rtsetse example1 savannah grass boundary

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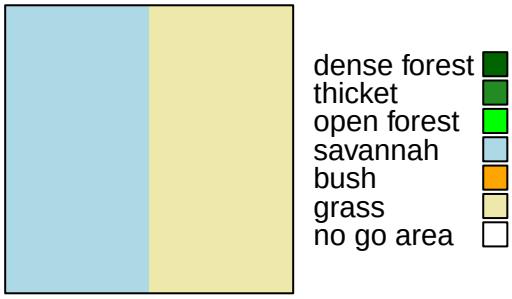
2015-12-18

This document shows results of a rtsetse simulation on a simple 50 x 50 grid, half savannah and half grassland with parameters set for G. morsitans. This was set up to compare results with an equivalent run in Hat-trick done by Steve.

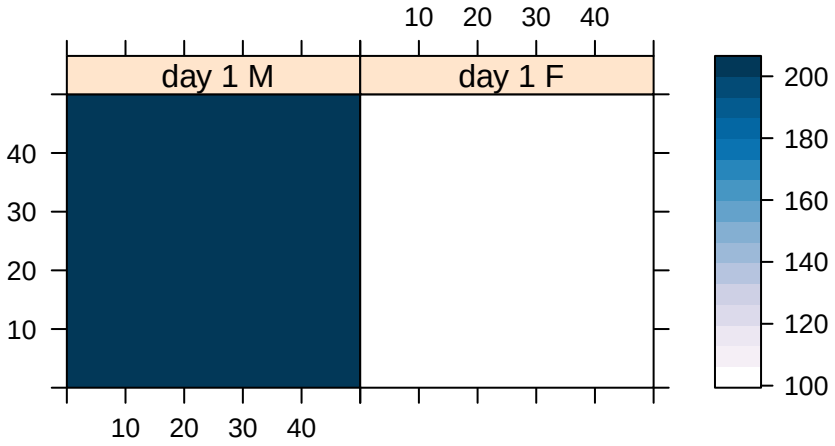


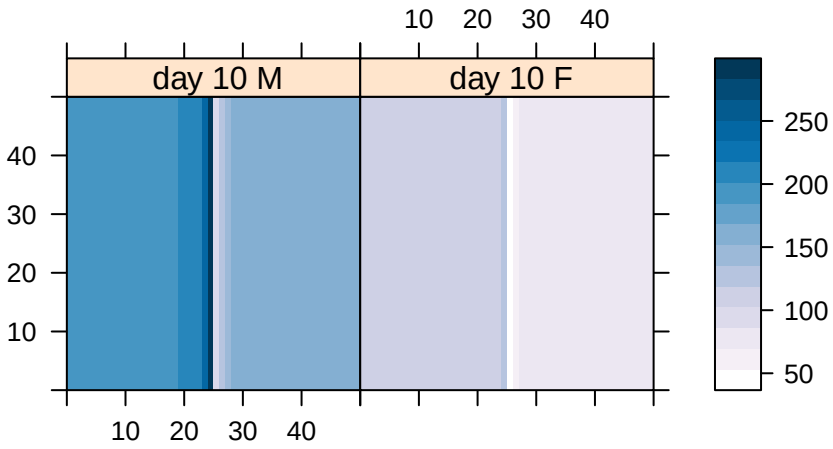
The following maps show the distribution of males and females over the progress of the simulation as it approaches equilibrium. Later ones show the same for flies older than 20.

