Exposure to fungal particles in sand. Why only water quality is assessed for safety in recreational settings?

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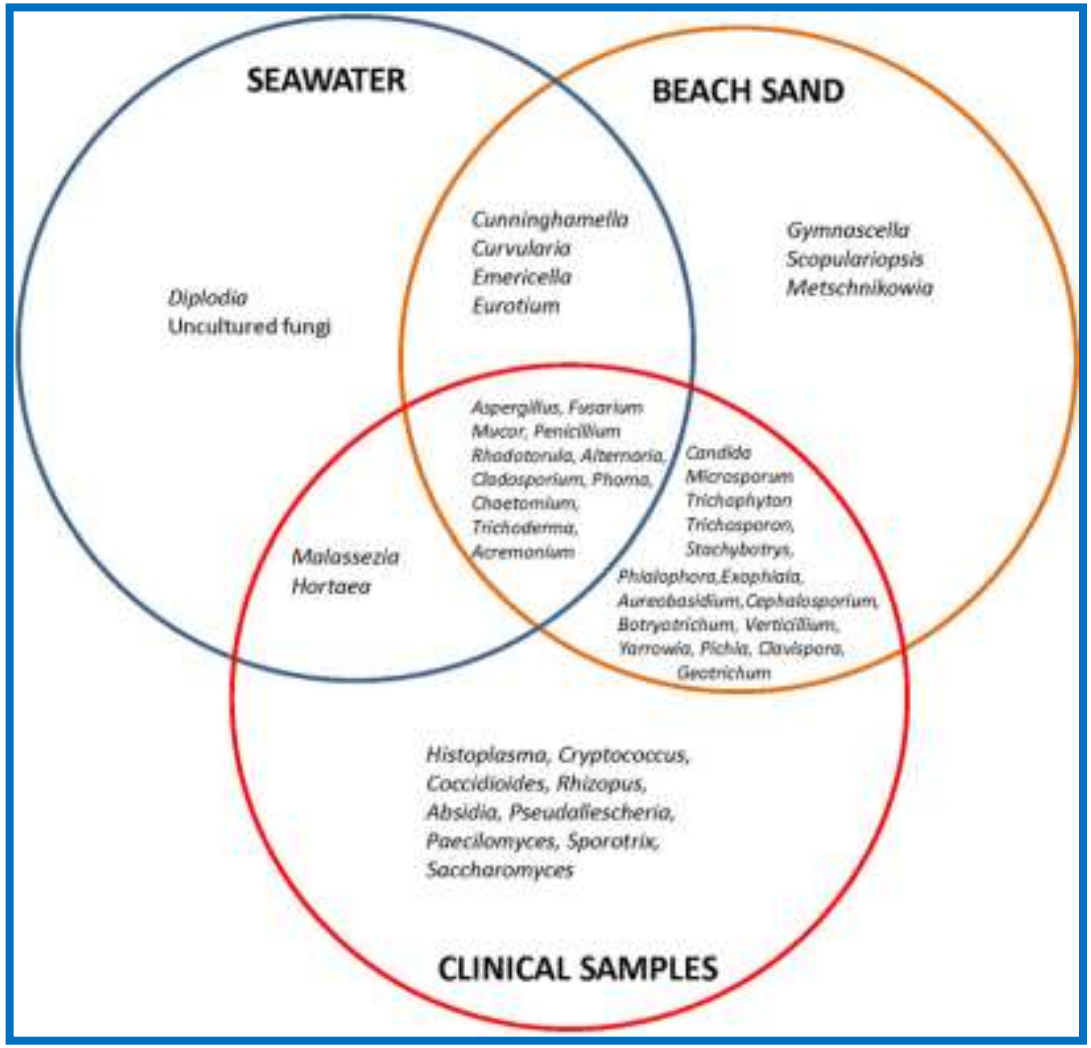
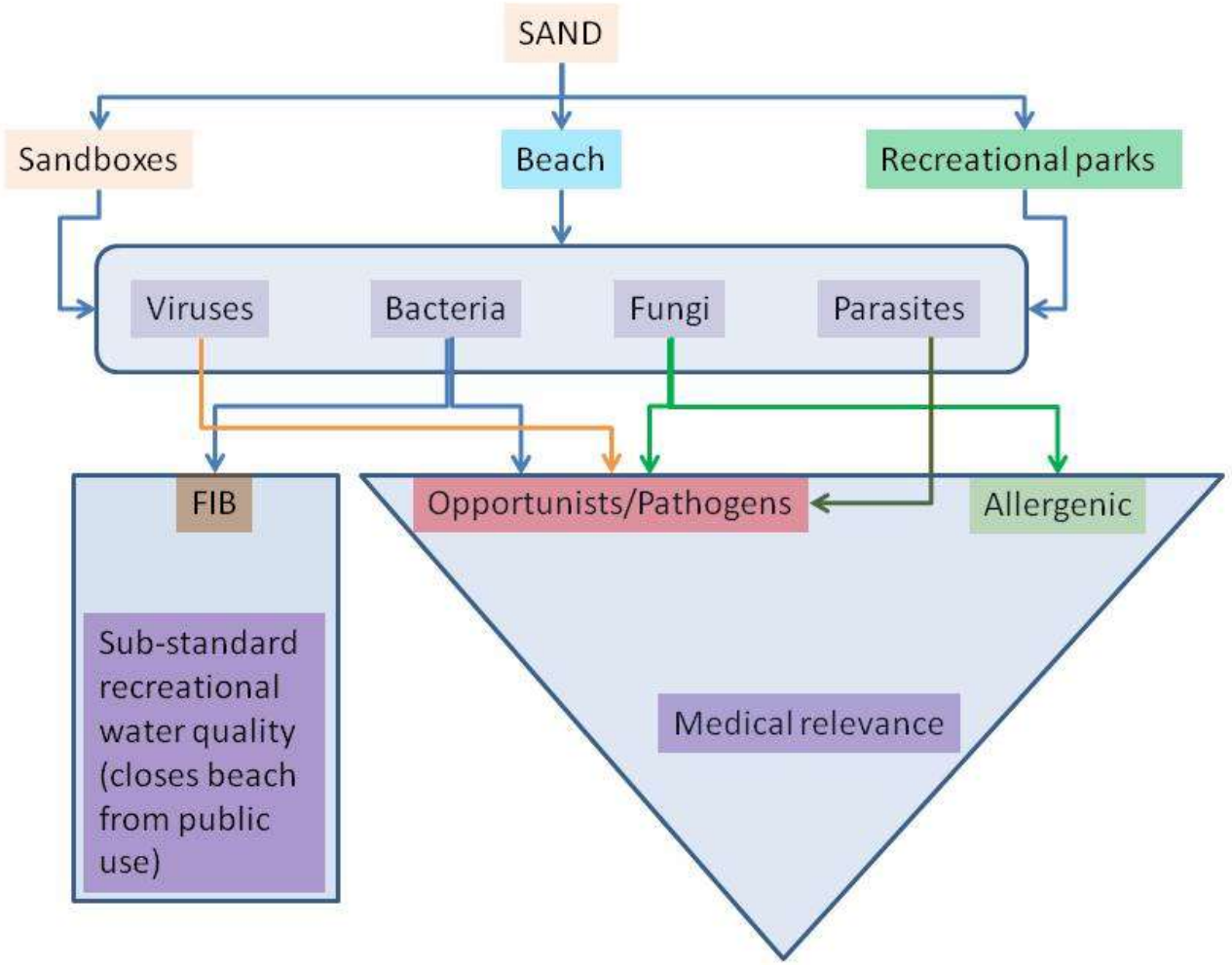
FAQ

