

SOME CONSIDERATIONS FOR MODELING GROWTH OF EAST ATLANTIC BLUEFIN TUNA IN STOCK SYNTHESIS

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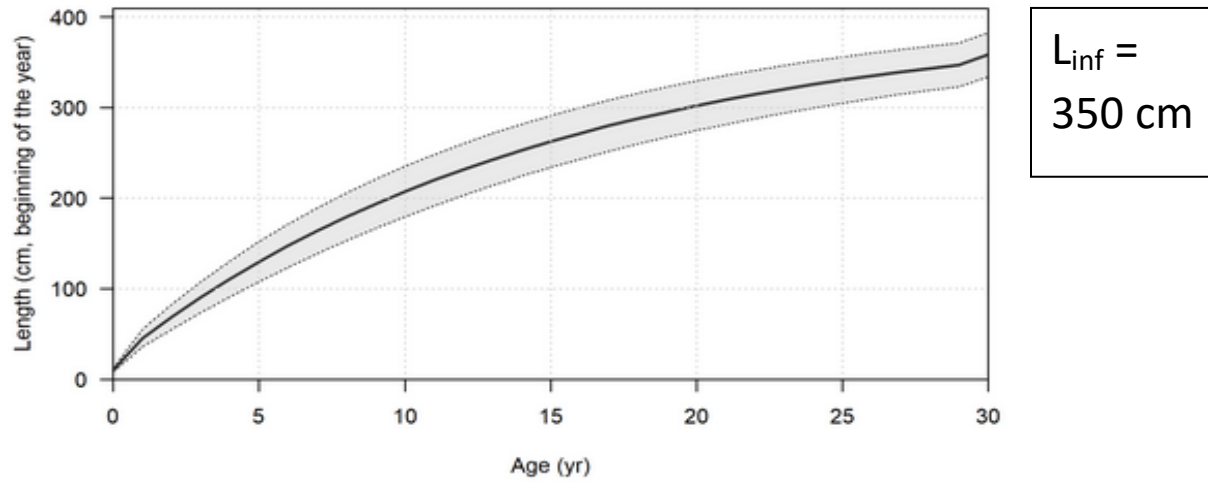
East Atlantic Bluefin Tuna Stock Assessment Workshop

