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ANALYSIS OF THE EFFECT OF HALOGEN LAMP REFLECTOR SHAPES ON LIGHT ILLUMINATION AND CATCH YIELD OF SCOOP NET FISHERIES IN CILACAP WATERS

Analisis Pengaruh Bentuk Reflektor Lampu Halogen Terhadap Iluminasi Cahaya Dan Hasil Tangkapan Perikanan Jaring Serok Di Perairan Cilacap

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ABSTRACT

Scoop net nets or Caduk nets are small pelagic fishing devices operated in the waters of Cilacap. The net scoop net is operated with a halogen lamp tool. To focus on the light, fishermen use a reflector (container). The shape and size of the refractor used by fishermen varies, there are two forms of reflectors that are often used by fishermen, namely cone and concave reflectors. The aim of the study was to determine the effect of using cone and concave reflectors on catches. The method used is descriptive method. While the method of data collection is observation, documentation and interviews with related parties. The research was condusted on August 2023. The results showed that the light illumination values in dim, standard and maximum conditions in cone reflectors were 20 lux, 4,970 lux and 6,970 lux, respectively. Whereas the concave reflector is 13 lux, 3,470 lux and 5,170 lux. The catch composition for 15 trips, namely from the types of white anchovy (Stolephorus indicus), anchovy rice (Stolephorus comersonni), lemuru (Sardinella lemuru), tembang (Sardinella fimbriata). The catch weight is the use of a cone reflector, namely 1,360 Kg teri putih, teri nasi 197 Kg, lemuru 198 Kg, and tembang 981 Kg. As for the concave reflector, the catch is obtained, 1,270 Kg white teri, 48 Kg teri nasi, 376 Kg Lemuru, and 805 Kg tembang. Based on statistical tests obtained that the use of different forms of reflector does not affect the acquisition of catches during the capture process. The significance value is 0.768 > 0.05, so H0 is accepted. This shows that there is no difference in the use of cone reflectors and concave to the catch on the scoop net.

Keywords: Anchovy (*Stolephorus Sp*.); Scoop net; reflector; light illumination; and Cilacap Waters.

ABSTRAK

Jaring *scoop net* atau jaring caduk merupakan alat tangkap ikan pelagis kecil yang dioperasikan di perairan Cilacap. Jaring scoop net dioperasikan dengan alat bantu lampu halogen. Untuk memfokuskan cahaya, nelayan menggunakan reflektor (wadah). Bentuk dan ukuran reflektor yang digunakan nelayan bervariasi, ada dua bentuk reflektor yang sering digunakan nelayan yaitu reflektor kerucut dan cekung. Tujuan dari penelitian ini adalah untuk mengetahui pengaruh penggunaan reflektor kerucut dan cekung terhadap hasil tangkapan. Metode yang digunakan adalah metode deskriptif. Sedangkan metode pengumpulan data yang digunakan adalah observasi, dokumentasi dan wawancara dengan pihak-pihak terkait. Penelitian ini dilakukan pada bulan Agustus 2023. Hasil penelitian menunjukkan bahwa nilai iluminasi cahaya pada kondisi redup, standar dan maksimum pada reflektor kerucut berturut-turut sebesar 20 lux, 4.970 lux dan 6.970 lux. Sedangkan pada reflektor cekung sebesar 13 lux, 3.470 lux dan 5.170 lux. Komposisi hasil tangkapan selama 15 trip, yaitu dari jenis ikan teri putih (*Stolephorus indicus*), teri nasi (*Stolephorus comersonni*), lemuru (*Sardinella lemuru*), tembang (*Sardinella fimbriata*). Hasil tangkapan dengan menggunakan reflektor kerucut yaitu teri putih 1.360 Kg, teri nasi 197 Kg, lemuru 198 Kg, dan tembang 981 Kg. Sedangkan untuk reflektor cekung diperoleh hasil tangkapan, teri putih 1.270 Kg, teri nasi 48 Kg, lemuru 376 Kg, dan tembang 805 Kg. Berdasarkan uji statistik diperoleh bahwa penggunaan bentuk reflektor yang berbeda tidak berpengaruh terhadap perolehan hasil tangkapan selama proses penangkapan.

Kata Kunci: Ikan teri (*Stolephorus* Sp.*);* reflektor; *Scoop net*; Pencahayaan; dan Perairan Cilacap.

