The biology of fog: results from coastal Maine reveal drivers of fog microbial composition. 2018

A B S T R A C T

Fog supplies water and nutrients to systems ranging from coastal forests to inland deserts. Fog droplets can also contain bacterial and fungal aerosols, but our understanding of fog biology is limited.

Using metagenomic tools and culturing, we provide a unique look at fungal and bacterial communities in fog at a: coastal Maine (USA) site.

Microbial communities in the fog at the site were diverse, distinct from clear aerosols, and influenced by both soil and marine sources. Fog from the site contained Actinobacteria and Firmicutes, commonly soil- and air-associated phyla, but also contained bacterial taxa associated with marine environments including Cyanobacteria, Oceanospirillales, Novosphingobium, Pseudoalteromonas, and Bradyrhizobiaceae.

Marine influence on fog communities was greatest near the coast.

Differences between pre- and post-fog aerosol communities suggest that fog events can significantly alter microbial aerosol diversity and composition. Fog is likely to enhance viability of transported microbes and facilitate their deposition, making fog biology ecologically important in fog-dominated environments.

Fog may introduce novel species to terrestrial ecosystems, including human and plant pathogens, warranting further work on the drivers of this important and under recognized aerobiological transfer between marine and terrestrial systems.

- Coastal fogs from Maine contained diverse microbial communities.

- Fog contains more ocean microbes(compared to soil} when fog is near the coast.

- Fog results in more microbial species to be deposited onto land than air alone.

- A fog event changes the composition of microbes in the air

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