remember most are the amazing wildlife, the pristine landscape, seeing the full Milky Way in the clear night skies, the unbelievable productivity of the seas with more squid than you can ever imagine, and the many close friends I made. There are so many stories I can tell but I won't bore you with these, as they will fill pages and I will quickly run out of superlatives. Suffice to say, it was the experience of a lifetime.

I finally felt I had accumulated sufficient, first-hand knowledge of fisheries to be able to call myself a fisheries scientist proper, and my familiarity with the Southwest Atlantic led to subsequent contract work with Imperial College, London, participating in research cruises to assess fish stocks along the Patagonian Shelf and around the island of South Georgia in the Southern Ocean. Later, I returned to Aberdeen University to conduct postdoctoral research on deep-sea fishery resources using autonomous, baited cameras as part Professor Monty Priede's Oceanlab group. By coincidence, this resulted in scientific cruises back in the Falkland Islands and South Georgia to study the Patagonian toothfish *(Dissostichus eleginoides)*. Our group worked on determining the abundance of toothfish and its role in the slope community with the aim of improving management strategies for this lucrative fishery, especially since this species is the subject of considerable conservation concern regarding illegal, unreported and unregulated (IUU) fishing, and subject of the debate on whether deep-sea species can be exploited in a sustainable manner.

Being a Postdoctoral Fellow at the Zoology Department, Aberdeen University, also entailed substantial teaching duties and administrating a multi-national, European Union-funded project on autonomous vehicles for deep-sea research. However, after spending too many years living in cold places, I decided not to renew my contract and went off in search of warmer climes. I was actually intending to travel around the world when my parents (now retired and with a house in the New Territories) caught up with me and urged me to apply for an advertised position at the Hong Kong University of Science and Technology. My family probably thought I had drifted enough and it was time for me to 'settle'. So in 2001, I got the post of Visiting Scholar at the Biology Department, HKUST, which mainly involved teaching in subjects such as Ecology, Environmental Science, Marine Biology, and Fisheries Biology, though I was also working on government-funded consultancy contracts.

I joined the Department of Ecology & Biodiversity in September 2003 as an Assistant Professor and it is like having turned full circle. I consider myself extremely fortunate to be a part of this department and to be a resident faculty at SWIMS in particular. Some of my earliest memories of Hong Kong were of catching shore crabs and digging up clams for the congee pot….probably not recommended these days, and strictly not allowed at Cape D'Aguilar of course (because of the marine reserve)! But I do enjoy teaching our students about the diverse local marine fauna and sharing information with them. The marine environment here is very different to those of Britain and the Southwest Atlantic, but I hope to be able to bring my previous experiences into use and conduct research on local fisheries resources. At present, I have projects focusing on the ecology and fisheries of cephalopods and have begun work on updating the checklist of species from the region in collaboration with the Chinese University of Hong Kong.

I still seize every opportunity to go out to sea, such as by taking part in regular trawl surveys of Hong Kong waters, and even to the extent of incorporating boat fieldwork into the Biological Oceanography course I direct. Oh, and in case anyone is wondering….yes, I *do* get seasick!

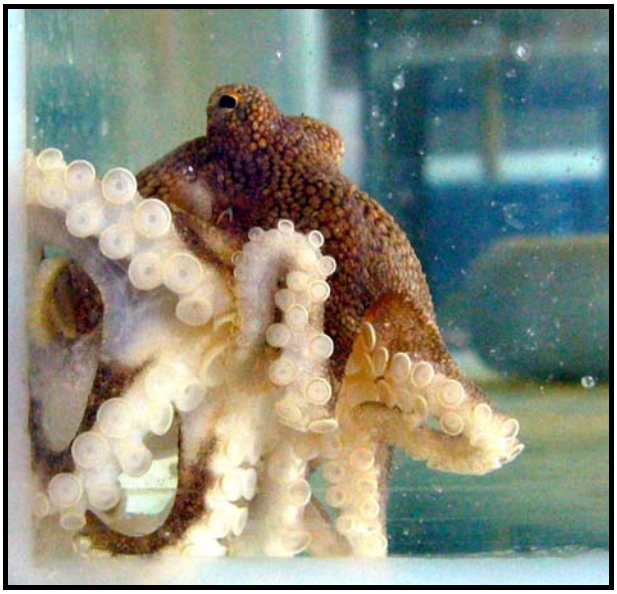

Fig. 1. Cephalopod (*Octopus membranaceous*) research at SWIMS – but who is studying who ?

