



Corso di Dottorato di Ricerca in Scienze della Vita e dell'Ambiente Ciclo XXXVI

Comparative investigation of the biology and ecology of Egyptian and common sole in the Adriatic Sea

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Two cryptic species of sole in the Adriatic Sea...

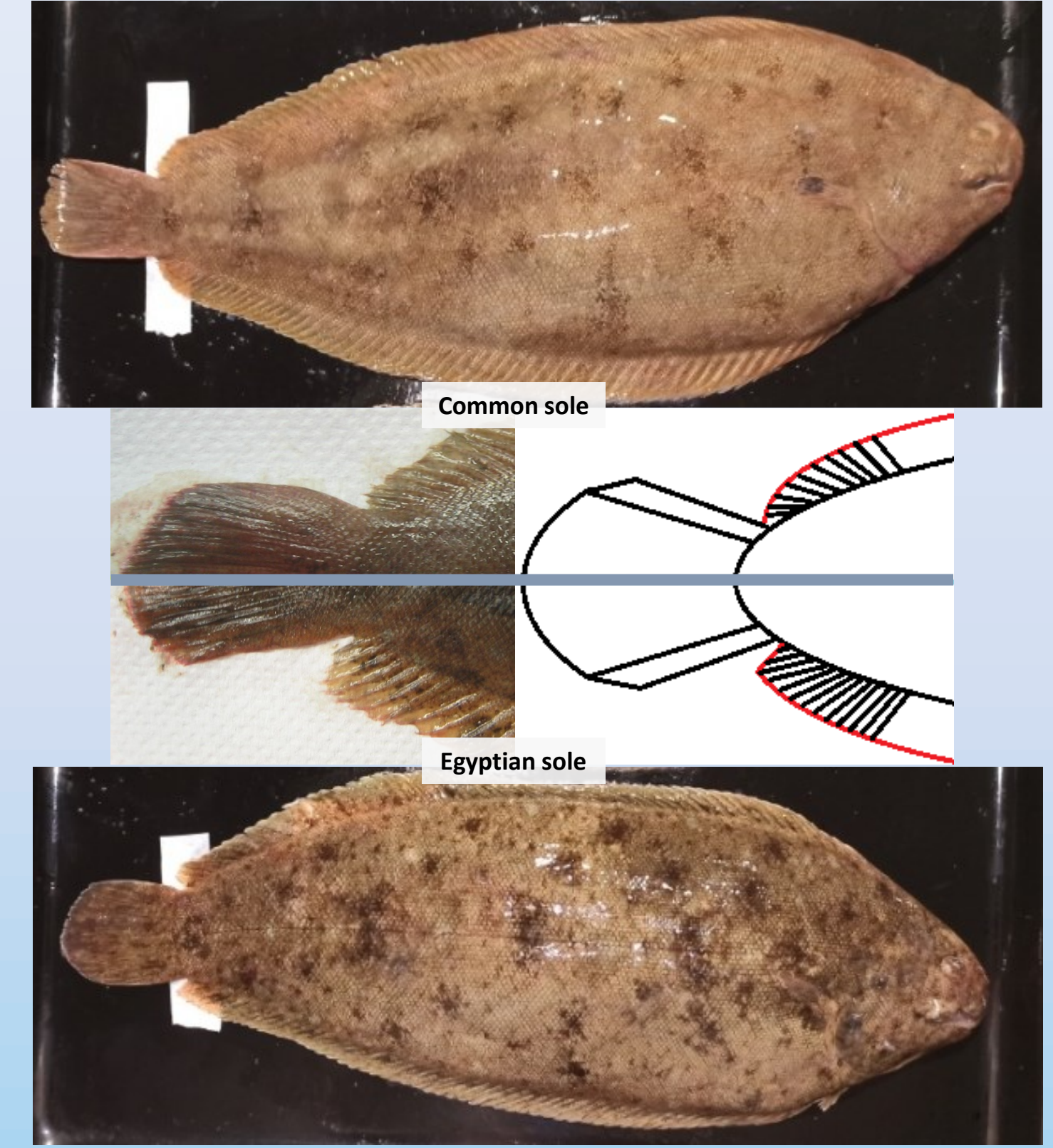
As in other areas of the Mediterranean, in the Adriatic Sea common and Egyptian sole are **sympatric** and **share the same habitats: sandy-muddy bottoms in marine and brackish waters**. They are considered two **cryptic species** because of their external similarity, but they are **genetically separated** and **reproductively isolated** (Borsa and Quignard, 2001; Boukouvala *et al.*, 2012).

