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Institut Català de Recerca per a la Governança del Mar

State of fisheries in Catalonia 2025, Part 1:

Report on the monitoring of the commercial fishing fleet

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This report presents the state of fisheries in Catalonia in 2025. Section 1 describes the methods of biological and fisheries monitoring throughout the seven years of icatmar monitoring program, Section 2 describes the results of the bottom trawling monitoring, Section 3 describes the results of the purse seine fishing monitoring and Section 4 describes the results of the small-scale fisheries monitoring.

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Table of contents

Glossary 18

Executive summary 19

SECTION 1: Introduction and methods 21

Introduction 22

Method 22

SECTION 2: Bottom trawling 29

Bottom trawl fishery in Catalonia 30

European hake (*Merluccius merluccius*) HKE 48

Red mullet (*Mullus barbatus*) MUT 56

Norway lobster (*Nephrops norvegicus*) NEP 63

Deep-water rose shrimp (*Parapenaeus longirostris*) DPS 71

Blue and red shrimp (*Aristeus antennatus*) ARA 77

Horned octopus (*Eledone cirrhosa*) EOI 85

Broadtail squid (*Illex coindetii*) SQM 91

Spottail mantis shrimp (*Squilla mantis*) MTS 97

Caramote prawn (*Penaeus kerathurus*) TGS 102

Bottom trawling by port 106

North Zone 106

Roses 107

Palamós 112

Blanes 117

Arenys de Mar 122

Center Zone 127

Barcelona 128

Vilanova i la Geltrú 133

Tarragona/Cambrils 138

South Zone 143

L'Ametlla de Mar 144

La Ràpita 149

SECTION 3: Purse seine fishing 155

Purse seine fishery in Catalonia 156

European sardine (*Sardina pilchardus*) PIL 161

Anchovy (*Engraulis encrasicolus)* ANE 167
SECTION 4: Small-scale fisheries 173
Sandeel fishery in Catalonia 175
Mediterranean sandeel (*Gymnammodytes cicerelus*) ZGC 177
Transparent goby (*Aphia minuta*) FIM 181
Common octopus fishery in Catalonia 183
Common octopus (*Octopus vulgaris*) OCC 184
Common octopus fishery in Central Catalonia 187
Common octopus fishery in the Ebre Delta 189
Common cuttlefish fishery in Catalonia 191
Common cuttlefish (*Sepia officinalis*), CTC 191
Blue crab fishery in Catalonia 195
Glass eel fishery sampling 203
Glass eel (*Anguilla anguilla*) ELE 204
References 209
Annexes 213

Figures

Figure 1. Fisheries monitoring sampling conducted in Catalonia in 2025. 22

Figure 2. Spatial distribution of the bottom trawl fishery (OTB) tracks. Colors represent the different OTB *métiers* identified for the Catalan trawl fishery. 23

Figure 3. Amount of records of the fishing sampling data stored in the data base from 2019 to 2025 (all sampling period of ICATMAR's monitoring program).. 28

Figure 4. Bottom trawling hauls conducted in Catalonia in the year analyzed. 30

Figure 5. Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter. 32

Figure 6. Landed species with most biomass including all hauls in each period. 32

Figure 7. Discarded species with most biomass including all hauls in each period. 33

Figure 8. Categories of natural debris with higher biomass including all hauls in each period. 34

Figure 9. Categories of marine litter with higher mass including all hauls in each year. 34

Figure 10. Catch composition for Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter fraction in each métier including all hauls in each period. 37

Figure 11. Landed species with most biomass. Percentage in weight including all hauls within each period and métier. 38

Figure 12. Discarded species with most biomass. Percentage in weight including all hauls within each period and métier. 39

Figure 13. Categories of natural debris with higher biomass. Percentage in weight including all hauls within each period and métier. 40

Figure 14. Categories of marine litter with higher mass. Percentage in weight including all hauls within each period and métier. 41

Figure 15. Spatial distribution of fishing effort (h/km^2) in the year analyzed. 42

Figure 16. Spatial distribution of fishing effort (h/km^2) for the years prior to the year analyzed. 43

Figure 17. Spatial distribution of landings (kg/km^2) in the year analyzed. 44

Figure 18. Spatial distribution of landings (kg/km^2) for the years prior to the year analyzed. 45

Figure 19. Spatial distribution of revenues per unit of effort (€/h*km^2) in the year analyzed. 46

Figure 20. Spatial distribution of revenues per unit of effort (€/h*km^2) for the years prior to the year analyzed. 47

Figure 21. Spatial distribution of landings (kg/km^2) for European hake in the Catalan fishing grounds (North GSA6) in the year analyzed. 48

Figure 22. Spatial distribution of landings (kg/km^2) for European hake in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 49

Figure 23. European hake length-weight relationship for the years sampled. 50

Figure 24. European hake length-eviscerated weight relationship for the years sampled. 50

Figure 25. European hake size at first maturity (L_{50}) for all years sampled 51

Figure 26. European hake monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 52

Figure 27. European hake monthly hepatosomatic index (HSI +/-SE (Standard Error)) and gonadosomatic index (GSI +/-SE) for females (top) and males (bottom). Blue shaded area indicates latest analyzed year. 52

Figure 28. Proportion of stomach fullness of European hake according to size range in different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Black numbers inside bars indicate the number of individuals sampled. Only lengths with more than 3 individuals sampled are shown. 53

Figure 29. Annual length-frequency distribution of European hake in different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of 2021 to 2024. 54

Figure 30. Spatial distribution of landings (kg/km²) for red mullet (*Mullus spp.*) in the Catalan fishing grounds (North GSA6) in the year analyzed. 56

Figure 31. Spatial distribution landings (kg/km²) for red mullet (M*ullus spp.)* in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 57

Figure 32. Red mullet length-weight relationship for the years sampled. 58

Figure 33. Red mullet length-eviscerated weight relationship for the years sampled. 58

Figure 34. Red mullet size at first maturity ($L_{50)}$ for the years sampled. 59

Figure 35. Red mullet monthly gonadal cycle for females (top) and males (bottom) for the years sampled. Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 60

Figure 36. Red mullet monthly hepatosomatic index (HSI +/-SE (Standard Error)) and gonadosomatic index (GSI +/- SE) for females (top) and males (bottom). Blue shaded area indicates latest analyzed year. 60

Figure 37. Annual length-frequency distribution of red mullet at different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf and Upper Slope). Left: four previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Red dashed line: size at first maturity (L_{50}). 61

Figure 38. Spatial distribution of landings (kg/km²) for Norway lobster in the Catalan fishing grounds (North GSA6) in the year analyzed. 63

Figure 39. Spatial distribution of landings (kg/km²) for Norway lobster in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 64

Figure 40. Norway lobster length-weight relationship for the previous four years sampled and the year analyzed. 65

Figure 41. Norway lobster size at first maturity (L_{50}) for all years sampled. 65

Figure 42. Norway lobster monthly gonadal cycle for females. Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 67

Figure 43. Norway lobster monthly proportion of different egg development stages. 67

Figure 44. Annual length-frequency distribution of Norway lobster at different *métiers* (Middle Delta shelf; Deeper shelf; Upper slope; Lower slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS) and red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of the previous four years sampled and the year analyzed. 69

Figure 45. Spatial distribution of landings (kg/km²) for deep-water rose shrimp in the Catalan fishing grounds (North GSA6) in the year analyzed. 71

Figure 46. Spatial distribution of landings (kg/km²) for deep-water rose shrimp in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 72

Figure 47 Deep-water rose shrimp length-weight relationship for the years sampled. 73

Figure 48 Deep-water rose shrimp size at first maturity (L_{50}) for all years sampled. 73

Figure 49 Deep-water rose shrimp monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 74

Figure 50 Annual length-frequency distribution of deep-water rose shrimp at different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. 75

Figure 51. Spatial distribution of landings (kg/km²) for blue and red shrimp in the Catalan fishing grounds (North GSA6) in the year analyzed. 77

Figure 52. Spatial distribution of landings (kg/km²) for blue and red shrimp in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 78

Figure 53. Blue and red shrimp length-weight relationship for the previous four years sampled and the year analyzed. 79

Figure 54. Blue and red shrimp size at first maturity (L_{50}) for all years sampled. 79

Figure 55. Blue and red shrimp monthly gonadal cycle for females from 2021 to 2054. Gonadosomatic index (GSI +/-SE (Standard Error)) and proportion of different maturity stages. 80

Figure 56. Monthly proportion of females with attached spermatophore of blue and red shrimp at different lengths. 81

Figure 57. Annual length-frequency distribution of blue and red shrimp at different *métiers* (US; Upper Slope and LS; Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of the previous four years sampled and the year analyzed. 83

Figure 58. Spatial distribution of landings (kg/km²) for horned octopus in the Catalan fishing grounds (North GSA6) in the year analyzed.. 85

Figure 59. Spatial distribution of landings (kg/km²) for horned octopus in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 86

Figure 60. Horned octopus length-weight relationship for the previous four years sampled and the year analyzed. 87

Figure 61. Horned octopus size at first maturity (L_{50}) for all years sampled. 87

Figure 62. Horned octopus monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 88

Figure 63. Annual length-frequency distribution of horned octopus at different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. 89

Figure 64. Spatial distribution of landings (kg/km²) for broadtail squid in the Catalan fishing grounds (North GSA6) in the year analyzed. 91

Figure 65. Spatial distribution of landings (kg/km²) for broadtail squid in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 92

Figure 66. Broadtail squid length-weight relationship for the previous four years sampled and the year analyzed. 93

Figure 67. Spottail mantis shrimp monthly gonadal cycle for females. 93

Figure 68 Broadtail squid monthly gonadal cycle for females (top) and males (bottom). Proportion of different maturity stages. 94

Figure 69. Annual length-frequency distribution of broadtail squid at different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red dashed line: size at first maturity (L_{50}) for both sexes combined calculated with data from 2025. 95

Figure 70. Spatial distribution of landings (kg/km²) for spottail mantis shrimp in the Catalan fishing grounds (North GSA6) in the year analyzed. 97

Figure 71. Spatial distribution of landings (kg/km²) for spottail mantis shrimp in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 98

Figure 72. Spottail mantis shrimp length-weight relationship for the previous four years sampled. 99

Figure 73. Spottail mantis shrimp monthly gonadal cycle for females. 99

Figure 74 Annual length-frequency distribution of Spottail mantis shrimp at different *métiers* (Coastal Delta Shelf and Middle Delta Shelf). Left: previous years sampled, right: the year analyzed. (n) Total number of measured individuals.. 100

Figure 75. Spatial distribution of landings (kg/km^2) for caramote prawn in the Catalan fishing grounds (North GSA6) in the year analyzed. 102

Figure 76. Spatial distribution of landings (kg/km^2) for caramote prawn in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 103

Figure 77. Caramote prawn length-weight relationship for the years sampled. 104

Figure 78. Annual length-frequency distribution of caramote prawn at the Coastal Delta shelf métier. Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. 105

Figure 79. North zone sampling trawls in the year analyzed. 106

Figure 80. Roses catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 107

Figure 81. Roses landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 108

Figure 82. Roses discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 109

Figure 83. Roses categories of natural debris with higher biomass. Percentage in weight including all hauls within each period and *métier*. 110

Figure 84. Roses categories of marine litter with higher mass. Percentage in weight including all hauls within each period and *métier*. 111

Figure 85. Palamós catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 112

Figure 86. Palamós landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 113

Figure 87. Palamós discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 114

Figure 88. Palamós Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 115

Figure 89. Palamós Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 116

Figure 90. Blanes catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 117

Figure 91. Blanes landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 118

Figure 92. Blanes discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 119

Figure 93. Blanes Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 120

Figure 94. Blanes Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 121

Figure 95. Arenys de Mar catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 122

Figure 96. Arenys de Mar landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 123

Figure 97. Arenys de Mar discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 124

Figure 98. Arenys de Mar Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 125

Figure 99. Arenys de Mar Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 126

Figure 100. Center zone sampling trawls in the year analyzed. 127

Figure 101. Barcelona catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and métier. 128

Figure 102. Barcelona landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 129

Figure 103. Barcelona discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 130

Figure 104. Barcelona Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 131

Figure 105. Barcelona Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 132

Figure 106. Vilanova i la Geltrú catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 133

Figure 107. Vilanova i la Geltrú landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 134

Figure 108. Vilanova i la Geltrú discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 135

Figure 109. Vilanova i la Geltrú Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 136

Figure 110. Vilanova i la Geltrú Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 137

Figure 111. Tarragona/Cambrils catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 138

Figure 112. Tarragona landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 139

Figure 113. Tarragona discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 140

Figure 114. Tarragona Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 141

Figure 115. Tarragona Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 142

Figure 116. South zone sampling trawls in the year analyzed. 143

Figure 117. L'Ametlla de Mar catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 144

Figure 118. L'Ametlla de Mar landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 145

Figure 119. L'Ametlla de Mar discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 146

Figure 120. L'Ametlla de Mar Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 147

Figure 121. L'Ametlla de Mar Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 148

Figure 122. La Ràpita catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*. 149

Figure 123. La Ràpita landed species with most biomass. Percentage in weight including all hauls within each period and *métier*. 150

Figure 124. La Ràpita discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*. 151

Figure 125. La Ràpita Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*. 152

Figure 126. La Ràpita Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*. 153

Figure 127. Purse seine sampling conducted in Catalonia in the year analyzed. 156

Figure 128. Purse seine fishery catch composition. Percentage by weight of target species (European sardine and anchovy), by-catch (other species commercialized), discarded catch (species not commercialized) and others (specimens sold at fish market under the label of a different species). 158

Figure 129. Purse seine fishery target species composition. Percentage by weight of each target species. 158

Figure 130. Purse seine fishery by-catch species composition. Percentage by weight of each by-catch species. 159

Figure 131. Purse seine fishery discarded species. Percentage by weight of species with most biomass discarded. 159

Figure 132. Spatial distribution of landings (kg/km^2) for European sardine in the Catalan fishing grounds (North GSA6) in the year analyzed. 161

Figure 133. Spatial distribution of landings (kg/km^2) for European sardine in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 162

Figure 134. European sardine length-weight relationship for the years sampled. 163

Figure 135. European sardine size at first maturity (L_{50}) for all years sampled. 163

Figure 136. European sardine monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 164

Figure 137. European sardine annual cycle for mesenteric fat content for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and monthly proportion of different mesenteric fat content. 165

Figure 138. Annual length-frequency distribution of European sardine. Left: previous years sampled, right: year analyzed. Top: fish market samples. Bottom: on board samples. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). 165

Figure 139. Spatial distribution of landings (kg/km^2) for anchovy in the Catalan fishing grounds (North GSA6) in the year analyzed. 167

Figure 140. Spatial distribution of landings (kg/km^2) for anchovy in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years. 168

Figure 141. Anchovy length-weight relationship for the years sampled. 169

Figure 142. Anchovy size at first maturity (L_{50}) for all years sampled. 169

Figure 143. Anchovy monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 170

Figure 144. Anchovy annual cycle for mesenteric fat content for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and monthly proportion of different mesenteric fat content. 171

Figure 145. Annual length-frequency distribution of anchovy. Left: from previous years sampled, right: year analyzed. Top: fish market samples. Bottom: on board samples. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). 171

Figure 146. Sandeel samplings in the year analyzed. 175

Figure 147. Sandeel fishery catch composition. Percentage by weight of landed and discarded catch. 175

Figure 148. Sandeel target species composition. Percentage by weight of each target species. 176

Figure 149. Sandeel discarded species composition. Percentage by weight of each discarded species. 176

Figure 150. Mediterranean sandeel length-weight relationship for all years sampled. 177

Figure 151. Mediterranean sandeel size at first maturity (L_{50}) for all years sampled. 178

Figure 152. Mediterranean sandeel monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages. 179

Figure 153. Annual length-frequency distribution of Mediterranean sandeel. Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of the previous four years sampled and the year analyzed. 179

Figure 154. Transparent goby length-weight relationship for all years sampled. 181

Figure 155. Annual length-frequency distribution of transparent goby. Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. 182

Figure 156. Common octopus sampling in the year analyzed. Central Catalonia (top-left), Ebre Delta (top-right and bottom-felt). 183

Figure 157. Common octopus length-weight relationship. Only individuals with all arms were included in the analysis. 184

Figure 158. Annual weight-frequency distribution of common octopus at different fishing gear (Traps and Pots). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red line: Minimum Conservation Reference Weight (MCRW). 186

Figure 159. Common octopus monthly gonadal cycle for females and males. 186

Figure 160. Common octopus monthly mating cycle for females. 187

Figure 161. Annual weight-frequency distribution of common octopus at different fishing gear (Traps and Pots) in Central Catalonia for the years sampled. Red line: Minimum Conservation Reference Weight (MCRW). 188

Figure 162. Common octopus monthly gonadal cycle for females and males in Central Catalonia. 188

Figure 163. Annual weight-frequency distribution of common octopus at different fishing gear in South Catalonia in 2021 - 2024 (Pots) and 2022 - 2024 (Traps). Red line: Minimum Conservation Reference Weight (MCRW). 189

Figure 164. Common octopus monthly gonadal cycle for females and males in South Catalonia. 190

Figure 165. Common cuttlefish length-weight relationship. 191

Figure 166. Common cuttlefish size at first maturity (L_{50}) for all years sampled. 192

Figure 167. Common cuttlefish monthly gonadal cycle for females and males. 193

Figure 168. Annual length-frequency distribution of common cuttlefish at different fishing gear (Traps and Pots). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red line: Minimum Conservation Reference Weight (MCRW). 194

Figure 169. Map of the sampling zones of blue crab. 195

Figure 170. Blue crab length-weight relationship for all years sampled. 198

Figure 171. Blue crab size at first maturity (L_{50}) for all years sampled. 199

Figure 172. Annual length-frequency distribution of Blue crab at different depth strata (SBN; Shallow Bay North, SBS; Shallow Bay South, BD; Deep Bay, CH; Channel and OW; Open Water). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red dashed line: size at first maturity ($L_{50)}$ calculated as the mean between the L_{50} values from 2020 to 2024. 200

Figure 173. Blue crab monthly gonadal cycle for females and males. 201

Figure 174. Blue crab monthly proportion of different egg development stages. 202

Figure 175. Sampling sites included in the Scientific Glass Eel Observatory in Catalonia during the 2025. Sampling covered the Ebre Delta. 204

Figure 176. Length-weight relationship of glass eels sampled in Catalonia during the 2025 fishing season. 206

Figure 177. Size-frequency distribution of glass eels sampled in Catalonia during the 2025. Length classes are shown by habitat. 207

Figure 178. Frequency distribution of glass eel pigmentation stages recorded during the 2025. Pigmentation stages were classified using a scale adapted from Briand (2009). 208

Tables

Table 1. Number of bottom trawling sampling hauls carried out along the zones sampled in each season and métier. 31

Table 2. European hake length-weight relationship in the year analyzed. 48

Table 3. Number of mature and immature individuals of European hake included monthly in biological analyses. 51

Table 4. Number of European hake individuals measured in the different fisheries along the zones sampled in each season (the values include all *métiers* sampled). 53

Table 5. Red mullet length-weight relationship in the year analyzed. 56

Table 6. Number of mature and immature individuals of red mullet included monthly in biological analyses. 59

Table 7. Number of red mullet individuals measured in the different fisheries along the zones sampled in each season (the values include all *métiers* sampled). 62

Table 8. Norway lobster length-weight relationship in the year analyzed. 63

Table 9. Number of mature and immature individuals of Norway lobster included monthly in biological analyses. 66

Table 10. Number of Norway lobster individuals measured in the different fisheries along the zones sampled in each season (the values include all the *métiers* sampled). 70

Table 11 Deep-water rose shrimp length-weight relationship in the year analyzed. 71

Table 12. Number of mature and immature individuals of deep-water rose shrimp included monthly in biological analyses. 74

Table 13 Number of deep-water rose shrimp individuals measured in the different fisheries along the zones sampled in each season (the values include all *métiers* sampled). 76

Table 14. Blue and red shrimp length-weight relationship in the year analyzed. 77

Table 15. Number of mature and immature individuals of blue and red shrimp included monthly in biological analyses. 80

Table 16. Number of blue and red shrimp individuals measured in bottom trawl fishery along the zones sampled in each season (the values include all *métiers* sampled). Blue and red shrimp sampling in the South zone ceased from 2021. 82

Table 17. Horned octopus length-weight relationship in the year analyzed. 85

Table 18. Number of mature and immature individuals of horned octopus included monthly in biological analyses. 88

Table 19. Number of horned octopus individuals measured in the bottom trawl fishery along the zones sampled in each season (the values include all *métiers* sampled). 90

Table 20. Broadtail squid length-weight relationship in the year analyzed. 91

Table 21. Number of mature and immature individuals of broadtail squid included monthly in biological analyses. 94

Table 22. Number of broadtail squid individuals measured in the bottom trawl fishery along the zones sampled in each season (the values include all *métiers* sampled). 96

Table 23. Spottail mantis shrimp length-weight relationship in the year analyzed. 97

Table 24. Number of spottail mantis shrimp individuals measured in the different fisheries along the zones sampled in each season (the values include all *métiers* sampled). 101

Table 25. Caramote prawn length-weight relationship in the year analyzed. 102

Table 26. Number of mature and immature individuals of caramote prawn included monthly in biological analyses. 104

Table 27. Number of caramote prawn individuals measured in the different fisheries along the zones sampled in each season (the values include all *métiers* sampled). 105

Table 28. Number of purse seine samplings. Fish market (samples obtained from the fish market) and on-board sampling (samples obtained on board commercial fishing vessels). 157

Table 29. European sardine length-weight relationship in the year analyzed. 161

Table 30. Number of mature and immature individuals of European sardine included monthly in biological analyses. 163

Table 31. Number of European sardine individuals measured in the different fisheries along the zones sampled in each season. 166

Table 32. Anchovy length-weight relationship in the year analyzed. 167

Table 33. Number of mature and immature individuals of anchovy included monthly in biological analyses. 169

Table 34. Number of anchovy individuals measured in the different fisheries along the zones sampled in each season. 172

Table 32. Number of on-board samplings of small-scale fisheries monitored (sandeel and common octopus fisheries). In this table samplings of blue crab were not included. 174

Table 36. Mediterranean sandeel length-weight relationship in the year analyzed. 177

Table 37. Number of mature and immature individuals of Mediterranean sandeel included in the biological analyses in each month. 178

Table 38 Number of Mediterranean sandeel individuals measured along the zones sampled in each season. 180

Table 39. Transparent goby length-weight relationship in the year analyzed. 181

Table 40. Number of transparent goby individuals measured along the zones sampled in each season. 182

Table 41. Common octopus length-weight relationship in the year analyzed. Only individuals with all arms were included in the analysis. 184

Table 42. Number of common octopus individuals measured in the different fisheries along the zones sampled in each season. 185

Table 43. Common cuttlefish length-weight relationship in the year analyzed. 191

Table 44. Number of mature and immature individuals of common cuttlefish included in the biological analyses in each month. 192

Table 45. Number of common cuttlefish individuals measured by different fishing gear along the zones sampled in each season. 194

Table 46. Number of blue crab samplings by season and strata according to fishery and zone. 196

Table 47. Number of blue crab individuals measured in the different fisheries along the zone sampled in each season (the values include all strata sampled). 197

Table 48. Blue crab length-weight relationship in the year analyzed. 198

Table 49. Number of juvenile and adult individuals of blue crab (only females) included monthly in biological analysis (the values include all strata sampled). 199

Table 50. Number of glass eel samplings by habitat and sampling type, dependent and inde-pendent data. 204

Table 51. Number of glass eel samples analyzed in 2025 by habitat. 205

Table 52. Length-weight relationship parameters estimated for glass eels sampled in Catalo-nia during the 2025 fishing season. 205

Annexes

Annex 1. Landed species with higher biomass for previous period. SE: standard error. 214

Annex 2. Landed species with higher abundance for previous period. SE: standard error. 215

Annex 3. Landed species with higher biomass for the year analyzed. SE: standard error. 216

Annex 4. Landed species with higher abundance for the year analyzed. SE: standard error. 217

Annex 5. Discarded species with higher biomass for previous period. SE: standard error. 218

Annex 6. Discarded species with higher abundance for previous period. SE: standard error. 219

Annex 7. Discarded species with higher biomass for the year analyzed. SE: standard error. 220

Annex 8. Discarded species with higher abundance for the year analyzed. SE: standard error. 221

Annex 9. Natural debris mass for previous period. SE: standard error. 222

Annex 10. Natural debris mass for the year analyzed. SE: standard error. 222

Annex 11. Marine litter mass for previous period. SE: standard error. 223

Annex 12. Marine litter mass for the year analyzed. SE: standard error. 223

Annex 13. Seasonal length-frequency distribution of European hake at different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D. 224

Annex 14. Seasonal length-frequency distribution of red mullet at different *métiers* (Coastal Delta shelf, Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Autumn: O, N, D. 225

Annex 15. Seasonal length-frequency distribution of Norway lobster at different *métiers* (Middle Delta shelf; Deeper shelf; Upper slope; Lower slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D. 226

Annex 16. Seasonal length-frequency distribution of deep-water rose shrimp at different *métiers* (Coastal Delta shelf, Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Autumn: O, N, D. 227

Annex 17. Seasonal length-frequency distribution of blue and red shrimp at dif-ferent *métiers* (Upper Slope and Lower Slope) in 2025. (n) Total number of meas-ured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D. 228

Annex 18. Seasonal length-frequency distribution of horned octopus at different *métiers* (Coastal Delta shelf, Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Autumn: O, N, D. 229

Annex 19. Seasonal length-frequency distribution of Broadtail squid at different *métiers* (Coastal Delta shelf; Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope; Lower slope) in 2025. (n) Total number of measured individuals. Red dashed line: size at first maturity (L_{50}) for both sexes combined calculated with data from 2025. Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D. 230

Annex 20. Seasonal length-frequency distribution of Spottail mantis shrimp at different *métiers* (Coastal Delta Shelf and Middle Delta Shelf) in 2025. (n) Total number of measured individuals. Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D. 231

Annex 21. Seasonal length-frequency distribution of caramote prawn at different *métiers* (Middle Delta shelf; Deeper shelf; Upper slope; Lower slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D. 232

Annex 22. Monthly length-frequency distribution of European sardine in 2024, left: fish market sampling and right: on-board sampling. (n) Total number of measured individuals. Red dashed line: Minimum Conservation Reference Size (MCRS).233

Annex 23. Monthly length-frequency distribution of Anchovy in 2025, left: fish market sampling and right: on-board sampling. (n) Total number of measured individuals. *Red line: Minimum Conservation Reference Size (MCRS).* 234

Annex 24. Monthly length-frequency distribution of the main target species of the sandeel fishery in 2025. (n) Total number of measured individuals. 235

Annex 25. Monthly weight-frequency distribution of common octopus at different fishing gear (Traps and Pots) in Central Catalonia in 2025. Red line: Minimum Conservation Reference Weight (MCRW). 236

Annex 26. Monthly weight-frequency distribution of common cuttlefish at different fishing gear (Traps and Trammel nets) in Central Catalonia in 2025. Red line: Size at maturity. 237

Annex 27. Monthly weight-frequency distribution of blue crab in 2025 at different strata. 238

Glossary

CL: Cephalohtorax Length
CPUE: Catch Per Unit Effort
CW: Carapace width
GFCM: General Fisheries Commission for the Mediterranean
GSA: Geographical Sub-Area
GSI: Gonadosomatic index
GT: Gross Tonnage
HSI: Hepatosomatic index
LF: Length Frequency
LPUE: Landing Per Unit Effort
MAP: Multi-Annual Plan
MCRS: Minimum Conservation Reference Size
MCRW: Minimum Conservation Reference Weight
MÉTIER: Group of fishing operations targeting a specific assemblage of species
ML: Mantle Length
OTB: Bottom Otter Trawl
PS: Purse Seine
SM: Squared mesh
STECF: Technical and Economic Committee for Fisheries
TAC: Total Allowable Catch
TL: Total Length
VL: Vessel Length
VMS: Vessel Monitoring System
WF: Weight Frequency
WMS: Geoserver a Web Map Service

Executive summary

This report presents the state of fisheries in Catalonia in 2025. Section 1 describes the methods of biological and fisheries monitoring over five years of ICATMAR monitoring program (2021-2025), Section 2 describes the results of the bottom trawling fishery monitoring, Section 3 describes the results of the purse seine fishery monitoring and Section 4 describes the results of the monitoring program conducted for small-scale fisheries operating under co-management plans in Catalonia, including the sandeel, common octopus, common cuttlefish, blue crab, and glass eel fisheries.

Section 1: Introduction and methods of biological and fishery monitoring

Sampling procedures varied according to the species studied and the fishing gear used. This section explains the methodology used for each gear sampled (bottom trawl, purse seine and various small-scale fisheries). Regarding bottom trawling, nine species were monitored, chosen on the basis of their importance in terms of catch and economic value: European hake (*Merluccius merluccius*), red mullet (*Mullus barbatus*), Norway lobster (*Nephrops norvegicus*), blue and red shrimp (*Aristeus antennatus*), deep-water rose shrimp (*Parapenaeus longirostris*), horned octopus (*Eledone cirrhosa*), broadtail squid (*Illex coindetii*), spottail mantis shrimp (*Squilla mantis*) and caramote prawn (*Penaeus kerathurus*). In the purse seine fishing, the two main target species of the fishery were monitored: European sardine (*Sardina pilchardus*) and anchovy (*Engraulis encrasicolus*). For small-scale fisheries the species included in co-management plans were monitored: sandeels – including Mediterranean sand eel (*Gymnammodytes cicerelus*), smooth sand eel (*G. semisquamatus*) and transparent goby (*Aphia minuta*), common octopus (*Octopus vulgaris*), common cuttlefish (*Sepia officinalis*), blue crab (*Callinectes sapidus*), and glass eel (*Anguilla anguilla*).

Section 2: Bottom trawling

In 2025, a total of 87 bottom trawl sampling hauls were conducted. Of the total catch, 66% was landed, 30% was discarded, 3% was natural debris mass and 1% was marine litter. In 2025 a total of 137 species were identified in the landed fraction and 304 in the discarded fraction (some species occur in both fractions).

Within the commercial fraction in 2025, each *métier* had a different composition, with *Pagellus erythrinus*, *Trachurus trachurus*, *Merluccius merluccius*, and *Mullus barbatus* being the most abundant species in the shelf *métiers* (coastal Delta shelf, middle Delta shelf, coastal shelf, and deeper shelf). In the upper and lower slope *métiers* were *Nephrops norvegicus* and *Aristeus antennatus* the most abundant species, respectively. For the discarded fraction, *Boops boops* and *Merluccius merluccius* were the most abundant species in the coastal Delta shelf and middle Delta shelf, respectively. In the coastal shelf and deeper shelf, the most abundant discarded species were *Pagellus acarne* and *Scyliorhinus canicula*, respectively. In the upper and lower slope the most abundant discarded species was *Scyliorhinus canicula*. In terms of natural debris, the most abundant element was shells in coastal Delta shelf and terrestrial plants in middle Delta shelf but marine organic debris was the most important in the rest of metiers. For the marine litter fraction, the main identifiable category in all *métiers* was plastic, although "Other waste" predominated in the middle Delta shelf and the upper and lower slopes.

For each of the eight commercial species monitored, distribution maps, length-weight relationship parameters, length at first maturity (L_{50}) models, length frequency distributions by *métier*, gonadal cycle and a table with the number of measured individuals for the previous period sampled (2021-2024) and for 2025 are presented.

Data on catch composition for the bottom trawling fishery are shown by port for each of the nine ports sampled from north to south: Roses, Palamós, Blanes, Arenys de Mar, Barcelona, Vilanova i la Geltrú, Tarragona/Cambrils, L'Ametlla de Mar and La Ràpita.

Section 3: Purse seine fishing

A total of 58 purse seine samplings were carried out in 2025, of which 18 were fish market samplings and 40 were on-board samplings. The catch composition of the on-board sampling in 2025 was 73% target species (either European sardine or anchovy), 16% other commercial species (by-catch), 6% discards, and 5% other species commercialized as target species.

For each of the purse seine fishery target species – European sardine (*Sardina pilchardus*) and anchovy (Engraulis encrasicolus) – spatial distribution maps, length-weight relationship parameters, length at first maturity (L_{50}) models, gonadal

cycles, mesenteric fat content cycle, length frequency distributions and a table with the number of measured individuals for the previous period sampled (2021-2024) and for 2025 are presented.

Section 4: Small-scale fisheries

The monitoring of small-scale fisheries covers the sandeel fishery, targeting Mediterranean sandeel (*Gymnammodytes cicerelus*) and transparent goby (*Aphia minuta*), which has been monitored since 2014; the common octopus fishery, monitoring *Octopus vulgaris* caught with pots and traps under the central and southern co-management plans since 2018; the blue crab fishery, monitoring *Callinectes sapidus* catches in the Ebre Delta since 2019; the common cuttlefish fishery, focusing on *Sepia officinalis* captured with traps and trammel nets in the Bays of Pals and Roses since 2025; and the glass eel fishery, targeting *Anguilla anguilla* in the main fishing areas of Catalonia since 2025. For each species and fishery monitored, maps of the sampling area, length-weight relationship parameters, length at first maturity (L_{50}) models, gonadal cycles, length frequency distributions were provided, together with a summary table showing the number of individuals measured by gear type during the period sampled..

SECTION 1
Introduction and methods

Biological and fishery monitoring



Introduction

The Mediterranean Sea is one of the most intensively exploited marine regions in the world and has supported fishing activities for thousands of years. As a result, fisheries have played a central role in shaping the social, cultural, and economic development of coastal communities throughout the region. In Catalonia, fishing remains an important economic activity and a key component of maritime heritage, supporting coastal livelihoods and providing valuable marine resources to society. However, increasing pressures on marine ecosystems, including fishing, habitat degradation, and climate change, highlight the need for science-based management strategies capable of ensuring the long-term sustainability of marine resources. Achieving this objective requires robust monitoring programs, reliable scientific information, and governance frameworks that actively involve stakeholders in decision-making processes. To address these challenges, the Catalan Research Institute for the Governance of the Sea (ICATMAR; https://icatmar.cat) was established in 2018 through a collaboration between the Directorate-General for Maritime Policy and Sustainable Fisheries of the Catalan Government and the Spanish National Research Council (CSIC), through the Institute of Marine Sciences of Barcelona. ICATMAR was created to provide the scientific and technical support required for the implementation of the Maritime Strategy of Catalonia, promoting evidence-based decision-making through fisheries monitoring, long-term ecological research, and innovative co-management approaches. By integrating scientific knowledge, fisheries data, and stakeholder participation, ICATMAR contributes to the development of adaptive management measures aimed at ensuring the ecological sustainability, economic viability, and social resilience of the Catalan fishing sector.

Method

Based on their importance in terms of catch and economic value, the target species of the biological sampling are European hake (*Merluccius merluccius*), red mullet (*Mullus barbatus*), Norway lobster (*Nephrops norvegicus*), blue and red shrimp (*Aristeus antennatus*), deep-water rose shrimp (*Parapenaeus longirostris*), horned octopus (*Eledone cirrhosa*), Broadtail

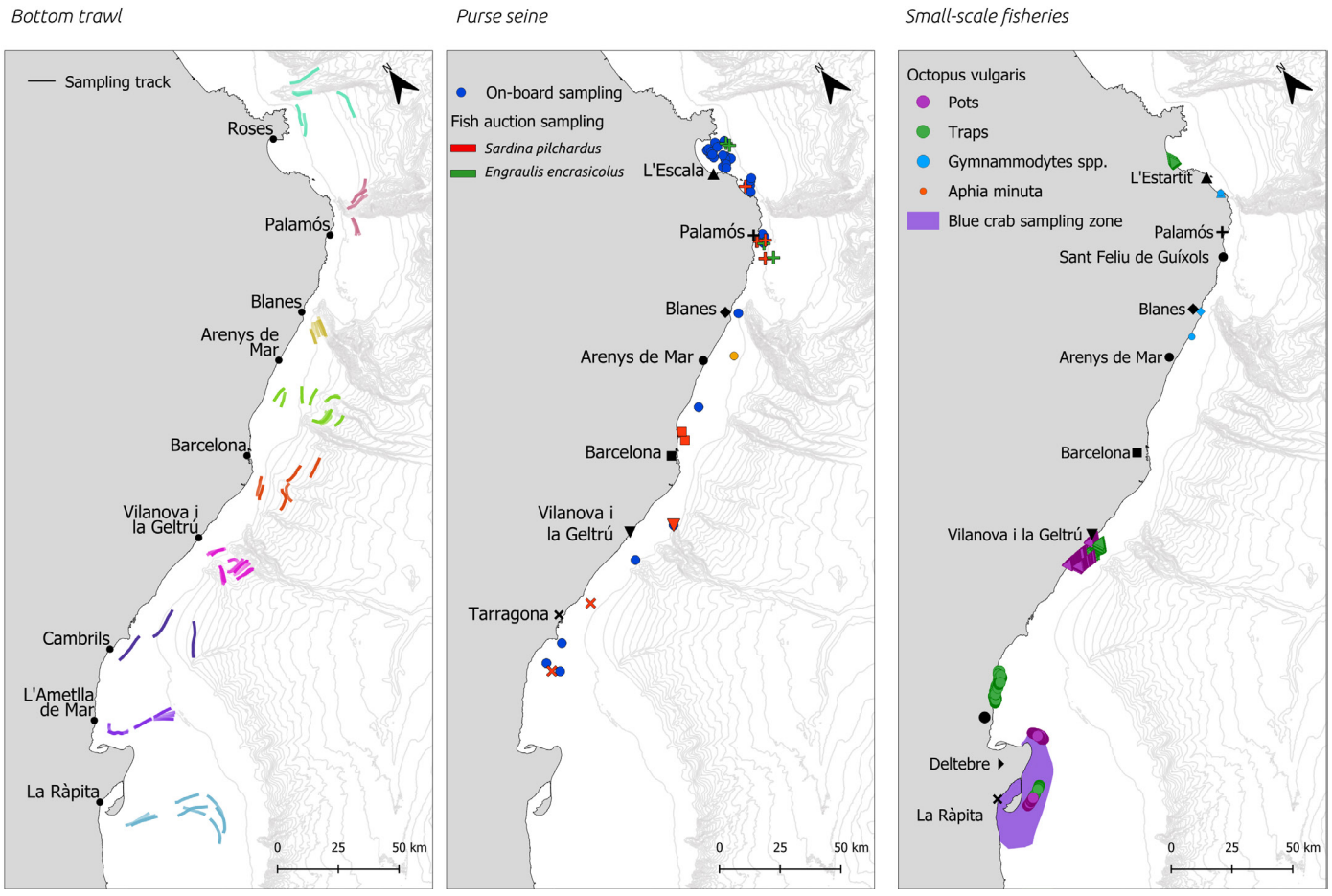


Figure 1. Fisheries monitoring sampling conducted in Catalonia in 2025.

squid (*Illex coindetii*), Spottail mantis shrimp (*Squilla mantis*), caramote prawn (*Penaeus kerathurus*), European sardine (*Sardina pilchardus*), anchovy (*Engraulis encrasicolus*), Mediterranean sandeel (*Gymnammodytes cicerelus*), transparent goby (*Aphia minuta*), common octopus (*Octopus vulgaris*), blue crab (*Callinectes sapidus*), Common cuttlefish (*Sepia officinalis*) and Glass eel (*Anguilla anguilla*).

The sampling procedures varied depending on the species studied and the fishing modality used to catch them. An overview of the total sampling trips across the three fishing modalities during the year 2025 is shown in Figure 1.

Bottom trawling sampling

For the bottom trawling fishery, sampling was carried out through experimental hauls at various depths within fishing grounds defined by *métiers*, in accordance with the European Common Fisheries Policy. This policy emphasizes the importance of accounting for heterogeneity in fishing practices and promotes *métier*-based sampling as a core component of the EU Data Collection Framework.

A *métier* is defined as a group of fishing operations that aim for a similar group of species using similar fishing gear during the same period and/or in the same area and with a similar pattern of exploitation (DCF, Regulation (EC) No 949/2008 and Commission Decision 2010/93 / EU). In the study area, the Catalan continental margin, the daily fishing landings of a vessel correspond to one effective fishing day, as vessels land their catch daily. Therefore, as each sampling haul is allocated to a specific *métier*, the sampled length frequencies can be weighed and extrapolated to the fishing landings by *métier*.

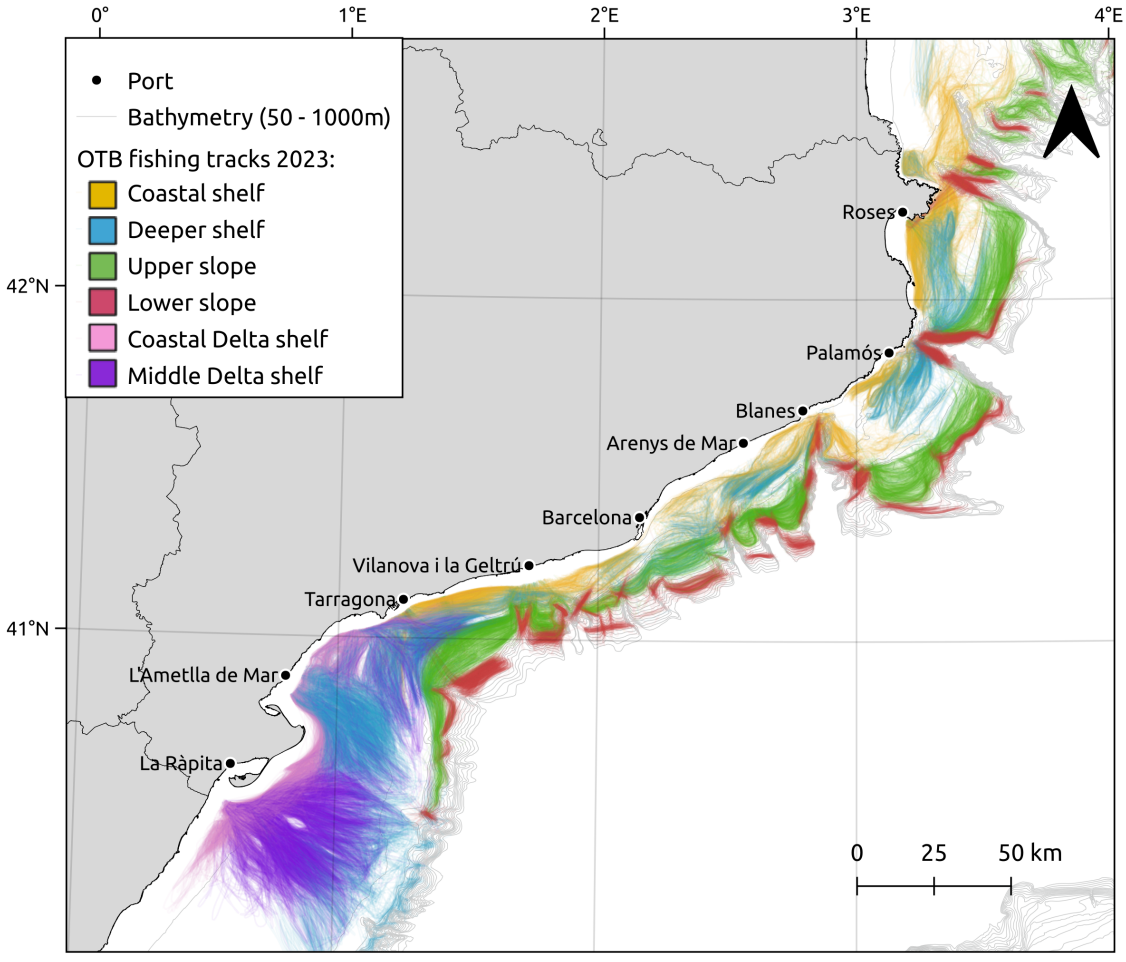


Figure 2. Spatial distribution of the bottom trawl fishery (OTB) tracks. Colors represent the different OTB *métiers* identified for the Catalan trawl fishery.

In the north-western Mediterranean demersal bottom trawl fisheries, *métier* classification has traditionally been based on three broad categories: coastal, mixed, and deep-sea fisheries. However, as described in detail in ICATMAR 22-04 and Panisello-Garriga et al. (submitted), dendrogram and cluster analyses of daily landings data collected between 2002 and 2021 identified six distinct *métiers* within the Catalan bottom trawl fleet (Figure 2). These *métiers* are associated with differences in fishing depth, fishing area, and catch composition. The daily landings of the Catalan fleet were subsequently assigned to these six *métiers* on an annual basis following the classification model described by Ribera-Altimir et al. (submitted).

Sampling was carried out from nine main commercial ports, with a quarterly frequency by port. The study area was divided into three zones—North, Center, and South—based on oceanographic features, geomorphological traits, and species community assemblages present in the Catalan Sea. The ports of the zones where the sampling took place are:

- North zone: Roses, Palamós, Blanes, and Arenys de Mar.
- Center zone: Barcelona, Vilanova i la Geltrú and Tarragona/Cambrils.
- South zone: L'Ametlla de Mar and La Ràpita.

Due to logistical issues in 2025, the third sampling port in the center zone was changed from Tarragona to Cambrils. However, the sampling was carried out in fishing grounds located near Tarragona by a vessel operating from Cambrils.

Each sampling day includes three experimental hauls on board the same vessel, each one at a different depth range corresponding to a specific *métier*. Each haul is GPS-recorded with a start and end point, fishing time and gear width. These measurements allow the calculation of the swept area to standardize species biomass and abundance values. The average depth for each haul was estimated by calculating the midpoint between the start and end coordinates of the haul.

The *métiers* sampled and their corresponding most common target species are:

- Coastal shelf (51 – 79 m): red mullet. This *métier* began being sampled for the first time in 2023, and was sampled from the ports of Arenys de Mar (since 2025) and Blanes in the north zone and Vilanova i la Geltrú in the south.
- Deeper shelf (80 – 200 m): European hake, horned octopus and deep-water rose shrimp. This *métier* was sampled in the ports of Roses, Palamós, Blanes and Arenys de Mar in the north zone; in Barcelona and Tarragona/Cambrils in the center zone; in L'Ametlla de Mar and La Ràpita in the south zone.
- Upper slope (201 – 500 m): Norway lobster and deep-water rose shrimp. This *métier* was sampled in the ports of Roses, Palamós, Blanes and Arenys de Mar in the north zone; in Barcelona, Vilanova i la Geltrú and Tarragona/Cambrils in the center zone.
- Lower slope (501 – 800 m): blue and red shrimp. This *métier* was sampled in the ports of Roses, Palamós and Arenys de Mar in the north zone; in Barcelona, Vilanova i la Geltrú and Tarragona/Cambrils in the center zone.

However, due to the different geomorphological structure of the Ebre Delta, where commercial fishing activity takes place exclusively on the broad continental shelf, two distinctive shelf *métiers* were defined in the south zone. The *métiers* sampled in the south zone and their most common corresponding target species are:

- Coastal Delta shelf (21 – 50 m): spottail mantis shrimp, caramote prawn and red mullet. This *métier* was only sampled in the ports of L'Ametlla de Mar and La Ràpita.
- Middle Delta shelf (40 – 80 m): spottail mantis shrimp and European hake. This *métier* was only sampled in the ports of L'Ametlla de Mar and La Ràpita.

The correspondence between the broad *métier* classification and the more detailed classification defined for the Catalan bottom trawl fleet is as follows: coastal fisheries include the coastal Delta shelf, coastal shelf, middle Delta shelf, deeper shelf, and upper slope *métiers*, whereas deep-sea fisheries correspond to the lower slope *métiers*.

Since mid-2025, a 40-mm square-mesh codend has been used in all hauls, with a few specific exceptions. Between 2019 and 2024, lower-slope hauls sampled in Palamós used a 50-mm square-mesh codend, in accordance with the co-management measures implemented for the blue and red shrimp fishery. In 2023, vessels operating in coastal fisheries from Palamós adopted a 45-mm square-mesh codend, while in 2024 deep-sea fisheries in Roses began using a 50-mm square-mesh codend. Furthermore, following the implementation of new management regulations on 1 June 2025, all Spanish Mediterranean bottom trawlers targeting coastal fisheries were required to use a 45-mm square-mesh codend, whereas those operating in deep-sea fisheries were required to use a 50-mm square-mesh codend.

On board, the fishers sort the catch into two categories: commercial, i.e. individuals of commercial species to be sold at the fish market, and discard, which can include individuals of non-commercial species and/or undersized or damaged individuals of commercial species, as well as marine litter and natural debris. Fish, crustacean and cephalopod individuals of the commercial fraction are identified and measured on board (total length, cephalothorax length and mantle length, respectively). For the target species, a subsample of a little over 30 individuals is preserved in coolers to transport to the laboratory. As for the discarded fraction, either the total sample or a subsample – depending on the total size of the catch – is preserved in coolers and transported to the laboratory for further analysis. The process is repeated for each of the three hauls.

Debris definition and composition

The samples used to characterize and analyze the debris and its composition, were obtained from the discard fraction gathered during the bottom trawl sampling.

The term debris includes two different types of items. On one side, the non-organic materials caught during fishing operations, also known as marine litter, and, on the other, organic materials with terrestrial and marine origin such as shells, algae and plants. Marine litter have been classified following REGULATION (EU) 2022/92, ICATMAR, 22-04, and Balcells et al., 2023).

For the analysis and plots of the debris, the categories analyzed were the 10 with the highest weight and representing over 2% of the total catch.

Purse seine fishing sampling

For the purse seine fishery, sampling was done through the acquisition of batches of European sardine and anchovy at the fish market and, since 2022, also through sampling of these two species on board purse seiners. Data gathered during on-board sampling allowed to complete the estimation of the biological parameters and the length-weight relationship parameters of these target species. In addition, it allowed to describe the whole catch composition, including data on by-catch (non-target commercial species) and the discarded fraction, and to estimate the fishing effort of the purse seine fleet along the Catalan coast.

In the on-board sampling, the fishing trips were not experimental but strictly planned by the vessel skippers according to their own interests. Furthermore, in neither of the two types of sampling the area of the Ebre Delta was sampled as no significant catch of these species lands in ports south of Tarragona and, thus, the purse seine fleet does not usually labor there.

For the acquisition of batches, a standard batch of fish (approximately 10 kg) of each of the target species – when both were available – was bought directly at the sampled port market three times per month. Each of the three-monthly batches was purchased in different ports, so that the entire length of the Catalan coast where this type of fishing takes place was covered. One of the batches was purchased in the northern port of Palamós, one in the central port of Barcelona, and one in the southern port of Tarragona. Data on the batch origin (vessel, catch coordinates and total catch) were gathered at the fish market or from the fisher who provided it.

On the other hand, sampling on board purse seiners was carried out twice a month from five main commercial ports: L'Escala, Blanes, Arenys de Mar, Vilanova i la Geltrú and Tarragona. One of the monthly samplings was always carried out in the port of L'Escala, in the north, while the other alternated between ports of the more central area (Blanes or Arenys de Mar) and ports of the southernmost area (Vilanova i la Geltrú or Tarragona).

Once in the laboratory, at the ICM-CSIC, the same protocol was followed in both types of sampling: all the individuals from a subsample of approximately 3 kg from each of the target species – when both were available – were measured to the nearest 0.5 cm and classified by size categories to obtain size frequencies. Then, 30 individuals from each species, distributed by all size categories, were measured and weighed individually, their reproductive state and fat content was assessed and their gonads were weighed. Furthermore, only in the on-board sampling, if by-catch and/or discarded species were present in the samples, they were identified and their individuals measured and weighted.

Small-scale fisheries sampling

Small-scale fisheries sampling includes sandeel and transparent goby for boat seine fishery, common octopus, common cuttlefish, blue crab and glass eel.

Sandeel fishery sampling

For the sandeel fishery, sampling was carried out on board boat seine ("sonsera") fishing vessels where biological batches were obtained. The fishing trips were not experimental but strictly planned by the vessel skippers according to their own interests. During closure periods, one sampling per month was carried out to check the state of the population before the opening of the fishery.

Sampling for Mediterranean and smooth sandeel was carried out from the ports of l'Estartit, Sant Feliu de Guíxols, Palamós and Blanes, in the northernmost province of Girona, and from the port of Arenys de Mar, in the central province of Barcelona. On the other hand, sampling for the transparent goby was carried out from the ports of Barcelona and Badalona.

Two monthly samplings were conducted where biological batches of 1 kg sandeel (Mediterranean sandeel) were obtained: one from the port of Arenys de Mar and the other from one of the ports in the province of Girona. Batches were preserved in coolers to transport to the laboratory. When transparent goby was available, two monthly batches of 1 kg were obtained from the ports of Barcelona and Badalona (one from each location).

Once in the laboratory, a random subsample of 100-200 individuals were measured to the nearest 0.5 cm, and classified by size categories to obtain size frequencies. Then, 50 individuals, distributed by all size categories, were measured and weighed individually, and, for the ones with a length above 6 cm, their reproductive state was assessed. If discard species were present, they were identified and their individuals measured and weighted. For the transparent goby, the same protocol was followed.

Common octopus fishery sampling

For the common octopus fishery, sampling was carried out on board fishing vessels, using pots and traps as fishing gears, where biological batches were obtained. The fishing trips were not experimental but strictly planned by the vessel skippers according to their own interests.

Sampling was carried out from five main ports, within the two zones that host a co-management plan for the species:

- Central Catalonia: Vilanova i la Geltrú.
- Ebre Delta: L'Ametlla de Mar, Deltebre, La Ràpita and Les Cases d'Alcanar.

Six monthly samplings were conducted: four from the port of Vilanova i la Geltrú, two with pots and two with traps, and the other two alternating from the port of L'Ametlla de Mar, with traps, and the ports of Deltebre, La Ràpita or Les

Cases d'Alcanar, with pots. For every sampling, batches of up to 30 individuals of common octopus – above minimum conservation reference weight (MCRW), established at 1000 g – were obtained and preserved in coolers to transport to the laboratory. If more than 30 individuals were caught, the extra individuals were measured (mantle length), weighted and sexed in situ. All individuals below MCRW were weighed and sexed in situ and released back to the sea. In addition, since 2023, all captured males weighing more than 2000 g were not transported to the laboratory, as 100% are considered sexually mature and, therefore, it is not necessary to evaluate their reproductive status.

Once in the laboratory, all individuals were measured (mantle length), weighed, sexed and their reproductive status was assessed.

Common cuttlefish fishery sampling

For the common cuttlefish fishery, two complementary sampling schemes were implemented: onboard sampling aboard commercial fishing vessels and market sampling through the acquisition of cuttlefish batches at the fish market. Sampling was conducted every 15 days, alternating between onboard and market-based sampling events. Both sampling schemes were carried out in the ports of Roses, l'Escala, and l'Estartit, the three ports included in the co-management Plan for the Bays of Pals and Roses. The onboard sampling scheme involved sampling aboard vessels operating with traps and trammel nets. The fishing trips were not experimental but strictly planned by the vessel skippers according to their own interests. Fishing operations were monitored using GPS tracking, and information on fishing effort was recorded, including the number of traps or trammel nets deployed and the number of days the gear remained at sea. The first 30 common cuttlefish caught in each sampled fishing operation were retained and preserved in coolers for transport to the laboratory. When catches exceeded 30 individuals, the additional specimens were processed onboard, with mantle length, body weight, and sex being recorded in situ. Furthermore, all species captured in the by-catch and discard fractions were identified, measured, and weighed onboard. During market sampling, batches of common cuttlefish were purchased directly from the fish market. Individuals were measured, weighed, and sexed in the laboratory following the same protocols applied to onboard-collected specimens, ensuring consistency between sampling schemes.

Blue crab fishery sampling

For the blue crab fishery, sampling was exclusively carried out in the Ebre Delta area, where it is an allochthonous species. Samples were collected once a month at the fish market in La Ràpita and data were taken from different vessels, ensuring that all sampling strata were represented for each sampling day. The depth and the approximate location of the catch was provided by the fishers (general fishing grounds or areas).

Between 30 and 50 individuals were sampled on each vessel and the total weight of individuals sampled per vessel was recorded. Prior to sale, samples were analyzed: individuals were measured (carapace length and width), sexed, assessed for maturity (adult or juvenile) and, in females, the presence of eggs and their developmental stage were determined.

Glass eel fishery sampling

For the glass eel fishery, monitoring was conducted within the framework of the Scientific Glass Eel Observatory, which combines biological sampling, fisher logbooks, and fishery-independent surveys to improve knowledge of glass eel recruitment dynamics and support scientific monitoring. Sampling covered the two main glass eel fishing areas in Catalonia: the Ebre Delta and the Girona coast.

The Scientific Glass Eel Observatory is based on two complementary sampling schemes. The first is a fishery-dependent sampling programme, consisting of daily logbooks completed by fishers throughout the fishing season. Information on fishing effort and catches was recorded, including fishing hours, fishing location, the number of glass eels captured, and the occurrence of bycatch species. In addition, fishers collected biological samples of glass eels during the season. These samples were transported to the laboratory, where individual length, weight, and pigmentation stage were recorded. The second component is a fishery-independent sampling programme, carried out monthly during the fishing season by ICATMAR personnel. Each sampling event consisted of two fishing operations of two hours' duration. During these surveys, all bycatch species were identified and measured, while glass eels were transported to the laboratory for individual measurements of length and weight and for classification according to their pigmentation stage.

Calculations and data analysis

The methods applied in this report for the calculation and analysis of the data were defined in Ribera-Altimir et al. (2023), while the information and data systems used can be found in ICATMAR, 22-04.

For each target species, the annual length frequency by *métier* (bottom trawling), depth strata or area was represented, as well as the size at first maturity (L_{50}), monthly proportion of each maturation stage, monthly average value of gonadosomatic and hepatosomatic index (HIS) was also represented. In the case of bottom trawling sampling, the length frequency distribution is only shown for the *métiers* where each species is naturally present. The L_{50} shown in the length-frequency distribution figures for the target species is calculated considering only the five years analyzed in this report. GSI and L_{50} values in the crustaceans analyzed are only shown for females, since males present stable GSI values throughout the year and the visual identification of immature males was not possible. A table with length-weight relationship parameters is provided for each species, using the relationship W = a*TLb, where W is weight (g) and TL is total length (cm). For crustacean species TL is replaced by CL, i.e., carapace length (mm), and for cephalopod species by ML, i.e., mantle length (cm).

The present report focuses on the year 2025, with comparisons made to the four preceding years of sampling (2021–2024), although ICATMAR's monitoring program has been ongoing since 2019. Data from earlier years are available in previous reports (ICATMAR 25-05, 24-05, 23-07, 22-04, 21-02, 19-01).

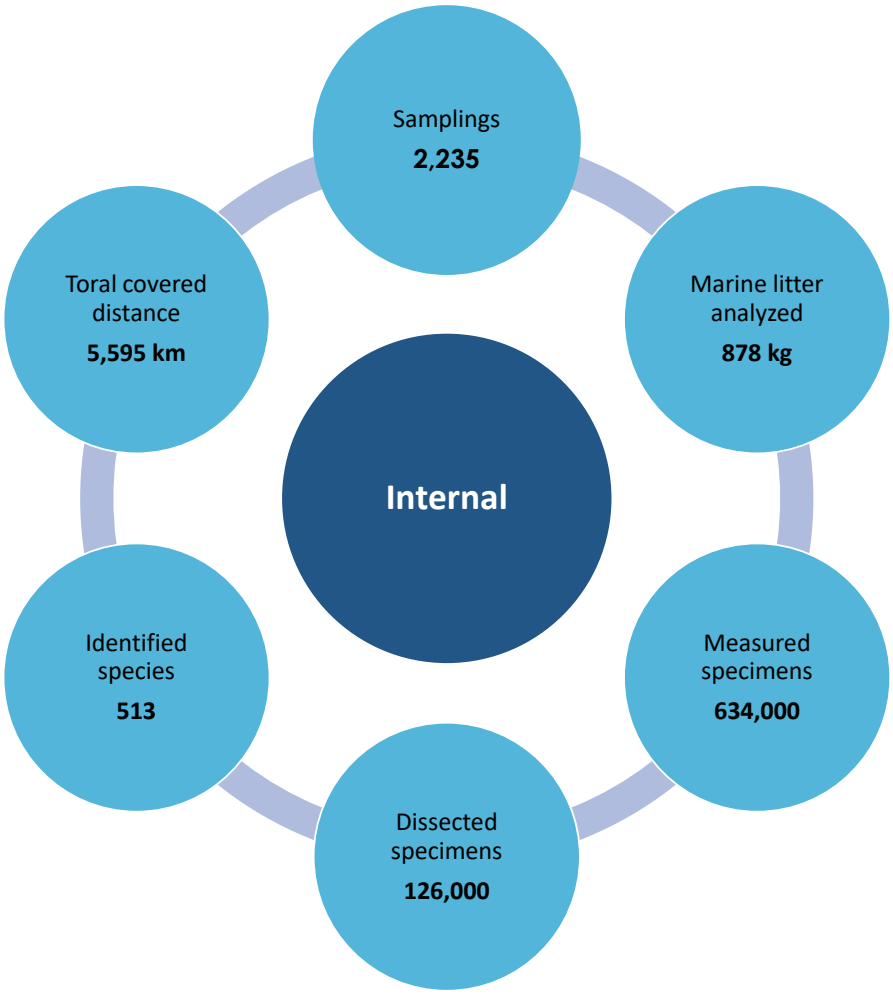
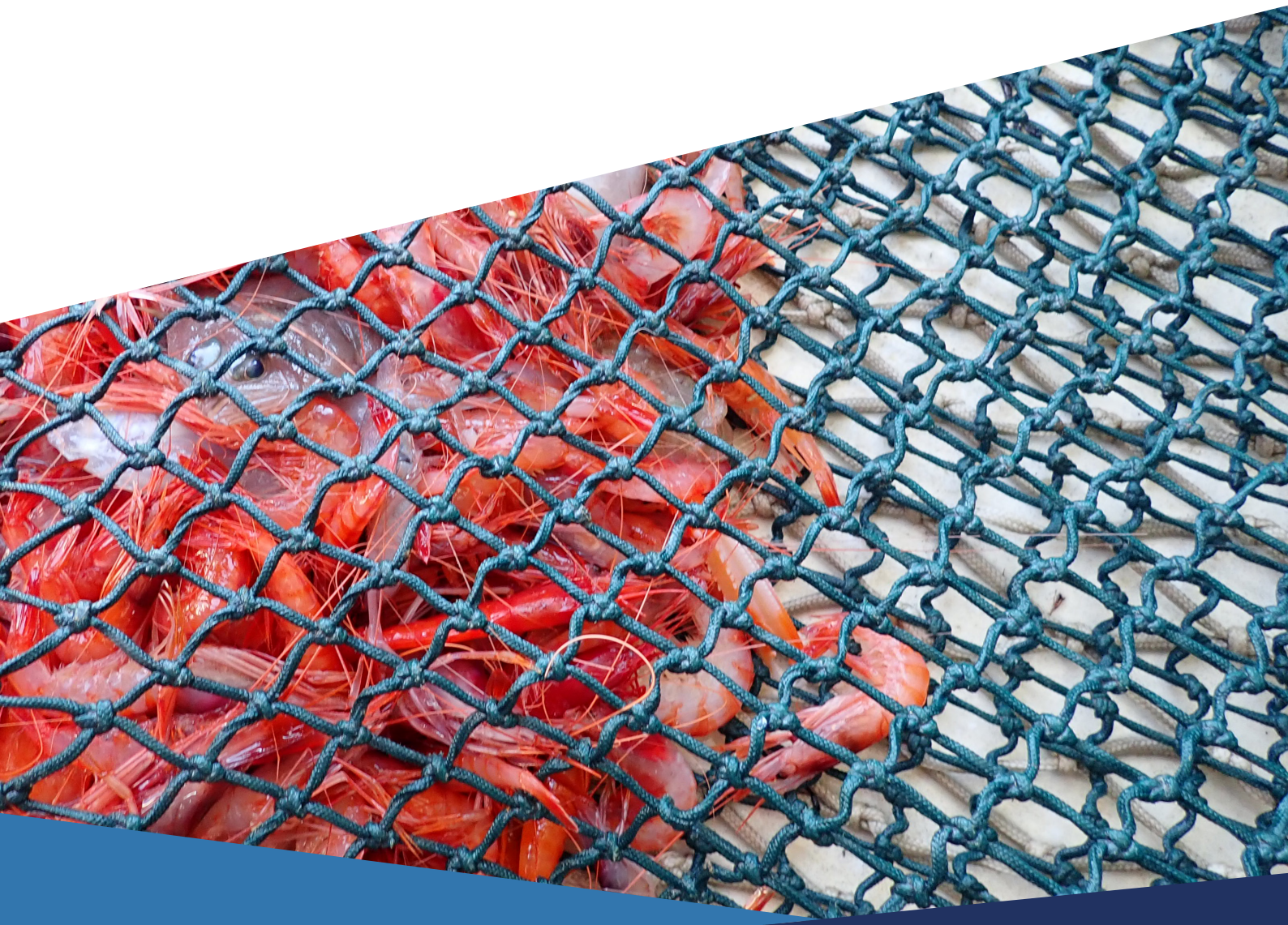


Figure 3. Amount of records of the fishing sampling data stored in the data base from 2019 to 2025 (all sampling period of ICATMAR's monitoring program)..

SECTION 2
Bottom trawling

Fishery monitoring of bottom trawl fishery in Catalonia



Bottom trawl fishery in Catalonia

The present report focuses on the year 2025, with comparisons made to the four preceding years of sampling (2021–2024), although ICATMAR's monitoring program has been ongoing since 2019. Data from earlier years are available in previous reports (ICATMAR 25-05, 24-05, 23-07, 22-04, 21-02, 19-01).

A total of 87 bottom trawling sampling hauls were carried out in 2025: 8 in the coastal Delta shelf, 7 in the middle Delta shelf, 10 in the coastal shelf, 23 in the deeper shelf, 22 in the upper slope and 17 in the lower slope (Figure 4).

In the whole sampling period from 2021 to 2025, 551 hauls: 37 in the coastal Delta shelf, 36 in the middle Delta shelf, 25 in the coastal shelf, 152 in the deeper shelf, 129 in the upper slope and 172 in the lower slope (Table 1).

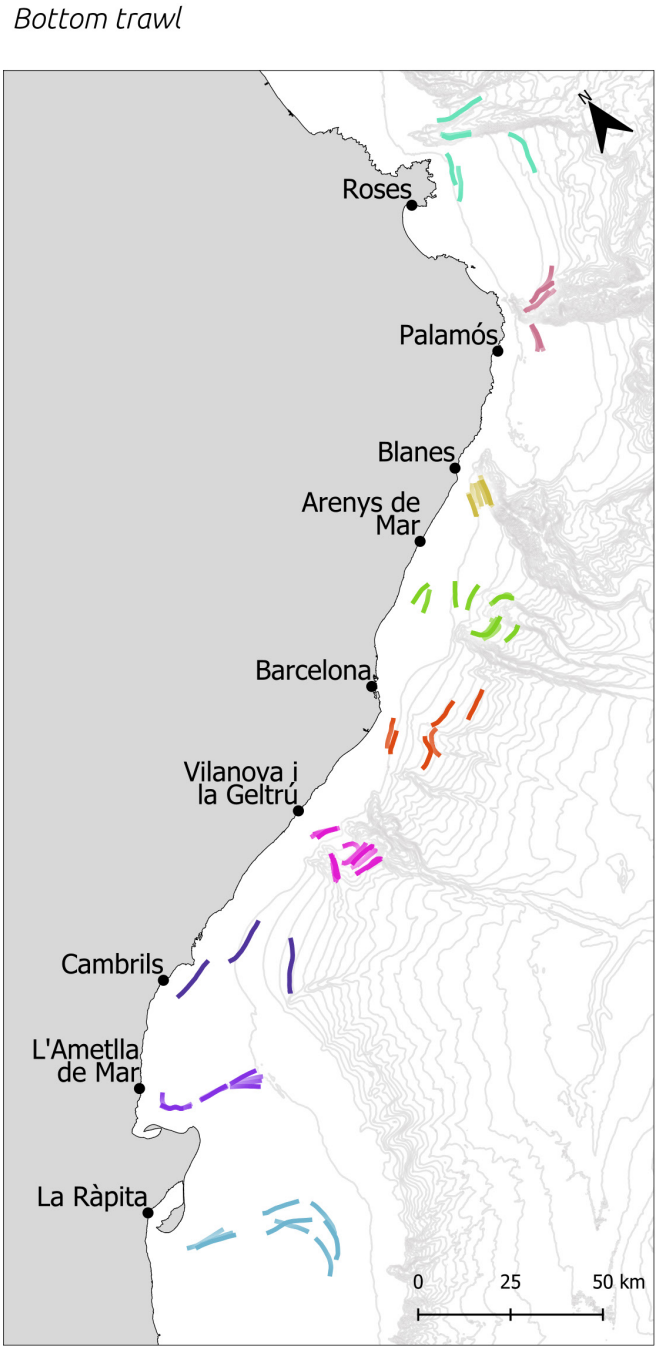


Figure 4. Bottom trawling hauls conducted in Catalonia in the year analyzed.

Table 1. Number of bottom trawling sampling hauls carried out along the zones sampled in each season and métier.

Fishery	Year	Zone	Coastal Delta shelf				Middle Delta shelf				Coastal shelf				Deeper shelf				Upper slope				Lower slope			
			W	Sp	Su	A	W	Sp	Su	A	W	Sp	Su	A	W	Sp	Su	A	W	Sp	Su	A	W	Sp	Su	A
Bottom trawl	2021	North													4	4	4	4	4	4	4	4	4	4	4	4
Bottom trawl	2021	Center													3	3	3	2	3	3	3	2	3	3	3	2
Bottom trawl	2021	South	2	1	2	2	2	1	2	2					2	1	2	2								
Bottom trawl	2022	North													3	4	4	4	3	4	4	4	3	4	4	4
Bottom trawl	2022	Center													3	2	3	3	3	2	3	3	3	2	3	3
Bottom trawl	2022	South	1	2	2	2	1	2	2	2					1	2	2	2								
Bottom trawl	2023	North									1	1	1	1	4	4	4	4	4	4	4	4	3	3	3	3
Bottom trawl	2023	Center									0	1	1	1	3	2	2	2	3	3	3	3	3	3	3	3
Bottom trawl	2023	South	2	2	2	1	2	2	2	1					2	2	2	1								
Bottom trawl	2024	North									1	1	1	1	4	4	3	4	4	4	3	4	3	3	2	3
Bottom trawl	2024	Center									1	1	1	1	1	2	2	2	2	3	3	3	2	3	3	3
Bottom trawl	2024	South	2	2	2	2	2	2	2	2					2	2	2	2								
Bottom trawl	2025	North									1	1	2	2	3	4	3	3	3	4	4	4	2	3	3	3
Bottom trawl	2025	Center									1	1	1	1	0	1	1	0	1	2	2	2	1	2	2	1
Bottom trawl	2025	South	2	2	2	2	2	2	2	1					2	2	2	2								
Total number of hauls per depth						**37**				**36**				**25**				**152**				**129**				**172**
Total number of hauls in the studied period																										**551**

In the period 2021-2024 the mean landed catch was 65% while in 2025 it was 66% (Figure 5). The mean discarded catch was 3% for both periods. The mean natural debris mass was 3% for both periods. The mean marine litter mass was 2% for the period (2021-2024) and 1% for 2025.

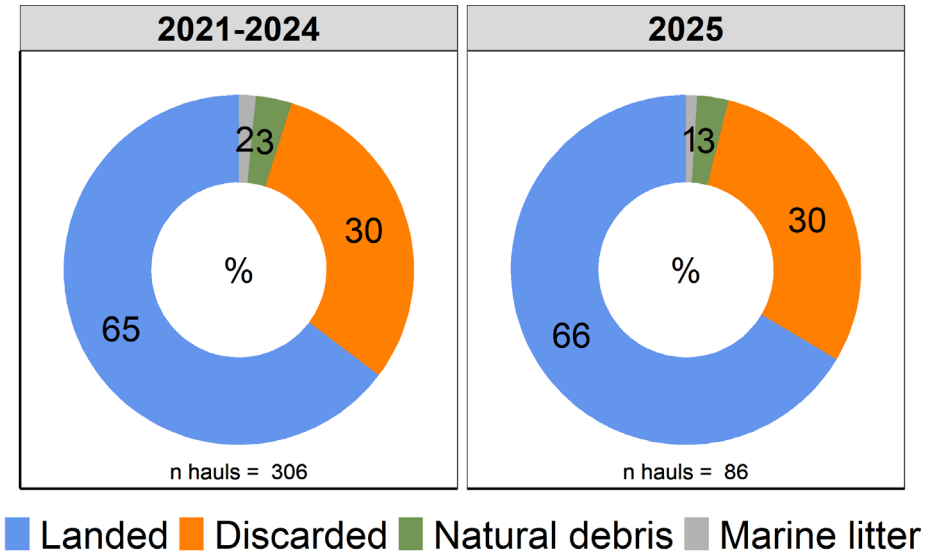


Figure 5. Catch composition in Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter.

The number of species commercialized (without considering discards) was 193 in the period 2021-2024 and 137 in 2025 (Figure 6). In Catalan margin, comparison of the 2021–2024 and 2025 periods indicates that the composition of the most important landed species remained relatively stable over time. *Trachurus trachurus* was the most important species in both periods, accounting for approximately 16% of the total landed biomass during 2021–2024 and 15% in 2025. It was followed by *Merluccius merluccius*, which represented approximately 9% and 8% of the landed biomass in the two periods, respectively. During the 2021–2024 period, *Micromesistius poutassou* accounted for approximately 3% of the total landed biomass; however, in 2025 it was no longer among the most important species in the landings. In contrast, *Aristeus antennatus* and *Nephrops norvegicus* contributed similar proportions of the landed biomass in both periods, representing

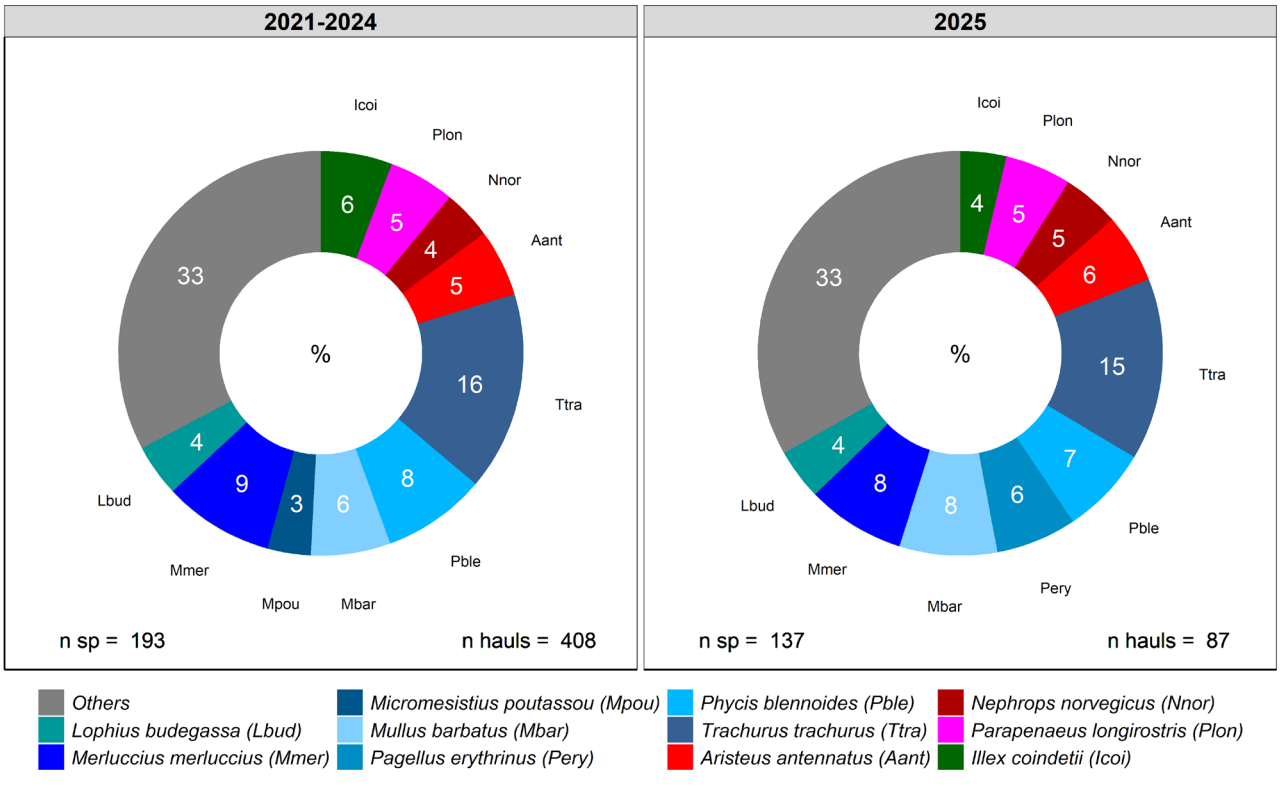


Figure 6. Landed species with most biomass including all hauls in each period.

approximately 5–6% and 4–5%, respectively. For detailed tables on the landed catch composition see Annex 1, Annex 2, Annex 3 and Annex 4.

The number of species discarded was 455 in the period 2021-2024 and 304 in 2025 (Figure 7). The species contributing most to the discarded catch was *Scyliorhinus canicula* in both periods, accounting for approximately 20–25% of the total discarded biomass. *Boops boops* was the second most important discarded species, representing between 8% and 10% of the total discards in both periods. Comparison of the two periods reveals some notable changes in discard composition. *Merluccius merluccius* consistently accounted for approximately 5% of the discarded biomass in both periods. In contrast, *Engraulis encrasicolus* represented around 3% of the discarded biomass during 2021–2024, but did not appear among the ten most important discarded species in 2025. Conversely, several *Sparidae* species increased in importance in 2025. In particular, *Pagellus acarne* and *Pagellus bogaraveo* were among the most frequently discarded species during that year, whereas they were not ranked among the top discarded species during the 2021–2024 period. For a detailed tables on the discarded catch composition see Annex 5, Annex 6, Annex 7 and Annex 8.

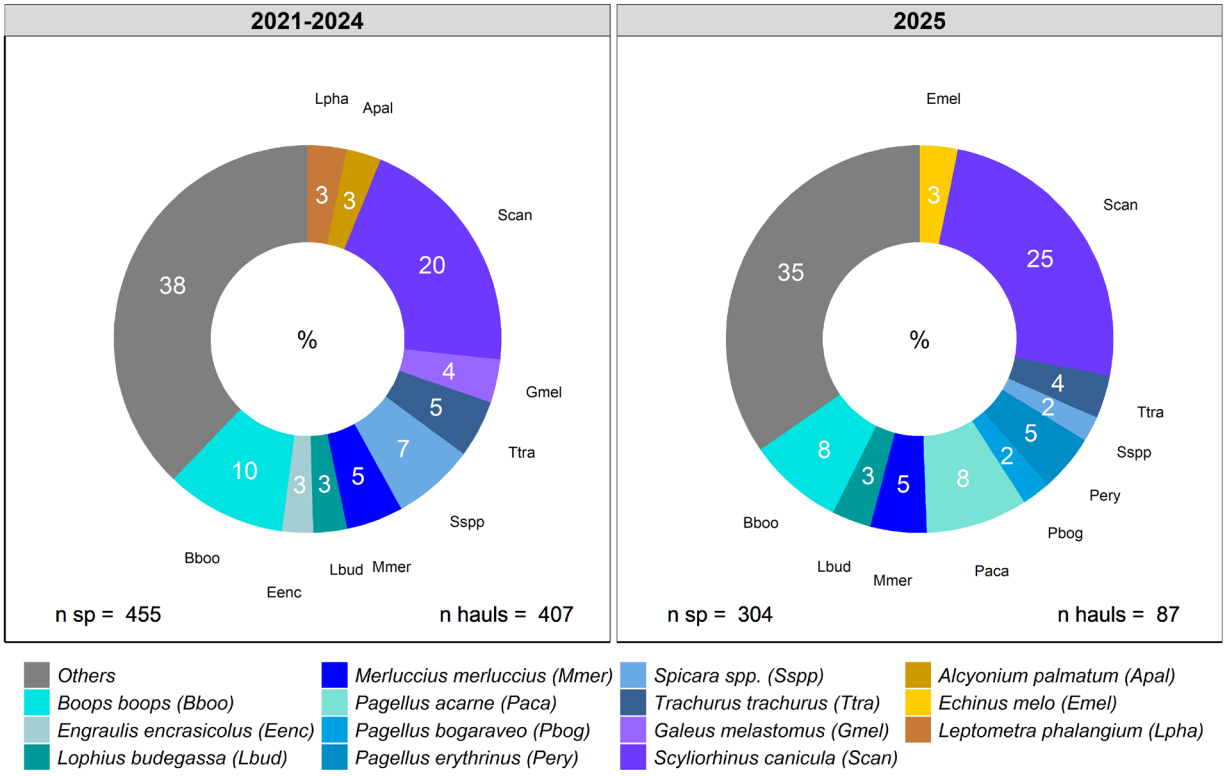


Figure 7. Discarded species with most biomass including all hauls in each period.

As for the natural debris, the predominant categories present in the bottom trawling samples were terrestrial plants, marine organic debris and shells in both periods analyzed (Figure 8). For detailed tables on the natural debris composition see Annex 9 and Annex 10.

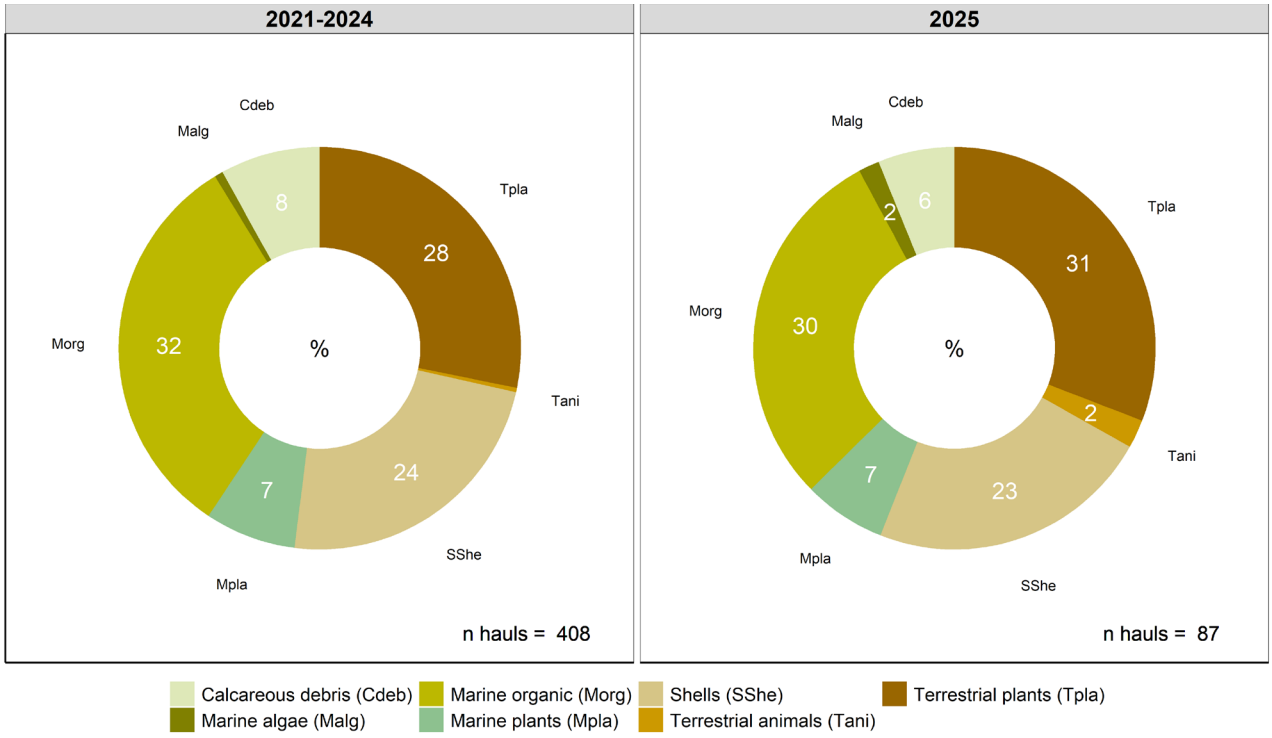


Figure 8. Categories of natural debris with higher biomass including all hauls in each period.

For marine litter (i.e., anthropogenic waste), plastics accounted for the highest proportions during the period 2021–2024 (Figure 9). This material tends to accumulate near river mouths and submarine outfalls (Blanco et al., 2025). During the 2021–2024 period, metal represented approximately 28% of the total marine litter mass recorded in bottom trawl catches. In contrast, its contribution decreased to around 5% in 2025. This marked difference was largely attributable to a single haul conducted off Blanes in 2024, which contained a metal container and substantially increased the overall proportion

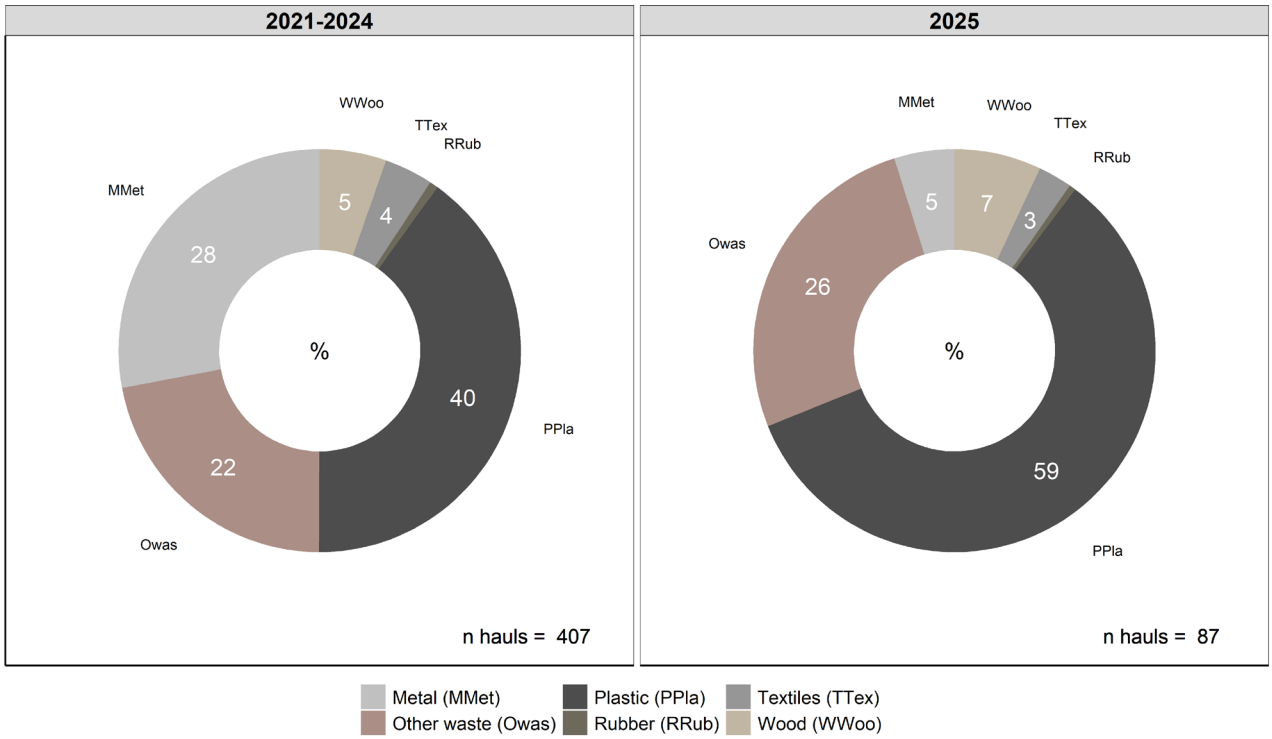


Figure 9. Categories of marine litter with higher mass including all hauls in each year.

of this category during the 2021–2024 period. Wood was another marine litter category that consistently appeared in the bottom trawl catches throughout the study period, accounting for approximately 5–7% of the total marine litter mass in both periods. For detailed tables on marine litter composition see Annex 11 and Annex 12.

Comparing the different catch fractions, discard proportions varied among *métiers* but remained broadly consistent between the two periods in most cases (Figure 10). The coastal shelf exhibited the highest discard rates, with discards accounting for approximately 42–43% of the total biomass in both periods 2021–2024 and 2025. In contrast, the middle Delta shelf showed a marked decrease in discards, from 35% during 2021–2024 to 20% in 2025, accompanied by an increase in the landed fraction from 61% to 76%. In the coastal Delta shelf, discards declined from 28% in 2021–2024 to 19% in 2025, while the landed fraction increased from 66% to 76%. The deeper shelf also showed a reduction in discard proportion, decreasing from 33% to 29%. Conversely, in the upper slope, discards increased from 24% to 32%, whereas in the lower slope they decreased slightly from 26% to 23%. Overall, discard proportions in both slope *métiers* remained below one-third of the total catch biomass. The slight reduction in the proportion of discarded catch observed across most of the sampled *métiers* in 2025 may be related to improvements in gear selectivity following the implementation of new codend mesh-size regulations during the second half of the year (Blanco et al., submitted). The adoption of larger square-mesh codends is expected to have enhanced the escape of smaller individuals and non-target species, thereby reducing discard rates and increasing the proportion of the catch retained for commercial purposes.

The proportion of natural debris was generally low across all *métiers*, ranging between 2% and 5% of the catch biomass (Figure 10). The highest values were observed in the coastal Delta shelf during 2021–2024 (5%) and in the lower slope during 2025 (5%). Natural debris tended to decrease slightly in most *métiers* in 2025. Marine litter represented the smallest fraction of the catch in all *métiers* and periods. Its contribution generally remained below 2% of the total mass (Figure 10), with slightly higher values observed in the lower slope in 2025 (approximately 5%) and in the deeper shelf and upper slope during 2021–2024 (around 2%). Overall, landed biomass remained the dominant component of the catch across all *métiers* and periods, accounting for between 52% and 76% of the total biomass recorded.

Regarding the species contributing the highest landed biomass, notable differences were observed among *métiers* and between the 2021–2024 and 2025 periods (Figure 11). In the coastal Delta shelf, *Pagellus erythrinus* remained the dominant species, increasing from 12% of the landed biomass in 2021–2024 to 18% in 2025. The contribution of *Trachurus trachurus* also increased markedly, from 0% to 15%, becoming the second most important species in 2025. In contrast, species that were important during 2021–2024, such as *Sphyraena sphyraena* (13%) and *Trachurus mediterraneus* (12%), declined substantially, representing only 4% each in 2025. *Sepia officinalis*, which accounted for 4% of the landed biomass in 2021–2024, was no longer among the principal landed species in 2025, whereas *Scomber scombrus* and *Pagellus acarne* increased their relative importance. In the middle Delta shelf, the species composition changed considerably between periods. During 2021–2024, *Merluccius merluccius* and *Illex coindetii* were among the dominant species, each contributing approximately 11% of the landed biomass. In 2025, however, *Trachurus trachurus* became the most important species, accounting for 25% of the landed biomass. *Merluccius merluccius* remained an important component of the catch (10%), while *Illex coindetii* disappeared from the top ten species. *Parapenaeus longirostris* slightly increased its contribution from 6% to 8%, whereas *Liocarcinus depurator* decreased from 5% to 3%.

On the coastal shelf, the most important species during 2021–2024 were *Diplodus vulgaris* (22%), *Mullus barbatus* (17%), *Mullus surmuletus* (12%), and *Pagellus erythrinus* (11%). In 2025, *Pagellus erythrinus* became the dominant species, contributing 21% of the landed biomass, followed by *Mullus barbatus* (16%) and *Pagellus acarne* (10%) (Figure 11). In the deeper shelf, *Trachurus trachurus* remained the dominant species in both periods, although its contribution decreased from 33% during 2021–2024 to 27% in 2025. *Mullus barbatus* increased from 10% to 13%, while *Merluccius merluccius* remained relatively stable, contributing approximately 10–11% of the landed biomass in both periods. The relative importance of *Parapenaeus longirostris* increased from 5% to 7%, whereas *Illex coindetii* showed a slight decrease from 10% to 9%.

On the upper slope, *Phycis blennoides* was the dominant species in both periods, accounting for 24% of the landed biomass during 2021–2024 and increasing slightly to 26% in 2025 (Figure 11). *Nephrops norvegicus* was the second most important species and increased from 16% to 20% of the landed biomass. In contrast, *Micromesistius poutassou* showed a marked decline, decreasing from 13% in 2021–2024 to 4% in 2025. *Merluccius merluccius* increased slightly from 8% to 9%, while *Helicolenus dactylopterus* became more important, rising from 4% to 9%. On the lower slope, *Aristeus antennatus* remained the dominant species throughout the study period, increasing from 45% of the landed biomass in 2021–

2024 to 63% in 2025. In contrast, *Phycis blennoides* decreased from 17% to 11%, while *Merluccius merluccius* increased slightly from 7% to 8%. Species such as *Galeus melastomus* and *Lophius piscatorius*, which were among the most important components of the landed catch during 2021–2024, were no longer present among the dominant species in 2025. The increase in the proportion of *A. antennatus* indicates a growing dominance of the blue and red shrimp fishery within the lower-slope *métier* during 2025.

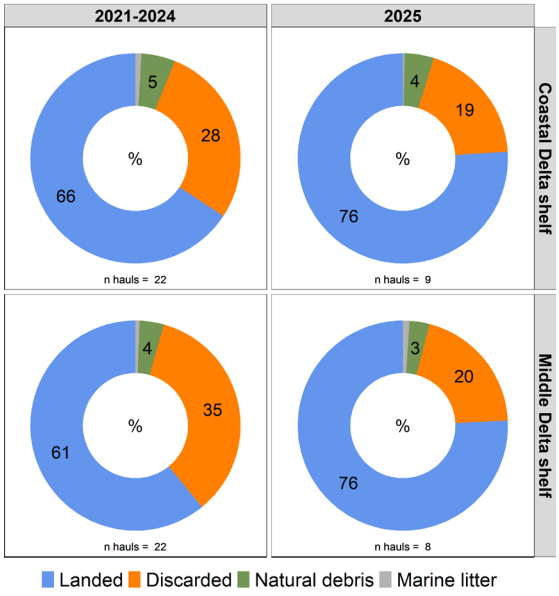
Regarding the discarded fraction of the catch, important shifts in species composition were observed among *métiers* between the 2021–2024 and 2025 periods (Figure 12). In the coastal Delta shelf, the discard composition changed markedly. During 2021–2024, *Sardinella aurita* was the most important discarded species, accounting for 16% of the discard biomass. In 2025, however, *Boops boops* became the dominant discarded species, representing 28% of the discarded biomass. The contribution of *Pagellus acarne* increased from 8% to 10%, while *Sardinella aurita* declined substantially to 4%. Other species that increased their importance in 2025 included *Octopus vulgaris* (6%) and *Sardina pilchardus* (6%). In the middle Delta shelf, the most important discarded species during 2021–2024 were the small pelagic fishes *Engraulis encrasicolus* and *Sardina pilchardus*, representing 25% and 22% of the discard biomass, respectively. In 2025, both species showed a pronounced decline, decreasing to 7%. Conversely, *Merluccius merluccius* increased markedly from 5% to 17% of the discarded biomass, becoming the dominant discarded species in 2025. The contribution of *Lophius budegass*a also increased from 4% to 10%.

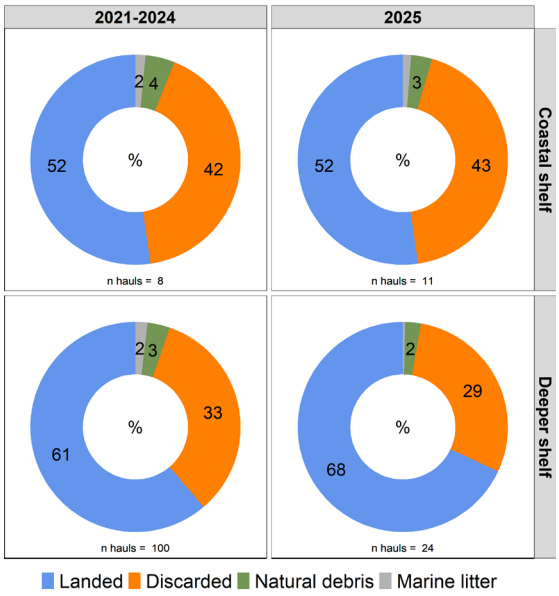
On the coastal shelf, the discard composition underwent substantial changes (Figure 12). During 2021–2024, *Spicara spp.* was the dominant discarded taxon, accounting for 40% of the discard biomass, followed by *Boops boops* (22%). In 2025, *Pagellus acarne* became the most important discarded species, representing 29% of the total discarded biomass. The contribution of *Spicara spp.* decreased to 2%, while *Boops boops* remained an important component of the discarded catch (11%). Additionally, *Pagellus erythrinus* increased considerably, from 5% to 14% of the discarded biomass. In the deeper shelf, *Scyliorhinus canicula* was the most important discarded species in both periods. Its contribution increased from 17% during 2021–2024 to 24% in 2025. *Boops boops* remained the second most important discarded species, although its relative contribution declined from 13% to 7%. Discards of *Lophius budegass*a increased from 4% to 8%, whereas *Trachurus trachurus* decreased slightly from 9% to 7%.

On the upper slope, *Scyliorhinus canicula* was by far the dominant discarded species in both periods, accounting for 63% of the discard biomass during 2021–2024 and 59% in 2025 (Figure 12). All other discarded species individually represented less than 5% of the discard biomass in both periods, highlighting the overwhelming dominance of this species within the upper-slope discard fraction. Finally, in the lower slope, the dominant discarded species shifted between periods. During 2021–2024, *Galeus melastomus* was the most important discarded species, accounting for 33% of the discard biomass, followed by *Scyliorhinus canicula* (25%). In 2025, *Scyliorhinus canicula* became the dominant discarded species, increasing to 41%, while *Galeus melastomus* decreased to 18%. Other species that gained relevance in 2025 included *Chimaera monstrosa* (8%) and *Lampanyctus crocodilus* (7%), whereas the contribution of *Octopus salutii* increased from 3% to less than 5%.

The composition of natural debris varied with depth but remained relatively consistent between periods (Figure 13). In the coastal Delta shelf and middle Delta shelf, the natural debris fraction was primarily composed of marine organic matter, shells, and, to a lesser extent, marine plants. In contrast, terrestrial plants became increasingly dominant with depth, representing the largest component of natural debris in the upper slope and lower slope *métiers* in both periods. In 2025, terrestrial plants accounted for more than 40% of the natural debris fraction on the upper slope and nearly 60% on the lower slope. The predominance of terrestrial plant material in deeper fishing grounds likely reflects inputs from river discharges, particularly following periods of intense rainfall, and its subsequent transport and accumulation offshore.

The composition of marine litter varied among *métiers* and between periods, although plastic was the dominant category in most cases (Figure 14). In the coastal Delta shelf and middle Delta shelf, plastics represented the largest fraction of marine litter in both periods, with their contribution increasing in 2025. On the deeper shelf, plastics remained the predominant category, accounting for more than 40% of marine litter in 2021–2024 and increasing to 66% in 2025. In the slope *métiers*, plastics and other waste were generally the main marine litter categories. On the upper slope, other waste represented the largest fraction in both periods (49–61%), whereas on the lower slope plastics increased markedly from 34% in 2021–2024 to 87% in 2025, becoming by far the dominant category. Wood, metals, textiles, and rubber generally contributed smaller proportions, although occasional increases in these categories were observed in some *métiers* and periods. Overall, the results indicate that plastics constitute the most widespread component of marine litter across Catalan bottom-trawl fishing grounds, while the relative importance of other categories varies according to depth and fishing area.





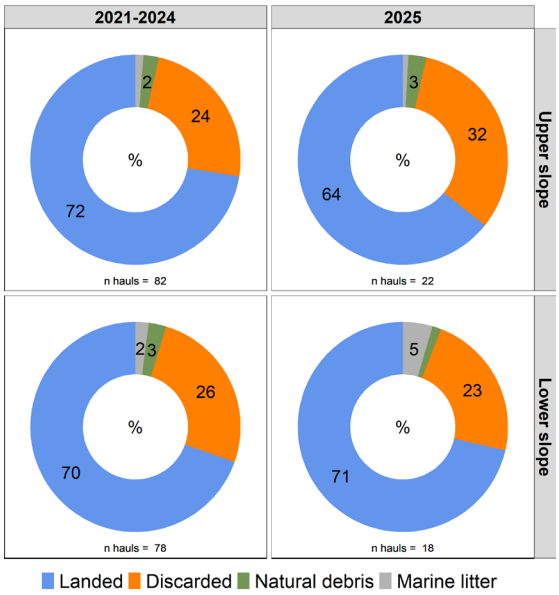


Figure 10. Catch composition for Catalonia. Percentage by weight of landings, discarded, natural debris and marine litter fraction in each métier including all hauls in each period.

