



Performance of Dual Culture of Amur Carp and Jayanti Rohu in Imphal East District, Manipur

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ABSTRACT

A dual culture of Amur common carp and Jayanti rohu were demonstrated for the first time in Imphal East district, Manipur. The trial was conducted in five farmers' ponds of a total 2 ha area for eight months period. Conventional feed like mustard oil cake (MOC) and rice bran (RB) @ 1:1 ratio was fed to the fish @ 3-6 percent of body weight per day in two installments by the farmers. Water quality parameters and plankton analysis were done during the culture period. Water temperature was found in the range of 20.4 to 27.7°C, pH was maintained in the optimum range of 7.2 to 7.6 and plankton analysis appeared between 0.4 to 6.3 mg/l. After eight months of the culture period, the average body weight (standard length) of Amur carp and Jayanti rohu were recorded as 751 g (20.46 cm) and 562.5 g (19.72 cm), respectively. Moreover, Amur carp observed a better growth rate as compared to Jayanti rohu.

Key Words: Amur Common Carp, Dual culture, Imphal East, Jayanti Rohu, Manipur Performance.

INTRODUCTION

Manipur has rich potential fisheries resources witnessing an estimated total area of 63,616 ha mainly contributed by wetlands (39,124 ha), rivers/streams (16,677 ha), waterlogged (3525 ha), and aquaculture ponds (2643 ha) (Anonymous, 2020). Due to the availability of freshwater resources, the state is exclusively prevalent in freshwater fish production. Fish production from marginal fish farms is dominant compared to small, medium, and large farms (Singh *et al*, 2018). According to Umesh *et al* (2012), Manipur reported 45 species which used as food fish. While currently, nearly about 13-15 species are being cultured as food fish by the fish farmers in the state. In Manipur, aquaculture of Indian major carps (IMC) and exotic carps such as common carp, grass carp, silver carp, and other commercially important species tilapia and pangasius are widely cultured and contributed to inland aquaculture production (Singh *et al*, 2018).

In spite of having huge potential of fish production from the above resources, Manipur is not self-reliant to meet state demand. The total fish production of Manipur during 2019-20 was

estimated to be 32,000 t (Anonymous, 2020). However, the estimated fish requirement in the state was 52,000 t in 2019-20 against the state-owned production of 32,520 t, indicating a 19,480 t shortage needed to import from other states for domestic consumption (Anonymous, 2020-21).

To narrow the supply-demand gap, Manipur depends on fish imported from other neighbouring states. Hence, improved candidate species like Amur carp, Jayanti rohu, etc, need to be introduced which can grow in this environment and also increase production scale to overcome fish shortage in Manipur. Amur carp (*Cyprinus carpio*) is an improved variety of wild common carp of Hungarian origin (Basavaraju *et al*, 2003; Das *et al*, 2017). It has appreciable realistic significance in low-input aquaculture systems as a result of its better growth performance, late maturing, hardy, accepts artificial feed, and parallel food habits to that of existing stock of common carp (Basavaraju and Reddy, 2013; Vijayakumar *et al*, 2019). Besides, Jayanti rohu is an improved strain of rohu over the normal rohu developed by ICAR-CIFA, Bhubaneswar to improve farm productivity. The improved rohu

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also proved to be significantly higher growth efficiency over the local rohu, reduction in the rearing period along with the increase in the yield, feed neutral and effective under all culture practices which have earned high acceptance level from the fish farmers and hatchery owners (Das *et al*, 2017; Jayasankar *et al*, 2018). Hence the present study was undertaken with the objective to demonstrate the growth performance of improved varieties fish like Amur carp and Jayanti rohu