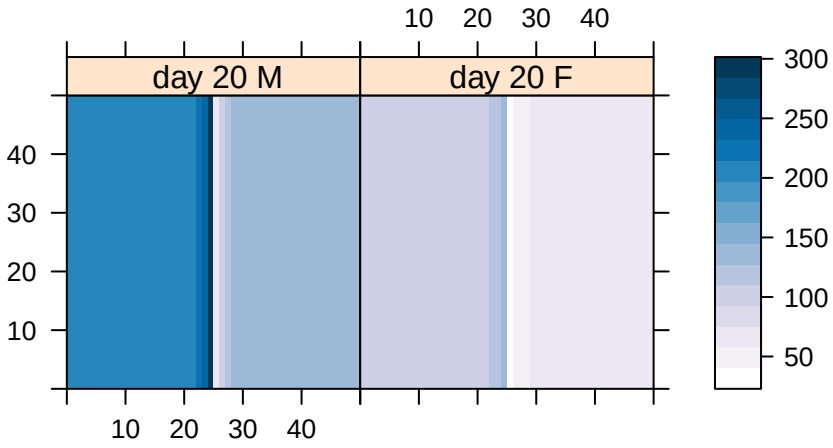
Over time differential mortality causes the densities to decline in the poorer habitat on the east half. Densities change in the boundary between the two habitats due to the interaction between mortalities and dispersal.

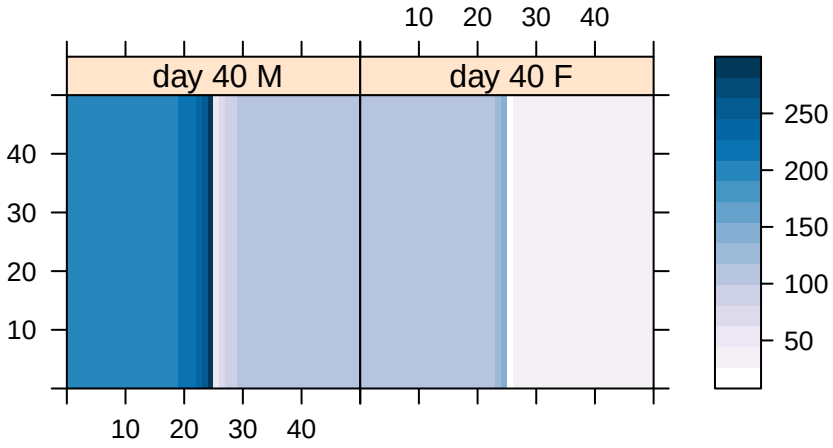
By the 150 days shown here the population hasn't quite reached equilibrium but the pattern changes little after this.

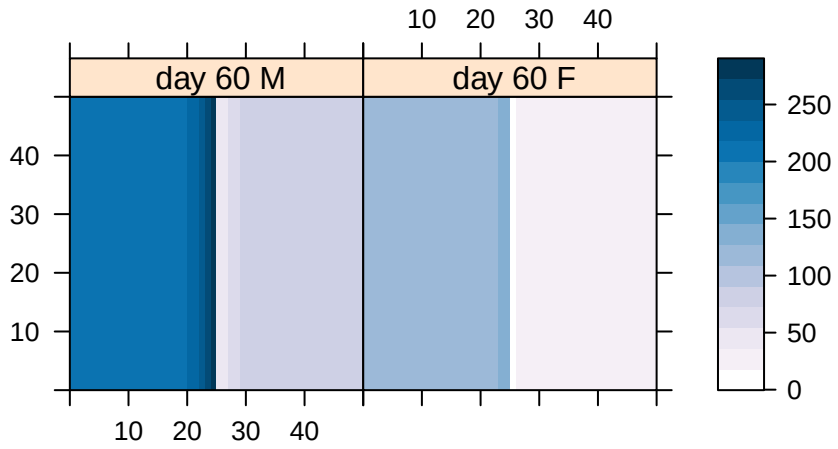
Is this pattern sufficeiently similar to what happens in Hat-trick ?

