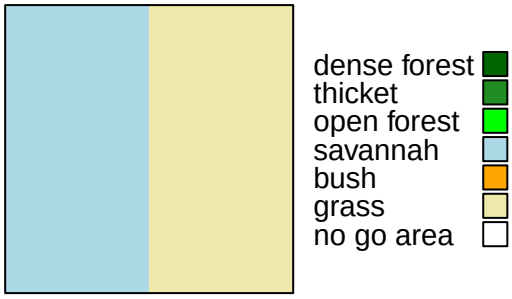
rtsetse example1 savannah grass boundary

Andy South

2015-12-17

rtsetse is an R package that simulates tsetse fly populations on a spatial grid of different vegetation types to enable investigation of tsetse control.

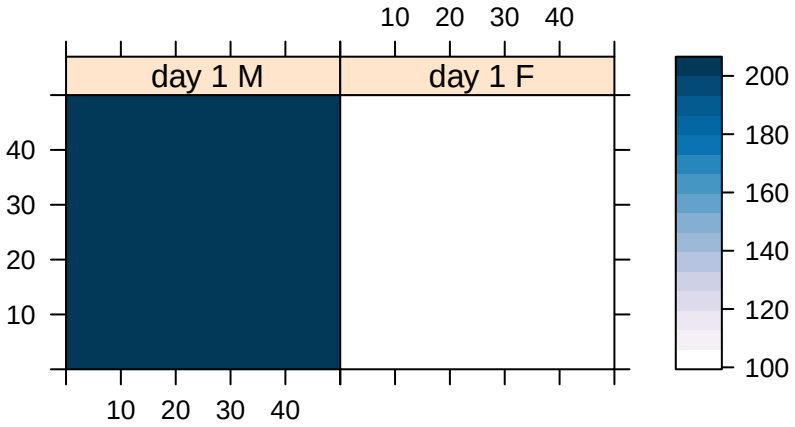
This document shows results of a simulation on a simple 50 x 50 grid, half savannah and half grassland. This was et up to compare results with an equivalent run in Hat-trick.

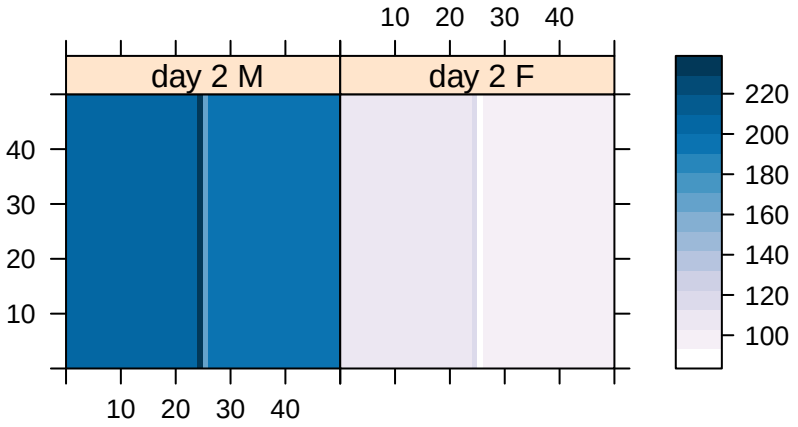


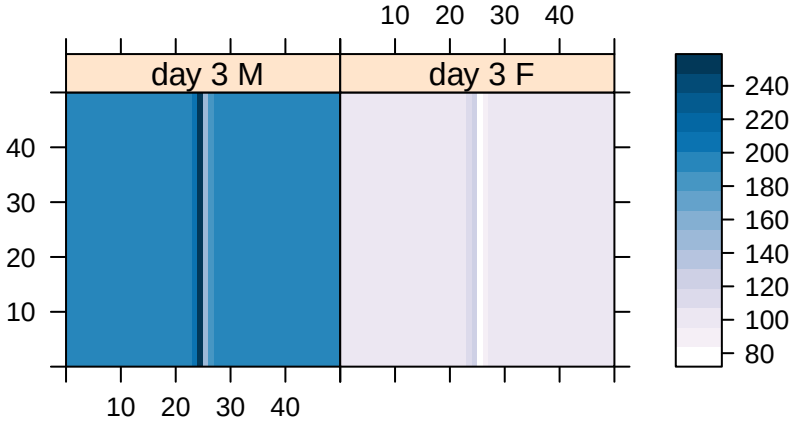
The following maps show the distribution of males and females over the progress of the simulation.