INTRODUCTION

Small-scale capture fisheries are a major livelihood in many parts of Indonesia, including Cilacap Regency. One traditional fishing gear still used by local fishermen is the caduk net. This tool is operated simply and efficiently to catch small pelagic fish such as anchovies (Stolephorus sp.), especially during night fishing operations (Adiyanto et al., 2018; Prasetyo & Sulistyo, 2021). Caduk nets are typically operated at night, from 6:00 PM to 5:00 AM WIB, and are divided into three operational trips. According to Sudirman and Mallawa (2004), fishing gear such as the scoop and sondong (types of caduk nets) are classified as lift nets. Lift nets are cone-shaped or pouch-shaped and are pulled using a wooden or bamboo frame. The mouth of the net is attached to a frame made of bamboo, rattan, or metal and can be operated without a boat. The advantages of this tool lie in its simplicity, low operational costs, and effectiveness in catching small pelagic fish in shallow waters (Rahman et al., 2023).

Besides being used to catch fish from other fishing gear such as lift nets, seine nets, or purse seines, scoop nets can also be operated independently. For example, during the lemuru season in the Bali Strait, using a scoop net independently can produce up to one quintal of fish per night with the aid of light. In practice, two 500-watt halogen lamps are used to attract fish to the fishing area. These lamps are installed on the right and left sides of the net and powered by a generator that has been specially configured by the fishermen to optimize output. The generator's output voltage can be adjusted to three levels: low, standard, and maximum. Each voltage setting affects the brightness of the halogen lamp, thus directly affecting fishing efficiency (Wibowo et al., 2023). To focus the light more effectively, fishermen equip the lamps with reflectors. Modifying the reflector shape has been shown to increase light efficiency and enhance fish response to the light source (Li et al., 2022; Siregar & Zulfikar, 2020).

Reflectors commonly used by fishermen are conical or concave. Fishermen believe that reflector shape affects fishing performance because it influences the pattern of light scattering underwater (Hasibuan et al., 2024). Therefore, scientific research is needed to examine the effect of reflector shape on light efficiency and catch yields. Furthermore, it is important to evaluate generator output power at different voltage levels, according to the configuration used by fishermen, to determine its effect on lighting performance in fishing operations. This study aims to analyze the effect of reflector shape and generator output power on light intensity and catch yields in scoop net fishing in Cilacap waters.

RESEARCH METHODS

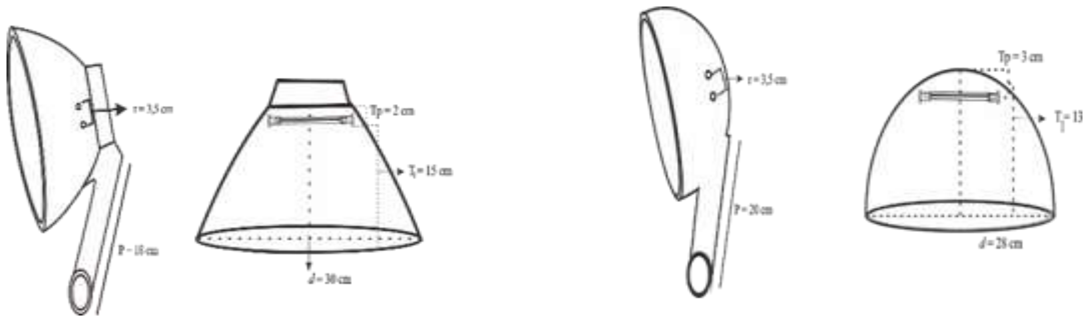
Tools and materials

The tools and materials used in this research are as follows.

No	Tools and materials	Accuracy	Utility
1	Caduk fishing gear (*scoop net*) - Triangle - Circle	-	Fishing gear
2	500 watt halogen lamp	-	Fishing gear
3	Reflektor	-	Light concentrator
4	Geberator set (Genset)	-	Halogen lamp power source
5	Stationery	-	Recording data from observations and calculations
6	Camera	0,1 pixcel	Documenting research activities
7	*Stopwatch*	0,01 detik	Measuring research activity time
8	*Luxmeter*	1 lux	Measuring the amount of light illumination
9	GPS	-	Determining the capture position
10	*Rollmeter*	1 mm	Measuring the dimensions of ships and fishing gear
11	Sewing meter	1 mm	Measuring the length of the catch
12	Scales	1 gram	Measuring the weight of the catch
13	*Multimeter*	-	Measuring the generator voltage value
14	Katir Boat	-	Floating means for operating Caduk nets
15	*Calm Meter*	-	Measuring generator current strength

Time and place

This research was conducted in August 2023 in the waters of Cilacap. The method used in the study was descriptive. The sampling technique used was purposive sampling, involving two subjects: Fisher A and Fisher B. Fisher A used a conical reflector, while Fisher B used a concave reflector. The power source for the lighting system was a 950-watt generator. Before operation, the generator was manually configured to maximize output power. The fuse and AVR (Automatic Voltage Regulator) components were disconnected, allowing the electric coil current to be passed directly to the lamp. The generator can also be adjusted to three voltage levels: low, standard, and maximum. This voltage setting affects the brightness level of the halogen lamp. The difference between the two reflector shapes used in this study is shown in Figure 1.



