SPECIES IN DANGER

INTERNATIONAL TRADE IN SWIFTLET NESTS

WITH SPECIAL REFERENCE TO HONG KONG

AMY S.M. LAU and DAVID S. MELVILLE

A TRAFFIC NETWORK REPORT

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This report was published
with the kind support of

WWF

Published by TRAFFIC International,
Cambridge, United Kingdom.

With financial support from WWF UK
(World Wide Fund For Nature).

The *Species in Danger* series is edited by Julie Gray, TRAFFIC International.

ISBN 1 85850 030 3

Front cover photograph: A nest collector ascends his rattan ladder in Gomantong Cave, Sabah, eastern Malaysia.

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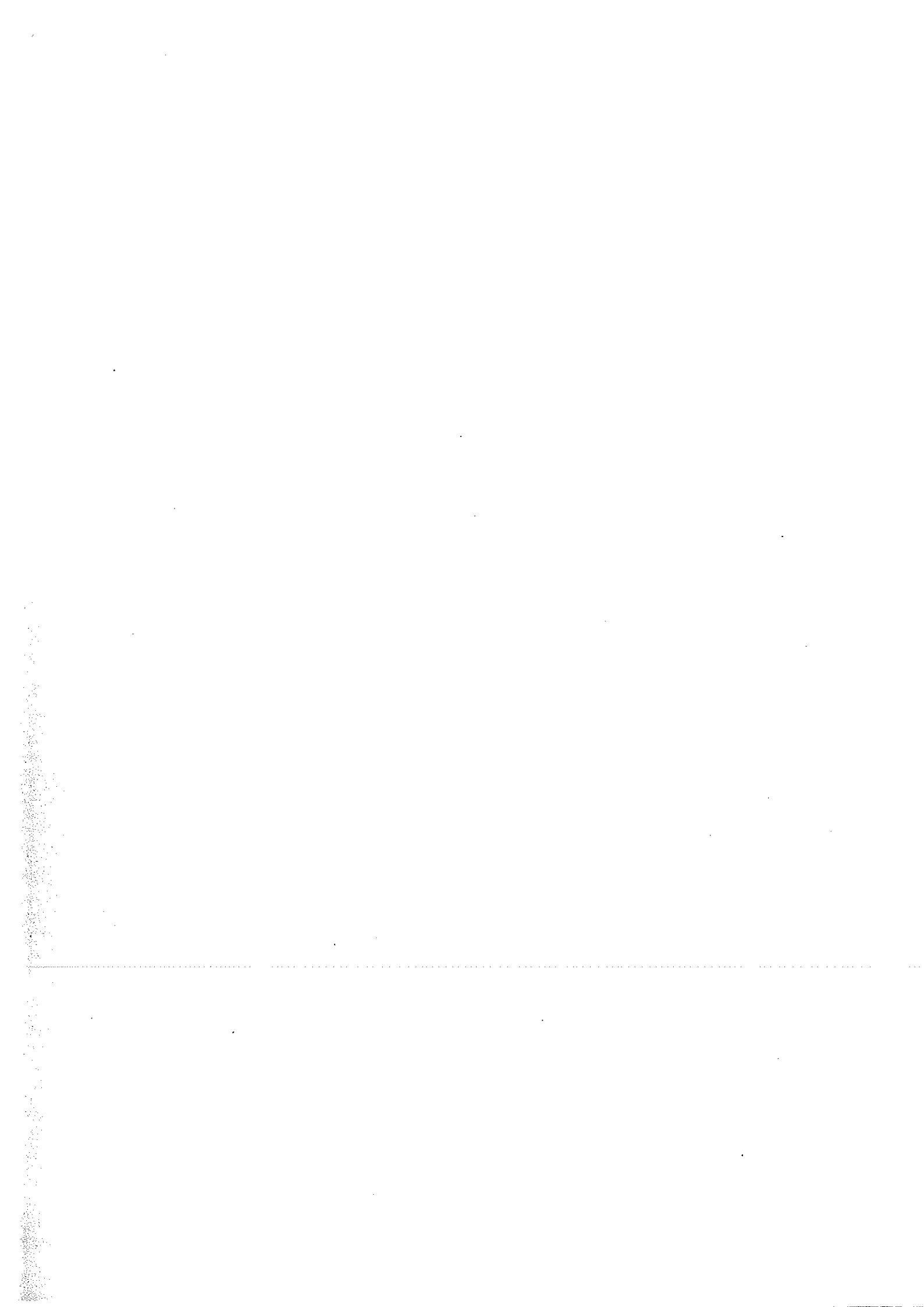
Amy S.M. Lau and David S. Melville[1]

The research for this report was supported financially by WWF Hong Kong



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ACKNOWLEDGEMENTS

We wish to thank the following people for providing information and/or commenting on the manuscript: Cheung To, Tom Milliken, Simon Lyster, Kang Nee, Charles Francis, Peter M.H. Wong, John Blower, Catherine P.S. Cheung, The Earl of Cranbrook, Francis Gombek, Han Yi-shi, H.D. Pratt, Steven Broad, Julie Gray, Mandy Haywood, S.W. Kotagama, Jarujin Nabhitabhata, Karen Ketterer, Richard Hale, I.S. Suwelo, Lynette Good, S.A. Hussain, E.C. Dickinson, Linda Birch, Verity Picken, Nigel Langham, David Wells, E. Nugroho, Lim Kim Keong, S. Somadikarta, S.S. Bist, Derek Holmes, Bas van Balen, J. Payne, J.C. Daniel, Y.C. Kong, Amie Bräutigam, Richard Saler, Ron Krupa, Samuel Pinafiel, Simplicia Alonzo-Pasicolan and Richard Luxmoore.

A particular debt of gratitude is owed to Tim Inskipp for his painstaking comments and for allowing access to his extensive reference material on the subject.

PREFACE

The nests of certain species of swiftlets (*Collocalia* spp.) have been esteemed by the Chinese as a food tonic for hundreds of years.

The examination of trade statistics from Hong Kong, long a centre of trade in such nests, now demonstrates a noticeable increase in their consumption within the colony over the past 30 years. Some 18.7 million edible swiftlets' nests were exported to Hong Kong in 1990 and 17.5 million in 1991, amounts which are estimated to account for almost all of total world trade in swiftlet nests in these years: it is calculated that some 19.9 million were traded worldwide in 1989 (excluding nests consumed within the country of origin).

Meanwhile, both populations of swiftlets and nest harvests have been reported by numerous sources to be decreasing throughout many parts of the ranges of these species. There is currently not enough knowledge to determine the level of threat to these species as a whole, yet the fact that local extinctions of swiftlet species have occurred, while the value of their nests imported to Hong Kong has recently multiplied at approximately ten times the rate of inflation, has caused conservationists to seek international co-operation in ensuring edible swiftlet nests are traded at sustainable levels.

In bringing together the analysis of Hong Kong data for the trade in edible nests of swiftlets with an almost exhaustive bibliography on the subject, this report presents an overview of what is known of the world trade in these nests.

Jorgen B. Thomsen
Director
TRAFFIC International

INTRODUCTION

The swiftlet genus *Collocalia* contains 30 species (Sibley and Monroe, 1990, 1993). Many are characterized by their ability to echo-locate, which is highly developed in some species (Medway and Pye, 1977). This enables them to nest in deep caves with little or no light. However, they also nest occasionally in culverts, tunnels and buildings - one colony of *C. fuciphaga* having being found even above the kitchen of a Chinese restaurant in Sumatra (van Marle and Voous, 1988). They construct small, shallow, cup-shaped nests which are glued to the rock face and are comprised of, wholly or in part, salivary secretions which usually harden into a cement-like substance.

The true origin of swiftlet nest material has been long debated. The Dutch naturalist and surgeon, Jacobus Bontius, who was the first European to write on the subject, considered that the nests were made from the foam of the sea (Bontius, 1658, quoted by Giles, 1936). It was also suggested that they might be constructed from gelatinous algae, fungi or tree gum, and indeed fake nests have been manufactured from boiled seaweed and tree gum, and adulterated with agar and gelatine (Sallet, 1930; Jabouille, 1931; Giles, 1936; Godfrey, 1991; L. Good, *in litt.*). By the late eighteenth century it was thought that the nests might derive from the salivary secretions of the birds, although this was not universally accepted (Hooyman, 1787; Home, 1817; Raffles, 1817; Crawfurd, 1820; Bonaparte, 1855; Trecul, 1855; Green, 1885). Subsequent research has confirmed that the nest cement is the mucilaginous secretion of the paired sub-lingual glands (Bernstein, 1859; Marshall and Folley, 1956), which enlarge during the breeding season (Medway, 1962c).

The nests of four species of swiftlet have been harvested for human consumption. The most prized are those of the "white-nest swiftlets", Edible-nest Swiftlets *C. fuciphaga* and Germain's Swiftlets *C. germani*, which are comprised entirely of saliva. Those of Black-nest Swiftlets *C. maxima* include up to 10% dry weight of feathers (Kang *et al.*, 1991), and those of Indian Swiftlets *C. unicolor* also include feathers, and some vegetation. The distribution of the four species is shown in Figure 1. Medway (1963, 1966) also refers to claims that Pygmy Swiftlets *C. troglodytes* produce an edible nest, but this is unconfirmed (Dickinson, 1989). However, as Medway (1966) suggested, it is possible that during periods of high demand it is worth extracting the saliva from the nests of this species, as also appears to be the case currently with nests of Mossy-nest Swiftlets *C. salangana* (D.R. Wells, *in litt.*). The Earl of Cranbrook (*in litt.*) has also recorded saliva from nests of the Glossy Swiftlet *C. esculenta* being used for soup.

Studies of the chemical composition of nests indicate that they are about 50-60% protein, 25% carbohydrate and 10% water, with small amounts of minerals, mainly calcium, phosphorus, potassium and sulphur (Wang, 1921; Liu, 1963; Anon., 1977; Becking, 1985; Kang *et al.*, 1991). Banks (1986) also notes the presence of arsenic in nests.

Available information suggests that swiftlet nests were first consumed as an unusual food, and only later came to be considered as a tonic and medicine (see Box 1). Nonetheless, swiftlet nests have long been regarded by the Chinese as a tonic, albeit of secondary importance to their native ginseng *Panax ginseng* (Read, 1932). The famous pharmacopoeia, *Pen Ts'ao Kang Mu Shi I*, listed swiftlet nests in an appendix in 1765 (Reid, 1932), and Wootton (1910) records swallow (= swiftlet) nests being listed in a seventeenth century London pharmacopoeia.

AN OVERVIEW OF SWIFTLET NEST HARVESTING AND TRADE

Details of traditional harvesting techniques are given by Sallet (1930), Chasen (1931), Medway (1957), Francis (1987) and Valli and Summers (1990a, 1990b). Formerly, harvesting was often traditionally restricted to certain seasons. For example, Medway (1958) noted that Land Dyaks in Sarawak traditionally collected nests twice a year (in November and February), thus the first and second nests of the season were taken but the third was left so the birds were able to rear one brood. However, even local practices varied and at Niah Cave harvesting was done in December and June. Medway (1958) noted, "At neither place do the nest owners have a realistic understanding of the breeding cycle of swiftlets, and it is curious that their same empirical approach should have produced these two different rhythms of collection". However, on the east coast of Malaya nest harvesting appears to have been more opportunistic (Gibson-Hill, 1948). In South Java, Koch (1910) recorded that nest-collecting took place three times a year and that the nests often contained eggs or young - the eggs were eaten by the collectors, while the young were thrown away. At Gomantong Caves, Sabah (see front cover photograph), Sims (1959) noted that "the collectors work throughout the season, taking every nest they can, and few escape their attention....the floors of the caves are carpeted with broken eggs and dead chicks".

