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Feature Article

Review of Egretries in Hong Kong

Wai-hung Lee, Eric Y.H. Wong, Gary K.L. Chow & Patrick C.C. Lai

鷺鳥經常聚集在一處築巢而形成鷺鳥林，同一個鷺鳥林內可發現不同品種的鷺鳥同時間築巢及繁殖。現時，在本港繁殖的鷺鳥主要有小白鷺、大白鷺、牛背鷺、夜鷺及池鷺五種。本文總結香港自1950年代起所有有關鷺鳥林的調查，分析當中的變化，並報告2006年最新的調查結果及介紹本港有關保育及管理鷺鳥林的措施。

Background

Ardeids (i.e. herons and egrets) usually nest in colonies forming egretries, which sometimes contain different ardeid species, with the size ranges from a few pairs to several thousands (Young and Cha, 1995). There are five main species of ardeids currently breeding in colonies in Hong Kong, namely Little Egret (*Egretta garzetta*) (Fig. 1), Great Egret (*Egretta alba*) (Fig. 2), Cattle Egret (*Bubulcus ibis*), Black-crowned Night Heron (*Nycticorax nycticorax*) and Chinese Pond Heron (*Ardeola bacchus*). There were also breeding records of Grey Heron (*Ardea cinerea*) and the globally endangered Swinhoe's Egret (*Egretta eulophotes*) in the past but none have been recorded for many years.

Fig 1. Little Egret

Contents

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Fig 2. Great Egret

In Hong Kong, egrets and herons generally breed between mid March and the end of August. The breeding periods may vary between different locations and species, or affected by weather conditions such as heavy rainfall (Tsim, 2002). Egretries are normally used for many years in succession. Protecting the breeding habitats from disturbances is therefore important for the conservation of these species in Hong Kong (Kwok and Dahmer, 1997). In particular, Great Egret in Hong Kong is of regionally importance, as the number of its nests in Hong Kong represents about half of the known nests in Southern China (Wong and Young, 2006).

Egretries in Hong Kong were monitored by volunteers of the Hong Kong Bird Watching Society (HKBWS) from as early as 1950's and up to 1975. However, such monitoring was suspended between 1975 and 1989. Since summer 1998, AFCD commissioned the HKBWS to survey local egretries as part of the waterbird monitoring programme for the Mai Po Inner Deep Bay Ramsar Site.

In this paper, we reviewed all available data on local egretries, including Young and Cha (1995), Carey (1999), Wong *et al*. (1999, 2000 & 2001), Kwok *et al*. (2001), Wong and Kwok (2002), Wong and Woo (2003) and HKBWS's egretry surveys commissioned by AFCD (Anon, 2004, 2005 & 2006).

An Overview of Egretries in Hong Kong

Over 40 egretries have been reported in Hong Kong from 1958 up to 2006, among these about 20 are currently actively being used. The majority of the abandoned egretries had only been used for less than three breeding seasons. Interestingly, the egretry in Shuen Wan, once abandoned in late 1990s, has been reused by several pairs of Chinese Pond Herons between 2000 and 2005. While certain egretries were abandoned at times, new egretries have been established and the total number of active egretries in Hong Kong remained at about 20 in recent years (Fig. 3).

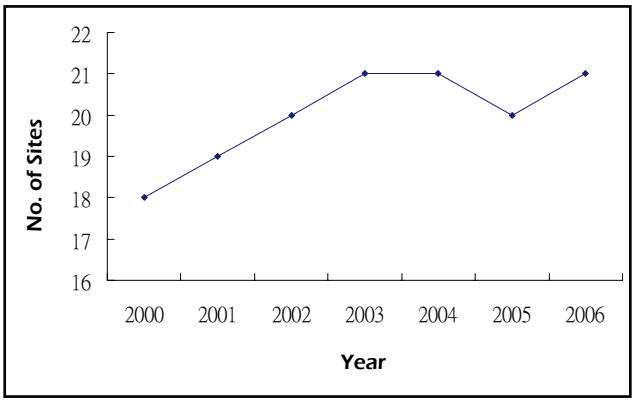

Fig 3. Total number of active egretries between years 2000 and 2006.

Fig 4. A Chau Egretry

Three egretries have a history of 20 years or more i.e. Mai Po Village, Yim Tso Ha and A Chau. The egretry at Mai Po Village has one of the earliest breeding records dated back to 1958. It was once the largest egretry in Hong Kong with over 500 nests recorded in 1988. The egretry is still being actively used but the location has been shifted slightly in recent years. The earliest record of the egretry at Yim Tso Ha also dated back to 1958, but it has been abandoned since 1993 after almost 30 years of colonization. It is believed that the populations used to breed at Yim Tso Ha have moved to A Chau (Fig. 4), which is a small coastal island relatively free from human disturbance. Currently, A Chau is the largest egretry in Hong Kong and may also be one of the most important night roosting sites for the ardeids in winter.

The egretries in Hong Kong appear to be smaller in size and more scattered in different locations in recent years (Fig. 5). The most peculiar year for comparison was 1992 when only four big egretries were recorded with an average of 200 nests per egretry. Whereas in 2006, there were 21 active egretries with the majority of them have less than 50 nests (Table 1). Although the average size of egretries (i.e. number of nests in each egretry) has reduced, the total number of active egretries found in the territory increased and become stable in recent years and the total number of nesting pairs remains more or less the same (Fig. 6). This trend may reflect the strategy adopted by the ardeids in response to the changes in land uses. It is noted that egretries are relatively mobile as egrets and herons may readily search for alternative nesting sites and abandon the old one due to disturbance, food availability or other unknown reasons. Hence, it appears that the breeding ardeids were opportunistic in exploring suitable nesting sites, which seem not to be a limiting factor in supporting the total ardeid populations in Hong Kong.

