全球性評估。在香港，紅色名錄經常被用作評估物種的稀有度及其保育狀況的參考。在本港記錄到17種收錄在紅色名錄的瀕危植物，而在這些植物當中，有些品種在本港卻是十分常見。當為物種制定保育措施或作影響評估時，除了參考紅色名錄外，我們亦應考慮它們在本地的保育狀況，從而更有效及適切地運用有限的資源以作保育。本文介紹這17種瀕危植物的特徵及本地的保育狀況，並就其中一些品種在紅色名錄的評估及其保育作出討論。

Introduction

The International Union for Conservation of Nature (IUCN) Red List of Threatened Species (Red List) (世界自然保護聯盟瀕危物種紅色名錄) is widely recognised as the most comprehensive and objective approach for evaluating the global conservation status of plant and animal species. The Red List is essentially a checklist of taxa that have undergone extinction risk assessments using the IUCN Red List Categories and Criteria. The majority of the assessments for the Red List were carried out by members of the IUCN Species Survival Commission Specialist Groups, appointed by the Red List Authorities, or by participants of the Global Biodiversity Assessment workshops. Individual researchers can also submit assessments to the IUCN for consideration. The Red List is often used as a reference for evaluating the rarity or conservation status of a particular species. For instance, the Technical Memorandum on Environmental Impact Assessment (EIA) Process in Hong Kong makes reference to the IUCN Red Data Book when evaluating whether a species is of conservation importance. It is crucial for conservationists and EIA practitioners to be aware of the species on the Red List, to be able to identify them in the field and to recognise their conservation importance. Currently, 17 threatened (Critically Endangered, Endangered, Vulnerable or Near Threatened) plant species listed in the Red List database are present in Hong Kong (Table 1).

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Table 1. Conservation status of the IUCN Red List of Threatened Plants occurring in Hong Kong.

	Scientific Name ^a	Chinese Name	Status			
			IUCN ^b	China ^c	AFCD ^d	HK Herb ^e
1.	<i>Amentotaxus argotaenia</i> (Hance) Pilg.	穗花杉	VU	V	VU	Rare
2.	<i>Keteleeria fortunei</i> (A. Murr.) Carr.	油杉	LR/nt	V	VU	Rare
3.	<i>Acanthephippium sinense</i> Rofle (A. striatum Lindl.)	錐囊鑷花蘭	E	-	-	Rare
4.	<i>Aquilaria sinensis</i> (Lour.) Spreng.	土沉香 (牙香樹)	VU	V	NT	Common
5.	<i>Aristolochia thwaitesii</i> Hook. f.	海邊馬兜鈴	VU	-	VU	Rare
6.	<i>Aristolochia westlandii</i> Hemsl.	香港馬兜鈴	CR	-	CR	Rare
7.	<i>Artocarpus hypargyreus</i> Hance ex Benth.	白桂木	VU	V	NT	Common
8.	<i>Camellia crapnelliana</i> Tutch.	紅皮糙果茶 (克氏茶)	VU	V	VU	Rare
9.	<i>Canthium dicoccum</i> (Gaertn.) Merr.	魚骨木	VU	-	-	Very Common
10.	<i>Castanopsis concinna</i> (Champ. ex Benth.) A. DC.	華南錐 (毛葉栲栗)	VU	E	VU	Rare
11.	<i>Castanopsis kawakamii</i> Hayata (C. greenii W.Y. Chun)	吊皮錐	LR/nt	V	VU	Rare
12.	<i>Dalbergia balansae</i> Prain (D. assamica Benth.)	南嶺黃檀	VU	-	-	Mostly cultivated
13.	<i>Diospyros vaccinioides</i> Lindl.	小果柿	CR	-	-	Very Common
14.	<i>Ilex graciliflora</i> Champ. ex. Benth.	細花冬青	E	-	-	Uncommon
15.	<i>Ixonanthes chinensis</i> Champ. (I. reticulata Jack)	黏木	VU	V	VU	Common
16.	<i>Mahonia oiwakensis</i> Hayata	海島十大功勞	VU	-	EN	Rare
17.	<i>Tetrathyrium subcordatum</i> Benth. (Loropetalum subcordatum (Benth.) Oliv.)	四藥門花	VU	R	CR	Rare

^a The scientific name follows the IUCN Red List of Threatened Species. A synonym, if any, is provided in parenthesis.

^b IUCN Red List of Threatened Species 2010.2.

^c China Red Data Book

^d Rare and Precious Plants of Hong Kong (AFCD, 2003)

^e Hong Kong Herbarium records

CR – critically endangered; E – endangered; LR/nt – lower risk/near threatened; NT – near threatened; R – rare; VU or V – vulnerable

It is important to note that the Red List includes only global-level assessments. There are some globally threatened species on the list which are, in fact, locally common in Hong Kong. In the local context, there may be a dilemma as to whether resources should be allocated to conserve these globally threatened but locally common species. Therefore, a review of the local and regional conservation status of the IUCN Red List of Threatened Plants that occur in Hong Kong was conducted, with a view to providing more background information for decision making. This paper starts with descriptions of these 17 plant species, followed by a discussion on Red List assessments on some of these species and the implications in their conservation.