These two species are **valuable fishery resources** in the Mediterranean Sea:

- Med provides 15% of the overall common sole's world landings -> 23% of these landings come from the north and the central Adriatic Sea (FAO-FISHSTAT source);
- Egyptian sole is an important fishery resource in the Eastern Mediterranean Sea (Mehanna, 2007).

Fishermen in the Adriatic Sea do not distinguish the two species, as was reported in other Mediterranean areas (Boukouvala *et al.*, 2012), and the **Egyptian sole does not appear in the Mediterranean fisheries statistics**, except for Egypt. Species misidentification could occur during the collection of fishery data and, consequently, the evaluation of stock status of common sole in the GSA17 (Grati *et al.*, 2013) could be questioned due to a potential bias in species identification. Moreover, the current **knowledge** on biology and many aspects of the ecology of these two species in the Adriatic Sea is **still scarce**.

The project work aims to shed light on the main life-history traits and ecological role of common and Egyptian sole in the Adriatic Sea. All these are key information for the implementation of an ecological approach in the fields of fishery biology and to support management actions.

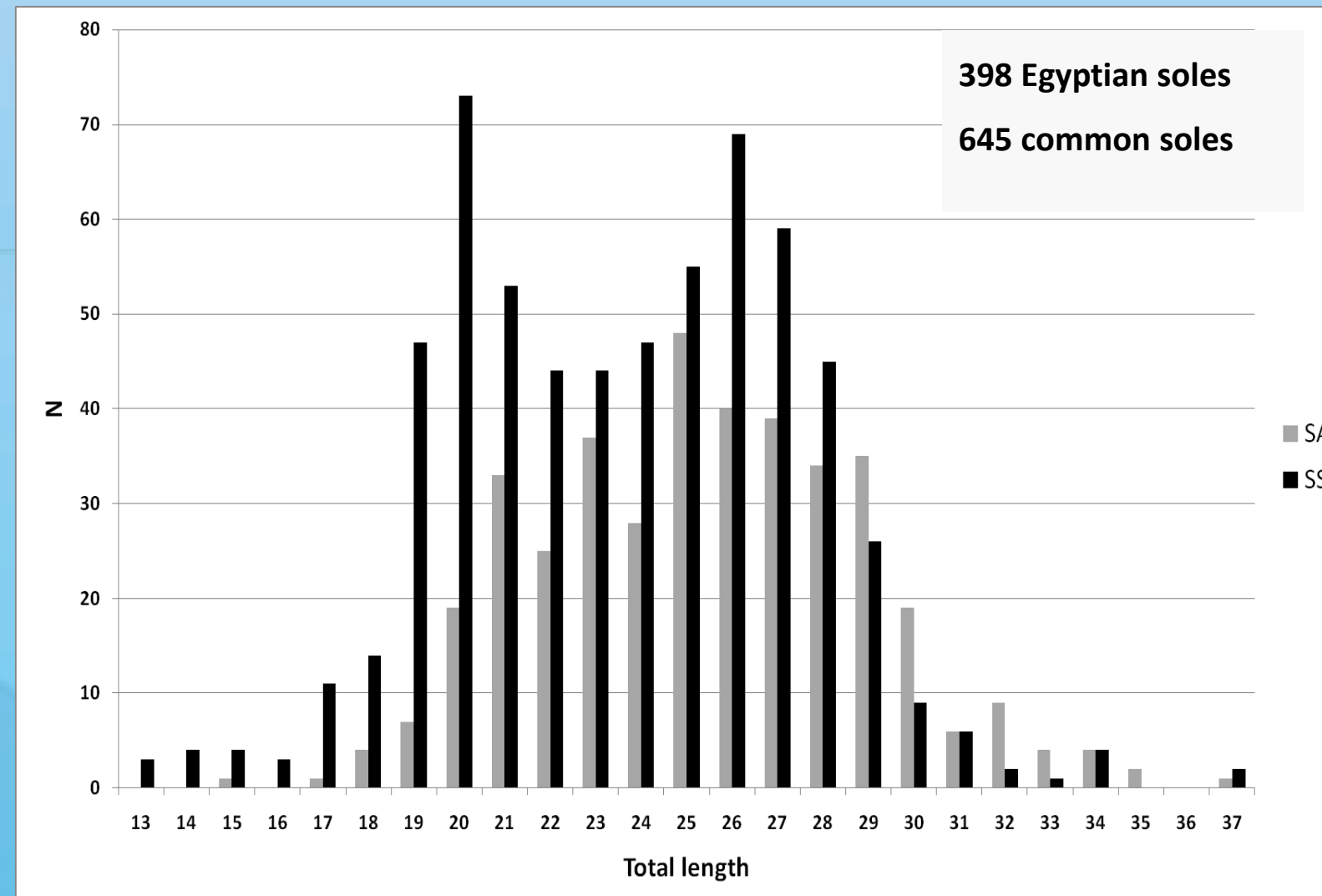


Sampling activities

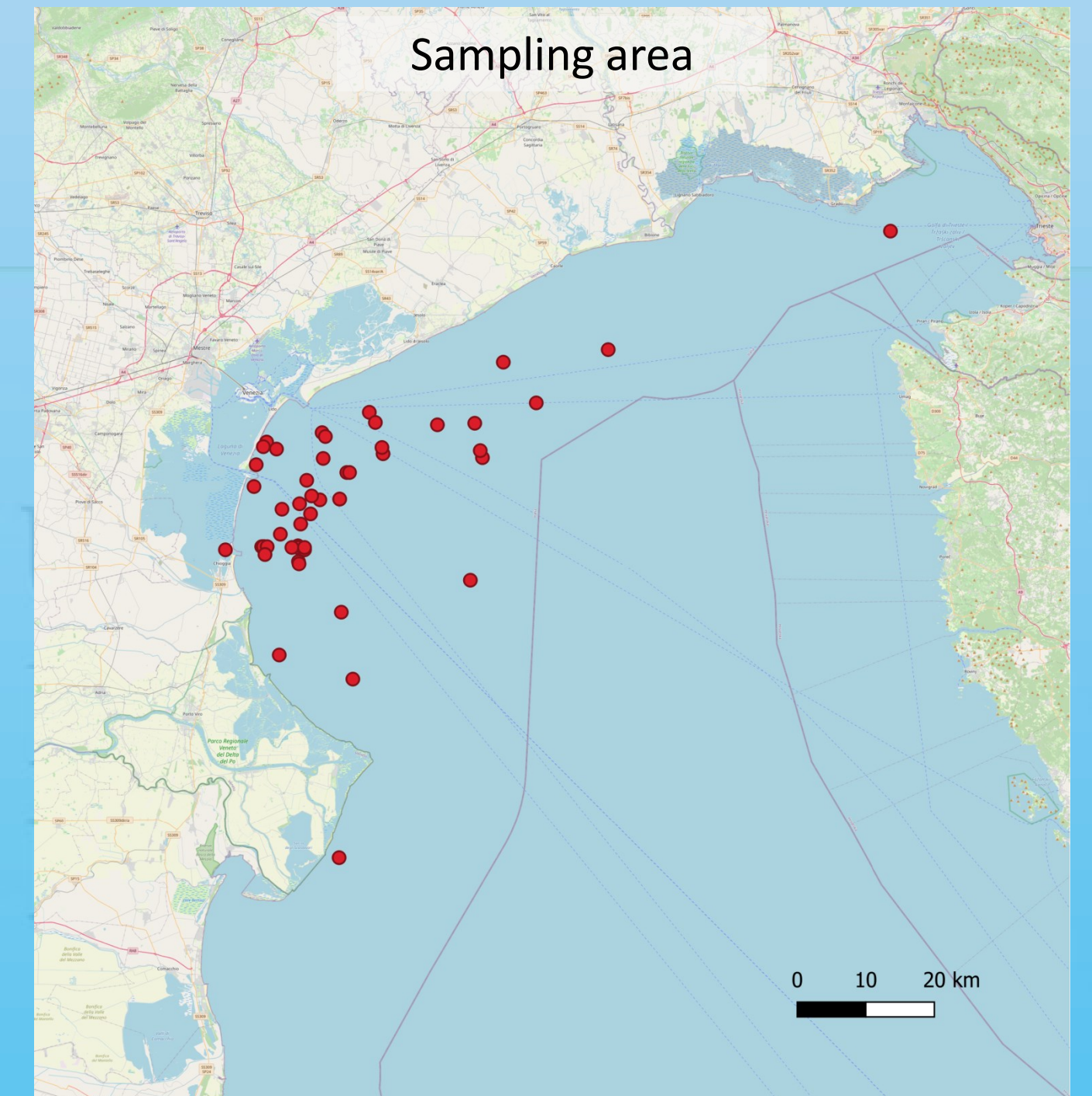


Fishery-independent activities: sampling during SoleMon survey (November-December 2021)

Fishery-dependent activities: monthly sampling from Chioggia fishery's landings (February – December 2021)



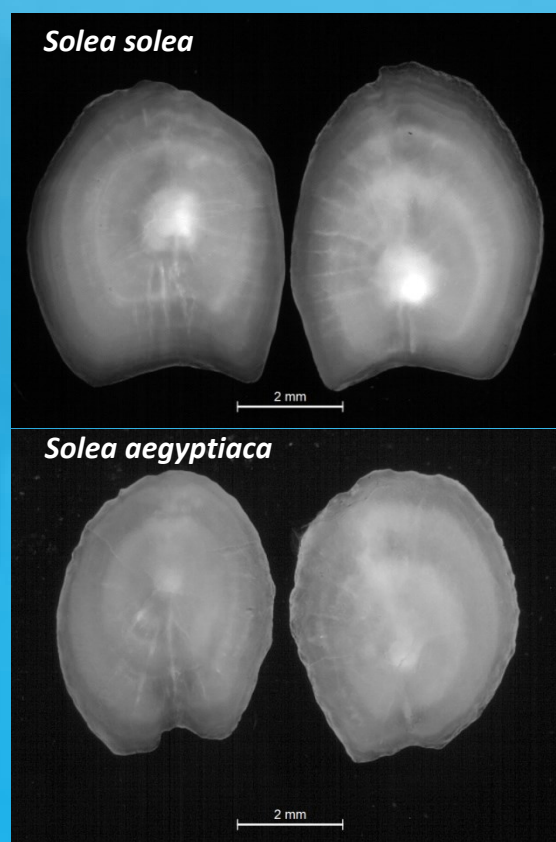
Length frequency distributions of the specimens sampled



