

Short Communication

TASTE PANEL EVALUATION OF POND-FATTENED SCHOOL PRAWNS *METAPENAEUS MACLEAYI* (HASWELL)

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ABSTRACT

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Juvenile school prawns (*Metapenaeus macleayi*) were collected from the Clarence River, N.S.W., Australia and fattened in artificial ponds. After harvest these prawns were assessed by taste panels along with other samples of the same species collected from estuarine fisheries in N.S.W. Taste panels could not detect any significant differences between pond-fattened and wild prawns and both were found to be highly acceptable.

INTRODUCTION

The success of an aquaculture project ultimately depends upon producing a product which is acceptable to the consumer. Lovell (1976) noted that off-flavours seriously affected marketing in the intensive fish culture industry. Maligalig et al. (1973) concluded that the flavour of farmed channel catfish depended primarily on pond conditions and that the diets fed to the catfish could also alter their flavour.

Little information is available on the quality of farmed prawns. Live cultured prawns (*Penaeus japonicus*) are marketed in Japan at very high prices (Shigueno, 1975), which indicates they are of high quality. However, diets used in intensive prawn farming in Japan must contain special ingredients (e.g. algae rich in β carotene) to maintain good shell colour, because previously the poor colour of these prawns had reduced their market value (K. Shigueno, personal communication, 1977). In a recent publication Salser et al. (1977) reported that the sensory qualities of the prawn *Penaeus californiensis* grown in a controlled environment were significantly preferred to those of 'wild' prawns. However no information was provided on the composition of the sensory panel nor on the quality of the wild prawns used in the comparison, and these factors can markedly influence the results of preference assessments.

The present study is part of a larger investigation into the feasibility of pond fattening school prawns (*Metapenaeus macleayi*) from the Clarence River, N.S.W. School prawns from this estuary tend to be unusually small and this is one of the reasons why much of the catch is unmarketable or of low value. The aim of these trials was to compare the sensory qualities of pond-fattened prawns with those of prawns netted from estuarine fisheries, i.e. wild prawns.

MATERIALS AND METHODS

Collection of stock for fattening trials

The school prawns were taken from the Clarence River using commercial otter trawl nets. The prawns were then held on board the trawler in aerated sea water before being transferred to a truck-mounted transport tank of 2-tonne capacity, filled with aerated recirculating sea water. While on the trawler and in the transport tank, the prawns were held in a multilayered system of submerged trays to prevent crowding. The prawns were transported 500 km by road and stocked into ponds at the Brackish Water Fish Culture Research Station, Salamander Bay, N.S.W. (32° 42'S, 152° 12'E).

Farming methods

Within this study there were two separate trials. In Trial 1, prawns were stocked into 3.25.m² netting enclosures within a fertilized and tidally flushed 0.12-ha earthen pond which was continuously aerated. In Trial 2, the prawns were released into undivided 0.01-ha, unfertilized but continuously aerated ponds which had concrete walls and sand bottoms. Once each week half of the water was exchanged by pumping.

In both trials the prawns were fed a fish-meal based trout grower diet ('Ewos', Rural Chemicals, Glenorie, N.S.W.). The pellets contained 5% dehydrated lucerne meal rich in Xanthophyll pigments which had been included to ensure acceptable trout flesh colour. A red amaranth dye had also been included at a low level (0.05%) to act as a visual attractant for the trout.

The fattening trials were carried out in summer over a period of 8–9 weeks. The prawns were fed at the rate of 5% biomass per day, adjusted for growth, and the mean weight of the whole prawn increased from approximately 2 g to 7 g. High survival rates (70–90%) were obtained.

Harvest and handling

The pond-fattened prawns were harvested with seine and scoop nets and placed immediately into aerated seawater tanks at least 30 min before being cooked. Previous experience had shown that this postharvest holding was necessary to avoid 'muddy' flavours. The prawns were cooked in boiling sea wa-

ter until they floated to the surface, i.e. less than 2 min. After cooling in clean sea water, the prawns were packed in insulated boxes with three times their weight of ice, and delivered to the tasting laboratory about 18 h after cooking.

