Further results for the initial implementation of an assessment model for the South African chokka squid (*Loligo reynaudii*) resource

A. Brandão

The problem experienced in Brandão and Butterworth (2025a) in that the program failed to update the parameter values after the first iteration has been solved and results are shown here when fitting to data for 2009 to 2024. Note that at the moment, CPUE data for the jig fishery is only available until September 2021.

REFERENCES

Brandão, A. and Butterworth, D.S. 2025a. Initial implementation of an assessment model for the South African chokka squid (*Loligo reynaudii*) resource. IWS document: IWS/2025/SQUID/P4.

Brandão, A. and Butterworth, D.S. 2025b. Available data for the assessment of the South African chokka squid (*Loligo reynaudii*) resource. IWS document: IWS/2025/SQUID/P3.

Table 1. Contributions to the negative log-likelihood when the model is fitted to the monthly pack size-disaggregated nominal CPUE, survey indices and pack data (Brandão and Butterworth, 2025b).

	Contribution to -ln *L*
-ln *L*: pack	-461.66
-ln *L*: CPUE	285.12
-ln *L*: survey SC autumn)	-12.08
-ln *L*: survey (WC summer)	14.84
-ln *L*: F_y related penalty	0.0014
-ln *L*: Total	-672.25

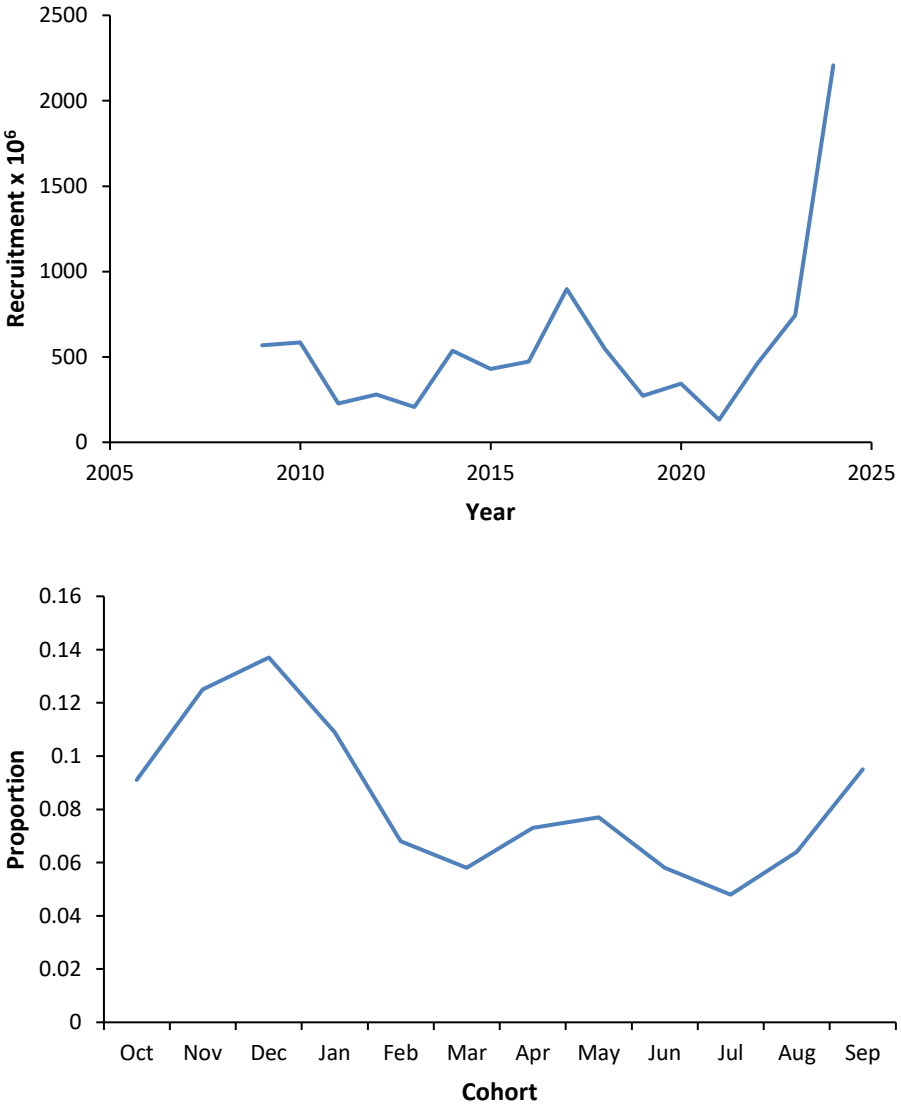

Figure 1. Estimated total recruitment (R_y^T) numbers added to the population (top) and recruitment proportions into the population (R_{bm}^B) (bottom).

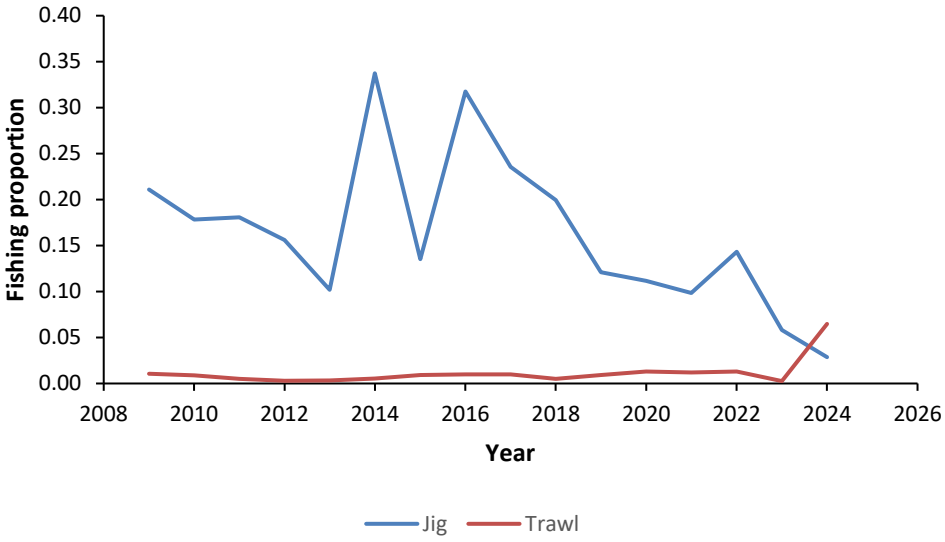

Figure 2. Estimated proportion of the exploitable resource harvested by the jig and the trawl fisheries $(F_{y^*}^f)$.

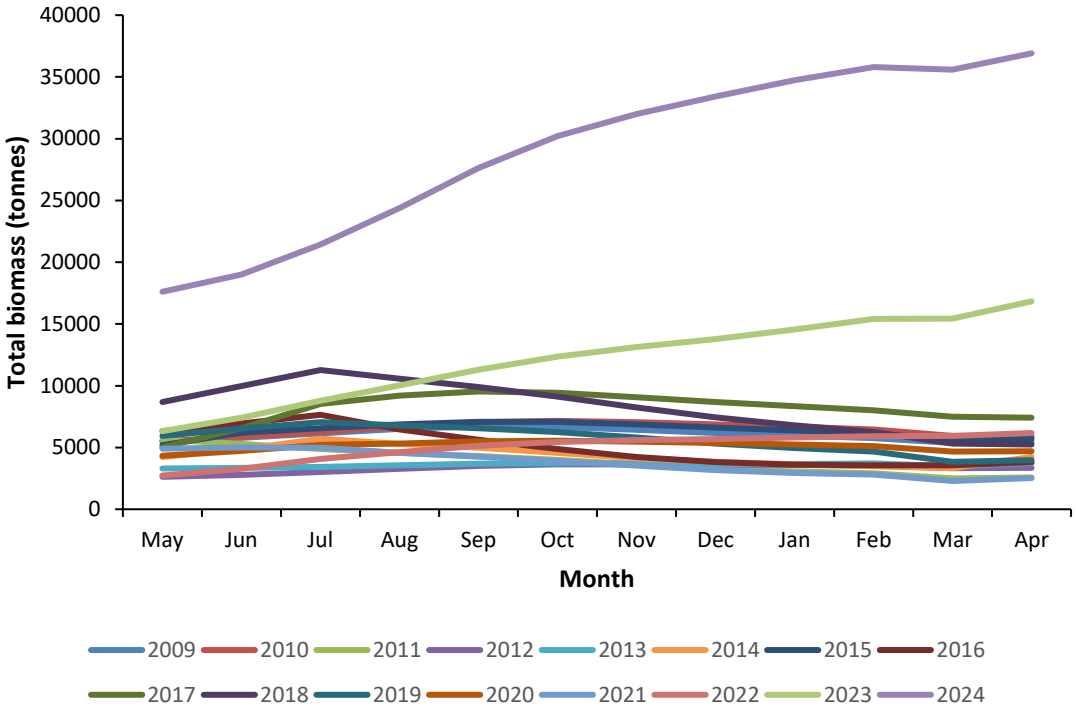

Figure 3. Total monthly biomass estimates for chokka squid for fishing years 2009 to 2024.

