

Contamination by Persistent Chlorinated Endocrine Disrupters in Cetaceans from the North Pacific and Asian Coastal Waters

T. B. Minh^{1*}, M. S. Prudente^{2*}, M. Watanabe¹, S. Tanabe¹, N. Miyazaki³,
T. A. Jefferson⁴ and A. Subramanian⁵

¹ Center for Marine Environmental Studies, Ehime University,
Tarumi 3-5-7, Matsuyama 790-8566, Japan
* E-mail: minh@agr.ehime-u.ac.jp

² Science Education Department, De La Salle University,
Taft Avenue, Manila 1004, Philippines
* E-mail: cedmsp@mail.disu.edu.ph

³ Otsuchi Marine Research Center, Ocean Research Institute, The University of Tokyo,
2-106-1 Akahama, Otsuchi, Iwate 028-1102, Japan
E-mail: miyazaki@wakame.ori.u-tokyo.ac.jp

⁴ Southwest Fisheries Science Center, National Marine Fisheries Service, NOAA,
USA and Ocean Park Conservation Foundation, Hong Kong

⁵ Centre of Advanced Study in Marine Biology, Annamalai University, India

To elucidate the global distribution and toxicological impacts of persistent organochlorines (OCs) on cetaceans, the present study determines the concentrations of organochlorine pesticides such as DDT and its metabolites (DDTs), hexachlorocyclohexane isomers (HCHs), hexachlorobenzene (HCB), chlordane compounds (CHLs), PCBs including toxic coplanar congeners and the two newly identified contaminants, *tris*(4-chlorophenyl)methane (TCPMe) and *tris*(4-chlorophenyl)methanol (TCPMOH) in the blubber of 10 species of adult male odontoceti cetaceans collected from several locations in the North Pacific Ocean and coastal waters of Japan, Hong Kong, Philippines and India during 1985–1997. Greater DDT concentrations were found in cetaceans from the Japan Sea, coastal waters of Hong Kong and India, indicating notable marine pollution in industrialized Asian nations and current usage of DDTs in the tropical region. In general, cetaceans inhabiting cold and temperate waters contained relatively higher concentrations of PCBs, HCHs, CHLs and HCB as compared with those from tropical regions, reflecting atmospheric transport from the tropical sources to the north-

ern sinks. Latitudinal distribution of TCPMe and TCPMOH in cetaceans was similar to that of DDTs, suggesting less transportable nature of these compounds in the marine environment. Penta- and hexa-chlorobiphenyls were the predominant PCB congeners, accounting for about 70% of the total PCBs. 2,3,7,8-tetrachlorodibenzo-*p*-dioxin equivalents (TEQs) of non- and mono-*ortho* coplanar PCBs in the blubber of cetaceans ranged from 36 (in spinner dolphin from Philippines) to 510 pg/g wet wt (in hump-backed dolphin from Hong Kong). Toxic evaluation of coplanar PCBs using TEQ concept indicates an increasing impact on cetaceans from mid-latitudes. Mono-*ortho* congener IUPAC 118 or non-*ortho* congener IUPAC 126 was estimated to have the greatest toxicity contribution. The estimated TEQ concentrations in the blubber of some cetacean species exceeded the level associated with immunosuppression in harbour seals. In general, spatial distribution of OCs in cetaceans suggests that tropical and sub-tropical region is a major emission source for higher latitudes.

Monitoring of Organochlorine Pesticides Residues in Green Mussels (*Perna viridis*) from the Coastal Area of Thailand

Ruchaya Boonyatumanond*, Areerat Jaksakul, Pornthip Pucharoen
and Monthip Sriratana Tabucanon

Environmental Research and Training Center, Department of Environmental Quality Promotion,
Ministry of Science, Technology and Environment,
Technopolis, Tambol Klong 5, Amphur klong, luang Pathumthani, Thailand, 12120

* E-mail: ruchayapoo@hotmail.com

The utilization of organochlorine pesticides for pest control has been of great interest because of the contamination of biological organisms by its residues in the environment. Green Mussel (*Perna viridis*) samples were monitored as a bioindicator for the assessment of water quality in coastal waters

along the Gulf of Thailand. Thirty-six samples were collected from 12 stations during 1997–1999 and were analyzed for 26 organochlorine pesticide compounds. This paper focuses on contamination by organochlorine pesticide residues in green mussel (*Perna viridis*) during 1997–1999. The levels of all