

FEED DEVELOPMENT

The paper gave an overview of the status of prawn feed development in the Philippines. Nutrient requirements, diet development, food and feeding habits, diet formulations for prawn (*P. monodon*) were discussed. Diets for prawn larvae and broodstock were also assessed.

The shift towards monoculture and a more intensive farming of prawns brought about by its high market price, increase in consumer demand, and availability of seeds have led to the demand for an external source of food for the various prawn stages. Due to the scarcity of hard data on *sugpo*, however, feed formulations are computed based on experience and work on other species. Available information on the nutritional requirements of *P. monodon* suggest the use of 35-40% protein, 10% fat, 20-30% carbohydrates and 1% cholesterol for grow-out formulations, while larval and broodstock diets still have to be developed. Nevertheless, recent studies indicate that certain nutrients in molluscs and fish are needed for gonad development and that polyunsaturated fatty acids like arachidonic acid, eicosapentanoic acid and docosahexaenotic acid, which are also present in molluscs and fish liver oils, are necessary for prawn maturation.

Prawns feed on slow-moving benthic organisms like crustaceans and molluscs. Their guts become empty four hours after feeding, thus, they must be fed twice or thrice a day after sunrise and before sunset. Since they are slow eaters, the diet must be stable in water for 3-6 hours. Use of finely ground feedstuff and a good binder, gelatinization of starch, and steaming of pellets have been found to give water-stable diets. Sago palm starch, corn starch and alpha potato at 5% level in the diet are considered acceptable binders. Diet attractants like earthworm are also necessary.

Several commercial feeds for prawn are now in the market but there is no ideal formulation as yet. There is much room for improvement on the diet formulations now available. Problems remain like the increasing cost of feedstuff, quality control, specific requirements for minerals, vitamins, specific fatty acids and amino acids, absence of larval and broodstock diets, and pilot-testing of laboratory-developed grow-out diets.

Guidelines on the use of locally available ingredients for practical diets with adequate protein, fat, carbohydrate and cholesterol levels were suggested. More studies were recommended to ascertain specific nutritional requirements particularly for amino acids, fatty acids, minerals and vitamins.

The paper drew varied reactions. The need for determining economics of feeding in semi-intensive culture systems was stressed in the light of present difficulties in importing raw materials for prawn feeds and spiralling capital and operational costs. It was also felt that most prawn culturists are not ready to adopt the semi-intensive and intensive culture methods; it was suggested that a two-stage culture system be adopted instead: the prawn is grown to 15-20 g in the first stage with only fertilization in large ponds, and then grown to market size in the second stage using smaller ponds with feeding.

It was recommended that intensive studies be conducted by SEAFDEC AQD on feed development both in the laboratory and field, that research results be disseminated as soon as possible, and that promising feeds be tested in the research station before they are field-tested in farmers' ponds. Private sector should play an active role in supporting research on the development of economical feeds, it was stressed.

On feed development, the following workshop recommendations were formulated:

1. Formulation of cost-efficient practical prawn rations using locally available ingredients, with only low-value fish species to be considered for fish meal;
2. Field-testing of promising feed formulas produced in the laboratory to be done at the SEAFDEC Leganes Research Station before their pilot-testing in cooperators ponds;
3. An indication by manufacturers of the guaranteed analysis, ingredients, date of manufacture, inclusive dates for use, and stability rate of feeds;
4. The establishment by SEAFDEC AQD, in cooperation with private or government agencies, of an analytical laboratory to service the needs of fishfarmers for proximate analyses;
5. Assistance by private fishfarmers in the funding of specific research studies on feed development not among the approved studies of AQD for the year;
6. Establishment by SEAFDEC AQD and feed manufacturers of feeding schemes and schedules, giving information on the start of feeding, rates and frequency of feeding for different growth stages.
7. Inclusion of the economic aspects of feeding prawn as part of the information to be gathered.
8. Reduction, if not elimination, of taxes on imported feed ingredients until such time as local ingredients are determined and made available.
9. Considering low-value fish species for fish meal.
10. Closer cooperation between farmers and manufacturers in pond evaluation of commercial feeds.