

On the origins of Cryptic Species

Insights from the *Stygocapitella subterranea* species complex

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Stygocapitella subterranea, Knöllner 1934 (Parergodrilidae, Annelida)

- Small ringed worm (approx. 3 mm long; Fig. 1)
- Found in interstitial habitats of sandy beaches
 - No known dispersal stage
- Cryptic species complex (comprising at least three morphologically identical species)
 - Boreal and temperate distribution in the Northern hemisphere (Fig. 2)

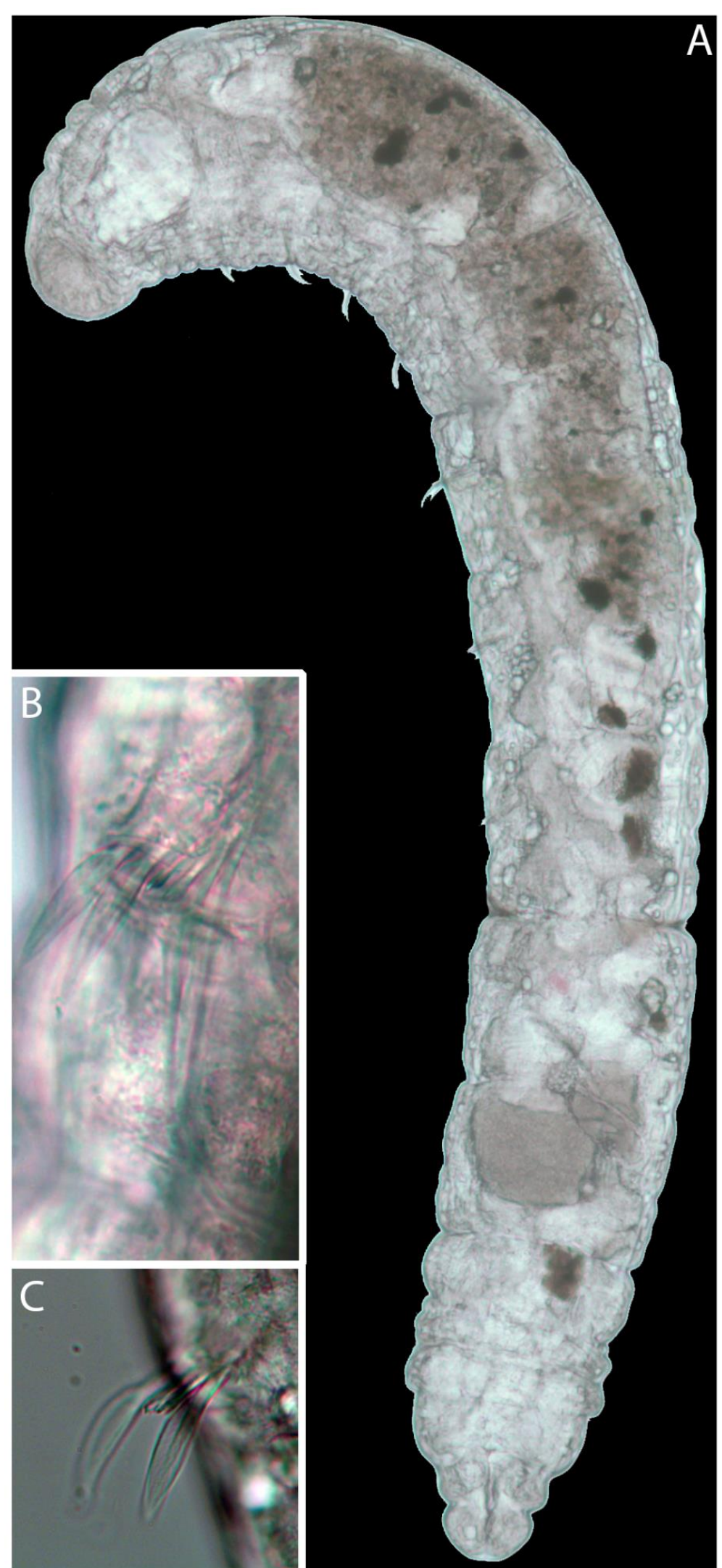


Figure 1. Images of *S. subterranea* obtained with a Leica DMLS microscope and a digital camera Spot Insight.

