



RESEARCH NOTE

# Influence of different stocking density on the growth, feed efficiency, and survival of Majalaya common carp (*Cyprinus carpio* Linnaeus 1758) [version 1; referees: 2 approved]

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**Abstract**

**Background:** Stocking density is key to successful Majalaya common carp (*Cyprinus carpio* Linnaeus 1758) culture which is a valuable fish culture in Indonesia. The aim of the present study was to evaluate the growth statuses, feed utilization, and survival rate of Majalaya common carp (reared with different stocking density).

**Methods:** In total, 1400 fish were randomly distributed into four replicates of four different groups of stocking density: 50, 75, 100, and 125 fish m<sup>-3</sup>. All fish were fed using a satiation method, three times per day with commercial diet for 12 weeks. At the end of the trial week, growth, feed utilization, and survival were determined. Water quality measures, such as dissolved oxygen (mg L<sup>-1</sup>), temperature (°C), pH, NH<sub>3</sub> (mg L<sup>-1</sup>), and NO<sub>2</sub> (mg L<sup>-1</sup>) were also measured once a week during the trial.

**Results:** Similar weight gain and SGR were found in Majalaya common carp reared at stocking densities of 50 to 100 fish m<sup>3</sup>. However, 125 fish m<sup>-3</sup> density may reduce weight gain and SGR. The average weekly and daily weight gain of Majalaya common carp significantly increased when reared from 50 to 100 fish m<sup>-3</sup> and remained constant at 125 fish m<sup>-3</sup> density. Meanwhile, feed conversion ratio and survival of Majalaya common carp were not affected by any stocking density.

**Conclusions:** A stocking density of 100 fish m<sup>-3</sup> exhibited significantly higher growth of Majalaya common carp in hapa net ponds among the treatment. Temperature ranges of 29.20-33.38°C, pH 7.47-8.22, DO 4.76-7.55 (mg L<sup>-1</sup>), NH<sub>3</sub> 0-0.5 mg L<sup>-1</sup>, and NO<sub>2</sub> 0-1 mg L<sup>-1</sup> were found to provide optimum condition to the fish.

**Keywords**

Majalaya Common carp, stocking density, growth

**Open Peer Review**

Referee Status:

	Invited Referees	
	1	2
<b>version 1</b> published 10 Dec 2018	 report	 report
1 <b>Zainal Abidin Muchlisin</b> , Syiah Kuala University, Indonesia		
2 <b>Kim T. Tran-Ngoc</b> , Nong Lam University, Vietnam		

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Comments (0)

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**Author roles:** **Hayat M:** Conceptualization, Formal Analysis, Funding Acquisition, Methodology, Resources; **Nugroho RA:** Data Curation, Supervision, Validation, Writing – Review & Editing; **Aryani R:** Methodology, Supervision, Validation, Writing – Original Draft Preparation

**Competing interests:** No competing interests were disclosed.

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## Introduction

One of the important factors related to fish culture productivity is stocking density<sup>1-4</sup>. Past research has found that growth, feed efficiency and survival can be optimized by considering stocking density in fish culture operations<sup>5-7</sup>. Besides stocking density, water quality is another factor that must be taken into consideration. Water quality is associated with stocking density in term of the availability of food and condition of the environment in fish culture<sup>8</sup>. Breeding of the Majalaya common carp (*Cyprinus carpio* Linnaeus 1758) is the result of selection conducted in Indonesia<sup>9</sup>. The Majalaya carp belongs to the Cyprinidae family and is an important fish to be cultured in Indonesia<sup>10</sup>. Though several research studies regarding stocking density in some fish have been conducted<sup>2,3,11-13</sup>, the influence of different stocking densities on the growth, feed efficiency, and survival of the Majalaya common carp in hapa fish ponds has never been determined. Thus, the purpose of the research was to evaluate the growth statuses, feed efficiency, and survival rate of the Majalaya common carp, reared at different socking density, viz: 50, 75, 100, and 125 fish m<sup>-3</sup> in the hapa fish pond.