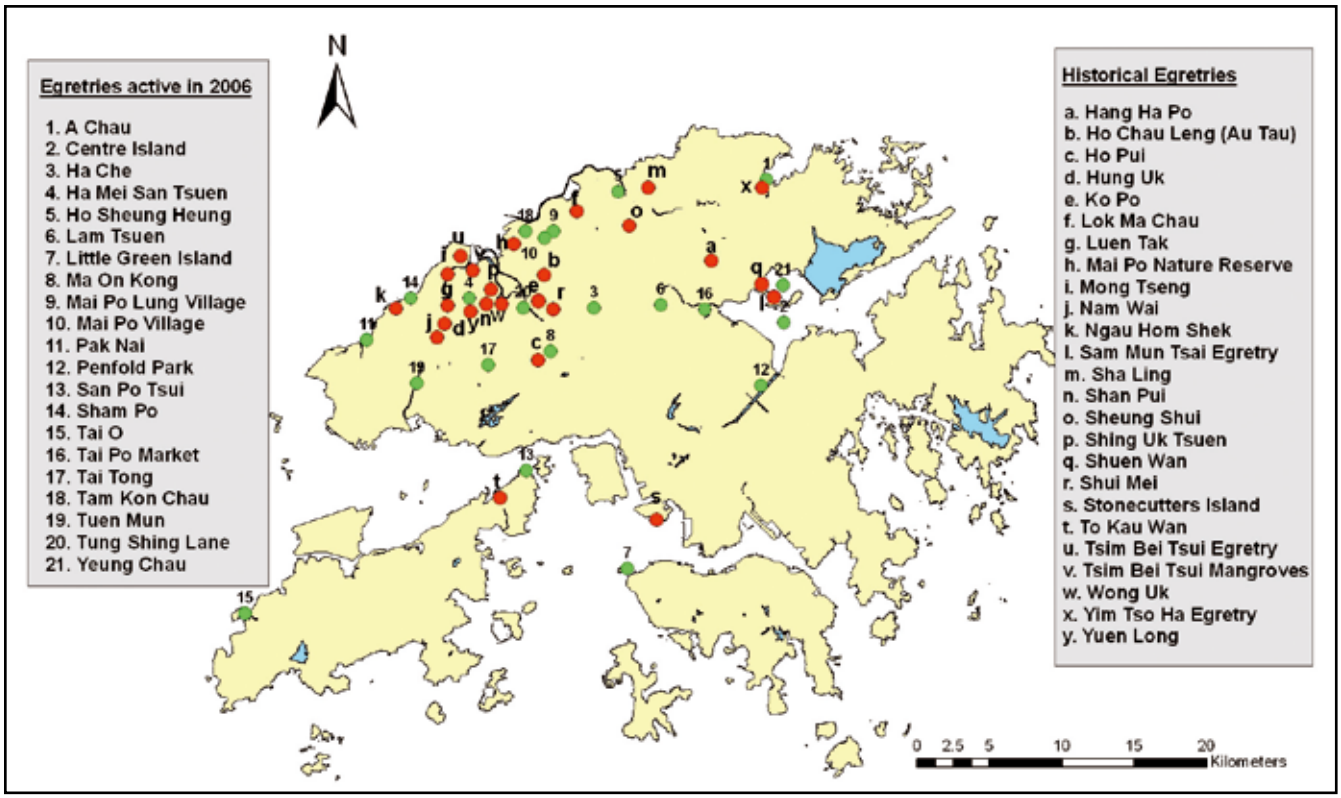

Fig 5. Distribution Map of Egretries in Hong Kong.

The majority of egretries are located in the Northern and Western parts of the New Territories (Fig. 5). There is so far no egretry reported on Hong Kong Island or in Sai Kung District. Ardeids are wetland-dependent species so that their population size and breeding success are closely related to the area of wetland habitats available for foraging (Wong *et al*. 1999). As such, it is believed that the distribution patterns of egretries in Hong Kong are related to the distribution of suitable foraging habitats e.g. shallow coastal waters, inter-tidal mudflats, freshwater marshes, mangroves and fishponds. Local studies reported that the foraging distances for egrets and herons ranged from about two to four km (Young, 1998; Wong *et al*. 1999; Kwok and Dahmer, 2002).

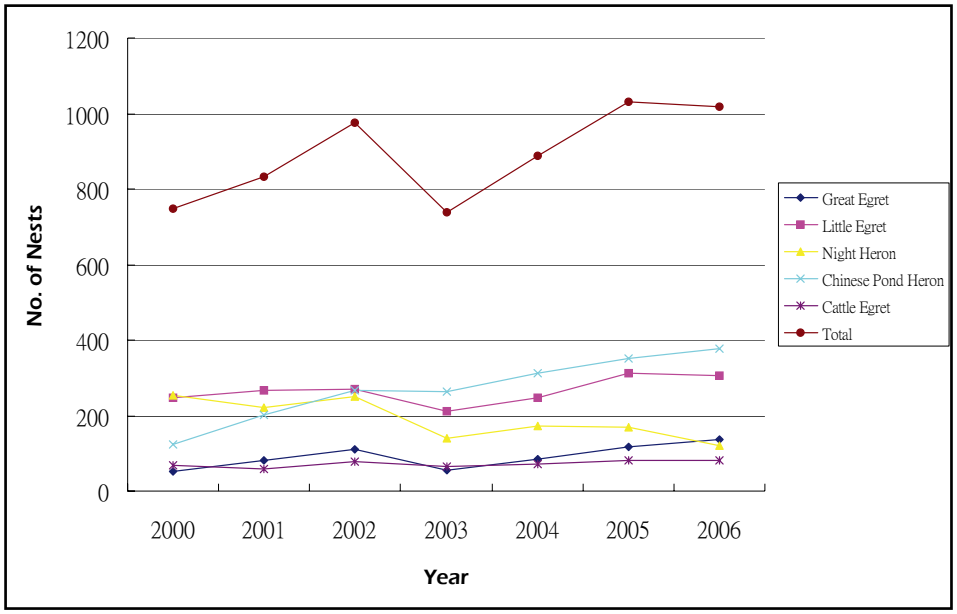

Fig 6. Total number of nests of five ardeid species between 2000 and 2006.