Species Description

Gymnosperm

Amentotaxus argotaenia (Hance) Pilg. 穗花杉/
CEPHALOTAXACEAE (Fig. 1)

Amentotaxus argotaenia is a small evergreen tree which grows up to 7 m tall. The leaves are twisted at the base and arranged in two rows, linear or linear-lanceolate (線形-披針形), and they have two white stomatal (氣孔) bands on the abaxial surface, which is a distinctive feature of this species. It flowers from April to May and the seeds, which are partially enclosed in a sac-like aril, ripen in May of the following year. Both the seeds and the arils are red when ripe. The species is restricted to China and northern Vietnam. In the southern provinces of China (including Hong Kong), *Amentotaxus argotaenia* is found mostly in mountains and forests. Besides habitat destruction, this species is limited by infrequent regeneration, slow growth rate and seed dormancy. In Hong Kong, it can be found in Ma On Shan and Sai Kung, and on Tai Mo Shan, Mount Parker (柏架山), Sunset Peak (大東山) and Lantau Peak. All of the localities are within Country Parks, which are under statutory protection.

Fig 1. *Amentotaxus argotaenia*



Keteleeria fortunei (A. Murr.) Carr. 油杉/PINACEAE (Fig. 2)

Keteleeria fortunei is a large evergreen tree, which grows up to 30 m tall, but individuals in Hong Kong are smaller. The leaves are linear and arranged in two ranks on lateral shoots. The seed cones are cylindrical, and brown at maturity. It is confined to coastal lowlands, mainly in the southern coastal region of China, extending to the western provinces and northern Vietnam. It is a light-requiring species, growing in open sunny areas. There remains very few pure stands due to habitat destruction; most of the remaining individuals are scattered in broad-leaved forests. In Hong Kong, it occurs naturally only in Cape D'Aguilar (鶴咀) and on Stanley Peninsula. The seeds of this species have been collected in the field and seedlings raised in nurseries. There have also been attempts to propagate the species in the natural environment, with promising results.

Fig 2. *Keteleeria fortunei*



Angiosperm

Acanthephippium sinense Rolfe (*A. striatum* Lindl.) 錐囊罐
花蘭/ORCHIDACEAE

Acanthephippium sinense is a terrestrial perennial herb. The pseudobulb (假球莖) is ovoid-cylindrical and covered with several membranous sheaths. The leaves are papery and obovate-elliptic (倒卵形-橢圓形), with an acute (急尖) or acuminate (漸尖) apex, and base attenuating into a petiole (葉柄). The flowers are medium-sized and appear from April to May. The species has been recorded only on Tai Mo Shan in Hong Kong, and its distribution in China is restricted to Guangdong.

Aquilaria sinensis (Lour.) Spreng. 土沉香/THYMELAEACEAE
(Fig. 3)

Aquilaria sinensis is an evergreen tree of medium size. The leaves are obovate to elliptic with conspicuous and nearly parallel venlets. It flowers from March to May. The flowers are small and yellowish-green. The fruits are green, woody capsules, which appear in September. It is endemic to China, distributed in the southernmost part mainly along the Tropic of Cancer, and as far-south as Hainan. It is shade tolerant and occurs in lowland, broad-leaved forests, in particular *Fung Shui* woods. The species has a long history of cultivation. The natural populations in China have been depleted due to indiscriminate collection of agar wood for medicinal use. The species is locally common in Hong Kong, but is under threat from illegal exploitation in recent years.

Fig 3. *Aquilaria sinensis*



Aristolochia thwaitesii Hook. f. 海邊馬兜鈴/
ARISTOLOCHIACEAE (Fig. 4)

Aristolochia thwaitesii is an erect subshrub, which grows up to 70 cm tall. The leaves are alternate, nearly leathery, glabrous above and densely brown villose beneath. The flowers in racemes (總狀花序) arise from the base of plant and bloom from March to May. The yellow-green perianth (花被) is in the form of a tube, strongly curved at the middle and pouched at the lower part. The upper part of the perianth is further curved and expands into a toothed limb in a very interesting and attractive form. It is restricted to Guangdong and Hainan (China Plant Specialist Group, 2004). It grows in thickets and stone crevices on hill-sides or on the seaside. In Hong Kong, the species has been recorded in Deep Water Bay and Wong Nai Chung Gap, as well as on Lantau Island.

Fig 4. *Aristolochia thwaitesii*



Aristolochia westlandii Hemsl. 香港馬兜鈴/
ARISTOLOCHIACEAE (Fig. 5)

Aristolochia westlandii is a woody vine which usually scrambles on trees. Young branches are pubescent and slender. The leaves are leathery to papery, and narrowly lanceolate to narrowly oblong (長圓形). The flowers are solitary and axillary, on leafy shoots or old woody stems. The species flowers from March to April. The perianth is yellow with purple veins and blotches, 10–15 cm long and very conspicuous. It is restricted to Guangdong, Guangxi and Yunnan. The species grows in ravine forests at relatively high altitudes. It was first discovered in Hong Kong, with the type specimen collected by A. B. Westland from Tai Mo Shan around 1880. The natural populations are very small, but the localities are within the Tai Mo Shan Country Park and Tai Po Kau Nature Reserve, both of which are under statutory protection.

