Agriculture impacts aquatic macroinvertebrates more than wastewater

March 4, 2019 | Stephanie Schnydrig
Topics: Wastewater | Biodiversity | Ecosystems | Pollutants

A new study by an interdisciplinary team from Eawag has shown that substances from agriculture affect living organisms in rivers and streams to a greater extent than treated wastewater, which has less impact on the species composition of microorganisms.

Community wastewater treatment plants and agricultural practices are the primary sources of pollution in rivers and streams, and affect aquatic communities. Substances such as traces of pharmaceuticals, nutrients, biocides, resistant bacteria and heavy metals find their way into the watercourses from wastewater treatment plants, while agriculture is primarily responsible for inputs of plant treatment agents, fine sediments and nutrients. However, little was known until recently about the relative influences of the two sources, which is why Christian Stamm and his team set out to plug this gap with their EcoImpact project—resulting in a new study that was recently published in the journal “Science of the Total Environment”.

Between 2013 and 2014, he and his team took water samples every two months at 23 wastewater treatment sites, both above and below the outflow pipes. They used the samples to determine the water quality and identify what substances were present in the water. In the spring of each year, they identified the macroinvertebrates present upstream and downstream of the outflows.

Worms love wastewater

The results showed that the impact of agriculture outweighs the organic contamination from wastewater treatment plants. The incidences of insects and other small invertebrates downstream varied only slightly in comparison with those upstream. The only exception to this was worm-like organisms, which

Überlandstrasse 133
CH-8600 Dübendorf
T +41 58 765 55 11
F +41 58 765 50 28
info@eawag.ch
www.eawag.ch
eawag aquatic research

seem to feel at home in the waters mixed with treated wastewater, and are far more common below the treatment plants than above them.

Agricultural inputs on the other hand have a significant impact on biodiversity: “Sensitive species in particular were rare in areas which were intensively farmed”, says Stamm. These include various mayflies and stoneflies, for example. The researchers also found that pesticides were the biggest culprits, and that increased inputs of nutrients were barely reflected in the species composition. “The results underline the need to substantially reduce pesticide pollution from agriculture”, stresses Christian Stamm.

The term “pesticide” is an umbrella term for plant protection agents (PPA) and biocides. While PPAs are predominantly used in agriculture, biocides are also used domestically, in products such as disinfectants, rat poison and wood treatment agents.

Original publication

Burdon, F. J.; Munz, N. A.; Reyes, M.; Focks, A.; Joss, A.; Räsänen, K.; Altermatt, F.; Eggen, R. I. L.; Stamm, C. (2019) Agriculture versus wastewater pollution as drivers of macroinvertebrate community structure in streams, *Science of the Total Environment*, 659, 1256-1265, doi:10.1016/j.scitotenv.2018.12.372, Institutional Repository

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Contact

Christian Stamm

Deputy Director

Tel. +41 58 765 5565

christian.stamm@eawag.ch

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