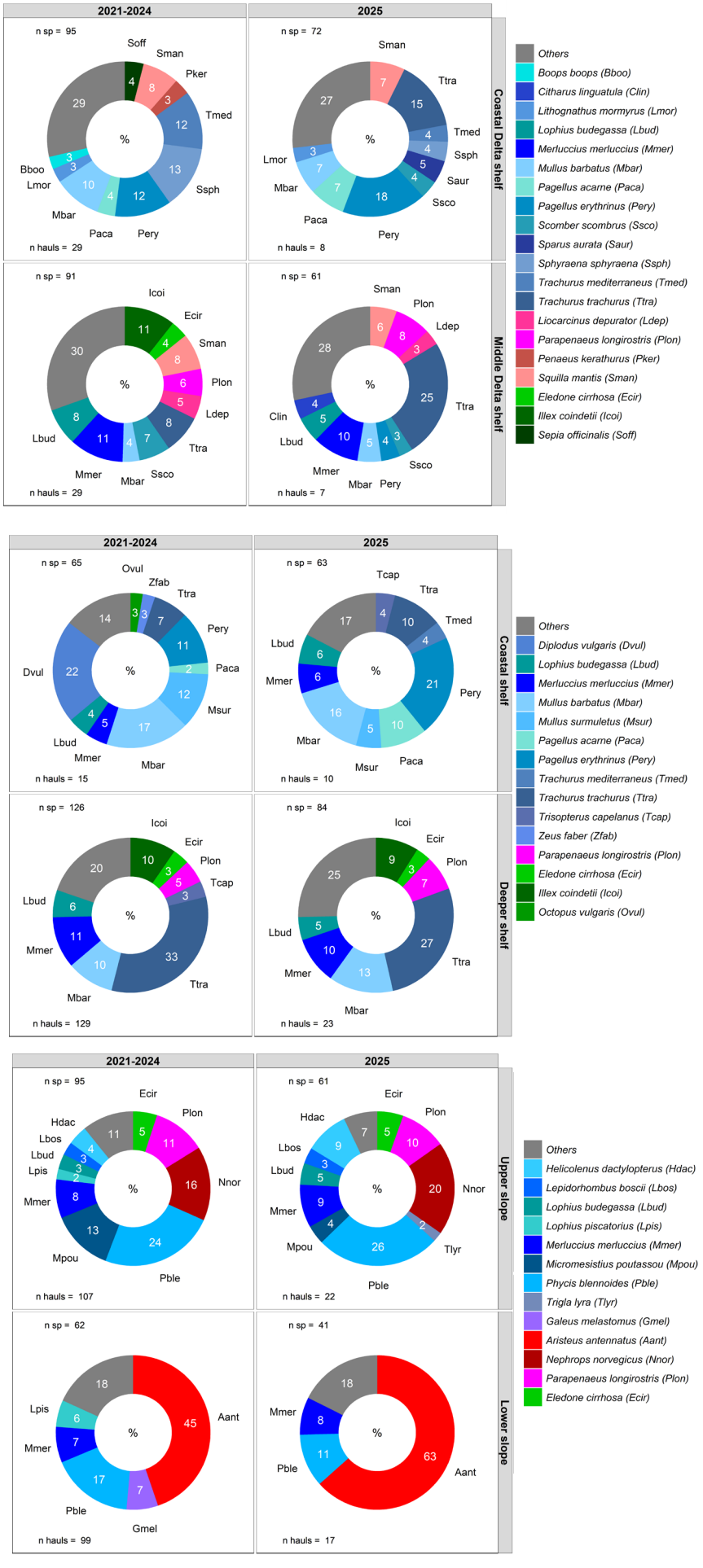


Figure 11. Landed species with most biomass. Percentage in weight including all hauls within each period and métier.

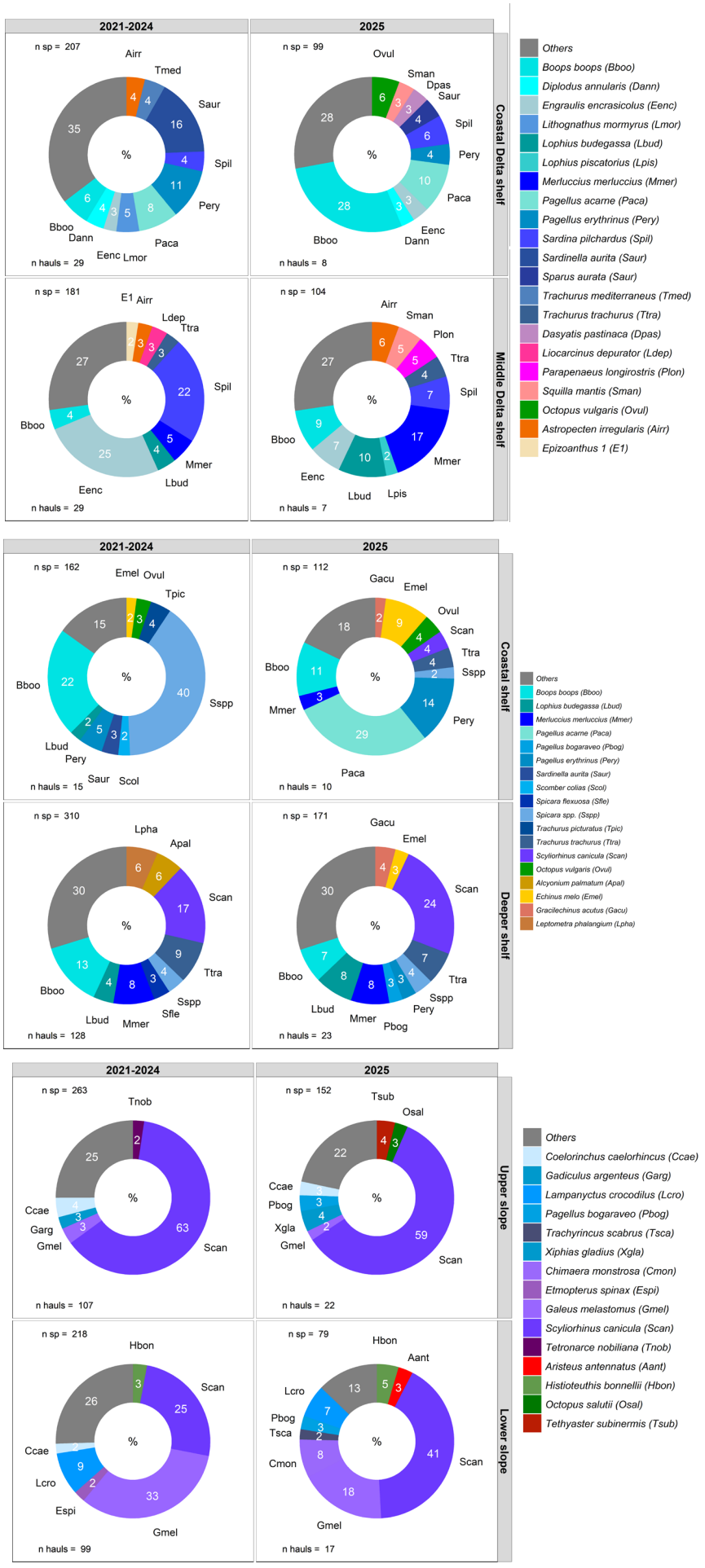


Figure 12. Discarded species with most biomass. Percentage in weight including all hauls within each period and métier.

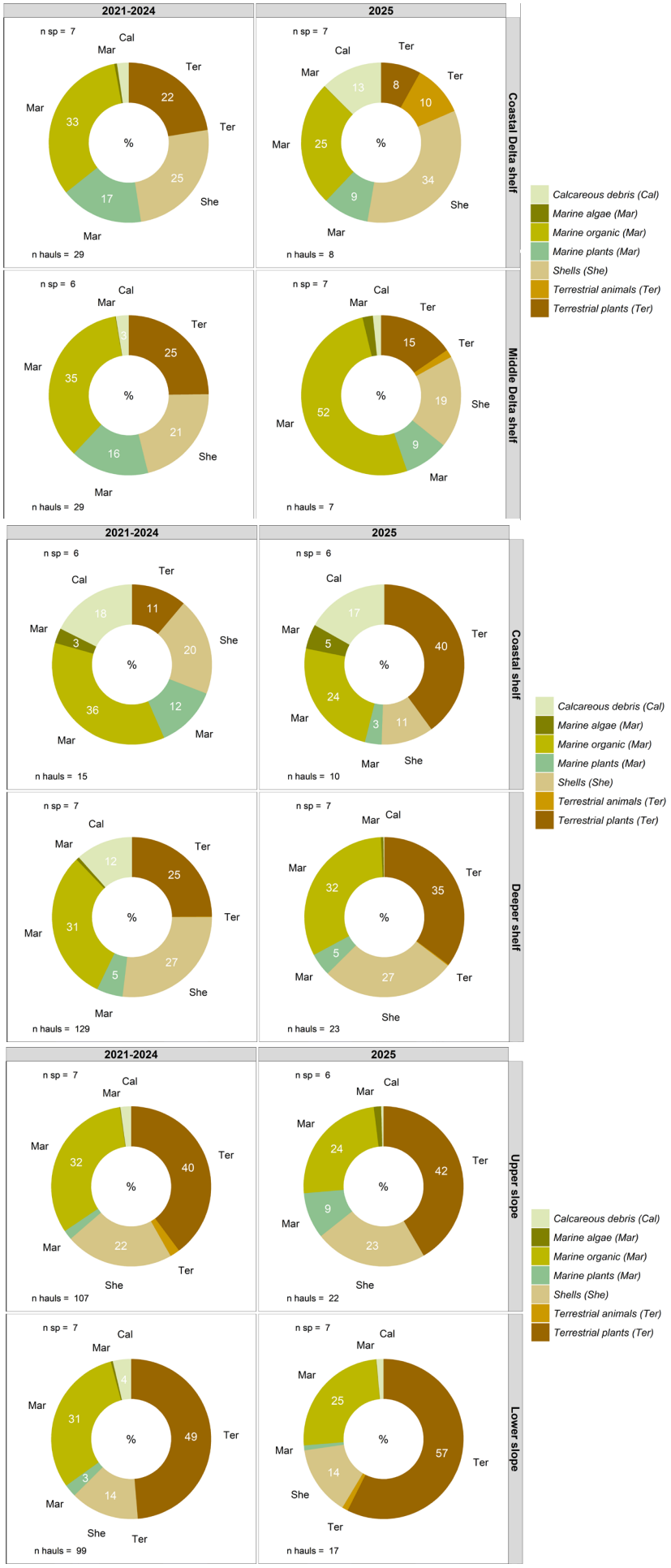


Figure 13. Categories of natural debris with higher biomass. Percentage in weight including all hauls within each period and métier.

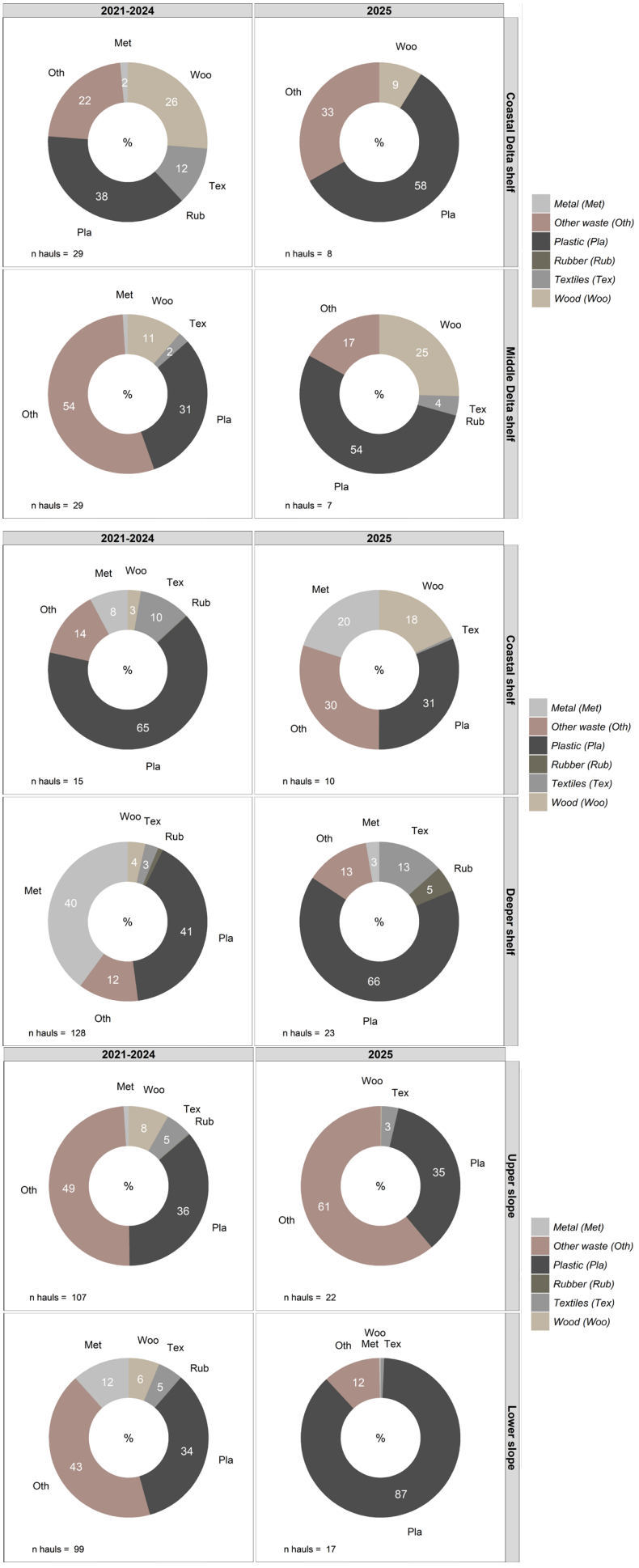


Figure 14. Categories of marine litter with higher mass. Percentage in weight including all hauls within each period and métier.

Figure 15 and Figure 16 show the spatial representation of fishing effort (h/km^2) in 2025 and from 2021 to 2025, respectively. Fishing effort is generally focused on submarine canyons in the North and Center zones, with more emphasis in the shallow continental slope in the Ebre Delta.

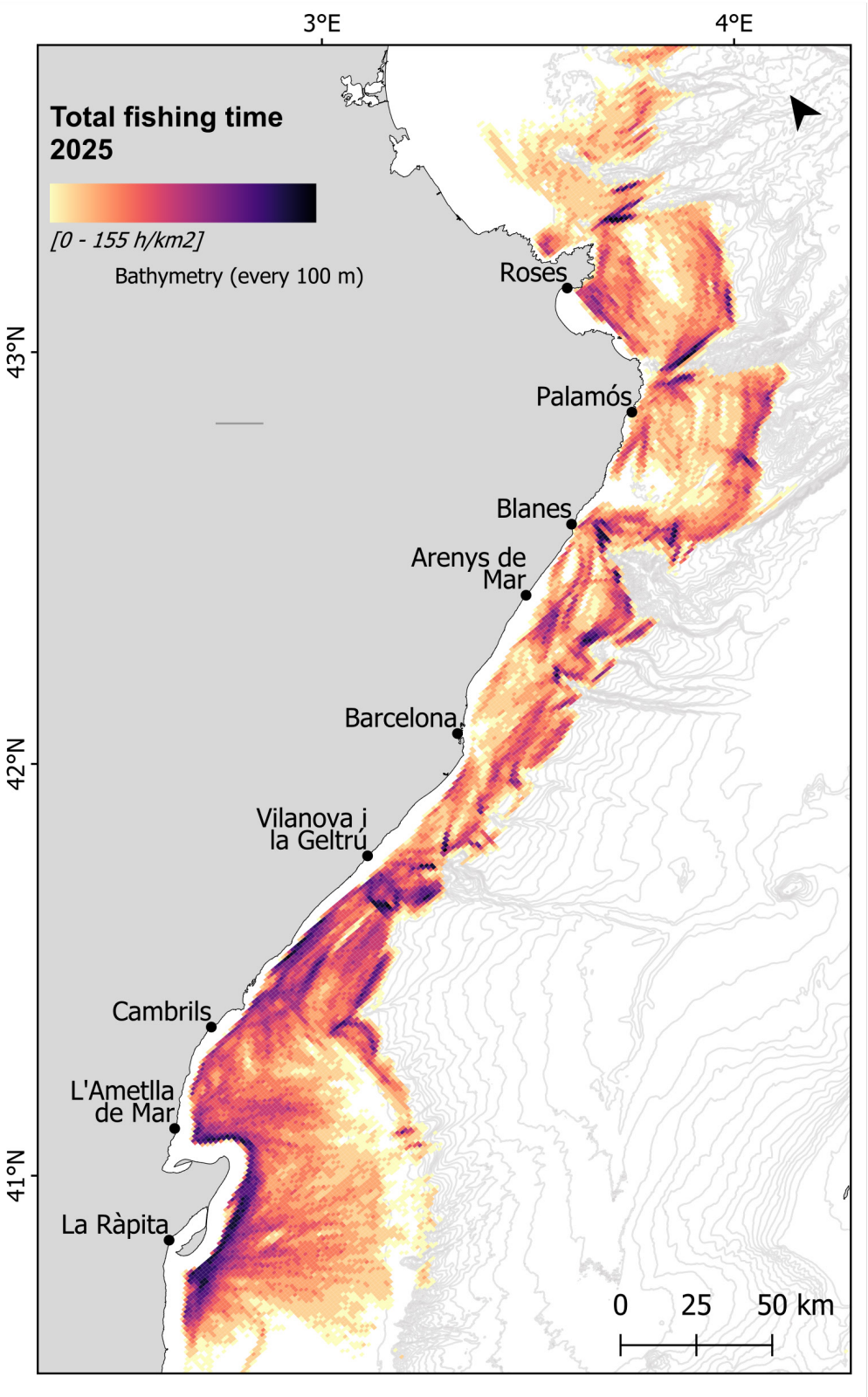


Figure 15. Spatial distribution of fishing effort (h/km^2) in the year analyzed.

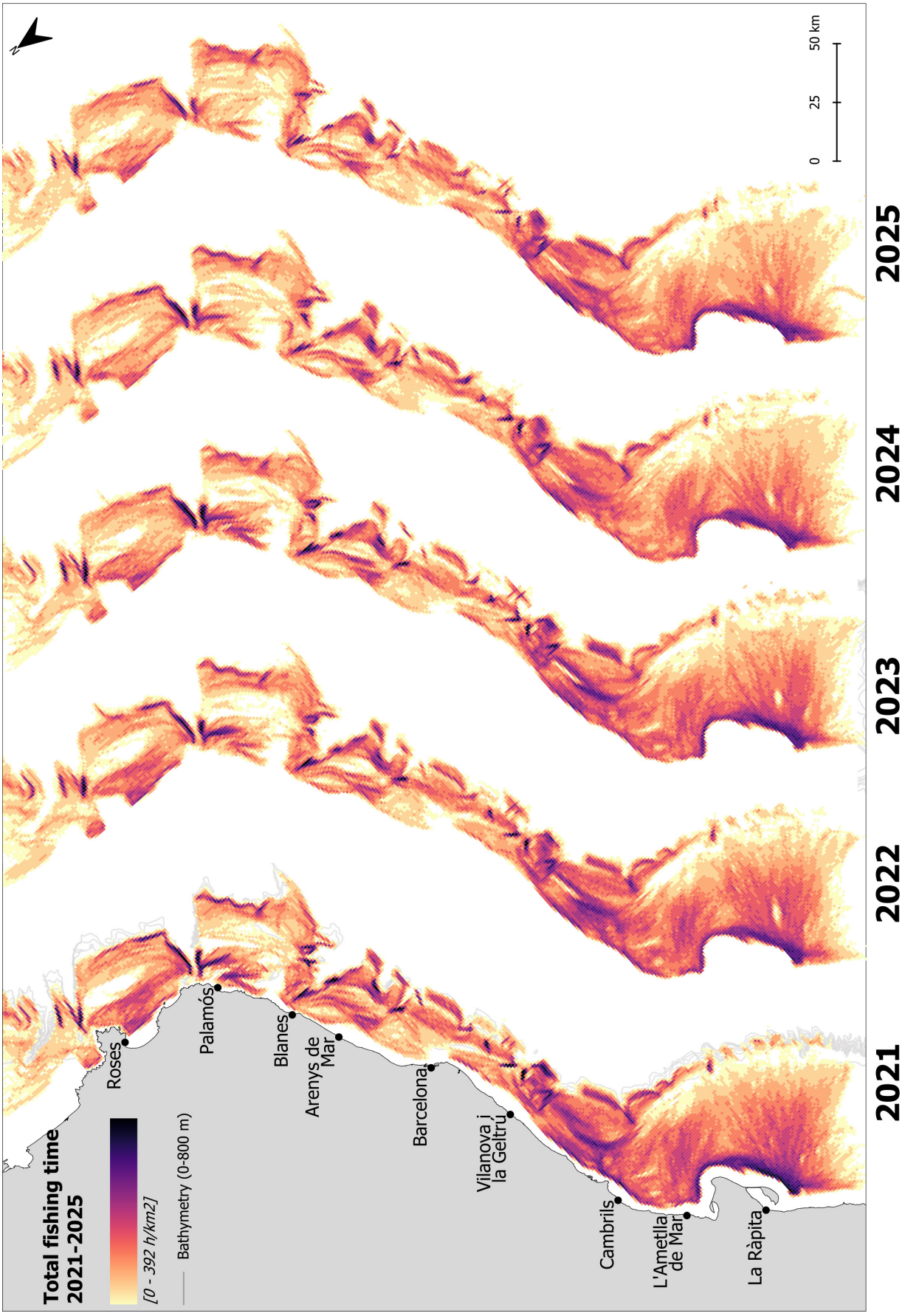


Figure 16. Spatial distribution of fishing effort (h/km^2) for the years prior to the year analyzed.

Figure 17 and Figure 18 show the spatial representation of total catches (kg) in 2025 and from 2021 to 2025, respectively. Total catch is concentrated around the shallower waters of the Ebre Delta and along the Center zone.

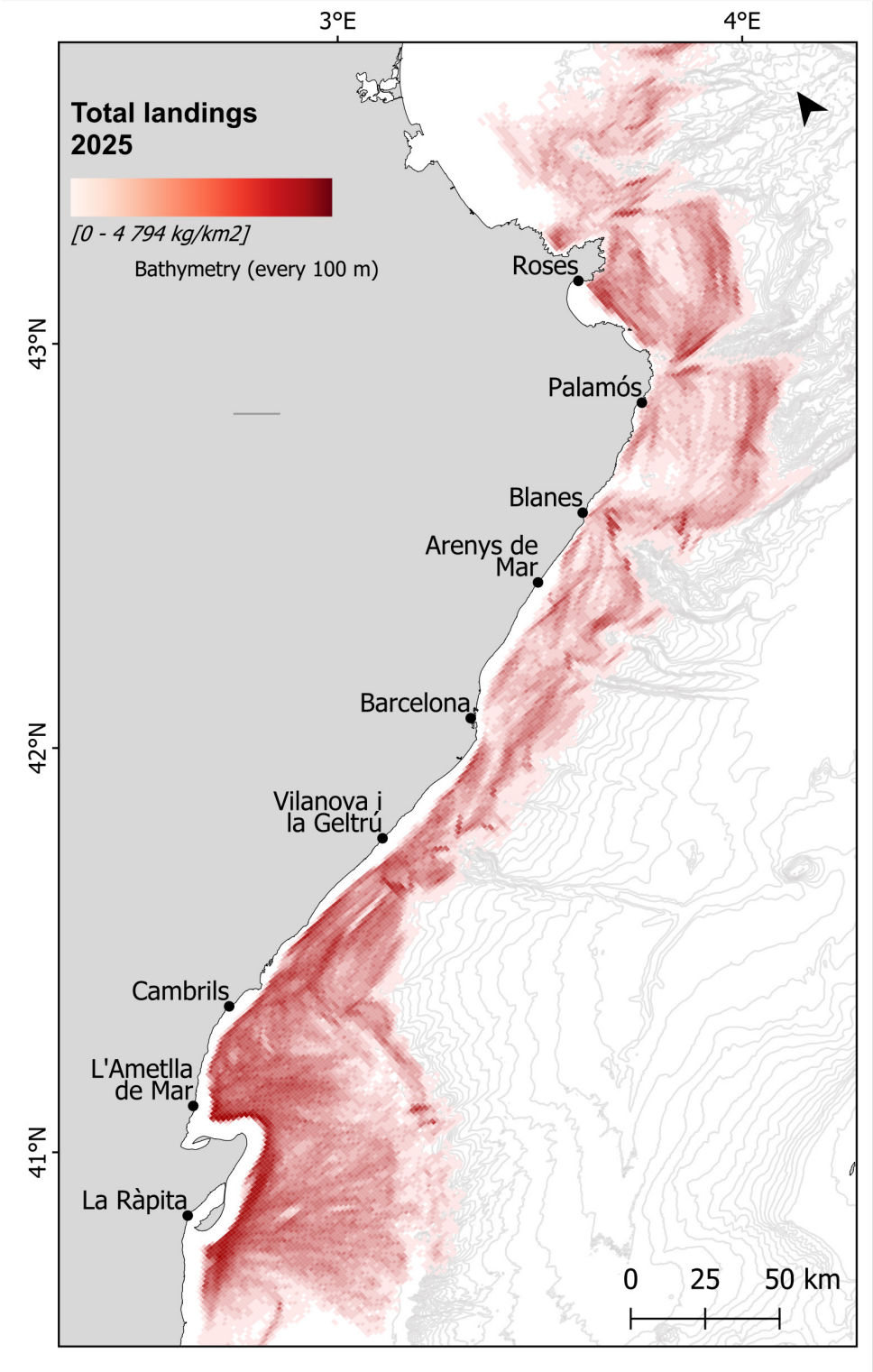


Figure 17. Spatial distribution of landings (kg/km²) in the year analyzed.

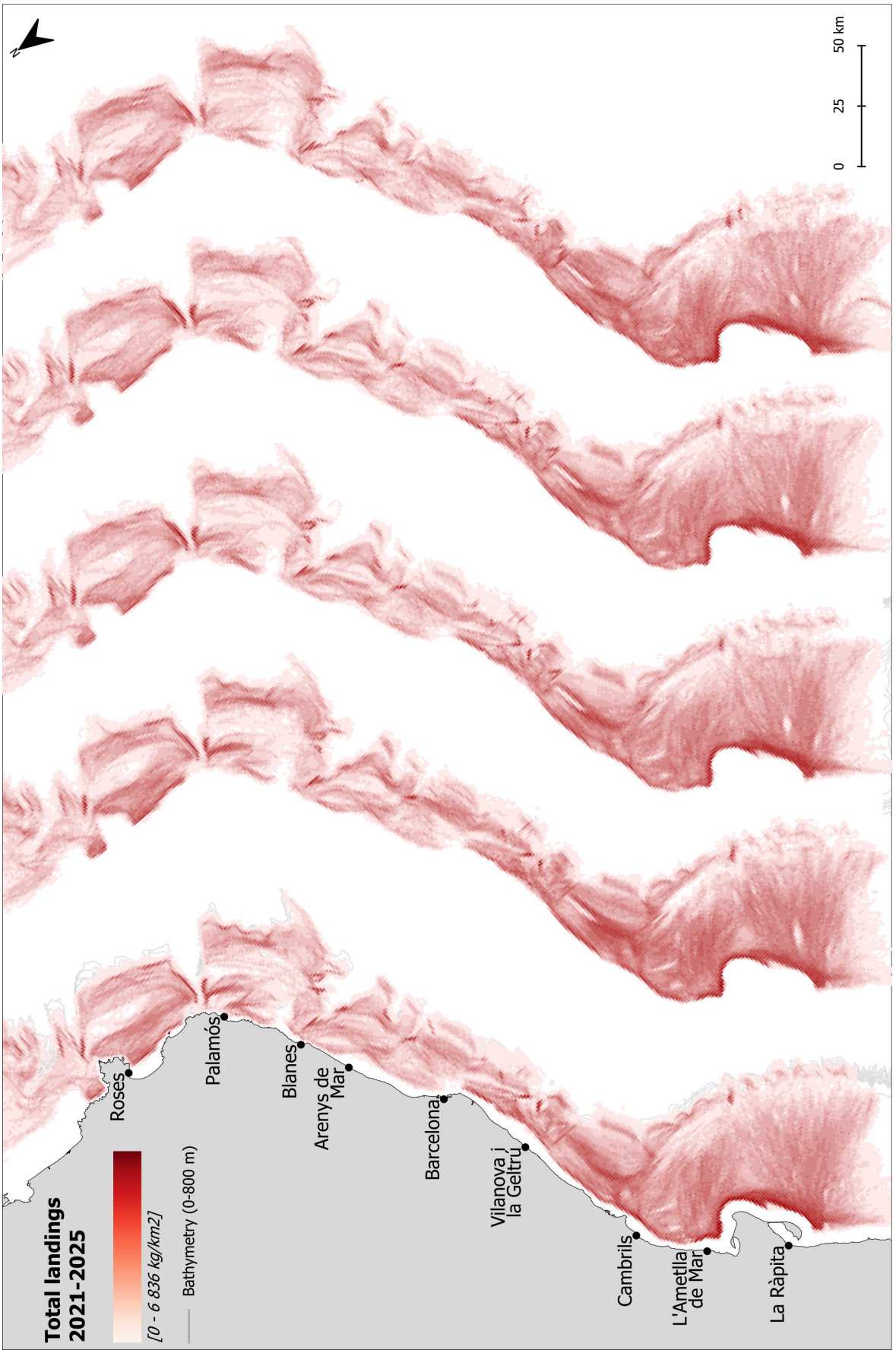


Figure 18. Spatial distribution of landings (kg/km^2) for the years prior to the year analyzed.

Figure 19 and Figure 20 show the spatial representation of revenues per unit effort (€/h·km²) in 2025 and from 2021 to 2025, respectively. Revenue per unit effort is higher in the northernmost parts of the studied area, with similar values near the shelf break of the Ebre Delta as well.

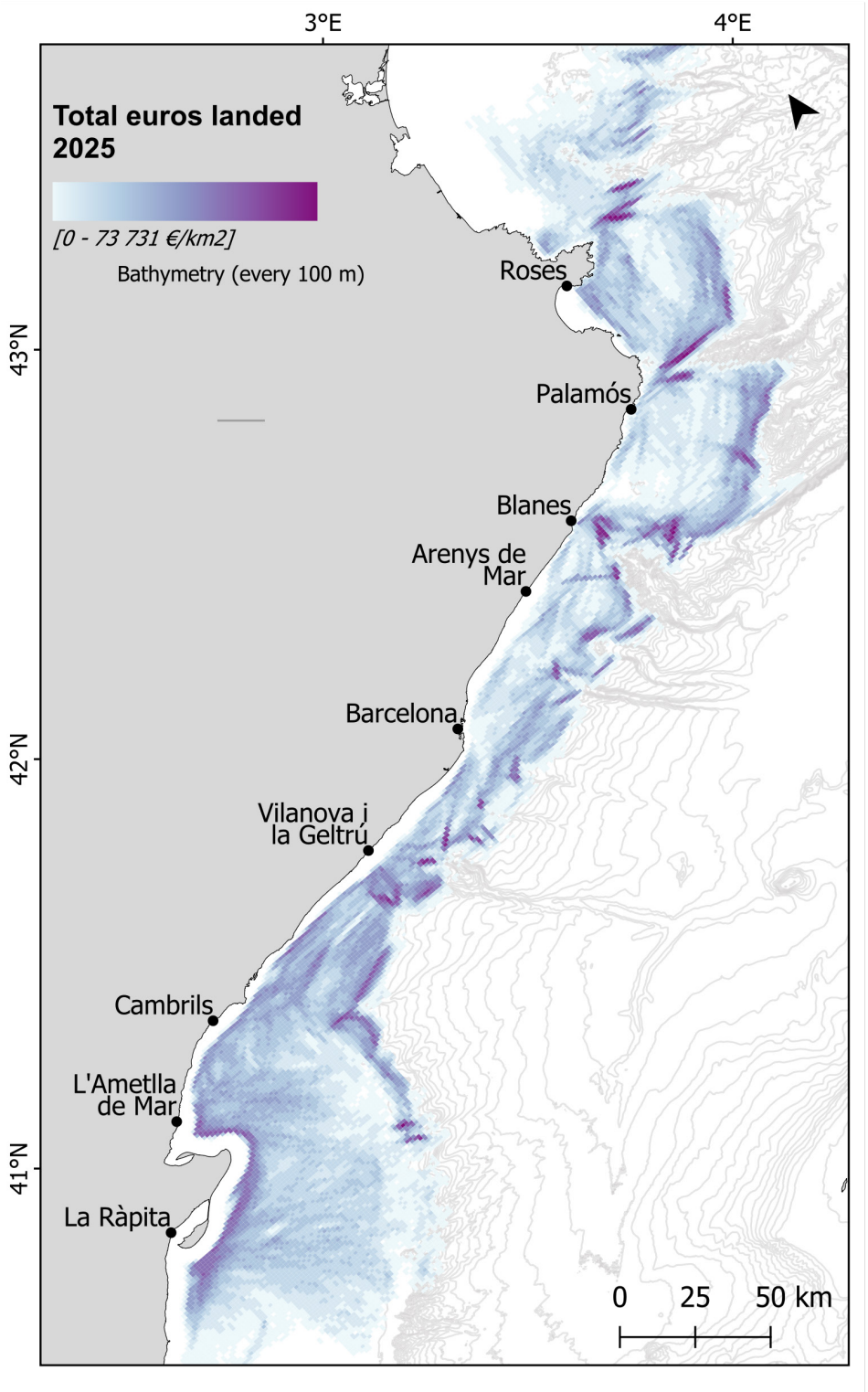


Figure 19. Spatial distribution of revenues per unit of effort (€/h*km²) in the year analyzed.

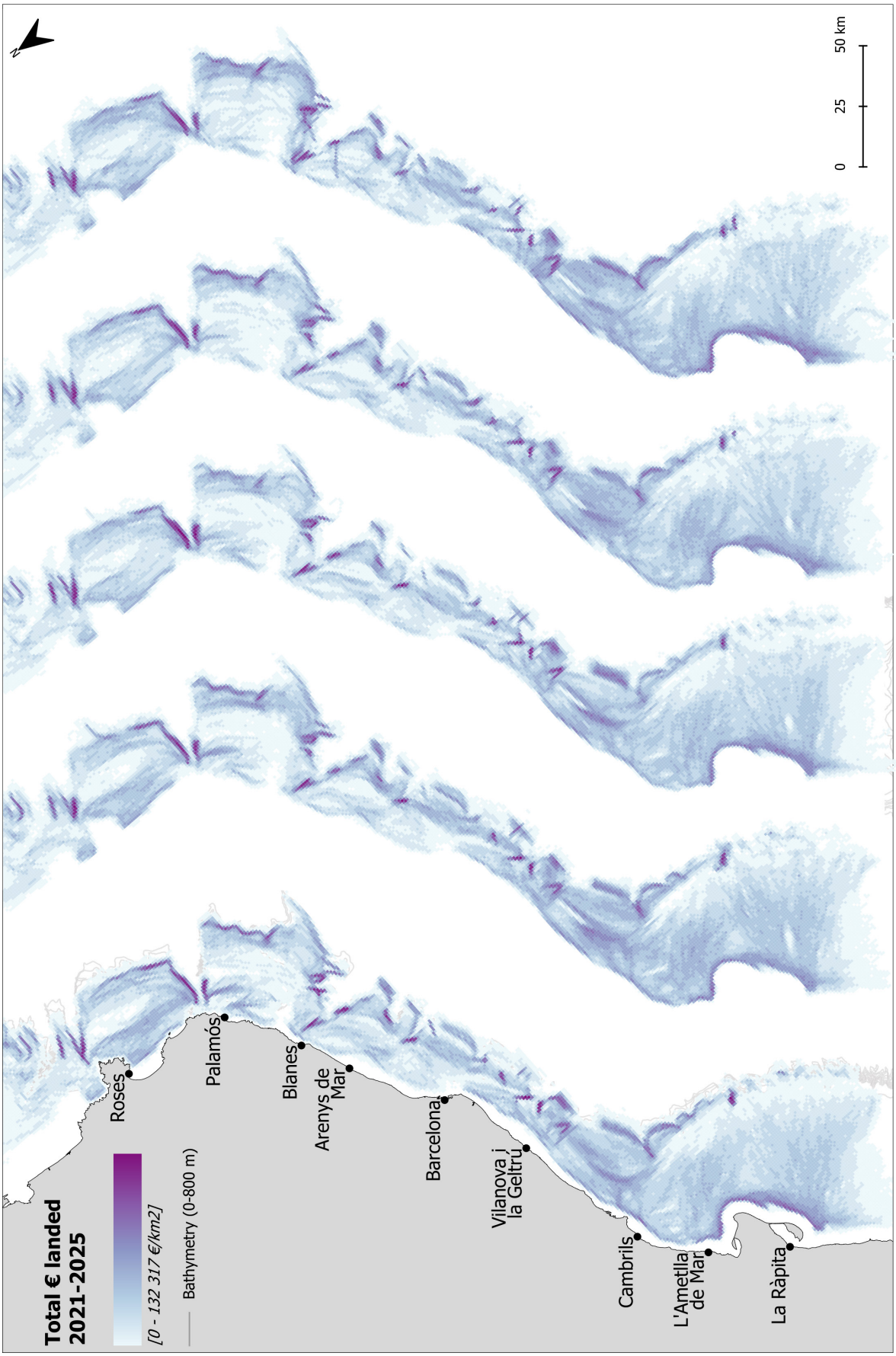


Figure 20. Spatial distribution of revenues per unit of effort (€/h*km²) for the years prior to the year analyzed.

European hake (*Merluccius merluccius*) HKE

The total European hake catch in Catalonia in 2025 was 649 t, of which approximately 95% were caught by bottom trawling and 5% by small-scale fisheries (ICATMAR, 26-02).

Figure 21 and Figure 22 show the spatial distribution of the species landings in 2025 and in the period 2021-2024 along the Catalan coast. The highest annual maximum in the series was recorded in 2021, with 545 kg/km². Since then, landings have progressively decreased, reaching their lowest annual maximum in 2024, with 202 kg/km². In 2025, the annual maximum recovered to 297 kg/km², although it remained well below the levels recorded in 2021.

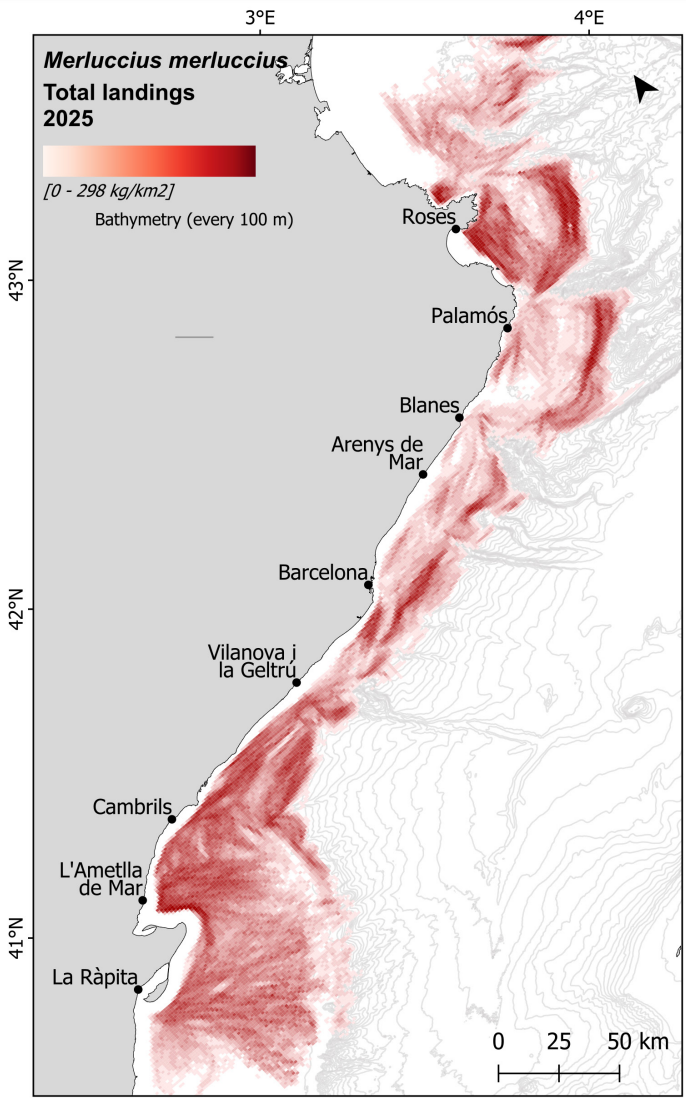


Figure 21. Spatial distribution of landings (kg/km²) for European hake in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 2. European hake length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	**a**	**b**	**r²**	**n**
Combined	0.0063	3.0399	0.98	1 959
Females	0.0074	2.9919	0.98	1 055
Males	0.0065	3.0267	0.96	686
Length – eviscerated weight relationship				
2025	**a**	**b**	**r²**	**n**
Combined	0.0061	3.0226	0.99	1 770
Females	0.0066	3.0002	0.99	1 055
Males	0.0055	3.0535	0.97	686

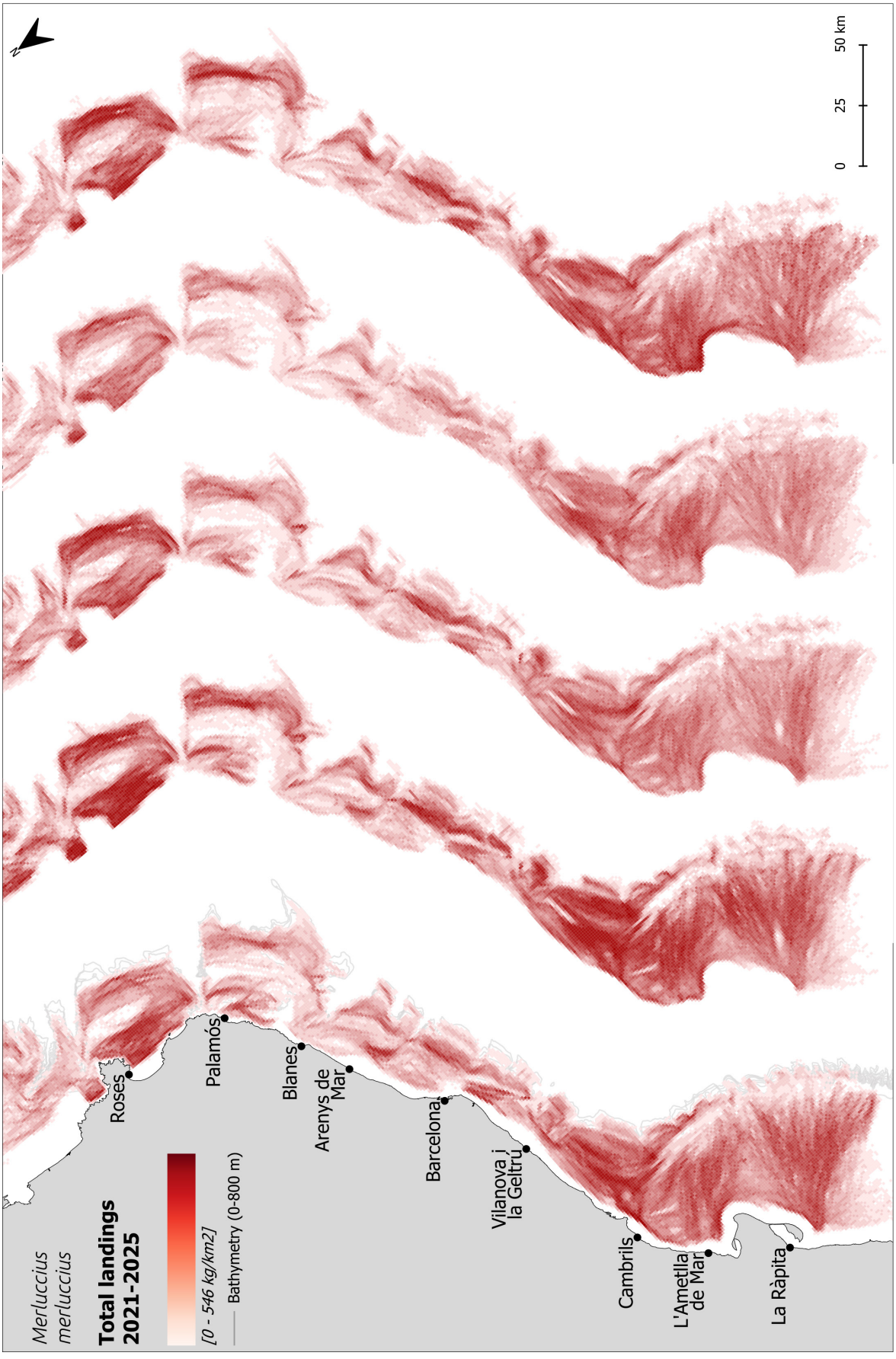


Figure 22. Spatial distribution of landings (kg/km^2) for European hake in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

According to length-weight relationship parameters for both sexes combined, European hake displayed an isometric growth (CL_{95}=3.021-3.058; b=3) in 2025 (Table 2). When comparing the total weight with the eviscerated weight, no differences were found in the length-weight relationship, as well as when analyzing the two sexes separately, both showing isometric growth with similar *a* and r^2 values.

Also, comparing European hake length-weight relationships for both total weight and eviscerated weight, for both sexes combined and separately from 2021 to 2025 (Figure 23 and Figure 24), the results show similar trends with isometric growth in all cases.

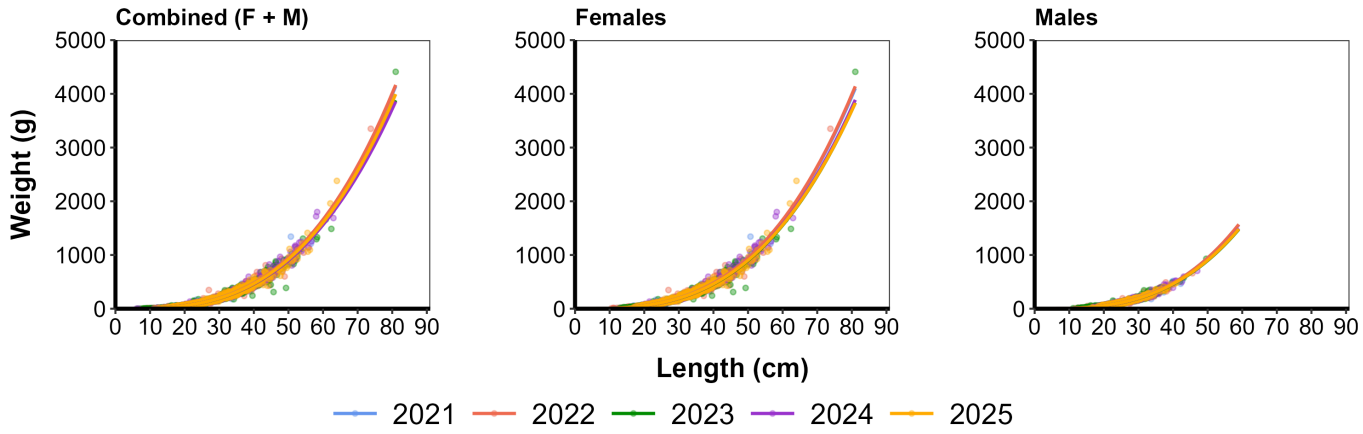


Figure 23. European hake length-weight relationship for the years sampled.

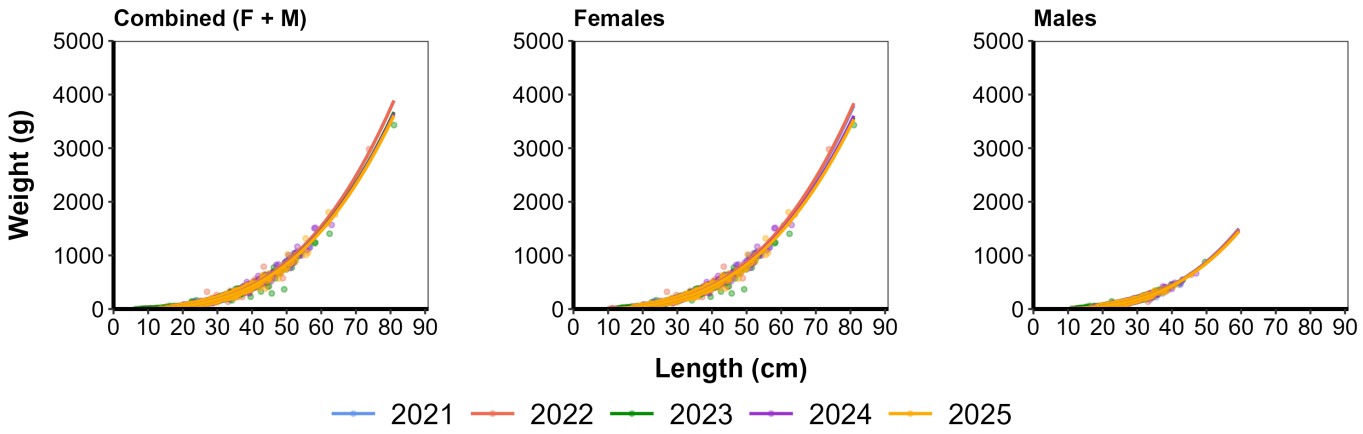


Figure 24. European hake length-eviscerated weight relationship for the years sampled.

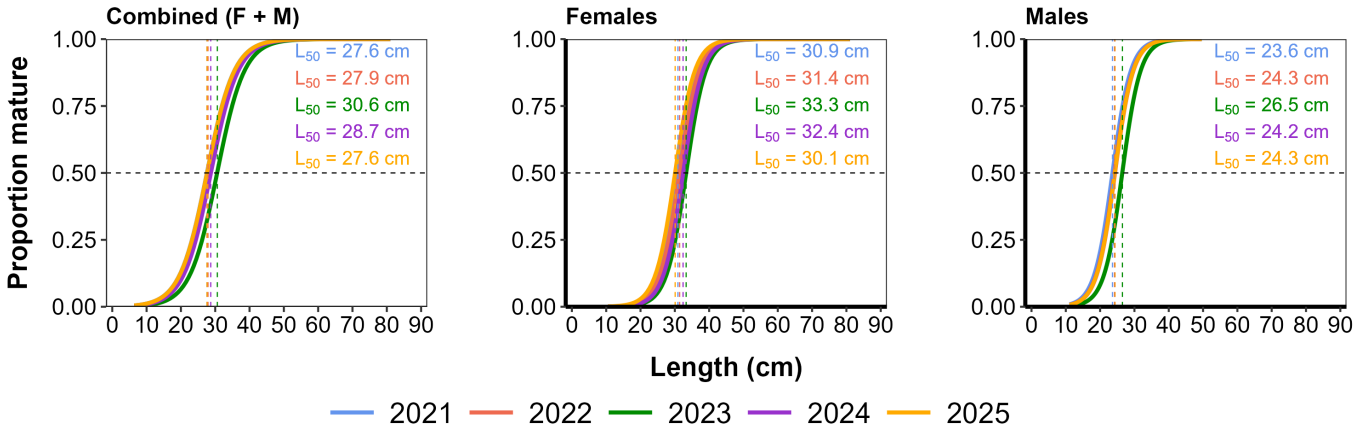


Figure 25. European hake size at first maturity (L_{50}) for all years sampled

The size at first maturity (L_{50}) for European hake in 2025 was 27.6 cm of TL for both sexes combined, and 30.1 cm of TL and 24.3 cm of TL for females and males respectively, indicating that males mature earlier than females (Figure 25). When comparing between years, similar sizes at first maturity were observed for both combined and separated sexes, with L_{50} values ranging from 27 to 30 cm for combined sexes, and from 30 to 33 cm and 24 to 26 cm for females and males, respectively.

In 2025, a total of 1 759 European hake individuals were analyzed to calculate the L_{50}. Out of these, 942 individuals were classified as immature and 817 as mature (Table 3).

Table 3. Number of mature and immature individuals of European hake included monthly in biological analyses.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	113	23	66	17	178	116	89	71	58	41
February	40	14	137	71	107	48	120	65	57	57
March	180	80	72	49	212	78	80	39	57	24
April	138	42	151	36	71	33	39	37	48	52
May	127	46	125	65	159	100	74	42	206	71
June	80	12	81	50	163	50	79	68	11	49
July	143	63	174	48	160	41	60	60	77	62
August	171	55	127	124	79	43	74	76	90	75
September	160	63	166	99	178	122	58	30	127	79
October	93	108	142	75	0	0	31	13	103	164
November	0	0	148	199	337	246	236	154	65	89
December	179	197	91	124	22	6	38	48	43	54
Total	**1 424**	**703**	**1 480**	**957**	**1 666**	**883**	**978**	**703**	**942**	**817**

The number of mature and immature individuals of European hake used to calculate all biological parameters are described in Table 3.

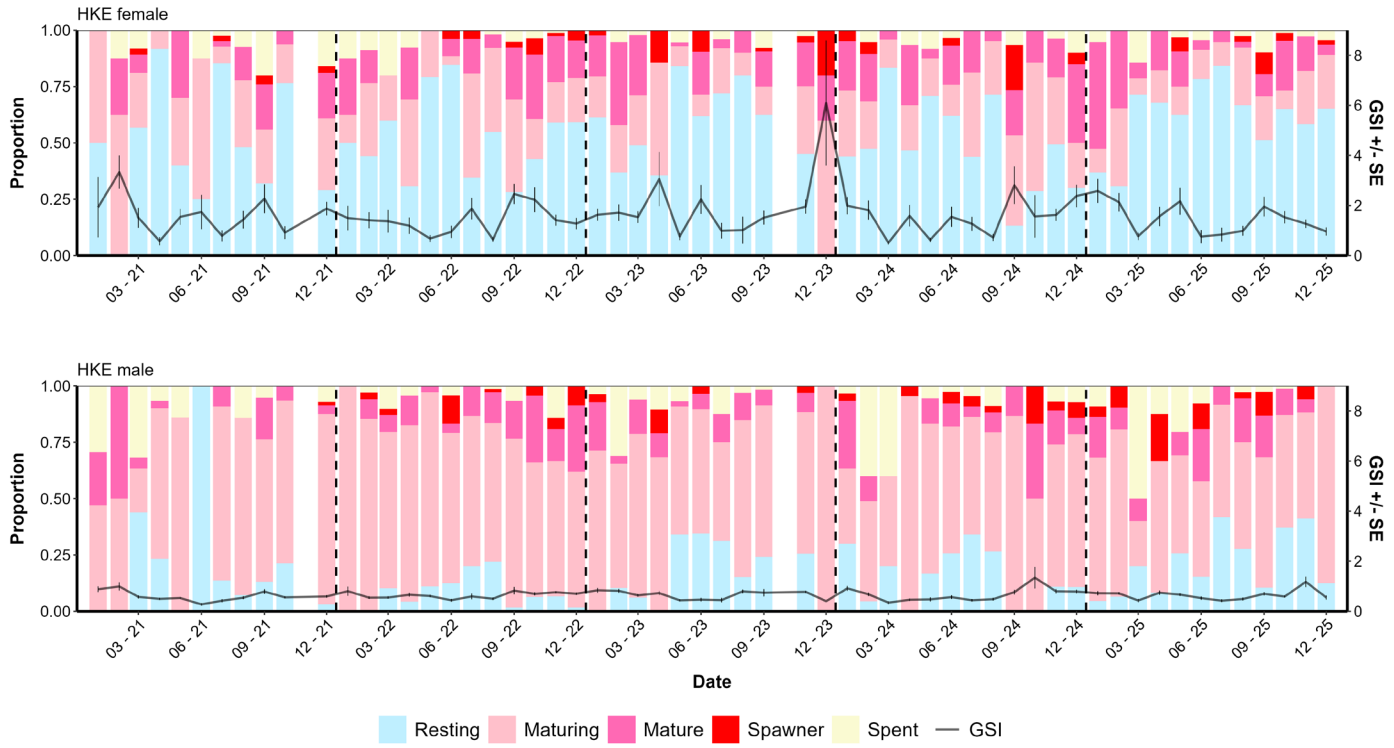


Figure 26. European hake monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

The gonadal cycle of European hake was analyzed monthly from 2021 to 2025 (Figure 26). The species, both males and females, showed a continuous reproductive activity as individuals in advanced maturity stages were present every month sampled throughout the years, confirming a continuous spawning period. However, both sexes exhibited higher GSI values during autumn and winter months, coinciding with the maximum reproductive activity of the species.

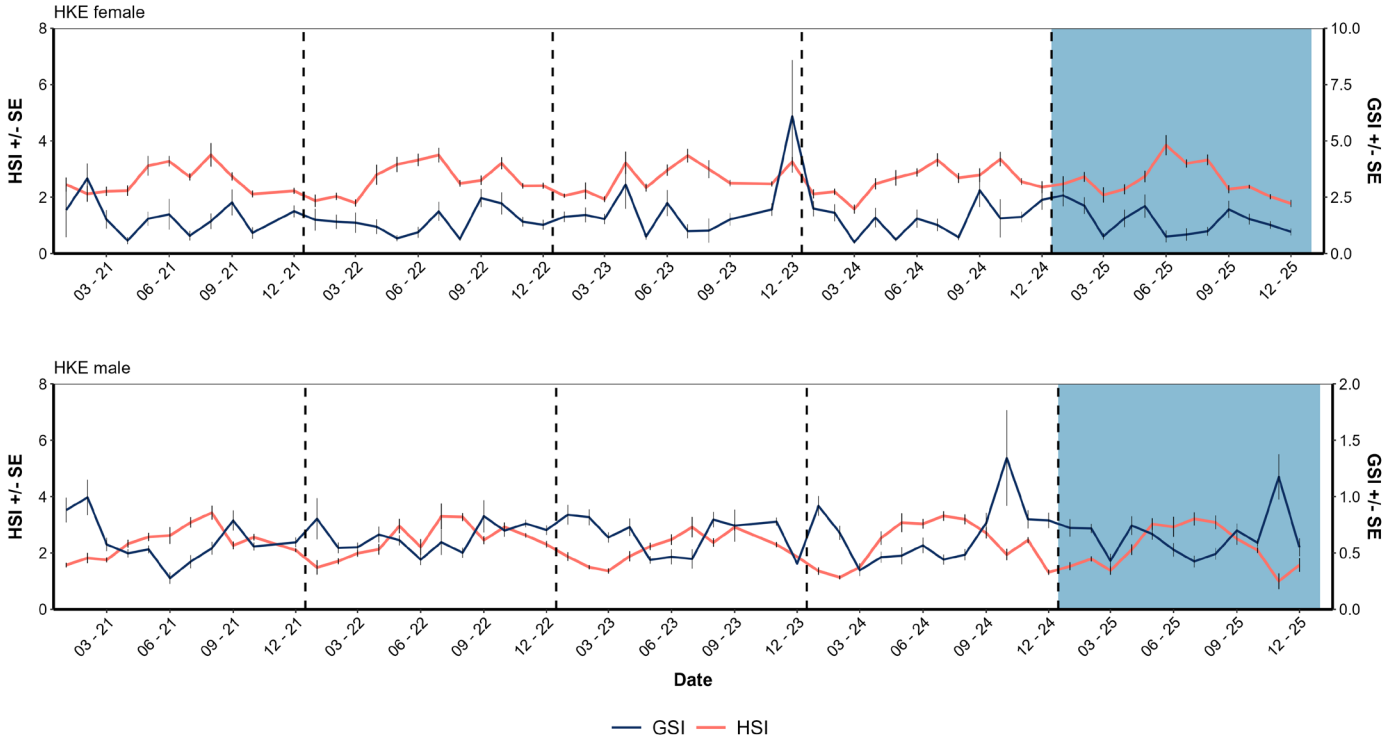


Figure 27. European hake monthly hepatosomatic index (HSI +/-SE (Standard Error)) and gonadosomatic index (GSI +/- SE) for females (top) and males (bottom). Blue shaded area indicates latest analyzed year.

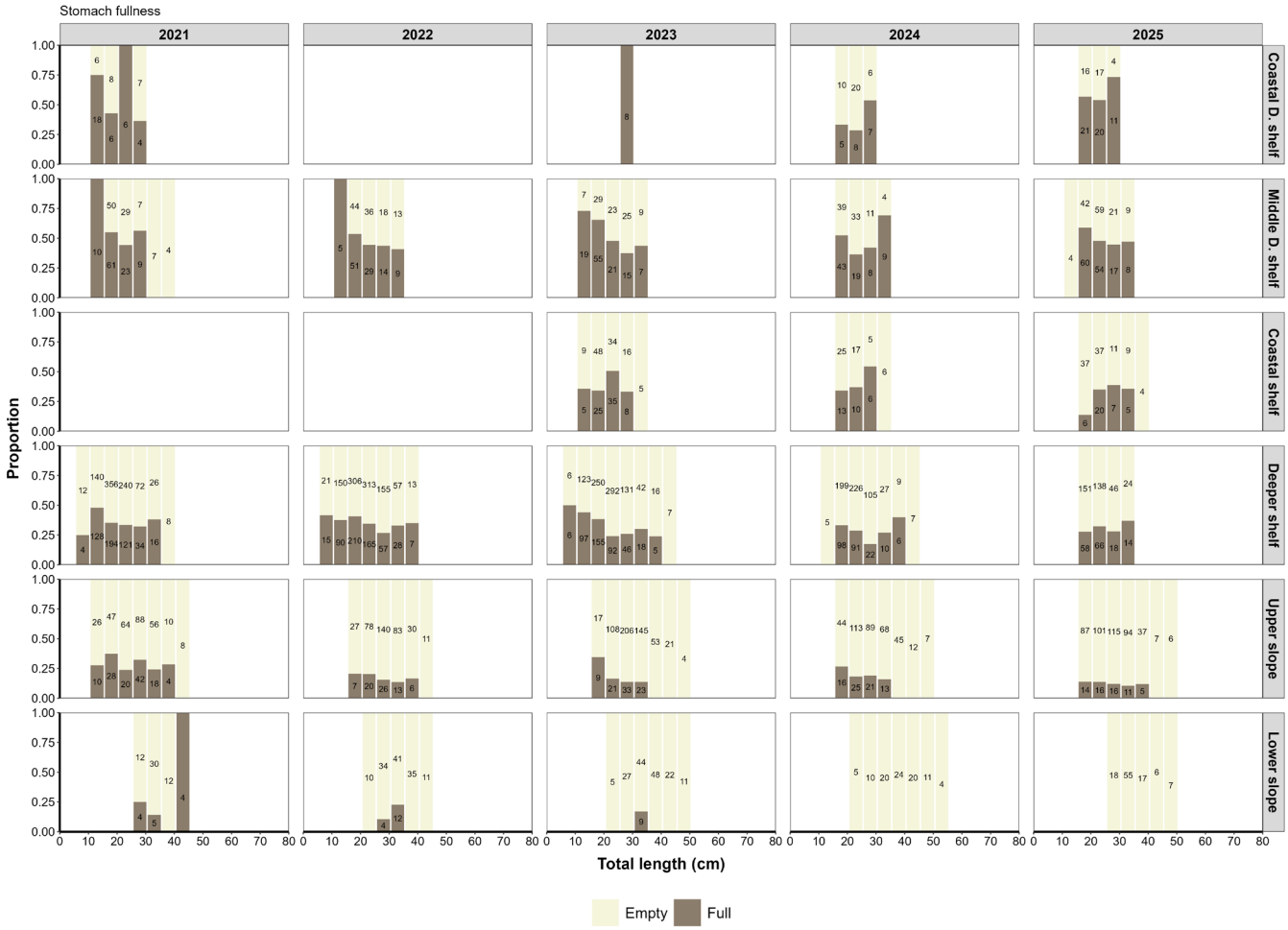


Figure 28. Proportion of stomach fullness of European hake according to size range in different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Black numbers inside bars indicate the number of individuals sampled. Only lengths with more than 3 individuals sampled are shown.

Table 4. Number of European hake individuals measured in the different fisheries along the zones sampled in each season (the values include all métiers sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	North	320	390	487	293	43
Bottom trawl	2021	Center	190	528	751	325	27
Bottom trawl	2021	South	141	56	641	441	20
Bottom trawl	2022	North	181	449	755	643	41
Bottom trawl	2022	Center	464	216	507	394	31
Bottom trawl	2022	South	92	165	353	306	18
Bottom trawl	2023	North	632	536	330	427	45
Bottom trawl	2023	Center	427	169	279	254	34
Bottom trawl	2023	South	189	152	289	164	20
Bottom trawl	2024	North	383	283	263	553	40
Bottom trawl	2024	Center	164	217	494	177	32
Bottom trawl	2024	South	165	136	246	245	21
Bottom trawl	2025	North	177	387	474	491	42
Bottom trawl	2025	Center	129	164	294	260	17
Bottom trawl	2025	South	157	324	487	897	22

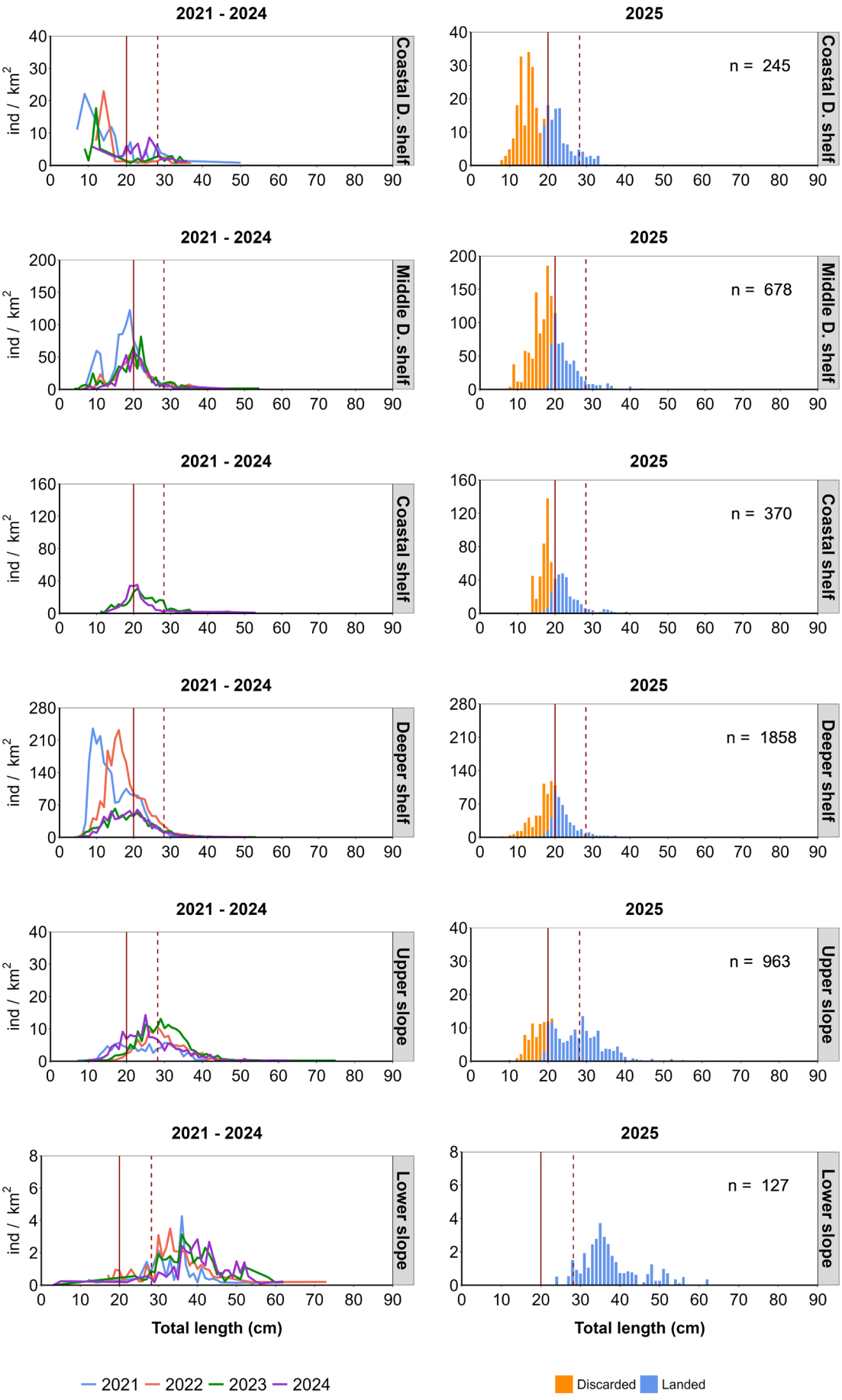


Figure 29. Annual length-frequency distribution of European hake in different métiers (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of 2021 to 2024.

Plotting European hake HSI and GSI together for all years sampled and for the two sexes separately showed that there was a relationship between these two parameters, as the main reproductive activity of the species occurred during autumn and winter was reflected in the variation of HSI values (Figure 27). Specifically, minimum HSI values were observed in autumn and winter, coinciding with peak reproductive activity, while maximum HSI values were reported in spring, when reproductive activity was lower.

The stomach fullness proportion of European hake is represented from 2021 to 2025 and for the six *métiers* studied (Figure 28). Results indicate that the proportion of individuals with full stomachs was higher in the four *métiers* of the continental shelf, corresponding to juvenile individuals, and decreased progressively with increasing depth, being empty stomachs more abundant in the slopes where adult individuals are concentrated.

A higher proportion of full stomachs in small-sized individuals, i.e. recruits, in the *métiers* belonging to the continental shelf may be related to this stratum acting as a feeding ground for juveniles. Also, recruits have higher energy demands than adults and need to allocate the energy obtained from feeding on growth to improve their survival in early life stages.

The spatiotemporal length-frequency distribution of European hake from 2021 to 2025 indicates that the species was more abundant on the deeper shelf for all years, despite being also present in the middle Delta shelf, the coastal shelf and the upper slope but with low levels of abundance (Figure 29). The coastal Delta shelf and the lower slope were the *métiers* with the lowest abundances of European hake, corresponding to the shallowest and deepest depth strata respectively.

The size of European hake caught ranged from 6.0 to 64.0 cm in 2025. In terms of catch size, a significant proportion of individuals, especially in the coastal and deeper shelves, were caught below the minimum conservation reference size (MCRS) for the species, established at 20 cm of TL, and corresponding to juvenile individuals that have not yet reached sexual maturity. Conversely, larger individuals were more predominant on both upper and lower slopes, corresponding to the adult population.

When comparing between years, maximum abundances of European hake recruits (<15 cm) were found in the deeper shelf in 2021 and 2022, suggesting an acceptable recruitment for the species during the preceding years. In 2025, abundances of European hake recruits increased across all shelf *métiers* compared with 2023 and 2024, yet still remained lower than those observed in 2021 and 2022 in the deeper shelf. The abundance of European hake recruits varied with bathymetric distribution, decreasing with increasing depth. Thus, juvenile individuals were concentrated in both coastal and deeper shelves and progressively reduced in abundance in the slope. Young adults (30-40 cm) were present in all *métiers*, despite showing the highest abundances in the upper slope, while larger individuals (>50 cm) were exclusively found in the slopes.

For seasonal length-frequency distribution of European hake at different *métiers* in 2025 see (Annex 13).

All parameters analyzed in this report for European hake were calculated using only individuals obtained by bottom trawling sampling (Table 4).

Red mullet (*Mullus barbatus*) MUT

The total red mullet catch in Catalonia in 2025 was 673.8 t, of which approximately 90% were caught by bottom trawling and 10% by small-scale fisheries (ICATMAR, 26-02).

Figure 30 and Figure 31 show the spatial distribution of red mullet landings in 2025 and in the period 2021-2025 along the Catalan coast. It should be noted that the data correspond to the two species of red mullet present in the area combined, *Mullus barbatus* and *Mullus surmuletus*, as they are not easily distinguishable in the fish auction. The spatial distribution of landings for these species typically ranges between 1 000 and 2 000 kg/km², reaching a maximum of 1 558 kg/km² in 2021. However, the value reported in 2025 was the lowest of the reported time series, amounting to 759 kg/km².

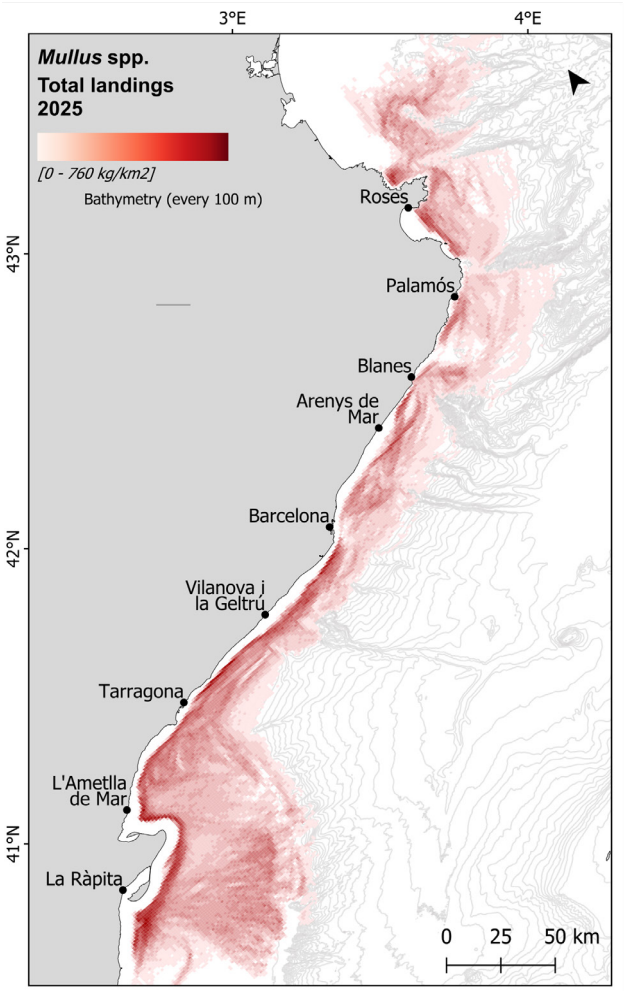


Figure 30. Spatial distribution of landings (kg/km²) for red mullet (*Mullus spp.*) in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 5. Red mullet length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	**a**	**b**	**r²**	**n**
Combined	0.0106	3.0196	0.96	1266
Females	0.0127	2.9592	0.96	939
Males	0.0185	2.8043	0.89	311
Length – eviscerated weight relationship				
2025	**a**	**b**	**r²**	**n**
Combined	0.0119	2.9470	0.96	1246
Females	0.0137	2.9016	0.95	920
Males	0.0174	2.8028	0.89	311

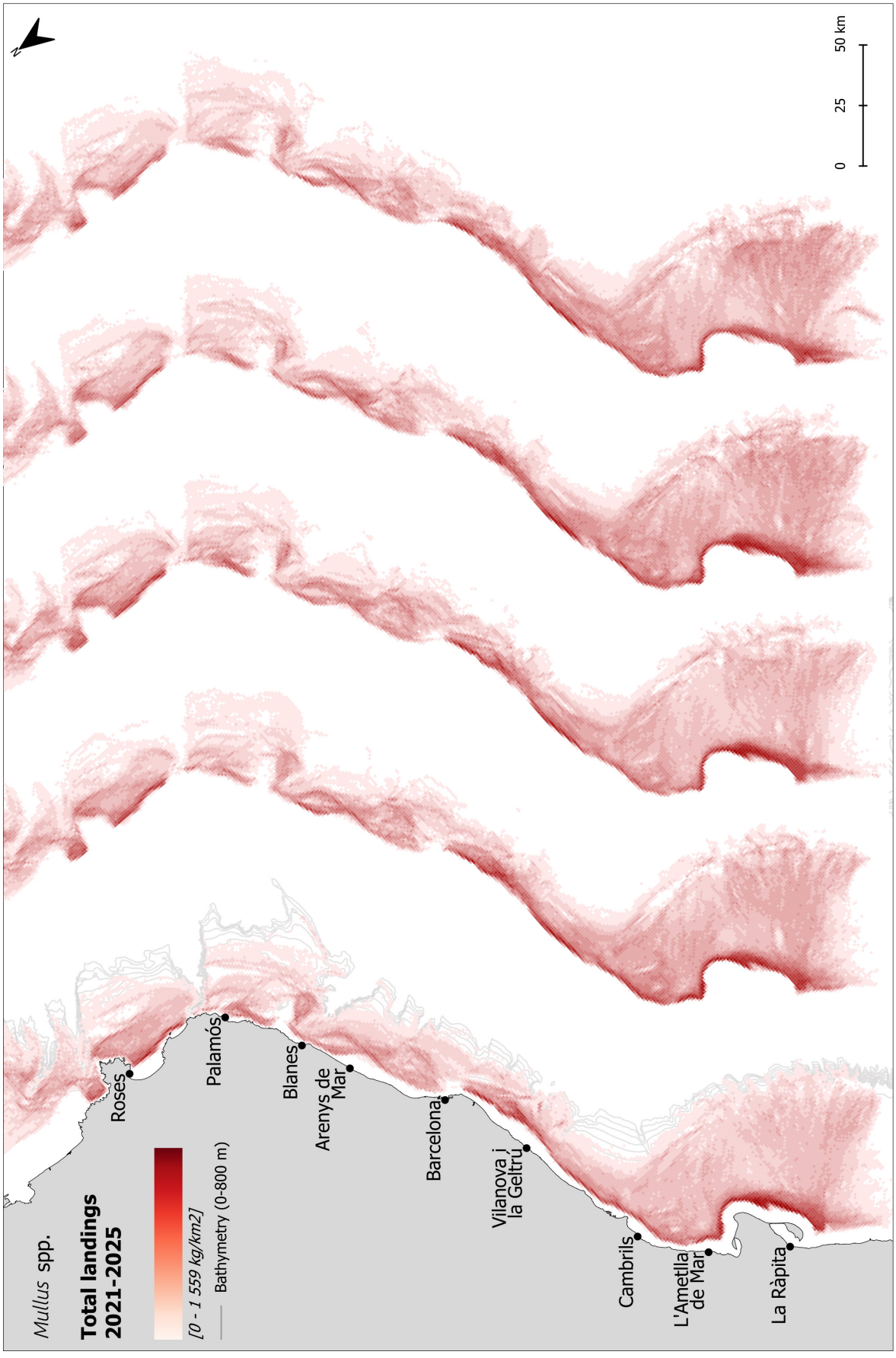


Figure 31. Spatial distribution landings (kg/km^2) for red mullet (*Mullus spp.*) in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

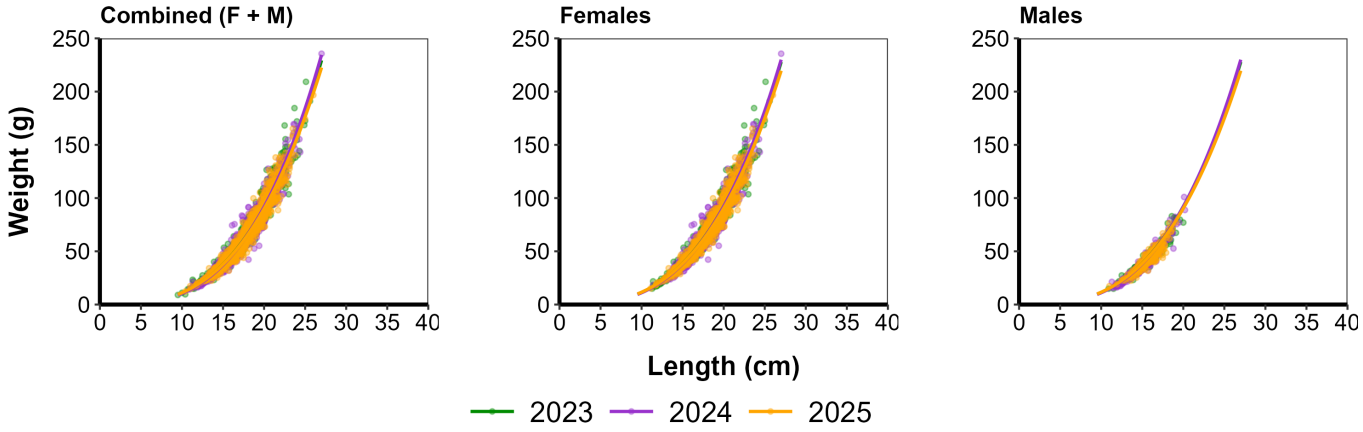


Figure 32. Red mullet length-weight relationship for the years sampled.

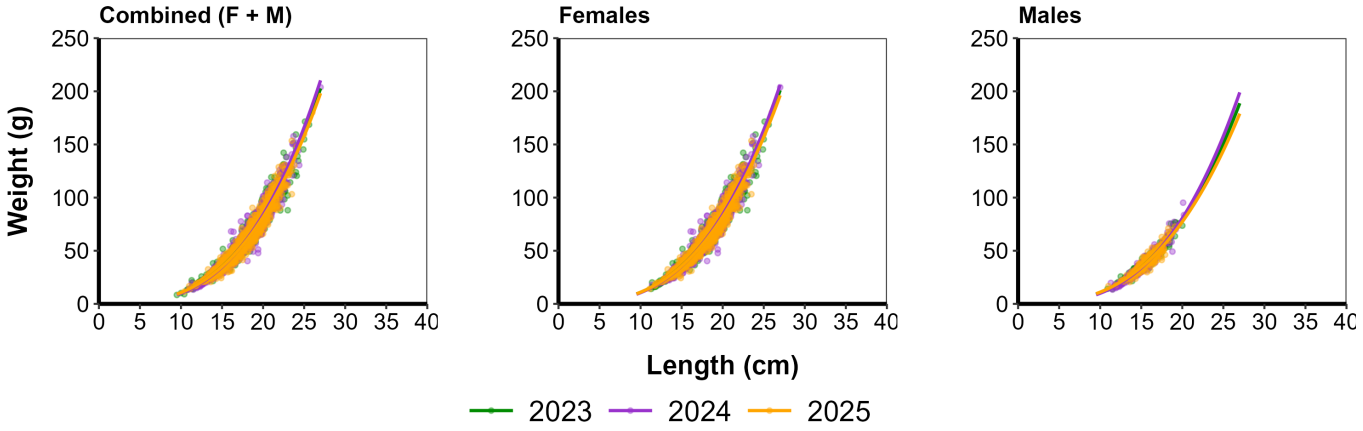


Figure 33. Red mullet length-eviscerated weight relationship for the years sampled.

”Although red mullet was already listed as a target species in previous reports (ICATMAR, 23-07), this species began to be sampled biologically in 2023. For this reason, the analyses for red mullet, with the exception of the length-frequency distribution, only use data from 2023 to 2025.

According to length-weight relationship parameters for both sexes combined, red mullet displayed an isometric growth (CL_{95}=2.992-3.059; b=3) in 2025 (Table 5). When analyzed separately, males exhibited lower b values than females and the combined sexes, indicating more negative allometric growth as well lower r2 values. However, it should be noted that the number of males sampled was around 30% of the number of females. These length-weight relationships for both total and eviscerated weight in 2025 are shown graphically in Figure 32 and Figure 33.

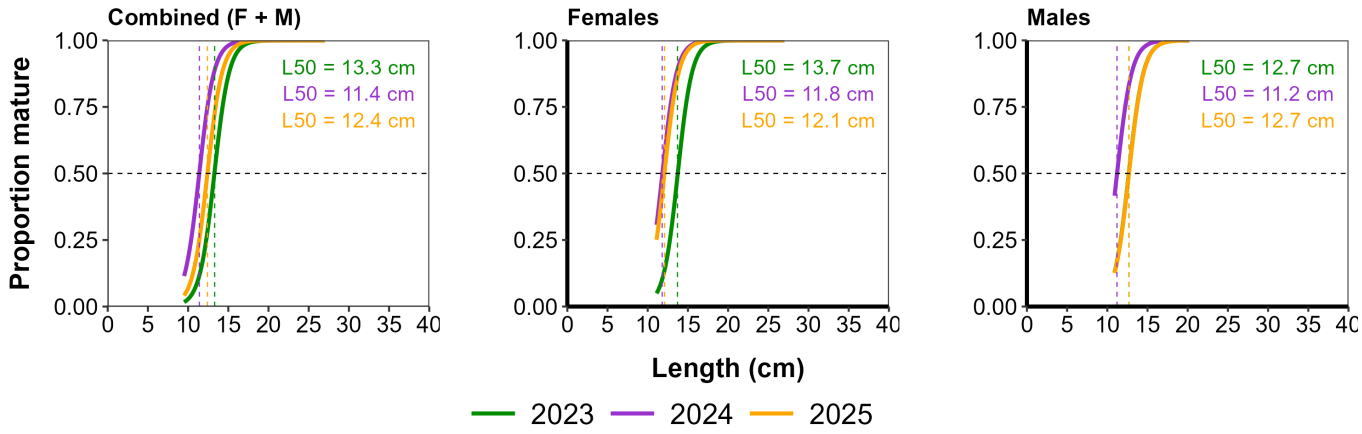


Figure 34. Red mullet size at first maturity (L_{50}) for the years sampled.

Table 6. Number of mature and immature individuals of red mullet included monthly in biological analyses.

Month	2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature
January	4	106	4	136	0	60
February	17	148	6	170	1	127
March	0	72	0	61	0	48
April	10	82	0	120	0	95
May	1	149	0	119	0	200
June	1	60	4	117	0	60
July	16	131	16	183	15	97
August	0	40	1	77	5	95
September	56	99	0	117	2	98
October	0	0	1	143	19	214
November	32	276	0	148	0	60
December	4	16	0	120	0	58
Total	**141**	**1179**	**32**	**1511**	**42**	**1212**

The size at first maturity (L_{50}) for red mullet in 2025 was 12.4 cm of TL for both sexes combined, 12.1 cm for females and 12.7 cm for males, recording for the first time a higher L_{50} for males (Figure 34).

In 2025, a total of 1 254 red mullet individuals were analyzed to calculate the L_{50} (Table 6). Out of these, 42 individuals were classified as immature and 1 212 as mature. It should be noted that the low number of immature individuals compared to the mature ones may bias the L_{50} toward larger sizes than it actually, and may also lead to an apparently higher L_{50} for males.

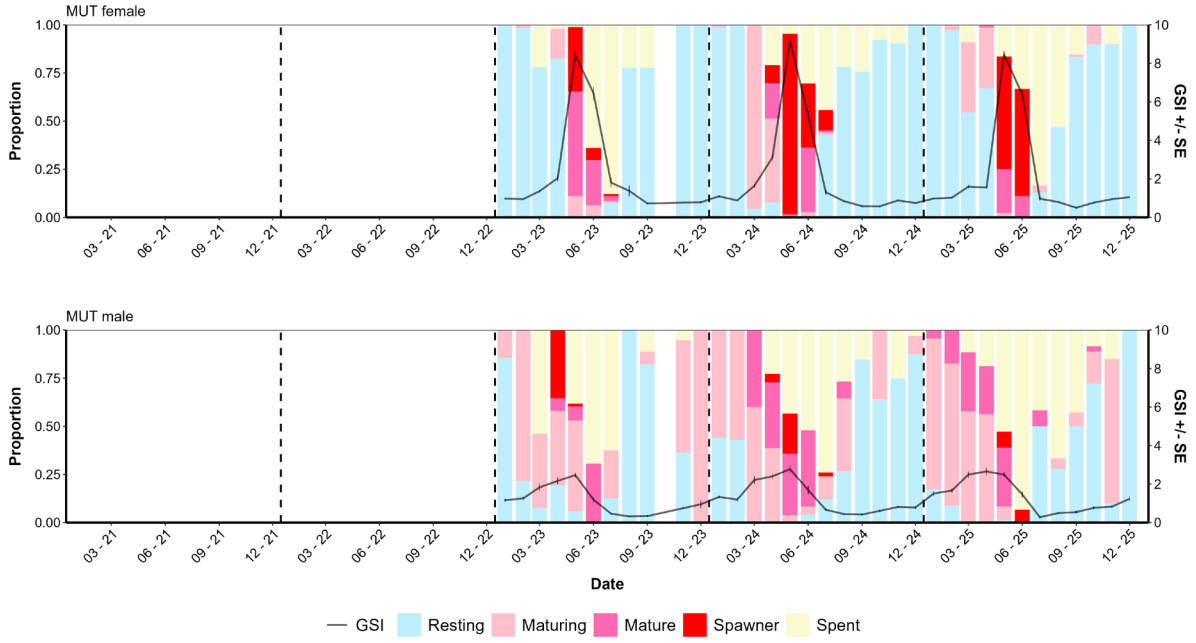


Figure 35. Red mullet monthly gonadal cycle for females (top) and males (bottom) for the years sampled. Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

The gonadal cycle of red mullet was analyzed monthly from 2023 to 2025 (Figure 35). Females of the species exhibited a markedly seasonal reproductive cycle with a peak during May when the highest proportion of mature and spawner individuals were present. In May and June 2025, most of the females analyzed were in the spawner stage. In contrast, males showed a more continuous reproductive cycle, although a slight peak was observed in spring, with the highest proportions of spawning individuals recorded in April 2023, in May 2024 and May and June 2025.

Females showed higher GSI values during the spring, reaching the maximum in May, coinciding with the maximum reproductive activity. GSI values for males were more constant throughout the year, although they began to increase during the autumn months until reaching a maximum in May, or April in 2025, coinciding with the highest GSI value for females. The reproductive cycle described here is consistent with that already known for the species from other studies in the Mediterranean Sea.

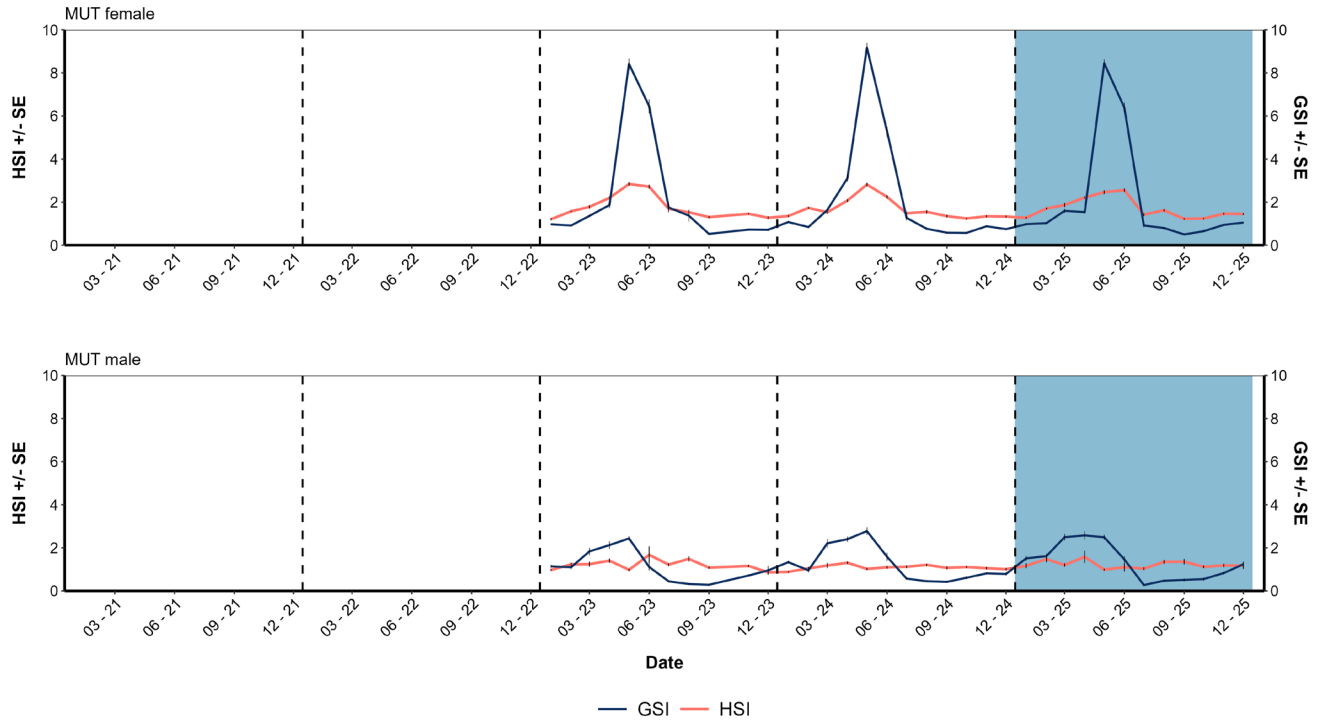


Figure 36. Red mullet monthly hepatosomatic index (HSI +/-SE (Standard Error)) and gonadosomatic index (GSI +/- SE) for females (top) and males (bottom). Blue shaded area indicates latest analyzed year.

Plotting red mullet HSI and GSI together from 2023 to 2025 shows that, for females, the highest HSI values coincide with the highest GSI values in May. In contrast, for males there is no clear relationship between these two parameters, with HSI values remaining relatively constant throughout the year (Figure 36).

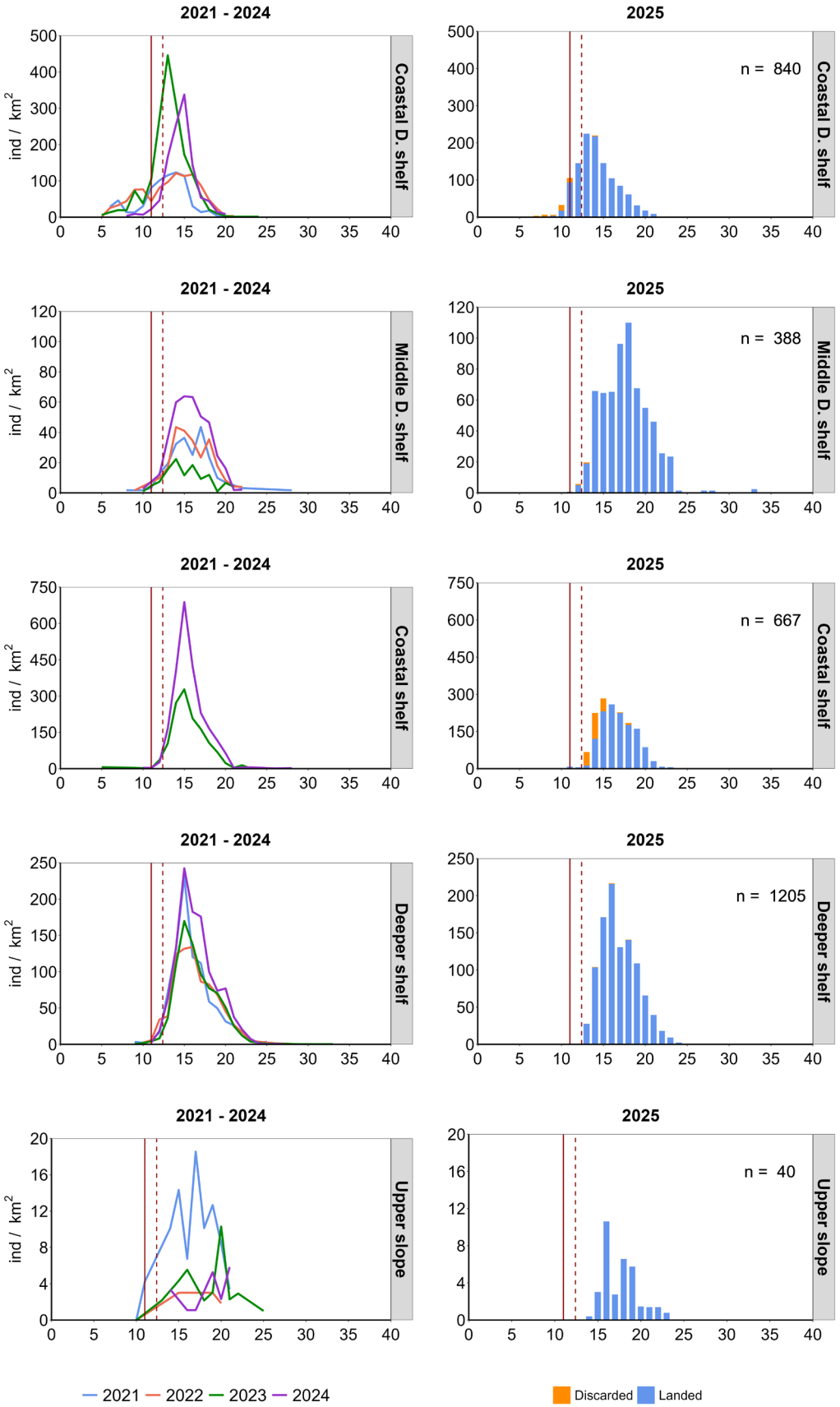


Figure 37. Annual length-frequency distribution of red mullet at different métiers (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf and Upper Slope). Left: four previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Red dashed line: size at first maturity (L_{50}).

The spatiotemporal length-frequency distribution of red mullet from 2021 to 2024 does not show a clear pattern across the sampled *métiers* (Figure 37, left). The highest abundances were found in 2024 in the coastal shelf (the coastal shelf,abundance, with a sharp decline, was observed in the upper slope, the limit of the bathymetric range of the species. As Figure 37 (right) shows for 2025, the highest abundance was also found in the coastal shelf, followed by the coastal Delta shelf and then the deeper shelf with similar abundances. Abundance on the middle Delta shelf was the highest of the time series, especially compared to 2023, when the lowest values of the series for this *métier* were reached. The upper slope showed a pattern of abundance similar to previous years.

In terms of catch size, a slight increase in TL can be observed as the depth of the *métier* increases in all years analyzed. The smallest individuals were caught in the coastal Delta shelf, with the largest proportion of individuals below the MCRS and the L_{50} set at 11 cm and 12.4 cm of TL respectively. When comparing between years, maximum abundances of red mullet recruits (<10 cm) were found in the coastal Delta shelf in 2022 and 2023, suggesting an acceptable recruitment for the species during these years.

For seasonal length-frequency distribution of red mullet at different *métiers* in 2025 see Annex 14.

Table 7. Number of red mullet individuals measured in the different fisheries along the zones sampled in each season (the values include all métiers sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	North	261	88	121	60	18
Bottom trawl	2021	Center	123	135	91	49	11
Bottom trawl	2021	South	33	46	221	211	20
Bottom trawl	2022	North	111	97	99	162	16
Bottom trawl	2022	Center	122	64	141	134	11
Bottom trawl	2022	South	88	188	272	359	21
Bottom trawl	2023	North	303	240	272	339	24
Bottom trawl	2023	Center	297	207	252	188	12
Bottom trawl	2023	South	297	141	285	122	20
Bottom trawl	2024	North	418	141	285	122	40
Bottom trawl	2024	Center	219	337	208	285	14
Bottom trawl	2024	South	245	319	270	477	24
Bottom trawl	2025	North	253	195	183	570	23
Bottom trawl	2025	Center	109	195	102	69	7
Bottom trawl	2025	South	269	377	407	411	23

All parameters analyzed in this report for red mullet were calculated using only individuals obtained by bottom trawl sampling (Table 7).

Norway lobster (*Nephrops norvegicus*) NEP

The total Norway lobster catch in Catalonia in 2025 was 181 t, almost 100% of which were caught by bottom trawling (ICATMAR, 26-02).

Figure 38 and Figure 39 show the spatial distribution of the species landings in 2025 and from 2021 to 2025 along the Catalan coast. Between 2021 and 2022, the annual maximum catch declined from 183 to 160 kg/km², followed by a steady recovery through 2023 (231 kg/km²) and 2024 (261 kg/km²), reaching a new peak of 343 kg/km² in 2025. This represents more than a twofold increase from the minimum recorded in 2022, highlighting a marked intensifi-cation of catch rates over the study period.

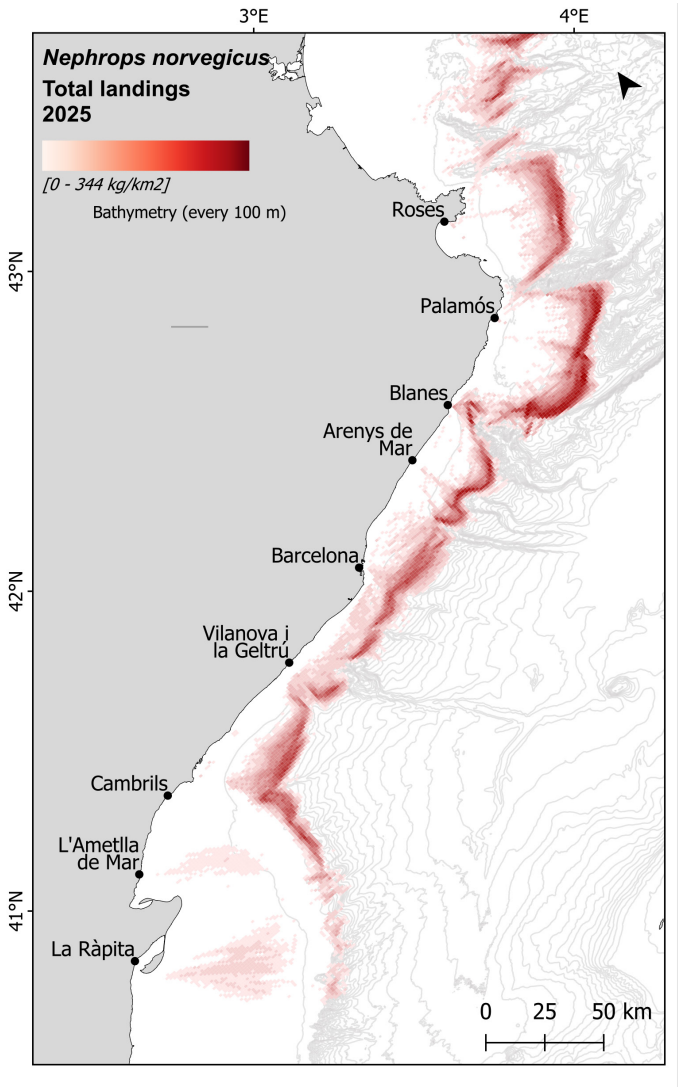


Figure 38. Spatial distribution of landings (kg/km²) for Norway lobster in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 8. Norway lobster length-weight relationship in the year analyzed.

