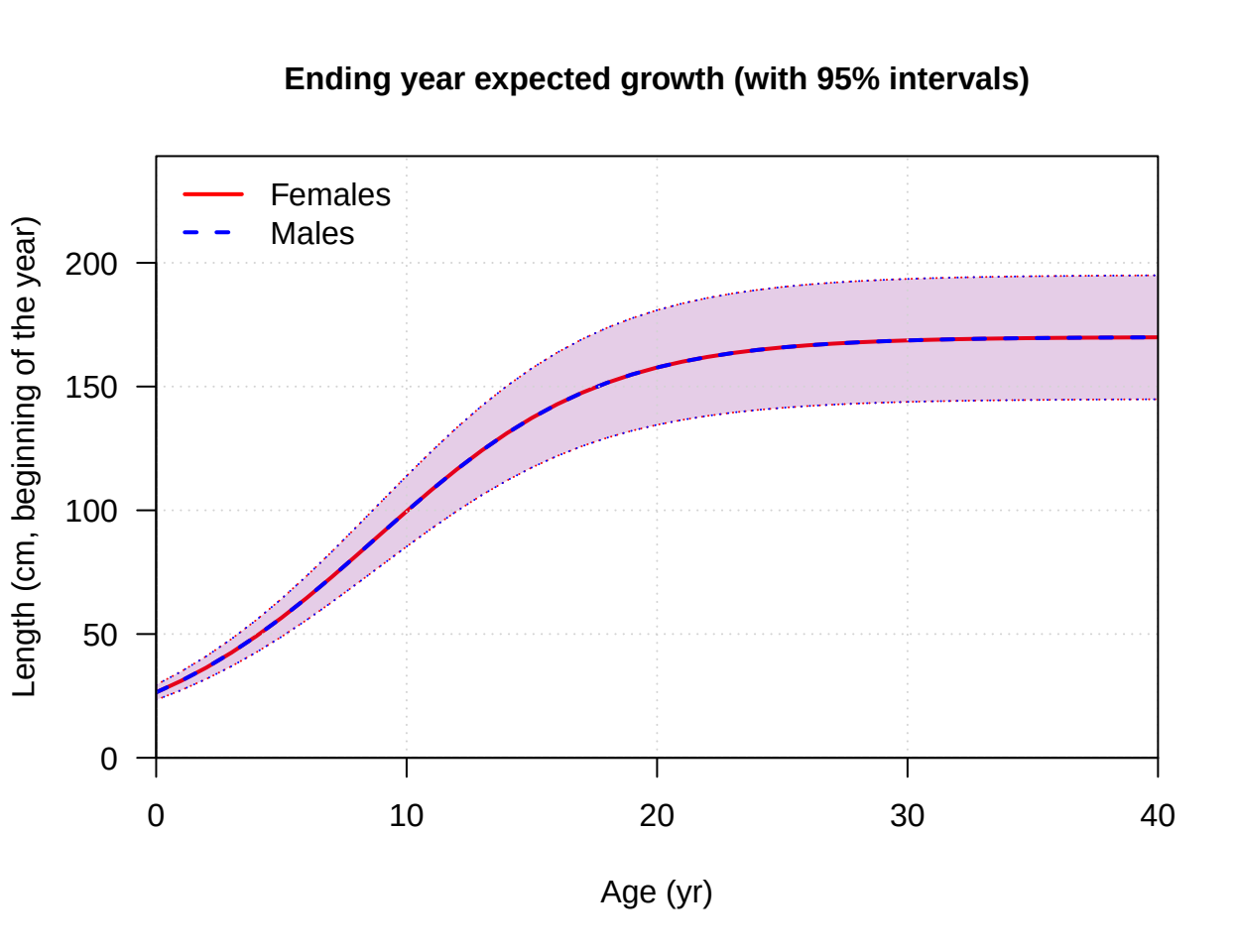
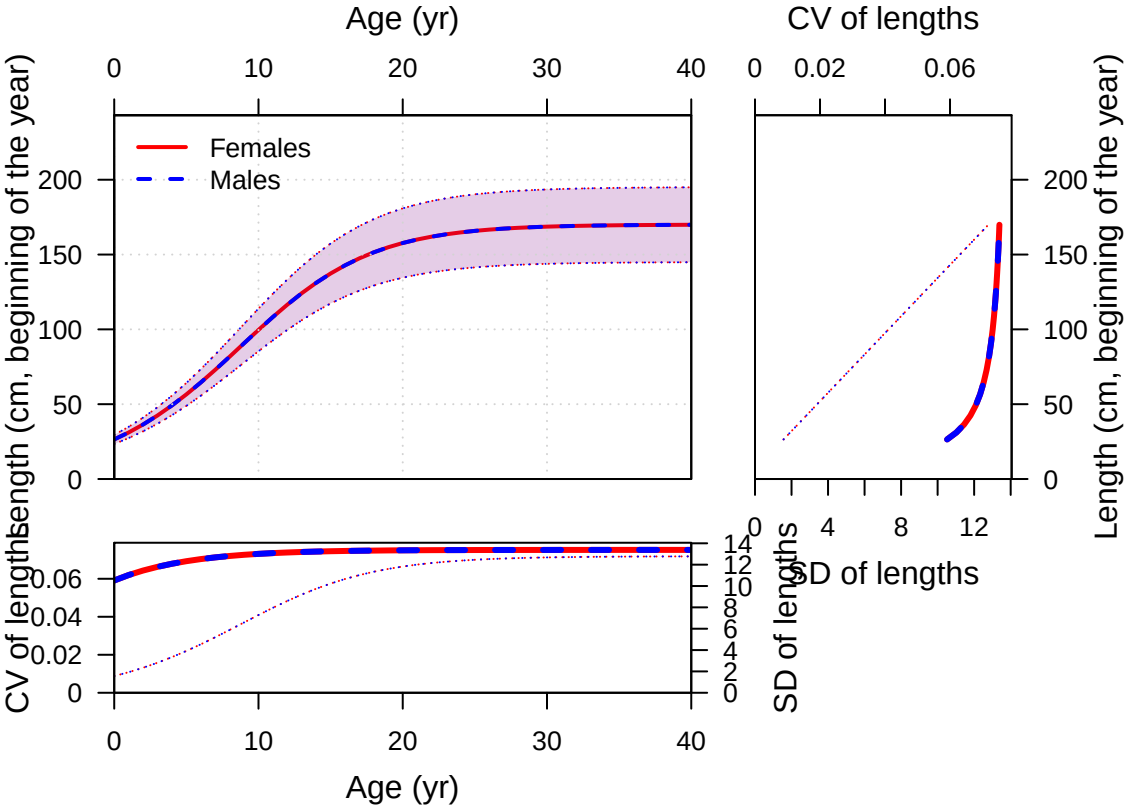
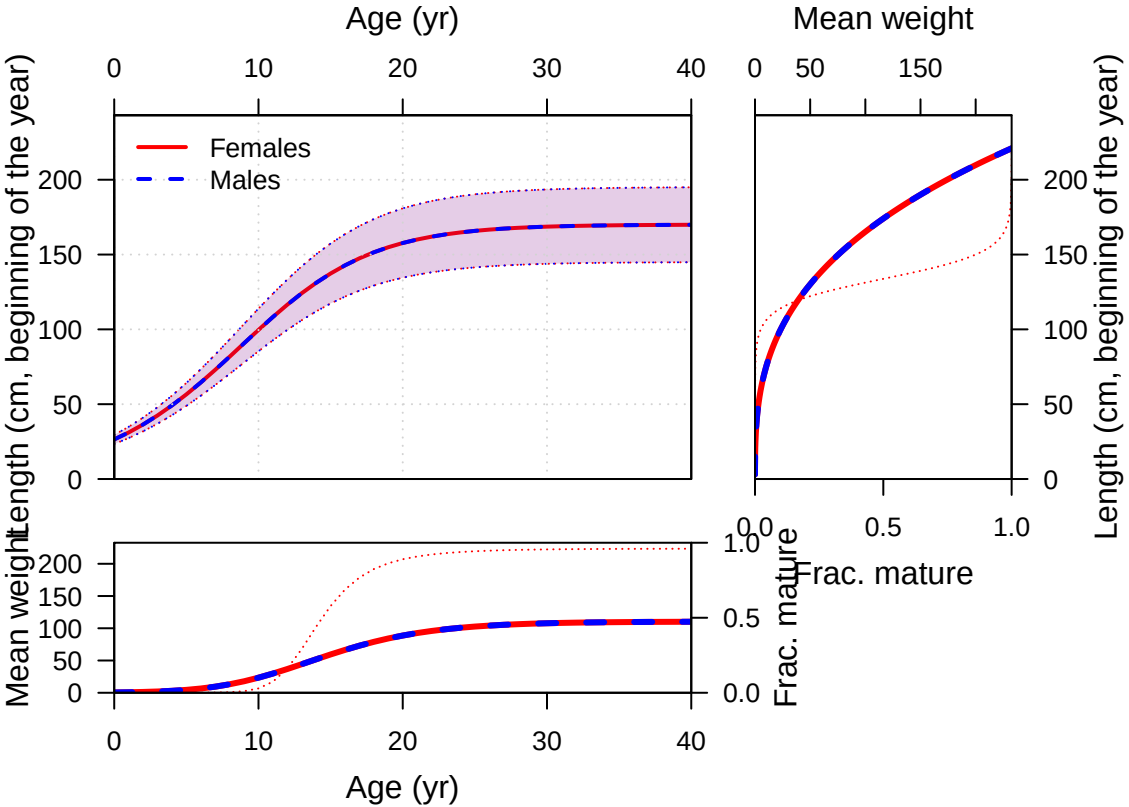
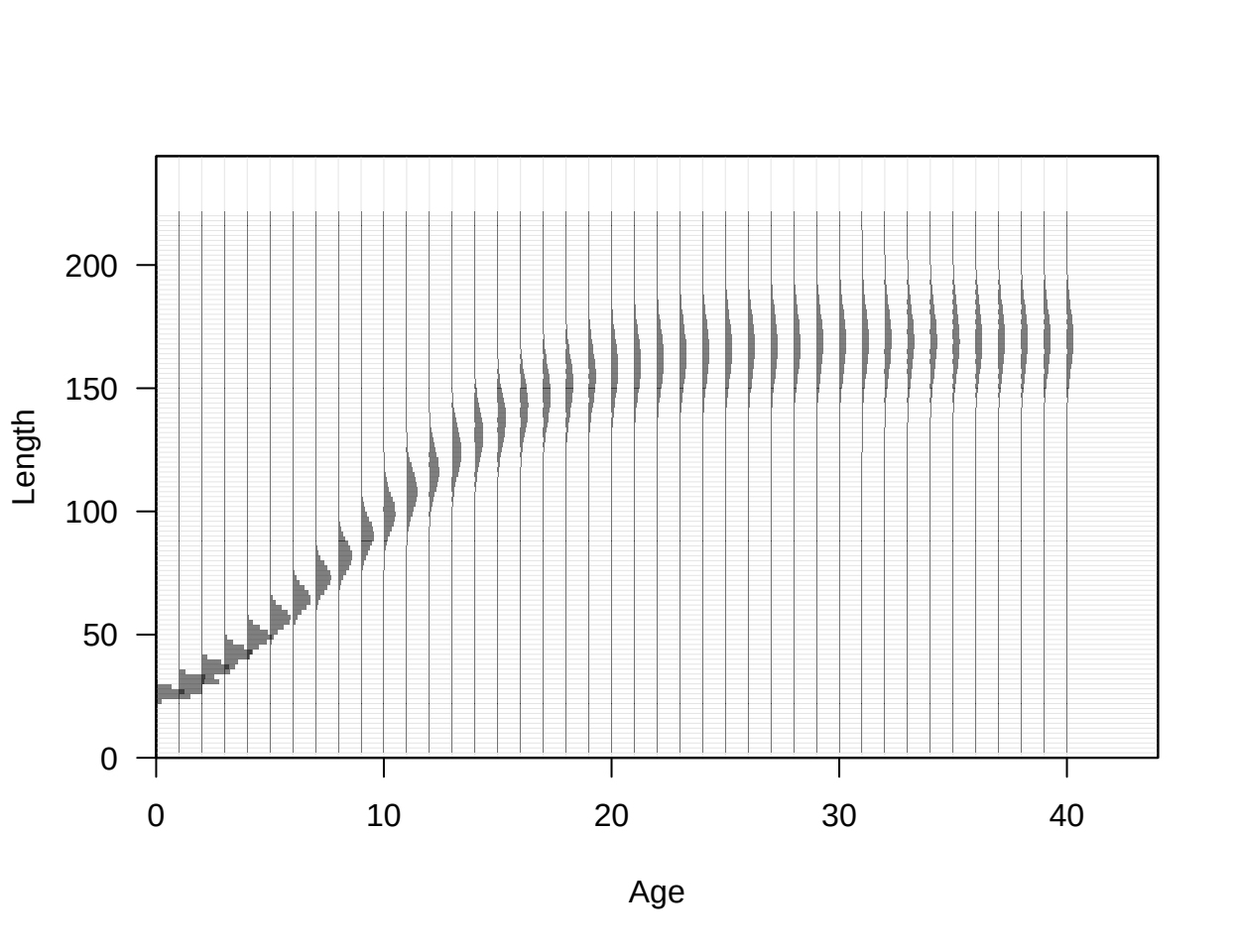
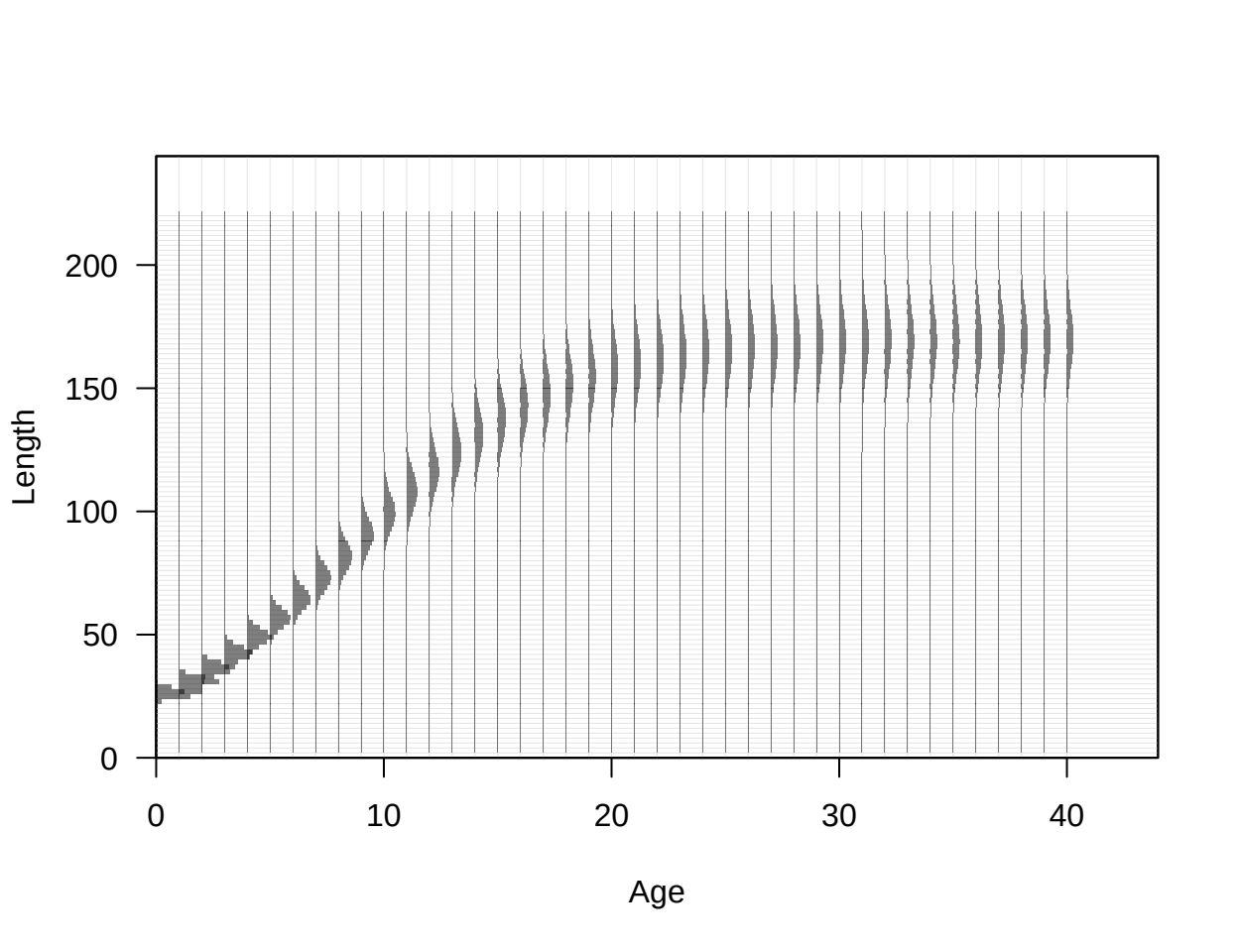
Plots created using the 'r4ss' package in R
Stock Synthesis version: 3.30.15.0
StartTime: Mon May 11 15:42:58 2020
Data_File: BET−EPO.dat
Control_File: BET−EPO.ctl

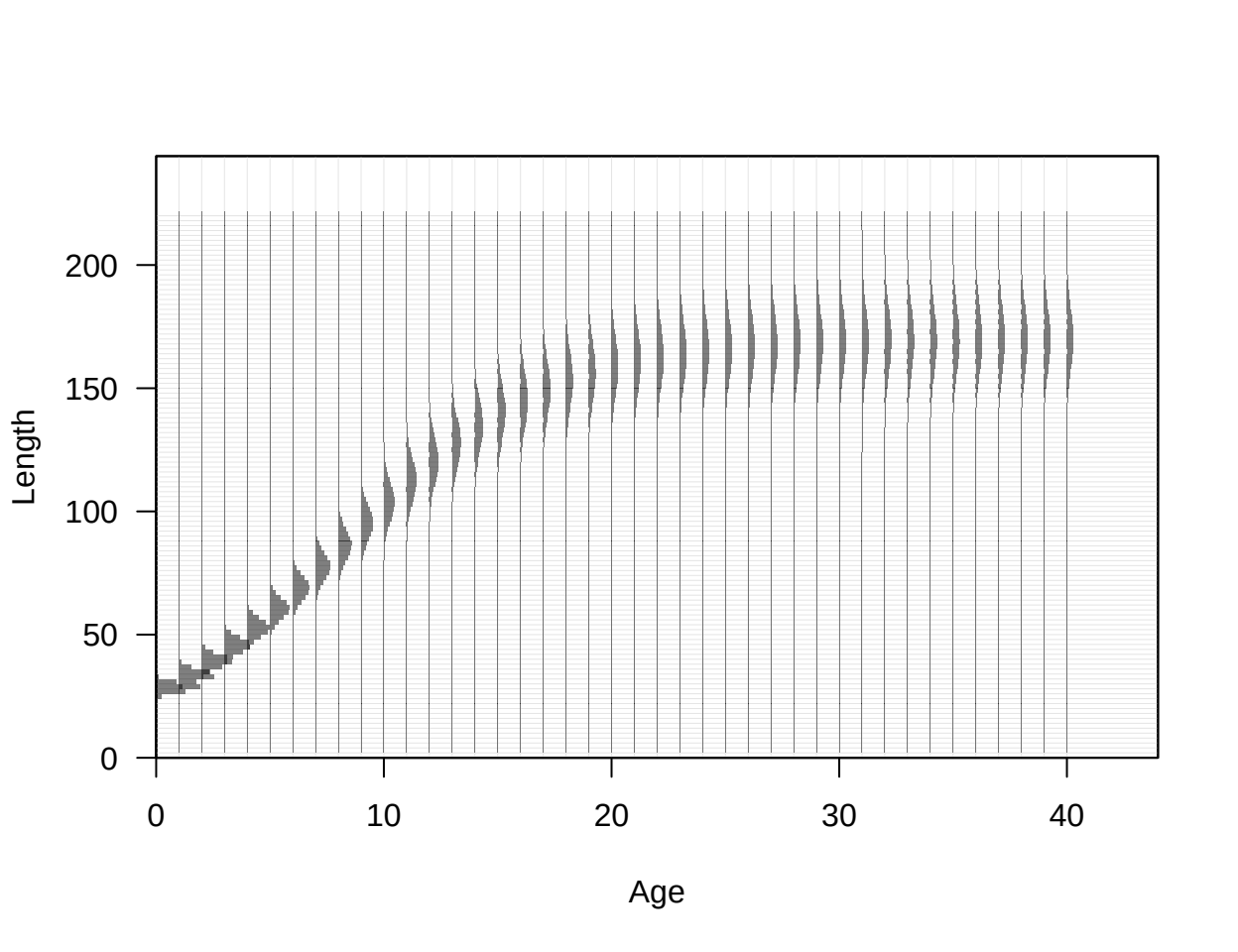

Ending year expected growth (with 95% intervals)
Females
Males
Length (cm, beginning of the year)
0
50
100
150
200
0
10
20
30
40
Age (yr)

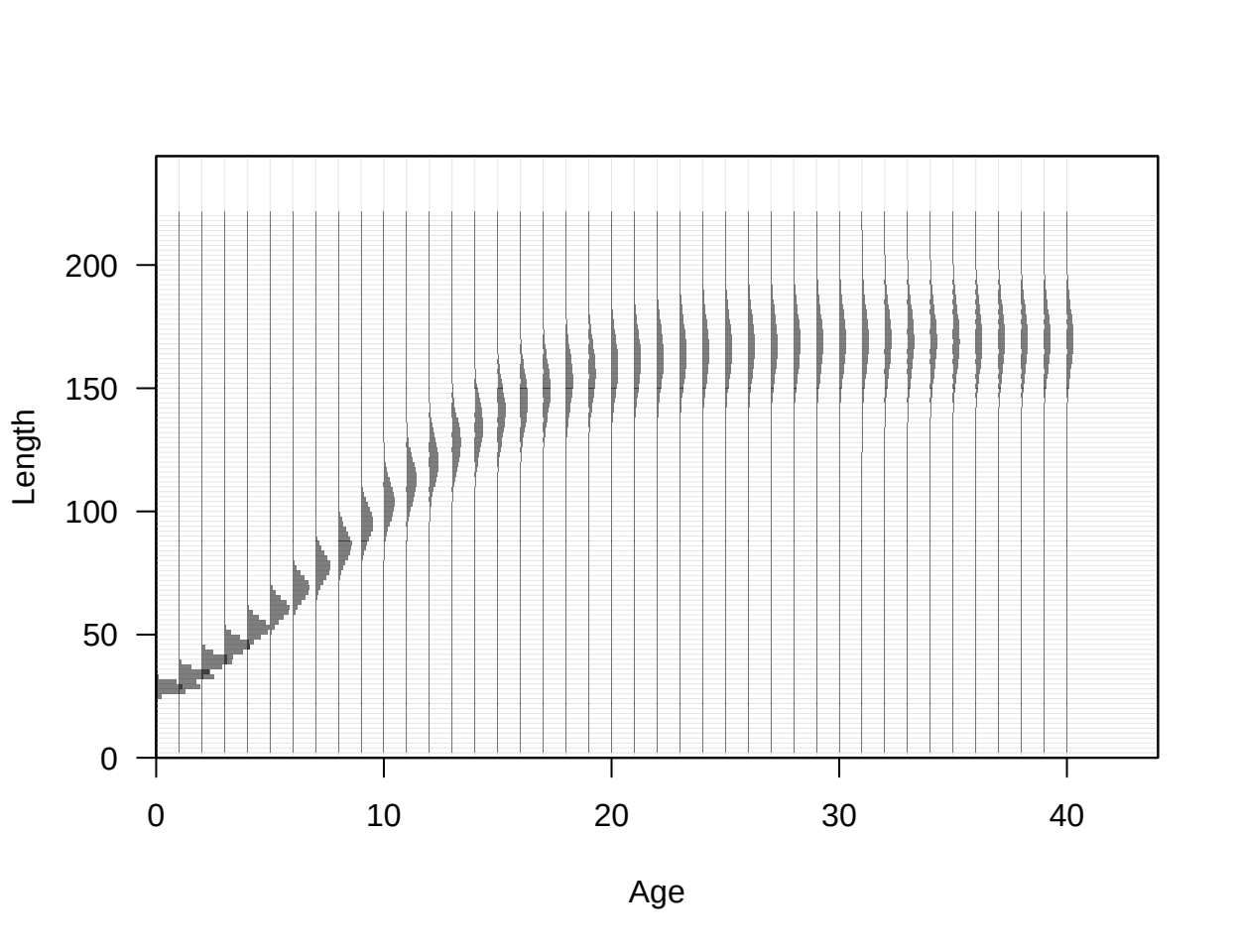

Age (yr)
CV of lengths
Females
Males
Length (cm, beginning of the year)
CV of lengths
SD of lengths
Age (yr)

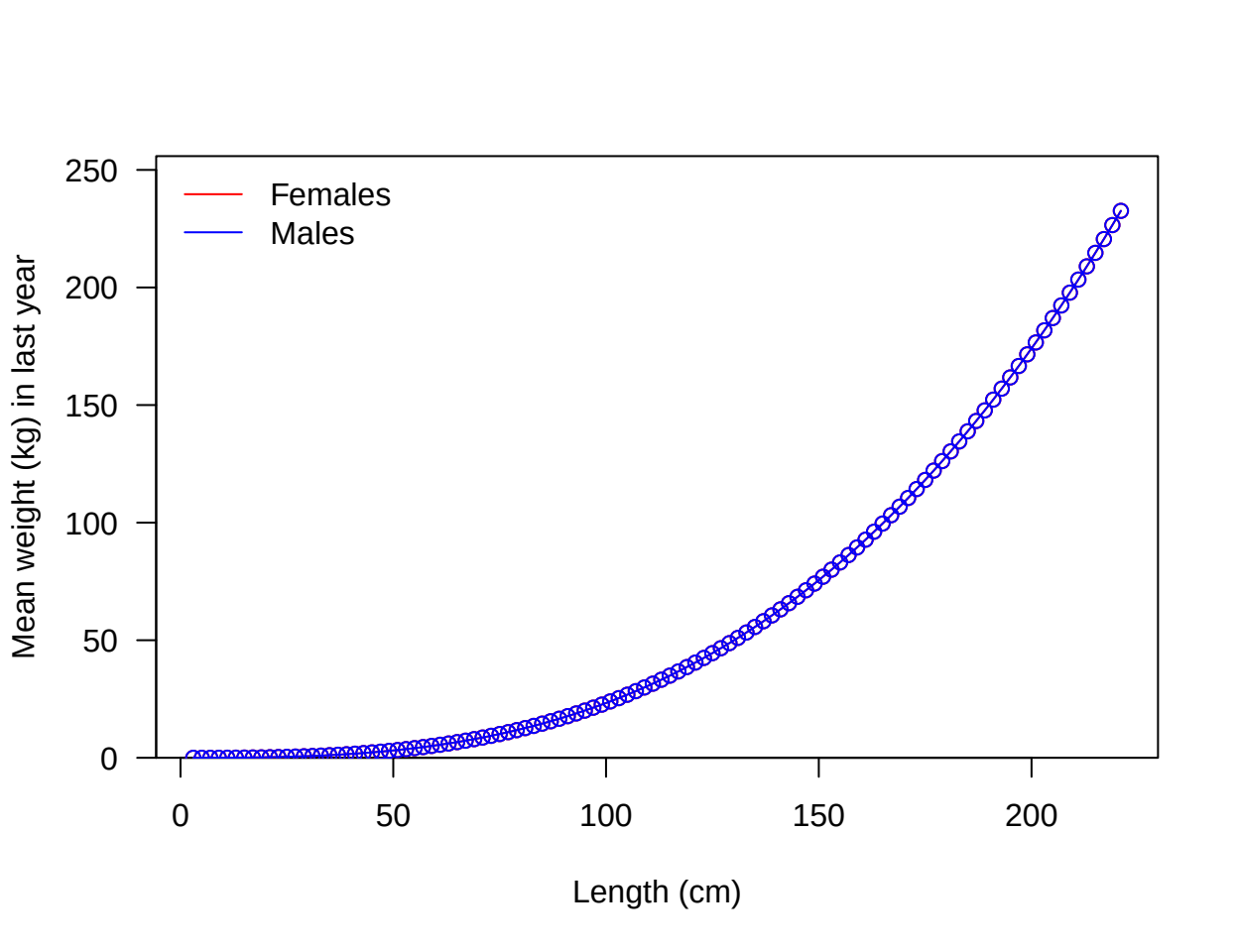

Age (yr)
Mean weight
Females
Males
Length (cm, beginning of the year)
Mean weight
Frac. mature
Age (yr)
0
10
20
30
40
50
150
200
100
0.5
1.0
0.0

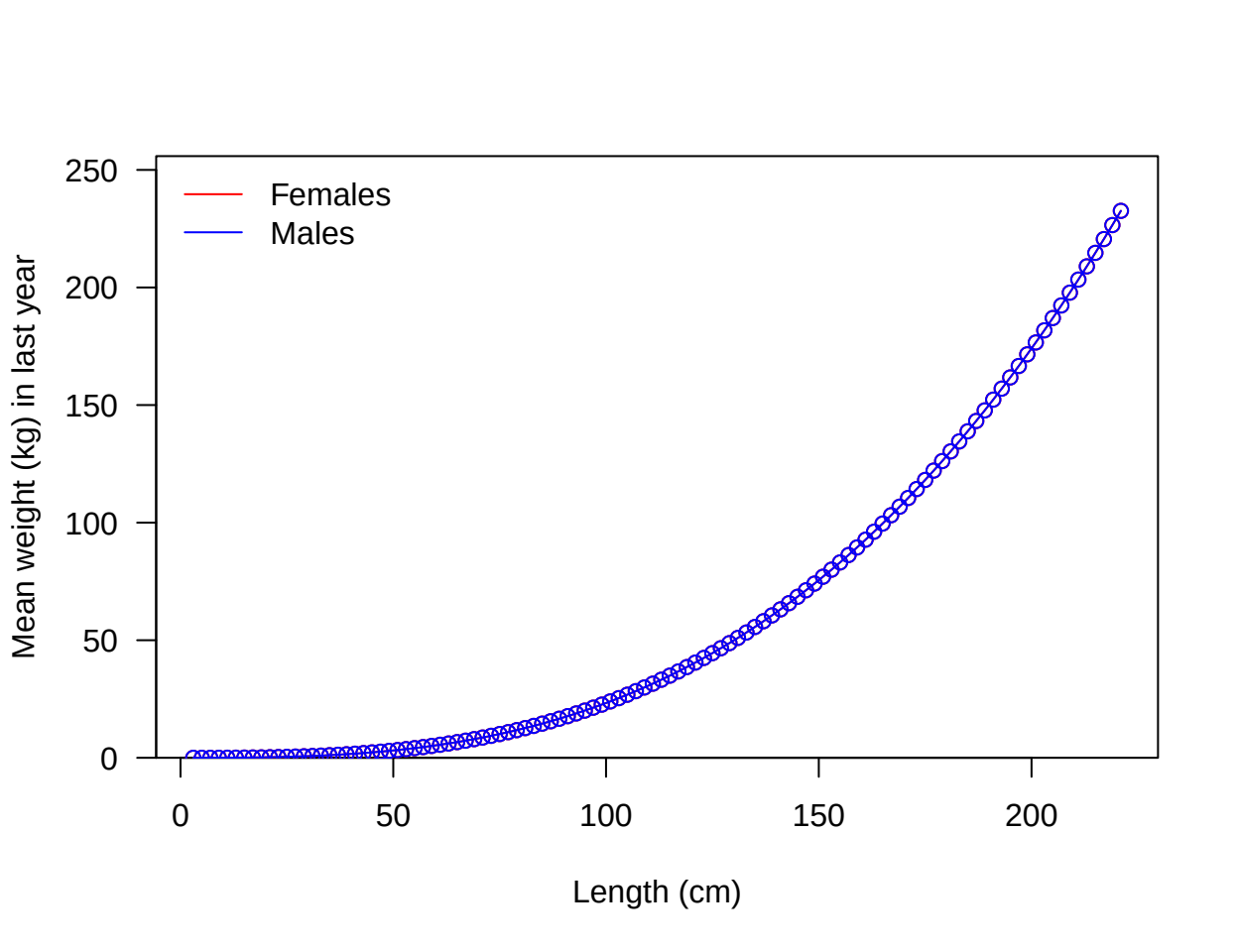

Length
200
150
100
50
0
0
10
20
30
40
Age

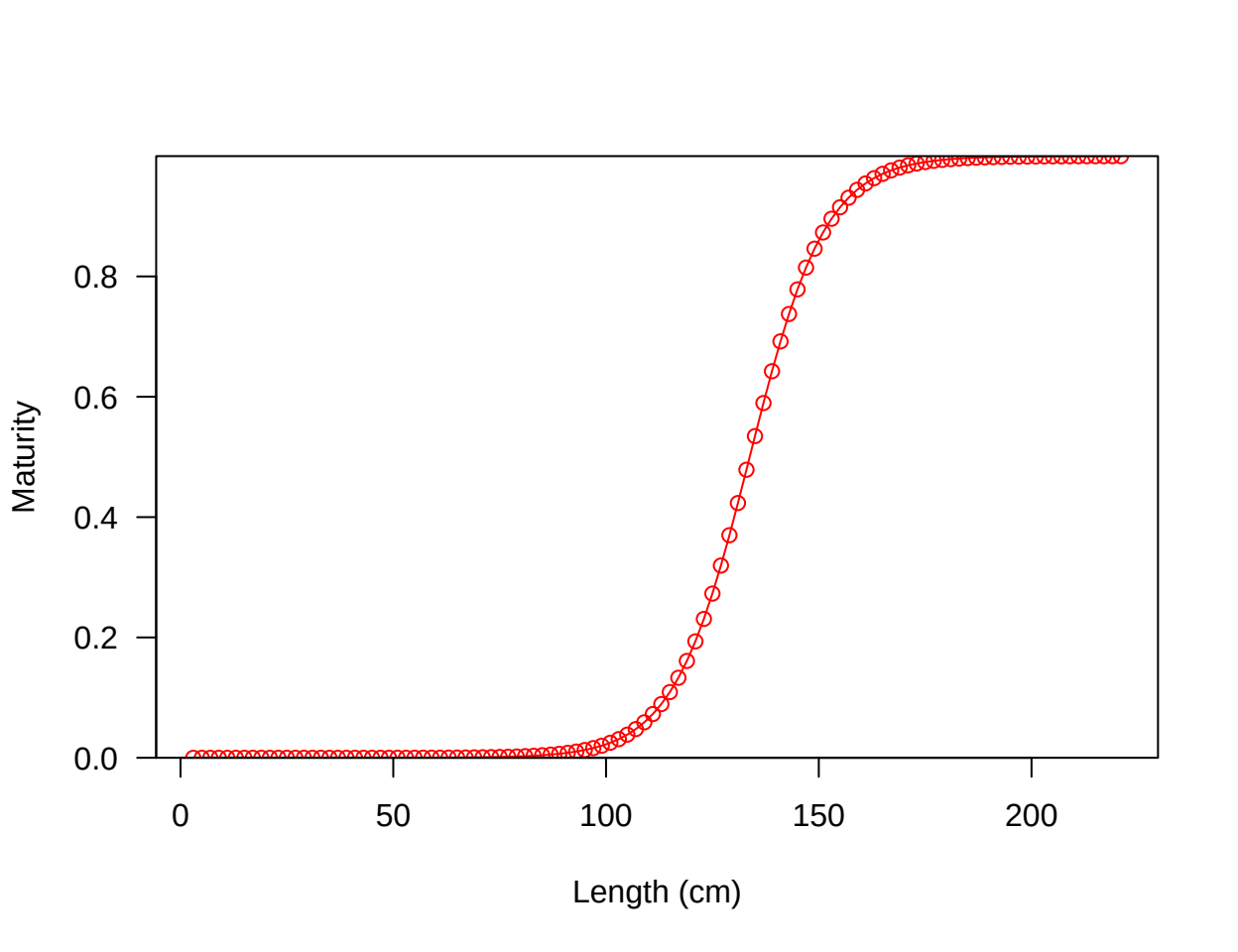

Length
200
150
100
50
0
0
10
20
30
40
Age

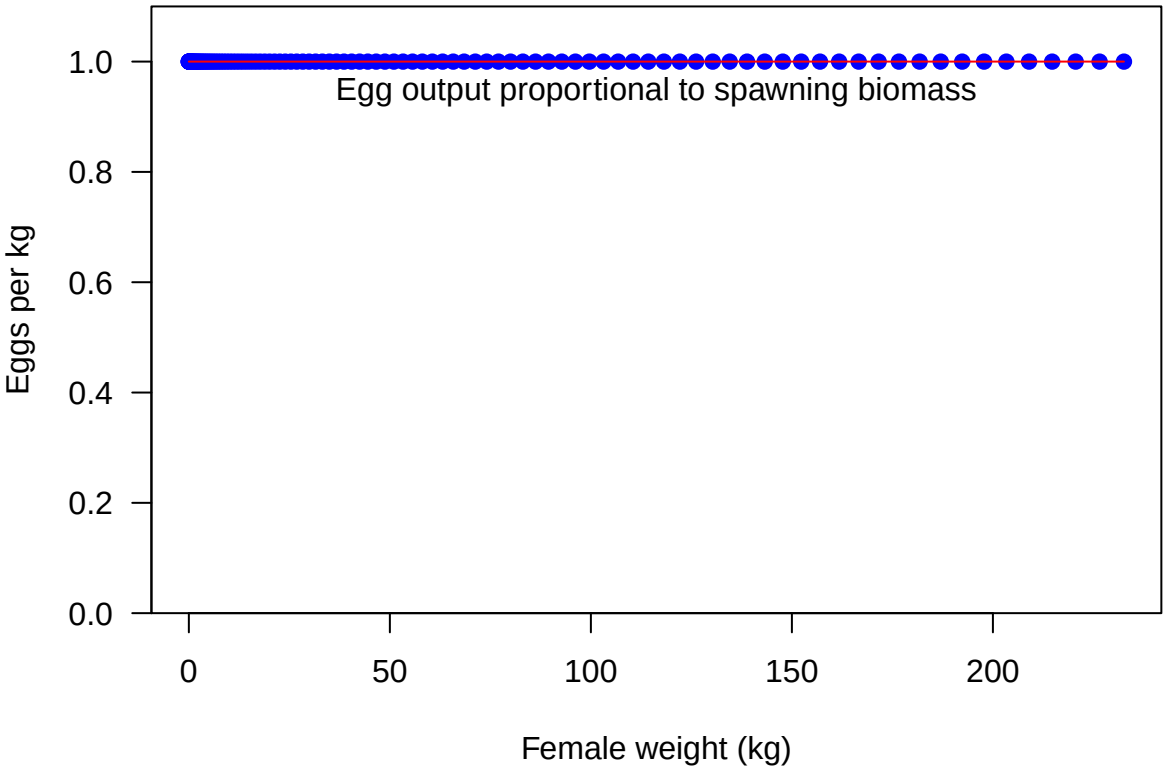

Length
0
50
100
150
200
0
10
20
30
40
Age

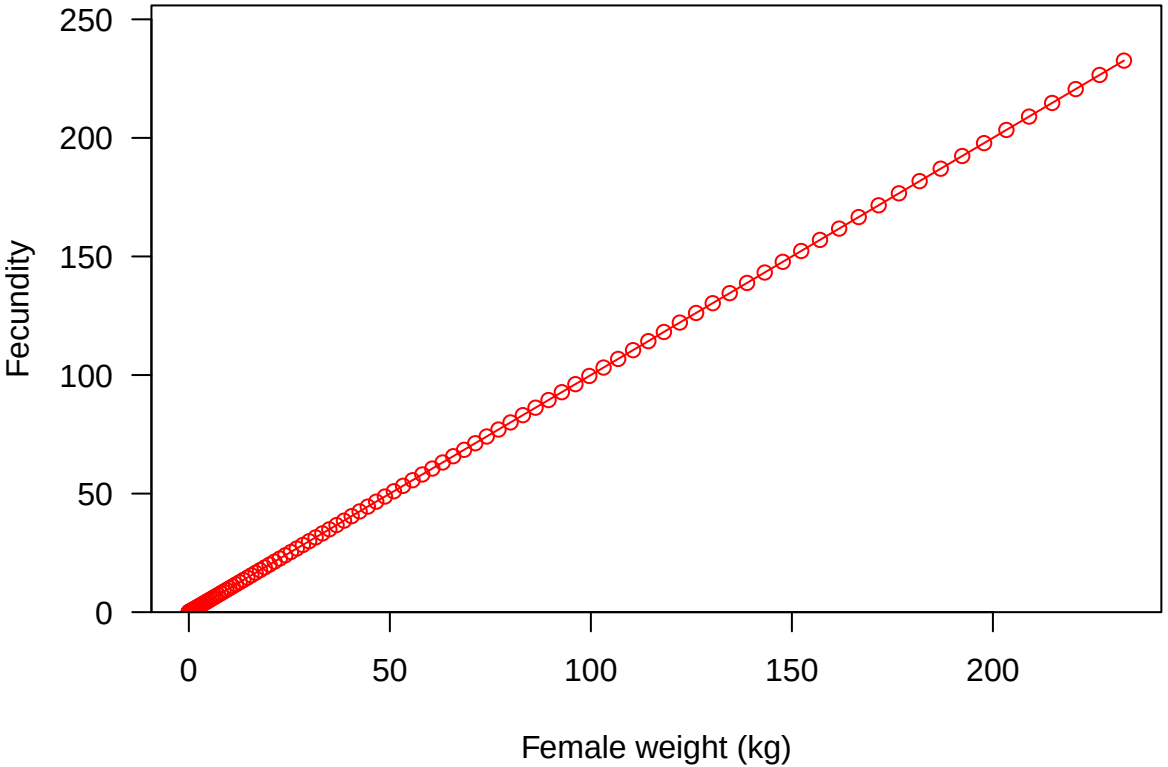

Length
0
50
100
150
200
0
10
20
30
40
Age

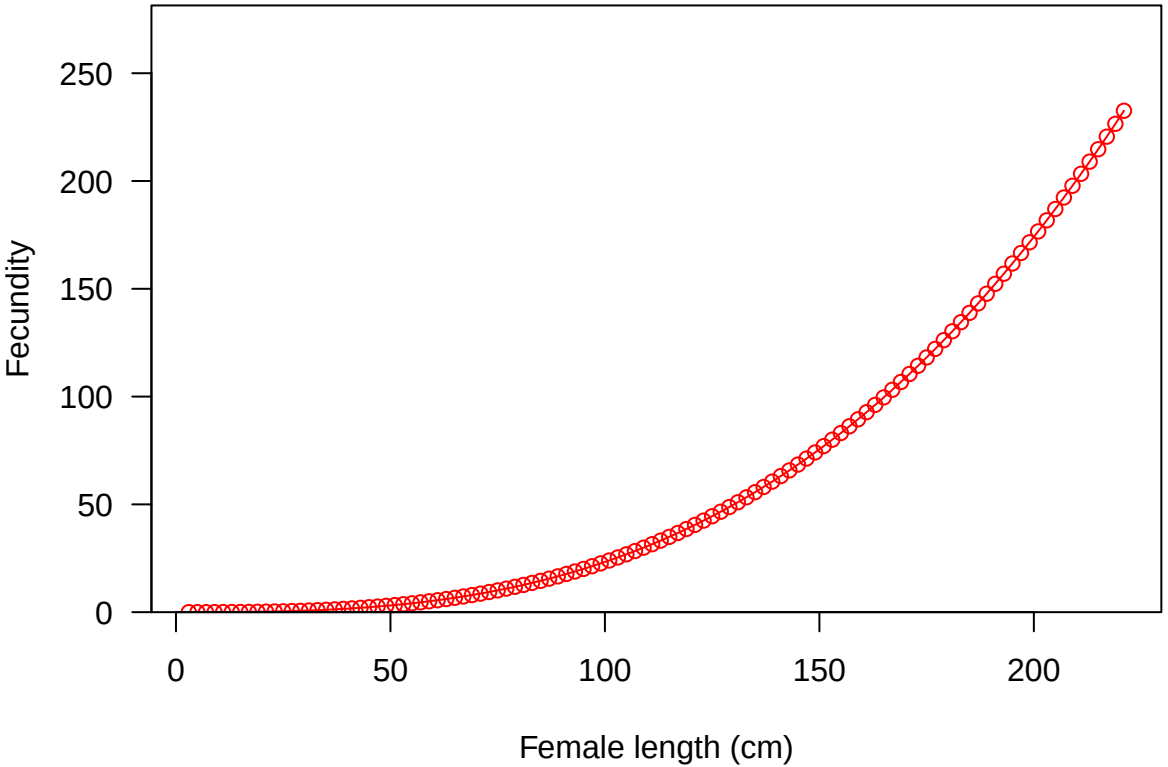

Females
Males
Mean weight (kg) in last year
Length (cm)
0
50
100
150
200
250
0
50
100
150
200

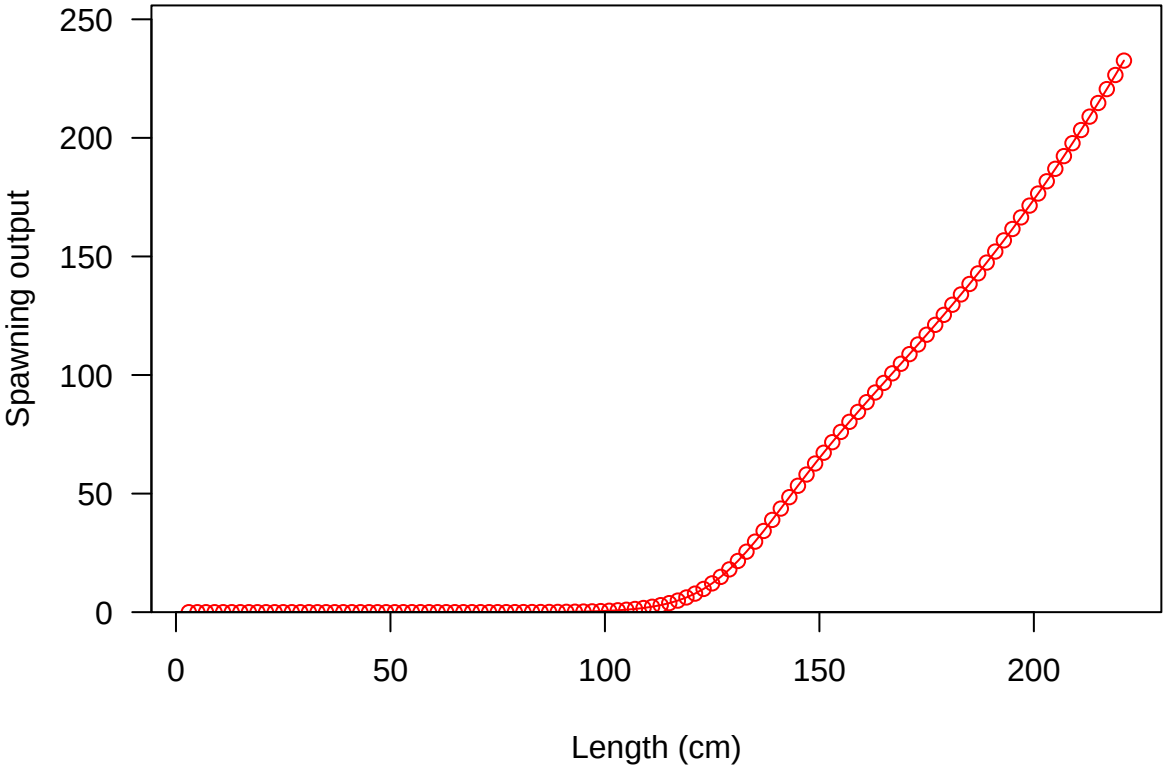

Females
Males
Mean weight (kg) in last year
Length (cm)
0
50
100
150
200
250
0
50
100
150
200

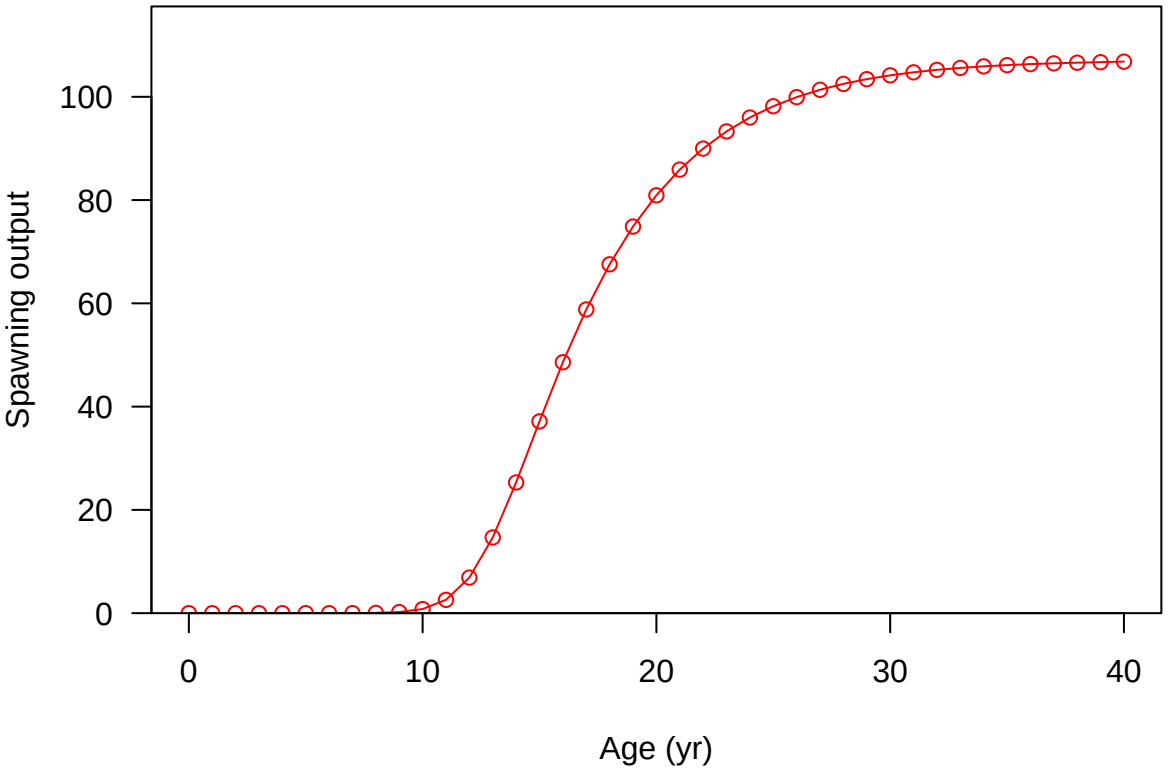

Maturity
0.0
0.2
0.4
0.6
0.8
0
50
100
150
200
Length (cm)

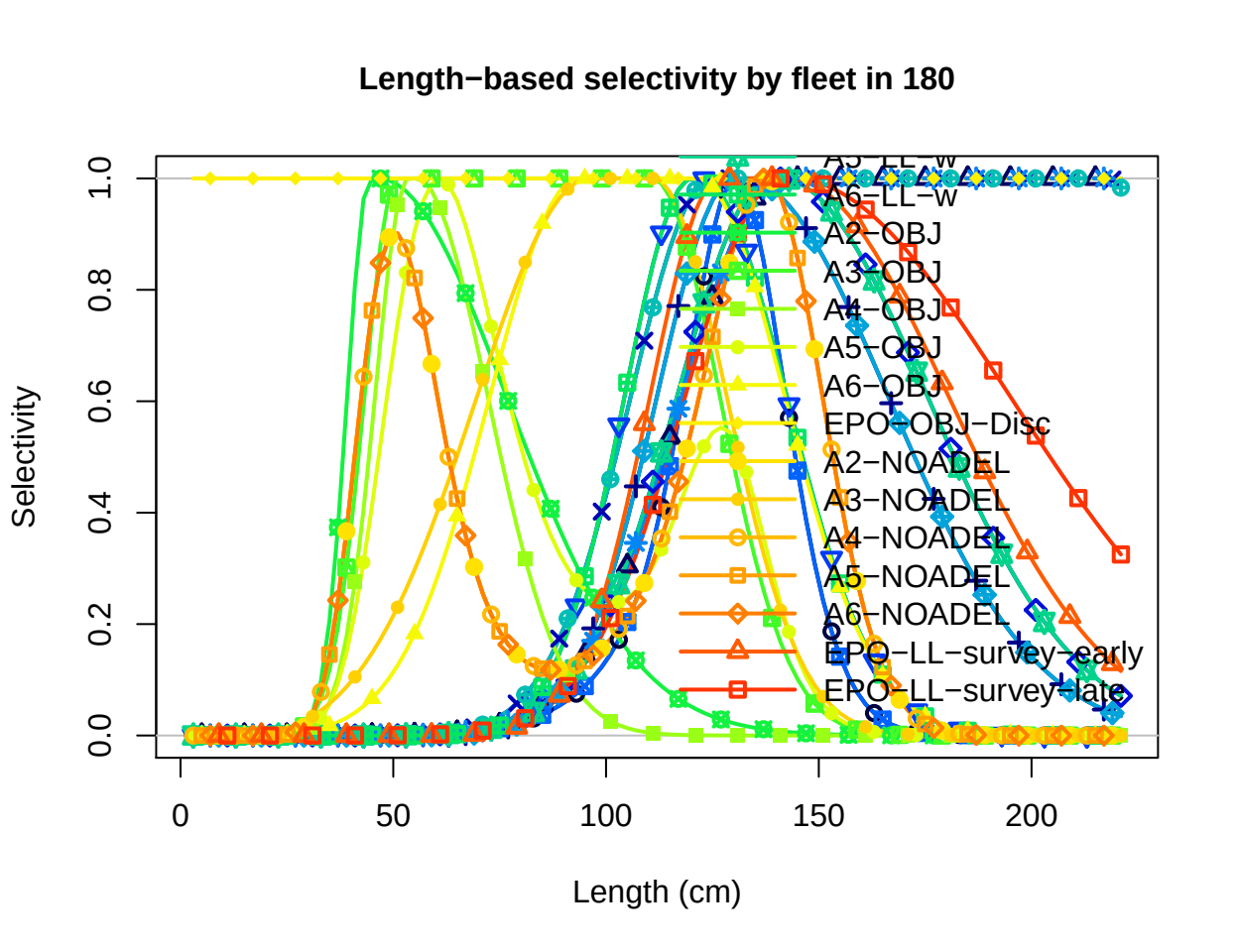

Egg output proportional to spawning biomass
Eggs per kg
1.0
0.8
0.6
0.4
0.2
0.0
0
50
100
150
200
Female weight (kg)

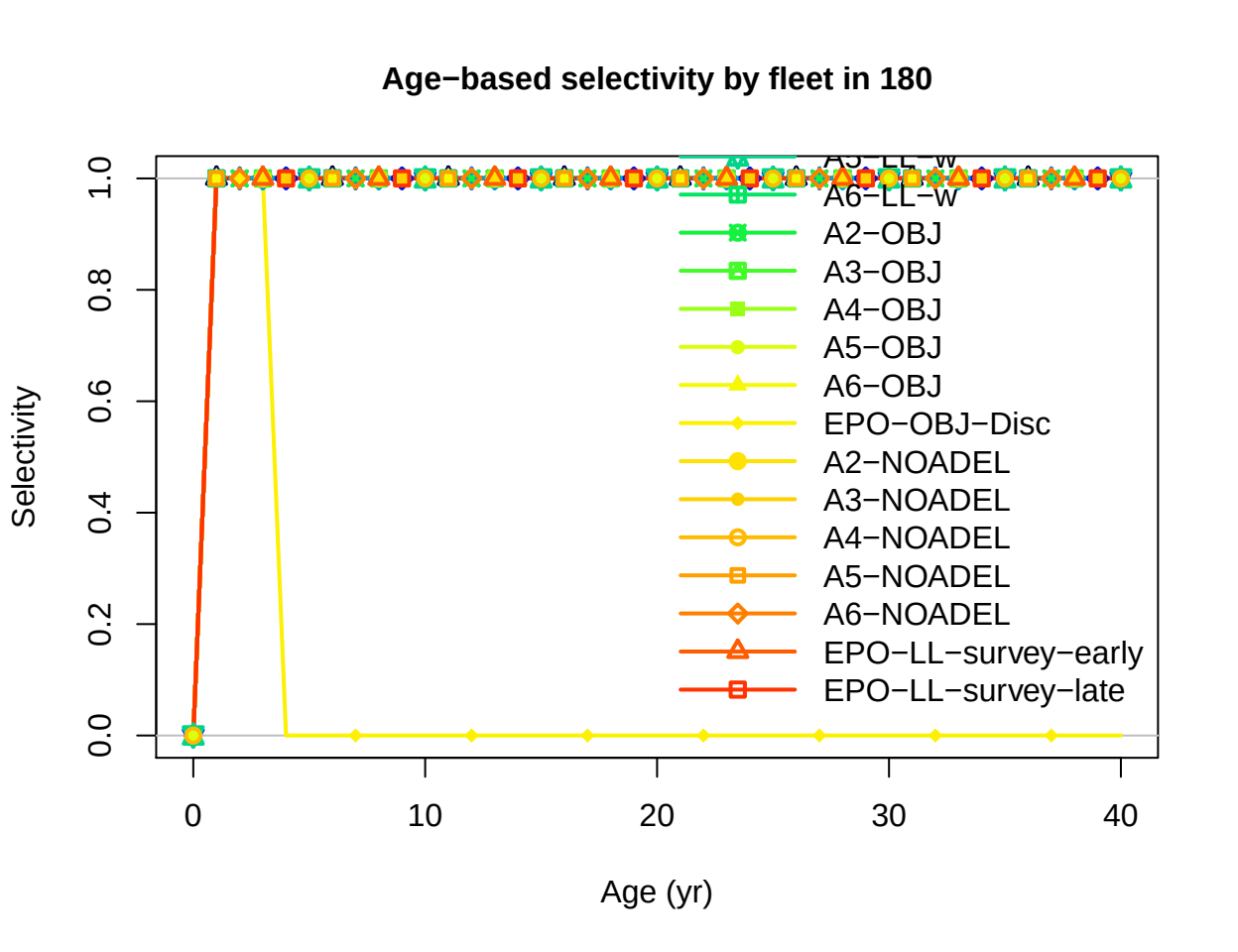

250
200
150
100
50
0
Fecundity
0
50
100
150
200
Female weight (kg)

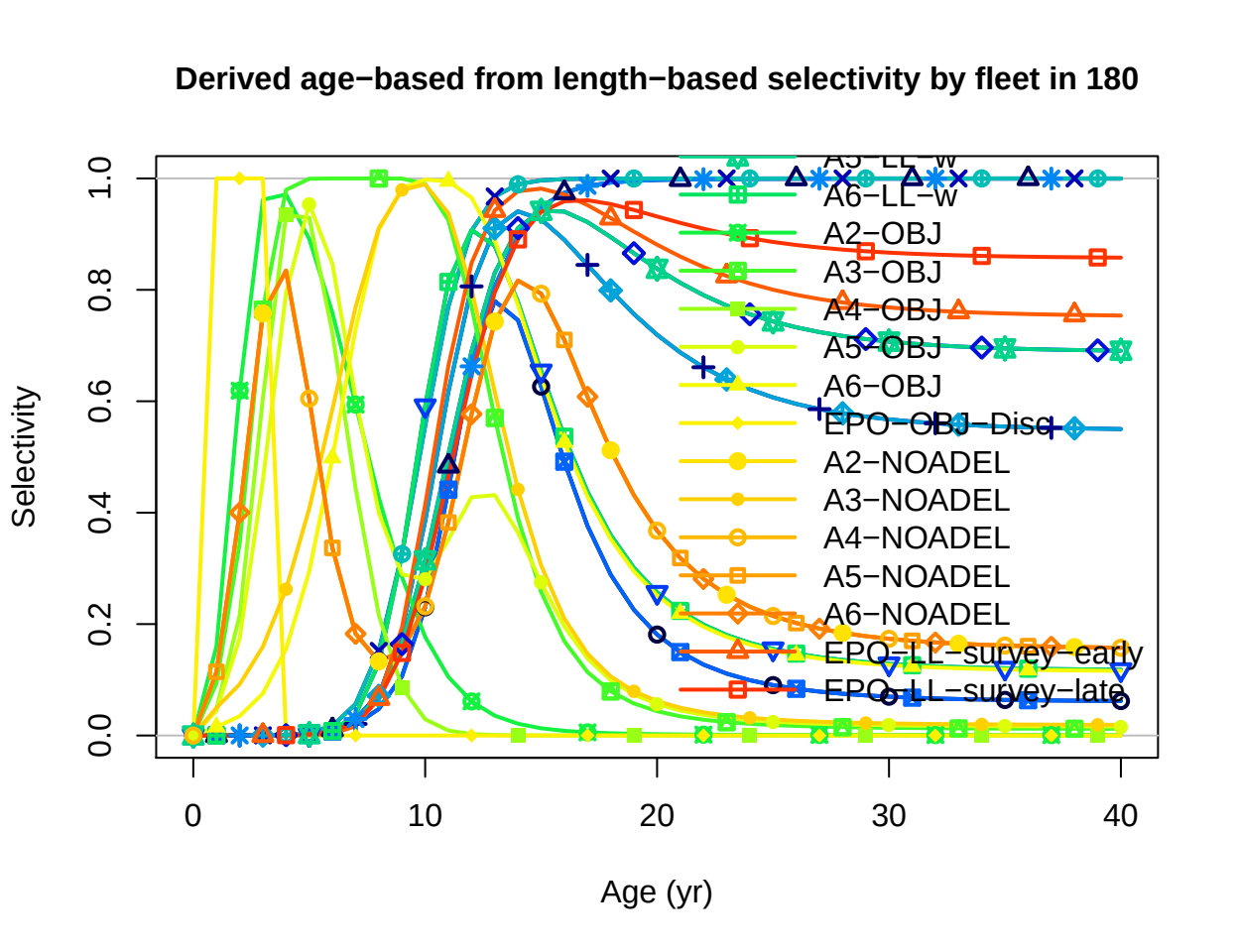

Fecundity
0
50
100
150
200
250
0
50
100
150
200
Female length (cm)

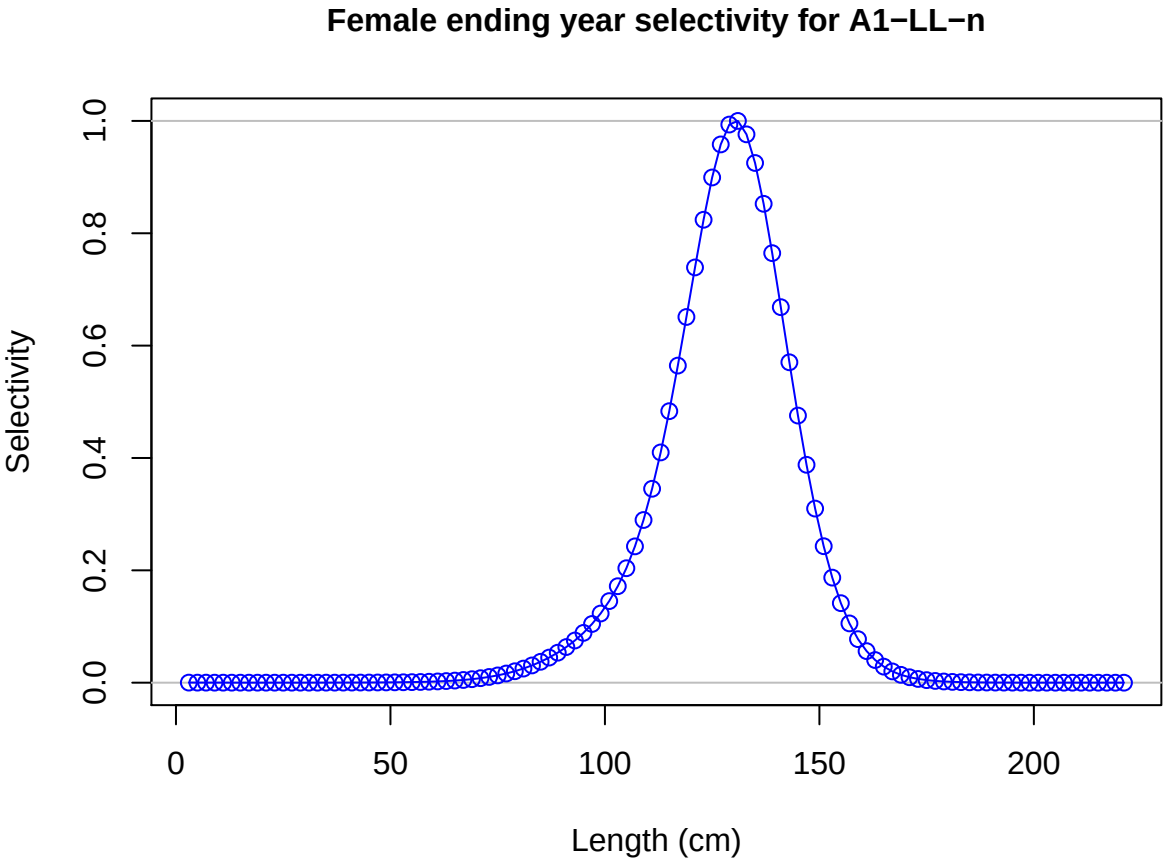

Spawning output
250
200
150
100
50
0
0
50
100
150
200
Length (cm)

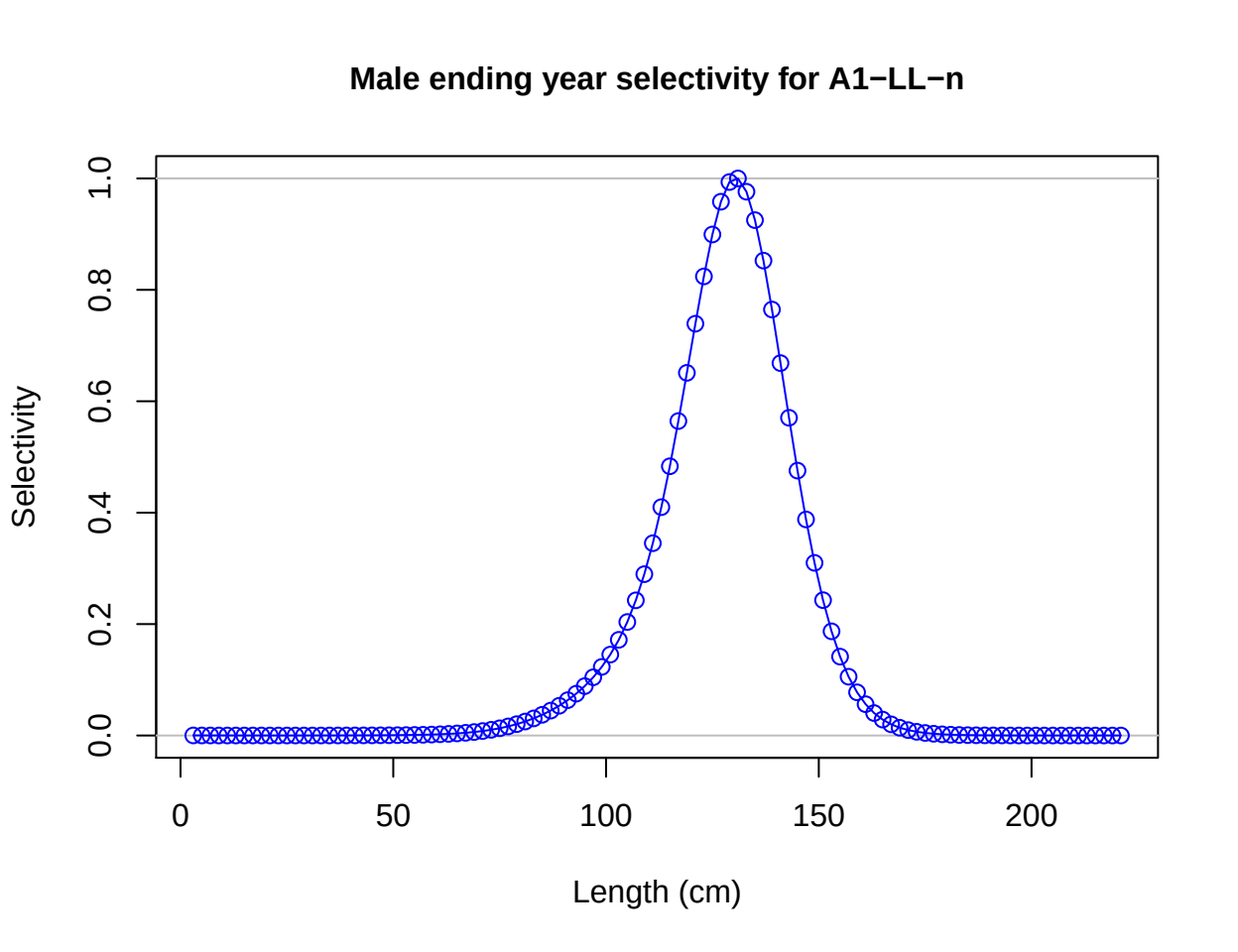

Spawning output
0
20
40
60
80
100
0
10
20
30
40
Age (yr)


Length−based selectivity by fleet in 180
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)
A5−LL−w
A6−LL−w
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
EPO−OBJ−Disc
A2−NOADEL
A3−NOADEL
A4−NOADEL
A5−NOADEL
A6−NOADEL
EPO−LL−survey−early
EPO−LL−survey−late

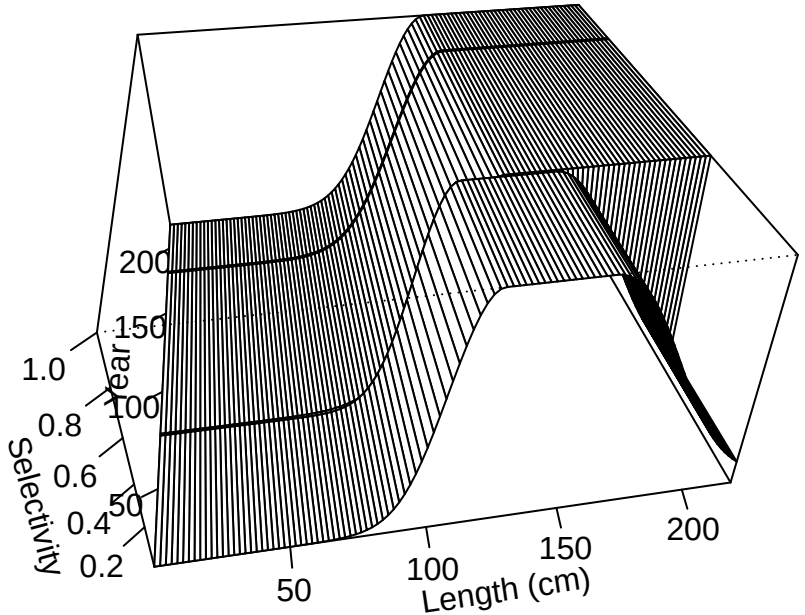

Age−based selectivity by fleet in 180
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
Age (yr)
A5−LL−w
A6−LL−w
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
EPO−OBJ−Disc
A2−NOADEL
A3−NOADEL
A4−NOADEL
A5−NOADEL
A6−NOADEL
EPO−LL−survey−early
EPO−LL−survey−late

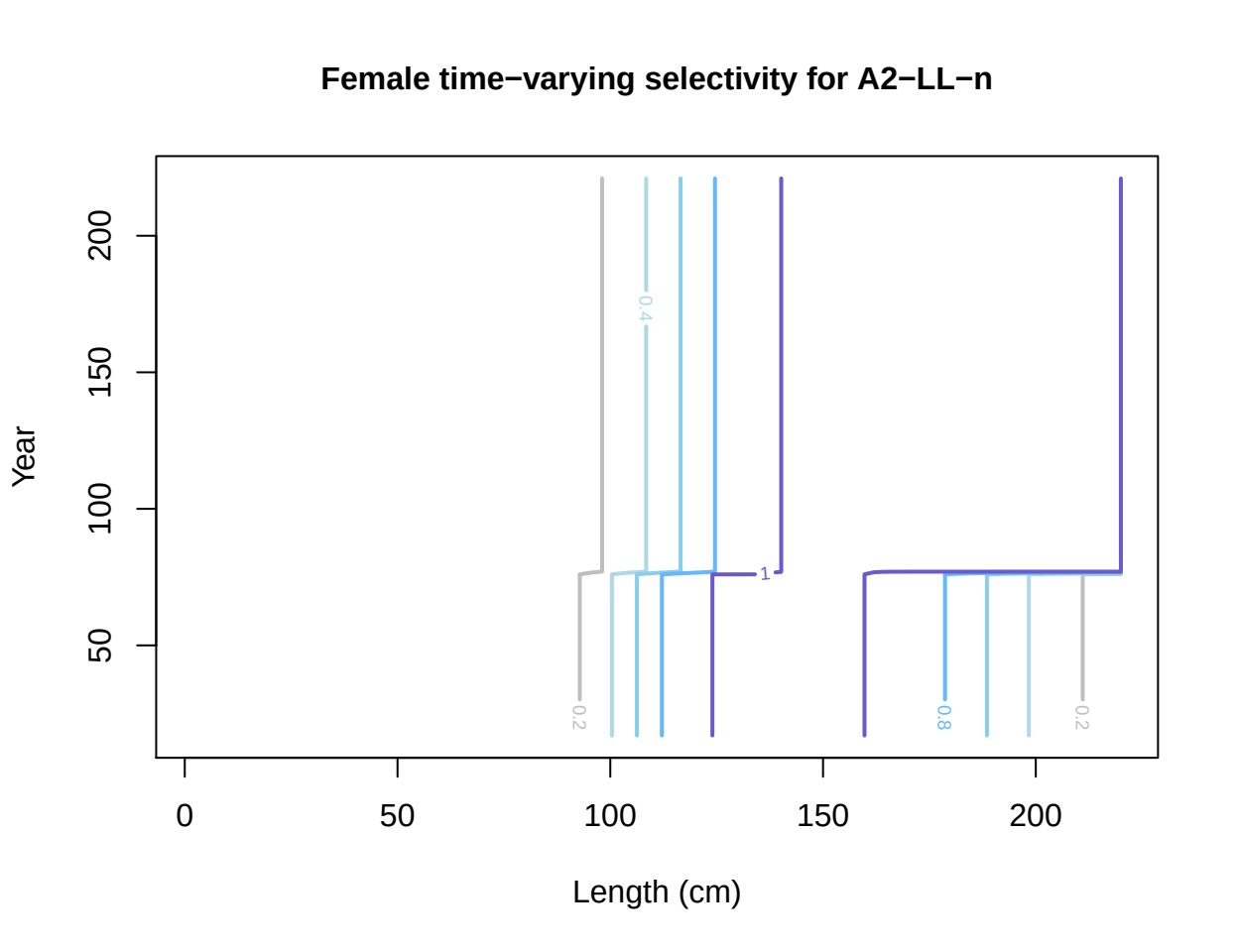

Derived age−based from length−based selectivity by fleet in 180
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
Age (yr)
A6−LL−w
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
EPO−OBJ−Disc
A2−NOADEL
A3−NOADEL
A4−NOADEL
A5−NOADEL
A6−NOADEL
EPO−LL−survey−early
EPO−LL−survey−late

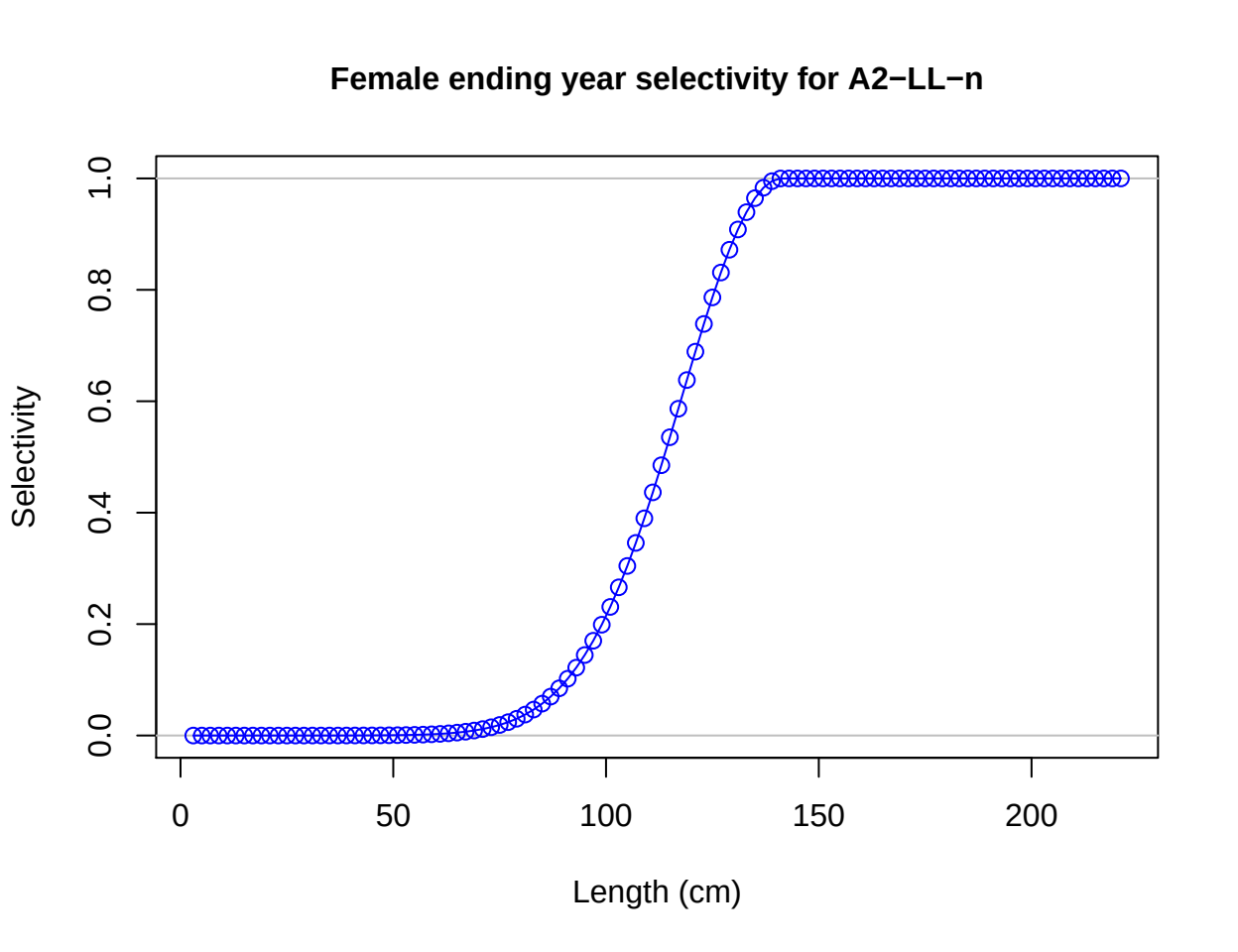

Female ending year selectivity for A1−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

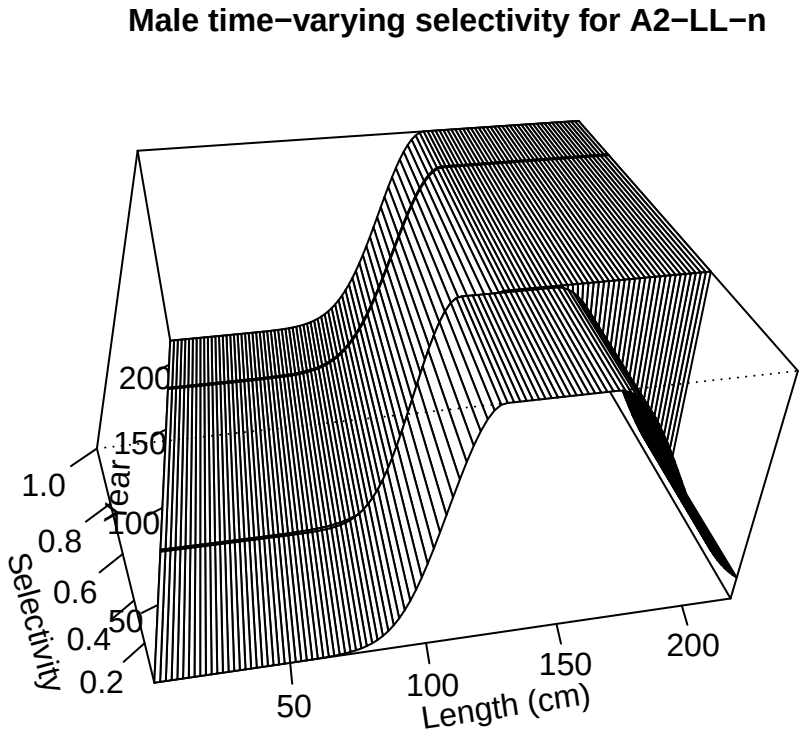

Male ending year selectivity for A1−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

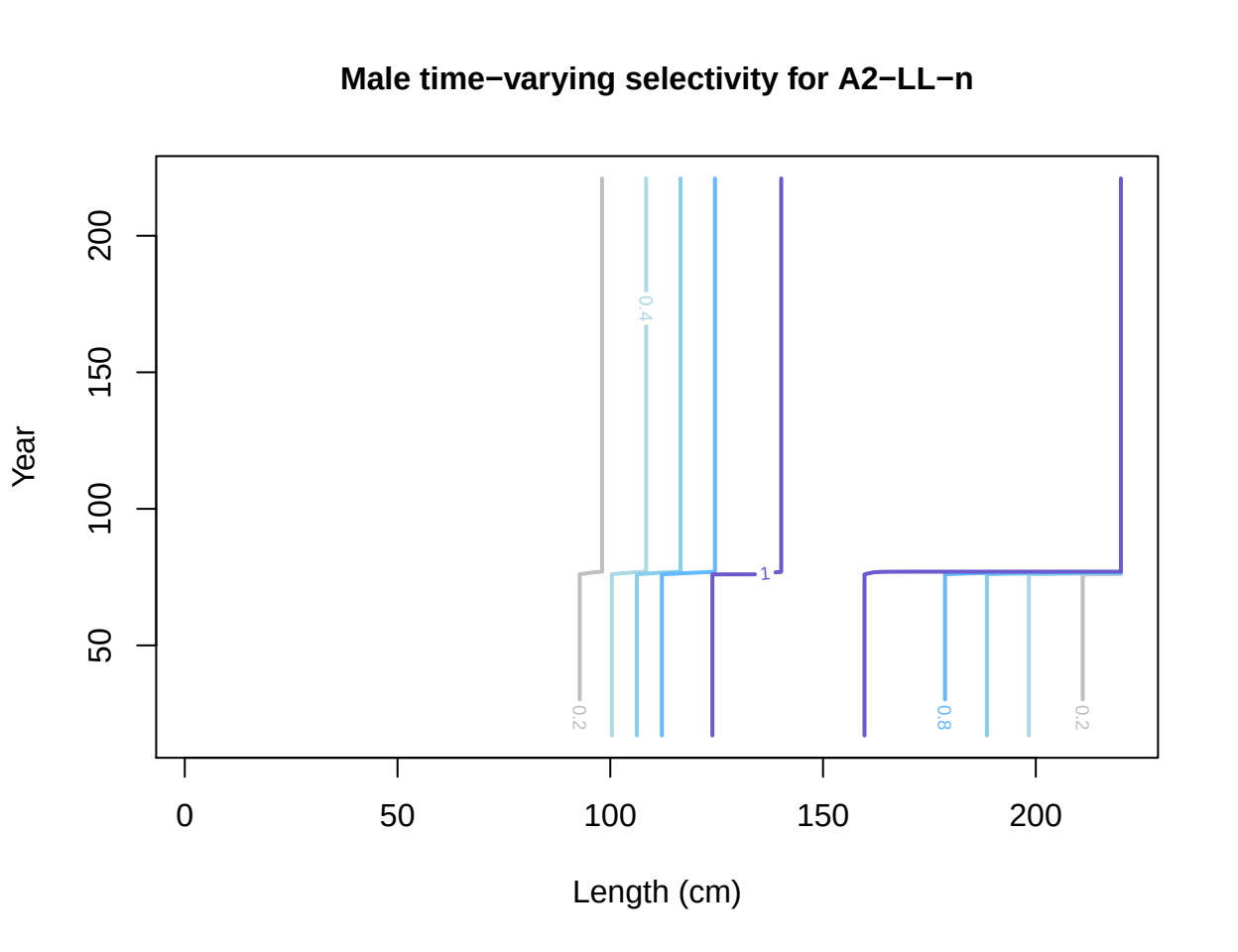
Female time−varying selectivity for A2−LL−n

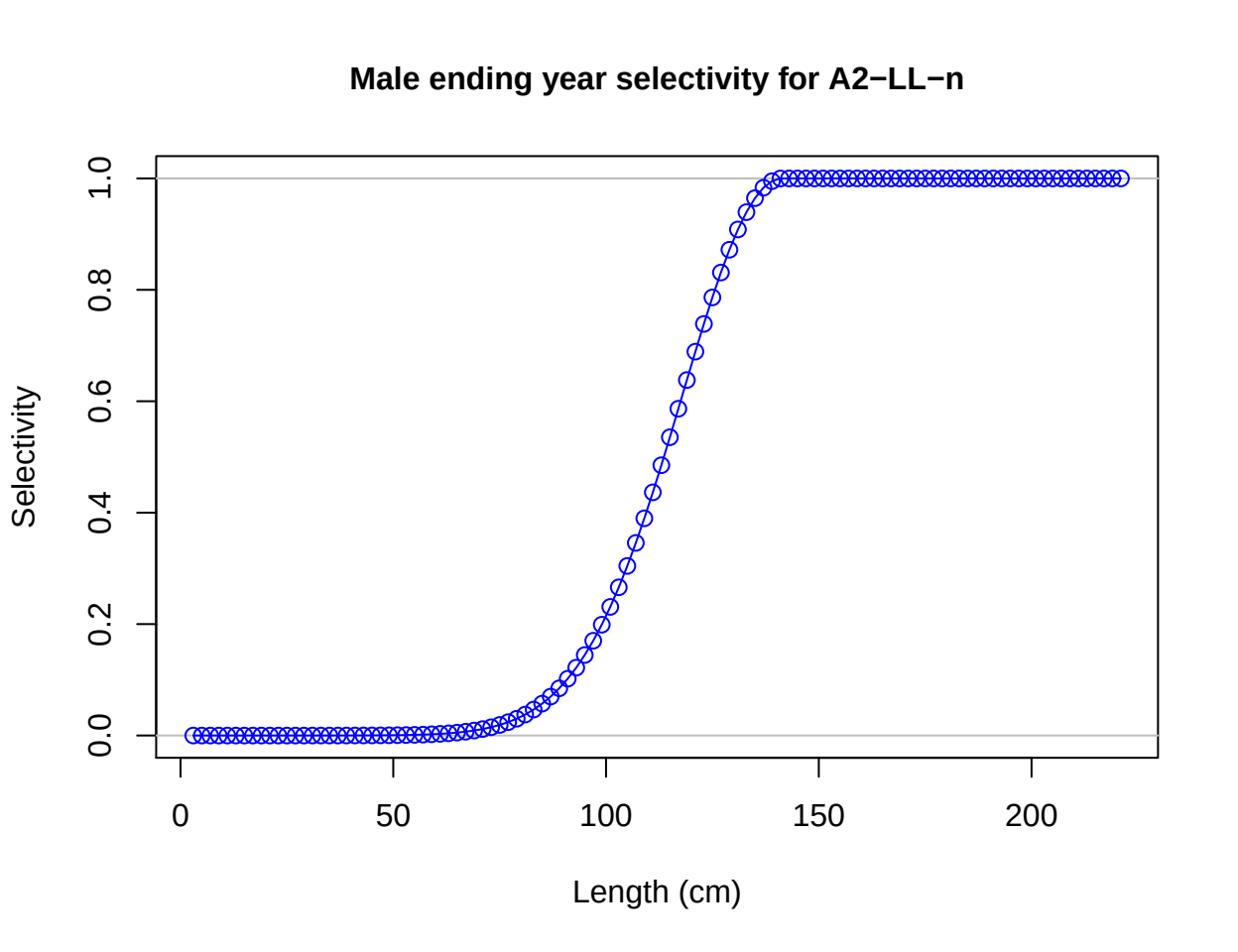



Female time−varying selectivity for A2−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
1
0.2
0.8
0.2

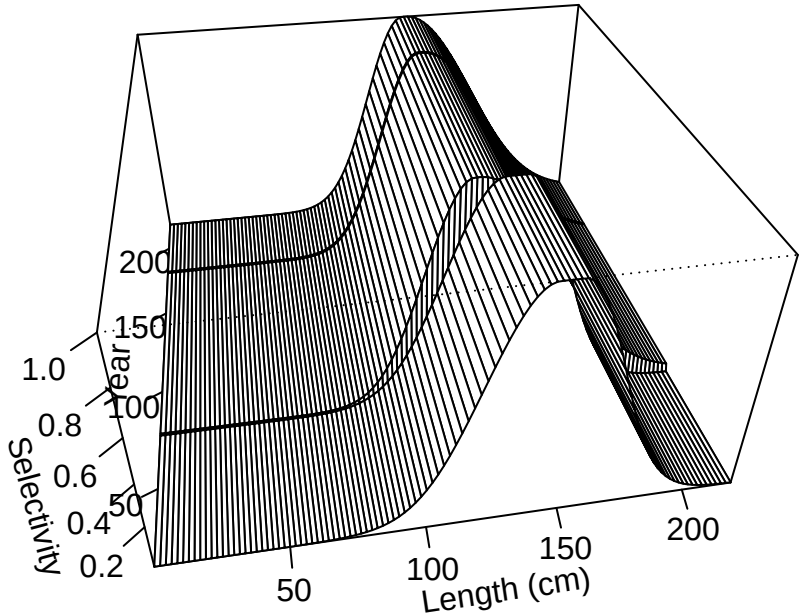

Female ending year selectivity for A2−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

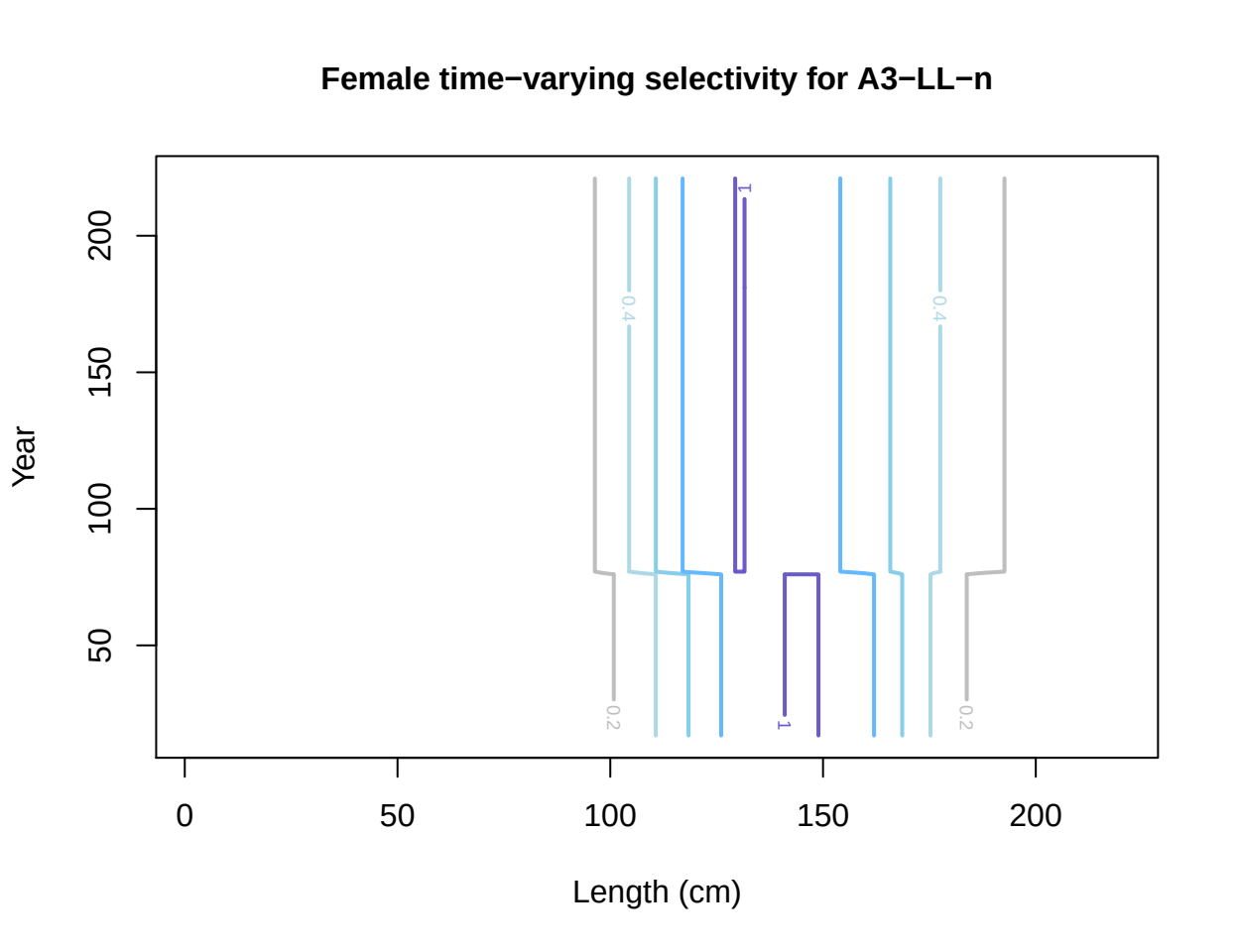

Male time−varying selectivity for A2−LL−n
Selectivity
1.0
0.8
0.6
0.4
0.2
Year
200
150
100
50
Length (cm)
50
100
150
200

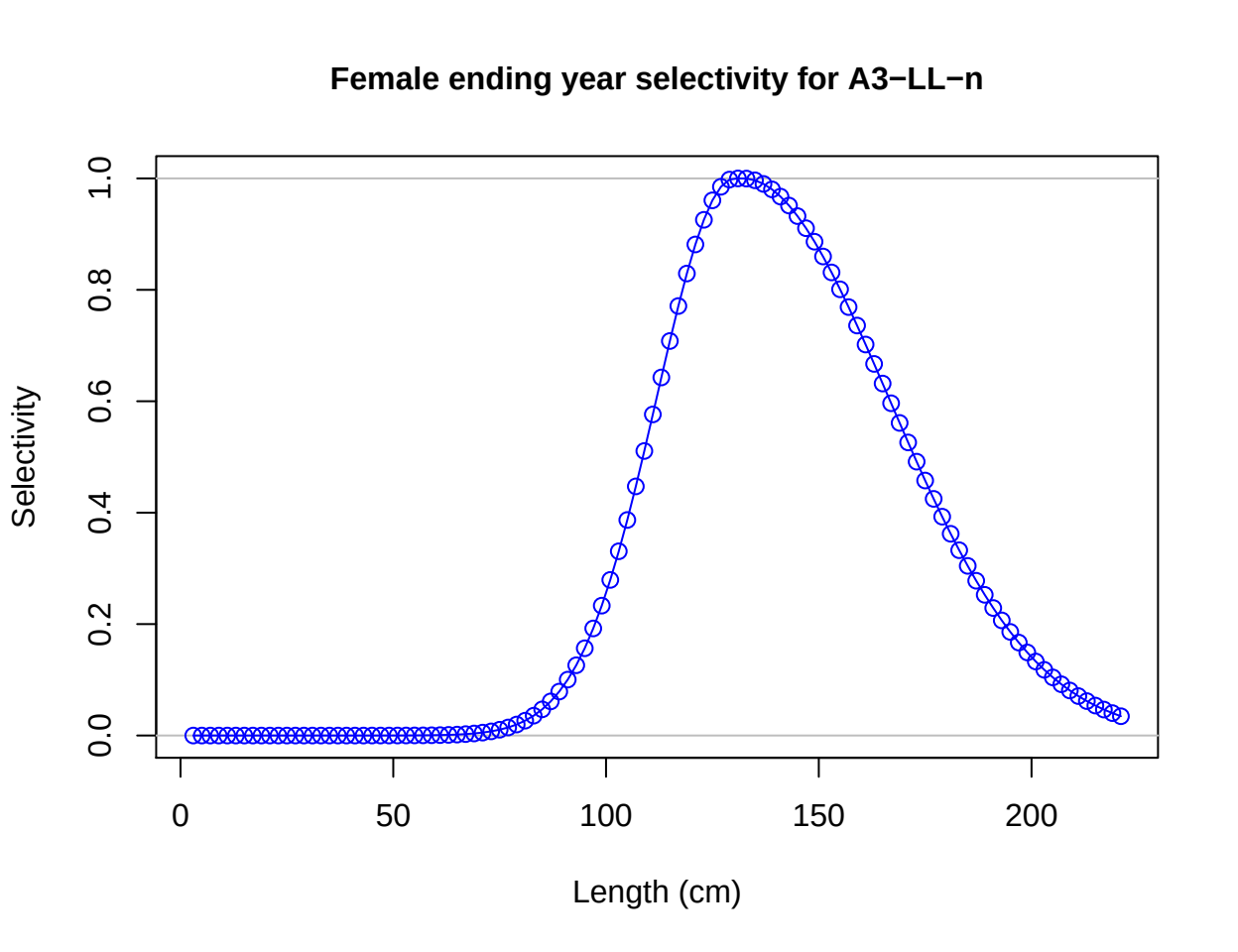

Male time−varying selectivity for A2−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.8
0.2

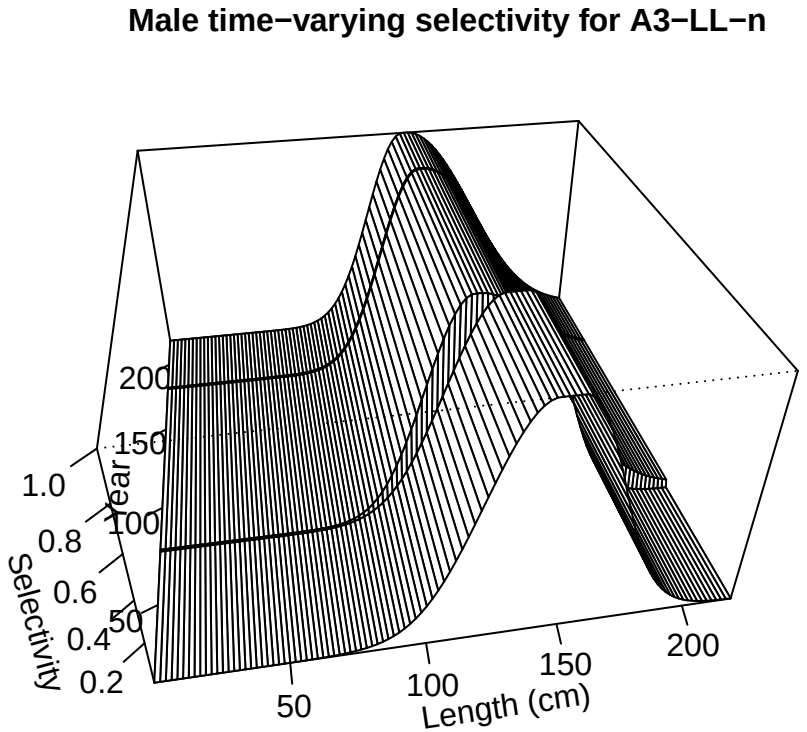

Male ending year selectivity for A2−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

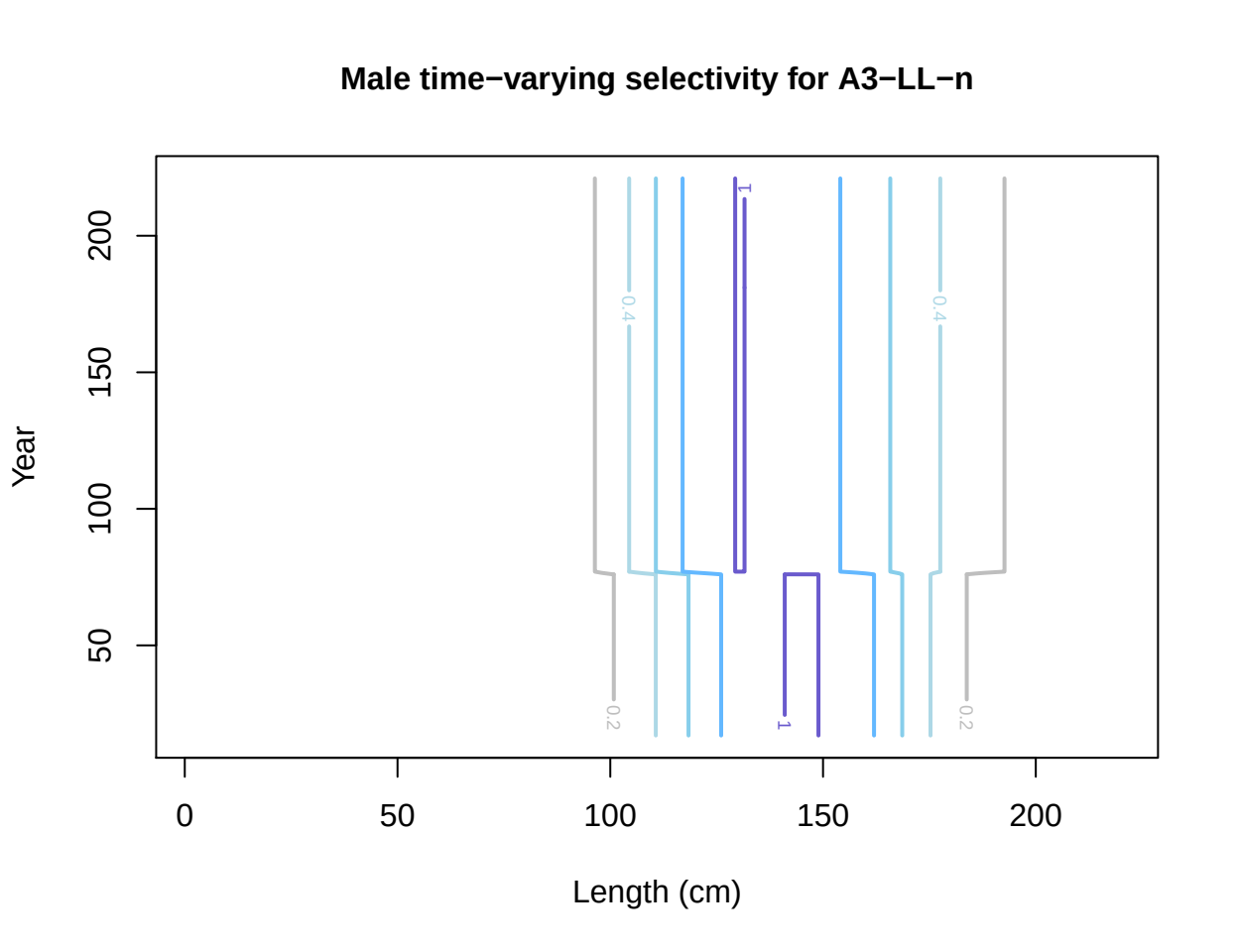
Female time−varying selectivity for A3−LL−n

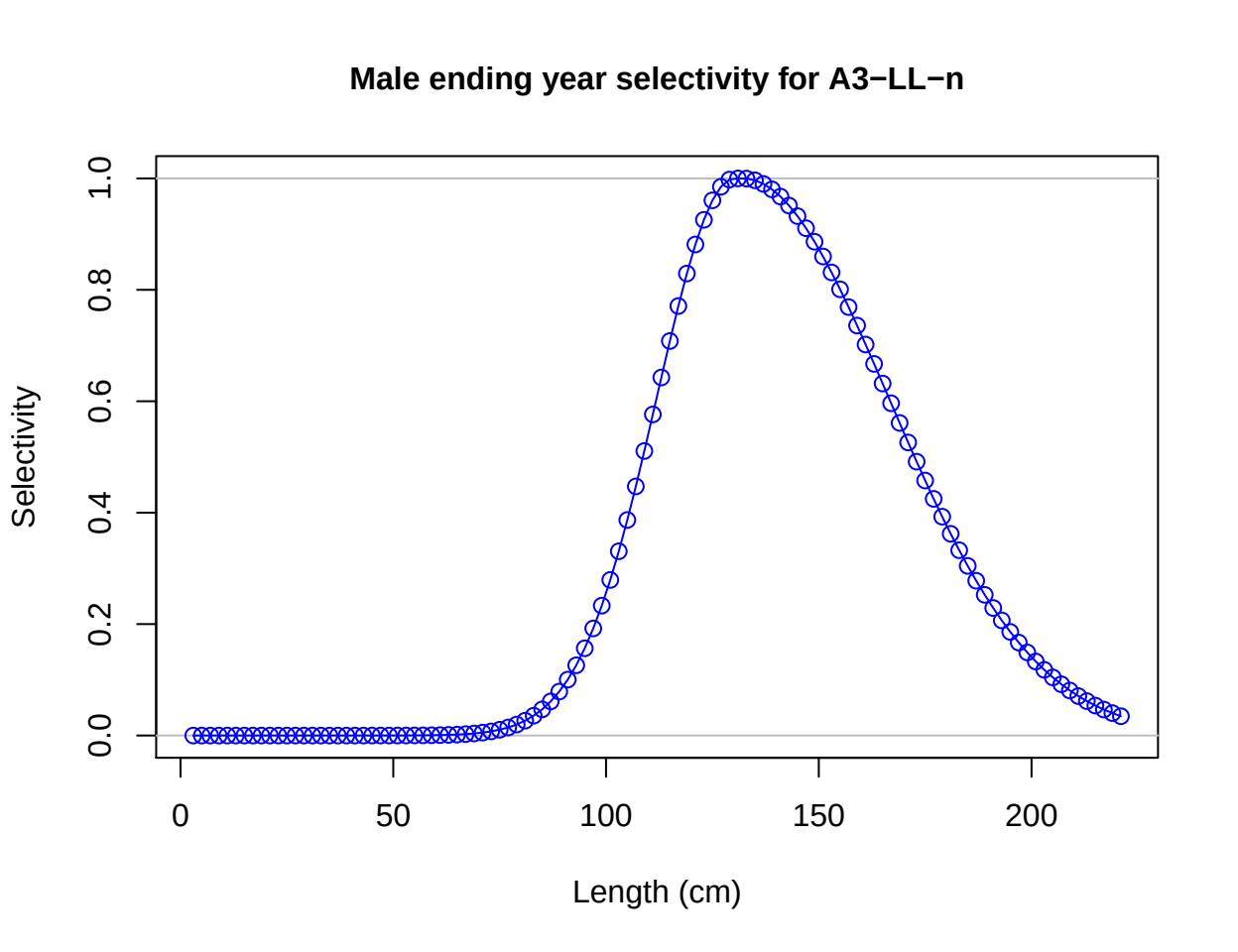



Female time−varying selectivity for A3−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
1
0.2
1
0.4
0.2

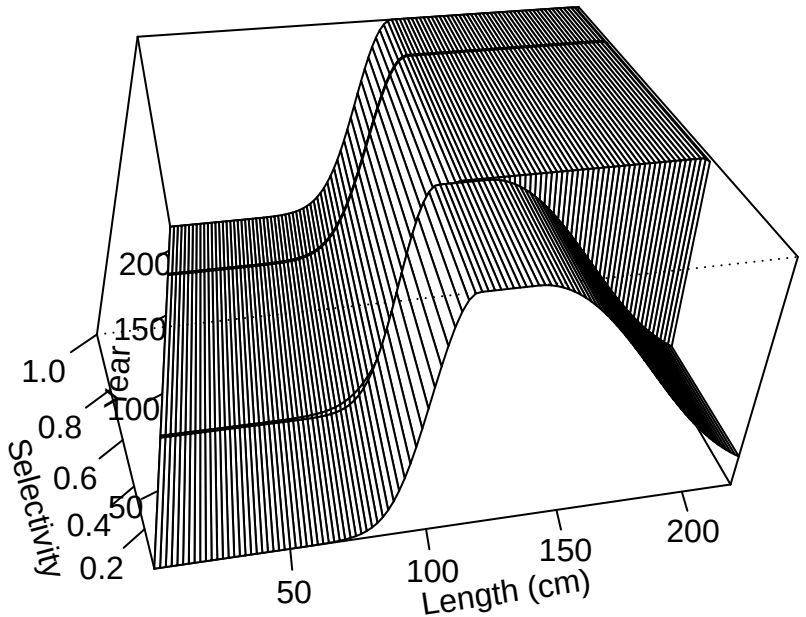

Female ending year selectivity for A3−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

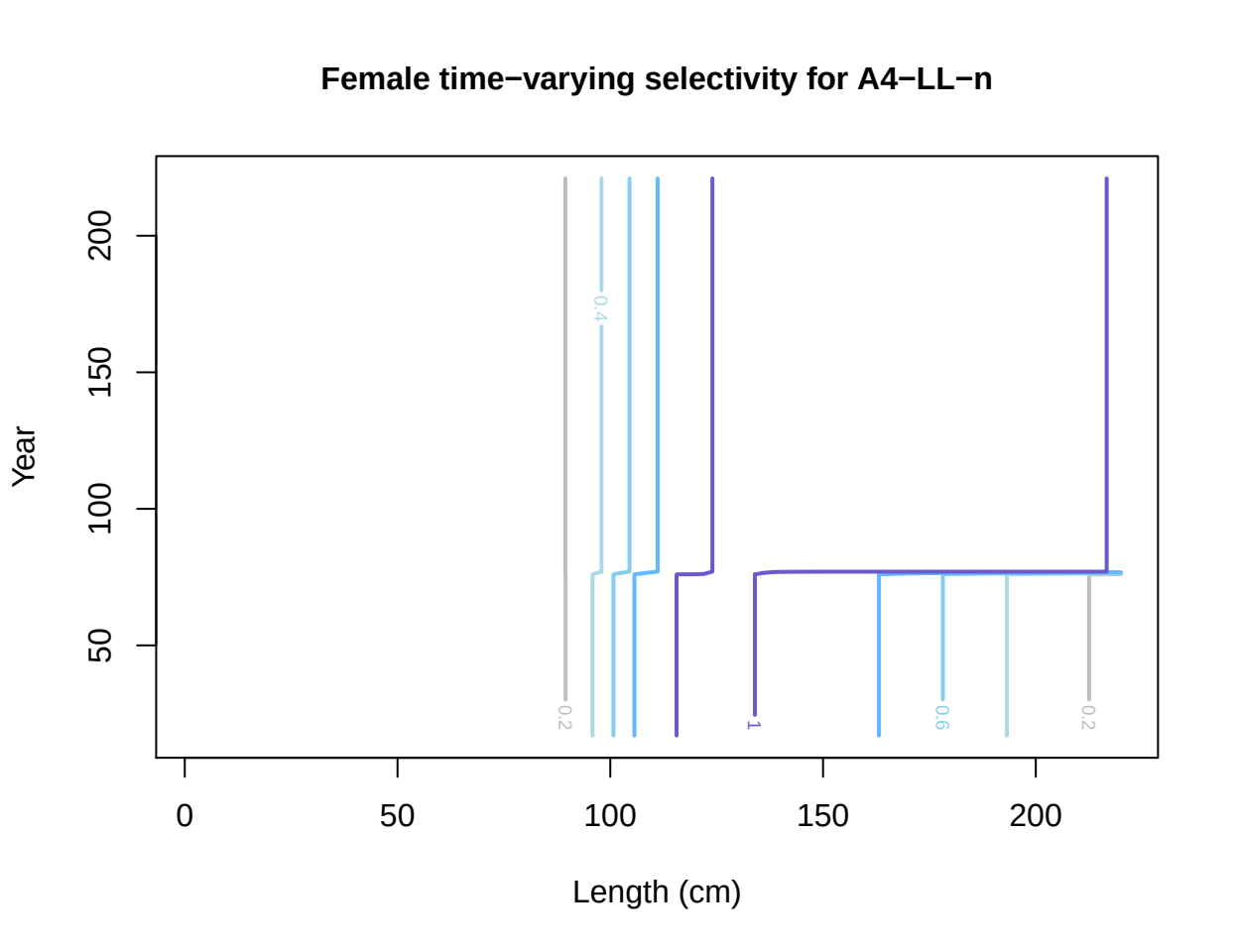

Male time−varying selectivity for A3−LL−n
Selectivity
1.0
0.8
0.6
0.4
0.2
Year
200
150
100
50
Length (cm)
50
100
150
200

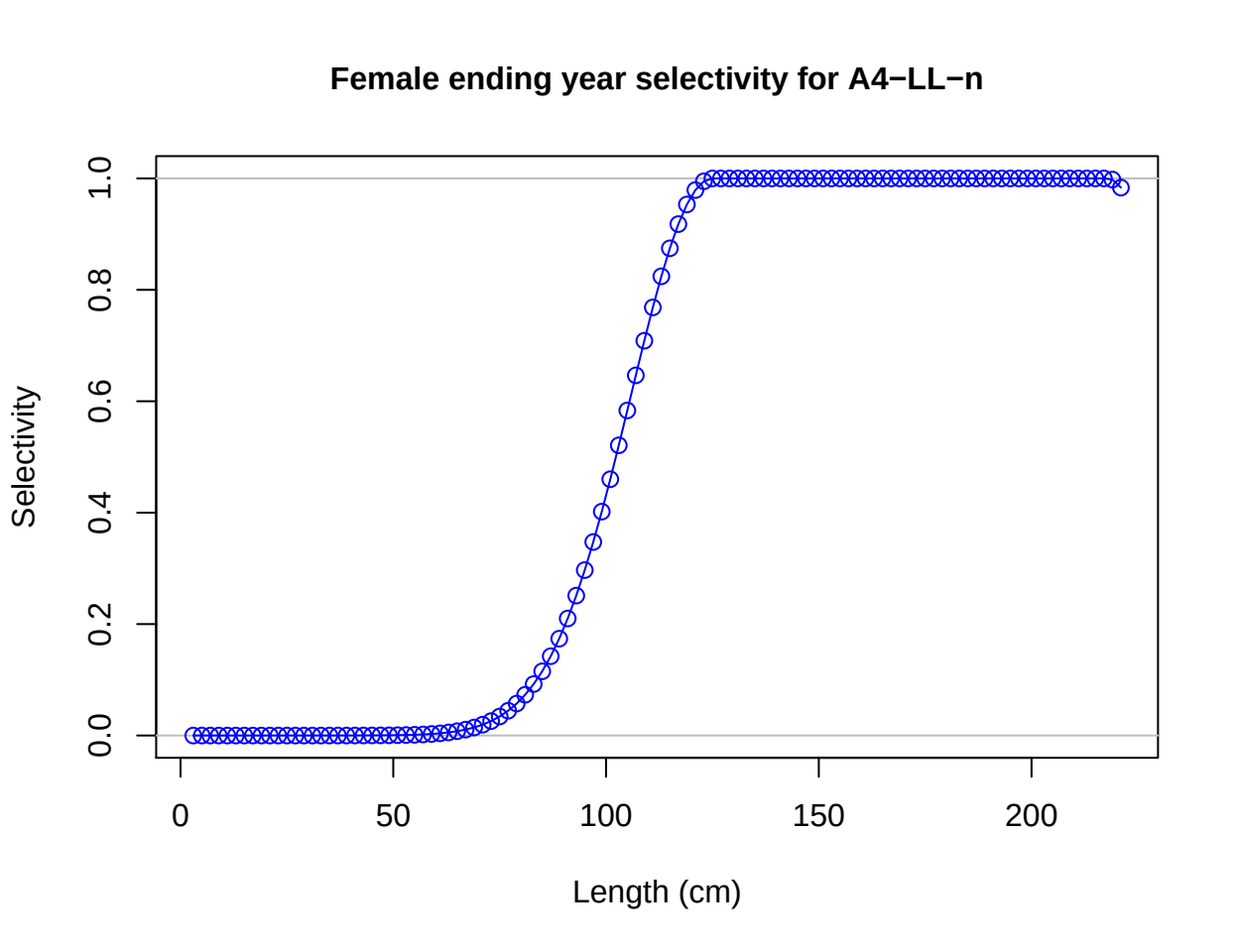

Male time−varying selectivity for A3−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
1
0.2
1
0.4
0.2


Male ending year selectivity for A3−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

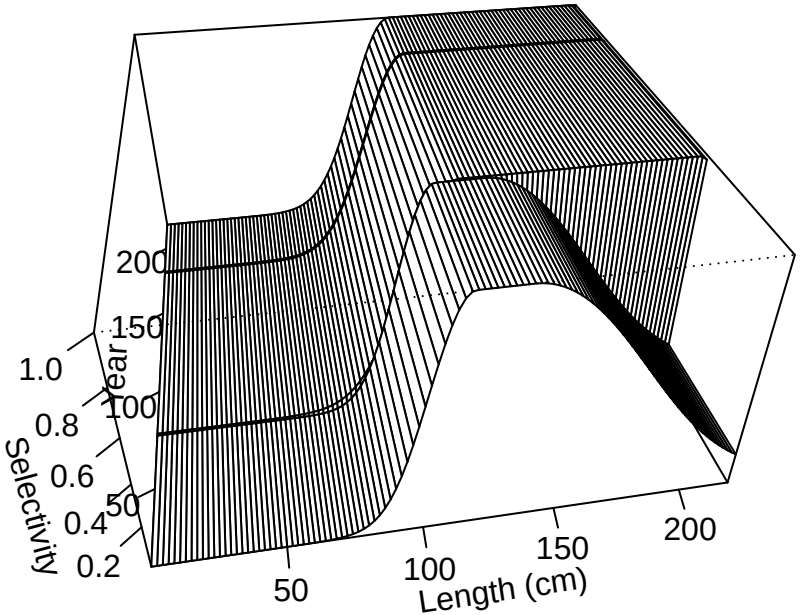
Female time−varying selectivity for A4−LL−n

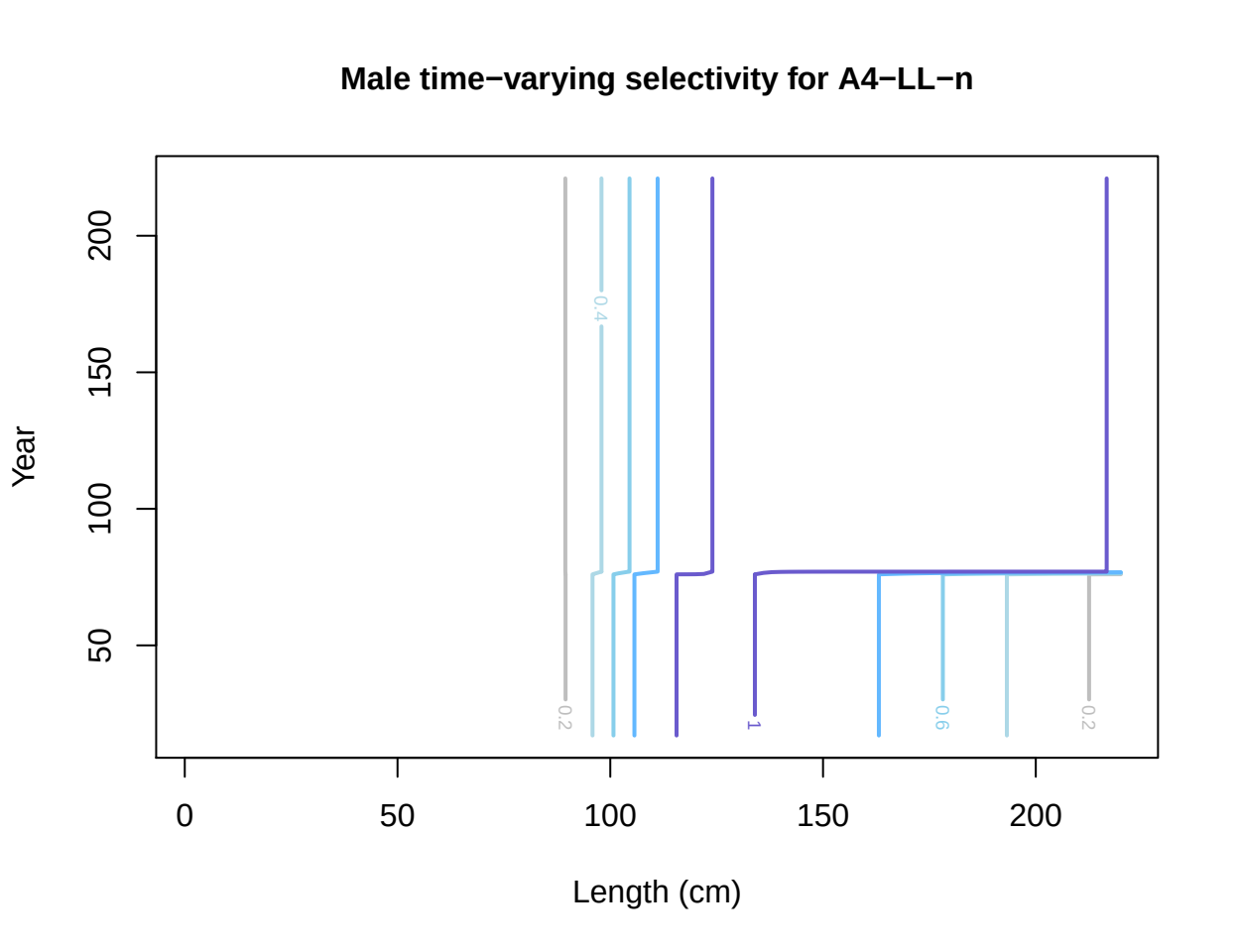


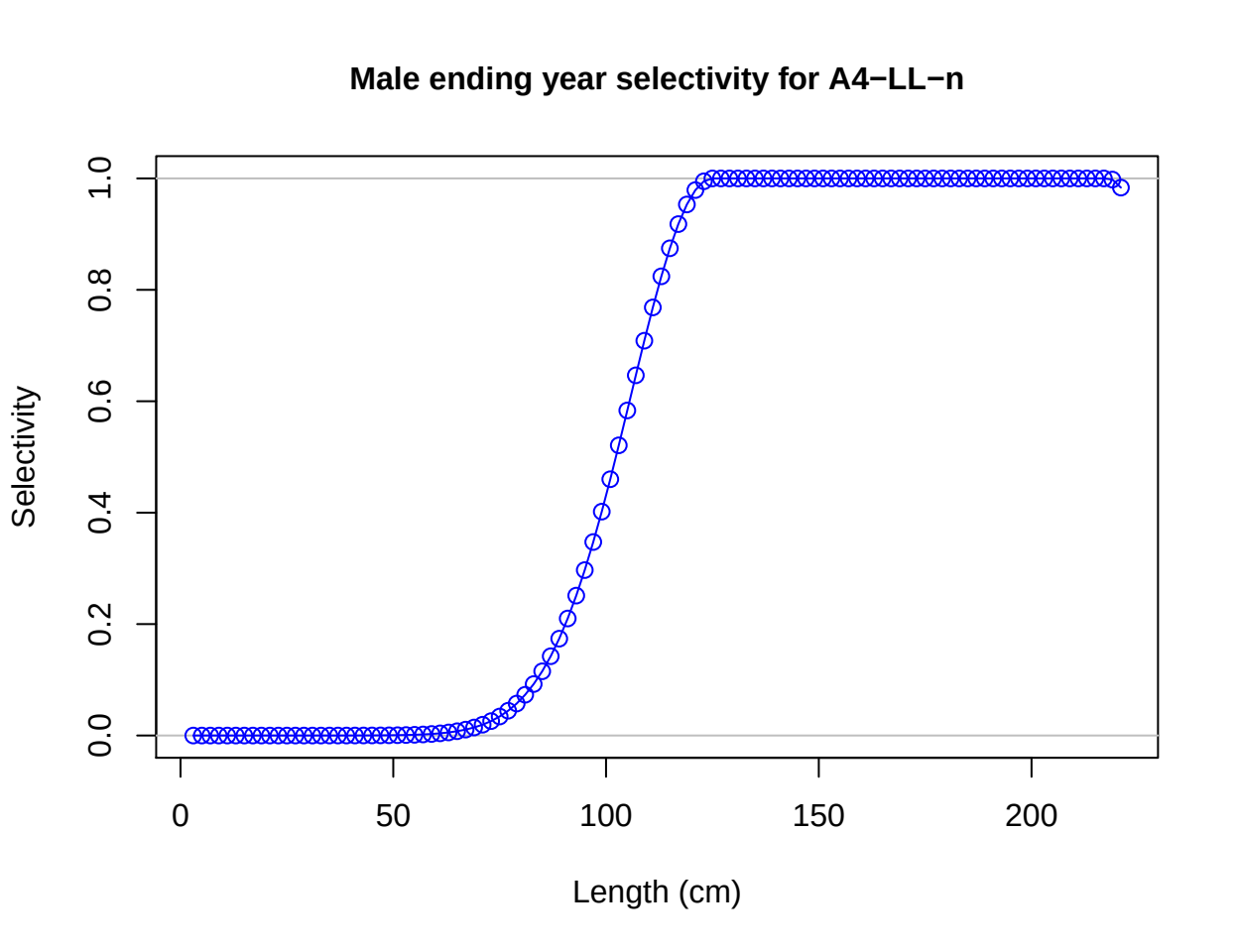

Female time−varying selectivity for A4−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.6
0.2


Female ending year selectivity for A4−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

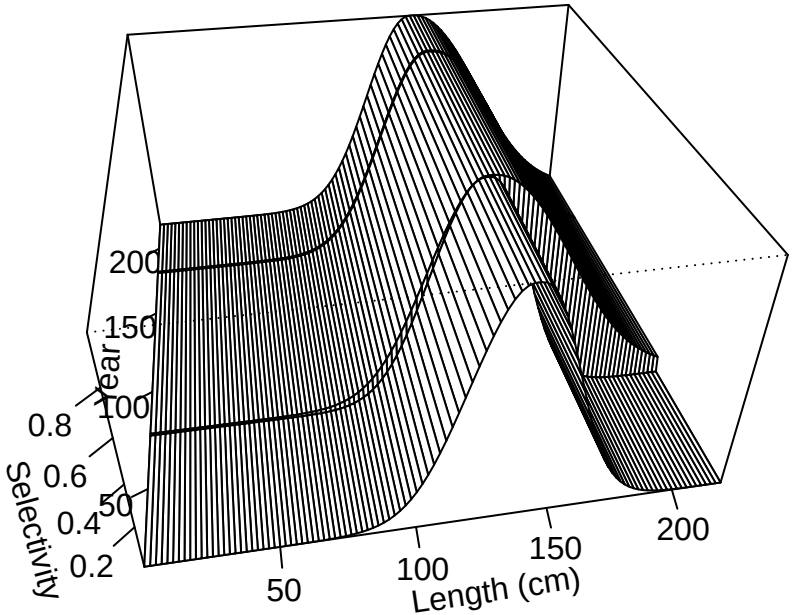
Male time−varying selectivity for A4−LL−n

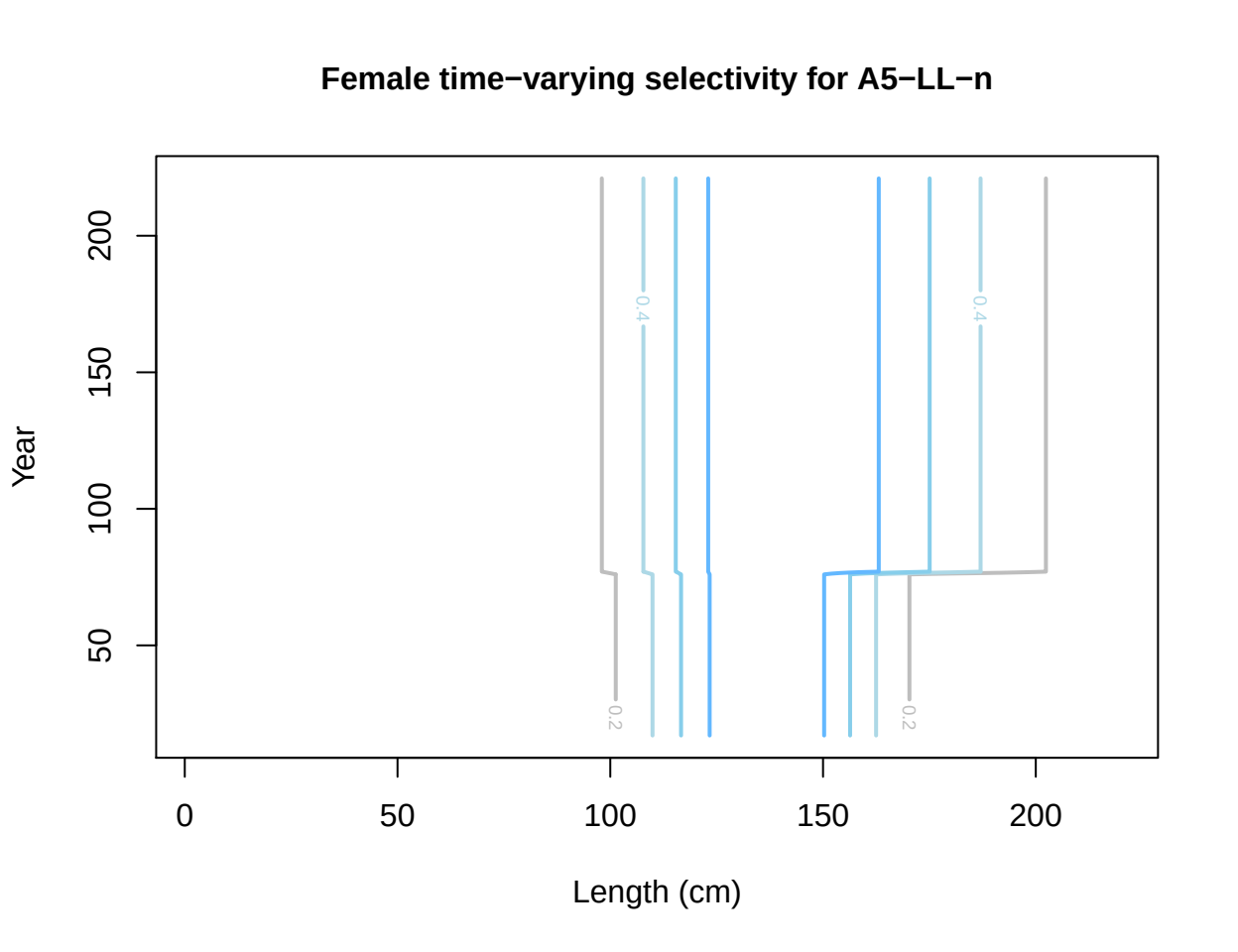


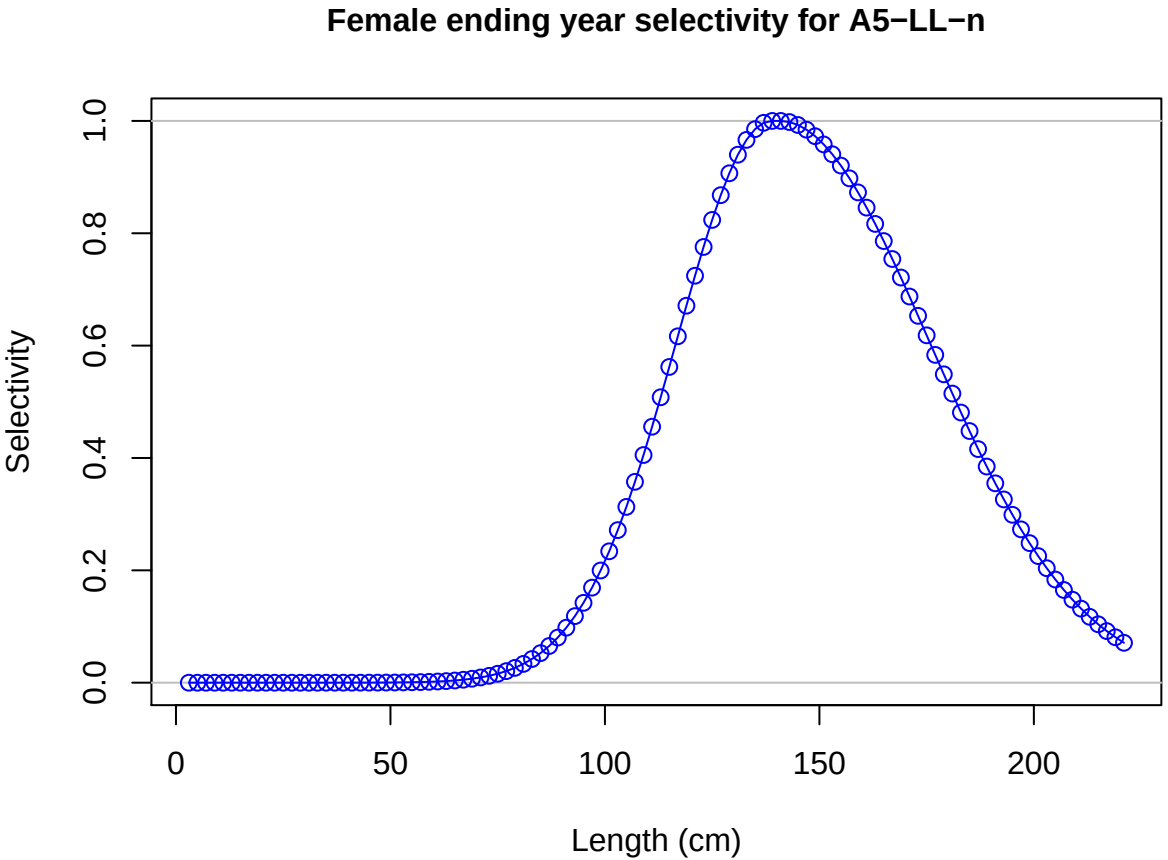

Male time−varying selectivity for A4−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.6
0.2

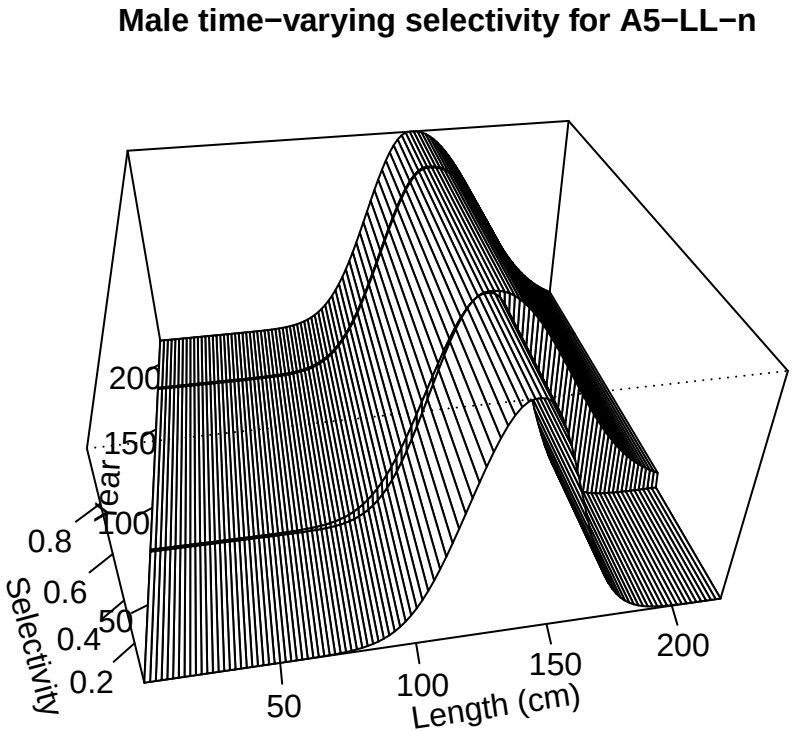

Male ending year selectivity for A4−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

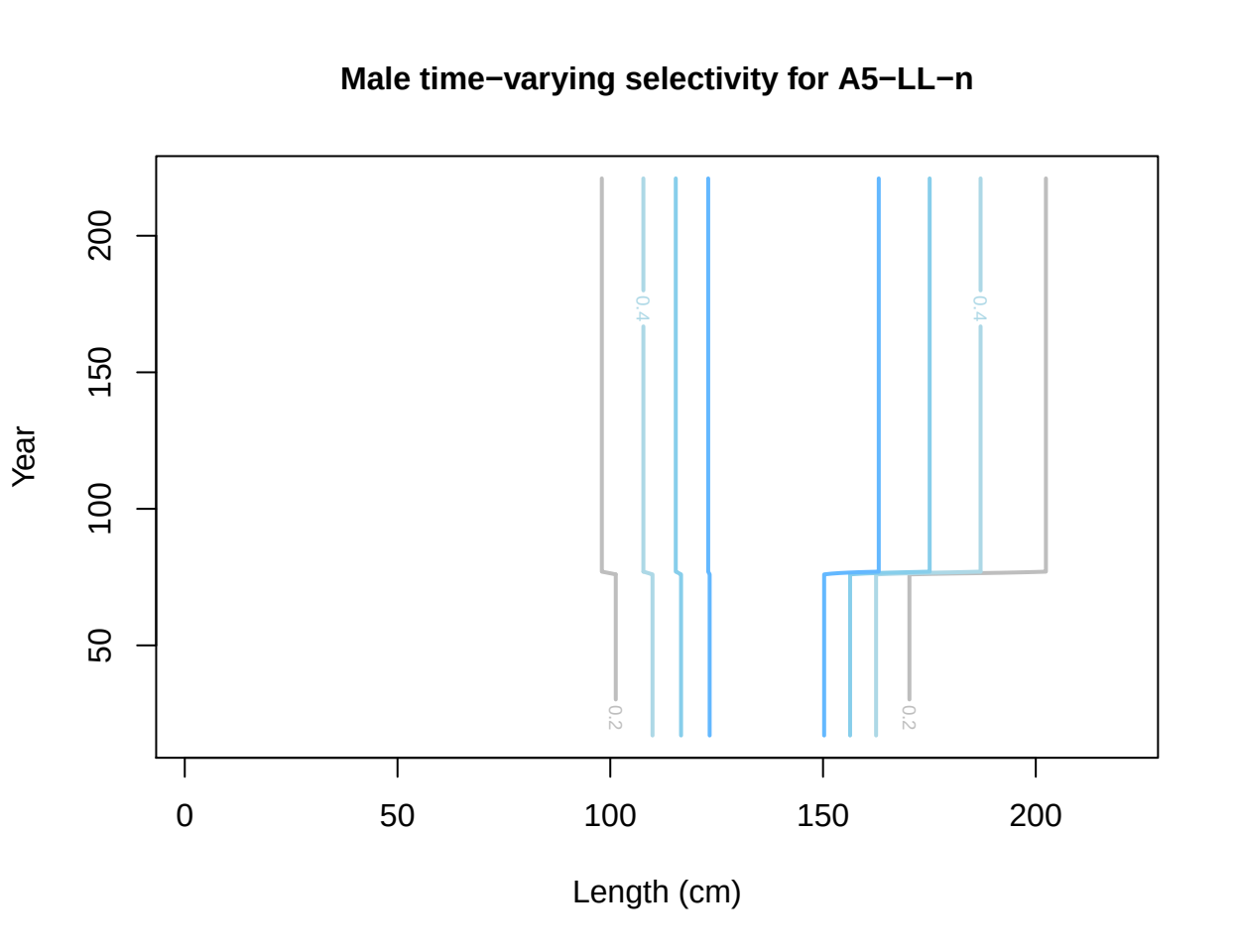
Female time−varying selectivity for A5−LL−n

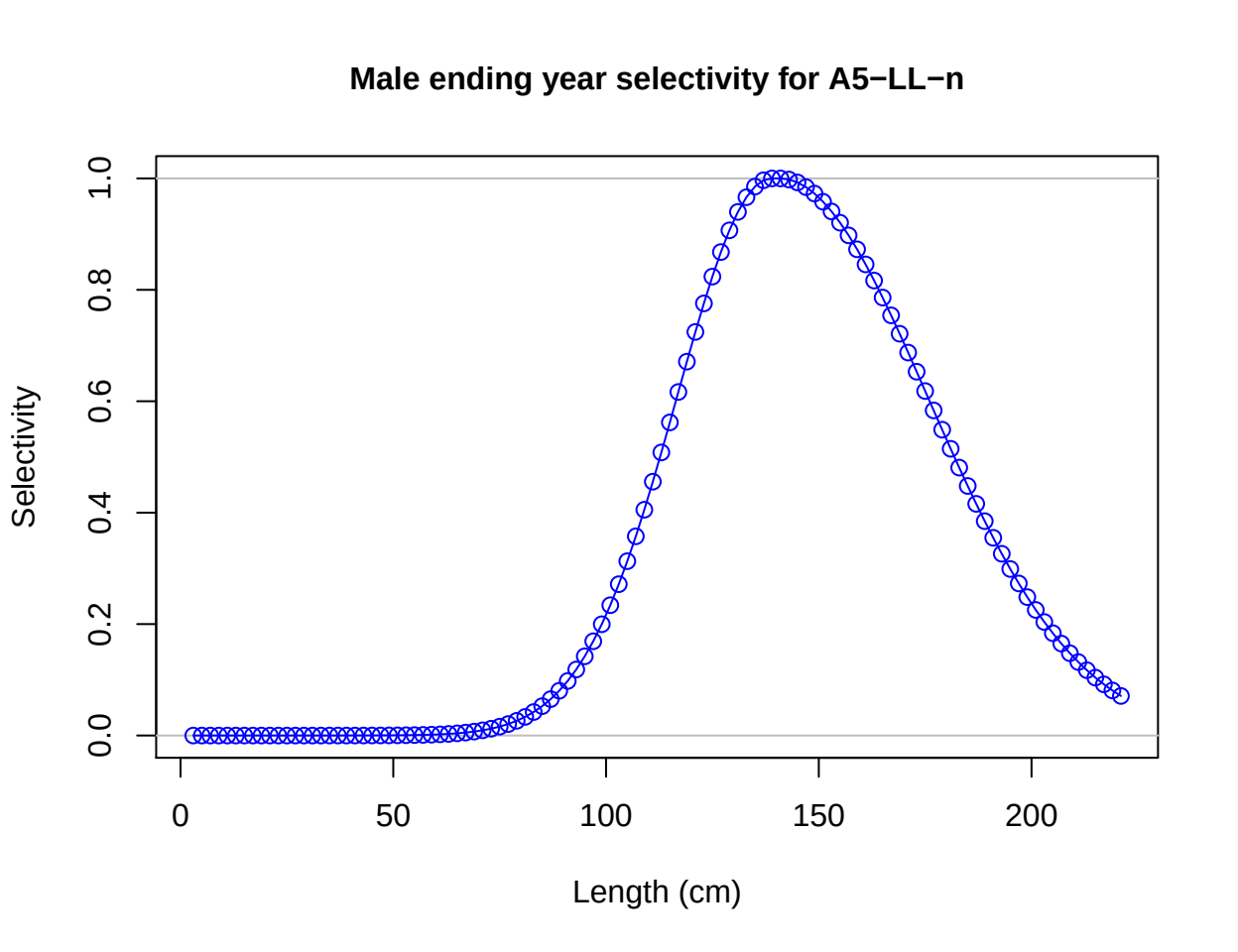



Female time−varying selectivity for A5−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
0.2
0.4
0.2

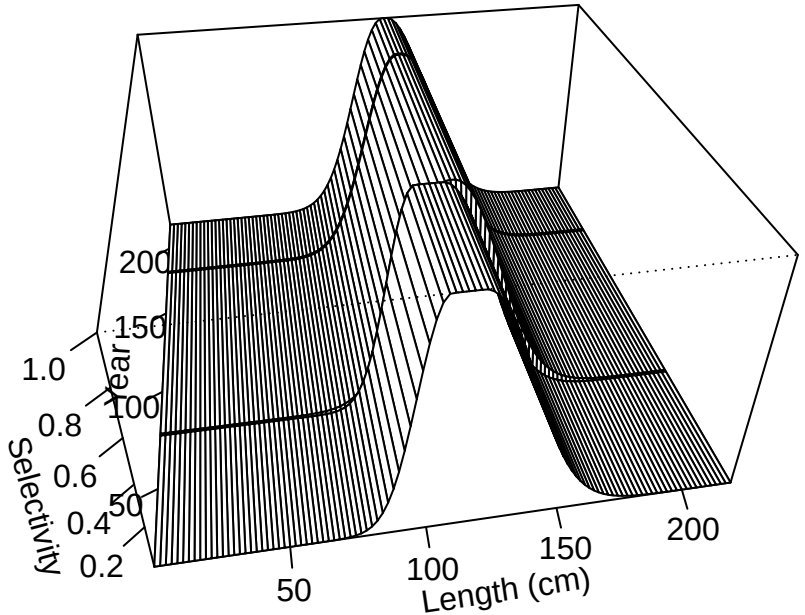

Female ending year selectivity for A5−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

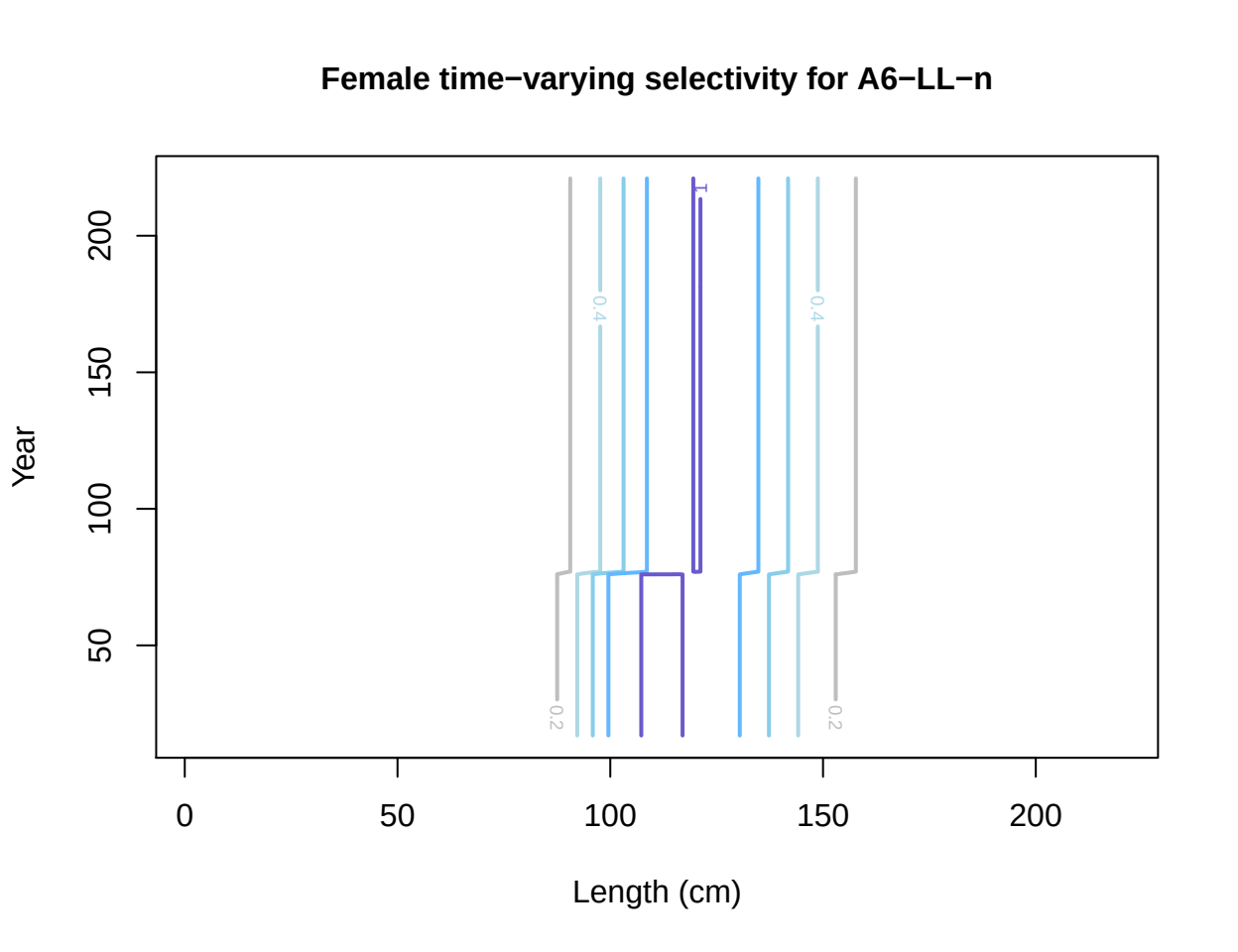

Male time−varying selectivity for A5−LL−n
Selectivity
0.2
0.4
0.6
0.8
Year
50
100
150
200
50
100
150
200
Length (cm)

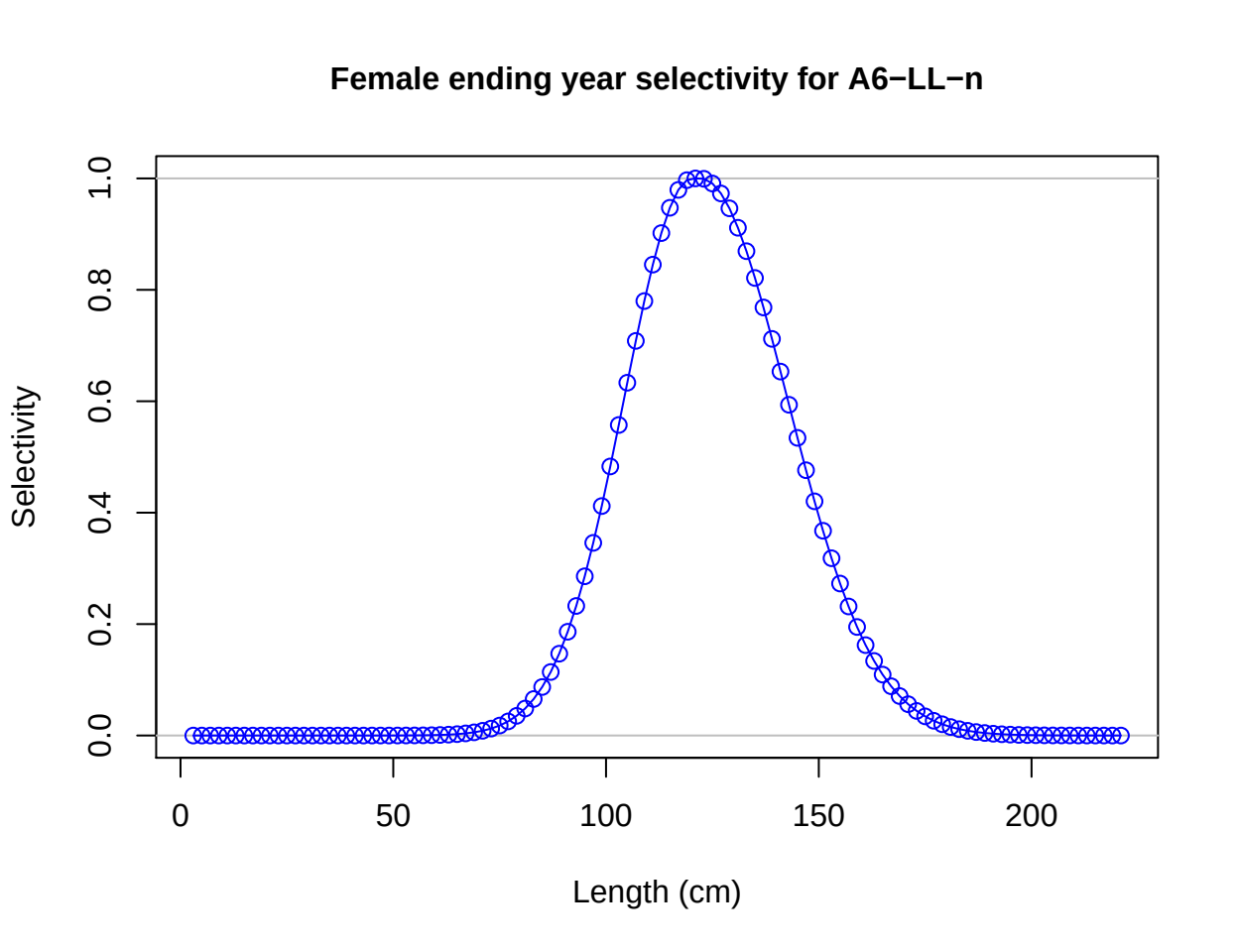

Male time−varying selectivity for A5−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
0.2
0.4
0.2

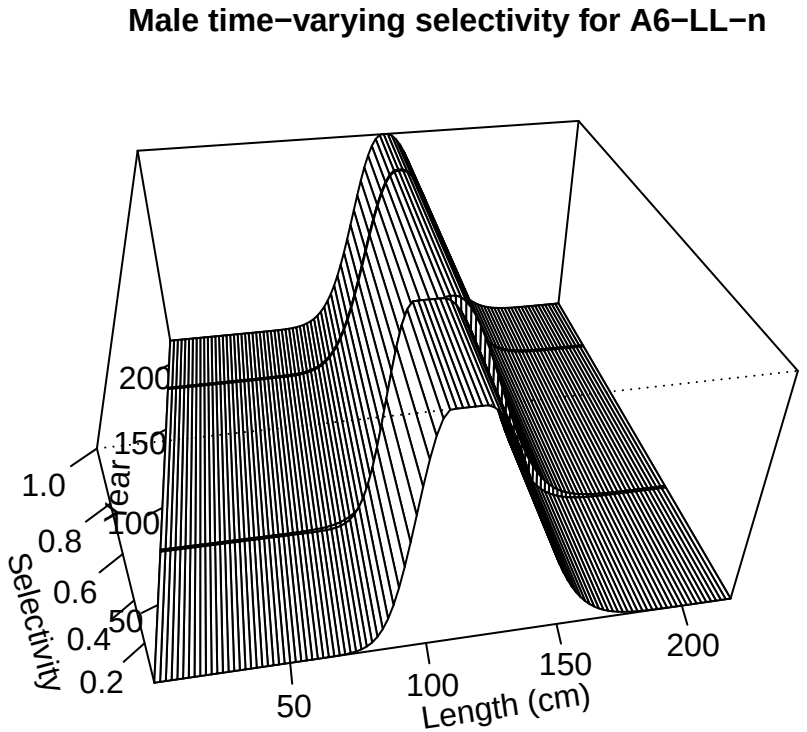

Male ending year selectivity for A5−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

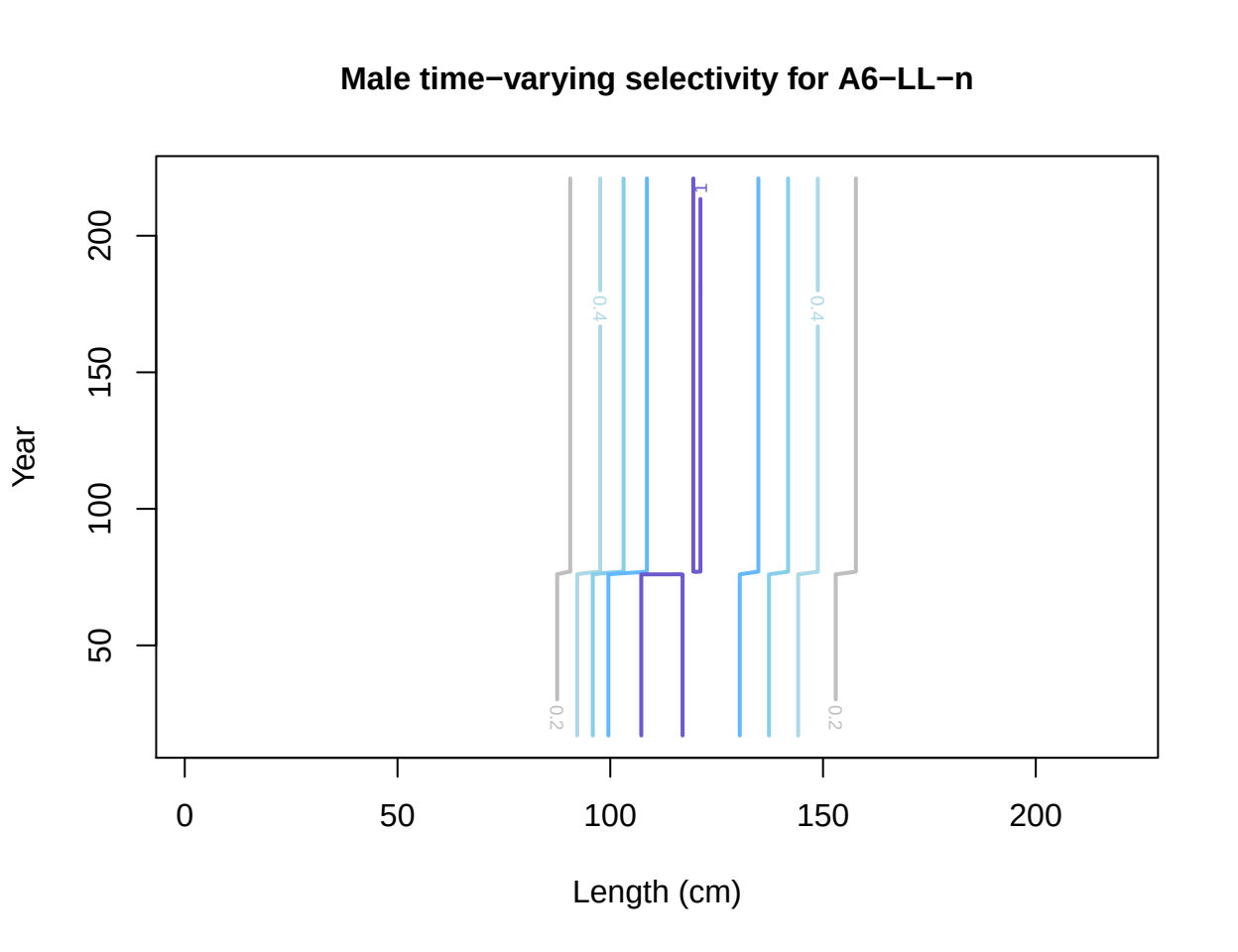
Female time−varying selectivity for A6−LL−n

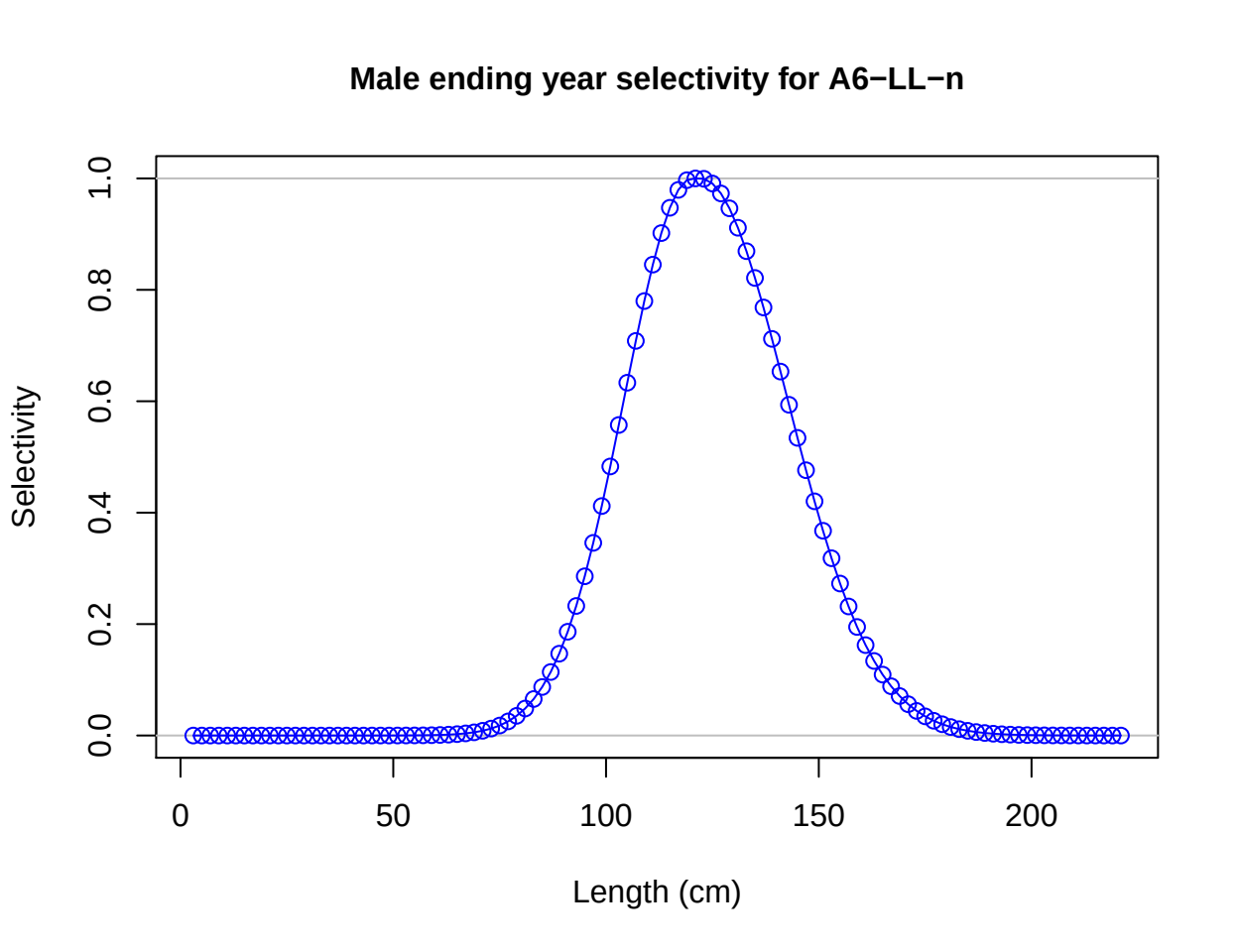


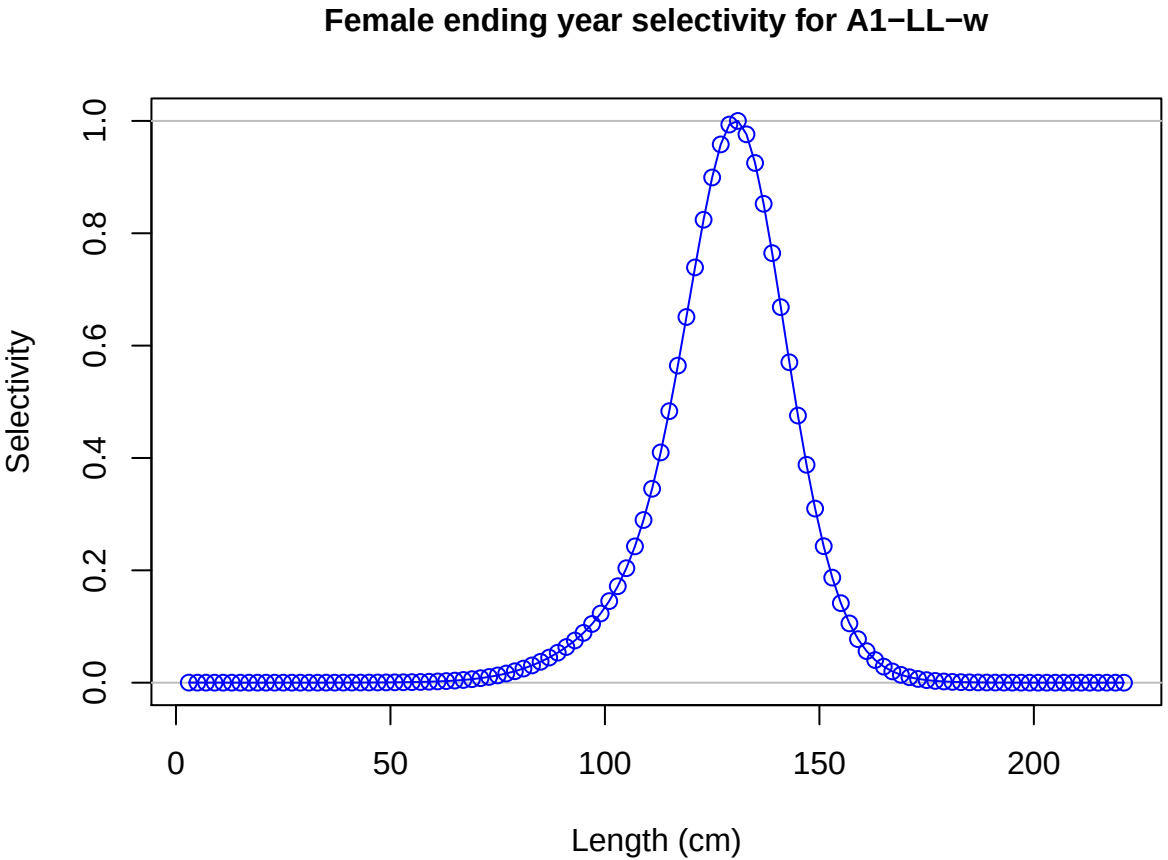

Female time−varying selectivity for A6−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
1
0.4
0.4
0.2
0.2

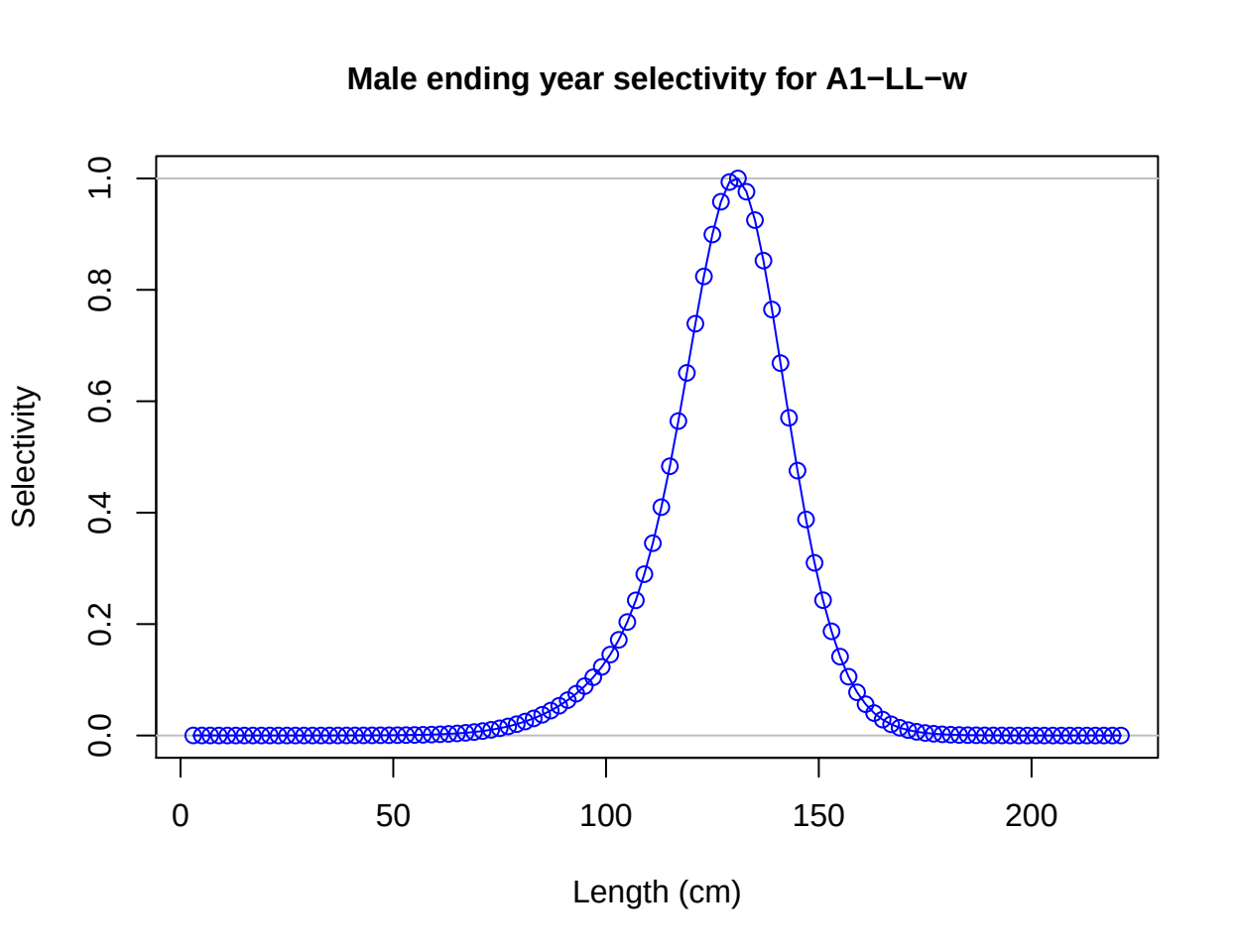

Female ending year selectivity for A6−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)


Male time−varying selectivity for A6−LL−n
Selectivity
1.0
0.8
0.6
0.4
0.2
Year
200
150
100
50
Length (cm)
50
100
150
200

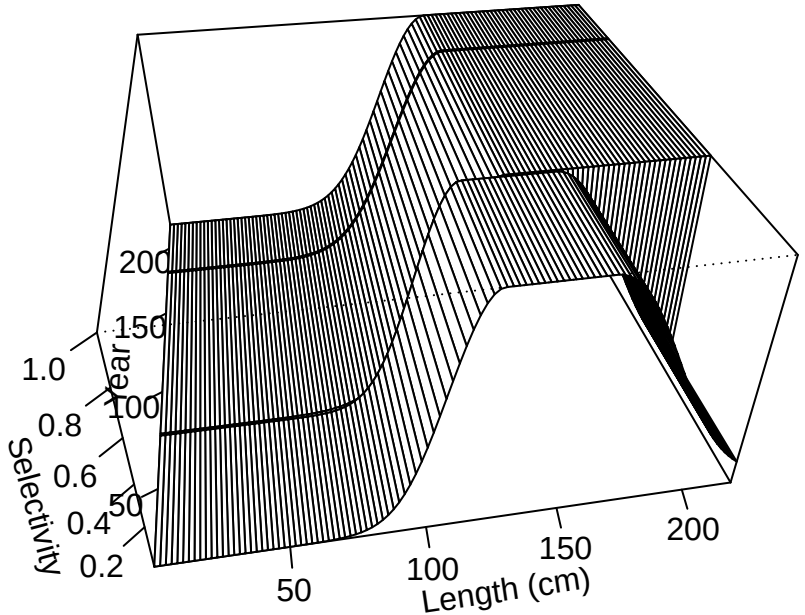

Male time−varying selectivity for A6−LL−n
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.4
0.2

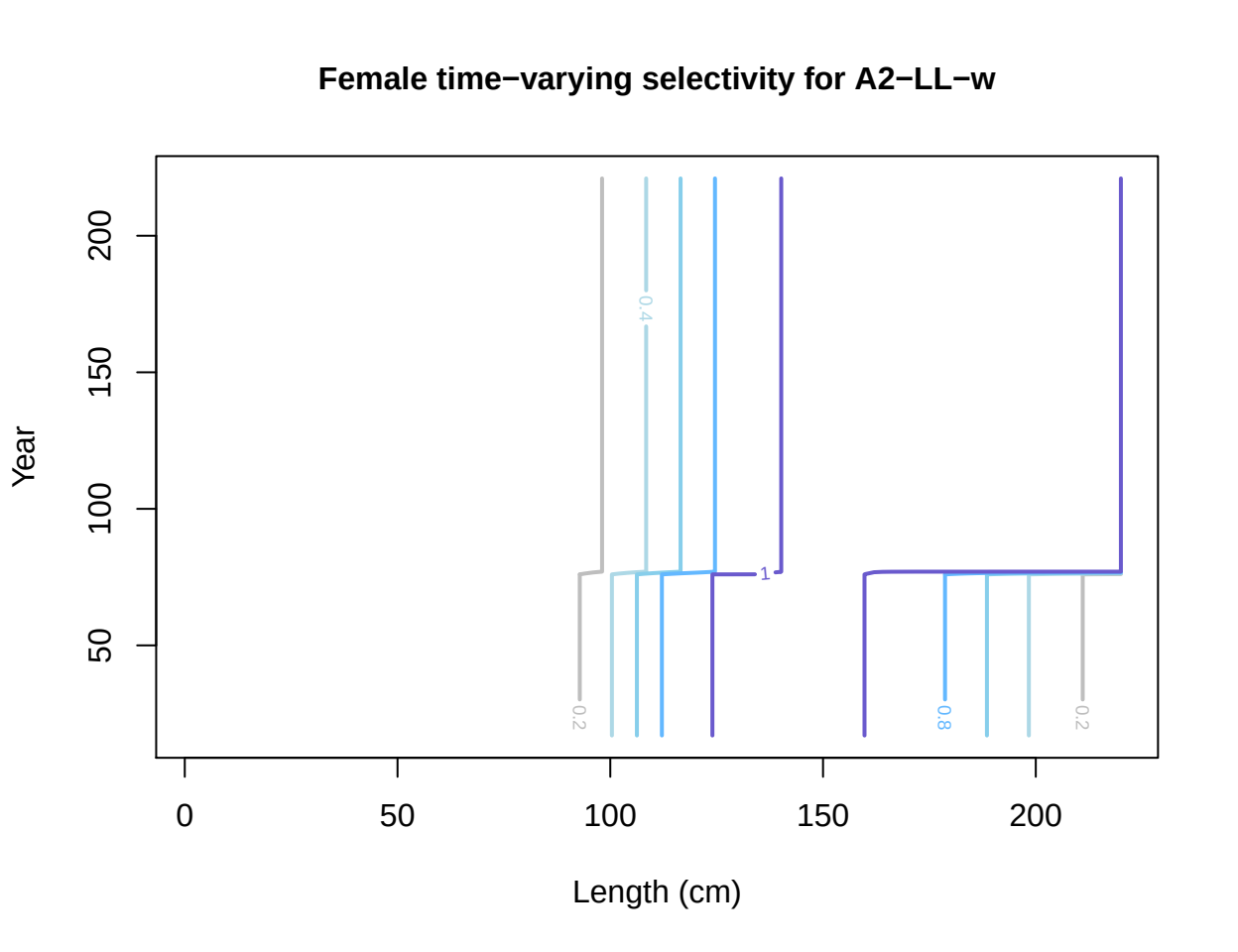

Male ending year selectivity for A6−LL−n
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

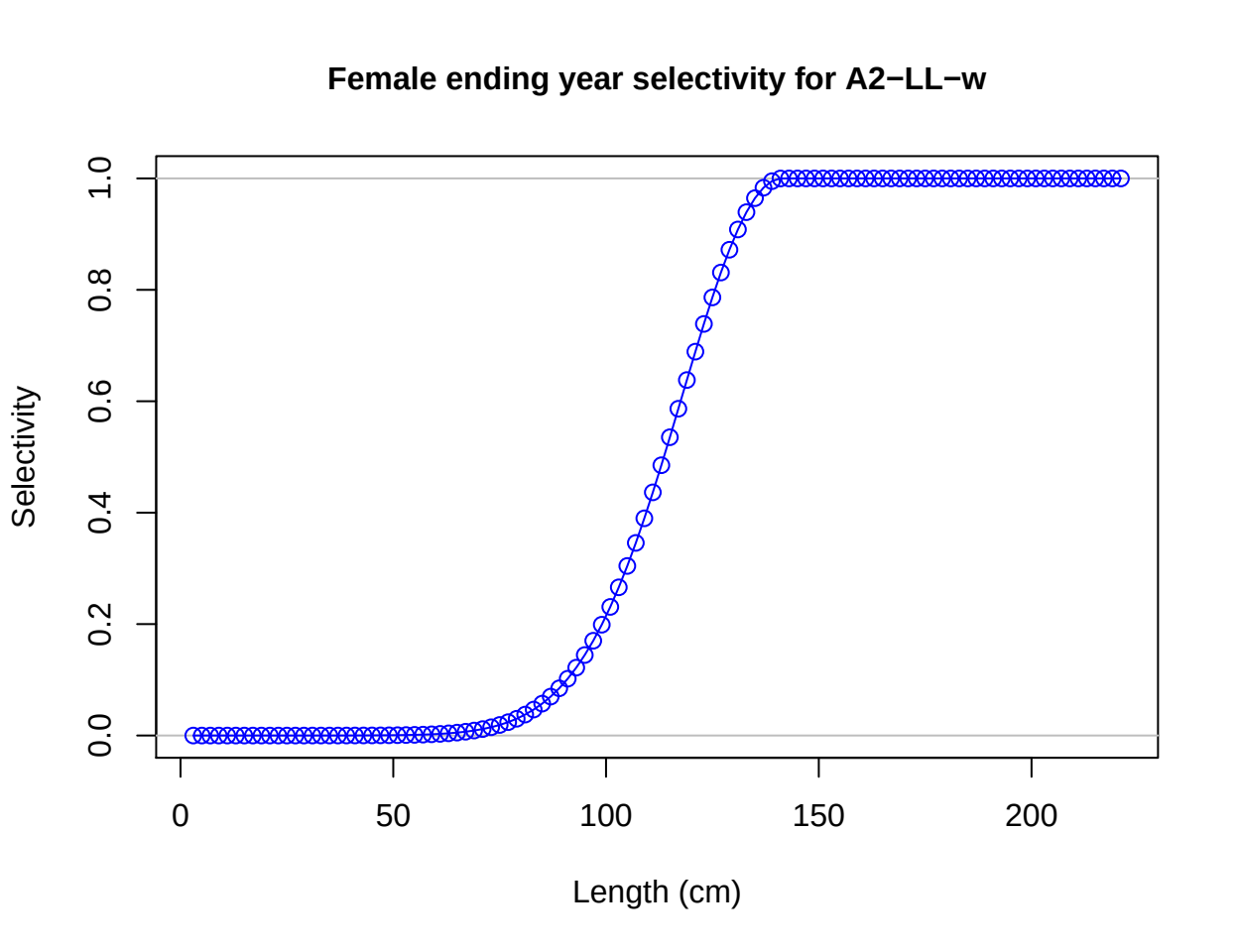

Female ending year selectivity for A1−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

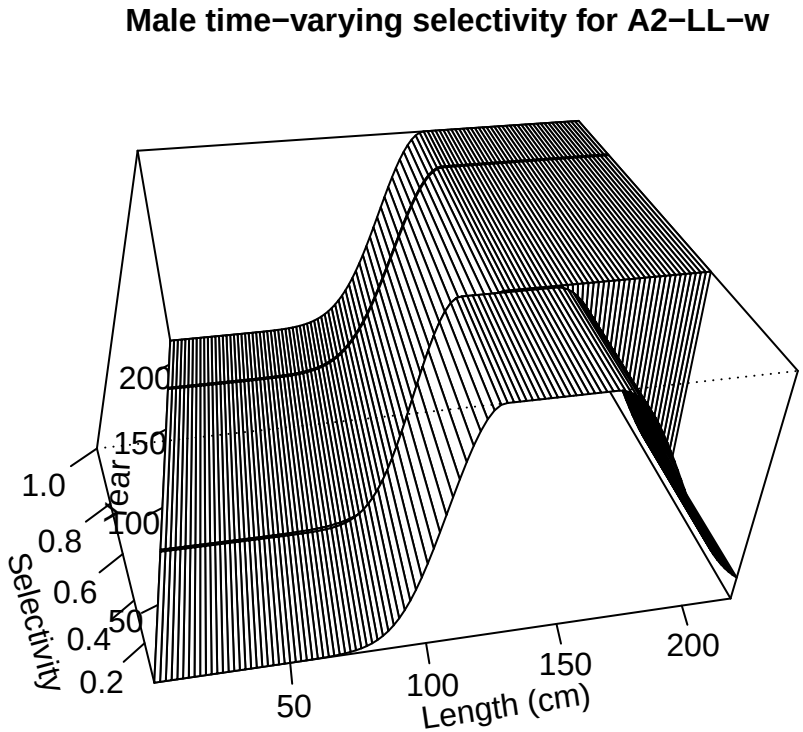

Male ending year selectivity for A1−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

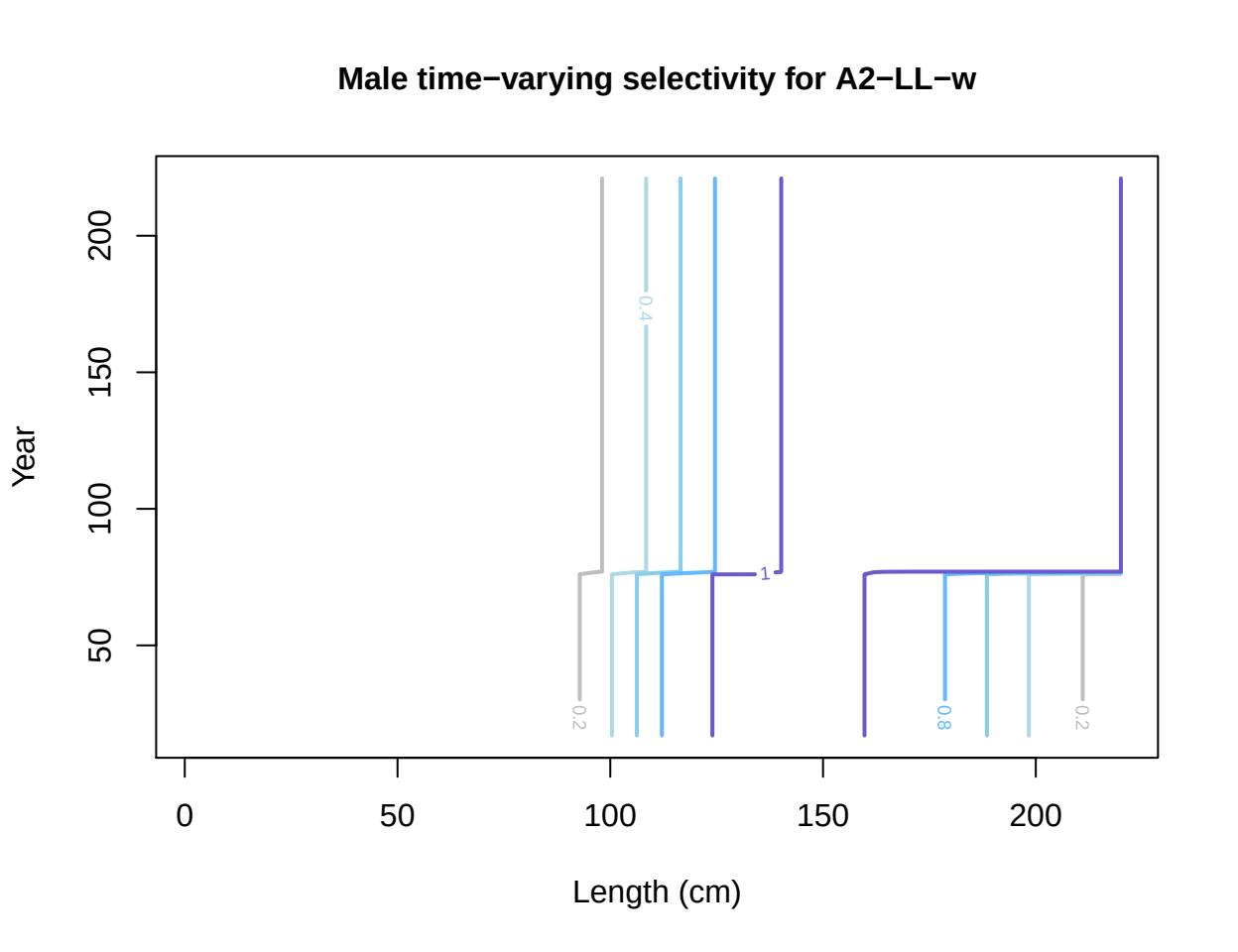
Female time−varying selectivity for A2−LL−w

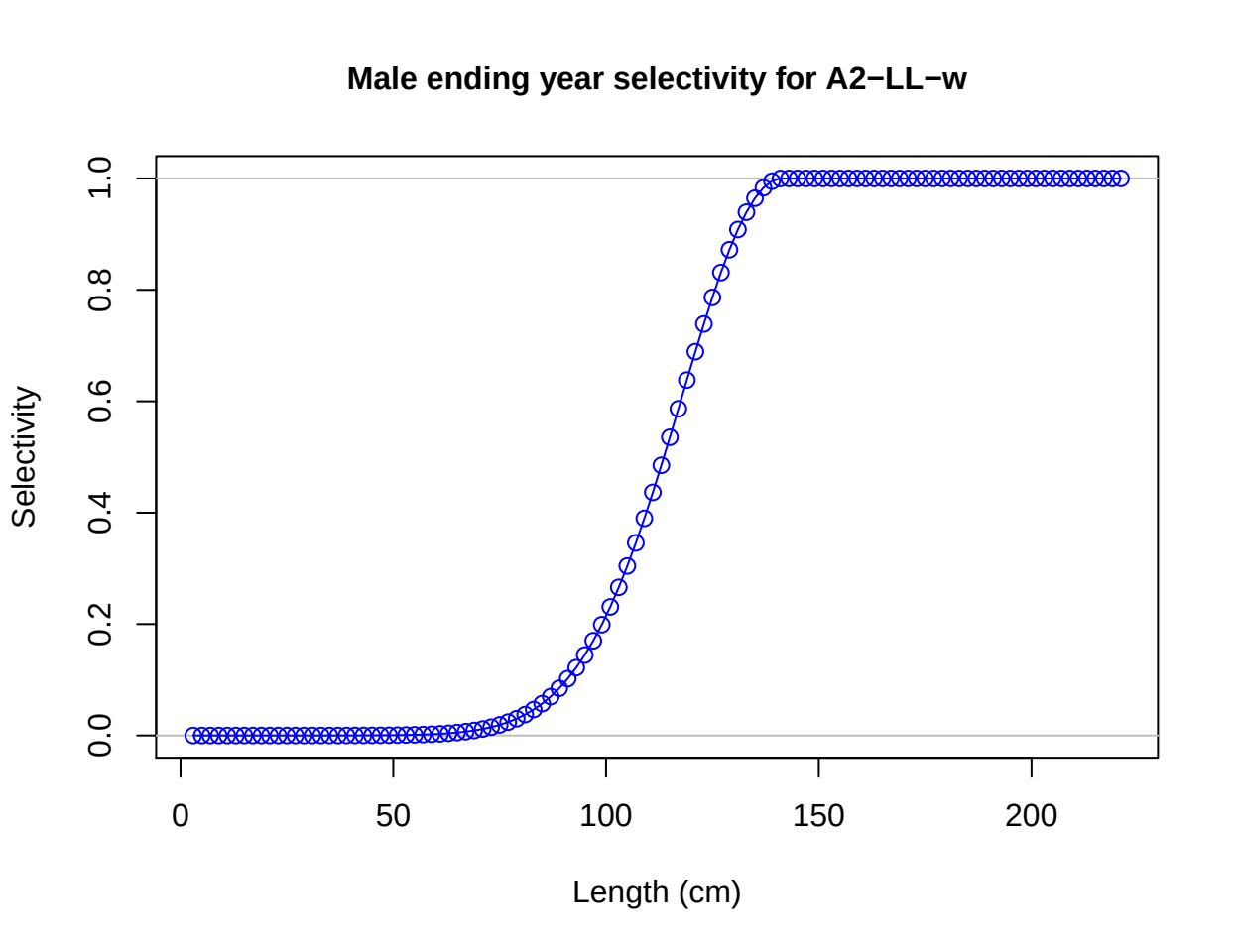



Female time−varying selectivity for A2−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.8
0.2

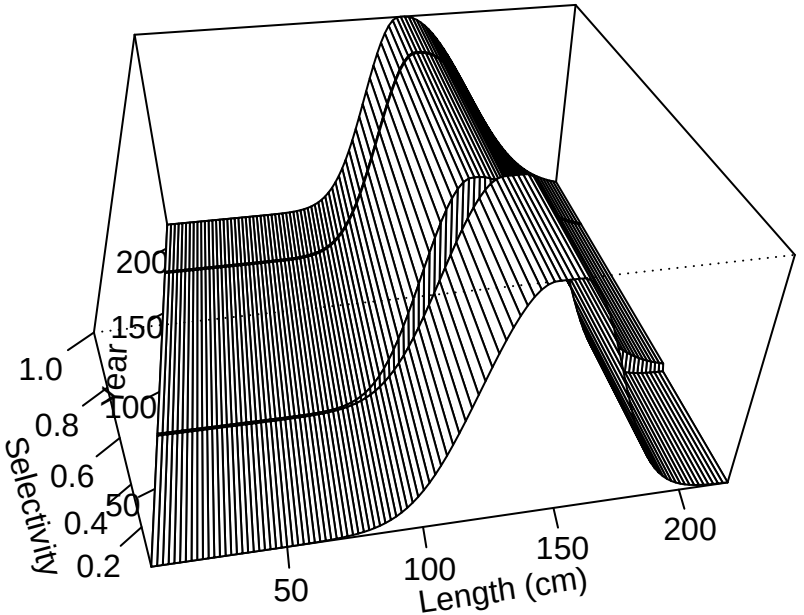

Female ending year selectivity for A2−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

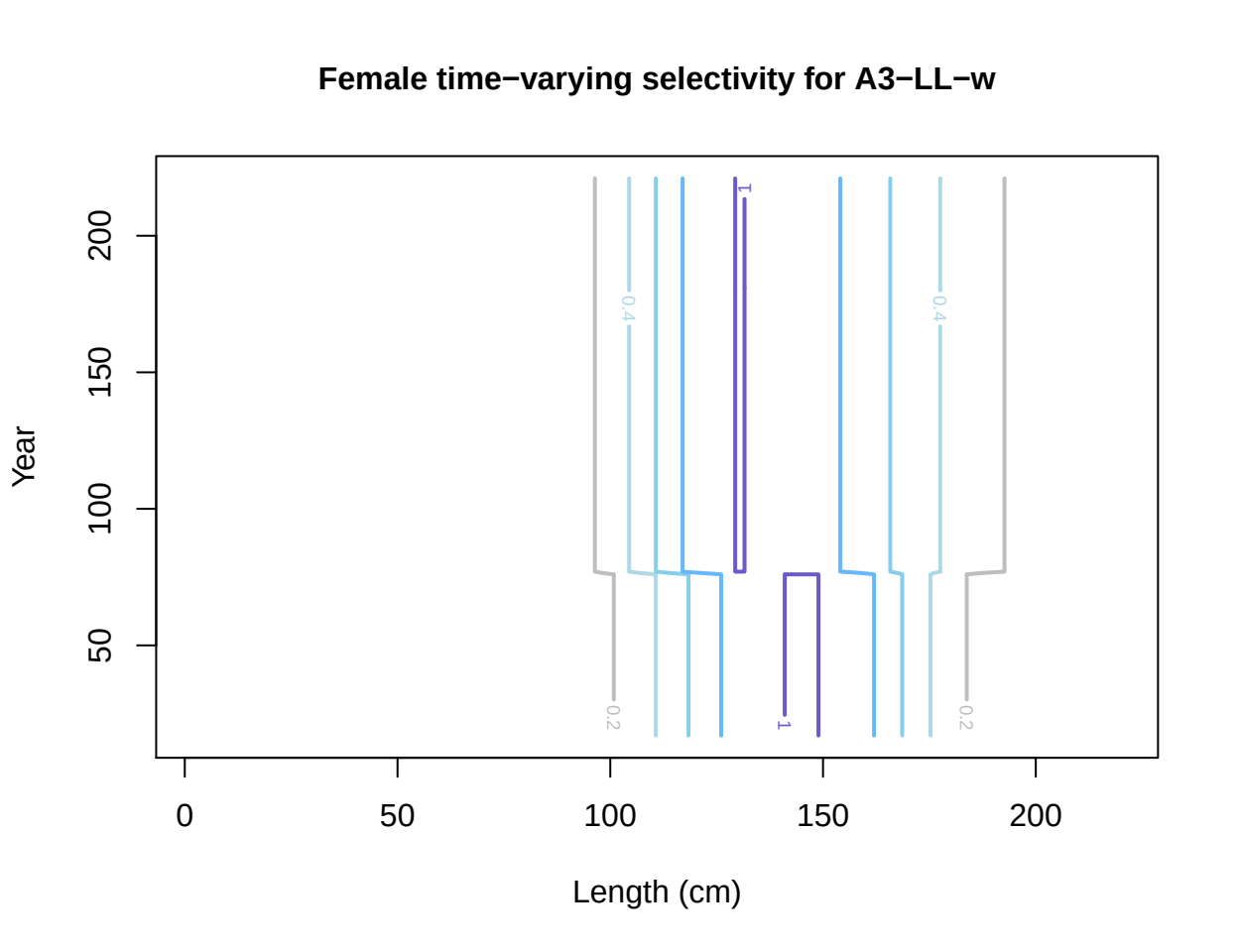

Male time−varying selectivity for A2−LL−w
Selectivity
1.0
0.8
0.6
0.4
0.2
Year
200
150
100
50
Length (cm)
50
100
150
200

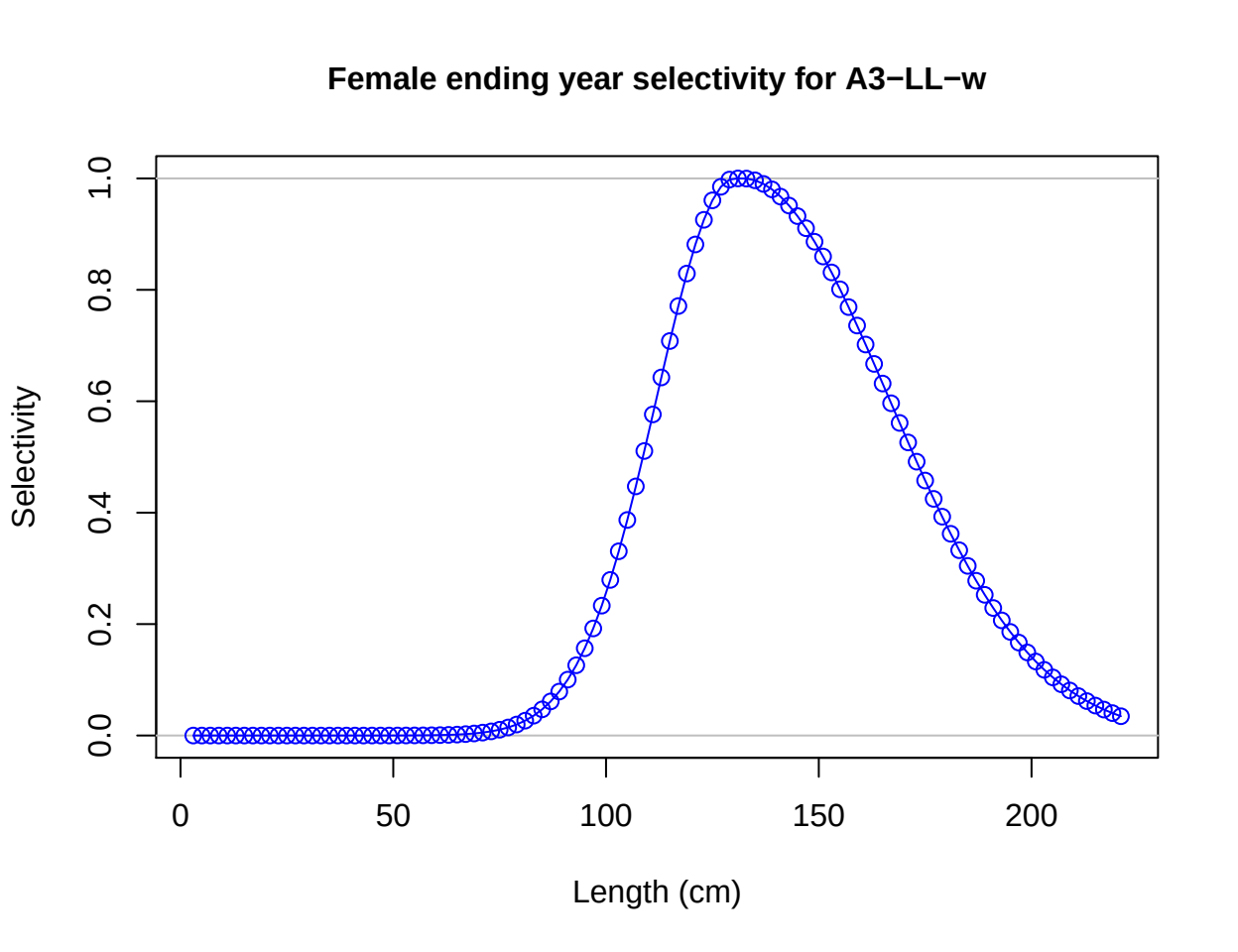

Male time−varying selectivity for A2−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.8
0.2

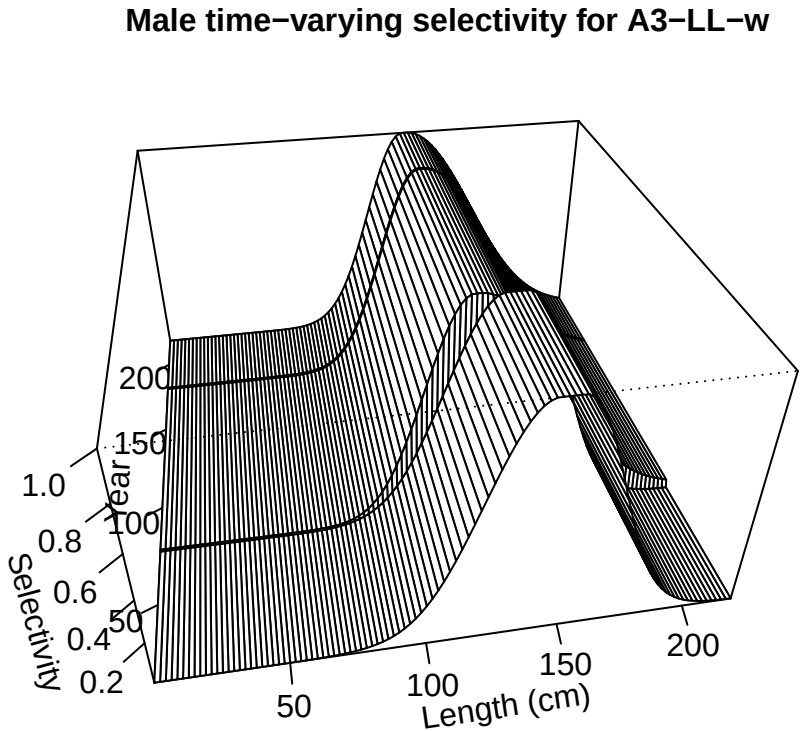

Male ending year selectivity for A2−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

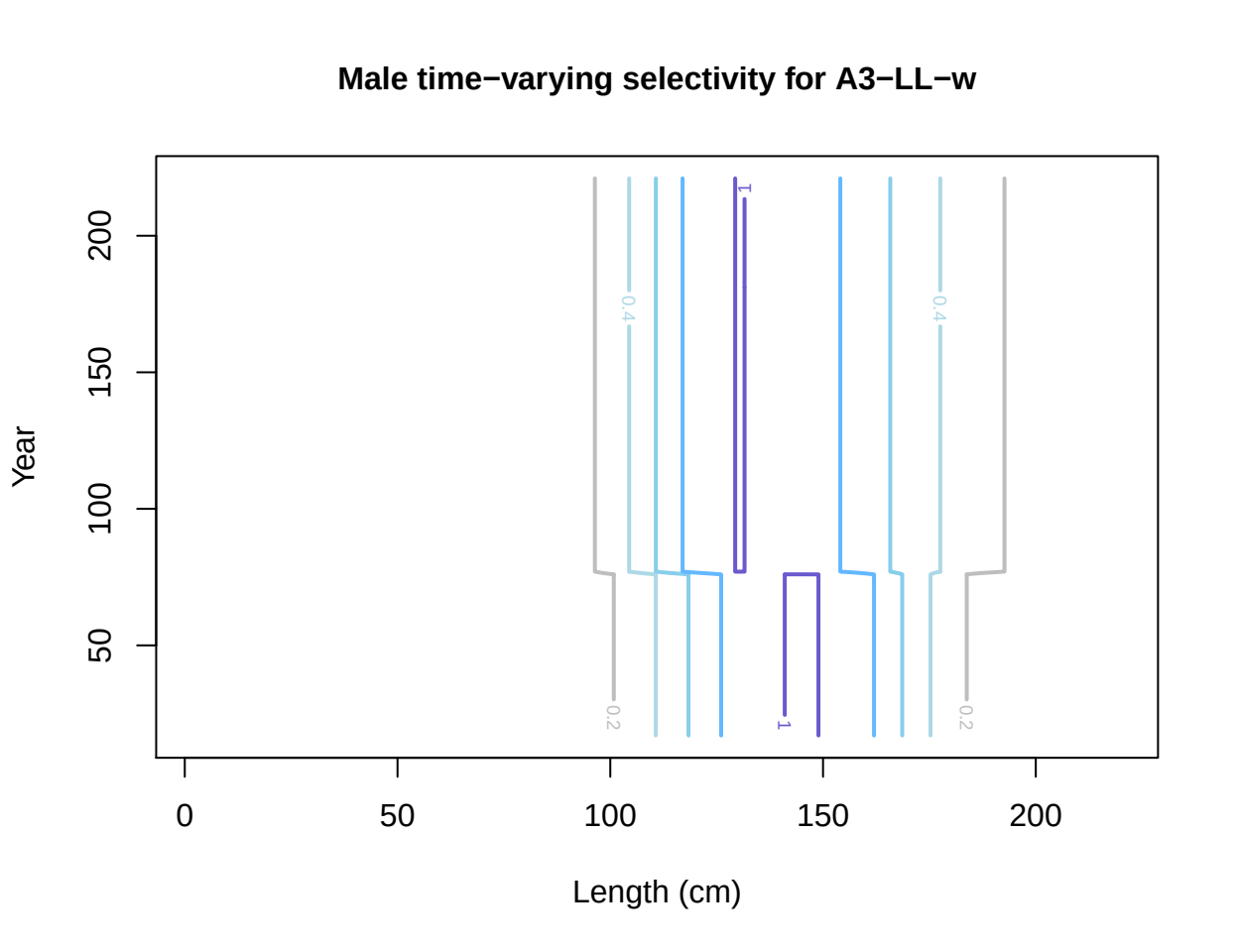
Female time−varying selectivity for A3−LL−w

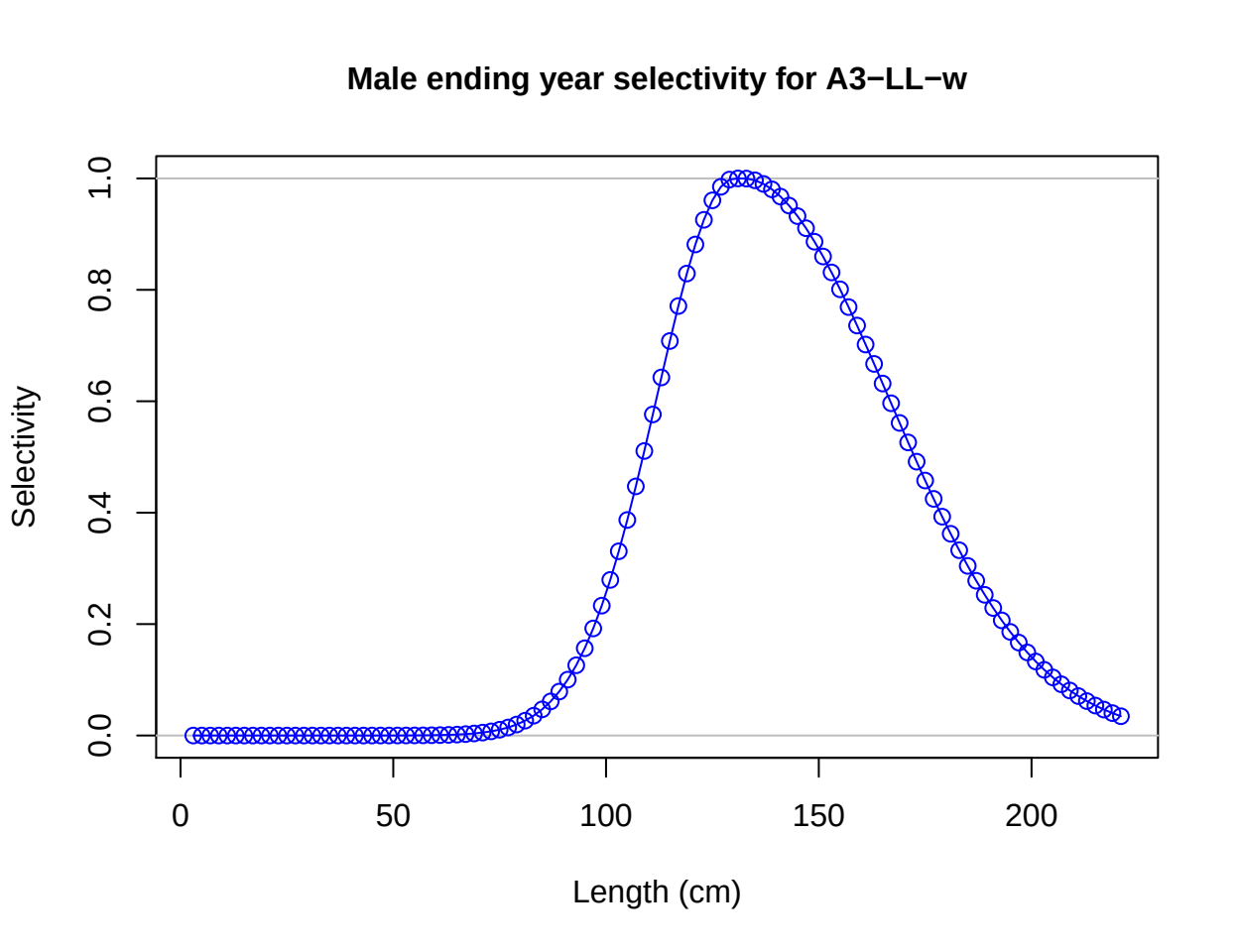



Female time−varying selectivity for A3−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
1
0.4
0.2
1
0.2

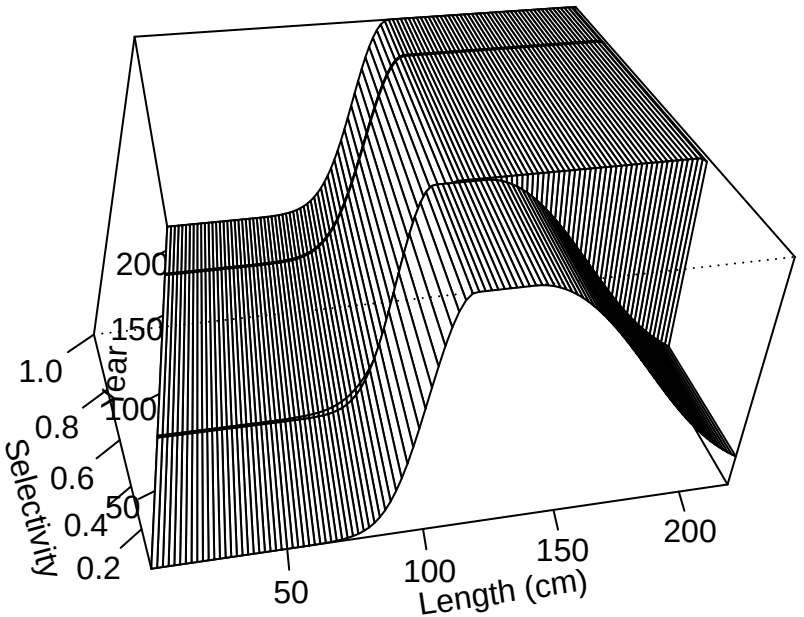

Female ending year selectivity for A3−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

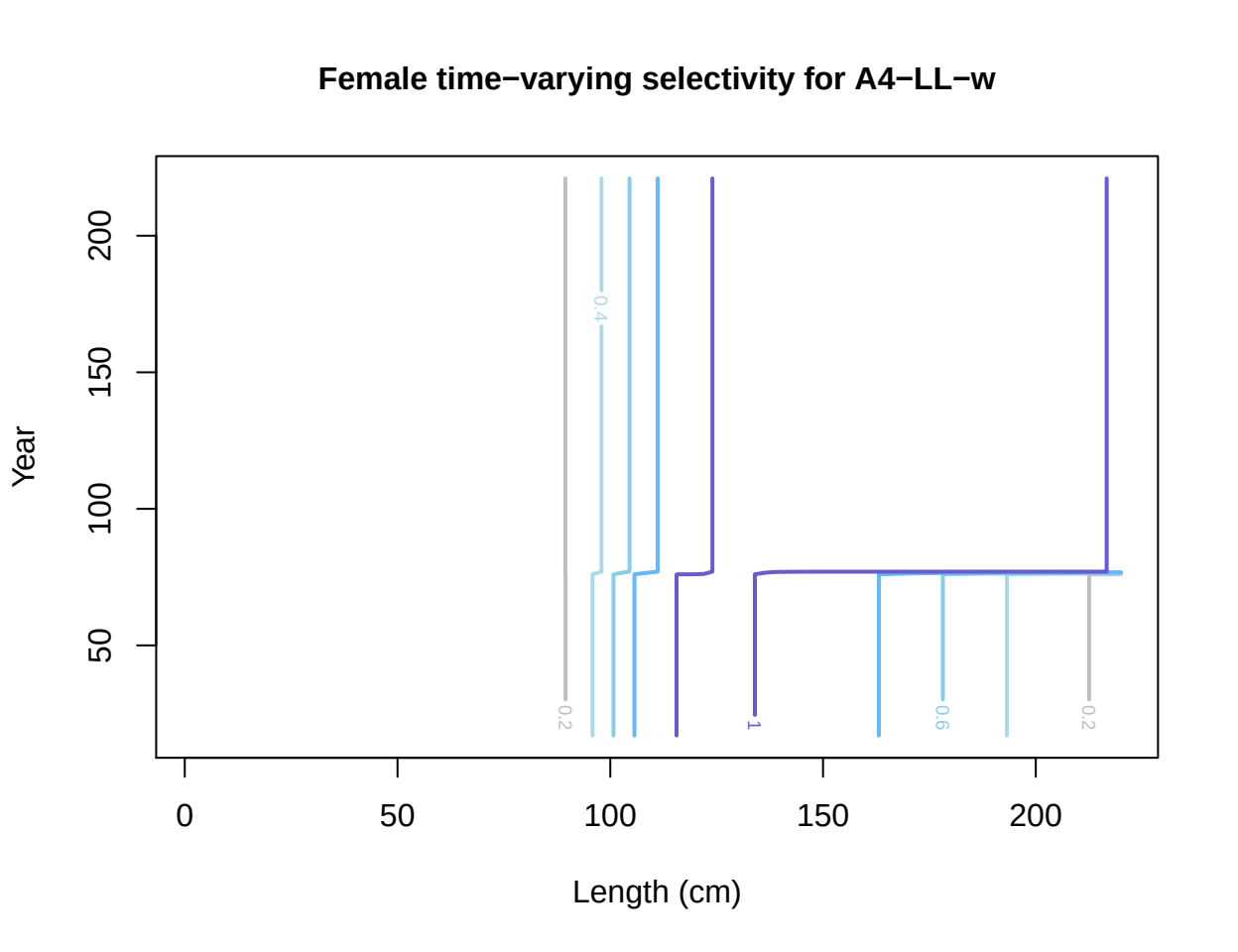

Male time−varying selectivity for A3−LL−w
Selectivity
1.0
0.8
0.6
0.4
0.2
Year
200
150
100
50
Length (cm)
50
100
150
200