## Methods

### Carp culture conditions

In total, 1400 Majalaya common carp (mean initial weight  $\pm 26.22$  g, random sex) were distributed into four groups with four replications each groups and reared with different stocking densities: 50, 75, 100, and 125 fish m<sup>-3</sup> in hapa fish ponds (1 x 1 x 1.2 m) for 12 weeks. During the trial, all fish were fed with a commercially available diet (PT Japfa Comfeed, No. reg. KKP RI IN 682072012, containing 30% protein, 5.5% fat, and 5% fibre). All fish were fed to satiation three times per day. At the end of the trial, growth parameters for each overall hapa fish pond, such as final weight, weight gain, average weekly weight gain (AWG), daily weight gain (DWG), specific growth rate (SGR), feed conversion ratio (FCR) were determined using an equation previously described by Abdel-Tawwab *et al.*<sup>14</sup>, Muchlisin *et al.*<sup>15</sup>, Tran-Ngoc *et al.*<sup>16</sup>, Asriqah *et al.*<sup>17</sup>. Meanwhile, survival was calculated with equation as used by Nugroho *et al.*<sup>18</sup>.

### Measuring water quality

Water quality, such as dissolved oxygen (DO) (mg L<sup>-1</sup>) and temperature (°C) were assessed using a digital water checker (YSI™ Model 550A DO Meter; Fisher Scientific, USA). The pH was measured with a pH-meter (CyberScan pH 11; EuTech Instruments, Singapore), while NH<sub>3</sub> (mg L<sup>-1</sup>), and NO<sub>2</sub> (mg L<sup>-1</sup>) were detected using a Sera test kit (Sera GmbH D52518, Heinsberg, Germany). All water quality parameter were measured once a week during the trial.

### Statistical analysis

Data were analysed using SPSS 22 (SPSS, Inc., USA). Growth, FCR, and survival were subjected to analysis of variance, followed by Duncan post hoc to evaluate significant differences among the groups. Water quality was descriptively analysed. All significant tests were at  $P < 0.05$ .

## Results

### Effect of stocking density

Present study showed that stocking density from 50 to 100 fish m<sup>-3</sup> of Majalaya common carp in the hapa fish pond resulted in similar weight gain and SGR. However, stocking density higher than 100 fish m<sup>-3</sup> may reduce weight gain and SGR. The AWG and DWG of Majalaya common carp showed a significantly increase trend when reared from 50 to 100 fish m<sup>-3</sup> and remained constant at 125 fish m<sup>-3</sup> density. Meanwhile, FCR and survival were not affected by any stocking density (Table 1; raw data available on OSF<sup>19</sup>). The high density (100 fish m<sup>-3</sup>) could be more profitable for the Majalaya common carp farms in Indonesia in terms of reduced land cost and facilities.

### Effect of density on water parameters

Water parameters showed a suitable condition for culturing Majalaya common carp at different stocking density up to 125 fish m<sup>-3</sup>. The temperature ranged 29.20–33.38°C, pH range of 7.47–8.22, DO of 4.76–7.55 mg L<sup>-1</sup>, NH<sub>3</sub> 0–0.5 mg L<sup>-1</sup>, and NO<sub>2</sub> 0–1 mg L<sup>-1</sup>, respectively (Table 2). The data showing the growth parameters and water quality parameters can be seen on OSF<sup>26</sup>.

**Table 1.** Mean  $\pm$  standard error of growth statuses and feed utilization of *Cyprinus carpio* Linnaeus 1758 Majalaya reared with different stocking density for 12 weeks in hapa fish ponds.

Parameters	Stocking density (fish m <sup>-3</sup> )			
	50	75	100	125
Initial weight (g)	1310 $\pm$ 0 <sup>a</sup>	1970 $\pm$ 0 <sup>b</sup>	2620 $\pm$ 0 <sup>c</sup>	3280 $\pm$ 0 <sup>d</sup>
Final weight (g)	6205.00 $\pm$ 76.84 <sup>a</sup>	8467.50 $\pm$ 347.16 <sup>b</sup>	11315.00 $\pm$ 324.17 <sup>c</sup>	12892.50 $\pm$ 669.19 <sup>d</sup>
Weight gain (g)	99.19 $\pm$ 3.98 <sup>a</sup>	87.03 $\pm$ 4.77 <sup>ab</sup>	88.39 $\pm$ 3.35 <sup>ab</sup>	79.43 $\pm$ 5.43 <sup>b</sup>
AWG (g week <sup>-1</sup> )	408.25 $\pm$ 14.73 <sup>a</sup>	541.50 $\pm$ 28.99 <sup>b</sup>	724.75 $\pm$ 26.92 <sup>c</sup>	801.00 $\pm$ 55.87 <sup>c</sup>
DWG (g day <sup>-1</sup> )	58.25 $\pm$ 2.28 <sup>a</sup>	77.25 $\pm$ 3.94 <sup>b</sup>	103.50 $\pm$ 3.96 <sup>c</sup>	114.25 $\pm$ 8.09 <sup>c</sup>
SGR (% day <sup>-1</sup> )	1.86 $\pm$ 0.035 <sup>a</sup>	1.73 $\pm$ 0.052 <sup>ab</sup>	1.75 $\pm$ 0.034 <sup>ab</sup>	1.65 $\pm$ 0.061 <sup>b</sup>
FCR	0.66 $\pm$ 0.019 <sup>a</sup>	0.66 $\pm$ 0.010 <sup>a</sup>	0.68 $\pm$ 0.020 <sup>a</sup>	0.70 $\pm$ 0.026 <sup>a</sup>
Survival (%)	99.00 $\pm$ 0.57 <sup>a</sup>	99.66 $\pm$ 0.33 <sup>a</sup>	98.75 $\pm$ 0.25 <sup>a</sup>	97.60 $\pm$ 0.65 <sup>a</sup>

