

Gill net fishery targeting *Solea vulgaris* Quensel, 1806 in the Eastern Ligurian Sea

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Introduction. The common sole, *Solea vulgaris*, Quensel 1806, is undoubtedly the most important flatfish in the Mediterranean Sea, both for its abundance and economic value. According to FAO statistics (1) the annual landings of *S. vulgaris* in this area increased from about 4500 tons in 1972 to about 10000 tons in 1992. The fishing activity is mostly carried out with towed gears (bottom and beam trawling), even if passive gears (set nets) are commonly employed to fish this species. Although common sole has been currently object of studies, basic information on the exploitation of this resource is still lacking in the Mediterranean area. The aim of this paper is to provide information on technical aspects and on catch composition of the common sole fishery performed by means of gill net by the artisanal fleet of Livorno (Eastern Ligurian Sea).

Material and methods. Data on the structure of the artisanal fleet of Livorno were collected from the official archives at the harbour office ("Capitaneria di Porto"). At the same time, interviews with fishermen were performed in order to identify the boats using gill net, to know the technical characteristics and the fishing activity of this gear. From January to December 2000, a monthly sampling on the gill net commercial landing was performed. At the landing site, for 4-8 days each month, the biomass landed of *S. vulgaris* and of the accessory species was registered. Moreover, the size of a representative sample of common sole was measured (Total Length, TL, to the nearest 0.5 cm below). Trips of researchers on board of commercial vessels were carried out to obtain information on the discard in this type of activity. Geo-referenced data were analysed by a Geographic Information System and an opportune algorithm (Inverse Distance Weighted); thus, a map of the fishing effort (fishing day) was produced.

Results and discussion. In the studied period, the artisanal fleet of Livorno accounted for 63 vessels (mean gross tonnage of 4.1 tons \pm 2.7 s.d., mean total length of 7.7 m \pm 2.6 s.d. and mean engine power of 54.4 Hpa \pm 41.4 s.d.); only four boats employed gill net regularly, while the other fishing units utilised this type of gear only occasionally and jointly with trammel net. These four boats employed a gill net of about 3500 m length during each trip; the length of the net varied from 1000 to 5000 m, according to the weather conditions. The technical features of a single sheet of net (135 m) are shown in Table 1.

