DISTRIBUTION OF ZOONOTIC PARASITE *ANISAKIS* DUJARDIN, 1845 IN JAPANESE WATERS AND ITS POSSIBLE USE AS BIOLOGICAL TAG FOR FISH STOCK AND BIODIVERSITY ASSESSMENT STUDIES

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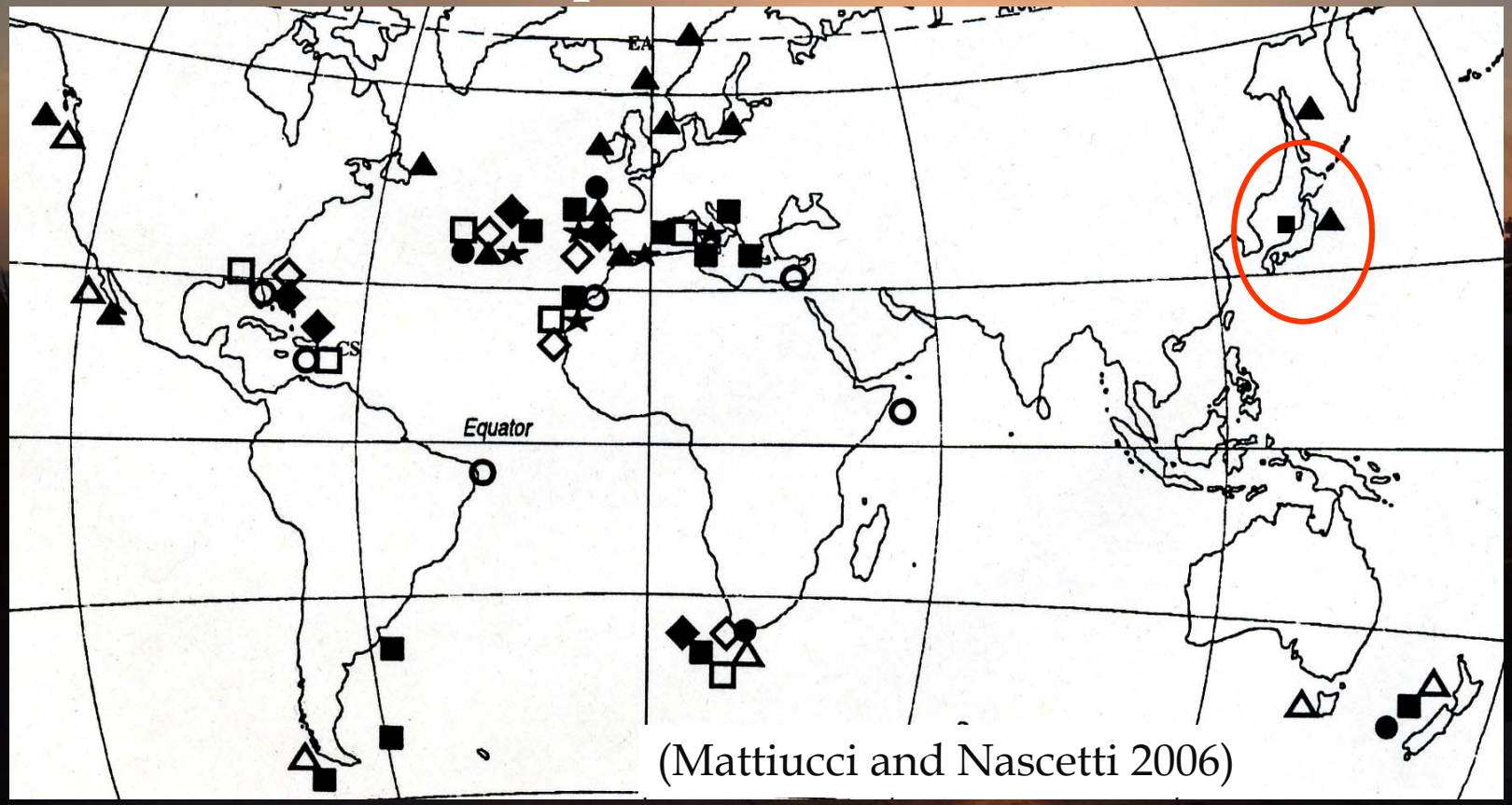