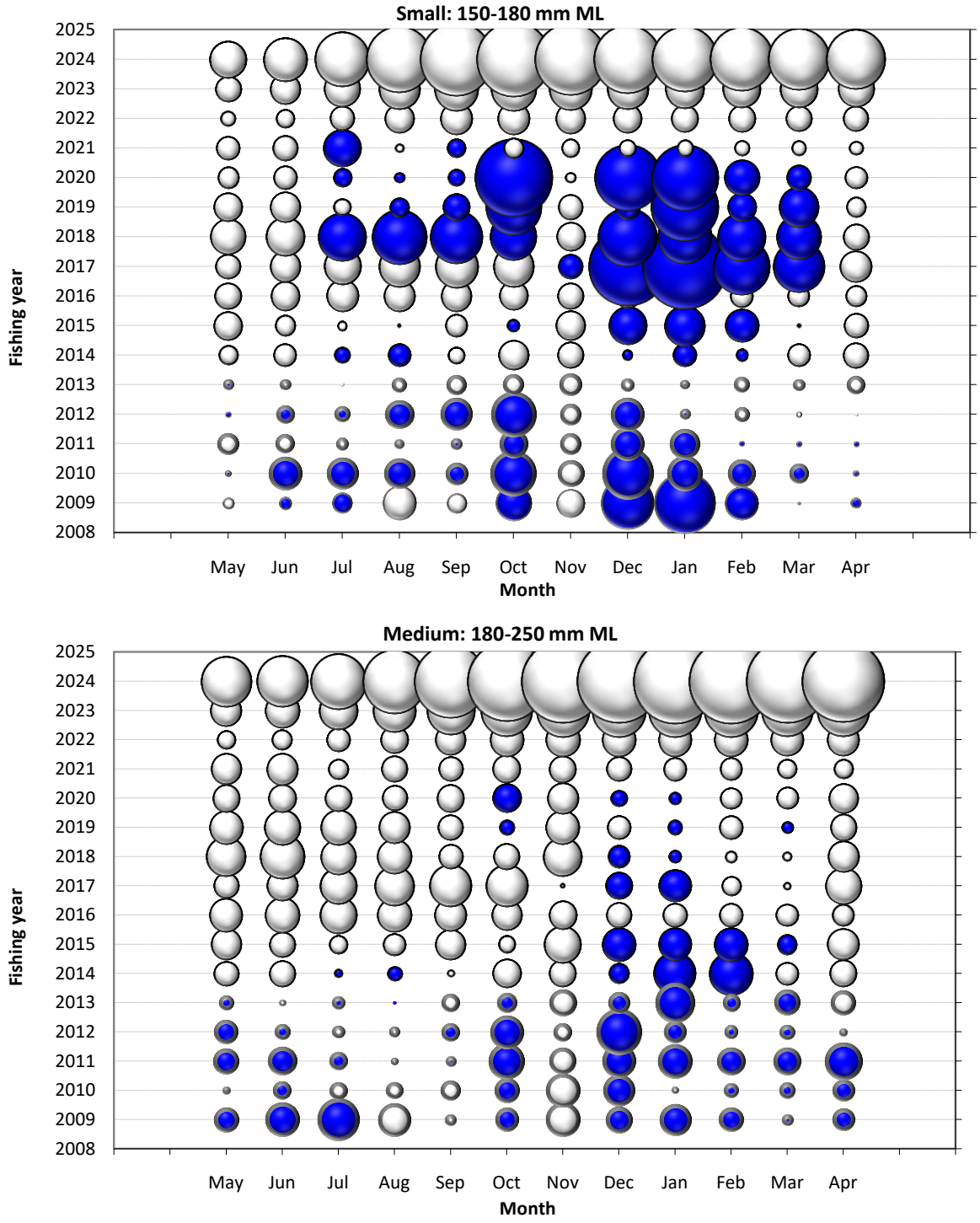

Figure 4a. Bubble plot of the difference between the observed nominal jig CPUE indices by month and by small and medium pack size categories to which the model is fit, and the predicted values (the predicted values are exploitable biomass multiplied by the estimated catchability q^{Jig} to express them in CPUE units). Blue bubbles represent positive differences, while white bubbles represent a negative one.

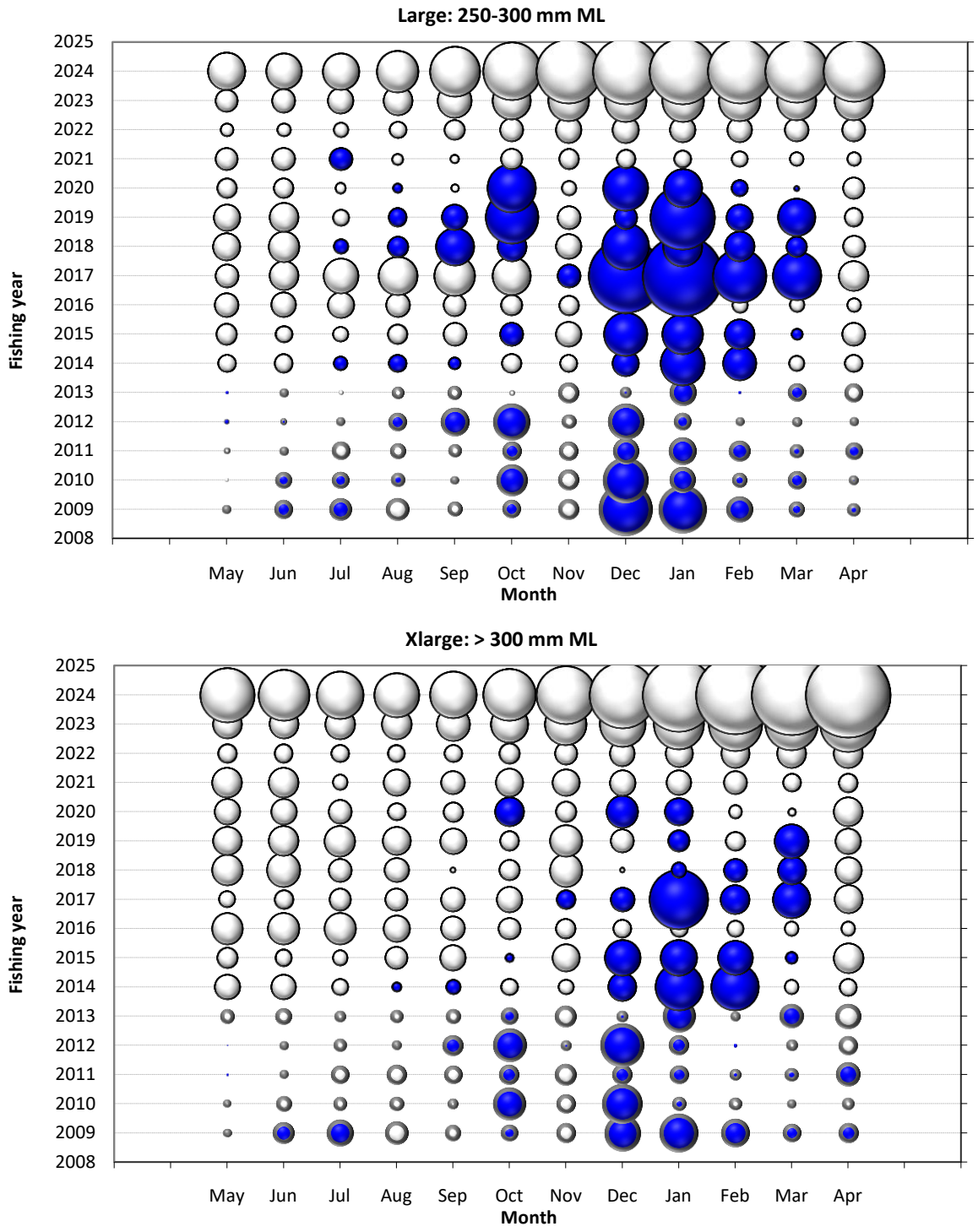

Figure 4b. Same as Figure 4a but for the large and Xlarge pack sizes.

