An evaluation of the use of the Traditional Ecological Knowledge of the fishers in the management of their fisheries: the case of the Galician purse seine fleet

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Summary

Mapping using the traditional ecological knowledge (TEK) of the fishers has been scarcely integrated in the management because studies of the reliability of the results are not often provided. We analysed the relationship between a TEK-based fishing ground cartography of the purse seiners of the Ría of Arousa (NW Spain) and the results of a fishery monitoring performed by the same vessels. Fishers tended to fish in the same areas of the TEK cartography, especially the most targeted species with the more detailed cartography.

Introduction

Different methodologies, based in the use of the TEK of the fishers, have been proposed to identify the fishing grounds of many fisheries in a cost-effective way (Close 2006). Mapping using TEK is considered a source of alternative and accurate information (Anuchiracheeva 2003), complementary to scientific knowledge. Nevertheless, has been scarcely integrated in the fisheries management (Huntington 2000), partly because the lack of studies analysing the reliability and accuracy of the results. The purse seine fishery is important in Galicia (NW Spain; Fig. 1): 4% of the 5000 vessels operating in coastal waters are purse seiners, accumulating 16% of the total fishing power. Their annual catch represents 33% of the total landings of the coastal fleet and 10% of the first sale total value (Instituto Galego de Estadística 2014). Unfortunately, there is a lack of valid information on the use of the fishing areas and on the allocation of the catches. In order to check the validity of the use of TEK in mapping the fishing areas of the purse seiners, we selected the Ría of Arousa (Fig. 1) because supports an intense fishing activity exerted by a diverse commercial fleet, including 30 purse seiners.

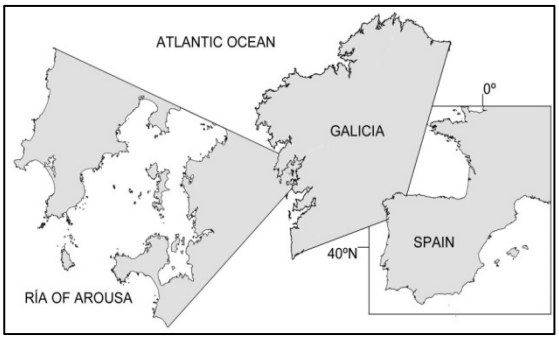

Figure 1. Map of the study area in the Ría of Arousa.

Materials and Methods

In November and December, 2012 we selected key local experts and performed personal interviews to fishers of three purse seiners operating in the study area. The fishers sketched in maps the location of the fishing zones for each target species. The zones in which two or more fishers agreed about the distribution of one species were represented with an added value. The same vessels of these fishers, plus another, also provided information about the catch of each species in daily fishing log-books, between January and December, 2012. We also used GPS data-loggers to record the position of the vessels every minute. For each species, we analysed by logistic additive multiple regression models (GAM; Hastie 1990) the positions of the fishing hauls included in each of the different layers of the TEK-based fishing ground cartography.

Results and Discussion

The fishers identified a total of 626.86 km² of fishing grounds of nine different species and provided 223 daily log-books and 232 GPS daily fishing routes. They targeted 21 species, but the most important species was *Trachurus trachurus* (total catch of 216.45 t). The fishers tended to fish each species in the same areas included in the TEK cartography, especially when catches were reported in the GPS positions (Table 1). Furthermore, *T. trachurus*, with a very detailed cartography, with many overlaps between informants and very captured, was mostly caught in fishing grounds indicated by more than one informant ($P<2e^{-16}$; Fig. 2).

Table 1. Coincidences of the GPS positions with the TEK cartography (for the nine coincident species; 0=out of the cartography, 5=5 fishers coincided).

Species	Coincidences within layers of TEK											
	Total						Reported catches					
	0	1	2	3	4	5	0	1	2	3	4	5
Ammodytidae	2063	41	6	0	0	0	39	0	0	0	0	0
Diplodus sargus	1149	292	261	337	69	2	24	0	2	24	9	0
Engraulis encrasicolus	0	0	0	0	0	0	0	0	0	0	0	0
Pagellus bogaraveo	2035	75	0	0	0	0	15	0	0	0	0	0
Sardina pilchardus	671	1439	0	0	0	0	20	46	0	0	0	0
Scomber scombrus	364	1303	443	0	0	0	124	200	49	0	0	0
Spondyliosoma cantharus	1956	154	0	0	0	0	214	10	0	0	0	0
Trachurus trachurus	398	164	833	182	533	0	251	125	685	168	373	0

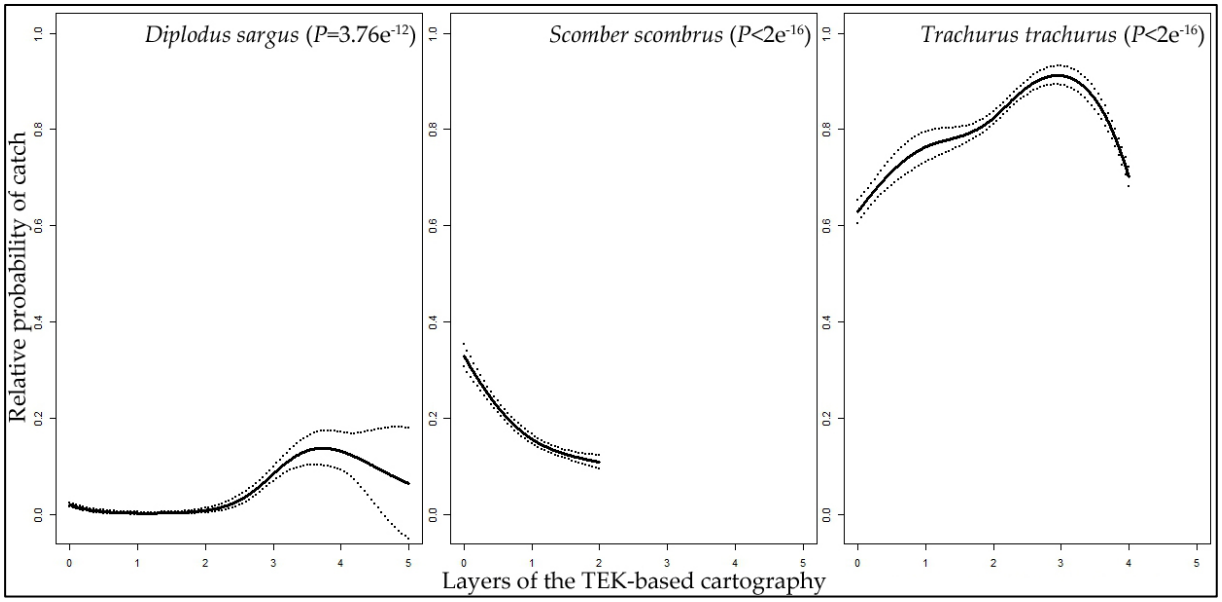

Figure 2. Relationships between the relative probability of catch of the purse seiners and the layers of the TEK cartography by species (0=out of the cartography, 5=5 fishers coincided), obtained by GAM. Models with non-significant effects were not represented.

References

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