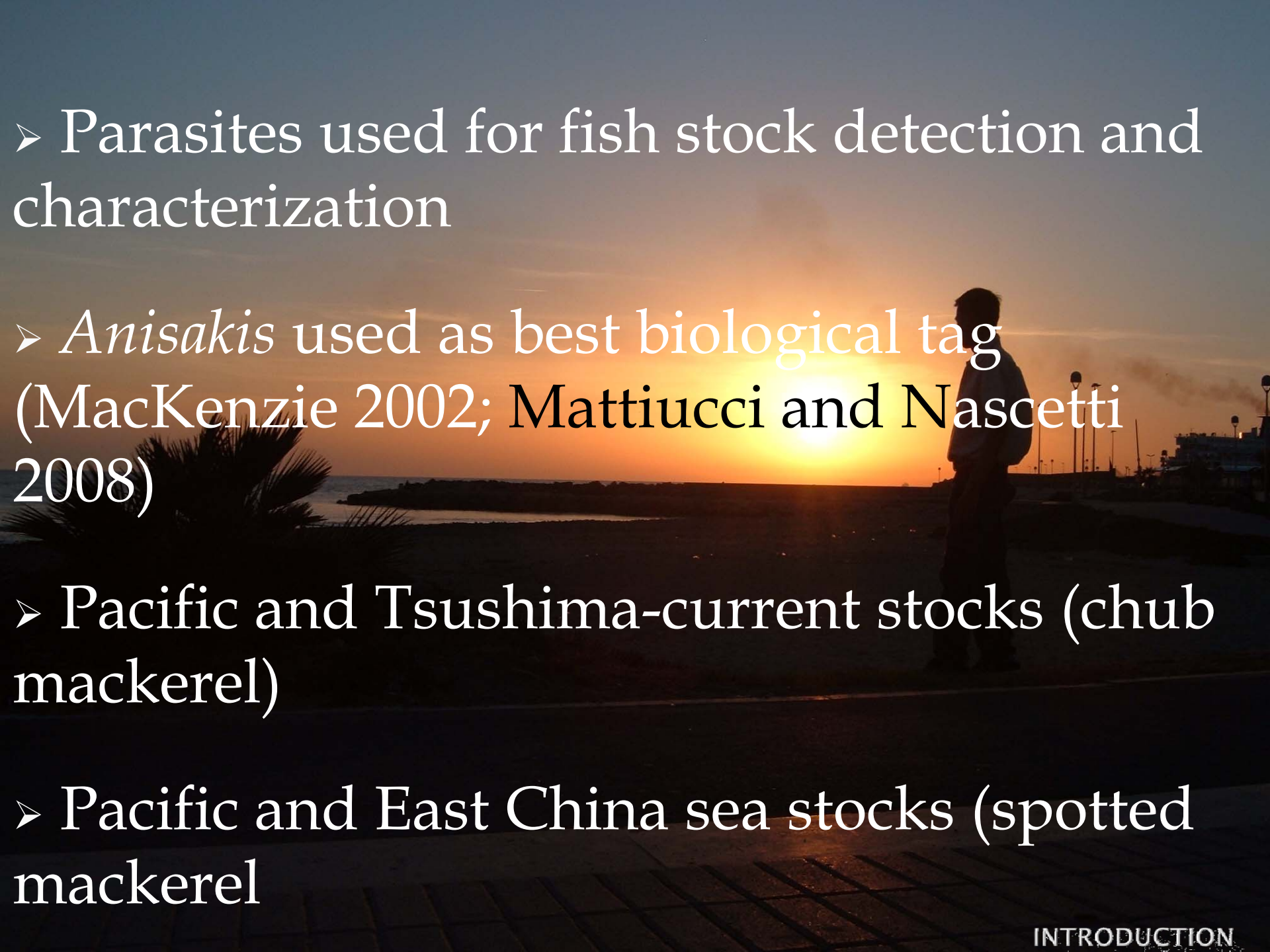
INTRODUCTION

- Worldwide distribution of *Anisakis* spp.
- Causative agent for human anisakiasis
- Human anisakiasis in Japan



(Mattiucci and Nascetti 2006)