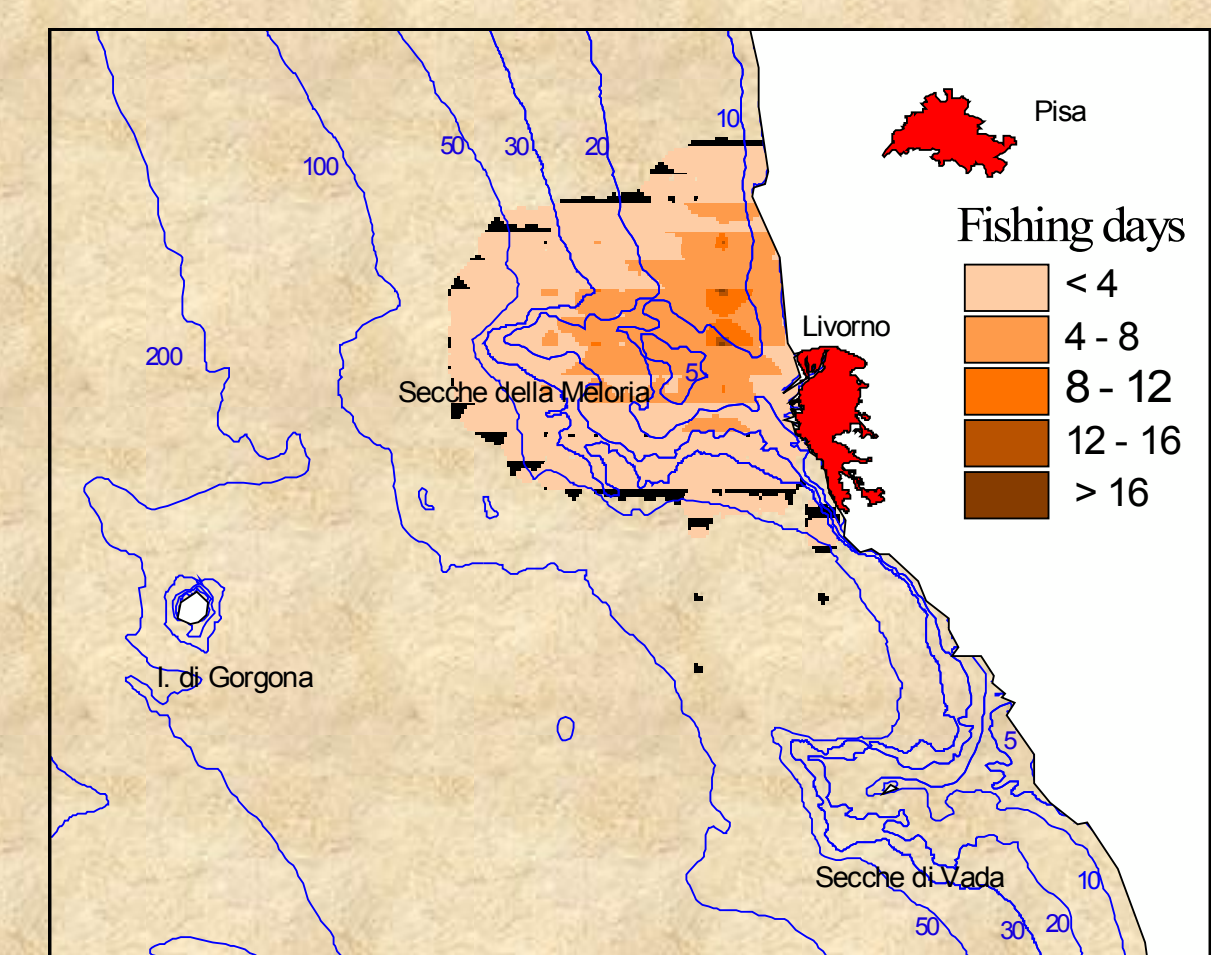


Figure 1 - Study area and fishing effort distribution of the boats with gill net.

Table 1 – Technical characteristics of the gill net used in Livorno.

PANEL				FLOATS			HEADLINE			LEADLINE				
Height (m)	Length (m)	N. mesh width	Material	Stretched mesh size (mm)	Diameter of the filament (mm)	Hanging ratio	Total number	Diameter (mm) max	Length (mm) internal	Length (m)	Diameter (mm)	Material	Length (m)	
3	135	2000	monofilament nylon	82	0.18	0.33	33	30	12	60	45	cotton	120	45