(a) Conical reflector (b) Concave reflector

Figure 1. Reflector specifications. Distance between lamps (r), reflector arm length (P), distance between reflector wall and lamp (Tp), reflector height (TI), and reflector diameter (d).

Reflector testing was conducted in two stages. The first stage involved measuring the distribution of light luminance in the air (controlled conditions). The second stage was field testing, in which conical and concave reflectors were used during actual scoop net operations. Field testing was conducted for 15 days for each reflector type. Two types of scoop nets were operated during the study (Figure 1): round scoop nets and triangular scoop nets. The frequency of use of each net type was not predetermined; the choice of net type depended on the behavior and abundance of surface fish resources. When fish were scarce and more agile, fishermen tended to use round scoop nets. Conversely, when fish were abundant and formed calmer schools, triangular scoop nets were preferred.

Scoop Net Construction and Fishing Operation Procedures

The construction of a scoop net consists of three main components: the frame, the handle, and the net material. The triangular frame of the scoop net is made of bamboo, with a length of 2.5 meters and a diameter of 30 mm. The net bag is made of polyethylene. The circular frame of the scoop net, on the other hand, is made of a 0.8 mm diameter iron ring with a circumference of 2.26 meters. The handle is made of bamboo, and the net material is polyamide (PA). In terms of durability, the circular scoop net is sturdier and more durable than the triangular type.

Scoop net operation involves several stages:

a) Preparation Stage

This stage is carried out before setting out to sea and includes preparing supplies (fuel, food, cigarettes), checking the condition of fishing equipment, generators, and lights. The boat departs from the fishing base at 5:00 PM WIB. The distance from the fishing base to the fishing location is approximately 3–5 nautical miles, with a travel time of approximately 30 minutes.

b) Looking for Schools of Fish

The process of finding schools of fish relies heavily on a fisherman's instincts. Fishermen typically pause to observe environmental cues such as wind direction, current strength, water conditions, and clarity. When the current is calm, fishermen search in open water. Conversely, when the current is strong, they choose bays or coastal zones, where water movement tends to be slower, making it easier to catch anchovies. Schools of fish disturbed by boat movements often jump to the surface, which helps fishermen pinpoint their location.

c) Herding Fish to Catchable Areas

The herding technique involves reducing the brightness of the lights to attract fish directly under the net. This is achieved by reducing the fuel supply or lowering the generator voltage until the light changes to orange or red. If the fish are already congregating under the bright light, reducing the brightness is unnecessary.

d) Arrest Process

The fishing process begins after the fish gather in the scoop net's catchment area. The net is pushed or maneuvered to capture the school of fish. Once the fish have entered the net's pocket, the scoop net is lifted to retrieve the catch.

e) Sorting and Identification

After catching, the catch is sorted by species, weighed, and identified.

Method of collecting data

The methods used in this research include observation, interviews, and documentation. The data collected consists of primary and secondary data.

Primary data includes:

- Construction of fishing gear
- Generator power output
- Lighting intensity (lux)
- Composition of the catch
- Total weight of the catch

Secondary data includes:

- General conditions of Cilacap waters
- Number of fishing gear operated in Cilacap

Data Analysis Methods

Descriptive Analysis

Measurement and observation data obtained during the research are presented in the form of graphs and tables, and analyzed descriptively based on the following topics:

1. Construction of conical and concave reflectors,
2. Generator output power calculation,
3. The luminance value of halogen lamps in air medium,
4. Catch per trip,
5. Species composition of the catch, and
6. Total weight of catch during the study period.

Statistical Analysis

Statistical analysis was used to determine the effect of reflector shape on anchovy (Stolephorus sp.) catches. The analysis was conducted for circular and triangular scoop nets. Catch data obtained using conical and concave reflectors were processed using SPSS version 23 software.

Normality Test

A normality test is performed to verify whether the data follows a normal distribution. If the data are normal, further analysis is performed using an independent sample t-test.

