Uttar Pradesh J. Zool. 32(2) :231-235, 2012 ISSN 0256-971X

IMPACT OF HERBS AS GROWTH PROMOTERS IN COMMON CARP AND KOI CARPS

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Aquaculture is the commercial farming, husbanding and harvesting of economically important aquatic animals and plants under controlled conditions. Aquaculture is playing an increasingly important role in world fishery production. Increase in the production and profit has been the main goals of aquaculture. Control of mortality due to disease and improvement of health status of the cultural stocks are thought to be the best options for the culturist (Acharya *et al.*, 1997). Common carp is one of the most popular exotic food fishes introduced to India from foreign countries. Common carp (*Cyprinus carpio communis*) is an integral part of composite fish culture. The fish is very hardy and tolerates large variations in temperature, salinity and other environmental fluctuations (Laxmappa, 2004). Koi carp is a colourful, hardy fish, which is adaptable to aquarium conditions and is easily available owing to its propense breeding ability. In Ayurveda, herbs had been prescribed as metabolic enhancers since ages. However use of medicinal herbs as growth promoters in fish feed as ingredient has attracted limited attention of aqua culturists.

Key words : Herbs, growth promoters, Indian common carps.

INTRODUCTION

Withania somnifera (Ashwagandha) is a perennial herb that reaches about 170cm (6feet) in nature. The plants contain the alkaloids withanine, and somniferine, which are used to treat nervous disorders, intestinal infections and leprosy. Ashwagandha has been used for strengthening the body and for helping to prevent disease. *Glycyrrhiza glabra* (Mulethi) has several medicinal values. Useful in abdominal pain, asthma, blood purifier, bronchitis, cough, dysuria, oedema, epilepsy and fever. It increases strength. It possesses antibacterial and antibiotic action. Ashwagandha has been used for strengthening the body and for helping to prevent disease. *Glycyrrhiza glabra* (Mulethi) has several medicinal values.

MATERIALS AND METHODS

Experimental fishes-fingerlings of Common carp (*Cyprinus carpio communis*) and Koi carp (*Cyprinus carpio* were purchased from Rosen fisheries-Marathakkara in absolutely fresh condition and brought to the laboratory. Experimental herbs selected for this comparative study on the basis of their growth enhancing ability are Ashwagandha (*Withania somnifera*), Gokhru (*Pedalium murex*), Kali musli (*Curculigo orchiodes*), Mulethi (*Glycyrrhiza glabra*) and Adena (*Ipomea paniculata).*These experimental diets were prepared by mixing chosen herbal powders in a basal diet containing rice bran and peanut cake in a fixed ratio. The control diet was devoid of herbs. All the experiments were conducted in controlled conditions with the experimental diets for a period of 6 weeks excluding initial conditioning of 5 days. Water quality parameters and FCR (Food Conversion Ratio) and SGR (Specific Growth Rate) are also observed.

The initial and final total length of the experimental animal was measured. The initial and final live weights of the fishes were determined by weighing the individual group of fishes in each treatment. The growth of the fish in length and live weight was

measured by using the following formula.

RESULTS AND DISCUSSION

Physico-chemical conditions of different experimental tanks common carps

Air temperature ranges between 28°C and 33°C during the period of 45 days from 2nd August to 16th September 2007. Water temperature in aquariums rearing Common carp fed with Ashwagandha, Adena, Mulethi, Kalimusli, Gokhru and Control diet ranges between 27.5°C and 30°C. P^H-ranges between 7 and 8.5. The dissolved oxygen level ranges between 7 and 8.4mg/litre. Amount of free carbon dioxide in the Control treatment varies between 5 and 7mg/litre. Total alkalinity of the Control aquaria ranges between 35 and 60mg/litre as $CaCO_3$. Phosphate-phosphorous level varies between 9 and 35µg/litre. Nitrite-nitrogen level varies between 6 and 30µg/litre

KOI Carp : Air temperature ranges between 28°C and 33° during the period of 45 days from 2nd August to 16th September 2007. Water temperature in tubs rearing Koi carp fed with Ashwagandha, Adena, Mulethi, Kalimusli, Gokhru and Control diet vary between 27.5°C and 30°C. pH ranges between 7 and 8.6

Table 1 : Average weight and length of common carp at different herbal treatment during the period of 45 days.