Figure 1a

Distribution of Edible-nest Swiftlet *Collocalia fuciphaga* and Germain's Swiftlet *C. germani*

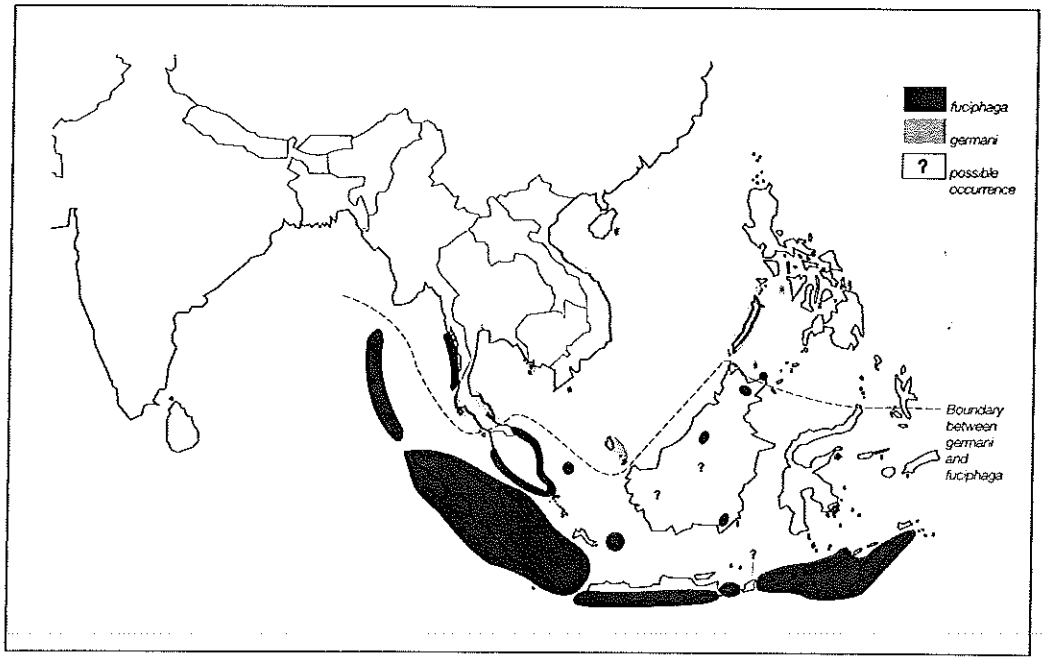
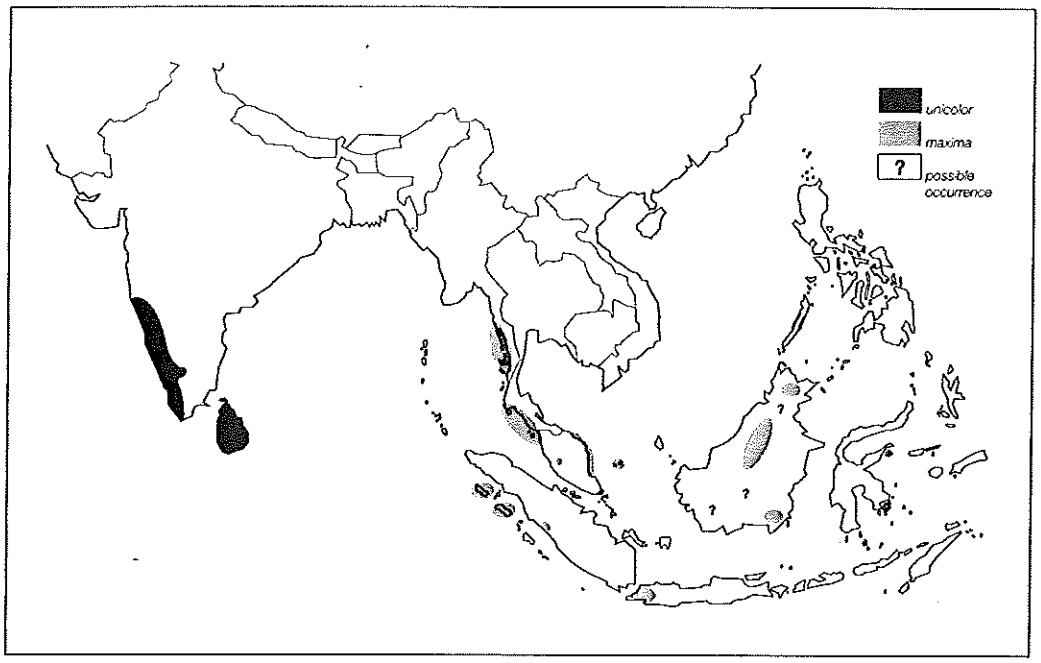


Figure 1b

Distribution of Indian Swiftlet *Collocalia unicolor* and Black-nest Swiftlet *C. maxima*



Today harvesting pressure in many areas has increased and may be continuous throughout the year, with eggs and chicks being destroyed at the time of collection (Chapman, 1987; Valli and Summers, 1990a, 1990b). This has resulted in marked declines in some populations of swiftlets and extinction of others (Francis, 1987; Cranbrook, 1988; Valli and Summers, 1990a, 1990b; Suwelo and Nugroho, 1990). In Sarawak, Good and Wong (1989) note a decline of about 48% in the population of Black-nest Swiftlets at Niah between 1935 and 1987, and a 43% reduction of Edible-nest Swiftlets over 17 years in the Baram. Jarujin Nabhitabhata (*in litt.*) recorded a 33% reduction in the population at Songkhla Lake, Thailand in the 1970s, which he attributes to over-harvesting. K.L. Kong is quoted as saying that "If harvesting continues on this scale, the species may die out within five to ten years" (Summers and Valli, 1992).

Nest harvests have fallen also. Cranbrook (1988) noted that harvest yields in Sarawak had "fallen far below previous levels". In Myanmar[2], J. Blower (*in litt.*) noted a 41% reduction in nest harvests of Edible-nest Swiftlets between 1951-56 and 1978-82, which he attributed to over-exploitation.

In April 1989, the Sarawak Government announced a three-year ban on nest-collecting at Niah Cave - containing probably the largest swiftlet colony in the world - in an attempt to let populations recover (Anon., 1989; Anon., 1990). This ban appears not to have worked owing, in part, to lack of manpower to enforce it. Black-nest Swiftlet nest prices in Sarawak have increased from M$140/kg in 1987, to M$4800/kg in 1991. By early 1991 there were more illegal collectors than before the ban, (when a permit system was in operation), many of whom were new and inexperienced, having been attracted by the high prices. There was a marked increase in the number of fatal accidents - eight collectors died in the first week of January 1991 (L. Good, *in litt.*). The ban was withdrawn on 21 March 1992 and harvesting is now allowed by collectors licensed by the Sarawak Forestry Department in accordance with a schedule determined by the Department for the Preservation of Birds (F. Gombek, *in litt.*).

A history of the trade in China

It is uncertain when bird nests were first harvested as a food. Harrisson (1959) reported the finding of "tools for scraping edible birds' nests off cave walls", apparently associated with T'ang and Sung ceramics at Niah Cave, thus indicating that nests were possibly traded to China as early as the T'ang dynasty (A.D. 618-907). By the Sung dynasty (960-1279) there were well-known sea routes around Southeast Asia and through the Malacca Strait to the Indian Ocean (Swanson, 1982), and Hanewald (1988) suggests that nests may have been bartered since the Sung dynasty in the Philippines. It is likely that from the Yuan dynasty onwards (1271-1368), as Chinese trade expanded and Chinese people emigrated to nearby areas in Asia, new sources of nests were discovered and exploited, but there is a complete lack of written reference to nests.

In the period 1405-1433, during the Ming dynasty, the eunuch, Zheng He (Cheng Ho), led seven major expeditions to foreign countries. These trips, each of which lasted several years, involved tens of thousands of people from different fields and occupations, and large fleets of sailing vessels. The routes they travelled covered what is now Indonesia, Malaysia, Thailand, Viet Nam, Sri Lanka and India, all places where swiftlets which produce edible nests are found. Swanson (1982) notes that one of the most important duties for Zheng He was to bring back exotic articles for the imperial court, and these included rare foods. However, birds' nests are not mentioned in accounts of the voyages (Medway, 1963).

It is possible that nests may have been paid as tribute to the Chinese emperors. Edible nests are listed among products from Johore, on the Malayan peninsula, in Ming dynasty writings (Chasen, 1931), but earlier records of trade from Malacca in the fifteenth century do not mention them (Medway, 1963). However, Giles (1936) notes that Mandelslo writing in 1639, states that "the nests in the Malay country.....are held in such esteem by the Chinese that they sell them three to four crowns the pound". Chasen (1931) noted that a trade register from Batavia (Jakarta), dated 1663, referred to transport of consignments of nests, and Beeckman (1718) recorded that Bornean nests were "the best in the world".

From the available information it appears that it was not until about the sixteenth century that birds' nests became an important item in Chinese cuisine and pharmacy. In view of their subsequent popularity it is somewhat surprising that the history of their use cannot be traced with more certainty. The origin of the custom of eating swiftlets' nests remains shrouded in mystery, legend and myth (Orolfo, 1961). Indeed, it is not known whether the "discovery" of edible nests by the Chinese was first made during expeditions overseas or in their home country. Details of a small population of Germain's Swiftlets breeding on an island off Hainan, south China, have only recently been published (Xian and Zhang, 1983), although an account in Swinhoe (1870) suggests that it has long been overlooked. It is alleged that Nanlou Cave on Daizhou Island, off Hainan, was discovered in 1392, but nest harvesting apparently only began about 200 years ago, in the Ching dynasty. Several kilogrammes of nests were harvested from this and two other caves until early this century. Uncontrolled harvesting has led to reduced yields - in 1984 only about 300g of nests were collected (Y.S. Han, *in litt.*) and only 15 nests were collected in 1991, since which time the site has been protected (Cheung, 1992). Van Kiem (1955) suggests that the species may occur occasionally in Yunnan.

Trade into China appears to have expanded considerably in the eighteenth century, since there are records of up to 56 700kg per year being traded through Batavia at that time (Medway, 1963). Crawfurd (1820) estimated imports to China at about 110t per year, with the best quality nests being more valuable than their weight in silver. Some one hundred years later Koch (1910) noted that China imported about 9 000 000 nests, weighing some 76t, each year. However, Chasen (1931) reported that 48 386, 46 895 and

34 228kg of nests were imported to China in 1926, 1927 and 1928 respectively, and Sowerby (1931) notes that this trade was worth in excess of 1 million taels[3].

Box 1

Nests: food, tonic and medicine

Traditionally, swiftlet nest material has been eaten for recuperative purposes after consumptive diseases such as tuberculosis, or for treating debility. Opium smokers would take it in the morning to refresh and strengthen their debilitated frames (Barbe, 1846). Swiftlets' nests are believed to reinforce body fluids, nourish blood and moisten the respiratory tract and skin; they are believed to replenish the vital energy of life, build up health and aid metabolism, digestion and absorption of nutrients. More specifically they are taken to treat excessive phlegm (causing coughing and asthma); haemoptysis (coughing up blood); haemoatemesis (spitting blood); chronic dysentery; chronic malaria and ague (Sallet, 1930; Jabouille, 1931; Anon., 1977; Kwan and Kong, 1985; Lu, 1987). There are also claims that the birds' nests can prolong life and resist ageing. Hong Kong traders also mentioned a claim from an unspecified medical researcher that the nests are beneficial in the treatment of pulmonary diseases, cancers (particularly breast cancer), and even AIDS and are believed to aid recuperation of patients receiving radiation treatment (Kong, 1990). Traditionally birds' nests are regarded as a powerful aphrodisiac (Sims, 1959), the legendary virility of Emperor Mian Ning (1821-1850) being attributed to his eating of nests (van Kiem, 1955).

Despite the strong belief among Chinese in the magnificent medicinal values of birds' nests, scientific research on their medicinal properties has been relatively scarce. Biddle and Belyavin (1963) showed that the nests had significant properties of haemaglutin inhibition, but the medicinal significance of this discovery, if any, was unknown. Dr Y.C. Kong and colleagues at the Chinese University of Hong Kong are currently undertaking research into possible biochemical properties of birds' nests. Research to date indicates that nests contain a glycoprotein which has a measurable effect on blood cells (Ng *et al.*, 1986), and an epidermal growth factor (egf)-like activity has been detected (Kong *et al.*, 1987). Additional research on nests of the House Swift *Apus affinis* also suggests that these contain an egf agent (Kong *et al.*, 1989). *In vivo* assay using rats indicated an increase in the weight of internal organs after feeding the test group with birds' nests extract continuously for three months (M.E. Song, pers. comm., October, 1989). However, Wang's earlier attempt (1921) to determine the nutritional value of the nests indicated that birds' nests added to the diet of rats did not increase the overall growth rate. In any event, the practical significance of these various findings is open to question in view of the fact that nest material is usually boiled for a number of hours before being eaten, during which the chemical composition may change (cf. Kong, 1990). Furthermore, the effects of human gastric juices on nest material is unknown, as is the ability of the human digestive system to absorb nest components.

