

# Summary report - AFSC Age and Growth Program data

## COLLECTION: Walleye Pollock 2018 Bering Sea Survey

### AGE AGREEMENT - TRADITIONAL AGE READING

The information below describes results of paired age readings between a primary age reader (“Read age”) and a second reader (“Test age”). Generally, the AFSC Age and Growth Program performs paired readings on 20% of each collection. These paired test and read age estimates are used to evaluate inter-reader precision and bias. Acceptable levels of precision vary among species. Precision statistics are compared to those of previous collections, and if they fall well outside of the norm, specimens may be re-aged or a larger portion of the cruise may be tested by the second reader. In cases where bias is detected between reader and tester, they work together to identify the source of the bias and resolve “Final Ages” prior to releasing data to the user.

Table 1: Precision statistics for the Walleye Pollock 2018 Bering Sea Survey collection.

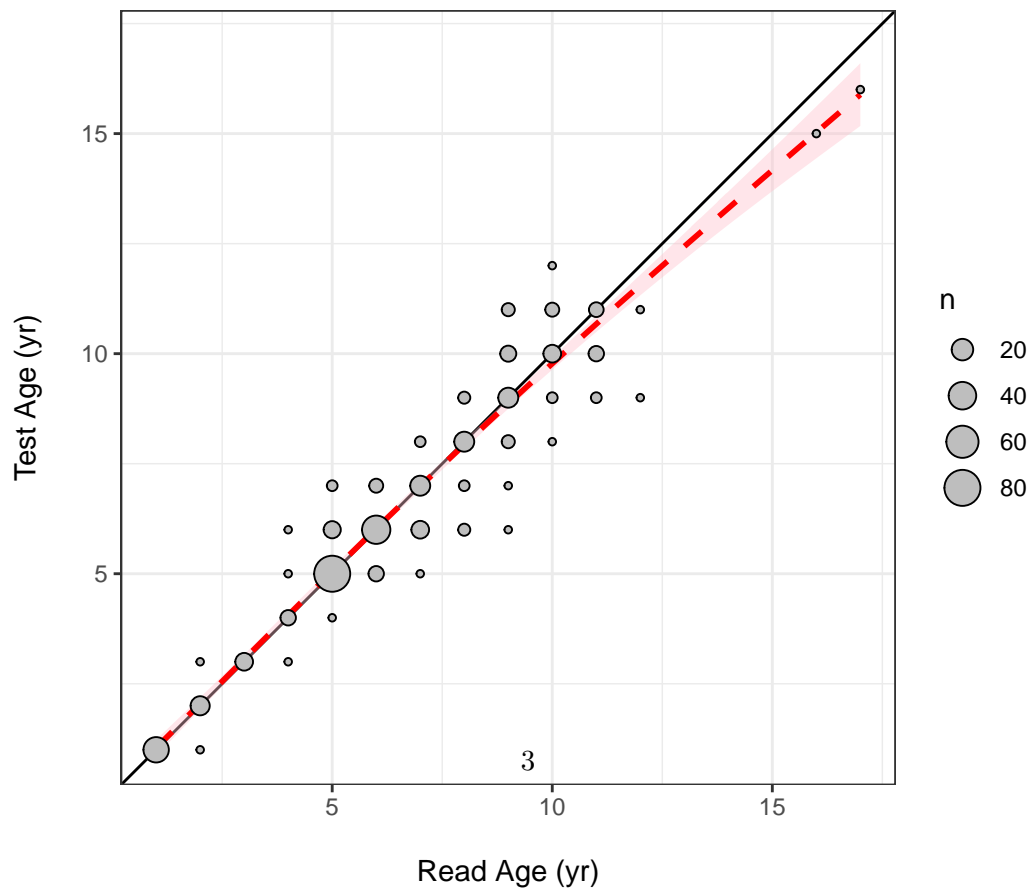
Precision statistic	Value
Percent agreement (PA)	73.26%
Average percent error (APE)	2.31%
Coefficient of variation (CV)	3.27%
Total number of fish in ageing collection	1752
Number of fish unaged	11
Number of fish in precision-testing sample	344
Number of fish aged by two readers	344
Percentage of fish with paired age readings	20
Average read age (paired reads only)	5.99
Average test age (paired reads only)	5.97

Table 2: Bias statistics for the Walleye Pollock 2018 Bering Sea Survey collection. The null hypothesis of the Bowker’s and Evans-Hoenig tests is that there is no asymmetry among cells off the diagonal of a cross-tabulation table.