Different superscript letters (a, b, c, d) indicate significantly different means for different group of diets at  $P < 0.05$ . Initial and final weights are the biomass weights.

**Table 2. Mean ± standard error of water quality during the stocking density trial of Majalaya Common carp reared in hapa fish ponds for 12 weeks.**

Parameters	Stocking density (fish m <sup>-3</sup> )				Value	
	50	75	100	125	Minimum	Maximum
DO (mg L <sup>-1</sup> )	6.07±0.13	6.07±0.13	6.07±0.13	6.07±0.13	4.76	7.55
Temperature (°C)	30.38± 0.16	30.38±0.16	30.38±0.16	30.38±0.16	29.20	33.80
pH	7.84 ±0.02	7.84 ±0.02	7.84 ±0.02	7.84 ±0.02	7.47	8.22
NH <sub>3</sub> (mg L <sup>-1</sup> )	0.08±0.02	0.08±0.02	0.08±0.02	0.08±0.02	0	0.50
NO <sub>2</sub> (mg L <sup>-1</sup> )	0.12±0.04	0.12±0.04	0.12±0.04	0.12±0.04	0	1.00

## Discussion

Previous research indicated that high growth rates, high levels of survival and better FCR may be due to low feed competition and density<sup>2,20,21</sup>. The present study stated that a stocking density up to 100 fish m<sup>-3</sup> resulted in similar weight gain and SGR, but this was reduced at the highest density (125 fish m<sup>-3</sup>). Meanwhile, FCR and survival were not affected by any stocking density. This finding is similar to previous research that survival and growth of fish were independent of the stocking density<sup>22,23</sup>. In addition, the growth and survival of fish in practical culture may also depend on the species. For example, the survival and growth rate of the catfish *Rita rita*, at different densities of 10, 20 and 30 fish per cistern, resulted in the highest survival and SGR in 20 fish per cistern. Further, no competition for feed and space observed at low density culture of this fish<sup>24</sup>. In contrast, a prior study revealed that survival rate in aquatic animals was negatively correlated with stocking which could be due to high competition and space for the fish<sup>2</sup>.

Excess feed remaining in the pond, as well as stocking density, might change the water quality. In this research, the water quality parameters during the trials showed no effects on the growth and survival of fish culture during the trial. The present findings are concomitant with those of previous studies, which found that water quality measures such as temperature, DO, pH, NO<sub>2</sub> and NH<sub>3</sub> measured in similar current experimental setups are all within the acceptable value for culturing fin fish in tropical regions<sup>25,26</sup>. The data regarding the growth status and water quality mean, minimum and maximum values can be obtained in Dataset 1.

## Conclusion

The Majalaya common carp can be reared at stocking density up to 100 fish m<sup>-3</sup> without negative effects on the growth, FCR, and survival. The water quality is suitable condition and suggested for culturing Majalaya common carp in hapa fish ponds. Further research needs to be conducted to evaluate the fillet and carcass proximate composition, and immune system of Majalaya common carp when reared at high stocking density.

## Data availability

Raw data for Tables can be accessed on OSF, DOI: <https://doi.org/10.17605/OSF.IO/TGC4519>.

Data are available under the terms of the [Creative Commons Zero "No rights reserved" data waiver](#) (CC0 1.0 Public domain dedication).