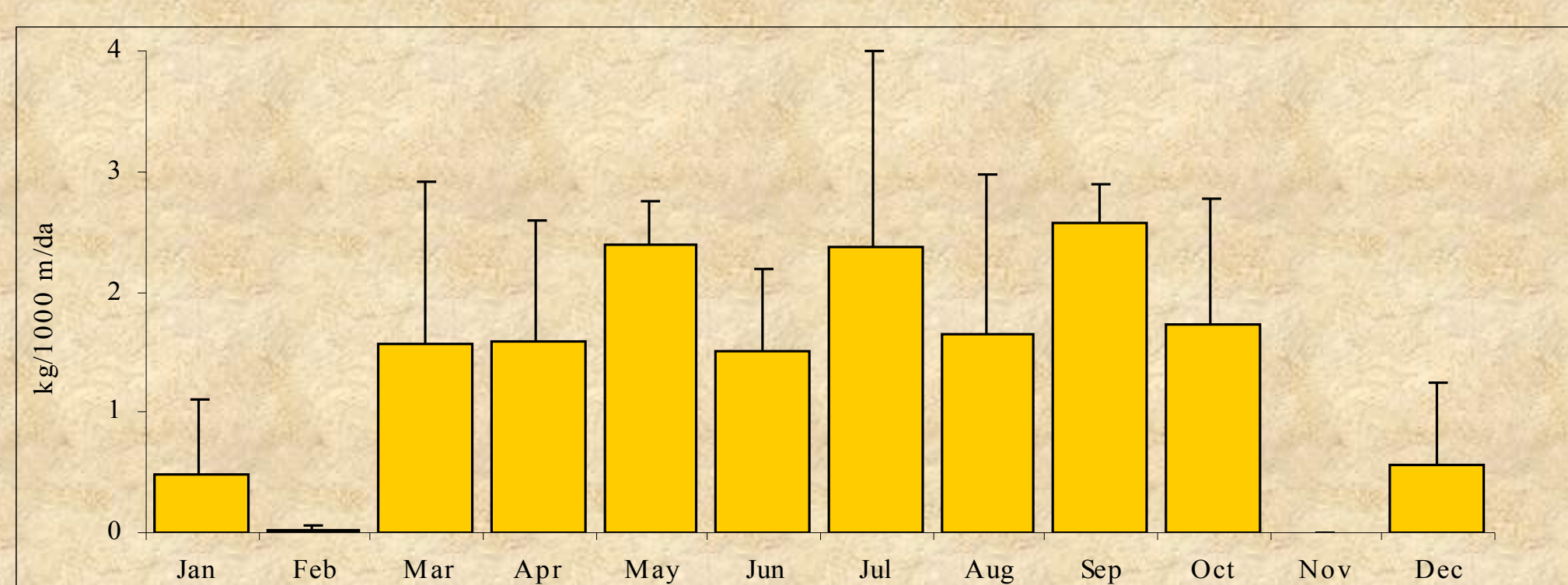


Figure 2 – Landings per Unit of Effort (kg/1000m/day +s.d.) of *S. vulgaris* during the studied period.