□ *A. ziphidarum*
■ *A. pegreffii*
▲ *A. simplex* s.s.
△ *A. simplex* C
○ *A. typica*
● *Anisakis* sp.
◆ *A. paggiae*
◇ *A. brevisculata*
★ *A. physeteris*



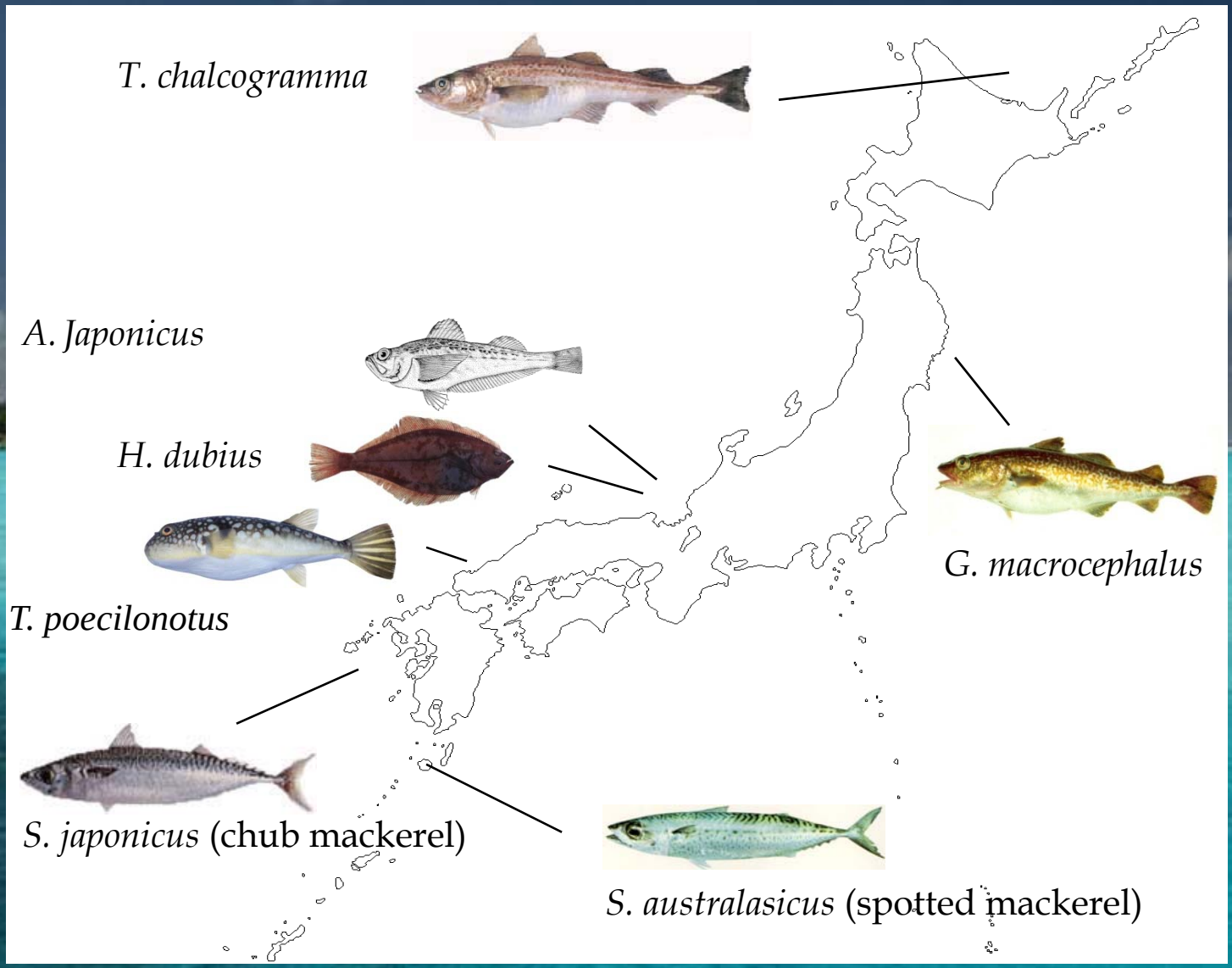
- Parasites used for fish stock detection and characterization
- *Anisakis* used as best biological tag (MacKenzie 2002; Mattiucci and Nascetti 2008)
- Pacific and Tsushima-current stocks (chub mackerel)
- Pacific and East China sea stocks (spotted mackerel