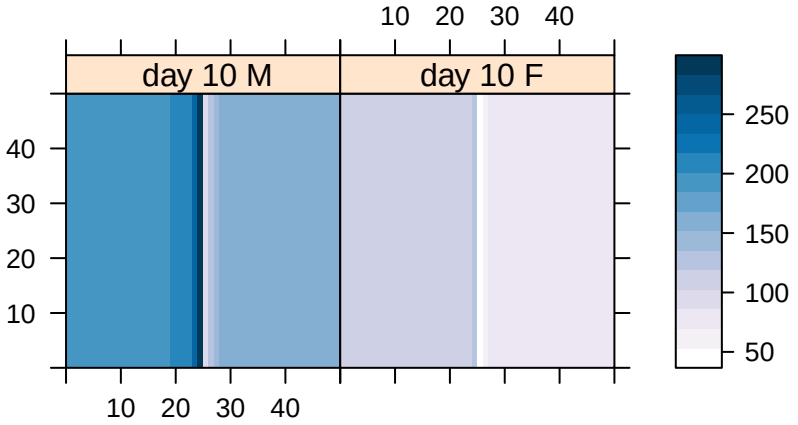
The simulation starts with female densities about half of those of males, constant across the grid.

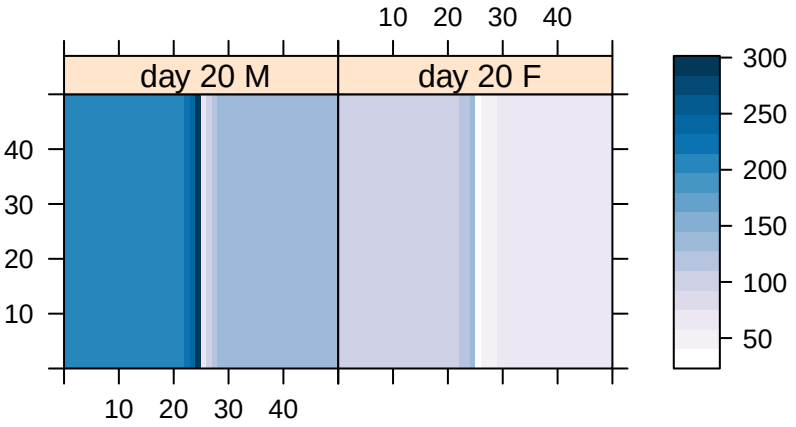
Differential mortality causes the densities to decline in the poorer habitat on the east half. Over time densities change in the boundary between the two habitats due to the interaction between mortalities and dispersal.