Fig 5. *Aristolochia westlandii*



Artocarpus hypargyreus Hance ex Benth. 白桂木/
MORACEAE (Fig. 6)

Artocarpus hypargyreus is a large evergreen tree. The leaves are leathery, oblong and elliptic to obovate. The fruits are syncarps (合心皮果), about 3–4 cm in diameter, which become yellowish to orange when ripe. The natural populations are found on low elevation sites in the southern part of China. It prefers sunny, wet habitats and can be found in lowland broadleaved forests and *Fung Shui* woods. The species is under threat in China due to the loss of lowland forests which have been converted to farmland. The species is locally common in Hong Kong.

Fig 6. *Artocarpus hypargyreus*



Camellia crapnelliana Tutch. 紅皮糙果茶/THEACEAE (Fig. 7)

Camellia crapnelliana is an evergreen tree of small to medium size. The orange-red bark is a distinctive feature of this species. The leaves are thickly leathery, obovate-elliptic to elliptic. The large white flowers and round capsules, both of which are as large as 10 cm in diameter, are also unique features for easy identification. This species occurs along the coastal areas of southern and southeastern China, usually in rocky and moist valleys. It is threatened by the destruction of forests. Natural populations of this species have been recorded in only two sites in Hong Kong: Mount Parker and Mau Ping. They have been successfully propagated and reintroduced in the countryside of Hong Kong.

Fig 7. *Camellia crapnelliana*

Canthium dicoccum (Gaertn.) Merr. 魚骨木/RUBIACEAE (Fig. 8)

Canthium dicoccum is a small to medium tree. The leaves are opposite and leathery, with an undulating leaf margin. The lateral veins of the leaf are slender, with three to five on each side of the midvein. This species was recorded as a native tree in Sri Lanka in the IUCN database, based on a report of threatened woody endemics in the wet lowlands of the country (Gunatilleke & Gunatilleke, 1991). The species is widely distributed in Southeast Asia, from India, Indochina and Malaysia to Australia, as well as the southern provinces of China. It is locally common in Hong Kong and is generally found in woodlands on hill slopes.

Fig 8. *Canthium dicoccum*

Castanopsis concinna (Champ. ex Benth.) A. DC. 華南錐 / FAGACEAE (Fig. 9)

Castanopsis concinna is an evergreen tree of medium size. The leaves are leathery, oblong-elliptic to oblong-lanceolate, and the abaxial surface is covered with reddish brown matted hairs. The fruits are cupules (殼斗) covered with clustered branching prickles. This species is endemic to China and has a very restricted distribution in eastern Guangxi and Guangdong. It occurs on hills or at low elevation on mountains along the coastline. There are only a few individuals in each locality and the natural regeneration is rather poor due to seed predation by wild animals. It was first discovered on Hong Kong Island around 1850, and can be found only in a few localities in Hong Kong, most of which are in Country Parks under statutory protection.

Fig 9. *Castanopsis concinna*

Castanopsis kawakamii Hayata (*C. greenii* W.Y. Chun) 吊皮錐/FAGACEAE (Fig. 10)

Castanopsis kawakamii is a large evergreen tree, which grows up to 25 m tall. The bark is dull grey-brown, shallowly and vertically fissured, and peels off in large flakes. The leaves are leathery, ovate (卵形) to lanceolate. The fruit cupules are covered with clustered branching prickles. The species is scattered in the southern subtropics of China along the southeastern coast, including Taiwan. It grows in broad-leaved evergreen forests and *Fung Shui* woods. Similar to *C. concinna*, natural regeneration of this species is rather poor due to seed predation by wild animals. The species was first discovered in 1927 in Shatin and named *C. greenii* W.Y. Chun. It is now restricted to Wu Kau Tang and Wong Chuk Yeung, where mature individuals above 12 m in height can be found.

Fig 10. *Castanopsis kawakamii*

Dalbergia balansae Prain (*D. assamica* Benth.) 南嶺黃檀 / FABACEAE (Fig. 11)

Dalbergia balansae is a tree that grows up to 15 m tall. The bark is greyish-black, rough and longitudinally fissured. The leaves are odd-pinnate (奇數羽狀複葉), with 13-15 papery leaflets. The species grows in forests and thickets. Its conservation status in the Red List was based on an assessment in Vietnam, with the major threat being reduction of distribution range due to shifting cultivation patterns. Distributed in India and IndoChina, the species has also been recorded in various provinces to the south of Changjiang River (長江) in China. The species has been cultivated locally and elsewhere in China.

Fig 11. *Dalbergia balansae*



Diospyros vaccinioides Lindl. 小果柿/EBENACEAE (Fig. 12)

Diospyros vaccinioides is an evergreen shrub about 1-3 m tall. The leaves are small and dense. It flowers in May, with small, solitary flowers borne at the axils. The fruits are ovate and become black when they ripen in autumn. Distribution is restricted to Guangxi, Guangdong, Hainan and Taiwan. It grows naturally in thickets or scrublands in ravines. The species has been exploited for ornamental use in Taiwan (Lu & Pan, 1998) but not in mainland China or Hong Kong, where it is very common.