July 2022

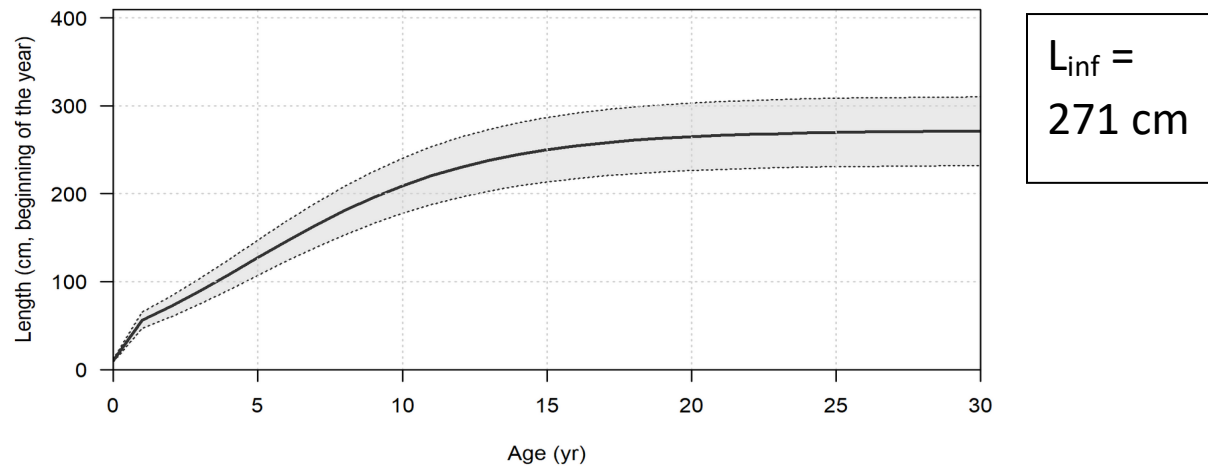
INTRODUCTION

- Some issues were identified when attempting to estimate East Atlantic bluefin tuna growth within Stock Synthesis
- Namely, the estimate of L_{inf} hit an upper bound and was considered biologically implausible with predictions of fish growing to > 4 meters
- This presentation provides a summary of available growth information and comparison of estimates from the West Atlantic bluefin tuna SS model
- It was noted that the West Atlantic SS model produced consistent estimates of growth over the last three assessment cycles since 2017, and incorporated a large dataset of otolith-aged fish, many of which are genetically identified as Mediterranean stock

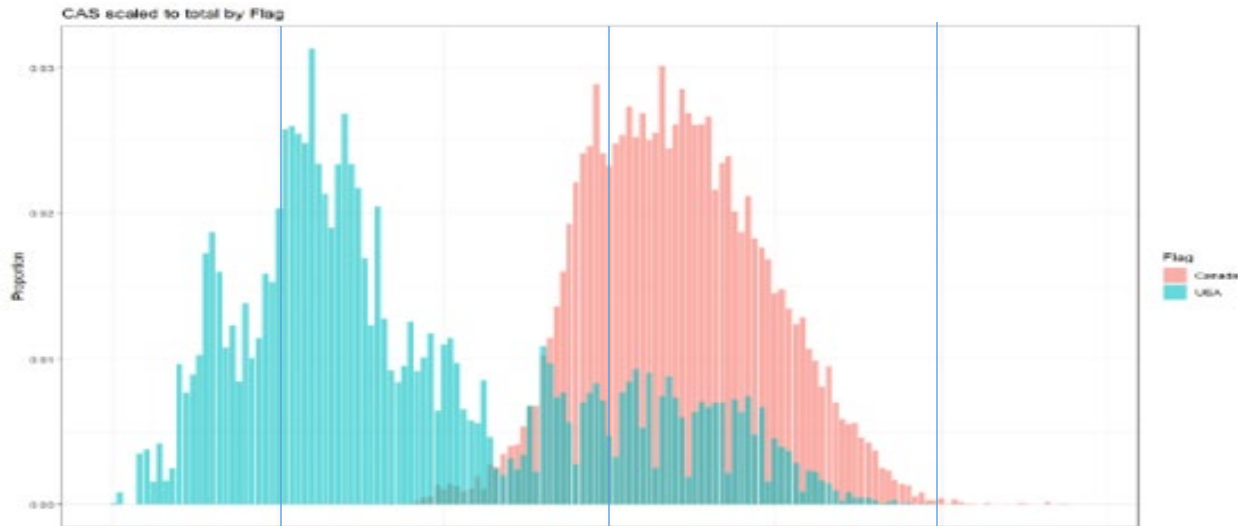
Stock Synthesis freely estimated growth using the size-at-age data of East Atlantic fish



