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NOTE

Variation in group hunting strategies by Cornetfish on two Red Sea reefs

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Predation by piscivores can influence the structure of fish communities, directly by consuming prey and indirectly by inducing fear responses that modify prey behavior (Estes et al. 2011). How predators respond to changes in prey distribution and behavior is an important element for understanding the reciprocal relationships that define the dynamics of predator-prey interactions (Heithaus et al. 2009, Catano et al. 2016, Campanella et al. 2019). One common response of predators is to hunt in single and mixed species groups, using variable behavioral strategies to search, detect, and attack prey in diverse ecological settings (Auster et al. 2013, 2019).

Here I describe variations in group hunting strategies of bluespotted cornetfish *Fistularia commersonii* (Fistulariidae), elongate stalking predators, in relation to landscape context. Cornetfish are mesopredators, principally feeding on small fish, crustaceans, and squids (http://www.fishbase.org; accessed 20 March 2023). While these observations are ad hoc and qualitative in nature, they serve to illustrate the role that small-scale habitat variability can have on predator behavior and interactions with prey species.

Groups of cornetfish were observed during six dives using scuba (16–17 September 2019) at Daedelus Reef (ca. 24.9312°, 35.8704°) and Al Ikhwan (Little Brother) Reef (ca. 26.3001°, 34.8628°) in the Red Sea. Reef sites were steeply sloped coral walls descending from a shallow crest at approximately 5 m to beyond 40 m depth. These reefs are in the central part of the northern Red Sea basin and are on the upper slope and summit of two isolated seamounts surrounded by depths of approximately 800 m. Total dive time was 293 minutes during the daylight period of 0830-1910 UTC (local time is UTC-2). Dives covered depths from the surface to 31 m. Water temperature ranged between 26.1–28.3°C.

Key words: coral reef fishes, predation, piscivore, behavior, species interactions, multiple predator effect, trophic, mesopredator

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Direct underwater observations revealed bluespotted cornetfish utilized multiple hunting strategies across small spatial scales (Fig. 1). Cornetfish occurred primarily in groups (identified by coordinated movements) of 2–17 individuals (with one large group of 32 individuals; overall total of n=356 individuals observed; 76 attacks on prey). Rates of attack success are unclear due to distance and orientation of some predators away from the observer, speed of attack, and concealment of captured prey in the buccal cavity. Prey species, the targets of attacks,