Independent Samples t-Test

- Statistical tests were conducted at a significance level (α) = 5%.
- Hypothesis:

H_0 = There is no significant influence of the reflector shape on the catch results using scoop nets.

H_1 = There is a significant effect of the reflector shape on the catch results using scoop nets.
• Decision criteria:
- If the significance value > 0.05, then H_0 is accepted.
- If the significance value is < 0.05, then H_0 is rejected.

RESULTS

Generator Output Power Measurement

The results of generator output power measurements are presented in Table 1.

Table 1. Generator Output Power at Different Voltage Settings

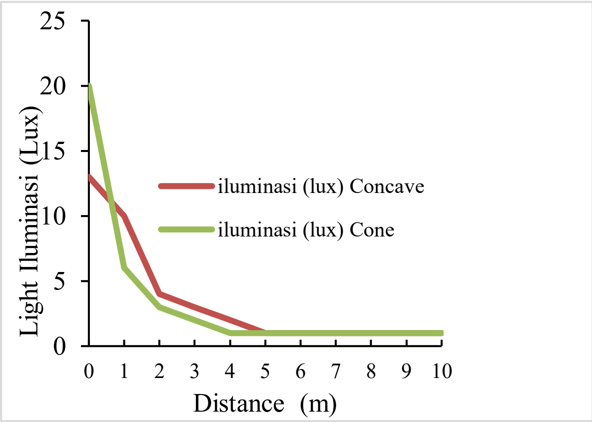
No	Generator condition	Voltage (*Volt*)	Current Strength (*Ampere*)	Power (*Watt*)	Illumination (Lux)	
					Cone	Sunken
1.	Lerekan (Minimum)	71	1	71	20	13
2.	Standard	355	2,8	994	4.970	3.470
3.	Maximum	410	3,1	1.271	6.930	5.170

Data source: 2023 research

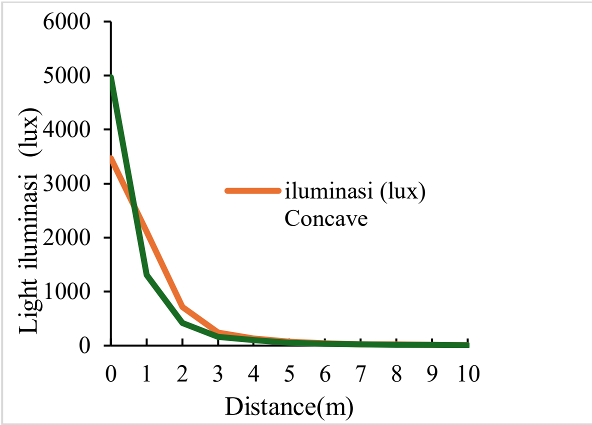
Based on Table 1, it can be seen that the generator output power ranges from a minimum of 71 watts at low voltage to a maximum of 1,271 watts at the highest setting, with 994 watts recorded at the standard setting. The increase in generator output power is closely related to variations in the generated voltage and current. The generator output voltage is strongly influenced by the rotor rotational speed (RPM); an increase in rotor speed causes a proportional increase in output voltage. Supardi et al., (2015) stated that there is a significant correlation between the rotational speed and output voltage of a low-speed induction generator under no-load conditions, where the voltage increases almost linearly with the rotor speed. This finding is supported by Priyambodo and Rachmat (2020), who found that in small-scale electrical systems for fishing, fluctuations in engine speed directly affect the voltage stability and quality of the electrical power used for lighting fishing lamps.

Measurement of Light Intensity in Air Medium

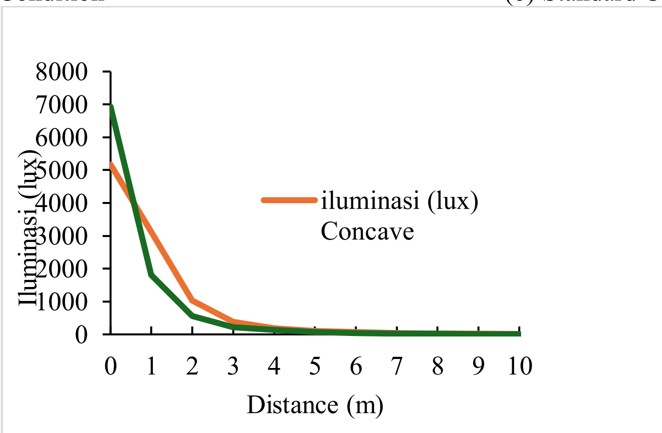
Airborne light intensity measurements were performed at three generator voltage settings: low, standard, and maximum. The results showed that under each condition, the highest light intensity was consistently recorded at the first measurement point. This is due to the proximity of the first point to the light source, resulting in a higher light intensity than at more distant points. The light intensity decreased with increasing distance from the light source. This decrease follows the inverse square law, which states that light intensity is inversely proportional to the square of the distance from the source.