Fig 12. *Diospyros vaccinioides*



Ilex graciliflora Champ. ex Benth. 細花冬青/
AQUIFOLIACEAE (Fig. 13)

Ilex graciliflora is a small tree, about 6-9 m tall. The branchlets are cylindrical but the current year's are angular. Its white flowers appear in April and its red fruits persist long on the trees, even until February or later. The species grows in woods or thickets, and is considered endemic to Hong Kong and Guangdong. Although the species has been recorded in only three places in Guangdong, it has been recorded in a number of localities in Hong Kong, including Victoria Peak, Wong Nai Chung, Ma On Shan, Pat Sin Leng, Bride's Pool and Lantau Island. It is considered to have patchy distribution in secondary habitats, partly along streams (Tsang, 2005). The type specimen was collected by J. G. Champion in Happy Valley between 1847 and 1850.

Fig 13. *Ilex graciliflora*



Ixonanthes chinensis Champ. (*I. reticulata* Jack) 黏木/
IXONANTHACEAE (Fig. 14)

Ixonanthes chinensis is a medium-sized evergreen tree. The leaves are elliptic to elliptic-oblong. The flowers are white and the capsules (蒴果) are brown-black at maturity. Its distribution is confined to Guangdong, Guangxi, and areas to the south of the Changjiang River and in Vietnam, with Hainan Island at the centre. It grows naturally in thickets and thin forests. Its populations in natural forests in China, especially on Hainan Island, are decreasing. The species is locally common in Hong Kong.

Fig 14. *Ixonanthes chinensis*



Mahonia oiwakensis Hayata 海島十大功勞/
BERBERIDACEAE (Fig. 15)

Mahonia oiwakensis is an evergreen shrub. The leaves are odd-pinnate with 12-20 leaflets each. The leaflet margin has two to nine spiny teeth, and is dark green above and yellowish-green underneath. The flowers are in racemes which are golden yellow and appear from June to September. The species grows in forests by streams. It is listed in the Red List as a species endemic to the central mountain range of Taiwan (Pan, 1998). In fact, the species has also been recorded in Hainan, Guizhou, Sichuan and Yunnan. In Hong Kong, it has been found only on Sunset Peak.

Fig 15. *Mahonia oiwakensis*

Tetrathyrum subcordatum Benth. (*Loropetalum subcordatum* (Benth.) Oliv.) 四藥門花/HAMAMELIDACEAE (Fig. 16)

Tetrathyrum subcordatum is an evergreen shrub or small tree. The leaves are leathery, ovate or elliptic. The flowers are in the form of inflorescence (花序), with petals that are white and ribbon-like. They appear from April to June and fruit from July to August. The species has been recorded only in Guangdong, Guangxi and Guizhou. It grows in subtropical forests and can tolerate moderate shade. It is endemic to China and is thus of considerable scientific importance. It was first discovered on Hong Kong Island in 1857, which was the only known locality for almost a century. It was later found on Jardine's Lookout (渣甸山), Mount Cameron (金馬倫山) and Sunset Peak as well. The species was last found in China in Guangxi in 1957 and in Guizhou, but the population was extremely small.

Fig 16. *Tetrathyrum subcordatum*

Discussion

The Red List is essentially a checklist of taxa that have undergone extinction risk assessments using the IUCN Red List Categories and Criteria. Under this mechanism, species that have not been assessed are not included in the list, even though they may meet the criteria for being listed as threatened species. Therefore, species not on the list cannot automatically be regarded as not being under

threat. For instance, *Croton hancei* (香港巴豆), which has been recorded in only two localities in the world, would potentially meet the listing criteria, but has not been included in the Red List.

As a matter of principle, when evaluating the conservation importance of a species, greater weight is normally given to those which are globally rare, then nationally rare, followed by locally rare species. Since the Red List is a global assessment, greater weight is often given to it when evaluating the conservation importance of a species, as in the EIA process. Nevertheless, it is equally important to consider the national, regional or local conservation status of a species, if available. Such statuses are usually more relevant in the local context. The 'China Plant Red Data Book' (中國植物紅皮書) lists 388 plant taxa in China as threatened (Fu and Chin, 1992), among which 14 species are present in Hong Kong (Lai et al., 1999). A rare and endangered plant species list was also prepared for Guangdong Province (Wu & Hu, 1988). The book 'Rare and Precious Plants of Hong Kong' identifies 100 plant species of conservation importance in Hong Kong (AFCD, 2003). These publications serve as useful references for evaluating the conservation status of plant species in Hong Kong.

In general, all species listed in the Red List deserve our attention and special care. Notwithstanding this, amongst the 17 globally threatened plant species described in this paper, some are locally common (Table 1). This leads to the dilemma of how many resources should be allocated to conserve these species. For instance, should a special propagation programme be conducted for them? If direct impact on these species from development is unavoidable, should transplantation or compensatory planting be required?

Although *Aquilaria sinensis*, *Artocarpus hypargyreus* and *Ixonanthes reticulata* are locally common in Hong Kong, we understand that the Red List assessments of their globally and nationally threatened status were based on a holistic review of the relevant data. As such, due consideration should be given to preserving the healthy and important populations of these species in their natural environment in Hong Kong. If impacts on individual trees are unavoidable, transplantation and/or compensatory planting should be considered as far as practicable. If compensatory planting is to be carried out, special arrangements should be made well in advance to confirm the availability of seedlings for propagation trials, since seedlings of these species are normally not commercially available.

