# Fitting models to time series data Ray2008

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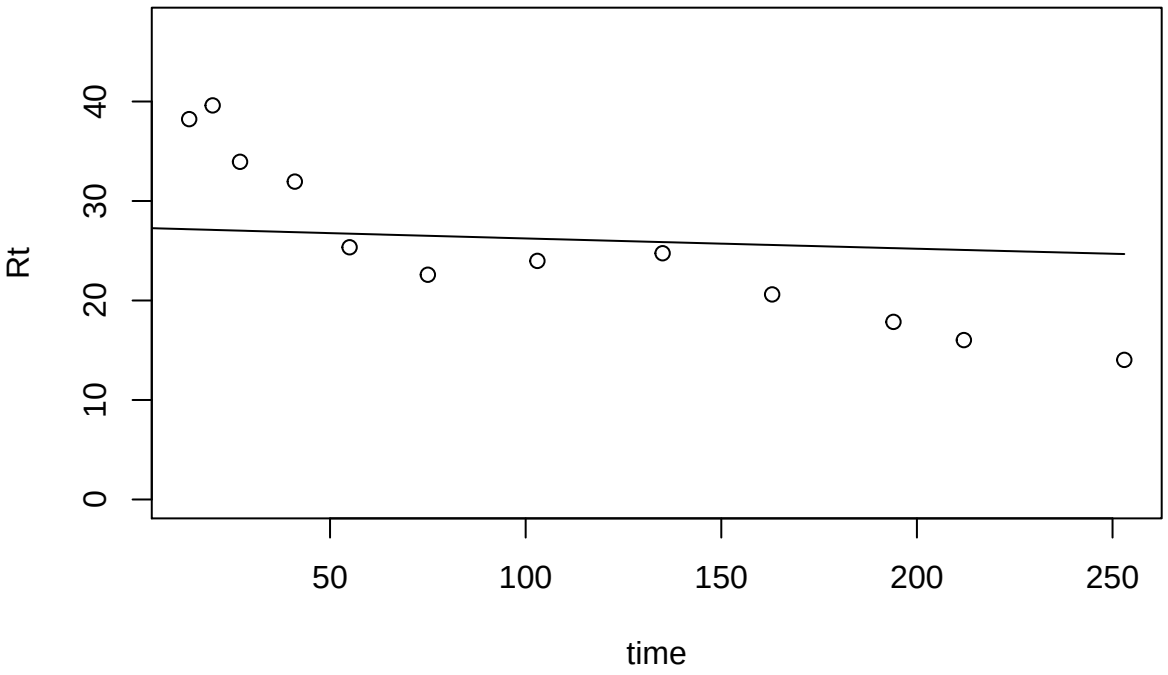
## Dataset Rey2008EJSS

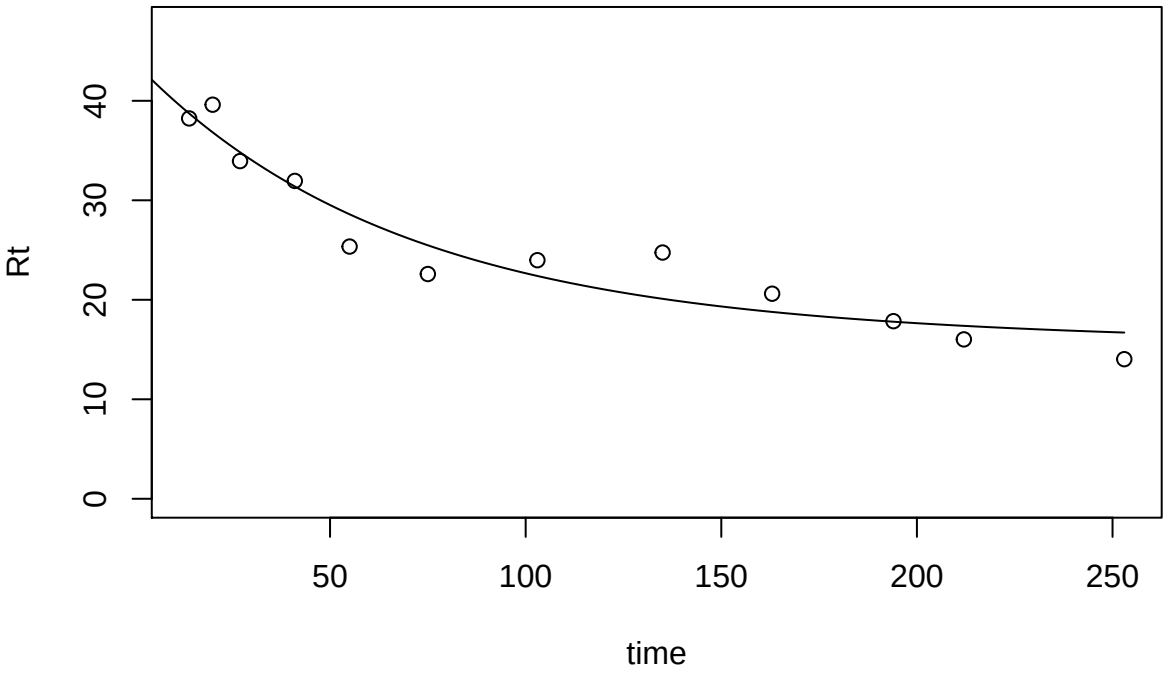
A dataset with 25 variables of 8 different study sites, 3 different depth (midDepth: 2.5, 7.5, 15). 58 observation

