

OSU review details negative impact of pesticides and fertilizers on amphibians

November 13 2013



Bullfrogs and other amphibians are especially vulnerable to agrochemicals because they live in both water and on land at different life stages. Credit: Lynn Ketchum.

Common pesticides and fertilizers can damage both the development and survival of amphibians to varying degrees, according to a new analysis by Oregon State University.

The new meta-analysis marks the first attempt at a large-scale summary

on the negative effects of specific chemical classes on amphibians, said Tiffany Garcia, a co-author of the study and an associate professor of wildlife science within OSU's College of Agricultural Sciences. Researchers reviewed more than 150 scientific studies detailing the impacts of [pesticides](#) and fertilizers on amphibians.

Around 30 percent of amphibian species are now extinct or endangered due to a range of factors, including habitat loss, disease, and exposure to contaminants, including pesticides and fertilizers, according to Garcia.

"Billions of tons of agrochemicals are used in farming every year," said Garcia, an expert in aquatic ecology. "Any disruption to frog, toad and salamander communities has clear negative impacts on biodiversity and can also set off a domino effect throughout the ecosystem by damaging the food base for amphibian predators, including birds, snakes and fish."

Amphibians are also valuable to the environment as grazers, herbivores and predators of pests, such as mosquitos, she added.

Four classes of common agrochemicals significantly reduce [amphibian](#) survival, the researchers say: chloropyridinyls; inorganic fertilizers; carbamates, which are common in insecticides; and triazines, used in herbicides. Two others both kill and inhibit animal growth: phosphonoglycines and organophosphates, standard ingredients in many pesticides.

Agrochemicals are most damaging to amphibians in the egg and larval stages, decreasing survivorship and making individuals more susceptible to predation and also hindering the production of offspring later in life. Amphibians are especially vulnerable to pesticides and fertilizers since they live on land and in water and can come into contact with agrochemicals by both direct exposure and runoff into aquatic systems.

To reduce the effects of pesticides and [fertilizers](#) on amphibians, timing is critical.

"Farmers can be, and often are, the best naturalists we have," Garcia said. "Mixing agricultural production with wildlife management is vital to the survival of amphibians, especially with agricultural intensity growing to feed our booming global human population."

"Spring, for example, is a time with heavy agricultural application, and it's also when amphibians lay eggs and develop as larvae and tadpoles," she added. "By modifying application schedules, growers can limit contact between sensitive wildlife species and harmful chemicals."

Provided by Oregon State University

Citation: OSU review details negative impact of pesticides and fertilizers on amphibians (2013, November 13) retrieved 16 July 2024 from <https://phys.org/news/2013-11-osu-negative-impact-pesticides-fertilizers.html>

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