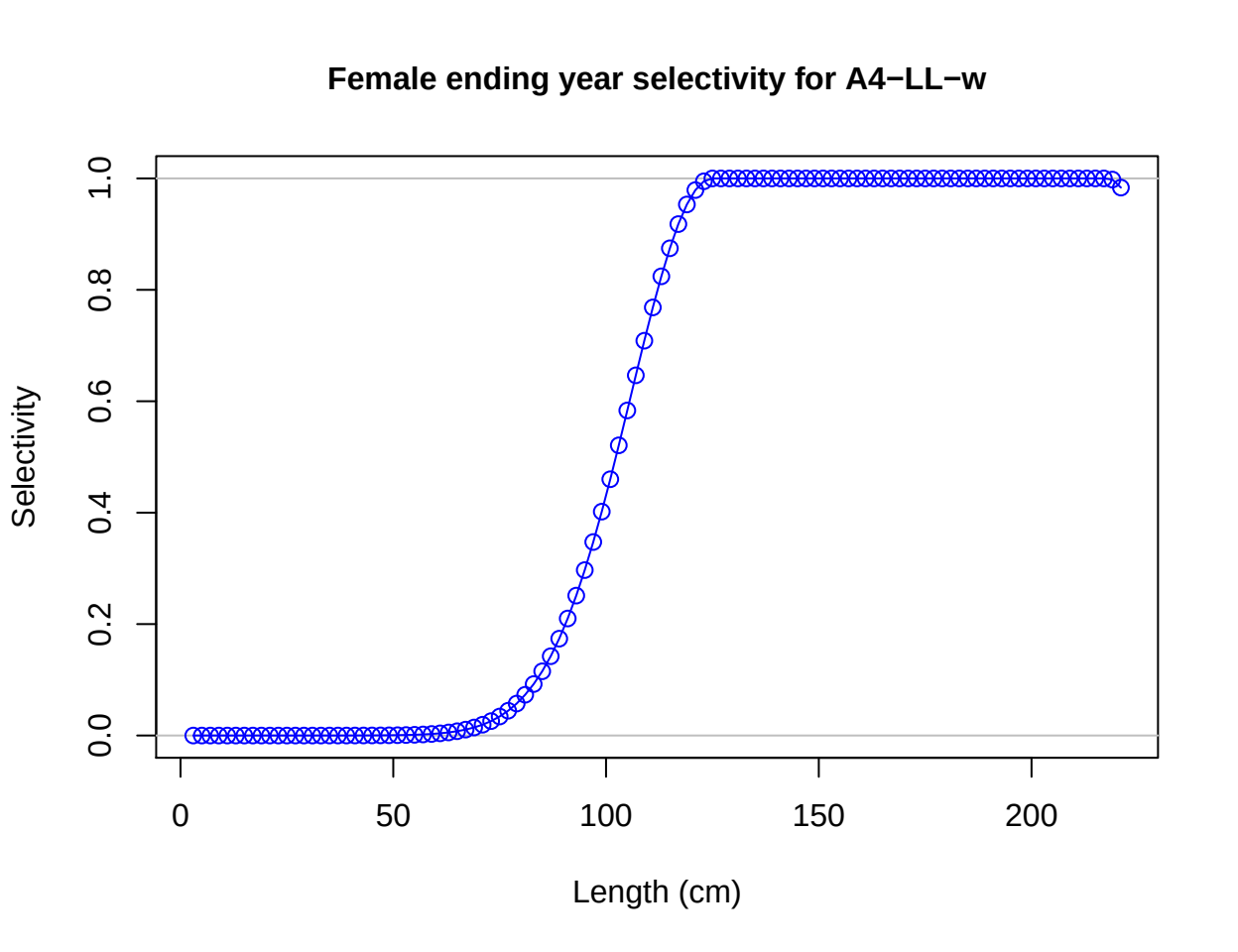

Male time−varying selectivity for A3−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
1
0.2
1
0.4
0.2


Male ending year selectivity for A3−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

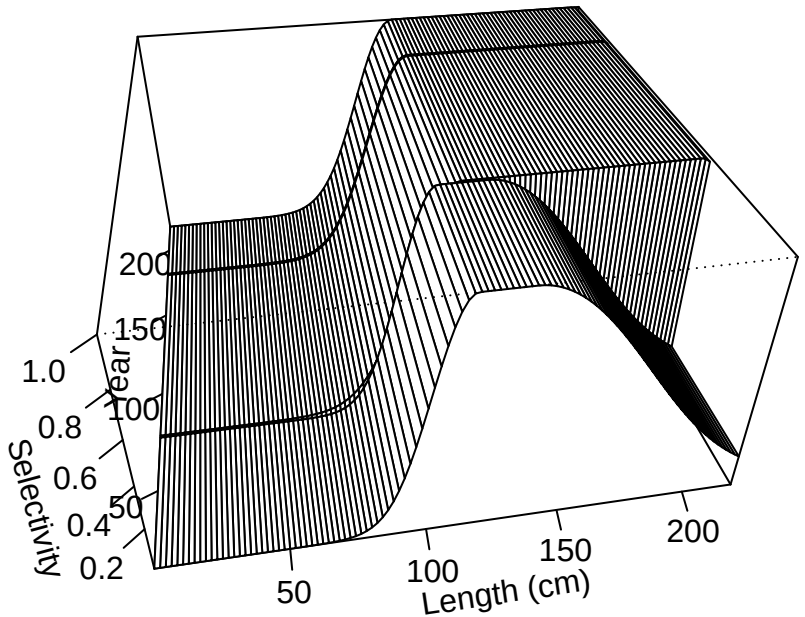
Female time−varying selectivity for A4−LL−w

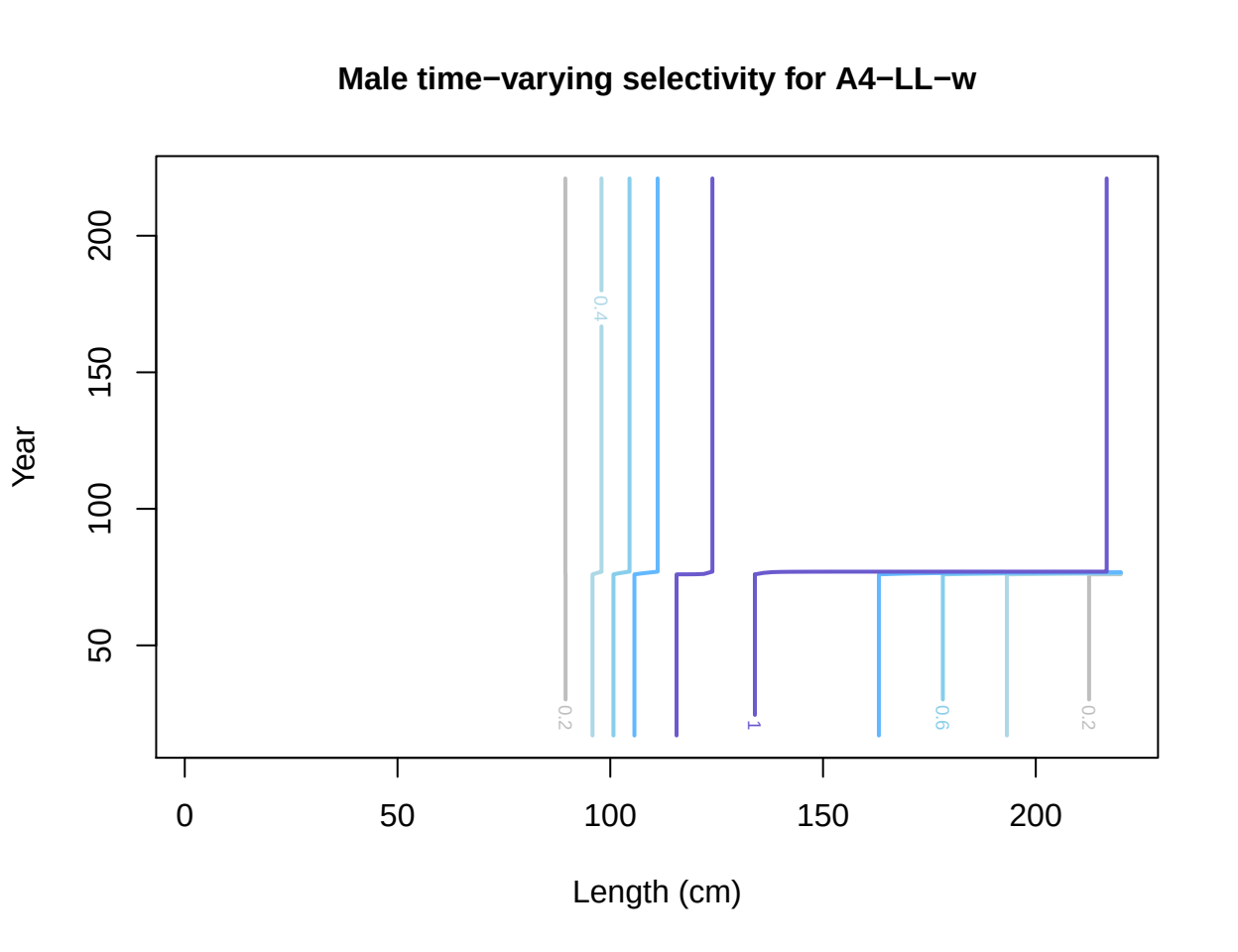


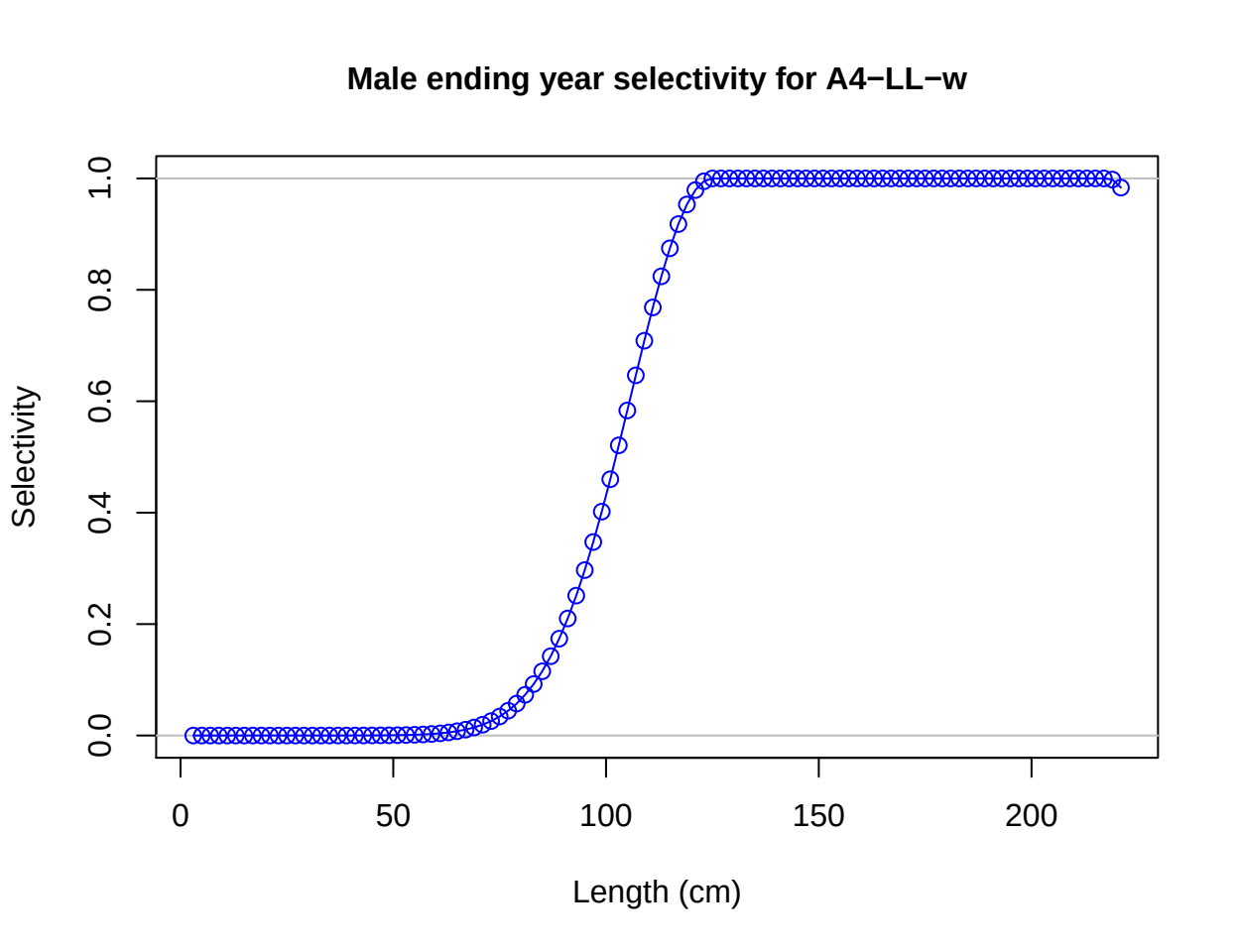

Female time−varying selectivity for A4−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.6
0.2


Female ending year selectivity for A4−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

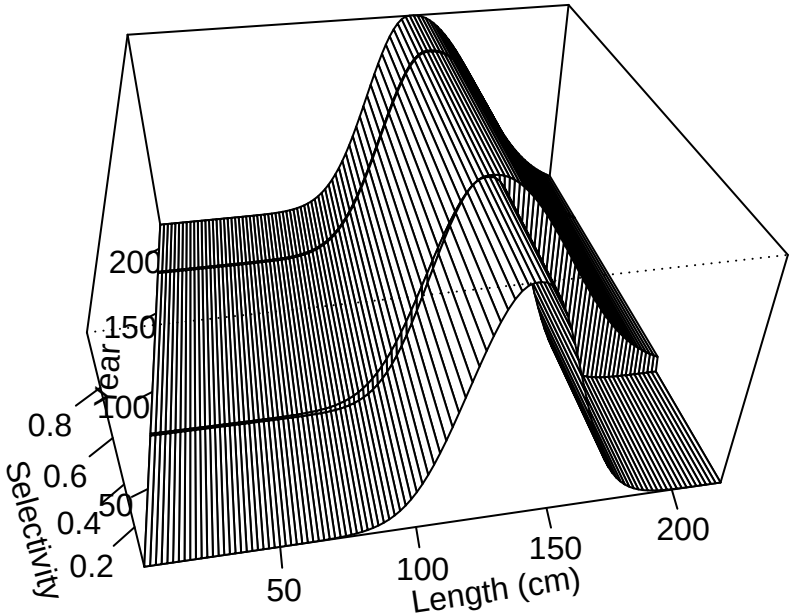
Male time−varying selectivity for A4−LL−w

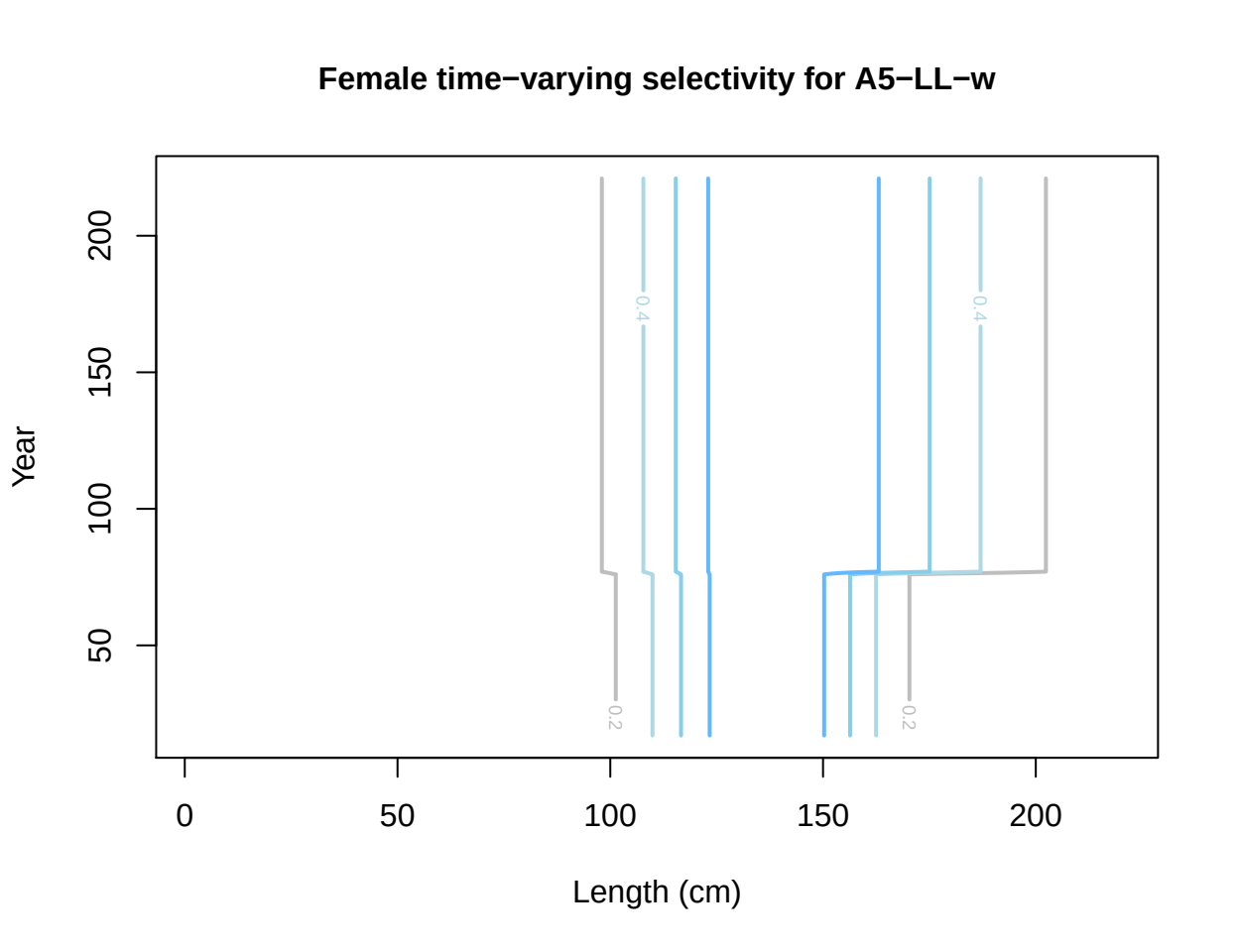


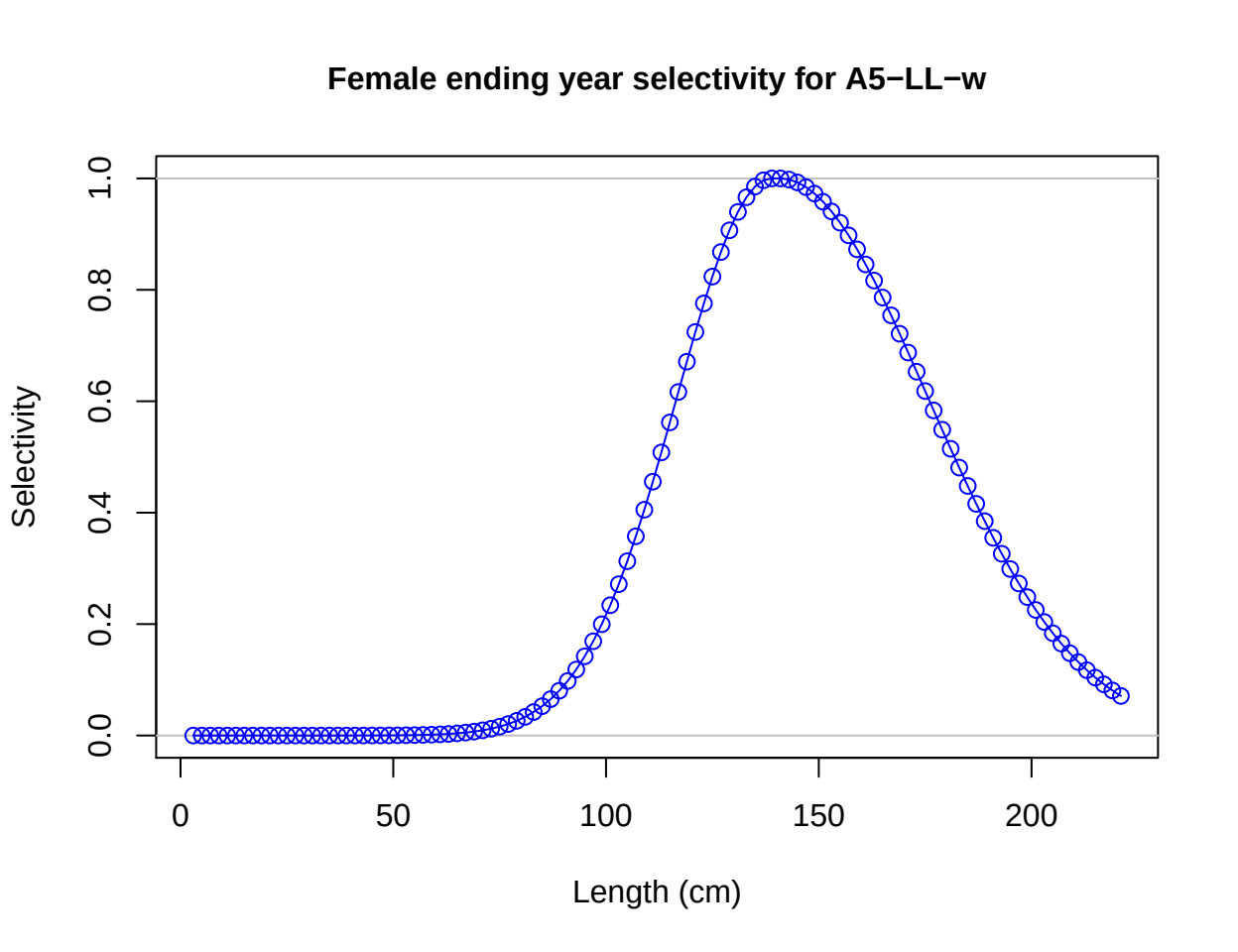

Male time−varying selectivity for A4−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.6
0.2

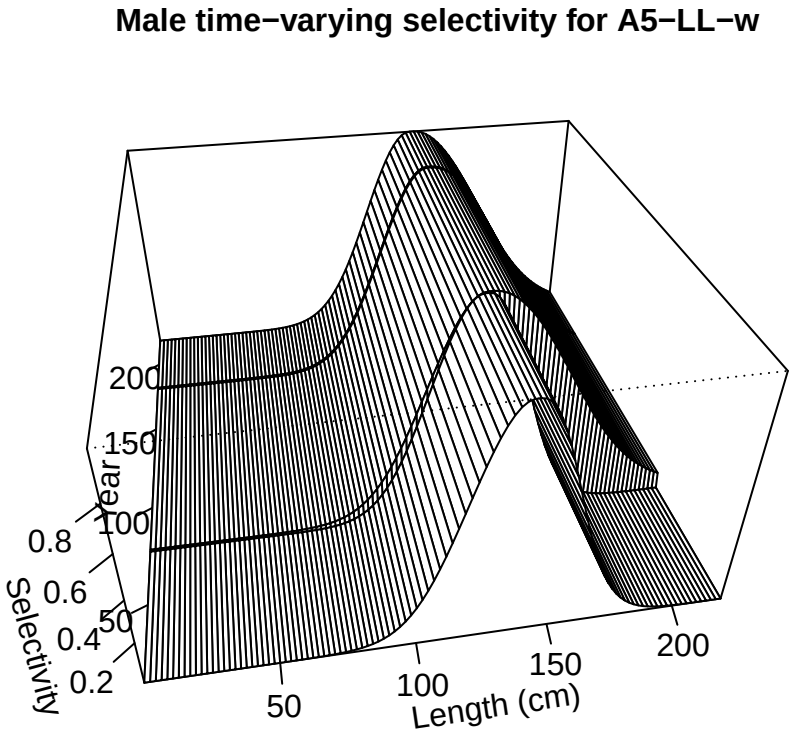

Male ending year selectivity for A4−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

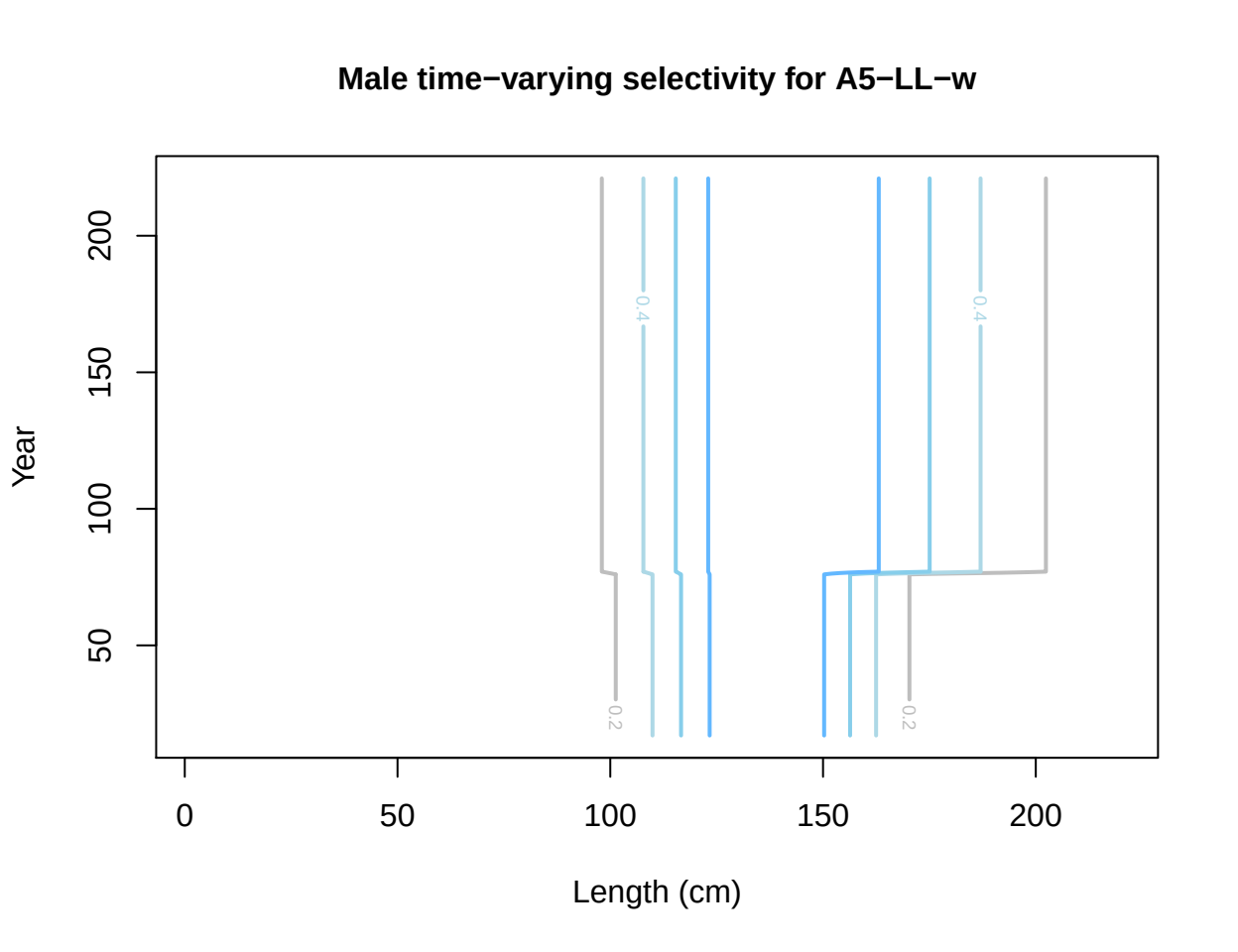
Female time−varying selectivity for A5−LL−w

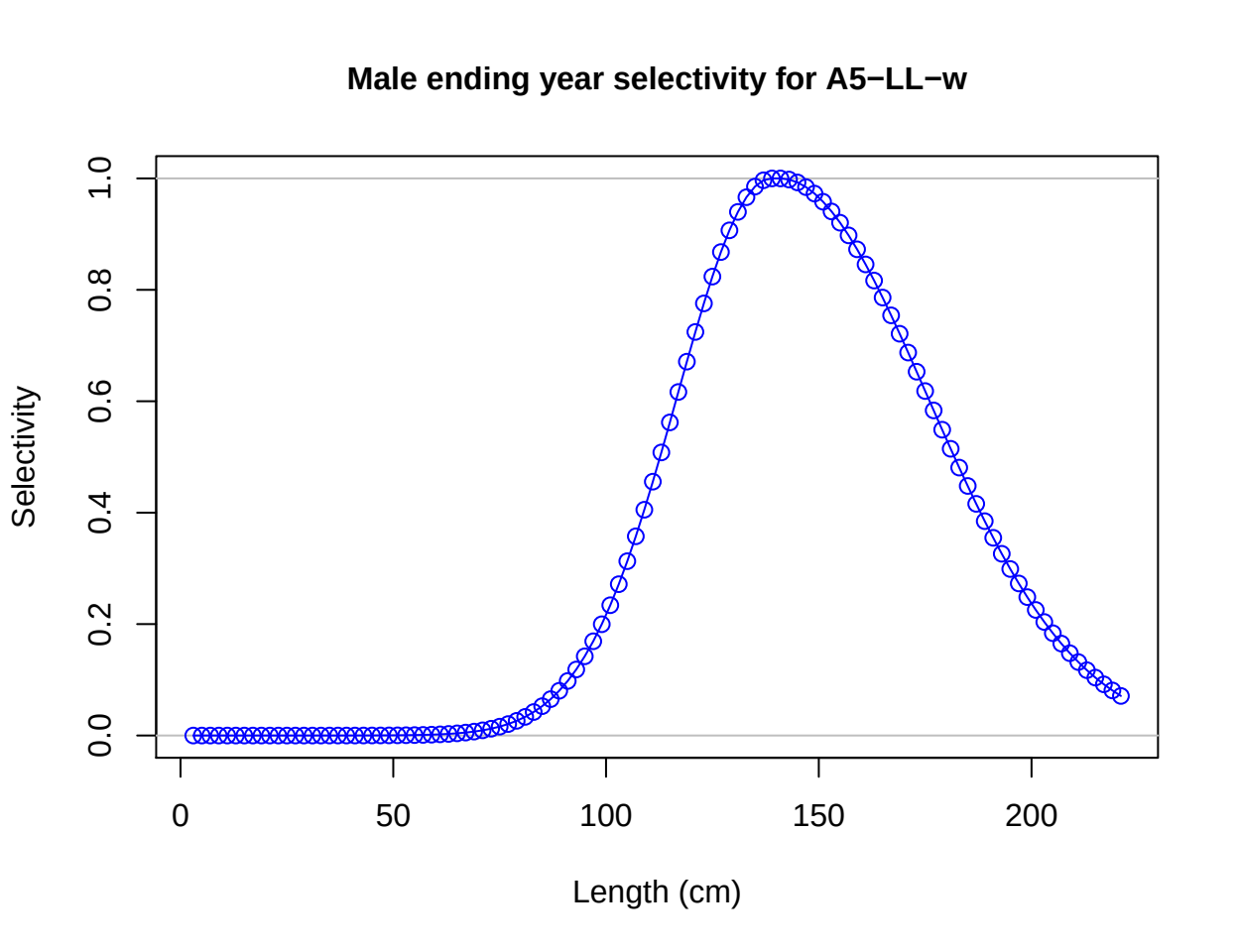



Female time−varying selectivity for A5−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
0.2
0.4
0.2

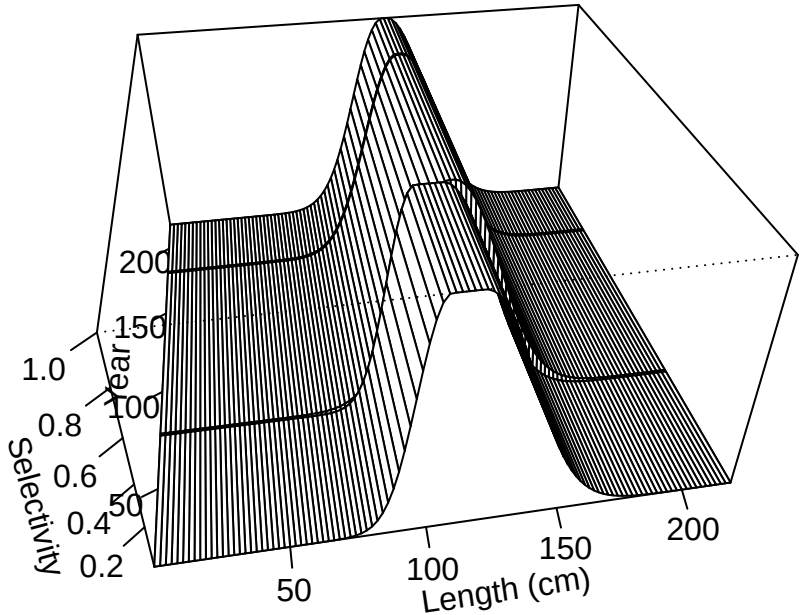

Female ending year selectivity for A5−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

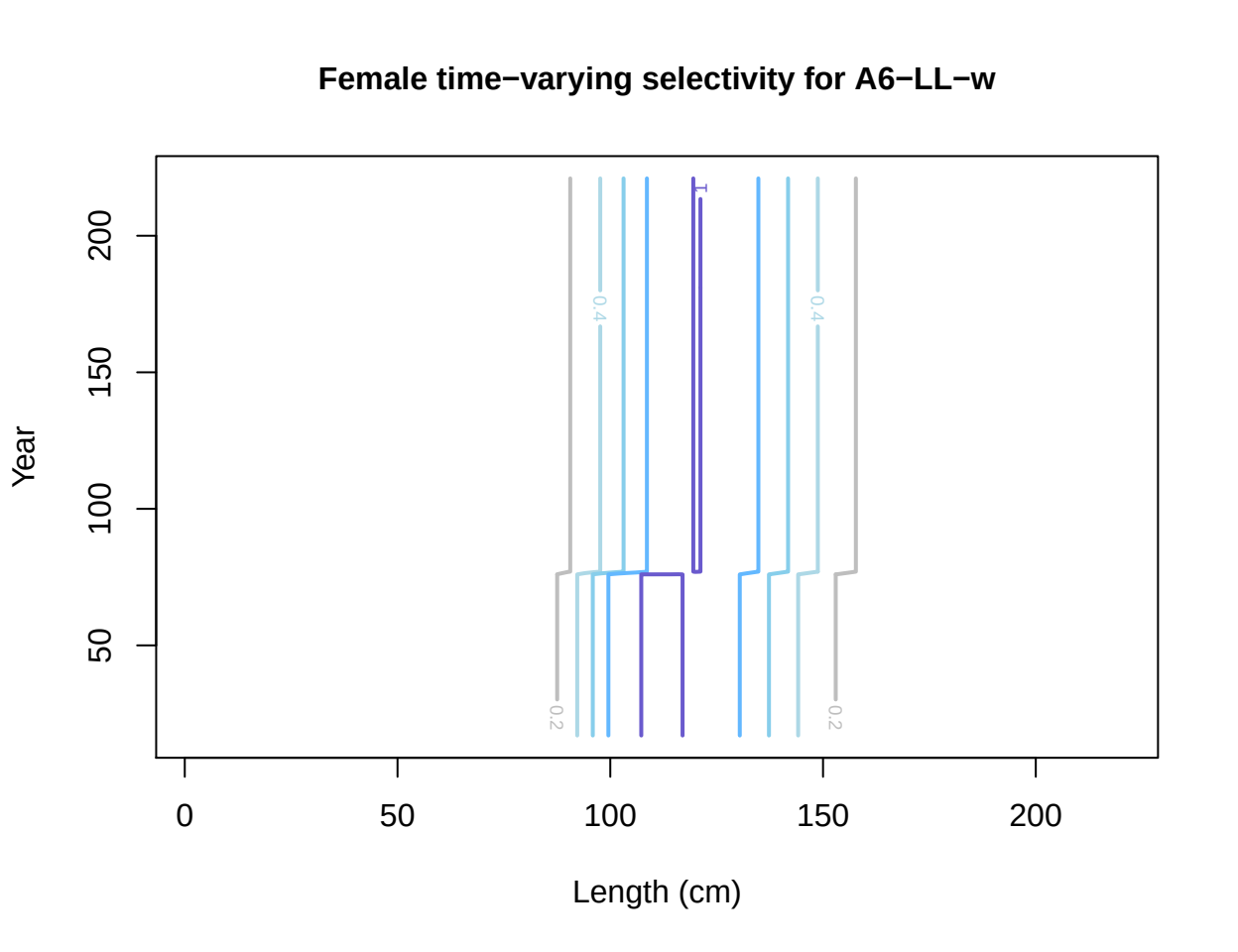

Male time−varying selectivity for A5−LL−w
Selectivity
0.2
0.4
0.6
0.8
Year
50
100
150
200
Length (cm)
50
100
150
200

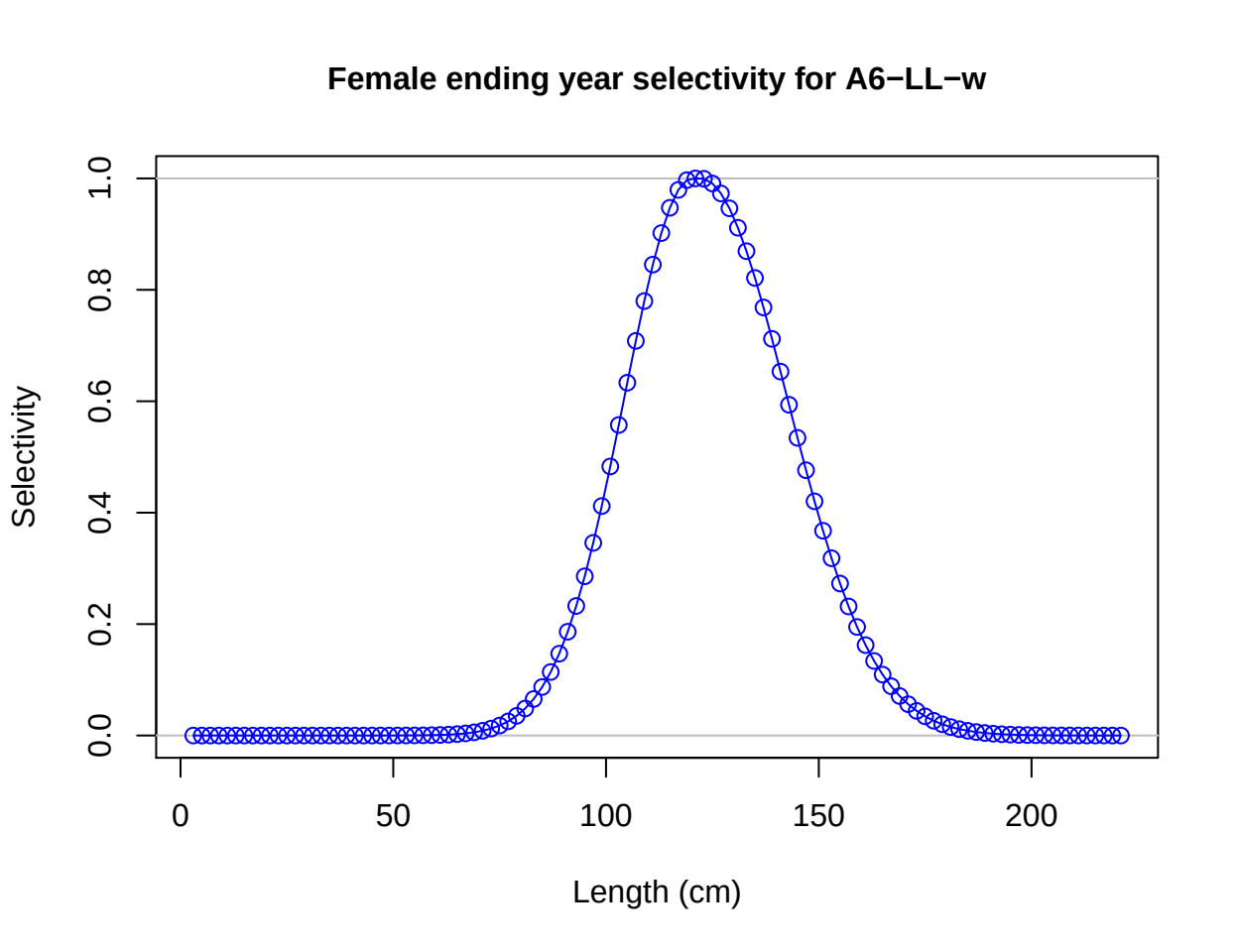

Male time−varying selectivity for A5−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.4
0.2
0.4
0.2


Male ending year selectivity for A5−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

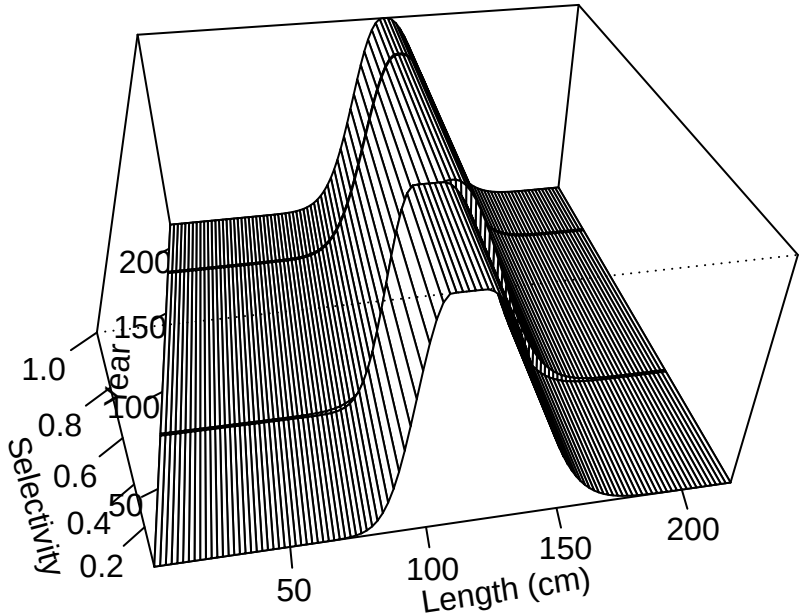
Female time−varying selectivity for A6−LL−w

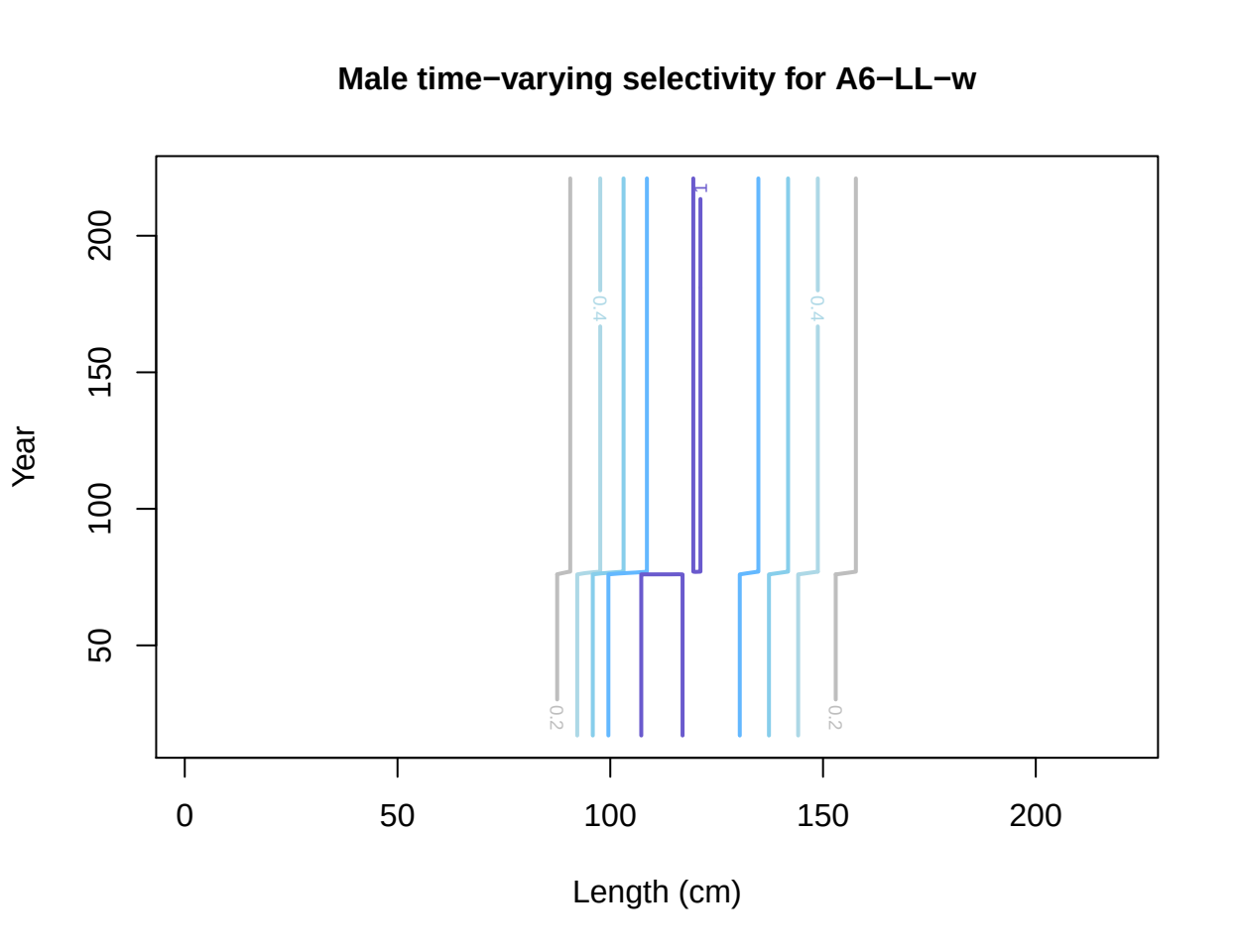


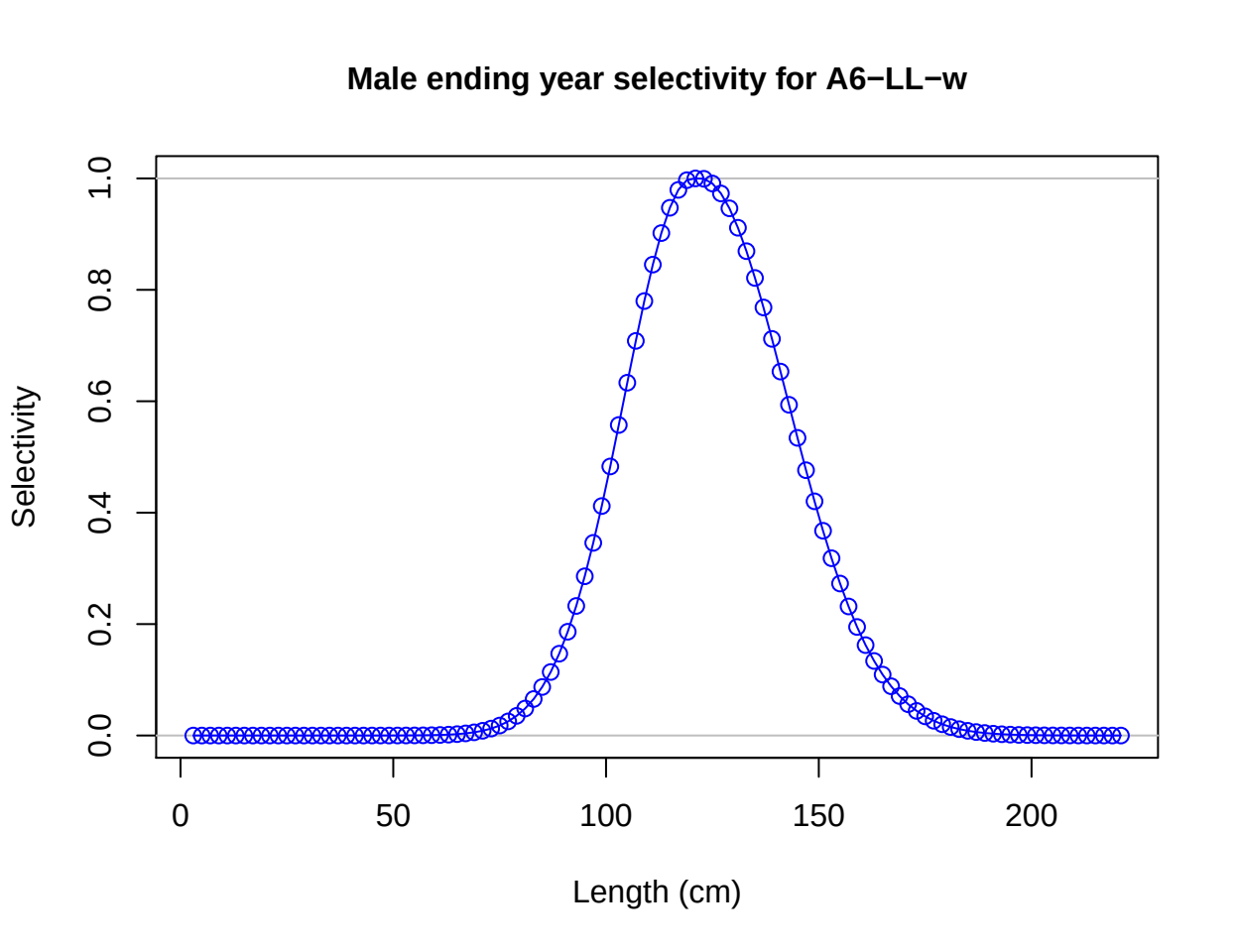

Female time−varying selectivity for A6−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
1
0.4
0.4
0.2
0.2

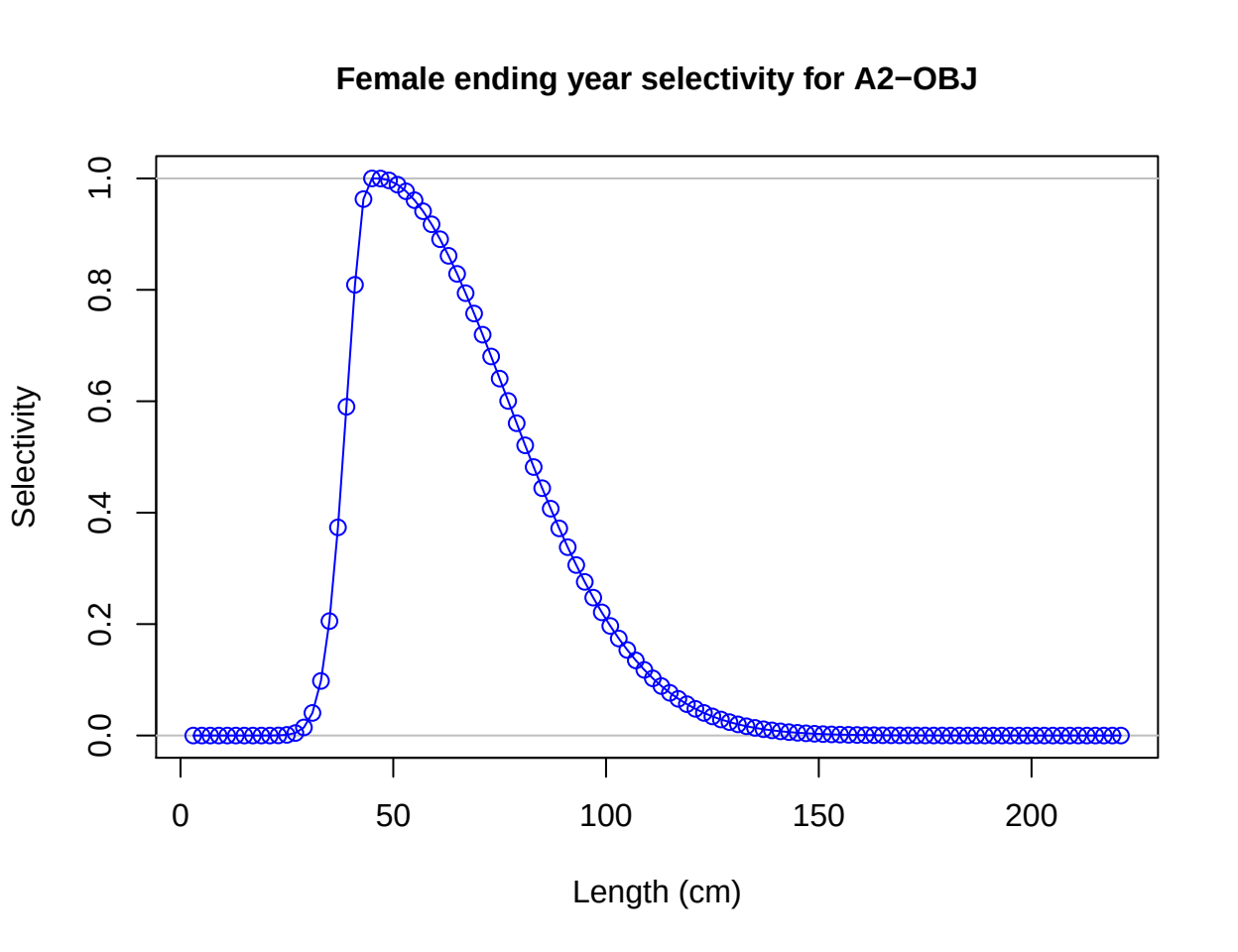

Female ending year selectivity for A6−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

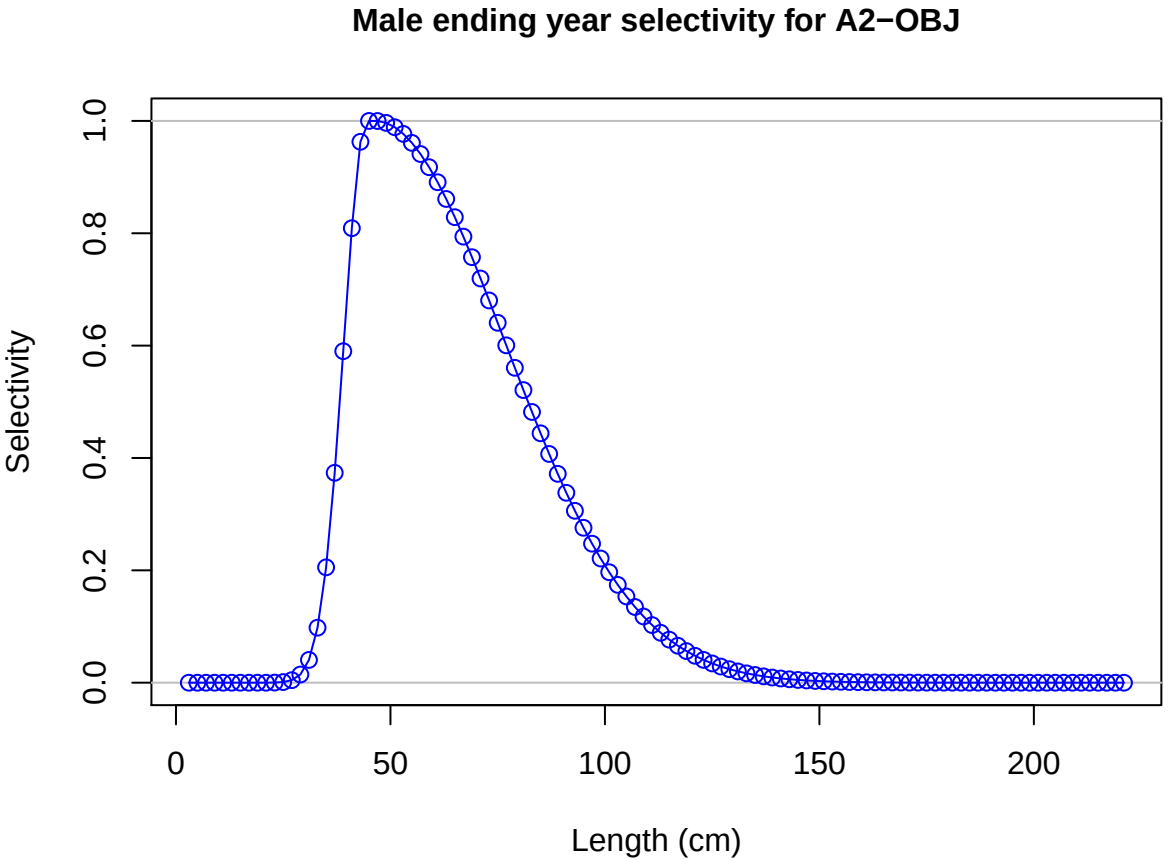
Male time−varying selectivity for A6−LL−w

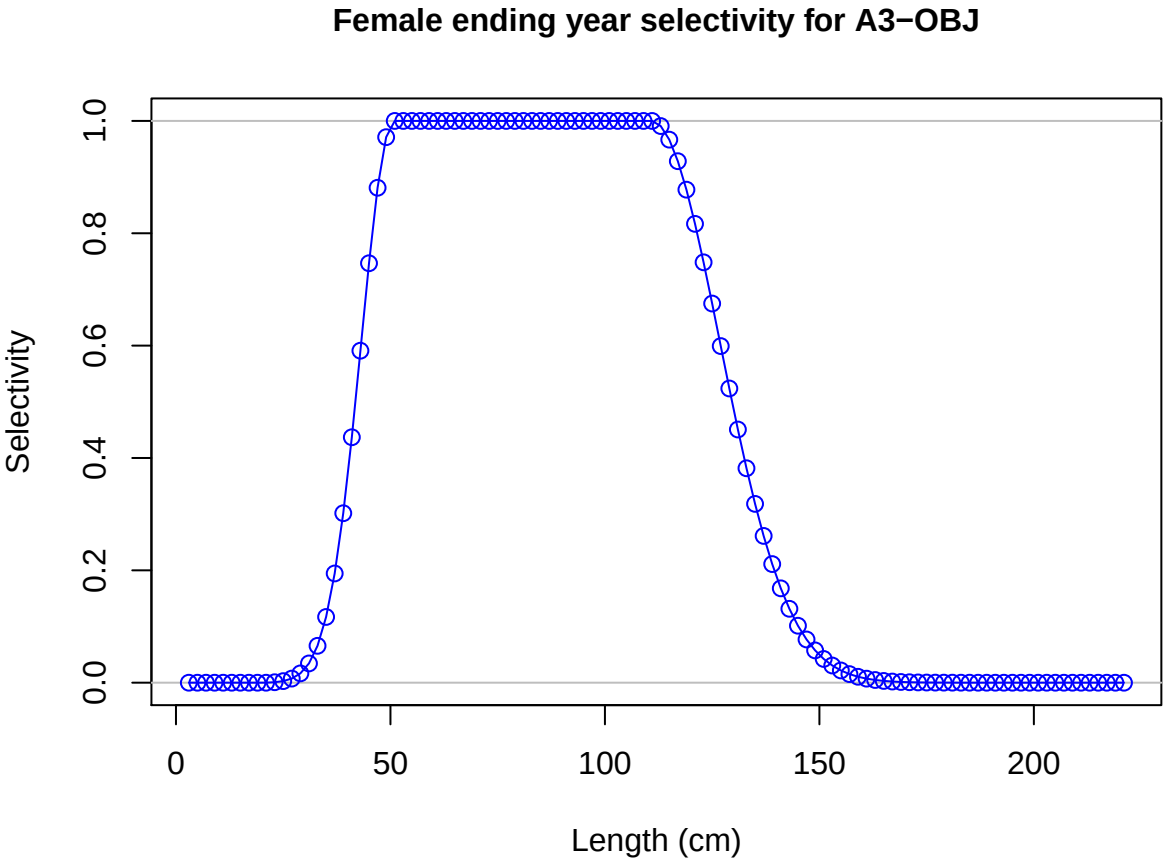


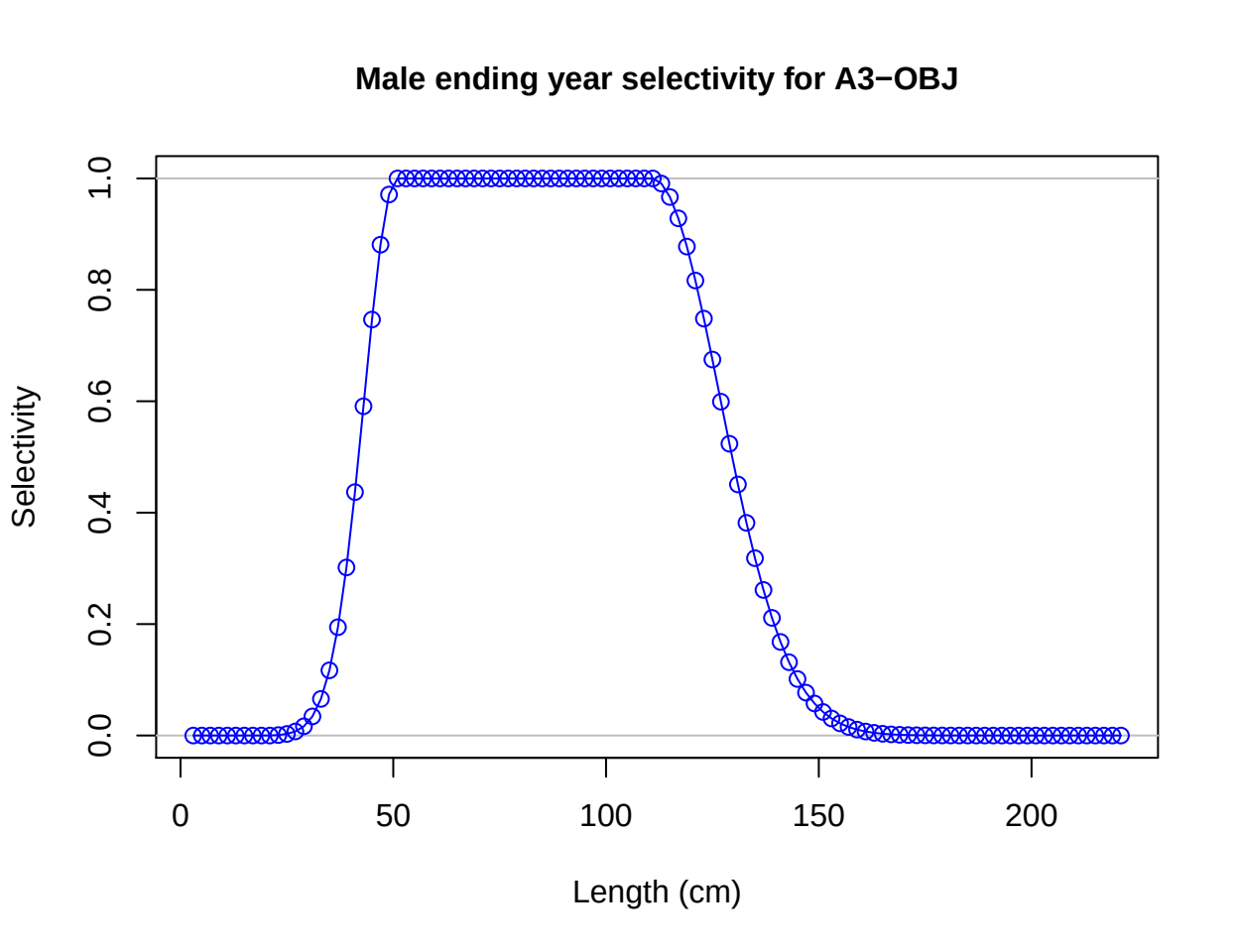

Male time−varying selectivity for A6−LL−w
Year
50
100
150
200
0
50
100
150
200
Length (cm)
0.2
0.4
1
0.4
0.2

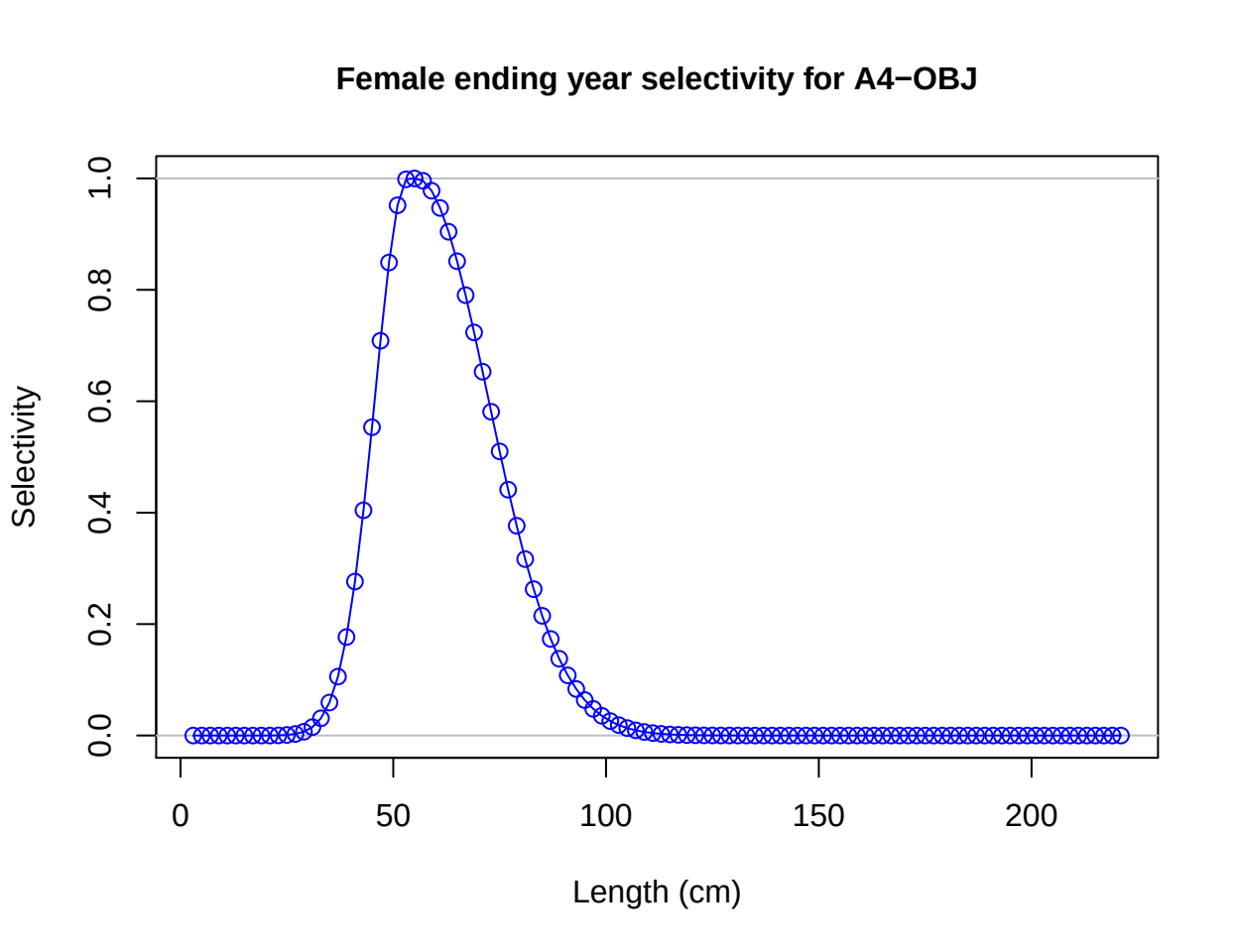

Male ending year selectivity for A6−LL−w
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

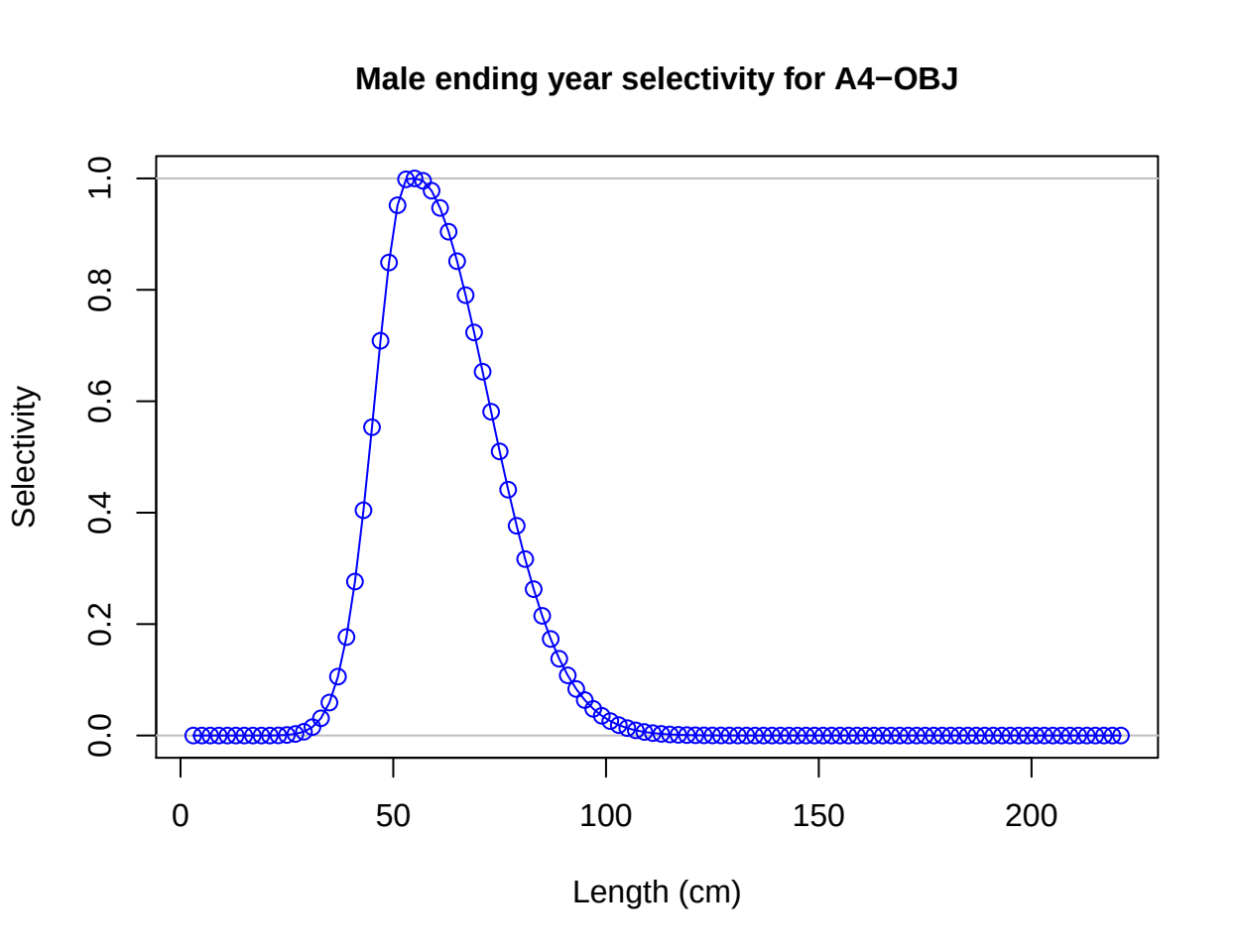

Female ending year selectivity for A2−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

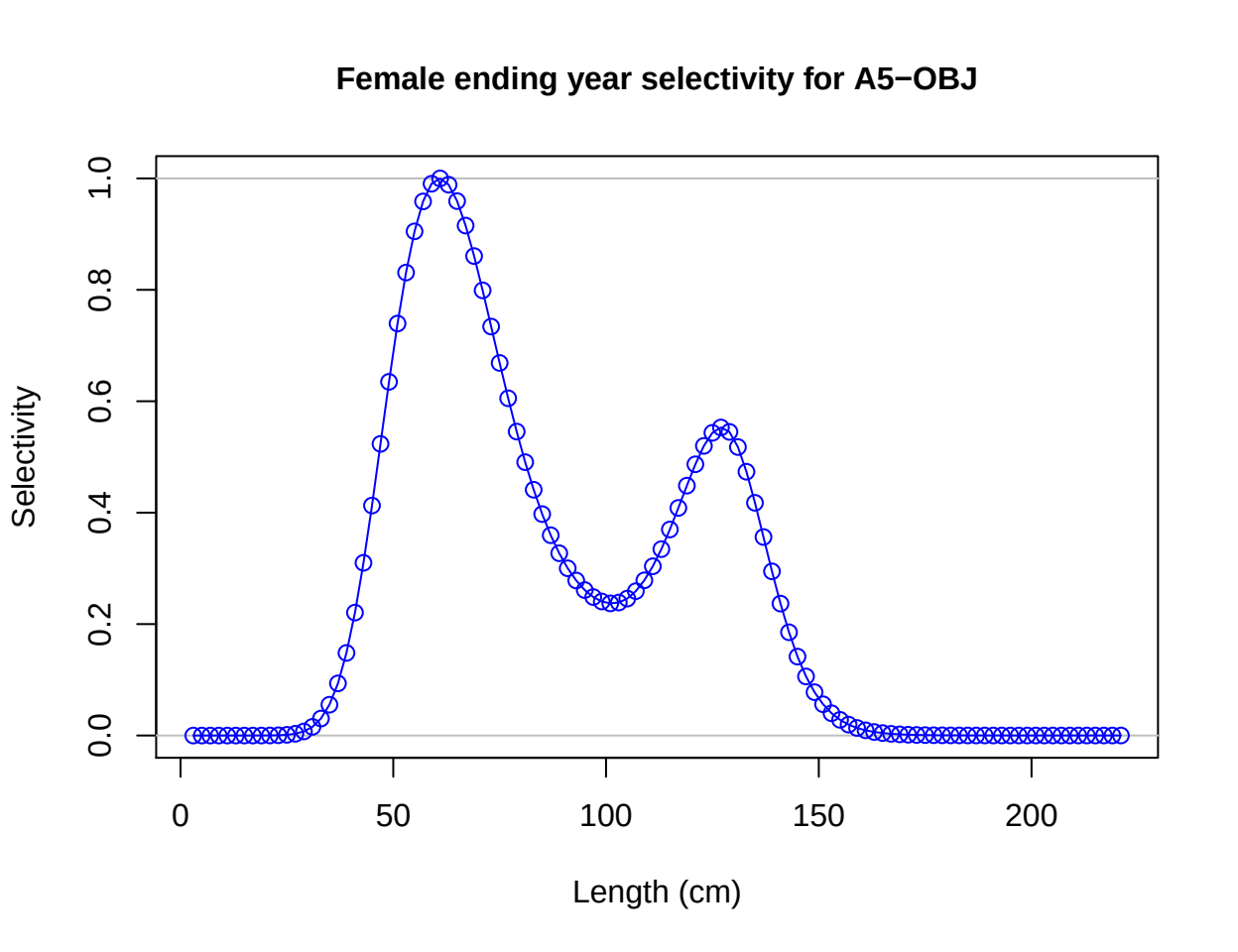

Male ending year selectivity for A2−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

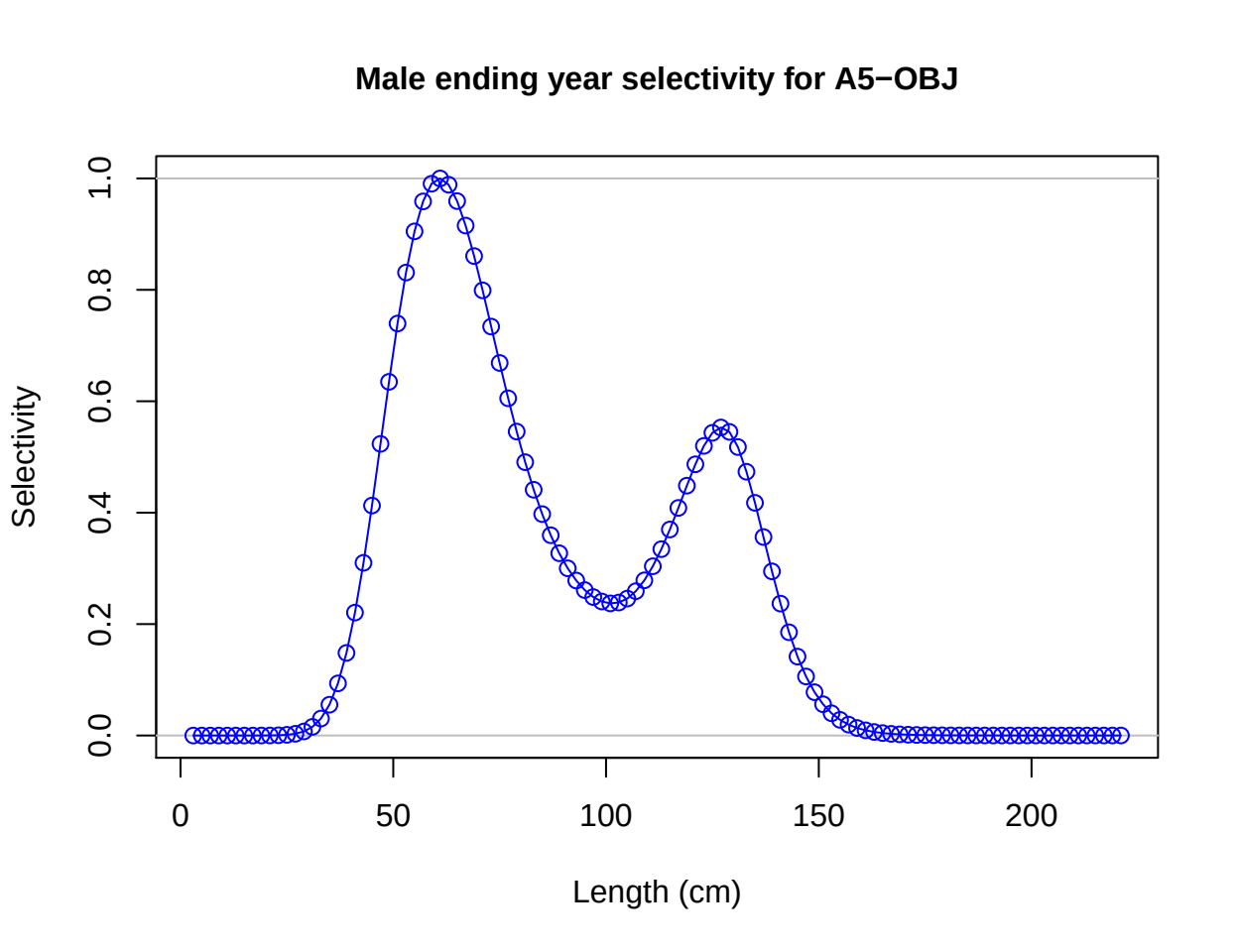

Female ending year selectivity for A3−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

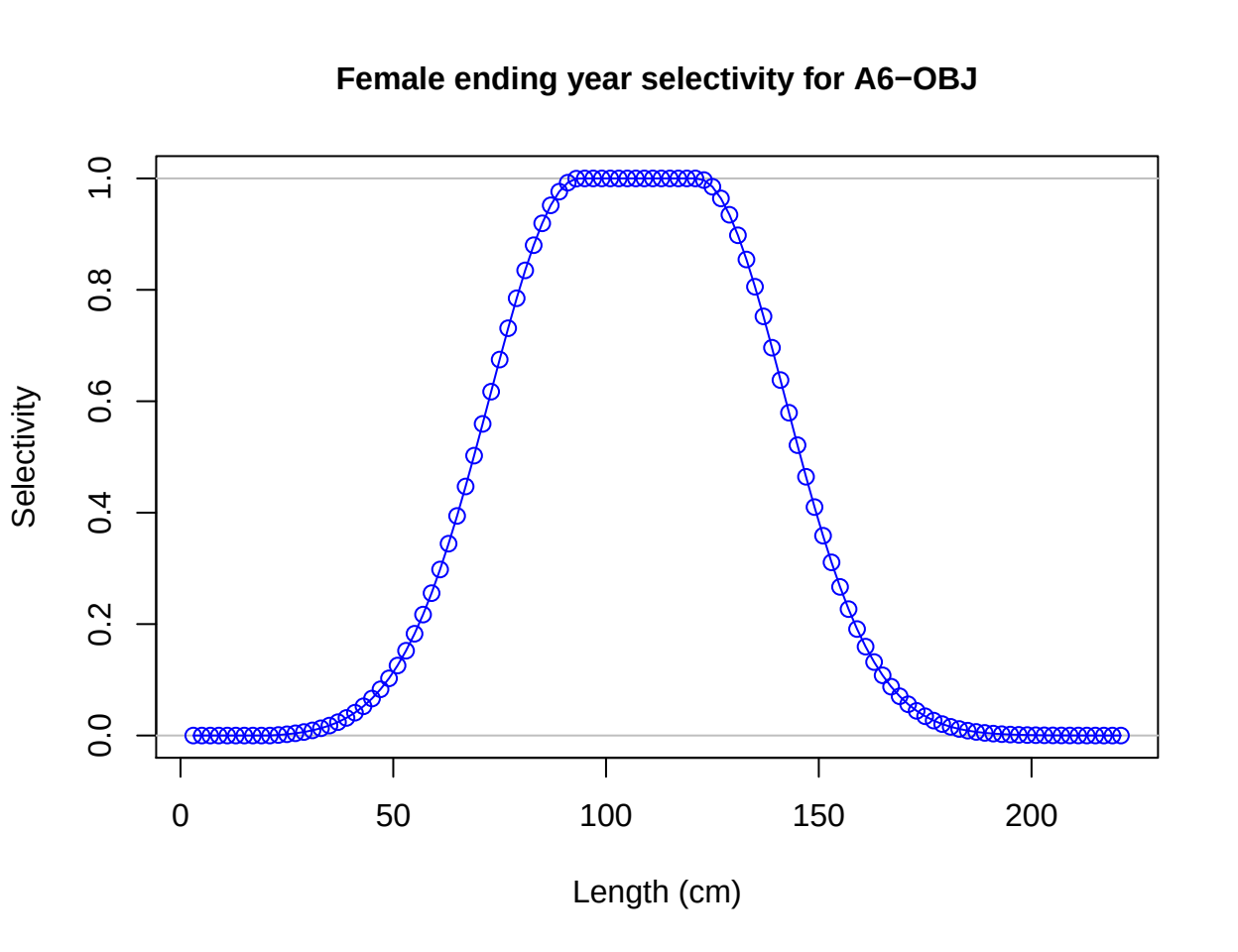

Male ending year selectivity for A3−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

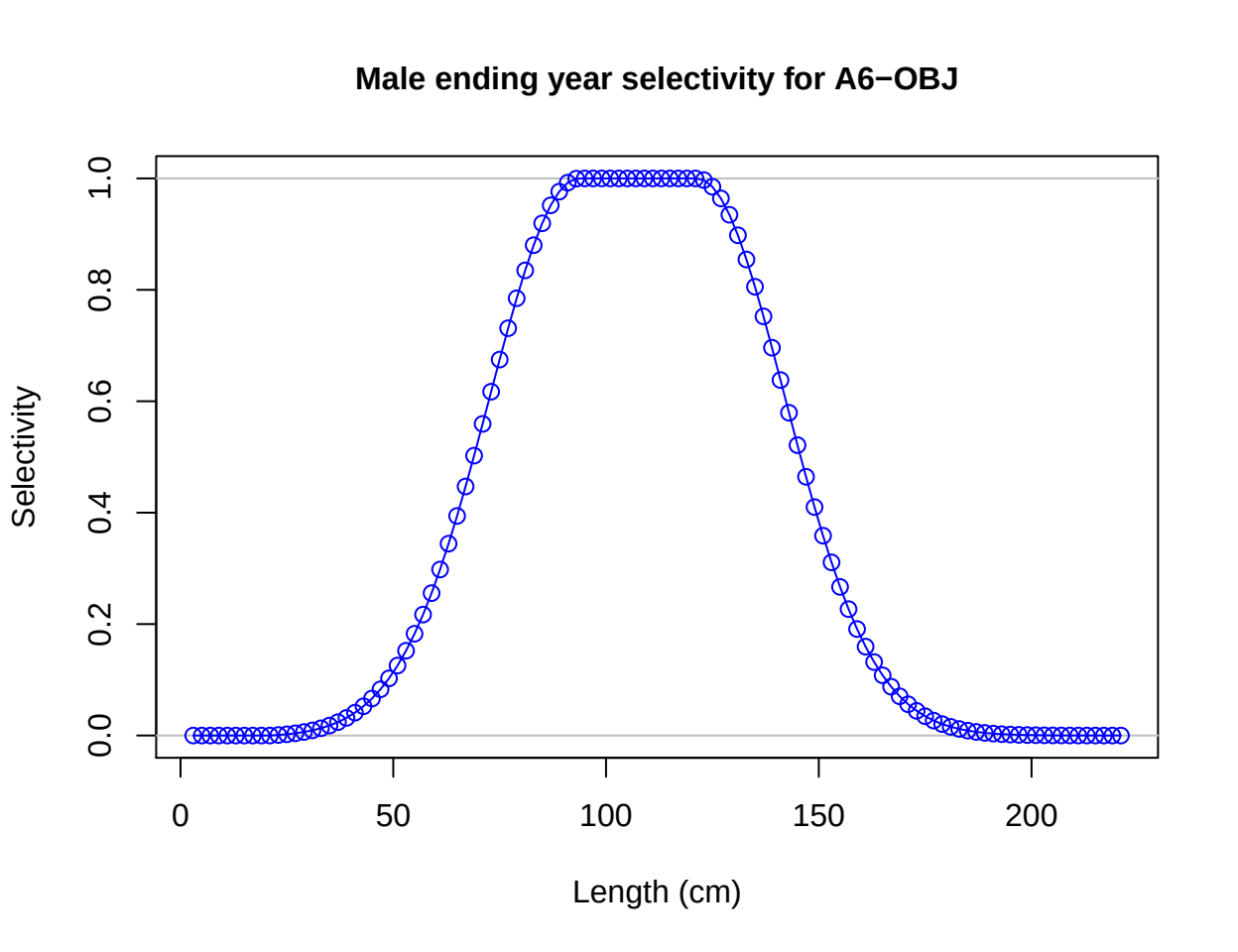

Female ending year selectivity for A4−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

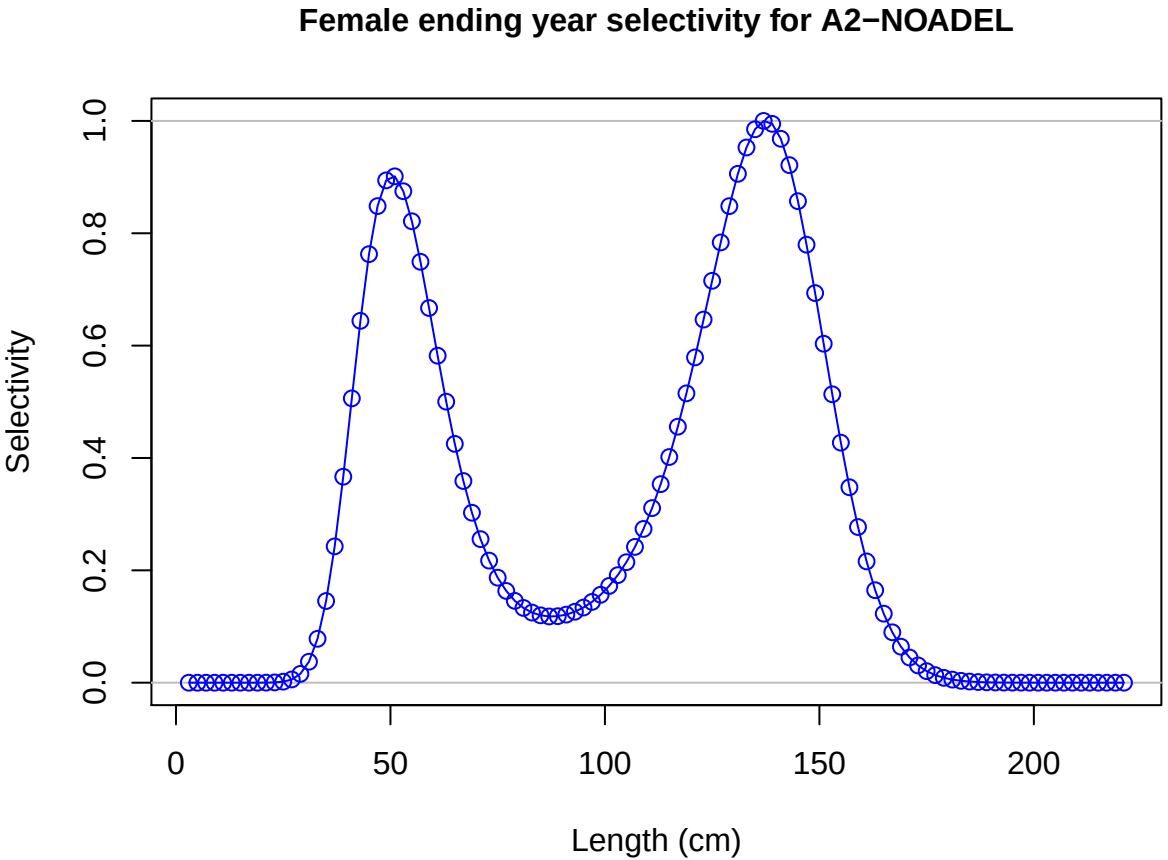

Male ending year selectivity for A4−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

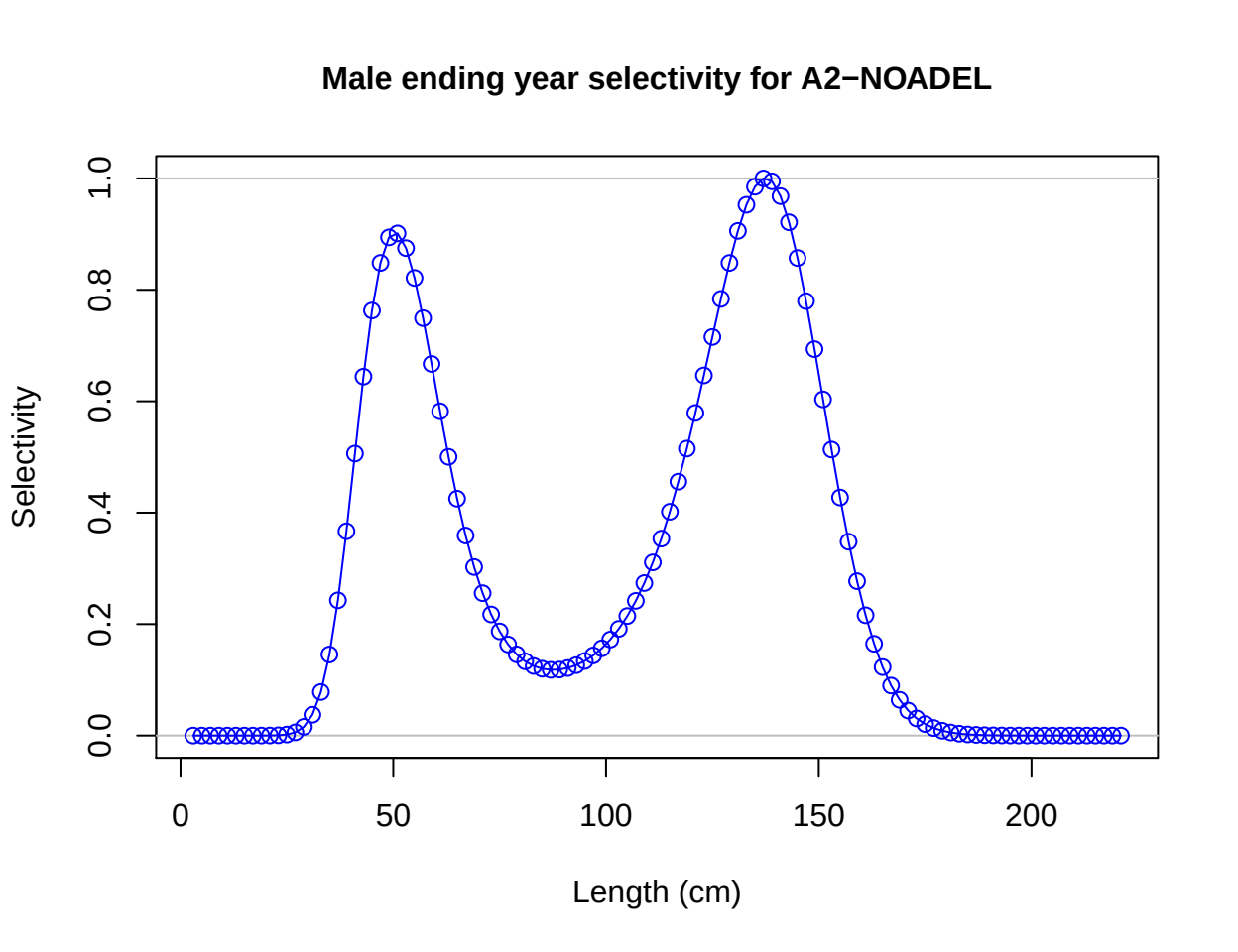

Female ending year selectivity for A5−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

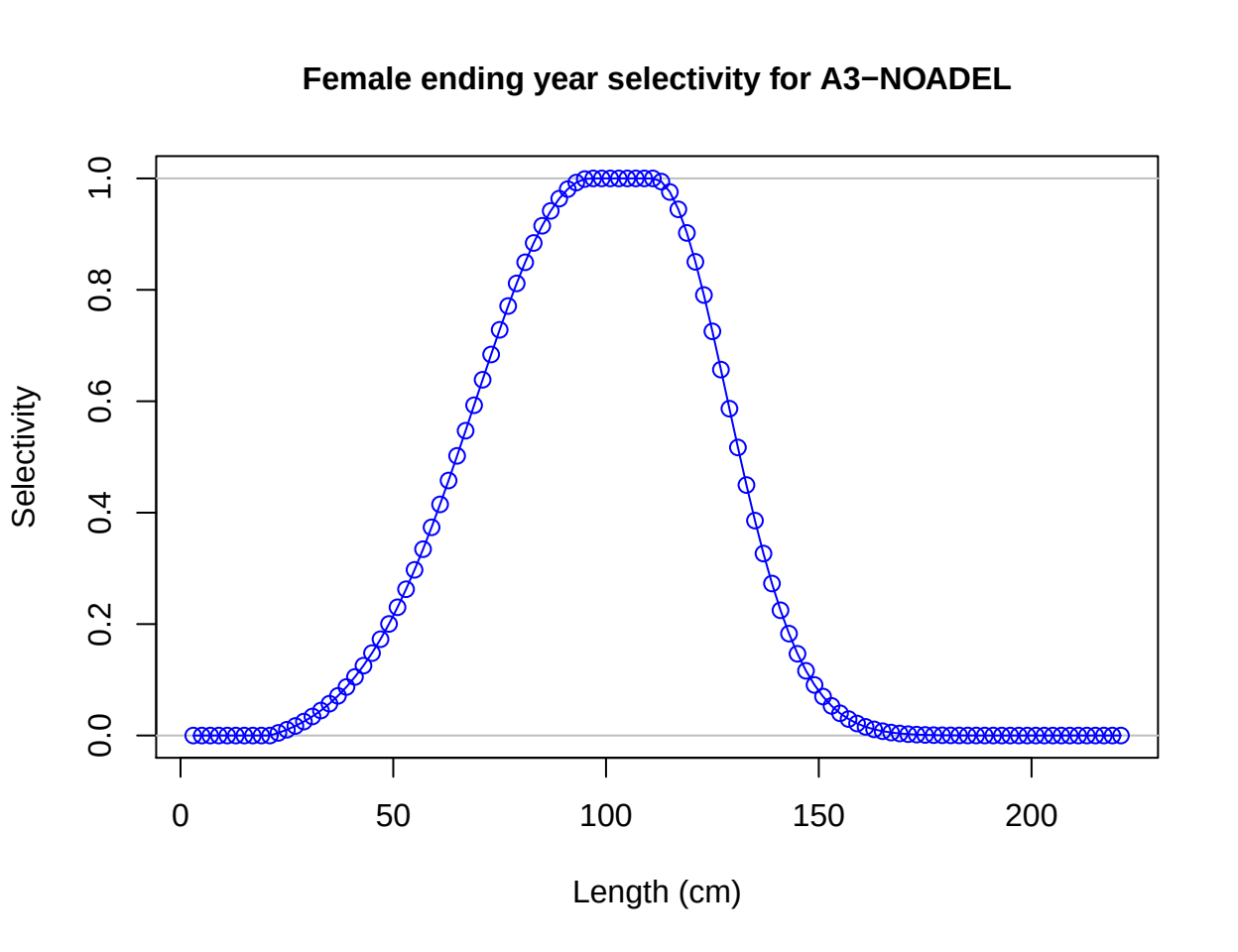

Male ending year selectivity for A5−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

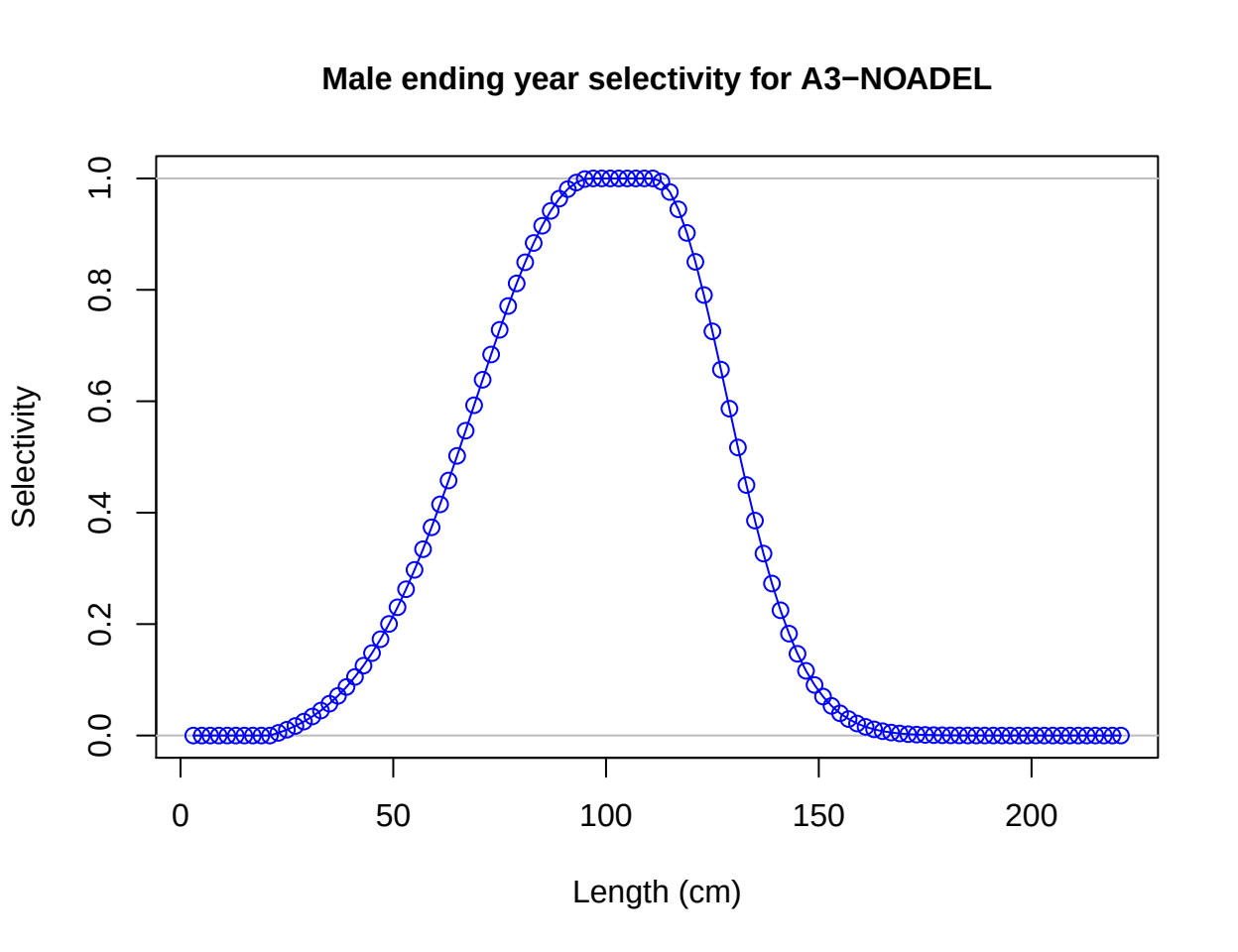

Female ending year selectivity for A6−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

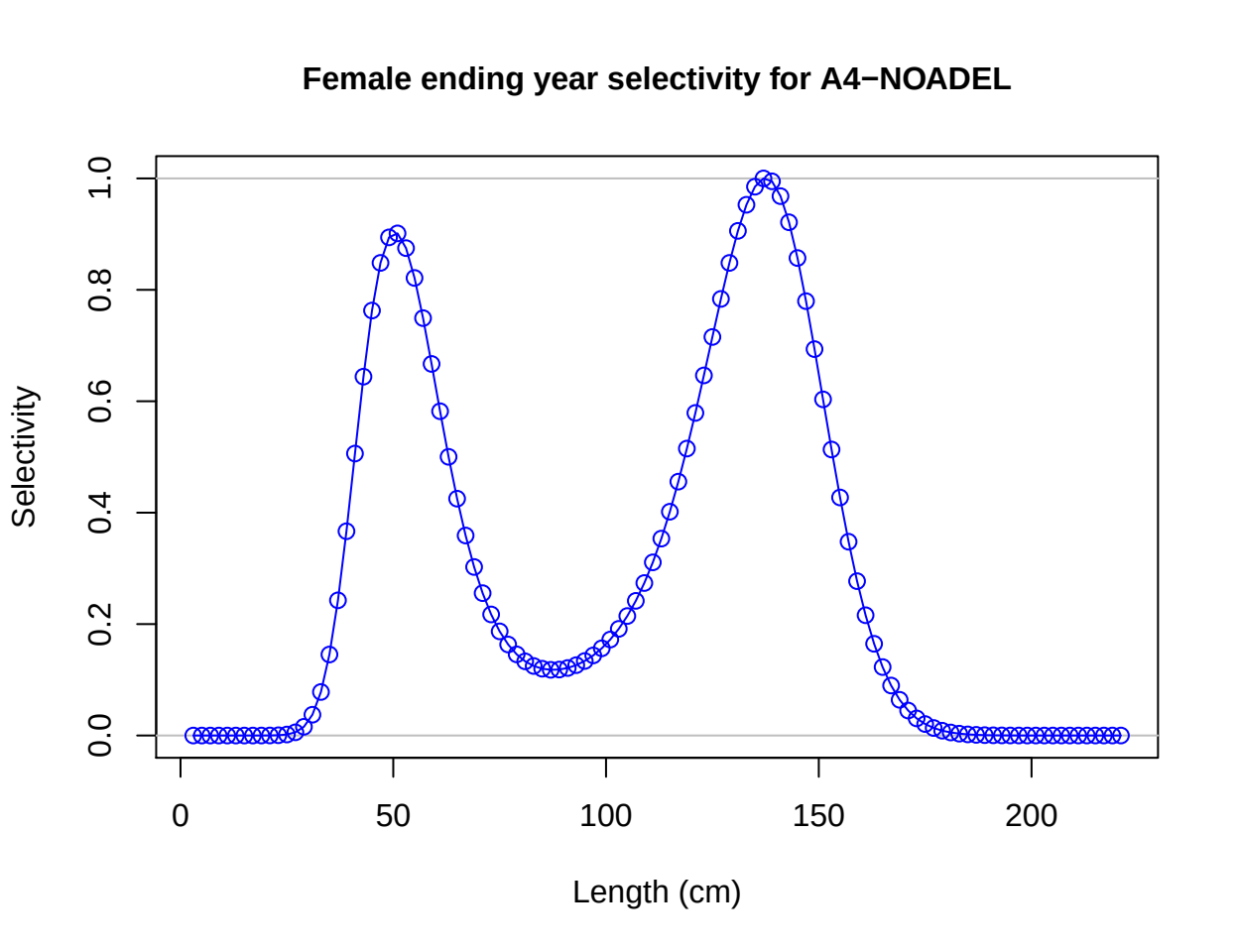

Male ending year selectivity for A6−OBJ
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

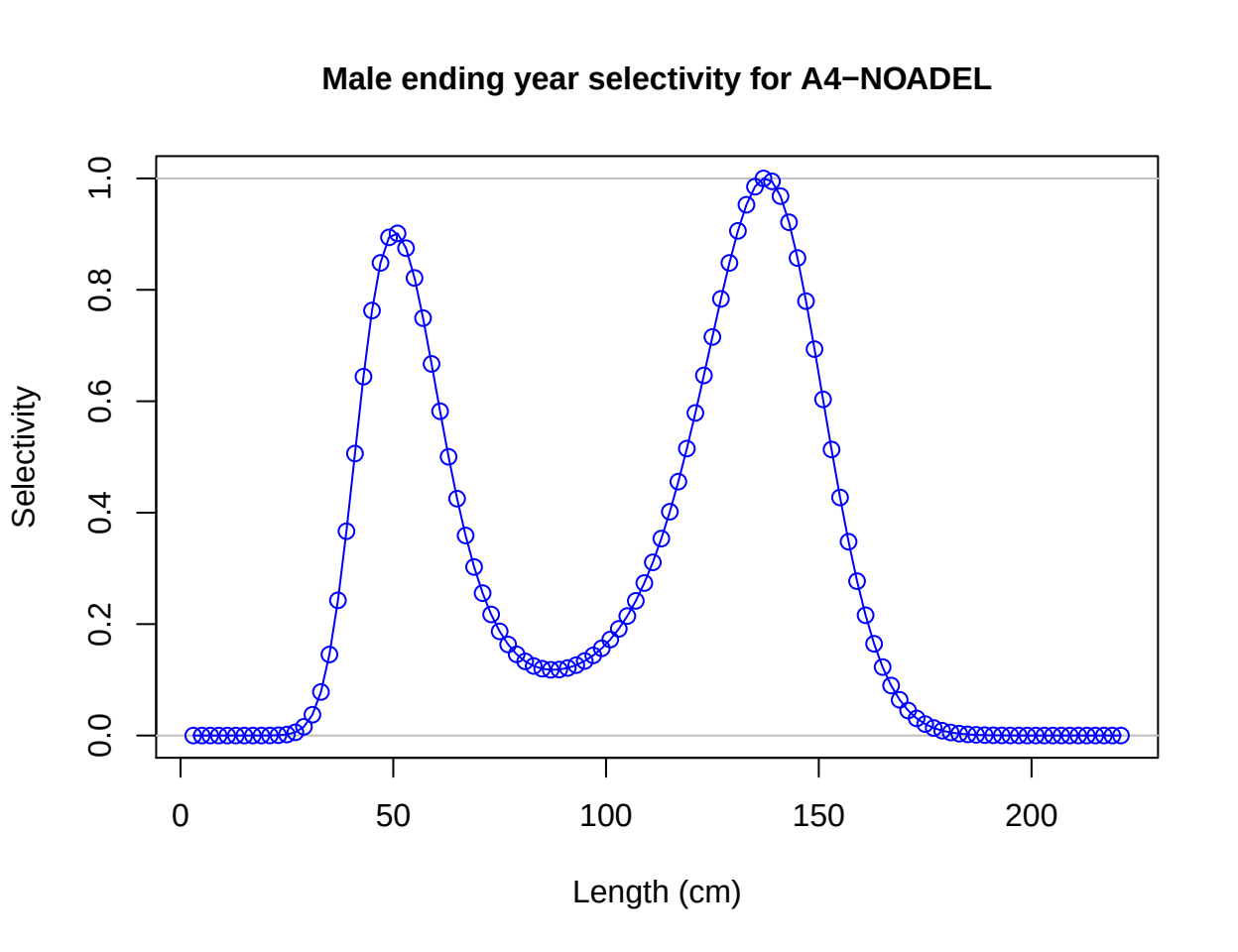

Female ending year selectivity for A2−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

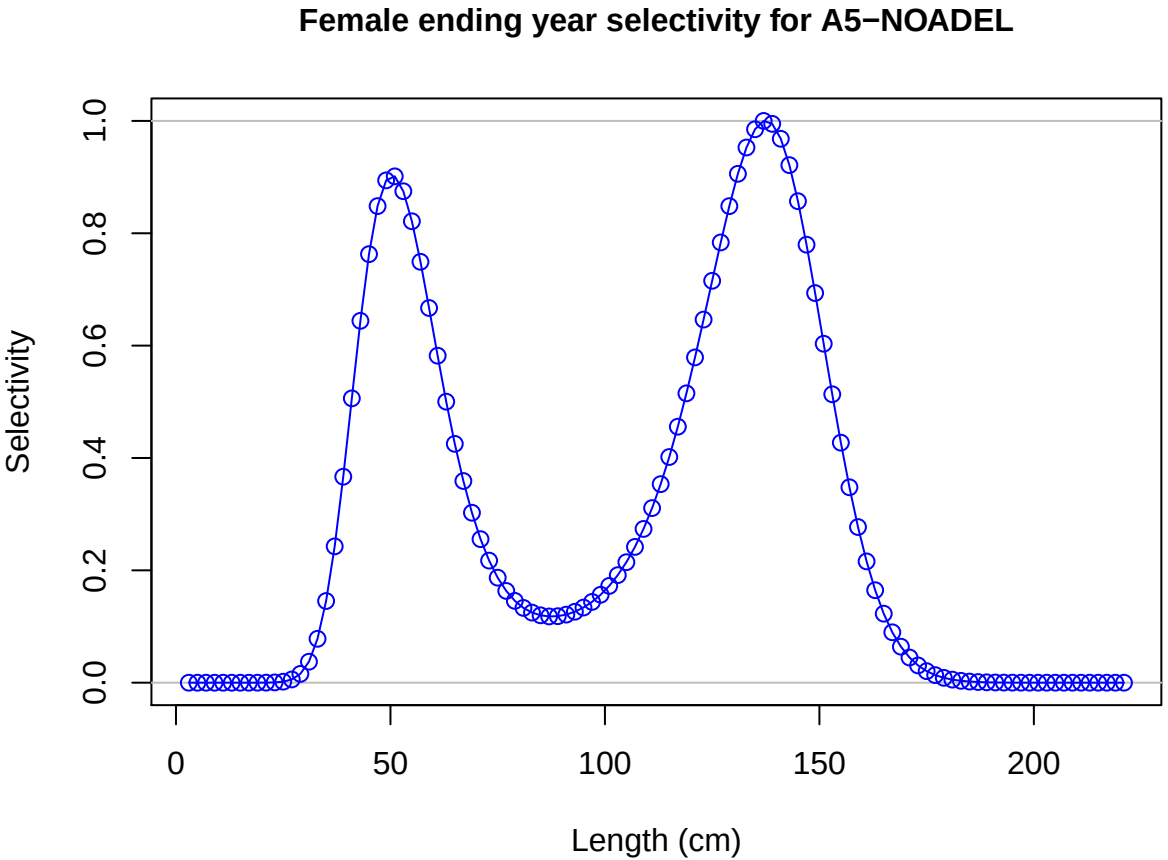

Male ending year selectivity for A2−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

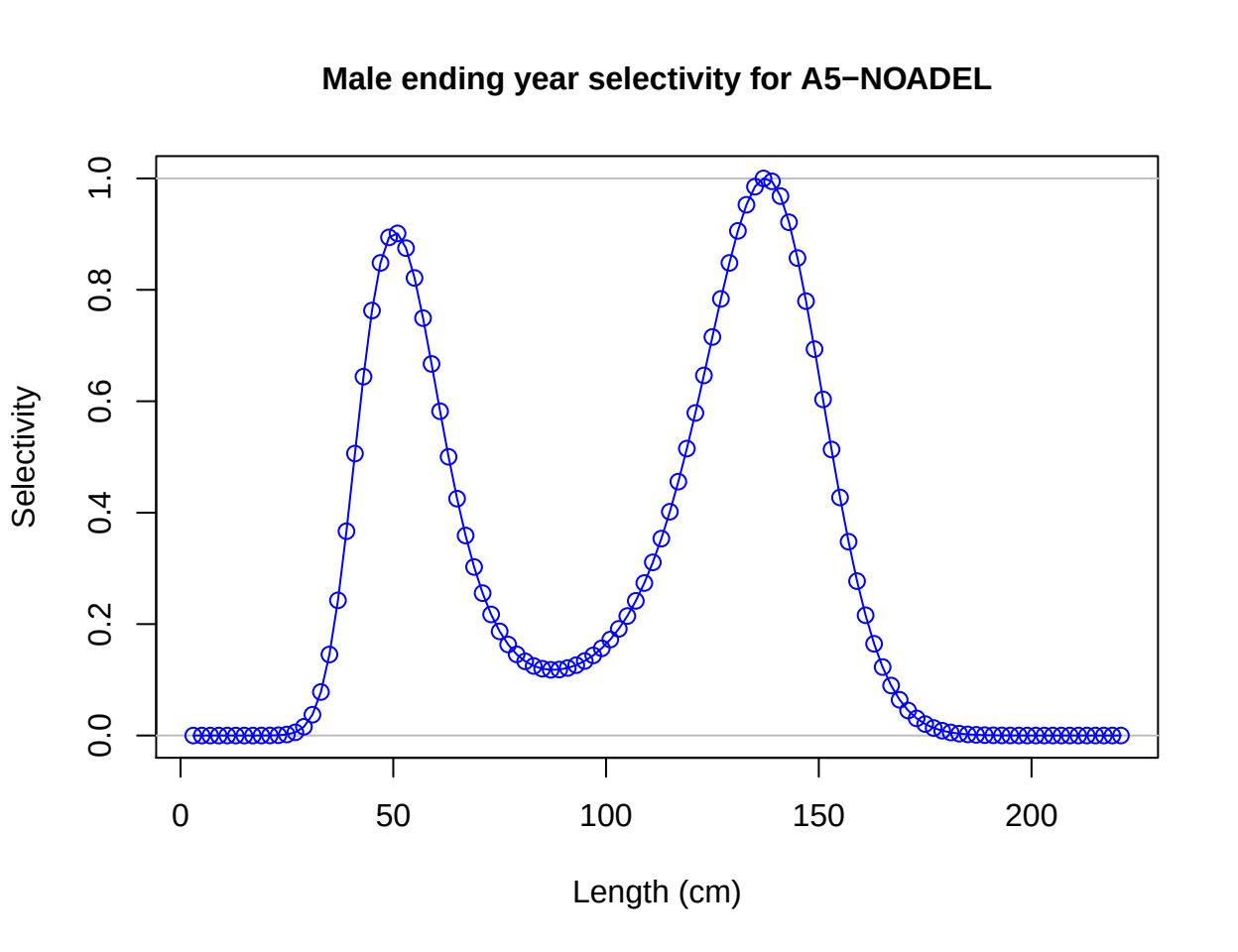

Female ending year selectivity for A3−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

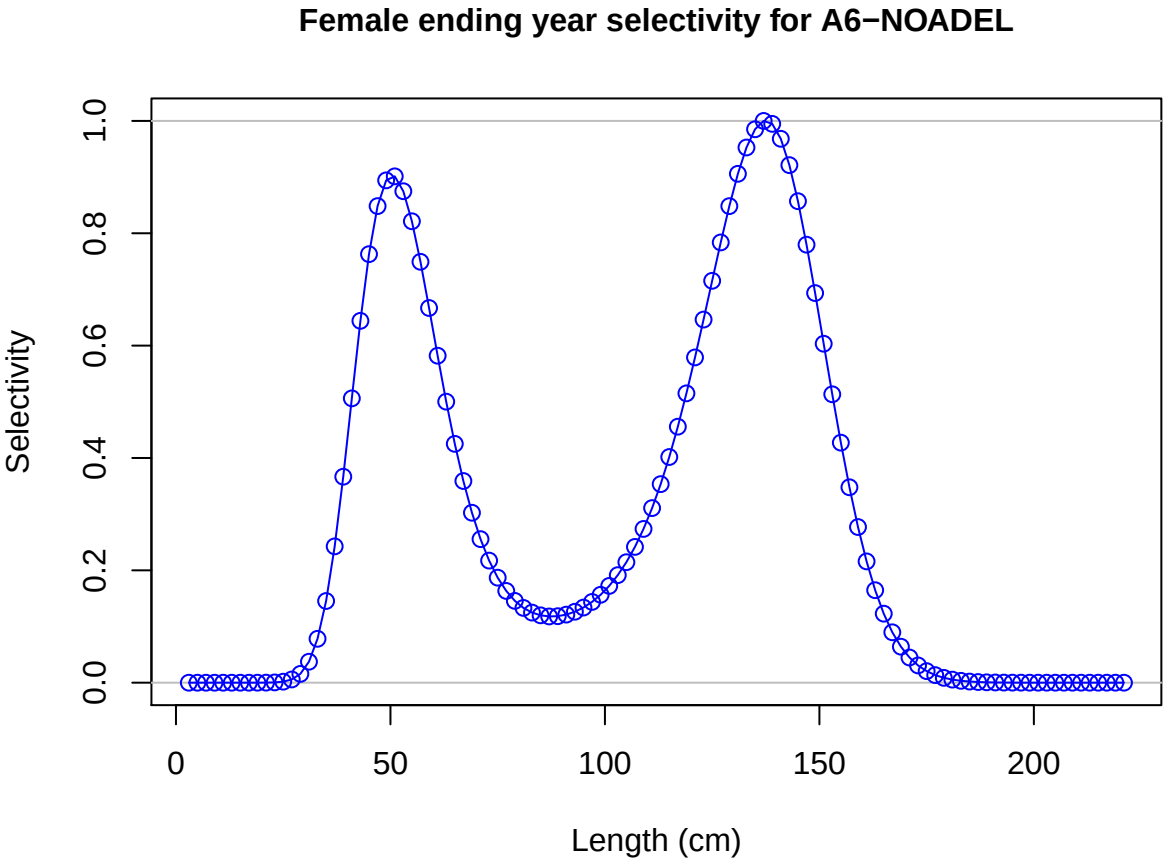

Male ending year selectivity for A3−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

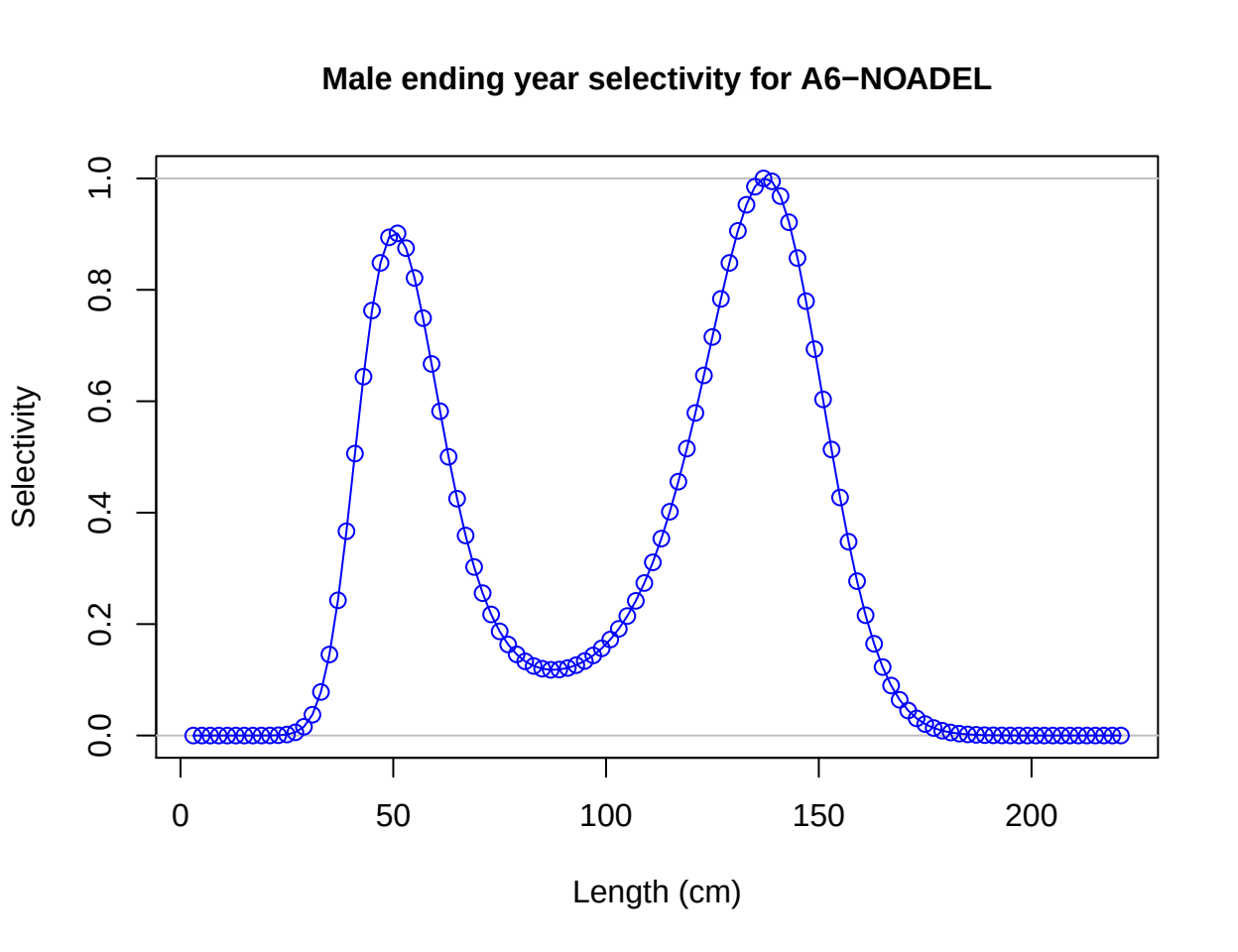

Female ending year selectivity for A4−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

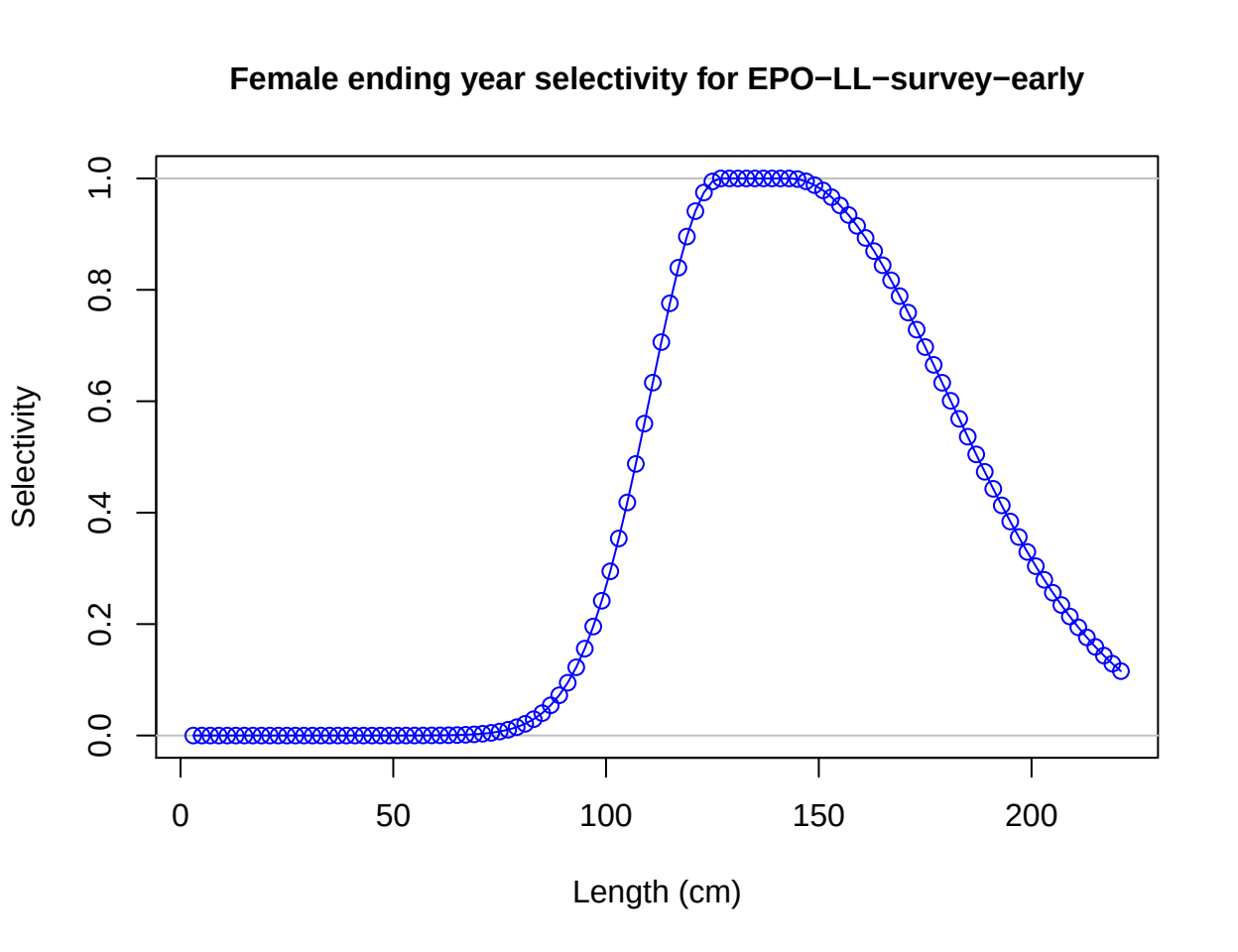

Male ending year selectivity for A4−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

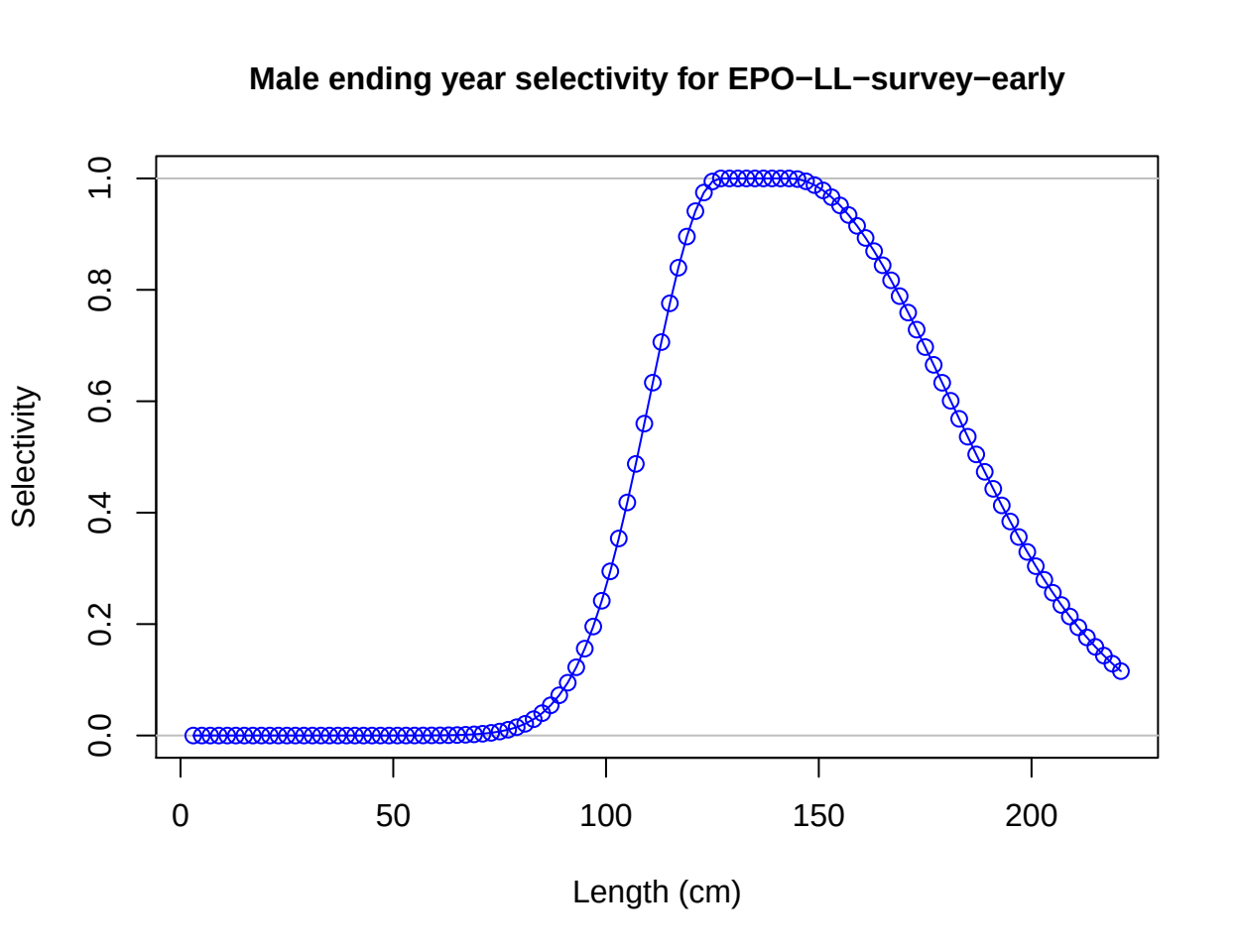

Female ending year selectivity for A5−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

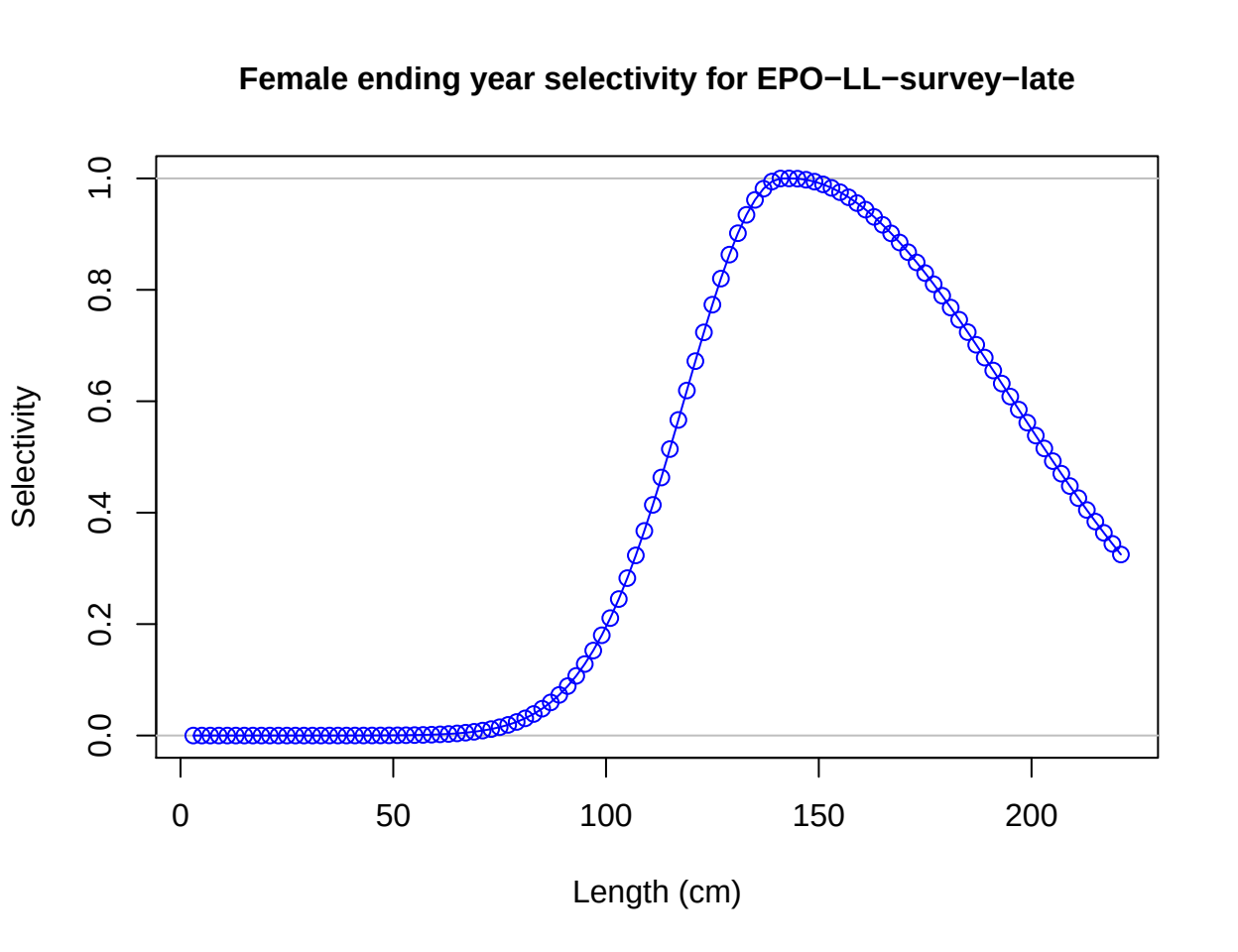

Male ending year selectivity for A5−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

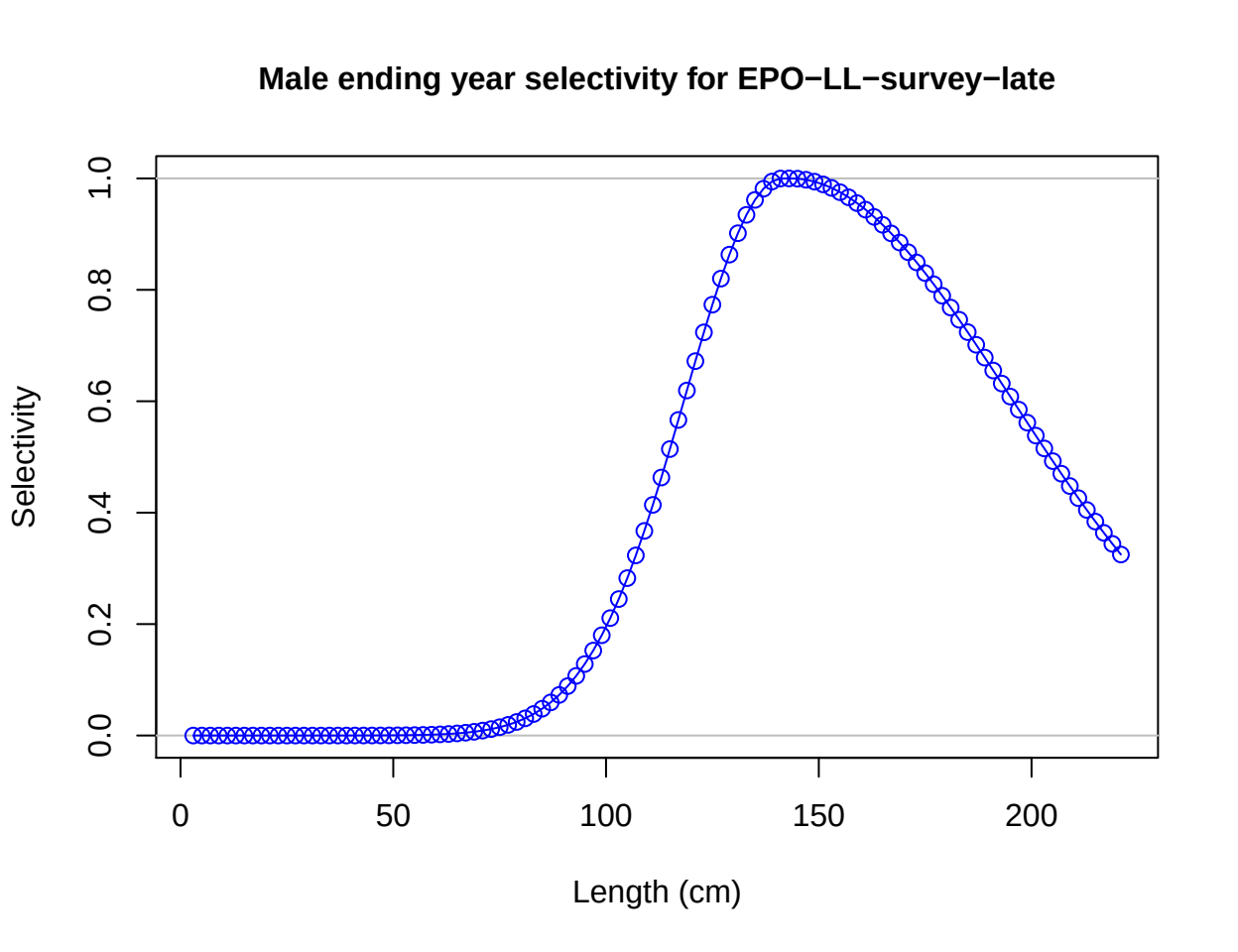

Female ending year selectivity for A6−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

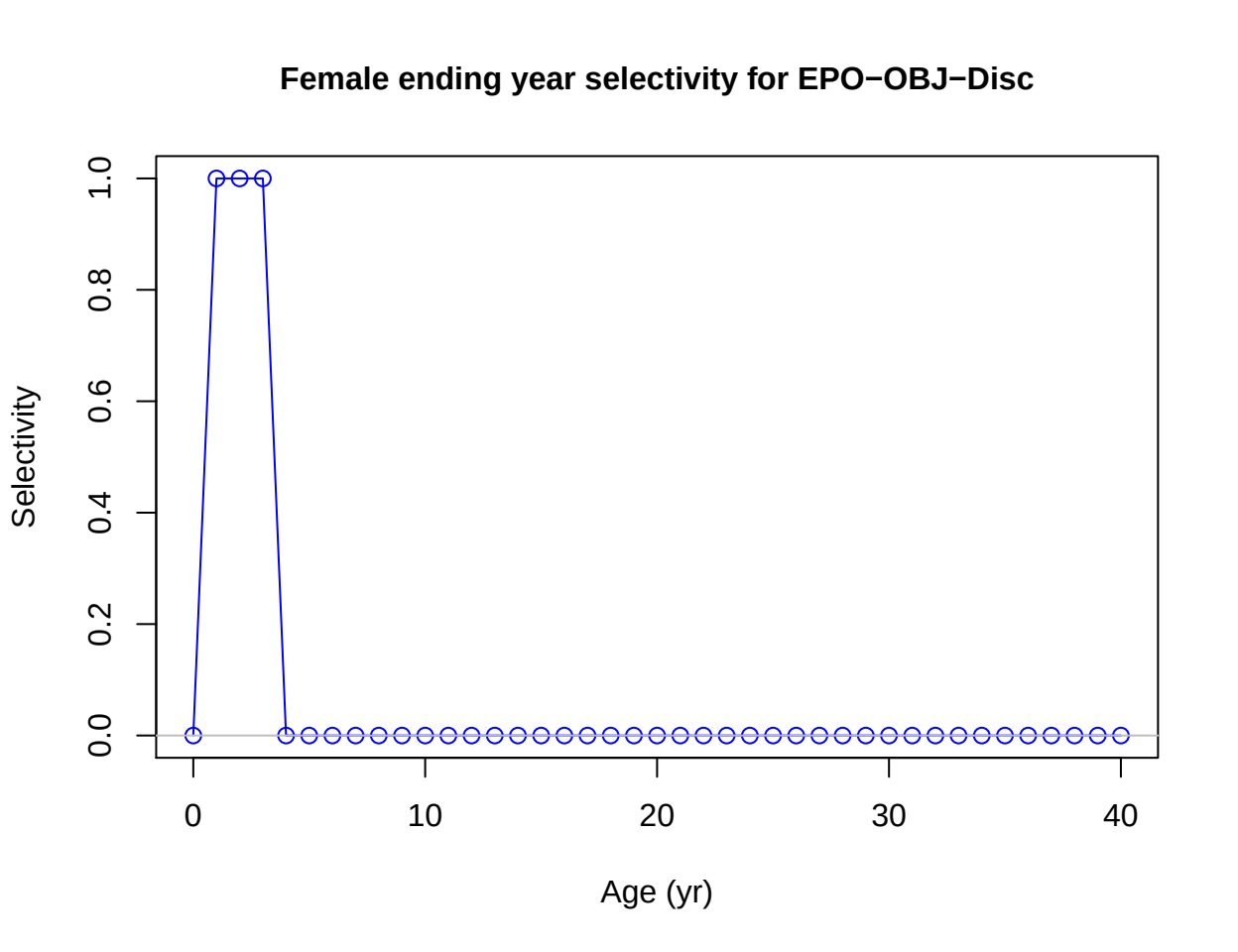

Male ending year selectivity for A6−NOADEL
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

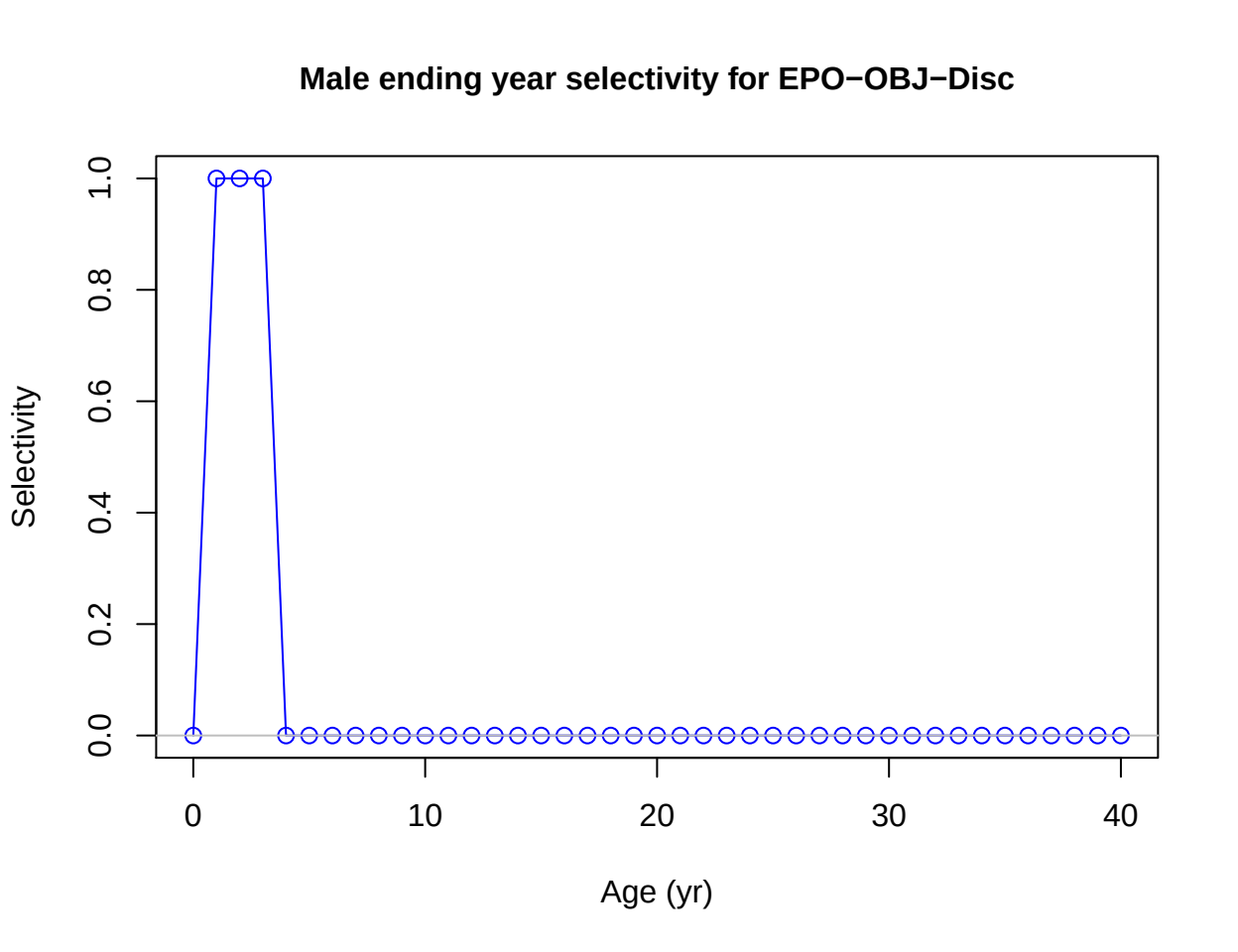

Female ending year selectivity for EPO−LL−survey−early
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

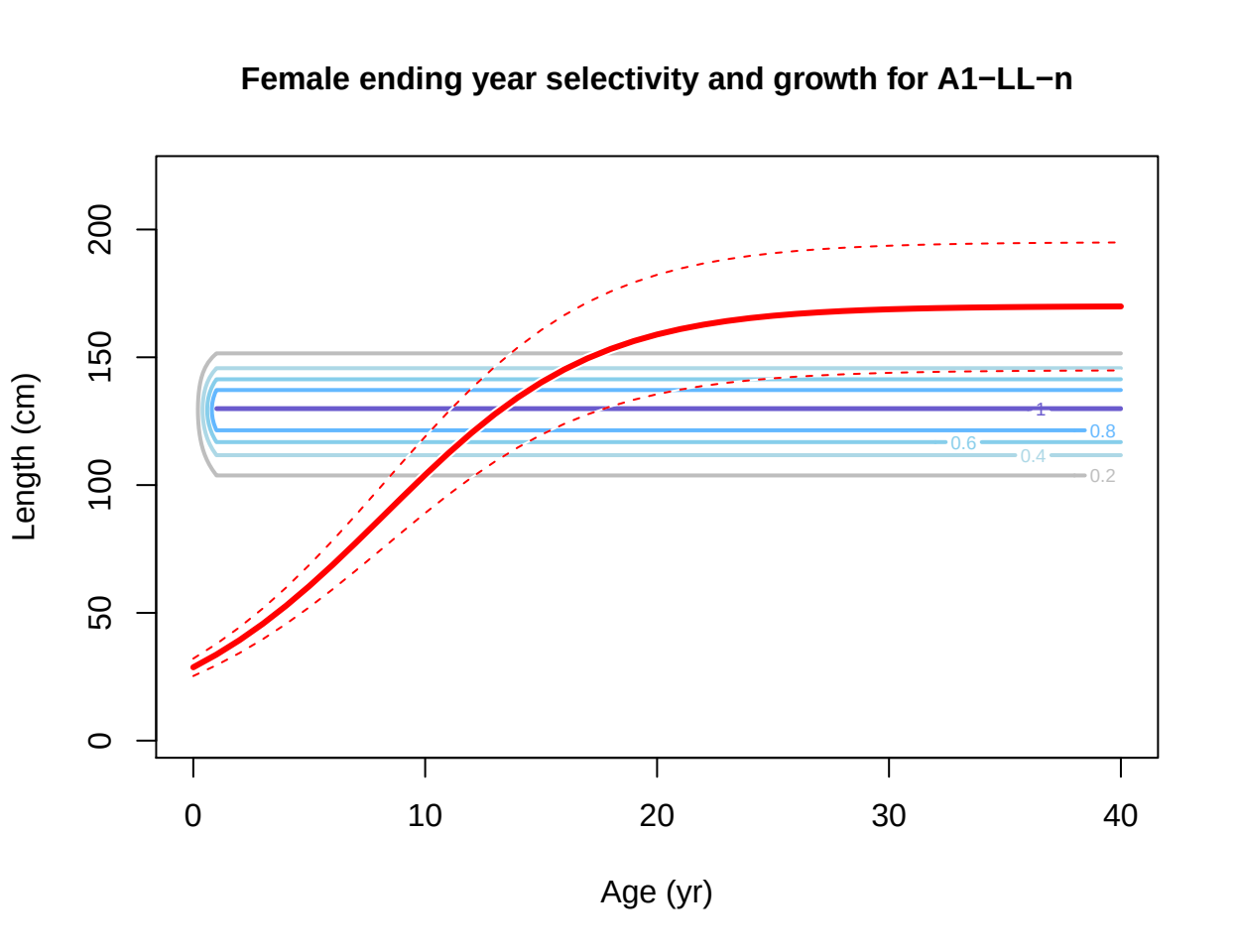

Male ending year selectivity for EPO−LL−survey−early
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

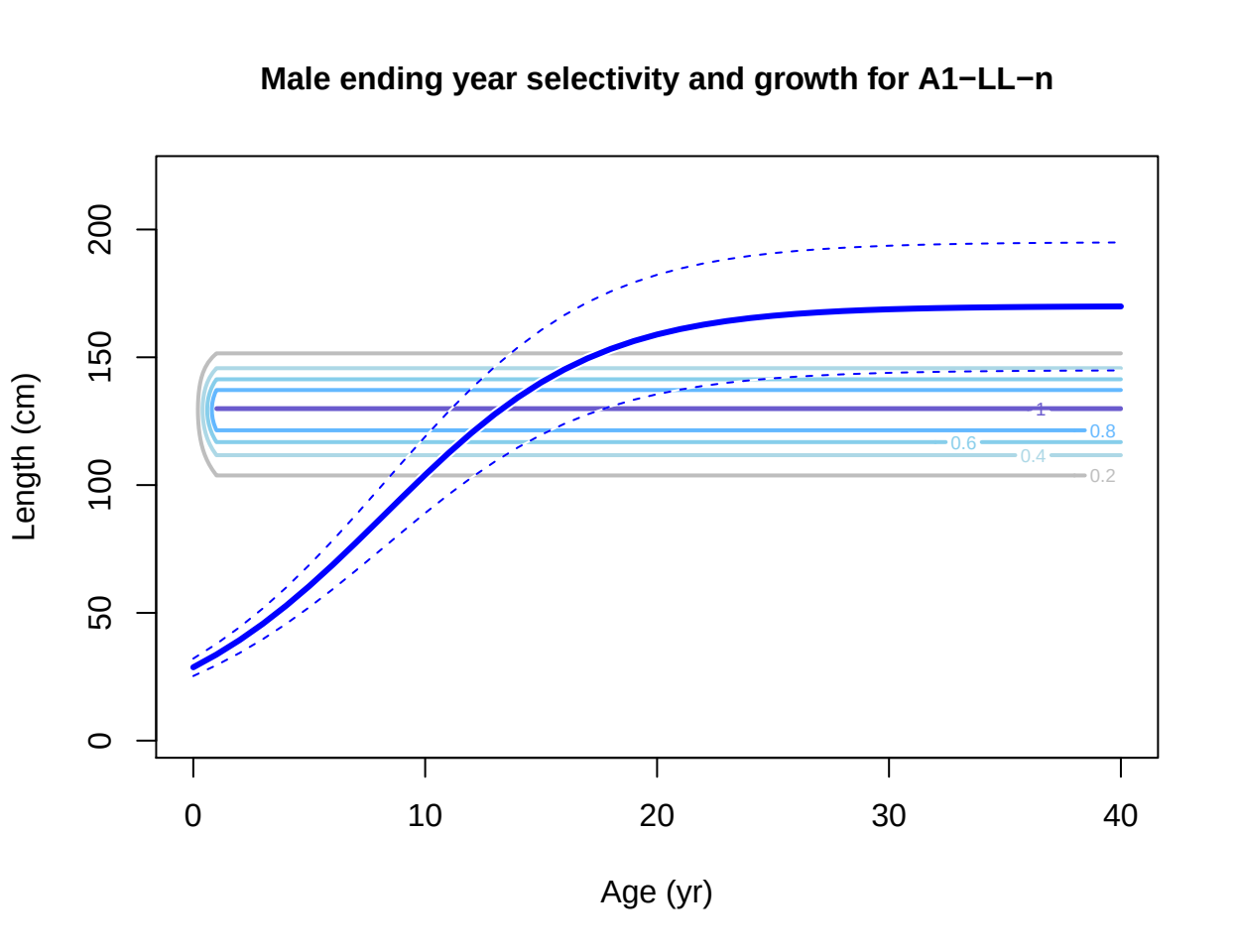

Female ending year selectivity for EPO−LL−survey−late
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

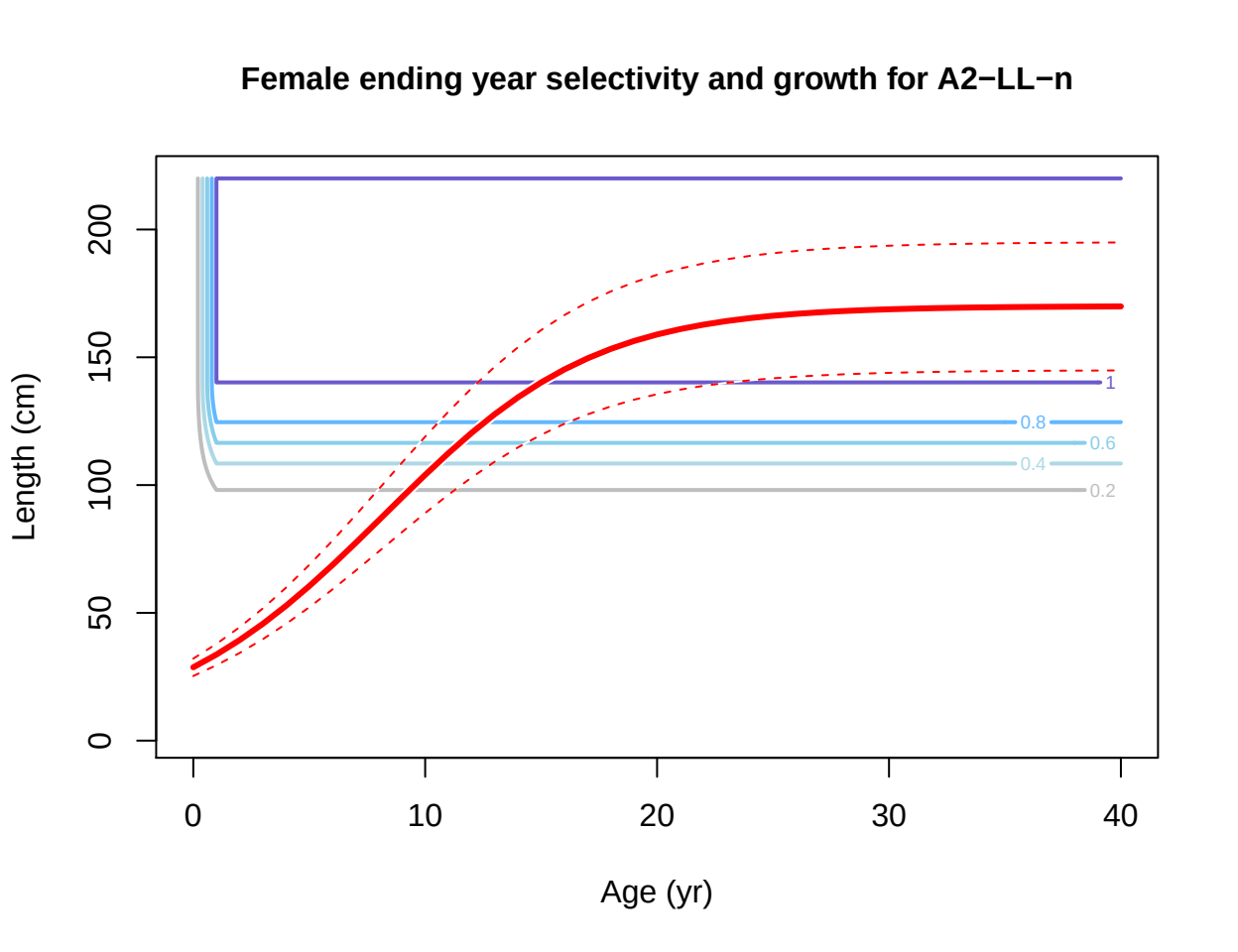

Male ending year selectivity for EPO−LL−survey−late
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
Length (cm)

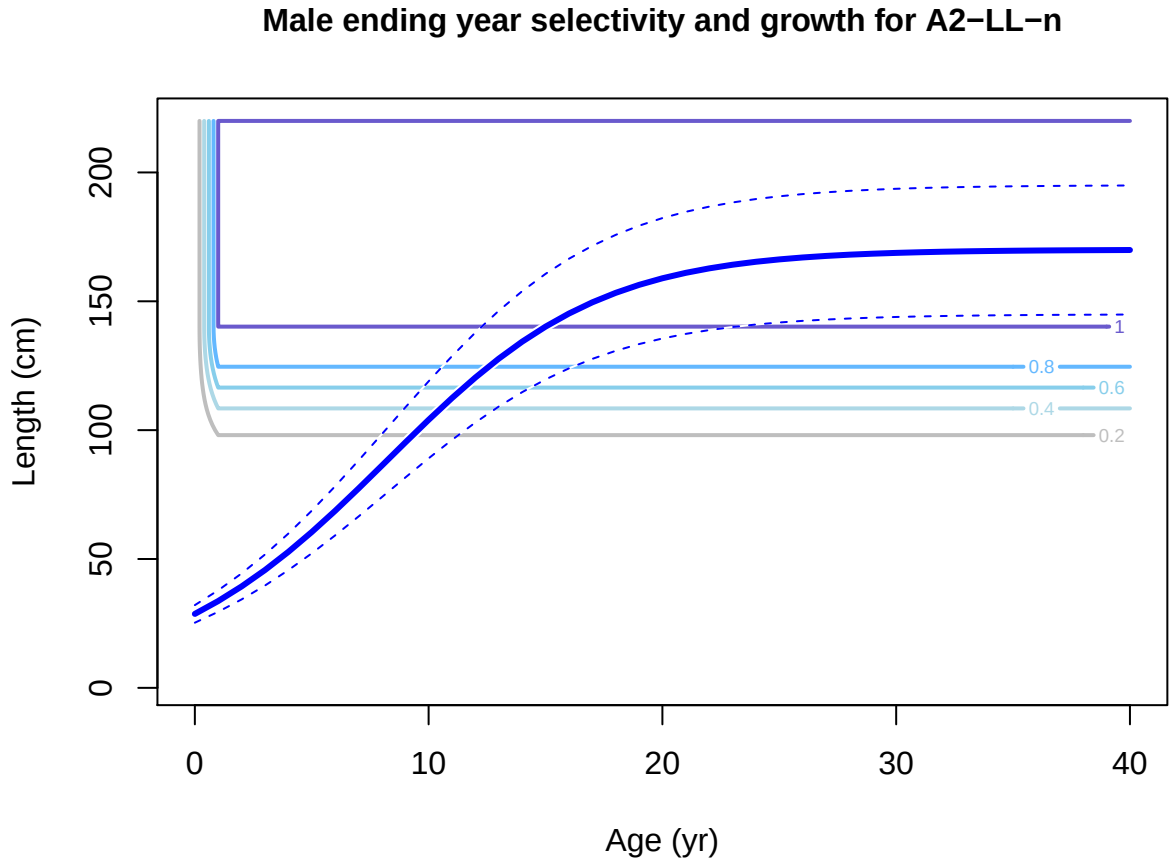

Female ending year selectivity for EPO−OBJ−Disc
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
Age (yr)

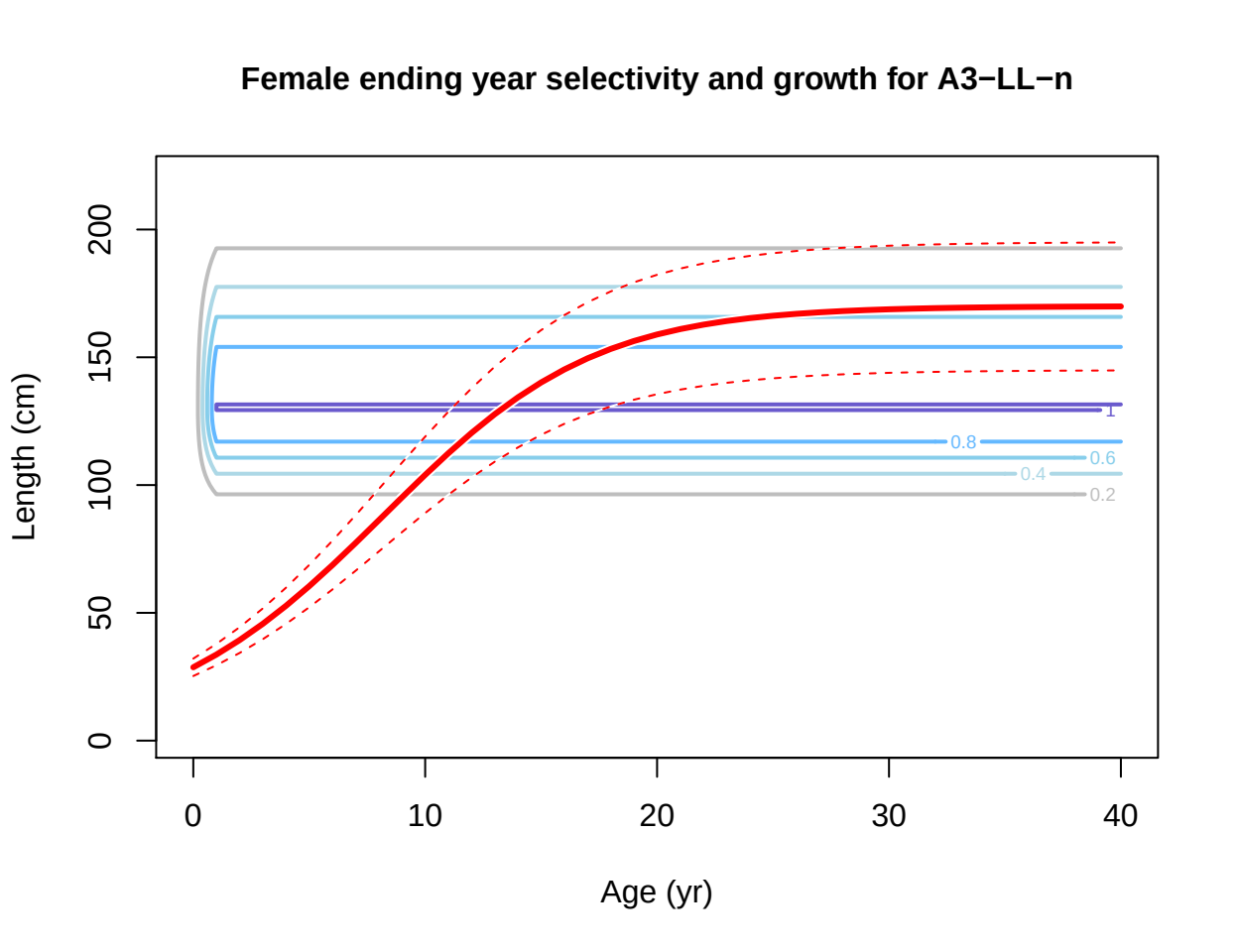

Male ending year selectivity for EPO−OBJ−Disc
Selectivity
0.0
0.2
0.4
0.6
0.8
1.0
0
10
20
30
40
Age (yr)

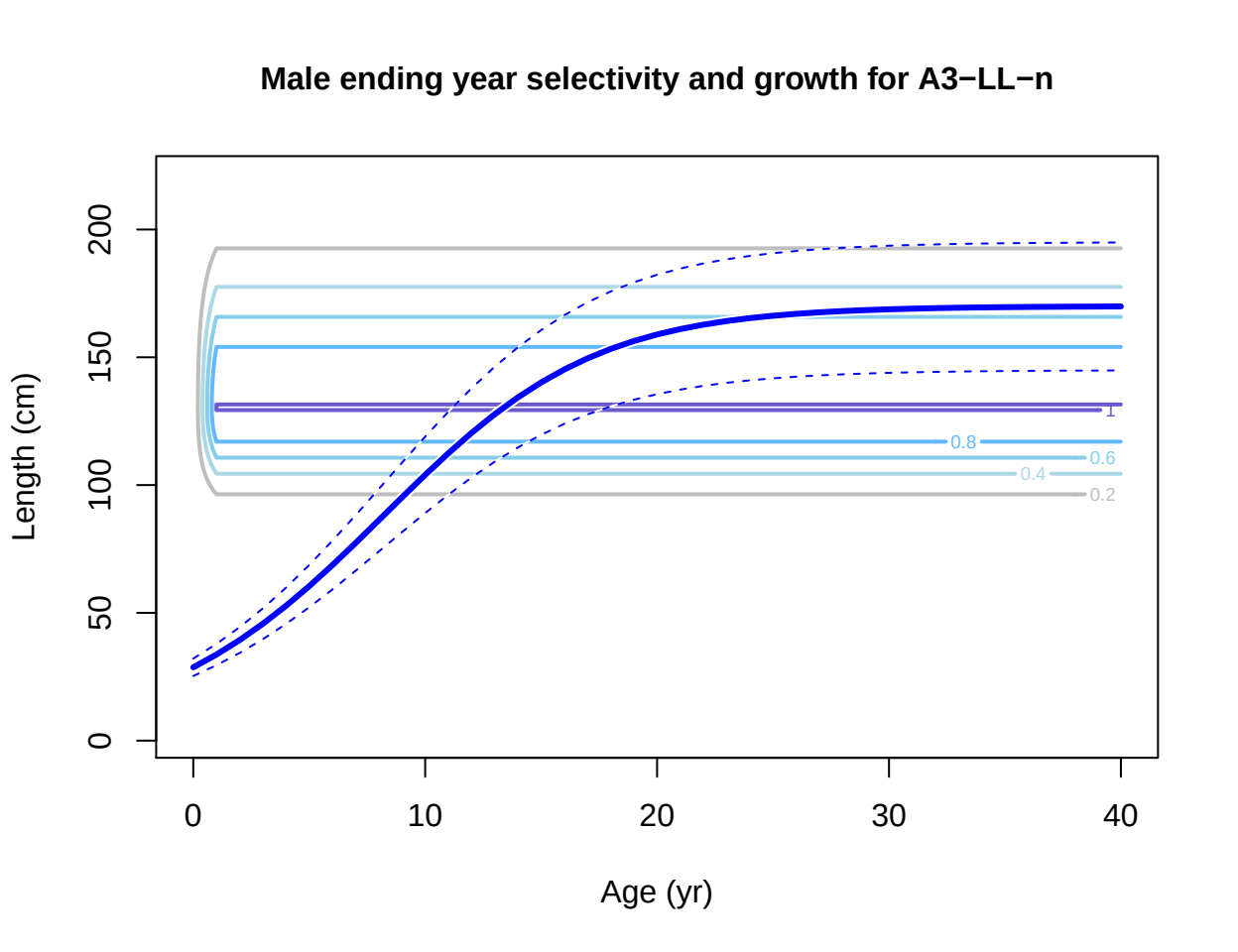

Female ending year selectivity and growth for A1−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

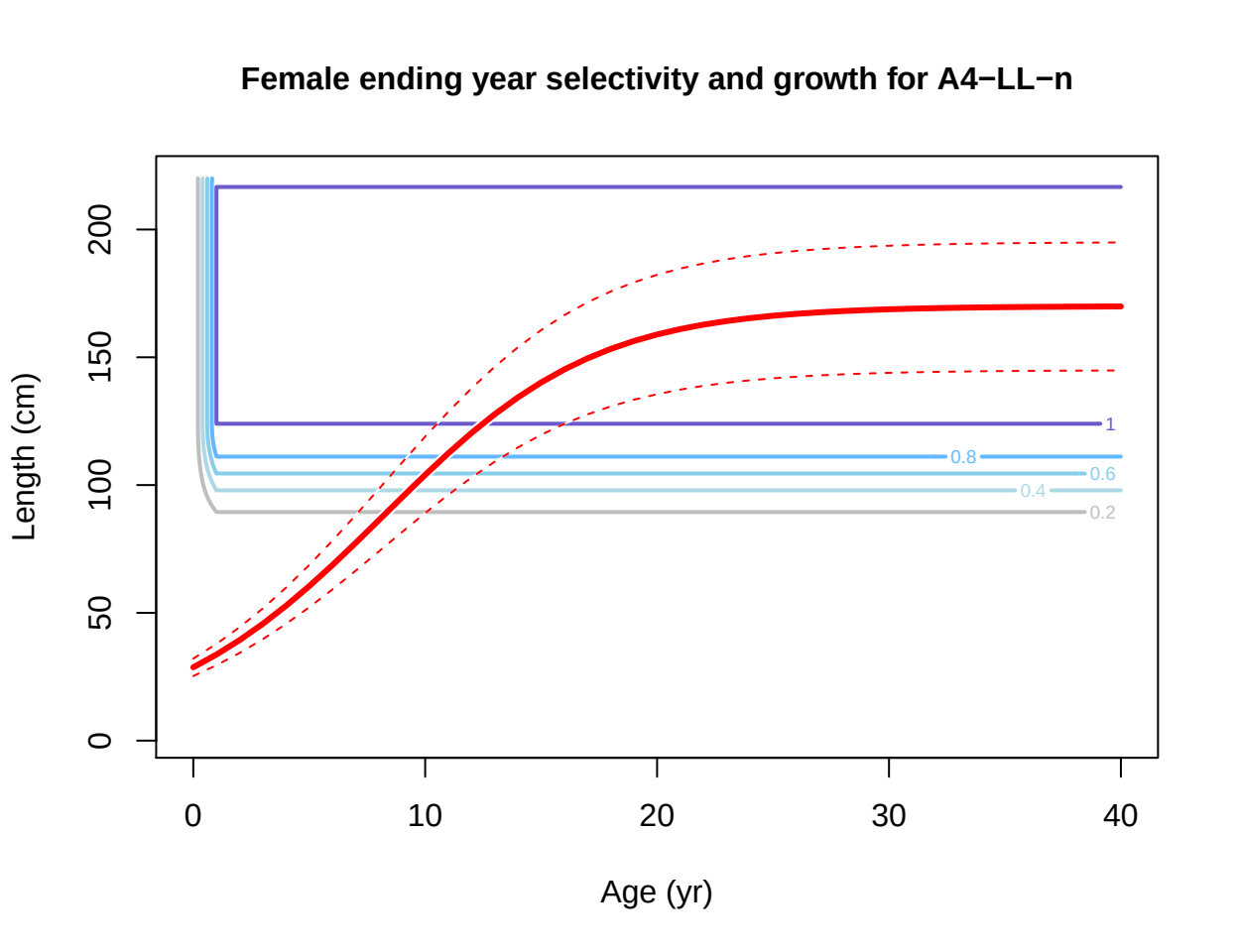

Male ending year selectivity and growth for A1−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

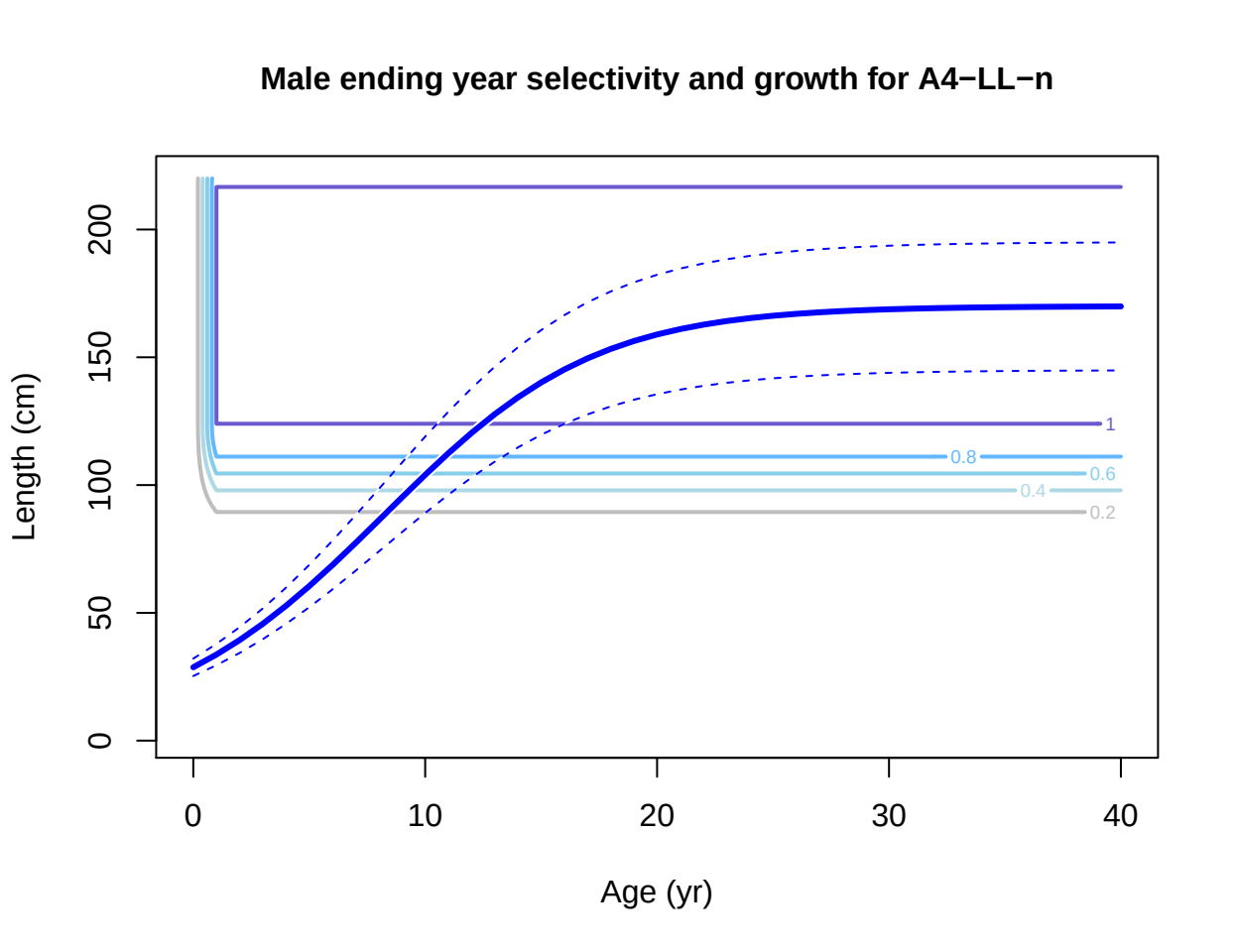

Female ending year selectivity and growth for A2−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

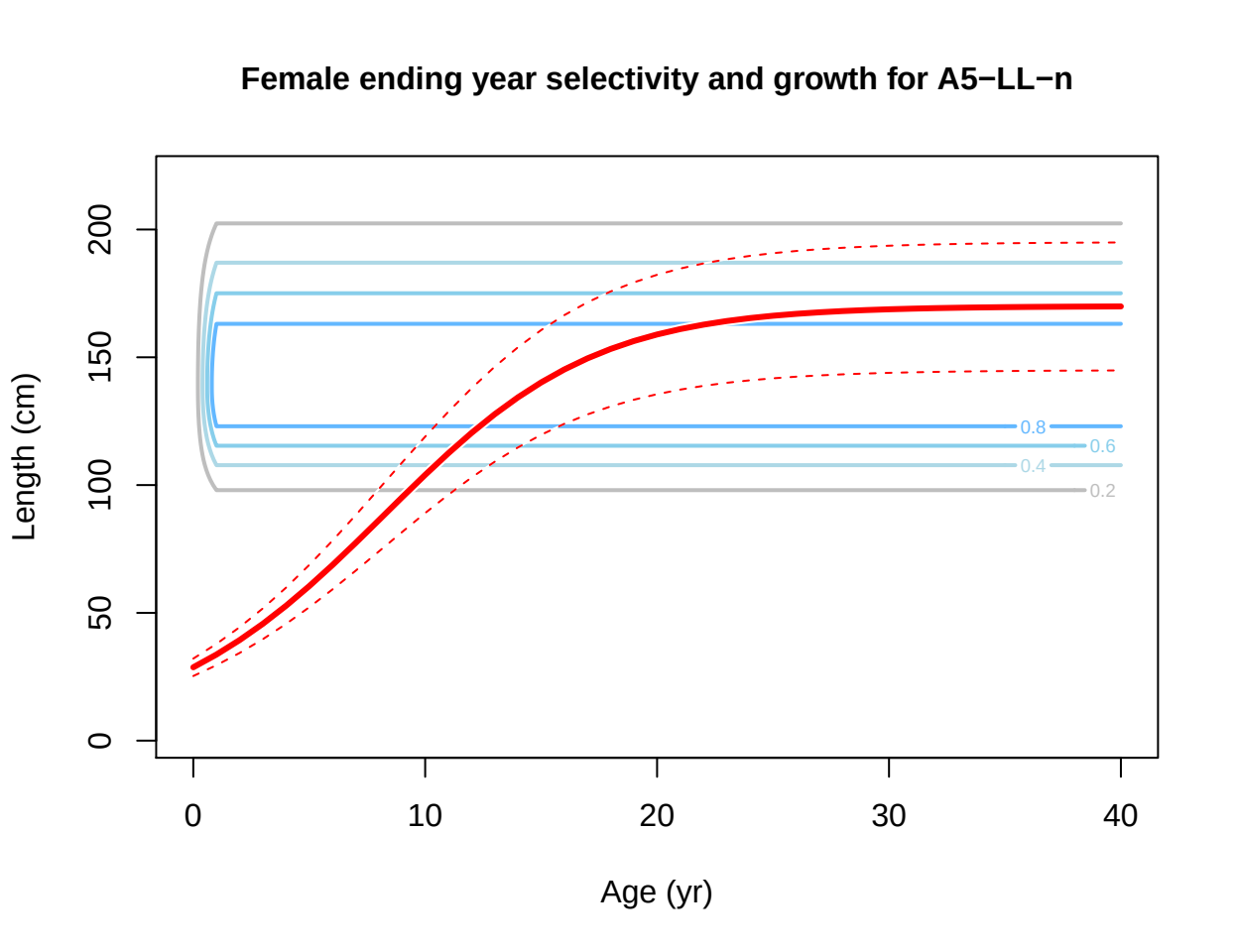

Male ending year selectivity and growth for A2−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

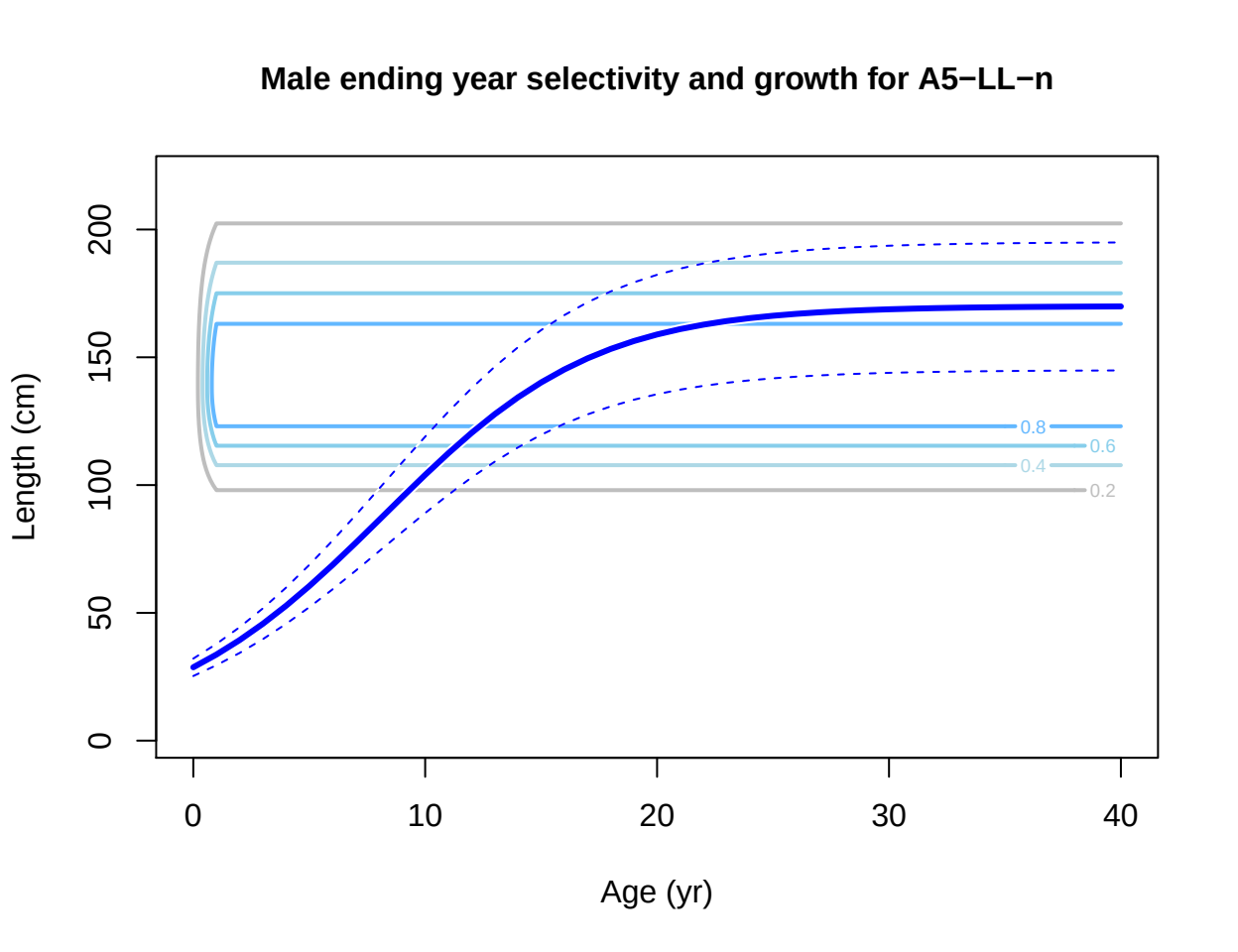

Female ending year selectivity and growth for A3−LL−n
Length (cm)
0
50
100
150
200
Age (yr)
0
10
20
30
40
1
0.8
0.6
0.4
0.2

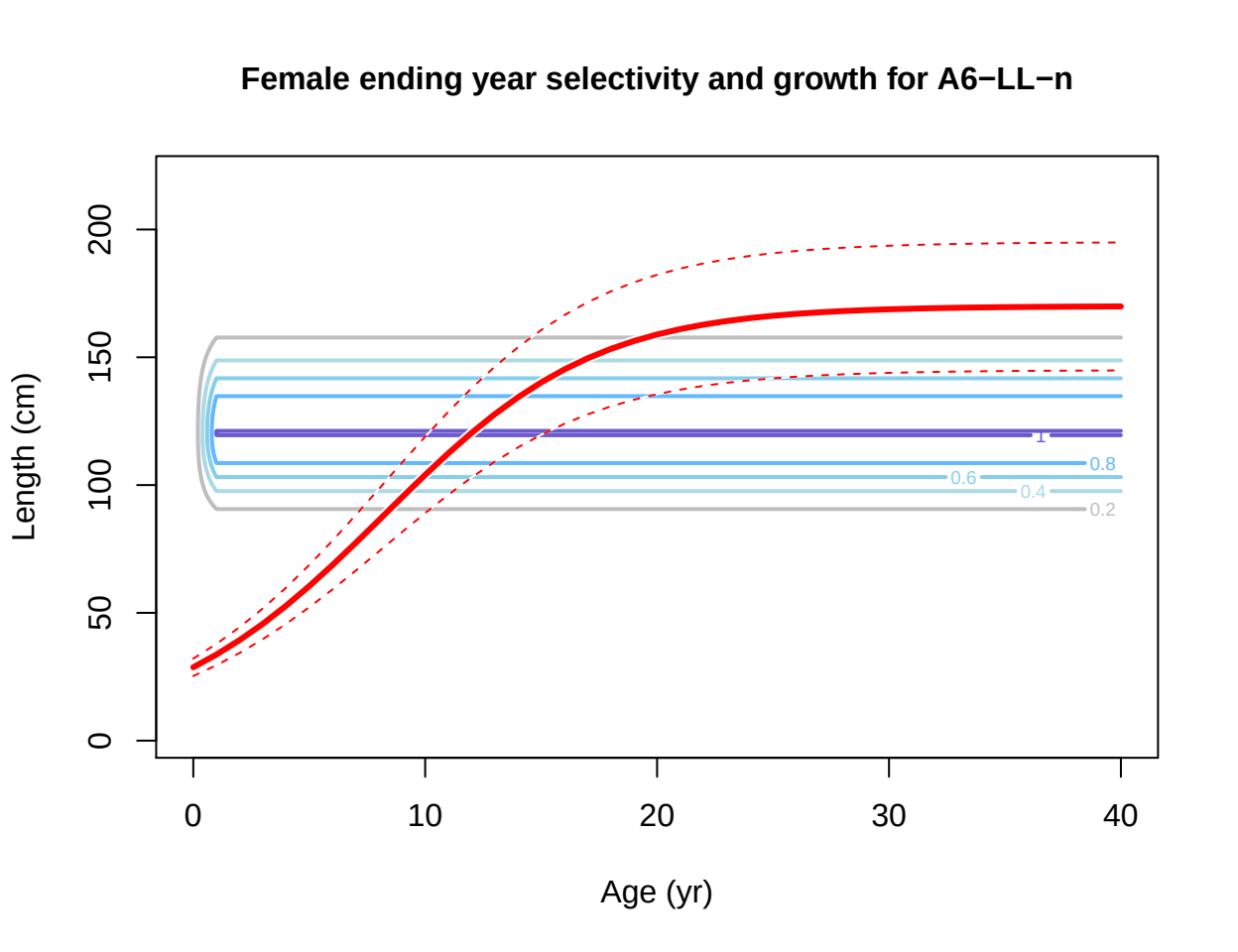

Male ending year selectivity and growth for A3−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

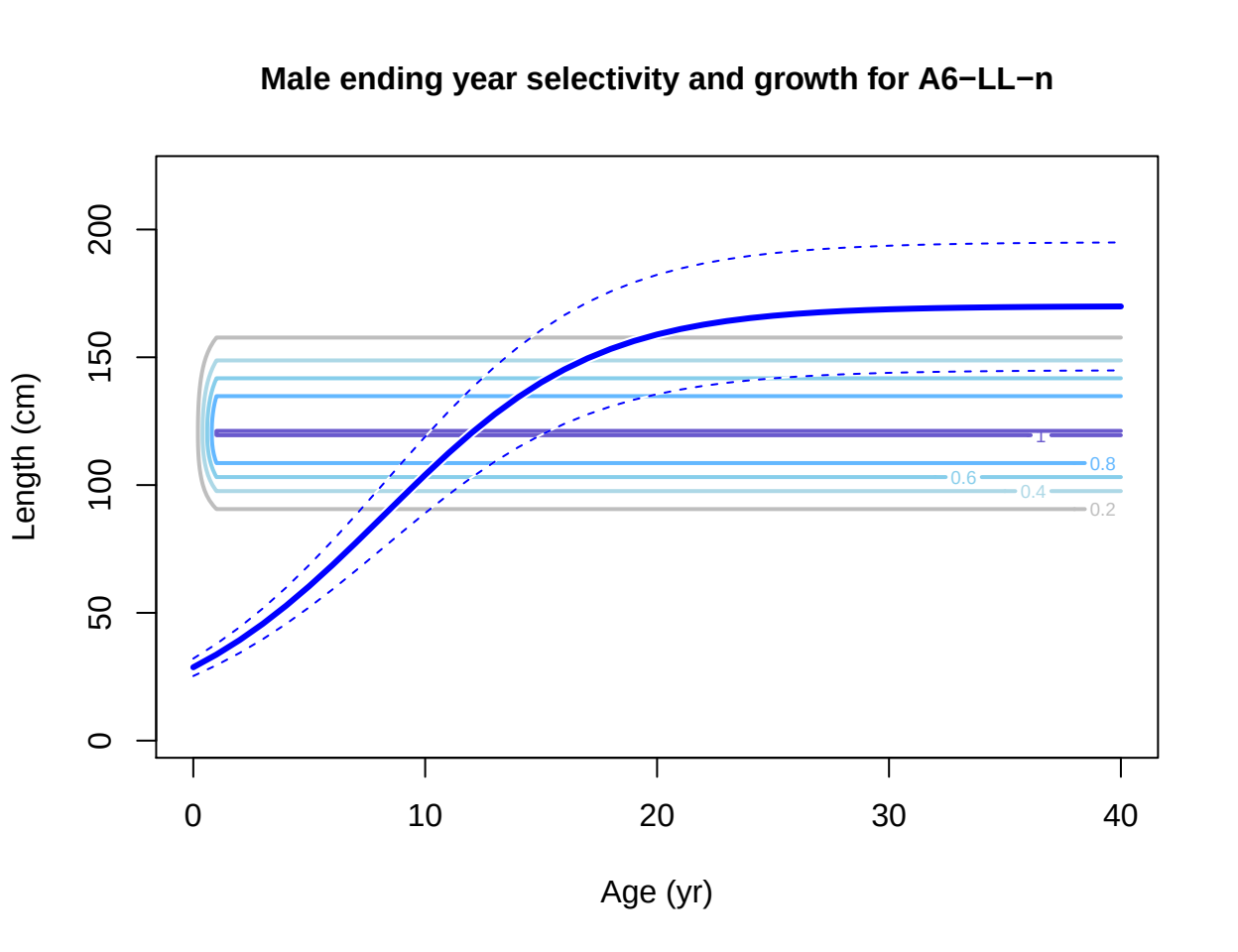

Female ending year selectivity and growth for A4−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

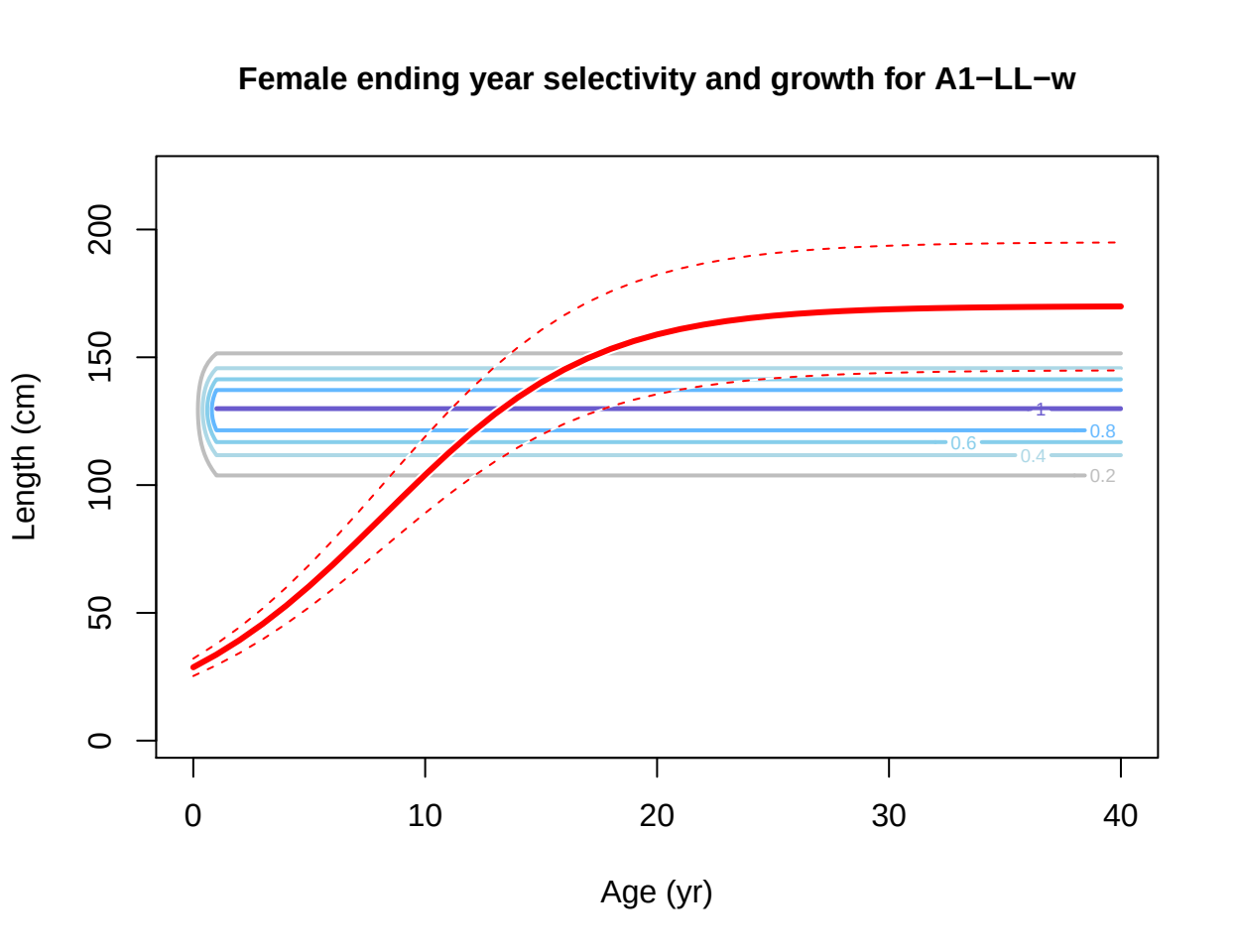

Male ending year selectivity and growth for A4−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

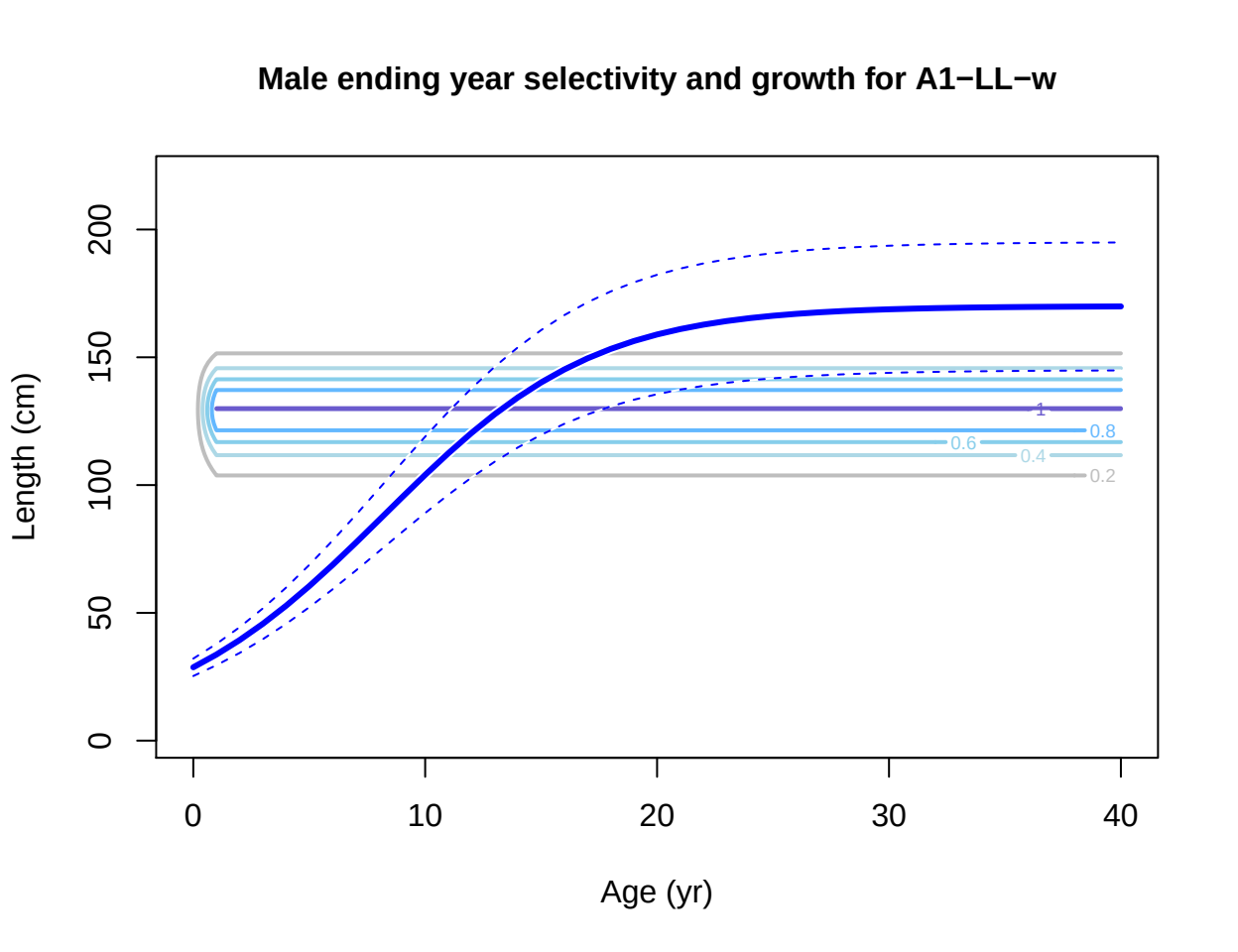

Female ending year selectivity and growth for A5−LL−n
Length (cm)
0
50
100
150
200
0.8
0.6
0.4
0.2
0
10
20
30
40
Age (yr)

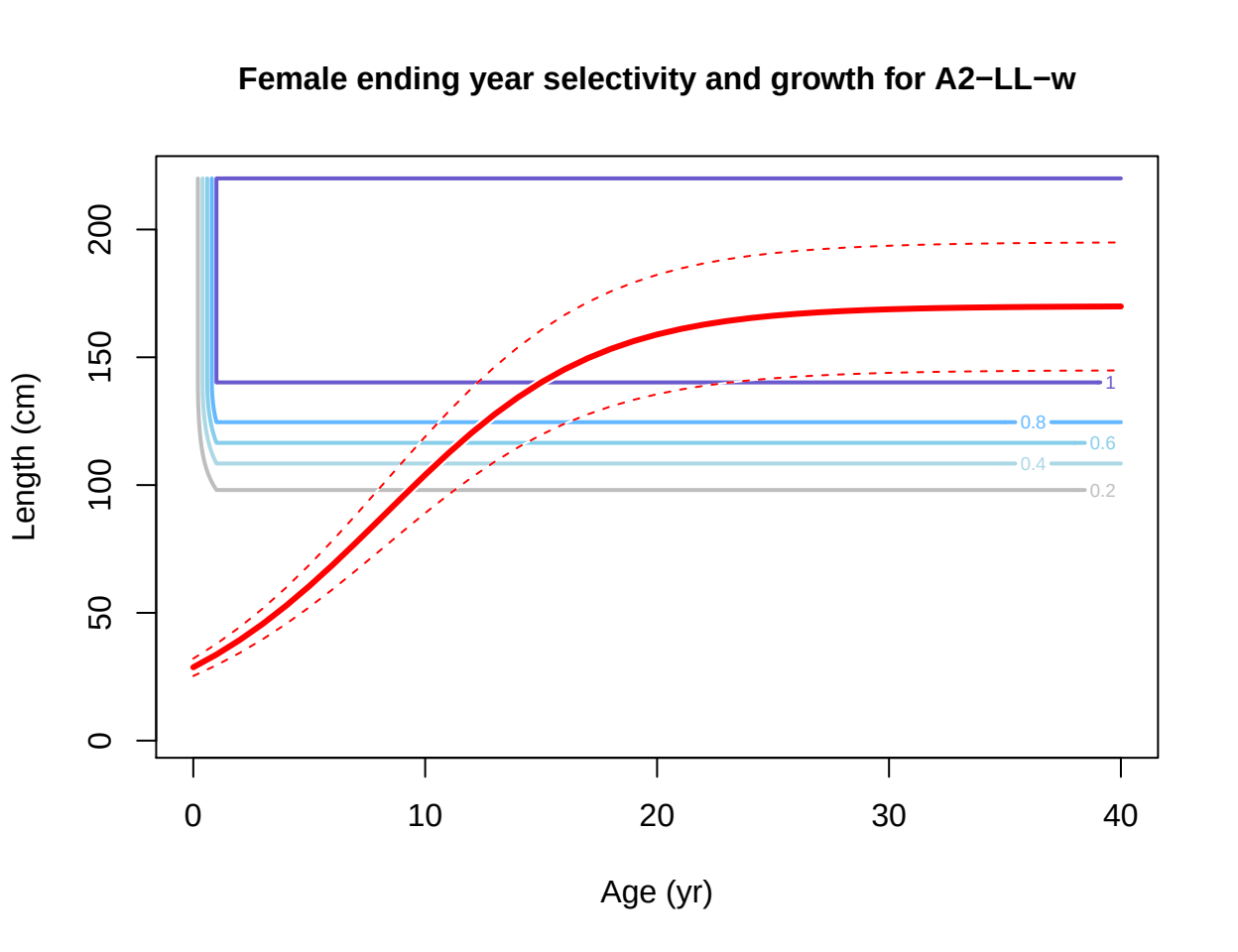

Male ending year selectivity and growth for A5−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
0.8
0.6
0.4
0.2

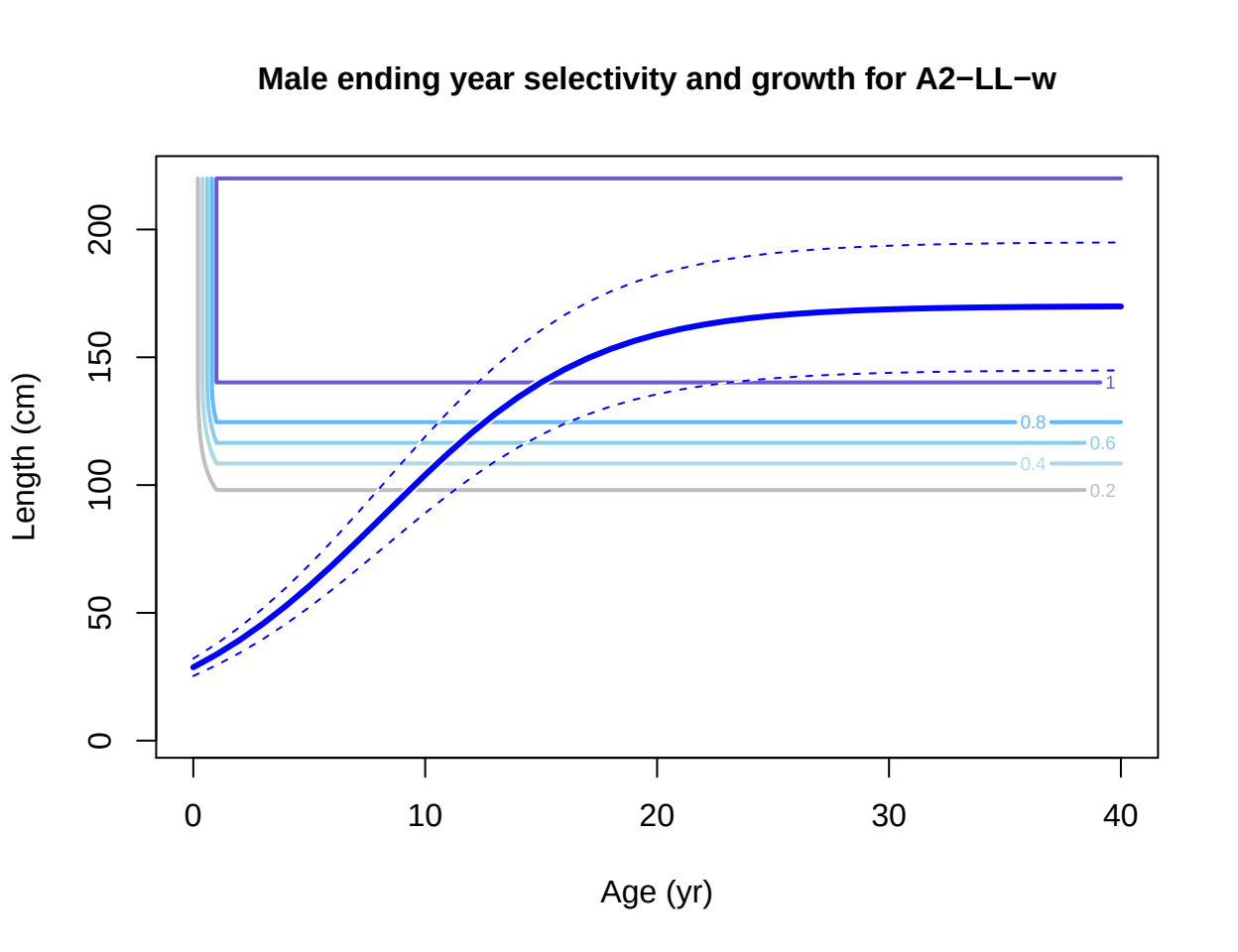

Female ending year selectivity and growth for A6−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

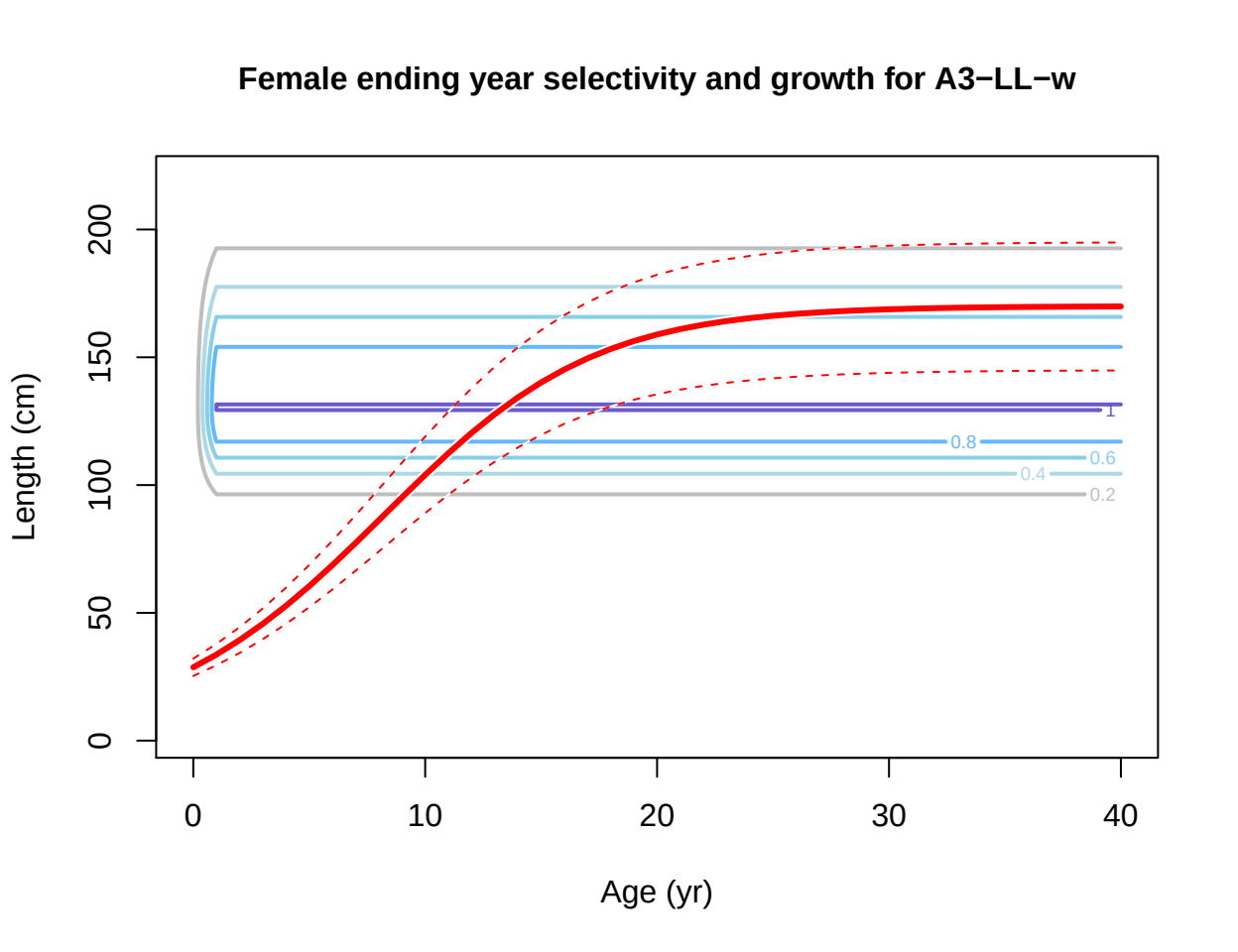

Male ending year selectivity and growth for A6−LL−n
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

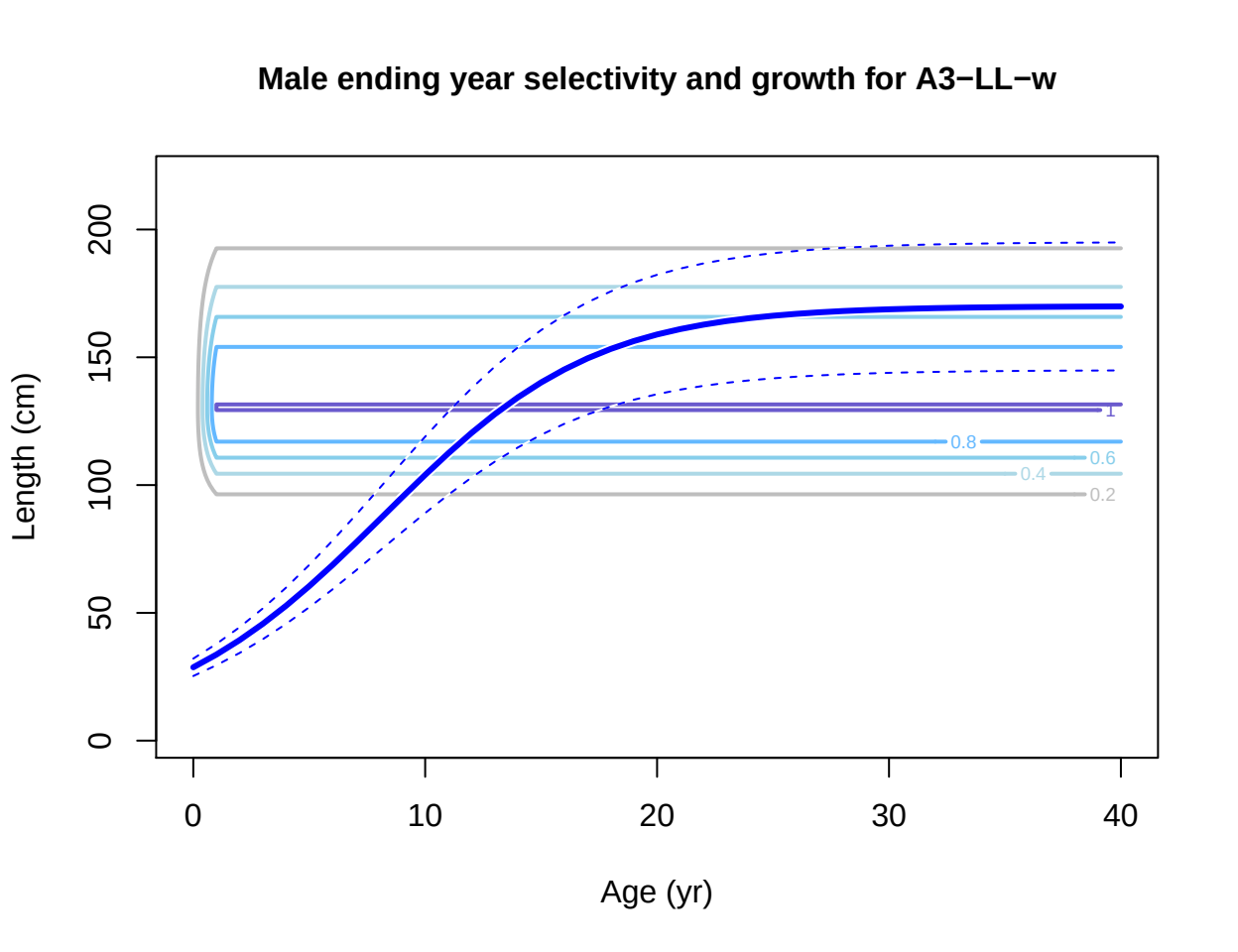

Female ending year selectivity and growth for A1−LL−w
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

