Unimodal head-width distribution of the European eel (*Anguilla anguilla* L.) from the Zeeschelde does not support disruptive selection

Pieterjan Verhelst1,2,3,4,\*, Jens De Meyer5, Jan Reubens3, Johan Coeck4, Peter Goethals2, Tom Moens1, Ans Mouton4

1 Marine Biology Research Group, Ghent University, Krijgslaan 281, 9000 Ghent, Belgium

2 Laboratory of Environmental Toxicology and Aquatic Ecology, Ghent University, Coupure Links 653, 9000 Ghent, Belgium

3 Flanders Marine Institute, Wandelaarkaai 7, 8400 Ostend, Belgium

4 Research Institute for Nature and Forest (INBO), Havenlaan 88, bus 73, 1000 Brussels, Belgium

5 Evolutionary Morphology of Vertebrates, University Ghent, K.L. Ledeganckstraat 35, 9000 Ghent Belgium

\* Corresponding author

Pieterjan Verhelst

Ghent University - Biology Department

Marine Biology Research Group

Krijgslaan 281 / S8

9000 Gent - Belgium

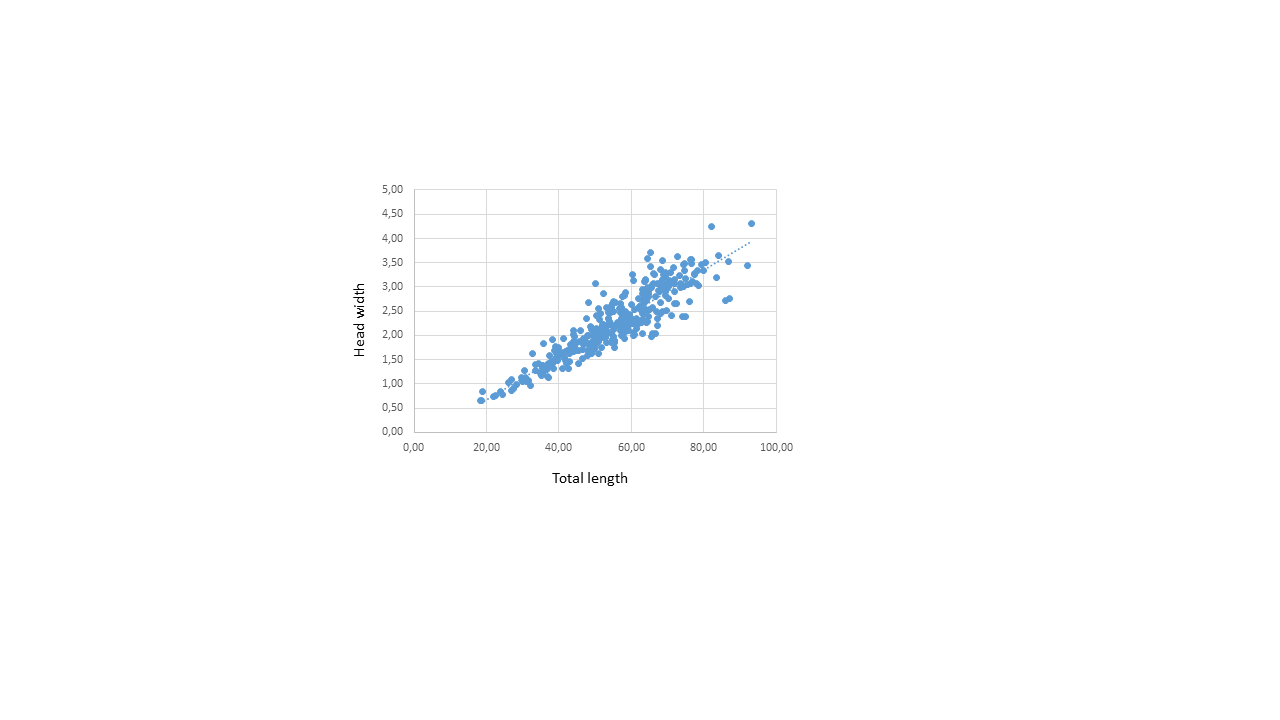
Tel.: +32 (0)9 264 85 17

[Pieterjan.Verhelst@UGent.be](mailto:Pieterjan.Verhelst@UGent.be)

