

Think globally, act locally:
海洋マイクロプラスチック問題をもとにして



小松輝久(横浜商科大学)

in collaboration with Prof. 高田秀重(東京農工大学)



Think globally

東京湾のカタクチイワシ64尾を分析 49尾から検出



東京農工大 高田研究室提供

マイクロプラスチックを動物プランクトンから検出

Arch Environ Contam Toxicol

DOI 10.1007/s00244-015-0172-5 2015

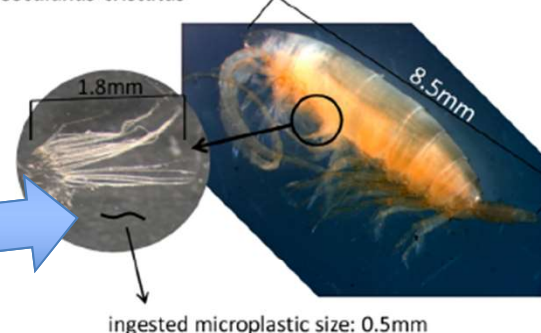
北東太平洋における動物プランクトンによる マイクロプラスティックの摂取

Ingestion of Microplastics by Zooplankton in the Northeast Pacific Ocean

Jean-Pierre W. Desforges¹ · Moira Galbraith² · Peter S. Ross¹

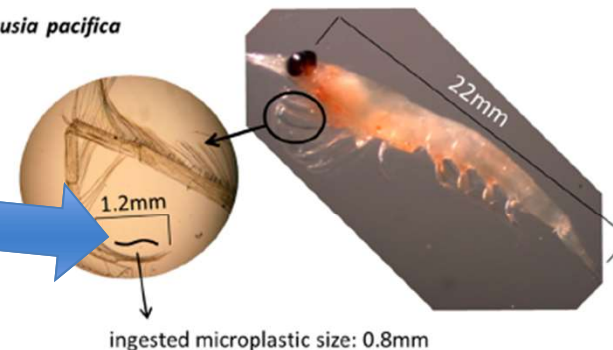
0.5 mmのマイクロプラステック

A *Neocalanus cristatus*



0.8 mmのマイクロプラステック

B *Euphausia pacifica*



サケ稚魚は 2-7 マイクロプラスティック粒子/日
回帰回遊の親サケは、 91 マイクロプラスティック粒子/日以下

微細プラスチックは養殖二枚貝の可食部に分布

Microplastics in bivalves cultured for human consumption

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養殖二枚貝（マガキとイガイ）
中のマイクロプラスチック
（ベルギーでの研究、2014）

ヨーロッパでは1人11,000 マ
イクロプラスチック/年 食べる
と推定

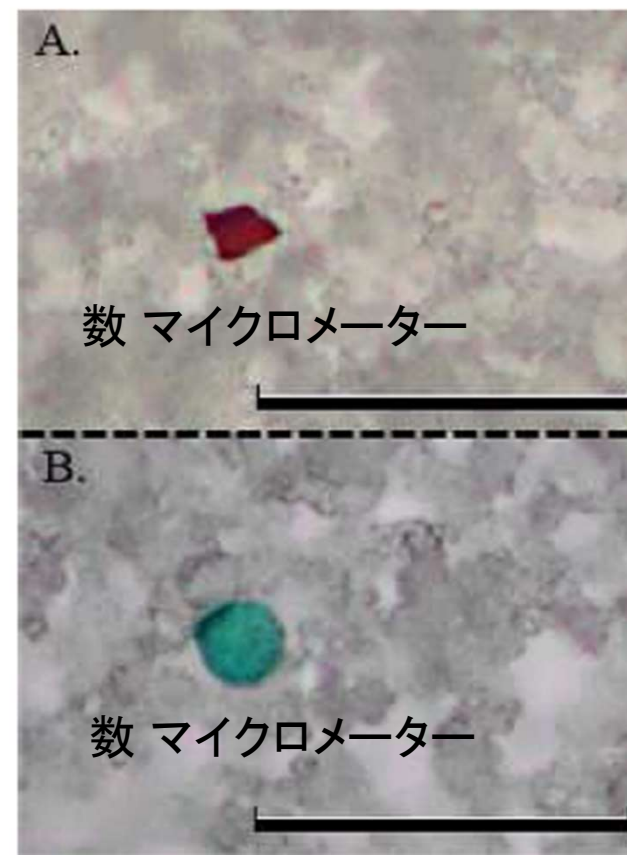
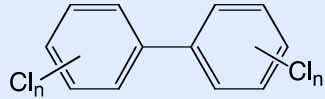


Fig. 1. Microplastics detected in the acid digested *Mytilus edulis* and *Crassostrea gigas*. A. Red particle recovered from *Mytilus edulis*; B. Green sphere detected in the soft tissue of *Crassostrea gigas*. (Scale bar: 50 μ m). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