(A) Full body (100x)

(B) Characteristic whip-like, bilimbate and fork-like chaetae present at the dorsal part of the first segment (400x)

(C) Bilimbate and fork-like chaetae present at the third segment (400x)

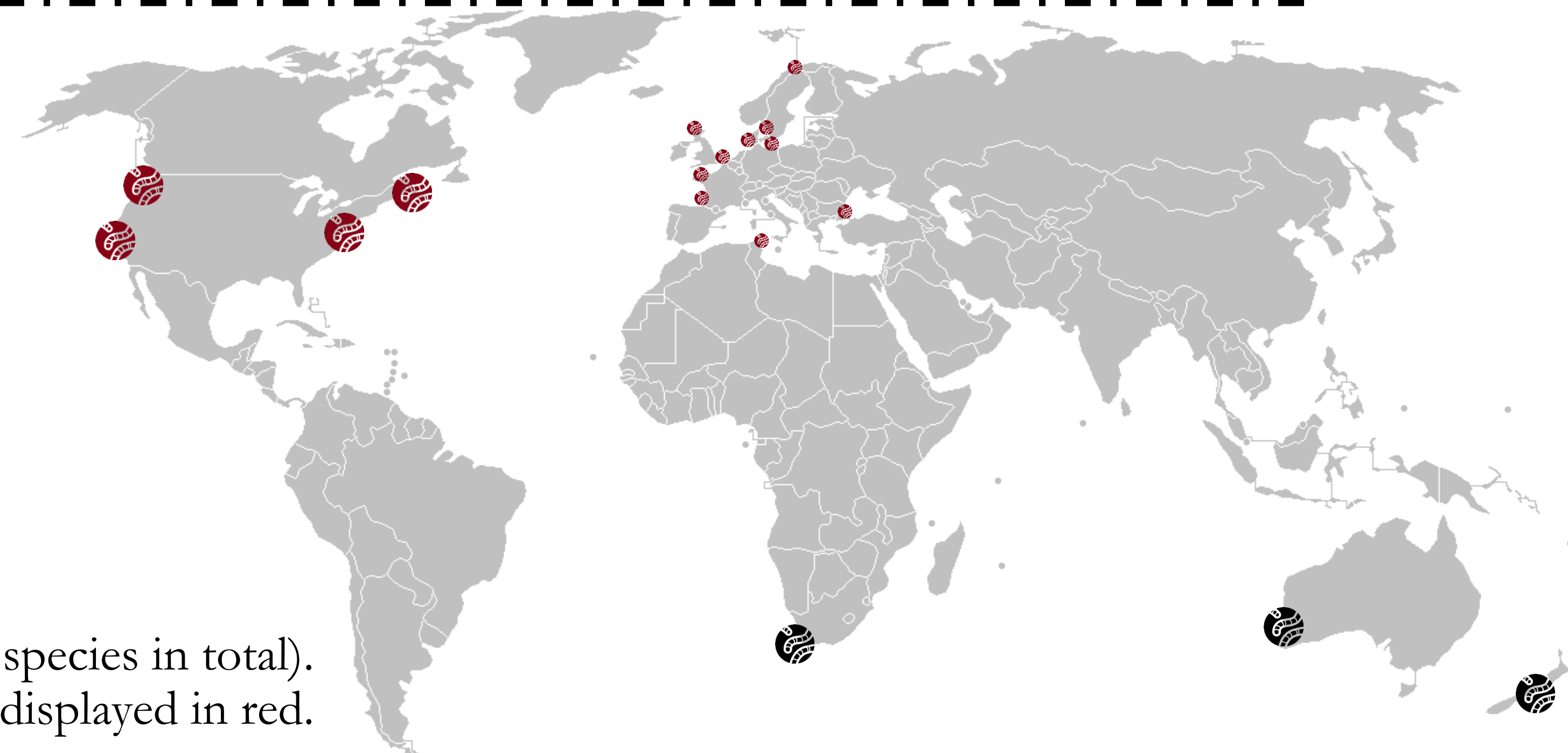


Figure 2. Known locations of *Stygocapitella* spp. (3 species in total). Records of *Stygocapitella subterranea* are displayed in red.

During my PhD I will:

1. Review recent advances concerning interstitial species and environments regarding:

- Cosmopolitan distributions
 - Cryptic species
 - Dispersal potential
 - Meiofauna paradox
 - Selective pressures
 - Morphological stasis

2. Study the phylogeography of *S. subterranea*

- Through morphological and genetic (COI, 16S, ITS1, ITS2) approaches.
- Assess the number of cryptic entities in the complex
- Confirm the degree of morphological similarity between these
 - Gauge dispersal potential at intercontinental scales

3. Study the population genomic structure

- Through RADseq approaches
- Confirmation of species delineated by classical marker systems
- Assess population diversity, gene flow and dispersal potential at regional and local scales along Northern and Western European coastlines
- Detection of potential past marine glacial refugia and potential routes of an interstitial species in response to global warming

