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The Use of Simulation Light and Moving Images in Determining Data for Artificial Colouration Lure Design (Top Water) For Sebarau Fish Species

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ABSTRACT

Lure fishing is a popular recreational sport-fishing game in Malaysia and easy excess in smaller river basins, lakes, and reservoirs. The classic colour of trust within the angler's community on 'Sebarau' recreational fishing activities has significantly penetrated the contradiction of colour theories and contributed to the theoretical fishing success rate. Significantly less local research examining how artificial lure colour works for Sebarau fish species in natural habitat responses (such as light transmittance, feeding pattern, water condition, seasonal etc.) The evolution of artificial lure design, especially on top-water by type, size, action ability, weight, and other exaggerated values, consistently increases demand in the market. However, lure colour selection has been popular with the classic of trust. Very little research has been investigated on how the dedicated fish's eyesight attracts lure colouration and influences the catching rate for a fishing trip.

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1. Introduction

Recreational fishing in Malaysia has been innovated and getting more attention from individuals and groups. Various innovations and revolutionary have been introduced and promoted in our local market. Thus, it has brought joy, happiness, and excitement into the most accessible hobbies among people.

One of the most demanding was ‘lure fishing’ that has classically existed in Malaysia, and until now, it has reached the outnumber of fans around the region. The fascination with new and modern products has been stimulated exclusively among local anglers, and every tackle product has become an individual and persona of choice to get the fish. The art of recreational fishing using an artificial lure, for example, has played an intensive role in promoting the tackle product demand in Malaysia.

Despite fulfilling the artificial lure to work with, there is still a question in-between unreasonable and imprecision on how the individual selects the lure colour for dedicated fish species for their fishing trip. Hence this research will be looking into a potential experiment on what primary management measures can be evaluated in how the Sebarau fish species see the top water lure colour presentation.

Figure 1. Recreational Fishing on Artificial Lures

2. Colour of Trust

Genuinely, the existing lure colour products available came into the originality and the characteristics of their native baitfish study from the original country or researcher who designed it. How relatively for local predatory fish species and the species outside? The discussion and debate of how the fish can see the colours have been the highlight for many people worldwide and have successfully contributed to a different result.

The classic observation on the issue of the phenomenon colour of trust among the angler (Warm Scheme: red, orange, and yellow families/How do warm colours affect visual attention) on top water lure colour selection for Sebarau fishing has been dominantly established among the local anglers by to unknown study. Nevertheless, no metric correlation has been found clearly in local research studies to sufficiently verify the attraction colour of trust on a feeding pattern for Sebarau fish species.

In this paper, the selection of colour has been set into two categories which reflect the research need and only the top water lure (popper) for the lure selection, which is in-between 5-7cm size only. Below is the visual of the colour identified as a ‘neutral colour’ and ‘colour of trust’.

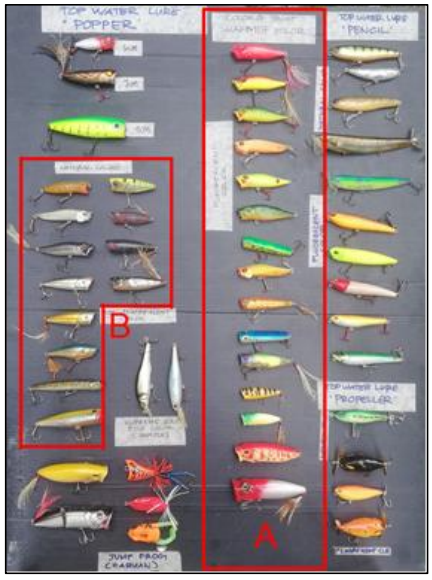

Figure 2. The Set of Two-Colour Categories (A: Warm Colour/Colour of Trust; B: Neutral Colour/Native Bait Fish Colour)

In the above photo, the classification of two colours has been identified: warm and neutral. The warm colour has been defined as the ‘colour of trust’ among the Sebarau lure fishing and the most demanding, while the neutral colour reflects on bait fish feeding pattern for Sebarau fish species. The size of the top water lure shows a minimum of 5 cm to 7 cm in length. In most Sebarau lure fishing, these are among the favourite size and effortless to carry in the most straightforward tackle box.

Figure 3. The Colour of Trust Phenomenon Among the Sebarau Lure Fishing Form Each of Anglers from Their Tackle Box

Figure 4. The Successful Colour of Trust for Sebarau Hunter (Warm Colour Scheme)

Consider how the lure colouration on light transmittance processes and records except the theoretically remains a formally untested hypothesis. (Wilde et al., 2003), Arlinghaus et al. (2008): And size-selectivity can also occur in recreational fisheries and has been evaluated in the context of lure size but little work on lure colour.

Besides the colour offered tremendously in lure designing, there is another significance of design attraction, especially the imitation of the natural baitfish. Any moving object on top of water triggering, attracting, or curious can make sense for fish to attack.

The associate can verify the correlation of colouration from the lure body in such due to the water splashes. (Don Wirth, 2008): Every lure possesses specific qualities that affect its potential with the physical nature of the lure by its size, colour, the way it moves, and the sounds it makes.