- Sand serves as a direct microbial exposure to beach goers and as a reservoir to FIB used in water quality assessment
- Can sunlight clean up? **No! – 2009: Mika** *et al*. showed that irradiation during day time doesn't help reducing E. coli in the sand
- **2012 Heaney** *et al*. showed positive relationship between sand-contact activities and enteric illness
- Fungi are very resilient, even in drier climates and bacteria lurk under the surface

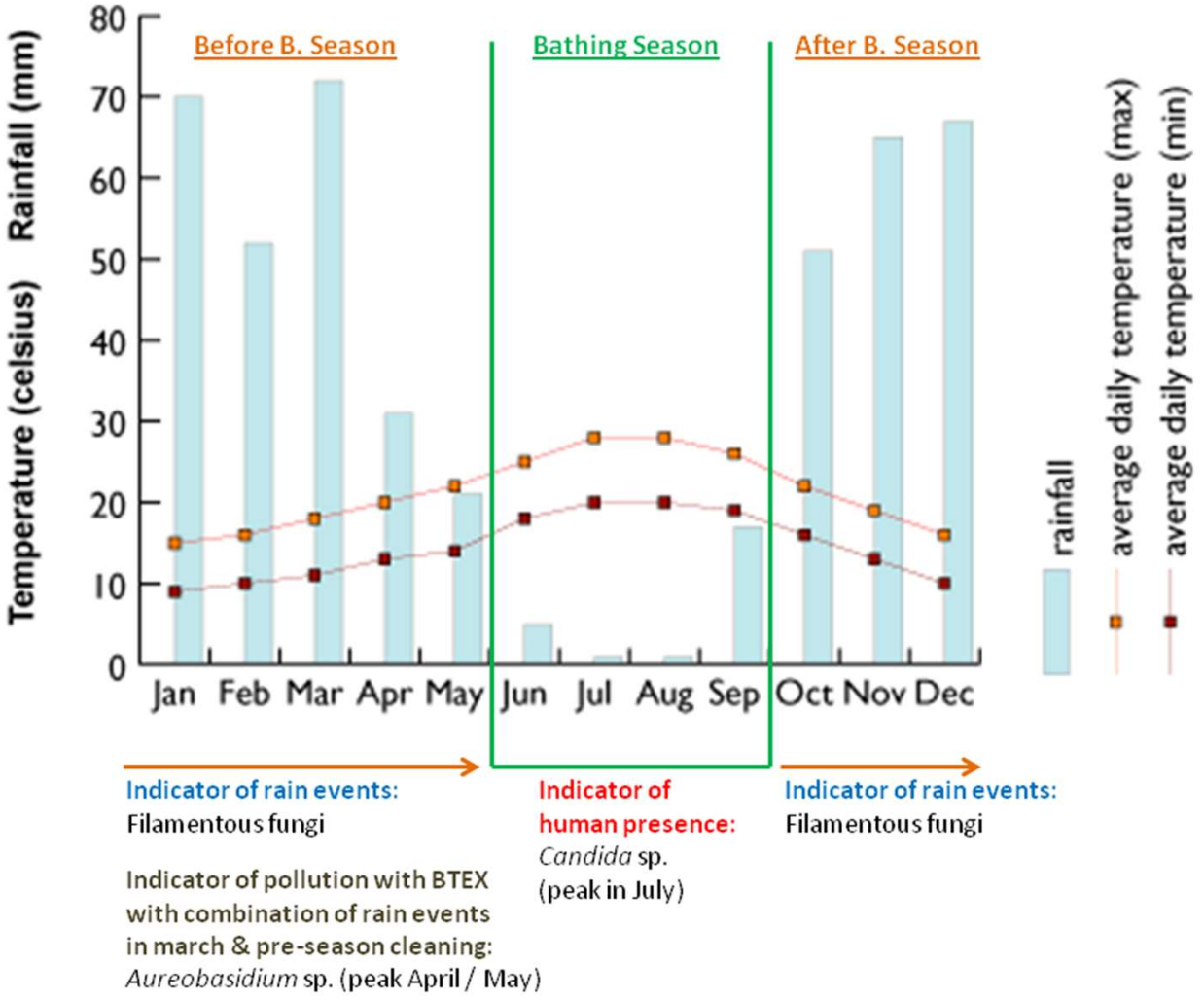
Presence of fungi in environmental and clinical studies



