Short Paper

Transport and culture of phyllosomas of the palinurid *Jasus edwardsii* collected in the ocean

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Because of their unusual leaf-like features and long planktonic life, the biology of phyllosomas of spiny lobster has been of great interest to many researchers. Less is known of the puerulus stage during its offshore phase, particularly about the drastic change in biology which takes place during metamorphosis. Recently, culture of phyllosomas to metamorphosis has been achieved in the laboratory.¹⁾ However, the numbers of phyllosomas reared have been insufficient to allow a detailed study of their ecology and physiology because of high mortality at the early stage. Use of mid- and late stage phyllosomas collected in the ocean for culture in the laboratory can therefore help in our understanding of the natural life history of spiny lobsters.

Phyllosomas of *J. edwardsii* were captured at night during June 3–6, 1988 off Gisborne, on the east coast of the North Island, New Zealand, using a fine-meshed midwater trawl from the 42 m RV James Cook (NZ MAF). The trawl was 40 m in length and ca. 70 m² in mouth area with 1–15 cm graded stretch mesh. The effective mouth was estimated to be about 10 m² and the sampling depth was about 30 m.

Sampling was carried out along two transects (Mahia and Tolaga Bay), each consisting of 6 evenly spaced half-hour tows at 1.0–1.5 m/s beginning 20 km beyond the continental shelf edge and extending approximately 120 km further off-shore (Fig. 1).

A total of 490 *Jasus edwardsii* mid- and late stage phyllosomas were caught in twenty tows. Higher numbers were caught along the Mahia transect than off Tolaga Bay. On average, about 0.1 m³ of material, mostly euphausiids, salps and midwater fish, were taken in each tow. The number of phyllosomas caught per 30 min trawl ranged between 3 and 65, with an average of 24.50. Phyllosomas in a suitable condition were immediately transferred to 15 l plastic buckets and the water changed about every 6 hours.

At 21 h on June 6, 1988, 17 phyllosomas (8 at stage VIII, 6 at stage IX, 3 at stage X) were prepared for air transport by being placed singly or in pairs in nine 4 l containers filled with sea water and placed in plastic fish boxes with ice-filled flasks. The phyllosomas were consigned from Gisborne at 8 h on June 7 to Tokyo via Wellington. The water in each container was renewed, and three dead phyllosomas removed at Wellington on June 8 after a delay in the flight. The phyllosomas reached Narita at 6 h on June 9, where ice flasks and water were changed, and Sanriku at 21 h on that day (1 h on June 10 New Zealand time).

Seven phyllosomas were alive on arrival at Sanriku, and 4 of these died on the following day. Almost all phyllosomas had lost either the fourth or fifth per-

Fig. 1. Collection of phyllosomas off Gisborne, New Zealand. Samplings were made along Mahia and Tolaga Bay transects. Depth contours are shown in meters.

ioopods, generally at the fourth segment. Several of the dead showed a black colour in the cephalic shield while others had changed to a white turbid colour. These may have suffered from damage during capture.

The rearing conditions were similar to those used in the culture of *J. lalandii* and *Jasus* hybrids. The phyllosomas were introduced into a 15 l culture container. Sea water treated with a 5 µm ceramic filter and ultra-violet sterilizer was supplied at the bottom of the culture container in the recirculating system. The larvae were fed on small (1 mm × 1 mm) pieces of *Mytilus edulis* ovary. Water temperature, salinity and pH ranged between 16.6 and 19.6°C, 34.0 and 35.5‰, and 8.08 and 8.75, respectively. Larvae were staged according to Lesser.

One stage X and two stage IX phyllosomas survived beyond June 11. The stage X phyllosoma died 10 days after arrival at Sanriku, and one of the stage IX phyllosomas died after 36 days without molting. The remaining stage IX phyllosoma molted 14, 35, 57 and 86 days, and metamorphosed into the puerulus 119 days, after arrival. This is the first time that phyllosomas in the wild have been cultured through to settlement after long air transport.

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References

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