(a) Bias direction			
minus bias	43 otoliths	12.5%	
plus bias	49 otoliths	14.2%	
complete agreement	252 otoliths	73.3%	
(b) Tests of symmetry			
Test name	df	Test statistic	<i>p</i>
Bowker’s	22	22.86	0.41
Evans-Hoenig	3	2.22	0.53

Table 3: Cross-tabulation showing Test Age (columns) vs Read Age (rows)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1	14	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	1	7	1	1	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	1	80	10	2	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	7	43	5	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	1	11	16	2	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	3	2	16	3	-	-	-	-	-	-	-	-
9	-	-	-	-	-	1	1	4	16	8	4	-	-	-	-	-	-
10	-	-	-	-	-	-	-	1	2	11	5	1	-	-	-	-	-
11	-	-	-	-	-	-	-	-	2	7	6	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-



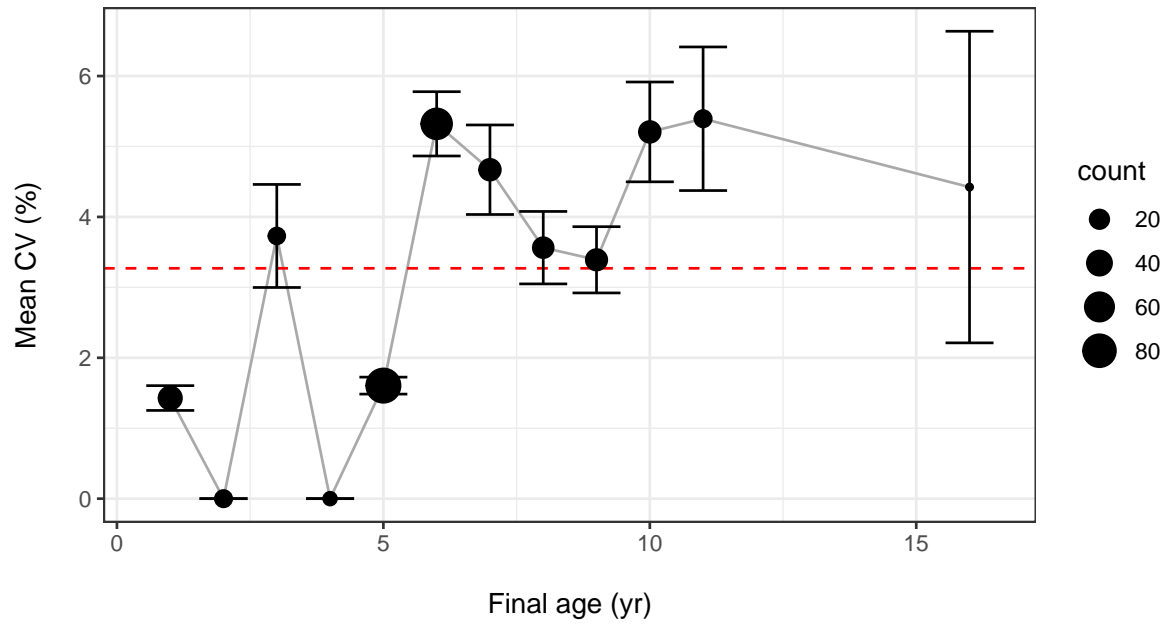


Figure 2: Mean CV by age group of this collection, with 95% confidence intervals. Red dashed line indicates overall mean CV for the collection.