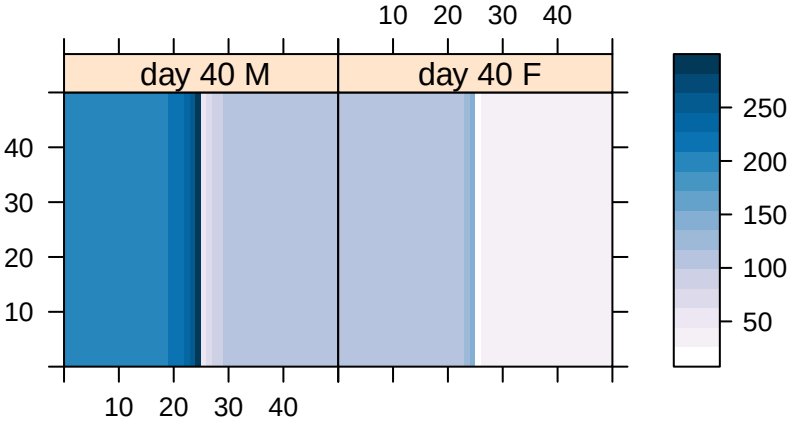


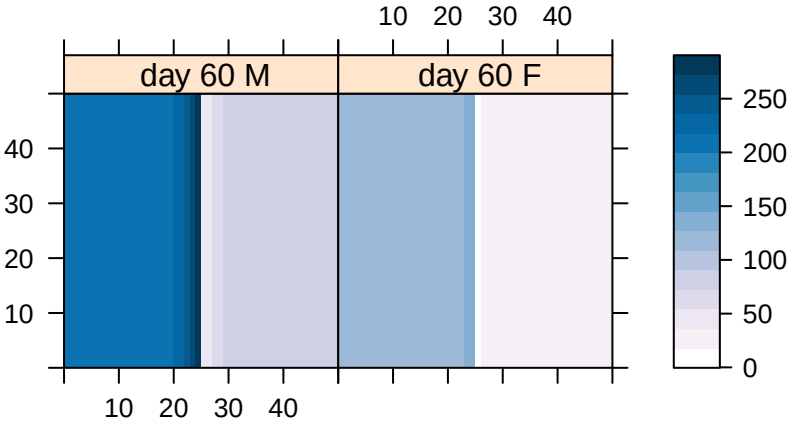

day 2 M
day 2 F
10 20 30 40
10 20 30 40
220
200
180
160
140
120
100

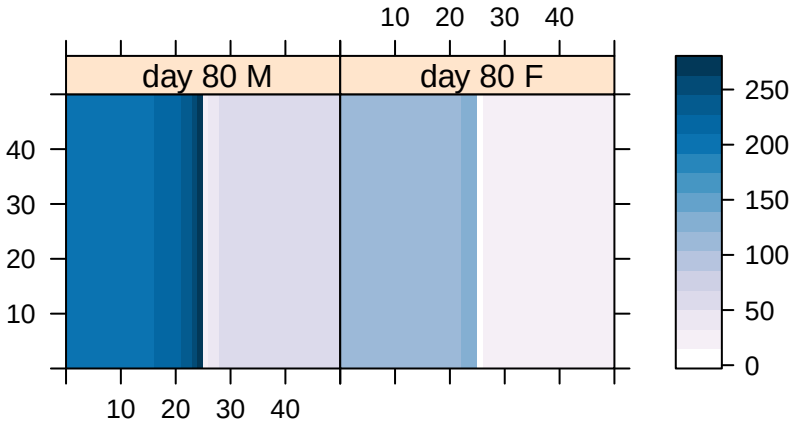

day 3 M
day 3 F
10 20 30 40
10 20 30 40
240
220
200
180
160
140
120
100
80

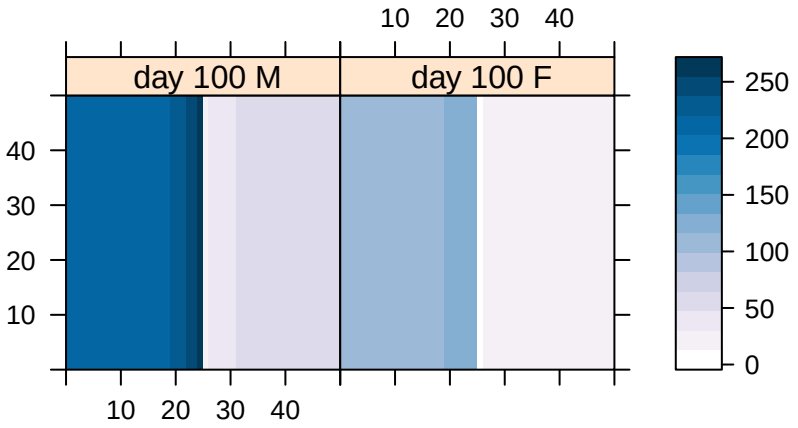

day 10 M
day 10 F
10 20 30 40
10 20 30 40
250
200
150
100
50