3. Sebarau Fish Species, Artificial Lure and Light

Figure 5. Sebarau Hampala Macrolepidota, National Park, Kuala Koh Kelantan

A carnivorous fish, Hampala macrolepidota, locally known as Sebarau (Kamaruddin et al., 2011) or jungle perch. Genus Hampala of Family Cyprinidac is widely distributed in almost all of Southeast Asia, such as Thailand, Malaysia, Vietnam, Philippines, and Indonesia. It has five species, H. macrolepidota, including H.m. Sabana as a sub-species, H. ampalong, H. bimaculate, H. lopezi and H. dispar. The dissimilarity of these five species is shown in the external morphological characteristic, especially in colour patterns (Safran et al., 2014).

Sebarau is a great sports fish. It is generally aggressive and hunts in schools (Eddie Chua, 2012). As one of the top-tier game fish on lure fishing in Malaysia, like the other fish species, the eye of Sebarau was enough to stimulate their prey's feeding pattern. They are particularly active in the early morning and late evening to

search for their prey; the rainy season is the best time. They hide on underwater structures such as fallen trees or rocks. Their accuracy for hunting is the best designed, and they will hunt in the most ambushed for any passing prey into their strike zone. The fish can easily be caught using artificial bait such as a lure, spoon, flies, or mini jigs. Moreover, the most enjoyable was using any top water lure such as popper or pencil bait as the ecstasy once the angler can feel the fish take the lure aggressively.

The contemporary tacklebox for recreational fishing is packed with lures that cover the full spectrum of colours with the assumption that colour influences fishing success, but this largely remains a formally untested hypothesis (Andrew D. Moraga et al.,2015). A method for selecting a fishing lure of a colour or colours most visible and attractive to fish includes observing the water's condition to be fished to determine the relative clarity of the water, then measuring the light transmittance at the depth in the water to be fished (Loren et al., 1987).

Any moving object on top water to be either triggering or attracting can make sense for fish to attack and can verify the correlation of the effect/pattern of colouration from lure body due to splashes pattern occurs (Don Wirth, 2008). A method for selecting a fishing lure of a colour or colours most visible and attractive to fish includes observing the condition of the water to be fished to determine the relative clarity of the water, then measuring the light transmittance at the depth in the water to be felt. (Loren G. Hill, 1987).

Significantly fewer scientific measures of data collection to understand how to lure colouration on light transmittance processes and recorded except the theoretically remains a formally untested hypothesis. (Wilde et al., 2003; Arlinghaus et al., (2008).

4. Light Transmittance on Colour Objects

Colour and light are the two main factors involving a close relationship. With one of each, we can see how beautiful the creator has designed for us. It has three elements that provoke the scenarios. The light sources from natural light include the sun, the presence of objects which fishing lure and the receiver, which is mainly the fish. Like human or identical to fish, the fish also penetrates their visibility on colours by having their cones and rod in their eyes. It allows the fish to see the contrast and colour, respectively.

While almost all fish can see the colour under ideal conditions, whether a particular colour is visible depends on factors like depth, time of day, weather, and colour (Brian Silvestre, 2012). Foremost, when entering the water column, light is potentially attenuated and distracted by many factors in absorption and scattering. In most situations, the light wavelength has distracted water particles and conditions, resulting in different turbidity being crystal clear, cloudy, opaque, or thick with minerals. Below is the image as suggested for lure colour work depending on the water turbidity that occurred.

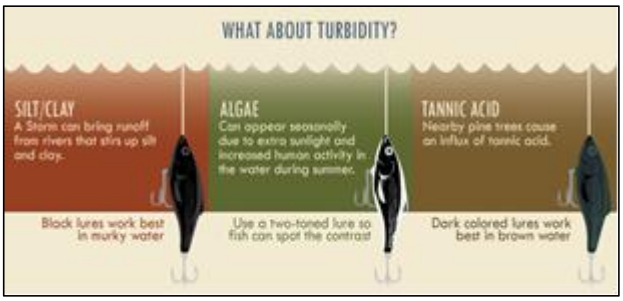

Figure 6. Turbidity of Water Conditions

On research 'Underwater Image Enhancement: Using Wavelength Compensation and Image Dehazing has mentioned that underwater environments often cause the colour to scatter, and colour cast during photography. Colour scatter is caused by haze effects occurring when light reflected from objects is absorbed or scattered multiple times by particles in the water.

Haze is caused by suspended particles such as sand, minerals, and plankton in lakes, oceans, and rivers. As light reflected from objects proceeds towards the camera, a portion meets these suspended particles, which absorb and scatter the light (John et al., 2011). The image model below shows how the research paper has penetrated the object's colour towards the light by various wavelengths through the water.

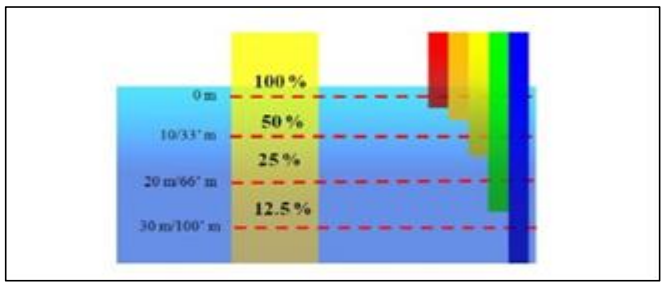

Figure 7. Object Colour on Light Wavelength Through Water Column

In addition, another American Photographer, Connie Imboden, shares on her website at (https://connieimboden.com/2013/12/the-science-of-color-underwater-2/). She mentioned that the light perceives colour reflected off and absorbed by an object. Due to the way water absorbs light, there is a loss of perceived colour when photographing underwater. The longer the light's wavelength frequency, the easier it is absorbed by the density of water. As depth and distance increase underwater, light is harder to travel through. Below here the image she has shared from www.makewoodenlures.com.

