

The Silent Spring prophecy that pesticides could “still the leaping of fish” has been confirmed

Posted by Joan Russow

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The Silent Spring prophecy that pesticides could “still the leaping of fish” has been confirmed, according to scientists investigating the collapse of fisheries in Japan. They say similar impacts are likely to have occurred around the world.

The long-term study showed an immediate plunge in insect and plankton numbers in a large lake after the introduction of neonicotinoid pesticides to rice paddies. This was rapidly followed by the collapse of smelt and eel populations, which had been stable for decades but rely on the tiny creatures for food.

The analysis shows a strong correlation but cannot prove a causal link between the insecticides and the collapse. However, independent scientists said other possibilities had been ruled out and that the work provided “compelling evidence”.

The research is the first to reveal the knock-on effects of insecticides on fish. Harm to bees [is well known](#), but previous studies in Europe have linked neonicotinoids to [die-offs in other freshwater species](#) including mayflies, dragonflies and snails and also to falling populations of [farmland bird that feed on insects](#), including starlings and swallows. The insecticide has also been shown to make [migrating songbirds lose their way](#).

Rachel Carson wrote [Silent Spring, her seminal book on the dangers of pesticides](#) in 1962. In their report, the Japanese researchers said: “She wrote: ‘These sprays, dusts and aerosols are now applied almost universally to farms, gardens, forests and homes – nonselective chemicals that have the power to kill every insect, the ‘good’ and the ‘bad’, to still the song of birds and the leaping of fish in the streams.’ The ecological and economic impact of neonicotinoids on the inland waters of Japan confirms Carson’s prophecy.”

“This disruption likely also occurs elsewhere, as neonicotinoids are currently the most widely used class of insecticides globally,” worth more than \$3bn year, they said.

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Prof Olaf Jensen, at Rutgers University in the US and not part of the research team, said: “This study, although observational, presents compelling evidence. A fishery that was sustainable for decades collapsed within a year after farmers began using neonicotinoids. This is a large and astoundingly fast response.”

The research, [published in the journal Science](#), looked at data from Lake Shinji spanning the decade before and the period after the introduction of neonicotinoids in 1993, from which point the pesticides started running off into the lake. They found neonicotinoid concentrations in the water frequently exceeded levels that are toxic to aquatic invertebrates.

The midge *Chironomus plumosus*, an important food source for smelt, was one of the worst affected. It vanished completely from all 39 locations sampled in 2016, despite being abundant in 1982. Another important food source, an abundant zooplankton species, *Sinocalanus tenellus*, fell by 83%.

The researchers found annual catches of smelt fell 90% in the decade after neonicotinoids were introduced, compared with the decade before. Catches of eels dropped by 74% over the same time period.

“Several alternative explanations for the collapse were evaluated and rejected: invasive species, hypoxia, or changes in fish stocking cannot plausibly explain the observations,” said Jensen. Furthermore, catches of icefish, which do not rely on the affected invertebrates for food, remained unchanged.

The research shows neonicotinoid pesticides can affect entire food webs, he said. On the lack of other reports of similar collapses, Jensen said: “There is the issue of not seeing a problem if we don’t look for it.”

Matt Shardlow, from the charity Buglife, said: “Japan has had a tragic experience with nerve-agent insecticides. In the paddy fields, where the air [once thrummed with the clatter of billions of dragonfly wings](#), these insecticides have imposed near silence.”

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“The annihilation of humble flies and the knock on effects on fish serve as further testament to the dreadful folly of neonicotinoids,” he said. “Let’s hope this is a wake-up call for Asian countries and they move to quickly ban the chemicals from paddyfields.”

“It is also extremely worrying that the levels of neonicotinoids in rivers in eastern England, [as recently reported by Buglife](#), are very similar to the levels reported in this research,” Shardlow said. “Unfortunately, while it is clear that harm must have been done to UK river health, the exact impact of neonicotinoids has yet to be quantified.”

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