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Influence of different feeding frequencies on the growth, body composition and blood chemistry of juvenile mandarin fish (*Siniperca scherzeri*)

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The spotted mandarin fish (*Siniperca scherzeri*) is one of the most commercially important freshwater endemic species in East Asia and is mainly distributed in China, Korea, and northern Vietnam (Zhou et al., 1988). Mandarin fish is the most promising species for inland fisheries due to its excellent taste, high market value, rapid growth and high disease resistance (Zohreh et al., 2017). However, wild stocks of mandarin fish have been rapidly decreasing due to fishing and habitat destruction, whereas commercial demand has continued to increase. Therefore, it is necessary to increase production of this species through aquaculture

We investigated the effect of different feeding frequencies (1, 2, 3, or 4 meals a day) on the growth performance, body composition and blood chemistry of juvenile mandarin fish (*Siniperca scherzeri*) to determine the optimal feeding regime for commercially reared fish.

Material and methods: Three replicate groups of fish (initial mean weight 7.5 g) were fed to apparent satiety with pelleted diets (55% protein) for 8 weeks. 300 juvenile mandarin fish (mean weight 7.5 g) were randomly distributed to 12 tanks (200 L each) with 25 fish per tank. Each tank was assigned to one of four feeding groups: one, two, three, or four meals a day. The feeding times were set as follows: 08:30 for the group that received one meal a

day; 08:30 and 17:30 for the group that received two meals a day; 08:30, 13:00, and 17:30 for the group that received three meals a day; and 08:30, 11:30, 14:30, and 17:30 for the group that received four meals a day. The experiment was conducted using a pilot-scaled recirculation system consisting of a biofilter tank (volume 2,000 L) and 12 FRP round rearing tanks (200 L).

Results: The weight gain and specific growth rate of fish fed one meal a day were significantly ($p < 0.05$) lower than those of fish fed two, three and four meals a day (Table 1). The feed efficiency of fish fed two meals a day was significantly ($p < 0.05$) higher than that of fish fed at other frequencies. The daily feed intake was significantly ($p < 0.05$) increased with feeding frequency, while the protein efficiency ratio significantly ($p < 0.05$) decreased with feeding frequency (Table 2). Whole-body analysis showed that the amounts of crude protein, lipid, ash and moisture in fish were not significantly ($p > 0.05$) affected by the feeding frequency. The amount of plasma cholesterol was significantly ($p < 0.05$) lower in fish fed one meal a day than in those fed two, three, or four meals a day. Taken together the proper feeding frequency for the optimum growth of mandarin fish weighing from 7 to 20 g is two meals a day under these experimental conditions

Table 1. Growth performance of juvenile mandarin fish (*Siniperca scherzeri*) fed at four different feeding frequencies for 8 weeks¹

Feeding frequency/day	Initial mean weight (g)	Final mean weight (g)	Weight gain (%)	Specific growth rate (%/day)	Survival (%)
One meal	7.35±0.03	14.2±0.32 ^a	93.8±4.82 ^a	1.18±0.04 ^a	100.0±0.01
Two meals	7.48±0.06	18.8±0.34 ^b	127.2±5.13 ^b	1.50±0.07 ^b	98.3±1.87
Three meals	7.57±0.12	17.1±0.37 ^b	128.4±4.19 ^b	1.50±0.09 ^b	98.3±1.47
Four meals	7.63±0.17	17.3±0.20 ^b	128.4±3.01 ^b	1.47±0.02 ^b	100.0±0.01

Table 2. Feed efficiency (FE), daily feed intake (DFI), daily protein intake (DPI) and protein efficiency ratio (PER) of juvenile mandarin fish (*Siniperca scherzeri*) fed at four different feeding frequencies for 8 weeks¹

Feeding frequency/day	Feed efficiency (%) ²	DFI (%) ²	PER (%) ²
One meal	67.1±2.09 ^a	1.70±0.01 ^a	5.74±0.18 ^a
Two meals	78.3±1.09 ^b	1.81±0.02 ^b	5.32±0.14 ^b
Three meals	66.0±1.81 ^a	2.11±0.02 ^b	4.35±0.08 ^b
Four meals	64.0±0.52 ^a	2.19±0.04 ^b	4.54±0.12 ^b

Biography

Kim Yi Oh has completed his PhD at the age of 37 years in 2007 from Pukung University and major in aquaculture (especially, freshwater fish aquaculture). He is working at Chungcheongbuk-do Inland Fisheries Research Institute, Chungju, South Korea. His research interest includes mandarin fish, koi carp and freshwater fish and so on. He has published more than 15 papers in Korea and oversee reputed journals.

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