2025	L-W (a)	L-W (b)	L-W (r^2)	n
Combined	0.0004	3.1764	0.97	1 546
Females	0.0004	3.1636	0.95	710
Males	0.0003	3.2271	0.97	832

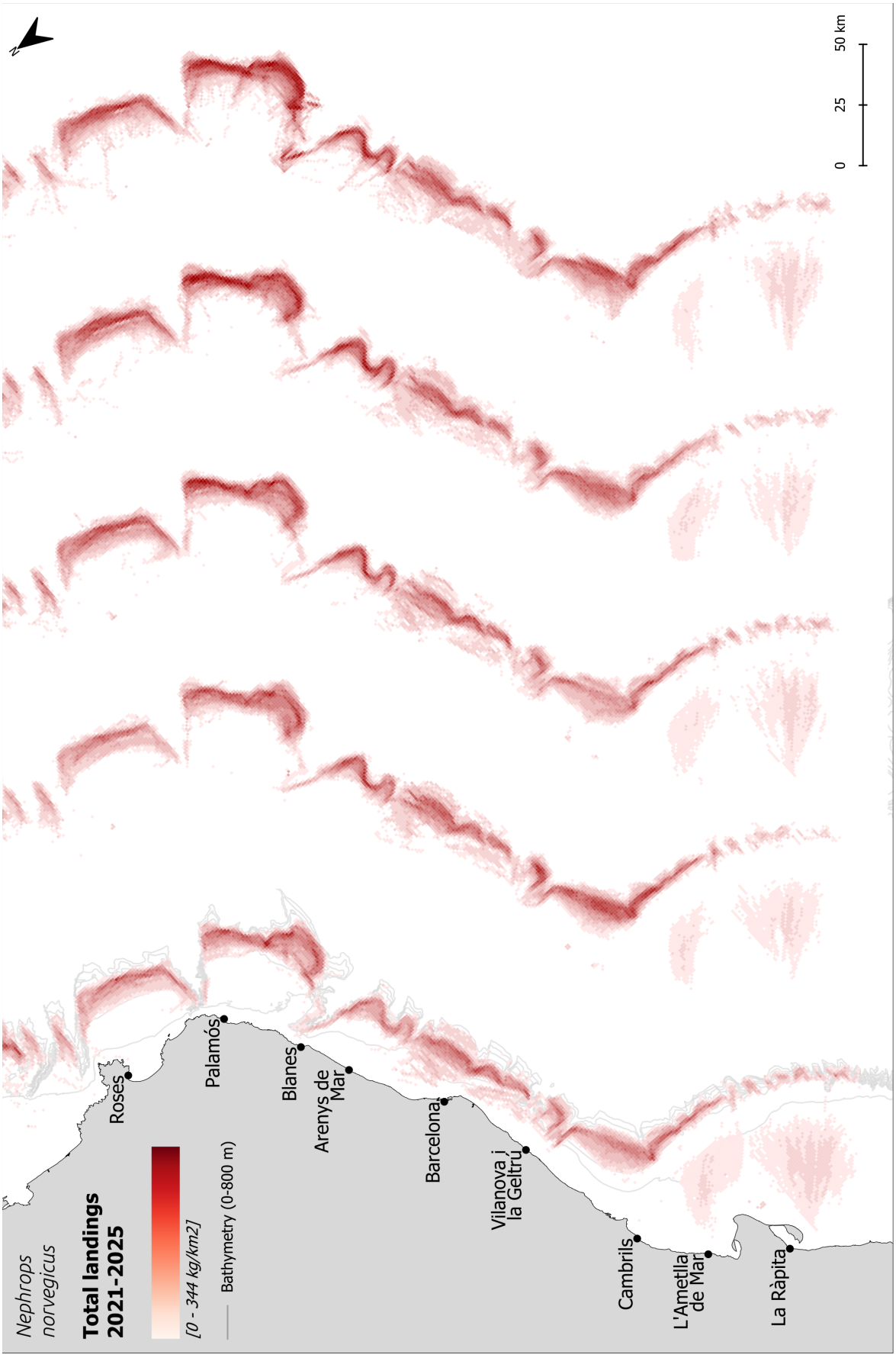


Figure 39. Spatial distribution of landings (kg/km^2) for Norway lobster in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

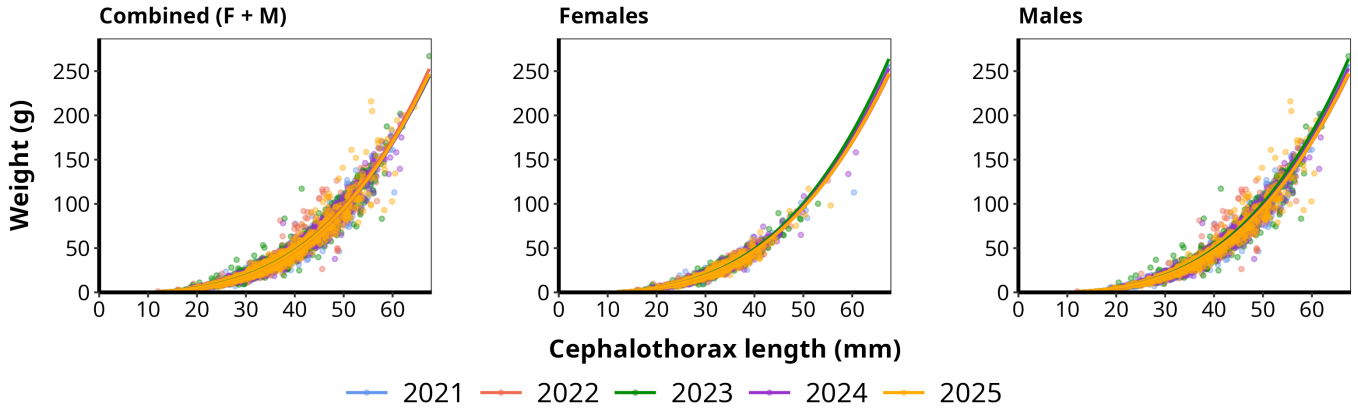


Figure 40. Norway lobster length-weight relationship for the previous four years sampled and the year analyzed.

According to length-weight relationship parameters for both sexes combined, the Norway lobster showed a positive allometric growth (CL_{95}=3.149-3.203; b>3) in 2025 (Table 8). Like-wise, when analyzing the growth curves separately for males and females, both exhibited posi-tive allometric growth and similar a and r^2 values.

In 2025, there was a higher proportion of males which are larger in size and weight than fe-males. Still, similar results can be observed over the years analyzed for both sexes combined and separately, with positive allometric growth in all cases (Figure 40).

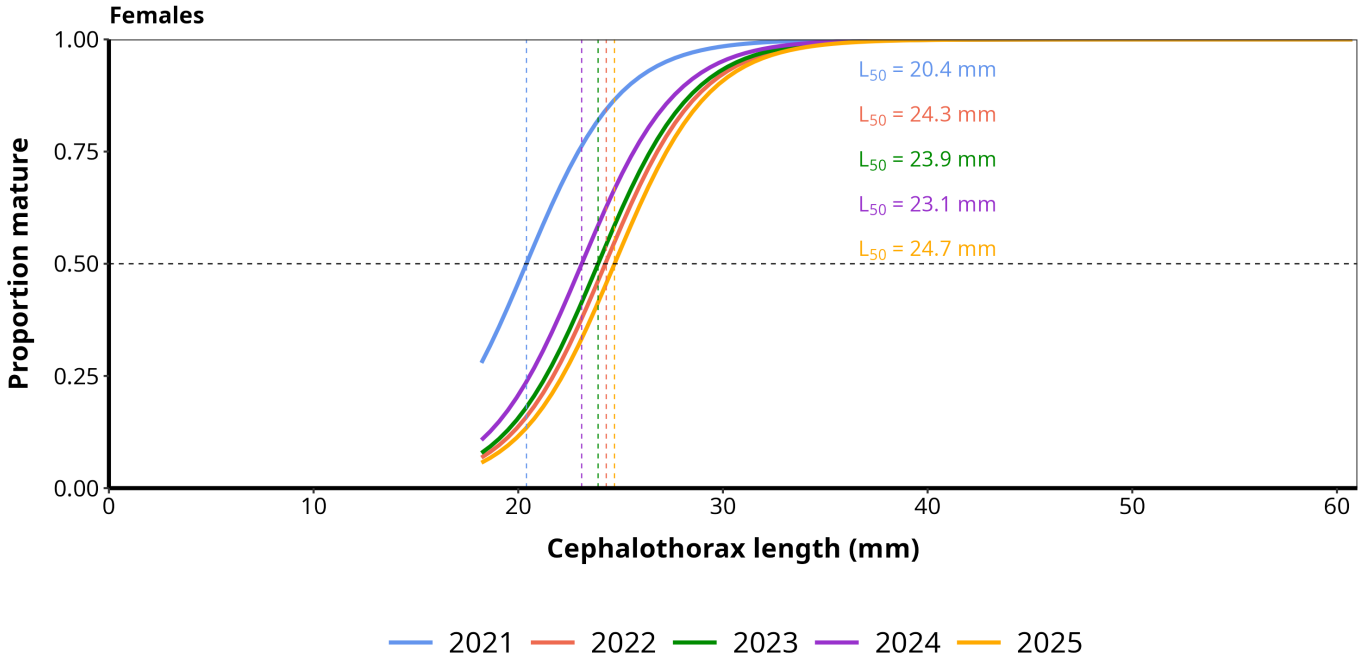


Figure 41. Norway lobster size at first maturity (L_{50}) for all years sampled.

Table 9. Number of mature and immature individuals of Norway lobster included monthly in biological analyses.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	8	47	12	27	8	55	9	53	3	61
February		6	13	60	15	84		55		
March	11	90	9	40	4	57		87	0	57
April		98	11	60	2	41	15	158	1	48
May	1	80	4	65	8	189	13	114	18	129
June		45	8	63	7	67		71	5	40
July	8	161	8	45	3	86	2	56	3	55
August	6	36	18	93	18	127	20	74	10	81
September	2	41	6	44	19	92		34	31	32
October	1	73	22	55			2	17	3	72
November			19	75	33	138	32	182	11	29
December	12	57		44	4	19			3	19
Total	**49**	**734**	**130**	**671**	**121**	**955**	**93**	**901**	**88**	**623**

The size at first maturity (L_{50}) for the Norway lobster in 2025 was 24.7 mm of CL (Figure 41). Comparing between years, similar sizes at first maturity were observed, with L_{50} values ranging from a minimum of 20.4 mm in 2021 and a maximum of 24.7 mm in 2025.

In 2025, a total of 711 Norway lobster individuals were analyzed to calculate the L_{50}. Out of these, 88 individuals were classified as immature and 623 as mature (Table 9). It should be noted that the low number of immature individuals sampled in some years may bias the L_{50} estimates towards larger sizes, and this should be considered when interpreting these results.

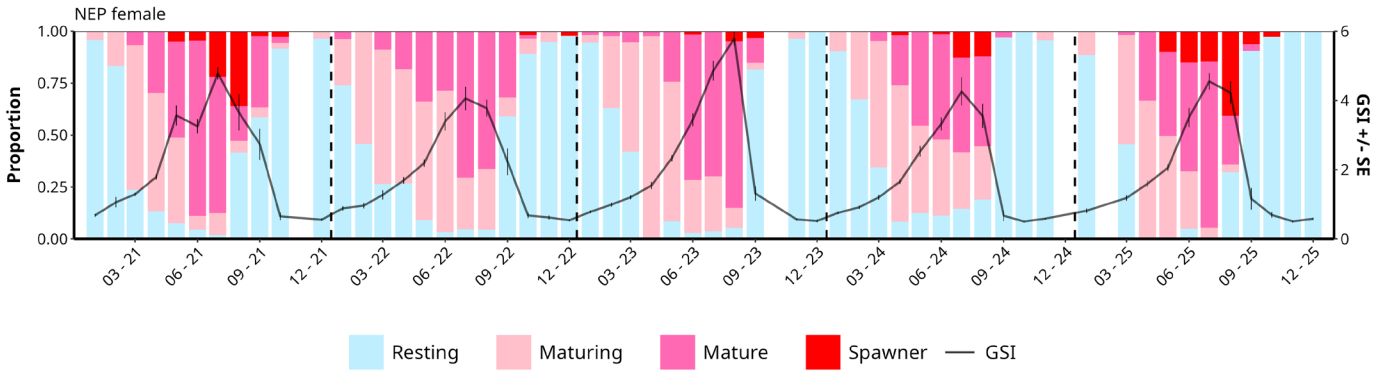


Figure 42. Norway lobster monthly gonadal cycle for females. Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

he gonadal cycle of Norway lobster was analyzed monthly from 2021 to 2025 (Figure 42). The species showed a seasonal reproductive cycle with the highest abundance of mature females generally from April to September in all years sampled. In 2025, mature females were more abundant between April and August, showing a peak in June and July, which matches with the known reproductive season of the species, and coincides with the pattern observed in previous years.

According to the GSI in 2025, the reproductive activity reached its peak in July, when the pro-portion of mature females was the highest (Figure 42). The proportion of resting females increased after August, with most individuals in the resting stage between September and December, coinciding with the minimum GSI values.

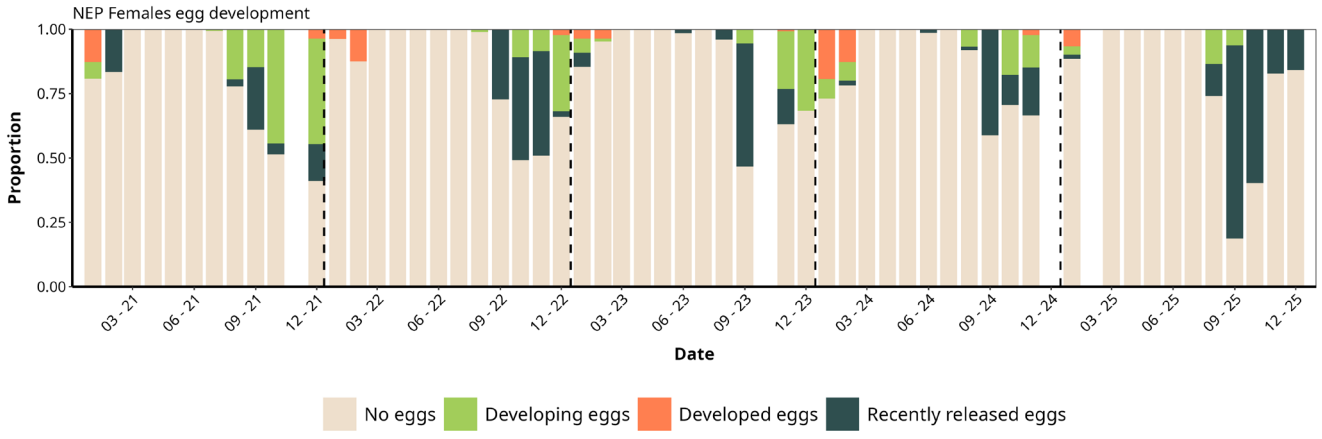


Figure 43. Norway lobster monthly proportion of different egg development stages.

For Norway lobster, the proportion of ovigerous females over the years sampled is represented in Figure 43. Females start to release the eggs right after the reproductive peak, in August, coinciding with the decrease of the GSI value (Figure 42). Thus, the highest proportion of eggs released in 2025 occurred between September and October, a trend that was also observed in all previous years. The eggs were graded according to their maturity stage by color: dark blue/dark green (eggs I, or recently released eggs), light green (eggs II or developing eggs), and orange/brown (eggs III or developed eggs). In 2025, ovigerous females with developing eggs (I) were found between August and September, while females with developed eggs (III) were only observed in January (Figure 43).

The spatiotemporal length-frequency distribution of Norway lobster from 2021 to 2025 indi-cates that the upper slope is the main habitat of the species. Nevertheless, the species is also present on the lower slope, and, to a lesser extent, on the deeper shelf and the middle Delta shelf (Figure 44). In 2025, the size of the Norway lobster caught ranged from 12.3 to 64.5 mm of CL. That year, the size-frequency distribution in the upper slope followed a roughly Gaussian shape, with both tails well represented, suggesting that the whole community was sampled in this *métier*. Here, the highest abundance of individuals was around 150 ind/km^2 for lengths around 25–30 mm of CL. Individuals in the upper and lower slope showed a wider size distri-bution, ranging from 15 to almost 60 mm of CL. In the deeper shelf and the middle Delta shelf, only isolated individuals were caught during 2025 (n = 11 and n = 9, respectively); neverthe-less, the largest individuals of the whole survey were found in these two *métiers*, reaching up to 60 and 64.5 mm of CL, respectively.

In terms of catch size and for all *métiers*, the highest proportion of individuals was caught above the minimum conservation reference size (MCRS), established at 20 mm of CL (Figure 44). In line with the observed habitat preference, larger individuals were more predominant in the upper and lower slope, corresponding to the adult population of the species. Discards were present across the whole size range in both *métiers*. However, while all individuals below the MCRS were discarded in the upper slope, a fraction of undersized individuals was still land-ed on the lower slope. The L_{50} for 2025 was estimated at 24.7 mm (dashed red line), and in the upper slope a non-negligible fraction of the commercial size-frequency distribution still falls below this threshold. When comparing between years, the highest abundances of adult individuals were consistently found in the upper and lower slope, suggesting a similar spatial distribution for the species over the preceding years. Juvenile individuals were concentrated on the upper slope and became less frequent on the lower slope.

For seasonal length-frequency distribution of the Norway lobster at different *métiers* in 2025 see Annex 15.

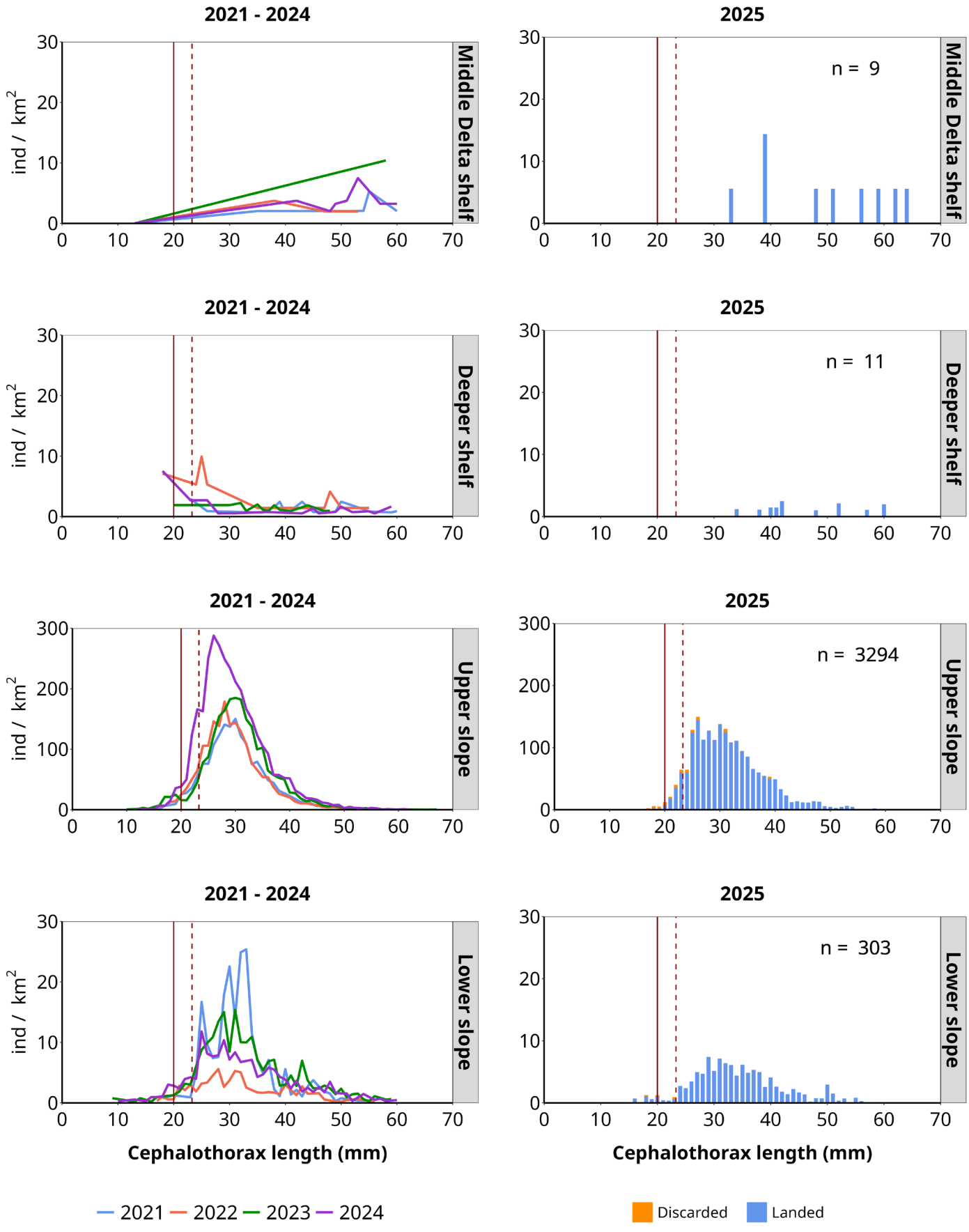


Figure 44. Annual length-frequency distribution of Norway lobster at different métiers (Middle Delta shelf; Deeper shelf; Upper slope; Lower slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS) and red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of the previous four years sampled and the year analyzed.

Table 10. Number of Norway lobster individuals measured in the different fisheries along the zones sampled in each season (the values include all the métiers sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	North	348	666	892	676	30
Bottom trawl	2021	Center	732	484	807	417	16
Bottom trawl	2021	South	15	1	6	2	8
Bottom trawl	2022	North	273	642	724	713	27
Bottom trawl	2022	Center	446	313	573	844	22
Bottom trawl	2022	South	1	1	2	0	4
Bottom trawl	2023	North	738	1017	1023	1044	27
Bottom trawl	2023	Center	414	803	662	450	24
Bottom trawl	2023	South	2	1	0	0	3
Bottom trawl	2024	North	636	1266	818	874	27
Bottom trawl	2024	Center	334	478	497	523	23
Bottom trawl	2024	South	3	9	1	3	8
Bottom trawl	2025	North	406	503	643	1010	27
Bottom trawl	2025	Center	88	503	302	42	11
Bottom trawl	2025	South	0	9	5	106	6

All parameters analyzed in this report for the Norway lobster were calculated using only individuals obtained by bottom trawling sampling (Table 10).

Deep-water rose shrimp (*Parapenaeus longirostris*) DPS

The total deep-water rose shrimp catch in Catalonia in 2025 was 501 t, 98% of which were caught by bottom trawling (ICATMAR, 26-02).

Figure 45 and Figure 46 show the spatial distribution of species landings along the Catalan coast in 2025 and during the 2020–2024 period. Overall, an increasing trend was observed over the study period, reaching an annual maximum of 935 kg/km² in 2025, the year analyzed. Within the previous period, the highest value was recorded in 2021, with 864 kg/km², followed by lower maximum values in 2023 and 2024, with 471 kg/km² and 405 kg/km², respectively.

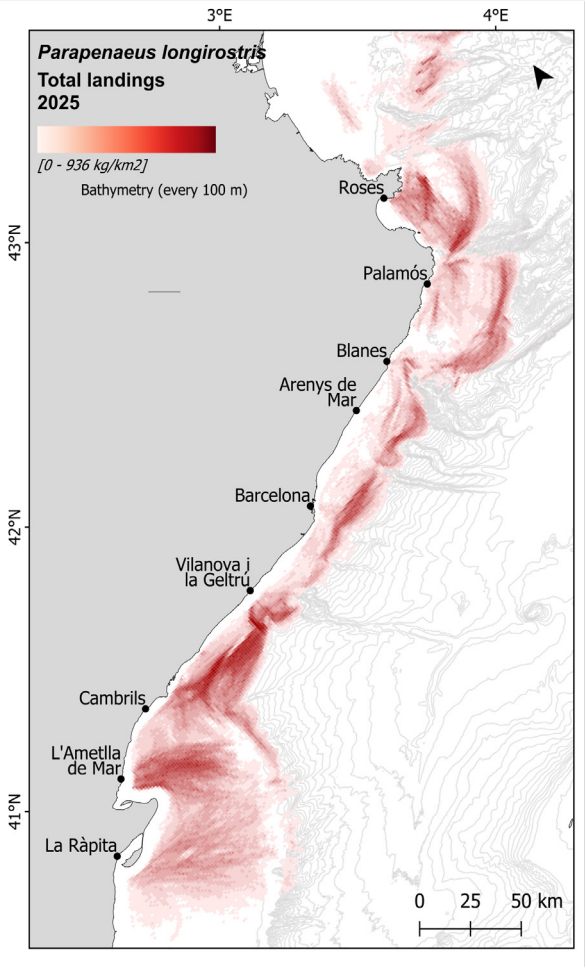


Figure 45. Spatial distribution of landings (kg/km²) for deep-water rose shrimp in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 11 Deep-water rose shrimp length-weight relationship in the year analyzed.

2025	L-W (a)	L-W (b)	L-W (r^2)	n
Combined	0.0034	2.4574	0.95	2342
Females	0.0036	2.4398	0.94	1911
Males	0.0036	2.4246	0.94	431

According to length-weight relationship parameters for both sexes combined and separately, deep-water rose shrimp displayed a negative allometric growth (CL_{95}= 2.435–2.480; b < 3) in 2025 (Table 11). In 2025 the sample size was 2342 individuals, and more than twice as many females as males. As with other crustacean species, there is a marked sexual dimorphism, with females being much larger than males.

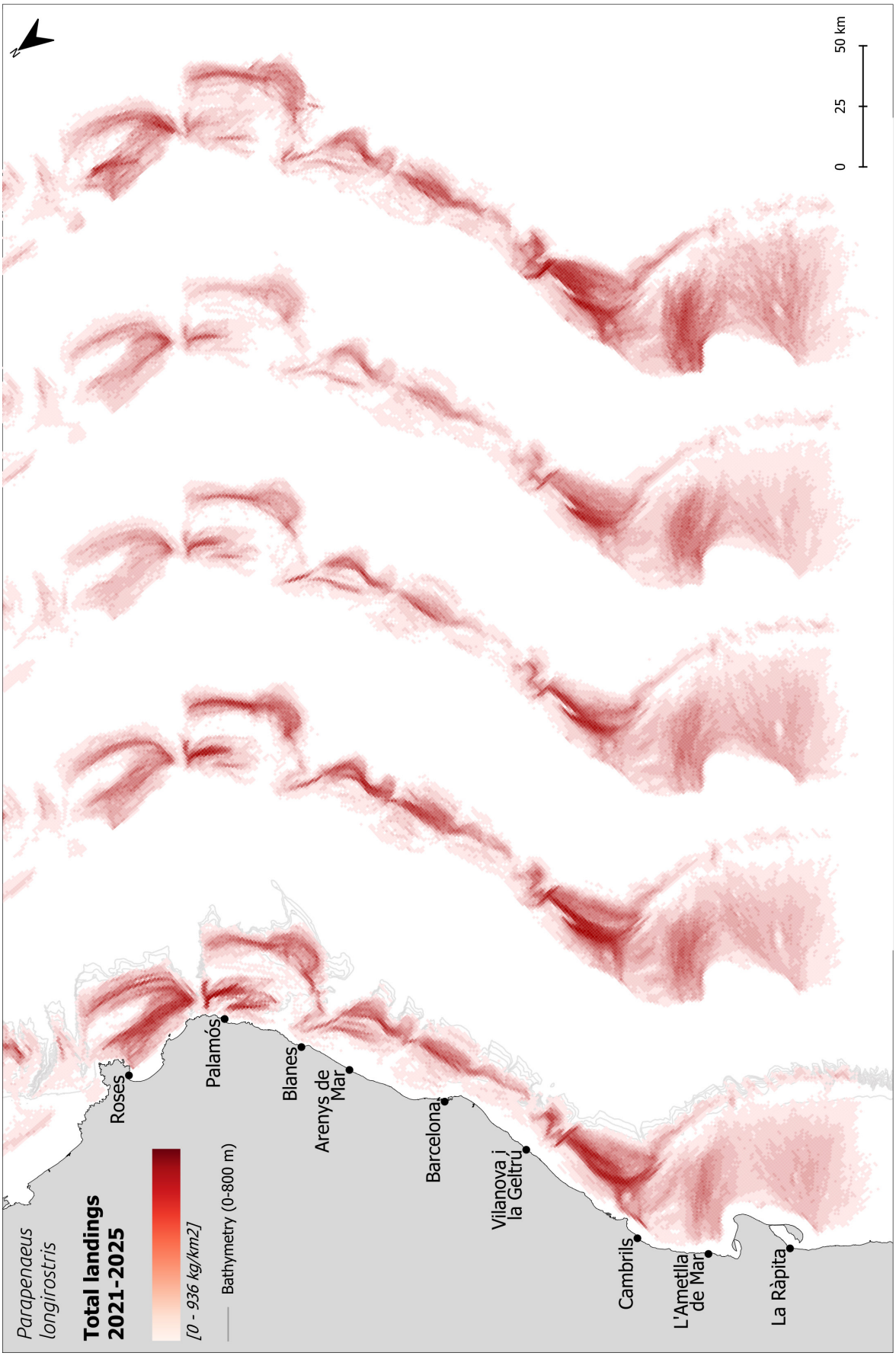


Figure 46. Spatial distribution of landings (kg/km^2) for deep-water rose shrimp in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

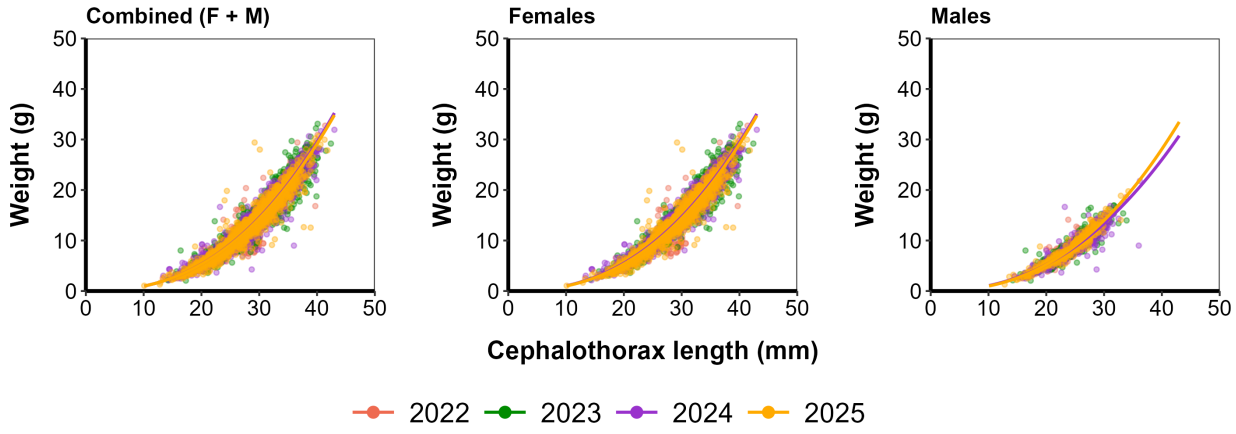


Figure 47 Deep-water rose shrimp length-weight relationship for the years sampled.

Figure 47 shows deep-water rose shrimp length-weight relationship for 2022 to 2025. As with other species in the suborder *Dendrobranchiata*, this species exhibits clear sexual dimorphism: females attain a larger size, while males typically do not exceed 40 mm in carapace length (CL).

The L_{50} for deep-water rose shrimp in 2025 was 17.3 mm of CL, which is consistent with that obtained in previous studies (Figure 48). Given that this species has become an important fishing resource on the Catalan coast due to the considerable increase in its catches over the last decade, it will be interesting to see how its L_{50} evolves over time, as variations in this parameter are useful for assessing the level of exploitation of a species.

In 2025, a total of 1912 deep-water rose shrimp individuals were analyzed to calculate the L_{50}. Out of these, 43 individuals were classified as immature and 1869 as mature (Table 12). It should be noted that the low number of immature individuals compared to the mature ones may bias the L_{50} towards larger sizes than it actually is. Even so, the values presented are consistent with the literature for the species.

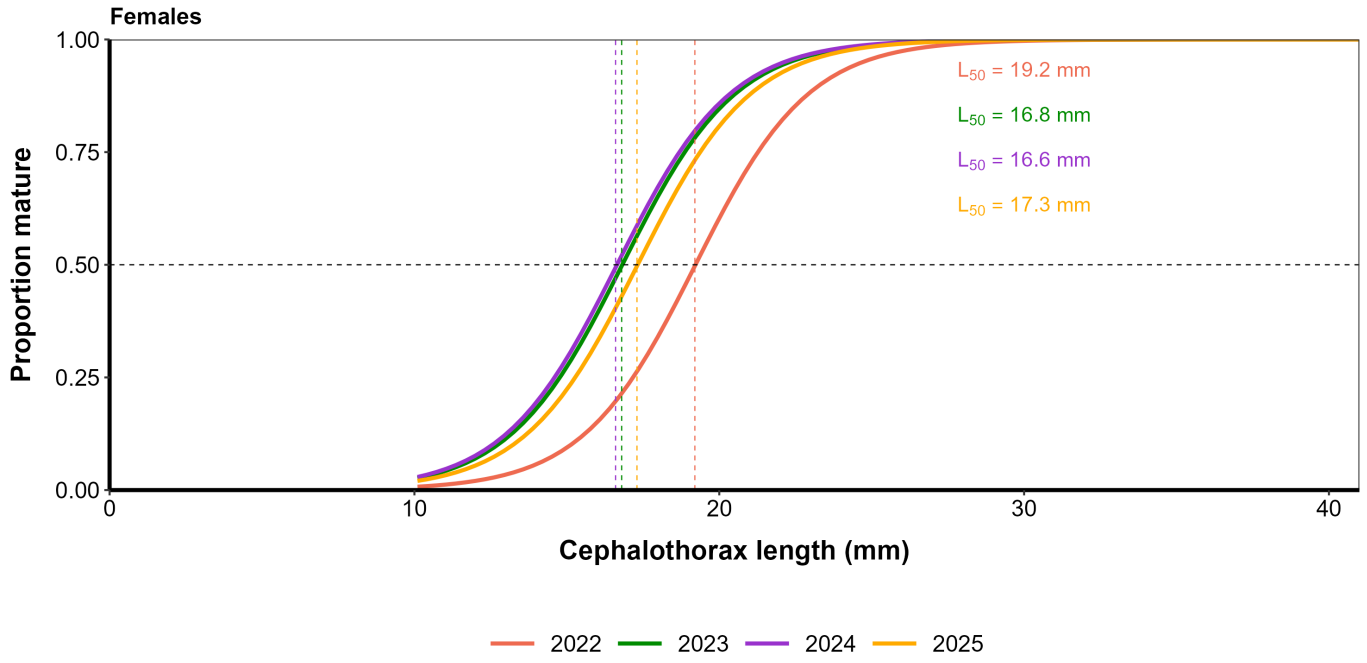


Figure 48 Deep-water rose shrimp size at first maturity (L_{50}) for all years sampled.

The number of mature and immature individuals of deep-water rose shrimp used to calculate all biological parameters are described in Table 12.

Table 12. Number of mature and immature individuals of deep-water rose shrimp included monthly in biological analyses.

Month	2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	0	0	2	133	3	79	0	123
February	0	0	6	315	1	241	0	231
March	0	0	23	227	0	180	0	135
April	0	0	0	104	0	160	3	81
May	0	0	0	114	126	0	16	215
June	0	0	0	193	3	79	0	50
July	0	0	8	180	7	173	3	147
August	10	180	9	133	3	79	0	126
September	13	158	10	162	7	124	10	234
October	14	220	0	0	7	244	8	327
November	2	235	3	292	0	455	0	109
December	2	78	0	52	0	104	3	91
Total	**41**	**871**	**52**	**1923**	**31**	**2230**	**43**	**1869**

The gonadal cycle of deep-water rose shrimp was analyzed on a monthly basis from August 2022, when biological sampling of this species began, to 2025. (Figure 49). The species showed a continuous reproductive cycle with females in all maturity states throughout the year. However, from February to April there was an increase in the proportion of resting females, coinciding with a decline of GSI values reaching their minimum. Existing literature indicates that, unlike other crustacean species of commercial interest, deep-water rose shrimp does not have a marked reproductive cycle, but presents individuals at different stages of maturity throughout the year, which could be related to the rapid expansion capacity of the species.

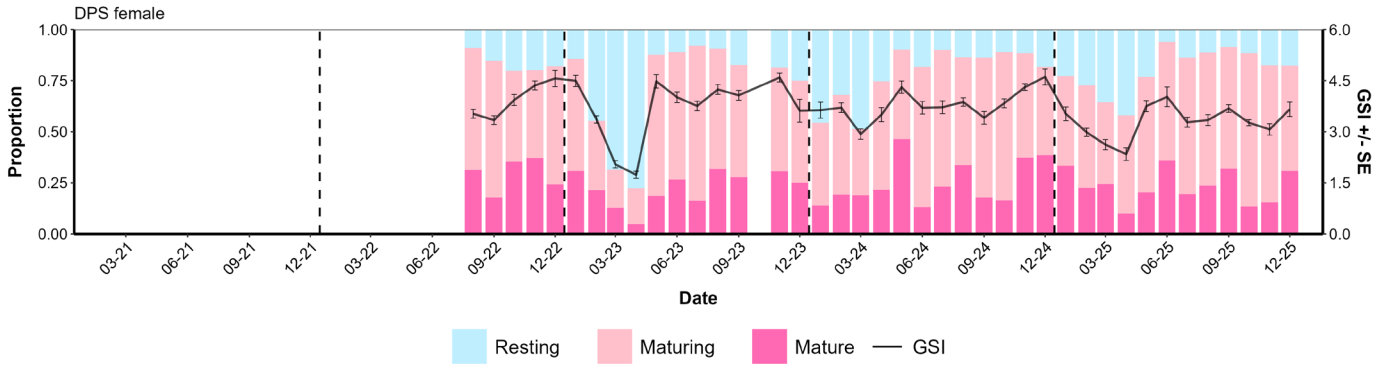


Figure 49 Deep-water rose shrimp monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

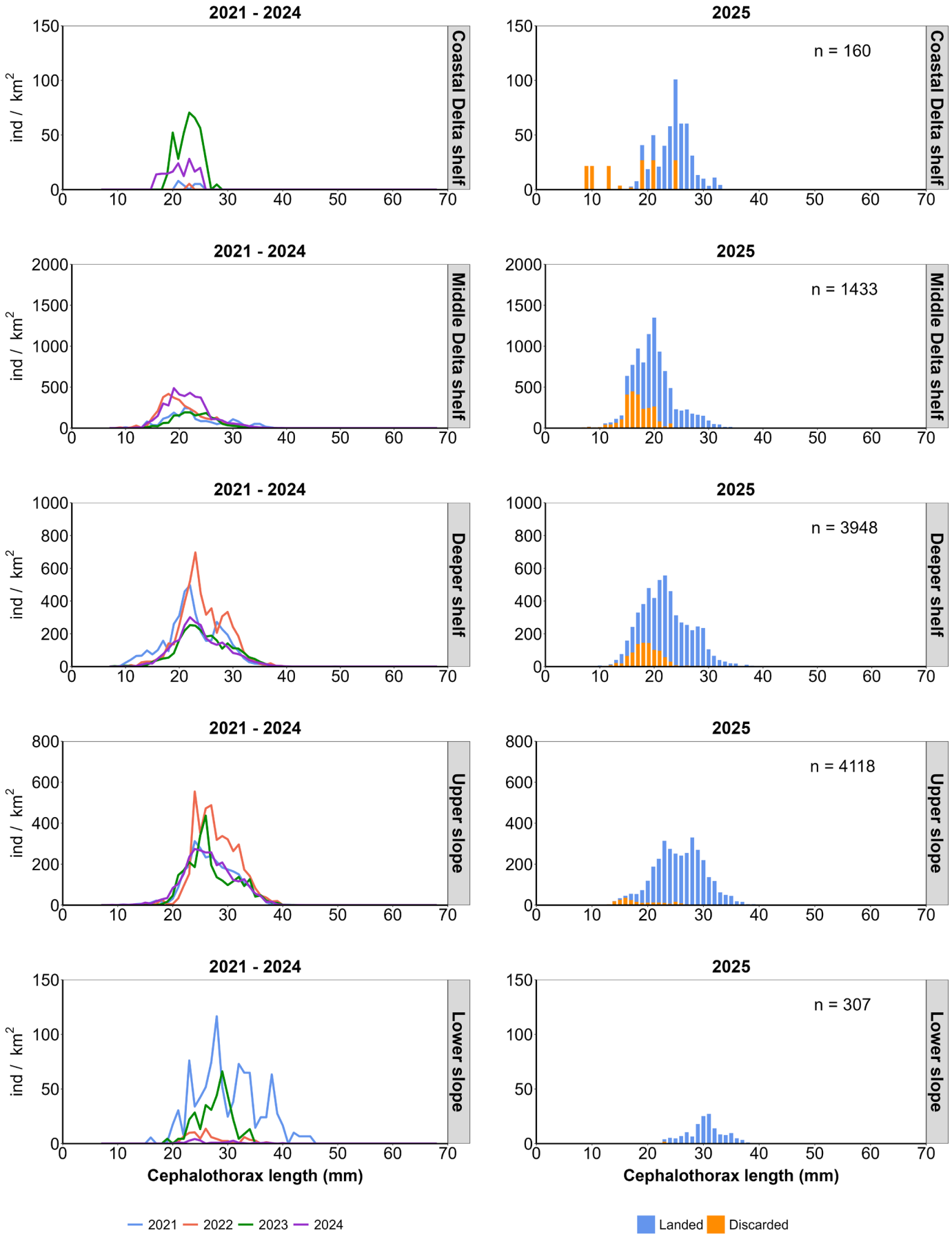


Figure 50 Annual length-frequency distribution of deep-water rose shrimp at different métiers (Coastal Delta Shelf, Middle Delta Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals.

The spatiotemporal length-frequency distribution of deep-water rose shrimp from 2021 to 2025 indicates that the species is present in all the *métiers* sampled, but shows the highest abundance in the upper slope, followed by the deeper shelf and the middle Delta shelf (Figure 50). It should also be noted that in Ebre Delta area, the species inhabits shallower waters. According to the literature, the deep-water rose shrimp benefits from breeding and developing in areas with high temperature and salinity (Mingote et al. 2024).

In terms of catch size, it can be observed that practically the entire available size range for the species was sampled, with the smallest individuals in the coastal Delta and middle Delta shelf and the deeper shelf in all years samples (Figure 50). At greater depths, particularly on the lower slope, all captured specimens were adults. When comparing between years, abundance appeared to increase over time, except in 2023 and 2024, when a slight decrease was observed across all depth strata, except on the coastal Delta shelf, where abundance increased.

For seasonal length-frequency distribution of deep-water rose shrimp at different *métiers* in 2025 see Annex 16.

Table 13 Number of deep-water rose shrimp individuals measured in the different fisheries along the zones sampled in each season (the values include all *métiers* sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	North	518	676	818	591	34
Bottom trawl	2021	Center	402	404	387	214	19
Bottom trawl	2021	South	297	41	204	224	16
Bottom trawl	2022	North	397	419	931	983	32
Bottom trawl	2022	Center	311	239	1197	659	19
Bottom trawl	2022	South	186	242	380	753	13
Bottom trawl	2023	North	1245	880	1012	565	25
Bottom trawl	2023	Center	585	369	591	207	18
Bottom trawl	2023	South	895	517	449	311	14
Bottom trawl	2024	North	830	742	627	936	26
Bottom trawl	2024	Center	355	657	1001	889	20
Bottom trawl	2024	South	576	282	611	1227	17
Bottom trawl	2025	North	627	1103	1457	1040	31
Bottom trawl	2025	Center	196	478	608	324	13
Bottom trawl	2025	South	850	766	965	1555	19

All parameters analyzed in this report for deep-water rose shrimp were calculated using only individuals obtained by bottom trawling sampling (Table 13).

Blue and red shrimp (*Aristeus antennatus*) ARA

The total blue and red shrimp catch in Catalonia in 2025 was 309.4 t, 100% of which were caught by bottom trawling (ICATMAR, 26-02).

Figure 51 and Figure 52 show the spatial distribution of the species landings in 2025 and in the period 2021- 2025 along the Catalan coast, where he fishing effort is mainly concentrated around submarine canyons. Although the over-all trend between 2021 and 2025 is decreasing, the highest value in the series is observed in 2023, at 2 853 kg/km^2, while the lowest value is reached in 2025, at 1 619 kg/km^2.

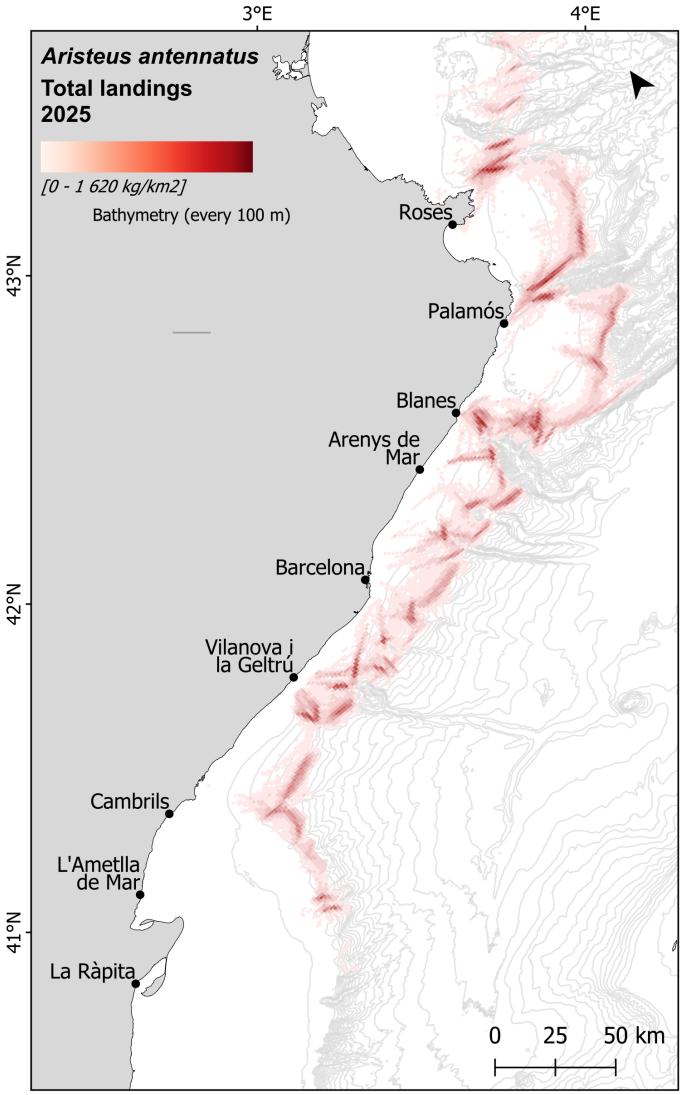


Figure 51. Spatial distribution of landings (kg/km^2) for blue and red shrimp in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 14. Blue and red shrimp length-weight relationship in the year analyzed.

2025	a	b	r^2	n
Combined	0.0036	2.4054	0.97	1 353
Females	0.0036	2.4046	0.96	1 260
Males	0.0087	2.1243	0.90	92

According to length-weight relationship parameters for both sexes combined and separately, blue and red shrimp displayed a negative allometric growth (b<3) in 2025 (Table 14).

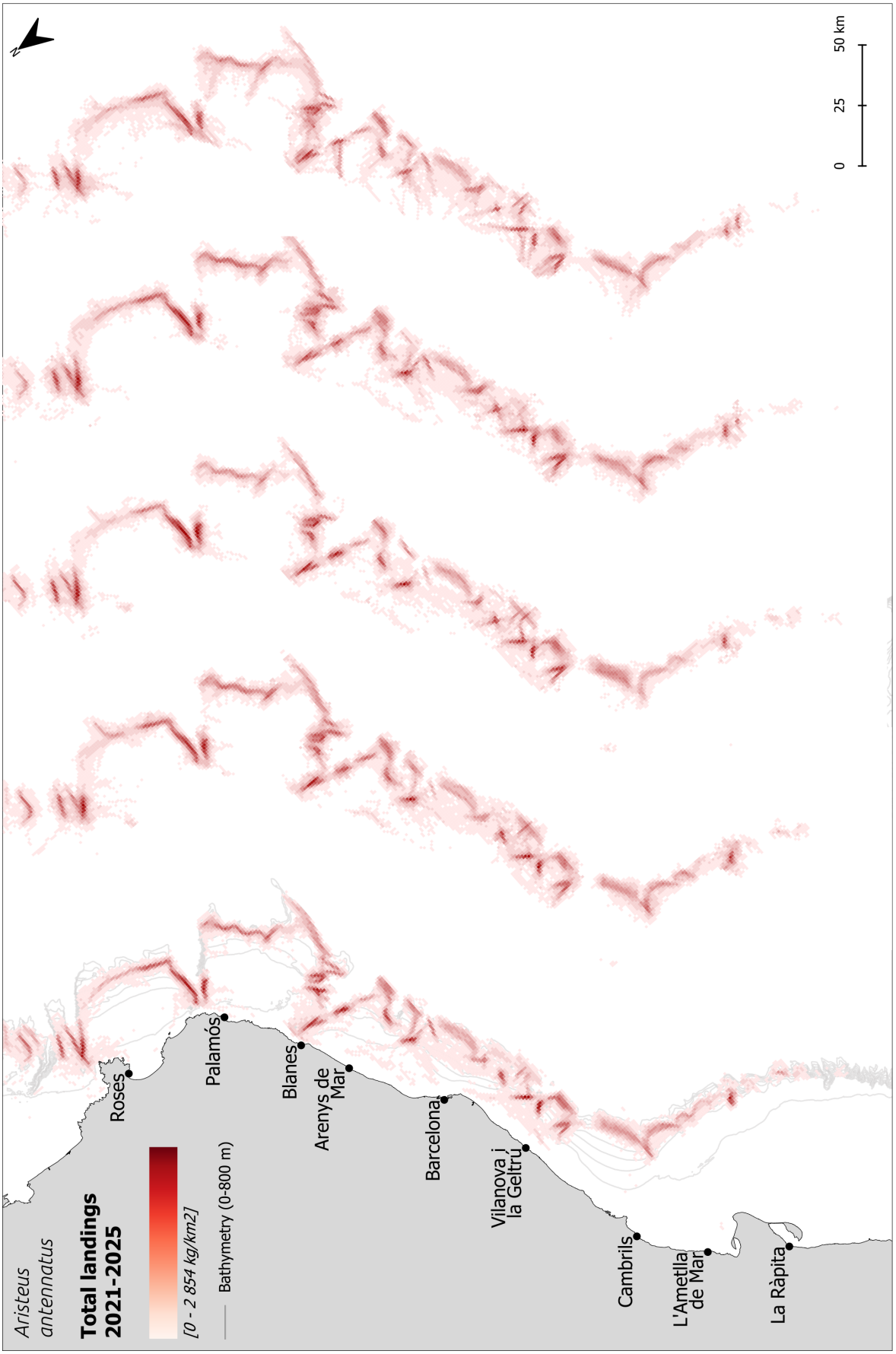


Figure 52. Spatial distribution of landings (kg/km^2) for blue and red shrimp in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

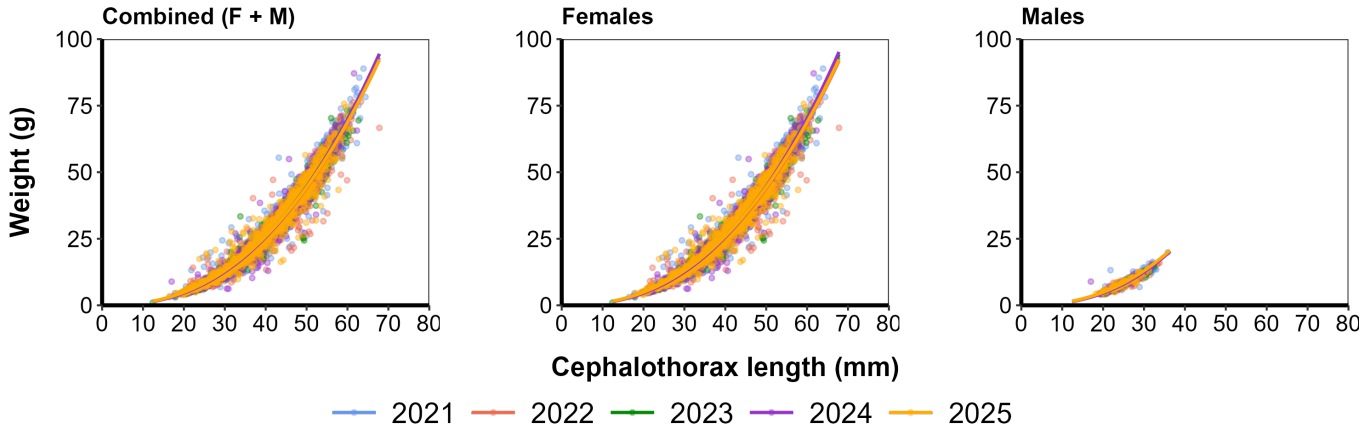


Figure 53. Blue and red shrimp length-weight relationship for the previous four years sampled and the year analyzed.

Comparing the growth curves between the years sampled for both sexes combined and separately, similar results can be observed over the years with negative allometric growth in all cases (Figure 53). As shown in the length-weight relationship separated by sexes, females reach larger sizes than males.

The L_{50} for blue and red shrimp in 2025 was 23.0 mm of CL (Figure 54). Comparing between years, fluctuating values around 23.2 mm of CL can be observed with the higher value observed in 2023 (24.3 mm) and the minimum observed in 2021 and 204 with the same value (22.6 mm of CL).

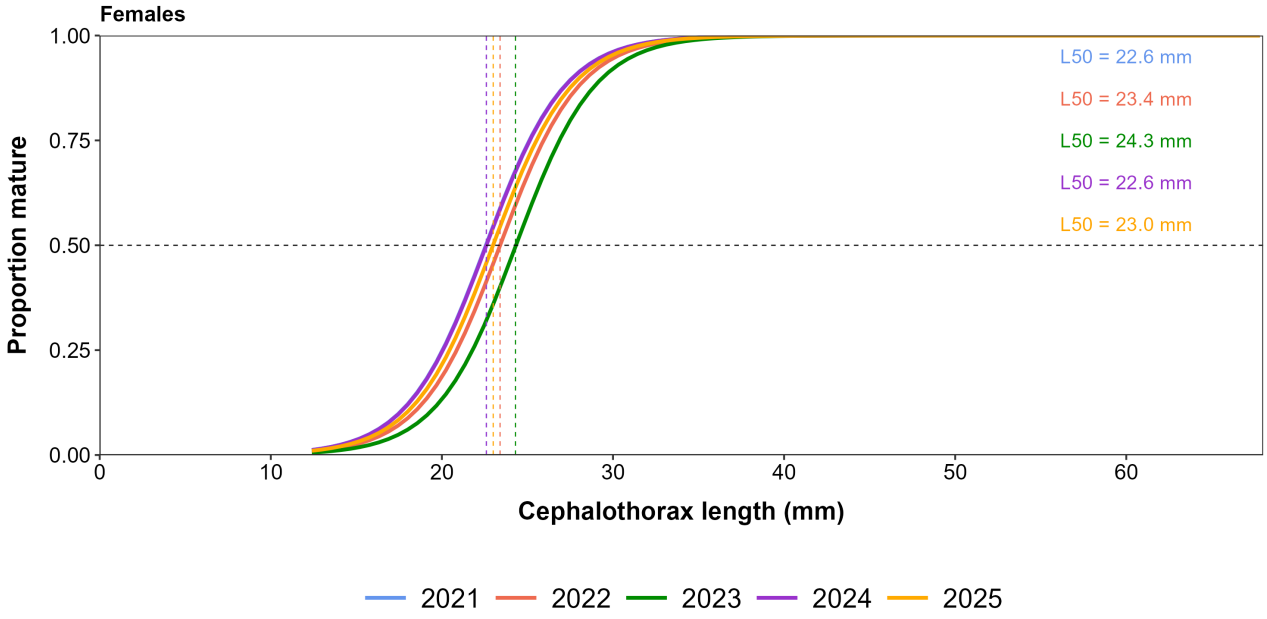


Figure 54. Blue and red shrimp size at first maturity (L_{50}) for all years sampled.

Table 15. Number of mature and immature individuals of blue and red shrimp included monthly in biological analyses.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	7	246	38	162	6	116	7	284	8	153
February	0	0	13	158	24	62	13	75	0	0
March	0	321	5	158	0	156	14	95	19	85
April	0	256	10	71	0	68	0	175	0	75
May	0	187	0	131	0	158	0	179	0	196
June	6	102	0	162	1	191	6	188	12	85
July	0	268	0	119	0	90	0	89	0	61
August	0	131	0	240	2	144	0	352	0	162
September	0	175	0	181	8	274	9	80	2	121
October	13	230	4	106	0	0	0	0	1	70
November	0	0	0	163	54	384	19	576	0	119
December	32	177	9	126	0	85	0	0	13	59
Total	**58**	**2 093**	**79**	**1 777**	**95**	**1 728**	**68**	**2 093**	**55**	**889**

In 2025, a total of 944 blue and red shrimp female individuals were analyzed to calculate the L_{50} (Table 15). Out of these, 55 individuals were classified as im-mature and 2 889 as mature. It should be noted that the low number of immature individuals compared to the mature ones may bias the L_{50} towards larger sizes than it actually is. However, the capture of a reduced number of immature individuals in the samples is a good indication of improved sustainability of the fishery. In fact, a possible management measure is to improve the selectivity of the trawl gear to reduce the catch of immature individuals.

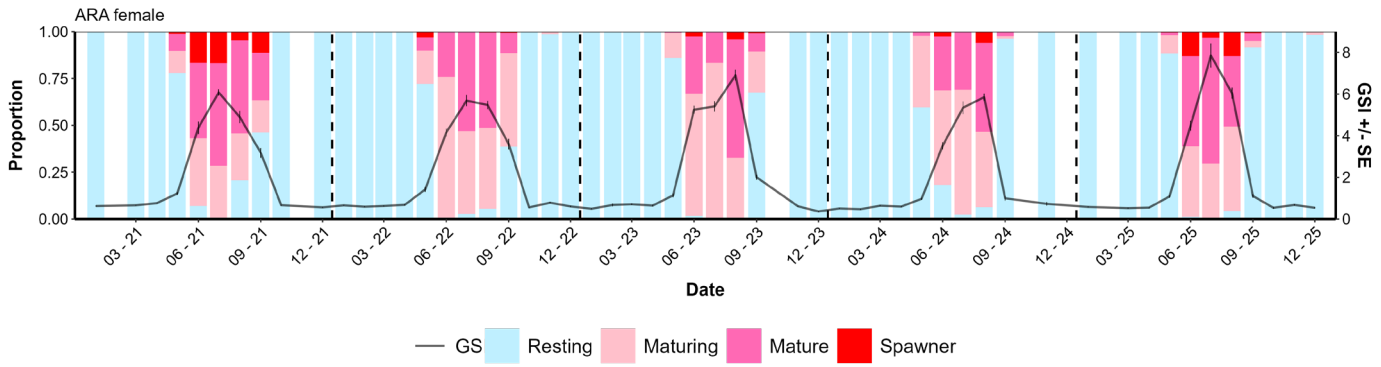


Figure 55. Blue and red shrimp monthly gonadal cycle for females from 2021 to 2054. Gonadosomatic index (GSI +/-SE (Standard Error)) and proportion of different maturity stages.

The gonadal cycle of blue and red shrimp was analyzed monthly from 2021 to 2025 (Figure 55). The species showed a highly seasonal reproductive cycle with a peak in its reproductive activity during the spring and summer months, coinciding with the highest GSI values. When comparing the different years, the highest GSI was recorded in July 2025. In contrast, females were in resting state during most of the autumn and winter months for all years.

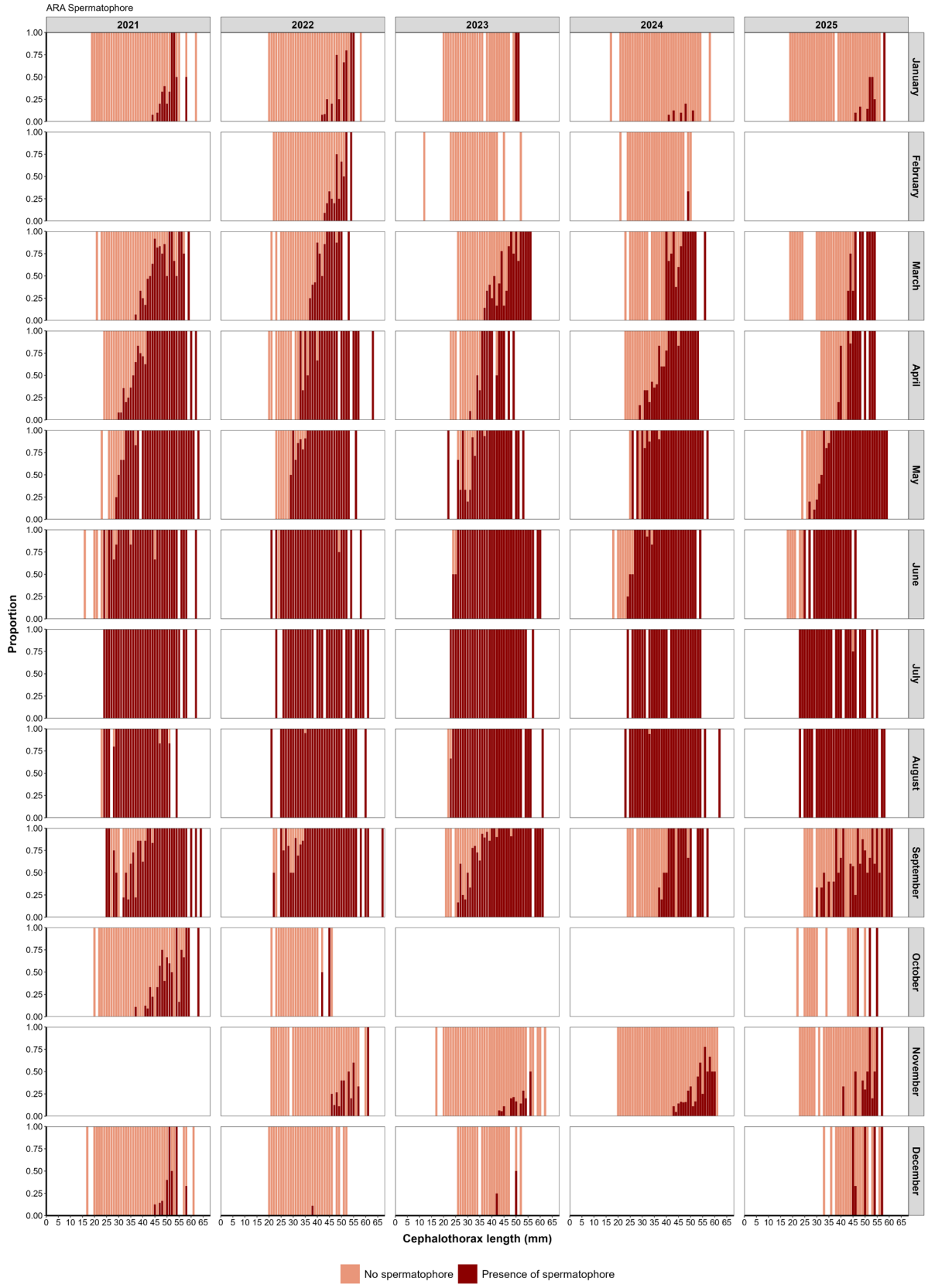


Figure 56. Monthly proportion of females with attached spermatophore of blue and red shrimp at different lengths.

Throughout their life cycle, blue and red shrimp females store the spermatophore deposited by a male in their telycum. The presence or absence of spermatophore is related to the sexual maturity of females. Figure 56 shows the monthly spermatophore occurrence by size in blue and red shrimp females over the years sampled. It can be observed that 100% of females showed presence of spermatophore during the summer months, coinciding with the species reproductive season (Figure 55). In contrast, during the autumn and winter months, the proportion of females with presence of spermatophore was lower.

In terms of size, larger individuals had more presence of spermatophore compared to smaller ones (Figure 56). Furthermore, larger individuals can maintain the spermatophore throughout the year regardless of their sexual maturity stage (Sardà and Demestre, 1987). The presence of spermatophore throughout the year could be related to the fact that larger individuals undergo less molting processes than smaller ones and therefore do not lose their spermatophore. On the contrary, the proportion of smaller individuals with spermatophore presence increased from spring onwards and decreased after summer, as they undergo multiple molting processes throughout the year. When comparing between years, the results are similar for all years sampled.

The spatiotemporal length-frequency distribution of blue and red shrimp from 2021 to 2025 is only shown for the upper and lower slopes *métiers*, as these are the ones that correspond to the strata where the species inhabits (Figure 57). The highest abundances were found in the lower slope in all years sampled. When comparing between years, 2024 and 2022 showed the highest abundance in both *métiers*. The abundance of large sizes in the lower slope, decreased from 2021 to 2022, however in 2023 and 2024 the abundance of large size increased.

In 2025, sizes ranged between 17 and 69 mm of CL, with the mode located at 27 mm of CL in the lower slope. Furthermore, in 2025 the MCRS for Blue and red shrimp (25 mm of CL) was established in December 2023, so in 2025 a small part of the catch has been discarded. Even so, a considerable proportion of the individuals sampled were below the L_{50} and the MCRS. In addition, a blue and red shrimps quota system was implemented, and from June 2025 onwards the use of a 50-mm codend mesh became mandatory. Although these management measures appear to have reduced the proportion of undersized individuals in the catches, individuals below the MCRS continued to be captured (Figure 57). However, the highest abundances of smaller individuals were observed during the winter of 2025, coinciding with the period of recruitment of blue and red shrimp (Annex 17). The higher recruitment observed in 2025, together with the implementation of a Total Allowable Catch (TAC) for this species, led to an increase in the discarding of blue and red shrimp. This species had previously been characterized by negligible or virtually non-existent discard rates.

Table 16. Number of blue and red shrimp individuals measured in bottom trawl fishery along the zones sampled in each season (the values include all métiers sampled). Blue and red shrimp sampling in the South zone ceased from 2021.

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	North	1 053	979	1 146	1 100	16
Bottom trawl	2021	Center	1 067	974	552	465	11
Bottom trawl	2022	North	889	921	934	746	15
Bottom trawl	2022	Center	835	532	663	431	11
Bottom trawl	2023	North	650	629	921	721	12
Bottom trawl	2023	Center	587	750	816	772	12
Bottom trawl	2024	North	924	964	859	881	14
Bottom trawl	2024	Center	556	895	931	1 062	12
Bottom trawl	2025	North	572	1 059	920	700	17
Bottom trawl	2025	Center	274	841	524	223	7

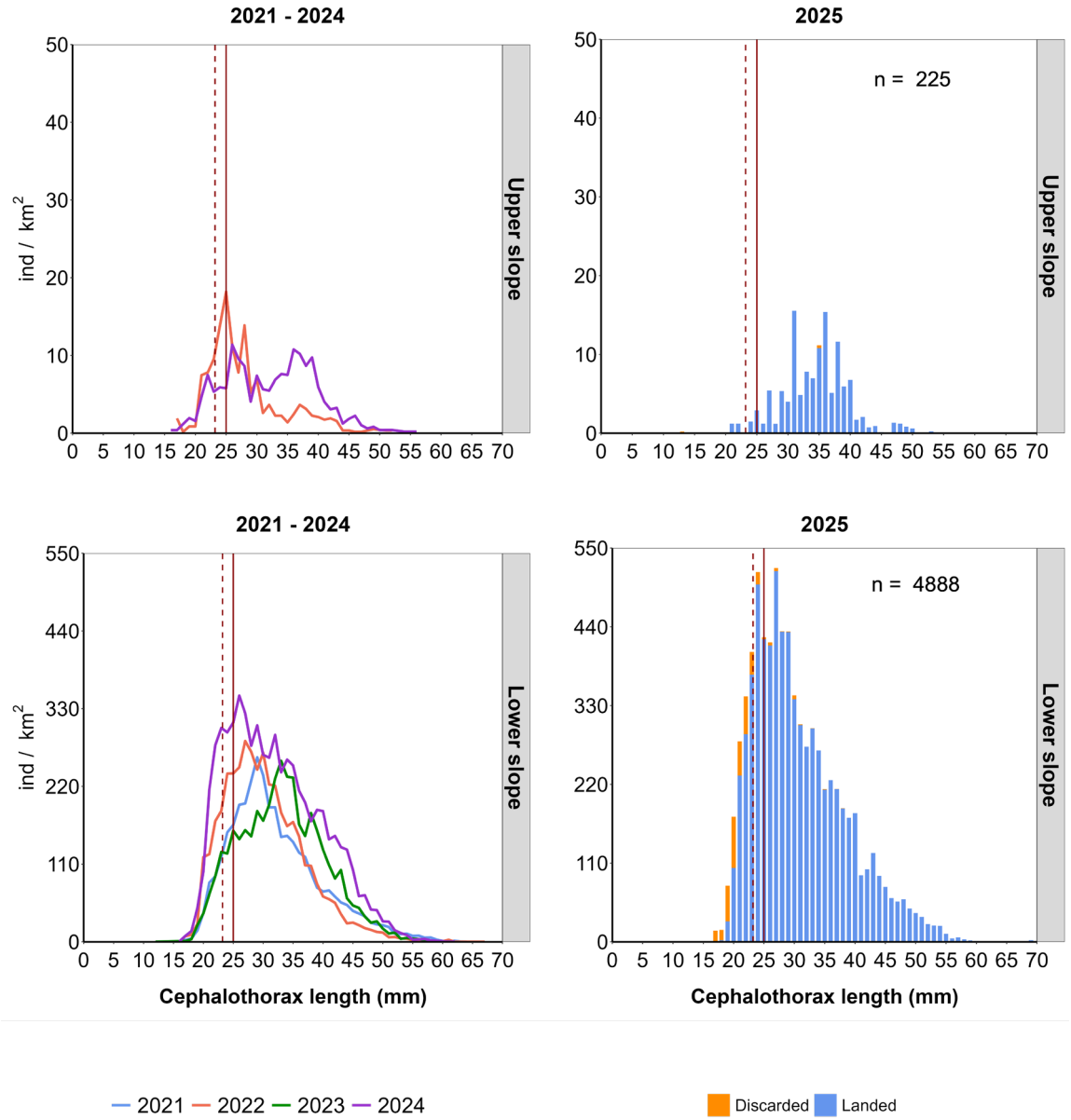


Figure 57. Annual length-frequency distribution of blue and red shrimp at different métiers (US; Upper Slope and LS; Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of the previous four years sampled and the year analyzed.

All parameters analyzed in this report for blue and red shrimp were calculated using only individuals obtained by bottom trawling sampling (Table 16).

Horned octopus (*Eledone cirrhosa*) EOI

The total horned octopus catch in Catalonia in 2025 was 174.58 t, 100% of which were caught by bottom trawling (ICATMAR, 26-02).

Figure 58 and Figure 59 show the spatial distribution of horned octopus landings in 2025 and from 2021 to 2025 along the Catalan coast. Maximum annual landings were reached in 2022 with 401 kg/km², mainly off Roses and Tarragona, and decreasing in the following years. In 2025, annual maximum landings per unit of effort were 289 kg/km² showing a reduction of nearly 28% in comparison with previous years.

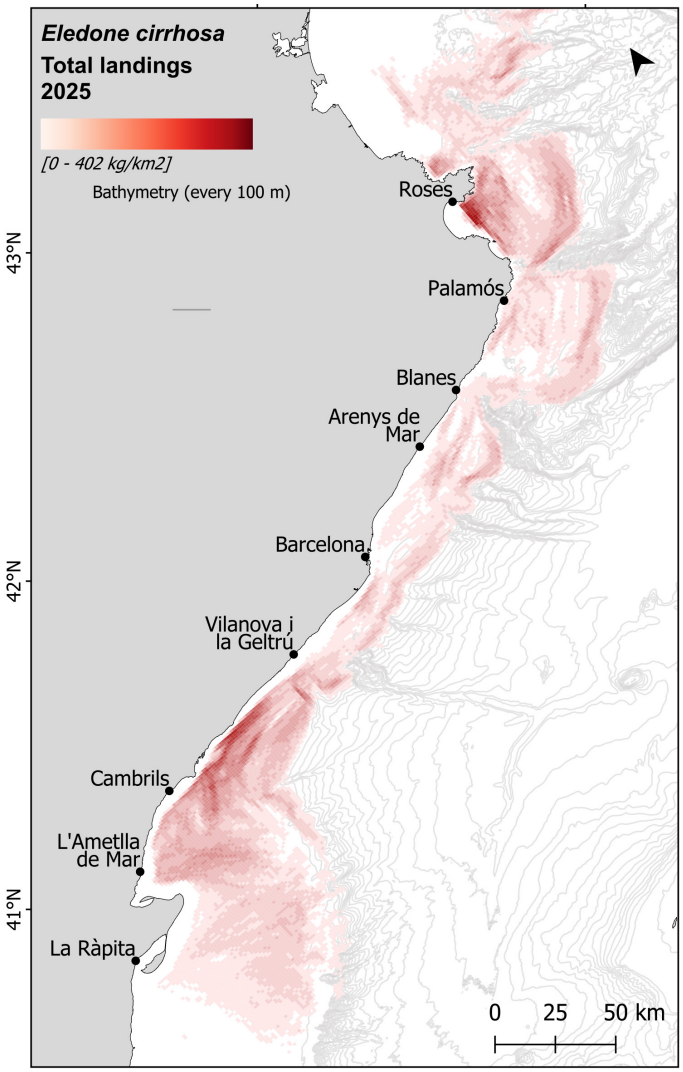


Figure 58. Spatial distribution of landings (kg/km²) for horned octopus in the Catalan fishing grounds (North GSA6) in the year analyzed..

Table 17. Horned octopus length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	a	b	r^2	n
Combined	0.3065	2.9725	0.83	224
Females	0.4122	2.8613	0.8	134
Males	0.4548	2.7515	0.73	90

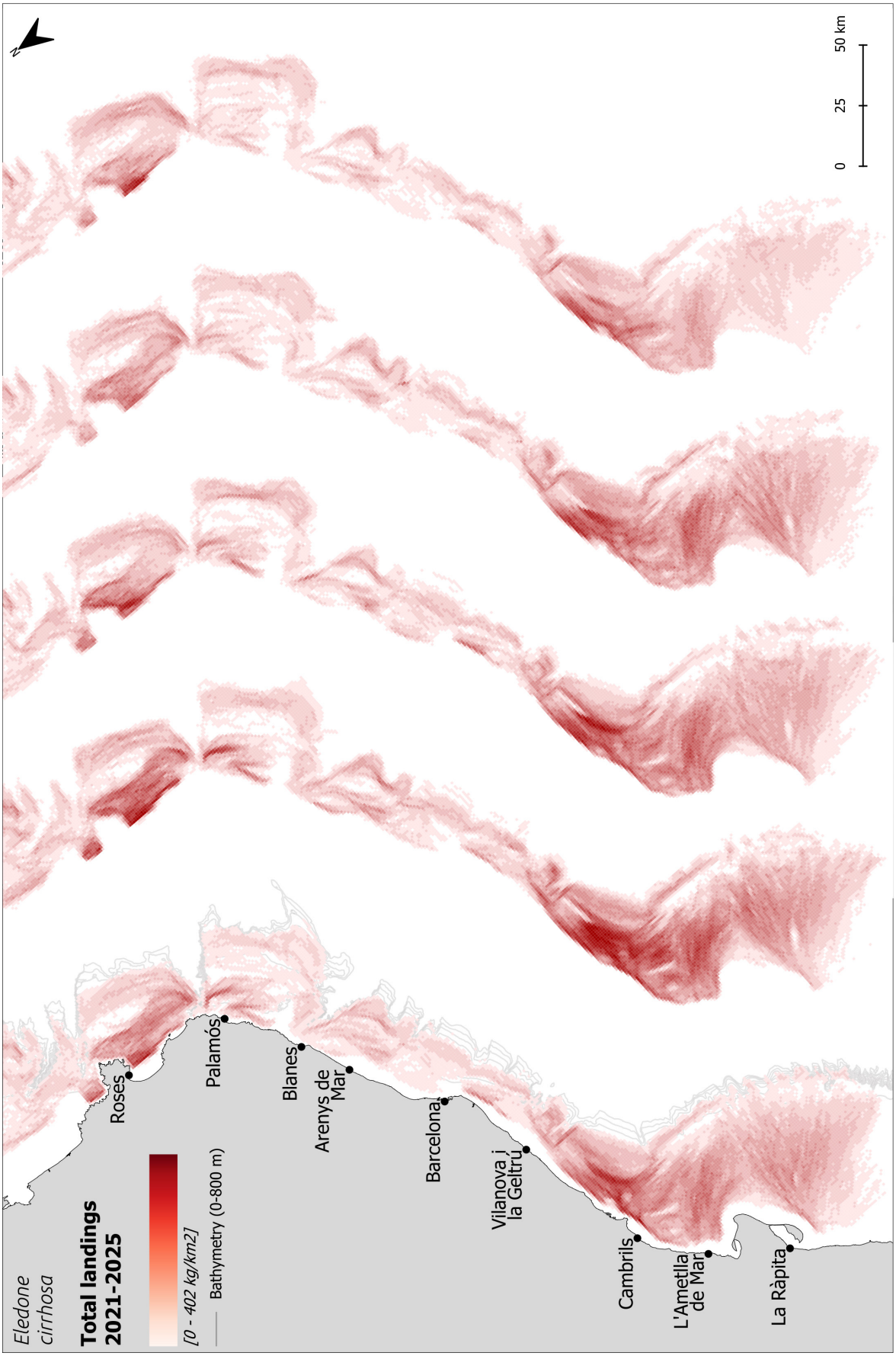


Figure 59. Spatial distribution of landings (kg/km^2) for horned octopus in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

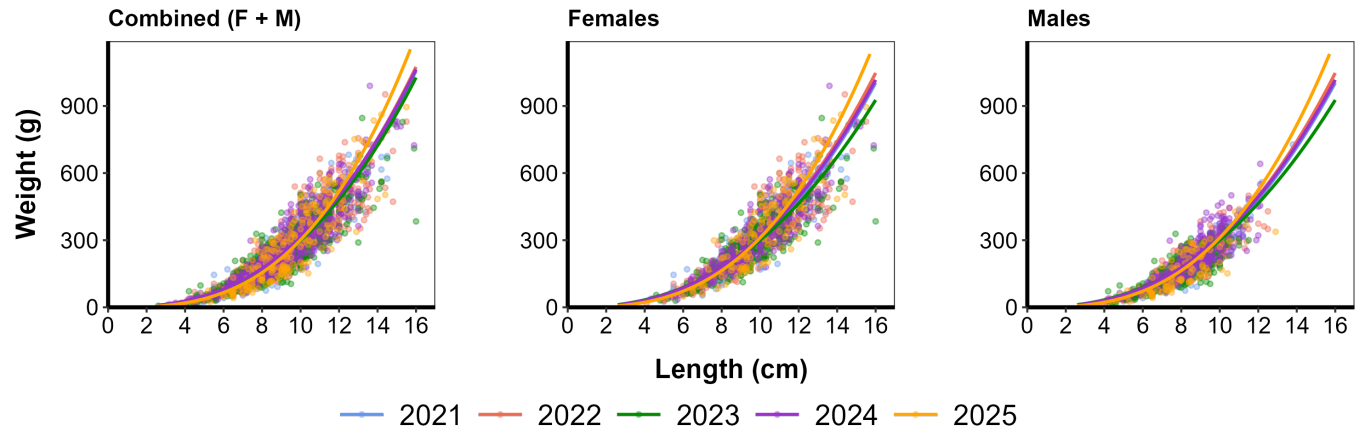


Figure 60. Horned octopus length-weight relationship for the previous four years sampled and the year analyzed.

According to length-weight relationship parameters for both sexes combined and separately, horned octopus displayed a isometric growth (CL_{95}= 2.795-3.149; b ≈ 3) in 2025 (Table 17). Likewise, when applying the growth curves separately for males and females, both sexes exhibited negative allometric growth. (Figure 60). Previous years showed similar growth trends when analyzing both sexes. However, growth trend seems to be slightly lower in 2023 when females and males are compared separately.

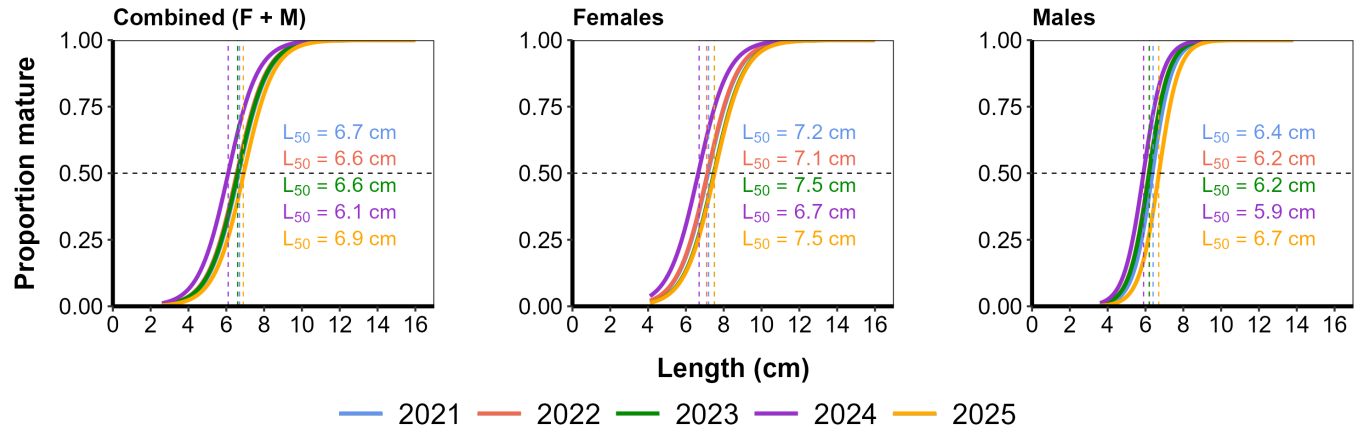


Figure 61. Horned octopus size at first maturity (L_{50}) for all years sampled.

Regarding the L_{50}, 50% of horned octopus specimens attained sexual maturity at 6.9 cm of ML (Figure 61). Males showed an earlier maturation as their L_{50} was 6.7 cm of ML, which is lower than L_{50} of females (7.5 cm of ML). When comparing between years, 2024 showed the lowest L_{50} of all. However, the differences between year were despicable.

Table 18. Number of mature and immature individuals of horned octopus included monthly in biological analyses.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	0	50	0	43	12	87	4	53	1	15
February	2	37	1	75	0	72	3	63	0	19
March	4	103	3	56	0	87	0	54	0	41
April	0	22	0	20	0	9	0	43	0	2
May	2	59	6	53	2	125	7	96	0	33
June	2	18	31	69	8	42	4	63	0	10
July	10	25	14	25	4	12	3	17	8	10
August	24	16	28	24	1	3	18	9	2	1
September	24	35	20	42	40	16	4	7	8	3
October	1	19	8	62	0	0	0	6	17	24
November	0	0	12	74	28	45	5	89	2	28
December	17	103	10	56	3	6	3	12	0	0
Total	**88**	**487**	**133**	**599**	**98**	**504**	**51**	**512**	**38**	**186**

In 2025, a total of 224 horned octopus individuals were analyzed to calculate the L_{50} (Table 18). Out of these, 38 individuals were classified as immature and 186 as mature. It should be noted that the low number of immature individuals compared to the mature ones may bias the L_{50} towards larger sizes than it actually is.

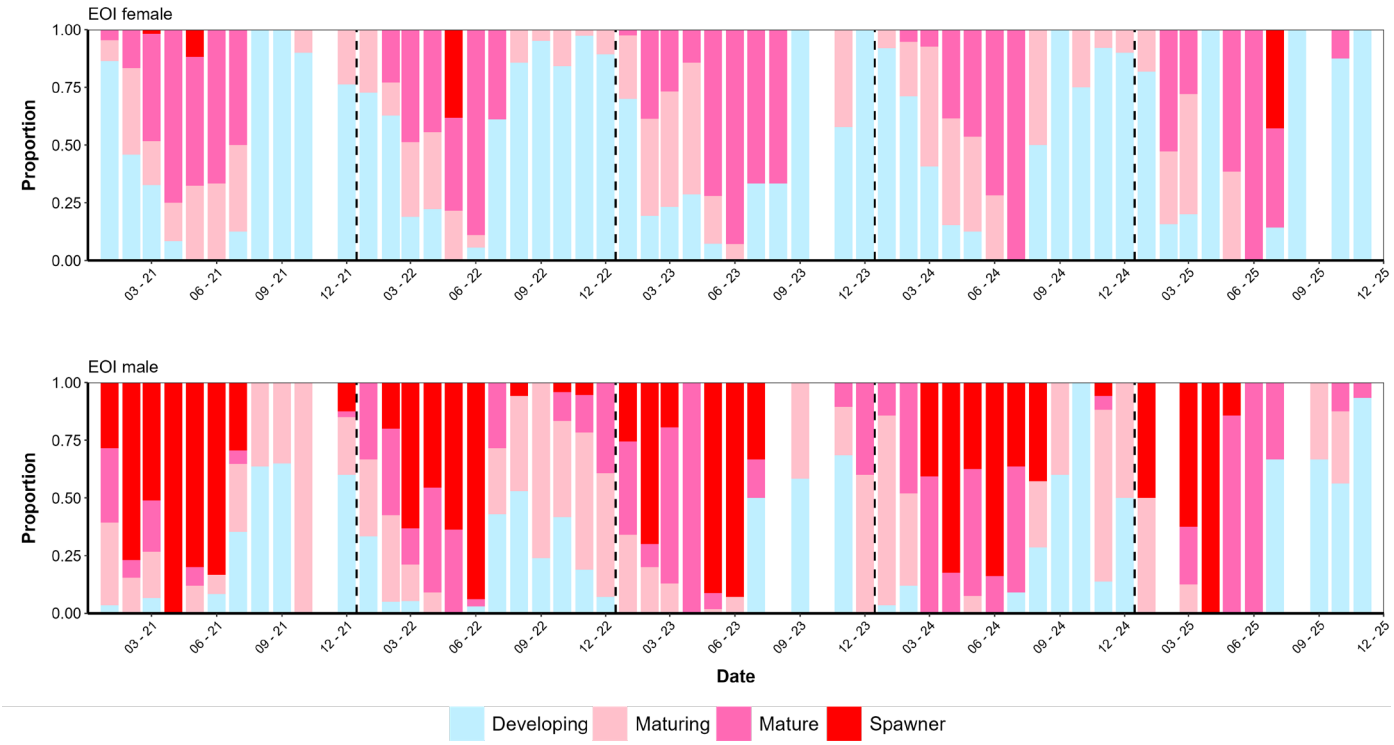


Figure 62. Horned octopus monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

The gonadal cycle of horned octopus was analyzed monthly from 2021 to 2025 (Figure 62). The species showed a seasonal reproductive cycle with the highest proportion of mature individuals (also spawners in the case of males) between February and July. When comparing between years, the reproductive peak from 2021 to 2024 occurred, as in 2021, in June. It should be noted that, although spawning females were almost absent, their monthly reproductive pattern was consistent with that of males.

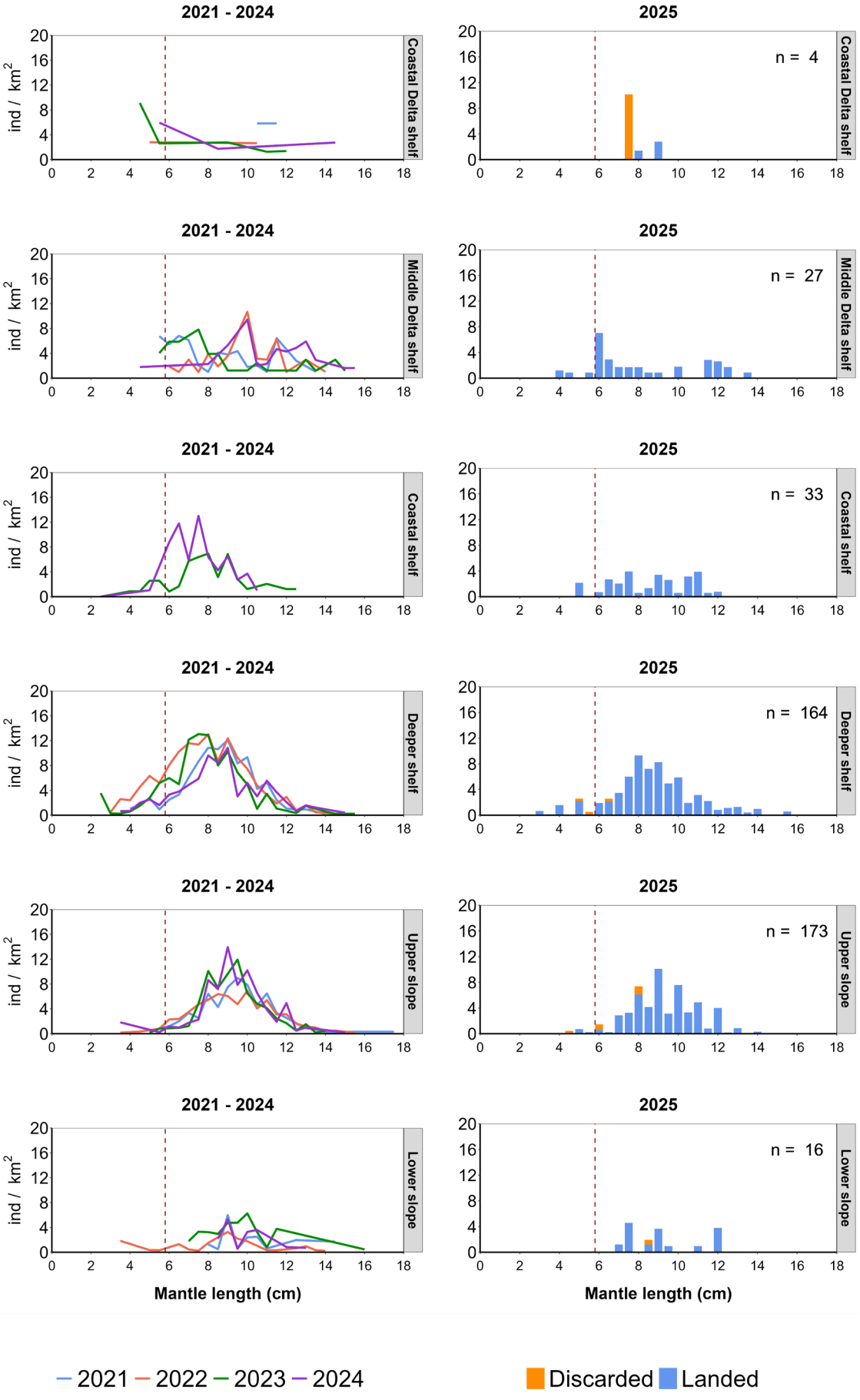


Figure 63. Annual length-frequency distribution of horned octopus at different métiers (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals.

The spatiotemporal length-frequency distribution of horned octopus in 2025 indicates that the species was more abundant in the deeper shelf and the upper slope, while presence in the coastal Delta shelf and the lower slope was despicable (Figure 63). In the coastal shelf, sizes ranged from 5 to 12 cm of ML with a mode at 7 cm of ML. In the deeper shelf, sizes ranged from 3 to 16 com of ML with a mode at 8 cm of ML in all years sampled. In the upper there was a lower proportion of small-sized individuals and the mode was located at 9.5 cm of ML, similar to the mode observed in 2021.

For seasonal length-frequency distribution of horned octopus at different *métiers* in 2025 see (Annex 18).

Table 19. Number of horned octopus individuals measured in the bottom trawl fishery along the zones sampled in each season (the values include all *métiers* sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	North	117	86	46	67	30
Bottom trawl	2021	Center	64	28	30	30	21
Bottom trawl	2021	South	62	5	61	51	14
Bottom trawl	2022	North	85	93	82	112	36
Bottom trawl	2022	Center	72	70	50	44	25
Bottom trawl	2022	South	25	24	53	94	15
Bottom trawl	2023	North	182	145	26	33	33
Bottom trawl	2023	Center	72	58	9	36	24
Bottom trawl	2023	South	45	12	43	16	16
Bottom trawl	2024	North	95	119	23	80	28
Bottom trawl	2024	Center	49	73	31	26	20
Bottom trawl	2024	South	54	27	5	21	16
Bottom trawl	2025	North	41	96	29	75	32
Bottom trawl	2025	Center	16	41	9	7	11
Bottom trawl	2025	South	19	14	15	55	17

All parameters analyzed in this report for horned octopus were calculated using 417 individuals obtained exclusively by bottom trawling sampling (Table 19).

Broadtail squid (*Illex coindetii*) SQM

The total broadtail squid catch in Catalonia in 2025 by the bottom trawling fleet was 277.94 t (ICATMAR, 26-02).

Figure 64 and Figure 65 show the spatial distribution of broadtail squid landings in 2025 and from 2021 to 2025 along the Catalan coast. Maximum annual landings per unit effort were reached in 2024 with 1326 kg/km². In contrast, the analyzed year shows a reduction of 70.4%, with a value of 406 kg/km².

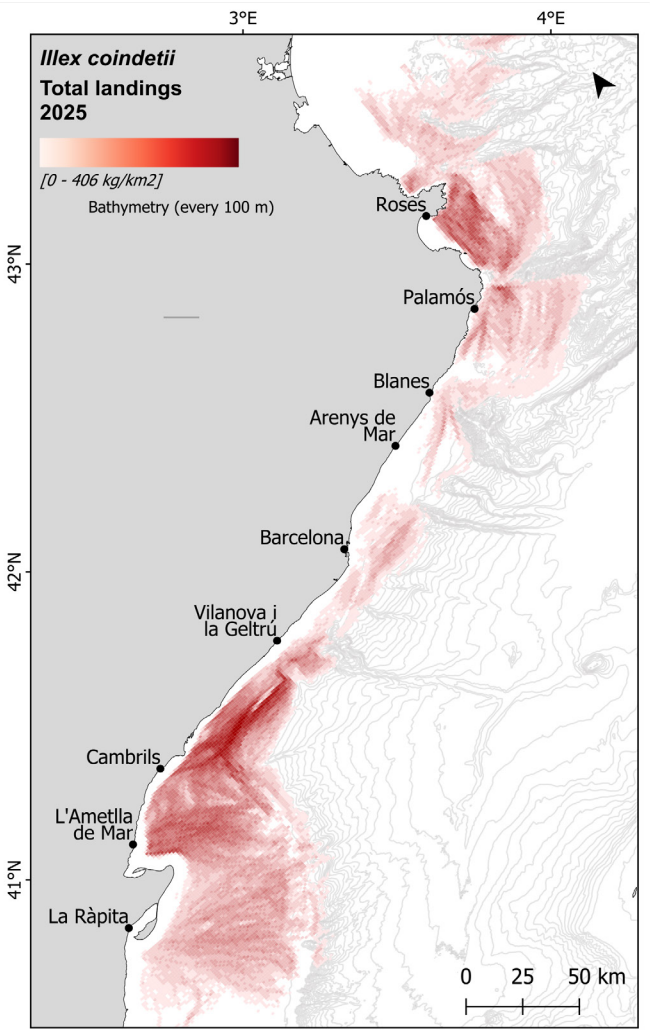


Figure 64. Spatial distribution of landings (kg/km²) for broadtail squid in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 20. Broadtail squid length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	a	b	r^2	n
Combined	0.0661	2.7365	0.92	1 228
Females	0.0678	2.6869	0.92	672
Males	0.0316	3.1077	0.92	538

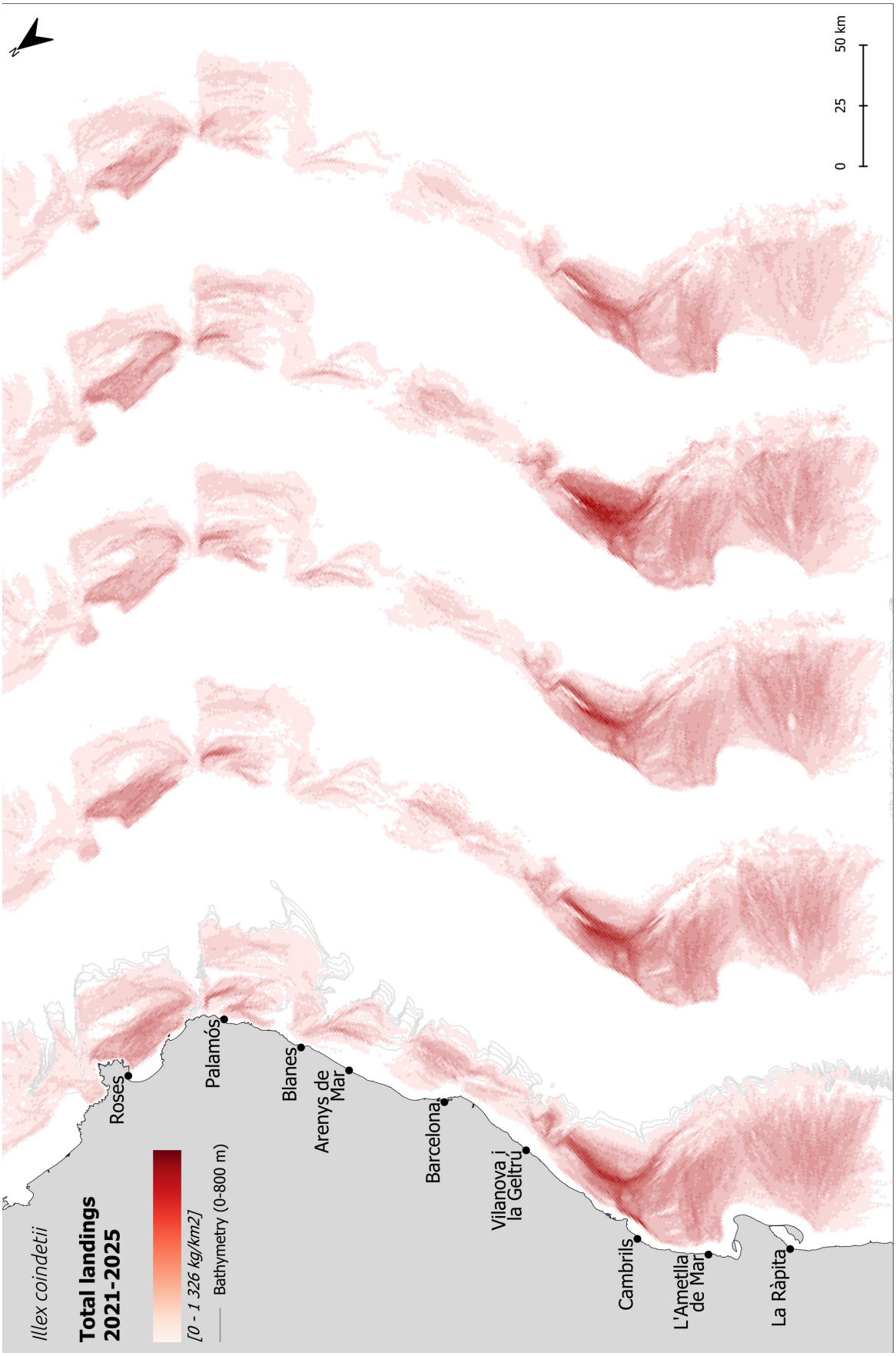


Figure 65. Spatial distribution of landings (kg/km^2) for broadtail squid in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

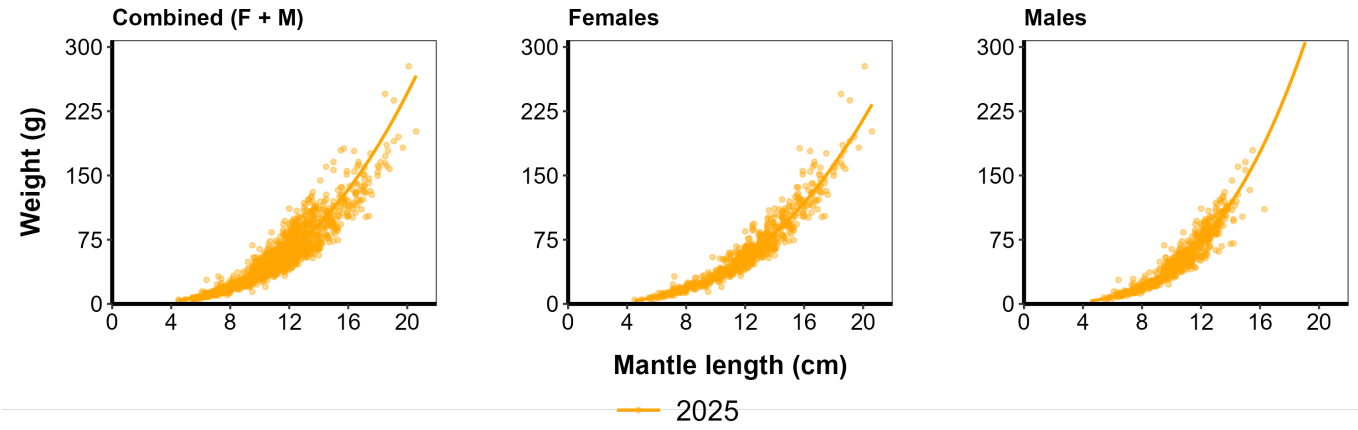


Figure 66. Broadtail squid length-weight relationship for the previous four years sampled and the year analyzed.