(a) Dim Condition



(b) Standard Conditions



(a) Maximum Condition

Figure 2. Lighting intensity at different generator voltage levels

Under low voltage conditions, the highest illuminance value recorded for the concave reflector was 13 lux, while the conical reflector reached 20 lux. The lowest illuminance value for both reflector types was 1 lux. Under standard voltage conditions, the highest illuminance value for the concave reflector was 3,470 lux and 4,970 lux for the conical reflector. The lowest illuminance values recorded were 8 lux for the concave reflector and 7 lux for the conical reflector. At maximum voltage, the highest illuminance value for the concave reflector was 5,170 lux, while the conical reflector reached 6,970 lux. The lowest illuminance values recorded were 10 lux for the concave reflector and 8 lux for the conical reflector. The light distribution pattern of the conical reflector tends to be more concentrated at a single focal point, resulting in a narrower illumination area than the concave reflector. The decrease in light intensity is more significant for the conical reflector as the distance from the light source increases. This is due to the narrow reflection angle, which focuses light in one direction. In contrast, concave reflectors produce a wider and more even horizontal spread, allowing for wider coverage but with lower intensity at any given point (Fahmi et al., 2021; Liu et al., 2023).

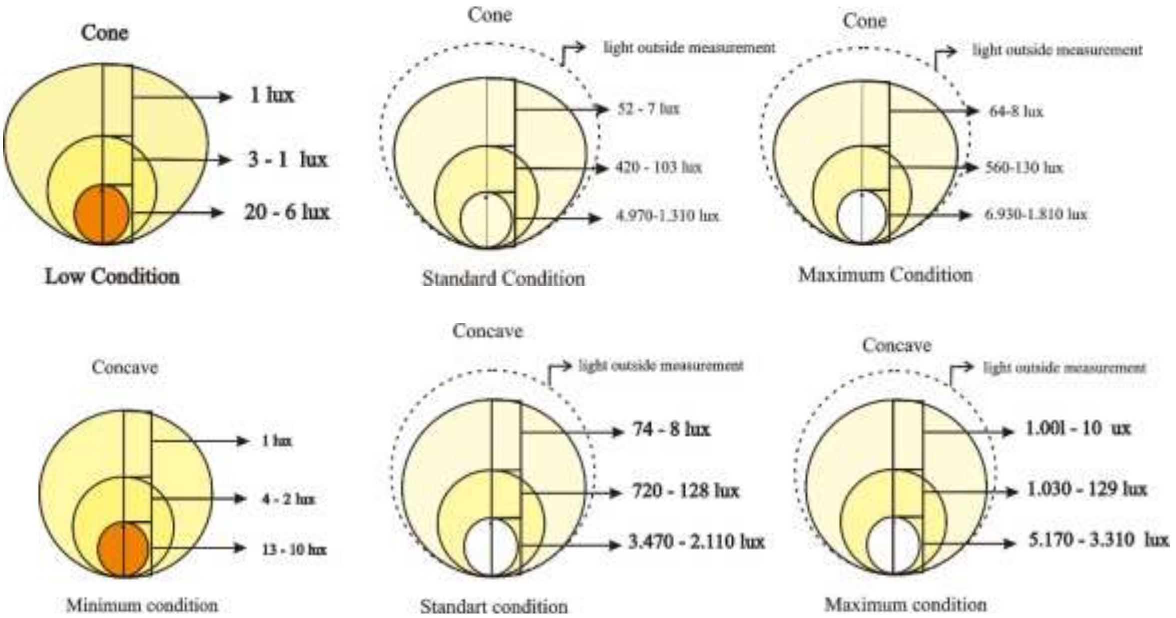


Figure 3. Light distribution patterns under different conditions for a conical reflector and a concave reflector.

Composition of catch by fish species

The catch composition consisted of four fish species: white anchovy (Stolephorus indicus), white anchovy (S. comersonnii), tembang (Sardinella fimbriata), and lemuru (S. lemuru). The dominant species caught was Stolephorus indicus, which contributed 50% of the total catch (2,631 kg), followed by Sardinella fimbriata at 34% (1,786 kg), Sardinella lemuru at 11% (574 kg), and Stolephorus comersonnii at only 5% (245 kg).

