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Short communication

Which baits for attracting black seabream (*Spondyliosoma cantharus*) in fish traps?

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ABSTRACT

The pressure that fishing exerts on marine ecosystems is of increasing concern worldwide. When deployed in compliance with appropriate technical regulations, the use of passive baited gear such as traps is a selective and low-impact fishing technique that can contribute to the sustainable exploitation of marine resources. In the case of traps or lines, the choice of bait might further increase the selectivity of the gear, particularly when the decision is based on the feeding preferences of the target species. In the present study, we investigate the effectiveness of different types of bait in attracting black seabream (*Spondyliosoma cantharus*), a commercially valuable fish with healthy populations in the Bay of Biscay (France). Specifically, we deployed a baited underwater video camera devoid of trap gear to identify the preferred bait among 10 options selected based on a review of the literature and interviews with recreational and professional fishermen. Because the performance (attractiveness) of a bait might vary depending on how it is assessed, we calculated and compared three indicators to describe the behavior of black seabream in relation to each bait: the number of fish per hour that exhibited Interest or Baited behaviors, with the latter being characterized by an attempt to eat the bait; the amount of time these fish spent in the vicinity of the bait (referred to as time of residence); and the probability that a fish that entered the view of the camera would exhibit Baited behavior (referred to as Baited probability). Cockles were associated with the longest time of residence of Baited fish and presented the highest Baited probability. Lugworm presented the highest time of residence for Interested fish, but the lowest Baited probability. More generally, all baits except an artificial lure demonstrated an ability to attract black seabream, but this tended to decrease with soaking time. The complementarity of the indicators used is discussed, as well as the application of our results to the development of passive baited gear such as fish traps targeting black seabream.

1. Introduction

The pressure that fishing exerts on marine ecosystems is of increasing concern, for both the general public and the fishing industry itself (Maesano et al., 2020). Though significant advances have been made over the past few decades to reduce the impact of fishing gear on ecosystems (Catchpole and Gray, 2010; Hamilton and Baker, 2019), there is still a recognized need for more selective and low-impact gear. From this point of view, trap fishing is a highly interesting technique: it is fuel efficient (Schau et al., 2009) and combines a low level of sea-floor disturbance (Kopp et al., 2020) with high selectivity (Gomes et al., 2014; Shester and Micheli, 2011; Stewart and Ferrell, 2003) and a high discard survival rate (Purves et al., 2003). These characteristics make it both ecologically and economically sustainable (Fissel et al., 2019; Petetta et al., 2021) provided it is efficient in catching the target species and deployed in a way that respects any relevant management conditions (e.g., gear and effort restrictions, mesh size, spatial and temporal management (Vadziutsina and Riera, 2020)). Fish traps have long been used in traditional fishing worldwide (Al-Masroori et al., 2004; Cruces et al., 2024; Purves et al., 2003; Vadziutsina and Riera, 2020), but there has recently been renewed interest in their viability or sustainability in European waters (Jørgensen et al., 2017; MacDonald et al., 2017). Other studies have focused on fish traps as alternatives to towed gear in areas such as marine renewable energy farms (Stelzenmüller et al., 2021) or marine protected areas (Cadiou et al., 2009). Though results regarding the ecological and economic benefits of fish traps have been encouraging, they are not commonly used in certain areas, including the Bay of Biscay (France). Indeed, during previous experimental trials of fish traps

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in this area, the two most common species caught were European conger and common pout (Méhault et al., 2010), which are of low economic interest. For fish traps to be more profitable in southern European waters, they must target one of the more-valuable commercial species. Following a consultation with artisanal fishermen, black seabream (*Spondyliosoma cantharus*) was identified as an appropriate target species: it is frequently present in coastal waters, mainly at depths between 10 and 100 m (Collins and Mallinson, 2012; Pajuelo and Lorenzo, 1999) and its population is considered of least concern by the IUCN (Russel et al., 2014). Moreover, as this species aggregates on inshore spawning grounds in large shoals (Pajuelo and Lorenzo, 1999), it is likely that if one individual enters the trap, other individuals might follow due to their gregarious behavior (Anders et al., 2017a; Vadziutsina and Riera, 2020).

