

Limit and Target Reference Points for Rational Exploitation of the Turbot (*Psetta maxima* L.) and Whiting (*Merlangius merlangus euxinus* Nordm.) in the Western Part of the Black Sea

Violin Raykov^{1*}, *Vladislav Schlyakhov*², *Volodia Maximov*³, *Gheorghe Radu*³, *Ionel Staicu*³, *Marina Panayotova*⁴, *Maria Yankova*¹, *Ivelina Bikarska*⁵

¹ Institute of Fishing Resources, Agricultural Academy, 4 Primorski Blvd., P.O.Box 72, Bulgaria; E-mail: vio_raykov@abv.bg

² YugNIRO, 2, Sverdlova St., Kerch, Ukraine, 98300 e-mail: fish@kerch.com.ua

³ National Institute of Marine Research and Development "Grigore Antipa" 300 Mamaia Blvd., Constanca, Romania
E-mail: gpr@alpha.rmri.ro

⁴ Institute of Oceanology – BAS, 40, Parvi Mai St., and P.O.Box 152, Varna 9000, Bulgaria; E-mail: mpanayotova@io-bas.bg

⁵ Center of Observation Fishing Vessels, NAFA 5, Primorski Blvd., Varna 9000, Bulgaria; E-mail: cnrk@nafa-bg.org

Abstract: Length growth analysis showed that turbot inhabiting Bulgarian marine area reaches highest asymptotic length: $L_{\infty} = 79.26$ cm. In Romanian waters: $L_{\infty} = 76.84$ cm and $L_{\infty} = 74$ cm in Ukrainian waters. Growth rate of turbot essentially differs in Ukrainian waters in comparison with Bulgarian and Romanian waters. The highest asymptotic length of whiting was calculated in Ukrainian Black Sea waters (39 cm) and cannot be used as growth indicator. Turbot stock biomass in northwestern part of the Black Sea ranges between 10 534 t. and 16 134 t. and was evaluated by "swept area method", as the main stock is located in Ukrainian waters. Therefore, the growth rate is significantly lowered there, indicating compensatory growth. The level of exploitation in the western part of the Black sea was assessed as high and the limiting threshold F_{max} was between 0.19 – 0.23; $F_{opt} = 0.14-0.15$; Whiting stock biomass in Ukrainian waters varies between 51 and 68 thousand tones. Maximum sustainable yield in Romanian and Bulgarian marine areas varies between 595.6 and 606.966 tones. Whiting stock represents a reserve for the fishery in the western Black Sea region. Turbot are overexploited and its stocks are strongly dependant on the whiting stocks, because the last is important trophic base for the turbot. The real levels of the whiting and turbot landings are unknown. It is highly recommended to create and support database of biological parameters and correct data on catch and bycatch of the examined commercially and ecologically important species.

Key words: turbot, whiting, population dynamics, reference points, western Black Sea