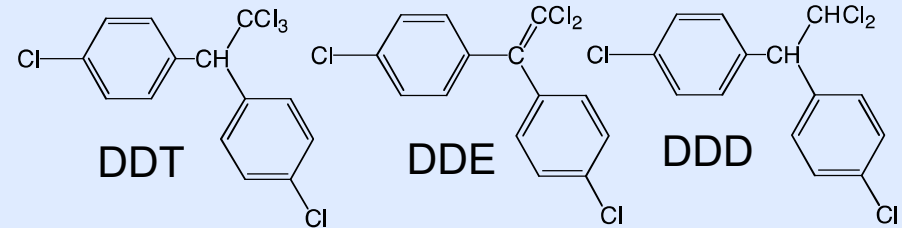
プラスチックは周辺海水中から汚染物質を吸着 =プラスチックの有害化

PCBs



- ・Industrial products for a variety of uses including dielectric fluid, heat medium, and lubricants.
- ・ Endocrine disrupting chemicals

DDTs

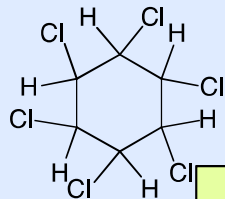


- ・DDT and its metabolites such as DDE and DDD.
- ・DDT was used as insecticides
- ・Endocrine disrupting chemicals

