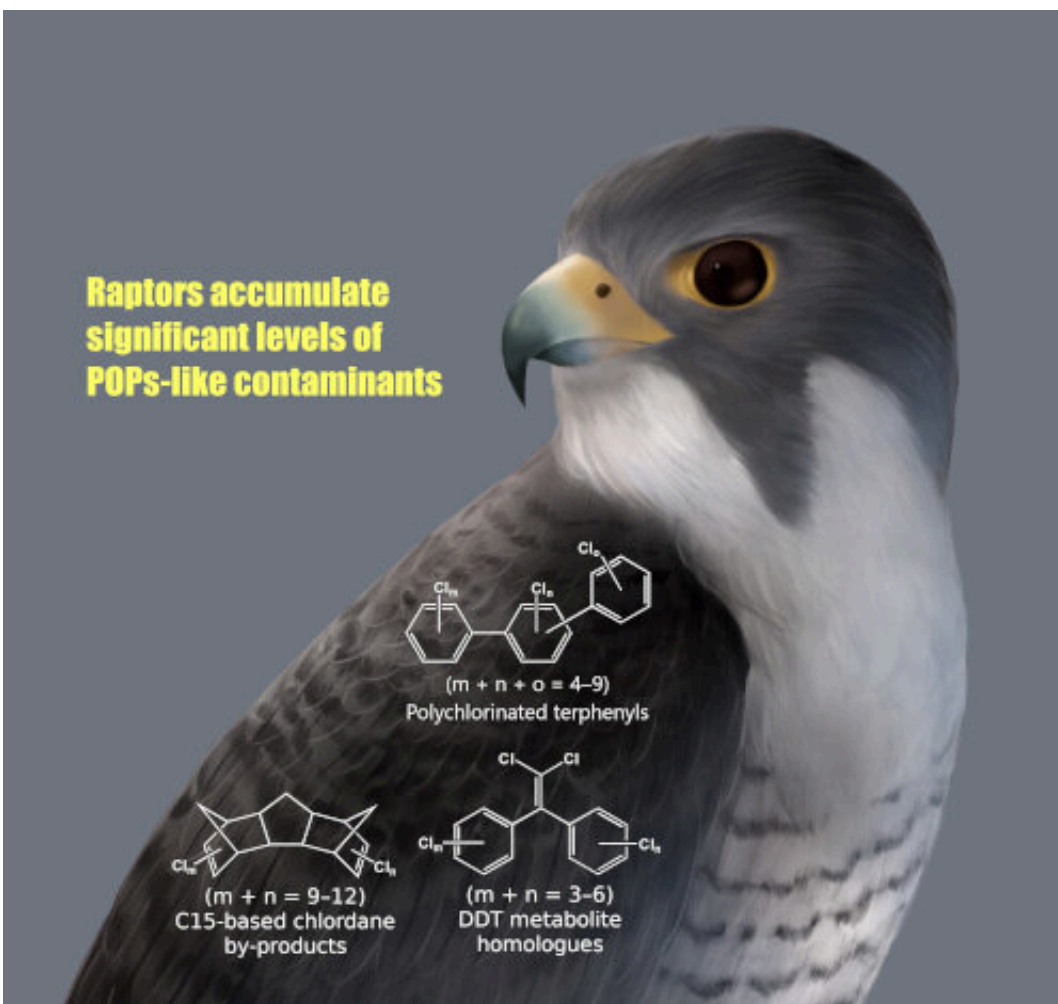


Uncommon byproducts of organochlorine pesticides found in the livers of raptors

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Raptors are top predators in the terrestrial food web. High accumulation levels of C15-based chlordane byproducts, homologues of DDT metabolites and polychlorinated terphenyls in the liver of raptors suggest high biomagnification potential of these typically unmonitored contaminants. Credit: Tatsuya Kunisue, Ehime University

A research team in Ehime University, Japan conducted a comprehensive profiling of chlorinated and brominated compounds bioaccumulated in the liver of various wild bird species from Osaka, Japan in order to find potentially harmful but "hidden" contaminants. The team found a specific accumulation of several groups of typically unmonitored halogenated contaminants in raptors, including those so far never been reported in wild animals. The findings were published in *Environmental Science & Technology* on June 8, 2021.

Ecological risk assessment of halogenated [contaminants](#) is an important issue, as many of these chemicals persist in the environment, bioaccumulate through the food web, and can cause lasting adverse effects. Chemicals listed as [persistent organic pollutants](#) (POPs) under the Stockholm Convention—including legacy industrial chemicals such as polychlorinated biphenyls (PCBs) and legacy organochlorine pesticides such as dichlorodiphenyltrichloroethane (DDT) and chlordane, etc.—are monitored in the environment, animals, and humans by national and international programs, typically using [chemical analysis](#) targeting specific predetermined groups of POPs. However, conventional analytical methods cannot detect untargeted contaminants such as chemical synthesis byproducts, and environmental transformation products. There is increasing evidence for the occurrence of many typically unmonitored and unknown bioaccumulative contaminants in the environment and biota, but the accumulation levels and behavior of such POPs-like contaminants in various food webs remain unclear.

The research team in Ehime University used advanced analytical methods based on two-dimensional gas chromatography (GC×GC), time-of-flight mass spectrometry (ToFMS), and software mass spectral filtering for comprehensive profiling of chlorinated and brominated

contaminants in the liver of terrestrial and brackish water bird species from Osaka, Japan. Relatively high levels of typically unmonitored halogenated contaminants, including polychlorinated terphenyls (PCTs), various DDT- and chlordane-related compounds, were found in raptors. Notably, chlordane byproducts with C₁₅-based structures were detected for the first time in [wild animals](#) and showed high biomagnification potential in the terrestrial food web. These findings highlight the need for further studies on occurrence, structure elucidation and toxicological assessment of unmonitored POPs-like contaminants.

More information: Nguyen Minh Tue et al, Nontarget Screening of Organohalogen Compounds in the Liver of Wild Birds from Osaka, Japan: Specific Accumulation of Highly Chlorinated POP Homologues in Raptors, *Environmental Science & Technology* (2021). [DOI: 10.1021/acs.est.1c00357](#)

Provided by Ehime University

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