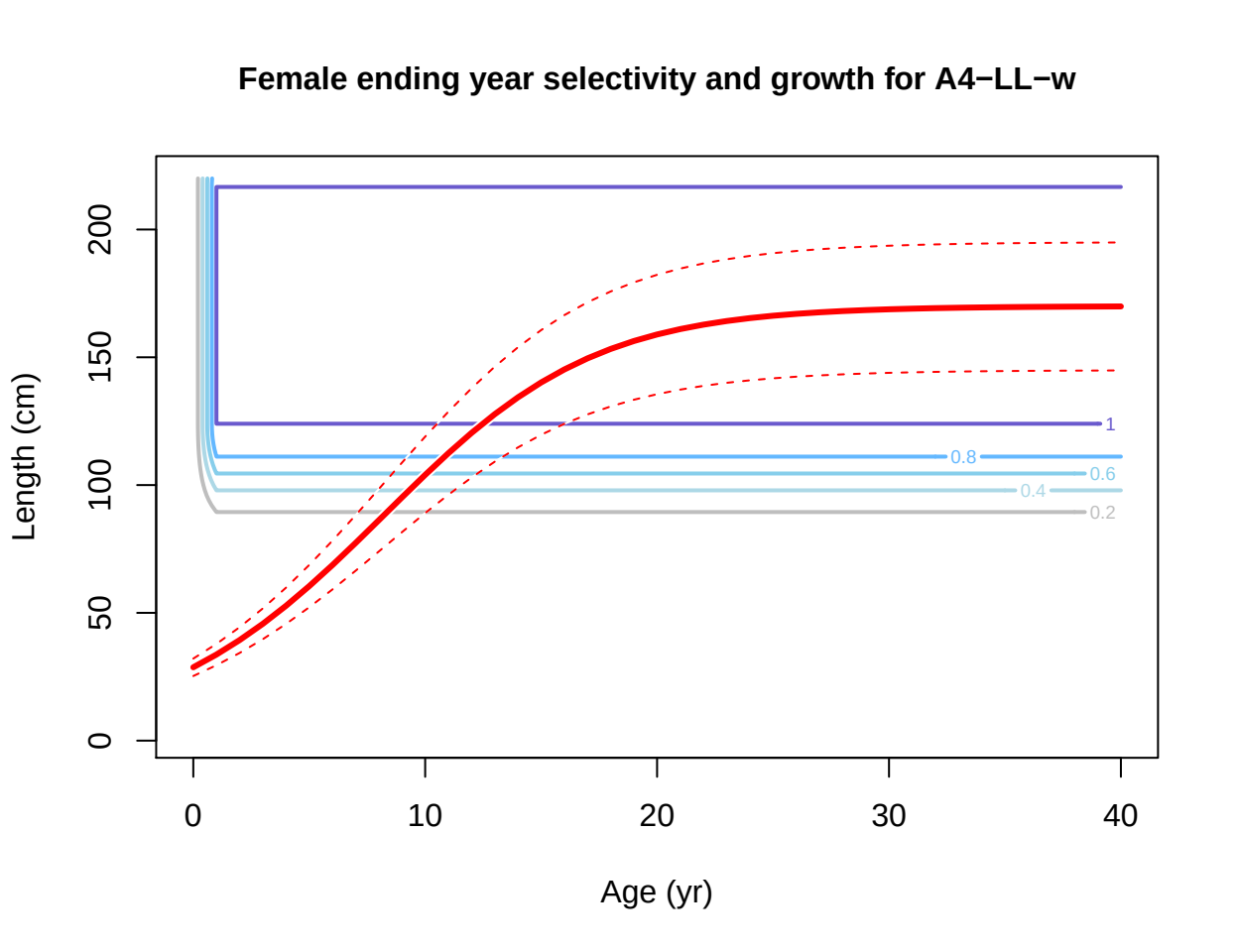

Male ending year selectivity and growth for A1−LL−w
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

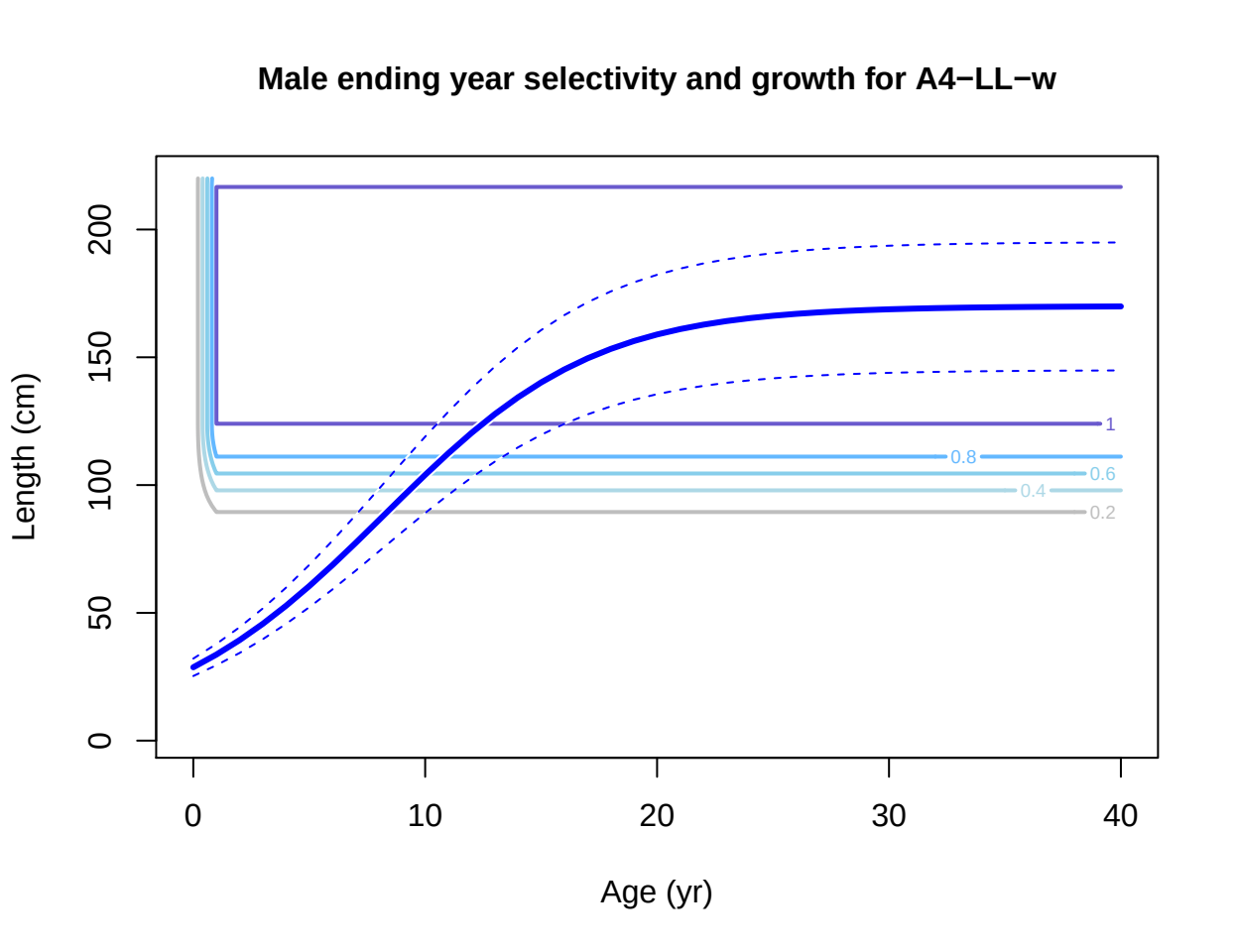

Female ending year selectivity and growth for A2−LL−w
Length (cm)
0
50
100
150
200
Age (yr)
0
10
20
30
40
1
0.8
0.6
0.4
0.2

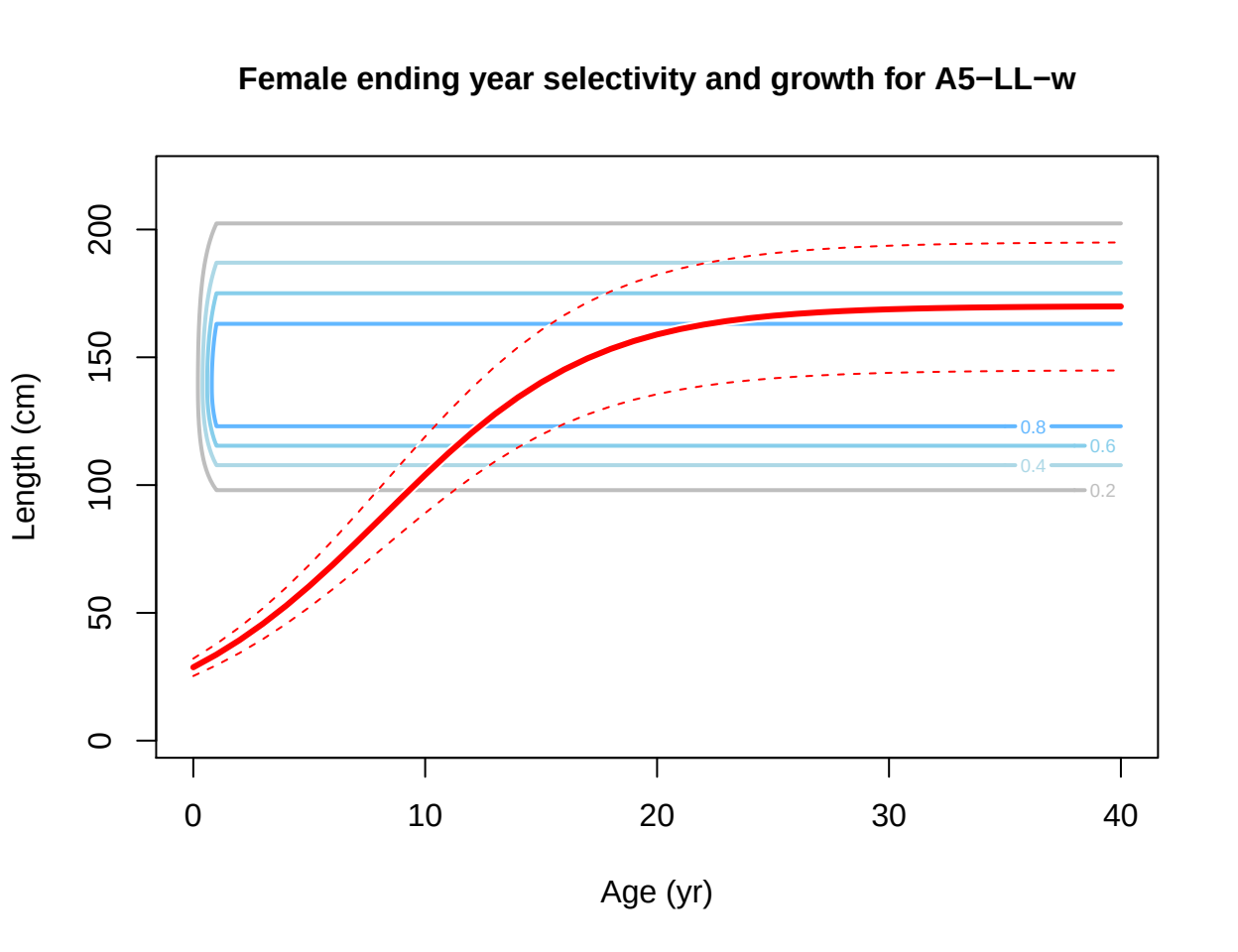

Male ending year selectivity and growth for A2−LL−w
Length (cm)
0
50
100
150
200
Age (yr)
0
10
20
30
40
1
0.8
0.6
0.4
0.2

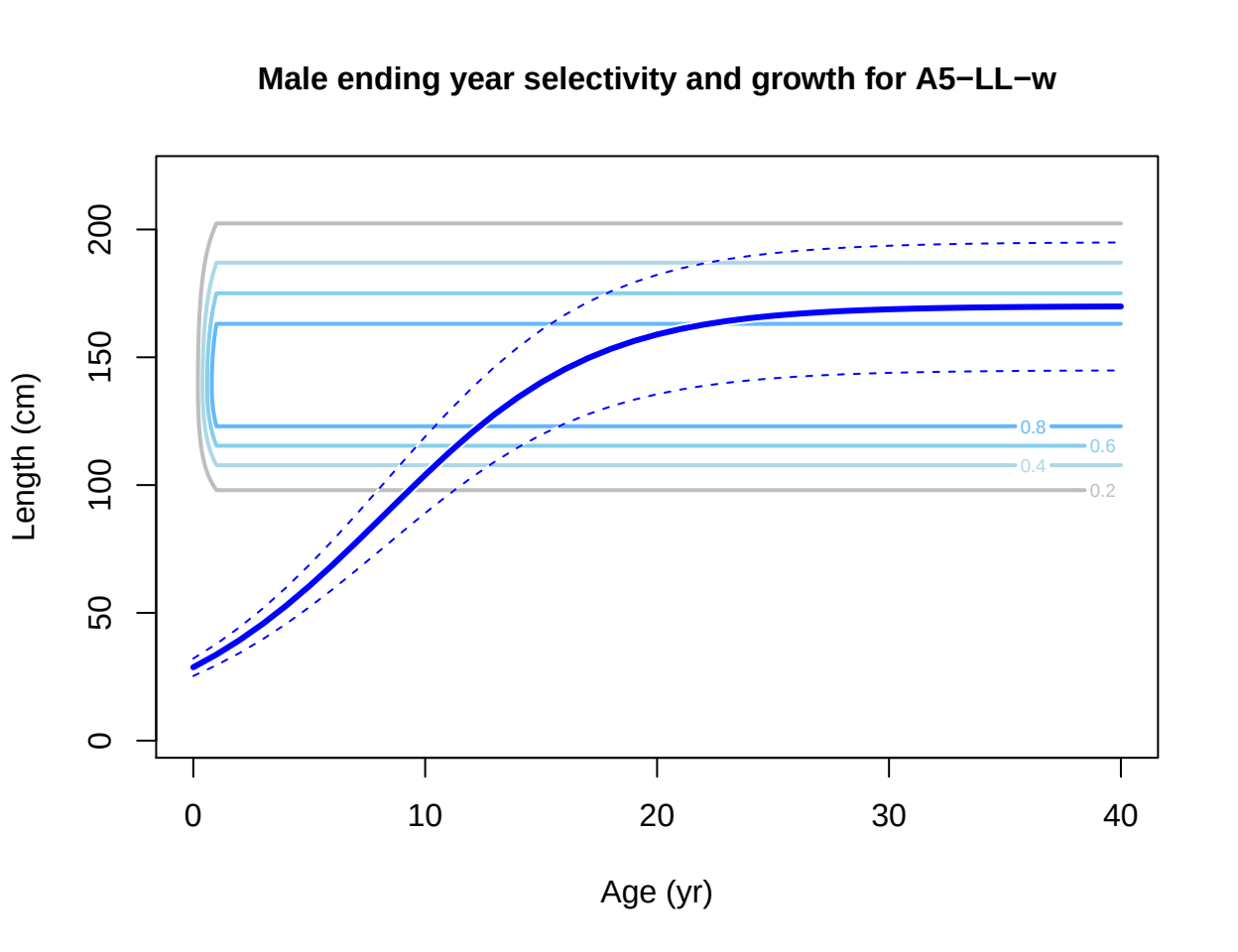

Female ending year selectivity and growth for A3−LL−w
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

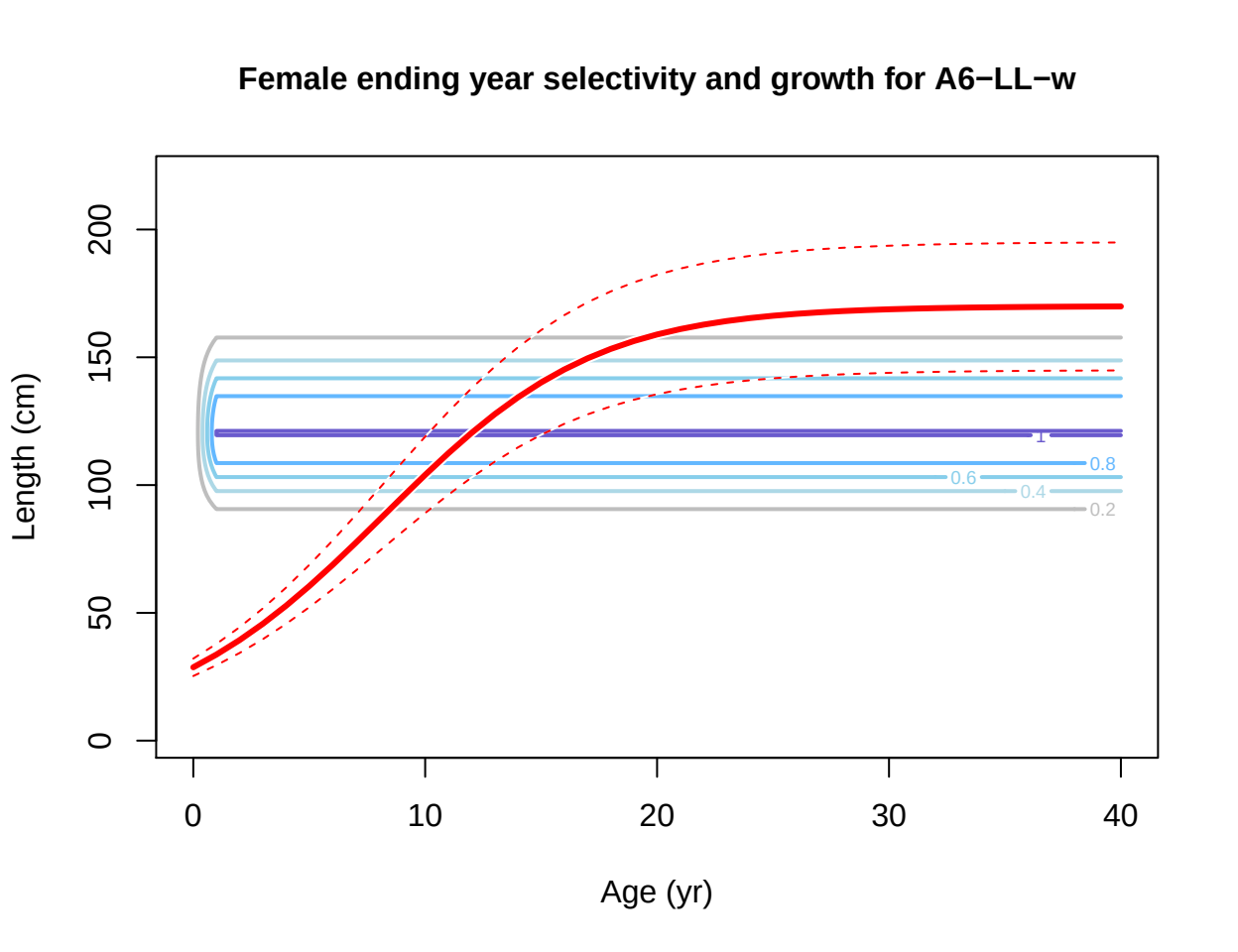

Male ending year selectivity and growth for A3−LL−w
Length (cm)
0
50
100
150
200
Age (yr)
0
10
20
30
40
1
0.8
0.6
0.4
0.2

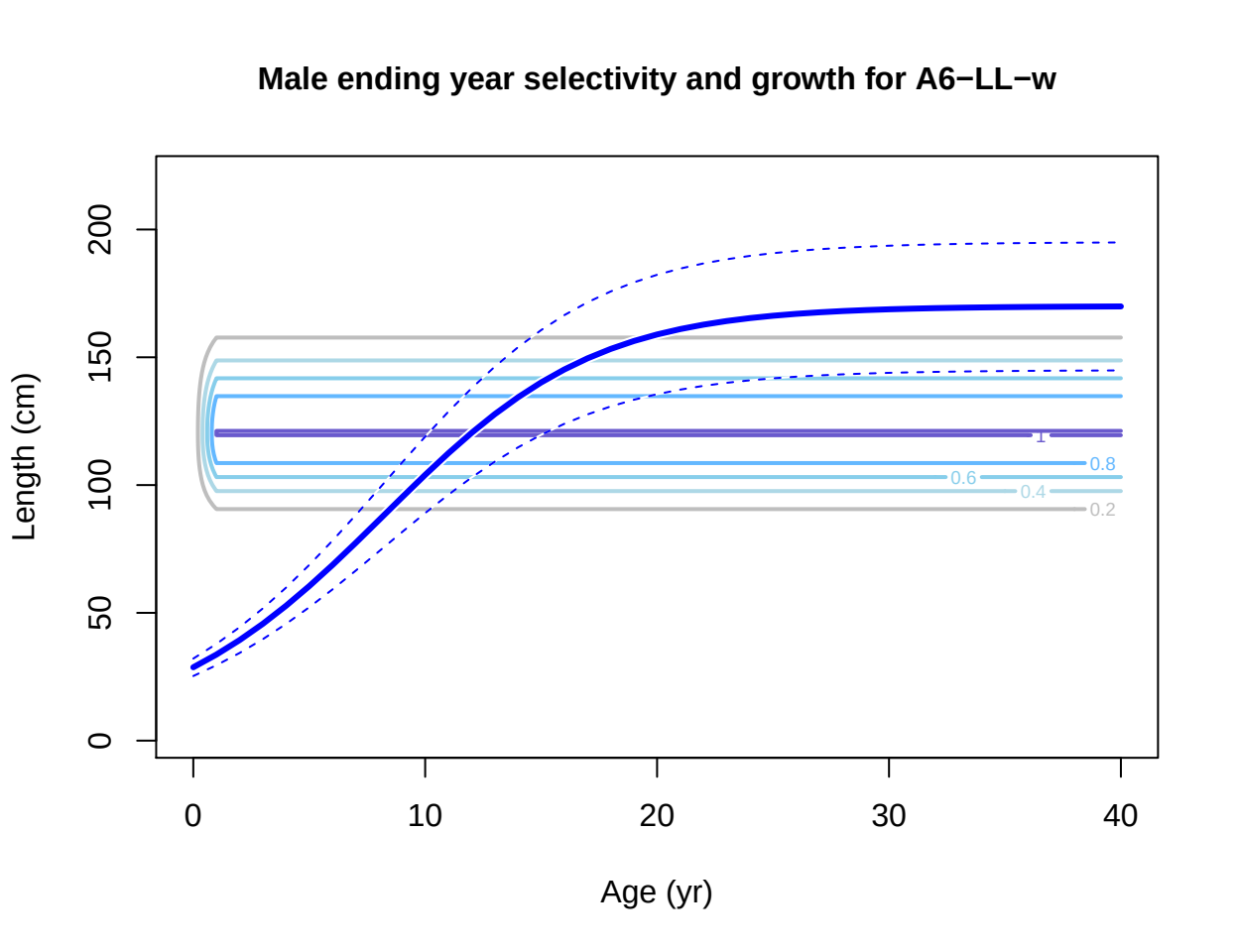

Female ending year selectivity and growth for A4−LL−w
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

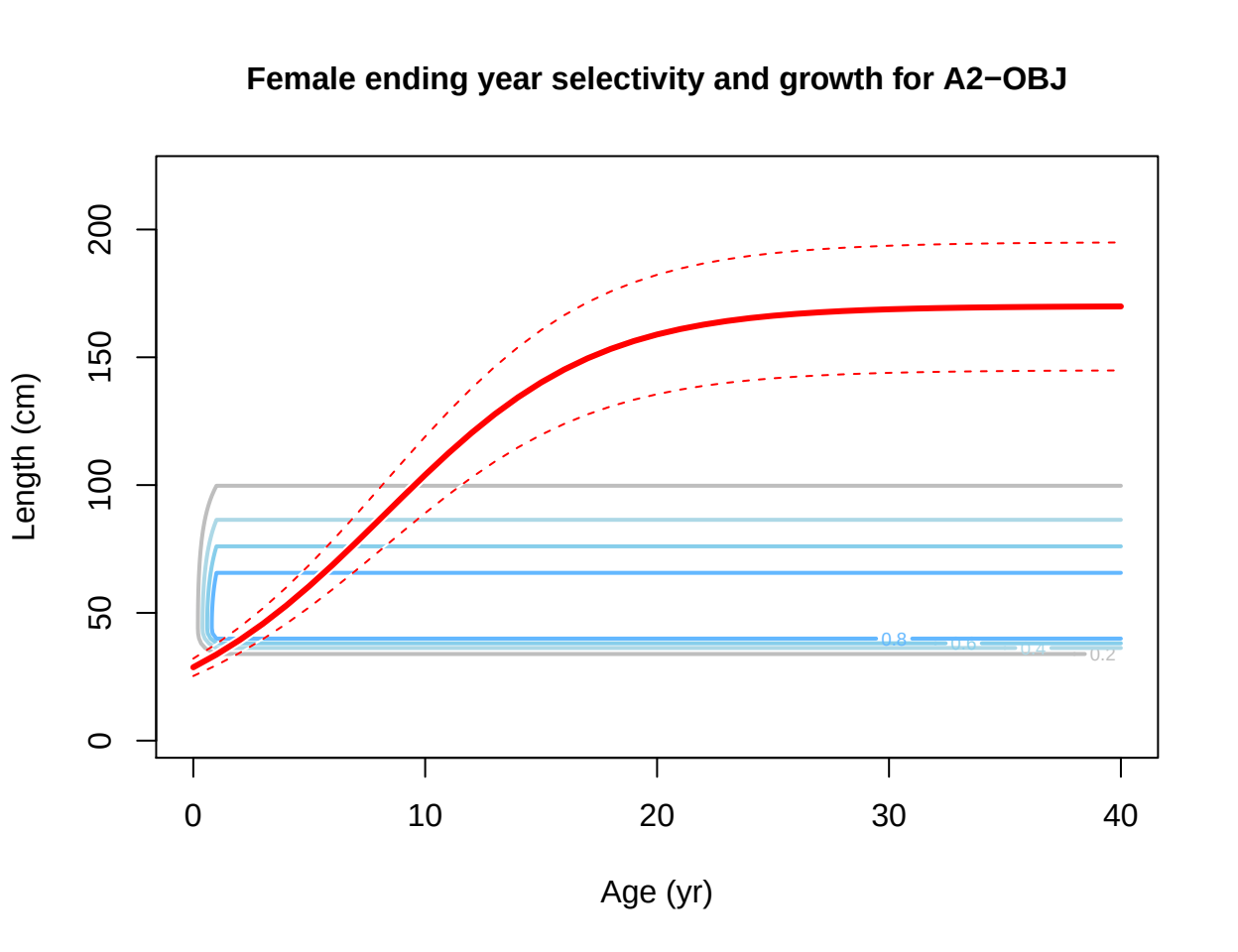

Male ending year selectivity and growth for A4−LL−w
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

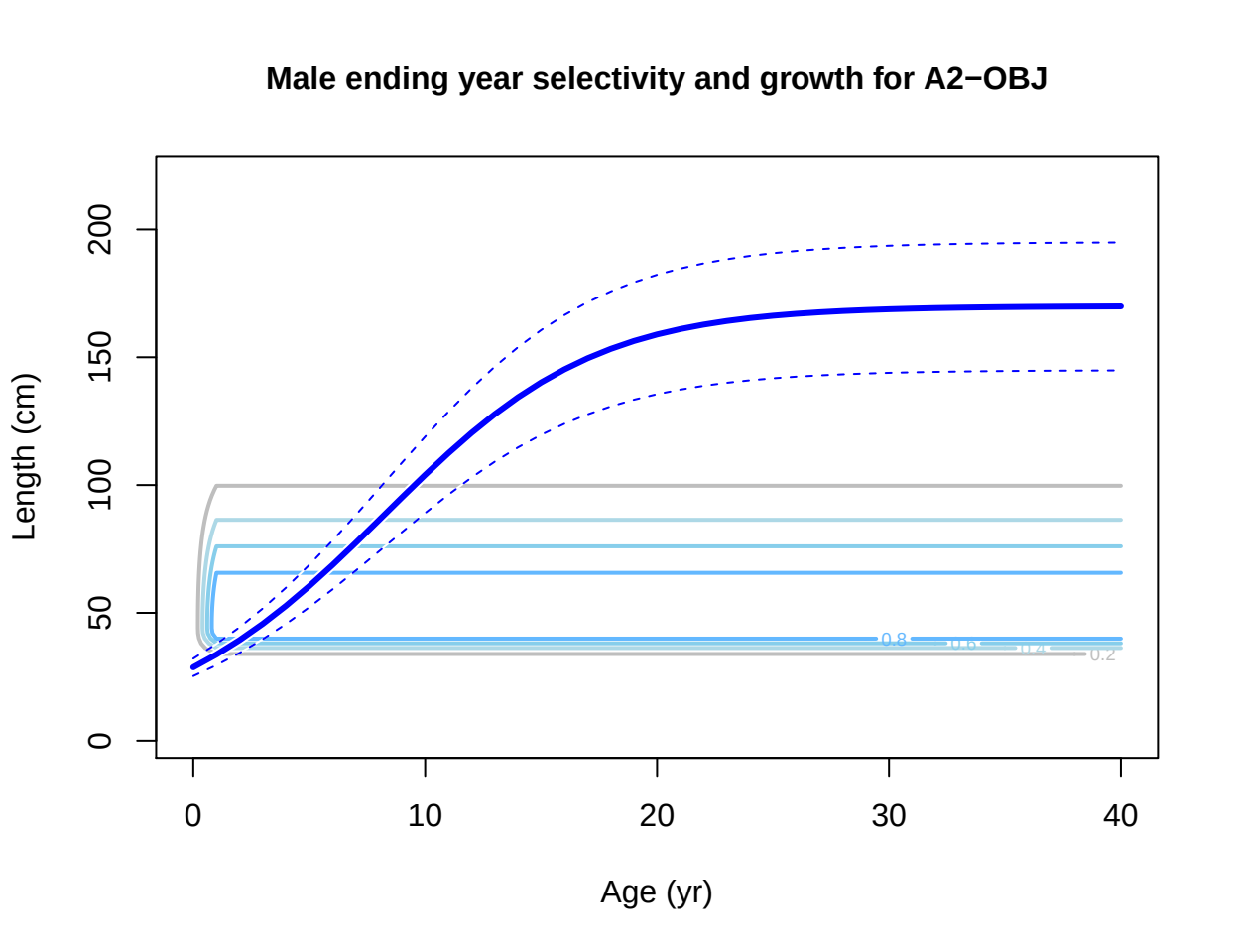

Female ending year selectivity and growth for A5−LL−w
Length (cm)
0
50
100
150
200
0.8
0.6
0.4
0.2
0
10
20
30
40
Age (yr)

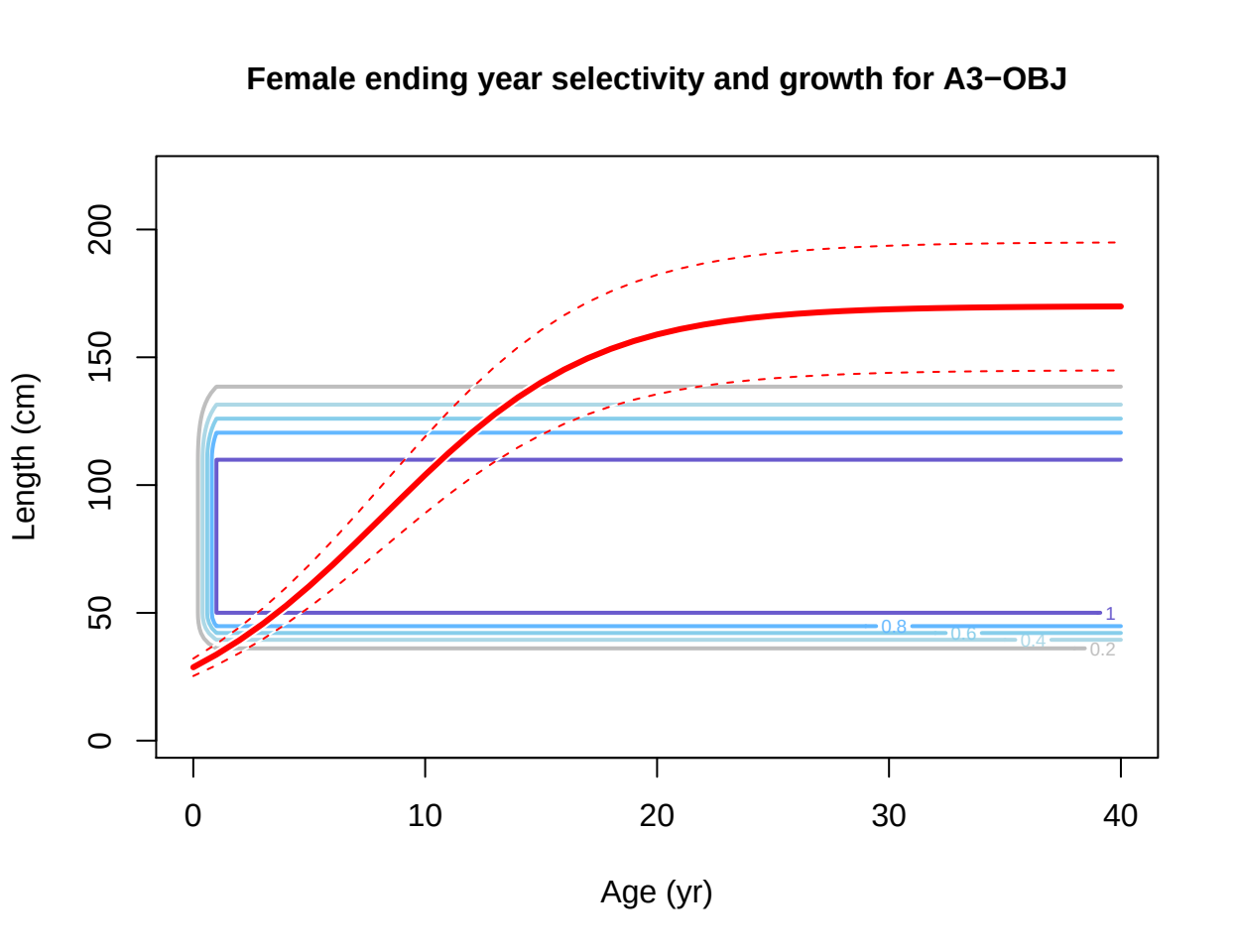

Male ending year selectivity and growth for A5−LL−w
Length (cm)
0
50
100
150
200
0.8
0.6
0.4
0.2
0
10
20
30
40
Age (yr)

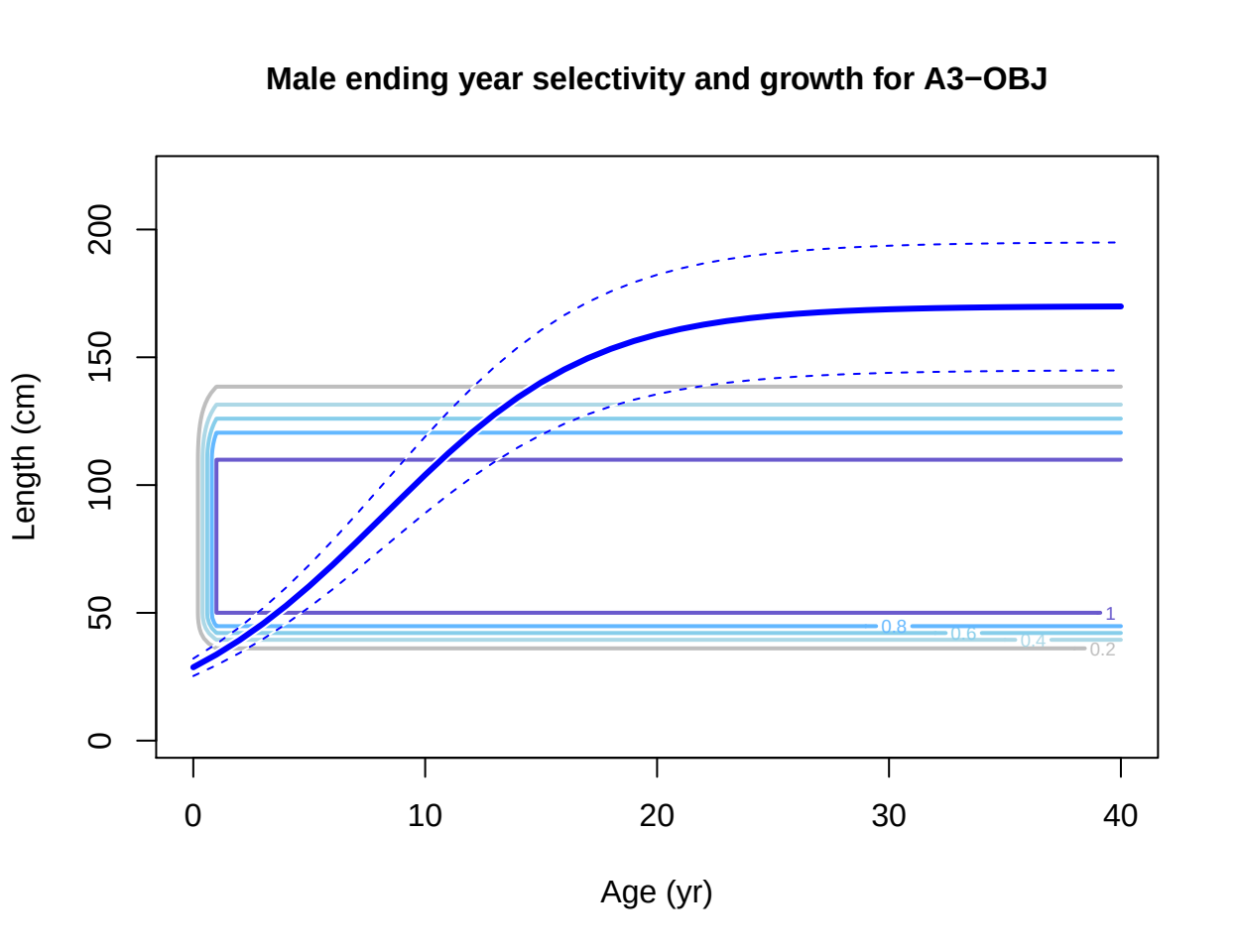

Female ending year selectivity and growth for A6−LL−w
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

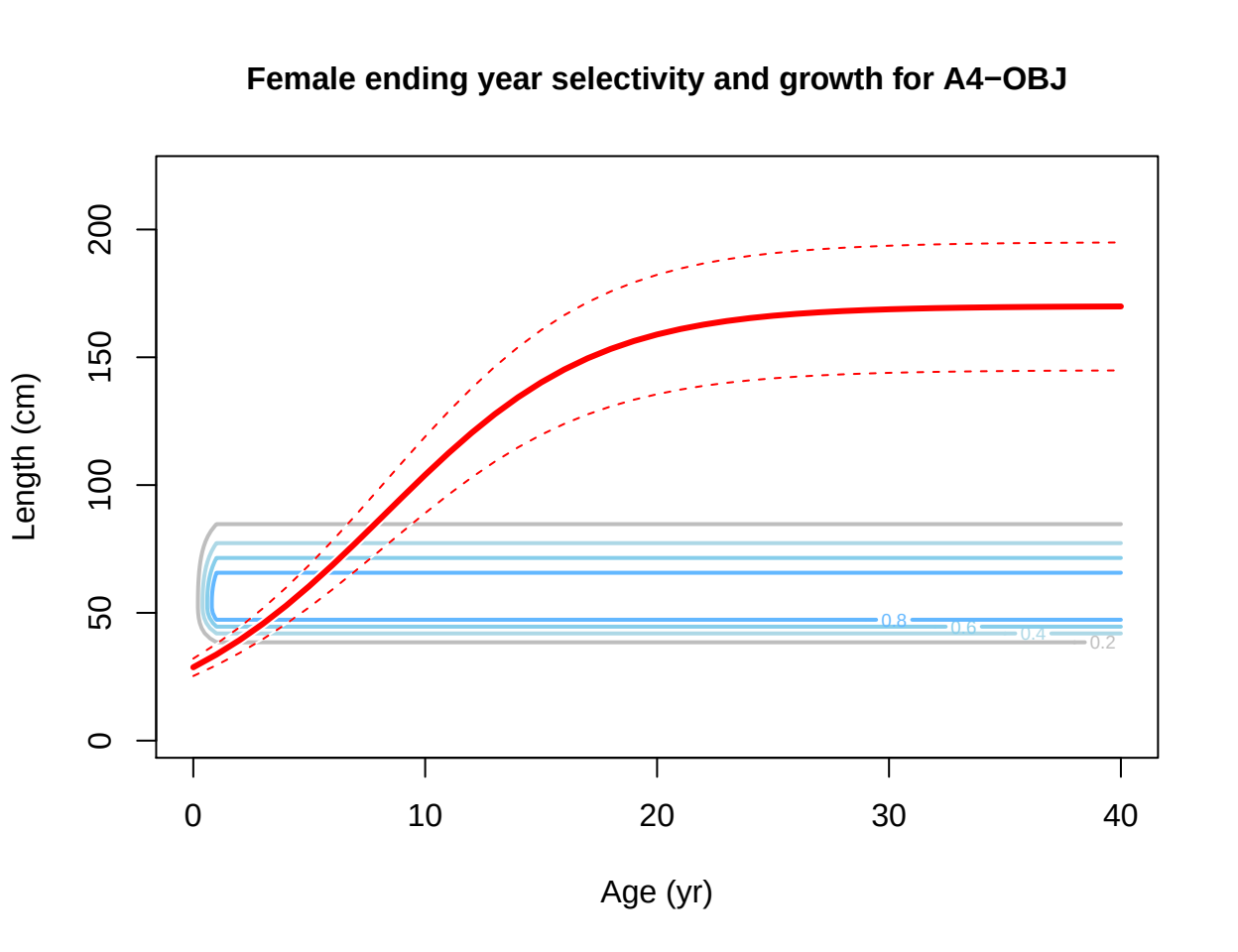

Male ending year selectivity and growth for A6−LL−w
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

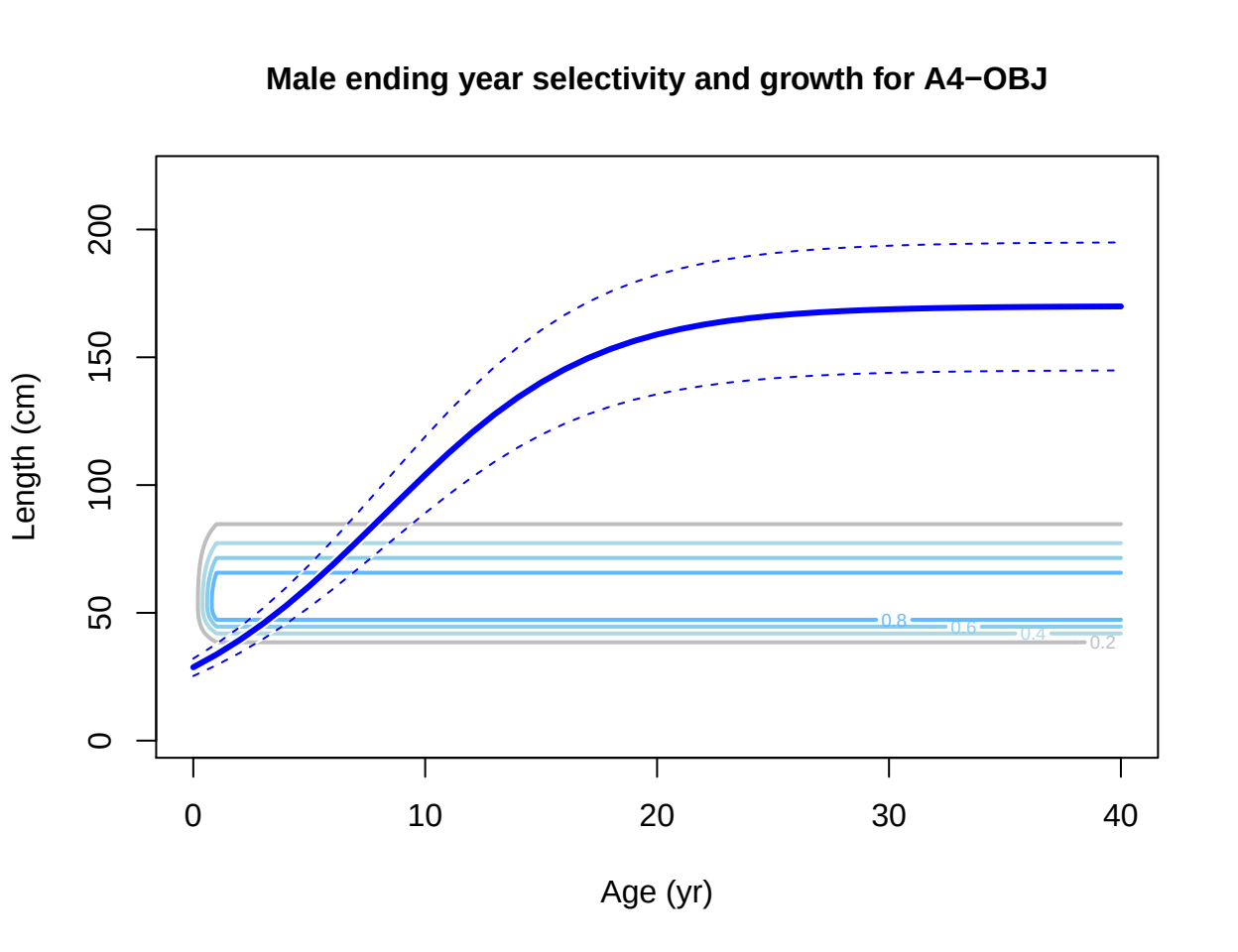

Female ending year selectivity and growth for A2−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
0.8
0.2

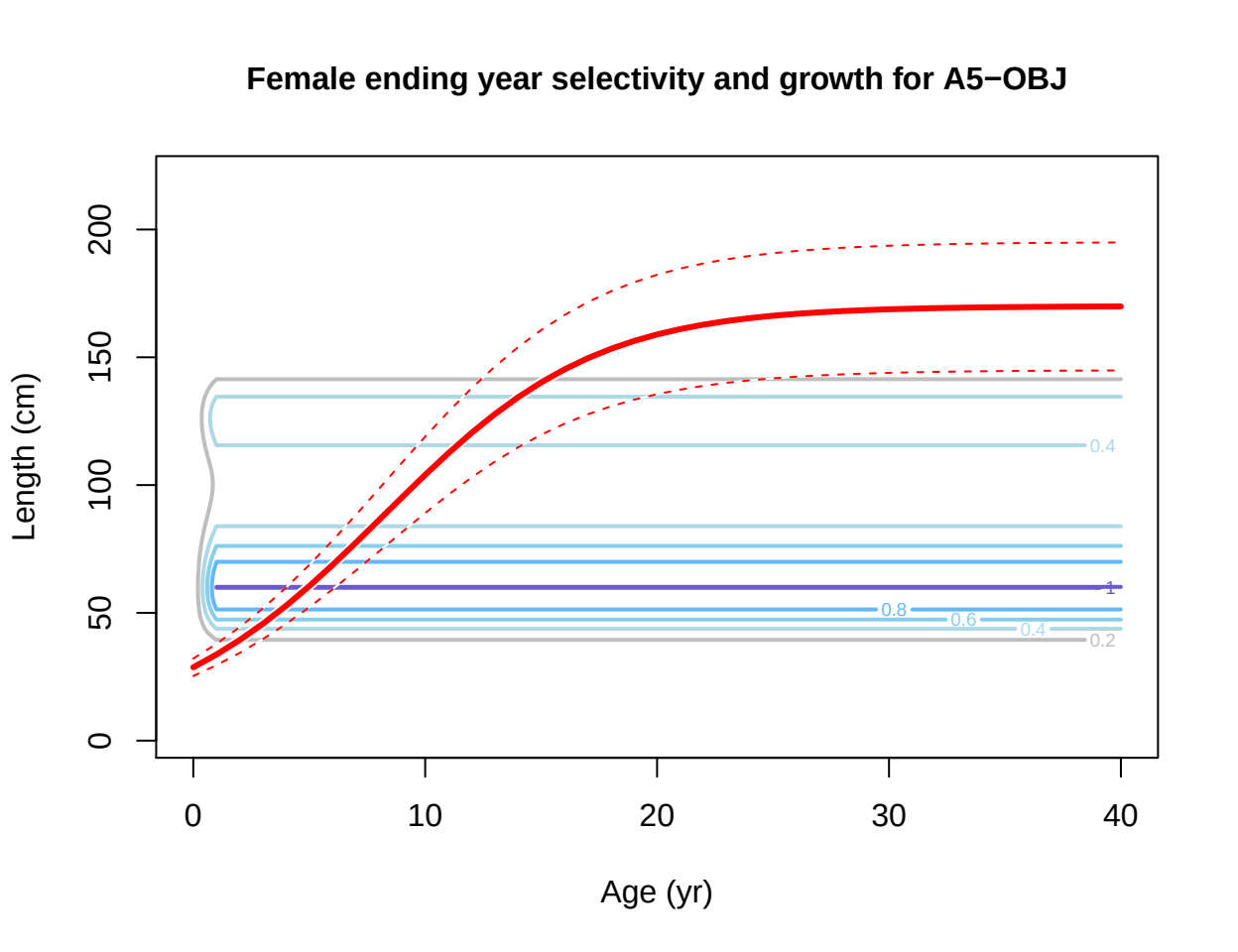

Male ending year selectivity and growth for A2−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
0.8
0.2

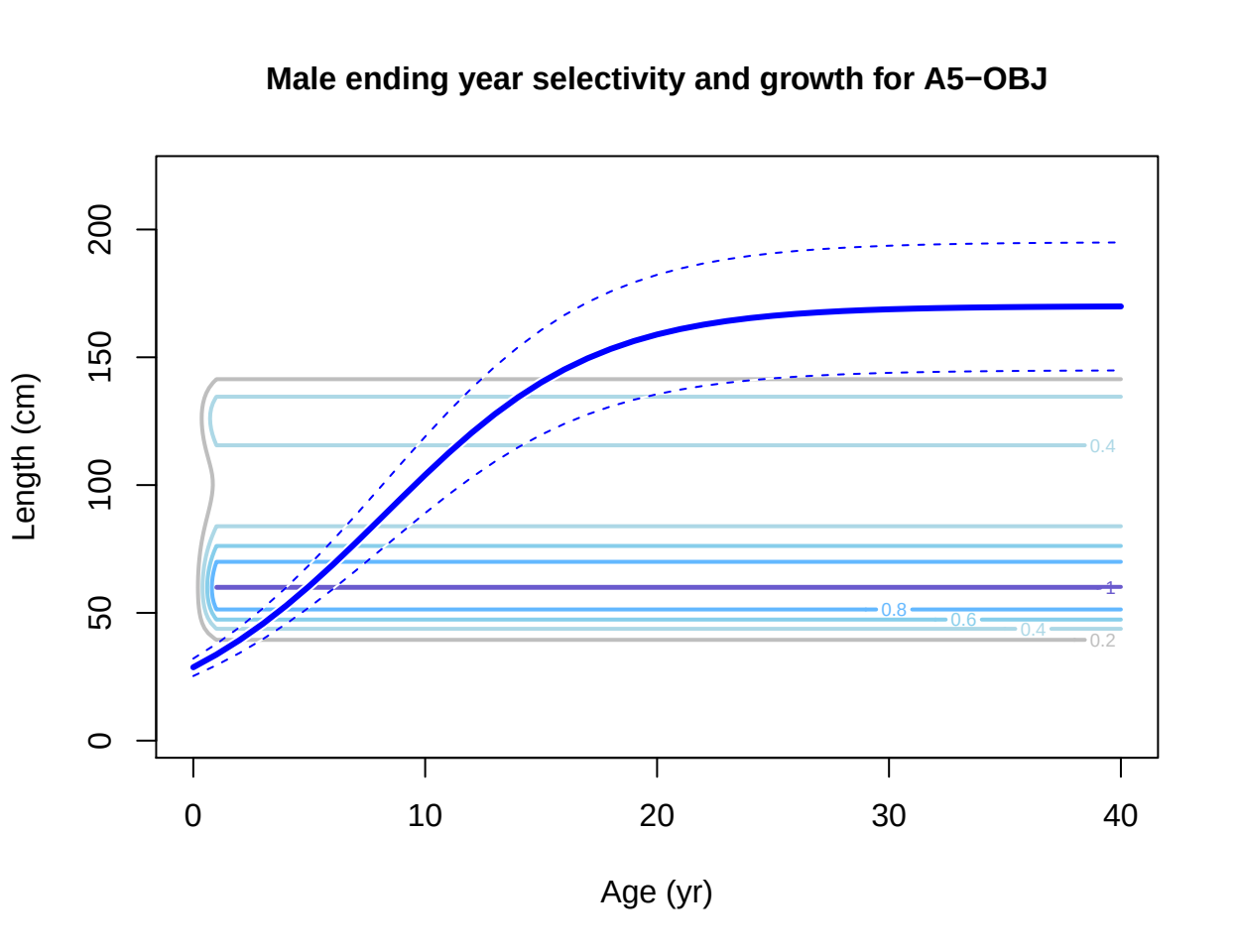

Female ending year selectivity and growth for A3−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

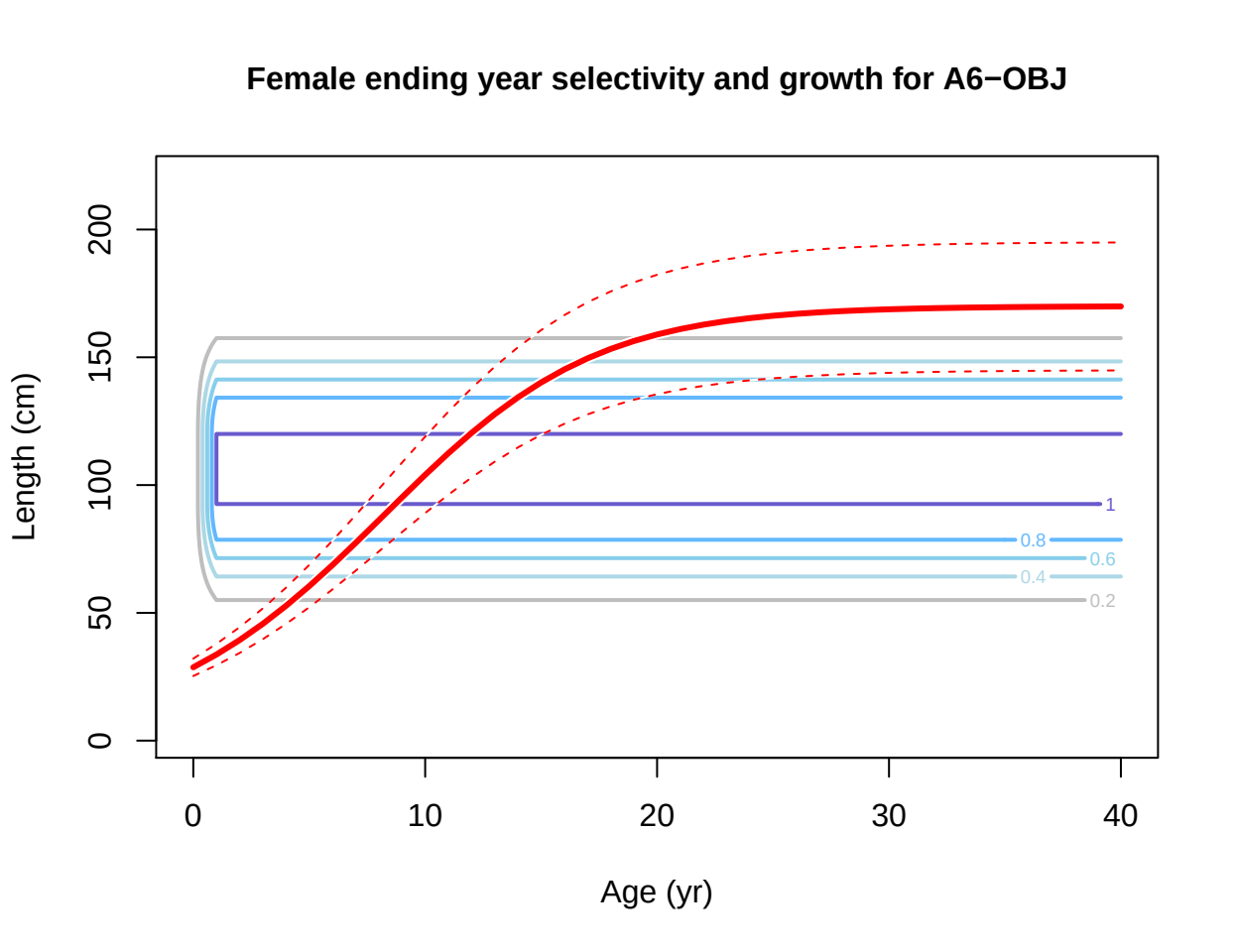

Male ending year selectivity and growth for A3−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

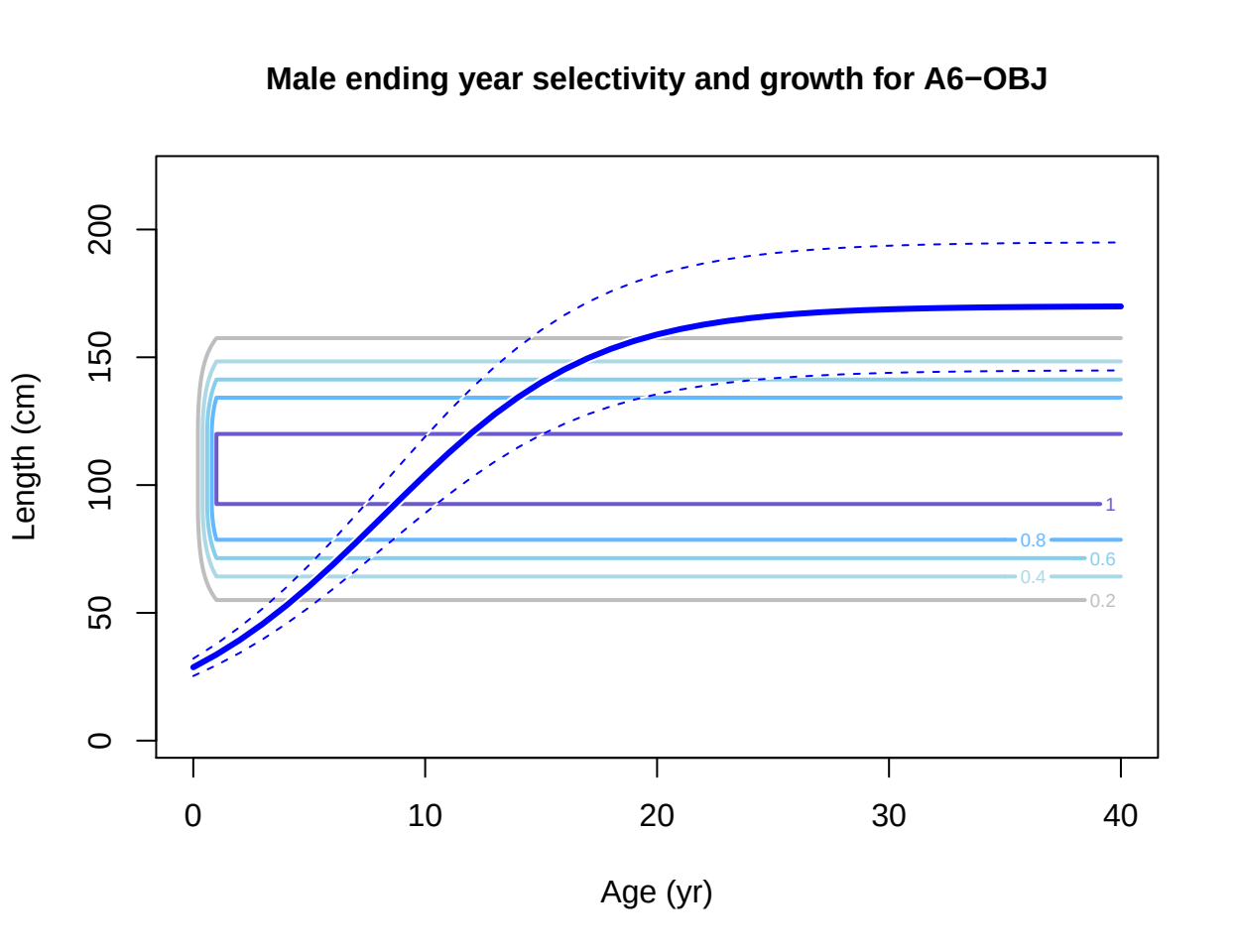

Female ending year selectivity and growth for A4−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
0.8
0.6
0.4
0.2

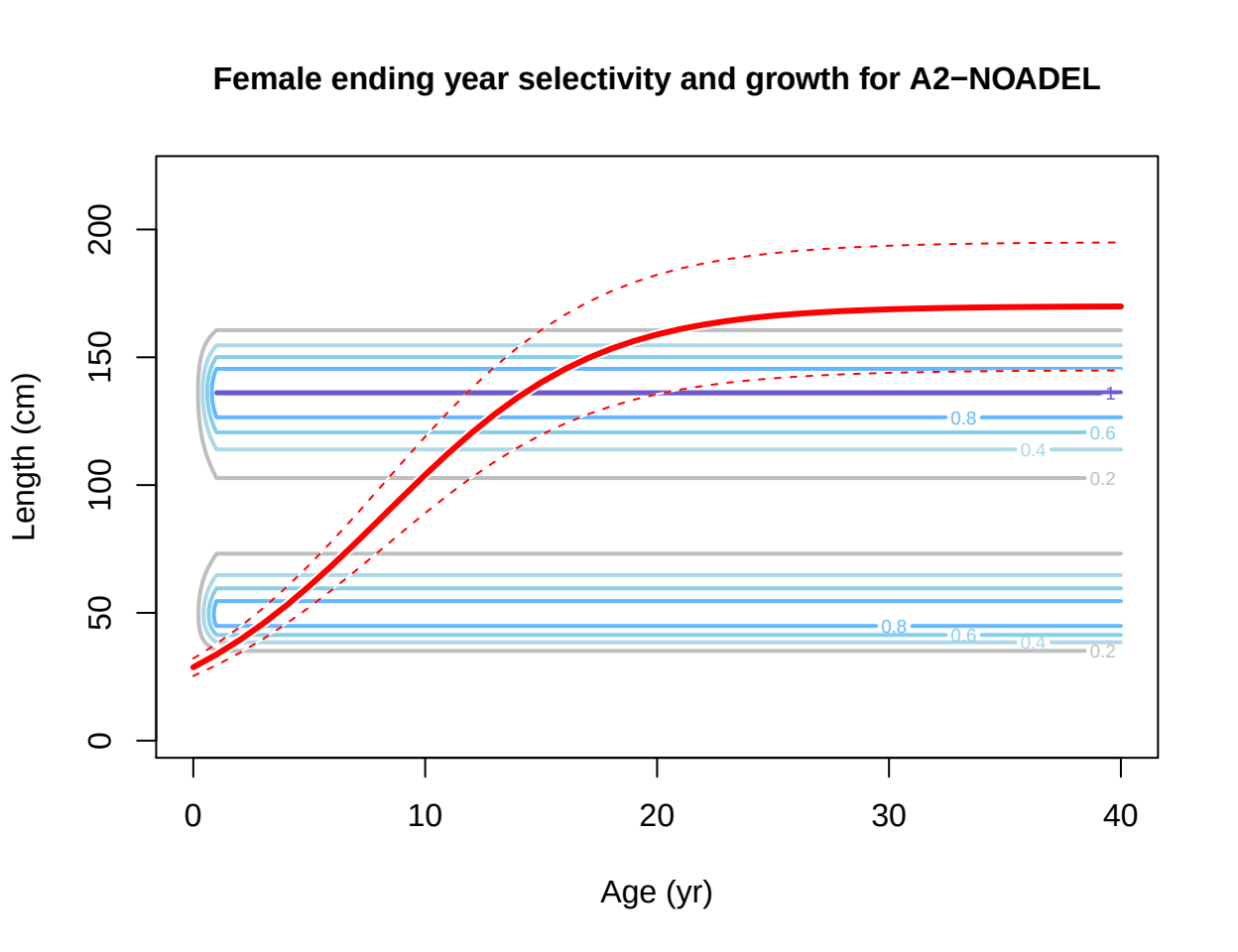

Male ending year selectivity and growth for A4−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
0.8
0.6
0.4
0.2

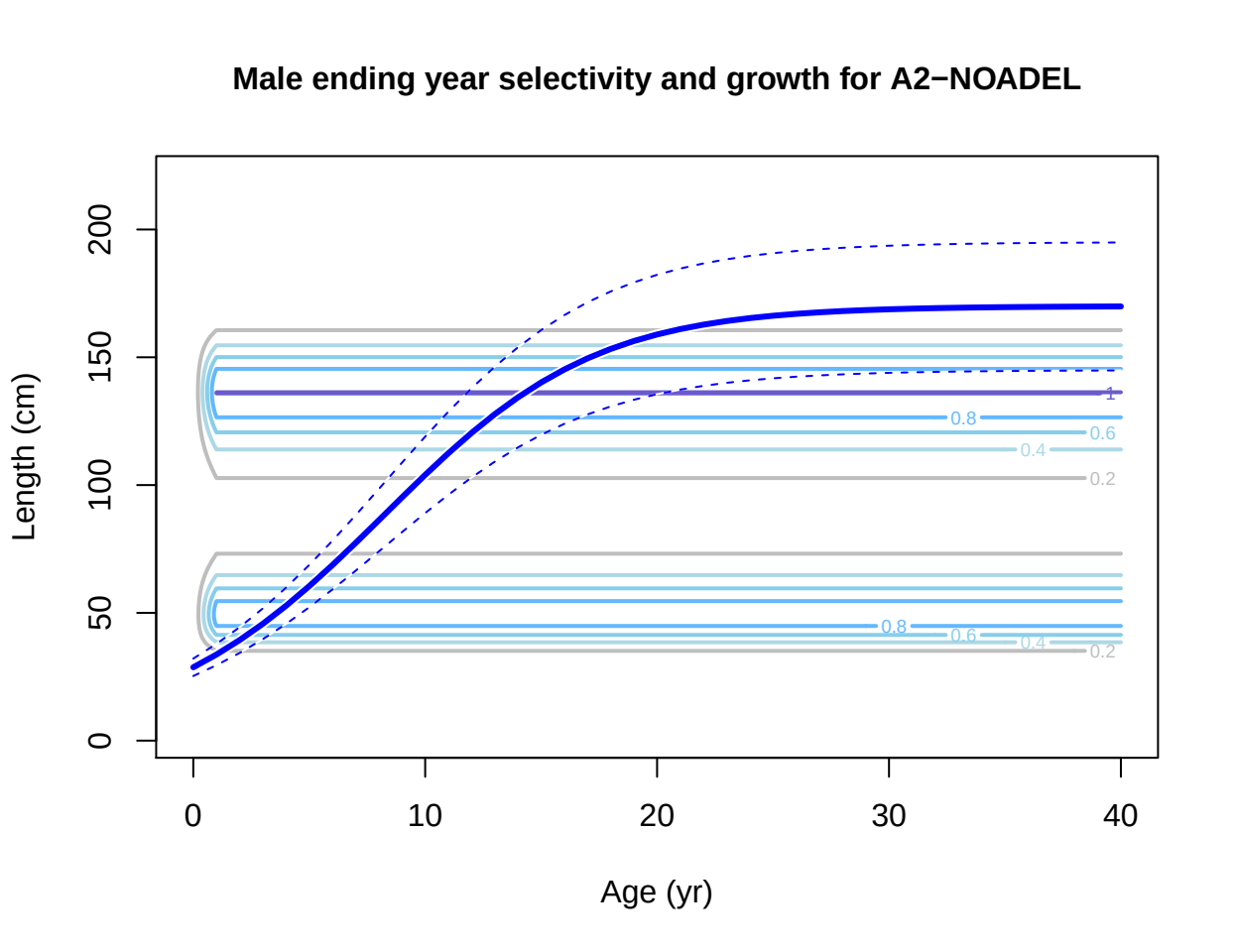

Female ending year selectivity and growth for A5−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
0.4
1
0.8
0.6
0.4
0.2

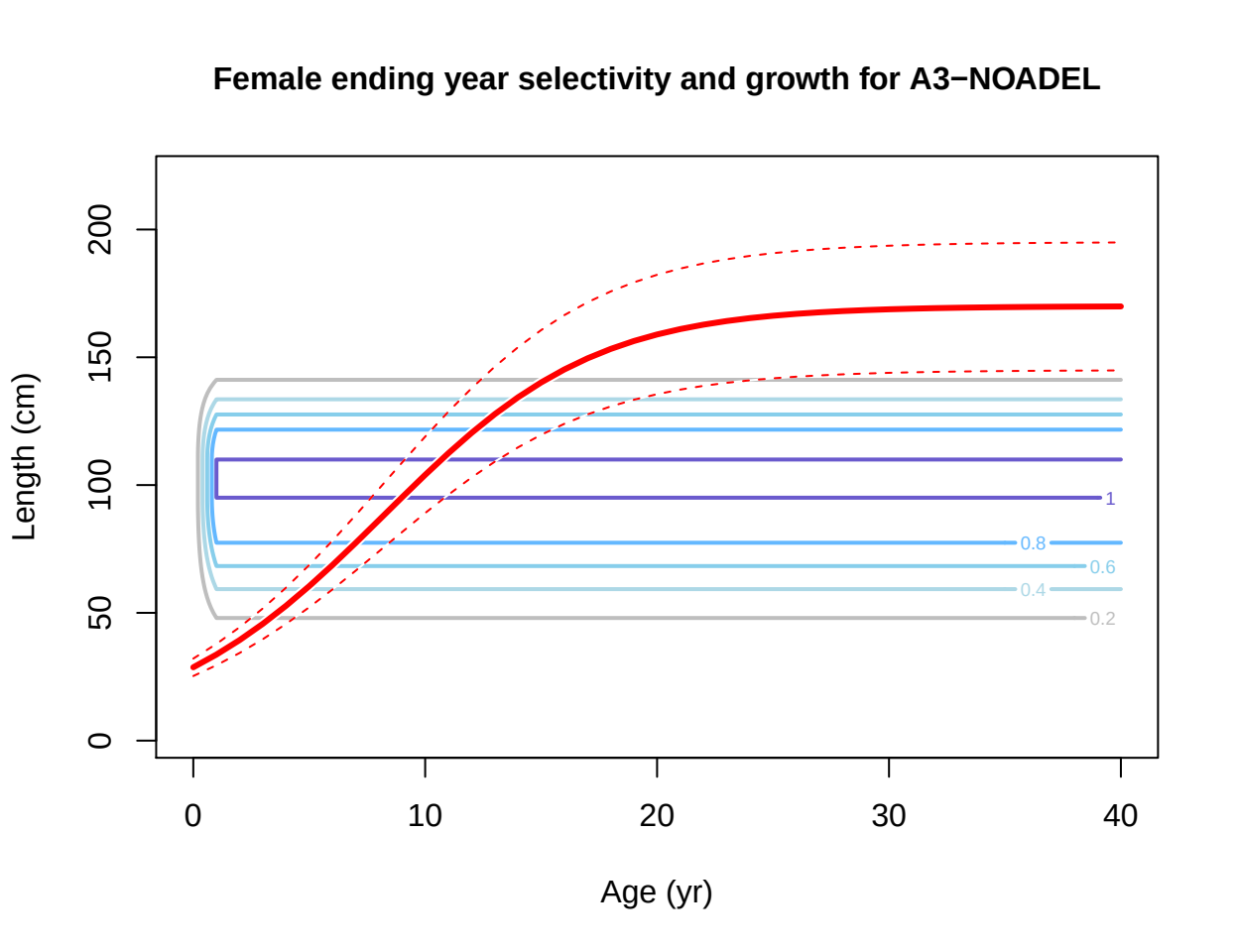

Male ending year selectivity and growth for A5−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
0.4
1
0.8
0.6
0.4
0.2

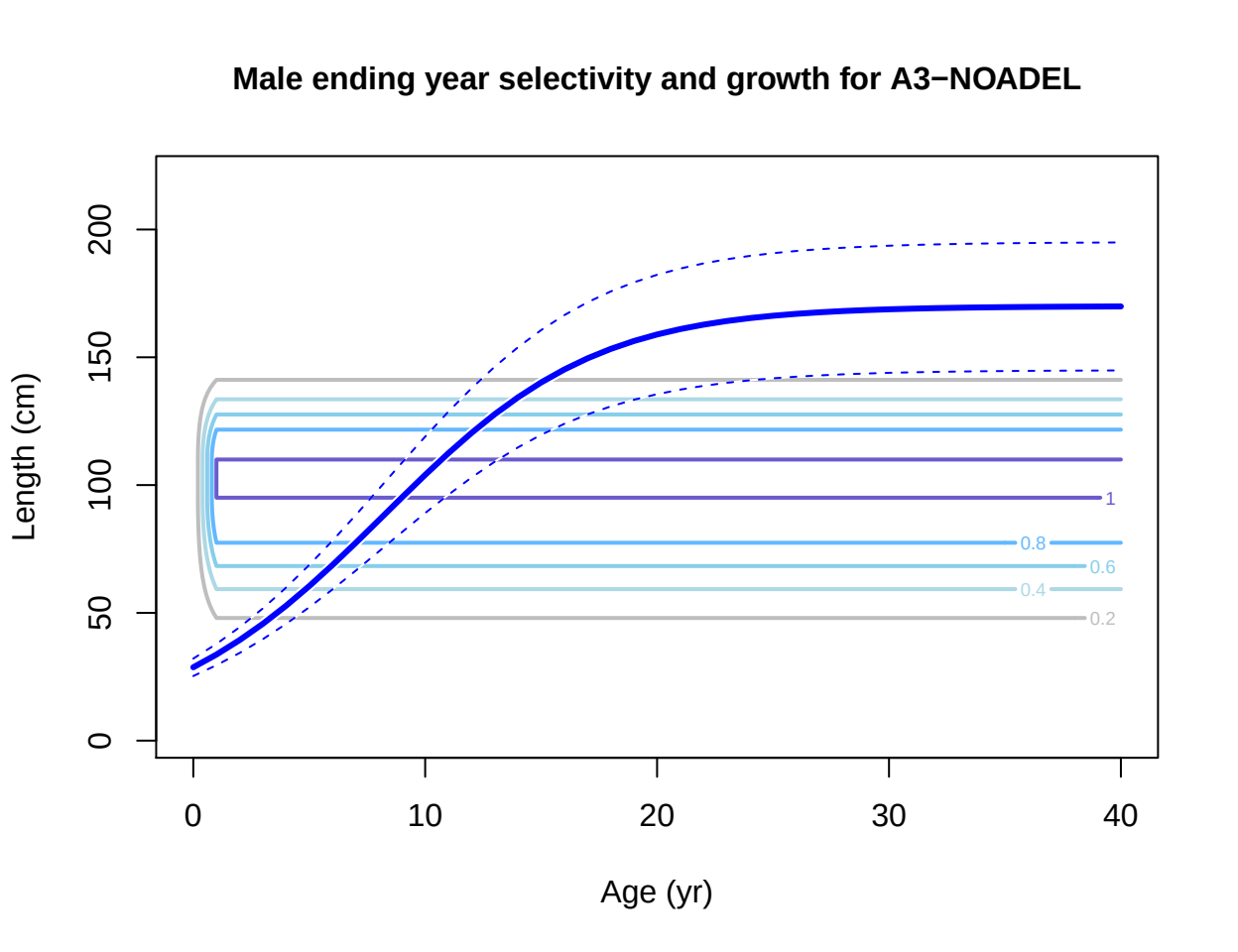

Female ending year selectivity and growth for A6−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

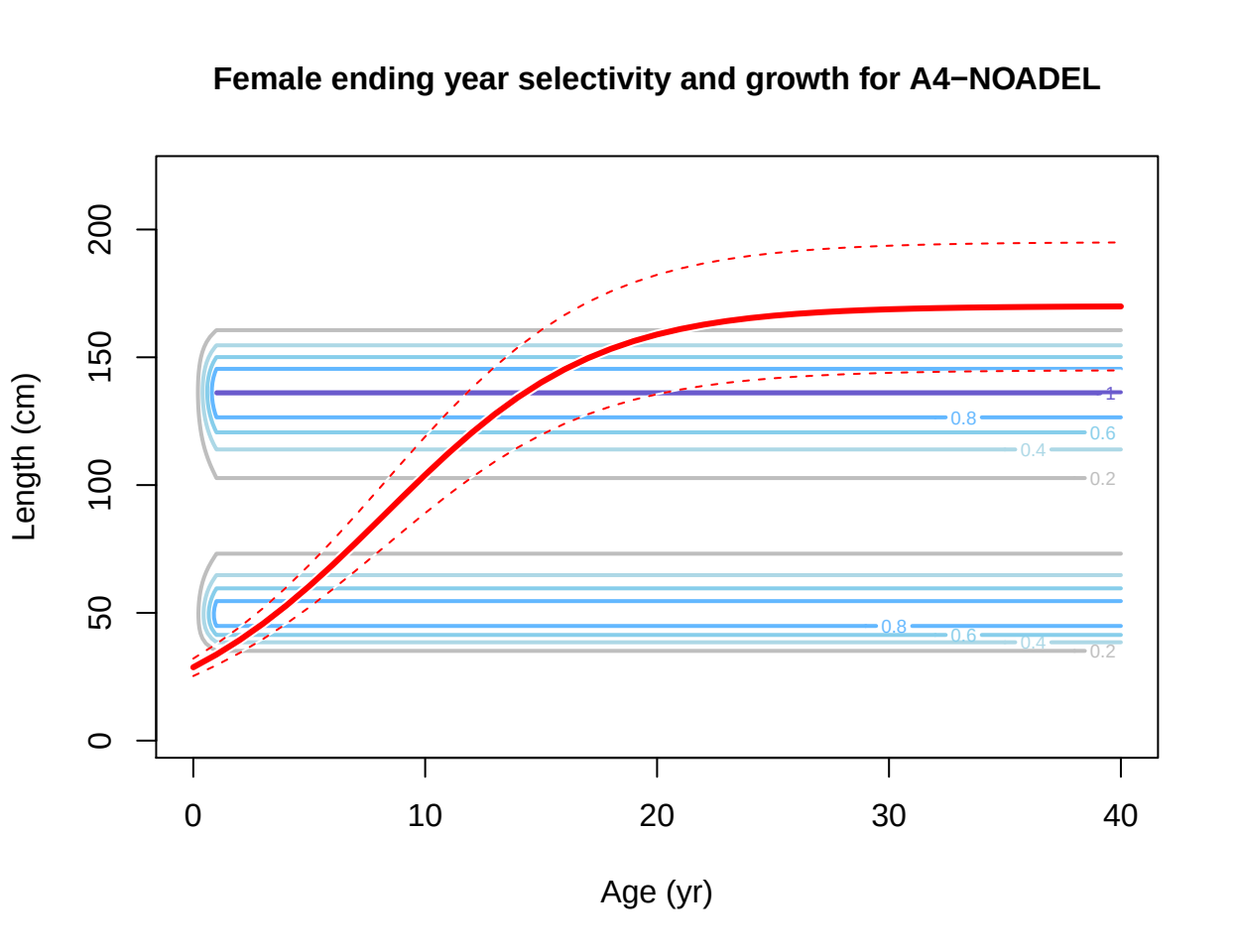

Male ending year selectivity and growth for A6−OBJ
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

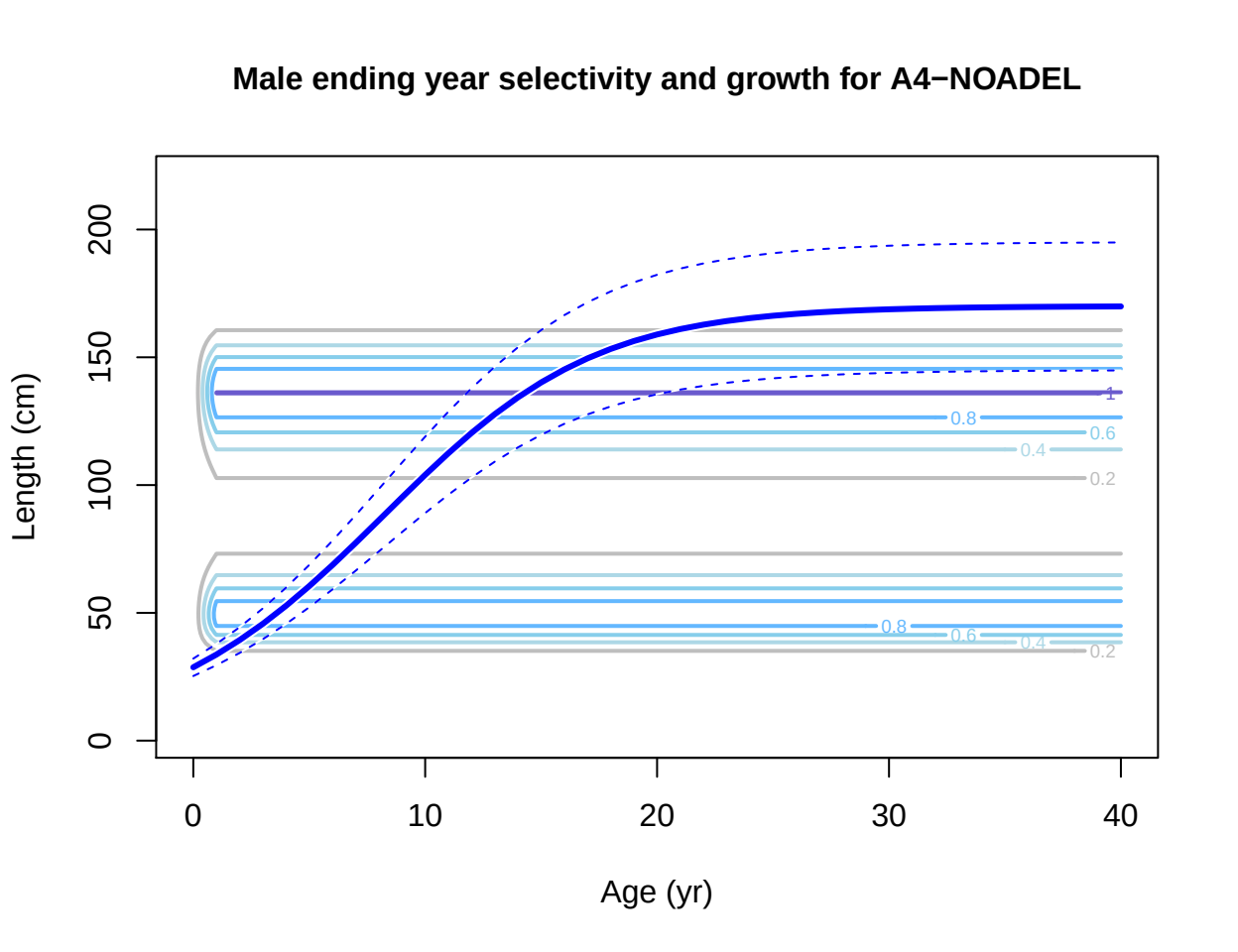

Female ending year selectivity and growth for A2−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

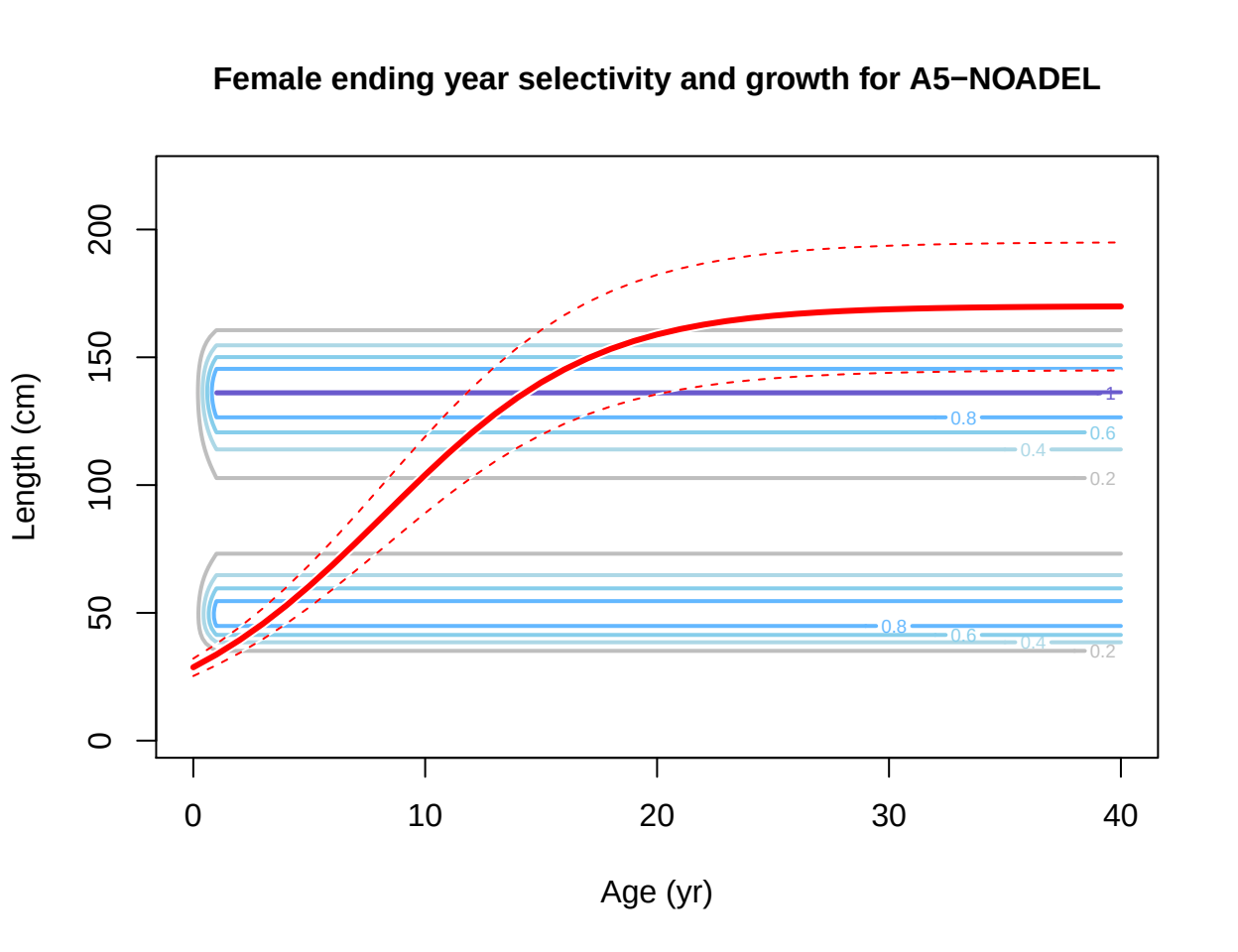

Male ending year selectivity and growth for A2−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

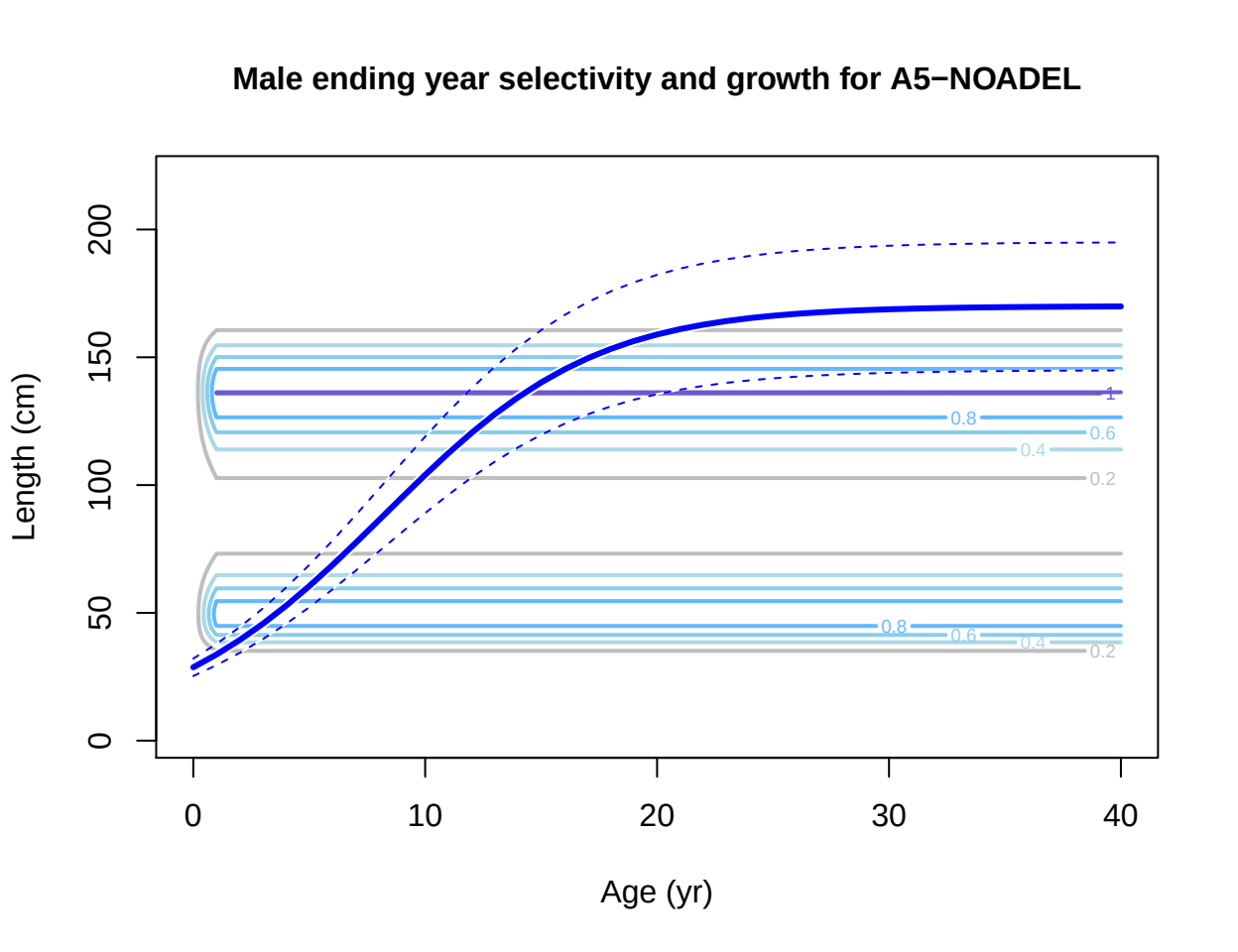

Female ending year selectivity and growth for A3−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

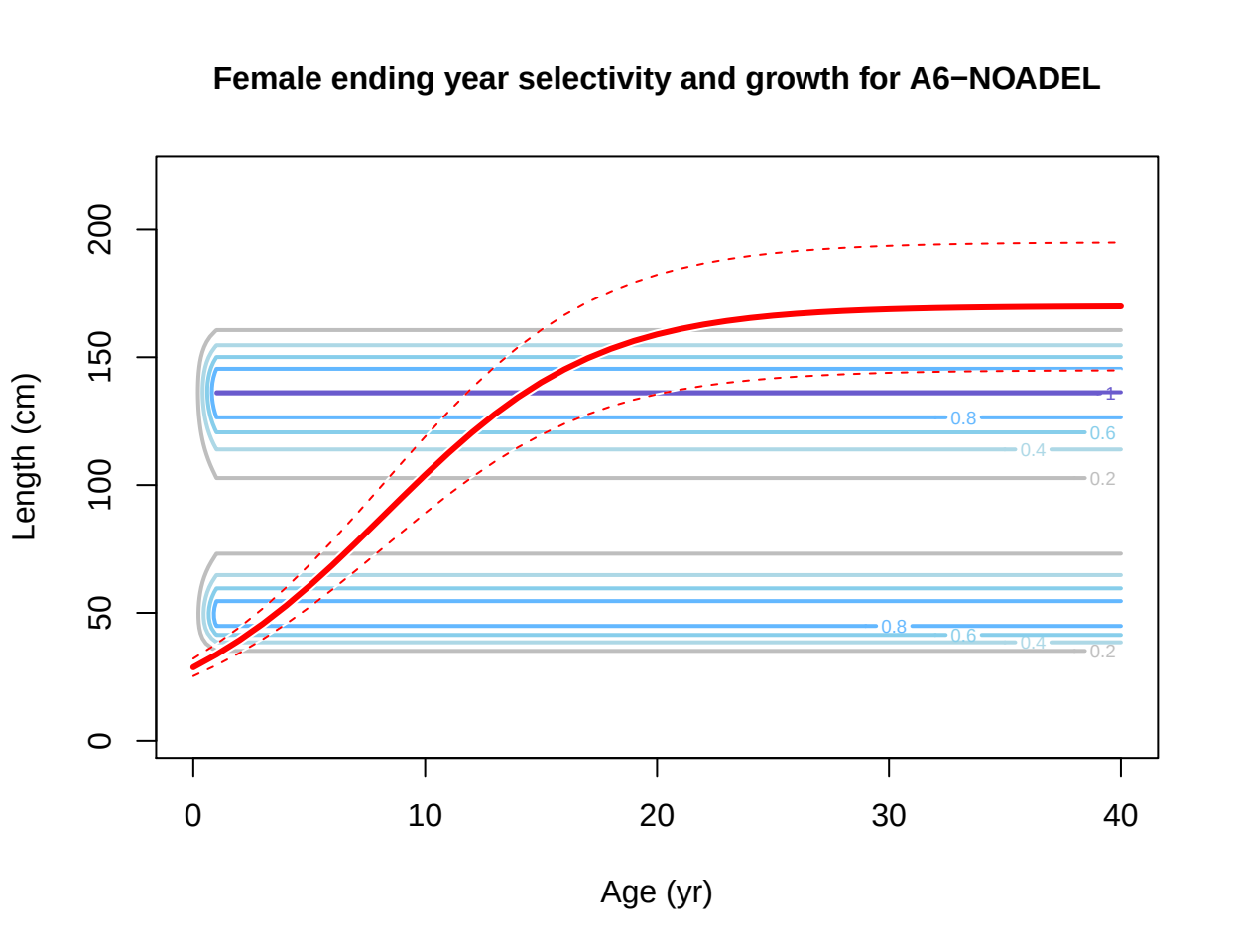

Male ending year selectivity and growth for A3−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

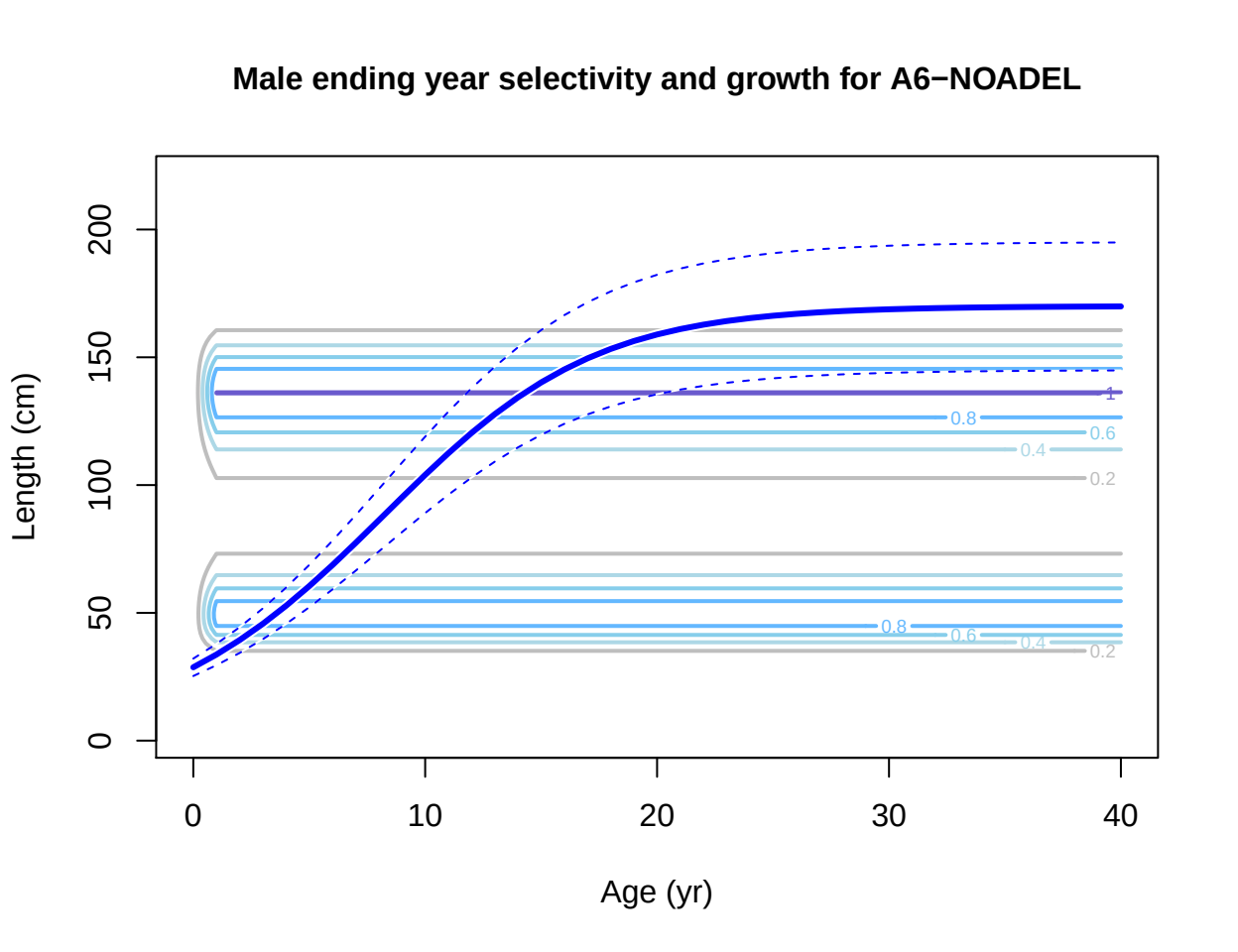

Female ending year selectivity and growth for A4−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

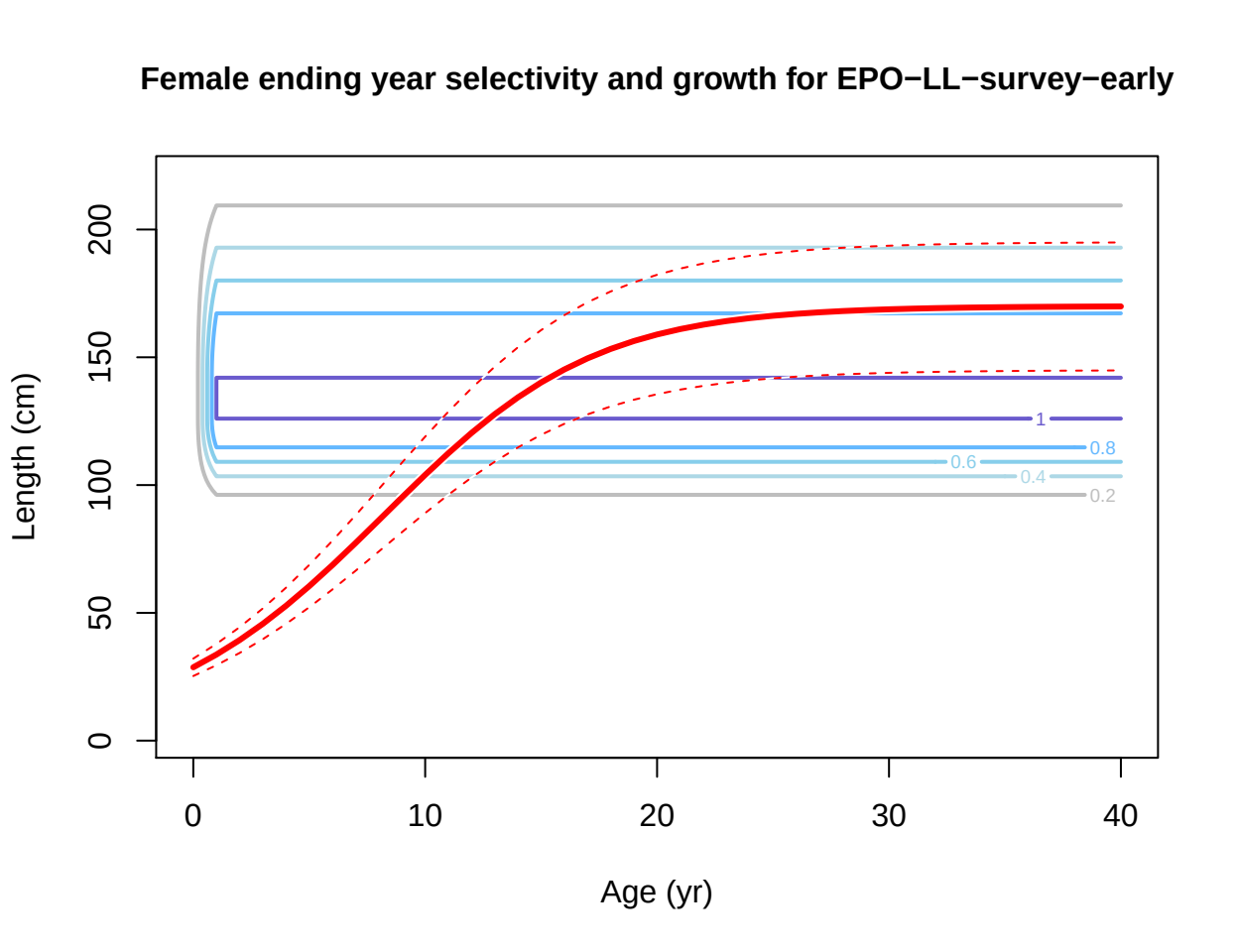

Male ending year selectivity and growth for A4−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

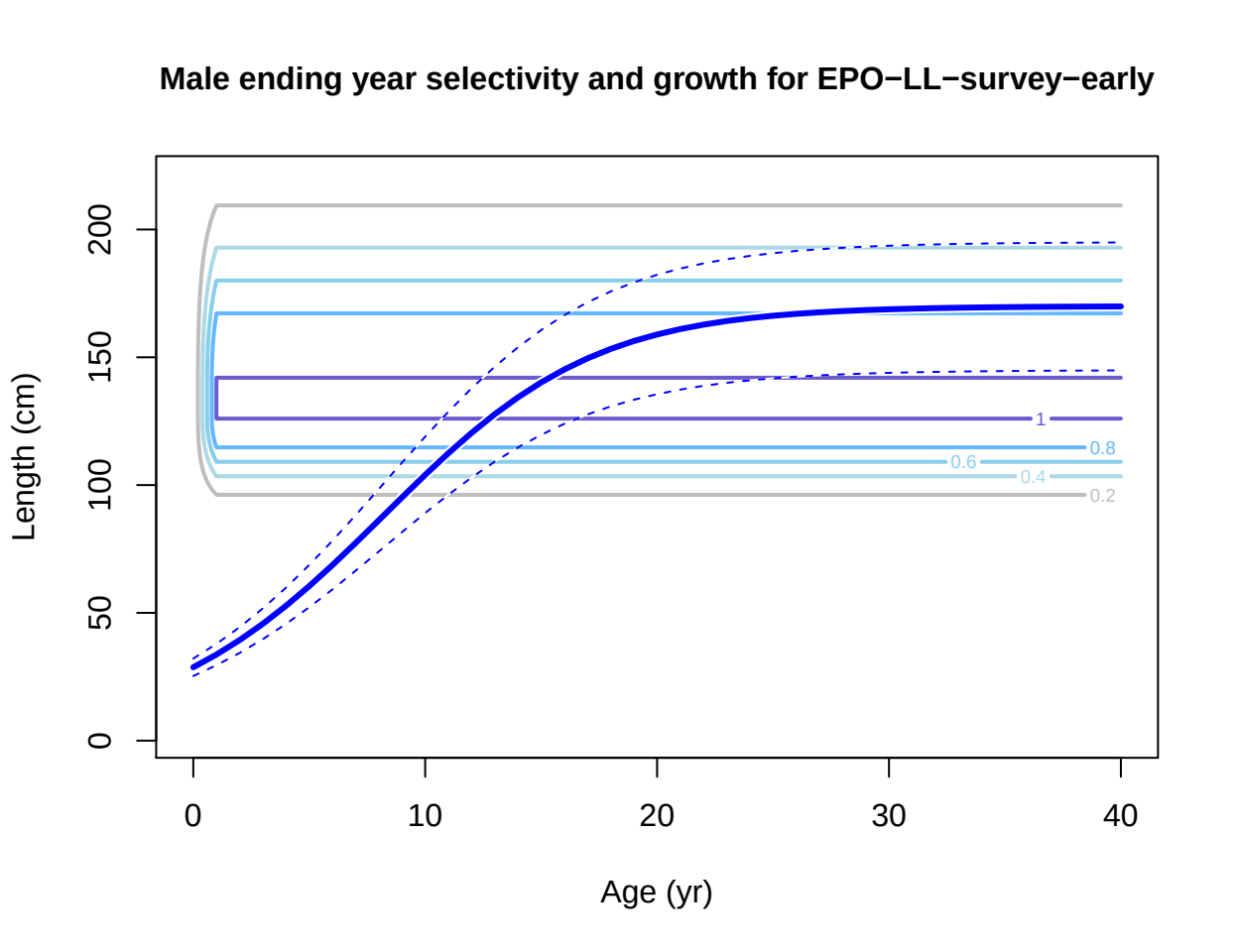

Female ending year selectivity and growth for A5−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

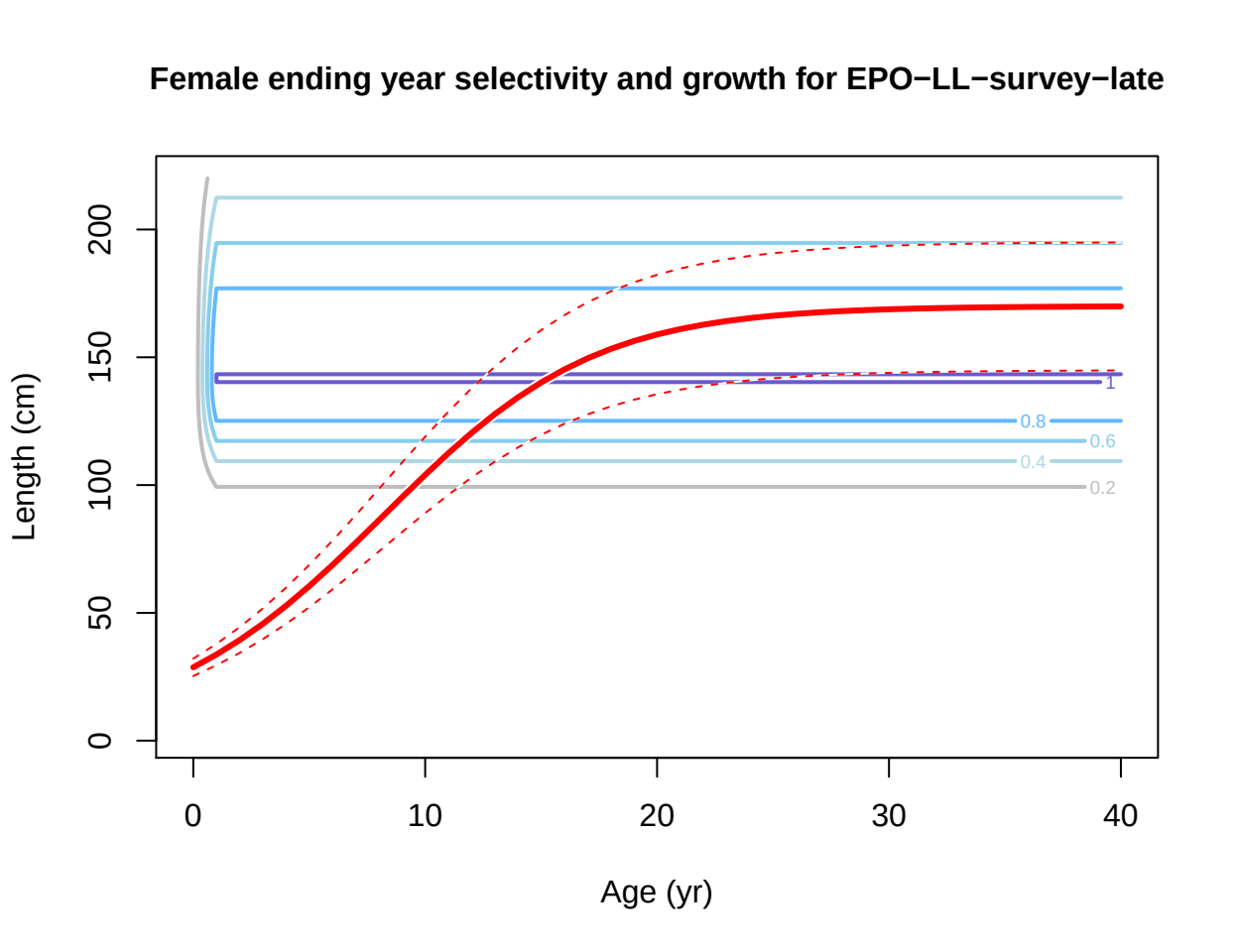

Male ending year selectivity and growth for A5−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

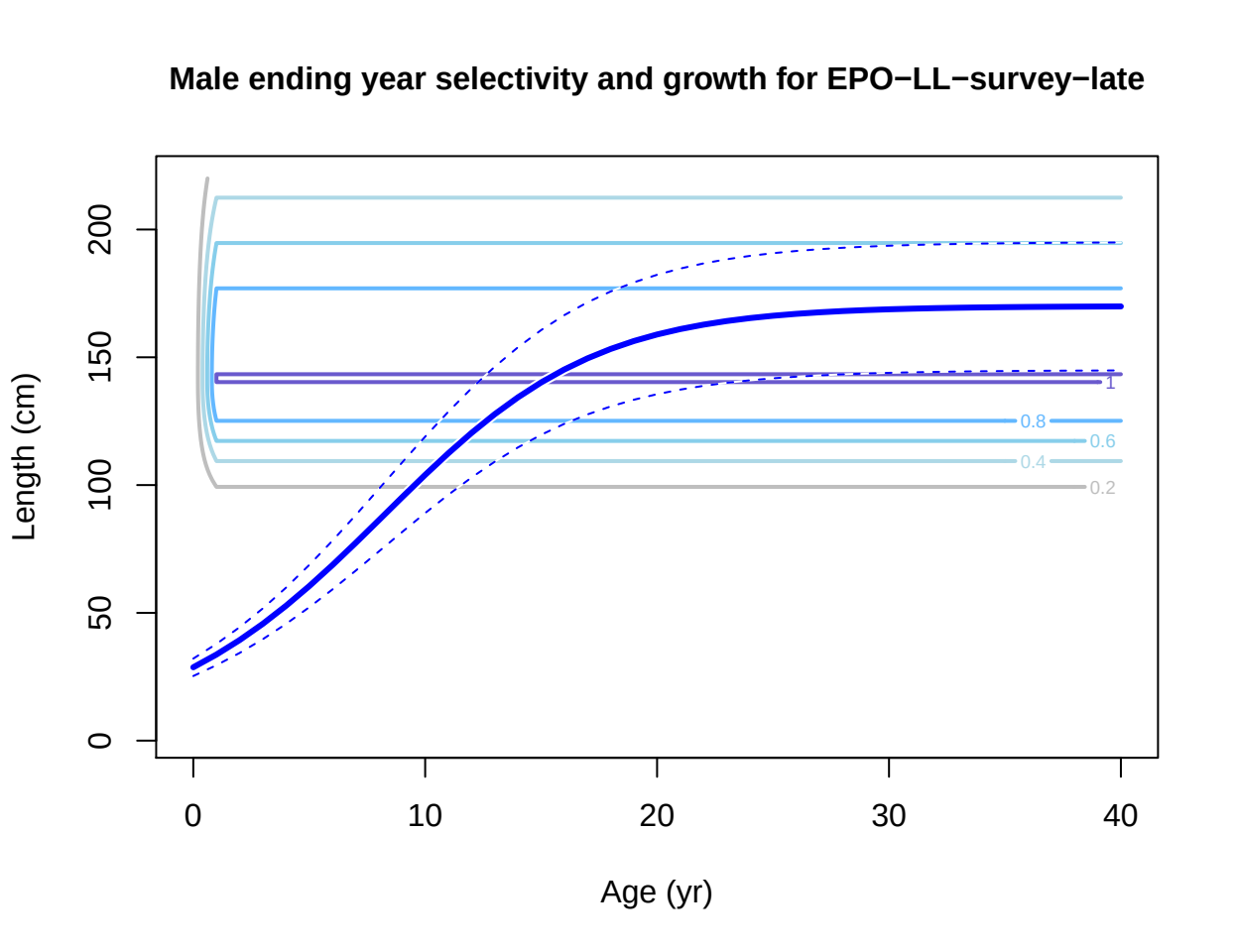

Female ending year selectivity and growth for A6−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

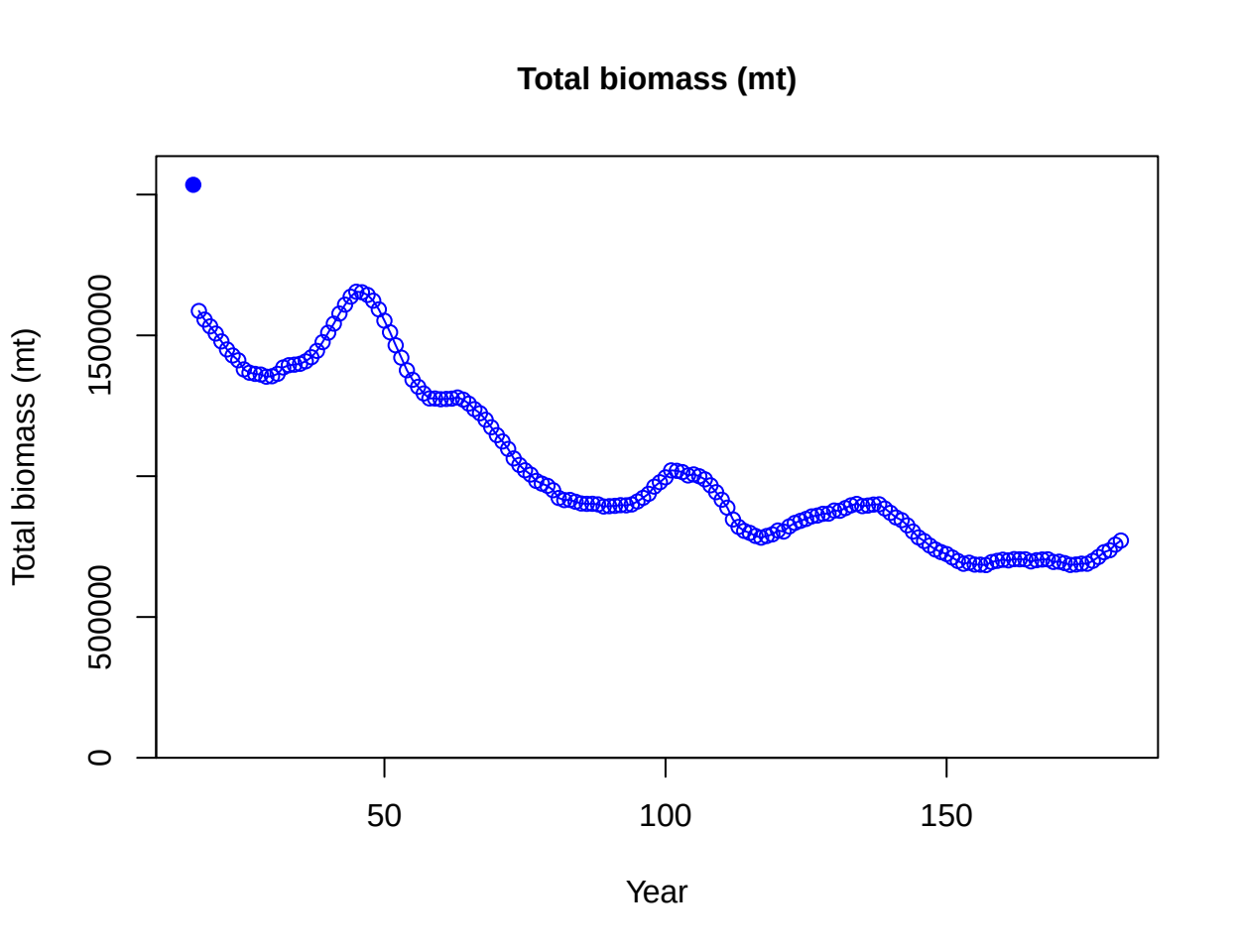

Male ending year selectivity and growth for A6−NOADEL
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2
0.8
0.6
0.4
0.2

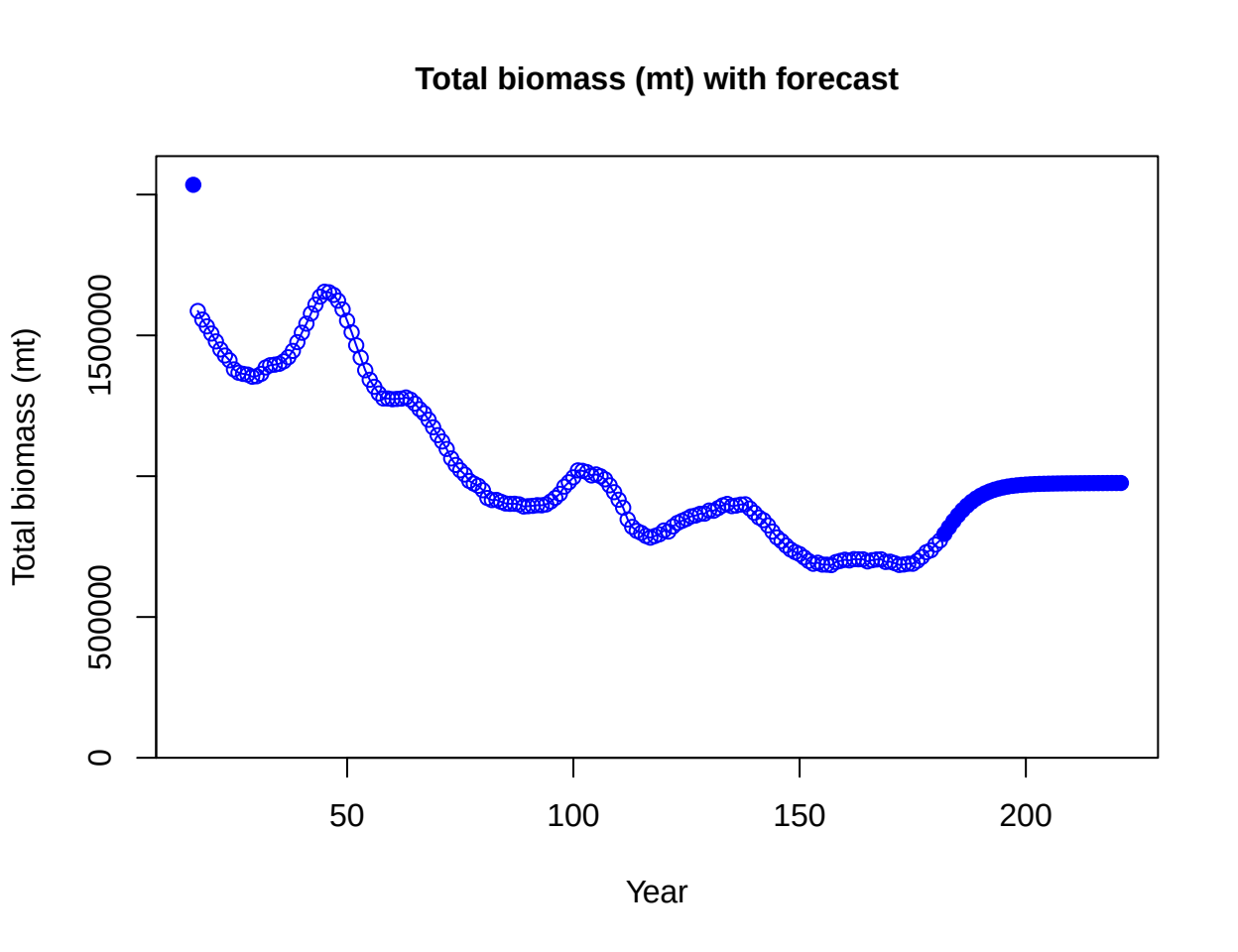

Female ending year selectivity and growth for EPO−LL−survey−early
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

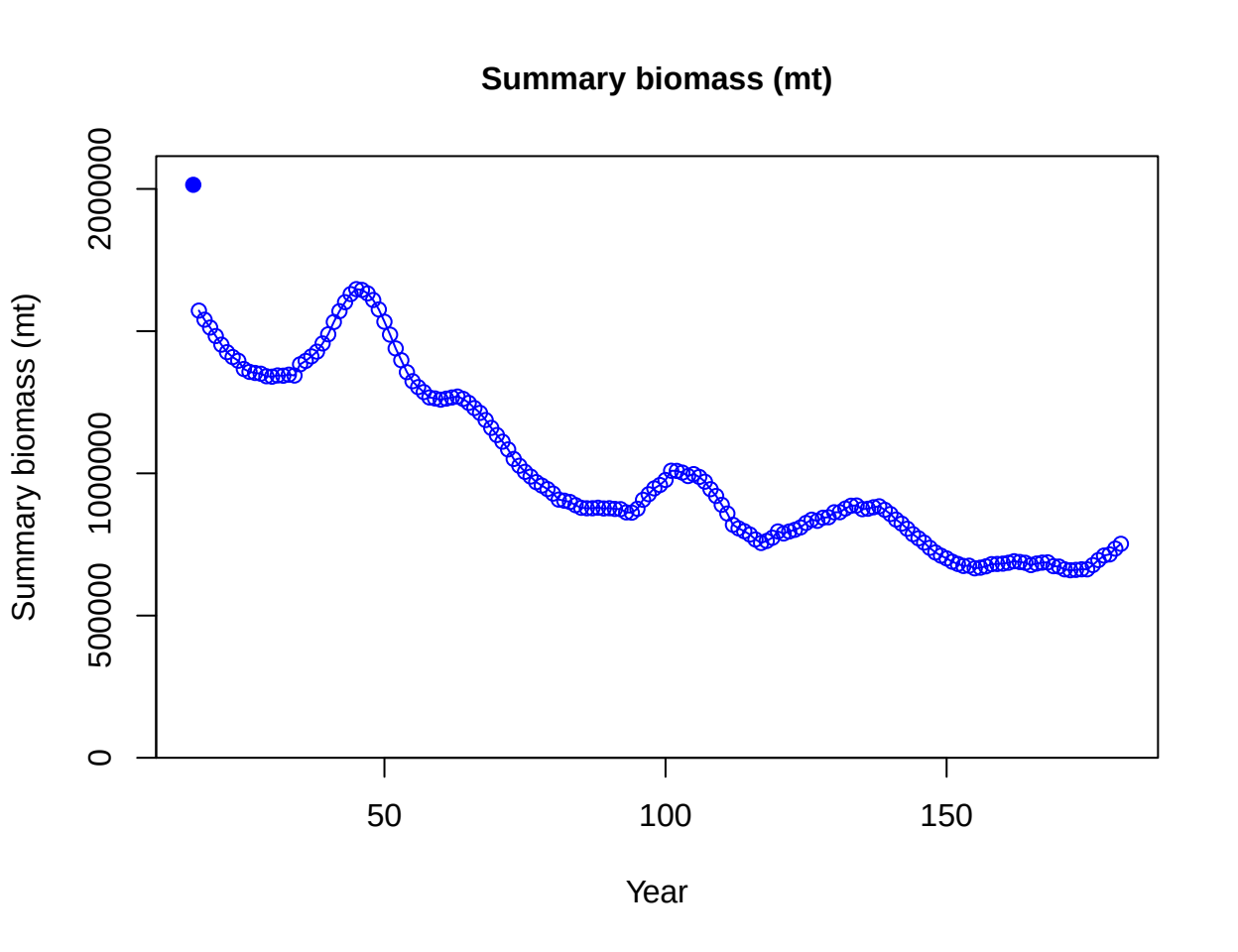

Male ending year selectivity and growth for EPO−LL−survey−early
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

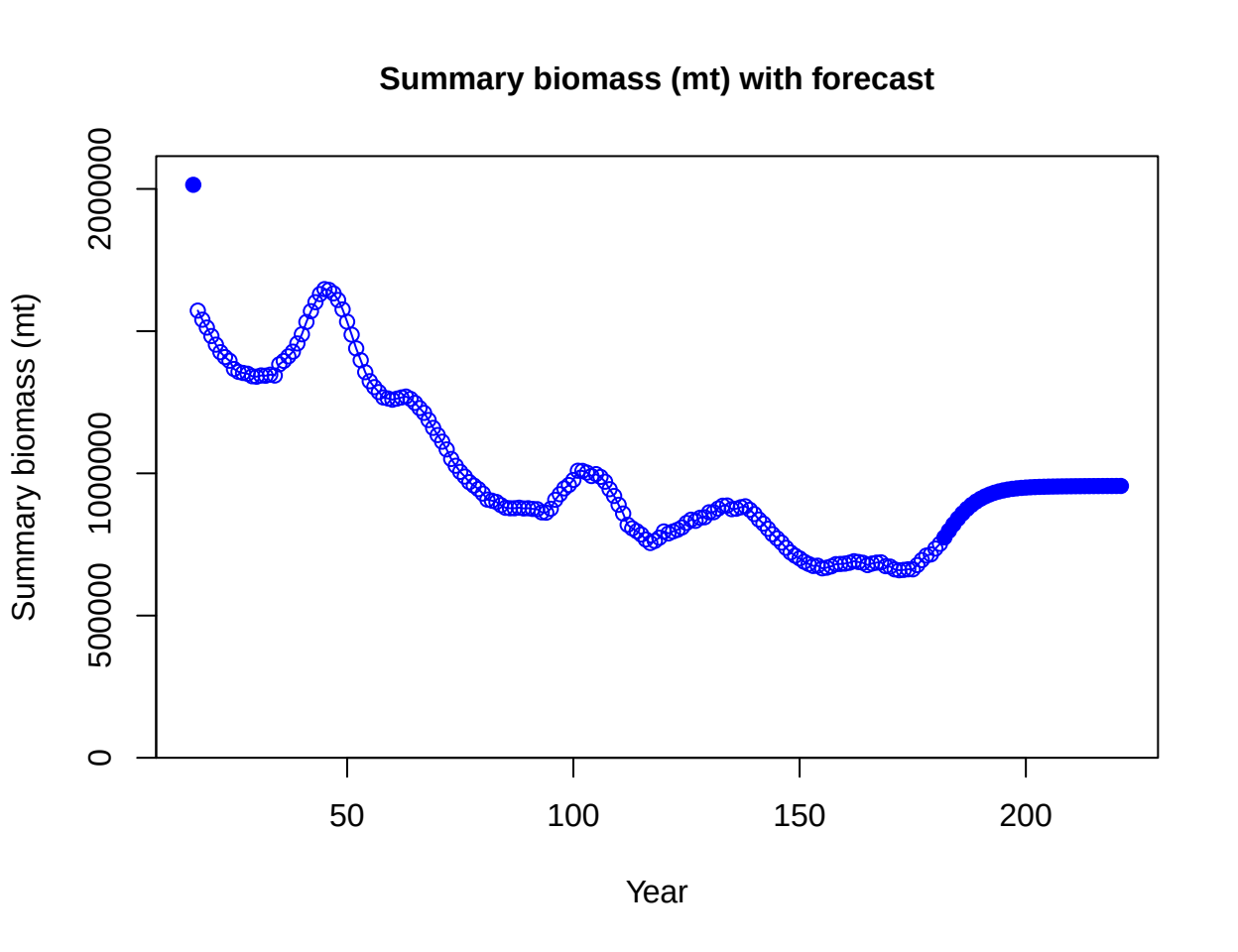

Female ending year selectivity and growth for EPO−LL−survey−late
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

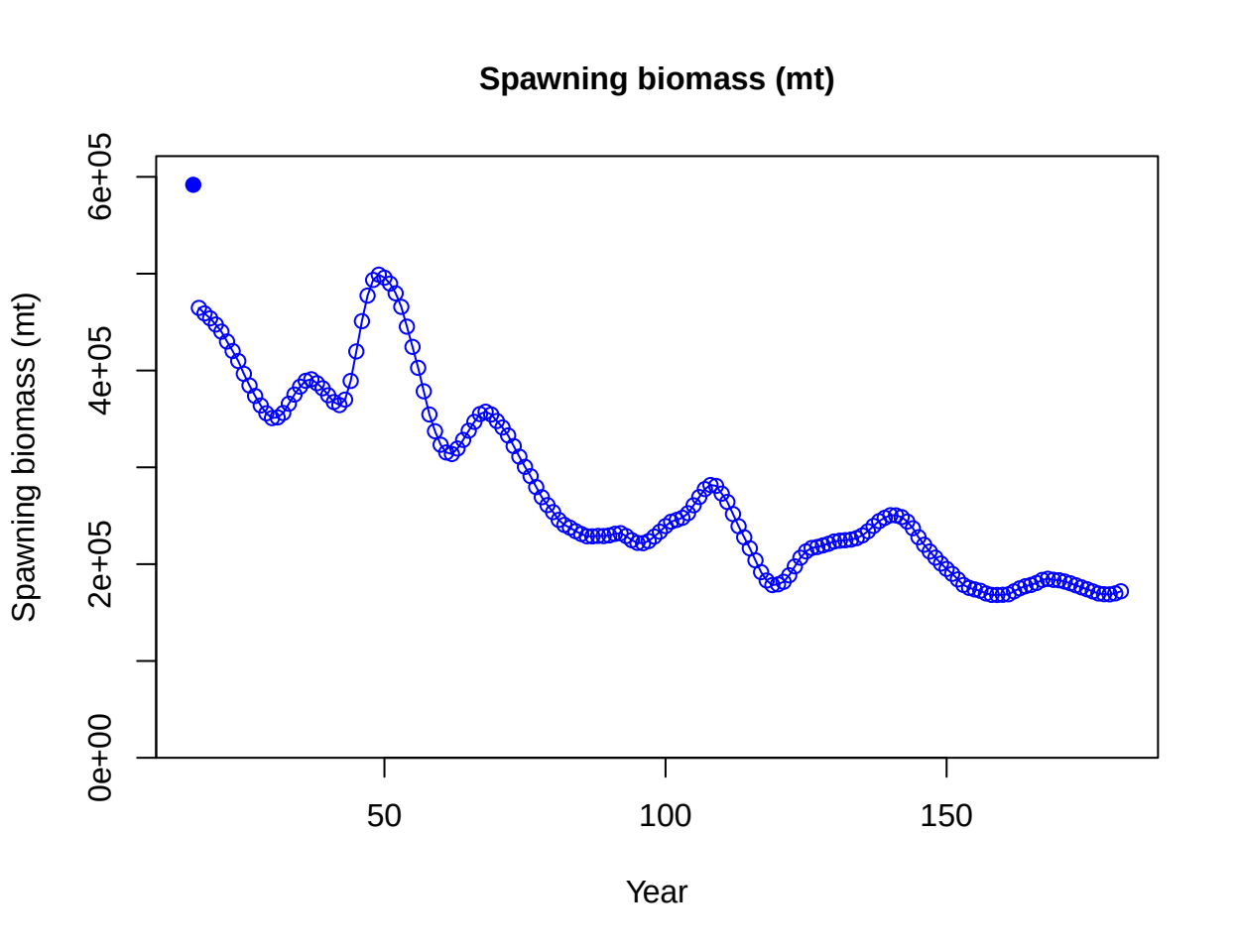

Male ending year selectivity and growth for EPO−LL−survey−late
Length (cm)
0
50
100
150
200
0
10
20
30
40
Age (yr)
1
0.8
0.6
0.4
0.2

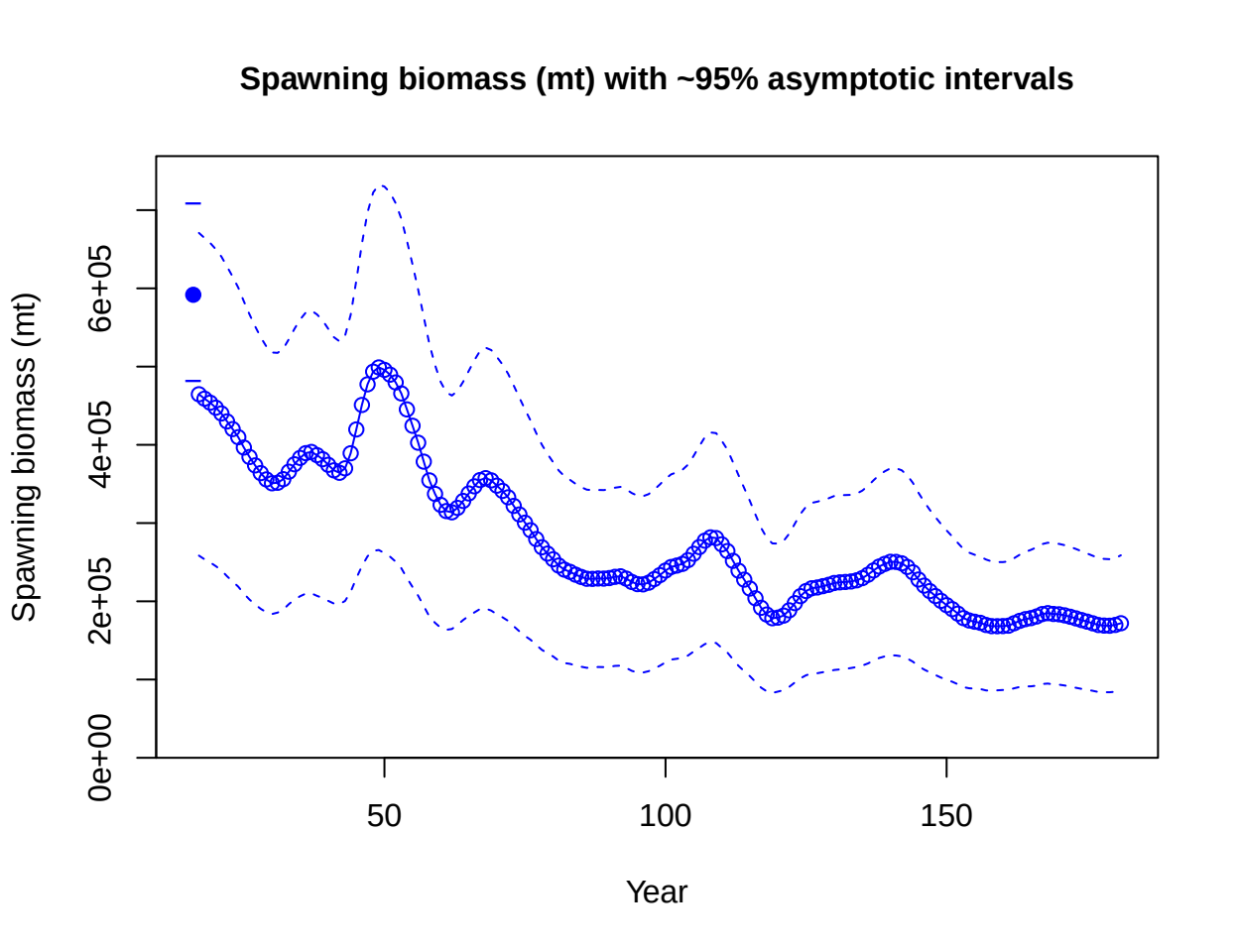

Total biomass (mt)
Total biomass (mt)
0
500000
1500000
50
100
150
Year

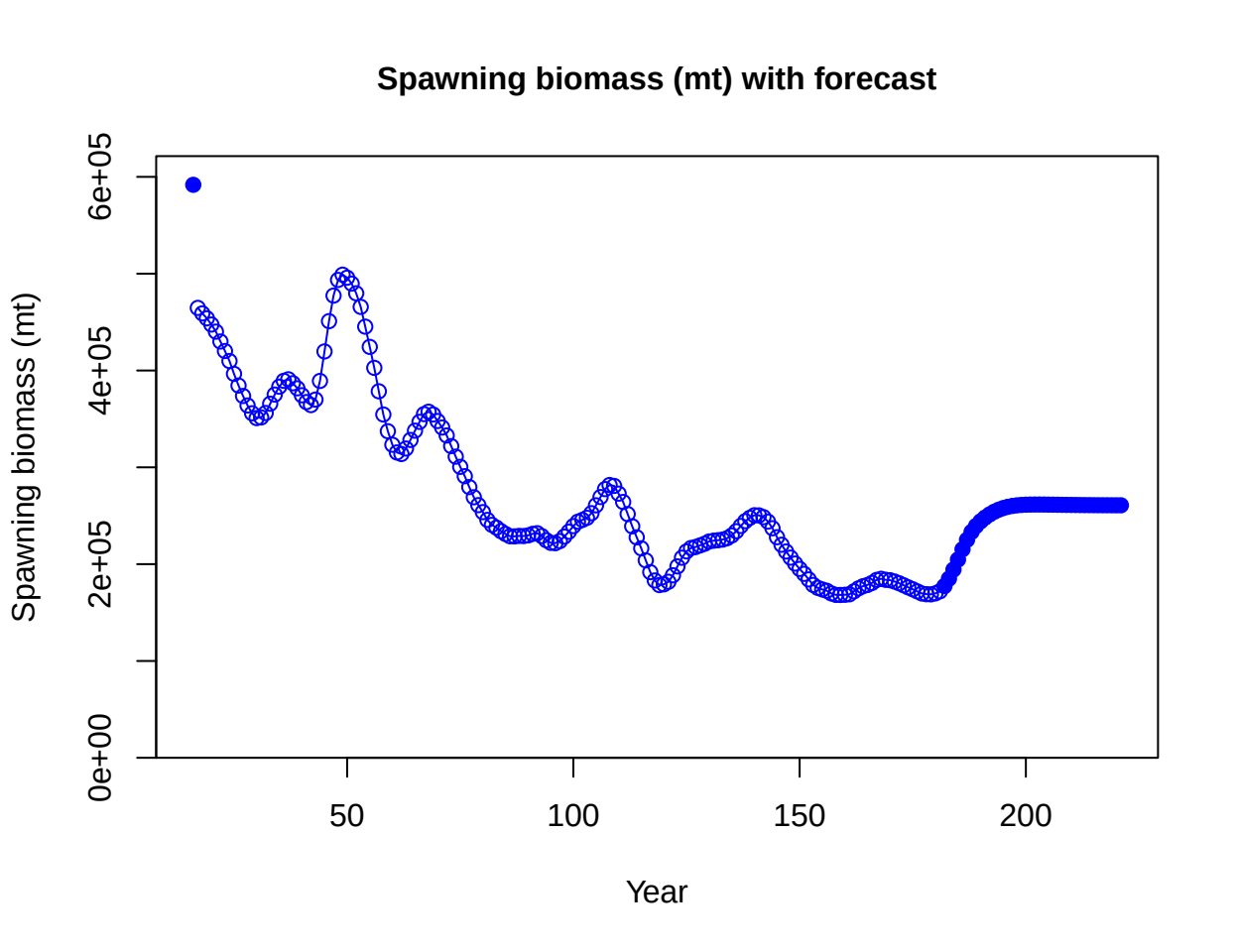

Total biomass (mt) with forecast
Total biomass (mt)
0
500000
1500000
50
100
150
200
Year

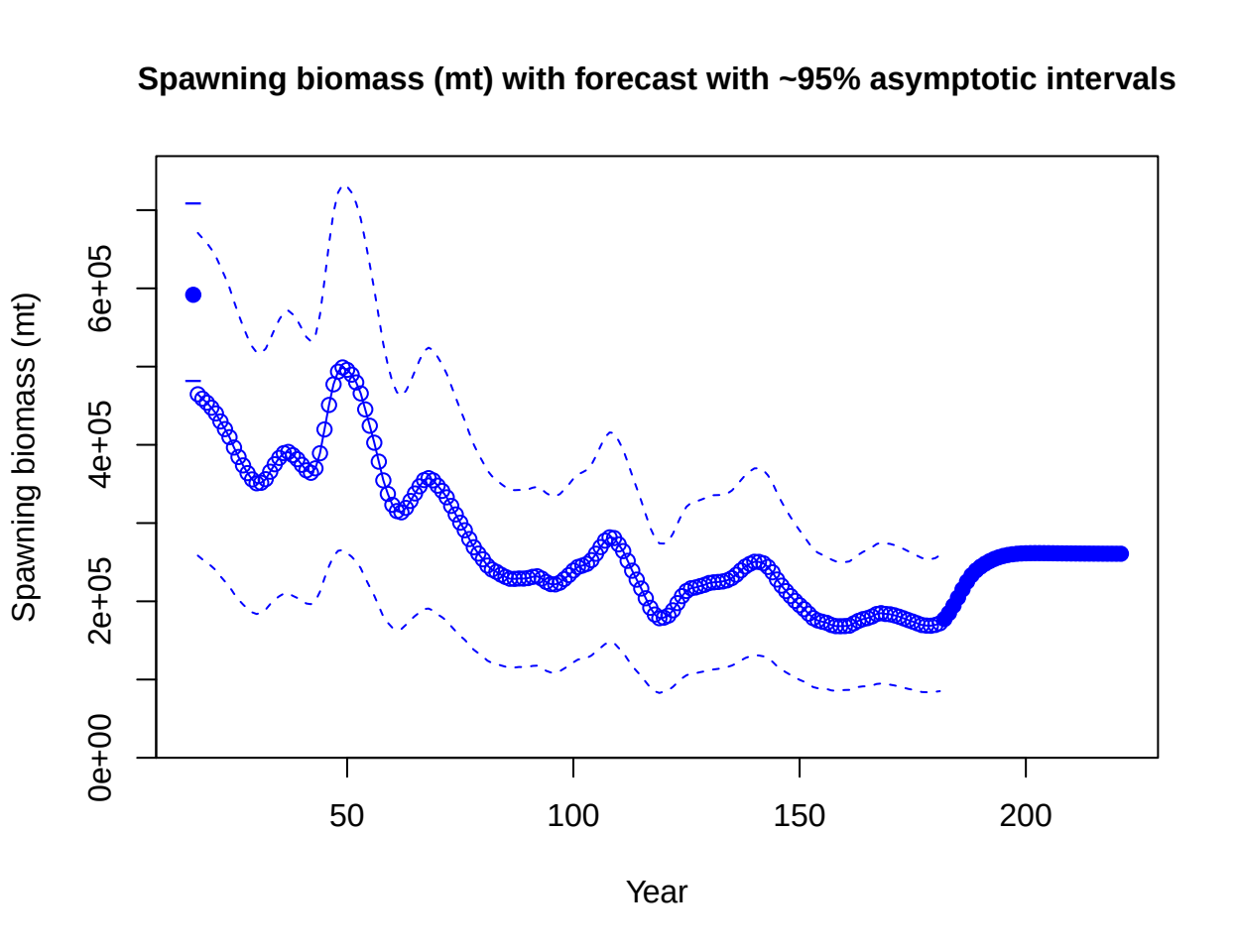

Summary biomass (mt)
Summary biomass (mt)
0
500000
1000000
2000000
50
100
150
Year

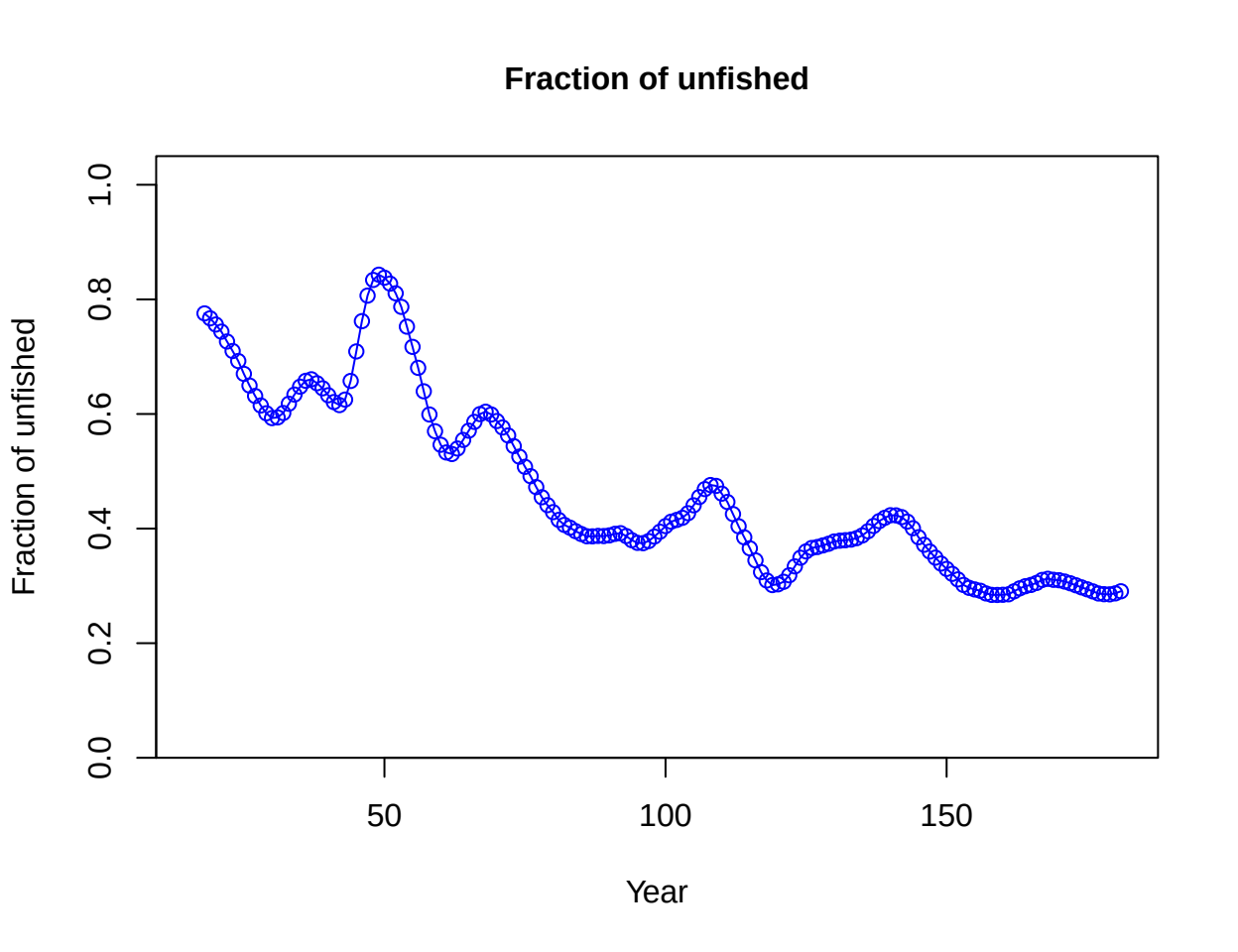

Summary biomass (mt) with forecast
Summary biomass (mt)
0
500000
1000000
2000000
50
100
150
200
Year

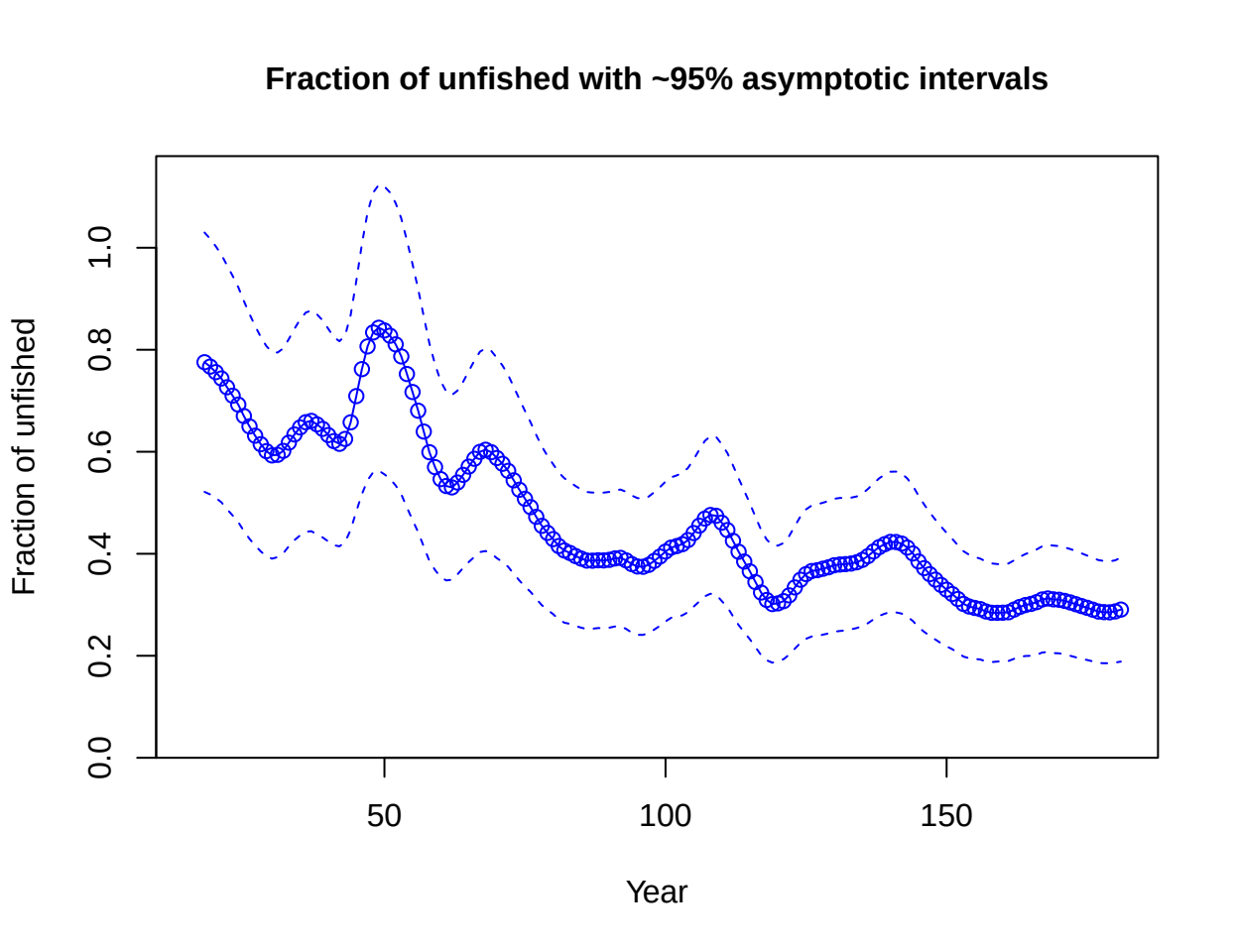

Spawning biomass (mt)
Spawning biomass (mt)
0e+00
2e+05
4e+05
6e+05
50
100
150
Year

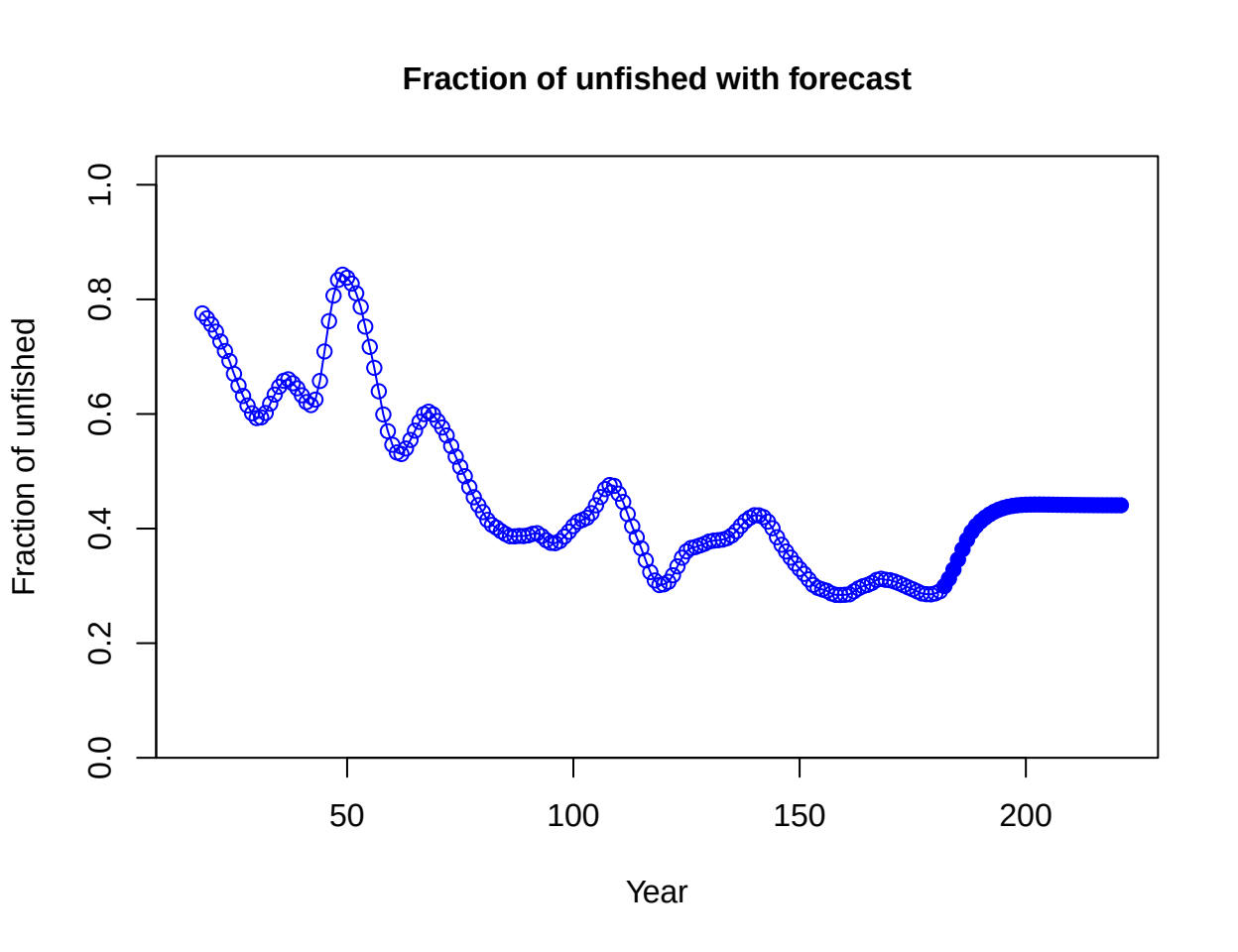

Spawning biomass (mt) with ~95% asymptotic intervals
Spawning biomass (mt)
0e+00
2e+05
4e+05
6e+05
50
100
150
Year

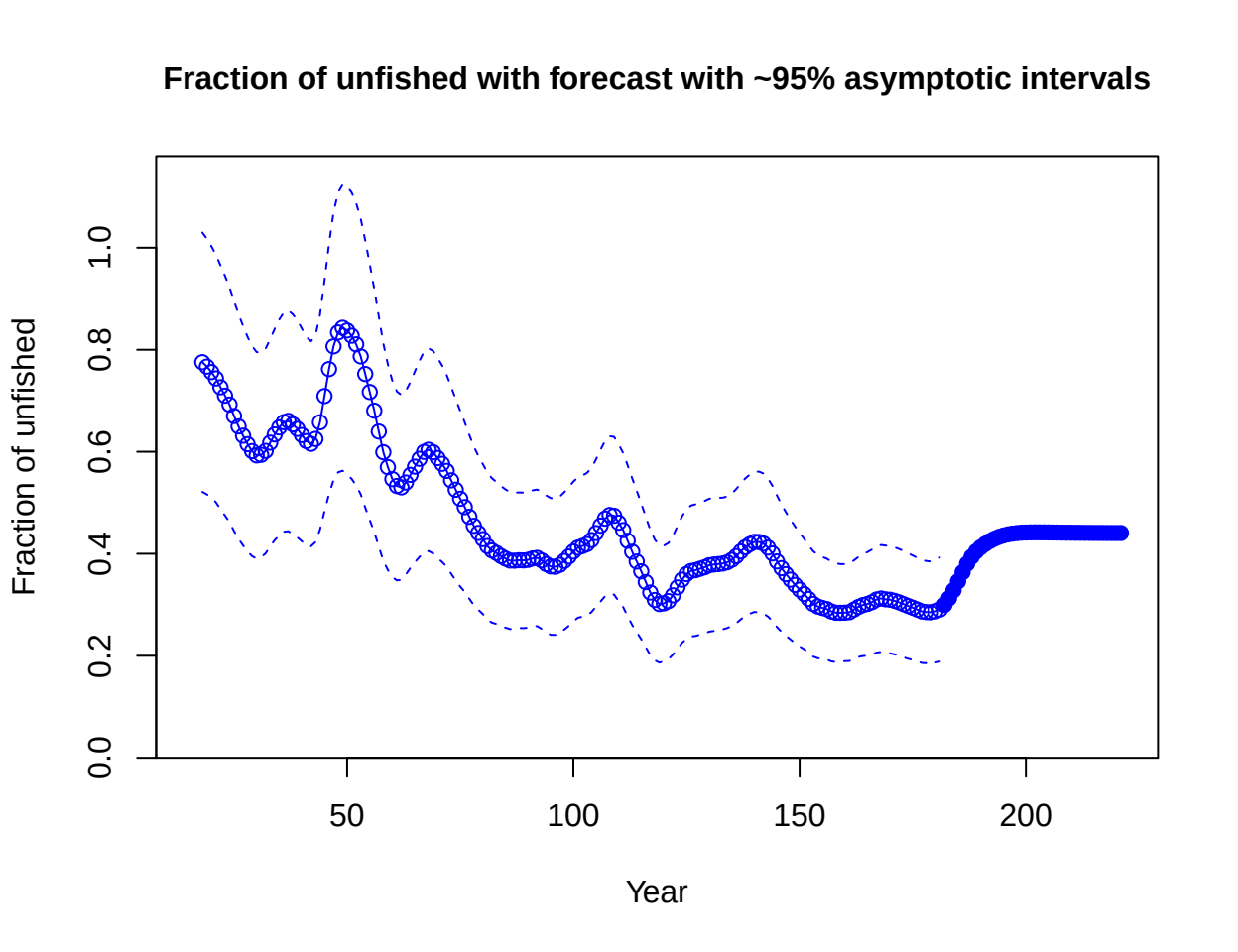

Spawning biomass (mt) with forecast
Spawning biomass (mt)
0e+00
2e+05
4e+05
6e+05
50
100
150
200
Year

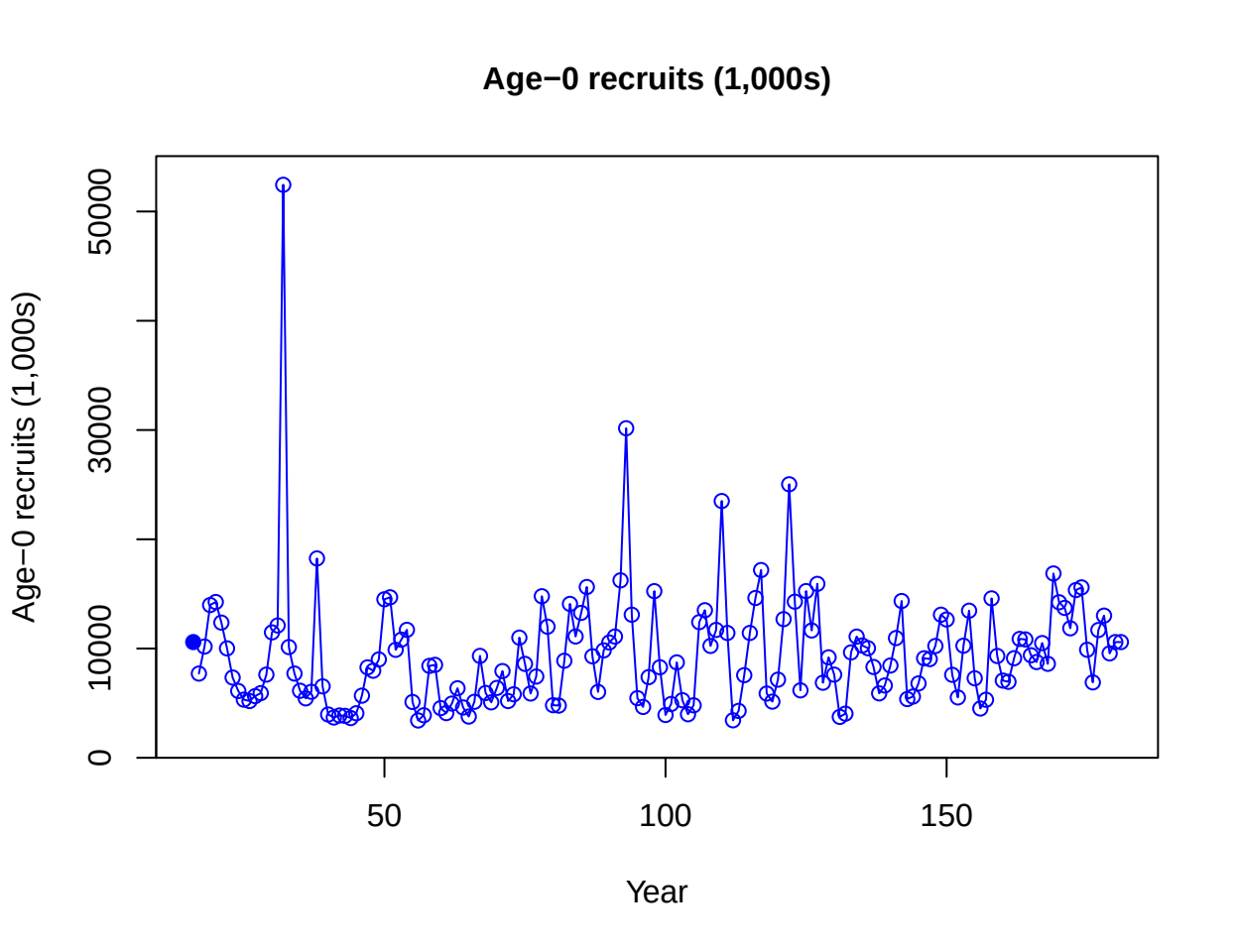

Spawning biomass (mt) with forecast with ~95% asymptotic intervals
Spawning biomass (mt)
0e+00
2e+05
4e+05
6e+05
50
100
150
200
Year

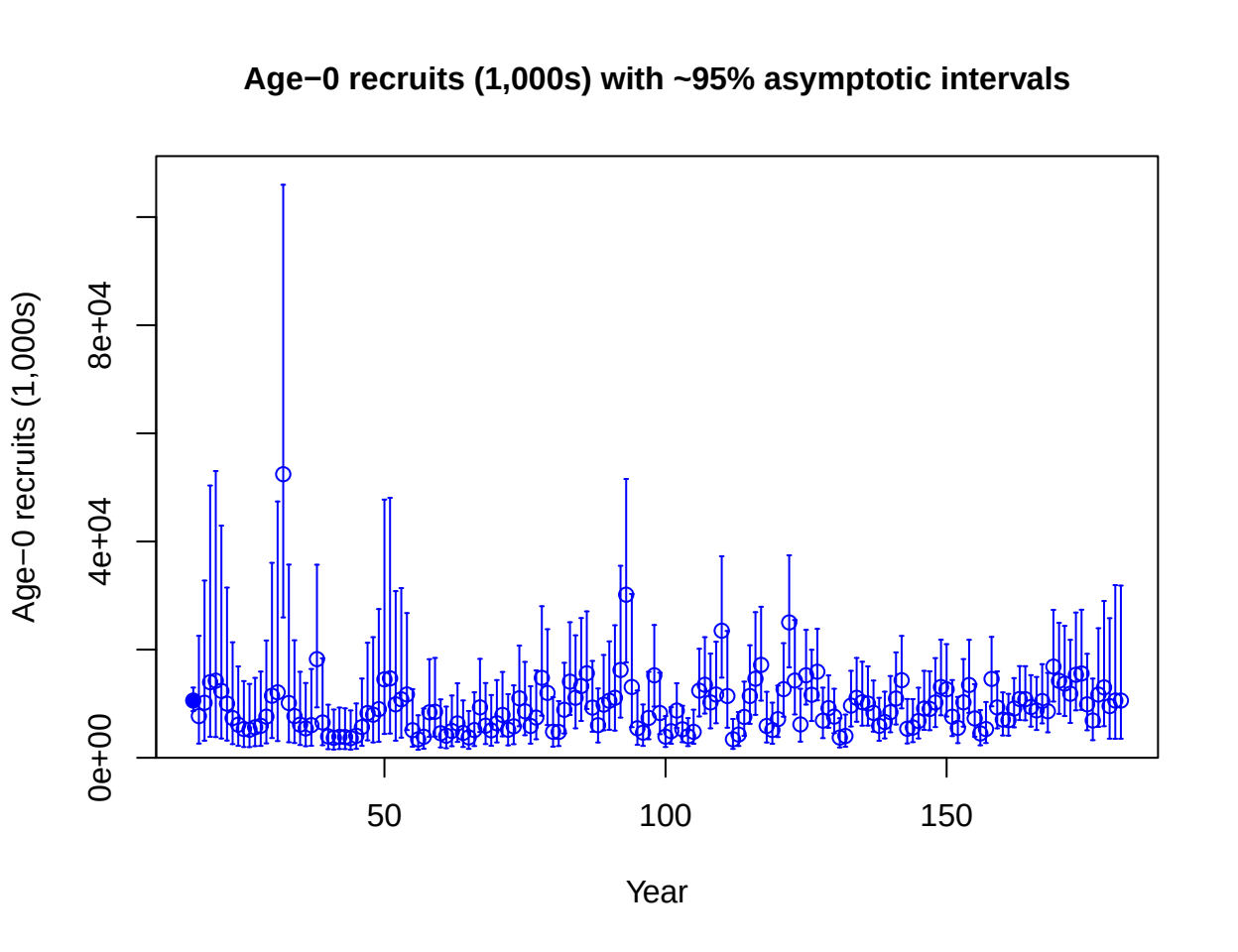

Fraction of unfished
Fraction of unfished
0.0
0.2
0.4
0.6
0.8
1.0
50
100
150
Year

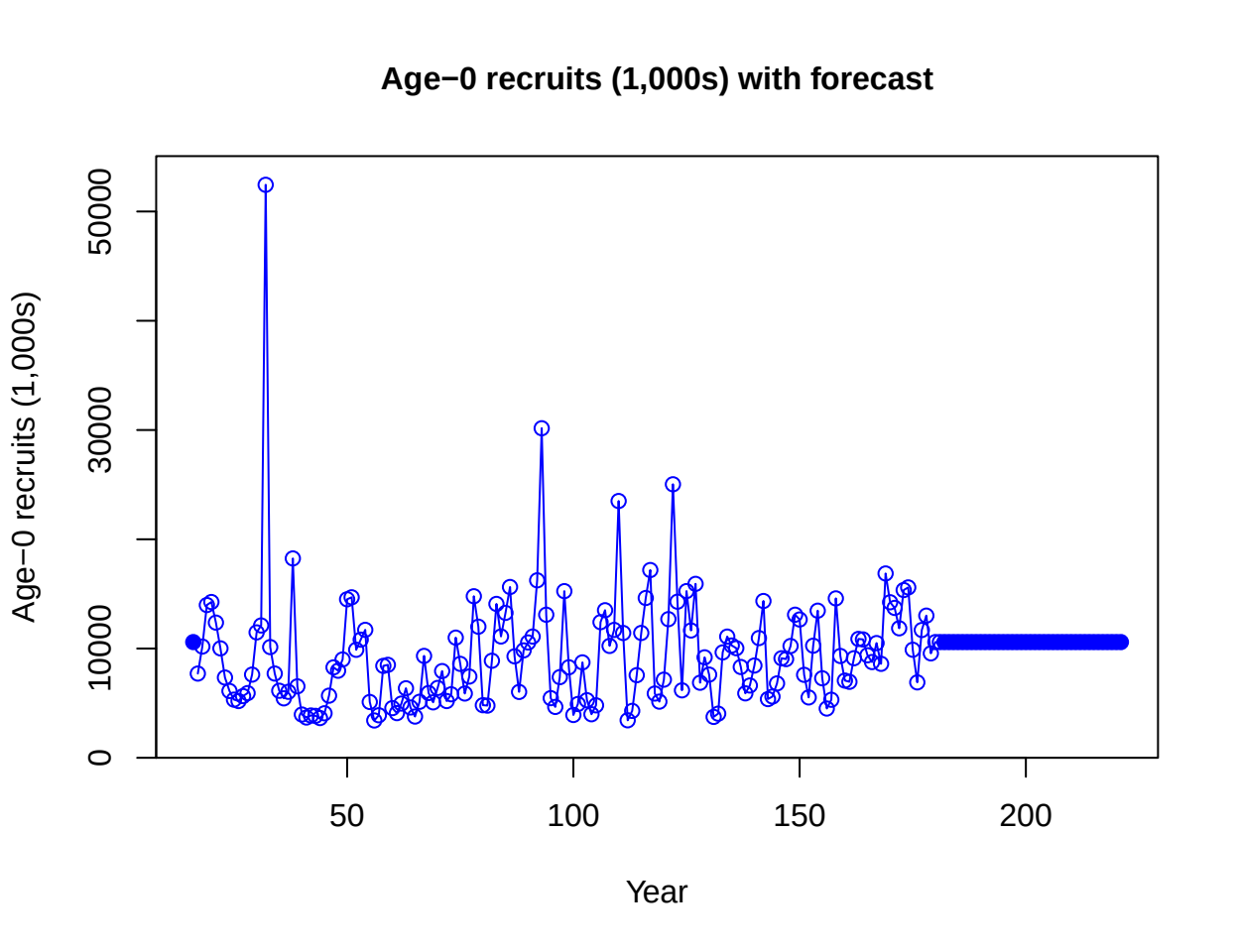

Fraction of unfished with ~95% asymptotic intervals
Fraction of unfished
0.0
0.2
0.4
0.6
0.8
1.0
50
100
150
Year

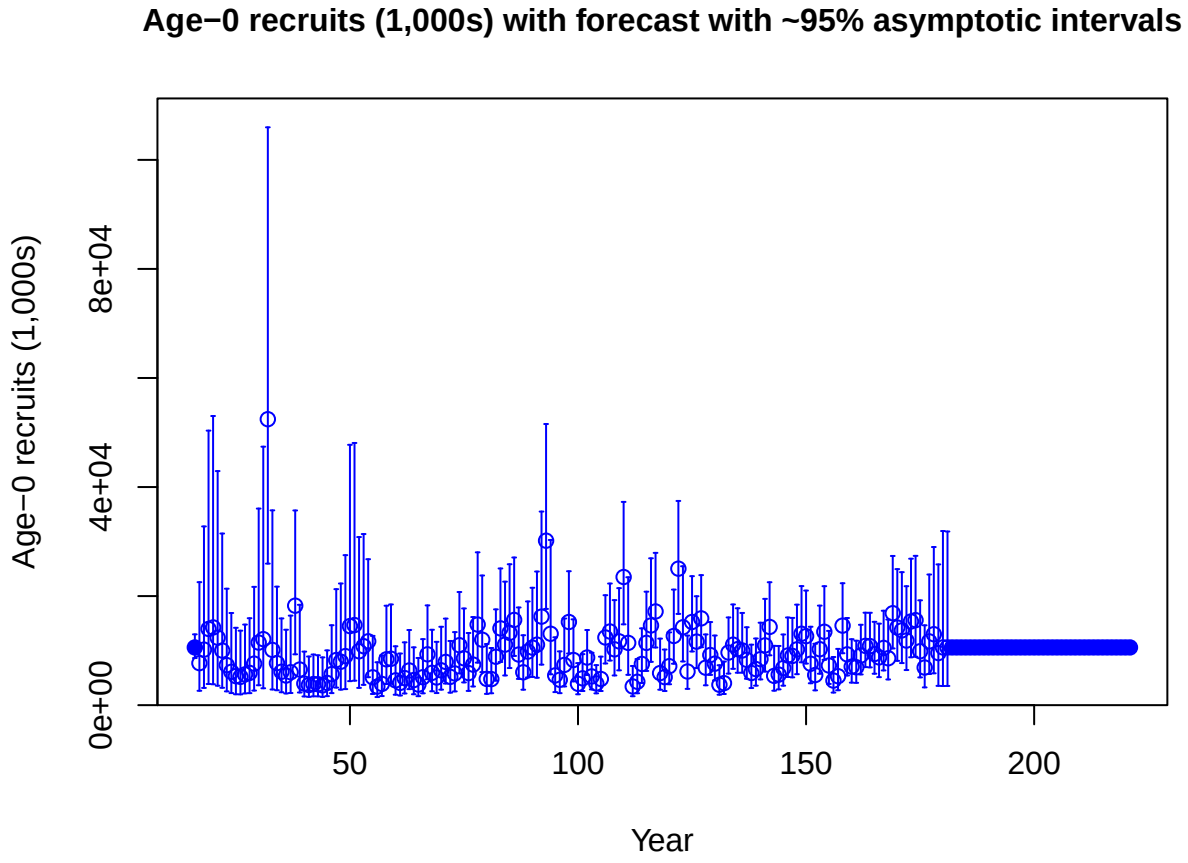

Fraction of unfished with forecast
Fraction of unfished
0.0
0.2
0.4
0.6
0.8
1.0
50
100
150
200
Year

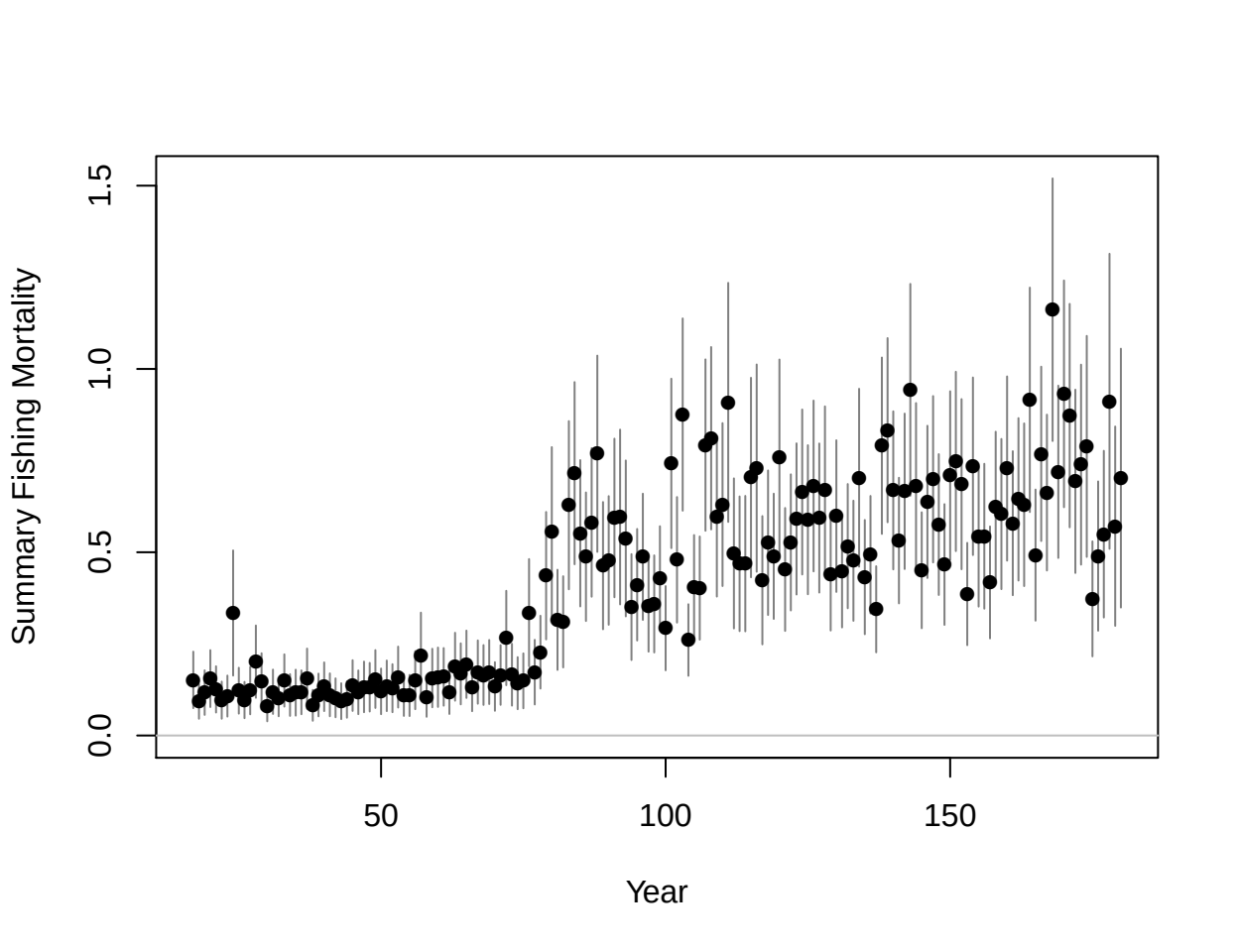

Fraction of unfished with forecast with ~95% asymptotic intervals
Fraction of unfished
0.0
0.2
0.4
0.6
0.8
1.0
50
100
150
200
Year

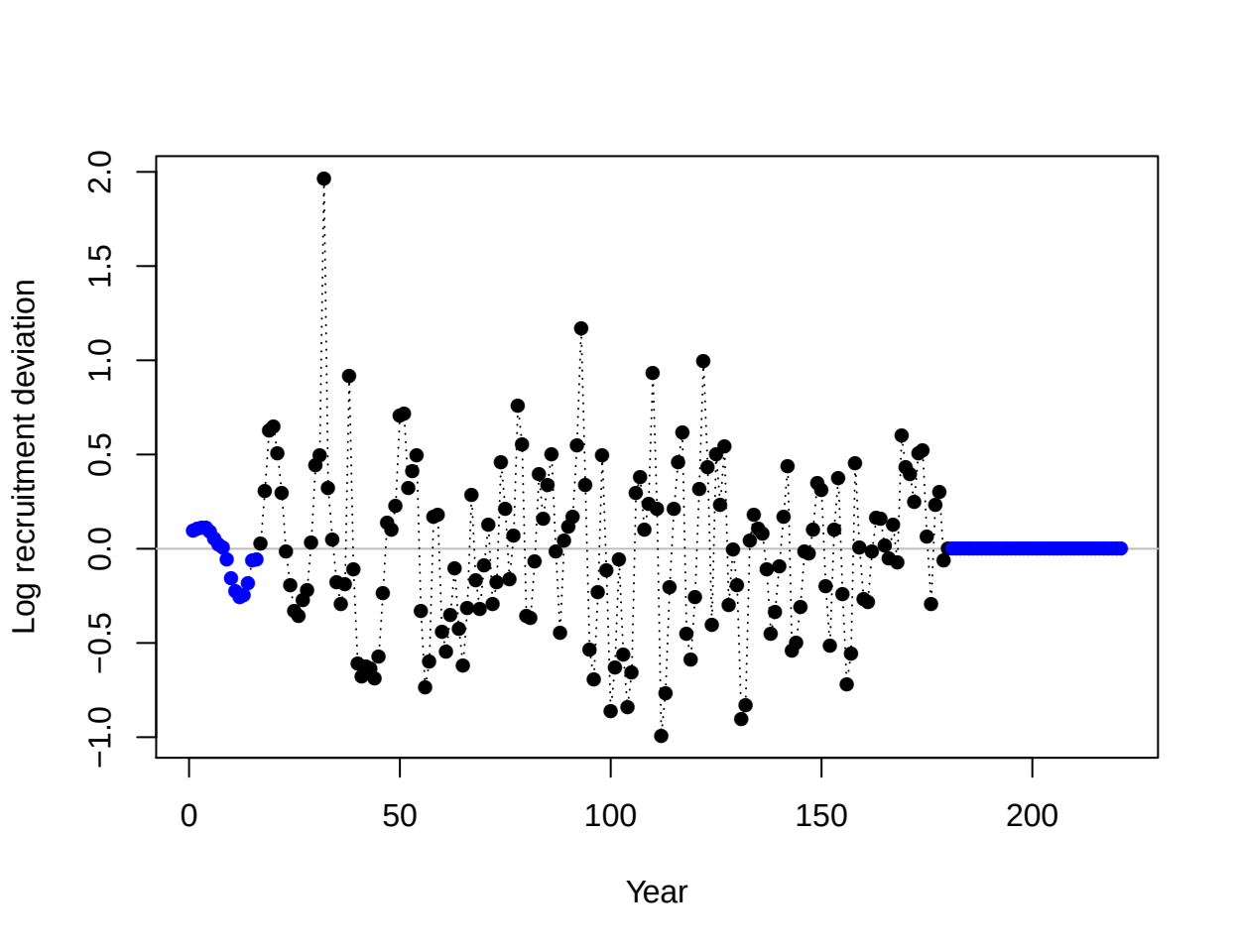

Age−0 recruits (1,000s)
Age−0 recruits (1,000s)
0
10000
30000
50000
50
100
150
Year

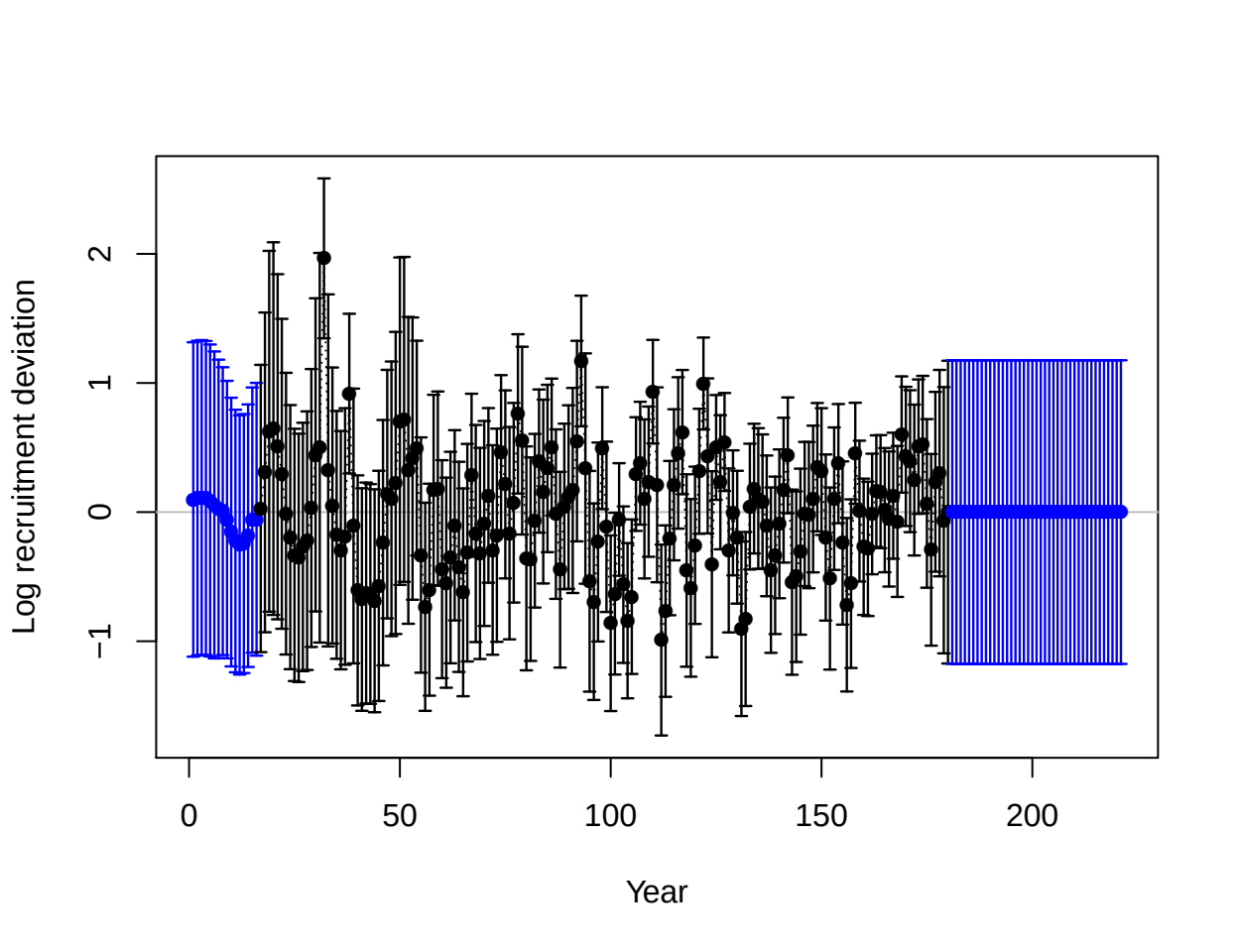

Age−0 recruits (1,000s) with ~95% asymptotic intervals
Age−0 recruits (1,000s)
0e+00
4e+04
8e+04
50
100
150
Year

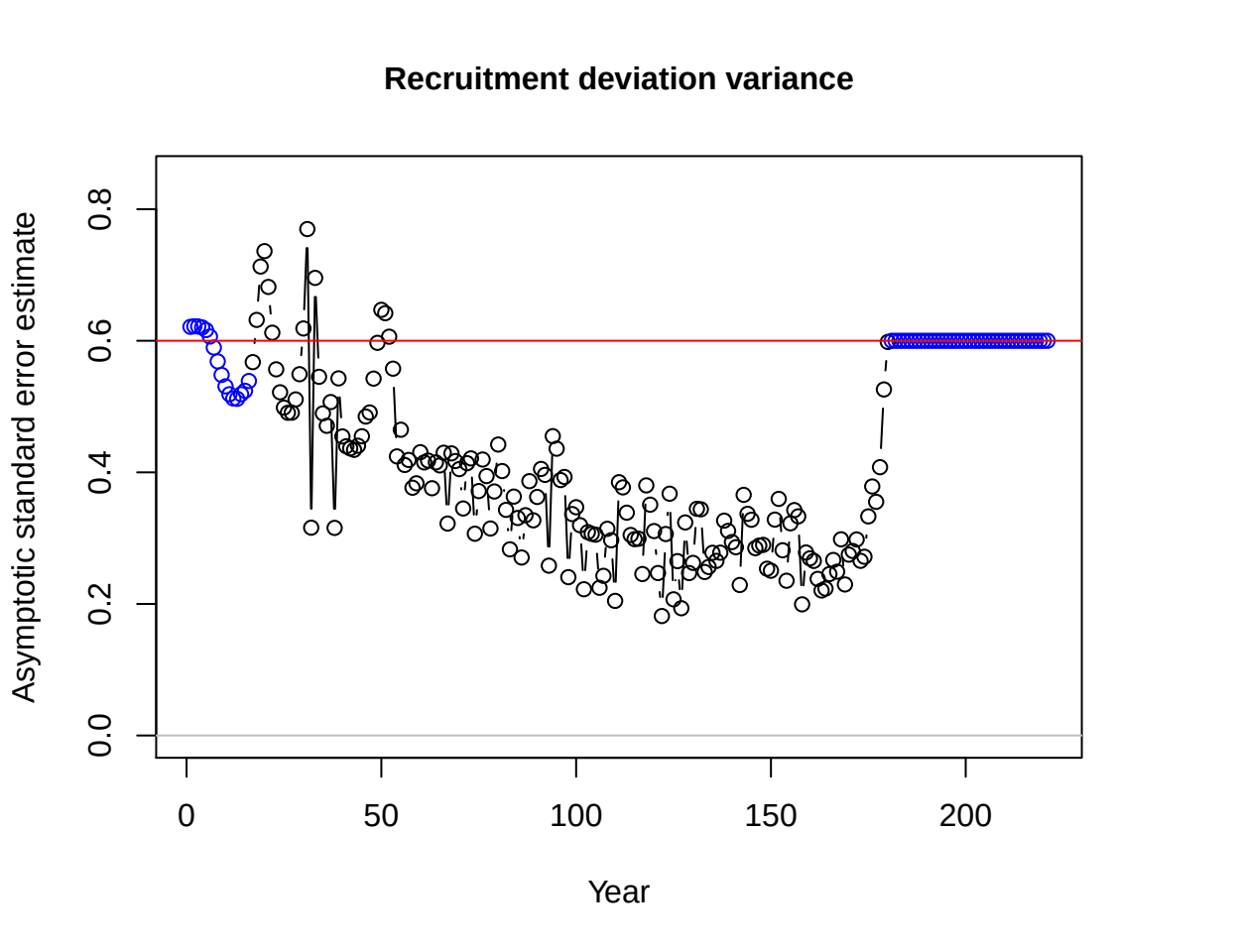

Age−0 recruits (1,000s) with forecast
Age−0 recruits (1,000s)
0
10000
30000
50000
50
100
150
200
Year

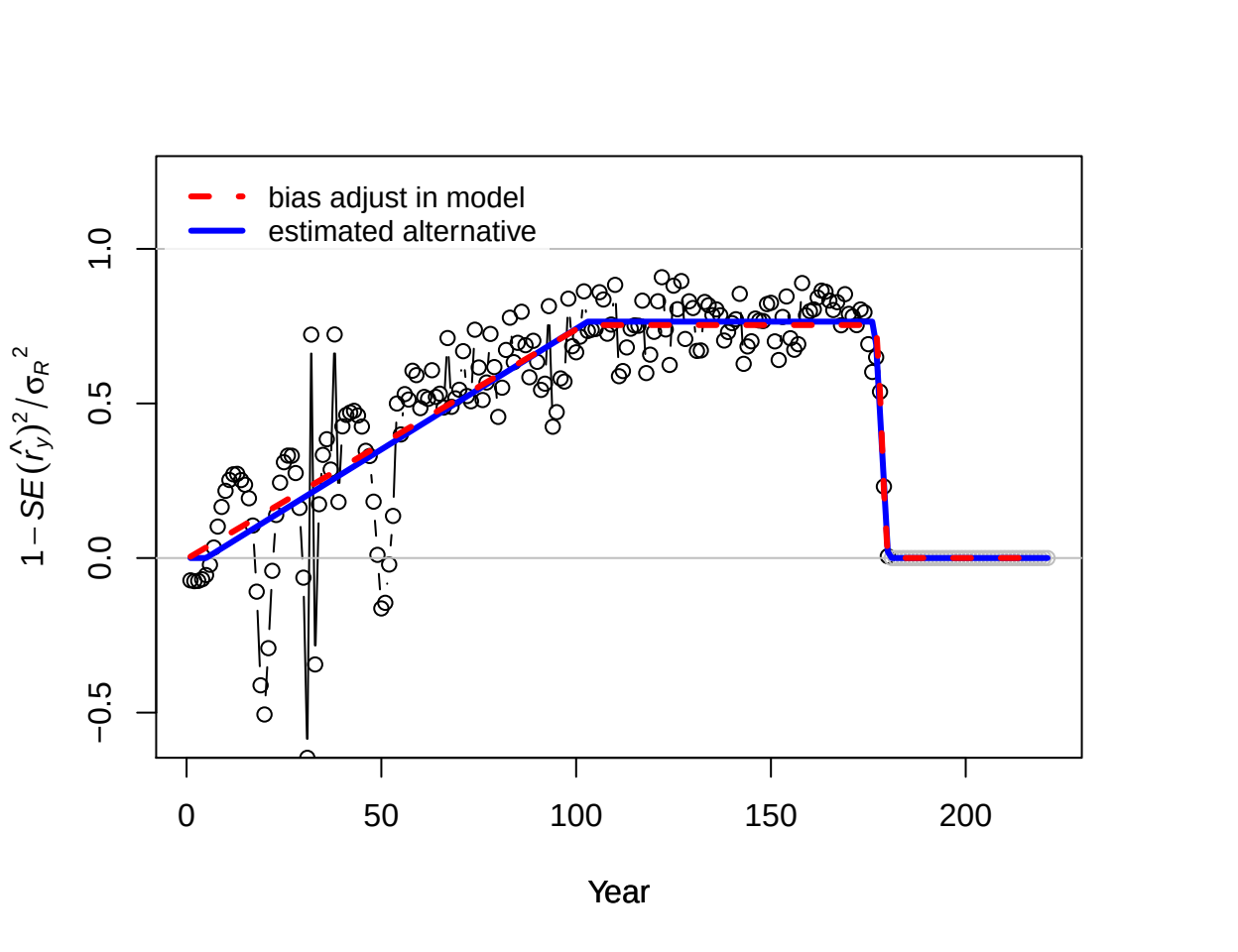

Age−0 recruits (1,000s) with forecast with ~95% asymptotic intervals
Age−0 recruits (1,000s)
0e+00
4e+04
8e+04
50
100
150
200
Year

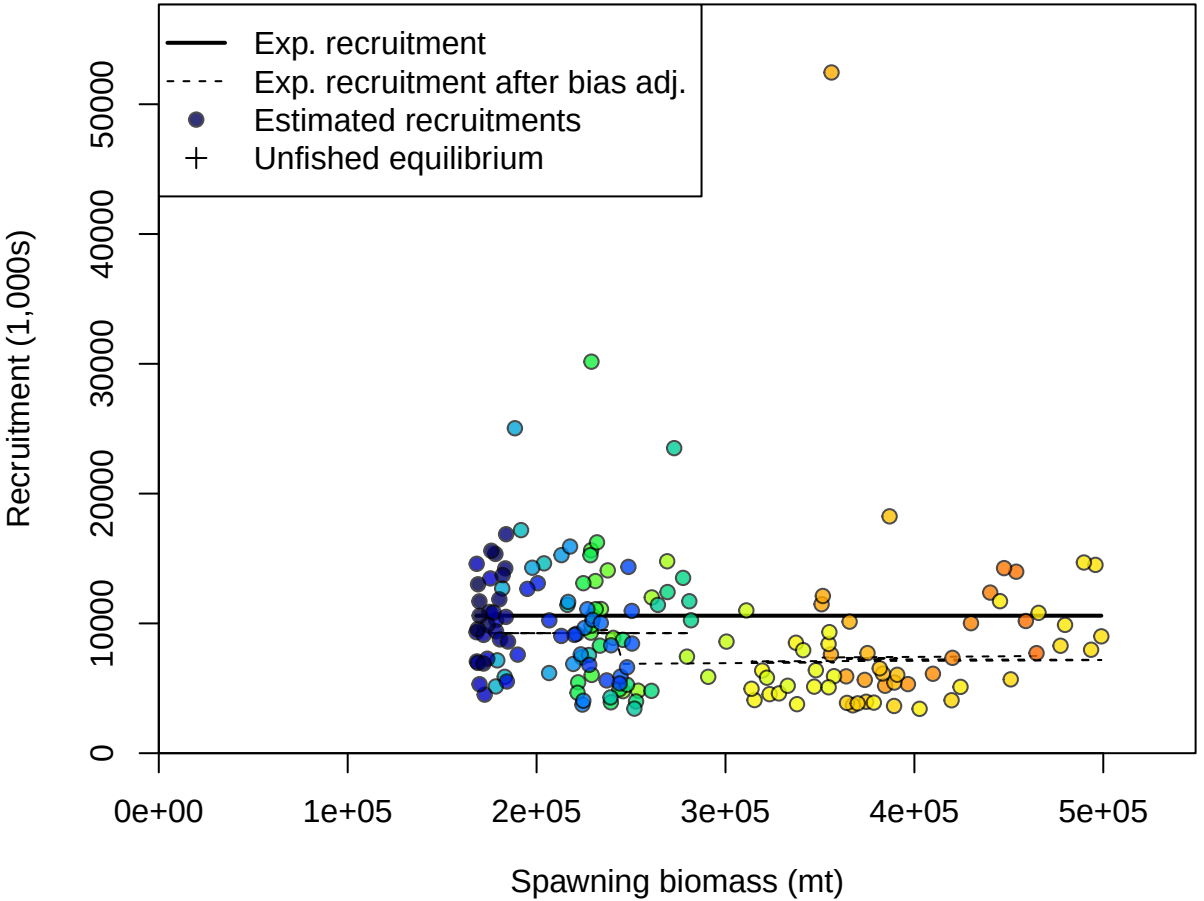

Summary Fishing Mortality
0.0
0.5
1.0
1.5
50
100
150
Year

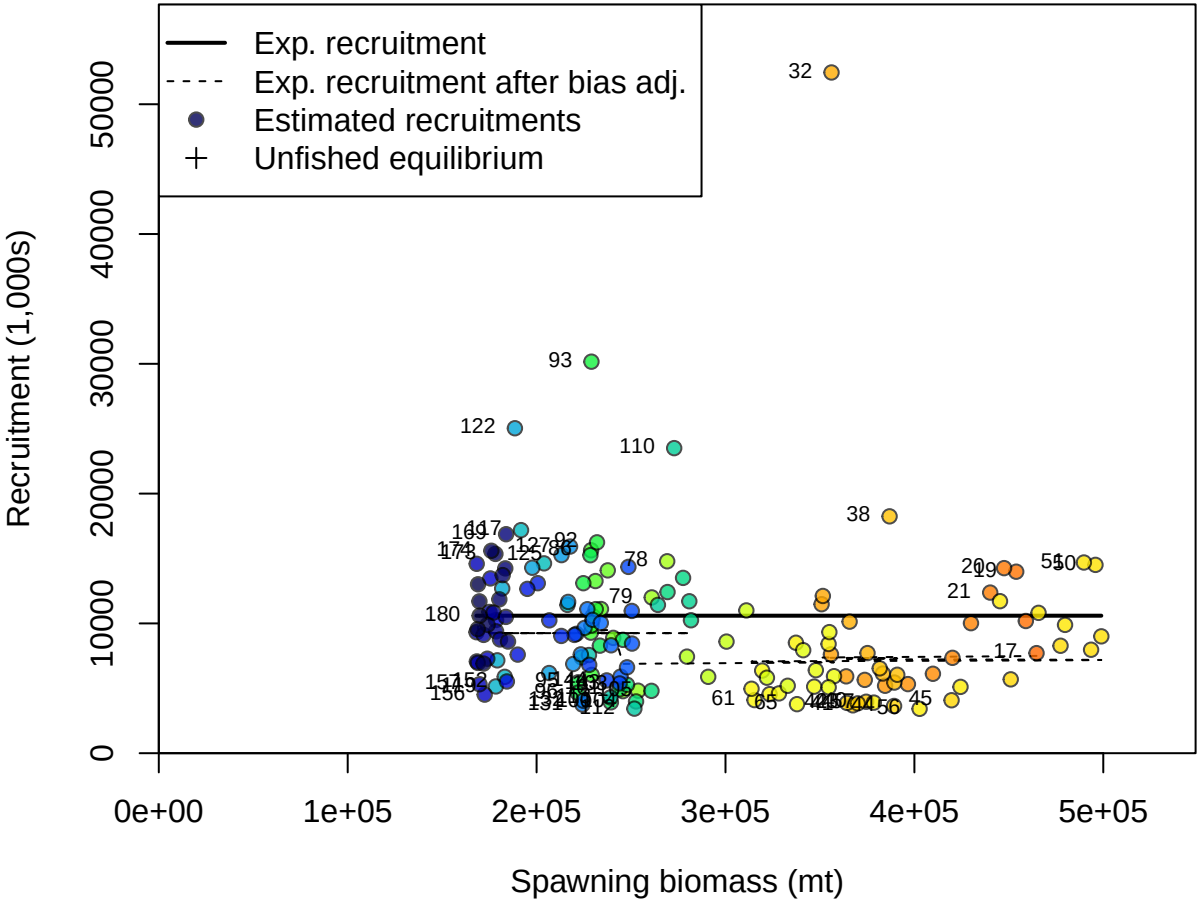

Log recruitment deviation
2.0
1.5
1.0
0.5
0.0
−0.5
−1.0
0
50
100
150
200
Year

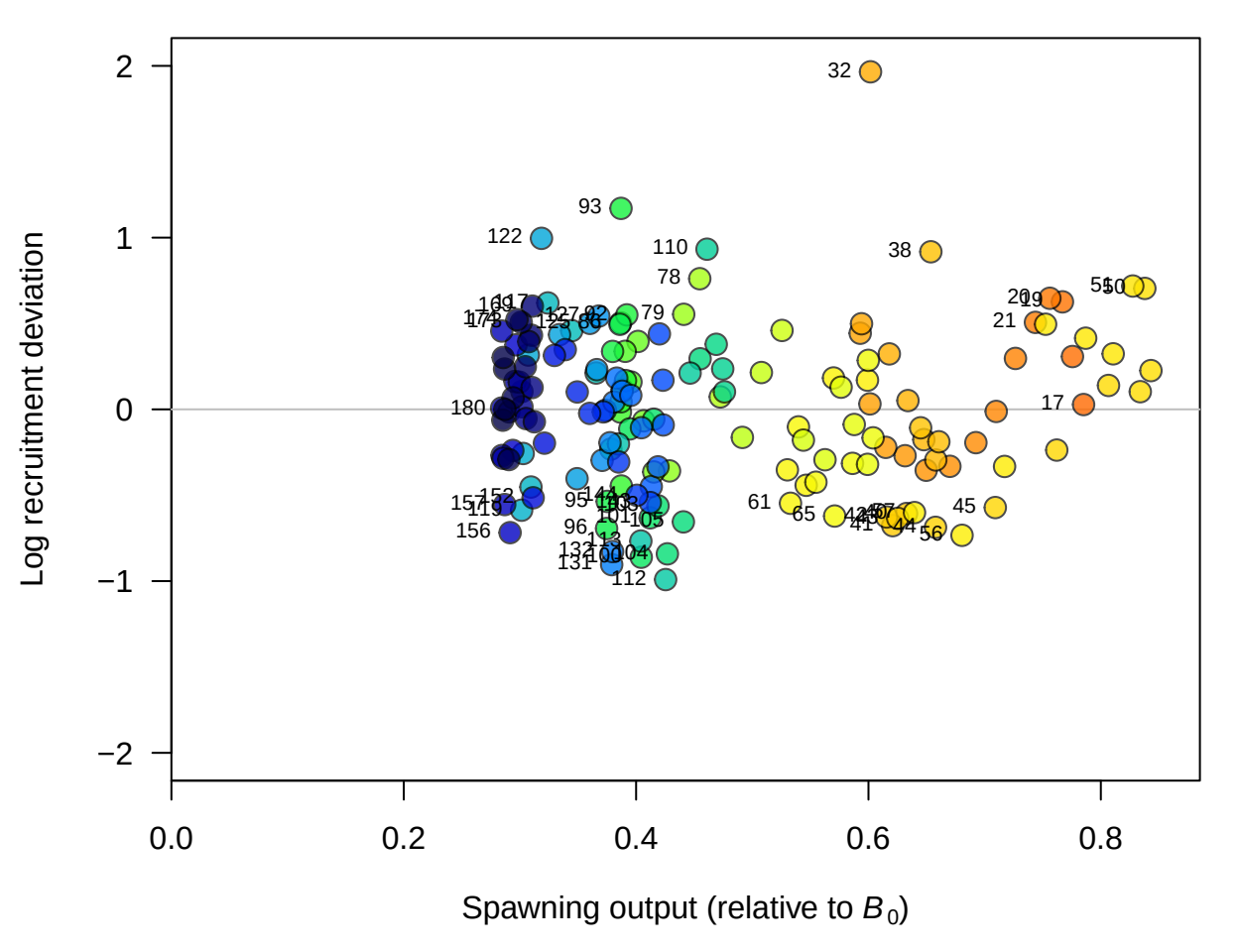

Log recruitment deviation
2
1
0
−1
0
50
100
150
200
Year

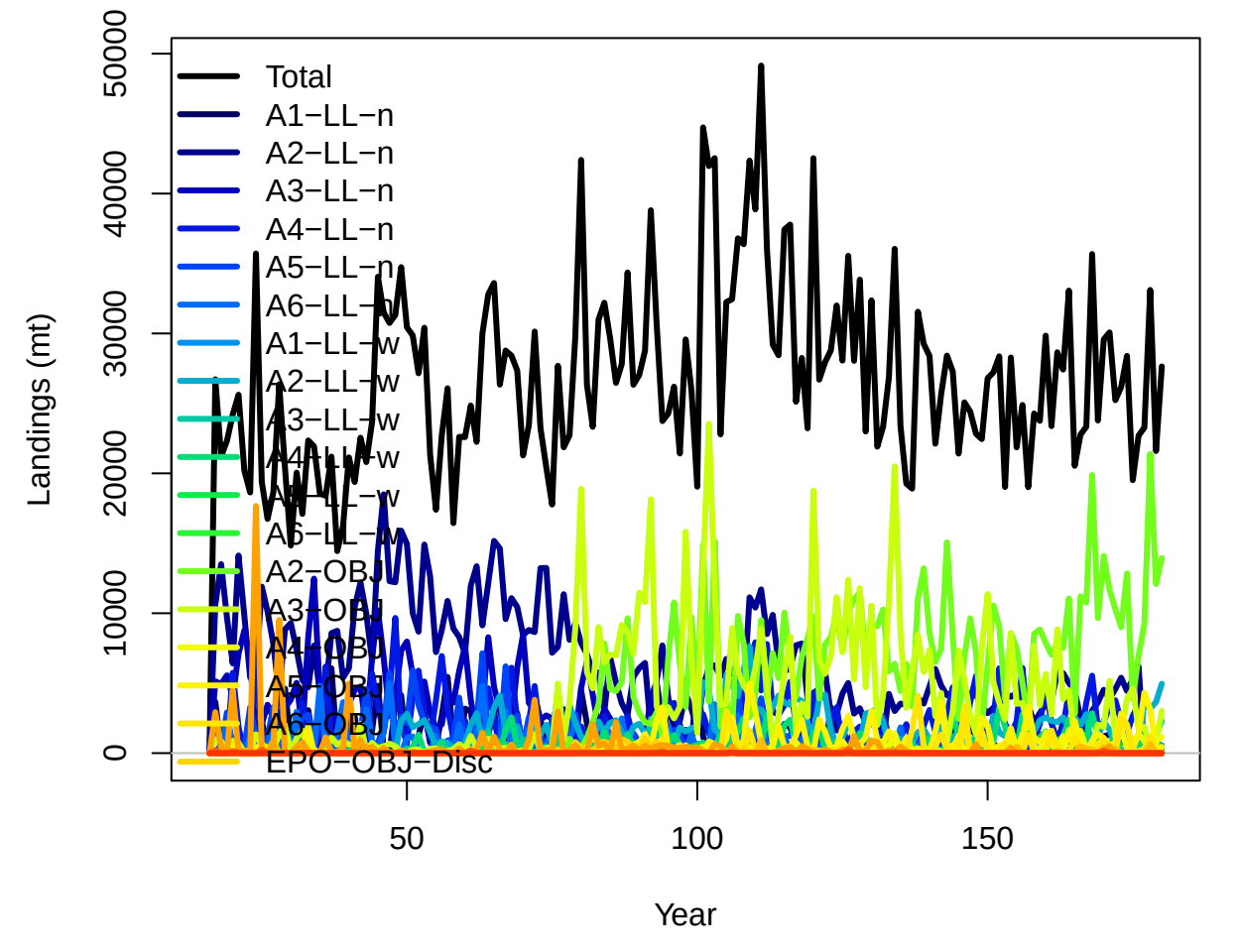

Recruitment deviation variance
Asymptotic standard error estimate
0.0
0.2
0.4
0.6
0.8
0
50
100
150
200
Year

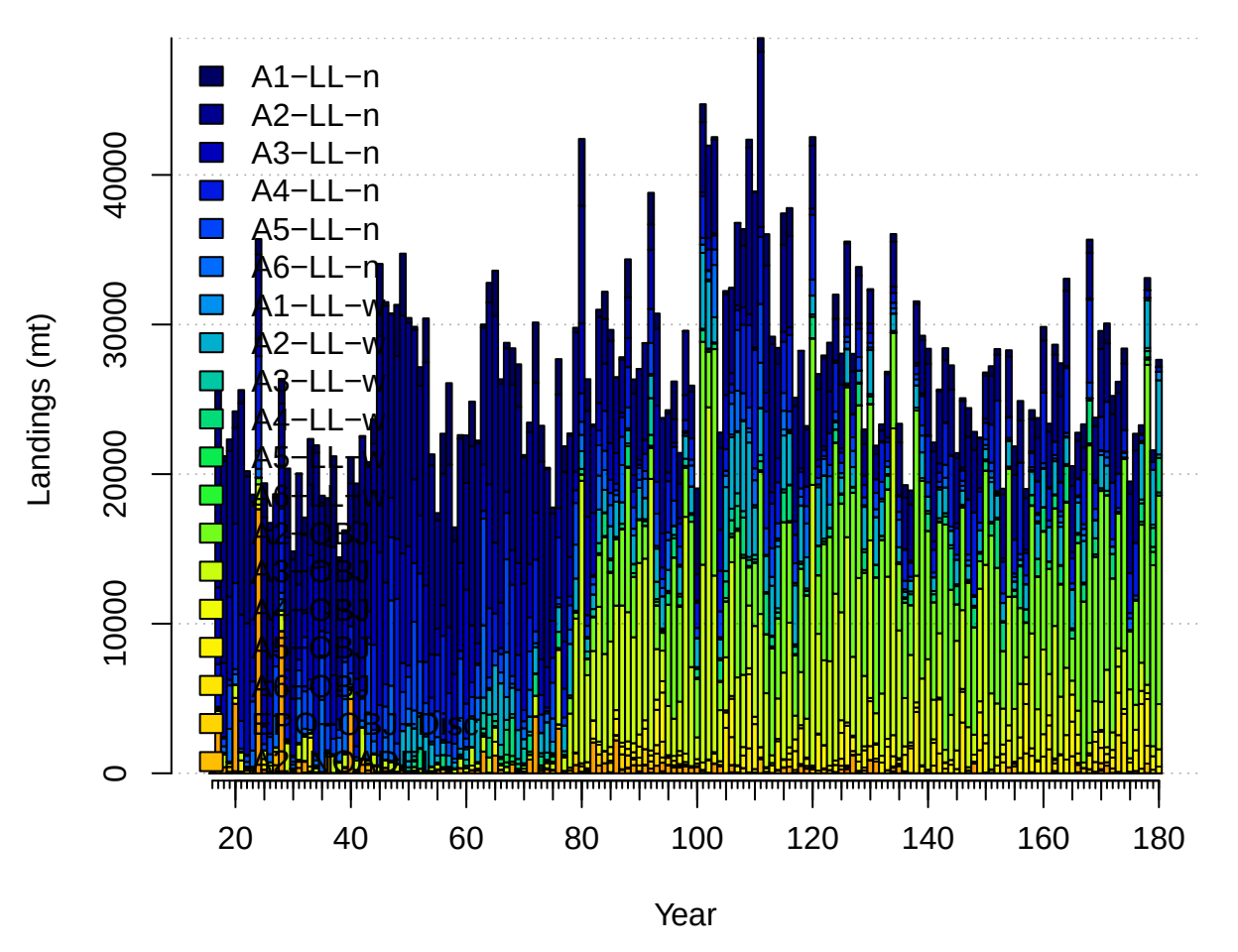

bias adjust in model
estimated alternative
$1 - SE(\hat{r}_y)^2/\sigma_R^2$
1.0
0.5
0.0
−0.5
0
50
100
150
200
Year