Objectives

- to evaluate *Anisakis* distribution in Japanese waters

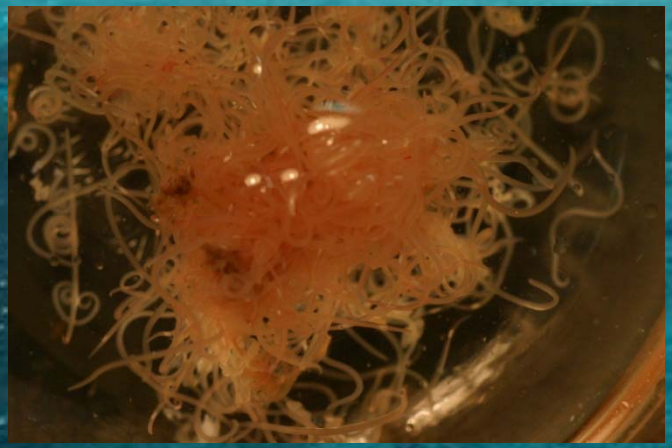
- *Anisakis* possible biological tags for chub and spotted mackerels ?

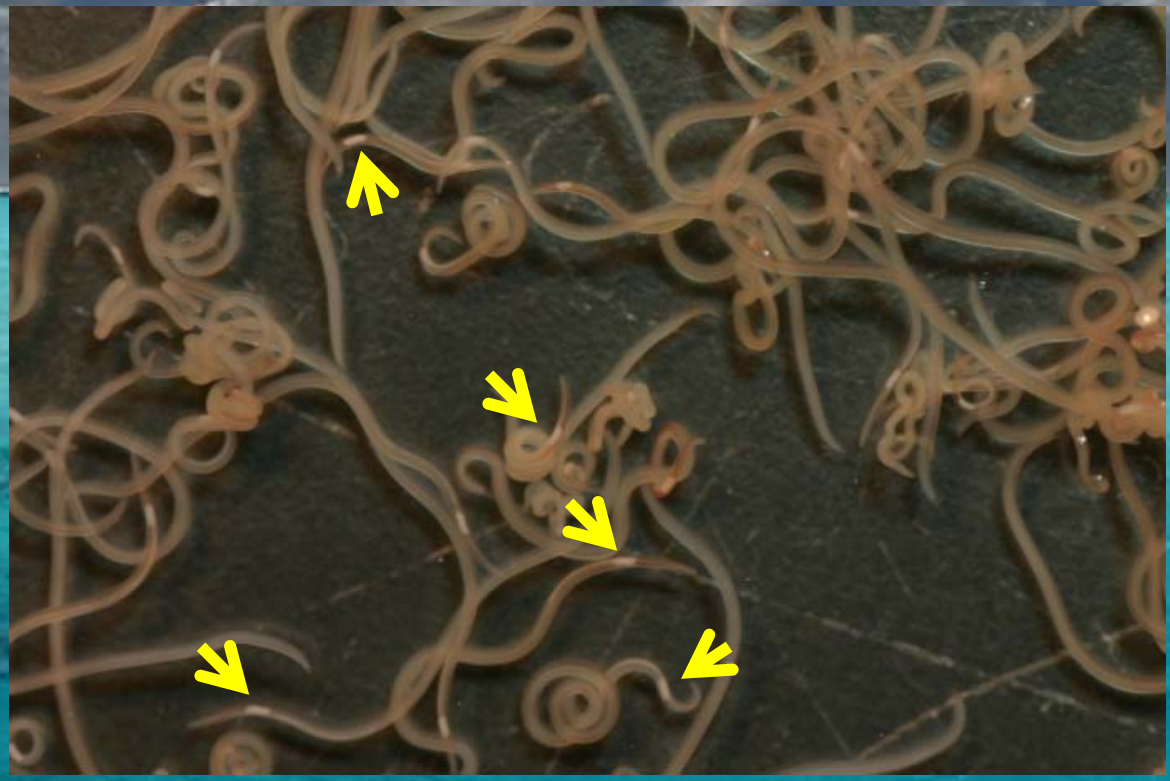
MATERIALS AND METHODS



Parasite collection

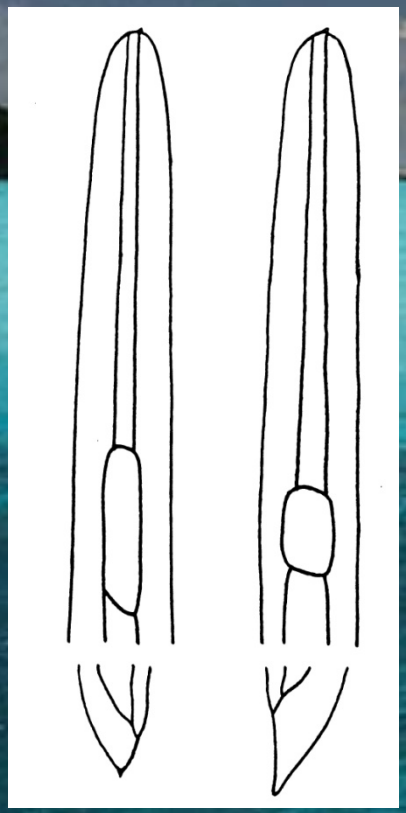
- Morphological examination
- Molecular examination

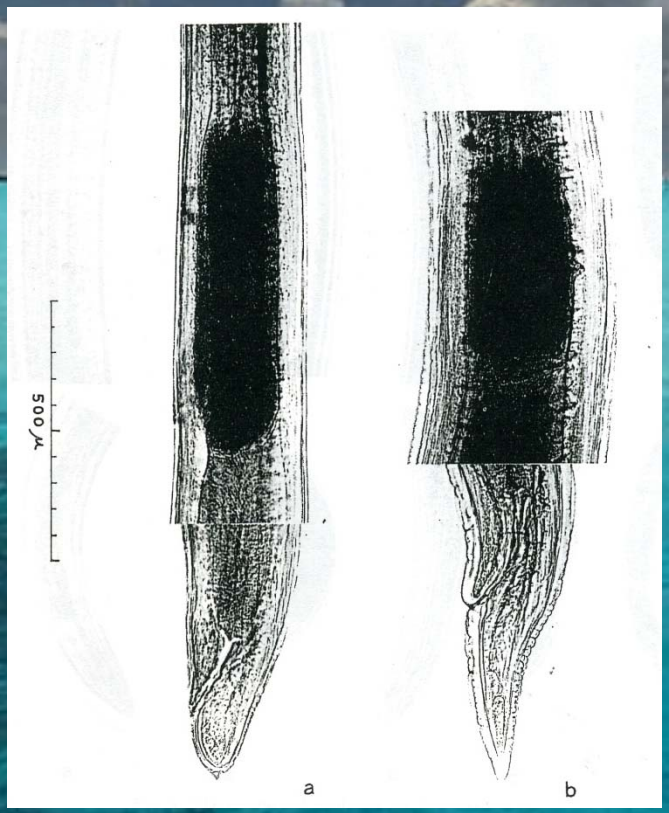




