

Baiting of gillnets: An innovative approach to increase catch efficacy

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Gillnets are one of the most commonly used fishing gears worldwide and frequently regarded as highly selective. Success of gillnet operation is dependent on the activity of fish in the vicinity of the gear, which increases the likelihood of physical contact. Stimuli, those appeal primarily to the olfactory system, are widely used in passive fishing operations such as traps and longlines, as fishes being seen at close proximity to the fishing gear. The success of bait-dependent fishing is highly dependent on knowledge of the targeted fish's feeding behaviour and an understanding of olfactory efficacy, or the ability to detect and locate the source of olfactory plumes efficiently (Hossucu, 1991). Various researchers have asserted that increasing the likelihood of a gillnet encounter is possible by luring the fish to the nets (Engas et al., 2000; Kallayil et al., 2003; Ozdemir and Erdem, 2006).

In this context, and with the goal of increasing the catch efficiency of gillnets, a preliminary work was attempted by baiting marine gillnets. Experiments were conducted off Cochin in Eastern Arabian sea during 2018 to 2019 at a depth range of 80-100 m. Experimental gillnets were made of polyamide multifilament (210x9x3) having a mesh size of 140 mm, and rigged at a hanging coefficient of 0.5. Due to its widespread availability and strong odour, Indian mackerel (*Rastrelliger kanagurta*) was chosen as bait. The chopped fishes were placed in small-mesh pouches and tied to each 10 g of head rope of the experimental nets measuring 1000 metres in length and 7.5 metres in vertical height (Figure 1). Control net (1000 m) was of identical specification as of the experimental net devoid bait pouch. Nets were set at dawn following a soaking period of four to five hours, and hauled at midnight.

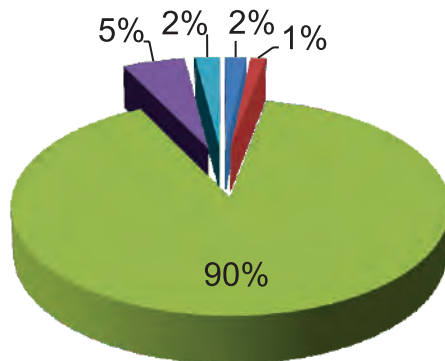
The catch per unit effort per soaking time of combined experimental gillnet was calculated as 5.08 kg/h. Baited gillnet landed more catch (93.8%) than non-baited gillnet (6.2%) (Figure 2). In the baited gillnet, the catch primarily comprised of *Manta birostris*, *Scomberomorus commersoni*, *Lobotes surinamensis*, *Megalops sp.*, Cyprinoides and *Katsuwonus pelamis*. where as in non-baited gillnet, *Katsuwonus pelamis*, *Rastrelliger kanagurta*, *Cypselurus sp.* and Leather jack contributed the catch (Figure 3 & 4). This indicated that carnivorous/top predatory fishes, which frequently fetched a higher price than the species caught in the control gillnet, interacted more with baited gillnets, indicating the bait efficacy.

Engas et al. (2000) compared catch rate of baited and non-baited fleets of gillnets using mackerel as bait and found significantly higher catch (61%, 23% and 36% for cod, ling and Greenland halibut, respectively) in baited fleets. Similarly, effect of baiting and colour combination on the efficacy of gillnets was studied in Butte Lake, New Mexico, showed increased catches between 80% and 85% (Jester, 1977). Dartay and Duman (2016) also reported higher catch efficacy in baited part of gill net than non-baited part. This study demonstrates that baiting can significantly increase the catch rate of gillnets. Baiting may also significantly reduce soaking time due to the increased CPUE in baited gillnets. A relatively short soaking time would benefit obtaining fresh catch, reducing catch loss due to predator depredation, and minimising gear loss. Understanding the food search behaviour and feeding mechanism of commercially targeted fish is critical for future research aimed at improving the efficacy of gillnet fishing through the use of bait. Extensive research is being conducted to learn more about the bait preferences of various target species.

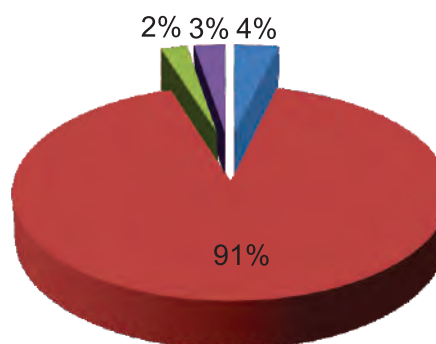


Fig.1 Experimental gillnet ready for operation

Species composition in baited gill net



Species composition in non-baited gill net



- Lobotes surinamensis
- Megalops
- Leather jack
- Katsuwonus pelamis
- Manta birostris
- Scomberomorus commers
- Rastrelliger kanagurta
- Cypselurus sp.
- Katsuwonus pelamis

Fig. 3 & 4 Major species contributed by baited and non-baited gill net

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