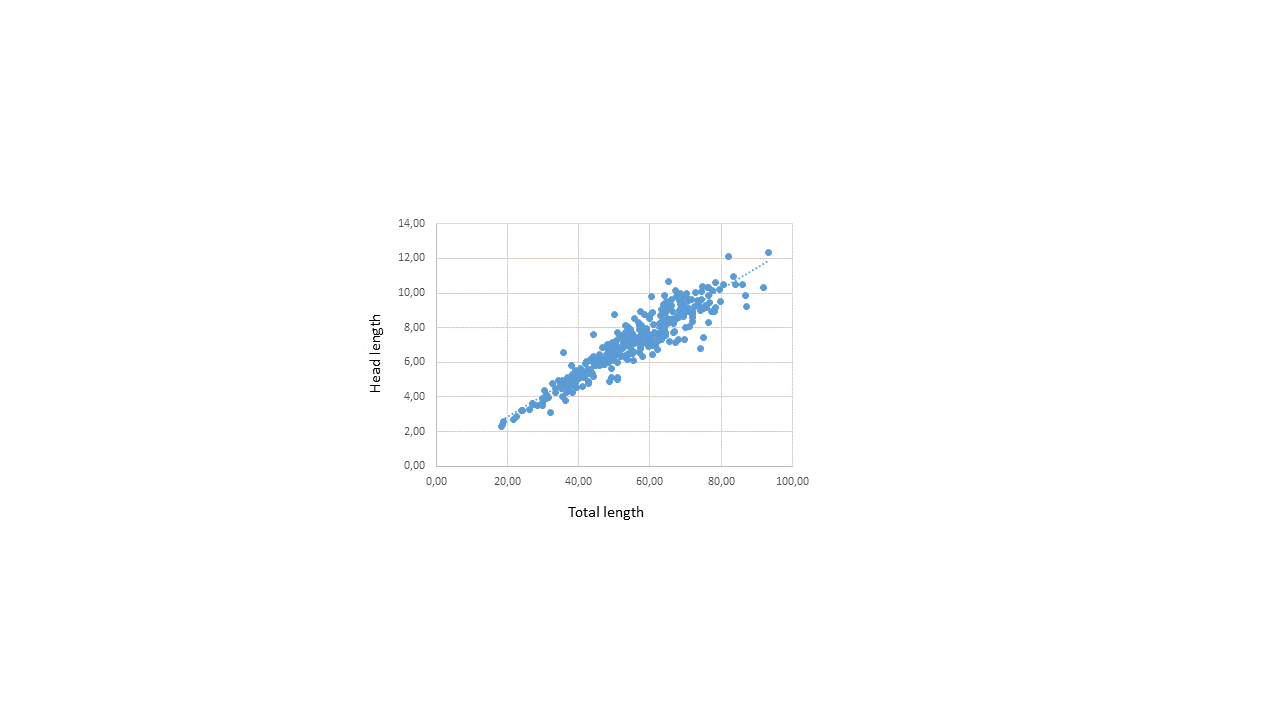
Appendix

In this appendix, we give a detailed description of the applied methodology to determine the head width distribution of the eels based on the unstandardized residuals.