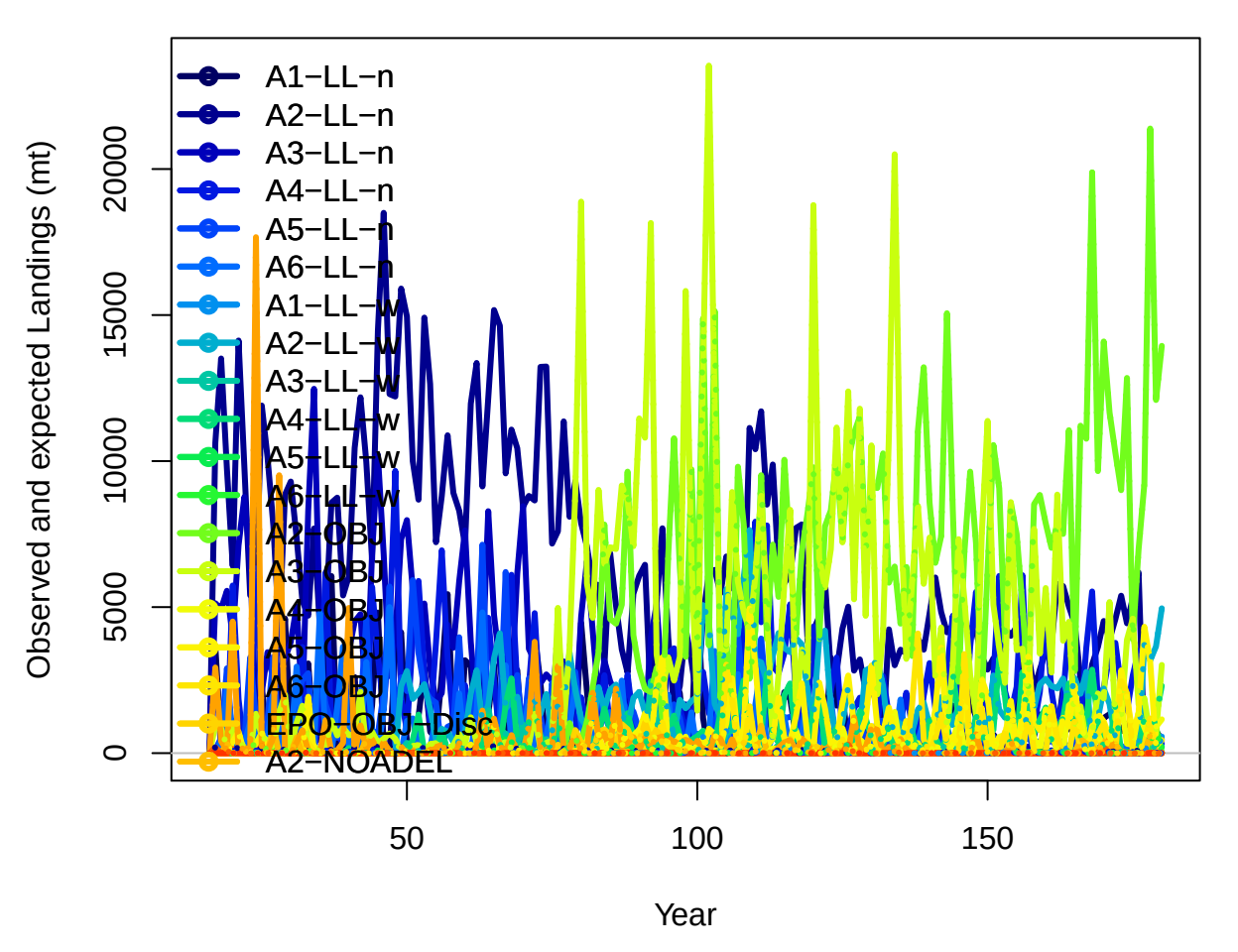

Exp. recruitment
Exp. recruitment after bias adj.
Estimated recruitments
Unfished equilibrium
Recruitment (1,000s)
0
10000
20000
30000
40000
50000
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning biomass (mt)

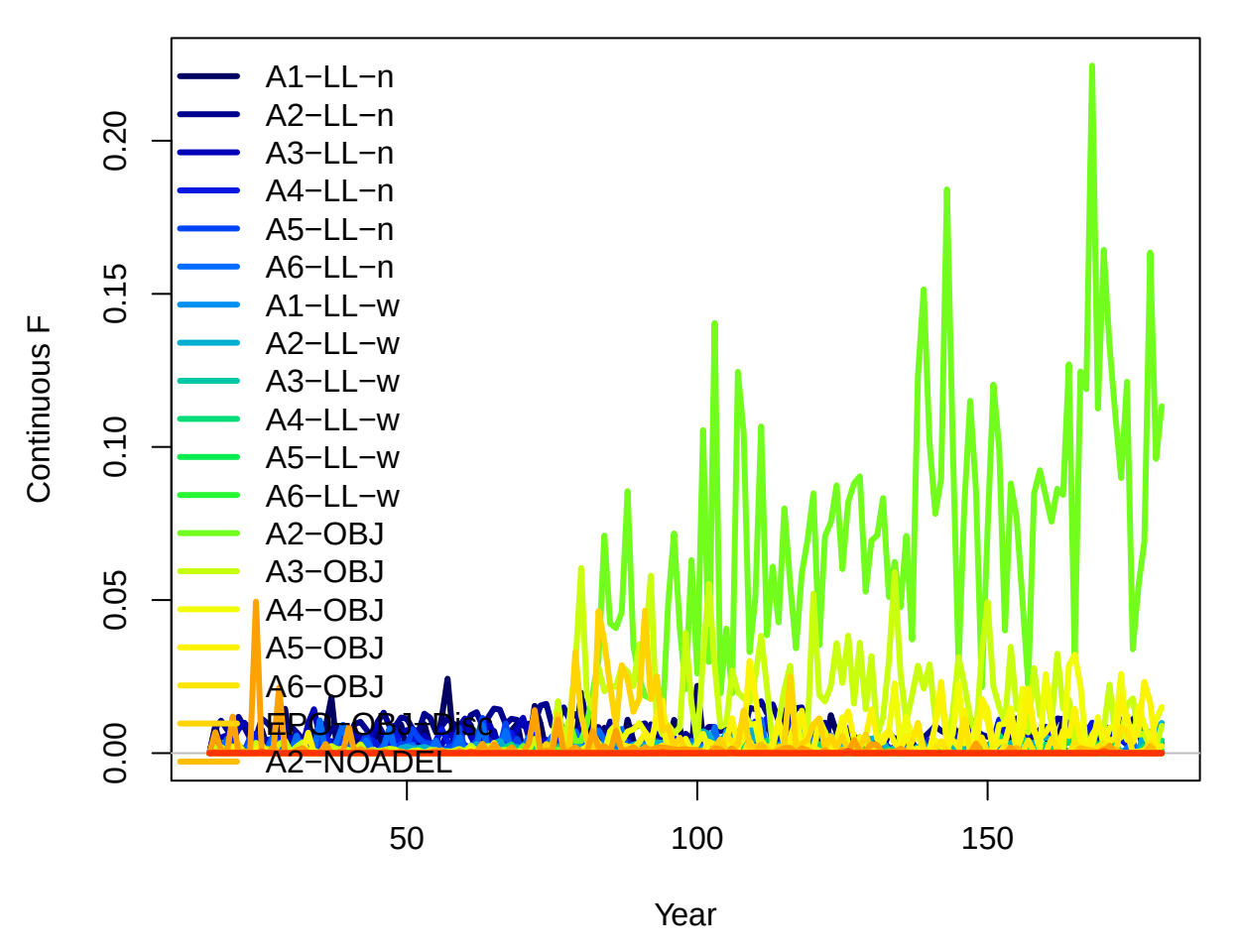

Exp. recruitment
Exp. recruitment after bias adj.
Estimated recruitments
Unfished equilibrium
Recruitment (1,000s)
0
10000
20000
30000
40000
50000
0e+00
1e+05
2e+05
3e+05
4e+05
5e+05
Spawning biomass (mt)
32
93
122
110
38
78
79
180
21
17
61
45

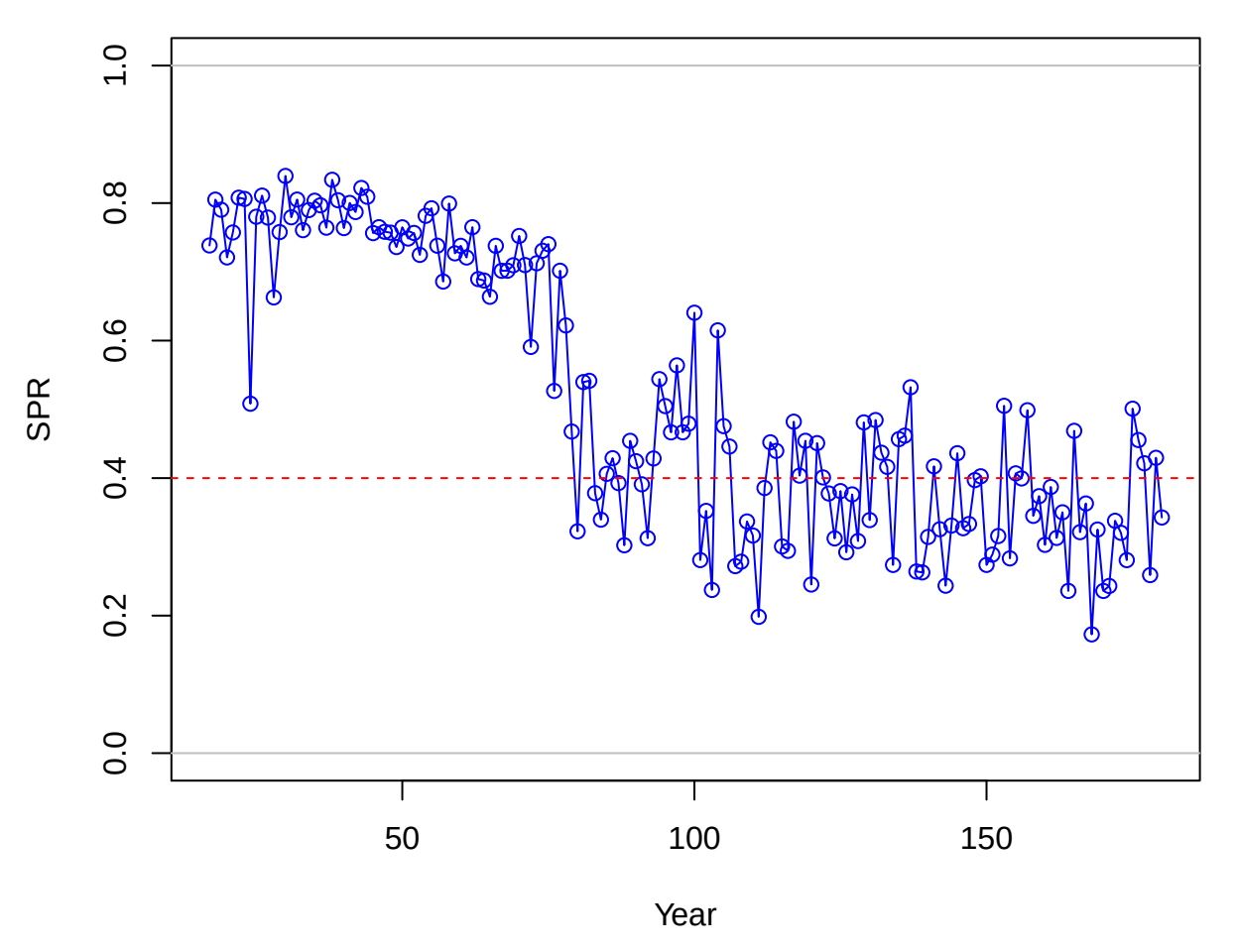

Log recruitment deviation
Spawning output (relative to B_0)
2
1
0
−1
−2
0.0
0.2
0.4
0.6
0.8
32
93
122
110
38
78
79
180
61
65
45
56
17
21
112

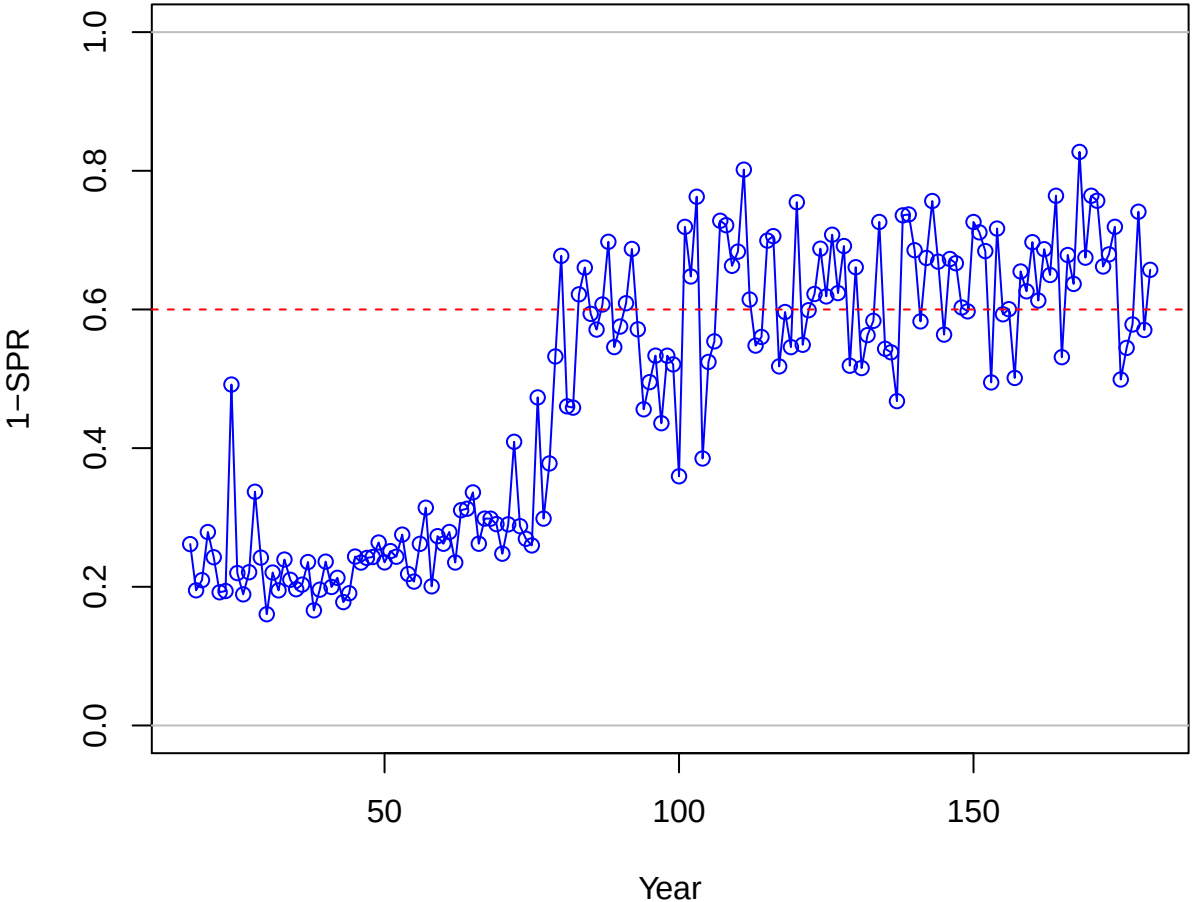

Landings (mt)
0
10000
20000
30000
40000
50000
50
100
150
Year
Total
A1−LL−n
A2−LL−n
A3−LL−n
A4−LL−n
A5−LL−n
A6−LL−n
A1−LL−w
A2−LL−w
A3−LL−w
A4−LL−w
A5−LL−w
A6−LL−w
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
EPO−OBJ−Disc

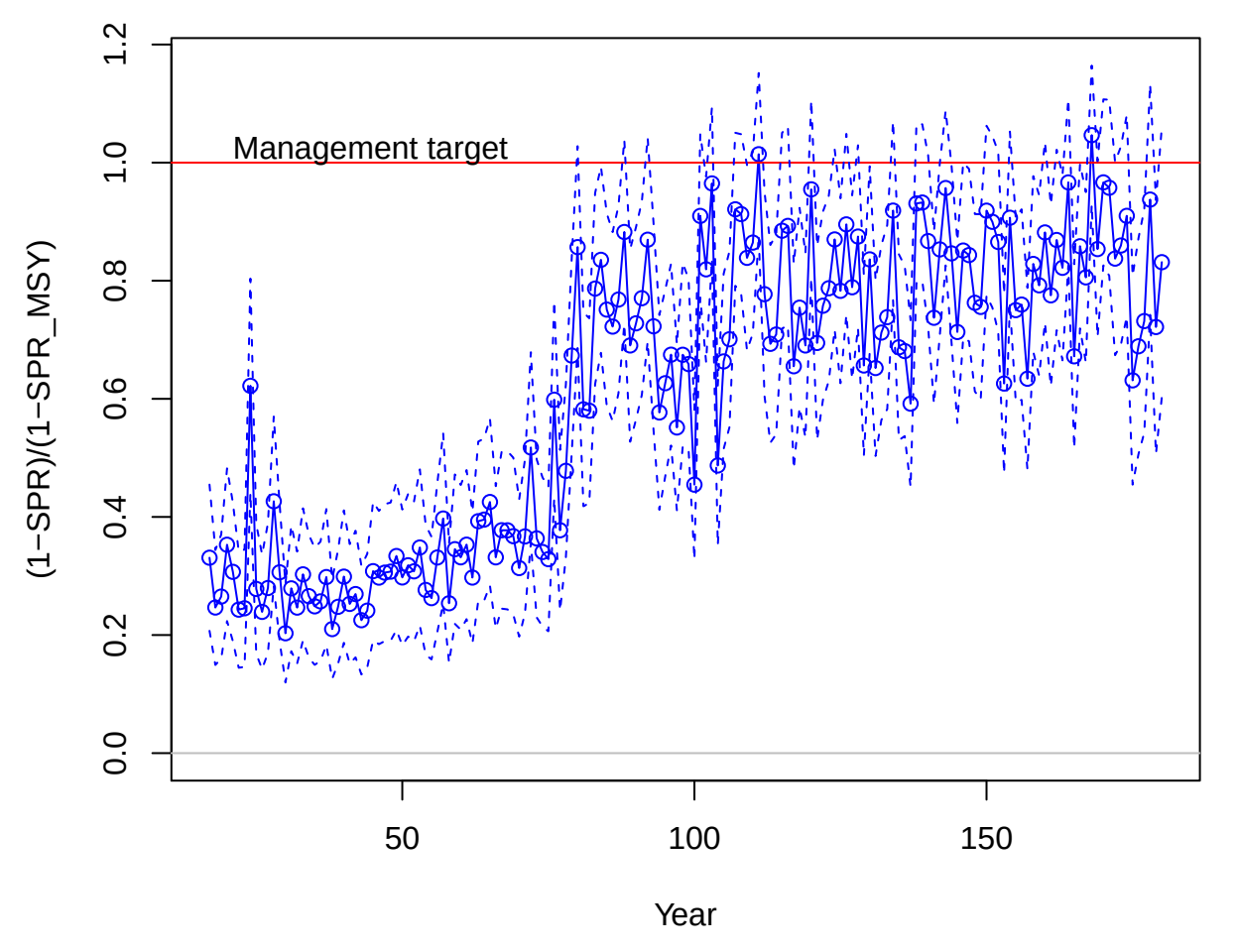

A1−LL−n
A2−LL−n
A3−LL−n
A4−LL−n
A5−LL−n
A6−LL−n
A1−LL−w
A2−LL−w
A3−LL−w
A4−LL−w
A5−LL−w
A6−LL−w
Landings (mt)
0
10000
20000
30000
40000
20
40
60
80
100
120
140
160
180
Year

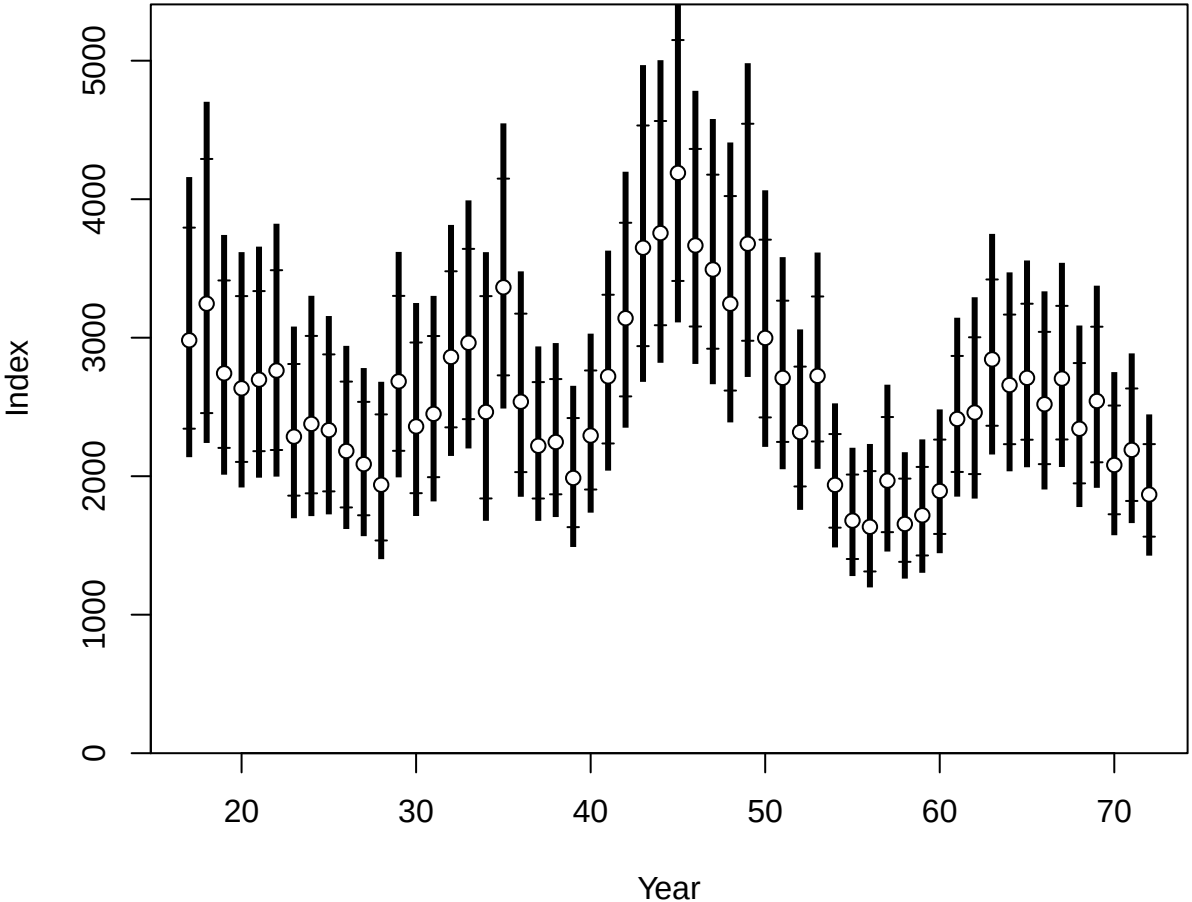

A1−LL−n
A2−LL−n
A3−LL−n
A4−LL−n
A5−LL−n
A6−LL−n
A1−LL−w
A2−LL−w
A3−LL−w
A4−LL−w
A5−LL−w
A6−LL−w
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
EPO−OBJ−Disc
A2−NOADEL
Observed and expected Landings (mt)
0
5000
10000
15000
20000
50
100
150
Year

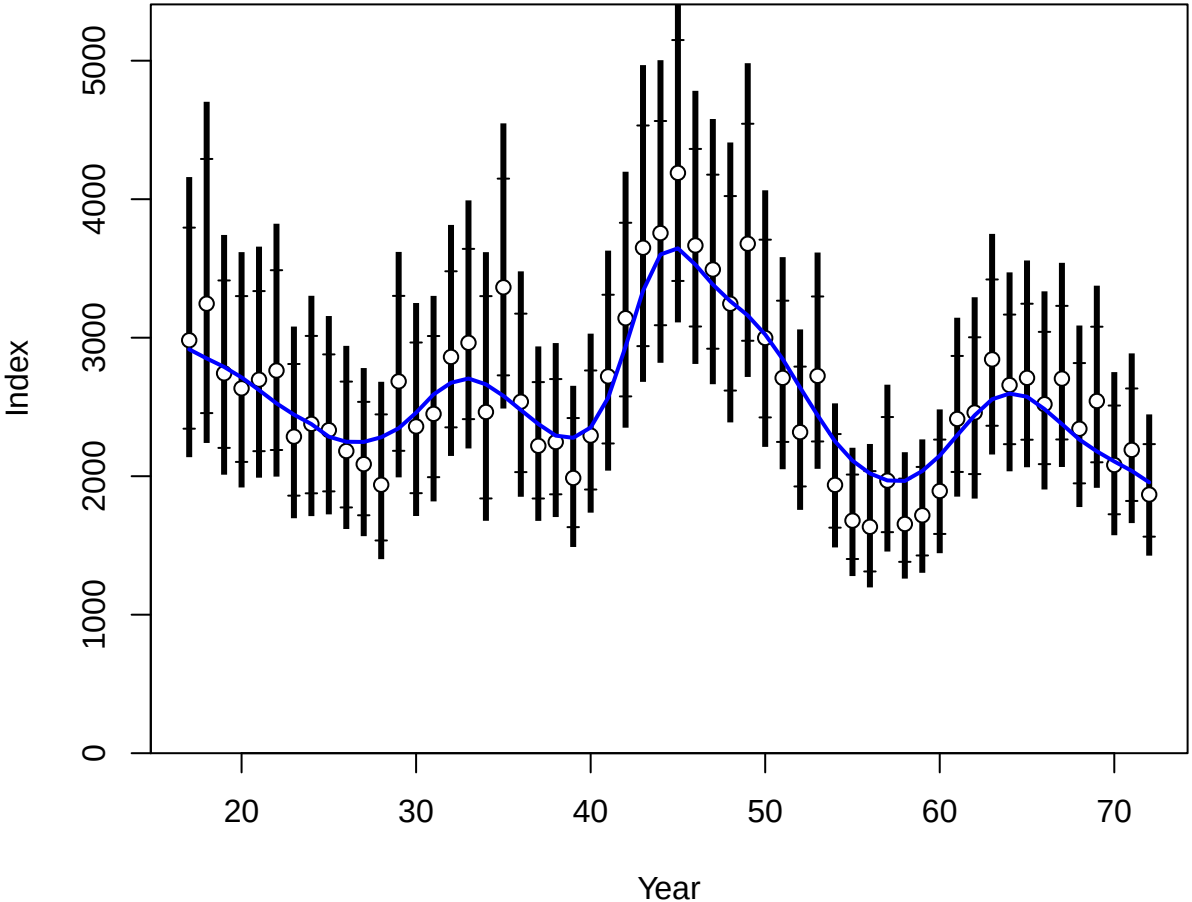

A1−LL−n
A2−LL−n
A3−LL−n
A4−LL−n
A5−LL−n
A6−LL−n
A1−LL−w
A2−LL−w
A3−LL−w
A4−LL−w
A5−LL−w
A6−LL−w
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
A2−NOADEL
Continuous F
0.00
0.05
0.10
0.15
0.20
50
100
150
Year

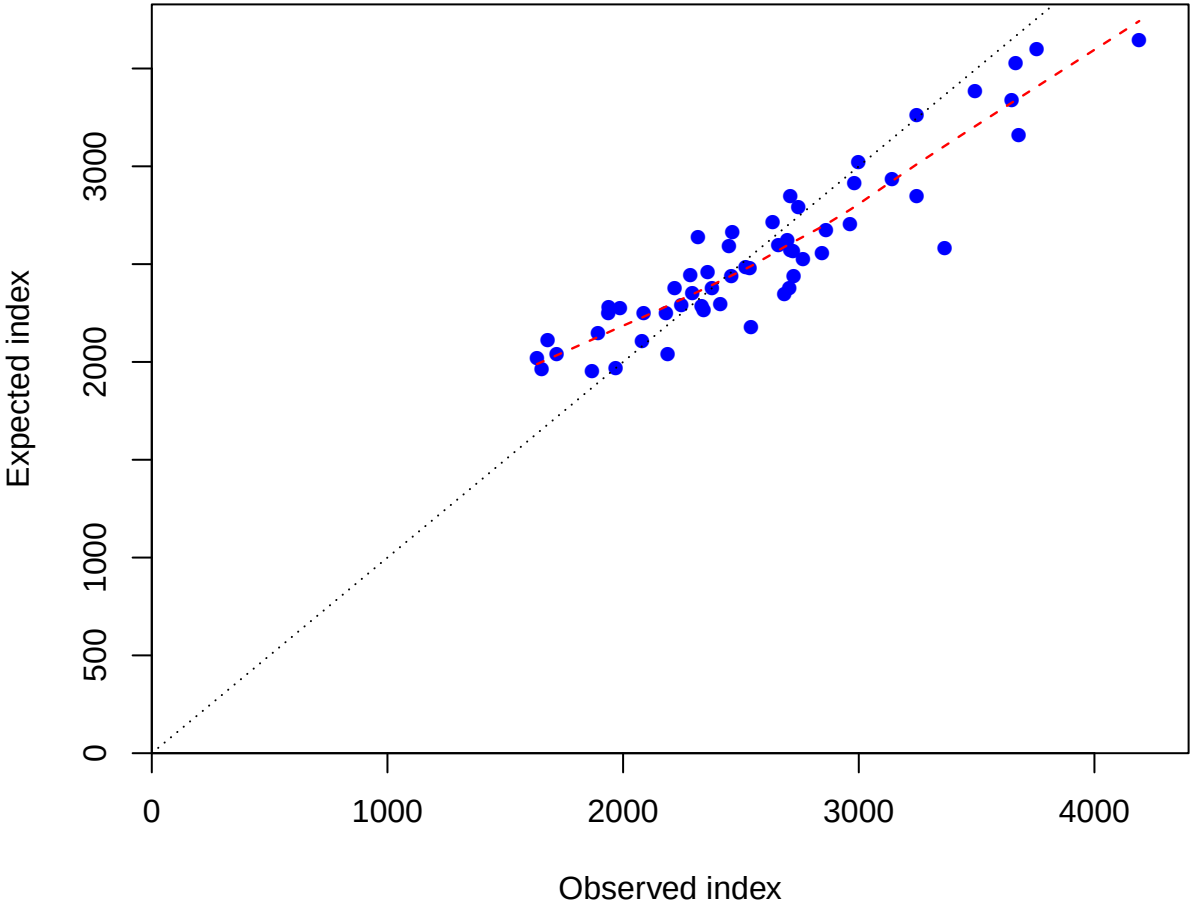

SPR
1.0
0.8
0.6
0.4
0.2
0.0
50
100
150
Year

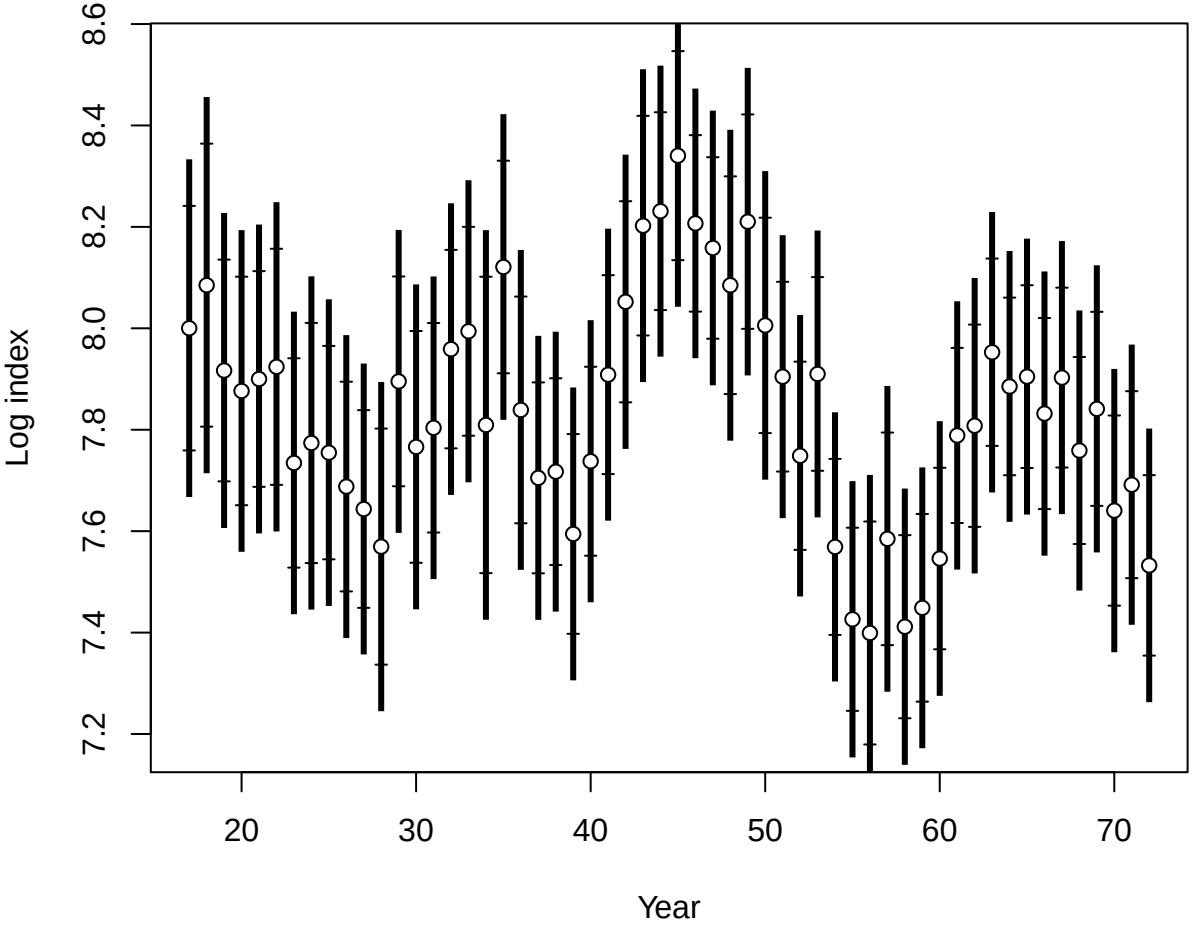

1−SPR
0.0
0.2
0.4
0.6
0.8
1.0
50
100
150
Year

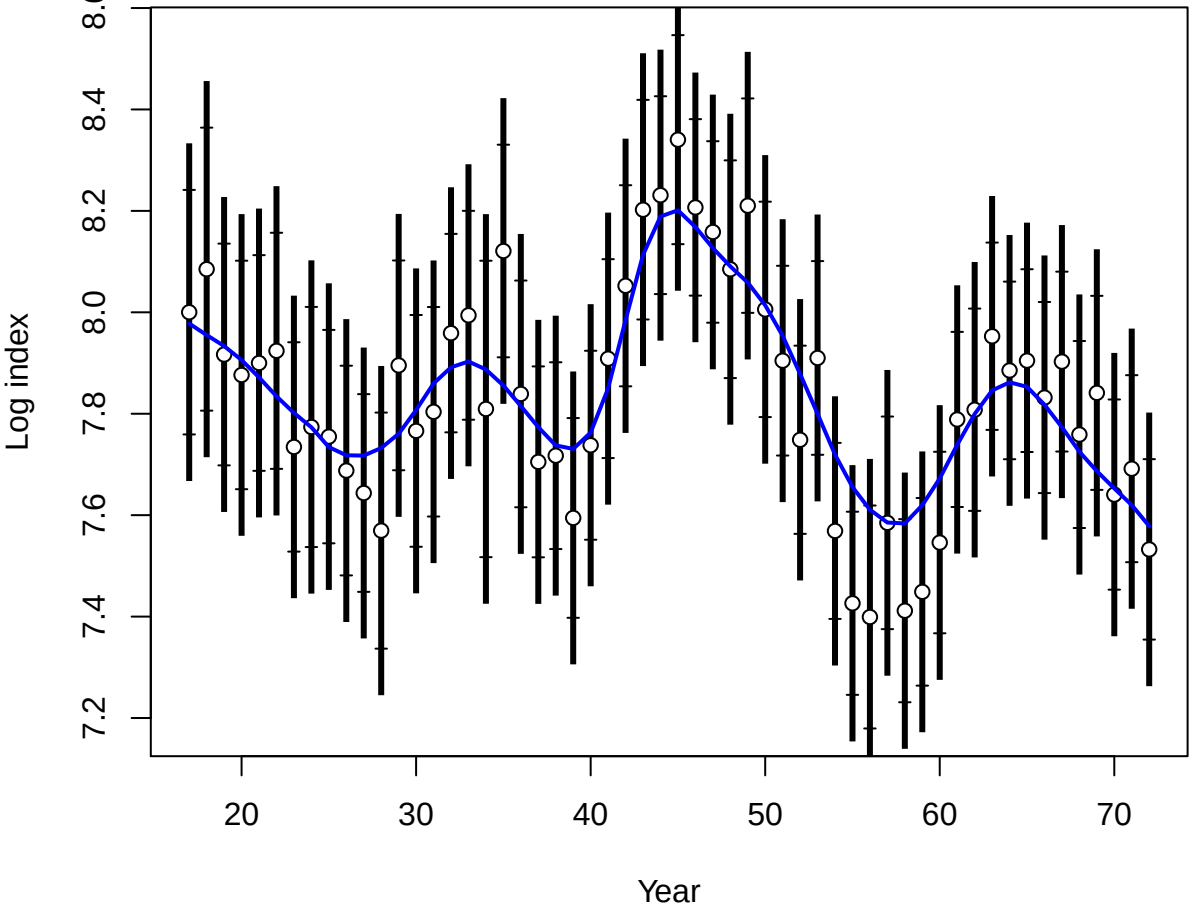

Management target
(1−SPR)/(1−SPR_MSY)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
50
100
150
Year

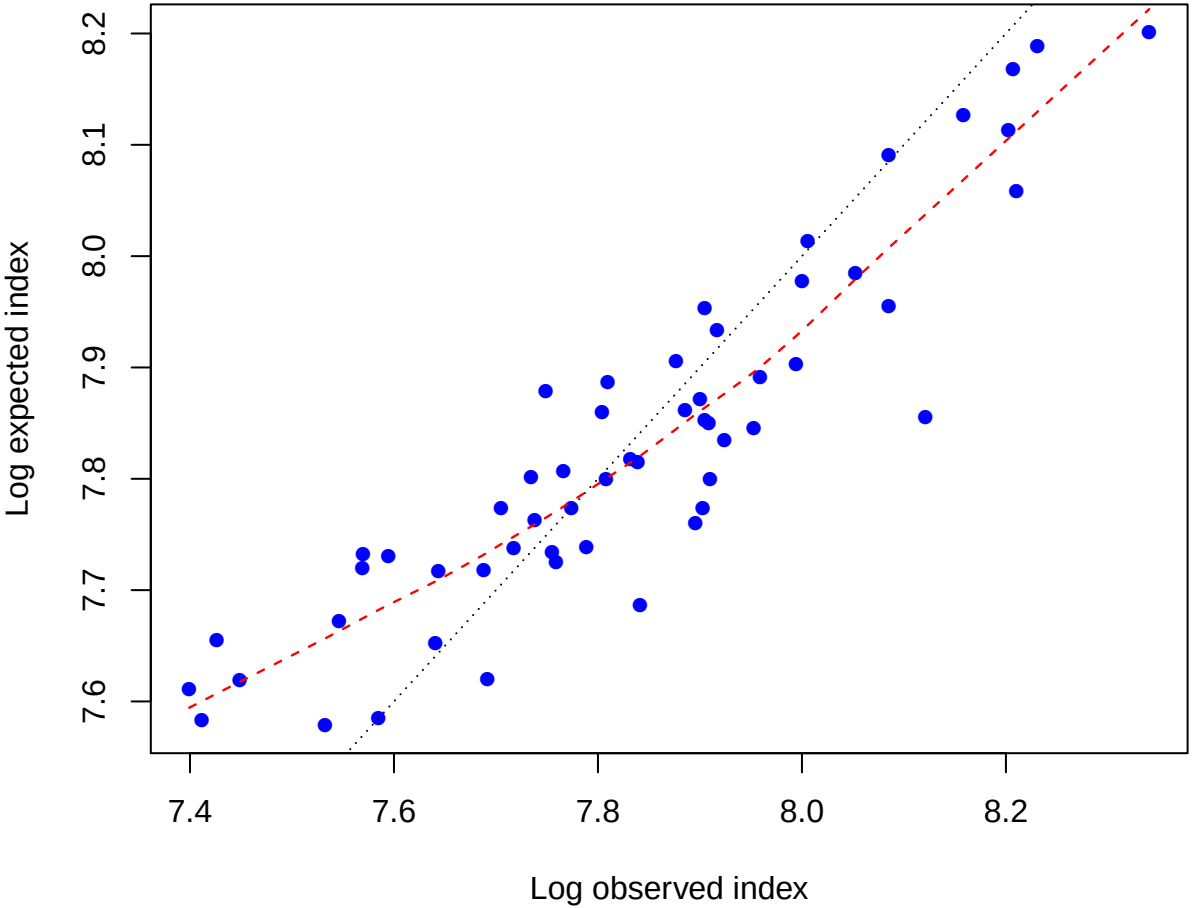

Index
0
1000
2000
3000
4000
5000
20
30
40
50
60
70
Year

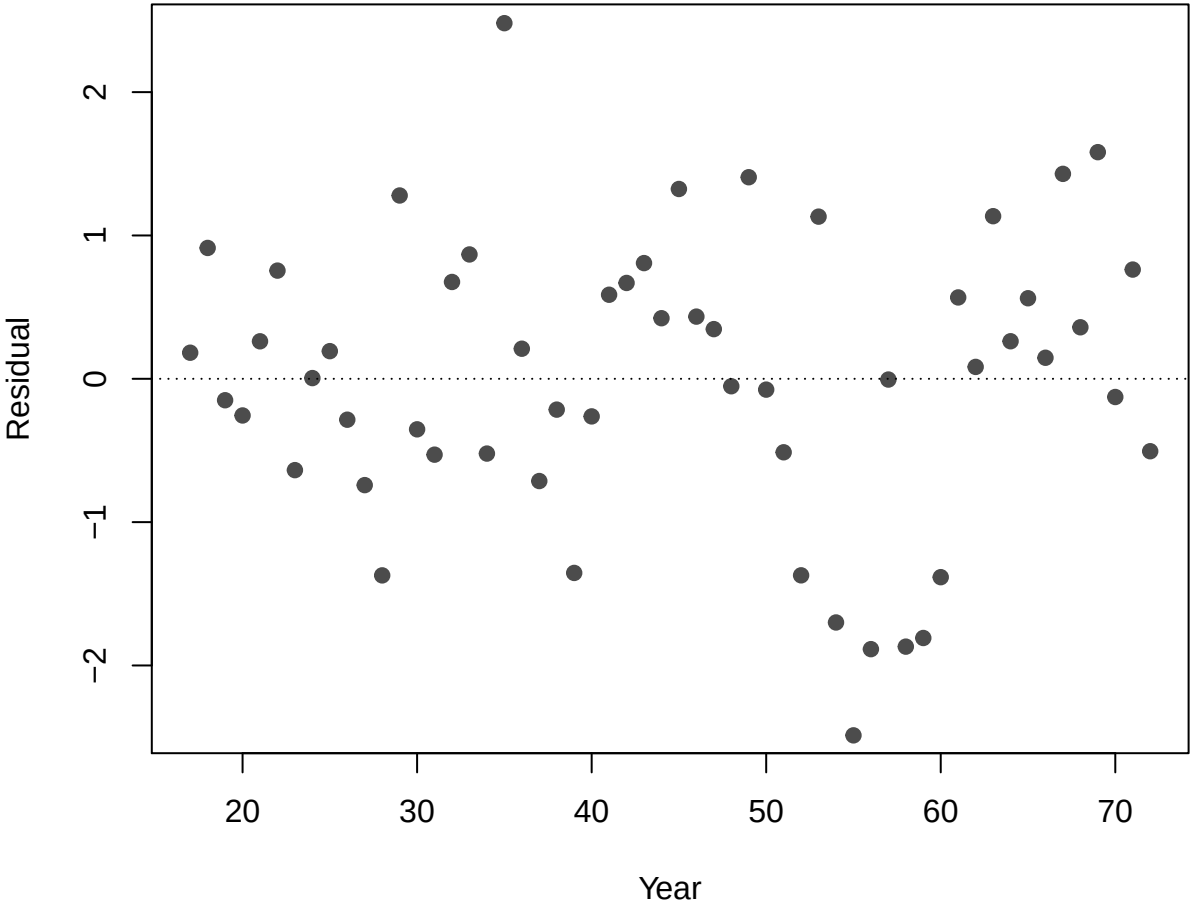

Index
0
1000
2000
3000
4000
5000
20
30
40
50
60
70
Year

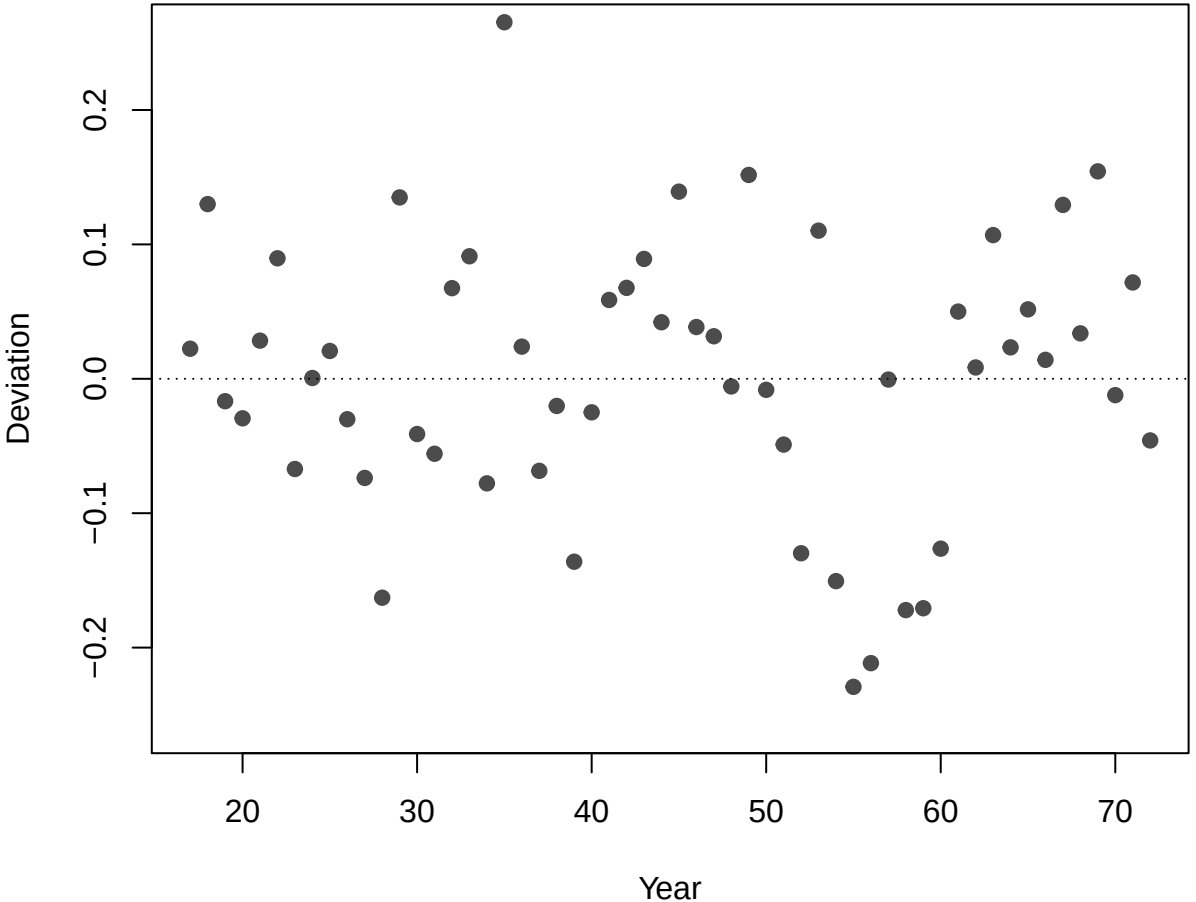

Expected index
0
500
1000
2000
3000
0
1000
2000
3000
4000
Observed index

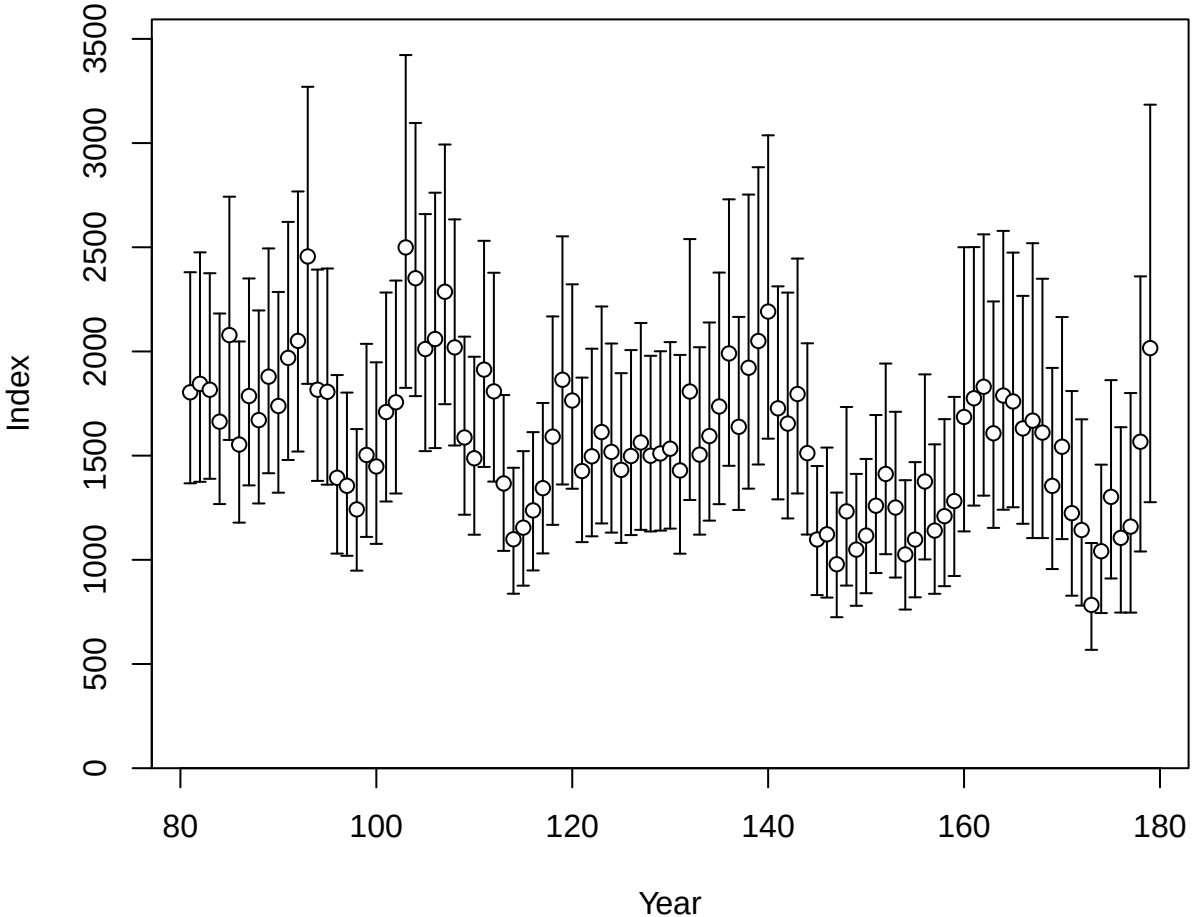

Log index
7.2
7.4
7.6
7.8
8.0
8.2
8.4
8.6
20
30
40
50
60
70
Year

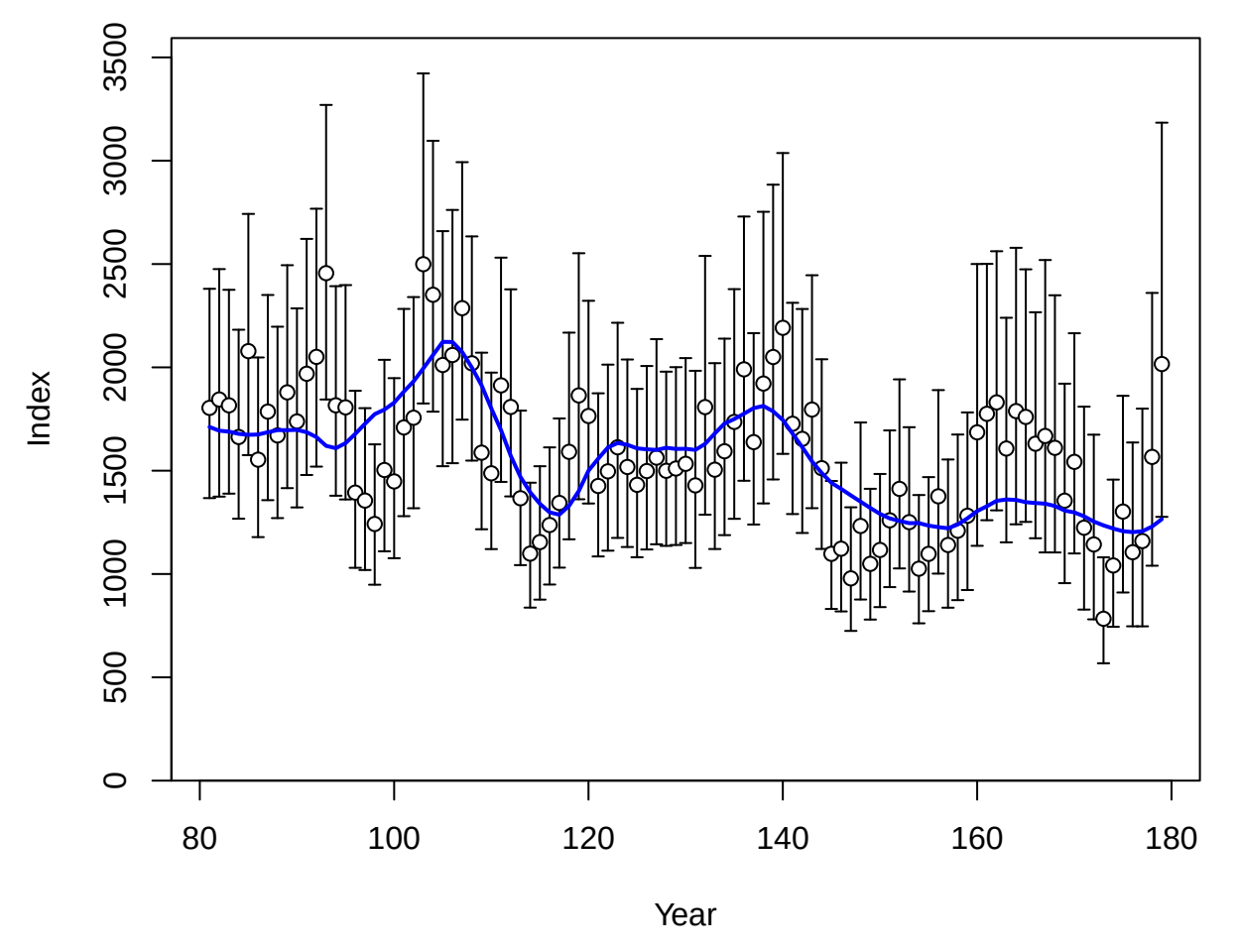

Log index
7.2
7.4
7.6
7.8
8.0
8.2
8.4
8.6
20
30
40
50
60
70
Year

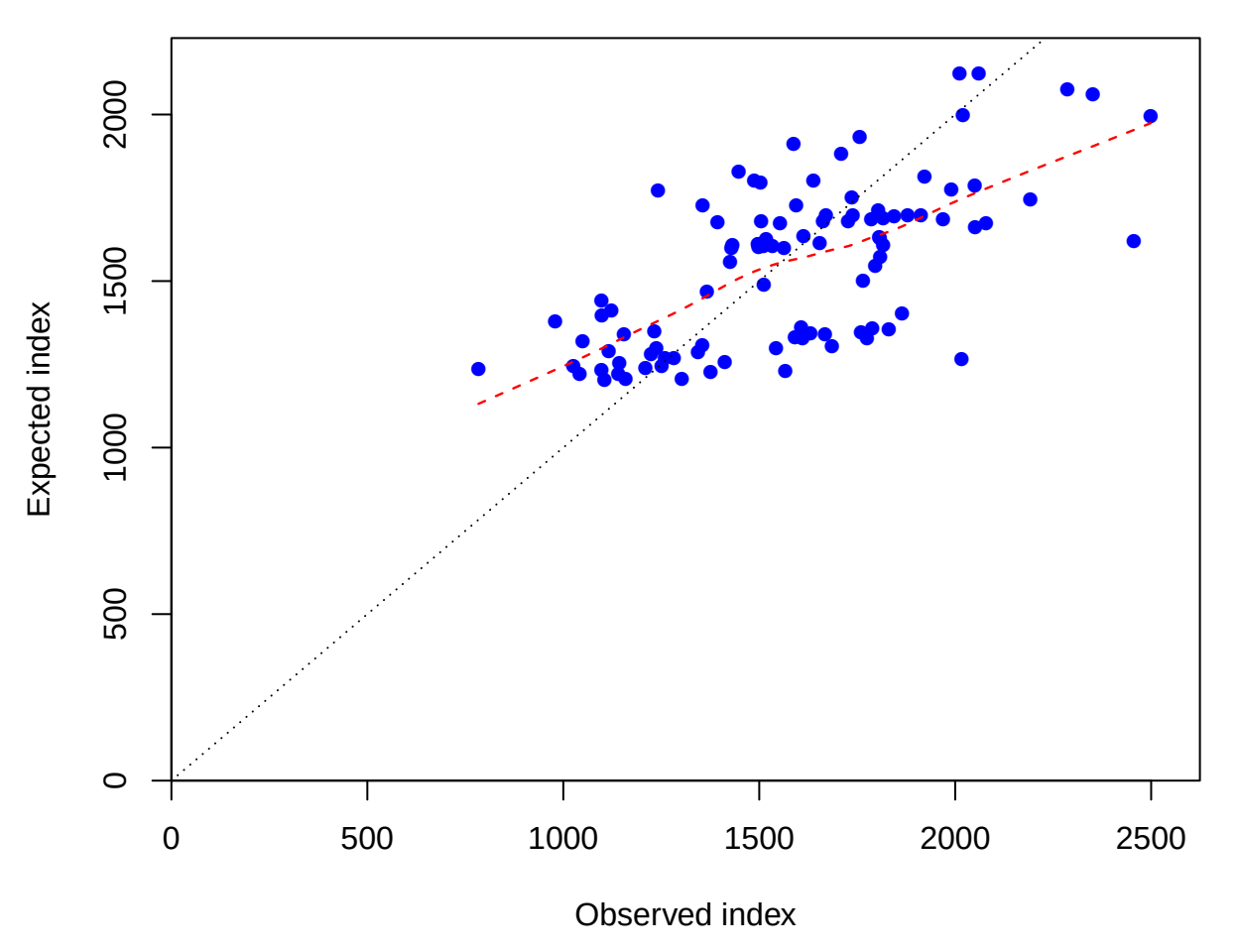

Log expected index
Log observed index
7.6
7.7
7.8
7.9
8.0
8.1
8.2
7.4
7.6
7.8
8.0
8.2

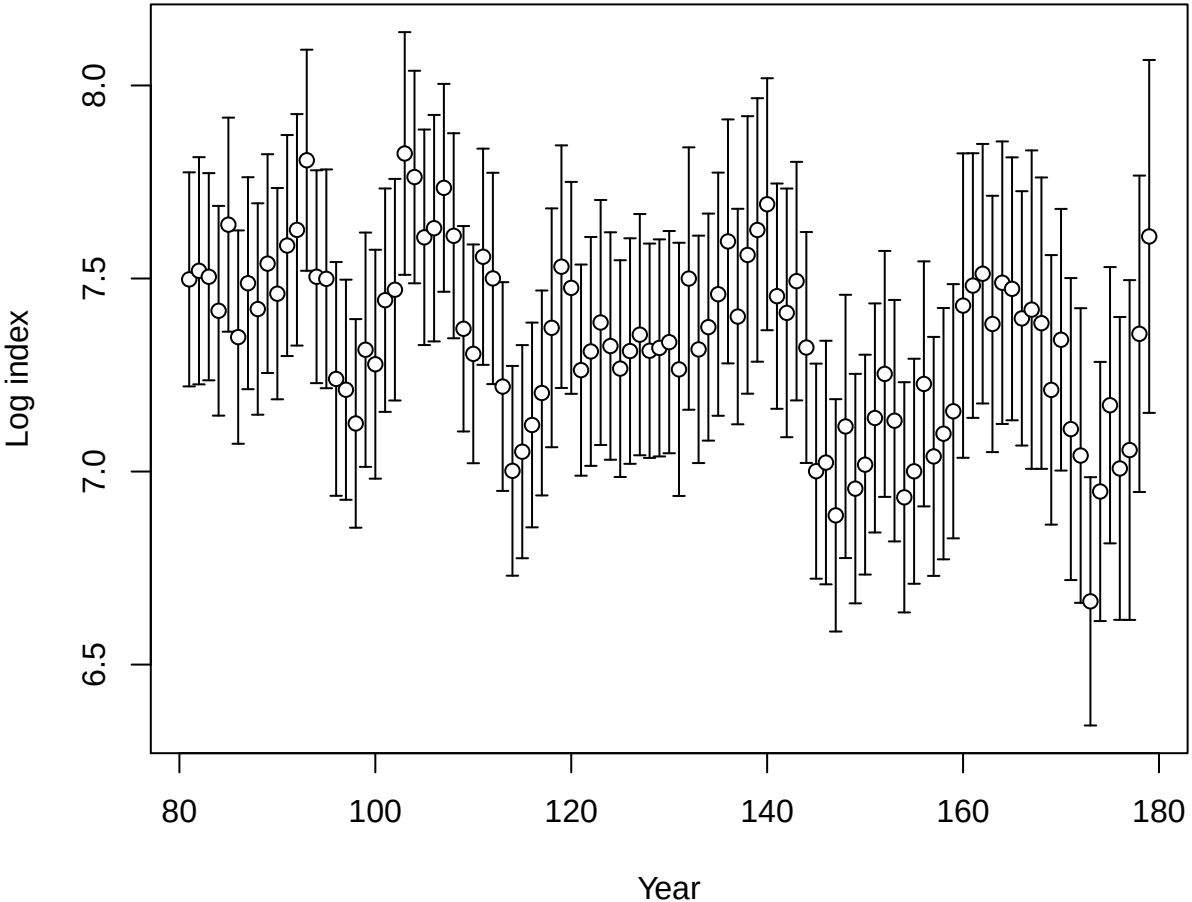

Residual
2
1
0
−1
−2
20
30
40
50
60
70
Year

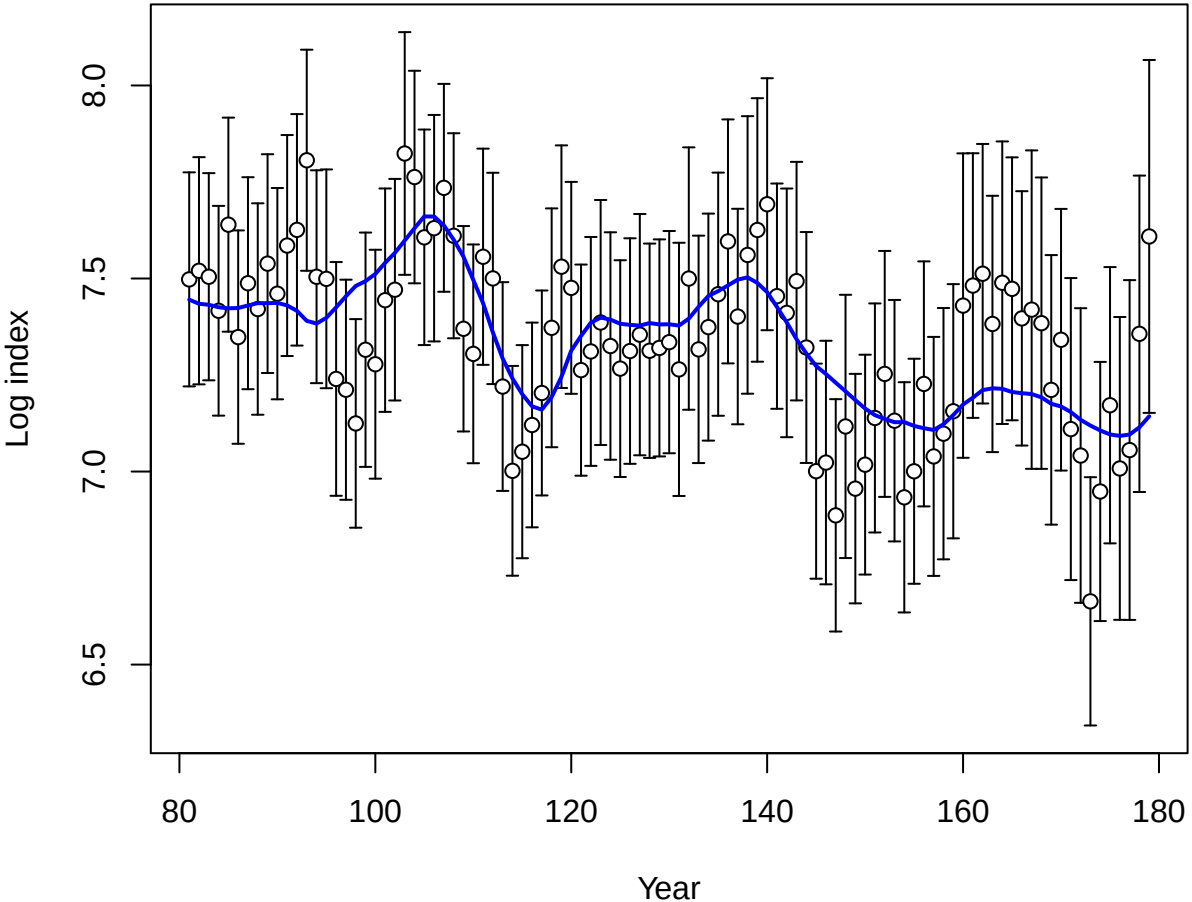

Deviation
0.2
0.1
0.0
−0.1
−0.2
20
30
40
50
60
70
Year

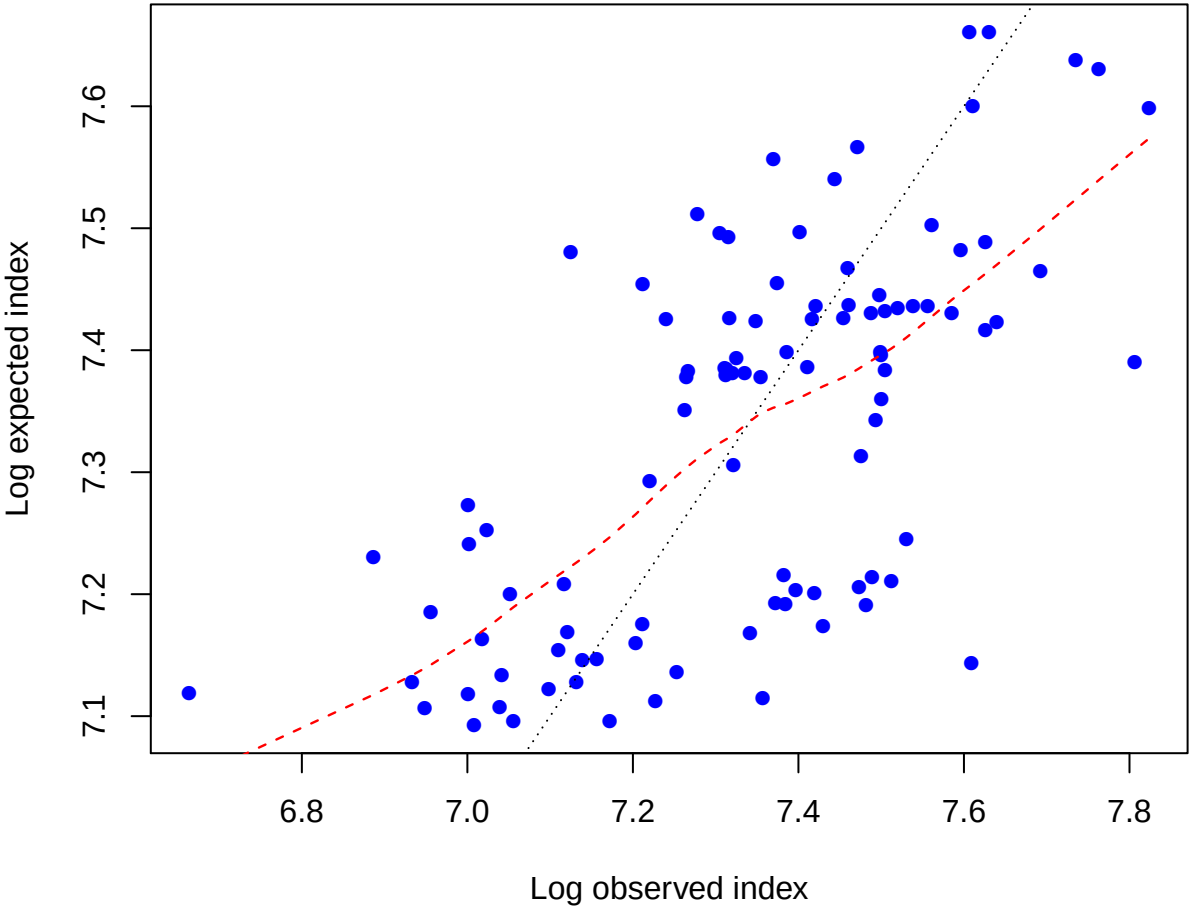

Index
0
500
1000
1500
2000
2500
3000
3500
80
100
120
140
160
180
Year

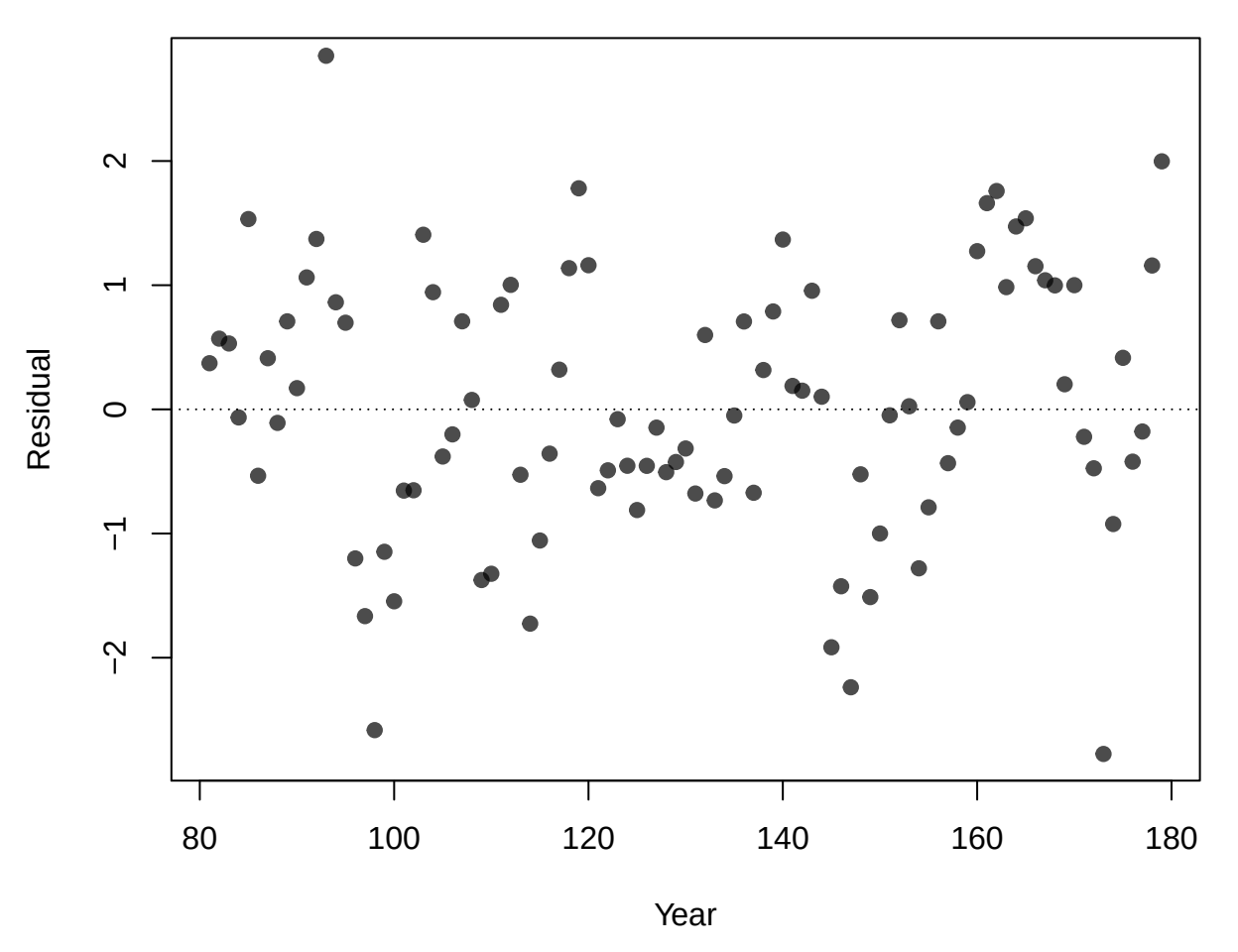

Index
0
500
1000
1500
2000
2500
3000
3500
80
100
120
140
160
180
Year

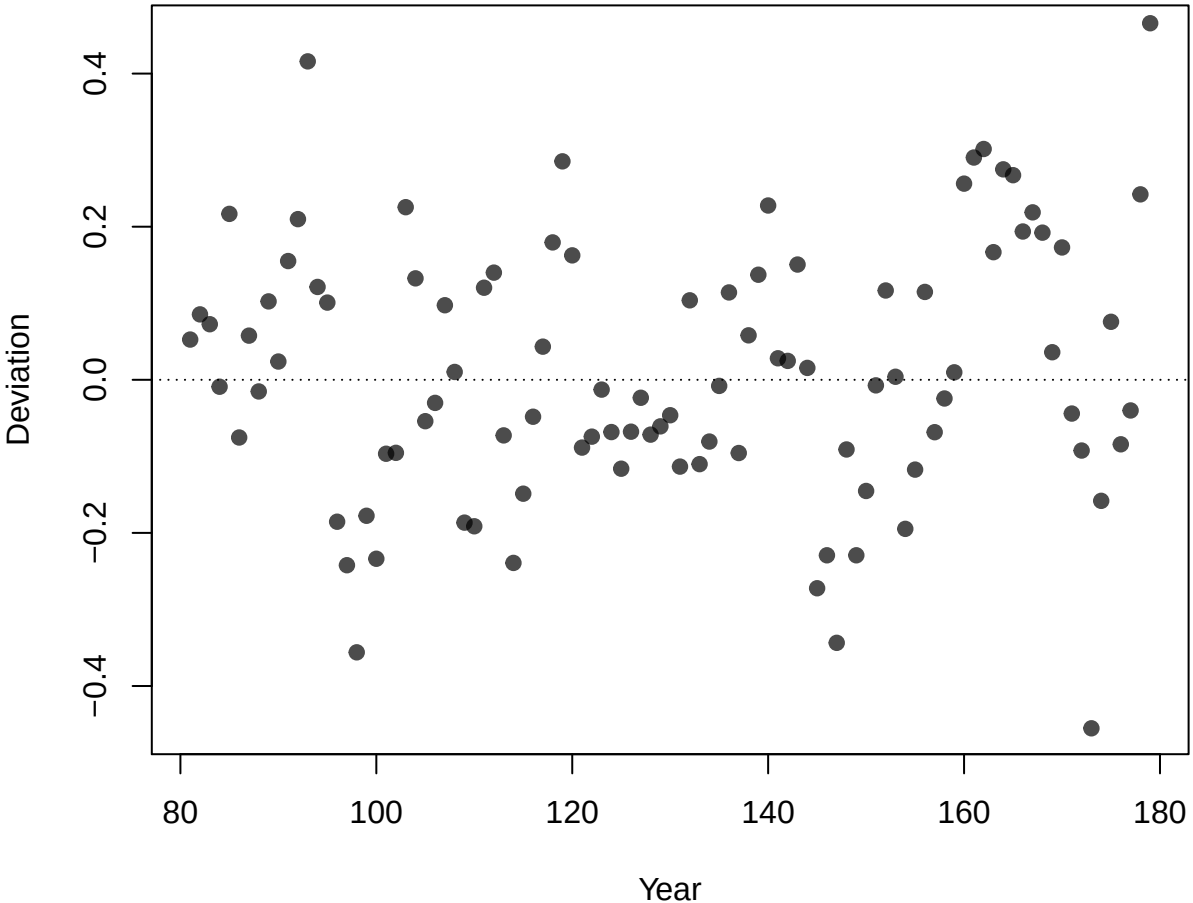

Expected index
0
500
1000
1500
2000
Observed index
0
500
1000
1500
2000
2500

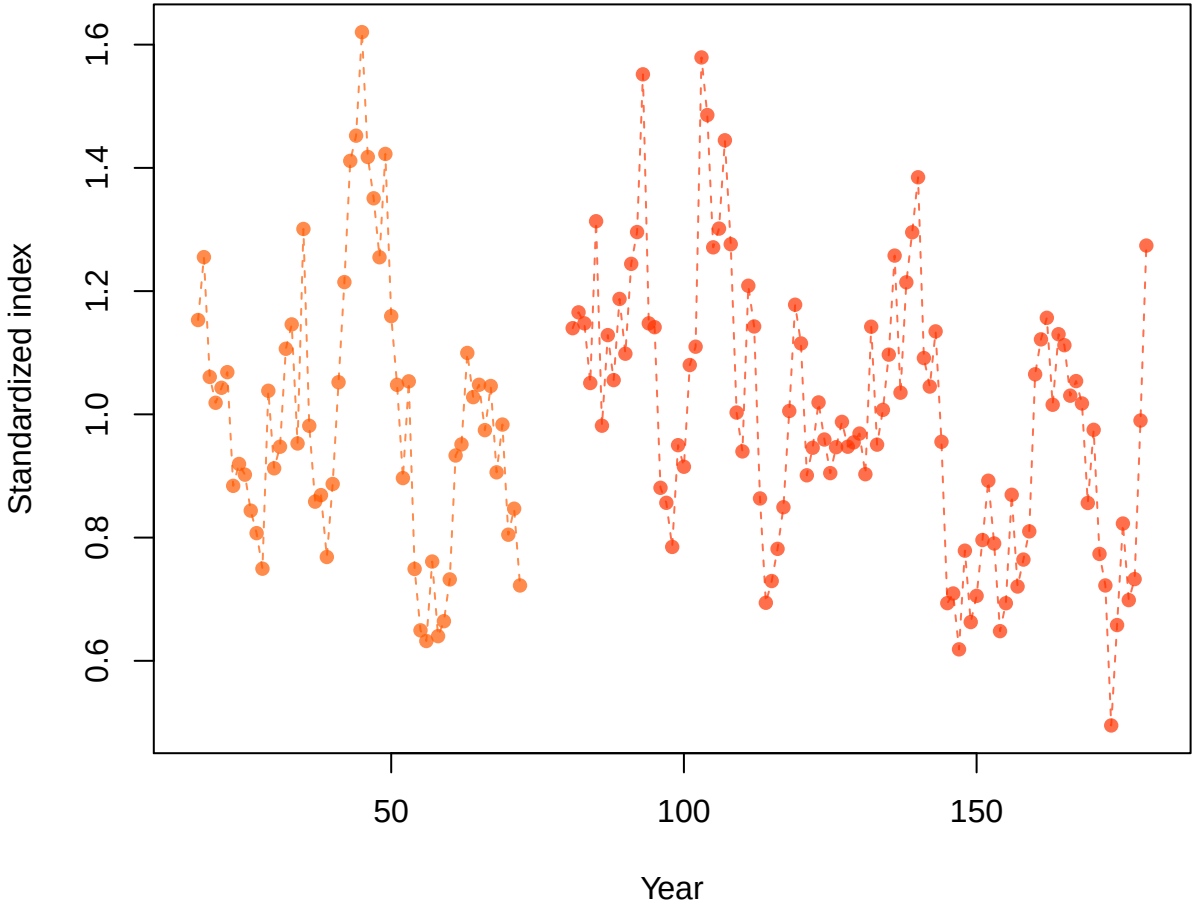

Log index
8.0
7.5
7.0
6.5
80
100
120
140
160
180
Year

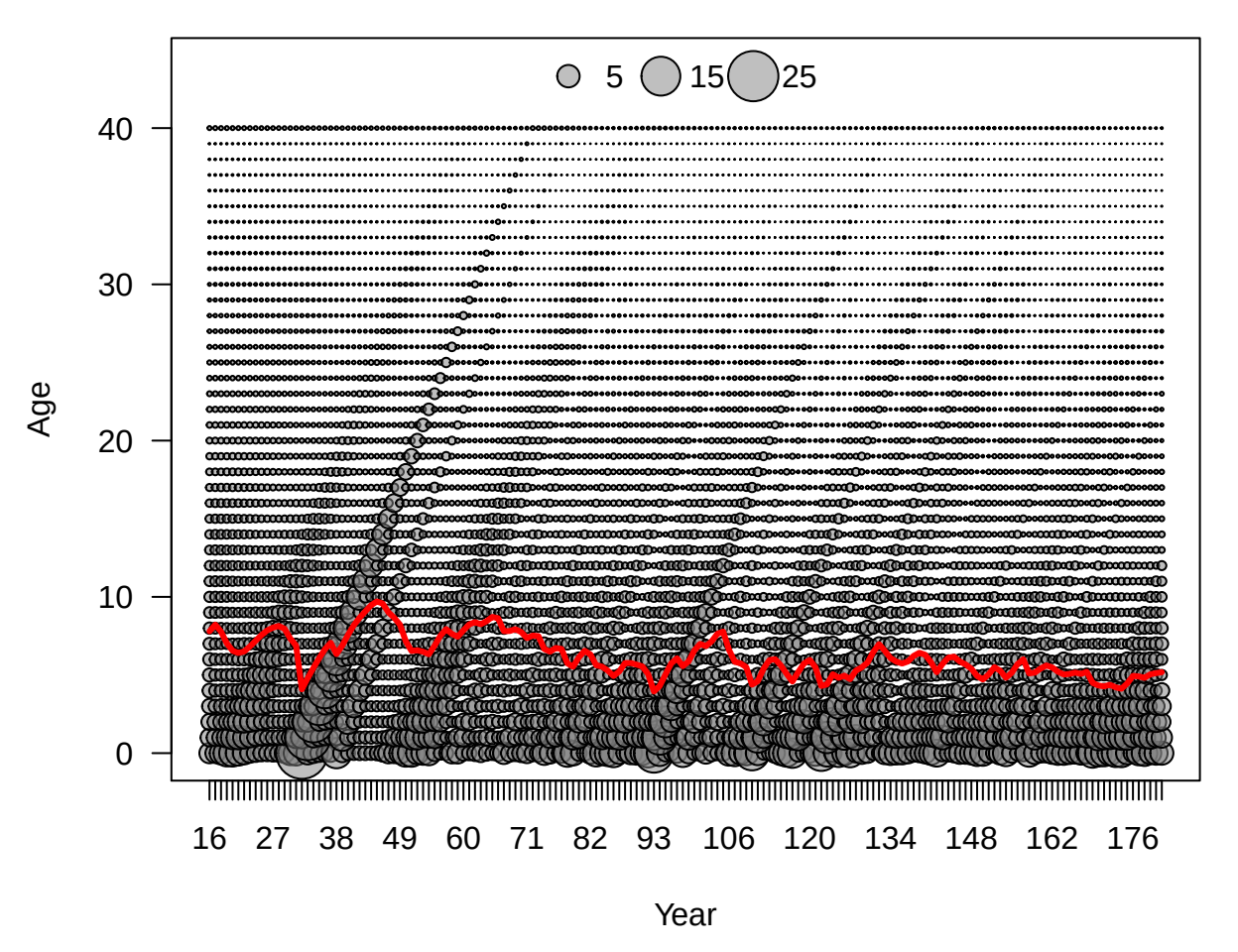

Log index
8.0
7.5
7.0
6.5
80
100
120
140
160
180
Year

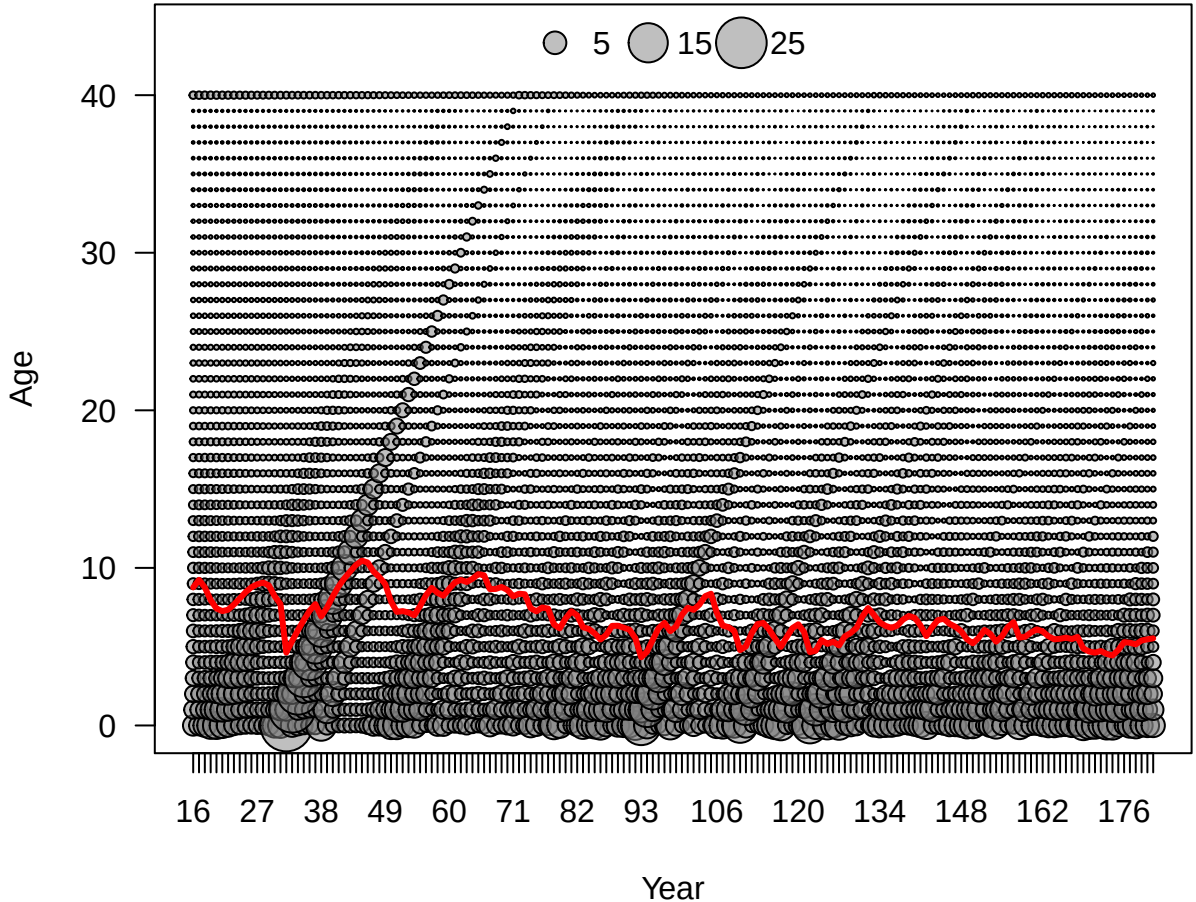

Log expected index
7.1
7.2
7.3
7.4
7.5
7.6
6.8
7.0
7.2
7.4
7.6
7.8
Log observed index

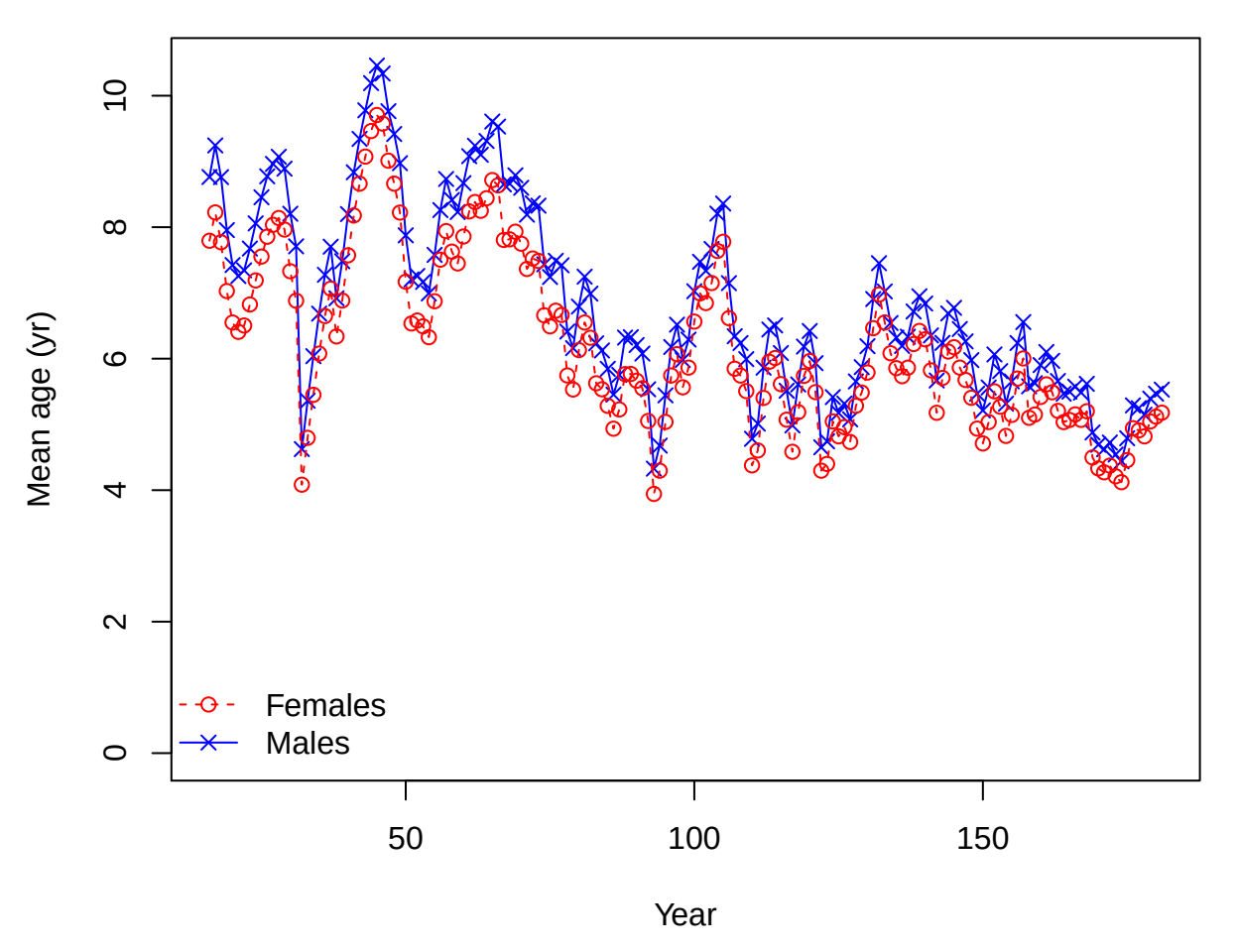

Residual
2
1
0
−1
−2
80
100
120
140
160
180
Year

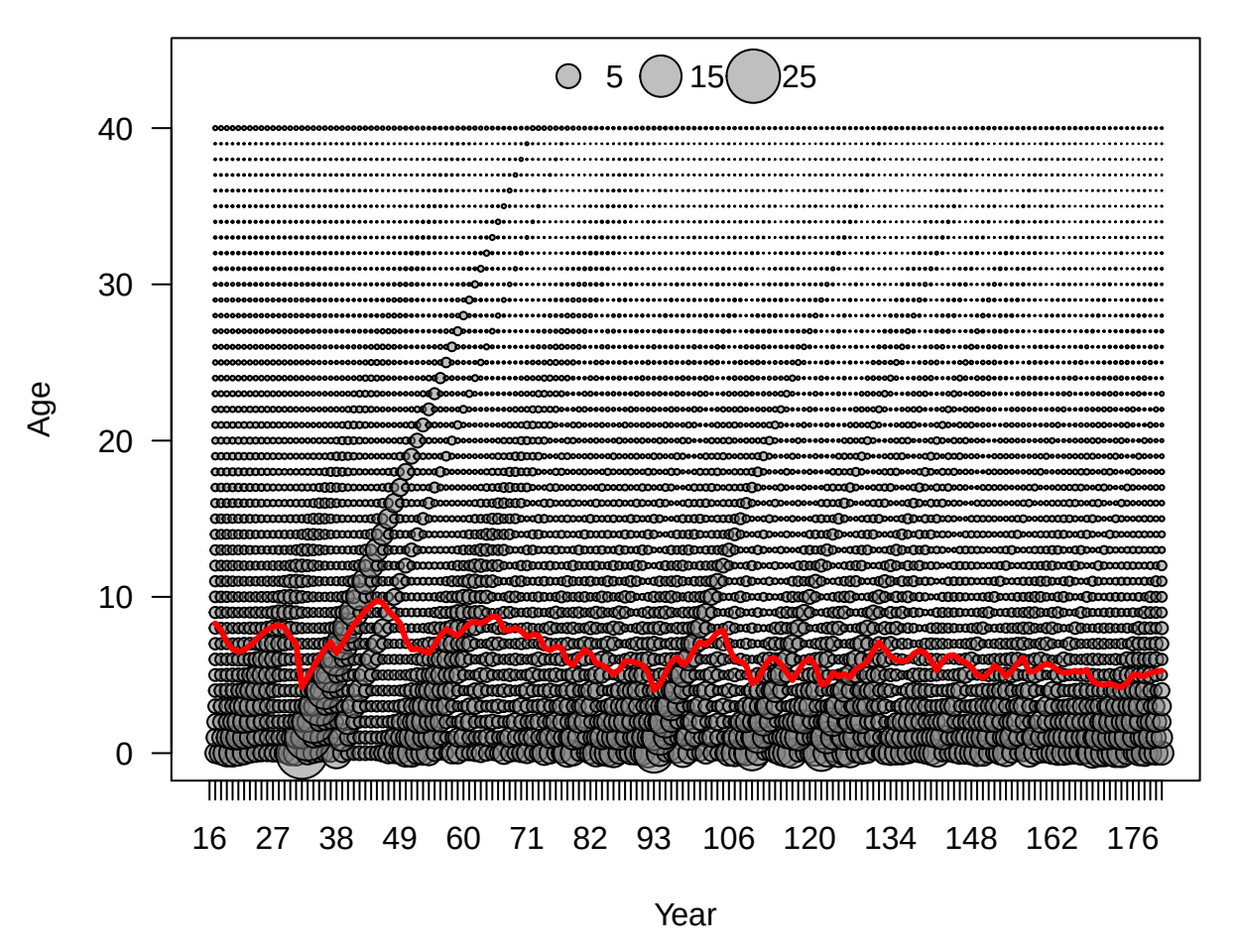

Deviation
0.4
0.2
0.0
−0.2
−0.4
80
100
120
140
160
180
Year

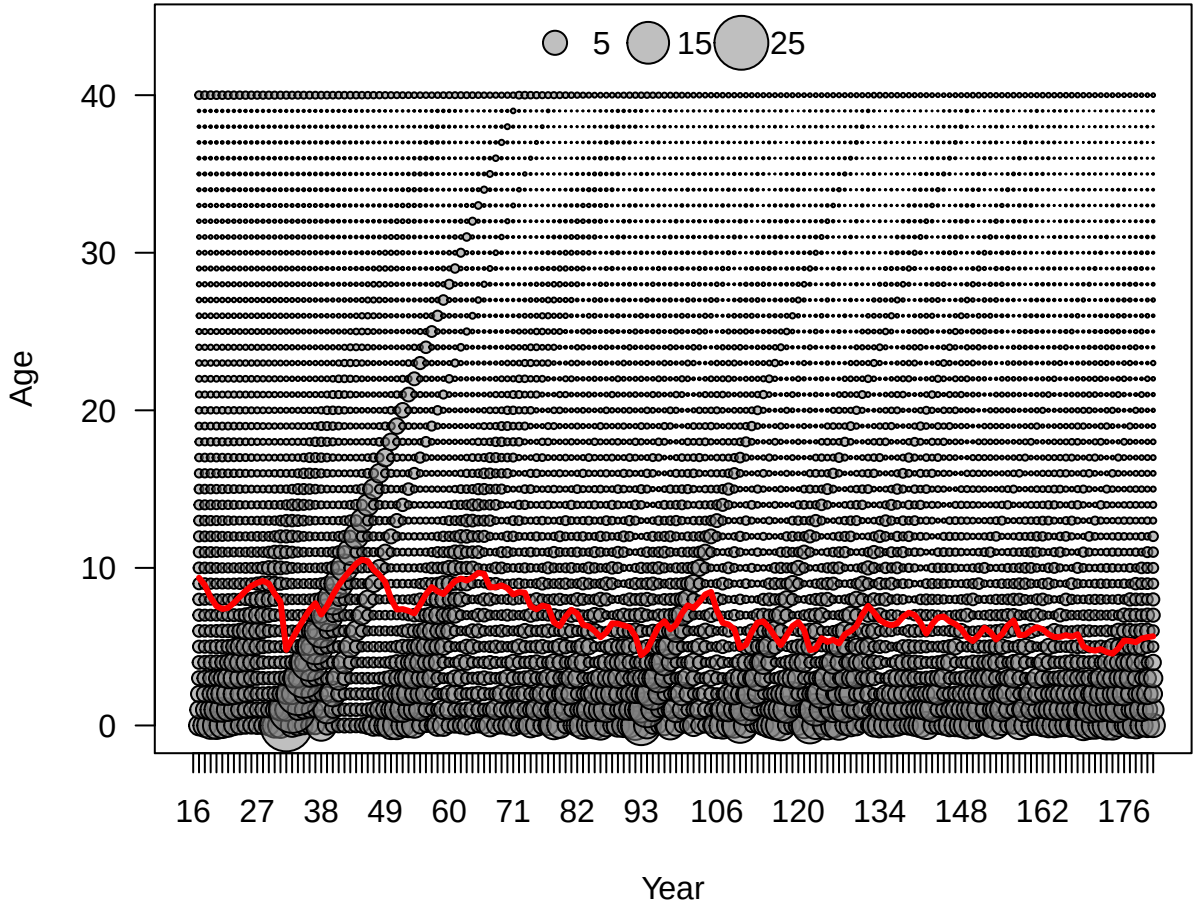

Standardized index
0.6
0.8
1.0
1.2
1.4
1.6
50
100
150
Year

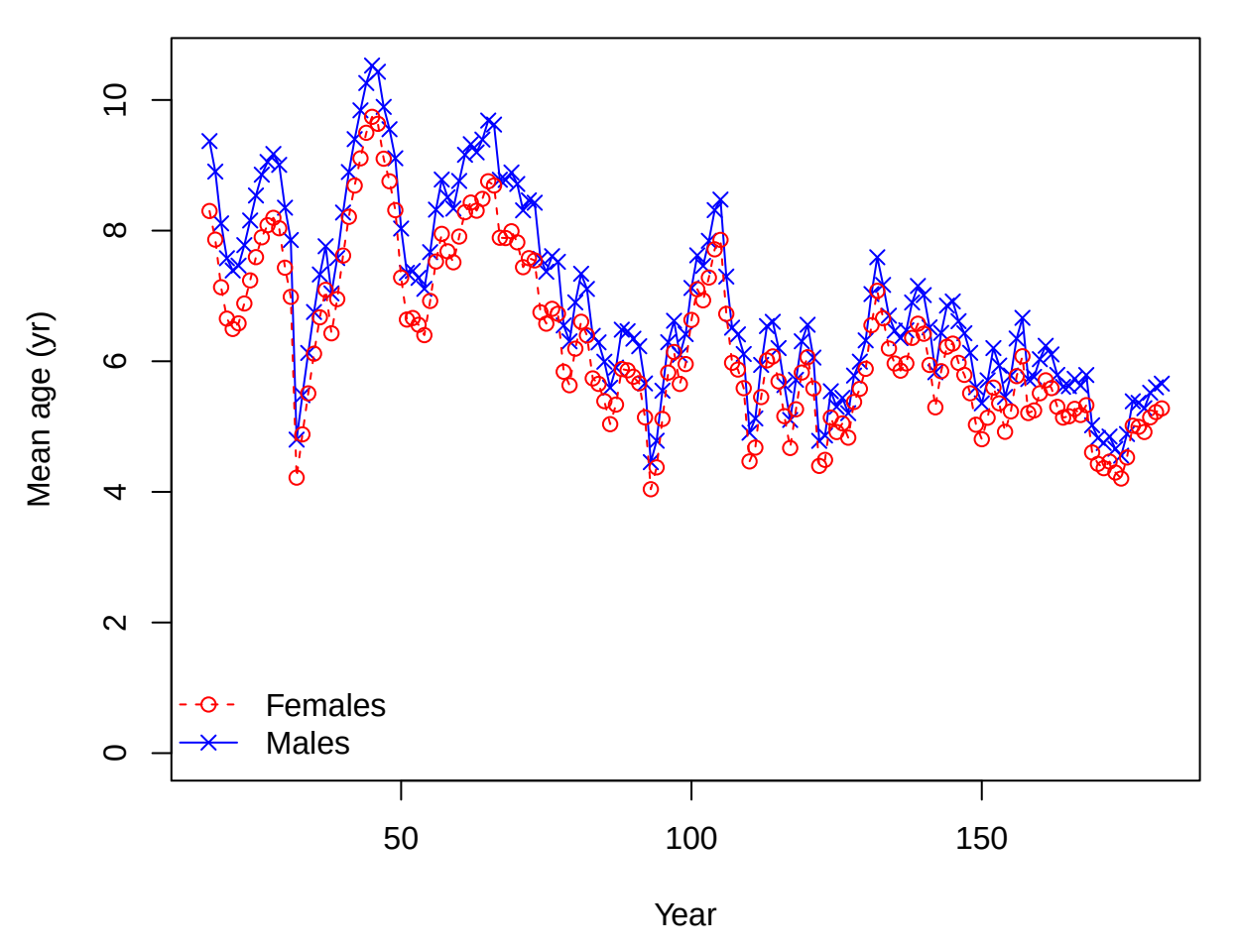

5
15
25
40
30
20
10
0
Age
16
27
38
49
60
71
82
93
106
120
134
148
162
176
Year

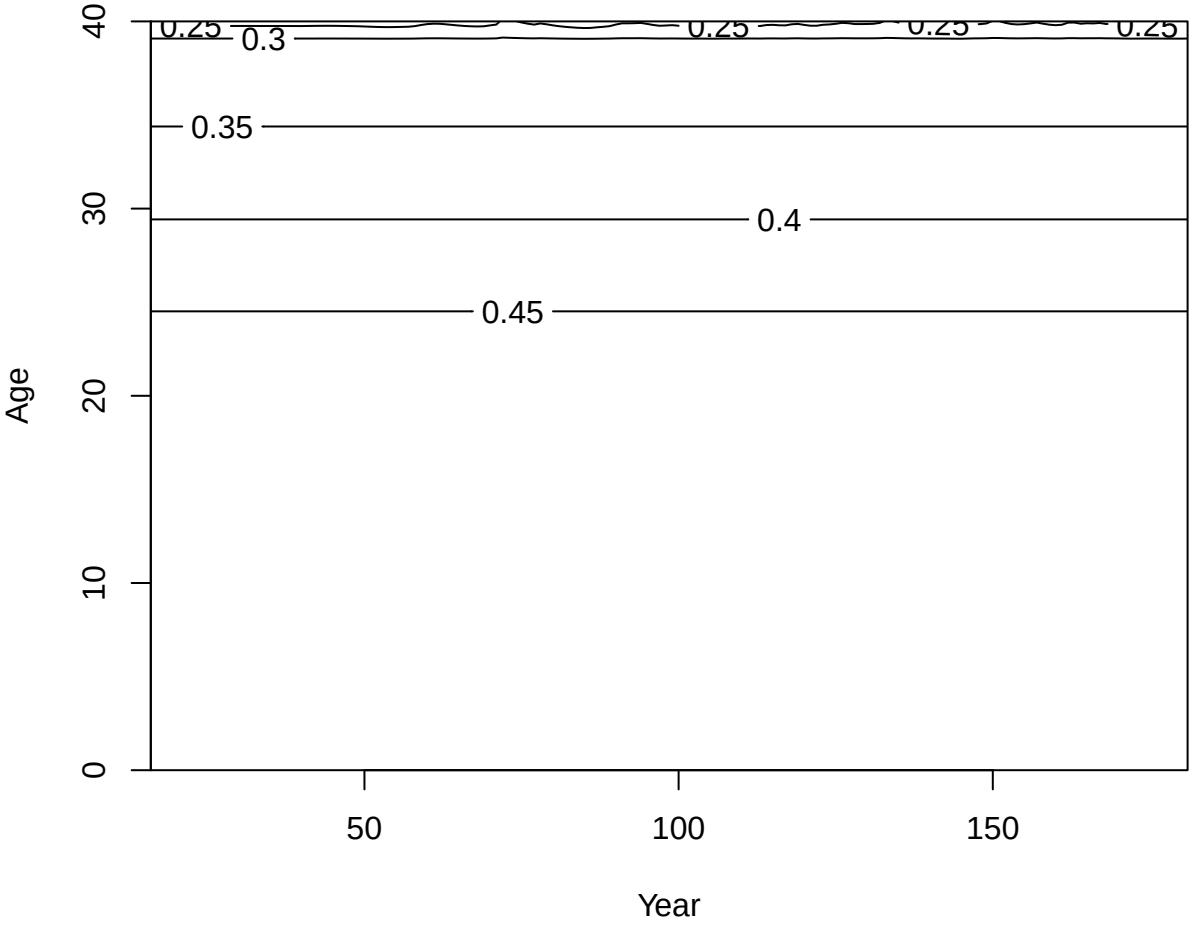

5
15
25
40
30
20
10
0
Age
16
27
38
49
60
71
82
93
106
120
134
148
162
176
Year

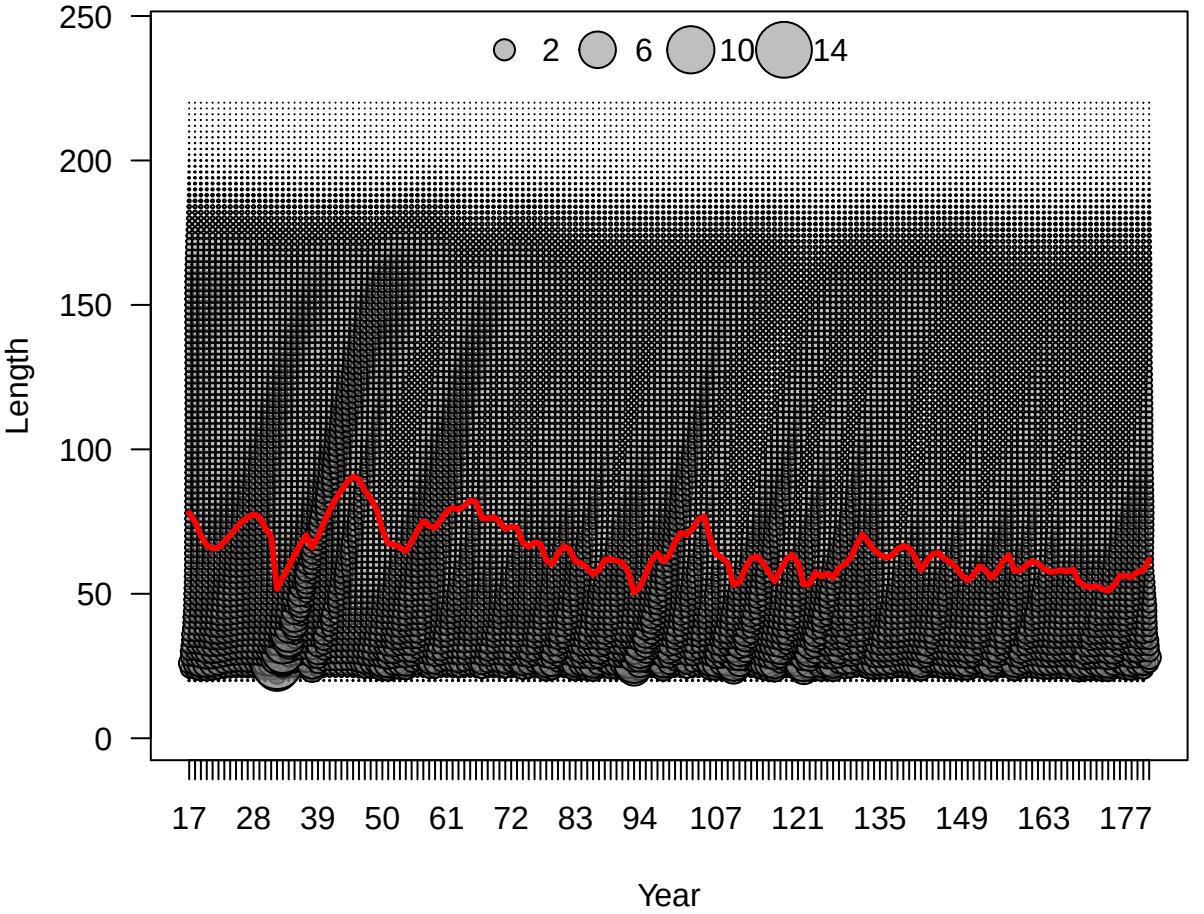

Mean age (yr)
0
2
4
6
8
10
50
100
150
Year
Females
Males

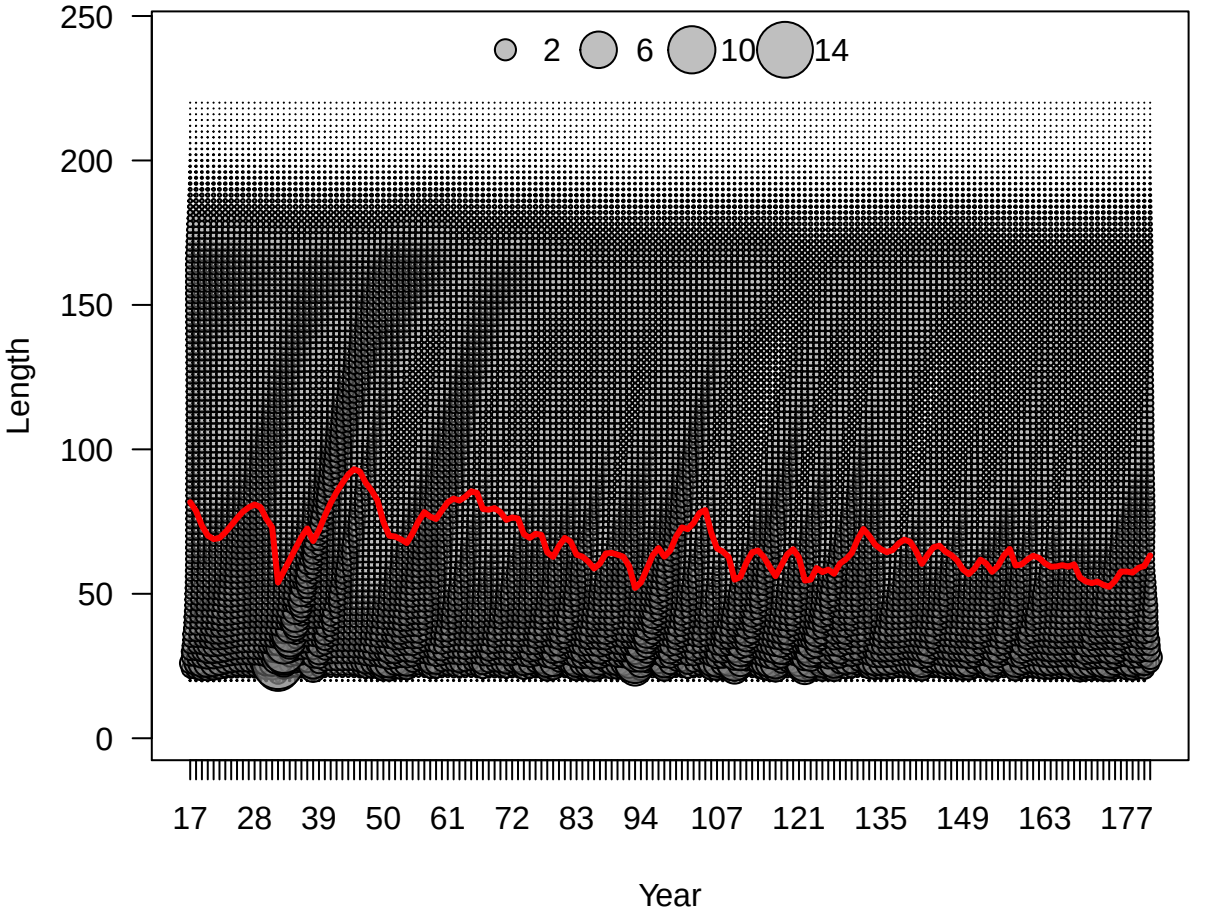

5
15
25
40
30
20
10
0
Age
16
27
38
49
60
71
82
93
106
120
134
148
162
176
Year

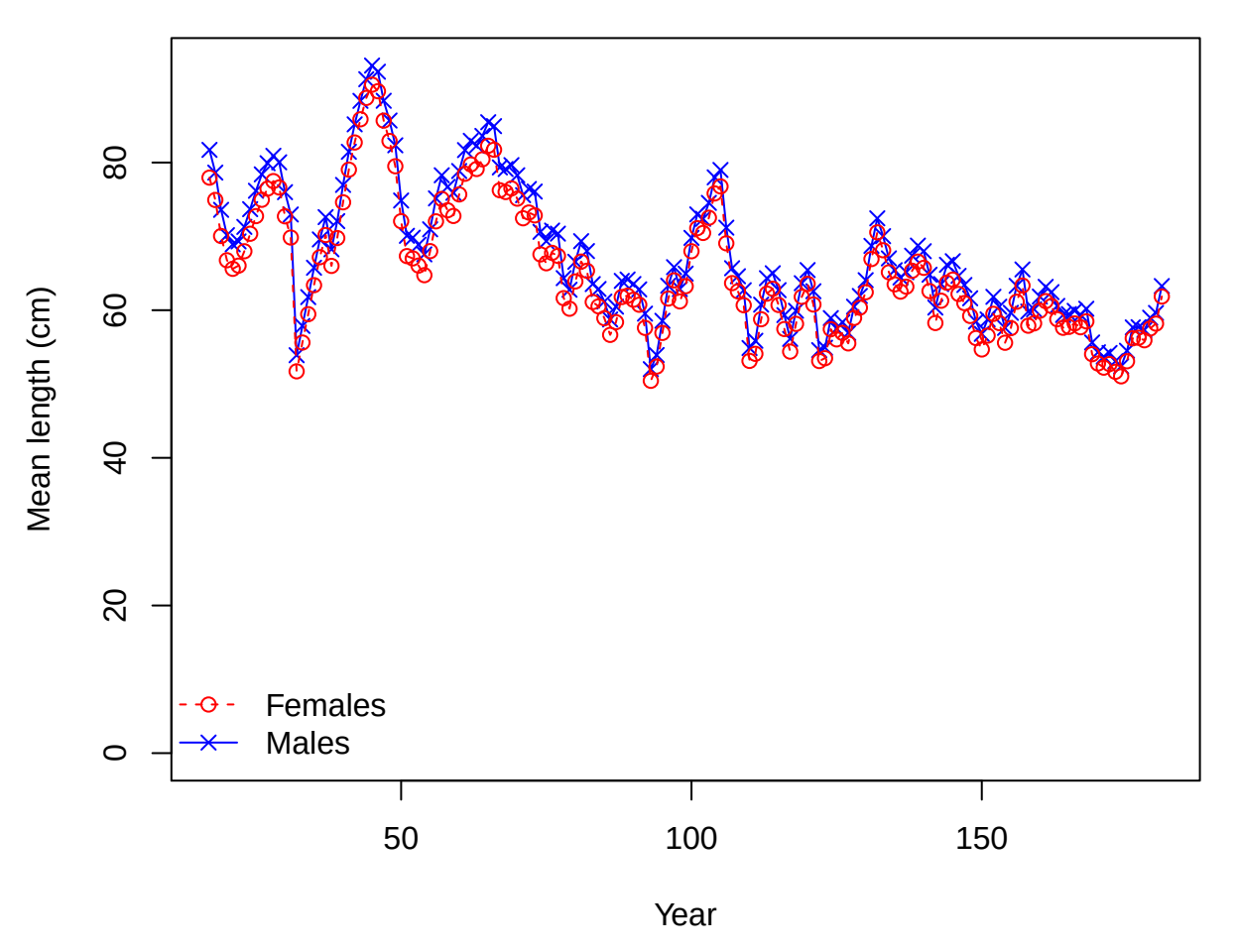

5
15
25
40
30
20
10
0
Age
16
27
38
49
60
71
82
93
106
120
134
148
162
176
Year

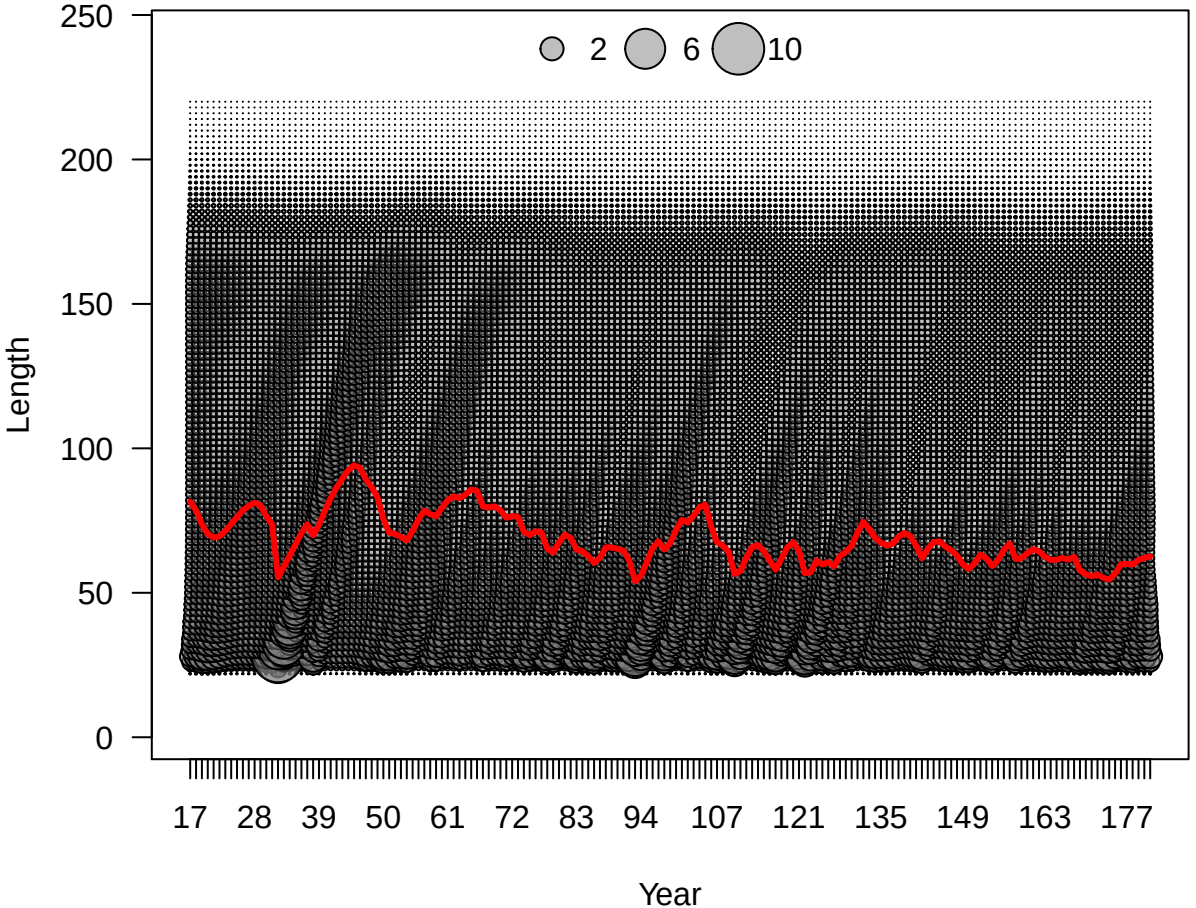

Mean age (yr)
0
2
4
6
8
10
50
100
150
Year
Females
Males

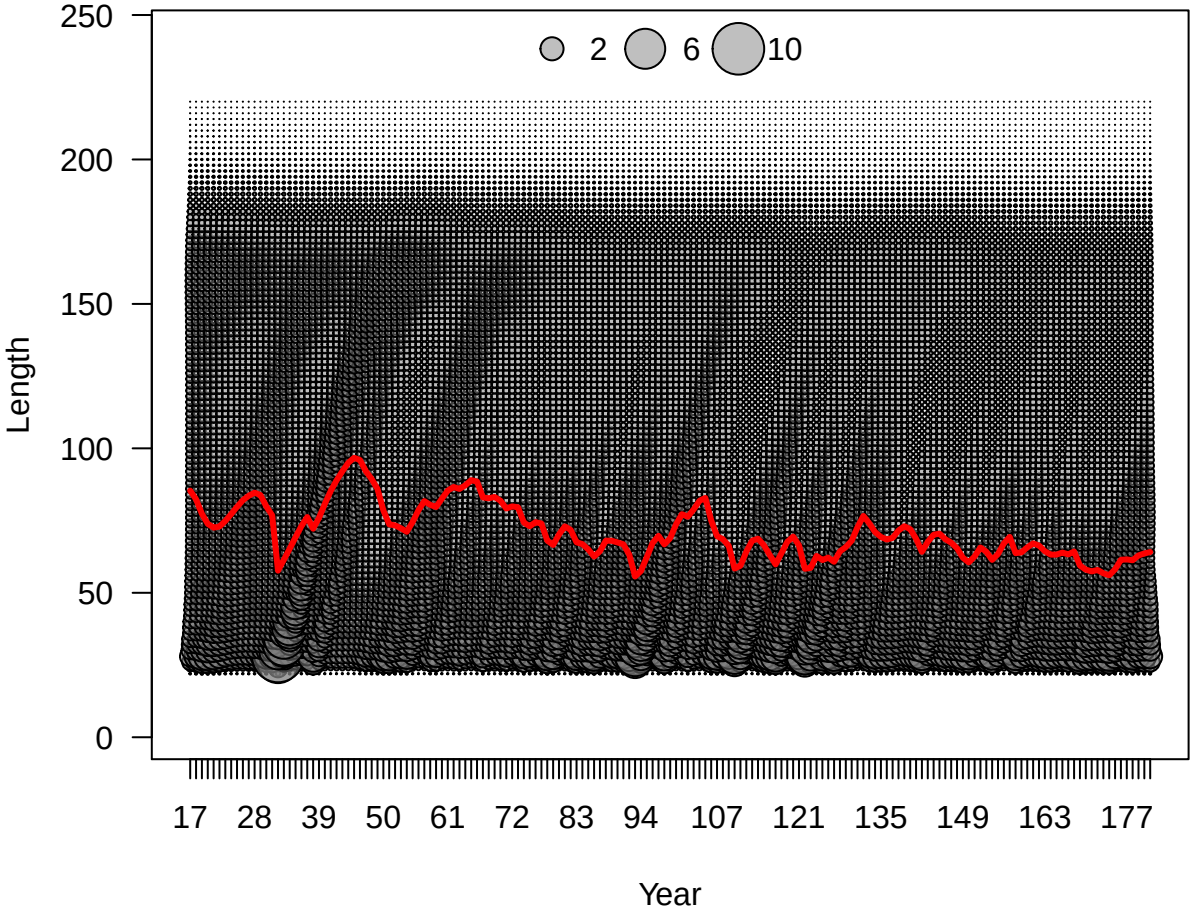

0.25
0.3
0.25
0.25
0.25
0.35
0.4
0.45
40
30
20
10
0
Age
50
100
150
Year

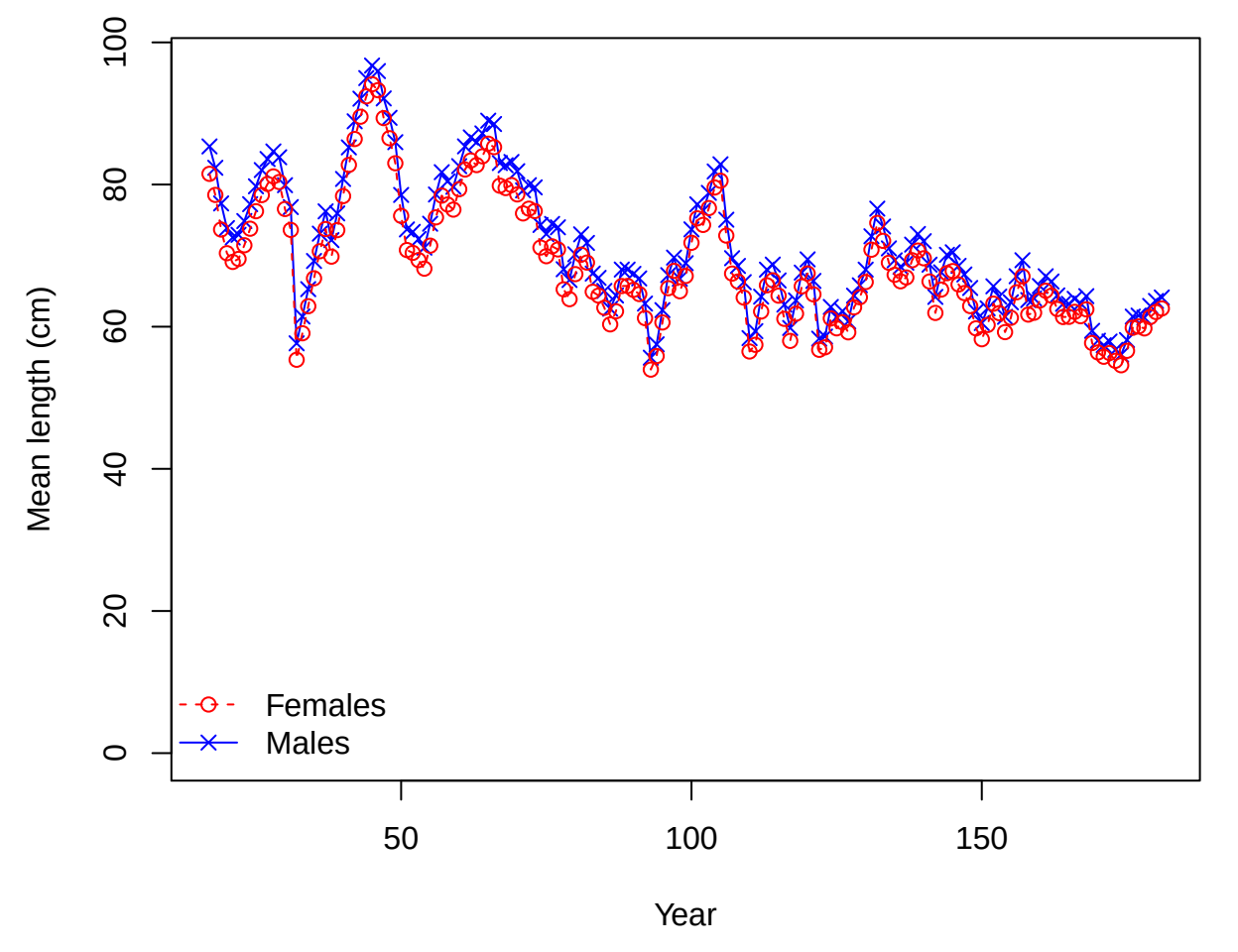

2
6
10
14
250
200
150
100
50
0
Length
17
28
39
50
61
72
83
94
107
121
135
149
163
177
Year

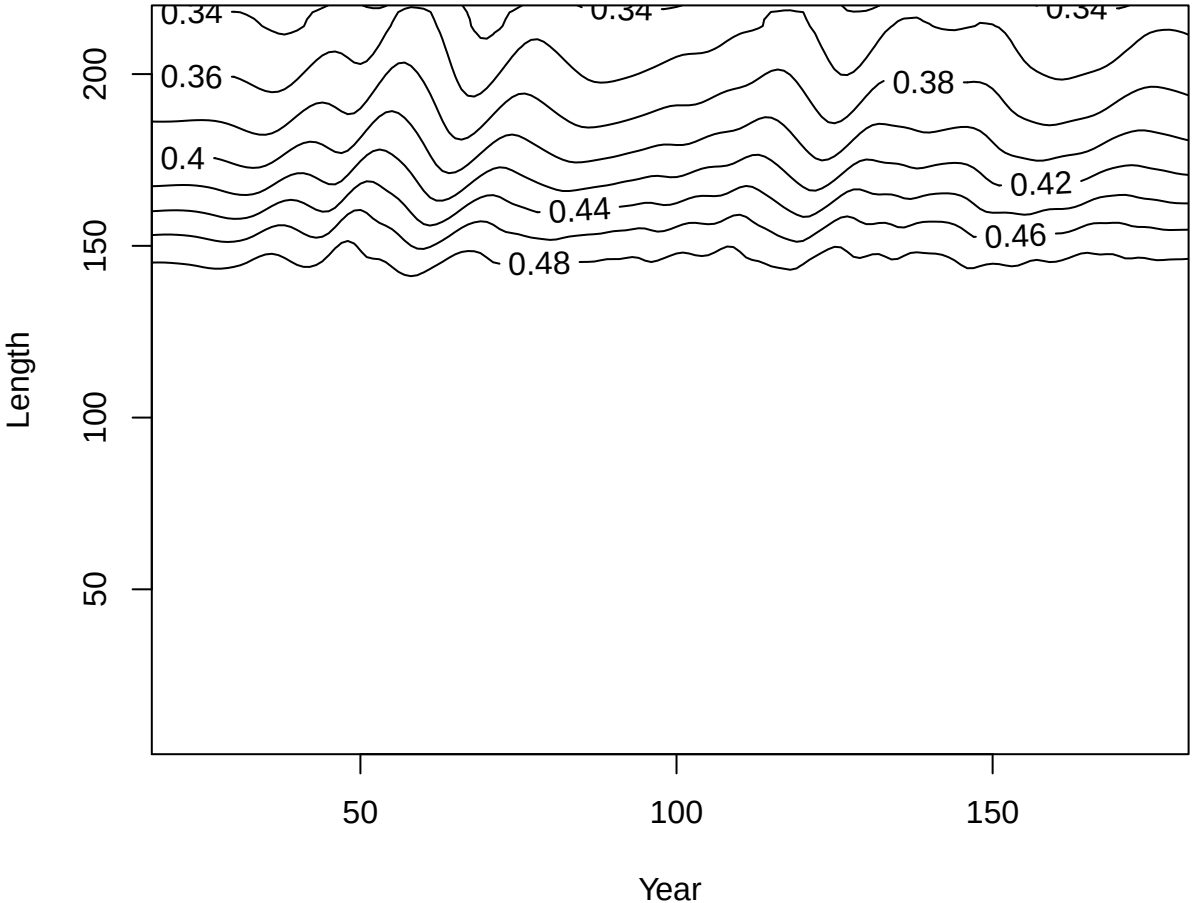

2
6
10
14
250
200
150
100
50
0
Length
17
28
39
50
61
72
83
94
107
121
135
149
163
177
Year

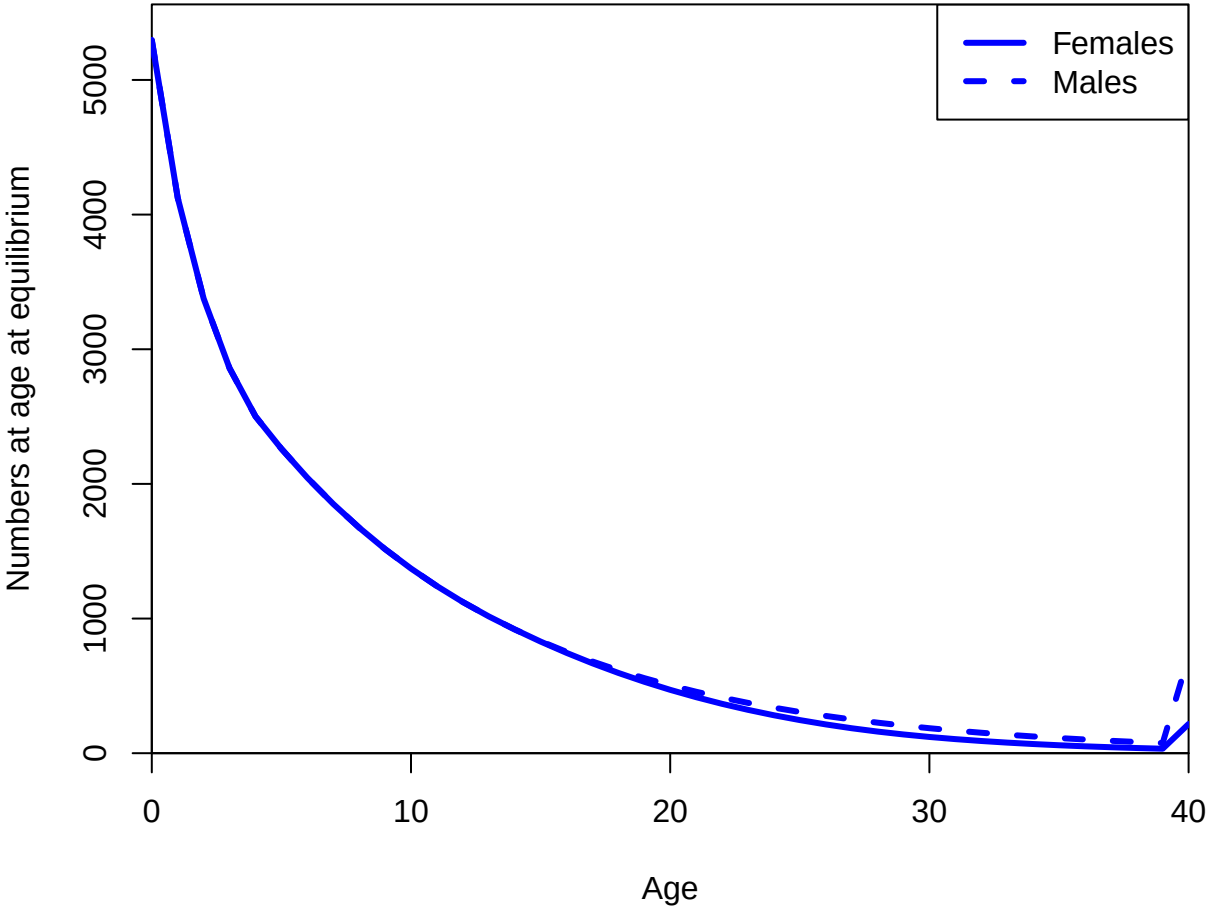

Mean length (cm)
0
20
40
60
80
50
100
150
Year
Females
Males

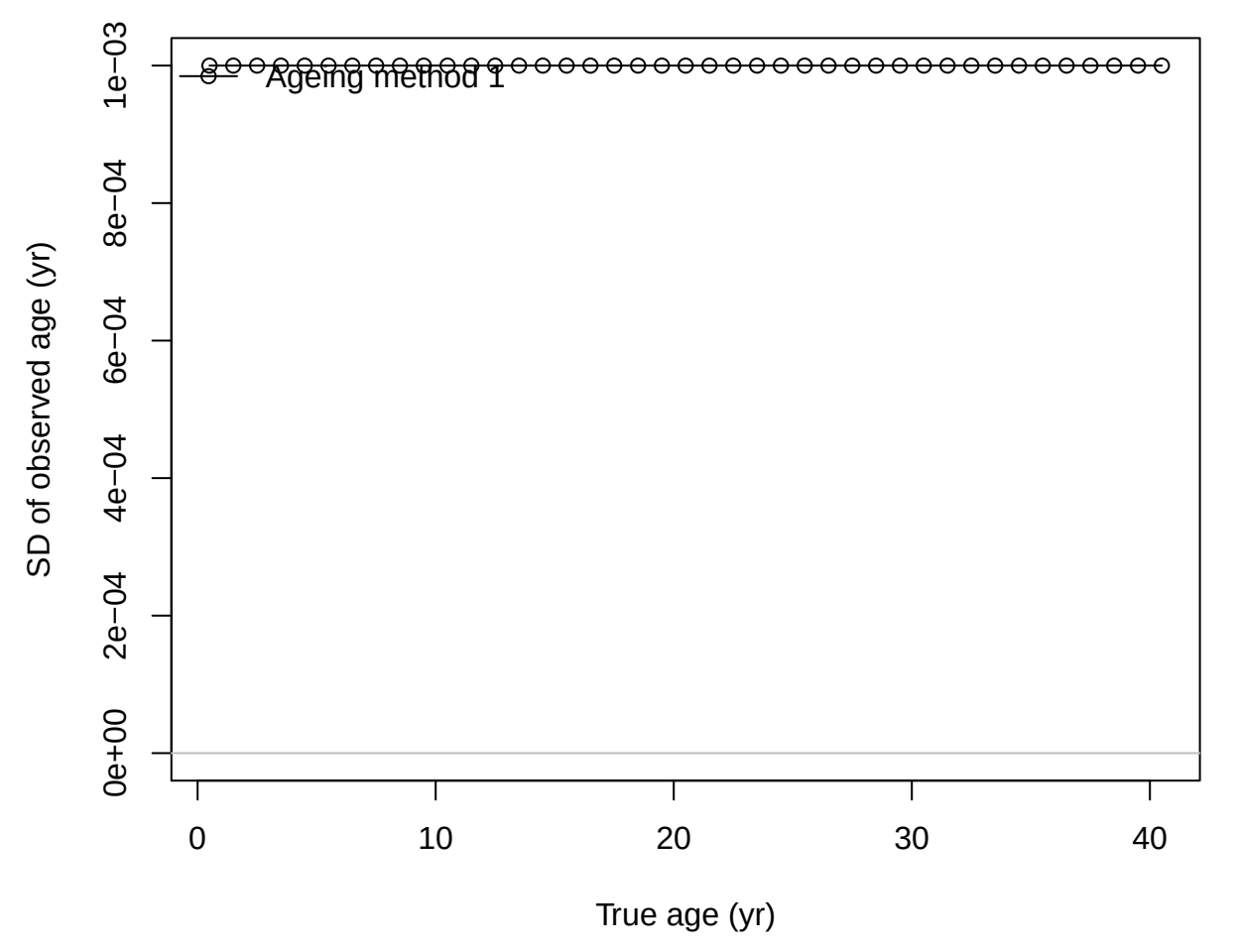

2
6
10
250
200
150
100
50
0
Length
17
28
39
50
61
72
83
94
107
121
135
149
163
177
Year

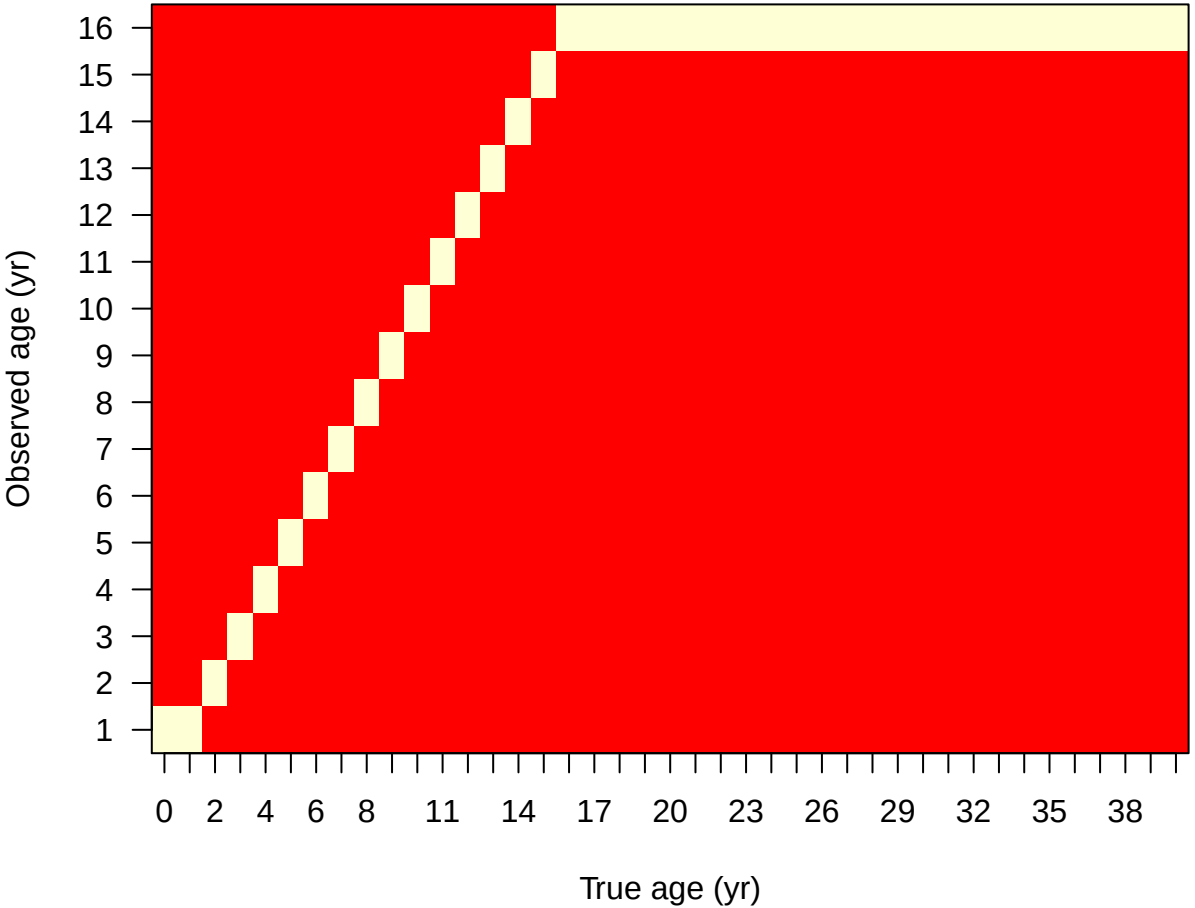

2
6
10
250
200
150
100
50
0
Length
17
28
39
50
61
72
83
94
107
121
135
149
163
177
Year

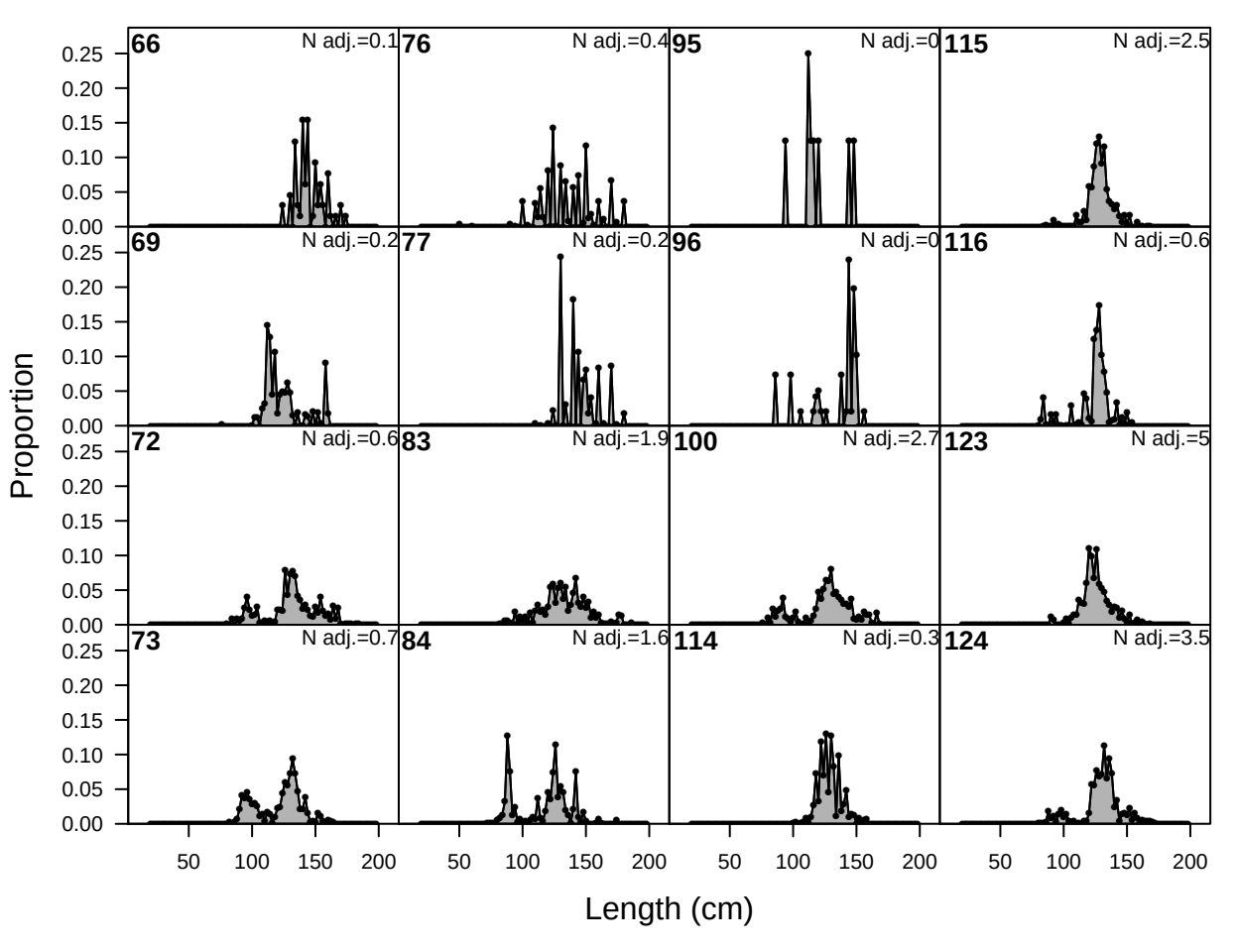

Mean length (cm)
0
20
40
60
80
100
50
100
150
Year
Females
Males

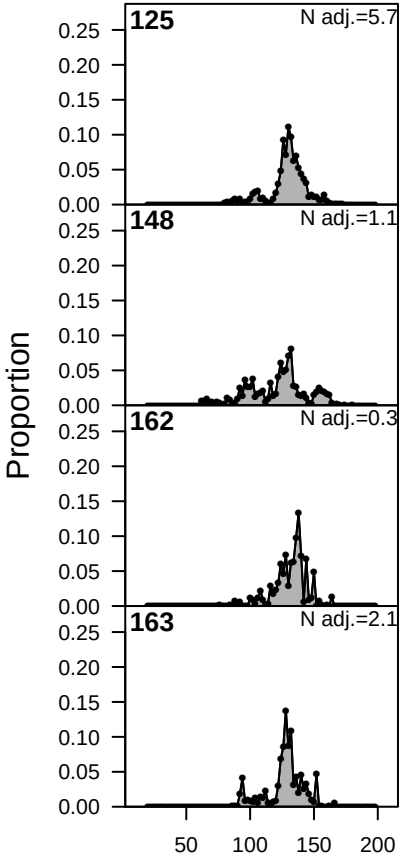

0.34
0.34
0.34
0.36
0.38
0.4
0.42
0.44
0.46
0.48
Length
50
100
150
200
50
100
150
Year

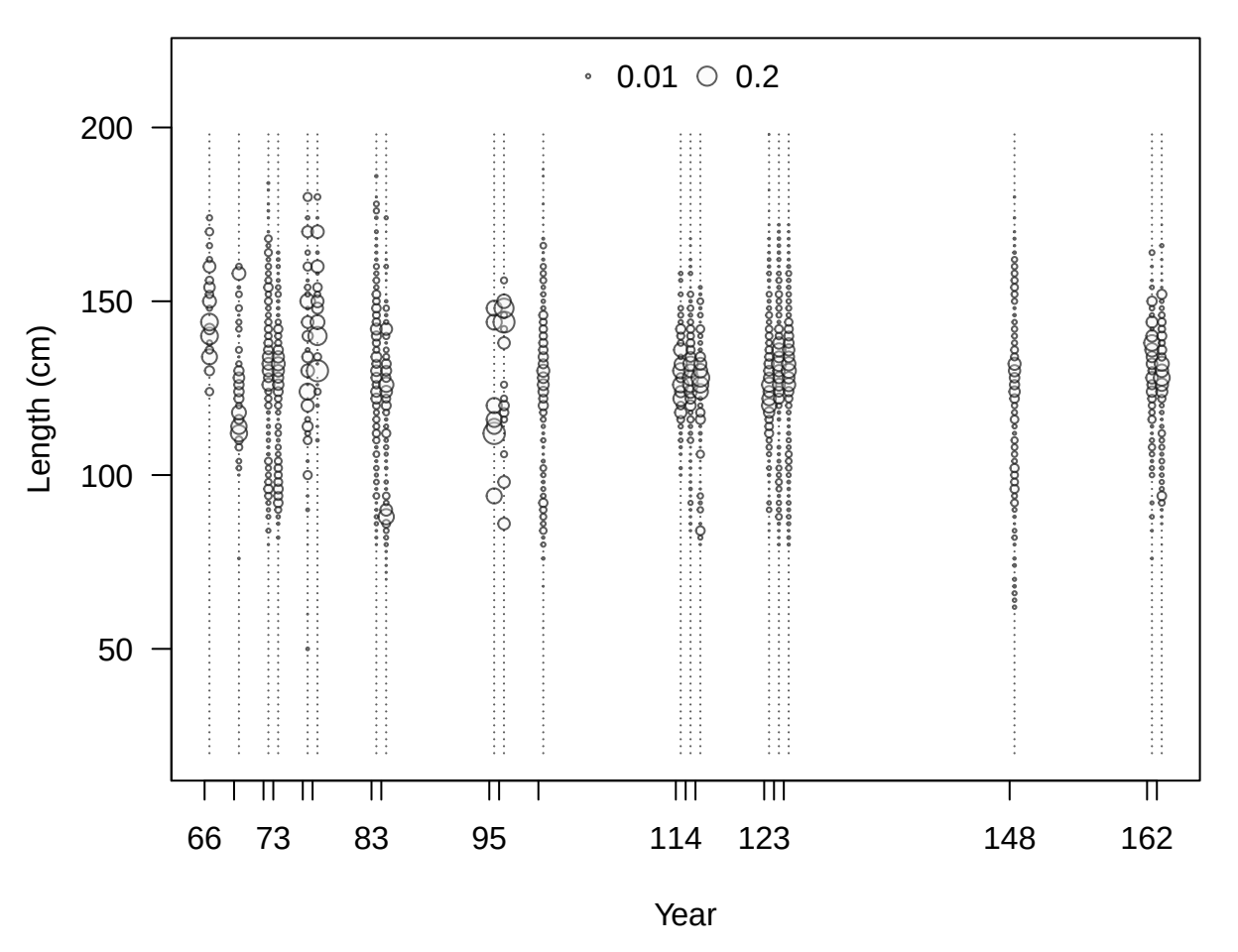

Females
Males
Numbers at age at equilibrium
0
1000
2000
3000
4000
5000
0
10
20
30
40
Age

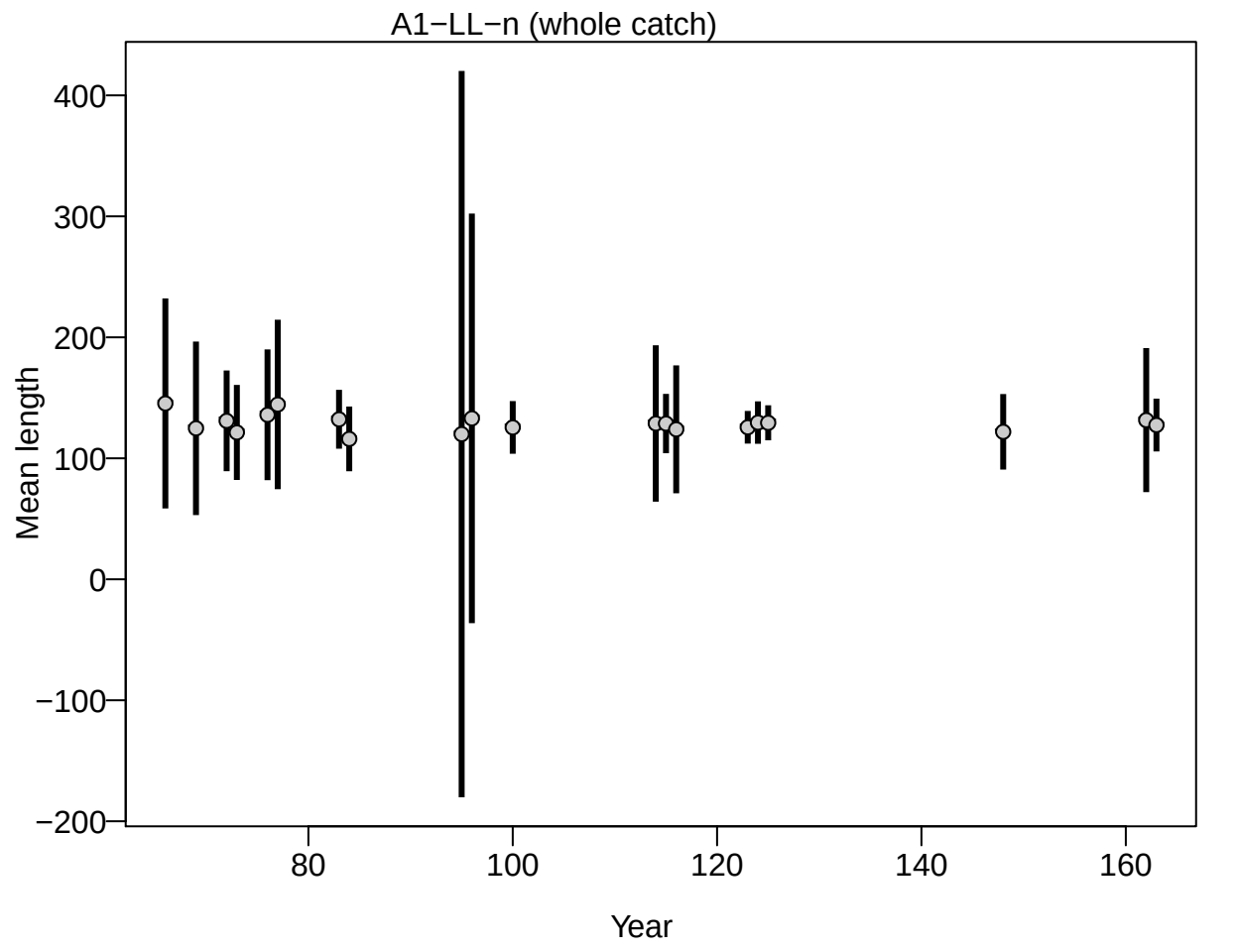

Ageing method 1
SD of observed age (yr)
0e+00
2e−04
4e−04
6e−04
8e−04
1e−03
0
10
20
30
40
True age (yr)

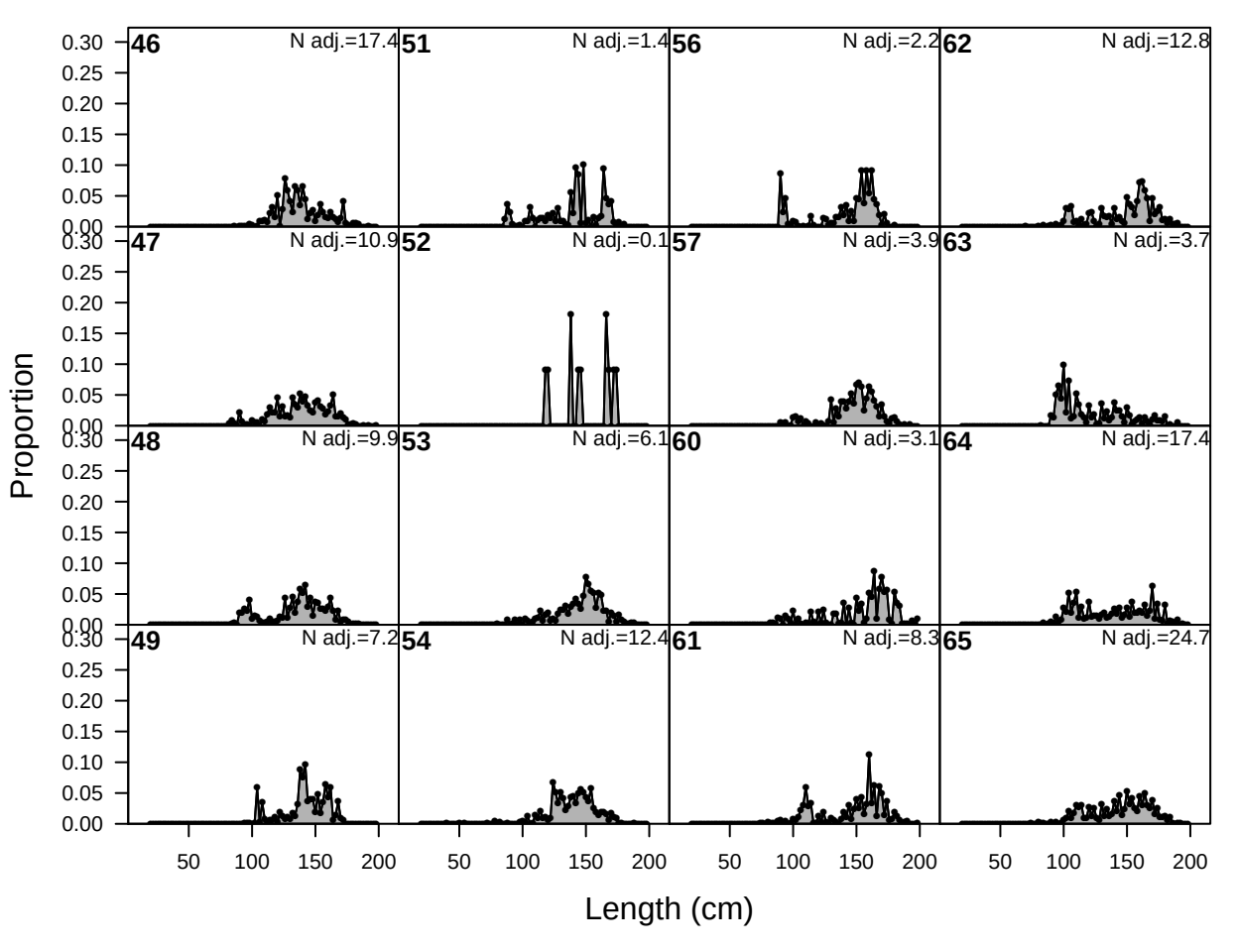

Observed age (yr)
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
2
4
6
8
11
14
17
20
23
26
29
32
35
38
True age (yr)

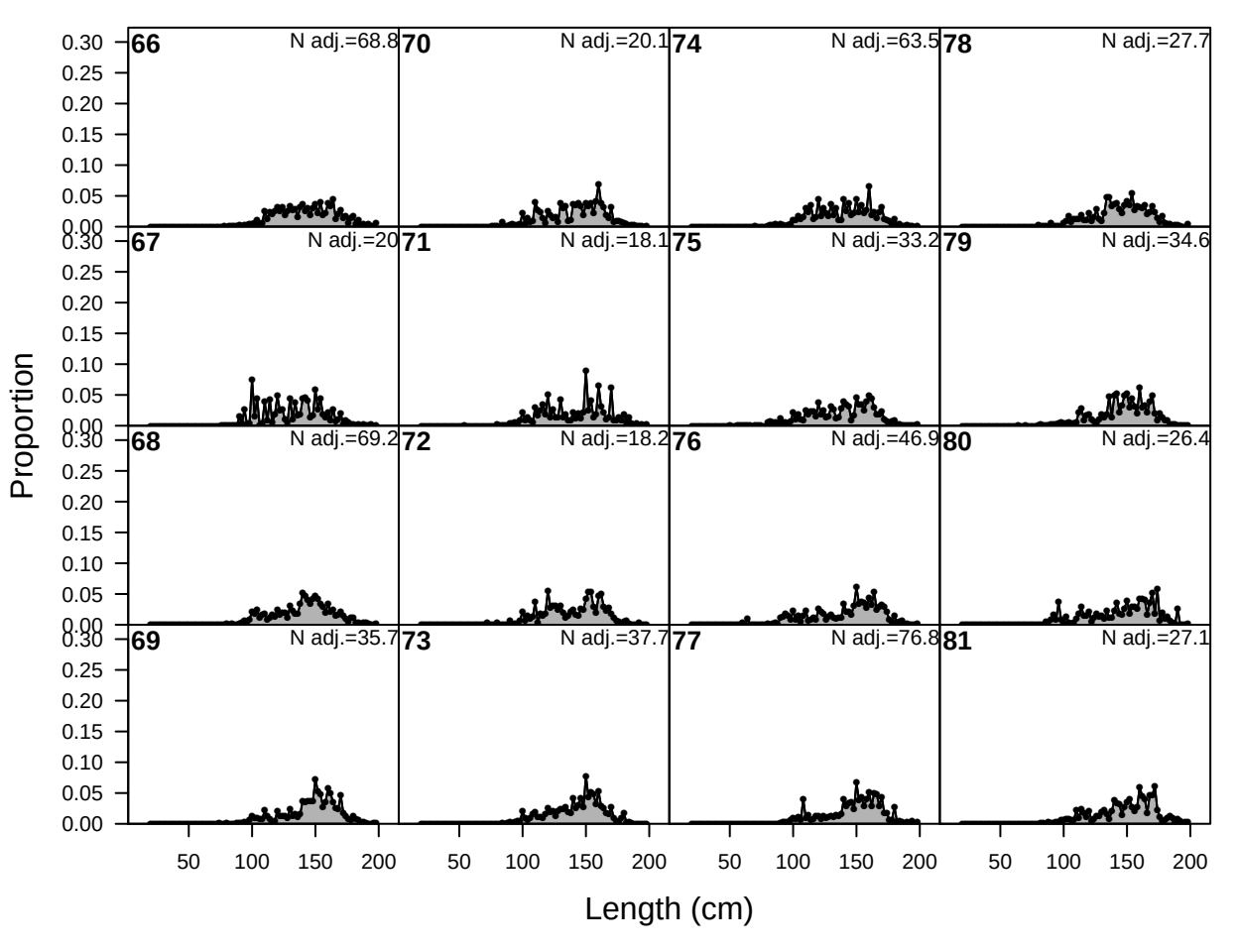

66
N adj.=0.1
76
N adj.=0.4
95
N adj.=0
115
N adj.=2.5
69
N adj.=0.2
77
N adj.=0.2
96
N adj.=0
116
N adj.=0.6
72
N adj.=0.6
83
N adj.=1.9
100
N adj.=2.7
123
N adj.=5
73
N adj.=0.7
84
N adj.=1.6
114
N adj.=0.3
124
N adj.=3.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

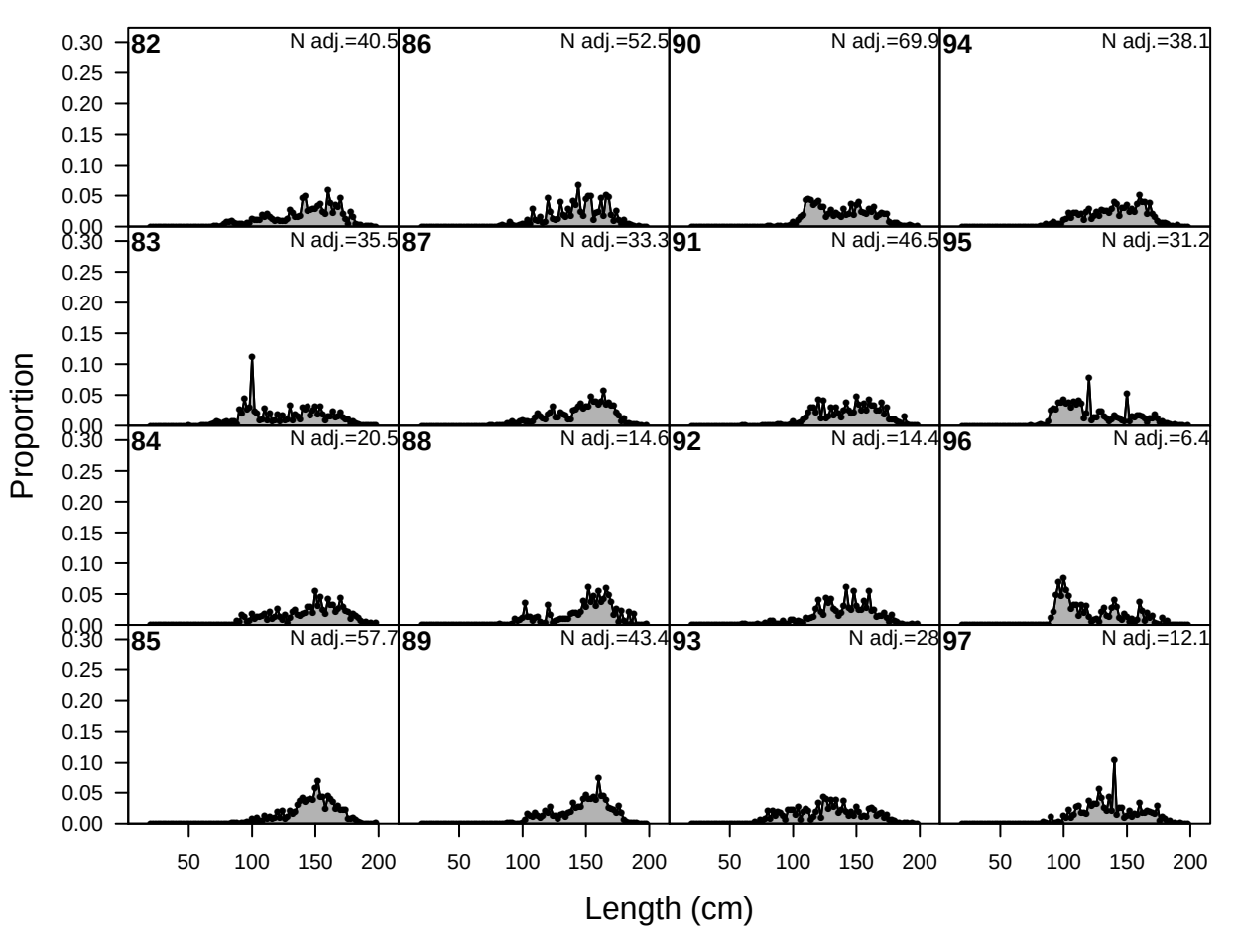

125
N adj.=5.7
148
N adj.=1.1
162
N adj.=0.3
163
N adj.=2.1
Proportion
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Length (cm)

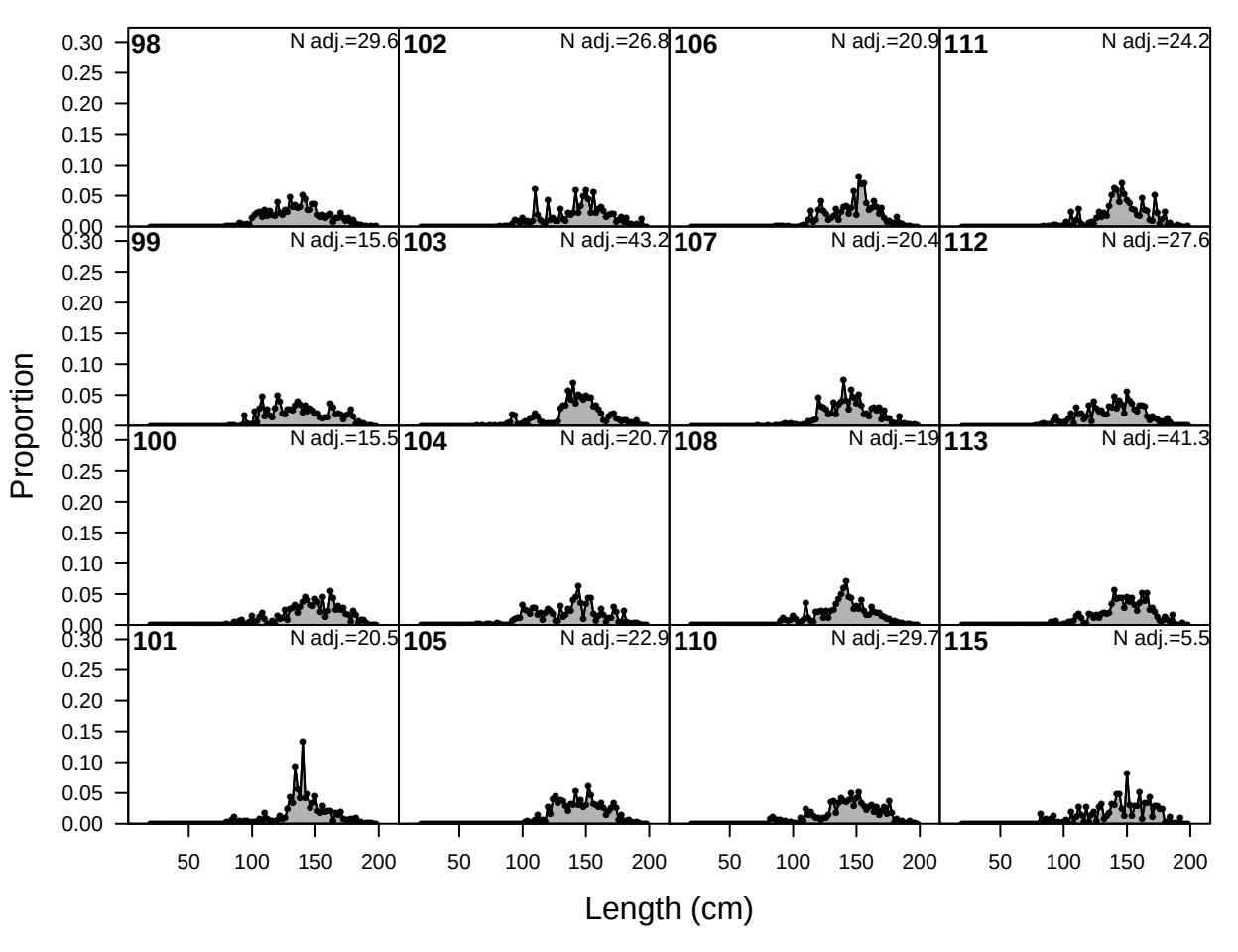

0.01
0.2
200
150
100
50
Length (cm)
66
73
83
95
114
123
148
162
Year


A1−LL−n (whole catch)
Mean length
400
300
200
100
0
−100
−200
80
100
120
140
160
Year


46
N adj.=17.4
51
N adj.=1.4
56
N adj.=2.2
62
N adj.=12.8
47
N adj.=10.9
52
N adj.=0.1
57
N adj.=3.9
63
N adj.=3.7
48
N adj.=9.9
53
N adj.=6.1
60
N adj.=3.1
64
N adj.=17.4
49
N adj.=7.2
54
N adj.=12.4
61
N adj.=8.3
65
N adj.=24.7
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)


66
N adj.=68.8
70
N adj.=20.1
74
N adj.=63.5
78
N adj.=27.7
67
N adj.=20
71
N adj.=18.1
75
N adj.=33.2
79
N adj.=34.6
68
N adj.=69.2
72
N adj.=18.2
76
N adj.=46.9
80
N adj.=26.4
69
N adj.=35.7
73
N adj.=37.7
77
N adj.=76.8
81
N adj.=27.1
0.30
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Proportion
Length (cm)


82
N adj.=40.5
86
N adj.=52.5
90
N adj.=69.9
94
N adj.=38.1
83
N adj.=35.5
87
N adj.=33.3
91
N adj.=46.5
95
N adj.=31.2
84
N adj.=20.5
88
N adj.=14.6
92
N adj.=14.4
96
N adj.=6.4
85
N adj.=57.7
89
N adj.=43.4
93
N adj.=28
97
N adj.=12.1
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)


98
N adj.=29.6
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N adj.=26.8
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N adj.=20.9
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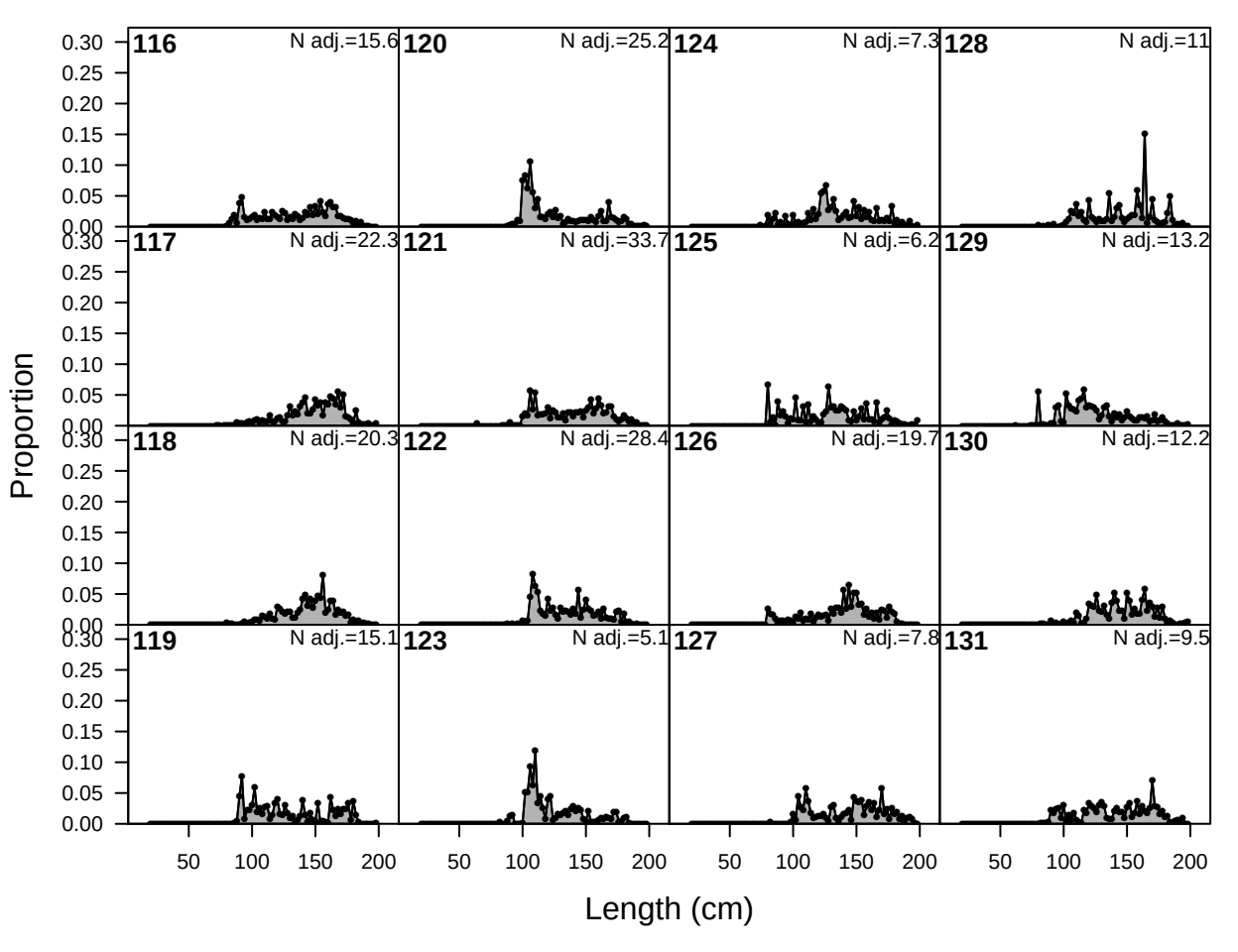
N adj.=24.2
99
N adj.=15.6
103
N adj.=43.2
107
N adj.=20.4
112
N adj.=27.6
100
N adj.=15.5
104
N adj.=20.7
108
N adj.=19
113
N adj.=41.3
101
N adj.=20.5
105
N adj.=22.9
110
N adj.=29.7
115
N adj.=5.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N adj.=25.2
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N adj.=7.3
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N adj.=11
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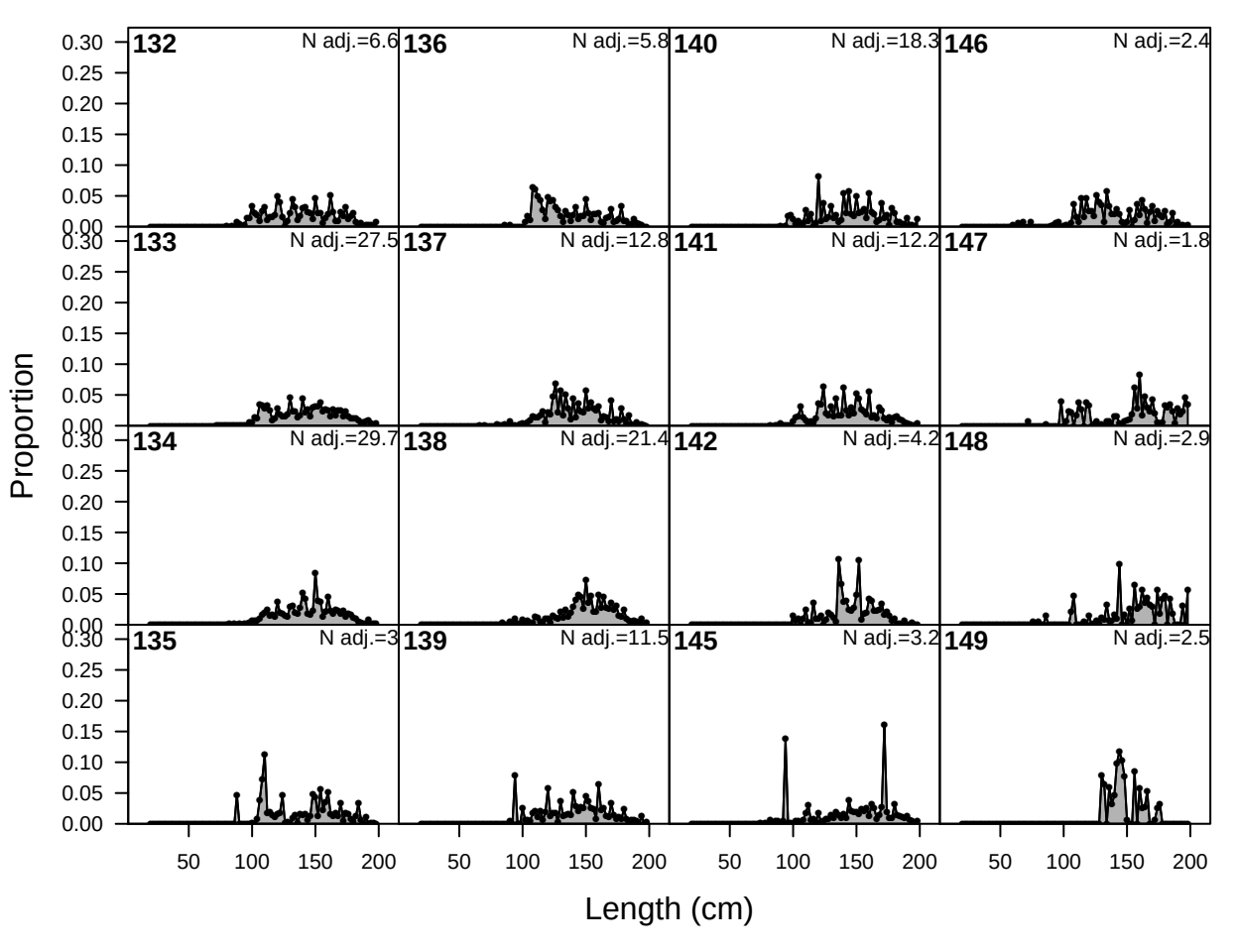
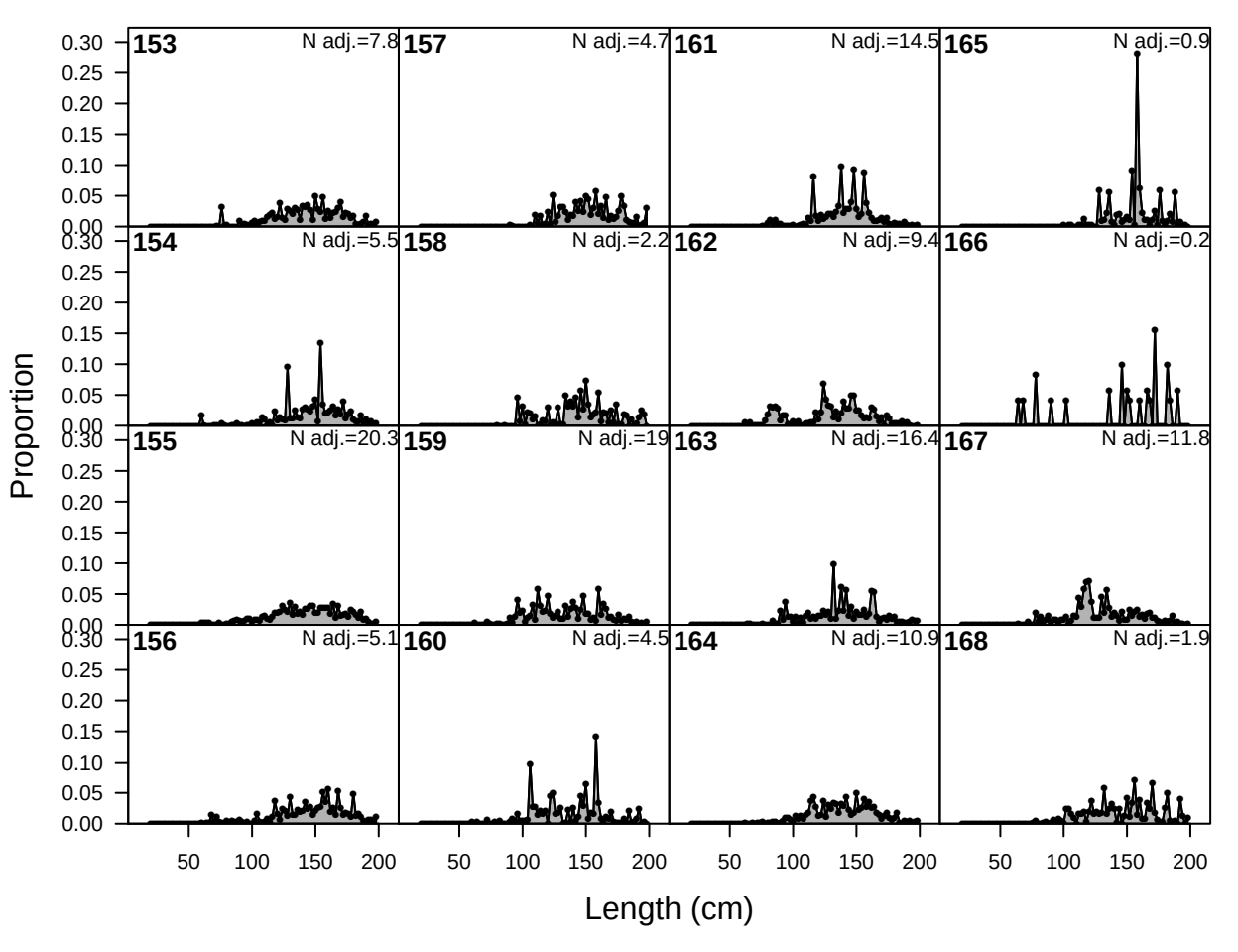
N adj.=22.3
121
N adj.=33.7
125
N adj.=6.2
129
N adj.=13.2
118
N adj.=20.3
122
N adj.=28.4
126
N adj.=19.7
130
N adj.=12.2
119
N adj.=15.1
123
N adj.=5.1
127
N adj.=7.8
131
N adj.=9.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)


132 N adj.=6.6
136 N adj.=5.8
140 N adj.=18.3
146 N adj.=2.4
133 N adj.=27.5
137 N adj.=12.8
141 N adj.=12.2
147 N adj.=1.8
134 N adj.=29.7
138 N adj.=21.4
142 N adj.=4.2
148 N adj.=2.9
135 N adj.=3
139 N adj.=11.5
145 N adj.=3.2
149 N adj.=2.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)


153
N adj.=7.8
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N adj.=4.7
161
N adj.=14.5
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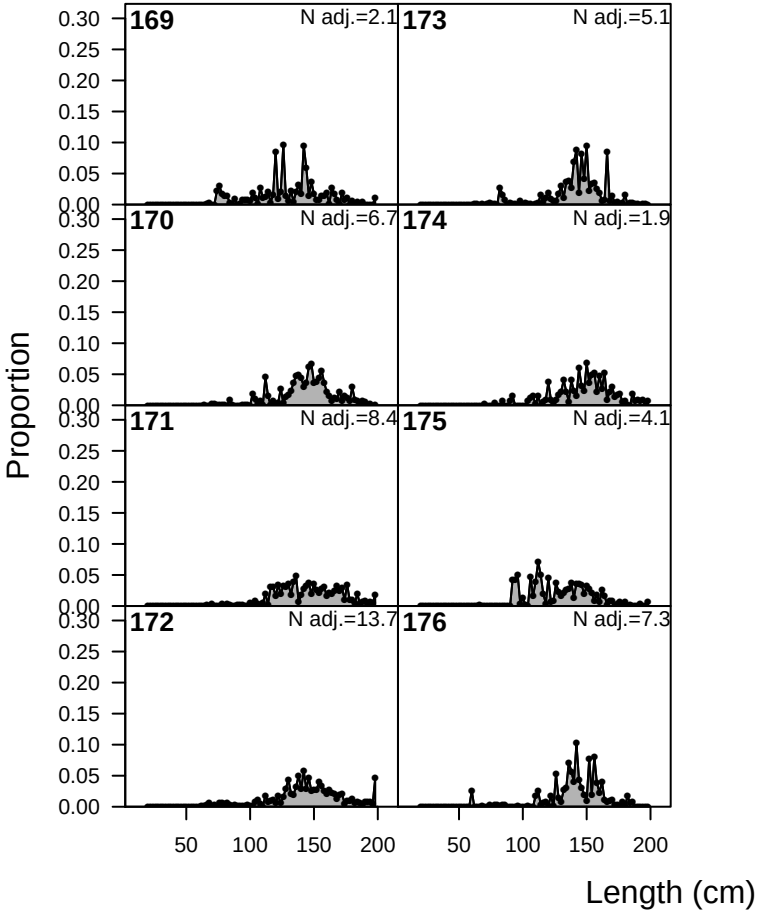
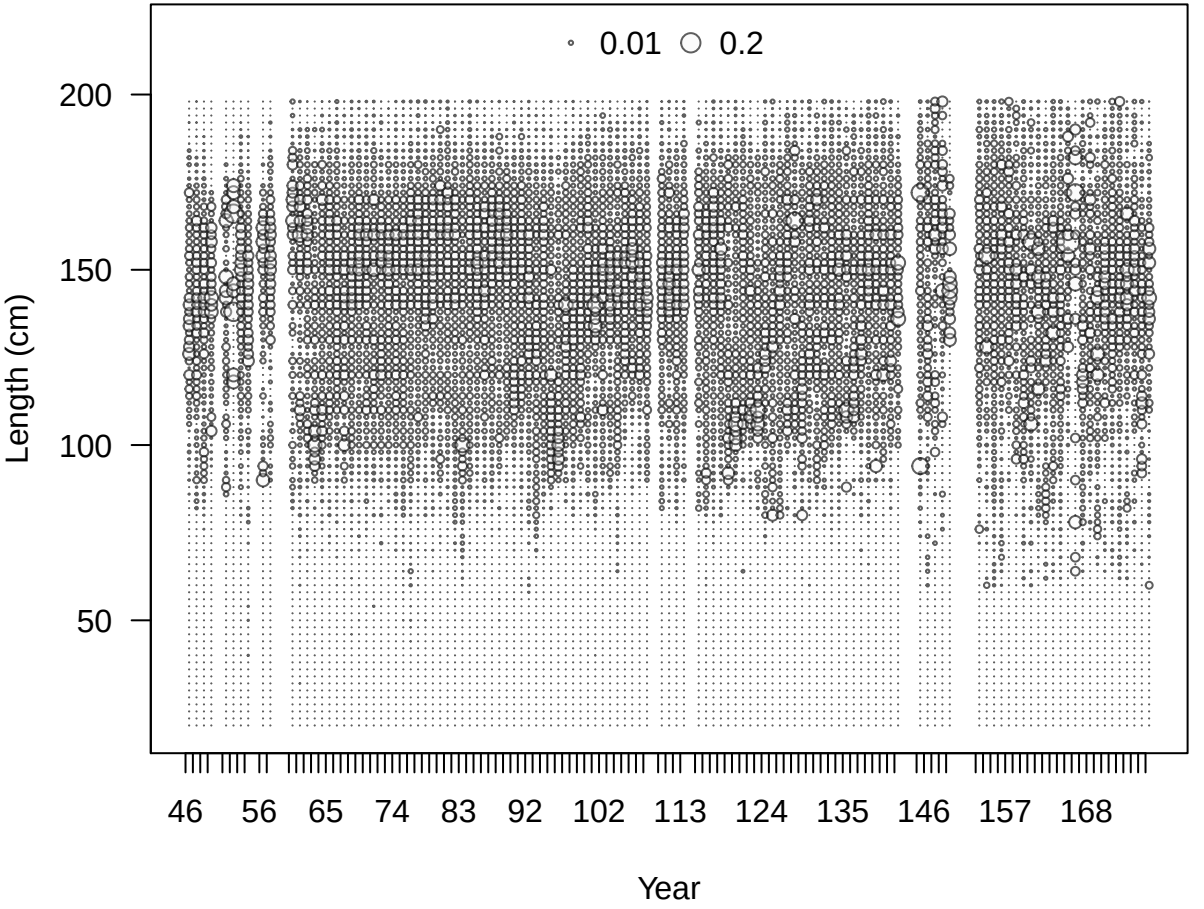
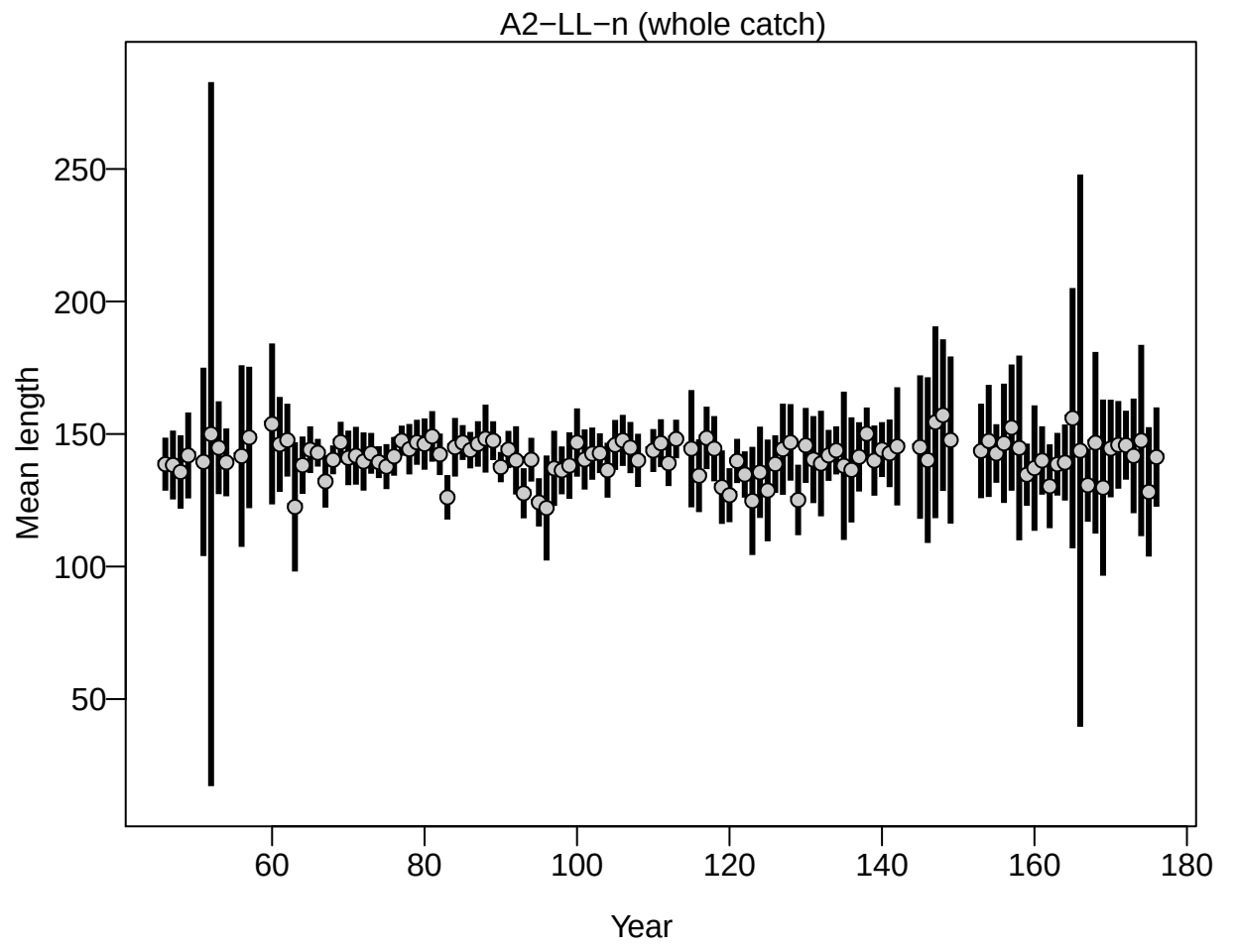
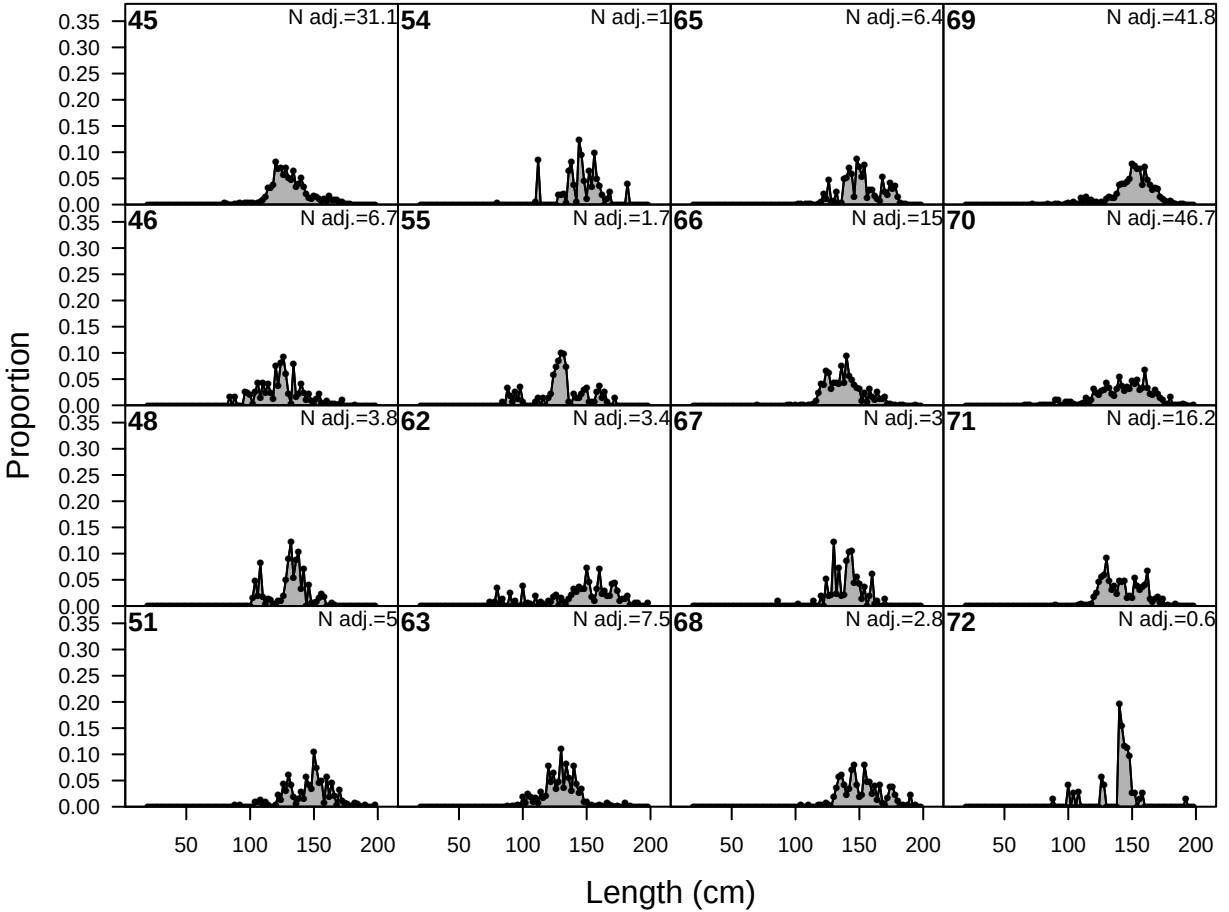
N adj.=0.9
154
N adj.=5.5
158
N adj.=2.2
162
N adj.=9.4
166
N adj.=0.2
155
N adj.=20.3
159
N adj.=19
163
N adj.=16.4
167
N adj.=11.8
156
N adj.=5.1
160
N adj.=4.5
164
N adj.=10.9
168
N adj.=1.9
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)


169
N adj.=2.1
173
N adj.=5.1
170
N adj.=6.7
174
N adj.=1.9
171
N adj.=8.4
175
N adj.=4.1
172
N adj.=13.7
176
N adj.=7.3
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)


0.01
0.2
200
150
100
50
Length (cm)
46
56
65
74
83
92
102
113
124
135
146
157
168
Year


A2−LL−n (whole catch)
Mean length
250
200
150
100
50
60
80
100
120
140
160
180
Year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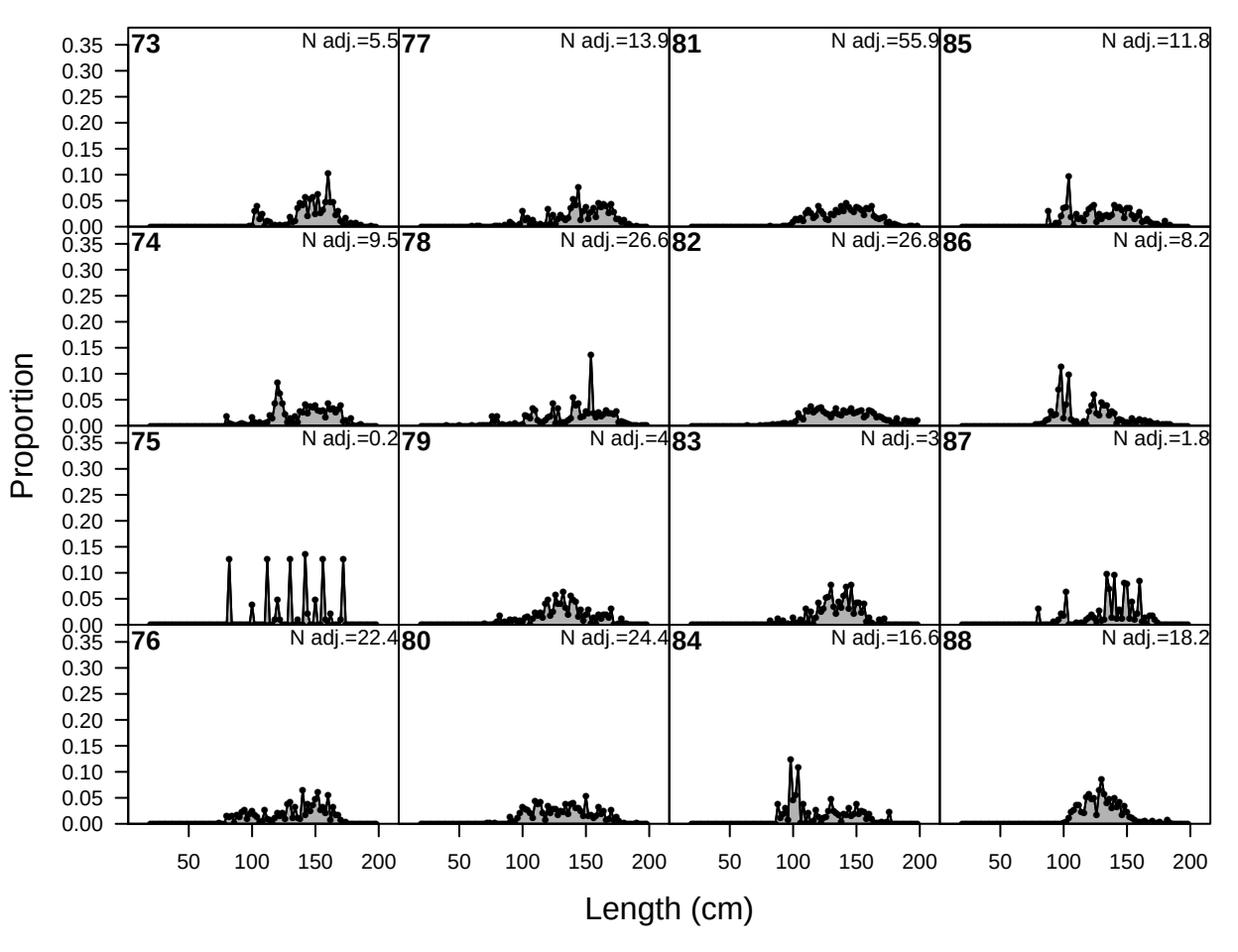
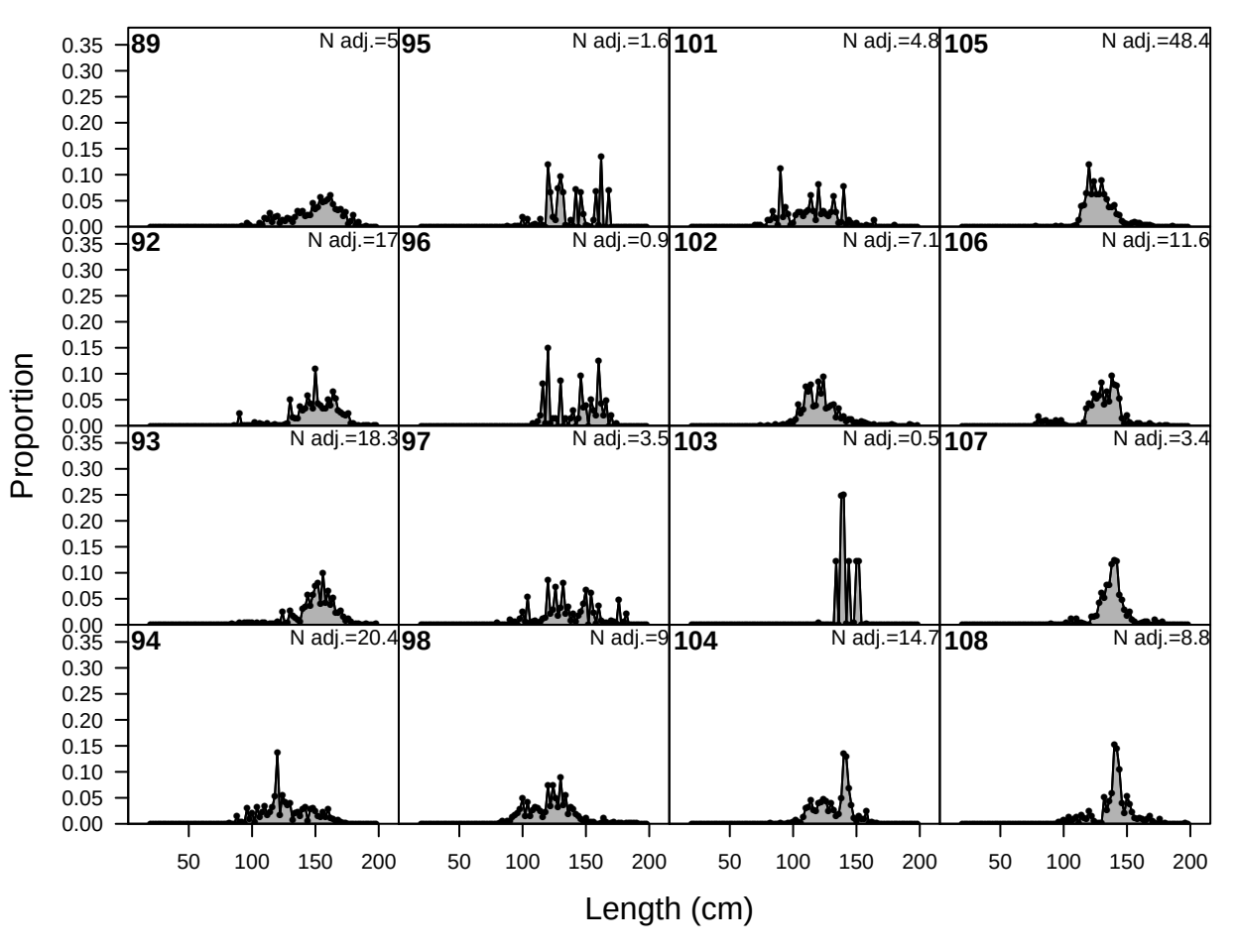
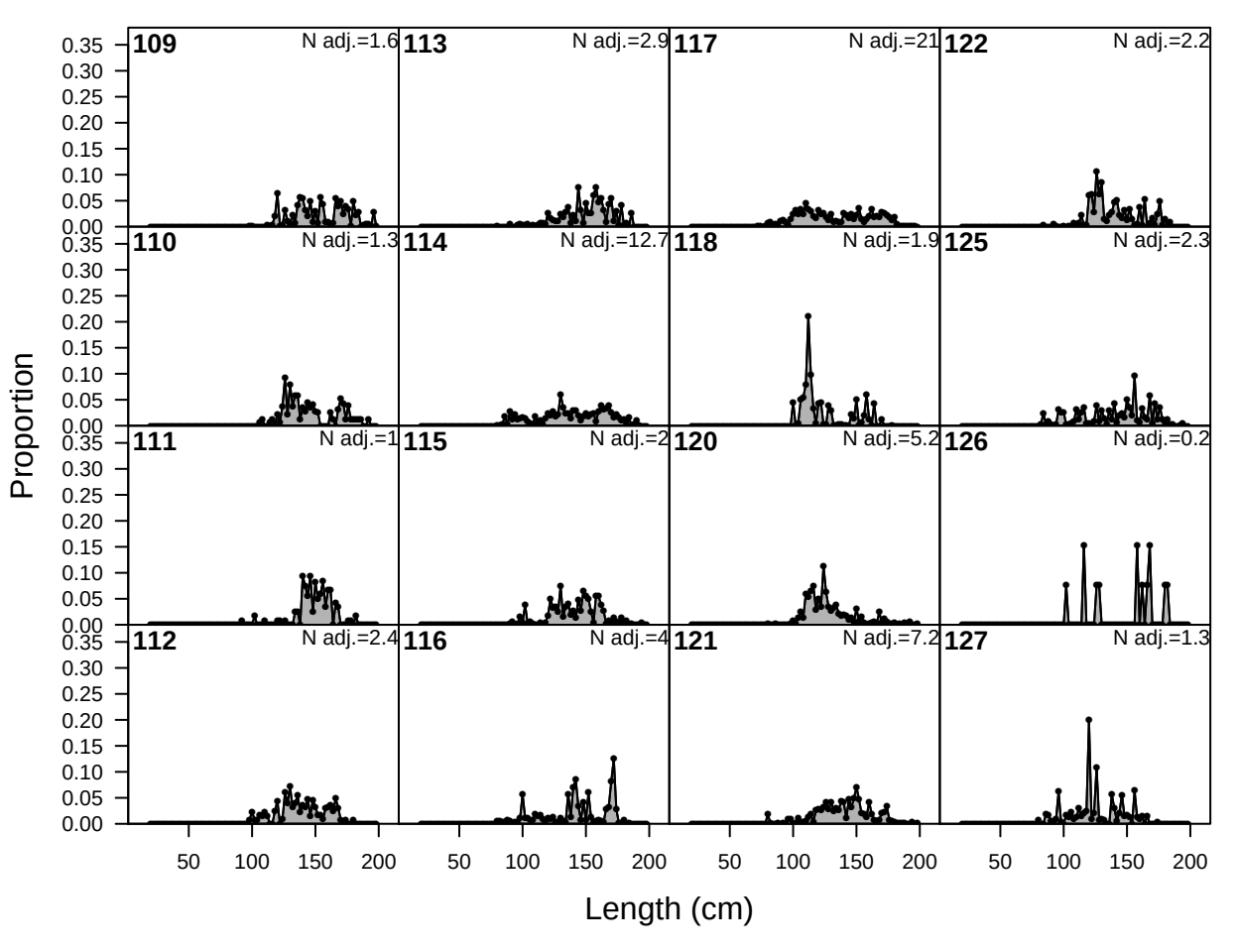
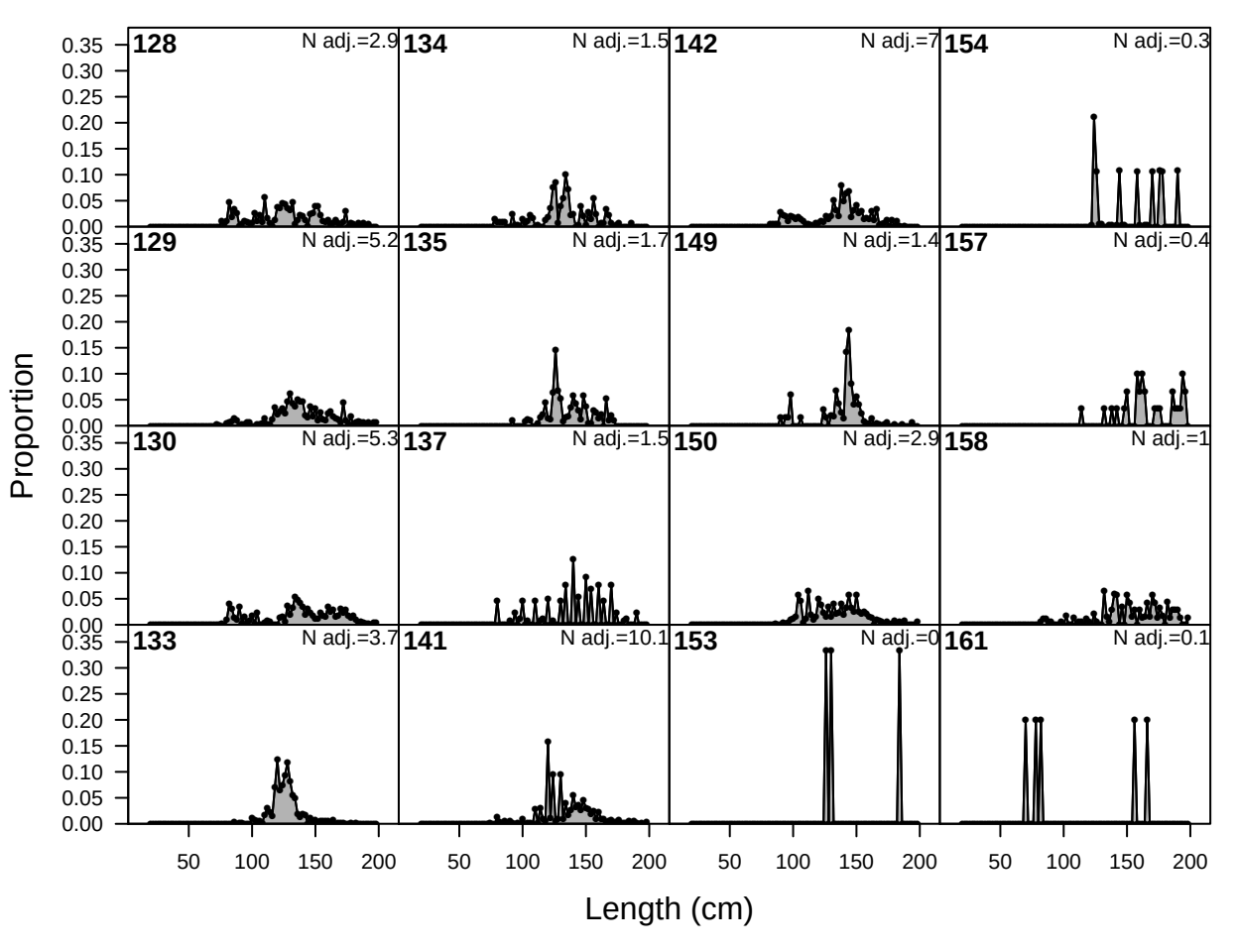
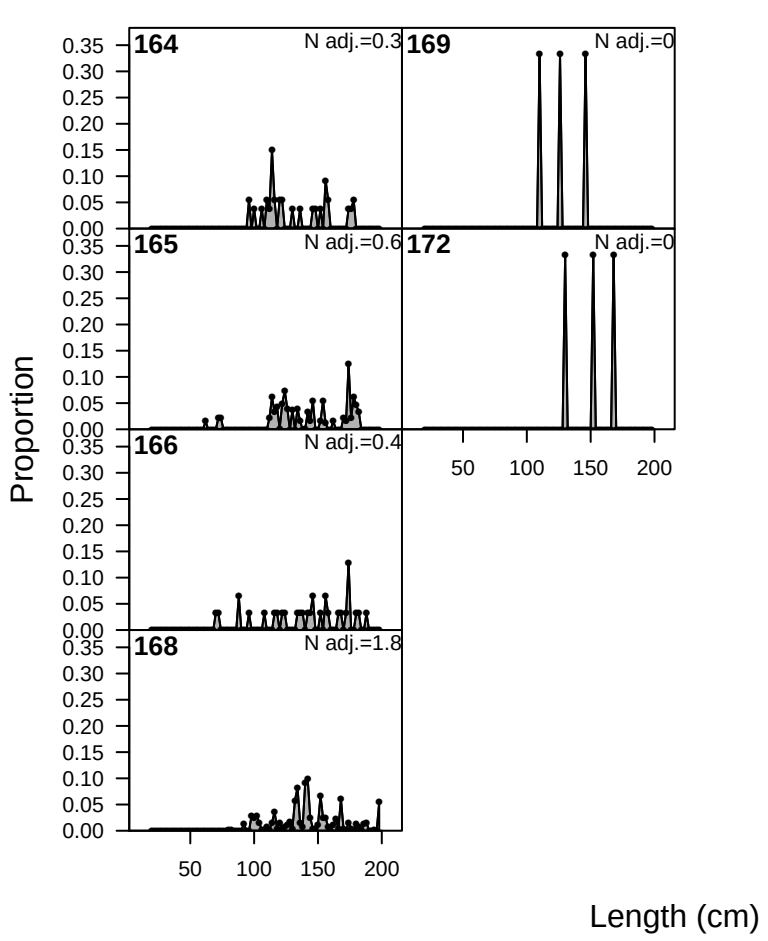
N adj.=31.1
54
N adj.=1
65
N adj.=6.4
69
N adj.=41.8
46
N adj.=6.7
55
N adj.=1.7
66
N adj.=15
70
N adj.=46.7
48
N adj.=3.8
62
N adj.=3.4
67
N adj.=3
71
N adj.=16.2
51
N adj.=5
63
N adj.=7.5
68
N adj.=2.8
72
N adj.=0.6
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

