

Growth Response And Feed Utilization Efficiency Of Common Carp

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Abstracta

Three aquatic weeds namely hornwort (*Ceratophyllum demersum*), longleaf pondweed (*Potamogeton nodosus*) and fringed water lily (*Nymphoides peltata*) were analyzed for proximate composition of nutrients. It was observed that crude protein (%) in *Nymphoides peltata* was (25%) which was comparatively higher than *Potamogeton nodosus* (22.57%) and *Ceratophyllum demersum* (24.15%) respectively. Similarly the percentage dry matter content showed a high value for *Nymphoides peltata* (93.60%) as compared to *Potamogeton nodosus* (91.50%) and *Ceratophyllum demersum* (90.46%) respectively. The crude fat in *Nymphoides peltata* (5.64%) was significantly higher than *Potamogeton nodosus* (4.75%) and *Ceratophyllum demersum* (3.60%) respectively. *Nymphoides peltata* with higher %age of protein was selected to be incorporated into the feed of Common carp to ascertain growth and feed utilization efficiency. Four isonitrogenous (CP:35%) and isocaloric (3500Kcal/kg) practical diets were formulated and *Nymphoides peltata* were added @ of 15% (T1), 30% (T2) and 45% (T3) tested diets and the control diet was formulated with 0.0% *Nymphoides peltata*. Fish with an average weight (8.95±1.1 g.) were fed on the tested diets at 5% body weight for 8 weeks. Results indicate that the fish fed with the tested diet (T3) had a significantly higher weight gain (17.09±0.55) and specific growth rate (1.106 ± 0.01) as compared to the control group (P < 0.05). FCR decreased significantly in fish fed diets containing *Nymphoids peltata* @ 45%. The FCR and PER was significantly (P<0.05) different from the control group. FCR (2.81±0.19) was lowest in the T3 group and highest PER (1.78±0.07) was observed in the T3 group as compared to control group. Mortality was recorded during the feeding trial and lowest mortality was observed in control group followed by T3 group. The results indicate that *Nymphoids peltata* has improved growth performance of Common carp as compared to control group. The selected weed also replaced fishmeal up to 45% without having any adverse effects on growth and survival.

Keywords: Common carp, aquatic weed, *Nymphoids peltata*, fishmeal, survival

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Introduction

The fish feed used in aquaculture is quite expensive, irregular and short in supply in many third world countries. These feeds are sometimes adulterated, contaminated with pathogens as well as containing harmful chemicals for human health. Moreover, the local fish farmer of the valley are dependent on the supply of fish feed from State Fisheries Department. The State Fisheries Department also procures feed ingredient from outside state which results in high feed cost, increased cost of production, and low economic return to farmers.

Naturally there is a need for the development of healthy, hygienic fish feed which influences positively the growth and

quality of the cultured fish. The increasing cost of fish feed has focused research on reducing the cost of the most expensive items, protein source. Numerous works have been reported on the possible replacement of fish meal which is used at high level in most of the fish feeds [1]. Reducing the dependency of aquaculture on fishmeal and other important fish feed ingredients is the key for sustainable development for the aquaculture industry of the state. The prime consideration of selecting a fish feed ingredients and formulation of the feed is the digestibility, palatability and acceptability by the fish, availability and cost of the ingredients [2]. The potential of the feedstuffs to be used in fish diets can be established based on their proximate chemical composition [3].

Use of aquatic plant leaves in the fish diet due to high nutrient content is well documented by various authors [4]. The advantage of usage includes cost effectiveness, ease of availability, nutritional contents etc. (Ray and Das, 1995). Considering the importance of nutritionally balanced and cost effective alternative diets for fish, there is a need for research effort to evaluate the nutritive value of different non-conventional feed resource, including terrestrial and aquatic macrophytes [5]. Aquatic and terrestrial macrophytes have been used as supplementary feeds in fish farming since the early times of freshwater fish culture [6] and still plays an important role as fish feed in extensive culture systems. The aquatic weeds have been shown to contain substantial amount of protein and mineral.

Aquatic macrophytes are known to have potential value as human food, livestock feeder, fertilizers and food for herbivorous fishes. Aquatic weeds are good source of nutrients and protein which is the costly component in fish feeds and also a very essential factor [6] affecting growth performance of fish and feed cost. Fishes have high dietary protein requirement. Reducing the cost of fish feed will be key factor for successful development of aquaculture.