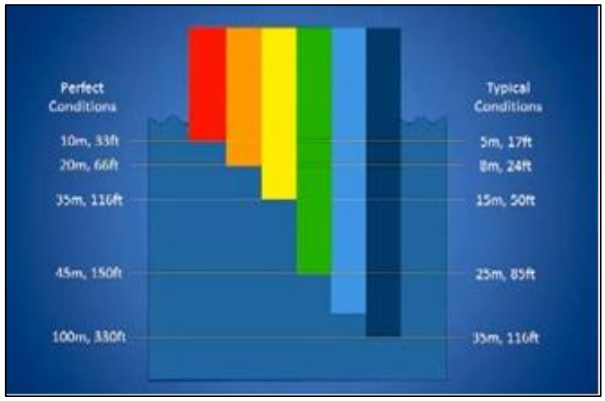

Figure 8. Object Colour on Light Wavelength Through Water Column

Comparing these two images has been shared by the researcher, clearly showing that the light has significantly perceived the colour wavelength of the object in a certain depth. In this case, the object will be the presence of a lure (assuming the vertical spectrums of lure colour), and the receiver will be the fish species. Every level of depth on these images clearly shows that it is significant within the 'red' colour on the first from 0 – 10 meters (33 feet). Moreover, the second image shows two types of water conditions (perfect & typical) for the 'red' colour, whereby 0-10 meters for perfect and 0-5 meters for typical conditions.

As this paper has mentioned earlier on top water lure type within the selective favourable colour among the angler for Sebarau hunter, the significant result from these two images has proven and verified that all the vertical colour spectrum works perfectly within from average 0 – 10 meter(0-33feet) by considering the top water lure will not be reached within the perimeter depth as mentioned.

Therefore, the next challenge will be how the Sebarau fish will penetrate the lure colour works on the top water surface, especially the finding on how truth the colour of trust among the society. How is the colour trustable to determine and successfully proven by the biological study on Sebarau fish able to see those colours? Or have the anglers been manipulated theoretically about the colour theories from the past and presence, which is not the actual answer?

5. The Eyesight for Sebarau Fish Species

Commonly, most anglers' communities for Sebarau hunters have reported that the eyesight for Sebarau fish species was fantastic. The ability of this species able to see its prey was terrific. Traditionally, the Sebarau fish always wait patiently for their underwater opportunity and dash out their helpless prey without warning. Many indicators of how and why the Sebarau took their prey, including the mesmerising and colourful artificial lure. However, do they dash out because of lure colour work on their eyesight and able to penetrate the colour of their feeding pattern or something else?

Figure 9. Object The Sebarau Fish Eyesight on Lure Fishing

The image above randomly shows the various Sebarau fish species taking the artificial lure, assuming their eyesight was excellent for the warm colour categories.

6. The Basic Fisheye

As well known, most fish can obtain a focused image, detect motion, and have good contrast-detection ability. Scientists need to find out precisely what fish see, or in other words, what images reach their brains. Most research on fish's vision is done by physical or chemical examination of different parts of their eyes or by determining how laboratory fish respond to various images or stimuli. (David Ross, 2020).

Some fish species not using eyesight or, in other words, do not depend on image or colour for their feeding, such as catfish species (beady-eyed nocturnal feeders), dependable on chemical senses as same to sharks' colour blind and close relatives of the ray's fish.

However, how about the Sebarau fish species able to penetrate the colour? It is hard to engage any local research study regarding the eyesight or morphology of how the Sebarau fish sees the object colour in their retina photoreceptor cell (where the rod and cone cell are integrated). However, we can understand how the basics of the fisheye work on seeing the image, colours, or contrast. The significant or the closes fundamental might be applied same into the Sebarau fish species eye morphology before the actual test will be engaging.

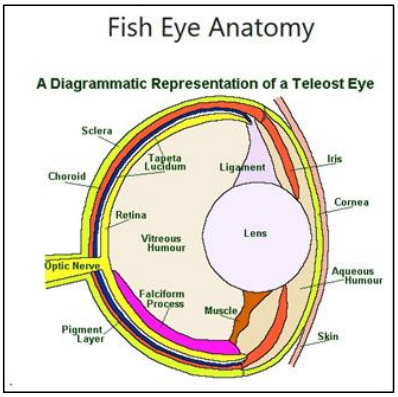

Figure 10. The Basic Fisheye on A Diagrammatic Representation

The fisheye is like the human eye, which has the same fundamental work in such lenses as the human eye, cornea, retina, and iris. The lens and cornea of the fish are most likely spherical, from which significantly less light bending since the fish cornea refraction is almost identical to the density of water.