The total number of nests recorded in all egretries in the past seven years remained more or less the same and so did the individual numbers of Great Egret, Little Egret and Cattle Egret (Fig. 6). The number of nests of Chinese Pond Heron gradually increased from 125 in 2000 to 376 in 2006. On the other hand, the number of nests of Black-crowned Night Heron decreased from 254 in 2000 to 121 in 2006. Apart from the possibility of under-estimation due to its dull body colour, the decline in the number of nests of Black-crowned Night Heron may be due to the change of prey availability, in particular the changes in operation practices in fishponds in Deep Bay area in recent year may not be beneficial to them (Anon, 2005).

Egertry Counts in 2006

The summary of egretry counts in 2006 with a breakdown by species at different egretries is given in Table 1. Chinese Pond Heron was the most abundant species, to be followed by Little Egret. These two are also the most widespread species. Out of the 21 egretries recorded in 2006, Chinese Pond Heron bred at 14 colonies and Little Egret bred at 16 of them.

Location	Number of active nests or breeding (% of nest / breeding pair)					
	LE	GE	CE	NH	CPH	Total
A Chau	5 (1.6%)	80 (59.3%)	32 (40.0%)	78 (64.5%)	0 (0.0%)	195 (19.2%)
Centre Island	0 (0.0%)	4 (3.0%)	0 (0.0%)	5 (4.1%)	0 (0.0%)	9 (0.9%)
Ha Che	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	17 (4.5%)	17 (1.7%)
Ha Mei San Tsuen	9 (3.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	30 (8.0%)	39 (3.8%)
Ho Sheung Heung	36 (11.8%)	0 (0.0%)	29 (36.3%)	0 (0.0%)	82 (21.8%)	147 (14.5%)
Lam Tsuen	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (1.9%)	7 (0.7%)
Little Green Island	13 (4.3%)	0 (0.0%)	0 (0.0%)	4 (3.3%)	0 (0.0%)	17 (1.7%)
Ma On Kong	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	18 (4.8%)	18 (1.8%)
Mai Po Lung Village	12 (3.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	74 (19.7%)	86 (8.5%)
Mai Po Village	35 (11.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	50 (13.3%)	85 (8.4%)
Pak Nai	64 (21.0%)	3 (2.2%)	1 (1.3%)	0 (0.0%)	10 (2.7%)	78 (7.7%)
Penfold Park	25 (8.2%)	42 (31.1%)	0 (0.0%)	7 (5.8%)	2 (0.5%)	76 (7.5%)
San Po Tsui	15 (4.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (1.3%)	20 (2.0%)
Sham Po (near Ngau Hom Shek)	2 (0.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.5%)	4 (0.4%)
Tai O	15 (4.9%)	0 (0.0%)	0 (0.0%)	9 (7.4%)	0 (0.0%)	24 (2.4%)
Tai Po Market (Tai Po Egretry)	12 (3.9%)	1 (0.7%)	0 (0.0%)	8 (6.6%)	0 (0.0%)	21 (2.1%)
Tai Tong	1 (0.3%)	0 (0.0%)	15 (18.8%)	0 (0.0%)	10 (2.7%)	26 (2.6%)
Tam Kon Chau	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	37 (9.8%)	37 (3.6%)
Tuen Mun	16 (5.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	16 (1.6%)
Tung Shing Lane	43 (14.1%)	0 (0.0%)	2 (2.5%)	0 (0.0%)	32 (8.5%)	77 (7.6%)
Yeung Chau (Plover Cove)	2 (0.7%)	5 (3.7%)	1 (1.3%)	10 (8.3%)	0 (0.0%)	18 1.8%)
Total in 2006	**305**	**135**	**80**	**121**	**376**	**1017**

Footnotes: LE-Little Egret; GE-Great Egret; CE-Cattle Egret; NH-Black-crowned Night Heron; CPH-Chinese Pond Heron.

Table 1. Summary of egretry counts in 2006.

On the other hand, Black-crowned Night Heron and Cattle Egret tend to be relatively restricted in distribution with seven and six breeding localities in 2006 respectively. Breeding records of Great Egret could be found at five egretries and most of the nests are concentrated at Penfold Park and A Chau. The nests found at Centre Island has dramatically decreased when compared with that of 2005 (39 nests of Great Egret recorded on the island in 2005). It is believed that the breeding population originally bred on the island have moved to Penfold Park (Anon, 2006) due to unknown reasons.

A Chau Egretry, amongst three other sites, have the highest species diversity with four species of egrets and herons bred at these sites. Indeed, about 60% of the nests of Great Egret and Black-crowned Night Heron were recorded at A Chau Egretry. A Chau Egretry also supports the highest number of nests (i.e. 195 nests/nesting pairs or 19% of total number of nests surveyed). These render A Chau the most important egretry for the conservation of egrets and herons in Hong Kong.

Interestingly, Chinese Pond Heron was the only species which were commonly recorded in egretries where the other species were absent, suggesting that Chinese Pond Heron may have a different niche from other ardeids species, or Chinese Pond Heron, which is the smallest in size, is less competitive in securing a nesting place amongst other breeding ardeids at the same location. Field observations revealed that the nests in egretries of Chinese Pond Heron were more scattered, particularly in bushes in village environs. In addition, the Chinese Pond Herons and Little Egrets breed in egretries in the proximity of villages, main roads or the West Rail's alignment (e.g. Mai Po Village, Ho Sheung Heung, Mai Po Lung Village and Tung Shing Lane). It seems that they could tolerate a relatively higher level of disturbance, suggesting that these two species are more adaptive in selecting their nesting habitats or they are forced to do so as they are inferior competitors.

Conservation and Management of Egretries

The Wild Animals Protection Ordinance, Cap. 170 provides for the protection of all wild birds, including egrets and herons, and their eggs and nests against hunting, trapping and willful disturbance in Hong Kong. Moreover, the Forests and Countryside Ordinance, Cap. 96 provides for the protection of trees in forests and plantations on Government land. Hence, the trees, nests, nestlings and the breeding pairs of the egretries are all protected under local legislation.