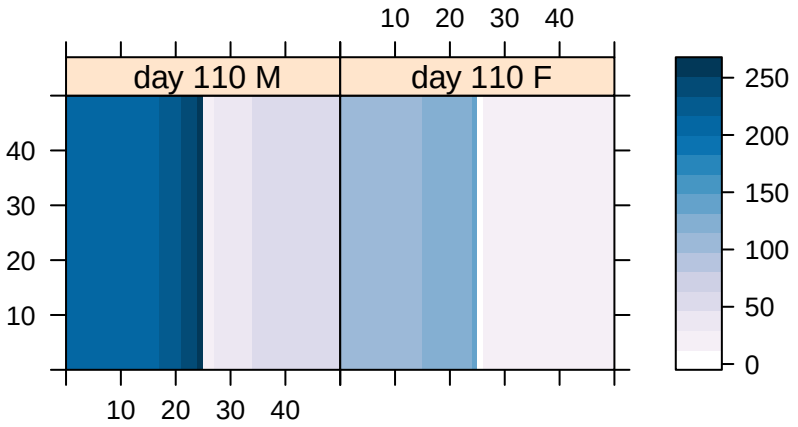

day 20 M
day 20 F
10 20 30 40
40
30
20
10
300
250
200
150
100
50

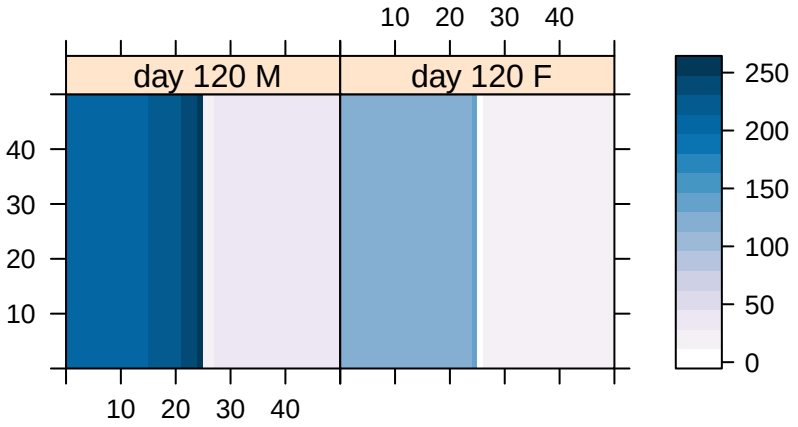

day 40 M
day 40 F
10 20 30 40
40
30
20
10
250
200
150
100
50

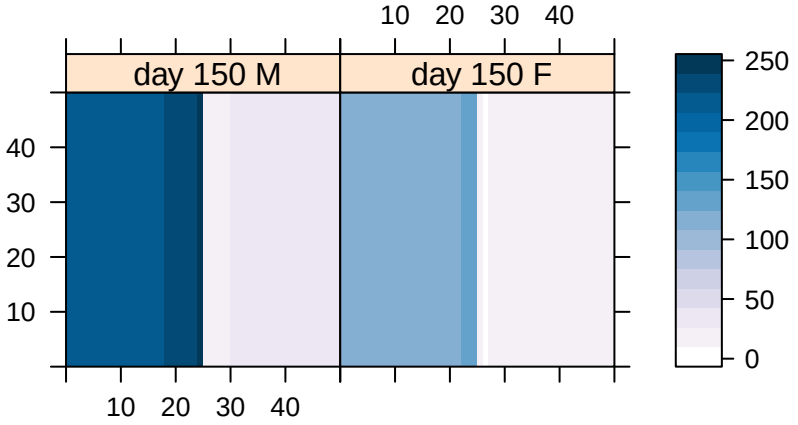

day 60 M
day 60 F
10 20 30 40
40
30
20
10
250
200
150
100
50
0


day 80 M
day 80 F
10
20
30
40
250
200
150
100
50
0

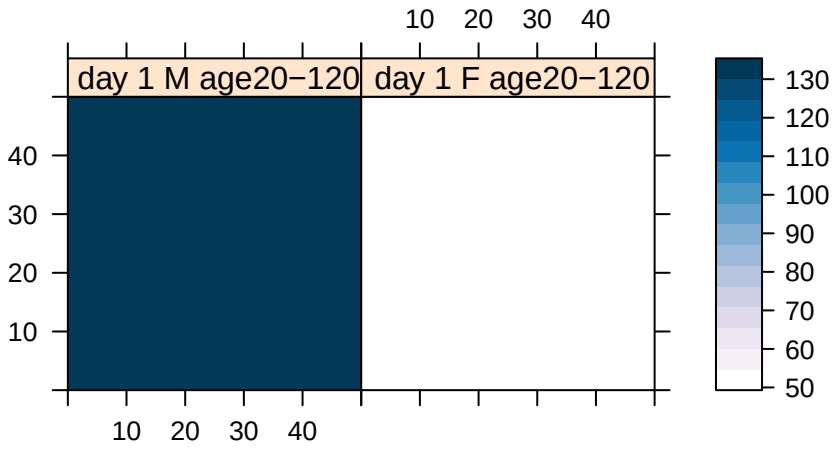