MATERIALS AND METHODS

The present study was carried out at farmers' pond covering a total area of 2 ha, selected in four villages of Imphal East district of Manipur namely, Andro, Takhel, Waiton, and Yumnam Patlou to demonstrate the growth performance of Amur carp (AC) and Jayanti Rohu (JR). Seeds of Jayanti rohu and Amur carp ranging between (0.19- 0.247) gm in weight and (2-2.5) cm in length were purchased from a certified seed farm and stocked in the farmers' ponds following proper acclimatization with the surrounding initial temperature. The fish fry were stocked in the farmers' pond during June, 2018 to January, 2019. The size of the pond ranged between 0.25 to 0.5 ha with a water depth of 1-1.5 meter. Stocking ratio (AC: JR) was 1:3. Stocking density/ha were varied from one location to another ranging from 10000 to 30000 fry/ha. Physio-chemical parameters of the water of the ponds were managed by applying agricultural lime along with pond fertilization with organic manure from cattle as well as inorganic fertilizers like urea and single super phosphate during the culture period of eight (8) months. Besides fertilization, fishes were also provided with supplementary pellet feed @ 3-6 percent of body weight per day given in two instalments that is one in the morning and another in the evening hours. Conventional feed like mustard oil cake (MOC) and rice bran (RB) @ 1:1 ratio was used by farmers. In all the ponds, water quality parameters like temperature, depth, transparency and pH were monitored at monthly interval. Frequent health monitoring was done by giving appropriate treatment, as and when required to maintain for better health condition of the fishes. Fish sampling by netting out a minimum number of ten fish from each pond of different location were also recorded

at the monthly interval in all the ponds to evaluate the performance of Amur carp and Jayanti rohu. Final harvesting was performed after 8 months of culture in all ponds. The average body weight gain and the body length gain (cm) were analysed. The data collected were processed for selected statistical parameters including mean, range, and standard error for drawing a specific conclusion using the data processing software SPSS-25.

RESULTS AND DISCUSSION

Water quality parameters such as temperature, depth, transparency and pH analysis were determined to be in the acceptable range all round the culture periods as shown in table 1. The better growth performance of Amur carp and Jayanti Rohu have been observed in all the demonstrated ponds as shown in Figures 1-2 and Tables 2-3. The average body weight of Amur common carp and Jayanti rohu have been recorded as 751 g (20.46 cm) and 562.5 g (19.72 cm) respectively in eight months of culture period, which was statistically significant ($P < 0.05$). Similarly, Hussain *et al* (2020) recorded that the average growth for Amur carp was 543.3 g in polyculture system with three Indian major carps (IMC) namely, Catla (*Catla catla*), Rohu (*Labeo rohita*), Mrigala (*Cirrhinus mrigala*) and two Chinese carps viz., Grass Carp (*Ctenopharyngodon idella*) and Silver carp (*Hypophthalmichthys molitrix*) during the culture period of 12 months. However, Bordoloi *et al* (2020) reported that Amur carp gained an average weight of 1010 g (30.5 cm) although the local common carp achieved a size of 920 g (27 cm) in twelve (12) months of culture period and also the Amur carp showed better growth than local carp in all the demonstrated ponds in Barak Valley Zone of Assam. In this study, Amur carp was recorded faster growth rate when compared to Jayanti rohu, which was supported in a study of polyculture system of Amur carp with other carps in polyculture system (Hari and Sagar, 2018).

Table 1 Water quality parameters noticed during the culture period.

Sr. No	Pond No.	Water Temperature (°C)	Water depth (m)	Transparency (cm)	Av. Water pH
1	Pond 1	20.4 -27.7	1-1.37	28-43	7.6
2	Pond 2	20.4 -27.4	1-1.37	22-35	7.5
3	Pond 3	20.4 -27.4	1-1.37	21-39	7.2
4	Pond 4	20.4 -27.4	1-1.52	23-52	7.4
5	Pond 5	20.4 -27.4	1-1.37	21-36	7.4

Table 2 Net weight and length gain in Amur carp

Sr. No	Location	Average weight (g)		Net weight gain (g)	Average length (cm)		Net length gain (cm)
		Initial weight	Final weight		Initial length	Final length	
1	Andro	0.247	815	814.753	2.5	21.7	19.2
2	Yumnam Patlou	0.247	910	909.753	2.5	22.1	19.6
3	Waiton	0.247	650	649.753	2.5	18.4	15.9
4	Ngariyan	0.247	550	549.753	2.5	18	15.5
5	Takhel	0.247	830	829.753	2.5	22.1	19.6

Table 3. Net weight and length gain in Jayanti Rohu.