## Grant information

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## Acknowledgments

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## References

- Akdemir F, Orhan C, Tuzcu M, *et al.*: **The efficacy of dietary curcumin on growth performance, lipid peroxidation and hepatic transcription factors in rainbow trout *Oncorhynchus Mykiss* (Walbaum) reared under different stocking densities.** *Aquac Res.* 2017; 48(8): 4012–4021. [Publisher Full Text](#)
- Daudpota AM, Kalhor IB, Shah SA, *et al.*: **Effect of stocking densities on growth, production and survival rate of red tilapia in hapa at fish hatchery Chilya Thatta, Sindh, Pakistan.** *J Fish.* 2014; 2(3): 180–186. [Publisher Full Text](#)
- Roy D, Petrobich ZA, Aleksebbich BB, *et al.*: **Intensive polyculture of common carp (*Cyprinus carpio*), mirror carp (*Cyprinus carpio carpio*), silver carp (*Hypophthalmichthys Molitrix*) and grass carp (*Ctenopharyngodon Idella*) at different stocking densities.** *Bangladesh J Zool.* 2018; 46(1): 71–80. [Publisher Full Text](#)

4. Vaishnav M, Sharma SK, Sharma BK, *et al.*: **Growth performance of *Pangasius Sp.* cultured at different stocking density in floating net cages in Mahi Bajaj Sagar Dam of Banswara (Rajasthan).** *J Entomol Zool Stud.* 2017; 5(5): 649–652.  
[Reference Source](#)
5. Narejo N, Dayo A, Dars B, *et al.*: **Effect of stocking density on growth and survival rate of *Labeo rohita* (Hamilton) fed with formulated feed.** *Sindh University Research Journal-SURJ (Science Series).* 2010; 42(1).
6. Ali A, Rahman MR, Hossain MK, *et al.*: **Stocking density effects on growth indices, survival and production of stinging catfish shing (*Heteropneustes fossilis*) in secondary nursing.** *Int J Fish Aquat Stud.* 2017; 5(6): 269–274.  
[Reference Source](#)
7. Abdel-Tawwab M: **Effects of dietary protein levels and rearing density on growth performance and stress response of Nile tilapia, *Oreochromis niloticus* (L.).** *International Aquatic Research.* 2012; 4(1): 3.  
[Reference Source](#)
8. Zahidah YAY, Zidni I: **Effect of density ratio on performance of Nile tilapia and catfish in polyculture fish farming system.** *Turkish J Zool.* 2015. 39: 180–187.
9. Sumantadinata K: **Present state of common carp (*Cyprinus carpio* L.) stocks in Indonesia.** *Aquaculture.* 1995; 129(1–4): 205–209.  
[Publisher Full Text](#)
10. Arisuryanti T, Wibowo AT: **Karyotype Ikan Mas (*Cyprinus carpio* Linnaeus 1758) Majalaya.** *Journal of Tropical Biodiversity and Biotechnology.* 2016; 1(1): 15–19.  
[Publisher Full Text](#)
11. Nuwansi K, Verma A, Tiwari V, *et al.*: **Standardization of the stocking density ratios of Koi carp (*Cyprinus carpio* var. koi): Goldfish (*Carassius auratus*) in Polyculture Aquaponic Recirculating System.** *Turk J Fish Aquat Sc.* 2017; 17(6): 1271–1278.  
[Publisher Full Text](#)
12. Sharma J, Chakrabarti R: **Larval rearing of common carp *Cyprinus carpio*: A comparison between natural and artificial diets under three stocking densities.** *J World Aquac Soc.* 1999; 30(4): 490–495.  
[Publisher Full Text](#)
13. Abdel-Tawwab M, Mousa MA, Sharaf SM, *et al.*: **Effect of crowding stress on some physiological functions of Nile tilapia, *Oreochromis niloticus* (L.) fed different dietary protein levels.** *Int J Zool Res.* 2005; 1(1): 41–47.  
[Publisher Full Text](#)