## VERTEBRATES

# Big fierce animals in Hong Kong

## by Richard T. Corlett

In his classic textbook, *Why Big Fierce Animals are Rare*, Paul Colinvaux (1978) explains why large carnivores necessarily live at much lower densities than their prey. For most of the world, however, it is not ecological necessity, but direct human impact that explains the rarity – or, in an increasing number of places, complete absence – of big fierce animals. They are killed because they threaten us or our livestock, or because they look as if they might, or simply because they are "bad animals". The history of China could be deduced from a comparison of large carnivore distribution maps at intervals over the last 10,000 years. Robert Marks (1998) attempts this for tigers in southern China in his book, *Tigers, Rice, Silk and Silt*.

If big fierce animals – BFAs from now on – are history in Hong Kong, why concern ourselves with them? The fuss caused by one juvenile crocodile in Yuen Long shows that even the most fervent proponent of reintroduction is unlikely

to have much success with a "Bring back the BFAs" campaign. The answer is that we cannot hope to understand the ecology of Hong Kong today without knowing more about the environment in which the flora and fauna lived before the overwhelming human impacts of the last couple of millennia. BFAs were a key element of that environment, not just because they killed stuff, but also because they modified the behaviour of their prey – the so-called 'ecology of fear'. By influencing the numbers and behaviour of herbivores, carnivores have an indirect impact on the structure of plant communities. Equally important may be the influence of large carnivores on the abundance of the smaller carnivores, such as civets, which are the main predators of birds and other small vertebrates. The removal of large carnivores can therefore have major consequences for the rest of the community as the effects propagate from level to level down the food web, from top carnivores to plants, in a "trophic cascade". Unfortunately, we currently know far too little about the complexities of tropical food webs to predict what the impact of the loss of particular carnivore species will be.

The ultimate BFAs are the big cats, of which the tiger (*Panthera tigris*, 70-250 kg) and leopard (*P. pardus*, 30-70 kg) visited Hong Kong well into the last century. By that time, the largest prey species available were muntjacs and wild pigs but, given the opportunity, tigers specialize on bigger prey, such as the sambar deer (*Cervus unicolor*), which must have been here in the past. Each tiger needs about 50 large ungulates a year (Karanth et al., 2004), so there can never have been many tigers in Hong Kong. The leopard, in contrast, is the ultimate generalist. They take more monkeys than tigers do, and the commonest items in the scats of leopards on the outskirts of Mumbai are dogs and rodents (Edgaonkar & Chellam, 2002). A small population of leopards would probably thrive in modern Hong Kong but, although they would soon eliminate the feral dog problem and put the macaques back in the trees where they belong, they are a little too dangerous for comfort.

There is a big size gap between the leopard and only surviving felid, the leopard cat (*Prionailurus bengalensis*, 1-4 kg), and historical records are no help in filling it. Hong Kong is well within the present range of the clouded leopard (*Neofelis nebulosa*, 10-23 kg), however, so this species is a reasonable guess. Clouded leopards are at least partly arboreal and take medium-sized prey, such as macaques, muntjacs, pigs and civets. They do not appear to pose a threat to people, but they need forest and have large home ranges (> 20 $km^2$) for their size (Austin & Tewes, 1999), so we will have to wait a few decades before even thinking about (re)introducing this species. More practical would be the Asiatic golden cat (*Catopuma temminckii*), which was present in southern Guangdong until recently (Gao, 1987), although at 8-16 kg it is not really a BFA.

The Asiatic black bear (*Ursus thibetanus*, < 170 kg) is an undisputed BFA. Hong Kong is well within the recent historical range for this species but, like tigers and leopards, a bear reintroduction would probably be too dangerous to people. Black bears are more herbivores than carnivores, with a passion for Fagaceae fruits, but they can and do kill muntjacs, serow and wild pigs (Hwang, 2003).

Dholes (*Cuon alpinus*, 10-20 kg) are not BFAs as individuals, but even tigers avoid a large dhole pack. In contrast to the big cats, but like other dogs, dholes do not deliver a killing bite, so large prey die from shock or loss of blood as a result of multiple injuries. There are historical records for this species in Hong Kong and a few small packs could perhaps survive here today if reintroduced, living on muntjacs, wild pigs and rats.

