

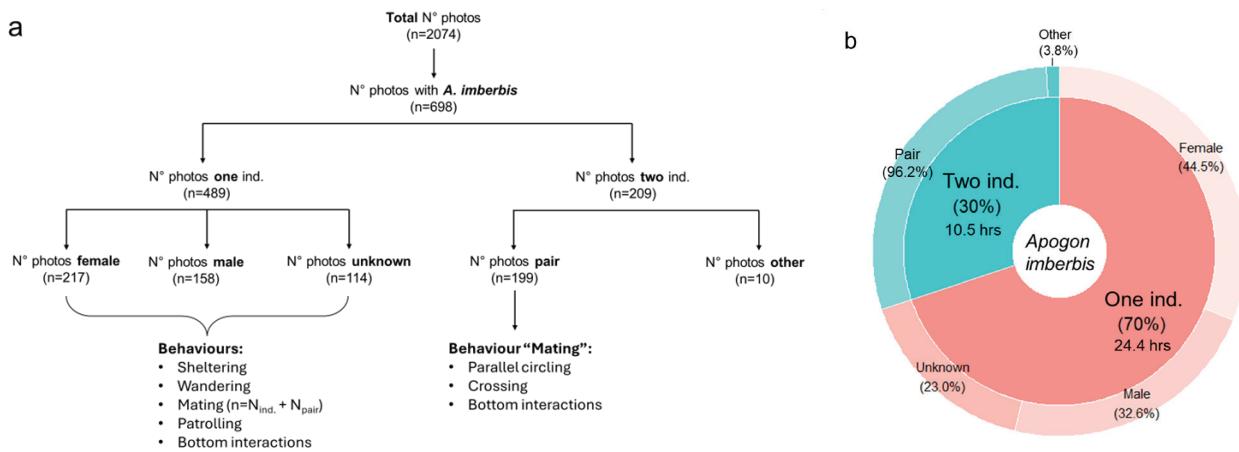
## In between coral branches: describing the courtship behavior of the Mediterranean cardinalfish *Apogon imberbis* (Linnaeus, 1758)

Chiara GREGORIN, Martina COPPARI, Teo MARROCCO, Torcuato PULIDO MANTAS, Camilla ROVETA, Trevor J. WILLIS, and Carlo CERRANO

