Original Research Article

Length weight relationships of small indigenous fish *Parambassisranga*(Hamilton, 1822)from Ujani wetland of Maharashtra, India.

ABSTRACT:

Length- weight relationships parameters are useful in fisheries science to estimate weight of individual fish from its length. It can always be used for determination of condition indices and to compare life history and morphology of populations of given species. *Parambassisranga*commonly called Indian glassy fish was investigated for the study of length-weight relationships (LWRs) from Ujani wetland, a dam constructed on Bhima river of Maharashtra state of India. During the study period of November 2021 to October 2022, total of 300 samples were collected from local fishermen and length-weight parameters were recorded in laboratory at Modern College, Ganeshkhind, Pune. The present study shows intercept (a value) of 0.0089. Slope (b value) was 3.2303 which liein expected range of 2.5 to 3.5. The slope value was more than 3 i.e. above isometric growth value that indicates positive allometric growth of fish.

Keywords: Indian glassy fish, length-weight relationships,*Parambassisranga,* small indigenous fish, Ujani wetland.

INTRODUCTION:(Where are the references that clarify the importance of this type of fish?)

Study of fish species and populations are importantto understand many vitalbiological aspects for their proper management of resources [1]. Length-Weight Relationship (LWR) is one of the most commonly used procedures for obtaining fisheries data [2]. The length-weight relationship (LWR) of fishes is commonly used tool to estimate the weight of a specimen from its length and vice versa, evaluation of fish populations and growth studies [3, 4]. It has valuable role in fishery research for the study of fish population dynamics and growth patterns. It has importance in assessment of taxonomic differences in fish populations, metamorphosis stages and maturity [5]. Length- weight relationship parameters are useful in fisheries science to estimate weight of individual fish from its length. It can always be used for evaluating condition indices and to compare life history and morphology of populations of given species [6]. Fish can attain either isometric growth, negative allometric growth or positive allometric growth. These growth patterns are associated with no change in body shape as fish grows, shape becomes slender as it increases in weight and becomes relatively stouter as it increases in length [7]. The determination of condition factor is important index for study of fish biology, as it provides important information related to fish physiological state that individuals of a given length having higher weight are in a better condition. The condition factor describes the wellness of fish in the habitat. While study of wellness of any species having different sizes population, the relative condition factor was more appropriate index [8]. The changes in the condition factor based on length-weight relationships reflect seasonal alterations in the metabolic balance, maturation patterns and stomach repletion. Decline in condition factor values may be due reproductive period and changes in the foraging habits of certain species [9].

Present study was conducted to study length-weight relationships of*Parambassisranga*fish from Ujani wetland of Maharashtra. It is commonly called as Indian glass fish and is a small indigenous fish species found in India, Pakistan, Bangladesh, Myanmar, Thailand, Malaysia [10] and Nepal[11]. Ujani wetland is a dam constructed on terminal region of upper Bhima river basin located on the western side of South Indian peninsula. River Bhima is a tributary of river Krishna originates in Western Ghats. The Ujani dam was constructed in year 1980 as a major dam and irrigation project. It hasa hydroelectric power project which generates 12 MW of electricity [12]. The present study aims at providing information on length-weight relations and condition factor of *Parambassisranga*from Ujani wetland.

MATERIALS AND METHODS:

Total of 300 samples of *Parambassisranga*(fig. 2)were collected from local fishermen from Ujani wetland backwater fishing areas (fig. 1) during the study period of November 2021 to October 2022. Collected samples were then preserved in 10% formalin solution and brought to the laboratory for identification and LWRs study. Fishes were identified based on literature of Jayaram (1981) [13]. Measurements of length (L) were taken by using digital caliper (Baker) to the nearest 0.01cm and body weight (W) was measured using weighing balance to nearest 0.01 gm (CONTECH – CB Series). Length weight relationships were estimated by the common formula:

$W = aL^b$[14, 3]. Where, 'L' is the total length (cm), 'W' is the body weight (g), 'a' is the intercept and 'b' is the slope of the log-transformed linear regression, r^2 is the coefficient of determination to estimate the goodness of fit.

