Length-Girth Relationships of *Barbodes gonionotus* and *Hampala macrolepidota* in the Jatiluhur Reservoir, Indonesia

Rapports longueur-circonférence de* Barbodes gonionotus *et* Hampala macrolepidota *dans le réservoir de Jatiluhur en Indonésie

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Abstract

The length-girth relationships of Javanese carp (*Barbodes gonionotus*) and hampal carp (*Hampala macrolepidota*) in the Jatiluhur Reservoir, Indonesia were examined. The equations derived from estimating the maximum girth of Javanese carp are G_m = -1.19 + 0.80L, and for the hampal carp, G_m = -0.47 + 0.62L. Models relating head girth to total length are also given. The relationship between G_m (maximum girth) of fish caught and gillnet mesh size is also briefly discussed.

*Les rapports longueur-circonférence de la carpe javanaise (*Barbodes gonionotus*) et de la carpe indonésienne (*Hampala macrolepidota*) dans le réservoir de Jatiluhur en Indonésie ont été examinés. Les équations sont dérivées des valeurs maximales de la circonférence de la carpe javanaise, G_m = -1,19 + 0,80L, et de la carpe indonésienne, G_m = -0,47 + 0,62L. Les modèles rapprochant la circonférence de la tête à la longueur totale sont aussi donnés. Le rapport entre la circonférence maximale (G_m) des poissons capturés et du vide de maille des filets maillants fait l'objet d'une brève discussion.*

Introduction

Jatiluhur in West Java is a multipurpose reservoir with a maximum area of 83 km² and depth of 110 m. The reservoir was formed in 1968 as a result of dam construction on the Citarum river. The annual fish yield is about 22 kg·ha^{-1}·year^{-1} consisting predominantly of two species, namely Javanese carp (*Barbodes gonionotus*) and hampal carp (*Hampala macrolepidota*). According to Purnomo and Kartamihardja (1986), gillnets contribute 40.8% of total fish production in the Jatiluhur Reservoir.

In fisheries research, length-girth relationships are important for biological studies and assessments related to gear selection (McCombie and Fry 1960). Selectivity pattern can be predicted from measurements of maximum and head girths of fish, even before any gillnetting has been carried out (Hamley 1975). In practice, girth cannot be measured as easily as length and the use of an elliptic model has been proposed by Ragonese and Bertolino (1994). This study examines the relationship between the length and girth of Javanese and hampal carp, and its relation to the mesh size of gillnets.

Materials and Methods

Fish were caught using seven gillnet mesh sizes in the Jatiluhur Reservoir. The total length and girth (maximum and head girth) were measured using a measuring board and metric plastic tape band, respectively. The length-girth relationships are expressed as:

$$G_m = a + bL \; ; \; G_h = a' + b'L$$

where G_m and G_h refer to maximum and head girth, respectively; a, a', b, b' are constants estimated from linear regression; and L is the total length of the fish.

According to Hamley (1975), the girth of the fish caught most efficiently is proportional to gillnet mesh size, and may be expressed by the equation:

$$G_m = 2 \text{ km}$$

where 2 m is the mesh perimeter and k is a constant (known as the perimeter ratio). The k values of *B. gonionotus* and *H. macrolepidota* were computed for the seven gillnet mesh sizes used in the study.

Results and Discussion

It was observed that the Javanese carp is caught mainly behind the gill cover, while the hampal carp, which is smoother in body shape, is caught mostly near the dorsal fin. Figs. 1 and 2 illustrate the scattergram of girth *vs.* total length data measured during the study. The linear models derived via regression for the

