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J. J. de Lope Arias, G. Mateu-Vicens, **M. Deudero Company**, 2016. [Meta-analysis review of fish trophic level at marine protected areas based on stable isotopes data](#)
. Mediterranean Marine Science. 17/2. 2016. 496-507.

Abstract: Stable isotopes ($\delta^{15}\text{N}$) are used to determine trophic level in marine food webs. We assessed if Marine Protected Areas (MPAs) affect trophic level of fishes based on stable isotopes on the Western Mediterranean. A total of 22 studies including 600 observations were found and the final dataset consisted of 11 fish species and 146 observations comparing trophic level inside and outside MPAs. The database was analysed by meta-analysis and the covariate selected was the level of protection (inside vs. outside MPAs). The results indicate significant difference between trophic levels inside and outside MPAs. However, results differ from expectations since the trophic level inside was lower than outside MPAs. Three habitats were analysed (coastal lagoons, demersal and littoral) and significant differences were found among them. Trophic level was higher in demersal habitats than in coastal lagoons and littoral areas. No significant differences were found in species classified by trophic functional groups. We consider several hypotheses explaining the obtained results linked to protection level of the MPAs, time since protection and MPAs size. We debate the suitability of using the stable isotope ($\delta^{15}\text{N}$) as direct indicator of trophic level in evaluating MPAs effects on food webs.

Keywords: Diet, fisheries effects, marine reserves, Mediterranean Sea