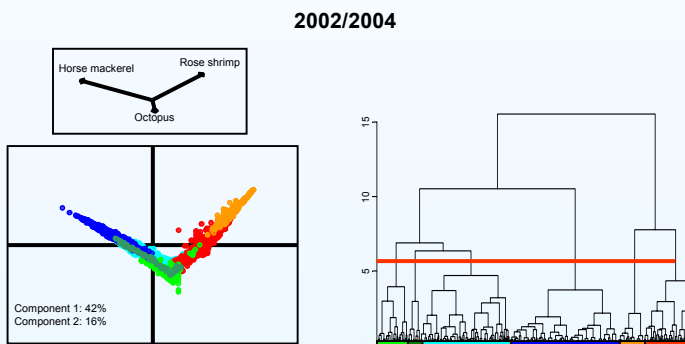


# Definition of fishing trip types in the bottom trawl fisheries off the Portuguese coast

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In the bottom trawl fisheries off the Portuguese continental waters a high number of commercial species are landed by a fleet composed of more than 100 trawlers, operating over different fish assemblages. The results obtained from applying ordination (Principal components analysis, **PCA**) and classification (Hierarchical agglomerative clustering, **HAC**) methods to the 2002/2004 monthly landings per vessel (fishing trips, **FT**) are presented with the purpose of defining fishing trip types (**FTTs**).



## Fishing Trip Types



The first two axes of PCA explain most part of the variability (over 55%) associated with monthly landings. Crustaceans (rose shrimp and *Nephrops*), horse mackerel, octopus and blue whiting are the main species characterizing the fishing trips. A number of different FTTs emerged from the HAC analysis, each defined by the relative importance of their target species (previously mentioned), as well as by-catch species.

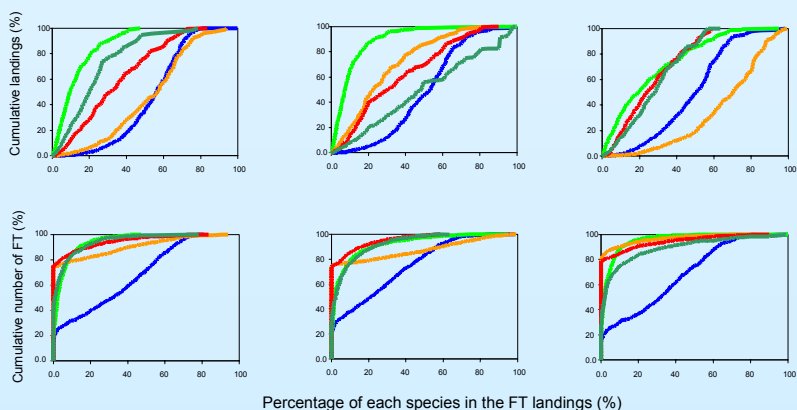
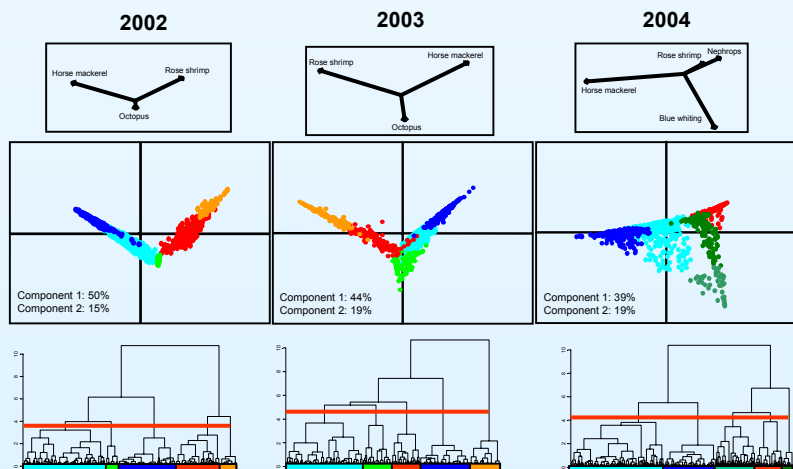
A correspondence between some of these FTTs and fleet components could be established, indicating the existence of groups of trawlers developing the same fishing pattern over time. The crustacean trawlers targeting *Nephrops* and/or rose shrimp and sub-segments of the fish trawlers directing their effort to small-pelagics (horse mackerel, mackerel and, blue whiting), to cephalopods or to combination of the latter with demersal fish species (hake).

The cumulative percentage of landings by species *versus* the respective percentage in the landing of the fishing trip (top plots) shows the level of efficiency in catching each species (i.e., species landed in low or high percentages).

The cumulative number of FTs by species *versus* the respective percentage in the landing of the FT (bottom plots) shows the importance of specialized trips in terms of landings (i.e., species landed in a limited or extended number of FTs).

The two cumulative plots distinguish among three main groups of species:

- those landed in most FTs, generally at high percentages (the case of horse mackerel, highly abundant along the coast and a target species for most fish trawlers);
- those landed in a smaller group of FTs, also at high percentages (rose shrimp in 2002 and 2003) or at intermediate percentages (*Nephrops* in all years and rose shrimp in 2004). These are also target species, but spatially located and exploited only by a restricted group of vessels;
- those landed in an intermediate proportion of FTs, in smaller percentages, such as the octopus and blue whiting in 2002. The status of these species varies according to the year. While octopus can be considered a target species in 2003, blue whiting shows an increasing importance along the 3-years period analysed.



Blue - horse mackerel; Orange - rose shrimp; Red - *Nephrops*; Light green - octopus; Dark green - blue whiting.

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