Age and growth: otolith analysis



Sagittal otoliths extraction



Whole otoliths of the two species



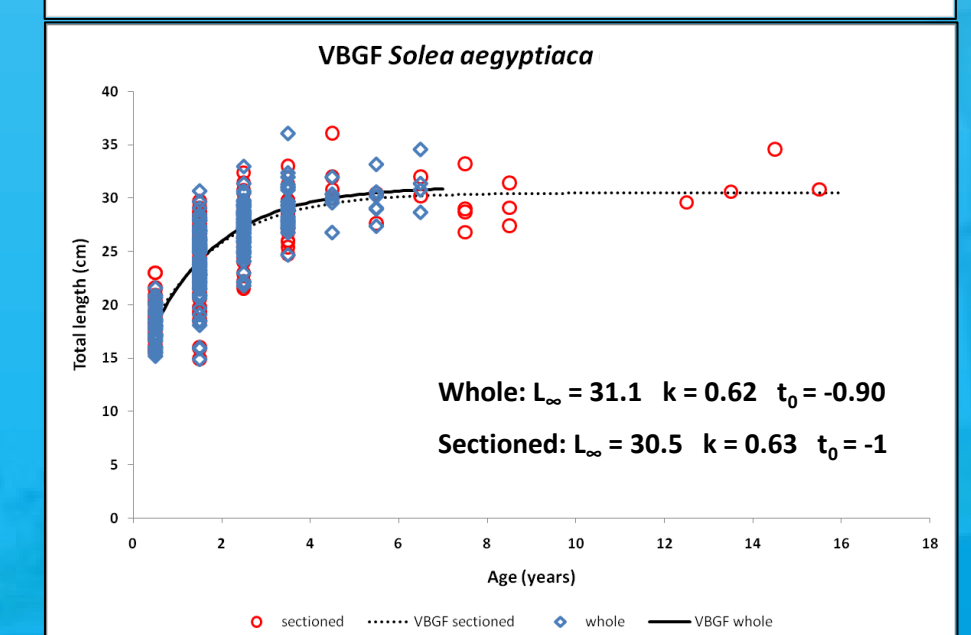
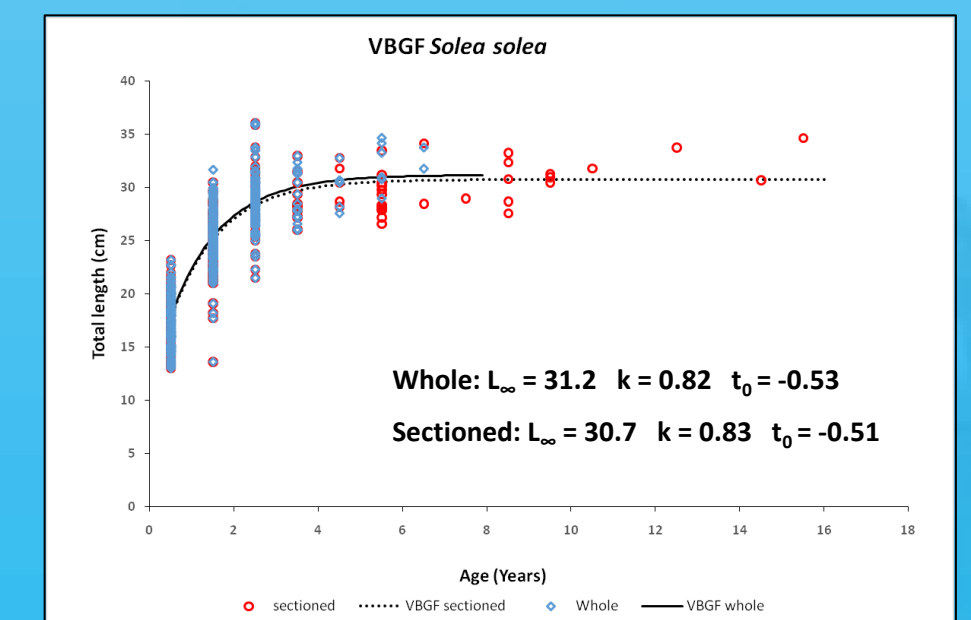
Burning and sectioning techniques



Age estimation from whole otolith: 5 years



Age estimation from burned-sectioned otolith: 14 years



Comparison of von Bertalanffy growth functions fitted to the age estimations made from whole and sectioned otoliths

Reproductive biology: histological analysis of gonads



Dehydration (increasing concentration of ethanol)
↓
Inclusion (paraffin)
↓
Slicing (microtome)
↓
Staining (hematoxylin-eosin)