Sr. No	Location	Average weight (g)		Net weight gain (NWG) (g)	Average length (cm)		Net length gain (NLG) (cm)
		Initial weight	Final weight		Initial length	Final length	
1	Andro	0.19	720	719.81	2	22.5	20.5
2	Yumnam Patlou	0.19	650	649.81	2	19.7	17.7
3	Waiton	0.19	470	469.81	2	17.5	15.5
4	Ngariyan	0.19	410	409.81	2	16.9	14.9
5	Takhel	0.19	710	709.81	2	22	20

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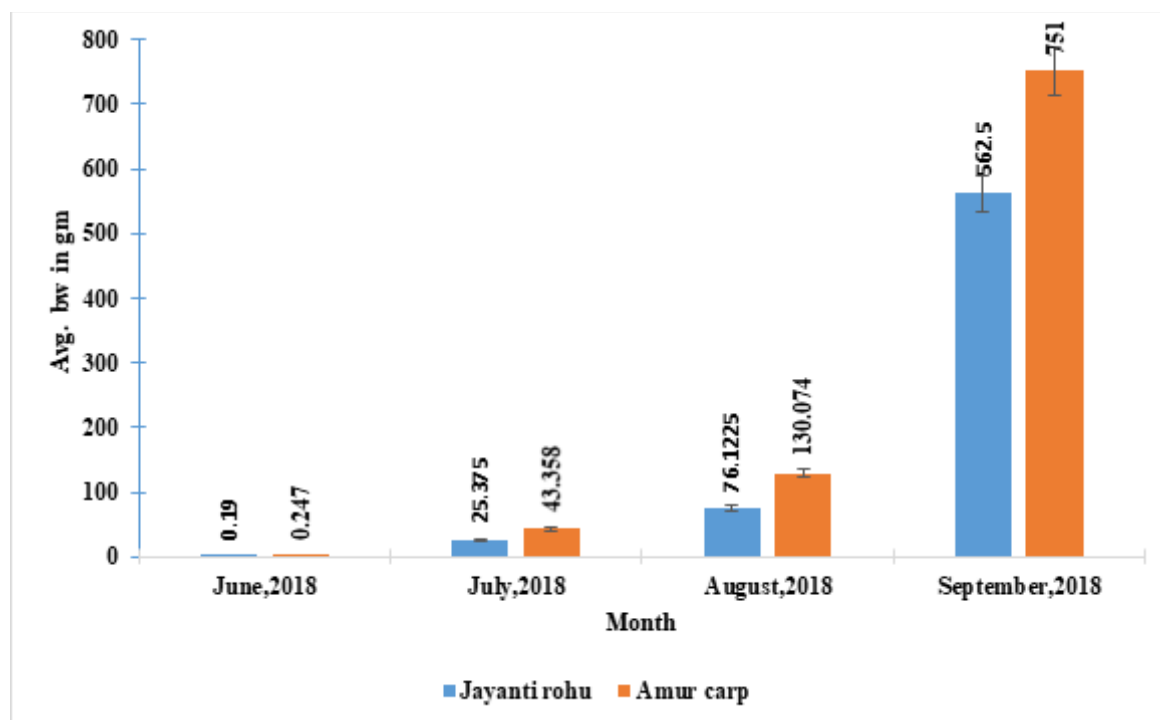