According to length-weight relationship parameters for both sexes combined, broadtail squid displayed a negative allometric growth (CL_{95}= 2.691-2.782; b < 3) in 2025 (Table 20). However, when applying the growth curves separately for males and females, positive and negative allometric growth was exhibited, respectively (CL_{95}=3.035-3.181 ; b > 3 for males and CL_{95}= 2.640-2.734; b < 3 for females) in 2025 (Figure 66).

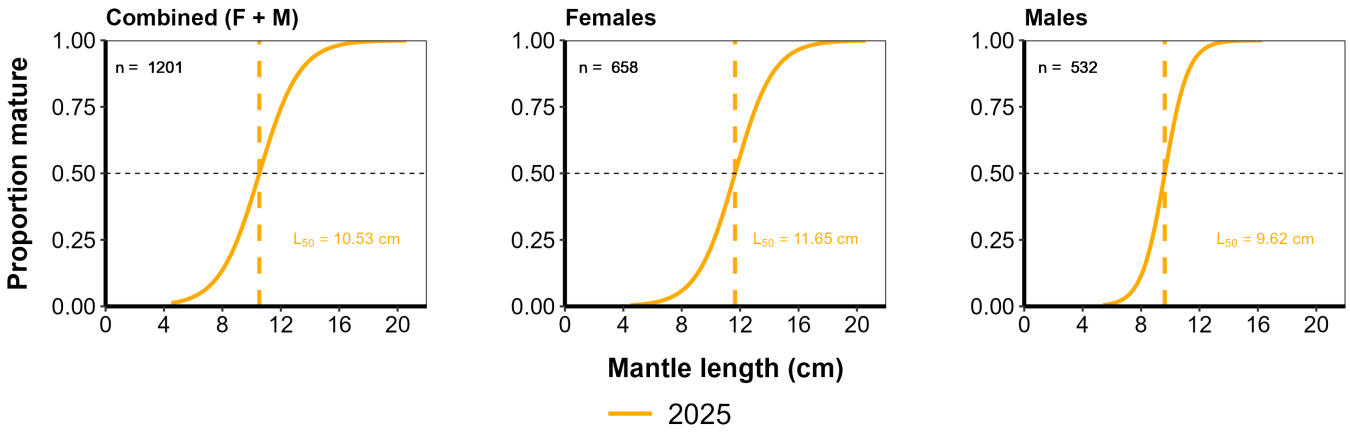


Figure 67. Spottail mantis shrimp monthly gonadal cycle for females.

Regarding the L_{50}, 50% of broadtail shortfin squid, specimens attained sexual maturity at 10.53 cm of ML (Figure 67). Males showed an earlier maturation as their L_{50} was 9.62 cm of ML, which is lower than females (11.65 cm of ML).

Table 21. Number of mature and immature individuals of broadtail squid included monthly in biological analyses.

Month	2025	
	Immature	Mature
January	6	20
February	125	60
March	66	57
April	53	68
May	11	105
June	1	29
July	44	32
August	31	89
September	34	81
October	83	107
November	25	50
December	19	5
Total	**498**	**703**

In 2025, a total of 1201 broadtail squid individuals were analyzed to calculate the L_{50} (Table 21). Out of these, 498 individuals were classified as immature and 703 as mature. It should be noted that the low number of immature individuals compared to mature ones may bias the L_{50} towards larger sizes.

The gonadal cycle of broadtail squid was analyzed monthly during 2025 (Figure 68). The species exhibited an annual reproductive cycle marked by the presence of mature individuals throughout the year. However, the low number of samples captured during the months of January, July and December, prevents the identification of reproductive peaks.

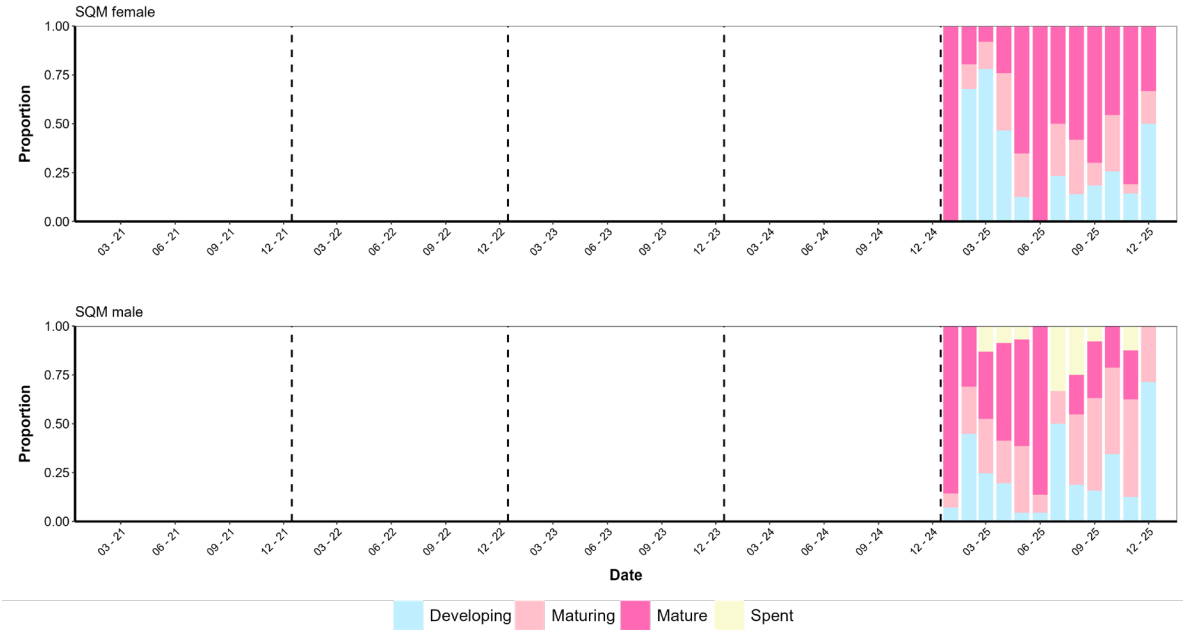


Figure 68 Broadtail squid monthly gonadal cycle for females (top) and males (bottom). Proportion of different maturity stages.

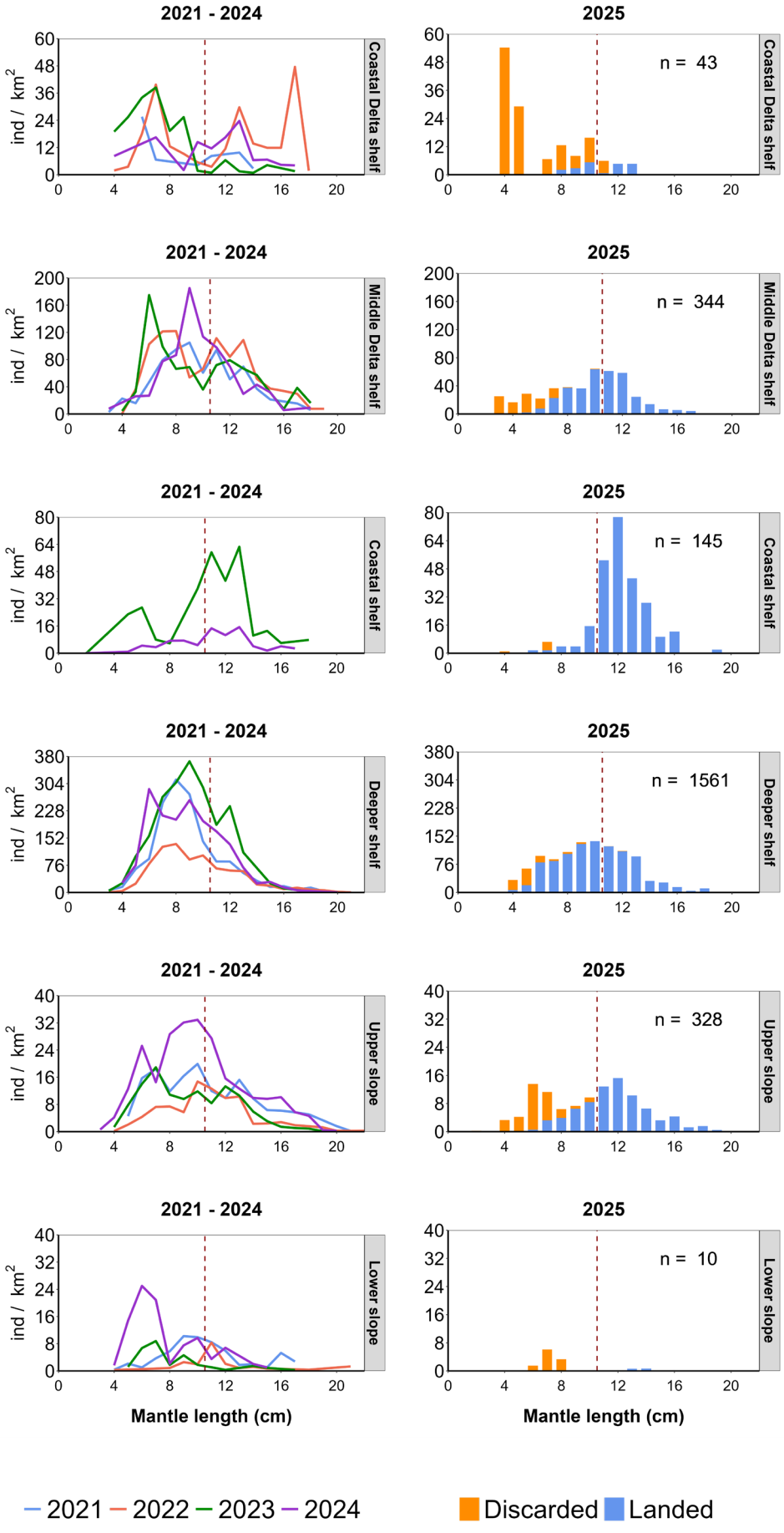


Figure 69. Annual length-frequency distribution of broadtail squid at different métiers (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red dashed line: size at first maturity (L_{50}) for both sexes combined calculated with data from 2025.

The spatiotemporal length-frequency distribution of broadtail squid in 2025 indicates that the species was more abundant in the deeper shelf, followed by the middle Delta shelf, the upper slope and the coastal shelf. In contrast, presence on the coastal Delta shelf and the lower slope was negligible (Figure 69). In the deeper shelf, sizes ranged from 4 to 18 cm of ML with a modal size at 10 cm of ML in the analyzed year. On the middle Delta shelf, sizes ranged from 3 to 17 cm of ML with a modal size of 10 cm of ML. On the upper slope, sizes range from 4 to 19 cm with two modes clearly differentiated: 6 cm and 12 cm. 2025's size distribution on the most abundant métiers, is slightly shifted towards larger individuals compared with previous years. On the coastal shelf, despite the lower number of samples, sizes ranged from 4 to 19 cm of ML with a modal size of 12.

For seasonal length-frequency distribution of broadtail squid at different métiers in 2025 see (Annex 19).

Table 22. Number of broadtail squid individuals measured in the bottom trawl fishery along the zones sampled in each season (the values include all métiers sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	North	141	199	251	233	38
Bottom trawl	2021	Center	197	210	286	195	27
Bottom trawl	2021	South	106	58	168	101	18
Bottom trawl	2022	North	103	171	170	161	37
Bottom trawl	2022	Center	83	58	204	60	25
Bottom trawl	2022	South	65	310	187	78	17
Bottom trawl	2023	North	182	246	374	283	39
Bottom trawl	2023	Center	116	137	140	102	26
Bottom trawl	2023	South	259	312	172	68	20
Bottom trawl	2024	North	300	188	181	247	36
Bottom trawl	2024	Center	72	250	351	98	25
Bottom trawl	2024	South	222	190	182	144	20
Bottom trawl	2025	North	264	328	369	162	37
Bottom trawl	2025	Center	32	15	26	97	10
Bottom trawl	2025	South	407	178	233	320	20

All parameters analyzed in this report for broadtail squid were calculated using 11042 individuals obtained exclusively by bottom trawling sampling (Table 22).

Spottail mantis shrimp (*Squilla mantis*) MTS

The total spottail mantis shrimp catch in Catalonia in 2025 was 278.3 t, 92.3% of which were caught by bottom trawling and 7.7% by artisanal fisheries (ICATMAR, 26-02).

Figure 70 and Figure 71 show the spatial distribution of the species landings in 2025 and the period 2021 to 2025 along the Catalan coast, centered around the Ebre Delta area. Following the annual peak of 1,145 kg/km² in 2021, annual maximum landings remained relatively stable between 2022 and 2024, before showing a slight recovery in 2025, reaching an annual maximum of 856 kg/km².

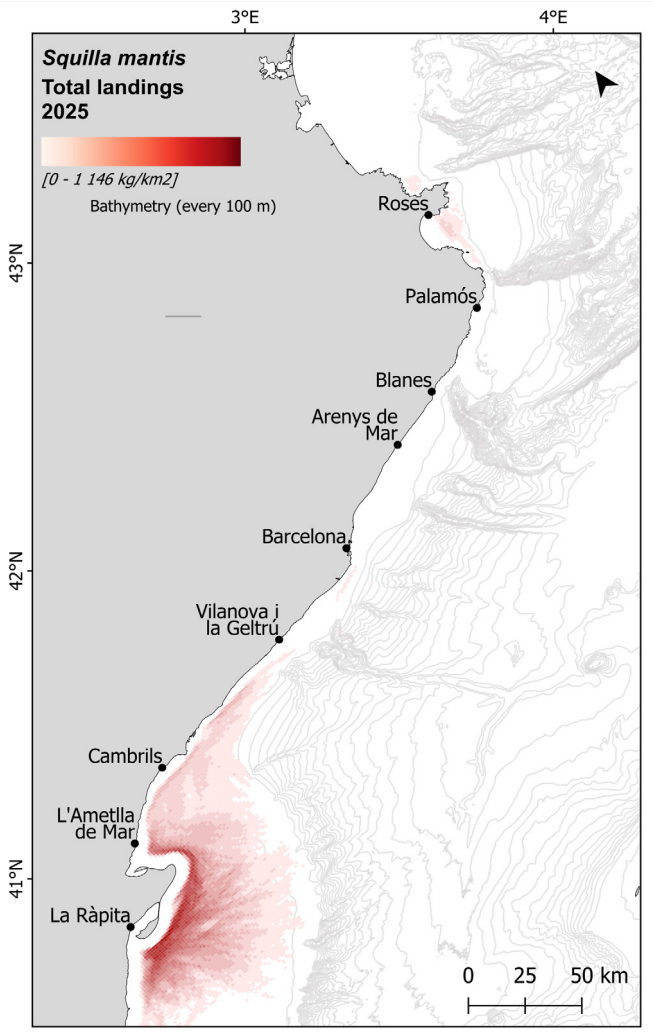


Figure 70. Spatial distribution of landings (kg/km²) for spottail mantis shrimp in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 23. Spottail mantis shrimp length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	a	b	r²	n
Combined	0.0022	2.9061	0.88	647
Females	0.0014	3.0462	0.89	378
Males	0.0043	2.6975	0.86	268

According to length-weight relationship parameters for both sexes combined and males separately, the species showed a negative allometric growth in 2025 (CL_{95}= 2.823-2.989 and CL_{95}=2.565-2.830 respectively; b<3). On the other hand, the length-weight relationship parameters for females showed positive allometric growth (CL_{95}= 2.938-3.154; *b*>3) but with significant weight variations at equal size (Table 23). Therefore, its length-weight relationship is not well adjusted, which could be related to the short life cycle of the species.

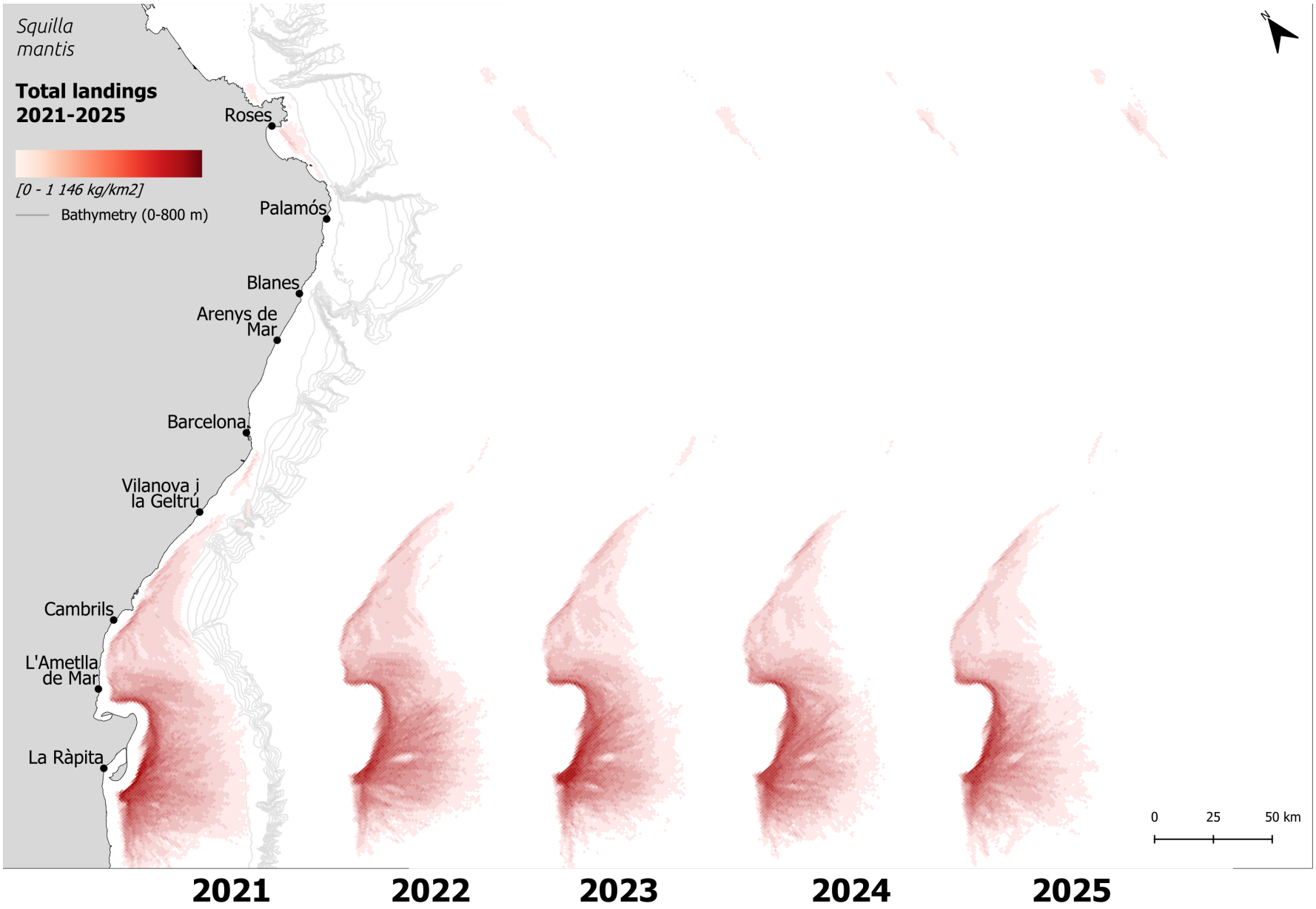


Figure 71. Spatial distribution of landings (kg/km²) for spottail mantis shrimp in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

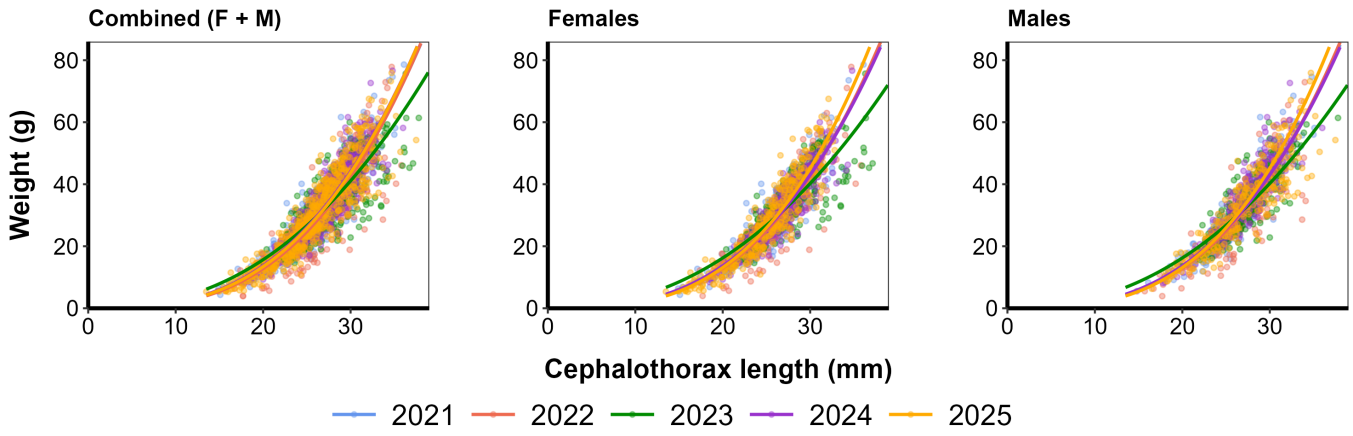


Figure 72. Spottail mantis shrimp length-weight relationship for the previous four years sampled.

When comparing growth curves for both sexes combined and separately from 2021 to 2025 (Figure 72), the results show a similar trend in the period. Although a different trend is seen between 2022 and 2023. As already mentioned, this species shows considerable variations in weight at the same size, and the reproductive period has a strong influence on the weight value.

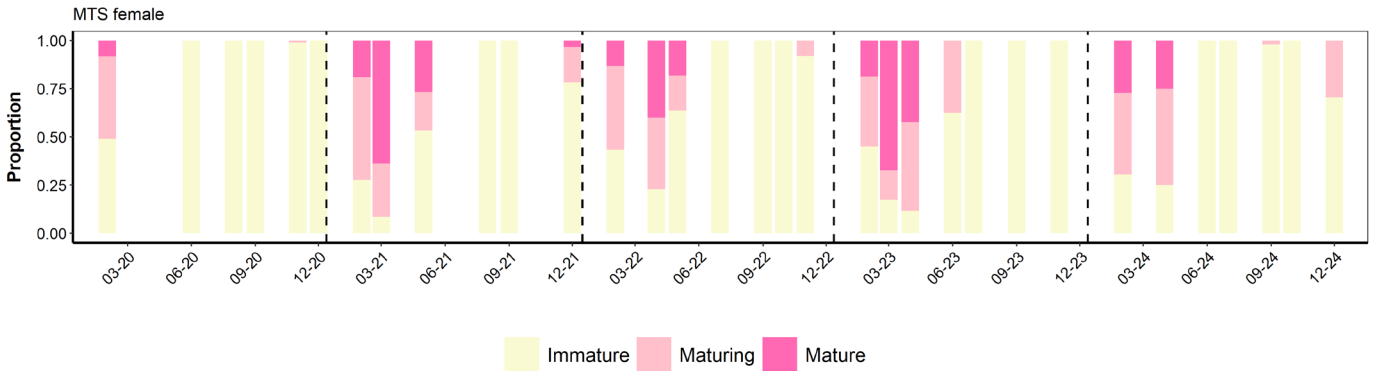


Figure 73. Spottail mantis shrimp monthly gonadal cycle for females.

The gonadal cycle of spottail mantis shrimp was analyzed seasonally from 2021 to 2025 (Figure 73). The species showed a marked reproductive cycle with maturing and mature individuals during winter and spring, which is consistent with its described reproductive cycle. The spottail mantis shrimp is a species with a short life cycle, in which adults die after spawning and, for this reason, only immature individuals were found after the reproductive peak during summer and autumn. This characteristic, together with rapid growth, makes this species able to withstand the fishing pressure to which it is subjected.

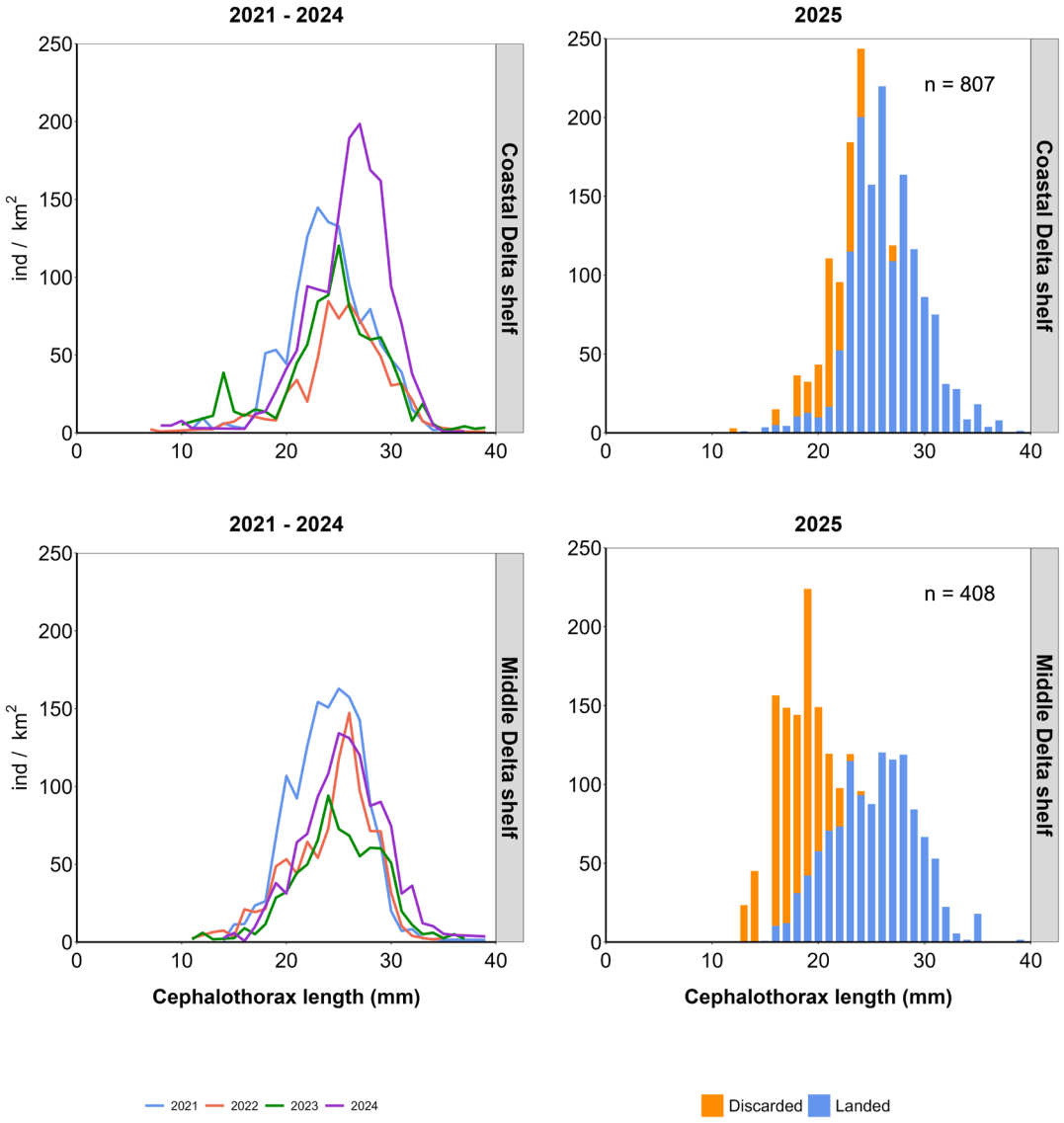


Figure 74 Annual length-frequency distribution of Spottail mantis shrimp at different métiers (Coastal Delta Shelf and Middle Delta Shelf). Left: previous years sampled, right: the year analyzed. (n) Total number of measured individuals..

The spatiotemporal length-frequency distribution of spottail mantis shrimp from 2021 to 2025 shows that most of the population size ranges were caught during the sampling (Figure 74). A comparison across years reveals that both the size range and modal size remained relatively consistent. The highest abundance was recorded in 2021 for both *métiers*. In 2023, abundance increased compared to 2022, particularly in the coastal Delta shelf. In 2025, abundances in the landed fraction were similar between the two strata, with a modal cephalothorax length (CL) ranging from 25 to 30 mm. By contrast, the discarded fraction was dominated by individuals with CL values around 20 mm. Additionally, the Middle Delta Shelf stratum showed a slightly higher abundance of the smallest size classes in the discarded fraction.

For seasonal length-frequency distribution of spottail mantis shrimp at different *métiers* in 2025, see Annex 20.

Table 24. Number of spottail mantis shrimp individuals measured in the different fisheries along the zones sampled in each season (the values include all métiers sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	Center	1	1	0	0	2
Bottom trawl	2021	South	573	85	647	613	21
Bottom trawl	2022	Center	1	0	0	0	1
Bottom trawl	2022	South	259	195	306	506	20
Bottom trawl	2023	Center	0	0	1	0	1
Bottom trawl	2023	South	585	221	289	69	19
Bottom trawl	2024	Center	1	0	0	0	1
Bottom trawl	2024	South	488	263	294	520	21
Bottom trawl	2025	Center	0	0	3	0	2
Bottom trawl	2025	South	464	118	297	439	23

All parameters analyzed in this report for spottail mantis shrimp were calculated using only individuals obtained by bottom trawling sampling (Table 24).

Caramote prawn (*Penaeus kerathurus*) TGS

In 2025, the total caramote prawn catch in Catalonia reached 110 t, with 35.5% of the landings originating from bottom trawl fisheries and 64.3% from artisanal fisheries (ICATMAR, 26-02).

Figure 75 and Figure 76 show the spatial distribution of the caramote prawn landings along Catalan coast in 2025 and over 2021 to 2024 period, respectively. Throughout these years, annual maximum landings remained well below the historical peak recorded in 2019 (402 kg/m2). The highest maximum landing density was recorded last year, 2025 (321 kg/m2), while the lowest was observed in 2024, with a maximum of just 172 kg/m2.

Is important to note that these maps do not include landings from artisanal fisheries, which account for the majority of the caramote prawn catch. Consequently, the spatial distribution and relative abundance shown in the maps may underestimate the overall importance of this species in the study area.

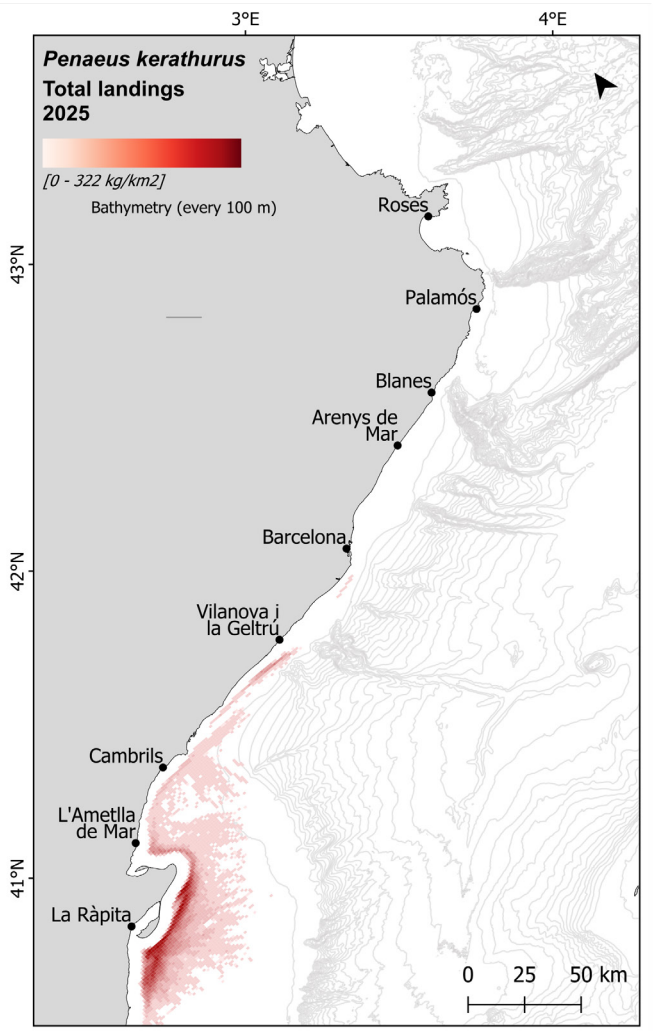


Figure 75. Spatial distribution of landings (kg/km²) for caramote prawn in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 25. Caramote prawn length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	a	b	r^2	n
Combined	0.0034	2.4987	0.95	326
Females	0.0026	2.5708	0.92	174
Males	0.0027	2.5673	0.90	152

According to length-weight relationship parameters for both sexes combined and separately, the caramote prawn showed a negative allometric growth (CL_{95} = 2.433-2.564; $b < 3$) in 2025 (Table 25). The sample size (n) is limited in this case due to the species not being sampled across its entire range and the low number of captures. Despite this limitation, the combined data show a very high correlation ($r^2 = 0.95$), with females exhibiting an even higher correlation ($r^2 = 0.92$). In contrast, males display a lower correlation ($r^2 = 0.90$).



Figure 76. Spatial distribution of landings (kg/km²) for caramote prawn in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

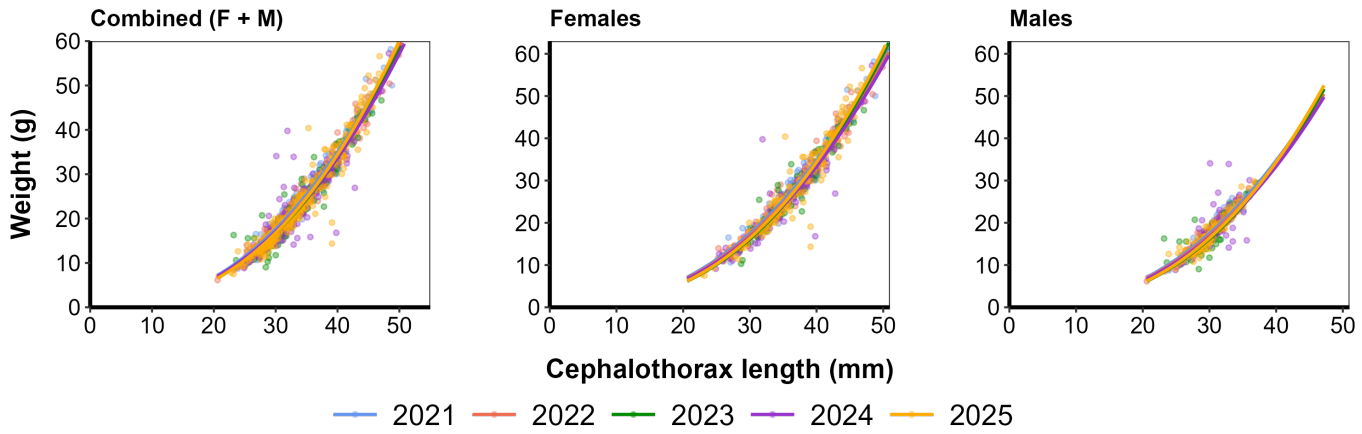


Figure 77. Caramote prawn length-weight relationship for the years sampled.

When comparing the growth curves between the years sampled for both sexes combined and separately (Figure 77), it is evident that this species exhibits a pronounced sexual dimorphism, with females being larger and heavier than males. The sampling *métier* for this species, the coastal Delta shelf, is located at a depth of less than 40 m — a depth stratum in which almost all the specimens captured are adults.

Table 26. Number of mature and immature individuals of caramote prawn included monthly in biological analyses.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	0	0	0	0	0	0	0	0	0	0
February	0	20	3	14	0	21	0	23	0	27
March	0	1	0	0	0	0	0	0	0	0
April	0	0	0	1	0	19	0	2	0	22
May	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0
July	0	0	0	13	0	17	0	11	0	38
August	0	14	0	0	0	0	0	0	0	0
September	4	11	7	33	6	21	11	24	25	12
October	0	0	0	22	0	0	0	21	4	52
November	0	0	0	36	0	4	0	0	0	0
December	0	42	0	0	0	0	22	13	0	0
Total	**4**	**88**	**10**	**115**	**6**	**82**	**33**	**94**	**29**	**151**

Table 26 shows the number of immature and mature caramote prawn individuals obtained for the years sampled. As can be observed, due to the low number of individuals sampled, the calculation of the L_{50} for this species is not considered fully reliable.

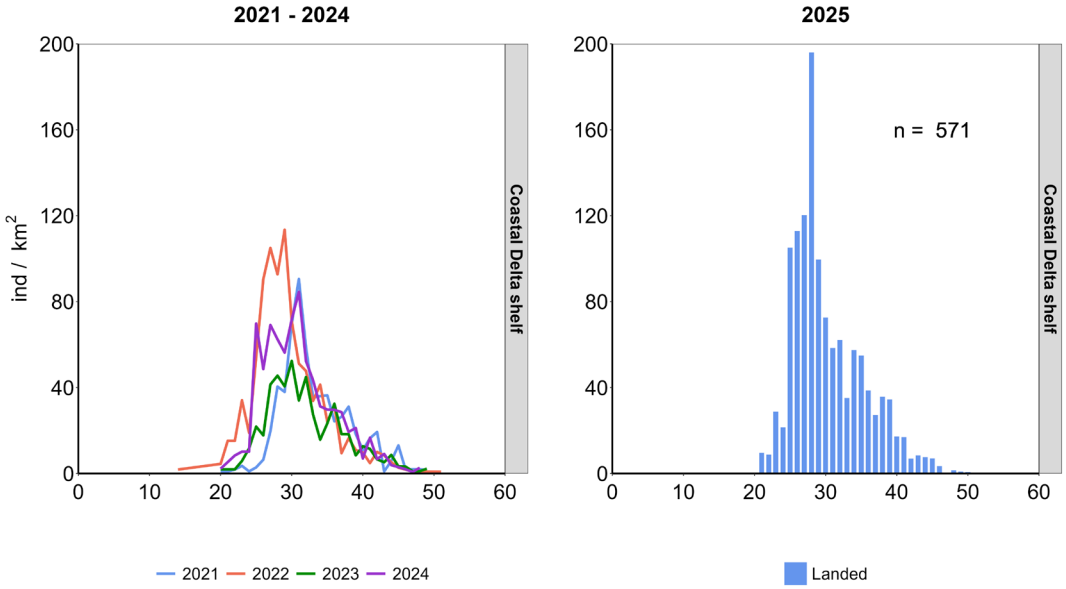


Figure 78. Annual length-frequency distribution of caramote prawn at the Coastal Delta shelf métier. Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals.

The spatiotemporal length–frequency distribution of the caramote prawn between 2021 and 2025 is presented exclusively for the Coastal Delta shelf, the principal habitat of the species (Figure 72). During the study period, carapace length (CL) ranged from 15 to 50 mm, with the modal size consistently occurring around 30 mm CL. In 2025, the size range extended from 21 to 50 mm CL, and the mean size was 30.3 mm CL, slightly lower than in 2024. Sampling was conducted at depths between 20 and 40 m, where catches were mainly composed of adult individuals. Juveniles and smaller specimens, which are generally associated with shallower waters near the river mouth, were scarcely represented in the samples.

The reproductive cycle of Caramote prawn was not analyzed because mature individuals move to shallower depths prior to spawning (from April to August) to a bathymetry not covered by this sampling design. This seasonal migration hinders the collection of comprehensive data on the species' distribution.

For monthly length-frequency distribution of caramote prawn at coastal Delta shelf *métier* in 2025 see Annex 21.

Table 27. Number of caramote prawn individuals measured in the different fisheries along the zones sampled in each season (the values include all *métiers* sampled).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Bottom trawl	2021	South	45	0	143	120	6
Bottom trawl	2022	South	39	2	121	361	6
Bottom trawl	2023	North	0	0	0	1	1
Bottom trawl	2023	South	122	83	168	11	5
Bottom trawl	2024	South	45	2	189	229	8
Bottom trawl	2025	Center	0	0	1	0	1
Bottom trawl	2025	South	77	22	344	296	7

All parameters analyzed in this report for caramote prawn were calculated using only individuals obtained by the bottom trawling sampling (Table 27).

Bottom trawling by port

In this section, the sampling hauls carried out in 2025 are shown for each zone. In addition, within each zone, the catch composition, landed species with higher biomass, discarded species with higher biomass, categories of natural debris with higher mass and categories of marine litter with higher weight are shown for each *métier* in the ports where bottom trawling samplings were conducted in the period 2021-2024 and in 2025

North Zone

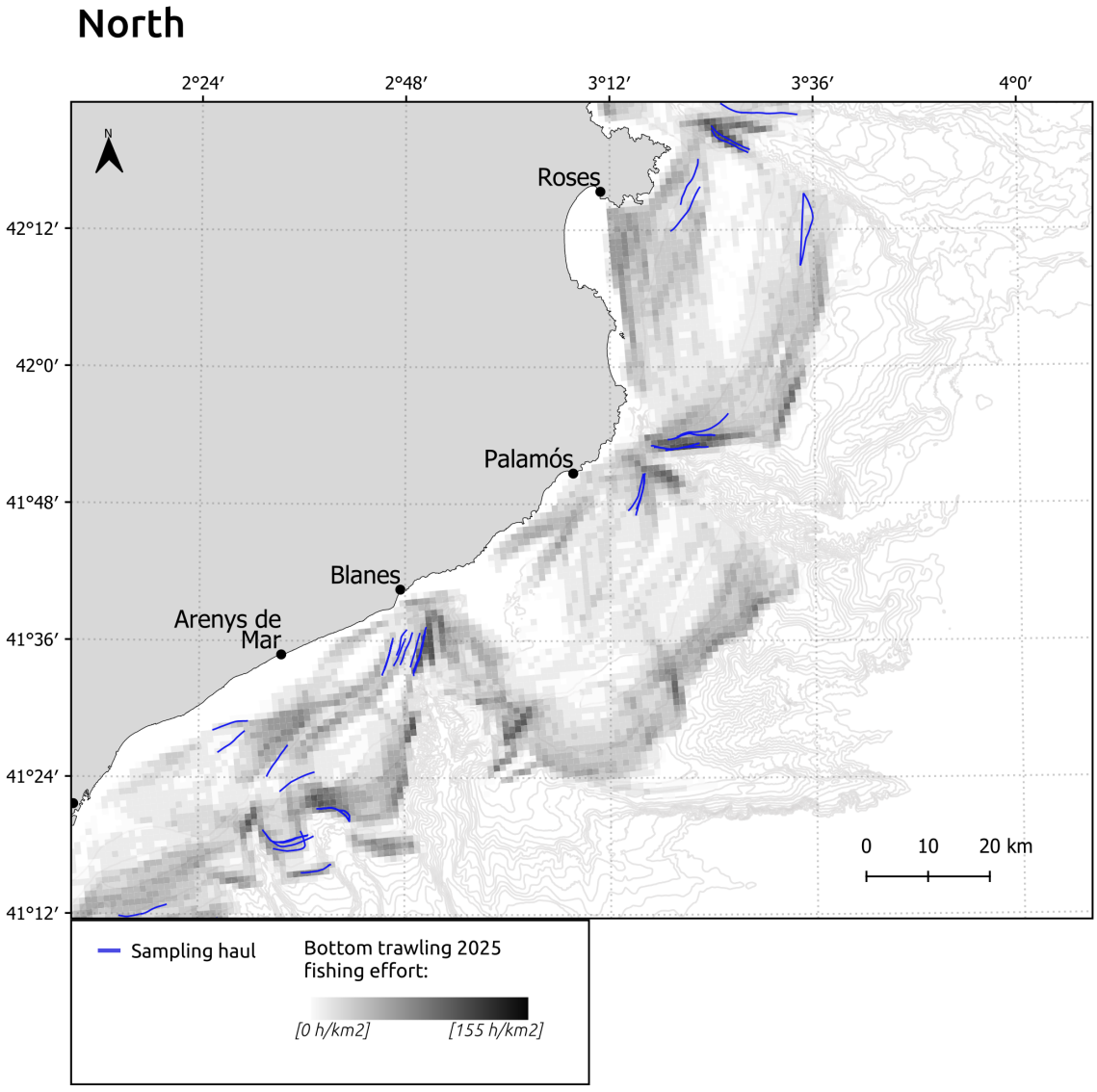


Figure 79. North zone sampling trawls in the year analyzed.

Roses

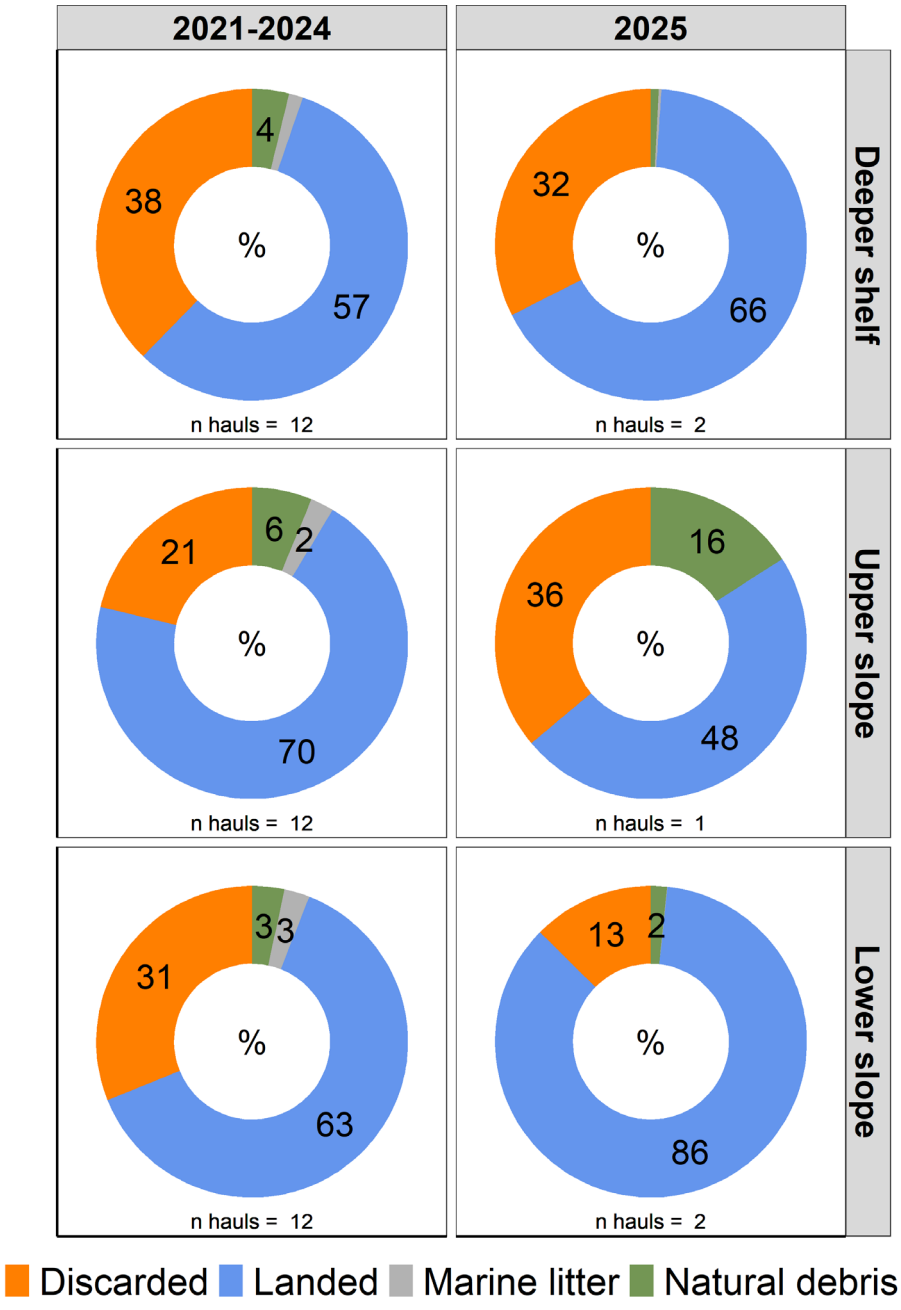


Figure 80. Roses catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.

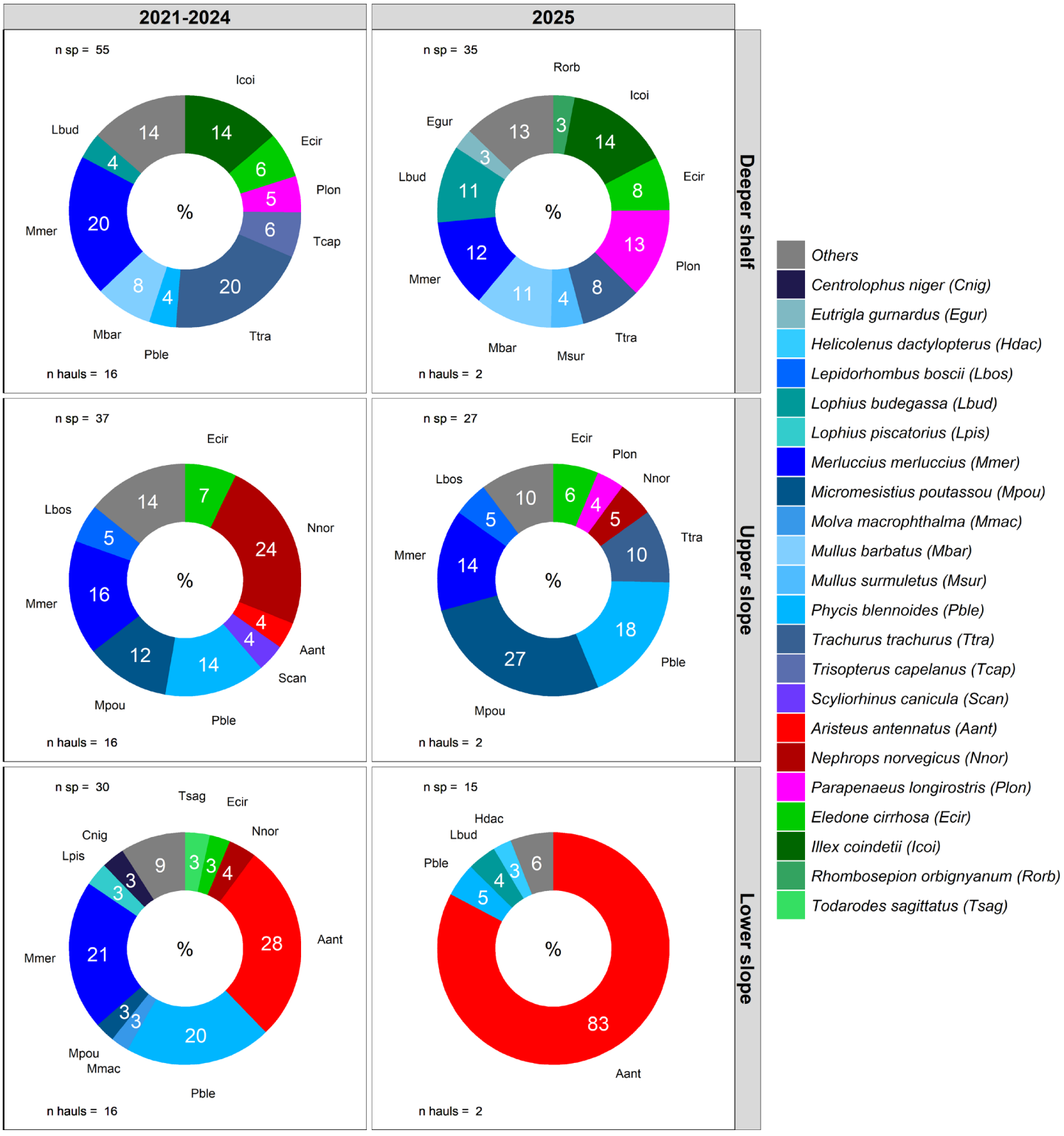


Figure 81. Roses landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.



Figure 82. Roses discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.

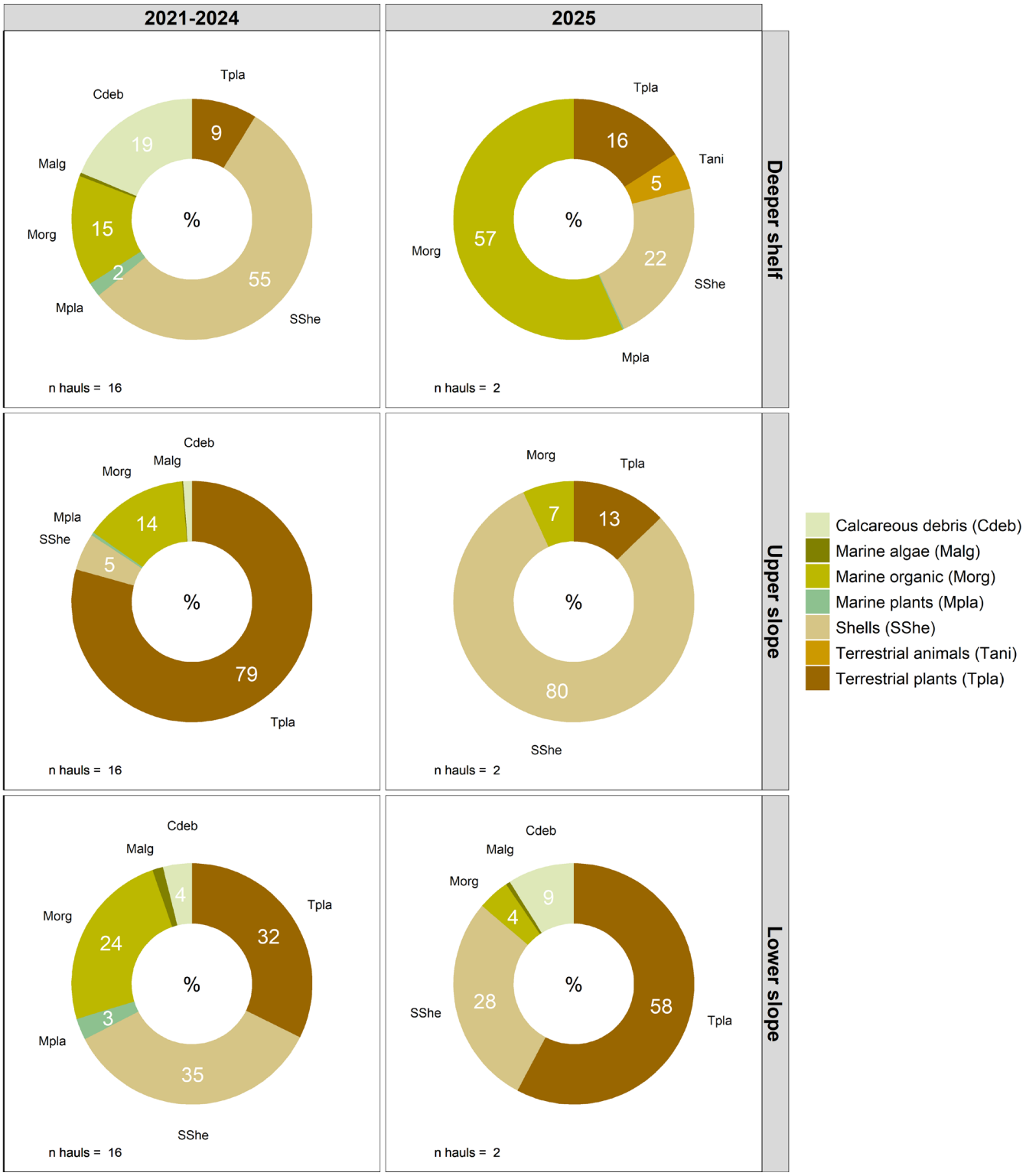


Figure 83. Roses categories of natural debris with higher biomass. Percentage in weight including all hauls within each period and *métier*.

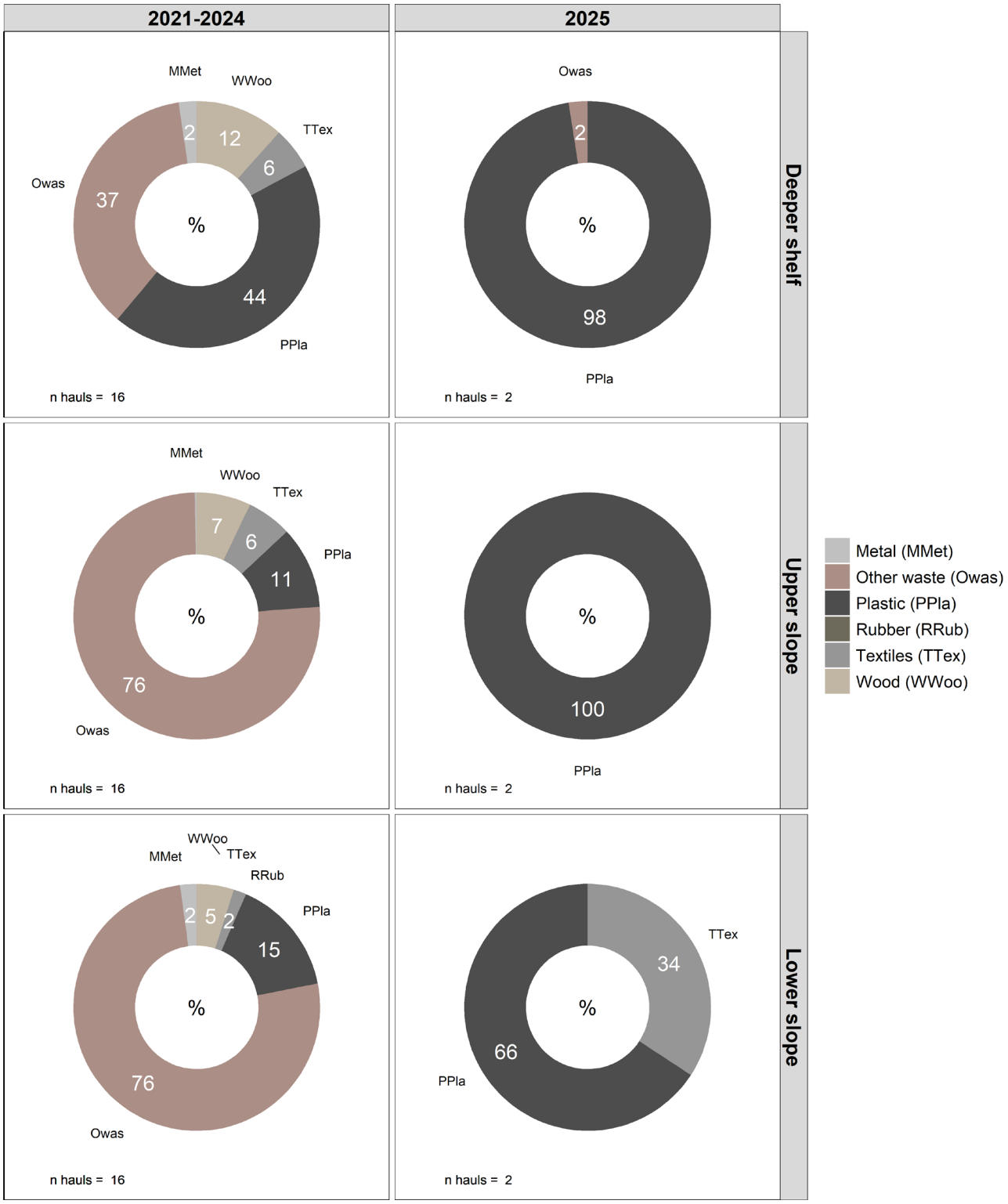


Figure 84. Roses categories of marine litter with higher mass. Percentage in weight including all hauls within each period and *métier*.

Palamós

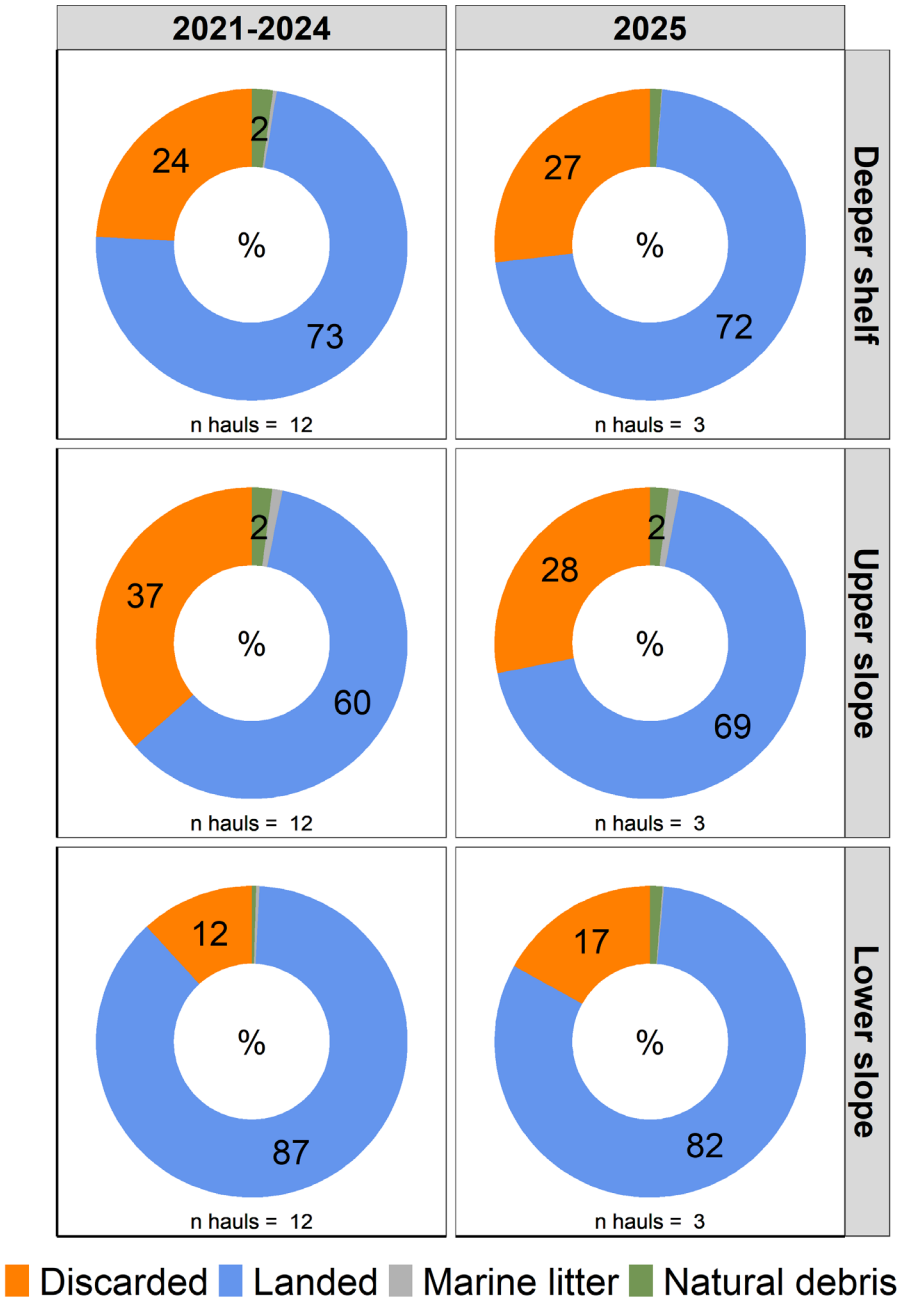


Figure 85. Palamós catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.

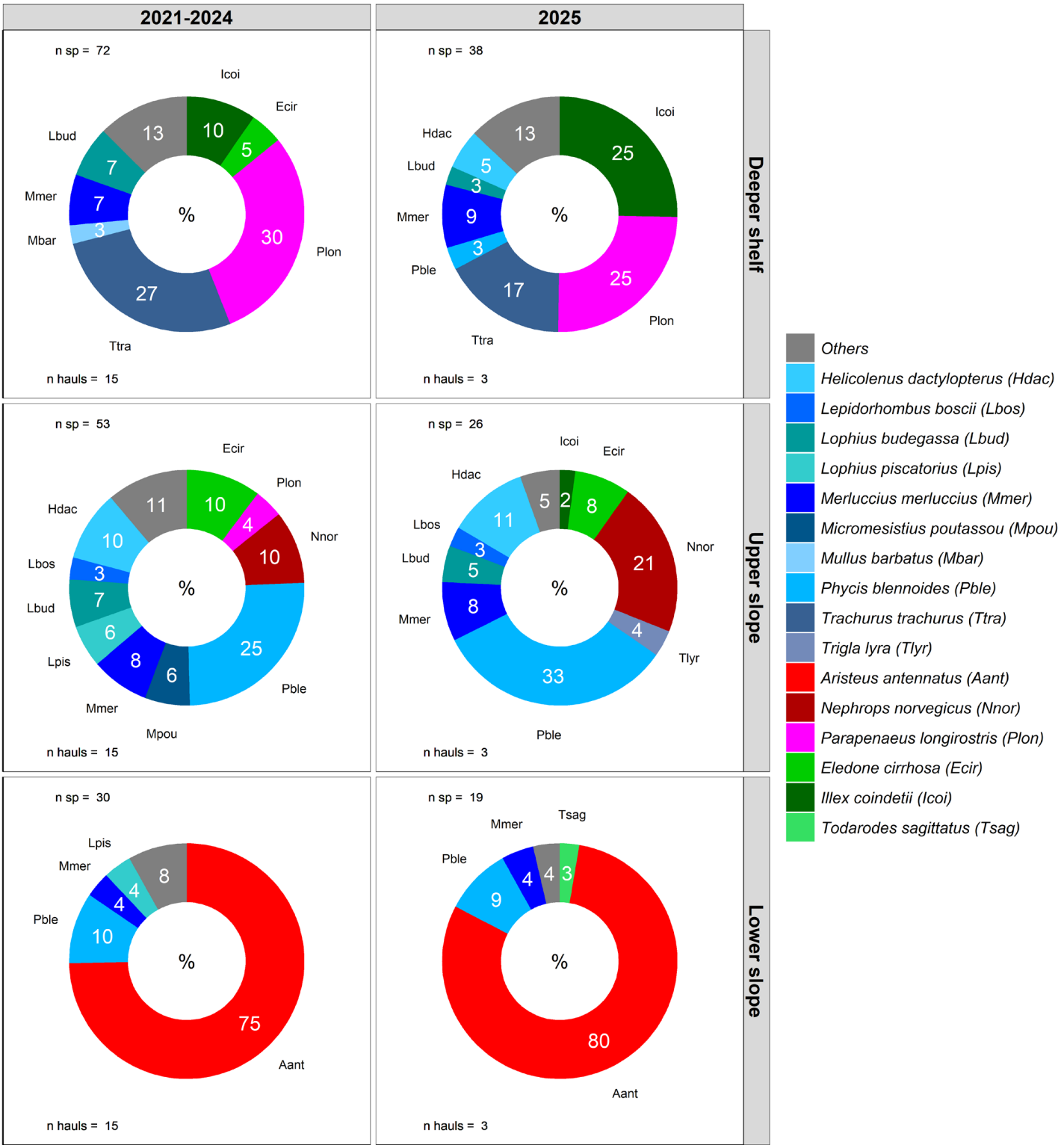


Figure 86. Palamós landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.

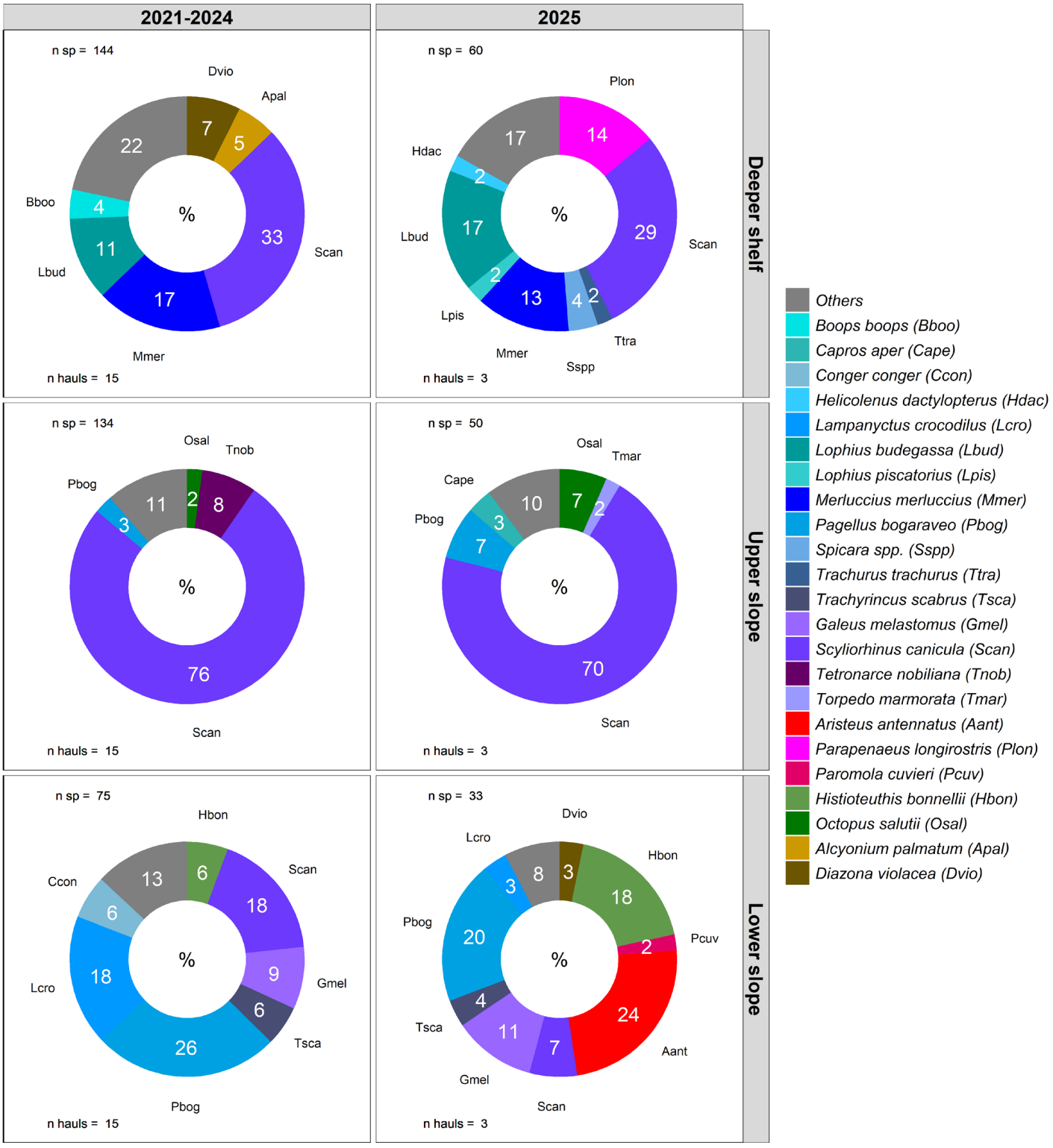


Figure 87. Palamós discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.

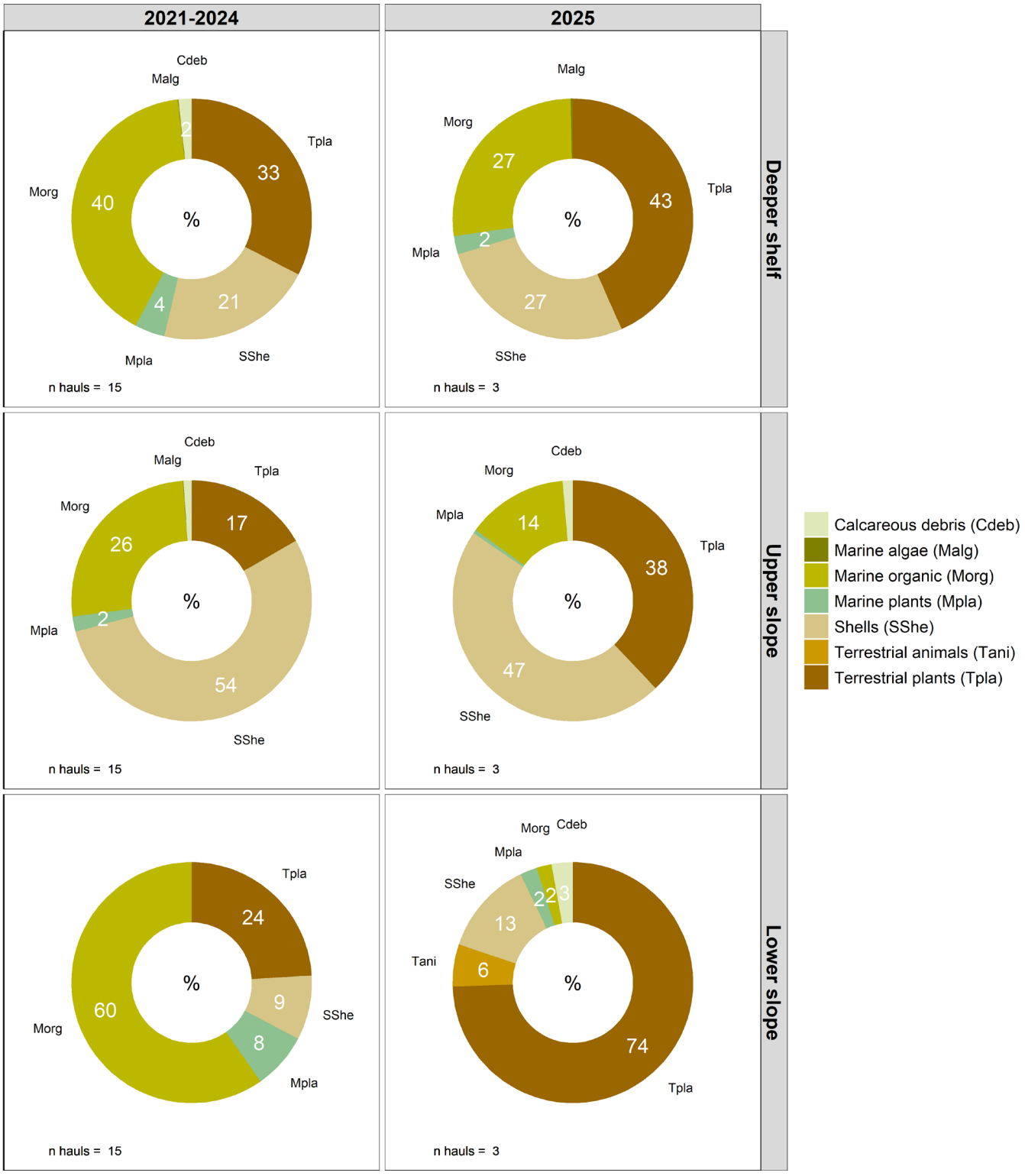


Figure 88. Palamós Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.



Figure 89. Palamós Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

Blanes

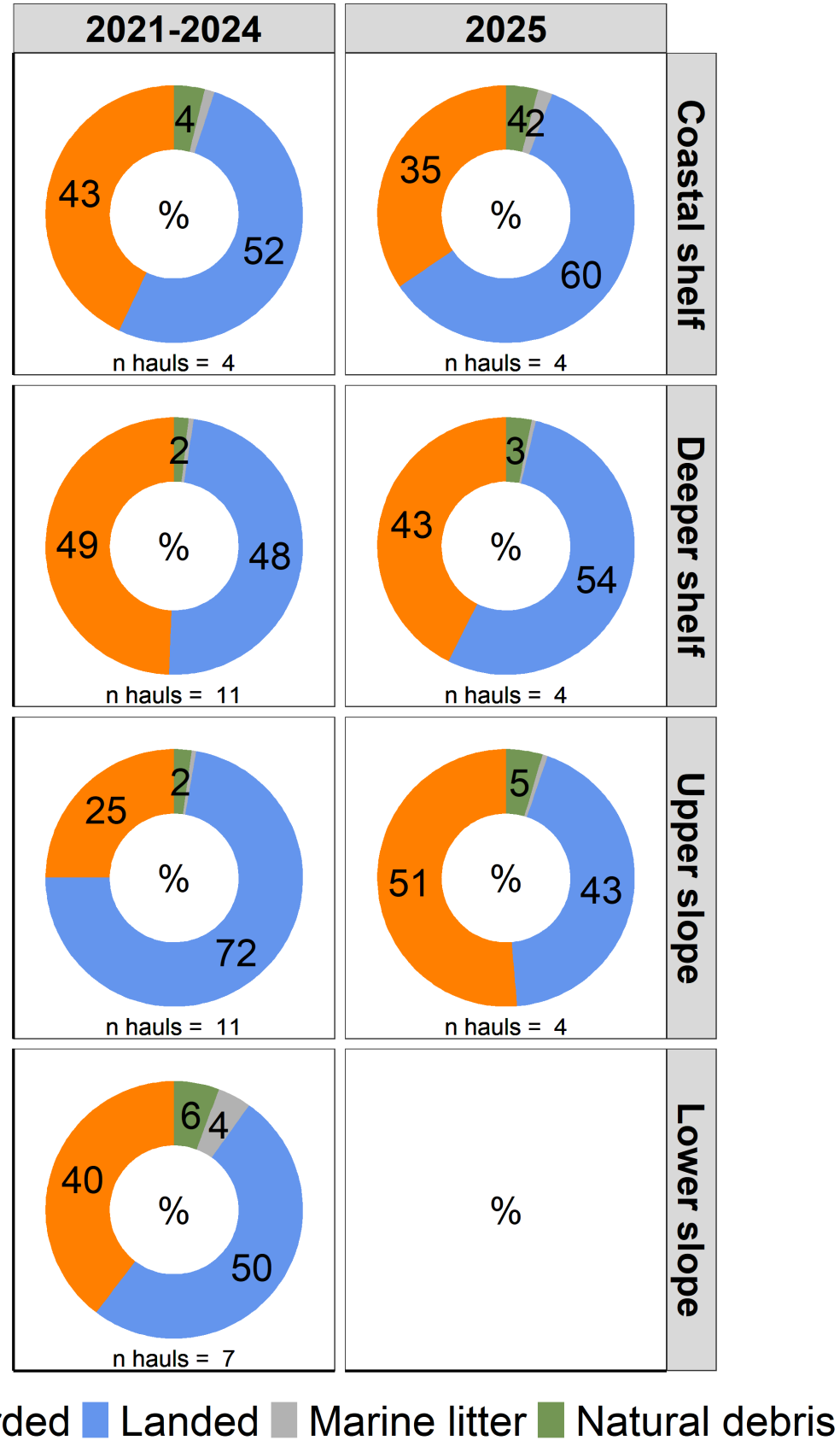


Figure 90. Blanes catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.

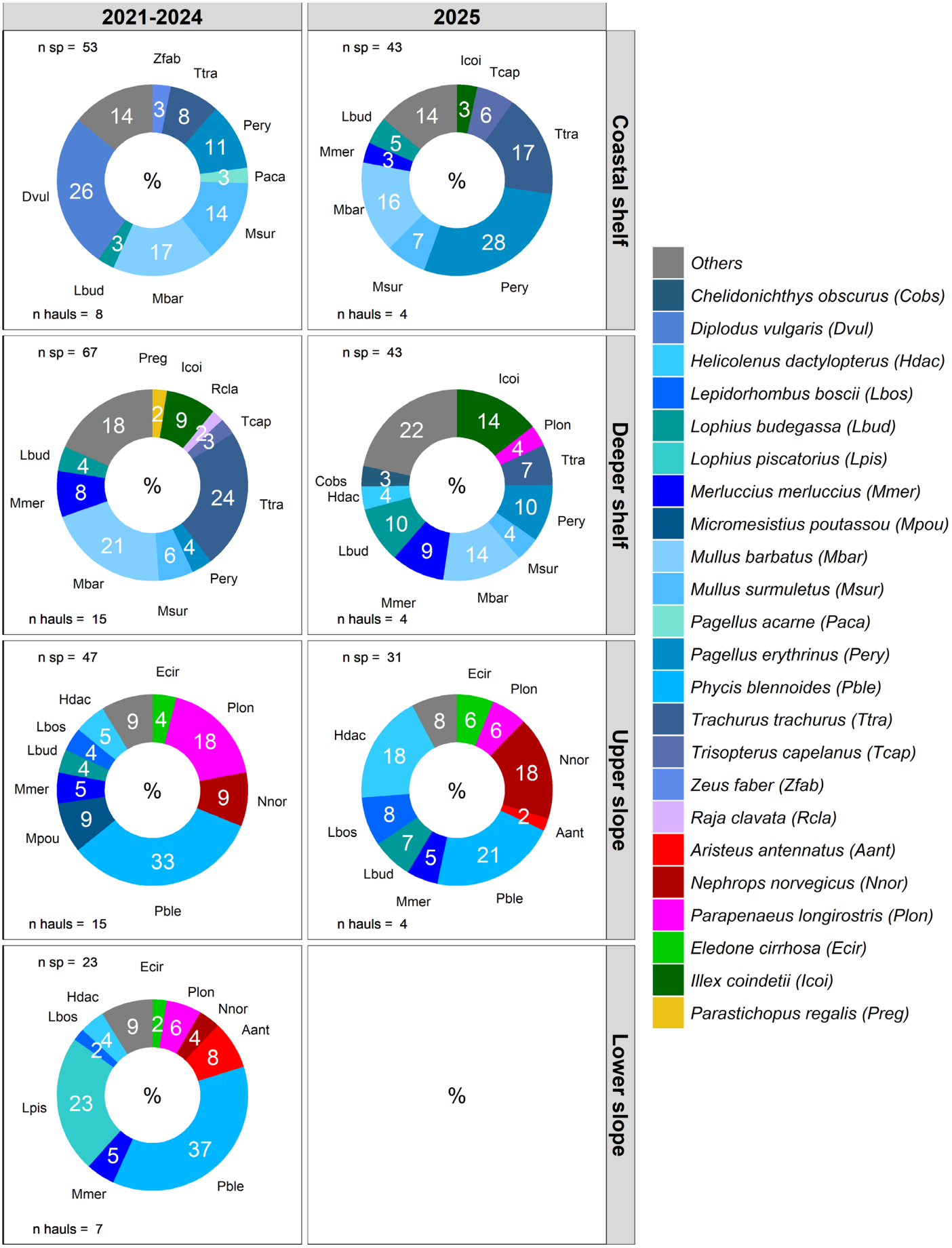


Figure 91. Blanes landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.

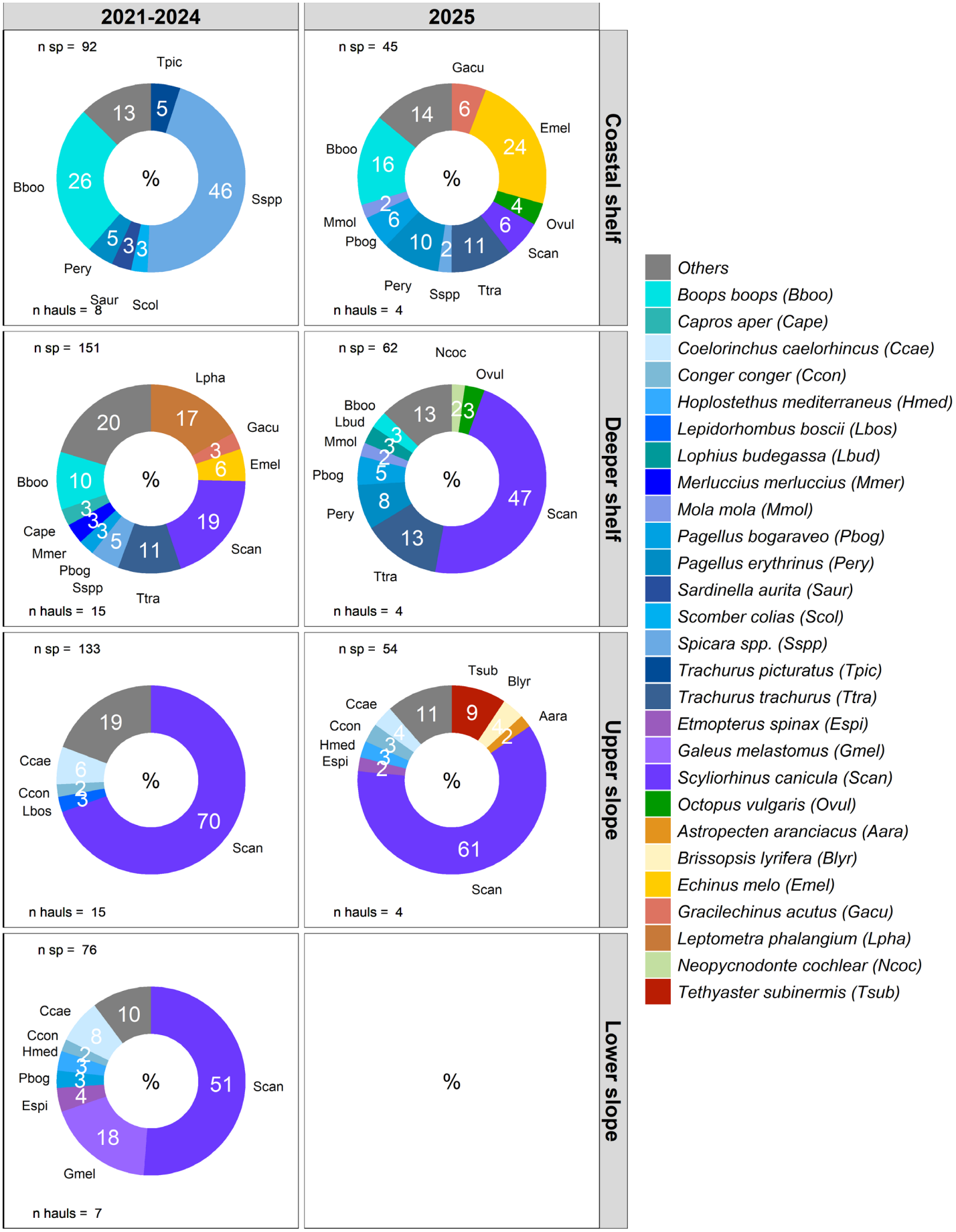


Figure 92. Blanes discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.



Figure 93. Blanes Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.

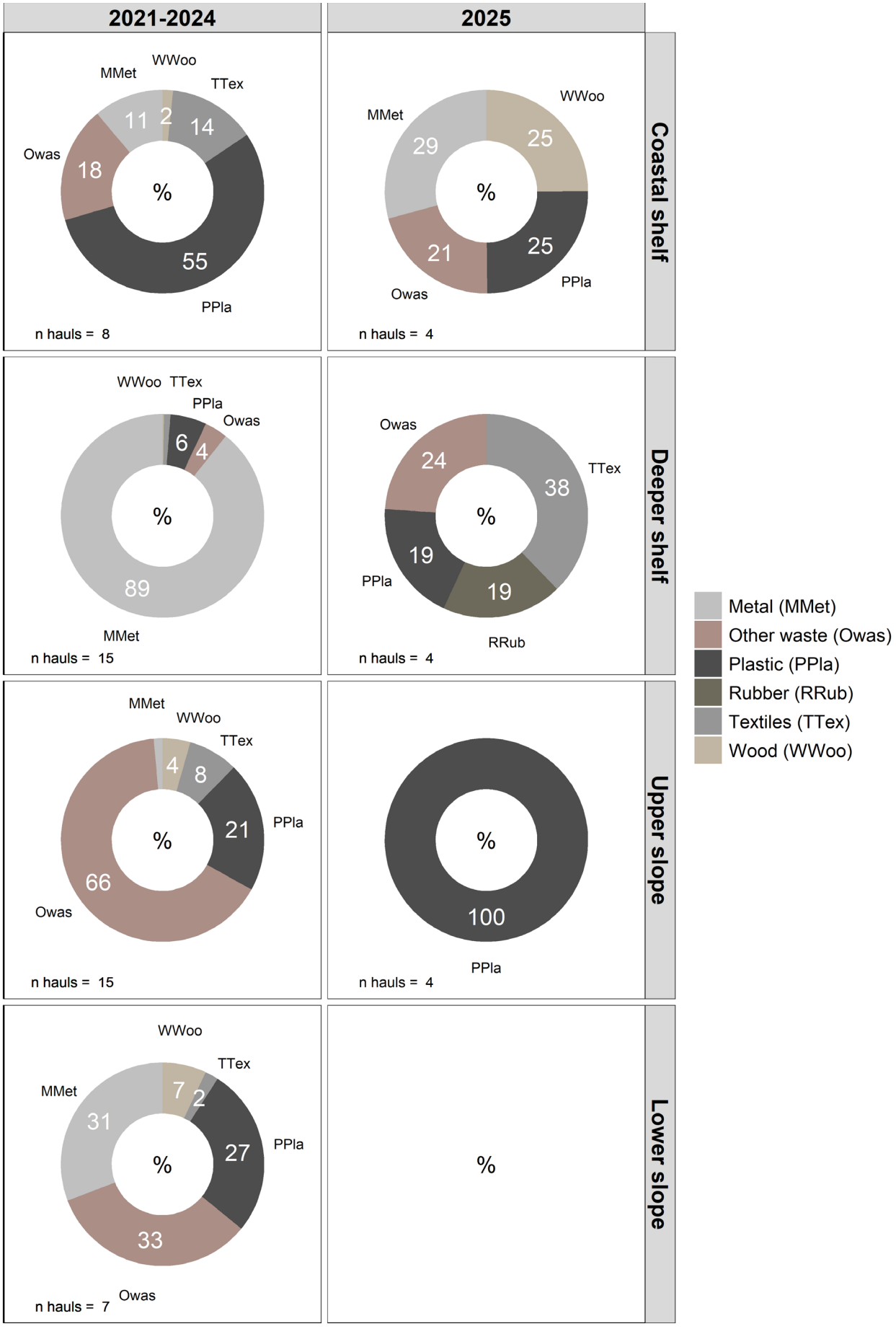


Figure 94. Blanes Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

Arenys de Mar

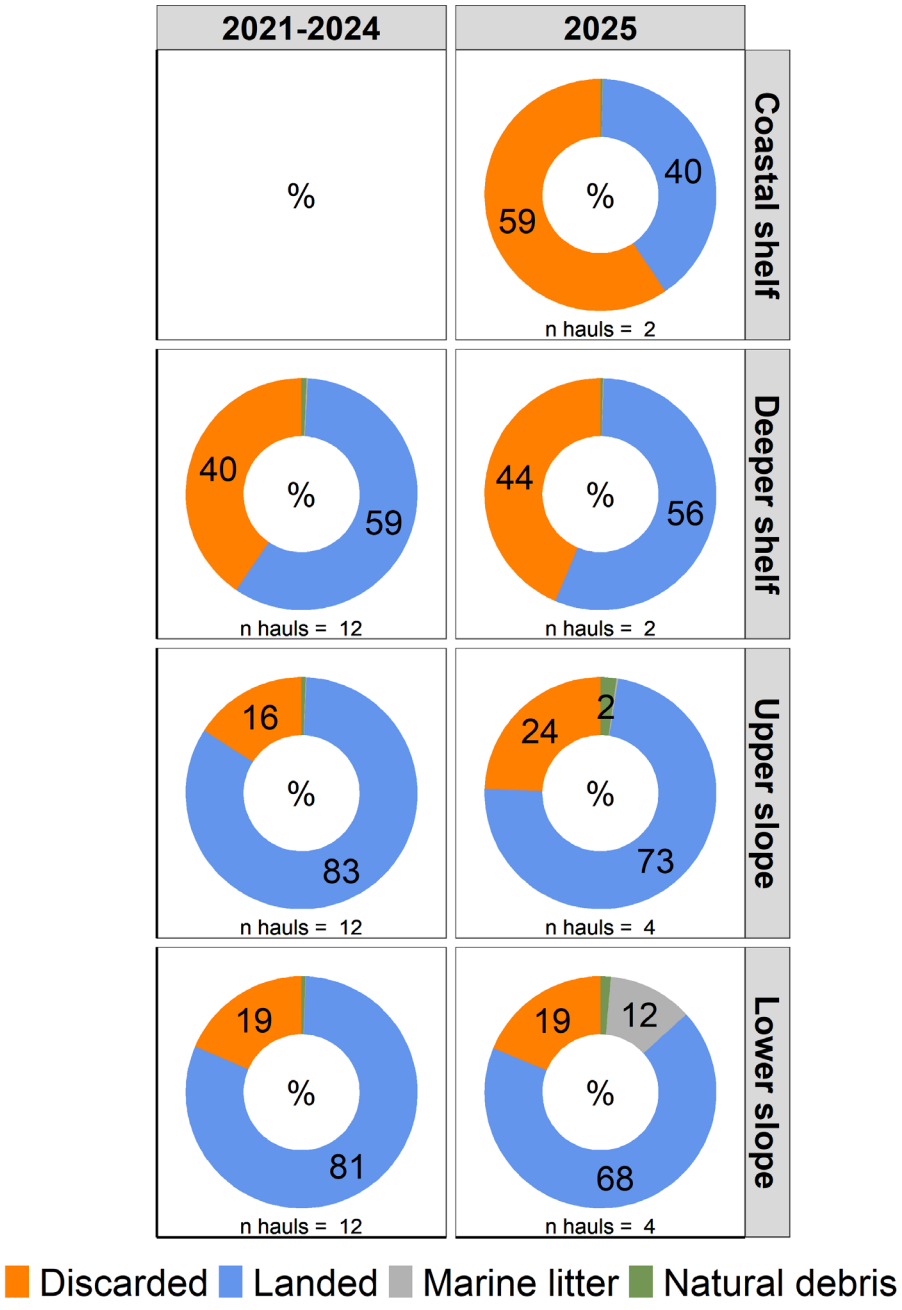


Figure 95. Arenys de Mar catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.

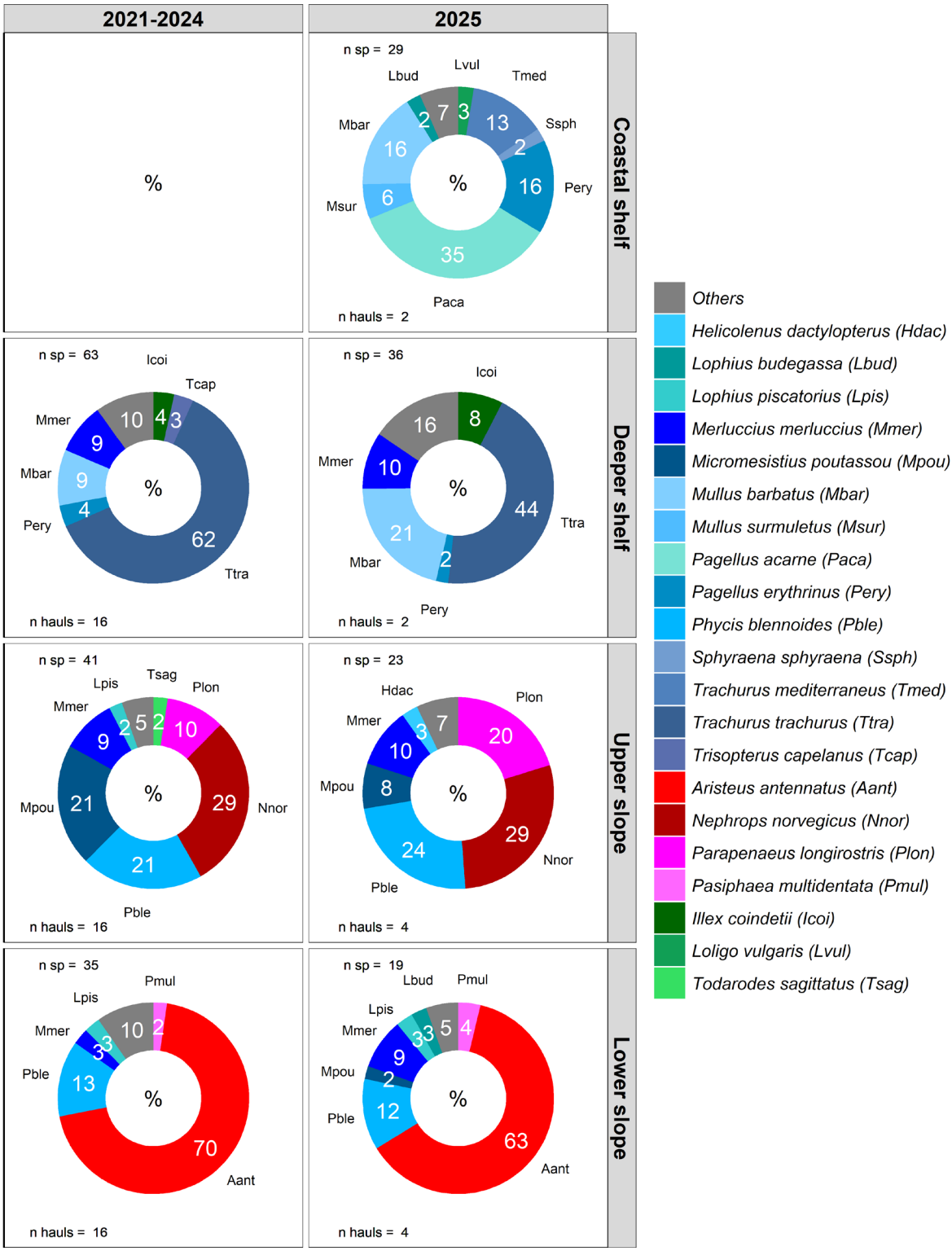


Figure 96. Arenys de Mar landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.