The same goes for the fish lens, which distorted the image at the edge of the fish's vision. At the same time, the centre of their eye produces a crisp and clear picture, which gets fuzzier as it extends into their peripheral vision. The most important part was the iris, which profoundly influenced how the fish could see the colour and contrast received.

On the iris is a cone and rode, which determines how the fish perceives the object (the artificial lure). The cones are most likely to work the same in the human eye, which is very sensitive to colour and recognises the fish's colour. While the rod is more towards on sensitivity of light, motion or shape allows the fish to see the object in shallow light and other visibility.

Assuming in most cases how the fish can see the vision, colour and contrast and depending on light condition, there are no issues, especially when the perfect condition is coloured comparing the typical condition (refer to the figure for absorption for colour underwater.). Fish has always had a good sense of vision within the light in particular conditions for a while during their cone and retina work to adjust their near-sightedness, allowing them to recognise the vision again accordingly.

6. Apparatus Items for Testing Approaches

In this paper, how the colour work on artificial topwater lures, which triggered the Sebarau fish species' ability to differentiate the colours, was not mainly focused on other lure designs, especially the shallow or deep dive. It will suggest only the top water lure selected (7-9cm length size) and with sets of testing approaches.

6.1 Top Water Lure Type and Sizes

Only the top water lure (Popper) will select for the experiment study (colour on the water surface).

Figure 11. The Top Water Lure/Popper

The top water lure sizes will be limited to only 7 cm and 9 cm. However, there are more sizes for this top water lure fishing in the market. It was due to the popularity of easy excess, the study scope, and popular being carried (small tackle box) by the angler, especially for jungle adventure and exploring the jungle river fishing.

Figure 12. An Example of 7 cm Top Water Lure from Rapala Brand

Figure 13. An Example of 9 Cm Top Water Lure from Rapala Brand

Besides the type of lure and sizes, the set of lure colours will be assigned into two categories: natural colour (the colour scheme that imitates the natural bait fish) and warm colour, which is the 'colour of trust' syndrome for most Sebarau hunters. According to the experiment test apparatus on tank simulation, these two-colour selections will be evaluated and recorded based on the Sebarau fish species response.

Below is a basic example of two sets of natural and warm colours. On the right side, the warm colour will represent the colour. The warm colours will be yellow, orange, red or a combination. It will represent the visual of heat, heat, or sunlight, while the natural colour is closer to the real thing we see daily. It can represent a very fantastic or earthy colour. In this case, this natural colour represents the actual colour of bait fish in our water system in the most famous Seluang fish species.

Some examples below show the signature colour of natural colour from various brands of topwater lures and natural bait fish colour in our water system, which imitates into natural colour for topwater lures.

Figure 14. Two Basic Colours for Natural Colour (Left) And Warm Colour (Right) From Rapala Brand

Figure 15. Another Example of a Natural Colour Scheme 'Caperlan' Product From 'The Decathlon' Brand

Figure 16. Popular Bait Fish for Our Water System – 'Seluang Fish Species' as Represent the Natural Colour Scheme

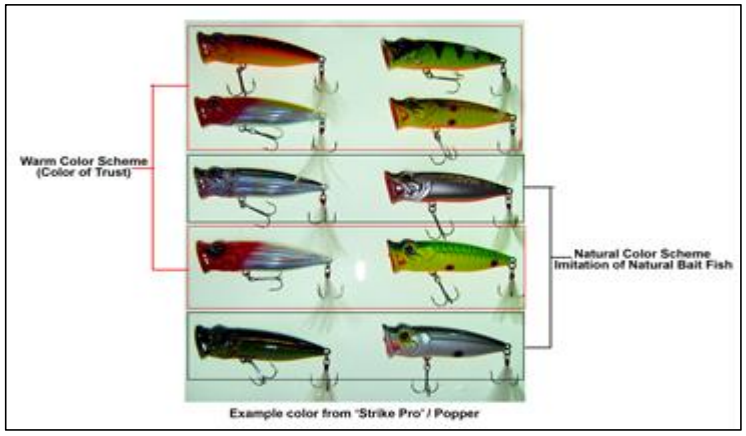

Figure 17. Another Set Top Water Lure from the 'Strike Pro' Brand Regarding the Natural and Warm Colour Scheme

In this paper, all the selected apparatus's potential experiments were not finally shown in any pictures, especially the colours and dedicated branding. The final selection will be defined in further application and agreement on sets available. The recommendation will be prior to highlighting one dedicated local brand within the same model type with a set of natural and warm colours. It was due to avoid the experiment evaluation conflicting with various types of topwater lures by considering different design profiles (weight, form design, and buoyancy) from various brands. The priority was to use the same design profile on experimental approaches.

3. Methodology

The method of the testing experiment will be divided into several applications. The dedicated area for the tank simulation has been identified and endorsed by UPM (Universiti Putra Malaysia) Hatchery-Aquaculture Research Station, Bukit Puchong Selangor. The simulation tank will be engaged within the 40 tons of water per gallon at 15ft Length x 15ft Width x 12ft Depth.