Different perspectives

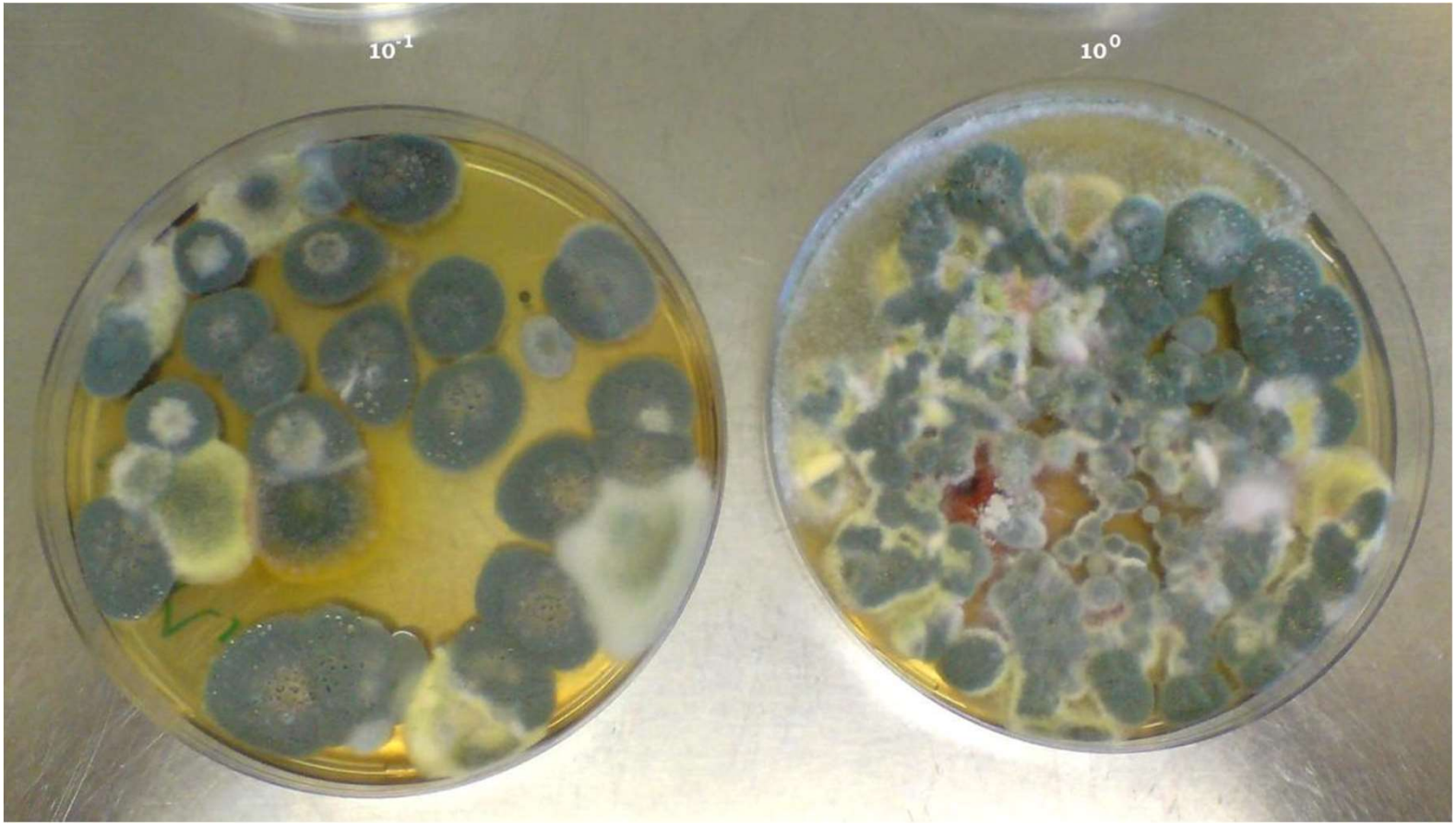


Seasonal analysis



Brandão J. & Novak Babič M. unpublished.