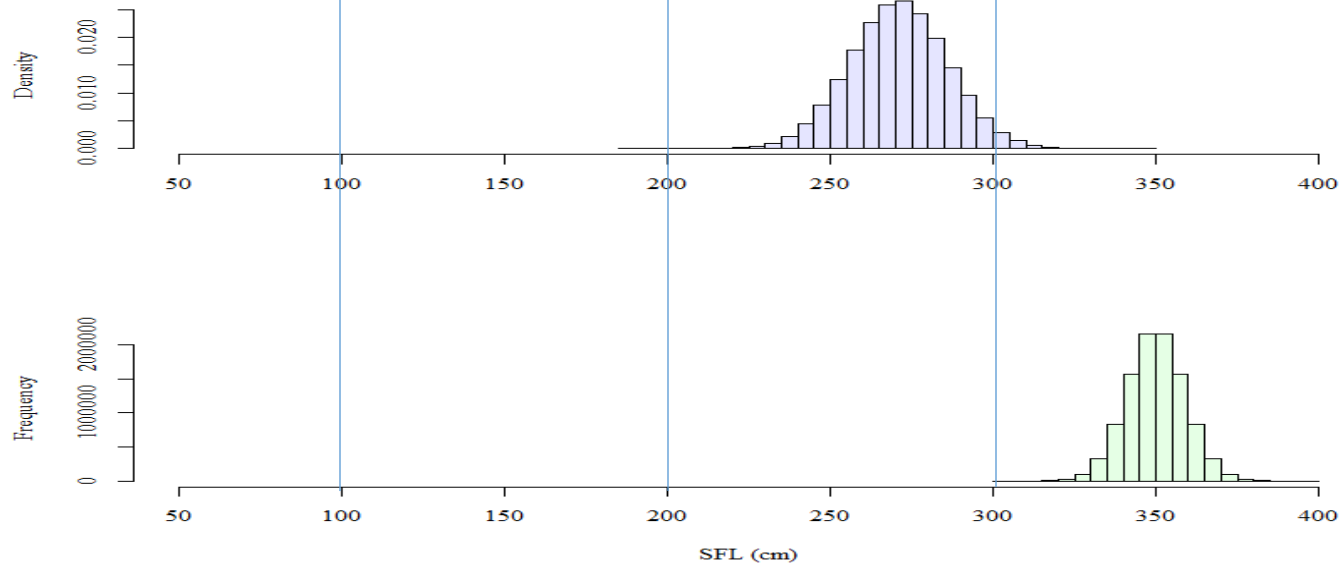
East Atlantic Stock Synthesis estimated growth with L_{inf} fixed at 271 cm



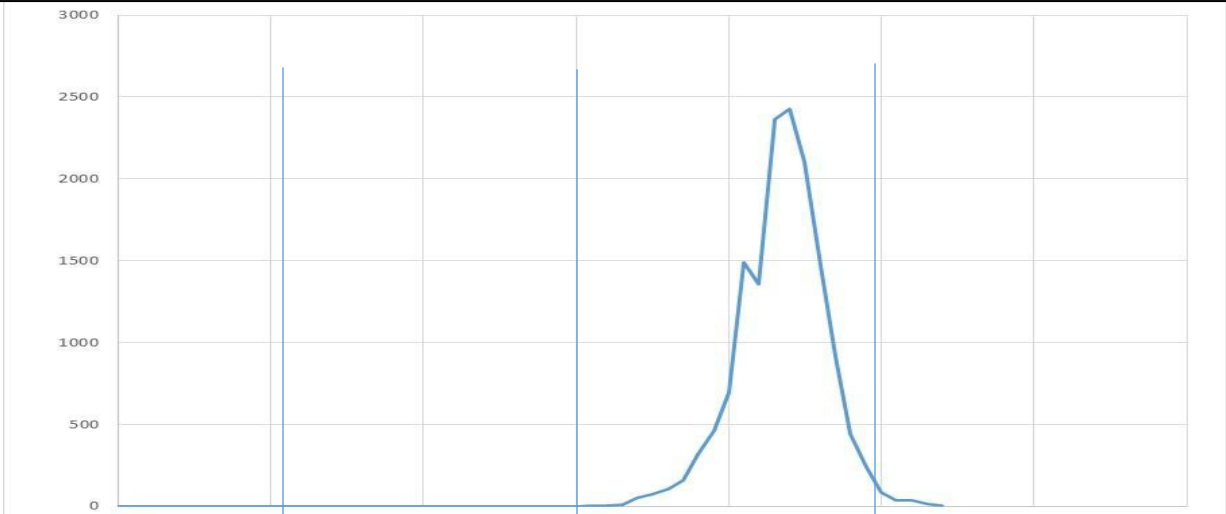
Length frequencies of the U.S. and Canada fleets from Hanke et al. SCRS/2021/027:



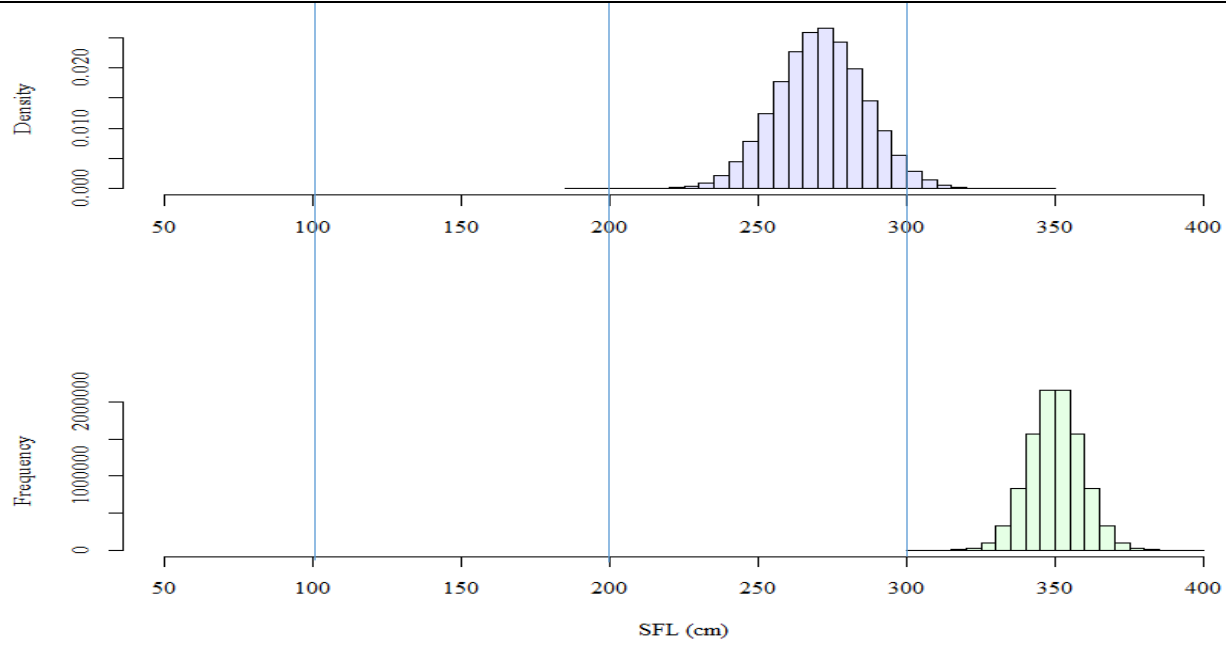
L_{inf} comparison between runs with value fixed at 271 cm (purple) vs freely estimated (green)