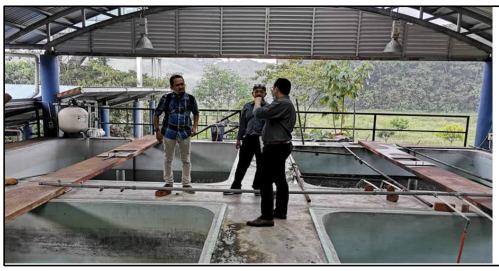

Figure 18. The Hatchery-Aquaculture Research Station, UPM Bukit Puchong, Selangor

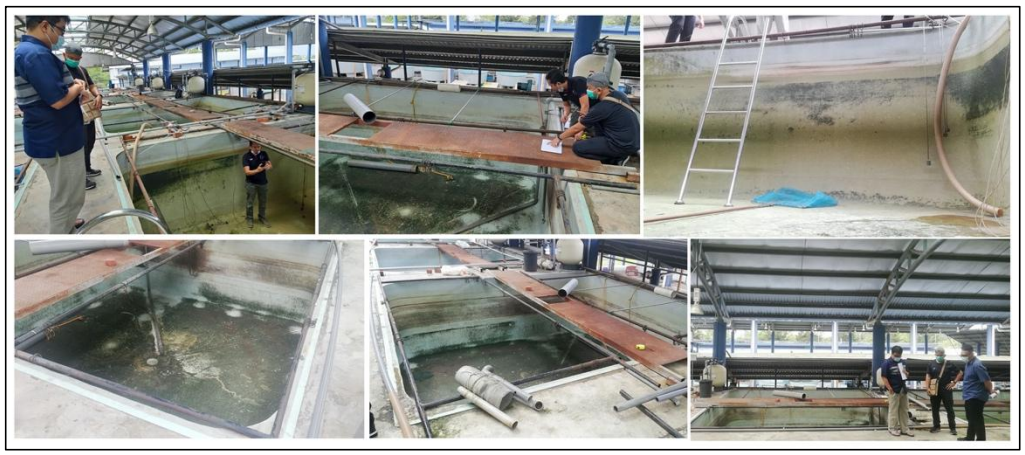

Figure 19. The Simulation Tank for Simulation Light and Moving Images on Top Water Lure (15ft L X 15ft W X 12ft D)

7.1 Hatchery Simulation, Light and Moving Images Testing Profile

The potential testing profile for the simulation of light and moving images has been identified in several applications and processes. Every application in the process will be engaged in video filming underwater, and photo capture within the significance needs. The image below will show the simulation light and moving images testing profile.

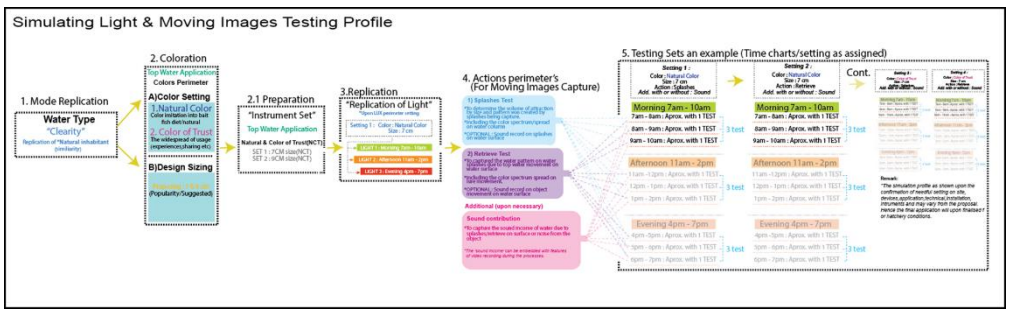

Figure 20. The Simulation Tank for Simulation Light and Moving Images on Topwater Lure

Based on the diagram, four apparatus profiles have been identified for the testing application.

7.2 Water Mode Replication

There are two types of water replication to be significant or closest to the Sebarau fish species inhabitant. Clarity and cloudy water. Both water modes will depend on the overall condition of the hatchery system.

7.3 Lure Coloration (Top Water Lure)

The topwater lure colouration will be split into two categories: natural colour and colour of trust. Moreover, the top water lure colours also will be paired with only two sets of lure sizes (7cm and 9 cm).

7.4 Replication of Light Simulation

Every light simulation will be upon the 'LUX' perimeter setting and aligned to the feeding time for Sebarau fish species. The three-time setting has been identified.

7.4.1 Simulation light 1: morning 7.00 am – 10.00 am

7.4.2 Simulation light 2: afternoon 11.00 am – 2.00 pm

7.4.3 Simulation light 3: evening 4.00 pm – 7.00 pm

**All timing above is based on the most significance for the Sebarau feeding pattern among the lure fishing communities in the actual scenario.*

7.5 Action Perimeter For (Moving Video Filming and Image Capture)

For the action perimeter, there are two applications for the action.

7.5.1 Splashes test

To determine the volume of attraction by size and lure drop pattern was created by splashes being captured, which included the colour spectrum/spread on the water column.

7.5.2 Retrieve test

To capture the colour pattern on water splashes due to the top water movement along the straight line on the water surface, including the colour spectrum spread on lure movement.