In most trap fisheries, the gear must be adequately baited to attract the target fish. Indeed, several experiments have demonstrated that the performance of fish traps might be dependent on the bait used (Tangke et al., 2018), as well as on the orientation of the trap in the water current for the optimal diffusion of the bait chemical cue (Stoner, 2004). In general, bait is a key factor in fishing efficiency, as the capture success of baited fishing gear mainly relies on the feeding preferences and food-search behavior of the target species (Anders et al., 2017b; Misund et al., 2008). A suitable bait should attract and raise the interest of fish present in the surroundings, and is ideally species-selective, convenient for fishermen, and cost-effective. Since the first phase of the catching process involves target fish locating the food source, the bait should release feeding attractants so that it triggers foraging behavior in the target species, spreads olfactive plumes over a significant period of time, and lures the target fish visually using an appropriate shape, texture, or color (Løkkeborg et al., 2014; Masilan and Neethiselvan, 2018). To better understand this process, fish behavior is usually observed using an underwater camera *in situ*. The increase in image quality and the decrease in the cost of underwater video in recent years has facilitated the deployment of cameras to capture a high number of replicates or a multiplicity of environmental conditions. More precisely, the technique of Baited Remote Underwater Video (BRUV) has been employed in many studies to study fish assemblages, attraction, and behavior towards baits and around fishing structures (Dorman et al., 2012; Hardinge et al., 2013; Harvey et al., 2007).

Using BRUV, this study compares the effectiveness of several baits in attracting black seabream in its natural environment. By evaluating multiple indicators—including the number of target fish per hour, the time of residence, and the baited probability—we explore the effect of bait type on the interest and feeding behavior of black seabream, and then use these data to identify the most attractive baits for targeting this species. We also discuss the potential applications of our results to the development of trap gear.

2. Materials and methods

2.1. Study area

The study was conducted in the Bay of Quiberon, Brittany, France from July to September 2018 (Fig. 1a). The study area was around 900 m^2, with water depths ranging from 7 to 12 m depending on the tide coefficient.

2.2. Tested baits

A review of the literature identified polychaetes, bivalves, decapods, and cephalopods as the natural prey of Sparidae (Dulčić et al., 2006; Pita et al., 2002). In order to trigger natural feeding behavior in black seabream, we selected lugworms (*Arenicola marina*), cockles (*Cerastoderma edule*), mussels (*Mytilus edulis*), shrimp (*Palaemon serratus),* krill (*Meganyctiphanes norvegica*), and cephalopods (*Sepia officinalis* and *Loligo vulgaris*) for use as experimental bait. In addition, interviews with professional and recreational fishermen revealed that other baits commonly used on hooks to target Sparidae are sipunculid worms (*Sipuncula sp.*), an artificial lure made of soft rubber and used by recreational fishermen to target seabream, velvet crabs (*Necora puber*), and strouille, which is a thin mixture of sand, blue fish such as anchovy and sardine, fish oil, and fish blood. All baits were raw except *Cerastoderma edule*, whose flesh was steamed. In total, 10 baits were selected for the experiment. The baits were designed to attract the target species as close as possible and to be pecked. Wire or bags of different mesh sizes were used as containers, depending on the texture of the bait. Lugworms, cockles, shrimp, cephalopods, and sipunculids were slipped on a metallic wire. Velvet crabs and mussels were crushed and placed in a 10-mm mesh bag to allow the target fish to grasp the bait. Krill and strouille were placed in fine nylon mesh bags due to, respectively, their small size and paste-like texture.

