Differences in the migratory history of male and female Japanese eels, *Anguilla japonica*

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Introduction I

Decrease of Japanese eel resources

![Graph showing the catch of elvers and yellow eels over time.](image)

- **elvers**
- **yellow eels**

Key:

**Catch of yellow eels (ton)**
- 0
- 50
- 100
- 150
- 200

**Catch of elvers (ton)**
- 0
- 50
- 100
- 150
- 200

**Legend**:
- Black line: elvers
- Dashed line: yellow eels
Introduction II

Sea, estuarine and river eels

Sea eel $\geq 6.0$

2.5 $\leq$ Estuarine eel $< 6.0$

2.5 $>$ River eel

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Tsukamoto and Arai (2001)
Objectives

1. Investigate the geographic distribution of sea, estuarine and river eels
2. Determine the proportion of males and females of the three migratory types
Sampling Sites For *Anguilla japonica*

- **Sanriku Coast**
  - June 2001 – September 2002
  - 48 females
  - Otolith study: 47 females

- **Mikawa Bay**
  - May 2000 – April 2002
  - 24 males and 40 females
  - Otolith study: 23 males and 19 females

- **Amakusa**
  - November and December 2000
  - 13 males and 30 females
  - Otolith study: 13 males and 24 females
Methods

Biological characteristics
(Total length, Body weight, Gonadsomatic Index)

Otolith Sr/Ca ratios

Divide into three migratory types
(Sea eel, estuarine eel and river eel)
Results I - Biological characteristics

**Total length**

<table>
<thead>
<tr>
<th>Length (cm)</th>
<th>Male</th>
<th>Total length</th>
<th>n = 37</th>
<th>mean 51.9 ± 6.4</th>
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<table>
<thead>
<tr>
<th>Length (cm)</th>
<th>Female</th>
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<th>n = 485</th>
<th>mean 70.2 ± 9.5</th>
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**Gonadsomatic Index**

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<table>
<thead>
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<th>Female</th>
<th>Total length</th>
<th>n = 277</th>
<th>mean 1.8 ± 1.0</th>
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Results II - Migratory history

There were differences in migratory types between males and females.

There were differences in migratory types between males and females.
Most common migratory type of males was river eel.
Sea eel is the most common migratory type in females.
Conclusion

There were differences in frequency of migratory history both localities and sexes

Need new management strategies for sustainable use of the Japanese eel at each locality
Future research directions

• Increase number of study areas and eels
• Why is there such a tendency for many Japanese eels to live in marine habitat?
Introduction II
Diversity of migratory history

Ocean

Freshwater
Sex determination

Elver

High population density
Poor food
Male

Low population density
Rich food
Female
Freshwater  Sea water

Otolith

X-ray electron microprobe analysis