**Additional: Sound contribution (Can capture the sound created due to splashes on the surface or noise from the lure. However, there are other concerns for the overall analysis.*

7.6 Testing Sets (Example)

An Example: Setting 1

Water Mode	:	Clarity
Top Water Lure Colour	:	Natural Colour
Size	:	7 cm
Light Simulation	:	Morning 7.00 am - 10.00 am
		7.00 am – 1 test
		8.00 am – 1 test
		9.00 am – 1 test
		10.00 am – 1 test
Action Perimeter	:	Splashes

**Every set will be upon to complete the entire cycle of apparatus setting for each apparatus, and it will take time-consuming to complete the whole experiment*

**There is also the suggestion for the tank simulation without and with Sebarau fish species before it is recommended into the entire water system for the data comparison*.

7.7 Simulating Light and Moving Images with Diagrams and Illustration (With/Without the Presence of Sebarau Fish Species)

Below is the proposal profile within the simulating light and moving images based on the dedicated testing profile with and without the presence of Sebarau fish species).

Simulating Light & Moving Images with Diagram (without presence of fish)

SETTING 1 : Clearity) without presence of Sebarau Fish	TOP WATER DESIGN (Coloration)	REPLICATION OF LIGHT 'LUX' Setting	Time charts as assigned	DURATION	ACTION PERIMETER
Replication of natural inhabitant (closest) *The water replication will be upon the hatchery technical advices and availability	**A) COLOR SETTING** **SET 1 : Natural Color** *Color imitation into local bait fish diet/natural* **SET 2 : Color of Trust** **A) Non-fluorescent color** *The premier color and matt. No glossy or shining texture* **B) Fluorescent color** The supreme color with neon and vibrant with shining, glossy and sparkling (popularity).	**LIGHT 1 : MORNING** *Upon LUX setting* **LIGHT 2 : AFTERNOON** *Upon LUX setting* **LIGHT 3 : EVENING** *Upon LUX setting*	7.00 - 10.00 am *Upon LUX setting* 11.00 - 2.00 pm *Upon LUX setting* 4.00 - 7.00 pm *Upon LUX setting*	INTERNAL (UPM Hatchery) *Estimation for 'hatchery' experiment which including the installation, setting the instruments, technical aplication and testing :* *Min : 2 months to max 4 months* EXTERNAL (Klang Gates Dam) *Estimation for external with upon confirmation on dedicated spot/area :* *Min : 1-2 months*	1) SPLASHES TEST *Drop test(replication bait drop)* *The lure will be release at dedicated height to measure the splashes pattern into water column, spread and sound capture* 2) RETRIEVE TEST *Retrieve test (forward movement/ syndrome of bait panicking)* *The lure will be retrieve in short straight line to determine the movement attaction, speed and build in action.* ADD. SOUND CONTRIBUTION *Upon confirmation/necessasry* *Sound test (embedded with video features)* *To capture the sound income of within the 'splashes & retrieve' test on water surfaces or noise creation* *Remark:* *All testing as assigned will be upon components such water types, coloration, replication of light with time assigned, action perimeters and with fish/without.*
	B) DESIGN SIZING The size will be simulate into 2 difference most demanding. 1) Length size of : 7cm 2) Length size of : 9cm	*The test will be within every hours according Light 1, 2 & 3			

Figure 21. Proposal Profile for An Example Setting

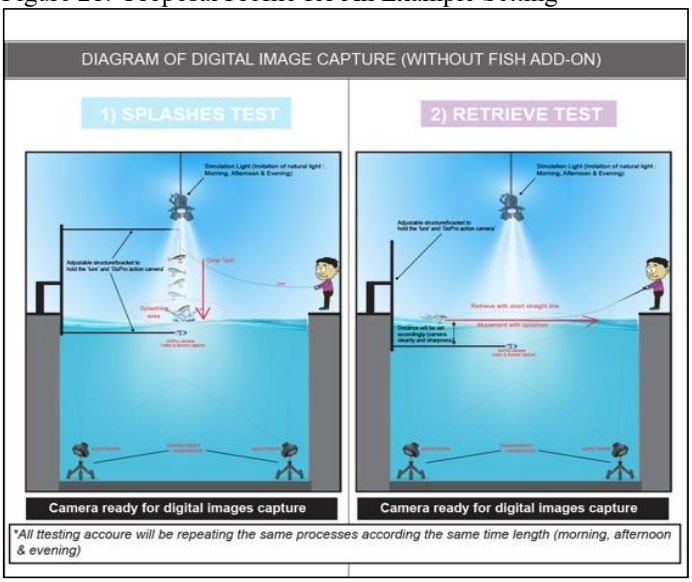

Figure 22. Proposal Diagram for An Example Set with The Illustration (Without the Presence of Sebarau Fish Species)

