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Biodiversity in Time and Space

FOI has been collecting and archiving weekly air filters from six locations throughout Sweden for ~50 years (>15,000 filters in total); the original goal of this project was to detect radioactive fallout. In cooperation with Umeå University and Swedish University of Agricultural Sciences, these filters have been utilized to examine biodiversity in Sweden through time by sequencing the DNA captured in these filters. Due to the special design of the filters and downstream packaging and storage, the DNA is remarkably well preserved, allowing long time series to be studied. In fact, using shotgun sequencing we can detect virtually all known organisms in Sweden; e.g. bacteria, viruses, plants, insects and even mammals along with the parasitic flatworms living in their intestines. Sequences associated with antibiotic resistance genes are also readily detected as well as known genes involved in virulence. We are now using these filters to study how the ecosystem is responding to a changing environment as well as tracking important pathogens to humans, agriculture and livestock. The goal is to make forecasts on future changes to ecosystems and pathogen distributions.

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