# Comparison of stomach contents of Pacific cod (*Gadus macrocephalus*) in Korean coastal waters

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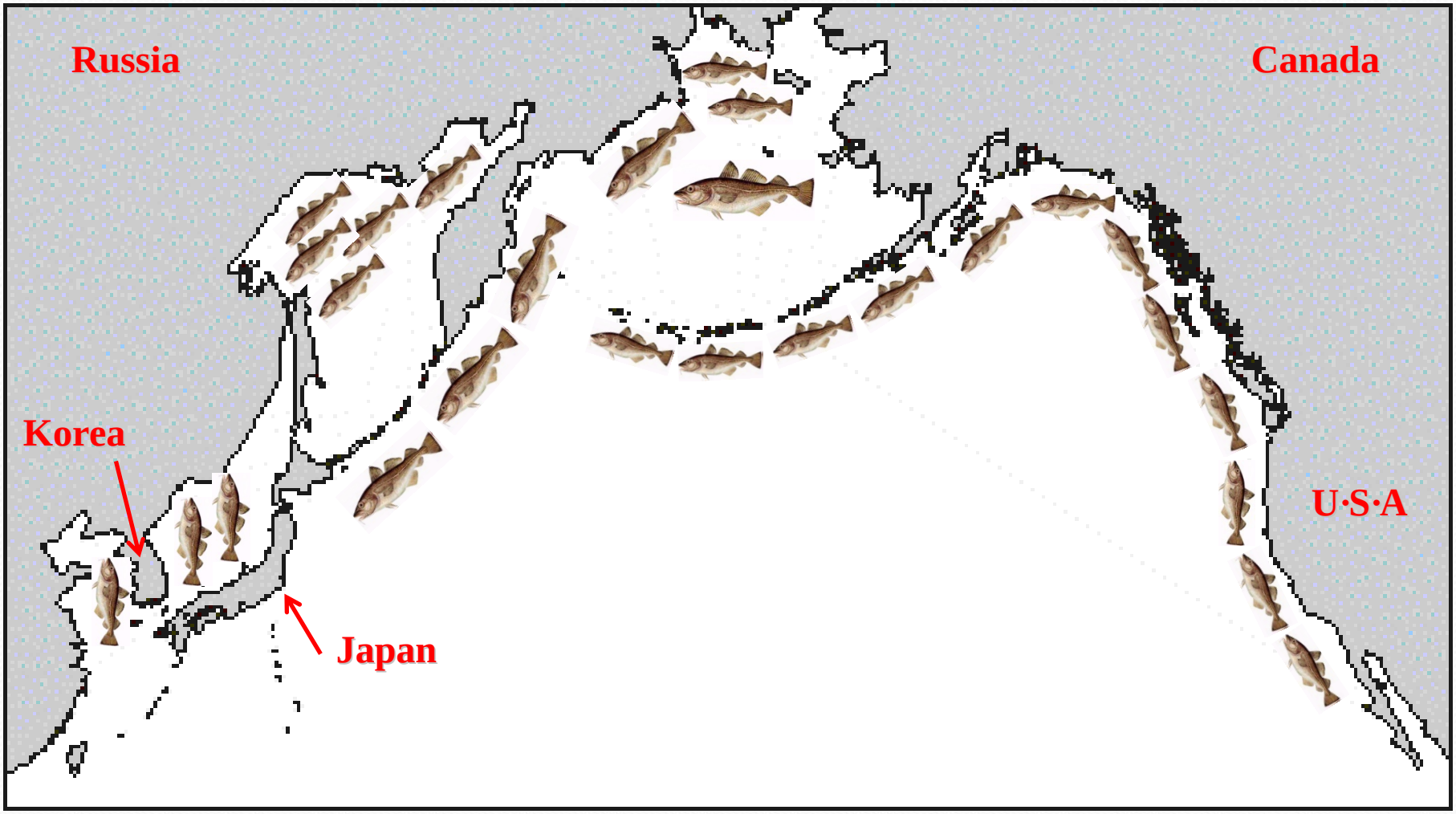
# Introduction

# Distribution of Pacific cod



**Zooplankton**

**Juvenile**

SL : 76mm

**Chub mackerel**

**Cephalopoda**

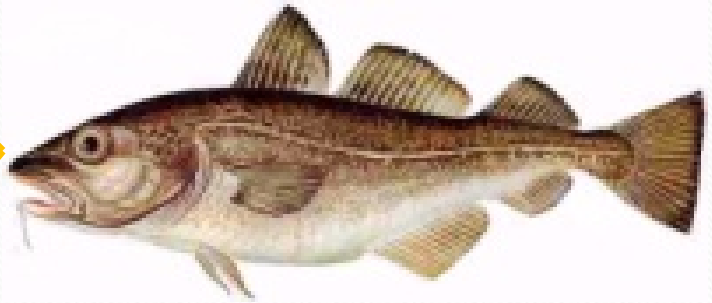
**Herring**

**Crab**

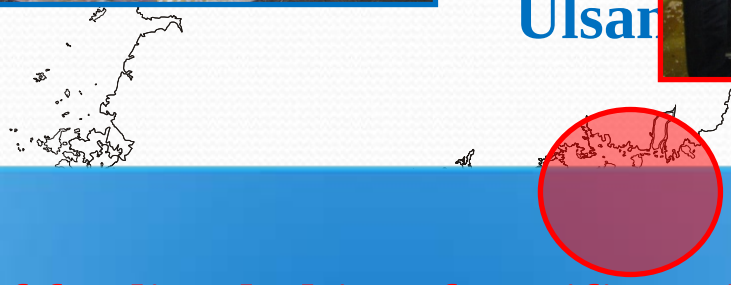
**Pleuronectidae**

**Polychaete**

**Adult**



**Previous studies : Jeong, 1997**




◆**Objective**

**Determination of feeding habits of Pacific cod in Korean waters by comparison of stomach contents.**

# Materials and Methods

# ●Sampling

| | East sea | Yellow sea | Jinhae Bay |
|---|---|---|---|
| Location | Sokcho, Uljin, Ulsan | Boryeong | Geoje |
| Period | April and December, 2007 | January, 2007 | Dec. 2006 - Feb. 2007Dec. 2007 - Feb. 2008 |
| Individuals | 140 | 122 | 256 |

