

# New pollutants detected in peregrine falcon eggs

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Flame retardants reach the peregrine falcons and can be detected in their eggs.  
Credit: Mike Baird.

Flame retardants are chemical compounds added to fabrics and plastics to keep them from burning easily, but these can be toxic. Now a team of researchers from Spain and Canada has detected some of these emerging pollutants for the first time in peregrine falcon (*Falco peregrinus*) eggs in both countries.

"The presence of 'dechlorane plus' and other related, chlorinated compounds used as [flame retardants](#) have been detected for the first time in the European biota (flora and fauna of the region)", explains Ethel Eljarrat, co-author of the study and scientist at the Institute of Environmental Assessment and Water Studies (IDAEA-CSIC, Spain).

The researchers have found these substances in peregrine falcon (*Falco peregrinus*) [eggs](#) in both Spain and Canada. The flame retardants are often added to textiles, electronic circuits and other products to inhibit or resist the spread of fire, but can be transferred to the environment.

In nature these compounds are "bioaccumulating and bioconcentrating" all along the food chain, as evidenced by the research published in the *Environmental Science & Technology* journal. The international research team for this study was led by Begoña Jiménez of the Institute of Organic Chemistry (CSIC, Spain), and Environment Canada researchers, Kim Fernie and Mehran Alaei.

Having received the relevant permits, eggs that had failed to hatch from various active falcon nests in Canada and Spain, were collected. The collection involved 13 eggs from Spain (five in Guadalajara – a territory representative of an inland habitat of the Iberian Peninsula - and eight in Bilbao - representing a coastal environment), and 12 eggs from Canada (Great Lakes Region and Eastern provinces).

The levels of some of the measured contaminants have been found to be somewhat higher in Bilbao than in Guadalajara, and the authors believe this may be due partially to the difference in the falcons' diet: more aquatic in the former and more terrestrial in the latter. In fact, if fish is highly contaminated, peregrines would accumulate more of the harmful substances. While peregrine falcons do not eat fish, they prey upon other birds, some of which may eat fish.

Selecting the [peregrine falcon](#) was no accident. This species was endangered in many areas of the northern hemisphere due to the use of organochlorinated pesticides, particularly DDT, though when this was prohibited in the 1970s the populations recovered. Furthermore, falcons are at the top end of the food chain and accumulate substances carried by their prey.

## Highest levels in the Canadian samples

The results reveal that the concentrations of 'dechlorane plus' and some of the other chlorinated halogens were "significantly higher" in the Canadian falcons' eggs than in those of Spain. The reason for this could be that the industry that has manufactured these compounds for decades (although they are now also produced in China) is located in New York State close to the area where samples were collected. In addition, the use of these compounds has generally been higher in North America than Europe.

The researcher acknowledges that the effects that these flame retardants may have on the falcons' eggs or on their development are still unknown, "but their detection is a first step". These are emerging pollutants, which comprise both those which have appeared more recently and those that have been used for a long time but are just lately the subject of environmental interest.

Other flame retardants, including some brominated flame retardants, have already been confirmed as toxic endocrine disruptors, and their use has been prohibited in some of the commercial mixes in Europe and America. Furthermore, they are candidates for inclusion on a list of Persistent Organic Pollutants to be eliminated, a list compiled by the Stockholm Convention which includes other pollutants such as DDT or dioxins.

This study forms part of the doctoral thesis submitted this month by the researcher Paula Guerra from IDAEA on "The analysis of emerging halogenated flame retardants and their impact on the environment and on humans". All of the eggs were analyzed by her during her exchange studies at Environment Canada.

A research group at IDAEA led by Damià Barceló has also confirmed

the presence of these compounds in sediment and fish in the rivers of the Ebro basin (Spain).

**More information:** Paula Guerra, Kim Fernie, Begoña Jiménez, Grazina Pacepavicius, Li Shen, Eric Reiner, Ethel Eljarrat, Damià Barceló and Mehran Alae. "Dechlorane Plus and Related Compounds in Peregrine Falcon (*Falco peregrinus*) Eggs from Canada and Spain". *Environmental Science & Technology* 45 (4): 1284-1290, January 2011. [Doi:10.1021/es103333j](https://doi.org/10.1021/es103333j)

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