



## Nodavirus infections in the grouper

For several years, the GEM (*Groupe d'Étude du Mérrou* / Grouper Study Group) has been studying the patterns of change in the grouper populations in the Mediterranean, and through its national and international network of scientists, it disposes of numerous studies and observations of these fishes. With regard to the virus by which they are currently affected, in particular, the GEM wishes to share with the public the latest information known to date.

Type of virus: In about fifty fish species (grouper, sea bass, sea bream, sole, etc.), the *Betanodavirus* is latent in healthy bearers and can cause encephalopathy and viral retinopathy, which are highly contagious for these species (often very fragile individuals).

Effects observed in the fishes: the dead or moribund fishes generally float on the surface, swim bladder overinflated, eyes damaged and glassy and skin in poor condition. In the fishes that are still active on the bottom, a change in colour (lighter or darker) is observed as well as a loss of control of movements and overinflation of the swim bladder.

Period and site of the first sightings of infected grouper in the Mediterranean, from July 1979 to the present: Crete, Libya, Malta, Italy (Ustica), Algeria (Djijel, Annaba), Greece, Turkey (from Alanya to Bodrum), Egypt (Matrouh), Northern Tunisia, Spain (Balearics), Corsica (Galeria and Balagne). According to observations, the virus began to develop along the southern coasts before reaching the Northern Mediterranean, although no link with the seawater warming can be established with certainty.

Biological and geographical origin of the virus: among the fishes, the cases observed mostly concern fish farms and the infection mainly (but not only) affects the larvae and juveniles of almost 50 fishes in many parts of the world (many in Asia and in the Pacific), with cases of massive mortality in aquaculture facilities. The identification of the cause of this mortality dates from the 1980s at a sea bass (*Dicentrarchus labrax*) farm in Martinique. The conditions of the farming facilities when they are borderline (temperature, stress, too great a density of fishes, etc.) may weaken the resistance of the farmed species and favour the expression of the virus within the fish farms. The dynamic of transmission to individuals in the wild is so far unknown.

Health risks for human populations: the virus is not transmissible to man, there is therefore no cause for alarm

What to do if live or dead infected fishes are sighted: the progression of knowledge regarding this infection depends on the collection of as much information as possible. If dead fishes are observed on the surface or washed up on the shore, contact the town hall (*Mairie*) for them to be removed, then the ECOMERS laboratory at Nice for the Mediterranean coast and the Provence-Alpes-Côte d'Azur and Languedoc-Roussillon Regions in particular (+ 33 (0)6 77 17 63 36, [francour@unice.fr](mailto:francour@unice.fr)), or the STARESO marine biology station for Corsica (+ 33(0)6 86 22 32 61, [m.leduc@stareso.com](mailto:m.leduc@stareso.com)).

If fishes that are alive but diseased are observed, also contact ECOMERS or STARESO. Take care to indicate systematically the exact location, the species, size (from nose to end of caudal tail), state and number of fishes affected and, if possible, the seawater temperature at the time of observation.

The GEM and its members monitor the patterns of change in these important data in order to understand the progression of these pathologies in populations of heritage fish species. Your observations are important.

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