BFAs do not have to be mammals and it is a reptile, the Burmese python (*Python molurus*), that is the biggest, fiercest animal present in Hong Kong today. Stomach contents of these snakes have included porcupines, muntjac, wild pigs, civets and even leopards (Daniel, 2002). A really large one could kill, if not swallow, an adult human. And don't struggle too hard – they are a protected species in Hong Kong. The locally extinct water monitor (*Varanus salvator*) is not usually seen as a BFA, but they can reach a length of 2.5 m in some parts of their range. This is not much smaller than the Komodo dragon (*V. komodoensis*), which has occasionally killed people, and water monitors themselves have taken macaques and small deer. Skeletal remains of the false gharial (*Tomistoma schlegelii*) have been found in the Pearl River. This crocodile is often considered a fish-eater, but there are reliable accounts of adults, which can exceed 5 m in length, taking riverbank mammals as large as macaques. Finally, Hong Kong is well within the historical range of the largest reptile of them all, the saltwater crocodile (*Crocodylus porosus*). A 7-metre "saltie" would be a threat to anything up to and including a tiger.

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# First record of the halfbeak *Zenarchopterus striga* (Blyth, 1858) in Hong Kong

by Nip Hin Ming, Tony
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Mangroves are considered to be important nursery grounds for fishes (e.g. Thayer *et al*., 1987; Sasekumar *et al*., 1992). Unfortunately, little information is available on fish communities in mangrove habitats in southern China. Because mangrove habitats in many parts of the world are disappearing at an alarming rate (Tam & Wong, 2000; Zhao & Wang, 2000), baseline information on the diversity and species composition of fish communities in mangroves is needed for scientists and managers to devise effective strategies to protect these important and unique habitats for sustainable development.

A detailed study on the fish communities in mangrove waters in eastern Hong Kong was carried out between 2002 and 2003. During the course of the study, halfbeaks were frequently recorded in net samples. The truncated caudal fin and the modified anal fin in males indicate that this halfbeak belongs to the genus *Zenarchopterus* (Collette & Su, 1986). The occurrence of *Zenarchopterus ectuntio* in Hong Kong has already been reported (Kottelat *et al*., 1993). Dr. Bruce Collette (National Museum of Natural History, USA) believes that two other species, *Z. dunckeri* and *Z. buffonis*, can also be found in this region (Bruce Collette personal communication). Specimens collected in this study have been identified by Dr. Collette as *Z. striga* after detailed examination. According to my study, this fish is one of the most abundant species in mangrove and brackish waters in the eastern parts of Hong Kong. Surprisingly, despite its high abundance, the presence of this species in Hong Kong has never been reported. This discovery suggests that there is insufficient information on fish communities in Hong Kong mangrove waters.

I am grateful to Dr. Bruce Collette of the National Museum of Natural History (USA) for his help in fish identification and suggestions.

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# Fishing carnage at Pedro Blanco

by Charles Frew and Andy Cornish

Fish populations at Pedro Blanco ( 大青針 ), an isolated rock pinnacle lying 85 kilometers due east of Hong Kong in mainland Chinese waters are being devastated (Fig. 1). Fishers using explosives have been increasingly targeting the once healthy fish stocks, while at weekends hoards of spearfishers from Hong Kong descend to pursue those fishes remaining. It wasn't always like this. Just five years ago, when we first visited the site, the diving was some of the best we had experienced anywhere in SE Asia with large schools of Kawakawa tuna (*Euthynnus affinis*) (Fig. 2), Pickhandle barracuda (*Sphyraena jello*), and abundant groupers, parrotfishes and other reef fishes rarely seen in Hong Kong waters. Large oceanic fishes such as Whale shark (*Rhincodon typus*), Yellowfin tuna (*Thunnus albacares)* and Manta ray (*Manta* sp.) have also been seen in recent years.

Fig. 1. Pedro Blanco

Light fishing pressure was one likely reason why fish populations were so diverse compared with Hong Kong, but it also seems possible that different larval sources have played a part. Although it is often quoted that the branch of the tropical Kuroshio current that passes through the Luzon Strait approaches Hong Kong (e.g. Morton and Morton, 1983), it has been difficult to establish whether it actually reaches Hong Kong waters (Tang and Ni, 1996). The presence of tropical species common at Pedro Blanco and known from the Philippines (www.fishbase.org) but not from Hong Kong waters (Sadovy & Cornish, 2000) suggests fish larvae are transported to this pinnacle from the east by the Kuroshio current, but that this water body does not often get close enough to coastal reefs to allow larval settlement. Such species include Tropical striped triplefin (*Helcogramma striatum),* Yellow-brown wrasse (*Thalassoma*

*lutescens*) and Reticulated sandperch (*Parapercis tetracantha*) (Fig. 3).

