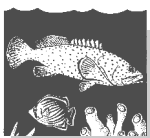


then there are incentives for the live food industry, from fishers through to wholesalers, to reduce the current catch to ensure the industry's sustainability in the future. Co-operation at an international level is imperative; some reef fish stocks are likely to straddle borders as will fishing effort and the transport of live fish. Without formulation under an international agreement, voluntary reductions in trade are unlikely to arise or to succeed.



The Hong Kong trade in Live Reef Fish for Food

by P. Lau & R. Parry Jones¹

Despite world-wide concerns about the methods used of catch live reef fish and the portable unsustainability of the trade, scant detailed information was available at the consumer end. This project was thus carried out, from May 1997 to February 1998,² to collate available information on the trade, to put forward recommendations with a view to strengthening current regulations where appropriate, and to highlight areas in need of further research. The study focuses upon the quantity, species and origin of LRFF imported into an re-exported out of Hong Kong, the structure and dynamics of the Hong Kong trade, and demand in Hong Kong market. Research was conducted through questionnaires with restaurateurs and traders of live reef food fish and through analysis of available import and re-export statistics.

Hong Kong is believed to be the largest consumer of LRFF in Asia as well as an important entrepôt for re-export of LRFF (Johannes & Riepen, 1995). Hong Kong imports LRFF from over 10 different countries/regions. The majority of these fish are caught in tropical reef habitats in the Southeast Asian countries and increasingly in the remote Pacific archipelagos. Southeast Asian countries were found to be the main countries of origin.

Indonesia and the Philippines were, respectively, the main sources of LRFF imports into Hong Kong as well as the main sources for Giant Grouper *Epinephelus lanceolatus*, High-finned grouper *Cromileptes altivelis* and for Humphead wrasse *Cheilinus undulatus*. Of concern is that exports of

The live reef food fish industry is a valuable fishery for Southeast Asia. Effective co-operation of governments, industry and other stakeholders, has the potential to ensure live reef food fish stocks are sustainably managed, to provide a sustainable livelihood for coastal fishers and thus an incentive for coral reef conservation throughout Southeast Asia.

Humphead wrasse are in fact prohibited from the Philippines and specimens of a certain size are prohibited in exports from Indonesia. Capture of this species and its export from the Maldives, another Hong Kong supplier, are also prohibited. Traders noted that they were aware it was illegal for this species to be exported from certain areas and noted that smuggling is a common phenomenon.

Import data from the Hong Kong Census and Statistics Department (HK CSD) record the largest quantities of 'other groupers' and 'other marine fishes' as being imported from Thailand. Malaysia was reportedly the main source of Coral trout imports. Thailand and Malaysia are also important sources for so-called 'cultured' species such as Brown spotted grouper *Epinephelus areolatus*/*E. bleekeri*, Green grouper *E. coioides*, Malabar grouper *E. malabaricus* and Mangrove snapper *Lutjanus argentimaculatus*, which are mostly grow-out specimens of wild-caught juveniles. Taiwan appears to be the only place where significant amounts of groupers are hatchery-reared. China was the major source of snooks and basses to Hong Kong in 1997, supplying over 96% (by weight) of total imports.

Faced with declining stocks in traditional fishing grounds such as the Philippines (Barber & Pratt, 1997), fishers and traders have been forced to look ever further afield to meet growing demand. Papua New Guinea and the Solomon islands, as well as the Maldives, are becoming increasingly important source countries for live reef fish, although with the former two this may also be due, in part, to the recent

1. This document is an executive summary (slightly condensed) of:
LAU, P. & R. PARRY JONES. (1999). The Hong Kong trade in Live Reef Fish for Food. TRAFFIC East Asia and World Wide Fund for Nature Hong Kong, Hong Kong
2. Although this report was published in June 1999 it is based on 1997 data. Another report on the same subject, but based on 1998 data, was published after this issue of the Information Bulletin went to press. It is:
PAWIRO, S. (1999). Trends in major Asian markets for live grouper. Infofish International 4/99: 20-28.
The author describes a number of problems that hit the live reef food fish industry in 1998 and predicts that consumption, already falling in 1998, 'will continue to fall for the next few years.'

push by Pacific Island Countries (PICs) to increase exports of LRFF (G. Sant, pers. comm., Sept. 1998).