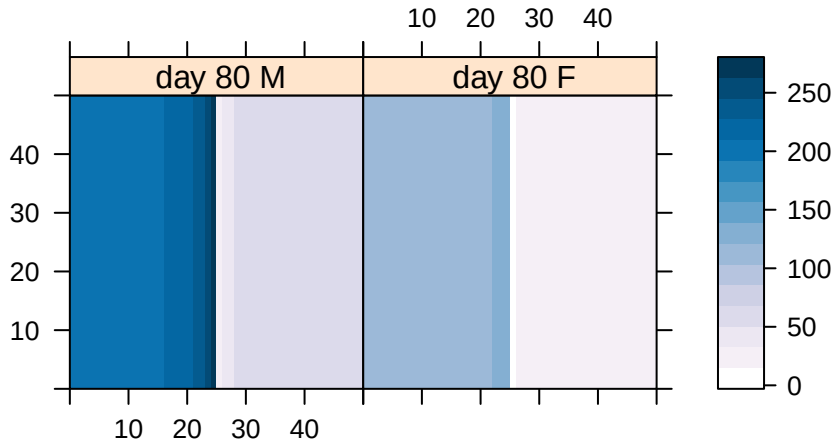


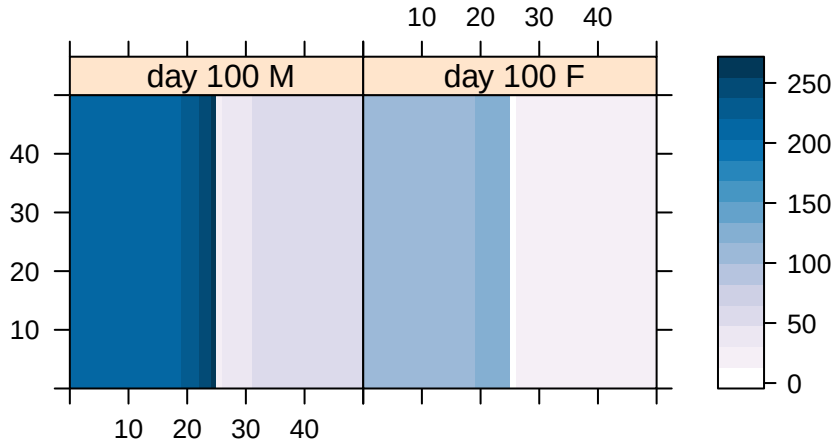

day 10 M
day 10 F
10
20
30
40
250
200
150
100
50

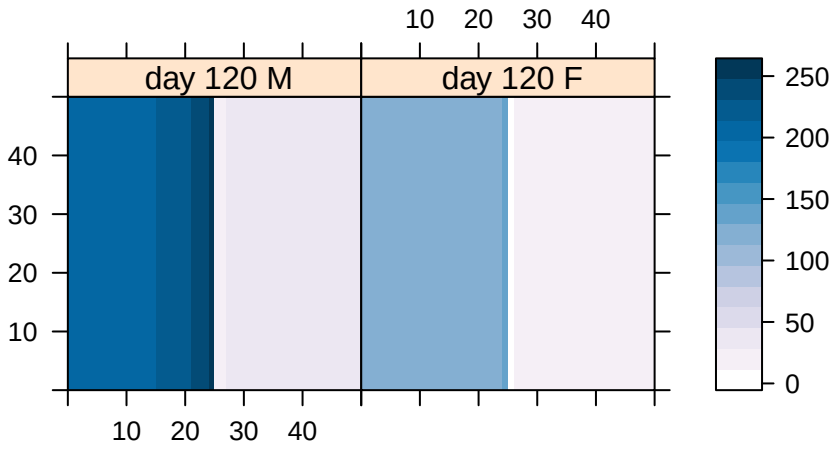

day 20 M
day 20 F
10
20
30
40
300
250
200
150
100
50

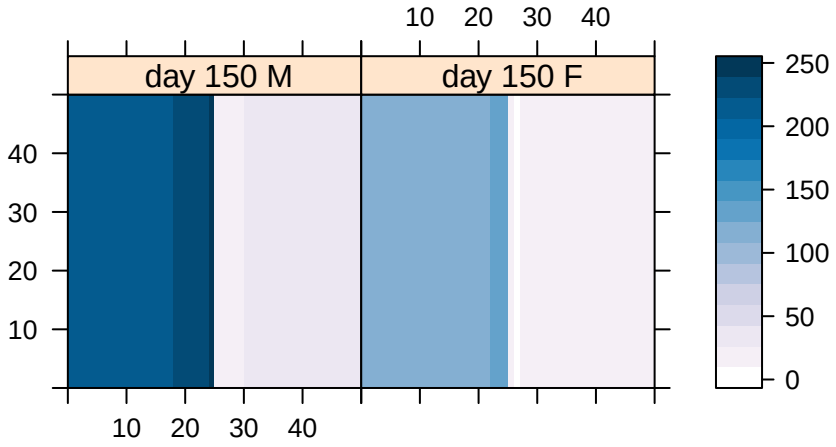

day 40 M
day 40 F
10
20
30
40
250