14. Abdel-Tawwab M, Adeshina I, Jenyo-Oni A, *et al.*: **Growth, physiological, antioxidants, and immune response of African catfish, *Clarias gariepinus* (B.), to dietary clove basil, *Ocimum gratissimum*, leaf extract and its susceptibility to *Listeria monocytogenes* infection.** *Fish Shellfish Immunol.* 2018; 78: 346–354.  
[PubMed Abstract](#) | [Publisher Full Text](#)
15. Muchlisin ZA, Murda T, Yulvizar C, *et al.*: **Growth performance and feed utilization of keureling fish *Tor tambra* (Cyprinidae) fed formulated diet supplemented with enhanced probiotic. [version 1; referees: 2 approved].** *F1000Res.* 2017; 6: 137.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
16. Tran-Ngoc KT, Dinh NT, Nguyen TH, *et al.*: **Interaction between dissolved oxygen concentration and diet composition on growth, digestibility and intestinal health of Nile tilapia (*Oreochromis niloticus*).** *Aquaculture.* 2016; 462: 101–108.  
[Publisher Full Text](#)
17. Asriqah L, Nugroho RA, Aryani R: **Effect of various organic acid supplementation diets on *Clarias gariepinus* BURCHELL, 1822: Evaluation of growth, survival and feed utilization [version 1; referees: 3 approved].** *F1000Res.* 2018; 7: 1465.  
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
18. Nugroho RA, Manurung H, Nur FM, *et al.*: **Terminalia catappa L. extract improves survival, hematological profile and resistance to *Aeromonas hydrophila* in *Betta* sp.** *Archives of Polish Fisheries.* 2017; 25(2): 103–115.  
[Publisher Full Text](#)
19. Nugroho RA: **Stocking Density.** *OSF Web.* 2018.
20. Narejo NT, Salam MA, Sabur MA, *et al.*: **Effect of stocking density on growth and survival of indigenous catfish, *Heteropneustes fossilis* (Bloch) reared in cemented cistern fed on formulated feed.** *Pakistan J Zool.* 2005; 37(1): 49–52.  
[Reference Source](#)
21. Darmawan J, Tahapari E, Suharyanto S, *et al.*: **Growth and survival of larva/patih jambal fish seed (*Pangasius djambal*) maintained solidly different distribution.** *Journal of Fisheries and Aquaculture Development.* 2017; 2017(4): 1–4.  
[Reference Source](#)
22. Khattab YA, Abdel-Tawwab M, Ahmad MH: **Effect of protein level and stocking density on growth performance, survival rate, feed utilization and body composition of Nile tilapia fry (*Oreochromis niloticus* L.).** In *Proceedings of the Sixth International Symposium on Tilapia in Aquaculture.* 2004.
23. Keshavanath P, Gangadhar B, Ramesha T, *et al.*: **Impact of substrates and fish stocking density on growth and production of the Indian major carp, *Labeo rohita* (Ham.).** *J Aqua Trop.* 2015; 30(1/2): 1–14.  
[Reference Source](#)
24. Jalbani S, Khan P, Narejo NT, *et al.*: **Stocking density and its effect on growth parameters of Catfish *Rita rita* (Hamilton) reared in cemented cisterns.** *Pak J Zool.* 2018; 50(6): 2371–2373.  
[Publisher Full Text](#)
25. NRC: **Nutrient requirements of warmwater fishes and shellfishes.** Washington D. C.: Subcommittee on Warmwater Fish Nutrition. National Research Council. National Academies. 1983.  
[Reference Source](#)
26. Omosowone O, Dada A, Adeparusi E: **Comparison of dietary butyric acid supplementation effect on growth performance and body composition of *Clarias gariepinus* and *Oreochromis niloticus* fingerlings.** *Iran J Fish Sci.* 2018; 17(2): 403–412.  
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# Open Peer Review