Sokcho

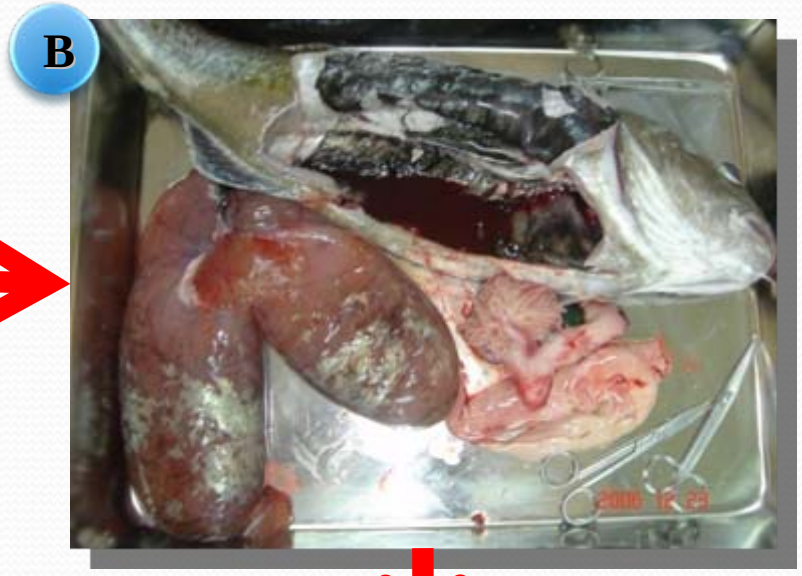
Uljin

Ulsan

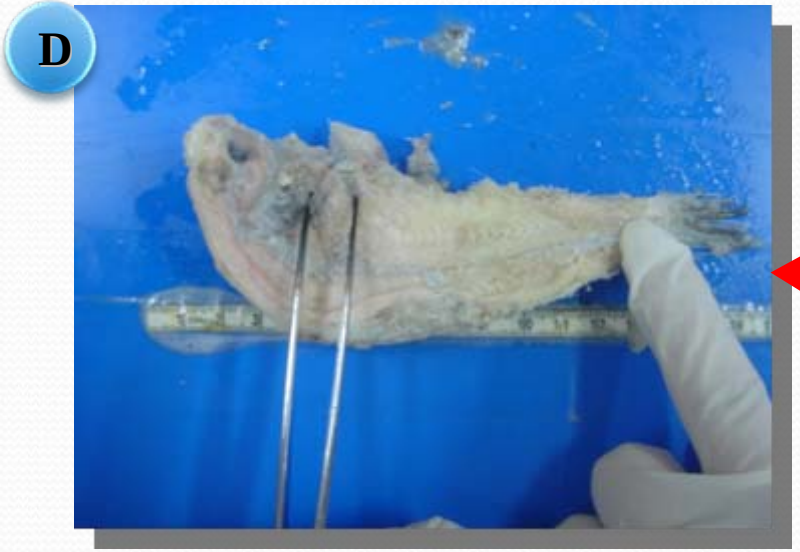
Boryeong

Geoje

- **Sampling and stomach contents analysis**





- **Data treatment**

## 1. Frequency of occurrence(F, %)

$F(\%) = A_i / N \times 100$

- $A_i$ : Number of Pacific cod categories
- N : Number of Pacific cod which were the stomachs contents