day 100 M
day 100 F
10
20
30
40
250
200
150
100
50
0

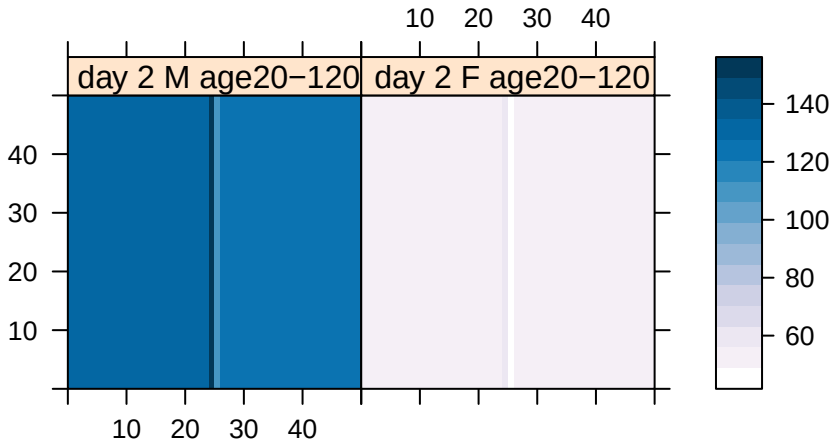

day 110 M
day 110 F
10
20
30
40
250
200
150
100
50
0

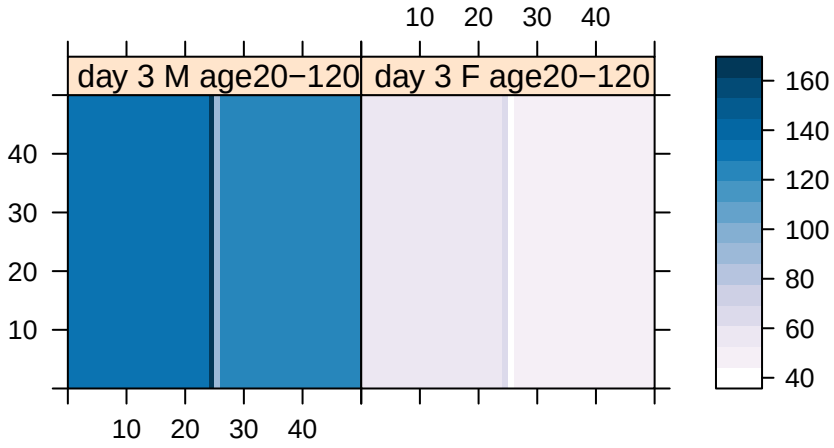


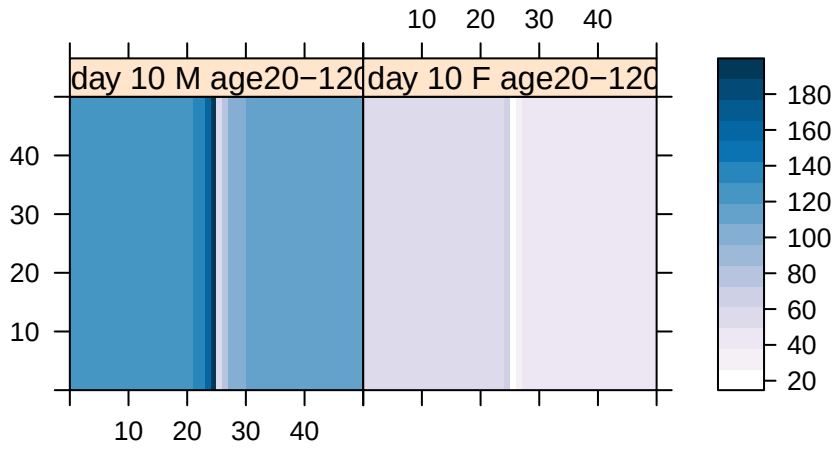


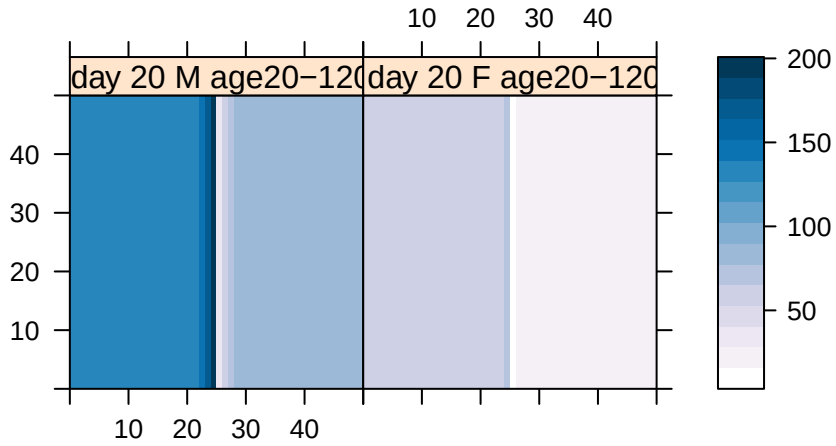
The plots below are for the same time periods as above, but just show the older flies. There is more pattern.