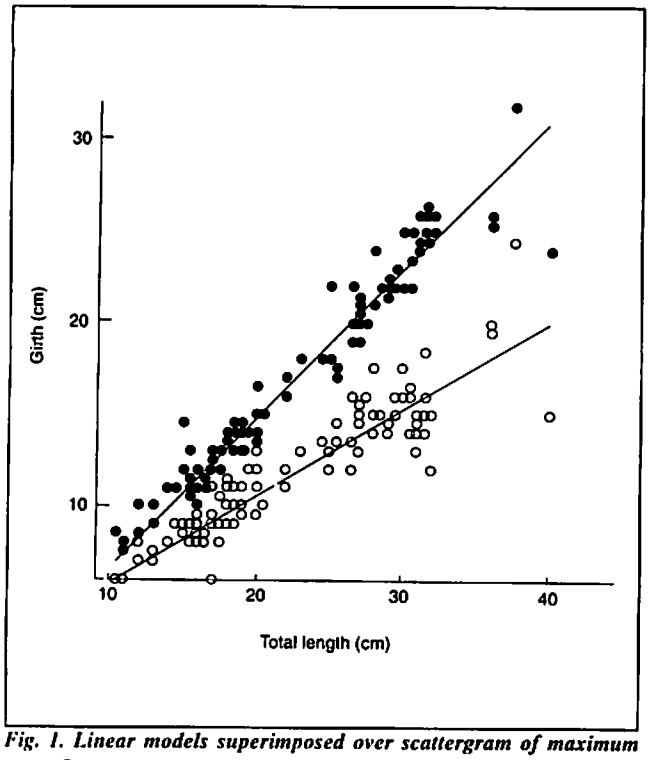

Fig. 1. Linear models superimposed over scattergram of maximum girth (●) and head girth (○) versus total length data for **P. gonionotus.**

Table 1. The modal girth and perimeter ratio of Javanese and hampal carp versus gillnet mesh size.

Mesh size (cm)	*B. gonionotus*		*H. macrolepidota*	
	Modal G_m	k	Modal G_m	k
5.1	11.9	1.17	12.7	1.25
6.4	14.6	1.15	14.9	1.17
7.6	20.0	1.31	20.0	1.31
8.9	22.3	1.25	-	-
10.2	24.0	1.18	-	-
11.4	25.6	1.12	-	-

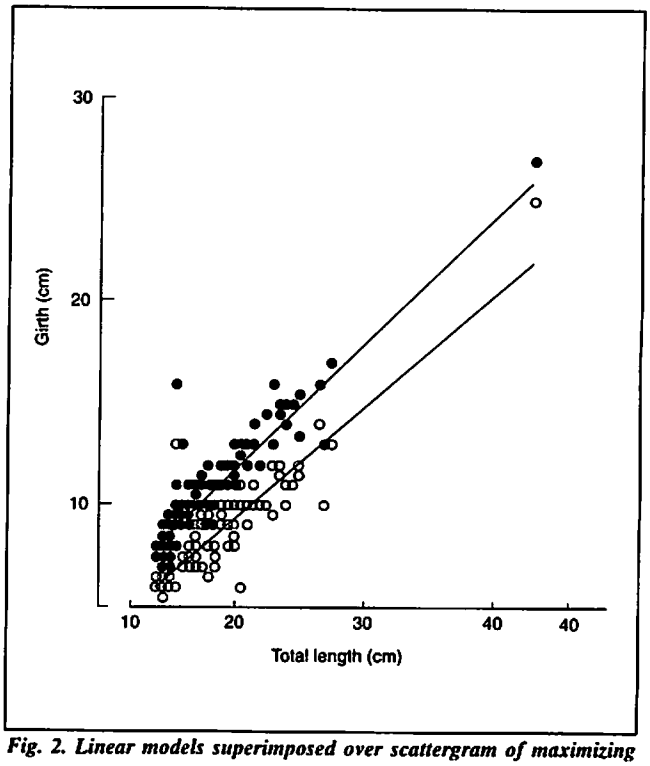

***Fig. 2. Linear models superimposed over scattergram of maximizing girth (●) and head girth (○) versus total length data for* H. macrolepidota.**

Javanese carp (*B. gonionotus*) are as follows:

$G_m = -1.19 + 0.80L$ ($r = 0.97, n = 113$), and
$G_h = 1.28 + 0.47L$ ($r = 0.92, n = 113$)

For the hampal carp (*H. macrolepidota*), these are:

$G_m = -0.47 + 0.62L$ ($r = 0.93, n = 132$), and
$G_h = -1.29 + 0.54L$ ($r = 0.90, n = 132$).

The results indicate that the slope of the Gm model for *B. gonionotus* is steeper than that of *H. macrolepidota* given the more slender form of the latter.

The k values for the two species using the seven gillnet mesh sizes used in the study are summarized in Table 1. These varied between 1.12 and 1.31 for *B. gonionotus* and between 1.17 and 1.31 for *H. macrolepidota*. Baranov (as cited in McCombrie and Berst 1969) has found k values for many species to be between 1.08 and 1.35. These values obtained here are consistent with this norm. The k values and models given here are useful in predicting the modal size of fishes impacted by a given mesh size of gillnet used to exploit them.

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