Morphological examination

- 70% ethanol fixation (morphological examination)
  - Ventriculus length (Quiazon et al. 2008)
  - Total body length





Molecular examination

- 100% ethanol fixation (DNA examination)
  - ITS region
    - ✓ PCR-RFLP
    - ✓ DNA sequencing
  - *mt*DNA *cox*2 gene
    - ✓ DNA sequencing

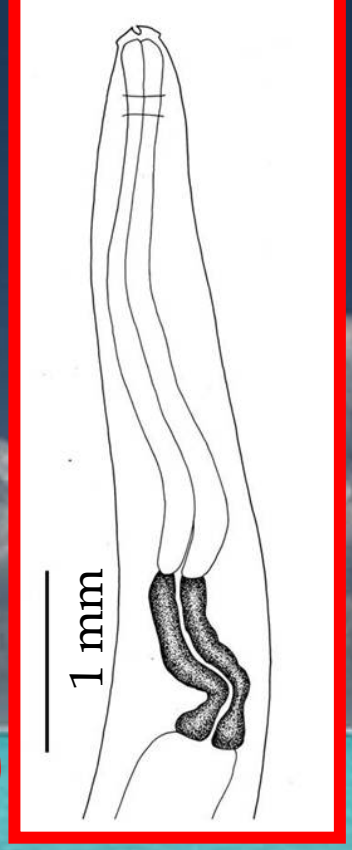
Anisakis publications (Japan)