A history of the trade in other countries

Discussing the trade in **Thailand**, Giles (1936) records how a Chinese by the name of Hao Yieng from north of Amoy (Xiamen) settled in Songkla in 1750 and was subsequently granted nest-collecting rights from islands off Patalung. Giles (1936) noted how revenue from nest-collecting was much less than formerly "owing to the economic depression and the vagaries of the Hong Kong and Chinese dollar". Exports from Thailand in the period 1926-1935 averaged 18.7t, only a small proportion of which (comprising "white" nests) went to Hong Kong, the majority of the harvest (including "black" nests) went to Penang (Giles, 1936). More recently, Sandham (1978) recorded that the better-quality nests were shipped to Singapore, others going to Hong Kong. He further noted that, "despite the fact that some birds and many fledglings die each year because of the collecting and many of the eggs are either broken or eaten by the nest-collectors, it would appear that the annual 'crop' of nests is steadily increasing". Now a number of former nesting caves are abandoned, and at one site Valli and Summers (1990b) quote a collector as saying, "There are no birds left there. They never came back. But we will follow them. Wherever the birds fly, we go".

In **Indonesia**, records of harvests from caves in central Java date back to 1743 (Voltz, 1905). In 1840, the Dutch colonial Government in Indonesia purchased nest-collecting rights from the feudal authorities (van der Meer, 1927) and subsequently leased them. In most cases it is likely that nests of Edible-nest Swiftlets, Germain's Swiftlets and Black-nest Swiftlets were collected, but it is of interest that in the Tjiampea District of Java, Medway (1962d) recorded that the collectors regarded "black" nests as worthless and did not harvest them. Manuel (1937) noted that 109 310kg of nests were exported from the former Dutch East Indies (now Indonesia) in 1927.

In Sarawak, **Malaysia**, birds' nests also provided an important source of income to the colonial Government, which first imposed an export tax on nests in 1876 (Cranbrook, 1984). In Sabah, Daly reported in 1888 that "the demand....is constant among the wealthier Chinese, and the supply is limited; the product is consequently of increasing value as a luxury". The first legal controls on nest harvesting in Sabah were introduced in 1901 (Francis, 1987), or maybe even earlier (Burder, 1961).

The collection of nests in the **Philippines** was first controlled in 1919, and in the 1930s some 500kg of "white" nests of Germain's Swiftlets were collected annually in Bacuit, Palawan (Manuel, 1937). Harvesting of nests continues (Hanewald, 1988) but the scale of activity is unknown.

In **Myanmar**, nests of Germain's Swiftlets have been harvested together with those of Black-nest Swiftlets (Blyth, 1875; Ali, 1957; Chein Hoe, 1959; U Tun Yin, 1975). As early as 1929 a Government report noted that in the Bassein Forest Division "persistent collection appears to be reducing the numbers of birds" (Chein Hoe, 1959). In 1959, Chein Hoe recorded that "as a result of over-collection, the number of swifts is dwindling" in the Tavoy Forest Division. In the period 1966-1972 annual harvests averaged 616kg (U Tun Yin, 1975).

Germain's Swiftlets nest at scattered sites along the coast of **Viet Nam** (Sallet, 1930; Delacour and Jabouille 1931; Wildash, 1967) as do Himalayan Swiftlets *C. brevirostris* (Nguyen, 1991). Sallet (1930) gives a detailed account of nest harvesting. Harvesting was subject to control as early as 1805 (Sallet, 1930), and Jabouille (1931) records that in 1902 nest-collecting at Nha Trang stopped owing to over-harvesting. However, 60kg were collected there in 1953 (van Kiem, 1955) and, in 1991, the Edible Swiftlet Company in Nha Trang collected 2150kg of swiftlet nests, representing a harvest of some 215 000 nests with an estimated market value of US$2 000 000 (Le Dien Duc, pers. comm., September 1993).

The archipelago in the Bay of Along is a traditional collecting locality (Delacour and Jabouille, 1931). Sallet (1930) notes that the more intrepid collectors were able to take some 61kg of nests per month from this site, which was still occupied by swiftlets in the 1960s (Fischer, 1961, 1963, 1965), although no mention is made of harvesting in that decade.

Trade in the nests of Indian Swiftlets in **India** seems to have become insignificant by the end of the nineteenth century, possibly due to over-exploitation (Baker, 1927; Ali and Ripley, 1983). Hume (1873-74) quoted Jerdon who reported claims of one hundredweight (*circa* 51kg) of nests being collected annually from the Vingorla Rocks on the Malabar coast, India, adding that, "if so, this must be the largest breeding-spot on the coast". Aitken (1894) noted that the population of swiftlets at this site had been reduced, apparently as a result of over-collecting, and when Abdulali (1942) visited the site he estimated a population of 5000 birds with over 1000 nests. At Sacrifice Rock, south of Tellicherry, nests were "annually taken away by some Moplahs from the mainland" (Hume 1873-74).

Nests of Germain's Swiftlets have long been harvested in the Andaman and Nicobar Islands (Anon., 1892; Barbe, 1846; Beavan, 1867; Abdulali, 1965). Harvesting continued at least until 1976 when McVean

(1976) noted that "collection should cease or be strictly controlled.....as the populations are probably small and the price of the nests in Calcutta is very tempting".

In **Sri Lanka**, the industry also collapsed and Lewis (1898) noted that "many years ago" the nest-collecting rights had been sold by the Government but this source of revenue was no longer available as "there are but few Chinese in the island, and the quality of nests obtained is so poor as not to justify their being collected for exportation". Apparently trade never resumed as it is not mentioned by Henry (1971), and S.W. Kotagama (*in litt.*) advises that there is currently no trade.

From available records it is clear that swiftlet nests have been an important trade item for at least several hundred years but it is not possible to determine the volume of this historical trade in a comprehensive way.

A review of recent trade through Hong Kong

Trade statistics recorded by the Hong Kong Government were examined to determine the scale of trade in "edible bird's nest", countries of origin and destinations for re-exports. Since there is no Hong Kong tax on import or export of birds' nests, reported figures should reflect trade reasonably accurately as there is no obvious reason for misdeclaration. Hong Kong is not a producer of swiftlet nests, yet a small quantity of "exports" are recorded. These may be nests which have been processed or re-packaged locally. All such "exports" have been regarded, therefore, as re-exports by this study. The first data available are for 1949. However, between 1952 and 1958 "edible bird's nest" was not "a registered commodity in the Hong Kong trade statistics. In January 1992 "edible bird's nest" was amalgamated with other commodities and is no longer identifiable in Hong Kong overseas trade statistics.

In addition, interviews were held with representatives of the five wholesale importing companies in Hong Kong, which deal exclusively in nests.

Commodities in trade

Swiftlet nests are imported in various forms. They may be whole, unprocessed "white" or "black" nests, or may be processed to some degree. (They may also be so-called "red" nests, also made by Edible-nest Swiftlets and Germain's Swiftlets, the origin of the colouring being uncertain, but probably the result of contamination with iron oxides (van Kiem, 1955), rather than birds' blood, as popularly believed.) "Black" nests require cleaning to remove the feathers and this may be done in the country of origin or in Hong Kong.

From information available in the Hong Kong trade statistics it is not possible to distinguish directly between "black" and "white", nor between processed and unprocessed nests. Discussions with traders failed to produce exact information regarding the proportions of these forms being imported, but two of the five wholesalers, who deal only in nests, indicated that 50-60% of nests they imported are raw "black" nests. There may be a similar situation with regard to the other three traders who deal only in nests, but other major importers who deal in various tonics in addition to nests probably lack the labour and equipment to clean raw "black" nests, and thus their imports are more likely to be "white" nests or cleaned "black" nests.

Singapore used to separate birds' nests in its trade data into two categories, "unpacked for retail sale" and "packed for retail sale" and, thus, it is possible to note that, in the period 1980-1982, about 80% of nests exported to Hong Kong were of the former category and the remainder of the latter. Since 1983, all nests have been included under one heading, but it was unclear, anyway, how processed/unprocessed related to

"packed"/"unpacked", since birds' nests discs made from cleaned "black" nests may be packed for retail sale, but equally, raw "white" nests may also be.

Some "black" nests from Sarawak are cleaned locally before sale but others are exported in their natural state (Good and Wong, 1989). Those from neighbouring Sabah are usually exported uncleaned (Francis, 1987).

Details of the nest cleaning process in Hong Kong are given below:

1. Nests with feathers are soaked overnight in a large barrel of water.
2. Excess water is squeezed out from the soaked nests.
3. A small amount of cooking oil (or other suitable oil) is added to the nests, which are then stirred and rotated mechanically. The process requires about 15 minutes until the strands of the nests are separated from the feathers and other debris, the nests being crushed and beaten into small pieces.
4. The treated nests are poured back into the large barrel, and a lot of water is added.
5. The feathers, which have become coated with the oil, float on the surface, from where they are skimmed off and thrown away.
6. The "smash", or residue, of the nests is then collected after the water has been poured away.
7. The selected birds' nest "smash" is then shaped into balls or discs and dried in an oven.

Cranbrook (1984) notes that the weight loss on cleaning may be up to 88%, but this seems to be too great in view of the findings of Kang *et al.* (1991) that the feather:cement ratio of the nests of Black-nest Swiftlets is 1:9. However, Hong Kong traders reported weight losses in nest material of up to 62.5% after cleaning processes. After cleaning, nests may be dried for up to half a day at 100 degrees Celsius to comply with health requirements for import to North America, and this will account for some of the weight loss, which may be offset by adding gelatine, as happens in Sarawak (L. Good, *in litt.*).

Dried birds' nest discs imported into Hong Kong may sometimes require further cleaning. This is done by hand, individual feathers being removed once the disc has been moistened enough to work, but not all "black" nests are cleaned. Sometimes they are consumed directly, by boiling the nests inside a cloth bag until the cement has dissolved, and then discarding the bag of feathers.

Yan-ging-jiao literally means the edge or corners of the nest and is another commodity in trade, consisting of hard pieces cut from the outer layer of whole "white" nests. *Yan-ging-jiao* is separated from the rest of the nest because it is much harder and of denser texture, and thus requires longer to cook. Traders often mix *yan-ging-jiao* from various sources for sale locally.

Bottles of instant birds' nest drinks, with rock sugar or chicken essence are readily available at Chinese herbal medicine shops, tonic shops, pharmacies and supermarkets.

Volume of trade

In the following account all forms of "edible bird's nest" are included together.

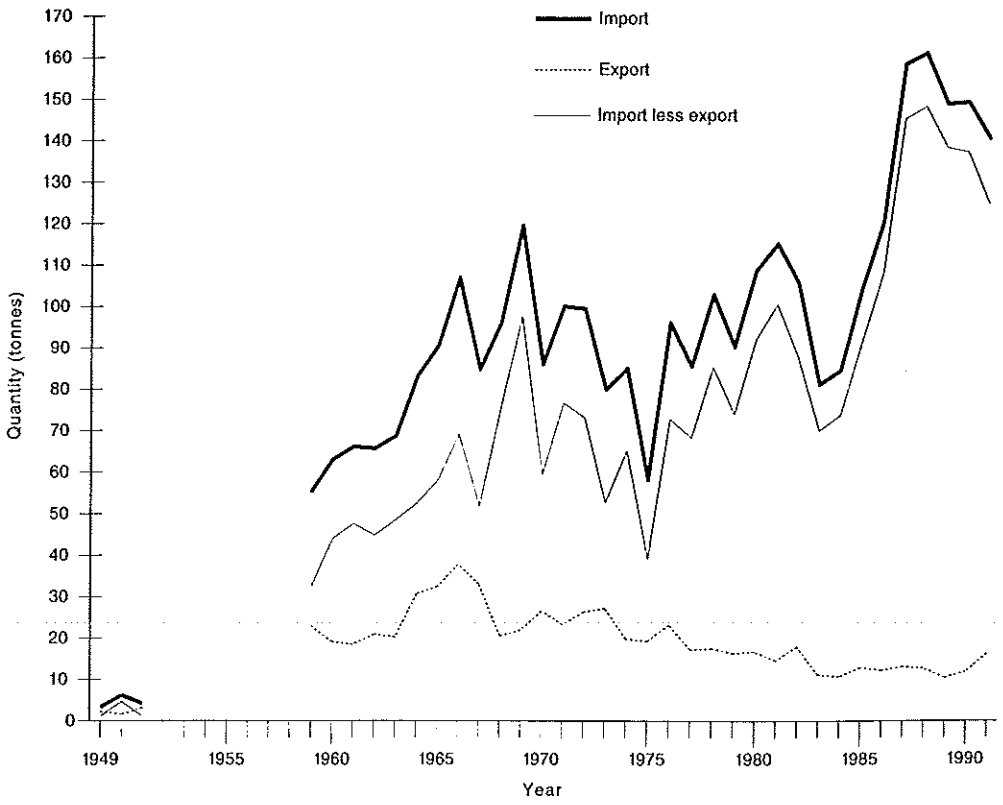
From Figure 2 it is apparent that Hong Kong's imports of birds' nests have increased some three-fold in the past 30 years, rising to a peak of 161t in 1988. There is no ready explanation for the wide annual fluctuations in imports prior to 1983. Hong Kong people tend to react to economic uncertainty and set-back by reduced patronage of luxury restaurants and it is tempting to relate some of the troughs to factors

such as the pro-communist riots in 1966/67 and the start of the Cultural Revolution in China, the 1975 oil crisis, the collapse of the local property market in 1982, the October 1987 stock market crash and the 1989 Tiananmen incident. It is of interest that the consumer price index rose markedly around these times. The cause of the decline in imports since 1988 is uncertain but may be related to the rapid unit price rise (Figure 3).