周辺海水中から吸着

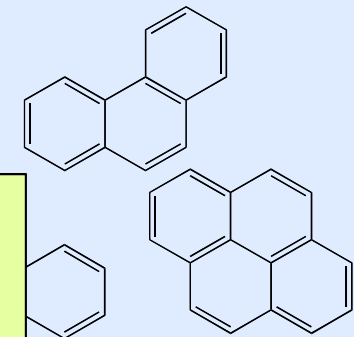
プラスチック

HCH



- ・Insecticide

PAHs

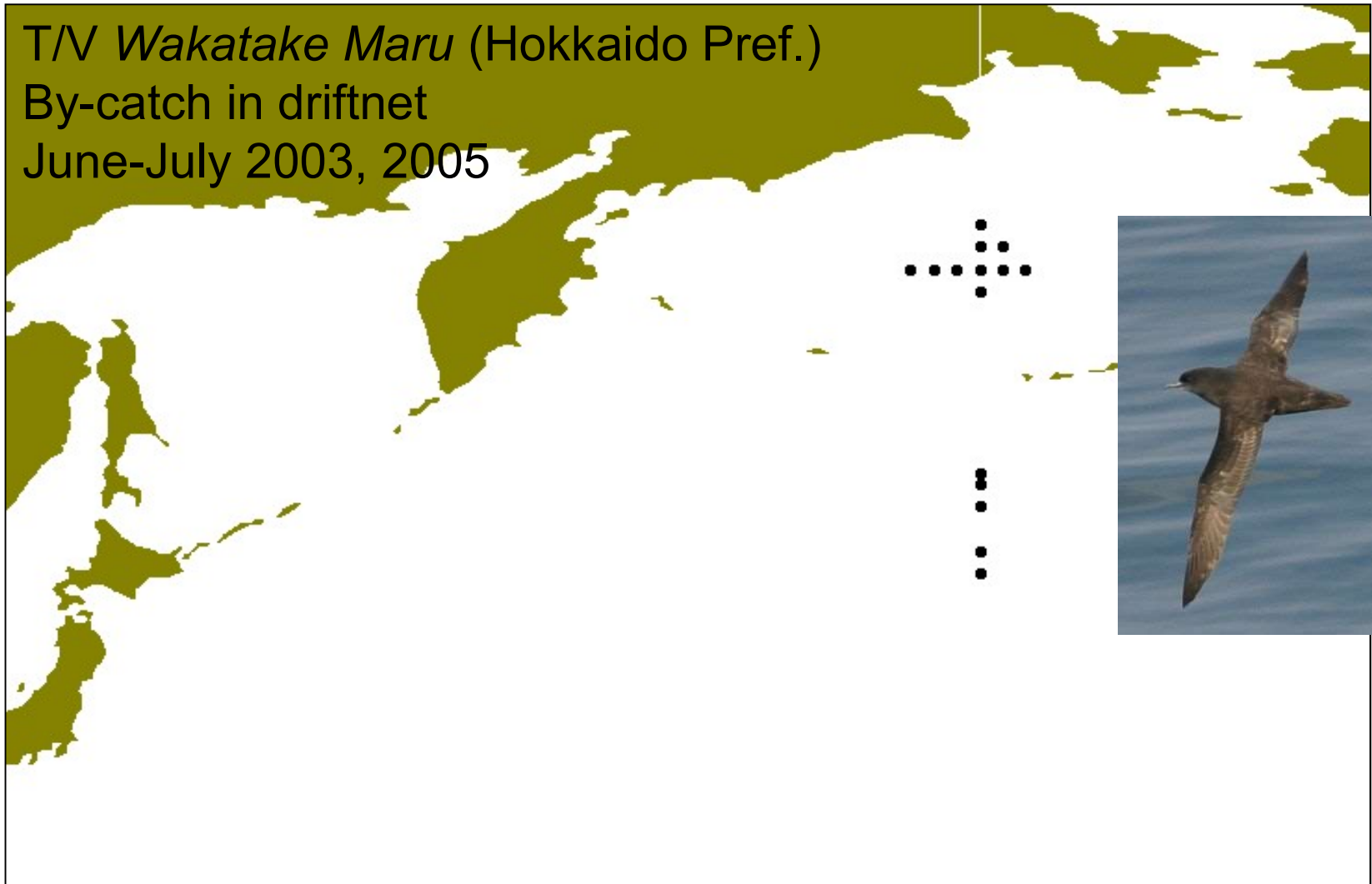


プラスチック中の汚染物質濃度は
周辺海水中の十万倍～百万倍

北部北太平洋で混獲により採取された海鳥12個体を分析した

ハシボソミズナギドリ

T/V *Wakatake Maru* (Hokkaido Pref.)
By-catch in driftnet
June-July 2003, 2005



東京農工大 高田研究室提供

北太平洋の海鳥へのプラスチック摂食の影響



Contents lists available at SciVerse ScienceDirect

Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul



Baseline

Edited by Bruce J. Richardson

The objective of BASELINE is to publish short communications on different aspects of pollution. Papers which clearly identify the quality of the data will be considered for publication. 'Baseline—The New Format and Content' (*Mar. Pollut. Bull.* **60**, 1–2).



Physical and chemical effects of ingested plastic debris on short-tailed shearwaters, *Puffinus tenuirostris*, in the North Pacific Ocean

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ARTICLE INFO

Keywords:

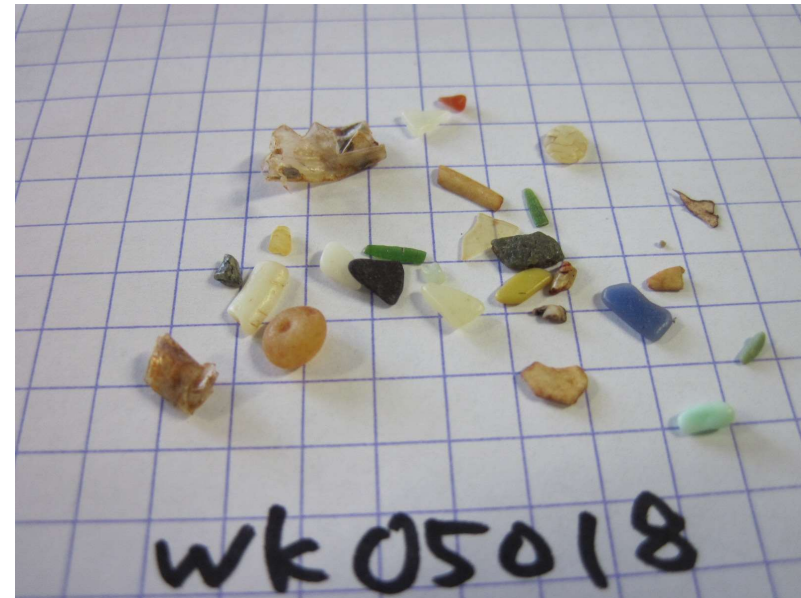
Marine plastic debris
Polychlorinated biphenyls (PCBs)
North Pacific Ocean
Plastic ingestion
Plastic contaminants
Short-tailed shearwater

ABSTRACT

We investigated the plastics ingested by short-tailed shearwaters, *Puffinus tenuirostris*, that were accidentally caught during experimental fishing in the North Pacific Ocean in 2003 and 2005. The mean mass of plastics found in the stomach was 0.23 g per bird ($n=99$). Plastic mass did not correlate with body weight. Total PCB (sum of 24 congeners) concentrations in the abdominal adipose tissue of 12 birds ranged from 45 to 529 ng/g-lipid. Although total PCBs or higher-chlorinated congeners, the mass of ingested plastic correlated positively with concentrations of lower-chlorinated congeners. The effects of toxic chemicals present in plastic debris on bird physiology should be investigated.