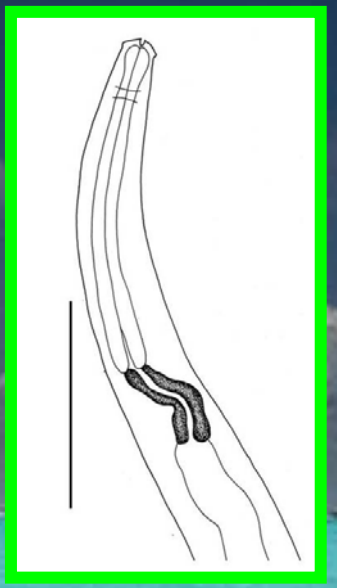
- Abe et al. 2005
- Umehara et al. 2006
- Umehara et al. 2008
- Quiazon et al. 2008
- Quiazon et al. *in press*

RESULTS

Anisakis species

- *Anisakis Type I group*
  - *Anisakis simplex* (s.s.)
  - *Anisakis pegreffii*

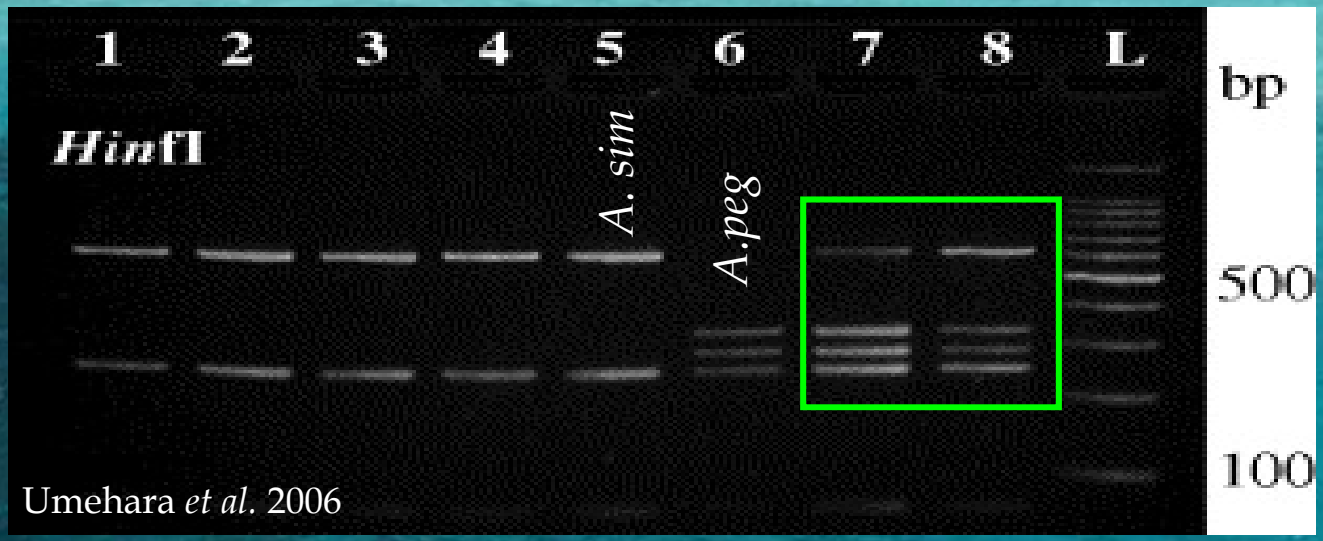




RESULTS

- *Anisakis Type II group*
  - *Anisakis brevispiculata*
  - *Anisakis physeteris*
  - *Anisakis* sp.

