

# A population-based online survey of the impact of *Sargassum* influx in the French West Indies.

Anna BERGER, Jérémie DAUVERNE, Elsa CECILIA JOSEPH, Michel DEBANDT, Sandrine TIGNAC, Maylis EFREMENKO, Christia, DERANCOURT, Anne CRIQUET-HAYOT. Antilles-Guyane.



## Abstract

- French West Indies are a major tourism destination.
- Since 2011, particularly during summer 2018, there has been a massive influx of *Sargassum* seaweed in the French West Indies<sup>1</sup>, due to a combination of climatic and nutritional factors<sup>2</sup>.
- The emission of toxic gases, in particular hydrogen sulfide (H<sub>2</sub>S), secondary to decomposition of seaweed during influx is known to cause clinical effects at acute exposure.
- As for chronic exposure to H<sub>2</sub>S, a small number of studies have suggested that it can cause clinical manifestations.
- The creation of a “*Sargassum* medical network” suspected cases of H<sub>2</sub>S poisoning secondary to the influx of *Sargassum* seaweed in Martinique and Guadeloupe.
- However, no diagnostic test was available to confirm the causal relationship between H<sub>2</sub>S poisoning and the influx of *Sargassum* seaweed in these various cases.

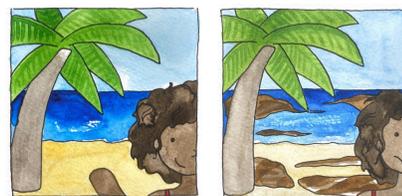
The aim of this study : to conduct a population-based online survey of symptoms potentially related to the emission of H<sub>2</sub>S from *Sargassum* seaweed based on level of exposure in Martinique and Guadeloupe.

## Material and Methods

The study was conducted during 3 month in Martinique and in Guadeloupe during summer 2018. Online questionnaire was distributed via social networks (WhatsApp, Facebook), included data on socio-demographic characteristics, place of residence and place of activity, experienced symptoms, and general condition.

Candidate symptoms were predetermined based on published studies of H<sub>2</sub>S poisoning. Data on pruritus, which was considered a control symptom, were collected in Guadeloupe. We included all respondents who provide information on their place of residence in Martinique or Guadeloupe. Municipalities were classified as clearly impacted or probably non-impacted based on their proximity to *Sargassum* influx areas<sup>8,9</sup>.

Three levels of individual exposure were defined: low level of exposure, intermediate level of exposure, and high level of exposure.

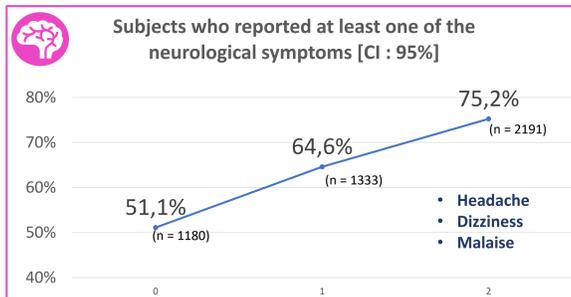
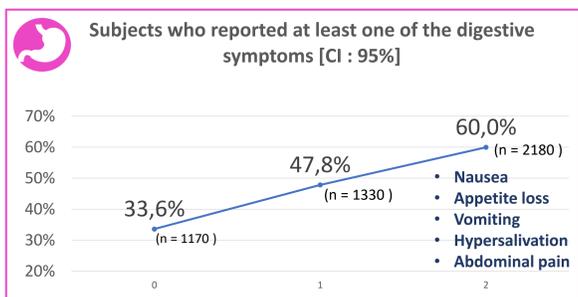
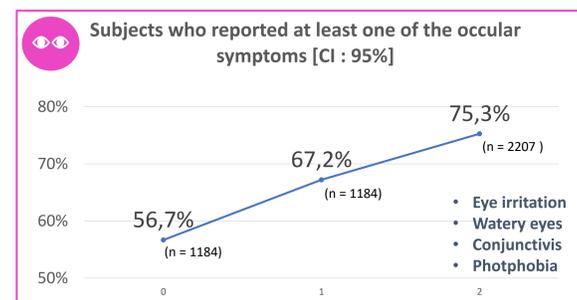
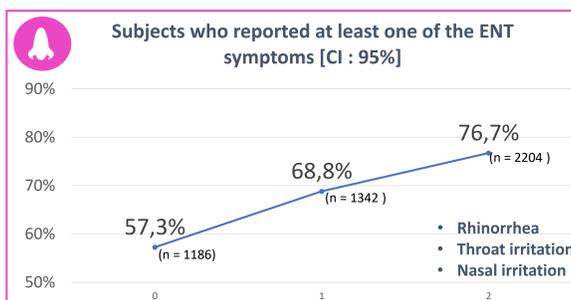
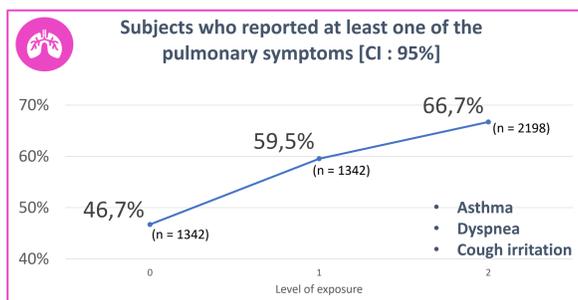


Habitation	Work/ Sclolarity	Level's exposition
Impacted	Impacted	2
Non-impacted	Non-impacted	0
Impacted	Non-impacted	1
Non-impacted	Impacted	1
Impacted	No Answer	2
Non-impacted	No Answer	0



## Results

- 5,436 subjects were analyzed.
- Response rate per municipality ranged from 1.4% to 28.4%.
- For each category of candidate symptoms, a significant association was found between level of exposure and presence of at least one candidate symptom ( $p < 0.05$ ).
- No statistically significant association was found between pruritus and level of exposure.



Level of exposure	Number of respondents	Distribution
Low	1442	26.53%
Intermediate	1535	28.24%
High	2459	45.24%
<b>Total</b>	<b>5436</b>	<b>100.00%</b>

## Discussion

- To our knowledge, this is the first population-based survey of symptoms potentially related to the influx of *Sargassum* seaweed in a particular area.
- The use of social networks in a circumscribed population is an innovative approach to an acute health problem that allowed us to reach a large number of people in just a few weeks.
- Our data strongly support the hypothesis of a causal relationship between the described symptoms and the emission of toxic gases from washed-up *Sargassum* seaweed.
- They also suggest that *Sargassum* influx has had a major impact on the population of the French West Indies.



- The selection bias present in all online surveys does not allow for a very refined and quantitative interpretation of the association between exposure and symptoms; however, the balanced distribution of respondents between probably non-impacted and clearly impacted municipalities mitigates this bias.
- The potential social desirability bias is probably very limited since pruritus, which was not significantly associated with the emission of toxic gases and was therefore treated as a control symptom, was reported in similar proportions all levels of exposure. Moreover, the over-representation of certain age groups (13 to 70 years old) and of intermediate and managerial classes is common in online surveys, and hence does not constitute a bias in light of our study objective.
- The high number of volunteer participants in this first-ever population-based online survey of symptoms potentially related to the emission of H<sub>2</sub>S from washed-up *Sargassum* seaweed indicates that this issue is of great social relevance.
- Our findings support an association between level of exposure to H<sub>2</sub>S and certain chronic ENT, pulmonary, ocular, digestive, and neurological symptoms.

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