200
150
100
50


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

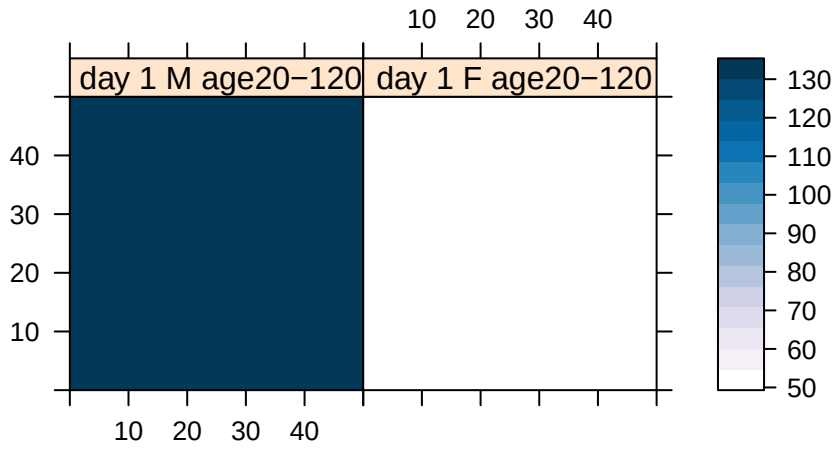

day 80 M
day 80 F
10
20
30
40
250
200
150
100
50
0

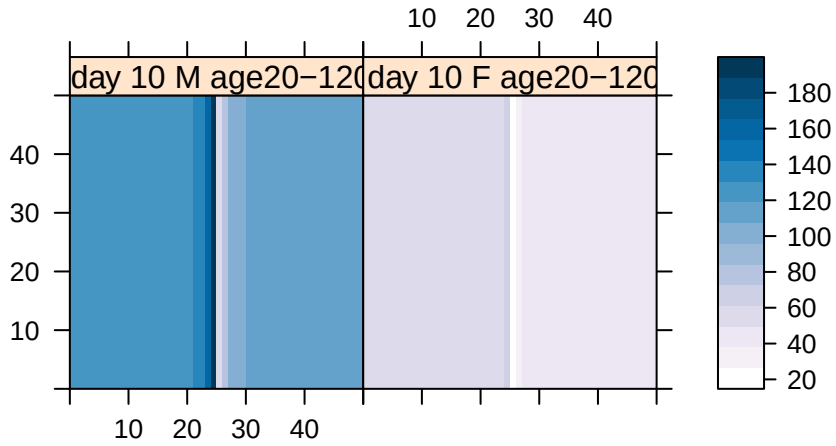

day 100 M
day 100 F
10
20
30
40
250
200
150
100
50
0

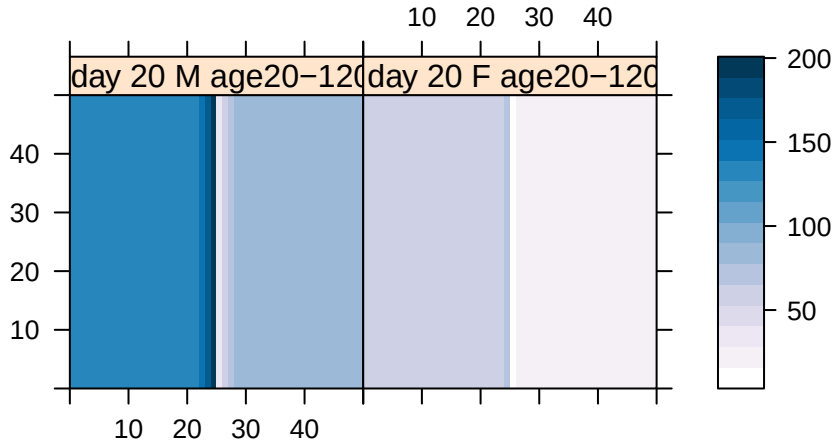