The high proportion of S. indicus catches in August indicates that this period represents the peak anchovy fishing season in the study area. This is consistent with the findings of Lestari et al., (2025), who reported that the anchovy fishing season peaked in September at Paotere Port, South Sulawesi, with a Fishing Season Index (IMP) of 134.74%. Data from untirta.ac.id also supports this observation, showing that the anchovy fishing season at Karangantu Port, Banten, begins in July and peaks in September with an IMP of 203.88% (Untirta, 2021).

In addition, Puspito et al., (2015) noted that traditional bagan operations are generally carried out during the anchovy season from April to October, which includes the month of August. Yadudin (2014) further stated that August–September is the peak season for several dominant pelagic species, including peptetek, shrimp, tembang, rebon, and hairtail, indicating that seasonal conditions during this period are very favorable for small pelagic fisheries.

Based on a comparison of data from various sources (Ridwan et al., 2024; Untirta, 2021; Puspito et al., 2015), it can be concluded that the August–September period is the optimal time for anchovy fishing. The presence of large numbers of S. indicus in August in this study aligns with this seasonal pattern.

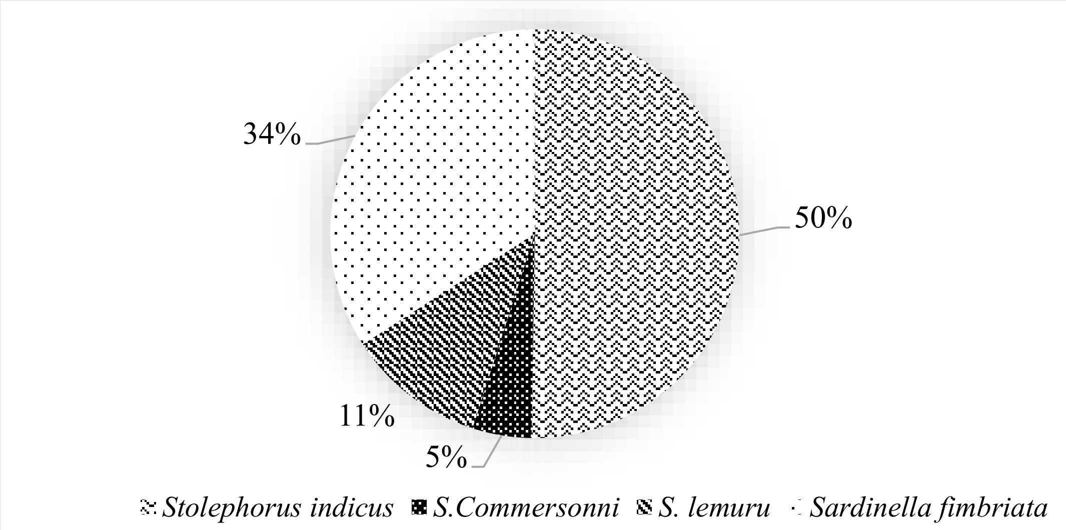


Figure 4. Percentage of catch by fish type.

Capture Results Based on Reflector Shape

Catch results based on reflector shape are shown in Figure 5. In general, conical reflectors produced higher catch weights compared to concave reflectors, both when using circular and triangular nets. This difference indicates that reflector shape affects the effectiveness of light distribution and the ability to attract fish to the fishing zone. The narrow reflective surface of conical reflectors focuses light more intensely under the lamp, encouraging a faster fish aggregation response.