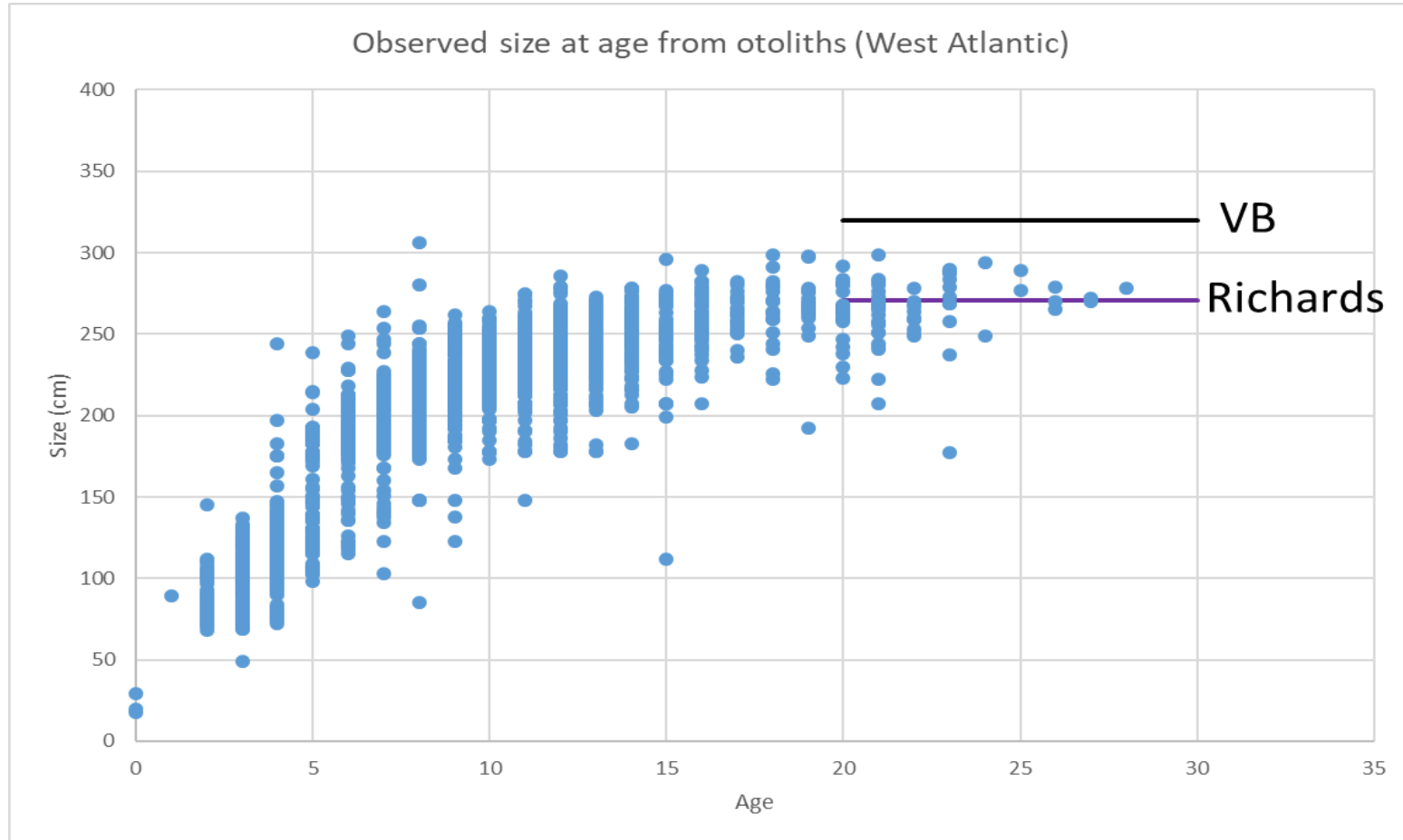
Norway purse seine aggregated length frequency for the period 1970-1981