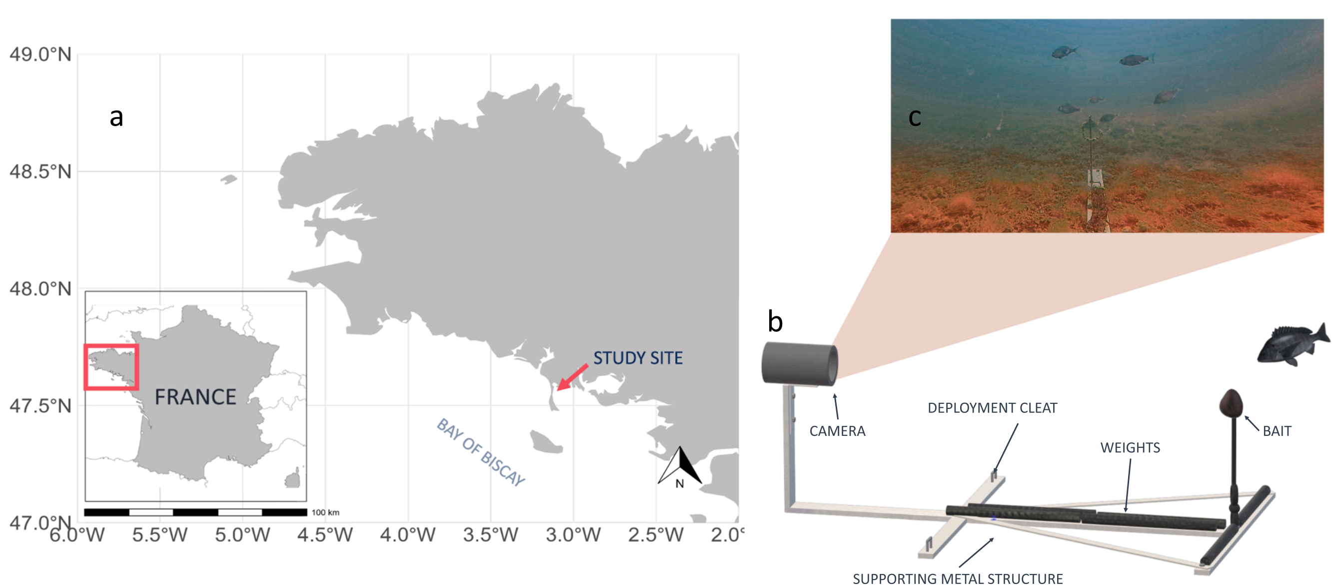

Fig. 1. (a) Study area. (b) BRUV setup. (c) Image obtained from the BRUV.

2.3. Experimental setup and video recording

The test consisted of recording the presence and behavior of fish around the bait using a BRUV randomly immersed within the experimental area. The BRUV was connected to the surface by a buoy and lowered from a small vessel. In order to take advantage of daylight conditions and avoid the use of artificial light, each immersion began in the morning and continued until the following morning. The bait and the SD video card were replaced each time the BRUV was recovered. Each bait was tested from 2 to 4 times, resulting in 10–36 hours of video recording per bait (Table 1). The BRUV was equipped with a Go Pro video camera (resolution 1920 x 1080 pixels) set at 25 frames per second, and a micro SD card of 128 Gb storage capacity. The camera was located at a distance of 2 m from the bait in custom housing designed to accommodate an extra 5 V USB battery pack of 15600 mAh. The bait was set 40 cm above the seafloor on a vertical stick to avoid predation from crustaceans such as spider crabs. The BRUV was devoid of any trap gear in order to assess the attractiveness of the bait alone (Fig. 1b and c).

2.4. Footage selection

We selected all underwater video sequences in which fish were present using an image analysis algorithm obtained from the OPENCV3.0 library (https://opencv.org/). The algorithm was designed to detect objects that are moving relative to the background. Algorithm parameters such as the sensitivity threshold and the size and number of detections for each track were set in such a way that fish could be distinguished from any other particles floating in the water. We first validated it for use by comparing the number of fish seen by the human eye and those detected by the algorithm. This comparison was performed on twelve 18-minute segments of footage exhibiting a wide range of fish abundance, light, and turbidity. In this analysis, 100 % of the detections made by the human eye were also made by the algorithm and vice versa. We therefore proceeded to apply this algorithm to the selection of fish sequences from the whole experiment. From all of the sequences highlighted by the algorithm, those with black seabream were then scrutinized visually. The tests for which no black seabream was recorded were excluded from the analysis, giving us a total of 26 valid tests and 177 hours of video recording (Table 1).

2.5. Footage analyses

The behavior of each individual was summarized and classified into one of three categories. (1) *Baited*: the individual swam to the bait, turned around within ca. 20 cm of it, and touched or ate it. (2) *Interest*: the individual spent time in the field of view of the camera because of the presence of the bait but did not approach within ca. 20 cm or touch it. (3) *Pass*: the individual appeared in the camera's field of vision but did not show any change of course towards the bait. Most of the Pass behaviors consisted of trajectories that never headed in the direction of the bait, although some fish stayed longer in the field of view of the camera because they were snouting the seabed without paying attention to the test bait. Unlike Pass behaviors, both Baited and Interest behaviors provide information about the attractiveness of a bait, with Baited behavior obviously demonstrating more robust attraction than Interest behavior. The sum of individuals exhibiting Pass, Baited, and Interest behaviors represented the total number of fish present in the area during the test. The start and end times of each behavior were recorded individually. An individual that demonstrated both Interest and Baited behaviors was recorded as Baited only. Following Anders et al. (2017b), a fish re-entering the field of vision after exiting for less than 20 seconds was recorded as being the same individual. If there were more than 20 seconds between an exit from and an entry to the field of vision, these fish, and their associated behaviors, were recorded as two distinct individuals.

