CIGUATERA IN THE FRENCH CARIBBEAN: PROVIDE MORE INFORMATION ON THE FISH SPECIES POTENTIALLY RESPONSIBLE

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Ciguatera is a type of food poisoning due to consumption of tropical fish contaminated with marine toxins known as ciguatoxins. Symptoms include digestive, skin, cardiovascular and neurological disorders, which can sometimes persist for several weeks or even months. The itching observed in cases of ciguatera has given this poisoning the French name la gratte. In order to provide more information to consumers, whether they are residents or holidaymakers, as well as to fishers and restaurant owners, ANSES has drawn up a list of 67 species of fish posing a risk of ciguatera in the French Caribbean.

Ciguatera is a particular type of food poisoning requiring medical attention and affecting residents of the French overseas territories, as well as people returning from a trip there. It is caused by eating fish from tropical and subtropical waters contaminated with marine toxins called ciguatoxins, which are produced by microscopic algae found in coral reefs. Herbivorous fish contaminated by ingesting these algae are then eaten by larger fish, in whose flesh or viscera the ciguatoxins accumulate, and so on throughout the food chain. Ciguatoxins do not affect the taste of the fish and are resistant to cooking and freezing. Poisoning can therefore also occur after eating imported frozen fish.

Because of climate change, ciguatoxins are spreading outside tropical and subtropical regions. In recent years, cases of ciguatera have been reported following consumption of fish caught in the Spanish Canary Islands. Fish contaminated with ciguatoxins have also been observed in the Balearic Islands, although to date there have been no cases of human poisoning.

WHAT IS CIGUATERA?

The first signs of ciguatoxin poisoning are usually digestive: abdominal pain, nausea, vomiting, diarrhoea, etc., and occur a few minutes to a few hours after eating contaminated fish. They are quickly followed by neurological disorders such as tingling and itching (hence the French name la gratte) in the hands, feet and face, reversal of hot and cold sensations[1], pain when cold, muscle pain and profuse sweating. This may be accompanied by a slowing of the heart rate and a drop in blood pressure, which can last for several days. Balance disorders, visual hallucinations and even a depressive syndrome have been observed in some cases.

While the digestive signs disappear on their own after a few days, the neurological signs may last for several weeks or even months. Treatment can only help ease the symptoms. The prognosis may be unfavourable in the case of paralysis of the respiratory muscles or heart attack. However, ciguatera is rarely fatal.

[1] Hot surfaces feel cold and cold surfaces feel hot.

Patients remain at risk of symptoms recurring, even several months after poisoning, if they consume alcohol or fish (whether contaminated or not), among other things. The mechanism of these resurgences is poorly understood.

In Guadeloupe, since 2002, a prefectoral order[2] has prohibited or restricted the marketing of certain fish due to the risk of ciguatera, depending on their weight[3] or the area in which they were fished[4]. However, certain unlisted species in the jack or snapper families are also frequently responsible for ciguatera poisoning. Cases of ciguatera are also regularly reported in Martinique, where unlike Guadeloupe there is no prefectoral order in place.

To better regulate the fishing and marketing of species posing a risk of ciguatera in the French Caribbean, the Directorate General for Food (DGAL) asked ANSES to draw up a list for Martinique and Guadeloupe.

WHICH FISH POSE A RISK OF CIGUATERA IN THE FRENCH CARIBBEAN?

Although ciguatera is not a notifiable disease, it is normal practice for healthcare professionals, catering professionals and the regional health agencies to report any cases of ciguatera of which they become aware to the Directorates for Food, Agriculture and Forestry (DAAFs) in their respective regions (Martinique or Guadeloupe). These reports are used to draw up a non-exhaustive list of poisoning cases. When fish leftovers from these cases are available, the DAAF informs the DGAL and sends samples (pieces or whole fish) to ANSES's National Reference Laboratory (NRL) for marine biotoxins, to test for ciguatoxins.

The NRL analysed fish samples associated with cases of ciguatera in the French Caribbean between 2002 and 2021. Some fish that were not consumed, but that had been caught in the same place and at the same time as other fish associated with cases, were also sent for analysis. In order to identify with certainty the fish species involved in poisoning, these same samples were sent to the Marseille laboratory of the Joint Laboratory Service (SCL) for DNA analysis. This is because visual or morphological identification of a fish species can be difficult and error-prone, especially with fish out of water.

The study ultimately focused on 74 fish analysed between 2002 and 2021, for Martinique and Guadeloupe combined. The results revealed three families of fish involved: jacks (40% of the fish analysed), snappers (32%) and groupers (18%), as well as a fourth group made up of miscellaneous fish (10%). A clear difference was observed between Martinique and Guadeloupe: groupers and snappers were found in Guadeloupe, but not in Martinique (Figure 1).

According to the DAAFs of Martinique and Guadeloupe, residents of both islands eat the same types of fish, but overfishing in Martinique means that there are now not enough groupers and snappers to satisfy local consumption. Most of these two families of fish are therefore imported from Venezuela and Grenada, which have so far been free of ciguatera.

In Guadeloupe, grouper and snapper are still fished locally.

