

**PERFORMANCES OF CIAMIS AND BANYUMAS CULTIVATED GOURAMI:  
BASED ON MORPHOLOGICAL AND MERISTIC STUDY**

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**ABSTRACT**

Recently, a study which was aimed to observe performances of Ciamis and Banyumas cultivated gourami was done. The cultivated fish were collected from those areas were subjected as research object which is part of a research series dealing with the Indonesian gourami genetic diversity. A survey applying a purposive random sampling was done to collect all samples from those two different areas, of each location it was taken 60 parental fish consists of 30 male and 30 female ones. Several parameters like, body's size, colour, total length, total weight, total spines of the fins, total number of scales on the lineal lateralis. Data obtained from this research were then analysed descriptively based on its morphological and meristic characters. In general the gourami fish of Banyumas and Ciamis, are similar and even tend to the colour of Gourami soang However, the body of the Ciamis fish is larger than those of Banyumas fish. The Ciamis male were varies between 55 – 61 cm length and 2.850 – 3.810 g weight, while the Banyumas fish has 52 – 57 cm length and 2.310 – 3.200 g weight. The Ciamis female, has 51 – 53,5 cm length with 2.000 – 2.360 g weight, and Banyumas female has 48,5 – 50,5 cm length and 2.000 – 2.340 g weight. The fin's spines showed between those of Ciamis and Banyumas were similar, especially on that of hard spine (s), though the soft spines were varied in numbers but still in the range *Osphronemus gouramy* Lac.

**Keywords:** *Banyumas, Ciamis, induk Gourami, performa*

**INTRODUCTION**

Low genetic quality of cultivated gouramy fish has long time been noted as one of the common obstacle in cultivating this fish which results in low quality of the juveniles and leads to low growth rate as well as low in diseases resistance. A selection of genetic quality of the cultivated fish become a prerequisite in discontinuing the low quality, especially to those of mature cultivated fish.

So far there are several techniques to observe fish's genetic quality starting from the simplest like observation which based on its morphological characters up to the most sophisticated one like application of molecular technique. Moyle and Cech (1988), some basic methods have been applied in taxonomy study namely: meristic measurement, anatomical characteristics, pattern of the colour, caryotypes, electrophoreses, and so the DNA.

Mayr and Ashlock (1991) stated morphological characters could represent genotype traits and so they could be used to make the analysis of other characters more complete. However if there is some discrepancies in morphological characters data, it must then be followed up with other taxonomical characters like: molecular, chromosomes, behaviours, and others..

Bhagawati and Abulias (2007) reported morphological as well as isozymes characterisations of the cultivated gouramy fish collected from Tasikmalaya, Purbalingga and Blitar. They also stated that bilaterla meristic characters which supported by isozyme character could be used as fundament on selecting the gouramy fish for breeding purposes. The population with hhg level abnormalities has lower polymorphisms. Bhagawati and Abulias (2008), also reported the cultivated fish genes flow of different genetic source, by inter and intra specific breeding among strains of cultivated fish from Purbalingga, Tasikmalaya and Blitar. Data showed that breed between male fish of Tasikmalaya and female of Purbalingga and Blitar had higher polymorphisms than other breeds. Unfortunately, data also showed that there was a decrease in genetic quality of hybridised gouramy. Nugroho (1992) stated that it, might happen due

to the use of low quality strain, therefore the genetic potential of that particular fish could not be utilized optimally.

According to Rahardjoet *al* (2011), fish's body including its organs might be used to identify, determine, and classify fish between species. Based on Kusminiet *al*. (2000), it was noted that some gouramy strains have differences in their morphological performances as well as their growing potential. A study was done to observe the difference in phenotypic performances of several gouramy strains leads to a conclusion that they genetically differ. Apart from that, the gouramy fish might also distinguished into several strains namely: bastar, blue, and blue saohire.

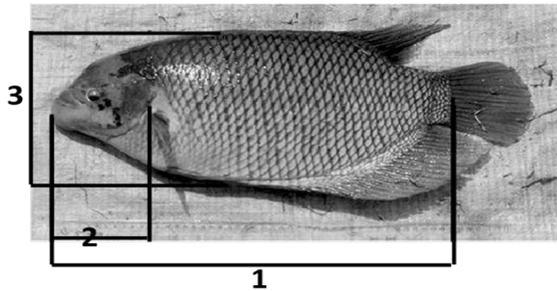
Satyani (2007), suggested that the female candidate for cultivation some requirements like: age, body size, and its genetic's ancestor. Following to this, Bhagawati and Abulias (2007, 2008), reported the physical performances of cultivated gouramy fish of Ciamis and Banyumas regencies which was based on its morphological and meristic characters leads to get genetic source of cultivated gouramy fish from some areas in Indonesia.

