Recovery of haemal lordosis in European sea bass *Dicentrarchus labrax* (Linnaeus 1758)†

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† This paper is dedicated to the memory of Dr. Pascal Divanach, an outstanding researcher and mentor who has made pioneering contributions to the science of [Aquaculture](https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/cryobiology). He was the first who conceived and tested the hypothesis of exercised-induced (haemal) lordosis in fish (Divanach et al. 1997) [1].

**Table S1**. Lordosis rates, sample and expected for the population, at 111 and 150 dph. N, fish with normal external morphology. L, fish with lordotic external morphology.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Age (dph) | External morphology | Lordosis % in the sample | Fish number in the population | No of lordotic fish in the population (expected) | Lordosis rate – (population, expected) |
| 111 | N | 16.5 (33/200) | 400 | 66 | 44.3 |
| L | 100 (100/100) | 200 | 200 |
| 150 | N+L | 46.2 (12/93) |  |  | 46.2 |

**Table S2**. Cumulative frequency of fish with lordotic (L), recovered (N-Rec) and normal (N) external morphology based on the degrees of the PrAn1 index. At the juvenile stage, the N-Rec group consists of the lordotic juveniles that presented recovered external morphology at the adult stage.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Juveniles (150 dph) | | | |  | Adults (502 dph) | | | |
| Angle (o) | L | N-Rec | N |  | Angle (o) | L | N-Rec | N |
|  |  |  |  |  | 129 | **3** |  |  |
|  |  |  |  |  | 130 | **3** |  |  |
|  |  |  |  |  | 131 | **3** |  |  |
|  |  |  |  |  | 132 | **3** |  |  |
|  |  |  |  |  | 133 | **3** |  |  |
| 134 | 3 |  |  |  | 134 | **6** |  |  |
| 135 | 3 |  |  |  | 135 | **10** |  |  |
| 136 | 6 |  |  |  | 136 | **10** |  |  |
| 137 | 13 |  |  |  | 137 | **13** |  |  |
| **138** | **13** | **0** |  |  | 138 | **13** |  |  |
| 139 | 19 | 2 |  |  | 139 | **19** |  |  |
| 140 | 29 | 4 |  |  | 140 | **26** |  |  |
| 141 | 32 | 4 |  |  | **141** | **29** |  | **0** |
| 142 | 32 | 9 |  |  | **142** | **32** | **0** | **1** |
| 143 | 35 | 11 |  |  | 143 | 48 | 2 | 2 |
| **144** | **58** | **26** | **0** |  | 144 | 65 | 9 | 7 |
| 145 | 77 | 43 | 2 |  | 145 | 81 | 13 | 14 |
| 146 | 84 | 59 | 9 |  | 146 | 81 | 26 | 19 |
| 147 | 84 | 76 | 18 |  | 147 | 90 | 37 | 31 |
| 148 | 90 | 91 | 29 |  | 148 | 94 | 54 | 48 |
| 149 | 94 | 100 | 51 |  | 149 | 100 | 72 | 61 |
| 150 | 97 |  | 67 |  | 150 |  | 85 | 79 |
| 151 | 100 |  | 81 |  | 151 |  | 91 | 89 |
| 152 |  |  | 91 |  | 152 |  | 100 | 94 |
| 153 |  |  | 97 |  | 153 |  |  | 96 |
| 154 |  |  | 98 |  | 154 |  |  | 98 |
| 155 |  |  | 99 |  | 155 |  |  | 100 |
| 156 |  |  | 100 |  |  |  |  |  |