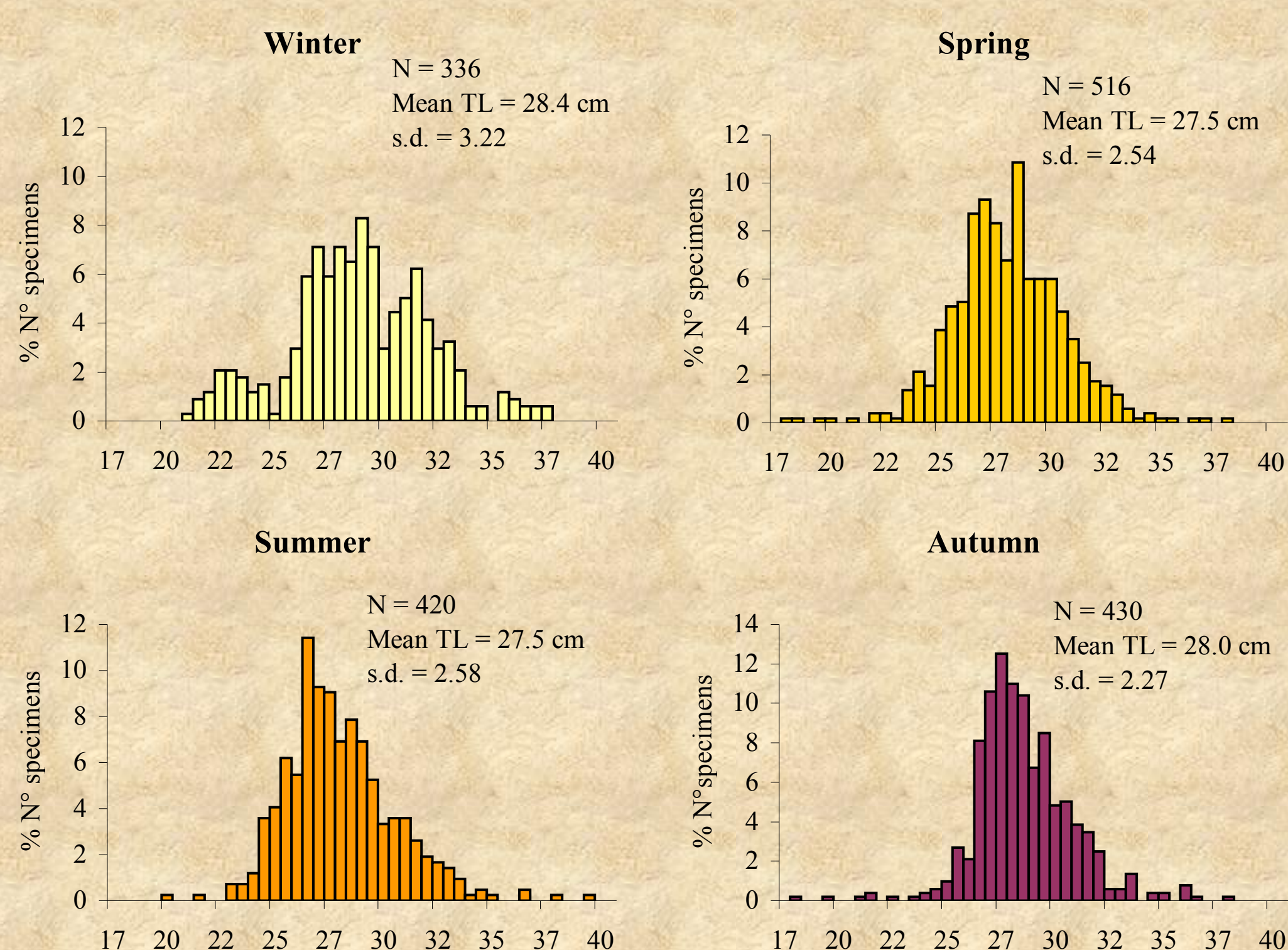


Figure 3 – Demographic structure of the landing of *S. vulgaris* during the studied period.

The fishing ground was localised in the surroundings of Livorno, from the harbour to the mouth of the Arno river, on sandy-muddy bottoms (Figure 1). The nets, placed between 4 and 40 m depth, were lowered into the sea at dusk and pulled in at dawn.

The mean monthly landing of *S. vulgaris*, standardised to 1000 m of net per fishing day, was characterised by high variability (Figure 2), due to the influence of the meteo-marine conditions on the yields of this type of fishery. However, from March to October, noticeable yields were observed, with values ranging from a minimum of 1.5 kg/1000m /day in June to a maximum of 2.6 kg/1000m /day in September.

The size composition of the landing of *S. vulgaris* did not show differences among the seasons (Figure 3). The distributions were uni-modal with modal class ranging from 26 to 28.5 cm TL. The majority of the specimens, comprised between 23 and 35 cm TL, was larger than the minimum legal size of commercialisation (20 cm TL, EU regulation 1626/94) and of the size at first maturity (25 cm TL) (2).

As regards the catch composition, *S. vulgaris* was the most important species reaching 34.4% of the total biomass caught (from 28% in summer to 38% in winter, Figure 4). Among the commercial species, it is worth of noting *Raja asterias* (21.1% of the total catch), *Squilla mantis* (4.8%) and *Trigla lucerna* (4.5%). Therefore, the above mentioned four species accounted for over 64% of the total biomass caught, confirming the high selectivity of this fishery. Other 64 species were collected (42 fishes, 10 crustaceans, 10 molluscs and 2 echinoderms), but the majority of them resulted occasional in the catches.

The total discarded biomass constituted an important fraction of the total catch, ranging from 8% in winter to 44% in summer. Not commercial species (crustaceans, molluscs and echinoderms) and damaged specimens of commercial species represented a high percentage of the discard of this fishery. A high reject in biomass of not commercial species (25%) was observed in summer, mostly due to the crustacean *Dardanus arrosor* (21.1% of the total catch). The discard of commercial species showed a clear increase during the year, with important values in summer (19%) and in autumn (30%). The discarded biomass of *S. vulgaris*, exclusively represented by damaged specimens, ranged from 0.3% of the total catch in spring to 5.2% in autumn.