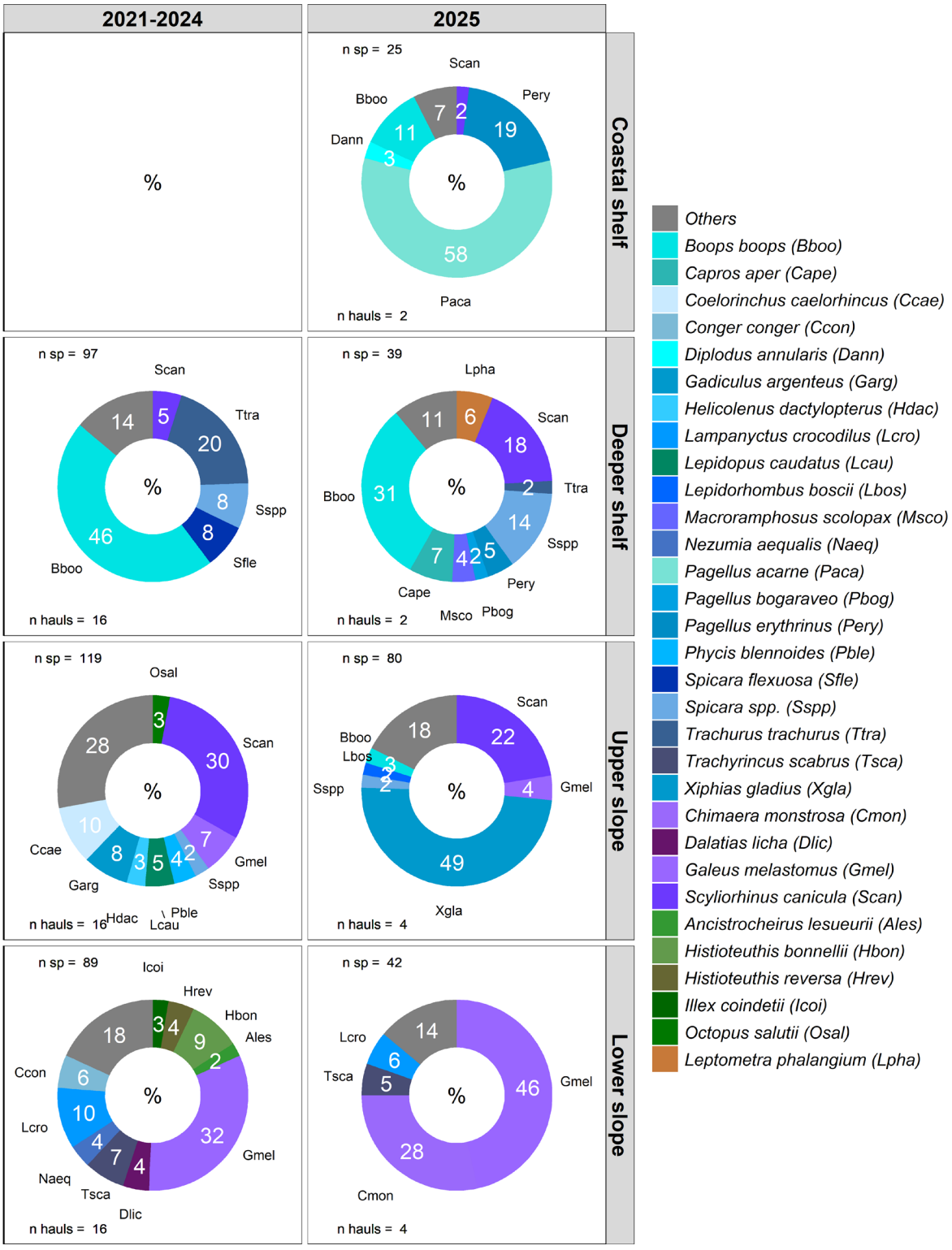


Figure 97. Arenys de Mar discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.

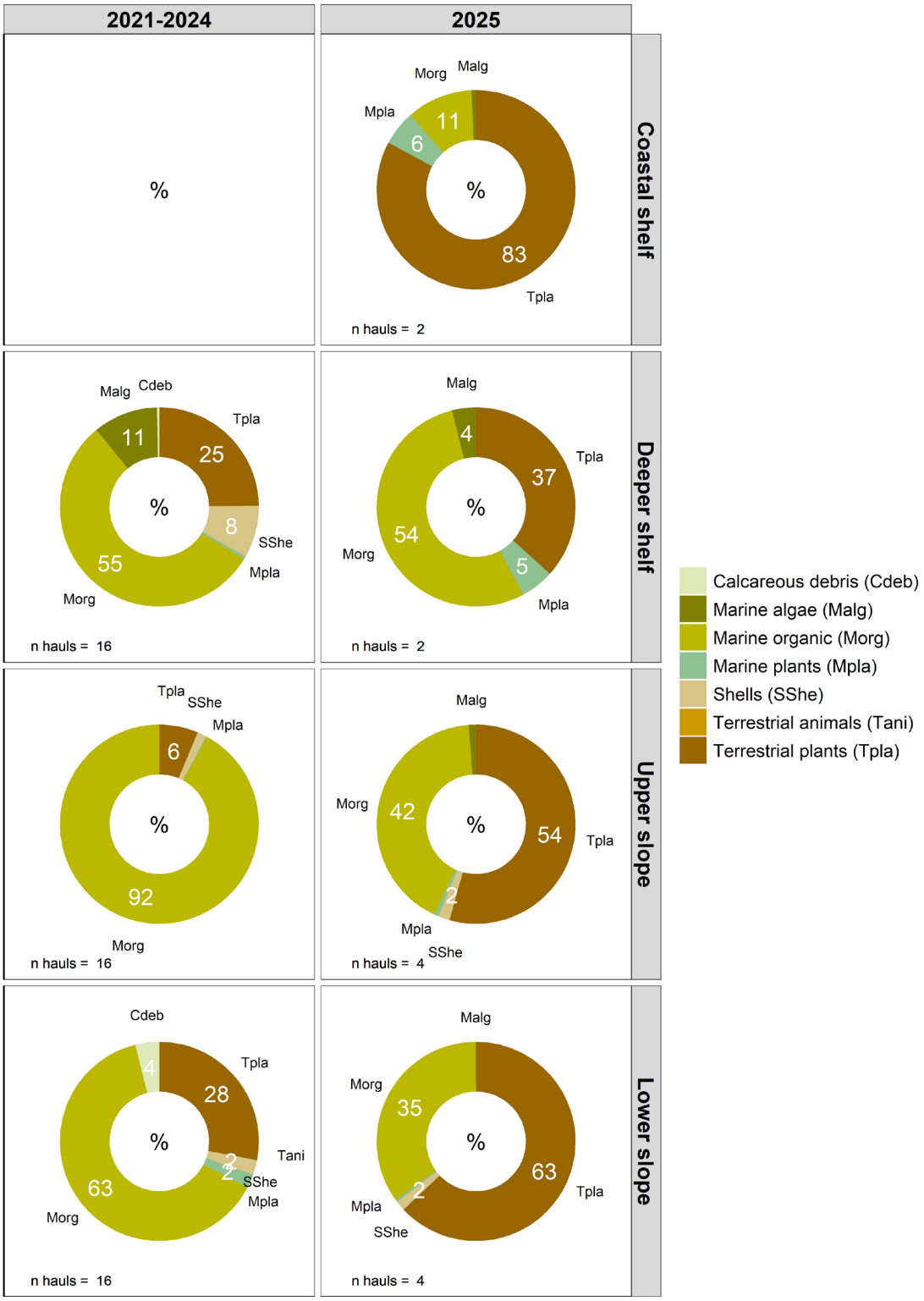


Figure 98. Arenys de Mar Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.

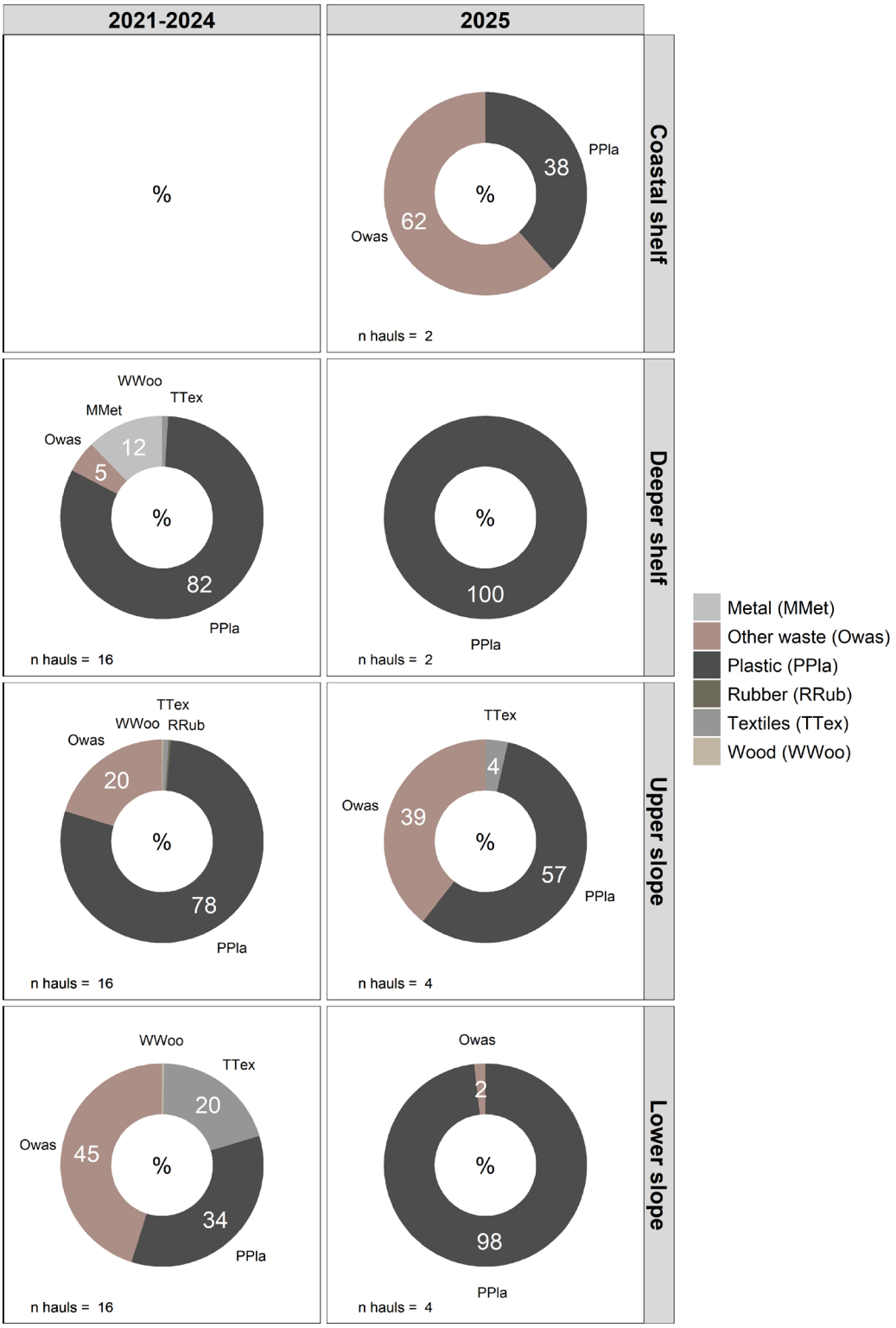


Figure 99. Arenys de Mar Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

Center Zone

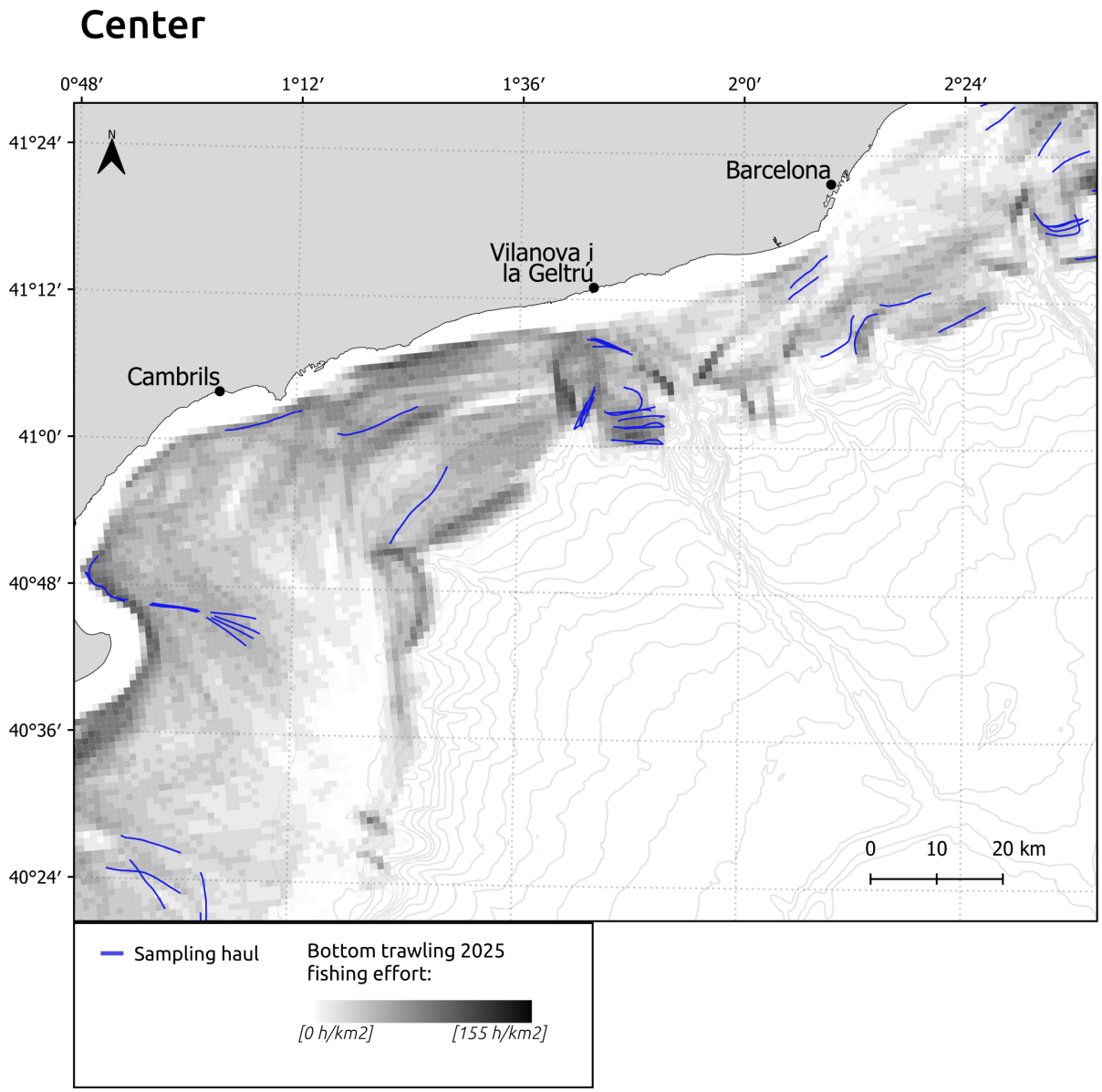


Figure 100. Center zone sampling trawls in the year analyzed.

Barcelona

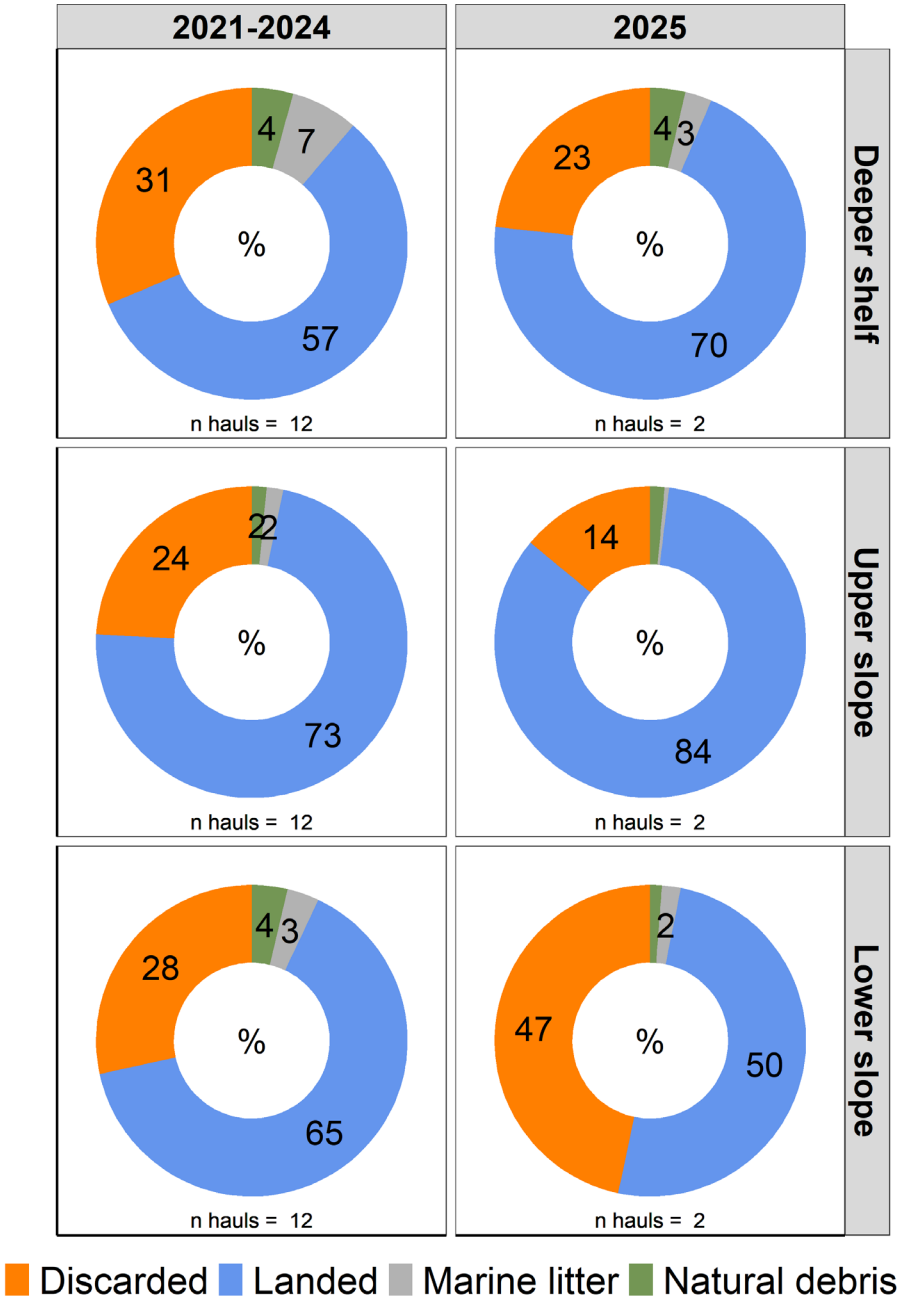


Figure 101. Barcelona catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and métier.

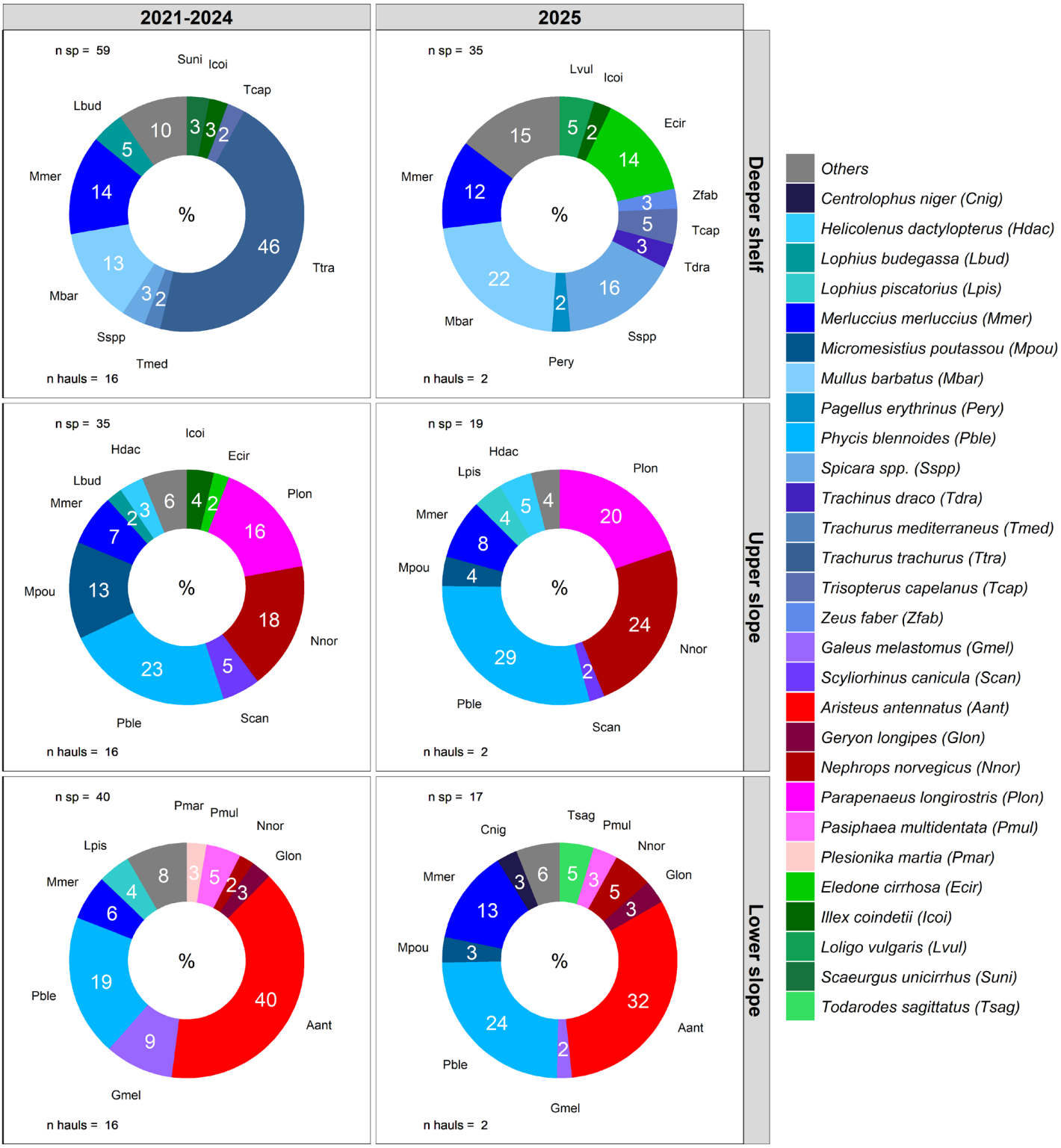


Figure 102. Barcelona landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.



Figure 103. Barcelona discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.

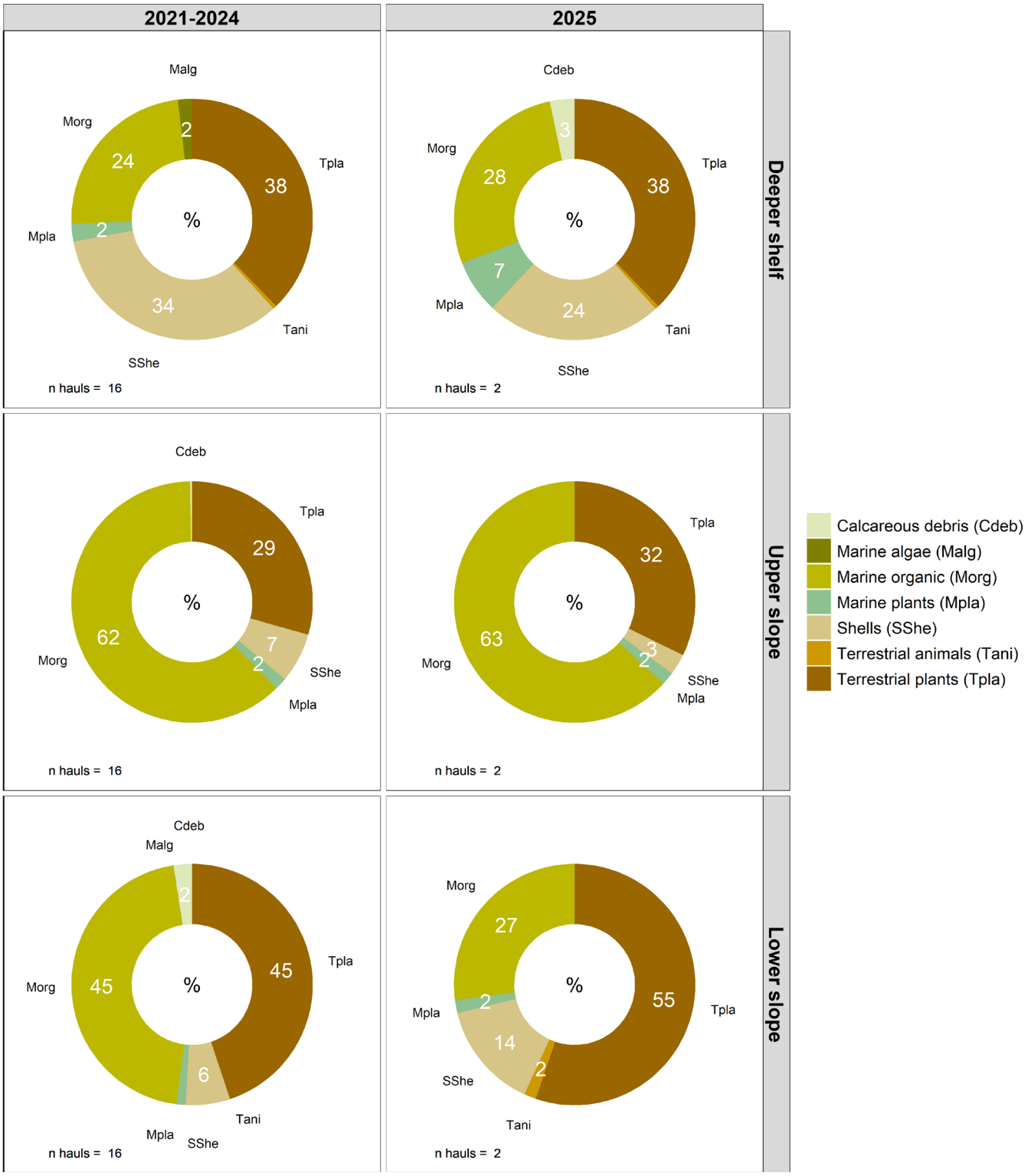


Figure 104. Barcelona Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.

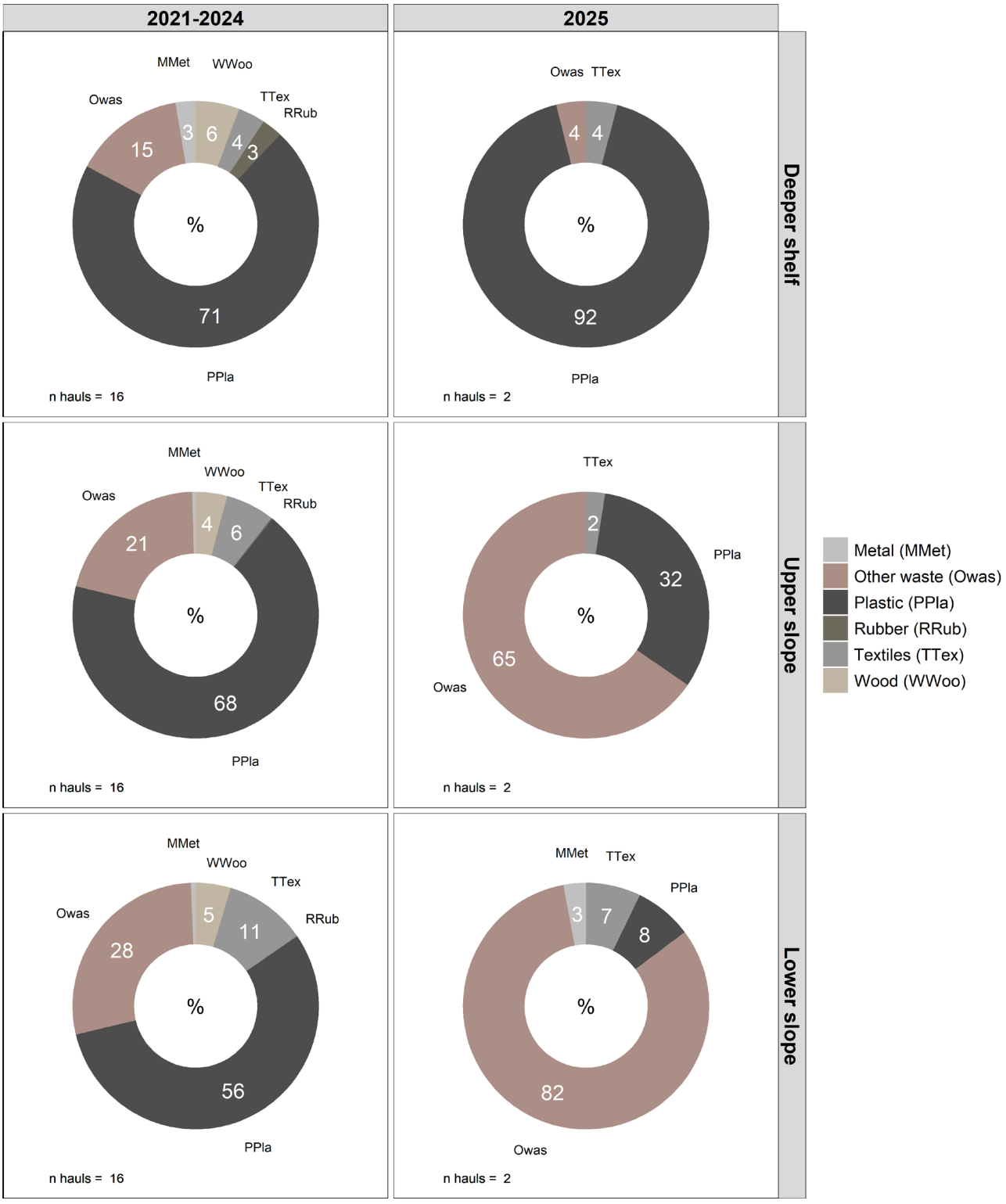


Figure 105. Barcelona Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

Vilanova i la Geltrú

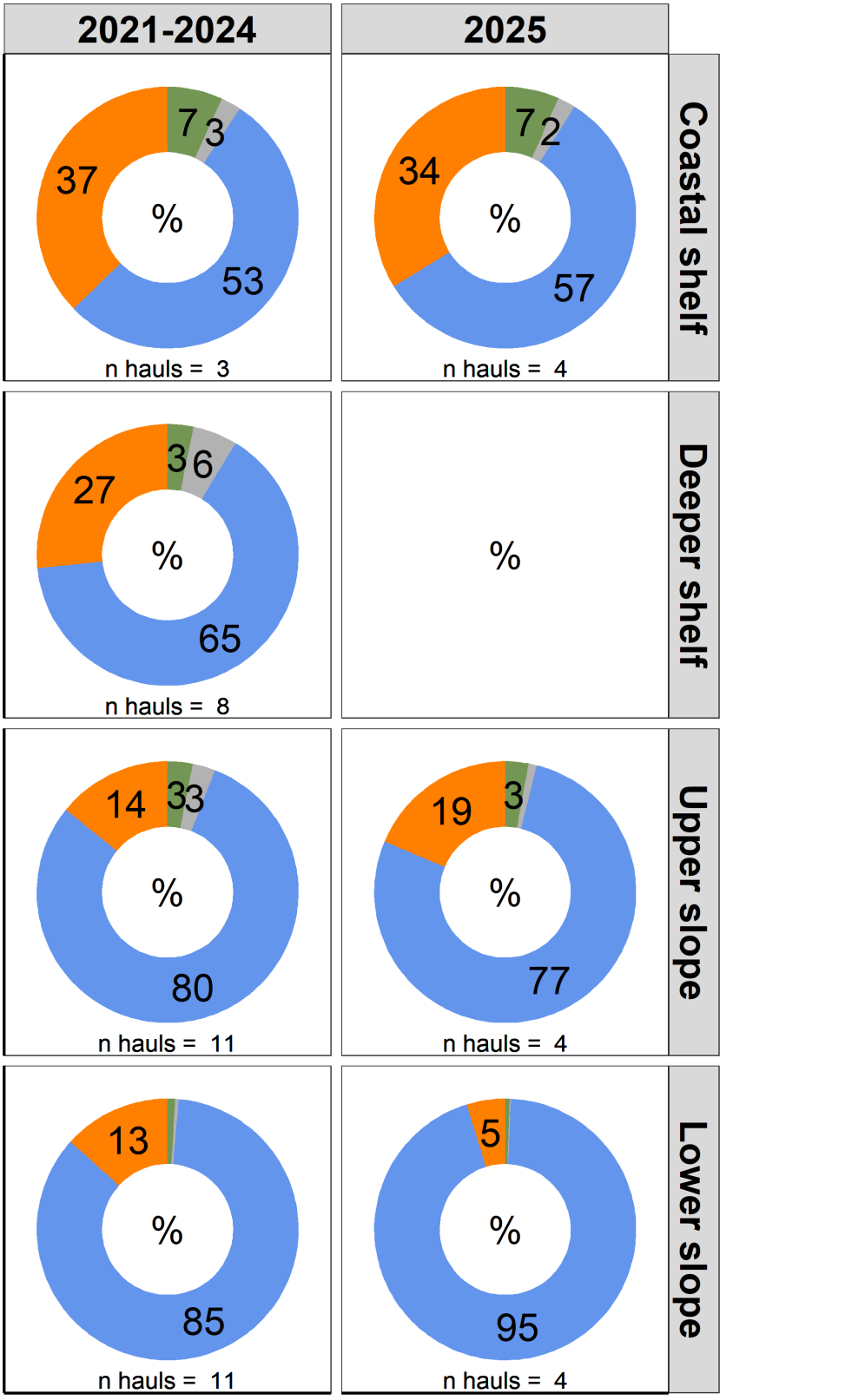


Figure 106. Vilanova i la Geltrú catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.

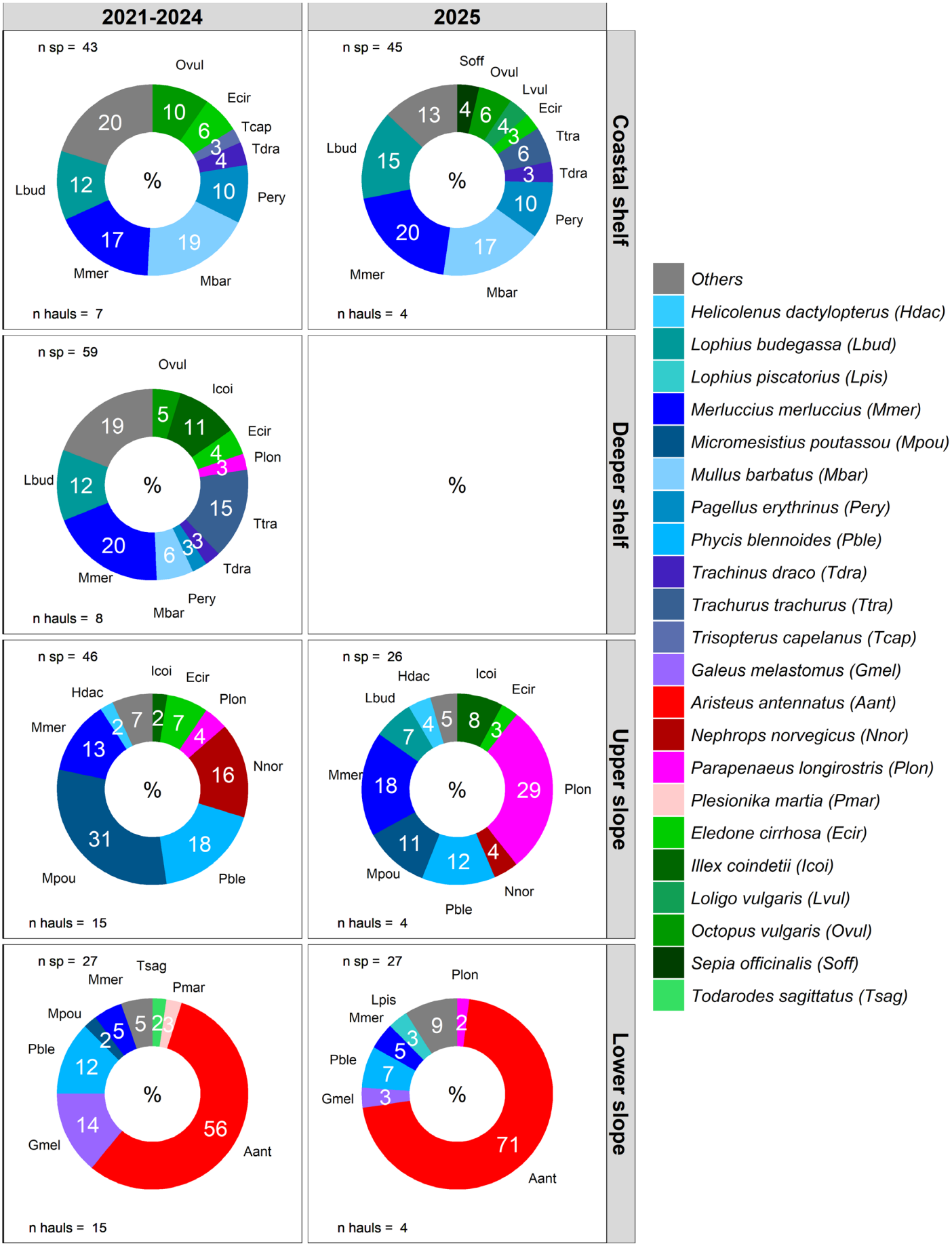


Figure 107. Vilanova i la Geltrú landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.

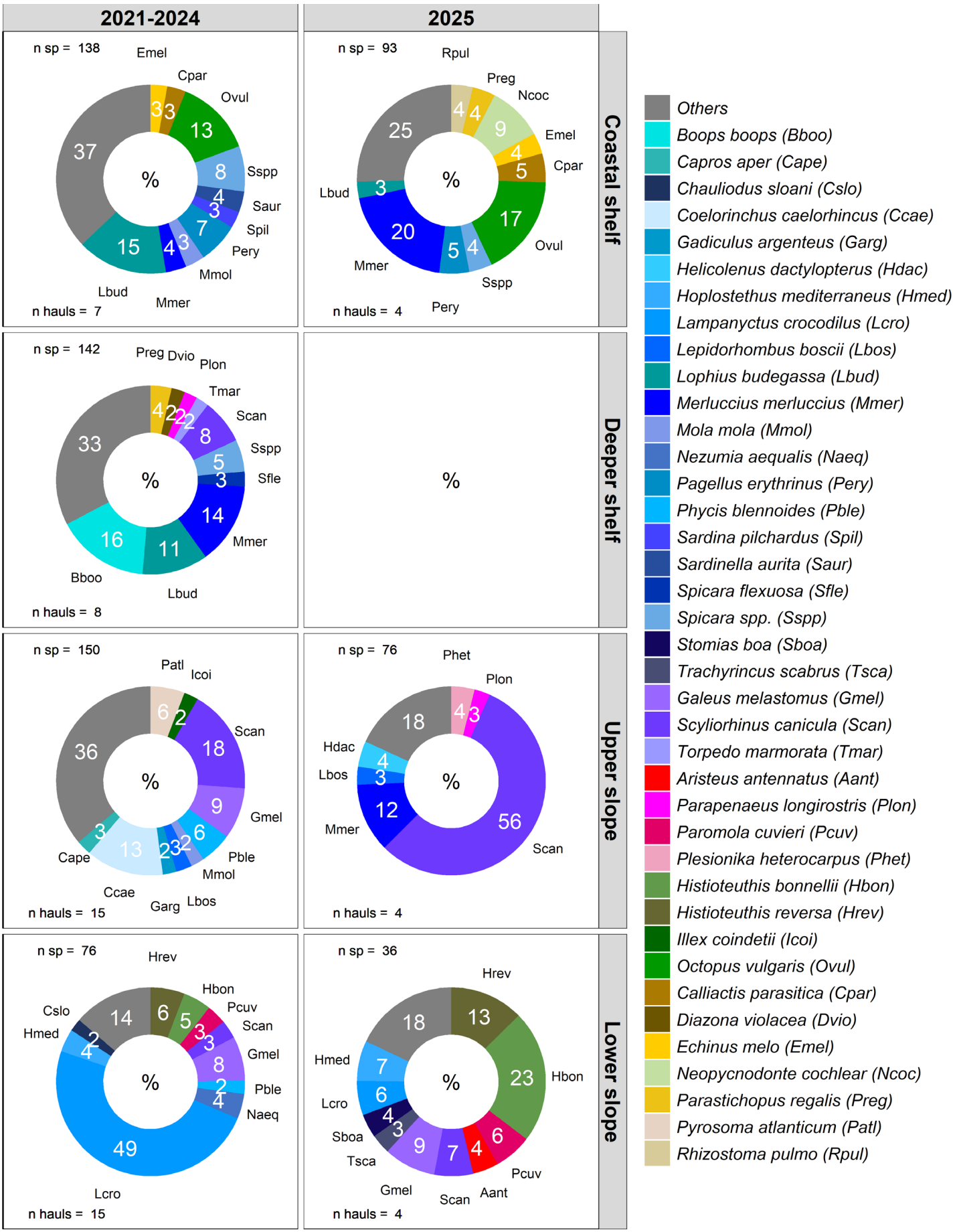


Figure 108. Vilanova i la Geltrú discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.



Figure 109. Vilanova i la Geltrú Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.

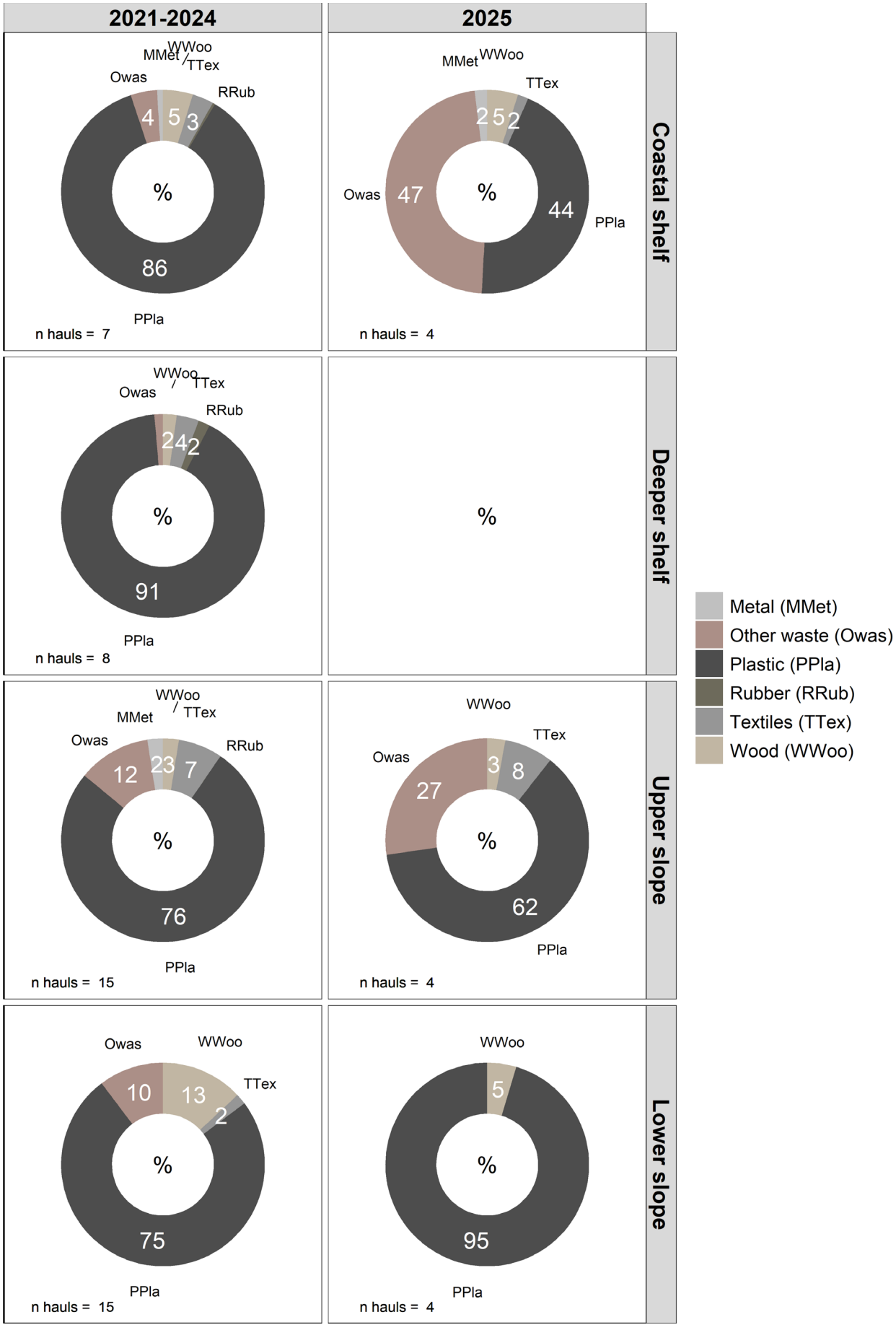


Figure 110. Vilanova i la Geltrú Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

Tarragona/Cambrils

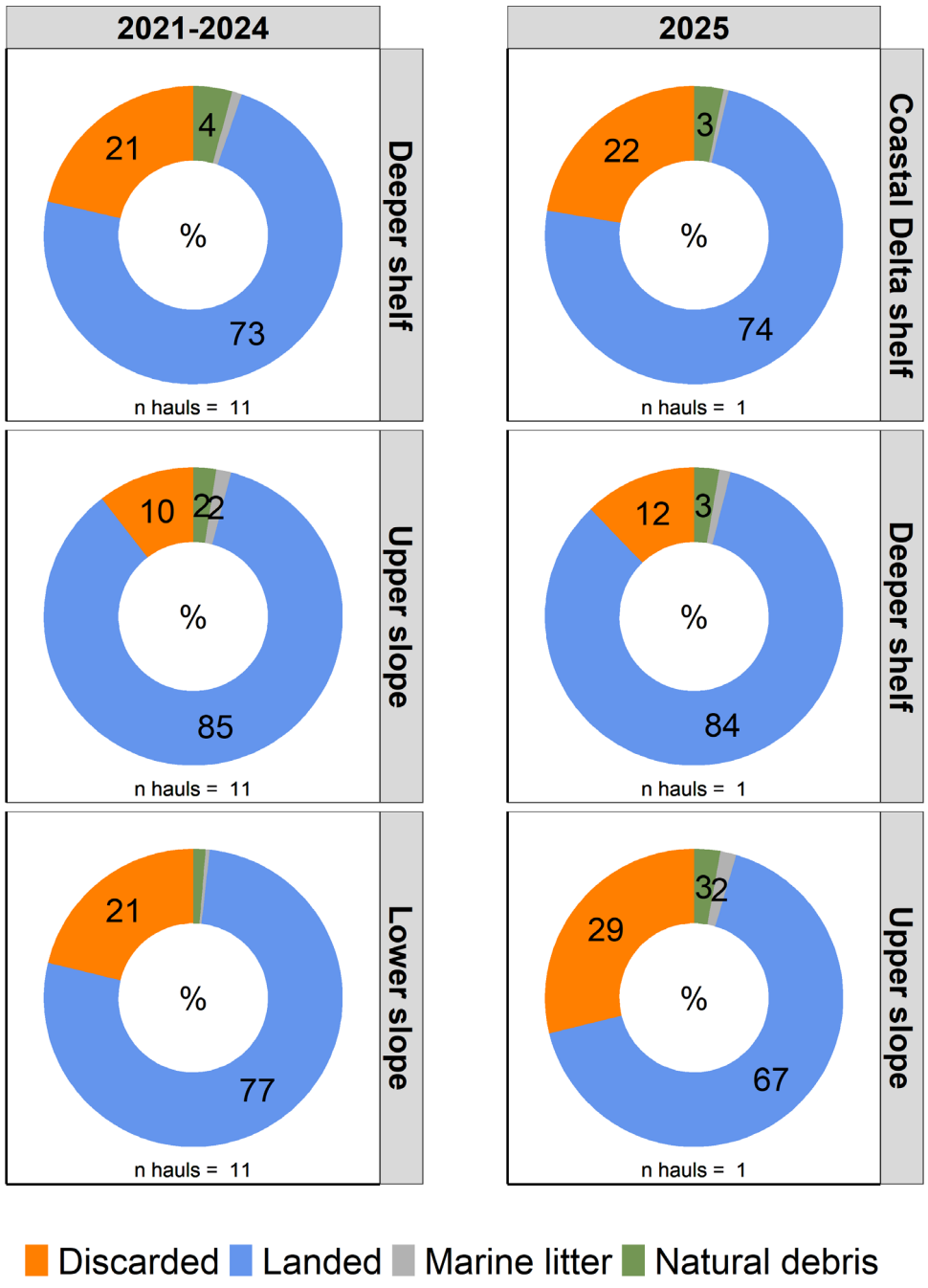


Figure 111. Tarragona/Cambrils catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.

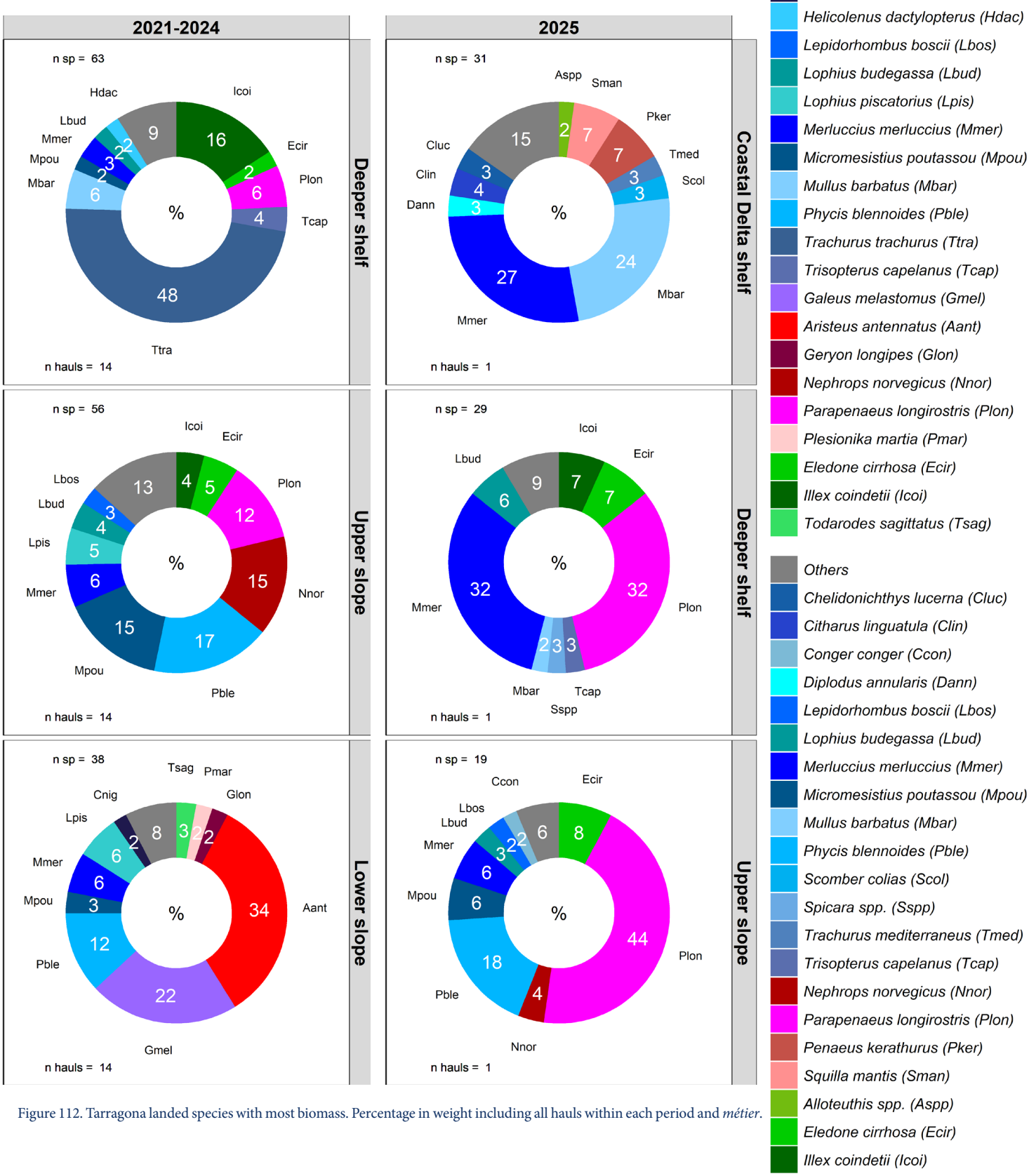


Figure 112. Tarragona landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.

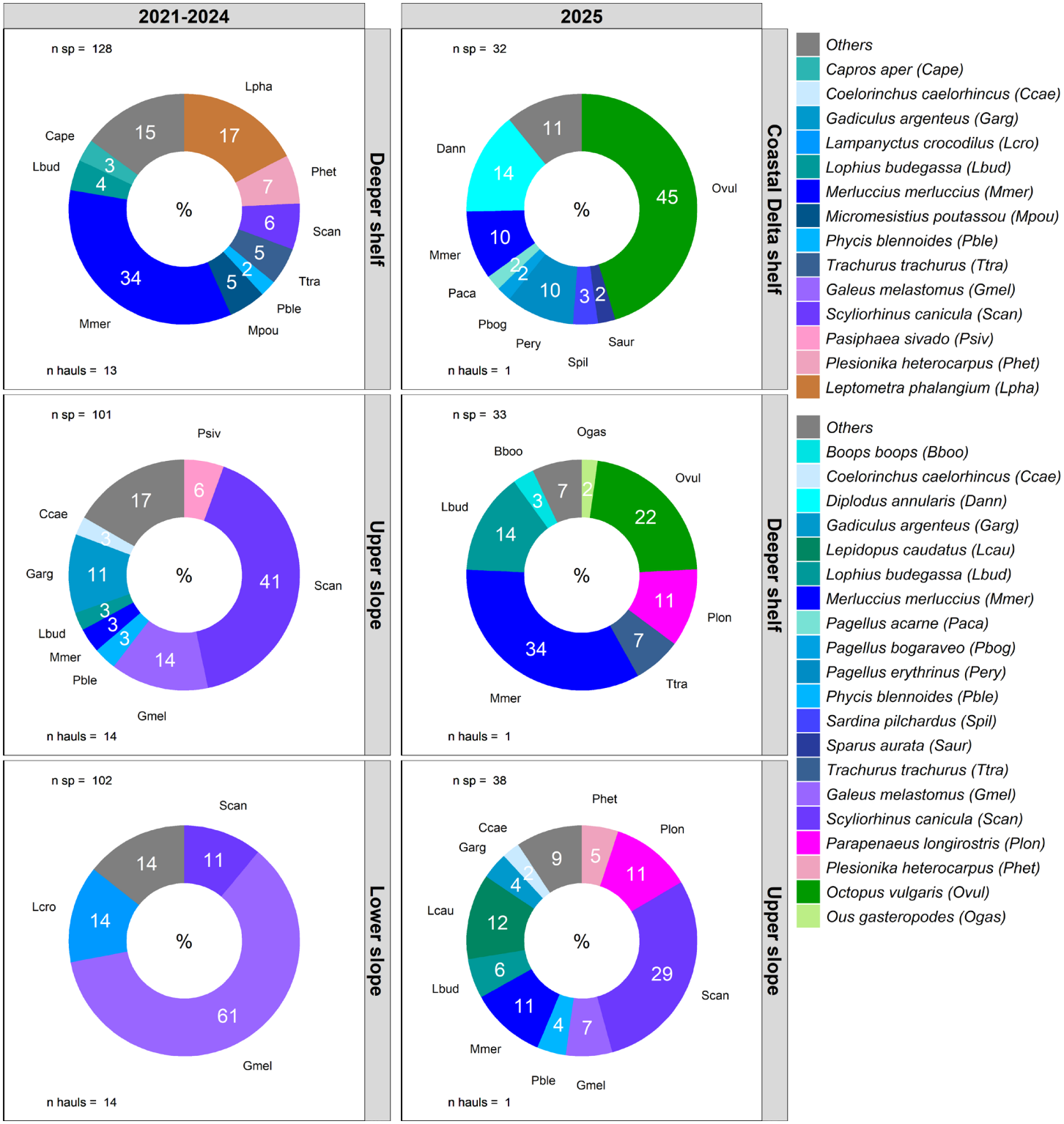


Figure 113. Tarragona discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.

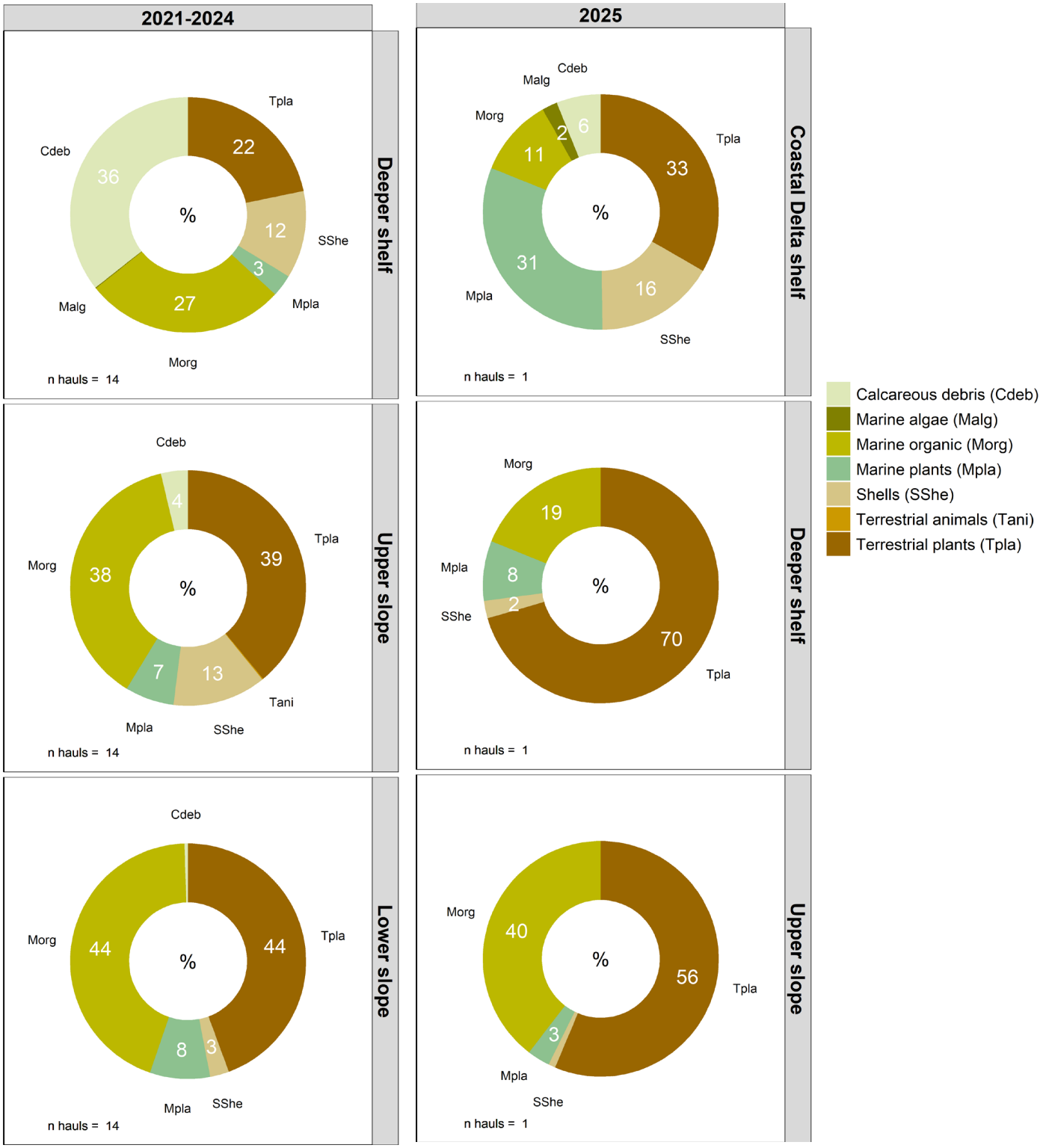


Figure 114. Tarragona Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.

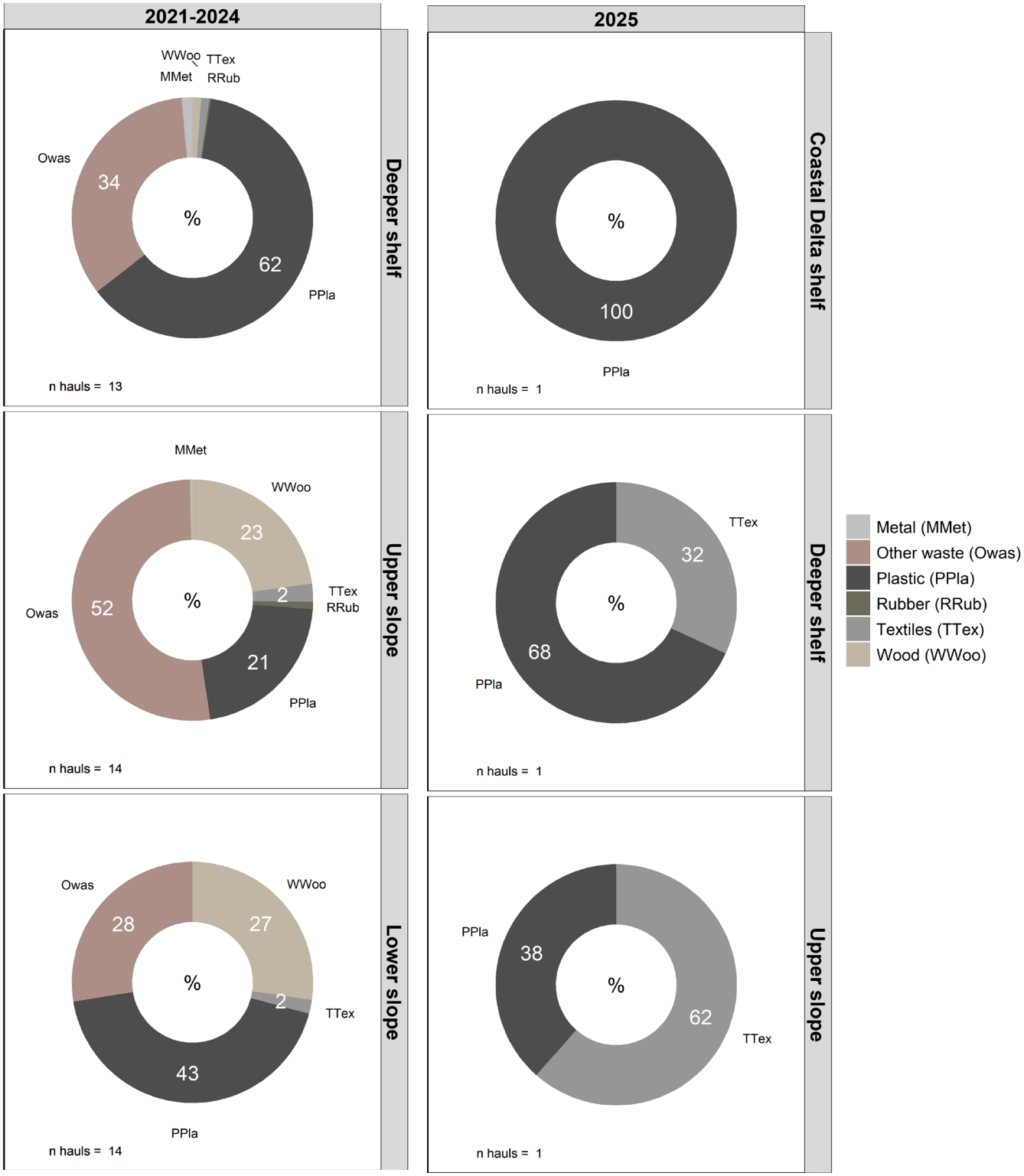


Figure 115. Tarragona Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

South Zone

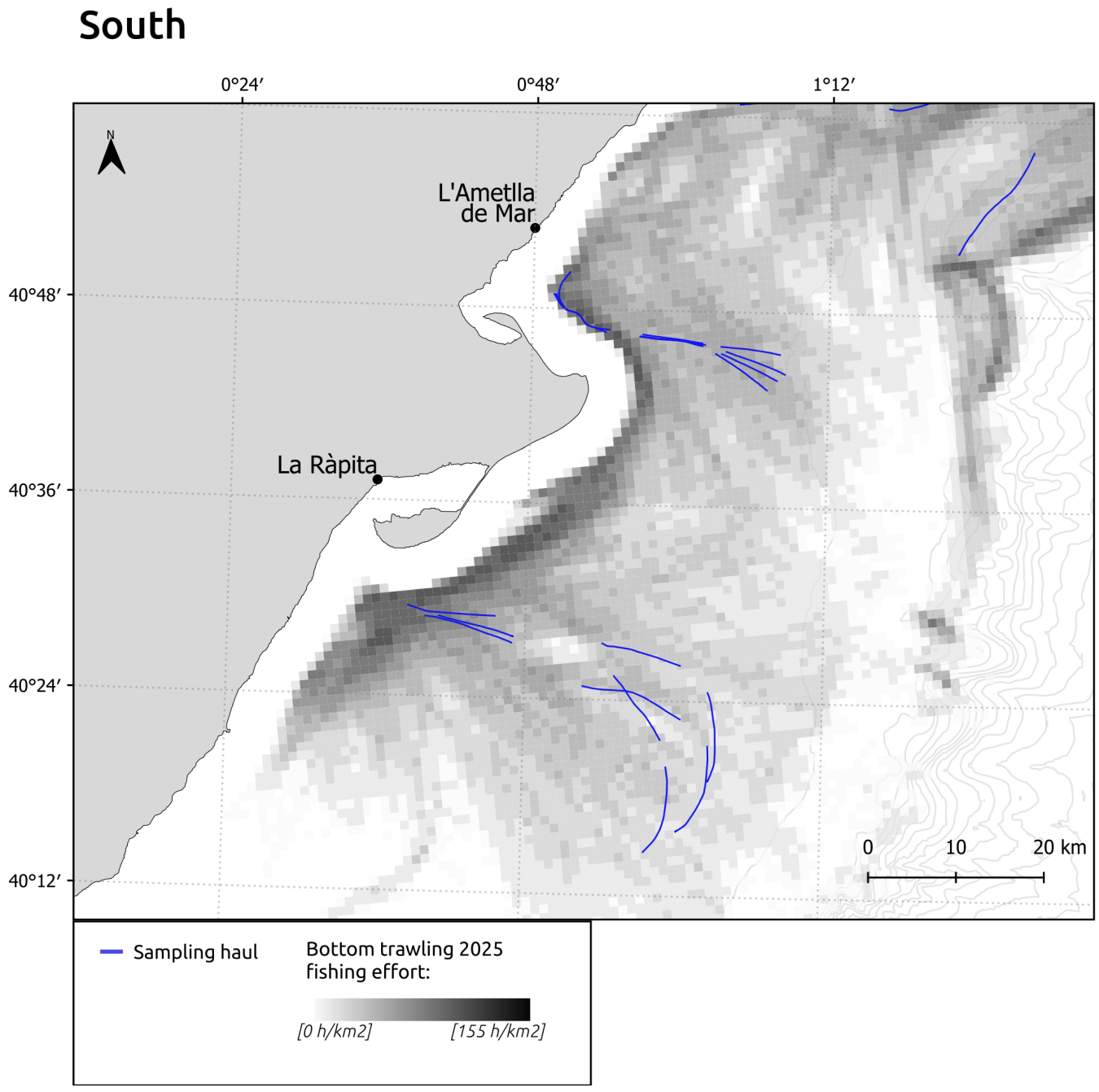


Figure 116. South zone sampling trawls in the year analyzed.

L'Ametlla de Mar

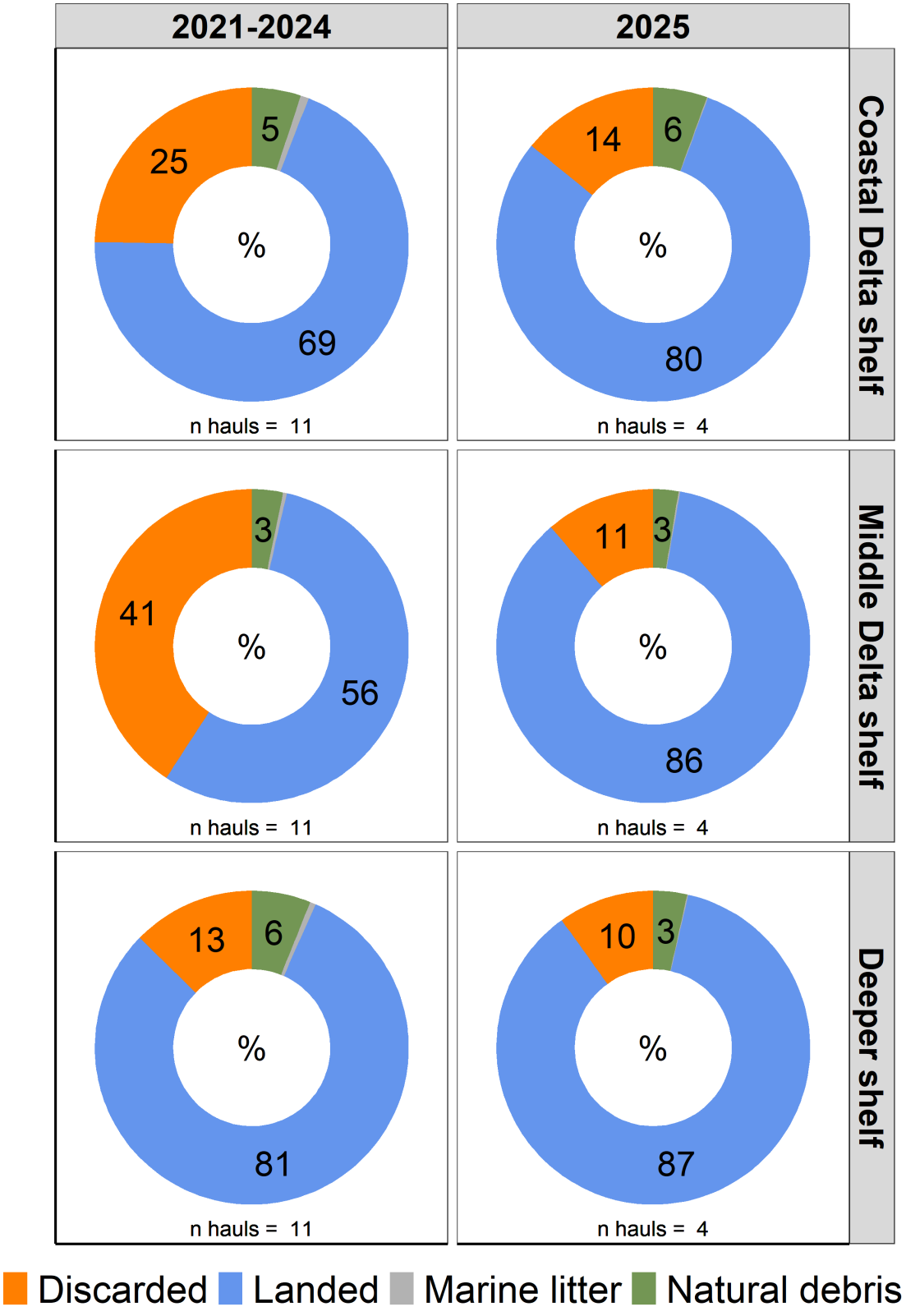


Figure 117. L'Ametlla de Mar catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.



Figure 118. L'Ametlla de Mar landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.



Figure 119. L'Ametlla de Mar discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.

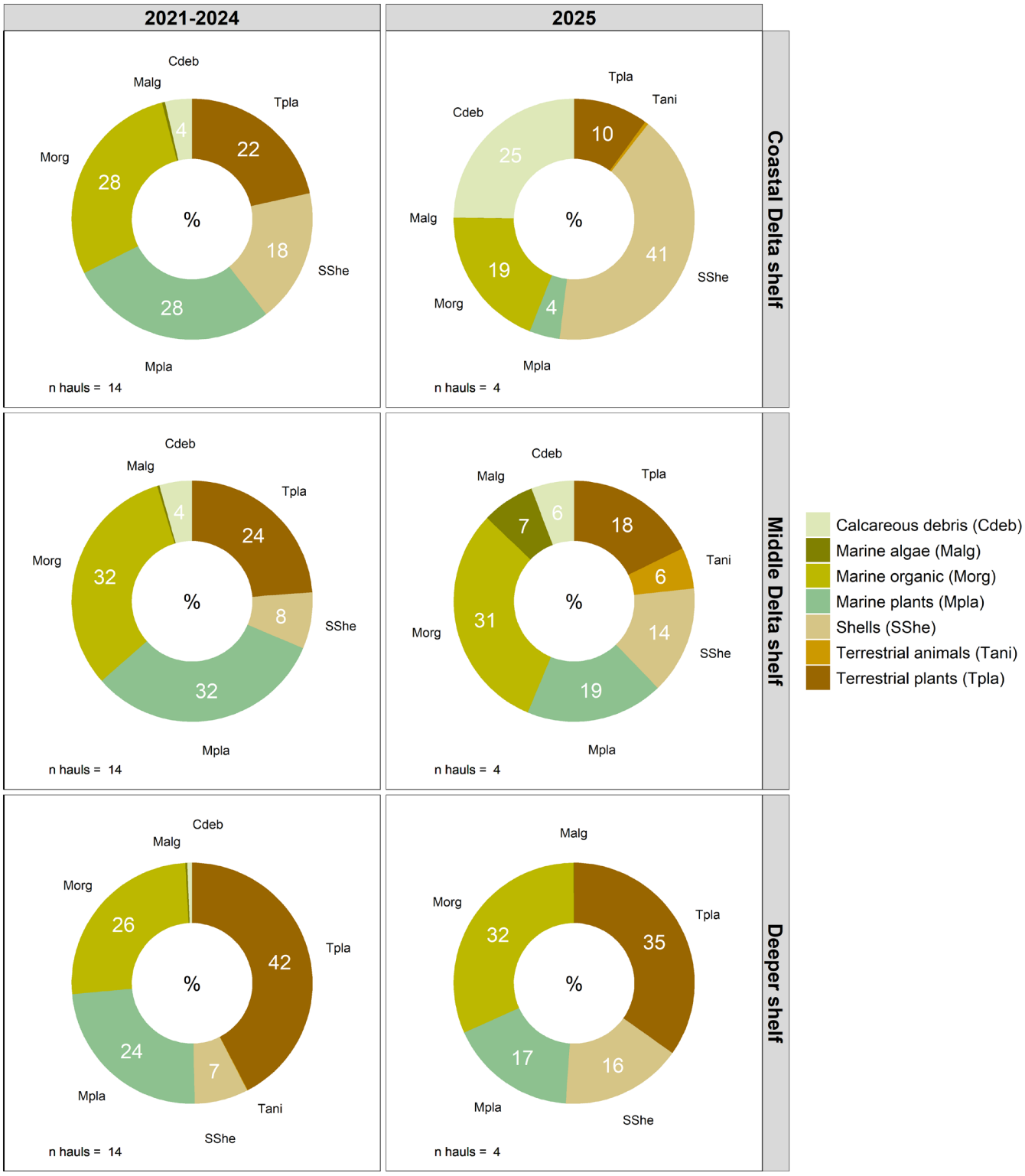


Figure 120. L'Ametlla de Mar Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.

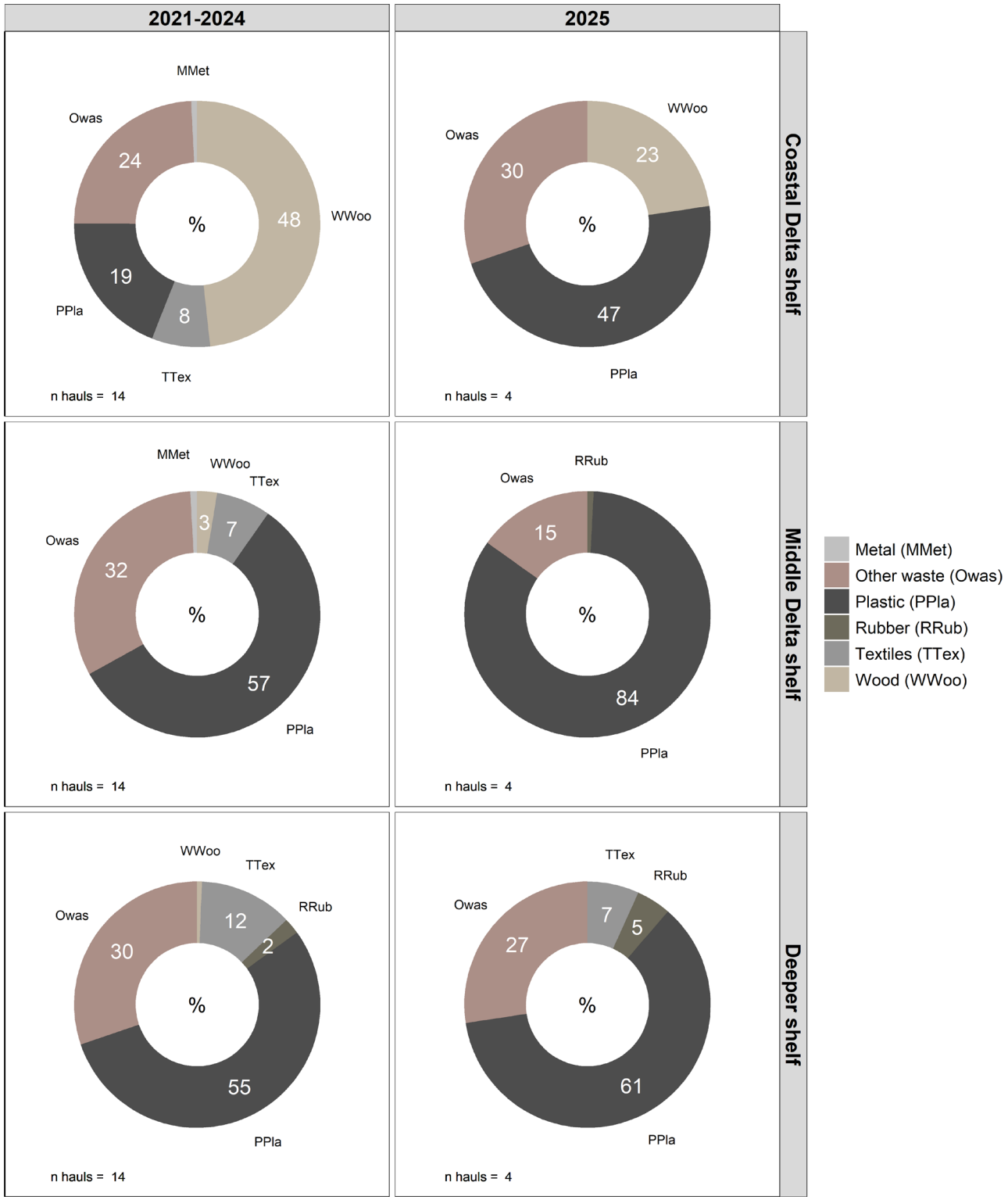


Figure 121. L'Ametlla de Mar Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

La Ràpita

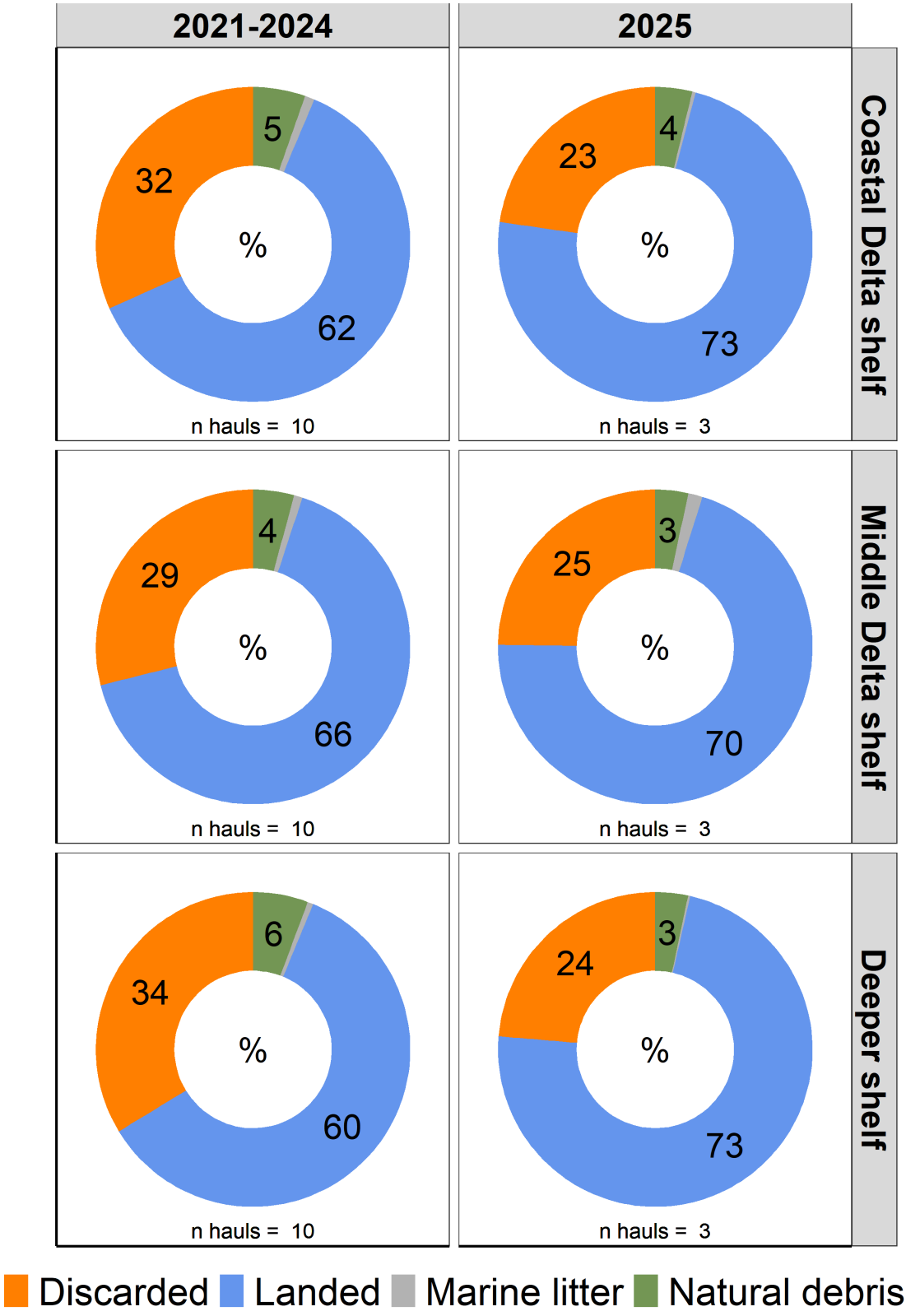


Figure 122. La Ràpita catch composition. Percentage by weight of landings, discarded, natural debris and marine litter fraction including all hauls within each period and *métier*.

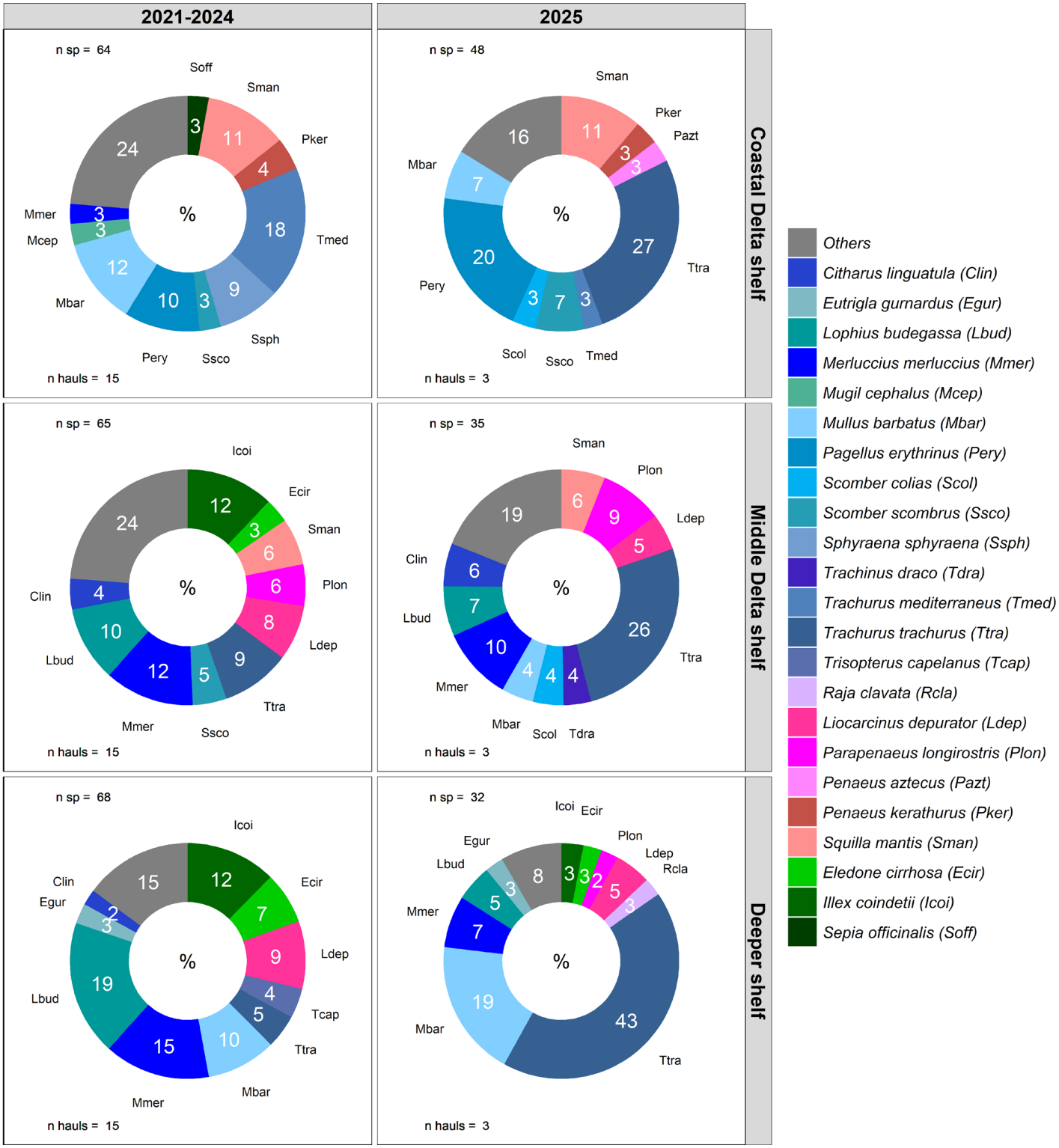


Figure 123. La Ràpita landed species with most biomass. Percentage in weight including all hauls within each period and *métier*.

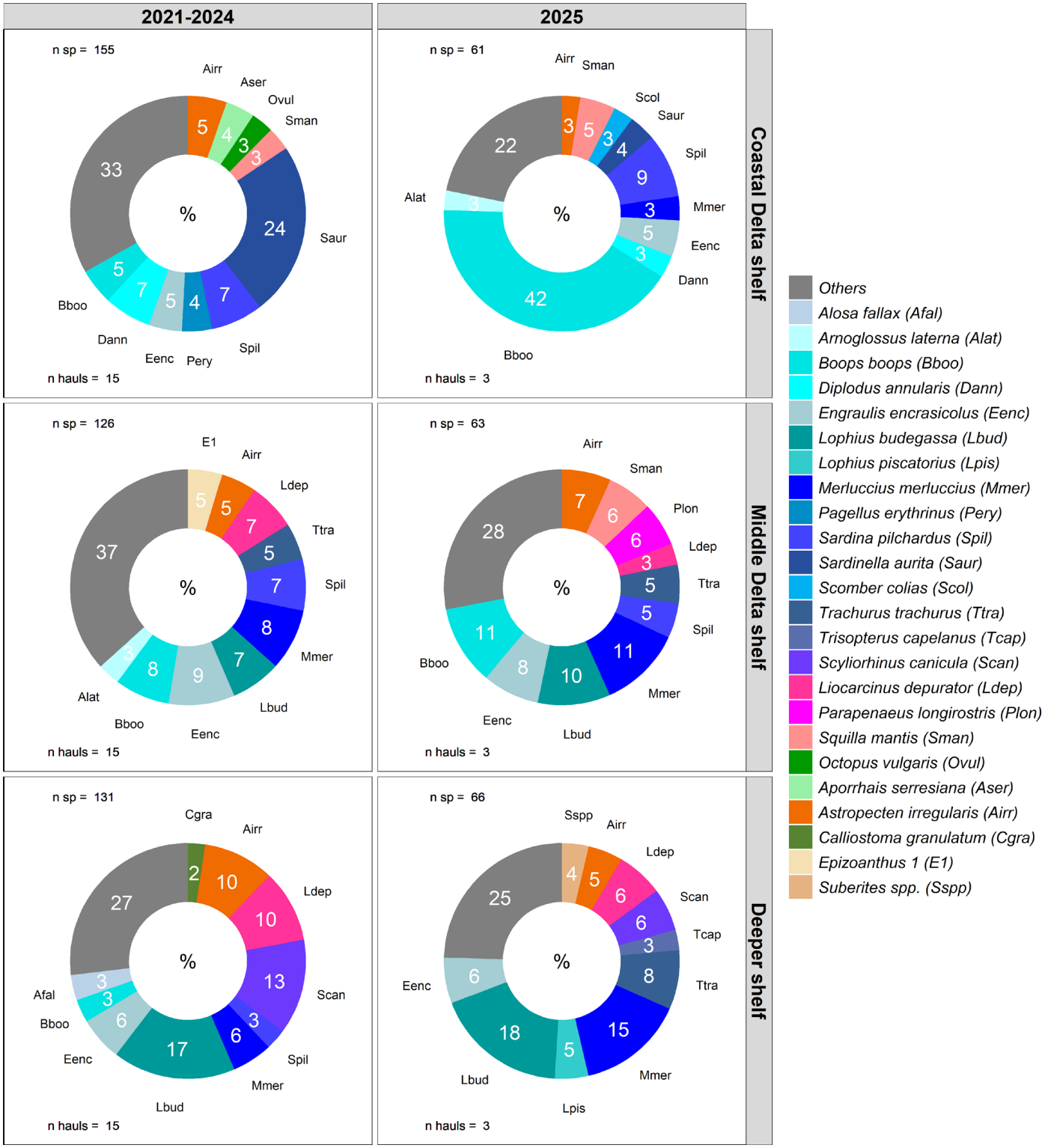


Figure 124. La Ràpita discarded species with most biomass. Percentage in weight including all hauls within each period and *métier*.

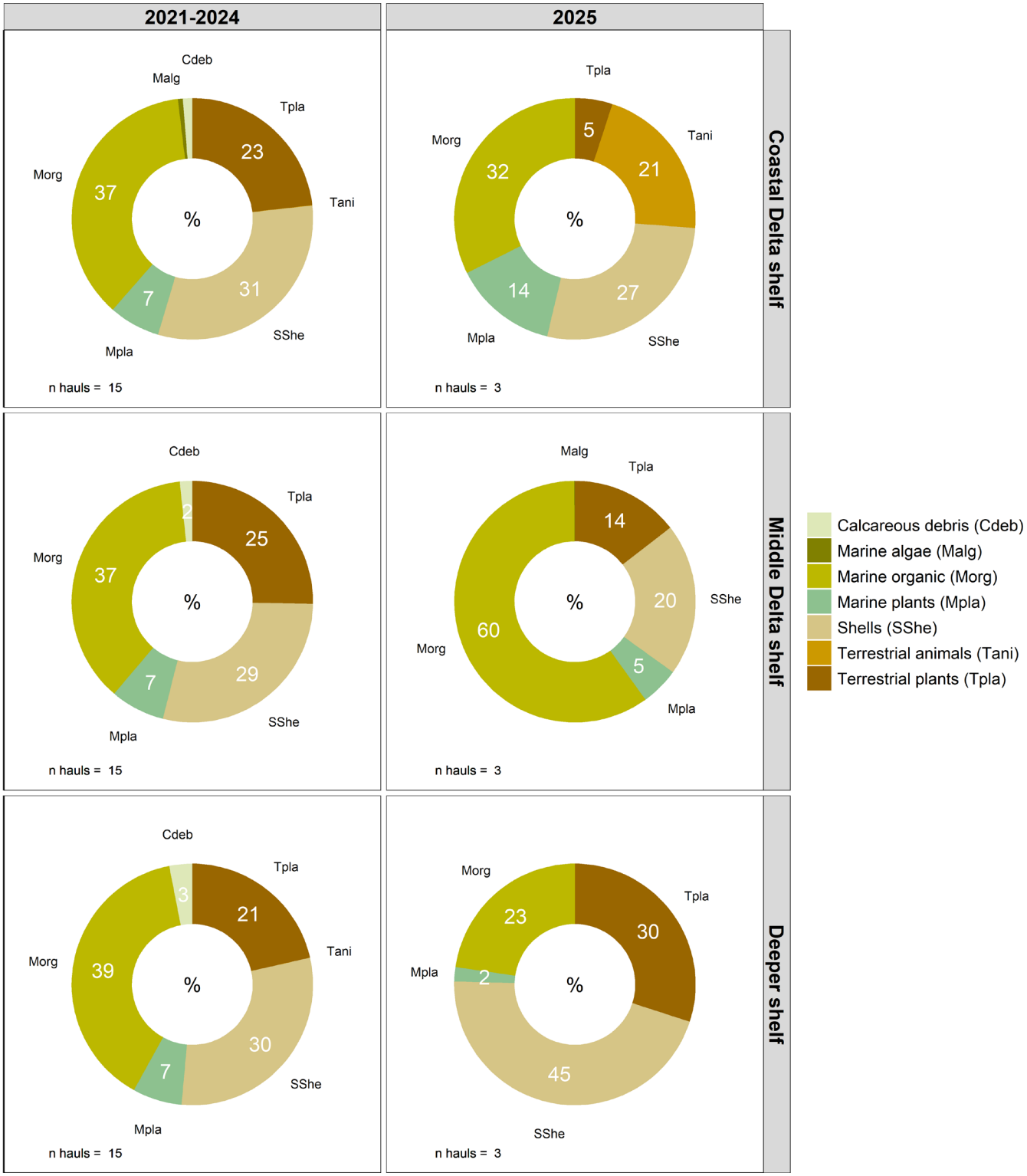


Figure 125. La Ràpita Categories with higher biomass natural debris. Percentage in weight including all hauls within each period and *métier*.

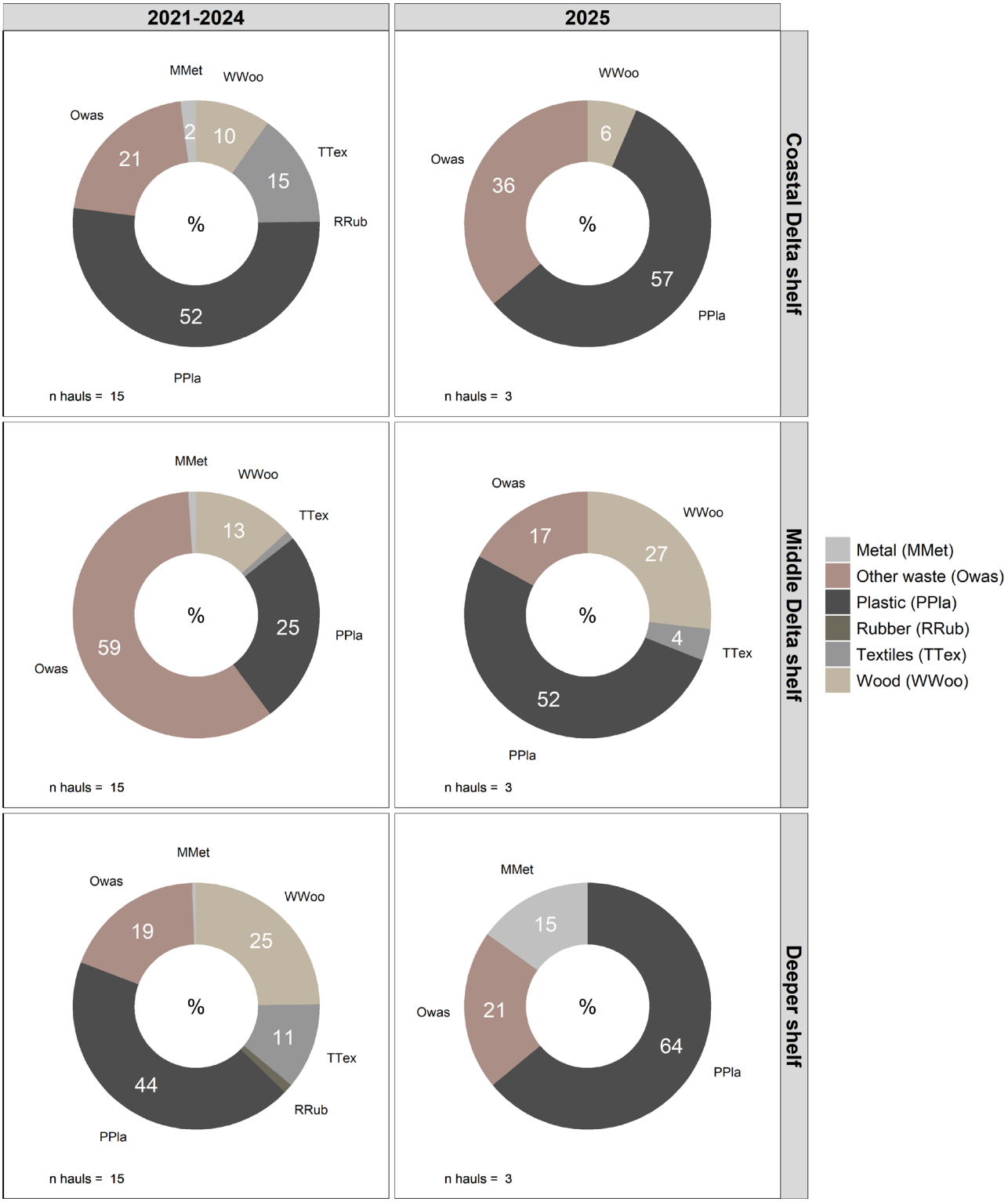


Figure 126. La Ràpita Categories with higher mass marine litter. Percentage in weight including all hauls within each period and *métier*.

North zone: Figure 79.

Roses: Figure 80, Figure 81, Figure 82, Figure 83, Figure 84.

Palamós: Figure 85, Figure 86, Figure 87, Figure 88, Figure 89.

Blanes: Figure 90, Figure 91, Figure 92, Figure 93, Figure 94.

Arenys de Mar: Figure 95, Figure 96, Figure 97, Figure 98, Figure 99.

Center zone: Figure 100.

Barcelona: Figure 101, Figure 102, Figure 103, Figure 104, Figure 105.

Vilanova i la Geltrú: Figure 106, Figure 107, Figure 108, Figure 109, Figure 110.

Tarragona/Cambrils: Figure 111, Figure 112, Figure 113, Figure 114, Figure 115.

South zone: Figure 116.

L'Ametlla de Mar: Figure 117, Figure 118, Figure 119, Figure 120, Figure 121.

La Ràpita: Figure 122, Figure 123, Figure 124, Figure 125, Figure 126.

SECTION 3
Purse seine fishing

Fishery monitoring of purse seine fishing in Catalonia



Purse seine fishery in Catalonia

A total of 383 purse seine fishery samplings were carried out in the period 2021-2025, 220 were fish market samplings, through the purchase of batches, and 147 were on-board samplings (Table 28). In 2025 40 on-board and 34 fish market samplings were carried out (Figure 127).

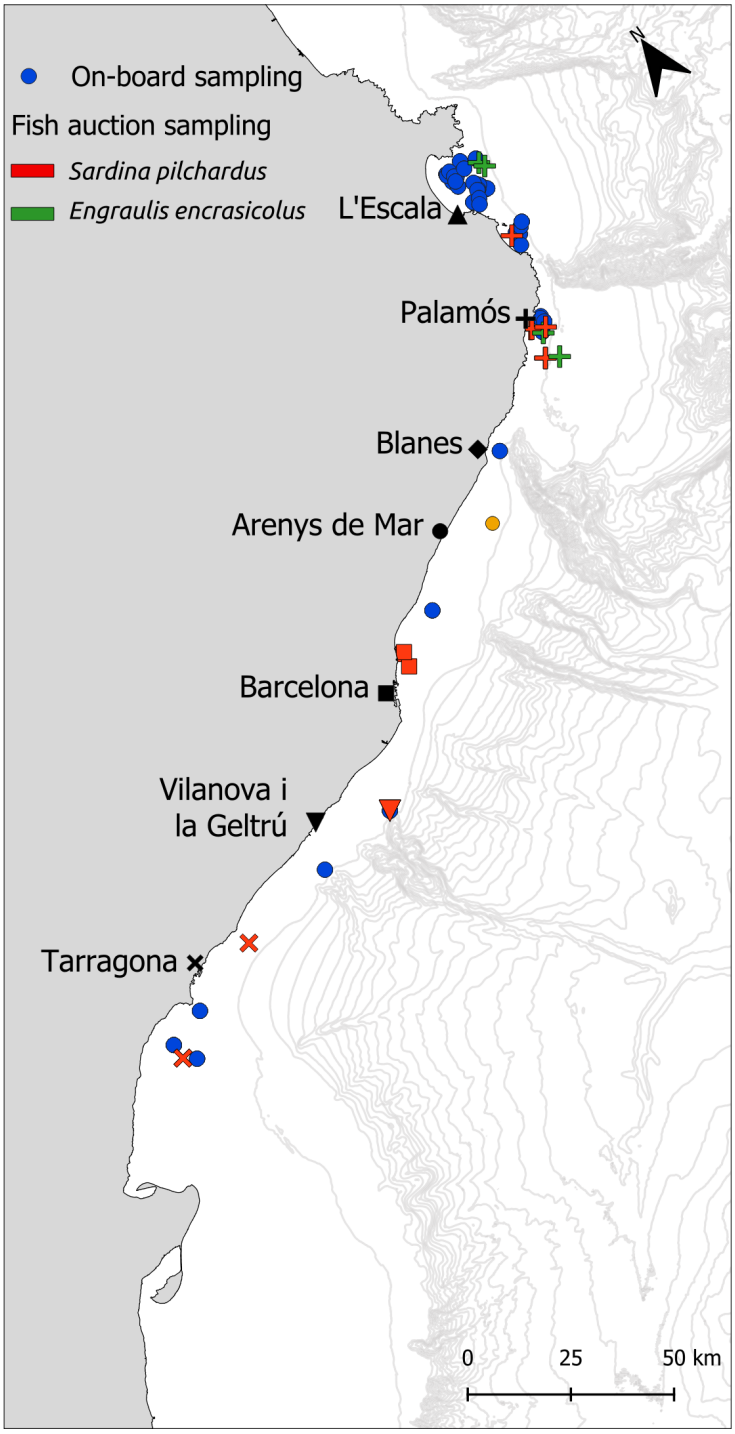


Figure 127. Purse seine sampling conducted in Catalonia in the year analyzed.

