

PRELIMINARY RESULTS ON RELATIONSHIPS BETWEEN TAIL AREA AND TOTAL BODY LENGTH FOR FOUR FISH SPECIES

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Abstract

We present tail area-length (TA-TL) relationships for four fish species. TA was linearly related to TL for *Uranoscopus scaber*, *Scomber japonicus* and *Scorpaena porcus* and was a power function of TL for *Arnoglossus laterna*, and positively ($p < 0.05$) related with trophic level.

Keywords: *Arnoglossus laterna*, *Scomber japonicus*, *Scorpaena porcus*, *Uranoscopus scaber*, tail area-length relationships

Introduction

Relationships among various morphometric characteristics of fish have been the object of extended research, mainly focusing on relationships between different types of lengths and weight, with an increasing interest on other types of relationships (e.g., girth: 1; mouth dimensions: 2). In contrast, relationships involving tail characteristics (e.g., area, height, aspect ratio), despite their well documented importance (3; 4) have not been studied extensively.

In this study we present preliminary results on tail area-length relationships for four fishes, using data obtained within the framework of a research project on the trophic ecology and feeding habits of more than 40 fish species.

Materials and methods





Samples of *Arnoglossus laterna*, *Scomber japonicus*, *Scorpaena porcus*, and *Uranoscopus scaber* were collected from commercial fishing vessels (i.e. purse seiners, trawlers and small-scale gill-netters), in N-NW Aegean Sea, and preserved in 10% formalin solution. For all individuals, total length (TL) was measured to the nearest mm and tail area (TA) was calculated using UTHESCSA IMAGETOOL Ver. 3.0.

Results and discussion

The results of the statistical analysis are shown in Table 1. TA was a linear function of TL in all cases, except for *Arnoglossus laterna* for which it was a power function of TL (Table 1, Fig. 1). TA was positively related ($r=0.98$, $p < 0.05$) with the log(trophic level, Troph) of the four species (Table 1). We point out that the shape of the TA-TL and TA-Troph relationships might change when more data and species will be added.

Calculating TA is important since it can be related to the estimation of food consumption rate (3; 4), the latter being essential for three main reasons (5): to assess the demand of fish from their food, to assess the effect of food availability on survival, growth and reproduction, and to estimate the energy available for maintenance, growth and reproduction.

Table 1. Relationships between tail area (TA, cm²) and total length (TL, cm) for four fishes. N=number of individuals; Troph=fractional trophic level (data from 6); tail shape is given as 25% of natural tail size.

Species	Equation	N	R ²	Troph	Shape
<i>Arnoglossus laterna</i>	$TA=0.02TL^{2.15}$	37	0.97	3.6 ± 0.54	 TL=15.0 cm
<i>Scomber japonicus</i>	$TA=0.33TL-2.28$	51	0.88	3.1 ± 0.43	 TL=14.9 cm
<i>Scorpaena porcus</i>	$TA=0.90TL-5.28$	49	0.79	3.9 ± 0.65	 TL=15.2 cm
<i>Uranoscopus scaber</i>	$TA=1.07TL-6.47$	38	0.95	4.4 ± 0.70	 TL=15.0 cm

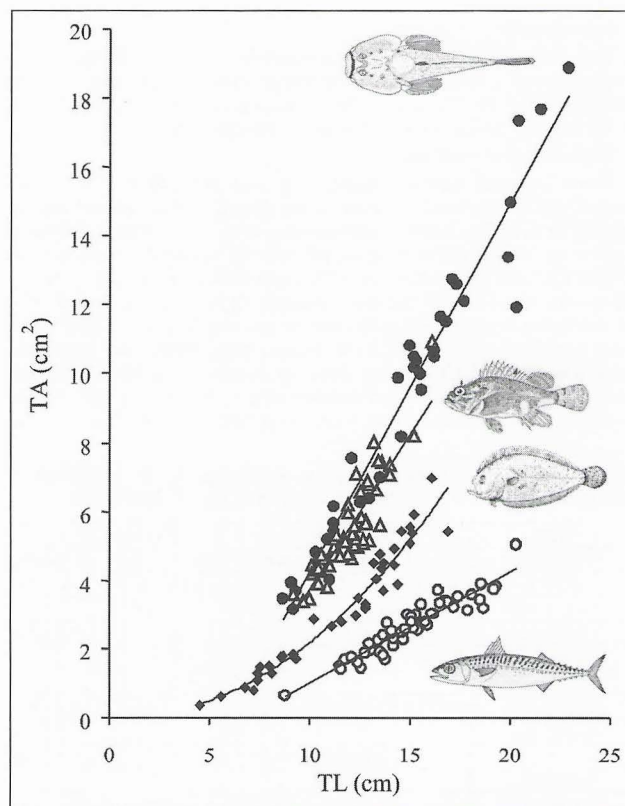


Fig. 1. Relationship between total length (TL) and tail area (TA) for *Arnoglossus laterna* (◆), *Scomber japonicus* (○), *Scorpaena porcus* (△) and *Uranoscopus scaber* (■).

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