Fishing trial using a portable fish aggregating device (FAD) in the Indian Ocean

R Yusfiandayani1*, M Nurilmala2, Nurjanah2, A Abdullah2, M F A Sondita1, R Mualim3, A Kusdinar3 and H Choerudin3

1Department of Fisheries Resources Utilization, Faculty of Fisheries and Marine Science, IPB University (Bogor Agricultural University), Bogor, Indonesia
2Department of Aquatic Product Technology, IPB University (Bogor Agricultural University), Bogor, Indonesia
3Jakarta Fisheries University, Jakarta, Indonesia

*E-mail: ocha_roza@apps.ipb.ac.id

Abstract. Fish aggregating device (FAD) are commonly used in Indonesia and once deployed in the waters they are immobile. A portable FAD equipped with sound generating devices is an innovation to attract fish which has capability to react to audio stimulant. A fishing trial in April 2019 was carried out to check the performance of the EFAD. The research was carried out using a research vessel operating handlines with fish baits. The fishing trial successfully caught the white spotted triggerfish (Canthidermis maculatus), which is usually bycatch of tuna purse seine and gillnet fisheries. The catch of the trigger fish could not be attributed solely to the sound generated by EFAD because other factors, such as the fish bait and the size of the boat, might attract the fish.

Keywords: handline, Indian ocean, portable EFAD

1. Introduction

Fish aggregating device (FAD) was commonly used by fishers targeting pelagic fish, such as tuna species. The use of FAD was reported to improve fishing efficiency since prospective fishing spots can be located more accurately, hence it reduce time and fuel consumption of fishing operation, improve fishing productivity (Monintja 1990). A unit of FAD usually consists of floating device, fish attractors, sinkers, mooring line and anchor (Monintja 1990). FADs are usually deployed in a fixed location in deep water regions.

A fishing trial with fish aggregating device (FAD) was conducted in a trip of M/V Madidihang 03 off Bengkulu coast, Indian Ocean. The FAD we used was different from conventional traditional FADs in terms of attracting device. The conventional traditional FADs commonly consist of floating device, fish attractors, sinkers, mooring line and anchor (Monintja 1990). Type of attractor can be any type of stimulant to any sensory organ of target fish. The FAD used in the fishing trial was equipped with sound generating device, called portable FAD (Yusfiandayani et al 2013, Yusfiandayani et al 2019). The FAD is one of innovation that reduce the risk of being lost or vandalized, handy to carry, easy to
construct and can be moved to any place. Yusfiandayani et al (2014) reported that from the operation of similar FAD in Palabuhanratu bay, fishers with handlines caught 5 species of fish, i.e. Coryphaena hippurus (2%), Sardinella sp. (1%) and Selaroides leptolepis (1%).

2. Materials and methods

Fishing was carried out onboard MV Madidihang in a trip from April 1-16 April 2019 in Indian Ocean waters. Portable FAD was made in Fishing Technology Laboratory, Department of Fisheries Resource Utilization, Faculty of Fisheries and Marine Sciences, IPB University (Bogor Agricultural University). The research method was experimental fishing by using portable FAD and handline.

The FAD (figure 1) was deployed at about 50 m from the boat; the specification of the FAD was presented in table 1. The FAD generated sound of frequency of chirp quadratic 11 – 15 KHz. Fish attractors were hung along the rope. The fishing gear was hand-operated hook and line, or handlines. There were 30 units of handlines, each with line of 150 m and 4 hooks number 6 (figure 2). A piece of squid meat was attached to each hook of the handline.

| Components  | Materials       | Volume or dimension | Amount (unit) |
|-------------|-----------------|---------------------|---------------|
| Frame       | Fibre glass     | 4.5 kg              | 1             |
| Attractors  | EFAD rafia fibre | 100 cm              | 220           |
| Mainline    | Polyethylene (PE)| 9 m                 | 1             |
| Sinkers     | lead            | 1.44 kg             | 3             |

Table 1. Specification of the portable EFAD used in the trial fishing in Indian Ocean off Bengkulu.

Figure 1. Portable EFAD, a sound generating unit without compartment (left) and a sound generating unit within water proof compartment (right).
Figure 2. A unit of handline used in the trial fishing in Indian Ocean off Bengkulu. a: roller, b: mainline, c: branch line, d: hook, e: sinkers.

3. Results and discussion

A total of 163 fish specimens from 7 species were caught during the trial fishing (table 2). The catch was dominated by white spotted triggerfish (*Canthidermis maculatus*), i.e. almost 90% of the total catch (figure 3). The second most caught fish was rainbow runner (*Elagatis bipinnulata*) (table 1, figure 4). The length-weight relationship for the trigger fish was: $W = 0.3026 L^{2.142}$ with $r^2 = 0.245$. The value of $b$ was less than 3; it means the growth of weight was less than the growth of length or negative allometric growth.

The triggerfish (*Canthidermis maculatus*) is one of demersal fish caught by fishers along Sumatera coast (Akbardiansyah et al 2018). In Indian waters, the fish was found at depths of 50-100 m with sandy, muddy or rocky bottoms (Makwana et al. 2015). Interestingly, the fish gathered below the boats and caught during the trial fishing. This should not be surprising because such coastal species was also bycatch from tuna purse seine fisheries (Lezama-Ochoa et al 2016) and gillnet fisheries (Moazzam et al 2016).

The fishing trial did not catch any tuna. The tuna might not be available in the fishing location. A market survey in Bengkulu received report from local fish sellers that during the time of the trial fishing local fishers did not catch much tuna. Therefore, it is not surprising that we did not catch any tuna.

The catch of the trigger fish, the rainbow runner and other fishes could not attributed to the effect of sound generated by the EFAD. Significant physical feature of the boat, the use of fish bait may have combined effect of the EFAD to the behaviour of the fishes we caught. Therefore, further research to investigate the effectiveness of the sound of the EFAD still needed.
Table 2. Fish composition from the fishing trial in Indian Ocean, off Bengkulu.

| No | Name                          | Species                  | Number (ind.) |
|----|-------------------------------|--------------------------|---------------|
| 1  | White spotted triggerfish     | *Canthidermis maculatus* | 144           |
| 2  | Rainbow runner                | *Elagatis bipinnulata*   | 6             |
| 3  | Smooth-tailed trevally        | *Selaroides leptolepis*  | 3             |
| 4  | Yellowtail                    | Caesionidae              | 3             |
| 5  | Shark                         | Selachimorpha            | 3             |
| 6  | Dolphin fish                  | *Coryphaena equiselis*   | 2             |
| 7  | Snake mackerel                | *Gempylus serpens*       | 2             |

Figure 3. White spotted triggerfish (*Canthidermis maculatus*) caught in Indian Ocean off Bengkulu.

Figure 4. Rainbow runner (*Elagatis bipinnulata*) caught in Indian Ocean off Bengkulu.
4. Conclusion

The fishing trial successfully caught the white spotted triggerfish (*Canthidermis maculatus*), which is usually bycatch of tuna purse seine and gillnet fisheries. The catch of the trigger fish could not be attributed solely to the sound generated by EFAD because other factors, such as the fish bait and the size of the boat, might attract the fish.

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**Figure 5.** Length-weight relationship for white spotted triggerfish (*Canthidermis maculatus*) caught in Indian Ocean off Bengkulu

\[ y = 0.3026x^{2.2142} \]
\[ R^2 = 0.245 \]
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