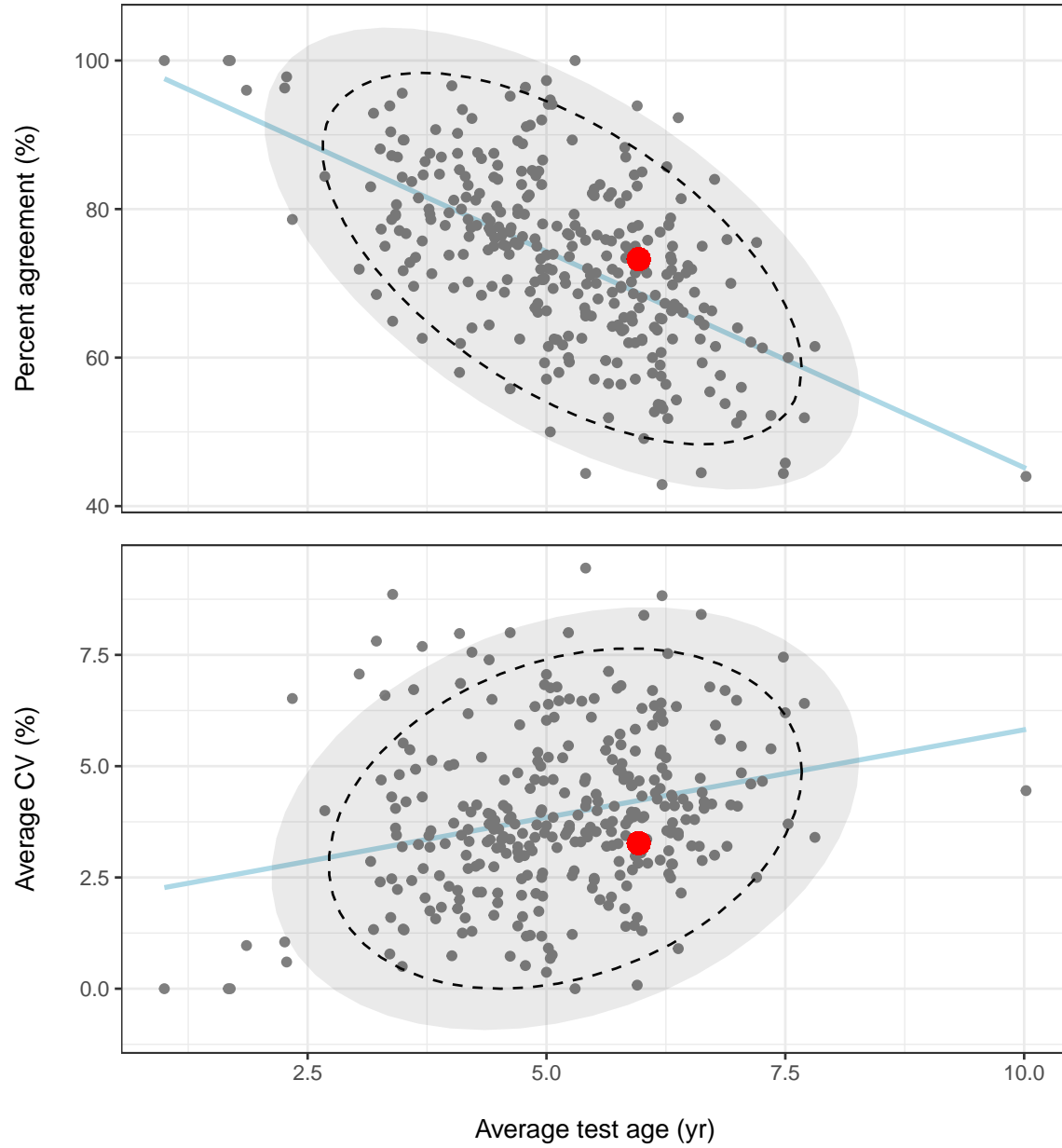


Figure 3: Comparison of reader agreement metrics between this collection (red point) and historical collections of the same species (gray points). Average test age versus percent agreement (top) and average CV (bottom). Dashed line and gray area indicate 95% and 99% confidence ellipses, respectively. Blue line indicates fitted generalized additive model. Points outside the ellipse but *above* the GAM in the case of percent agreement or *below* the GAM in the case of CV would still be desirable outcomes because they indicate better precision than expected for this species. Note that historical collections are summarized at the reader level, sometimes with multiple readers for a given year and cruise.

## AGE RANGES

This section shows information pertaining to the full collection of Walleye Pollock aged from the 2018 Bering Sea survey, including age and size distributions and length-at-age.

Average age (years)	6.12
Median age (years)	6
Average length (mm)	442
Median length (mm)	470
Average weight (g)	639
Median weight (g)	648