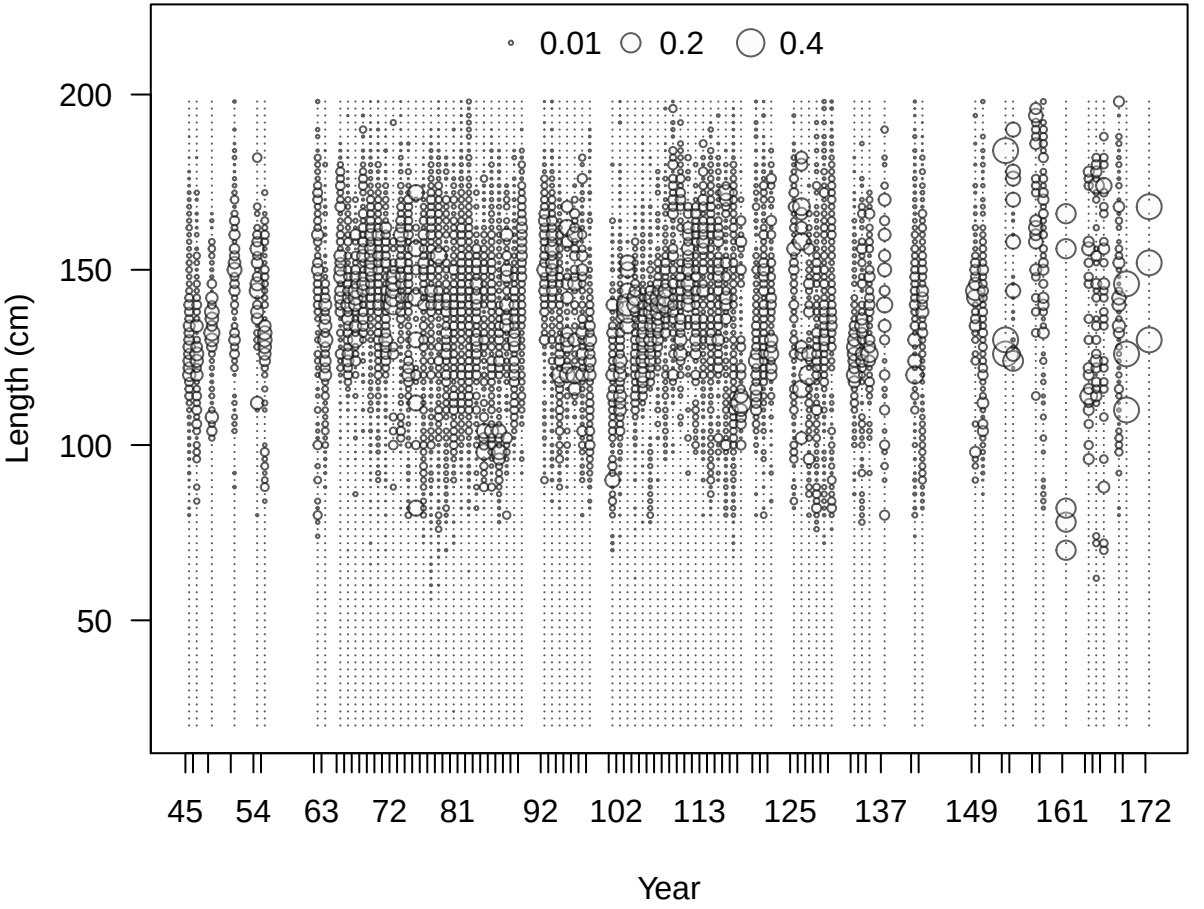

73
N adj.=5.5
77
N adj.=13.9
81
N adj.=55.9
85
N adj.=11.8
74
N adj.=9.5
78
N adj.=26.6
82
N adj.=26.8
86
N adj.=8.2
75
N adj.=0.2
79
N adj.=4
83
N adj.=3
87
N adj.=1.8
76
N adj.=22.4
80
N adj.=24.4
84
N adj.=16.6
88
N adj.=18.2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

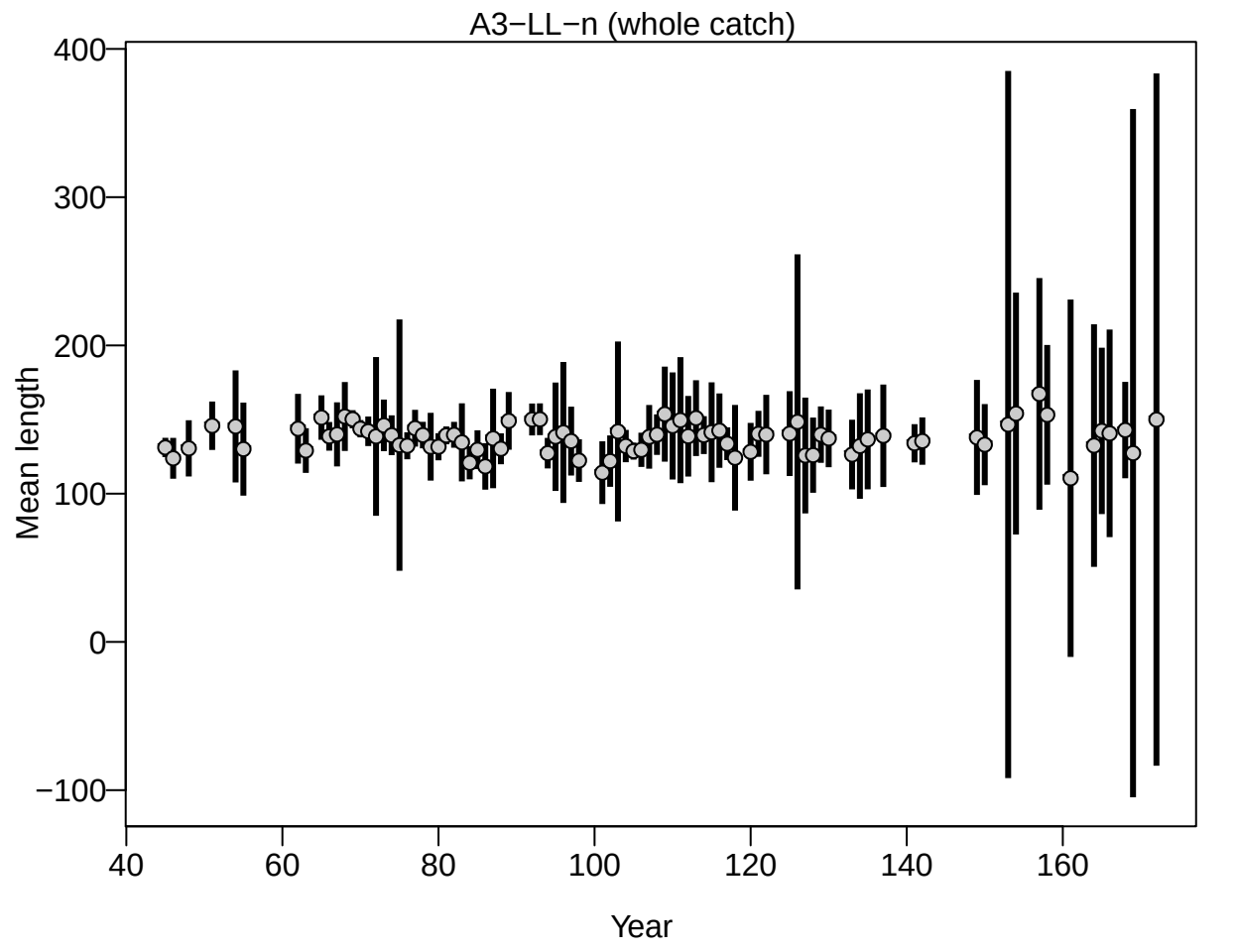

89
N adj.=5
95
N adj.=1.6
101
N adj.=4.8
105
N adj.=48.4
92
N adj.=17
96
N adj.=0.9
102
N adj.=7.1
106
N adj.=11.6
93
N adj.=18.3
97
N adj.=3.5
103
N adj.=0.5
107
N adj.=3.4
94
N adj.=20.4
98
N adj.=9
104
N adj.=14.7
108
N adj.=8.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

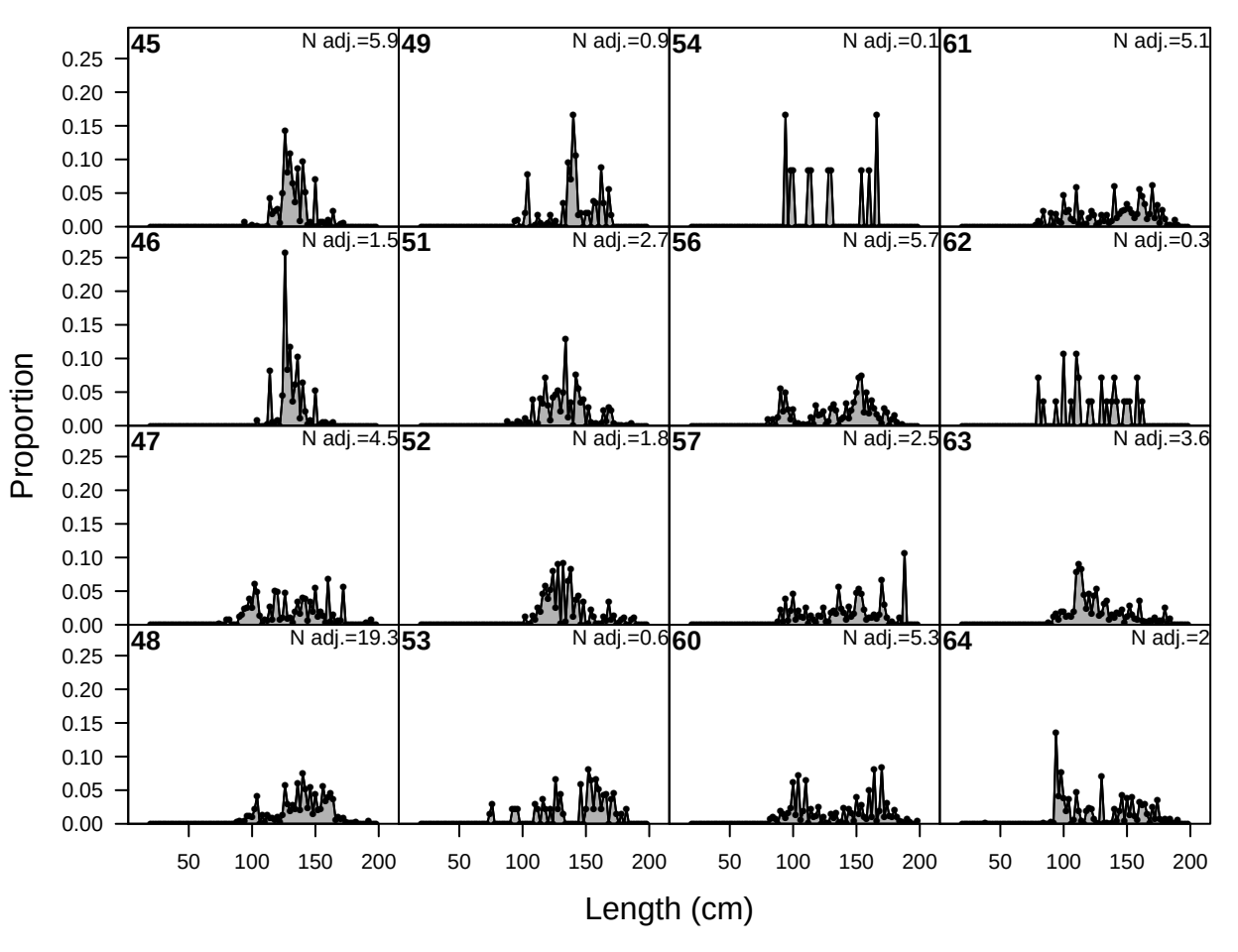

109
N adj.=1.6
113
N adj.=2.9
117
N adj.=21
122
N adj.=2.2
110
N adj.=1.3
114
N adj.=12.7
118
N adj.=1.9
125
N adj.=2.3
111
N adj.=1
115
N adj.=2
120
N adj.=5.2
126
N adj.=0.2
112
N adj.=2.4
116
N adj.=4
121
N adj.=7.2
127
N adj.=1.3
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)


128
N adj.=2.9
134
N adj.=1.5
142
N adj.=7
154
N adj.=0.3
129
N adj.=5.2
135
N adj.=1.7
149
N adj.=1.4
157
N adj.=0.4
130
N adj.=5.3
137
N adj.=1.5
150
N adj.=2.9
158
N adj.=1
133
N adj.=3.7
141
N adj.=10.1
153
N adj.=0
161
N adj.=0.1
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)


164
N adj.=0.3
169
N adj.=0
165
N adj.=0.6
172
N adj.=0
166
N adj.=0.4
168
N adj.=1.8
Proportion
Length (cm)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200


0.01
0.2
0.4
200
150
100
50
Length (cm)
45
54
63
72
81
92
102
113
125
137
149
161
172
Year


A3−LL−n (whole catch)
Mean length
Year
400
300
200
100
0
−100
40
60
80
100
120
140
160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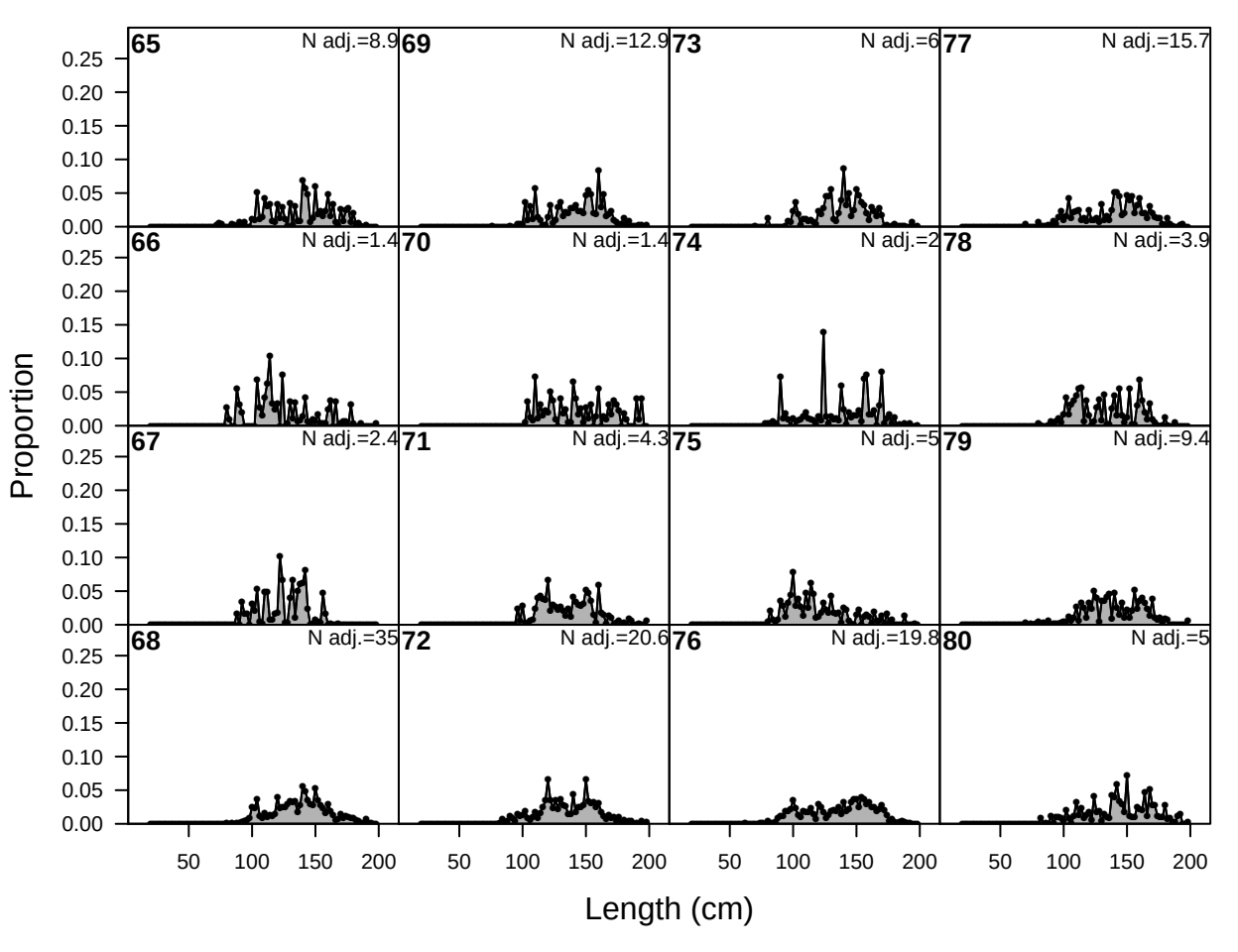
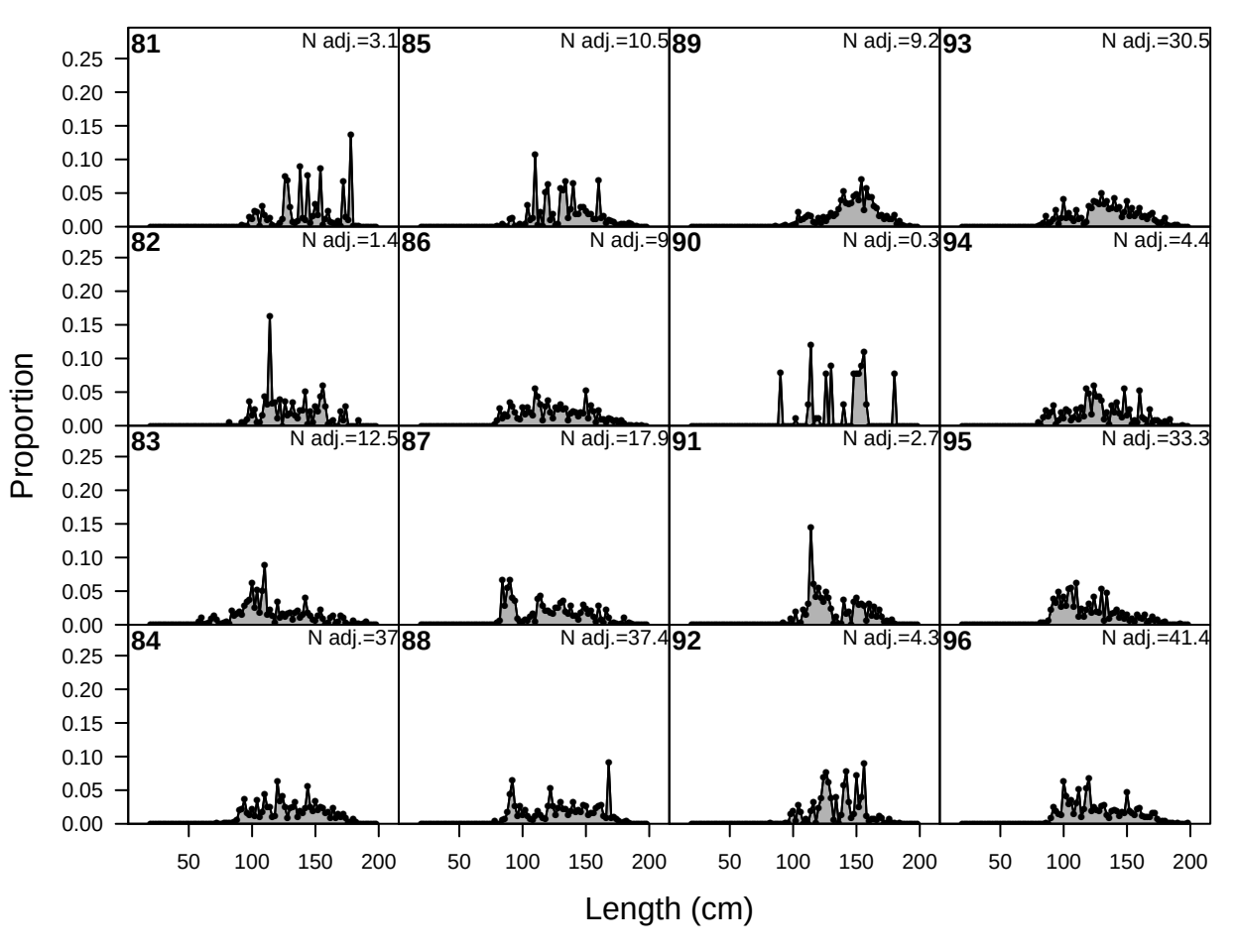
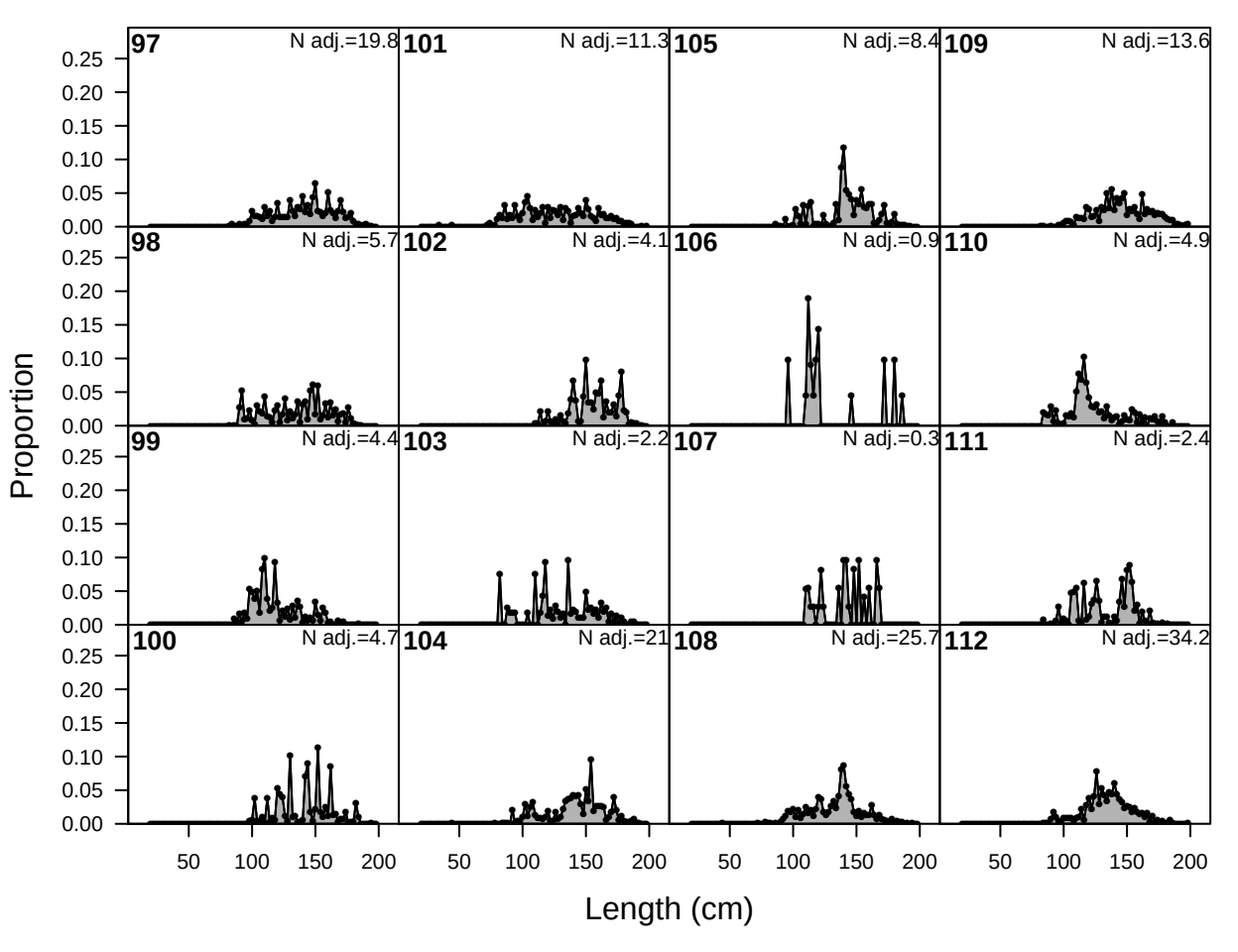
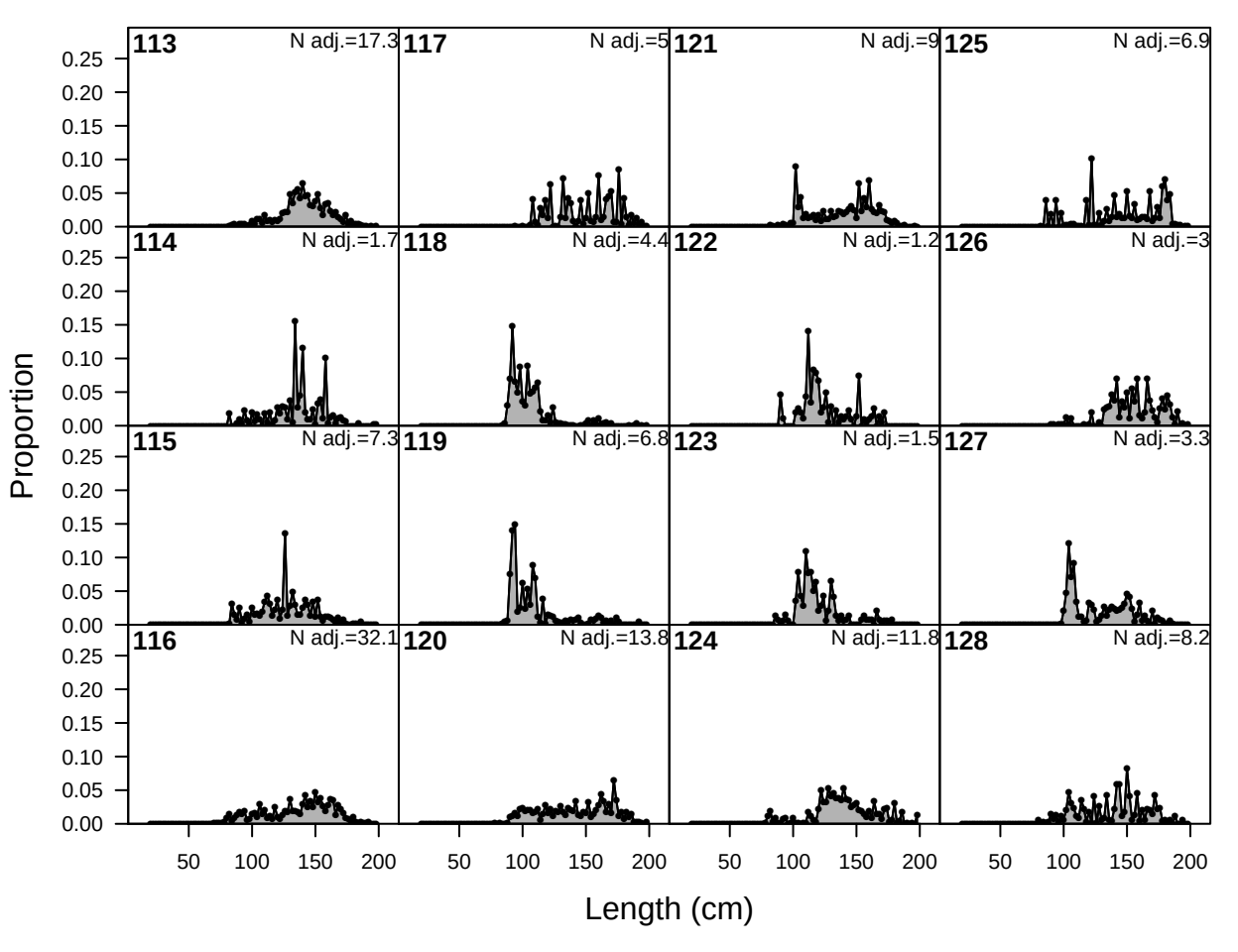
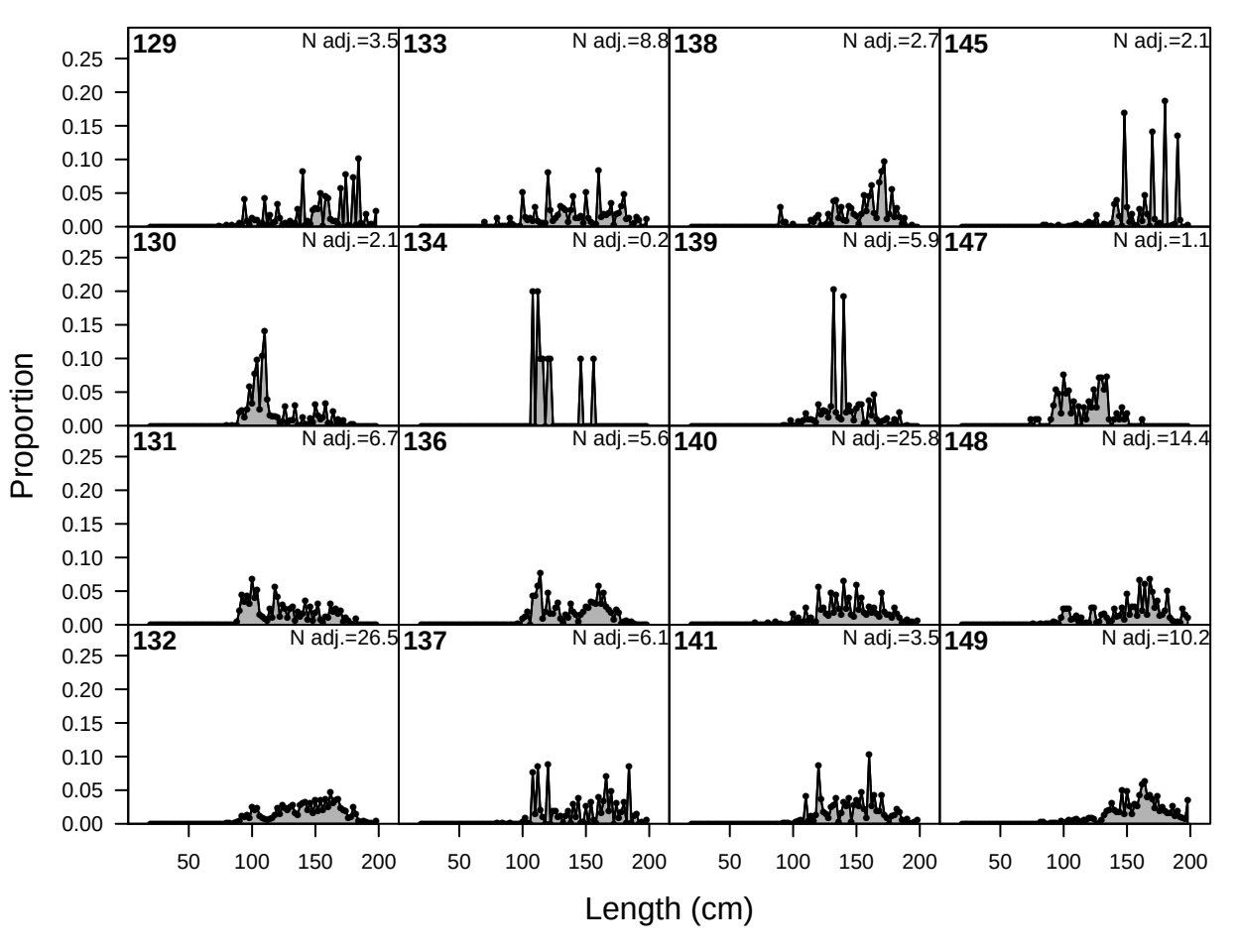
N adj.=5.9
49
N adj.=0.9
54
N adj.=0.1
61
N adj.=5.1
46
N adj.=1.5
51
N adj.=2.7
56
N adj.=5.7
62
N adj.=0.3
47
N adj.=4.5
52
N adj.=1.8
57
N adj.=2.5
63
N adj.=3.6
48
N adj.=19.3
53
N adj.=0.6
60
N adj.=5.3
64
N adj.=2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

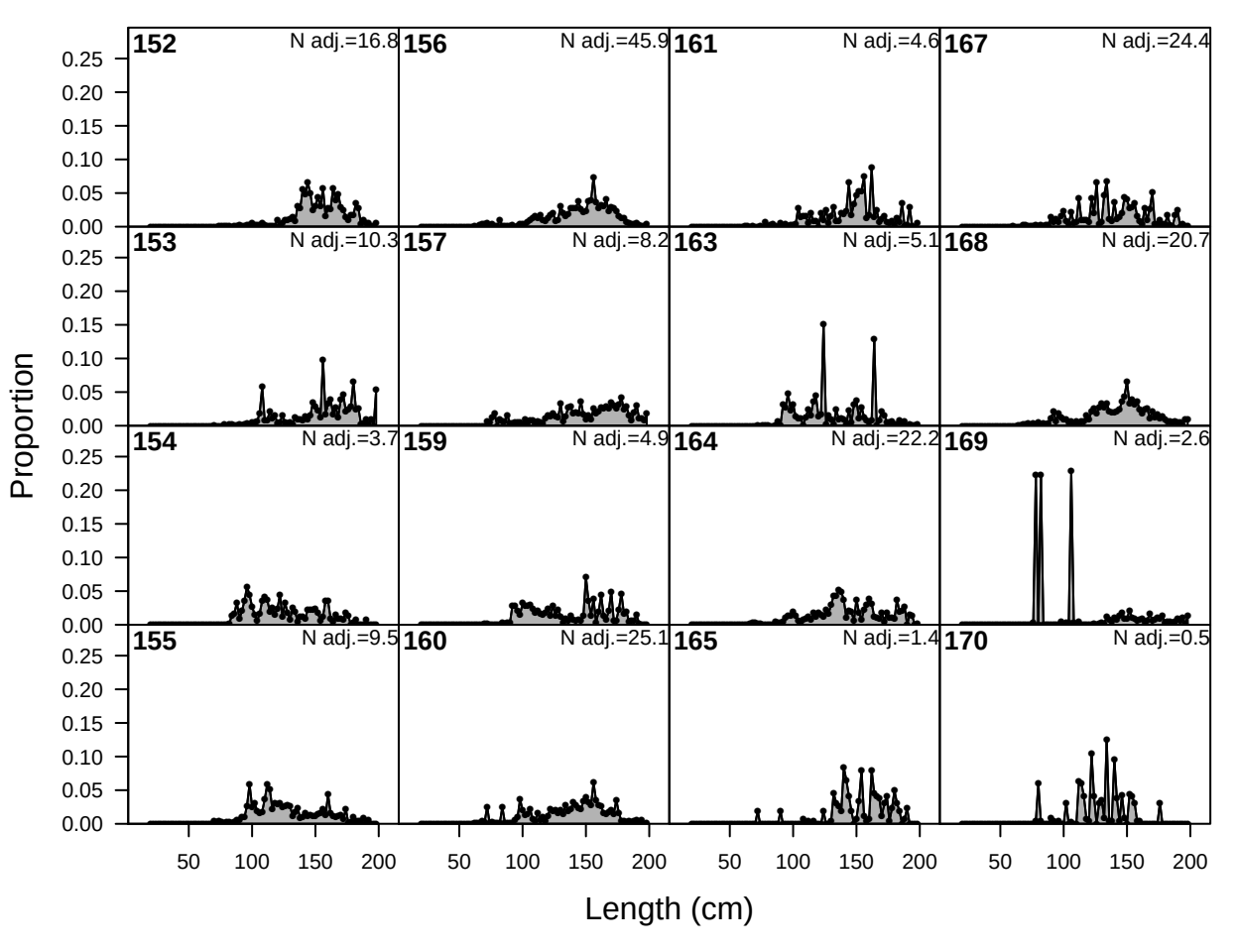

65
N adj.=8.9
69
N adj.=12.9
73
N adj.=6
77
N adj.=15.7
66
N adj.=1.4
70
N adj.=1.4
74
N adj.=2
78
N adj.=3.9
67
N adj.=2.4
71
N adj.=4.3
75
N adj.=5
79
N adj.=9.4
68
N adj.=35
72
N adj.=20.6
76
N adj.=19.8
80
N adj.=5
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Proportion
Length (cm)

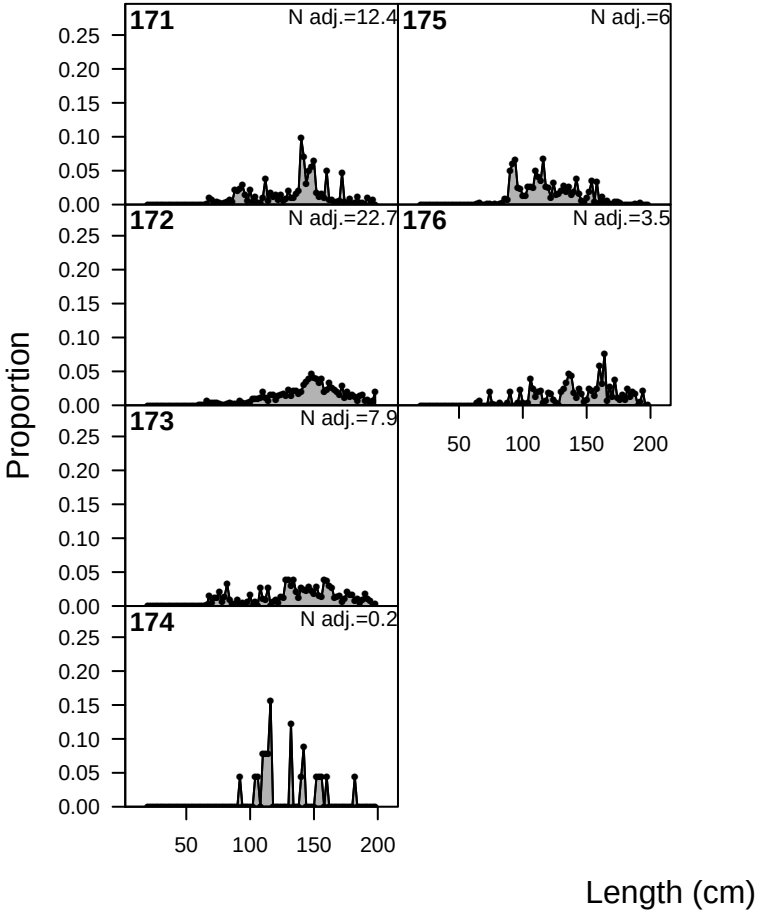

81
N adj.=3.1
85
N adj.=10.5
89
N adj.=9.2
93
N adj.=30.5
82
N adj.=1.4
86
N adj.=9
90
N adj.=0.3
94
N adj.=4.4
83
N adj.=12.5
87
N adj.=17.9
91
N adj.=2.7
95
N adj.=33.3
84
N adj.=37
88
N adj.=37.4
92
N adj.=4.3
96
N adj.=41.4
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

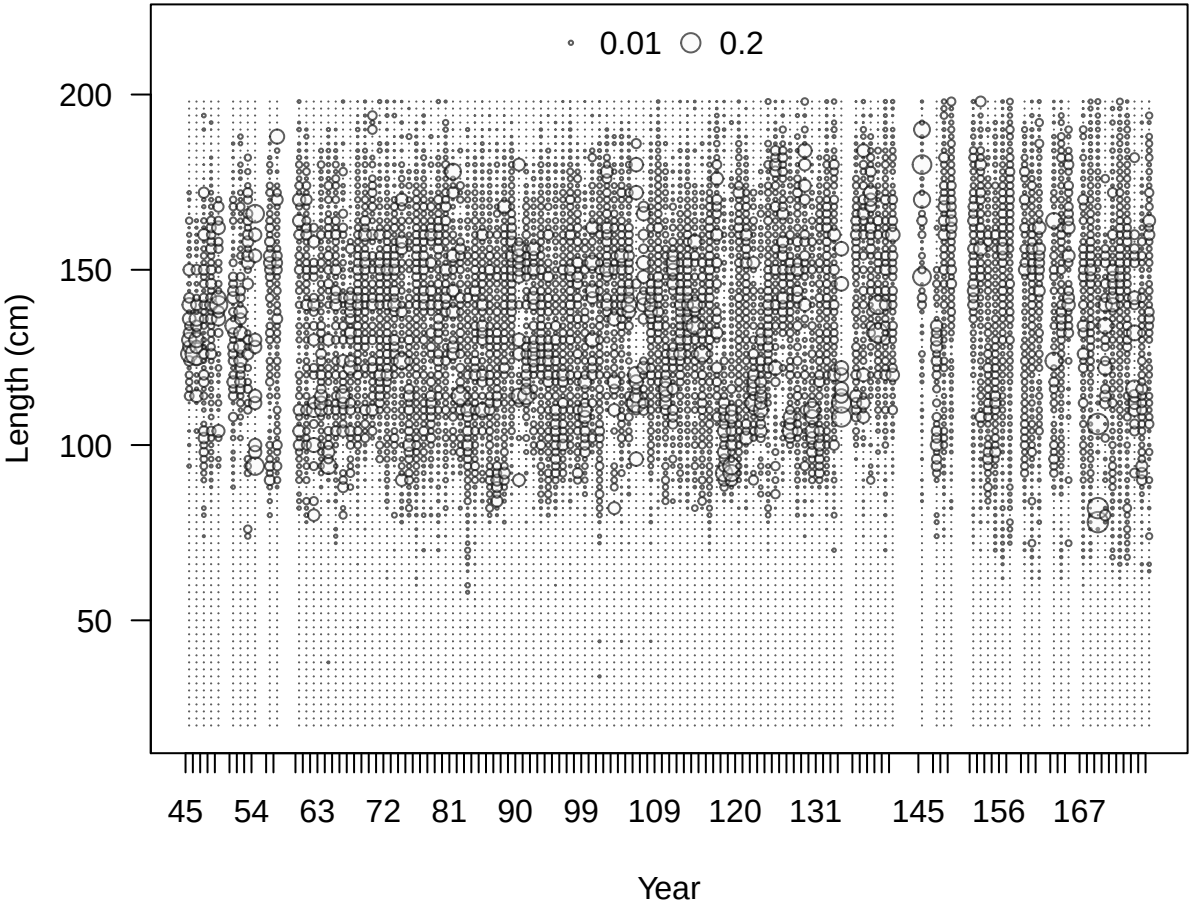

97
N adj.=19.8
101
N adj.=11.3
105
N adj.=8.4
109
N adj.=13.6
98
N adj.=5.7
102
N adj.=4.1
106
N adj.=0.9
110
N adj.=4.9
99
N adj.=4.4
103
N adj.=2.2
107
N adj.=0.3
111
N adj.=2.4
100
N adj.=4.7
104
N adj.=21
108
N adj.=25.7
112
N adj.=34.2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

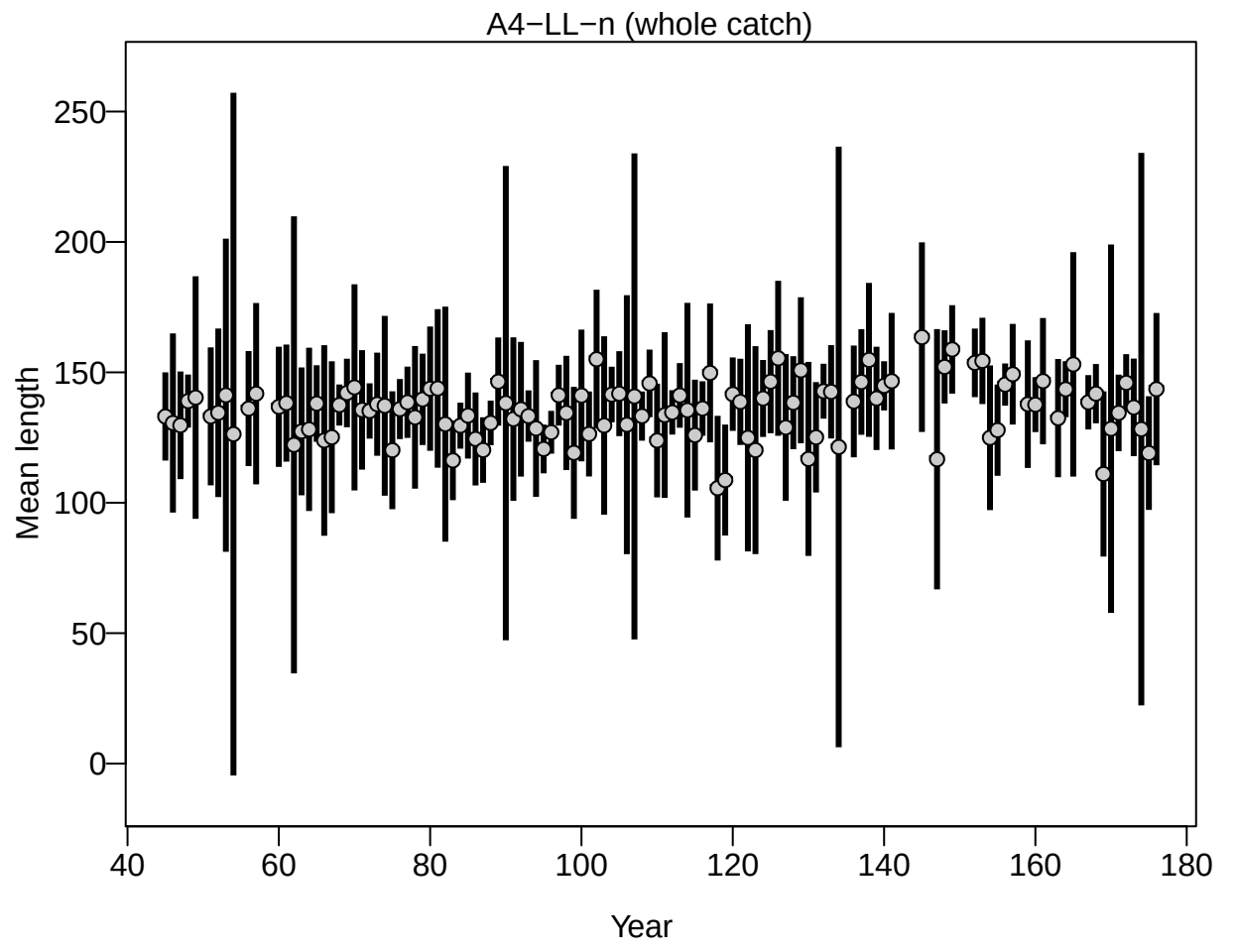

113
N adj.=17.3
117
N adj.=5
121
N adj.=9
125
N adj.=6.9
114
N adj.=1.7
118
N adj.=4.4
122
N adj.=1.2
126
N adj.=3
115
N adj.=7.3
119
N adj.=6.8
123
N adj.=1.5
127
N adj.=3.3
116
N adj.=32.1
120
N adj.=13.8
124
N adj.=11.8
128
N adj.=8.2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

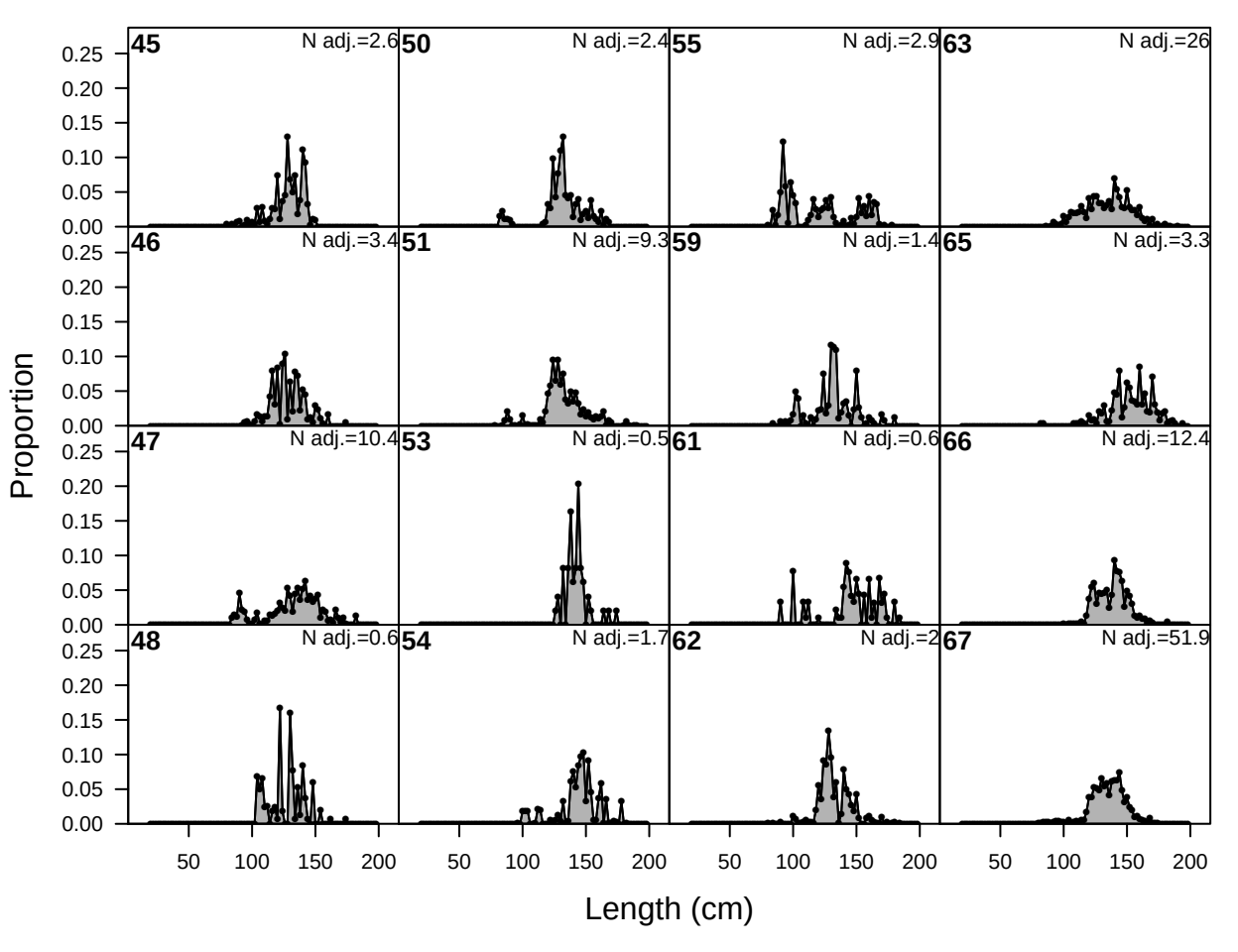

129
N adj.=3.5
133
N adj.=8.8
138
N adj.=2.7
145
N adj.=2.1
130
N adj.=2.1
134
N adj.=0.2
139
N adj.=5.9
147
N adj.=1.1
131
N adj.=6.7
136
N adj.=5.6
140
N adj.=25.8
148
N adj.=14.4
132
N adj.=26.5
137
N adj.=6.1
141
N adj.=3.5
149
N adj.=10.2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)


152
N adj.=16.8
156
N adj.=45.9
161
N adj.=4.6
167
N adj.=24.4
153
N adj.=10.3
157
N adj.=8.2
163
N adj.=5.1
168
N adj.=20.7
154
N adj.=3.7
159
N adj.=4.9
164
N adj.=22.2
169
N adj.=2.6
155
N adj.=9.5
160
N adj.=25.1
165
N adj.=1.4
170
N adj.=0.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)


171
N adj.=12.4
175
N adj.=6
172
N adj.=22.7
176
N adj.=3.5
173
N adj.=7.9
174
N adj.=0.2
Proportion
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Length (cm)


0.01
0.2
200
150
100
50
Length (cm)
45
54
63
72
81
90
99
109
120
131
145
156
167
Year


A4−LL−n (whole catch)
Mean length
250
200
150
100
50
0
40
60
80
100
120
140
160
180
Year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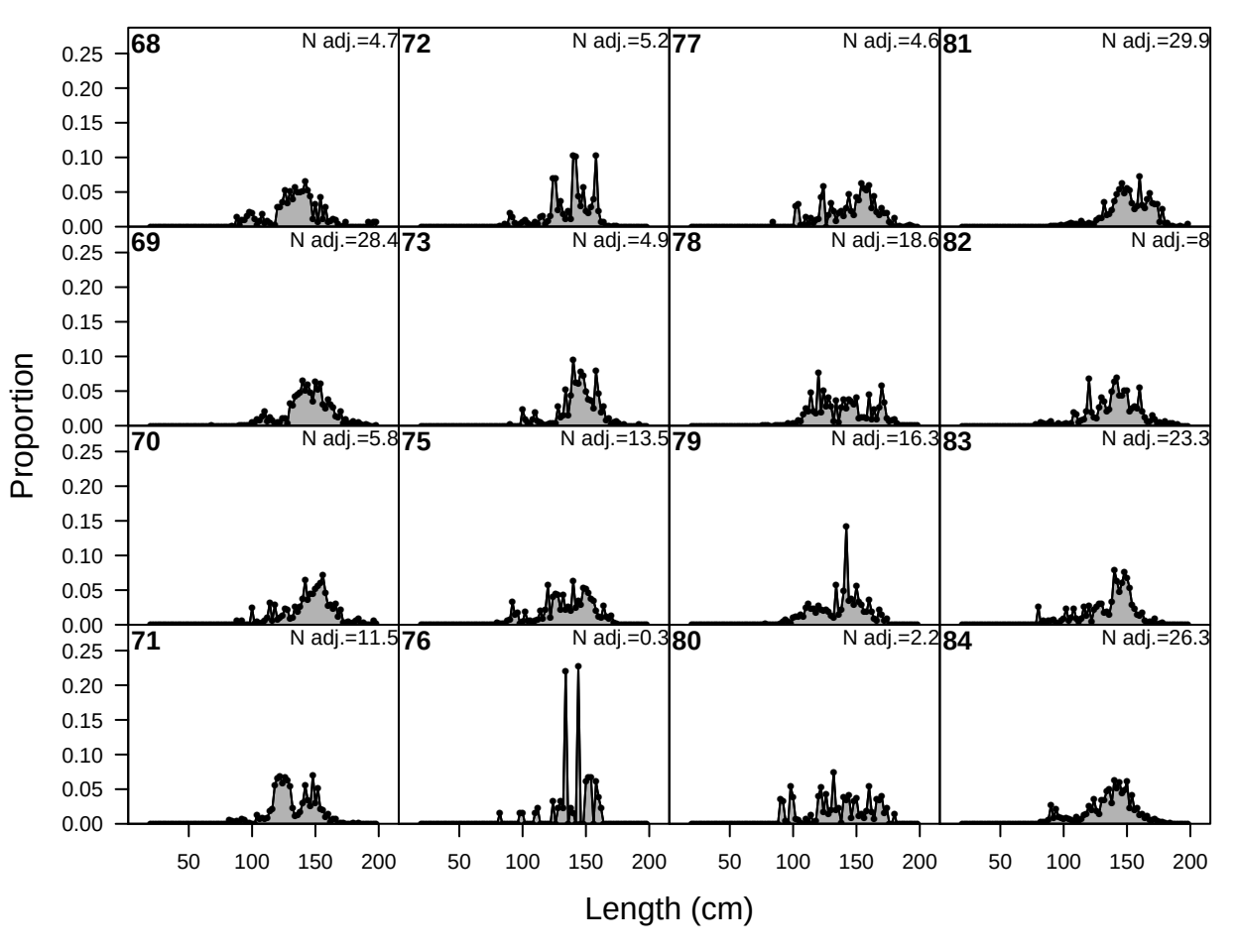
N adj.=2.6
50
N adj.=2.4
55
N adj.=2.9
63
N adj.=26
46
N adj.=3.4
51
N adj.=9.3
59
N adj.=1.4
65
N adj.=3.3
47
N adj.=10.4
53
N adj.=0.5
61
N adj.=0.6
66
N adj.=12.4
48
N adj.=0.6
54
N adj.=1.7
62
N adj.=2
67
N adj.=51.9
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)


68
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N adj.=5.2
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N adj.=4.6
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N adj.=29.9
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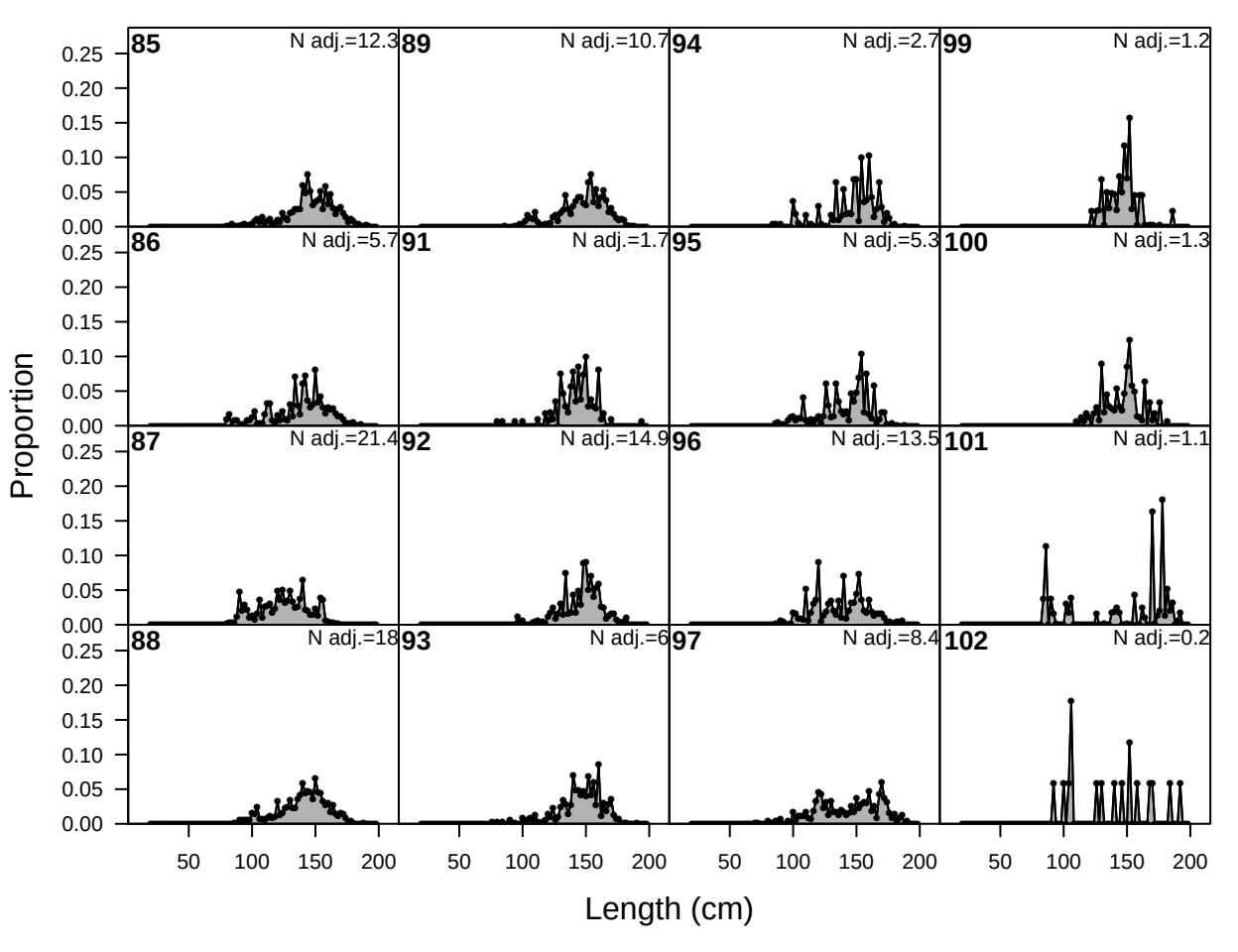
N adj.=28.4
73
N adj.=4.9
78
N adj.=18.6
82
N adj.=8
70
N adj.=5.8
75
N adj.=13.5
79
N adj.=16.3
83
N adj.=23.3
71
N adj.=11.5
76
N adj.=0.3
80
N adj.=2.2
84
N adj.=26.3
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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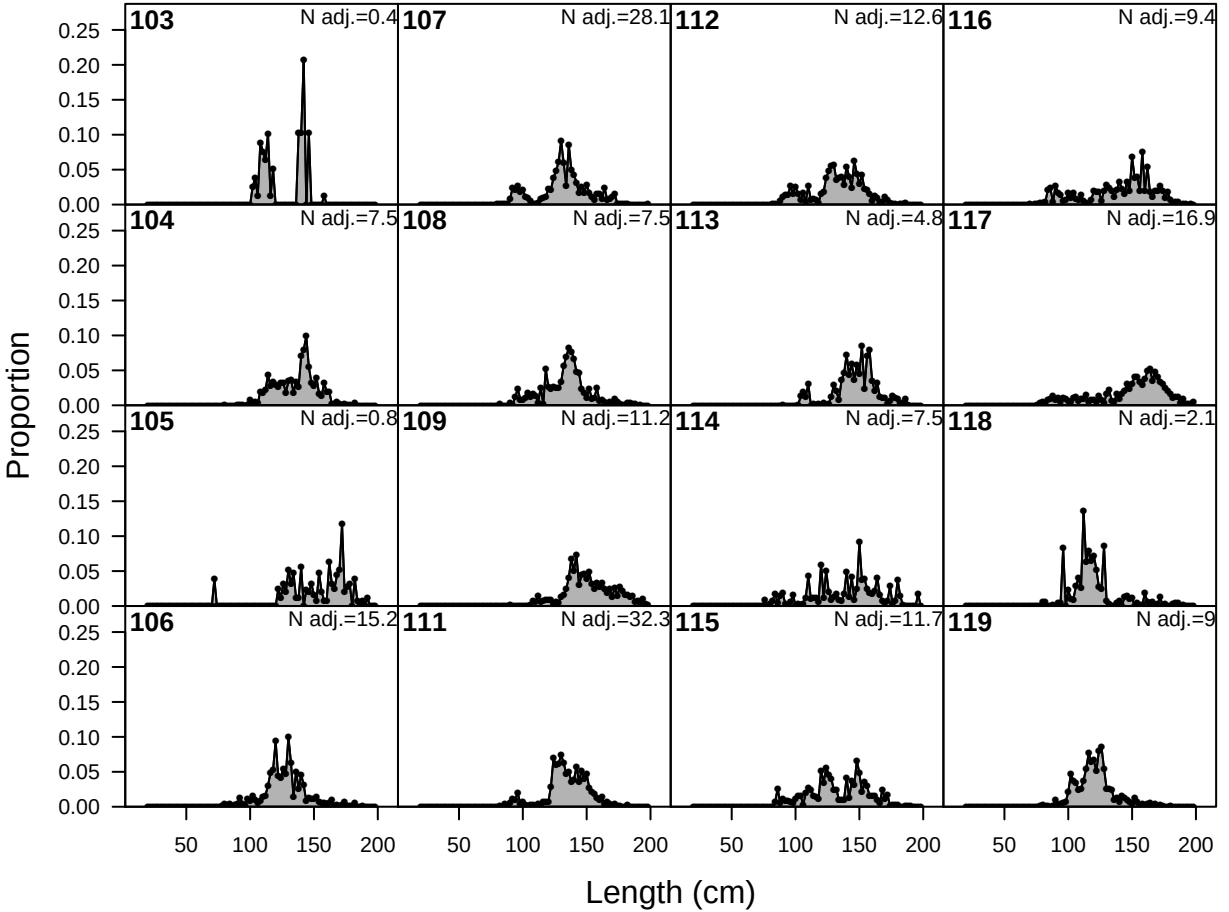
99
N adj.=1.2
86
N adj.=5.7
91
N adj.=1.7
95
N adj.=5.3
100
N adj.=1.3
87
N adj.=21.4
92
N adj.=14.9
96
N adj.=13.5
101
N adj.=1.1
88
N adj.=18
93
N adj.=6
97
N adj.=8.4
102
N adj.=0.2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)


103
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N adj.=28.1
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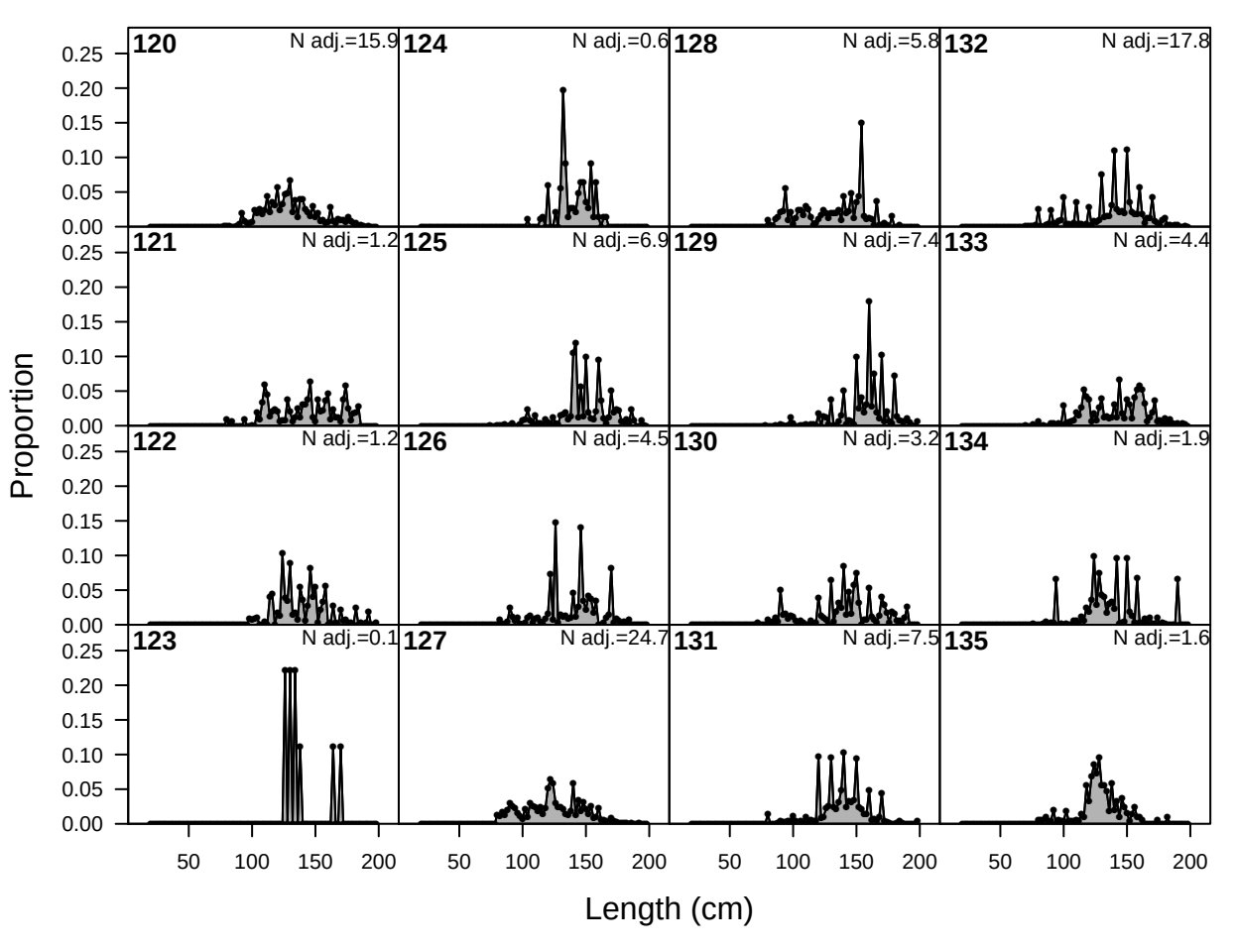
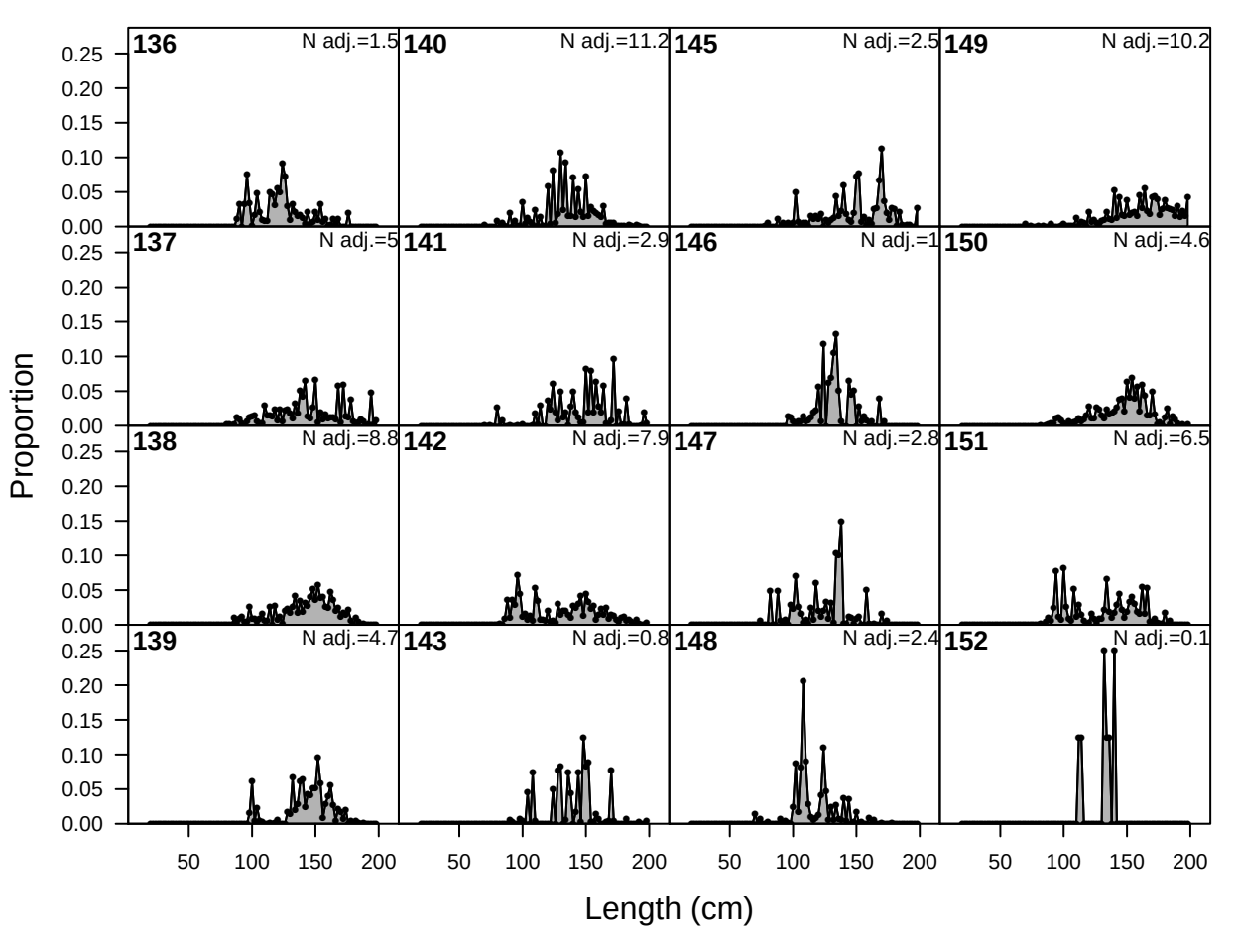
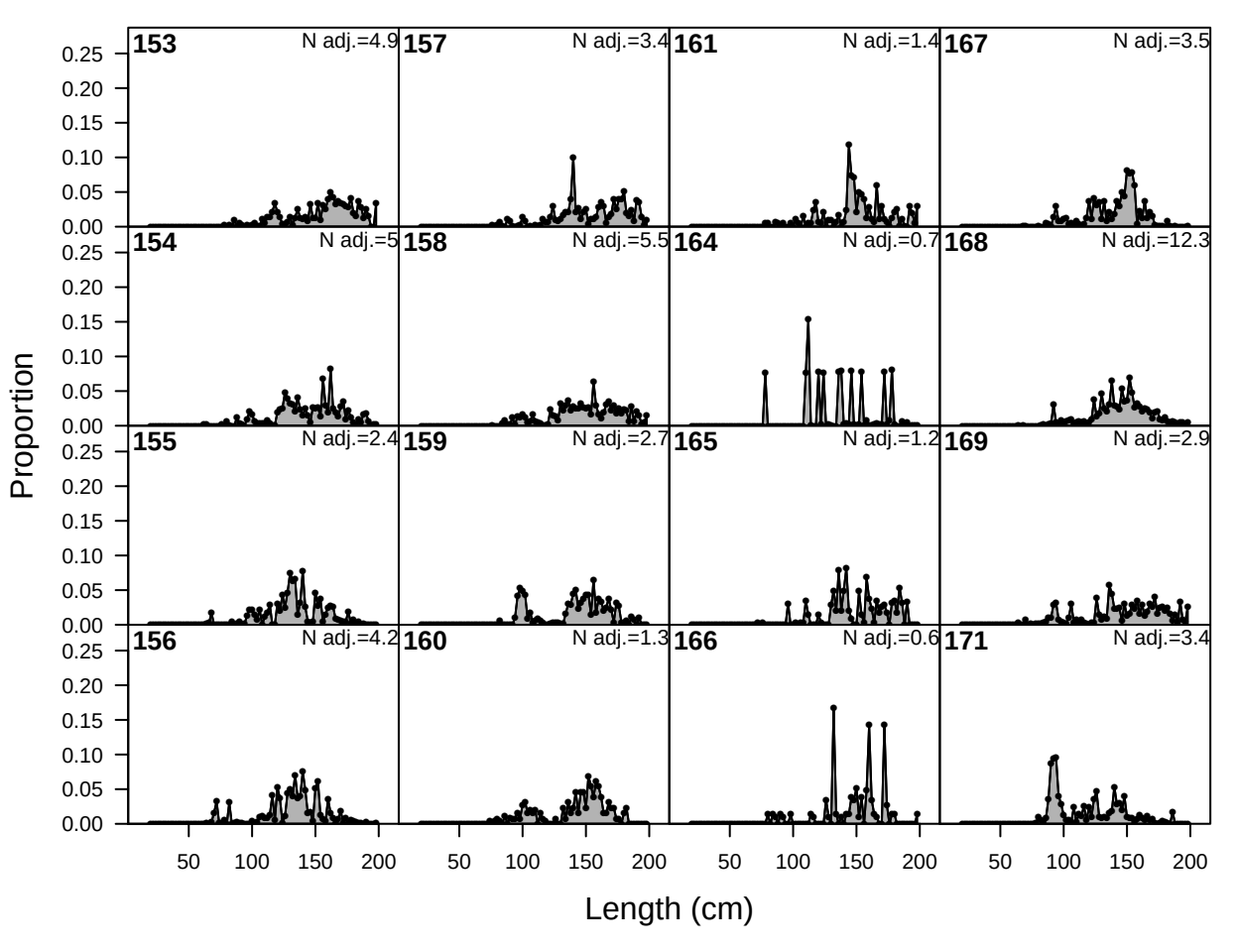
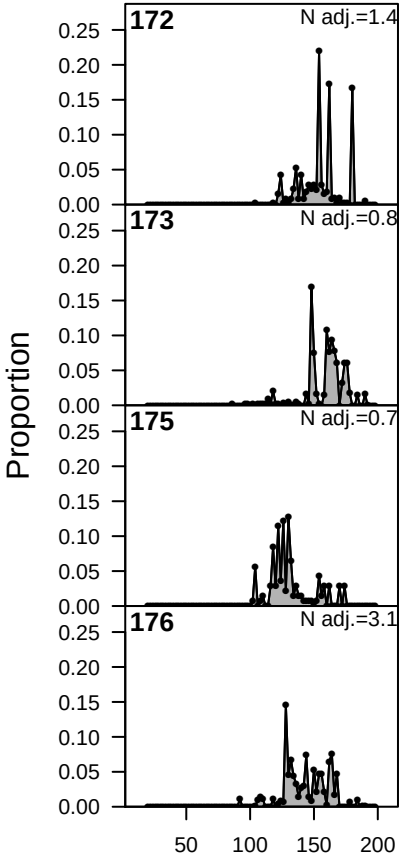
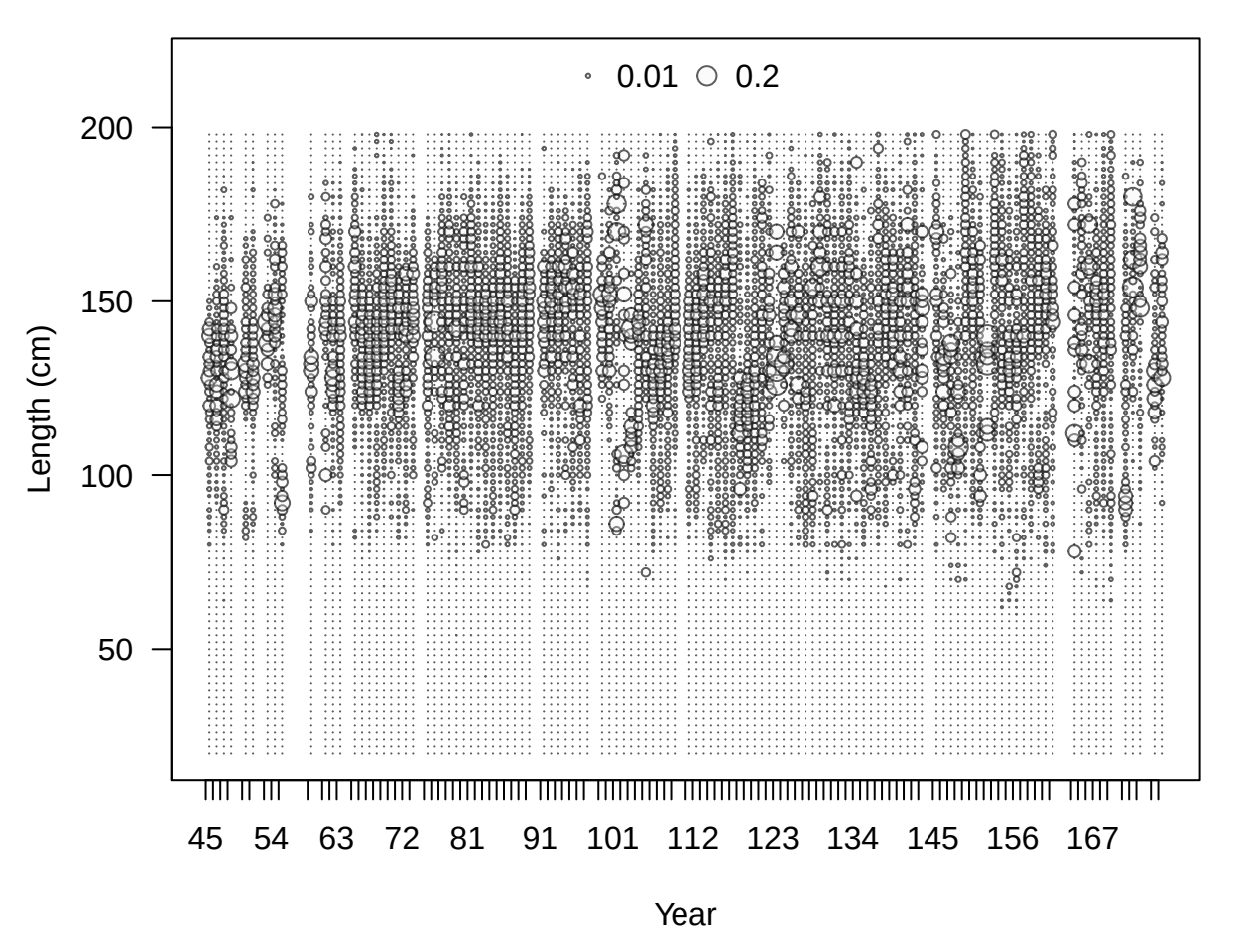
N adj.=12.6
116
N adj.=9.4
104
N adj.=7.5
108
N adj.=7.5
113
N adj.=4.8
117
N adj.=16.9
105
N adj.=0.8
109
N adj.=11.2
114
N adj.=7.5
118
N adj.=2.1
106
N adj.=15.2
111
N adj.=32.3
115
N adj.=11.7
119
N adj.=9
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

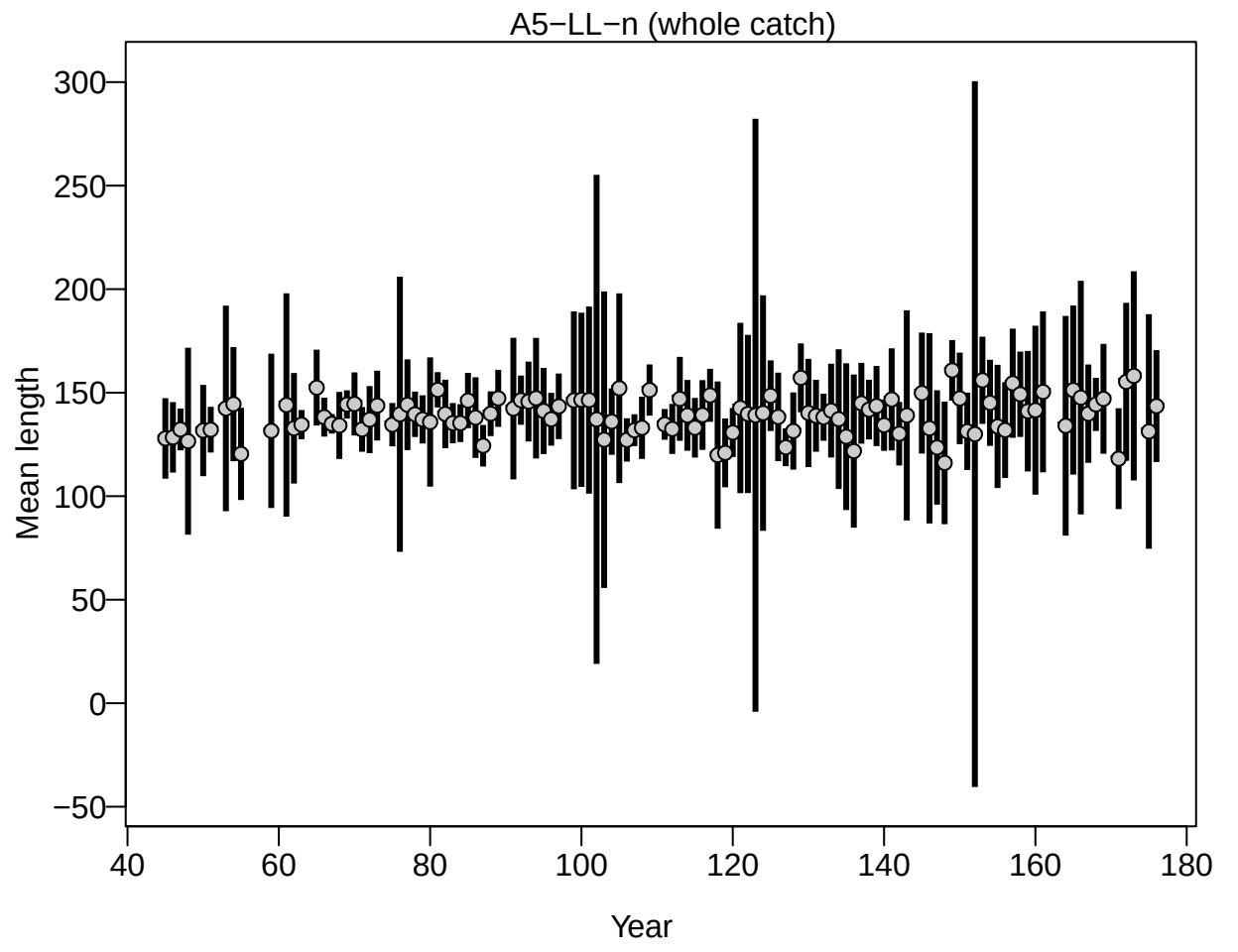

120
N adj.=15.9
124
N adj.=0.6
128
N adj.=5.8
132
N adj.=17.8
121
N adj.=1.2
125
N adj.=6.9
129
N adj.=7.4
133
N adj.=4.4
122
N adj.=1.2
126
N adj.=4.5
130
N adj.=3.2
134
N adj.=1.9
123
N adj.=0.1
127
N adj.=24.7
131
N adj.=7.5
135
N adj.=1.6
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

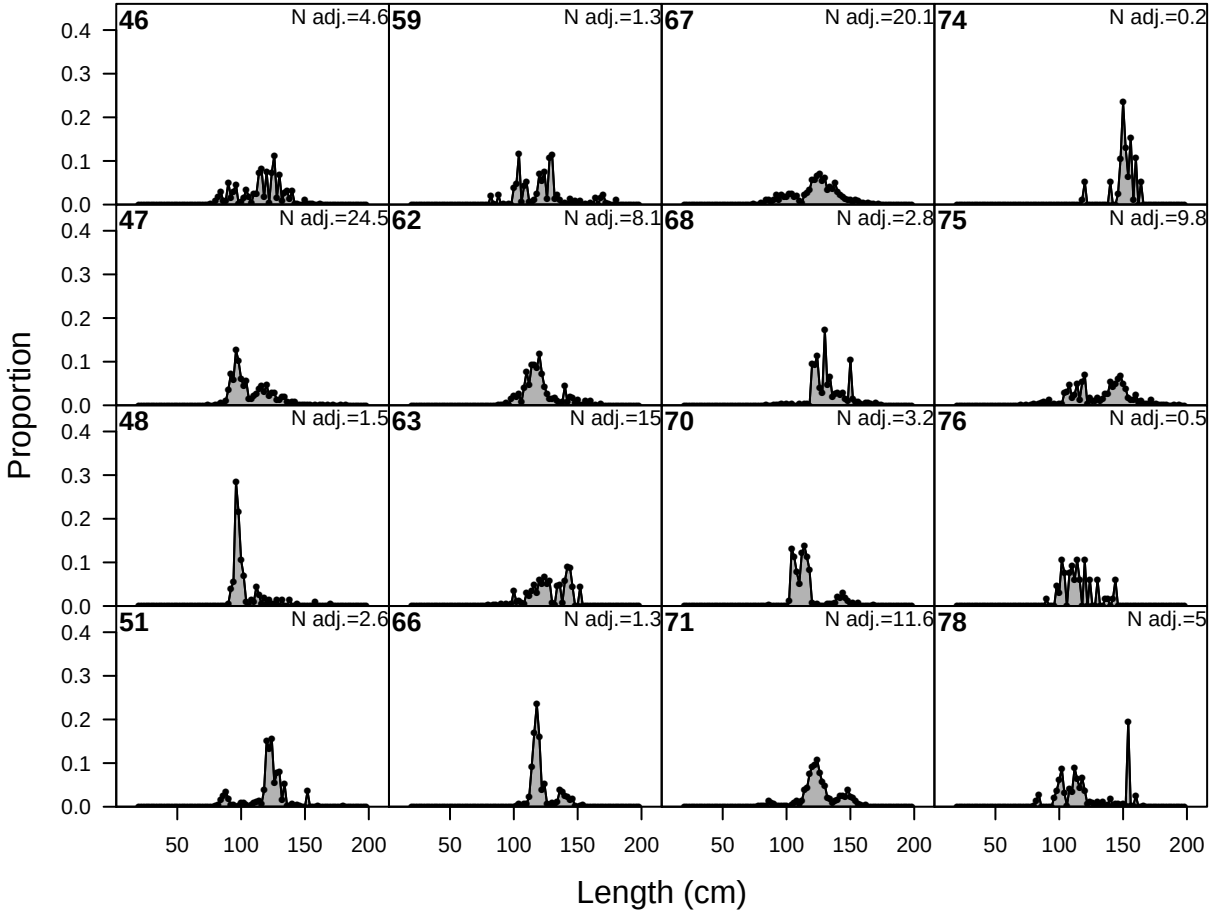

136
N adj.=1.5
140
N adj.=11.2
145
N adj.=2.5
149
N adj.=10.2
137
N adj.=5
141
N adj.=2.9
146
N adj.=1
150
N adj.=4.6
138
N adj.=8.8
142
N adj.=7.9
147
N adj.=2.8
151
N adj.=6.5
139
N adj.=4.7
143
N adj.=0.8
148
N adj.=2.4
152
N adj.=0.1
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

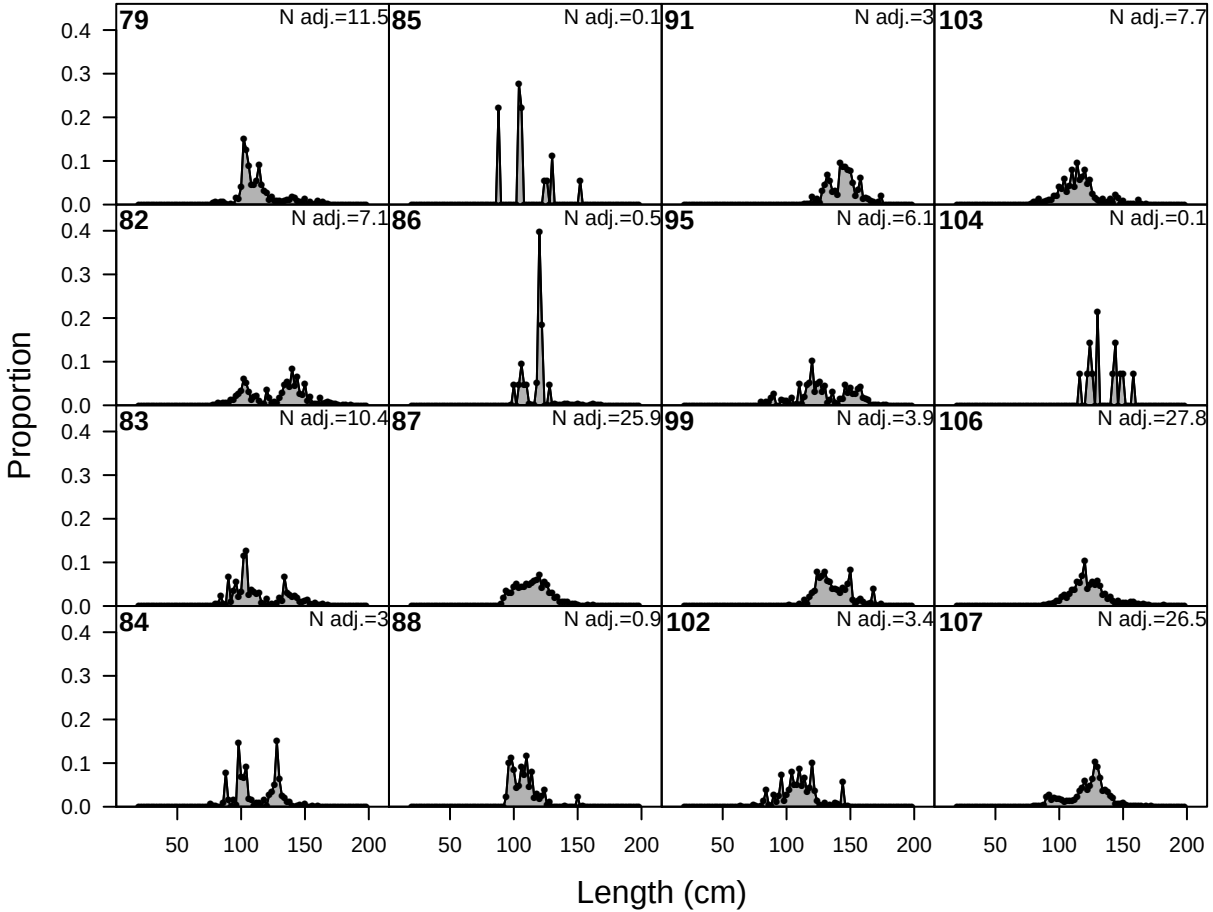

153
N adj.=4.9
157
N adj.=3.4
161
N adj.=1.4
167
N adj.=3.5
154
N adj.=5
158
N adj.=5.5
164
N adj.=0.7
168
N adj.=12.3
155
N adj.=2.4
159
N adj.=2.7
165
N adj.=1.2
169
N adj.=2.9
156
N adj.=4.2
160
N adj.=1.3
166
N adj.=0.6
171
N adj.=3.4
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

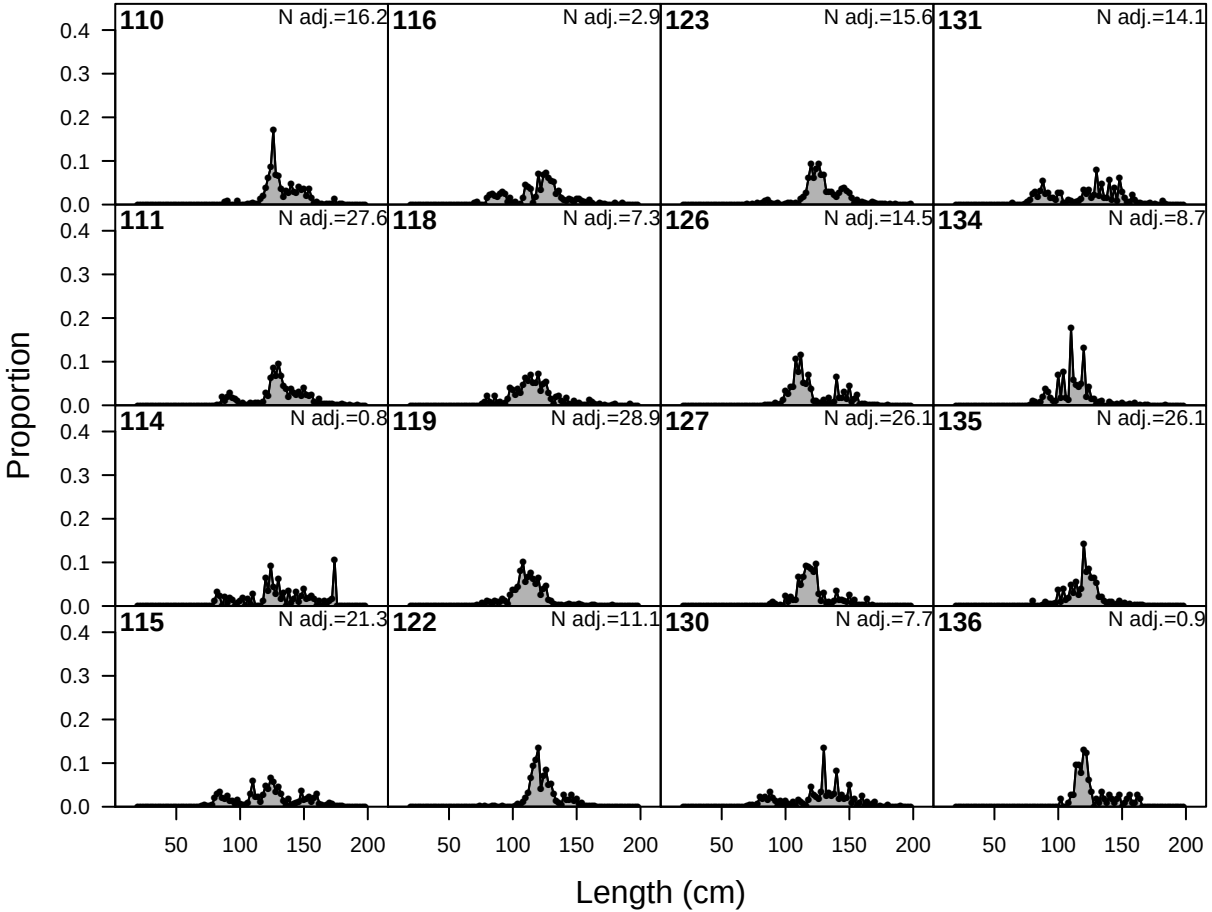

172
N adj.=1.4
173
N adj.=0.8
175
N adj.=0.7
176
N adj.=3.1
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Proportion
Length (cm)

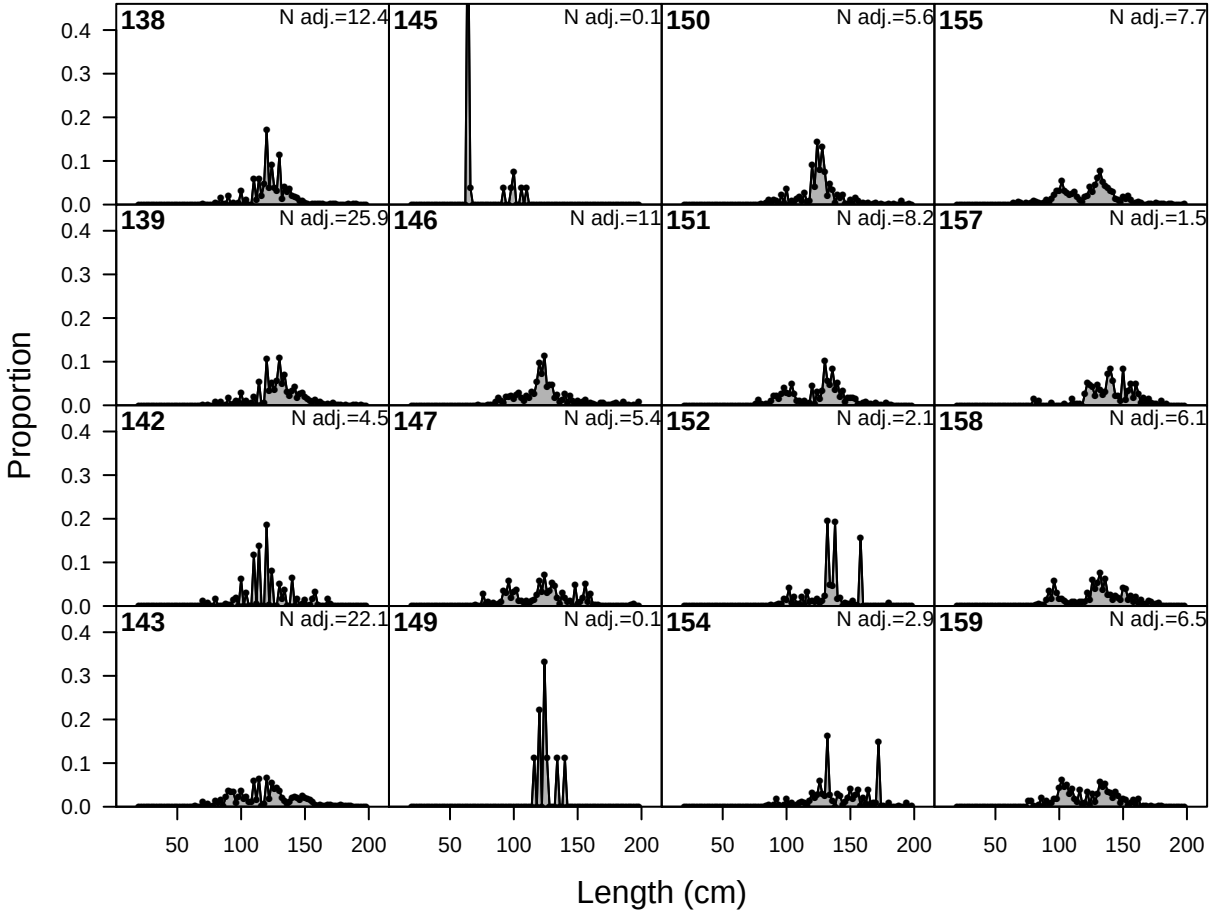

0.01
0.2
200
150
100
50
Length (cm)
45
54
63
72
81
91
101
112
123
134
145
156
167
Year

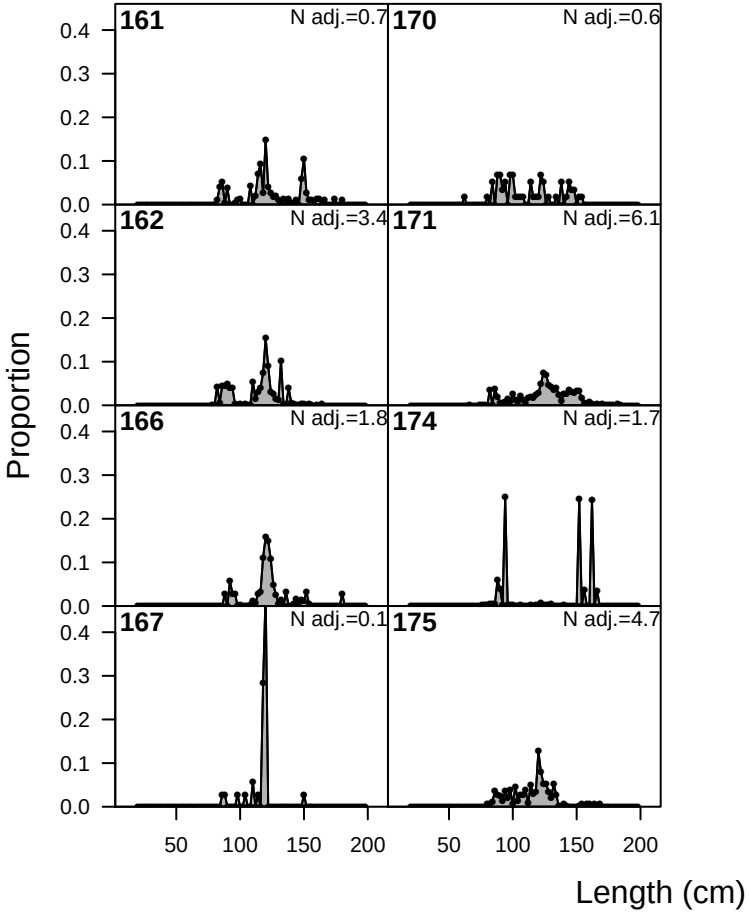

A5−LL−n (whole catch)
Mean length
300
250
200
150
100
50
0
−50
40
60
80
100
120
140
160
180
Year

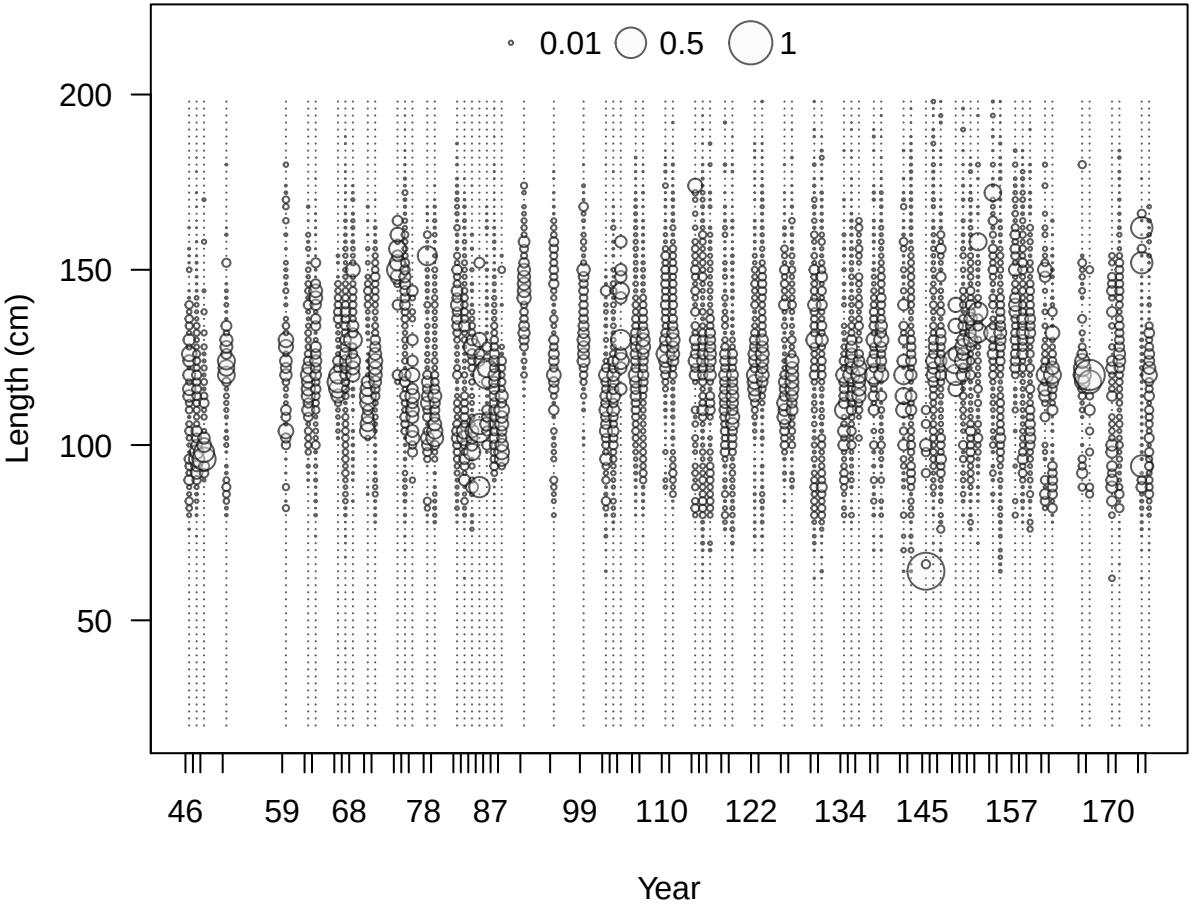

46
N adj.=4.6
59
N adj.=1.3
67
N adj.=20.1
74
N adj.=0.2
47
N adj.=24.5
62
N adj.=8.1
68
N adj.=2.8
75
N adj.=9.8
48
N adj.=1.5
63
N adj.=15
70
N adj.=3.2
76
N adj.=0.5
51
N adj.=2.6
66
N adj.=1.3
71
N adj.=11.6
78
N adj.=5
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

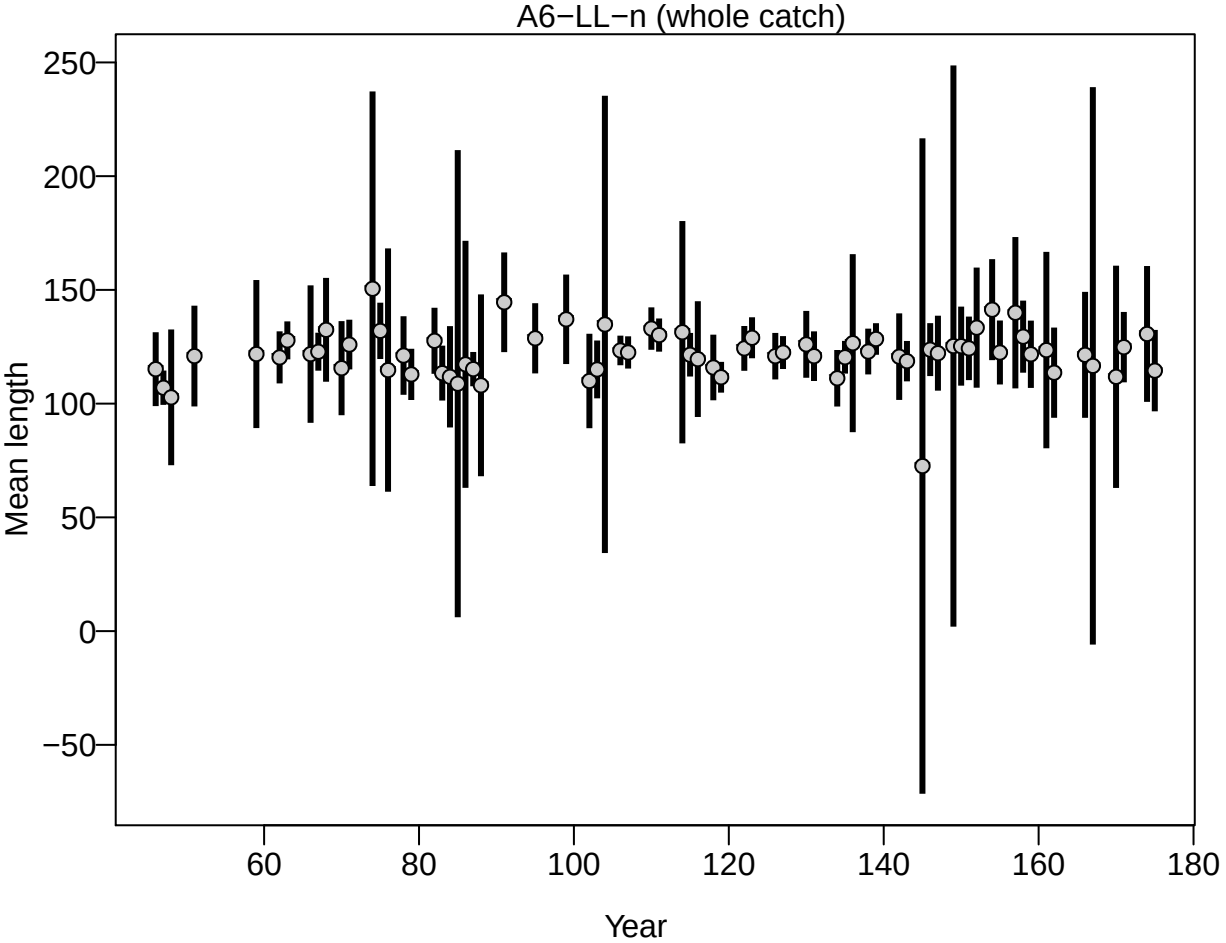

79
N adj.=11.5
85
N adj.=0.1
91
N adj.=3
103
N adj.=7.7
82
N adj.=7.1
86
N adj.=0.5
95
N adj.=6.1
104
N adj.=0.1
83
N adj.=10.4
87
N adj.=25.9
99
N adj.=3.9
106
N adj.=27.8
84
N adj.=3
88
N adj.=0.9
102
N adj.=3.4
107
N adj.=26.5
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

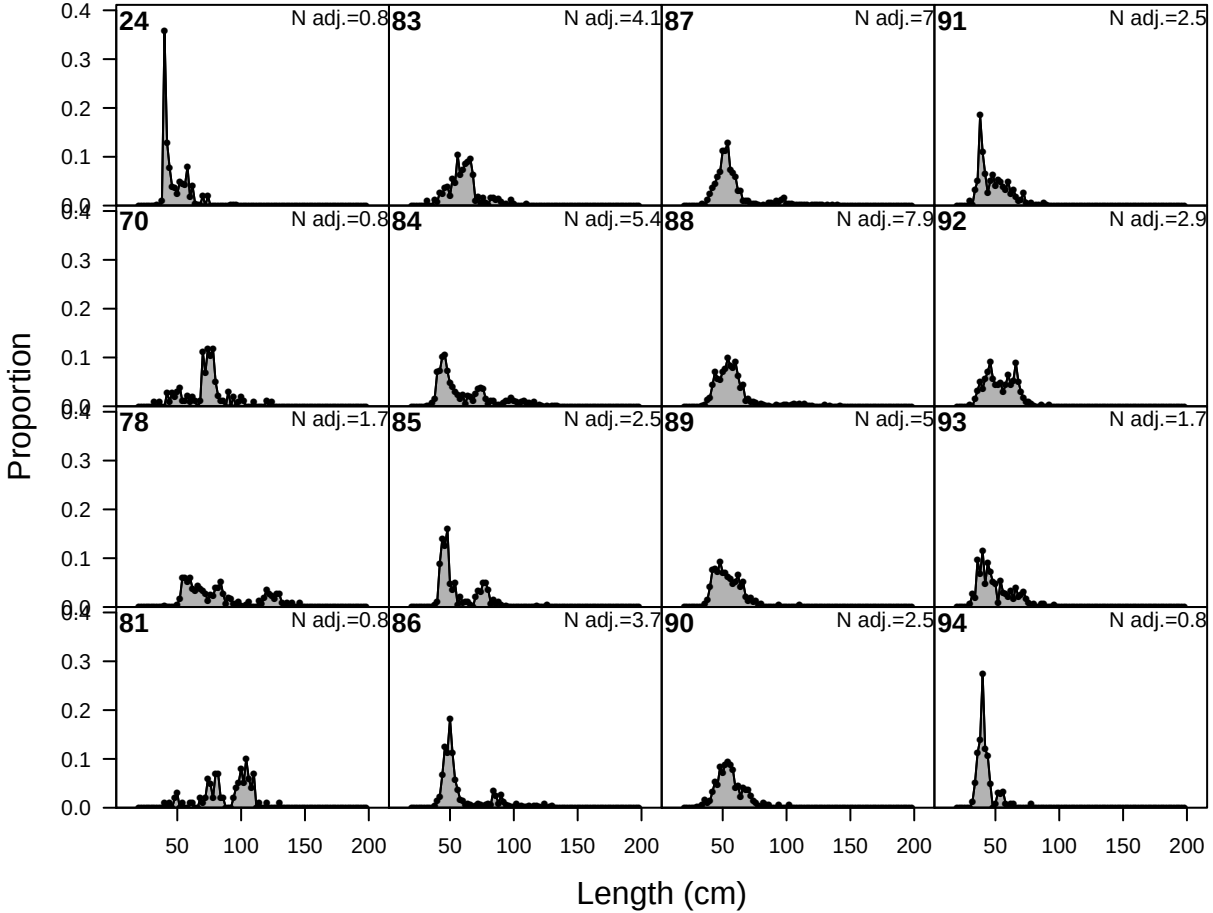

110
N adj.=16.2
116
N adj.=2.9
123
N adj.=15.6
131
N adj.=14.1
111
N adj.=27.6
118
N adj.=7.3
126
N adj.=14.5
134
N adj.=8.7
114
N adj.=0.8
119
N adj.=28.9
127
N adj.=26.1
135
N adj.=26.1
115
N adj.=21.3
122
N adj.=11.1
130
N adj.=7.7
136
N adj.=0.9
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

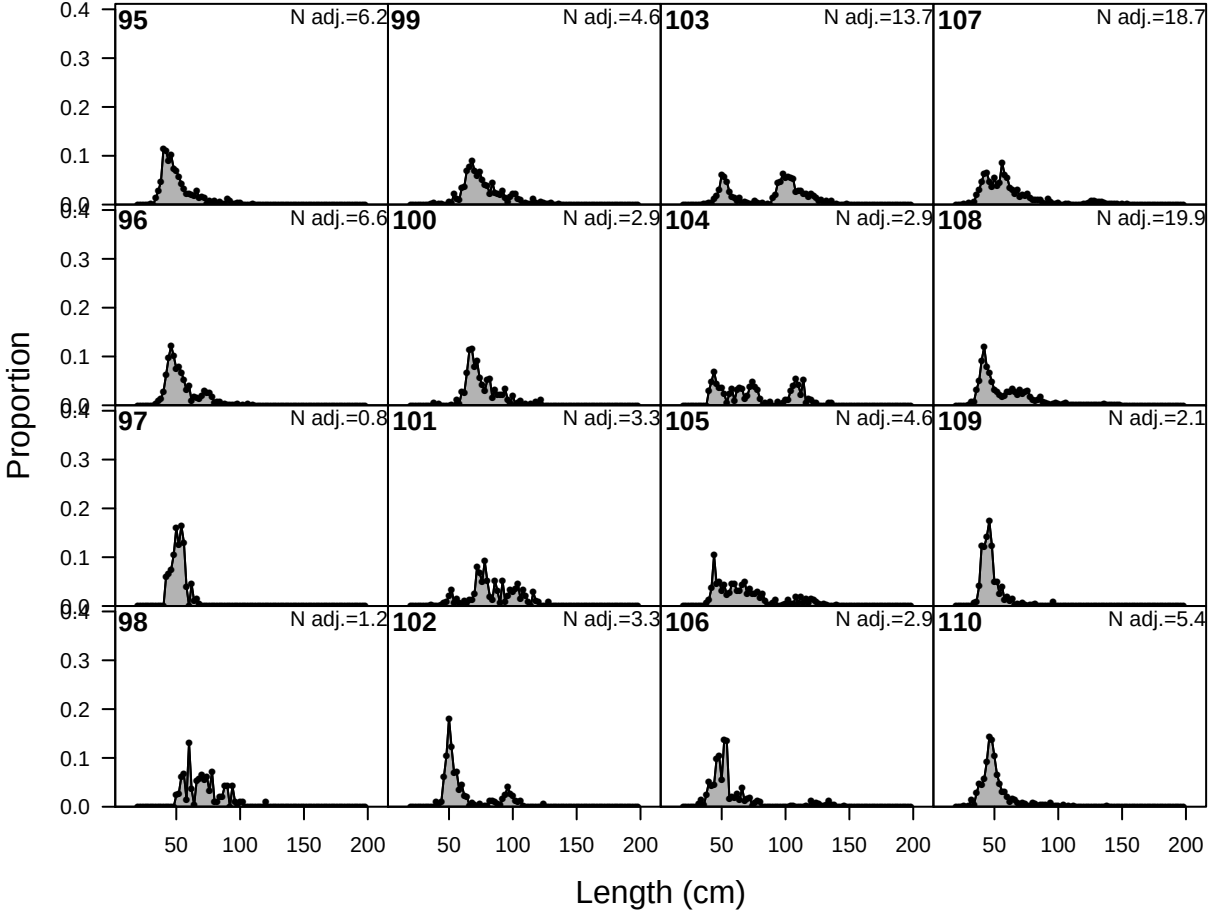

138
N adj.=12.4
145
N adj.=0.1
150
N adj.=5.6
155
N adj.=7.7
139
N adj.=25.9
146
N adj.=11
151
N adj.=8.2
157
N adj.=1.5
142
N adj.=4.5
147
N adj.=5.4
152
N adj.=2.1
158
N adj.=6.1
143
N adj.=22.1
149
N adj.=0.1
154
N adj.=2.9
159
N adj.=6.5
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

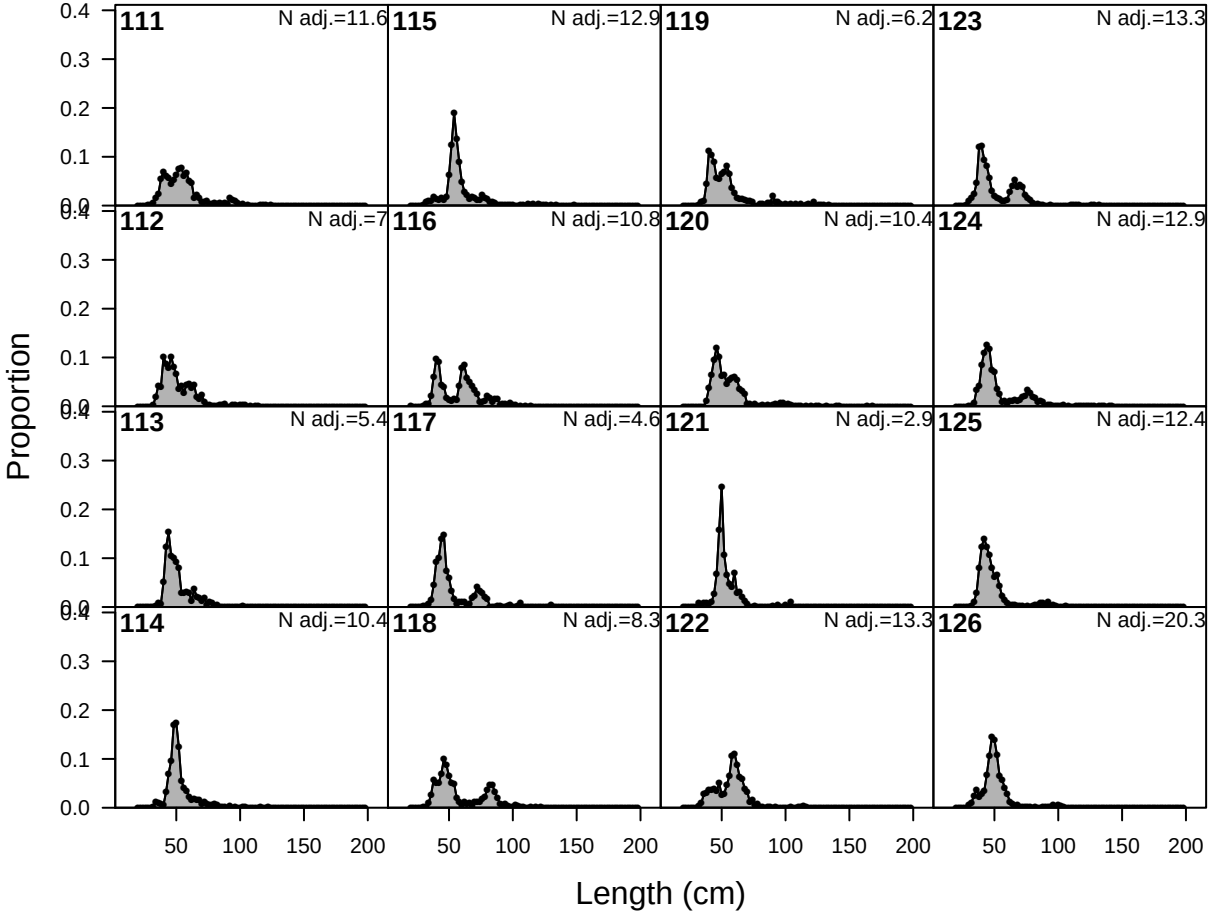

161
N adj.=0.7
170
N adj.=0.6
162
N adj.=3.4
171
N adj.=6.1
166
N adj.=1.8
174
N adj.=1.7
167
N adj.=0.1
175
N adj.=4.7
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

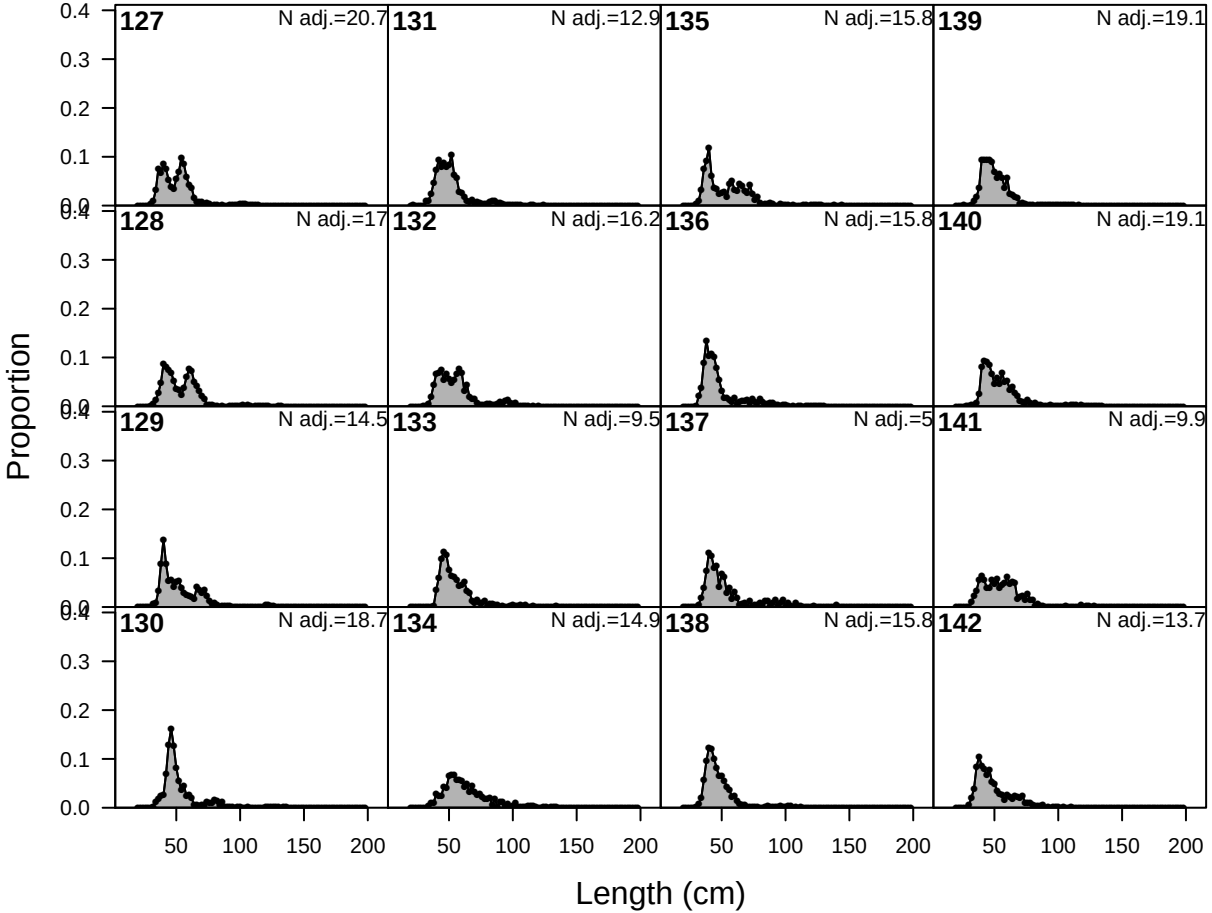

0.01
0.5
1
200
150
100
50
Length (cm)
46
59
68
78
87
99
110
122
134
145
157
170
Year

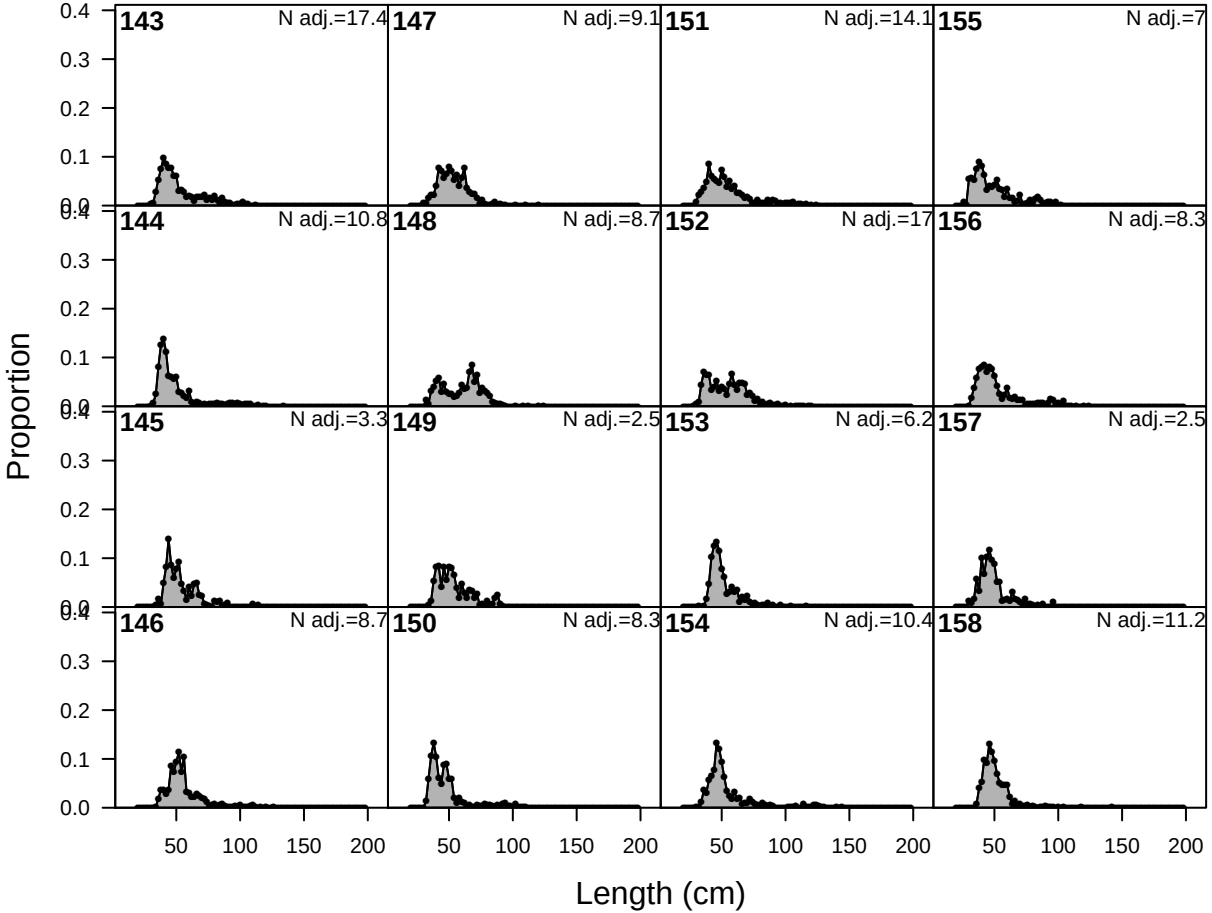

A6−LL−n (whole catch)
Mean length
Year
250
200
150
100
50
0
−50
60
80
100
120
140
160
180

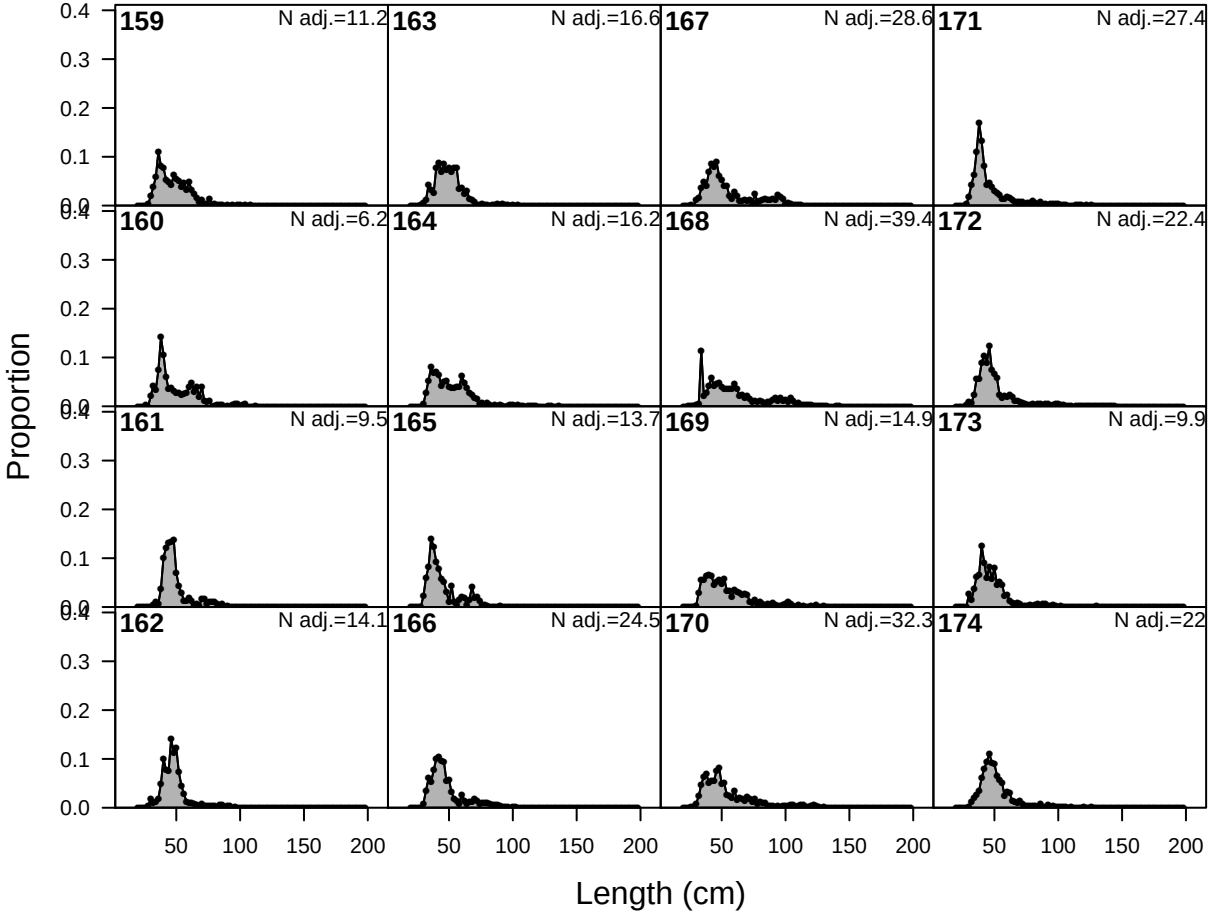

24
N adj.=0.8
83
N adj.=4.1
87
N adj.=7
91
N adj.=2.5
70
N adj.=0.8
84
N adj.=5.4
88
N adj.=7.9
92
N adj.=2.9
78
N adj.=1.7
85
N adj.=2.5
89
N adj.=5
93
N adj.=1.7
81
N adj.=0.8
86
N adj.=3.7
90
N adj.=2.5
94
N adj.=0.8
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

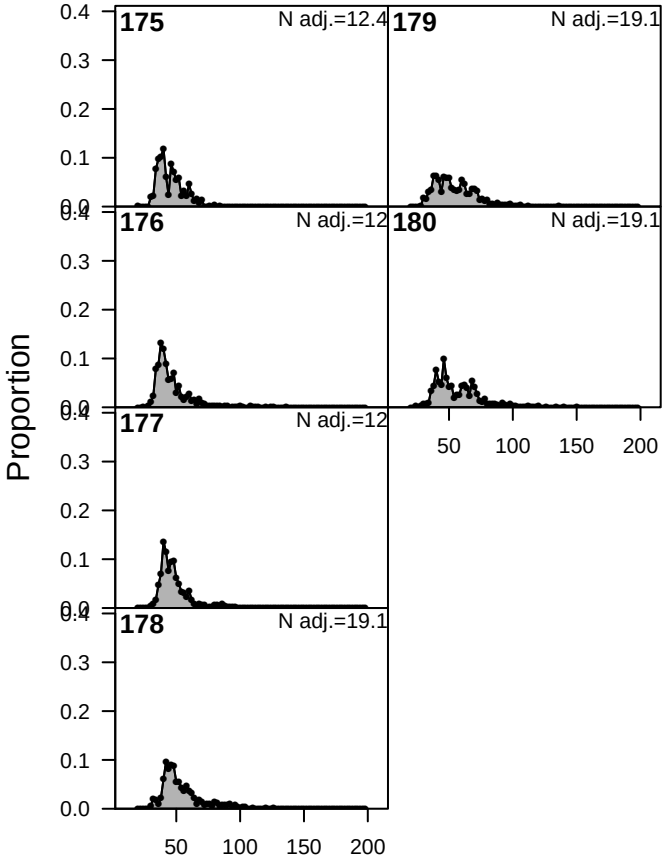

95
N adj.=6.2
99
N adj.=4.6
103
N adj.=13.7
107
N adj.=18.7
96
N adj.=6.6
100
N adj.=2.9
104
N adj.=2.9
108
N adj.=19.9
97
N adj.=0.8
101
N adj.=3.3
105
N adj.=4.6
109
N adj.=2.1
98
N adj.=1.2
102
N adj.=3.3
106
N adj.=2.9
110
N adj.=5.4
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

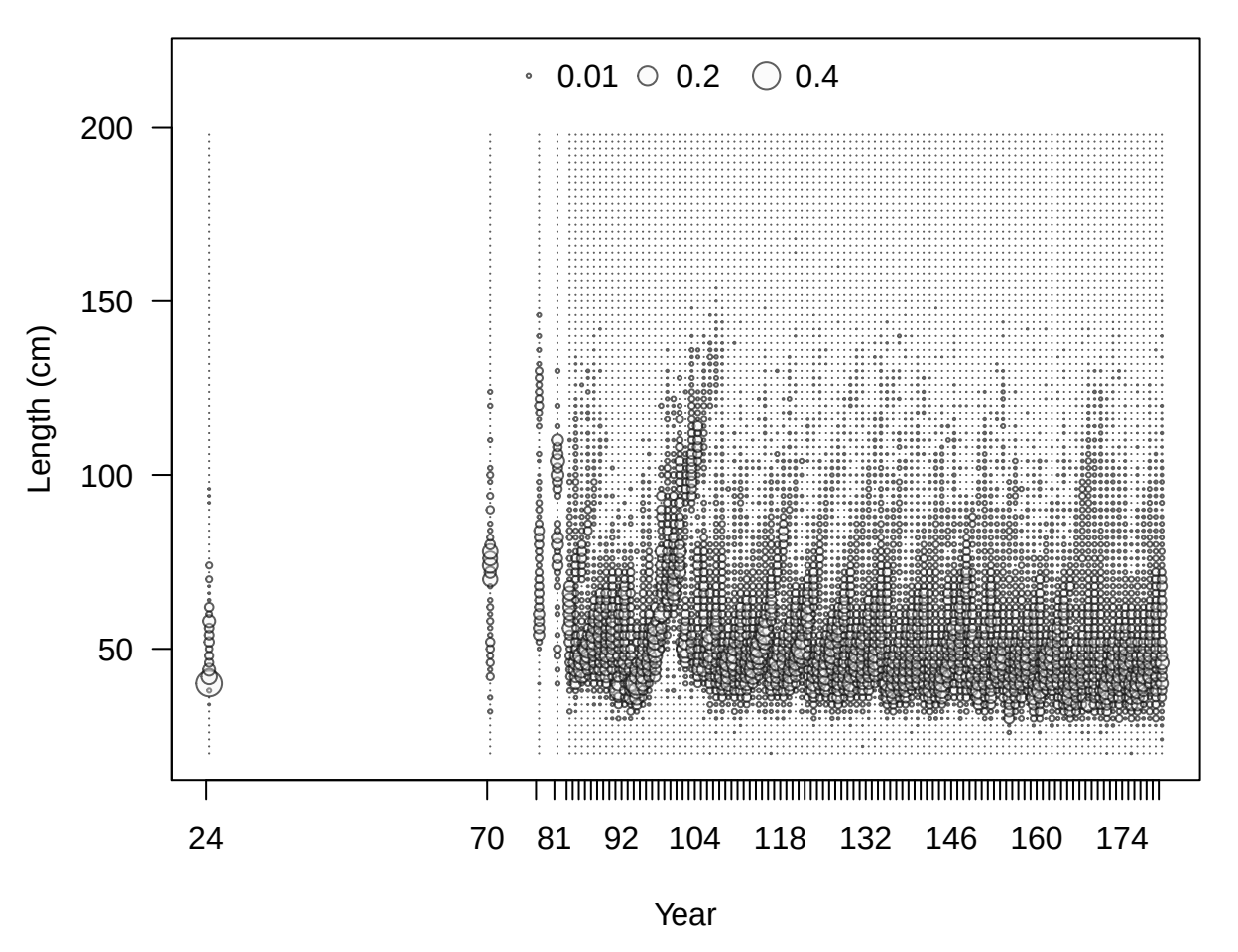

111
N adj.=11.6
115
N adj.=12.9
119
N adj.=6.2
123
N adj.=13.3
112
N adj.=7
116
N adj.=10.8
120
N adj.=10.4
124
N adj.=12.9
113
N adj.=5.4
117
N adj.=4.6
121
N adj.=2.9
125
N adj.=12.4
114
N adj.=10.4
118
N adj.=8.3
122
N adj.=13.3
126
N adj.=20.3
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

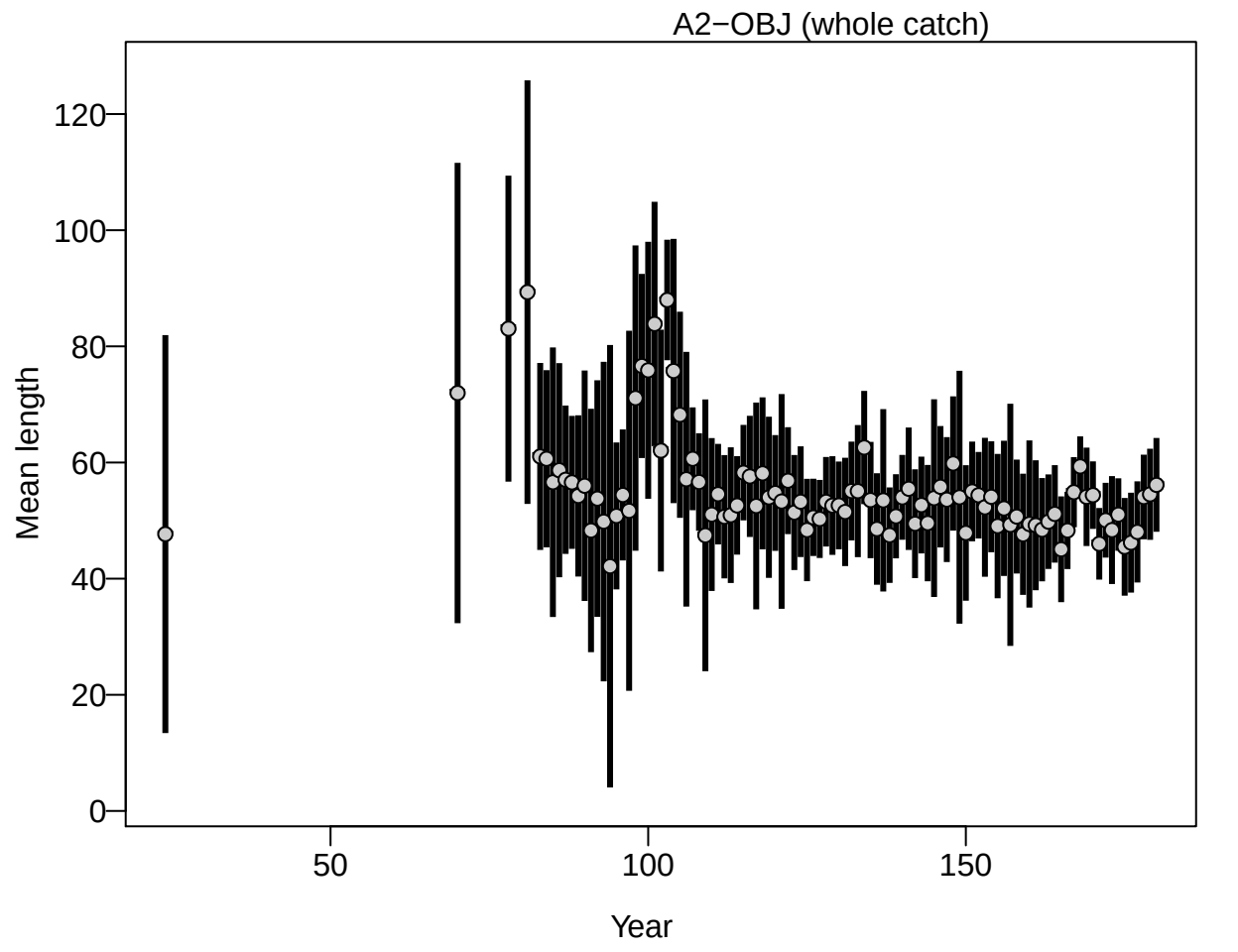

127
N adj.=20.7
131
N adj.=12.9
135
N adj.=15.8
139
N adj.=19.1
128
N adj.=17
132
N adj.=16.2
136
N adj.=15.8
140
N adj.=19.1
129
N adj.=14.5
133
N adj.=9.5
137
N adj.=5
141
N adj.=9.9
130
N adj.=18.7
134
N adj.=14.9
138
N adj.=15.8
142
N adj.=13.7
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

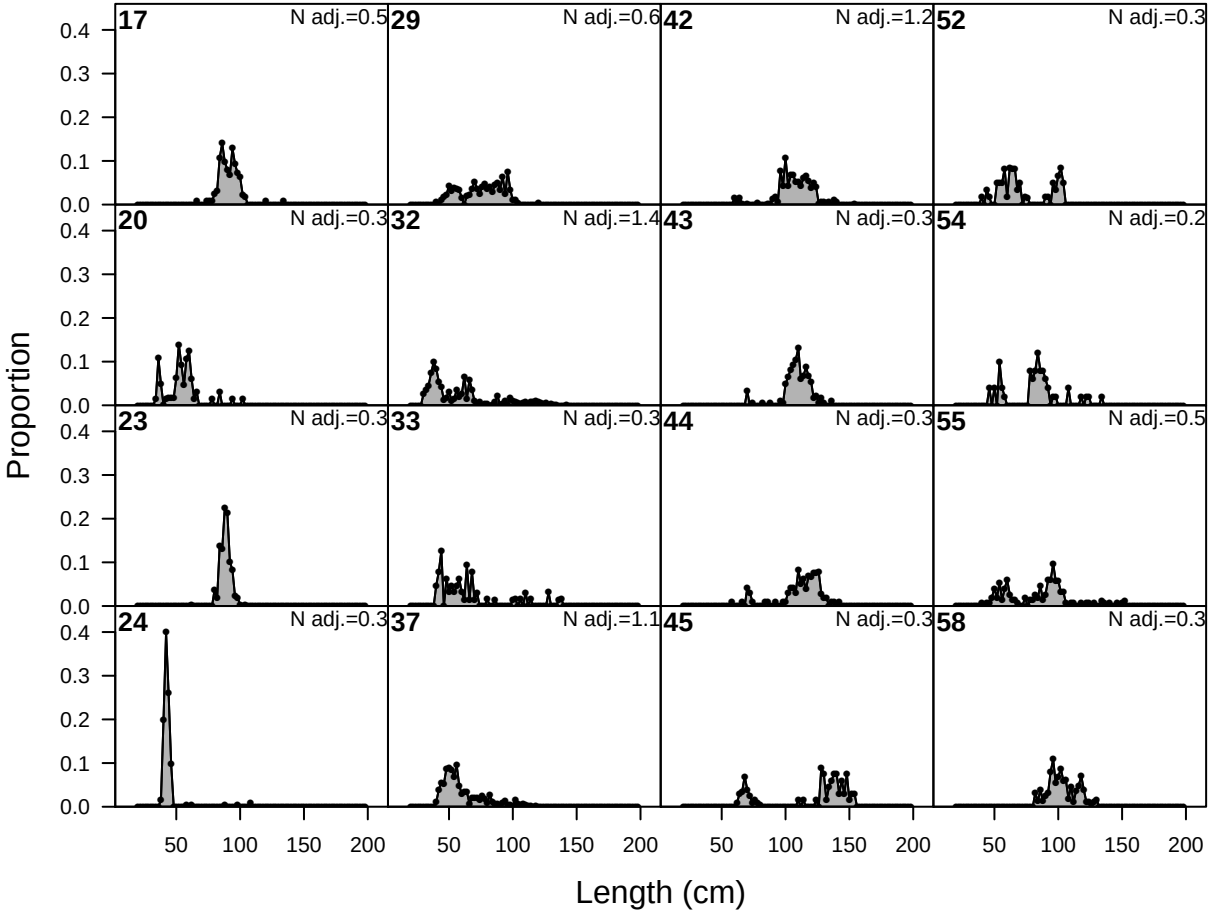

143
N adj.=17.4
147
N adj.=9.1
151
N adj.=14.1
155
N adj.=7
144
N adj.=10.8
148
N adj.=8.7
152
N adj.=17
156
N adj.=8.3
145
N adj.=3.3
149
N adj.=2.5
153
N adj.=6.2
157
N adj.=2.5
146
N adj.=8.7
150
N adj.=8.3
154
N adj.=10.4
158
N adj.=11.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

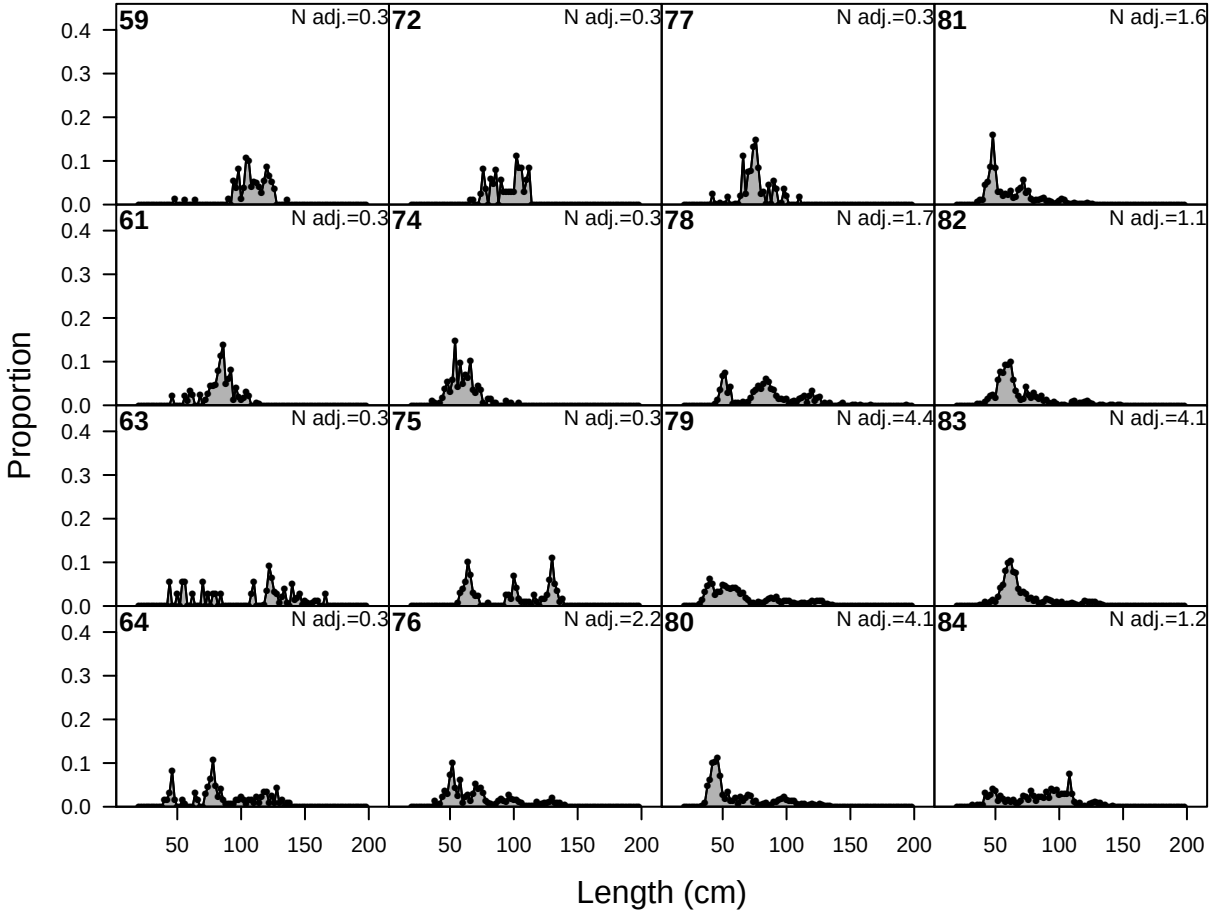

159
N adj.=11.2
163
N adj.=16.6
167
N adj.=28.6
171
N adj.=27.4
160
N adj.=6.2
164
N adj.=16.2
168
N adj.=39.4
172
N adj.=22.4
161
N adj.=9.5
165
N adj.=13.7
169
N adj.=14.9
173
N adj.=9.9
162
N adj.=14.1
166
N adj.=24.5
170
N adj.=32.3
174
N adj.=22
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

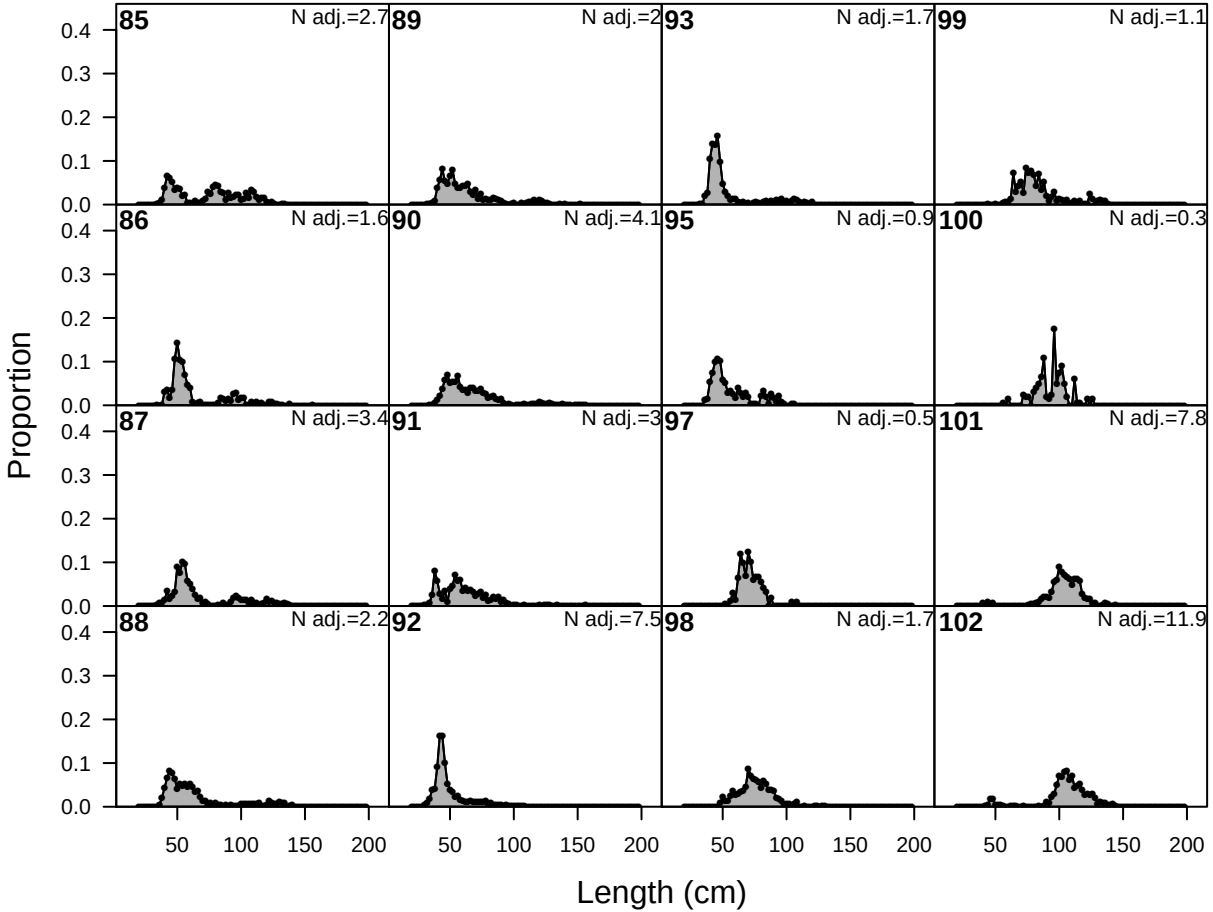

175
N adj.=12.4
179
N adj.=19.1
176
N adj.=12
180
N adj.=19.1
177
N adj.=12
178
N adj.=19.1
Proportion
Length (cm)
0.0
0.1
0.2
0.3
0.4
50
100
150
200

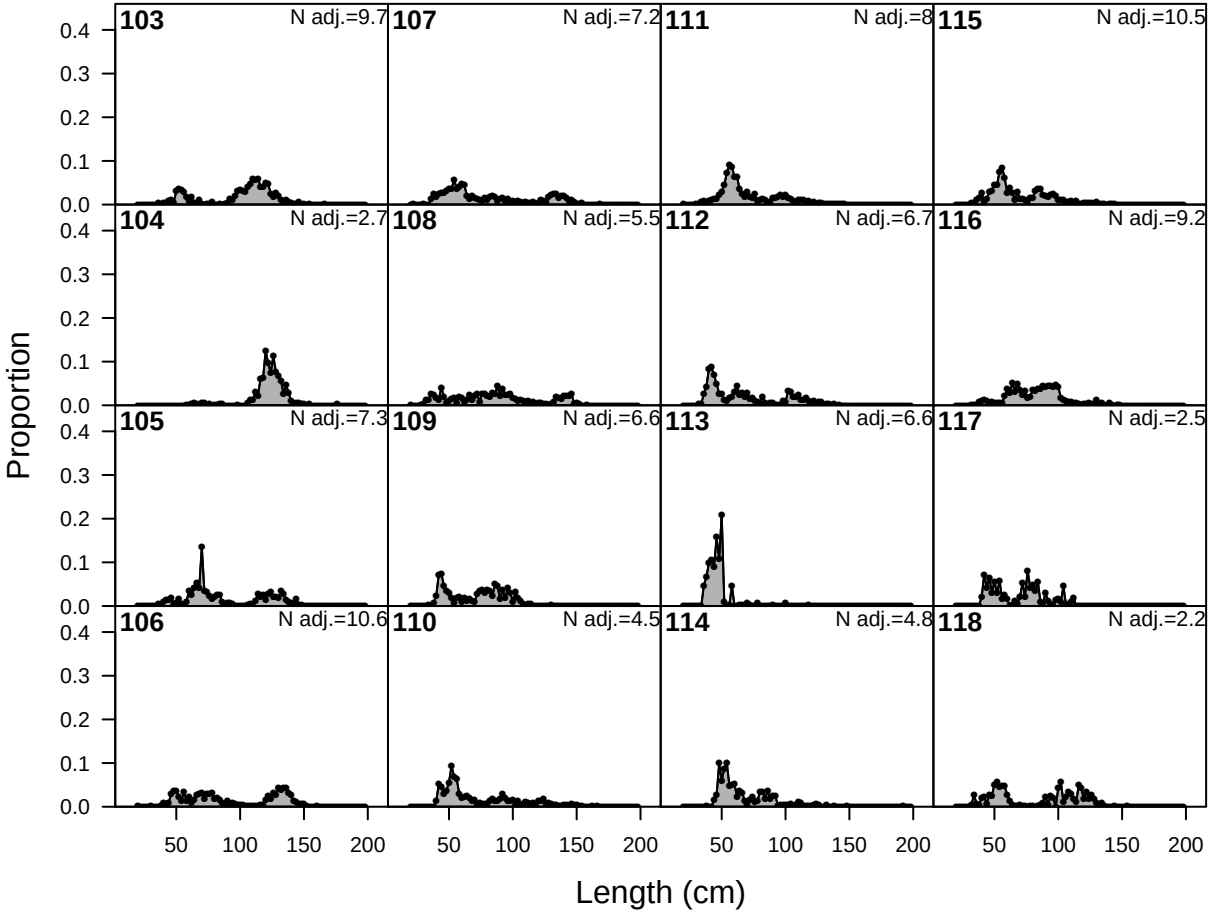

0.01
0.2
0.4
200
150
100
50
Length (cm)
24
70
81
92
104
118
132
146
160
174
Year

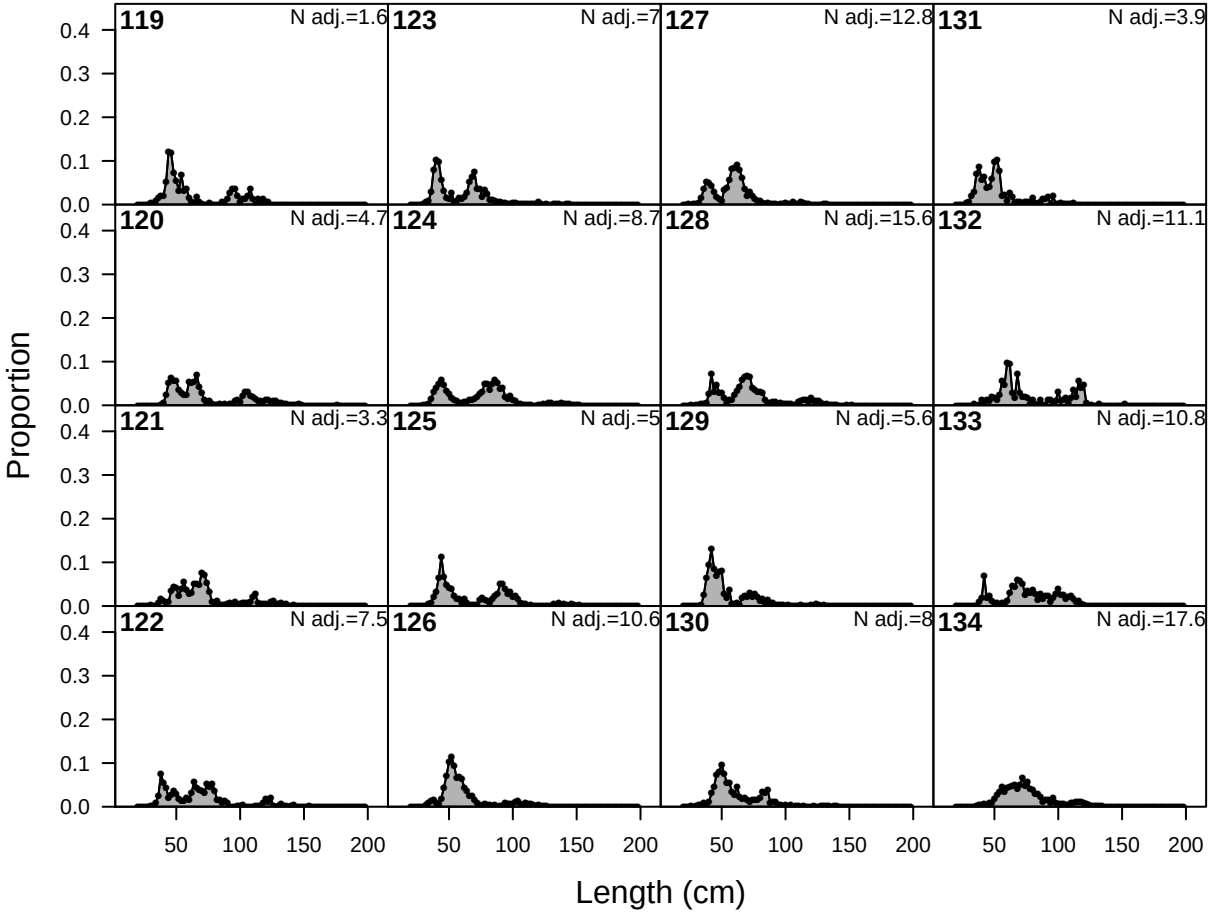

A2−OBJ (whole catch)
Mean length
0
20
40
60
80
100
120
50
100
150
Year

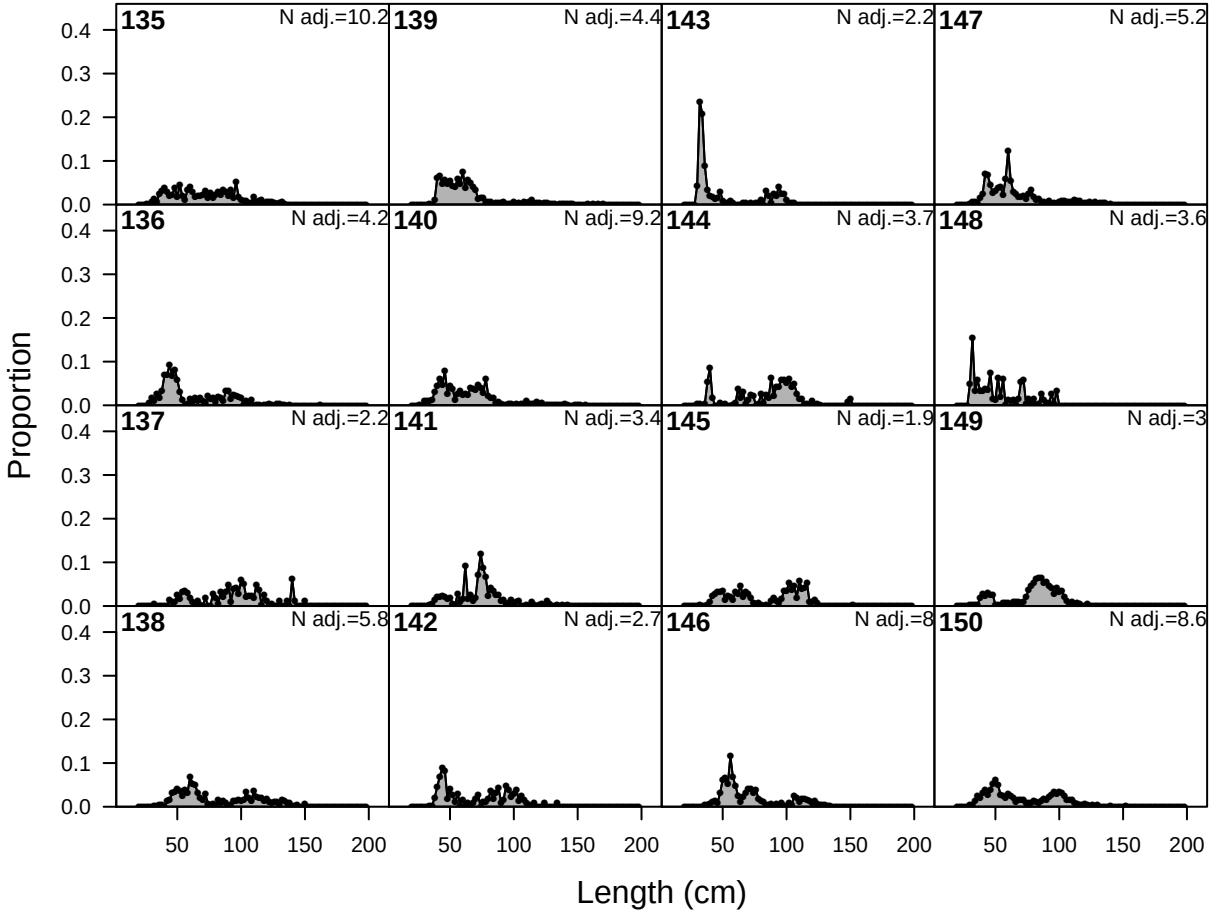

17
N adj.=0.5
29
N adj.=0.6
42
N adj.=1.2
52
N adj.=0.3
20
N adj.=0.3
32
N adj.=1.4
43
N adj.=0.3
54
N adj.=0.2
23
N adj.=0.3
33
N adj.=0.3
44
N adj.=0.3
55
N adj.=0.5
24
N adj.=0.3
37
N adj.=1.1
45
N adj.=0.3
58
N adj.=0.3
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

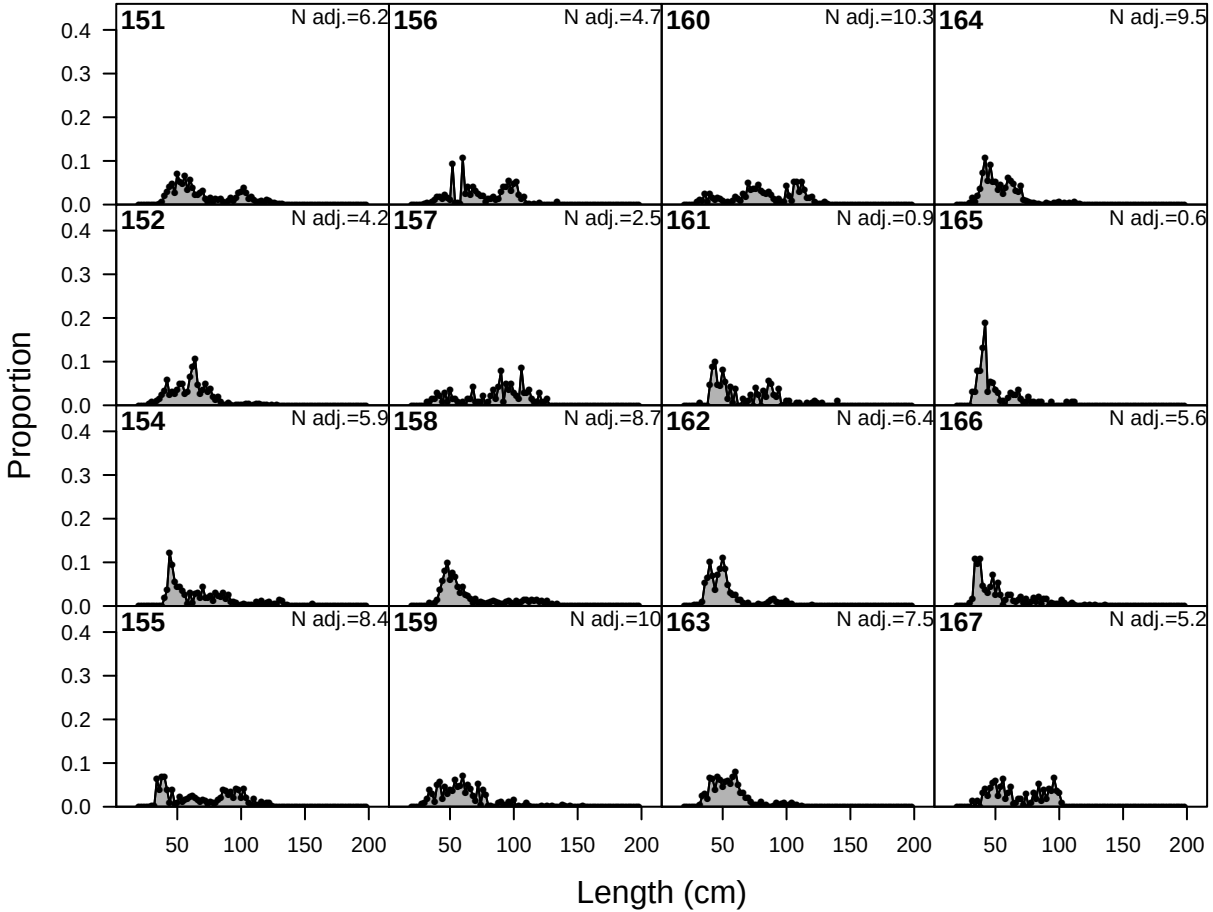

59
N adj.=0.3
72
N adj.=0.3
77
N adj.=0.3
81
N adj.=1.6
61
N adj.=0.3
74
N adj.=0.3
78
N adj.=1.7
82
N adj.=1.1
63
N adj.=0.3
75
N adj.=0.3
79
N adj.=4.4
83
N adj.=4.1
64
N adj.=0.3
76
N adj.=2.2
80
N adj.=4.1
84
N adj.=1.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

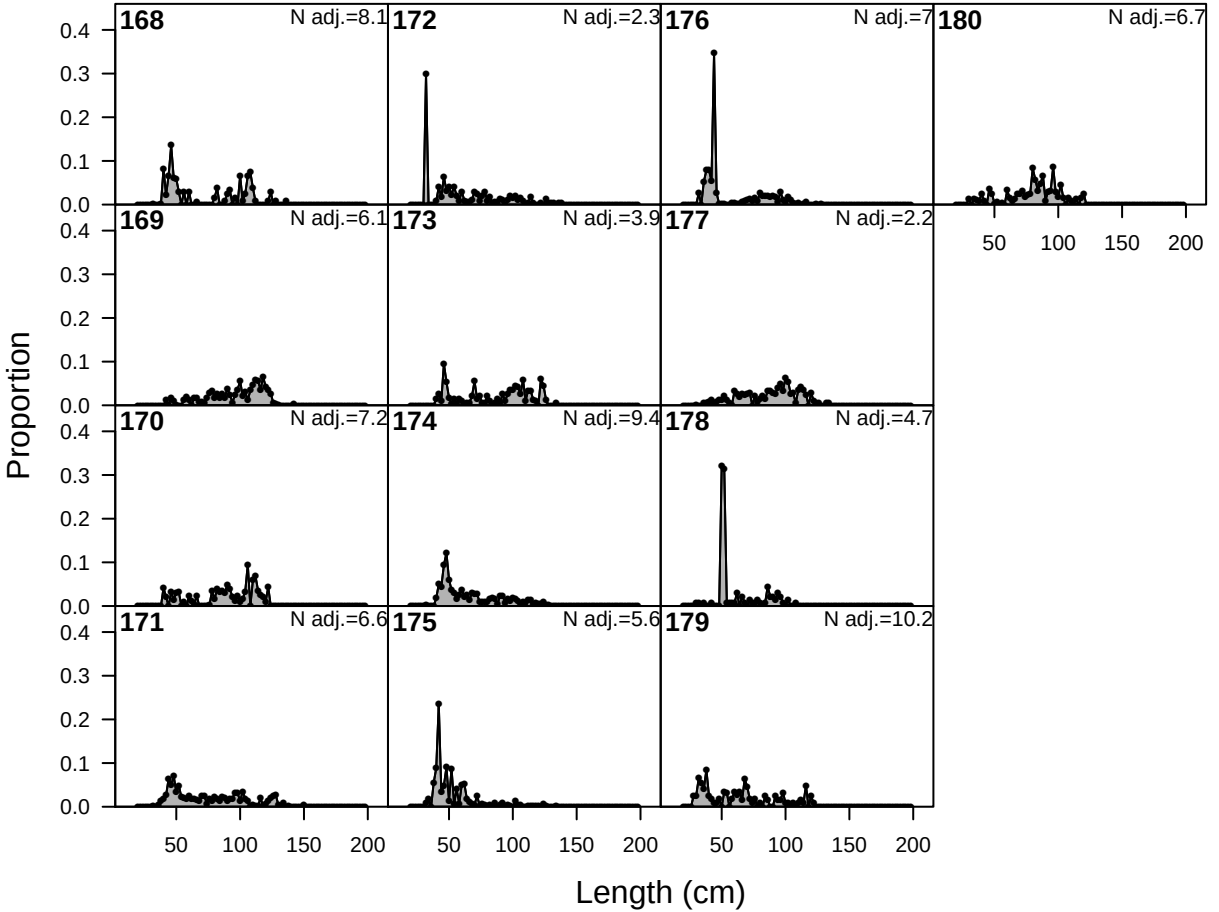

85
N adj.=2.7
89
N adj.=2
93
N adj.=1.7
99
N adj.=1.1
86
N adj.=1.6
90
N adj.=4.1
95
N adj.=0.9
100
N adj.=0.3
87
N adj.=3.4
91
N adj.=3
97
N adj.=0.5
101
N adj.=7.8
88
N adj.=2.2
92
N adj.=7.5
98
N adj.=1.7
102
N adj.=11.9
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

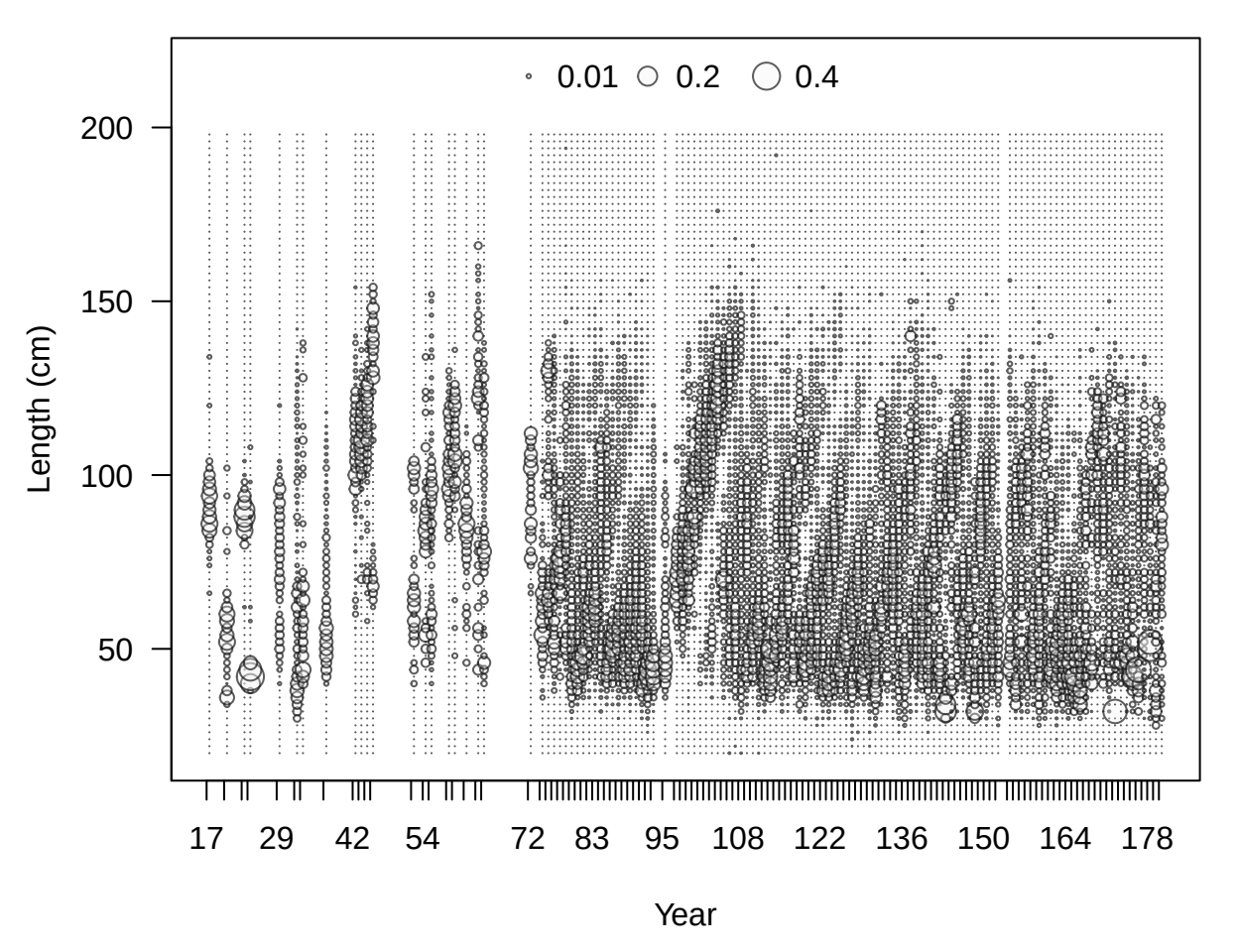

103
N adj.=9.7
107
N adj.=7.2
111
N adj.=8
115
N adj.=10.5
104
N adj.=2.7
108
N adj.=5.5
112
N adj.=6.7
116
N adj.=9.2
105
N adj.=7.3
109
N adj.=6.6
113
N adj.=6.6
117
N adj.=2.5
106
N adj.=10.6
110
N adj.=4.5
114
N adj.=4.8
118
N adj.=2.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

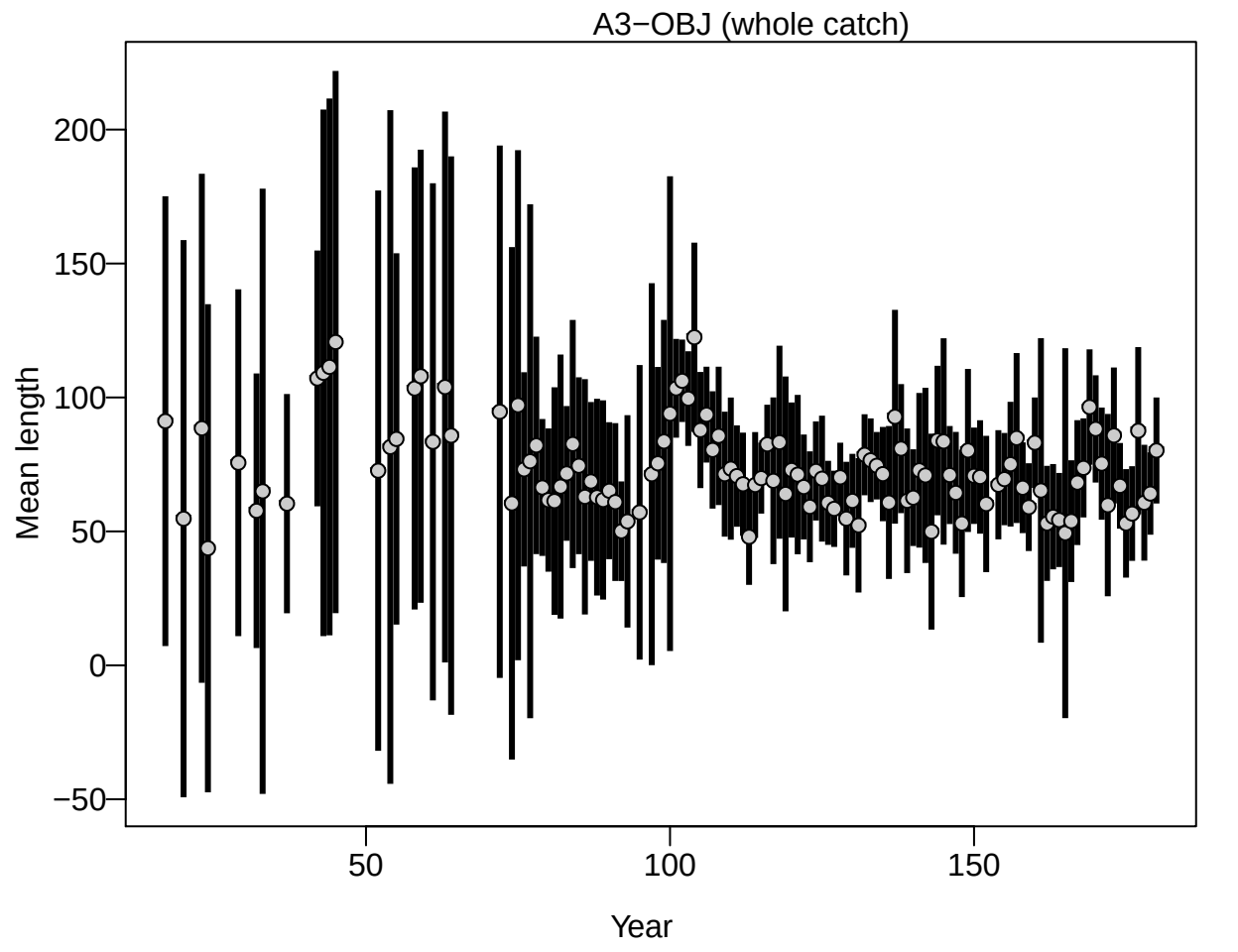

119
N adj.=1.6
123
N adj.=7
127
N adj.=12.8
131
N adj.=3.9
120
N adj.=4.7
124
N adj.=8.7
128
N adj.=15.6
132
N adj.=11.1
121
N adj.=3.3
125
N adj.=5
129
N adj.=5.6
133
N adj.=10.8
122
N adj.=7.5
126
N adj.=10.6
130
N adj.=8
134
N adj.=17.6
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

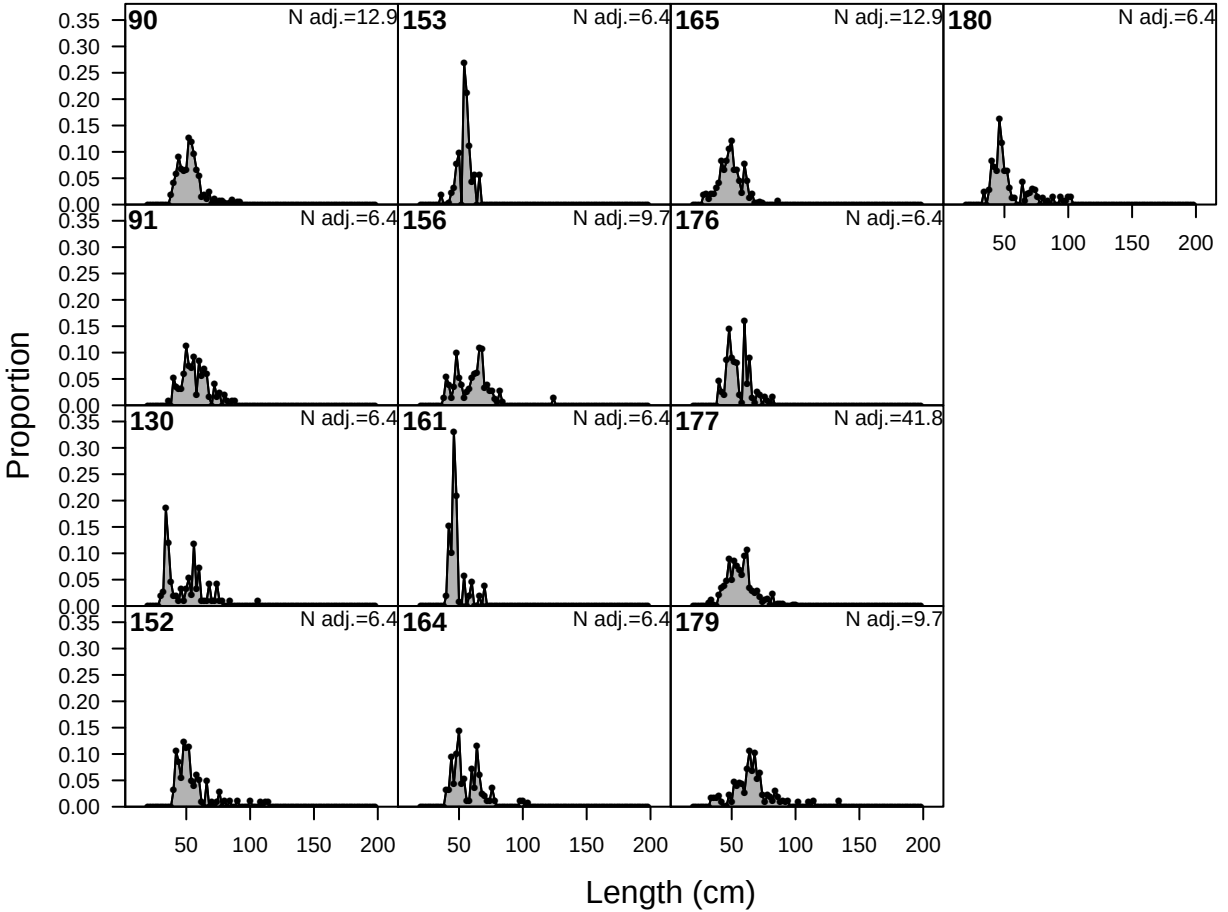

135
N adj.=10.2
139
N adj.=4.4
143
N adj.=2.2
147
N adj.=5.2
136
N adj.=4.2
140
N adj.=9.2
144
N adj.=3.7
148
N adj.=3.6
137
N adj.=2.2
141
N adj.=3.4
145
N adj.=1.9
149
N adj.=3
138
N adj.=5.8
142
N adj.=2.7
146
N adj.=8
150
N adj.=8.6
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

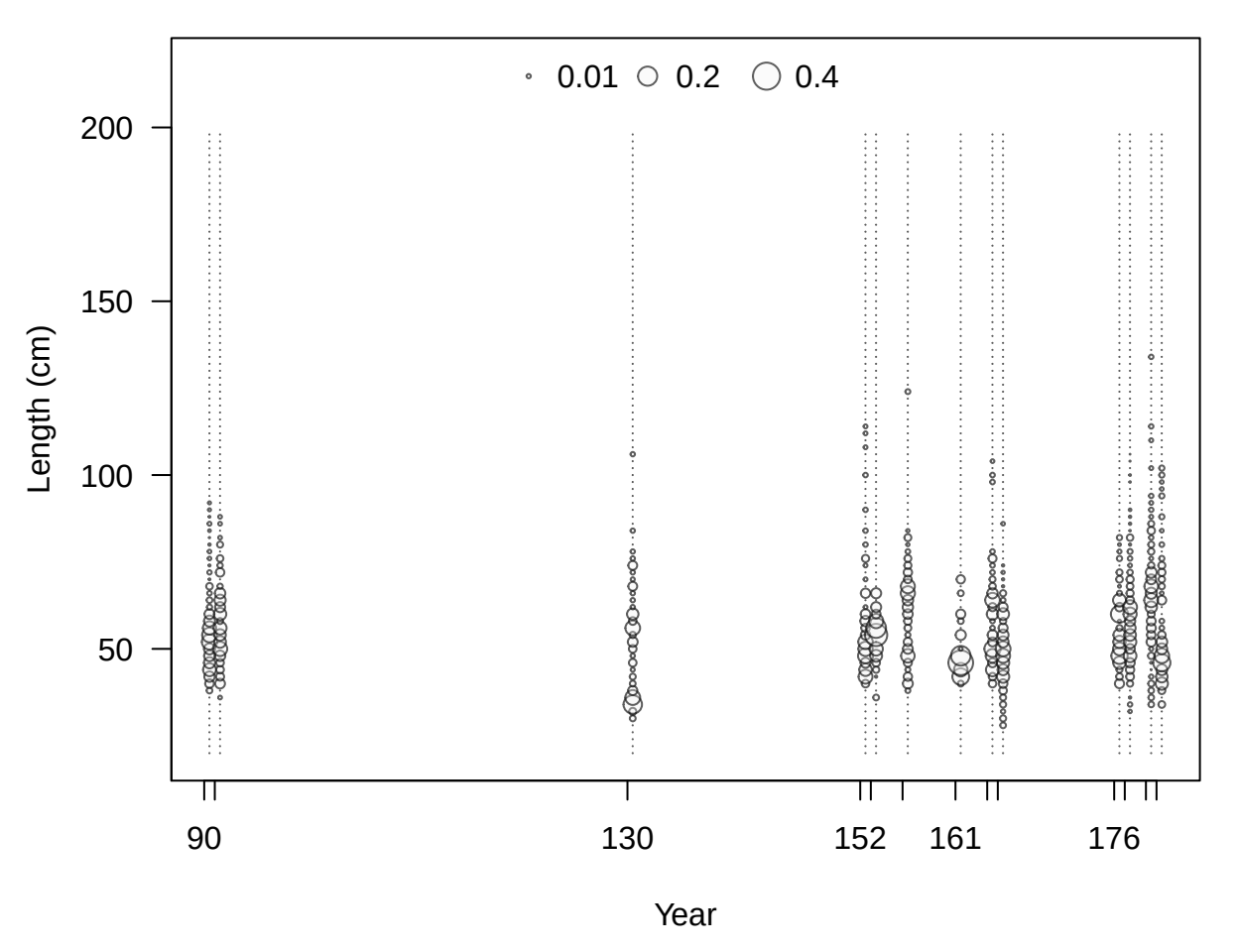

151
N adj.=6.2
156
N adj.=4.7
160
N adj.=10.3
164
N adj.=9.5
152
N adj.=4.2
157
N adj.=2.5
161
N adj.=0.9
165
N adj.=0.6
154
N adj.=5.9
158
N adj.=8.7
162
N adj.=6.4
166
N adj.=5.6
155
N adj.=8.4
159
N adj.=10
163
N adj.=7.5
167
N adj.=5.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

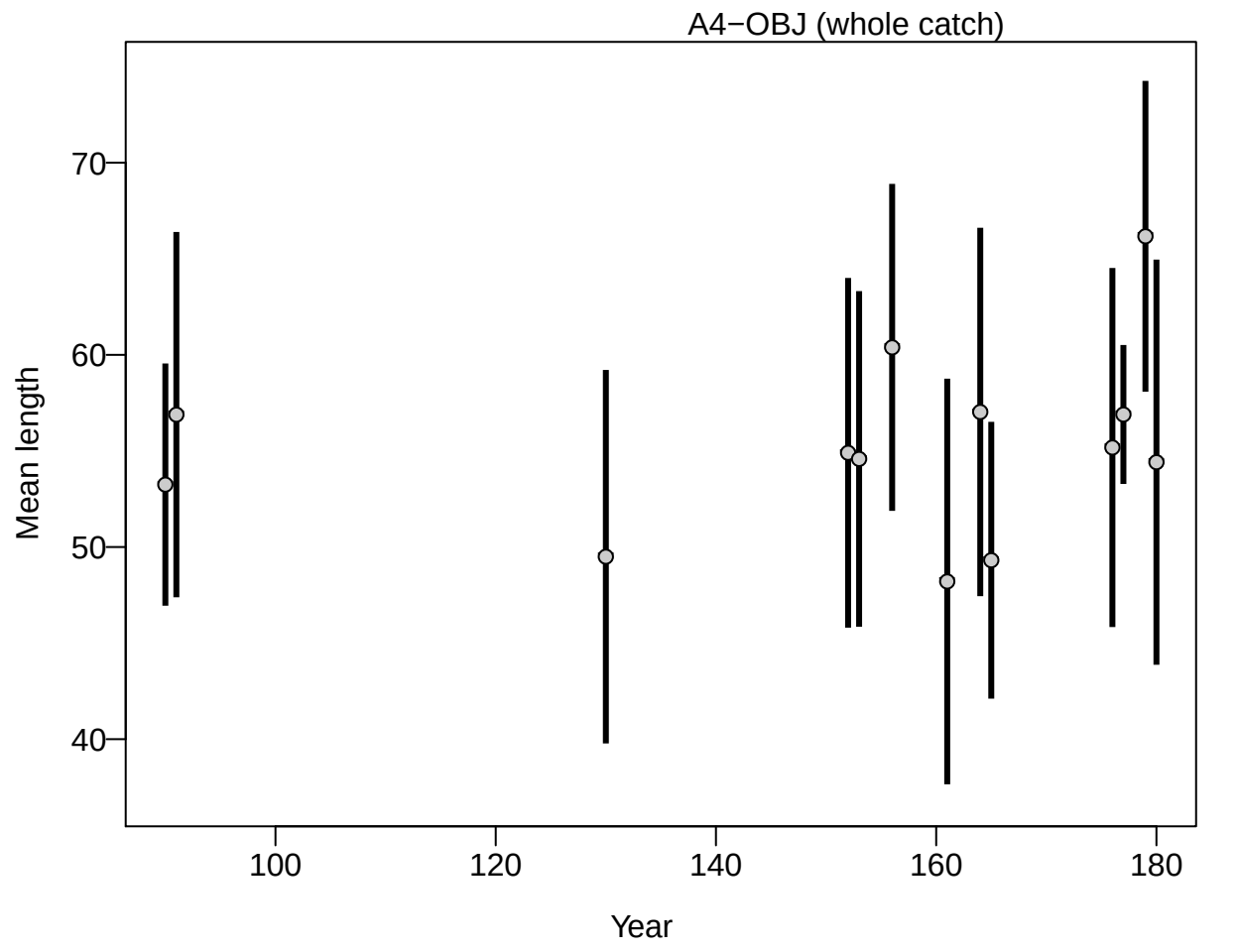

168
N adj.=8.1
172
N adj.=2.3
176
N adj.=7
180
N adj.=6.7
169
N adj.=6.1
173
N adj.=3.9
177
N adj.=2.2
170
N adj.=7.2
174
N adj.=9.4
178
N adj.=4.7
171
N adj.=6.6
175
N adj.=5.6
179
N adj.=10.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

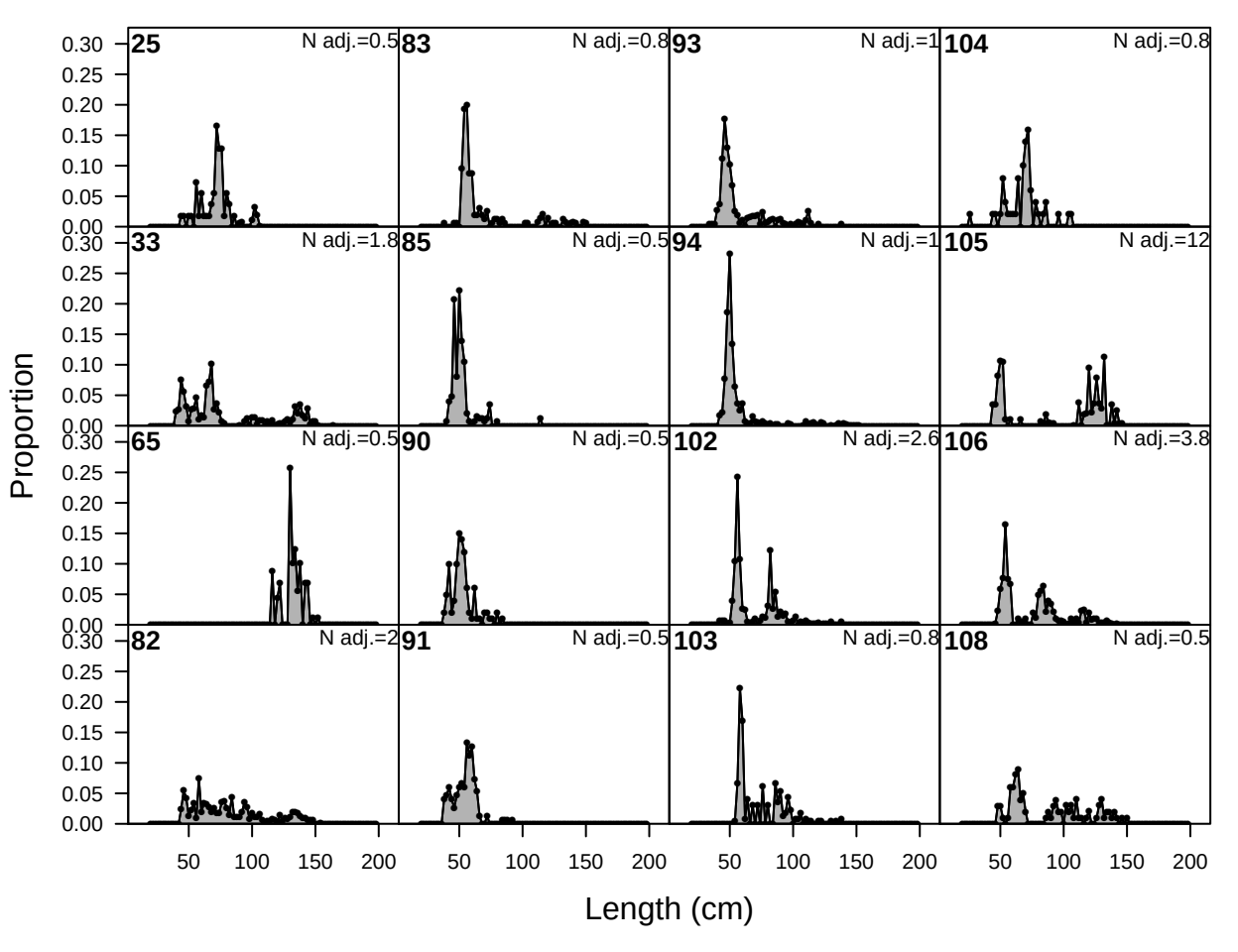

0.01
0.2
0.4
200
150
100
50
Length (cm)
17
29
42
54
72
83
95
108
122
136
150
164
178
Year

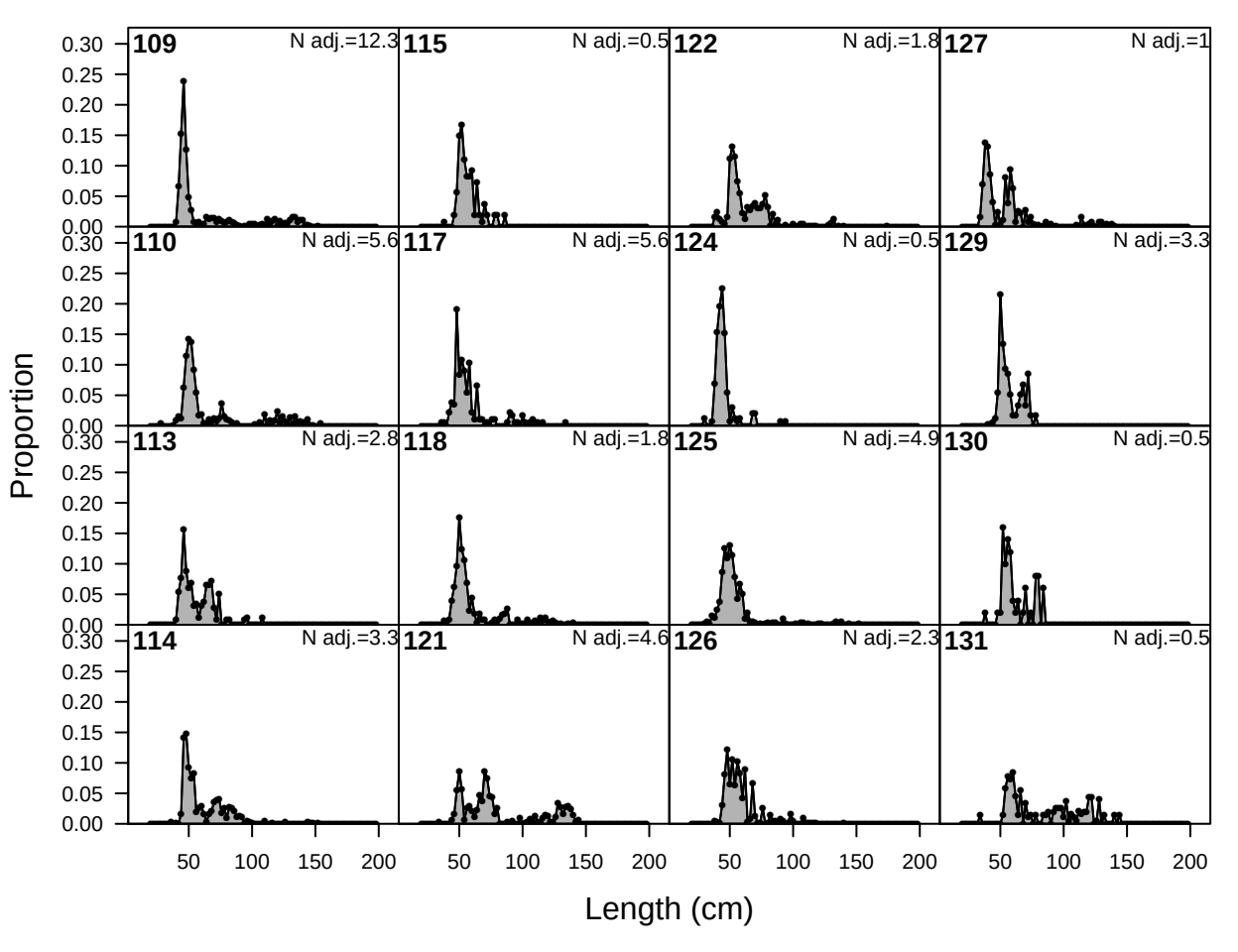

A3−OBJ (whole catch)
Mean length
200
150
100
50
0
−50
50
100
150
Year

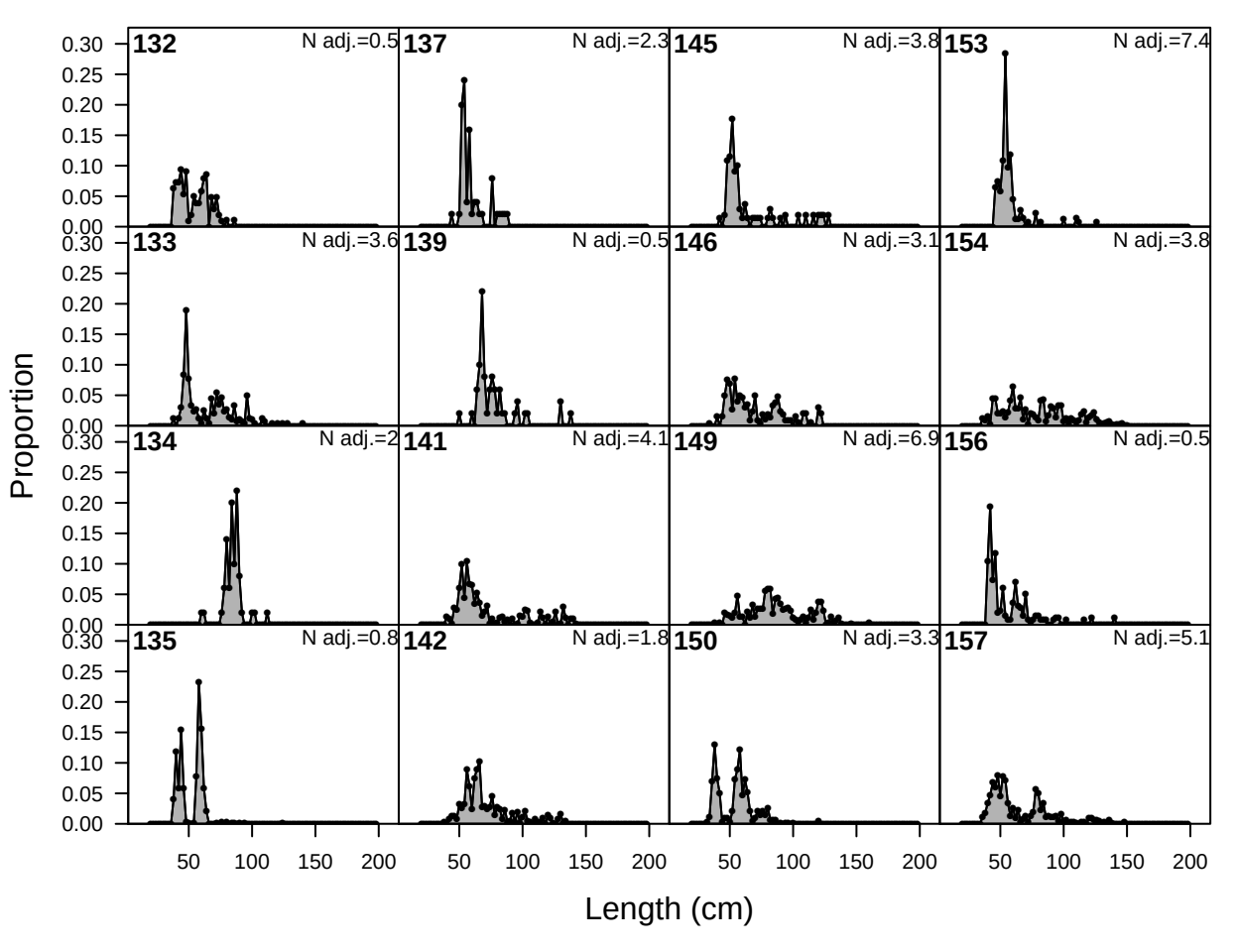

90
N adj.=12.9
153
N adj.=6.4
165
N adj.=12.9
180
N adj.=6.4
91
N adj.=6.4
156
N adj.=9.7
176
N adj.=6.4
130
N adj.=6.4
161
N adj.=6.4
177
N adj.=41.8
152
N adj.=6.4
164
N adj.=6.4
179
N adj.=9.7
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