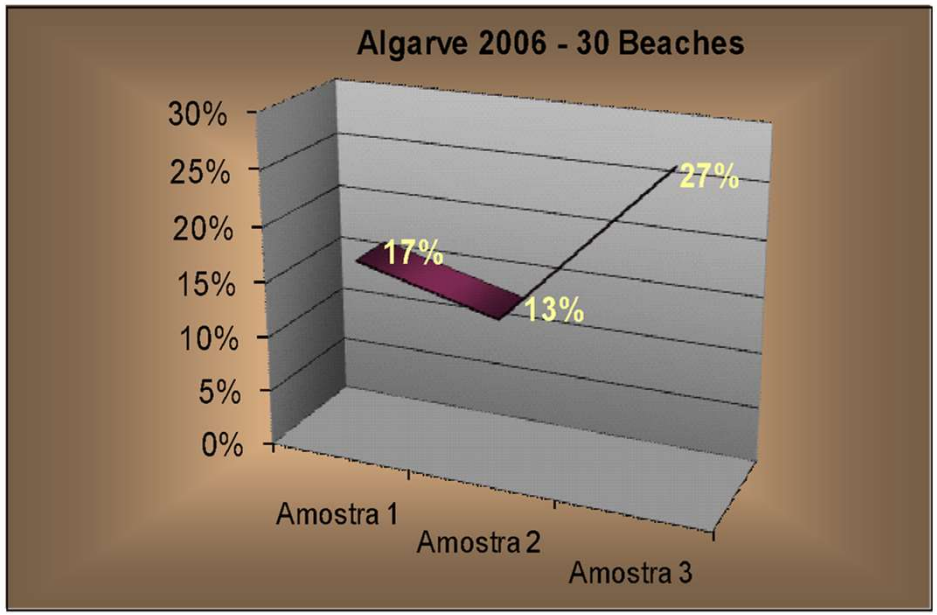
Example of a fungal analysis (with low diversity)

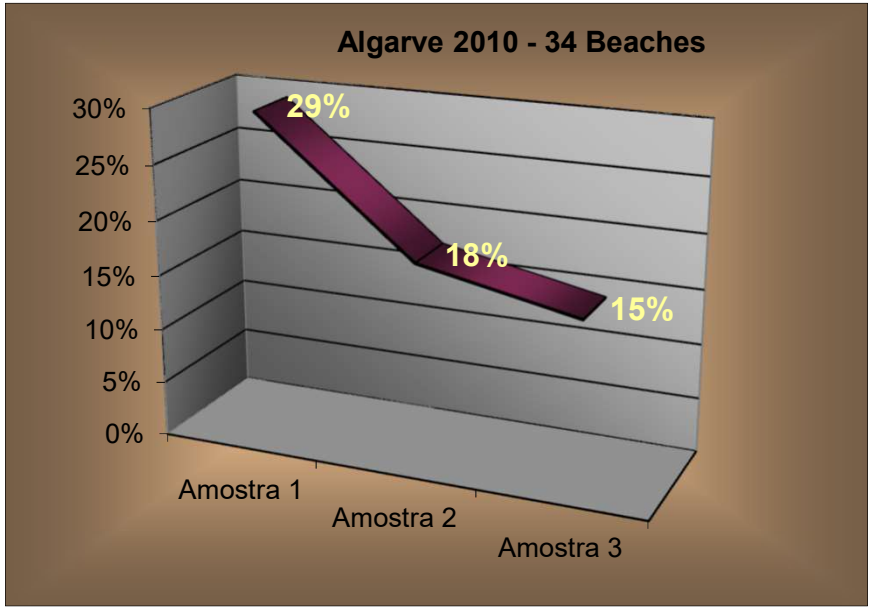


Malt plates inoculated with sand wash 100 rpm/30', 1:1 w/v (10^0 and 10^{-1} dilutions) 5 days growth at 27.5(+/-2.5) ºC – mainly *Penicillium spp* and *Aspergillus fumigatus* visible

Algarve 2006 x 2010

Samples that exceeded at least one of the Reference Values





Beach managers were instructed on how to control contaminant levels.

Result: Drastic reduction of contaminant levels from the first sampling (pre-bathing season) to the following two (during bathing season) after the first year of the project (2006)

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White Paper – ANNO 2015

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doi:10.1017/S0025315415000843

Beach sand and the potential for infectious disease transmission: observations and recommendations

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White paper on sand contaminants Solo-Gabriele *et al*. 2015

There is no legislation or regulation in Europe or elsewhere in the world!