Control of direct and indirect impacts of developments and inappropriate land uses on land where egretries are found can also be achieved by listing the land as a Site of Special Scientific Interest (SSSI). Listing of SSSI is an administrative device to ensure that government departments concerned are aware of the scientific interest of the site in question and that due consideration is given to conservation when developments in or near these sites are proposed. Important and representative egretries have been listed as SSSIs and there are currently seven egretry SSSIs. The first SSSI in Hong Kong was the Yim Tso Ha Egretry, which was listed in 1975 when it was the most important egretry in Hong Kong. The largest existing egretry A Chau was listed as a SSSI in 1985. The statuses of SSSIs are regularly monitored and reviewed by AFCD.

a) Centre Island was originally covered by Mikania and b) Mikania was removed.

c) Tree seedlings were planted and d) Trees were established.

Fig 7. An example of active conservation management works carried out at Centre Island.

Egretries which are covered by statutory plans could be zoned with conservation-related zonings such as “SSSI” or “CA” where appropriate to provide then with the statutory protection from development under the Town Planning Ordinance, Cap. 131. The Environmental Impact Assessment Ordinance, Cap 499 stipulates requirements in respect of environmental impact of projects. For example, for any designated projects to be carried out in or in the proximity of an egretry, the potential impacts on the egretry would be assessed and appropriate mitigation would be implemented to avoid or minimize such impacts.

In addition to the protection provided by legislation, active conservation management work has been carried out at important egretries. For instance, Mikania (*Mikania micrantha*) at the egretry on A Chau, Centre Island and in Shuen Wan were cleared regularly, and a total of about 4,000 tree seedlings have been planted in these egretries (Fig. 7a-d). The clearance and tree planting work was carried out outside the breeding season in order to avoid disturbance to the nestling egrets and herons.

All active egretries in Hong Kong are being monitored on an ongoing basis and AFCD maintains an inventory of active egretries as a reference to facilitate commenting on development plans and proposals and giving conservation advice to minimize potential impacts on egretries. Recommendations on appropiate land use zonings or conservation and management work for enhancing the ecological condition of the egretries would be made where necessary.

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Working Group Column

A Brief Account and Revision on Gastropods Found in Local Mangroves

Josephine K.Y. Yang
Coastal Community Working Group

Introduction

The Coastal Community Working Group has initiated a territory-wide survey on mangrove community in 2002 with a view to collect and update both flora and fauna information so as to assess the ecological value of individual mangrove sites for better conservation. From 2002 to 2005, more than 63nos of mangroves sites were visited with mangrove-dwelling gastropod species being collected. Recently the author visited the Department of Zoology of the Natural History Museum in London and verified the specimens collected against the collections there with the assistance of Dr David G. Reid. Basing on the morphological features, the specimens were identified and an updated checklist of the gastropods found in local mangroves was complied. The verified specimens in the visit could be served as references for future identification use.

Gastropods Found in Local Mangroves

The abundant and diverse gastropods are an important part of the food web of mangroves. Gastropods vary considerably in their structure, way of life and diet.

Superorder : Neritopsina

Nerita and Clithon are notable for their smooth, oval and variably patterned shells. The mouth is characteristically semicircular with a calcareous operculum. The family is rich in species, as they can live in the sea, brackish or fresh waters. All graze upon algae growing on firm underwater surfaces. *Clithon faba* (Sowerby, 1836) (Fig. 8a) (up to 1.5cm in shell length) and *C. oualaniensis* (Lesson, 1831) (Fig. 8b) (up to 1cm in shell length and more shiny) are always found near estuarine mangroves where the fresh water input is substantial. A spiny Clithon, only collected at Chek Keng in the survey, was confirmed to be *C. corona* (Linnaeus, 1758) (Fig. 8c&d); this is the first record in Hong Kong. The shell is always brown in color with some axial striae, around 0.9 – 1.5cm in length with an unapparent shoulder bearing short spines. The inner lip is flat with a quite prominent tooth. The apical region of the shell is always eroded. It is also found in estuarine regions of Philippines, Taiwan and Japan. *C. souverbiana* (Montrouzier, 1863) has an elongated shell (Fig. 8e&f) and *C. retropicta* (v. Martens, 1879) (Fig. 8g&h) has small triangles with vertical black bars on dark green shell. Outer edge of operculum red (Okutani, 2000).

Fig 8. a) *Clithon faba*, b) *C. oualaniensis*, c&d) *C. corona* (arrows showing the shoulder spines), e&f) *C. souverbiana* and g&h) *C. rectropicta* (arrow showing the red outer edge)

Fig 9. a&b) *Neritina violacea* and c&d) *N. cornucopia*

Neritina violacea (Gmelin, 1791) (Fig. 9a&b) with dull blood-red mouth is commonly found on the base of mangroves in muddy habitats. *N. cornucopia* (Benson, 1836) (Fig. 9c&d) with grayish aperture and more prominent white triangles pattern on shell (Okutani, 2000) is however comparatively rarer locally.

Nerita chamaeleon Linnaeus, 1758 (Fig. 10a&b) is common on stones among mangroves. Easily confused with it is *N. litterata* Gmelin, 1791 (Fig. 10c&d) which is smooth at bottom with glossy parietal area and fine teeth at outer lip. *N. squamulata* Le Guillou, 1841 (Fig. 10e&f) has wider and flatter shell with strong sculpture, usually more colorful. Shell of *N. albicilla* Linnaeus, 1758 (Fig. 10g&h) is flat topped and patelliform in sharp. *N. undata* Linnaeus, 1758 (Fig.10i&j) has the most obvious spire with a pointed apex, bears two quite large columellar teeth. *N. lineata* (Gmelin, 1791) (Fig. 10k&l), the largest species of the local neritas, can be easily distinguished by its large, thick shell with pronounced spiral cords. It usually inhabits tree trunks on the backside mangroves. This appealing snail, used to be recorded in a few sites, was however found in quite a number of mangroves sites in the survey.

Fig 10. a&b) *Nerita chamaeleon*, c&d) *N. litterata* (arrow showing the glossy parietal area), e&f) *N. squamulata*, g&h) *N. albicilla*, i&j) *N. undata* (arrows showing the pointed apex) and k&l) *N. lineata*.