Cutting of the paraffin-embedded gonads with the microtome

Stained samples on microscope slides

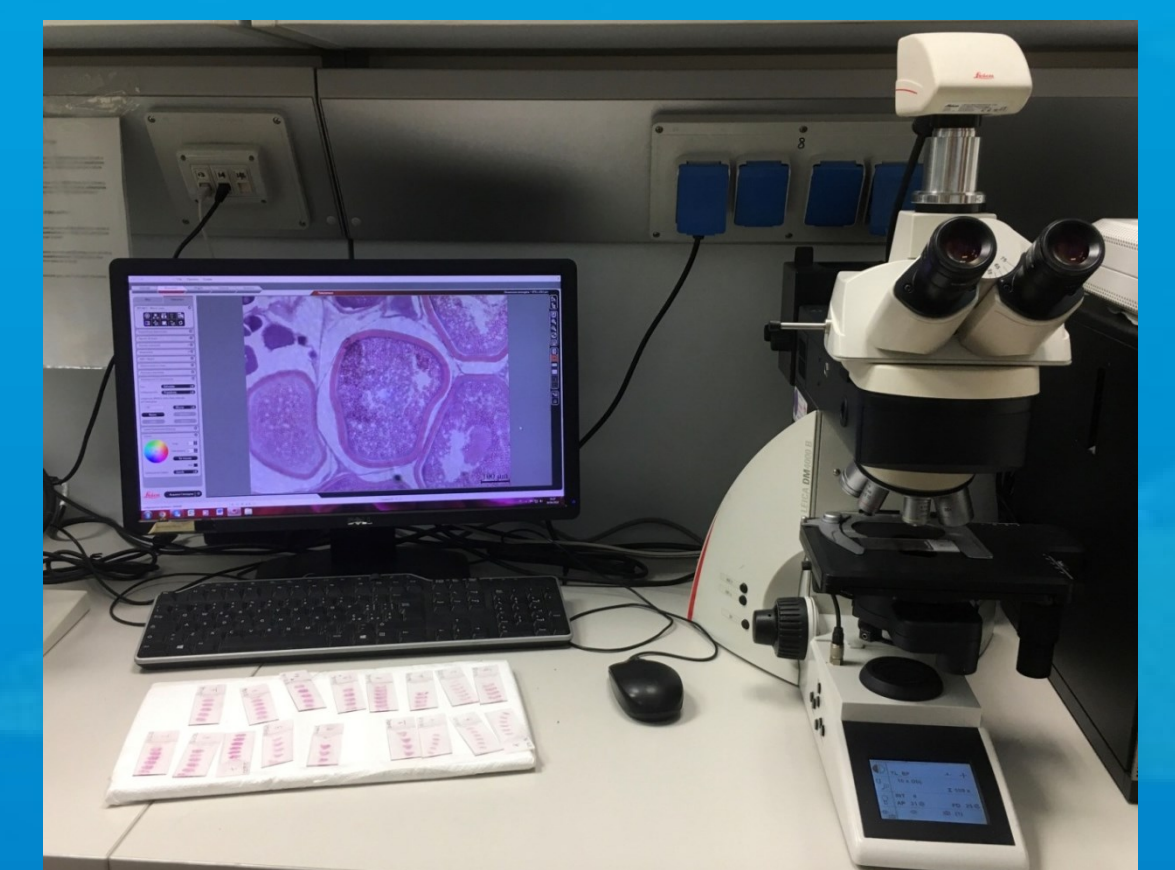
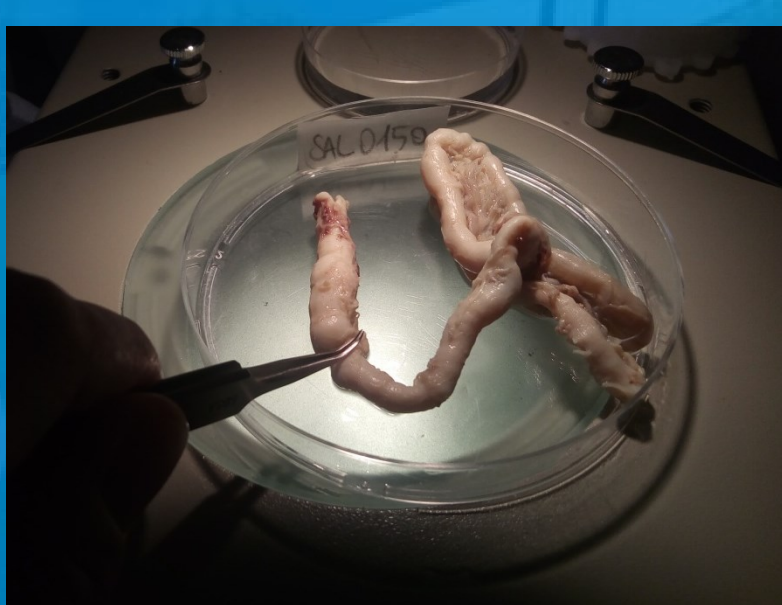