**Table S3**. Cumulative frequency of fish with lordotic (L), recovered (N-Rec) and normal (N) external morphology based on the degrees of the PrAn2 index. At the juvenile stage, the N-Rec group consists of the lordotic juveniles that presented recovered external morphology at the adult stage.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Juveniles (150 dph) | | | |  | Adults (502 dph) | | | | |
| Angle (o) | L | N-Rec | N |  | Angle (o) | L | N-Rec | N | |
|  |  |  |  |  | 253 | **3** |  | |  |
|  |  |  |  |  | 252 | **3** |  | |  |
| 251 | **3** |  |  |  | 251 | **3** |  | |  |
| 250 | **3** |  |  |  | 250 | **3** |  | |  |
| 249 | **3** |  |  |  | 249 | **3** |  | |  |
| 248 | **3** |  |  |  | 248 | **3** |  | |  |
| 247 | **3** |  |  |  | 247 | **3** |  | |  |
| 246 | **3** |  |  |  | 246 | **3** |  | |  |
| 245 | **3** |  |  |  | 245 | **3** |  | |  |
| 244 | **3** |  |  |  | 244 | **3** |  | |  |
| 243 | **3** |  |  |  | 243 | **3** |  | |  |
| 242 | **3** |  |  |  | 242 | **3** |  | |  |
| 241 | **10** |  |  |  | 241 | **3** |  | |  |
| 240 | **10** |  |  |  | 240 | **3** |  | |  |
| 239 | **10** |  |  |  | 239 | **6** |  | |  |
| 238 | **13** |  |  |  | 238 | **6** |  | |  |
| 237 | **13** |  |  |  | 237 | **6** |  | |  |
| 236 | **13** |  |  |  | 236 | **6** |  | |  |
| 235 | **19** |  |  |  | 235 | **10** |  | |  |
| 234 | **26** |  |  |  | 234 | **10** |  | |  |
| 233 | **26** |  |  |  | 233 | **13** |  | |  |
| 232 | **29** | 0 |  |  | 232 | **13** |  | |  |
| 231 | 29 | 2 |  |  | 231 | **13** |  | |  |
| 230 | 29 | 2 |  |  | 230 | **13** |  | |  |
| 229 | 29 | 4 |  |  | 229 | **13** |  | |  |
| 228 | 29 | 7 |  |  | 228 | **19** |  | |  |
| 227 | 29 | 7 |  |  | 227 | **23** |  | |  |
| 226 | 35 | 9 |  |  | 226 | **26** |  | |  |
| 225 | 35 | 9 |  |  | 225 | **26** |  | |  |
| 224 | 39 | 13 |  |  | 224 | **26** |  | | 0 |
| 223 | 42 | 13 |  |  | 223 | 26 |  | | 1 |
| 222 | 48 | 20 |  |  | 222 | 26 |  | | 1 |
| 221 | 52 | 22 |  |  | 221 | 32 |  | | 2 |
| 220 | 65 | 30 | 0 |  | 220 | 39 | 0 | | 2 |
| 219 | 68 | 35 | 1 |  | 219 | 48 | 2 | | 4 |
| 218 | 68 | 39 | 2 |  | 218 | 55 | 4 | | 5 |
| 217 | 77 | 50 | 3 |  | 217 | 55 | 4 | | 7 |
| 216 | 81 | 57 | 7 |  | 216 | 65 | 7 | | 11 |
| 215 | 81 | 65 | 11 |  | 215 | 74 | 9 | | 11 |
| 214 | 81 | 72 | 13 |  | 214 | 77 | 13 | | 14 |
| 213 | 84 | 76 | 17 |  | 213 | 81 | 17 | | 17 |
| 212 | 90 | 83 | 20 |  | 212 | 84 | 24 | | 19 |
| 211 | 94 | 89 | 26 |  | 211 | 84 | 26 | | 22 |
| 210 | 94 | 89 | 33 |  | 210 | 84 | 30 | | 25 |
| 209 | 94 | 91 | 43 |  | 209 | 90 | 37 | | 31 |
| 208 | 94 | 96 | 49 |  | 208 | 90 | 39 | | 37 |
| 207 | 94 | 100 | 61 |  | 207 | 94 | 46 | | 42 |
| 206 | 94 |  | 65 |  | 206 | 94 | 59 | | 47 |
| 205 | 97 |  | 73 |  | 205 | 97 | 61 | | 53 |
| 204 | 97 |  | 79 |  | 204 | 97 | 67 | | 60 |
| 203 | 97 |  | 83 |  | 203 | 100 | 72 | | 66 |
| 202 | 97 |  | 87 |  | 202 |  | 76 | | 73 |
| 201 | 97 |  | 92 |  | 201 |  | 85 | | 77 |
| 200 | 100 |  | 94 |  | 200 |  | 87 | | 80 |
| 199 |  |  | 96 |  | 199 |  | 91 | | 86 |
| 198 |  |  | 96 |  | 198 |  | 93 | | 88 |
| 197 |  |  | 97 |  | 197 |  | 96 | | 92 |
| 196 |  |  | 98 |  | 196 |  | 96 | | 94 |
| 195 |  |  | 98 |  | 195 |  | 100 | | 94 |
| 194 |  |  | 99 |  | 194 |  |  | | 95 |
| 193 |  |  | 99 |  | 193 |  |  | | 96 |
| 192 |  |  | 100 |  | 192 |  |  | | 98 |
|  |  |  |  |  | 191 |  |  | | 98 |
|  |  |  |  |  | 190 |  |  | | 99 |
|  |  |  |  |  | 189 |  |  | | 99 |
|  |  |  |  |  | 188 |  |  | | 100 |