Order : Pulmonata

For the Ellobiidae family, three Cassidula species were recorded in the survey. The largest one is *C. aurifelis* (Brugeuière, 1789) (Fig. 11c&d) which in fact is rather large (~2.6cm) for the subfamily and genus (Brandt, 1974). *C. crassiuscula* Mousson, 1869 (Fig. 11a&b) is similar to *C. aurifelis* in shell sharp but much smaller (~1cm) and bears distinct brown hairs (Okutani, 2000). Shell of *C. plectrematoides* Möllendorff, 1901 (Fig. 11e&f), is however, more pyriform (pear-shaped).

Fig 11. a&b) *Cassidula crassiuscula*, c&d) *C. aurifelis* and e&f) *C. plectrematoides*.

Unlike the snails, the shell has been totally lost in seashore slugs. Common slugs collected in the survey were identified as *Platevindex mortoni* Britton, 1984 (Fig. 24a&b) that is flat, oval and rather solid. The other may probably be *Onchidium hongkongensis* Britton, 1984 (Fig. 24c&d) which is rather soft with foot occupied almost all area of ventrum (Okutani, 2000). They are commonly found crawling on floor of the mangroves, mainly using waves of muscular contraction of the single foot.

Fig 24. a&b) *Platevindex mortoni* and c&d) *Onchidium hongkongensis*.

Superorder : Caenogastropoda

Three Clypeomorus species were collected in the survey. Amongst these, only the *C. pellucida* (Hambron & Jacquinot, 1852) (Fig. 12a) is a true mangrove dweller, clinging on the lower part of mangrove trunks. It has three strong varices on the body whorl (Fig. 13a). *C. batillariaeformis* Habe & Kosuge, 1966 (Fig. 12b) mainly occurs on hard substrate and occasionally on softer substratum. It has a large varix on the right dorsal side of the body whorl (Houbrick, 1985) (Fig. 13b). *C. petrosa chemnitziana* (Pilsbry, 1901) (Fig. 12c), usually found around rocks, is an occasional species in mangroves only.

Fig 12. a) *Clypeomorus pellucida*, b) *C. batillariaeformis* and c) *C. petrosa chemnitziana*.

Fig 13. Comparsion of the a) three strong varices of *C. pellucida* and b) large varix of *C. batillariaeformis*.

Amongst the various gastropods found in Hong Kong mangroves, Littoraria species have the closest relationship with mangroves. They are always found crawling slowly, or adhering firmly, on the stems and foliage of mangroves where they extract plant cells, fungi and microalage from the surfaces. The two common species are *L. ardouiniana* (Heude, 1885) (Fig. 14c&d) (variable shell color with growth marks) and *L. melanostoma* (Gray, 1839) (Fig. 14a&b) (pale yellow shell with a distinctive brown patch on the inner lip). The *L. sinensis* (Philippi, 1847) (Fig. 14e&f), once confused with the similar *L. articulata* (Philippi, 1846) (Fig. 15c&d), was distinguished recently by examining further on the penis, form of the aperture and columella, and the diffuse color pattern on the shoulder region by Reid (2001). In general, the whorls of *L. sinensis* are slightly more rounded and the shell color is paler with indistinctly clouded pattern (Fig. 15a&b). It is more commonly found in mangroves habitat whereas *L. articulata* on rocky shores. One more specimen of Littoraria species being confirmed in the visit was the *L. pallescens* (Philippi, 1846) (Fig. 14g). It is rare in Hong Kong and used to be found on mangroves in oceanic situation with clear water (Reid, 1992). The most distinctive shell character of the species is the 8-11 primary grooves on the spire whorls (Fig. 16).

Fig 14. a&b) *Littoraria melanostoma* (arrow showing the brown patch), c&d) *L. ardouiniana*, e&f) *L. sinensis* and g) *L. pallescens* (arrow showing the primary grooves).

Fig 15. Comparsion of a&b) *L. sinensis* (more clouded pattern) and c&d) *L. articulata*.

Fig 16. The 8-11 primary grooves on the spire whorl of *L. pallescens*.

Batillaria zonalis (Brugeuière, 1792) (Fig. 17c) bears apparent white bandings with the outer lip forms a distinct point (Fig. 18a). The outer lip of *B. multiformis* (Lischke, 1869) is however straight (Fig. 18b) and the shell is more knobby in appearance (Fig. 17a). Easily distinguished from the formers, *B. sordida* (Gmelin, 1791) (Fig. 17b) is much stocky. It has two thick brown spiral nodules occur on the upper whorls and five on the body whorl (Wells, 1983).

Fig 17. a) *Batillaria multiformis*, b) *B. sordida* and c) *B. zonalis*.

Fig 18. Shape of the outer lips of a) *B. zonalis* and b) *B. multiformis*.

Five Cerithidea can be found in Hong Kong. *Cerithidea rhizophorarum* A. Adams, 1855 (Fig. 19e) is a common species found in grass covered mangroves at the backside of the shore. The apical tip of the spire is usually eroded. *C. ornata* A. Adams, 1863 (Fig. 19d) can be easily distinguished by its prominent axial sculptures, commonly found at the back shore. Channels on the body whorls crossed by axial ribs give the shell of *C. cingulata* (Gmelin, 1790) (Fig. 19b) a beaded appearance (Wells, 1983). Its shell is generally smaller than those of other local species and it always inhabits the open mudflat. Living under the mangroves are two similar species, the *C. alata (*Philippi, 1849) (Fig. 19a) and *C. djadjariensis* (Martin, 1899) (Fig. 19c). The *C. djadjariensis* is larger than the *C. cingulata* and its beans are more uniform. The *C. alata* (Fig. 20b) can only be distinguished from *C. djadjariensis* (Fig. 20a) by its extended upper part of the peristome which forms a wing with a pointed angle (Brandt, 1974).