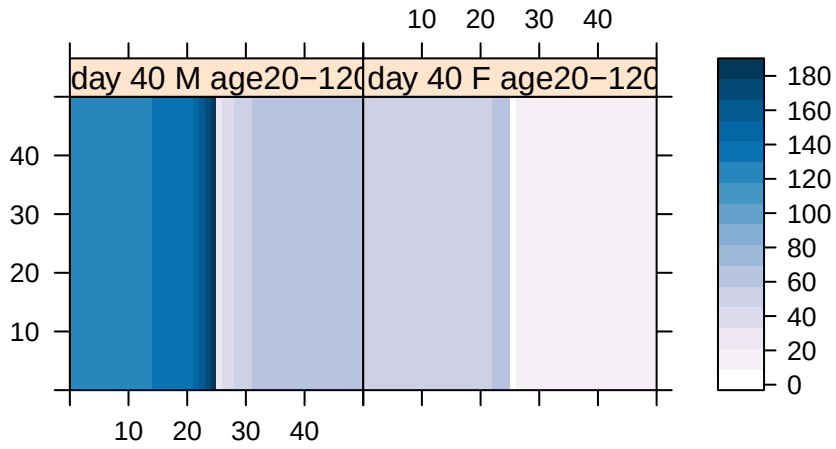


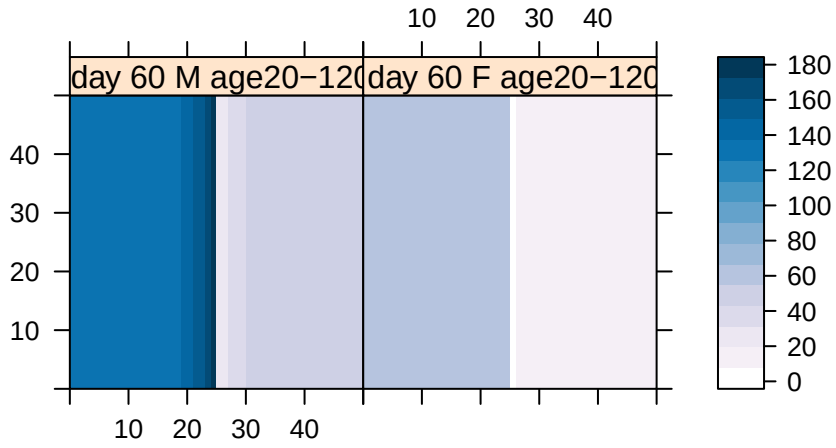
The plots below are for the same time periods as above, but just show the older flies.

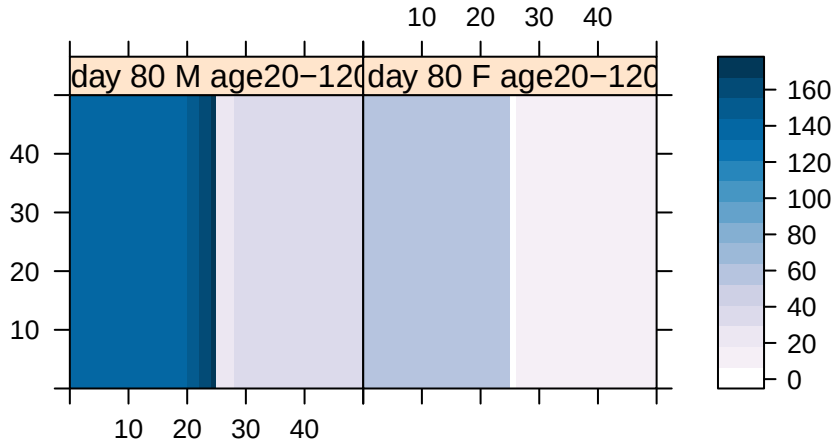

day 1 M age20−120
day 1 F age20−120
10 20 30 40
10 20 30 40
130
120
110
100
90
80
70
60
50