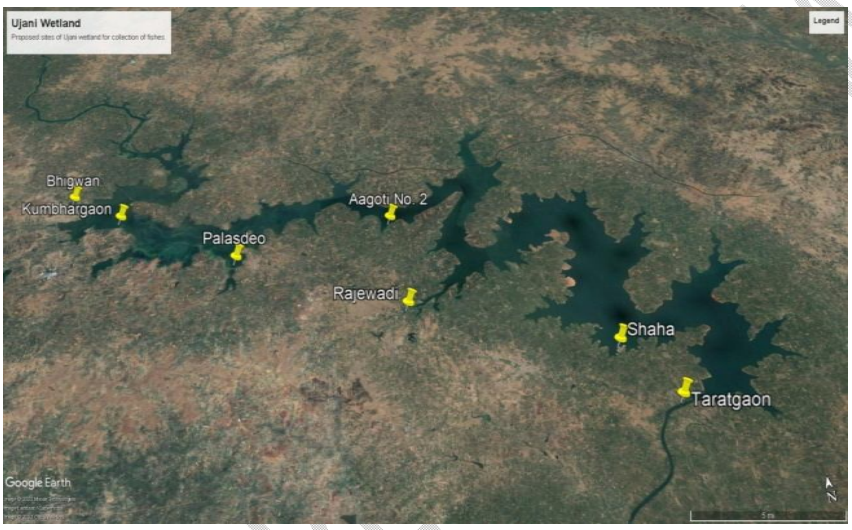

Figure 1 Satellite view of Ujani wetland showing sites of fish collection.

Figure 2 Study fish: *Parambassisranga.*

RESULTS AND DISCUSSION:

Table 1 shows descriptive statistics and estimated parameters of LWRs such as total length range, mean, standard deviation, body weight range, mean, standard deviation, a and b values, r^2 (coefficient of determination for goodness).

Table 1. Length-weight relations parameters of *Parambassisranga* (N: Number of samples; TL: Total length; cm: centimeter; SD: Standard deviation; Min: Minimum; Max: Maximum; g: gram.

Parameters	Results
N	300
Min. TL (cm)	3.713
Max. TL (cm)	7.945
TL range	3.713 - 7.945
TL (Mean±SD)	5.735±0.8336
Std. error	0.04812831
Length stand. Dev	0.8336067
Median	5.737
Min. Weight (g)	0.64
Max. Weight (g)	8.07
Weight range	0.64 - 8.07
Wight (Mean±SD)	2.751±1.2695
Std. error	0.07329833
Weight Stand. Dev	1.269564
Median	2.615
a value	0.0089
b value	3.2303
r^2	0.909
Fulton's Condition factor	1.353