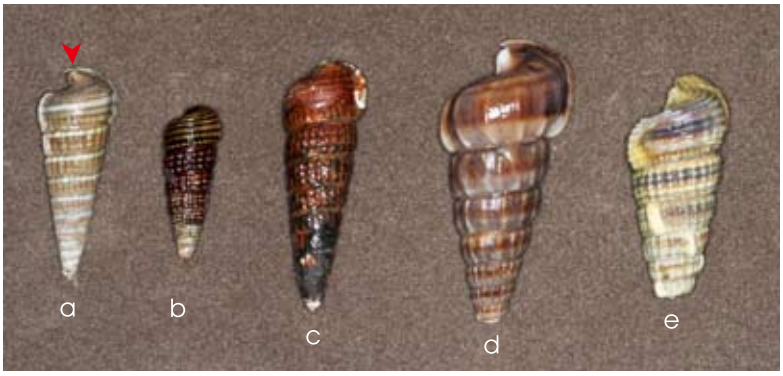

Fig 19. a) *Cerithidea alata* (arrow showing the wing), b) *C. cingulata*, c) *C. djadjariensis*, d) *C. ornata* and e) *C. rhizophorarum*.

Fig 20. Comparsion of the upper part of the peristome of a) *C. djadjariensis* and b) *C. alata* (arrow showing the pointed angle).

Living with Clypeomorus and Cerithidea among the mangroves, *Cerithium coralium* Kiener, 1841 (Fig. 21a&b) is frequently misidentified as a Batillaria or Cerithidea (Houbrick, 1992). However, unlike the Batillaria or Cerithidea which have circular and multi-spiral operculum (Fig. 22a), the operculum of Cerithium is similar to Clypeomorus are ovate and paucispiral (Fig. 22b).

Fig 21. a&b) *Cerithium coralium*.

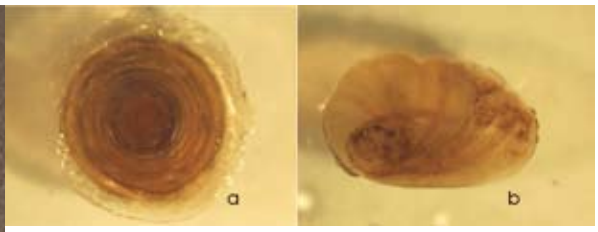

Fig 22. Operculum of a) Cerithidea - circular and multi-spiral and b) Cerithium - ovate and paucispiral.

Terebralia is represented by one species locally, *Terebralia sulcata* (Born, 1778) (Fig. 23). A round hole can be seen at the anterior end which, in fact, is the siphonal canal being enclosed progressively by the growth of the shell.

Fig 23. *Terebralia sulcata*

Uncommon and occasional species

Amongst the uncommon species found in the survey, the *Haminoea* sp. (Fig. 25a&b) that gives a violet secretion when handled, was found only in Sheung Pak Nai. *Salinator fragilis* (Lamarck, 1822) (Fig. 26) was found in Sheung Pak Nai and Tai Tam. The *Nassarius festivus* (Powys, 1835) (Fig. 27a&b), *Polinices mammilla* (Linnaeus, 1758) (Fig. 28) and *Umbonium* cf. *vestiarium* (Linnaeus, 1758) (Fig. 29d) used to be found in sandy habitats were found in open area of the mangroves at Tai Tan, Lai Chi Chong and Shui Hau respecitively. The same applies to *Milda ventricosa* (Guerin, 1830) (Fig. 30) which was found in Tai Tam and Chek Keng. The *Ellobium polita* (Fig. 31b) that was previously found restricted to Mai Po, was found in Sha Tau Kok, Tai O, Tsim Bei Tsui and Tung Chung as well in the survey. Some mangroves in Hong Kong have diverse microhabitats involving rocky substratum. In the survey, quite a number of rocky shores gastropods could be found. These include *Omphalius rusticus* (Gmelin, 1791) (Fig. 29b), *Trochus maculatus* (Linnaeus, 1758 (Fig. 29c), *Strombus urceus* Linnaeus, 1758 (Fig. 32), *Strigatella scutula* (Gmelin, 1791) (Fig. 33), *Morula margariticola* Broderip, 1832 (Fig. 34a), *M. musiva* (Kiener, 1834) (Fig. 34b) and *Thais clavigera* (Küster, 1860) (Fig. 34c).

Fig 25. a&b) *Haminoea* sp.

Fig 26. *Salinator fragilis*

Fig 27. *Nassarius festivus*

Fig 28. *Polinices mammilla*

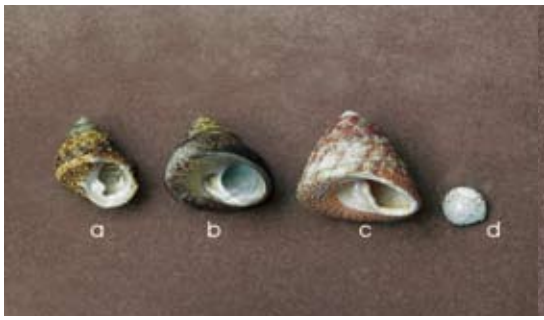

Fig 29. a) *Monodonta labio*, b) *Omphalius rusticus*, c) *Trochus maculatus* and d) *Umbonium* cf. *vestiarium*.

Fig 30. *Milda ventricosa*

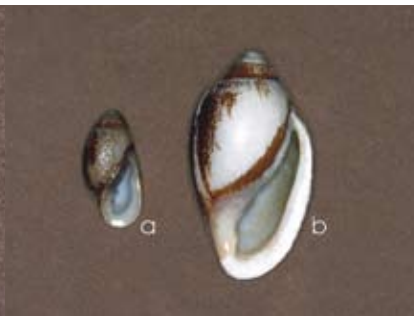

Fig 31. a) *Ellobium chinensis* and b) *E. polita*.

Fig 32. *Strombus urceus*

Fig 33. *Strigatella scutula*

Fig 34. a) *Morula margariticola* (purple mouth with whitish teeth), b) *M. musiva* (thick shell lip with few submarginal teeth) & c) *Thais clavigera*.

Fig 35. *Lunella coronata granulata*

Fig 36. *Assiminea* sp.

Fig 37. *Planaxis sulcatus*

Fig 38. a&b) *Tarebia granifera*

Discussion

More than 56 species of gastropods belonging to 19 families were found in the surveyed mangrove sites (Table 2). Amongst all the recorded species, important families in terms of the number of species found were Neritidae (13spp.), Potamididae (9spp.) Ellobiidae (5spp.) and Littorinidae (5spp.). In our observation, mangroves with diverse microhabitats (i.e. tree trunk, stilt root) and substratum (i.e. rocky, boulder, sandy and muddy) and with substantial fresh water coming in are the richest in the gastropods species diversity. An intact and well preserved backshore also allows gastropods species of high intertidal zone to inhabit. With the collected specimens verified and an updated list complied, the distribution and diversity of the gastropods in mangroves of Hong Kong could be compared.

