

**ORL-AAQ-18****Effect of Aeration on Carp Polyculture**

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Aquaculture in Nepal is dominated by semi-intensive carp polyculture, practiced with low input system. Intensive culture is promoted due to higher demand and scarce land for further expansion. Production in intensive culture increases by altering various biological, chemical and physical parameters. Global aquaculture production trends also indicate intensification. Similarly, a 21% increase in production and a 49% increase in productivity of aquaculture compared to 2001/02 A.D. also highlight the increasing production and intensification trend in Nepal (CFPCC, 2018). Higher stocking density is crucial for intensification, which requires oxygen levels, particularly in the early morning hours. To meet the increasing demand for fish and address the oxygen deficiency, aeration in closed systems can be employed. This approach improves yield per square meter, thus narrowing the gap between demand and production. The study assessed the effect of different aeration duration on water quality and production parameters in carp polyculture.

A field experiment was carried out in Kawaswoti municipality, Nawalparasi district, to assess the growth and production of carp with varying aeration period at higher stocking density (25,000 fish/ha). The study spanned for 120 days from March 21 to July 19, 2023, comprising three treatments (T<sub>1</sub>: no aeration, T<sub>2</sub>: two hours aeration from 4 am to 6 am and T<sub>3</sub>: three hours aeration from 4 am to 7 am) with four replication each. Different carps like common carp (*Cyprinus carpio*), Rohu (*Labeo rohita*), Naini (*Cirrhinus mrigala*), grass carp (*Ctenopharyngodon idella*), Silver carp (*Hypophthalmichthys molitrix*) and bighead carp (*Hypophthalmichthys nobilis*) were stocked in ratio of 4:5:5:1:3:2 and fed with a formulated mass feed comprising 15% roasted soybean, 45% mustard oil cake and 40% rice bran. Feeding was done at 5% of body weight in first month and 3% for the rest of experiment.

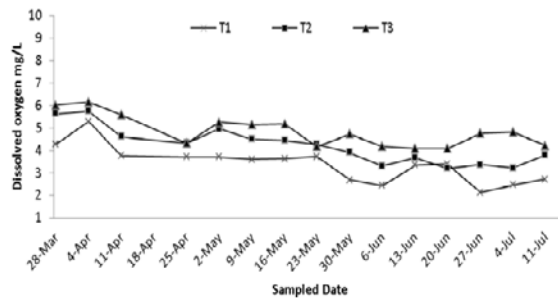


Figure: Weekly mean DO (mg/L) of the pond in different treatment during the experiment period

Aerated ponds exhibited significantly ( $p < 0.05$ ) higher dissolved oxygen ( $6.58 \pm 0.05$  g/L) compared to control ponds ( $3.71 \pm 0.04$  mg/L) while pH ranged (6.5 to 9.5). Water temperature of experimental ponds ranged between  $23.6^\circ\text{C}$  to  $32.7^\circ\text{C}$ . The growth, survival and production parameters of all species individually were significantly higher ( $P < 0.05$ ) in treatment with three hours aeration (T<sub>3</sub>) compared to treatment with two hours of aeration (T<sub>2</sub>) which in turn is significantly higher ( $p < 0.05$ ) than treatment with no aeration (T<sub>1</sub>). Similarly, the combined EGFY and ENFY in T<sub>3</sub> was significantly higher ( $p < 0.05$ ) than T<sub>2</sub> which in turn was significantly higher ( $p < 0.05$ ) than T<sub>1</sub>. The aeration period also had significant effect in reducing the AFRCR of carp polyculture resulting in significantly lowest ( $p < 0.05$ ) AFRCR in T<sub>3</sub> and significantly highest ( $p < 0.05$ ) AFRCR in T<sub>1</sub>. The increased production was also reflected in the gross margin of different treatments. The gross margin analysis of present study showed significantly higher gross margin and B:C ratio in T<sub>3</sub> compared to T<sub>2</sub> which in turn was significantly higher than T<sub>1</sub>.

The overall result of present study showed that aeration of pond up to three hours using 2.5 HP submersible motor had best result in terms of fish growth parameters as well as gross margin.