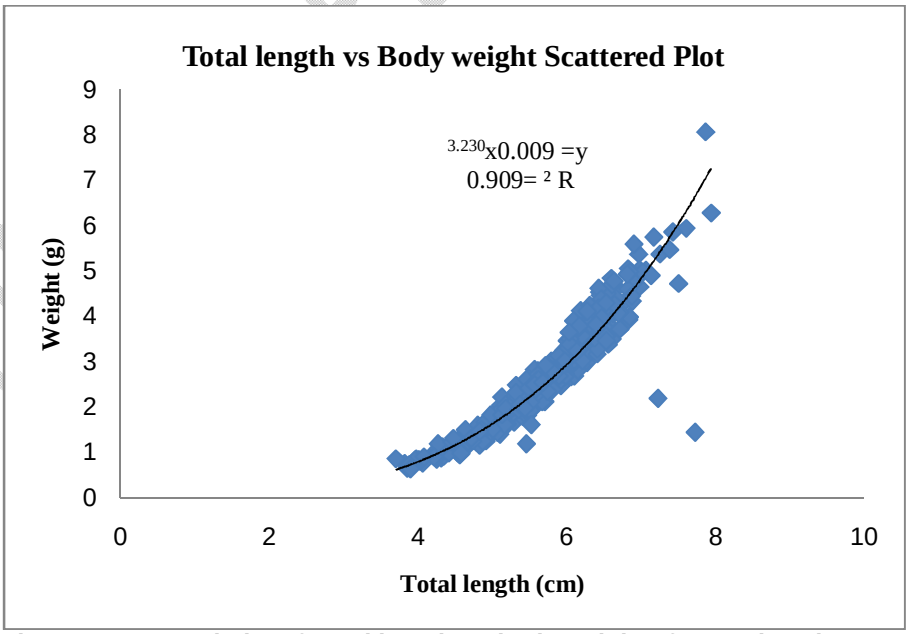

Figure 3 Scattered plot of Total length Vs body weight of Parambassisranga

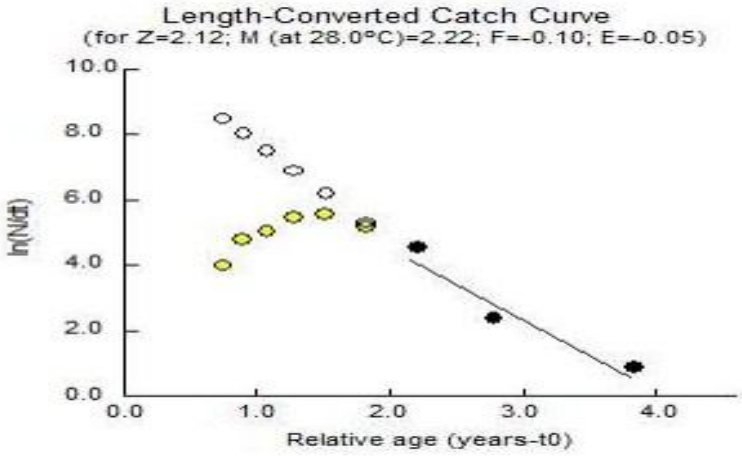

Figure 4 Length- converted catch curve

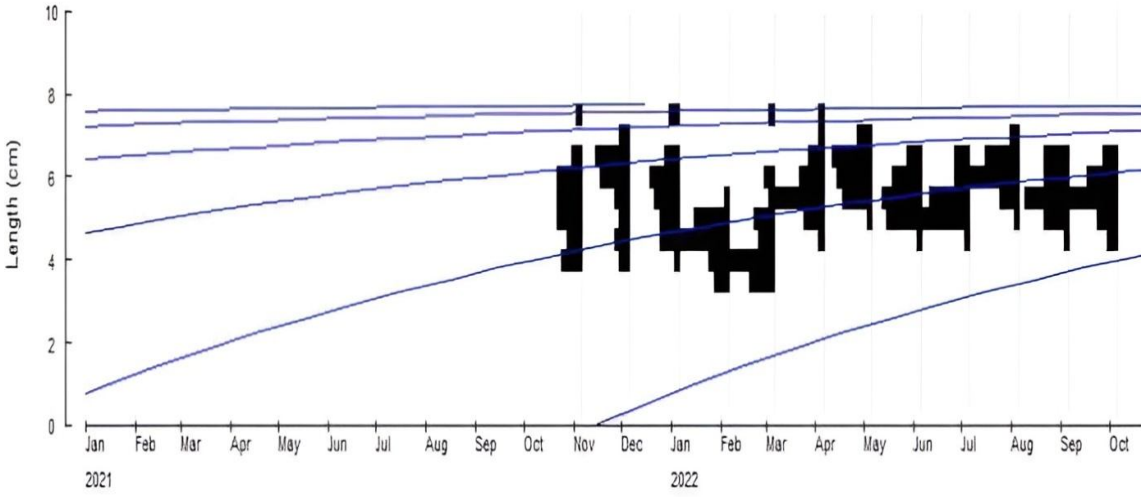

Figure 5Growth curve from November 2021 to October 2022.

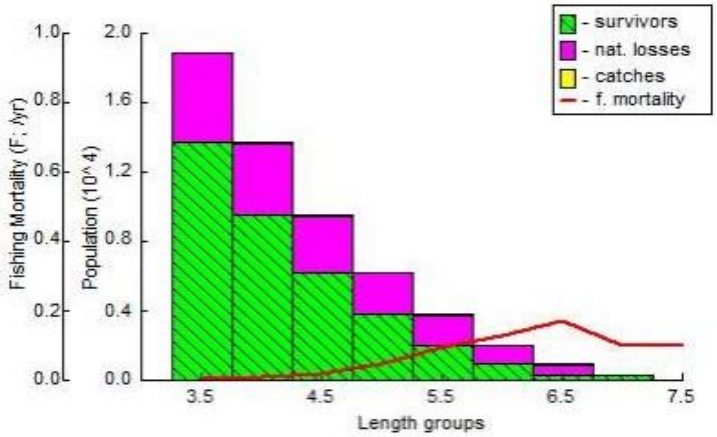

Figure 6 Length- structured virtual population analysis (VPA)