*Mediterranean Marine Science, 26 (3) 2025*

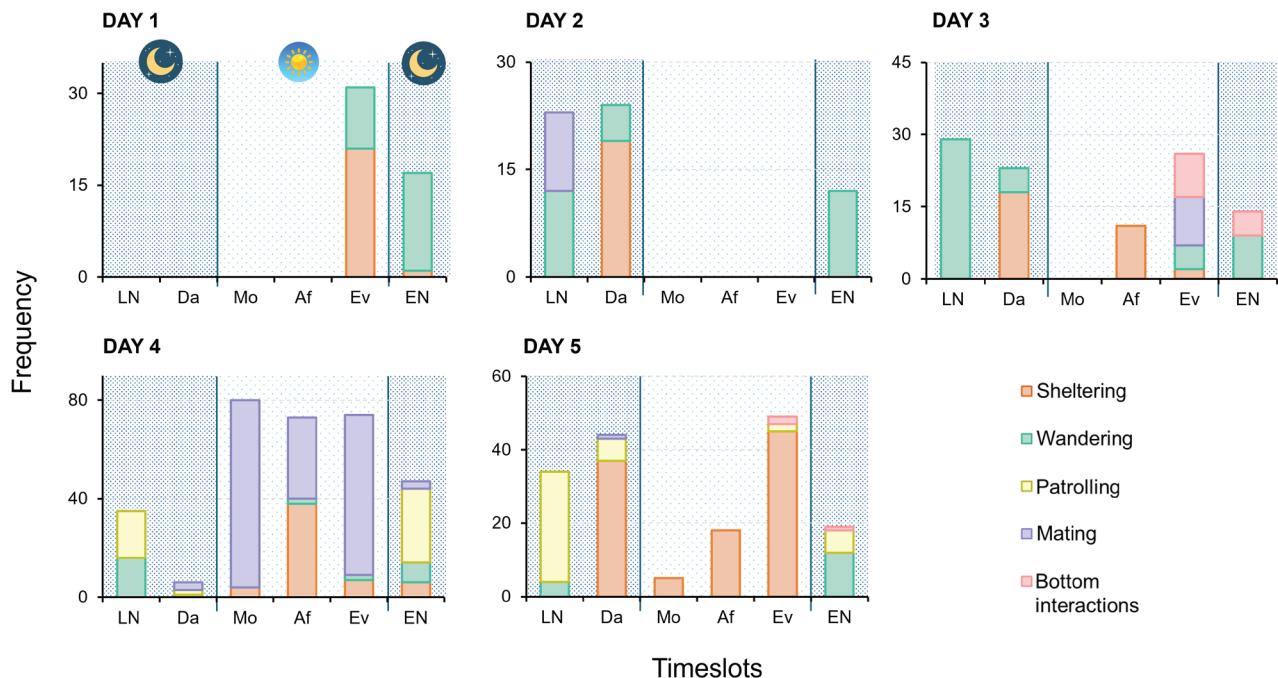
**Video V1\_Patrolling:** The female individual of the species *Apogon imberbis* patrolling the substrate at the base of the *Paramuricea clavata* colony. This activity was observed the night after the mating event, and lasted for approximately 6-7 hours, within the timeslots Early Night (20:00 – 23:59), Late Night (00:00 to 3:59) and, partially, Dawn (4:00 – 7:59) of day 4-5.

**Video V2\_Courtship:** The pair formed by male and female *Apogon imberbis* performing courtship. Two activity patterns are distinct, the tail-to-tail crossing and the parallel circling. The courtship occurred during daytime of day 4 for approximately 10 hours, covering timeslots from Dawn (04:00 – 07:59) to Evening (16:00 to 19:59).



**Fig. SI:** a) scheme of the analysis of images. Ind. = individual; b) among the photos portraying *A. imberbis* (n=698), percentage and approximative time of observation of one or two individuals, male/female/unknown or pair/other, respectively.

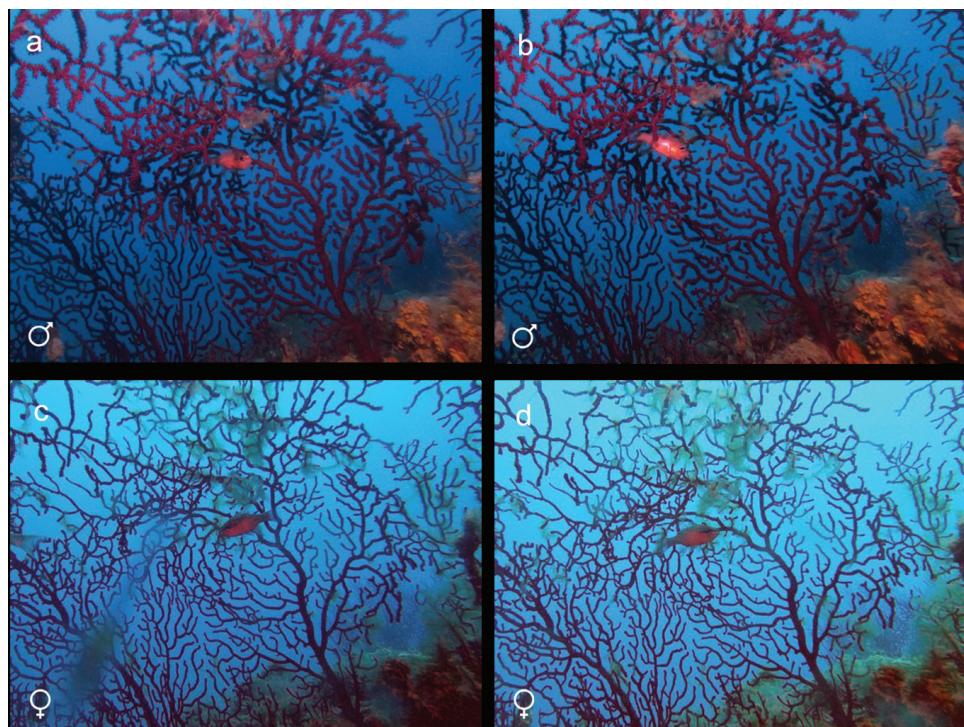
### Activity patterns within timeslots between days