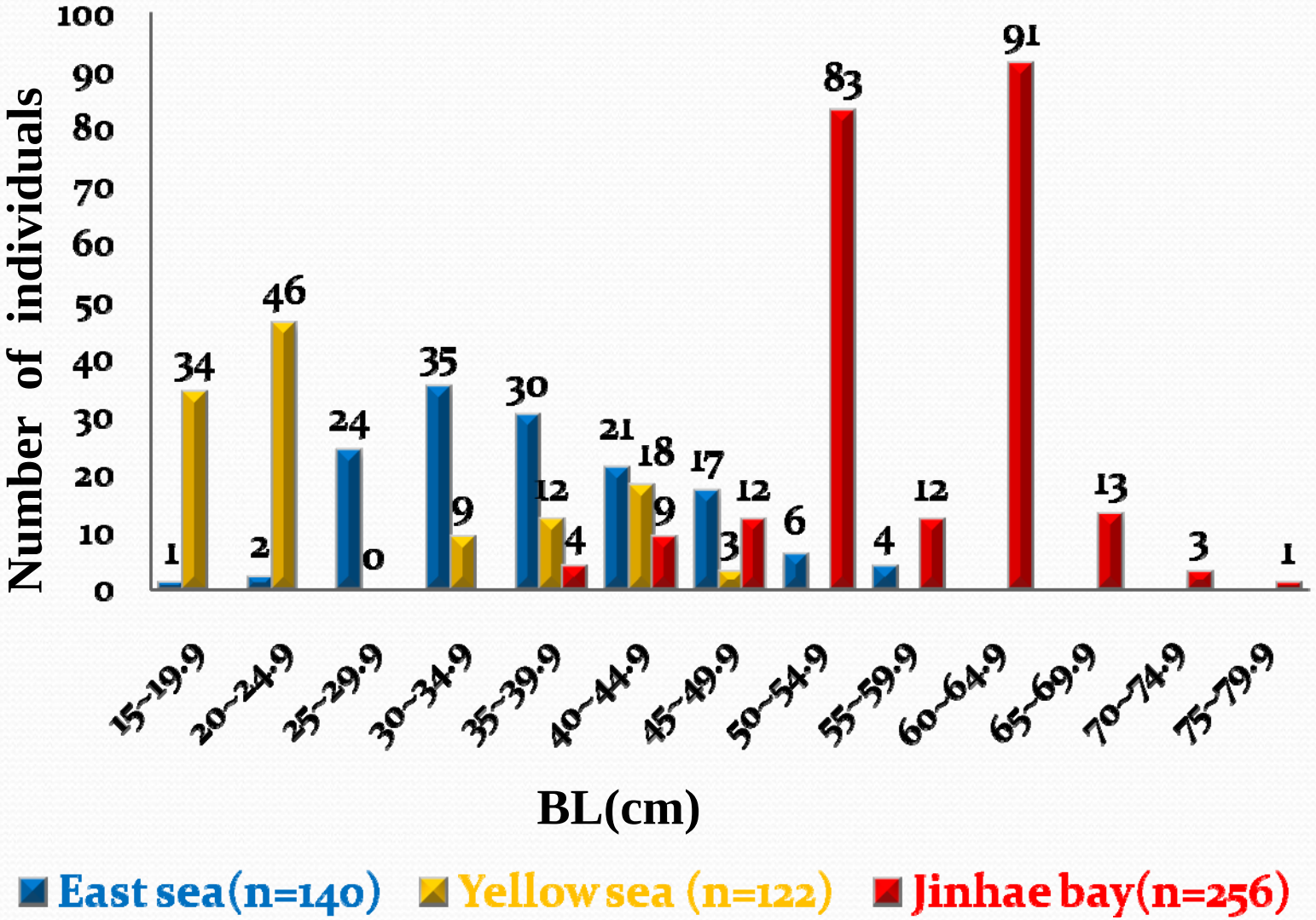
## 2. Index of relative importance(IRI)

$IRI = (N + W) \times F$ Pinkas et al. (1971)

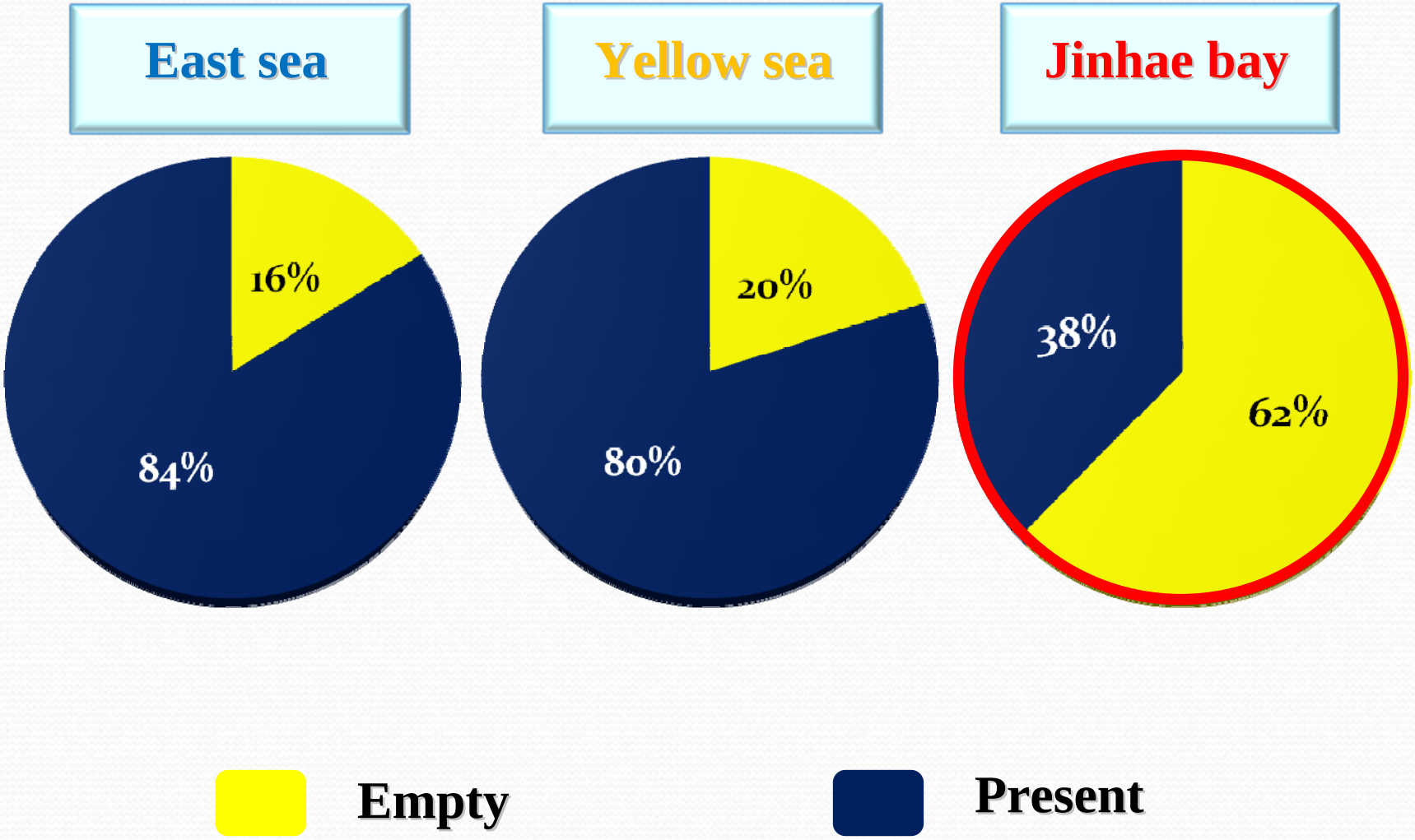
- N : Percent by number of stomachs contents
- W : Percent by dry weight of stomachs contents
- F : Frequency of occurrence