Collection of wild prawns

For Trial 1, school prawns were otter trawled from Pipeclay Creek, Port Stephens, N.S.W., and for Trial 2 they were collected from commercial set pocket nets in the Myall River, N.S.W. Wild prawns were collected on the days the ponds were harvested and were cooked and handled in the same way as the pond-fattened prawns.

Sensory evaluation

Sensory evaluation was carried out at the CSIRO Food Research Laboratory, North Ryde, N.S.W., in a sensory testing laboratory (Christie, 1966).

Trial 1. The aim of Trial 1 was to establish if experienced sensory assessors could detect differences between pond-fattened and wild prawns. The panel consisted of 20 assessors. All were experienced in sensory evaluation techniques but none had been trained to assess prawn quality.

At each of four sessions (two sessions a day for 2 days) each assessor was presented with one chilled prawn from one treatment and two chilled prawns from the other treatment in a balanced order. Assessors were required to identify the one considered different from the other two (triangle test, Amerine et al., 1965). Samples were matched for size to prevent discrimination on this attribute. Assessors were free to discriminate on whatever sensory attribute they wished, i.e. colour, flavour or texture.

Trial 2. The aim of this trial was to evaluate the consumer acceptability of pond-fattened prawns. Selected assessors were not used; the only criterion for inclusion in the panel was a liking for prawns.

There were four sessions, two sessions each morning for 2 days. In order to simulate normal domestic consumption, pond-fattened prawns were presented at one session and wild prawns at the other, so there was no direct comparison of the two types of prawns. Statistically this design is less sensitive than a paired comparison, but in terms of consumer acceptability the responses are more meaningful. Each of the 50 tasters was served two prawns and asked to score them for colour, ease of shelling, flavour and texture, using 9-point scales (extremely good = 9, extremely poor = 1).

RESULTS AND DISCUSSION

The results of Trial 1 are summarized in Table I. Experienced assessors were

TABLE I

Trial 1. Results of triangle tests in which 20 experienced assessors sought to detect sensory differences between wild and pond-fattened prawns

	Session				Total
	1	2	3	4	
Difference detected	6	9	8	8	31 N.S. ¹
Difference not detected	14	11	12	12	49
Total	20	20	20	20	80

¹ Not significant ($P > 0.05$).

unable to detect significant differences between pond-fattened and wild prawns ($P > 0.05$).

Table II gives mean scores for prawns assessed in Trial 2. These results indicate that both samples were acceptable. There were no significant differences ($P > 0.05$) between pond-fattened and wild prawns in scores for colour, ease of shelling, flavour or texture.

TABLE II

Trial 2. Mean scores for pond-fattened and wild prawns evaluated by 50 tasters at two sessions on 2 consecutive days

	Day	Colour	Ease of shelling	Flavour	Texture
Pond-fattened	1	8.0	6.5	5.9	7.3
	2	7.6	6.7	6.5	7.3
Wild	1	8.0	6.4	5.9	6.9
	2	7.7	6.4	5.8	7.3

The wild prawns used in Trial 1 were not taken from an established fishery and thus it is difficult to assess their commercial value. Nevertheless, the inability of an experienced panel to detect any differences at least indicated that the sensory properties of the pond-fattened prawns were not in any way abnormal, i.e. they were not of different colour and did not have foreign flavours.

School prawns from the Myall River are renowned for their eating quality and command the highest prices for the species in Australia. It was therefore encouraging to find that the pond-fattened school prawns assessed in this study were just as acceptable as Myall River prawns. Subsequent growth trials with alternative cheaper diets have produced pond-fattened prawns of comparable sensory quality and this augurs well for the future of a prawn farming industry on the Clarence River.

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