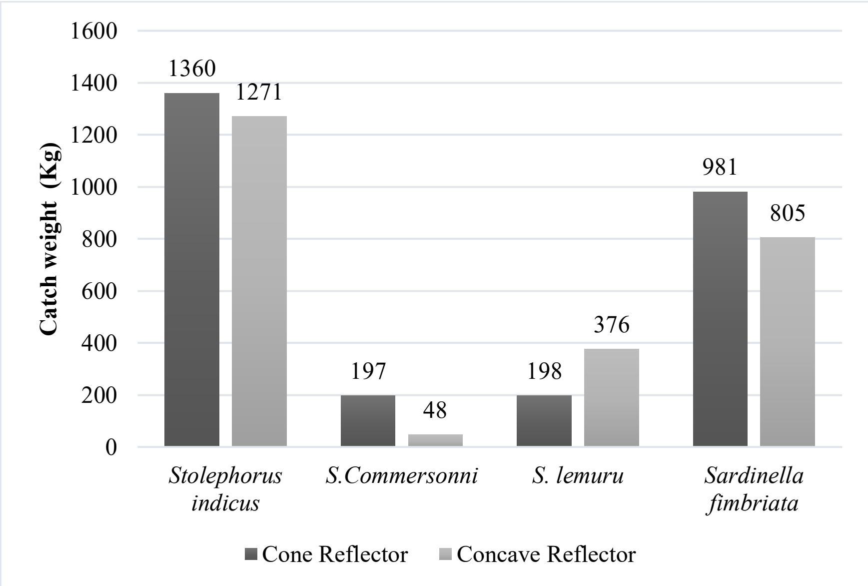


Figure 5. Catch results based on reflector shape. Conical reflectors consistently produce higher catch weights compared to concave reflectors under all operational conditions.

DISCUSSION

Variations in generator voltage and current, manually adjusted by fishermen, cause changes in power output, which directly affects the light intensity produced by halogen lamps. Higher power output results in higher light levels, potentially increasing the effectiveness of attracting fish to fishing gear (Wibowo et al., 2023). Furthermore, a study by Maulana and Haryanto (2021) revealed that light levels in fishing lighting systems tend to increase with increasing generator power output, which is influenced not only by the type of lamp used but also by the stability of the power supply.

The generator's power output directly affects the level of light produced by the lamp. Lighting increases with the generator's voltage output, as higher voltage produces more electrical power, which is required to operate the lamp at optimal levels. Conversely, when the generator's voltage decreases, the intensity of the light emitted also decreases, resulting in dimmer lighting (Maulana & Haryanto, 2021). This is because halogen lamps require a stable and sufficient voltage to operate at their maximum lighting capacity.

In the context of traditional fishermen using scoop nets, lighting plays a crucial role in attracting small pelagic fish to the fishing gear. Therefore, regulating generator output power is essential to ensure fishing efficiency. Technically, the relationship between generator power and lighting load can be explained by two main conditions:

- If the generator output power (Watts) > lamp load (Watts), the light emission will be bright and stable.
- If the generator output power (Watts) < lamp load (Watts), the light will be dim, unstable, and can even damage the lamp due to voltage drop (Wibowo et al., 2023; Supardi et al., 2015).

This phenomenon is in line with the principles of electrical systems, where a mismatch between power supply (generator) and power demand (light load) causes fluctuations in light intensity. This is also supported by the findings of An et al., (2017), who stated that lighting stability in night fishing operations is highly dependent on the match between power source output and light requirements. Under ideal conditions, generator output should be slightly higher than the total light load to ensure system efficiency and optimal lighting.

In fisheries lighting systems, illumination decreases significantly with each meter of distance from the main light source, especially in open environments. Similarly, Stari el al., (2024) found that although lighting intensity generally follows an inverse square law, deviations can occur depending on the type of light source and the reflectivity of the surrounding environment. In addition, research by Liu et al., (2023) demonstrated that changes in light distribution in fisheries lighting systems affect fish aggregation behavior. Brightly illuminated zones are more effective in attracting fish compared to areas that receive only indirect lighting. Therefore, in the context of scoop net operations, light distribution is a critical factor to consider in designing lighting systems, to ensure that effective catch zones are optimally illuminated.

Measurement results show that conical reflectors consistently produce higher reflected luminance values compared to concave reflectors at all generator voltage conditions—minimum, standard, and maximum. This is likely due to the narrower reflecting surface area of conical reflectors and the shorter distance between the lamp and the reflecting surface, which increases the concentration of reflected light. According to Karuwal and Umamit (2023), the conical reflector design allows for better light penetration into the water, as each increase in the illumination distance broadens the vertical scattering pattern while maintaining high intensity at close range. Conical reflectors generally use reflective materials such as silver foil or aluminum foil attached to the inner surface. These surfaces have high reflectivity and significantly increase the intensity of light reflected by halogen lamps. A study by Hidayat et al., (2022) also emphasized that both the type of reflector coating material and the geometric shape of the reflector significantly affect the distribution and effectiveness of light in fisheries lighting systems, especially in visually attracting fish below the water surface. The light distribution patterns of conical and concave reflectors are illustrated in Figure 3.