Air transport has become increasingly important for transporting fish as it enables a faster and more reliable supply. Transport by sea, however, is still used for imports of the larger specimens of Giant grouper and Humphead wrasse as larger specimens fare better if transported by sea. Although transport methods have, in general, been developed to a high standard, very high rates of mortality, up to 90% (Sadovy, *in litt.* 1998) can occur when juveniles are transported for mariculture and for adult fish transported prior to sale. Mortality is an issue of conservation concern because it is live fish, which are in demand. Hence, more fish need to be caught to compensate for those that die in transit in order to meet demand.

In 1997, Hong Kong imported an estimated 32,000 tonnes of live reef fish for food, of which an estimated 3200–6400 tonnes were re-exported to China. Local consumption is estimated to be around 25,600–28,800 tonnes per year, and LRFF traders estimated that 75% of imports were comprised of the 11 most commonly available species in Hong (traders, however, use the same common name—Chi Ma Ban (Brown spotted grouper)—for *E. bleekeri* and *E. areolatus*). Thus, although they spoke of the 11 most commonly available species there were in fact 12. These were Humphead wrasse *Cheilinus undulatus*, Leopard coral trout *Plectropomus leopardus*, Spotted coral trout *P. areolatus*, High-finned grouper *Cromileptes altivelis*, Green grouper *Epinephelus coioides*, Flowery grouper *E. polyphekadion*, Brown spotted grouper *E. bleekeri/areolatus*, Tiger grouper *E. fuscoguttatus*, Giant grouper *E. lanceolatus*, Red grouper *E. akaara*, and Mangrove snapper *Lutjanus argentimaculatus*.

Trade data from the HK CSD show that Hong Kong recorded imports of 21,000 tonnes only of live marine food fish (except eels)—a discrepancy of 11,000 tonnes with this study's estimate. Analysis and comparison of officially recorded imports with interviews with traders provide an insight into the shortcomings of the current monitoring system in Hong Kong. Traders revealed that although Indonesia and the Philippines were the main countries of origin for Humphead wrasse imports, other countries exporting this species also included Australia, China, Malaysia, the Maldives, Papua New Guinea, the Solomon Islands, Thailand, and Vietnam. These countries are not recorded in the CSD data. Discrepancies in the two data sets may also be attributed to other factors: locally licensed fishing vessels and locally licensed live fish transport vessels in Hong Kong are exempt from declaration of imports of live reef

food fish—the main mode of transport for Humphead wrasse. Furthermore, under the current Marine Fish (Marketing) Ordinance (Chapter 291), the category 'marine fish' does not, ironically, include 'live fish'. There are no inspections of live food fish imported into Hong Kong and declarations by species are not checked. There is, however, no obvious reason for deliberate misdeclaration of imports into Hong Kong as imports are not subject to taxation and, although it is illegal to export Humphead wrasse from certain countries, this does not make it illegal to import the species into Hong Kong.

Giant grouper *Epinephelus lanceolatus*, Humphead wrasse *Cheilinus undulatus*, High-finned grouper *Cromileptes altivelis*, Red grouper *Epinephelus akaara* and Coral trouts *Plectropomus* spp. were, respectively, the most highly valued fish.

Wholesale prices, in 1997, ranged from US\$ 38/kg for Spotted coral trout to over US\$ 100/kg for the smaller specimens of Giant grouper. Overall average wholesale price for reef fish was US\$ 20/kg (Sham, *in litt.*, 1997). The estimated total annual value of live reef fish imported into Hong Kong for food therefore exceeded US\$ 500 million. The value of this fishery industry far exceeds Hong Kong's total annual seafood production by its entire traditional capture fleet (Lee & Sadovy, 1998).

