

SOCIETY FOR MARINE MAMMALOGY: SMALL GRANTS IN AID OF RESEARCH (2019)

GRANT REPORT

Persistent Organic Pollutants in the Coastal Spotted Dolphin (*Stenella attenuata graffmani*) from the Mexican Central Pacific: Evaluating a Possible Risk Factor

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Project Summary:

In waters of the Mexican Central Pacific (MCP, extending from 16.5° to 21.5° N and from 102.33° to 107.69° W) the coastal subspecies of the spotted dolphin (*Stenella attenuata graffmani*) is found year-round and could be an efficient ecosystem bio-indicator. However, ecological studies of the subspecies are scarce and within the MCP studies are even more limited. Under such a premise, the proposed project forms part of a doctoral dissertation aimed at determining ecological aspects of the coastal spotted dolphin including distribution, abundance, trophic niche, and levels of persistent organic pollutants (POPs). POP levels were determined in 136 blubber samples of coastal spotted dolphins collected during 2010-2015. Overall, mean POP levels were relatively low (Table 1). The highest mean values were presented by the cyclodiene pesticides—aldrin, dieldrin, and endrin (\sum Dienes: 1.29 ng g⁻¹ dry weight; Table 1), probably because land adjacent to the MCP is primarily used for agriculture. POP levels varied annually with dolphins sampled in 2015 presenting the highest overall levels, yet no significant variations were found between sampling years ($p > 0.05$). Additionally, sex was genetically determined for 131 of the dolphins sampled (68 females and 63 males) and POP levels were determined per sex (Table 2). No significant differences in POP levels were detected between sexes, probably because coastal spotted dolphins inhabiting the MCP feed in mixed groups as has been suggested by isotopic levels of carbon and nitrogen ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) found in these same sampled dolphins. To determine more in-depth spatial, temporal, and ontogenetic patterns in POP levels further statistical analyses are currently underway.

Table 1. Geometric Means and standard deviations in ng g⁻¹ dry weight for blubber biopsies of 136 coastal spotted dolphins (*Stenella attenuata graffmani*) sampled in the Mexican Central Pacific during 2010-2015.

	Mean	Std. Dev.	Max
Σ Dienes	1.2870	1.7197	8.2423
Σ Endosulfan	0.1465	0.2500	2.4816
Σ DDTs	0.0067	0.0109	0.0924
Σ Chlordane	0.0235	0.0394	0.2887
GamaHCH	0.0068	0.0205	0.2169
Σ Heptachlor	0.0318	0.0390	0.2208
Methoxychlor	0.0259	0.0429	0.2192

Table 2. Geometric Means and standard deviations in ng g⁻¹ dry weight for blubber biopsies of female (n=68) and male (n=63) coastal spotted dolphins (*Stenella attenuata graffmani*) sampled in the Mexican Central Pacific during 2010-2015.

		Σ Dienes	Σ Endosulfan	Σ DDTs	Σ Chlordane	GamaHCH	Σ Heptachlor	Methoxychlor
Female	Mean	1.364	0.172	0.006	0.023	0.009	0.035	0.024
	Std. Dev.	1.633	0.323	0.012	0.041	0.028	0.039	0.044
	Max	7.178	2.482	0.092	0.289	0.217	0.221	0.219
Male	Mean	1.282	0.125	0.007	0.024	0.005	0.029	0.030
	Std. Dev.	1.859	0.145	0.010	0.039	0.007	0.040	0.043
	Max	8.242	0.572	0.054	0.190	0.045	0.196	0.173

Outcomes:

The grant from SMM was used to cover part of the cost of contaminant analyses of 136 samples; each sample analysis had a cost of 20 USD. At the start of the project, the samples had already been collected. All lab work has been done successfully, data analyses and the manuscript are currently under process. This research is part of a doctoral dissertation, which is expected to be concluded in July 2021. We also expect to submit the manuscript for publication in 2021. We are grateful for the support provided by the Society for Marine Mammalogy.