Exports (= re-exports) show relatively little variation, by contrast, and have remained at a consistent level of about 12t over the past 10 years. If it is assumed that the difference between imports and re-exports is equivalent to local consumption, then Figure 2 indicates a doubling in local consumption of birds' nests between 1983 and 1990. It is uncertain how valid this assumption is. If a majority of re-exports were "black" nests which had been processed in Hong Kong, then a considerable proportion of imports could be accounted for, bearing in mind the likely weight loss during cleaning. In this respect it is of interest that some countries, such as the USA, will only allow import of cleaned nests. The fact that average re-export prices are only a little above average import prices (see below) gives no useful indication regarding the material make-up of the re-exports since various combinations of nest types and stages of processing could be combined to give this result.

Figure 2

Hong Kong's annual total import and export of edible birds' nests, 1949-1991, by weight (tonnes)



Discussions with trade sources indicate that there has indeed been a marked increase in consumption of nests in Hong Kong in recent years. There is no ready explanation for this, but the standard of living rose throughout the 1980s and it may be that an increasing proportion of the population can now afford to buy nests. Furthermore, there has been an increase in publicity to promote the consumption of birds' nests in recent years through advertising, popular newspaper and magazine articles, television and special "bird nest" restaurants.

Value of nests

The declared total value of imports shows a very dramatic increase since 1949, this being particularly noticeable since 1975 - the total value having increased 48-fold between 1975 and 1991, from HK$9.5 million to HK$459 million. When the price per kilogramme is calculated we find a nearly 20-fold increase over the same period (Figure 3). It is also apparent that the price per kilogramme is somewhat higher for (re-)exports than imports - with the exception of 1990 and 1991, for which there are no obvious reasons. It is uncertain how much this price difference is attributable to processing and/or packaging in Hong Kong adding to the value, and how much is simply entrepreneurial percentage. The value of the trade within Hong Kong is considerably higher than the import figures suggest. Examples of local retail prices are given in Table 1.

Table 1

Examples of retail nest prices in Hong Kong

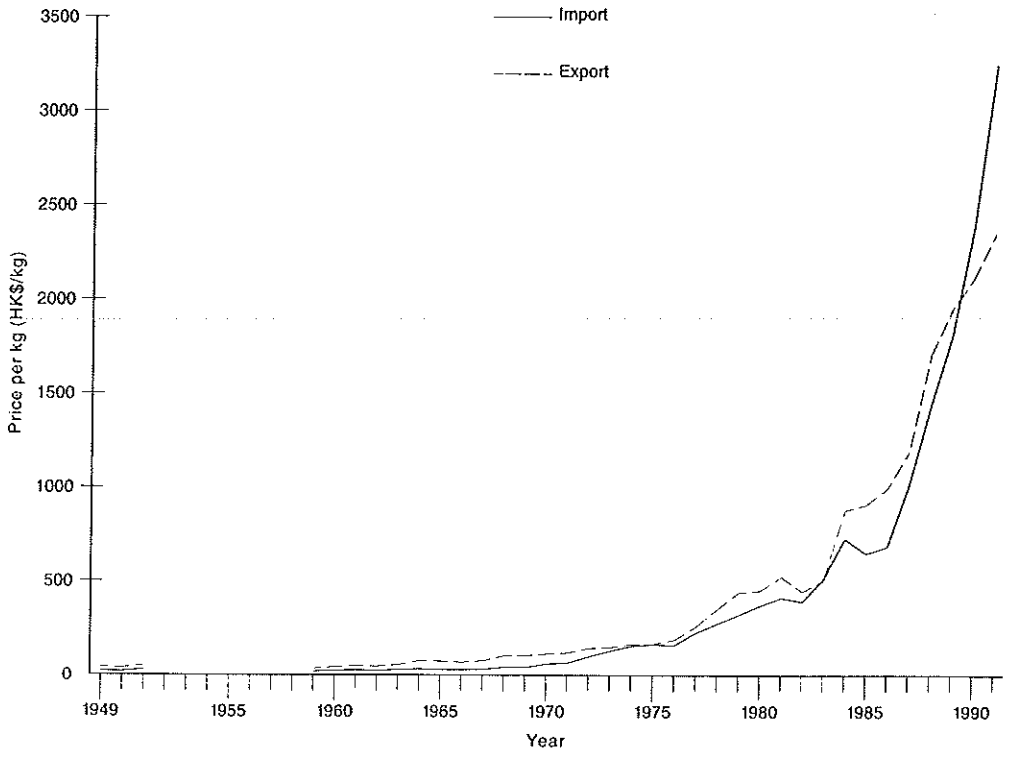
	1989 Price, HK$/kg	1992 Price, HK$/tael~	1992 Price, US$/kg
Whole "white" nest -		770-1450	2620-4060
good	370-625		
medium	300-380		
Yan-ging-jiao*	350	500-630	1700-2140
Processed black nest	120	200-500	680-1700
Raw black nest	50-60	210	720

* Hard pieces cut from the thickened edge of the whole white nest by traders.

~ Traditional Chinese unit for measurement of weight: 1 tael = 37.8g.

Figure 3

Average price in Hong Kong (HK$/kg), 1949-1991, of edible birds' nests at import and export

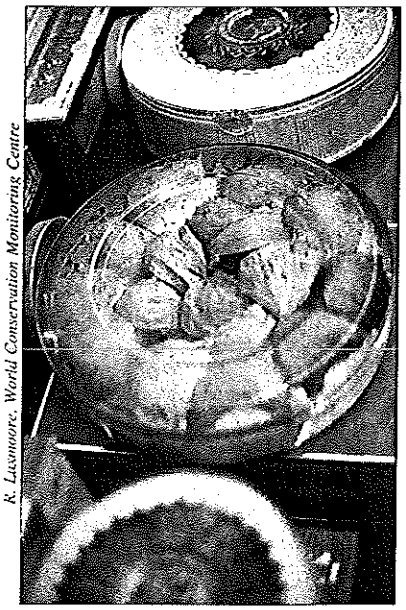


A number of factors could account for the dramatic increase in the unit price. "White" nests are much more valuable than "black" nests, and the price rise could be caused by a corresponding increase in the proportion of imports being "white" nests. If it is assumed that all nests imported from Viet Nam and China are "white" (Black-nest Swiftlets do not breed in these countries), it might be expected that imports from these countries would contribute a greatly increased proportion of the total imports, but this is not the case. The total value of imports from these countries only rose from 2.9% of the total import value in 1980 to 7.7% in 1990 and dropped back to 4.4% in 1991. "White" nests are imported from other countries also but it is not possible to determine amounts. Nonetheless, since the total weight of imports has increased at the same time as the declared value, it is unlikely that the unit price increase is attributable solely to more "white" nests entering trade, although this could be a contributory factor.

The current prices could reflect inflationary increases. To investigate this, the unit price for one kilogramme of nest was compared with the Hong Kong Consumer Price Index for the period 1971 to 1991, taking 1971, or the next possible year thereafter, as the standard. Imports from individual countries were examined. Imports from all countries showed a consistent trend of nest prices generally keeping ahead of inflation, with very marked increases in prices since 1985 for Myanmar, Viet Nam, and China. Singaporean prices rose sharply from 1979 to 1984 and then dropped slightly before recovering. Thai and Malaysian prices have fluctuated considerably but show a general trend of increases far in excess of inflation. Indonesian prices also fluctuated widely, there being no clear trend between 1979 and 1988, but, broadly speaking, similar patterns were found in price data for the countries studied, and on combining these data, it was found that if nest prices had increased only in line with inflation, then the increase between 1971 and 1991 would have been five-fold, whereas it was 50-fold.

It is considered that the apparent increase in unit price is "real", therefore, and explained by the fact that "the supply never catches up with the demand", as stated by a major Hong Kong trader in the early 1980s (de Groot, 1983).

Sources and destinations of nest material



K. Lasmoore, World Conservation Monitoring Centre

From torchlit cave to the bright lights of the metropolis: swiftlet nests, among the world's most expensive animal products, packaged and displayed as luxury items in the window of a Chinese pharmacy in Singapore.

The major exporters, by weight, of swiftlet nests to Hong Kong are Indonesia, Malaysia and Singapore (Figure 4 - see Appendix 1). When comparing the value of imports to Hong Kong from these countries, the order of relative importance is markedly different from that for the weight of imports (Figure 5 - see Appendix 1).

Table 2 highlights the variation in the average import price between different countries. Thus, in 1991 imports from Malaysia averaged only HK$1691 per kilogramme, whereas imports from China and Viet Nam averaged HK$10 398 per kilogramme. This wide discrepancy is considered to be explained by the fact that all nests from these countries are likely to be high priced "white" ones, since Black-nest Swiftlets do not occur in China and Viet Nam, whereas imports from Malaysia are likely to comprise a high proportion of low value "black" nests (cf. Francis, 1987), this being confirmed by local traders. The high price of nests from Myanmar also suggests a high proportion of "white" nests, although both Germain's

Swiftlets and Black-nest Swiftlets occur there. The more intermediate prices of imports from Indonesia and Thailand may reflect a mixture of both nest types. However, it should be borne in mind that nest exports from producer countries are liable to tax and thus declared values may be lower than real market values.

Table 2

Comparison of unit nest prices from different countries listed in Hong Kong imports

Country	1989 price HK$/kg	1991 price HK$/kg	1991 price US$/kg
Indonesia	3595.28	4476.27	573.88
Malaysia	725.87	1690.79	216.77
Singapore	893.14	1748.29	224.14
Thailand	2694.75	3684.68	472.39
Viet Nam	7037.21	10 397.69	1333.04
Myanmar	6508.80	7879.38	1010.18

The fact that the Philippines does not feature in the Hong Kong import figures is of interest since nests were formerly exported from there to China (Manuel, 1937). Nest-collecting still occurs (Hanewald, 1988); however, it is possible that nests are consumed within the country, or are traded through a third country, such as Sabah, since there are well established trade ties with Mindanao in the south. Since the Philippines imports nests from Hong Kong and Singapore (about 6-7000kg annually in 1987 and 1988), the likelihood is that any nests produced locally are also consumed locally.

The re-export trade from Hong Kong is relatively small (11% of total weight imported in 1991), the most important re-export market being the USA (Figures 6 and 7 - see Appendix 1). It should be noted that Valli and Summers (1990a, 1990b) record some 30t per year being imported to North America - some six times the figures suggested by Hong Kong export statistics. All nests entering the USA and Canada must be cleaned and be accompanied by an inspection certificate from a registered laboratory in the country of export. However, no records are maintained of imports to either country (Agriculture Canada, *in litt.*; Food and Drug Administration, USA, *in litt.*). The two registered inspection offices in Hong Kong declined to provide any information.

The data for re-exports only relate to those declared, and thus will somewhat underestimate the total, since tourists visiting Hong Kong, in particular Taiwanese, are known to buy nests to take home. The majority of all re-exports are considered to be purchased by overseas Chinese. The increase in the number of countries appearing in the re-export statistics, probably reflects the growing Chinese populations in Europe and North America, doubled in the decade since 1980 (Marsh, 1991). The trade with China has increased since the "opening" of the country in the late 1970s - no exports were recorded in the period 1960-1968, but 4.6% of exports went there in the period 1980-1988.

Recent trade elsewhere

Not all countries keep separate data for trade in edible birds' nests, thus it is not possible at present to give a detailed account of trade globally. However, there are data from a sufficient number of countries to allow a preliminary assessment of the total volume of trade.