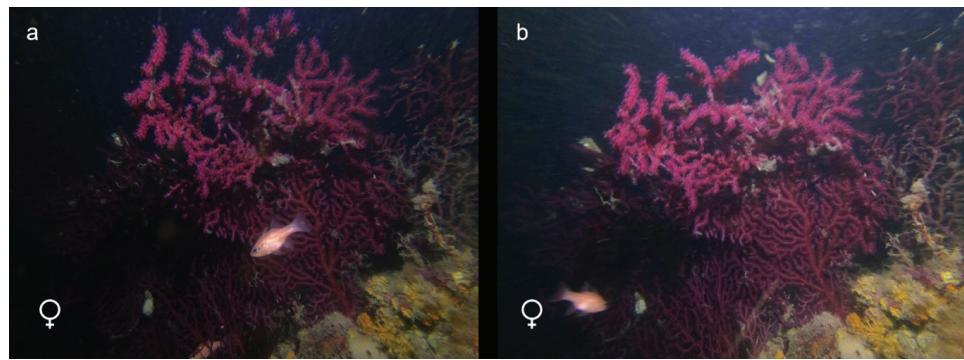
**Fig. S2:** Activity budget of *Apogon imberbis* taken in totality (female, male, unknown) in the days of recoding, highlighting differences of their activity pattern between timeslots. LN = late night; Da = dawn; Mo = morning; Af = afternoon; Ev = evening; EN = early night.

### Photographic references to the activity patterns of *Apogon imberbis* (Figures E1 – E5)

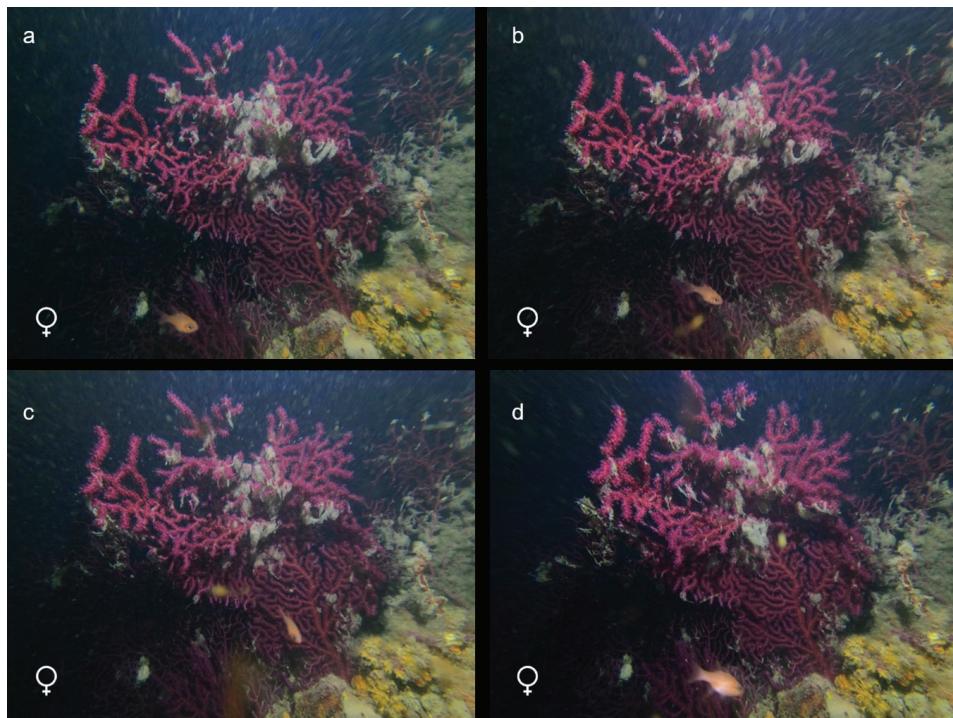
Photos may not represent the real dimension of the frame, because they have been enlarged for better appreciation of the fish behavior.



