

12. CULTURED COPEPODS AS LIVE FOOD FOR FISH

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Intensive fish cultivation requires the large-scale production of live prey. The following are summaries of experiments aimed at maximising production of *G. imparipes* nauplii.

COPEPOD DIETS

The effect of five diets on copepod growth and fecundity were tested: *Isochrysis galbana*, *Chaetoceros muelleri*, *Dunaliella tertiolecta*, *Nannochloropsis oculata* and bakers yeast. Copepods did not survive to maturity on a diet of bakers yeast. Highest nauplius production was recorded on a diet of *I. galbana* and lowest on a diet of *N. oculata* (Figure 12.1).

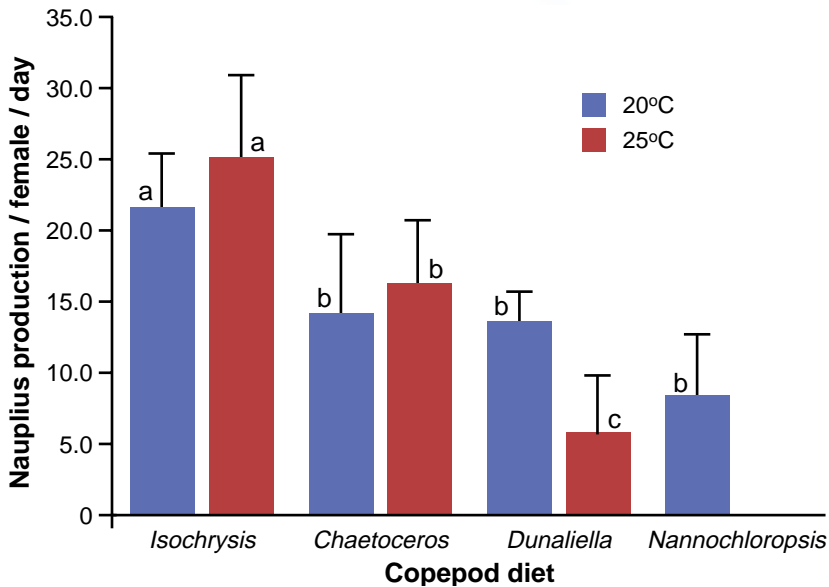


Figure 12.1. Effect of diet on nauplius production by *Gladioferens imparipes*.

¹ Fremantle Maritime Centre. (See details in appendix.)

SALINITY

Fecundity was recorded for copepods grown at salinities of 25%, 50%, 75% and 100% seawater. Nauplius production was not reduced at any of the test salinities.

STORAGE IN REFRIGERATOR

Nauplii and adult copepods were stored at both 4 and 8°C. Survival was poor at 4°C. At 8°C, nauplii survival was greater than 95% after 12 days and survival of adults was approximately 70% after 42 days (Figure 12.2).

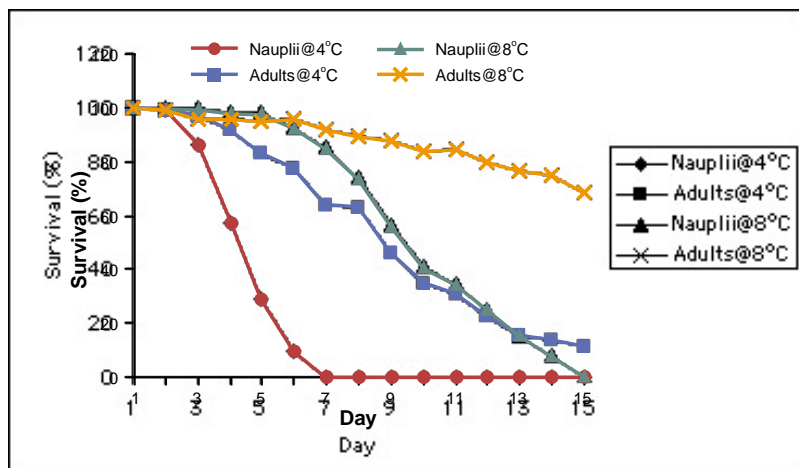


Figure 12.2. Survival of adult and naupliar *Gladioferens imparipes* after refrigeration.