# Results

# Size comparison of Pacific cod

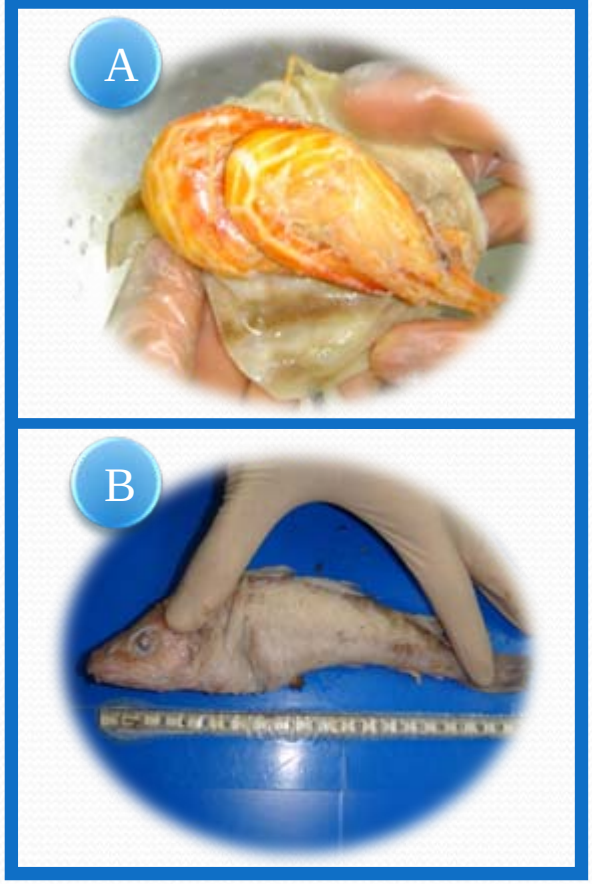


# Comparison of stomach emptiness



# Stomach contents

## East sea

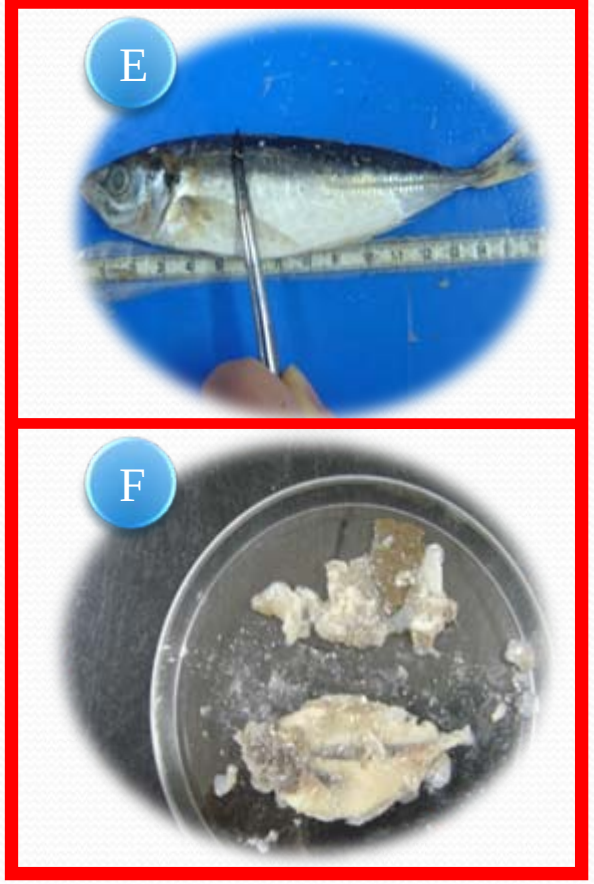



A: Caridea
(*Pandalopsis japonica*)
B: Pisces
(*Gadus macrocephalus*)

## Yellow sea


C: Pisces(Stichaeidae)
D: Pisces
(*Syngnathus schlegeli*)
Caridea(Unidentified)