Of the countries known to produce and export swiftlet nests we have so far been unable to obtain information from China and Viet Nam. Export data for other countries are given in Table 3. These figures

should be viewed as minimum estimates. Data from Sabah and Sarawak indicate a probable unregistered export trade (Francis, 1987; Cranbrook, 1984), and this is likely to occur to a greater or lesser extent in other countries which also impose an export duty on birds' nests.

Table 3

Total exports of edible birds' nests from known producing countries*

Countries	Year^	Quantity (kg)	Value** (HK$)	Price (HK$/kg)	Price (US$/kg)
Malaysia	1990	34 806	21 104 072	606.34	77.74
Singapore	1991	54 944	84 057 380	1529.87	196.14
Myanmar	1989/90	21	60 840	2897.14	371.43
Indonesia^^	1988	68 589	12 716 115	185.40	23.77
Thailand	1990	4536	11 894 700	2622.29	336.19
Viet Nam		?	?	?	?
China		?	?	?	?
Minimum total		**162 896**	**129 833 107**		

* Data from trade statistics of exporting countries.

^ The most up-to-date data are used whenever available.

** Declared value of exports to Hong Kong corrected to HK$ at average annual exchange rate.

^^ The 1988 data are used here since in 1989, "Bird's Nest" was not registered as a separate item.

In an attempt to assess under-recording of trade we compared recorded exports to Hong Kong and Hong Kong's recorded imports. These data also are difficult to interpret owing to a variety of factors. For example, goods exported at the end of one year may arrive in Hong Kong in the next year, (although this is unlikely to account for major differences). Probably of greater importance is that Hong Kong data may record intermediate ports of call as ports of origin. This may happen, for example, with nests originating from Indonesia but shipped via Singapore, the problem being exacerbated since Singapore does not record trade with Indonesia.

The available data (Table 4) indicate regular under-recording of trade from Malaysia, Singapore and Thailand and, in the last case, this is very substantial. Indonesia apparently over-records exports but, as noted above, this may result, at least in part, from trans-shipment through Singapore. However, Singapore consistently exports/re-exports more nests than it imports, and the discrepancy of some 10t a year cannot be accounted for by local harvesting (C. Hails, pers. comm., 1993) and may be due to unrecorded exports from Indonesia and Malaysia: there is a considerable amount of smuggling of goods from Indonesia to Singapore.

Available import data from consuming countries are summarised in part C of Table 4. Once again there is a major problem of discrepancies in import and export figures. Taiwan imposes a 25% import duty on nests and this probably accounts for the fact that the weight of nests reported as imported from Hong Kong in 1990 was only 4% of the weight reportedly exported from Hong Kong to Taiwan. Japanese data suggest that up to some 50% of imports go unrecorded, probably related to the 2.5% import duty.

Table 4

Comparison of import and export data for shipments to and from Hong Kong of edible birds' nests by weight (kg)

A. Producing countries

Indonesia

Year	Recorded export	HK recorded import	Difference (kg)	Difference %
1980	23 671	29 775	-6104	-20.50%
1981	33 999	35 802	-1803	-5.04%
1982	33 494	36 846	-3352	-9.10%
1983	35 259	33 727	1532	4.54%
1984	42 833	40 430	2403	5.94%
1985	59 165	44 331	14834	33.46%
1986	36 921	44 625	-7704	-17.26%
1987	55 353	49 106	6247	12.72%
1988	41 171	38 663	2508	6.49%
1989	-	43 617	-	-
1990	-	62 864	-	-
1991	-	64 066	-	-

Malaysia

Year	Recorded export	HK recorded Import	Difference (kg)	Difference %
1980	22 432.45	30 752	-8320	-27.05%
1981	21 739.98	30 658	-8918	-29.09%
1982	23 326.28	24 500	-1174	-4.79%
1983	27 264.50	28 281	-1017	-3.59%
1984	22 392.70	24 299	-1906	-7.85%
1985	27 619.99	29 779	-2159	-7.25%
1986	34 955.73	38 368	-3412	-8.89%
1987	37 170.14	43 066	-5896	-13.69%
1988	33 049.81	34 942	-1892	-5.42%
1989	26 753.25	27 110	-357	-1.32%
1990	34 292.29	37 295	-3003	-8.05%
1991	-	17 531	-	-

Thailand

Year	Recorded export	HK recorded import	Difference (kg)	Difference %
1980	294	3143	-2849	-90.65%
1981	1372	3529	-2157	-61.12%
1982	1504	1755	-251	-14.30%
1983	1906	4292	-2386	-55.59%
1984	707	3129	-2422	-77.40%
1985	3034	4103	-1069	-26.05%
1986	837	2884	-2047	-70.98%
1987	6171	8176	-2005	-24.52%
1988	6250	-7950	-1700	-21.38%
1989	3588	5701	-2113	-37.06%
1990	3701	5509	-1808	-32.82%
1991	-	5534	-	-

B. Entrepot country

Singapore

Year	Recorded export	HK recorded import	Difference (kg)	Difference %
1980	29 629	43 401	-13 772	-31.73%
1981	33 096	43 650	-10 554	-24.18%
1982	28 671	30 218	-1547	-5.12%
1983	18 319	11 465	6854	59.78%
1984	18 406	14 506	3900	26.89%
1985	20 870	23 479	-2609	-11.11%
1986	24 992	29 961	-4969	-16.58%
1987	42 798	53 423	-10 625	-19.89%
1988	45 910	76 672	-30 762	-40.12%
1989	37 264	70 424	-33 160	-47.09%
1990	35 621	40 032	-4411	-11.02%
1991	44 953	48 948	-3995	-6.16%

C. Consuming countries

Japan

Year	Recorded import	HK recorded export	Difference (kg)	Difference %
1980	708	1408	-700	-49.72%
1981	513	907	-394	-43.44%
1982	465	637	-172	-27.00%
1983	307	555	-248	-44.68%
1984	414	447	-33	-7.38%
1985	806	955	-149	-15.60%
1986	633	927	-294	-31.72%
1987	446	763	-317	-41.55%
1988	393	869	-476	-54.78%
1989	859	1162	-303	-26.08%
1990	1119	1157	-38	-3.28%
1991	536	613	-77	-12.58%

Taiwan

Year	Recorded import	HK recorded export	Difference (kg)	Difference %
1980	-	0	-	-
1981	-	0	-	-
1982	-	0	-	-
1983	1	0	1	-
1984	30	30	0	0.00%
1985	80	116	-36	-31.03%
1986	427	327	100	30.58%
1987	391	1350	-959	-71.04%
1988	587	1232	-645	-52.35%
1989	236	1462	-1226	-83.86%
1990	17	386	-369	-95.60%
1991	234	409	-175	-42.79%

Data on the weight of nests imported by Japan and Taiwan (Table 5) show a rapid increase in the weights imported since 1985, although this increase, in the case of Japan, has declined since 1989, the trend being similar to that of Hong Kong data for exports from that country to Japan.

An aspect of trade which this study does not address is that accounted for by local consumption. Francis (1987) has noted that there is no export of "white" nests collected in Sabah, all being eaten within the State. Chinese populations in other producer countries undoubtedly also consume nests locally.

Total world trade

The data in Table 5 suggest that in 1989 an absolute minimum of 159t of swiftlet nests entered international trade. This is equivalent to approximately 19.9 million nests, based on an average nest weight of 8g (Appendix 2). It is likely that more than one nest of an individual pair may be taken at some sites, thus the total does not necessarily relate directly to the number of pairs which lose their nest, but data are not available to permit further discussion on this topic.

Table 5

Total net imports of nests by weight (kg) of major importing countries

Countries	1986	1987	1988	1989	1990	1991
USA*	6158	6399	6619	5299	2777	2257
Canada**	1078	1120	1158	927	486	395
Japan	3544	1205	6510	6944	3447	2213
Taiwan	604	1667	1811	2224	1418	2095
Hong Kong	108 229	145 520	148 388	138 400	137 560	124 093
Singapore^	2993	5727	6957	5095	5343	2811
Total	**122 606**	**161 638**	**171 443**	**158 889**	**151 031**	**133 864**
Nest equivalents~	**15 325 706**	**20 204 728**	**21 430 416**	**19 861 166**	**18 878 875**	**16 733 000**

* The USA does not keep records of imports. The figures are derived from summation of export of nests from all available data including trade data from Hong Kong, Singapore, Malaysia and Indonesia – the last did not export any nests to USA during the period.

** No data available - estimate based on Hong Kong exports to Canada being 17.5% of exports to USA. However the figures for both USA and Canada may be seriously underestimated since Valli and Summers (1990a, 1990b) note imports of c. 30t to North America annually.

^ Official import figures of Singapore.

~ Based on an average nest weight of 8.0g - see Appendix 1.

THE NEED TO CONTROL HARVESTS

There is no doubt that the market for swiftlet nests has increased dramatically in the late 1980s in Hong Kong, Taiwan and Japan - all countries with a rising standard of living. Prices for nests have climbed far above those which would result from inflation and it can be expected that higher prices will lead to yet more intense harvesting and reduced breeding productivity, leading to still higher prices. Clearly the situation has changed considerably from that prevailing in the 1950s and 1960s when nest prices in Sarawak were comparatively low and the industry at Niah was reported to be dying (Medway, 1958). In 1966, Medway wrote, "Studies of colonies of Edible-nest Swiftlets have indicated that even rigorous and repeated nest collection does not significantly reduce the size of a breeding population", but it is unlikely

that present world populations of Edible-nest Swiftlets, Germain's Swiftlets and Black-nest Swiftlets can sustain the current high levels of nest harvesting indefinitely. As noted above, there is already evidence of over-exploitation and population declines, and even local extinction. Mining of limestone, accumulation of pesticides by the birds, destruction of forests and disturbance from guano collectors have also been considered to have adverse impacts on swiftlets (Cranbrook, 1984, 1988; Francis, 1987), but undoubtedly nest harvesting, and the disturbance associated with it, is the most important threat to most swiftlet populations. The degree of impact resulting from harvesting will depend to some extent upon the timing, but there is abundant evidence that nests with eggs and/or young are being harvested in some, if not many, areas (Medway, 1962b; Cranbrook, 1984, 1988; Francis, 1987; Valli and Summers, 1990a, 1990b), thus directly reducing breeding success, as well as possibly reducing future breeding output by the parent birds, owing to lipid stress, which limits egg production (Kang *et al.*, 1991).

Properly managed, swiftlet populations can provide a sustainable natural resource (Langham, 1980). The biology of Edible-nest Swiftlets, Germain's Swiftlets and Black-nest Swiftlets has been well studied (e.g. Medway, 1962a, 1962b, 1962c, 1969; Langham, 1980; Francis, 1987; Kang *et al.*, 1991). The recent studies of Kang *et al.* have demonstrated the desirability of harvesting nests before egg-laying, to reduce the likelihood of lipid stress in females. They recommend that, following the first harvest, there should be a closed season of 135 days to permit the birds to rebuild nests and rear young successfully, after which harvesting could resume. Similar harvesting schedules have been proposed in Sarawak by Banks (1935).

Implementation of successful management schemes would not be without practical problems, however: Cranbrook (1984) suggested closed seasons of 150-160 days for Black-nest Swiftlets, yet of 140 days for Edible-nest Swiftlets, following the first nest-harvest of the year, and in mixed colonies of Edible-nest Swiftlets, Germain's Swiftlets and Black-nest Swiftlets there may be differences in breeding seasons, so the legal harvesting of one species could adversely disturb other species in the same colony, exempt from collection at the time.

Details of the protected status of swiftlets throughout the range states are given in Appendix 3. Both Sabah and Sarawak have old control systems to regulate the taking of nests, dating back to early this century, but in neither State has it been possible to control harvests adequately (Cranbrook, 1984, 1988; Francis, 1987; Good and Wong, 1989; L. Good, *in litt.*).

With the current dramatic increases in both the price of, and demand for nests, noted above, it is unrealistic to expect sudden improvements in the enforcement of existing local controls in producer countries without international attention to the trade. The need for international regulation of trade, especially by consumer countries, is further highlighted by the severe problem of nest poaching in areas where some level of control is implemented, either by law or by the cave owner.

Box 2
Swiftlet nest farming

The term "farming" of nests has been used by a number of authors, apparently to describe the regular harvesting of nests, rather than to imply that the "farmer" does anything for the welfare of the birds to maintain or increase his harvest. However, there are a few indications of direct human intervention to promote harvests.