Discussion

One of the most commonly encountered difficulties, when alternative protein source are used, is acceptability due to the palatability of diets fed to fish. In the present study, no palatability problem was encountered with any of the treatment during the experiment. The crude protein (%) in *Nymphoides peltata* was (25%) and were comparatively higher than other selected aquatic weeds. The present study demonstrated the acceptable nutritional value of *Nymphoides peltata* as an ingredient in the diet of fingerling of *Cyprinus carpio*, since this product can replace the most commonly used fish feed ingredient, fish meal up to certain level. Inclusion of *Nymphoides peltata* in the diets for fry of *Cyprinus carpio* may therefore is a function of diet formulation. An inclusion level up to 45% *Nymphoides peltata* in the practical diet for *Cyprinus carpio* did not exert an adverse effect on growth, feed utilization efficiency and survival. The results from this study were very encouraging to use *Nymphoides peltata* in a very safe and economical manner in fish feed. Kaul and Sarap evaluated the nutritive value of some very common aquatic macrophytes of Kashmir and among *Nymphoides peltata*, *Ceratophyllum demersum* and *potamogeton nodosus* the *Nymphoides peltata* was having high value for crude protein which is in agreement with the present study. In the present study it was possible to include powdered form of *Nymphoides peltata* having 25% of the total protein by replacing fishmeal at 45% inclusion level in the diet of *Cyprinus carpio* with no adverse effects on the growth of the fish. All the physico chemical parameters of water such as temperature, pH, dissolved oxygen, hardness and ammonia were observed to be within the optimum range of requirements for fish as suggested by many authors (Boyd and Tucker, 1998). All the water quality parameters were found to vary non-significantly and were within the acceptable ranges during the experimental period. During the whole experimental period no adverse impact of *Nymphoides peltata* was noted on water quality parameters. The common carp fingerlings fed with *Nymphoides peltata*

supplemented diet showed appreciable increase in growth, measured in terms of weight gain, per cent weight gain, specific growth rate, feed conversion ratio as compared to control feed diet. In the present study, *Nymphoides peltata* at 45% inclusion level exhibited highest weight gain ($p < 0.05$) as compared to control group. The weight gain recorded in *Cyprinus carpio* by 45% *Nymphoides peltata* weed supplemented diets of T1, T2 and T3 were 12.62, 16.01 and 17.09 g, respectively. The control group showed the lowest weight gain of 11.46 g only. The highest weight gain of 17.09 g was recorded in T3 treatment supplemented with 45% inclusion rate of *Nymphoides peltata*. Similar results were also observed by Nisha and geetha (2017) which showed that *L. rohita* fed with 30% *P. stratiotes* meal in the diet exhibit higher weight gain than rest of the experimental groups. The present study is also in agreement with Efflong et al (2009) who reported that 10% duckweed meal inclusion gave the best final weight gain, feed conversion ratio (FCR), specific growth rate and percentage survival. In the present study, the specific growth rate (SGR) of *Cyprinus carpio* was found significantly higher that is 1.106 in treatment 3 at similar inclusion level of 45% *Nymphoides peltata* as compared to the control group. This growth rate was significantly different from the growth rates shown by T1, T2 and more significantly different from control. The minimum specific growth rate 0.751 was recorded in control containing no weed supplementation. Similar results were found by Noor et al., (2000) who reported that in terms of growth rate, diet containing 17.07% duckweed showed the best ($P < 0.05$) performance. In the present study, there is a significant difference ($p < 0.05$) in the feed conversion ratio (FCR) of *Cyprinus carpio* fed with *Nymphoides peltata* (45%) as compared to the control group. Similar results were also observed by Srirangam (2016) who reported that the acceptable nutritional value of *Lemna Minor* & soybean meal as an ingredients in diets for *Ctenopharyngodon Idella* which showed significant differences ($P < 0.05$) in weight gain, specific growth rate, total feed intake, feed conversion ratio, and protein efficiency ratio were found among the feeding treatments. In the present study, the protein efficiency ratio (PER) was significantly higher in *Cyprinus carpio* fed with *Nymphoides peltata* at 45% level as compared to the control group. The results of the present study is in agreement with Asimi et al 2018 who reported that duckweed inclusion level of 15% in the diet of Common carp gives better results in terms of weight gain, specific growth rate, protein efficiency ratio and also survival. The results of the present study is also in agreement with Ebrahim (2007) who reported that, azolla meal at a maximum percentage of 31.8% can replace about 50% of soybean meal protein (about 30% of total protein in diet) in fingerlings tilapia diet without any adverse effect on growth performance, feed efficiency and survival rate. The crude fat in *Nymphoides peltata* (5.64%) was significantly higher than *Potamogeton nodosus* (4.75%) and *Ceratophyllum demersum* (3.60%) respectively.

References

1. Jackson AJ, Capper BS, Matty AJ. Evaluation of some plant proteins in complete diets for the tilapia *Sarotherodon mossambicus*. *Aquaculture*. 1982 Mar 1;27:97-109.
2. Lovell RT. Nutrition of aquaculture species. *Journal of Animal Science*. 1991 Oct 1;69:4193-200.

3. Mzengereza K. Nutritional value of locally available plants with potential for diets of *Tilapia rendalli* in pond aquaculture in NkhataBay, Malawi.
4. Chiayvareesajja S, Wongwit C, Tansakul R. Cage culture of tilapia (*Oreochromis niloticus*) using aquatic weed-based pellets. InProc. 2nd Asian Fish. Forum. Asian Fish. Soc., Manila, Philippines 1990 : 287-290.
5. Edwards P, Kamal M, Wee KL. Incorporation of composted and dried water hyacinth in pelleted feed for the tilapia *Oreochromis niloticus* (Peters). *Aquaculture Research*. 1985 Jul;16:233-48.
6. Bardach JE, Ryther JH, McLarney WO. *Aquaculture. The farming and husbandry of freshwater and marine organisms*. John Wiley & Sons, Inc.; 1972.