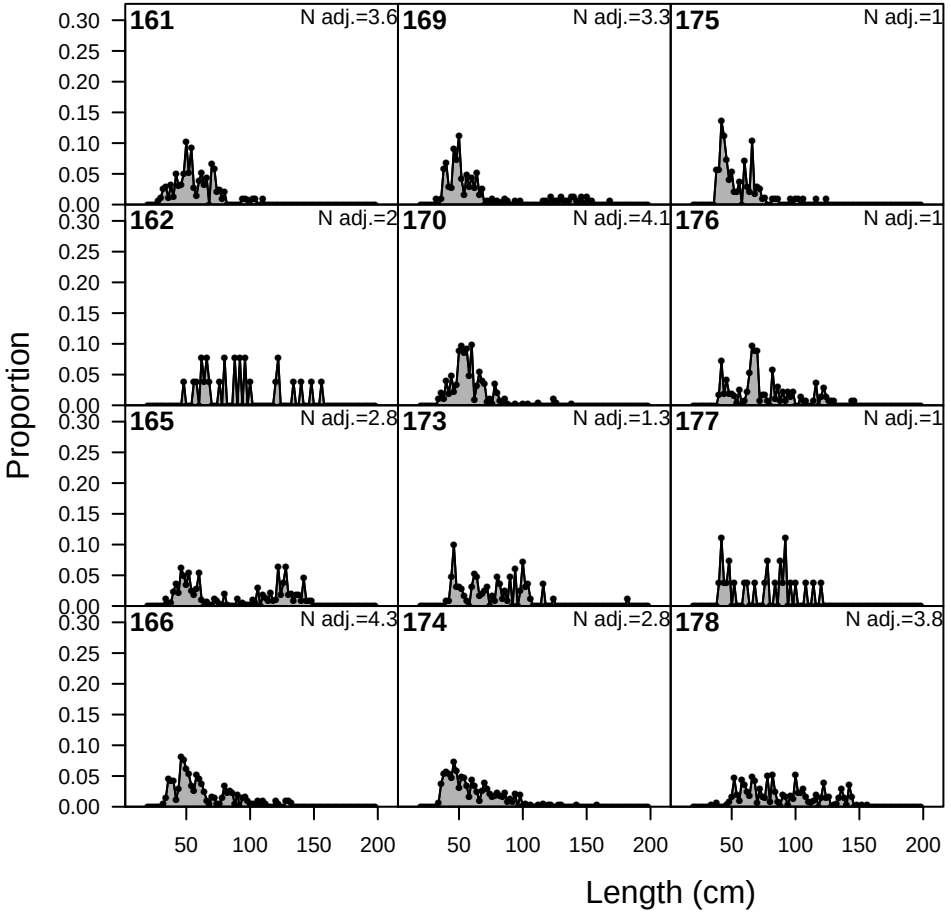

0.01
0.2
0.4
200
150
100
50
Length (cm)
90
130
152
161
176
Year

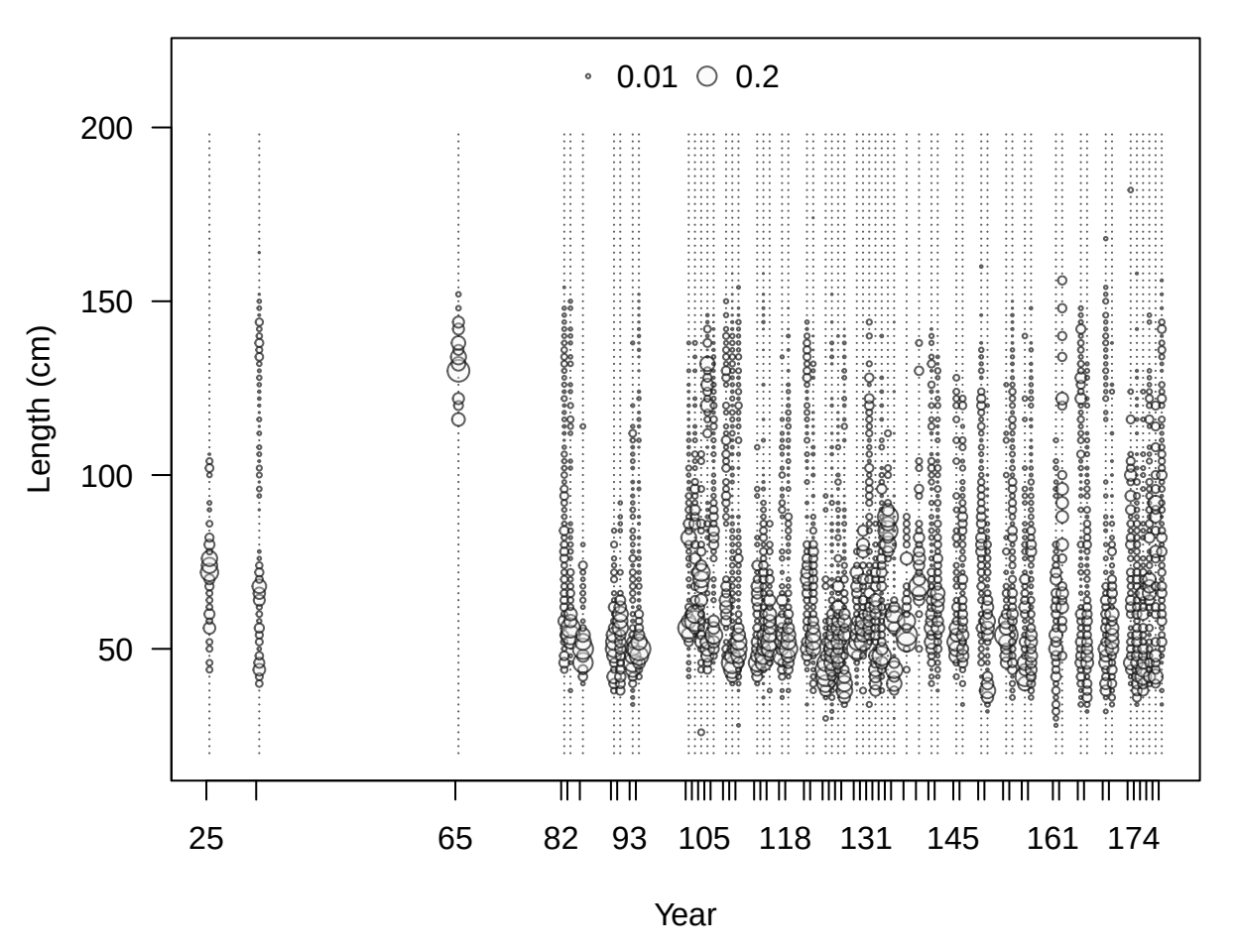

A4−OBJ (whole catch)
Mean length
70
60
50
40
100
120
140
160
180
Year

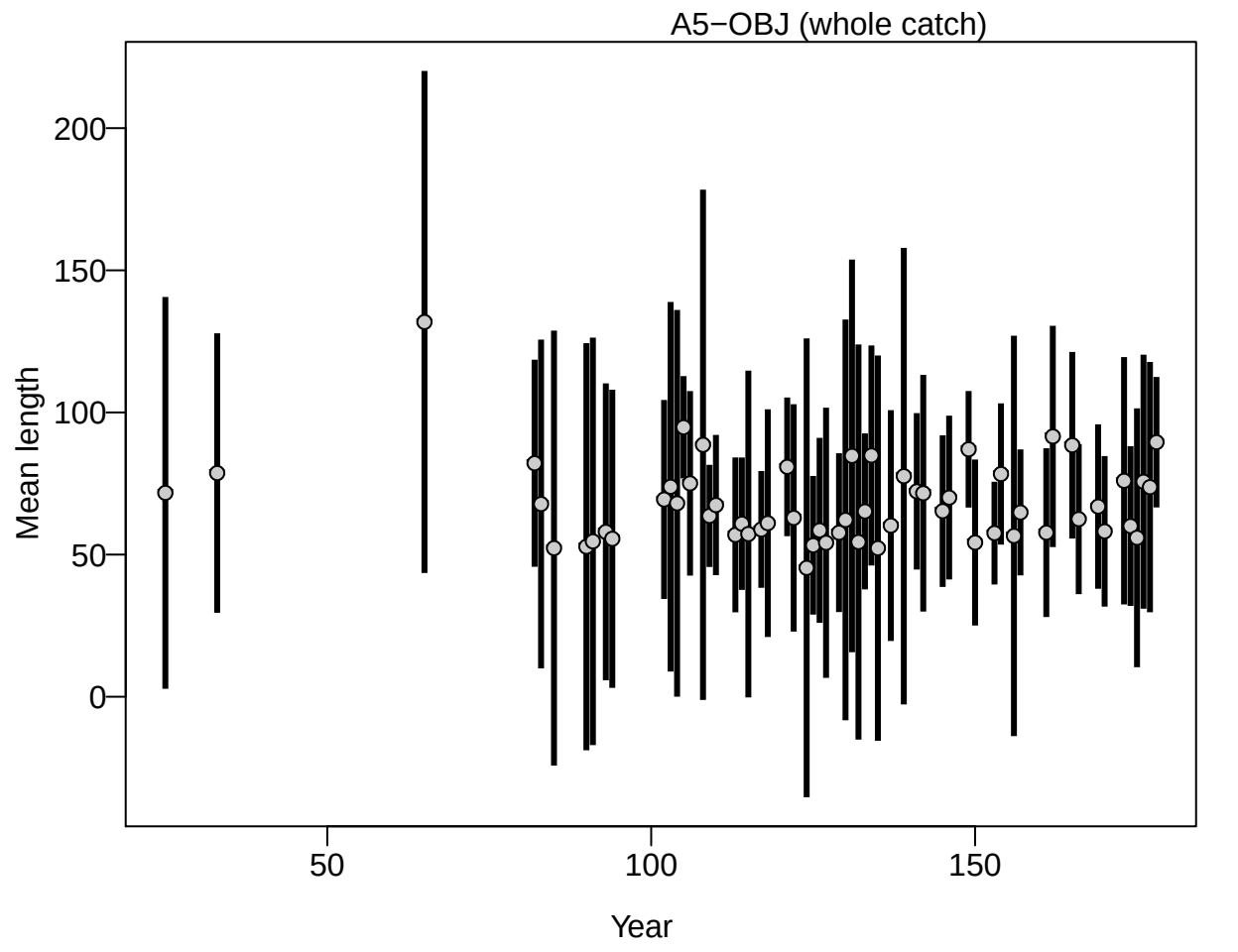

25
N adj.=0.5
83
N adj.=0.8
93
N adj.=1
104
N adj.=0.8
33
N adj.=1.8
85
N adj.=0.5
94
N adj.=1
105
N adj.=12
65
N adj.=0.5
90
N adj.=0.5
102
N adj.=2.6
106
N adj.=3.8
82
N adj.=2
91
N adj.=0.5
103
N adj.=0.8
108
N adj.=0.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)

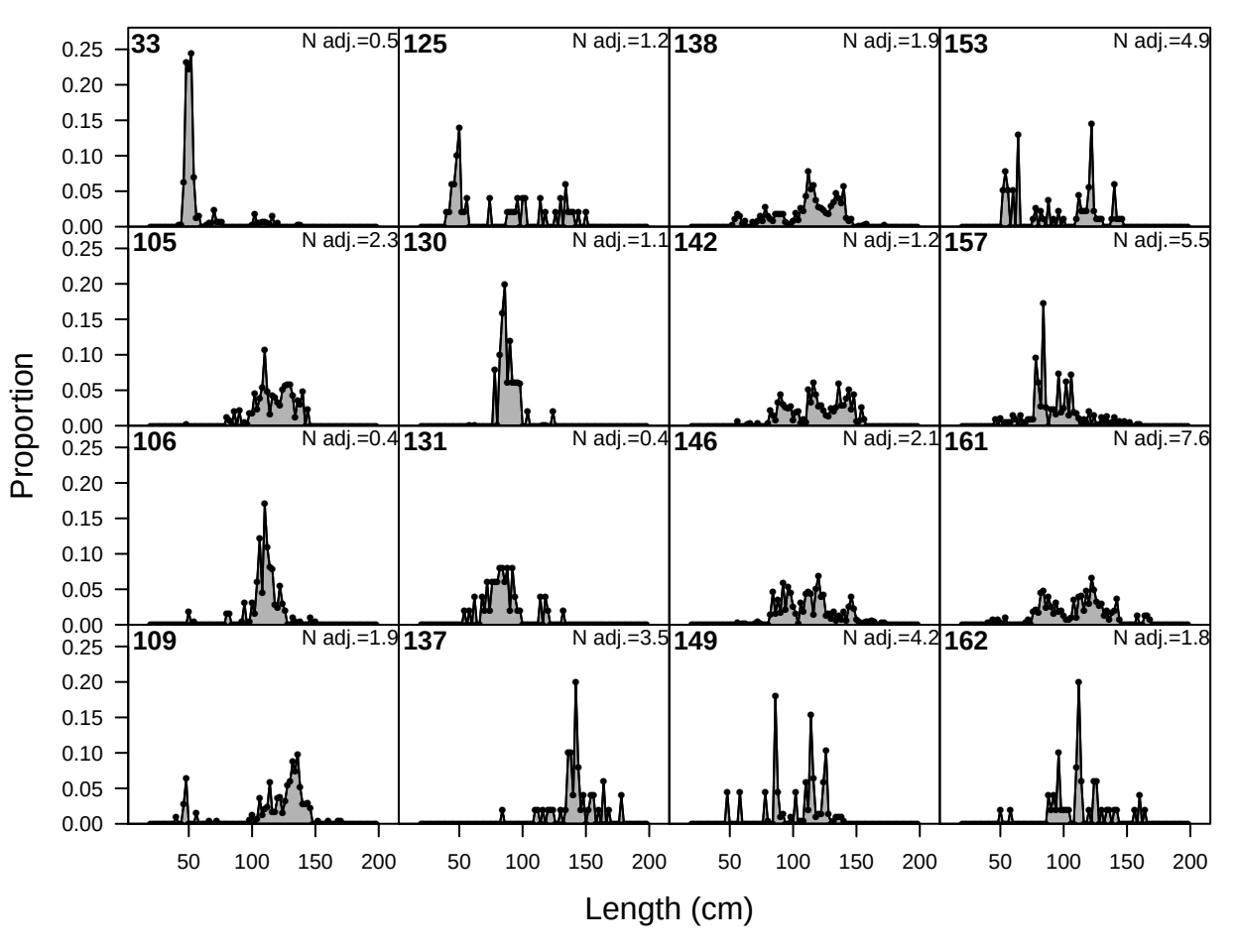

109
N adj.=12.3
115
N adj.=0.5
122
N adj.=1.8
127
N adj.=1
110
N adj.=5.6
117
N adj.=5.6
124
N adj.=0.5
129
N adj.=3.3
113
N adj.=2.8
118
N adj.=1.8
125
N adj.=4.9
130
N adj.=0.5
114
N adj.=3.3
121
N adj.=4.6
126
N adj.=2.3
131
N adj.=0.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)

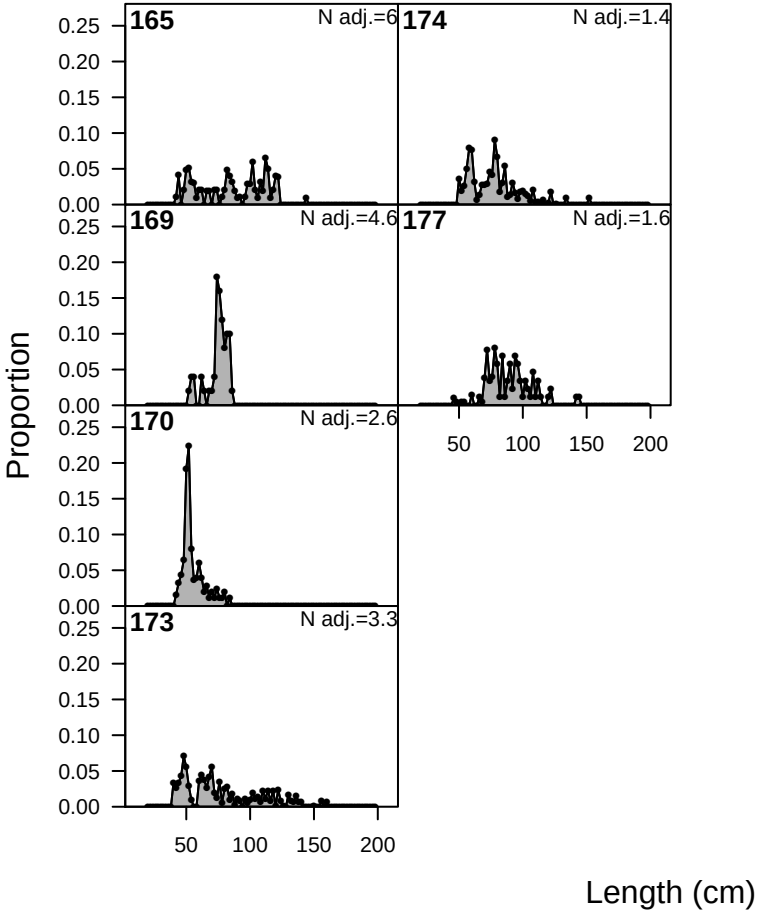

132
N adj.=0.5
137
N adj.=2.3
145
N adj.=3.8
153
N adj.=7.4
133
N adj.=3.6
139
N adj.=0.5
146
N adj.=3.1
154
N adj.=3.8
134
N adj.=2
141
N adj.=4.1
149
N adj.=6.9
156
N adj.=0.5
135
N adj.=0.8
142
N adj.=1.8
150
N adj.=3.3
157
N adj.=5.1
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)

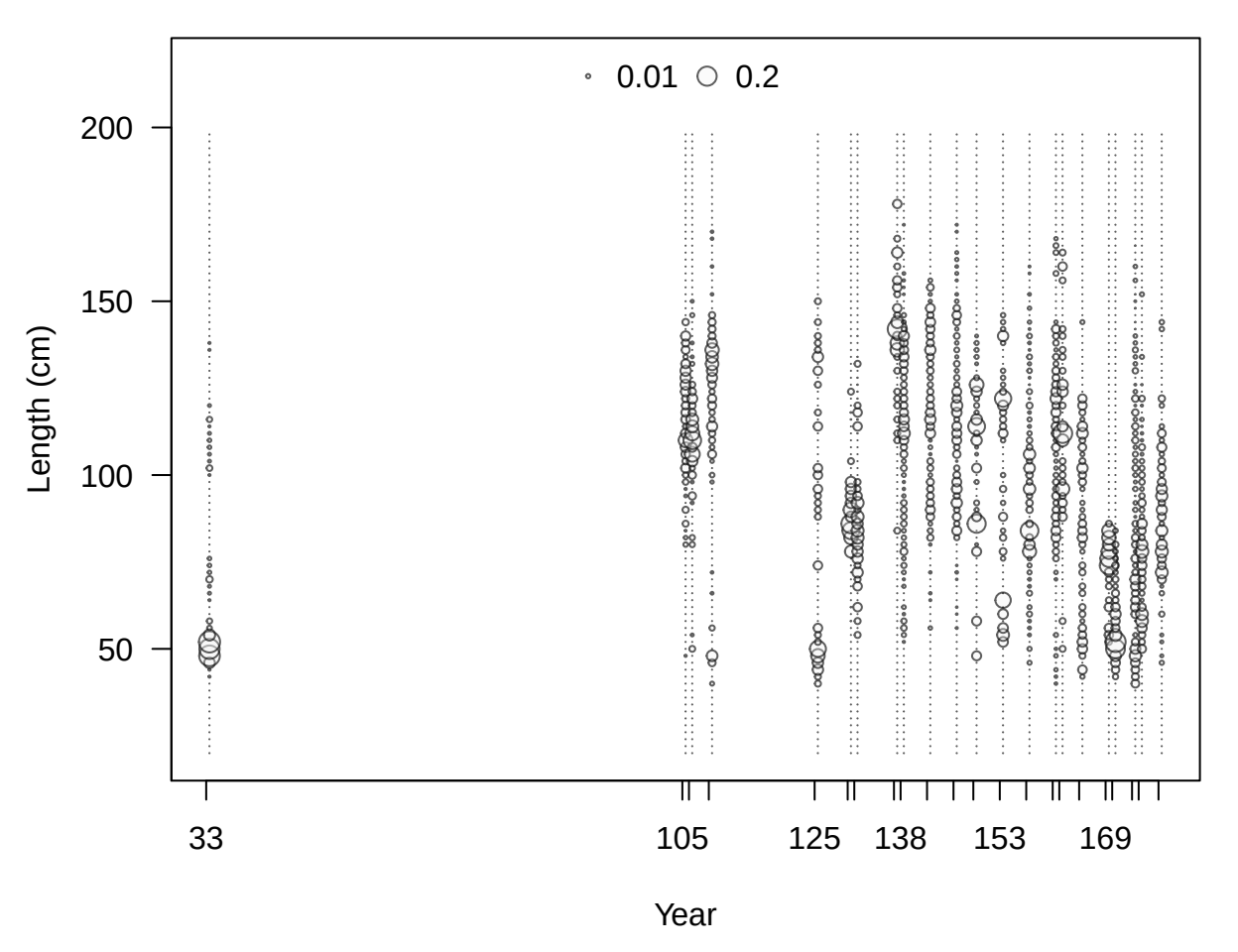

161
N adj.=3.6
169
N adj.=3.3
175
N adj.=1
162
N adj.=2
170
N adj.=4.1
176
N adj.=1
165
N adj.=2.8
173
N adj.=1.3
177
N adj.=1
166
N adj.=4.3
174
N adj.=2.8
178
N adj.=3.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)

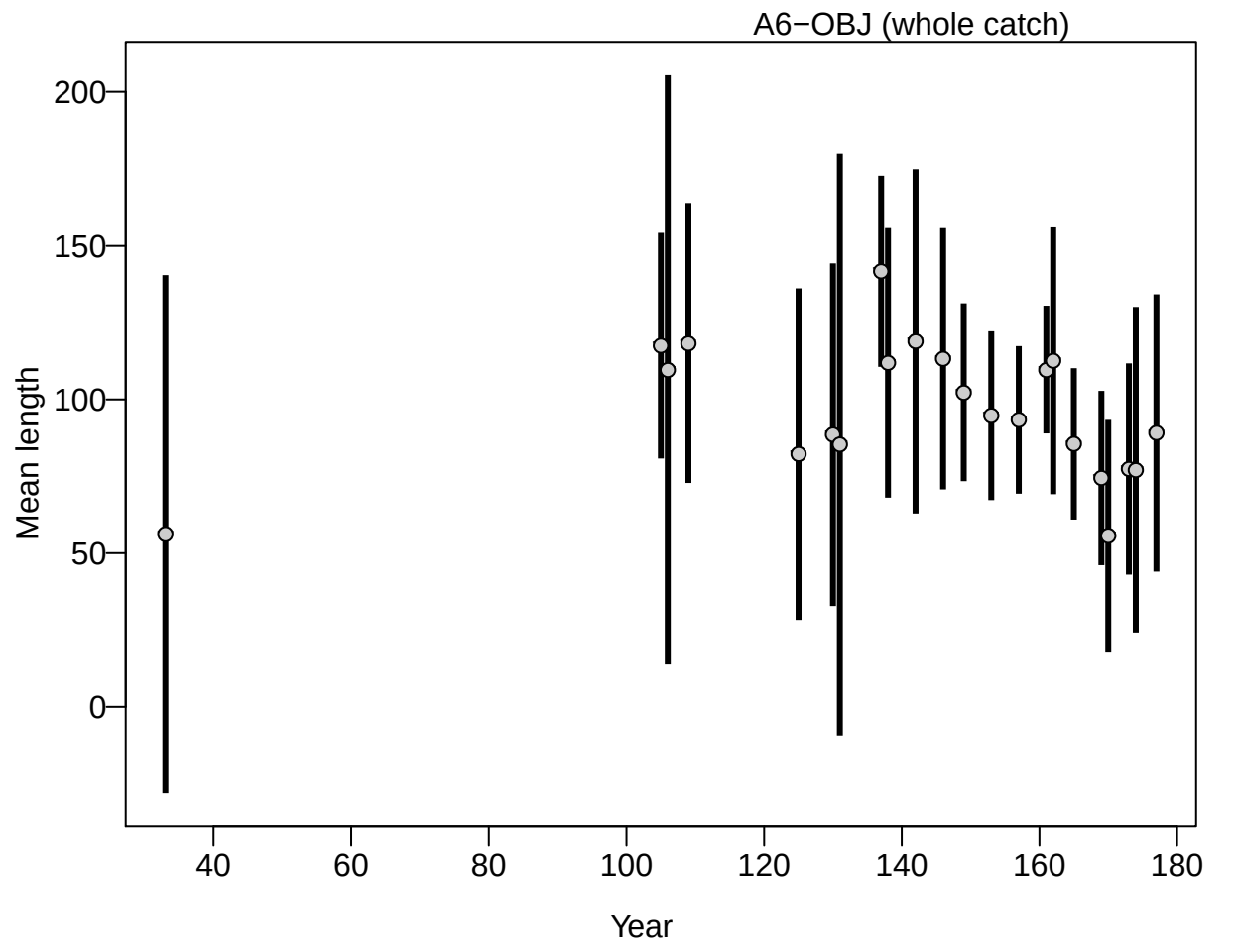

0.01
0.2
200
150
100
50
Length (cm)
25
65
82
93
105
118
131
145
161
174
Year

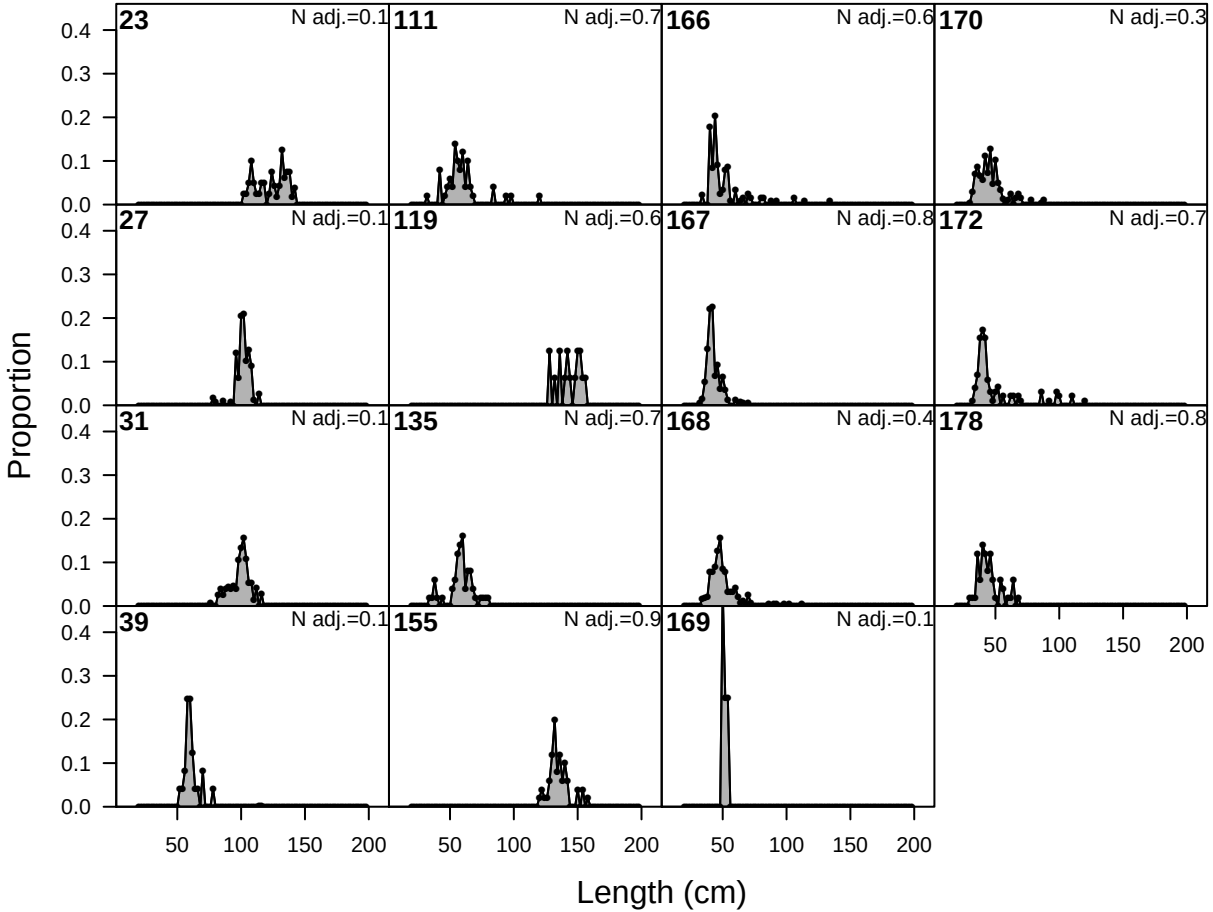

A5−OBJ (whole catch)
Mean length
200
150
100
50
0
50
100
150
Year

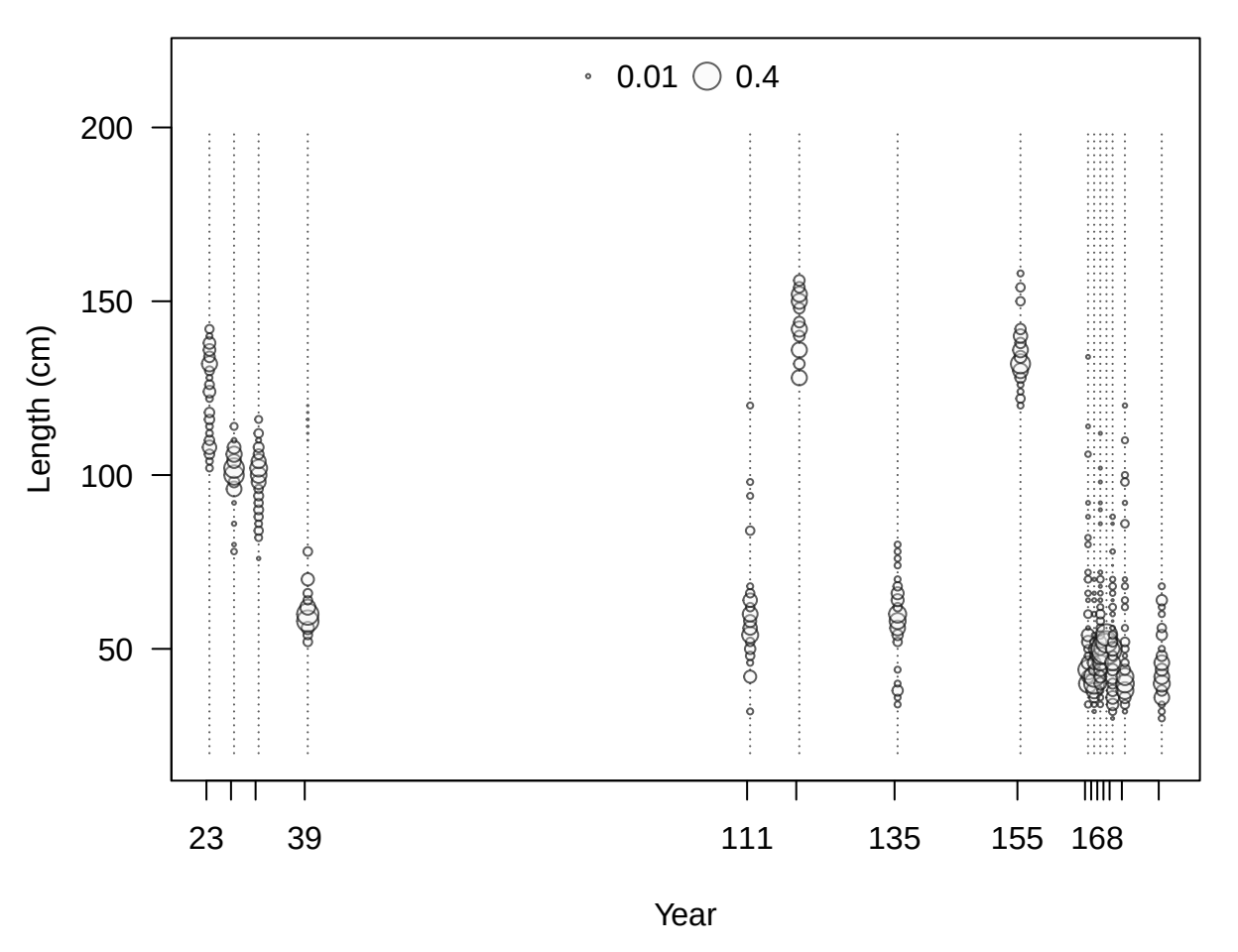

33
N adj.=0.5
125
N adj.=1.2
138
N adj.=1.9
153
N adj.=4.9
105
N adj.=2.3
130
N adj.=1.1
142
N adj.=1.2
157
N adj.=5.5
106
N adj.=0.4
131
N adj.=0.4
146
N adj.=2.1
161
N adj.=7.6
109
N adj.=1.9
137
N adj.=3.5
149
N adj.=4.2
162
N adj.=1.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

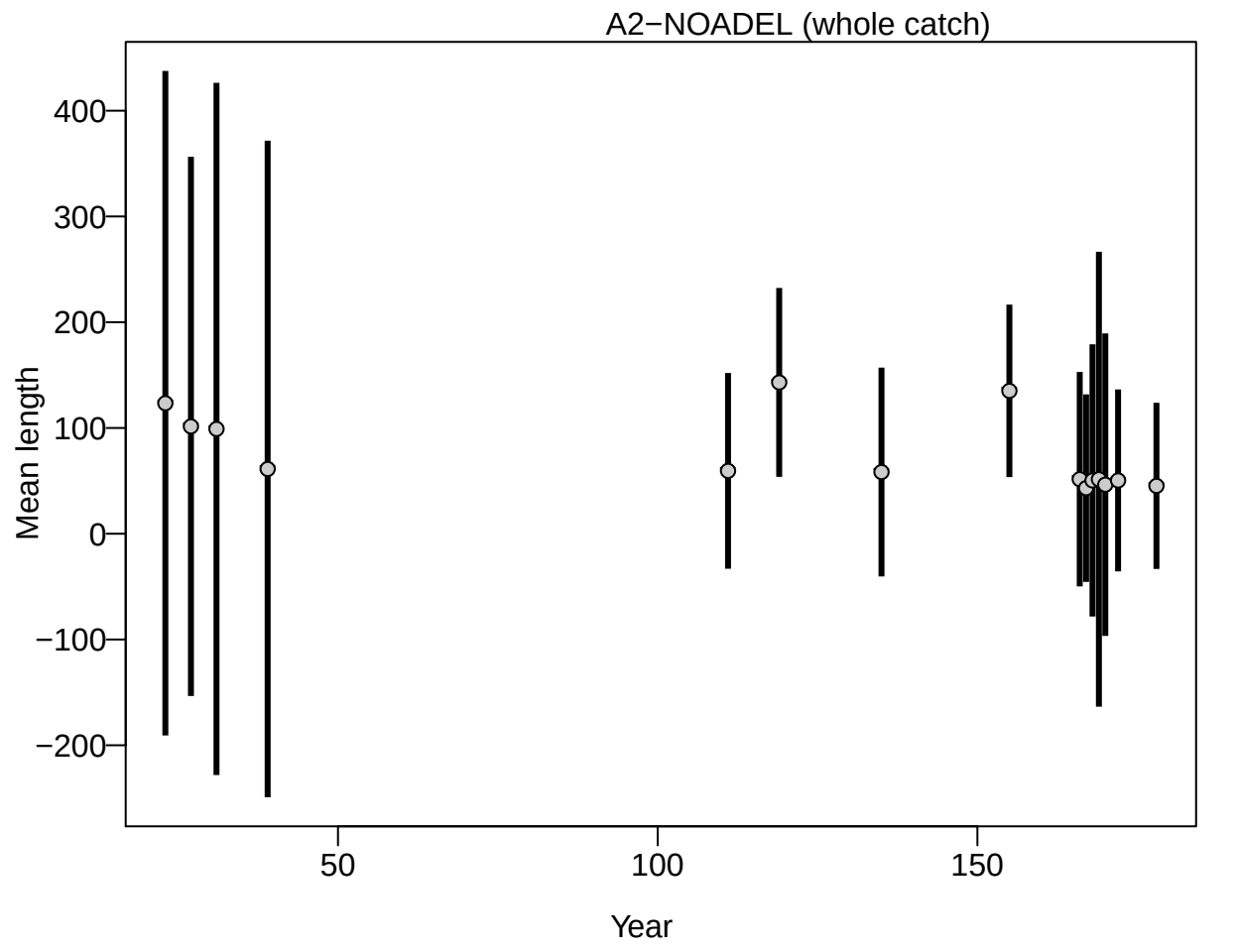

165
N adj.=6
174
N adj.=1.4
169
N adj.=4.6
177
N adj.=1.6
170
N adj.=2.6
173
N adj.=3.3
Proportion
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Length (cm)

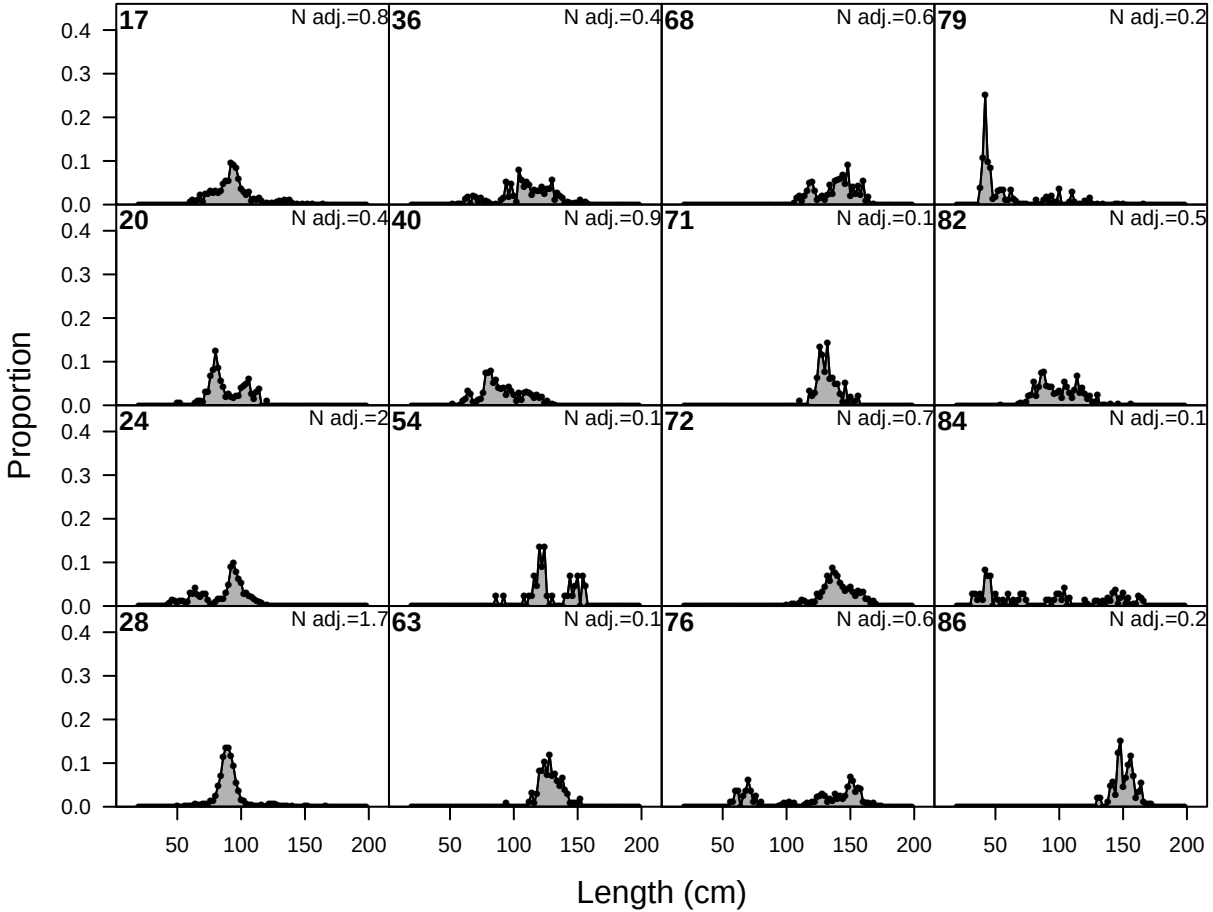

0.01
0.2
200
150
100
50
Length (cm)
33
105
125
138
153
169
Year

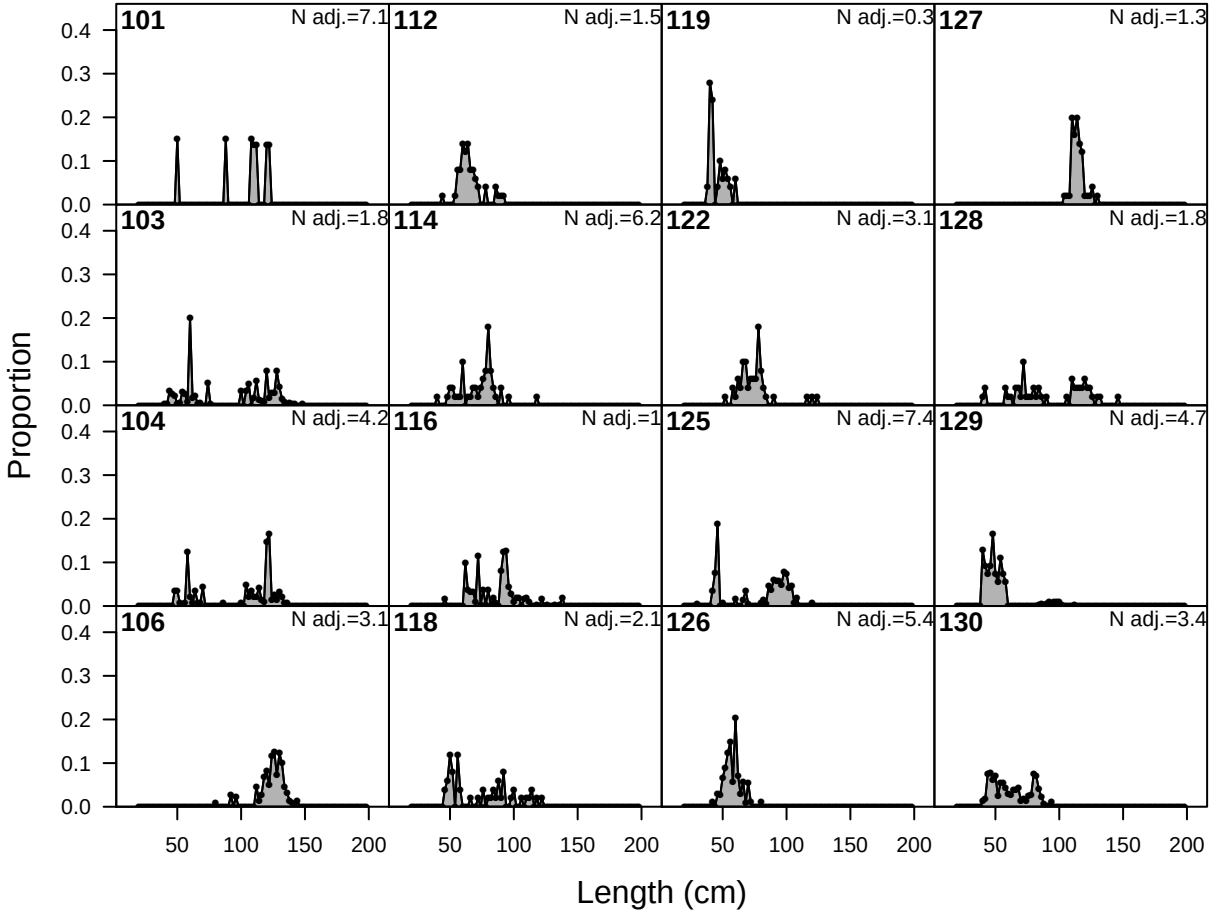

A6−OBJ (whole catch)
Mean length
200
150
100
50
0
40
60
80
100
120
140
160
180
Year

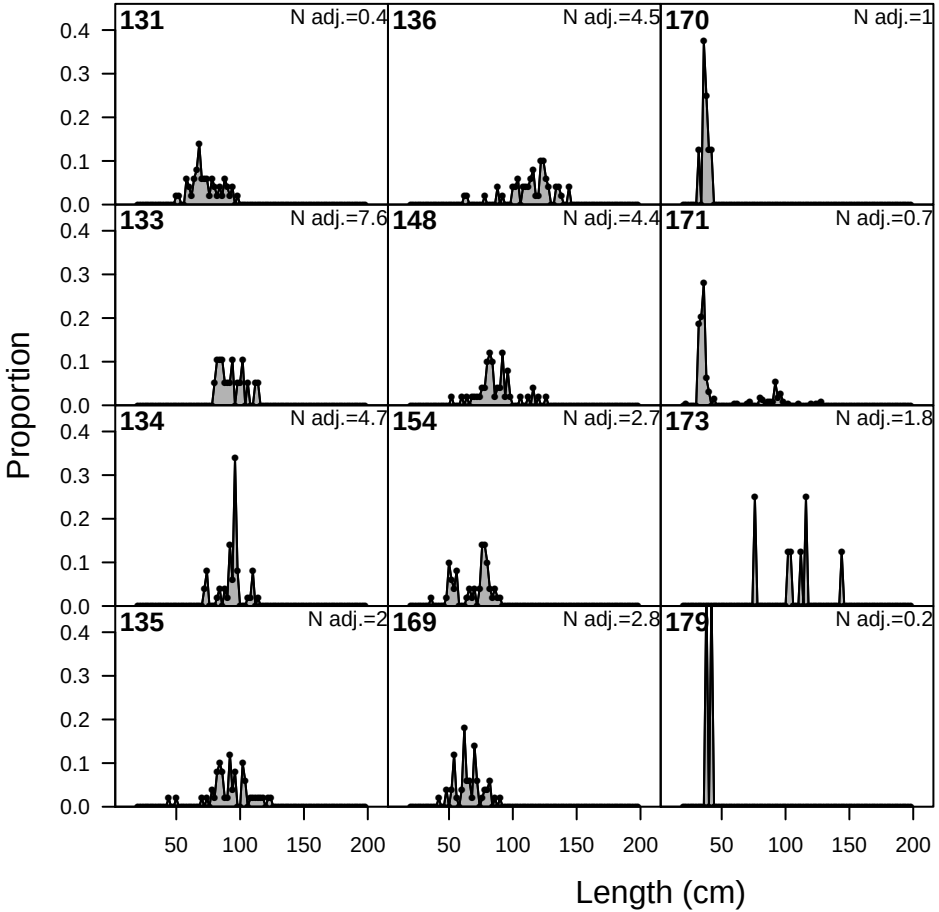

23
N adj.=0.1
111
N adj.=0.7
166
N adj.=0.6
170
N adj.=0.3
27
N adj.=0.1
119
N adj.=0.6
167
N adj.=0.8
172
N adj.=0.7
31
N adj.=0.1
135
N adj.=0.7
168
N adj.=0.4
178
N adj.=0.8
39
N adj.=0.1
155
N adj.=0.9
169
N adj.=0.1
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

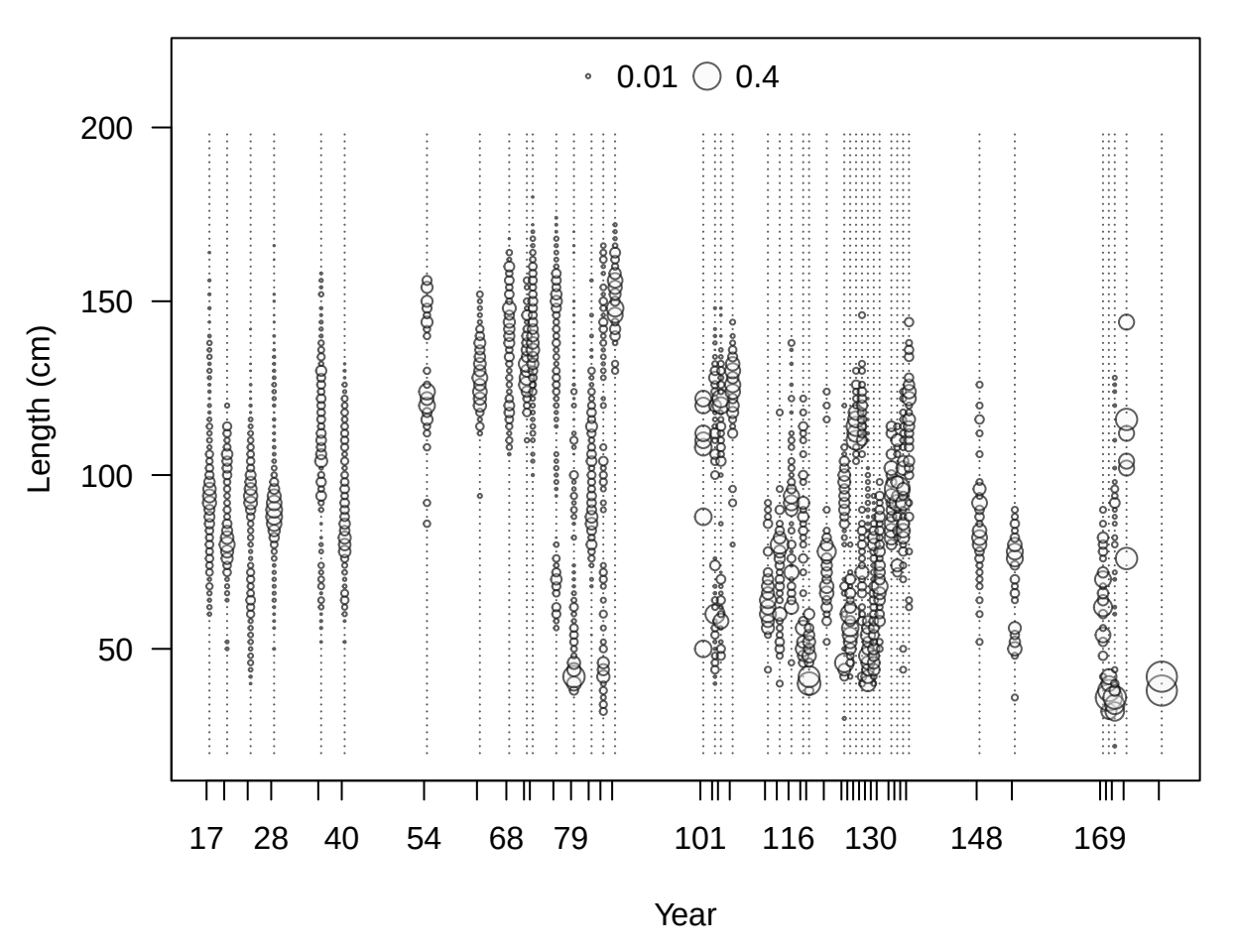

0.01
0.4
200
150
100
50
Length (cm)
23
39
111
135
155
168
Year

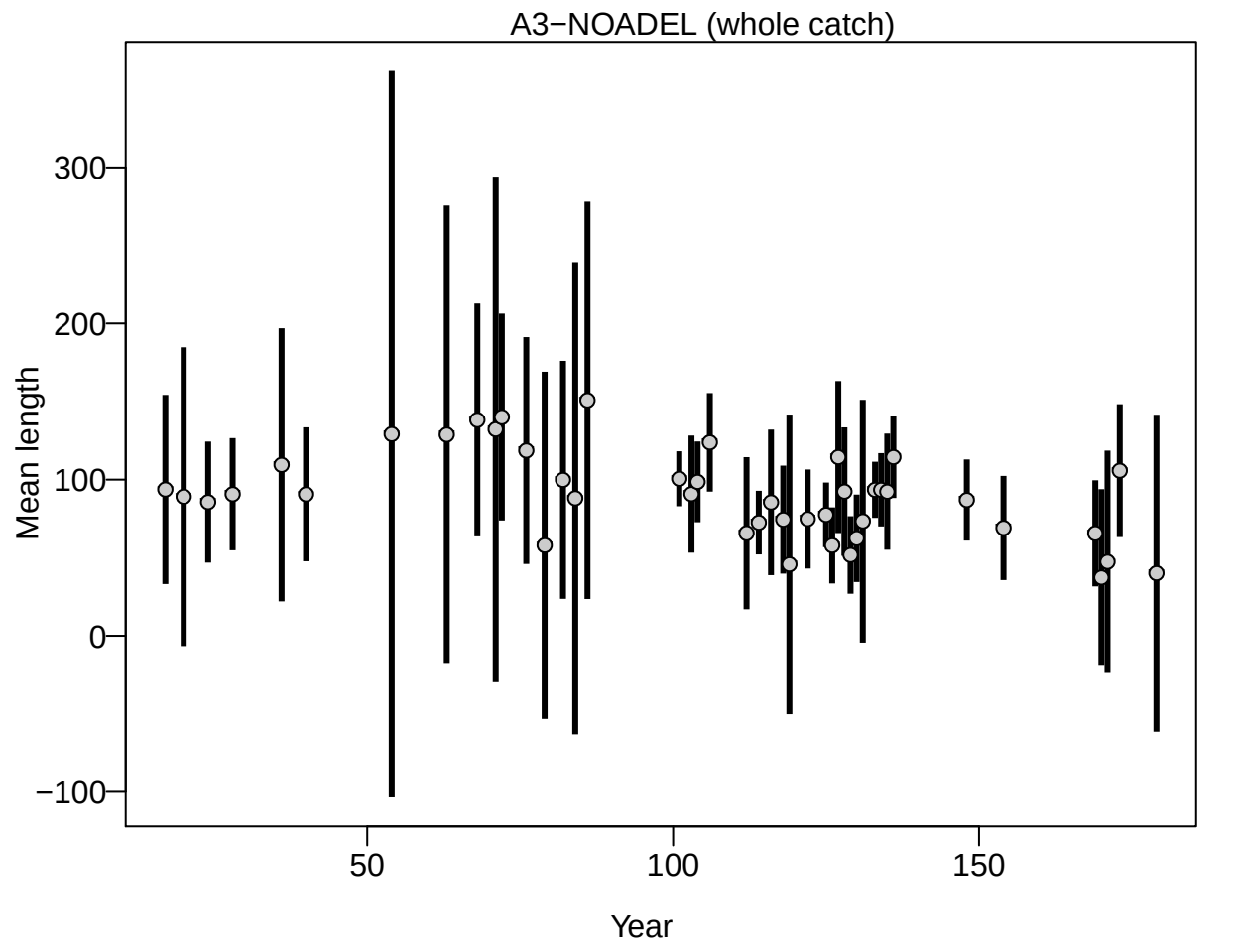

A2−NOADEL (whole catch)
Mean length
400
300
200
100
0
−100
−200
50
100
150
Year

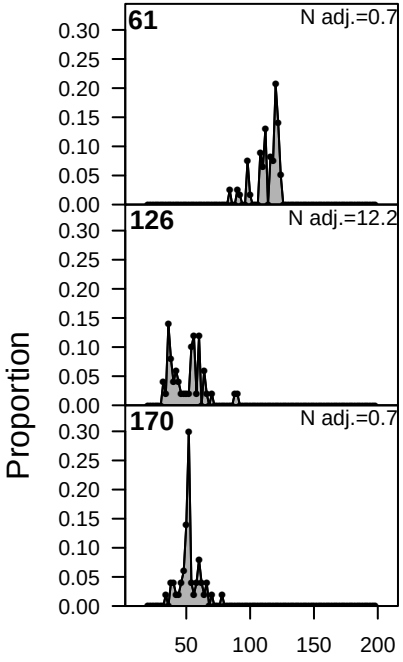

17
N adj.=0.8
36
N adj.=0.4
68
N adj.=0.6
79
N adj.=0.2
20
N adj.=0.4
40
N adj.=0.9
71
N adj.=0.1
82
N adj.=0.5
24
N adj.=2
54
N adj.=0.1
72
N adj.=0.7
84
N adj.=0.1
28
N adj.=1.7
63
N adj.=0.1
76
N adj.=0.6
86
N adj.=0.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

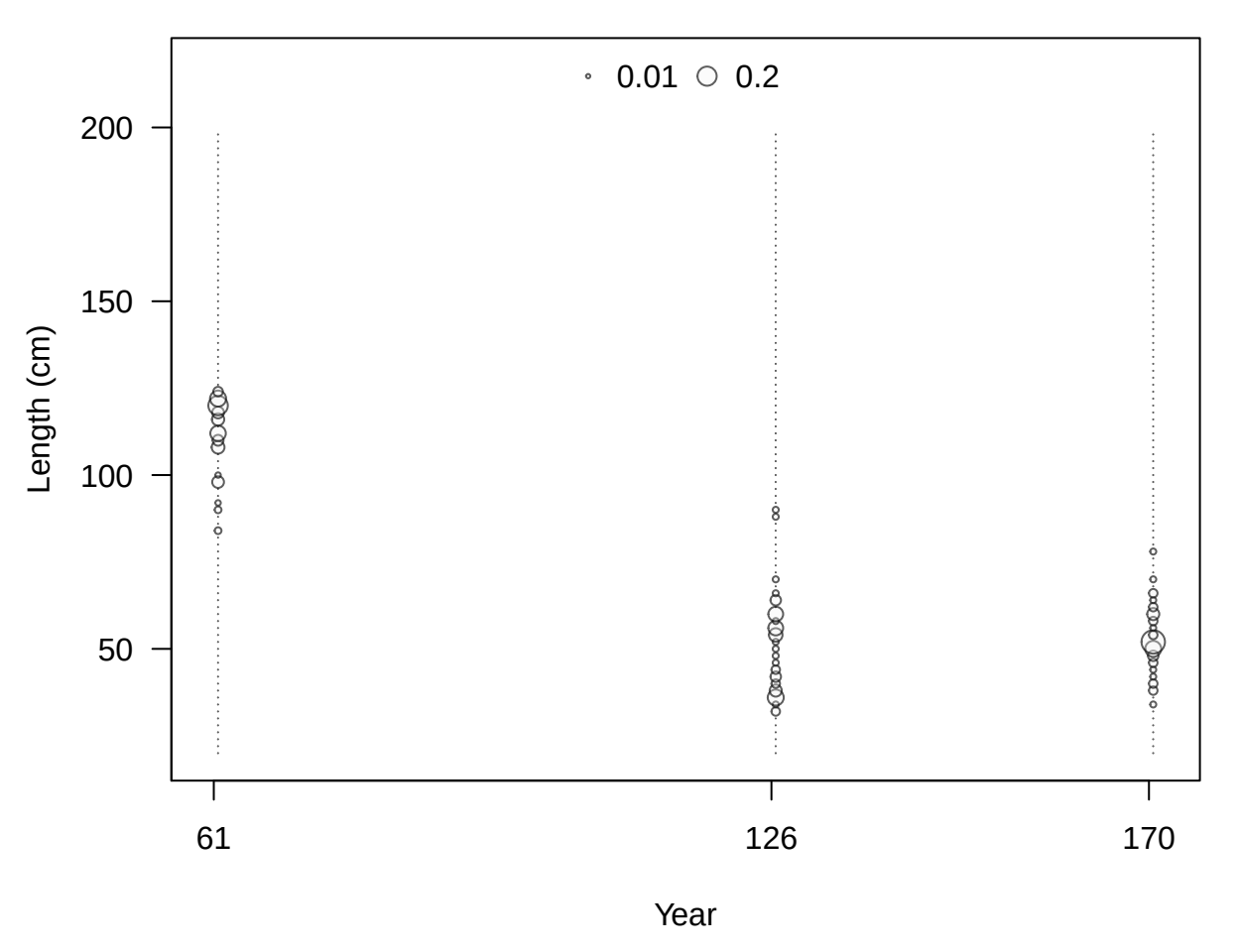

101
N adj.=7.1
112
N adj.=1.5
119
N adj.=0.3
127
N adj.=1.3
103
N adj.=1.8
114
N adj.=6.2
122
N adj.=3.1
128
N adj.=1.8
104
N adj.=4.2
116
N adj.=1
125
N adj.=7.4
129
N adj.=4.7
106
N adj.=3.1
118
N adj.=2.1
126
N adj.=5.4
130
N adj.=3.4
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

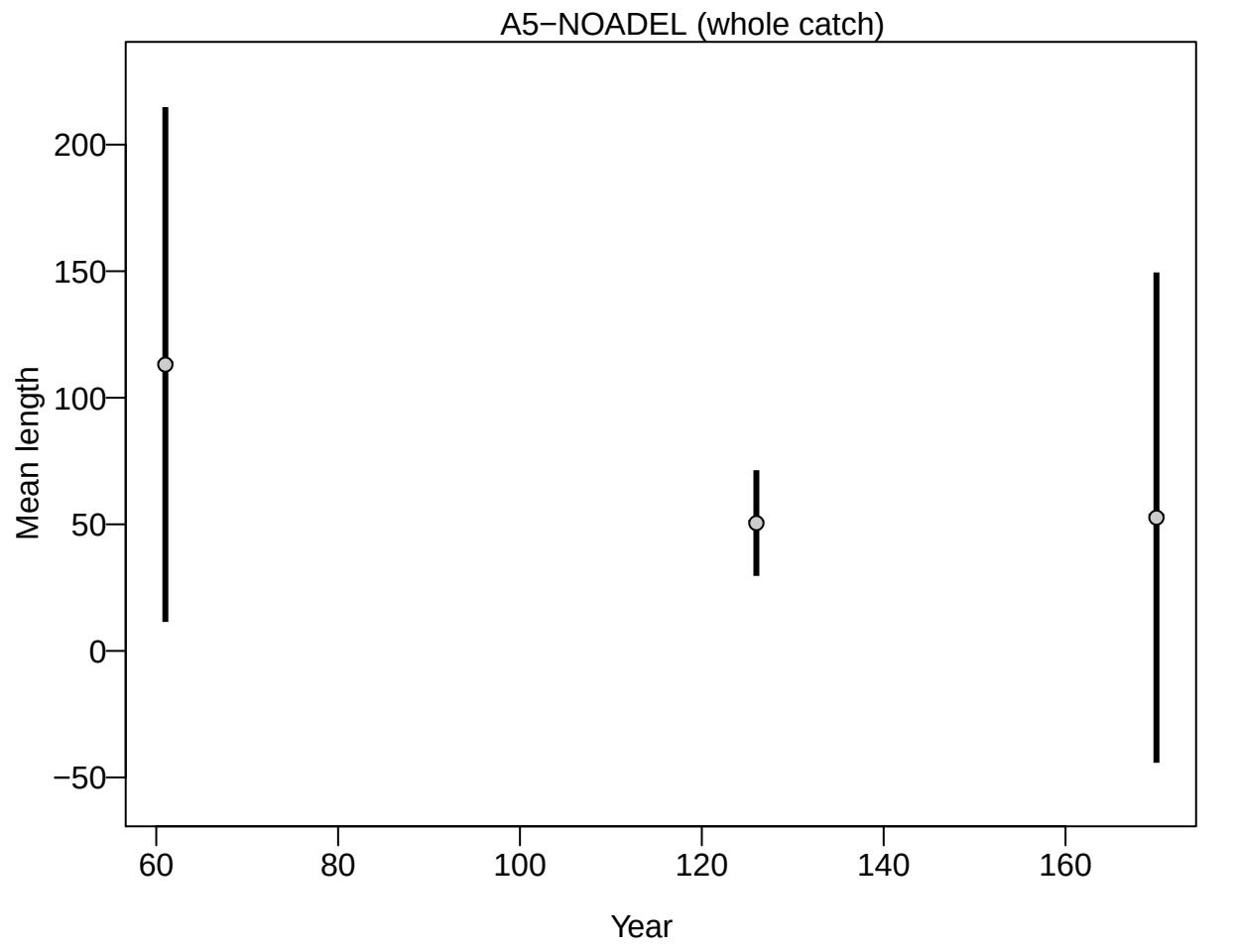

131
N adj.=0.4
136
N adj.=4.5
170
N adj.=1
133
N adj.=7.6
148
N adj.=4.4
171
N adj.=0.7
134
N adj.=4.7
154
N adj.=2.7
173
N adj.=1.8
135
N adj.=2
169
N adj.=2.8
179
N adj.=0.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

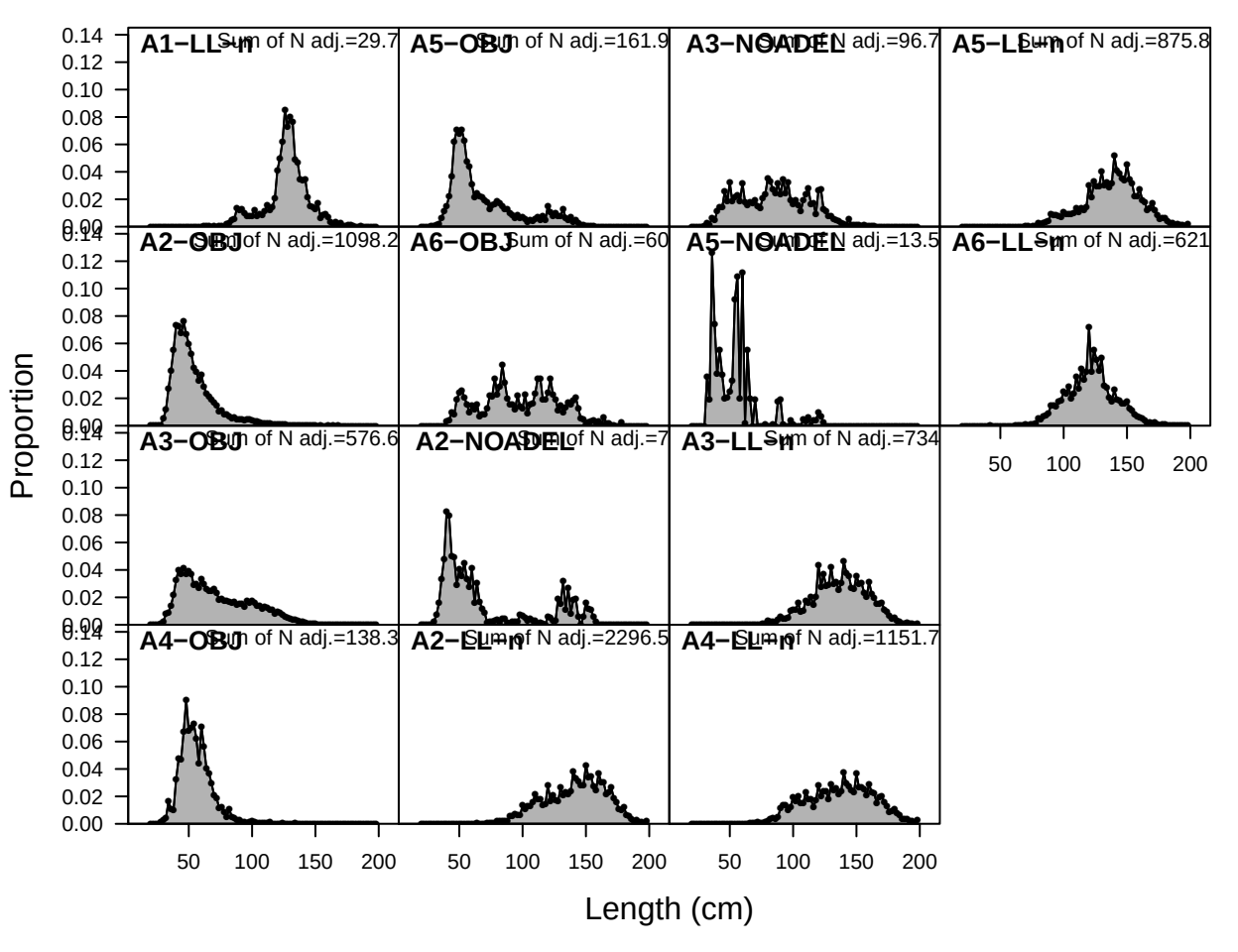

0.01
0.4
200
150
100
50
Length (cm)
17
28
40
54
68
79
101
116
130
148
169
Year

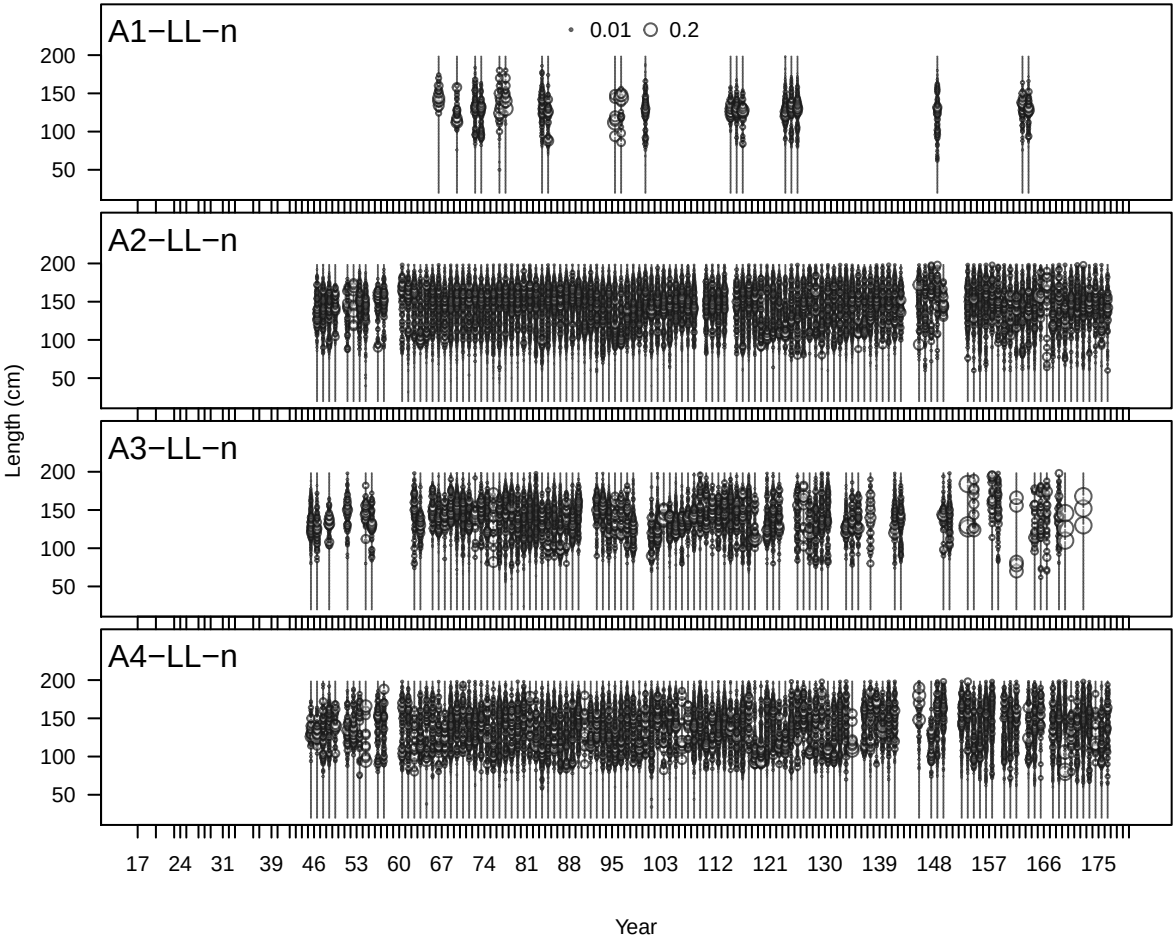

A3−NOADEL (whole catch)
Mean length
300
200
100
0
−100
50
100
150
Year

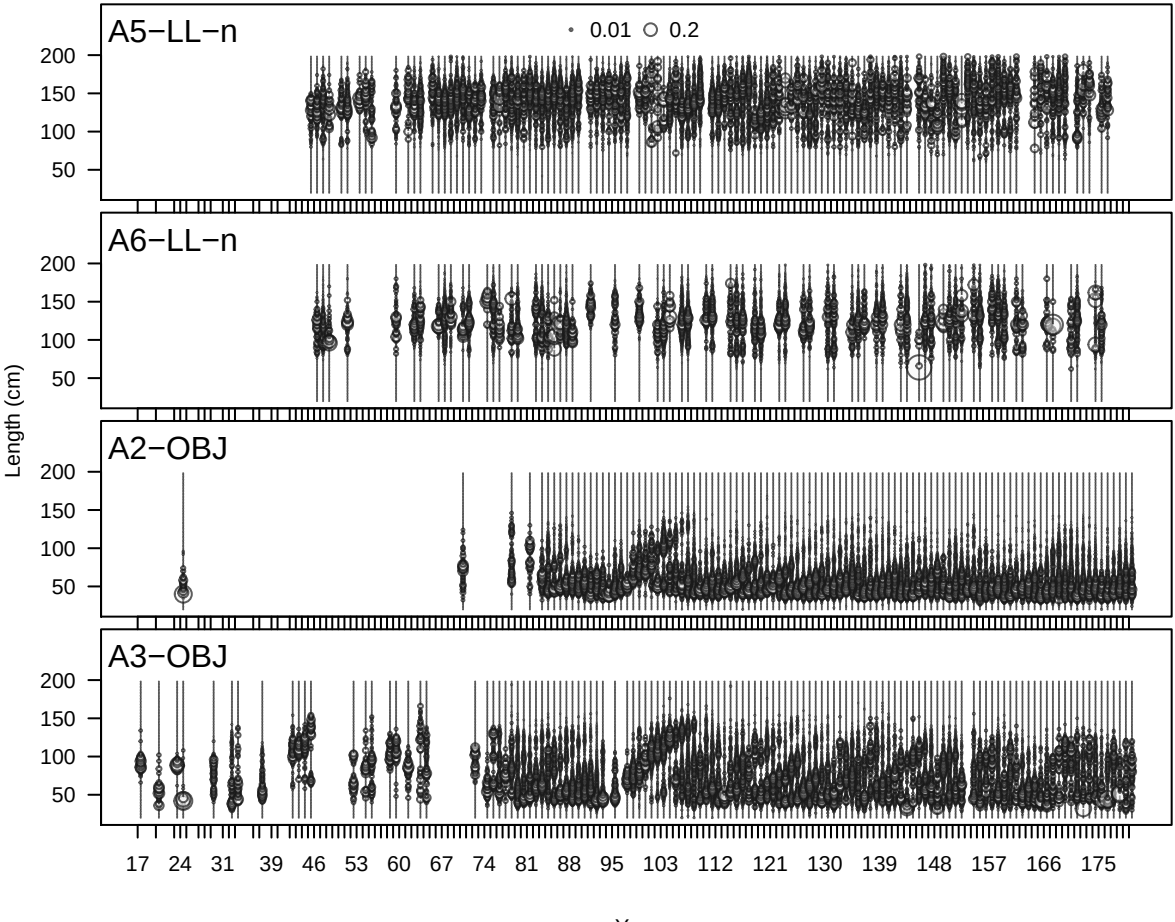

61
N adj.=0.7
126
N adj.=12.2
170
N adj.=0.7
0.30
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Proportion
Length (cm)

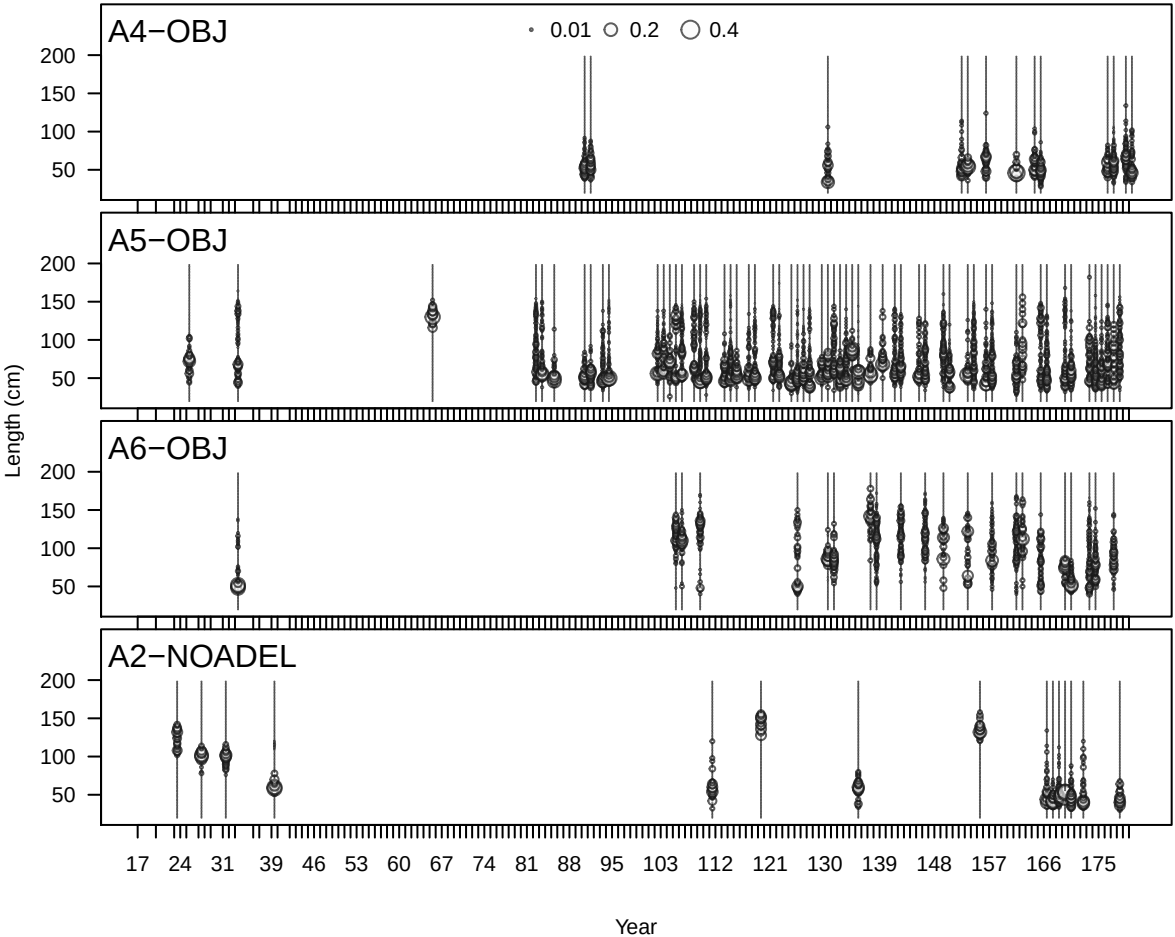

0.01
0.2
200
150
100
50
Length (cm)
61
126
170
Year

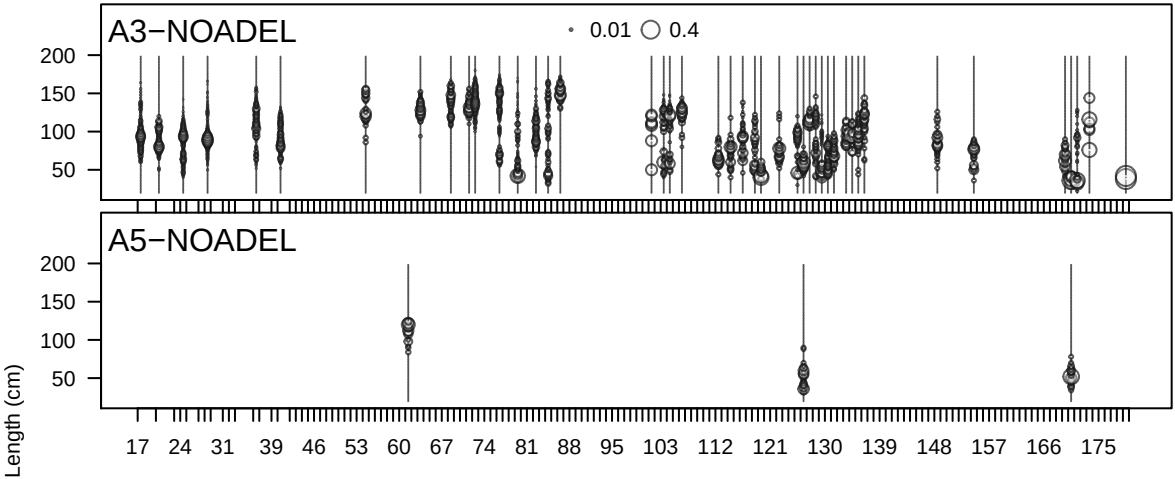

A5−NOADEL (whole catch)
Mean length
200
150
100
50
0
−50
60
80
100
120
140
160
Year

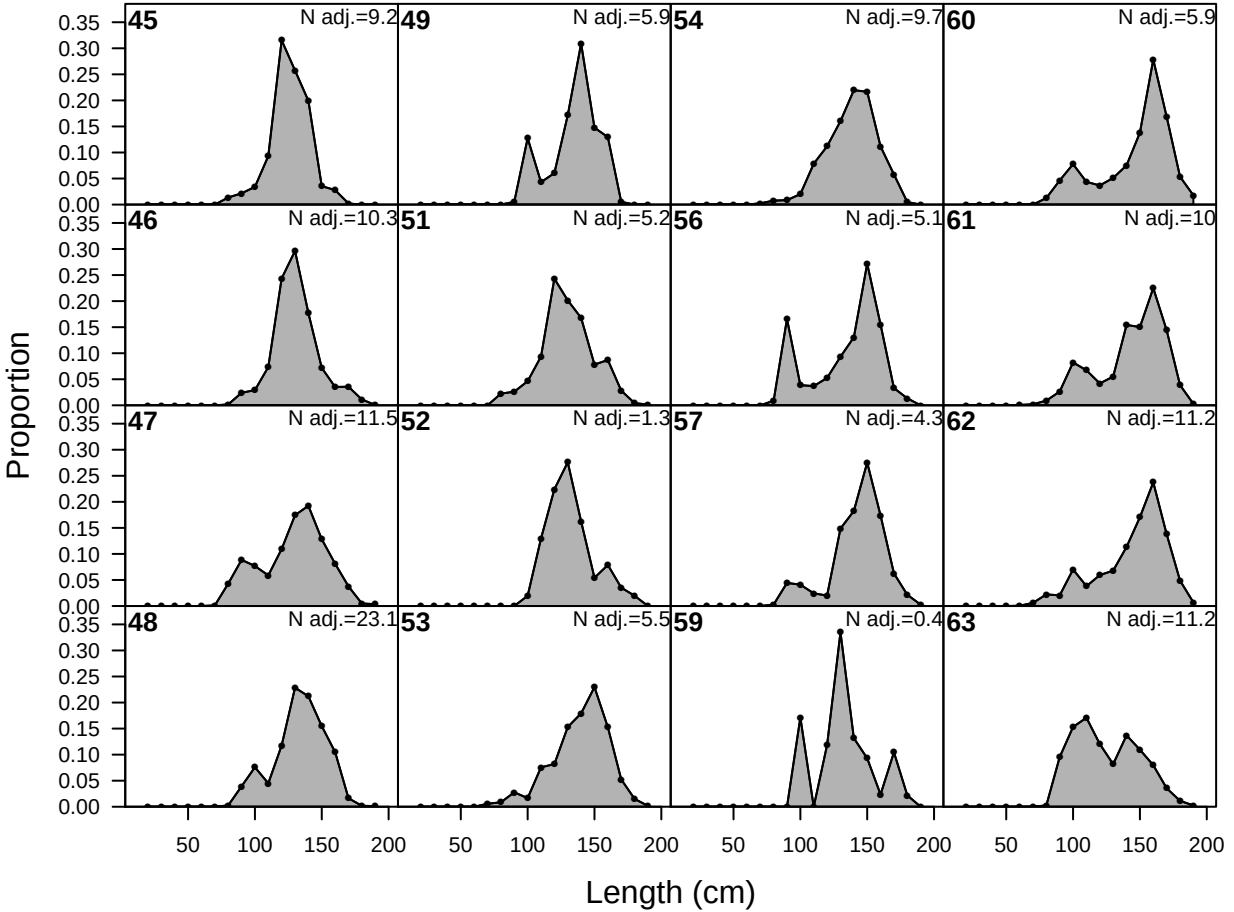

A1−LL−n
Sum of N adj.=29.7
A5−OBJ
Sum of N adj.=161.9
A3−NOADEL
Sum of N adj.=96.7
A5−LL−n
Sum of N adj.=875.8
A2−OBJ
Sum of N adj.=1098.2
A6−OBJ
Sum of N adj.=60
A5−NOADEL
Sum of N adj.=13.5
A6−LL−n
Sum of N adj.=621
A3−OBJ
Sum of N adj.=576.6
A2−NOADEL
Sum of N adj.=7
A3−LL−n
Sum of N adj.=734
A4−OBJ
Sum of N adj.=138.3
A2−LL−n
Sum of N adj.=2296.5
A4−LL−n
Sum of N adj.=1151.7
Proportion
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
50
100
150
200
Length (cm)

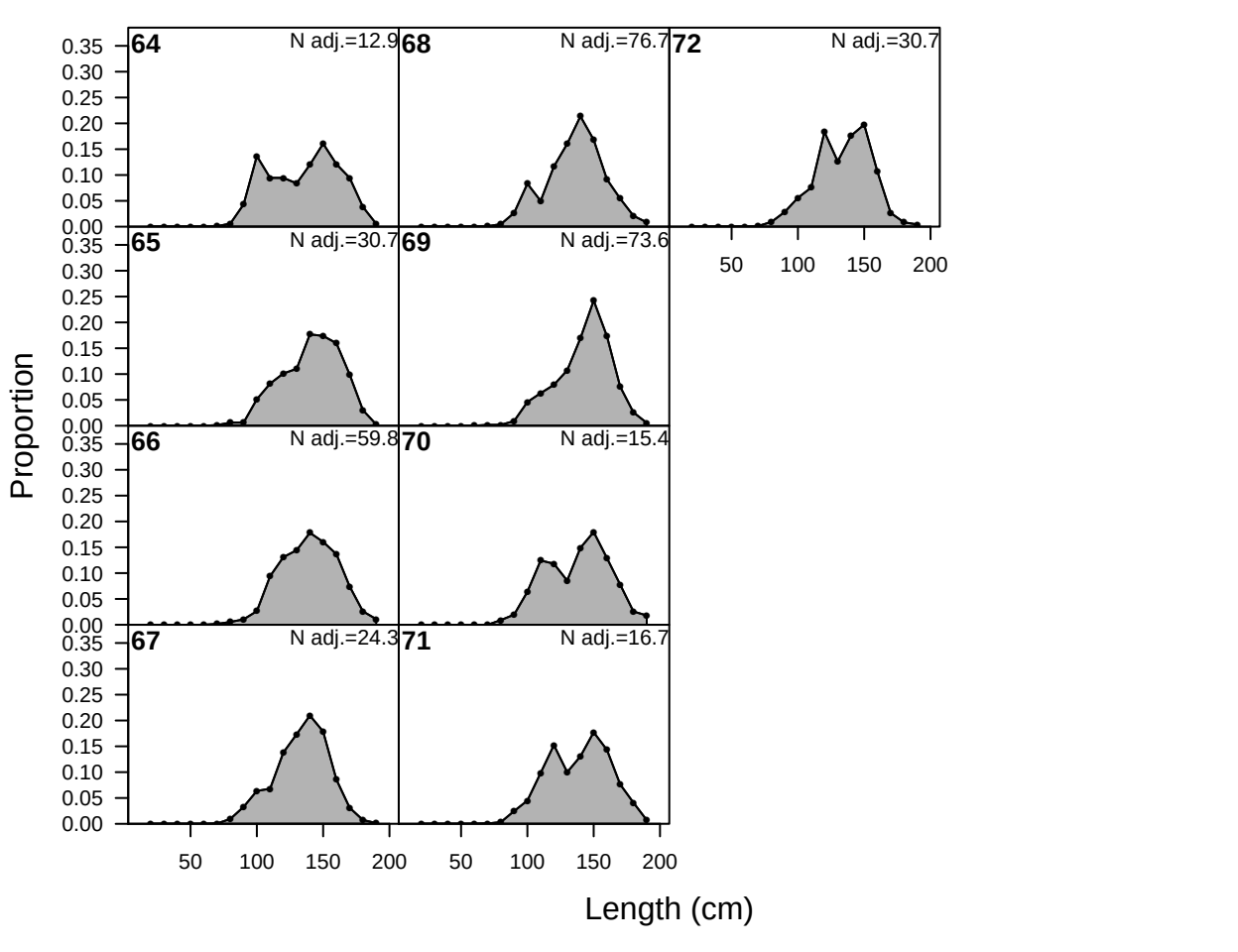

A1−LL−n
0.01
0.2
A2−LL−n
A3−LL−n
A4−LL−n
Length (cm)
200
150
100
50
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

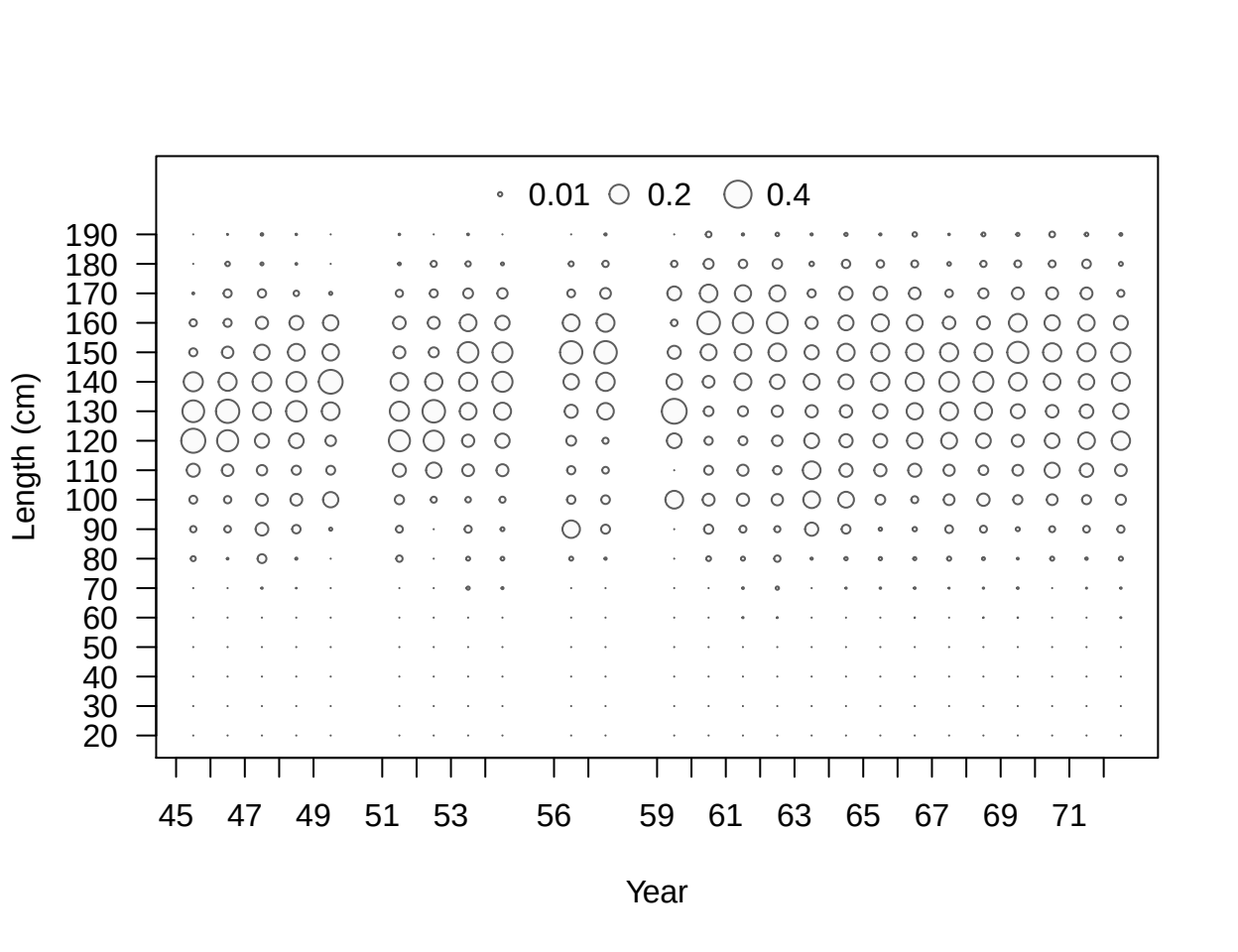

A5−LL−n
0.01
0.2
A6−LL−n
A2−OBJ
A3−OBJ
Length (cm)
200
150
100
50
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

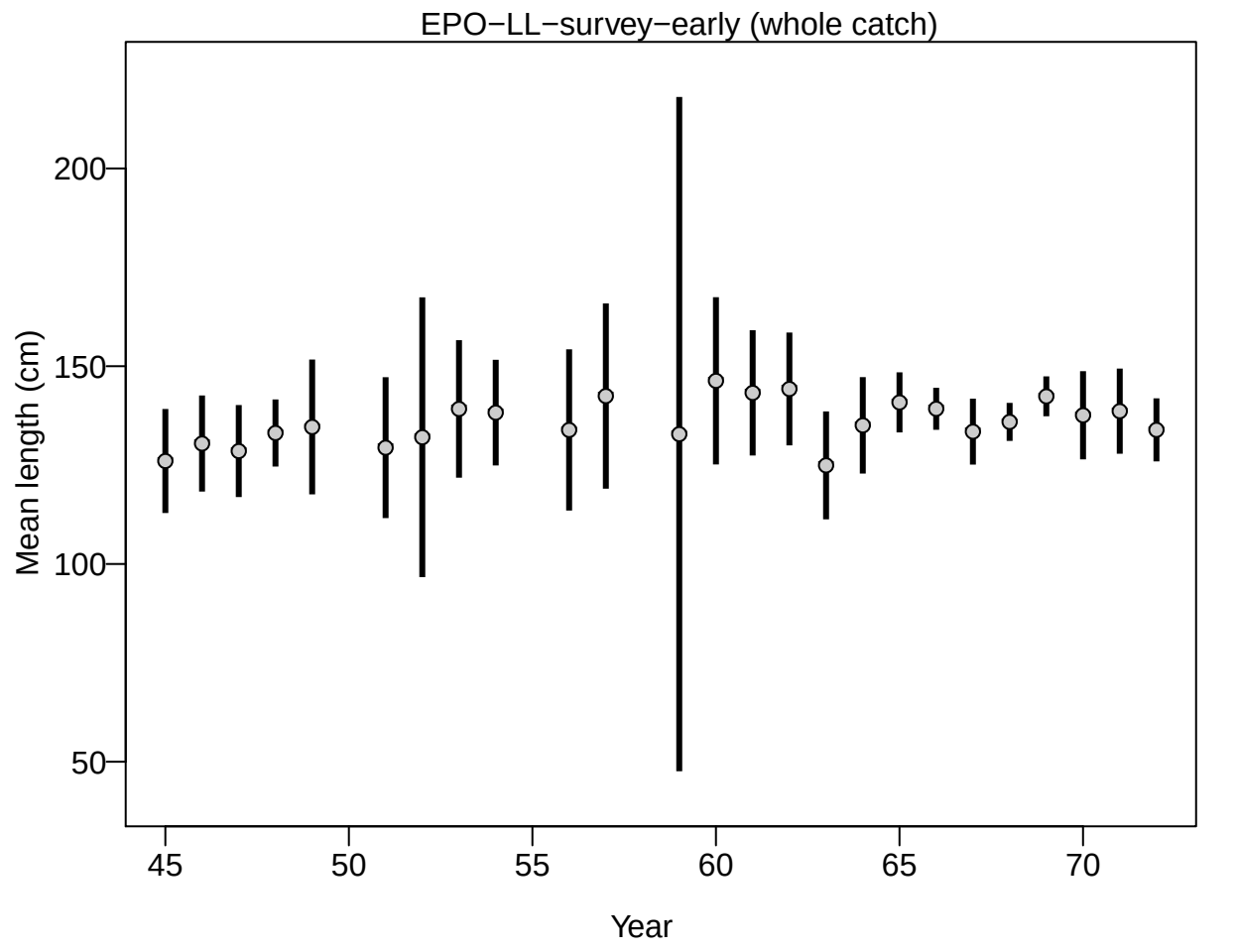

A4−OBJ
0.01
0.2
0.4
A5−OBJ
A6−OBJ
A2−NOADEL
Length (cm)
200
150
100
50
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

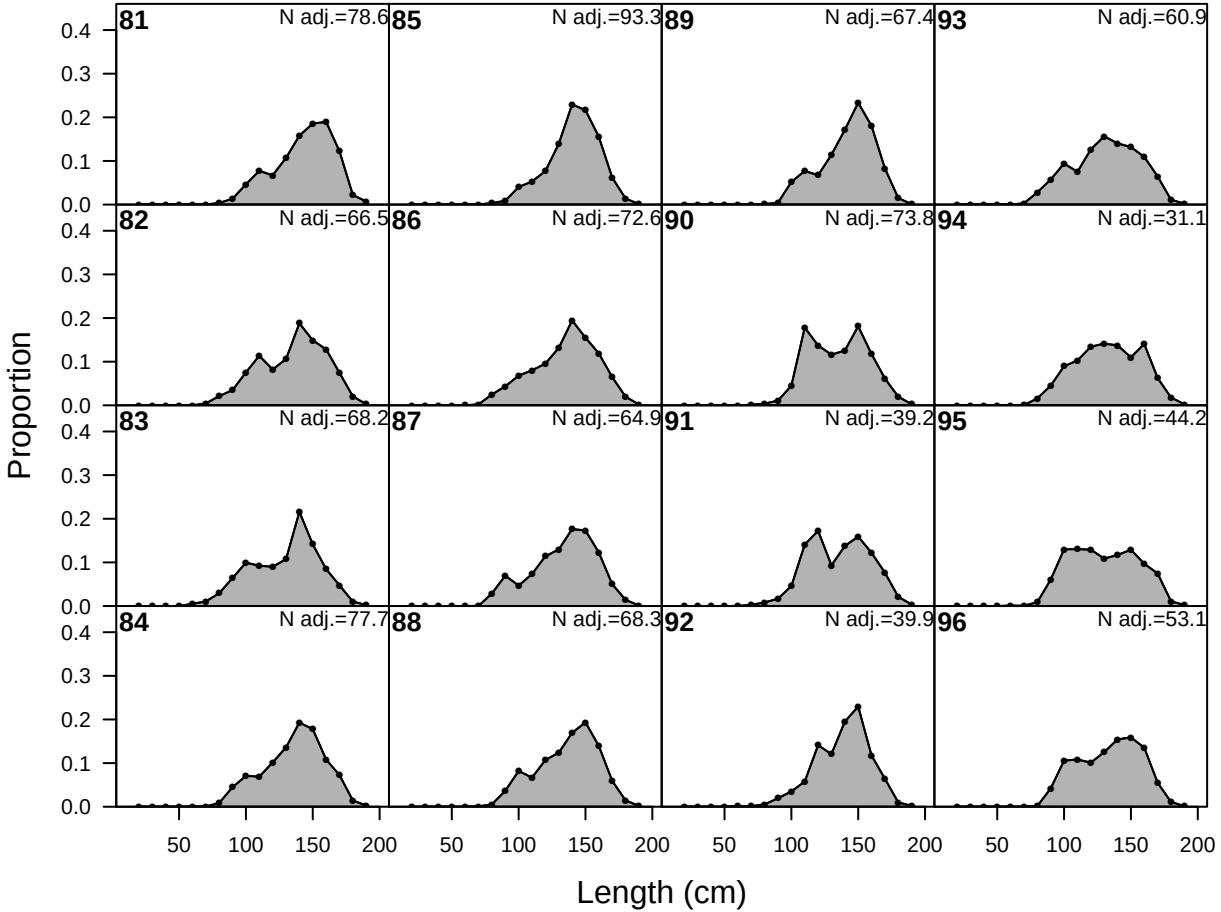

A3−NOADEL
0.01
0.4
200
150
100
50
A5−NOADEL
200
150
100
50
Length (cm)
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

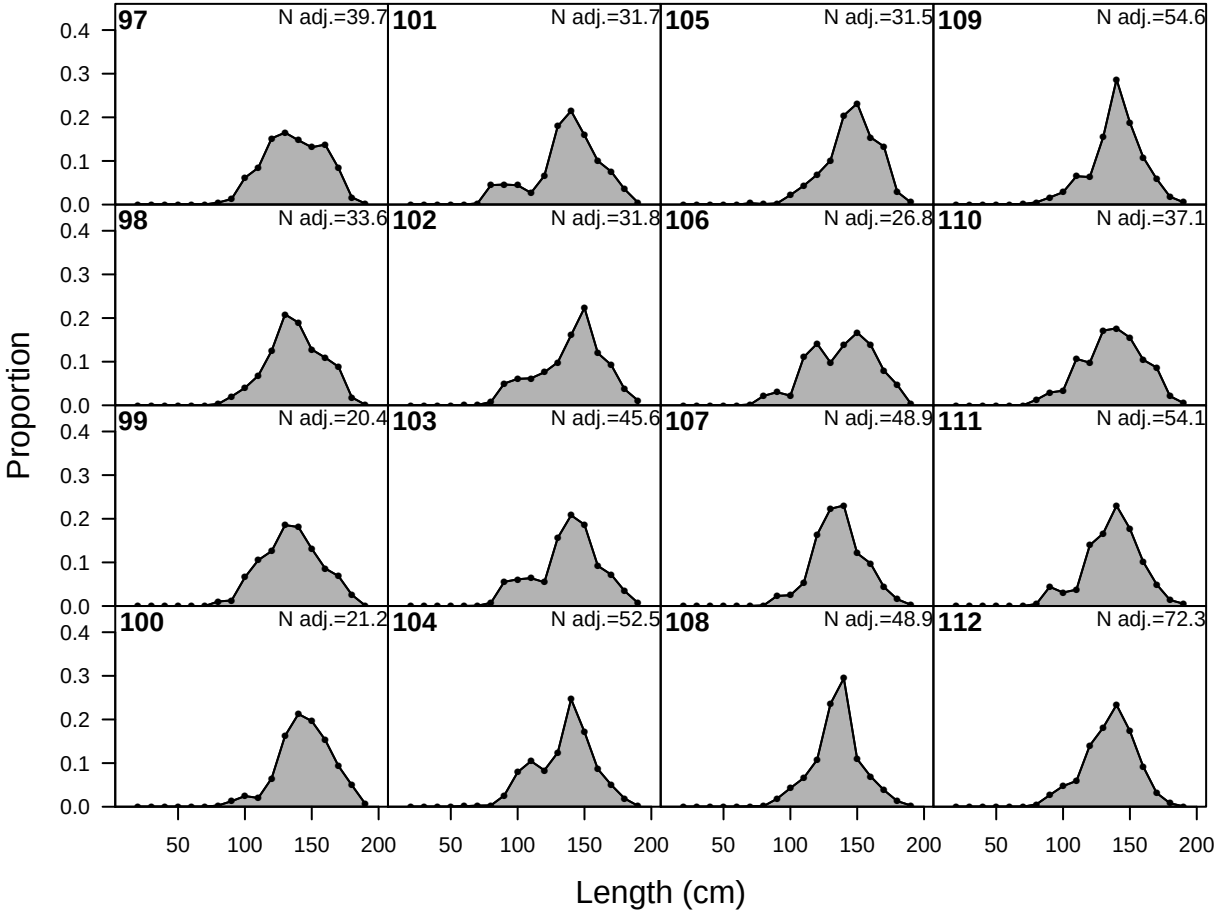

45
N adj.=9.2
49
N adj.=5.9
54
N adj.=9.7
60
N adj.=5.9
46
N adj.=10.3
51
N adj.=5.2
56
N adj.=5.1
61
N adj.=10
47
N adj.=11.5
52
N adj.=1.3
57
N adj.=4.3
62
N adj.=11.2
48
N adj.=23.1
53
N adj.=5.5
59
N adj.=0.4
63
N adj.=11.2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

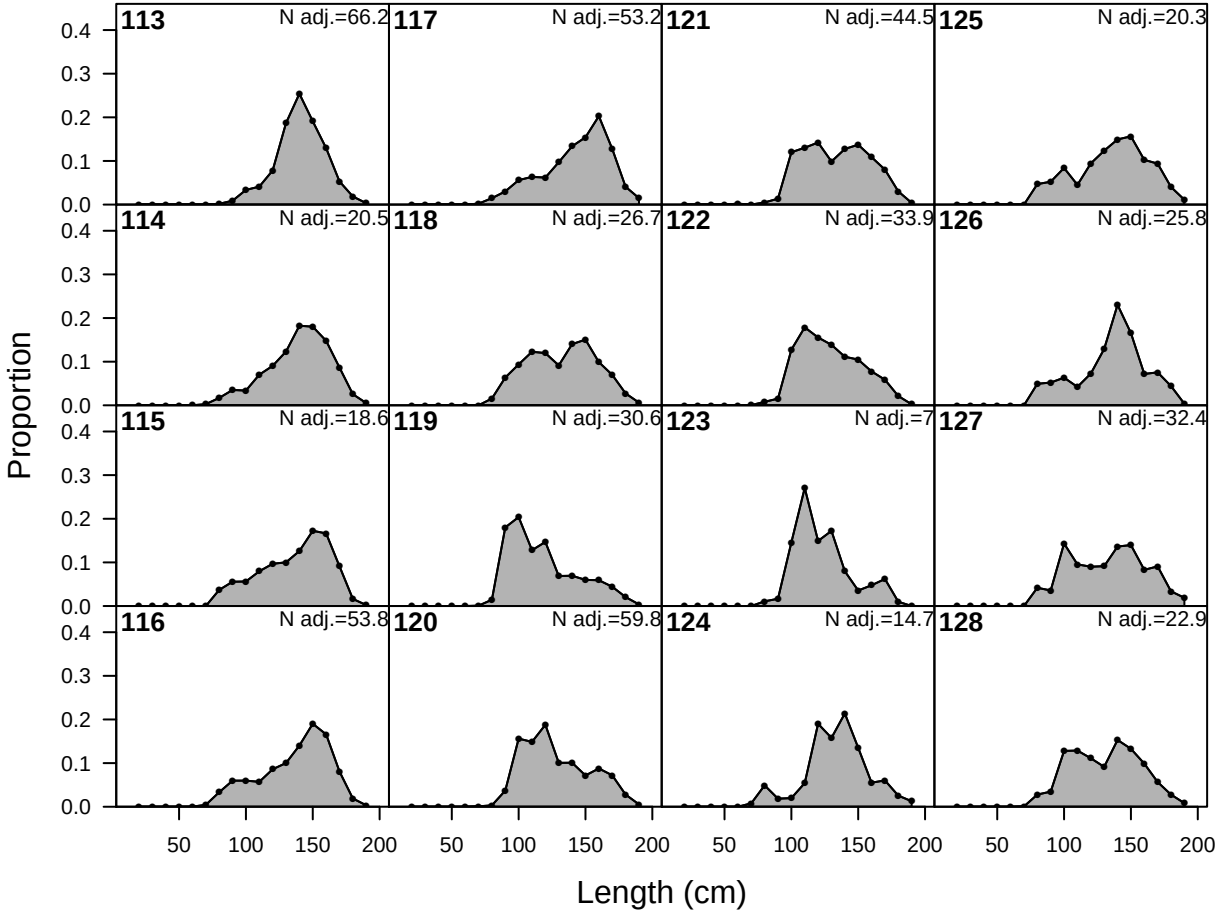

64
N adj.=12.9
68
N adj.=76.7
72
N adj.=30.7
65
N adj.=30.7
69
N adj.=73.6
66
N adj.=59.8
70
N adj.=15.4
67
N adj.=24.3
71
N adj.=16.7
Proportion
Length (cm)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200

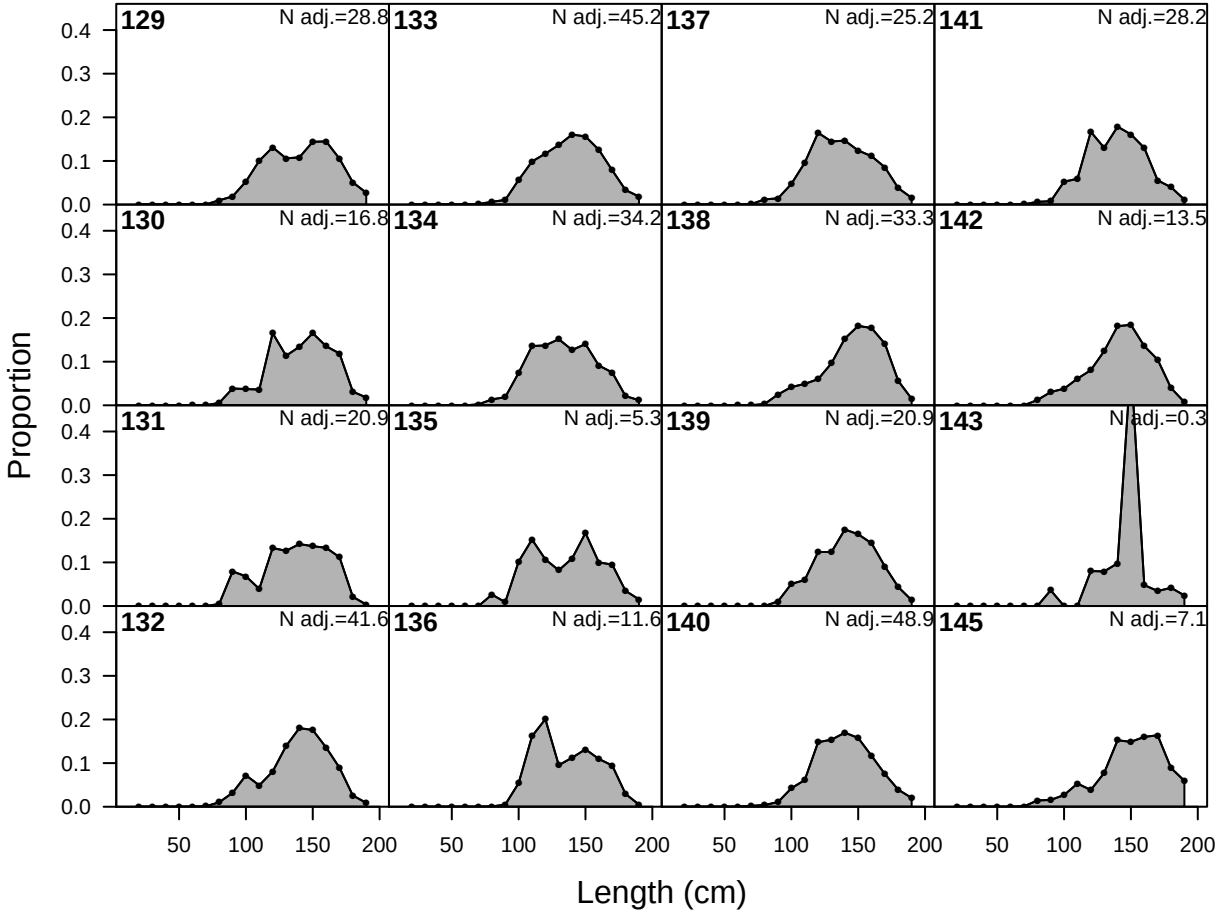

0.01
0.2
0.4
Length (cm)
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
45
47
49
51
53
56
59
61
63
65
67
69
71
Year

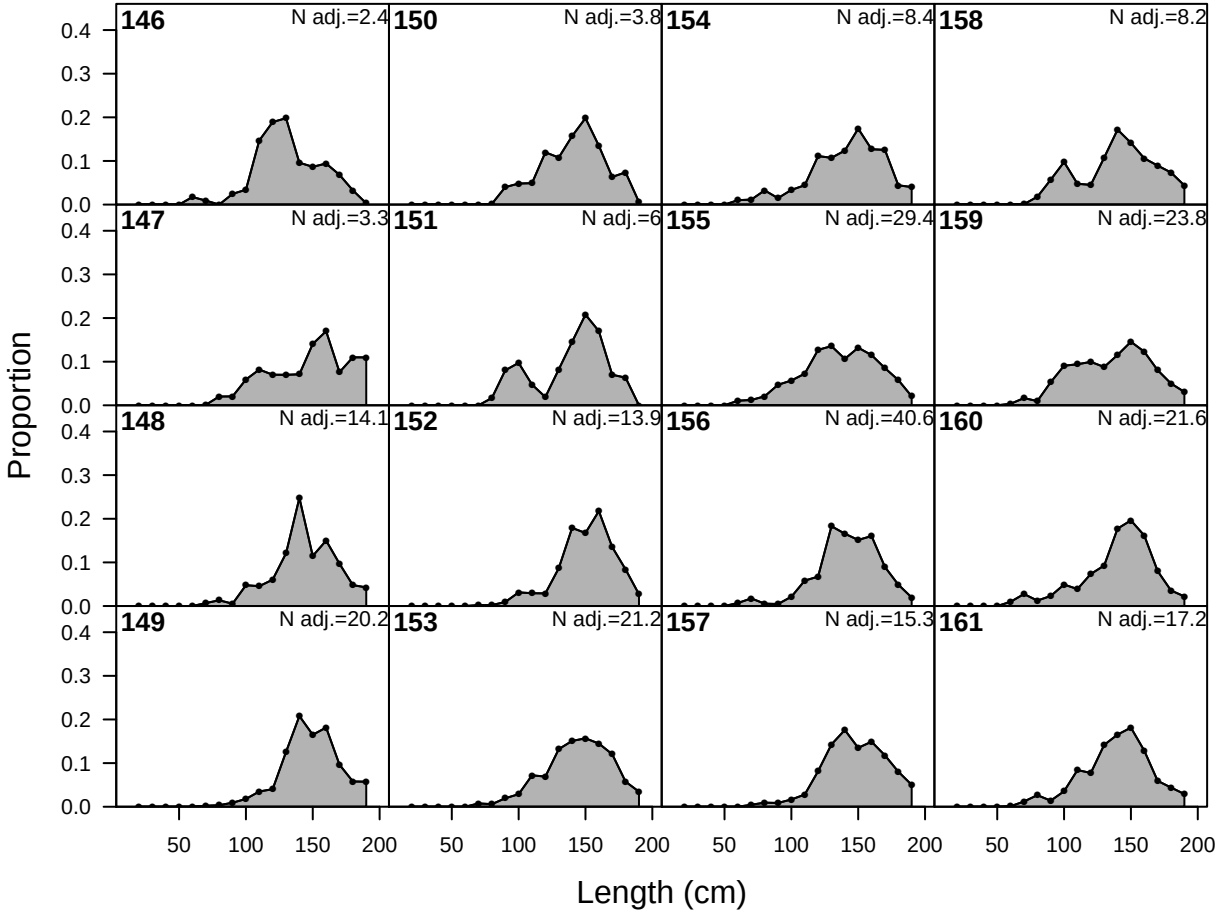

EPO−LL−survey−early (whole catch)
Mean length (cm)
200
150
100
50
45
50
55
60
65
70
Year

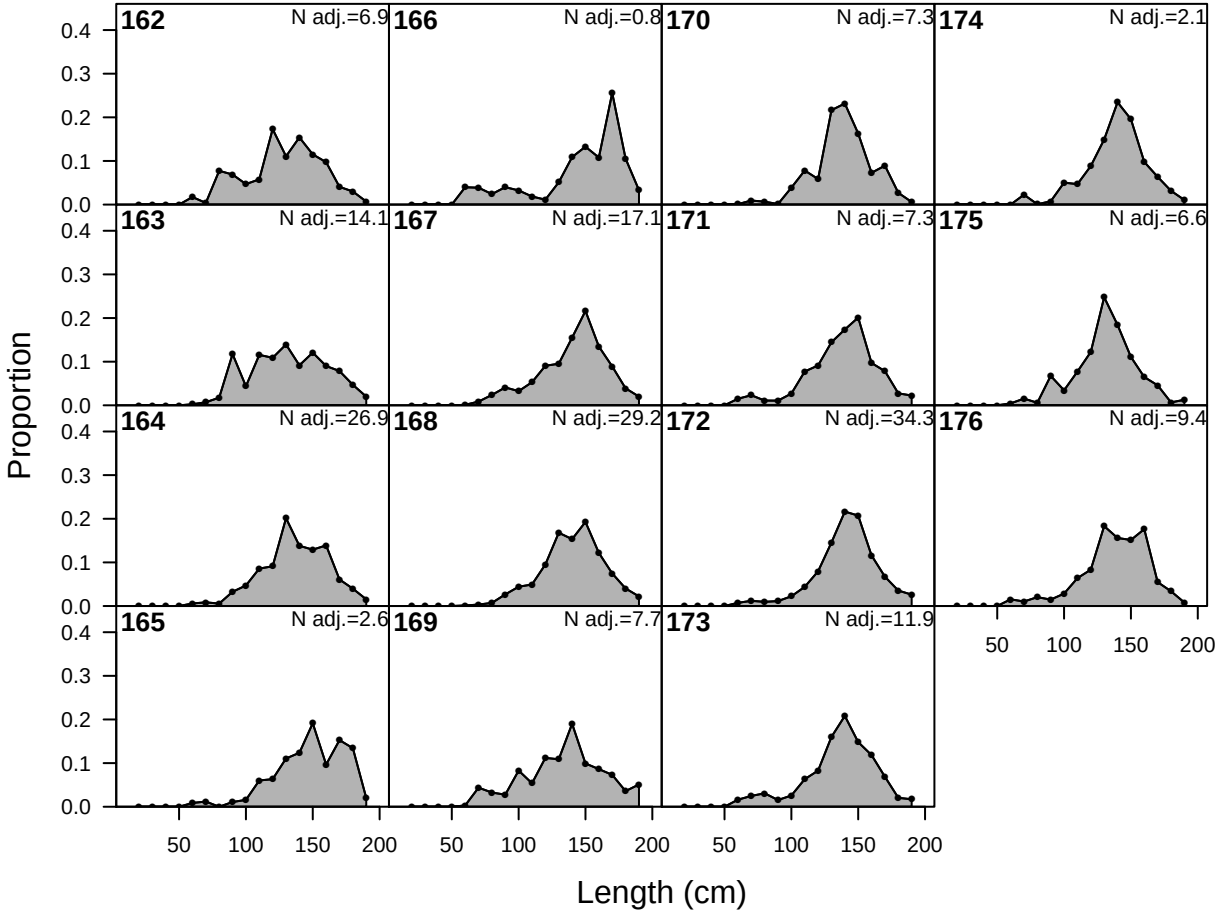

81
N adj.=78.6
85
N adj.=93.3
89
N adj.=67.4
93
N adj.=60.9
82
N adj.=66.5
86
N adj.=72.6
90
N adj.=73.8
94
N adj.=31.1
83
N adj.=68.2
87
N adj.=64.9
91
N adj.=39.2
95
N adj.=44.2
84
N adj.=77.7
88
N adj.=68.3
92
N adj.=39.9
96
N adj.=53.1
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

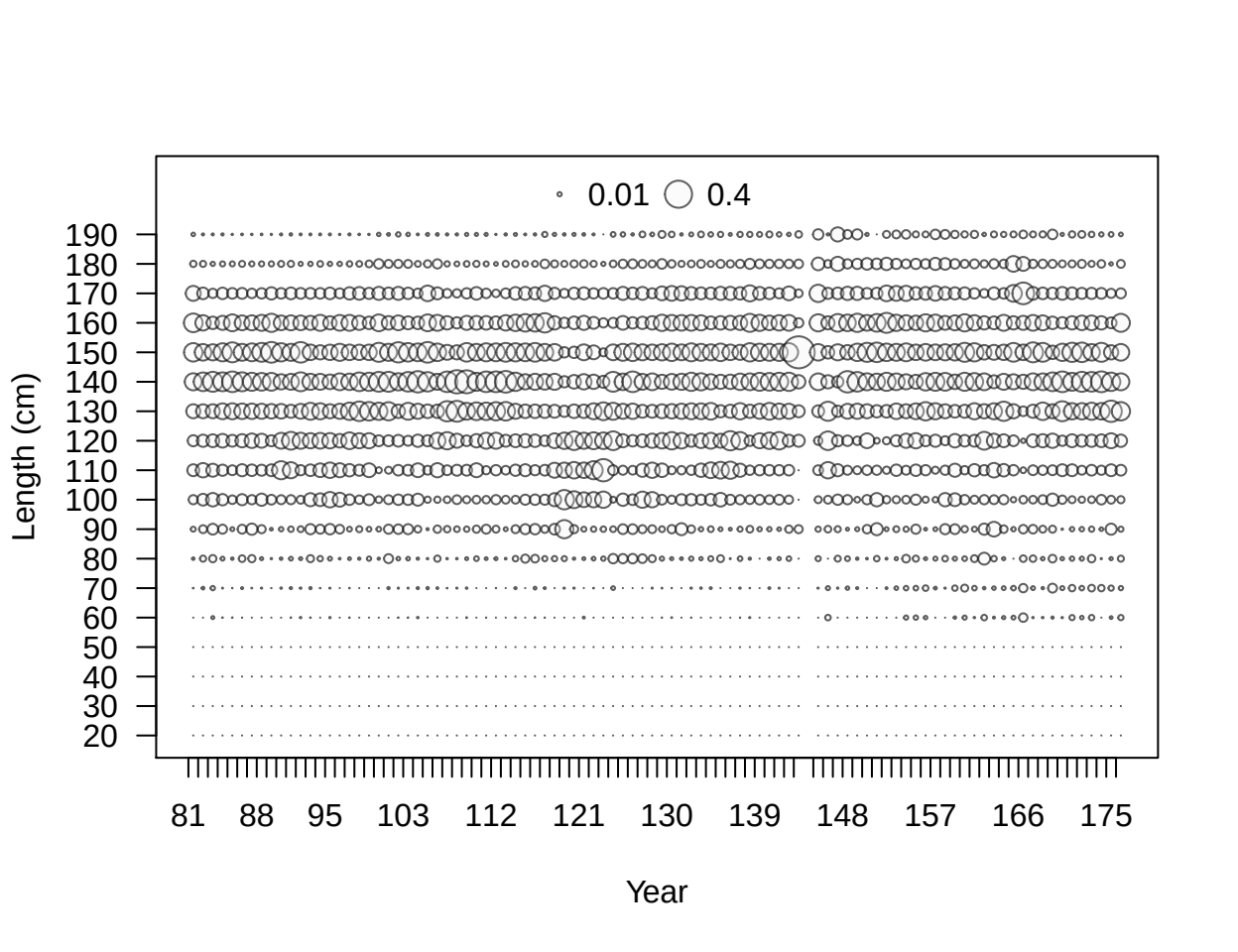

97
N adj.=39.7
101
N adj.=31.7
105
N adj.=31.5
109
N adj.=54.6
98
N adj.=33.6
102
N adj.=31.8
106
N adj.=26.8
110
N adj.=37.1
99
N adj.=20.4
103
N adj.=45.6
107
N adj.=48.9
111
N adj.=54.1
100
N adj.=21.2
104
N adj.=52.5
108
N adj.=48.9
112
N adj.=72.3
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

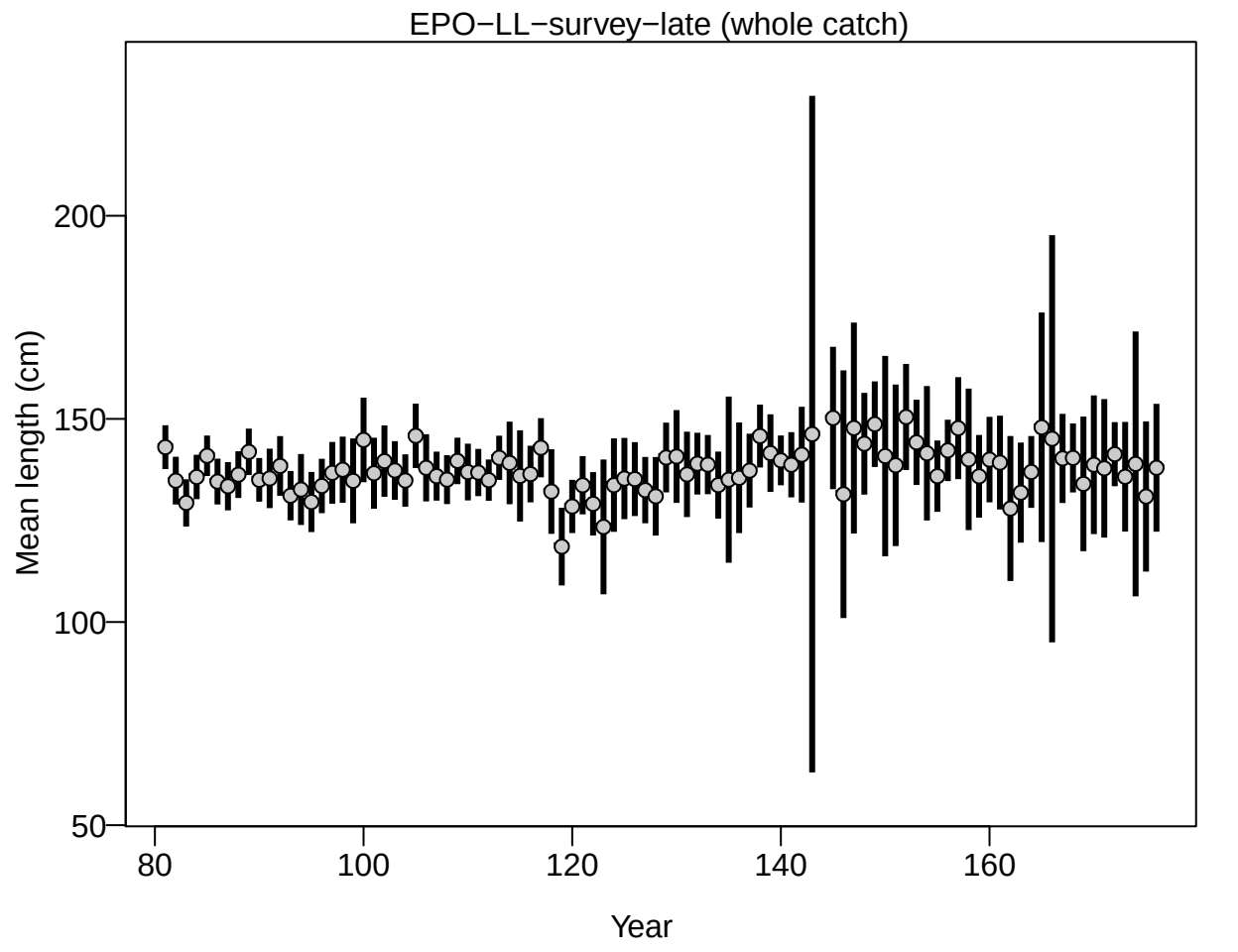

113
N adj.=66.2
117
N adj.=53.2
121
N adj.=44.5
125
N adj.=20.3
114
N adj.=20.5
118
N adj.=26.7
122
N adj.=33.9
126
N adj.=25.8
115
N adj.=18.6
119
N adj.=30.6
123
N adj.=7
127
N adj.=32.4
116
N adj.=53.8
120
N adj.=59.8
124
N adj.=14.7
128
N adj.=22.9
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

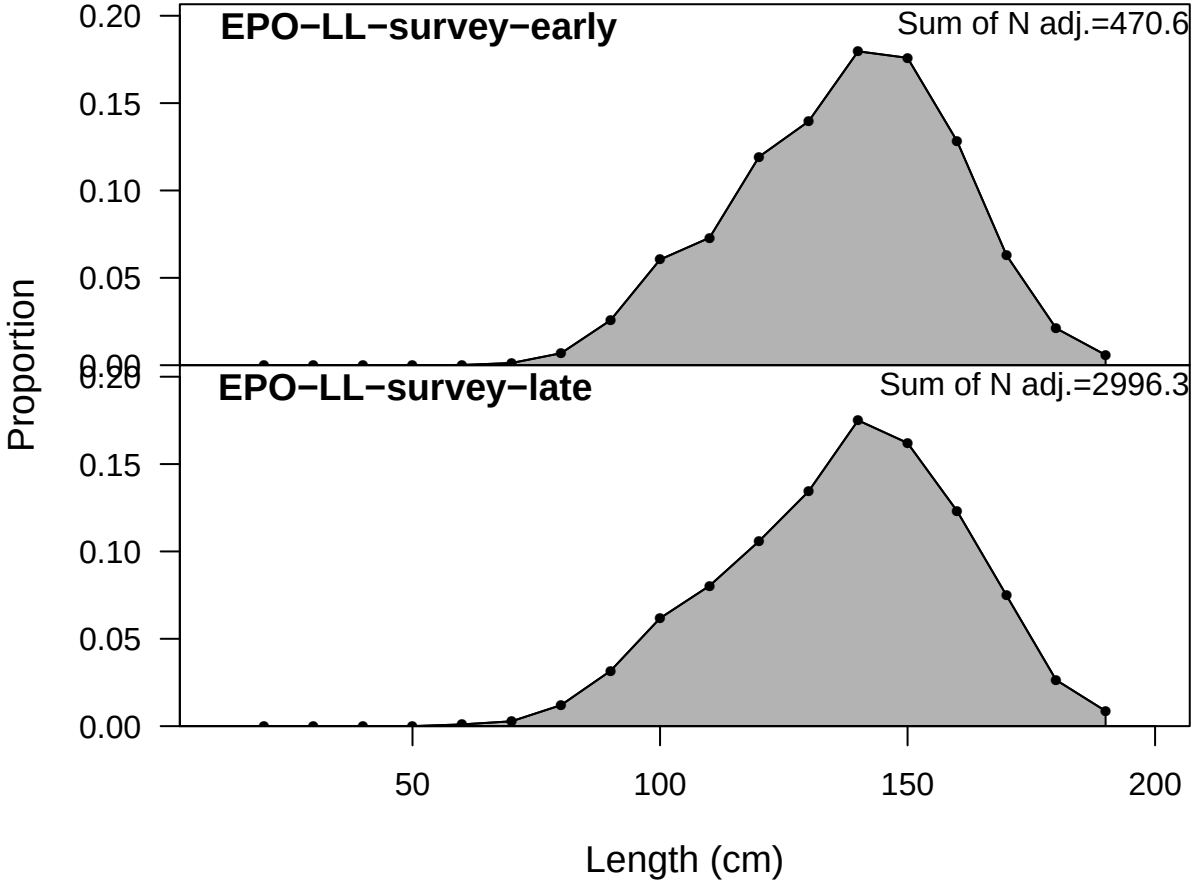

129
N adj.=28.8
133
N adj.=45.2
137
N adj.=25.2
141
N adj.=28.2
130
N adj.=16.8
134
N adj.=34.2
138
N adj.=33.3
142
N adj.=13.5
131
N adj.=20.9
135
N adj.=5.3
139
N adj.=20.9
143
N adj.=0.3
132
N adj.=41.6
136
N adj.=11.6
140
N adj.=48.9
145
N adj.=7.1
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

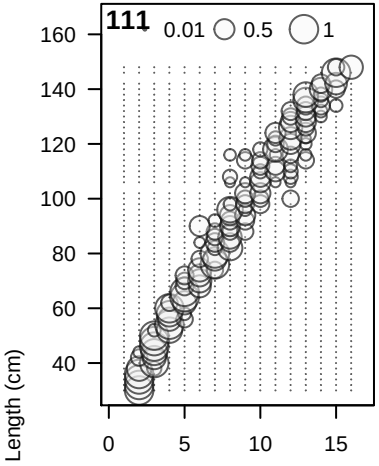

146
N adj.=2.4
150
N adj.=3.8
154
N adj.=8.4
158
N adj.=8.2
147
N adj.=3.3
151
N adj.=6
155
N adj.=29.4
159
N adj.=23.8
148
N adj.=14.1
152
N adj.=13.9
156
N adj.=40.6
160
N adj.=21.6
149
N adj.=20.2
153
N adj.=21.2
157
N adj.=15.3
161
N adj.=17.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)


162
N adj.=6.9
166
N adj.=0.8
170
N adj.=7.3
174
N adj.=2.1
163
N adj.=14.1
167
N adj.=17.1
171
N adj.=7.3
175
N adj.=6.6
164
N adj.=26.9
168
N adj.=29.2
172
N adj.=34.3
176
N adj.=9.4
165
N adj.=2.6
169
N adj.=7.7
173
N adj.=11.9
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

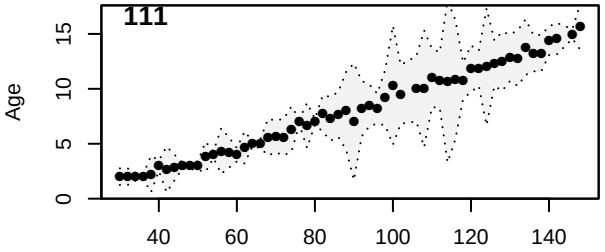

0.01
0.4
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
Length (cm)
81
88
95
103
112
121
130
139
148
157
166
175
Year

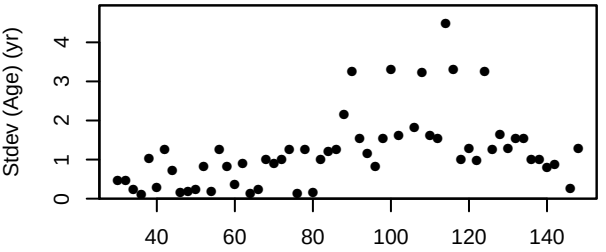

EPO−LL−survey−late (whole catch)
Mean length (cm)
200
150
100
50
80
100
120
140
160
Year


EPO−LL−survey−early
Sum of N adj.=470.6
EPO−LL−survey−late
Sum of N adj.=2996.3
Proportion
0.00
0.05
0.10
0.15
0.20
50
100
150
200
Length (cm)

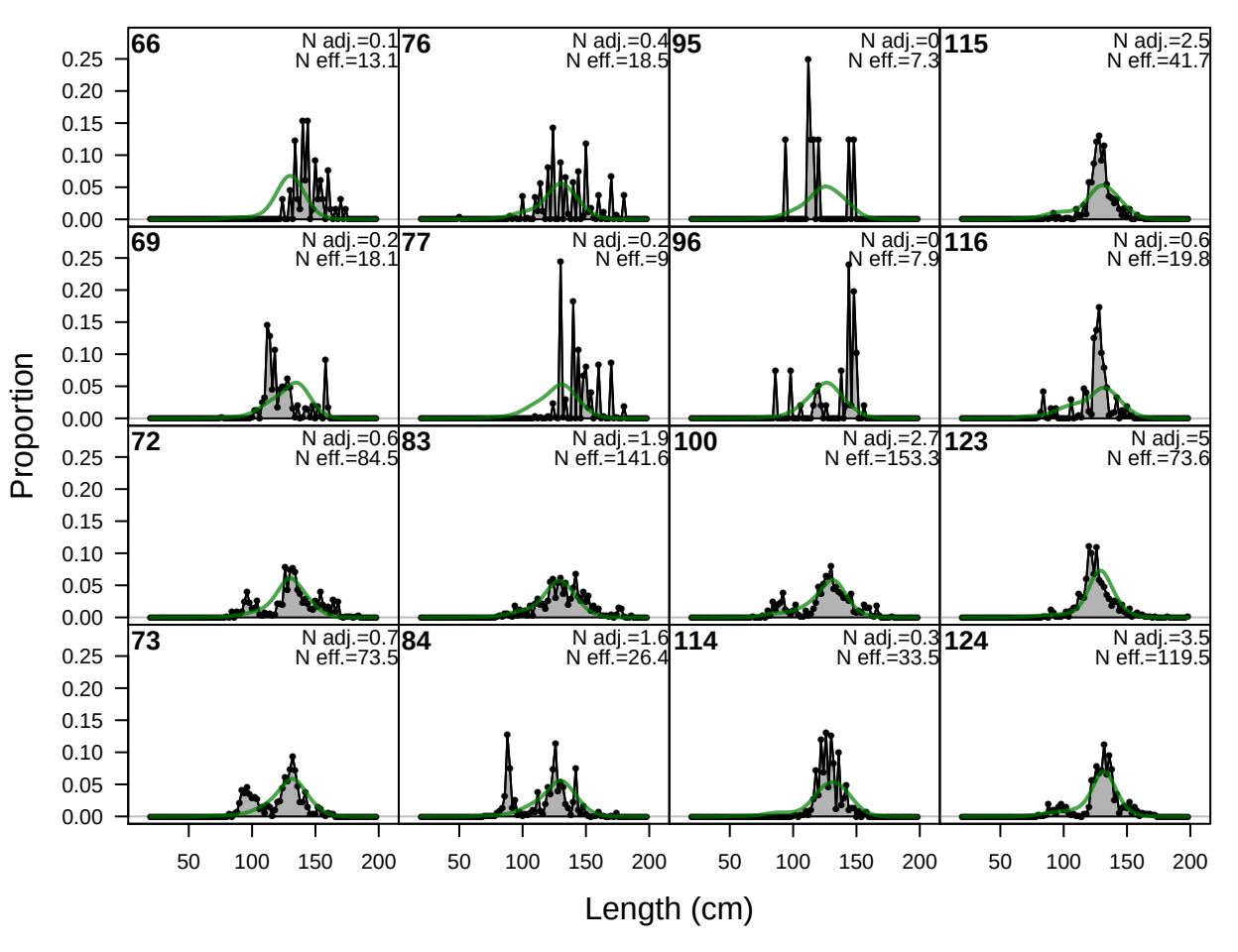


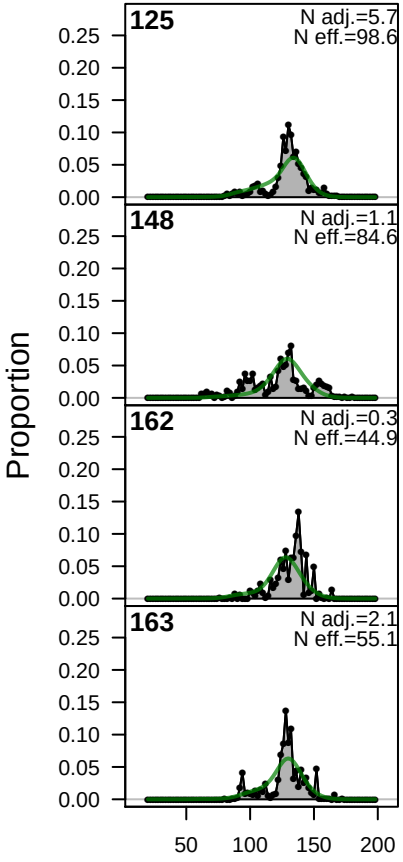
Age (yr)

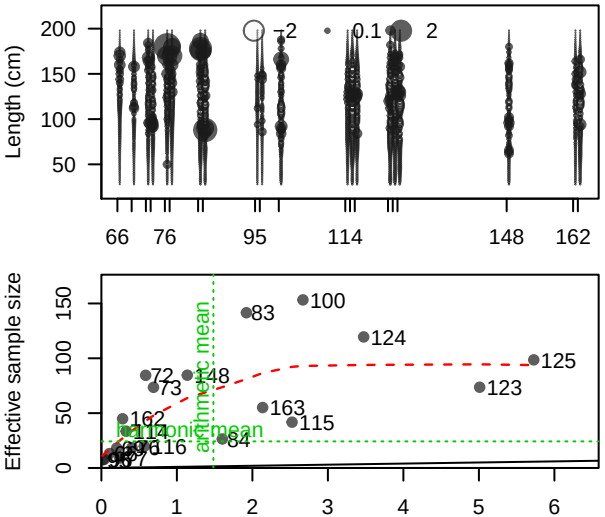

111
Age
0
5
10
15
40
60
80
100
120
140

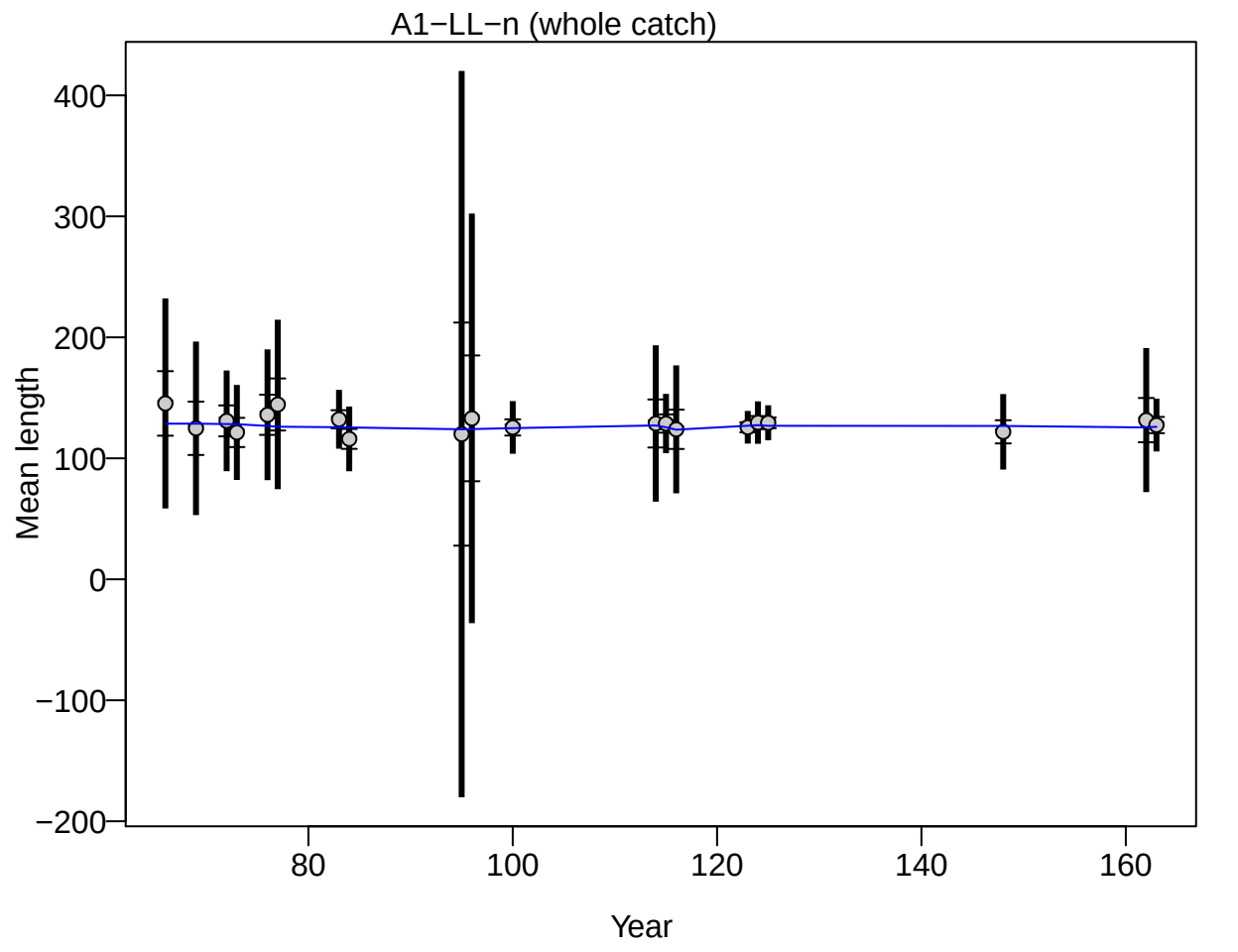

Stdev (Age) (yr)
0
1
2
3
4
40
60
80
100
120
140

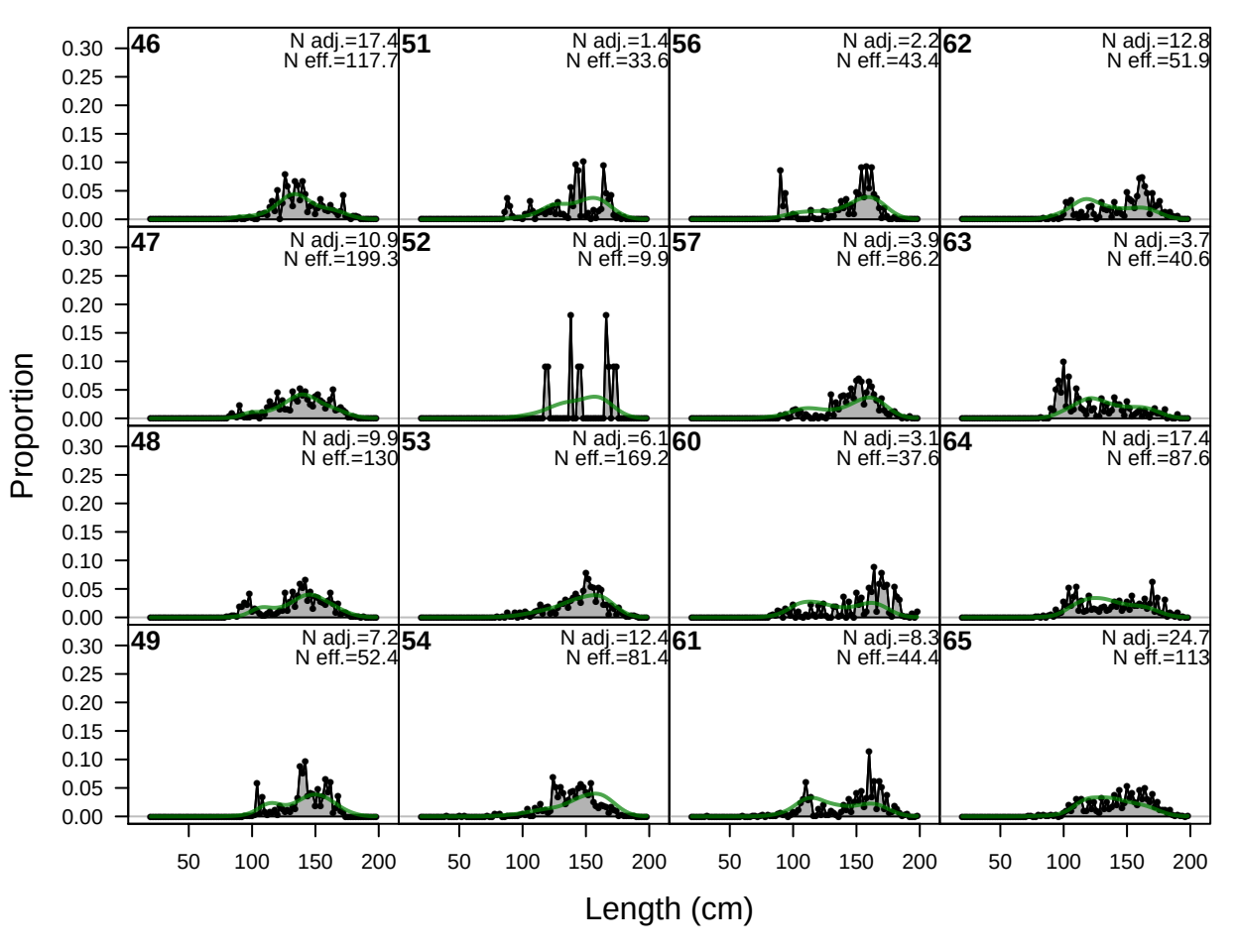
Length (cm)


66
N adj.=0.1
N eff.=13.1
76
N adj.=0.4
N eff.=18.5
95
N adj.=0
N eff.=7.3
115
N adj.=2.5
N eff.=41.7
69
N adj.=0.2
N eff.=18.1
77
N adj.=0.2
N eff.=9
96
N adj.=0
N eff.=7.9
116
N adj.=0.6
N eff.=19.8
72
N adj.=0.6
N eff.=84.5
83
N adj.=1.9
N eff.=141.6
100
N adj.=2.7
N eff.=153.3
123
N adj.=5
N eff.=73.6
73
N adj.=0.7
N eff.=73.5
84
N adj.=1.6
N eff.=26.4
114
N adj.=0.3
N eff.=33.5
124
N adj.=3.5
N eff.=119.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)


125
N adj.=5.7
N eff.=98.6
148
N adj.=1.1
N eff.=84.6
162
N adj.=0.3
N eff.=44.9
163
N adj.=2.1
N eff.=55.1
Proportion
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Length (cm)


Length (cm)
200
150
100
50
2
0.1
2
66
76
95
114
148
162
Effective sample size
150
100
50
0
83
100
124
125
72
73
148
123
163
162
115
84
harmonic mean
arithmetic mean
0
1
2
3
4
5
6


A1−LL−n (whole catch)
Mean length
Year
400
300
200
100
0
−100
−200
80
100
120
140
160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47
N adj.=10.9
N eff.=199.3
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N adj.=0.1
N eff.=9.9
57
N adj.=3.9
N eff.=86.2
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N adj.=3.7
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48
N adj.=9.9
N eff.=130
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N adj.=3.1
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N adj.=17.4
N eff.=87.6
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N adj.=7.2
N eff.=52.4
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N adj.=12.4
N eff.=81.4
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N adj.=8.3
N eff.=44.4
65
N adj.=24.7
N eff.=113
Proportion
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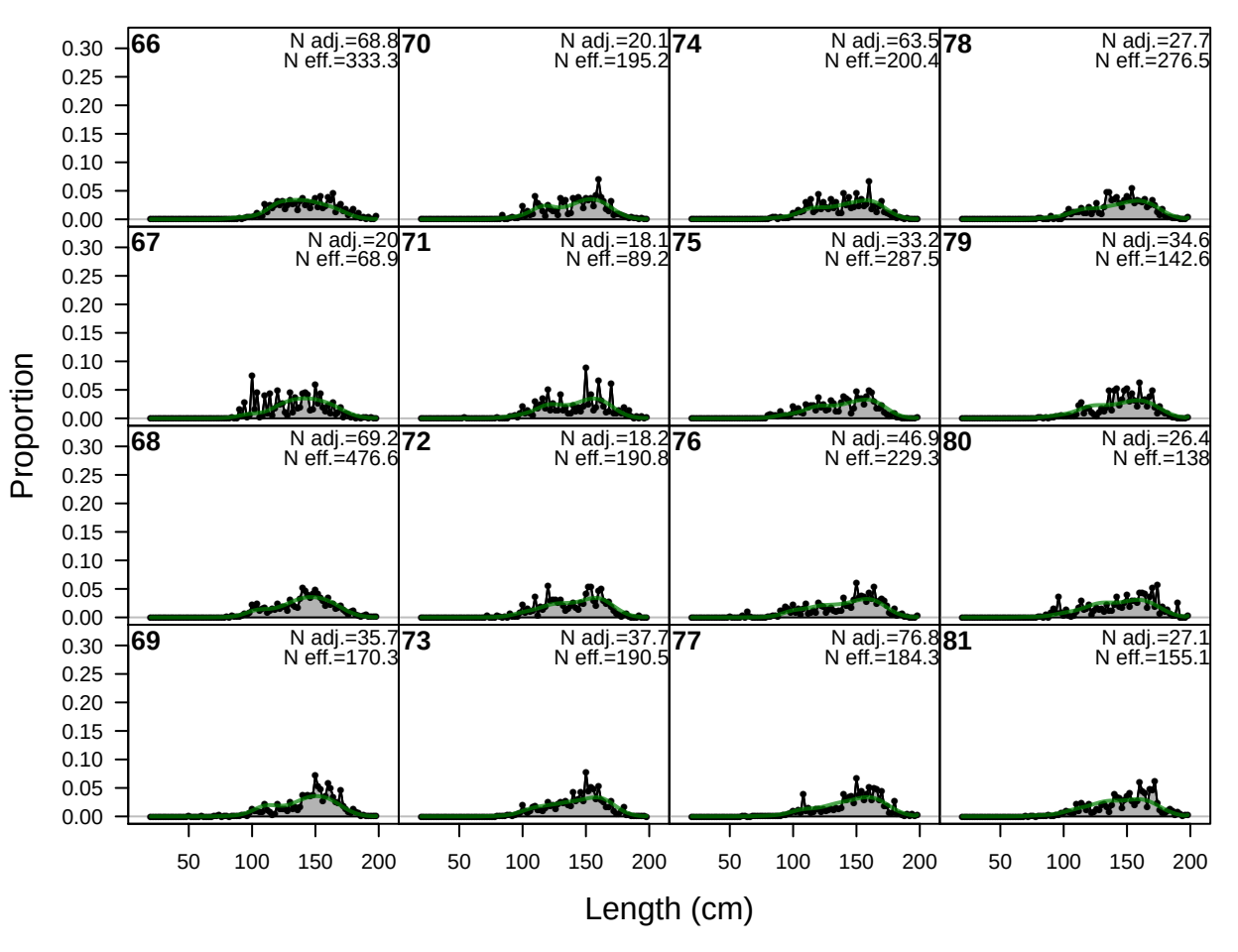
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N eff.=89.2
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N adj.=33.2
N eff.=287.5
79
N adj.=34.6
N eff.=142.6
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N adj.=69.2
N eff.=476.6
72
N adj.=18.2
N eff.=190.8
76
N adj.=46.9
N eff.=229.3
80
N adj.=26.4
N eff.=138
69
N adj.=35.7
N eff.=170.3
73
N adj.=37.7
N eff.=190.5
77
N adj.=76.8
N eff.=184.3
81
N adj.=27.1
N eff.=155.1
Proportion
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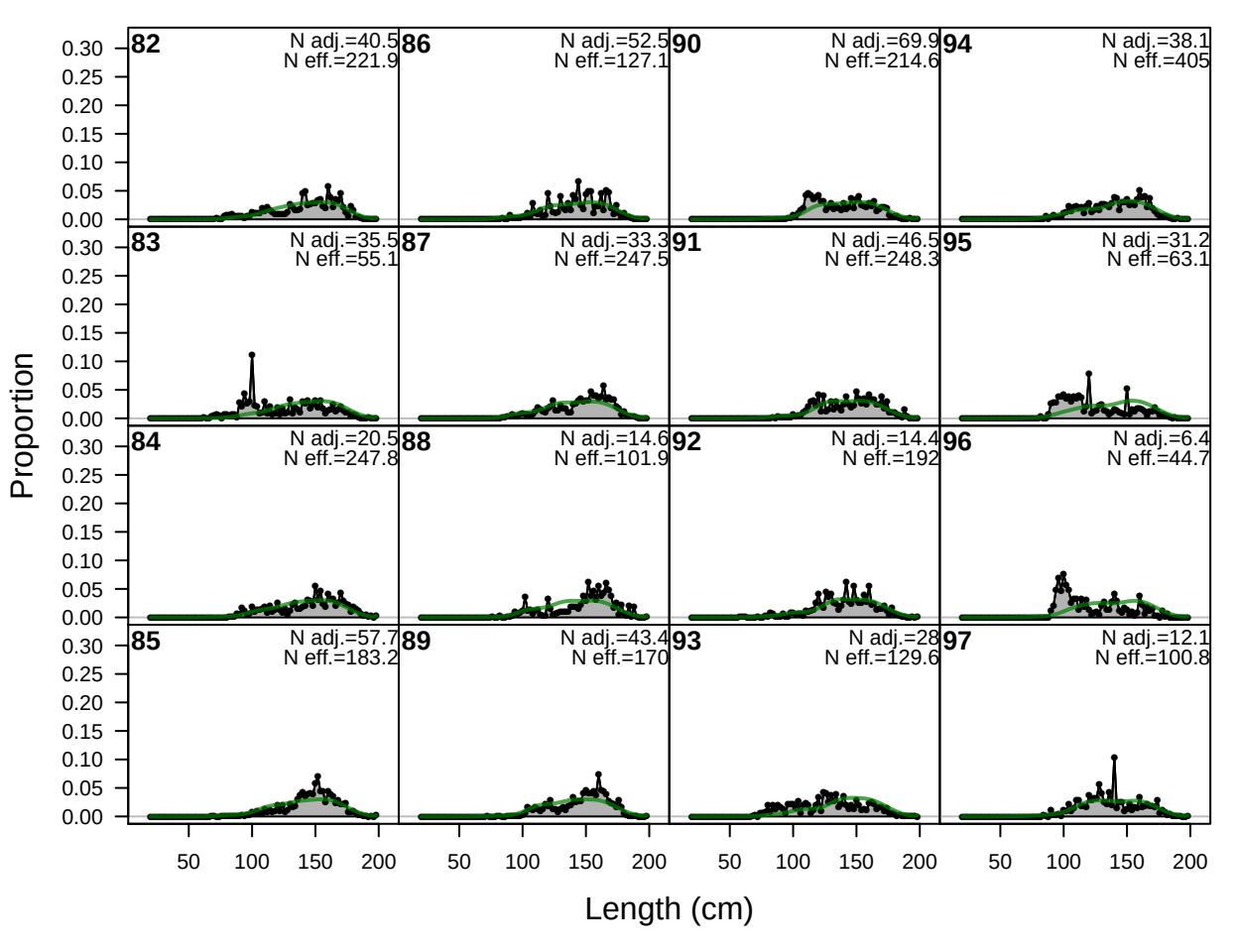
0.20
0.25
0.30
50
100
150
200
Length (cm)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83
N adj.=35.5
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87
N adj.=33.3
N eff.=247.5
91
N adj.=46.5
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N adj.=31.2
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84
N adj.=20.5
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88
N adj.=14.6
N eff.=101.9
92
N adj.=14.4
N eff.=192
96
N adj.=6.4
N eff.=44.7
85
N adj.=57.7
N eff.=183.2
89
N adj.=43.4
N eff.=170
93
N adj.=28
N eff.=129.6
97
N adj.=12.1
N eff.=100.8
Proportion
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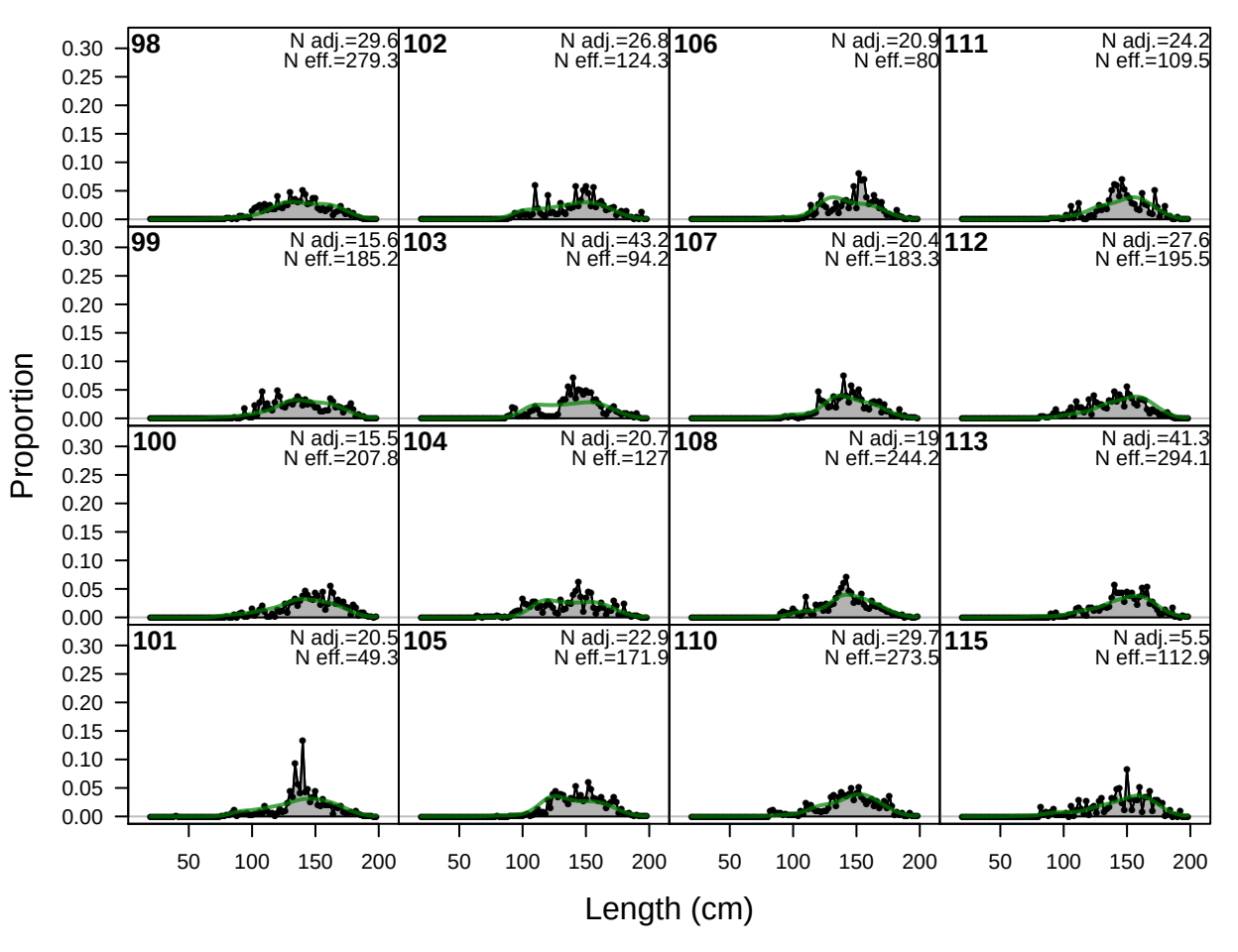
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N adj.=15.6
N eff.=185.2
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N adj.=43.2
N eff.=94.2
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N eff.=244.2
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N eff.=49.3
105
N adj.=22.9
N eff.=171.9
110
N adj.=29.7
N eff.=273.5
115
N adj.=5.5
N eff.=112.9
Proportion
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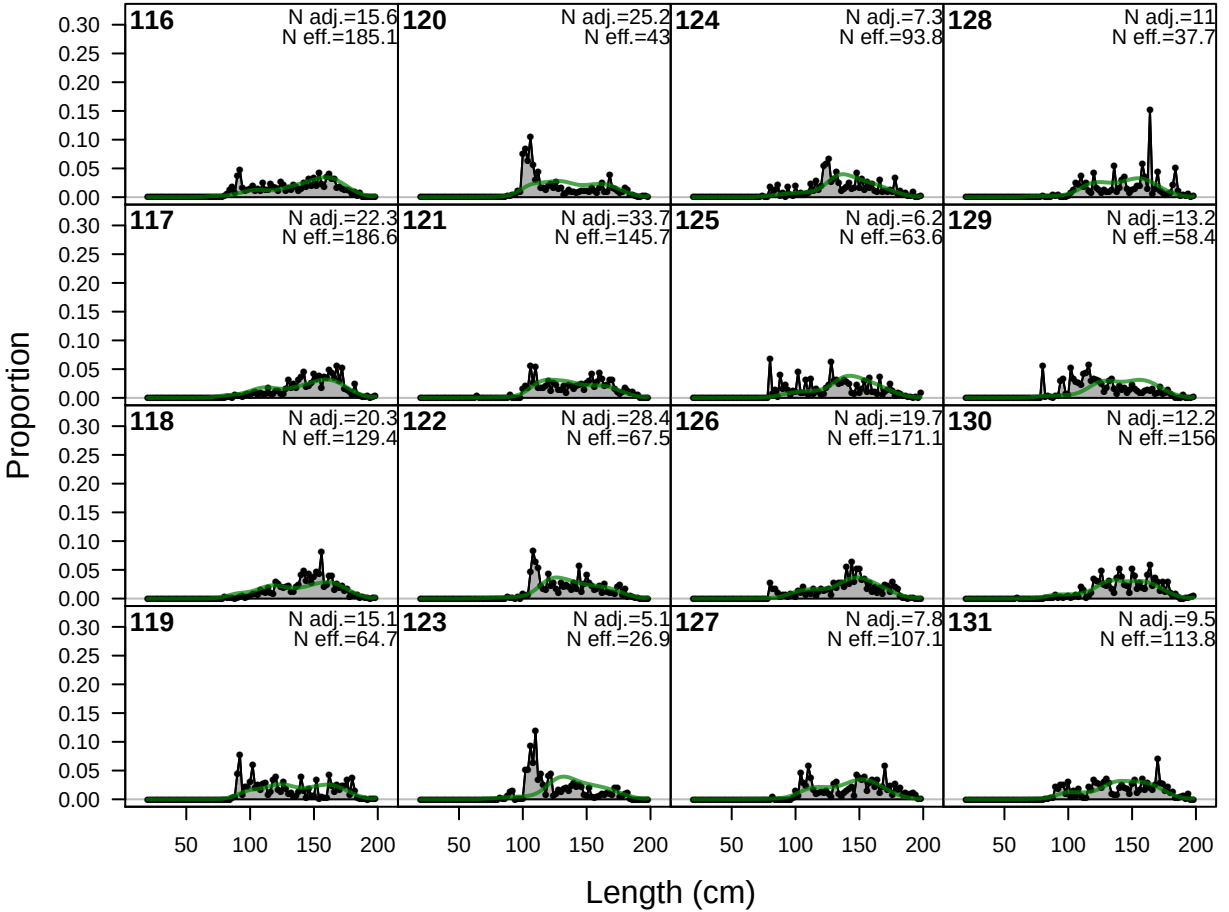
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N adj.=25.2
N eff.=43
124
N adj.=7.3
N eff.=93.8
128
N adj.=11
N eff.=37.7
117
N adj.=22.3
N eff.=186.6
121
N adj.=33.7
N eff.=145.7
125
N adj.=6.2
N eff.=63.6
129
N adj.=13.2
N eff.=58.4
118
N adj.=20.3
N eff.=129.4
122
N adj.=28.4
N eff.=67.5
126
N adj.=19.7
N eff.=171.1
130
N adj.=12.2
N eff.=156
119
N adj.=15.1
N eff.=64.7
123
N adj.=5.1
N eff.=26.9
127
N adj.=7.8
N eff.=107.1
131
N adj.=9.5
N eff.=113.8
Proportion
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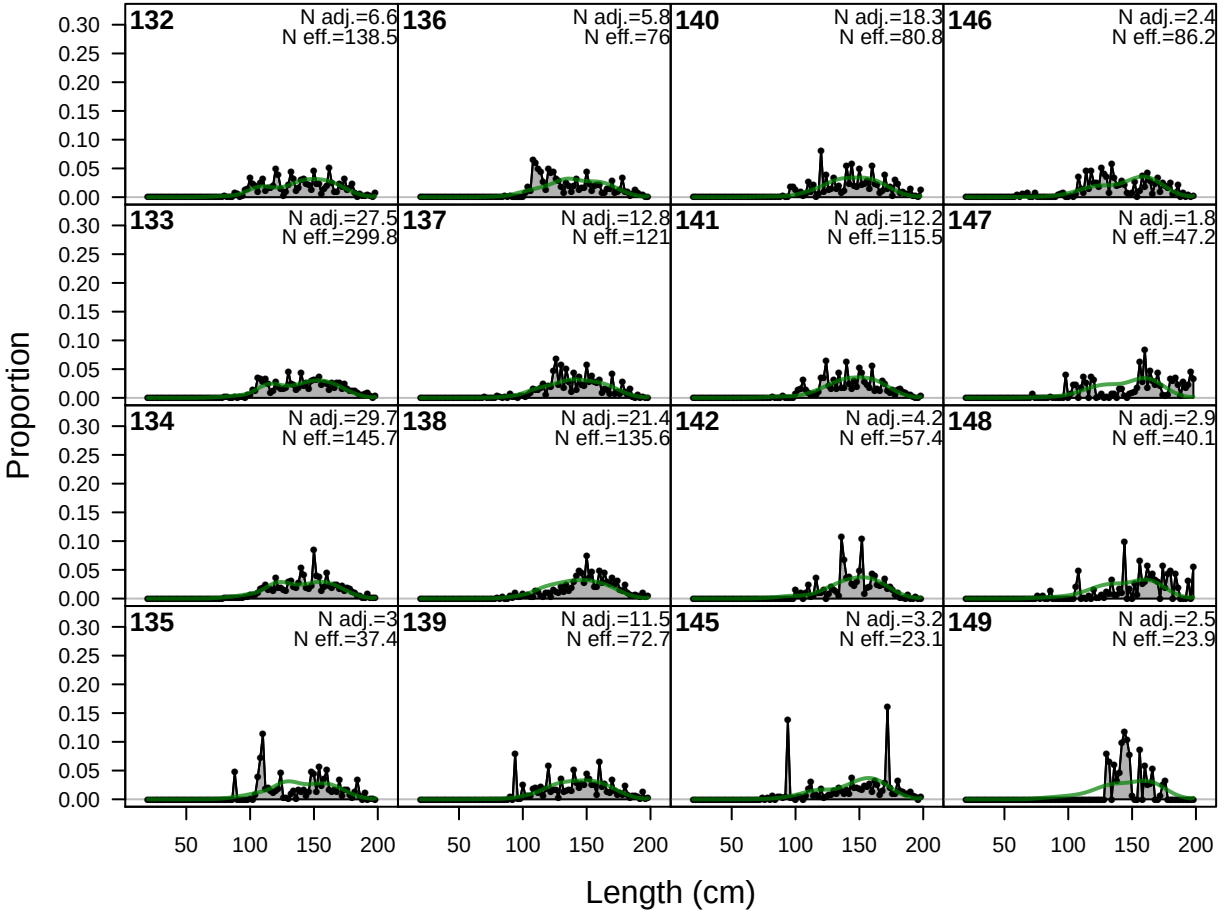
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N eff.=76
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N eff.=80.8
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N eff.=86.2
133
N adj.=27.5
N eff.=299.8
137
N adj.=12.8
N eff.=121
141
N adj.=12.2
N eff.=115.5
147
N adj.=1.8
N eff.=47.2
134
N adj.=29.7
N eff.=145.7
138
N adj.=21.4
N eff.=135.6
142
N adj.=4.2
N eff.=57.4
148
N adj.=2.9
N eff.=40.1
135
N adj.=3
N eff.=37.4
139
N adj.=11.5
N eff.=72.7
145
N adj.=3.2
N eff.=23.1
149
N adj.=2.5
N eff.=23.9
Proportion
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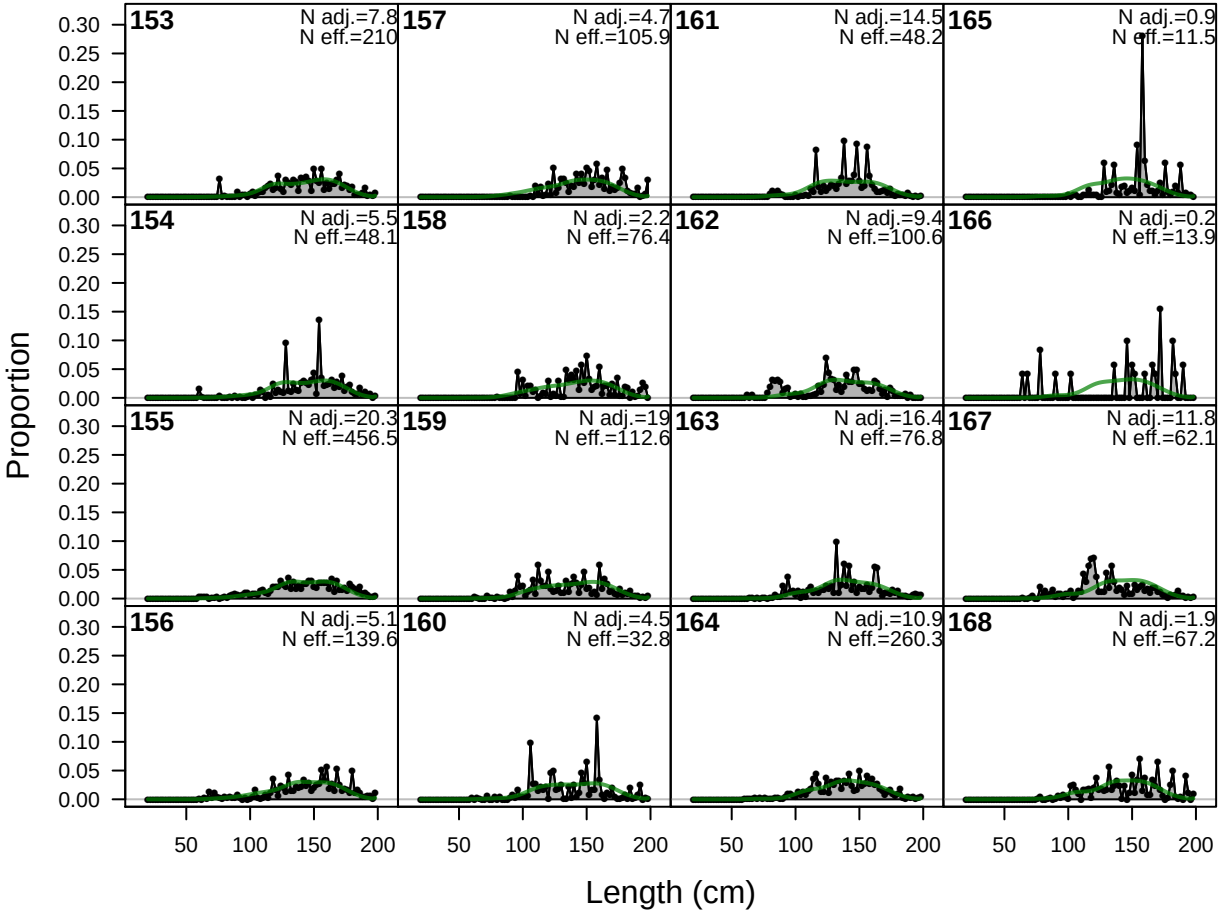
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N eff.=210
157
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N eff.=105.9
161
N adj.=14.5
N eff.=48.2
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N eff.=11.5
154
N adj.=5.5
N eff.=48.1
158
N adj.=2.2
N eff.=76.4
162
N adj.=9.4
N eff.=100.6
166
N adj.=0.2
N eff.=13.9
155
N adj.=20.3
N eff.=456.5
159
N adj.=19
N eff.=112.6
163
N adj.=16.4
N eff.=76.8
167
N adj.=11.8
N eff.=62.1
156
N adj.=5.1
N eff.=139.6
160
N adj.=4.5
N eff.=32.8
164
N adj.=10.9
N eff.=260.3
168
N adj.=1.9
N eff.=67.2
Proportion
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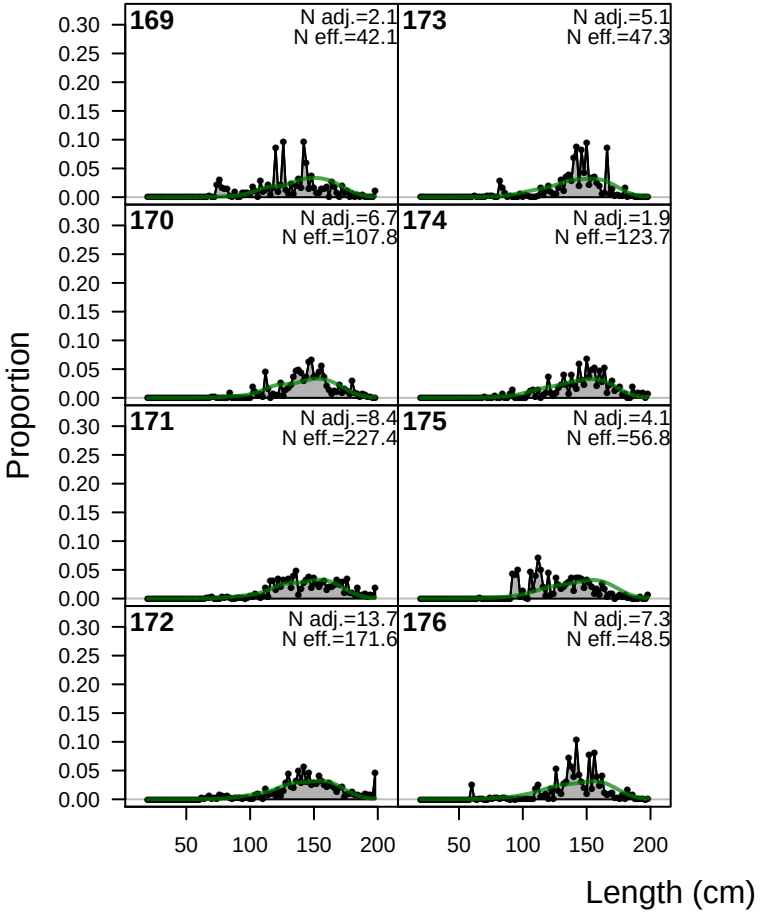
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N eff.=42.1
173
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N eff.=47.3
170
N adj.=6.7
N eff.=107.8
174
N adj.=1.9
N eff.=123.7
171
N adj.=8.4
N eff.=227.4
175
N adj.=4.1
N eff.=56.8
172
N adj.=13.7
N eff.=171.6
176
N adj.=7.3
N eff.=48.5
Proportion
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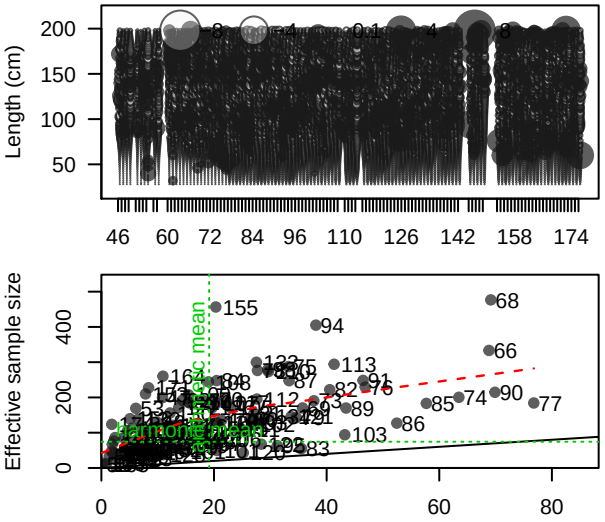
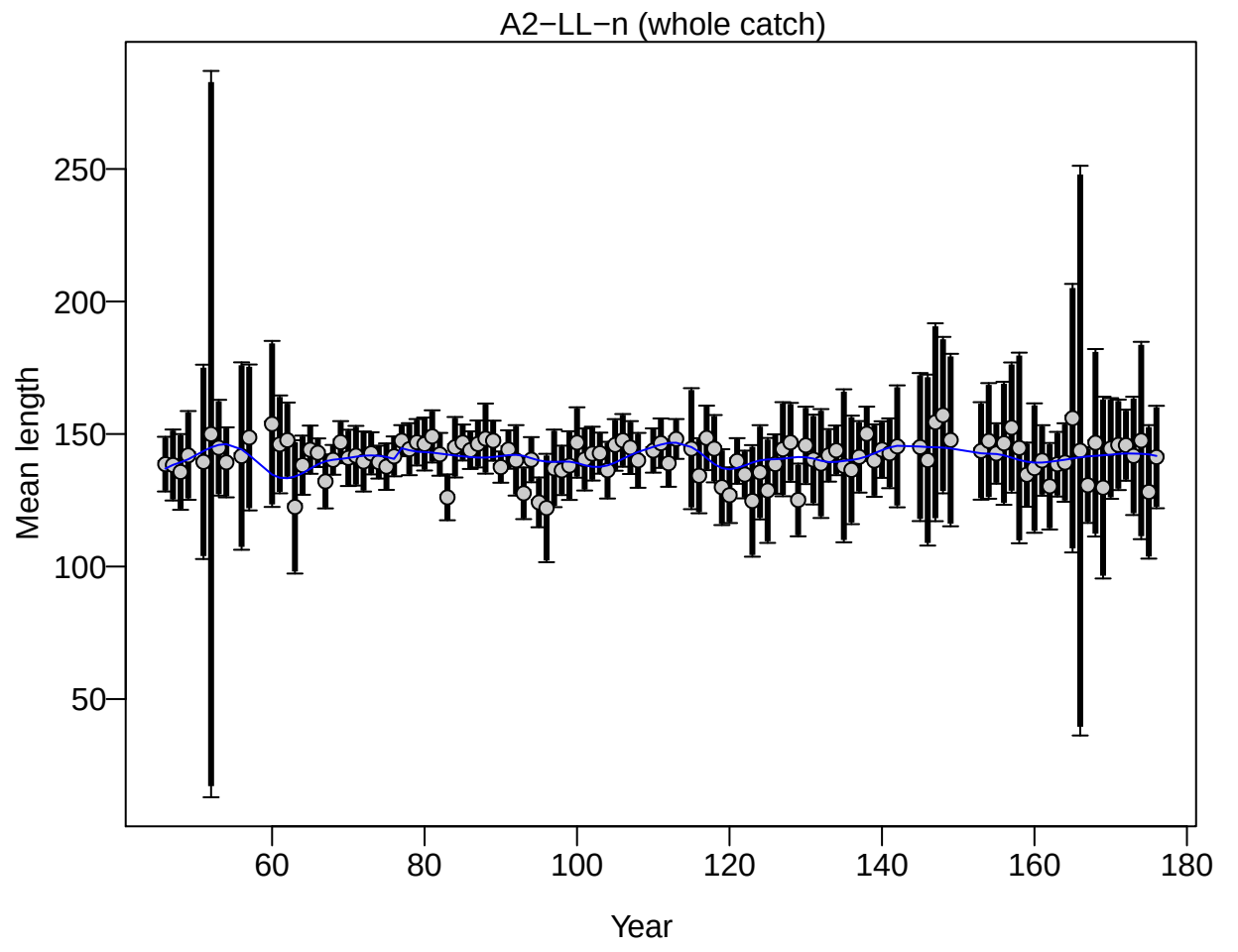
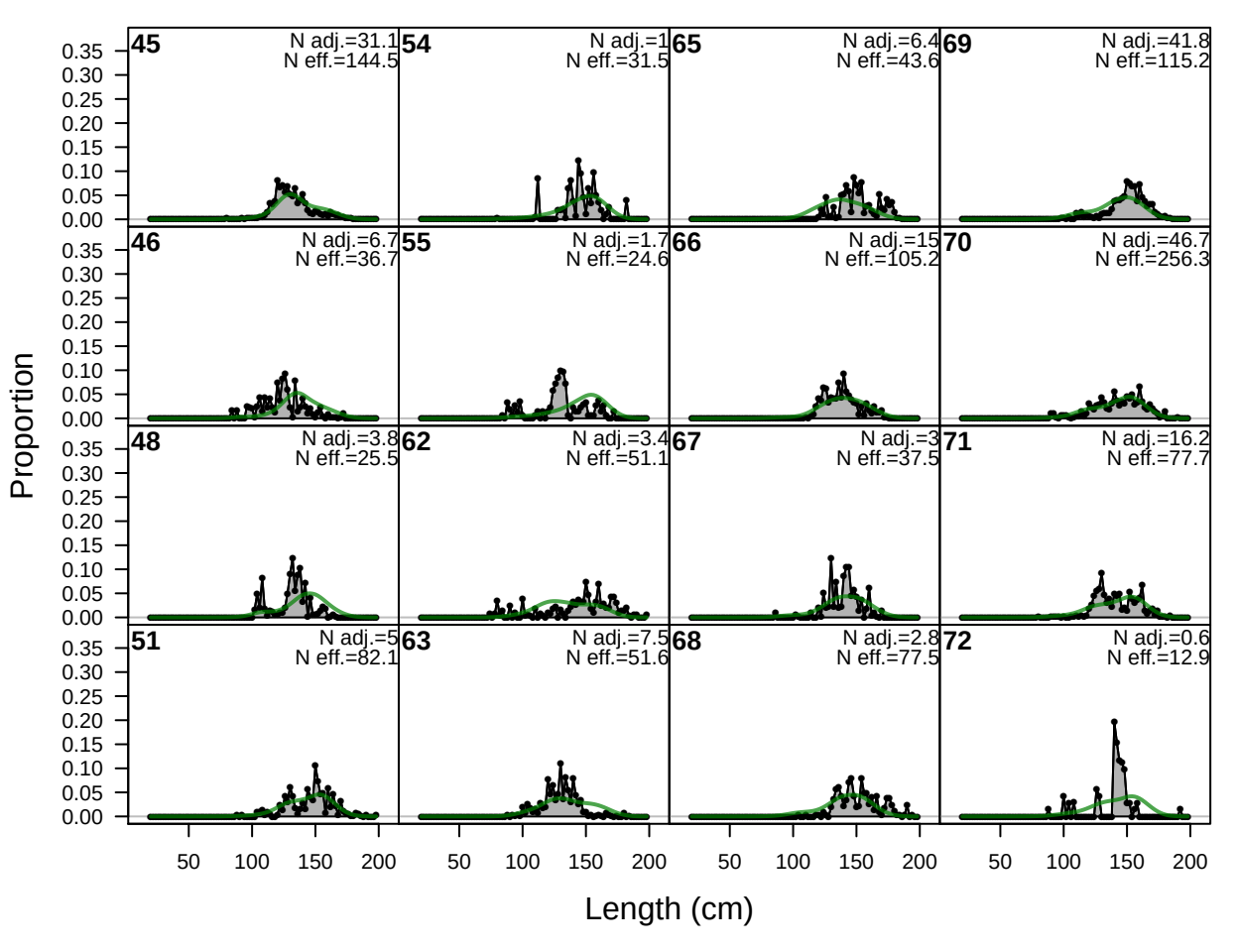
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)



Length (cm)
200
150
100
50
46
60
72
84
96
110
126
142
158
174
Effective sample size
400
200
0
0
20
40
60
80
155
94
68
66
113
91
76
82
74
90
77
85
89
86
103
83


A2−LL−n (whole catch)
Mean length
250
200
150
100
50
60
80
100
120
140
160
180
Year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N eff.=31.5
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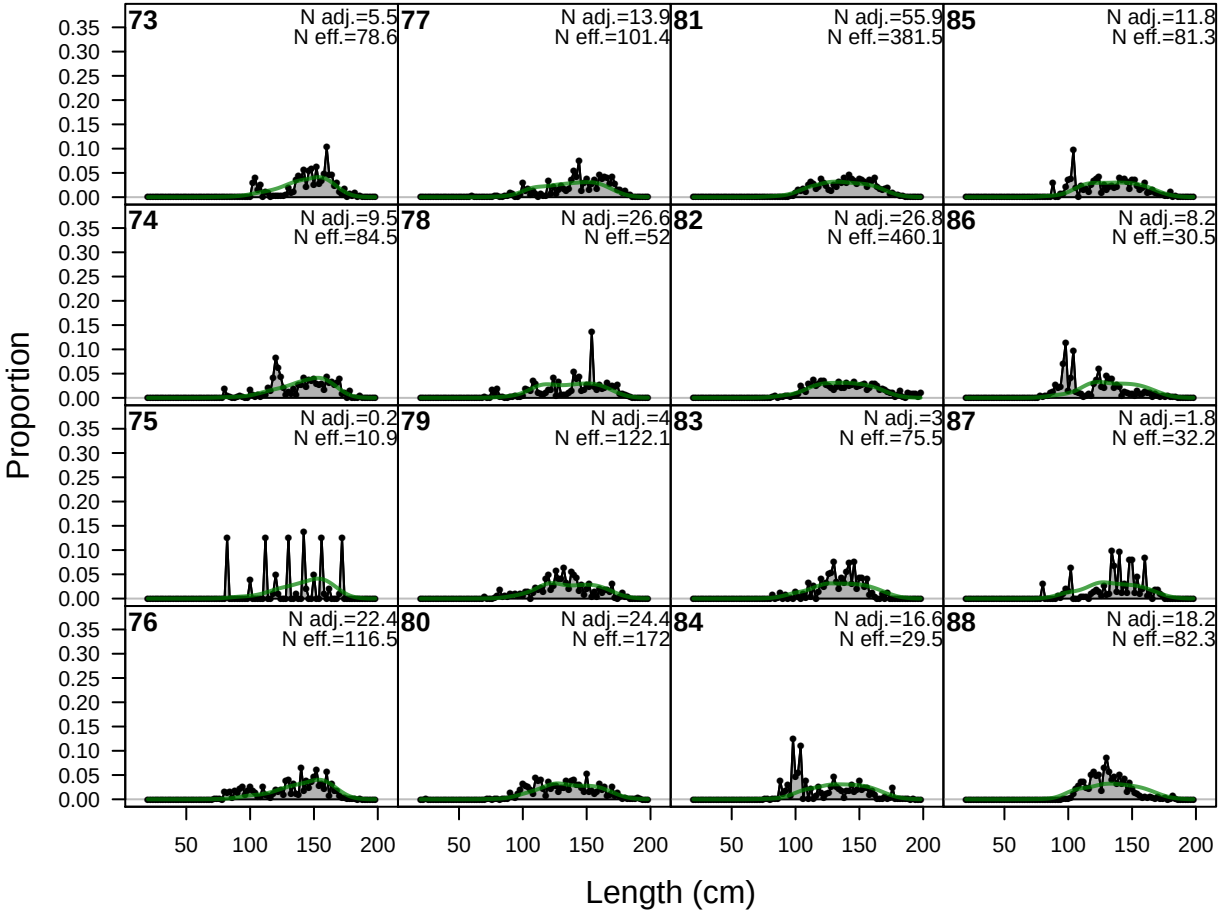
N eff.=43.6
69
N adj.=41.8
N eff.=115.2
46
N adj.=6.7
N eff.=36.7
55
N adj.=1.7
N eff.=24.6
66
N adj.=15
N eff.=105.2
70
N adj.=46.7
N eff.=256.3
48
N adj.=3.8
N eff.=25.5
62
N adj.=3.4
N eff.=51.1
67
N adj.=3
N eff.=37.5
71
N adj.=16.2
N eff.=77.7
51
N adj.=5
N eff.=82.1
63
N adj.=7.5
N eff.=51.6
68
N adj.=2.8
N eff.=77.5
72
N adj.=0.6
N eff.=12.9
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)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N adj.=11.8
N eff.=81.3
74
N adj.=9.5
N eff.=84.5
78
N adj.=26.6
N eff.=52
82
N adj.=26.8
N eff.=460.1
86
N adj.=8.2
N eff.=30.5
75
N adj.=0.2
N eff.=10.9
79
N adj.=4
N eff.=122.1
83
N adj.=3
N eff.=75.5
87
N adj.=1.8
N eff.=32.2
76
N adj.=22.4
N eff.=116.5
80
N adj.=24.4
N eff.=172
84
N adj.=16.6
N eff.=29.5
88
N adj.=18.2
N eff.=82.3
Proportion
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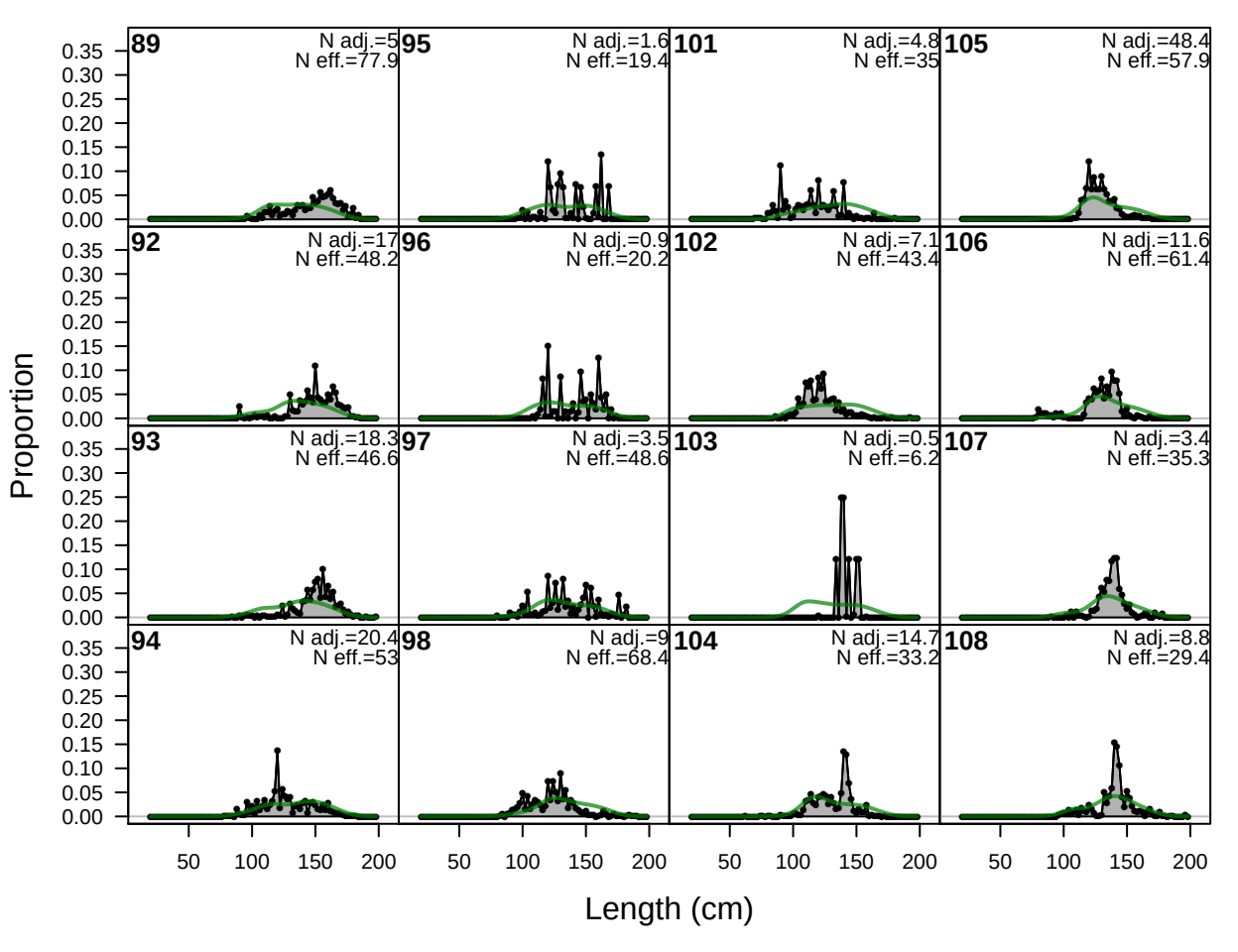
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)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101
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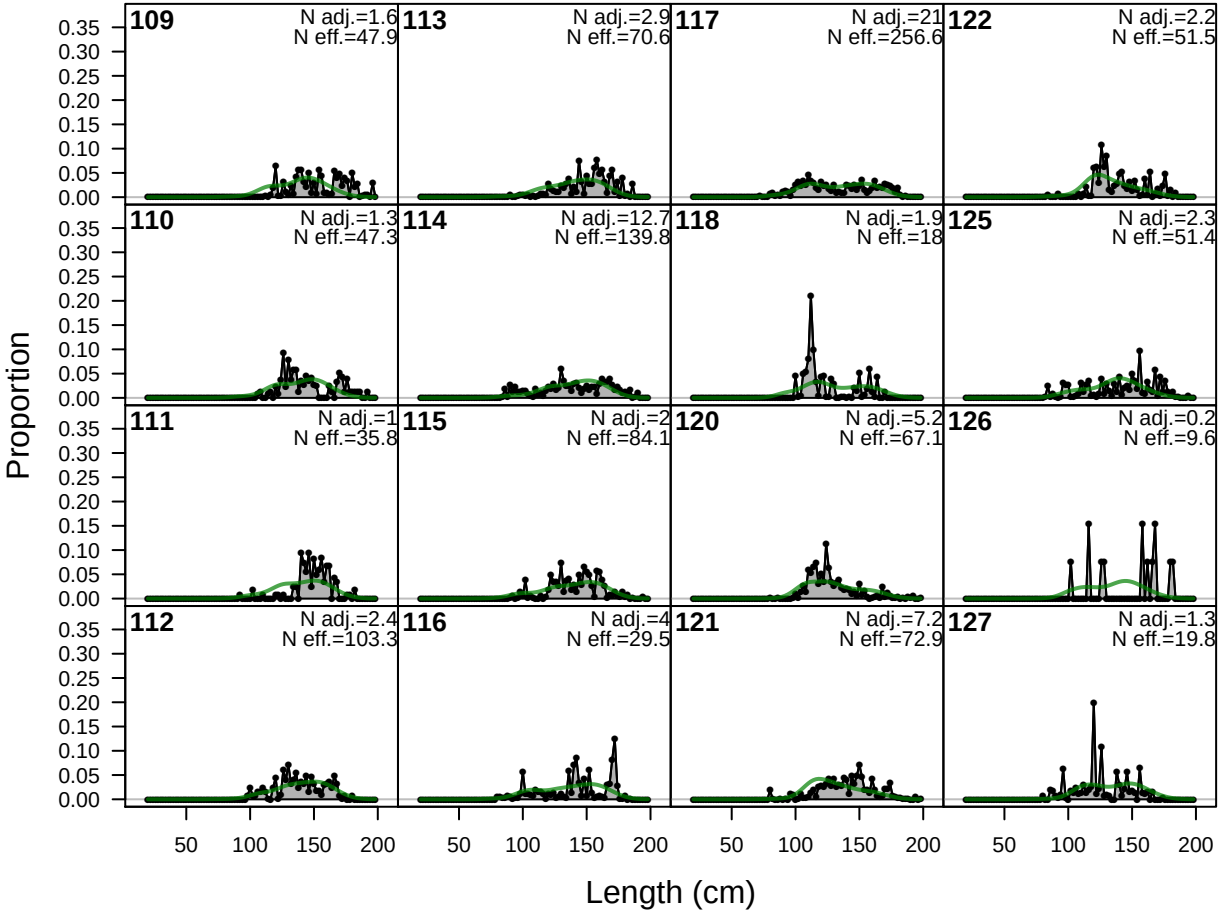
N eff.=35
105
N adj.=48.4
N eff.=57.9
92
N adj.=17
N eff.=48.2
96
N adj.=0.9
N eff.=20.2
102
N adj.=7.1
N eff.=43.4
106
N adj.=11.6
N eff.=61.4
93
N adj.=18.3
N eff.=46.6
97
N adj.=3.5
N eff.=48.6
103
N adj.=0.5
N eff.=6.2
107
N adj.=3.4
N eff.=35.3
94
N adj.=20.4
N eff.=53
98
N adj.=9
N eff.=68.4
104
N adj.=14.7
N eff.=33.2
108
N adj.=8.8
N eff.=29.4
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)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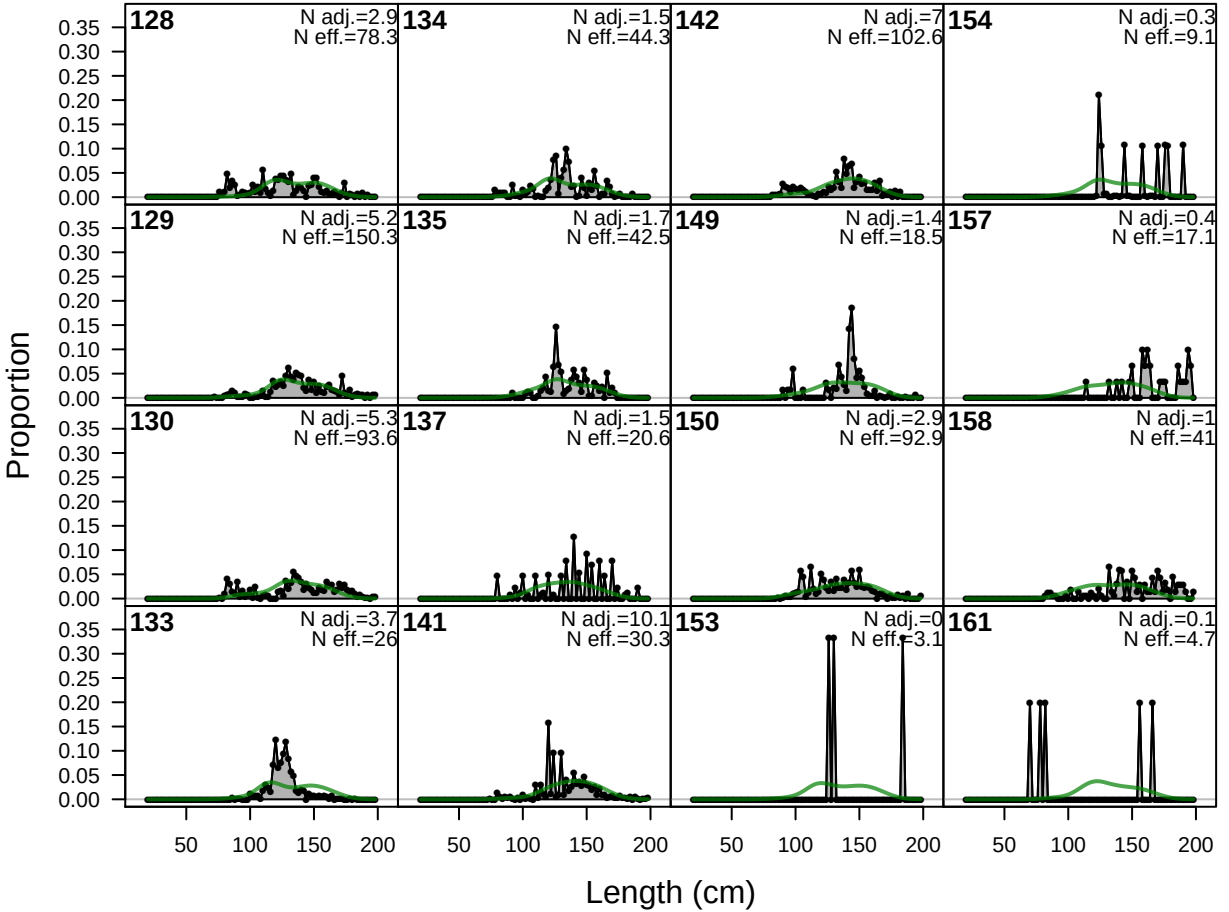
N eff.=47.9
113
N adj.=2.9
N eff.=70.6
117
N adj.=21
N eff.=256.6
122
N adj.=2.2
N eff.=51.5
110
N adj.=1.3
N eff.=47.3
114
N adj.=12.7
N eff.=139.8
118
N adj.=1.9
N eff.=18
125
N adj.=2.3
N eff.=51.4
111
N adj.=1
N eff.=35.8
115
N adj.=2
N eff.=84.1
120
N adj.=5.2
N eff.=67.1
126
N adj.=0.2
N eff.=9.6
112
N adj.=2.4
N eff.=103.3
116
N adj.=4
N eff.=29.5
121
N adj.=7.2
N eff.=72.9
127
N adj.=1.3
N eff.=19.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)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N eff.=78.3
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N eff.=44.3
142
N adj.=7
N eff.=102.6
154
N adj.=0.3
N eff.=9.1
129
N adj.=5.2
N eff.=150.3
135
N adj.=1.7
N eff.=42.5
149
N adj.=1.4
N eff.=18.5
157
N adj.=0.4
N eff.=17.1
130
N adj.=5.3
N eff.=93.6
137
N adj.=1.5
N eff.=20.6
150
N adj.=2.9
N eff.=92.9
158
N adj.=1
N eff.=41
133
N adj.=3.7
N eff.=26
141
N adj.=10.1
N eff.=30.3
153
N adj.=0
N eff.=3.1
161
N adj.=0.1
N eff.=4.7
Proportion
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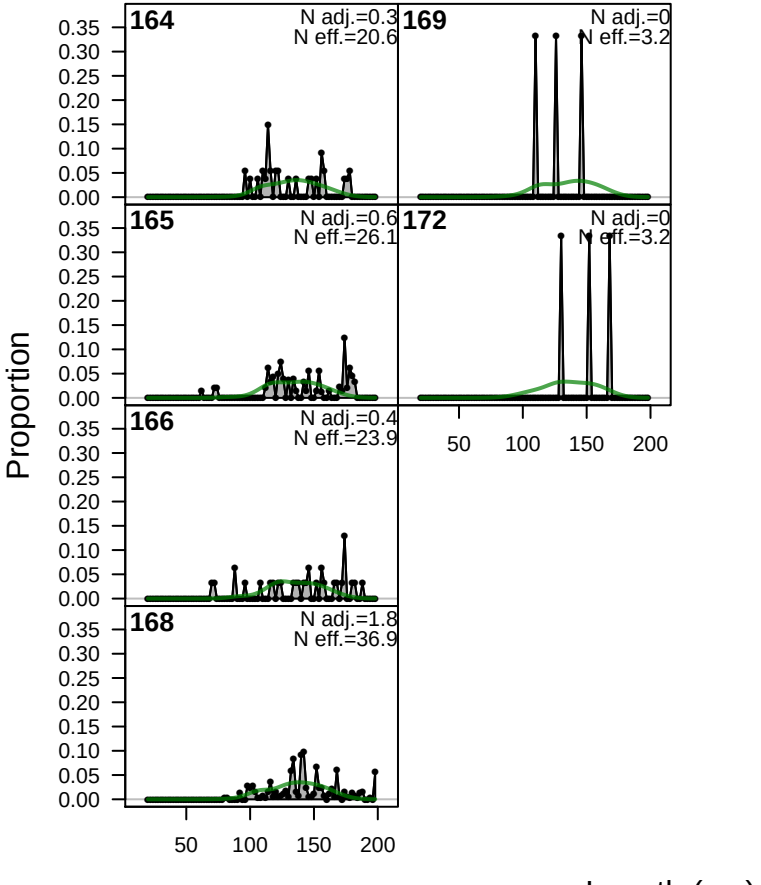
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)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N eff.=3.2
165
N adj.=0.6
N eff.=26.1
172
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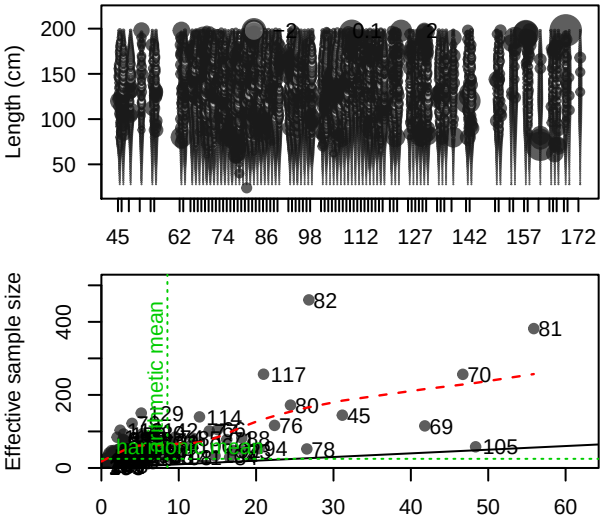
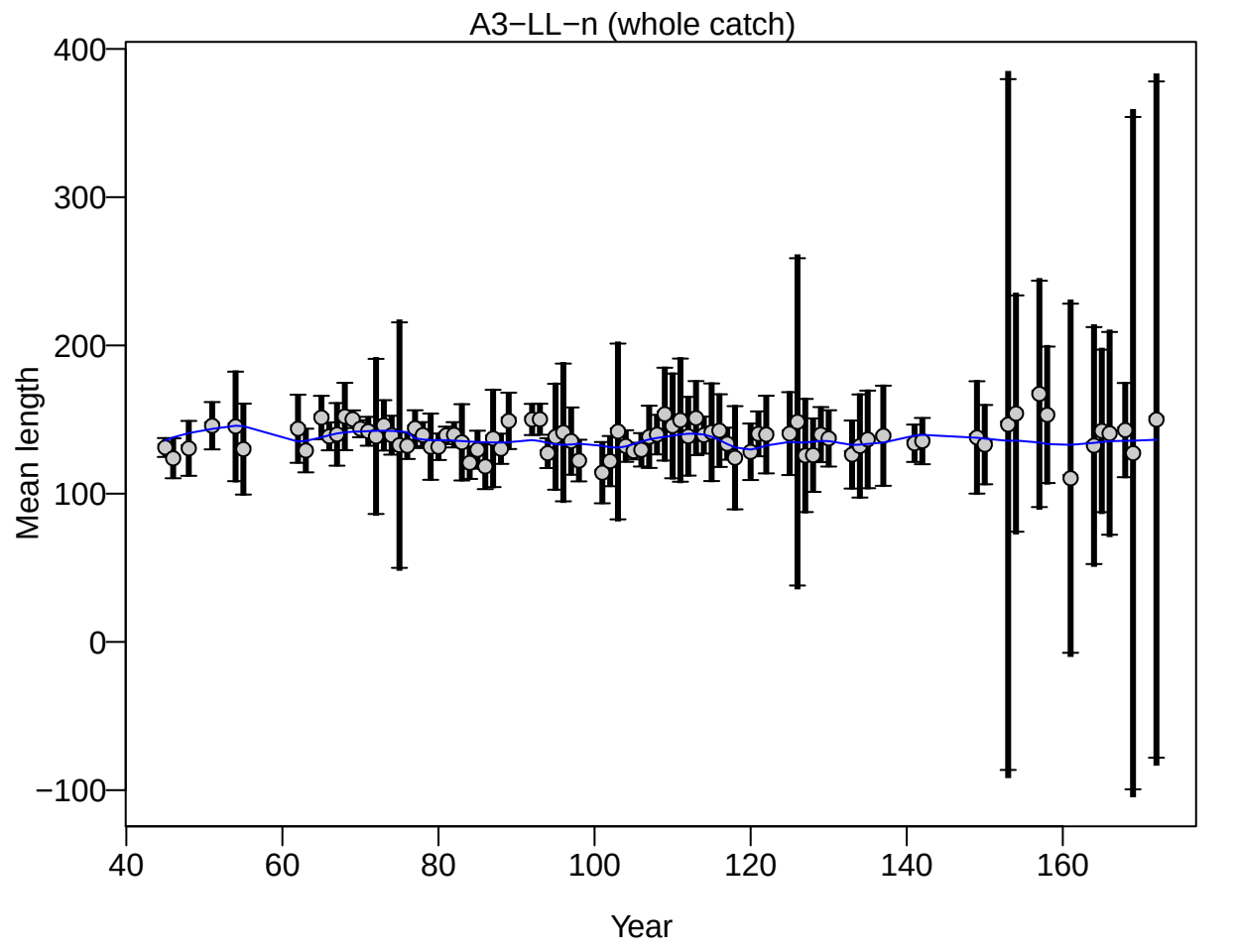
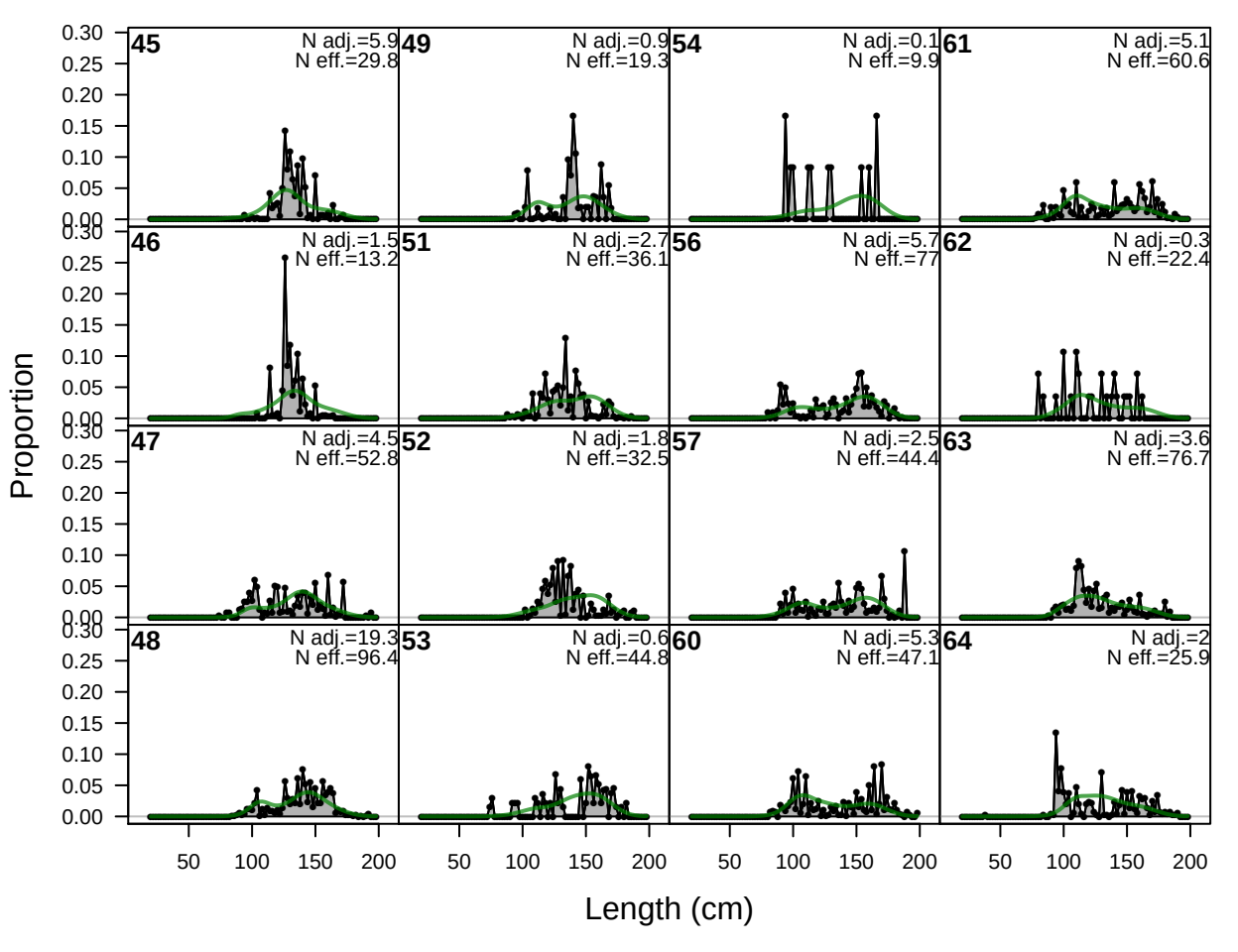
N eff.=3.2
166
N adj.=0.4
N eff.=23.9
168
N adj.=1.8
N eff.=36.9
Proportion
Length (cm)


Length (cm)
200
150
100
50
0.2
0.1
2
45
62
74
86
98
112
127
142
157
172
Effective sample size
400
200
0
harmonic mean
82
81
117
70
80
45
69
76
114
78
105
0
10
20
30
40
50
60