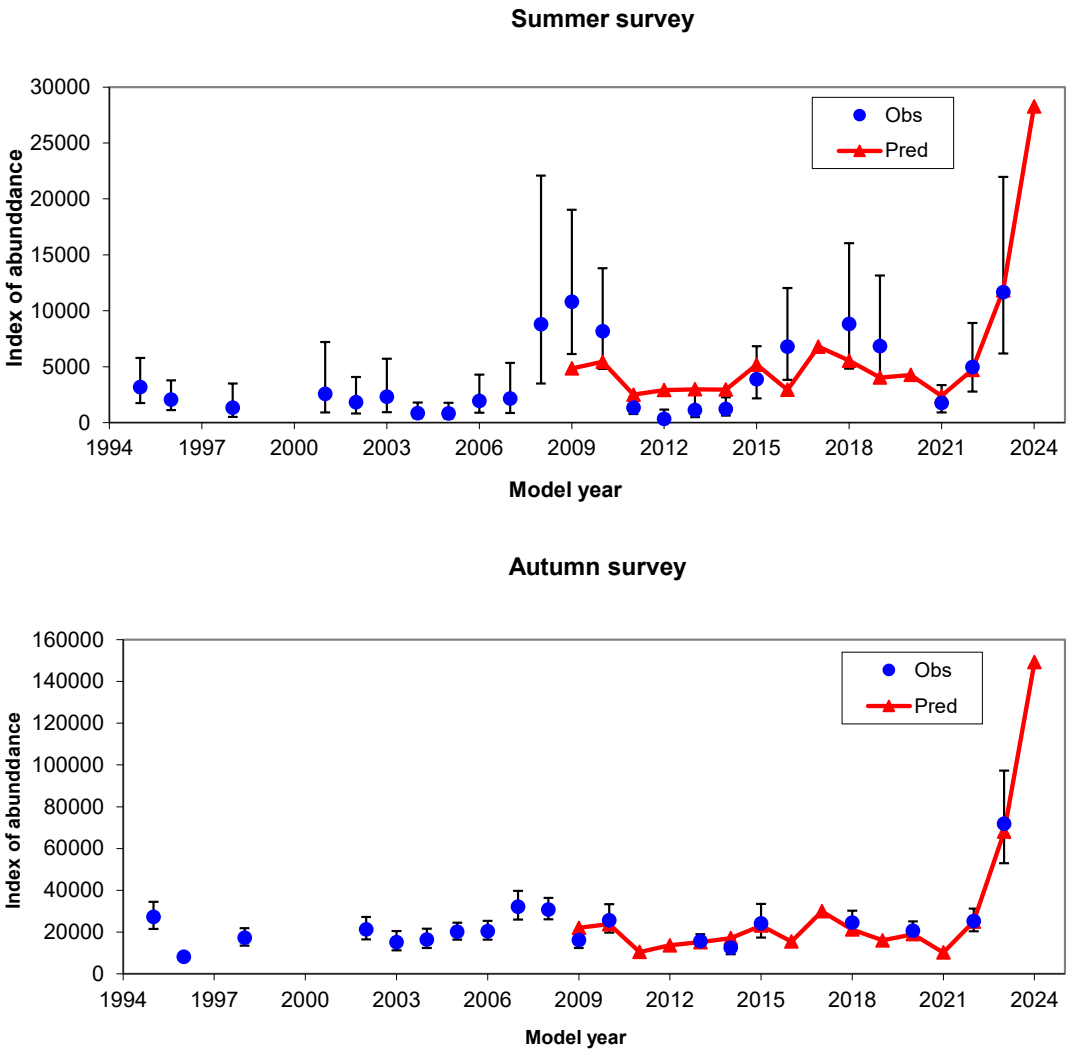

Figure 5. Comparison of observed and model-predicted trends for the survey abundance indices of the West coast summer surveys and the South coast autumn surveys. Note that the 95% confidence intervals shown for observed values have been computed as: estimate*exp(±1.96*CV).

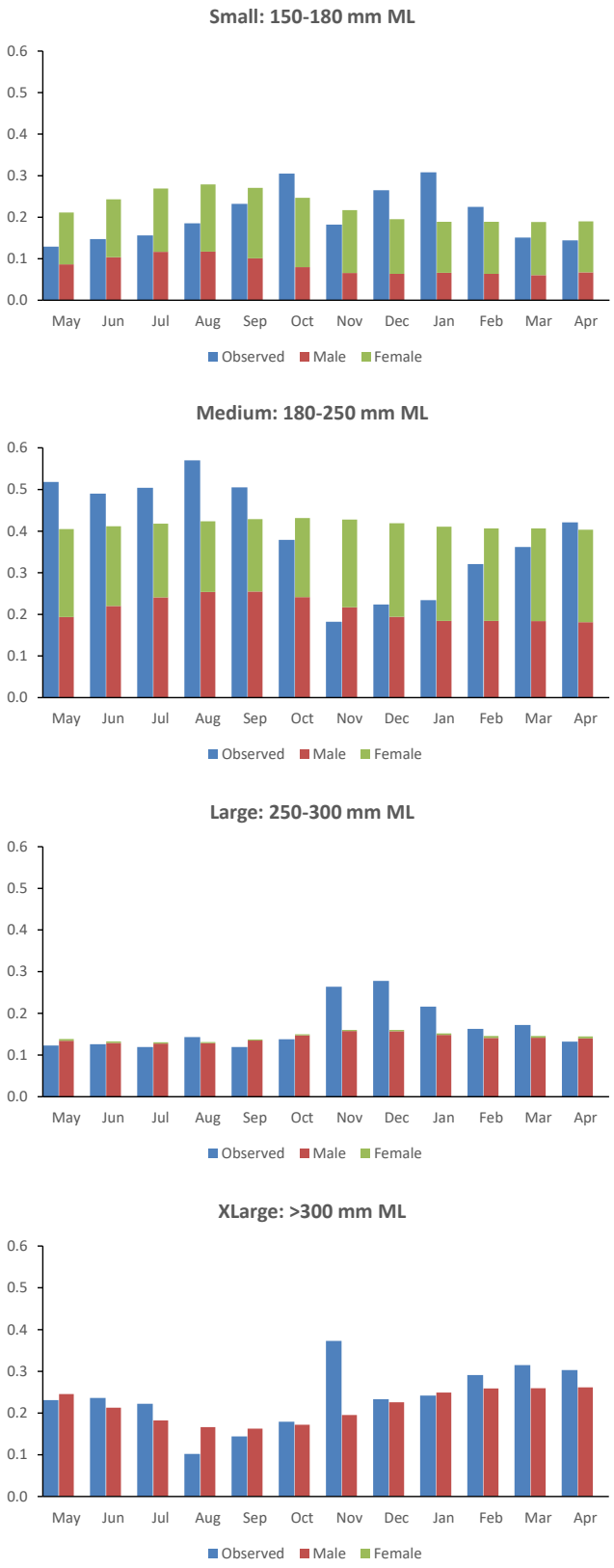

Figure 6. Comparison of the 2009 observed proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