Table 1
Summary of the number of tests and the corresponding number of video hours and individuals detected for each bait.

Bait	Number of tests	Number of tests with black seabream present	Number of hours of video recorded from tests with black seabream	Min. and max. no. of black seabream per bait (all behaviors)
Cephalopod	4	4	30.1	1 – 98
Lugworm	4	3	21.3	4 – 34
Strouille	4	4	35.8	10 – 28
Cockles	3	3	13.3	3 – 12
Lure	3	1	8.9	16 – 16
Shrimp	3	3	16.0	1 – 291
Krill	2	2	13.1	2 – 260
Mussel	2	2	10.2	10 – 26
Sipunculid	2	2	10.9	6 – 21
Velvet crab	2	2	17.3	9 – 337

2.6. Indicators of bait performance

Three indicators were used to compare the effectiveness of different baits in attracting and retaining black seabream. (1) We calculated the number of target fish per hour that demonstrated either Baited or Interest behavior, which provided information on the evolution of bait attractiveness over the soaking time; the two behaviors were considered together to generate a single curve for each test (Fig. 2). This indicator was computed for each bait either until the bait was completely consumed or until the end of the video recording. (2) The time of residence was recorded (in seconds) of each individual exhibiting Baited or Interest behavior. This indicator quantified the capacity of a bait to retain a target fish it in close vicinity. The effect of bait identity on the times of residence of all fish exhibiting either Baited or Interest behavior (pooled together) was tested using a one-way Anova. A post-hoc Fisher's least significant difference (LSD) test was then applied to further investigate the differences among baits. (3) We assessed the probability p that a black seabream in view of the camera exhibited Baited behavior as a function of bait identity with a binomial model including the bait as a fixed effect:

$$Y_i \sim B(p_{ki})$$

with Y_i the success or failure (0/1) of a fish i demonstrating Baited behavior in response to a given bait k (with $i \in \{1, \ldots, 1398\}$ and k $\in \{1, \ldots, 9\}$).

The resulting Baited probability provides information on the attractiveness of the bait independently of the abundance of the target species in the study area. Finally, as our ultimate objective was the identification of baits that most stimulate the presence of black seabream in the vicinity, the times of residence were explored for all three behaviors to determine if there were any significant difference between them. Mean times of residence (all baits together) were compared using a one-way Anova.

The distribution of the data was checked with a Shapiro test and log-transformed if necessary to achieve normality. Statistical analyses were performed using R (v4.3.0; R Core Team, 2020).

3. Results

Of all the organisms who were recorded as exhibiting Baited or Interest behavior, 89.1 % were black seabream, followed by spider crabs (*Maja brachydactyla*, 5.7 %) and other crab species (1.9 %). As the bait was suspended above the seabed and inaccessible to the crabs, no competition was observed.

For all baits combined, the mean number of black seabream per hour that exhibited either Baited or Interest behavior around the BRUV was