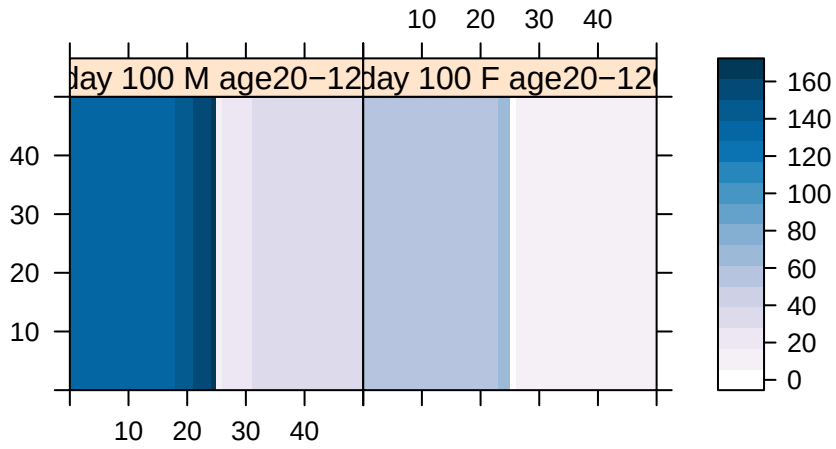

day 10 M age20−120
day 10 F age20−120
10 20 30 40
10 20 30 40
180
160
140
120
100
80
60
40
20

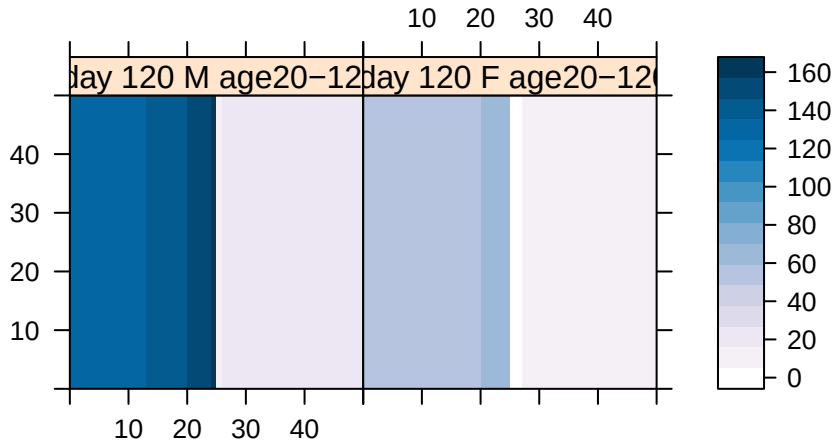

day 20 M age20−120
day 20 F age20−120
10 20 30 40
10 20 30 40
200
150
100
50

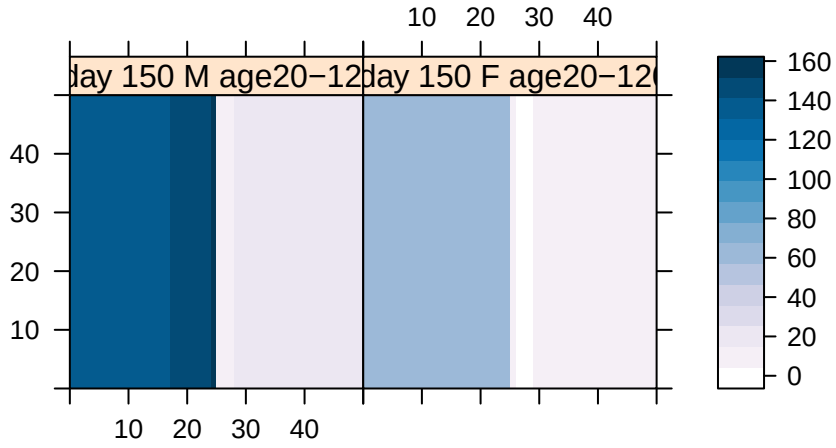

day 40 M age20−120
day 40 F age20−120
10 20 30 40
40 30 20 10
10 20 30 40
180 160 140 120 100 80 60 40 20 0


