



Ciguatera – A continuing problem for Hong Kong's consumers, live reef fish traders and high-value target species

by Yvonne Sadovy¹

Ciguatera poisoning (an illness caused by consuming fishes that contain naturally occurring ciguatoxins) continues to plague the live food fish trade in Hong Kong, and poses a threat to both consumers and, indirectly, to highly-valued target species. Moreover, there is little hope of an effective solution to the problem in the short term without legislative changes. This article examines the sharp increase in ciguatera cases in Hong Kong over the past three years, the impacts on retail prices, the inability of the Hong Kong Government to protect consumers from exposure to ciguatoxic fishes and implications for reef fishes that are frequently ciguatoxic. Potential impacts on the economic development of the nearshore resources of economies where these ciguatoxic fishes frequently occur have been addressed elsewhere (Dalzell, 1992).

Low levels of ciguatera have been recorded in Hong Kong for over 10 years, and were evidently associated with fishes caught locally or in the northern sector of the South China Sea. Cases were not common, however, and the condition was not considered a particular health problem. As local and regional reef fish stocks became overfished, however, and Hong Kong-based businesses searched ever further for rich fishing grounds, they unwittingly found themselves the conveyers of toxic fishes back to Hong Kong (Sadovy, 1998a).

By the mid-1990s, having largely depleted readily available stocks in the Philippines and Indonesia (e.g. see Bentley, this issue), businesses explored fishing possibilities ever further east into the Pacific and west into the Indian Ocean. By 1998 they had reached at least as far as the Seychelles at one extreme and were negotiating with Fiji at the other. Such distances from Hong Kong make for long (20 days or more) and costly transportation by sea and were only possible because of the high retail prices of live reef fishes, low prices paid at source, and the large capacity (up to 30 mt) of the cargo vessels used.

A problem arose when some of the western Pacific sites being exploited proved to be sources of signif-

icant numbers of ciguatoxic fishes producing hundreds of victims of ciguatera in Hong Kong. From an annual average of about 70 cases of ciguatera between 1993 and 1996, to 95 in 1997, the incidence rose to 425 in 1998 (*South China Morning Post*, 25 January 1998; Hong Kong Department of Health). Despite the fact that several of the newly-exploited areas are well-known sources of ciguatoxic fishes, both the Hong Kong Government and the Hong Kong-based live reef fish trade appeared to be unaware of, and certainly unprepared for, the problem of importing toxic fishes. Although dead fish are occasionally tested for ciguatoxins² for the Hong Kong Department of Health, there is no legal requirement for live fish to be tested because, for historical reasons, they are not considered to be 'food'. Moreover, since most importers use Hong Kong-registered vessels that do not have to declare their cargo on import, it proved difficult to trace the origins of the first contaminated shipments and to intercept shipments for testing.

Hong Kong has one of the highest *per capita* seafood consumption rates in the world and markets a wide diversity of fish and invertebrate species. About 80% of the fish consumed locally are imported. At the lower end of the price market are a few freshwater and cultured species, while a broad range of tropical marine reef fishes and invertebrates, maintained alive until cooking, command the top prices. These are imported in large volumes (live reef fish imports in the last couple of years are estimated at about 30,000 mt annually). In a survey of fish species and sizes marketed live for food, many of the more commonly encountered species being sold (e.g. tiger grouper *Epinephelus fuscoguttatus*; flowery grouper, *E. polyphekadion*, coral trout, *Plectropomus* spp.), were potentially ciguatoxic (Lee & Sadovy, 1998; Sadovy, 1998b). The risks to the public, in terms of both species and volumes being marketed, were clear.

Current laws and recent government actions cannot protect Hong Kong consumers from ciguatoxic fishes, if these are marketed alive. While it is illegal to sell contaminated food, since live fish is not classified as food, technically the Government has no

1. The Department of Ecology & Biodiversity, The University of Hong Kong, Pok Fu Lam Road, Hong Kong, China

2. Using a mouse bioassay, a reference level is set at 100 'mouse units'/kg, below which fish are considered to be safe for sale; there is, however, no international consensus on safe levels of these toxins.

authority to prevent their sale. In a recent incident, about 10 mt of contaminated fish were knowingly shipped to Hong Kong from Fiji by a Hong Kong company. Intervention by the Hong Kong Chamber of Seafood Merchants and informal action by the Departments of Health and Agriculture and Fisheries ultimately prevented sale of the fish in Hong Kong. However, the fish were eventually sold in mainland China with unknown impacts on consumers. And trade continues with Fiji!

This case revealed several areas for concern. First, some importers do not feel responsible for the risk they knowingly expose consumers to. Second, there is no authority in the the Hong Kong Government to prevent such sales and protect local consumers. Although there is now an informal process (currently under review by Dept. of Health) whereby fish may be screened for toxins prior to arrival in Hong Kong, the government has no legal power to prevent their sale by, or to prosecute unscrupulous vendors. To advise the public of the risk they might face in eating too many reef fish, or large fish of certain species which may carry ciguatera toxins, posters were produced for distribution in appropriate areas. But when I recently made two visits to one of the two major retail outlets for live reef fish in Hong Kong, Lei Yue Mun, not one warning poster was displayed.

The problem of ciguatera needs to be addressed; the implications for business and for the public are obvious, those for the target species are less so but nonetheless significant. Following reports of ciguatera, retail prices became temporarily depressed by 20 to 60%. It was not only those species which pose the most risk which were affected, but all fish, including those that were cultured, freshwater species and locally caught fishes; the public does not appear to discriminate (Agriculture and Fisheries Department; Patrick Chan, pers. comm).

While businesses clearly suffer from reduced sales and lower prices and people become ill, it is also important not to overlook implications for certain exploited fish species. Since larger individuals of susceptible species tend to pose a greater risk of ciguatera than smaller ones (due to accumulation of toxins over time), there has, predictably, been an increase in demand for smaller fish. This trend is reflected in the greater proportion of juveniles being sold in retail outlets compared to three 3 years ago (Lee & Sadovy, 1998; pers. obs.). Among the top valued grouper species implicated in recent incidences of ciguatera, such as tiger grouper and coral trout, most are now being sold within their juvenile size range. Since juveniles have not had an

opportunity to contribute to the next generation, this trend augurs badly for the long-term health of these fisheries; capture fisheries need to maintain spawning biomass and typically minimize capture of juvenile fishes.

A number of solutions can be considered for Hong Kong. The first is clear; classify live fish as food and close the loophole which allows their unregulated import. In this way, importers or traders who sell toxic fishes become responsible under the law for selling contaminated food and the government can use public money to test fish and to monitor imports. Possible control strategies include prohibiting the trade of susceptible reef fishes or import from areas where the incidence of ciguatera is typically high (e.g. United States Food and Drug Administration, 1999 Food Code – HACCP guidelines), or prohibiting the sale of fishery products containing biotoxins, such as ciguatera (e.g. European Communities Directive 91/493/EEC). It is fairly well documented which species pose a high risk and which areas have been sources of ciguatera, such that either approach is feasible for Hong Kong, given the appropriate legislation.

Ciguatera is a problem that is not going to go away. For consumers, traders and target species alike, the issue needs to be addressed. Since there is no quick and easy, widely-accepted test that traders can apply to check their own fish reliably, the assistance of Government and properly-equipped laboratories is essential in preventing the import of contaminated fishes into Hong Kong. On the other hand, because the Government has no legal authority to prevent the import or sale of contaminated live fishes, should the public be expected to pay for testing fish if they are not thereby protected? Where does the ultimate responsibility lie in protecting the public?

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