ENRICHMENT

The HUFA content of copepod nauplii fed *I. galbana* was determined. DHA content was greatest after 6 h of enrichment. EPA content did not change. When *I. galbana* was combined with *N. oculata* during enrichment, the EPA and arachidonic acid content of nauplii increased (see Table 12.1).

Table 12.1. HUFA Content of Copepod Nauplii (-; not deleted).

Time (h)	Arachidonic	EPA	DHA	DHA:EPA
0	-	1.4 ± 0.4	6.9 ± 0.2	4.9
0.5	-	1.4 ± 0.3	7.8 ± 0.1	5.6
2	-	1.4 ± 0.2	7.9 ± 1.2	5.6
4	-	1.3 ± 0.1	8.6 ± 0.6	6.6
6	-	1.3 ± 0.1	9.1 ± 0.2	7.0
6+Nanno	0.9 ± 0.4	2.8 ± 0.2	10.1 ± 0.9	3.6

DIET FOR PINK SNAPPER LARVAE

Snapper (*Pagrus auratus*) larvae were fed diets consisting of rotifers only and rotifers supplemented with copepod nauplii. Growth, survival and swim-bladder inflation were higher in those larvae fed the supplemented diet, but not by a significant margin (Figure 12.3).

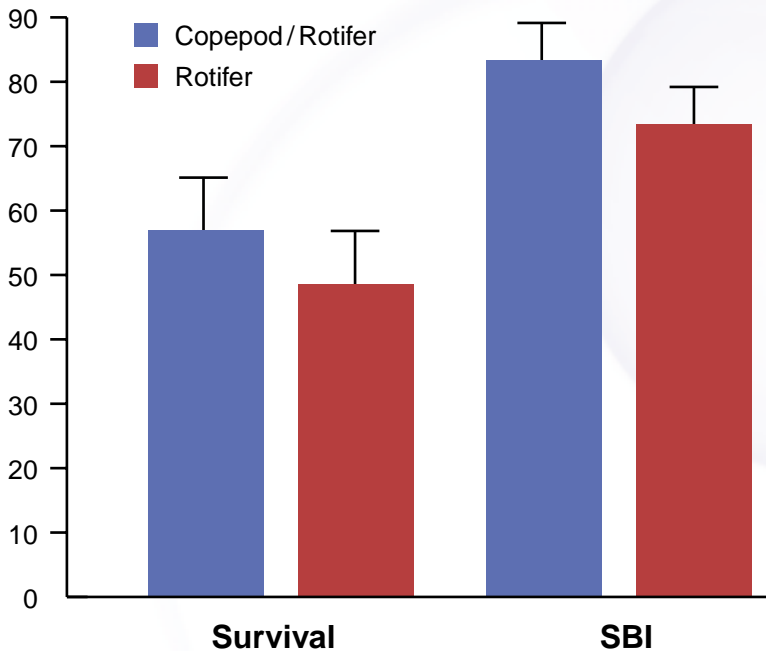


Figure 12.3. Percentage survival and swim bladder inflation (SBI) of snapper larvae fed diets of rotifers, or rotifers supplemented with copepods.

DIET FOR WA SEAHORSES

Growth and survival of juvenile WA seahorses (*Hippocampus subelongatus*) were substantially greater on a diet of copepod nauplii than on a diet of enriched *Artemia* nauplii (Figure 12.4).