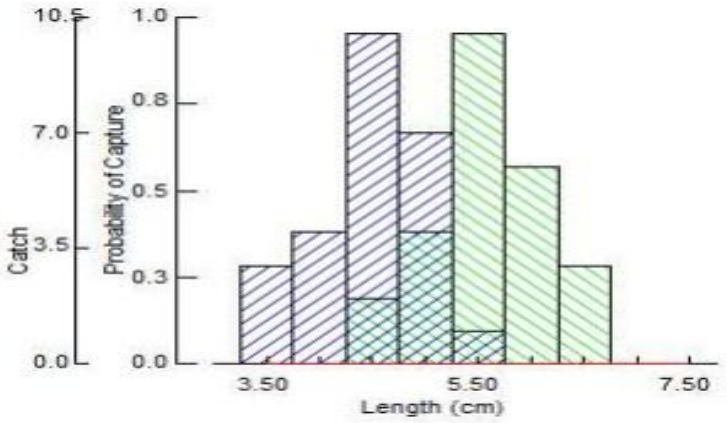

Figure 7 Probability of capture

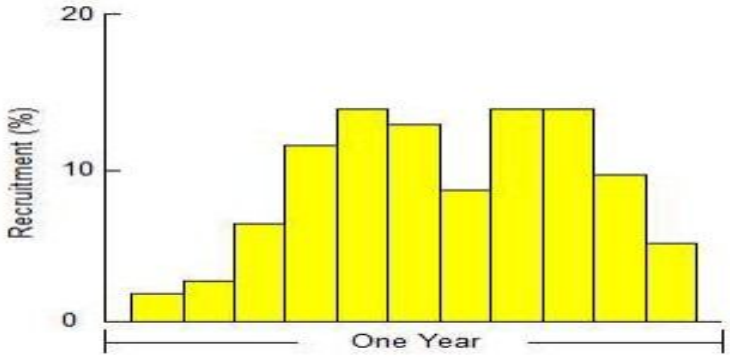

Figure 8 Recruitment Pattern for 1 year

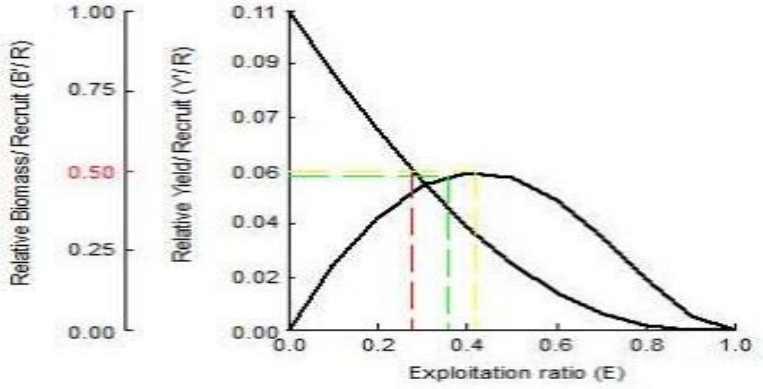

Figure 9) Relative yield per recruit (Y/R) and relative biomass per recruit (B/R)

'a' is the coefficient of the arithmetic weight–length relationship and the intercept of the logarithmic form. Ninety percent of the values ranged between 0.001 and 0.05. Current study recorded a value of 0.0089, which is in expected range of 0.001 to 0.05 (Froese, 2006). The value of 'b' for the samples investigated during study was found to be 3.2303 which was in expected range of 2.5 to 3.5 (Froese, 2006). The value of 'b' was found to be close to 3.309 of the findings of Baitha*et al.,* (2017).The present study b value was higher than 2.794 recorded by Karna*et al.,* 2018 [15] for *P. ranga*from Hirakud reservoir, Odisha, India. Islam *et al., 2017*[16] reported slope, b value of 2.525 from Atrai and Brahmaputra rivers, Bangladesh. Winn *et al.,* 2021 [17] found b value of 3.059 from Sunny lake, Myanmar which was close to the b value of current study.

The variation reported in b values may be because of differences in sample size investigated, habitat, variations in stomach fullness, sex of fishes, gonad maturity, season, health status of fish and differences in observed length of specimen [18, 19, and 3]. The b value of 3.2303 reported during present study shows positive allometric growth as it is above 3.0 (isometric growth)level. Such positively allometric growth pattern shows large specimens have increased in height or width more than in length [3]. Fulton's condition factor that is free from regression parameters (a and b) calculated based on length and weight data of fish species was used to determine the physical fitness of fish. The present study reported Fulton's condition factor of 1.353that indicates fishes are in good physical state in their habitat [20].

This manuscript is strong in studying the relationship between length and weight, but very weak in the lack of studies such asstomach fullness, sex of fishes, gonad maturity, season, health status of fish.

CONCLUSION:

The present study showed positive allometric growth pattern of length-weight relationship of *Parambassisranga*from Ujani wetland. It reflected that the fish species is in good state in that habitat.

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4 REFERENCESwithout *Journal*(????????)

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