

# “Champimer” project: investigation of fungal diversity at the air-water interface of maritime environment

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The marine environment is known for its biological and microbiological diversity. A recent review of the literature has described the diversity of pathogen microorganisms in seawater [1]. Moreover, it is well-known that the air contains several pathogenic microorganisms. But few studies investigate it. Marks et al. [2] found between 0 and 1200 CFU fungus per cubic meter of air within the maritime environment, depending on the location and the seasons; however, no fungus identification was given. The aim of the “Champimer” project is to investigate the fungus diversity at the air-water interface of maritime environment. This project is part of a partnership between the French Society of Maritime Medicine, the Resource Centre for Occupational and Environmental Pathologies of the University Hospital of Brest, the Medical Analysis Laboratory of the Military Hospital of Brest, and the Host-Pathogen Interaction Study Group of the University of Brittany–Loire.

Our study comprises four air sampling campaigns, one of each season, on Brest Harbour, Brest roadstead and on the Iroise Sea, in order to draw up a mycological cartography applied to military sailors, fishermen, as well as leisure sailors (Fig. 1). The air samples were taken from the open air, on the wheelhouse’s roof of a ship belonging to the university. This ship is a trawler adapted for scientific research. Air was

impacted in 15 mL of liquid medium using the Coriolis  $\mu^{\circledR}$  air sampler (10 min, 300 L/min). After centrifugation, the pellet was divided for fungus isolation on agar media malt agar (incubated at 27°C), DG18 (incubated at 27°C) and DG18 (incubated at 37°C). The identification of fungi was based on macroscopic and microscopic examination, and by analysing 28S and ITS loci when fungi were not microscopically identified.

We have already realised and analysed air samples collected during the winter. No cultivable fungi were detected in samples taken in the Iroise Sea, whereas samples taken on Brest Harbour and Brest roadstead showed *Cladosporium* sp., *Eutypa lata* or *Aspergillus* section *fumigati*.

*Aspergillus* and *Cladosporium* may induce asthma manifestations or keratitis [3–5]. *Cladosporium clado-sporioides* was also described to cause dermatological disease [6]. We aim to explore the fungal diversity over the four seasons on Brest Harbour, Brest roadstead and on the Iroise Sea and to collect epidemiological and clinical data on sea users.

These first results showed some fungi at the air-sea-water interface in winter. The origin of these fungi may be telluric. This project will be proceeded over a year, three seasons more.

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