Diospyros vaccinioides was listed in the Red List as "Critically Endangered" in 1998 based on the situation in Taiwan (Lu & Pan 1998; 1996). The species was first discovered in southern Taiwan in Feng Kang (楓港), Ping Tung County (屏東縣) in 1982 and was reported in 1985 as a new species: *D. fengchangensis* S.Y. Lu. It was then taxonomically merged with *D. vaccinioides* (Lu & Yang, 1988). In Taiwan, a wild population of this species could be found only in an Acacia

woodland at about 200 m above sea level in Feng Kang. The species has been heavily exploited for ornamental use. Over-collection of this species in Taiwan has led to the complete absence of mature trees in the wild. However, the above assessment would seem to be made based on the situation in Taiwan and may not truly reflect the global status of the species. Apart from over-collection, their restricted distribution in Taiwan might also be due to the fact that Taiwan is at the northern distribution limit of this species, and Feng Kang at the very southern part of Taiwan. In fact, southern China is the major distribution range of *D. vaccinioides*. Besides Taiwan, the species has been recorded in Guangdong (including Hong Kong), on islands in the Pearl River Delta, and in Hainan and Guangxi. In Hong Kong, the species is a very common shrub growing in shrublands

in ravines and on hill slopes, with territory-wide distribution. The situation is similar in Guangdong, where the species has been found to be very common in a number of areas (Q. M. Hu, pers. comm.). Similarly, *Dalbergia balansae* and *Canthium dicoccum* were assessed as 'Vulnerable' based on their respective situations in Vietnam (Nghia, 1997) and Sri Lanka (Gunatilleke & Gunatilleke, 1991). However, these two species have a Pan-Asian tropical distribution, including the southern provinces of China, and are locally common in Hong Kong. When the opportunity arises, the IUCN assessments for these species should be updated based on the best available ecological information at their respective range of distribution. For better utilization of resources, we should accord priority to plant species that are under genuine threat.

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Working Group Column

***Aquatica leii* (雷氏螢): A New Record of an Aquatic Firefly Species in Hong Kong**

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漁農自然護理署甲蟲工作小組於2010年7月在新界中部一個淡水沼澤發現數條尾部發出綠光的螢火蟲幼蟲。其後這些幼蟲經人工培養，成功結蛹及孵化為成蟲。經鑑定後，這些水生螢火蟲證實為雷氏螢 (*Aquatica leii*)。這是雷氏螢於香港的首次記錄。本文旨在介紹該種螢火蟲的鑑定特徵及於人工飼養下的生命週期。

Introduction

Fireflies can be divided into three groups: terrestrial, aquatic and semi-aquatic. While terrestrial species complete all their life stages on land, and the larvae of semi-aquatic species live in habitats subject to periodic immersion, the larvae of aquatic fireflies live in water and most of them have lateral gills along the abdomen (Ballantyne & Menayah, 2002; Jeng et al., 2003).

In the previous issue of this Newsletter (Issue 19), we reported the finding of the larvae of an unidentified aquatic firefly species in a freshwater marsh in the central New Territories in July 2010. The larvae were reared to pupation and adult emergence. Taxonomic investigation of the adults confirmed that they were the aquatic firefly *Aquatica leii* (雷氏螢) (Order: Coleoptera 鞘翅目, Family: Lampyridae 螢科). This is the first record of this species and the second record of an aquatic firefly species in Hong Kong since the discovery of *Aquatica ficta* (黃緣螢) in 1909.

Morphology

A. leii was discovered, described and named by Dr. Fu Xin-hua (傅新華博士) and his colleagues in Hubei Province in 2006 (Fu & Ballantyne, 2006). The adult of this species has a body length of about 9 mm. Its pronotum (前胸背板) and the ventral surface of its thorax are orange-yellow. The elytra (鞘翅) are semi-transparent but appear to be light brown as the dark hind wings are shown through the elytra (Fig. 17). This is one of the major features differentiating *A. leii* from the similar *A. ficta*, which has dark brown elytra with very narrow pale margins (Fu et al., 2010) (Fig. 18). The most conspicuous difference between the male and female *A. leii* is the number of segments that their light organs occupy. While the light organ of the male *A. leii* occupies the whole segment of its sixth ventrite (節腹面) and anterior half of the seventh ventrite, the light organ of the female *A. leii* is restricted to its sixth ventrite only, leaving the seventh and eighth ventrites semi-transparent (Fig. 19). The larva is dorsally dark grey and ventrally medium grey (Fig. 20). It has eight pairs of bifurcate (分叉) gills in its pleural (胸膜) regions along the first to eighth abdominal segments.

Fig 17. Adult *A. leii* (a) dorsal view; (b) semi-transparent elytra.



Fig 18. Dorsal view of the adult *A. ficta* (Photo credit: Dr. Fu Xin-hua).



Fig 19. Ventral view of the (a) male and (b) female *A. leii*, with an arrow showing the light organ.