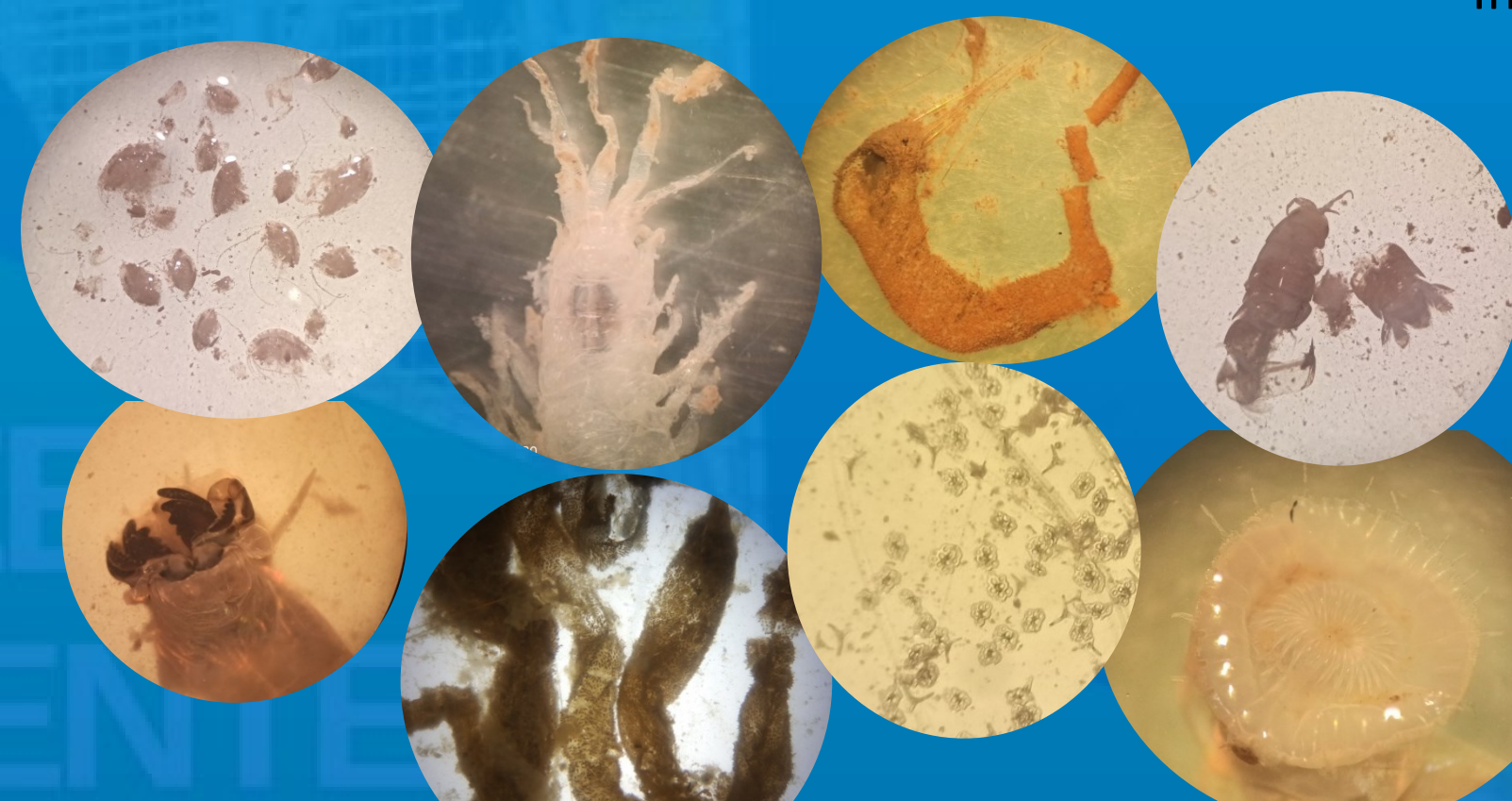
Image analysis of gonadal tissues

Feeding habits investigation: stomach contents analysis



Stomach and intestine are weighed

Preys are identified to the lowest taxonomic level possible, then counted and weighed



Both species feed mainly on Polychaeta and Amphipoda. The digestion process has been observed to continue in the intestine, where different prey than those in the stomach are often found