**RESEARCH METHODOLOGY**

Current study applied a survey method with a purposive random sampling to collect samples. Samples were both cultivated gouramy fish males and females ever mated. Of each sex, 30 males and 30 females were taken from each sampling site location. An MS-222 was applied to make the fish are unconsciousness during the observation for body size, colour, total length, total weight, total spines of the fins, and scales on the *linea lateralis*. Observation was based on the SNI:01-6485.1-2000 about parental stocks characters of gouramy fish (*Osphronemus gouramy*, Lac) (Figure 1.). The meristic characters, however, was based on the Saanin (1968), including total spines of the dorsal fin, (D), anal's fin (A), ventrals fin (V), pectoral's fin (P) and total *linea lateralis* scales (LL). Data were then analysed descriptively based on their body size range in compared with standard size as stated in the SNI: 01-6485.1-2000.

**RESULTS AND DISCUSSIONS**

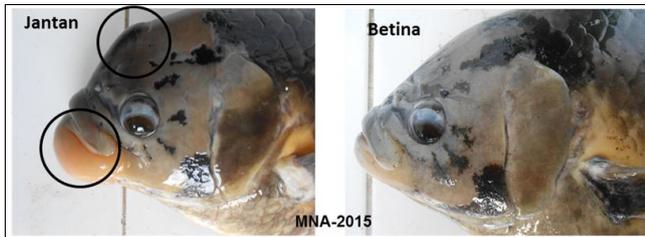
One of the criteria given to the samples was, the stock fish must have ever mated, since body size could not always be used as a platform in selecting as stocks fish.



**Fig.1. The parental stock of gourami fish according SNI : 01-6485.1 - 2000**

Remarks: 1 : Standart length; 2 : Head's length; 3 : Body height

Based on morphological characters and their behavior of both sexes fish stocks, male and female, the study noted the the easiest part of the body to distinguish the fish's sex is their forehead and bottom lip. The male fish has strong forehead and bigger and thicker bottom's lip than the upper lip, but the female fish is characterised with flat more flatter fore head and smaller size of bottom lip (Figure 2.). The mature gourami fish at more than 1 year old could show this sexual character, to allow the selection process become easier especially in distinguishing male and female stocks. Kottelat et al. (1993), stated that the gourami fish's head is characterised with straight forehead but getting blunt or even irregular form when they reach their maturity stage.



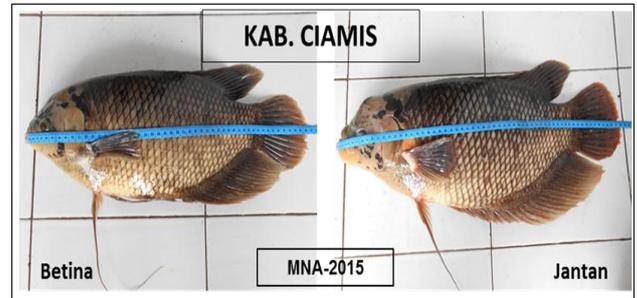
**Fig. 2: Dimorphisms characters on the male and female gourami stock**

Sexual dimorphisms are a situation where there are some characters discrepancies between male and female fish. Difereces in size is then called as *sexual size dimorphism*, and differences in shape is called as *sexual shape dimorphism*. Sexual dimorphism becomes one of several tools or patterns and mechanisms to know genetic diversity, which is currently discussed fully in evolutionary as well as ecology (Berns, 2013).