Acknowledgements

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Family	Genus	Species
Amphibolidae	*Salinator*	*fragilis*
Assimineidae	*Assiminea*	sp (Fig. 36)
Cerithiidae	*Cerithium*	*coralium*
	Clypeomorus	*batillariaeformis*
	Clypeomorus	*pellucida*
	Clypeomorus	*petrosa chemnitziana*
Ellobiidae	*Cassidula*	*aurifelis*
	Cassidula	*crassiuscula*
	Cassidula	*plectrematoides*
	Ellobium	*chinensis* (Fig. 31a)
	Ellobium	*polita*
Haminoeidae	*Haminoea*	sp
Littorinidae	*Littoraria*	*ardouiniana*
	Littoraria	*articulata*
	Littoraria	*melanostoma*
	Littoraria	*pallescens*
	Littoraria	*sinensis*
Mitridae	*Strigatella*	*scutula*
Muricidae	*Morula*	*margariticola*
	Morula	*musiva*
	Thais	*clavigera*
Nassariidae	*Nassarius*	*festivus*
Naticidae	*Polinices*	*mammilla*
Neritidae	*Clithon*	*corona*
	Clithon	*faba*
	Clithon	*oualaniensis*
	Clithon	*rectropicta*
	Clithon	*souverbiana*
	Neritina	*violacea*
	Neritina	*cornucopia*
	Nerita	*albicilla*
	Nerita	*chamaeleon*
	Nerita	*lineata*
	Nerita	*litterata*
	Nerita	*squamulata*
	Nerita	*undata*
Onchidiidae	*Onchidium*	*hongkongensis*
	Platevindex	*mortoni*
Planaxidae	*Planaxis*	*sulcatus* (Fig. 37)
Potamididae	*Batillaria*	*multiformis*
	Batillaria	*sordida*
	Batillaria	*zonalis*
	Cerithidea	*alata*
	Cerithidea	*cingulata*
	Cerithidea	*djadjariensis*
	Cerithidea	*ornata*
	Cerithidea	*rhizophorarum*
	Terebralia	*sulcata*
Pyramidellidae	*Milda*	*ventricosa*
Strombidae	*Strombus*	*urceus*
Thiaridae	*Tarebia*	*granifera* (Fig. 38)
Trochidae	*Monodonta*	*labio* (Fig. 5a)
	Omphalius	*rusticus*
	Trochus	*maculatus*
	Umbonium	cf. *vestiarium*
Turbinidae	*Lunella*	*coronata granulata* (Fig. 35)

Table 2. Classification of Gastropods found in Local Mangroves.

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Division Column

An Unusual Record of Green Turtle Nesting on Tai Long Wan Beach, Sai Kung East Country Park in 2006

Ka-shing Cheung[1], Ying-ming Lee[2] and Pamela Y.M. Wan[1]
[1]Wetland and Fauna Conservation Division
[2]Country Parks Ranger Services Division

去年9月下旬，有市民在西貢東郊野公園的大浪灣沙灘發現綠海龜產卵。鑑於天氣及環境因素，本署決定將其中65枚龜卵遷移到室內進行人工孵化，餘下的18枚則留在沙灘作天然孵化。人工孵化成功率達86%，天然孵化的成功率亦有67%。小綠海龜暫時由本署飼養，稍後將於天氣較穩定及回暖後放回海洋生活。

南丫島深灣是香港目前唯一有綠海龜定期產卵的地方。根據記錄，西貢大浪灣在過去30多年均未有海龜產卵。本署會在大浪灣進行監察，留意會否繼續有海龜產卵。

On 22 September 2006, Lisa Christensen and her friends found a green turtle (*Chelonia mydas*) nesting on Tai Long Wan beach in Sai Kung East Country Park. They carefully removed the trace of nesting and reported the case to the Wetland and Fauna Conservation Division on 4 October. This was possibly the last nesting in the season as we did not find any trace of further nesting. Later on 3 November 2006, Vanda Kennedy, who also witnessed the nesting, found 2 dead hatchlings at the same site. The timing suggested that the dead hatchlings might come from a nesting before the one on 22 September 2006 and it was likely that the mother turtle laid at least 2 nests of eggs in Tai Long Wan this summer.

Fig 39. Excavated nest, showing the top few layers of eggs.

Though the nesting site is remote and not assessable through public transport, it is a popular beach among the country park visitors. Furthermore, if the eggs were left to hatch on site, the weather was expected to turn cool when the hatchings emerge in late November. As such, it was decided to collect the eggs for artificial incubation. With the assistance of the informants, AFCD visited Tai Long Wan beach and located the nest on 9 October 2006 (Fig. 39). 65 eggs were retrieved for artificial incubation while 18 eggs were left on site as an assurance colony (Fig. 40&41).

Fig 40. Eggs were carefully placed on sand in a bucket for transportation.

Fig 41. Eggs were pencil-marked on the top to prevent drastic displacement of embryos during subsequent handling.

We incubated these eggs in AFCD's laboratory. The hatchlings took 58 to 64 days to emerge (Fig. 42&43). When we revisited Tai Long Wan on 27 November, the hatchlings in the nest were ready to go after 67 days of natural incubation (Fig. 44) and all were brought back for captive rearing because the weather was turning cool. The hatching rates of natural and artificial incubation were 67% (12/18) and 86% (56/65) respectively.

Fig 42. Hatchlings from artificial incubation.

Fig 44. Hatchlings from natural incubation on Tai Long Wan beach.

Fig 43. A hatchling from artificial incubation, showing the opening on the plastron once connecting to the yolk sac. The opening would generally seal up in 2 to 3 weeks.