In Myanmar, Chein Hoe (1959) recommended measures to improve the nesting of Black-nest Swiftlets on offshore islands, including the offer of rewards to people shooting falcons and cutting woody vegetation, which were considered to have a deleterious effect on the swiftlets.

Giles (1936) noted that on islands in the Gulf of Siam "where the profit of the revenue farmer depends entirely on the number of white nests, he requires his professional gatherers, Cha Haw, to take steps to keep [Black-nest Swiftlets] within proper bounds. This is done by the gatherers preventing the young from being hatched by removing the nest before incubation has been completed. This practice is indulged in only when it appears that this species shows signs of being on the increase". Ali (1957) also recorded that in Myanmar "the local inhabitants are said to believe that unless the "black" nests are all removed the crop of "white" nests will be a poor one", however, he gives no further details.

Brandt (1966) notes that Germain's Swiftlets have been "enticed" to breed in the attics of large houses in southern Thailand but gives no details as to how this was achieved. In Java, Heberlein (1925) noted how Edible-nest Swiftlets were encouraged to breed in houses by making small openings in the eaves to allow access to a darkened room divided with extra walls. Medway (1961) also described "swiftlet houses". Cave Swiftlets nest quite commonly in houses throughout Java (Holmes and Nash, 1989), and Edible-nest Swiftlets occasionally nest with this species (Franck, 1926).

Banks (1986) states that "sometimes eggs [of Edible-nest Swiftlets and Black-nest Swiftlets] were transferred to 'mossy' nests and hatched out by foster parents". This technique is currently being used quite widely in Java to increase harvestable populations of Edible-nest Swiftlets. Eggs of Edible-nest Swiftlets are introduced to nests of Cave Swiftlets *C. linchi* and the foster parents are able to incubate and raise the young successfully (I.S. Suwelo and E. Nugroho, pers. comm.), despite the larger size of the eggs (Hoogerwerf, 1949). The success of such cross-fostering is of interest in view of van Kiem's (1955) observations that individual Edible-nest Swiftlets will not incubate eggs other than their own. After fledging, the Edible-nest Swiftlets leave the house, to return once they have attained sexual maturity. At that time they occupy sites in the dark interior of the house, whereas Cave Swiftlets, lacking the ability to echo-locate, are restricted to the lighter areas. Thus a new colony of Edible-nest Swiftlets can be established. Fong (1993) notes that there are several thousand swiftlet farms in Indonesia which, it is claimed, produce some 30% of the total nest harvest in the country. She suggests that the high incidence of cross-fostering to Cave Swiftlets may result in the disappearance of that species from Java within five to 10 years.

Some people have built special houses with a view to attracting Edible-nest Swiftlets, but this is a risky business since there is no guarantee that the birds will occupy the site. Thus, nest traders usually prefer to find a house with an existing Cave Swiftlet colony, purchase it, and then introduce Edible-nest Swiftlets via fostering (I.S. Suwelo and E. Nugroho, pers. comm.). The value of houses containing Edible-nest Swiftlet colonies must have long been recognized, and both Heberlein (1925) and Franck (1926) report such houses being auctioned and/or tenants evicted. However, it is uncertain how long cross-fostering has been practised.

The potential importance of such husbandry of Edible-nest Swiftlets is now recognized in Java, where the *Asosiasi Perwaletan Indonesia* (Indonesian Swiftlet Association) has been established by traders. The Association met in November 1989 and concluded that the "semi-natural" breeding of swiftlets should be promoted, with technical assistance being provided at national level (Anon., 1989b). In 1991, the Association had some 600 members (Levingston, 1991).

The deliberate introduction of the Mariana Swiftlet *C. inquieta bartschi* from Guam to Hawaii (Bowles, 1962; Long, 1981; Pratt *et al.*, 1987), however, was not owing to a belief that the birds produced edible nests, despite Baker (1951) calling them "Edible Nest Swiftlet", as the organization which undertook the introduction (Hui Manu) had no interest in nests (H.D. Pratt, *in litt.*)

Swiftlets and CITES

This report has attempted to demonstrate that the demand for edible swiftlet nests, which has had a fast foothold in Asia for decades, if not centuries, has soared in Hong Kong since the 1960s. The resultant price rises are likely to stimulate collection at nest sites and although some "farming" to increase harvestable populations of swiftlets is practised (see Box 2), the output by farming is small and most trade will continue to be in nests obtained from the wild. If present trends of increasing prices and increasing demand go unabated, many wild populations of swiftlets face an uncertain future, if not certain collapse. The authors feel that the issue merits a more concerted international effort to monitor the status of the species and trade in their nests, such as would occur if edible nest-producing swiftlets were collectively listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

CITES, which came into force in 1975, has a membership of 122 Parties, which have agreed to control trade in the wild animals and plants listed in its two principal Appendices. Appendix I lists species which are threatened with extinction and the treaty largely prohibits their commercial trade, whilst Appendix II lists species of some conservation concern, trade in which is allowed to continue under a permit system which aims to prevent over-exploitation and allows for trade monitoring.

First and foremost, Appendix II controls would provide for international support of harvest control measures adopted by producer countries. With demand, and price, at such peak levels, those measures and the legitimate income of nest collectors and producer countries is sure to be undermined by illegal trade. Appendix II listing would not necessarily limit exports, rather it would help exporting countries to ensure that all trade leaving its border is derived from legal harvests. Importing countries could only accept nest shipments which were accompanied by export permits issued by a specific government agency. Secondly, listing of swiftlet species would permit monitoring of trade levels and routes to allow periodic review of production and trade dynamics. Overall, CITES listing would draw attention, locally and internationally, to the need to control harvests of such a valuable natural resource for the countries which allow export. It would provide an incentive for legal, well-managed production from wild populations and from artificial nest sites.

However, it is important to recognize that the implementation of a CITES Appendix II listing would not be straightforward owing to the difficulty of establishing which swiftlet species produced any particular sample of nest material. Without such information, the issuance of valid CITES docments would not strictly be possible.

Box 3

Swiftlets and CITES: special considerations

The proposal to list swiftlets on CITES raises a number of questions: do swiftlet species meet the criteria for listing in CITES Appendix II?; if so, which species should be listed?; would trade in nest material fall under the Convention's controls?; and what conservation benefits might arise? To deal with the first two of these questions, it is necessary to refer to Article II, paragraph 2 of the text of CITES, which states that Appendix II shall include:

"(a) all species which although not necessarily now threatened with extinction may become so unless trade in specimens of such species is subject to strict regulation in order to avoid utilization incompatible with their survival; and

(b) other species which must be subject to regulation in order that trade in specimens of certain species referred to in sub-paragraph (a) of this paragraph may be brought under effective control".

Listing would therefore depend primarily upon demonstration that trade has potential to be a threat to wild populations of swiftlet species, unless regulated by the Convention. The present report quotes a number of specific reports of declining populations and declining harvests (Francis, 1987; Cranbrook, 1988; Valli and Summers, 1990a, 1990b; Suwelo and Nugroho, 1990; Cranbrook, 1988; J. Blower, *in litt.*), but a thorough review of available population data would be necessary to provide the evidence required to demonstrate that these are more than isolated and localized instances. If such evidence is forthcoming, it would arguably be appropriate to list all species of the genus *Collocalia* in Appendix II of CITES. Although trade is currently largely confined to the nests of Edible-nest Swiftlets, Germain's Swiftlets and Black-nest Swiftlets, the confused taxonomy of these birds (Brooke, 1972; Medway and Pye, 1977; Pratt, 1986; Sibley and Monroe, 1990, 1993), the difficulty of identifying nest material, and the fact that nests of some other species may be harvested in future could justify the inclusion in the Appendix of not only those three species but of the remainder of the genus also under the provisions of paragraph (b) above.

The question of applicability of CITES to trade in nest material is complicated. In most circumstances CITES controls deal with live animals, plants and their products (such as ivory, skins or timber). However, the definition of a controlled "specimen" provided by Article I of the Convention includes the term "any recognizable part or derivative thereof". Saliva, the most important constituent of the traded nest material, is quite clearly a derivative of the swiftlet; it is produced by living animals, not as a waste product, but to aid digestion and more notably to build nests without which the species cannot survive. The existing control of coral trade under CITES Appendix II provides an analogous precedent for including an animal derivative in the Appendices.

CONCLUSIONS

It is hoped that this study of the keen and rising demand for edible swiflet nests can be used in conjunction with existing and future knowledge of the status of relevant swiftlet populations to assess the levels of harvesting they may sustain. Full consideration of CITES Appendix II listing could prove a major contribution to the conservation of swiftlet species subject to trade and to the needs of those countries attempting to ensure sustainable and profitable harvests for the future.

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NOTES

[1] WWF Hong Kong, 1 Tramway Path, G.P.O. Box 12721, Hong Kong

[2] The former name of Myanmar was Burma (until 1989).

[3] 1 tael = 37.8g, in this case, of silver

Appendix 1

Figure 4a

Imports of birds' nests to Hong Kong, by weight, 1960-68 (total quantity = 725t)

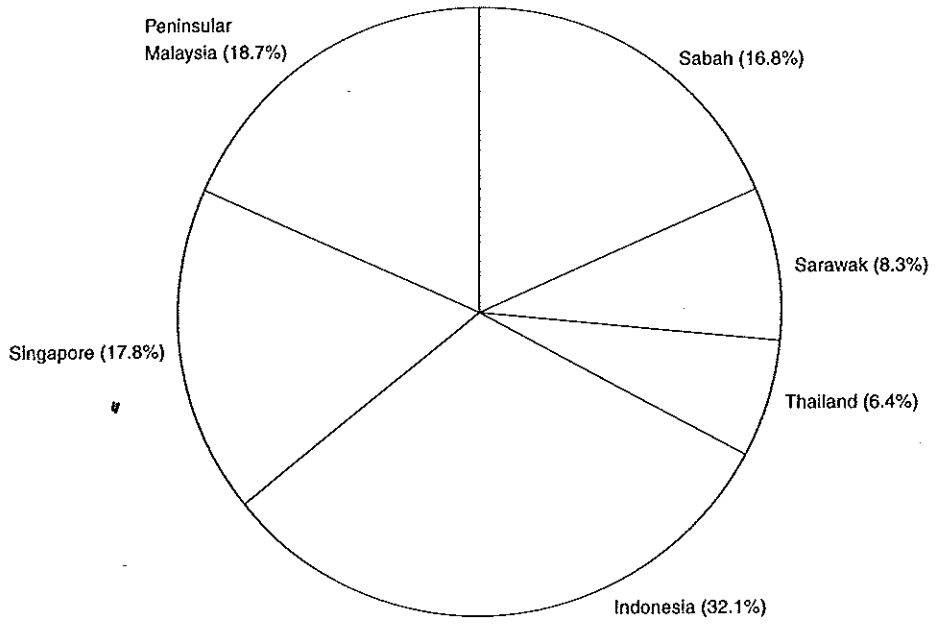
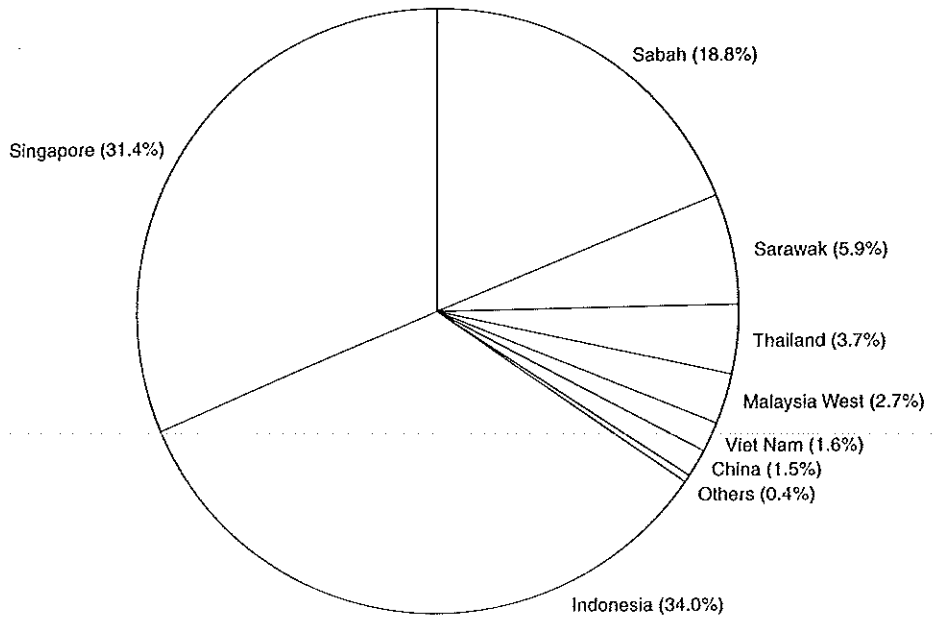