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全ての個体の消化管内からはプラスチックが検出された

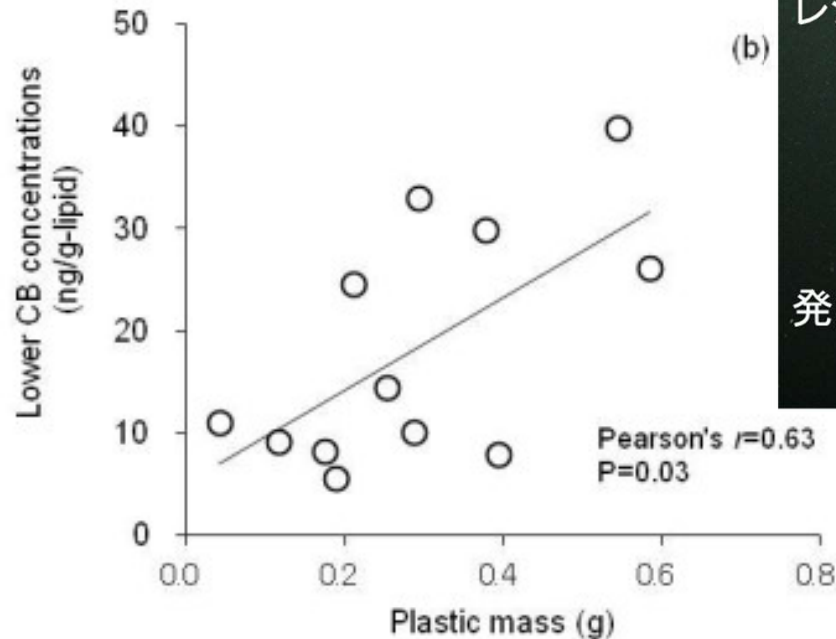


東京農工大 高田研究室提供

0.1 g – 0.6 g

胃内のプラスチック量が増えると 脂肪中の有害化学物質濃度が上昇

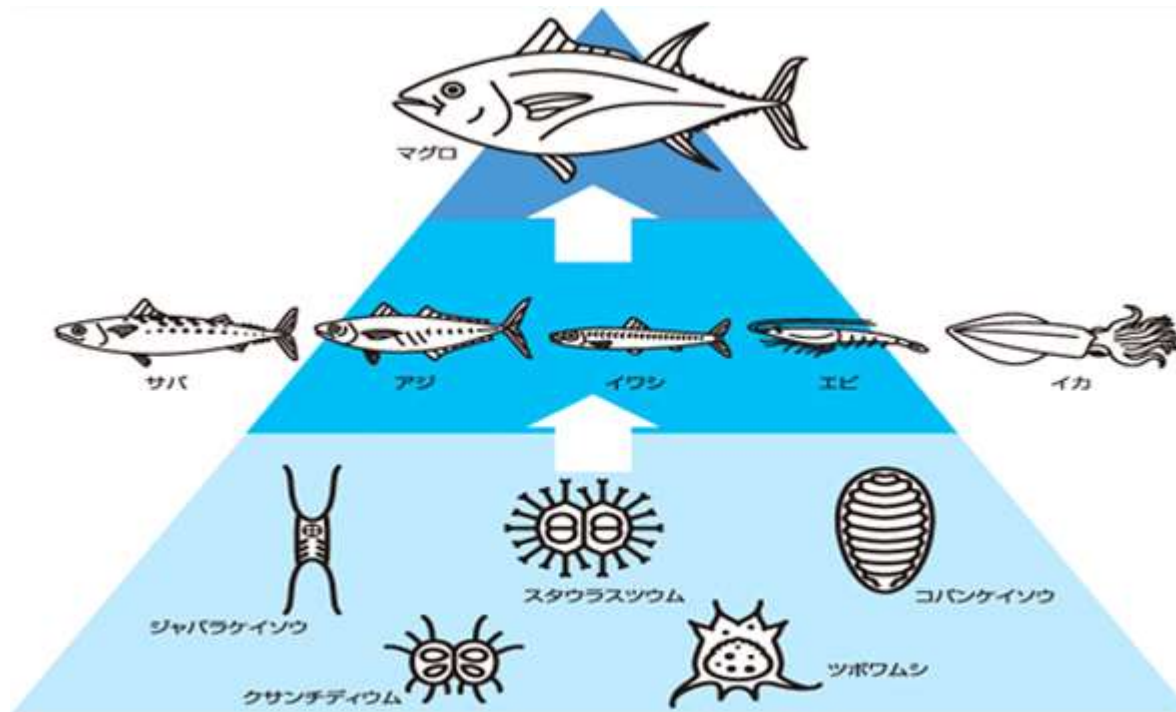
脂肪中の有害化学物
低塩素化同族体濃度
(ng/g-脂肪)



海鳥の胃の中のプラスチック量(g)

Yamashita, Rei, et al. "Physical and chemical effects of ingested plastic debris on short-tailed shearwaters, *Puffinus tenuirostris*, in the North Pacific Ocean." *Marine Pollution Bulletin* 62.12 (2011): 2845-2849.

生物濃縮



生態ピラミッド