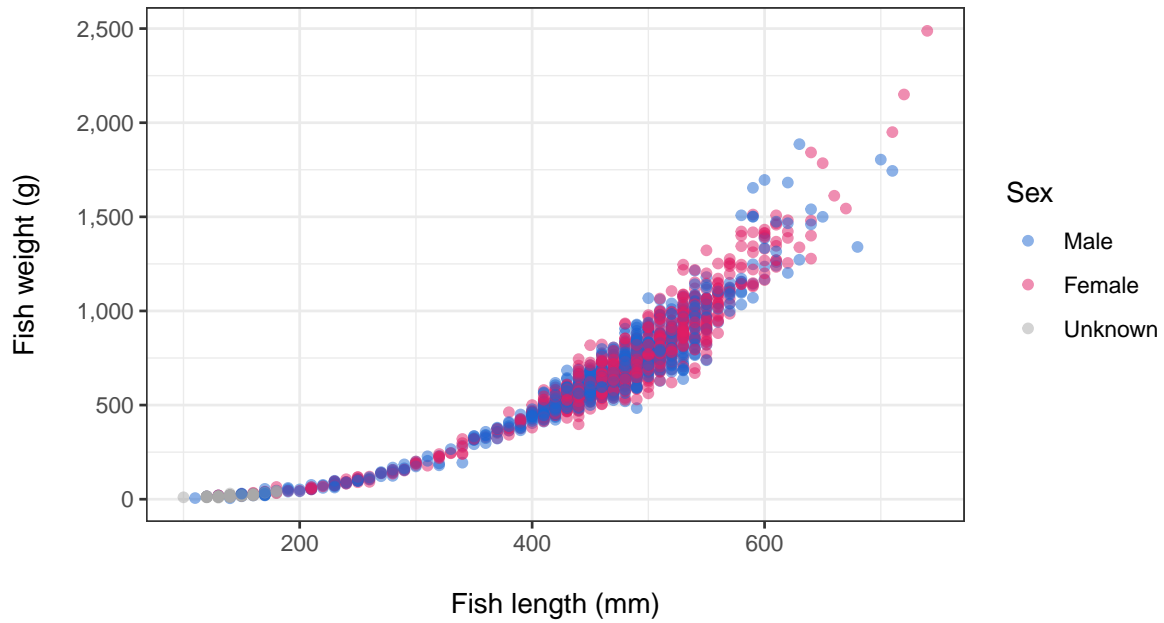


Figure 4: Observations of weight-at-length for males, females, and unsexed individuals.

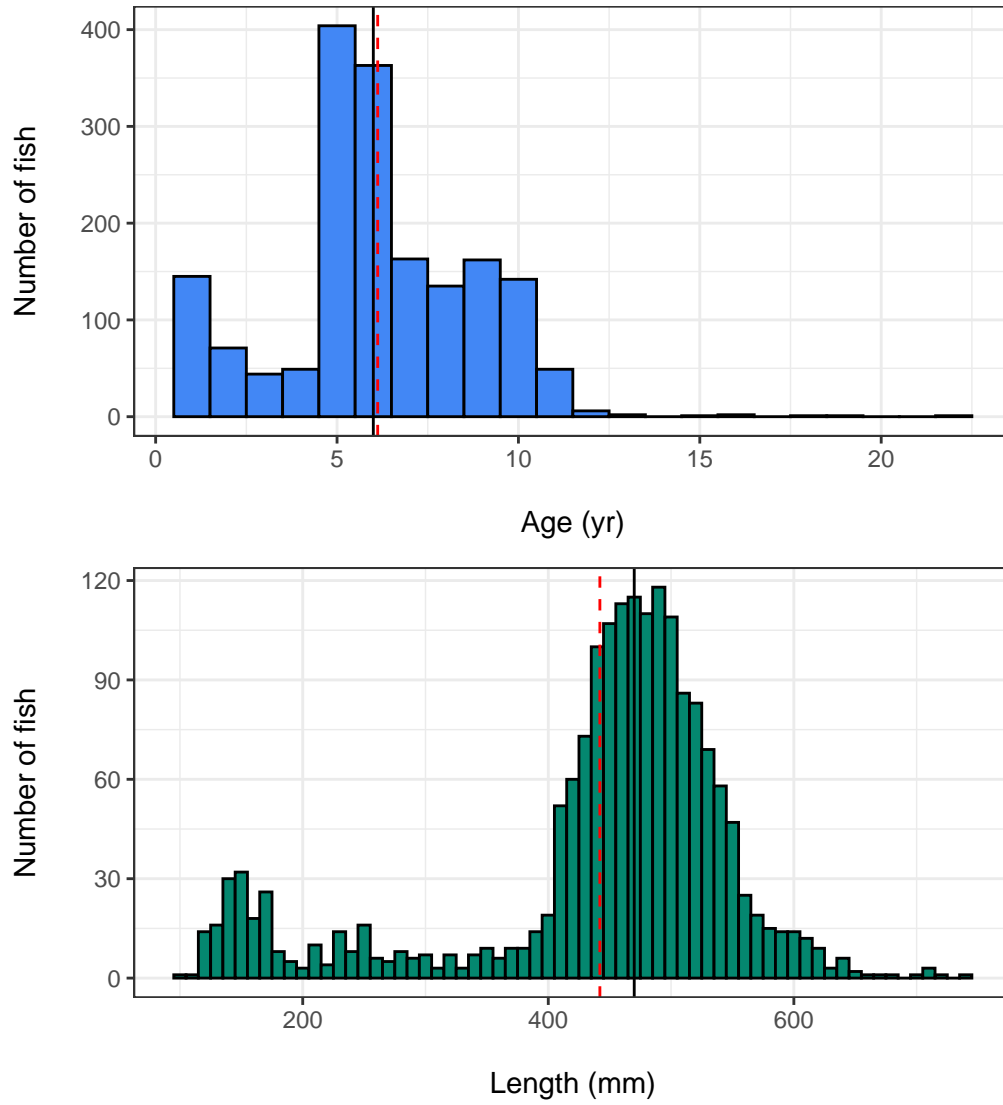


Figure 5: Age (top) and length (bottom) distributions of fish aged by the AFSC Age and Growth Program. Dashed red line represents the mean, solid black line represents the median.