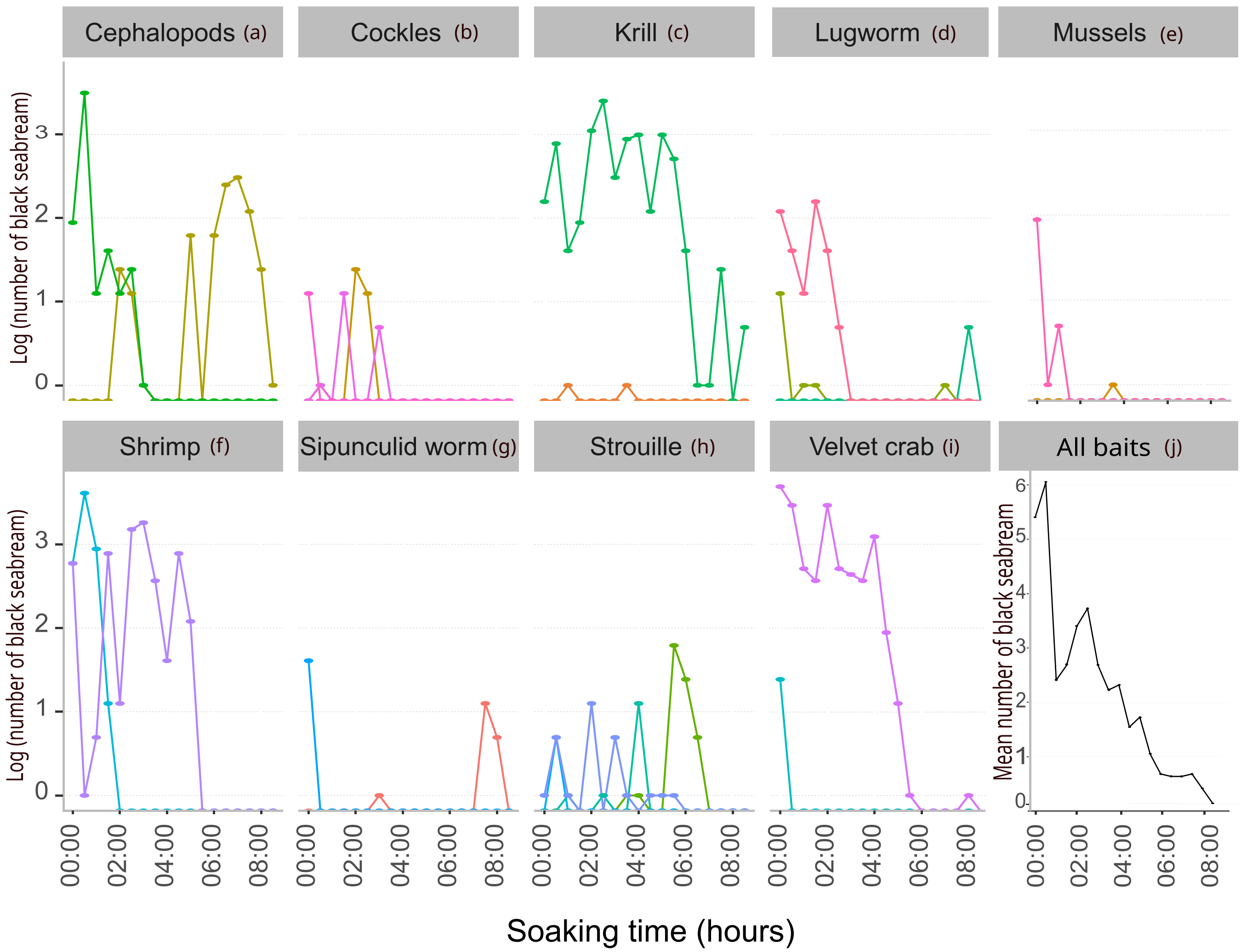

Fig. 2. (a) to (i) Number of black seabream (logarithm scale) demonstrating either Baited or Interest behavior (grouped together), observed for each bait in 30-minute time blocks following the launch of the BRUV. Each colored curve shows the results of a single test. (j): Mean number of black seabream with Baited or Interest behaviors per 30-minute time block, all baits combined. Individuals were counted from underwater images obtained from the BRUV.

highest during the first soaking hour (Fig. 2j). It then decreased steadily from the second soaking hour until either the bait was completely consumed or the end of the video recording (Fig. 2j). For each individual bait, the number of black seabream (Baited or Interest) per hour also tended to decrease with soaking time (e.g. Fig. 2a and e), with the exception of cockles and strouille (Fig. 2b and h), for which this indicator tended to remain stable. Tests using lugworms and sipunculid worms (Fig. 2d and g) featured few black seabream both at the beginning and at the end of the soaking time. Krill, velvet crab, and shrimp (Fig. 2c, i and f) attracted the highest mean number of Baited individuals per hour (9.8, 7.6, and 6.8, respectively), as well as the highest mean numbers of Interested individuals per hour (Table 2). The artificial lure

Table 2
Mean number of black seabream per hour demonstrating Baited or Interest behavior in the video footage. Mean time of residence for fish with Baited or Interest behavior and the Baited probability for each bait type. The standard deviation (σ) or the 95 % confidence intervals [CI] are shown in brackets. a, b, c, ab, and bc: Groups of baits with different effects on time of residence (Baited + Interest), as determined by Fisher's test.