Fig. 2. Kawakawa (*Euthynnus affinis)*

The isolation that once protected the fishes at Pedro Blanco now seems to be working against them. A letter written to the Guangdong Marine Fisheries and Agricultural Bureau in 2003 informing them of the blast fishing situation met with a favourable response and seems to have resulted in increased patrols in 2004. However, bombing continues as the rock is too isolated for regular patrols and it is difficult to catch the bombers in the act (Fig. 4). In addition, the increase in popularity of recreational fishing and spearfishing in Hong Kong in recent years, and the introduction of larger dive boats capable of taking up to 40+ divers to the site have greatly increased fishing pressure from these gears. As in Hong Kong, such fishing is not regulated.

Fig. 3. Reticulated sandperch (*Parapercis tetrtacantha)*

Although the effect of recreational fishers is probably fairly low, so many spearfishers targeting large reef fishes that typically show long life and are slow to reach sexual maturation is likely having a devastating effect on the fish populations on such a small reef. Even this, however, pales with comparison to the destruction from blast fishing. Blast fishing kills indiscriminately large and small fish alike through rupturing of swim bladders and spinal columns, and the bombs being used recently are large enough to be fracturing the bedrock. Hundreds of fishes have been seen lying on the seabed following bombing as they sink to the bottom and the fishers only collect those few floating on the surface (Fig. 5). On a recent dive trip to Pedro Blanco, no groupers were encountered and only small schools of *E. affinis* were present. Unicorn leatherjacket (*Aluterus monoceros*), Hound needlefish (*Tylosurus crocodilus crocodilus*) and countless moray eels lay on the seabed, evidence of recent bombing. As a final insult, divers from a Hong Kong dive centre were using small spears to jab into small holes and damaging surrounding corals.

Fig. 4. Bomb blast

So what is the solution? Pedro Blanco is an ideal site for some kind of Marine Protected Area in terms of its rich marine life, but enforcing regulations would be problematic due to the large distance between the pinnacle and mainland ports. For the time being we would like to see an increased effort by the mainland authorities to tackle the blast fishing problem, a realization by recreational and spear-fishers from Hong Kong that the fish populations at the pinnacle are limited, and that restraint needs to be shown in terms of the numbers of fishes and size taken if this amazing site is not to be ruined for everyone.

Fig. 5. Blasted Painted sweetlips (*Diagramma pictum)*

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# Space partitioning by two common Bulbuls in Hong Kong

by Eric Chan

**Introduction**

The Crested Bulbul *Pycnonotus jocosus* (also called Red-whiskered Bulbul) and the Chinese Bulbul *Pycnonotus sinensis* (also called Light-vented Bulbul) are two of the commonest bird species in Hong Kong. Both of them are residents, and they can be found in a wide range of habitats throughout the region (Carey *et al.* 2001), including parks, gardens, farmland, shrubland, suburban areas, villages and so on.

According to Gause's Principle (also known as the Principle of Competitive Exclusion), similar species cannot coexist in the same ecological niche for a long time. However, according to casual observations, the Crested Bulbul and the Chinese Bulbul have long been abundant residents in Hong Kong and co-occur in many of the same habitats, although they both appear to have similar food and environmental requirements. Herklots (1946) and later literature (e.g. Herklots 1953, Herklots 1967, Viney & Phillipps 1977, Viney *et al.* 1994 and Carey *et al.* 2001) all described these two species as very abundant in Hong Kong. The life spans for both Crested Bulbuls and Chinese Bulbuls are around eight years; many generations must have passed after so many years of recording, and yet both of them are still very common and seem to coexist in many habitats. This study aimed to compare the ecology of the Crested Bulbul and the Chinese Bulbul, and to explain how both have managed to become so abundant in a small place like Hong Kong.

**Methodology**

Field observations were conducted from September 2001 to February 2002 to compare the two species. Transect counts were used: a route had been pre-determined in each site, and bulbuls that could be detected visually were recorded during the survey. Eleven sites were chosen in the study (Table 1). The sites cover a number of habitats in Hong Kong, including suburban areas, urban parks, hills and mountains, mangroves, villages and forests. Activities, group size, choice of substrates (e.g. tree branches, concrete ground) and estimated distances of the birds from the ground were recorded.