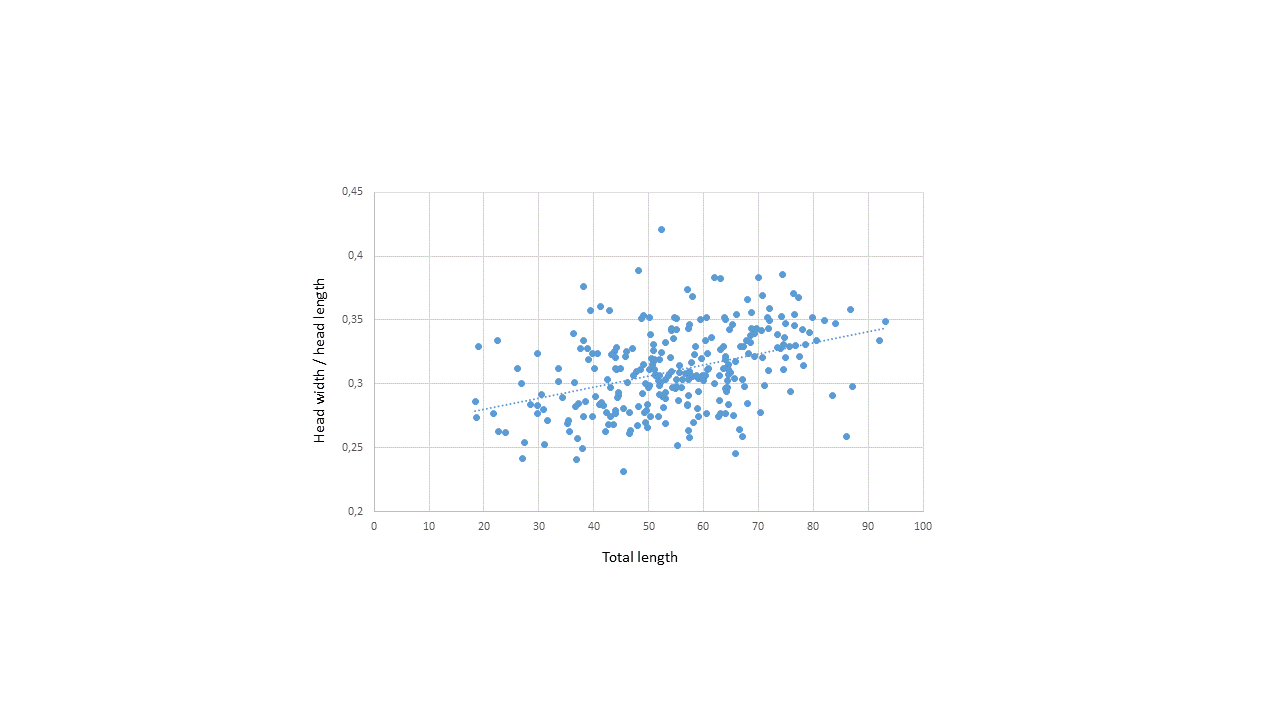
First, linear regressions of head width (**Fig. 1**) and head length to total length (**Fig. 2**) revealed a significant difference between the two slopes (i.e. under the null hypothesis that slopes are equal, *p* < 0.05). Despite the fact that the regression of head length had a steeper slope than the regression of head width, head width / head length increased with total length (**Fig. 3**). Next, head width / total length (**Fig. 4**) and head length / total length were plotted over total length (**Fig. 5**) and revealed that the latter slightly decreased, while head width / total length increased. Further, variation of the former proved larger than variation of the latter (range: 0.03 - 0.06 and 0.09-0.19 respectively). Since head length / total length only slightly increased with total length and the variation was lower compared to head width / head length, we can assume that head length increases proportionally with total length. However, for head width / total length this is not the case due to plasticity in head morphology and a size effect. Consequently, to correct for these issues, the unstandardized residuals of head width / head length over total length were calculated and used for analysis of the eels’ head width distribution.



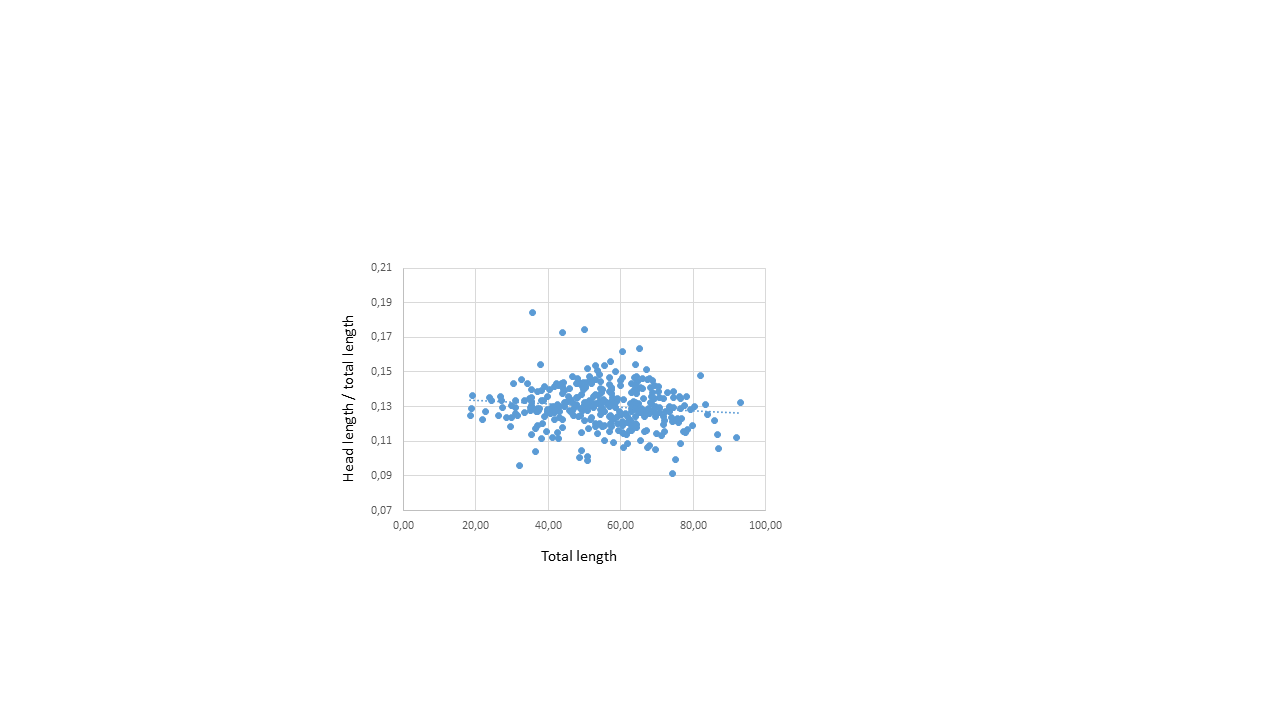
**Figure 1.** Head width over total length (y = 0.0447x – 0.2104, R² = 0.859)