Bait	Mean number of Baited individuals / hour	Mean number of Interested individuals / hour	Mean time of residence "Baited" in seconds	Mean time of residence "Interest" in seconds	Bait group from Fisher's LSD test	Baited predicted probability p [CI]
Cephalopd	3.4 (4.5)	2.3 (3.4)	24 (22)	15 (10)	b	0.36 [0.30; 0.43]
Lugworm	0.5 (0.9)	1.8 (3.2)	25 (47)	26 (29)	a	0.16 [0.08; 0.29]
Strouille	0.0	0.9 (0.6)	0	21 (16)	ab	0.00
Cockles	1.6 (1.1)	0.2 (0.2)	33 (51)	13 (6)	a	0.59 [0.38; 0.77]
Lure	0.0	0.0	0	0	NA	0.00
Shrimp	11.2 (10.1)	11.9 (12.4)	14 (20)	12 (15)	bc	0.29 [0.25; 0.34]
Krill	7.3 (10.3)	4.1 (5.2)	20 (68)	11 (10)	b	0.49 [0.43; 0.55]
Mussels	0.0	3.6 (4.9)	0	10 (7)	c	0.00
Sipunculid	1.2 (1.0)	0.4 (0.2)	21 (40)	16 (15)	ab	0.30 [0.16; 0.49]
Velvet crab	8.1 (11.4)	4.9 (6.3)	18 (61)	10 (7)	bc	0.38 [0.33; 0.43]

did not trigger any Baited or Interest behavior.

For the fish that exhibited Baited behavior, cockles induced the highest mean time of residence, followed by lugworm (33 and 25 seconds, respectively; Table 2). For fish with Interest behavior, instead, lugworm generated the highest mean time of residence (26 seconds). Strouille and mussels triggered only Interest, not Baited, behavior, with respective mean times of residence of 21 and 10 seconds. When Baited and Interest behaviors were pooled together, there was a clear effect of bait identity on time of residence (one-way Anova, *p-value* < 0.001). Fisher's LSD test differentiated among three groups of baits with respect to their effect on time of residence (a, b and c), with a few baits allocated to two overlapping groups (ab and bc). Of all tested baits, the longest mean times of residence were found for cockles and lugworm, and these were significantly higher than those associated with cephalopods, krill, velvet crab, shrimp, and mussels.

A one-way Anova indicated that the mean Baited time of residence was significantly longer than the Interest or Pass time of residence. The mean time of residence of fish exhibiting Pass behavior was significantly shorter than those demonstrating Interest (all *p-values* < 0.001) (Fig. 3).

The probability p predicted by the GLM that a black seabream present in the camera's field of view would exhibit Baited behavior was the highest for cockles ($p = 0.59$, Table 2), though only a few individuals were observed in tests of this bait. Lugworm was associated with the smallest positive probability of baiting black seabream ($p = 0.16$), while the artificial lure, strouille, and mussels all had a null probability of triggering Baited behavior.

4. Discussion

A thorough understanding of the feeding behavior of the target species is key to developing passive fishing gear such as fish traps (Løkkeberg et al., 2014; Vabo et al., 2004; Winger et al., 2016). The present study enabled us to determine the most suitable baits for attracting black seabream using three complementary indicators: the number of black seabream per hour that exhibited Baited or Interest behavior over the course of the soaking time, the time of residence of a fish that exhibited Baited or Interest behavior, and the Baited probability (i.e., the probability that a fish that entered the view of the camera would exhibit Baited behavior). Among the 10 baits we selected based on interviews with fishermen and the literature on the diet of black seabream, cockles were the most attractive in terms of Baited probability and Baited or Interest times of residence, though relatively few seabream were observed. This result corroborates studies of other Sparidae such as *Sparus aurata* or *Diplodus annularis* that reported a preference for bivalves (Dulčić et al., 2006; Pita et al., 2002). We also tested another bivalve species, mussels, that triggered Interest, but this bait was contained in a net that seemed to discourage Baited behavior. In the same way, black seabream showed Interest behavior towards strouille but did not feed on it. On the other hand, krill and velvet crab ranked second and third after cockles for Baited probability, probably because these baits could be grabbed by black seabream through the mesh of the surrounding net. The attractiveness of krill and velvet crab was also reported by Pita et al. (2002), who found that black seabream can feed on small crustaceans such as mysidaceans, as well as on large crustacean decapods. Polychaetes have also been identified as a dominant part of the diet of black seabream (Dulčić et al., 2006), and indeed, we found that lugworm was associated with the highest time of residence for Interested fish and second-highest for Baited fish. However, this bait was associated with a low probability of baiting black seabream despite being directly accessible to the fish.