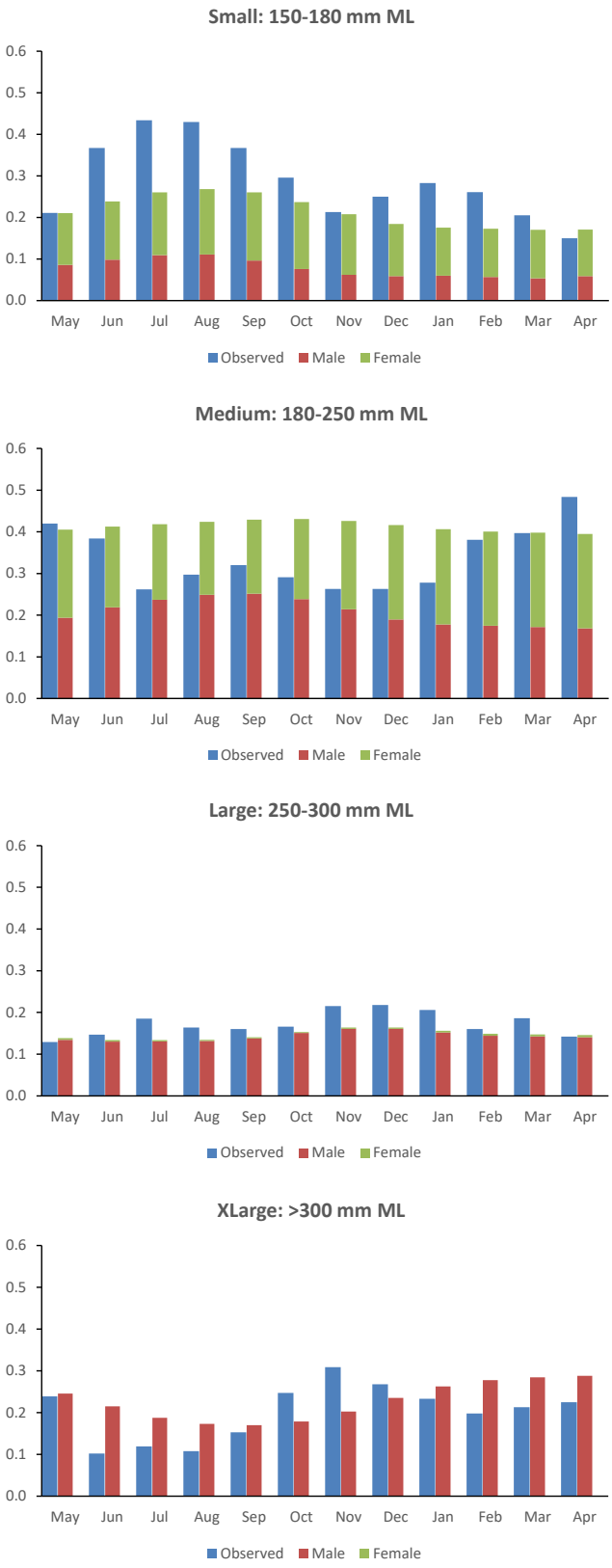

Figure 7. Comparison of the 2010 observed proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

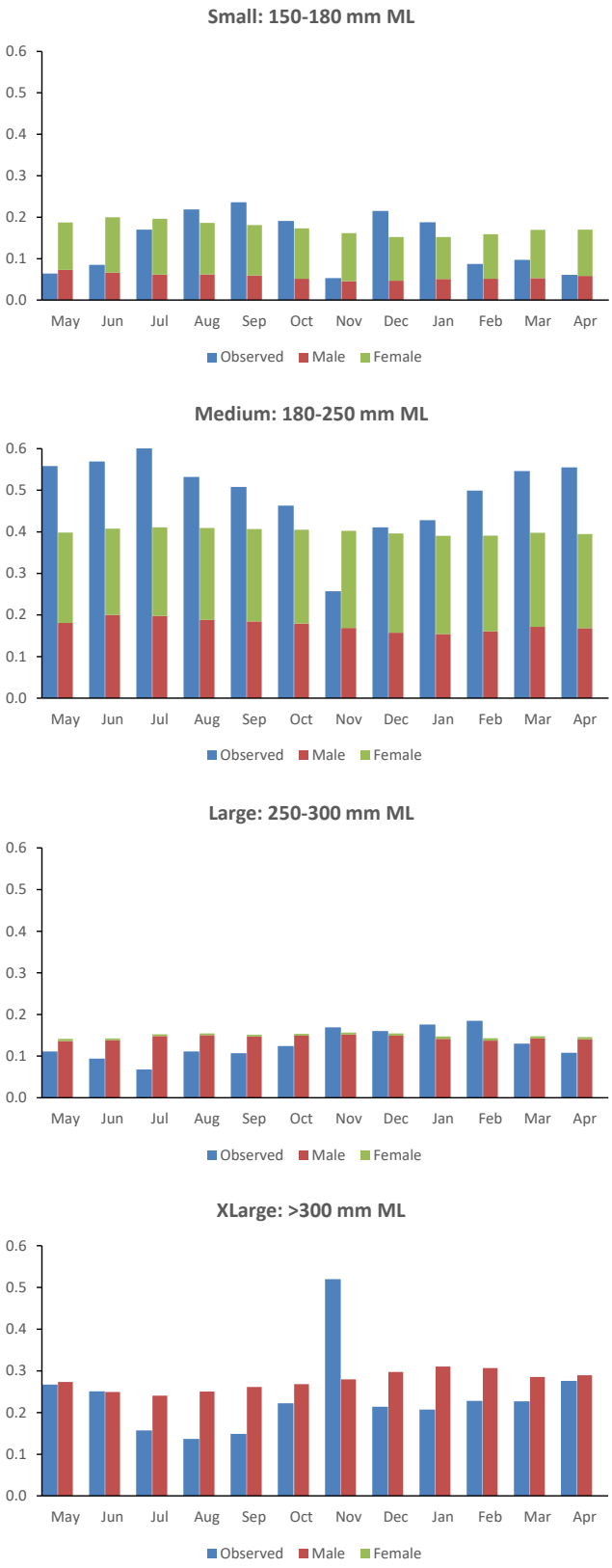

Figure 8. Comparison of the 2011 observed proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

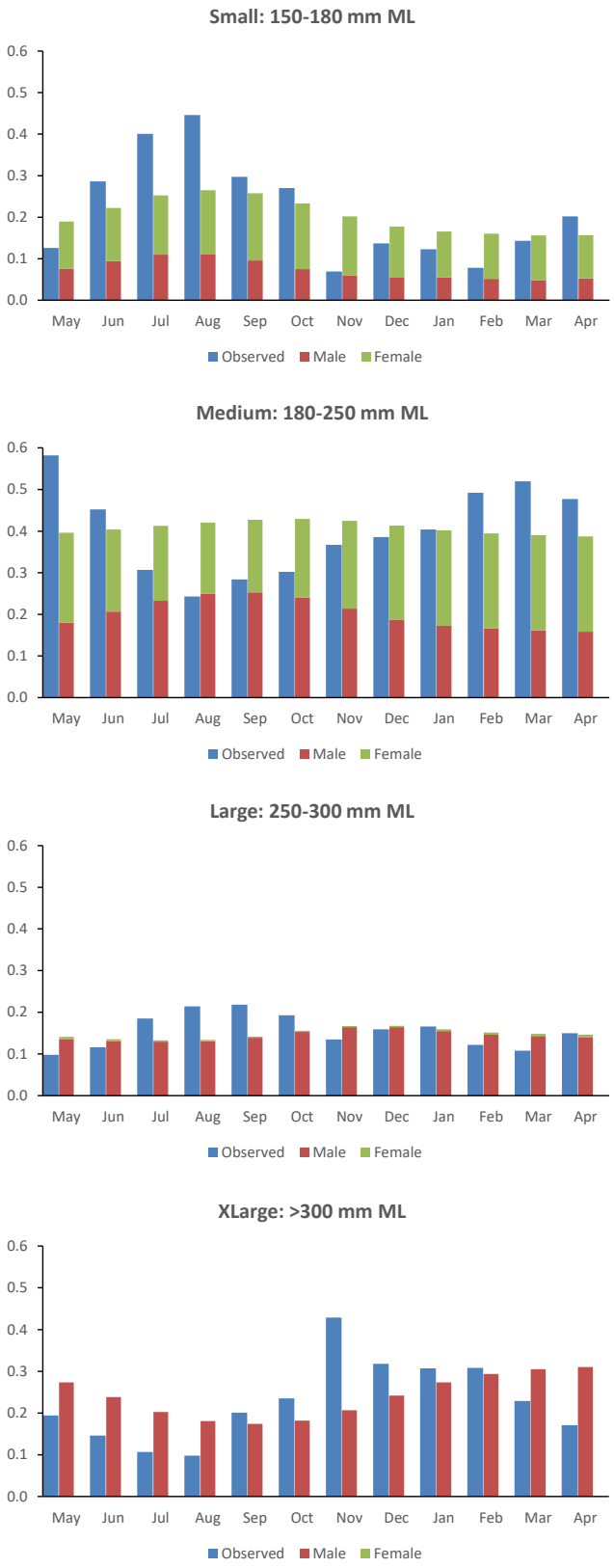

Figure 9. Comparison of the 2012 observed proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