Table 1. Length of transects and number of visits for each site.

| **Site** | **Length of Transect (m)** | **Number of Visits** | **Habitat Type and brief descriptions of the sites** |
|---|---|---|---|
| Hatton Road | 604 | 8 | Sub urban |
| Hong Kong Park | 524 | 4 | Urban park |
| HKU Campus (near Graduate House) | 542 | 9 | Sub urban |
| Kowloon Park | 536 | 5 | Urban Park |
| Lung Fu Shan | 1,500 | 5 | Hill, with secondary forest and rich understorey |
| Mai Po | 1,600 | 2 | Mangrove |
| Nim Wan | 2,856 | 1 | Mixed habitat, with mangrove, villages and cultivated area |
| Ping Kong | 1,428 | 2 | Villages, with cultivated area |
| Tai Mo Shan | 714 | 3 | Mountain (the site was at 700m above sea level.) |
| Inside Tai Po Kau Forest | 4,000 | 5 | Secondary forest with rich understorey |
| Outside Tai Po Kau Forest | 1356 | 6 | The periphery of a secondary forest |
| Total | - | 50 | |

**Results**

A total of 451 Crested Bulbuls and 333 Chinese Bulbuls were recorded, and there was no significant difference between their activities, group size, choice of substrate and height above ground (p-values for all comparisons > 0.1). Both species favour trees and shrubs for perching and they mainly stay within 10 m above ground. However, it is striking to find that there was a clear difference in their spatial distribution (Fig. 1). In suburban areas (the small woodland and shrubland near Graduate House on the HKU campus) and urban parks (Hong Kong Park, Kowloon Park), there were a lot more Crested Bulbuls than Chinese Bulbuls. On the other hand, in rural areas including mountains (Lung Fu Shan, Tai Mo Shan), mangrove (Mai Po Marshes) and forest (inside Tai Po Kau Forest), there were a lot more Chinese bulbuls than Crested Bulbuls. In Ping Kong, Nim Wan and outside Tai Po Kau Forest, the differences were less extreme.

## Discussion

The behavioural records in the current study suggest that these two species are very similar in their behaviour. Kwok and Corlett (1999) studied birds inside Tai Po Kau Forest, and their results showed that Chinese Bulbuls are a lot more abundant than Crested Bulbuls. Leven (2000) did bird surveys in six different shrubland sites and found that the density of Chinese Bulbuls was higher than that of Crested Bulbuls in all sites. These results are consistent with the current study. The observed space partitioning could simply reflect different habitat requirements by the two species. Alternatively, it could be explained by competition (perhaps for food and nesting sites), with the Crested Bulbul a better competitor in human-modified habitats (Kowloon Park, Hong Kong Park), while the Chinese Bulbul is a better competitor in rural areas (e.g. Tai Mo Shan, inside Tai Po Kau Forest). In sites where a combination of habitats is present (e.g. Ping Kong, Nim Wan), the differences between their abundances are less extreme (Fig. 1). Crested Bulbuls are in general confined to human-modified habitats and absent in forest, probably because it is an introduced species (Dudgeon & Corlett 1994; Leven & Corlett 2004). Swinhoe (1861) clearly stated that no Crested Bulbul was seen in Hong Kong, while the Chinese Bulbul was described as 'an abundant resident'.

No survey in this study was performed during the breeding season (April to August). As differences in breeding requirements can affect their distribution, surveys in the breeding season will contribute to a better understanding of these two species.

