Early development of preleptocephalus larvae of the Japanese eel in captivity

why *Brachionus* rotifers are not available as an initial feed for rearing eel larvae?

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Background

Production (MT)

Anguilla anguilla

Anguilla japonica

Anguilla rostrata

Life cycle of Anguilla japonica in western Pacific Ocean
The first captive-bred grass eel was produced in 2002.
Methods:

Fig. NRIA protocol for induced breeding

Ota, Kagawa and Tanaka.
Results: 1. Embryonic development at 21°C

Eggs were transparent, non-adhesive, pelagic, segmented and spherical in shape with wide perivitelline space.
Spawned egg: 0.98 mm
Max. egg diameter: 1.5-16 mm (o.g 20%)
Hatching: 45 h-49 h
Results: 2. Early development of preleptocephalus larvae at 25°C

0 dph: 2.75±0.08 mm TL
1 dph: 4.96±0.14 mm TL
2 dph: 5.96±0.22 mm TL
3 dph: 6.58±0.14 mm TL
4 dph: 6.63±0.11 mm TL
5 dph: 6.90±0.19 mm TL
6 dph: 7.18±0.13 mm TL
7 dph: 7.26±0.08 mm TL
8 dph: 7.13±0.14 mm TL

Mouth opening: 3 dph
Rudimental larval teeth: 4-5 dph
Larval teeth move to snout: 6 dph
Completion of yolk absorption: 8 dph (201.5 day-degrees)
Results: 3. Development of larval teeth at 25 °C

No active feeding behavior. Larval teeth are not for catching prey.

a: 3 dph, b: 4 dph, c: 5 dph, d: 6 dph, e: 7 dph, f: 8 dph
Results: 4. Histological structure of oesophagus in preleptocephalus larvae

Onset of initial feeding at 25°C

cc: cordial cavity

Hematoxylin and eosin stain
Results: 4. Histological structure of oesophagus in preleptocephalus larvae

Characteristic structure found in eel larvae: thick tissue layer in oesophageal part without mucous cells
In case of ordinary marine teleosts:

Development of mucous cells on oesophagus of larval *Plecogrossus altivelis* (10 dph) by Tadahide Kurokawa

Diadromous migration
Huge difference found in oesophageal parts between ordinary teleost and eel larvae.

- Ordinary marine teleost larva
- Eel preleptocephalus larva

i.e. no development of mucous cells and thick gullet tissue and circular muscle.
**Conclusion:**

The embryonic and early development of the Japanese eel was studied in captivity.

Fertilized eggs were hatched out 45 to 49 hours after insemination at 21°C.

Newly hatched larvae completed yolk absorption 8 days after hatching at 201.5 day-degrees on 25°C.

Due to its characteristic feeding behavior and specific physical structure in oesophageal part, eel larvae cannot intake rotifers as an initial food item.

This substantially makes the mass production of eel larvae difficult.
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