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THE MARINE FISHERIES INFORMATION SERVICE: Technical and Extension Series envisages the rapid dissemination of Information on marine and brackish water fishery resources and allied data available with the Fishery Data Centre and the Research Divisions of the Institute, results of proven researches for transfer of technology to the fish farmers and industry and of other relevant information needed for Research and Development efforts in the marine fisheries sector.

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ALFALFA PROMOTES GROWTH IN PRAWNS*

Introduction

In recent years, culture of prawns in ponds and paddy fields has attained much importance as a means of augmenting production of these crustaceans for export. In this context, it was thought worthwhile to have investigations to enhance the growth of prawns using different anabolic chemicals/agents. Alfalfa, a known growth promoter was added to the supplementary feed and experimented with juveniles of *Penaeus indicus* in the laboratory and in the field culture ponds as well. The present report deals with the results of the experiments to assess the impact of Alfalfa on the growth rate of prawns.

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Growth promoting agents

Certain classes of chemical compounds such as antibiotics, vitamins, hormones, arsenicals, tranquillisers and surfactants have been reported to stimulate the growth of animals. Recently the use of some chemicals has been found to enhance the production of Indian major carp fry and fingerlings (Sen, P. R. and D. K. Chatterjee, 1979). Enhancing production of Indian major carp fry and fingerlings by the use of growth promoting substances. *Advances in Aquaculture,*

FAO Technical Conference on Aquaculture. Fishing News Books Ltd., Farnham, Surrey, England, pp. 134 – 141). The chemicals used included Proloid, Eltroxin, Berin, Macrabin, Vitamin B complex, Yeast, Starch, Selenium, Molybdenum, Boron, Cobalt chloride, Enterocycline, Chloromycetin, Hoestacycline and Manganese. They found that Cobalt chloride, Starch, Boron and Manganese significantly enhanced the survival rate.

Role of Alfalfa

The leguminous forage plant known botanically as *Medicago sativa* commonly known as lucerne, alfalfa, purple medick or chilean clover, is known to be a good source of vitamin K. The exact function of vitamin K in the metabolism of animals is unknown, although it has been postulated that it is a fat soluble, thermostable compound essential for the formation of normal amounts of prothrombin which diminishes the clotting time of blood. Unlike other grasses, Alfalfa does not possess large amount of reserve polysaccharides in the form of fructosans, but it contains small amount of starch and large quantities of pectin. The protein content is high and if the crop is cut in the early flowering stage the crude protein content is above 20%. Alfalfa is a valuable source of the element Magnesium (0.20–0.36%). Many forage plants are known to contain plant estrogens which in limited amounts, have a beneficial effect on the fattening of animals similar to that of giving synthetic hormones such as stilbestrol and hexestrol. Alfalfa has been found to contain such estrogenic substances (McDonald, P., R. A. Edwards, J.F.D. Greenhalgh 1973. *Animal Nutrition.* Longman, London, pp. 357-358).

As early as 1933 Chibnall A. C., E. F. Williams, A. L. Latner and S.M. Piper (1933. *Biochem. Jl.*, 27, pp. 1885–1888) had isolated the principal chemical component of Alfalfa wax, as n-triacontanol, M.p. 86.3 – 86.5°. Triacontanol is insoluble in water, soluble in acetone, ethylacetate and benzene and crystallises in the form of lustrous plates M.p. 86.5°. Triacontanol was isolated from waxes (Robinson, 1934. *J. Chem. Soc.*, p. 1545). It was shown that triacontanol was the active material of Alfalfa grass which resulted in higher yields of crops when sprayed in minute quantities (Stanley, K. R. 1975). In view of the above, it was decided to investigate whether Alfalfa can be of any effect to enhance the growth in juvenile prawns.

Experiments

Juveniles of prawn *Penaeus indicus* were reared both in aquarium tanks in the laboratory and culture ponds in the field at Neendakara simultaneously.