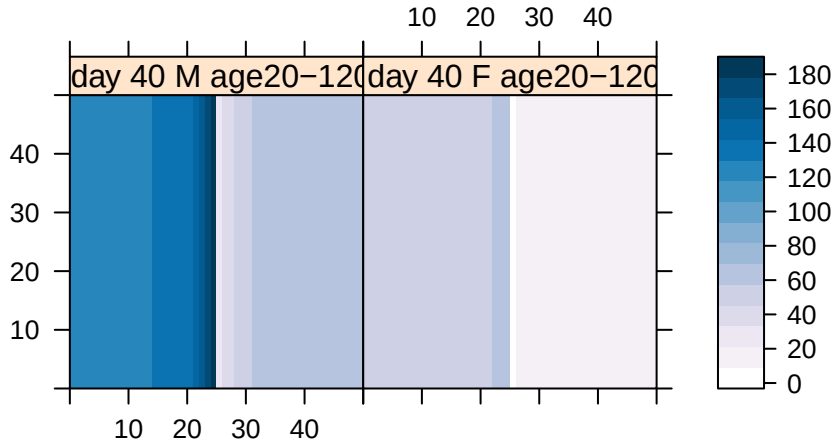

day 1 M age20−120
day 1 F age20−120
10 20 30 40
10 20 30 40
130 120 110 100 90 80 70 60 50

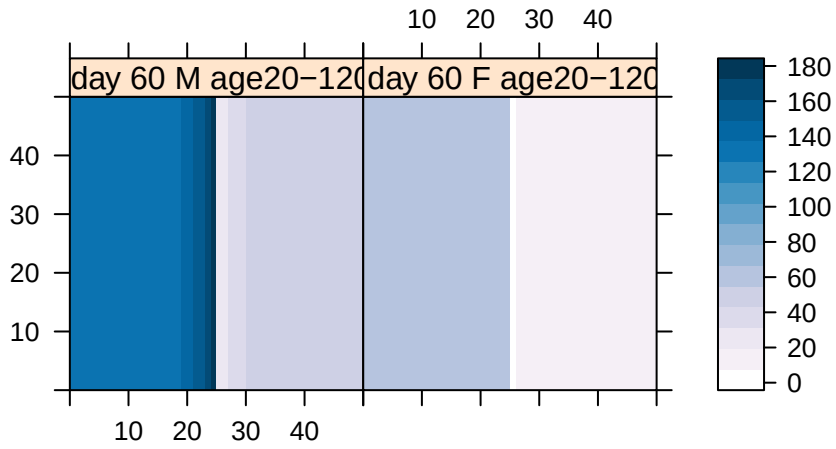

day 2 M age20−120
day 2 F age20−120
10 20 30 40
10 20 30 40
140 120 100 80 60

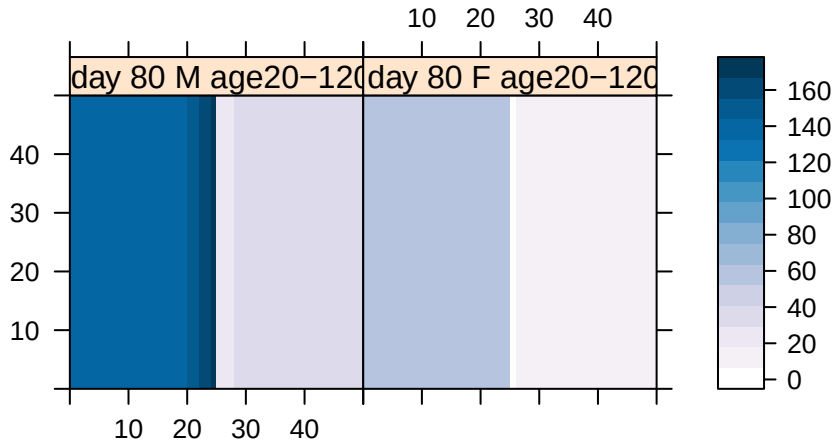

day 3 M age20−120
day 3 F age20−120
10 20 30 40
10 20 30 40
160 140 120 100 80 60 40