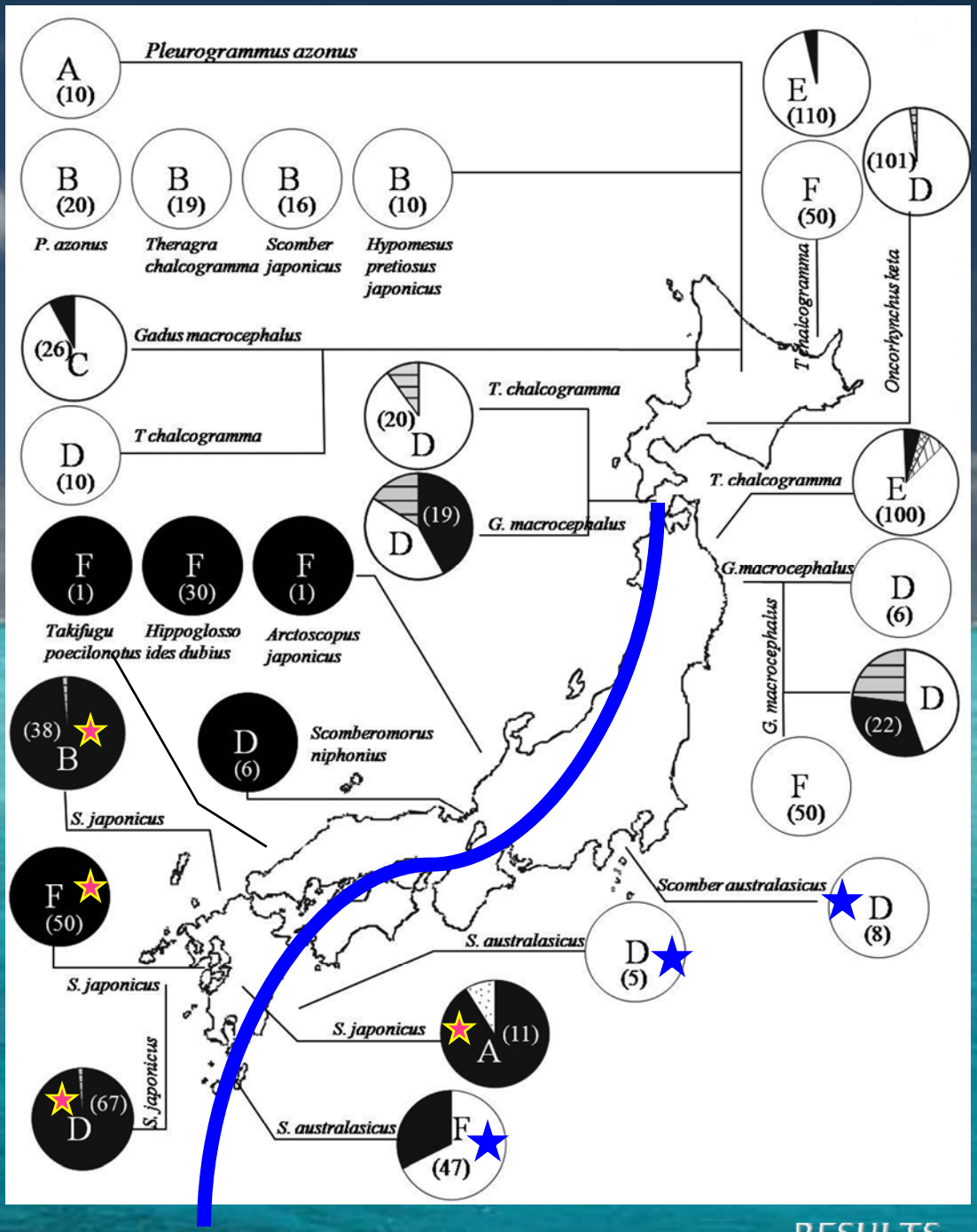
- Hybrid genotype (*A. simplex* s.s. x *A. pegreffii*)



Umehara *et al.* 2006

Anisakis

- distribution
- as biological tag? (chub mackerel ★) vs. spotted mackerel ★)



CONCLUSION

- ✓ Clear distribution particularly between *A. simplex* (s.s.) and *A. pegreffii.*
- ✓ Human anisakiasis mainly due to *A. simplex* (s.s.) (Umehara et al 2007)
- ✓ Distribution is not host-specific but rather site-specific
- ✓ Four *Anisakis* spp. present and one *Anisakis* sp. from Type II group
- ✓ Possible use of *Anisakis* spp. to differentiate chub and spotted mackerel stocks from Pacific-Tsushima current and Pacific-East China sea side

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