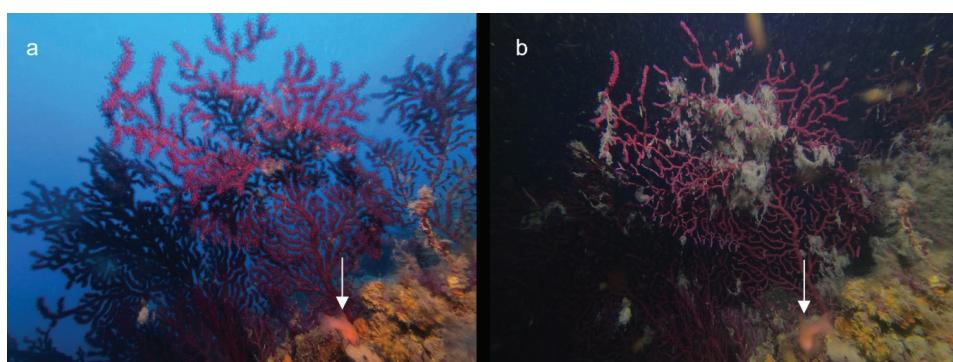
**Fig. E1 a – d:** Sheltering behavior of single *Apogon imberbis* individual, male (a and b) and female (c and d). *A. imberbis* uses the branches of the gorgonian *Paramuricea clavata* for hiding, making it the territory to protect from intruders and the courtship arena.



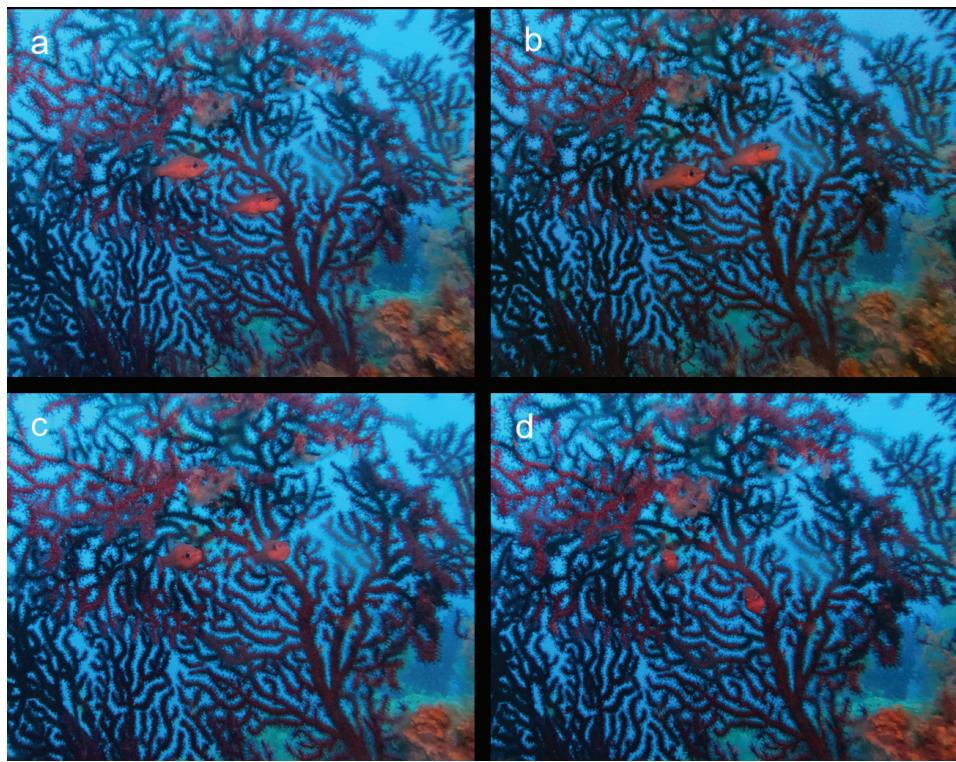
**Fig. E2 a, b:** Wandering behavior performed by *A. imberbis* female, swimming around the colony with no clear direction, often out of focus because moving.