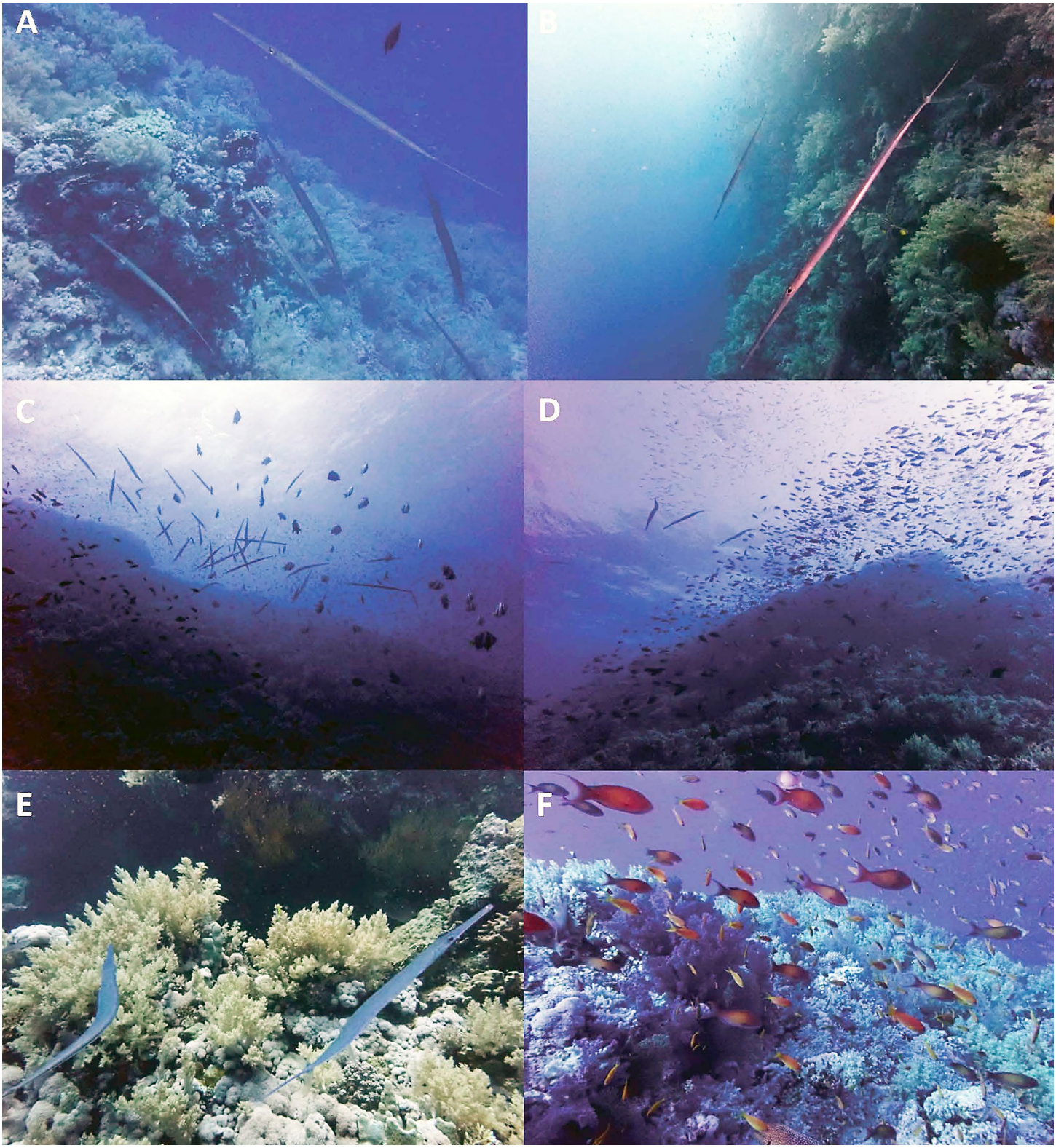

Figure 1. Images illustrating hunting strategies across habitat settings for bluestriped cornetfish; A: hunting group largely in parallel and oriented upslope at < 20 m depth; B: hunting group oriented in parallel and downslope at > 20 m depth; C: coherent aggregation of cornetfish maneuvering in extended region of planktivorous prey fishes at reef crest; D: cornetfish hunting along outer edge of prey-fish aggregation; E: breaking formation to attack prey in complex structure of the reef; F: undisturbed aggregation of Anthias above reef with Chromis species below (P.J. Auster).

were hyperabundant aggregations of small size fish, principally Lyretail Anthias, *Pseudanthias squamipinnis*; Half-and-half Chromis, *Chromis dimidiata*; and Arabian Chromis, *Chromis flavaxilla*. All prey species targeted were approximately 4 cm total length and smaller, based on visual estimates, and retreated towards and into the coral framework when attacked.

Orientation of cornetfish to the reef and behavior while hunting in groups was associated with depth and reef structure. Groups of cornetfish generally oriented upslope and roughly parallel to the seafloor (less than 1 m above corals) in 10–20 m depth, breaking formation to attack prey directly or maneuver to intercept those escaping the attack of an initial predator. Conversely, hunting groups oriented downslope when below approximately 20 m, or when beneath shaded ledges, where they encountered prey rising to feed on plankton. Notable was cornetfish were generally larger at deeper depths (ca. 20–50 cm total length at < 20 m, 40 cm up to 1 m at > 20 m depth). In the shallow 5–10 m reef crest region, Anthias rose and extended horizontally over 2 m from the reef crest when undisturbed. Here cornetfish formed the largest coherent group of 32 individuals in the midwater while drifting and maneuvering through the aggregation of prey fish to encounter and attack individuals. Orientation of individuals varied but exhibited general group cohesion based on sustained aggregation within the larger patch of prey and individuals orienting to and attacking prey disturbed by neighbors. Finally, smaller groups of cornetfish paralleled the outer fringe of Anthias, furthest from the reef, and attacked from the outer edge (2–12 individuals in a group).

These context-specific hunting strategies were identified based on general characterizations of habitat (i.e., steep slope into mesophotic depths around entire seamount summit) as well as prey distribution and behavior (high-density patches of planktivorous fishes and local response to predators), demonstrating plasticity in group-hunting behavior. Notable is cornetfish numbers were extremely low at 17 other dive sites along the Egyptian coast, characterized by shallow sloping seafloor.

Adapting to local conditions to optimize predation strategies may be a common attribute of stalking predators. Variation in hunting strategies over small spatial scales was also described for trumpetfish *Aulostomus maculatus* (Aulostomidae), another elongate stalking predator, from the Caribbean Sea (Auster 2008). In this case strategies varied principally for individuals rather than in coordinated hunting groups. One significant difference in the setting in which these observations occurred is group-hunting cornetfish were on steep sloped and isolated reefs while trumpetfish were observed on and above reef crest and reef front rising offshore of a narrow shoreline and from maximum depths of approximately 30 m. Such behavioral plasticity is also in contrast to cornetfish hunting in mixed-species groups, as observed in the Gulf of California, Indian Ocean, and Tropical Eastern Pacific (Auster 2005, Auster et al. 2019).

These largely qualitative observations lead to questions about the role of spatial and temporal variation in behavior-mediating group interactions, differential behavior of predators shaping demographic outcomes (variation in fitness), and the ecological factors that mediate group formation and function (Parrish 1993, Sih et al 1998, Pressier et al. 2005).

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