	Weight of the fishes (gm)				Length of the fishes (cm)			
	Initial	After 15 days	After 30 days	After 45 days	Initial	After 15 days	After 30 days	After 45 days
Control	0.964	1.584	1.238	1.196	4.0	4.2	4.5	4.7
Ashwagandha	1.368	1.283	1.573	1.644	4.8	5.0	5.3	5.4
Adena	0.972	1.009	0.742	0.627	3.0	3.1	3.1	3.1
Mulethi	0.944	1.347	1.207	1.3377	4.2	4.4	4.9	4.9
Kalimusli	1.089	1.04	1.04	0.724	3.5	3.5	3.5	3.5
Gokhru	1.365	1.192	1.58	1.6	4.9	4.9	5.3	5.5

Table II : Average weight and length of Koi carp at different herbal treatment during the period of 45 days

	Weight of the fishes (gm)				Length of the fishes (cm)			
	Initial	After 15 days	After 30 days	After 45 days	Initial	After 15 days	After 30 days	After 45 days
Control	0.964	1.584	1.238	1.196	4.0	4.2	4.5	4.7
Ashwagandha	1.368	1.283	1.573	1.644	4.8	5.0	5.3	5.4
Adena	0.972	1.009	0.742	0.627	3.0	3.1	3.1	3.1
Mulethi	0.944	1.347	1.207	1.3377	4.2	4.4	4.9	4.9
Kalimusli	1.089	1.04	1.04	0.724	3.5	3.5	3.5	3.5
Gokhru	1.365	1.192	1.58	1.6	4.9	4.9	5.3	5.5

Table III : Survival rates of Common and Koi carp at different herbal diet from 2.8.07 to 16.9.07.

Treatments	Initial	After 15 days		After 30 days		After 45 days	
		Common carp	Koi carp	Common carp	Koi carp	Common carp	Koi carp
Control	100%	100%	100%	100%	100%	75%	100%
Ashwagandha	100%	100%	90%	50%	90%	50%	80%
Adena	100%	100%	100%	100%	100%	75%	80%
Mulethi	100%	75%	100%	75%	90%	50%	90%
Kali musli	100%	100%	80%	100%	70%	100%	50%
Gokhru	100%	100%	90%	100%	90%	100%	80%

Table IV : Specific Growth Rate (SGR) and Food conversion Ratio (FCR) of Common Carp.

	Initial individual weight (gm)	Final individual weight gm)	ln mean initial weight	ln mean final weight	SGR	Feed consumed (gm)	Total weight gain (gm)	FCR
Control	1	1.2	0.0	0.2	0.4	33.8	2.3	14.569
Ashwagandha	1.4	1.6	0.3	0.5	0.4	33.8	- 0.5	-63.77
Adena	1	0.6	0.0	-0.5	-0.9	24.2	- 4.7	-5.15
Mulethi	0.9	1.3	-0.1	0.3	0.7	29.1	2.6	11.192
Kali musli	1.1	0.7	0.1	-0.3	-0.8	24.4	- 7.3	-3.356
Gokhru	1.4	1.6	0.3	0.5	0.3	35.3	- 0.9	-37.95

Table V : Specific Growth Rate (SGR) and Food conversion Ratio (FCR) of Koi Carp

	Initial individual weight (gm)	Final individual weight (gm)	ln mean initial weight	ln mean final weight	SGR	Feed consumed (gm)	Total weight gain (gm)	FCR
Control	2.485	2.586	0.91	0.95	0.089	23	-2.18	-10.54
Ashwagandha	1.41	1.64	0.344	0.495	0.336	16.4	-5.18	-3.166
Adena	2.17	1.29	0.775	0.255	-1.16	19.8	-4.810	-4.116
Mulethi	2.22	1.015	0.798	0.015	-1.74	14.9	-6.850	-2.175
Kali musli	2.562	2.117	0.941	0.75	-0.42	24.40	-1.772	-13.77
Gokhru	1.5	1.2725	0.405	0.241	-0.36	16.7	-0.910	-18.35