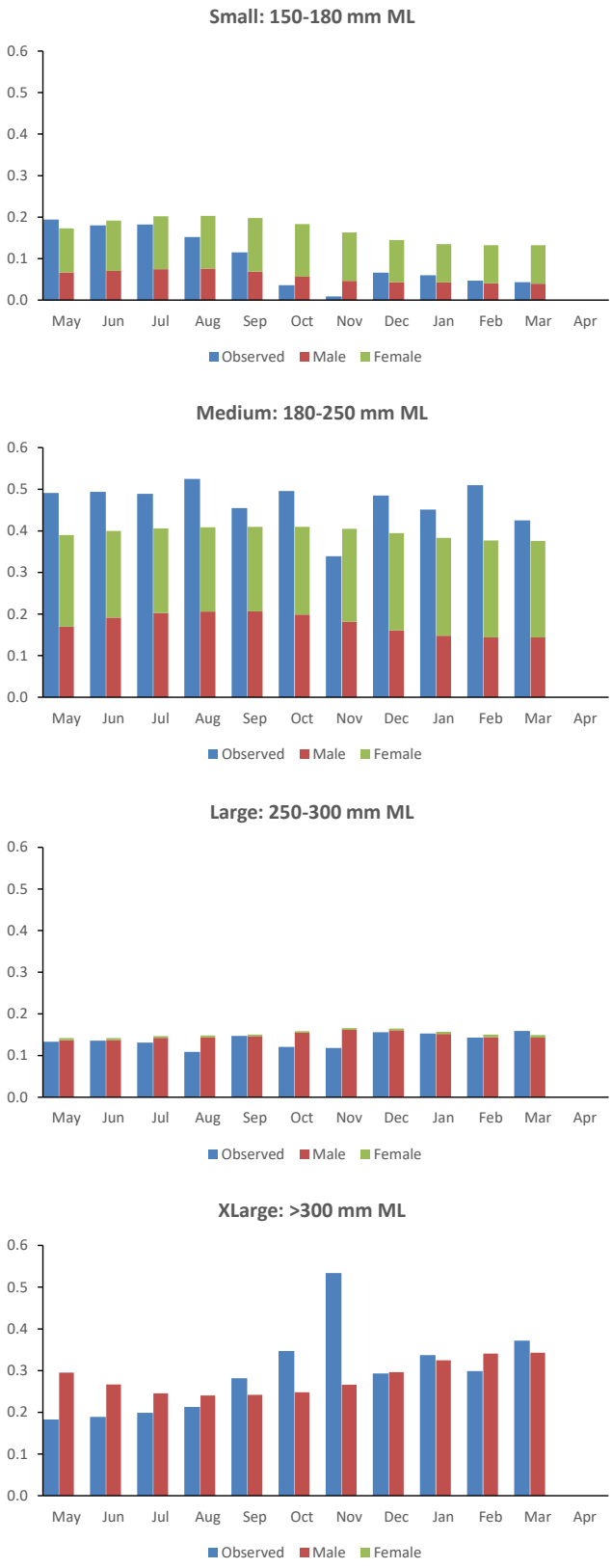

Figure 10. Comparison of the 2013 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

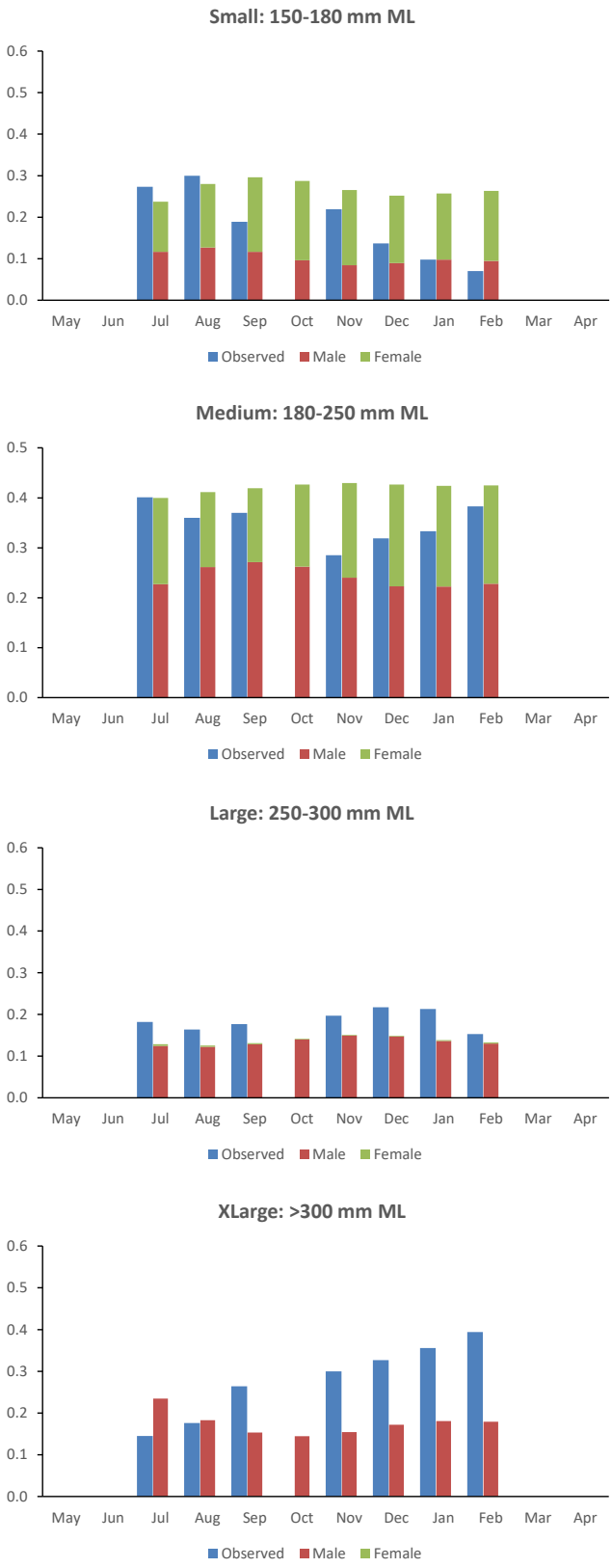

Figure 11. Comparison of the 2014 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

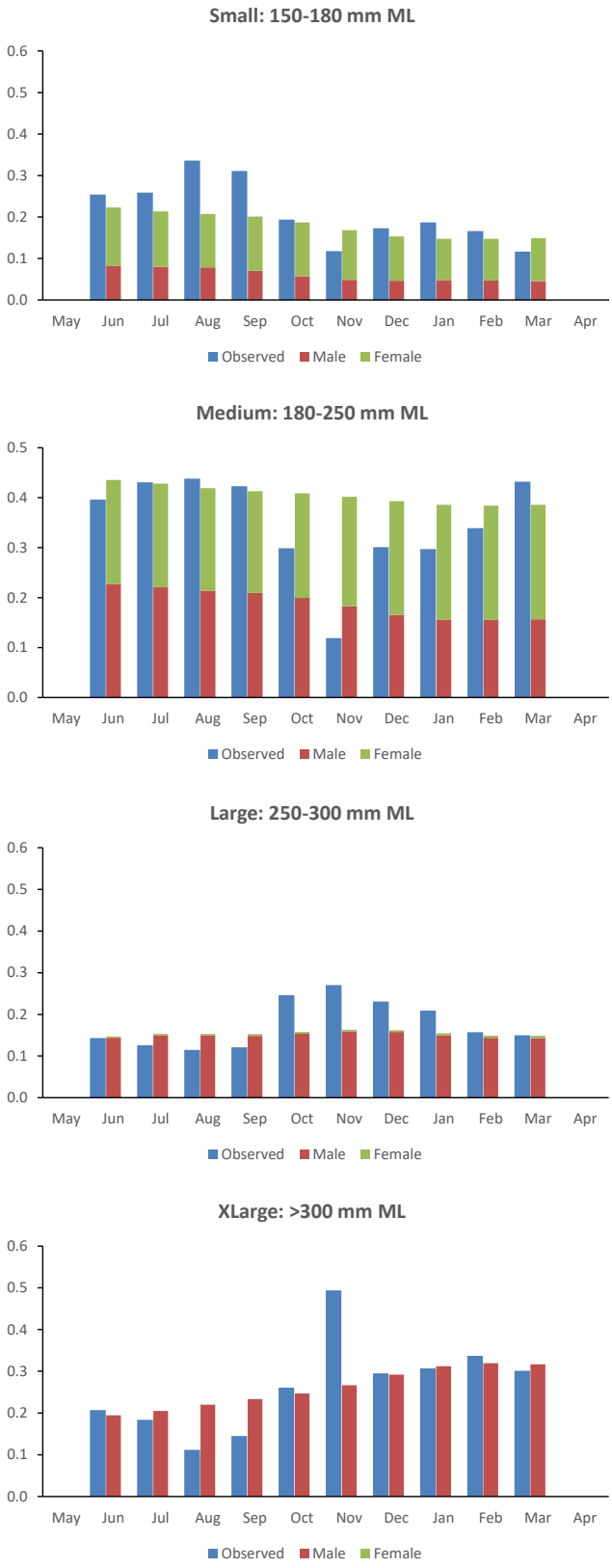

Figure 12. Comparison of the 2015 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