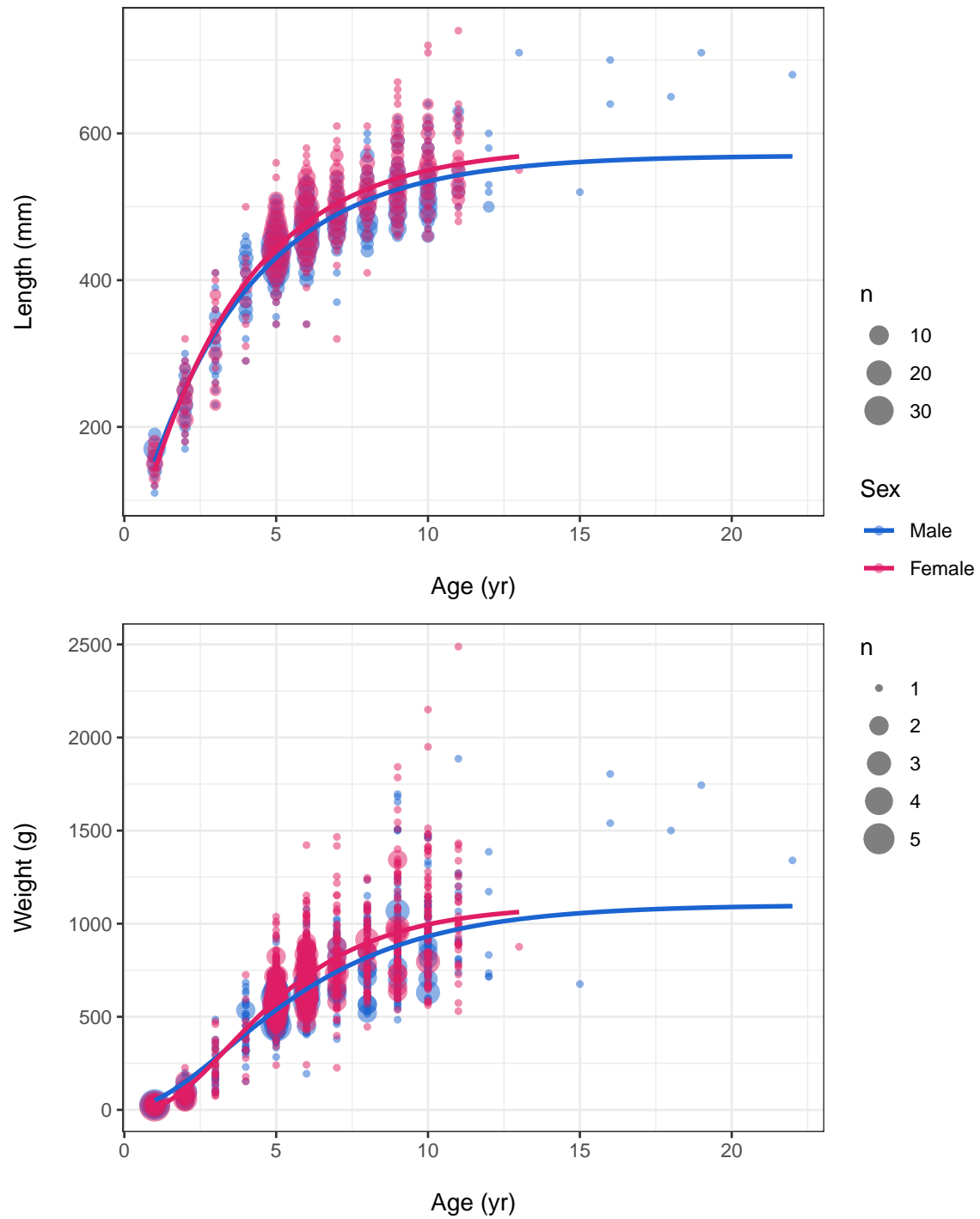


Figure 6: Observations of length (top) and weight (bottom) at age with fitted von Bertalanffy growth functions for males and females.