Retail prices for the 11 most commonly consumed reef fish species ranged from around US \$30/kg for a large Tiger grouper to around US\$ 175/kg for a small (< 1 kg) Humphead wrasse. As fish served whole are preferred to slices of fish, the larger specimens of Giant grouper *Epinephelus lanceolatus*, Tiger grouper *Epinephelus fuscoguttatus* and Humphead wrasse *Cheilinus undulatus*, have a lower wholesale price per kg than smaller specimens of the same species. Interviews with restaurateurs revealed that Leopard coral trout *Plectropomus leopardus* and Green grouper *Epinephelus coioides* were the two most popular species and Humphead wrasse and Giant grouper the least common species consumed in Hong Kong restaurants. Most consumers eat Giant grouper and Humphead wrasse as a status symbol due to their rarity and high price rather than for their taste and texture.

Demand for reef fish peaks during festivals with demand highest on Mother's Day. Second to festivals are special events such as celebratory banquets—the two most important banquets being Wedding banquets and Birthday banquets, respectively. Traders also noted that consumers apparently preferred wild-caught individuals over cultured species, and wholesale and retail prices are adjusted accordingly. Retail price for wild-caught Red

grouper, for example, is 60% higher than for cultured Red Grouper, apparently due to the rarity of this species in the wild and the relatively poor texture of cultured specimens. Findings of blind taste tests, however, showed that overall, people preferred cultured Malabar grouper *Epinephelus malabaricus* to wild-caught specimens (Omni' Trak Group Inc., 1997).

The preference for the smaller, and thus sexually immature, specimens of Giant Grouper and Humphead wrasse is an issue of great concern. Both these species are naturally scarce and particularly vulnerable to overfishing. Specimens of other species in the Hong Kong market, such as Malabar and Tiger groupers, were also found, in large part, to be sexually immature. Given the low density of species naturally occurring on coral reefs, the preference for sexually immature fish and the large quantities in trade, current catch levels may not be sustainable. Although Coral trout commonly consumed in Hong Kong are within the range of sexual maturity, the high demand for this species may make it susceptible to overfishing. An additional issue of concern is the increase in supply into Hong Kong of certain groupers during the spawning season. Targeting spawning aggregations can be devastating for stocks. Range states for coral reef fish will have to take the main initiative and responsibility to protect and use wisely their marine resources. Recommendations agreed upon at the 1997 APEC Workshop on the Impacts of Destructive Fishing Practices on the Marine Environment should constitute the basis from which range states work towards conserving their coral reef resources. Consumer countries, however, such as Hong Kong, also have an important role to play. As the main consumer of reef fish, Hong Kong could take the initiative in working with member-nations of APEC towards establishing a comprehensive and standardised monitoring system for reef fish in trade. Although Hong Kong already monitors imports of certain species of reef fish, this monitoring system could be improved upon.

Recommendations

The primary recommendation for Hong Kong is to amend the licensing and classification system for locally registered fishing vessels and locally registered transport vessels bringing in live marine fish so as to enable recording of all LRFF imports into Hong Kong. The term 'marine fish' in the Marine Fish (Marketing) Ordinance (Chapter 291) also should be redefined so as to include 'live fish' in the definition of 'marine fish'. Although Hong Kong already monitors imports of certain species of reef fish into Hong Kong, trade records should be amended to specify:

- a. Tiger grouper, *Epinephelus fuscoguttatus*
- b. Flowery grouper, *Epinephelus polyphekadion*
- c. Leopard coral trout, *Plectropomus leopardus*
- d. Spotted coral trout, *Plectropomus areolatus*
- e. Green grouper, *Epinephelus coioides*
- f. Mangrove snapper, *Lutjanus argentimaculatus*

Tiger grouper, Flowery grouper, Leopard coral trout and Spotted coral trout are among the most important live reef food fishes in the Hong Kong industry and subject to intense fishing pressure.

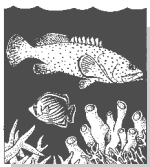
The Government of the Hong Kong (SAR) also should be encouraged to share its expertise and to work with other member-nations of the Asia Pacific Economic Cooperation (APEC) to establish a comprehensive and standardised system for monitoring trade of live reef fish in the region. Imports from countries newly entering the trade, such as the Maldives, Papua New Guinea, the Solomon Islands, US Oceania and Sri Lanka, should be monitored as exports of LRFF from these countries develop.

