A rare occurrence of reversal in the common megrim Lepidorhombus whiffiagonis (Pleuronectiformes: Scophthalmidae) in the northern North Sea

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A rare occurrence of reversal in the common megrim, *Lepidorhombus whiffiagonis* (Walbaum, 1792) (Pleuronectiformes: Scophthalmidae), in the northern North Sea

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Rare occurrence of reversal in common megrim

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Abstract

An adult (231 mm $L_s$; 371 mm $L_T$), dextral (right-sided) common megrim, *Lepidorhombus whiffiagonis*, is reported from the northern North Sea. This is the first recorded occurrence of reversal in this species. Other than its reversed asymmetry, the specimen had similar morphological and meristic characteristics to those of non-reversed individuals of the same species.

Keywords: flatfish, sinistral, dextral, reversed asymmetry
Ontogenetic metamorphosis in flatfishes (Pleuronectiformes) results in one eye migrating from one side of the head to the other (Brewster, 1987). The side to which the eye migrates, resulting in a left-sided (sinistral) or right-sided (dextral) orientation, is typically species dependent. However, in the most primitive flatfishes, the Psettodidae (spiny turbots), the eye migrates to the left or right side with equal frequency (Janvier, 2008). For many species of flatfishes, the majority of individuals exhibit the same orientation, although occurrences of reversal, resulting in sinistral orientation in dextral species and *vice versa* have been well documented (Norman, 1934; Ahlstrom *et al.*, 1984). Occurrences of reversal have been reported in a broad range of species of flatfishes and in some species it is commonly encountered (Norman, 1934; Gartner, 1986). Studies on the left-sided Californian flounder *Paralichthys californicus* (Ayres 1859) have reported that the incidence of reversal in this species is as high as 40% (Ginsburg, 1952; Kramer *et al.*, 1995). Hubbs and Kuronuma (1942) noted that starry flounder *Platichthys stellatus* (Pallas 1787) exhibit a geographical cline in asymmetry with sinistrality increasing from 50% in California to 100% in Japan. However, cases of reversal are typically rarer for the majority of species of flatfishes. For example, Bruno and Fraser (1987) reported a single case of reversal amongst 15,859 common dab *Limanda limanda* (L. 1758) sampled in the North Sea. Similarly, occasional occurrences of reversal have been reported in summer flounder *Paralichthys dentatus* (L. 1766) (Gudger, 1936), Atlantic halibut *Hippoglossus hippoglossus* (L. 1758) and plaice *Pleuronectes platessa* (L. 1758) (Gudger, 1935).
The common megrim *Lepidorhombus whiffiagonis* (Walbaum 1792) (Scophthalmidae) is a commercially important flatfish distributed from Iceland to the Mediterranean Sea (Nielsen, 1989). It is one of two species of the genus *Lepidorhombus* (Günther 1862), the other being the four-spotted megrim *Lepidorhombus boscii* (Risso 1810). One adult (231 mm $L_s$; 371 mm $L_T$) reversed common megrim was caught 100 km northwest of the Shetland Isles in June 2009 during sampling of megrim in the northern North Sea (Figure 1). The specimen is a mature male and was captured using a demersal twin-rig otter trawl at a depth of 196 m. It represents the only case of reversal recorded for 39,072 measured individuals of this species that were captured in the North Sea between May 2008 and March 2012. In the reversed individual, interorbital width is less pronounced and caudal peduncle length is greater (Table I) than corresponding values of non-reversed individuals. No other significant variation in meristic features or patterning and coloration were apparent in this individual, suggesting that reversal did not result in significant changes in the external morphology and colouration of this individual. In contrast, a similar study of reversal in the shallow-water flounder *Paralichthys orbignyanus* (Valenciennes 1839) reported several differences in a number of comparative measurements, including head, maxilla and prepectoral lengths, between non-reversed individuals and a reversed specimen of this species (Diaz de Astarloa, 1997).

Reversals in megrius are not limited to *L. whiffiagonis*. Vassilopoulou (1993) reported a small number of occurrences (0.026%) of reversed (dextral) individuals from samples of *L. boscii* collected in the Aegean Sea, indicating that reversal exists, but is rare in species of *Lepidorhombus*. 

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This is the first reported occurrence of reversal in common megrim. Due to the rarity of reversed specimens in this species, it has been preserved and deposited in the fish collection of the NAFC Marine Centre, Scalloway, Shetland. The collection is not formally catalogued and therefore does not assign numbers to specimens.

Acknowledgements

This study was carried out during a wider investigation into the biology and ecology of megrim in the northern North Sea and was partly funded by the Seafish Industry Authority, Scottish Fishermen’s Trust and Shetland Islands Council. I am grateful to Marine Scotland-Science and all the fishermen and who provided access to their vessels for sampling. I am also grateful to two anonymous reviewers for their insightful comments.

References


Table 1 A comparison of morphological features of a reversed and non-reversed *Lepidorhombus whiffiagonis*.

<table>
<thead>
<tr>
<th></th>
<th>Reversed <em>L. whiffiagonis</em></th>
<th>Non-reversed <em>L. whiffiagonis</em> (n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean</td>
</tr>
<tr>
<td>Total length ($L_T$)</td>
<td>331</td>
<td>314 - 357</td>
</tr>
<tr>
<td>Standard length ($L_S$)</td>
<td>272</td>
<td>262 - 302</td>
</tr>
<tr>
<td>Head length</td>
<td>28.3</td>
<td>27.2 - 30.3</td>
</tr>
<tr>
<td>Prepectoral distance</td>
<td>27.2</td>
<td>26.8 - 29.6</td>
</tr>
<tr>
<td>Maxilla length</td>
<td>16.5</td>
<td>15.2 - 17.5</td>
</tr>
<tr>
<td>Caudal peduncle length</td>
<td>20.6</td>
<td>14.3 - 20.1</td>
</tr>
<tr>
<td>Pectoral fin length</td>
<td>16.1</td>
<td>11.6 - 18.4</td>
</tr>
<tr>
<td>Interorbital width</td>
<td>0.3</td>
<td>0.5 - 1.0</td>
</tr>
<tr>
<td>Dorsal-fin rays</td>
<td>90</td>
<td>84 - 93</td>
</tr>
<tr>
<td>Anal-fin rays</td>
<td>67</td>
<td>65 - 72</td>
</tr>
<tr>
<td>Pectoral-fin rays</td>
<td>11</td>
<td>10 - 12</td>
</tr>
</tbody>
</table>

Total and standard lengths are reported in mm: all other measurements are % standard length.
Figure 1 Reversed specimen of *Lepidorhombus whiffiagonis*, 272 mm $L_S$ (top), and non-reversed specimen, 284 mm $L_S$ (bottom), caught in the northern North Sea.