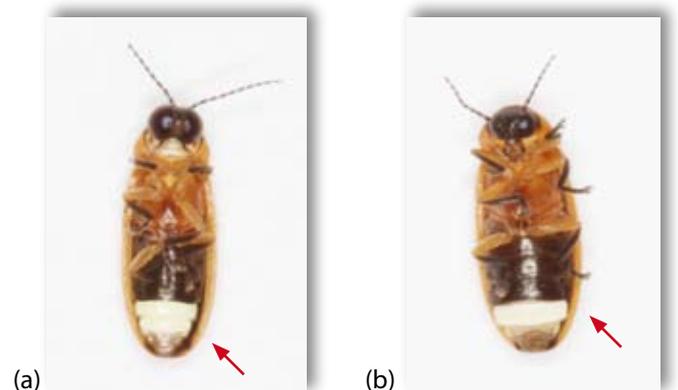
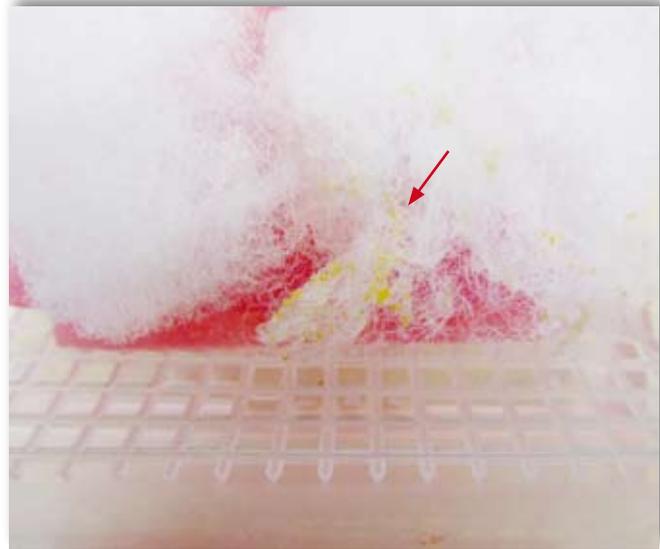


Fig 20. Larva of the *A. leii* feeding on (a) aquatic snail and (b) bloodworm, with an arrow showing the bifurcate gills.



Fig 21. The apparatus for collecting hatched larvae, with an arrow showing the eggs in a cotton ball.



Larvae were found in the water after 21 days. They were then transferred to a water tank and fed aquatic snails and bloodworms (Fig. 20). After six stages of moulting, the final instar larvae reached a length of about 12-15 mm before pupation.

Observation in the Fireflies' Natural Habitat

Subsequent to the finding of the larvae, adult *A. leii* were found in the same marsh in August 2010. Male *A. leii* were observed flying above the vegetation after dusk and emitting light in search of females. Female individuals hid in vegetation and were difficult to locate, but they were found when they emitted light occasionally in response to males' signals or in mating pairs. After copulation, the females laid their eggs on the stems or leaves of aquatic plants above the water surface. Hatched larvae were found crawling on the benthic substrates of the marsh, emitting a faint light, which was believed to be an act of defence against potential predators (Fu et al., 2006).

Captive Breeding

In order to further understand the life cycle of *A. leii*, three males and three females were collected for captive breeding. They were paired up in individual plastic boxes and fed with apple slices. On the seventh day, yellow eggs were found on the moist cotton balls placed in the boxes as egg beds. The cotton balls with eggs were then transferred to an apparatus specially designed for collecting hatched larvae. The apparatus was set up as follows: the cotton ball with the eggs was placed on sponge, which, in turn, was placed on a plastic screen at the water surface inside a plastic box (Fig. 21). The apparatus was checked daily and the water level was maintained to keep the cotton ball moist so as to prevent the eggs from drying out.

Since the larvae normally climb onto land for pupal cell construction, an apparatus based on the design of Ho and Chiang (2006) was set up for pupation in captivity (Fig. 22). Foam rubber with holes was used as bedding. The larvae climbed into the holes of the apparatus and entered into the pre-pupal stage, during which they remained stationary for three to four days. After casting off their last larval skin, the larvae turned into light yellow pupae which are 7-9 mm in length (Fig. 23). The pupae emitted light when disturbed. The whole pupal stage lasted for 4-6 days. After the pre-imago (成蟲前) stage, the adults emerged ready to undergo another round in the *A. leii* life cycle.

Fig 22. The pupation set-up.



Fig 23a-d. Development of the *A. leii* pupae.

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The First Record of Two Bagrid Fishes in Hong Kong: *Tachysurus virgatus* (條紋鮠) and *Pelteobagrus vachellii* (瓦氏黃鰱魚)

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Freshwater Fish Working Group

漁護署淡水魚工作小組最近於新界東北發現兩種於香港均屬首次記錄的鱮科(Bagridae)淡水魚，牠們分別為條紋鮠(*Tachysurus virgatus*)及瓦氏黃鰱魚(*Pelteobagrus vachellii*)。本文並就其分佈、鑒別特徵及生境作出簡短的描述。

Introduction

On 24 December 2010, the Mammal Working Group of the Agriculture, Fisheries and Conservation Department (AFCD) found some unidentified fish in a shallow ditch inside a water tunnel while they were conducting a bat survey in the northwest New Territories. The AFCD Freshwater Fish Working Group subsequently conducted a survey in the tunnel and found two freshwater fishes new to Hong Kong, one a *Tachysurus virgatus* (條紋鮠) and the other a *Pelteobagrus vachellii* (瓦氏黃鰱魚). Similar to the rare Three-lined Bagrid Fish (*Pseudobagrus trilineatus*, 三線擬鱮) found in Hong Kong, these two fish species belong to Bagridae (鱮科), a family of catfish under the order Siluriformes (鮎形目).