The differences in Baited probability among the tested baits may be explained by fish feeding preferences, but also by different reactions to the visual or chemical stimuli generated by the various baits. The effectiveness of a bait in attracting a target species is likely related to the

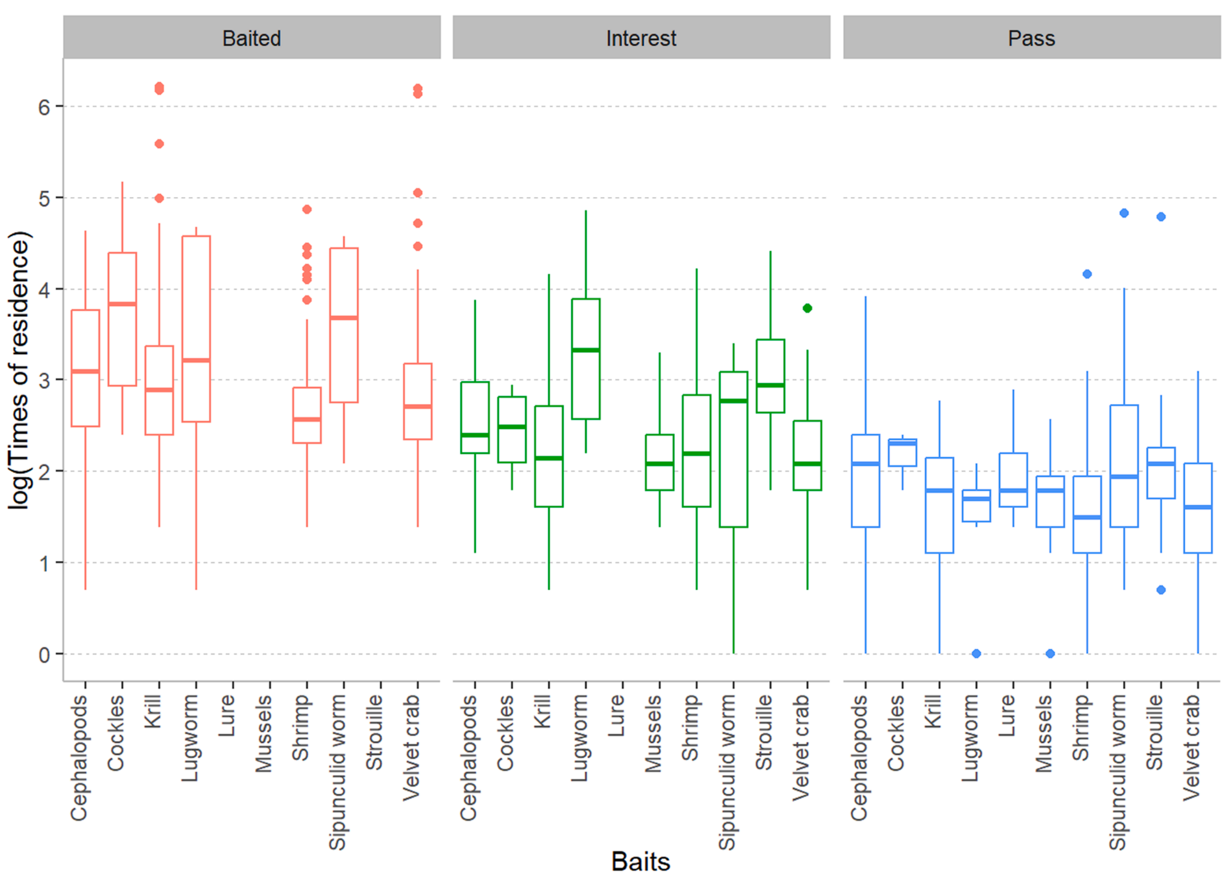

Fig. 3. Distribution of log-transformed times of residence (seconds) of black seabream exhibiting each behavior (Baited, Interest, and Pass) for each bait.