DNA analysis results from the SCL in Marseille showed that the 74 fish analysed belonged to 22 distinct species.

As ciguatera reporting is not exhaustive and fish leftovers are not always available, a review of the scientific literature was also carried out to search for species that may not have been identified by the analysis of fish collected between 2002 and 2021. To do this, two databases of

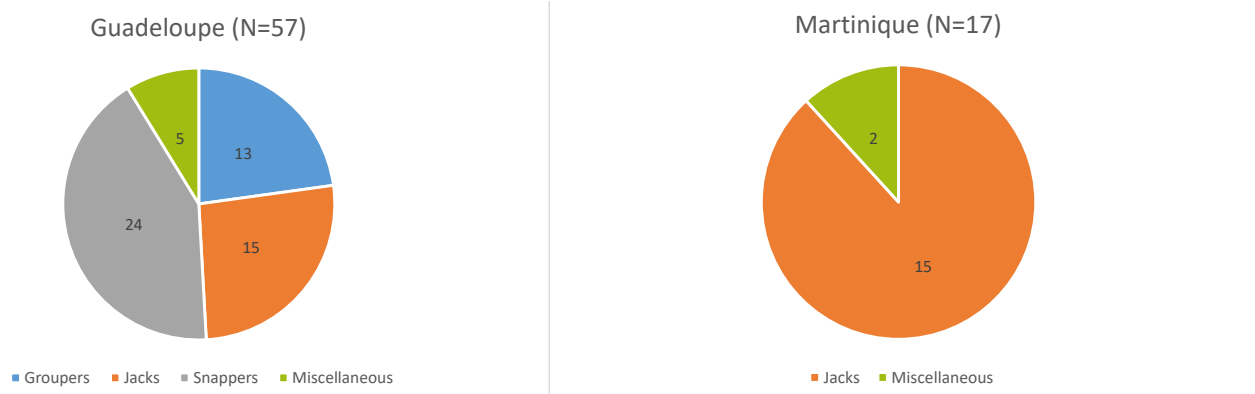

Figure 1 - Families of consumed fish responsible for cases of ciguatera reported between 2002 and 2021 in Guadeloupe and Martinique. Sources: Data from the DGAL and the NRL for marine biotoxins.

[2] Order No. 2002/1249/PREF/SGAR/MAP regulating inshore fishing in the waters of the département of Guadeloupe.
[3] Fish weighing more than 1 kg for certain species listed in the order.
[4] Fish caught north of 16.5° latitude for certain species listed in the order.

scientific articles were queried, searching according to a combination of geographical terms corresponding to a large area of the Caribbean[5] and keywords relating to ciguatera, ciguatoxins and the microalgae that produce them. This literature review added another 45 fish species posing a risk of ciguatera in the Caribbean to the 22 already identified.

Ultimately, the study of the data collected and the literature search led to a list being drawn up of 67 fish species posing a risk of ciguatera in the French Caribbean:

- 12 species of grouper (family Seranidae, subfamily Epinephalinae) and one species of Seranidae from another subfamily;
- 9 species of jacks or amberjacks (family Carangidae);
- 14 species of snapper (family Lutjanidae) and two species of bigeye (family Priacanthidae);
- 29 other fish species (28 native to the Caribbean and one invasive alien species) from 18 other fish families.

This list is detailed in the ANSES opinion of May 2025 (see "Find out more").
These fish species posing a risk of ciguatera are found in all the islands of the French Caribbean, in the Lesser Antilles outside France, in the Greater Antilles and in the continental United States and Mexico (Figure 2).

LESSONS TO BE LEARNED

Compared with other regions such as the Indian or Pacific Oceans, the number of fish species posing a risk of ciguatera listed for the French Caribbean is relatively low.

While each of the 15 species from the 2002 Guadeloupe prefectoral order is present among the 67 species identified by ANSES, two differences can be noted:

- The fish weight criterion was not included in the ANSES opinion, unlike in the Guadeloupe order, because recent articles have shown that poisoning can also occur after eating small or low-weight fish.
- The geographical criterion for the origin of the fish was not included in the ANSES opinion, unlike in the order. The risk of ciguatera from fish caught in the southern French Caribbean islands does not seem any lower than that from fish caught in the northern islands (Saint-Martin and Saint-Barthélemy). Moreover, the place where the fish were caught is not always known, limiting the possibility of determining the origin of fish identified as toxic.