As it did turn cool in late November, we continue to keep the hatchings in captivity and plan to release them back to Tai Long Wan beach when the weather becomes warmer and stable. This captive rearing of juvenile green turtles is the largest in scale AFCD has ever undertaken. The juveniles are being kept in the Hong Kong Wetland Park and the laboratory of the AFCD, and the Hong Kong Ocean Park (Fig. 45).

Fig 45. Morsels of food, e.g. squids or shrimps, would be placed on tank bottom to provide incentive for the hatchlings to practise diving. Caruncle, also known as egg-tooth, can be seen in the hatchling in front as a small whitish cone just below the nostrils. Hatchlings use it to rupture the egg shells and the feature will disappear in the first few weeks after hatching.

Many beaches in the Eastern and Southern waters in Hong Kong were used to support sea turtles nesting. Nowadays, however, Sham Wan at Lamma Island is the only regular nesting site of Green Turtles in Hong Kong. According to the local villagers, sea turtles have not nested in Tai Long Wan for over 30 years. Whilst we are not sure whether Green Turtles do nest on Tai Long Wan beach recurrently without being noticed, there is no doubt that the current nesting is one of the only two documented records outside Lamma Island in the past few decades. Another recent nesting was on Big Wave Bay Beach, Hong Kong Island in 2000. AFCD is planning to monitor the Tai Long Wan beach to see if there is a stable population of Green Turtles that keeps returning to mate and nest.

6 out of the 7 species of sea turtles in the world are ranked "endangered" or "critically endangered" under the 2006 IUCN Red List. Sightings of sea turtles should be reported to the Wetland and Fauna Conservation Division so that appropriate actions could be taken in good time accordingly. You can report to K.S. Cheung, Wetland and Fauna Conservation Officer (Monitoring) by phone at 2150 6922 or e-mail to ks_cheung@afcd.gov.hk

Acknowledgements

We extend our gratitude to Lisa Christensen, Paul Hilton and their friends who reported the case to us and helped find the nest; and to Vanda Kennedy who collected and handed to us the dead hatchlings found in November. We are also grateful to Mr. David Lai, Dr. Paolo Martelli and their colleagues of the Hong Kong Ocean Park for participating in captive rearing and veterinary care of the juveniles.

This rescue, artificial incubation and captive rearing exercise could not be successful without the assistance and supports from our colleagues including the Biodiversity Conservation Division, Country Parks Ranger Services Division, Information Unit, Veterinary Laboratory, Wetland and Fauna Conservation Division, Wetland Park Division, Simon Chan, Wendy Li and Lilian Lo.

A New Camellia Record for Hong Kong, *Camellia furfuracea* (糙果茶), and Its Propagation Trial

Joseph K. L. Yip & Patrick C. C. Lai
Hong Kong Herbarium

本署的香港植物標本室最近在大圍的坳背灣記錄了一種本港新發現的茶花，名為糙果茶。故名思意，糙果茶的果表面粗糙有糠秕，正是其拉丁學名 *furfuracea* 所含的意思。在欠缺花或果作識別的情況下，糙果茶容易與大苞山茶混淆。本署收集了一批糙果茶的種子進行人工繁殖，初步結果顯示發芽率達九成之高，相信可以進一步繁殖這個本地稀有的品種作保育用途。

The Hong Kong Herbarium recently recorded and propagated a new species of Camellia *Camellia furfuracea* (Fig. 46) in Hong Kong.

Fig 46. *Camellia furfuracea* at Au Pui Wan.

While verifying previous plant records from different sources, we noticed a seemingly new locality of *Camellia granthamiana* besides its type locality at Tai Mo Shan. The "new" location record was Au Pui Wan, which is an abandoned village about 4 km north of Tai Wai just outside the Tai Po Kau Nature Reserve.

In 2004 we surveyed Au Pui Wan with an attempt to collect voucher specimens and gather further information of this new record of *C. granthamiana*. The site is adjacent to a sheltered valley and the population is under woodland canopy. Interestingly, we noticed a fruiting population of Theaceae plants with slightly impressed veins on shiny serrated leaves. The plants, especially the leaves, indeed much resemble those of *C. granthamiana*. However, closer examination of their fruits (Fig. 47) revealed that they are a different species. The fruit has rough and hairy surface, is much smaller (2-4 cm in diameter) and not as red as that of *C. granthamiana* (6cm in diameter). Each fruit has 3 free styles remained at the apex, whereas the fruit of *C. granthamiana* has only one style (Fig. 48). Upon comparison with identified specimens deposited in the Hong Kong Herbarium and relevant literature, the Theaceae species was later identified as *Camellia furfuracea* (Merr.) Coh. Stuart. The common Chinese name (糙果茶) and the

specific epithet describe the rough surface of the capsule (Latin *furfur* = Branlike, scaly). Although flowers have not been observed in-situ so far, they are reported to be white and 1.5—2.0 cm wide (Chun, 1964; Chen, 1991; Hu & Wu, 2007).

Fig 47. Fruit of *Camellia furfuracea*.

Fig 48. Fruit of *Camellia granthamiana*.

So far, we are unable to locate any *C. granthamiana* in Au Pui Wan and the locality record of the species, as one would suspect, might be a result of the mis-identification of *C. furfuracea* due to the lack of flowers or fruits. *C. furfurcea* was previously known from Guangdong and Hainan in China, and overseas in Vietnam and Laos. This discovery adds yet another species to our local flora. All the wild Camellia species of Hong Kong (11 species are known) are protected under the Forestry Regulations, subsidiary legislation of the Forests and Countryside Ordinance, Cap. 96.

Subsequent visits to the Au Pui Wan confirmed that the population was healthy. It was found fruiting in July 2005 and we collected seeds from the population. As there is only one known locality of this locally rare species in Hong Kong, active propagation is being conducted. The seeds collected were germinated in our nursery with very high germination rate (approximately 86% outdoors and 92% in greenhouse, Fig. 49). The species is therefore considered suitable for further propagation in a larger scale. Special efforts have been given to maximize genetic diversity of the seedlings by collecting seeds from as many mother plants as possible. Ultimately, we will identify suitable sites for re-reintroduction after the seedlings have been successfully established.

Fig 49. Seedlings of *Camellia furfuracea* at Tai Tong Nursery.

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