A3−LL−n (whole catch)
400
300
200
100
0
−100
Mean length
40
60
80
100
120
140
160
Year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N eff.=19.3
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N adj.=0.1
N eff.=9.9
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N adj.=5.1
N eff.=60.6
46
N adj.=1.5
N eff.=13.2
51
N adj.=2.7
N eff.=36.1
56
N adj.=5.7
N eff.=77
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N adj.=0.3
N eff.=22.4
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N adj.=4.5
N eff.=52.8
52
N adj.=1.8
N eff.=32.5
57
N adj.=2.5
N eff.=44.4
63
N adj.=3.6
N eff.=76.7
48
N adj.=19.3
N eff.=96.4
53
N adj.=0.6
N eff.=44.8
60
N adj.=5.3
N eff.=47.1
64
N adj.=2
N eff.=25.9
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
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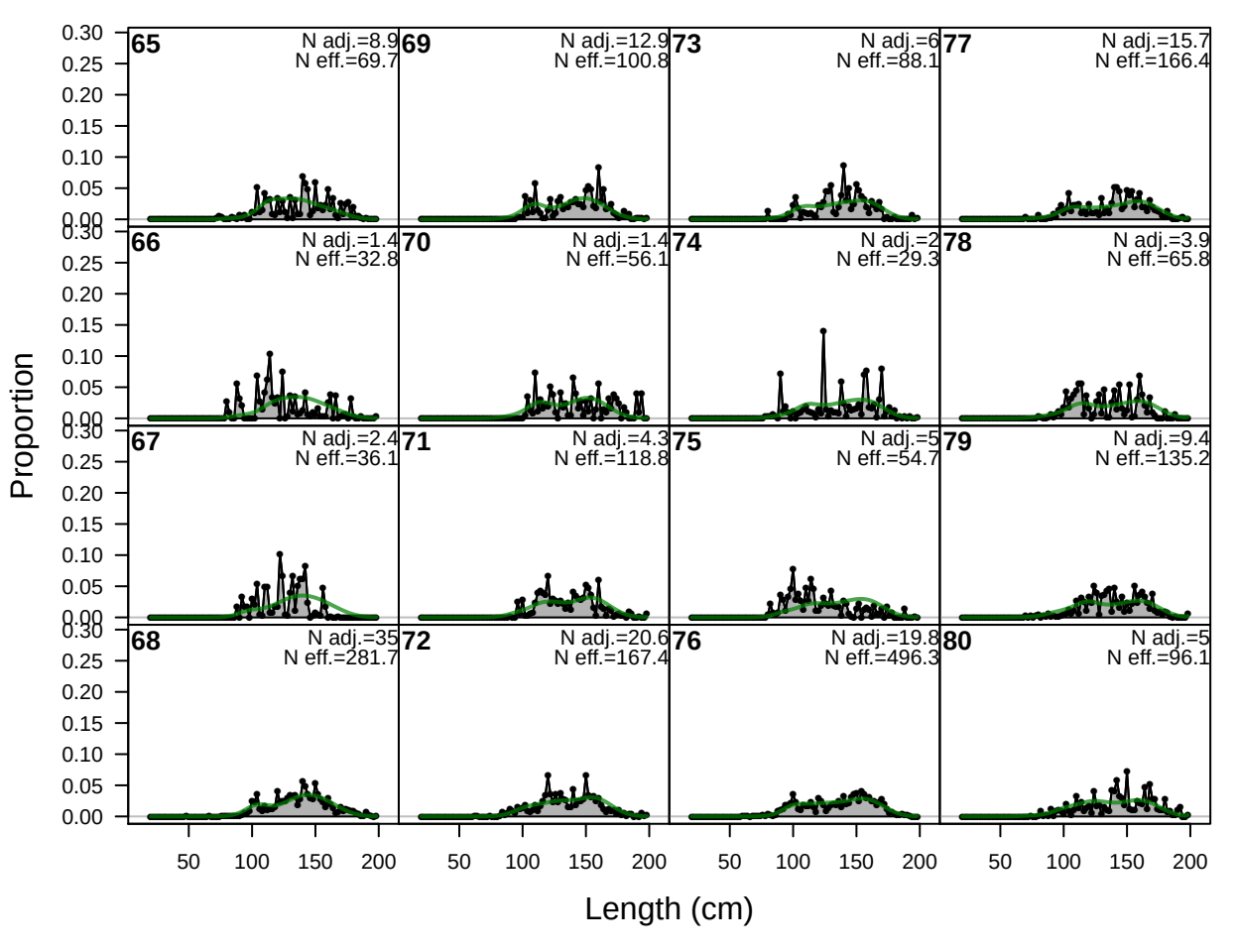
100
150
200
Length (cm)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N eff.=496.3
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N adj.=5
N eff.=96.1
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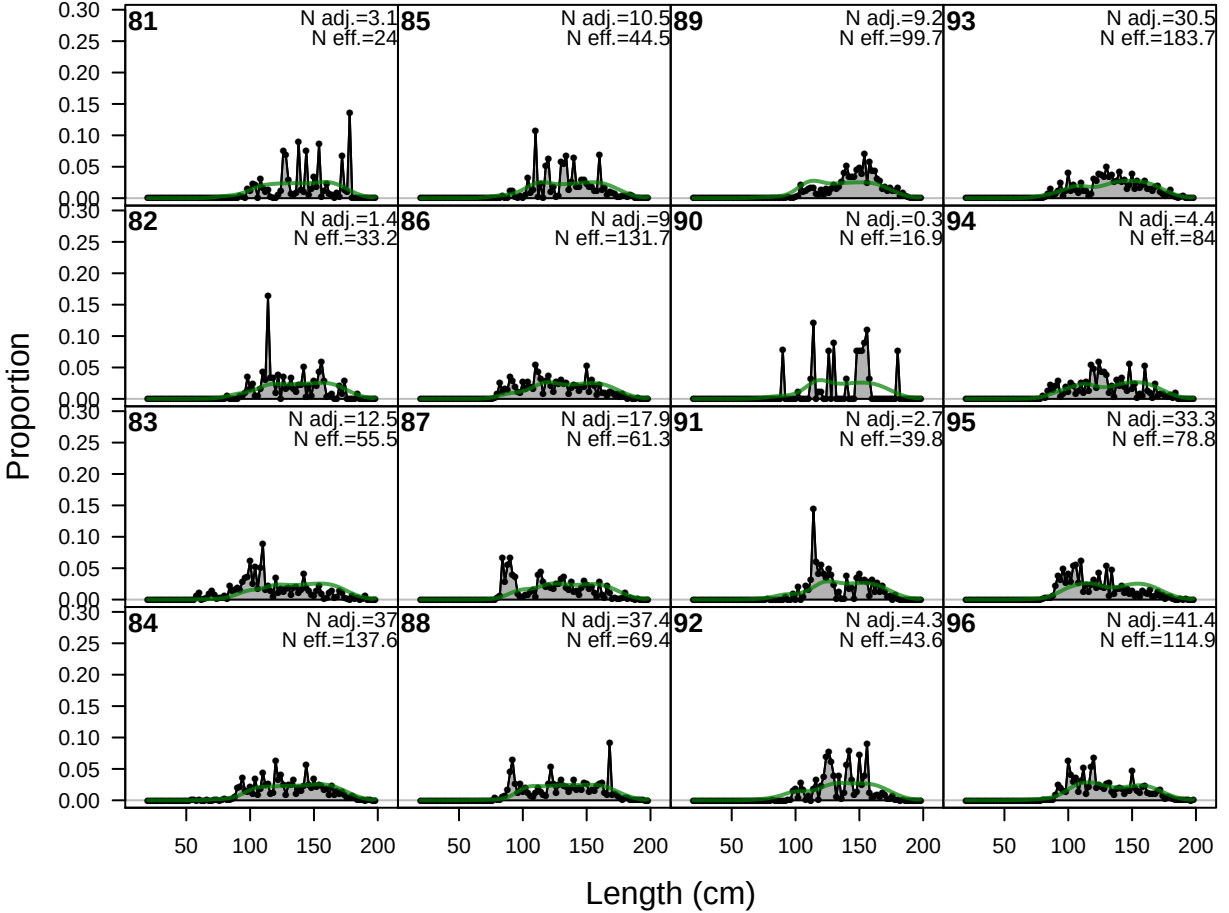
0.30
50
100
150
200
Length (cm)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N eff.=137.6
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N adj.=37.4
N eff.=69.4
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N eff.=114.9
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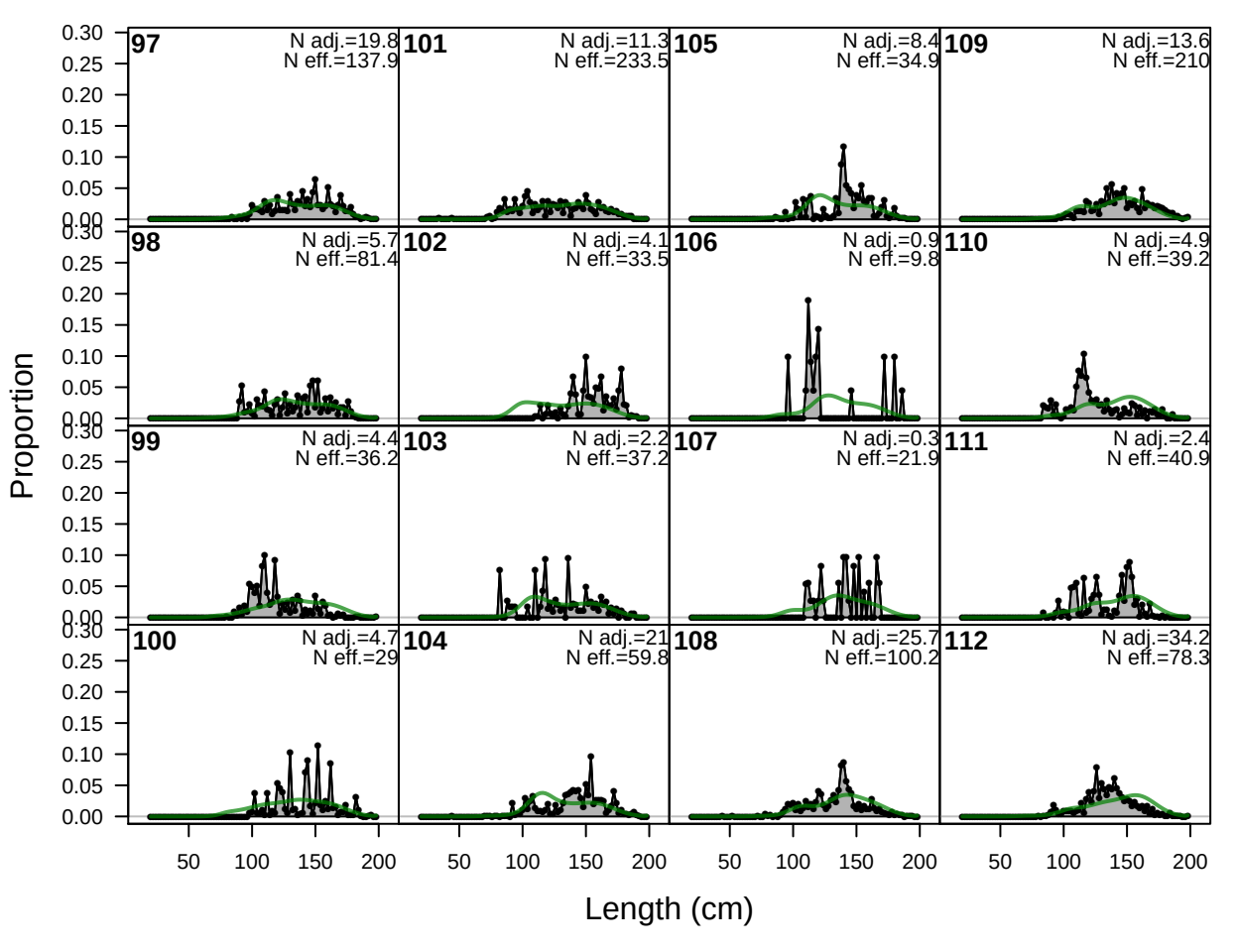
0.30
50
100
150
200
Length (cm)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N eff.=29
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N adj.=21
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N adj.=34.2
N eff.=78.3
Proportion
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0.30
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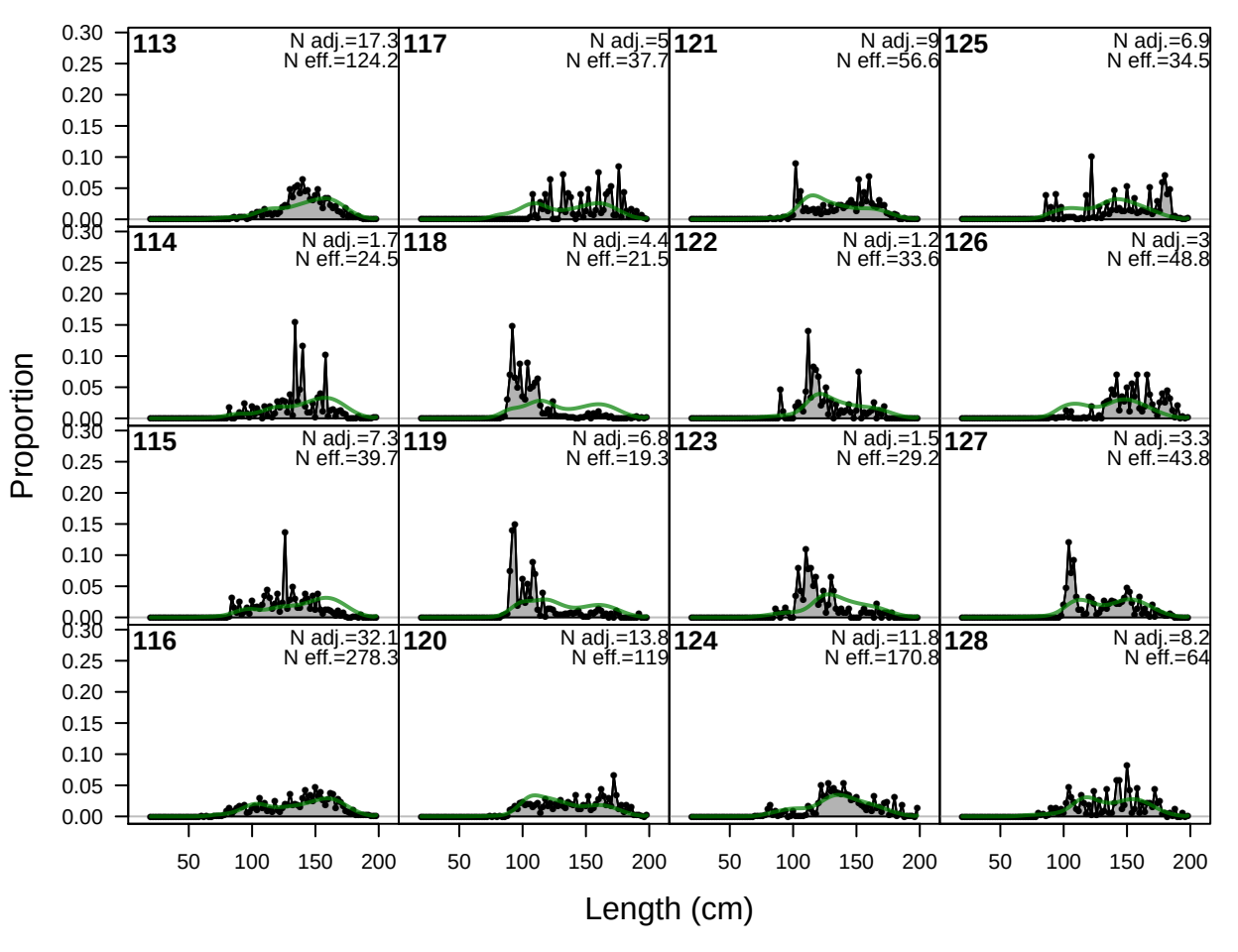
100
150
200
Length (cm)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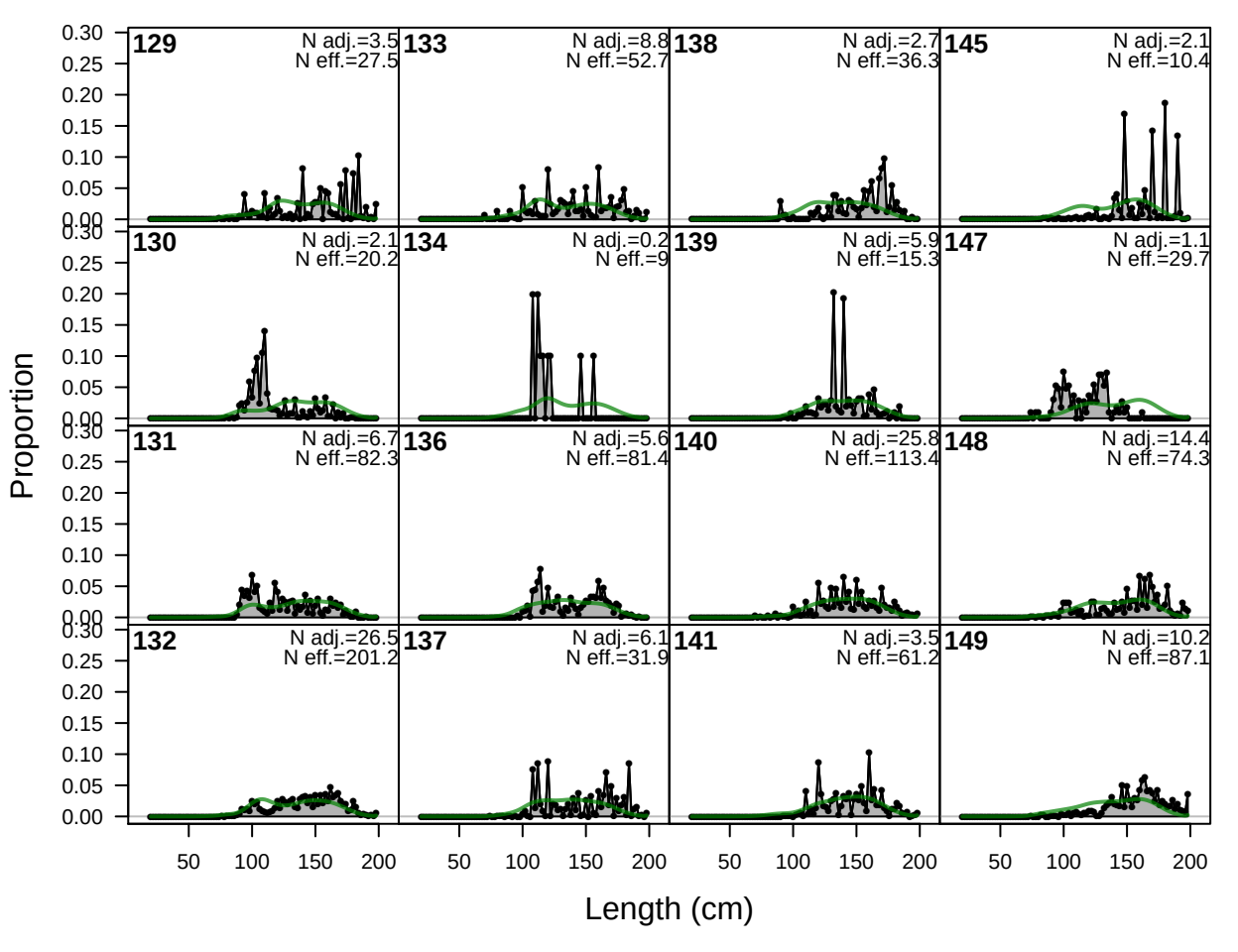
0.30
50
100
150
200
Length (cm)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N eff.=20.2
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N eff.=9
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N adj.=5.9
N eff.=15.3
147
N adj.=1.1
N eff.=29.7
131
N adj.=6.7
N eff.=82.3
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140
N adj.=25.8
N eff.=113.4
148
N adj.=14.4
N eff.=74.3
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N adj.=26.5
N eff.=201.2
137
N adj.=6.1
N eff.=31.9
141
N adj.=3.5
N eff.=61.2
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N adj.=10.2
N eff.=87.1
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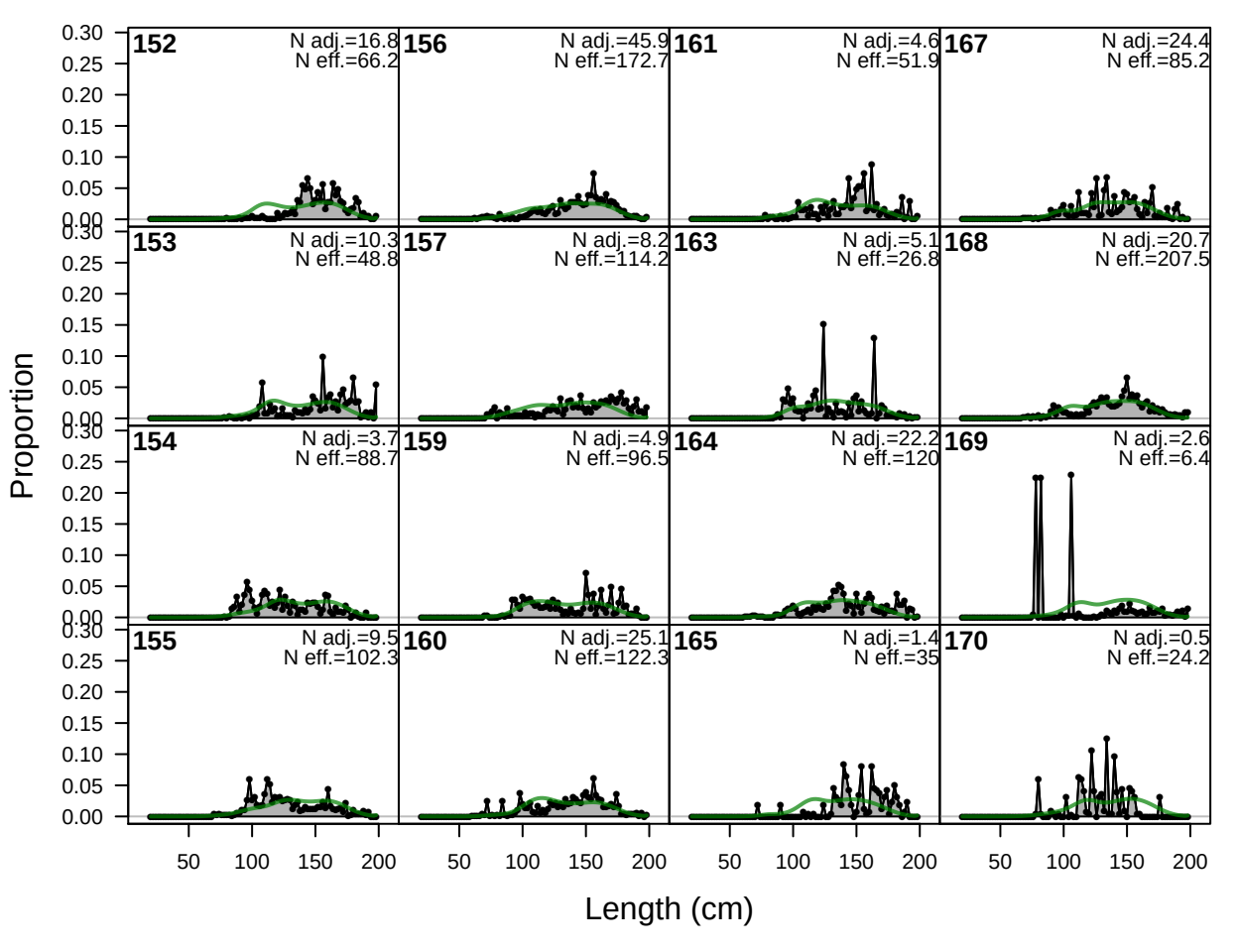
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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167
N adj.=24.4
N eff.=85.2
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N adj.=10.3
N eff.=48.8
157
N adj.=8.2
N eff.=114.2
163
N adj.=5.1
N eff.=26.8
168
N adj.=20.7
N eff.=207.5
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N adj.=3.7
N eff.=88.7
159
N adj.=4.9
N eff.=96.5
164
N adj.=22.2
N eff.=120
169
N adj.=2.6
N eff.=6.4
155
N adj.=9.5
N eff.=102.3
160
N adj.=25.1
N eff.=122.3
165
N adj.=1.4
N eff.=35
170
N adj.=0.5
N eff.=24.2
Proportion
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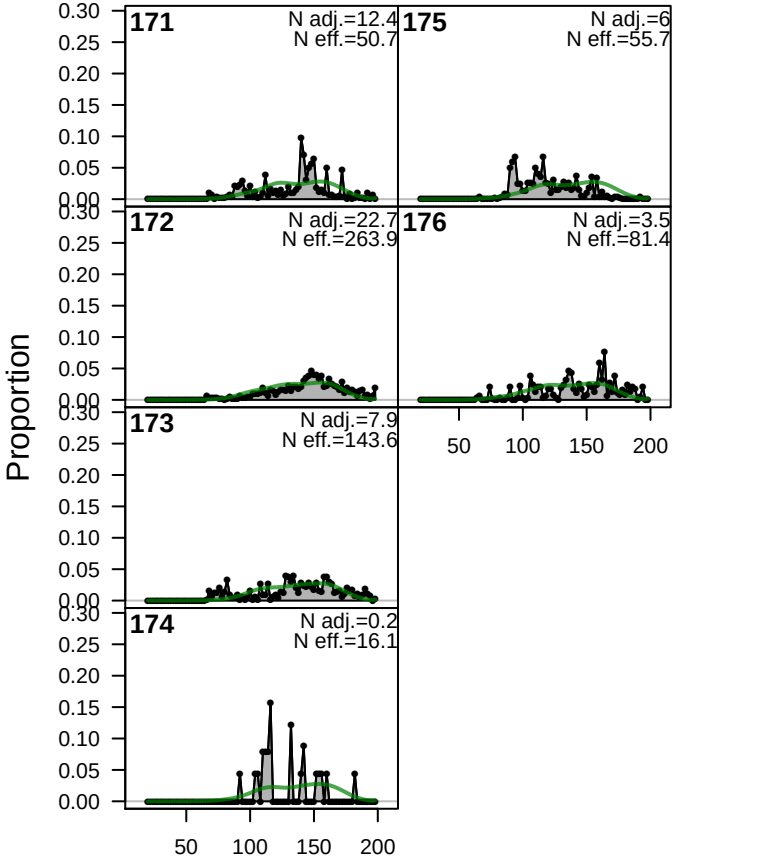
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)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N eff.=55.7
172
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N eff.=263.9
176
N adj.=3.5
N eff.=81.4
173
N adj.=7.9
N eff.=143.6
174
N adj.=0.2
N eff.=16.1
Proportion
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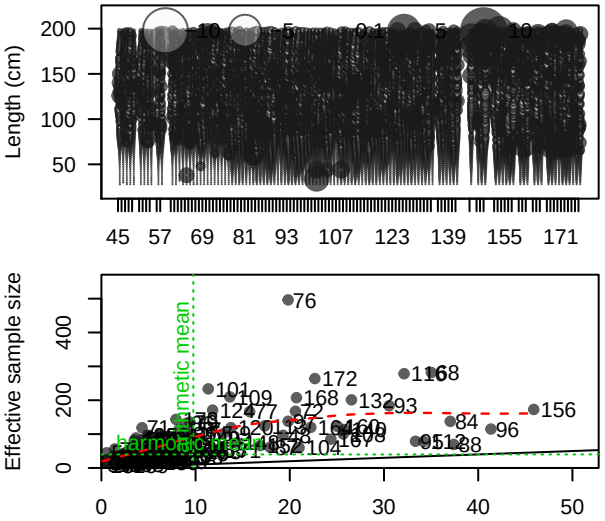
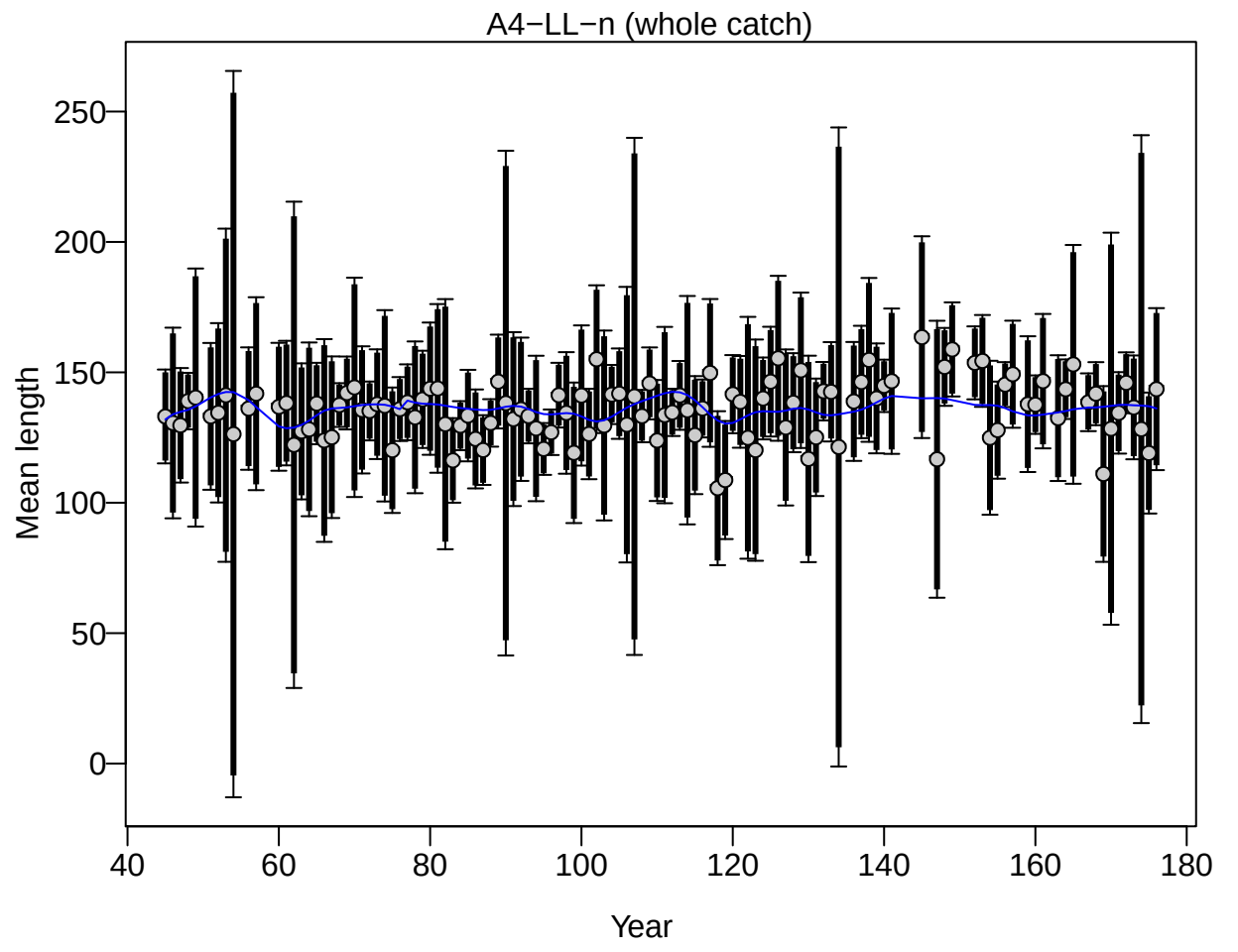
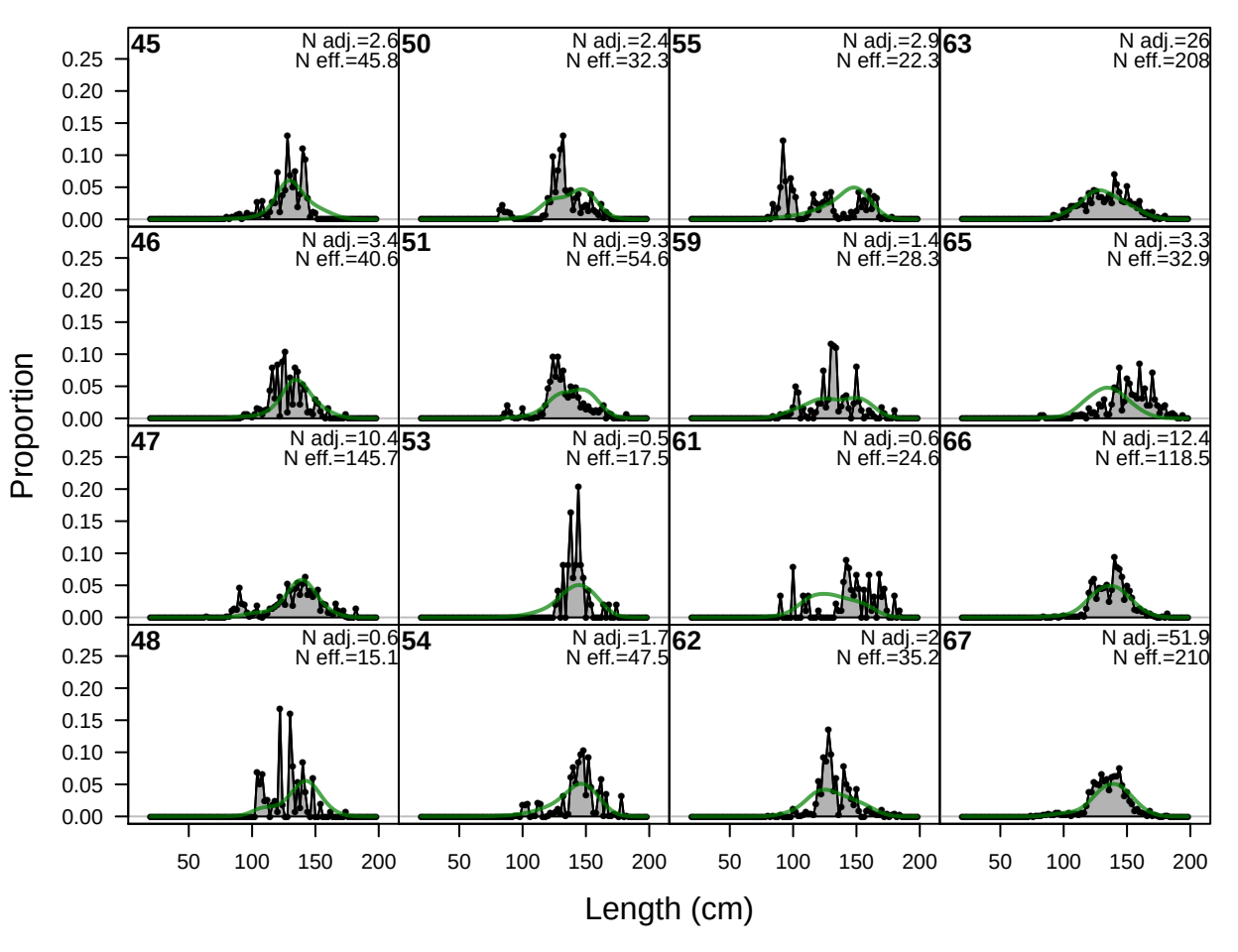
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)



Length (cm)
200
150
100
50
45
57
69
81
93
107
123
139
155
171
Effective sample size
400
200
0
0
10
20
30
40
50
76
172
101
109
168
132
93
156
84
96
104


A4−LL−n (whole catch)
Mean length
250
200
150
100
50
0
40
60
80
100
120
140
160
180
Year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N eff.=32.3
55
N adj.=2.9
N eff.=22.3
63
N adj.=26
N eff.=208
46
N adj.=3.4
N eff.=40.6
51
N adj.=9.3
N eff.=54.6
59
N adj.=1.4
N eff.=28.3
65
N adj.=3.3
N eff.=32.9
47
N adj.=10.4
N eff.=145.7
53
N adj.=0.5
N eff.=17.5
61
N adj.=0.6
N eff.=24.6
66
N adj.=12.4
N eff.=118.5
48
N adj.=0.6
N eff.=15.1
54
N adj.=1.7
N eff.=47.5
62
N adj.=2
N eff.=35.2
67
N adj.=51.9
N eff.=210
Proportion
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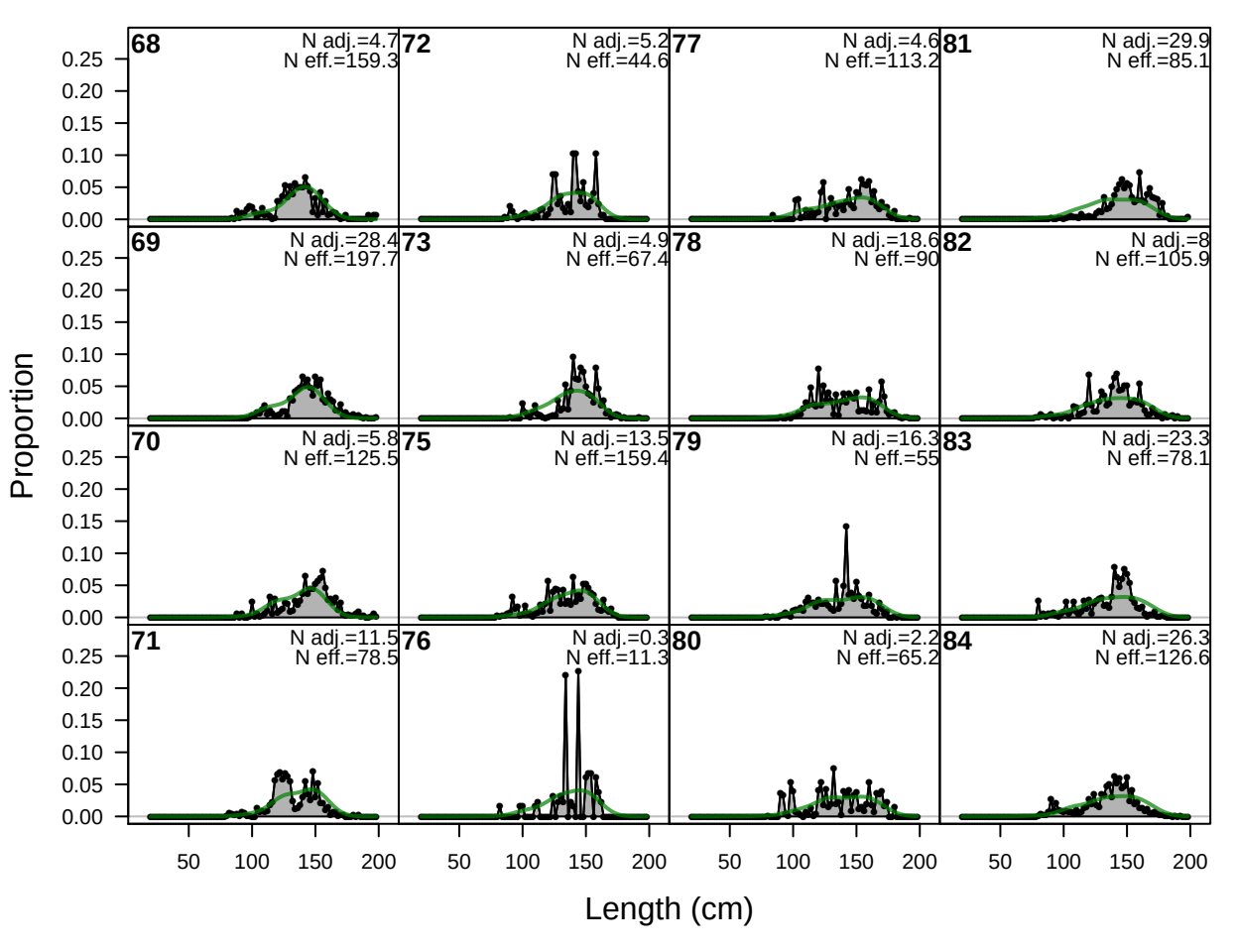
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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N eff.=159.3
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81
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N eff.=85.1
69
N adj.=28.4
N eff.=197.7
73
N adj.=4.9
N eff.=67.4
78
N adj.=18.6
N eff.=90
82
N adj.=8
N eff.=105.9
70
N adj.=5.8
N eff.=125.5
75
N adj.=13.5
N eff.=159.4
79
N adj.=16.3
N eff.=55
83
N adj.=23.3
N eff.=78.1
71
N adj.=11.5
N eff.=78.5
76
N adj.=0.3
N eff.=11.3
80
N adj.=2.2
N eff.=65.2
84
N adj.=26.3
N eff.=126.6
Proportion
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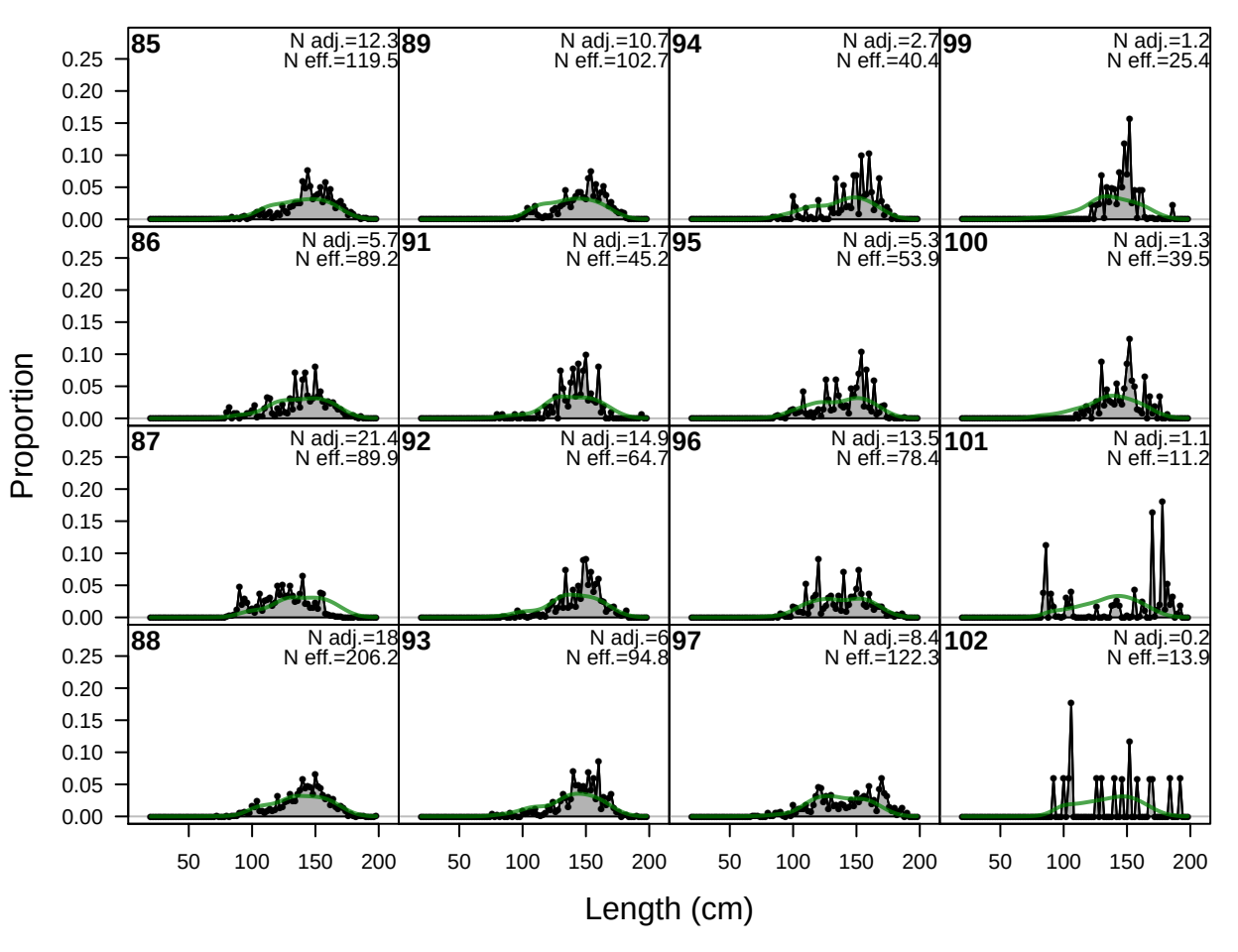
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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N adj.=5.7
N eff.=89.2
91
N adj.=1.7
N eff.=45.2
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N adj.=5.3
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N eff.=39.5
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N adj.=21.4
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92
N adj.=14.9
N eff.=64.7
96
N adj.=13.5
N eff.=78.4
101
N adj.=1.1
N eff.=11.2
88
N adj.=18
N eff.=206.2
93
N adj.=6
N eff.=94.8
97
N adj.=8.4
N eff.=122.3
102
N adj.=0.2
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Proportion
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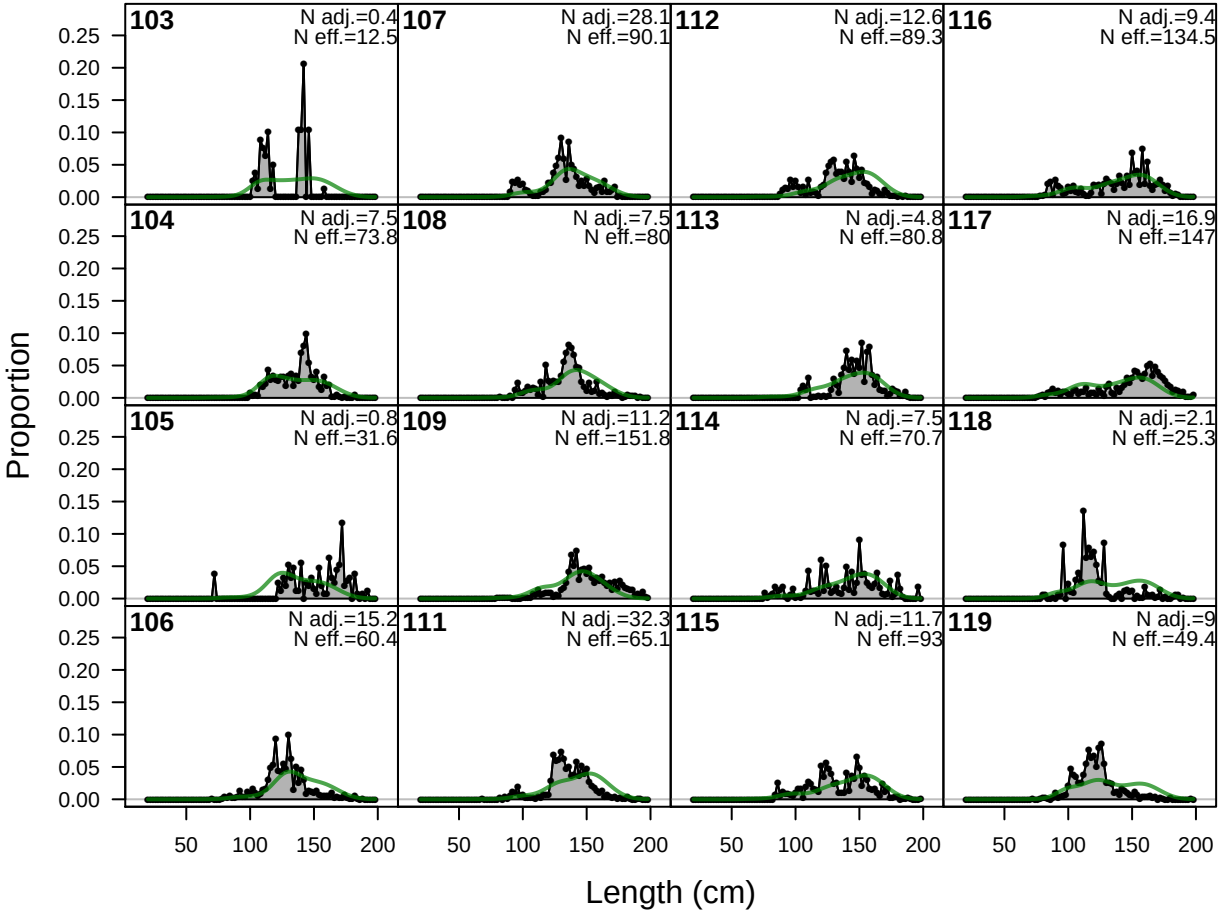
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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104
N adj.=7.5
N eff.=73.8
108
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N eff.=80
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N adj.=4.8
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117
N adj.=16.9
N eff.=147
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N adj.=0.8
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N adj.=11.2
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N adj.=7.5
N eff.=70.7
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N adj.=2.1
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N adj.=15.2
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111
N adj.=32.3
N eff.=65.1
115
N adj.=11.7
N eff.=93
119
N adj.=9
N eff.=49.4
Proportion
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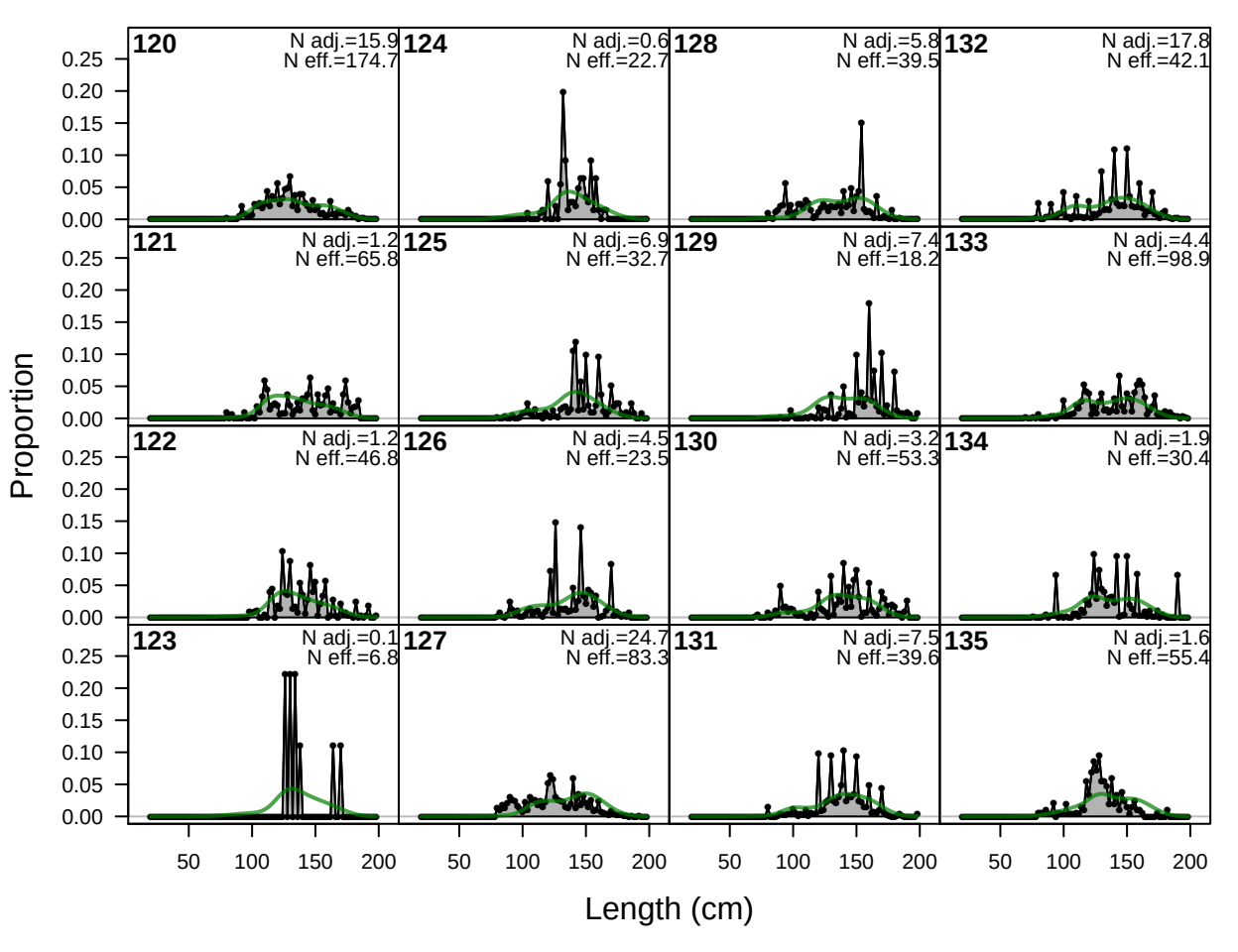
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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132
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N adj.=4.5
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N adj.=3.2
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N adj.=1.9
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N adj.=0.1
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N adj.=24.7
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N adj.=7.5
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N adj.=1.6
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Proportion
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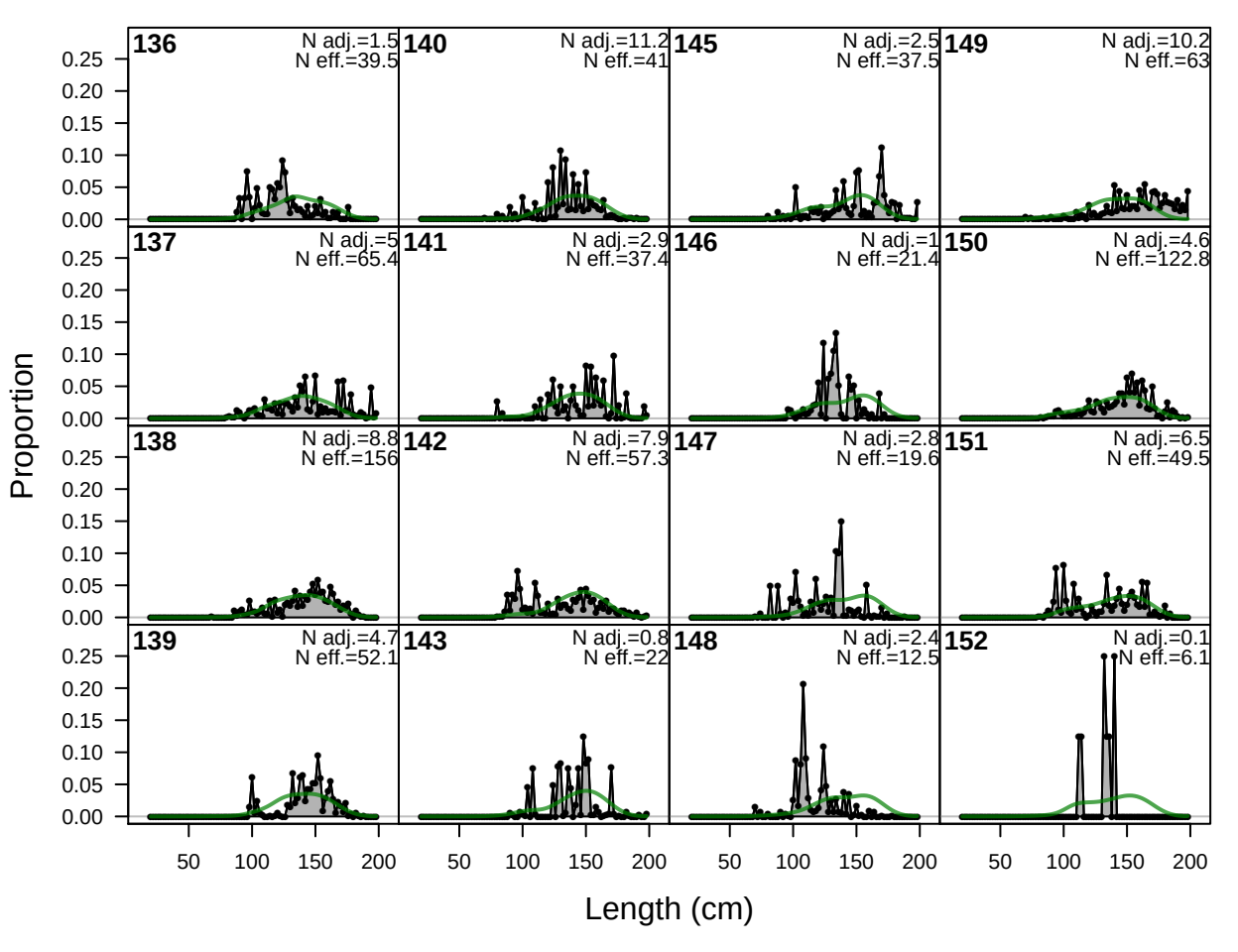
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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N eff.=37.5
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N eff.=63
137
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N eff.=65.4
141
N adj.=2.9
N eff.=37.4
146
N adj.=1
N eff.=21.4
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N adj.=4.6
N eff.=122.8
138
N adj.=8.8
N eff.=156
142
N adj.=7.9
N eff.=57.3
147
N adj.=2.8
N eff.=19.6
151
N adj.=6.5
N eff.=49.5
139
N adj.=4.7
N eff.=52.1
143
N adj.=0.8
N eff.=22
148
N adj.=2.4
N eff.=12.5
152
N adj.=0.1
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Proportion
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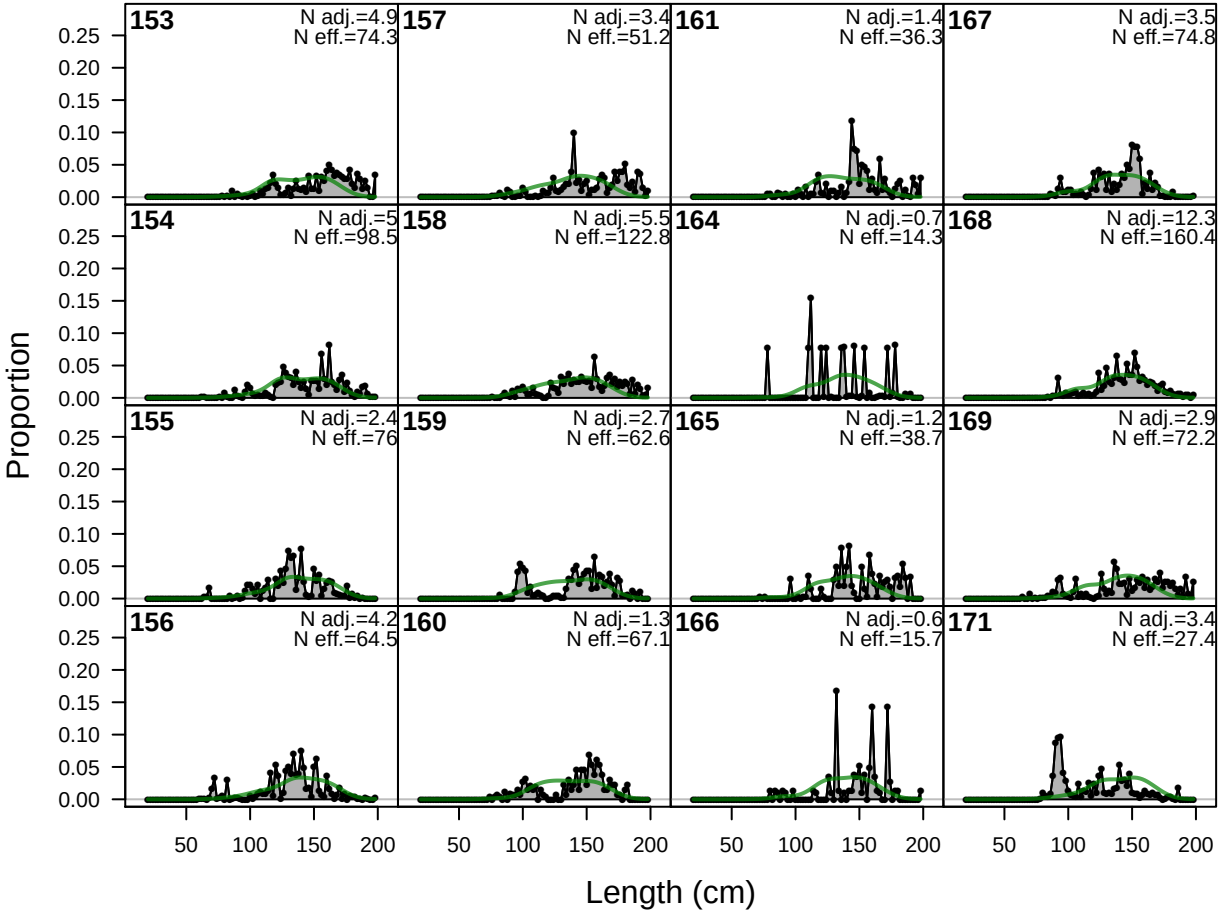
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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N eff.=51.2
161
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N eff.=36.3
167
N adj.=3.5
N eff.=74.8
154
N adj.=5
N eff.=98.5
158
N adj.=5.5
N eff.=122.8
164
N adj.=0.7
N eff.=14.3
168
N adj.=12.3
N eff.=160.4
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N adj.=2.4
N eff.=76
159
N adj.=2.7
N eff.=62.6
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N adj.=1.2
N eff.=38.7
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N adj.=2.9
N eff.=72.2
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N adj.=4.2
N eff.=64.5
160
N adj.=1.3
N eff.=67.1
166
N adj.=0.6
N eff.=15.7
171
N adj.=3.4
N eff.=27.4
Proportion
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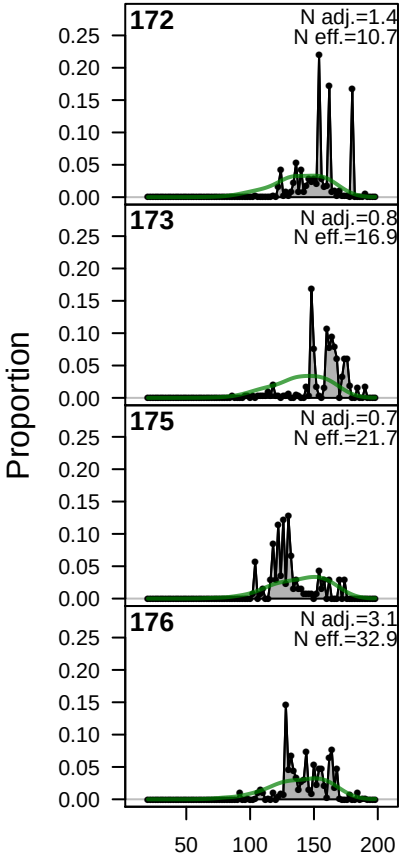
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)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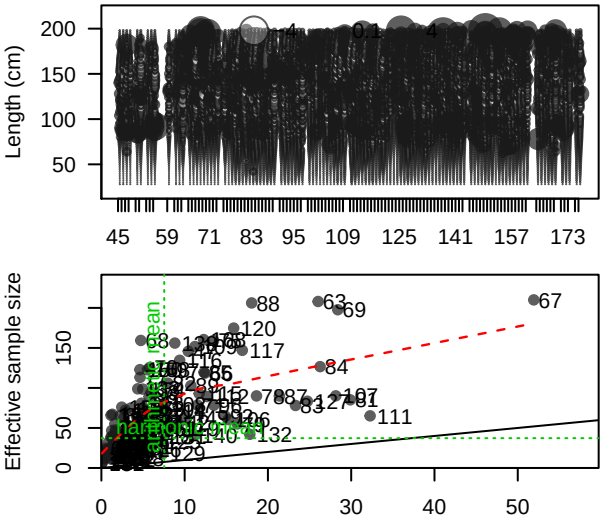
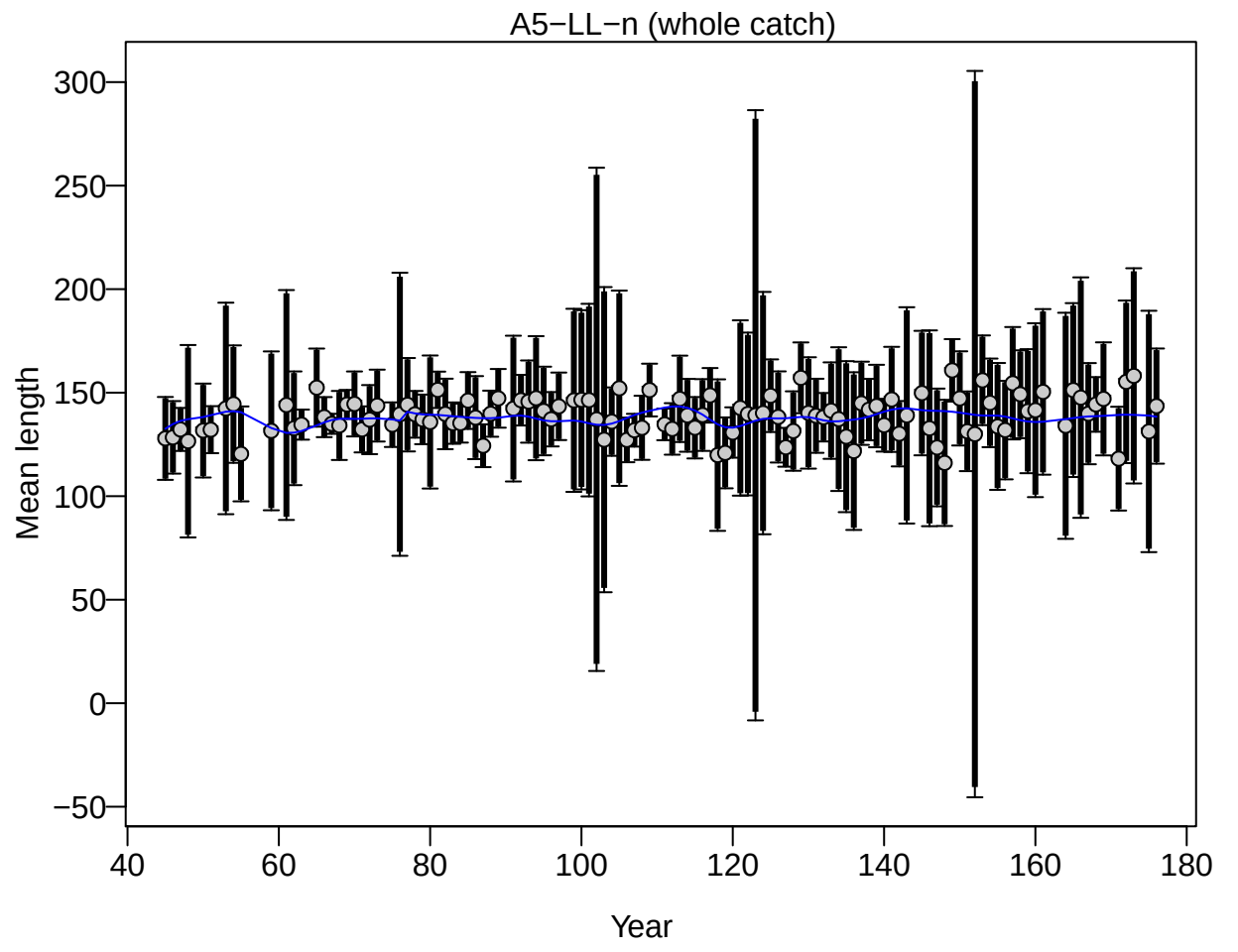
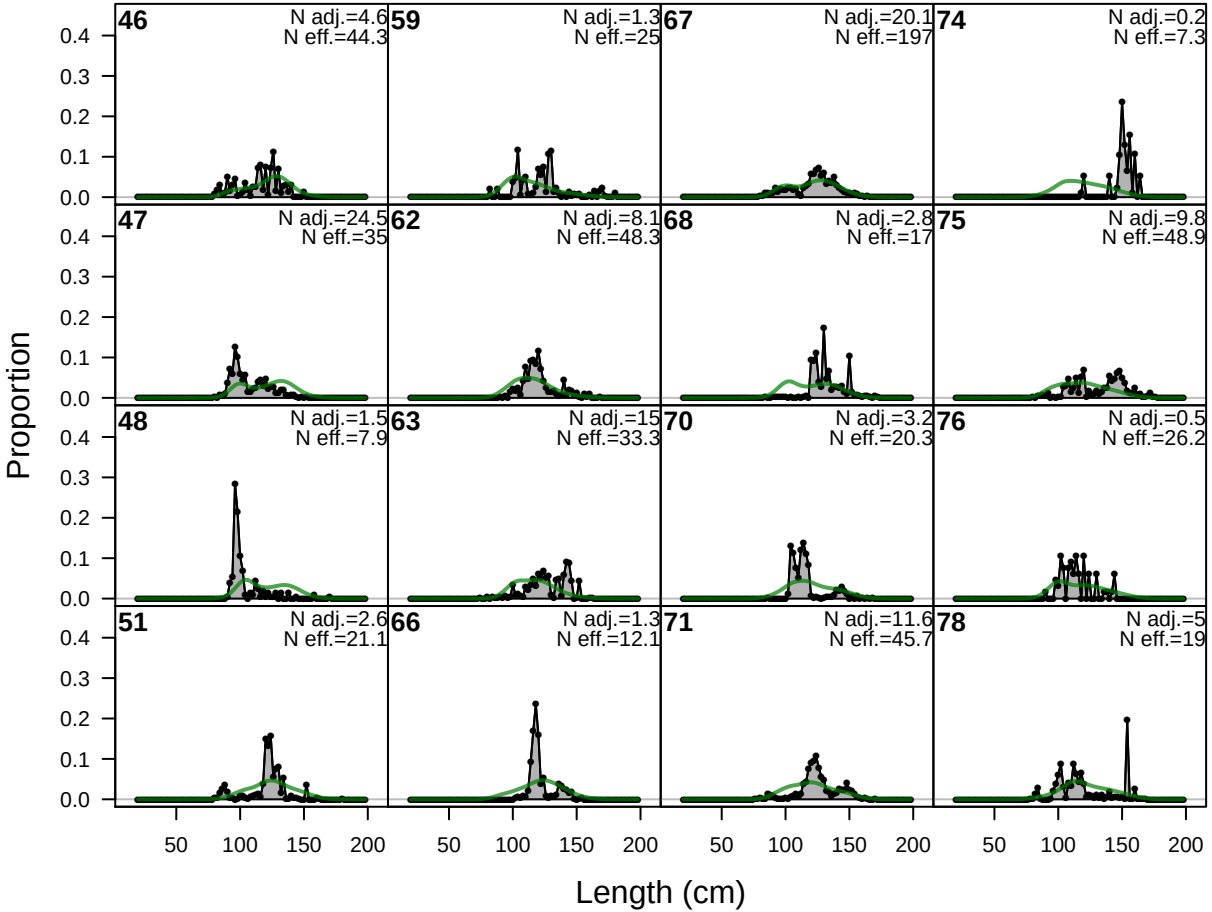
N eff.=16.9
175
N adj.=0.7
N eff.=21.7
176
N adj.=3.1
N eff.=32.9
Proportion
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200
Length (cm)



Length (cm)
200
150
100
50
45
59
71
83
95
109
125
141
157
173
Effective sample size
150
50
0
0
10
20
30
40
50
harmonic mean


A5−LL−n (whole catch)
Mean length
Year
300
250
200
150
100
50
0
−50
40
60
80
100
120
140
160
180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N eff.=25
67
N adj.=20.1
N eff.=197
74
N adj.=0.2
N eff.=7.3
47
N adj.=24.5
N eff.=35
62
N adj.=8.1
N eff.=48.3
68
N adj.=2.8
N eff.=17
75
N adj.=9.8
N eff.=48.9
48
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N eff.=7.9
63
N adj.=15
N eff.=33.3
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N adj.=3.2
N eff.=20.3
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N adj.=0.5
N eff.=26.2
51
N adj.=2.6
N eff.=21.1
66
N adj.=1.3
N eff.=12.1
71
N adj.=11.6
N eff.=45.7
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Proportion
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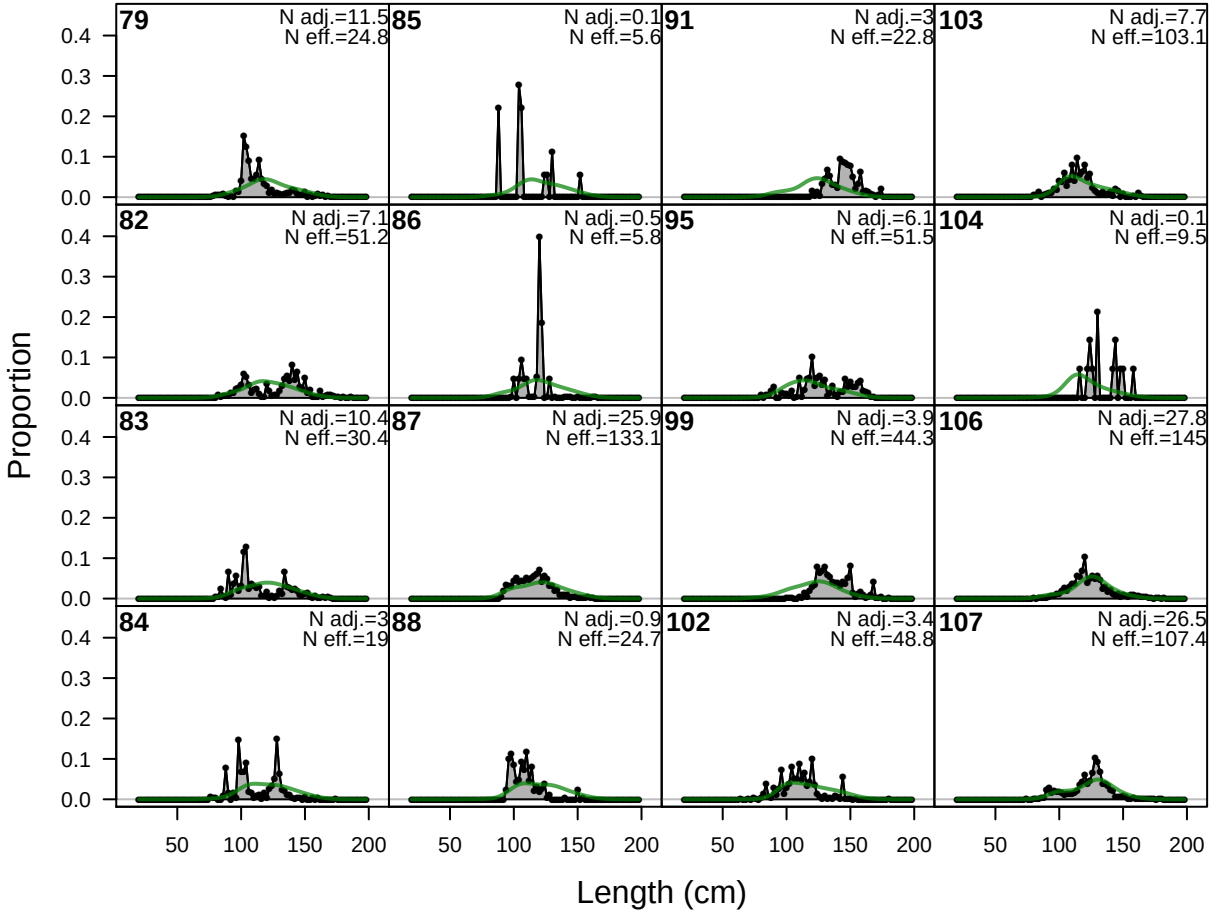
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=145
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N adj.=3
N eff.=19
88
N adj.=0.9
N eff.=24.7
102
N adj.=3.4
N eff.=48.8
107
N adj.=26.5
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Proportion
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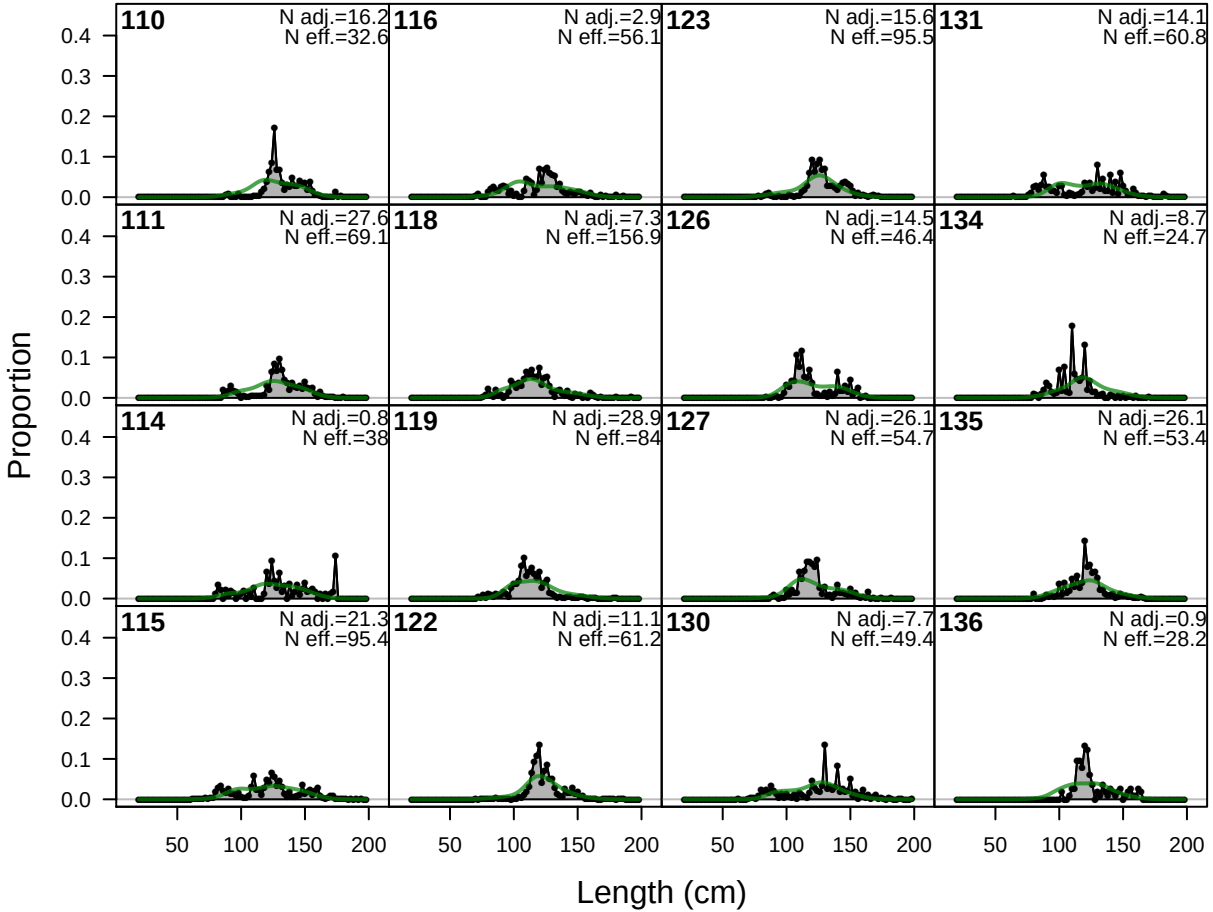
100
150
200
Length (cm)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N adj.=7.3
N eff.=156.9
126
N adj.=14.5
N eff.=46.4
134
N adj.=8.7
N eff.=24.7
114
N adj.=0.8
N eff.=38
119
N adj.=28.9
N eff.=84
127
N adj.=26.1
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N adj.=21.3
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N adj.=7.7
N eff.=49.4
136
N adj.=0.9
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Proportion
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0.1
0.2
0.3
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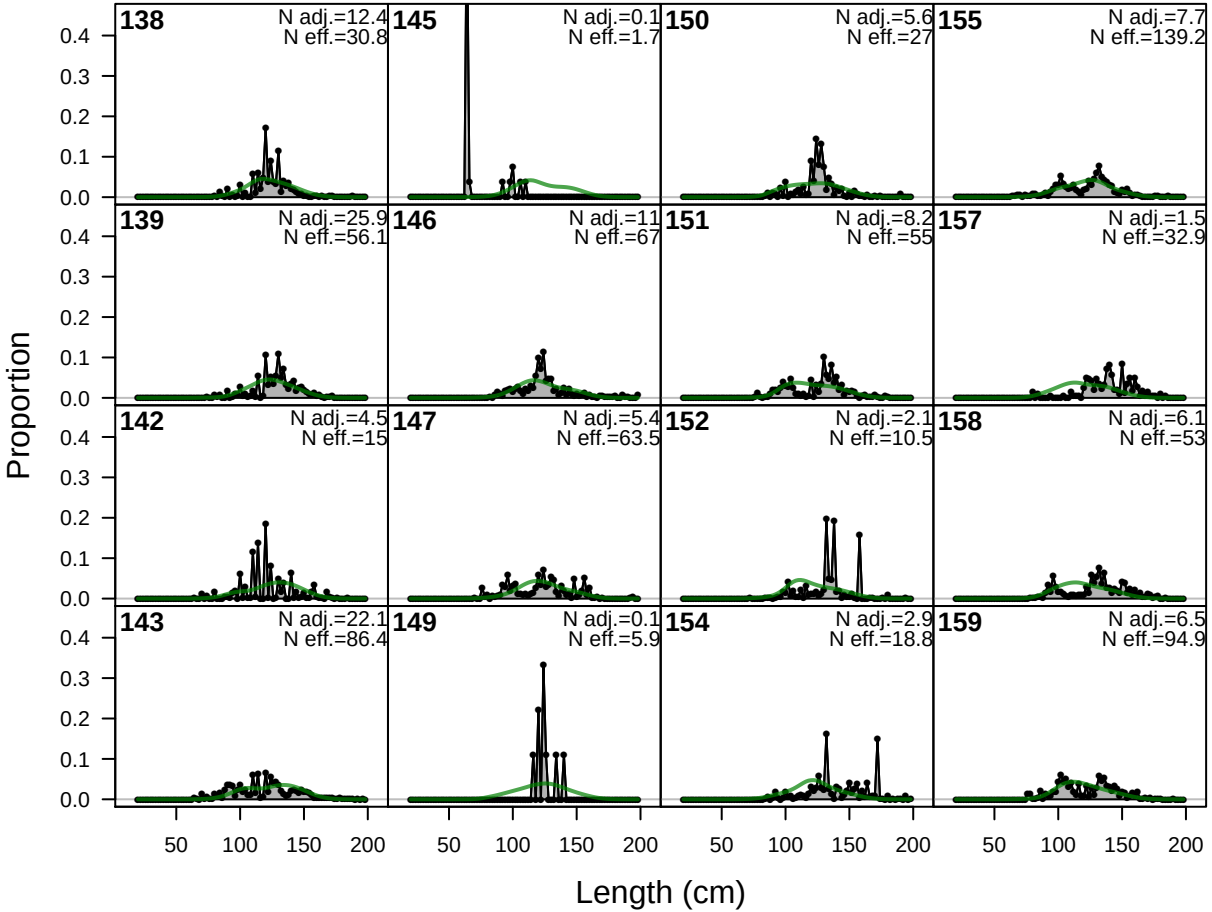
50
100
150
200
Length (cm)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N adj.=25.9
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146
N adj.=11
N eff.=67
151
N adj.=8.2
N eff.=55
157
N adj.=1.5
N eff.=32.9
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N adj.=4.5
N eff.=15
147
N adj.=5.4
N eff.=63.5
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N adj.=2.1
N eff.=10.5
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N adj.=6.1
N eff.=53
143
N adj.=22.1
N eff.=86.4
149
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N eff.=5.9
154
N adj.=2.9
N eff.=18.8
159
N adj.=6.5
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0.4
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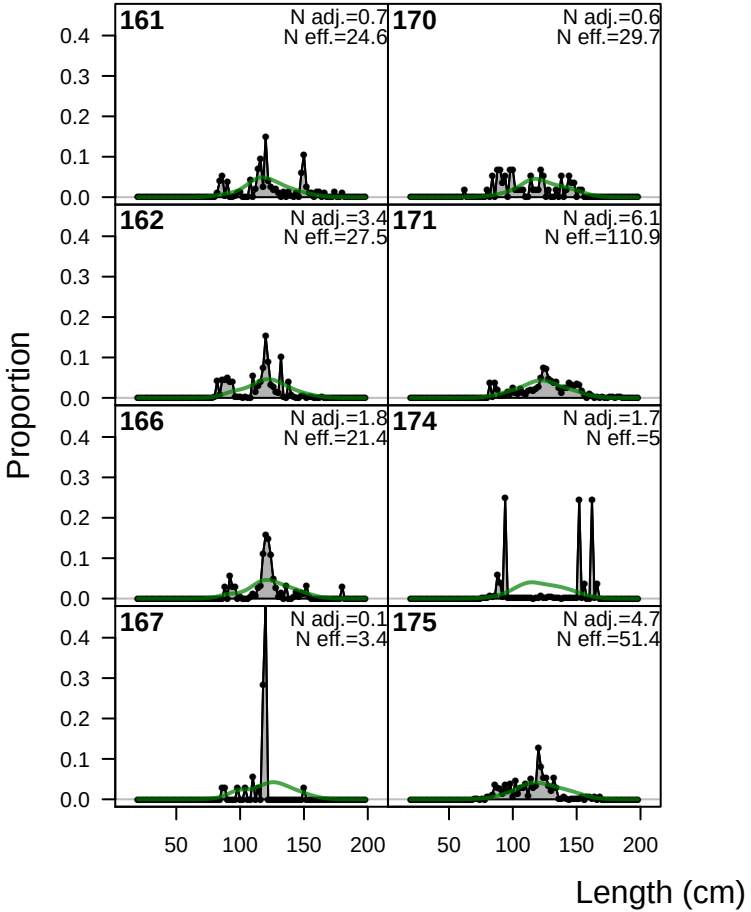
150
200
Length (cm)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N adj.=1.8
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174
N adj.=1.7
N eff.=5
167
N adj.=0.1
N eff.=3.4
175
N adj.=4.7
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0.2
0.3
0.4
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100
150
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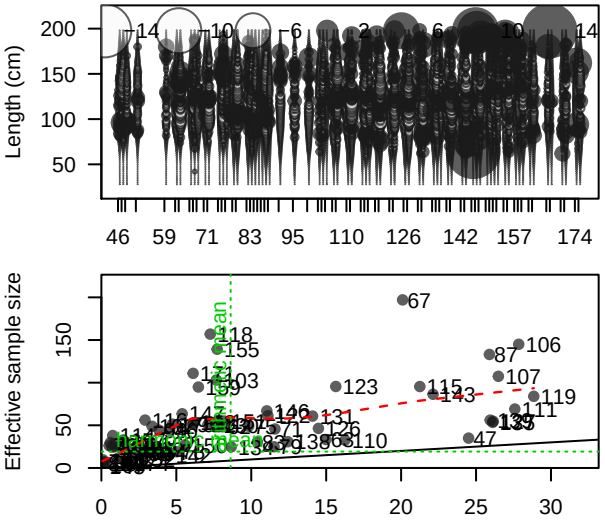
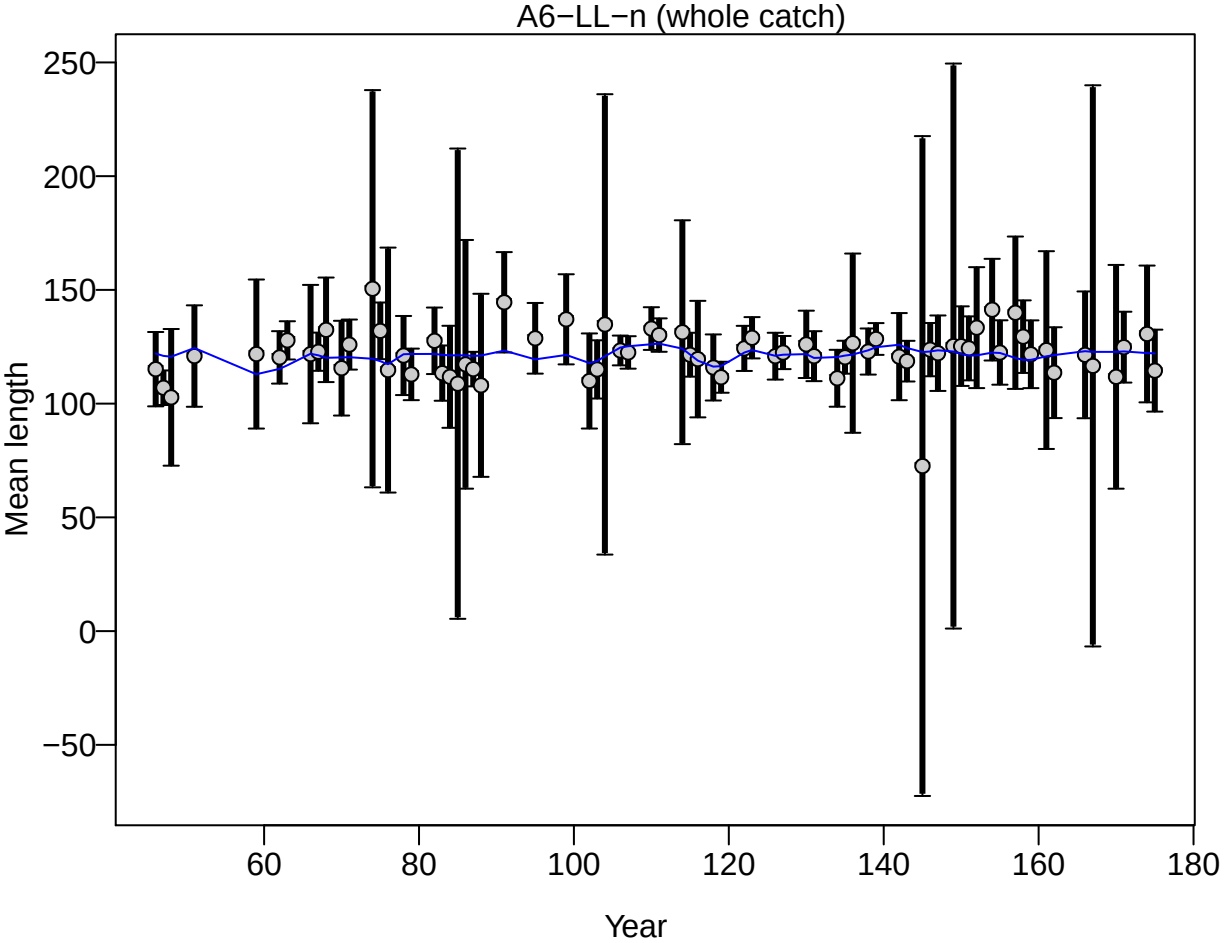
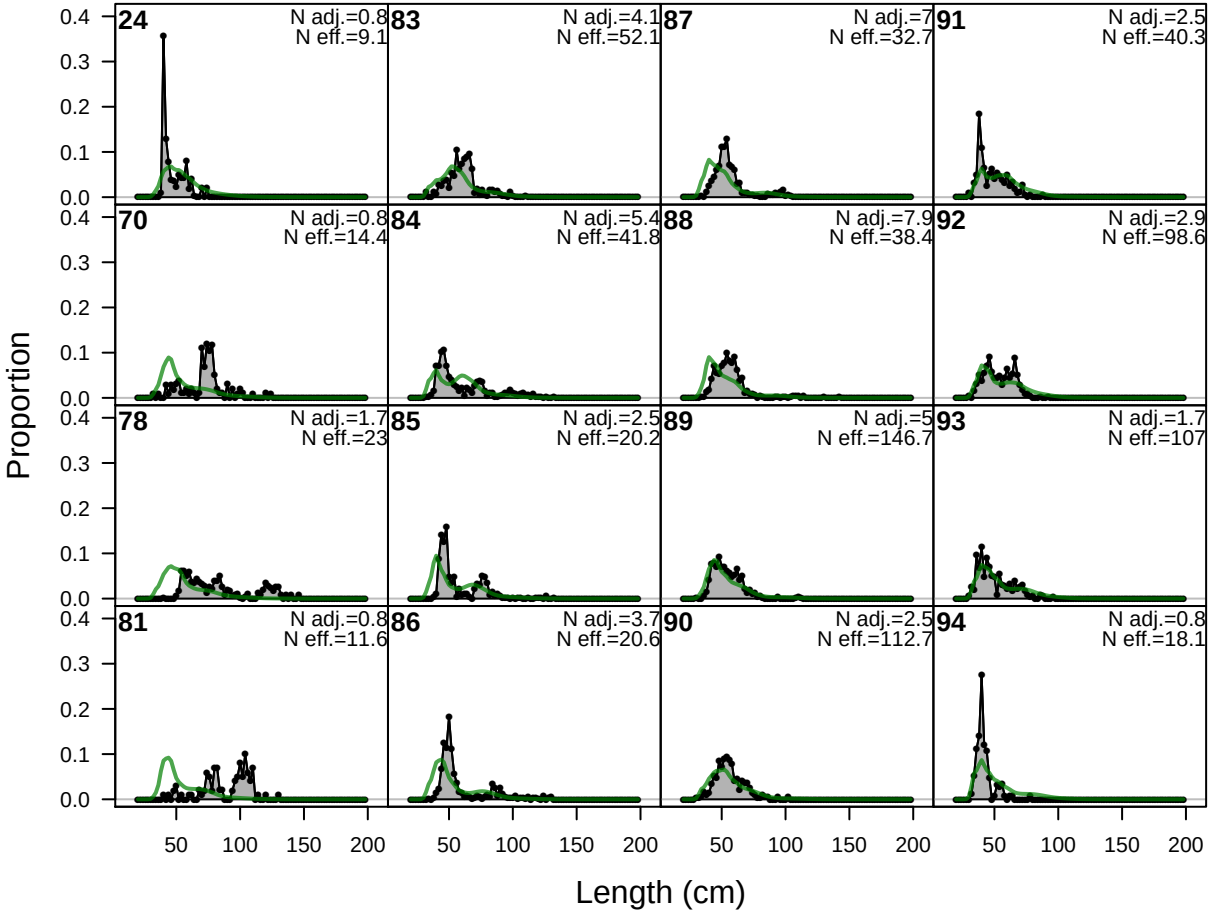
Length (cm)



Length (cm)
200
150
100
50
14
10
6
2
6
10
14
46
59
71
83
95
110
126
142
157
174
Effective sample size
150
50
0
67
118
155
106
87
107
123
115
143
119
111
47
110
0
5
10
15
20
25
30


A6−LL−n (whole catch)
Mean length
Year
250
200
150
100
50
0
−50
60
80
100
120
140
160
180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83
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N eff.=52.1
87
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N eff.=32.7
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N eff.=40.3
70
N adj.=0.8
N eff.=14.4
84
N adj.=5.4
N eff.=41.8
88
N adj.=7.9
N eff.=38.4
92
N adj.=2.9
N eff.=98.6
78
N adj.=1.7
N eff.=23
85
N adj.=2.5
N eff.=20.2
89
N adj.=5
N eff.=146.7
93
N adj.=1.7
N eff.=107
81
N adj.=0.8
N eff.=11.6
86
N adj.=3.7
N eff.=20.6
90
N adj.=2.5
N eff.=112.7
94
N adj.=0.8
N eff.=18.1
Proportion
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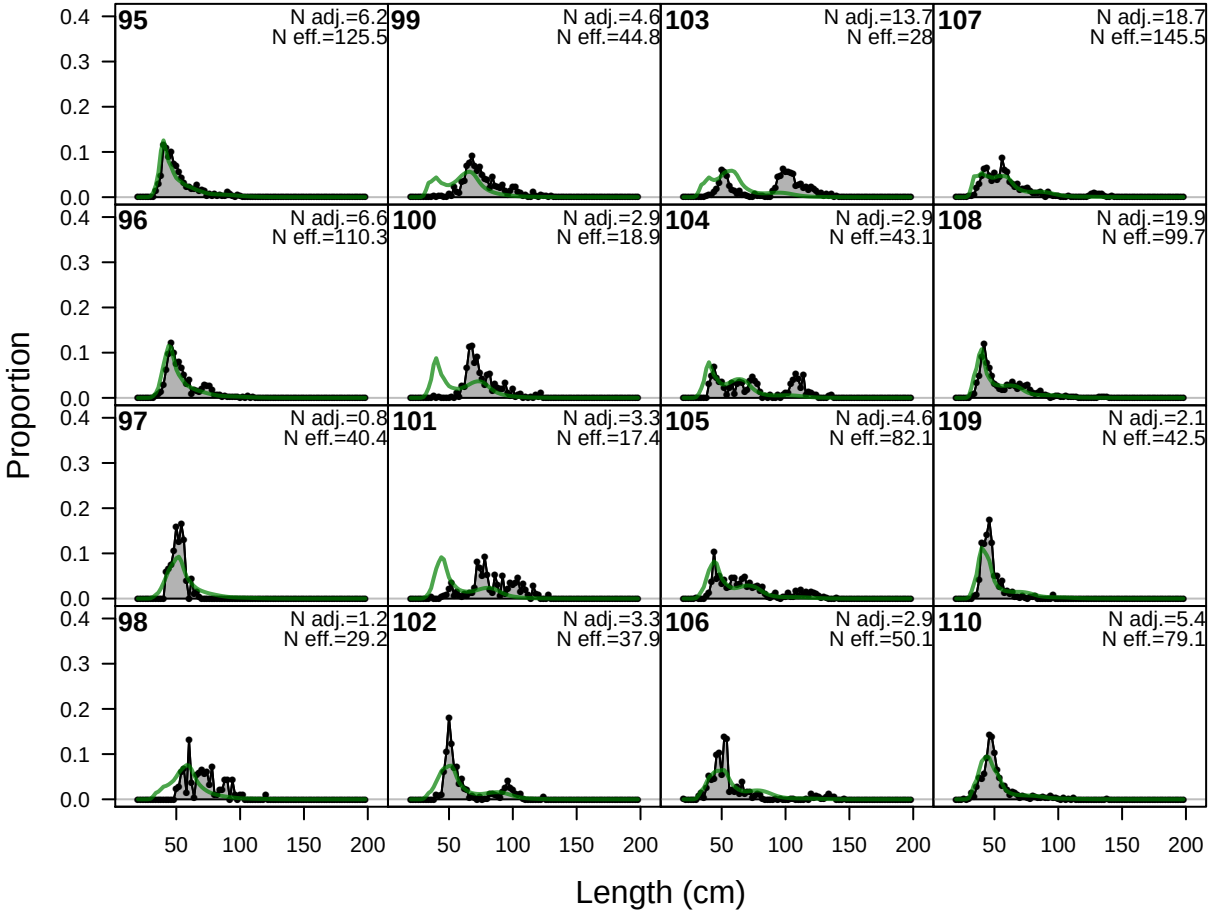
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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103
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N eff.=28
107
N adj.=18.7
N eff.=145.5
96
N adj.=6.6
N eff.=110.3
100
N adj.=2.9
N eff.=18.9
104
N adj.=2.9
N eff.=43.1
108
N adj.=19.9
N eff.=99.7
97
N adj.=0.8
N eff.=40.4
101
N adj.=3.3
N eff.=17.4
105
N adj.=4.6
N eff.=82.1
109
N adj.=2.1
N eff.=42.5
98
N adj.=1.2
N eff.=29.2
102
N adj.=3.3
N eff.=37.9
106
N adj.=2.9
N eff.=50.1
110
N adj.=5.4
N eff.=79.1
Proportion
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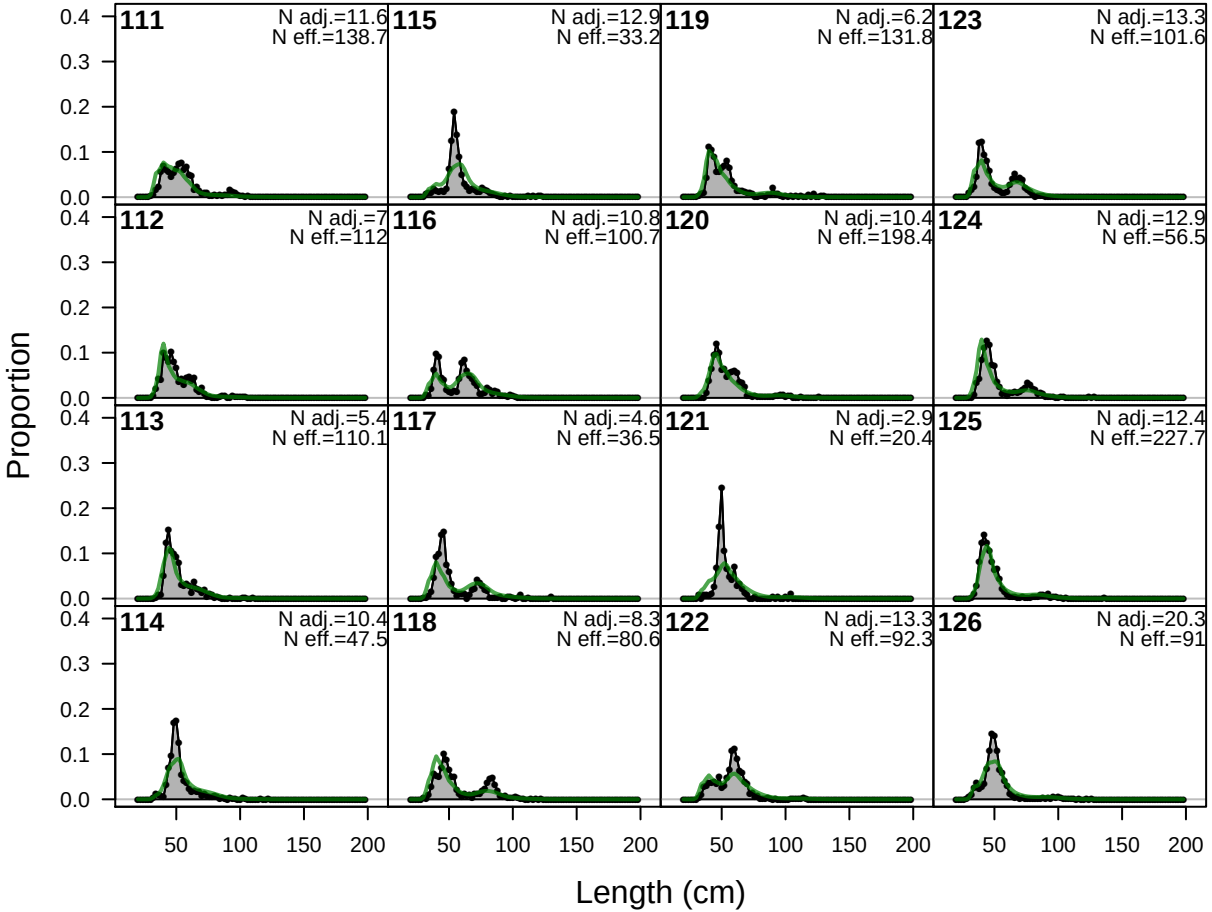
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=138.7
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N eff.=33.2
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N eff.=131.8
123
N adj.=13.3
N eff.=101.6
112
N adj.=7
N eff.=112
116
N adj.=10.8
N eff.=100.7
120
N adj.=10.4
N eff.=198.4
124
N adj.=12.9
N eff.=56.5
113
N adj.=5.4
N eff.=110.1
117
N adj.=4.6
N eff.=36.5
121
N adj.=2.9
N eff.=20.4
125
N adj.=12.4
N eff.=227.7
114
N adj.=10.4
N eff.=47.5
118
N adj.=8.3
N eff.=80.6
122
N adj.=13.3
N eff.=92.3
126
N adj.=20.3
N eff.=91
Proportion
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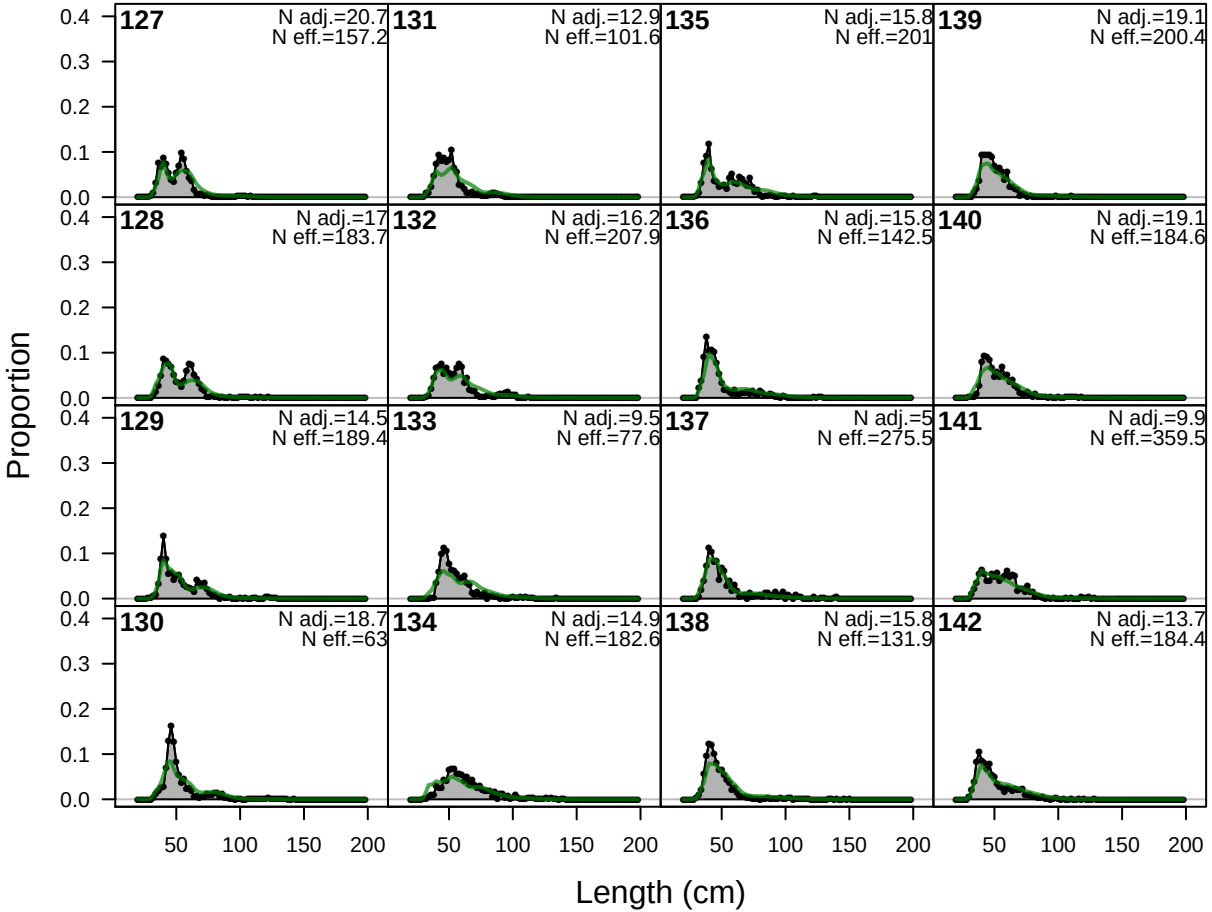
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=201
139
N adj.=19.1
N eff.=200.4
128
N adj.=17
N eff.=183.7
132
N adj.=16.2
N eff.=207.9
136
N adj.=15.8
N eff.=142.5
140
N adj.=19.1
N eff.=184.6
129
N adj.=14.5
N eff.=189.4
133
N adj.=9.5
N eff.=77.6
137
N adj.=5
N eff.=275.5
141
N adj.=9.9
N eff.=359.5
130
N adj.=18.7
N eff.=63
134
N adj.=14.9
N eff.=182.6
138
N adj.=15.8
N eff.=131.9
142
N adj.=13.7
N eff.=184.4
Proportion
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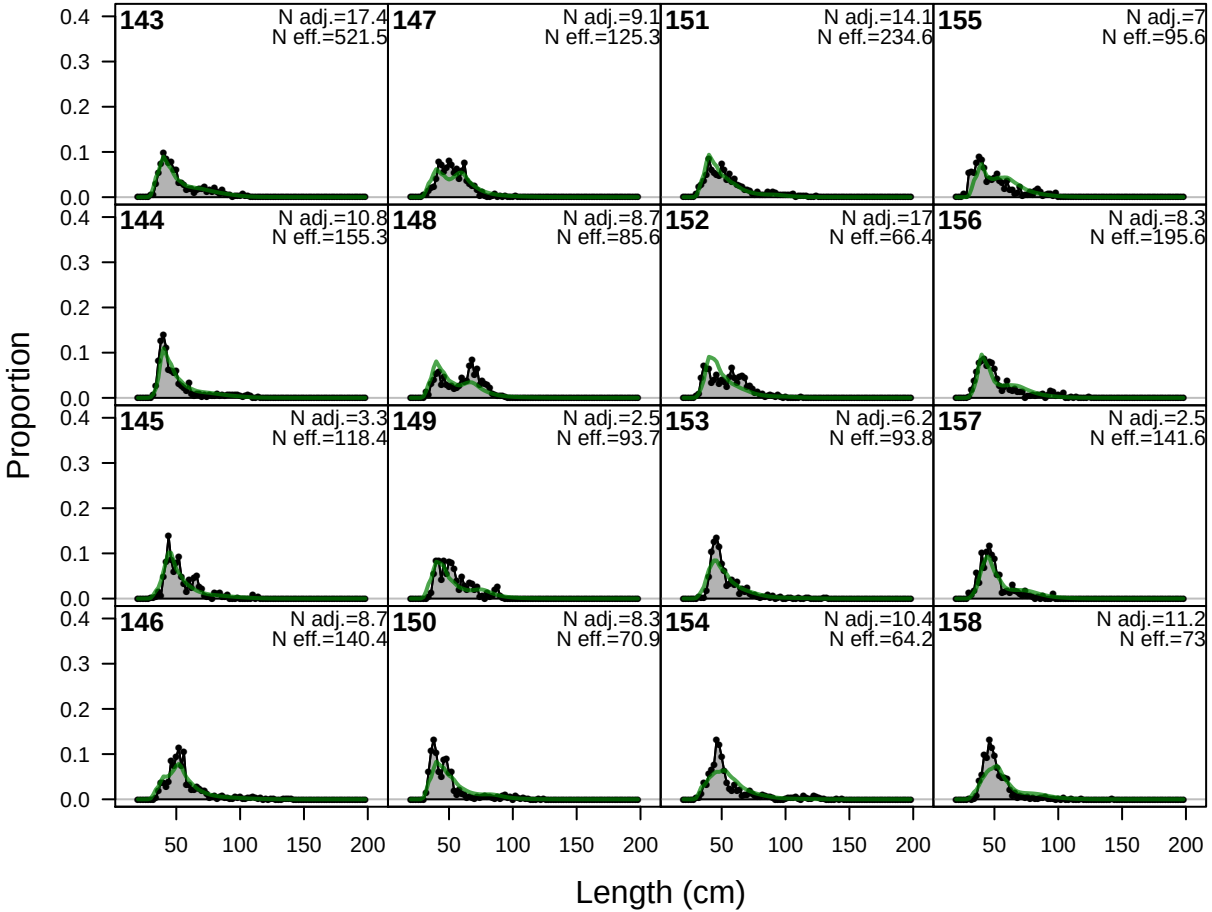
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=125.3
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N eff.=234.6
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N adj.=7
N eff.=95.6
144
N adj.=10.8
N eff.=155.3
148
N adj.=8.7
N eff.=85.6
152
N adj.=17
N eff.=66.4
156
N adj.=8.3
N eff.=195.6
145
N adj.=3.3
N eff.=118.4
149
N adj.=2.5
N eff.=93.7
153
N adj.=6.2
N eff.=93.8
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N adj.=2.5
N eff.=141.6
146
N adj.=8.7
N eff.=140.4
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N adj.=8.3
N eff.=70.9
154
N adj.=10.4
N eff.=64.2
158
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N eff.=73
Proportion
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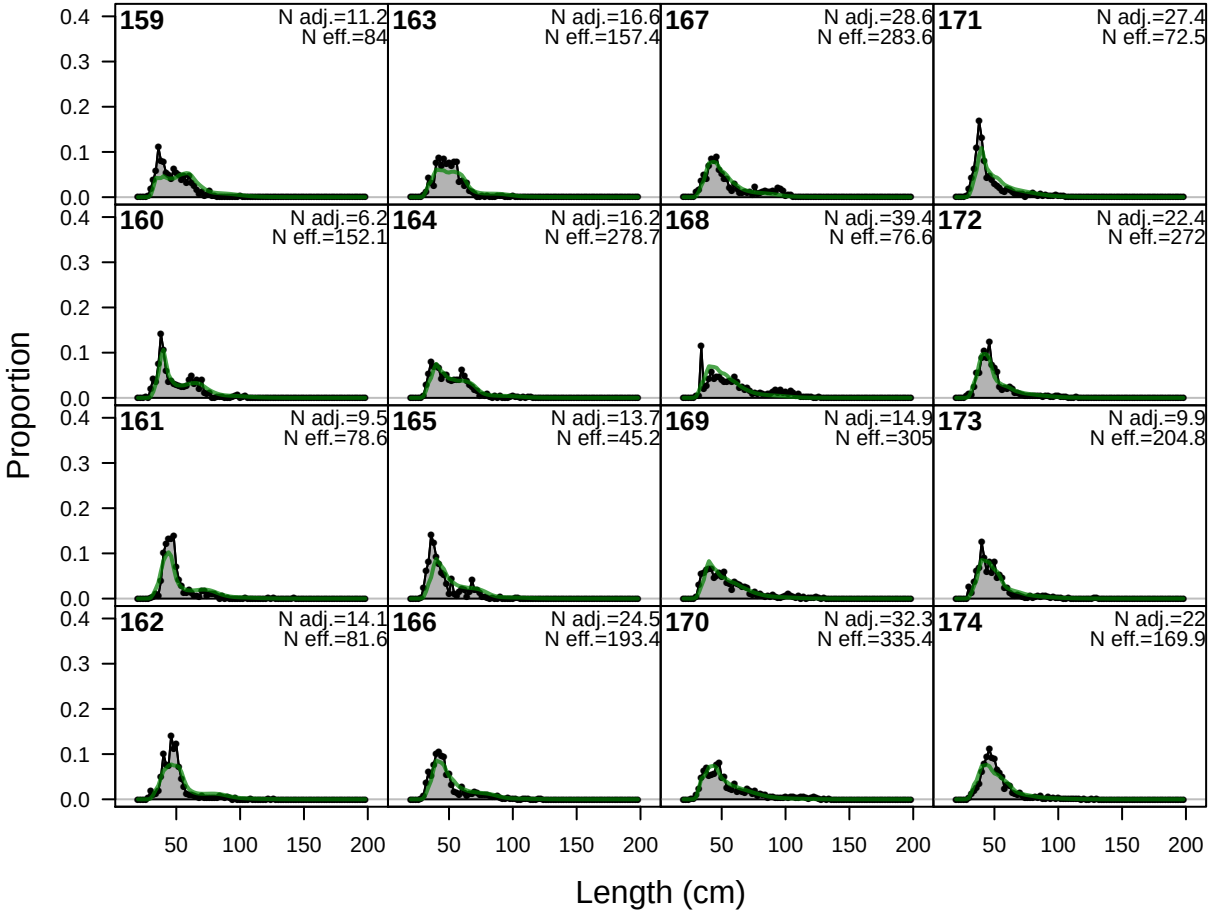
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=84
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N eff.=157.4
167
N adj.=28.6
N eff.=283.6
171
N adj.=27.4
N eff.=72.5
160
N adj.=6.2
N eff.=152.1
164
N adj.=16.2
N eff.=278.7
168
N adj.=39.4
N eff.=76.6
172
N adj.=22.4
N eff.=272
161
N adj.=9.5
N eff.=78.6
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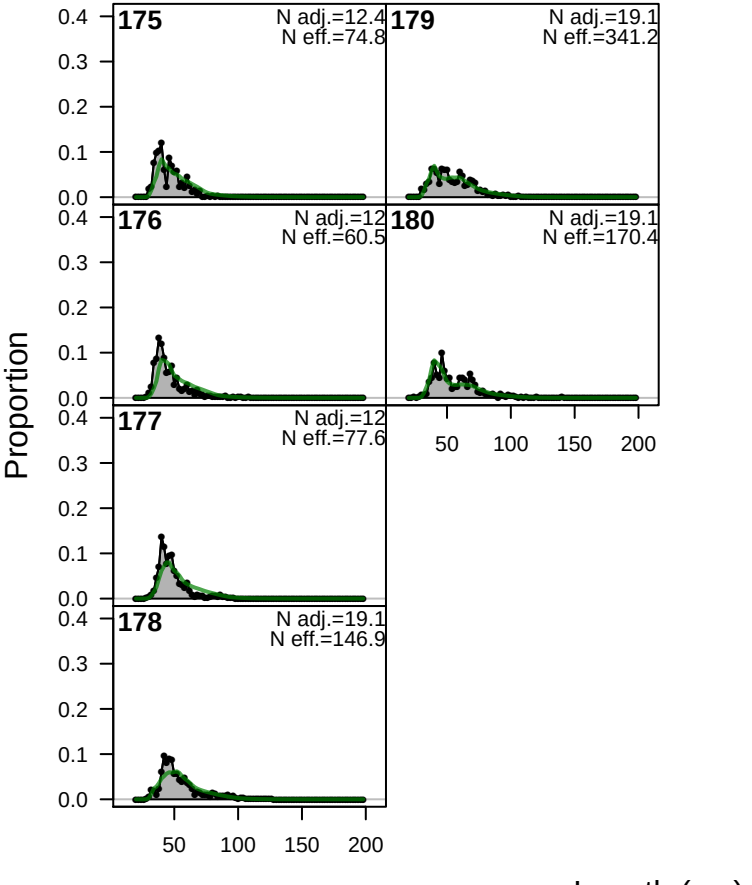
N adj.=13.7
N eff.=45.2
169
N adj.=14.9
N eff.=305
173
N adj.=9.9
N eff.=204.8
162
N adj.=14.1
N eff.=81.6
166
N adj.=24.5
N eff.=193.4
170
N adj.=32.3
N eff.=335.4
174
N adj.=22
N eff.=169.9
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=74.8
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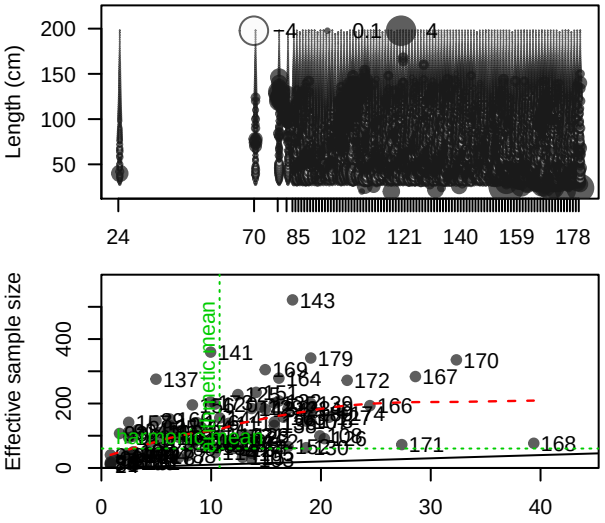
N adj.=19.1
N eff.=341.2
176
N adj.=12
N eff.=60.5
180
N adj.=19.1
N eff.=170.4
177
N adj.=12
N eff.=77.6
178
N adj.=19.1
N eff.=146.9
Proportion
Length (cm)
0.0
0.1
0.2
0.3
0.4
50
100
150
200


Length (cm)
200
150
100
50
4
0.1
4
24
70
85
102
121
140
159
178
Effective sample size
400
200
0
143
141
179
170
137
169
164
172
167
166
171
168
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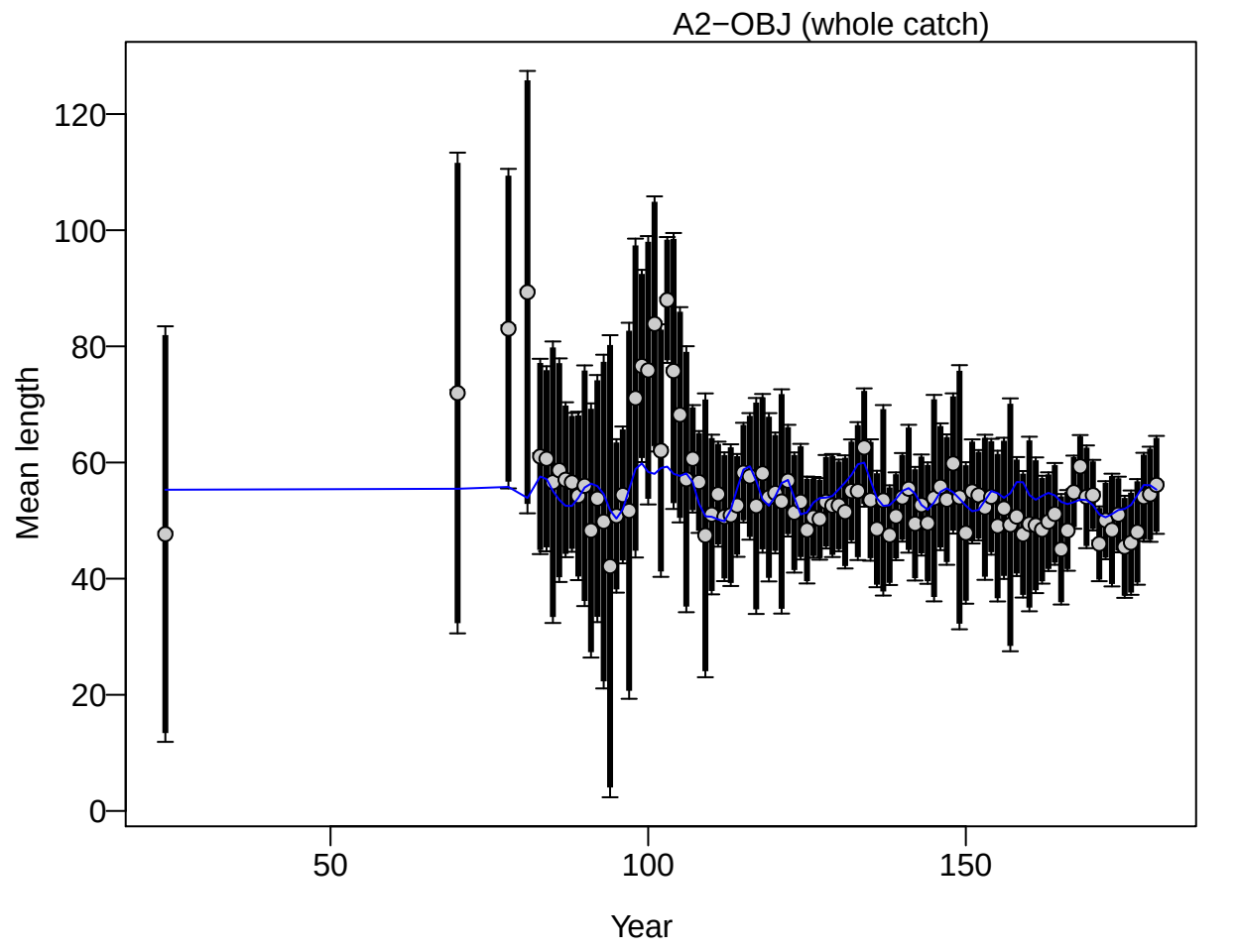
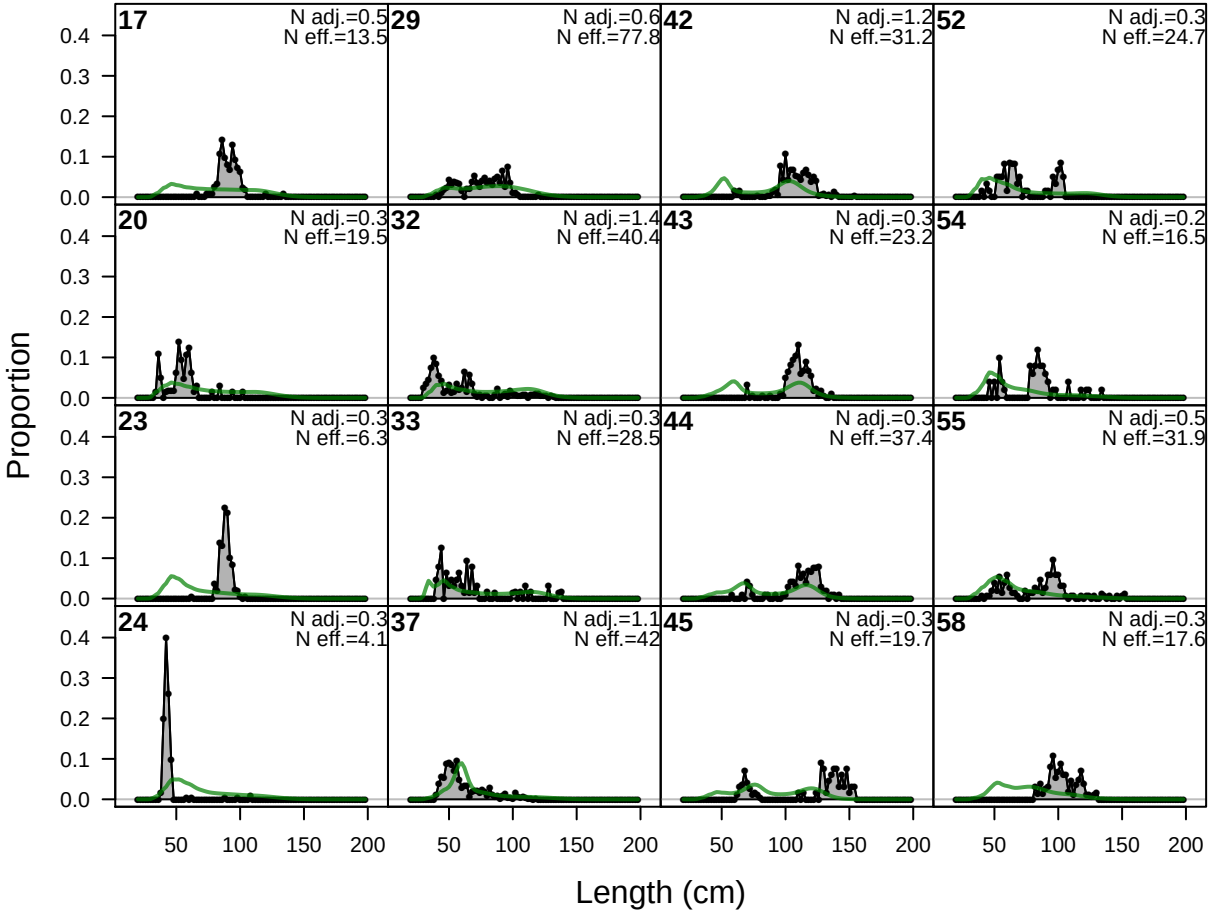
10
20
30
40


A2−OBJ (whole catch)
Mean length
Year
0
20
40
60
80
100
120
50
100
150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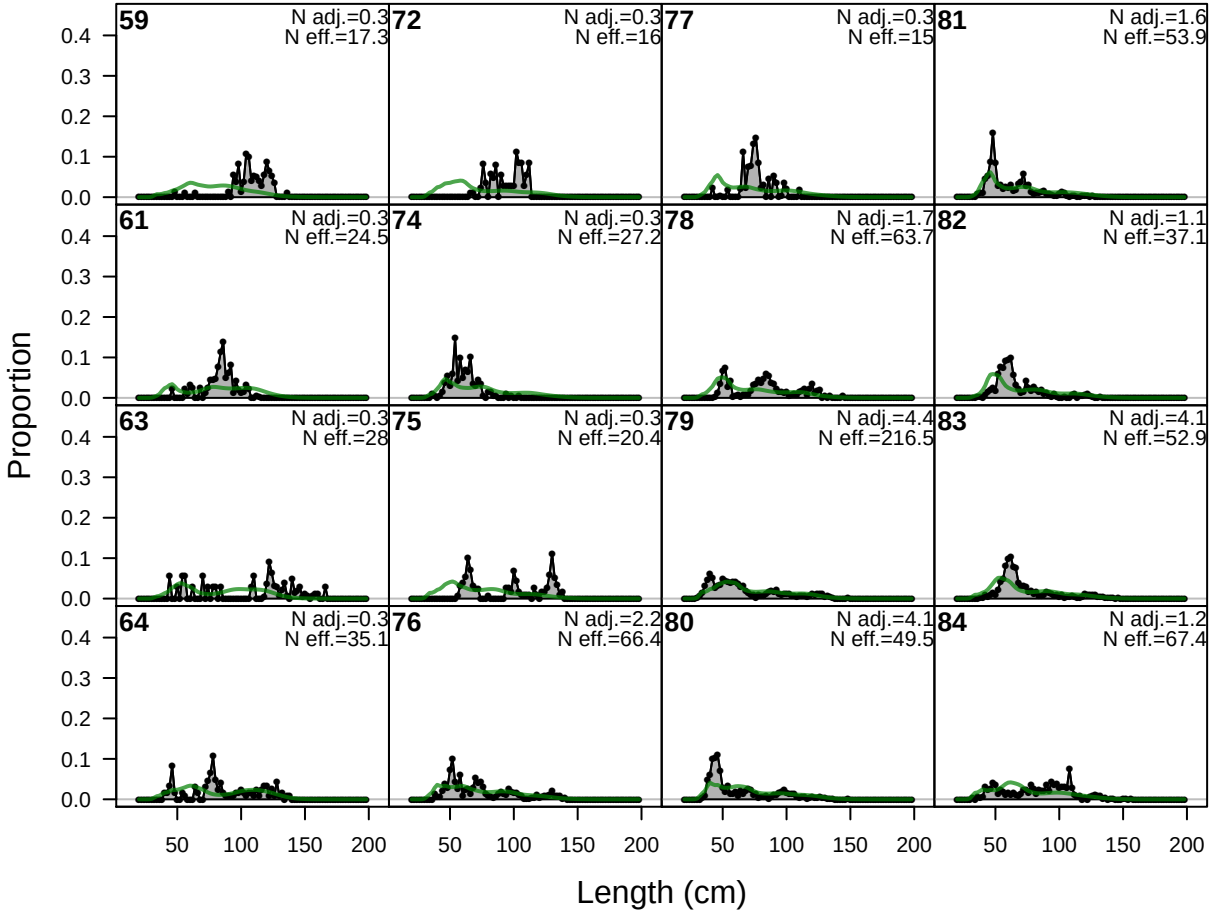
N eff.=31.2
52
N adj.=0.3
N eff.=24.7
20
N adj.=0.3
N eff.=19.5
32
N adj.=1.4
N eff.=40.4
43
N adj.=0.3
N eff.=23.2
54
N adj.=0.2
N eff.=16.5
23
N adj.=0.3
N eff.=6.3
33
N adj.=0.3
N eff.=28.5
44
N adj.=0.3
N eff.=37.4
55
N adj.=0.5
N eff.=31.9
24
N adj.=0.3
N eff.=4.1
37
N adj.=1.1
N eff.=42
45
N adj.=0.3
N eff.=19.7
58
N adj.=0.3
N eff.=17.6
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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77
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N eff.=15
81
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N eff.=53.9
61
N adj.=0.3
N eff.=24.5
74
N adj.=0.3
N eff.=27.2
78
N adj.=1.7
N eff.=63.7
82
N adj.=1.1
N eff.=37.1
63
N adj.=0.3
N eff.=28
75
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79
N adj.=4.4
N eff.=216.5
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N adj.=4.1
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N adj.=0.3
N eff.=35.1
76
N adj.=2.2
N eff.=66.4
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N adj.=4.1
N eff.=49.5
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N adj.=1.2
N eff.=67.4
Proportion
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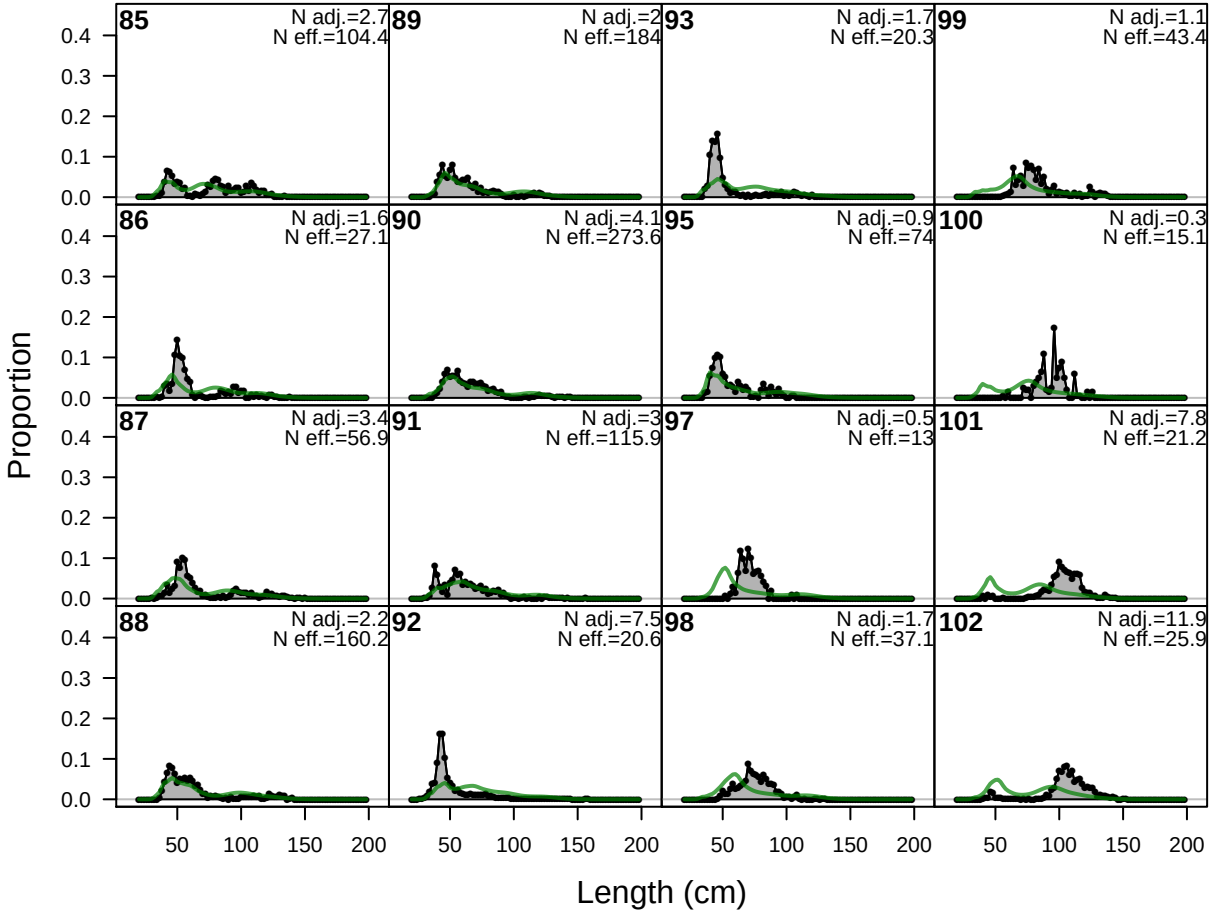
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=104.4
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N adj.=2
N eff.=184
93
N adj.=1.7
N eff.=20.3
99
N adj.=1.1
N eff.=43.4
86
N adj.=1.6
N eff.=27.1
90
N adj.=4.1
N eff.=273.6
95
N adj.=0.9
N eff.=74
100
N adj.=0.3
N eff.=15.1
87
N adj.=3.4
N eff.=56.9
91
N adj.=3
N eff.=115.9
97
N adj.=0.5
N eff.=13
101
N adj.=7.8
N eff.=21.2
88
N adj.=2.2
N eff.=160.2
92
N adj.=7.5
N eff.=20.6
98
N adj.=1.7
N eff.=37.1
102
N adj.=11.9
N eff.=25.9
Proportion
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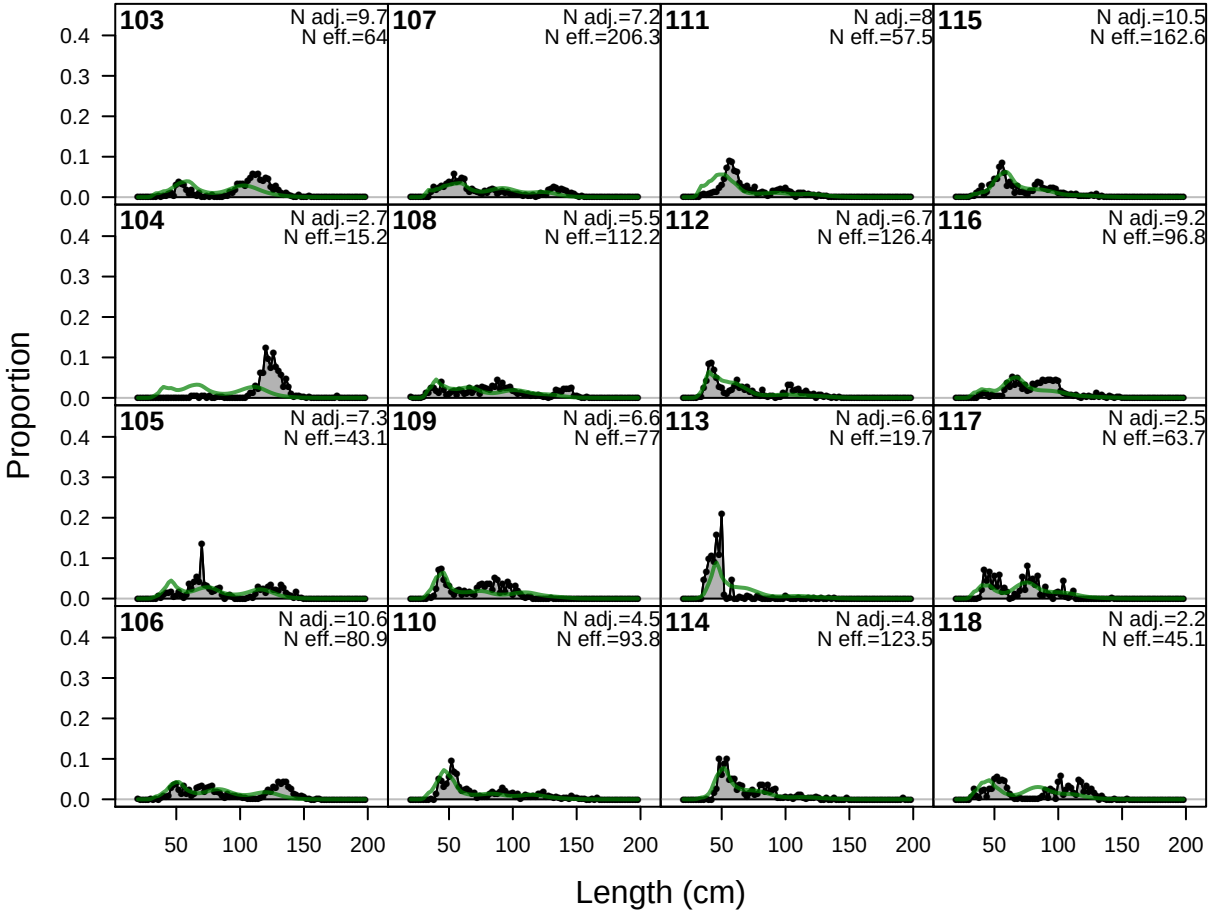
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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N eff.=162.6
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N adj.=2.7
N eff.=15.2
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N adj.=5.5
N eff.=112.2
112
N adj.=6.7
N eff.=126.4
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N adj.=9.2
N eff.=96.8
105
N adj.=7.3
N eff.=43.1
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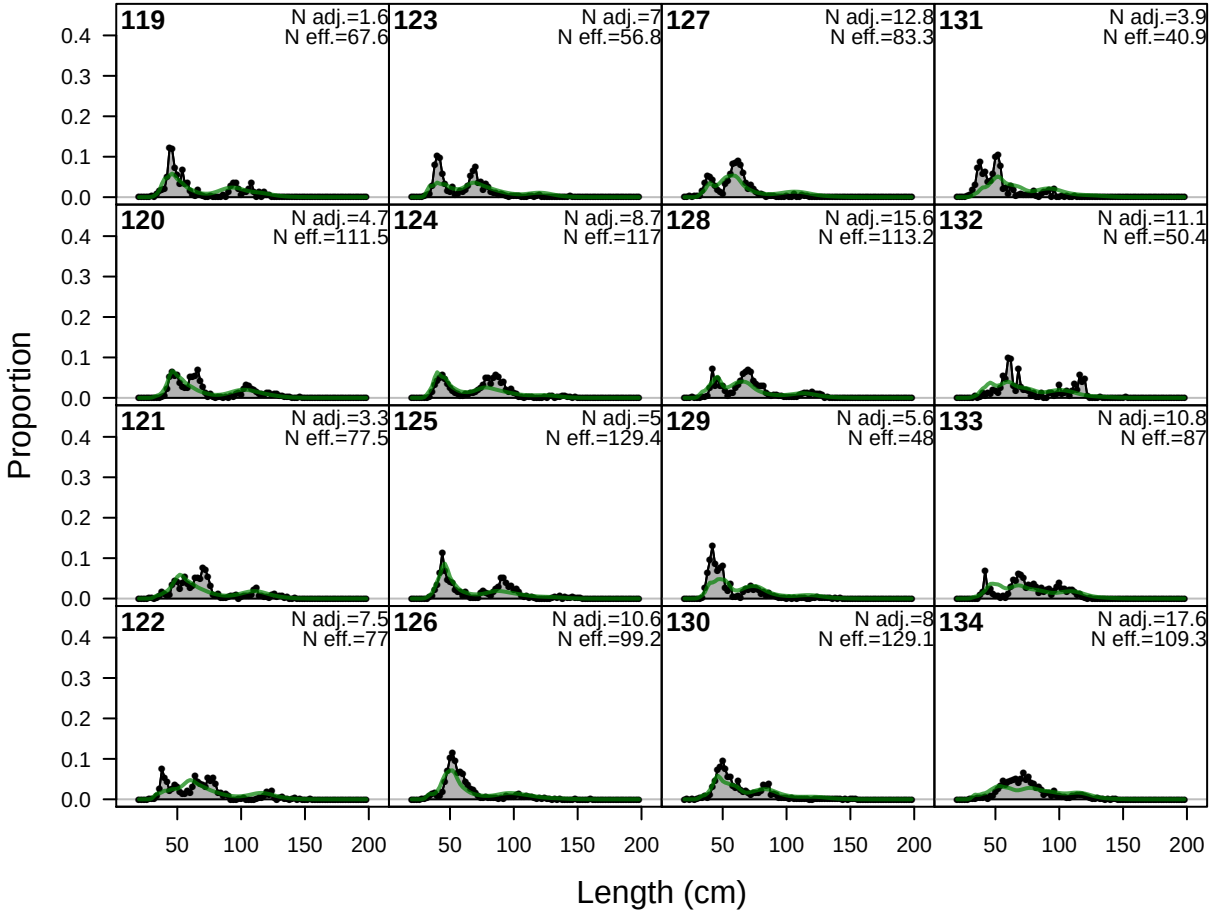
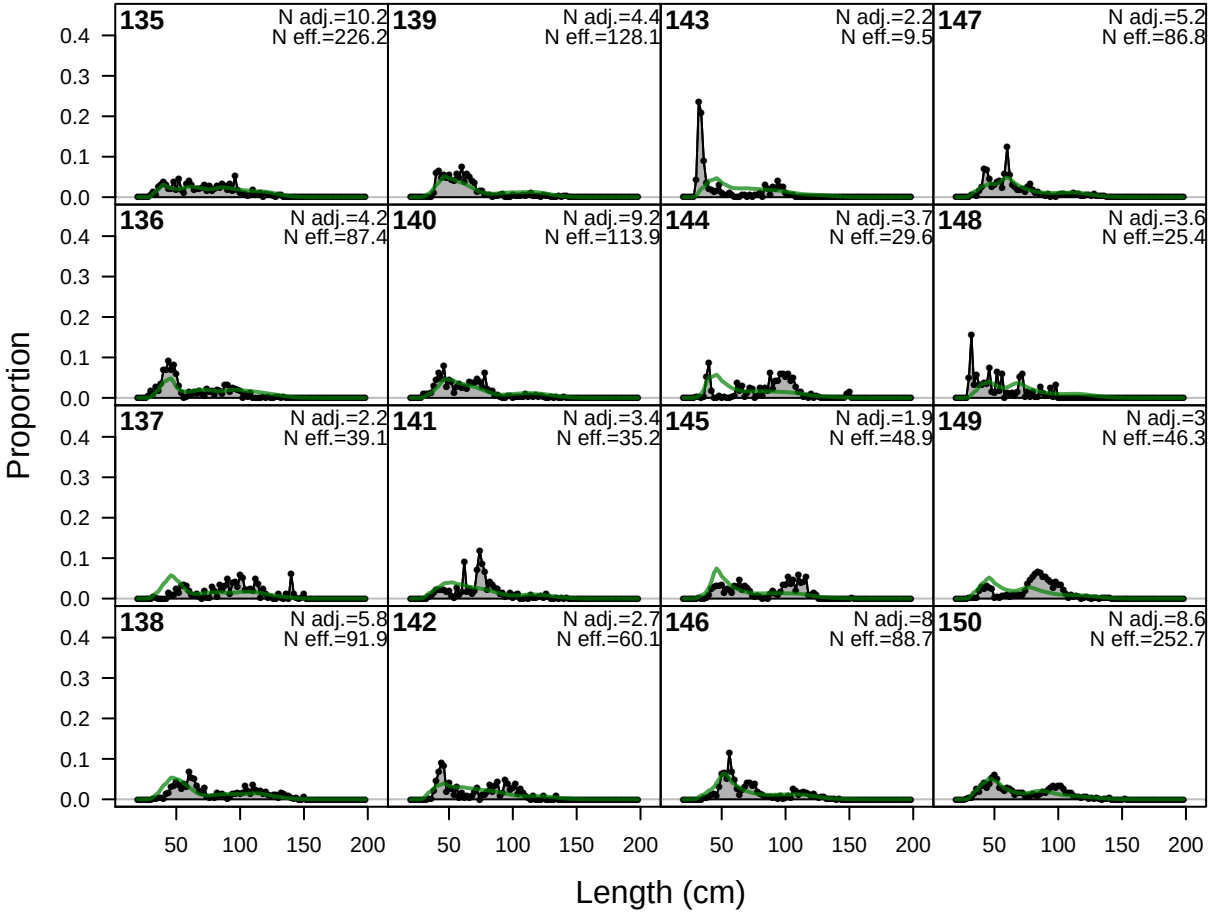
N adj.=6.6
N eff.=77
113
N adj.=6.6
N eff.=19.7
117
N adj.=2.5
N eff.=63.7
106
N adj.=10.6
N eff.=80.9
110
N adj.=4.5
N eff.=93.8
114
N adj.=4.8
N eff.=123.5
118
N adj.=2.2
N eff.=45.1
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)


119
N adj.=1.6
N eff.=67.6
123
N adj.=7
N eff.=56.8
127
N adj.=12.8
N eff.=83.3
131
N adj.=3.9
N eff.=40.9
120
N adj.=4.7
N eff.=111.5
124
N adj.=8.7
N eff.=117
128
N adj.=15.6
N eff.=113.2
132
N adj.=11.1
N eff.=50.4
121
N adj.=3.3
N eff.=77.5
125
N adj.=5
N eff.=129.4
129
N adj.=5.6
N eff.=48
133
N adj.=10.8
N eff.=87
122
N adj.=7.5
N eff.=77
126
N adj.=10.6
N eff.=99.2
130
N adj.=8
N eff.=129.1
134
N adj.=17.6
N eff.=109.3
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)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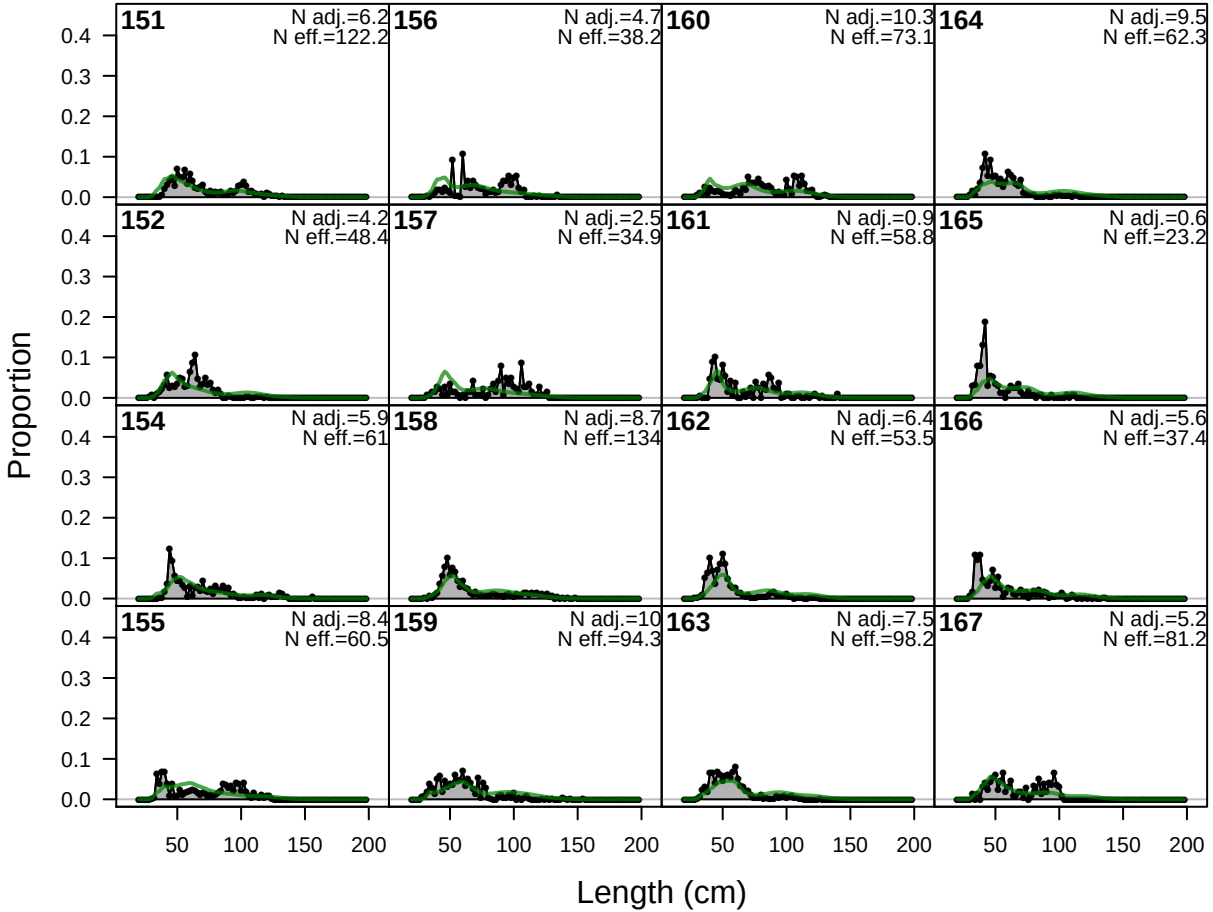
N eff.=226.2
139
N adj.=4.4
N eff.=128.1
143
N adj.=2.2
N eff.=9.5
147
N adj.=5.2
N eff.=86.8
136
N adj.=4.2
N eff.=87.4
140
N adj.=9.2
N eff.=113.9
144
N adj.=3.7
N eff.=29.6
148
N adj.=3.6
N eff.=25.4
137
N adj.=2.2
N eff.=39.1
141
N adj.=3.4
N eff.=35.2
145
N adj.=1.9
N eff.=48.9
149
N adj.=3
N eff.=46.3
138
N adj.=5.8
N eff.=91.9
142
N adj.=2.7
N eff.=60.1
146
N adj.=8
N eff.=88.7
150
N adj.=8.6
N eff.=252.7
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)


151
N adj.=6.2
N eff.=122.2
156
N adj.=4.7
N eff.=38.2
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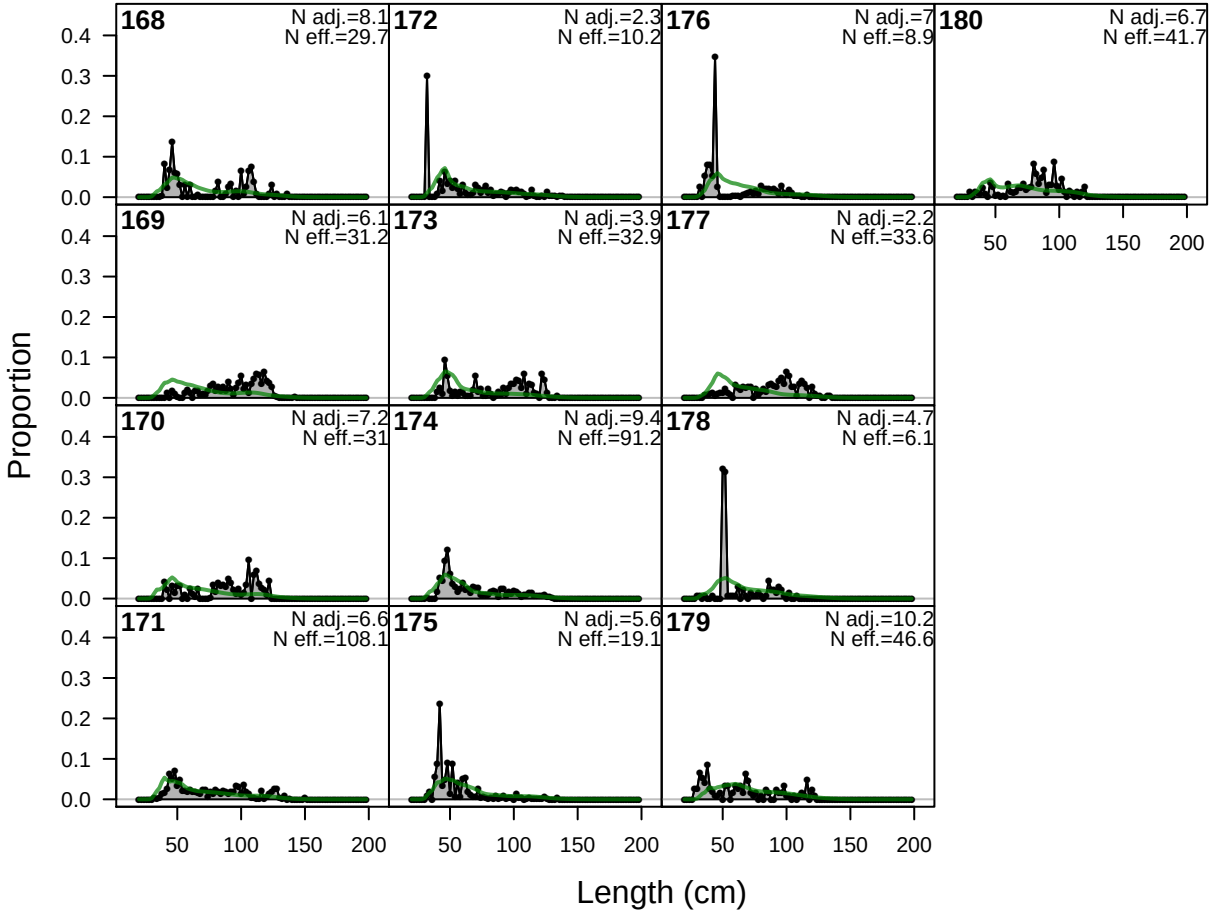
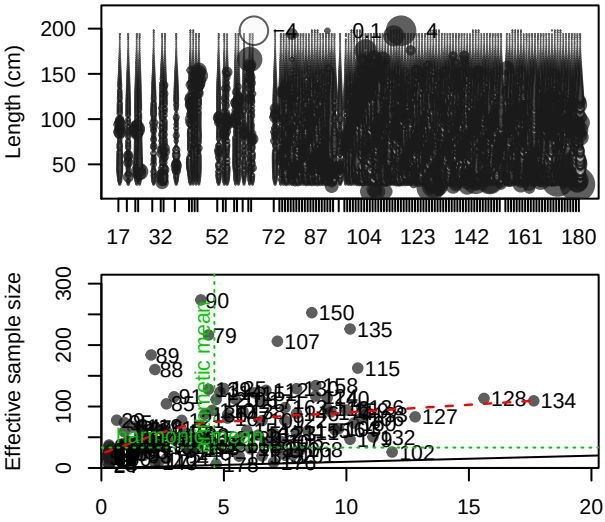
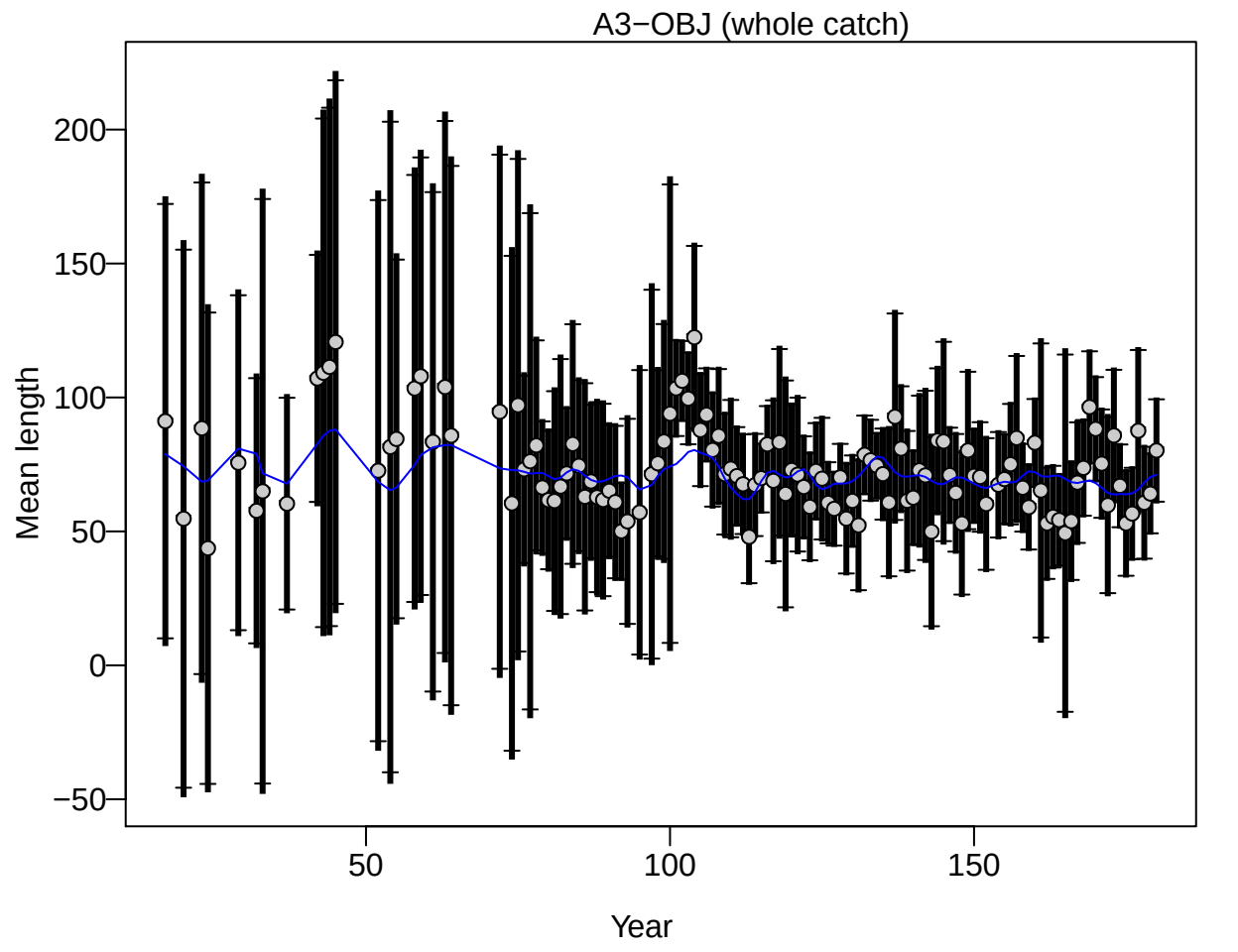
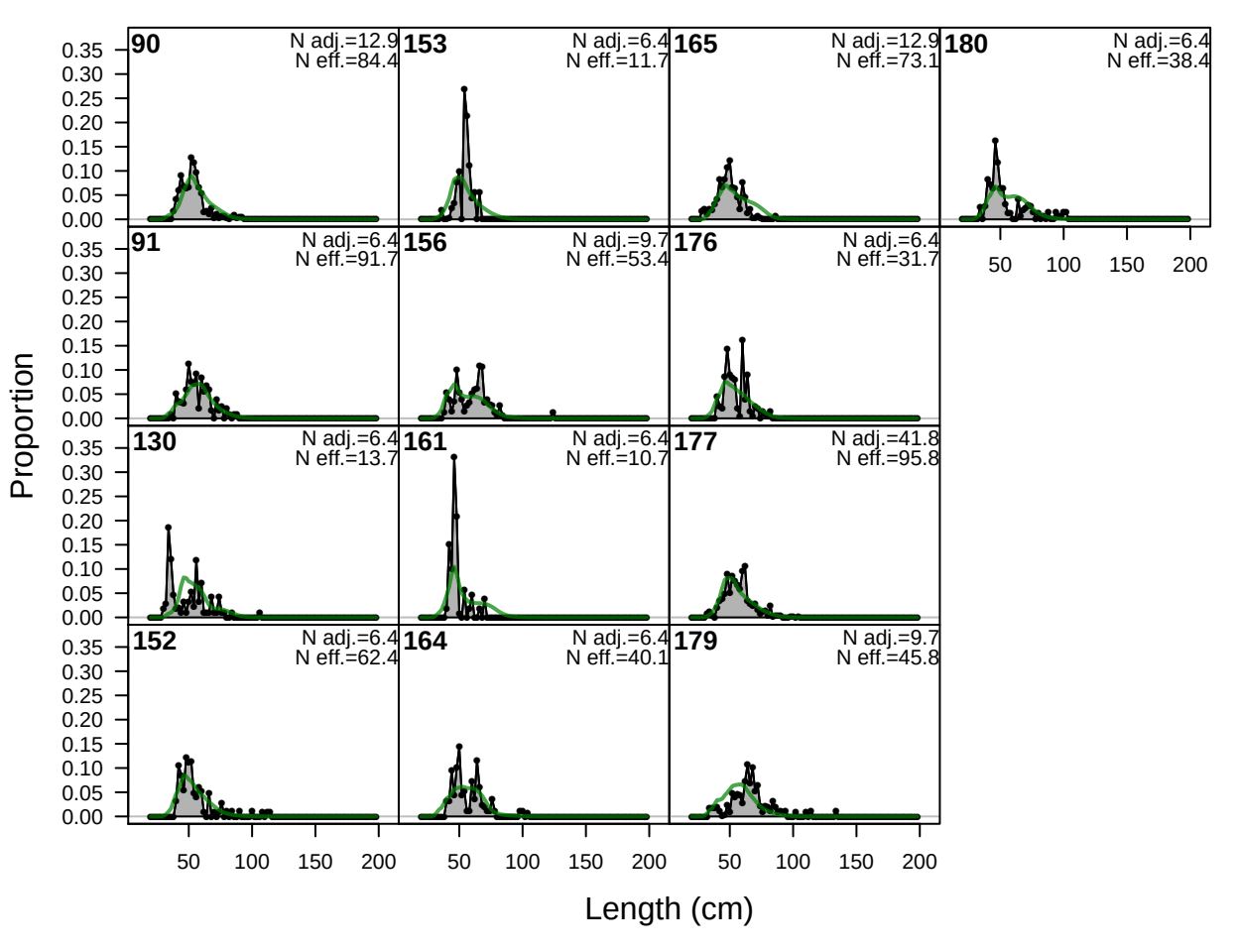
N adj.=10.3
N eff.=73.1
164
N adj.=9.5
N eff.=62.3
152
N adj.=4.2
N eff.=48.4
157
N adj.=2.5
N eff.=34.9
161
N adj.=0.9
N eff.=58.8
165
N adj.=0.6
N eff.=23.2
154
N adj.=5.9
N eff.=61
158
N adj.=8.7
N eff.=134
162
N adj.=6.4
N eff.=53.5
166
N adj.=5.6
N eff.=37.4
155
N adj.=8.4
N eff.=60.5
159
N adj.=10
N eff.=94.3
163
N adj.=7.5
N eff.=98.2
167
N adj.=5.2
N eff.=81.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

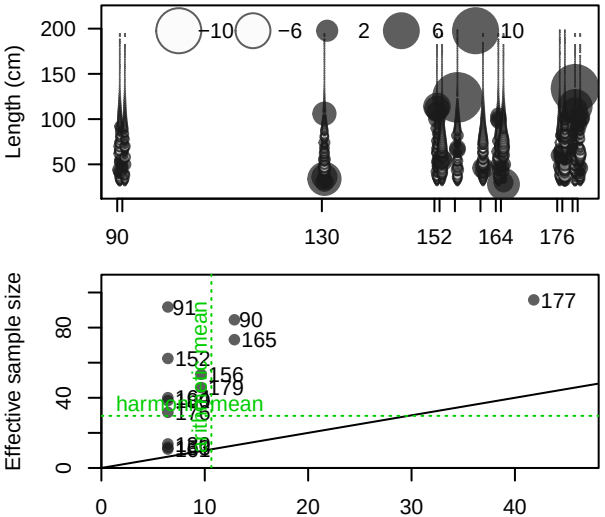

168
N adj.=8.1
N eff.=29.7
172
N adj.=2.3
N eff.=10.2
176
N adj.=7
N eff.=8.9
180
N adj.=6.7
N eff.=41.7
169
N adj.=6.1
N eff.=31.2
173
N adj.=3.9
N eff.=32.9
177
N adj.=2.2
N eff.=33.6
170
N adj.=7.2
N eff.=31
174
N adj.=9.4
N eff.=91.2
178
N adj.=4.7
N eff.=6.1
171
N adj.=6.6
N eff.=108.1
175
N adj.=5.6
N eff.=19.1
179
N adj.=10.2
N eff.=46.6
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

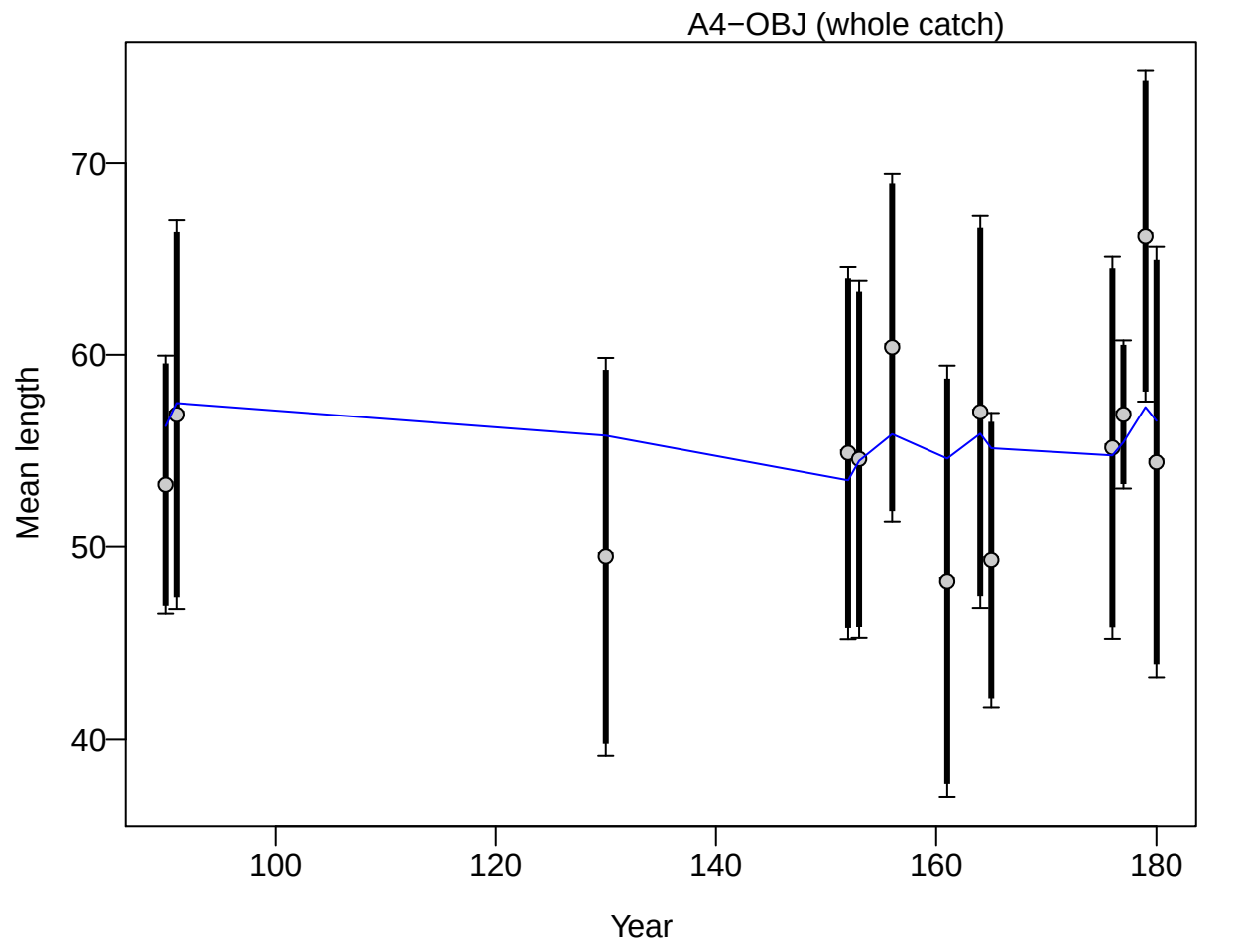


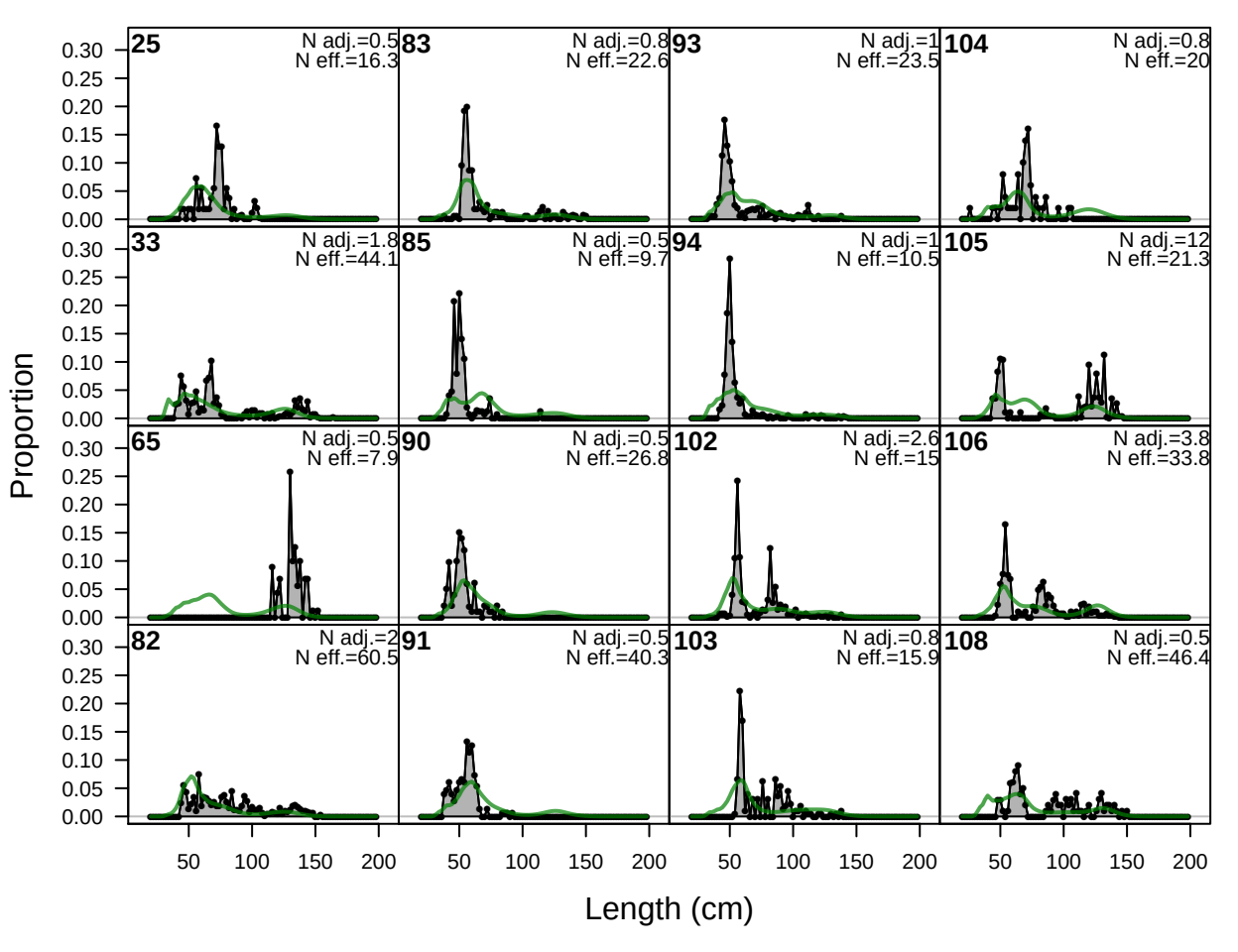
Length (cm)
200
150
100
50
-4
0.1
4
17
32
52
72
87
104
123
142
161
180
Effective sample size
300
200
100
0
90
79
150
135
107
89
88
115
128
134
127
102
0
5
10
15
20

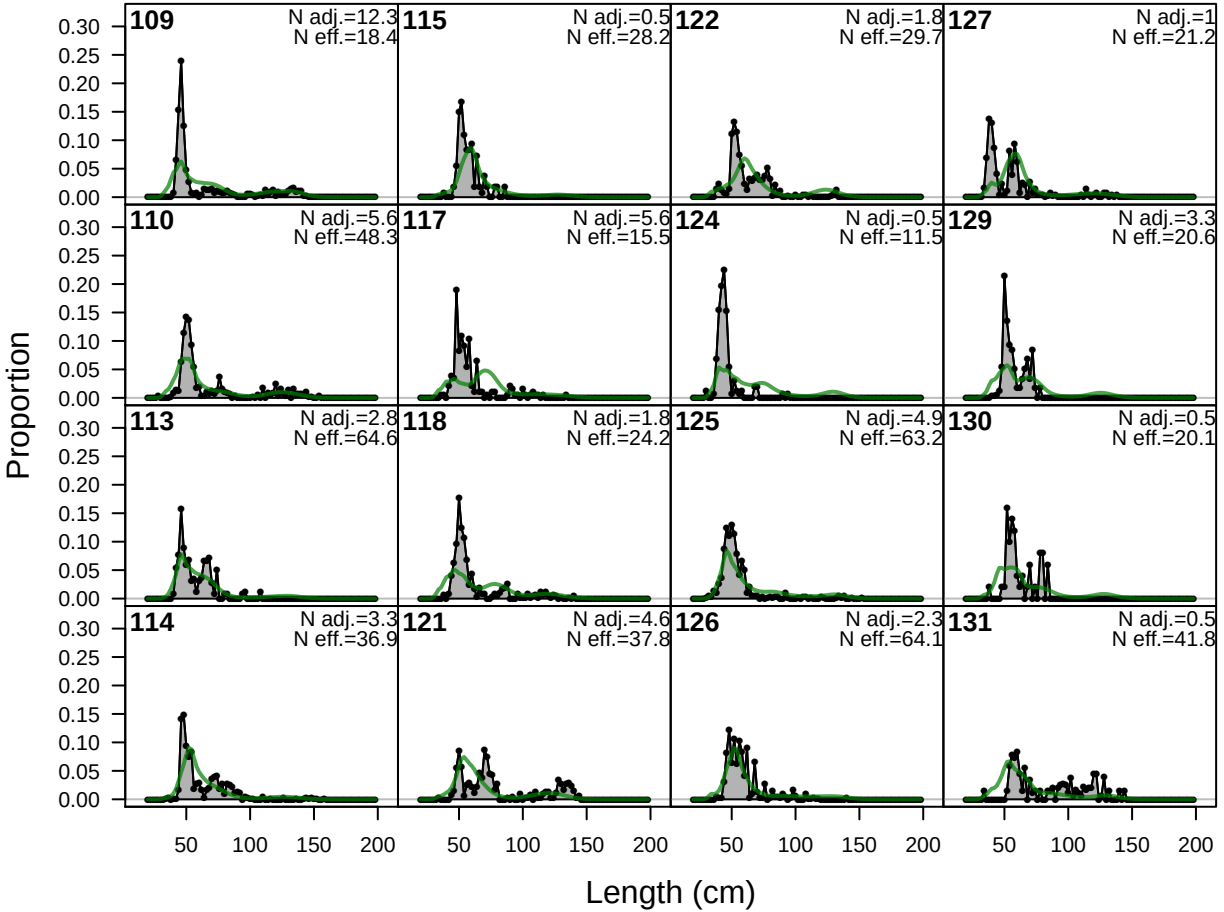

A3−OBJ (whole catch)
Mean length
200
150
100
50
0
−50
50
100
150
Year

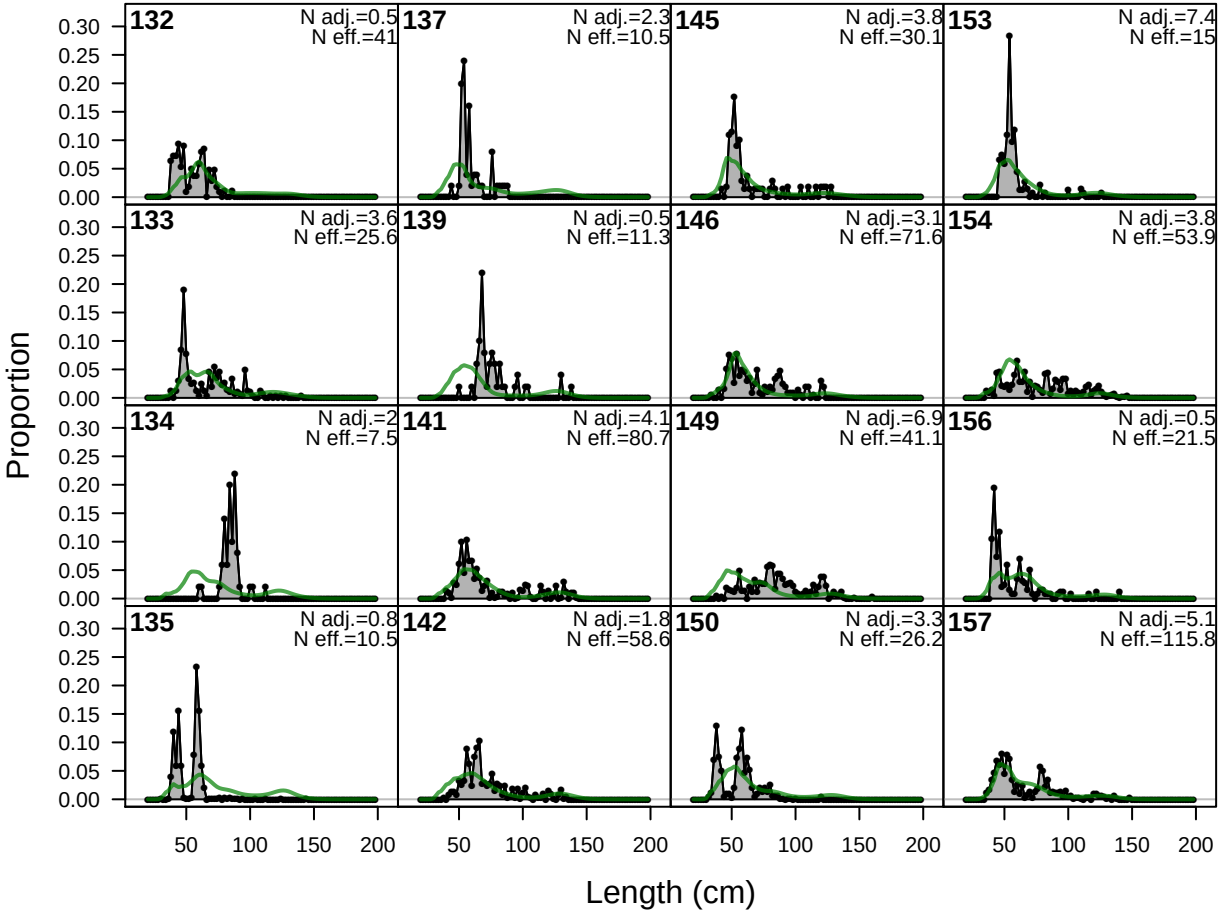

90
N adj.=12.9
N eff.=84.4
153
N adj.=6.4
N eff.=11.7
165
N adj.=12.9
N eff.=73.1
180
N adj.=6.4
N eff.=38.4
91
N adj.=6.4
N eff.=91.7
156
N adj.=9.7
N eff.=53.4
176
N adj.=6.4
N eff.=31.7
130
N adj.=6.4
N eff.=13.7
161
N adj.=6.4
N eff.=10.7
177
N adj.=41.8
N eff.=95.8
152
N adj.=6.4
N eff.=62.4
164
N adj.=6.4
N eff.=40.1
179
N adj.=9.7
N eff.=45.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

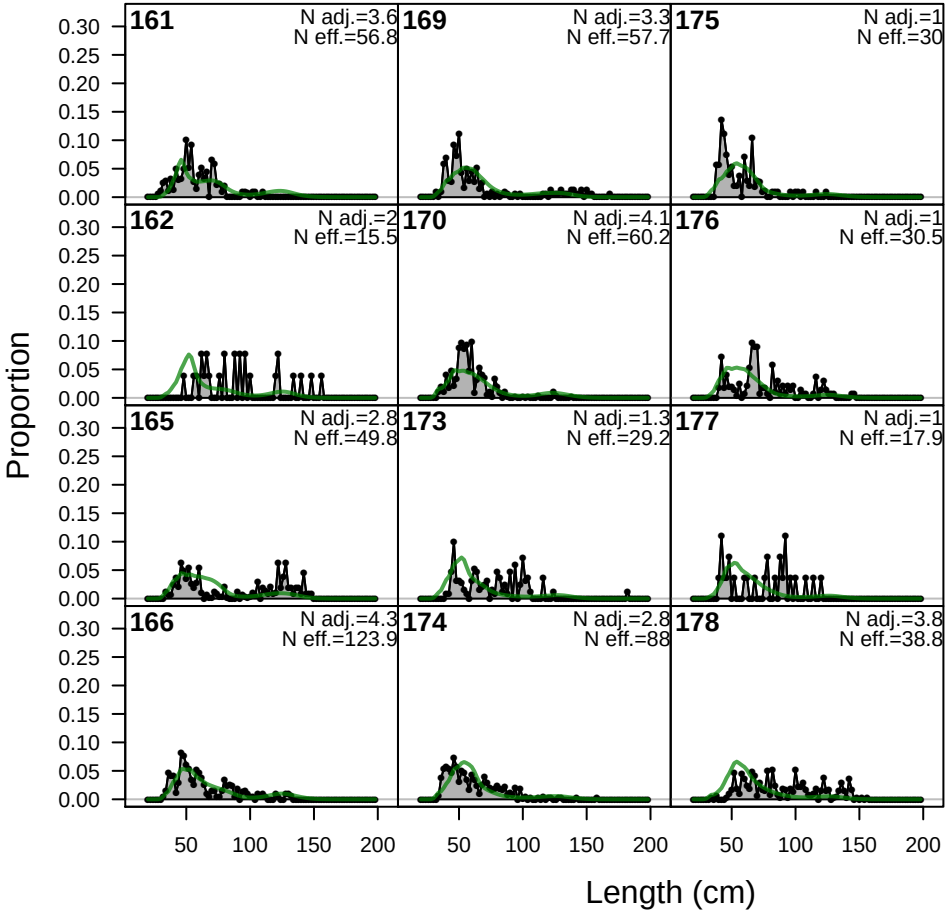

Length (cm)
200
150
100
50
−10
−6
2
6
10
90
130
152
164
176
Effective sample size
80
40
0
91
90
165
177
152
156
179
harmonic mean
0
10
20
30
40

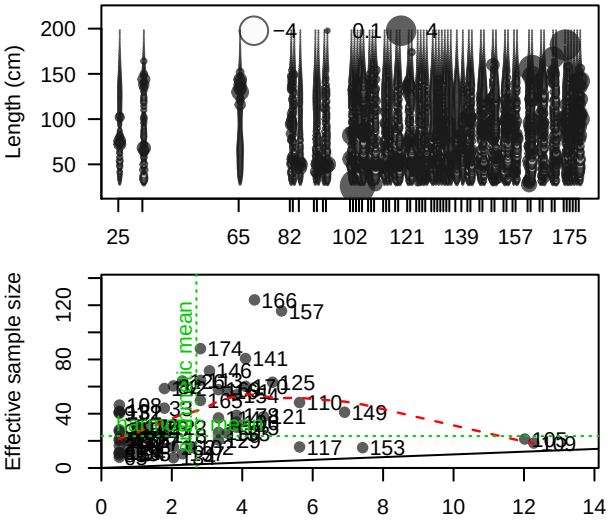

A4−OBJ (whole catch)
Mean length
70
60
50
40
100
120
140
160
180
Year

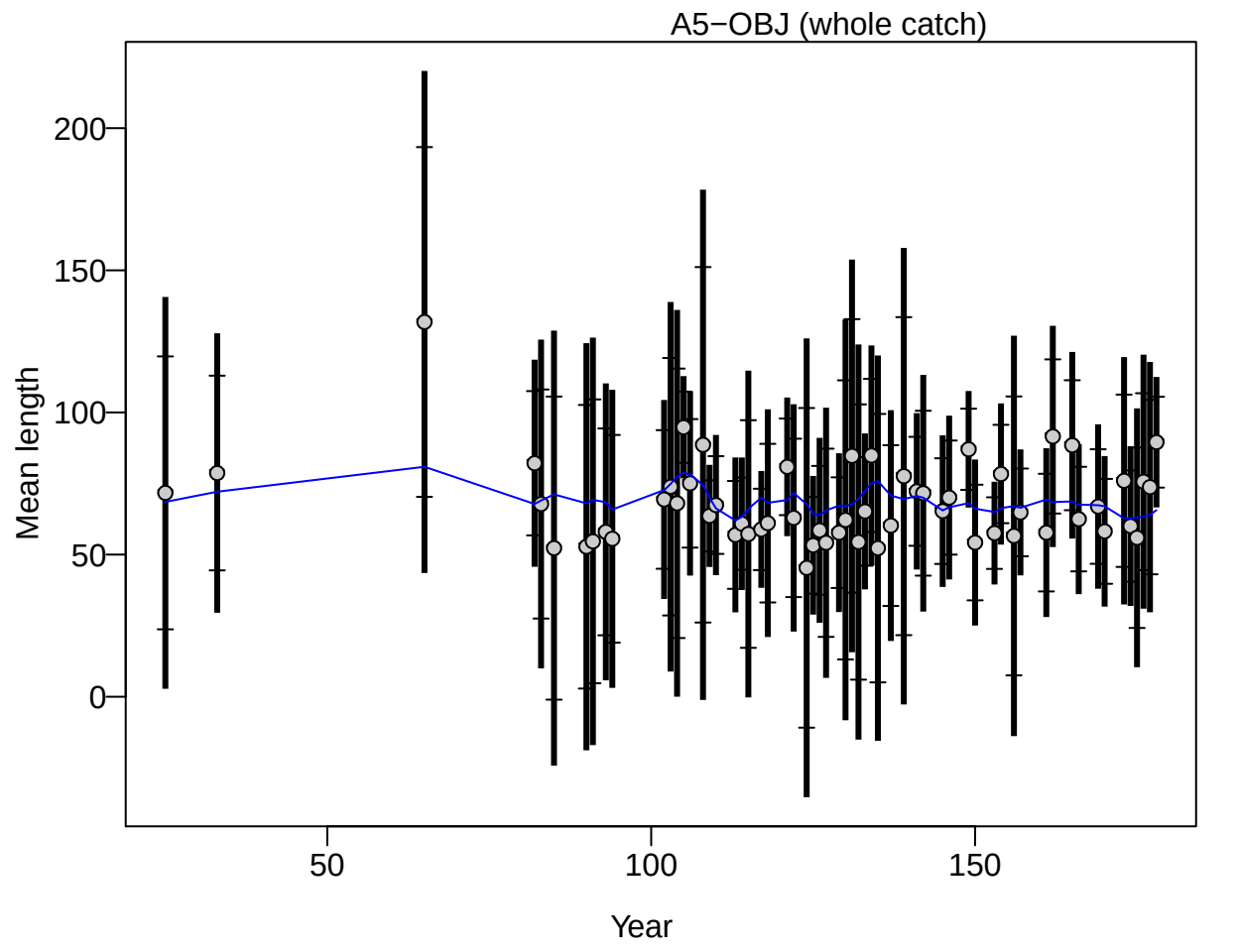

25
N adj.=0.5
N eff.=16.3
83
N adj.=0.8
N eff.=22.6
93
N adj.=1
N eff.=23.5
104
N adj.=0.8
N eff.=20
33
N adj.=1.8
N eff.=44.1
85
N adj.=0.5
N eff.=9.7
94
N adj.=1
N eff.=10.5
105
N adj.=12
N eff.=21.3
65
N adj.=0.5
N eff.=7.9
90
N adj.=0.5
N eff.=26.8
102
N adj.=2.6
N eff.=15
106
N adj.=3.8
N eff.=33.8
82
N adj.=2
N eff.=60.5
91
N adj.=0.5
N eff.=40.3
103
N adj.=0.8
N eff.=15.9
108
N adj.=0.5
N eff.=46.4
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)

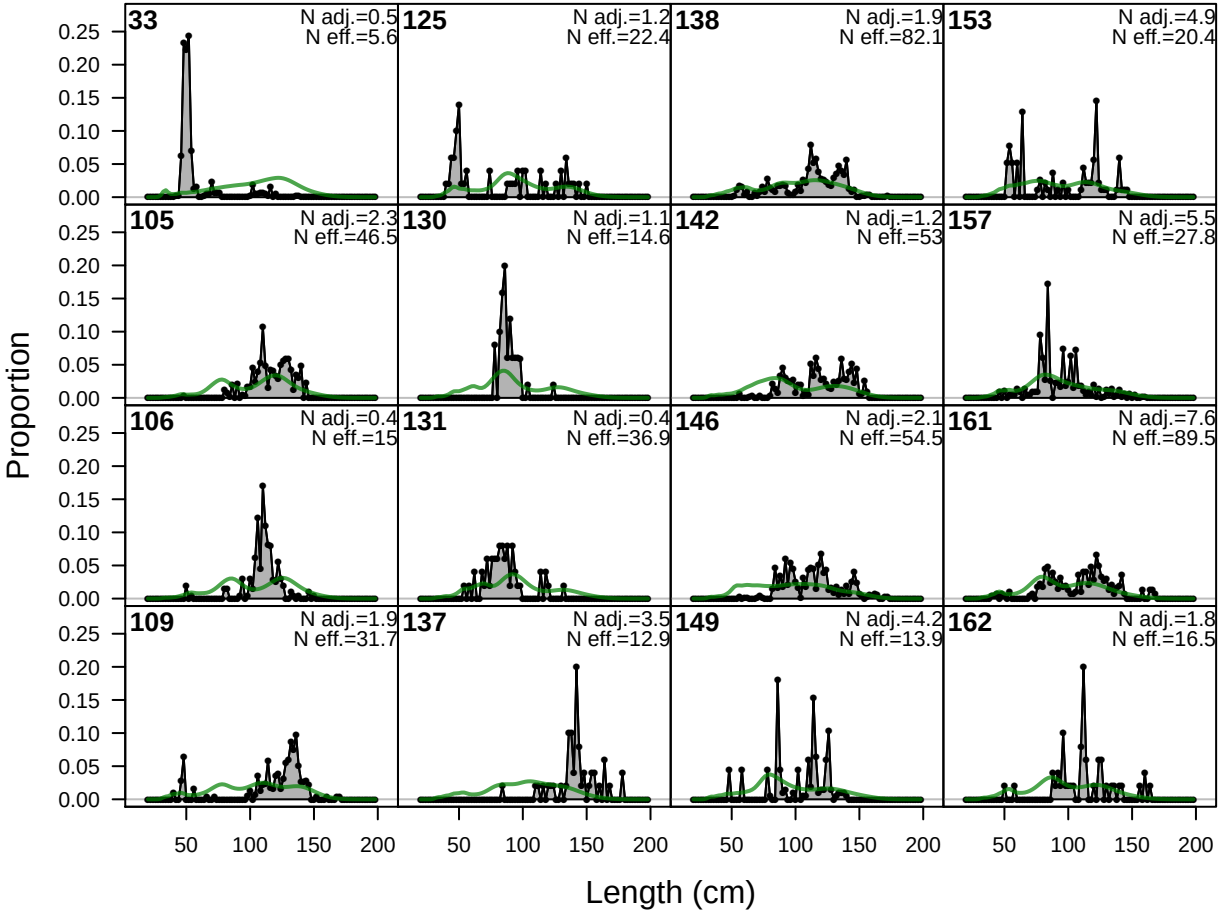

109
N adj.=12.3
N eff.=18.4
115
N adj.=0.5
N eff.=28.2
122
N adj.=1.8
N eff.=29.7
127
N adj.=1
N eff.=21.2
110
N adj.=5.6
N eff.=48.3
117
N adj.=5.6
N eff.=15.5
124
N adj.=0.5
N eff.=11.5
129
N adj.=3.3
N eff.=20.6
113
N adj.=2.8
N eff.=64.6
118
N adj.=1.8
N eff.=24.2
125
N adj.=4.9
N eff.=63.2
130
N adj.=0.5
N eff.=20.1
114
N adj.=3.3
N eff.=36.9
121
N adj.=4.6
N eff.=37.8
126
N adj.=2.3
N eff.=64.1
131
N adj.=0.5
N eff.=41.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)

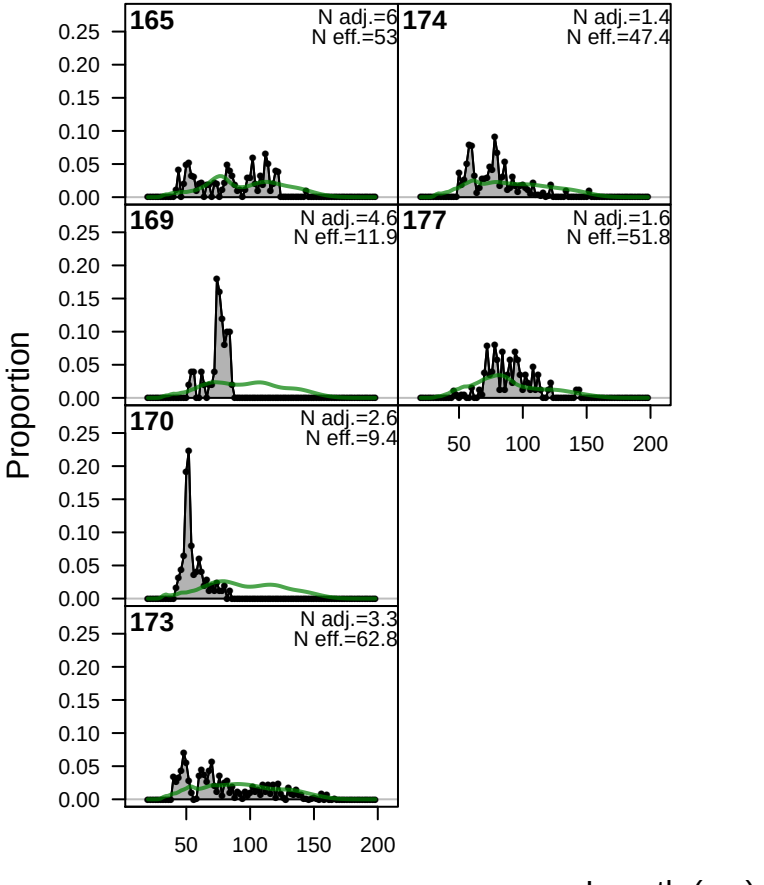

132
N adj.=0.5
N eff.=41
137
N adj.=2.3
N eff.=10.5
145
N adj.=3.8
N eff.=30.1
153
N adj.=7.4
N eff.=15
133
N adj.=3.6
N eff.=25.6
139
N adj.=0.5
N eff.=11.3
146
N adj.=3.1
N eff.=71.6
154
N adj.=3.8
N eff.=53.9
134
N adj.=2
N eff.=7.5
141
N adj.=4.1
N eff.=80.7
149
N adj.=6.9
N eff.=41.1
156
N adj.=0.5
N eff.=21.5
135
N adj.=0.8
N eff.=10.5
142
N adj.=1.8
N eff.=58.6
150
N adj.=3.3
N eff.=26.2
157
N adj.=5.1
N eff.=115.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)

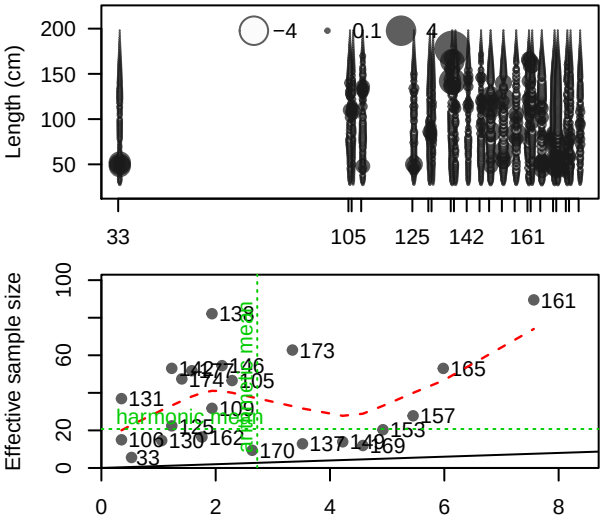

161
N adj.=3.6
N eff.=56.8
169
N adj.=3.3
N eff.=57.7
175
N adj.=1
N eff.=30
162
N adj.=2
N eff.=15.5
170
N adj.=4.1
N eff.=60.2
176
N adj.=1
N eff.=30.5
165
N adj.=2.8
N eff.=49.8
173
N adj.=1.3
N eff.=29.2
177
N adj.=1
N eff.=17.9
166
N adj.=4.3
N eff.=123.9
174
N adj.=2.8
N eff.=88
178
N adj.=3.8
N eff.=38.8
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
50
100
150
200
Length (cm)


Length (cm)
200
150
100
50
−4
0.1
4
25
65
82
102
121
139
157
175
Effective sample size
120
80
40
0
arithmetic mean
166
157
174
141
146
125
110
149
117
153
105
109
0
2
4
6
8
10
12
14

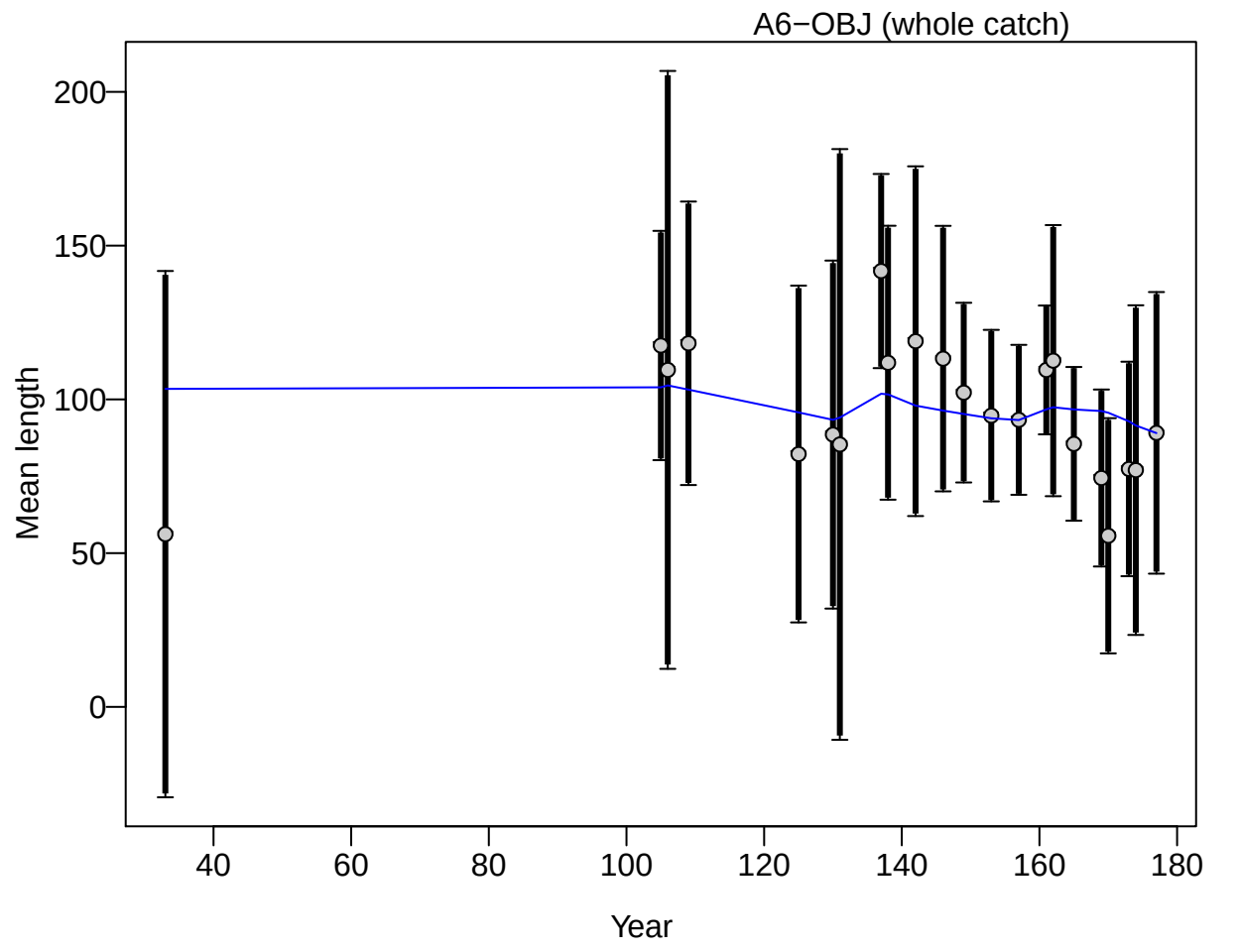

A5−OBJ (whole catch)
Mean length
200
150
100
50
0
50
100
150
Year

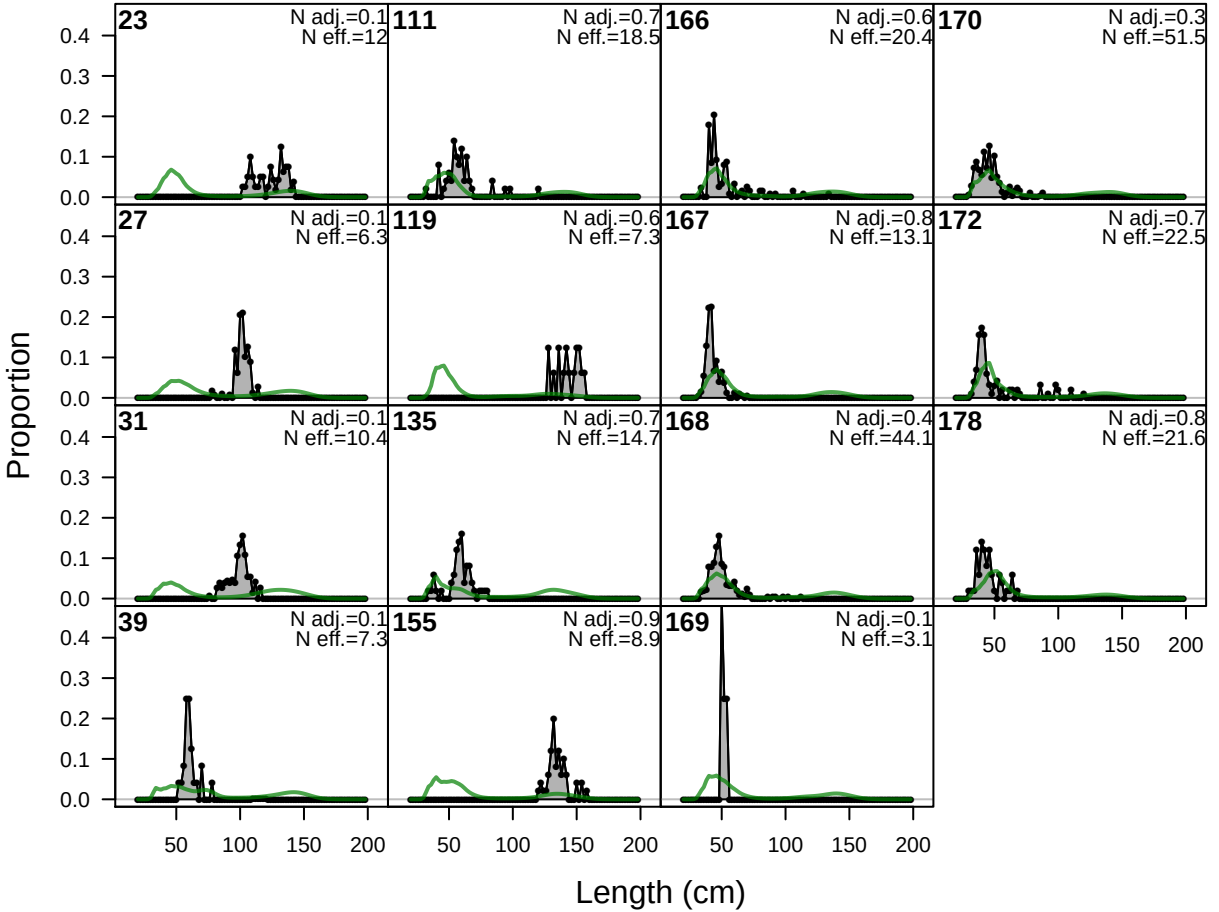

33
N adj.=0.5
N eff.=5.6
125
N adj.=1.2
N eff.=22.4
138
N adj.=1.9
N eff.=82.1
153
N adj.=4.9
N eff.=20.4
105
N adj.=2.3
N eff.=46.5
130
N adj.=1.1
N eff.=14.6
142
N adj.=1.2
N eff.=53
157
N adj.=5.5
N eff.=27.8
106
N adj.=0.4
N eff.=15
131
N adj.=0.4
N eff.=36.9
146
N adj.=2.1
N eff.=54.5
161
N adj.=7.6
N eff.=89.5
109
N adj.=1.9
N eff.=31.7
137
N adj.=3.5
N eff.=12.9
149
N adj.=4.2
N eff.=13.9
162
N adj.=1.8
N eff.=16.5
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200
Length (cm)

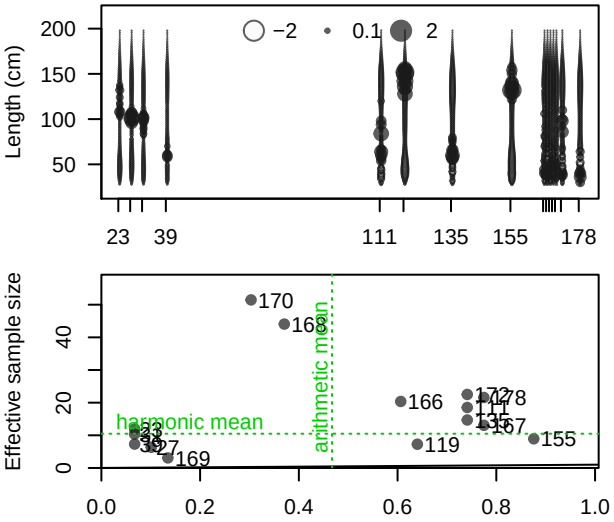

165
N adj.=6
N eff.=53
174
N adj.=1.4
N eff.=47.4
169
N adj.=4.6
N eff.=11.9
177
N adj.=1.6
N eff.=51.8
170
N adj.=2.6
N eff.=9.4
173
N adj.=3.3
N eff.=62.8
Proportion
Length (cm)
0.00
0.05
0.10
0.15
0.20
0.25
50
100
150
200



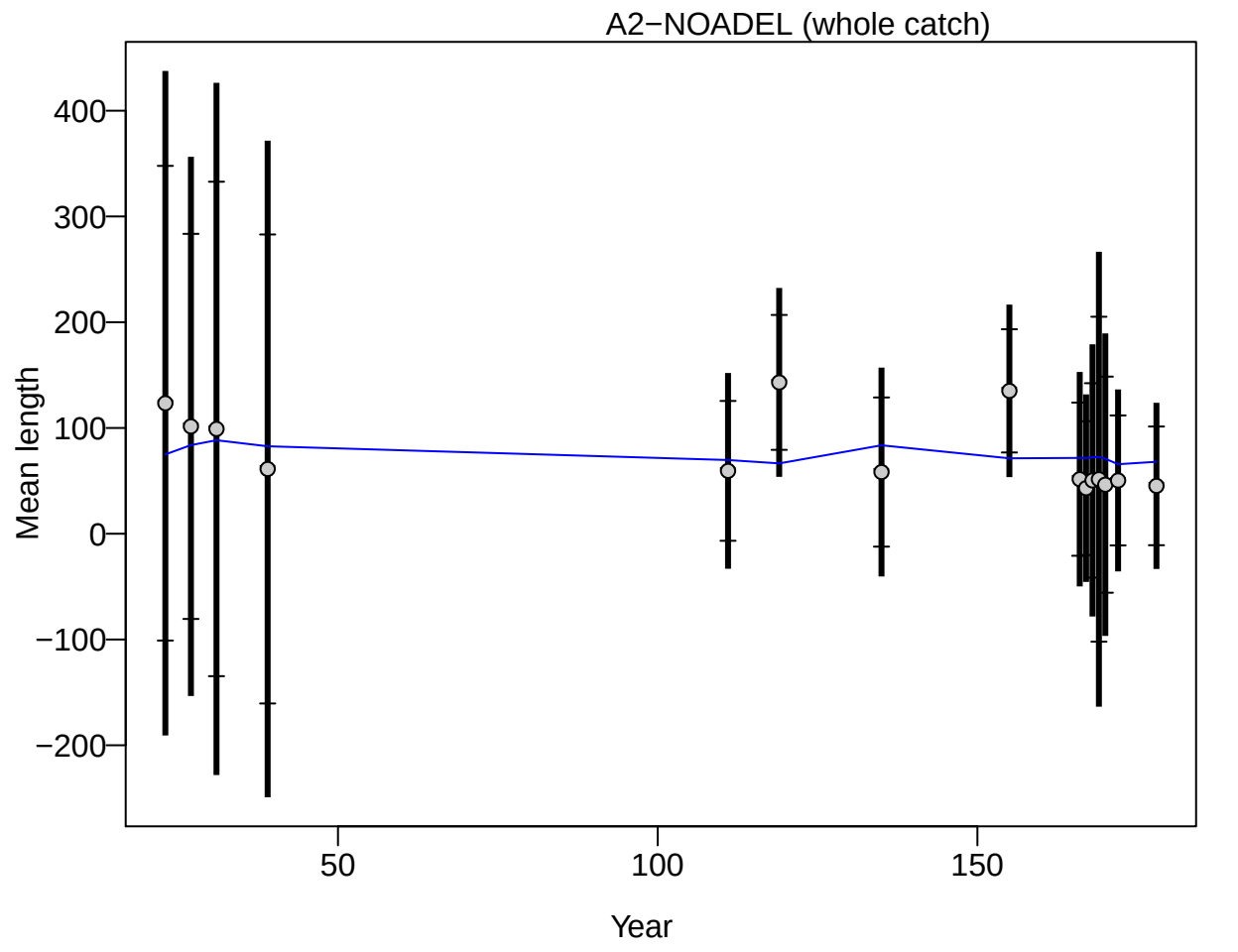
Length (cm)
200
150
100
50
−4
0.1
4
33
105
125
142
161
Effective sample size
100
60
20
0
0
2
4
6
8
161
138
173
165
146
105
131
109
157
153
125
106
130
162
170
137
149
169
33
harmonic mean

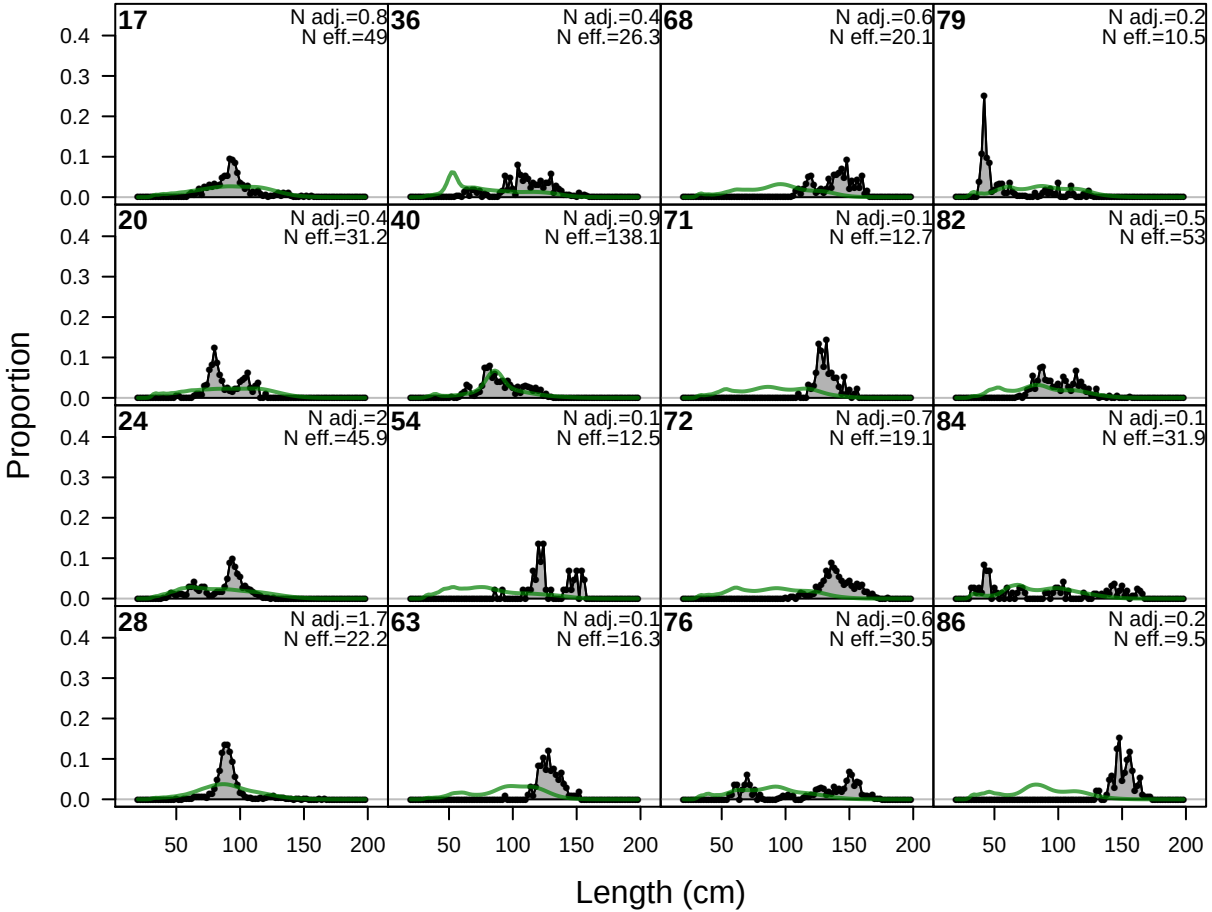

A6−OBJ (whole catch)
Mean length
200
150
100
50
0
40
60
80
100
120
140
160
180
Year