The water tunnel in which the two fish species were found is connected only with the Muk Wu Raw Water Pump Station (木湖原水抽水站) near Man Kam To, which receives freshwater from mainland China. It is suspected that the *T. virgatus* and *P. vachellii* might have made their way to Hong Kong directly through the freshwater pipes from the mainland.

Tachysurus virgatus (條紋鮠) (Synonyms: *Pelteobagrus virgatus*, *Pseudobagrus virgatus*, *Leiocassis virgatus*)

Morphological features

T. virgatus has an elongated and scaleless body (Fig. 24). The anterior part of the body is round, the posterior part is laterally compressed, and the head is dorso-ventrally compressed. It has large eyes and four pairs of slender barbels. The maxillary barbels (上頰鬚) terminate before the gill opening and do not extend to the base of the pectoral fin spines (Fig. 25). The nasal barbels (鼻鬚) extend to the middle of the eyes, and the inner mandibular barbels (下頰內側鬚) are very short. The mouth is subterminal (口下端位).

Fig 24. *Tachysurus virgatus*

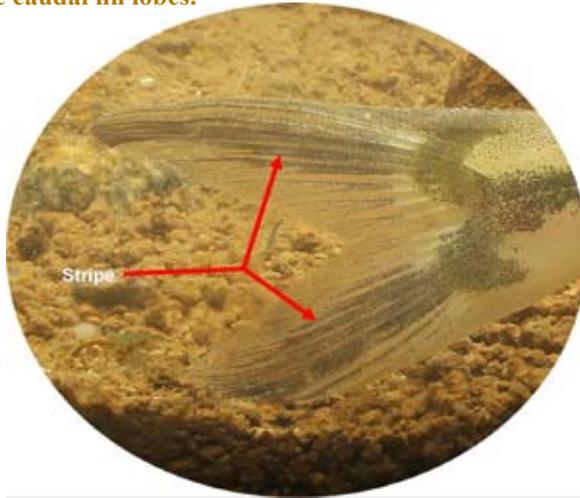


Fig 25. Maxillary barbel of *T. virgatus*, which does not extend to the base of the pectoral fin spine.



The dorsal fin spine (背鰭棘) and pectoral fin spines (胸鰭棘) are sharply pointed at the tips and their posterior edges are serrated. The adipose fin (脂鰭), which has a short base, is located at the midpoint of the dorsal fin (背鰭) and caudal fin (尾鰭). The caudal fin is deeply forked. The body is generally yellowish-brown, with a pale yellow abdomen, and it is characterised by three black stripes along its side. The upper stripe runs along the back from the dorsal fin to the base of the caudal fin. The middle stripe runs along the lateral line and extends to the caudal fin lobes (Fig. 26). The lower stripe at the side of the abdomen is discontinuous and pale in colour. The lateral line is complete, and the fins have scattered black spots. The maximum body length of *T. virgatus* is about 150 mm. In general, the dorsal fin has one spine and 6-7 branched rays. The anal fin has three unbranched rays and 13-16 branched rays. The pectoral fin has one spine and 7-8 branched rays.

Fig 26. The middle dark stripe of *T. virgatus* extends to the caudal fin lobes.



Living Habits

T. virgatus is a primary freshwater fish. It is a benthic species, preferring streams with rocky and sandy bottoms. It is nocturnal and feeds mainly on worms, small aquatic insects and crustaceans.

Regional Distribution

It can be found in the provinces of Guangdong, Fujian and Hainan in China; and in Vietnam.

Conservation Status

T. virgatus is neither rare nor endangered.

***Pelteobagrus vachellii* (瓦氏黃鰯魚) (Synonyms: *Pseudobagrus vachellii*, *Bargus vachellii*)**

Morphological features

P. vachellii has an elongated and scaleless body (Fig. 27). The anterior part of the body is round, the posterior part is laterally compressed, and the head is dorso-ventrally compressed. It has large eyes and four pairs of slender barbels. The maxillary barbels extend over the gill openings and terminate behind the base of the pectoral fin spines (Fig. 28). It has long nasal barbels and outer mandibular barbels. The former extend over the eye and the latter extend to the base of the pectoral fin spine. The mouth is subterminal.

Fig 27. *Pelteobagrus vachellii*



The dorsal fin has two spines. The first spine is very short and smooth, and is covered by skin. The second one is long and serrated at the posterior edge. The pectoral fin spine is sharply pointed at the tip and its posterior edge is serrated. The adipose fin, which has a short base, is located slightly beyond the midpoint of the dorsal fin and caudal fin. The caudal fin is deeply forked. The body is generally grayish-brown with a pale yellow abdomen. The lateral line is complete and the edges of all fins are greyish-black. The maximum body length of *P. vachellii* is about 300 mm. In general, the dorsal fin has two spines and 6-8 branched rays. The anal fin has three unbranched rays and 21-26 branched rays. The pectoral fin has one spine and 7-9 branched rays.

Living Habits

Similar to *T. virgatus*, *P. vachellii* is a primary freshwater fish. It is a benthic species, preferring streams with rocky and sandy bottoms. It is nocturnal and feeds mainly on worms, small fishes and invertebrates.