Figure 4b

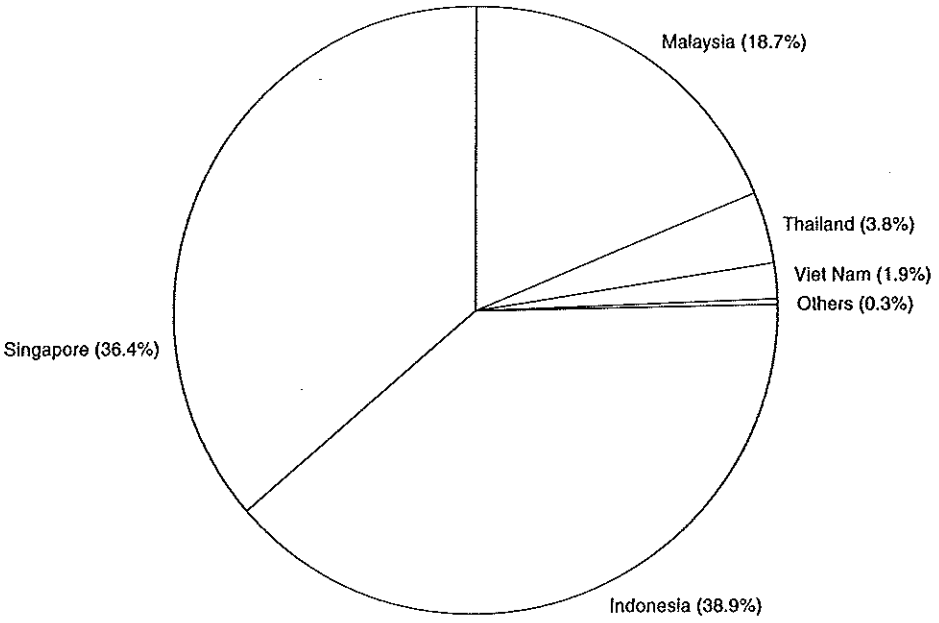
Imports of birds' nests to Hong Kong, by weight, 1980-88 (total quantity = 1040t)



Appendix 1

Figure 4c

Imports of birds' nests to Hong Kong, by weight, 1989-91 (total quantity = 438.5t)



Appendix 1

Figure 5a

Imports of birds' nests to Hong Kong, by value, 1960-68 (total value HK$21 million)

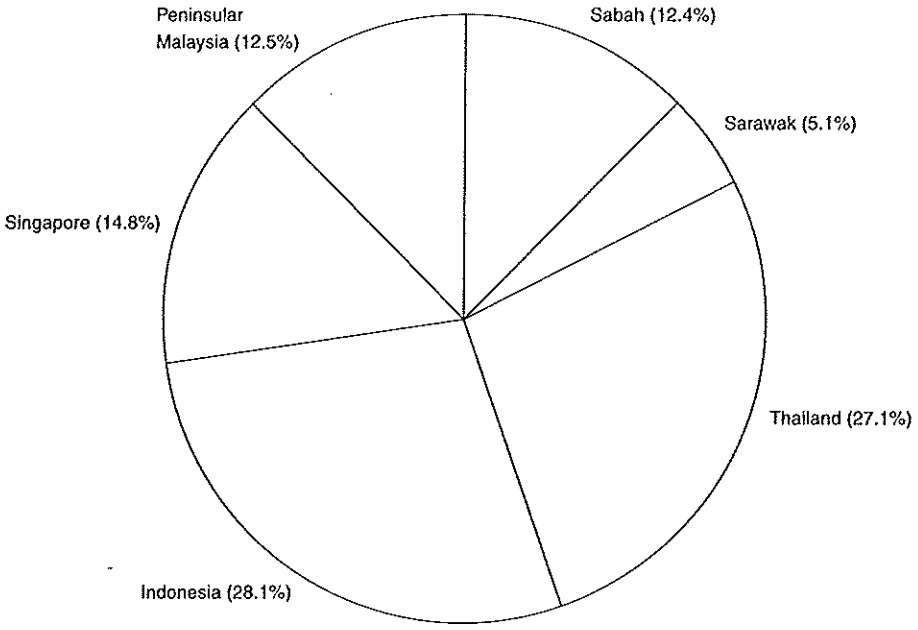
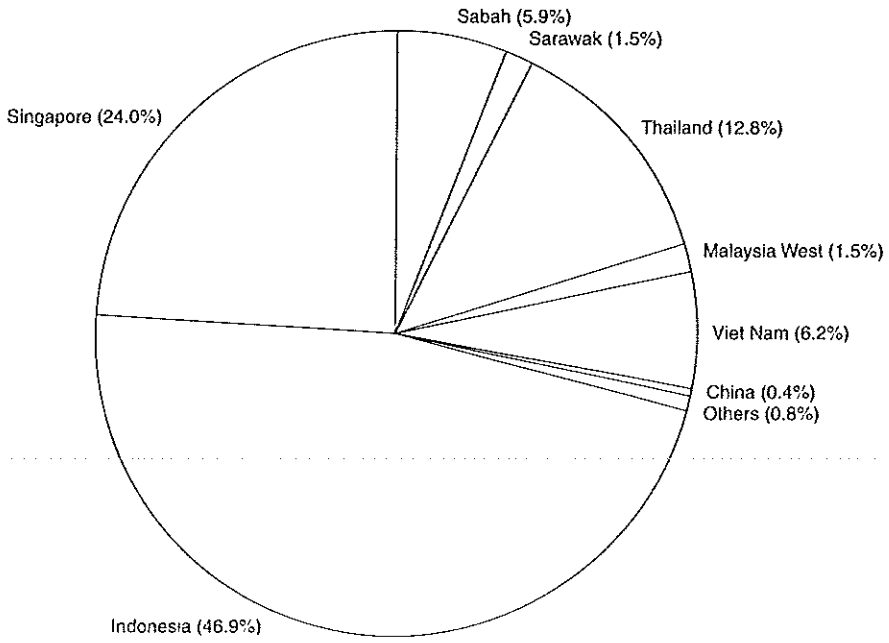


Figure 5b

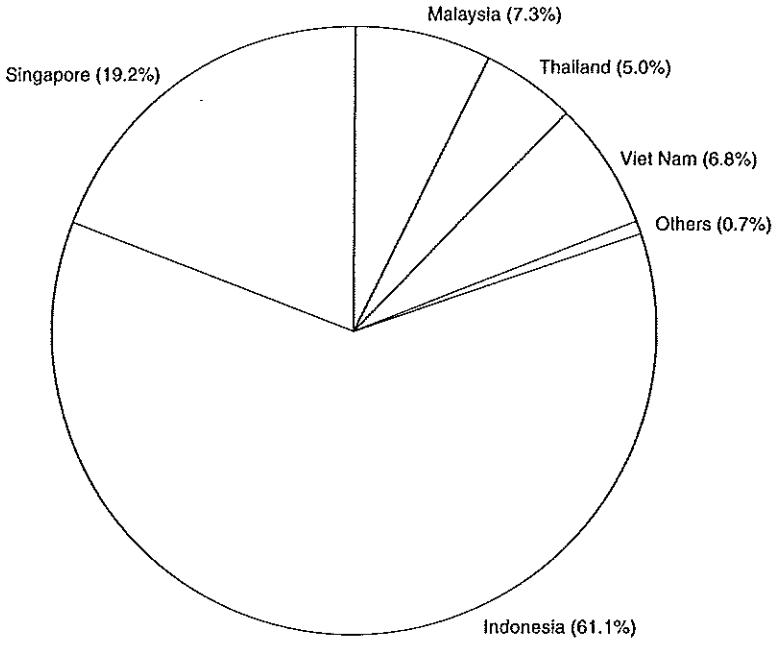
Imports of birds' nests to Hong Kong, by value, 1980-88 (total value HK$774 million)



Appendix 1

Figure 5c

Imports of birds' nests to Hong Kong, by value, 1989-91 (total value HK$1088 million)



CORRIGENDA

Please note that the following dates (as underlined) have been omitted from the titles of Figures 6 and 7 in **Appendix 1.**

Figure 6a Exports of birds' nests from Hong Kong by weight, 1960-68 (total quantity 246t)

Figure 6b Exports of birds' nests from Hong Kong, by weight, 1980-88 (total quantity 123t)

Figure 6c Exports of birds' nests from Hong Kong, by weight, 1989-91 (total quantity 38t)

Figure 7a Exports of birds' nests from Hong Kong, by value, 1960-68 (total value HK$15 million)

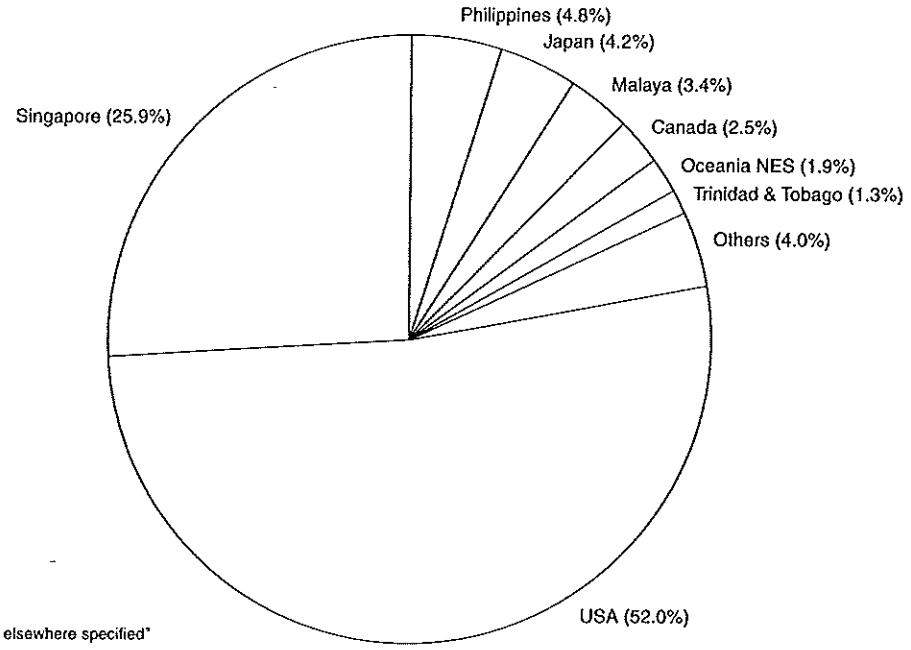
Figure 7b Exports of birds' nests from Hong Kong, by value, 1980-88 (total value HK$100 million)

Figure 7c Exports of birds' nests from Hong Kong, by value 1989-91 (total value HK$80.7 million)

Appendix 1

Figure 6a

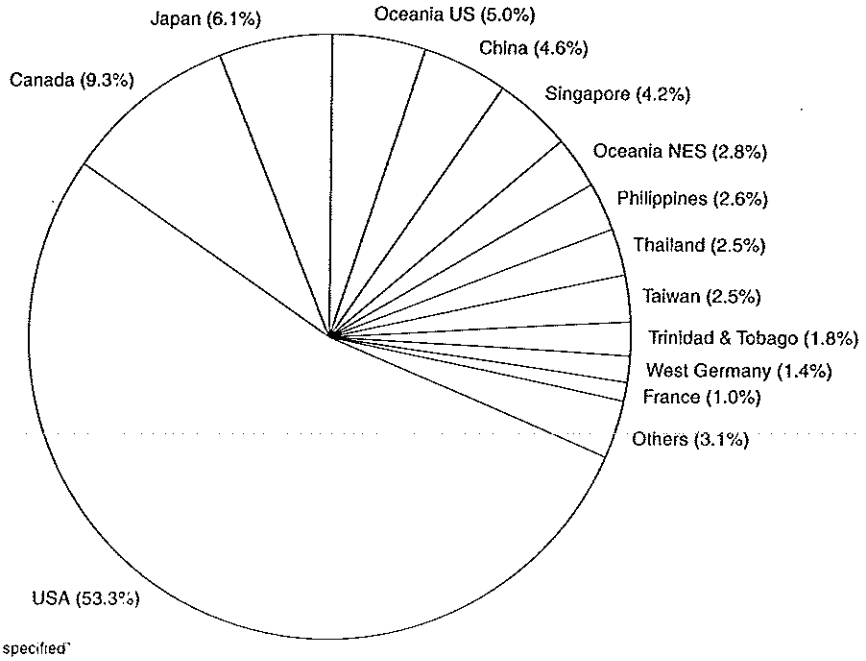
Exports of birds' nests from Hong Kong, by weight, (total quantity 246t)