Table 28. Number of purse seine samplings. Fish market (samples obtained from the fish market) and on-board sampling (samples obtained on board commercial fishing vessels).

Fishery	Year	Zone	Winter	Spring	Summer	Autumn
			Number of samplings			
Purse seine (on-board sampling)	2021	Center	1	1	0	0
Purse seine (on-board sampling)	2021	North	0	5	0	0
Purse seine (on-board sampling)	2022	Center	2	2	2	3
Purse seine (on-board sampling)	2022	North	9	4	7	4
Purse seine (on-board sampling)	2023	Center	0	0	0	3
Purse seine (on-board sampling)	2023	North	7	3	3	6
Purse seine (on-board sampling)	2023	South	1	2	0	0
Purse seine (on-board sampling)	2024	Center	4	0	2	6
Purse seine (on-board sampling)	2024	North	7	11	5	7
Purse seine (on-board sampling)	2025	Center	1	1	0	1
Purse seine (on-board sampling)	2025	North	11	6	11	6
Purse seine (on-board sampling)	2025	South	1	0	1	1
Purse seine (fish market)	2021	Center	10	8	8	7
Purse seine (fish market)	2021	North	9	4	8	8
Purse seine (fish market)	2022	Center	9	6	6	9
Purse seine (fish market)	2022	North	8	6	6	9
Purse seine (fish market)	2023	Center	6	4	7	7
Purse seine (fish market)	2023	North	6	3	6	6
Purse seine (fish market)	2024	Center	8	4	5	5
Purse seine (fish market)	2024	North	5	2	4	3
Purse seine (fish market)	2025	Center	7	5	2	4

The catch composition, in terms of biomass, of the purse seine fishery in the on-board sampling in 2025 consisted of 73% target species (either European sardine or anchovy), 16% other commercial species (by-catch) and 6% discards (species not commercialized). The remaining 5%, classified as "Others", corresponds to individuals sold at the fish market under the label of a different species. This category may include specimens that were discarded during fishing operations or captured alongside the retained catch but subsequently marketed separately. As a result, these individuals may have been overlooked during the sampling process, leading to their biomass being assigned to another species in fish market records (Figure 128).

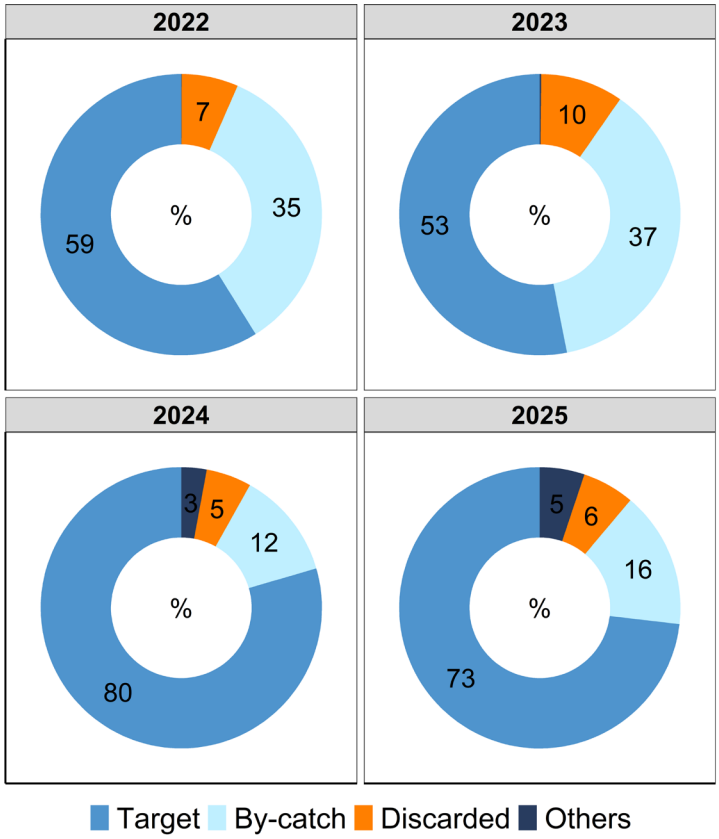


Figure 128. Purse seine fishery catch composition. Percentage by weight of target species (European sardine and anchovy), by-catch (other species commercialized), discarded catch (species not commercialized) and others (specimens sold at fish market under the label of a different species).

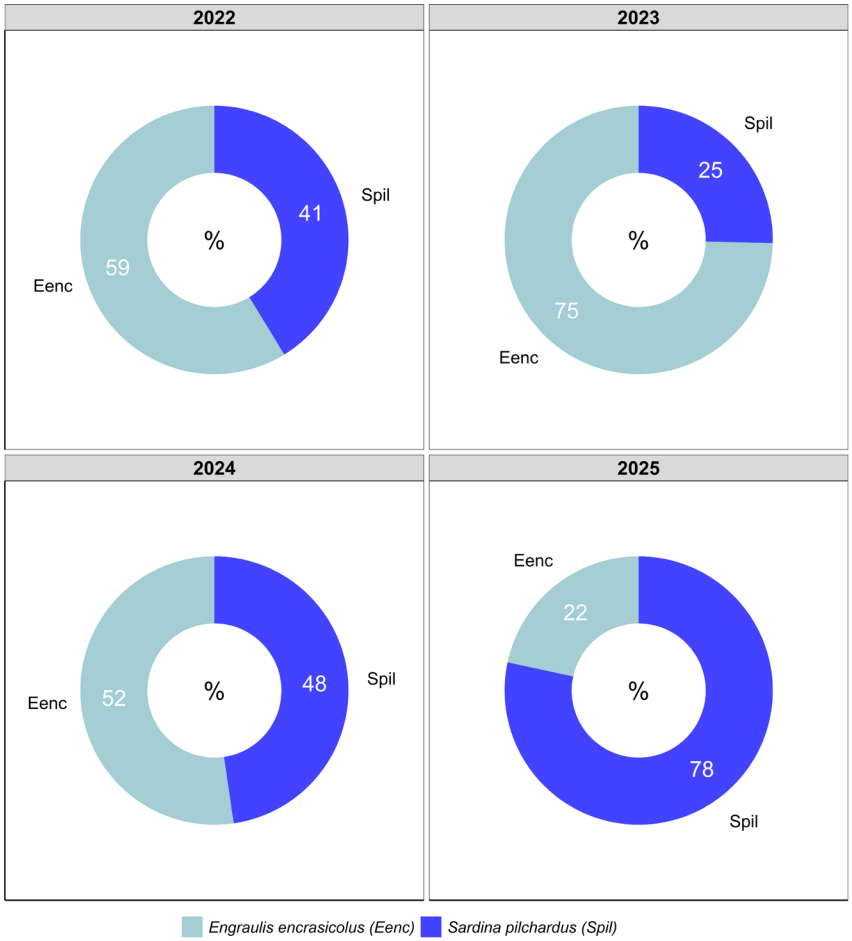


Figure 129. Purse seine fishery target species composition. Percentage by weight of each target species.

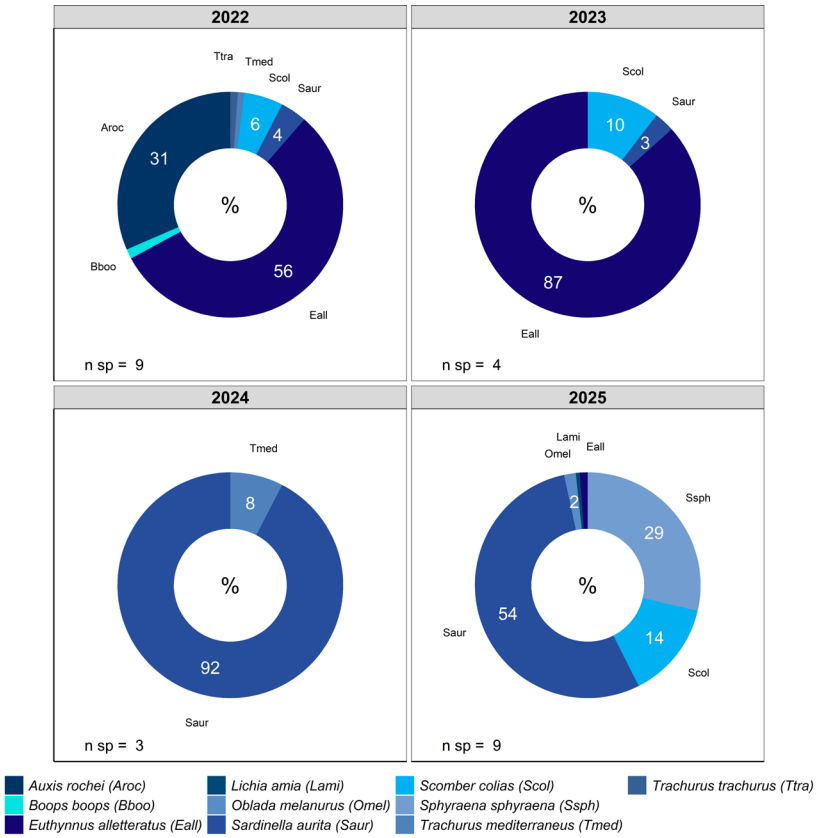


Figure 130. Purse seine fishery by-catch species composition. Percentage by weight of each by-catch species.

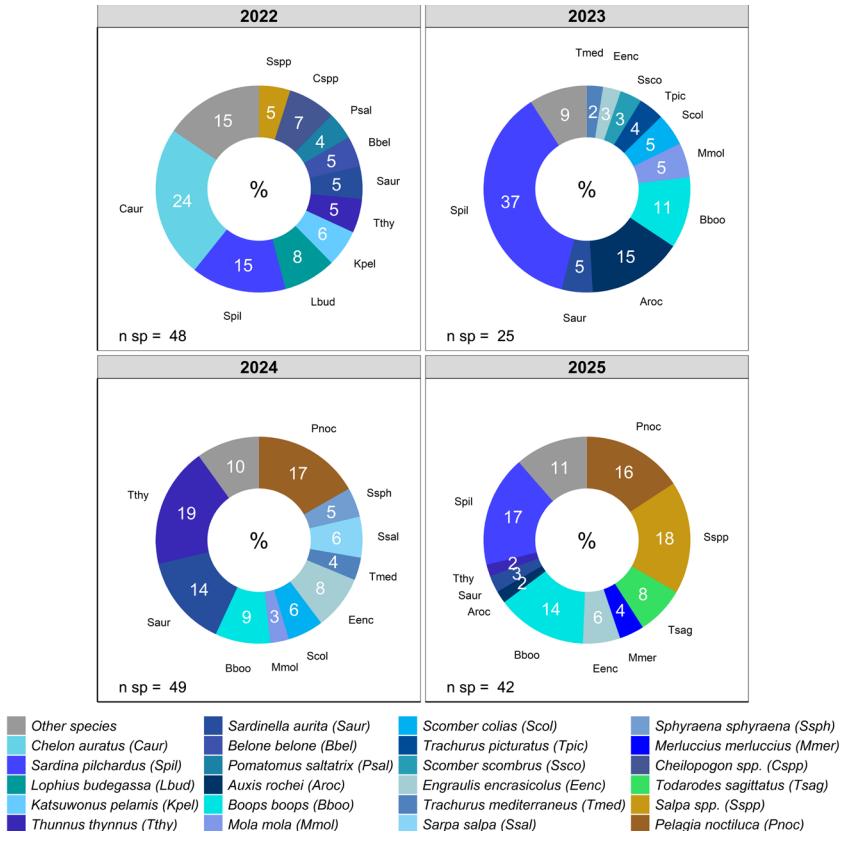


Figure 131. Purse seine fishery discarded species. Percentage by weight of species with most biomass discarded.

Regarding the catch composition of target species in terms of biomass from on-board sampling in 2025, anchovy accounted for 22%. European sardine accounted to 78% in 2025, an increase from the 48% it accounted for in 2024 (Figure 129).

Nine species were identified within the by-catch fraction of the on-board purse seine fishery sampling in 2025 (Figure 130). The non-target commercial species with higher biomasses were *Sardinella aurita* (54%) followed by *Sphyraena sphyraena* (29%) and Scomber colias (14%).

From the discarded fraction of the on-board sampling in 2025, 42 species were identified (Figure 131). Of these, the species that accounted for the highest biomasses were Salpa spp. (18%) followed by *Sardina pilchardus* (17%) and Pelagia noctiluca (16%).

European sardine (*Sardina pilchardus*) PIL

The total European sardine catch in Catalonia in 2025 was 3 934.8t, 99,5% of which were caught by purse seine (ICATMAR, 26-02). .

Figure 132 and Figure 133 show the spatial distribution of the species landings in 2025 and from 2021 to 2025 along the Catalan coast. The annual maximum value was reached in 2022 with 31 465 kg/km^2. In 2025, the maximum landing value per area was 19 494 kg/km^2.

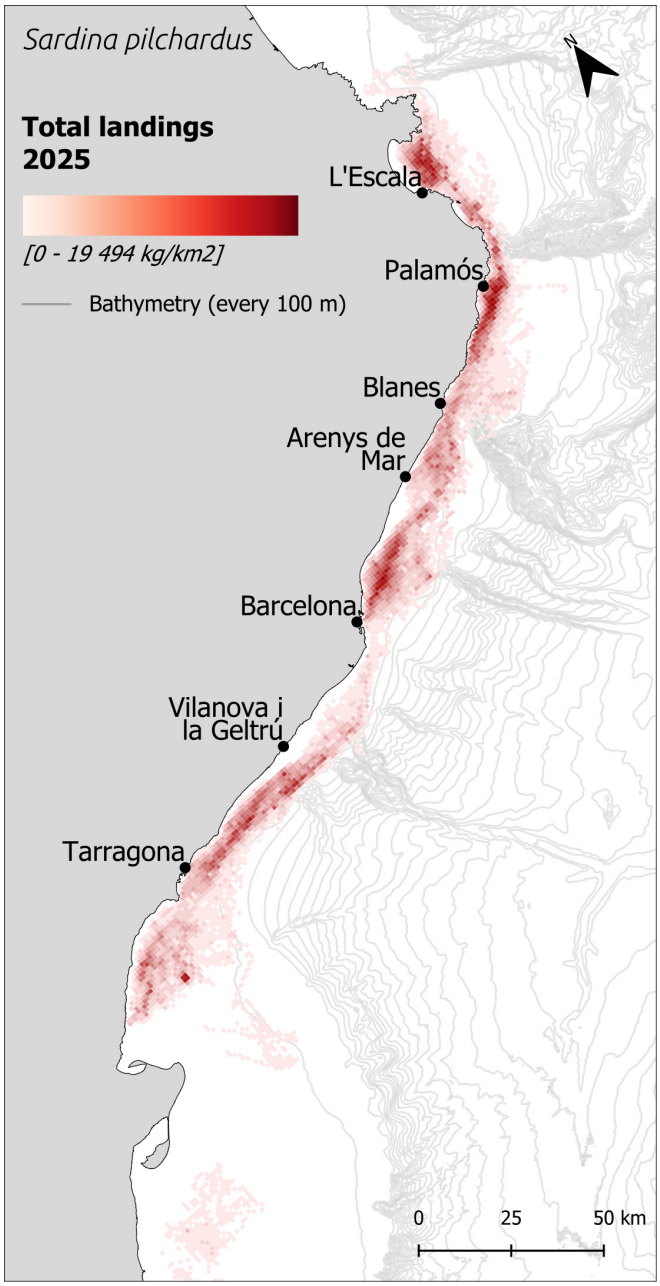


Figure 132. Spatial distribution of landings (kg/km^2) for European sardine in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 29. European sardine length-weight relationship in the year analyzed.

Length – total weight relationship				
2024	**a**	**b**	**r^2**	**n**
Combined	0.0045	3.1878	0.99	1487
Females	0.004	3.237	0.97	779
Males	0.0033	3.3088	0.96	592

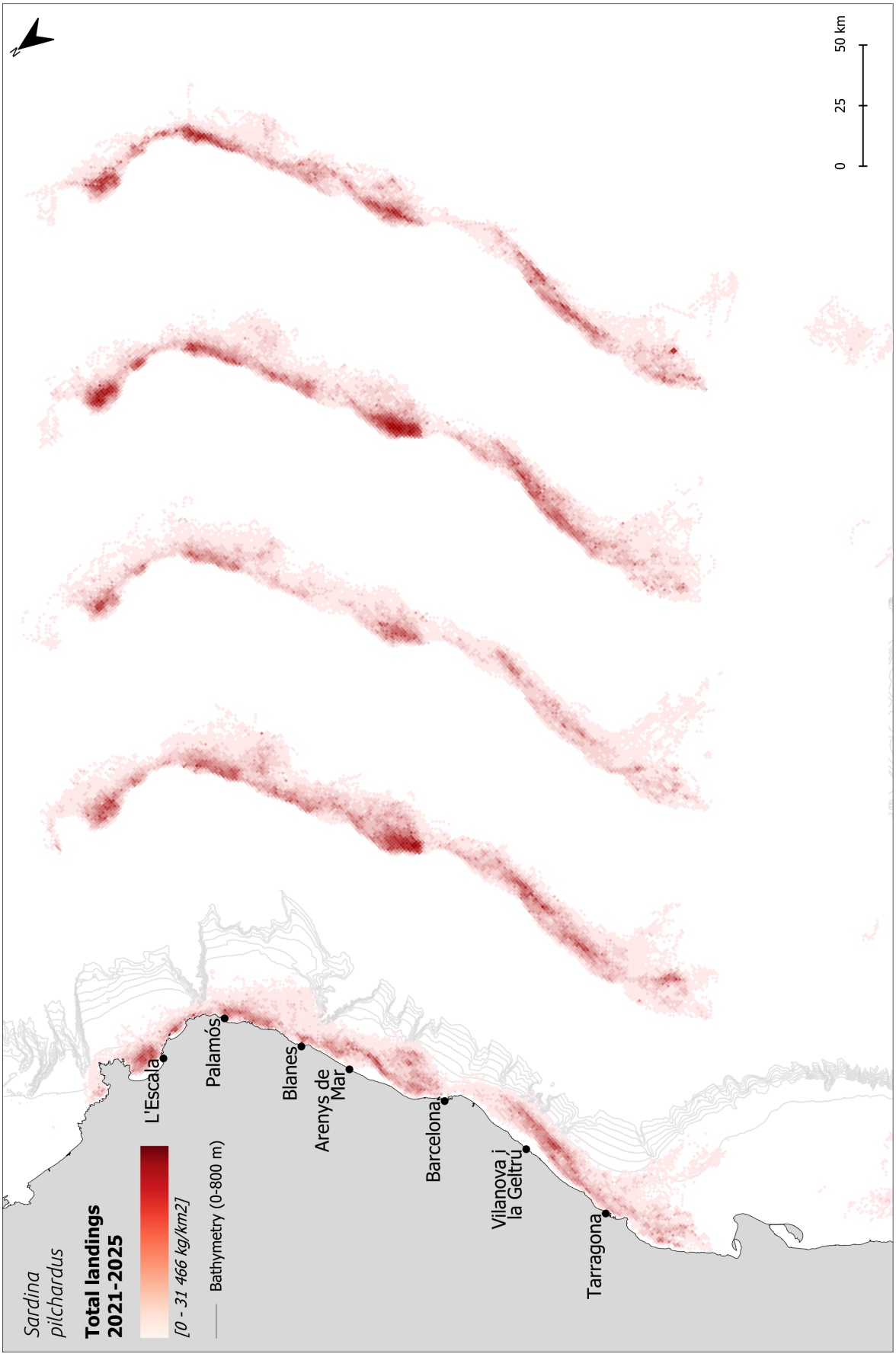


Figure 133. Spatial distribution of landings (kg/km²) for European sardine in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

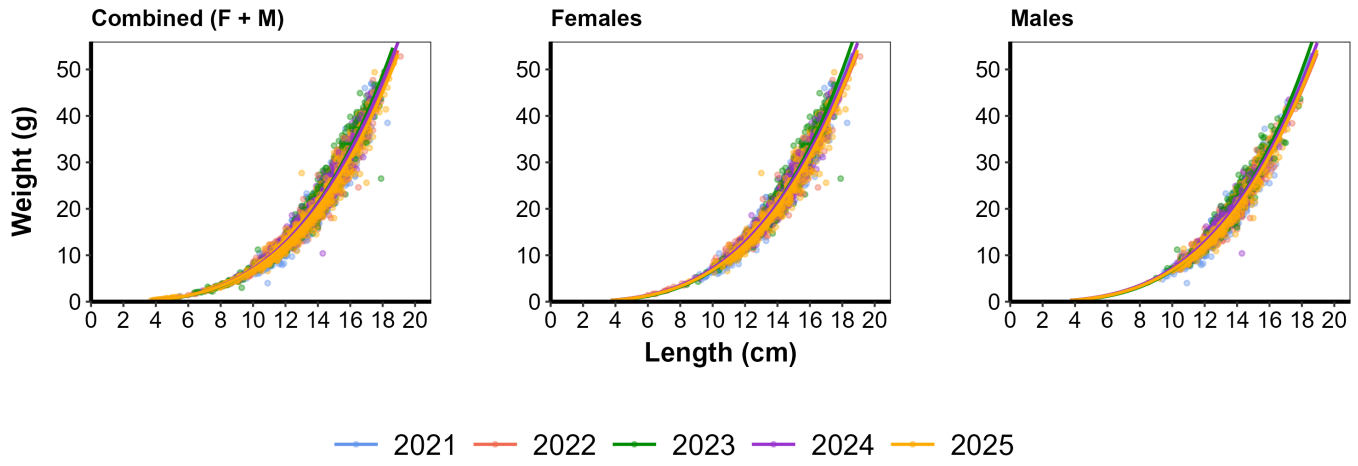


Figure 134. European sardine length-weight relationship for the years sampled.

According to the length–weight relationship parameters estimated for females, males, and both sexes combined, European sardine exhibited positive allometric growth (for both sexes combined: CI95 = 3.17–3.20, b > 3) in 2025 (Table 28). Comparing the growth curves between the years sampled for both sexes combined and separately, similar results can be observed over the years with positive allometric growth in all cases (Figure 134).

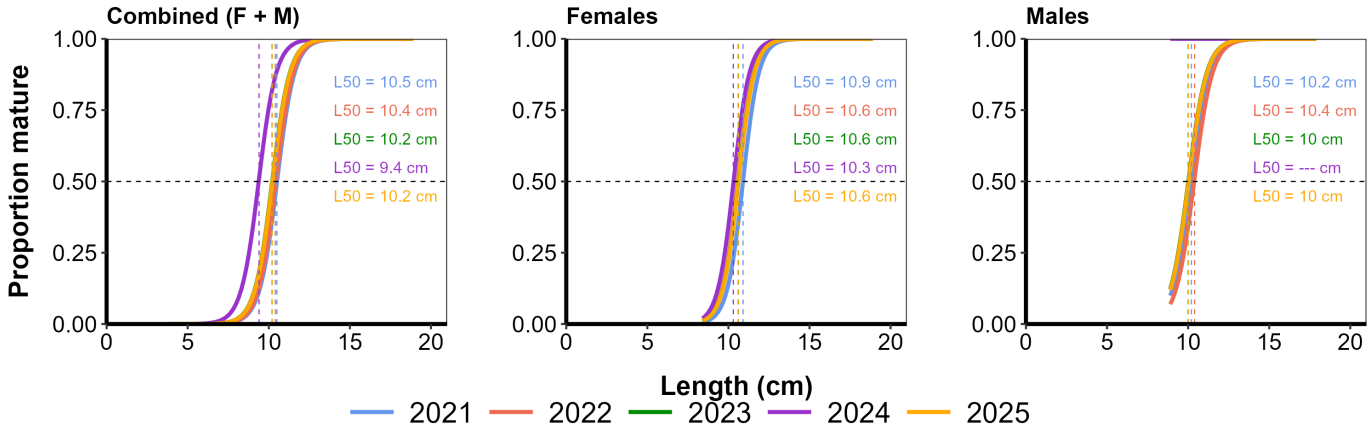


Figure 135. European sardine size at first maturity (L_{50}) for all years sampled.

Table 30. Number of mature and immature individuals of European sardine included monthly in biological analyses.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	0	80	0	67	5	100	3	96	0	72
February	1	159	11	150	6	157	0	101	1	117
March	3	157	7	125	0	149	0	150	38	117
April	0	119	35	128	15	119	5	156	7	118
May	8	152	31	142	20	105	7	146	32	124
June	16	60	60	131	62	148	10	100	31	94
July	2	157	0	180	46	86	5	83	56	122
August	64	171	5	136	30	36	1	89	32	136
September	70	94	10	141	42	120	1	161	3	119
October	33	95	5	87	20	70	5	72	16	84
November	51	68	3	65	7	53	1	120	15	114
December	12	97	0	60	0	0	0	0	0	30
Total	260	1409	167	1412	253	1143	38	1274	231	1247

The size at first maturity (L_{50}) for European sardine in 2025 was 10.2 cm of TL for both sexes combined (Figure 132). Males showed an earlier maturation than females in 2025 with a L_{50} of 10cm, whereas females showed a L_{50} of 10.6, following the same trend observed in previous years sampled. Comparisons among years revealed little interannual variation in L_{50}. It should be noted that the low L_{50} estimated for 2024 when both sexes were combined should be interpreted with caution, as the scarcity of immature males during the reproductive period hindered a robust estimation of this parameter for that year.

In 2025, a total of 1 478 European sardine individuals were sampled throughout the year (Table 29). Out of these, 231 individuals were classified as immature and 1 247 as mature. It should be noted that the low number of immature individuals in the samples may have biased the estimated L_{50} towards larger sizes. This is likely because most sampled fish were obtained from commercial catches, which are dominated by individuals above the species' minimum conservation reference size (MCRS), potentially resulting in an underrepresentation of immature individuals.

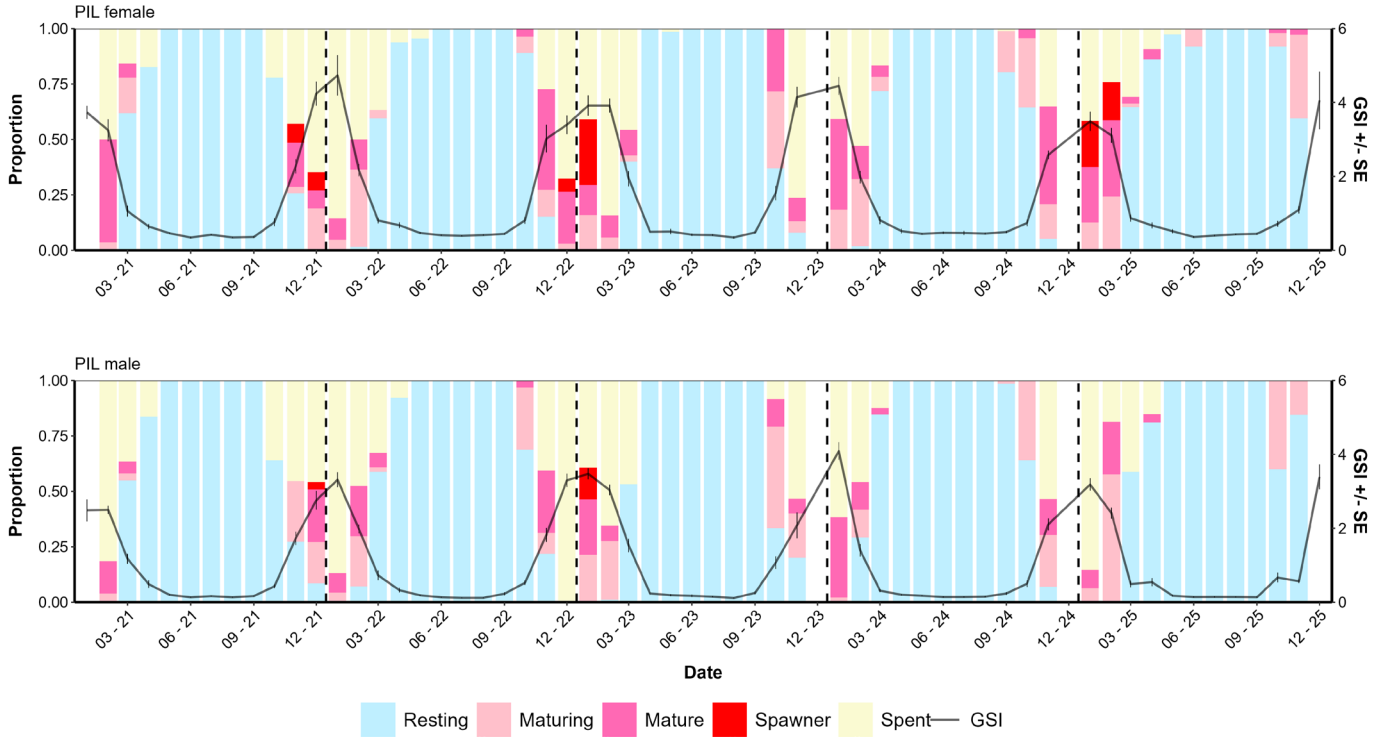


Figure 136. European sardine monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

The gonadal cycle of European sardine was analyzed monthly from 2021 to 2025 (Figure 136). The species, both males and females, showed a seasonal reproductive cycle as individuals in advanced maturity stages were present from November to February, which is consistent with the reproductive cycle described for the species in the study area (Palomera et al., 2007). On the other hand, the highest proportion of resting individuals was observed from April to September. The highest GSI values for both males and females were also found between November and February, coinciding with the reproductive peak of the species.

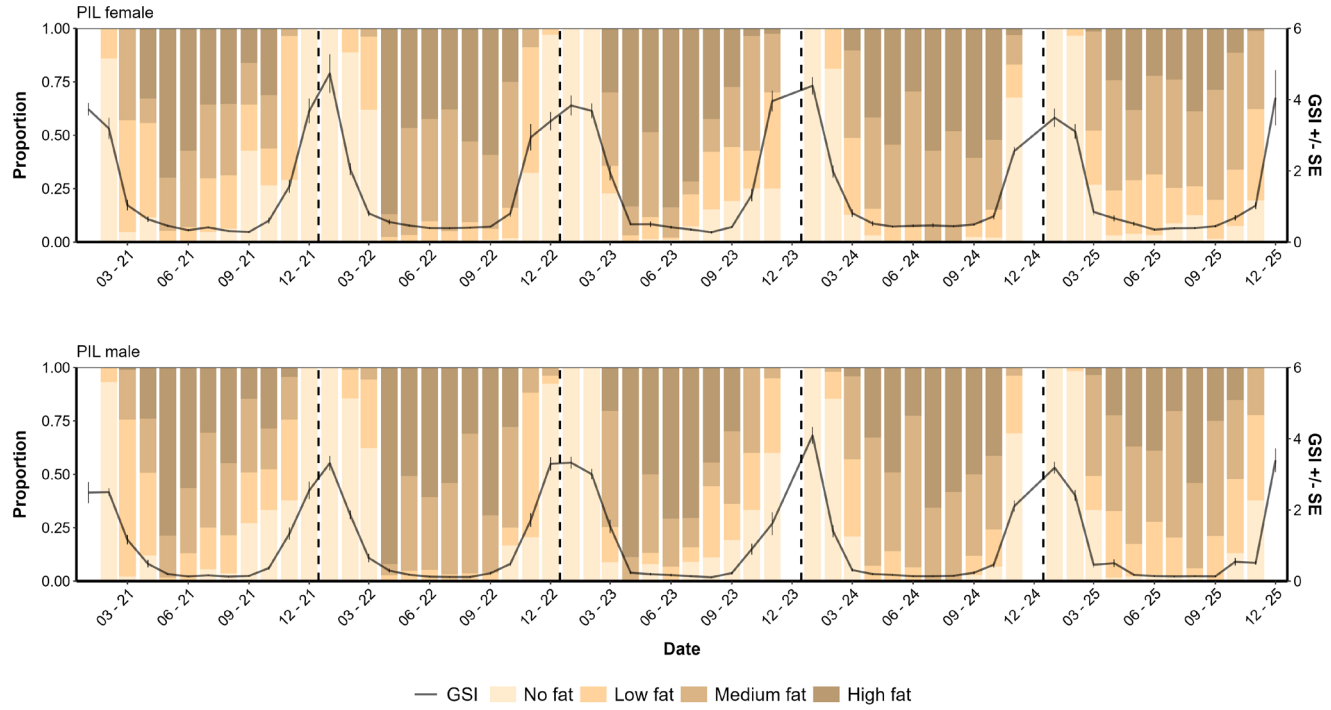


Figure 137. European sardine annual cycle for mesenteric fat content for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and monthly proportion of different mesenteric fat content.

The annual cycle of mesenteric fat content of European sardine was analyzed monthly from 2021 to 2025 (Figure 137). As shown, females and males followed the same pattern, with the highest proportion of individuals with medium and high fat content from April to October. Notably, GSI followed an opposite pattern, with the lowest values during spring and summer, confirming that European sardine stores fat before the reproductive season as described by Zorica et al., (2019).

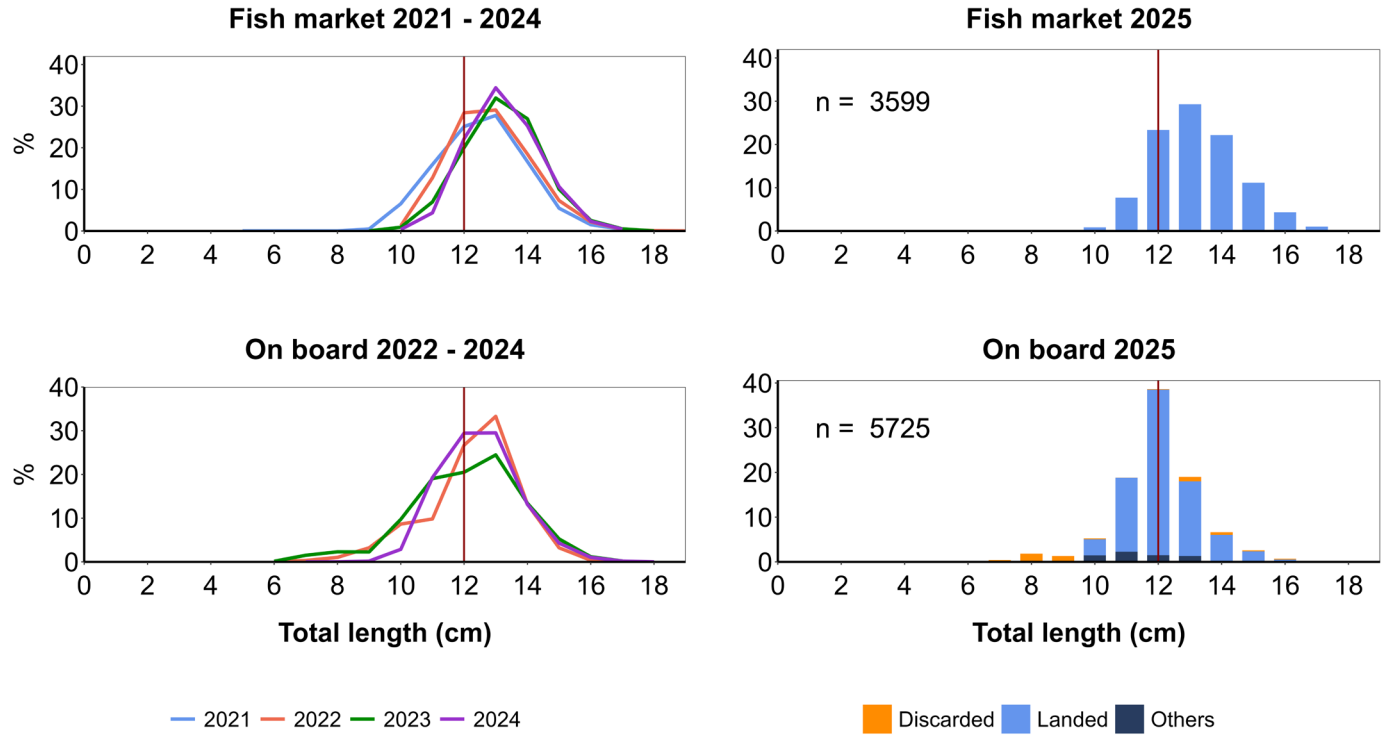


Figure 138. Annual length-frequency distribution of European sardine. Left: previous years sampled, right: year analyzed. Top: fish market samples. Bottom: on board samples. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS).

The annual length-frequency distributions of European sardine from 2021 to 2025 showed a clear mode at around 12–13 cm TL in all sampled years and across both sampling types (Figure 138). In 2025, most individuals sampled at the fish market were above the species' minimum conservation reference size (MCRS; 12 cm TL). In contrast, approximately half of the individuals collected during on-board sampling were below the MCRS. Nevertheless, the commercialized fraction showed a length distribution similar to that observed in fish market samples. The smallest individual recorded during on-board sampling measured 8 cm TL and had been discarded. The category "Others" includes sardine individuals marketed within lots of other species.

For monthly length-frequency distribution of European sardine in the different months for 2025 see (Annex 22).

Table 31. Number of European sardine individuals measured in the different fisheries along the zones sampled in each season.

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Artisanal fisheries	2021	North	1	0	0	0	1
Artisanal fisheries	2024	North	2	0	0	0	1
Artisanal fisheries	2025	North	23	0	0	0	2
Bottom trawl	2021	North	4	0	4	0	4
Bottom trawl	2021	Center	9	1	15	11	6
Bottom trawl	2021	South	16	85	352	191	17
Bottom trawl	2022	North	0	5	2	1	4
Bottom trawl	2022	Center	4	0	0	38	2
Bottom trawl	2022	South	0	31	182	166	12
Bottom trawl	2023	North	0	8	2	3	3
Bottom trawl	2023	Center	0	70	31	0	2
Bottom trawl	2023	South	7	247	294	29	18
Bottom trawl	2024	North	0	5	1	0	3
Bottom trawl	2024	Center	2	16	89	0	3
Bottom trawl	2024	South	64	135	111	41	21
Bottom trawl	2025	North	0	0	6	0	4
Bottom trawl	2025	Center	1	8	1	10	4
Bottom trawl	2025	South	12	139	213	117	20
Purse seine (fish market)	2021	North	867	878	925	557	21
Purse seine (fish market)	2021	Center	623	370	921	526	17
Purse seine (fish market)	2022	North	979	785	500	407	17
Purse seine (fish market)	2022	Center	699	905	663	561	19
Purse seine (fish market)	2023	North	470	394	485	130	10
Purse seine (fish market)	2023	Center	570	463	598	431	15
Purse seine (fish market)	2024	North	314	425	416	164	9
Purse seine (fish market)	2024	Center	761	542	532	266	15
Purse seine (fish market)	2025	North	350	456	466	241	9
Purse seine (fish market)	2025	Center	307	447	790	542	13
Purse seine (on-board sampling)	2020	North	1800	0	0	0	5
Purse seine (on-board sampling)	2020	Center	21	0	0	0	1
Purse seine (on-board sampling)	2021	North	0	0	0	974	4
Purse seine (on-board sampling)	2021	Center	0	0	219	149	2
Purse seine (on-board sampling)	2022	North	736	497	750	11	17
Purse seine (on-board sampling)	2022	Center	0	267	193	0	4
Purse seine (on-board sampling)	2023	North	1058	942	970	144	23
Purse seine (on-board sampling)	2023	Center	78	332	0	0	4
Purse seine (on-board sampling)	2023	South	0	0	1	0	1
Purse seine (on-board sampling)	2024	North	795	1274	951	683	28
Purse seine (on-board sampling)	2024	Center	296	879	111	0	10
Purse seine (on-board sampling)	2025	North	1264	420	2118	698	33
Purse seine (on-board sampling)	2025	Center	0	178	96	208	3
Purse seine (on-board sampling)	2025	South	206	299	238	0	3

All parameters analyzed in this report for European sardine were calculated using individuals obtained by purse seine sampling, which represents 99,5% of species catches (ICATMAR, 25-04), a small number of individuals were also caught by bottom trawling, especially in the southern part of the sampling area, and by artisanal fisheries (Table 30).

Anchovy (*Engraulis encrasicolus*) ANE

The total anchovy catches in Catalonia in 2025 was 1178.29 t, 98.5% of which were caught by purse seine (ICATMAR, 26-02).

Figure 139 and Figure 140 show the spatial distribution of the species landings in 2025 and from 2021 to 2025 along the Catalan coast. A decreasing trend is observed over the years. In 2025, the maximum landings per area were 8 795 kg/km^2.

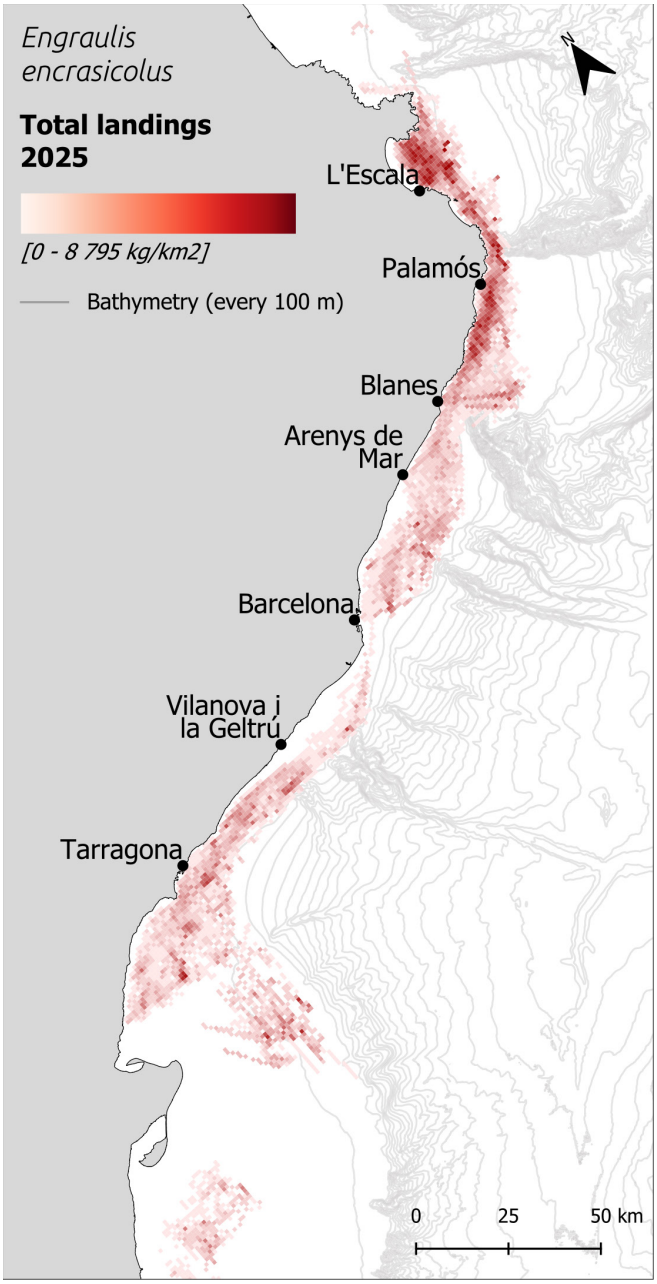


Figure 139. Spatial distribution of landings (kg/km^2) for anchovy in the Catalan fishing grounds (North GSA6) in the year analyzed.

Table 32. Anchovy length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	a	b	r^2	n
Combined	0.0039	3.1827	0.97	922
Females	0.0031	3.2757	0.97	452
Males	0.0044	3.1349	0.94	408

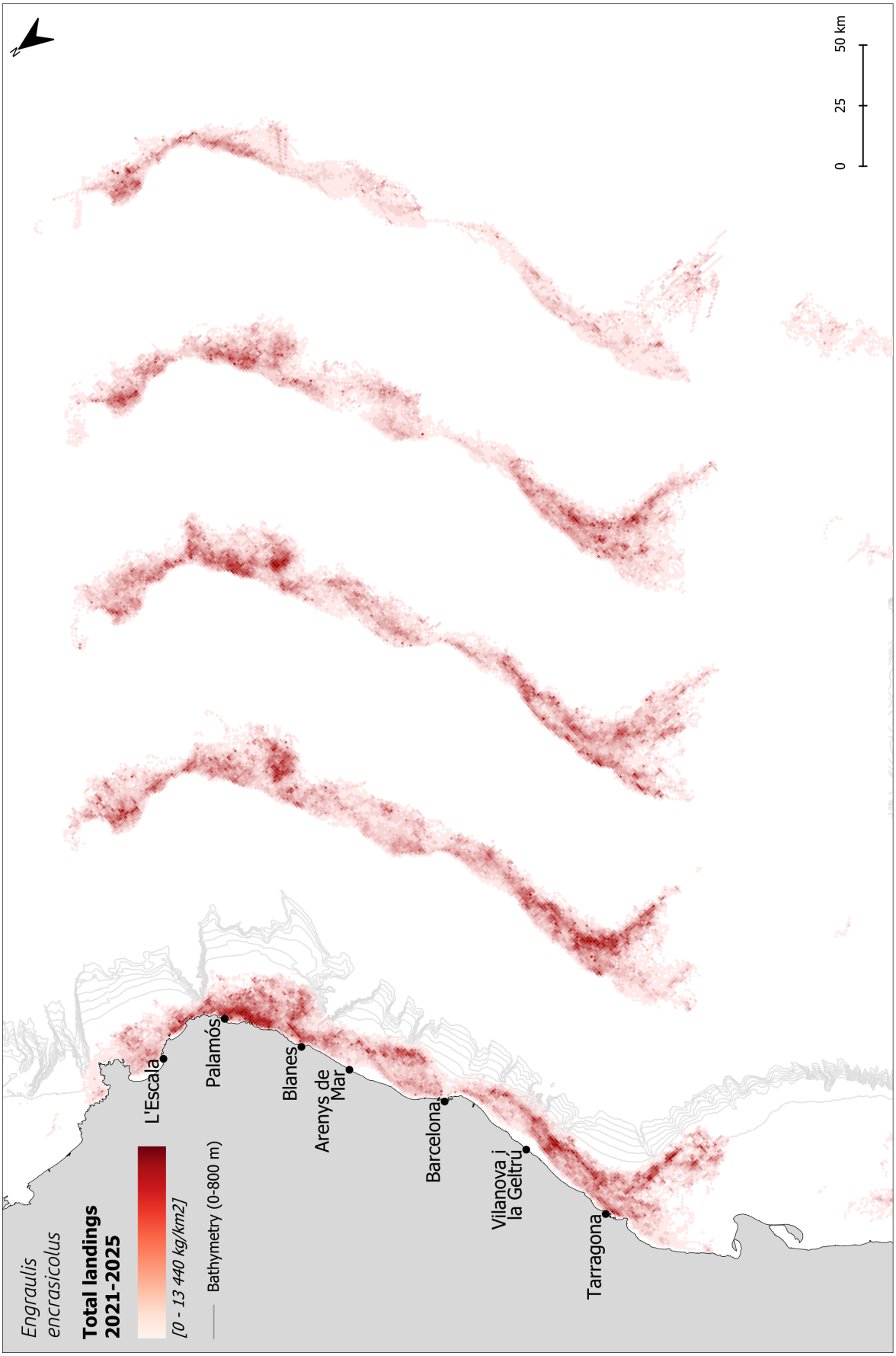


Figure 140. Spatial distribution of landings (kg/km²) for anchovy in the Catalan fishing grounds (North GSA6) for the year analyzed and the four previous years.

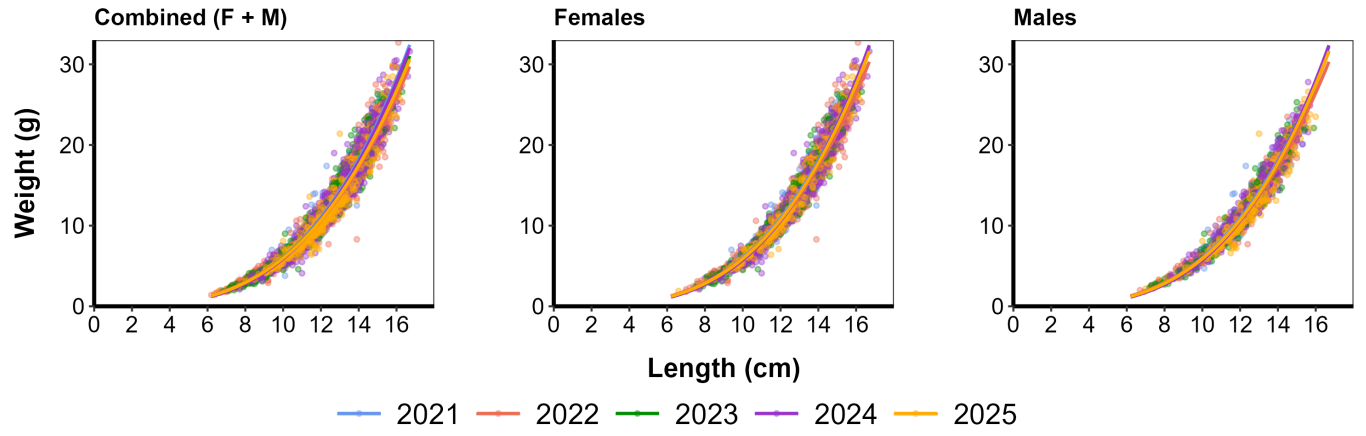


Figure 141. Anchovy length-weight relationship for the years sampled.

According to length-weight relationship parameters for both sexes combined and separately, anchovy displayed a positive allometric growth (for both sexes combined: CI95 = 3.15 - 3.22; b > 3) in 2025 (Table 32). Comparing the growth curves between the years sampled for both sexes combined and separately, similar trends are observed (Figure 141).

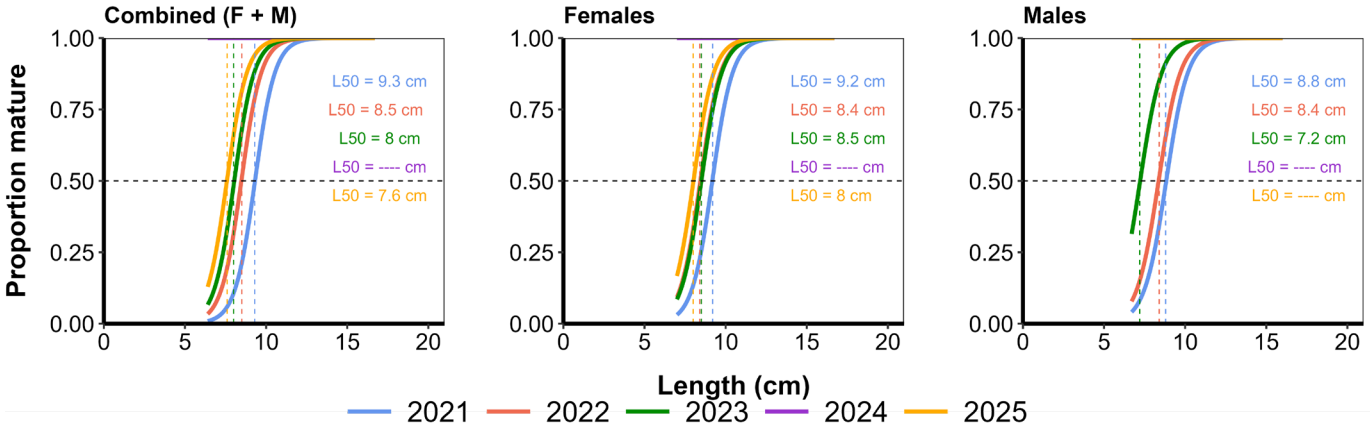


Figure 142. Anchovy size at first maturity (L_{50}) for all years sampled.

Table 33. Number of mature and immature individuals of anchovy included monthly in biological analyses.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	34	44	8	22	8	82	1	58	0	2
February	21	136	29	126	64	120	7	59	29	48
March	19	140	9	171	5	115	6	144	30	80
April	7	112	14	136	0	90	0	153	0	90
May	10	150	5	145	0	120	0	127	1	90
June	0	120	0	149	5	115	0	42	0	92
July	0	120	0	151	0	150	0	124	0	121
August	11	186	6	153	3	72	0	60	0	90
September	8	110	25	136	8	97	0	130	26	61
October	12	30	21	53	4	59	2	58	1	60
November	19	63	9	84	1	91	37	101	0	28
December	39	67	37	49	0	0	0	0	19	22
Total	**180**	**1278**	**163**	**1375**	**98**	**1111**	**53**	**1056**	**106**	**784**

The size at first maturity (L_{50}) for anchovy in 2025 was 7.6 cm of TL for both sexes combined. Females sized 8 cm and males have no data due to a lack of sampled immature individuals during the reproductive cycle (Figure 142). In all the sampled previous years, males showed earlier maturation than females except in 2022 that they show the same TL. Comparing between years for both sexes combined, we observe a declining trend of the L_{50}.

In 2025, a total of 890 anchovy individuals were sampled throughout the year (Table 33). Out of these, 106 individuals were classified as immature and 784 as mature. It should be noted that the low number of immature individuals compared to the mature ones, as most of the sampled individuals come from the fish market through the purchase of batches and are therefore above the MCRS of the species, may bias the L_{50} towards larger sizes than it actually is.

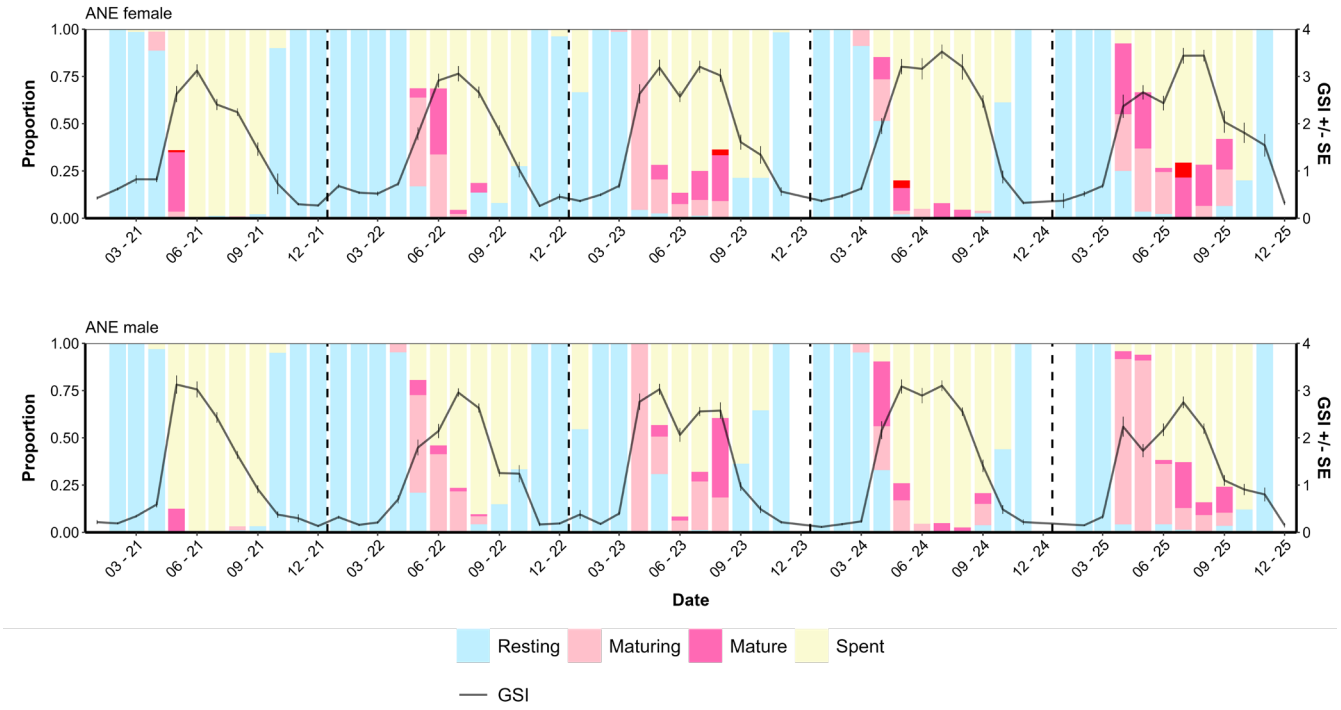


Figure 143. Anchovy monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

The gonadal cycle of anchovy was analyzed monthly from 2021 to 2025 (Figure 143). The species, both males and females, showed a seasonal reproductive cycle as individuals in advanced maturity stages were present from May to September, which is consistent with the reproductive cycle described for the species in the study area in Palomera et al., (2007). On the other hand, the highest proportion of resting individuals was found from November to April. The highest GSI values for both males and females were also found between May and September, coinciding with the reproductive peak of the species.

The annual cycle of mesenteric fat content of anchovy was analyzed monthly from 2021 to 2025 (Figure 144). It can be observed that females and males followed the same pattern, with the highest proportion of individuals with medium and high fat con-tent from October to April/May. Notably, GSI followed an opposite pattern, with the lowest values during autumn and winter.

The annual length-frequency distribution of anchovy from 2021 to 2024 shows a mode between around 12 cm of TL in all years sampled (Figure 145). In the case of 2025, fish market samples showed a mode at 13 cm of TL and on-board samples slightly lower, with 11 cm. Most of the individuals measured in both types of sampling were above the MRCS of the species (10 cm of TL) in 2025.

For monthly length-frequency distribution of anchovy in the different months for 2025 see Annex 23.

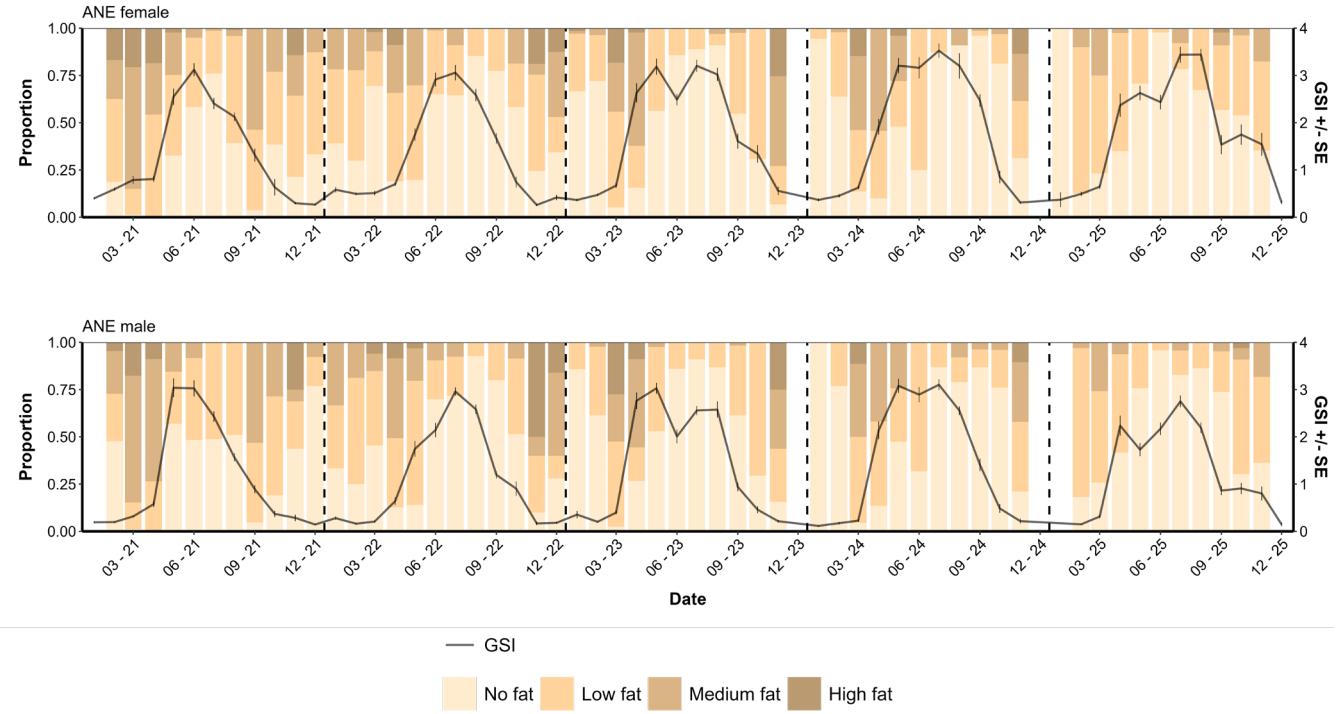


Figure 144. Anchovy annual cycle for mesenteric fat content for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and monthly proportion of different mesenteric fat content.

All parameters analyzed in this report for anchovy were calculated using individuals obtained by purse seine sampling (Table 34). Some of the sampled individuals were also caught by bottom trawling, especially in the southern part of the sampling area, and by artisanal fisheries, although their numbers were considerably low.

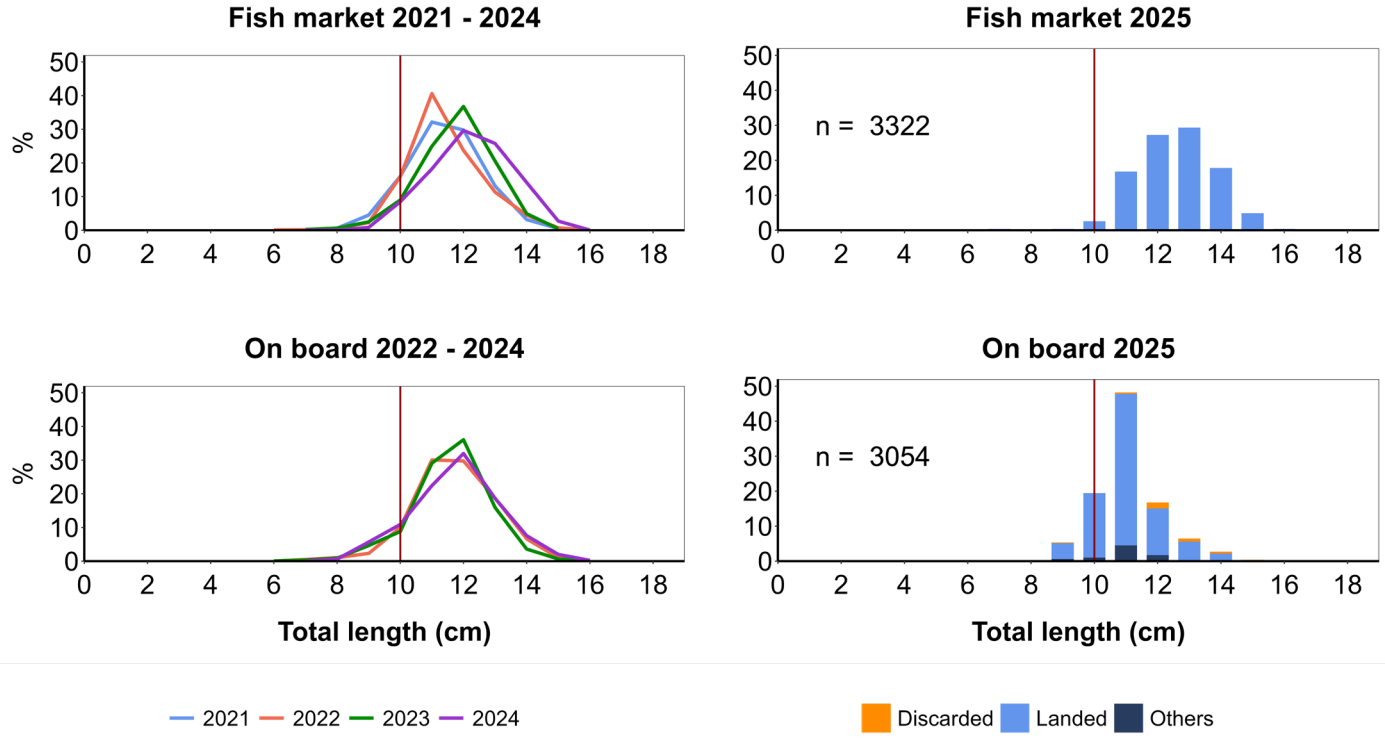


Figure 145. Annual length-frequency distribution of anchovy. Left: from previous years sampled, right: year analyzed. Top: fish market samples. Bottom: on board samples. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS).

Table 34. Number of anchovy individuals measured in the different fisheries along the zones sampled in each season.

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Artisanal fisheries	2021	North	0	3	0	1	2
Artisanal fisheries	2021	Center	105	0	0	0	3
Artisanal fisheries	2022	Center	0	13	0	0	1
Artisanal fisheries	2023	North	0	0	0	30	1
Artisanal fisheries	2023	Center	39	0	0	0	1
Artisanal fisheries	2025	North	140	0	0	0	2
Bottom trawl	2021	North	3	52	5	0	8
Bottom trawl	2021	Center	56	6	30	47	4
Bottom trawl	2021	South	72	143	192	297	19
Bottom trawl	2022	North	3	40	91	0	4
Bottom trawl	2022	Center	0	13	0	0	1
Bottom trawl	2022	South	8	259	155	180	17
Bottom trawl	2023	North	0	2	1	0	2
Bottom trawl	2023	Center	0	31	0	0	1
Bottom trawl	2023	South	60	277	109	1	17
Bottom trawl	2024	North	0	5	3	0	3
Bottom trawl	2024	Center	0	20	40	0	3
Bottom trawl	2024	South	174	130	140	19	20
Bottom trawl	2025	North	0	0	4	0	2
Bottom trawl	2025	Center	0	35	0	0	1
Bottom trawl	2025	South	75	302	43	101	21
Purse seine (fish market)	2021	North	1307	1100	1416	565	19
Purse seine (fish market)	2021	Center	778	1037	1083	968	18
Purse seine (fish market)	2022	North	576	1637	867	752	16
Purse seine (fish market)	2022	Center	710	1337	1135	399	16
Purse seine (fish market)	2023	North	986	551	697	387	12
Purse seine (fish market)	2023	Center	907	1327	384	269	13
Purse seine (fish market)	2024	North	396	579	343	240	8
Purse seine (fish market)	2024	Center	707	801	649	325	13
Purse seine (fish market)	2025	North	254	593	585	456	9
Purse seine (fish market)	2025	Center	0	343	624	467	7
Purse seine (on-board sampling)	2022	North	1600	153	939	573	15
Purse seine (on-board sampling)	2022	Center	430	383	471	834	9
Purse seine (on-board sampling)	2023	North	967	185	887	525	13
Purse seine (on-board sampling)	2023	Center	254	193	0	0	2
Purse seine (on-board sampling)	2023	South	0	0	221	398	3
Purse seine (on-board sampling)	2024	North	515	208	510	1033	19
Purse seine (on-board sampling)	2024	Center	145	778	342	0	11
Purse seine (on-board sampling)	2025	North	1405	484	726	0	21
Purse seine (on-board sampling)	2025	Center	0	50	49	0	2
Purse seine (on-board sampling)	2025	South	305	31	4	0	3

SECTION 4
Small-scale fisheries

Fishery monitoring of SSF in Catalonia



Since 2018, ICATMAR's small-scale fisheries monitoring programme has combined onboard sampling and biological sampling of fisheries and species managed under co-management plans in Catalonia. These include:

- The sandeel fishery, targeting Mediterranean sandeel (*Gymnammodytes cicerelus*), smooth sandeel (*Gymnammodytes semisquamatus*), and transparent goby (*Aphia minuta*). Monitoring of this fishery has been conducted since 2014.
- The common octopus fishery, monitoring common octopus (*Octopus vulgaris*) caught with pots and traps under the central and southern co-management plans. This monitoring programme started in 2018.
- The common cuttlefish fishery, focusing on common cuttlefish (*Sepia officinalis*) captured with traps and trammel nets in the Bays of Pals and Roses. Monitoring of this fishery began in 2025.
- The blue crab fishery, monitoring catches of blue crab (*Callinectes sapidus*) in the Ebre Delta. This monitoring programme has been in place since 2019.
- The glass eel fishery, targeting glass eel (*Anguilla anguilla*) in the main fishing areas of Catalonia. Monitoring of this fishery started in 2025.

Through these sampling programmes, biological and fishery-dependent data are collected to support the assessment, monitoring, and adaptive co-management of these small-scale fisheries in Catalonia.

Table 32. Number of on-board samplings of small-scale fisheries monitored (sandeel and common octopus fisheries). In this table samplings of blue crab were not included.

Fishery	Type	Year	Zone	Winter	Spring	Summer	Autumn
				Number of samplings			
Artisanal fisheries	Sandeel seiner	2021	North	4	6	7	2
Artisanal fisheries	Sandeel seiner	2021	Center	8	0	0	0
Artisanal fisheries	Sandeel seiner	2022	North	5	6	10	7
Artisanal fisheries	Sandeel seiner	2022	Center	0	4	0	0
Artisanal fisheries	Sandeel seiner	2023	North	6	7	9	8
Artisanal fisheries	Sandeel seiner	2023	Center	1	0	0	0
Artisanal fisheries	Sandeel seiner	2024	North	4	7	2	0
Artisanal fisheries	Sandeel seiner	2025	North	3	7	1	1
Artisanal fisheries	Pots	2021	Center	9	11	6	18
Artisanal fisheries	Pots	2021	South	5	6	7	4
Artisanal fisheries	Pots	2022	Center	14	8	8	19
Artisanal fisheries	Pots	2022	South	4	1	6	11
Artisanal fisheries	Pots	2023	Center	17	8	2	15
Artisanal fisheries	Pots	2023	South	3	6	4	7
Artisanal fisheries	Pots	2024	Center	20	8	2	19
Artisanal fisheries	Pots	2024	South	2	3	1	5
Artisanal fisheries	Pots	2025	Center	17	3	1	7
Artisanal fisheries	Pots	2025	South	0	1	2	1
Artisanal fisheries	Traps	2021	Center	7	6	12	11
Artisanal fisheries	Traps	2022	Center	9	11	12	15
Artisanal fisheries	Traps	2022	South	2	6	0	0
Artisanal fisheries	Traps	2023	Center	14	13	2	8
Artisanal fisheries	Traps	2023	South	6	6	0	0
Artisanal fisheries	Traps	2024	Center	16	7	4	15
Artisanal fisheries	Traps	2024	South	7	3	0	0
Artisanal fisheries	Traps	2025	North	0	2	0	0
Artisanal fisheries	Traps	2025	Center	23	12	4	5
Artisanal fisheries	Traps	2025	South	5	3	0	0
Artisanal fisheries	Trammel nets	2025	North	4	5	0	2
Total number of samplings per season				**215**	**166**	**102**	**180**
Total number of samplings in the studied period							**663**

Sandeel fishery in Catalonia

In Catalonia, the main target species of the boat seines "sonsera" are *Gymnammodytes cicerelus*, *Gymnammodytes semisquamatus*, and *Aphia minuta*. The two species of the genus *Gymnammodytes* are coastal species found on the continental shelf on shallow waters, on sand, shells and fine gravel bottoms, inhabiting burrows dug on sandy substrates and living in large groups.

The sandeel fishery is regulated by quotas and fishing effort limitations (number of vessels and fishing days per vessel). Fishing has a regulated closure during the spawning season, from December 15th to March 1st. On the other hand, the transparent goby is only allowed to be fished during the closed fishing period for the sandeels.

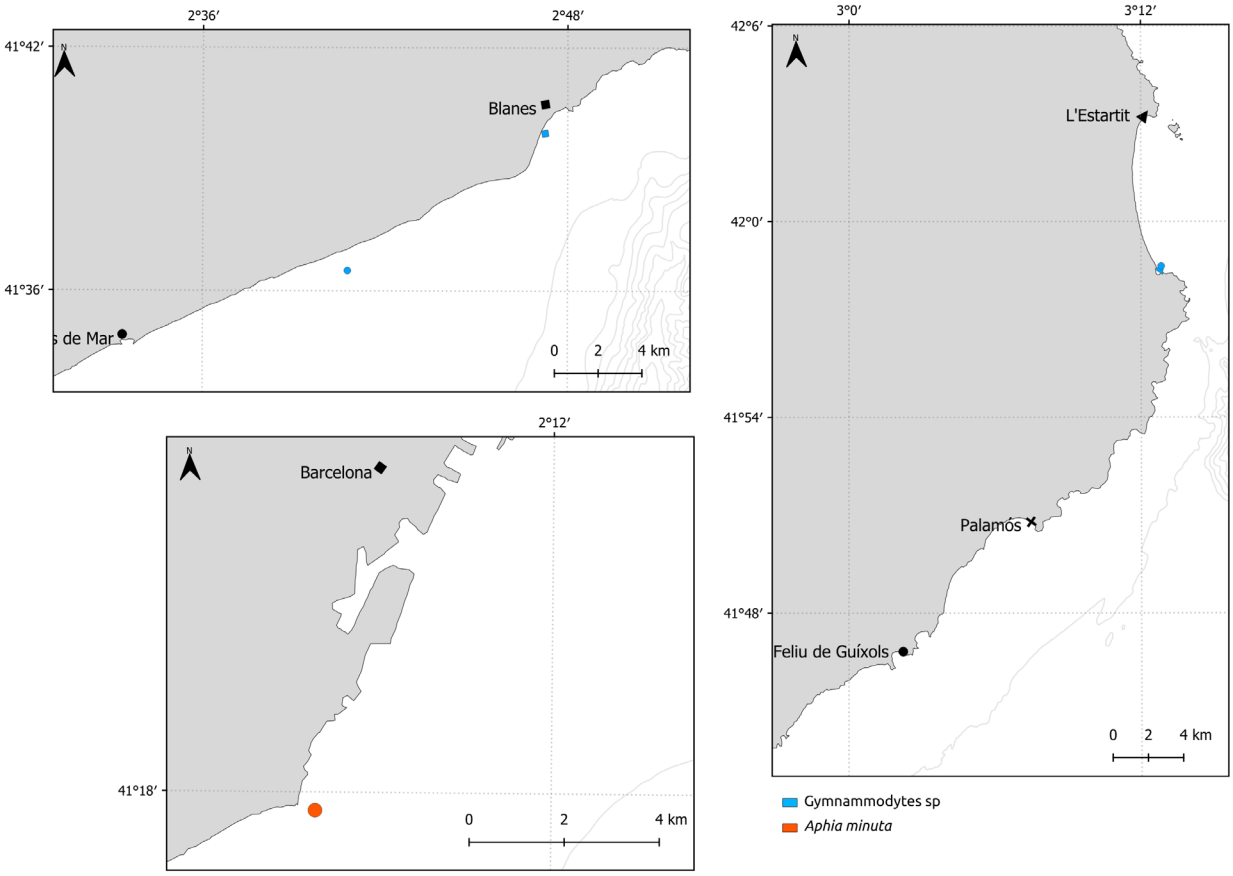


Figure 146. Sandeel samplings in the year analyzed.

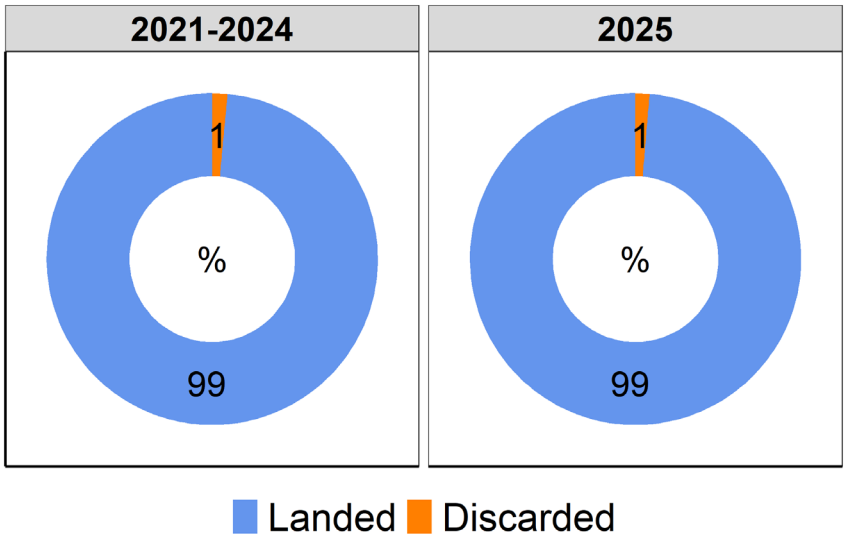


Figure 147. Sandeel fishery catch composition. Percentage by weight of landed and discarded catch.

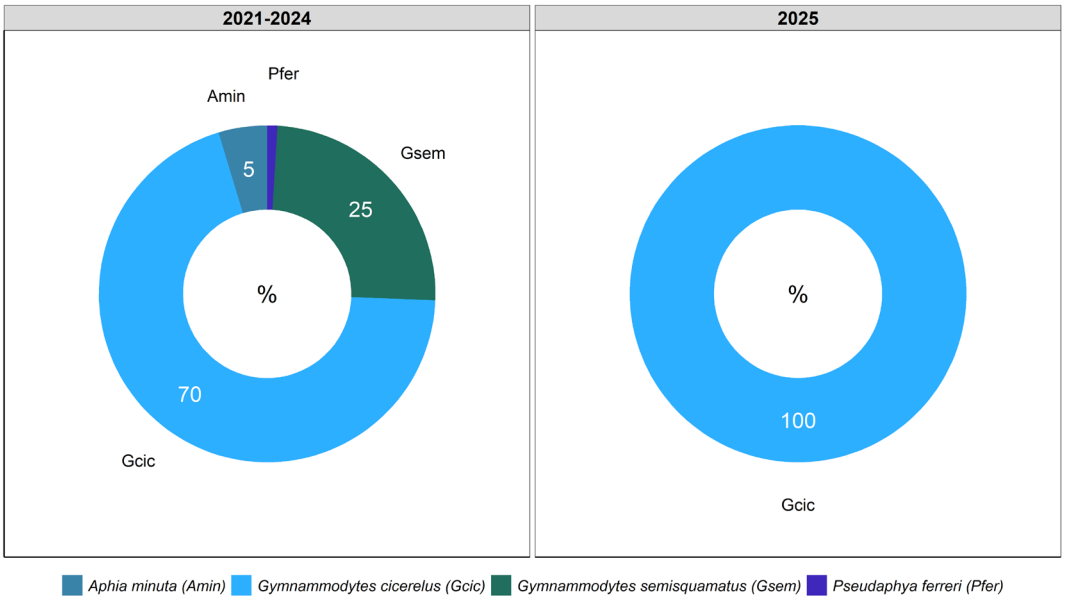


Figure 148. Sandeel target species composition. Percentage by weight of each target species.

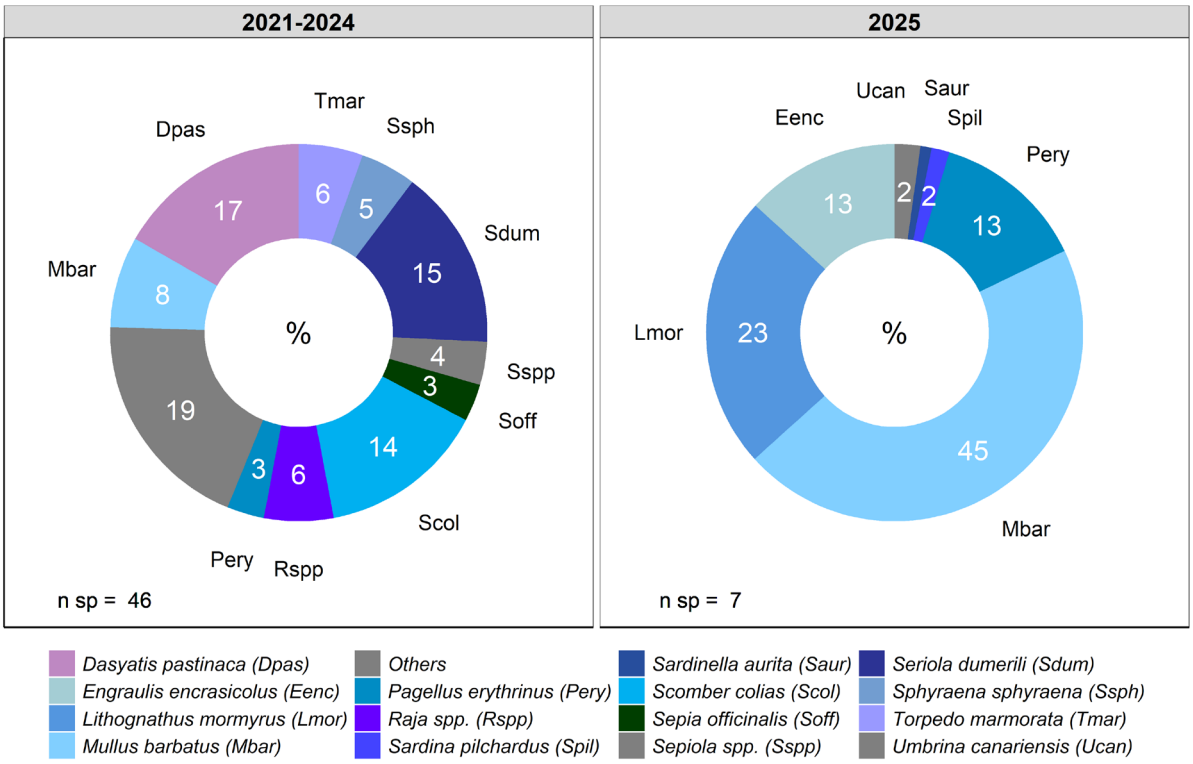


Figure 149. Sandeel discarded species composition. Percentage by weight of each discarded species.

The total sandeel catch in Catalonia in 2025 was 24 t, all of it caught by boat seines "sonsera" within the co-management plan (ICATMAR, 26-02). Total sandeel catch during 2025 decreased compared to 2024 because, due to the scarcity of the resource, the quota established by the co-management committee was not reached. The co-management plan for sandeels states that if 50% of the quota established by the committee is not captured, the fishery will be closed as a precautionary measure to protect the species.

A total of 12 sandeel fishery samplings were carried out in 2025 (Table 35 and Figure 146). Catch composition shows that 99% of the catch were target species and 1% were discards (Figure 147). The most important target species of the fishery was Mediterranean sandeel (70% in the period 2021-2024 and 100% in 2025), with transparent goby (*Aphia minuta*) accounting for 5% in the period 2021-2024 and less than 1% in 2025 (Figure 148). The most abundant species in sandeel discards was *Seriola dumerilii* for the period 2021-2024 and *Mullus barbatus* in 2025 (Figure 149).

Mediterranean sandeel (*Gymnammodytes cicerelus*) ZGC

According to length-weight relationship parameters for both sexes combined Mediterranean sandeel displayed a slightly positive allometric growth (*b*>3) in 2025, while females separately showed an positive allometric growth (*b*>3) (Table 36). Also, when comparing length-weight relationships for both sexes combined and separately from 2021 to 2025, results show similar trends for all years sampled (Figure 150). According to length-weight relationship parameters for both sexes combined, *Gymnammodytes cicerelus* displayed an allometric growth (CL_{95} = 3.043 – 3.271; b = 3.15) in 2025 (Table 36).

Table 36. Mediterranean sandeel length-weight relationship in the year analyzed.

2025	L-W (a)	L-W (b)	L-W (r^2)	n	L_{50}
Combined	0.0019	3.1571	0.94	200	8.5
Females	0.0011	3.3653	0.93	15	

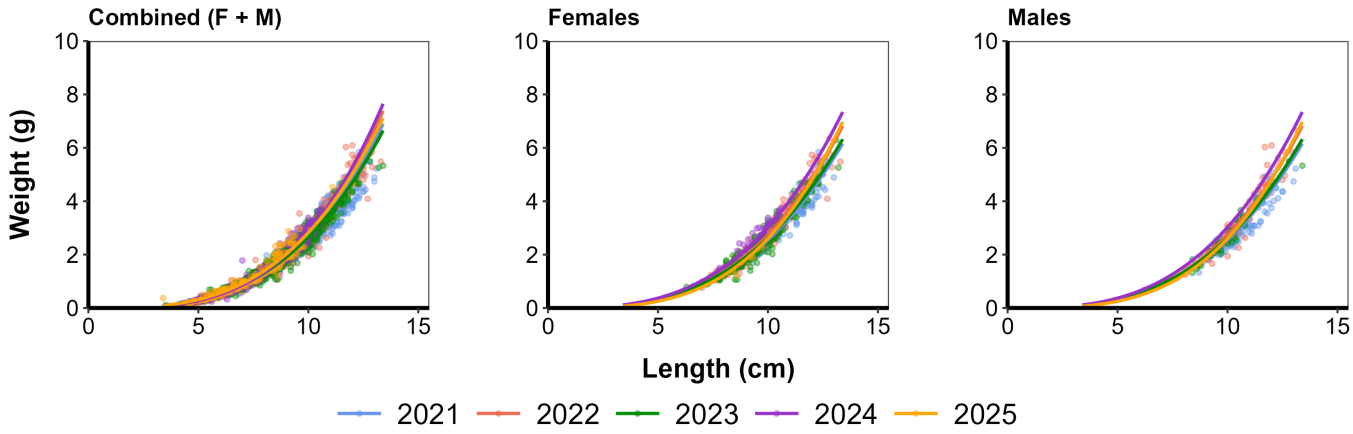


Figure 150. Mediterranean sandeel length-weight relationship for all years sampled.

The size at first maturity (L_{50}) for Mediterranean sandeel in 2025 was 8.5 cm of TL for both sexes combined (Figure 151). When comparing between years, the L_{50} in 2025 is within the range of the ones obtained in the previous five years sampled (8.5 to 10 cm of TL).

In 2025, a total of 200 Mediterranean sandeel individuals were analyzed to calculate the L_{50} (Table 37). Out of these, 196 individuals were classified as immature and 4 as mature.

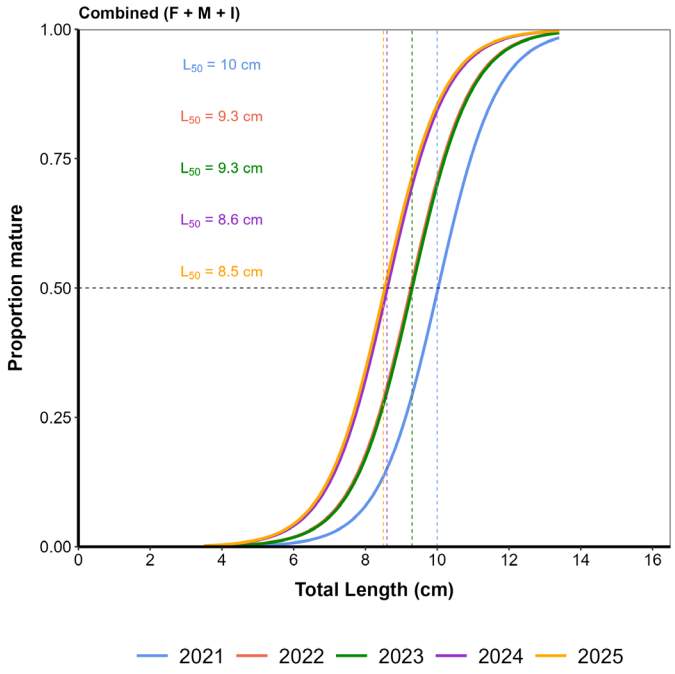


Figure 151. Mediterranean sandeel size at first maturity (L_{50}) for all years sampled.

Table 37. Number of mature and immature individuals of Mediterranean sandeel included in the biological analyses in each month.

Month	2021		2022		2023		2024		2025	
	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature	Immature	Mature
January	0	50	0	50	0	0	0	0	0	0
February	0	50	0	0	0	76	0	0	0	0
March	20	29	56	0	99	1	50	1	0	0
April	50	51	15	0	98	2	80	0	80	0
May	21	0	18	1	83	0	60	0	30	0
June	4	0	0	0	100	0	30	30	56	4
July	48	0	50	0	76	0	19	11	30	0
August	39	0	81	18	78	19	30	0	0	0
September	55	7	71	29	56	0	0	0	0	0
October	7	3	37	52	0	53	0	0	0	0
November	0	0	7	93	19	80	0	0	0	0
December	2	48	0	50	0	0	0	0	0	0
Total	246	238	335	293	609	231	269	42	196	4

The gonadal cycle of Mediterranean sandeel was analyzed monthly from 2021 to 2025 (Figure 152). The species showed a seasonal reproductive cycle with spawning females present from November to March, with a peak in January. In the period 2024-2025, spawning females were found in November, but no samples were obtained during December and January. In this period, the highest GSI values, both for females and males, were found from November 2023.

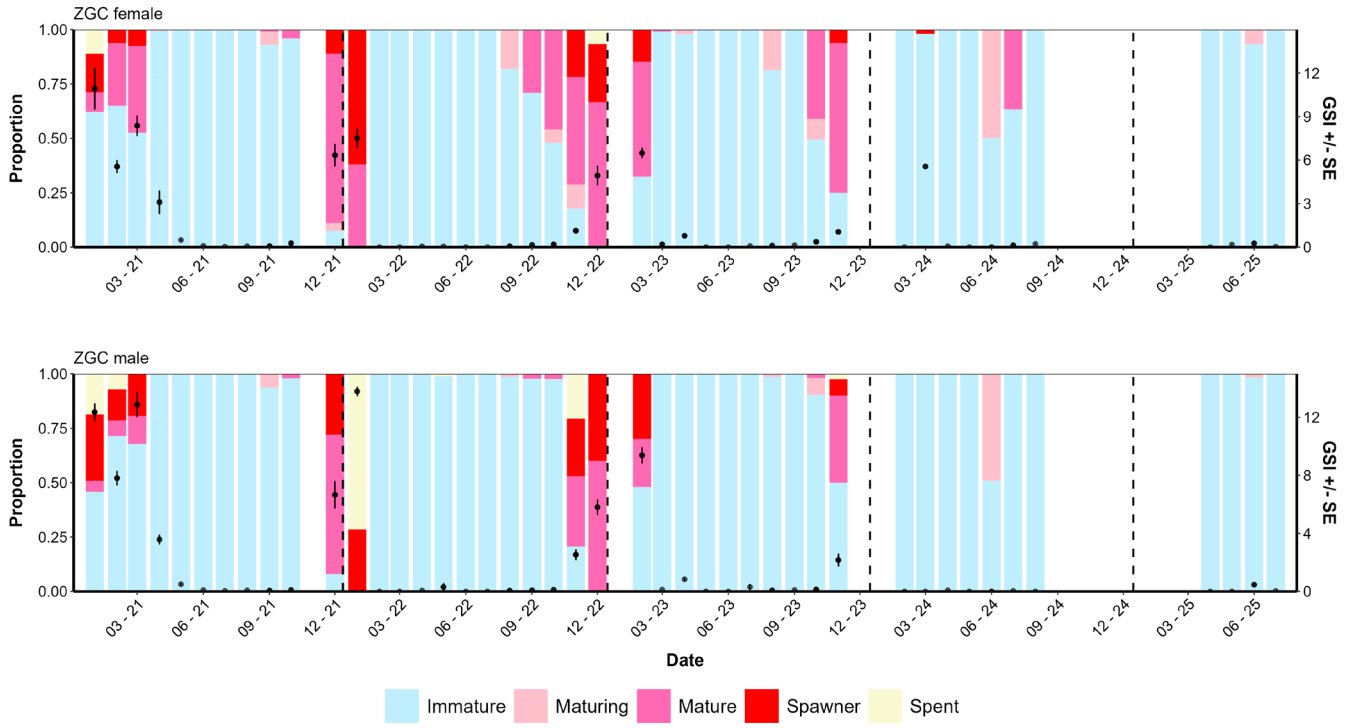


Figure 152. Mediterranean sandeel monthly gonadal cycle for females (top) and males (bottom). Gonadosomatic index (GSI +/- SE (Standard Error)) and proportion of different maturity stages.

The annual length-frequency distribution of Mediterranean sandeel from 2021 to 2025 ranged between 3.5 and 14 cm of TL (Figure 153). As opposed to previous years sampled, no individuals above 14 cm of TL were caught. As can be observed, distribution modes varied over the four years sampled.

Monthly size frequency distributions of Mediterranean sandeel in 2025 showed an evolution of sizes throughout the year (Annex 24). The largest individuals were caught in August and the smallest ones in March.

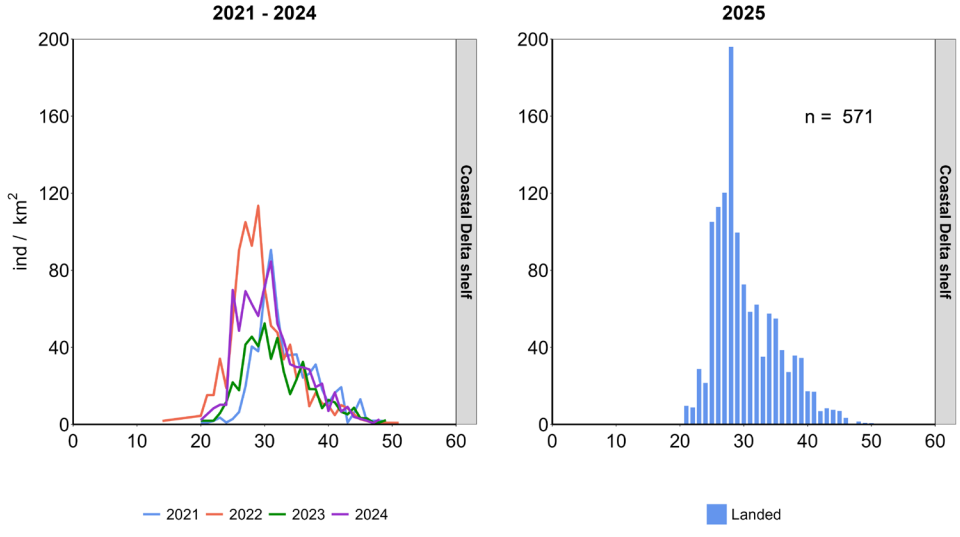


Figure 153. Annual length-frequency distribution of Mediterranean sandeel. Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values of the previous four years sampled and the year analyzed.

Table 38 Number of Mediterranean sandeel individuals measured along the zones sampled in each season.

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N fishing trips
			Number individuals sampled				
Artisanal fisheries	2021	North	723	1935	1335	301	17
Artisanal fisheries	2022	North	749	1884	1418	999	21
Artisanal fisheries	2023	North	809	1909	1852	1200	20
Artisanal fisheries	2024	North	326	2371	346	0	10
Artisanal fisheries	2025	North	0	1591	268	0	6

All parameters analyzed in this report for Mediterranean sandeel were calculated using individuals obtained by artisanal fisheries sampling (Table 38).

Transparent goby (*Aphia minuta*) FIM

According to length-weight relationship parameters for both sexes combined, trans-parent goby displayed a positive allometric growth (*b*>3) in 2025 (Table 39). Also, when comparing length-weight relationships from 2021 to 2025, results show similar trends for all years sampled (Figure 154). According to length-weight relationship parameters for both sexes combined, *Aphia minuta* displayed a positive allometric growth (CL_{95}= 3.170–3.590; b = 3.38) in 2025 (Table 39).

Table 39. Transparent goby length-weight relationship in the year analyzed.

2025	L-W (a)	L-W (b)	L-W (r^2)	n
Combined	0.003	3.3803	0.9	110

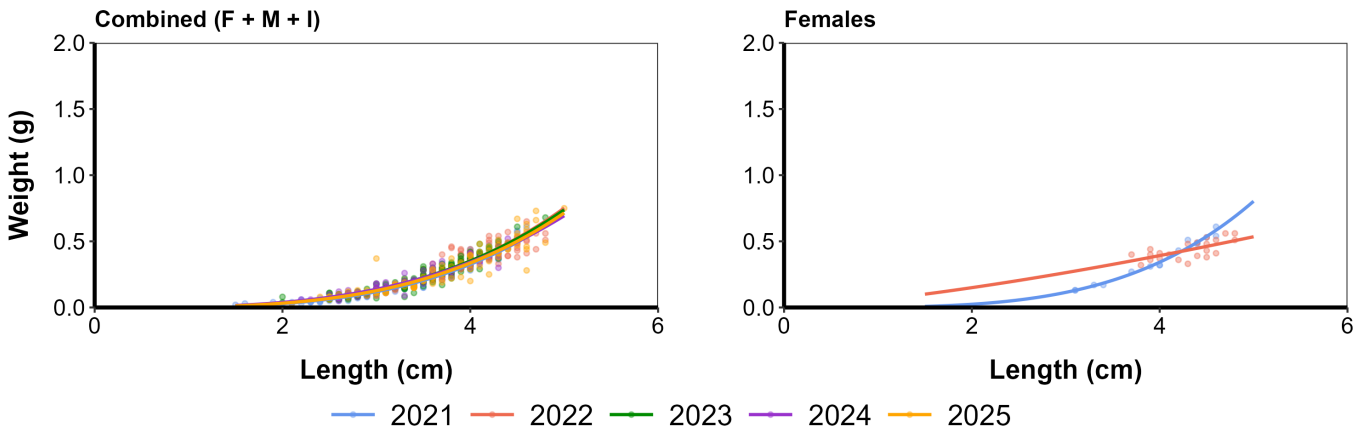


Figure 154. Transparent goby length-weight relationship for all years sampled.

The annual length-frequency distribution of transparent goby in 2025 ranged between 2 and 4.5 cm of TL, but most individuals samples ranged between 2.5 and 4 cm of TL (Figure 155). From 2021 to 2025, sizes ranged between 1.5 and 4.5 of TL, with similar distribution trends across all years sampled.

For monthly length-frequency distribution of transparent goby in 2025 see (Annex 24). This species can only be fished during the sandeel closure period, so the months not shown in the graph were not sampled.

Table 40. Number of transparent goby individuals measured along the zones sampled in each season.

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	Fishing trips
			Number individuals sampled				
Artisanal fisheries	2021	Center	777	0	0	0	3
Artisanal fisheries	2022	North	117	0	0	0	1
Artisanal fisheries	2022	Center	0	86	0	0	1
Artisanal fisheries	2023	North	413	0	0	0	2
Artisanal fisheries	2023	Center	184	0	0	0	1
Artisanal fisheries	2024	North	307	0	0	0	2
Artisanal fisheries	2025	North	423	0	0	0	3

All parameters analyzed in this report for transparent goby were calculated using individuals obtained by artisanal fisheries sampling (Table 39).

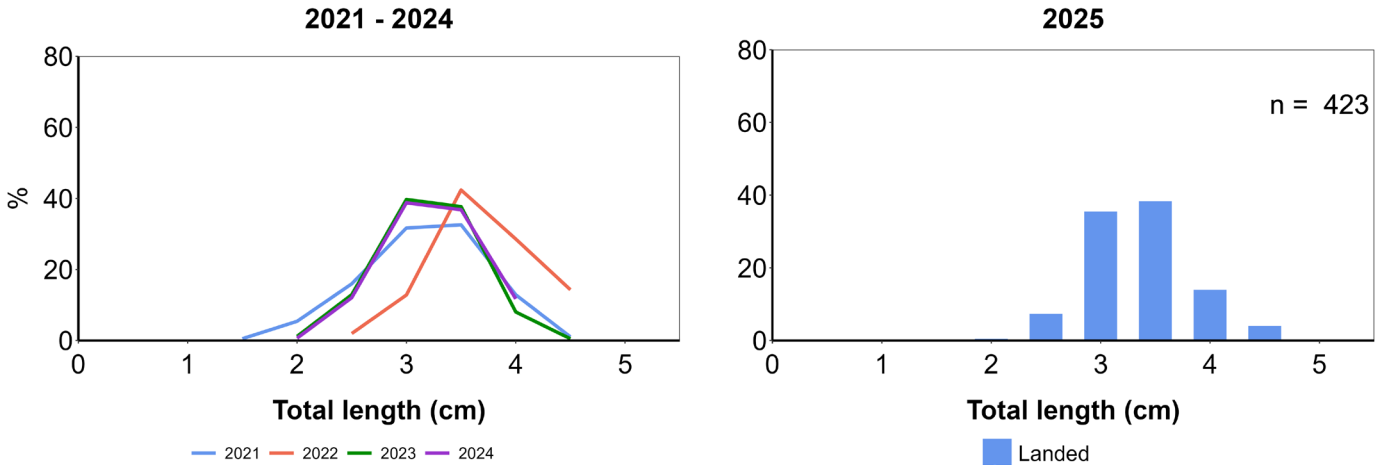


Figure 155. Annual length-frequency distribution of transparent goby. Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals.