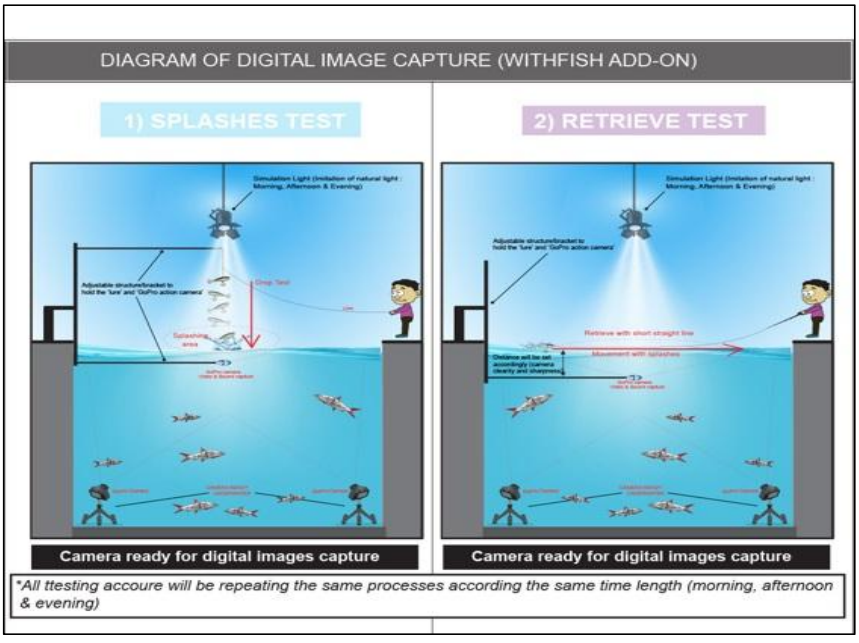

Figure 23. Proposal Diagram for An Example Set with The Illustration (With the Presence of Sebarau Fish Species)

The proposal illustration above shows how the setting will be proposed within the underwater camera filming and image capture. Two primary camera angle settings will be proposed for these exercises. The first camera will be allocated underneath the water surface at less > than 1 feet depth (with adjustable), especially for the splashes test. (Refer to the left illustration above).

The splashes test was mainly for the lure drop on video and image capture, contributing to the lure drop action within the colour spectrum splashes into the water column. Another two sets of the camera will be placed underwater for mostly the video filming of the splashes, retrieving action and movement of fish for the response and other relevant.

**Lure Drop/Falling – Significance of standard lure casting in the distance from the angler from the shore to the mid of water. It will be splashed on the water column after being dropped, and the lure colour spectrum will be recorded underneath the water columns.*

7.8 Additional: The Illustration of Tank Simulation on Testing Profile

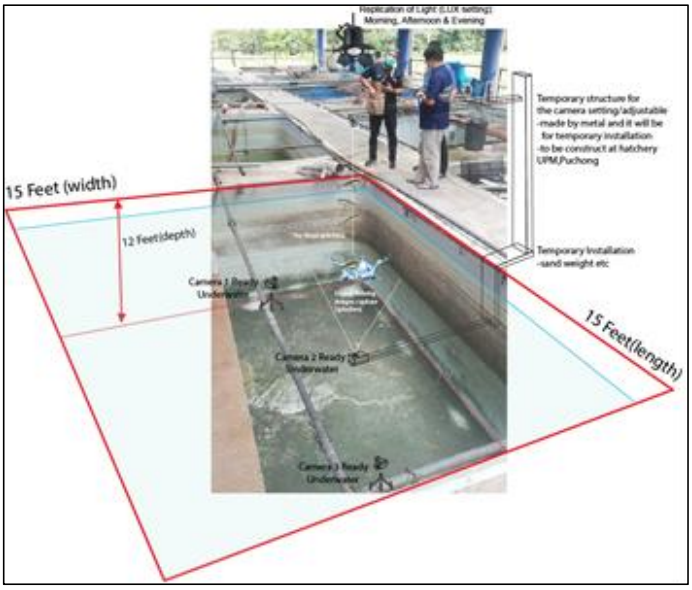

Figure 24. The Illustration Above Shows the Splashes on The Underwater Lure Drop Testing Profile Within the Underwater Camera Installation to Capture the Video and Images

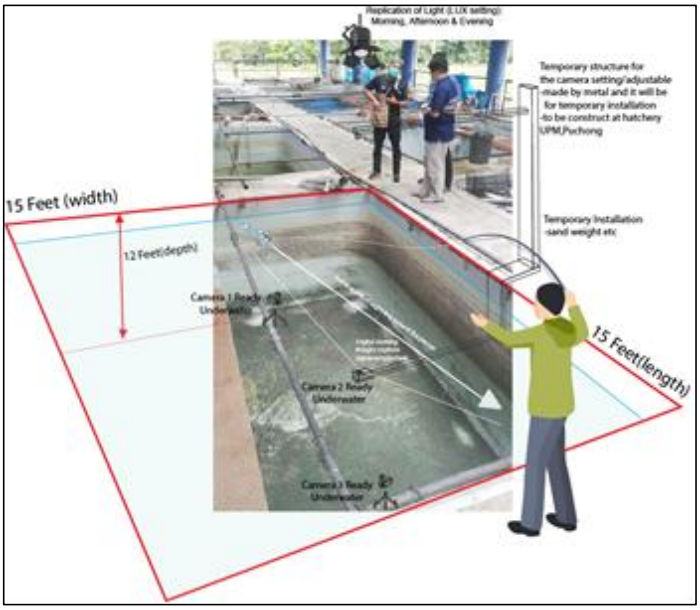

Figure 25. The Illustration Above Shows the Retrieved Test on Topwater Lures Moving Straight Toward the Tester After Cast. This Retrieve Will Be Sought on How the Lure Colour Spread into The Water Column and Splashes

7.9 The Theoretical and Expected Result of Testing Exercises Within the Existing Study Images

From the methods mentioned in the testing proposal and details, herewith are some similar experiments from the testing exercises on the application, especially the topwater lures on splashes and retrieve test situation on the water column. The sources were taken from DUO International from Japan for their product review on a topwater lure (Fang Pop) streaming on YouTube (https://www.youtube.com/watch?v=-CbMlPmc_EE).