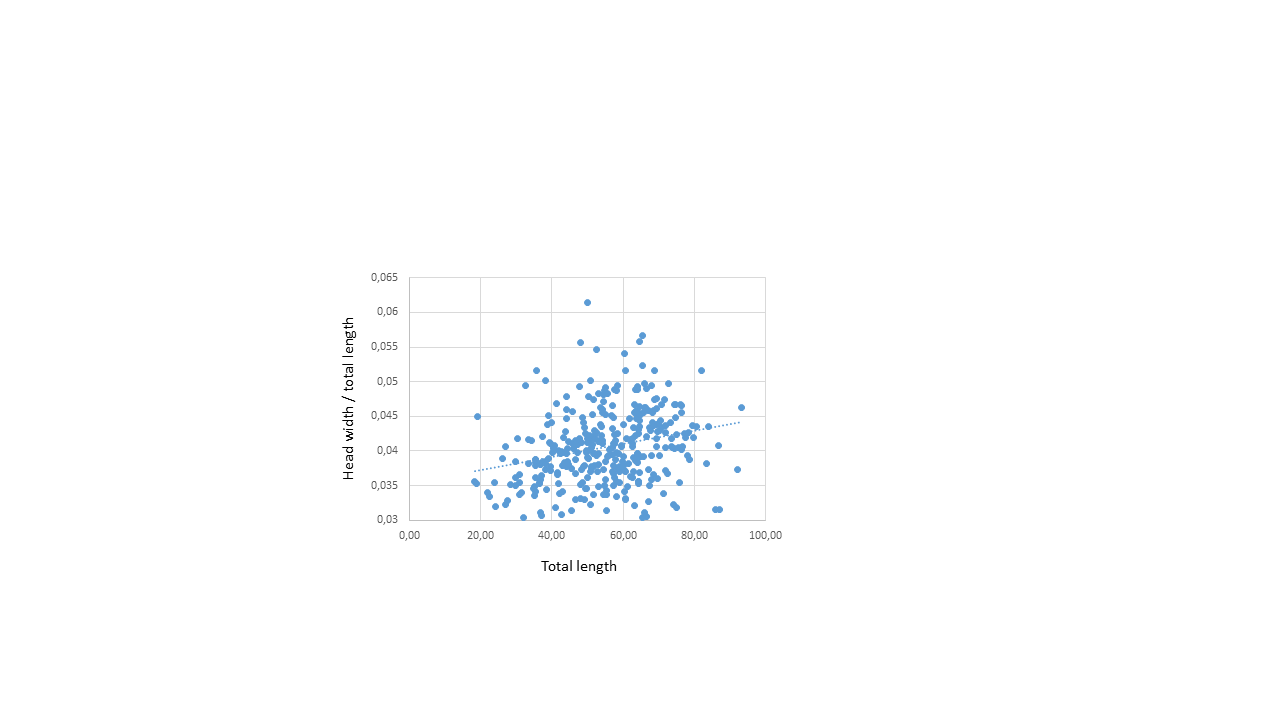
**Figure 2.** Head length over total length (y = 0.1227x + 0.3906, R² = 0.818).



**Figure 3.** Head width / head length over total length (y = 0.0010x + 0.2592, R² = 0.160).



**Figure 4.** Head length / total length over total length (y = 1e-4x + 0.0353, R² = 0.092).



**Figure 5.** Head width / total length over total length (y = -1e-4x + 0.1354, R² = 0.027).