**Fig. E3 a – d:** Patrolling behavior, the sight of the fish is oriented towards the site where previous interactions with the substrate occurred. The fish moves in circles and keeps the eyes on the spot.



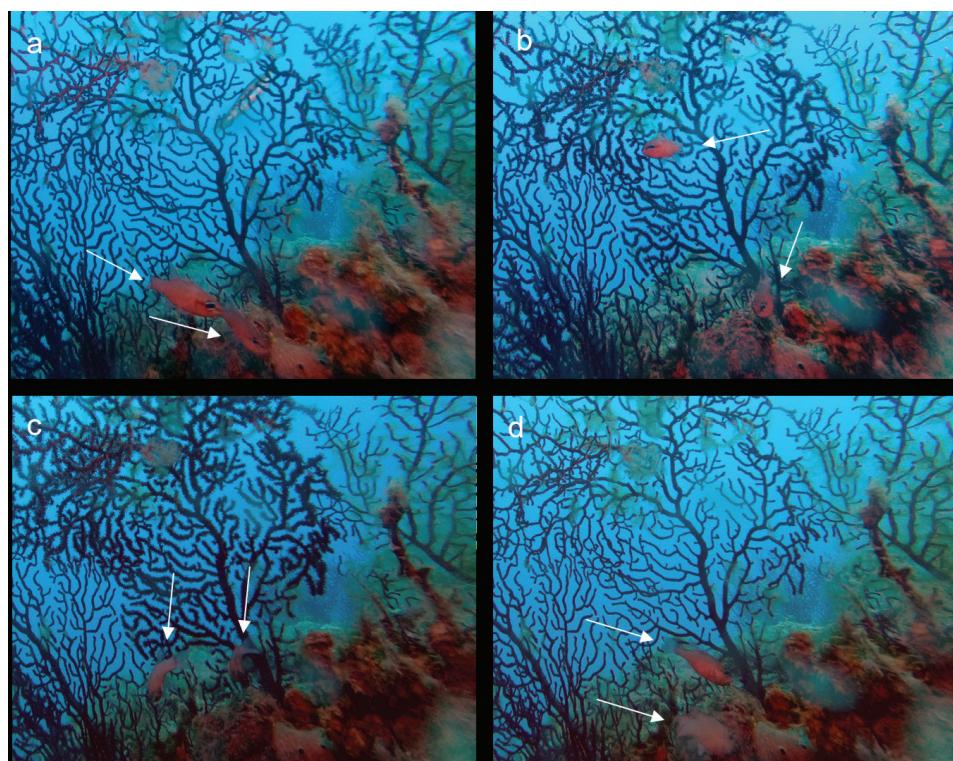
**Fig. E4 a, b:** Bottom interactions of single individual, whose gender is unknown. The white arrow indicates the fish, which is in a vertical position with head down and tail up.



**Fig. E5:** Parallel circling during courtship. The fish change orientation by keeping a parallel position to each other, while turning in circles. The female is on the left of the photo, keeping the outer side of the circle.



**Fig. E6:** Crossing of caudal fins during courtship to form a “X” shape in a sort of “tail-to-tail” position. The female is on the left of the photos.



**Fig. E7:** Bottom interactions by the two partners during courtship. White arrows indicate the two fish.