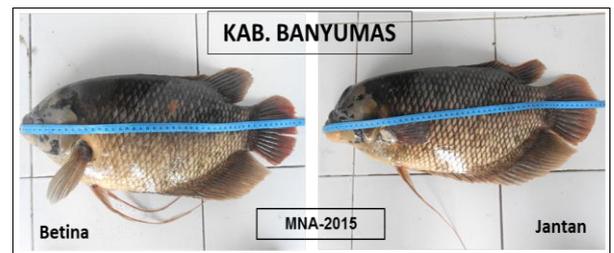
However, in factually we sometimes noted particular fish with different characters like they are supposed to be and called as 'vogue, or 'transgender', especially when the fish have reaced more than 1 year old and bigger size than normal, but their secondary sexual characters is still not obvious. In such a situation, the farmer will apply further selection criterias like the movement of tail's fin when the fish is taken out from the water. The male fish, will move its tail's fin strongly to make a "U" shape, while the female one move its tail's fin slowly and so do not making a "U" shape.

Quantitative data taken from the system of particular organ could help to understand functional of particular organ. Measurement is then fit to its structure as well as system going to be applied. When a particular organ has a clear geometric shape means the measurement can be done easily and vice versa when the organ has a complex shape, measurement should be done in a complex morphometrics way (Roy & Munshi in Munshi & Dutta, 1996).

The gourami fish slected for candidate of stocks, were characterized with straight body shape, simetric bilaterally, strong different between head, body and tail. Short mouth, but the male fish has thick lower lip including teeth in the lower jaw, a pair of chest's fins, a pair of abdominal fins, dorsal fin, anal fin and tail's fin. The abdominal fin, however, is modified to a rope shape leads to a relative longer size. The stenoid scale has a relatively large size, the fish has also continuous *linea lateralis* scales, along the anterior to anterior to posterior (Figure 2 and 3). Symetric bilateral body shape, means that if we cut the fish into two pieces from dorsal to abdominal from the head to the tail, we will have two parts of the fish with equal size and shape between left and right hand sides. More over, they could be seelika a two sides of a coin (Rahardjo et al, 2011).



**Fig.2: Male and female stock fish of Ciamis regency**



**Fig.3: Male and female stock fish of Banyumas regency**



**Fig. 4: Ombilinichthys yamini, gen. et sp. nov., holotype, PALITB/TLW-213-2009**

(Sumber: Murray et al., 2015)

Outer characters of the gourami fish subspecies, have been identified by Soewardi et al (1995) who reported that grouping of gourami fish could be based on their body colour, gead shape, and the scales pattern. Roberts (1992) concluded that there are only three species belong to Genus *Osphronemus*, each of them is characterized with different in meristic, morphometric, and body's colour. The species are *Osphronemus gouramy* Lacapède which is spreaded along the South East Asia, yang the rest two species are indigenous species of Kalimantan namely: *O. latilavius* Roberts 1992, an endemic species of Sabah and *O. septemfasciatus* Roberts 1992, in Sarawak, East Kalimantan and West Kalimantan. According to Ruber et al (2006) Genus *Osphronemus*, including *O. exodon*, *O. goramy* and *O. septemfasciatus*. Latest information, however, as stated by Murray et al. (2015) there was a new species of gourami in Ombilan dam Sumatra which was found as fossil though the fossil was actually

found in 1870's, but since it had never been published yet, the fossil was then re observed in year 2009. Currently, the fossil belongs to the Palaeontologylaboratpry of ITB. The fossil was then grouped in the *Osphronemidae* BleekerFamily.

As it was stated in the book of SNI:01-6485.1-2000, some quantitative criteria to be grouped as ready mated stocks include: age, standard length, body weight, fecundity, and egg's diameter. Stock's candidate age supposed to be 24-30 months for male and 30-36 months for female; standard length, head's length, and body's height. Meanwhile, the define male gonads maturity, we could use their pair's behavioral when they are in the pond, the female stock will make her own nest; the female fish also characterize with bigger size and softer in its abdomen.

A study on fish morphology always discuss morphometrics and meristics which deals with specific characters like body size or part of the fish body including total length, and stadrad length. These two

measurements can further be used as taxonomical characters in identifying fish. Data will be shown in unit of either millimeter or centimeter, the data are called as absolute data; the meristics measurement however, specific character related with total number of particular fish's part, like: total number of scales soft ones on dorsal (Affandiet *al.*,1992).

In a quatitative analysis, the morpphometric study can be used to : (1) distinguish fish's sexes or even species, (2) describing patterns of morphological differences between population or species; (3) classify and predicting the phylogenetics relations among the samples. Furthermore, a morphometrics study can also be used to differentiate the fish within the species but have different geographic or even between varieties (Turan, 1999).