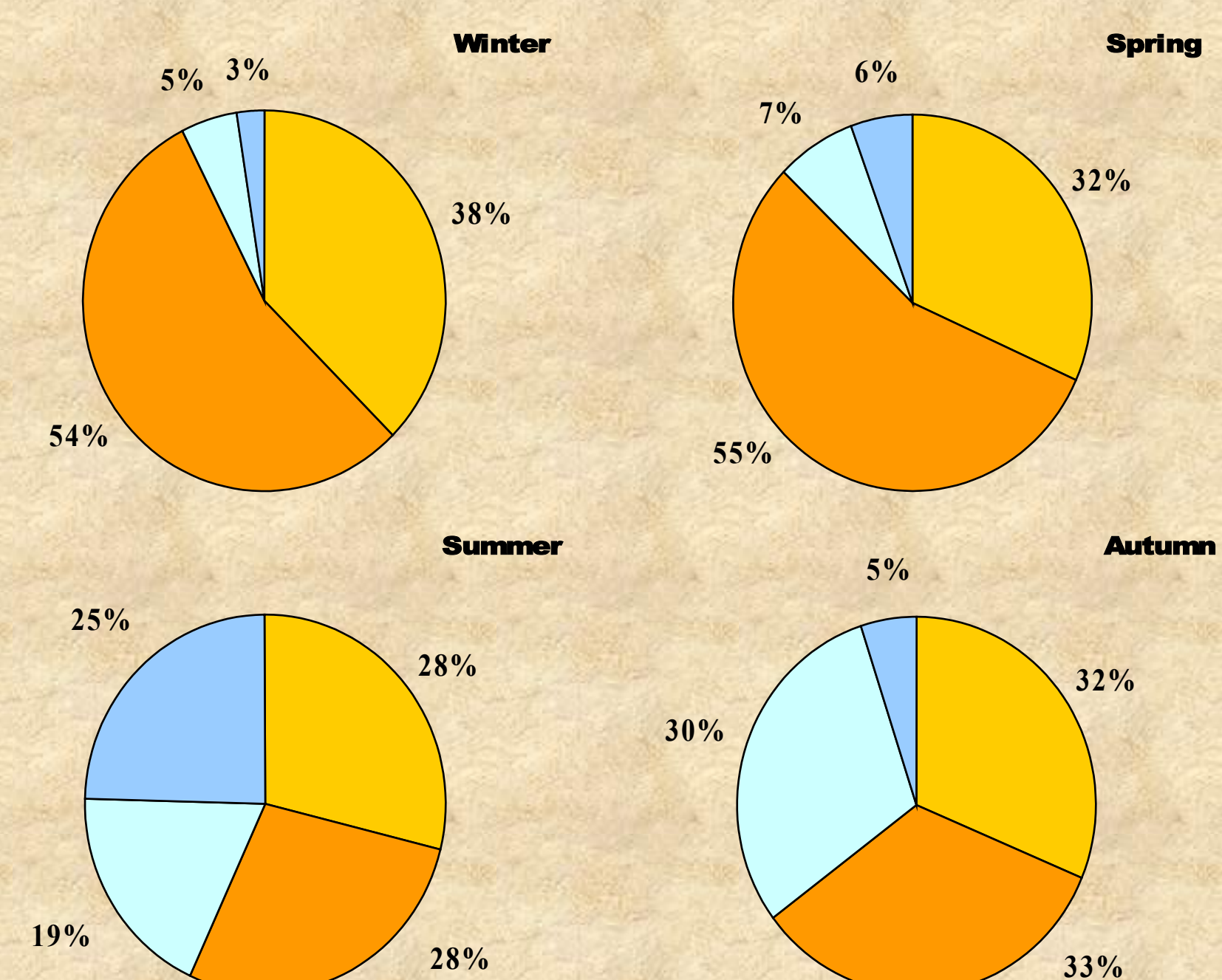


Figure 4 – Composition of the gill net catches during the observations on board.

References

- 1 - Stamatopoulos C., 1993. Trends in catches and landings. Mediterranean and Black Sea fisheries: 1972-1992. *FAO Fish. Circ.*, 855(4 suppl.): 177 pp.
- 2 - Fischer, W., M.L. Bauchot and Schneider M., 1987. Fiches FAO d'identification des espèces pour les besoins de la pêche. (Revision 1). Méditerranée et Mer Noire. Zone de pêche 37. 1. Vertébrés. Rome, FAO: 761-1530.