## Jinhae bay

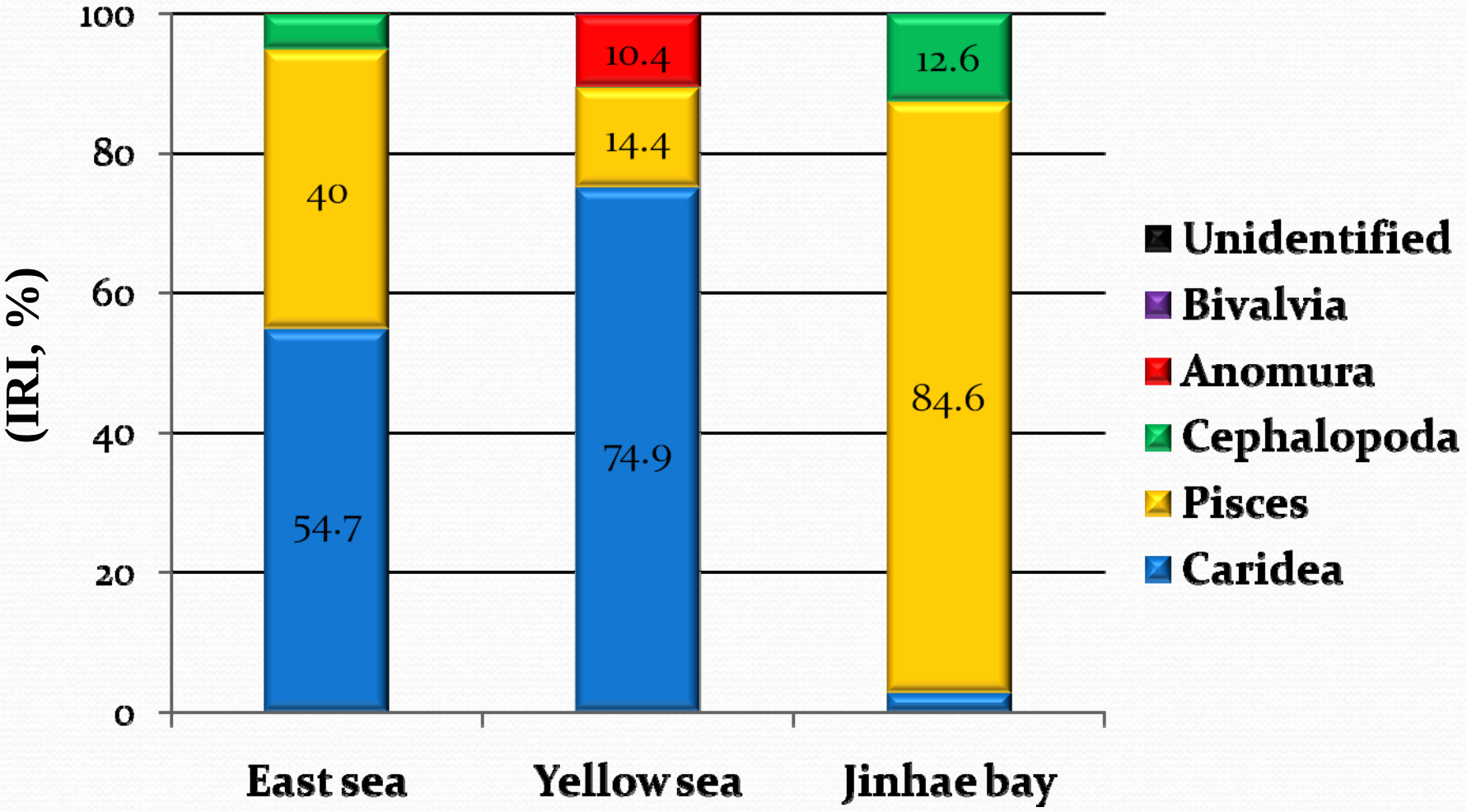



E: Pisces
(*Trachurus japonicus*)
F: Pisces
(Pleuronectiformes)

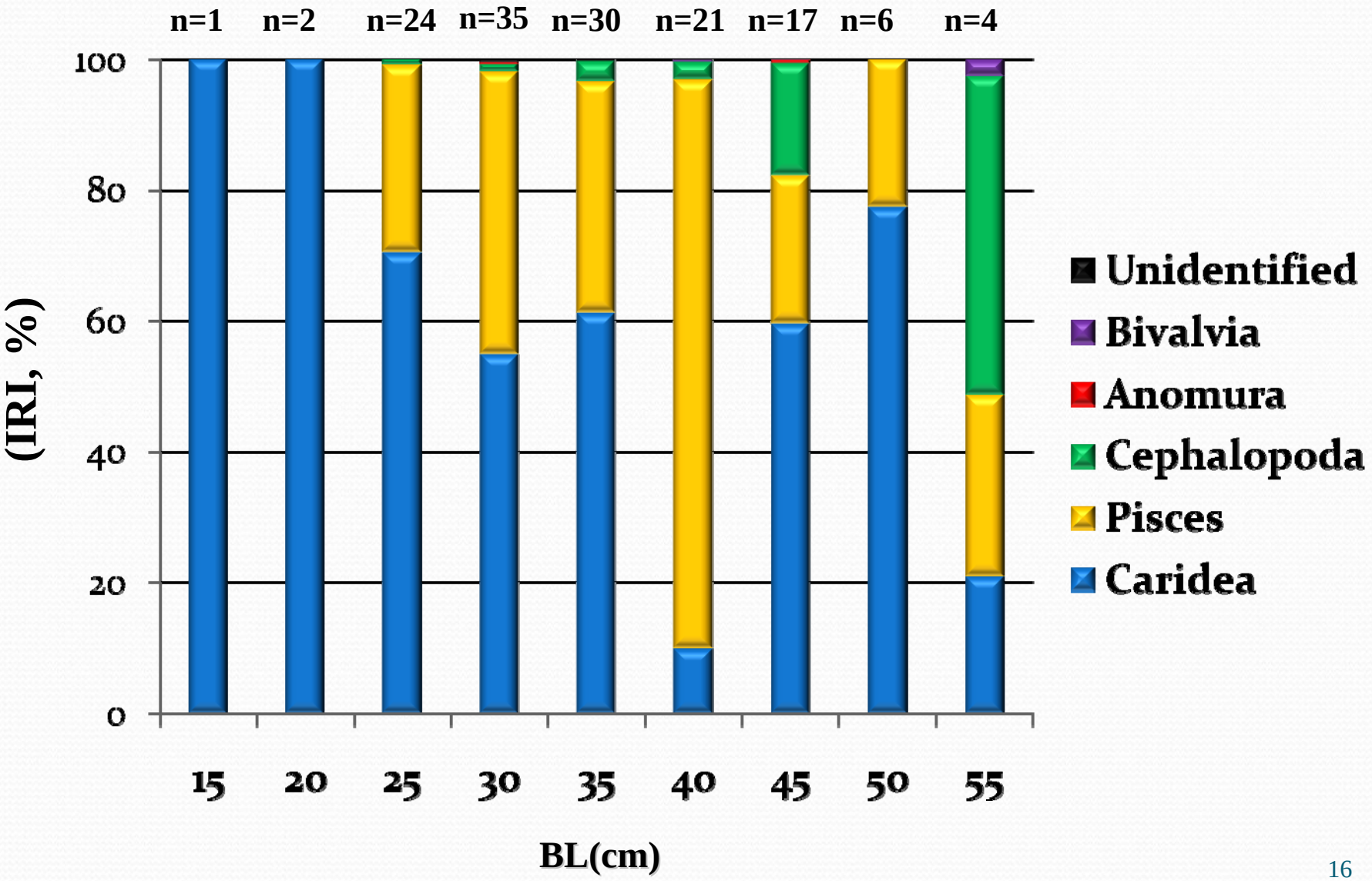
# Percent comparison of the stomach contents