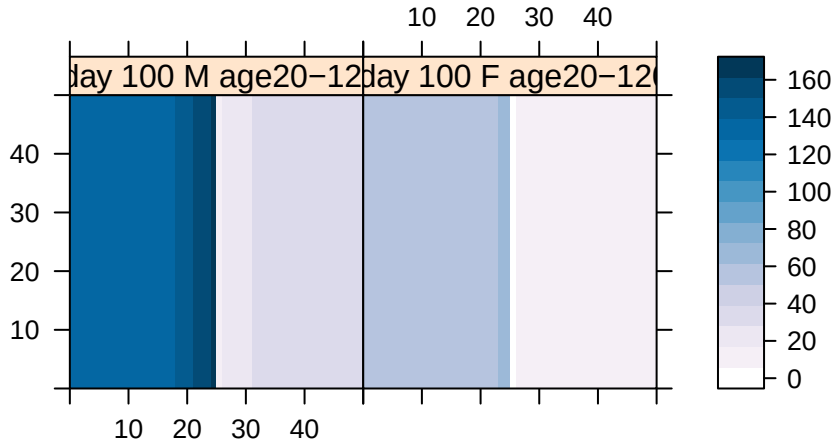

day 10 M age20−120
day 10 F age20−120
10 20 30 40
40 30 20 10
10 20 30 40
180 160 140 120 100 80 60 40 20

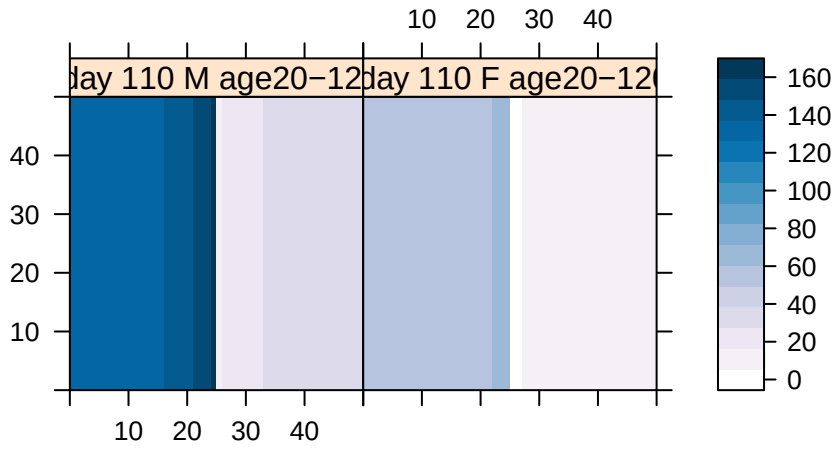

day 20 M age20−120
day 20 F age20−120
10 20 30 40
40 30 20 10
10 20 30 40
200 150 100 50

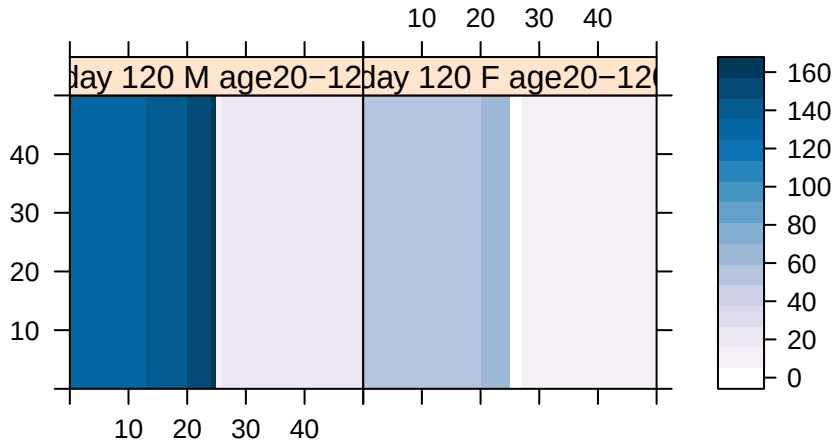

day 40 M age20−120
day 40 F age20−120
10 20 30 40
40 30 20 10
10 20 30 40
180 160 140 120 100 80 60 40 20 0

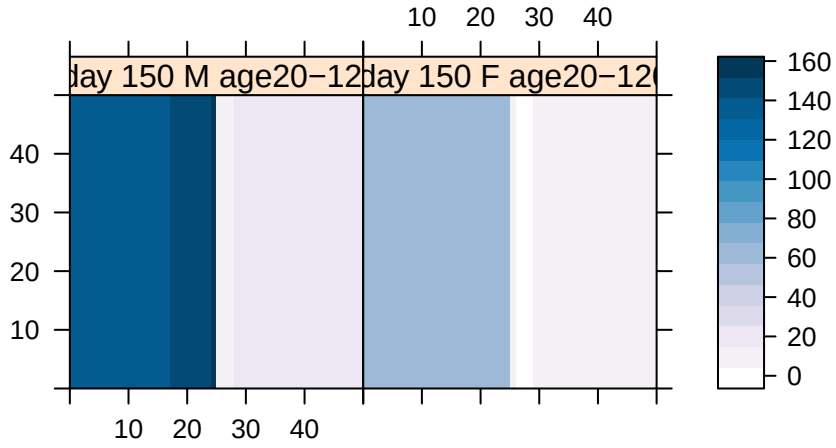

day 60 M age20−120
day 60 F age20−120
10 20 30 40
40
30
20
10
180
160
140
120
100
80
60
40
20
0