The Government of the Hong Kong (SAR) could strongly recommend that nations which have banned the export of Humphead wrasse and Giant grouper explore the possibility of listing these two species on Appendix II or Appendix III of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Despite the fact that exports of Humphead wrasse of a certain size are banned from Indonesia, that all exports are banned from the Maldives and certain areas of the Philippines, this species is still found in trade from these locations into Hong Kong. A CITES listing would aid the HK SAR Government's regulatory efforts.

An identification manual should be prepared to assist government officers in the recognition of fish species and to assist traders in making consistent declarations. Confusion between Malabar grouper and Green grouper is but one documented example where an ID manual would be a useful tool.

Effective channels of communication should be established in Hong Kong between stakeholders in the live reef fish industry. The Government of the Hong Kong (SAR) should also maintain dialogue and conduct regular exchanges of information with governments of exporting nations. Research should be conducted to determine consumer attitudes towards the consumption of reef fish to ascertain the most effective means of involving the public in the protection of coral reef habitats, the impact of destructive fishing methods, and the consequent impact on the trade and consumption of LRFF.

Countries exporting LRFF should establish quotas to ensure the long-term sustainability of their fisheries. Lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation (FAO, 1996).



The use of chemicals in the live fish export industry

by Katherine Kelly¹

Attention has recently been drawn to the use of chemicals in the live fish trade. This article will attempt to clarify the use of chemicals, the Australian Quarantine and Inspection Service's (AQIS) role and the National Registration Authority's (NRA) requirements.

The live fish trade has an annual export income of about AUS 20 million accounting for 15% of the total commercial landings of demersal reef fish in Queensland, with catches primarily of coral trout in north Queensland. In the reef/line fishery about 110 licensed fishing boats have changed over to live reef fish operations, with production in 1997 at 369 tonnes (*QLD Fisheries News*, Issue 2, June 1998).

The pressure to use chemicals such as anaesthetics and antibiotics has increased with the reduction in airfreight capacity due to the down turn in tourism flights from Asia to far north Queensland. Purpose-built cargo boats are currently used to transport fish to Hong Kong.

Transportation time has increased resulting in a greater need for water conditioners to remove ammonia, antibiotics to reduce infection and anaesthetics to sedate fish.

Asian companies are pressuring exporters to use chemicals banned for use in Australia. Chemicals used for veterinary or agricultural purposes during the production of food intended for human consumption must be approved and registered for use by the NRA. The NRA is responsible for registering chemicals for that 'use pattern' (this means for a particular species and purpose).

A chemical may be used 'off label' if prescribed by a veterinarian or if the user has obtained a 'minor use permit' from NRA. According to legislation, it is an offence to possess and use an unregistered

chemical product or unapproved active ingredient, or to use a registered product in a manner not included on the label.

Further research into hatchery-based mariculture should be encouraged as currently all mariculture operations, with the exception of mariculture operations for Green grouper *E. cooides* and Malabar grouper *E. malabaricus* in Taiwan, are based upon grow-out of wild-caught juveniles.

One chemical registered for use in the handling and harvesting of Salmonids is 'AQUIS-S', an aquatic anaesthetic. This chemical may currently be used for other species in a 'off-label' capacity (with a veterinarian prescription) or with a 'minor use permit' obtained from NRA. Restrictions apply on when and how the chemical is to be used and permission for use is only for the applicant concerned.

There are currently no antibiotics registered for use on fish destined for human consumption. As the NRA can only deal with drugs and chemicals that have a direct effect on animals, the debate over water conditioners being a NRA issue continues.

The process to register a chemical with NRA is currently expensive and time consuming. It has been argued that no single manufacturer is likely to invest in registering new uses for existing chemicals because their share of an increased market will be too small, to warrant the investment. In addition, once chemical is registered, all competing companies can expand their own label claims without significant expense.

The process of obtaining a 'minor use permit' for a registered chemical to be used in another 'use pattern' is less costly and more acceptable than 'off label' veterinary prescriptions.

AQIS is responsible for ensuring that exported fish is safe and wholesome for human consumption, under the Commonwealth's *Export Control Act's 1982* and its subordinate regulations the *Export Control (Processed Food) Orders*. The 'Orders' require that exported fish may not contain contaminants or residues potentially harmful to humans or in quantities exceeding limits determined by relevant domes-

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