Microorganisms Stowaway to Travel Great Distances

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Dust clouds allow bacteria and viruses to migrate.

Bilbao, Spain – infoZine – Sneezing is only one means of air travel for germs. Hitching a ride on blowing dust takes them even farther.

Every day, millions of microorganisms reach Spain from the Sahara Desert and the Sahel region – by flying. Only recently discovered that bacteria, funguses and viruses can travel thousands of kilometers stuck onto dust particles. Satellite images show clouds that come close to the size of the Iberian Peninsula. For the first time, these traveling microorganisms have been analyzed using molecular biology techniques. As well as identifying the species, they have found that they colonize high-mountain lakes in the Sierra Nevada and the Pyrenees, and that the phenomenon is escalating with climate change.

The "migration" of these microorganisms on African dust is most intense in spring and summer, and has been gathering momentum in recent years; at times multiplying their numbers ten times over. This is due, researchers say, to the drought afflicting the Sahel region for the last thirty years, itself a product of our changing climate. An added spur is the loss of plant cover in Africa driven by changes in farming practices. It is reckoned that between 60 and 200 million tons of dust rise up from the Sahara every year; a material rich in nitrogen, phosphorous and iron with an important role in the growth of marine plankton, and even the fertilization of tropical forests.

The molecular biology techniques researchers used allowed them to detect almost all the organisms present in a given sample, in contrast to earlier methods which revealed "a good deal less than there really is".

The Canary Islands bear the brunt

That is why until now we could not even identify 0.1 percent of the 500 bacteria present in a liter of air, and had no inkling of how they might affect their "destination" ecosystems. The Saharan dust spreads across the whole planet, but the prevailing winds – from the east – mean the regions most affected are the Canary Islands and the Caribbean.

Ecosensor researchers have taken air samples in the places where it is easiest to detect the rain of microorganisms, such as high-mountain lakes. "Such spots have barely been altered by local human activity" Isabel Reche, of the University of Granada remarks, " so they are invaluable for studying the incidence of invading airborne microorganisms blown in from remote sources".

The lakes chosen are located in Sierra Nevada and the Pyrenees, as well as the Alps (Austria), Argentinean Patagonia, the Bylot Islands in the Arctic (Canada), and the South Shetland archipelago (Antarctica).
The researchers suck out air, filter it and extract the DNA of the organisms present. "By analyzing the genes we can tell what microorganism they belong to," Reche continues. They also separate the microorganisms to ascertain which can reach the lakes alive.