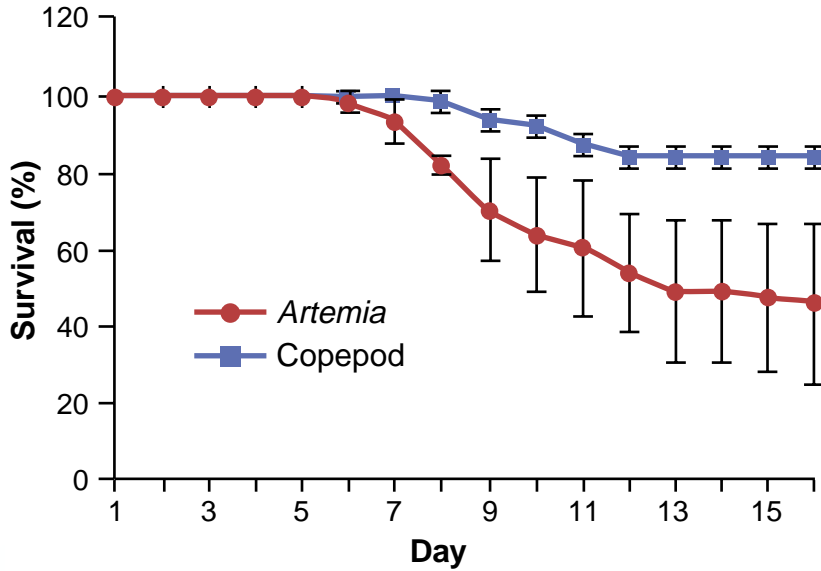


Figure 12.4. Percentage survival of juvenile WA seahorses fed diets of enriched *Artemia* nauplii or copepod nauplii.

DIET FOR WESTRALIAN DHUFISH LARVAE

Dhufish (*Glaucosoma hebraicum*) larvae were fed diets of rotifers only and an equal combination of rotifers and copepod nauplii. Growth and survival were substantially greater on the combined diet (Figure 12.5).

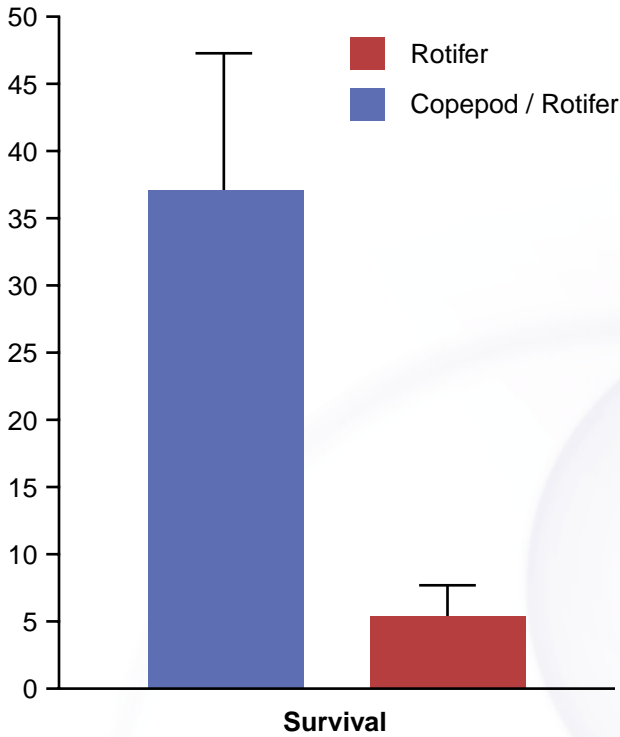


Figure 12.5. Percentage survival of dhufish larvae fed diets of rotifers, or rotifers supplemented with copepods.

CURRENT STATUS

Much background work has been completed on *G. imparipes*, and two practical, large-scale culture systems are being developed at the Fremantle Maritime Centre. The first consists of two 1000-L tanks based on the automated system described previously but without the automation. This system produces nauplii for feeding direct to fish larvae. The second system consists of a 5000-L tank. This tank is maintained as a semi-continuous system, requiring only occasional draining and restocking. The main purpose of this system is to provide adult copepods to stock into green-water larviculture systems.