Fig 1 Comparison of body weight gain during 4 months culture periods

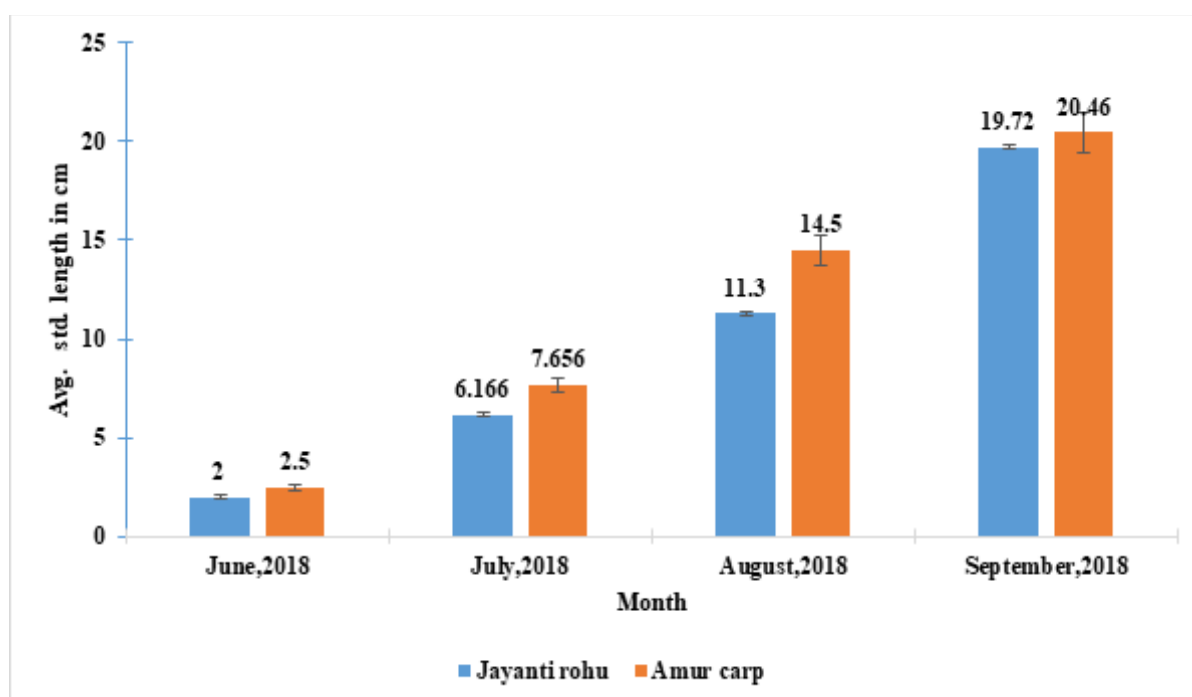


Fig 2 Comparison of length (cm) gain during 4 months culture periods

Moreover, Saikia *et al* (2020) also reported Amur Carp and Jayanti Rohu showed a remarkable higher growth in comparison to locally available Rohu (*Labeo rohita*) and Common Carp (*Cyprinus carpio*) in every farmers' pond in 11 months of culture in Extensive Polyculture System.

Sharma *et al* (2022) revealed that Amur carp performs better in a polyculture system than major and minor carps in 5 months of culture. Basavaraju and Reddy (2013) exhibited its superior growth performance over common carp, catla, grass carp and silver carp in both mono and polyculture over a period of 24 weeks in low-input aquaculture systems. Das (2017) also reported that amur carp is superior over the existing local breed of common carp in farmers' ponds under the mid hill conditions in 15 months under monoculture. Amur carp appeared a better growth compared to Catla at polythene-lined farm ponds for 10 months culture period (Vijayakumar *et al*, 2019).

CONCLUSION

Due to the hardy nature, disease resistance and better growth rate, Amur carp and Jayanti rohu can be considered as one of the opted candidate species in aquaculture. Further, both fish species can be considered as economically viable and also socially acceptable to be cultured in Manipur. Amalgamation of Amur Carp and Jayanti Rohu in poly-culture aquaculture systems was highly advisable to raise the overall production of fish and for improving the livelihood of the rural small and marginal farmers.

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