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Non-Predatory Behavior in White Sharks

White sharks are known to seize and release other species ranging from common prey (pinnipeds) to those which are not normal prey (birds, humans, otters, etc.). It has been assumed that one of two reasons explained this behavior: 1) for prey species that whites were disabling large animals and retreating to allow the prey to die before consumption; 2) for non-prey, as well as inanimate objects, that mistaken identification was involved. However, another factor which could account for seize-and-release or other behaviors in which there is no follow-up interaction has received little attention...displacement. Displacement has been well-studied for many non-marine animals. Dogs and cats are well-known examples. Both undergo resting periods when potential to enact certain behaviors builds then, at threshold, they're acted out. This may take several forms including stalking, pursuing, batting at, pouncing, evading or seizing objects or other animals. Displacement apparently serves several functions including honing hunting skills, stress relief, or development of skills necessary to socialization or hierarchical order. Once enacted displacement tends to dissipate rapidly and the animal displaying the behavior appears to become sated. White sharks may exhibit one or more similar behaviors in addition to others, such as intraspecific threat displays, not of a displacement nature. Observations of non-predatory behavior will be examined including "seize-and-release", "bouncing", "bashing", and "gaping" involving white sharks and other species.

KEYWORDS: white sharks; displacement; nonpredatory; Lamnidae; intraspecific; interspecific; *Carcharodon carcharias*; behavior

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Carbon and nitrogen analysis as a measure of condition of fish larvae, in particular for sardine *Sardina pilchardus* larvae off Spain

As part of the European Sardine Anchovy Recruitment Project (SARP) larvae of sardine *Sardina pilchardus* were sampled off the north and north-west coasts of Spain in 1991 and 1992 to measure their nutritional condition in relation to hydrography, food availability, and subsequent survival. Results from analyses of total carbon and nitrogen showed significant differences between cruises, with larvae <10mm in length being more prevalent among those in poor condition than the larger larvae. A seasonal change in larval condition with distance from the coast was related to the onset of offshore transport and seasonal upwelling. These results are compared with similar findings for larvae of sprat *Sprattus sprattus* in a parallel series of cruises in the North Sea. The field results are discussed in relation to equivalent findings from laboratory experiments to validate elemental analysis as a measure of larval condition.

KEYWORDS: condition; carbon; larvae; *Sardina pilchardus*

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A Cladistic Reassessment of the Generic Interrelationships within the Subfamily Pleuronectinae (Pleuronectiformes: Pleuronectidae): a progress report

Past studies dealing with interrelationships of flatfish species belonging to the Pleuronectinae (Pleuronectidae) have lacked the theoretical consistency required to make valid assumptions of phylogeny. In one case this has led to confusion in the taxonomic status of important commercial species. The monophyletic status of the Pleuronectinae is examined assuming the validity of a previously defined bothoid group. In addition, the monophyletic status of 28 genera within the subfamily is reviewed with special attention given to those genera regrouped as a result of a previously published phenetic study. A preliminary cladistic analysis is presented to show generic interrelationships within this subfamily, utilizing published and new osteological, meristic and morphological data. It is expected that a well corroborated phylogenetic hypothesis of interrelationships at the species level will provide an adequate historical basis for future studies dealing with the evolution life history traits in flatfish and should prove to be useful in future fisheries management programs.

KEYWORDS: flatfish; Pleuronectinae; cladistics; phylogeny