Common octopus fishery in Catalonia

A total of 81 artisanal fisheries samplings were carried out for the common octopus fishery in 2025 (pots and traps), within the co-management areas of Central Catalonia and Ebre Delta (Figure 156). Individuals below 1 kg weight were measured on-board but not sold in auction, as explained by the current regulation (ARP/222/2020).

The total common octopus catch in Catalonia in 2025 was 328,39 t, approximately 61.7% of which were caught by small-scale fisheries, 27,3% by bottom trawling and 0.07% by shellfishers (ICATMAR, 26-02).

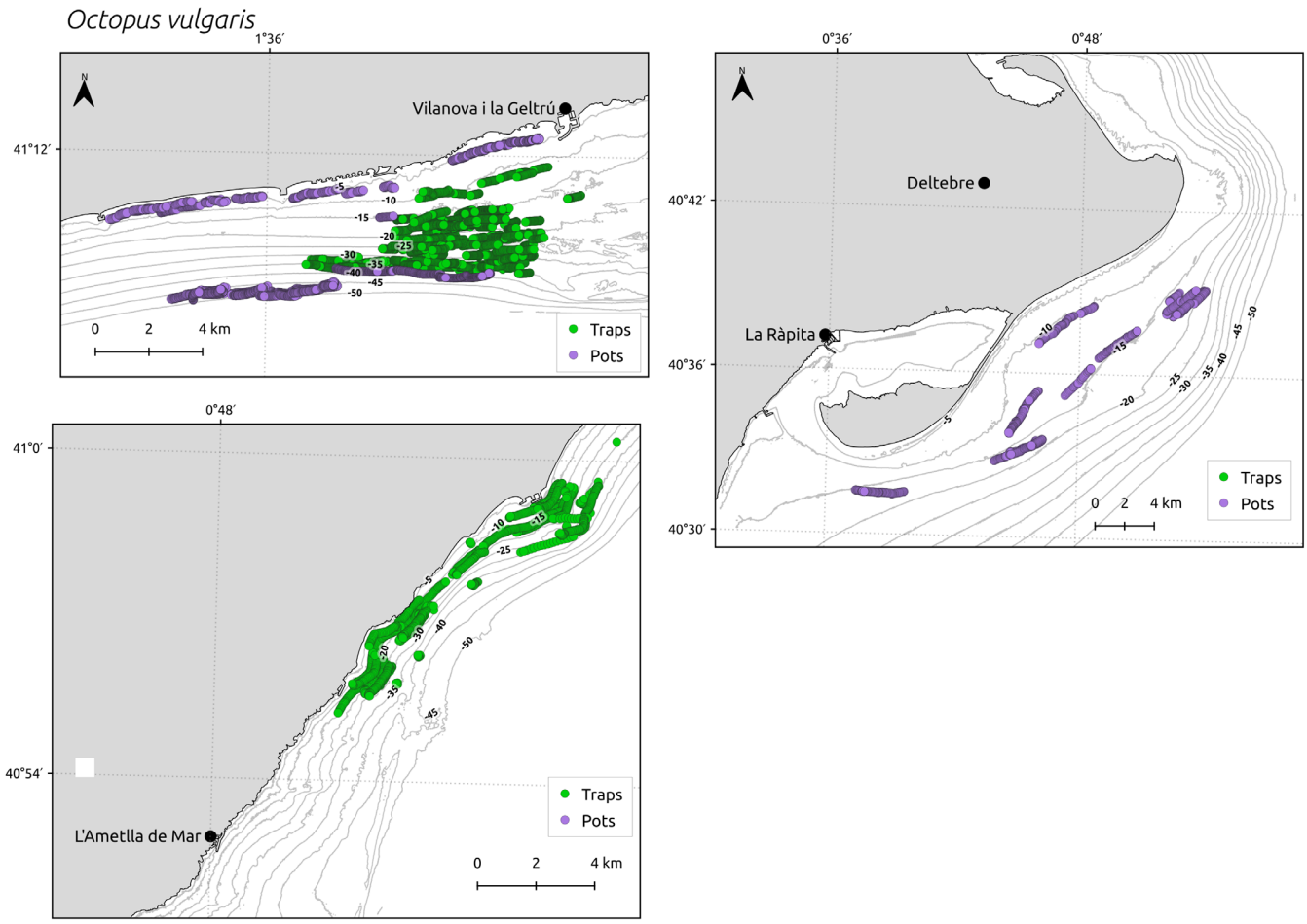


Figure 156. Common octopus sampling in the year analyzed. Central Catalonia (top-left), Ebre Delta (top-right and bottom-felt).

Common octopus (*Octopus vulgaris*) OCC

Individuals with missing arms were excluded from the calculations of length-weight parameters for the common octopus in 2025.

According to length-weight relationship parameters for both sexes combined and separately, the common octopus showed a negative allometric growth (CL_{95} = 1.65 – 1.85; b < 3) in 2025 (Table 41). For the period 2021-2024, results also show negative allometric growth in all cases for length-weight relationships calculated both for combined and separated sexes (Figure 157).

Table 41. Common octopus length-weight relationship in the year analyzed. Only individuals with all arms were included in the analysis.

Length – total weight relationship				
2025	a	b	r^2	n
Combined	13.6486	1.7518	0.66	643
Females	23.1703	1.5516	0.64	312
Males	6.7636	2.0149	0.7	331

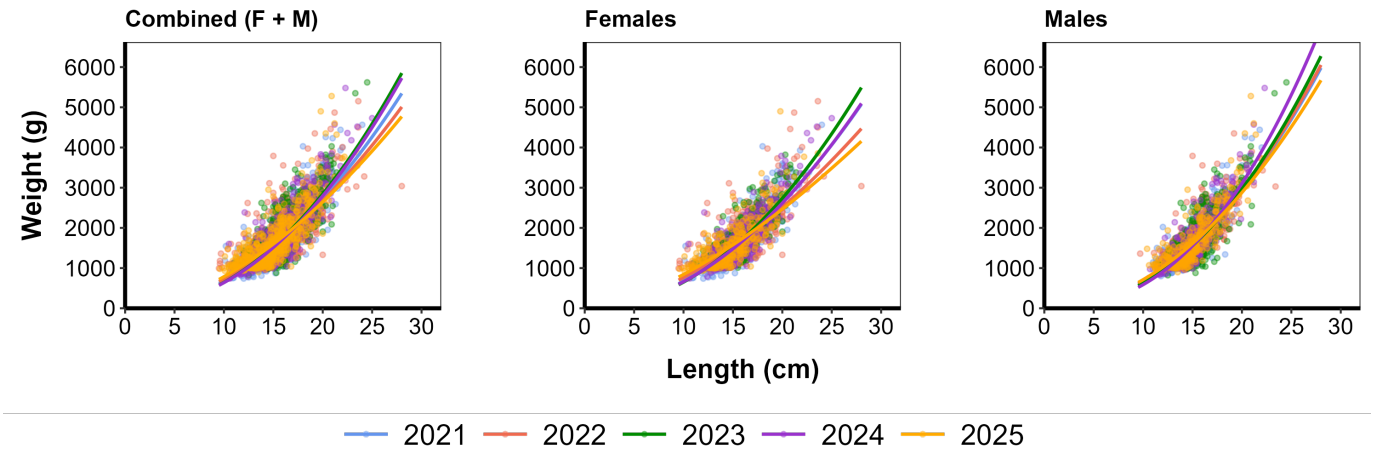


Figure 157. Common octopus length-weight relationship. Only individuals with all arms were included in the analysis.

Table 42. Number of common octopus individuals measured in the different fisheries along the zones sampled in each season.

Fishery	Fishing gear	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
				Number individuals sampled				
Artisanal Fisheries	Pots	2021	Center	103	85	91	155	43
Artisanal Fisheries	Pots	2021	South	96	77	207	104	21
Artisanal Fisheries	Traps	2021	Center	81	169	159	64	36
Artisanal Fisheries	Pots	2022	Center	74	102	112	95	46
Artisanal Fisheries	Pots	2022	South	115	19	83	330	22
Artisanal Fisheries	Traps	2022	Center	112	202	218	57	45
Artisanal Fisheries	Traps	2022	South	5	61	0	0	8
Artisanal Fisheries	Pots	2023	Center	120	200	47	238	40
Artisanal Fisheries	Pots	2023	South	70	45	75	139	17
Artisanal Fisheries	Traps	2023	Center	140	308	51	93	35
Artisanal Fisheries	Traps	2023	South	28	45	0	0	9
Artisanal Fisheries	Pots	2024	Center	202	274	68	102	48
Artisanal Fisheries	Pots	2024	South	24	39	51	76	11
Artisanal Fisheries	Traps	2024	Center	89	134	44	73	40
Artisanal Fisheries	Traps	2024	South	56	127	0	0	10
Artisanal Fisheries	Pots	2025	Center	105	127	24	77	26
Artisanal Fisheries	Pots	2025	South	0	11	56	80	4
Artisanal Fisheries	Traps	2025	Center	145	58	36	40	43
Artisanal Fisheries	Traps	2025	South	71	83	0	0	8

All parameters analyzed in this report for the common octopus species were calculated using only individuals obtained by artisanal fisheries sampling: traps and pots (Table 42). Most of the variations between the Ebre Delta and Central Catalonia areas were due to differences in sampling effort, being greater in the latter.

The annual weight-frequency distribution for the common octopus from 2021 to 2025 shows that the highest weight frequencies were below the MCRW. Especially when they were caught using traps, although most of these individuals are released back to the sea alive (Figure 158). The temporal distributions show, in the case of traps, an increase in abundances near the MCRW and, in the case of pots, a similar trend over the years. In 2025 traps showed the mode around 800 g, below the MRCW. While in the case of pots, a similar trend is observed to the past period, with the mode just at the MCRW.

The gonadal cycle of the common octopus was analyzed monthly from 2021 to 2025 (Figure 159). Both sexes exhibited a spawning period during late spring and summer, with the highest occurrence of mature and spawning individuals from May to September. However, notable sexual differences were observed. Females displayed a strongly seasonal reproductive cycle, with spawning concentrated in late spring and summer. In contrast, males showed a continuous reproductive cycle, with mature and spawning individuals present throughout the year. The lower presence of spawning and spent females may be due to a faster senescence process after spawning compared to males, leading to earlier mortality.

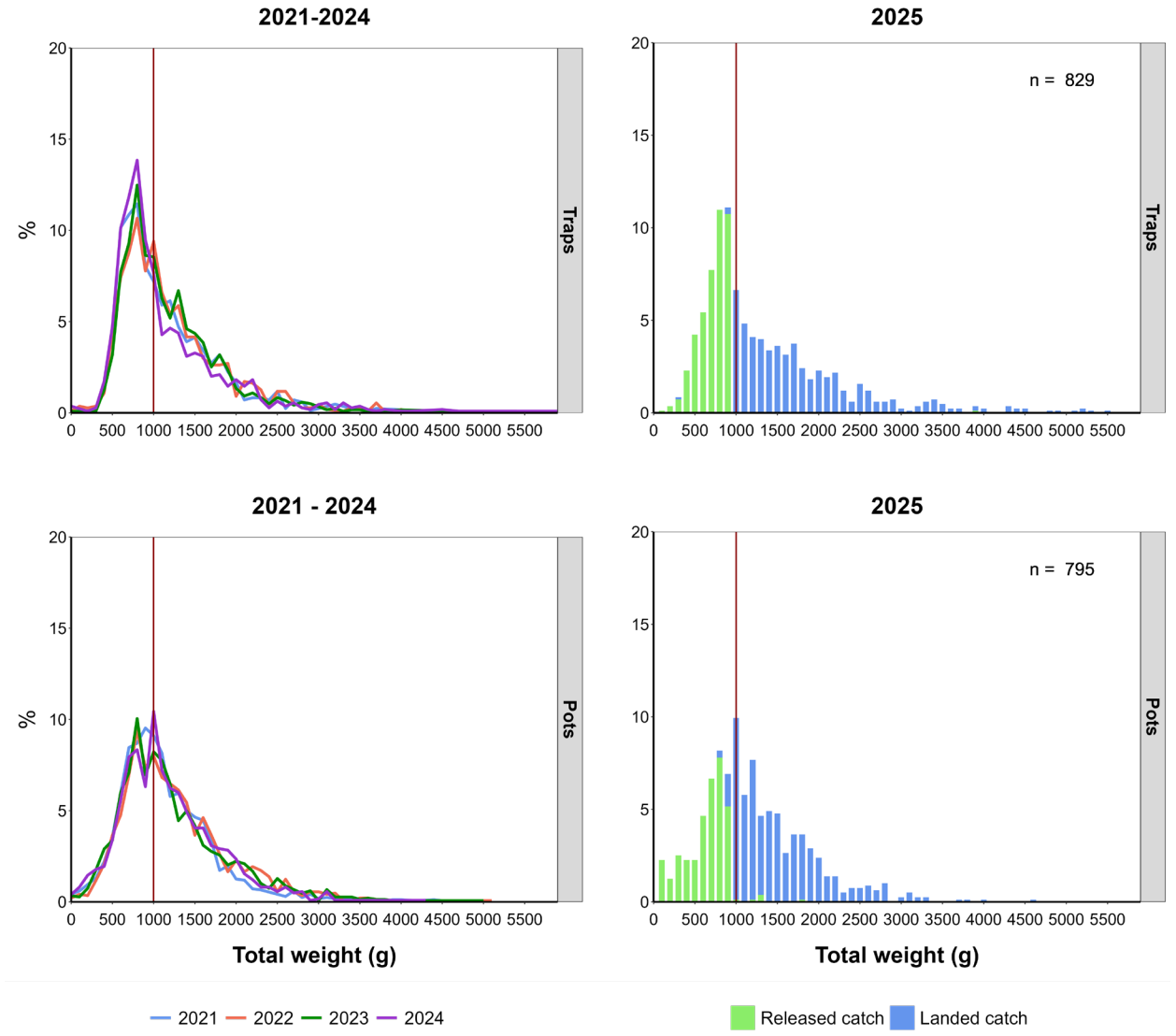


Figure 158. Annual weight-frequency distribution of common octopus at different fishing gear (Traps and Pots). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red line: Minimum Conservation Reference Weight (MCRW).

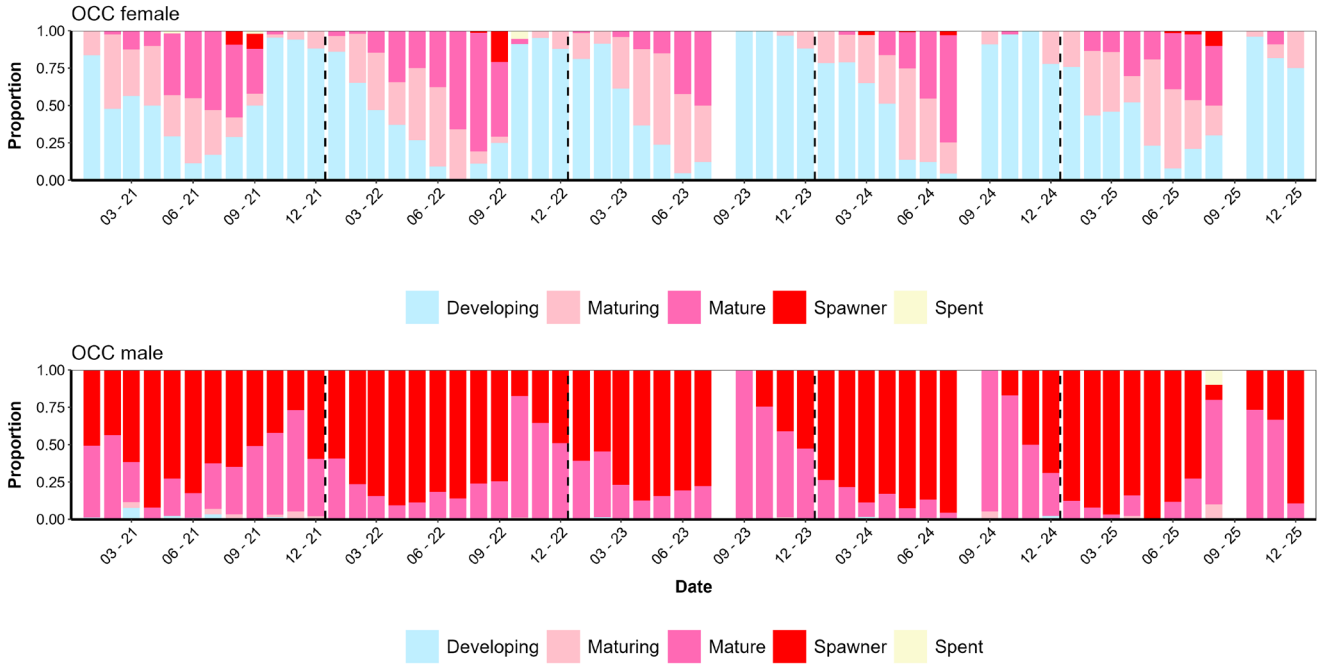


Figure 159. Common octopus monthly gonadal cycle for females and males.

Common octopus females can accumulate sperm from several males in their spermathecae for some time before fertilizing their eggs. In this way, they increase the genetic variability of their offspring. Thus, they can mate and store sperm while they are still developing and use it when they mature.

Figure 160 shows, as in Figure 159, that this species has a marked reproductive cycle. Although mating occurs all year-round, the period with the highest proportion of mated females with sperm stored in their spermathecae coincided with the reproductive period over the years.

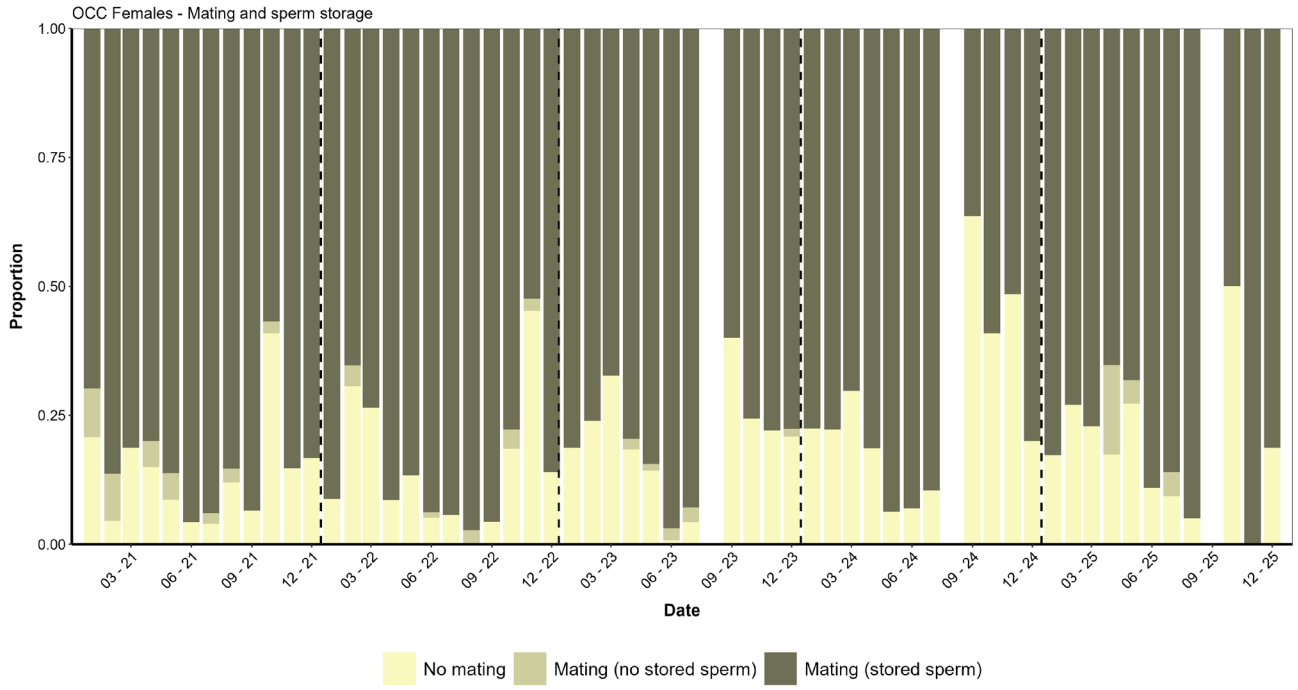


Figure 160. Common octopus monthly mating cycle for females.

Common octopus fishery in Central Catalonia

The annual weight-frequency distribution of common octopus in Central Catalonia in 2025 shows generally similar patterns between fishing gears, except for the smallest size classes. Individuals under 500 g were more abundant in catches from pots, while those between 500–1000 g were more frequent in catches from traps (Figure 161). Moreover, a lower abundance of individuals below 2500 g was observed in traps compared to pots.

A normal distribution was evident, especially in the case of pots, with the highest frequencies concentrated around 1000 g — close to the Minimum Conservation Reference Weight (MCRW). For traps, the mode was slightly lower, around 800-900 g. These differences suggest gear-specific selectivity patterns, particularly in the smaller size ranges.

For monthly weight-frequency distribution of Central Catalonia common octopus in 2025 see Annex 25.

The gonadal cycle of common octopus in Central Catalonia was analyzed monthly from 2021 to 2025 (Figure 162). Both sexes showed a spawning period during late spring and summer, with the highest presence of mature and spawning individuals from May to September. However, sexual differences were observed. The reproductive cycle of females showed a marked seasonality with the spawning period in late spring and summer. On the contrary, males showed a continuous reproductive cycle with presence of mature individuals throughout the year. Due to the closed season, there are gaps in the sampling that result in missing data for several important months of the reproductive cycle.

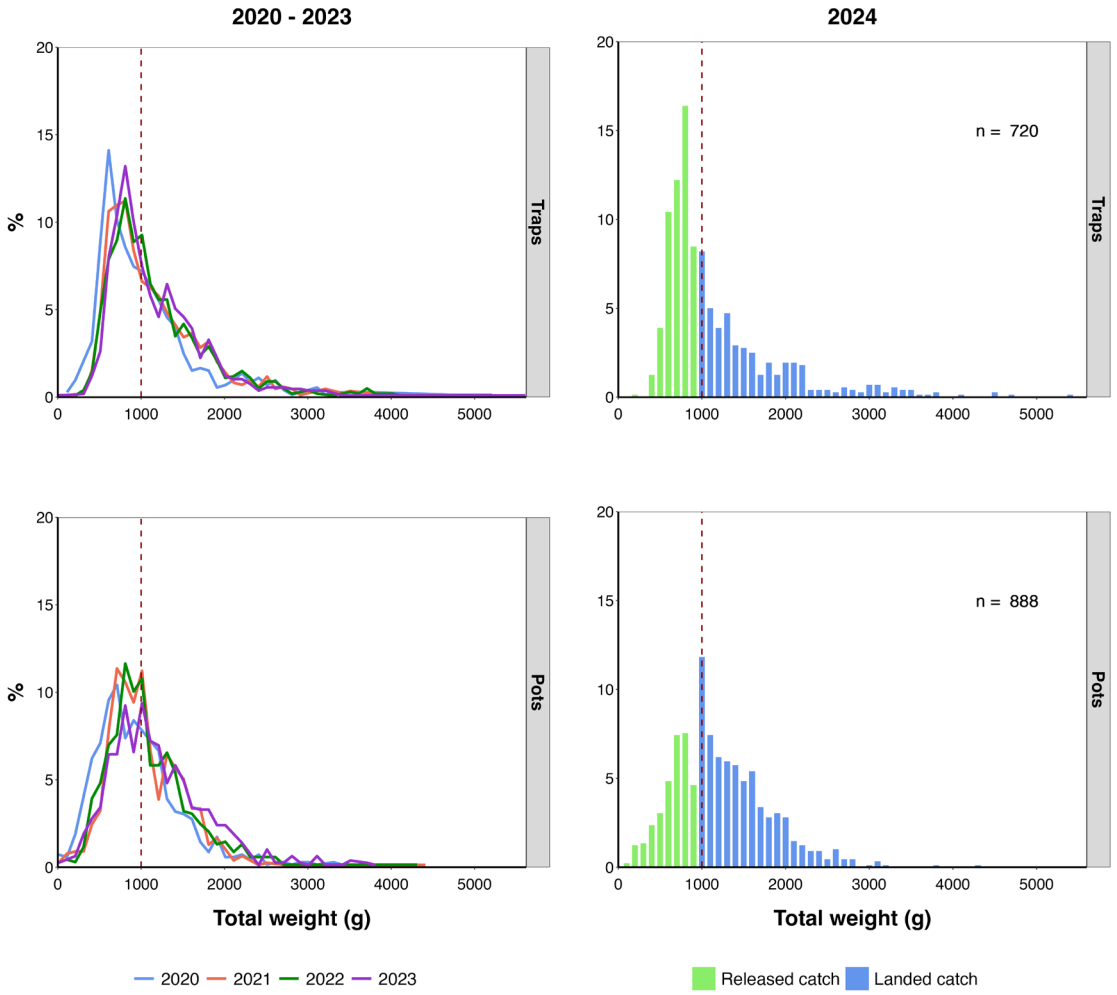


Figure 161. Annual weight-frequency distribution of common octopus at different fishing gear (Traps and Pots) in Central Catalonia for the years sampled. Red line: Minimum Conservation Reference Weight (MCRW).



Figure 162. Common octopus monthly gonadal cycle for females and males in Central Catalonia.

Common octopus fishery in Ebre Delta

The annual weight-frequency distribution for the common octopus in the Ebre Delta in 2025 follows a similar trend to those catches for the previous year. For traps the mode has moved below the Minimum Conservation Reference Weight (MCRW), just as was observed in 2024, while for the 2022-2023 period was closer to the MCRW (Figure 163). For both fishing gears in 2025 the highest abundances were recorded below the MCRW. Moreover, in the Ebre Delta area the mode for pots was also below the MCRW, unlike that observed for pots in Central Catalonia.

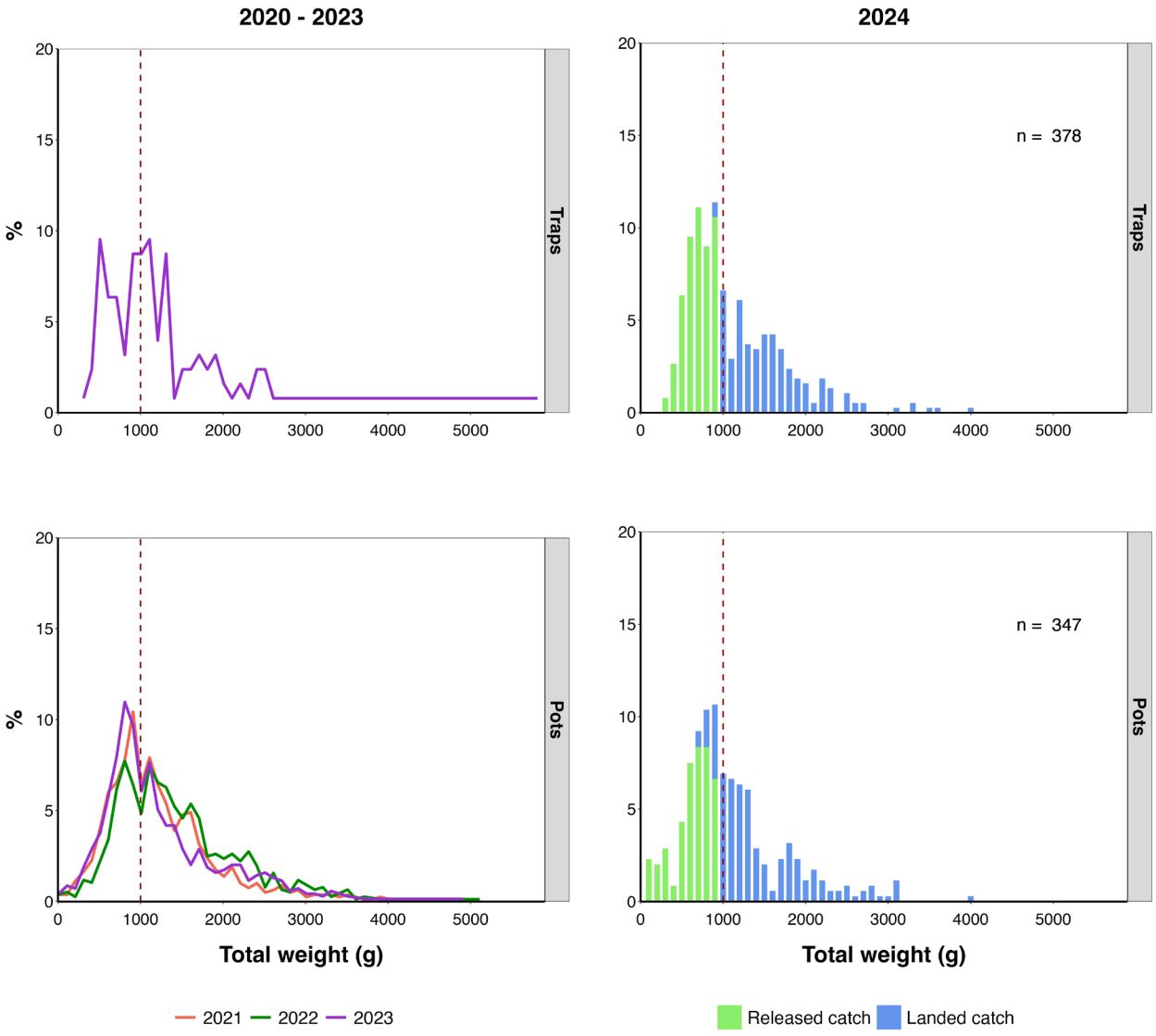


Figure 163. Annual weight-frequency distribution of common octopus at different fishing gear in South Catalonia in 2021 - 2024 (Pots) and 2022 - 2024 (Traps). Red line: Minimum Conservation Reference Weight (MCRW).

The gonadal cycle of common octopus in South Catalonia was analyzed monthly from 2021 to 2025 (Figure 164). Both sexes show a spawning period during late spring and summer, with the greatest presence of mature and spawner individuals from May to August. The cycle was not as marked as in Central Catalonia, probably due to the lower number of individuals sampled, but sexual differences between both sexes were also observed. The reproductive cycle of females showed a marked seasonality with the spawning period in late spring and summer, while males showed a continuous reproductive cycle with presence of mature individuals all year-round. It is worth mentioning that there are some significant months for the reproductive cycle in which data are missing due to gaps in sampling, either because of the closed season or for other reasons.

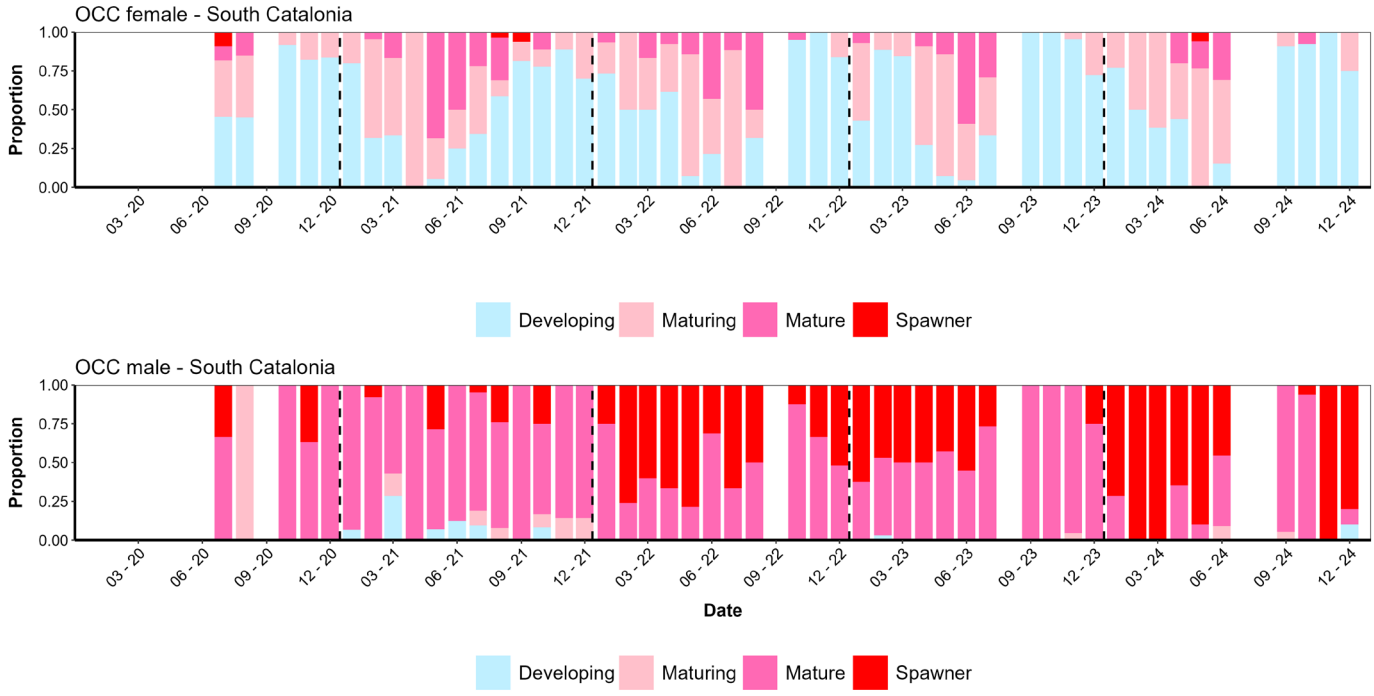


Figure 164. Common octopus monthly gonadal cycle for females and males in South Catalonia.

Common cuttlefish fishery in Catalonia

A total of 13 artisanal fisheries samplings were carried out for the common cuttlefish fishery in 2025 (trammel net and traps), within the co-management areas of Pals and Roses Bays (Table 45).

The total common cuttlefish catch in Catalonia in 2025 was 226,77 t, approximately 69,3% of which were caught by small-scale fisheries, 30,7% by bottom trawling (ICATMAR, 26-02).

Common cuttlefish (*Sepia officinalis*) CTC

According to length-weight relationship parameters for both sexes combined and separately (Figure 165), the common cuttlefish showed a negative allometric growth (CL_{95} = 2.52 – 2.61; b < 3) in 2025 (Table 43).

Table 43. Common cuttlefish length-weight relationship in the year analyzed.

Length – total weight relationship				
2025	a	b	r^2	n
Combined	13.6486	1.7518	0.66	643
Females	23.1703	1.5516	0.64	312
Males	6.7636	2.0149	0.7	331

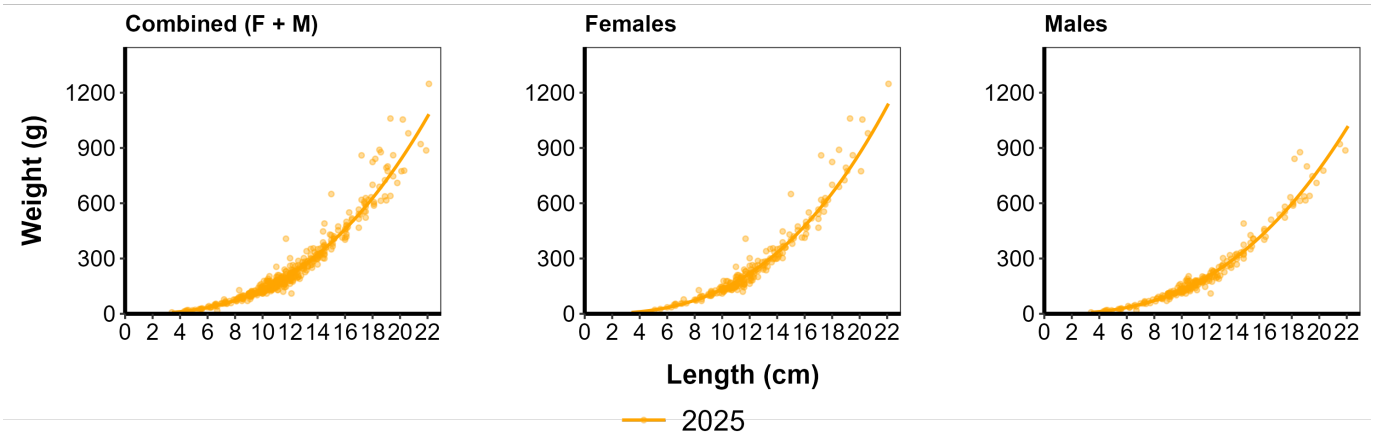


Figure 165. Common cuttlefish length-weight relationship.

Regarding the L_{50}, 50% of common cuttlefish, specimens attained sexual maturity at 8.7 cm of ML (Figure 166). Males showed an earlier maturation as their L_{50} was 8.4 cm of ML, which is lower than females (9.3 cm of ML).

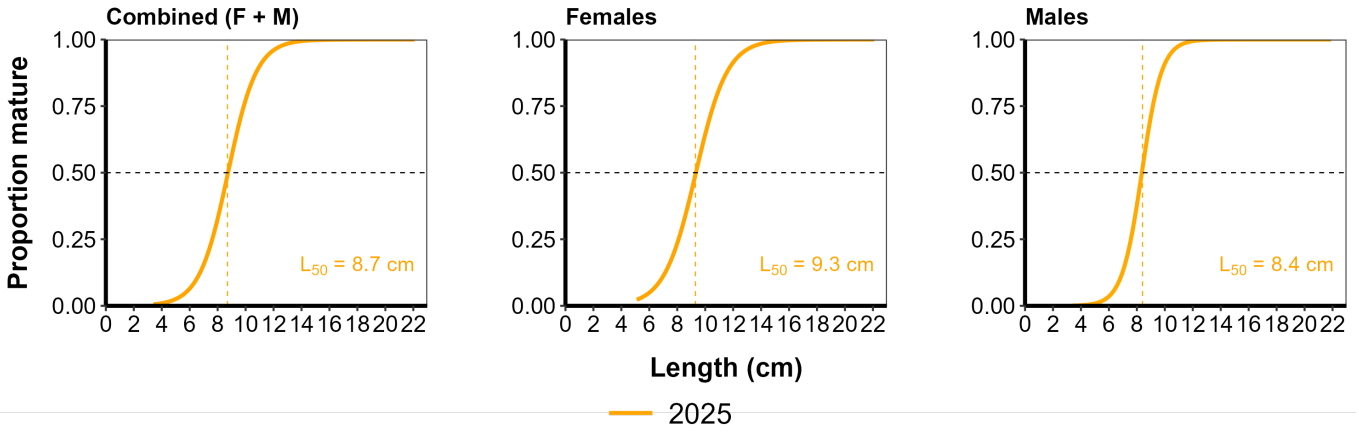


Figure 166. Common cuttlefish size at first maturity (L_{50}) for all years sampled.

In 2025, a total of 335 common cuttlefish individuals were analyzed to calculate the L_{50} (Table 44). Out of these, 72 individuals were classified as immature and 263 as mature. It should be noted that bottom trawling data was included as this fishing gear catch the immature fraction of the population.

Table 44. Number of mature and immature individuals of common cuttlefish included in the biological analyses in each month.

Month	2025	
	Immature	Mature
January	N/A	N/A
February	0	13
March	0	46
April	0	24
May	0	50
June	2	64
July	20	1
August	N/A	N/A
September	19	13
October	24	9
November	7	18
December	0	4
Total	72	263

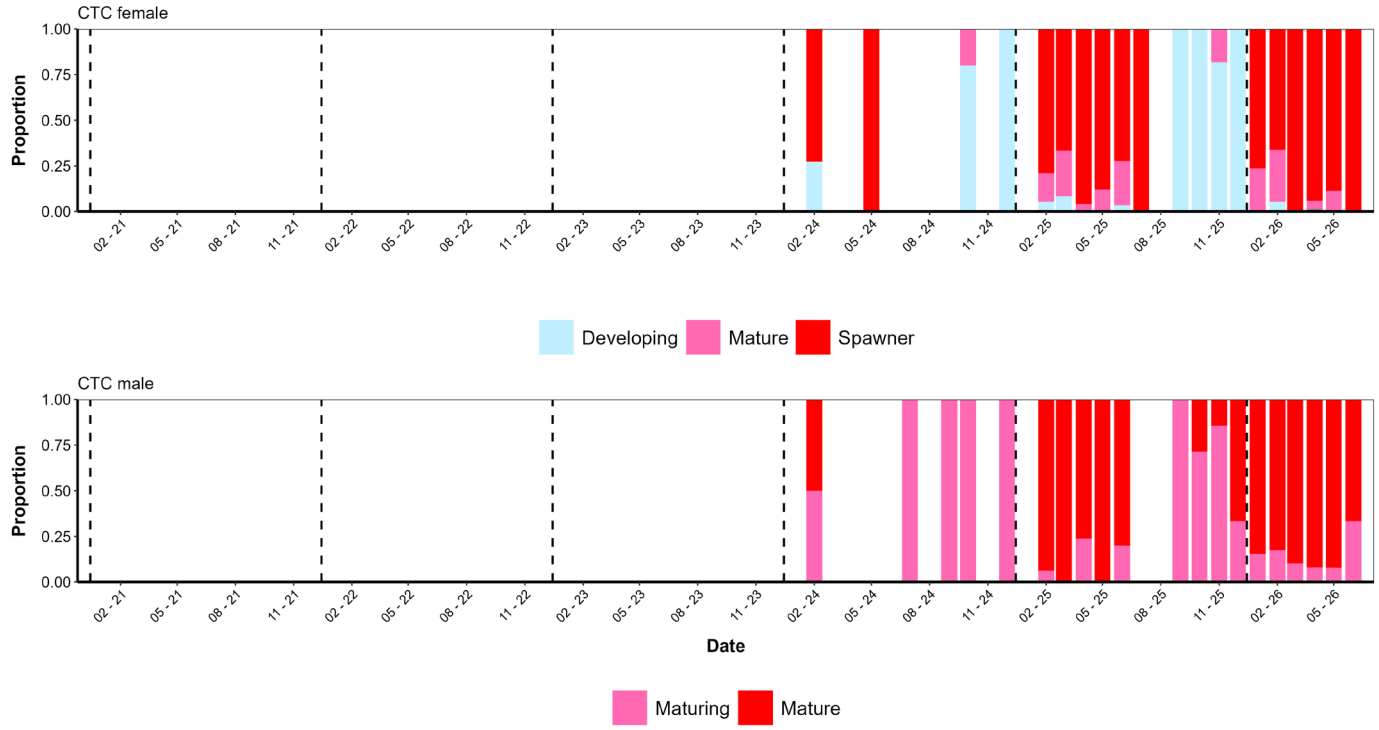


Figure 167. Common cuttlefish monthly gonadal cycle for females and males.

The gonadal cycle of the common cuttlefish was analyzed monthly from 2021 to 2025 (Figure 167). Both sexes exhibited a spawning period during spring and summer, with the highest occurrence of mature and spawning individuals from March to June. However, notable sexual differences were observed. Females displayed a strongly seasonal reproductive cycle, with spawning concentrated in spring and summer. In contrast, males showed a continuous reproductive cycle, with mature and spawning individuals present throughout the year. The lower presence of spawning and spent females may be due to a faster senescence process after spawning compared to males, leading to earlier mortality.

All parameters analyzed, excepting L_{50} and gonadal cycle, in this report for the common cuttlefish species were calculated using only individuals obtained by artisanal fisheries sampling: traps and trammel nets (Table 45).

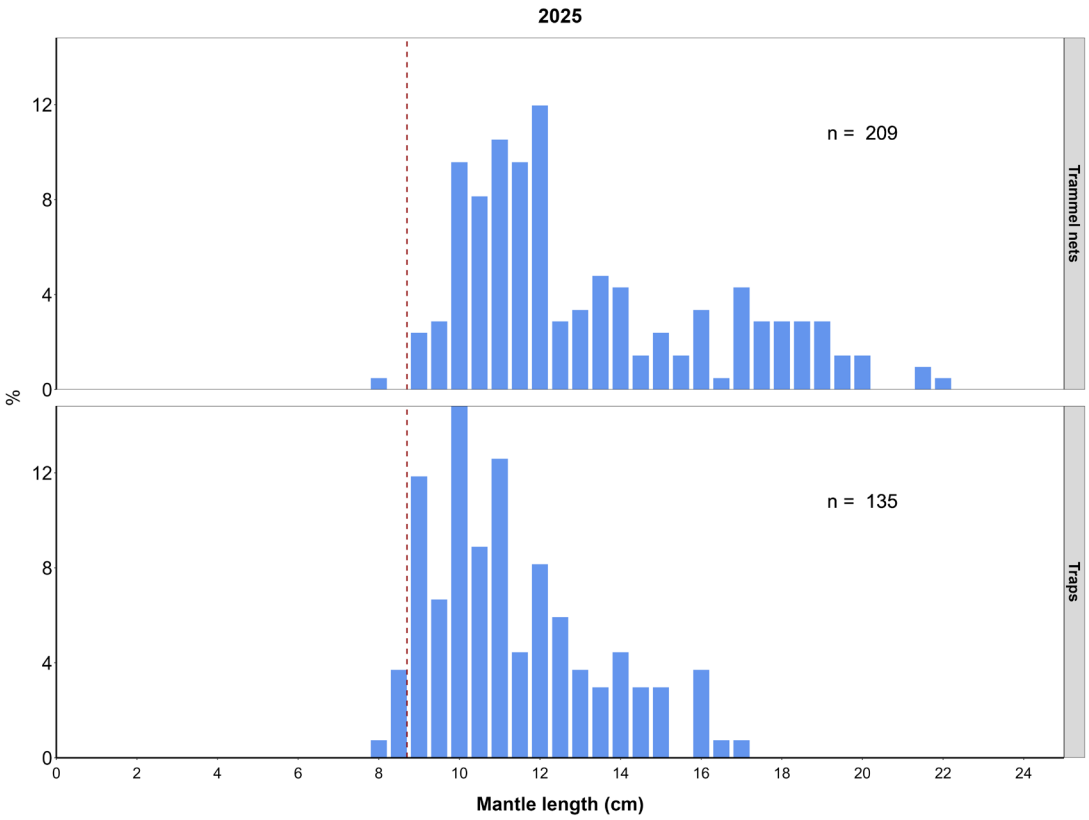


Figure 168. Annual length-frequency distribution of common cuttlefish at different fishing gear (Traps and Pots). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red line: Minimum Conservation Reference Weight (MCRW).

The annual length-frequency distribution for the common cuttlefish from 2025 shows that the highest weight frequencies were above the size at maturity. Especially when they were caught using trammel nets (Figure 168). In 2025 traps showed the mode around 10 cm of mantle length, above the size at maturity. While in the case of trammel nets, a larger individual was caught, with the mode at 12 cm. Seasonal length–frequency distributions for 2025 are presented in Annex 26.

Table 45. Number of common cuttlefish individuals measured by different fishing gear along the zones sampled in each season.

Fishery	Year	Zone	Winter	Spring	Summer	Autumn	N hauls
			Number individuals sampled				
Artisanal fisheries	2025	North	59	226	N/A	29	13

Blue crab fishery in Catalonia

The blue crab fishery sampling is exclusively carried out in the Ebre Delta zone, where it is a non-indigenous species. It was first detected in 2012 and has become into a new fishing resource since 2016, with an amount of 400 t cached during 2025 and average price of 4,07€/kg (ICATMAR, 26-02). It is fished with bottom trawling, dredge ("rastell de cadenes"), trammel nets and a specific kind of traps used in La Ràpita ("monetes"). The sampling strata are defined both by location inside or outside Alfacs Bay and by depth (Figure 169):

- Inside the bay: deep bay (DB, starting at 5 m depth), shallow bay North (SBN, up to 5 m depth), and shallow bay South (SBS, up to 5 m depth).
- Outside the bay: open water (OW).
- Transition zone between the bay and the open water: channel (CH).

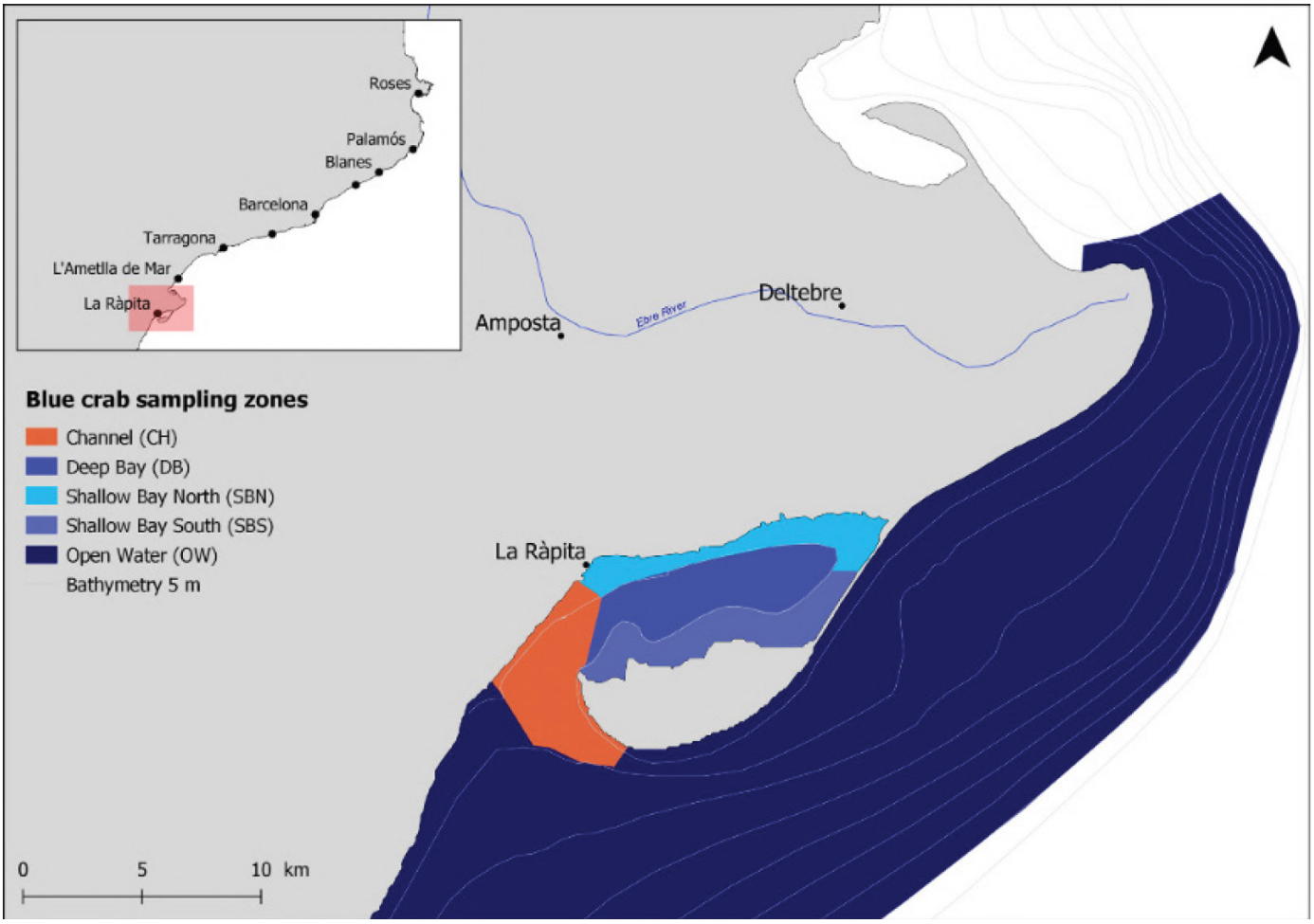


Figure 169. Map of the sampling zones of blue crab.

Sampling is conducted monthly using individuals landed from the commercial fishery. Length-frequency data are collected from all sampled individuals at the fish market, while a subsample of up to 50 individuals per month is retained for detailed biological analyses in the laboratory.

The fishery has become increasingly spatially specialized in recent years, with vessels repeatedly operating in the same fishing grounds. As the species exhibits strong habitat segregation and different population components (e.g. males, females and ovigerous females) are distributed across different areas. Consequently, fishery-dependent sampling may not fully represent the population, as some fishing strata defined at the beginning of the monitoring are no longer exploited, while others are dominated by specific demographic groups. This may result in the underrepresentation of some groups, particularly females, in the biological samples.

Table 46. Number of blue crab samplings by season and strata according to fishery and zone.

Fishery	Type	Year	SBN				SBS				DB				CH				OW			
			W	Sp	Su	A	W	Sp	Su	A	W	Sp	Su	A	W	Sp	Su	A	W	Sp	Su	A
Small-scale fisheries	Traps	2021	7	7	5	8	1				2	1		2								
Small-scale fisheries	Trammel net	2021			1			1								1			5			1
Small-scale fisheries	Longline	2021																				
Small-scale fisheries	Dredge	2021																		2	3	5
Shellfish gatherer	Traps	2021	3	6	4	2								1								
Bottom trawl		2021																				
Small-scale fisheries	Traps	2022	5	7	8	9	2	1		1	2	1	1	2								
Small-scale fisheries	Trammel net	2022	1	2			1						2		1				1			
Small-scale fisheries	Longline	2022																				
Small-scale fisheries	Dredge	2022																			2	1
Shellfish gatherer	Traps	2022	2	2	3						1											
Bottom trawl		2022																				
Small-scale fisheries	Traps	2023	4	7	10	7		1			2		5									
Small-scale fisheries	Trammel net	2023	2							2	1							1				1
Small-scale fisheries	Longline	2023																				
Small-scale fisheries	Dredge	2023																				4
Shellfish gatherer	Trammel net	2023	1	1		2					1					1						
Bottom trawl		2023																			1	
Small-scale fisheries	Traps	2024	8	10	8	12					1		1	3								
Small-scale fisheries	Trammel net	2024									1								1	1	1	
Small-scale fisheries	Dredge	2024																			2	1
Shellfish gatherer	Traps	2024	3		2	2																
Small-scale fisheries	Traps	2025	8	11	7	2					1			1								
Shellfish gatherer	Trammel net	2025	1																			
Total number of samplings per strata						188				8				34				4				32
Total number of samplings in the period sampled																						266

During 2025 all individuals sampled come from the bay (shallow and deep waters) from artisanal fisheries, such as traps and trammel nets (Table 46). Individuals sampled from the channel, connecting the bay and the open sea, were captured with trammel nets (all years), while individuals sampled in the open sea came from dredges, bottom trawls and, to a lesser extent, trammel nets and longlines. In the case of shellfish gatherers, most of the individuals sampled came from the shallow bay waters with traps, except in 2025 which are caught with trammel nets. The most sampled area over the years is the shallow bay North (SBN), Open Water (OW) and Deep Bay (DB)strata, as there are where the species are most abundant and, therefore, where fishing is concentrated. No blue crab data from trawl fisheries were collected during the year 2024 and 2025. Moreover, no samples were collected from the SBS, CH and OW strata during the last year.

The total blue crab catch in Catalonia in 2025 was 384 t, approximately 89,3% of which were caught by small-scale fisheries, 18,1% by shellfish and no catches have been re-ported from bottom trawling (ICATMAR, 26-02).

Almost all of the individuals sampled were caught by artisanal fisheries during 2021 to 2025 (Table 47). In the case of bottom trawling, dredges and longline, blue crab was a by-catch. Similar trends are observed over the five years for individuals measured in all seasons, although a slight seasonality is observed, with a lower number of individuals sampled particularly during the winter, compared to the rest of seasons. Across all sampling years the highest number of individuals was sampled during summer and autumn, corresponding to the peak commercial fishing season.

Table 47. Number of blue crab individuals measured in the different fisheries along the zone sampled in each season (the values include all strata sampled).

Fishery	Fishing gear	Year	Zone	Winter	Spring	Summer	Autumn	N samplings
				Number individuals sampled				
Artisanal fisheries	Dredge	2021	South	0	23	41	66	10
Artisanal fisheries	Traps	2021	South	510	475	450	604	31
Artisanal fisheries	Trammel net	2021	South	84	58	32	3	9
Shellfish gatherers	Traps	2021	South	184	376	243	83	16
Artisanal fisheries	Dredge	2022	South	0	0	32	1	3
Artisanal fisheries	Traps	2022	South	483	466	602	670	33
Artisanal fisheries	Trammel net	2022	South	174	81	39	0	8
Shellfish gatherers	Traps	2022	South	109	90	159	0	8
Artisanal fisheries	Dredge	2023	South	0	0	0	11	4
Artisanal fisheries	Traps	2023	South	144	745	871	585	32
Artisanal fisheries	Trammel net	2023	South	150	8	0	46	7
Shellfish gatherers	Traps	2023	South	44	50	0	101	4
Shellfish gatherers	Trammel net	2023	South	9	22	0	0	2
Bottom trawling		2023	South	0	0	50	0	1
Artisanal fisheries	Dredge	2024	South	0	0	24	4	3
Artisanal fisheries	Traps	2024	South	526	786	664	1011	40
Artisanal fisheries	Trammel net	2024	South	77	75	44	0	4
Shellfish gatherers	Traps	2024	South	0	0	235	47	7
Artisanal fisheries	Traps	2025	South	637	754	886	937	49
Artisanal fisheries	Trammel net	2025	South	52				1
Shellfish gatherers	Trammel net	2025	South	29				1
Shellfish gatherers	Traps	2025	South				35	1

According to length-weight relationship parameters for both sexes combined, females and males, blue crab displayed a negative allometric growth CL_{95}=1.70 – 2.04; *b*<3) in 2025 (Table 48). Figure 170 shows differences by sex in the 2025 length–weight relationship, indicating sexual dimorphism, with males reaching greater sizes and weights than females. The length–weight relationship followed the same trend across years.

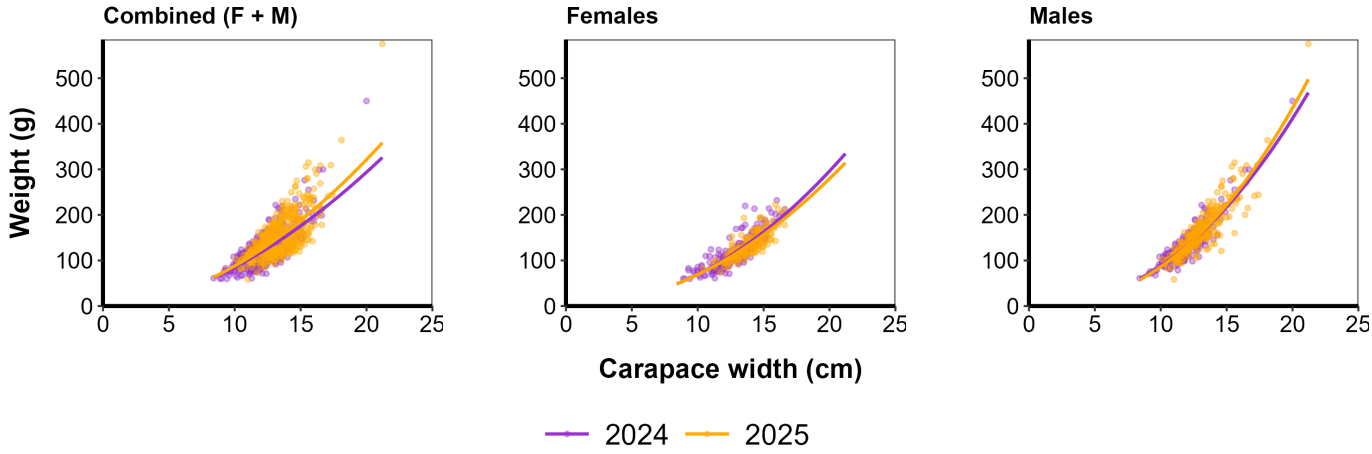


Figure 170. Blue crab length-weight relationship for all years sampled.

Table 48. Blue crab length-weight relationship in the year analyzed.

Length – weight relationship				
2025	**a**	**b**	**r^2**	**n**
Combined	1.1698	1.8681	0.52	424
Females	0.6629	2.0152	0.67	161
Males	0.3974	2.3326	0.80	263

The L_{50} for blue crab shows some differences between females and males over the years. In the case of 2025 was 113 mm of CW for females, the highest of the series, and 93 cm of CW for males (Figure 171). However, when comparing between sampled years, it is observed that the L_{50} values show little variation over the years.

In 2025, a total of 3362 blue crab were analyzed to calculate the L_{50} (Table 49). Out of these, 80 individuals were classified as juvenile and 3282 as adults. It should be noted that the low number of juvenile individuals compared to the adult ones, may bias the L_{50} towards larger sizes than it actually is. The highest number of juvenile individuals is concentrated in the winter months, from January to April.

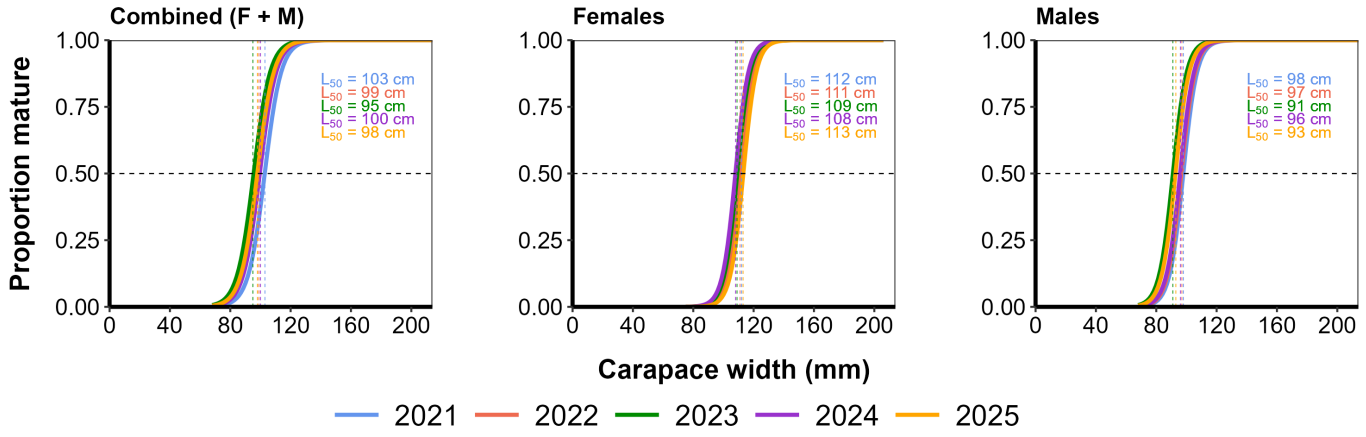


Figure 171. Blue crab size at first maturity (L_{50}) for all years sampled.

Table 49. Number of juvenile and adult individuals of blue crab (only females) included monthly in biological analysis (the values include all strata sampled).

Month	2021		2022		2023		2024		2025	
	Juvenile	Adult	Juvenile	Adult	Juvenile	Adult	Juvenile	Adult	Juvenile	Adult
January	2	190	5	309	1	255	11	62	11	270
February	4	313	20	160	14	238	62	103	6	196
March	0	0	21	253	14	193	2	170	20	218
April	0	0	0	0	11	179	30	270	30	178
May	0	207	18	551	0	229	0	249	3	287
June	1	321	7	295	1	216	1	278	1	253
July	2	193	0	0	0	0	3	222	1	286
August	21	286	20	415	20	558	2	330	3	308
September	17	246	4	240	9	253	8	326	0	300
October	2	139	0	274	1	295	7	121	0	239
November	1	185	17	215	0	143	9	268	1	374
December	8	233	19	191	4	231	8	340	4	373
Total	**131**	**2903**	**75**	**2790**	**81**	**2739**	**196**	**3320**	**80**	**3282**

The annual length-frequency distribution of blue crab from 2021 to 2025 showed a similar trend over the years for all strata sampled (Figure 172). The highest number of individuals were caught in shallow and deep waters inside the bay and in the open waters (SBN and DB), while lower frequencies were found in the south shallow waters inside the bay and in the channel linking the bay (SBS and CH), also in OW during 2025.

In 2025, the highest number of individuals was caught in SBN and DB strata, while in SBS, CH and OW, no specimens were captured. Notably, the species showed a differential distribution by sex, with males mainly found within the bay, especially in shallow waters (SBN). In contrast, non-ovigerous females predominated in deep areas within the bay (DB). Most of the individuals measured over the years were above the size at first maturity (L_{50}).

For monthly weight-frequency distribution of blue crab at different depth strata in 2025 see Annex 27.

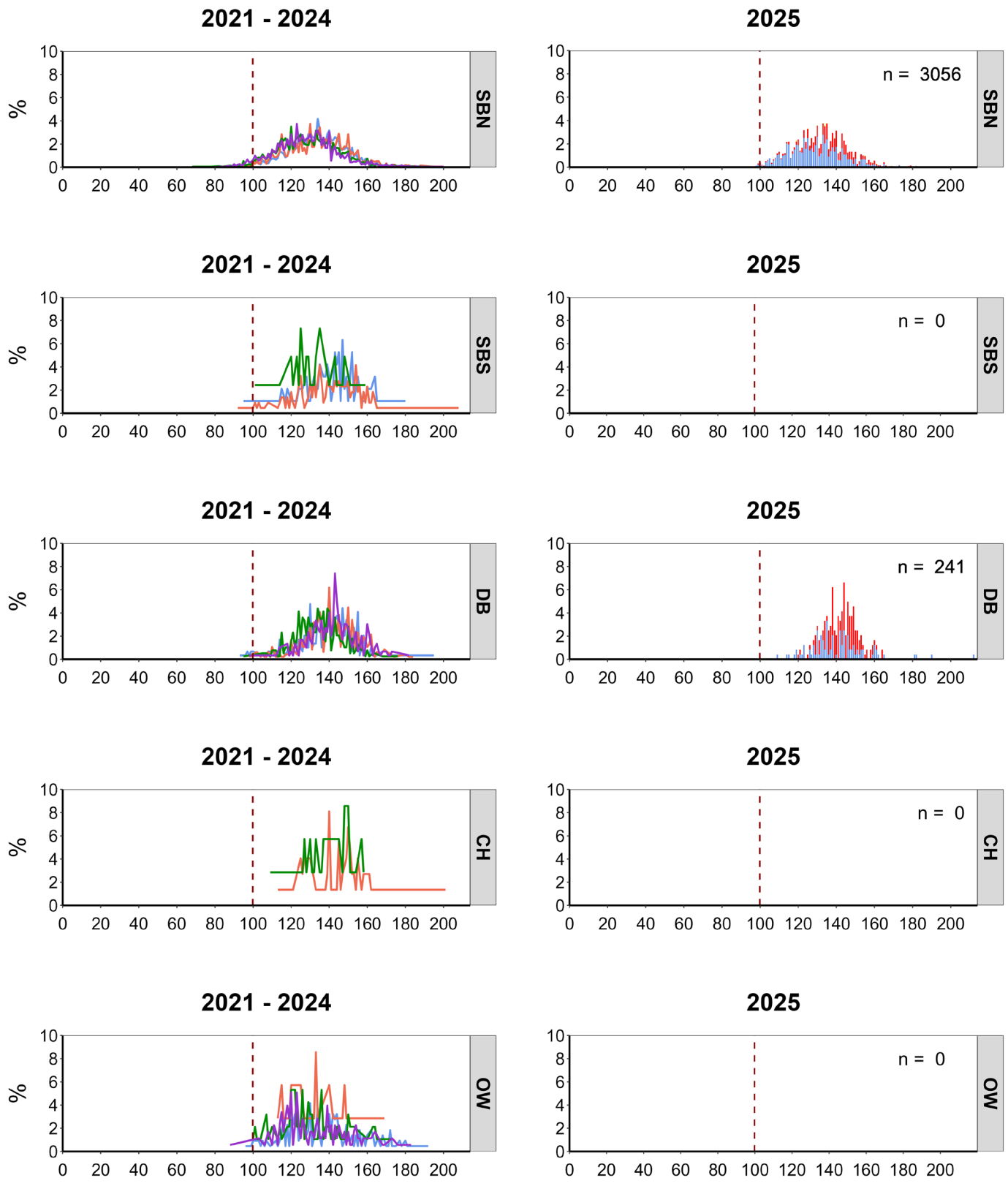


Figure 172. Annual length-frequency distribution of Blue crab at different depth strata (SBN; Shallow Bay North, SBS; Shallow Bay South, BD; Deep Bay, CH; Channel and OW; Open Water). Left: previous years sampled, right: year analyzed. (n) Total number of measured individuals. Red dashed line: size at first maturity (L_{50}) calculated as the mean between the L_{50} values from 2020 to 2024.

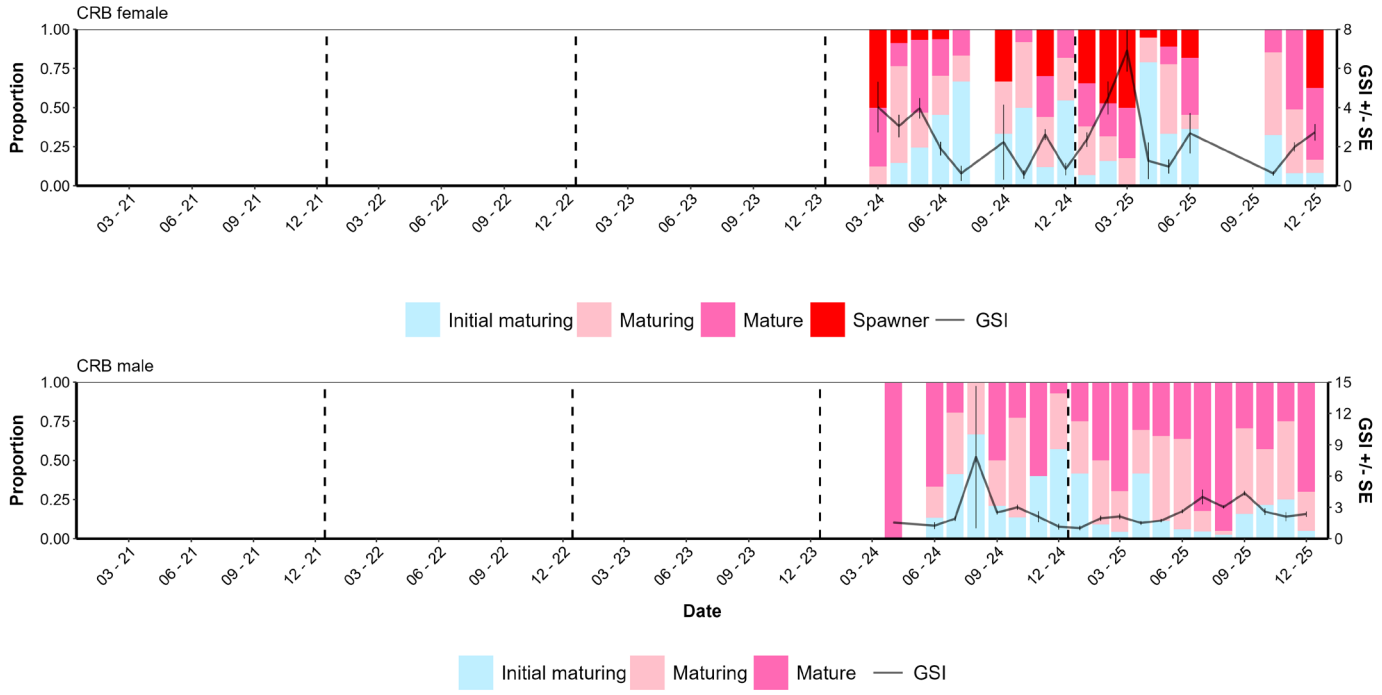


Figure 173. Blue crab monthly gonadal cycle for females and males.

The gonadal cycle of blue crab was analyzed monthly for 2024 and 2025 (Figure 173). Mature females were recorded throughout the year, with a higher proportion of mature individuals between December and April. No data are available for July to September, as although sampling and laboratory processing were conducted during these months, no females were included in the analyzed subsample. In contrast, mature males were also present over the year, with a higher proportion of mature individuals observed in July and August 2025 compared with the rest of the year.

Females showed GSI peaks in 2025 during the month with the highest proportion of mature individuals, whereas the lowest GSI values coincided with periods characterized by a higher proportion of females in early maturation stages.

Males exhibited consistently higher GSI values than females throughout the study period. In contrast to females, male GSI remained relatively stable over the year, indicating a more constant reproductive condition. However, a pronounced outlier was ob-served in August 2024, corresponding to an individual with exceptionally high gonadal development, which strongly deviated from the general pattern.

Overall, female GSI patterns appear more closely associated with temporal variation in maturity stages, whereas males show a more stable reproductive investment over time with limited seasonal variation.

Figure 174 shows the proportion of blue crab females with eggs and their develop-mental stages from 2021 to 2025. Overall, higher proportions of females with more advanced egg development stages were observed with two main peaks: on in spring (April and May) and another in late summer (September) in most years, consistent with the reproductive cycle shown in Figure 173.

However, this pattern is less evident in 2025, as previously noted. This is likely due to a reduction in fishing effort in the areas where ovigerous females are typically found, leading to an underrepresentation of these individuals in the samples. Despite this limitation, ovigerous females were still recorded in 2025 through fish-market sampling, although in lower numbers compared with previous years.

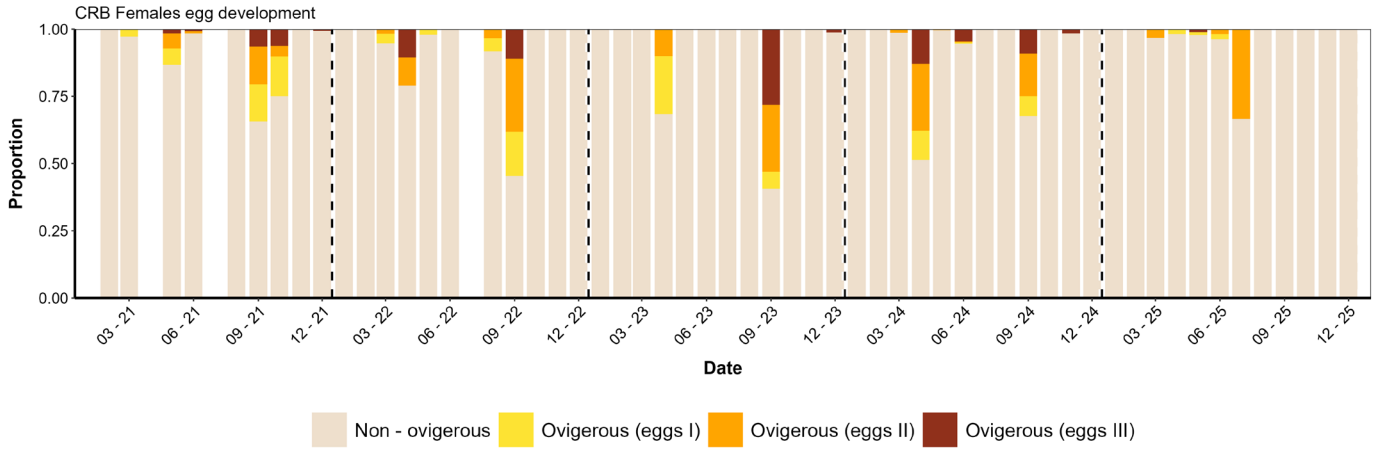


Figure 174. Blue crab monthly proportion of different egg development stages.

Glass eel fishery sampling

For the glass eel fishery, monitoring was carried out within the framework of the Scientific Glass Eel Observatory, combining biological sampling, fisher logbooks and fishery-independent surveys, with the aim of improving knowledge on glass eel recruitment dynamics and supporting scientific monitoring.

Sampling covered the two main glass eel fishing areas in Catalonia:

- Ebre Delta: the main fishing area, with 152 authorized fishing points managed by three fisher associations.
- Girona coast: the northern fishing area, with 17 authorized fishing points, also managed by three fisher associations.

The fishery is a small-scale traditional activity operated with a gear locally known as the *bussó*. Fishing takes place at night, from 6:00 PM to 8:00 AM, during a season lasting approximately two months, corresponding to around 60 fishing days. Overall, the fishery includes 66 active fishing licenses and 169 authorized fishing points along the Catalan coast.

The Scientific Glass Eel Observatory is based on two types of sampling. The fishery-dependent sampling consisted of daily logbooks completed by fishers during the fishing season. These logbooks recorded information on fishing hours, fishing location, captured individuals and bycatch species. During the fishing season, fishers also collected biological samples of glass eels, which were analyzed in the laboratory. For each individual, length, weight and pigmentation stage were recorded to characterize the biological structure of the sampled individuals and the timing of recruitment.

The second component consisted of fishery-independent sampling, which was carried out monthly during the fishing season by ICATMAR samplers. Each sampling event consisted of two fishing operations of two hours each. During these surveys, bycatch species were identified and measured, and glass eels were transported to the laboratory to be individually measured, weighed and classified according to pigmentation stage.

The data analyzed in this report correspond exclusively to the sampling surveys con-ducted in the Ebre Delta. Data collected from Girona were not included in the analyses.

The length–weight relationship was assessed using all sampled individuals, as sex de-termination is not possible in glass eels at this developmental stage. Consequently, all individuals were analyzed as a single group.

Pigmentation stages were classified according to an adaptation of the scale proposed by Briand, C. (2008).

Glass eel (*Anguilla anguilla*) ELE

Figure 175 shows the location of the sampling sites included in the Scientific Glass Eel Observatory during the 2025 fishing season. Sampling was carried out in the Ebre Delta, the main glass eel fishing area in Catalonia. The monitoring programme combined fishery-dependent and fishery-independent information to describe the biological characteristics of glass eels during recruitment and to establish a baseline for future comparisons. For the biological analyses, fishery-dependent and fishery-independent samples were analyzed together in order to increase sample size and provide an overall description of the sampled fraction. Sampling strata were grouped by habitat according to the environmental characteristics of each sampling site.

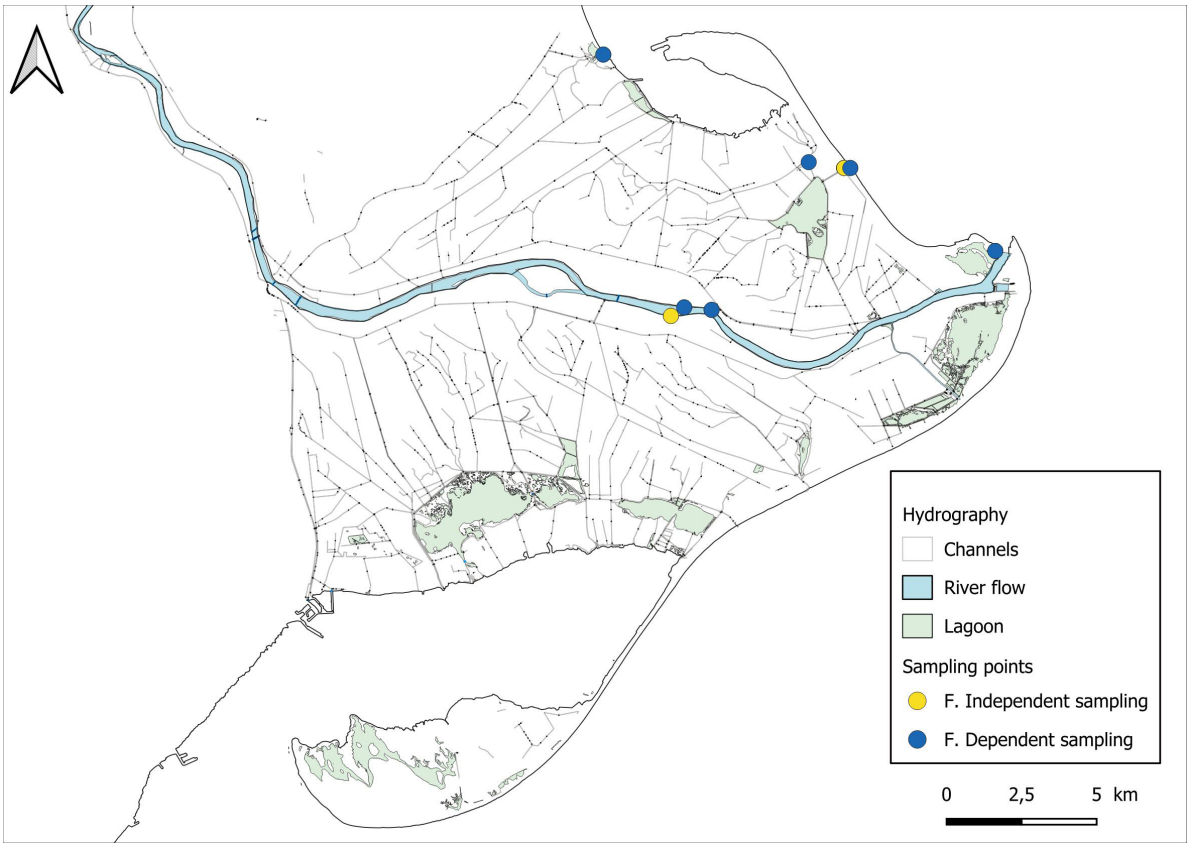


Figure 175. Sampling sites included in the Scientific Glass Eel Observatory in Catalonia during the 2025. Sampling covered the Ebre Delta.

Table 50. Number of glass eel samplings by habitat and sampling type, dependent and inde-pendent data.

Fishery	Type	Year	River Upstream	River Mouth	Lagoon Inlet
Small-scale fisheries	Fiheries independent	2025	2	0	1
Small-scale fisheries	Fisheries dependent	2025	8	1	5
Total number of samplings per strata			**10**	**1**	**6**
Total number of samplings in the period sampled					**17**

Table 50 shows the number of glass eel samplings conducted in 2025 by habitat and sampling type. Sampling was adapted to the habitat characteristics of the Ebre Delta, including the main environments where the fishery operates. Fishery-independent sampling was only conducted from November onwards and, therefore, covered only part of the fishing season. In addition, no fishery-independent sampling was carried out in the river mouth stratum due to difficult access conditions and the short duration of the fishing season. Since 2025 represents the first year of the monitoring programme, the number of samplings was still limited and the results should be interpreted as preliminary.

Table 51. Number of glass eel samples analyzed in 2025 by habitat.

Fishery	Year	Habitat	Winter	Spring	Summer	Autumn	Nº Hauls
			Number individuals sampled				
Artisanal fisheries	2025	Lagoon inlet	50	0	0	400	0
Artisanal fisheries	2025	River Mouth	48	0	0	0	0
Artisanal fisheries	2025	River Upstream	142	0	0	53	0

The number of glass eel samples analyzed in 2025 by fishing habitat is shown in Table 51. These samples were used to characterize the biological structure of the recruited fraction through length, weight and pigmentation stage analyses. Given the limited number of samples available and the fact that the monitoring period only covered part of the recruitment season, no clear spatial patterns could be identified visually at this stage.

Table 52. Length-weight relationship parameters estimated for glass eels sampled in Catalo-nia during the 2025 fishing season.

Fishery	Year	Habitat	Winter	Spring	Summer	Autumn	Nº Hauls
			Number individuals sampled				
Artisanal fisheries	2025	Lagoon inlet	50	0	0	400	0
Artisanal fisheries	2025	River Mouth	48	0	0	0	0
Artisanal fisheries	2025	River Upstream	142	0	0	53	0

Length-weight relationship parameters for glass eel in 2025 are presented in Table 52, and the corresponding relationship is shown in Figure 176. The length-weight relationship of glass eels should be interpreted with caution, as this early life stage is strongly influenced by recruitment timing. Individuals with missing length or weight values were excluded from the analysis. Since glass eels correspond to an immature life stage of the European eel, analyses were performed for all individuals combined, without sex differentiation.

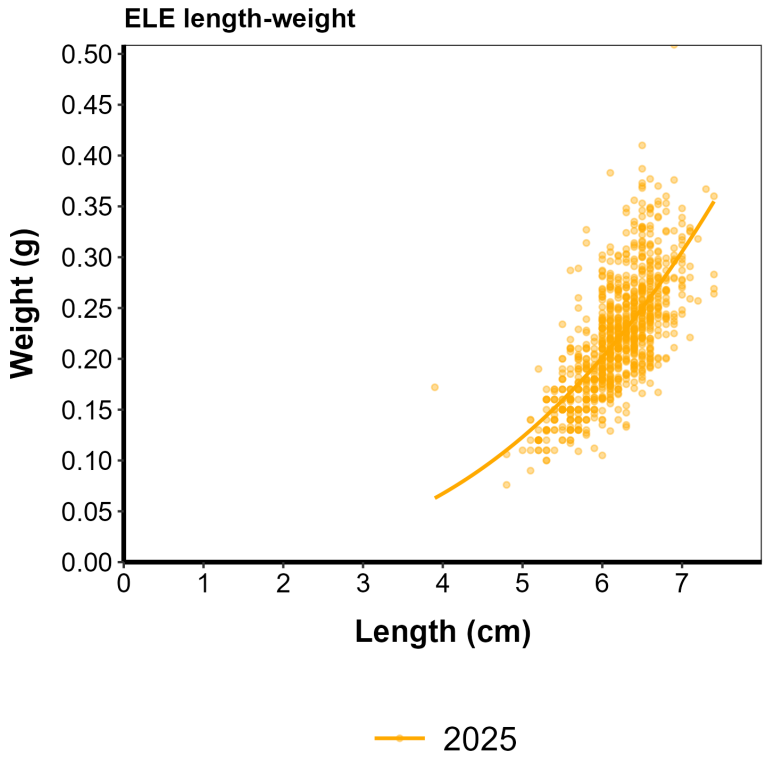


Figure 176. Length-weight relationship of glass eels sampled in Catalonia during the 2025 fishing season.

The size-frequency distribution of glass eels sampled in 2025 is shown in Figure 177. Differences in size structure among fishing habitats were not clearly evident from the available data. However, this analysis provides an initial description of the size structure of glass eels entering the monitored habitats and will be useful for future comparisons as additional years of data become available.

Figure 178 shows the frequency distribution of pigmentation stages recorded in 2025. The analysis of pigmentation stages provides information on the developmental condition of glass eels during recruitment, as pigmentation progressively increases as individuals enter coastal, estuarine and riverine habitats. No clear pattern in pigmentation stage distribution could be identified in 2025, as only one year of data is available and the sampling period was limited to part of the fishing season. Therefore, these results should be considered preliminary and will need to be evaluated together with future monitoring years to better describe recruitment dynamics in the Ebre Delta.

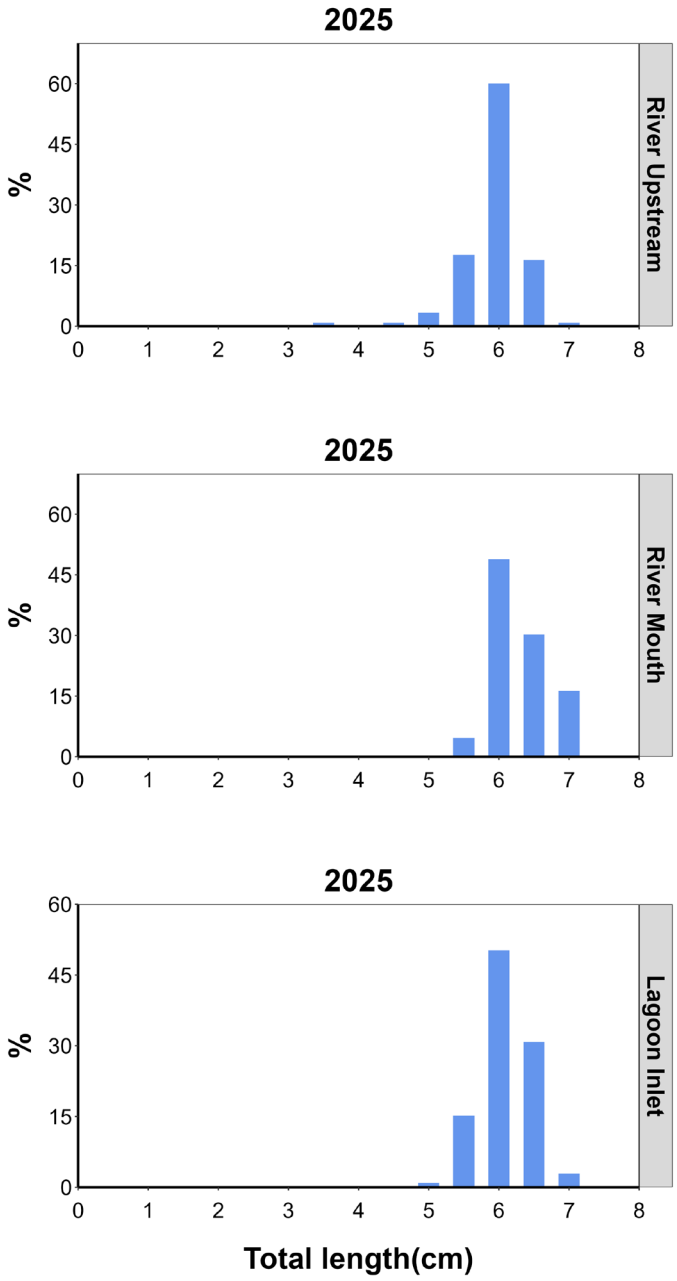


Figure 177. Size-frequency distribution of glass eels sampled in Catalonia during the 2025. Length classes are shown by habitat.

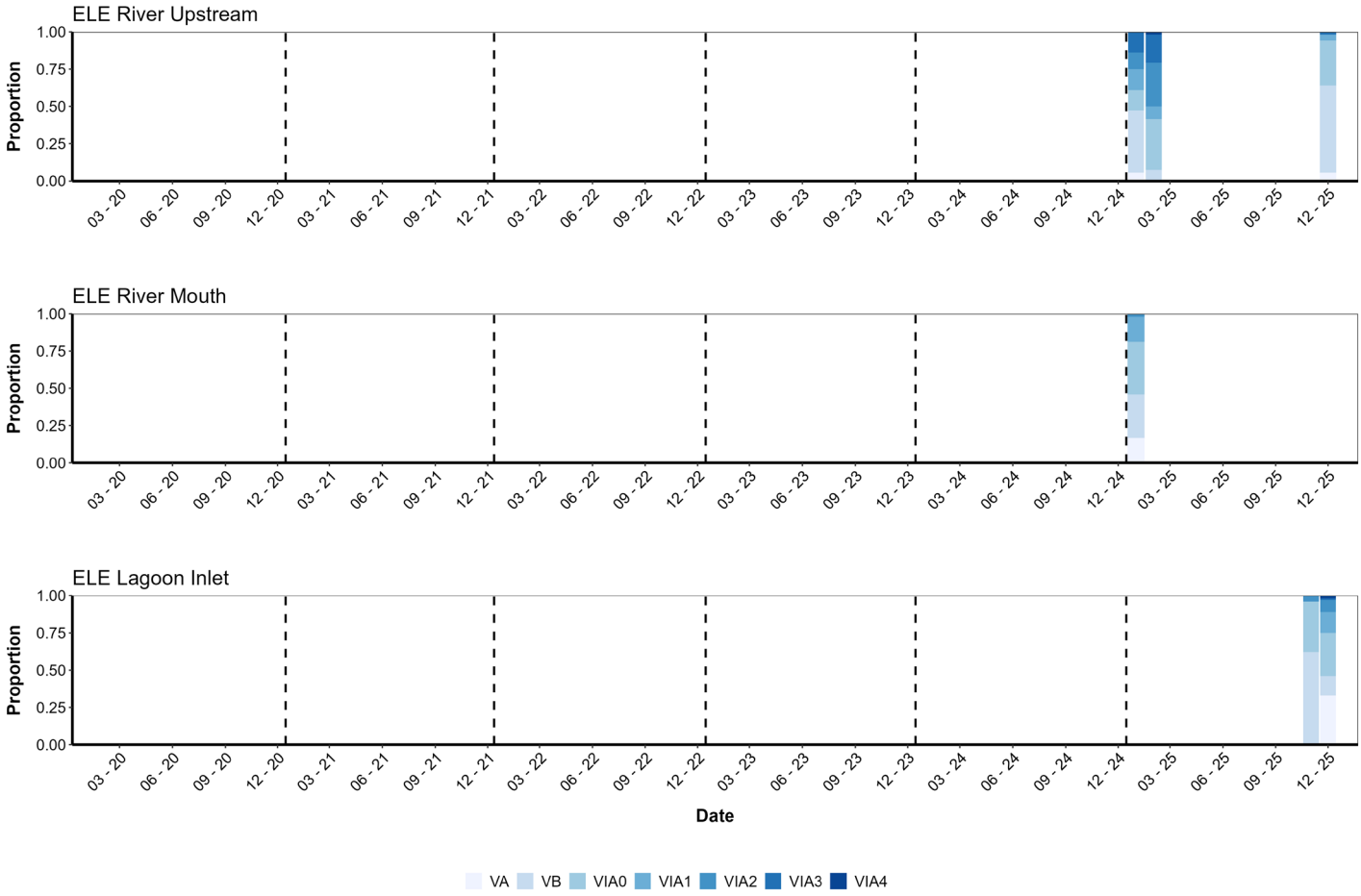


Figure 178. Frequency distribution of glass eel pigmentation stages recorded during the 2025. Pigmentation stages were classified using a scale adapted from Briand (2009).

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Annexes



Annex 1. Landed species with higher biomass for previous period. SE: standard error.

2021-2024 Landed Biomass (kg/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Actinopterygii	*Trachurus trachurus*	3.80	3.36	28.15	12.27	35.85	17.56	162.16	45.25	1.54	0.64	0.03	0.03
	Mullus barbatus	35.67	7.01	12.27	2.15	86.99	23.39	48.73	4.80	0.34	0.13	0.00	0.00
	Merluccius merluccius	5.99	1.71	39.19	6.17	22.75	5.32	53.40	4.06	25.31	2.37	12.68	2.34
	Diplodus vulgaris	5.74	2.70	0.16	0.08	107.58	94.16	0.01	0.01	0.01	0.01	0.00	0.00
	Pagellus erythrinus	42.18	10.50	9.72	2.12	55.06	15.44	5.58	1.18	0.01	0.01	0.01	0.01
	Phycis blennoides	0.00	0.00	0.01	0.01	0.00	0.00	6.07	1.01	75.19	9.34	29.31	2.79
	Lophius budegassa	0.45	0.32	26.94	5.28	21.95	3.67	28.29	3.31	9.84	1.93	0.93	0.43
	Mullus surmuletus	2.72	0.63	2.84	0.93	58.53	20.03	5.38	1.42	1.41	0.52	0.11	0.09
	Trachurus mediterraneus	43.59	13.32	6.21	3.37	2.01	0.97	2.08	1.75	0.00	0.00	0.01	0.01
	Sphyraena sphyraena	47.08	22.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Micromesistius poutassou	0.00	0.00	0.00	0.00	0.00	0.00	2.10	1.20	40.51	5.88	3.14	0.42
	Scomber scombrus	5.68	2.26	22.62	6.29	1.28	0.74	4.17	0.98	0.03	0.02	0.00	0.00
	Trisopterus capelanus	1.73	0.83	9.37	1.33	5.01	2.04	16.48	1.47	0.02	0.01	0.00	0.00
	Pagellus acarne	13.48	4.83	1.85	0.71	11.93	4.71	0.21	0.11	0.02	0.02	0.00	0.00
	Boops boops	9.33	3.29	10.87	3.60	0.00	0.00	1.61	0.55	0.00	0.00	0.00	0.00
	Lophius piscatorius	0.37	0.25	2.05	1.20	1.48	0.92	1.35	0.39	6.85	2.14	9.53	4.22
	Helicolenus dactylopterus	0.00	0.00	0.00	0.00	0.02	0.02	4.01	0.90	12.86	2.17	1.56	0.51
	Citharus linguatula	0.89	0.25	11.19	1.81	1.28	0.55	2.73	0.36	0.03	0.02	0.00	0.00
	Zeus faber	0.03	0.03	0.11	0.06	12.84	6.23	1.94	0.81	0.00	0.00	0.00	0.00
	Lepidorhombus boscii	0.00	0.00	0.00	0.00	0.03	0.03	3.56	0.47	8.71	1.10	0.89	0.21
	Lithognathus mormyrus	10.50	4.44	0.68	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Trachinus draco	0.32	0.09	2.55	0.61	5.08	1.43	3.04	0.57	0.00	0.00	0.00	0.00
	Gobius niger	4.19	1.66	3.53	0.66	1.25	1.13	0.29	0.15	0.00	0.00	0.00	0.00
	Chelidonichthys lucerna	3.87	1.22	3.09	1.08	0.87	0.38	1.26	0.21	0.00	0.00	0.00	0.00
	Spicara spp.	2.32	1.66	3.13	0.84	0.00	0.00	3.30	1.55	0.00	0.00	0.00	0.00
	Chelon auratus	7.75	5.74	0.12	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lepidotrigla cavillone	0.01	0.00	1.37	0.35	5.24	3.69	1.08	0.21	0.00	0.00	0.00	0.00
	Mugil cephalus	5.36	2.86	1.88	1.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Diplodus annularis	6.33	1.80	0.55	0.18	0.03	0.03	0.02	0.01	0.00	0.00	0.00	0.00
	Eutrigla gurnardus	0.15	0.12	3.03	0.87	0.06	0.05	3.28	0.56	0.01	0.01	0.00	0.00
	Galeus melastomus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.14	11.16	2.74
Malacostraca	*Parapenaeus longirostris*	0.23	0.18	19.76	3.28	0.00	0.00	23.82	3.86	34.66	5.43	1.21	0.67
	Aristeus antennatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.14	0.60	75.82	6.61
	Squilla mantis	27.24	4.85	26.25	3.34	0.03	0.02	1.31	0.39	0.00	0.00	0.00	0.00
	Nephrops norvegicus	0.00	0.00	0.63	0.24	0.00	0.00	0.26	0.06	48.54	4.47	3.28	0.71
	Liocarcinus depurator	0.21	0.11	16.80	4.25	0.00	0.00	6.28	1.76	0.13	0.11	0.00	0.00
	Penaeus kerathurus	11.99	2.69	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00
Cephalopoda	*Illex coindetii*	2.88	1.69	36.92	7.96	8.47	4.68	47.26	8.16	6.09	1.13	0.51	0.21
	Eledone cirrhosa	0.73	0.33	12.47	2.42	8.04	2.53	17.16	1.72	15.63	1.97	1.90	0.49
	Octopus vulgaris	7.18	2.70	1.94	1.01	12.61	4.61	2.55	0.61	0.03	0.03	0.00	0.00
	Sepia officinalis	13.96	3.07	0.09	0.09	1.62	0.98	0.42	0.23	0.00	0.00	0.00	0.00
	Loligo vulgaris	2.43	0.83	2.54	0.83	5.23	3.83	1.27	0.30	0.04	0.03	0.00	0.00
	Alloteuthis spp.	3.10	0.80	4.42	0.76	0.09	0.09	0.87	0.20	0.00	0.00	0.00	0.00

Annex 2. Landed species with higher abundance for previous period. SE: standard error.