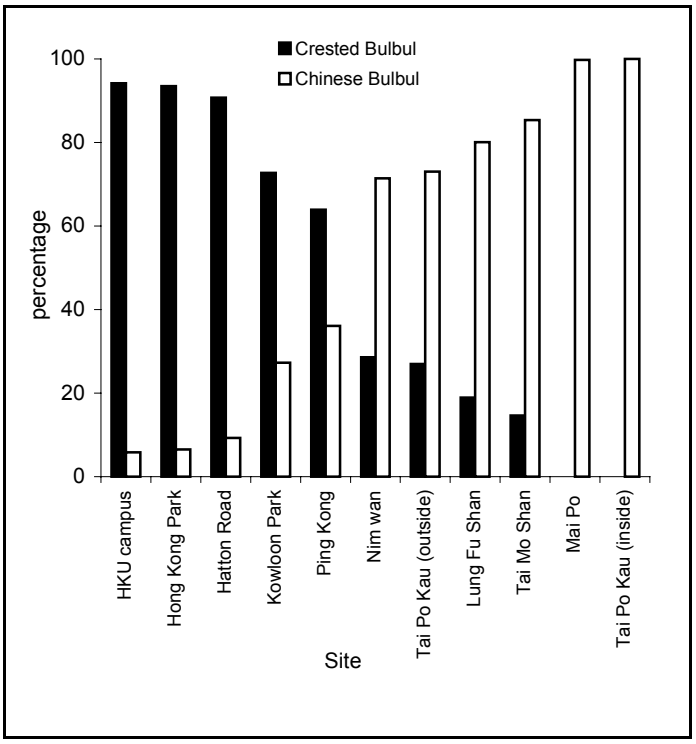


Fig. 1. Relative abundance of Crested Bulbuls and Chinese Bulbuls in different sites.

Other bulbuls (family Pycnonotidae) that can be seen in Hong Kong include Chestnut Bulbuls *Hemixos castanonotus*, Red-vented Bulbuls *Pycnonotus aurigaster*, Black Bulbuls *Hypsipetes leucocephalus* and Mountain Bulbuls *Hypsipetes mcclellandii*. Their distributions were also recorded in this study, but the sample sizes are too small to make any representative comparisons. However, there are two points worth noting: (1) Chestnut Bulbuls were only seen inside Tai Po Kau among the 11 study sites. This suggests that this bird is a forest specialist. (2) Five Mountain Bulbuls were recorded inside Tai Po Kau. There was just one disregarded record for this species in Hong Kong previously (Viney *et al.* 1994). This finding, and the subsequent records (Wild Corner 2003, 2004, Wong 2004, Lewthwaite 2004) for this bird in Hong Kong suggest, that Mountain Bulbuls are now re-colonizing Hong Kong as our forests are becoming more mature.

## Acknowledgements

This study is the outcome of my final year project. I would like to express my sincere gratitude to Dr Richard Corlett, who supervised this project and has given me lots of useful comments.

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# Nest abundance of ardeids in Hainan 2004

by Josephine Y.P. Wong and Captain Wong

**Egret Research Group, Hong Kong Bird Watching Society**

The Egret Research Group of Hong Kong Bird Watching Society, and Prof. Liang Wei of The Hainan Normal University jointly conducted a baseline survey of nest abundance in northern Hainan between 26 and 29 May 2004. A second survey of eight new colonies, reported by villagers after the press release of the first survey in the 1 June Hainan Daily, was conducted by Prof Liang in June. Press releases (in simplified Chinese) on the two surveys are available at first survey
http://www.hinews.cn/jisxw/hn_article.php?wzid=32620
second survey:
http://www.hinews.cn/jisxw/hn_article.php?wzid=33762

Of these two surveys, a total of 4547 nests of four ardeids, i.e. Little Egrets, Cattle Egrets, Chinese Pond Herons and Black-crowned Night Herons in 17 colonies in northern Hainan were found. The Chinese Pond Heron was the dominant breeding ardeid (56.8% of the total nests) and the Black-crowned Night Heron the least abundant (4.2%).

Table 1. The nest abundance of nine colonies in the northern Hainan in May 2004. The 2004 nest abundance in Hong Kong is listed for reference (+: present, % = relative abundance).

| | **Great Egret** | **Little Egret** | **Cattle Egret** | **Chinese Pond Heron** | **Night Heron** | **Unidenti-fied nest** | **Total (%)** |
|---|---|---|---|---|---|---|---|
| Daitian National Nature Reserve | | | | 5 | 190 | | 195 (7.3) |
| Luoji Village | | 33 | 345 | 131 | | 7 | 516 (19.2) |
| Chong-wei Village | | | 458 | 394 | | | 852 (31.7) |
| Guyue Resort | | + | 145 | 200 | + | | 345 (12.8) |
| Nanwei Village | | | 52 | 48 | | | 100 (3.7) |
| Hung-doubo Village | | | | 106 | | | 106 (3.9) |
| Nan Lai Lake Resort | | | 105 | 156 | | | 261 (9.7) |
| Xian-lailiang Village | | | 10 | 115 | | | 125 (4.7) |
| Mingren Village | | | | 186 | | | 186 (6.9) |
| Sub-total (%) | | 33 (1.2) | 1115 (41.5) | 1341 (49.9) | 190 (7.1) | 7 (0.3) | 2686 (100) |
| June survey | | 240 | 380 | 1241 | | | 1861 |
| **Overall (%)** | | **273 (6.0)** | **1495 (32.9)** | **2582 (56.8)** | **190 (4.2)** | **7 (0.2)** | **4547 (100)** |
| No of nests in HK in 2004 (%) | 84 (10.0) | 229 (27.7) | 58 (6.9) | 315 (37.3) | 158 (18.7) | - | 844 (100) |