day 80 M age20−120
day 80 F age20−120
10 20 30 40
40
30
20
10
160
140
120
100
80
60
40
20
0

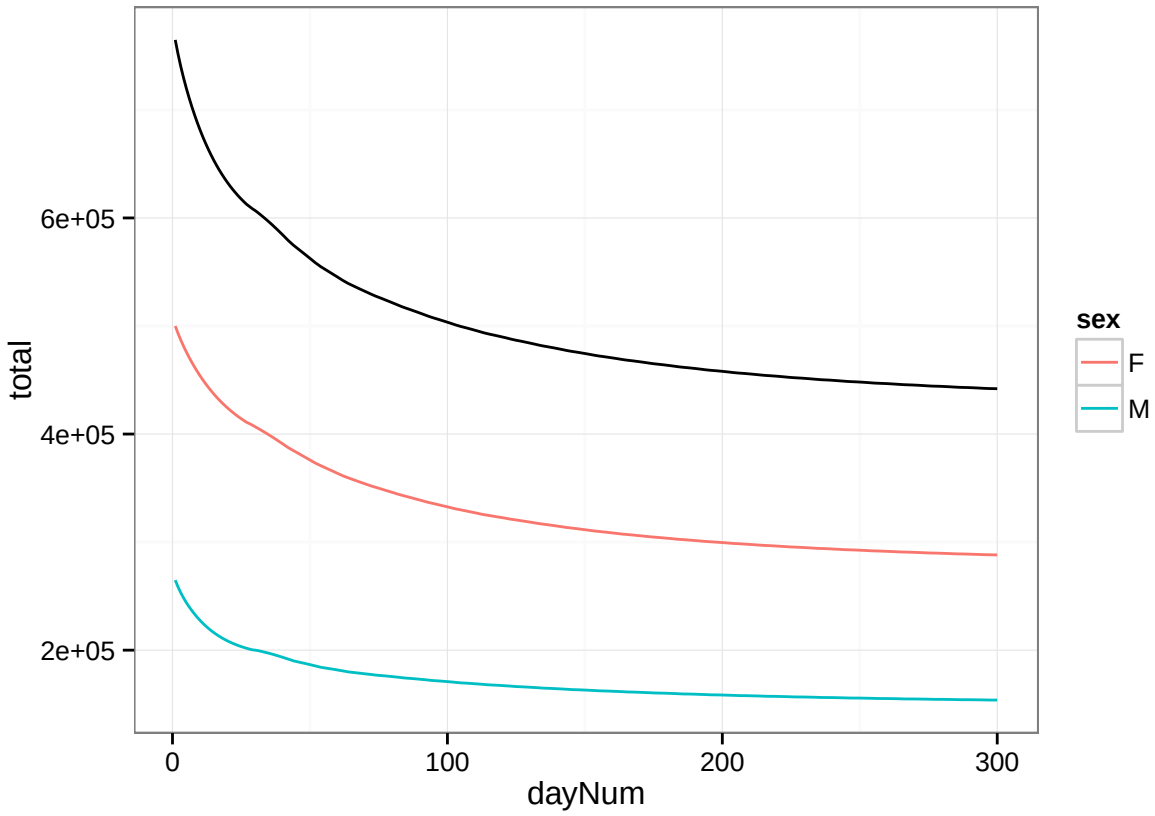

day 100 M age20−120
day 100 F age20−120
10 20 30 40
40
30
20
10
160
140
120
100
80
60
40
20
0


day 110 M age20−12
day 110 F age20−12
10 20 30 40
160 140 120 100 80 60 40 20 0


day 120 M age20−12
day 120 F age20−12
10 20 30 40
160 140 120 100 80 60 40 20 0


day 150 M age20−12
day 150 F age20−12
10 20 30 40
160 140 120 100 80 60 40 20 0

Adult population over time summed for the whole grid.



Adults over 20 days summed for the whole grid.