NES = "Not elsewhere specified"

Figure 6b

Exports of birds' nests from Hong Kong, by weight, (total quantity 123t)

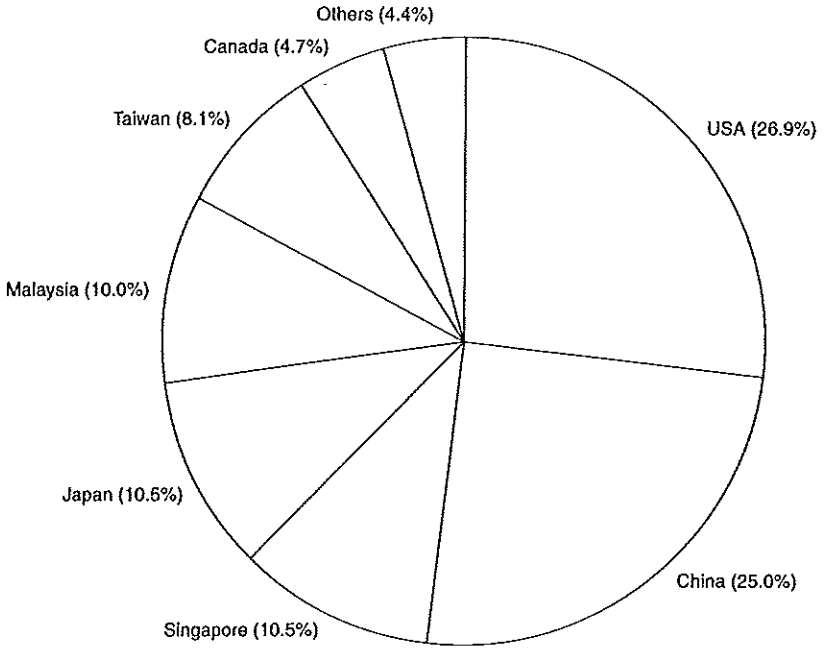


NES = "Not elsewhere specified"
US = US territories in Oceania

Appendix 1

Figure 6c

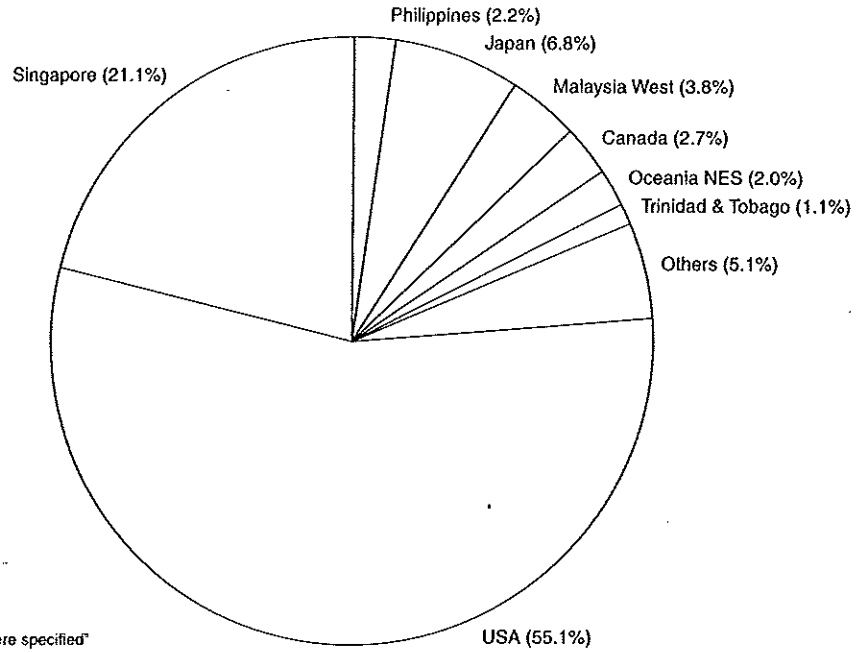
Exports of birds' nests from Hong Kong, by weight, (total quantity 38t)



Appendix 1

Figure 7a

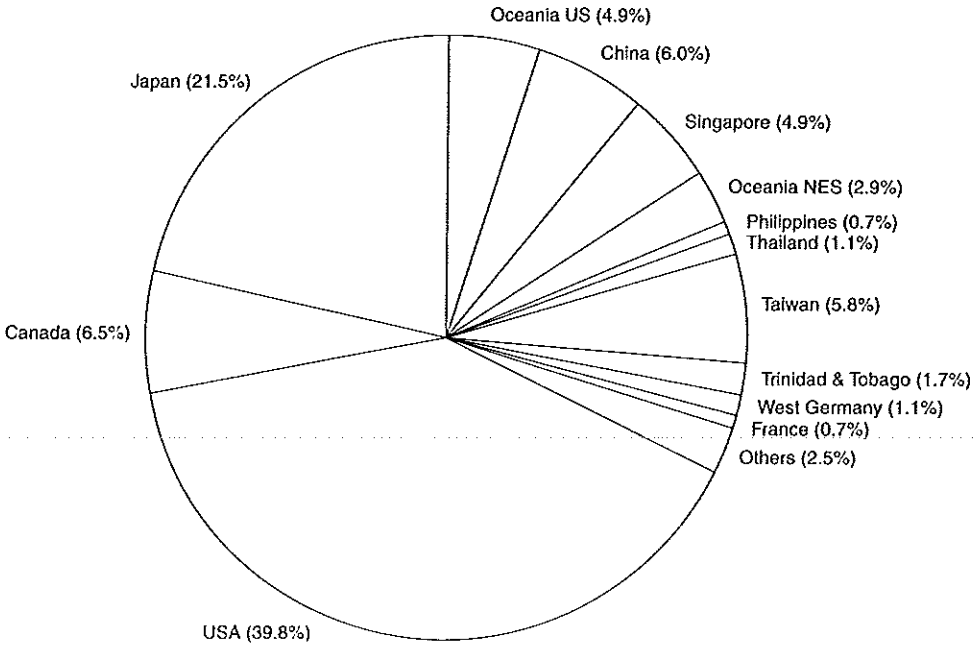
Exports of birds' nests from Hong Kong, by value, (total value HK$15 million)



NES = "Not elsewhere specified"

Figure 7b

Exports of birds' nests from Hong Kong, by value, (total value HK$100 million)

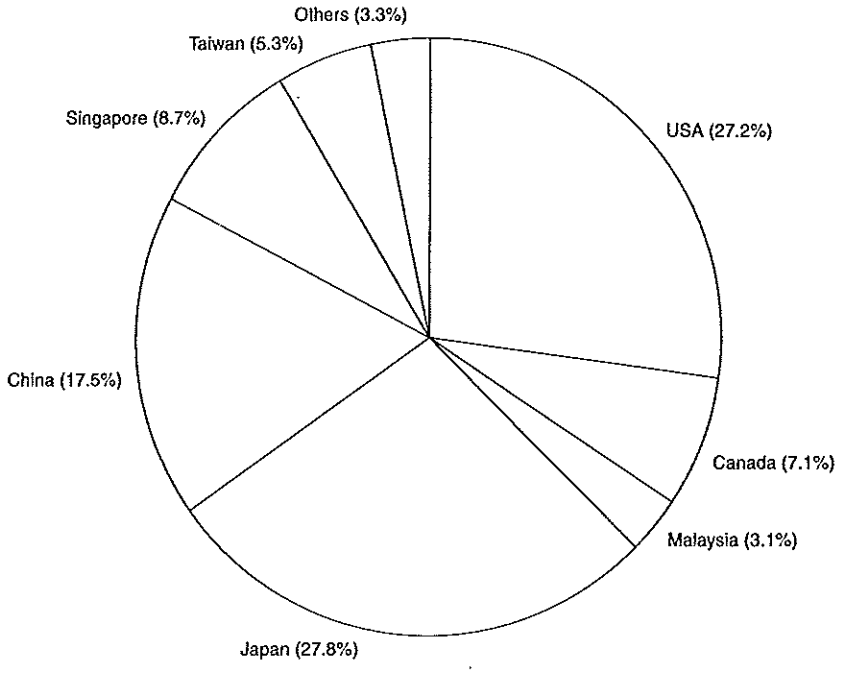


NES = "Not elsewhere specified"
US = US territories in Oceania

Appendix 1

Figure 7c

Exports of birds' nests from Hong Kong, by value, (total value HK$80.7 million)



Source: Hong Kong Customs data (for figures 4, 5, 6 and 7).

Appendix 2

Swiftlet nest weights

The subject of swiftlet nest weights has received relatively little attention in the past. In order to estimate the total number of nests in trade it has been necessary to decide upon an "average" weight and the background information upon which the decision was made is set out below.

a) Published weights (g)

"white" nest		
Green (1885)	7	
Koch (1910)	8.4	
Sallet 1930 (Jabouille 1931)	8-15	(average 9.0g)
Thai van Kiem (1955)	8-10	
Sims (1959)	10.9	
Medway (1963)	10	
Poivre (In: Medway, 1963)	70.5	(clearly an error)
Kang *et al.* (1991)	5.17	±1.2g*
Langham (1980)	ca. 10	
de Groot (1983)	ca. 9/ca. 7	
Xian and Zhang (1983)	13	
"black" nest		
Banks (1935)	8.25	
Sims (1959)	15	
Kang *et al.* (1991)	6.72	± 1.30g*
"white"/"black" nest		
Boswall and Kanwanich (1978)	<10	

* (air-dried at 60 degrees Celsius)

b) Nests weighed in Hong Kong

"white" nest

Date	Sample size	Total weight (g)	Average nest weight (g)
/04/90	10	60.5	6.05
/04/90	20	75.6	3.78
/04/90	11	75.6	6.87
17/10/90	5	36.8	7.36
17/10/90	4	40.4	10.10
17/10/90	3	26.9	8.97
Aggregate average			**5.96**
"black" nest			
15/10/90	5	37.2	7.44
17/10/90	4	43.9	10.98
17/10/90	4	40.4	10.10
11/11/90	4	37.5	9.35
Aggregate average			**9.35**

Nest weights vary depending on how dry the nests are. Recently-collected nests usually weigh more than older ones. Banks (1937) notes an average weight loss of 4.5% per annum.

Not all of the nests collected will be complete — indeed Cranbrook (1988) notes that nests which he saw on a visit to Niah in September 1988 were "nearly all very small, even vestigial".

Kang *et al.* (1991) record a feather:cement ratio of 1:9 in "black" nests from Singapore, thus if cleaned nests are traded, a minimum of 10% weight loss can be expected. In fact, the loss during cleaning appears to be considerably higher, and Cranbrook (1984) records a loss of up to one third on preliminary cleaning and drying, and an 88% loss on final cleaning to extract edible material. Hong Kong traders report losses of up to 62.5%.

Clearly, it is far from simple to derive an "average" weight. For the purpose of the present study, we have presumed such a value to be 8g.

Appendix 3

Protected status of swiftlets and nests

Country	Species	Protected status: Bird Yes	Bird No	Nest Yes	Nest No	Nest collection allowed under permit
China	*C. germani*		+			
Viet Nam	*C. germani*		+			
Thailand	*C. germani*	+*		+*		+
	C. maxima	+*		+*		+
Philippines	*C. germani*	+				+
	C. maxima	+				+
Sabah	*C. fuciphaga* & *C. germani*		+	+		+
	C. maxima		+	+		+
Sarawak	*C. fuciphaga* & *C. germani*	+				+
	C. maxima	+				+
Brunei	*C. fuciphaga*		+			
	C. maxima		+			
Indonesia	*C. fuciphaga*		+*			~+
	C. maxima		+*			~+
Singapore	*C. germani*	+			+	
	C. maxima	+			+	
West Malaysia	*C. germani*	+	+	+		
	C. maxima	+	+	+		
Myanmar	*C. germani*		+?			+
	C. maxima		+?			+
India	*C. unicolor*	+		+		+ (but never had any permit been issued)
Sri Lanka	*C. unicolor*	+		+		Not allowed

* Protected only in National Park

~ According to the Department of Wildlife and National Parks (which in theory can issue the necessary permit), no permits were being issued for nest collection. In practice, however, the Forest Department issue permits for collection of swiftlet nests in forest reserves.