Amount of dissolved oxygen varies between 6 and 8.6mg/litre. Free carbon dioxide level ranges between 5 and 7mg/litre. Total alkalinity varies between 40 and 60 mg/litre as $CaCO_3$ Phosphate-phosphorous level in ranges between 9 and 41 µg/litre. Nitrite-nitrogen level in varies between 6 and 37 µg/litre.

Growth of fishes fed with herbal diets

Average length and weight of Common carp at different herbal treatments and control during the period of 45 days from 2nd August to September 16th are presented in Table I. Weight of common carp were in fluctuating pattern. The length and weight of

common carp were generally increased in control, Ashwagandha, Muthi and Gokhru treatments. But there was no increase in length and slight decrease in weight in Adena and Kali musli treatments. Average length and weight of Koi carp at different herbal treatments and Control are presented in Table II. Weight of Koi carp was fluctuating pattern. The length and weight of Koi carp was generally increased in Control and Ashwagandha treatment. But there was no increase in length and weight in Adena, Mulethi, Gokhru and Kali musli treatments.The survival rate of Common carp and Koi carp are presented in Table III.

Food Conversion Ratio and Specific Growth Rate of Common carp and Koi carp are depicted in Table IV and V. In case of Common carp, FCR was highly varying for different herbal treatment. Control diet fed fishes show high FCR. There was not much deviation from Control in Mulethi treatment. In other treatments FCR was negative (Ashwagandha, Adena, Kali musli and Gokhru). In Koi carp, FCR is negative for all treatments.

The present study indicates some sort of positive effect on the growth and survival of Common carp and Koi carp due to incorporation of herbs in the diet. In fact, there was a reduction in weight and survival rate due to incorporation of some herbs under the experimental conditions.

In the present study, the average values of water temperature varied from 27.5°C to 30°C, which were fairly suitable for fish growth. Backiel & Horoszewicz (1970) found that the intensity of feeding by carps increased with upward rise in temperature from 28°C-29°C. In common carp remarkably higher growth was in Mulethi treated fishes followed by Ashwagandha and Gokhru. In case of Koi carp, higher growth was in Ashwagandha. Observation of Common carp revealed that higher specific growth rate was seen in Mulethi followed by Control, Ashwagandha and Gokhru. Specific growth rate is negative in Adena and Kali musli. In Koi carp, specific growth rate was positive in Ashwagandha and Control treatment and others, it was negative. In Common carp, food conversion ratio was higher in Control followed by Mulethi treatment and in others, it was negative. In Koi carp, food conversion ratio is negative for all treatments. The survival rate of common carp fed with Ashwagandha, Adena, Mulethi and Gokhru mixed diet are found to be favourable. Survival rate was low in Kali musli treatment. The survival of Koi carp fed with Gokhru and Kali musli mixed diet are found to be 100%. It was low in other herbal treatments.

In Common carp, the best herbal feed identified out of five herbs was Mulethi. In Koi carp, Ashwagandha in the diet have positive effect on growth. These results were observed in the study done by Sharma *et al.* (2006). Kavitha *et al.* (1996) used Satavari and Chandrashoor as supplementary diets of *Labeo rohita* and found a significant increase in growth. Kumar (2000) used Ashwagandha in the supplementary feed of *Cirrhinus mrigala* and obtained encouraging results.

ACKNOWLEDGEMENT

Grateful thanks are due to the Principal and, Dr. T.K. Ramesan, Head, Department of Zoology, S.N. College, Nattika, Thrissur, for their kind encouragement and necessary facilities provided during this study

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