Nevertheless, it was not the accurate experimental and expectation in complete profiles, especially how the simulation of light and moving images in determining data for top water lure colouration study for Sebarau fish species (fish response etc.)

The picture below will show the standard examples of two approaches, as mentioned earlier (lure drop/ falling on the water surface and lure splashes).

Figure 26. The Capture of How the Topwater Lure Fell After Casting from The Shore by The Angler (Beast Popper: The Versatility of Fang Pop, 2021)

The image above was a standard visual of how the lure fell into the water after the angler made the cast. The falling depth depends on the lure sizes (7-9 cm) and casting style. The lure colour will spread into the water column by determining the light transmittance from below. The below image shows another section view of the lure falling moment within the water surfaces after cast.

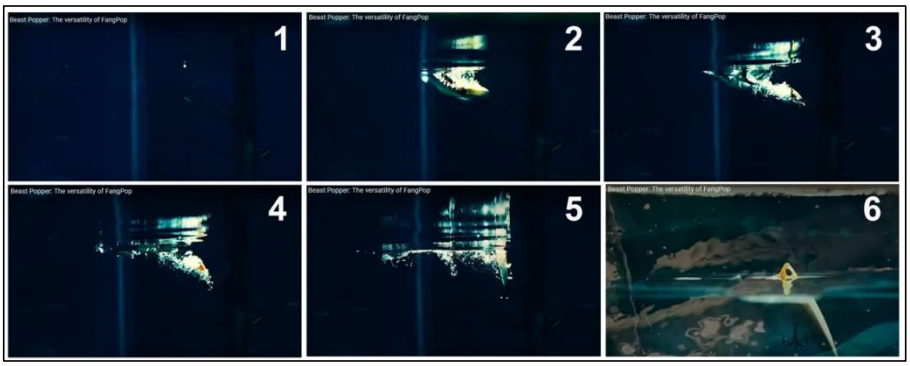

Figure 27. The Sequences Screenshot Shows the Lure Falling Following the Number Sequences (Beast Popper: The Versatility of Fang Pop, 2021)

The picture above shows how the side profile for every shot on the lure falls with lure colour and light involvement. The number two graphic shows the falling power with the first impact. It fell hard and brought the total amount of the lure weight into the water column, while the no. Three image shows the maximum depth reached in water. On this measure, the impact will force the lure weight into the maximum energy accumulation as it crashes into the water's surface.

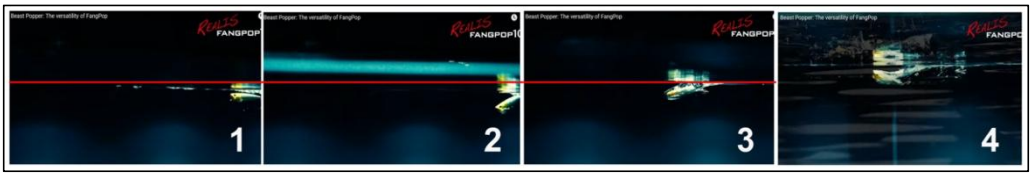

Figure 28. The Lure Action on The Side Profile for The Topwater Lure Created the Water Splashed (Beast Popper: The Versatility of Fang Pop, 2021)

On the second approach, the lure will start to be retrieved by jerking into the straight line (red line). It will create the water splashed into the water column, integrated with lure colour and light. Picture no. one shows how, from the calm lure on the surface and after the angler starts to have jerking, twitch, or slow, the lure will

dive spontaneously into only maximum depth, as seen in picture no two. The top water lure for 7-9cm will be at a steady weight; it will be fast floating immediately after the pause and stop. It will repeat the processes along the casting distance back to where the angler is standing before it will cast again into the dedicated location where the angler believes the fish is there.

8. Conclusion

Generally, lure fishing is a fascinating experience whereby the angler hunting and allocates the fish species attracted to a particular artificial lure presentation. Most likely, the imported product in the local market has proven and successfully contributed to the excitement of increasing the catching rate during the trip.

However, some of our local game fish, especially Sebarau (Hampala macrolepidota), could be clearer in showing that their eyesight can predict colouration on lure presentation, which too is less info in the research context, especially in the local study. How eventually do these fish attract to the colours based on behavioural study? Most local angler has been affirmed that the colour of a trust primarily work into our water and has been successfully adaptable. This correlation on existing lure colours products on the market should be encouraged by having dedicated testing and evaluation, especially on our dedicated fish species. A few have been identified in local R&D that have started to develop the lure design, including individuals with high skill in making DIY lure; however, they still question colour observation, testing and evaluation as attractive and primary concerns in designing the lure colour. Colour should be integrated into the target application within the ability the eyesight connectivity.

Therefore, this paper may be a small opening on how the design process and experimental activities can measure the specific constraint on a colour study by simulating light and moving images in digital applications. The underwater filming, image capture, biological contribution and digitalisation of the data collection can contribute to some answers based on the research concerned as proposed. The popular term of the colour for the angler or because the colour catch fish was a significant doubt among the prediction and potentially to discover has brought this research paper intends to explore.

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