**Champsodon spp. (Perciformes, Champsodontidae) in the Eastern Mediterranean: How many species are there?**

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**Champsodontidae**

A family of small Indo-Pacific fishes comprising 13 species in a single genus, *Champsodon* (Fig. 1), most recently revised by Nemeth (1994). Over the last six years three species of this genus, believed to be Lessopcean migrants, have been reported from the Eastern Mediterranean, namely *C. nudivittis*, *C. vorax* and *C. capensis* (Çiçek and Bilecenoglu 2009, Bariche 2010, Dalyan et al. 2012, respectively).

**Why are we doing this study?**

One or more of the reported species from the Eastern Mediterranean may have been misidentified because:

- Species of this genus are very similar morphologically and there are few non-overlapping meristic and morphometric characters
- Nemeth’s (1994) key relies heavily on squamation, but little is known about the ontogeny and intraspecific variation in scale characters
- Creases and folds of skin on the chin can be mistaken for scales
- The illustrations in the Mediterranean reports are mostly of poor quality making verification of authors’ observations difficult
- Older identifications from the Red Sea may not be reliable, as demonstrated by Goren et al. (2011): “...twenty specimens previously identified as *C. omanensis* by Dor (1970) were found to be in fact *C. nudivittis*”

Consequently, the number of migrant species and their identity require confirmation

**C. capensis**

- Not reported from the Red Sea by Nemeth (1994)
- Dalyan et al. (2012) did not provide specimen sizes for the images in their Fig. 2, making it impossible to relate scale cover to size
- There is disagreement in Dalyan et al. (2012) regarding the minimum extent of abdominal scales cover between the text (8-41%) and Table 1 (0-41%), making the average value in Table 1 questionable. This average (15.5% of the belly area) is much smaller than would be expected given the size range of their fish. In the lectotype (62.0 mm SL) about 65% of the abdominal area is scaled (Fig. 2a)
- Dalyan et al. (2012) described the triangular scale patch between the pectoral and pelvic fin bases as not extending posteriorly. In the lectotype and two largest paratypes (44.25-45.1 mm SL) this scale patch clearly extends posteriorly beyond V base; in the lectotype it connects with the abdominal scales (Fig. 2b)
- The size of the illustrated breast scale patch in Dalyan et al. (2012) is smaller than in the lectotype (Fig. 2c), which is presumably smaller than their photographed fish

**C. nudivittis**

- Not reported from the Red Sea by Nemeth (1994)
- Area between pectoral and pelvic fin bases naked (holotype), or with less than 10 scales
- Breast naked or with small patch of scales (holotype)
- Mediterranean specimens usually have more scales in these two areas (Fig. 3a, b, respectively)

**C. vorax**

- This species is not known from the Western Indian Ocean
- Assuming that Bariche (2010) correctly identified the scales on the chin, his description of fins peppered with melanophores (pale in *C. vorax*) suggests that his fish could be *C. omanensis*.

**Genetics**

- A preliminary analysis of diversity within Mediterranean *Champsodon* was conducted using the barcoding fragment of the cytochrome c oxidase subunit I (COI) gene.
- DNA was extracted from specimens identified as *C. nudivittis* from the Mediterranean, the COI gene region was amplified by PCR and sequenced using standard approaches. Additional data of *C. nudivittis* and specimens identified as *C. snyderi* (in order to contextualise relationships and divergences) were obtained from GenBank.
- A neighbour-joining tree (Fig. 4), based on the analysis of 507 bp of COI, revealed two separate lineages of *C. nudivittis* in the Mediterranean.
- Most specimens were genetically similar (0–0.6% sequence divergence) and were included in single cluster.
- A second individual (GenBank KF6564399) from the Mediterranean was highly divergent (22.2–22.6% sequence divergence) and appeared to be more closely allied to *C. snyderi* (JQ681321). This specimen was still 15.2% divergent from the latter and 22.0% divergent from another specimen (NCC20473), tentatively identified as *C. snyderi*.
- Parsimony analysis (not shown) revealed the same associations, with a bootstrap of 100% for the relationship among this single *C. nudivittis* specimen and *C. snyderi*.
- Although the high divergences reflect the incomplete taxonomic sampling of the present analysis, evidence suggests the occurrence of two distinct taxa, referred to as *C. nudivittis* in the Mediterranean and highlights some of the issues discussed above.