| Prey organisms | East sea | | | Yellow sea | | | Jinhae Bay | | |
|---|---|---|---|---|---|---|---|---|---|
| | F (%) | N (%) | W (%) | F (%) | N (%) | W (%) | F (%) | N (%) | W (%) |
| Pisces | 39.3 | 30.7 | 58.3 | 15.3 | 34.5 | 33.4 | 65.3 | 54.9 | 92.0 |
| Caridea | 55.6 | 55.9 | 30.2 | 69.4 | 50.7 | 27.4 | 18.9 | 14.5 | 1.6 |
| Cephalopoda | 23.1 | 10.0 | 9.3 | 3.1 | 2.0 | 0.6 | 43.2 | 29.4 | 3.7 |
| Anomura | 1.7 | 1.0 | 1.2 | 16.3 | 10.8 | 35.4 | | | |
| Bivalvia | 2.6 | 1.0 | 0.3 | 2.0 | 1.3 | 3.0 | 2.1 | 0.6 | 2.6 |
| Unidentified | 3.4 | 1.4 | 0.7 | 1.0 | 0.7 | 0.2 | 1.1 | 0.6 | 0.1 |
| Total | | 100 | 100 | | 100 | 100 | | 100 | 100 |

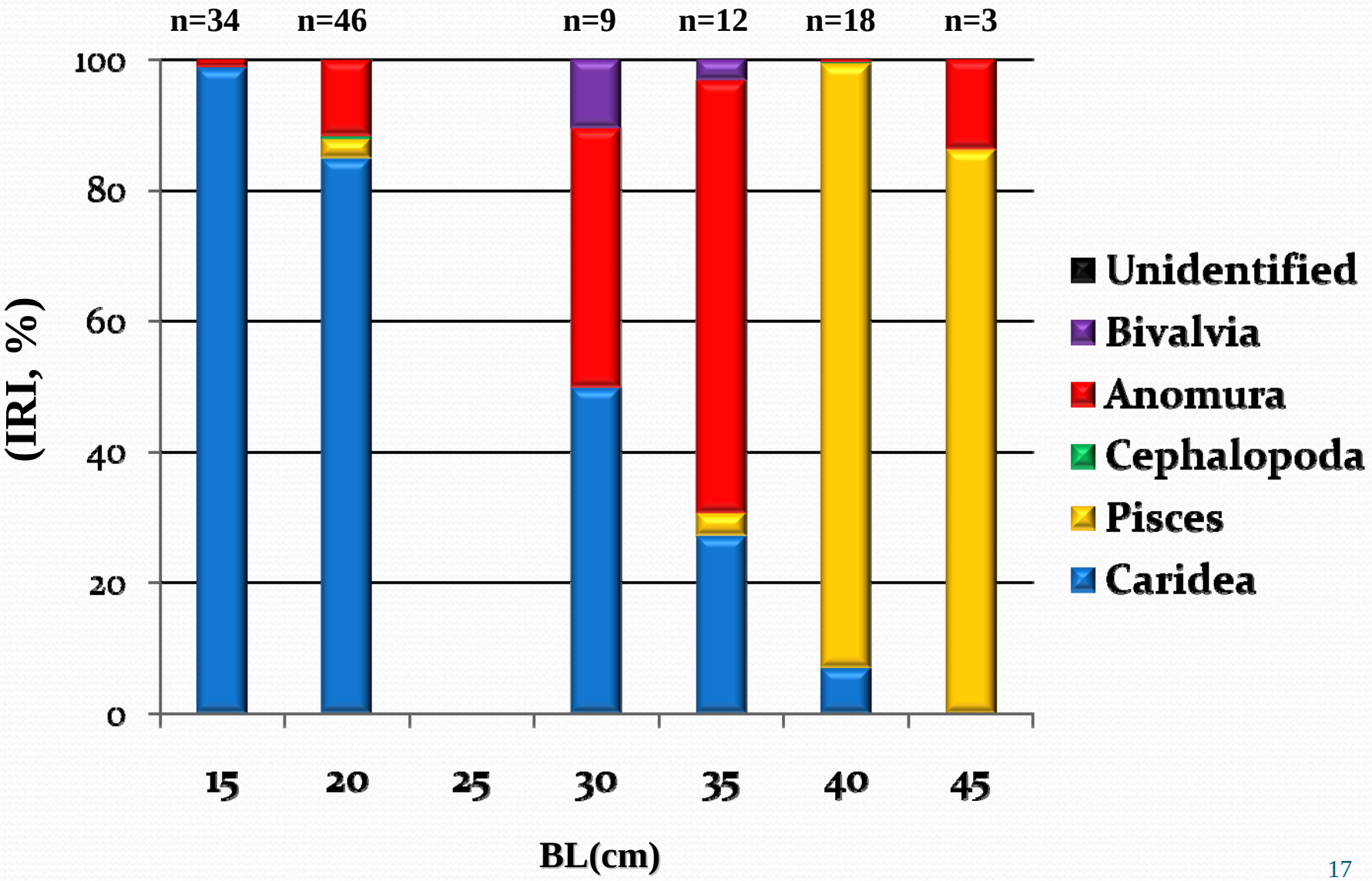
# Relative prey composition



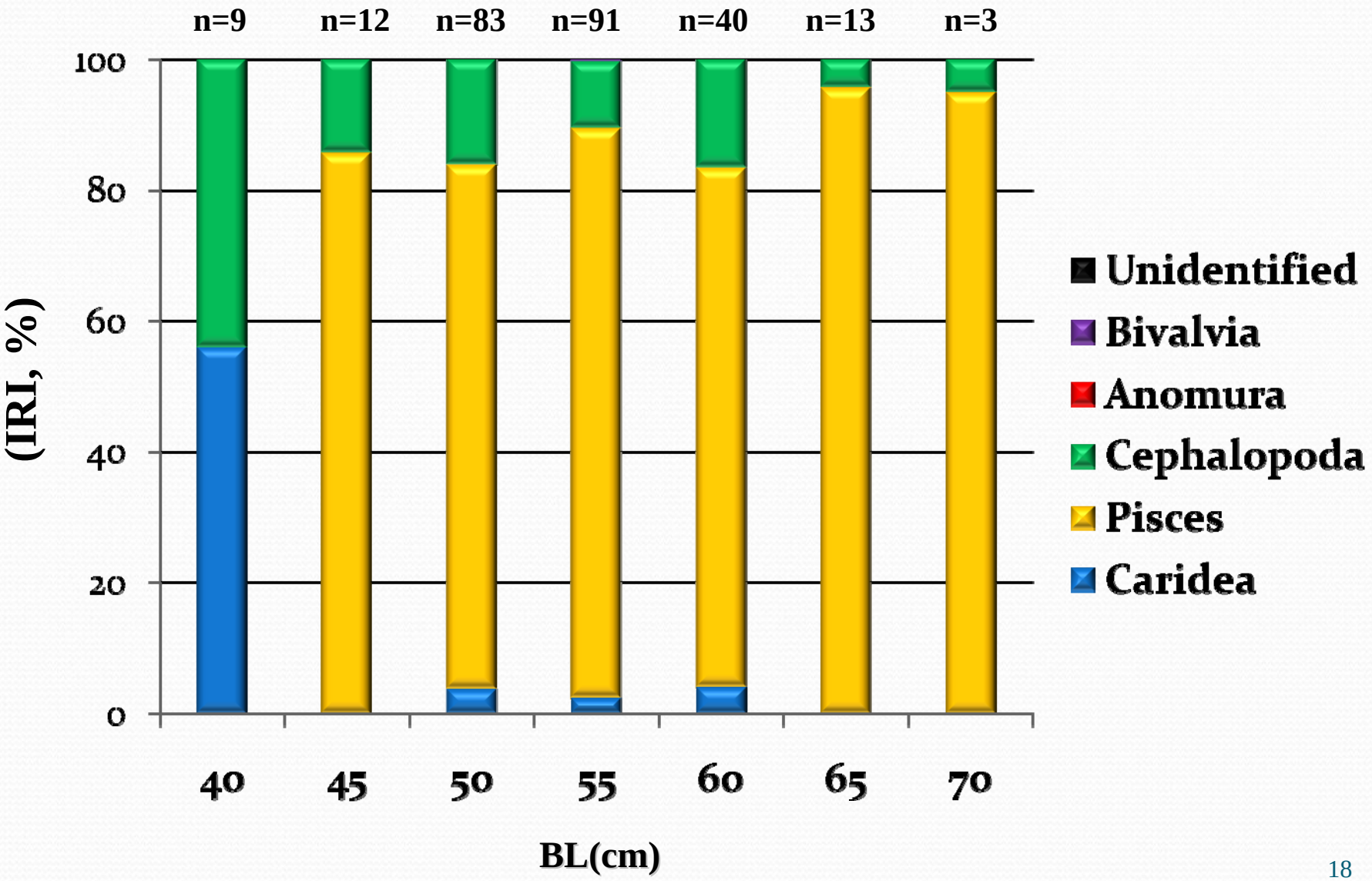
# Relative prey composition(East Sea)



