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The Use of Bridle Line on Operation of Bottom Gill Nets in Manado Bay Waters, North Sulawesi, Indonesia

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Abstract

This study was intended to figure out the influence of bridle line application on bottom gill net fishing operations. Bridle line length 1 m in order to prevent the lead line and lower net line to directly touch the bottom waters, and to minimize lifting of pieces of coral and by-catch. Lifting pieces of coral could damage bottom habitats and the benthic organisms. The use of bridle line had resulted the gill net to be environmental friendly and cought only the economically important fish. Bottom gill net used in this study had a size of 148.00 m long and 4.70 m wide and mesh size of 13.75 cm with net yarn number 18. It was operated outside of the coral reefs zones at the depth range of 20 m to 50 m. The fish catches were demersal and reef fish with minimum size of 25 cm body circle or bigger was dominated by dogtooth tuna, *Gymnosarda unicolor*. The application of 1 m-bridle line can reduce the coral cover up to 98 % compared to the other bottom gill net which its lower part have a direct contact with the seabottom. During 10 fishing trips, there was no benthos brought up to the surface at during the net hauling. But new problem was found that the use of bridle line on the gill net had causes fish escape through the bridle line along the bottom net.

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Keywords: Benthos; bridle line; coral cover; coral reef; gill net

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1. Introduction

Bottom gill net operations known by fishermen communities in Manado Bay. This fishing gear is usually operated in shallow waters around coral reefs in the depth of 10 m to 50 m, with fishing target of demersal fishes. However, damages in bottom substrates from the gear operation occur when the net is brought up to the boat in which some corals are also taken. Previous finding on 75 cm gill net of bridle line indicated that the use of bridle line helped reducing the damage of bottom substates compared with the gill net without a bridle line. The fish species caught in both gill nets were not different (Wahyuddin et al., 2013).

Bottom gill net was designed with a total height of 5.7 m consisting of 4.7 m of net and 1 m of bridle line. This becomes a basis of demersal fish target fishing operation as suggested by Grove and Sonu (1985) that vertical distribution of most demersal fish was at the range of 3 m above the bottom. Therefore, the net height should not exceed 5 m in order to ease the net placement on the bosat and its fishing operation (Reppie, 2004).

The seine components used in bottom gill net comprised upper line, float line, float, net, side lines, lower line, lead line, anchor, and long line, forming a unit of bottom gill net. Its sinking rate usually reaches (2 to 3) times faster than its floatability, and the mesh size generally used ranged from 3.75 cm to 7.5 cm. The gear is operated on the bottom around coral reefs where the lower part directly touches the sea bottom. Fishing operations are done in either day or night with setting time of 6 h to 12 h. Catches are demersal fish, other unconsumed animals, and broken corals.

To reduce damage the bottom damage either bottom animals or corals, a study was done on bottom gill net added with bridle line to know how far the contribution of the bridle line to the coral cover and fish catch selectivity.

This study used 13.75 cm mesh size gill net of 148.00 m long and 4.70 m high divided into 6 units of each 24.67 m long. Three units were added with bridle line of 100 cm long and the other three units were without bridle line. Each bridle line was equipped with additional concrete weight. Fishing operation was done at night at the water depth of 30 m near the coral reefs.

2. Material and methods

Fishing operation were conducted in Manado Bay waters to obtain the data of number lifted and number in the bottom gill net using bridle line and then compared with previous finding using the fishermen's design bottom gill nets and that with 75 cm bridle line. t-test was used to compare sample median following (Steel and Torrie, 1989).

$$\left\{ \mathrm{t} = \frac{\overline{X} - \overline{Y}}{S_{\overline{D}}} ; S_{\overline{D}} = \frac{\sum D^2 - \left(\left(\sum D \right)^2 / n \right)}{n-1} \right\} \tag{1}$$

or

$$t = \frac{\overline{X} - \overline{Y}}{\sqrt{\frac{\sum D^2 - \left(\left(\sum D \right)^2 / n \right)}{n-1}}} \tag{2}$$

Where :

$\overline{X}$: value of coral cover/catches in bottom gill net

$\overline{Y}$: value of coral cover/ bottom gill net catches with bridle line.

D : difference of coral cover/catches in bottom gill net without bridle line and bridle line

n : fishing trip