In the first survey in May, a total of 2686 nests of four nesting ardeids was recorded in nine colonies (Table 1, Fig. 1). Of the eight known colonies we intended to visit, two were abandoned but three new sites in Central and North East Hainan were discovered. The Chinese Pond Heron (49.9% of the total nests) and Cattle Egret (41.2%) were the dominant breeding species, while the Little Egret was the least abundant (1.2%) (Table 1). The Chinese Pond Heron and Cattle Egret were the most widespread breeding species, while only one colony was recorded for each of the Little Egret and Night Heron. The Chongwei Village colony at Chengmei County in central Hainan was the largest colony (31.7% of the total nests), while the Nanwei Village colony at Tunchang County in central Hainan was the smallest (3.7%).

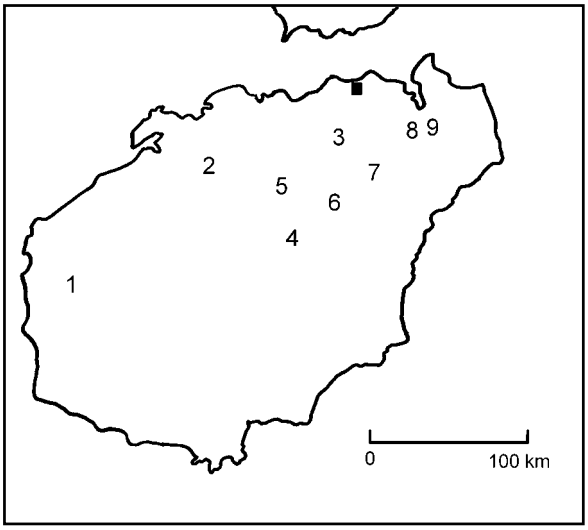


Fig. 1. Ardeid nesting colony distribution in Hainan (black square: Haikou, provincial capital; Colony numbers 1: Daitian National Nature Reserve, 2: Luoji Village, 3: Chongwei Village, 4: Guyue Resort, 5: Nanwei Village, 6: Hungdoubo Village, 7: Nan Lai Lake Resort, 8: Xianlailiang Village, 9: Mingren Village)

In the second survey in June, a total of 1861 nests of three ardeids was recorded in eight colonies (Table 1). Again, the Chinese Pond Heron was the dominant species and more nests of Little Egrets were found. Details of this survey are still being prepared. The large area of man-made feeding habitats like paddy fields in lowland Hainan could contribute to the dominant status of Chinese Pond Herons and Cattle Egrets. (Fig. 2) Only small nest numbers of Little Egrets and Black-crowned Night Herons were recorded in the present survey. This was quite unexpected as paddy fields were also the main

feeding habitats of Little Egrets in Hong Kong previously (Murton 1972), and in Japan (Takumi and Ezaki 1998), and of both ardeids in the Mediterranean region (Hafner *et al.* 1987).

Fig. 2. The extensive rice paddy in Hainan is feeding habitat for ardeids.

Probable differences in rice farming practices between south China and elsewhere could reduce the attractiveness of paddy fields to these two ardeids. Selective hunting due to the difference of "tastes" among ardeids, as reported by villagers, may also contribute to low abundances.

The preference for fishponds and mangrove by nesting Black-crowned Night Herons in Hong Kong (Wong *et al.* 1999) may indicate that they prefer coastal wetlands. In this survey, no Great Egret was seen to nest in Hainan. In considering the only currently known colony of 20 Great Egret nests in Guangxi South China (Wong *et al.* 2004), Hong Kong is so far the most important known breeding site of Great Egrets in south China.

Fig. 3. Nests were counted inside a colony though direct observations by binoculars.

Compared with the 2004 nest abundance in Hong Kong (Table 1), the nest number in Hainan is only three times that of Hong Kong. Although we do not have the statistics of land use figures in Hainan so far, the area of wetlands, such as paddy fields in Hainan, is obviously much greater than Hong Kong. Apparently, the wetlands in Hong Kong support more nesting ardeids than those in Hainan (Fig. 3). In addition, hunting is the major threat for the survival of ardeids in Hainan, e.g. ardeids are still available at many restaurants.