In the laboratory, duplicate aquarium tanks of 30 x 70 x 35 cm size were selected of which one served as control and the other as experimental unit. 30 litres of water having salinity of 20‰ was taken in each container. The juvenile prawns were brought to the laboratory and after acclimation for 10 days the healthier ones of almost same length and weight were separated, the initial size (both length and wet weight) were recorded and stocked at the rate of 40 prawns per tank. The duration of the experiment was 35 days during which the environmental parameters such as temperature, light, pH, dissolved oxygen were kept almost identical in both control and experimental units. About 50% of water in both the units was changed every day. The average temperature in the aquarium tanks in the laboratory during the experiment was 30.07°C, the fluctuation during the period was within ± 1.5°C. The average salinity fluctuation in the experimental as well as control tanks was within ± 1.5‰. The dissolved oxygen was kept at 4.5 ml/l by aeration except for one day due to power failure when there was mortality.

Table 1. *Details of Alfalfa incorporated in the supplementary diet and fed the prawns in experimental tank at the laboratory and in the culture pond. Prawns in the control tank and culture pond were also fed with supplimentary diet without Alfalfa.*

At the laboratory		At the field	
Week	Quantity of Alfalfa (gm)	Fortnight	Quantity of Alfalfa (gm)
1st	0.011	1st	0.4375
2nd	0.011	2nd	0.5250
3rd	0.070	3rd	0.6125
4th to 7th*	0.105	4th	0.7000

* The amount of Alfalfa in the feed was kept constant from 4th week due to mortality of experimental prawns due to insufficient aeration caused by power failure.

In the field, two identical and adjacent culture ponds of 0.024 ha were selected of which one was kept as control and the other for experiment. The juvenile prawns were stocked in the ponds at a density of 0.104 million/ha. The average conditions of temperature, salinity and dissolved oxygen at the surface were 33.8°C,

Table 2. *Details of experiments conducted by rearing the juvenile prawns in tanks at the laboratory and in culture ponds at the field*

	Laboratory		Field	
	Experimental	Control	Experimental	Control
Initial				
Number of specimen	40	40	2,500	2,500
Size — Mean length (mm ± S.D.)	33.75 ±3.98	33.22 ±3.43	32.0	32.5
Size — Mean weight (gm)	0.286	0.280	...	...
Duration of Experiment (days)	35 (29.3.1980 to 3.5.1980)		48 (12.41980 to 30.5.1980)*	
Final				
Number of specimen	27	25	*	*
Size — Mean length (mm ± S.D)	58.18 ±5.33	50.56 ±5.40	79.25 ±9.79	64.06 ±6.36
Size — Mean weight (gm)	1.750	1.237	...	...
Differences (Final-Initial) — Length (mm)	24.43	17.34	47.25	31.56
Differences (Final-Initial) — Weight (gm)	1.464	0.957	...	...
Growth per day — Length (mm)	0.698	0.495	0.984	0.658
Growth per day — Weight (gm)	0.042	0.027	...	...

* On 30.5.1980 there was flood which affected the ponds and hence the experiment was terminated.

29.84‰ and 3.8 ml/l respectively and 33.7°C, 29.84‰ and 2.1 ml/l respectively at the bottom. The fluctuation in temperature in both the ponds was high at noon rising up to 36.0°C due to solar radiation.

Feed

A compounded feed was prepared using starch, fish meal, groundnut oil cake, wheat bran and starmin P.S. in the proportion 4:5:5:4:2 by weight and made into pellets and used for controls in the laboratory and in the field. The same feed prepared identically but with an addition of 10% w/v alcoholic extract of Alfalfa by volume in the proportion 4:5:5:4:2:7 was used for the experimental tanks in the laboratory and pond in the field. The triacontanol content of Alfalfa raw material from which the alcoholic extract was obtained was 0.998% by dry weight. The quantity of Alfalfa incorporated in the supplementary diet for prawns both in the laboratory tanks and in the culture ponds during the period of experiment are given in Table 1. The prawns in the laboratory and field (both control and experimental units) were fed with the respective compounded feed at a rate of 10% body weight.

Results and Conclusions

The details of experiments and the results obtained both in the laboratory and field are given in Table 2.

In the laboratory experiments it was found that the prawns in the experimental tank grew faster and has recorded an increase of 0.20 mm growth (0.02 gm) per day over the control kept in an identical situation and fed but without Alfalfa. In the field culture experiments an increase of 0.33 mm growth per day over the control was recorded.

The results indicate that Alfalfa increases the rate of growth in prawns. The optimum amount of Alfalfa to be applied for maximum growth based on the length and weight of experimental rearing animals has to be further studied.