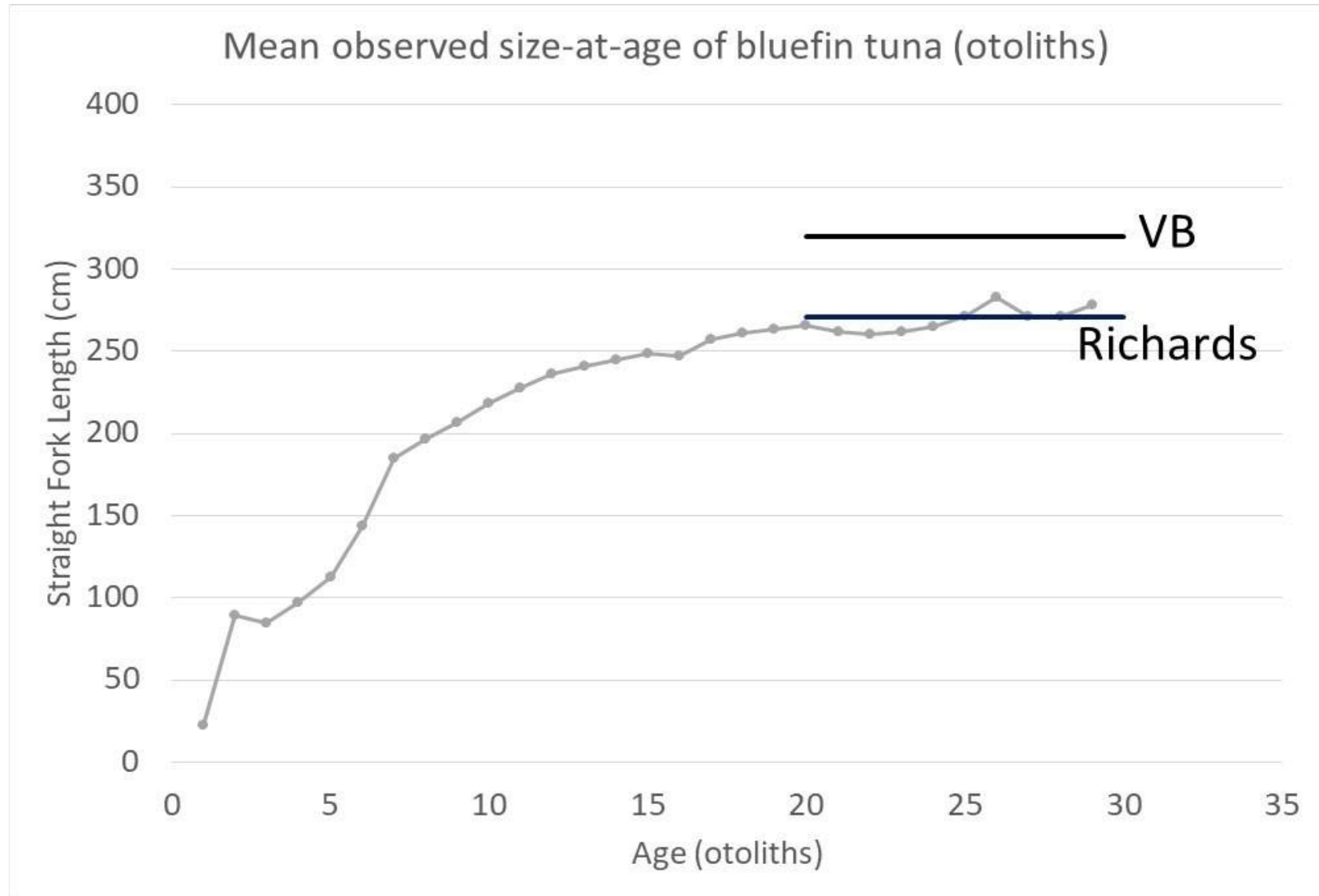
L_{inf} comparison between runs with value fixed at 271 cm (purple) vs freely estimated (green)