Current Referee Status:  

Version 1

Referee Report 17 January 2019

<https://doi.org/10.5256/f1000research.18450.r41743>



**Kim T. Tran-Ngoc** 

Faculty of Fisheries, Nong Lam University, Ho Chi Minh City, Vietnam

The experimental design and procedures sound good overall. The findings are obtained for better understanding of Majalaya common carp cultured with different stocking density.

I have some comments that may improve your work:

1. The information about the feed is lacking: pellet size? Extruded pellets?
2. In Table 1: the initial weight and final weight can be confused between biomass or individual fish. Please add details for this.
3. In Table 1: please add the explanation for AWG, DWG, SGR and FCR in the footnote. The table and footnote should be understandable without distracting the reader from the main text.

Additional comments:

1. **Comment 1:** Table 1 shows that the final biomass weight was significantly different between treatments. You claim it was because of stocking density. From my view, since the initial biomass weight is already significantly different, that can be a main reason that lead to a difference in final weight. Then, either stocking density or initial weight has an effect on final weight. Could you please explain more about this?
2. **Comment 2:** In the discussion part “this finding is similar to previous research that survival and growth of fish were independent of the stocking density” that from of my view, it is much too subjective. You refer to 2 papers to support your findings.

However, growth, survival and yield effects of stocking density on aquaculture are well known for a diversity of species and seem to impact production differently. Both growth performance and survival rate, for instance, tend to be higher in low stocking density in the African catfish, *C. gariepinus* (Hecht *et al.*, 1996<sup>1</sup>), *Oreochromis* spp. (Sorphea *et al.*, 2010<sup>2</sup>) and Thai climbing perch *Anabas testudineus* (Khatune-Jannat *et al.*, 2012<sup>3</sup>). Therefore, I suggest you should paraphrase this sentence.

3. **Comment 3:** The feeding was ad libitum in your method. Do you have excess feed remaining in the hapa? If yes, how do you manage it? How is feed intake calculated in this experiment? Does stocking density affect feed intake?

## References

1. Hecht T, Oellermann L, Verheust L: Perspectives on clariid catfish culture in Africa. *Aquatic Living Resources*. 1996; **9**: 197-206 [Publisher Full Text](#)
2. Sorphea S, Lundh T, Preston TR, Borin K: Effect of stocking densities and feed supplements on the growth performance of tilapia (*Oreochromis* spp.) raised in ponds and in the paddy field. *Livestock Research for Rural Development*. 2010; **22** (11). [Reference Source](#)
3. Khatune-Jannat M, Rahman MM, Bashar MA, Hasan MN, Ahamed F: Effects of Stocking Density on Survival, Growth and Production of Thai Climbing Perch (*Anabas testudineus*) under Fed Ponds. *Sains Malaysiana*. 2012; **41** (10): 1205-1210 [Reference Source](#)

**Is the work clearly and accurately presented and does it cite the current literature?**

Yes

**Is the study design appropriate and is the work technically sound?**

Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**

Yes

**If applicable, is the statistical analysis and its interpretation appropriate?**

Yes

**Are all the source data underlying the results available to ensure full reproducibility?**

Yes

**Are the conclusions drawn adequately supported by the results?**

Yes

**Competing Interests:** No competing interests were disclosed.

**Referee Expertise:** aquaculture nutrition

**I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

Referee Report 10 January 2019

<https://doi.org/10.5256/f1000research.18450.r41741>



**Zainal Abidin Muchlisin** 

Department of Aquaculture, Faculty of Marine and Fisheries, Syiah Kuala University, Banda Aceh, Indonesia

- Title: Sufficient.

- Abstract: Sufficient.
- Keywords: I think it would be better if the keywords are different from the words which already exist in the title.

#### Introduction:

- The introduction should be started with the general information about the culture of Majalaya common carp *Cyprinus carpio* in Indonesia and the world, not directly with the problem statement. What are the advantages of this species, etc.?
- This species is known as common carp, but in this study the authors add the “Majalaya” common carp as a common name, so the authors have to introduce why the *Cyprinus carpio* is called Majalaya common carp; maybe this is a new strain or variety which resulted from cross-breeding between species X and species Y.

#### Methods:

- Please clarify where the experimental fish come from - whether they come from the wild or from a hatchery. If from a hatchery, from which location? Etc.
- Before distribution into the hapas, did you acclimatise the experimental fish? If yes, for how long and what feed were they fed on during acclimatisation?
- I suggest deleting the producer name of the feed; just say “commercial diet”.
- You fed the fish three times a day, at what times exactly?
- How many times was the weight gain measured? For example 2 weeks interval for 12 weeks? Etc.

#### Results:

- Please add information about the results of the ANOVA test, whether the treatment gave the significant effect or not to the measured parameters.
- The FCR data are lower than 1 in all treatments; it means that to get 1 kg of fish we need 0.7 kg of feed. Are you sure about that? I think it is impossible except you used the additional feed for example plankton, or the plankton were available without attention, where the biomass of these plankton was not included in the calculation. Please clarify.

#### Discussion:

- Extend the discussion by comparing with other studies; maybe some studies are in agreement with your findings and some previous studies are contradictory, so that we have discussed both phenomena.

#### Conclusion:

- You said that “The Majalaya common carp can be reared at stocking density up to 100 fish m<sup>-3</sup> without negative effects on the growth” - be careful, can be reared until what size?

#### **Is the work clearly and accurately presented and does it cite the current literature?**

Yes



**Is the study design appropriate and is the work technically sound?**

Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**

Partly

**If applicable, is the statistical analysis and its interpretation appropriate?**

Yes

**Are all the source data underlying the results available to ensure full reproducibility?**

Yes

**Are the conclusions drawn adequately supported by the results?**

Partly

**Competing Interests:** No competing interests were disclosed.

**Referee Expertise:** Aquaculture

**I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.**

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