- The European Bathing water Directive contemplates surrounding areas to bathing waters because those may influence water quality but….

…Doesn't specify sand-specific contaminants or sand as its own entity.

World Health Organization, 2003, in "Guidelines for safe recreational water environments", p118.*

- "From a recreational viewpoint, sand beaches are sought after. Especially in higher latitudes, a significant percentage of time is spent on the beach itself rather than in the water."

- "A number of genera and species that may be encountered through contact with sand are potential pathogens. Accordingly concern has been expressed that beach sand may act as reservoir of vectors of infection."

*(to be updated in 2020)

Who decides on What WHO does?

World Health Assembly (WHA)

The supreme decision-making body,
determines the policies of the Organization,
meets once a year in Geneva: **194 Member States**

Executive Board (EB)

Main functions are to give effect to the decisions and policies of the World Health Assembly and advise the WHA. Members elected for three-year terms: **34 members**

What drives Member States decisions?

(by Carmem Lúcia Pessoa-Silva, ISHAM 2018, 1st July, Amsterdam, NL)

- Burden of disease
- Perception of threat to health security
- Global agendas for development of mankind

Gain the sympathy of the public and of the social media. Political advocacy will follow and then only is regulation prepared!

What needs to be done?

- A **consensus** in methods and parameters based on a wide review proposal of relevant papers on sand contaminants

- More epi and case/diversity studies in order to set regulatory guidelines that express recreational user's safety

- Regulate

- Confirm efficiency of regulation

Current activities

Effects of a Changing Earth on Predicting Microbial Dynamics and Human Health Risks in the Beach Water/Sand Continuum

Outline and Team leaders

- **Introduction*** lead by Jody Harwood and Mike Sadowski
- **Pathways to the Beach** lead by Thomas Edge and Erin Symonds
- **Moving Around** lead by Clare Robinson and Laura Vogel
- **Hangouts*** lead by João Brandão and Helena Solo-Gabriele
- **Bummers** lead by Gregory Kleinheinz and Meredith Nevers
- **Putting It All Together (Modeling)** lead by Ali Boehm and Mantha Phanikumar
- **Effect of Climate Change on Microbial Fate and Transport (A changing world, e.g. temperature, precipitation, storm events, sea level rise, population increase, changing land use)*** lead by Christopher Heany and Tarja Pitkänen
- **Discussion*** lead by Chelsea Weiskerger and Julie Kinzelman

https://www.researchgate.net/project/Effects-of-a-Changing-Earth-on-Predicting-Microbial-Dynamics-and-Human-Health-Risks-in-the-Beach-Water-Sand-Continuum

*João Brandão contributes to the section personally

Outline of exploratory study

1. **Participants**: Mediterranean Coast: Portugal, France, Italy, Spain, Greece, Turkey, Israel, Sweden (representing/including the South of Portugal), Other Water bodies: Romania (Black Sea) – Estimation: 15 research partners

2. **Fungal Parameters**:
   A. Dermatophytes – indicators of human/animal dermal contamination (including the *Arthroderma insingulare* complex, formerly known as *Trichophyton terrestre*)
   B. Candida albicans –indicator of human fecal contamination,
   C. Allergenic fungi – *Aspergillus, Penicilium* and most likely others as well

3. **Geo parameters:**
   The target is all of Europe, sectioned by climates, geological characteristics and fresh water and seawater. A strong participation of the Mediterranean coast, where tourists tend to congregate the most during warm months, is highly desired.

4. **Methodology**:
   A. Culture and quantification
   B. Molecular methodology

5. **Duration:** One year (tests will be carried out during all 4 seasons). After that year, data will be analysed and decision will be made as to generate more data or to end the project and publish the results .

6. **Budget:** To be decided.

7. **Data management and project co-management**: J. Brandão.

8. **Analysis of sand samples from Portugal; data collection and analysis of Portuguese data: J. Brandão.**

Sampling Map of Europe – Exploratory Study
(as per June 2018 – excludes Bondi Beach AUS)