2021-2024 Landed Abundance (Ind/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Actinopterygii	*Trachurus trachurus*	48.37	41.8	525.25	243.6	523.55	226.8	3 195.93	844.9	13.8	6.5	0.18	0.2
	Mullus barbatus	988.41	231.7	239.07	42.7	1 819.31	494.0	879.70	89.1	4.7	2.0	0.00	0.0
	Pagellus erythrinus	489.96	120.0	105.12	21.9	579.72	123.7	62.87	14.0	0.1	0.1	0.12	0.1
	Merluccius merluccius	42.73	13.3	337.44	57.3	187.33	54.7	513.36	47.9	125.2	14.1	30.68	5.2
	Phycis blennoides	0.00	0.0	0.34	0.3	0.00	0.0	86.70	14.7	830.6	76.7	199.95	18.5
	Trisopterus capelanus	42.14	18.9	303.15	48.3	134.83	56.0	524.99	46.9	0.4	0.2	0.00	0.0
	Mullus surmuletus	42.49	11.3	28.90	8.6	679.66	228.6	60.54	18.2	6.6	2.5	0.56	0.4
	Diplodus vulgaris	93.11	46.0	2.27	1.4	651.87	538.1	0.11	0.1	0.1	0.1	0.00	0.0
	Trachurus mediterraneus	519.08	147.4	80.40	38.7	26.77	12.3	44.02	36.5	0.0	0.0	0.06	0.1
	Micromesistius poutassou	0.00	0.0	0.00	0.0	0.00	0.0	77.09	48.4	456.4	69.7	26.93	4.6
	Citharus linguatula	30.24	8.2	358.66	54.3	43.41	17.8	77.36	11.4	0.6	0.4	0.10	0.1
	Lepidotrigla cavillone	0.70	0.5	93.32	24.6	329.50	231.7	76.26	15.9	0.0	0.0	0.00	0.0
	Boops boops	169.19	60.7	193.73	65.6	0.00	0.0	27.05	9.1	0.0	0.0	0.00	0.0
	Helicolenus dactylopterus	0.00	0.0	0.00	0.0	0.73	0.7	169.24	42.1	194.4	36.1	17.09	5.8
	Pagellus acarne	205.42	79.8	26.32	10.0	119.14	43.7	1.87	0.8	0.3	0.3	0.00	0.0
	Scomber scombrus	90.70	40.3	199.88	59.5	17.13	12.4	34.14	8.3	0.2	0.1	0.00	0.0
	Lepidorhombus boscii	0.00	0.0	0.00	0.0	1.78	1.2	75.59	11.7	220.4	35.3	13.10	3.3
	Sardina pilchardus	0.40	0.4	164.62	108.5	53.98	54.0	26.49	15.5	0.0	0.0	0.00	0.0
	Eutrigla gurnardus	7.70	6.0	121.23	30.3	1.51	0.9	114.02	24.2	0.0	0.0	0.00	0.0
	Chelidonichthys cuculus	7.83	6.7	0.00	0.0	170.17	67.3	32.21	7.5	0.1	0.1	0.00	0.0
	Lophius budegassa	1.41	1.0	72.83	13.2	29.91	4.6	87.42	12.4	17.1	3.1	0.95	0.3
	Trigla lyra	0.00	0.0	0.00	0.0	3.60	2.3	79.96	16.0	99.7	15.8	2.94	1.6
	Spicara spp.	50.38	34.7	67.01	20.5	0.00	0.0	67.25	29.6	0.0	0.0	0.00	0.0
	Arnoglossus laterna	25.78	13.1	89.31	18.3	14.77	8.3	34.55	7.7	0.0	0.0	0.00	0.0
	Lithognathus mormyrus	148.20	59.1	6.60	3.9	0.00	0.0	0.00	0.0	0.0	0.0	0.00	0.0
	Trachinus draco	10.96	3.4	47.72	11.4	50.88	15.2	37.18	6.3	0.0	0.0	0.00	0.0
	Diplodus annularis	129.16	33.8	8.65	2.7	0.57	0.6	0.28	0.1	0.0	0.0	0.00	0.0
Malacostraca	*Parapenaeus longirostris*	27.93	22.0	2 562.93	463.0	0.00	0.0	2 466.05	385.5	2768.4	461.3	76.37	36.5
	Aristeus antennatus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	74.1	40.9	4 293.65	341.4
	Nephrops norvegicus	0.00	0.0	6.16	2.4	0.00	0.0	3.71	0.8	2196.5	217.1	106.96	26.3
	Liocarcinus depurator	15.95	7.9	1 452.39	397.0	0.00	0.0	507.30	141.8	16.0	13.6	0.24	0.2
	Squilla mantis	843.58	148.2	860.38	104.3	0.79	0.5	42.65	13.2	0.0	0.0	0.00	0.0
	Plesionika martia	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	130.8	49.2	569.48	79.5
	Penaeus kerathurus	571.30	141.4	0.00	0.0	0.59	0.6	0.05	0.0	0.0	0.0	0.00	0.0
	Plesionika heterocarpus	0.00	0.0	0.00	0.0	0.00	0.0	518.65	250.4	46.5	17.6	0.99	0.8
	Pasiphaea multidentata	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	6.6	2.9	477.09	75.0
Cephalopoda	*Illex coindetii*	29.83	15.5	772.76	144.8	131.31	74.0	1 365.62	260.1	100.9	16.5	5.67	1.8
	Alloteuthis spp.	85.68	21.1	131.22	22.8	2.39	2.4	26.71	6.0	0.0	0.0	0.00	0.0
	Eledone cirrhosa	1.79	0.8	40.27	7.5	51.21	17.9	82.04	8.3	56.1	7.2	6.29	1.7
	Loligo vulgaris	51.33	17.2	46.37	11.8	86.08	56.3	12.87	3.0	0.2	0.1	0.00	0.0
	Alloteuthis media	33.46	15.2	101.32	44.5	0.00	0.0	6.35	2.8	0.0	0.0	0.00	0.0
	Sepia officinalis	129.79	35.8	0.42	0.4	6.99	4.6	1.29	0.7	0.0	0.0	0.00	0.0
Gastropoda	*Bolinus brandaris*	182.75	38.6	56.22	13.6	0.00	0.0	3.81	1.0	0.0	0.0	0.00	0.0

Annex 3. Landed species with higher biomass for the year analyzed. SE: standard error.

2025 Landed Biomass (kg/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Actinopterygii	*Trachurus trachurus*	96.72	70.5	154.80	78.2	54.16	30.0	127.93	63.7	2.00	1.4	0.00	0.0
	Pagellus erythrinus	115.25	66.3	24.66	11.7	109.26	31.7	8.90	3.6	0.00	0.0	0.00	0.0
	Mullus barbatus	45.62	11.6	31.38	9.4	83.46	13.0	63.38	19.3	0.62	0.4	0.00	0.0
	Merluccius merluccius	12.63	5.4	60.77	16.2	32.13	8.5	46.70	7.8	33.66	6.9	14.66	3.4
	Phycis blennoides	0.00	0.0	0.00	0.0	0.21	0.2	5.21	1.9	97.12	46.1	20.73	6.0
	Lophius budegassa	0.83	0.8	33.53	13.5	32.28	6.0	22.76	5.2	16.92	5.2	3.06	1.7
	Pagellus acarne	48.75	26.4	2.43	1.3	50.24	48.6	1.61	1.3	0.00	0.0	0.00	0.0
	Trisopterus capelanus	4.85	3.2	15.14	3.9	20.61	9.4	7.77	1.8	0.11	0.1	0.00	0.0
	Scomber scombrus	24.42	15.7	18.00	8.7	1.87	0.8	1.20	0.4	0.15	0.1	0.00	0.0
	Trachurus mediterraneus	22.94	7.3	0.78	0.4	19.14	17.4	0.45	0.4	0.16	0.2	0.00	0.0
	Mullus surmuletus	5.52	3.0	3.13	1.3	27.21	9.4	6.04	2.4	0.48	0.3	0.00	0.0
	Helicolenus dactylopterus	0.00	0.0	0.00	0.0	0.00	0.0	5.44	3.0	34.44	13.4	1.27	0.7
	Citharus linguatula	5.06	2.2	25.27	16.4	2.84	1.0	4.10	0.9	0.00	0.0	0.00	0.0
	Scomber colias	12.31	11.7	17.26	16.0	0.35	0.3	4.18	2.7	0.01	0.0	0.00	0.0
	Sparus aurata	31.28	19.5	0.00	0.0	1.28	1.0	0.00	0.0	0.00	0.0	0.00	0.0
	Sphyraena sphyraena	26.72	16.3	0.00	0.0	3.08	3.1	0.00	0.0	0.00	0.0	0.00	0.0
	Trachinus draco	1.18	0.6	16.03	13.0	7.60	1.5	2.56	0.6	0.00	0.0	0.14	0.1
	Boops boops	5.31	3.4	17.50	10.4	0.00	0.0	0.51	0.3	0.00	0.0	0.00	0.0
	Lithognathus mormyrus	19.78	13.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
	Chelidonichthys lucerna	4.34	2.8	12.54	11.1	0.51	0.4	1.04	0.4	0.00	0.0	0.10	0.1
	Lepidorhombus boscii	0.00	0.0	0.00	0.0	0.35	0.2	4.22	1.3	12.56	4.1	0.99	0.4
	Micromesistius poutassou	0.00	0.0	0.00	0.0	0.04	0.0	0.02	0.0	15.01	4.2	2.62	1.1
	Eutrigla gurnardus	1.06	0.4	9.42	3.9	0.15	0.1	6.50	2.3	0.00	0.0	0.03	0.0
	Gobius niger	5.30	4.2	7.14	3.7	1.41	1.4	0.52	0.3	0.00	0.0	0.00	0.0
	Diplodus annularis	11.32	3.1	1.60	1.0	0.00	0.0	0.03	0.0	0.00	0.0	0.00	0.0
	Diplodus vulgaris	9.18	5.0	0.29	0.3	3.20	1.4	0.25	0.2	0.00	0.0	0.00	0.0
	Lophius piscatorius	0.00	0.0	1.22	1.2	1.19	1.2	1.75	0.9	5.07	2.7	3.43	1.7
	Spicara spp.	1.92	1.8	5.38	2.4	0.00	0.0	3.90	3.2	0.00	0.0	0.00	0.0
	Trigla lyra	0.00	0.0	0.00	0.0	0.90	0.9	2.00	0.7	7.51	4.1	0.78	0.6
	Engraulis encrasicolus	0.00	0.0	7.98	8.0	0.01	0.0	0.90	0.9	0.00	0.0	0.00	0.0
Malacostraca	*Parapenaeus longirostris*	1.68	1.6	47.38	18.1	0.00	0.0	34.82	8.3	36.42	6.6	1.15	0.5
	Aristeus antennatus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	2.42	1.5	117.96	13.6
	Squilla mantis	47.47	23.1	34.93	19.2	0.03	0.0	0.73	0.3	0.00	0.0	0.00	0.0
	Nephrops norvegicus	0.00	0.0	1.61	1.4	0.00	0.0	0.30	0.1	73.03	30.9	3.00	1.4
	Liocarcinus depurator	0.00	0.0	20.36	13.7	0.00	0.0	9.23	4.3	0.05	0.0	0.01	0.0
	Penaeus kerathurus	18.77	10.8	0.00	0.0	0.01	0.0	0.00	0.0	0.00	0.0	0.00	0.0
	Penaeus aztecus	15.73	10.4	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
Cephalopoda	*Illex coindetii*	0.45	0.3	17.81	3.4	10.15	5.5	42.10	7.7	7.04	3.2	0.04	0.0
	Eledone cirrhosa	0.23	0.2	6.64	1.8	5.20	1.4	14.58	4.4	20.32	11.3	1.04	0.6
	Loligo vulgaris	5.12	2.4	4.24	1.2	9.69	3.5	3.02	1.1	0.10	0.1	0.00	0.0
	Octopus vulgaris	8.57	5.7	3.06	2.1	7.97	5.4	2.37	1.4	0.00	0.0	0.00	0.0
	Sepia officinalis	11.97	5.5	0.00	0.0	3.97	2.3	0.00	0.0	0.00	0.0	0.00	0.0
	Alloteuthis spp.	3.93	2.0	6.44	4.3	0.30	0.3	2.55	0.9	0.00	0.0	0.00	0.0

Annex 4. Landed species with higher abundance for the year analyzed. SE: standard error.

2025 Landed Abundance (Ind/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Actinopterygii	*Trachurus trachurus*	1 427.61	1096.3	2 828.11	1483.1	1 052.20	566.8	2 384.90	1081.3	18.76	13.4	0.00	0.0
	Mullus barbatus	1 156.85	413.8	518.77	150.9	1 352.84	218.5	1 032.52	328.5	8.29	6.0	0.00	0.0
	Pagellus erythrinus	1 272.63	623.8	261.51	123.3	1 076.64	310.2	95.05	40.6	0.00	0.0	0.00	0.0
	Merluccius merluccius	117.87	56.6	623.98	194.1	293.09	96.6	497.43	98.3	177.65	41.8	33.85	8.6
	Phycis blennoides	0.00	0.0	0.00	0.0	1.15	1.1	58.04	22.9	1 162.51	539.6	162.39	47.9
	Trisopterus capelanus	133.06	90.5	469.95	125.9	508.36	225.7	227.62	53.8	2.00	2.0	0.00	0.0
	Pagellus acarne	764.90	402.3	35.17	18.0	361.00	345.2	12.68	8.9	0.00	0.0	0.00	0.0
	Citharus linguatula	157.05	59.9	779.44	508.1	109.62	43.9	122.92	30.3	0.00	0.0	0.00	0.0
	Helicolenus dactylopterus	0.00	0.0	0.00	0.0	0.00	0.0	144.66	76.5	483.47	189.5	9.23	4.1
	Eutrigla gurnardus	51.11	31.6	348.11	165.2	6.29	3.8	209.23	74.6	0.00	0.0	1.14	1.1
	Lepidotrigla cavillone	155.41	104.8	125.88	66.6	201.73	113.5	122.54	51.7	0.00	0.0	0.00	0.0
	Trachurus mediterraneus	285.31	79.0	9.83	4.9	239.97	227.4	3.52	3.3	0.73	0.7	0.00	0.0
	Scomber scombrus	313.25	223.4	136.14	49.0	11.83	5.1	11.00	3.9	1.19	1.2	0.00	0.0
	Trachinus draco	22.54	10.1	313.24	274.2	82.58	14.3	32.34	8.1	0.06	0.1	0.57	0.6
	Boops boops	115.23	70.1	320.50	182.4	0.00	0.0	8.72	4.7	0.00	0.0	0.00	0.0
	Engraulis encrasicolus	0.00	0.0	386.96	387.0	0.84	0.8	46.18	46.2	0.00	0.0	0.00	0.0
	Lepidorhombus boscii	0.00	0.0	0.00	0.0	65.32	44.1	89.57	31.2	255.35	84.3	13.07	5.2
	Mullus surmuletus	59.33	33.5	30.91	14.6	252.68	89.1	56.54	25.0	2.04	1.3	0.00	0.0
	Diplodus annularis	314.37	92.4	24.89	13.4	0.00	0.0	0.54	0.4	0.00	0.0	0.00	0.0
	Trigla lyra	0.00	0.0	0.00	0.0	91.81	91.8	45.21	16.4	157.12	85.4	12.06	10.8
	Spicara spp.	33.66	31.3	123.00	55.4	0.00	0.0	80.25	66.9	0.00	0.0	0.00	0.0
	Sparus aurata	225.04	135.3	0.00	0.0	6.98	4.8	0.00	0.0	0.00	0.0	0.00	0.0
	Lithognathus mormyrus	224.44	146.1	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
	Chelidonichthys obscurus	53.09	23.8	0.00	0.0	116.86	36.1	49.82	41.6	0.00	0.0	0.00	0.0
	Chelidonichthys lucerna	58.87	34.0	124.00	113.7	4.17	3.1	6.97	2.5	0.00	0.0	2.86	2.9
	Lophius budegassa	0.66	0.7	58.52	20.9	57.18	10.4	48.47	11.7	30.78	10.3	1.11	0.4
	Arnoglossus laterna	56.46	31.3	68.83	35.6	47.66	33.3	20.22	8.1	0.00	0.0	0.00	0.0
	Scomber colias	77.87	74.0	84.14	71.9	3.44	2.6	23.16	14.6	0.06	0.1	0.00	0.0
	Micromesistius poutassou	0.00	0.0	0.00	0.0	0.60	0.6	1.00	1.0	163.86	46.2	16.89	6.9
	Serranus hepatus	27.57	18.4	50.57	11.3	12.25	5.4	46.51	16.2	0.00	0.0	0.00	0.0
Malacostraca	*Parapenaeus longirostris*	169.31	160.3	7 281.11	2891.6	0.00	0.0	4 253.16	972.4	3 168.31	591.2	72.81	31.7
	Aristeus antennatus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	124.46	80.0	7 299.68	1125.7
	Squilla mantis	1 440.55	698.5	1 546.24	930.2	1.16	1.2	27.79	11.8	0.00	0.0	0.00	0.0
	Nephrops norvegicus	0.00	0.0	15.25	11.2	0.00	0.0	3.62	1.5	2 600.03	912.1	88.08	40.5
	Liocarcinus depurator	0.00	0.0	1 383.21	972.6	0.00	0.0	637.29	267.6	4.96	4.9	1.31	1.3
	Penaeus kerathurus	1 001.92	652.3	0.00	0.0	0.58	0.6	0.00	0.0	0.00	0.0	0.00	0.0
	Penaeus aztecus	488.57	299.2	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
	Pasiphaea multidentata	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.41	0.4	473.98	193.6
	Plesionika martia	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	45.35	29.9	290.76	94.4
Cephalopoda	*Illex coindetii*	10.08	6.9	390.99	43.6	152.66	75.9	986.69	167.7	87.65	27.3	0.45	0.3
	Alloteuthis spp.	108.89	61.0	186.20	131.5	7.69	6.7	92.59	36.3	0.00	0.0	0.00	0.0
	Loligo vulgaris	82.77	41.3	88.25	31.4	159.03	57.7	54.50	24.7	0.94	0.7	0.00	0.0
	Eledone cirrhosa	1.05	1.0	28.45	8.2	23.59	5.5	60.50	17.3	72.71	38.0	3.85	2.4

Annex 5. Discarded species with higher biomass for previous period. SE: standard error.

2021-2024 Discarded Biomass (kg/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
	Spicara spp.	3.69	3.4	2.29	1.0	207.82	185.2	9.35	2.9	0.28	0.1	0.01	0.0
	Boops boops	8.30	3.3	6.59	2.7	116.77	63.8	34.14	15.0	0.10	0.1	0.04	0.0
	Engraulis encrasicolus	3.74	2.0	40.69	32.9	0.31	0.2	3.30	0.7	0.01	0.0	0.00	0.0
	Sardina pilchardus	5.72	2.0	35.71	28.2	2.30	1.6	1.62	0.4	0.00	0.0	0.01	0.0
	Sardinella aurita	22.31	10.0	2.88	1.8	17.78	11.3	0.29	0.2	0.00	0.0	0.00	0.0
	Pagellus erythrinus	14.55	6.0	1.22	0.4	25.75	7.0	1.35	0.4	0.02	0.0	0.00	0.0
	Merluccius merluccius	0.49	0.2	8.61	3.1	2.73	1.7	21.63	5.4	0.49	0.2	0.08	0.0
	Trachurus trachurus	0.62	0.5	4.75	2.7	4.21	2.1	21.92	9.9	0.97	0.3	0.07	0.0
	Lophius budegassa	0.24	0.1	6.39	2.6	12.35	4.8	10.71	1.6	0.88	0.2	0.09	0.1
	Trachurus picturatus	0.27	0.3	0.00	0.0	22.16	22.2	0.48	0.2	0.04	0.0	0.00	0.0
	Pagellus acarne	11.49	4.9	2.35	1.1	3.78	1.8	0.34	0.2	0.00	0.0	0.00	0.0
	Scomber colias	0.77	0.4	0.27	0.2	12.52	8.7	0.19	0.1	0.00	0.0	0.00	0.0
Actinopterygii	*Spicara flexuosa*	0.20	0.2	1.56	0.9	1.84	1.2	8.69	1.9	0.02	0.0	0.00	0.0
	Trachurus mediterraneus	6.01	3.0	1.18	0.7	1.38	1.0	0.33	0.2	0.00	0.0	0.00	0.0
	Lithognathus mormyrus	6.53	6.0	0.05	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
	Arnoglossus laterna	2.32	0.8	2.52	0.6	0.71	0.3	0.93	0.2	0.01	0.0	0.00	0.0
	Diplodus annularis	5.28	2.0	0.45	0.3	0.70	0.4	0.00	0.0	0.00	0.0	0.00	0.0
	Lampanyctus crocodilus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.31	0.2	5.58	1.4
	Pagellus bogaraveo	0.03	0.0	0.45	0.2	0.45	0.3	2.41	0.9	1.22	0.3	1.15	0.6
	Coelorinchus caelorhincus	0.00	0.0	0.00	0.0	0.00	0.0	0.03	0.0	3.94	0.8	1.28	0.5
	Capros aper	0.00	0.0	0.03	0.0	0.01	0.0	4.56	1.7	0.57	0.2	0.06	0.0
	Spicara maena	2.60	2.5	0.74	0.6	0.00	0.0	0.88	0.3	0.04	0.0	0.00	0.0
	Spicara smaris	0.02	0.0	0.00	0.0	3.43	2.6	0.50	0.5	0.00	0.0	0.00	0.0
	Trisopterus capelanus	0.28	0.1	1.42	0.4	0.35	0.2	1.73	0.4	0.01	0.0	0.00	0.0
	Sparus aurata	3.56	1.6	0.02	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
Elasmobranchii	*Scyliorhinus canicula*	0.00	0.0	0.07	0.1	0.68	0.5	42.22	7.2	60.71	8.7	15.62	3.7
	Galeus melastomus	0.00	0.0	0.00	0.0	0.00	0.0	0.08	0.0	3.33	0.6	20.48	4.0
Malacostraca	*Liocarcinus depurator*	0.68	0.3	5.30	1.6	0.01	0.0	3.00	1.3	0.02	0.0	0.03	0.0
	Squilla mantis	2.98	0.8	3.17	0.5	0.00	0.0	0.30	0.2	0.00	0.0	0.00	0.0
Cephalopoda	*Octopus vulgaris*	3.65	1.4	0.89	0.3	15.64	4.2	1.24	0.3	0.10	0.1	0.00	0.0
	Illex coindetii	0.83	0.4	0.61	0.2	0.34	0.2	2.33	0.4	0.62	0.1	0.53	0.1
Gastropoda	*Aporrhais serresiana*	3.11	1.5	0.94	0.4	0.00	0.0	0.09	0.0	0.00	0.0	0.00	0.0
Crinoidea	*Leptometra phalangium*	0.00	0.0	0.00	0.0	0.00	0.0	16.44	12.5	0.01	0.0	0.00	0.0
Asteroidea	*Astropecten irregularis*	5.29	1.4	4.77	1.0	0.10	0.1	3.62	0.9	0.10	0.0	0.06	0.0
	Astropecten aranciacus	0.51	0.3	0.08	0.1	2.71	0.9	0.19	0.1	0.06	0.0	0.00	0.0
Echinoidea	*Echinus melo*	0.00	0.0	0.00	0.0	10.67	7.8	4.73	1.8	0.00	0.0	0.00	0.0
	Spatangus purpureus	0.00	0.0	0.00	0.0	4.10	4.1	1.68	1.6	0.03	0.0	0.00	0.0
	Gracilechinus acutus	0.00	0.0	0.00	0.0	2.97	2.1	2.64	1.1	0.00	0.0	0.00	0.0
	Sphaerechinus granularis	0.00	0.0	0.00	0.0	4.06	4.1	0.00	0.0	0.00	0.0	0.00	0.0
Anthozoa	*Alcyonium palmatum*	0.31	0.1	0.44	0.1	0.68	0.3	14.30	3.6	0.22	0.1	0.38	0.2
	Calliactis parasitica	0.17	0.1	0.24	0.1	3.25	0.8	0.57	0.2	0.10	0.0	0.02	0.0
	Epizoanthus 1	0.15	0.1	3.91	2.7	0.00	0.0	0.03	0.0	0.00	0.0	0.00	0.0

Annex 6. Discarded species with higher abundance for previous period. SE: standard error.

2021-2024 Landed Abundance (Ind/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Actinopterygii	*Trachurus trachurus*	48.37	41.8	525.25	243.6	523.55	226.8	3 195.93	844.9	13.8	6.5	0.18	0.2
	Mullus barbatus	988.41	231.7	239.07	42.7	1 819.31	494.0	879.70	89.1	4.7	2.0	0.00	0.0
	Pagellus erythrinus	489.96	120.0	105.12	21.9	579.72	123.7	62.87	14.0	0.1	0.1	0.12	0.1
	Merluccius merluccius	42.73	13.3	337.44	57.3	187.33	54.7	513.36	47.9	125.2	14.1	30.68	5.2
	Phycis blennoides	0.00	0.0	0.34	0.3	0.00	0.0	86.70	14.7	830.6	76.7	199.95	18.5
	Trisopterus capelanus	42.14	18.9	303.15	48.3	134.83	56.0	524.99	46.9	0.4	0.2	0.00	0.0
	Mullus surmuletus	42.49	11.3	28.90	8.6	679.66	228.6	60.54	18.2	6.6	2.5	0.56	0.4
	Diplodus vulgaris	93.11	46.0	2.27	1.4	651.87	538.1	0.11	0.1	0.1	0.1	0.00	0.0
	Trachurus mediterraneus	519.08	147.4	80.40	38.7	26.77	12.3	44.02	36.5	0.0	0.0	0.06	0.1
	Micromesistius poutassou	0.00	0.0	0.00	0.0	0.00	0.0	77.09	48.4	456.4	69.7	26.93	4.6
	Citharus linguatula	30.24	8.2	358.66	54.3	43.41	17.8	77.36	11.4	0.6	0.4	0.10	0.1
	Lepidotrigla cavillone	0.70	0.5	93.32	24.6	329.50	231.7	76.26	15.9	0.0	0.0	0.00	0.0
	Boops boops	169.19	60.7	193.73	65.6	0.00	0.0	27.05	9.1	0.0	0.0	0.00	0.0
	Helicolenus dactylopterus	0.00	0.0	0.00	0.0	0.73	0.7	169.24	42.1	194.4	36.1	17.09	5.8
	Pagellus acarne	205.42	79.8	26.32	10.0	119.14	43.7	1.87	0.8	0.3	0.3	0.00	0.0
	Scomber scombrus	90.70	40.3	199.88	59.5	17.13	12.4	34.14	8.3	0.2	0.1	0.00	0.0
	Lepidorhombus boscii	0.00	0.0	0.00	0.0	1.78	1.2	75.59	11.7	220.4	35.3	13.10	3.3
	Sardina pilchardus	0.40	0.4	164.62	108.5	53.98	54.0	26.49	15.5	0.0	0.0	0.00	0.0
	Eutrigla gurnardus	7.70	6.0	121.23	30.3	1.51	0.9	114.02	24.2	0.0	0.0	0.00	0.0
	Chelidonichthys cuculus	7.83	6.7	0.00	0.0	170.17	67.3	32.21	7.5	0.1	0.1	0.00	0.0
	Lophius budegassa	1.41	1.0	72.83	13.2	29.91	4.6	87.42	12.4	17.1	3.1	0.95	0.3
	Trigla lyra	0.00	0.0	0.00	0.0	3.60	2.3	79.96	16.0	99.7	15.8	2.94	1.6
	Spicara spp.	50.38	34.7	67.01	20.5	0.00	0.0	67.25	29.6	0.0	0.0	0.00	0.0
	Arnoglossus laterna	25.78	13.1	89.31	18.3	14.77	8.3	34.55	7.7	0.0	0.0	0.00	0.0
	Lithognathus mormyrus	148.20	59.1	6.60	3.9	0.00	0.0	0.00	0.0	0.0	0.0	0.00	0.0
	Trachinus draco	10.96	3.4	47.72	11.4	50.88	15.2	37.18	6.3	0.0	0.0	0.00	0.0
	Diplodus annularis	129.16	33.8	8.65	2.7	0.57	0.6	0.28	0.1	0.0	0.0	0.00	0.0
Malacostraca	*Parapenaeus longirostris*	27.93	22.0	2 562.93	463.0	0.00	0.0	2 466.05	385.5	2768.4	461.3	76.37	36.5
	Aristeus antennatus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	74.1	40.9	4 293.65	341.4
	Nephrops norvegicus	0.00	0.0	6.16	2.4	0.00	0.0	3.71	0.8	2196.5	217.1	106.96	26.3
	Liocarcinus depurator	15.95	7.9	1 452.39	397.0	0.00	0.0	507.30	141.8	16.0	13.6	0.24	0.2
	Squilla mantis	843.58	148.2	860.38	104.3	0.79	0.5	42.65	13.2	0.0	0.0	0.00	0.0
	Plesionika martia	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	130.8	49.2	569.48	79.5
	Penaeus kerathurus	571.30	141.4	0.00	0.0	0.59	0.6	0.05	0.0	0.0	0.0	0.00	0.0
	Plesionika heterocarpus	0.00	0.0	0.00	0.0	0.00	0.0	518.65	250.4	46.5	17.6	0.99	0.8
	Pasiphaea multidentata	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	6.6	2.9	477.09	75.0
Cephalopoda	*Illex coindetii*	29.83	15.5	772.76	144.8	131.31	74.0	1 365.62	260.1	100.9	16.5	5.67	1.8
	Alloteuthis spp.	85.68	21.1	131.22	22.8	2.39	2.4	26.71	6.0	0.0	0.0	0.00	0.0
	Eledone cirrhosa	1.79	0.8	40.27	7.5	51.21	17.9	82.04	8.3	56.1	7.2	6.29	1.7
	Loligo vulgaris	51.33	17.2	46.37	11.8	86.08	56.3	12.87	3.0	0.2	0.1	0.00	0.0
	Alloteuthis media	33.46	15.2	101.32	44.5	0.00	0.0	6.35	2.8	0.0	0.0	0.00	0.0
	Sepia officinalis	129.79	35.8	0.42	0.4	6.99	4.6	1.29	0.7	0.0	0.0	0.00	0.0
Gastropoda	*Bolinus brandaris*	182.75	38.6	56.22	13.6	0.00	0.0	3.81	1.0	0.0	0.0	0.00	0.0

Annex 7. Discarded species with higher biomass for the year analyzed. SE: standard error.

2025 Discarded Biomass (kg/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Actinopterygii	*Pagellus acarne*	17.11	10.0	2.80	2.2	123.55	119.4	0.27	0.2	0.04	0.0	0.00	0.0
	Boops boops	46.93	39.3	14.66	11.1	47.56	24.3	14.43	10.9	1.24	0.8	0.00	0.0
	Pagellus erythrinus	7.19	3.0	0.12	0.1	58.99	25.3	5.96	3.2	0.02	0.0	0.00	0.0
	Merluccius merluccius	4.19	2.4	29.07	15.2	12.76	10.5	15.96	7.2	1.92	0.8	0.00	0.0
	Trachurus trachurus	1.69	1.3	7.47	4.0	17.37	14.1	13.55	7.4	1.83	0.9	0.03	0.0
	Lophius budegassa	0.12	0.1	16.71	7.6	4.11	2.1	15.92	5.2	0.63	0.2	0.01	0.0
	Spicara spp.	4.50	2.3	3.35	2.8	9.96	4.5	7.81	4.0	0.35	0.2	0.00	0.0
	Pagellus bogaraveo	1.41	1.3	0.52	0.4	8.95	5.7	5.65	2.4	6.10	3.8	1.67	1.4
	Sardina pilchardus	10.11	8.7	11.76	6.5	0.74	0.4	0.83	0.4	0.00	0.0	0.00	0.0
	Engraulis encrasicolus	5.76	3.6	11.48	8.0	0.04	0.0	3.96	2.3	0.00	0.0	0.00	0.0
	Diplodus annularis	4.65	3.0	0.00	0.0	6.36	5.7	0.24	0.2	0.00	0.0	0.00	0.0
	Mola mola	0.00	0.0	0.00	0.0	7.15	4.8	2.60	1.8	0.00	0.0	0.00	0.0
	Xiphias gladius	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	7.98	8.0	0.00	0.0
	Lophius piscatorius	0.00	0.0	4.08	3.8	0.60	0.4	2.70	2.1	0.00	0.0	0.00	0.0
	Capros aper	0.00	0.0	0.93	0.8	0.00	0.0	3.49	2.6	2.81	2.2	0.00	0.0
	Sparus aurata	6.88	5.5	0.24	0.2	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
	Scomber colias	3.07	2.2	1.05	1.0	1.71	1.5	0.93	0.5	0.04	0.0	0.00	0.0
	Coelorinchus caelorhincus	0.00	0.0	0.00	0.0	0.00	0.0	0.04	0.0	5.29	1.7	0.58	0.3
	Arnoglossus laterna	3.02	1.9	1.88	1.0	0.42	0.3	0.34	0.1	0.01	0.0	0.00	0.0
	Trisopterus capelanus	0.48	0.3	1.39	1.3	0.98	0.7	1.90	0.9	0.00	0.0	0.00	0.0
	Sardinella aurita	4.40	3.5	0.17	0.1	0.06	0.1	0.03	0.0	0.00	0.0	0.00	0.0
	Trachurus mediterraneus	2.61	1.4	0.04	0.0	1.44	1.4	0.32	0.2	0.00	0.0	0.00	0.0
	Lampanyctus crocodilus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.29	0.2	4.05	2.6
Elasmobranchii	*Scyliorhinus canicula*	0.00	0.0	2.46	2.5	15.63	4.8	48.40	16.8	108.78	36.8	24.50	20.7
	Galeus melastomus	0.00	0.0	0.00	0.0	0.00	0.0	0.02	0.0	3.77	1.7	10.74	5.8
	Dasyatis pastinaca	5.73	5.7	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
Malacostraca	*Squilla mantis*	5.56	3.8	8.55	8.1	0.00	0.0	0.29	0.3	0.00	0.0	0.00	0.0
	Parapenaeus longirostris	0.23	0.2	8.32	5.6	0.08	0.1	3.98	2.2	1.27	0.4	0.01	0.0
	Liocarcinus depurator	0.11	0.1	4.01	2.6	0.08	0.0	3.35	2.2	0.01	0.0	0.00	0.0
	Dardanus arrosor	0.81	0.4	0.74	0.7	2.29	0.9	0.52	0.3	0.25	0.1	0.04	0.0
Cephalopoda	*Octopus vulgaris*	9.48	3.6	0.05	0.1	17.38	5.7	2.70	1.2	0.39	0.2	0.00	0.0
	Octopus salutii	0.12	0.1	0.00	0.0	0.00	0.0	0.00	0.0	4.94	3.9	0.09	0.1
Asteroidea	*Astropecten irregularis*	3.66	1.8	9.39	4.9	4.04	3.4	2.53	1.5	0.12	0.0	0.02	0.0
	Tethyaster subinermis	0.00	0.0	0.00	0.0	0.25	0.2	0.79	0.5	6.99	4.8	0.11	0.1
	Astropecten aranciacus	0.46	0.5	0.01	0.0	2.36	1.3	0.36	0.3	1.73	1.1	0.00	0.0
Holothuroidea	*Parastichopus regalis*	0.23	0.2	0.06	0.1	8.33	3.5	0.75	0.7	0.86	0.8	0.00	0.0
Echinoidea	*Echinus melo*	0.00	0.0	0.00	0.0	39.14	19.6	5.69	3.5	0.00	0.0	0.00	0.0
Echinoidea	*Gracilechinus acutus*	0.00	0.0	0.00	0.0	9.17	9.2	8.39	6.9	0.00	0.0	0.02	0.0
Anthozoa	*Calliactis parasitica*	0.06	0.1	0.00	0.0	4.06	1.6	0.20	0.1	0.19	0.2	0.03	0.0

Annex 8. Discarded species with higher abundance for the year analyzed. SE: standard error.

2025 Landed Abundance (Ind/km^2)		Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Class	Species	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Actinopterygii	*Sardina pilchardus*	1 420.56	1209.9	1 238.96	808.4	85.49	47.3	68.45	35.1	0.27	0.3	0.00	0.0
	Engraulis encrasicolus	843.17	564.4	1 306.32	975.6	6.70	6.7	381.50	181.2	0.00	0.0	0.00	0.0
	Boops boops	842.73	715.0	262.43	203.6	1 144.57	446.6	271.18	197.0	15.25	10.1	0.00	0.0
	Pagellus erythrinus	253.92	96.6	4.34	2.9	2 028.39	982.8	167.59	99.0	0.27	0.3	0.00	0.0
	Trachurus trachurus	82.37	68.4	838.49	551.5	766.17	561.2	546.22	288.3	45.13	21.7	0.86	0.9
	Pagellus acarne	542.23	252.9	76.11	49.7	1 524.60	1425.2	6.56	3.7	0.63	0.4	0.00	0.0
	Merluccius merluccius	172.89	100.5	919.19	437.3	329.80	277.4	493.98	218.4	57.51	21.8	0.00	0.0
	Arnoglossus laterna	357.05	209.9	280.75	136.4	493.49	469.6	53.84	21.3	2.89	2.2	0.00	0.0
	Spicara spp.	194.42	92.6	116.42	103.7	570.57	290.8	201.33	109.0	8.04	5.2	0.00	0.0
	Capros aper	0.00	0.0	202.03	151.2	0.00	0.0	286.57	159.2	221.51	173.0	0.86	0.9
	Lophius budegassa	8.08	8.1	278.62	145.6	113.48	92.7	142.73	43.8	23.52	8.5	0.22	0.2
	Pagellus bogaraveo	58.09	49.9	15.74	11.0	220.91	139.7	132.35	54.8	70.75	35.0	7.25	6.5
	Citharus linguatula	107.04	46.4	68.02	47.1	190.53	188.5	34.82	29.3	0.00	0.0	0.00	0.0
	Diplodus annularis	162.07	92.4	0.00	0.0	218.11	165.4	4.68	3.7	0.00	0.0	0.00	0.0
	Lepidotrigla cavillone	96.90	64.6	0.00	0.0	118.42	92.5	104.55	38.9	0.00	0.0	0.00	0.0
	Trisopterus capelanus	15.87	10.9	81.28	56.1	117.13	94.3	95.68	45.8	0.39	0.4	0.00	0.0
	Coelorinchus caelorhincus	0.00	0.0	0.00	0.0	0.00	0.0	1.56	1.6	268.27	114.5	11.49	4.9
	Trachurus mediterraneus	226.01	112.5	3.69	3.7	32.35	29.8	3.43	2.9	0.00	0.0	0.00	0.0
Elasmob.	*Scyliorhinus canicula*	0.00	0.0	22.61	22.6	72.85	21.5	316.50	105.7	656.28	238.2	112.50	98.8
	Raja spp. eggs	92.51	40.1	96.67	39.8	207.92	187.2	92.96	47.5	4.46	2.4	0.23	0.2
	Scyliorhinus canicula eggs	83.71	71.6	30.46	15.7	105.86	64.0	46.69	14.9	19.58	5.5	1.28	1.0
Malacostraca	*Parapenaeus longirostris*	56.59	35.6	2 500.14	1713.6	6.38	5.7	869.90	459.5	243.02	106.1	1.36	1.0
	Dardanus arrosor	70.41	21.6	57.49	44.1	1 300.45	1116.8	39.47	19.5	20.22	11.4	4.39	3.5
	Liocarcinus depurator	19.32	15.9	686.91	419.8	62.16	47.1	456.02	309.6	1.19	0.6	0.00	0.0
	Squilla mantis	352.25	236.4	817.54	787.2	0.00	0.0	24.51	19.7	0.00	0.0	0.00	0.0
	Macropodia tenuirostris	56.59	56.6	325.48	172.2	99.20	93.9	86.90	47.8	1.62	1.1	0.00	0.0
	Goneplax rhomboides	123.74	70.5	188.65	94.6	0.00	0.0	36.96	23.6	7.41	3.7	0.47	0.5
	Aristeus antennatus	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.57	0.4	323.06	274.9
Cep.	*Illex coindetii*	60.80	33.3	93.02	74.5	16.90	13.3	113.46	48.6	30.84	13.7	3.84	2.1
Gas.	*Calliostoma granulatum*	110.42	88.8	262.56	175.2	285.97	282.8	193.82	105.5	0.22	0.2	0.00	0.0
	Aporrhais serresiana	73.45	70.2	263.48	152.9	0.00	0.0	1.38	1.1	0.00	0.0	0.00	0.0
Biv.	*Neopycnodonte cochlear*	0.70	0.7	0.00	0.0	3 575.56	3279.7	95.50	45.5	2.12	1.4	0.00	0.0
	Venus nux	18.16	12.0	424.72	352.9	0.00	0.0	101.98	57.3	0.00	0.0	0.00	0.0
Crin.	*Leptometra phalangium*	0.00	0.0	0.00	0.0	94.36	94.4	6 153.45	4203.8	411.48	301.4	12.86	12.9
Aste.	*Astropecten irregularis*	1 396.72	615.6	3 527.28	1828.4	118.20	92.6	620.50	329.1	42.00	19.0	5.77	3.6
Anthozoa	*Calliactis parasitica*	3.85	2.8	0.86	0.9	1 944.39	1675.9	27.99	12.5	16.03	14.3	2.68	1.8
	Epizoanthus 1	0.52	0.5	1 247.39	801.7	2.89	2.9	5.86	5.6	0.36	0.4	0.00	0.0
	Alcyonium palmatum	79.84	37.3	112.85	58.9	324.80	279.7	138.95	52.3	5.51	3.9	0.00	0.0
	Anthozoa 2	5.79	5.8	615.45	615.4	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0
	Veretillum cynomorium	88.64	47.9	8.04	4.5	248.07	234.8	10.34	9.2	0.00	0.0	0.00	0.0

Annex 9. Natural debris mass for previous period. SE: standard error.

2021-2024 Natural Debris mass (kg/km^2)	Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Category	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Marine organic	8.11	1.53	6.86	1.16	13.09	4.06	7.18	0.94	2.97	0.35	2.05	0.25
Terrestrial plants	5.55	1.26	4.82	0.95	4.07	1.08	5.84	0.99	3.68	1.48	3.25	1.23
Shells	6.21	0.90	4.15	0.86	7.19	2.13	6.32	0.84	2.02	0.43	0.93	0.30
Marine plants	4.16	1.01	3.10	0.57	4.55	2.56	1.24	0.19	0.18	0.03	0.17	0.04
Calcareous debris	0.59	0.25	0.51	0.24	6.41	3.96	2.72	1.36	0.20	0.09	0.25	0.11
Marine algae	0.13	0.06	0.02	0.01	1.10	0.48	0.15	0.08	0.01	0.00	0.03	0.02
Terrestrial animals	0.01	0.01	0.00	0.00	0.00	0.00	0.02	0.02	0.19	0.17	0.00	0.00

Annex 10. Natural debris mass for the year analyzed. SE: standard error.

2025 Natural Debris mass (kg/km^2)	Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Category	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Marine organic	9.79	3.40	13.26	6.63	7.72	2.81	5.41	1.72	3.98	1.02	0.86	0.29
Terrestrial plants	3.12	1.06	3.97	1.04	12.70	5.28	5.92	1.32	6.79	1.94	1.99	0.84
Shells	13.21	4.81	4.82	1.55	3.36	2.11	4.58	2.10	3.71	1.50	0.49	0.17
Calcareous debris	4.83	4.50	0.43	0.40	5.34	4.28	0.03	0.03	0.08	0.07	0.05	0.04
Marine plants	3.60	1.33	2.31	0.51	1.07	0.73	0.78	0.19	1.52	1.38	0.03	0.01
Terrestrial animals	4.02	3.92	0.41	0.41	0.00	0.00	0.03	0.03	0.00	0.00	0.04	0.03
Marine algae	0.02	0.02	0.54	0.52	1.58	1.09	0.08	0.07	0.24	0.15	0.00	0.00

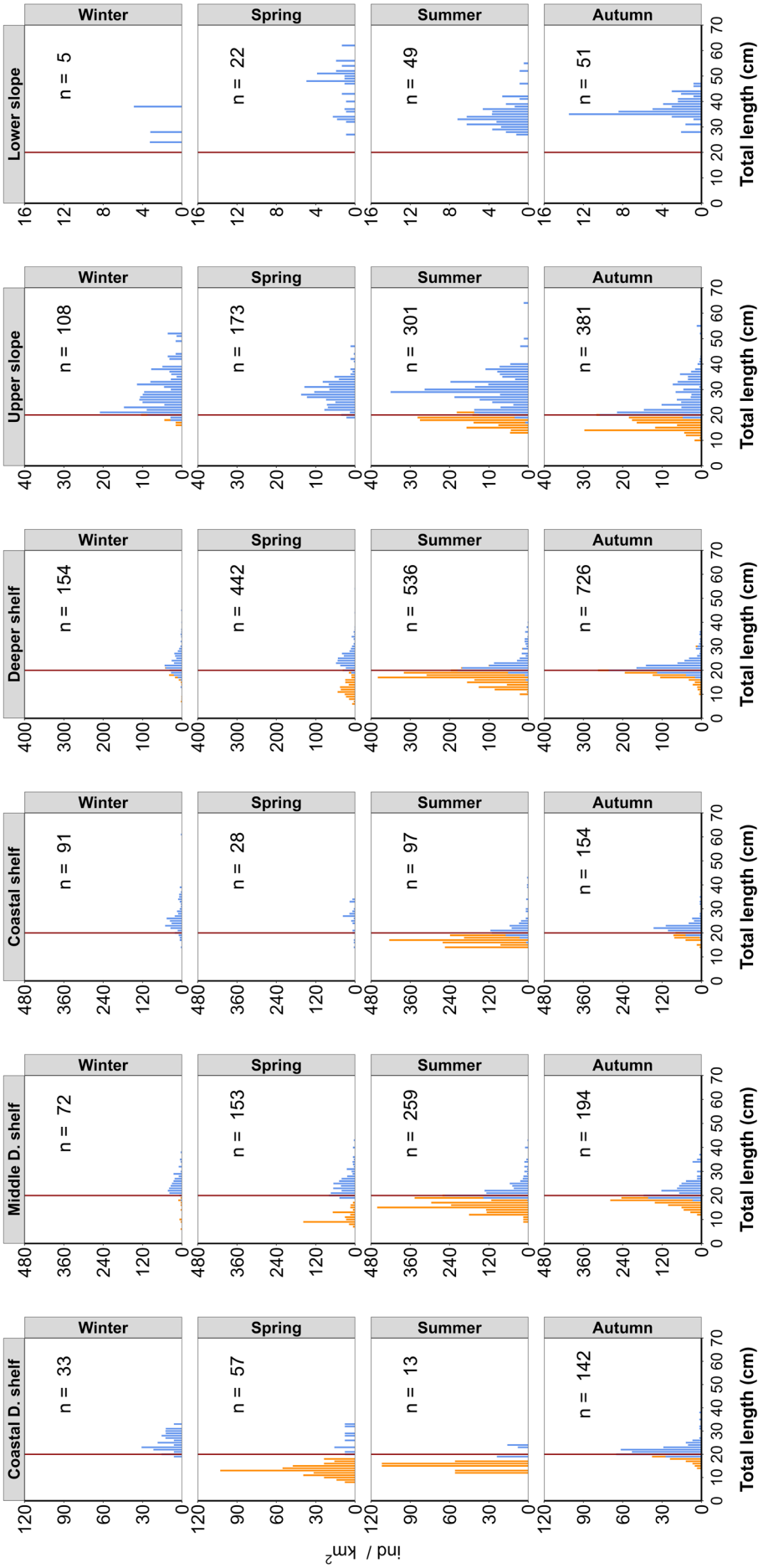
Annex 11. Marine litter mass for previous period. SE: standard error.

2021-2024 Marine litter mass (kg/km^2)	Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Category	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Plastic	1.60	0.49	1.46	0.44	7.99	2.17	8.73	1.85	1.80	0.29	1.45	0.34
Other waste	0.94	0.44	2.56	0.94	1.69	0.79	2.62	0.51	2.45	0.40	1.81	0.40
Metal	0.06	0.03	0.05	0.03	0.95	0.76	8.58	8.27	0.05	0.02	0.49	0.45
Wood	1.10	0.78	0.53	0.33	0.33	0.18	0.77	0.31	0.41	0.14	0.26	0.12
Textiles	0.50	0.25	0.10	0.06	1.28	0.55	0.58	0.11	0.27	0.07	0.22	0.08
Rubber	0.00	0.00	0.00	0.00	0.02	0.02	0.22	0.11	0.01	0.00	0.00	0.00

Annex 12. Marine litter mass for the year analyzed. SE: standard error.

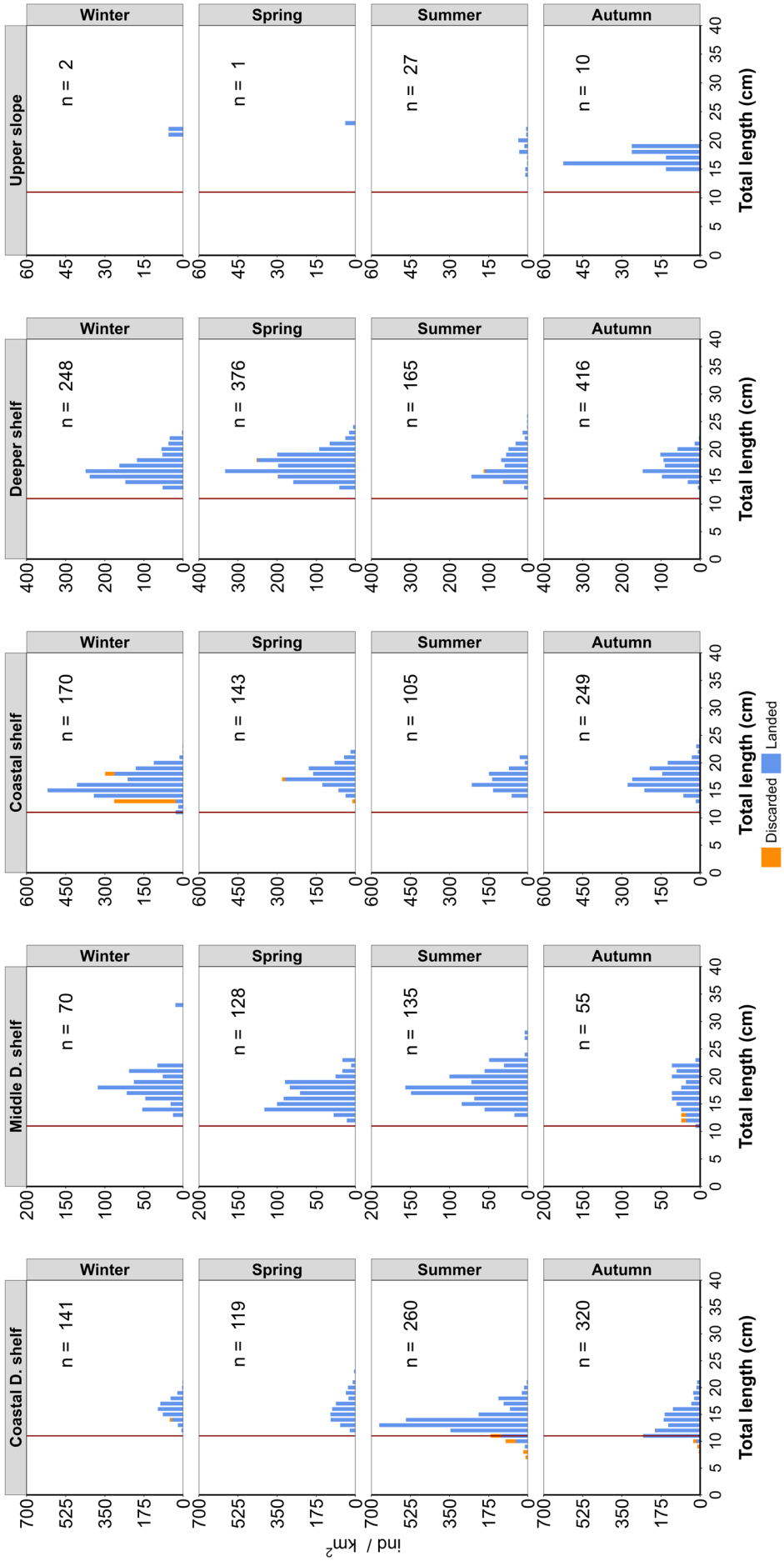
2025 Marine litter mass (kg/km^2)	Coastal Delta shelf		Middle Delta shelf		Coastal shelf		Deeper shelf		Upper slope		Lower slope	
Category	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Plastic	1.32	0.54	4.51	3.35	4.40	0.93	1.64	0.63	1.78	0.62	12.65	11.83
Other waste	0.75	0.38	1.43	1.21	4.19	2.17	0.33	0.16	3.07	1.98	1.68	1.13
Wood	0.20	0.13	2.14	2.14	2.54	2.30	0.00	0.00	0.01	0.01	0.00	0.00
Metal	0.00	0.00	0.00	0.00	2.82	2.71	0.07	0.07	0.00	0.00	0.04	0.04
Textiles	0.00	0.00	0.33	0.33	0.08	0.08	0.34	0.25	0.17	0.13	0.10	0.10
Rubber	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.13	0.00	0.00	0.00	0.00

Hake (*Merluccius merluccius*) HKE



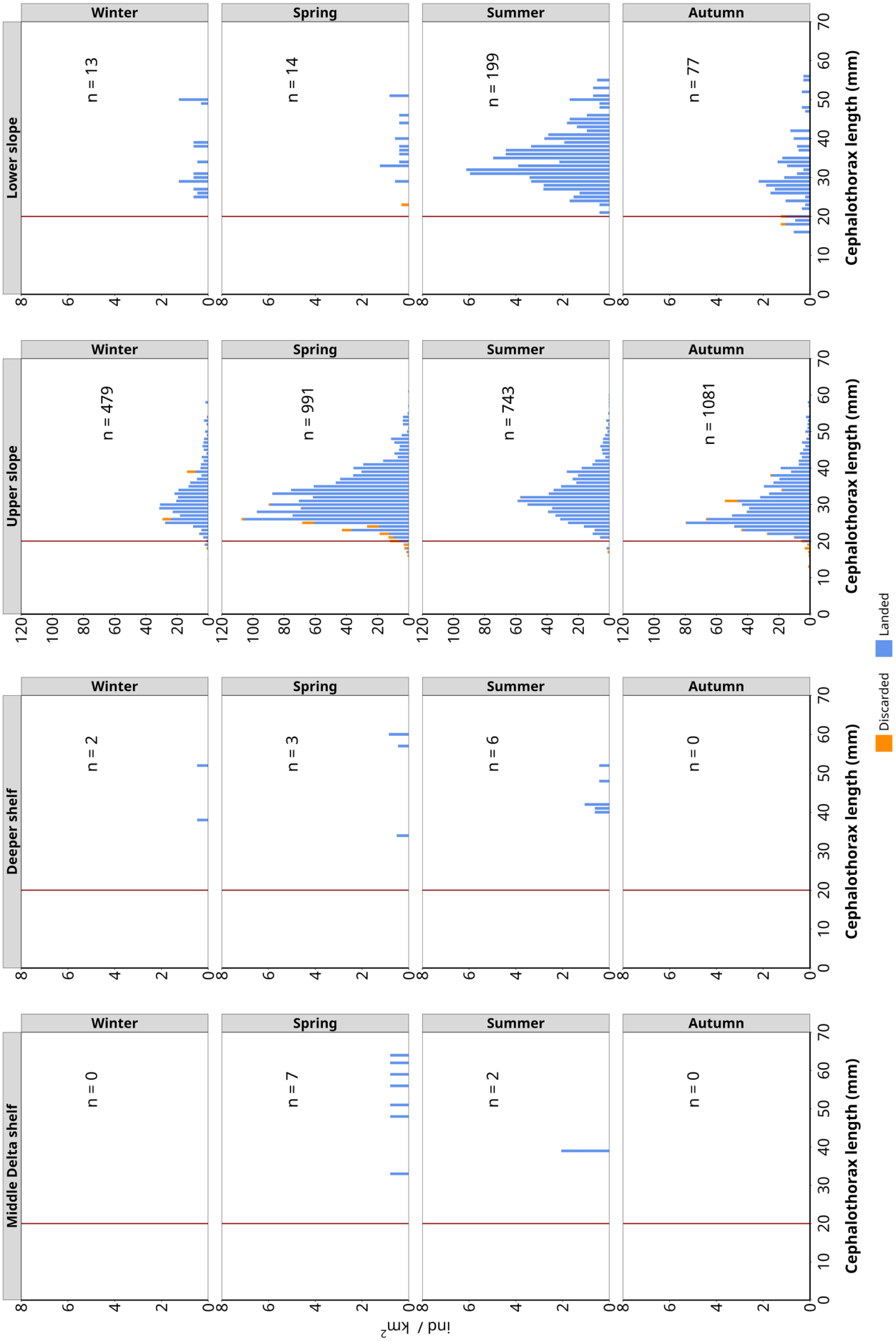
Annex 13. Seasonal length-frequency distribution of European hake at different *métiers* (Coastal Delta Shelf, Middle Delta Shelf, Coastal Shelf, Deeper Shelf, Upper Slope and Lower Slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D.

Red Mullet (*Mullus barbatus*) MUT



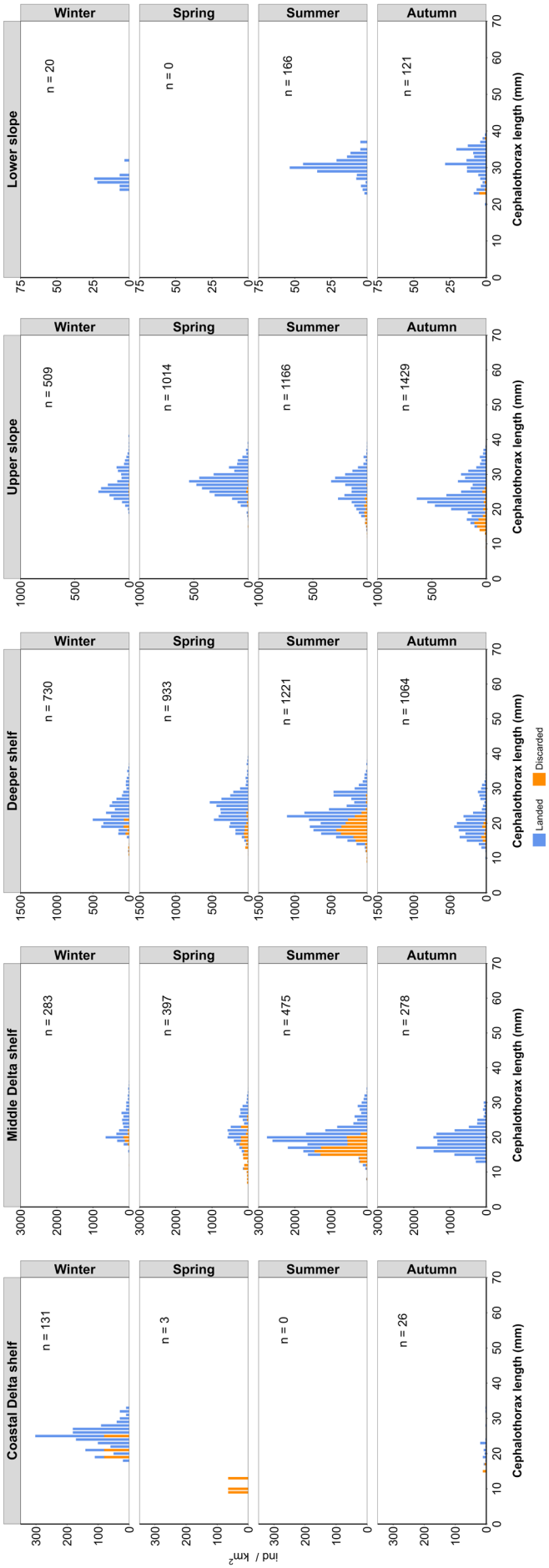
Annex 14. Seasonal length-frequency distribution of red mullet at different *métiers* (Coastal Delta shelf, Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Autumn: O, N, D.

Norway lobster (*Nephrops norvegicus*) NEP



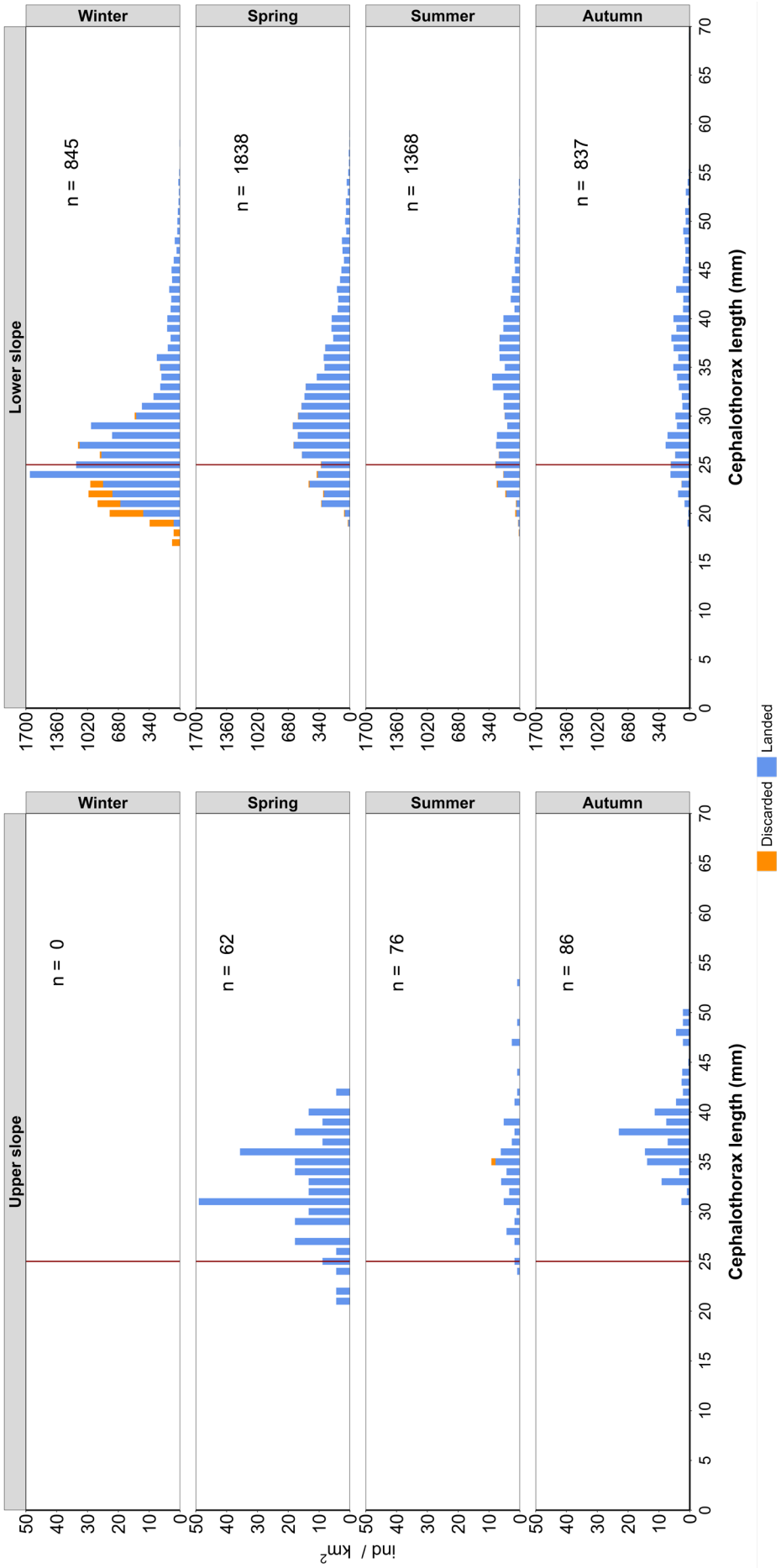
Annex 15. Seasonal length-frequency distribution of Norway lobster at different *métiers* (Middle Delta shelf; Deeper shelf; Upper slope; Lower slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D.

Deep-water rose shrimp (*Parapenaeus longirostris*) DPS



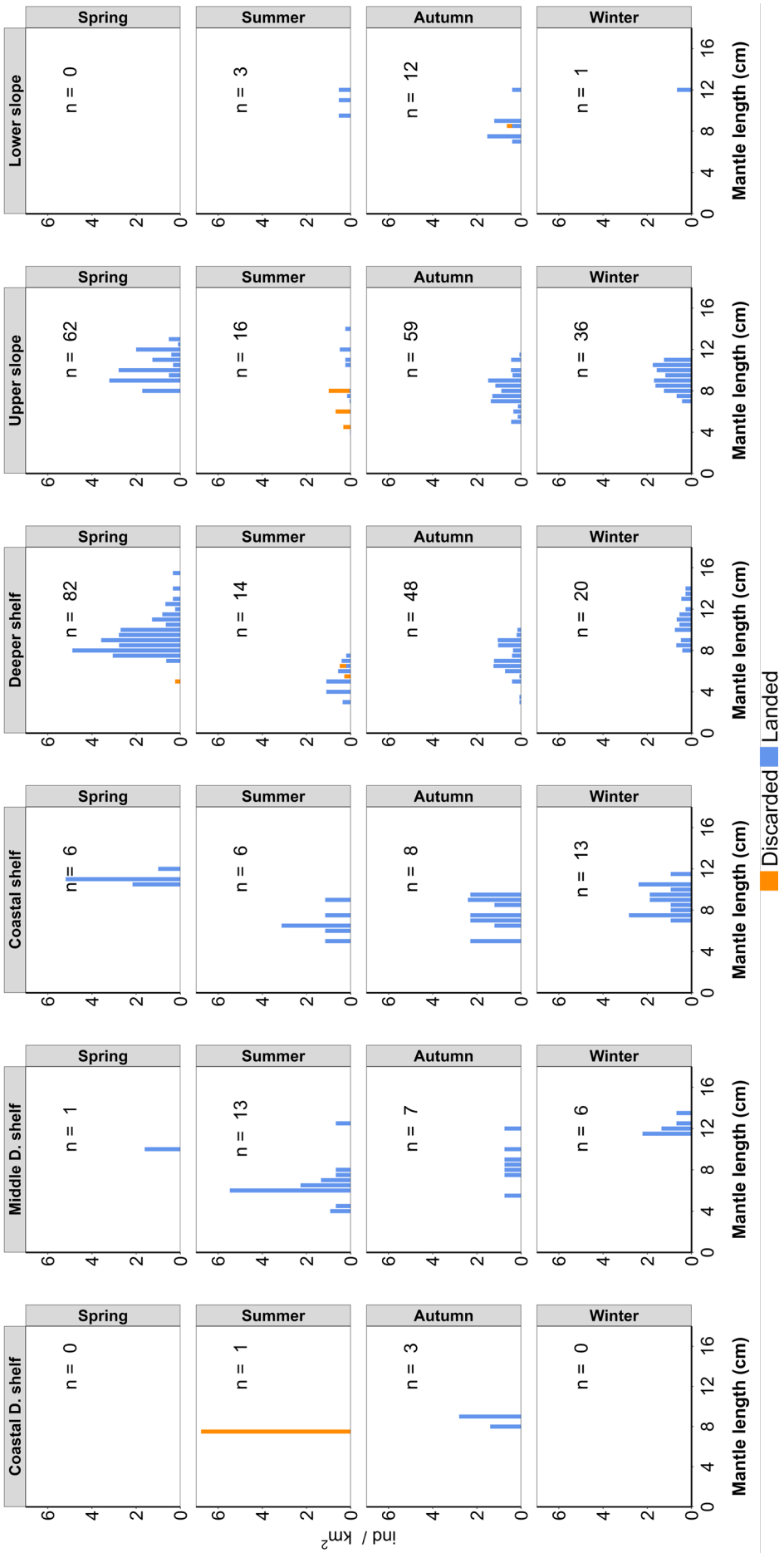
Annex 16. Seasonal length-frequency distribution of deep-water rose shrimp at different *métiers* (Coastal Delta shelf, Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Autumn: O, N, D.

Blue and red shrimp (*Aristeus antennatus*) ARA



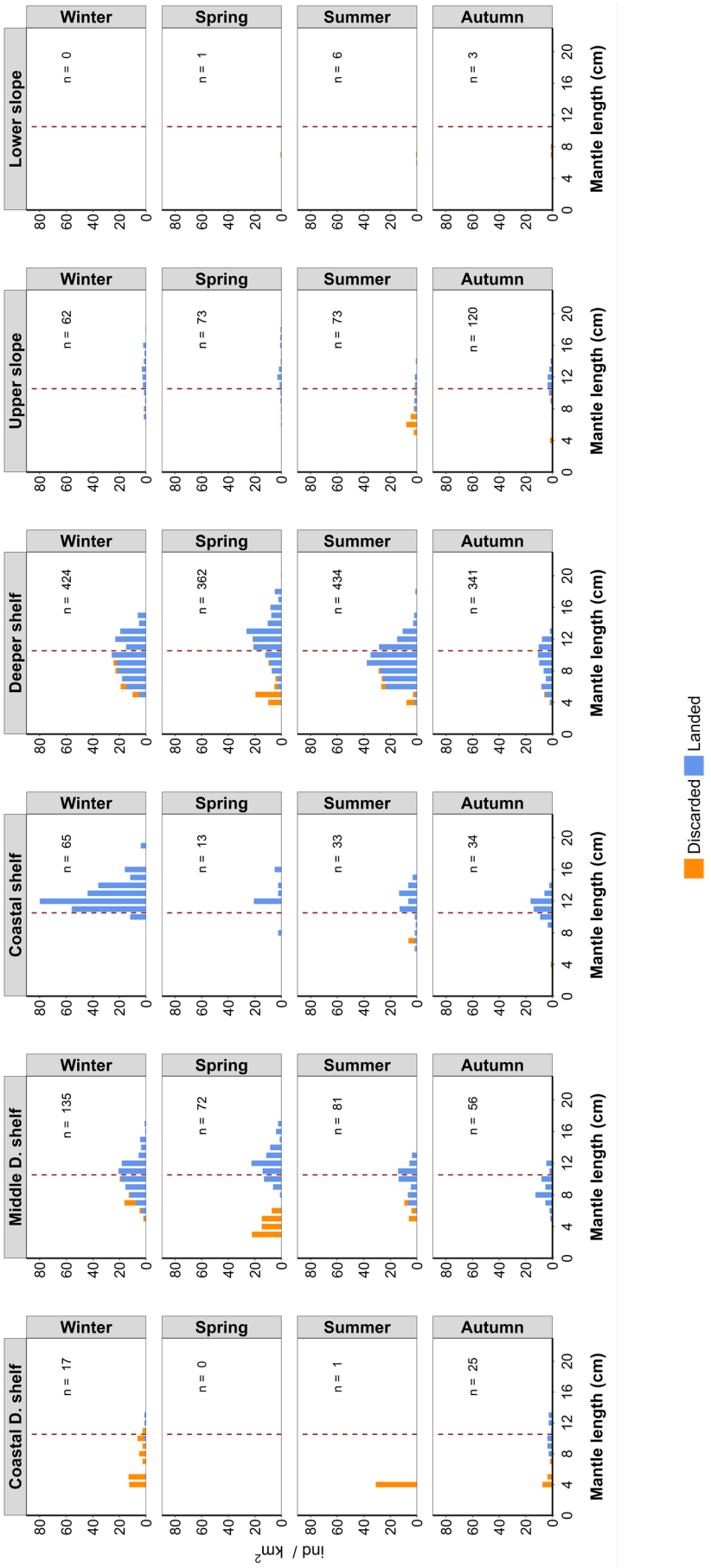
Annex 17. Seasonal length-frequency distribution of blue and red shrimp at dif-ferent *métiers* (Upper Slope and Lower Slope) in 2025. (n) Total number of meas-ured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D.

Horned octopus (*Eledone cirrhosa*) EOI



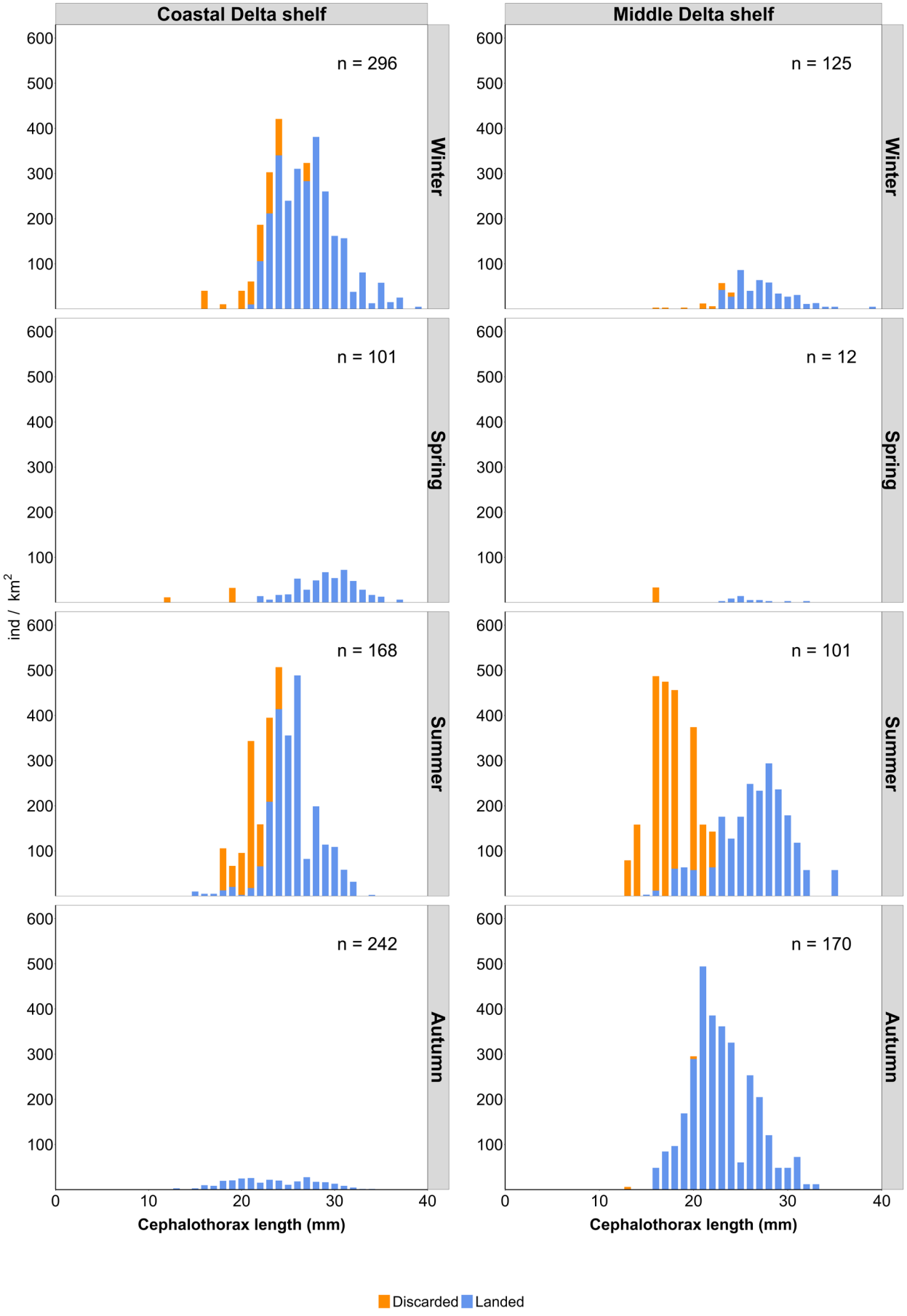
Annex 18. Seasonal length-frequency distribution of horned octopus at different *métiers* (Coastal Delta shelf, Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Autumn: O, N, D.

Broadtail squid (*Illex coindetii*) SQM



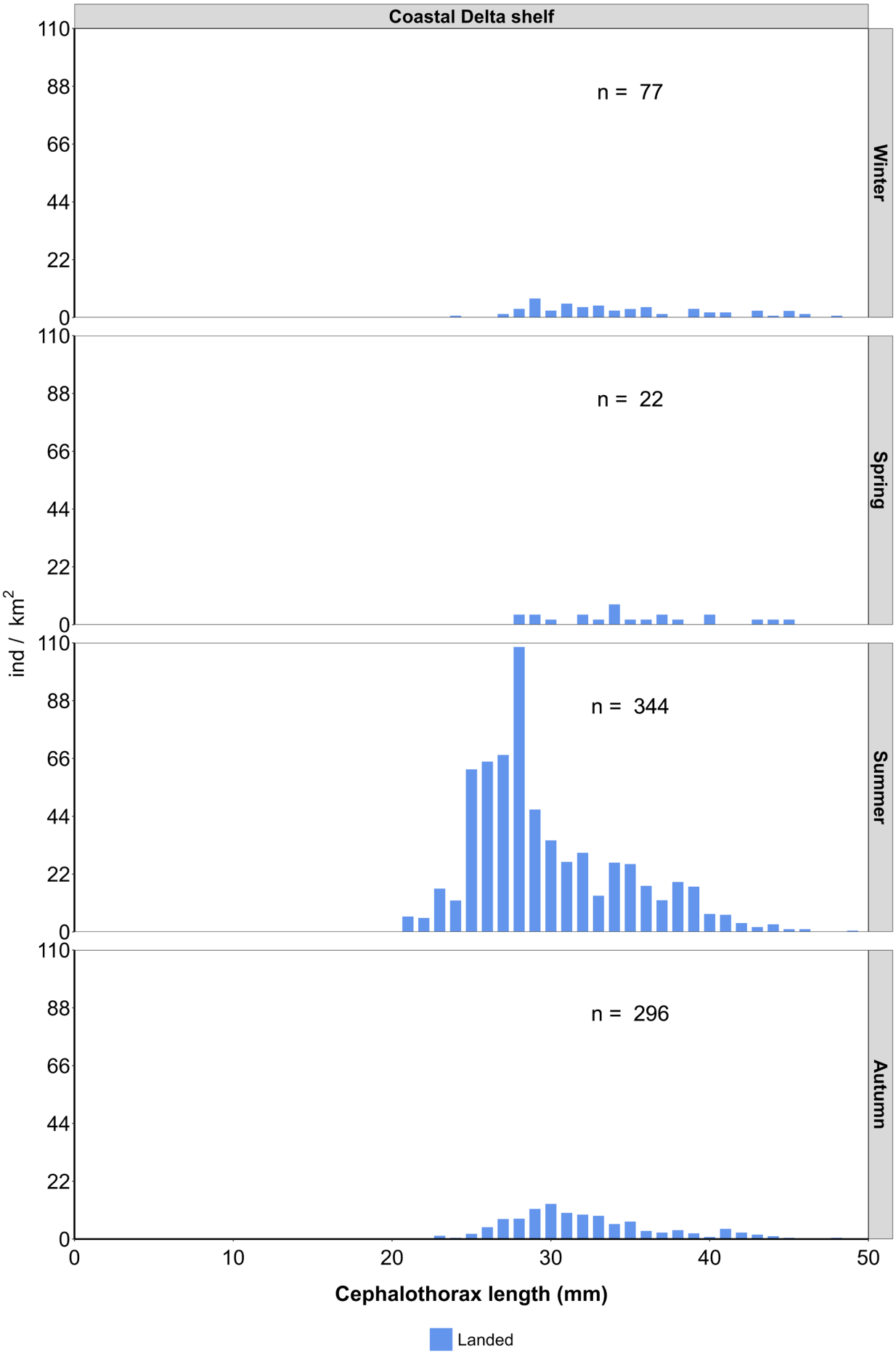
Annex 19. Seasonal length-frequency distribution of Broadtail squid at different métiers (Coastal Delta shelf; Middle Delta shelf; Coastal shelf; Deeper shelf; Upper slope; Lower slope) in 2025. (n) Total number of measured individuals. Red dashed line: size at first maturity (L_{50}) for both sexes combined calculated with data from 2025. Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D.

Spottail mantis shrimp (*Squilla mantis*) MTS



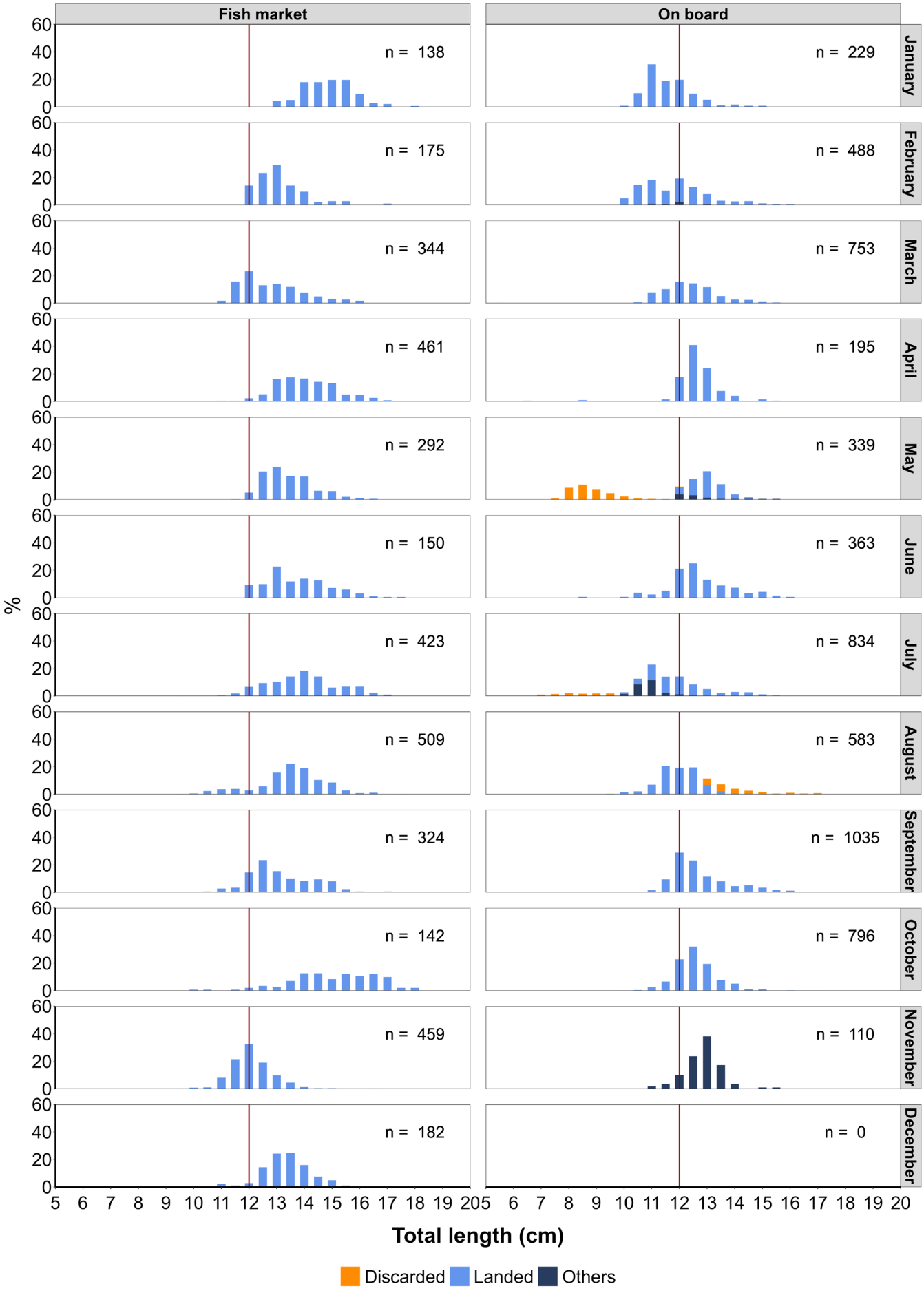
Annex 20. Seasonal length-frequency distribution of Spottail mantis shrimp at different *métiers* (Coastal Delta Shelf and Middle Delta Shelf) in 2025. (n) Total number of measured individuals. Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D.

Caramote prawn (*Penaeus kerathurus*) TGS



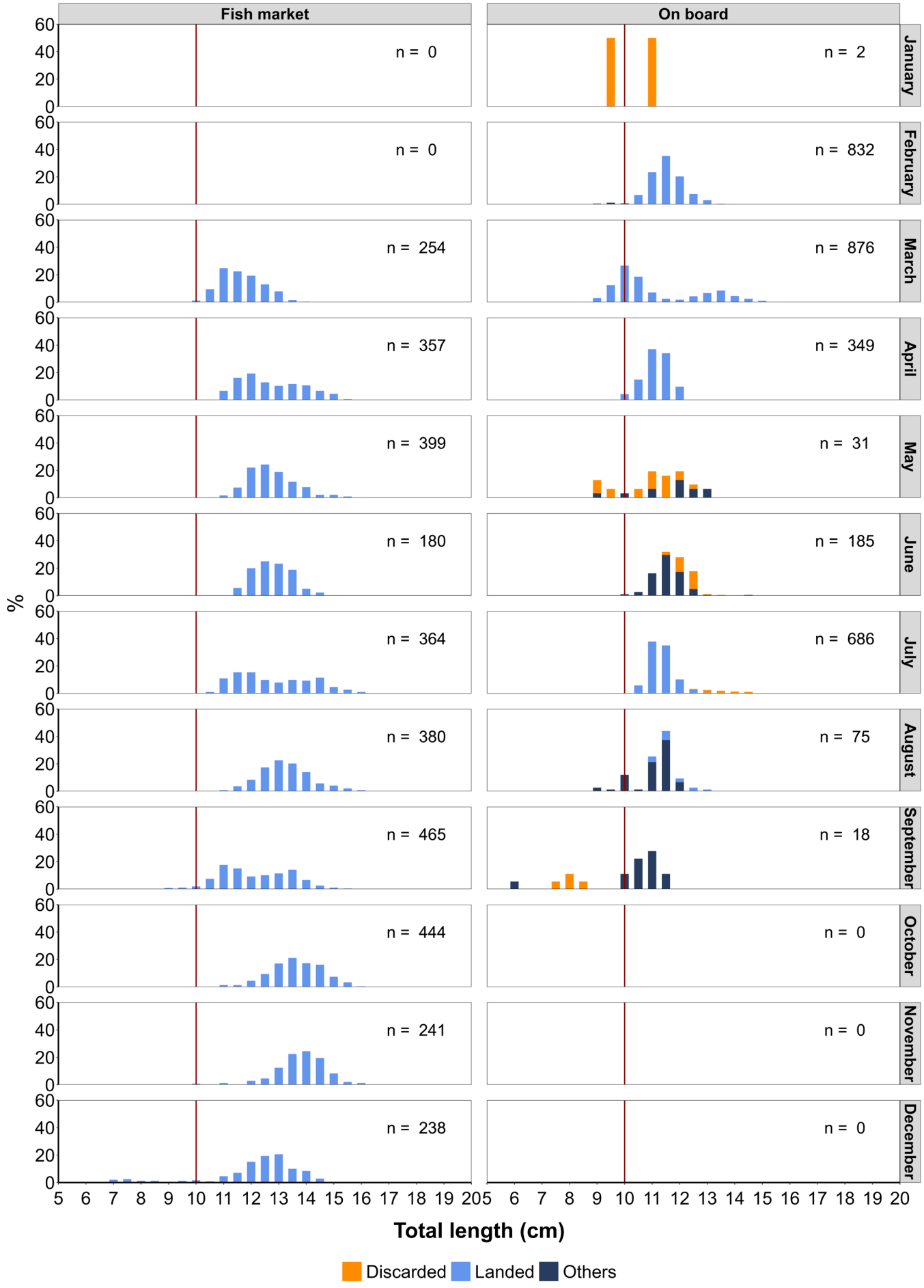
Annex 21. Seasonal length-frequency distribution of caramote prawn at different *métiers* (Middle Delta shelf; Deeper shelf; Upper slope; Lower slope) in 2025. (n) Total number of measured individuals. Red solid line: Minimum Conservation Reference Size (MCRS). Winter: J, F, M; Spring: A, M, J; Summer: J, A, S; Winter: O, N, D.

European sardine (*Sardina pilchardus*) PIL



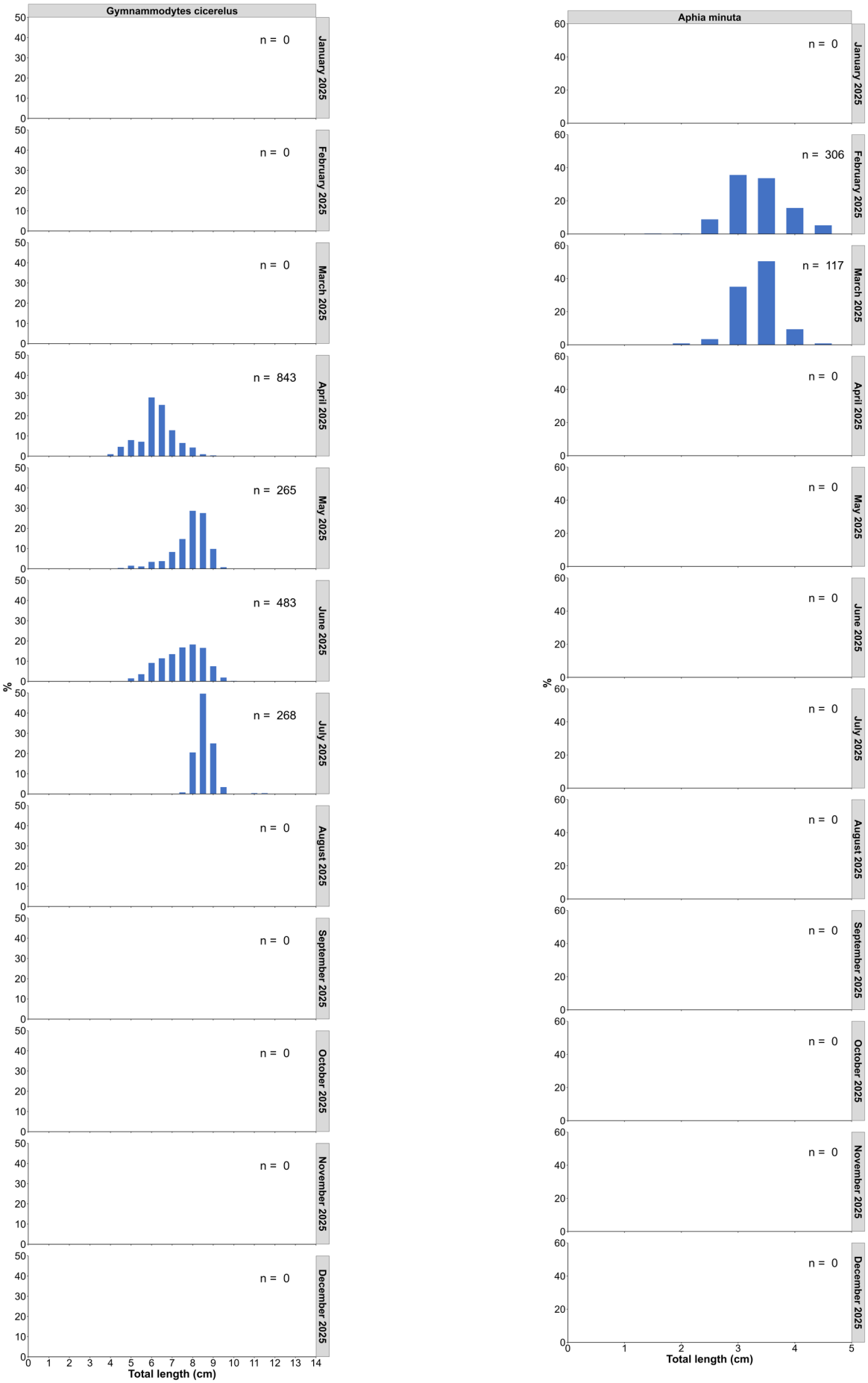
Annex 22. Monthly length-frequency distribution of European sardine in 2024, left: fish market sampling and right: on-board sampling. (n) Total number of measured individuals. Red dashed line: Minimum Conservation Reference Size (MCRS).

Anchovy (*Engraulis encrasicolus*) ANE



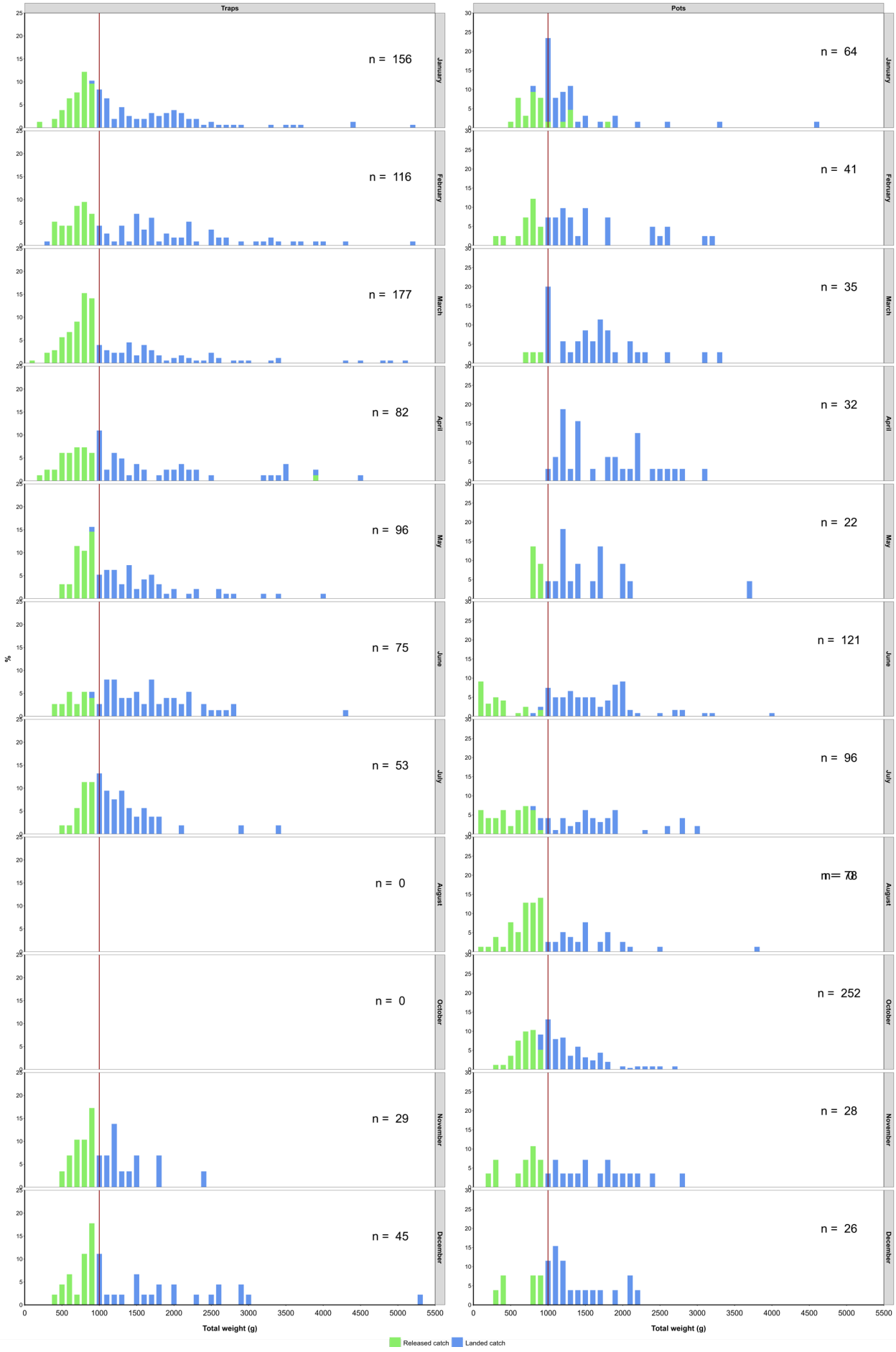
Annex 23. Monthly length-frequency distribution of Anchovy in 2025, left: fish market sampling and right: on-board sampling. (n) Total number of measured individuals. *Red line: Minimum Conservation Reference Size (MCRS).*

Target species in Sand eel fishery (ZGC, FIM)



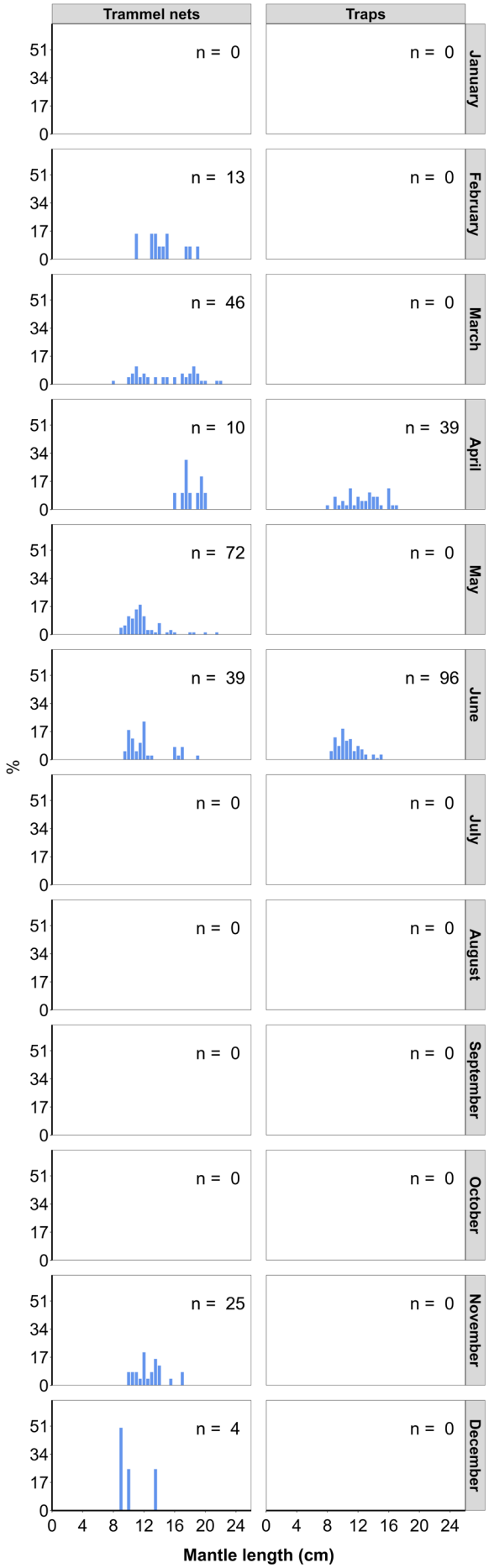
Annex 24. Monthly length-frequency distribution of the main target species of the sandeel fishery in 2025. (n) Total number of measured individuals.

Common octopus (*Octopus vulgaris*) OCC



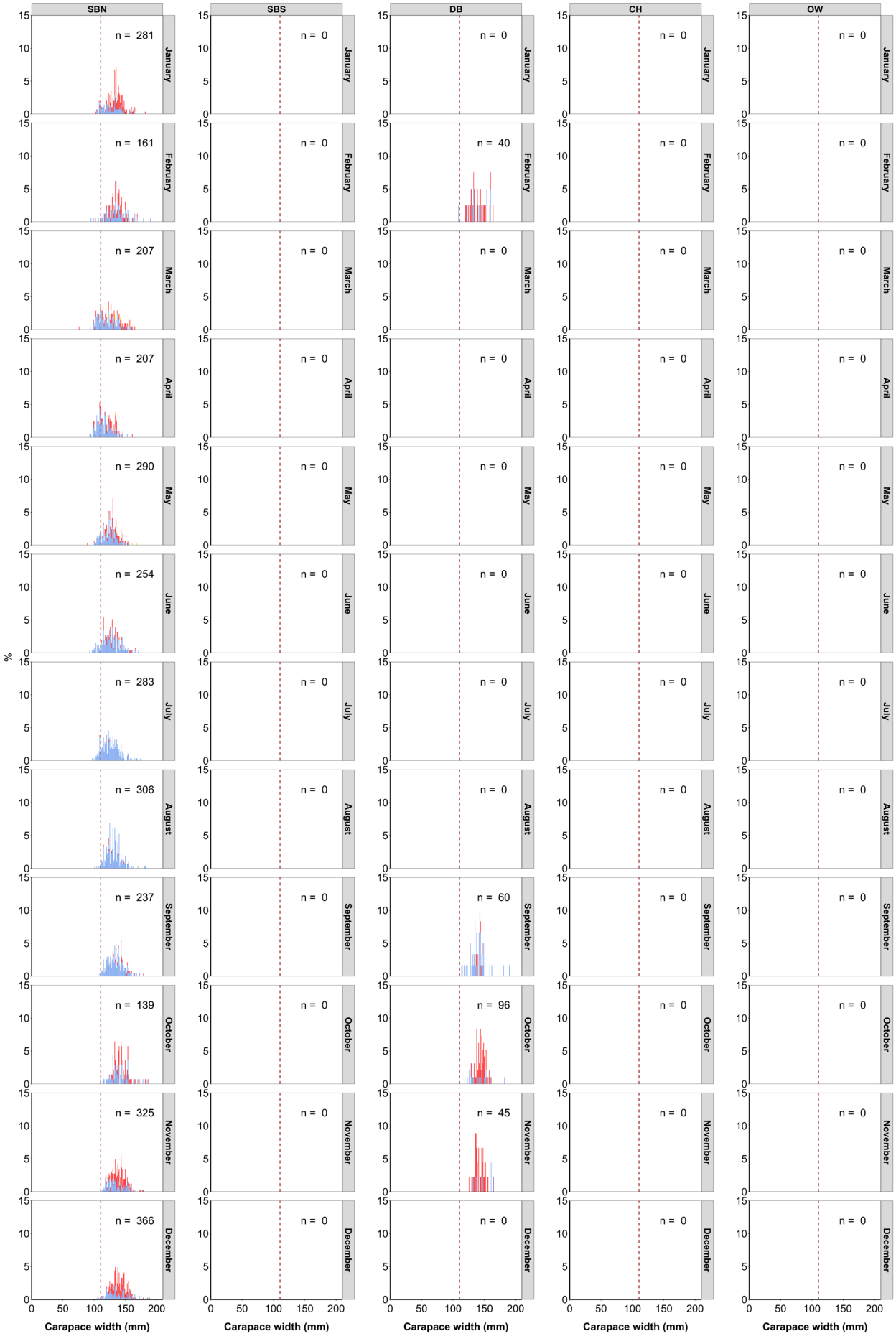
Annex 25. Monthly weight-frequency distribution of common octopus at different fishing gear (Traps and Pots) in Central Catalonia in 2025. Red line: Minimum Conservation Reference Weight (MCRW).

Common cuttlefish (*Sepia officinalis*), CTC



Annex 26. Monthly weight-frequency distribution of common cuttlefish at different fishing gear (Traps and Trammel nets) in Central Catalonia in 2025. Red line: Size at maturity.

Blue crab (*Callinectes sapidus*) CRB



Annex 27. Monthly weight-frequency distribution of blue crab in 2025 at different strata.



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