Promoting environmental education is the most effective way to enhance the conservation of breeding ardeids. In fact, local county governments have put much effort into environmental education in recent years. Notice boards on conservation and promoting appreciation of ardeids were installed in front of colonies (Fig. 4). Governments also organized talks to educate the villagers about the importance of conservation. Moreover, conservation and environmental news often appear in the local newspapers. This could help to increase people's awareness about conservation and their appreciation of wildlife. As mentioned earlier, the result of our survey in Hainan was published in the Hainan Daily three days after the survey, and new colonies were reported by villagers for our baseline study, indicating that some of Hainan people are concerned about their environment.

In the future, it is hoped that we can extend this survey to other parts of south China, and collect more up-to-date information about colony distribution and nest abundance in this region for assessing the regional status, and enhancing conservation and appreciation of these elegant birds.


Fig. 4. A notice board set up by the local government for educating the public about the importance of nesting colony conservation .

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# Rediscovered ferns from Hong Kong, China

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**Abstract**

In recent field surveys in Hong Kong, four ferns, *Trichomanes auriculatum*, *Hypolepis punctata*, *Cyrtomidictyum basipinnatum* and *Chieniopteris kempii*, were rediscovered after about one hundred years.

Hong Kong (22°09′- 22°37′ N, 113°52′- 114°30′ E), consists of Hong Kong Island, Kowloon, the New Territories, and 235 other islands, of which the largest one is Lantau Island (148 km$^2$). The total land area is 1098 km$^2$. The topography is extremely rugged, and the highest point is at Tai Mo Shan (957 m) in the central New Territories. The climate of Hong Kong has typical south subtropical characteristics. Hong Kong's flora is diverse for its island geography and 1911 flowering plant species and 242 fern species (including infraspecific taxa) have been reliably recorded from Hong Kong (Corlett *et al.* 2000; Lee *et al*., 2003), most of which are pantropical and tropical Asian plants (Xing *et al*. 1999).

The earliest reported survey of Hong Kong plants was in 1841 (Bentham, 1861) and the Hong Kong ferns have been well studied since then. The Hong Kong Herbarium (2001) has published the Checklist of Hong Kong Plants four times. The most recent checklist (Lee *et al*., 2003) shows that 242 fern species in 96 genera and 47 families have been recorded in Hong Kong.

There have been great changes in the environment, vegetation and species of Hong Kong since the Opium Wars (Corlett, 1999; Dudgeon & Corlett, 1994). Although documented extinctions of species are few, it is certain that some species have disappeared from Hong Kong because of the massive human impacts. Complete deforestation at low altitudes must have resulted in the loss of a substantial fraction of Hong Kong's native flora in the past (Dudgeon & Corlett, 1994). In recent evaluations, 57 species of ferns, 4 gymnosperms and 339 angiosperms are considered as locally extinct or very rare: 19% of the total recorded vascular plant flora. An additional 15% are considered rare. Twenty-one species of ferns were not seen during recent surveys (Corlett *et al*. 2000). However, in our recent surveys on the biodiversity of Hong Kong during 1996 to 2002, four fern species were rediscovered 100 years after they were first collected.

**Chieniopteris kempii** (Cop.) Ching, *Acta Phytotax*. Sinica. 9 (1): 39. 1964.

*Illustration*. Wu (1999): p. 208-210. fig. 36: 6.

*Distribution*. China (Fujian, Guangdong, Guangxi and Taiwan) and Japan.

*Specimens examined*. Very rare under forest near stream on Mt. Taimoshan (F. W. Xing 10078, in IBSC)

*Notes*. Only one specimen of this species was collected from Taimoshan in Hong Kong in 1899 (Hong Kong Herbarium, 2001) and it was considered as very rare. This is the first collection since 1899 in Hong Kong. This species is 40 cm tall and bipinnatipartite in Hong Kong.

**Cyrtomidictyum basipinnatum** (Baker) Ching *in Acta Phytotax*. Sinica. 6: 262. pl. 51. 1957 (Fig. 1 and 2).

*Illustration*. Ching (1957): p. 262. fig. 51. Xie (2001): p. 219-220.

*Distribution.* Endemic to China (Guangdong and Hong Kong).

Fig. 1. Top side view of *Cyrtomidictyum basipinnatum* – a rediscovered fern from Bride's Pool.