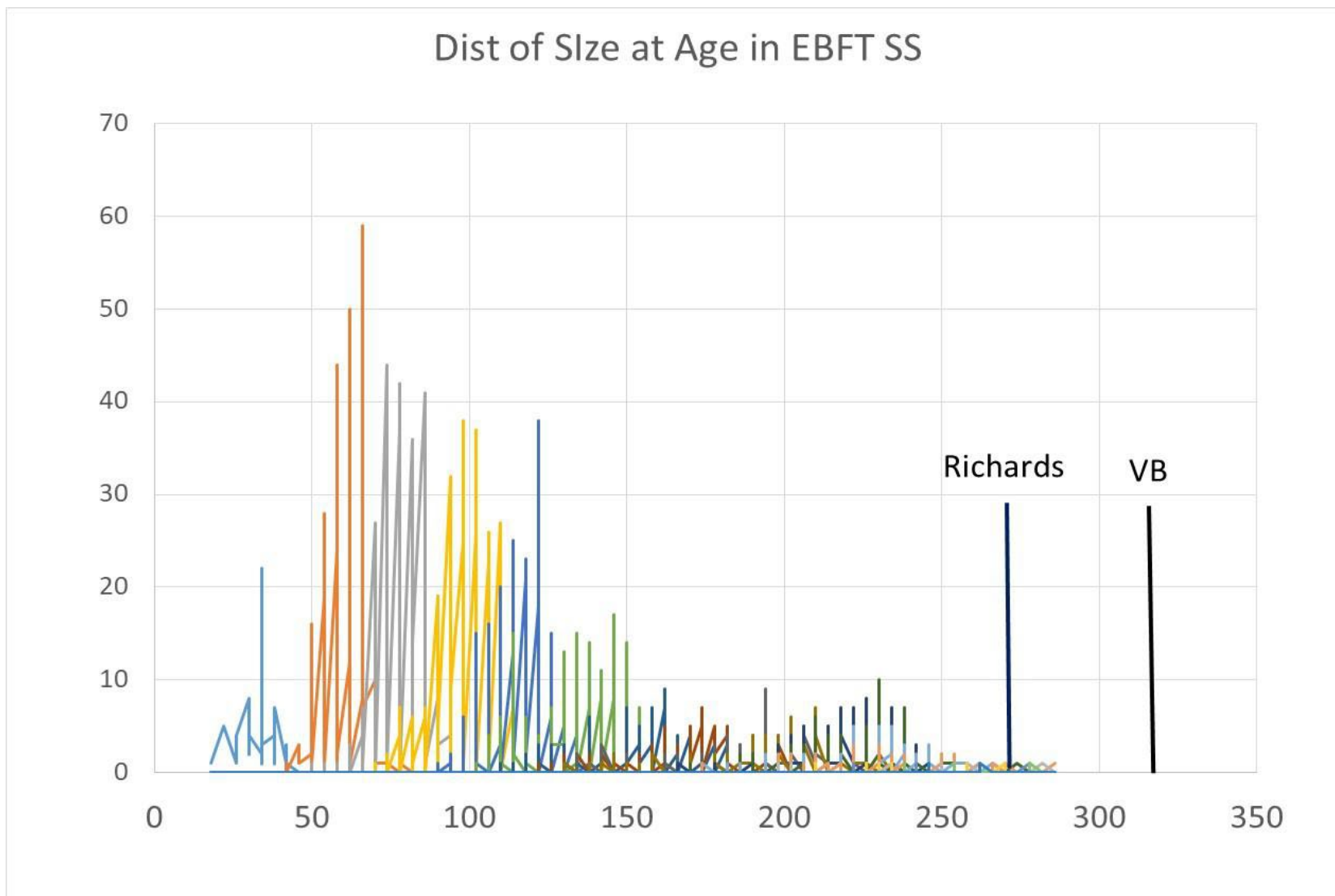
Observed sizes-at-age of otolith read bluefin tuna from the mixed stock fisheries in the West Atlantic.