rate of diffusion of the chemical attractants it emits (Løkkeberg et al., 2014; Masilan and Neethiselvan, 2018). Significant differences were observed among baits in terms of their ability to attract black seabream, with fish approaching more closely to cockles (Baited behavior) than strouille (Interest behavior), for example. This is likely due to the ways the baits were presented. Cockles were stripped of their shells and set on a wire, and thus were directly available to the fish, whereas strouille was put in a fine-mesh bag. The bag allows the odor cue to diffuse in the water current, which could be enough to trigger the interest of fish, but its visual appearance might prevent fish from attempting to eat. The importance of visual appearance and, notably, the shape of a bait was discussed by Løkkeberg *et al.* in their 2014 review on efficient longline fisheries. The authors argued that the shape of a bait may affect the likelihood of it being eaten because fish prefer feeding on familiar shapes. These results underline the importance of consistency in the presentation of a bait, as well as the role played by the design of the container relative to the bait size: to provoke Baited behavior, which should translate into the highest possibility of being caught in a trap, the bait should be easily available to the target fish's mouth. It is likely that long times of residence (both Baited and Interest) were observed with cockles because they were directly available until they were completely consumed. This observation also suggests that, to optimize the soaking time of a trap, one should consider the trade-off between the quantity of bait and its consumption rate by target fish. The cost-benefit ratio for the quantity of bait should also take into account the economic and ecological values of both the bait and the expected catch. In the Bay of Biscay, cockles have the advantage of being a local resource, making them a suitable bait as long as their exploitation is sustainably managed. Indeed, in cases where traditional baits are taken from the wild, it may be necessary to investigate alternatives in order to reduce the use of natural resources (Patanasatienkul et al., 2020; Petetta et al., 2021).

The three indicators utilized in our study have direct applications to the deployment of trap gear. The evolution of the first indicator—the number of black seabream per hour over the soaking period that exhibited Interest or Baited behavior—revealed that the highest numbers of fish are present within a short time of launching the BRUV. When combined with the fact that the probability of fish escaping from traps increases with soaking time (Cullen and Stevens, 2017), this suggests that the longer the soaking time, the lower the catch of the trap; in other words, in an area with high fish abundance, just a few hours might be sufficient to optimize the catch. Next, the time of residence of Baited or Interested fish reflects the effectiveness of a bait in maintaining fish in its vicinity and its potential to stimulate fish attraction through social effects (Anders et al., 2017a; Kressler et al., 2021). Therefore, baits that induce long times of residence may increase the number of target fish entering the trap gear. Finally, the Baited probability can be interpreted as a proxy of catch probability, provided that the trap design facilitates fish entry (Méhault et al., 2022). Ideally, a suitable bait should be associated with both a high Baited probability and long times of residence of the target species. These indicators could also be used to understand the interactions between the target fish species, the bait, and unwanted competitor species (e.g., crustaceans), with the goal of improving the species-selectivity for passive baited gear (Gilman et al., 2020; Løkkeborg et al., 2014). Finally, understanding how fish behave relative to the bait and gear can have direct applications for the development of fish traps (Méhault et al., 2022) by helping to identify features that facilitate access to the bait while preventing both unwanted by-catch and the escape of the target species.

Overall, our study highlights the importance of the type of bait, bait container, and soaking time in attracting a target species. Nevertheless, our results are based on a methodology that has a few notable limitations. First, following the example of Anders et al. (2017b), we used a time period of 20 seconds to discriminate one individual from another entering and exiting the field of view. This arbitrary time-lapse value may have led to an overestimation of the number of fish counted for the analysis. However, given that only one target species was studied, this potential behavioral bias was considered to be of the same order of magnitude for all of the videos. Second, the experiment was carried out exclusively during the day to avoid the use of artificial light, which could have altered the natural feeding behavior of the target fish (Bassi et al., 2022). Future studies might benefit from the recent development of acoustic underwater cameras, which might be able to overcome the limitations of current technology with respect to light and turbidity (Wei et al., 2022) and could potentially open up opportunities to improve the efficiency of passive gear for finfish capture.

All the baits tested have an economic value, are either commercially and/or locally available, and were easily accessible for a small-scale experiment. However, the cost and sustainability of bait remains an issue for large-scale use (Spoors et al., 2021). For this reason, the results of this study were used to develop a semi-artificial bait: a dose of lyophilized cockles was transformed into powder and integrated into a biodegradable and long-lasting bio-plastic (Abangan et al., 2024). Such experiments pave the way for the development of alternative and sustainable baits, especially if, at a later stage, the natural flavor can be replaced by a synthesized one. Although not all natural baits are cost-effective, understanding which ones are successful in attracting a target species is a first step towards developing alternatives that are economically and ecologically sustainable at a large scale.

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CRediT authorship contribution statement

Fluhr Julie: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Morandeau Fabien:** Writing – review & editing, Methodology, Investigation, Data curation, Conceptualization. **Mehault Sonia:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Baudry Jéromine:** Investigation, Data curation. **Kopp Dorothée:** Writing – review & editing, Writing – original draft, Methodology, Funding acquisition, Conceptualization. **Robert Marianne:** Writing – review & editing, Formal analysis, Data curation. **Simon Julien:** Writing – review & editing, Methodology, Investigation, Data curation, Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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