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

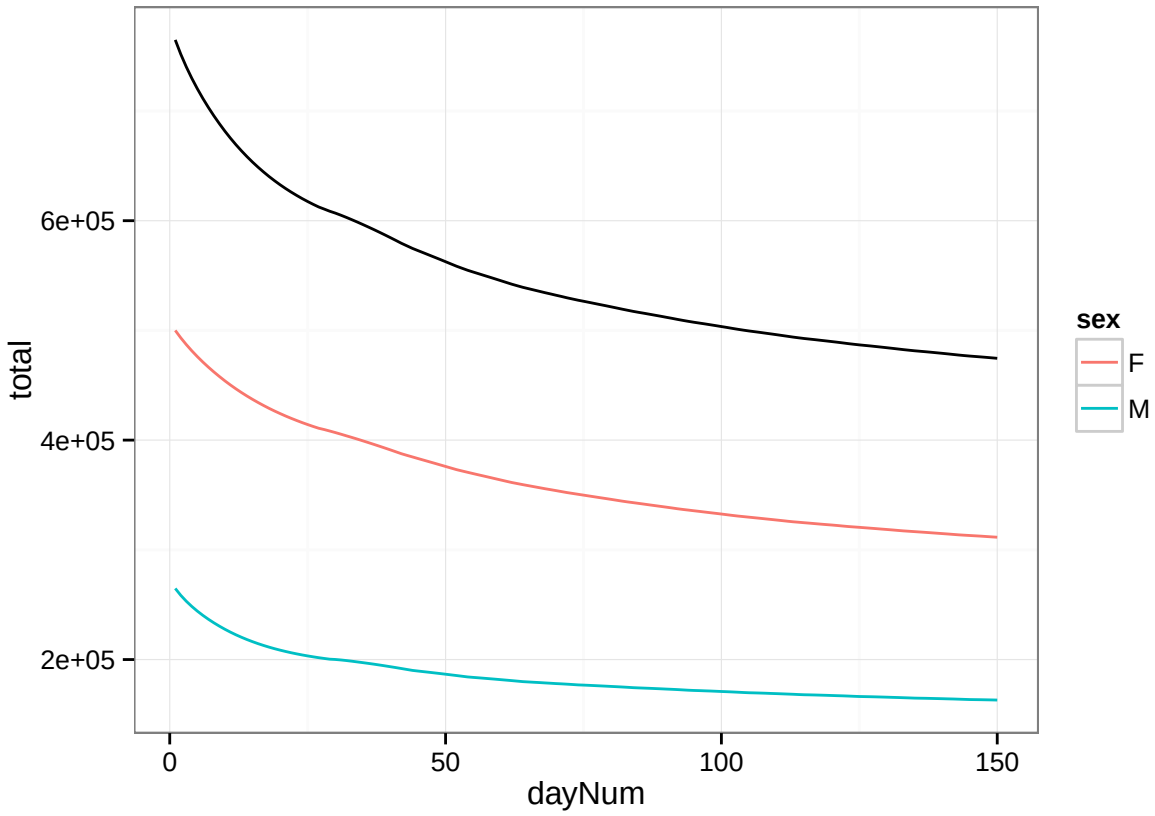

day 80 M age20−120
day 80 F age20−120
10 20 30 40
40 30 20 10
10 20 30 40
160 140 120 100 80 60 40 20 0


