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Cottus petiti Băcescu & Băcescu-Meşter, 1964 (Cottidae)

by

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Common name(s)

Lez sculpin (English), Chabot du Lez (French) (Fig. 1).

IUCN status

Critically Endangered in France according to the IUCN guidelines (UICN France, 2019).

Identification

It is the smallest French cottid species (max. 6.5 cm TL; Keith *et al*., 2011), with prickling on body, extending backwards to caudal peduncle in juveniles and adults; no distinct transverse bands on pelvic-fins; last dorsal-fin ray is almost reaching the caudal-fin rays; eye diameter 27 to 31% of the head length (HL); interorbital distance 1.9 to 2.4 times the eye diameter; last anal-fin ray connected to the body by a membrane along about 2/3 of its length; and depth of the caudal peduncle 24 to 28% HL (Freyhof *et al*., 2005). Despite the absence of molecular characterization from adjacent *C. rondeleti* Freyhof, Kottelat & Nolte, 2005 and *C. gobio* Linnaeus, 1758, this population has its own morphological and ecological (dwarfism) characteristics which justify its consideration as a distinct species recently speciated (see Freyhof *et al*., 2005).

Biology

Cottus petiti has a carnivorous diet and mainly feeds on small aquatic invertebrates, especially amphipods *Gammarus pulex* (Linnaeus, 1758), which is abundant in the calcareous upstream part of the Lez River (Keith *et al*., 2011). Sexual maturity is reached as soon as the first year. Reproduction, with multiple egg-layings of 20 to 70 eggs of 2.1 mm of diameter per female, occurs from February to July but can resume in autumn (Persat *et al*., 1996; Beaudou *et al*., 2002). Fish larvae measure 5.1 mm at hatching. The life expectancy seems to be 2 years in natural conditions (Keith *et al*., 2011).

Habitat and ecology

Cottus petiti colonizes most of the accessible habitats of its distribution area (Beaudou *et al*., 2002), with a distinct preference for gravel, pebbles and small hydrophytes and tree roots, in current flows of 20-70 cm/s and medium water height (30-70 cm). It cohabits with the Languedoc minnow *Phoxinus septimaniae* Kottelat, 2007 and the Languedoc stone loach *Barbatula quignardi* (Băcescu-Meşter, 1967), and in downstream with the European chub *Squalius cephalus* (Linnaeus, 1758), the barbel *Barbus barbus* (Linnaeus, 1758), the Languedoc gudgeon *Gobio occitaniae* Kottelat & Persat, 2005 and the European eel *Anguilla anguilla* Linnaeus, 1758 (Keith *et al*., 2011).

Figure 1. – *Cottus petiti*. Credit photo: V. Sablain / SYBLE.

Abundance

The studies on the Lez sculpin were carried out through electrofishing campaigns since 2001 and resulted in an estimated population of 27,000 to 54,000 individuals. The follow-ups since the end of 2000 show inter-annual fluctuations, with an obvious trend to regression of the densities (SYBLE, 2017).

Distribution

Cottus petiti is a Mediterranean species endemic of the Lez River (Southern France, near Montpellier). It occurs only in the first five-six upstream kilometres of the Lez River as well as in its affluent, the Lirou stream (Persat *et al*., 1996). Its distribution area is thus estimated at less than 100 km^2 (Beaudou *et al*., 2002; UICN France, 2019).

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Main threats

In addition to its very localized distribution, this species is threatened by many factors (SYBLE, 2017). The hydrological and thermal regimes are modified by the water pumping at the source of the Lez River for drinking water, as well as a low minimal flow returns to the river (0.230 $m^3.s^{-1}$ for a mean annual flow of 1 $m^3.s^{-1}$). Its habitat was altered by recalibrations and corrections of the riverbed, as well as dam constructions. When situated in fords, the spawning zones are disturbed by human and equestrian trampling. The degradation of water quality has induced algae blooms (such as *Cladophora* sp.), which are related to a biological clogging of the bottom of the riverbed. Finally, the recent colonization of the catchment by the red swamp crayfish *Procambarus clarkii* (Girard, 1852) constitutes an additional source of direct disturbance by predation on the layings of *Cottus petiti*.

Conservation measures implemented

Conservation measures have been carried out during the last decade, including new urban waste-water management modalities (since 2007), the gradual increase of the reserved flow and the relocation upstream of a long gravel bar favourable to *Cottus petiti* reproduction (since 2016) (SYBLE, 2017).

Protection status

Cottus petiti was listed in Annex II of the Habitat Fauna Flora Directive (1992).

Conservation recommendations

Although actions have been taken in recent years, there is still a need to restore the morphology and aquatic habitats of the Lez, and to improve upstream and downstream connectivity to ensure long term genetic mixing. Management measures of the *Procambarus clarkii* crayfish may also be implemented or, at least, a follow-up carried out on its extension, in relation with the ongoing recolonization of the Lez basin by the European Otter *Lutra lutra* (Linnaeus, 1758), which may help to regulate this invasive exotic species.

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