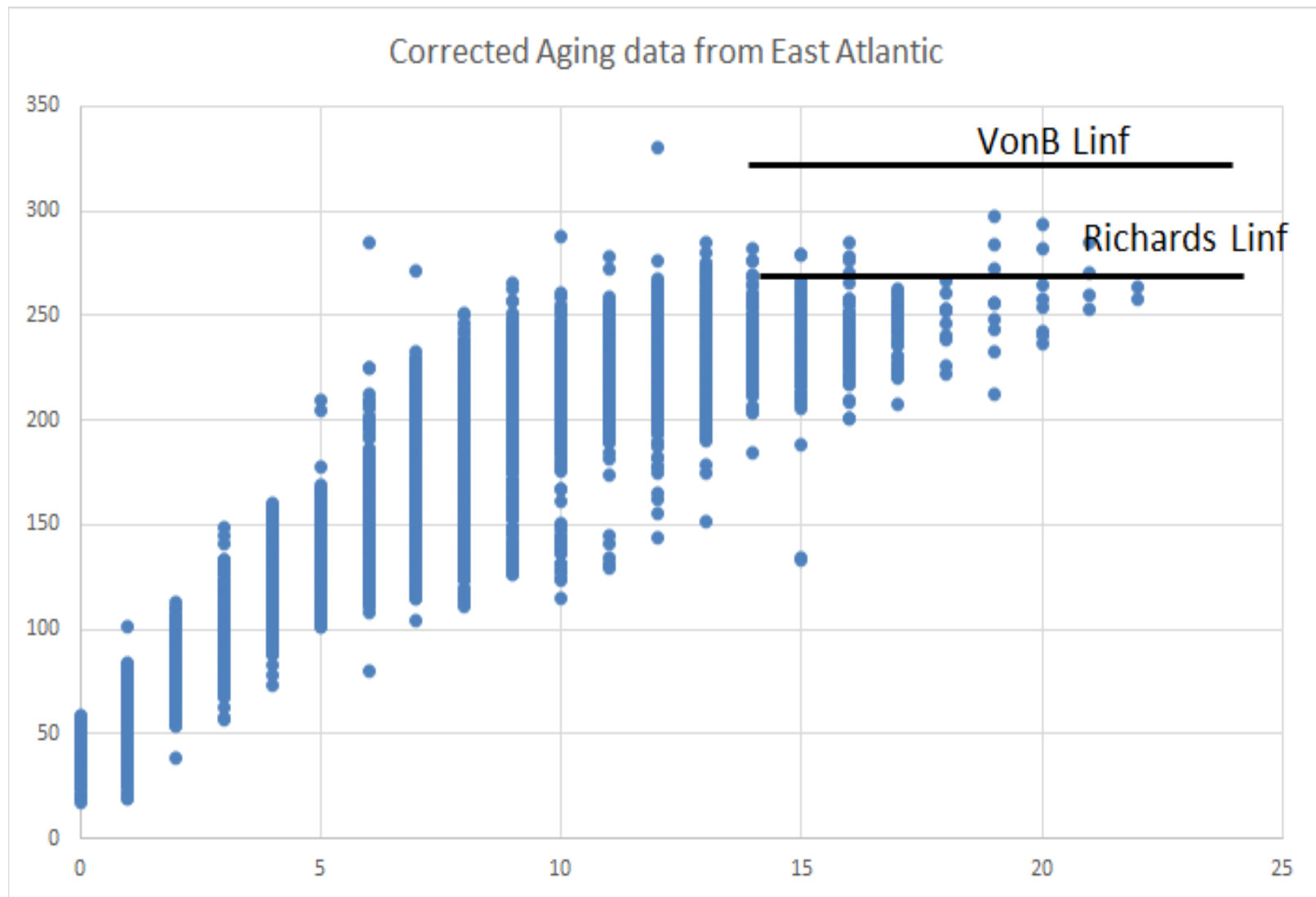
Observed mean size-at-age of otolith read bluefin tuna from the mixed stock fisheries in the West Atlantic.



Size-at-age distributions of aged bluefin tuna in the East Atlantic SS model.



East Atlantic bluefin tuna conditional length-at-age data available for the stock assessment models.



CONCLUSIONS

- The preliminary Stock Synthesis run estimated L_{inf} at the upper bound of 350 cm, but the estimate is not supported by any observations of mean size-at-age
- SS estimates of growth for the West Atlantic model, which includes large numbers of East Atlantic otolith-aged fish, resulted in $L_{inf} = 272$ and 273 cm from the 2020 and 2021 assessments, respectively
- Ailloud et al. 2017 estimated Richards growth of the mixed stocks in the West Atlantic from integrated tagging/otolith data with a resulting $L_{inf} = 271$ cm.
- The northern fleets of Canada HL and Norway PS appear to catch the largest bluefin tuna observed with upper modes near 270 cm and L_{max} near 340 cm.
- Distributions of size-at-age and estimates of mean size of older age classes support the Richards growth estimates of Ailloud et al. 2017 and SS estimates for the West Atlantic model.
- It is recommended to fix growth assumptions (L_{inf} in particular) in the East Atlantic SS model, and consider the Norway PS (1970-1981) to have asymptotic selectivity