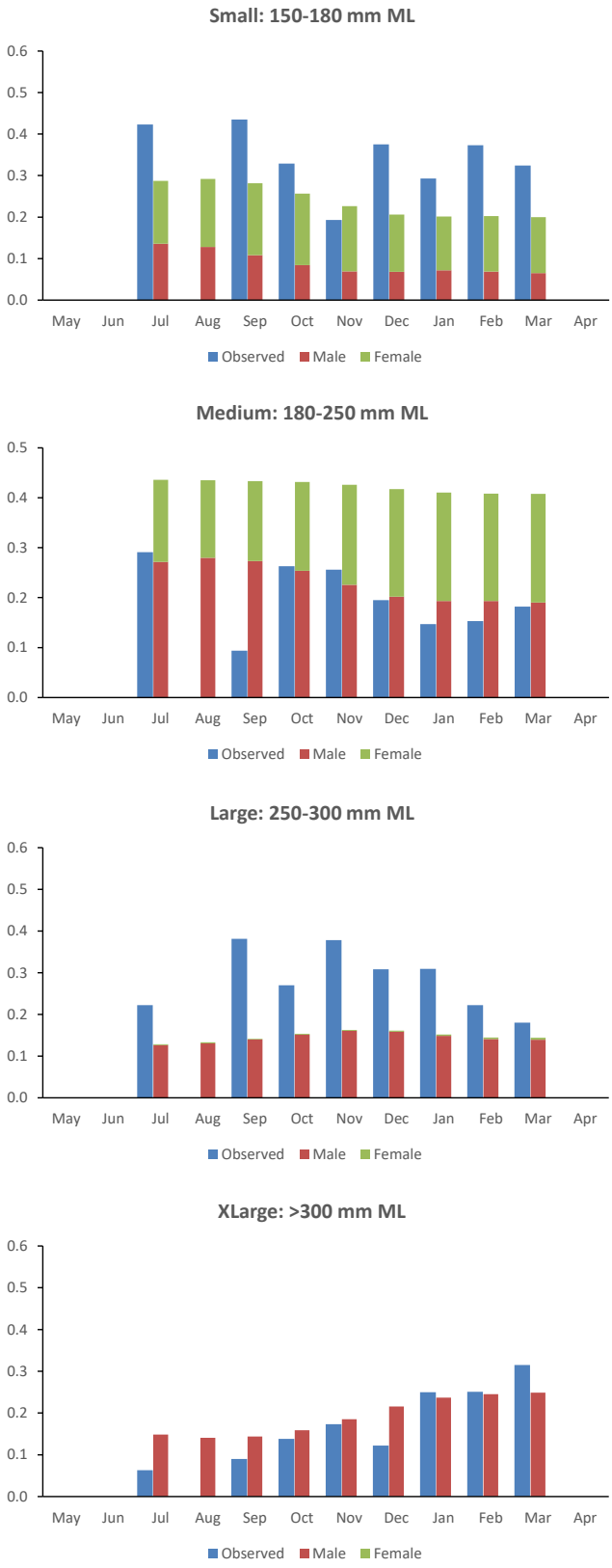

Figure 13. Comparison of the 2017 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

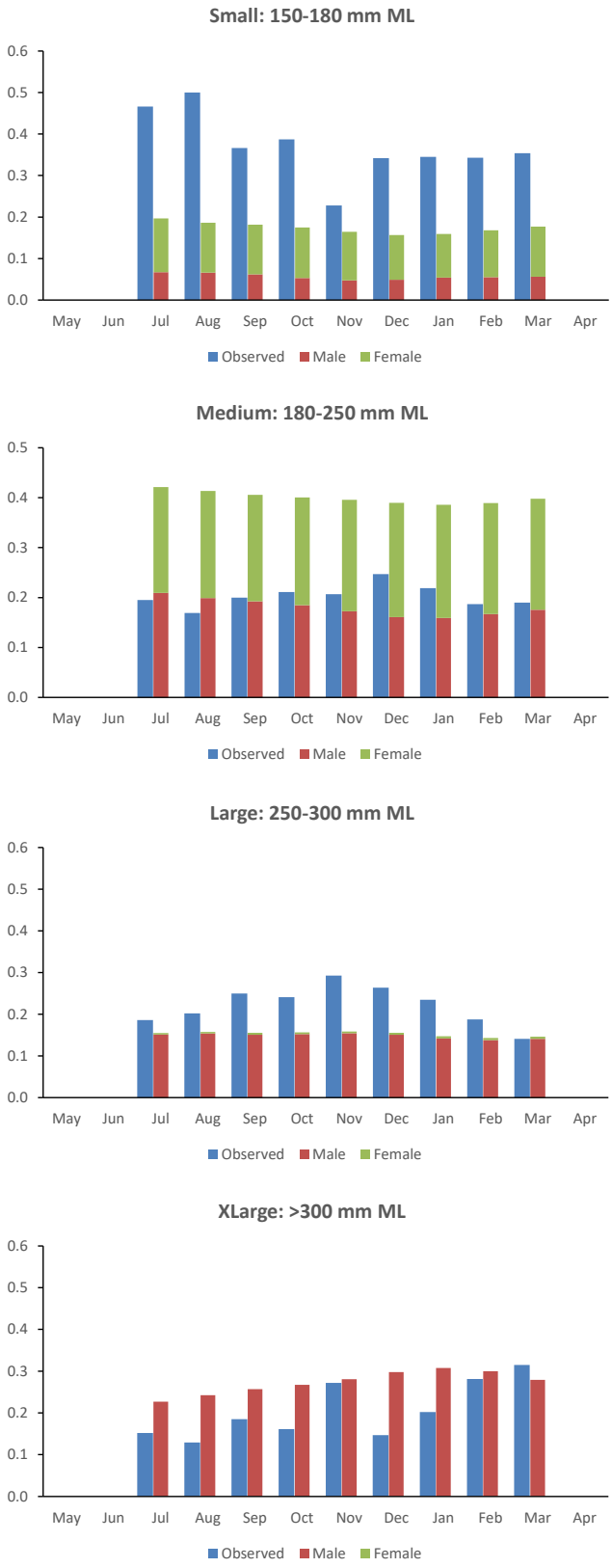

Figure 14. Comparison of the 2018 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