As in the book of SNI:01-6485.1-2000, current study noted several quantitative data on morphological performance of gouramy fish stocks of Ciamis and Banyumas regencies Table 1.

**Table 1: Quantitative data on morphological characters of gouramy fish-stocks of Ciamis and Banyumas regencies**

Criteria	Ciamis Gouramy		Banyumas Gouramy		SNI:01-6485.1-2000	
	Male	Female	Male	Female	Male	Female
Standard length (cm)	55 - 61	51 - 53,5	52 - 57	48,5 - 50,5	30 -35	30 - 35
Head's length (cm)	13 -14	10-11	11-12	10-11	-	-
Body's height (cm)	20-23	20-21,5	19-21	19-20	-	-
Body's weight (kg/ekor)	2.850 - 3.810	2.000 - 2.360	2.310 - 3.200	2.000 - 2.340	1,5 -2,0	2,0 - 2,5

Quantitative data on morphological characters (Table 1.) tends to be similar to that of belong to the "soang" gouramy, i.e.: the body size is a bit longer than normal including size of the scales which also larger than normal. According to Sulhi and Nugroho (2005), and Susanto (2014), the soang gouramy (angsa/galunggung) has a specific colour which is a bit lighter than normal, growing rate and viability relatively higher than others, may reach a particular size which is

bserta mampu igger than others (65 cm length and 8 kg weight).

The meristics data of the gouramy fish collected from Ciamis and Banyumas, showed a similarity on the formula of spine(s) of the fins, especially those of spines, but varies in total number of soft spine (s) though it still in the range for gouramy fish *O.gouramy* Lac. Data of total number of fin's spines of the gouramy fish are shown in Table 2.

**Table 2. Rumus Jari-jari Sirip Induk Gurami asal Ciamis dan Banyumas**

Nama organ	Gurami Ciamis		Gurami Banyumas	
	Jantan	Betina	Jantan	Betina
Dorsal fin (D)	D.XII-XIII.11-13	D.XII-XIII.11-13	D.XII-XIII.11-13	D.XII-XIII.12-13
Chest's fin (P)	P.2.13-14	P.2.13-14	P.2.13-14	P.2.13-14
Ventral fin (V)	V.I.5	V.I.5	V.I.5	V.I.5
Anal fin (A)	A.IX-XI.16-22.	A.IX-XI.16-22.	A.IX-XI.16-22.	A.IX-XI.17-22.
Linelateralis scales (LL)	31-33	31-33	31-33	31-33

Total number of spine (s) on dorsal fin, chest fin, abdominal fin, and anal fin of the gouramy fish stocks of both Ciamis and Banyumas (Table 2) are similar to those described as parts of *Osphronemus gouramy* Lacapede (Kottelat *et al.*, 1993; Saanin 1968), moreover, they are parallel to the formula of the SNI:01-6485.1-2000 book, the formula for dorsal fin is D.XII-XIII.11-13, chest's fin P.2.13-14, abdominal fin V.I.5 and anal's fin IA.IX-XI.16-22.

The data showed if both populations of gouramy fish stocks of Ciamis and Banyumas do not have any abnormality, especially because all organs are still complete. Moreover, the meristic bilateral characters showed that there is no extreme different even equal. According to Van Valen (1962) phenotypic different among individual for bilaterla meristic characters indicating asymmetric fluctuation i.e.: differences between left and right hand side with average of zero due to the fish's inability in growing normally.

## CONCLUSIONS AND SUGGESTIONS

### CONCLUSIONS

The mature gouramy fish has dimorphisms in their sexual characters where the male has strong forehead, bigger and thicker lower lip and longer than upper one, whereas the female has flat forehead, with normal size of lower lip. When the fish are taken out from the water, the male fish show fast movement on his tail's fin o make a "U" shape, but the female shows a slow movement and so does not make a "U" shape. All gouramy samples collected from both areas

Ciamis and Banyumas regencies, have similar characterisctcs on both morphology as well as their meristic to be fit with the description of *Osphronemus gouramy* Lac. Which tend to the soang sub species.

### SUGGESTIONS

It is suggested that a selection for gouramy stock might be based on their based on their morphological characters like measuring standard body length, head's length, body's height, and body's weight as a simple and relatively easy way. However, it would be better if the measurements are based on the criteria as stated in the SNI:01-6485.1-2000 book, about the gouramy stocks (*Osphronemus gouramy*, Lac).

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