Regional Distribution

In China it can be found in Guangdong, Hainan, the Yangtze River (長江), and the Huang He (黃河). It can also be found in Korea and Vietnam.

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Fig 28. The maxillary barbel of *P. vachellii* extends to the base of pectoral fin spine.



Conservation Status

P. vachellii is a very widespread species. It is raised in China for food and has commercial importance.

Division Column

A Short Note on the First Record of the Philippine Duck (*Anas luzonica*, 棕頸鴨) in Hong Kong

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漁農自然護理署職員於2010年3月7日在米埔沼澤自然護理區進行「米埔及內后灣國際重要濕地水鳥普查」期間，錄得一隻棕頸鴨，為香港首次錄得的記錄。本文就棕頸鴨的特徵、數量和保育狀況作簡短描述。

Introduction

At about 12:30pm on 7 March 2010, a Philippine Duck (*Anas luzonica*, 棕頸鴨) was observed at freshwater pond No. 20 in the Mai Po Marshes Nature Reserve (MPMNR) (米埔沼澤自然護理區) during the bird count for the 'Waterbird Monitoring Programme at the Mai Po Inner Deep Bay Ramsar Site'. The Philippine Duck was resting in the pond with a Chinese Spot-billed Duck (*Anas zonorhyncha*, 中華斑嘴鴨) (Fig. 29). The bird was observed for about one minute. The following paragraphs provide a brief description of the species.

Description

Size: The Philippine Duck is a large dabbling duck with prominent greyish-brown colour. It is slightly smaller than the Chinese Spot-billed Duck (Fig. 29). According to del

Hoyo et al. (1992), the Philippine Duck is about 48-58 cm in length, while the Chinese Spot-billed Duck is about 58-63 cm.

Plumage: The Philippine Duck has a rusty-cinnamon head and neck, with a distinctive dark brown crown, nape and eye-stripe. It has a dark brown iris and bluish-grey bill. The upper parts are greyish-brown, with a bright bluish-green speculum (翼鏡), bordered with a black and narrow white trailing edge. The underparts and belly are also greyish-brown, but paler.

Distribution

The Philippine Duck is endemic to the Philippines. It has been recorded mostly in Luzon (呂宋) and Mindanao (棉蘭老島) (BirdLife International, 2000). The species inhabits a variety of wetlands, including mountain lakes, small pools, rivers, coastal waters, reservoirs, marshes, swamps, estuaries,

Fig 29. A Philippine Duck (left) and a Chinese Spot-billed Duck (right) at Pond 20 in the Mai Po Marshes Nature Reserve.



brackish fishponds, tidal creeks, mangroves, mudflats and the open sea (Sibley and Monroe, 1990; del Hoyo et al., 1992; BirdLife International, 2001).

Outside the Philippines, one individual was recorded in Yonaguni-jima in southern Nansei Shoto (Ryukyuan Okinawa, 沖繩) in the spring of 1987 (Brazil, 1991). Records of this species in Mainland China are uncertain (MacKinnon and Phillips, 2000). In Taiwan, there have been occasional sightings of one to two individuals in Lungluan Lake (龍鑾潭) in Ping Tung (屏東), Guangdu (關渡) and Shezi (社子) in Taipei, and Potz Stream (朴子溪) in Chiayi (嘉義) (Severinghaus et al., 2010). The sighting described above was the first record of this species in Hong Kong.

Conservation Status

An assessment of the status of the Philippine Duck was conducted by the BirdLife International Red List Authority in 2008. The assessment considered the species as Vulnerable. The species has undergone a rapid and continuing population decline since the 1960s owing to over-hunting, loss of wetland habitats, including changes in land use (such as the adoption of aquaculture) and degradation of natural wetland habitats (such as the extensive use of pesticides in rice-fields), in the last three decades (BirdLife International, 2008; BirdLife International, 2011).

In 1993, the population of the Philippine Duck was estimated at 10,000-100,000 individuals (BirdLife International, 2000). The conservation status of the species was upgraded to Vulnerable in 2000 (BirdLife International, 2001). By 2002, fewer than 10,000 birds were thought to remain (BirdLife International, 2011). According to information from the Asian Waterbird Census by Wetlands International, 4,632 birds were counted in 2004 and 4,428 were counted in 2005 (Wetlands International, 2006). The population trend is considered to be decreasing.

Conservation measures for the Philippine Duck have been carried out in five localities: Mt Iglit-Baco (伊格里特-巴科國家公園) and Lake Naujan National Parks (瑙漢湖國家公園) in Mindoro (民都洛島), Maria Aurora Memorial Natural Park (瑪利亞之光紀念自然公園) and Bataan Natural Park/Subic Bay Forest Reserve (巴丹自然公園/蘇碧灣森林保護區) in Luzon, and the Olango Island Ramsar Site (峨蘭哥島拉姆薩爾濕地) (BirdLife International, 2001). On the other hand, the MPMNR, as a Restricted Area and Ramsar Site, provides a suitable habitat for the duck to rest and refuel in Hong Kong.

Acknowledgements

I would like to thank Y. T. Yu for his comment on the status of the bird, and K. L. Chow, X. Cheng and M. Chung who observed and discussed the sighting with the author in the field.

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