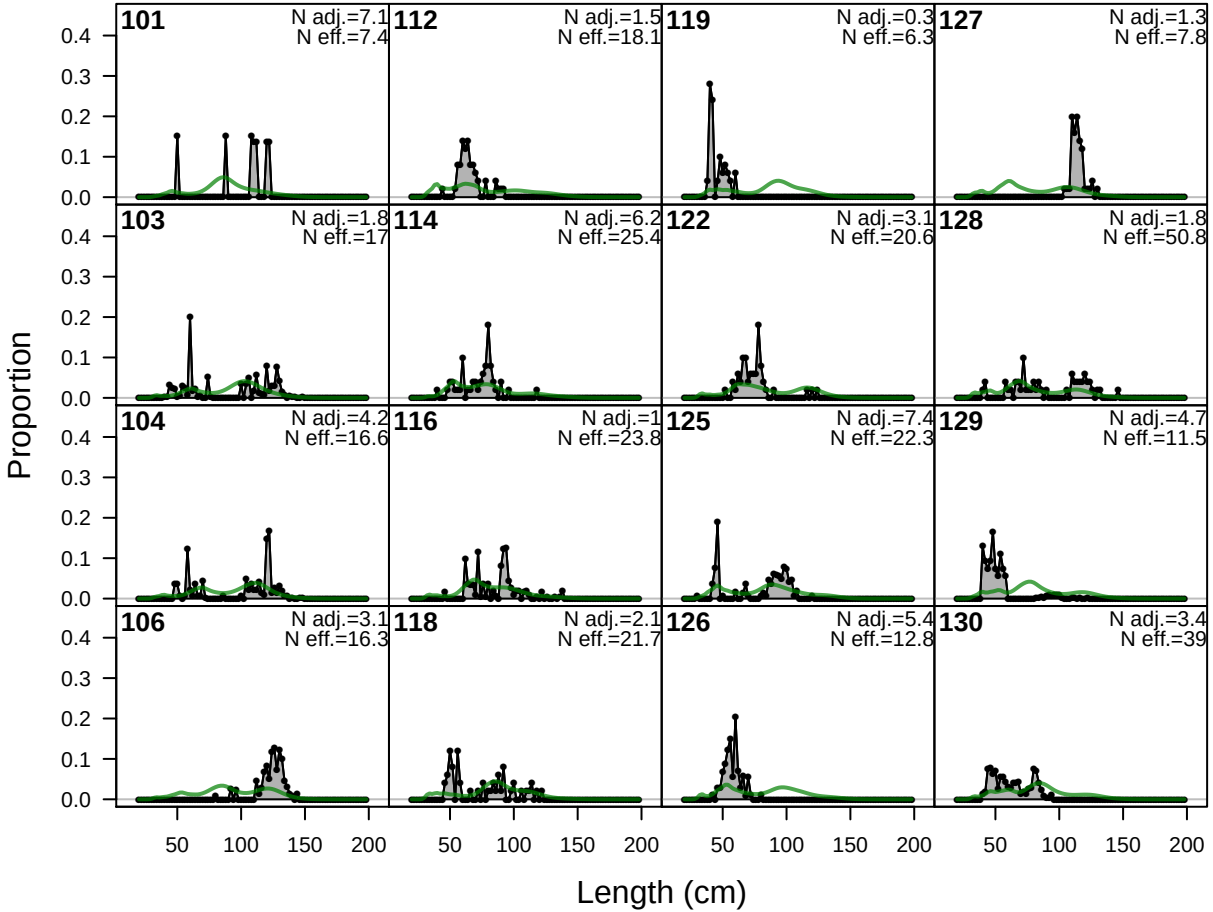

23
N adj.=0.1
N eff.=12
111
N adj.=0.7
N eff.=18.5
166
N adj.=0.6
N eff.=20.4
170
N adj.=0.3
N eff.=51.5
27
N adj.=0.1
N eff.=6.3
119
N adj.=0.6
N eff.=7.3
167
N adj.=0.8
N eff.=13.1
172
N adj.=0.7
N eff.=22.5
31
N adj.=0.1
N eff.=10.4
135
N adj.=0.7
N eff.=14.7
168
N adj.=0.4
N eff.=44.1
178
N adj.=0.8
N eff.=21.6
39
N adj.=0.1
N eff.=7.3
155
N adj.=0.9
N eff.=8.9
169
N adj.=0.1
N eff.=3.1
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

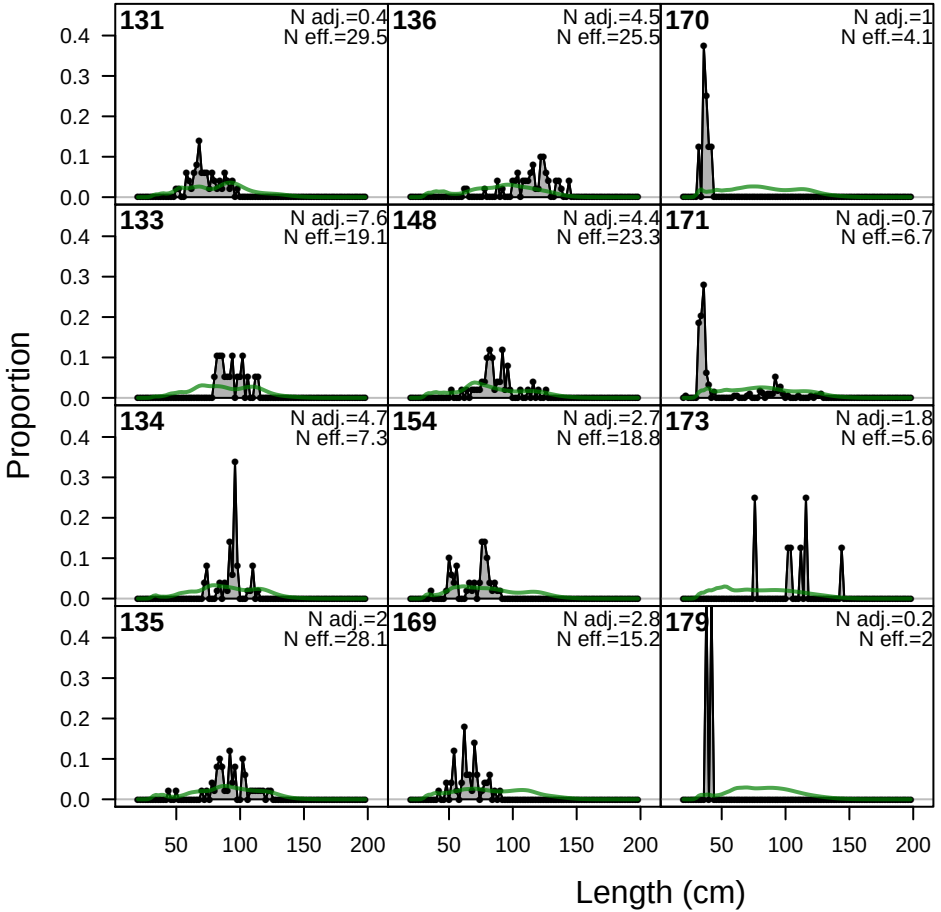


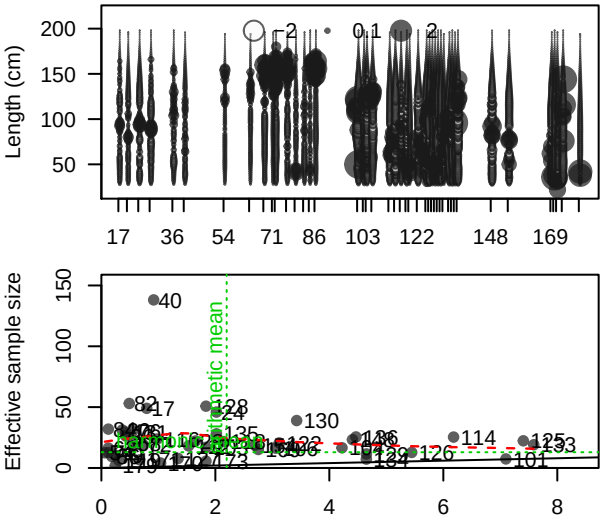
Length (cm)
200
150
100
50
−2
0.1
2
23
39
111
135
155
178
Effective sample size
0
20
40
170
168
166
172
178
111
135
167
155
119
169
harmonic mean
arithmetic mean
0.0
0.2
0.4
0.6
0.8
1.0


A2−NOADEL (whole catch)
Mean length
400
300
200
100
0
−100
−200
50
100
150
Year

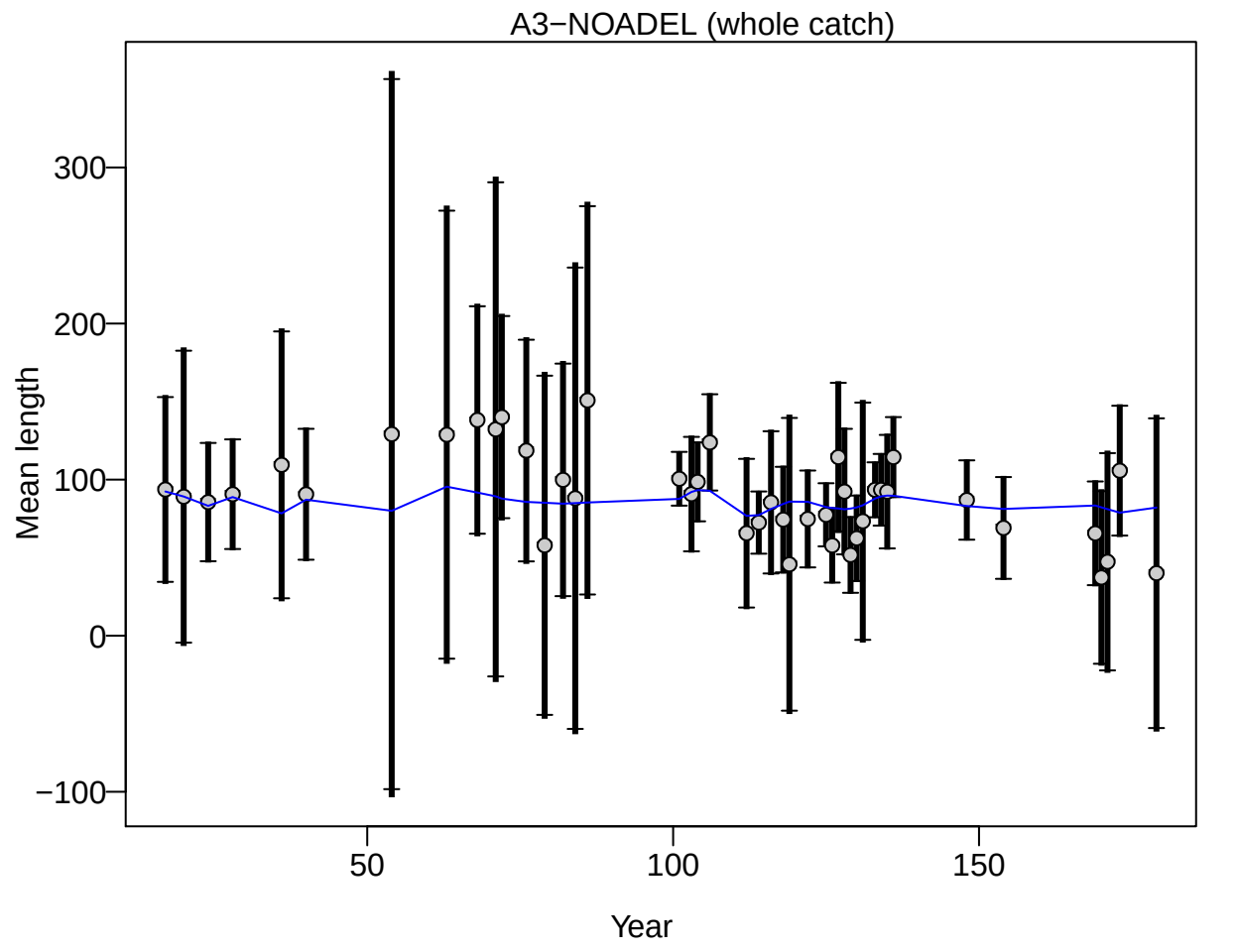

17
N adj.=0.8
N eff.=49
36
N adj.=0.4
N eff.=26.3
68
N adj.=0.6
N eff.=20.1
79
N adj.=0.2
N eff.=10.5
20
N adj.=0.4
N eff.=31.2
40
N adj.=0.9
N eff.=138.1
71
N adj.=0.1
N eff.=12.7
82
N adj.=0.5
N eff.=53
24
N adj.=2
N eff.=45.9
54
N adj.=0.1
N eff.=12.5
72
N adj.=0.7
N eff.=19.1
84
N adj.=0.1
N eff.=31.9
28
N adj.=1.7
N eff.=22.2
63
N adj.=0.1
N eff.=16.3
76
N adj.=0.6
N eff.=30.5
86
N adj.=0.2
N eff.=9.5
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

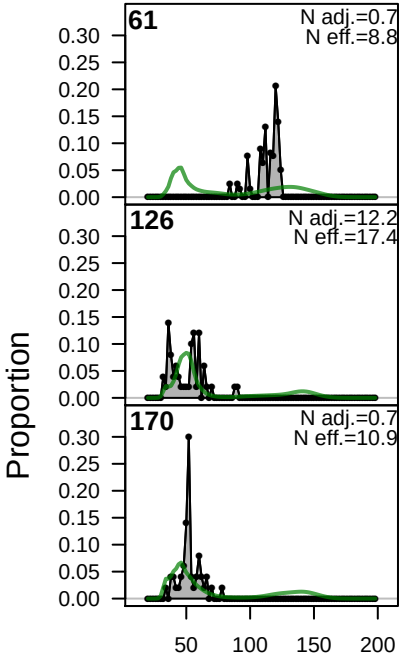

101
N adj.=7.1
N eff.=7.4
112
N adj.=1.5
N eff.=18.1
119
N adj.=0.3
N eff.=6.3
127
N adj.=1.3
N eff.=7.8
103
N adj.=1.8
N eff.=17
114
N adj.=6.2
N eff.=25.4
122
N adj.=3.1
N eff.=20.6
128
N adj.=1.8
N eff.=50.8
104
N adj.=4.2
N eff.=16.6
116
N adj.=1
N eff.=23.8
125
N adj.=7.4
N eff.=22.3
129
N adj.=4.7
N eff.=11.5
106
N adj.=3.1
N eff.=16.3
118
N adj.=2.1
N eff.=21.7
126
N adj.=5.4
N eff.=12.8
130
N adj.=3.4
N eff.=39
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)


131
N adj.=0.4
N eff.=29.5
136
N adj.=4.5
N eff.=25.5
170
N adj.=1
N eff.=4.1
133
N adj.=7.6
N eff.=19.1
148
N adj.=4.4
N eff.=23.3
171
N adj.=0.7
N eff.=6.7
134
N adj.=4.7
N eff.=7.3
154
N adj.=2.7
N eff.=18.8
173
N adj.=1.8
N eff.=5.6
135
N adj.=2
N eff.=28.1
169
N adj.=2.8
N eff.=15.2
179
N adj.=0.2
N eff.=2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

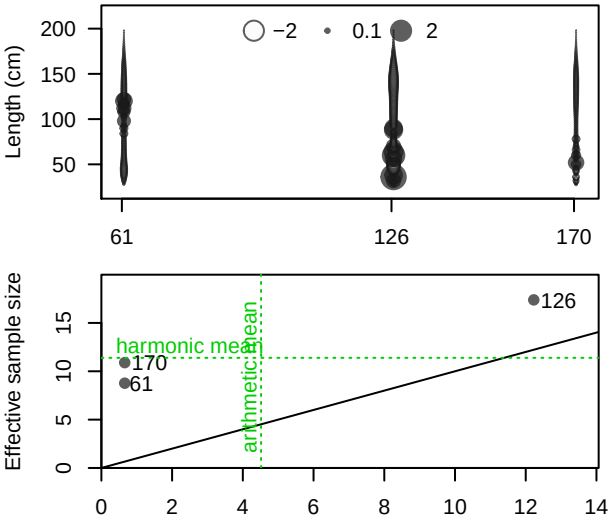


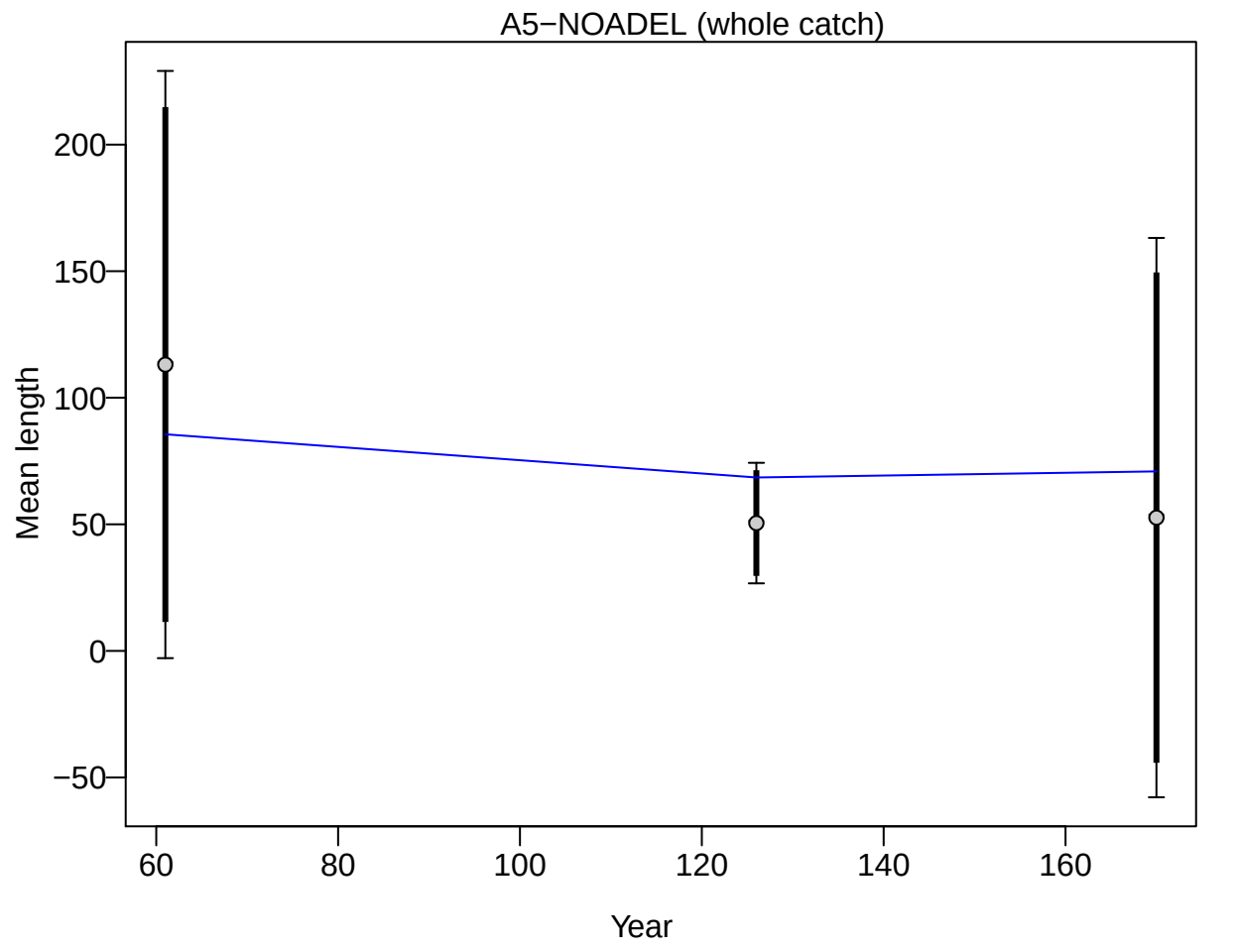
Length (cm)
200
150
100
50
−2
0.1
2
17
36
54
71
86
103
122
148
169
Effective sample size
150
100
50
0
40
82
17
128
24
130
135
114
125
133
126
101
0
2
4
6
8

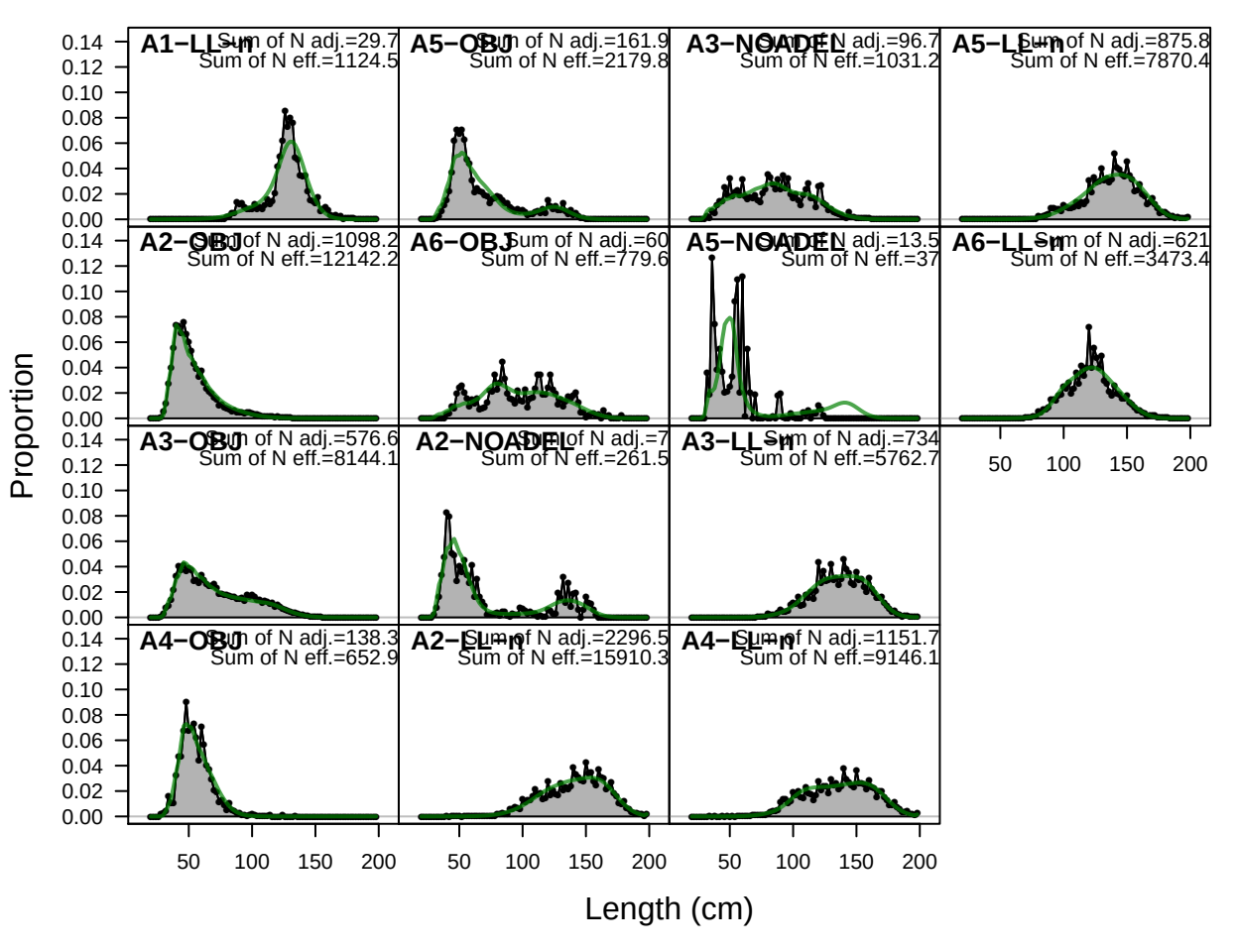

A3−NOADEL (whole catch)
Mean length
300
200
100
0
−100
50
100
150
Year

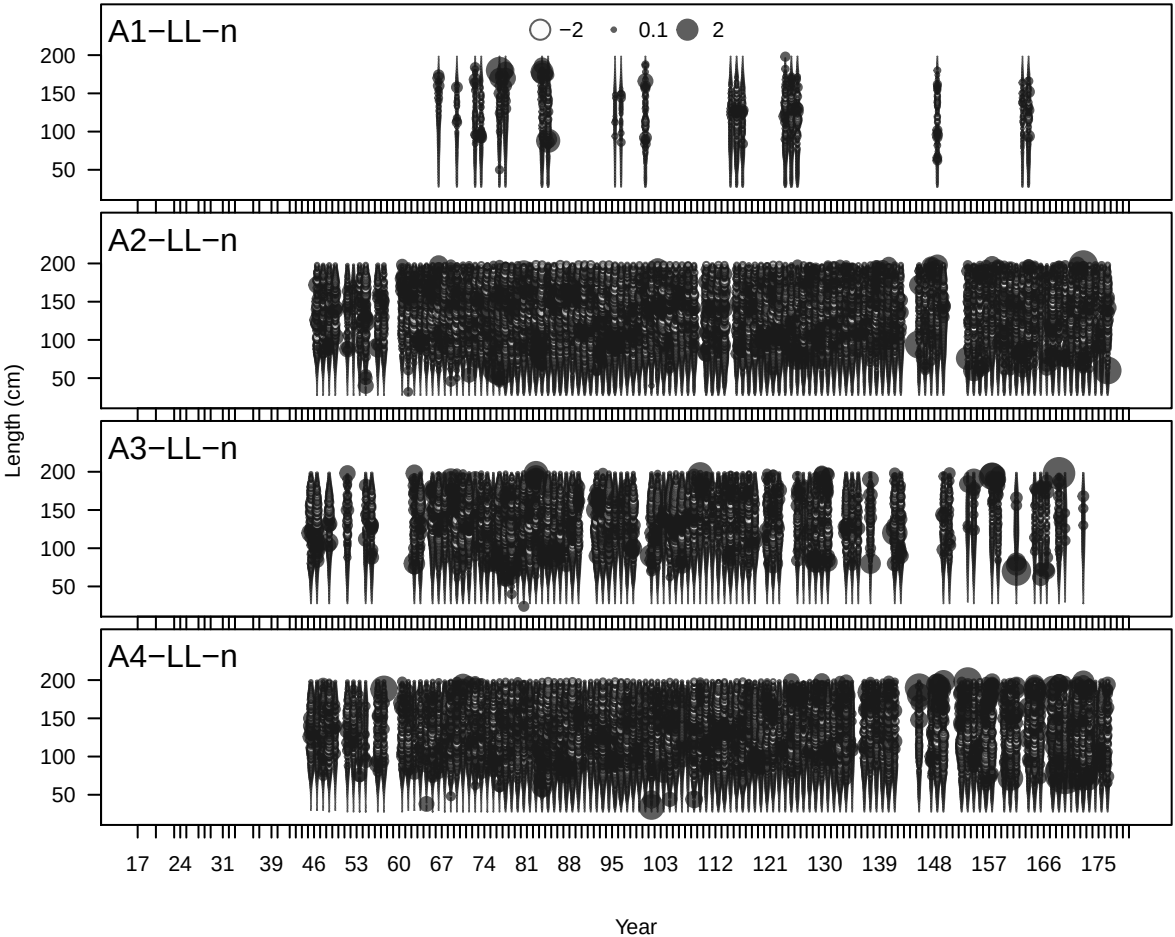

61
N adj.=0.7
N eff.=8.8
126
N adj.=12.2
N eff.=17.4
170
N adj.=0.7
N eff.=10.9
Proportion
0.30
0.25
0.20
0.15
0.10
0.05
0.00
50
100
150
200

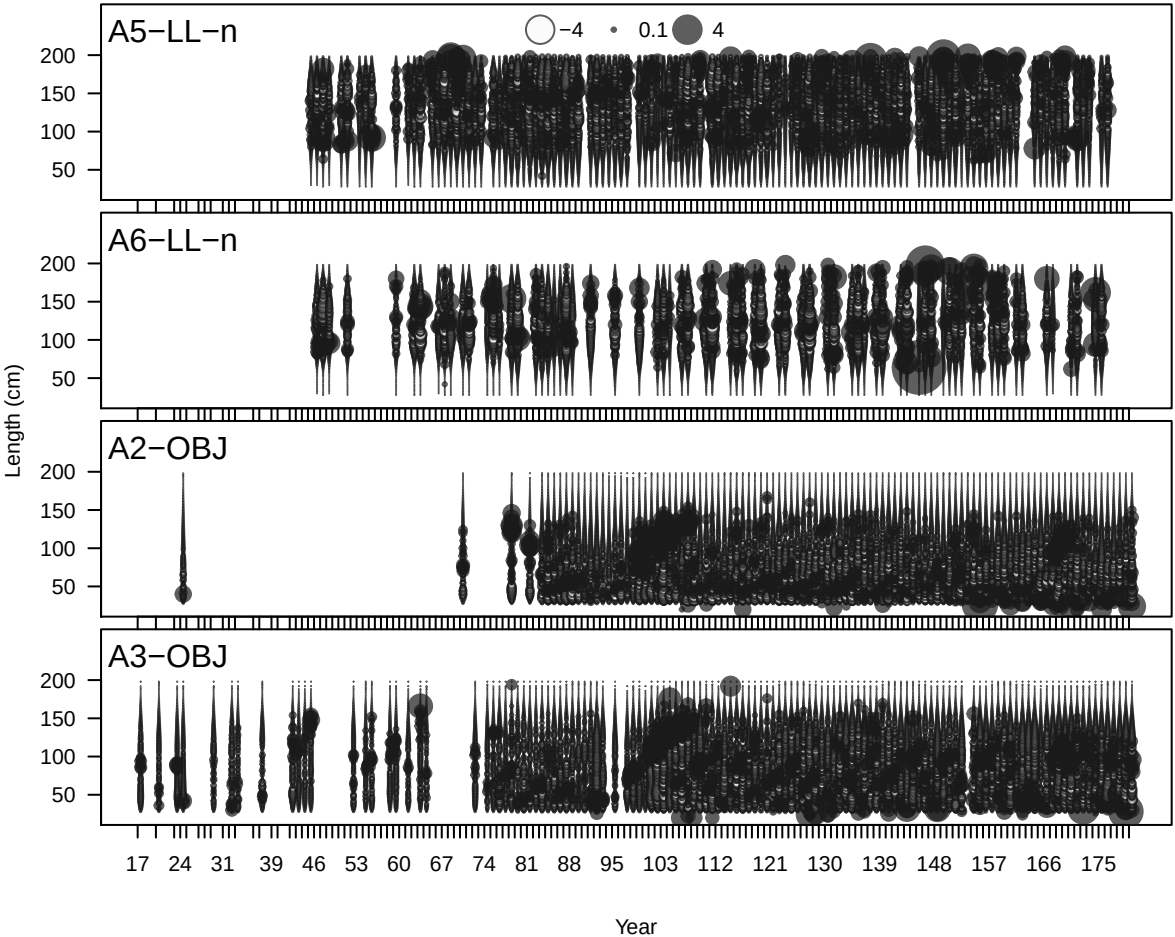
Length (cm)

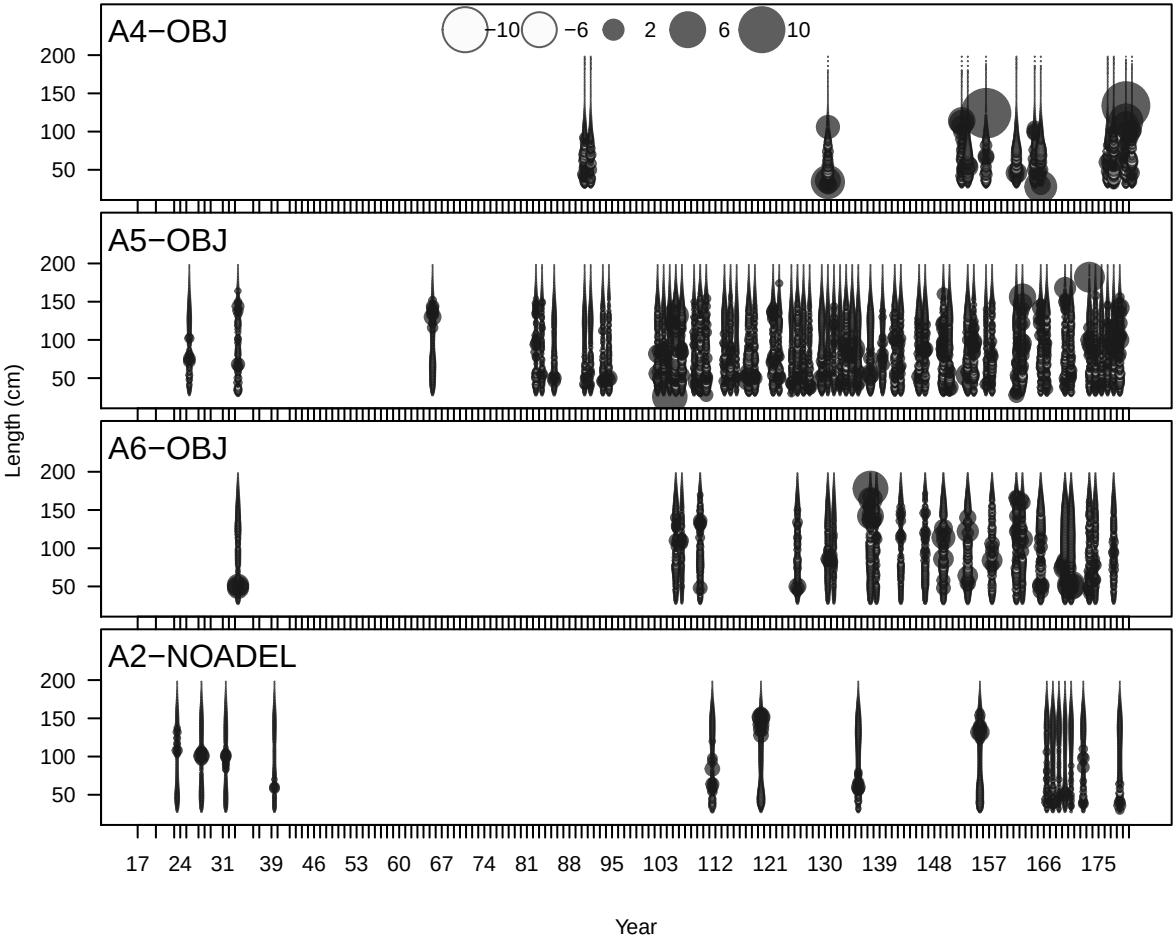

Length (cm)
200
150
100
50
−2
0.1
2
61
126
170
Effective sample size
0
5
10
15
harmonic mean
170
61
arithmetic mean
126
0
2
4
6
8
10
12
14

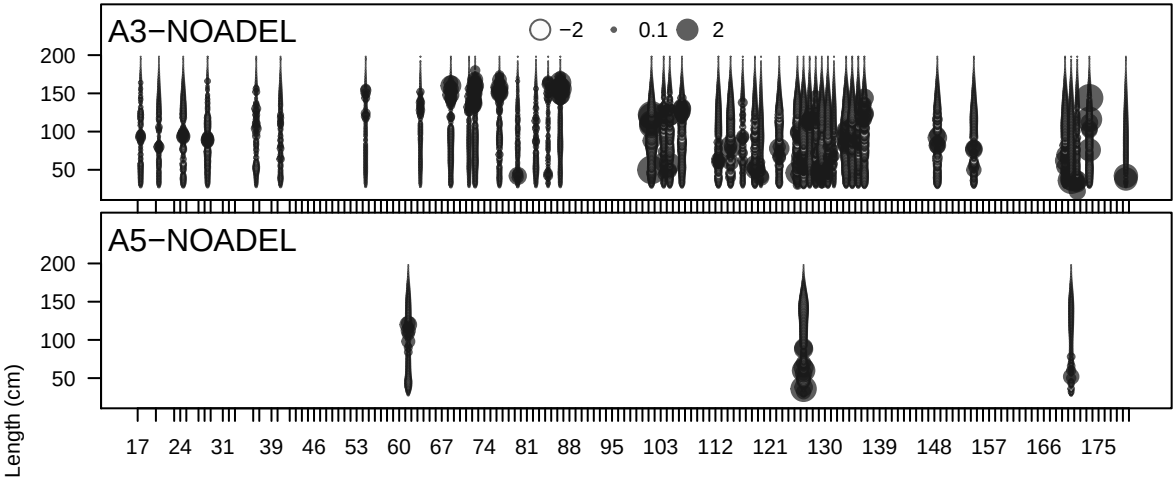

A5−NOADEL (whole catch)
Mean length
200
150
100
50
0
−50
60
80
100
120
140
160
Year

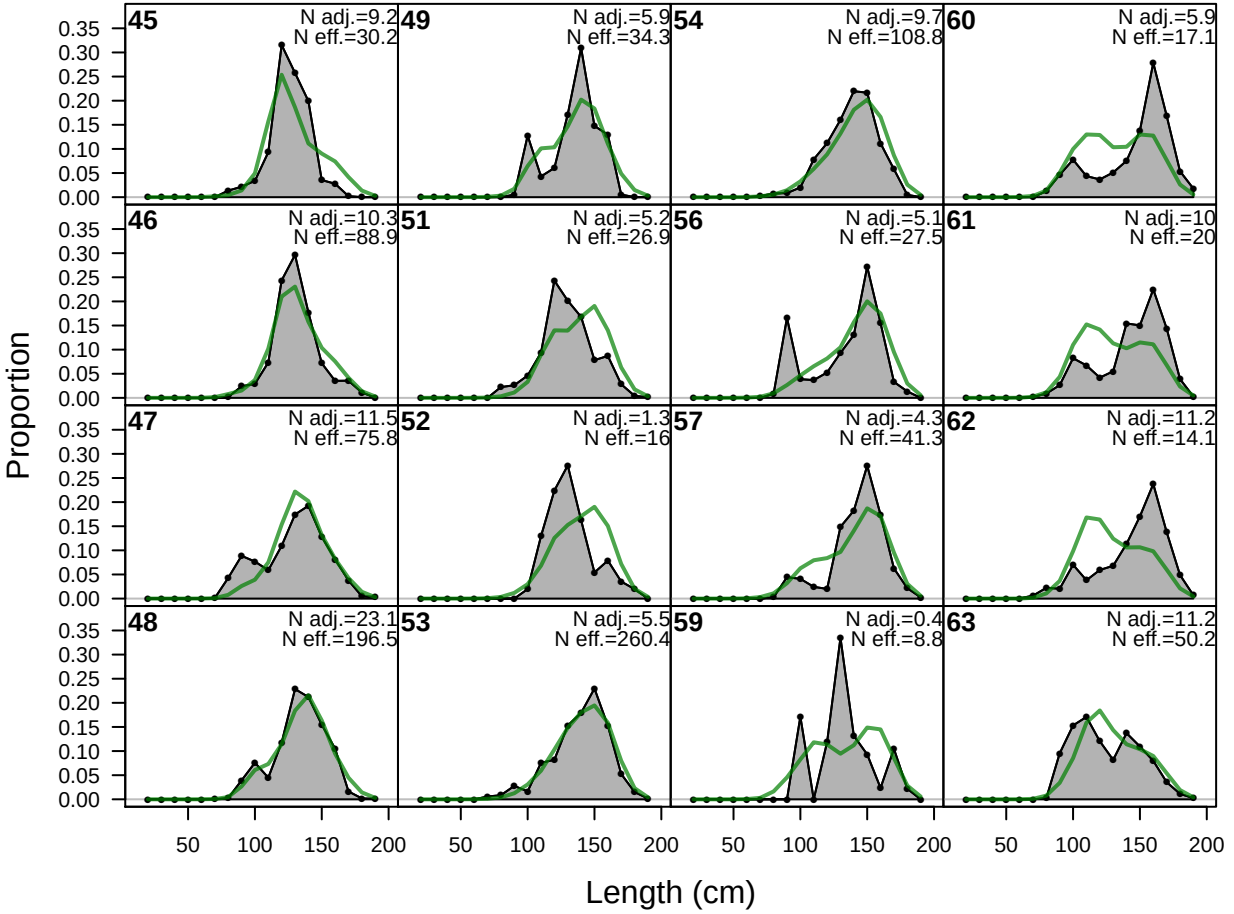

A1−LL−n
Sum of N adj.=29.7
Sum of N eff.=1124.5
A5−OBJ
Sum of N adj.=161.9
Sum of N eff.=2179.8
A3−NOADEL
Sum of N adj.=96.7
Sum of N eff.=1031.2
A5−LL−n
Sum of N adj.=875.8
Sum of N eff.=7870.4
A2−OBJ
Sum of N adj.=1098.2
Sum of N eff.=12142.2
A6−OBJ
Sum of N adj.=60
Sum of N eff.=779.6
A5−NOADEL
Sum of N adj.=13.5
Sum of N eff.=37
A6−LL−n
Sum of N adj.=621
Sum of N eff.=3473.4
A3−OBJ
Sum of N adj.=576.6
Sum of N eff.=8144.1
A2−NOADEL
Sum of N adj.=7
Sum of N eff.=261.5
A3−LL−n
Sum of N adj.=734
Sum of N eff.=5762.7
A4−OBJ
Sum of N adj.=138.3
Sum of N eff.=652.9
A2−LL−n
Sum of N adj.=2296.5
Sum of N eff.=15910.3
A4−LL−n
Sum of N adj.=1151.7
Sum of N eff.=9146.1
Proportion
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
50
100
150
200
Length (cm)

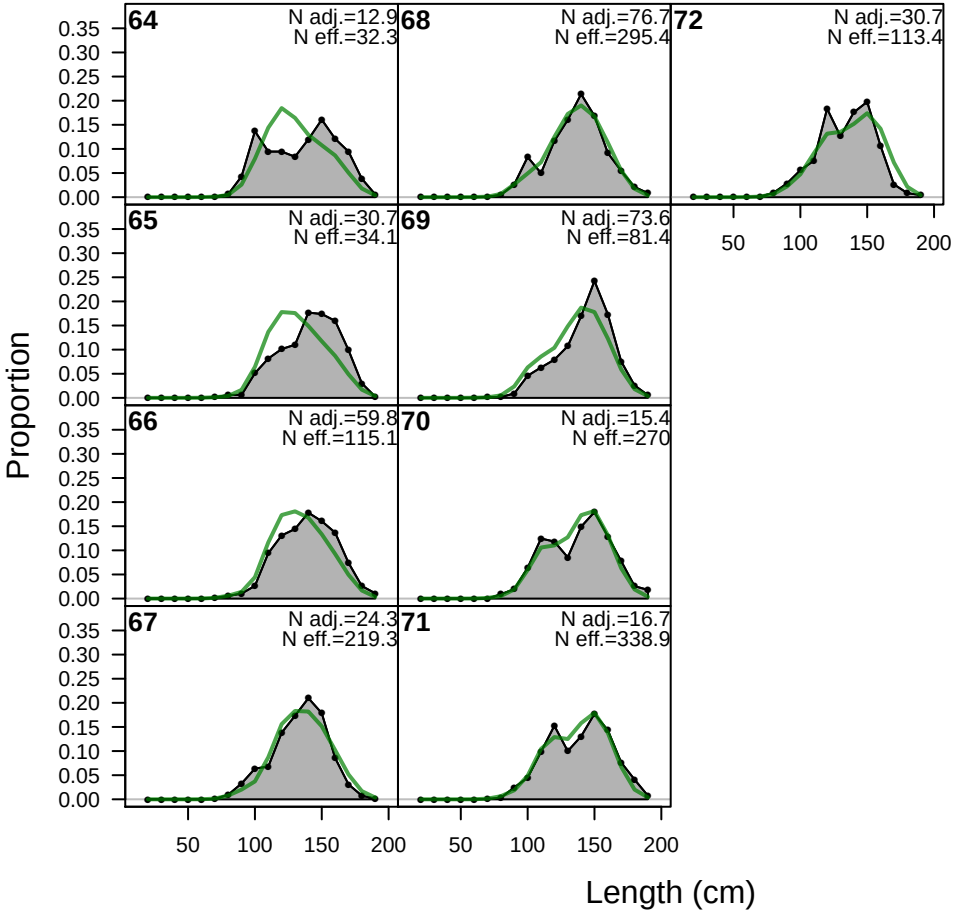

A1−LL−n
A2−LL−n
A3−LL−n
A4−LL−n
−2
0.1
2
Length (cm)
200
150
100
50
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

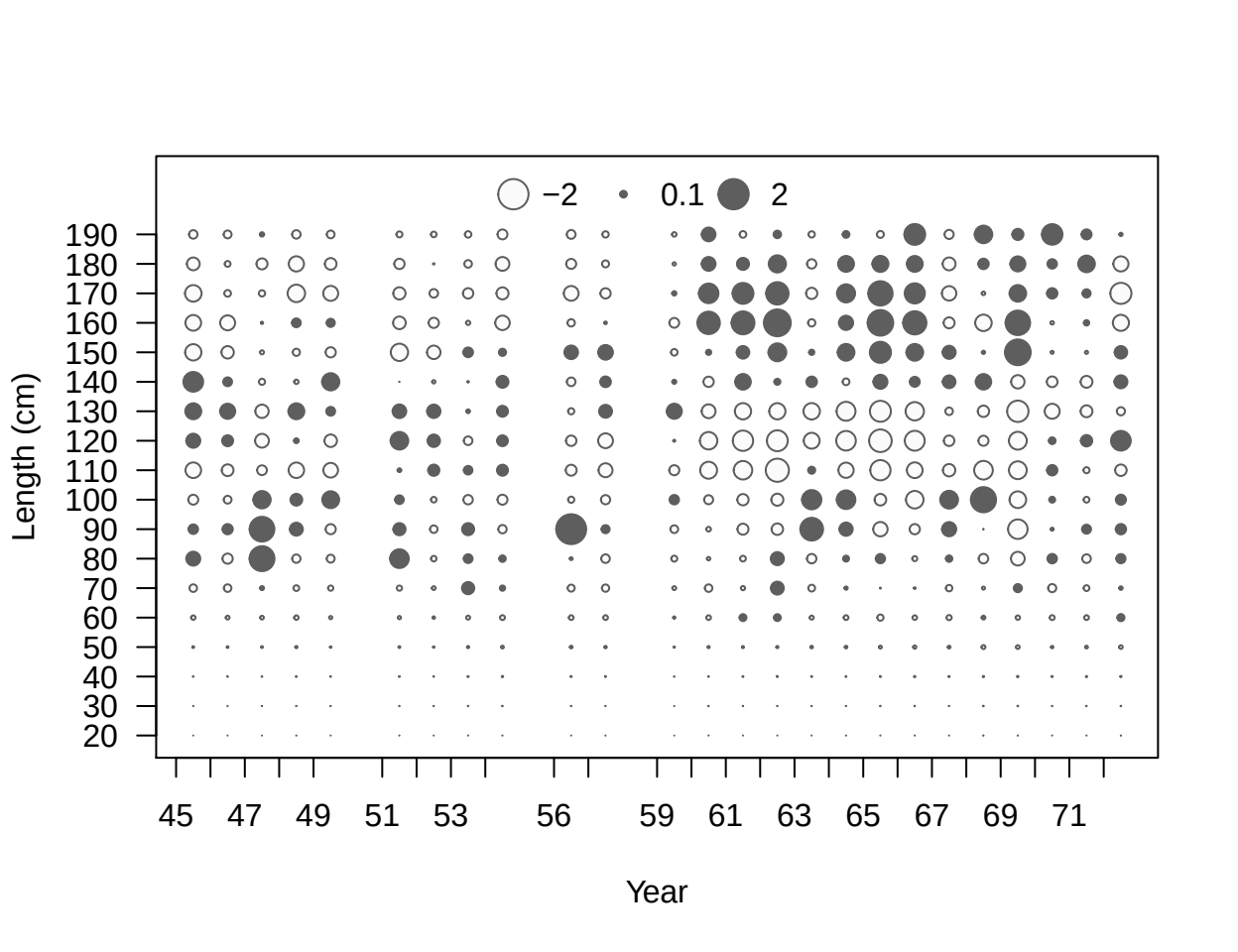

A5−LL−n
−4
0.1
4
A6−LL−n
A2−OBJ
A3−OBJ
Length (cm)
200
150
100
50
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

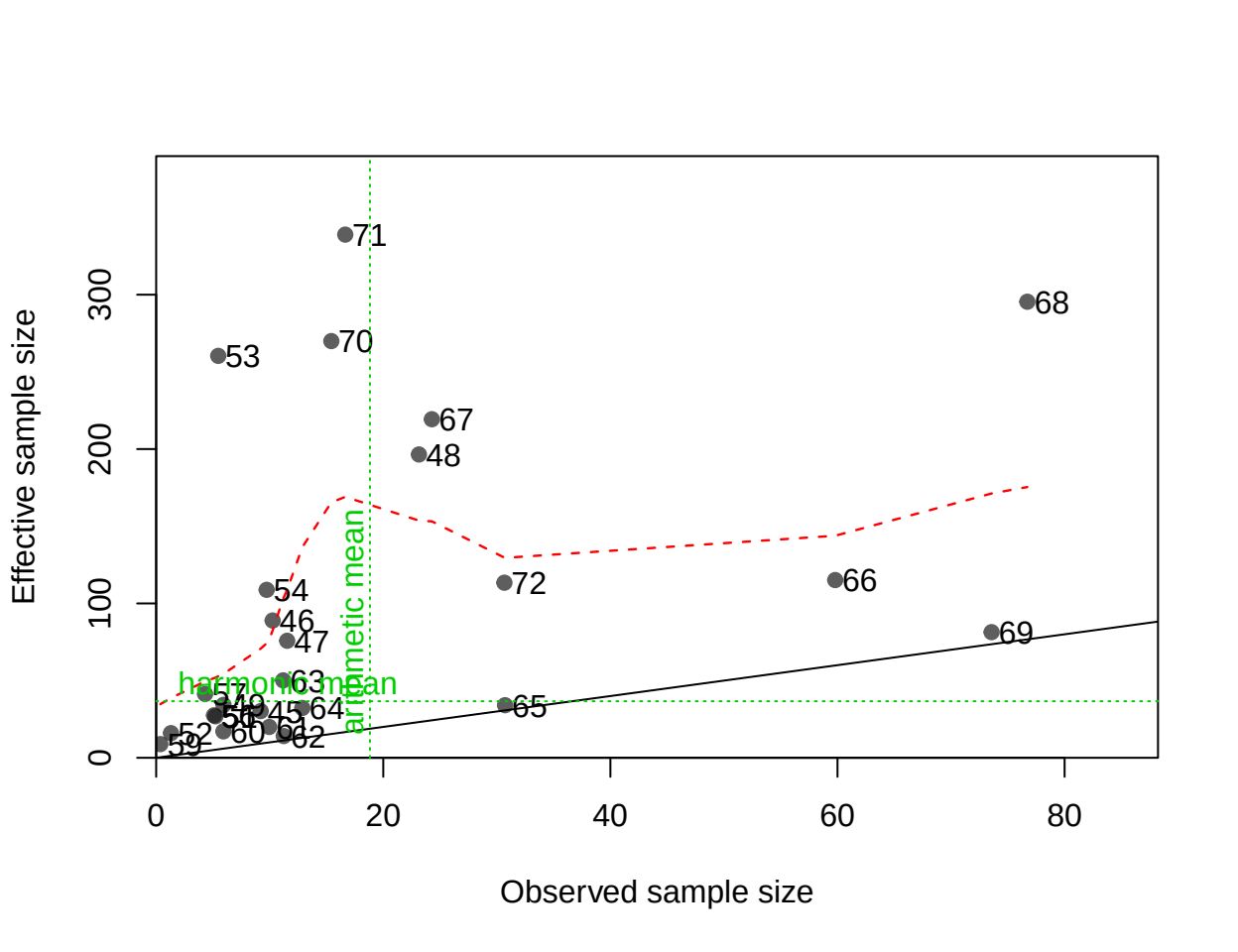

A4−OBJ
A5−OBJ
A6−OBJ
A2−NOADEL
−10
−6
2
6
10
200
150
100
50
Length (cm)
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

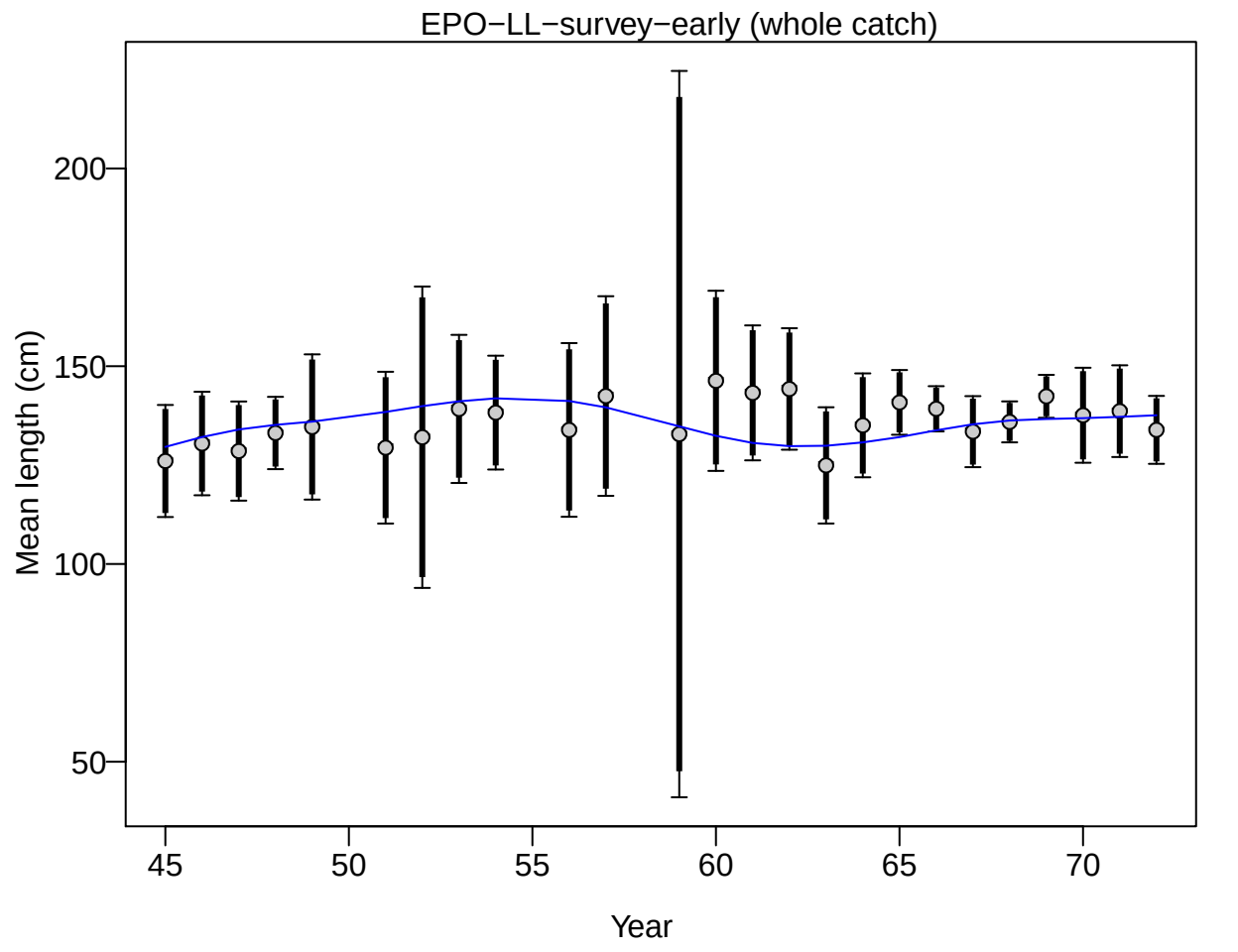

A3−NOADEL
−2
0.1
2
200
150
100
50
A5−NOADEL
200
150
100
50
Length (cm)
17
24
31
39
46
53
60
67
74
81
88
95
103
112
121
130
139
148
157
166
175
Year

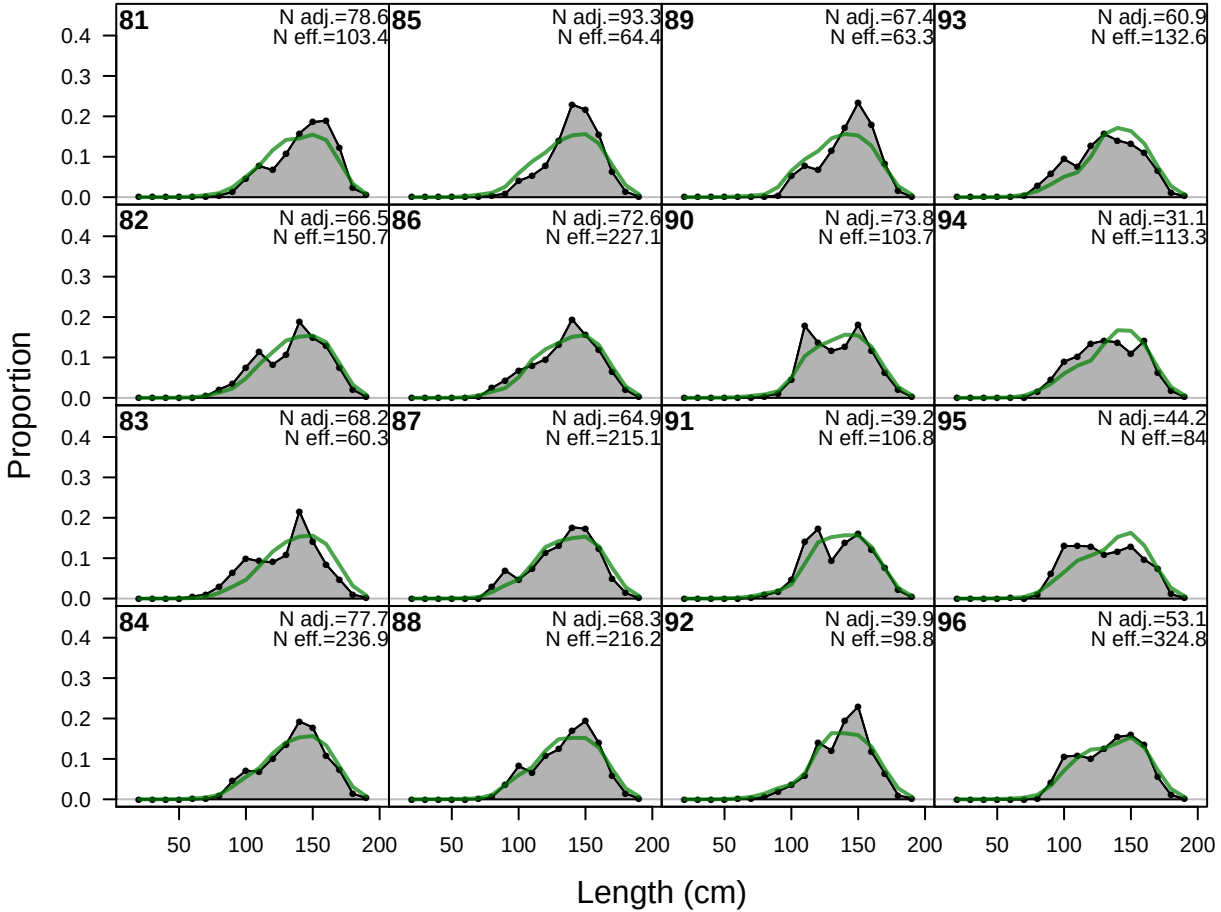

45
N adj.=9.2
N eff.=30.2
49
N adj.=5.9
N eff.=34.3
54
N adj.=9.7
N eff.=108.8
60
N adj.=5.9
N eff.=17.1
46
N adj.=10.3
N eff.=88.9
51
N adj.=5.2
N eff.=26.9
56
N adj.=5.1
N eff.=27.5
61
N adj.=10
N eff.=20
47
N adj.=11.5
N eff.=75.8
52
N adj.=1.3
N eff.=16
57
N adj.=4.3
N eff.=41.3
62
N adj.=11.2
N eff.=14.1
48
N adj.=23.1
N eff.=196.5
53
N adj.=5.5
N eff.=260.4
59
N adj.=0.4
N eff.=8.8
63
N adj.=11.2
N eff.=50.2
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

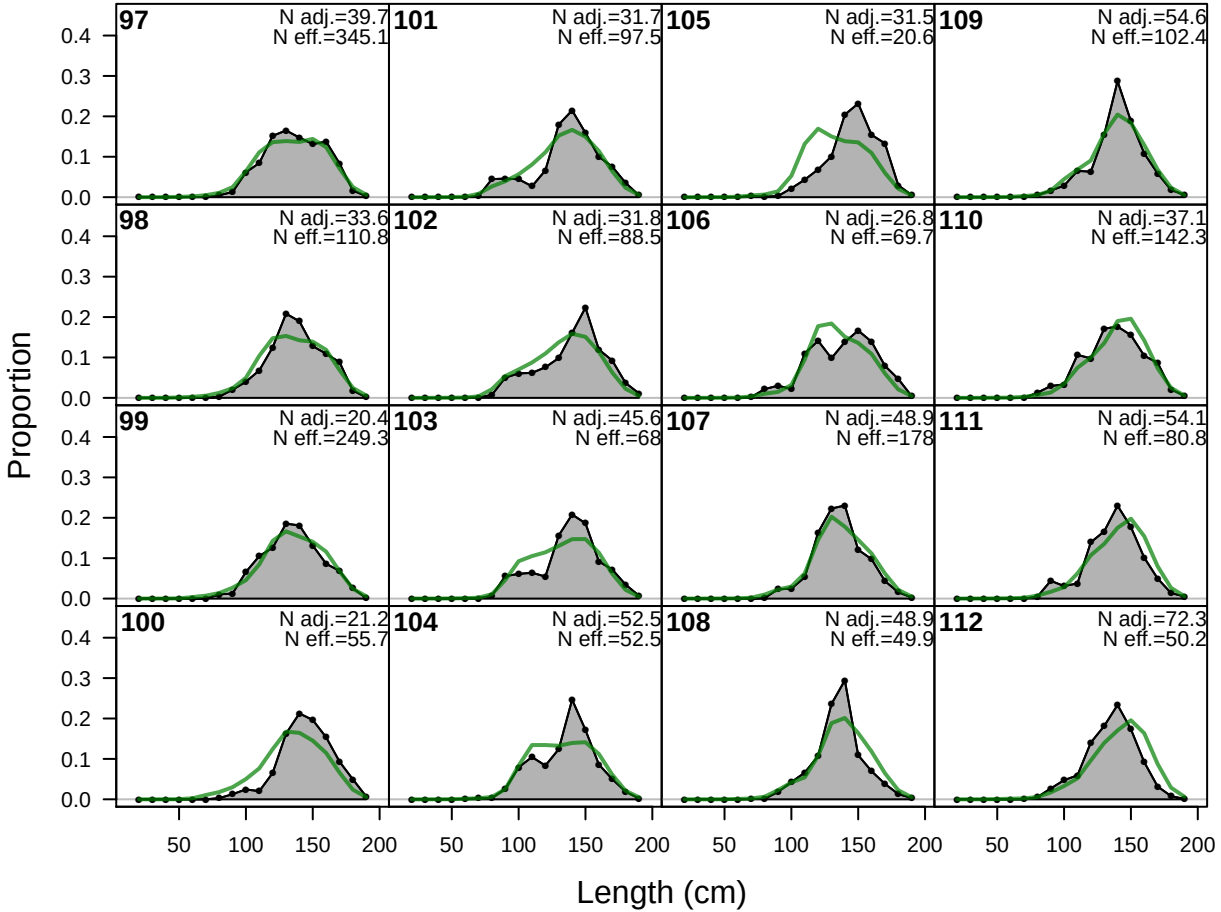

64
N adj.=12.9
N eff.=32.3
68
N adj.=76.7
N eff.=295.4
72
N adj.=30.7
N eff.=113.4
65
N adj.=30.7
N eff.=34.1
69
N adj.=73.6
N eff.=81.4
66
N adj.=59.8
N eff.=115.1
70
N adj.=15.4
N eff.=270
67
N adj.=24.3
N eff.=219.3
71
N adj.=16.7
N eff.=338.9
Proportion
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
50
100
150
200
Length (cm)

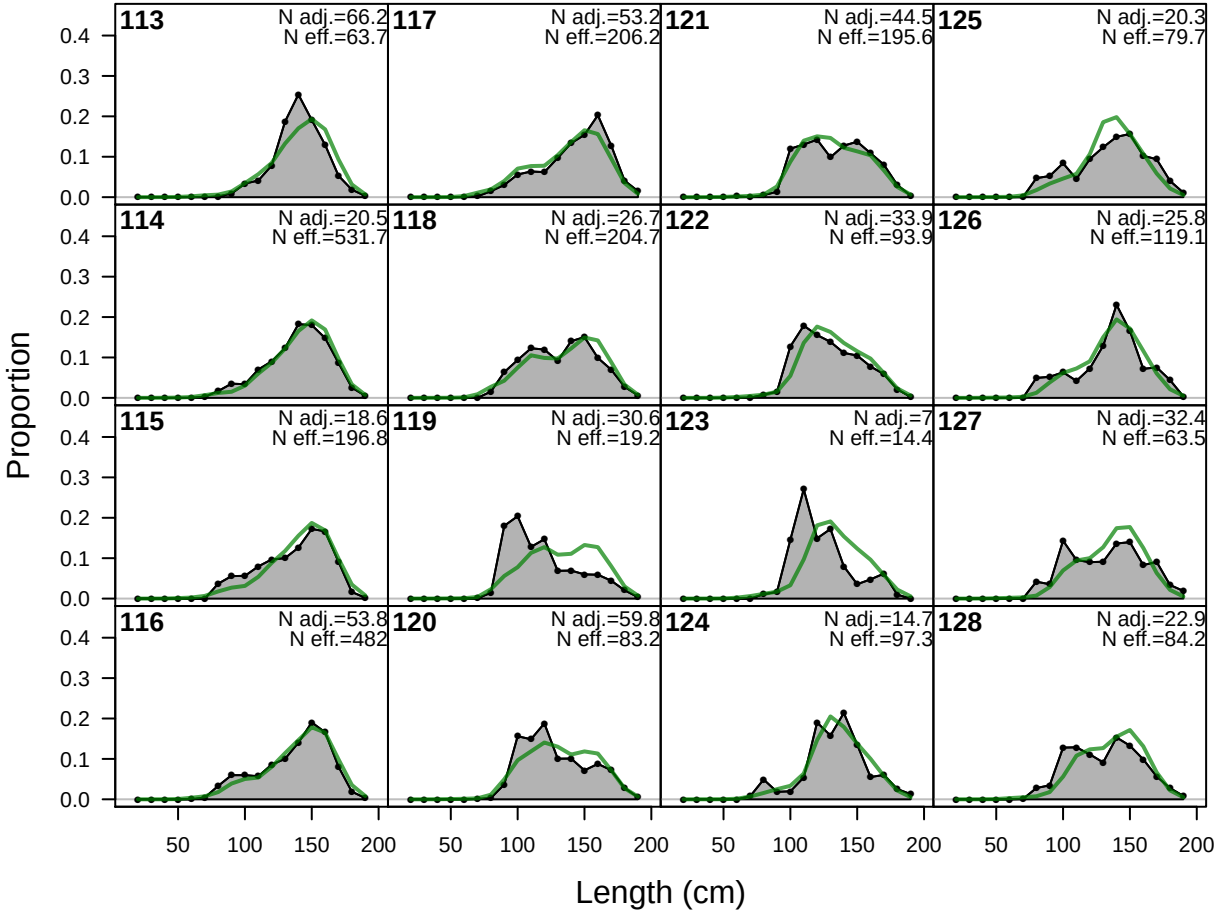

−2
0.1
2
Length (cm)
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
45
47
49
51
53
56
59
61
63
65
67
69
71
Year

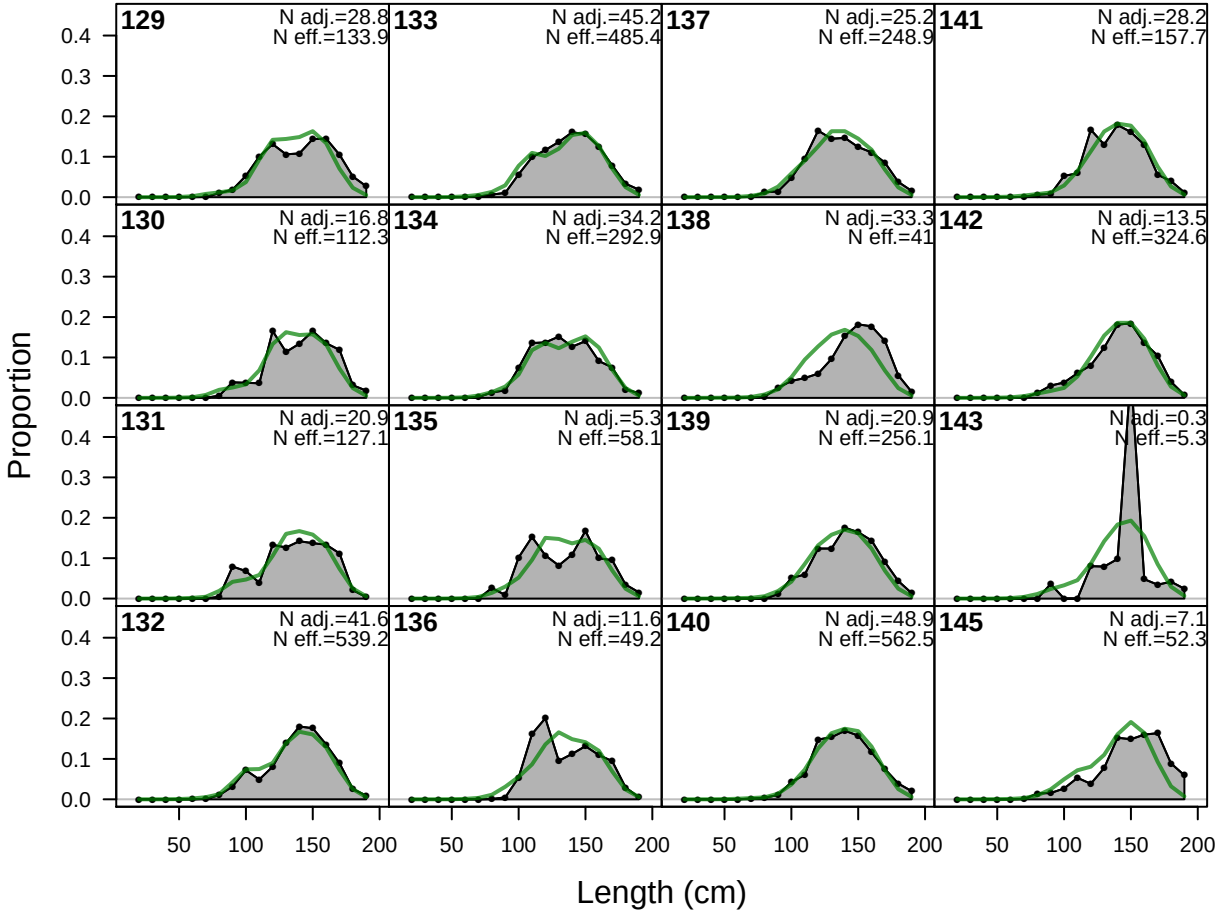

Effective sample size
Observed sample size
0
100
200
300
0
20
40
60
80
harmonic mean
arithmetic mean
71
68
53
70
67
48
72
66
54
46
47
69
63
64
65
45
52
60
62
59

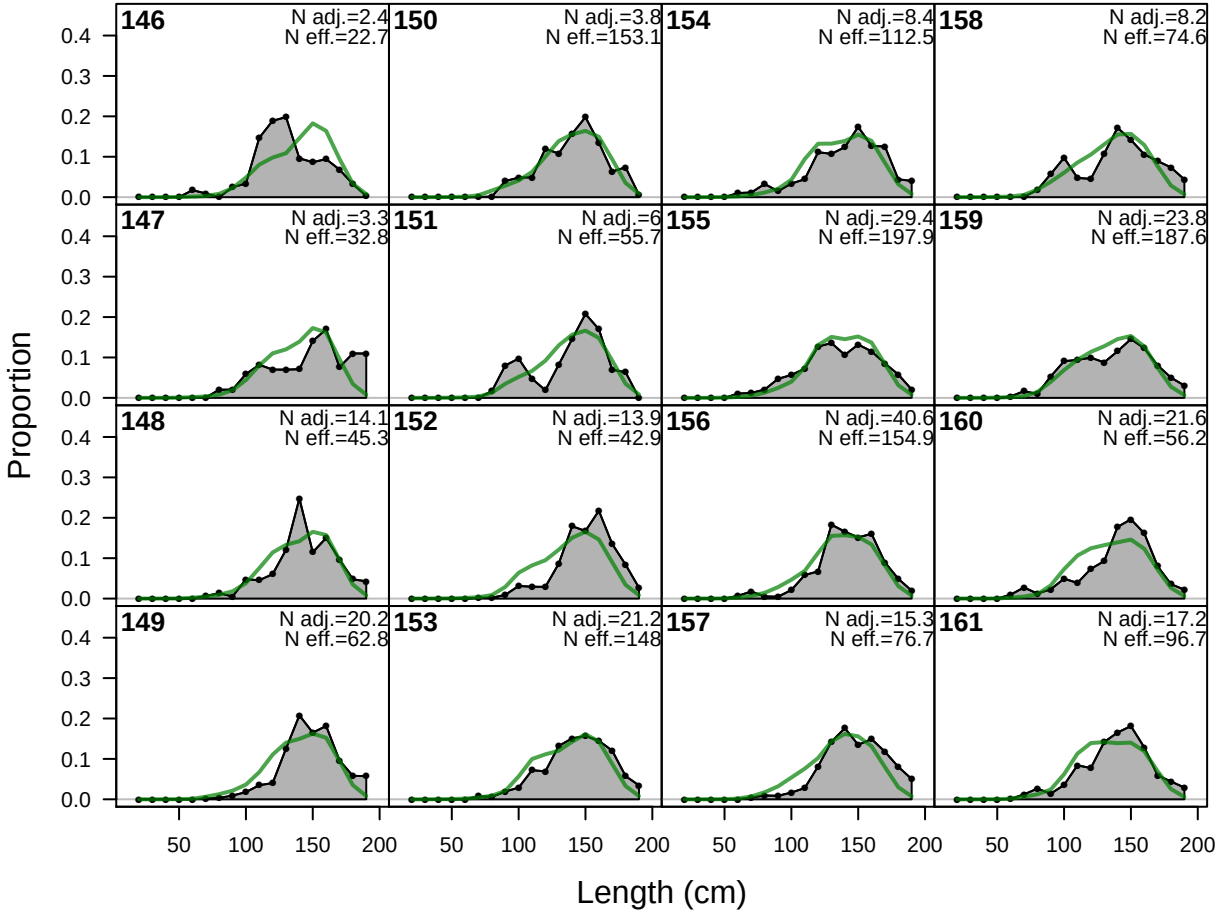

EPO−LL−survey−early (whole catch)
Mean length (cm)
200
150
100
50
45
50
55
60
65
70
Year

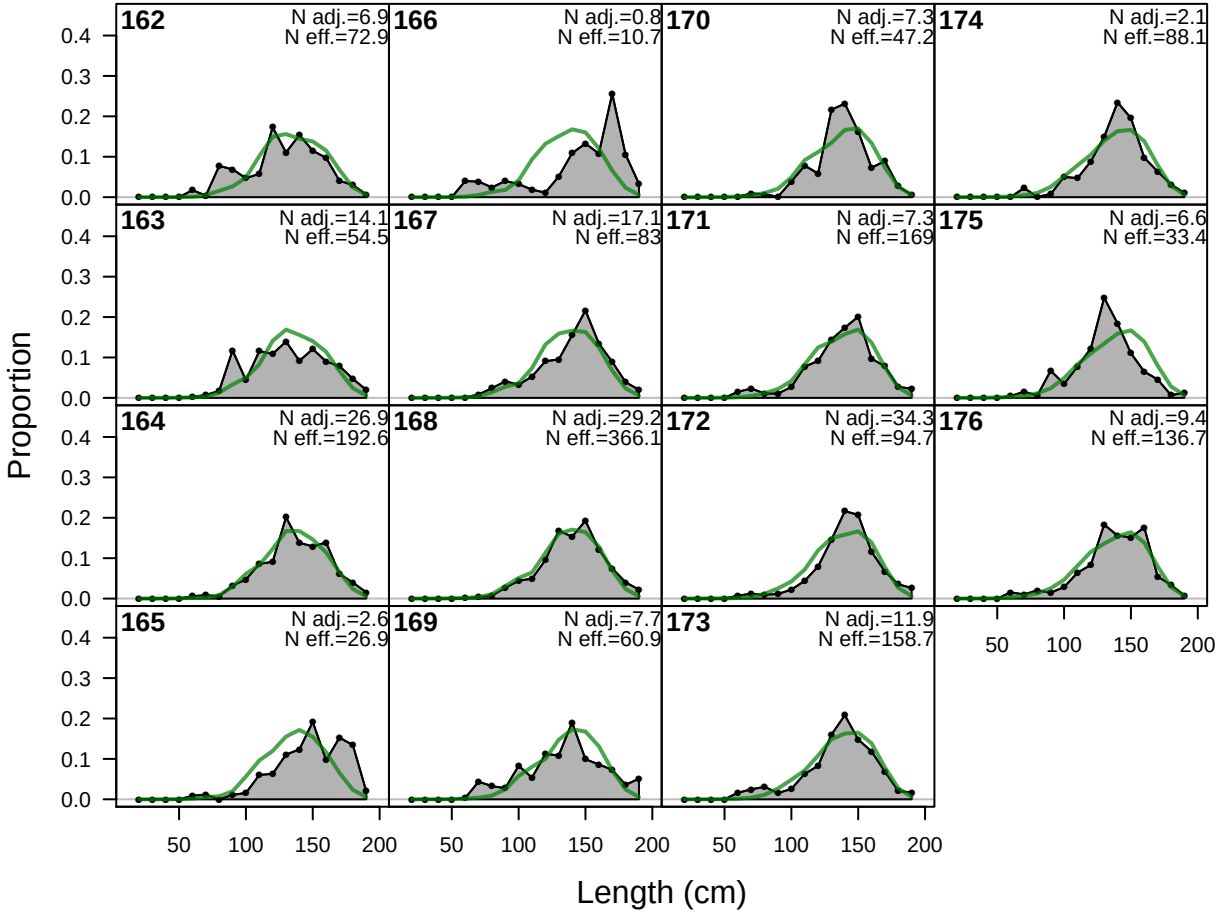

81
N adj.=78.6
N eff.=103.4
85
N adj.=93.3
N eff.=64.4
89
N adj.=67.4
N eff.=63.3
93
N adj.=60.9
N eff.=132.6
82
N adj.=66.5
N eff.=150.7
86
N adj.=72.6
N eff.=227.1
90
N adj.=73.8
N eff.=103.7
94
N adj.=31.1
N eff.=113.3
83
N adj.=68.2
N eff.=60.3
87
N adj.=64.9
N eff.=215.1
91
N adj.=39.2
N eff.=106.8
95
N adj.=44.2
N eff.=84
84
N adj.=77.7
N eff.=236.9
88
N adj.=68.3
N eff.=216.2
92
N adj.=39.9
N eff.=98.8
96
N adj.=53.1
N eff.=324.8
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

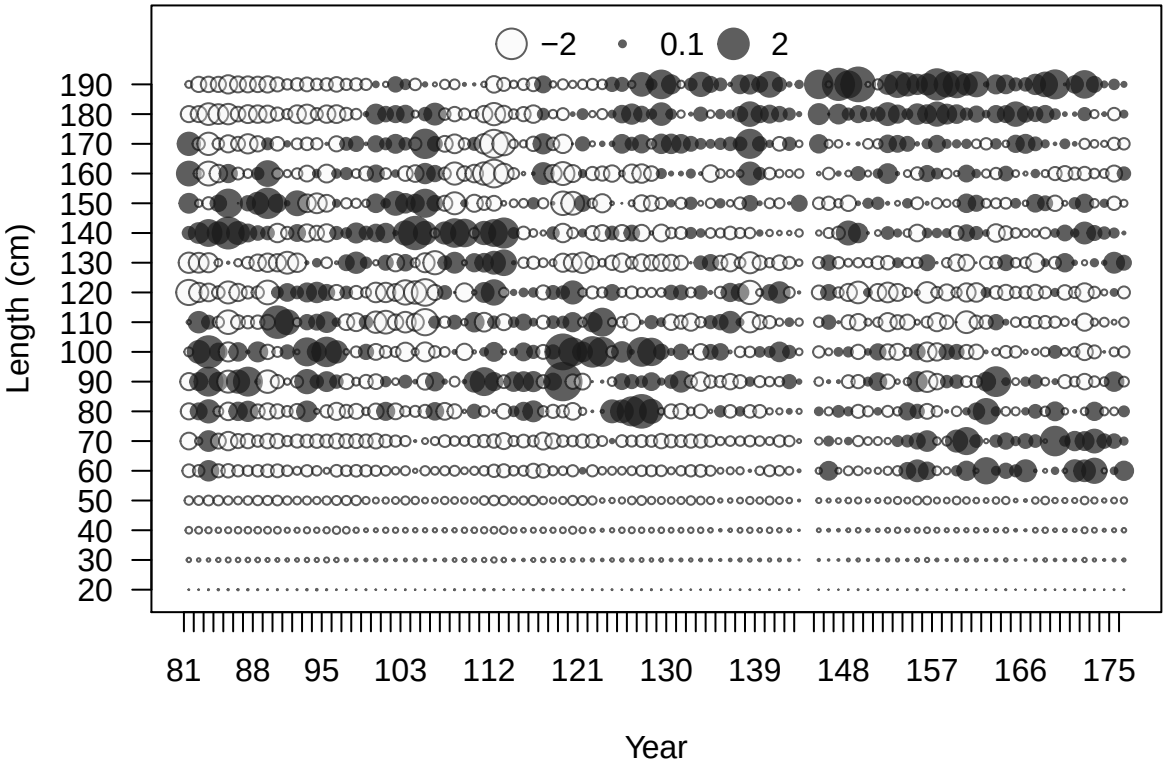

97
N adj.=39.7
N eff.=345.1
101
N adj.=31.7
N eff.=97.5
105
N adj.=31.5
N eff.=20.6
109
N adj.=54.6
N eff.=102.4
98
N adj.=33.6
N eff.=110.8
102
N adj.=31.8
N eff.=88.5
106
N adj.=26.8
N eff.=69.7
110
N adj.=37.1
N eff.=142.3
99
N adj.=20.4
N eff.=249.3
103
N adj.=45.6
N eff.=68
107
N adj.=48.9
N eff.=178
111
N adj.=54.1
N eff.=80.8
100
N adj.=21.2
N eff.=55.7
104
N adj.=52.5
N eff.=52.5
108
N adj.=48.9
N eff.=49.9
112
N adj.=72.3
N eff.=50.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

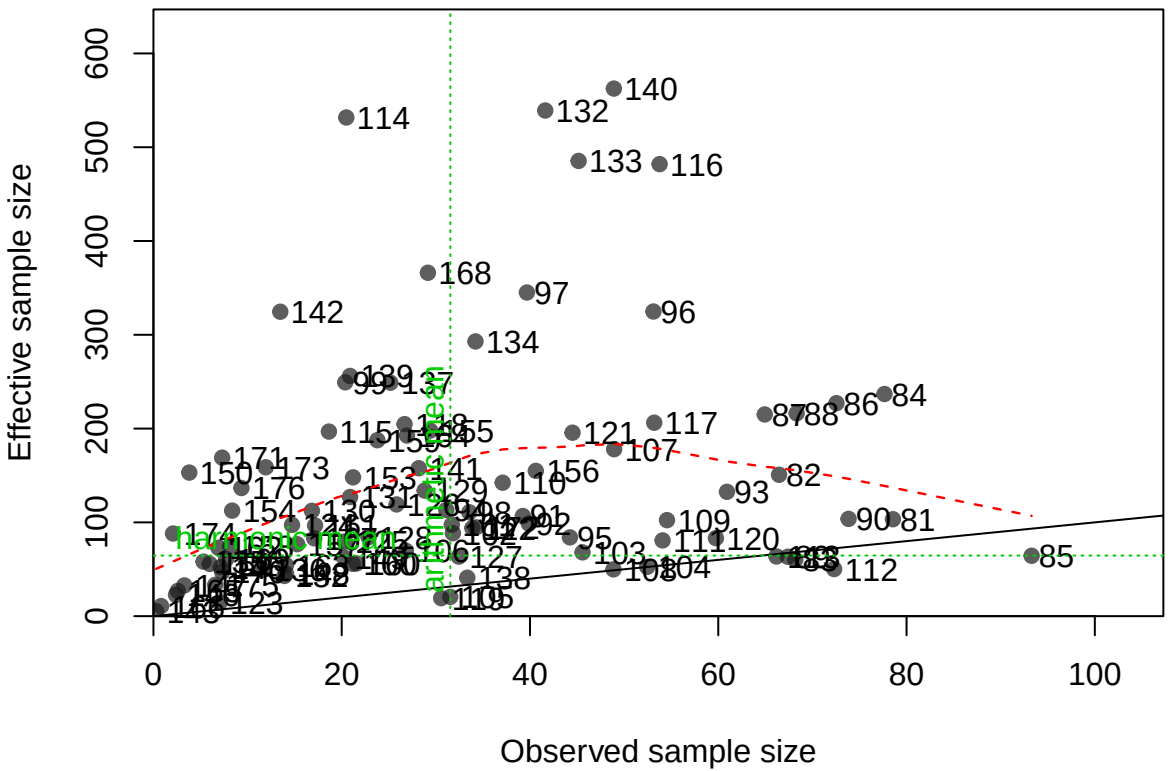

113
N adj.=66.2
N eff.=63.7
117
N adj.=53.2
N eff.=206.2
121
N adj.=44.5
N eff.=195.6
125
N adj.=20.3
N eff.=79.7
114
N adj.=20.5
N eff.=531.7
118
N adj.=26.7
N eff.=204.7
122
N adj.=33.9
N eff.=93.9
126
N adj.=25.8
N eff.=119.1
115
N adj.=18.6
N eff.=196.8
119
N adj.=30.6
N eff.=19.2
123
N adj.=7
N eff.=14.4
127
N adj.=32.4
N eff.=63.5
116
N adj.=53.8
N eff.=482
120
N adj.=59.8
N eff.=83.2
124
N adj.=14.7
N eff.=97.3
128
N adj.=22.9
N eff.=84.2
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)


129
N adj.=28.8
N eff.=133.9
133
N adj.=45.2
N eff.=485.4
137
N adj.=25.2
N eff.=248.9
141
N adj.=28.2
N eff.=157.7
130
N adj.=16.8
N eff.=112.3
134
N adj.=34.2
N eff.=292.9
138
N adj.=33.3
N eff.=41
142
N adj.=13.5
N eff.=324.6
131
N adj.=20.9
N eff.=127.1
135
N adj.=5.3
N eff.=58.1
139
N adj.=20.9
N eff.=256.1
143
N adj.=0.3
N eff.=5.3
132
N adj.=41.6
N eff.=539.2
136
N adj.=11.6
N eff.=49.2
140
N adj.=48.9
N eff.=562.5
145
N adj.=7.1
N eff.=52.3
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

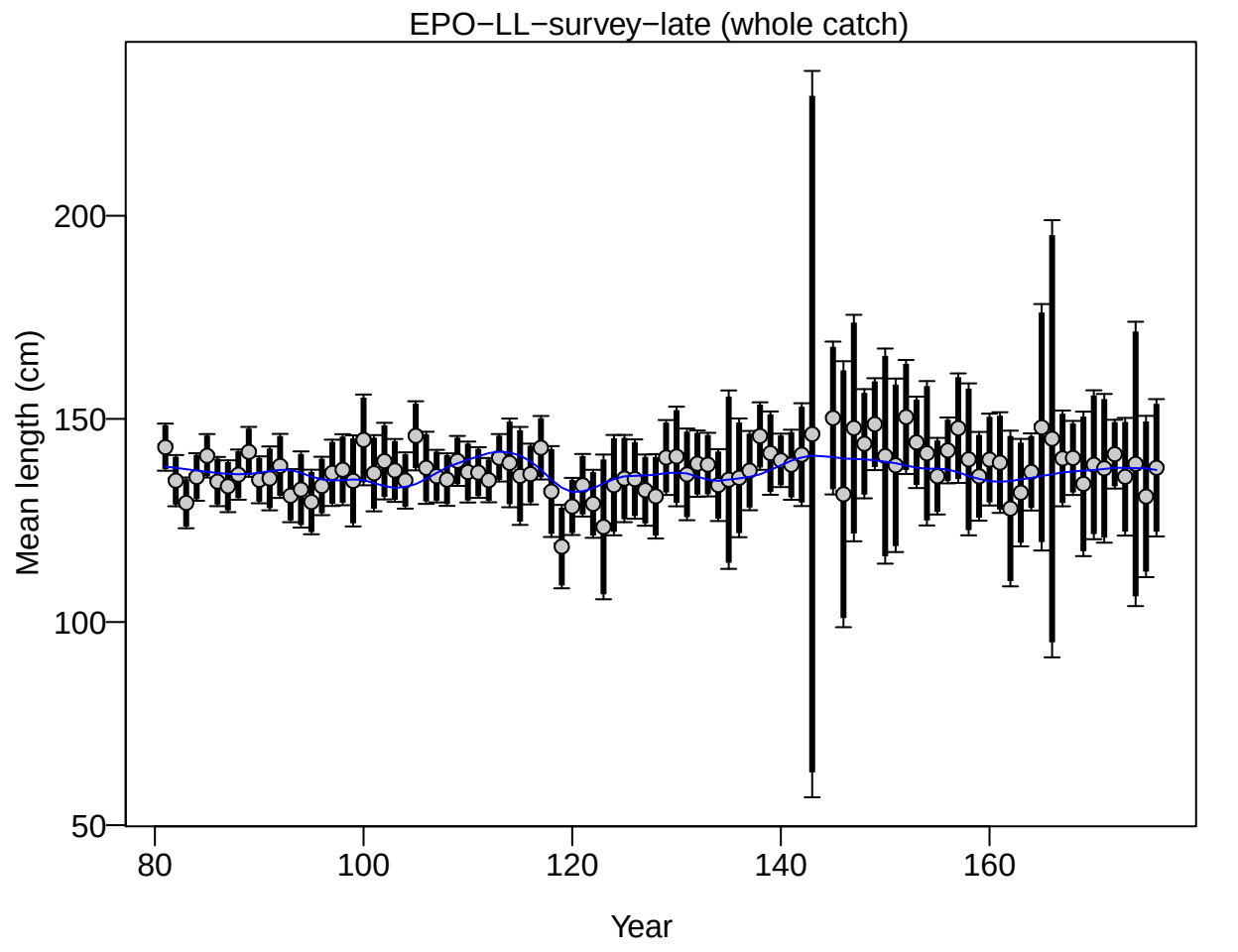

146
N adj.=2.4
N eff.=22.7
150
N adj.=3.8
N eff.=153.1
154
N adj.=8.4
N eff.=112.5
158
N adj.=8.2
N eff.=74.6
147
N adj.=3.3
N eff.=32.8
151
N adj.=6
N eff.=55.7
155
N adj.=29.4
N eff.=197.9
159
N adj.=23.8
N eff.=187.6
148
N adj.=14.1
N eff.=45.3
152
N adj.=13.9
N eff.=42.9
156
N adj.=40.6
N eff.=154.9
160
N adj.=21.6
N eff.=56.2
149
N adj.=20.2
N eff.=62.8
153
N adj.=21.2
N eff.=148
157
N adj.=15.3
N eff.=76.7
161
N adj.=17.2
N eff.=96.7
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

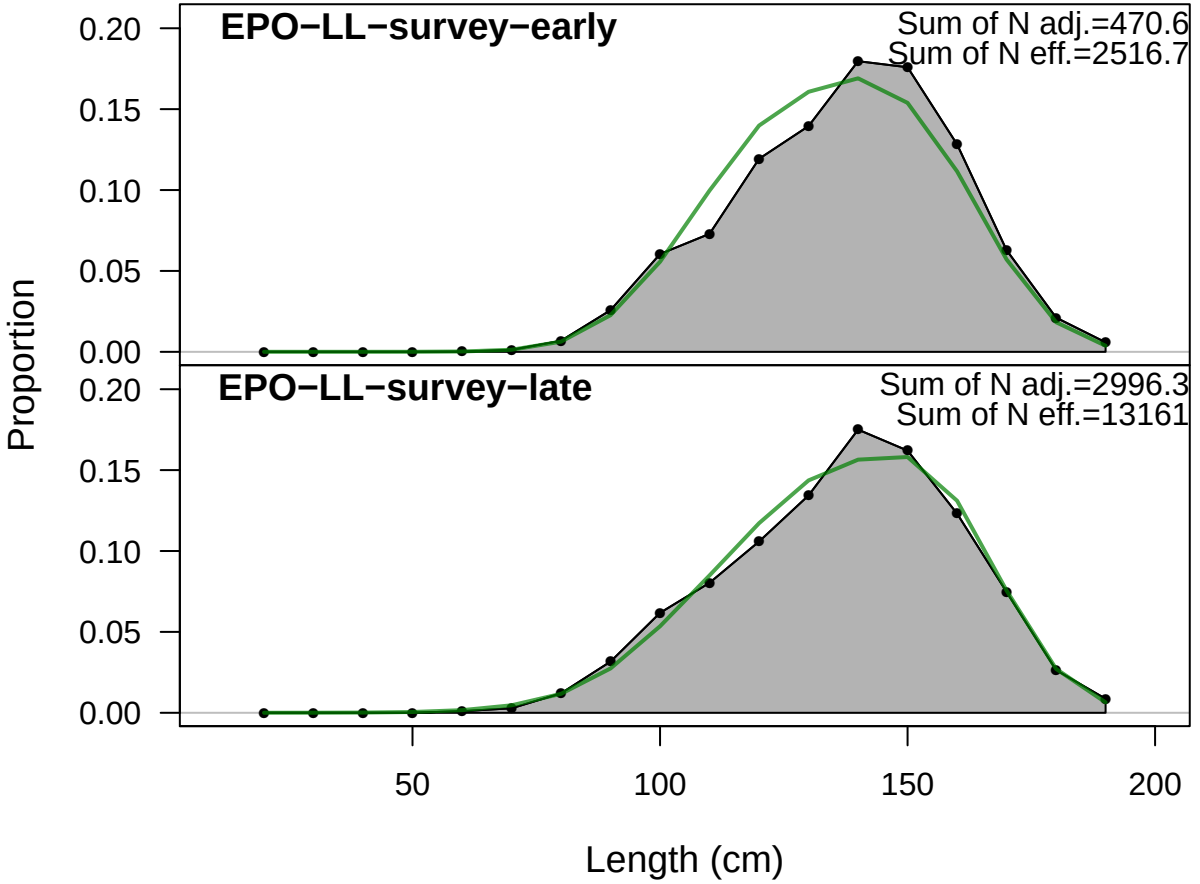

162
N adj.=6.9
N eff.=72.9
166
N adj.=0.8
N eff.=10.7
170
N adj.=7.3
N eff.=47.2
174
N adj.=2.1
N eff.=88.1
163
N adj.=14.1
N eff.=54.5
167
N adj.=17.1
N eff.=83
171
N adj.=7.3
N eff.=169
175
N adj.=6.6
N eff.=33.4
164
N adj.=26.9
N eff.=192.6
168
N adj.=29.2
N eff.=366.1
172
N adj.=34.3
N eff.=94.7
176
N adj.=9.4
N eff.=136.7
165
N adj.=2.6
N eff.=26.9
169
N adj.=7.7
N eff.=60.9
173
N adj.=11.9
N eff.=158.7
Proportion
0.0
0.1
0.2
0.3
0.4
50
100
150
200
Length (cm)

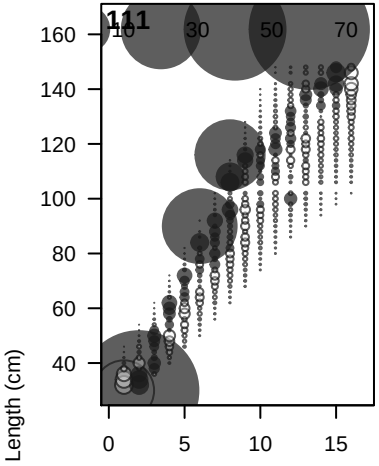

−2
0.1
2
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
Length (cm)
81
88
95
103
112
121
130
139
148
157
166
175
Year

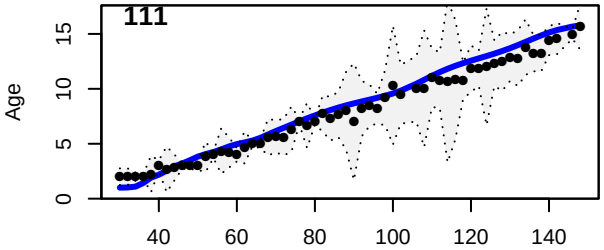


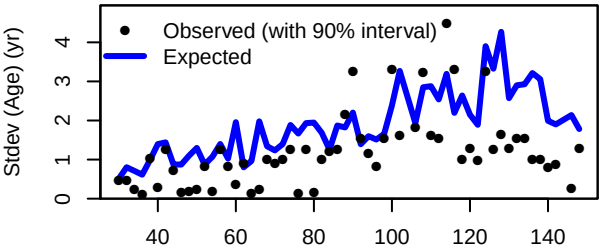
Effective sample size
Observed sample size
0
100
200
300
400
500
600
0
20
40
60
80
100
140
132
114
133
116
168
97
142
96
134
84
86
117
121
107
156
82
93
109
90
81
85
112


EPO−LL−survey−late (whole catch)
Mean length (cm)
200
150
100
50
80
100
120
140
160
Year

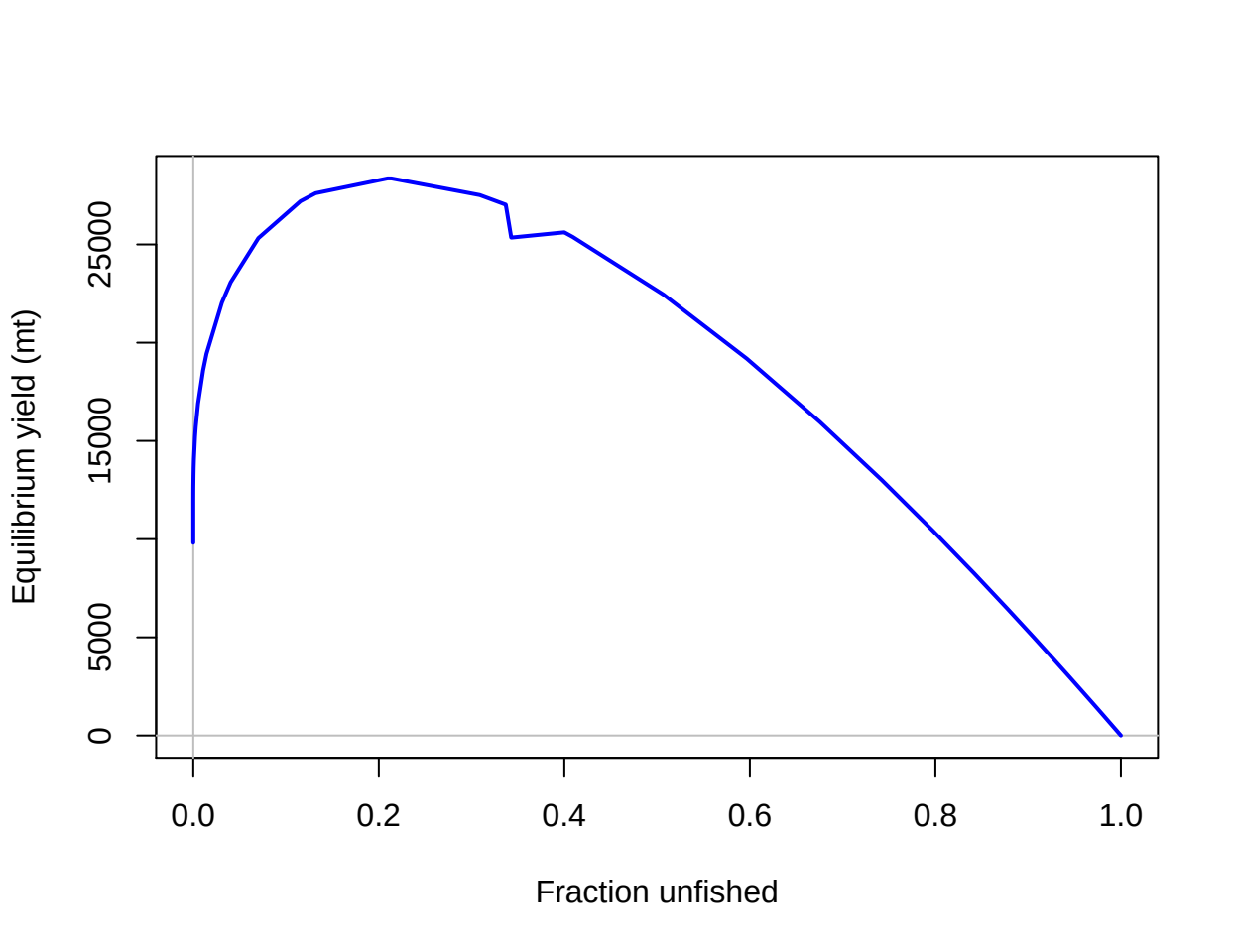

EPO−LL−survey−early
Sum of N adj.=470.6
Sum of N eff.=2516.7
EPO−LL−survey−late
Sum of N adj.=2996.3
Sum of N eff.=13161
Proportion
0.00
0.05
0.10
0.15
0.20
50
100
150
200
Length (cm)

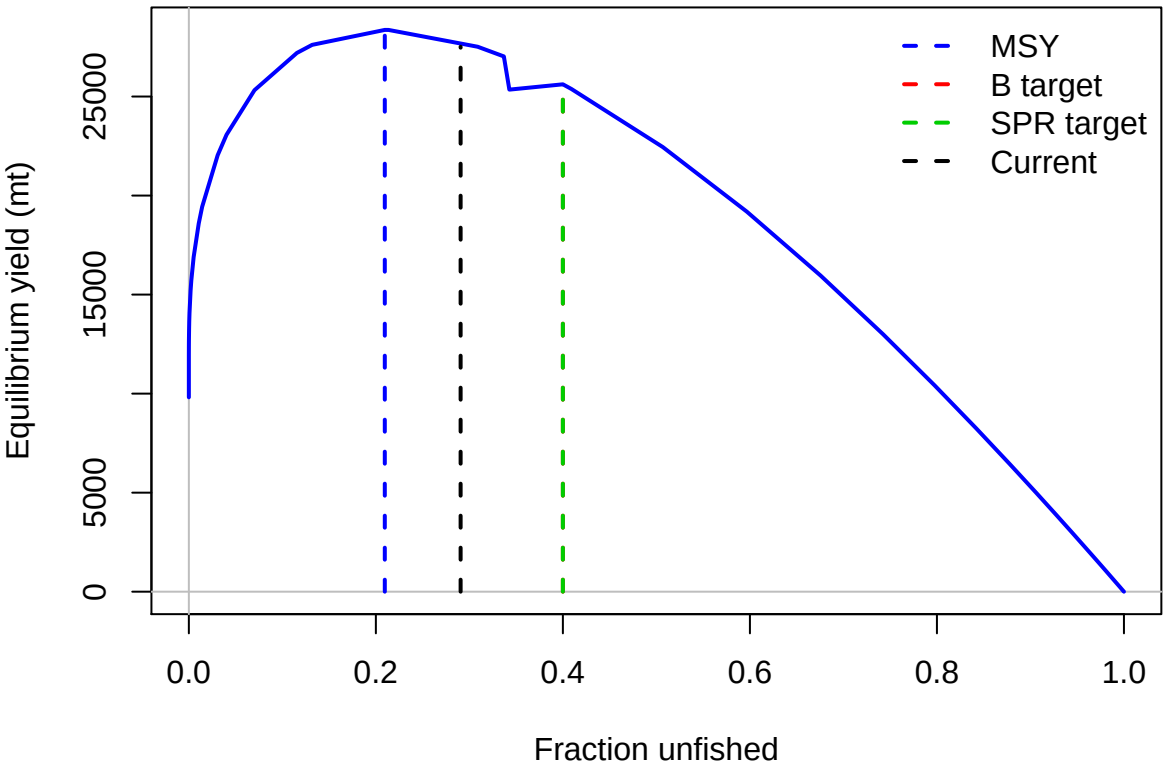

111
10
30
50
70
160
140
120
100
80
60
40
Length (cm)
0
5
10
15
Age (yr)

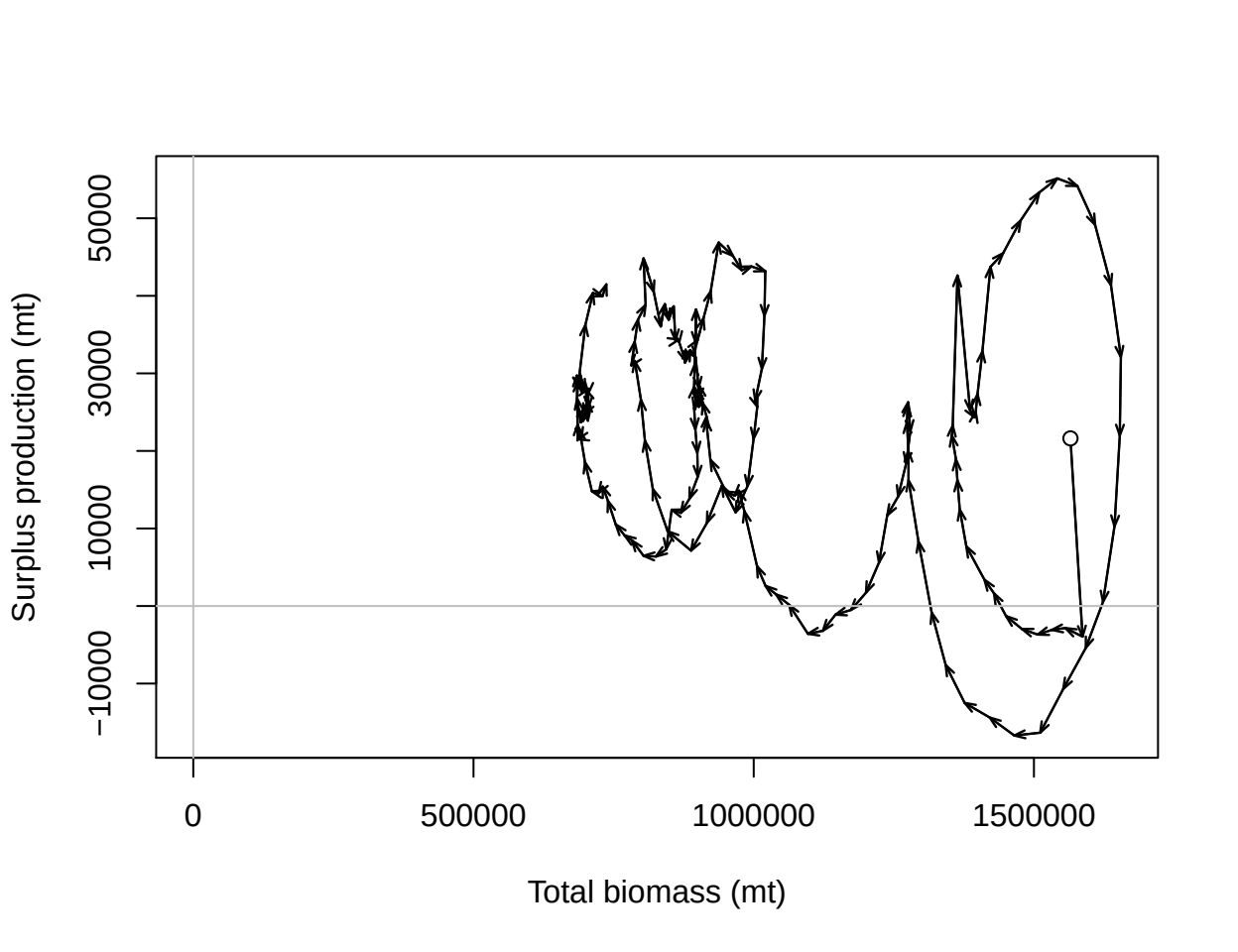

111
Age
0
5
10
15
40
60
80
100
120
140

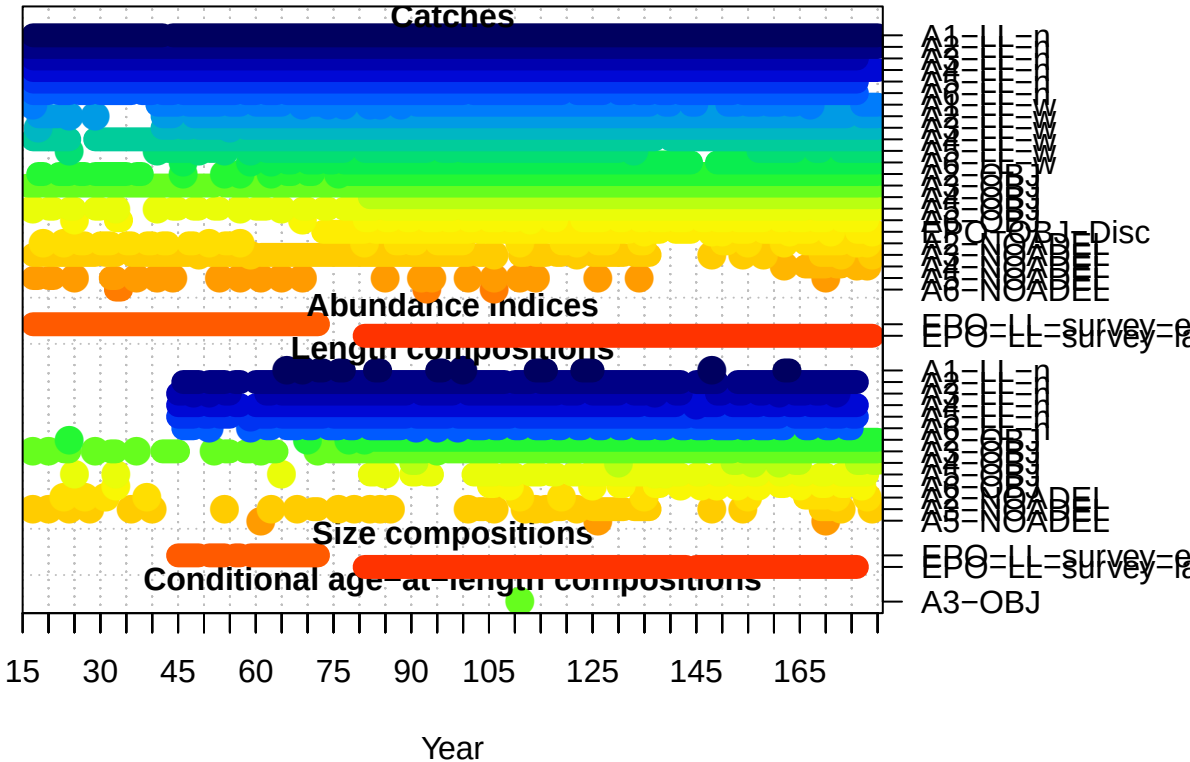

Observed (with 90% interval)
Expected
Stdev (Age) (yr)
0
1
2
3
4
40
60
80
100
120
140

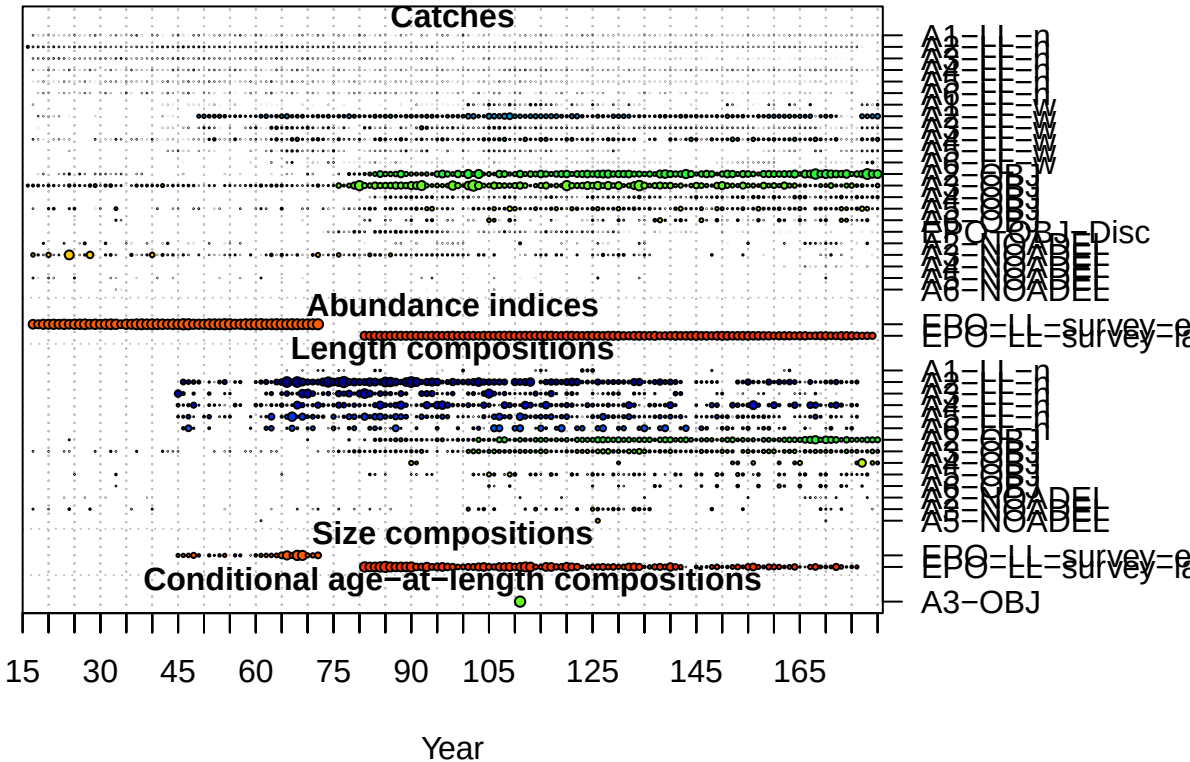
Length (cm)

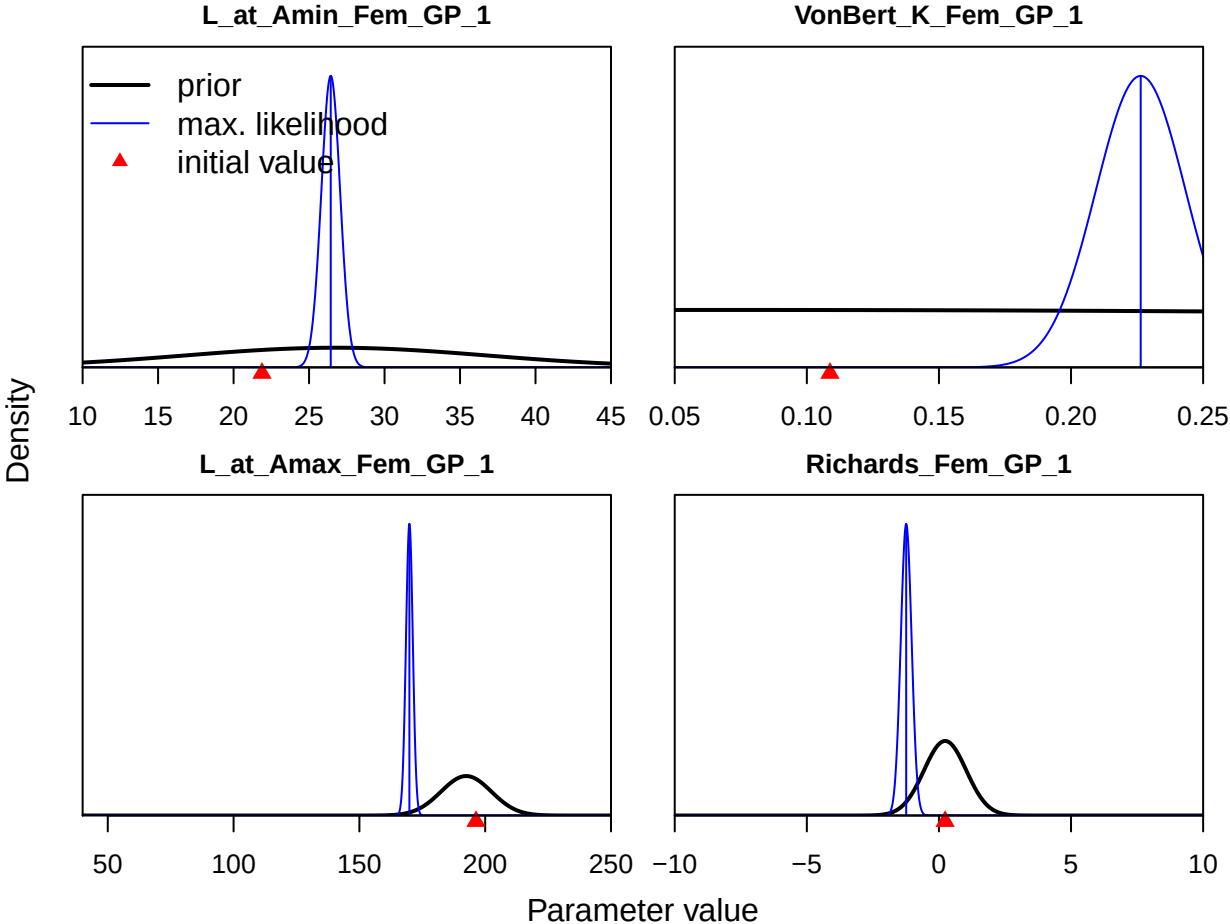

Equilibrium yield (mt)
0
5000
15000
25000
0.0
0.2
0.4
0.6
0.8
1.0
Fraction unfished

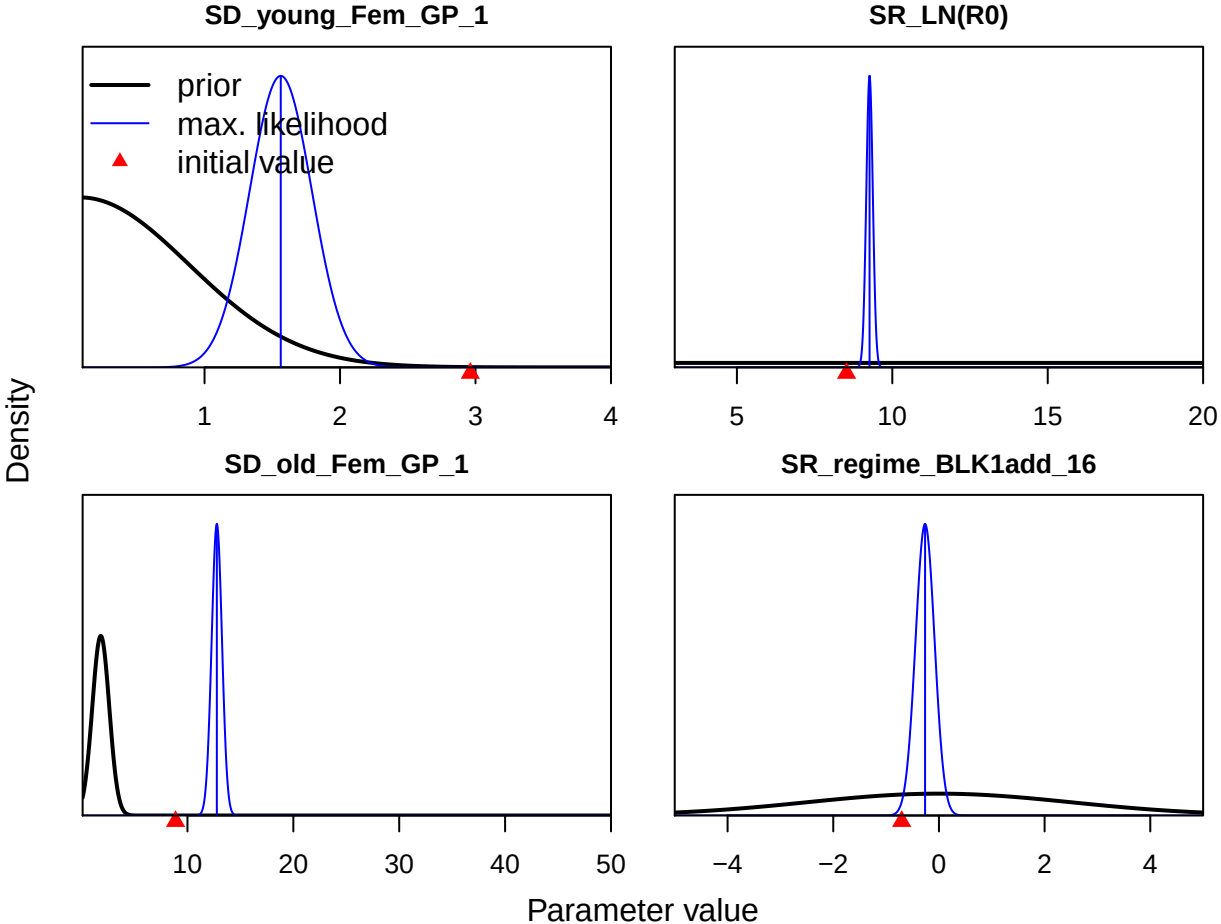

MSY
B target
SPR target
Current
Equilibrium yield (mt)
0
5000
15000
25000
0.0
0.2
0.4
0.6
0.8
1.0
Fraction unfished

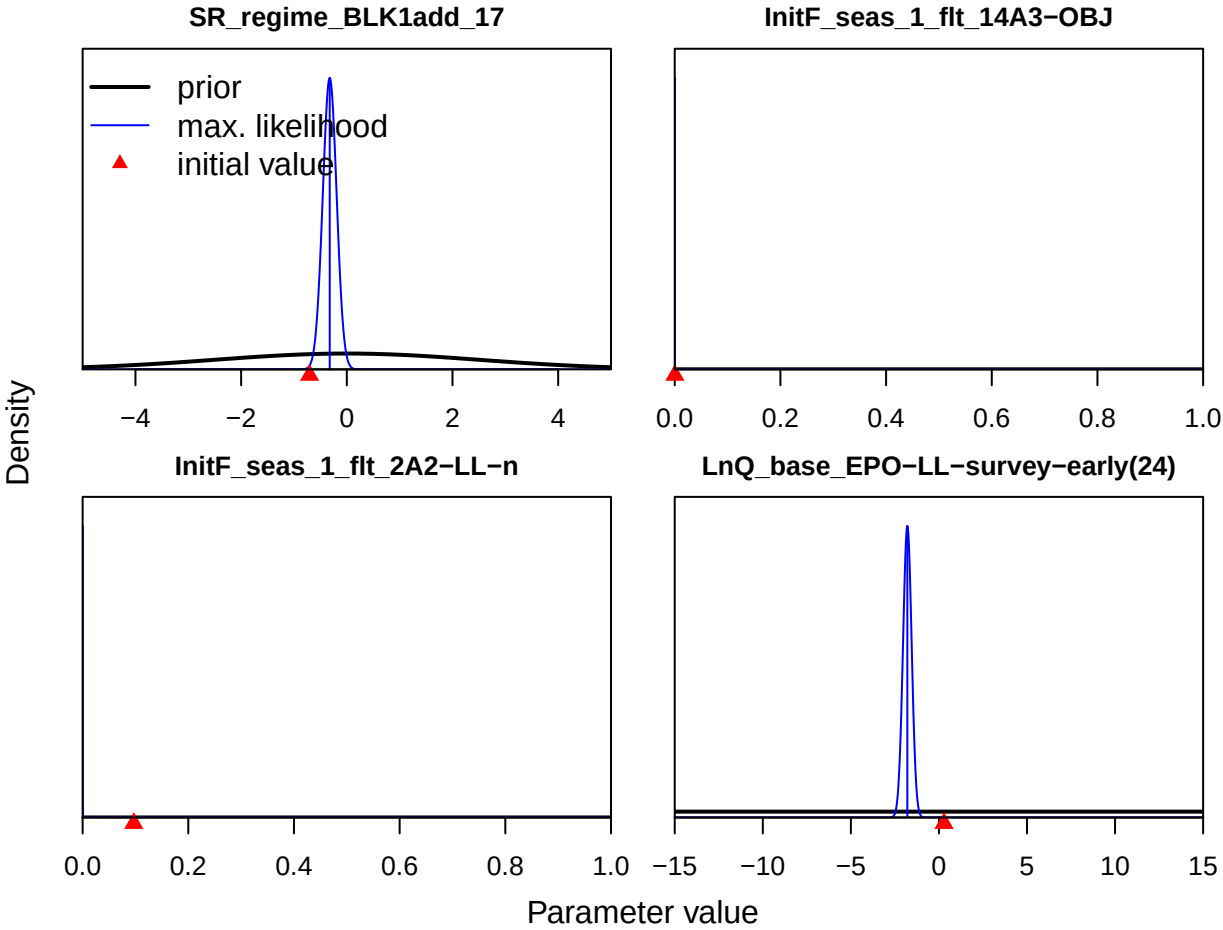

Surplus production (mt)
50000
30000
10000
−10000
0
500000
1000000
1500000
Total biomass (mt)

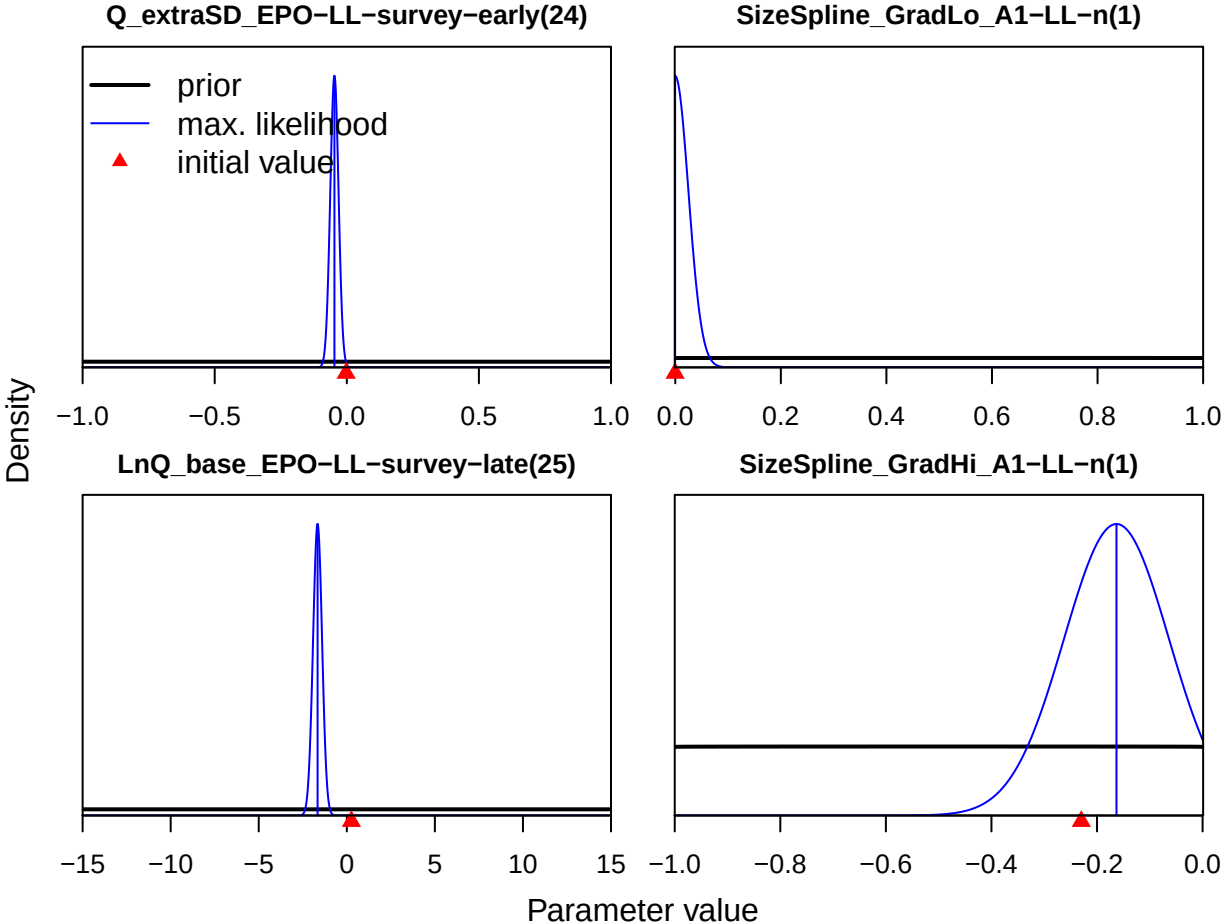

Catches
Abundance indices
Length compositions
Size compositions
Conditional age−at−length compositions
A1−LL−n
A3−LL−n
A5−LL−n
A6−LL−n
A1−LL−w
A3−LL−w
A5−LL−w
A6−LL−w
A1−OBJ
A3−OBJ
A5−OBJ
A6−OBJ
EPO−OBJ−Disc
A1−NOADEL
A3−NOADEL
A5−NOADEL
A6−NOADEL
EPO−LL−survey−e
EPO−LL−survey−la
A1−LL−n
A3−LL−n
A5−LL−n
A6−LL−n
A1−OBJ
A3−OBJ
A5−OBJ
A6−OBJ
A1−NOADEL
A3−NOADEL
A5−NOADEL
A6−NOADEL
EPO−LL−survey−e
EPO−LL−survey−la
A3−OBJ
15
30
45
60
75
90
105
125
145
165
Year

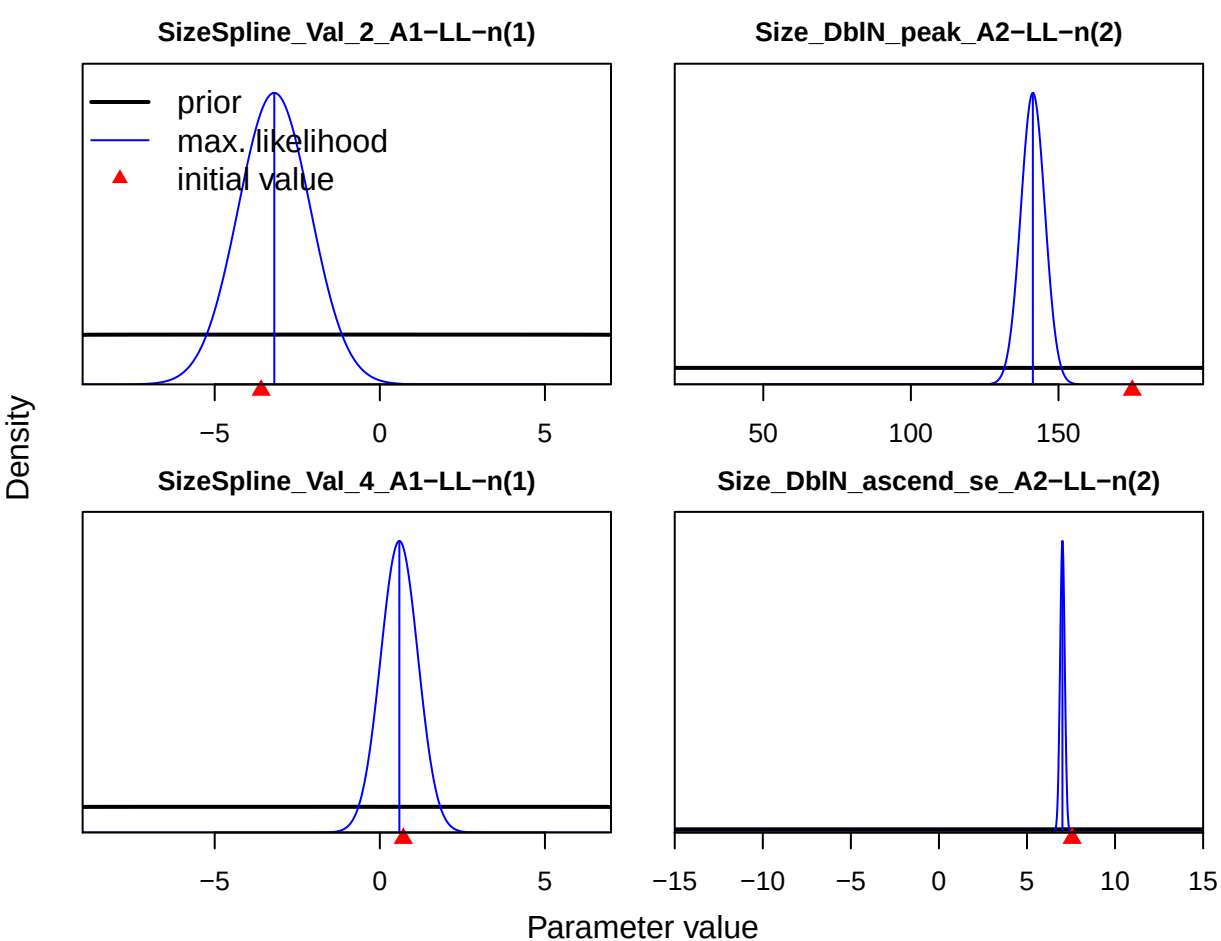

Catches
Abundance indices
Length compositions
Size compositions
Conditional age−at−length compositions
A1−LL−n
A2−LL−n
A3−LL−n
A4−LL−n
A5−LL−n
A6−LL−n
A1−LL−w
A2−LL−w
A3−LL−w
A4−LL−w
A5−LL−w
A6−LL−w
A1−OBJ
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
EPO−OBJ−Disc
A1−NOADEL
A2−NOADEL
A3−NOADEL
A4−NOADEL
A5−NOADEL
A6−NOADEL
EPO−LL−survey−e
EPO−LL−survey−la
A1−LL−n
A2−LL−n
A3−LL−n
A4−LL−n
A5−LL−n
A6−LL−n
A1−OBJ
A2−OBJ
A3−OBJ
A4−OBJ
A5−OBJ
A6−OBJ
A1−NOADEL
A2−NOADEL
A3−NOADEL
A4−NOADEL
A5−NOADEL
A6−NOADEL
EPO−LL−survey−e
EPO−LL−survey−la
A3−OBJ
15
30
45
60
75
90
105
125
145
165
Year

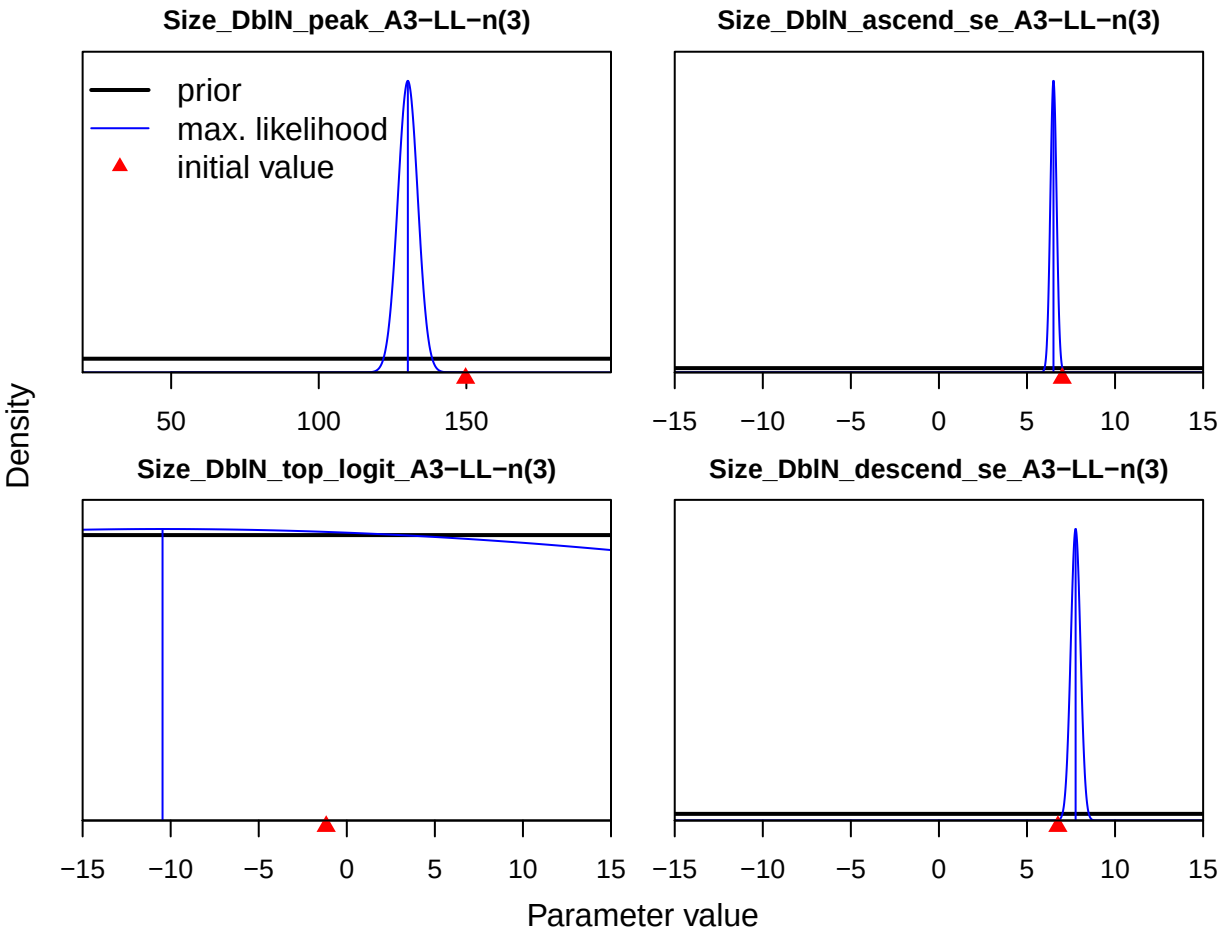

L_at_Amin_Fem_GP_1
VonBert_K_Fem_GP_1
L_at_Amax_Fem_GP_1
Richards_Fem_GP_1
prior
max. likelihood
initial value
Density
Parameter value
10
15
20
25
30
35
40
45
0.05
0.10
0.15
0.20
0.25
50
100
150
200
250
−10
−5
0
5
10

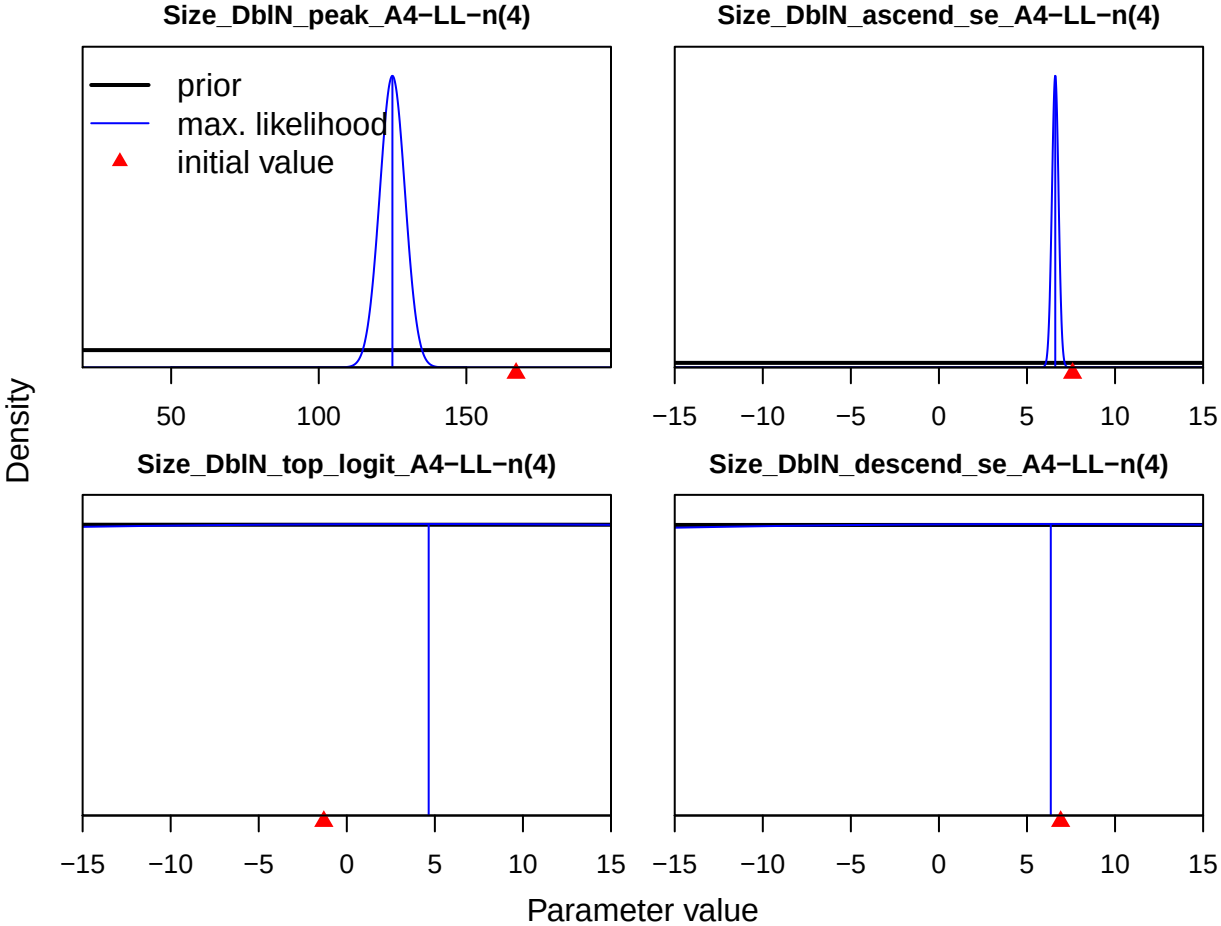

SD_young_Fem_GP_1
SR_LN(R0)
SD_old_Fem_GP_1
SR_regime_BLK1add_16
prior
max. likelihood
initial value
Density
Parameter value
1
2
3
4
5
10
15
20
10
20
30
40
50
−4
−2
0
2
4

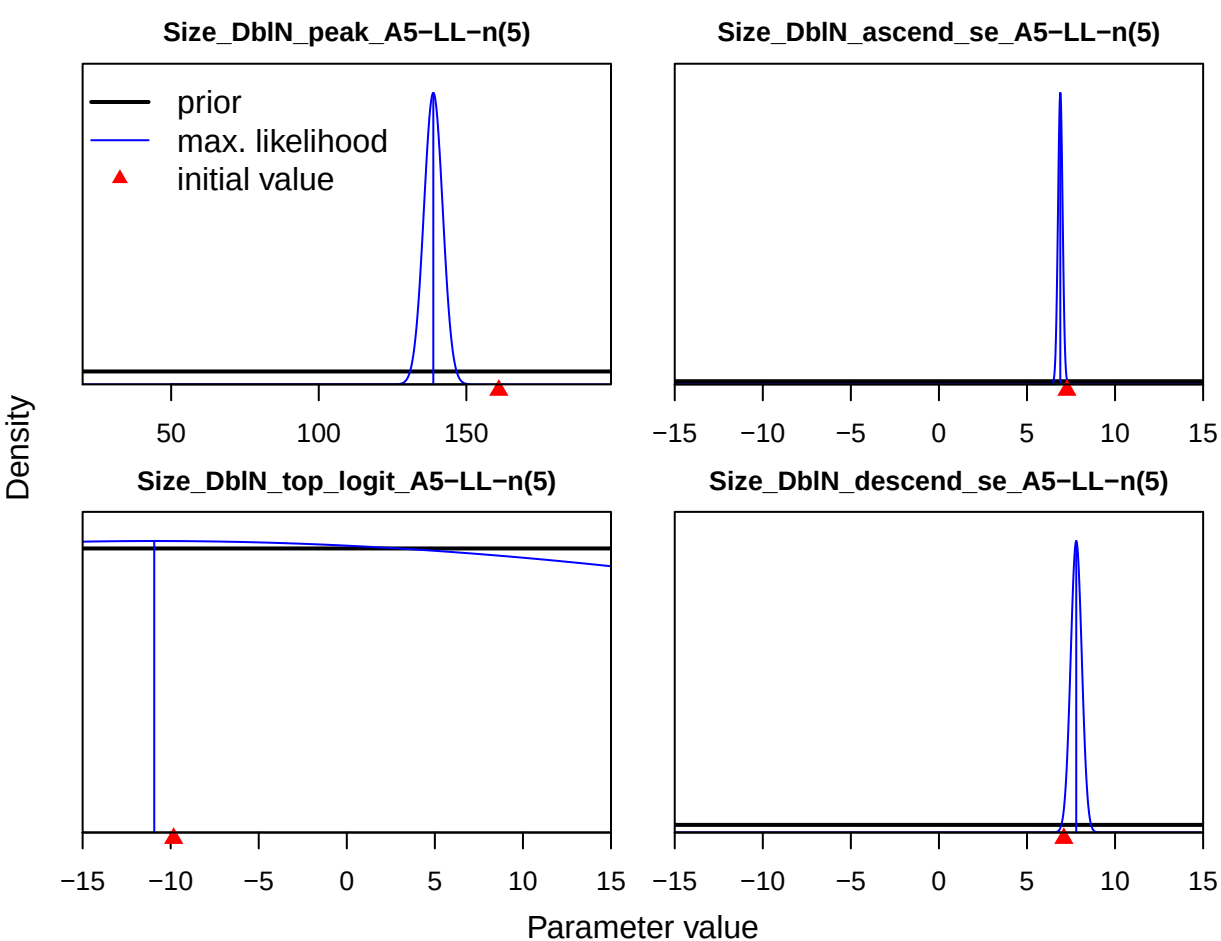

SR_regime_BLK1add_17
InitF_seas_1_flt_14A3−OBJ
InitF_seas_1_flt_2A2−LL−n
LnQ_base_EPO−LL−survey−early(24)
prior
max. likelihood
initial value
Density
Parameter value
−4
−2
0
2
4
0.0
0.2
0.4
0.6
0.8
1.0
−15
−10
−5
0
5
10
15

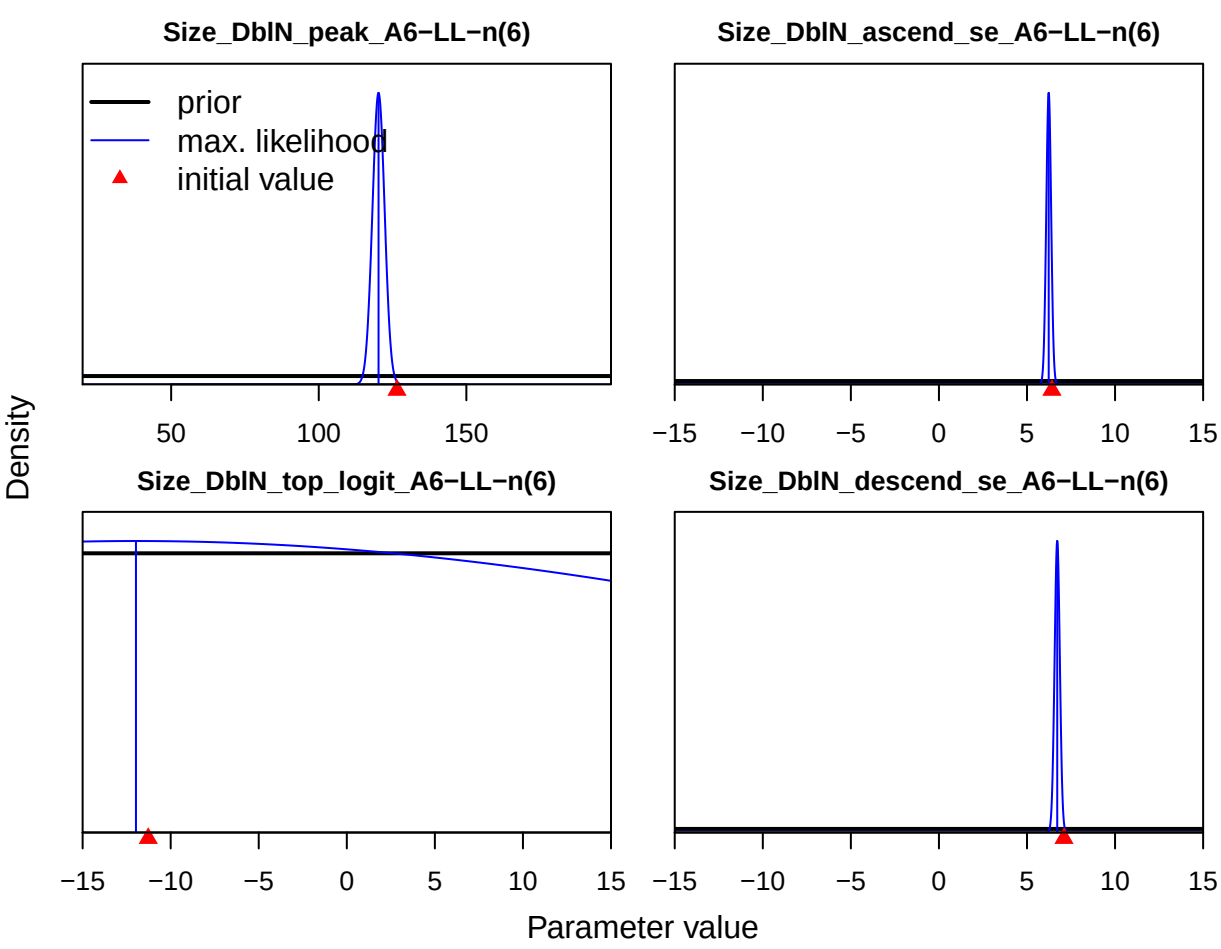

Q_extraSD_EPO−LL−survey−early(24)
SizeSpline_GradLo_A1−LL−n(1)
prior
max. likelihood
initial value
Density
−1.0
−0.5
0.0
0.5
1.0
0.0
0.2
0.4
0.6
0.8
1.0
LnQ_base_EPO−LL−survey−late(25)
SizeSpline_GradHi_A1−LL−n(1)
−15
−10
−5
0
5
10
15
−1.0
−0.8
−0.6
−0.4
−0.2
0.0
Parameter value

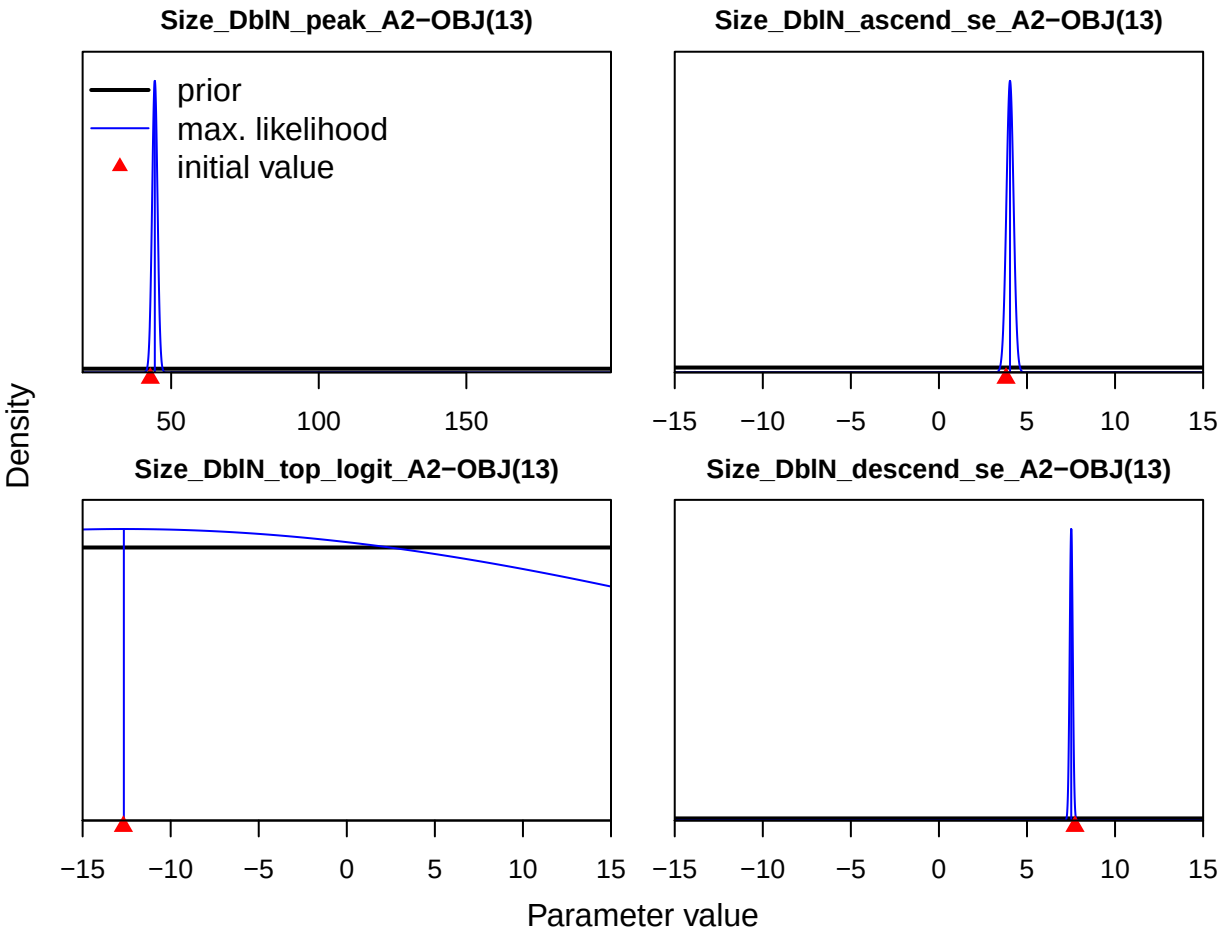

SizeSpline_Val_2_A1−LL−n(1)
Size_DblN_peak_A2−LL−n(2)
SizeSpline_Val_4_A1−LL−n(1)
Size_DblN_ascend_se_A2−LL−n(2)
prior
max. likelihood
initial value
Density
Parameter value
−5
0
5
50
100
150
−15
−10
10
15

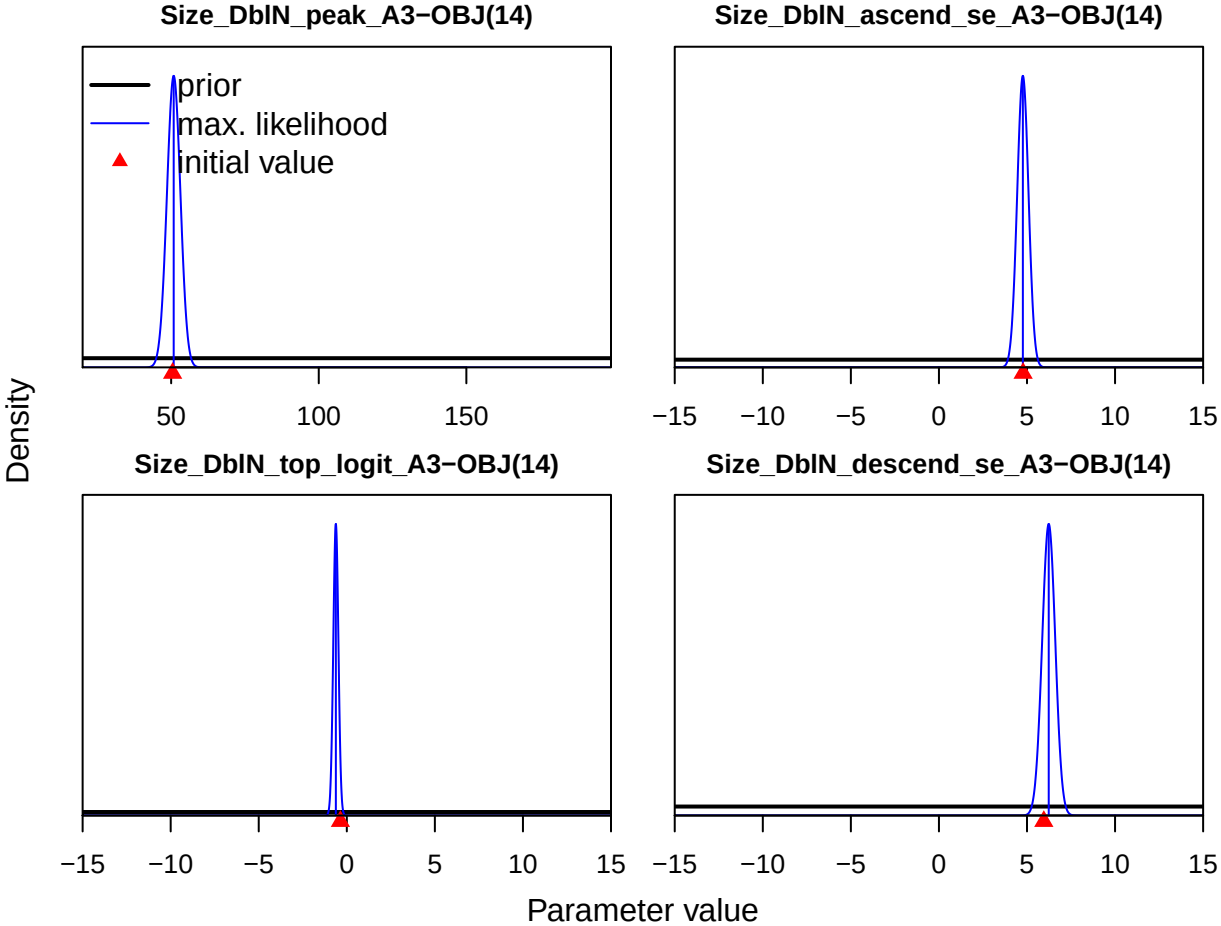

Size_DblN_peak_A3−LL−n(3)
Size_DblN_ascend_se_A3−LL−n(3)
Size_DblN_top_logit_A3−LL−n(3)
Size_DblN_descend_se_A3−LL−n(3)
prior
max. likelihood
initial value
Density
Parameter value
50
100
150
−15
−10
−5
0
5
10
15

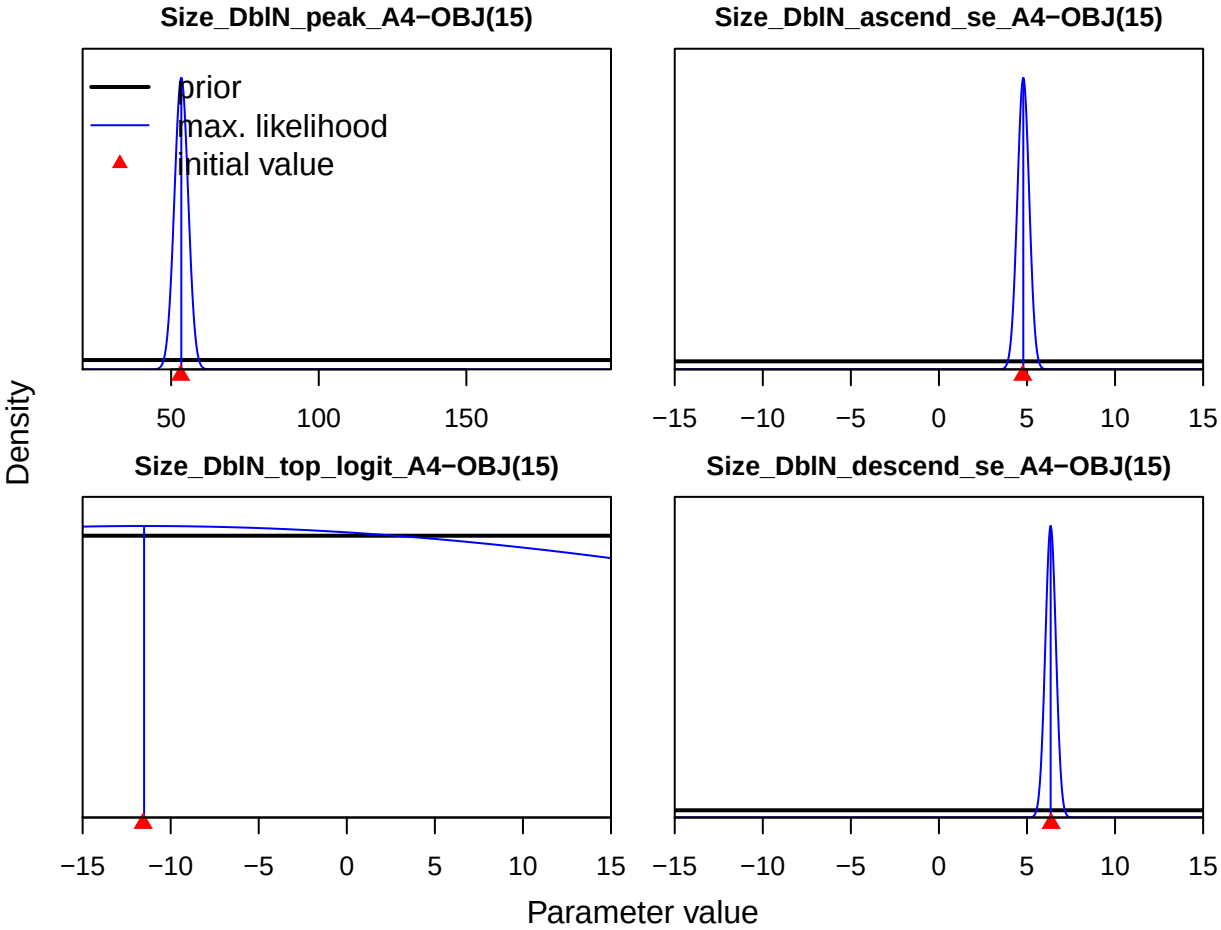

Size_DblN_peak_A4−LL−n(4)
Size_DblN_ascend_se_A4−LL−n(4)
Size_DblN_top_logit_A4−LL−n(4)
Size_DblN_descend_se_A4−LL−n(4)
prior
max. likelihood
initial value
Density
Parameter value
50
100
150
−15
−10
−5
0
5
10
15

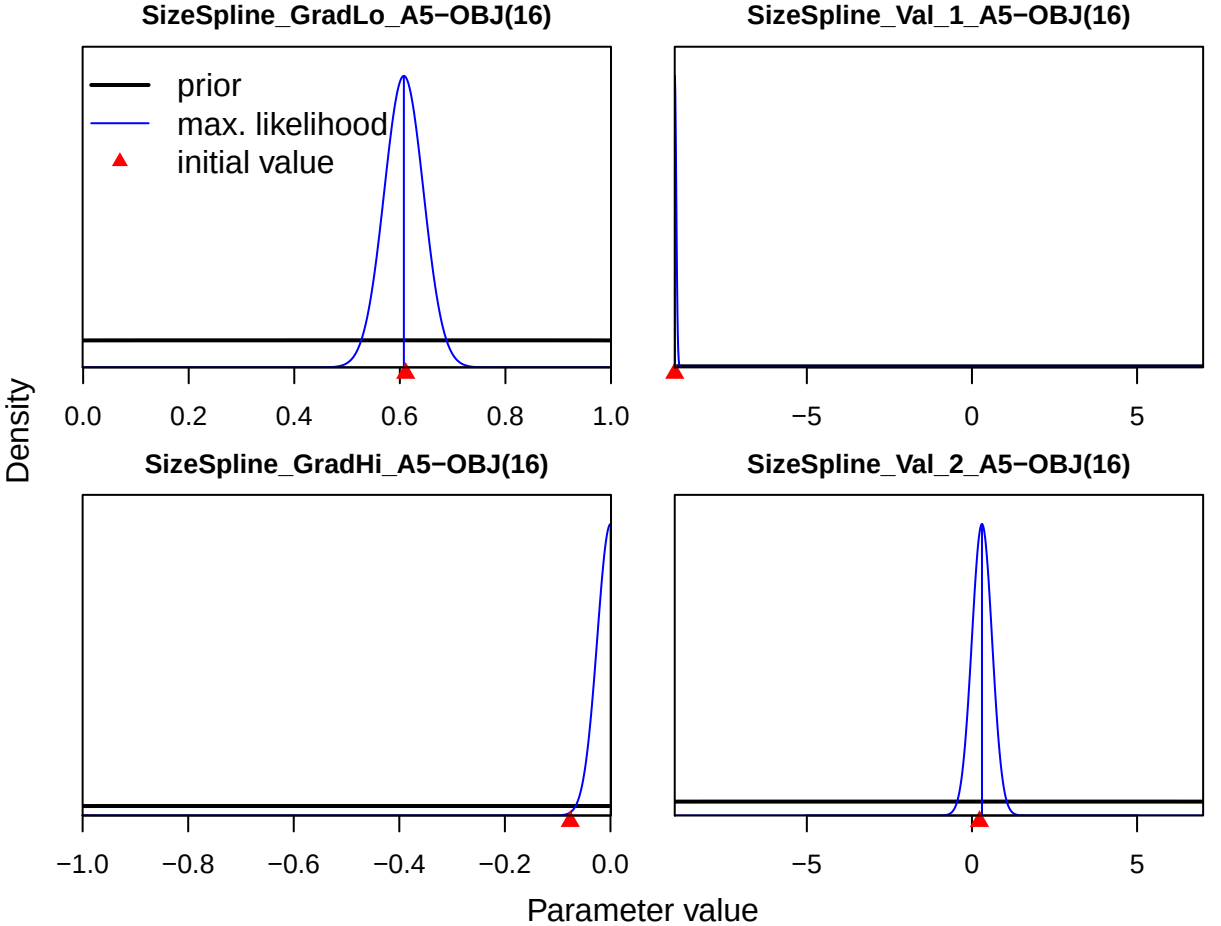

Size_DblN_peak_A5−LL−n(5)
Size_DblN_ascend_se_A5−LL−n(5)
Size_DblN_top_logit_A5−LL−n(5)
Size_DblN_descend_se_A5−LL−n(5)
prior
max. likelihood
initial value
Density
Parameter value
50
100
150
−15
−10
−5
0
5
10
15

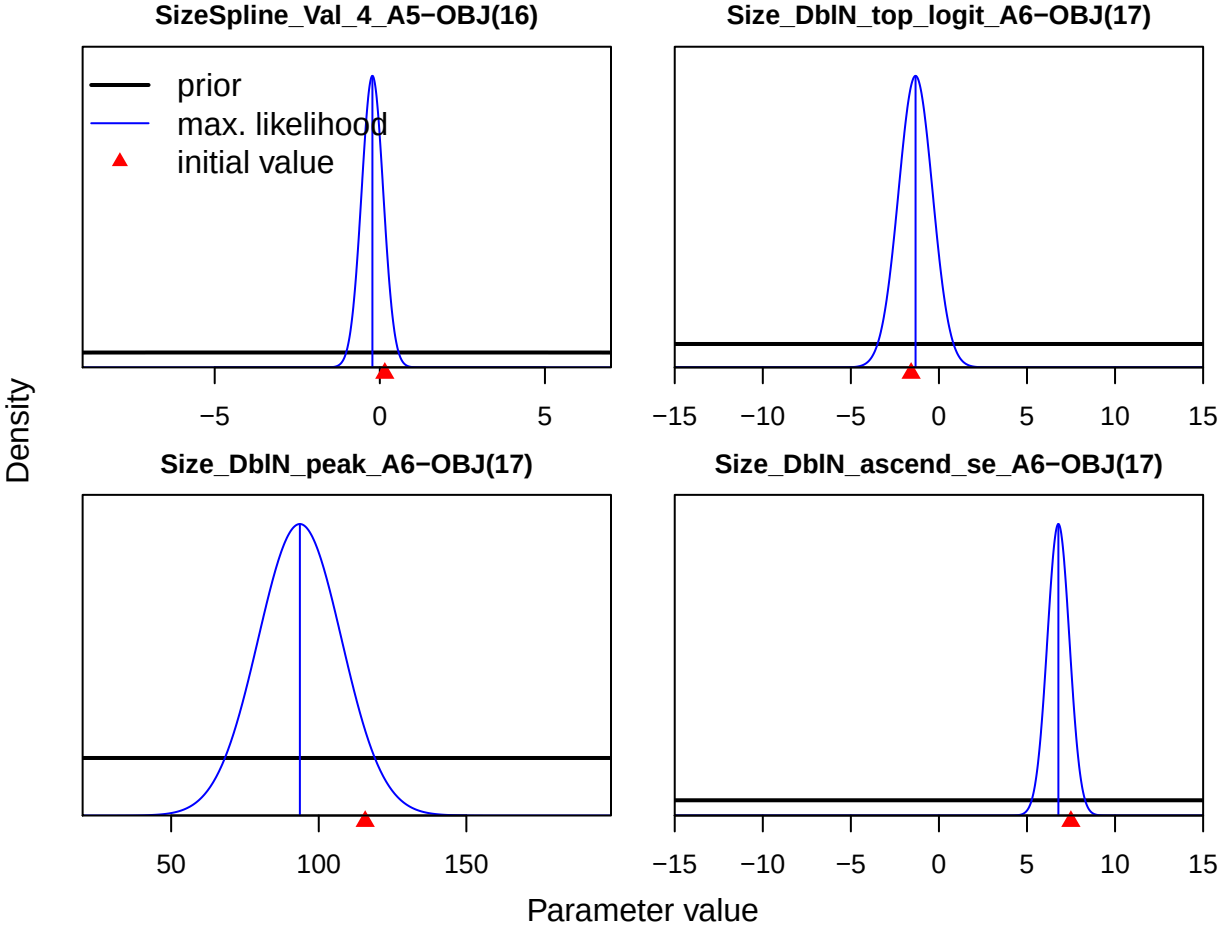

Size_DblN_peak_A6−LL−n(6)
Size_DblN_ascend_se_A6−LL−n(6)
Size_DblN_top_logit_A6−LL−n(6)
Size_DblN_descend_se_A6−LL−n(6)
prior
max. likelihood
initial value
Density
Parameter value
50
100
150
−15
−10
−5
0
5
10
15

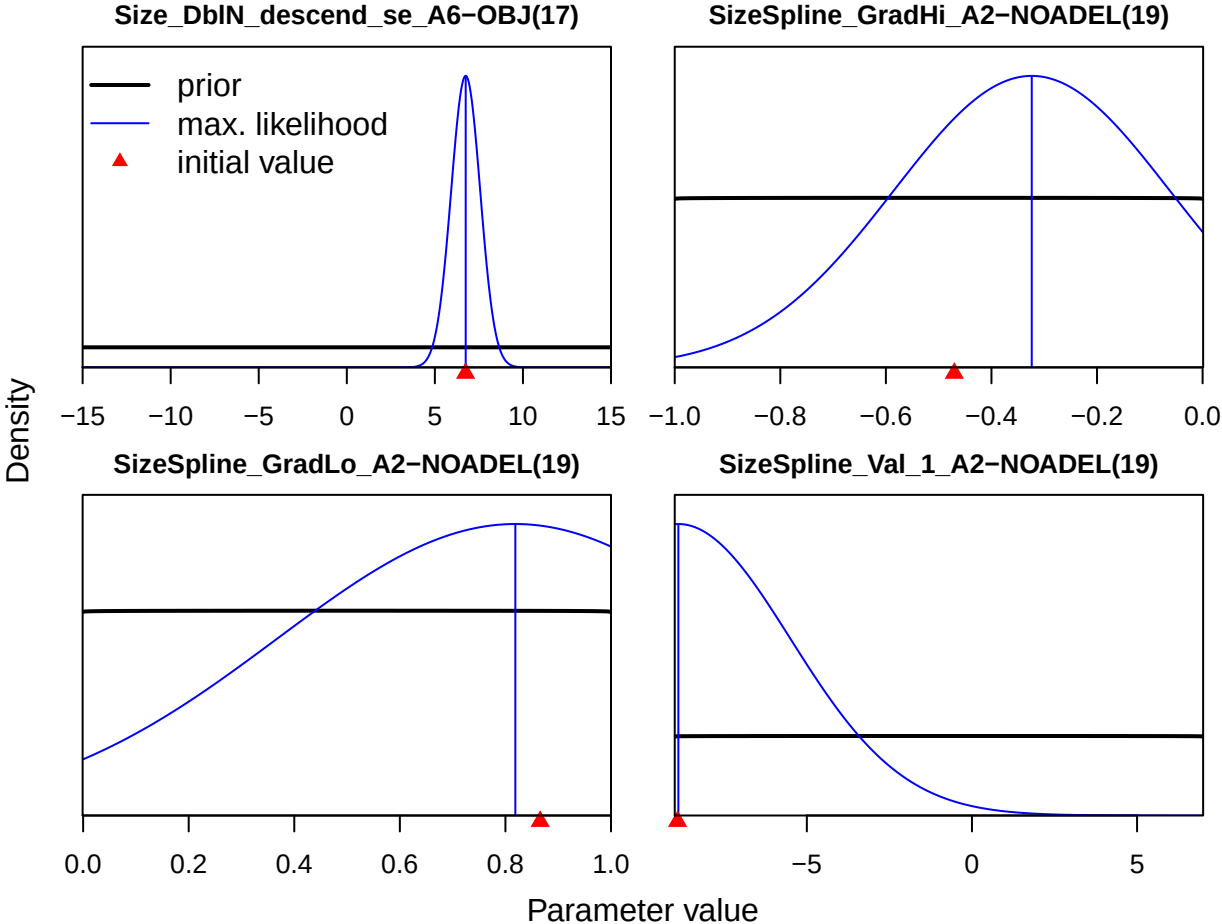

Size_DblN_peak_A2−OBJ(13)
Size_DblN_ascend_se_A2−OBJ(13)
Size_DblN_top_logit_A2−OBJ(13)
Size_DblN_descend_se_A2−OBJ(13)
prior
max. likelihood
initial value
Density
Parameter value
50
100
150
−15
−10
−5
0
5
10
15

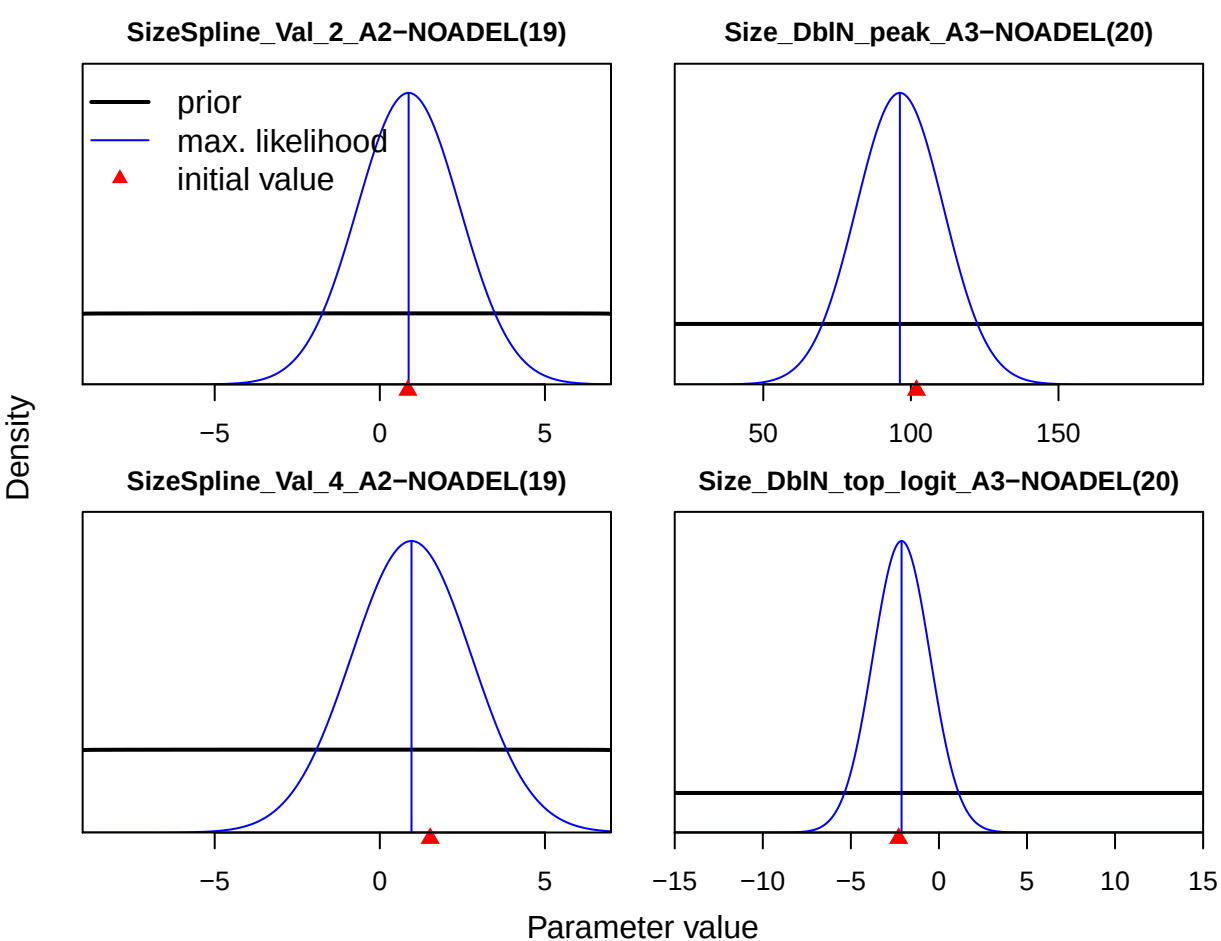

Size_DblN_peak_A3−OBJ(14)
Size_DblN_ascend_se_A3−OBJ(14)
Size_DblN_top_logit_A3−OBJ(14)
Size_DblN_descend_se_A3−OBJ(14)
prior
max. likelihood
initial value
Density
Parameter value
50
100
150
−15
−10
−5
0
5
10
15

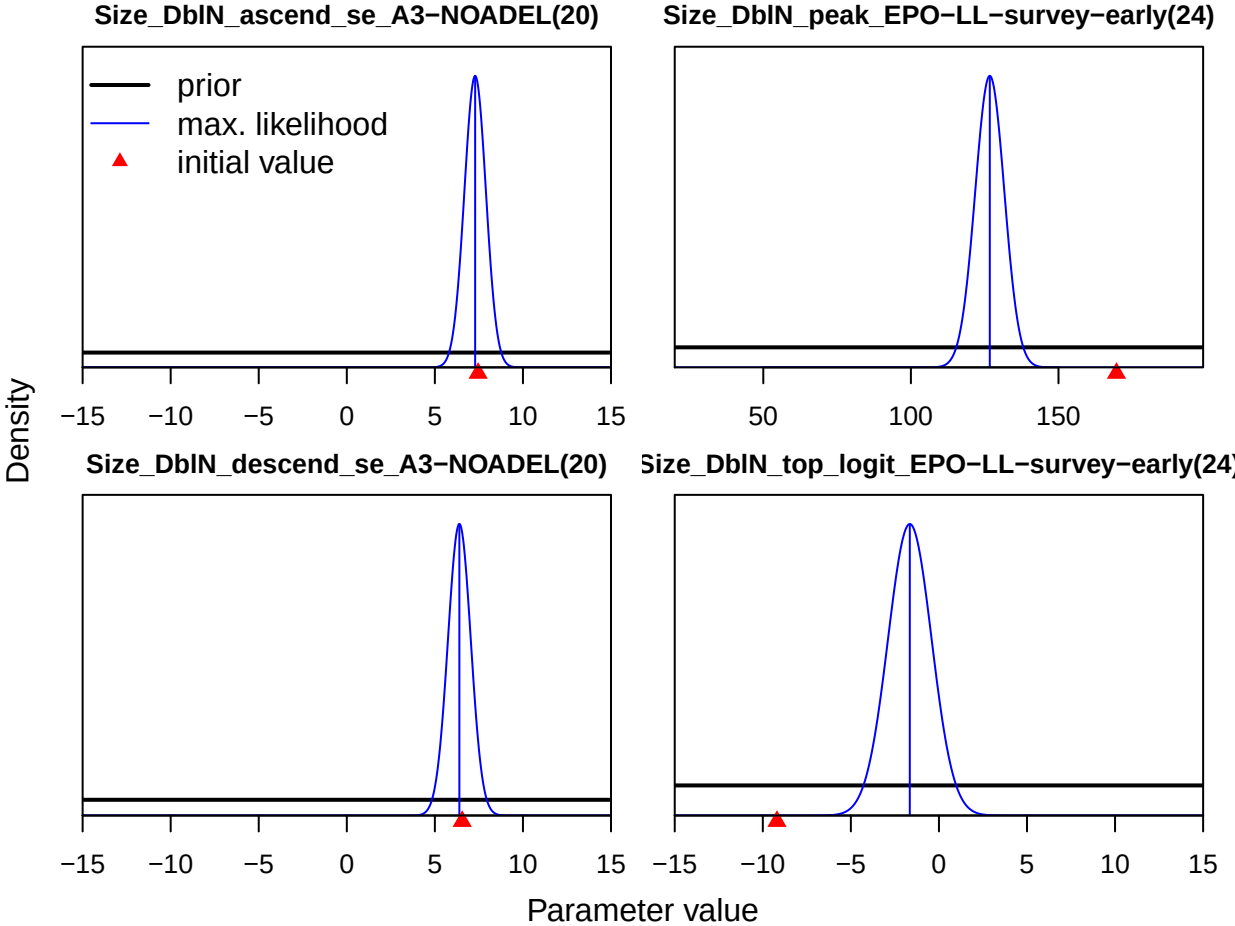

Size_DblN_peak_A4−OBJ(15)
Size_DblN_ascend_se_A4−OBJ(15)
Size_DblN_top_logit_A4−OBJ(15)
Size_DblN_descend_se_A4−OBJ(15)
prior
max. likelihood
initial value
Density
Parameter value
50
100
150
−15
−10
−5
0
5
10
15

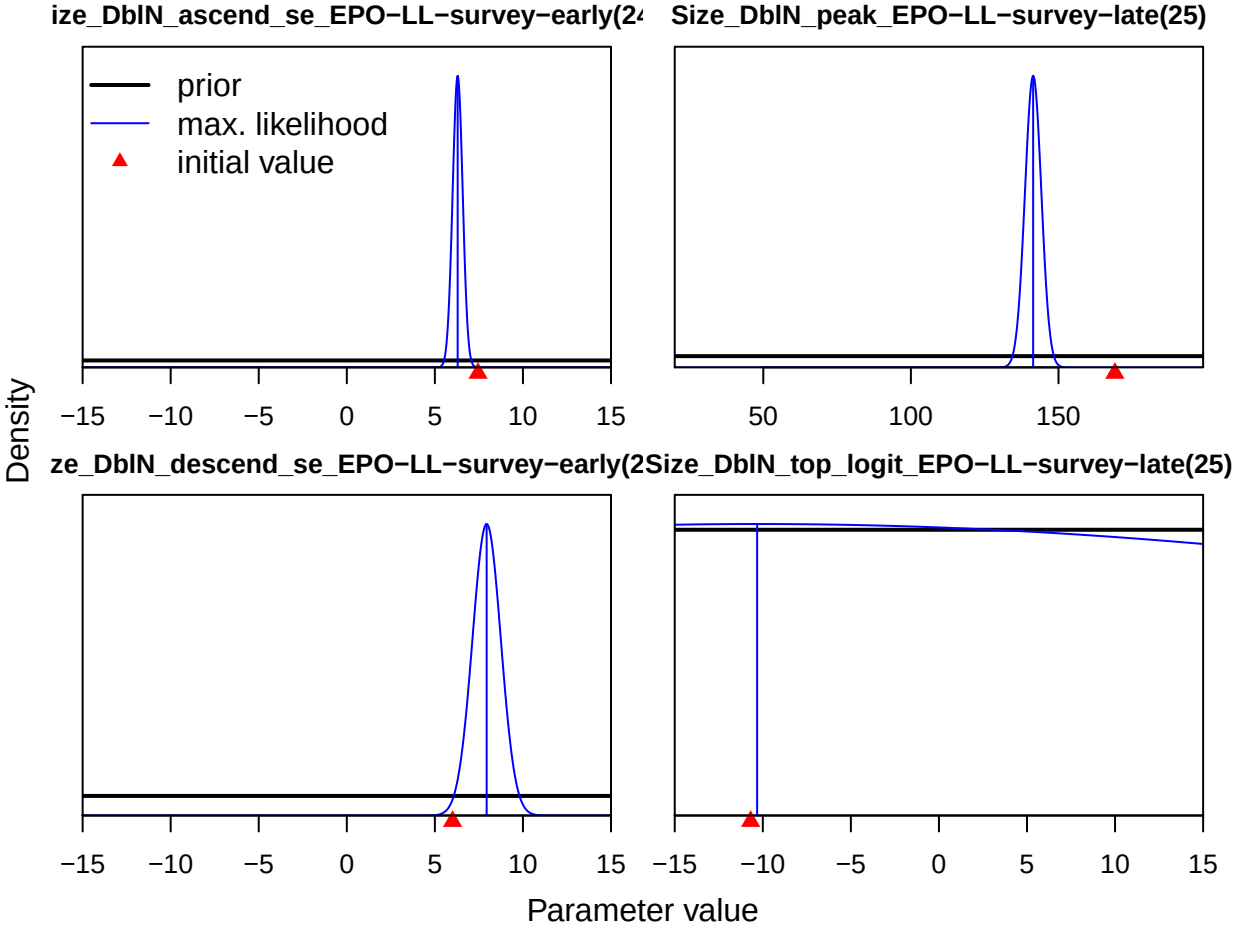

SizeSpline_GradLo_A5−OBJ(16)
SizeSpline_Val_1_A5−OBJ(16)
SizeSpline_GradHi_A5−OBJ(16)
SizeSpline_Val_2_A5−OBJ(16)
prior
max. likelihood
initial value
Density
Parameter value
0.0
0.2
0.4
0.6
0.8
1.0
−5
0
5
−1.0
−0.8
−0.6
−0.4
−0.2
0.0

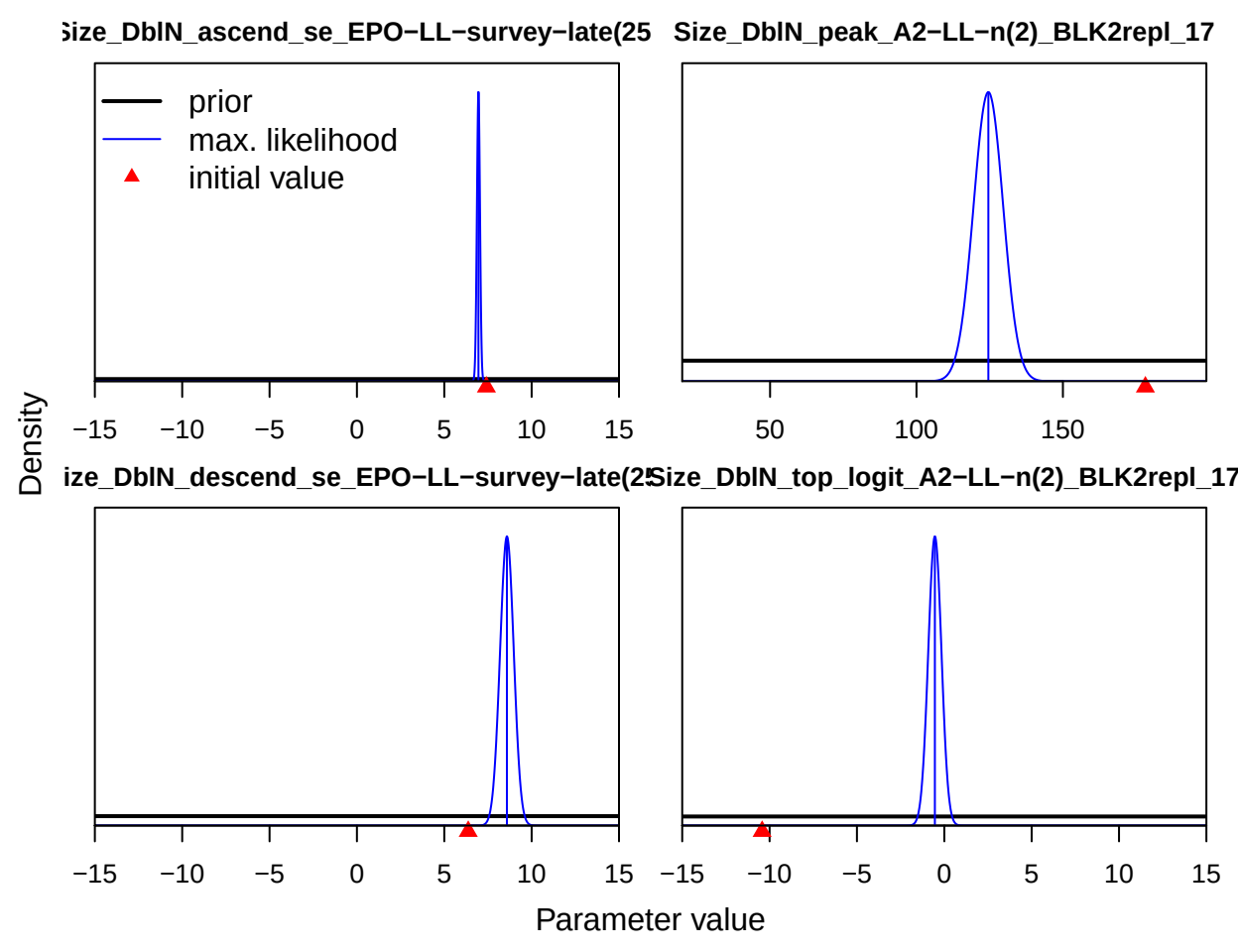

SizeSpline_Val_4_A5−OBJ(16)
Size_DblN_top_logit_A6−OBJ(17)
Size_DblN_peak_A6−OBJ(17)
Size_DblN_ascend_se_A6−OBJ(17)
prior
max. likelihood
initial value
Density
Parameter value
−5
0
5
−15
−10
−5
0
5
10
15
50
100
150

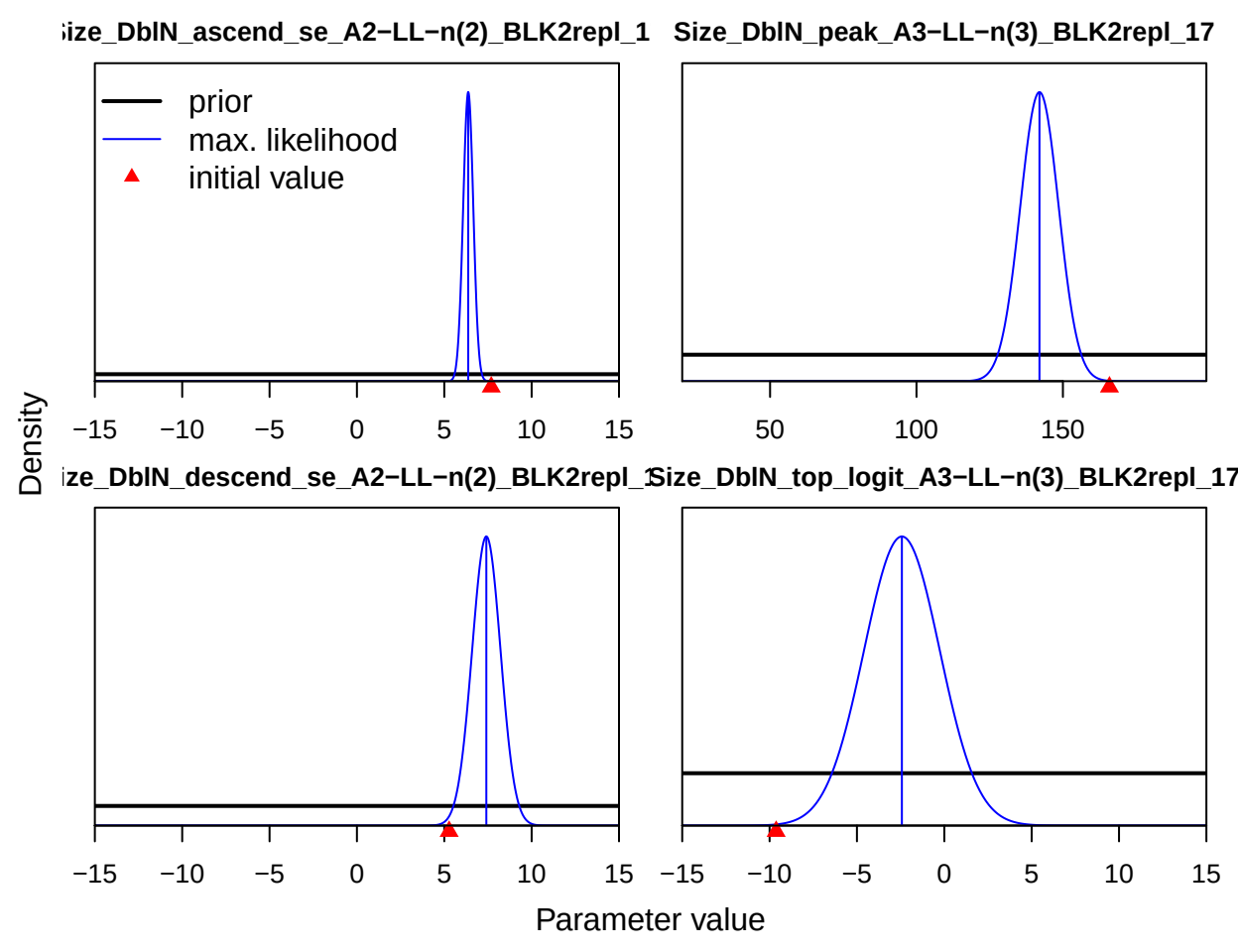

Size_DblN_descend_se_A6−OBJ(17)
SizeSpline_GradHi_A2−NOADEL(19)
SizeSpline_GradLo_A2−NOADEL(19)
SizeSpline_Val_1_A2−NOADEL(19)
prior
max. likelihood
initial value
Density
Parameter value
−15
−10
−5
0
5
10
15
−1.0
−0.8
−0.6
−0.4
−0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
−5
0
5

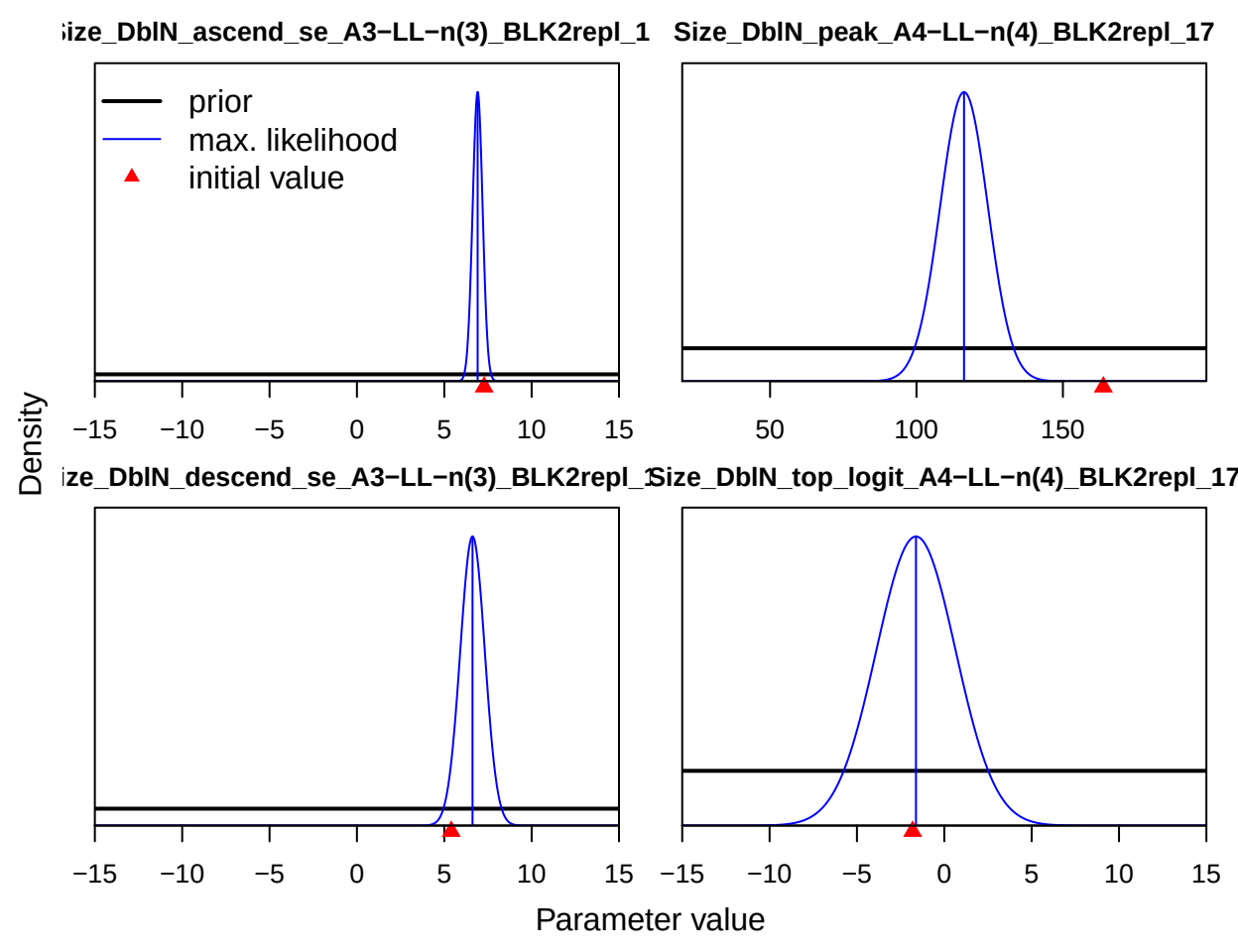

SizeSpline_Val_2_A2−NOADEL(19)
Size_DblN_peak_A3−NOADEL(20)
SizeSpline_Val_4_A2−NOADEL(19)
Size_DblN_top_logit_A3−NOADEL(20)
prior
max. likelihood
initial value
Density
Parameter value
−5
0
5
50
100
150
−15
−10
10
15

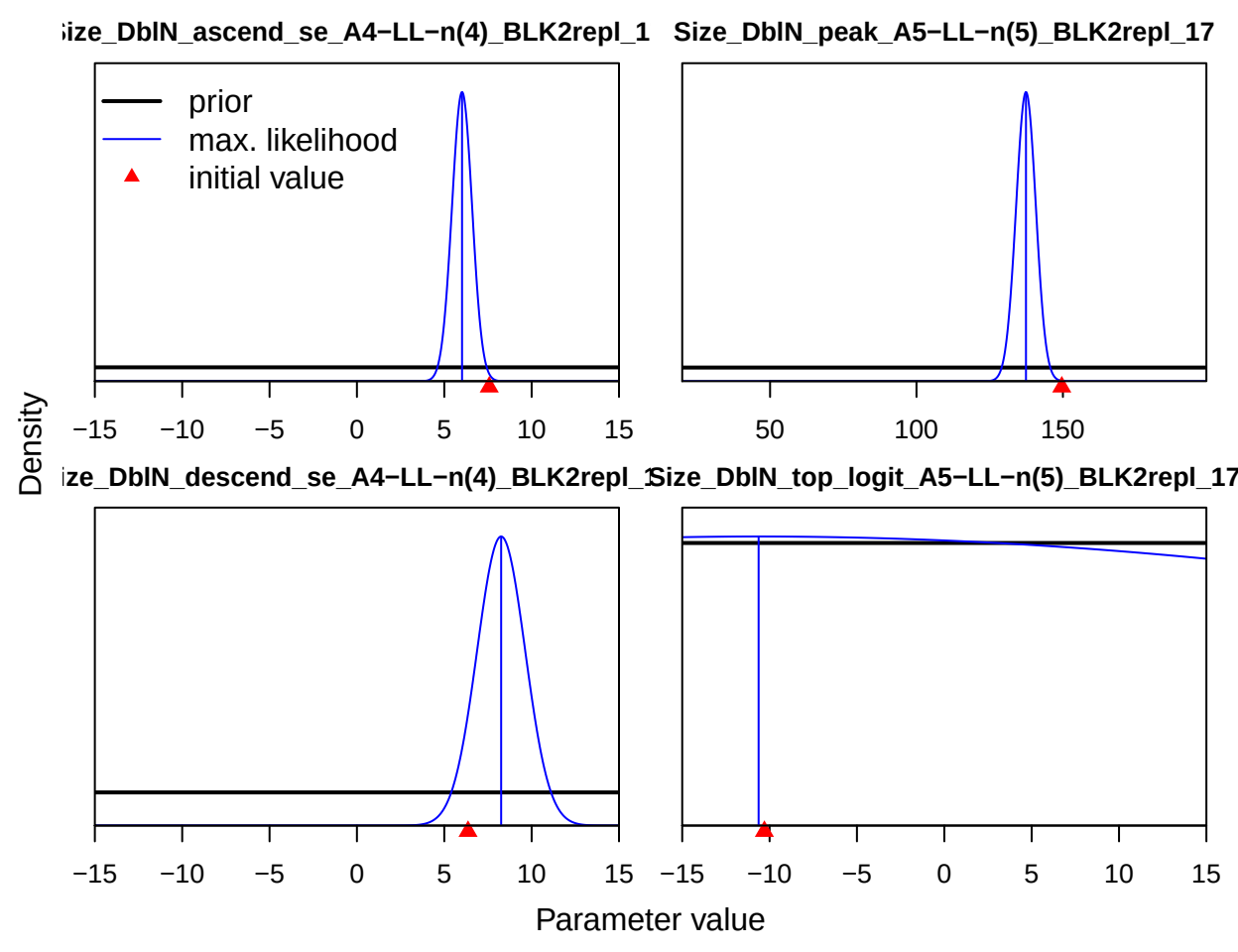

Size_DblN_ascend_se_A3−NOADEL(20)
Size_DblN_peak_EPO−LL−survey−early(24)
Size_DblN_descend_se_A3−NOADEL(20)
Size_DblN_top_logit_EPO−LL−survey−early(24)
prior
max. likelihood
initial value
Density
Parameter value
−15
−10
−5
0
5
10
15
50
100
150

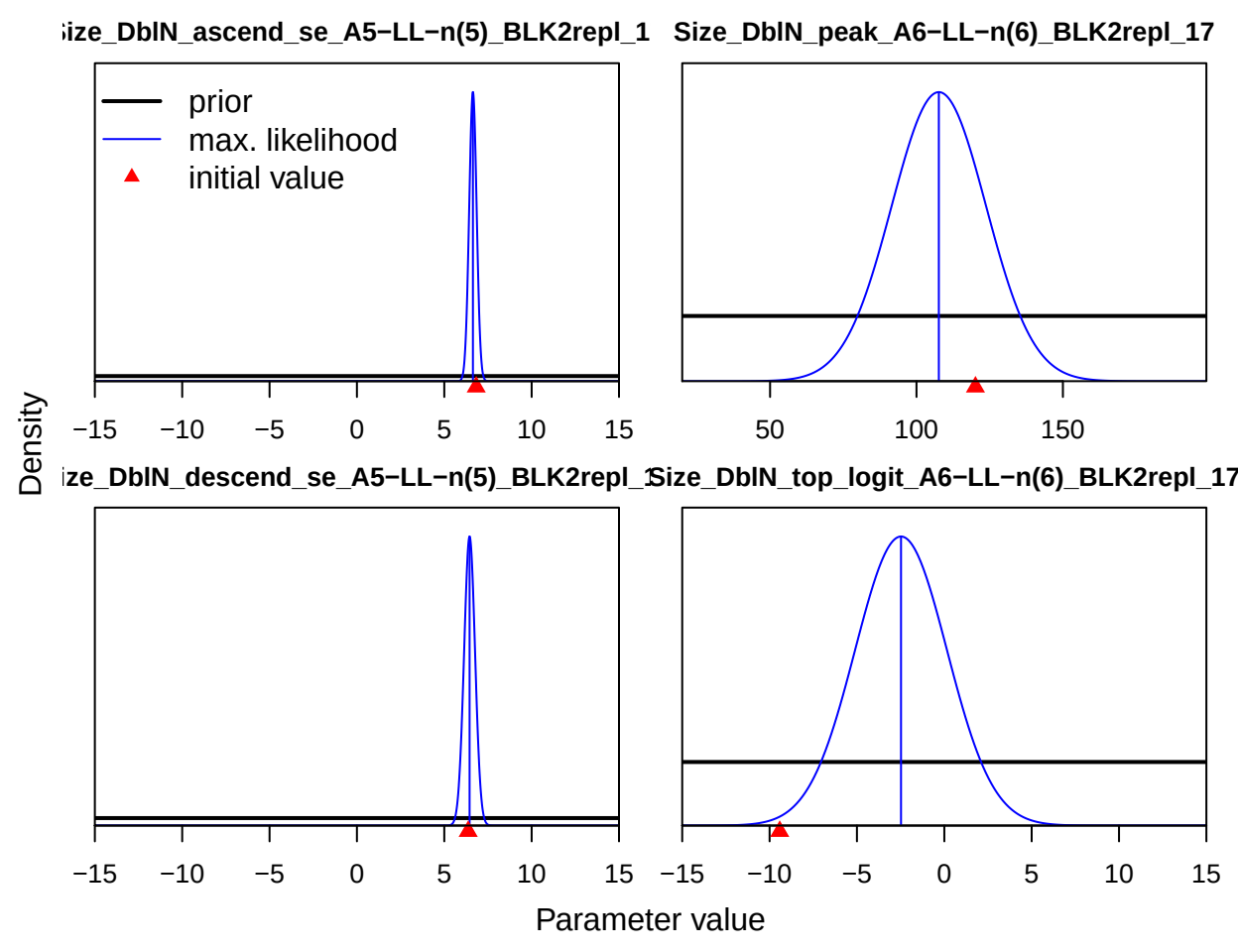

ize_DblN_ascend_se_EPO−LL−survey−early(2
Size_DblN_peak_EPO−LL−survey−late(25)
prior
max. likelihood
initial value
Density
ze_DblN_descend_se_EPO−LL−survey−early(2
Size_DblN_top_logit_EPO−LL−survey−late(25)
−15
−10
−5
0
5
10
15
50
100
150
Parameter value

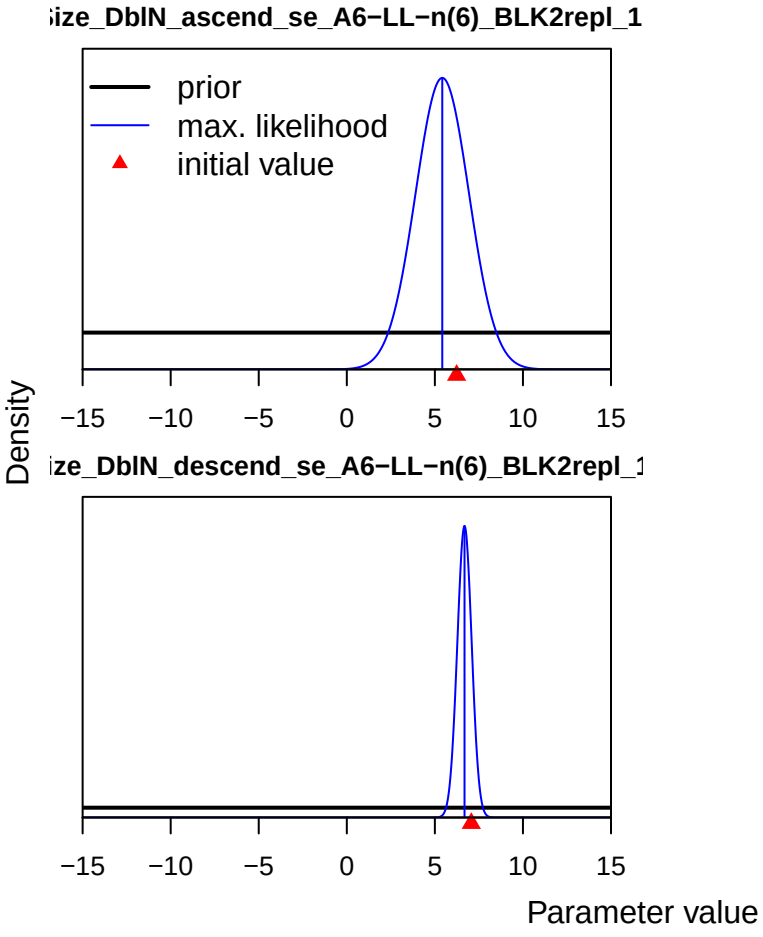

Size_DblN_ascend_se_EPO−LL−survey−late(25
Size_DblN_peak_A2−LL−n(2)_BLK2repl_17
prior
max. likelihood
initial value
Density
−15
−10
−5
0
5
10
15
50
100
150
ize_DblN_descend_se_EPO−LL−survey−late(25
Size_DblN_top_logit_A2−LL−n(2)_BLK2repl_17
Parameter value


ize_DblN_ascend_se_A2−LL−n(2)_BLK2repl_1
Size_DblN_peak_A3−LL−n(3)_BLK2repl_17
prior
max. likelihood
initial value
Density
−15
−10
−5
0
5
10
15
50
100
150
ize_DblN_descend_se_A2−LL−n(2)_BLK2repl_1
Size_DblN_top_logit_A3−LL−n(3)_BLK2repl_17
Parameter value


ize_DblN_ascend_se_A3−LL−n(3)_BLK2repl_1
Size_DblN_peak_A4−LL−n(4)_BLK2repl_17
prior
max. likelihood
initial value
Density
−15
−10
−5
0
5
10
15
50
100
150
ize_DblN_descend_se_A3−LL−n(3)_BLK2repl_1
Size_DblN_top_logit_A4−LL−n(4)_BLK2repl_17
Parameter value


ize_DblN_ascend_se_A4−LL−n(4)_BLK2repl_1
Size_DblN_peak_A5−LL−n(5)_BLK2repl_17
prior
max. likelihood
initial value
Density
ize_DblN_descend_se_A4−LL−n(4)_BLK2repl_1
Size_DblN_top_logit_A5−LL−n(5)_BLK2repl_17
−15
−10
−5
0
5
10
15
50
100
150
Parameter value


ize_DblN_ascend_se_A5−LL−n(5)_BLK2repl_1
Size_DblN_peak_A6−LL−n(6)_BLK2repl_17
prior
max. likelihood
initial value
Density
−15
−10
−5
0
5
10
15
50
100
150
ize_DblN_descend_se_A5−LL−n(5)_BLK2repl_1
Size_DblN_top_logit_A6−LL−n(6)_BLK2repl_17
Parameter value


ize_DblN_ascend_se_A6−LL−n(6)_BLK2repl_1
prior
max. likelihood
initial value
Density
−15
−10
−5
0
5
10
15
ize_DblN_descend_se_A6−LL−n(6)_BLK2repl_1
−15
−10
−5
0
5
10
15
Parameter value