# Relative prey composition(Yellow Sea)



# Relative prey composition(Jinhae bay)



# Discussion

◆ **East sea and Yellow sea**

⇒ Smaller size of Pacific cod

**Caridea : IRI = 55%(East Sea), 75%(Yellow Sea)**

◆ **Jinhae bay**

⇒ Larger size of Pacific cod

**Pisces : IRI = 85%**

**Body size of Pacific cod is closely related with dietary shift.**

**smaller size**

**main food item : shrimps**

**larger size**

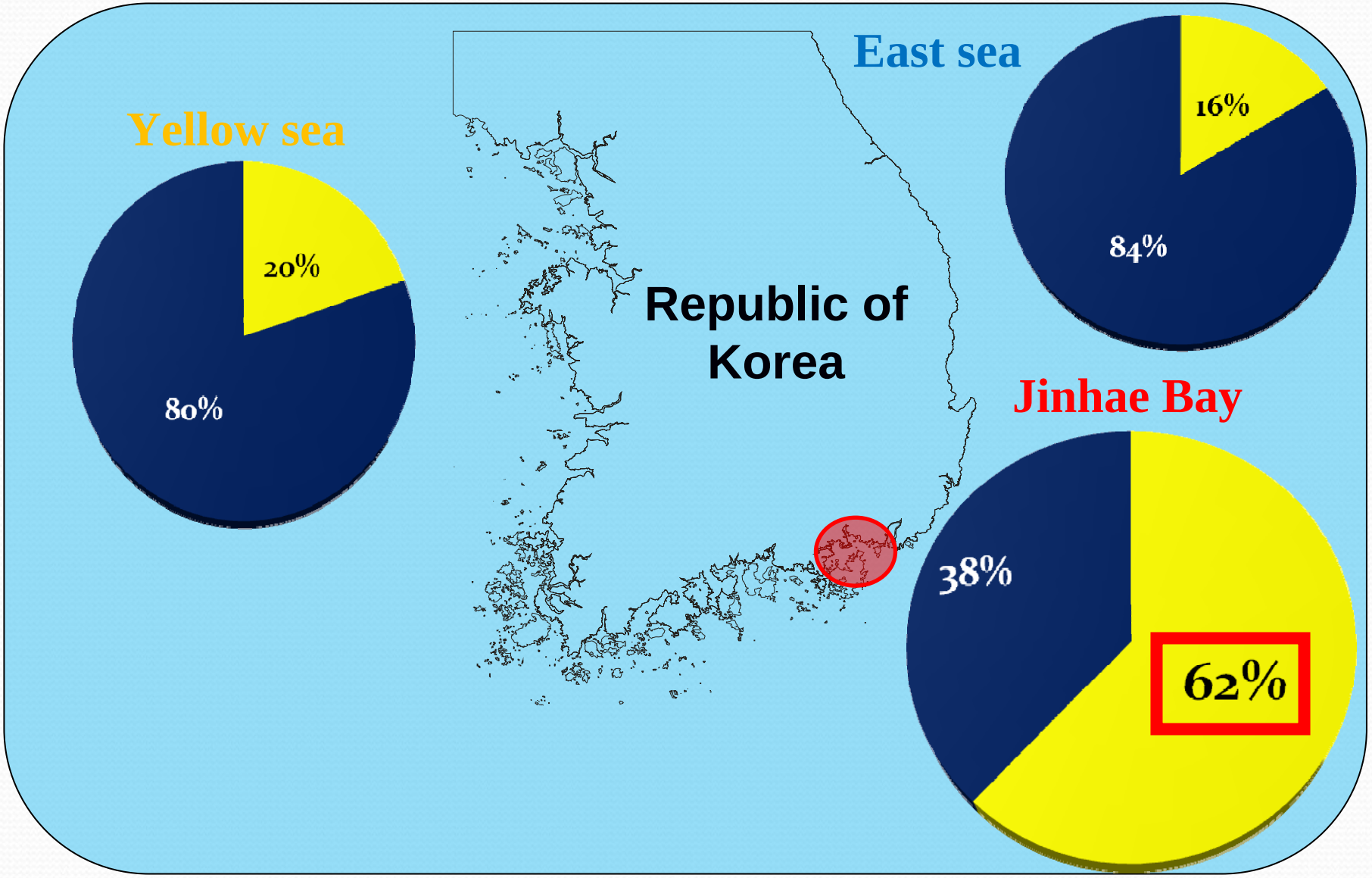
**main food item : fishes**

**Previous studies : BRAWN (1969), ALBERS and ANDERSON(1985)**

- **Pacific cod may have a feeding selectivity to some extent under particular conditions.**

- **The stomach contents of Pacific cod with certain size is determined by prey abundance and prey size spectrum in its habitat.**

# What is the meaning of the highest stomach emptiness of Pacific cod in Jinhae Bay?



## during spawning season …

- Feeding activities : abruptly decrease
- Stomach contents : nearly absent

Ex) Western coast of Kamchatka : **9.2 – 37.7%** in 1947,
**2.0 – 39.0%** in 1948 (Moiseev, 1953)

Northeastern coast of Japan : **15.2%** (Hashimoto, 1974)

**Jinhae Bay → 62%**

**Jinhae Bay is one of the most important and largest spawning ground in Korean waters and should be conserved for Pacific cod's spawning.**

# Acknowledgements

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# Thank you!!!