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

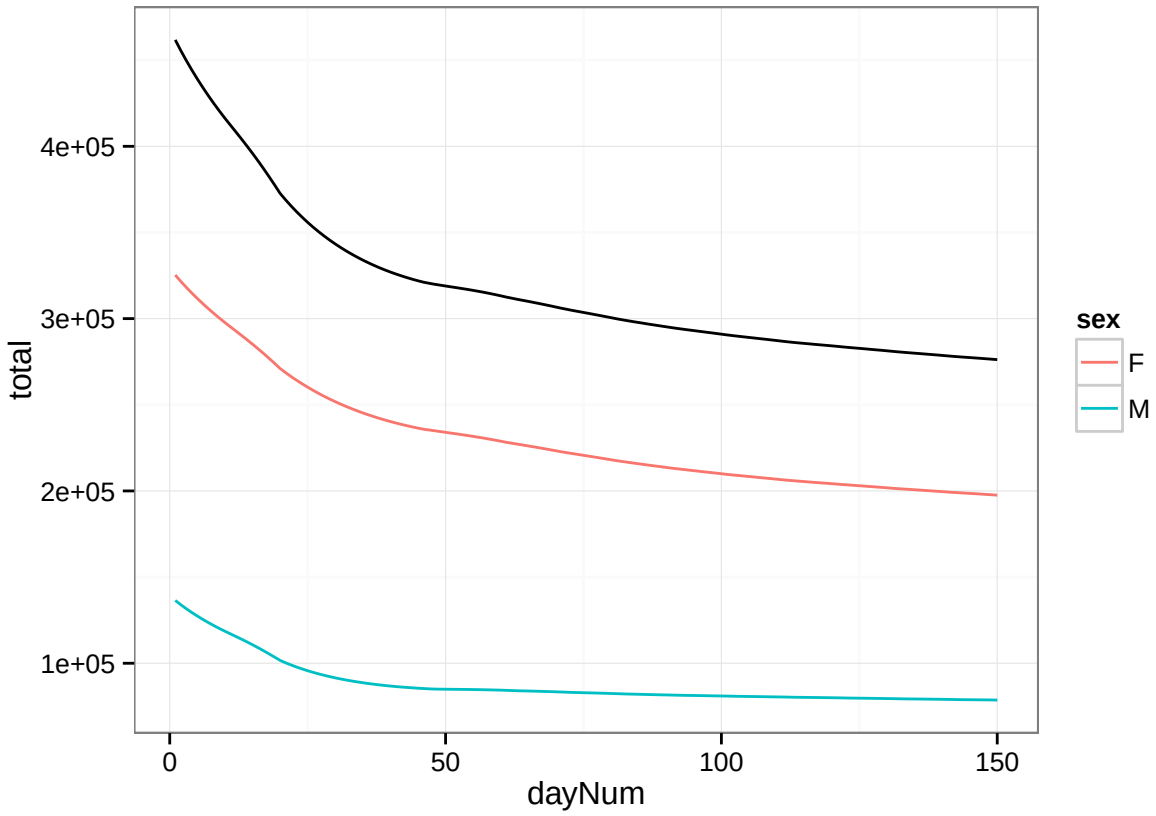

day 120 M age20−12
day 120 F age20−12
10 20 30 40
10 20 30 40
160 140 120 100 80 60 40 20 0


day 150 M age20−12
day 150 F age20−12
10 20 30 40
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.



appendix : code used to run this simulation, showing param values used.

iDays <- 150

aRecord <- rt_runGrid (pMoveF=0.6, pMoveM=0.3, iDays=iDays, pMortF=0.082, pMortM=0.139, pMortPupa=0.2, fStartPopPropCC=1, iCarryCapF=200, propMortAdultDD=0.25, iFirstLarva=16, iInterLarva=10, pMortLarva=0.05, propMortLarvaDD=0.25, propMortPupaDD=0.25, mVegCats =system.file("extdata","vegHalfSavannahHalfGrass50x50.txt", package="rtsetse"), dfMortByVeg=list(code = c("D", "T", "O", "S", "B", "G", "N"), name = c("Dense Forest", "Thicket", "Open Forest", "Savannah", "Bush", "Grass", "No-go area"), mortality = c(200, 150, 110, 100, 110, 210, 999), pupmortality = c(120, 110, 105, 100, 120, 170, 999)))