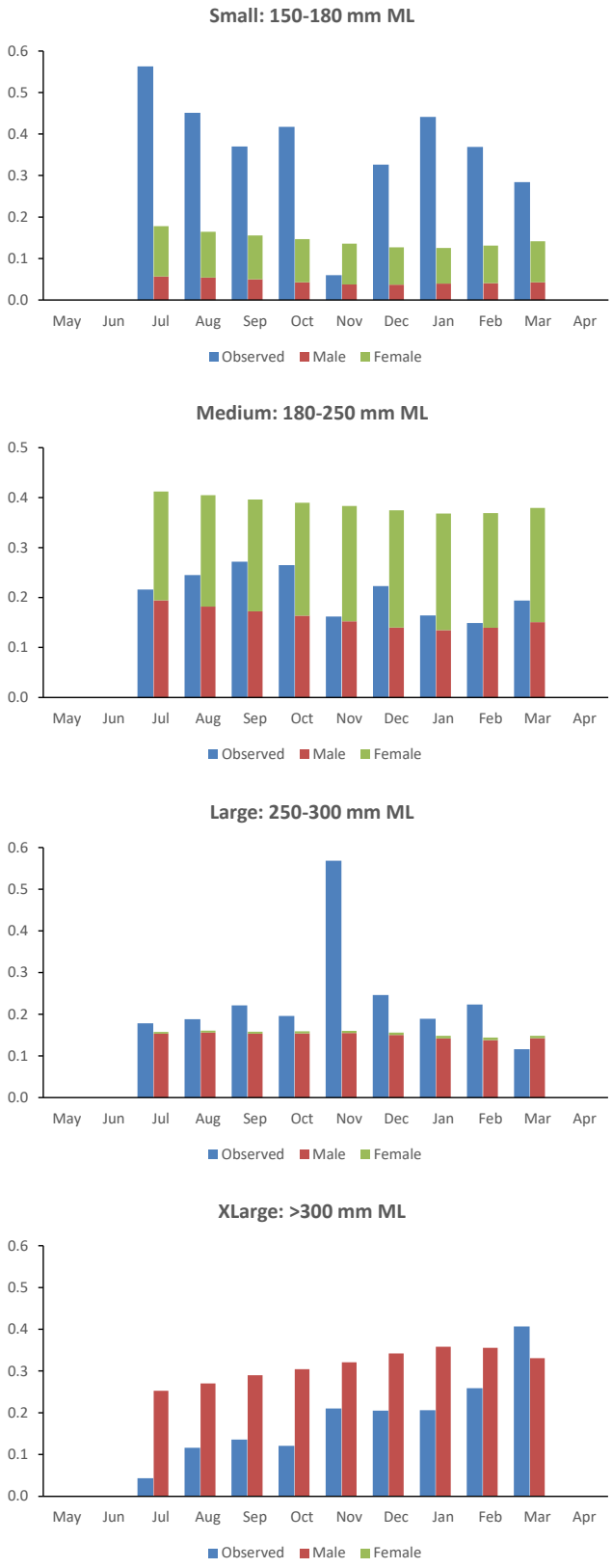

Figure 15. Comparison of the 2019 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

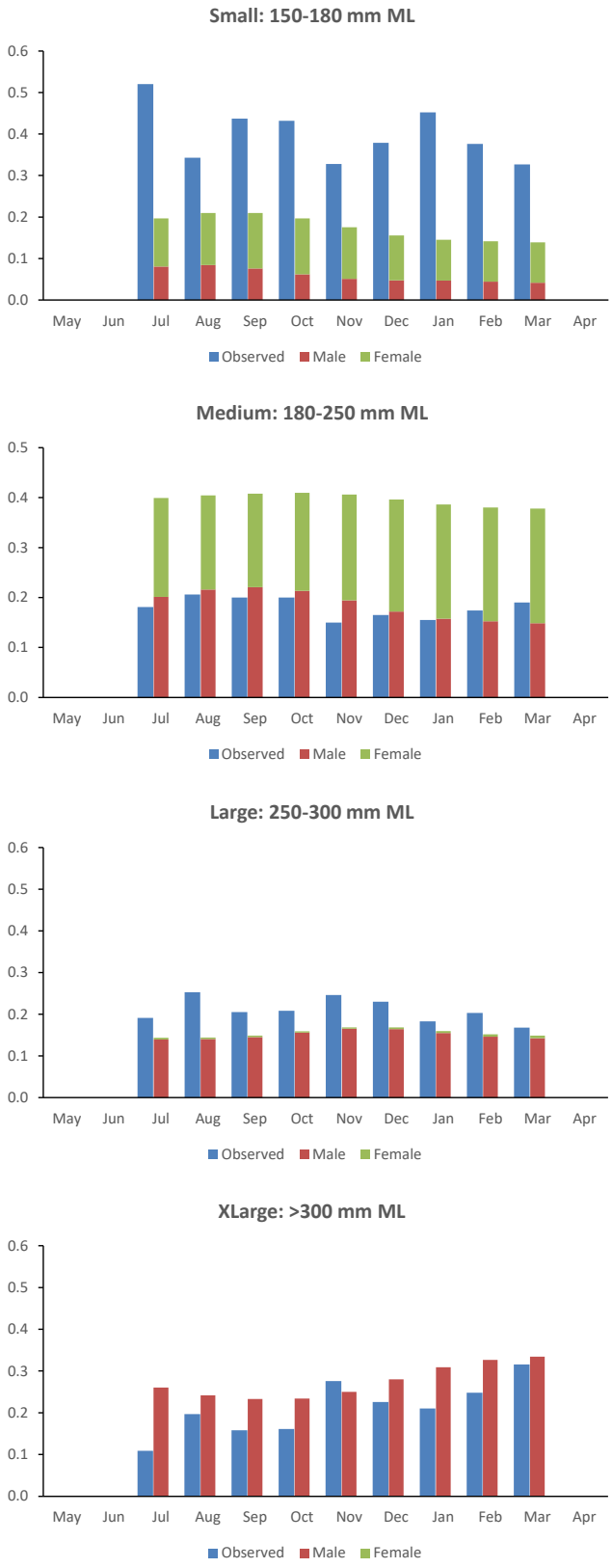

Figure 16. Comparison of the 2020 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

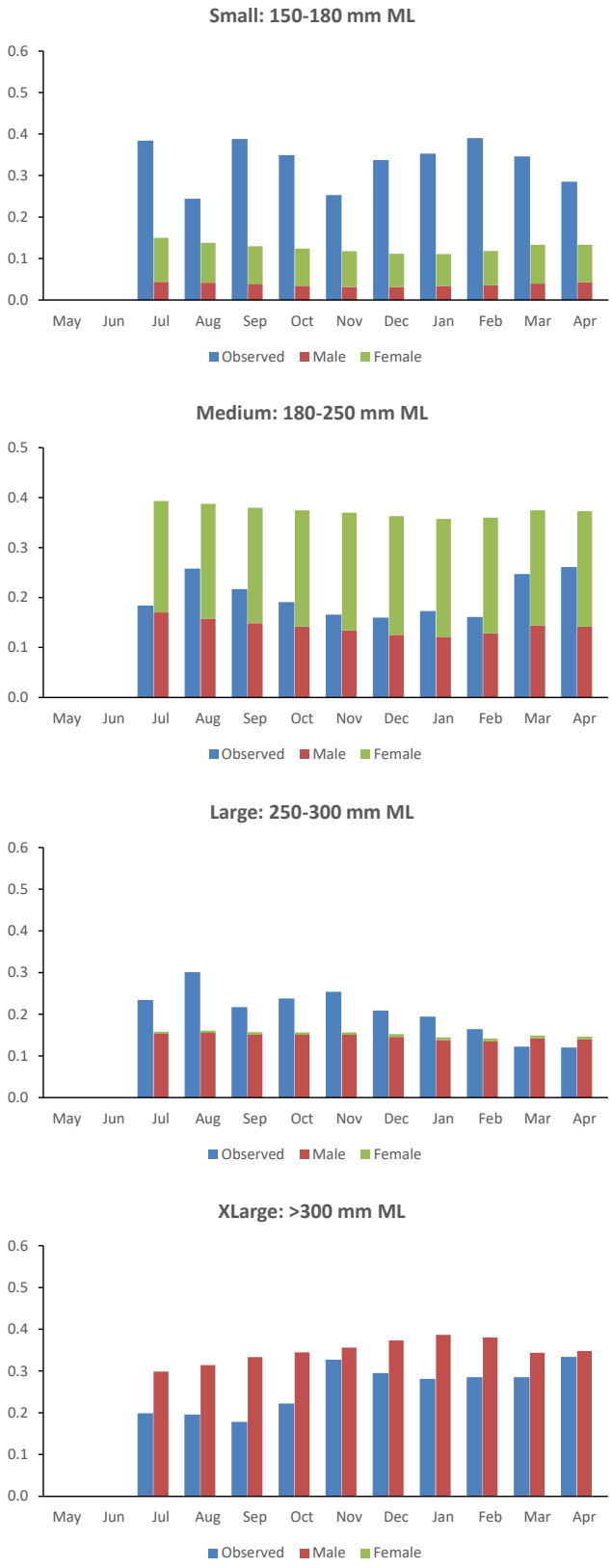

Figure 17. Comparison of the 2021 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