In communications to the general public, restaurant

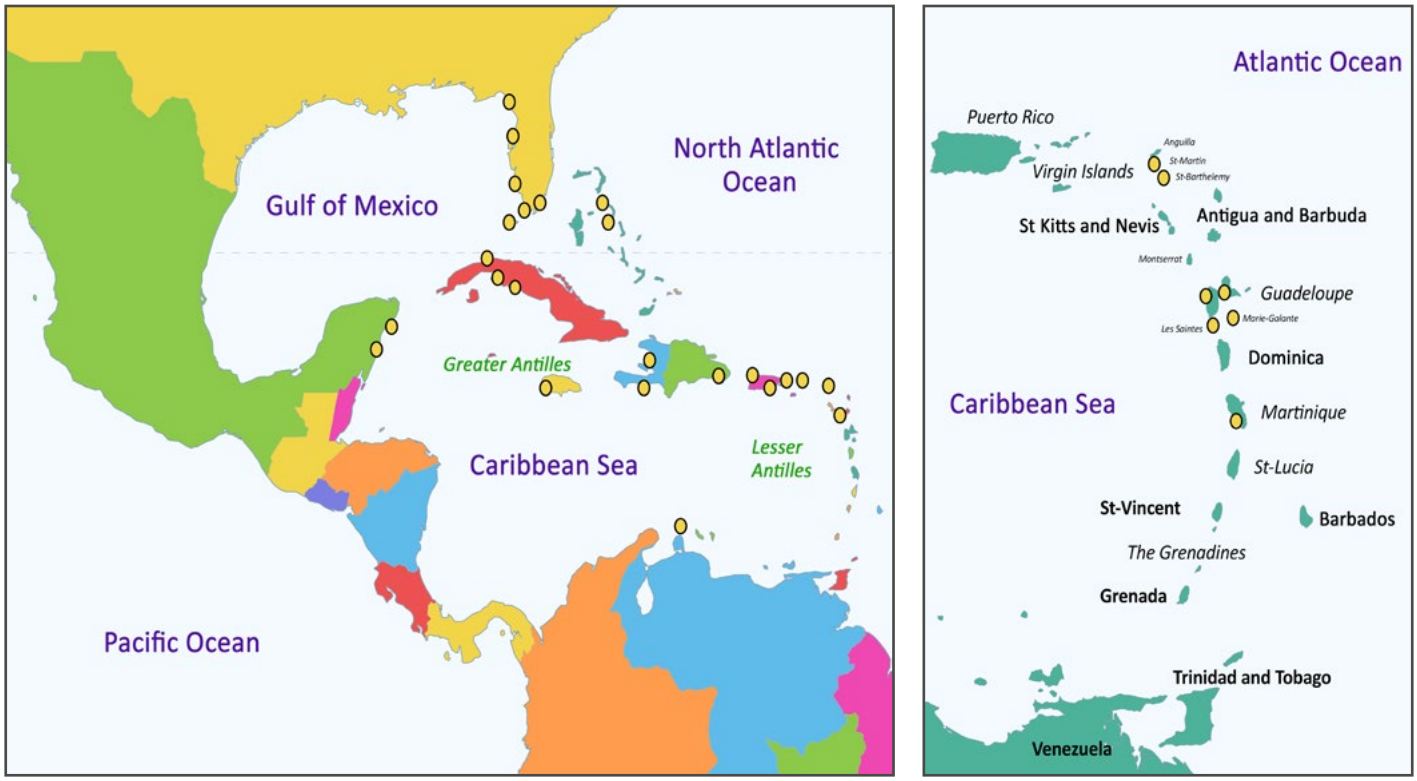

Figure 2 - Geographical areas of fish posing a risk of ciguatera, based on a study of data collected by the DGAL and the NRL for marine biotoxins between 2002 and 2021 and a literature review (yellow circles correspond to places where cases of ciguatera have been observed).

[5] Geographical areas corresponding to the French Overseas Territories, the Caribbean Sea and the Western Atlantic, selected on the basis of geographical proximity or trade interactions between these areas.

owners and fishers, it is important to mention the unambiguous Latin scientific name (genus and species) of fish posing a risk, as well as their common name and any local names. This makes it possible to precisely identify the species of fish observed and avoids confusion among fishers and consumers. A reference guide[6] has been published that gives the common names, local names and scientific names of the fish identified.

STRENGTHEN RECOMMENDATIONS FOR FISHERS AND CONSUMERS

Following this opinion, ANSES recommended that information on ciguatera be widely disseminated to consumers, whether they are residents or holidaymakers, as well as to fishers and restaurant owners, in order to reduce the risk of this little-known form of food poisoning.

Sandra Sinno-Tellier (ANSES),
Luc de Haro (Marseille poison control centre).

WHAT CAN BE DONE TO AVOID CIGUATOXIN POISONING??

- When buying fish, check with the fishmonger or fisher to avoid eating a high-risk species;
- If in doubt about the species of fish, do not eat it;
- Avoid the parts most likely to contain the toxin: head, viscera, offal.

WHAT SHOULD BE DONE IN THE EVENT OF POISONING?

- Appelez un Centre antipoison 24h/24 7j/7 • Call a poison control centre (+33 (0)1 45 42 59 59: the line is open 24/7) or consult a doctor, mentioning any medicines you are taking, as some may aggravate the symptoms;
- In the event of heart problems (drop in blood pressure, slowing of the heart), call 15 (in France) immediately, or 112, or 114 for the hearing impaired;
- Keep leftovers of meals or fish in the freezer for toxin analysis;
- After an initial poisoning episode, certain foods and drinks can reactivate the symptoms: seek advice from a poison control centre.

FIND OUT MORE

Anses. (2025). Opinion on the study of fish species posing a risk of ciguatera in the French Caribbean Request No 2023-AST-0213. ANSES. Maisons-Alfort. 64 p.

[6] https://archimer.ifremer.fr/doc/00917/102881/