The catch obtained from the operation of the triangular scoop net using a conical reflector was 2,366 kg, while the concave reflector was 2,143 kg. Furthermore, the operation of the round scoop net with a conical reflector obtained a catch of 370 kg, while the use of a concave reflector obtained a catch of 357 kg. The catch obtained using the conical reflector tends to be higher than the concave reflector, both in the operation of the triangular and round scoop nets. This difference is most likely caused by the characteristics of the reflected light produced by the conical reflector which is more focused and directed to a certain point below the water surface. This focused light causes a higher concentration of lighting at one point, so that small pelagic fish respond more quickly and gather in the lighting area.

According to Fauziyah et al., (2012), the higher the intensity of light entering the water, the faster the fish will react and gather around the light source. This finding is supported by recent research from Liu et al., (2023), which shows that increasing the intensity of artificial lighting at night significantly increases the visual response and aggregation of small pelagic fish such as Stolephorus spp. In addition, research by Hidayat et al., (2022) states that reflectors with a cone-shaped design can increase the effectiveness of light reflection, especially if the reflecting material has a high reflection coefficient value.

In addition to lighting, fishermen's placement of fish shoals also significantly impacts catches. Scoop net fishing is an active method, requiring fishermen to move directly to locate shoals of fish on the water's surface. Rosyidah (2011) explains that traditional fishermen often rely on the reflection of light from fish scales as an indicator of shoal presence. Bright, bluish water conditions—which indicate high visibility—generally encourage fishermen to employ solo techniques, which involve collecting fish using lights before hauling in the net (Azhar et al., 2021). Nugraha et al., (2022) found that a combination of fishermen's experience, adaptation to environmental conditions, and expertise in reading visual indications such as fish flashes significantly increases the efficiency of catching small pelagic fish. Meanwhile, Fitriandi and Darmawan (2023) confirmed that during nighttime operations, fishermen's ability to interpret flash patterns or fish movements in real time directly impacts the rapid response and effectiveness of fish collection.

The catch composition of a single trawl net operation tends to consist of one species of small pelagic fish, primarily Stolephorus indicus. During the study, no bycatch of predatory fish such as hairtail (Trichiurus spp.), mackerel (Rastrelliger spp.), and mackerel (Selar spp.) was found. This is generally due to the relatively short duration of collection and retrieval of the net (5-15 minutes), so that interactions in the food chain have not had time to occur. Fatimah et al., (2015) also stated that predators such as squid, mackerel, pepetek, mackerel, and hairtail are not the target catch in the fixed lift net and are more often present because they chase their prey under the lights. Recent research supports this finding. Wijaya et al., (2023) reported that predators tend to appear in the middle to late phase of the operation when the lighting duration is quite long, while Putra and Kurniawan (2021) stated that the longer the lighting duration, the greater the chance of predator-prey interactions. Furthermore, Senko et al., (2022) showed that lighting gillnets with LED lights in coastal waters can reduce bycatch by 63%, including large predators such as squid and many non-target fish (48% reduction) while maintaining target catch.

The catch data was tested for normality of data distribution. Testing was carried out on the use of different reflectors. The test results showed that the catch data was not normally distributed, with an Asymp.Sig. (2-tailed) value of $0.021 > 0.05$. Therefore, treatment was carried out to obtain normally distributed data. The results of the normality test after data transformation obtained an Asymp.Sig. (2-tailed) value of $0.200 > 0.05$ (normally distributed data).

An independent sample t-test was then conducted, with a significance value of $0.768 > 0.05$, thus H0 was accepted. This indicates that the use of the reflector shape has no effect on the catch of the trawl net.

CONCLUSION

The use of conical reflectors resulted in higher light illumination values than concave reflectors under all test conditions. Under low voltage conditions, the highest recorded illumination value for the concave reflector was 13 lux, while the conical reflector reached 20 lux. The lowest recorded illumination value for both reflector types was 1 lux. Under standard voltage conditions, the highest illumination values for the concave reflector were 3,470 lux and 4,970 lux for the conical reflector. The lowest recorded values were 8 lux for the concave reflector and 7 lux for the conical reflector. At maximum voltage, the highest illumination value for the concave reflector was 5,170 lux, while the conical reflector reached 6,970 lux. The lowest recorded values were 10 lux for the concave reflector and 8 lux for the conical reflector. However, differences in reflector shape did not significantly affect the catch of the scoop net, either in triangular or circular shapes (H0 is accepted). The catch was dominated by white anchovies (Stolephorus indicus), indicating that August is the peak season for small pelagic fish in Cilacap waters. The absence of predatory fish as bycatch is thought to be due to the short fishing duration, so that food chain interactions have not yet occurred. Lighting factors, fisherman experience, and generator output settings play an important role in the effectiveness of fishing operations with scoop nets.

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