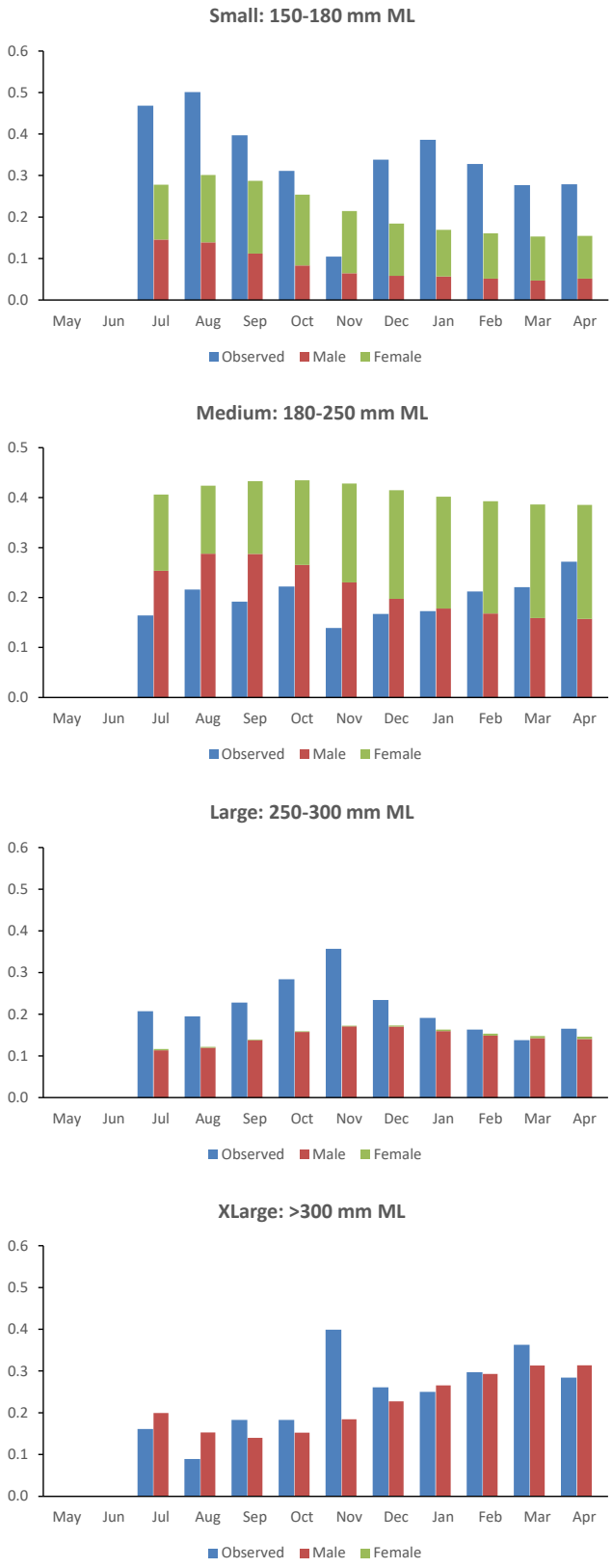

Figure 18. Comparison of the 2022 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

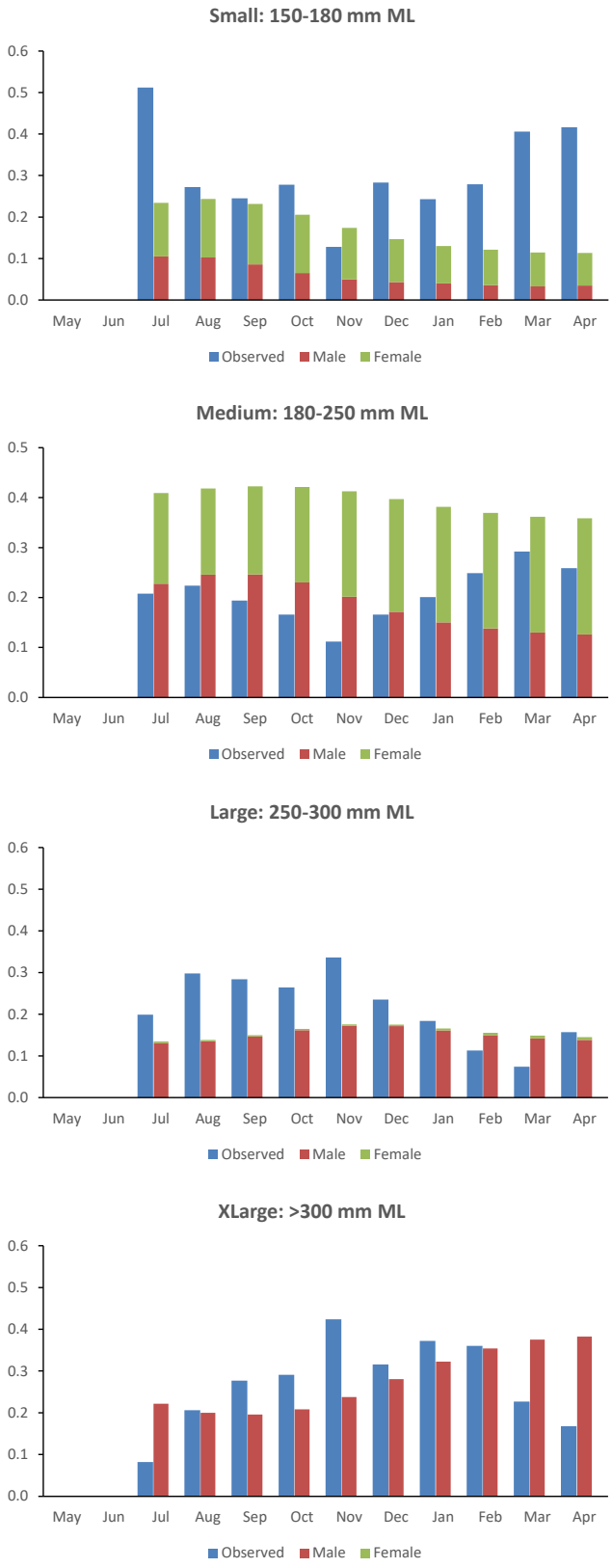

Figure 19. Comparison of the 2023 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.

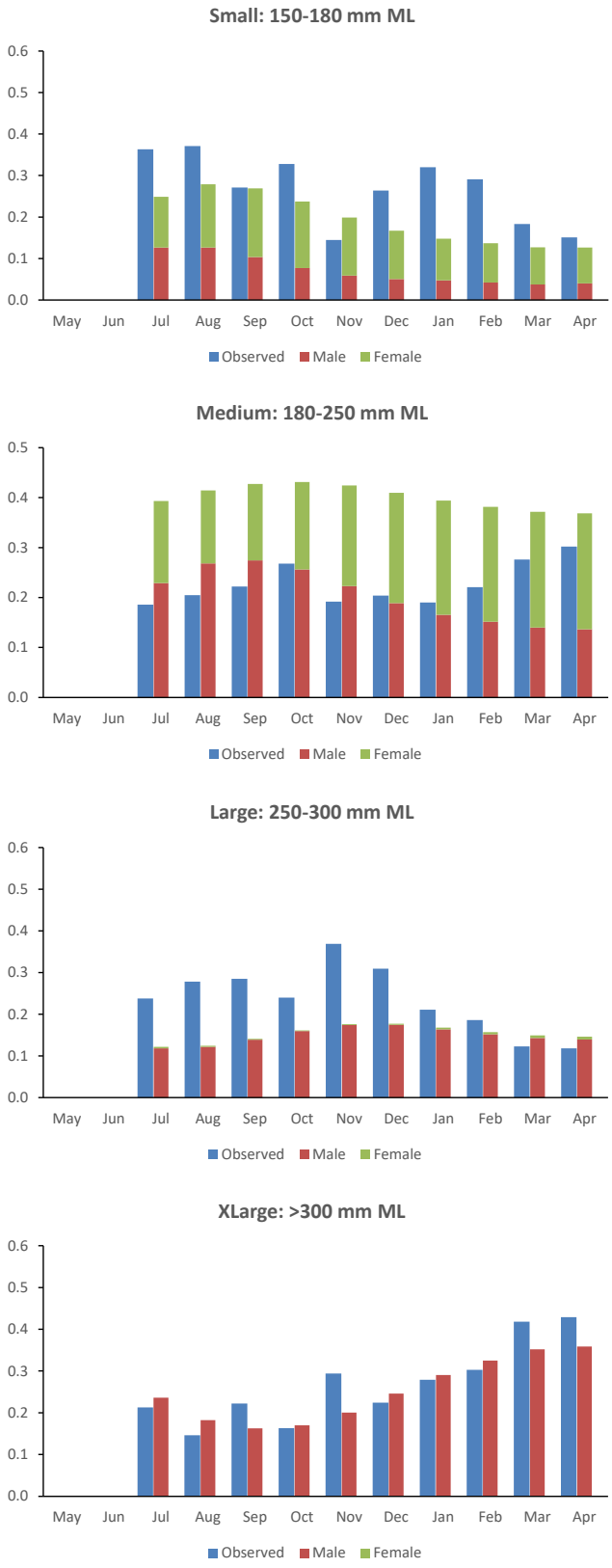

Figure 20. Comparison of the 2024 proportions by weight of each pack category in each month and the sex-disaggregated model estimated proportions.