Variable units: 'mgC/gSoil/d', initial carbon measured as percent.

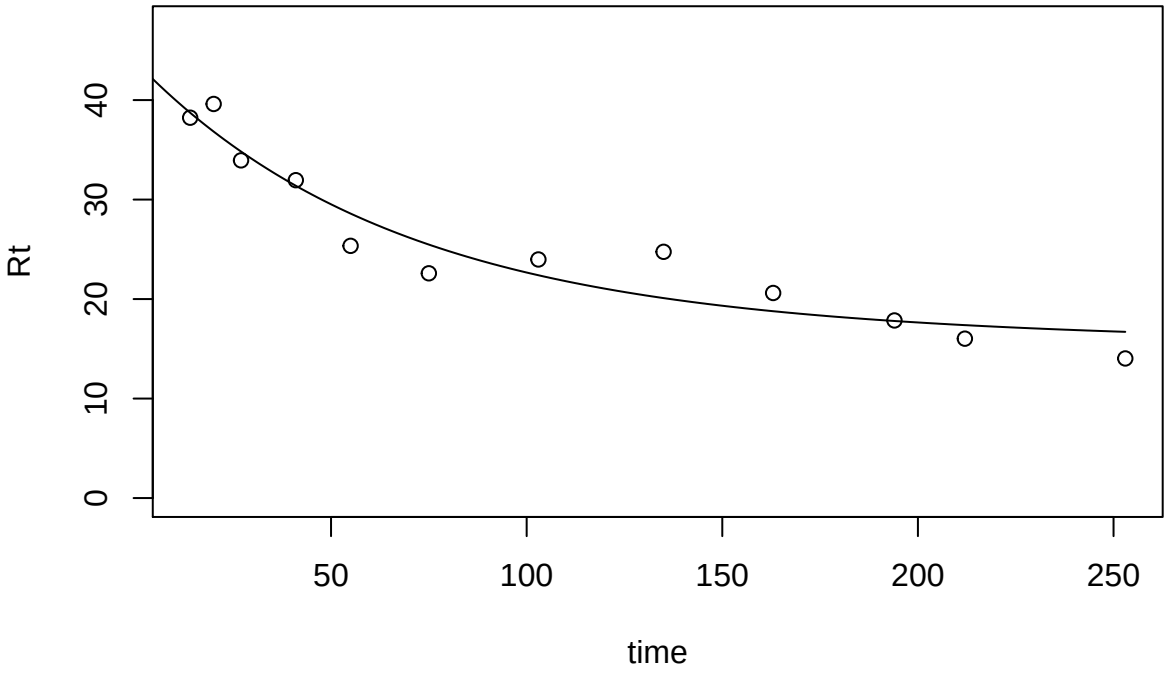
```
## [1] "Best fit parameter:  0.000402890086565832"
```



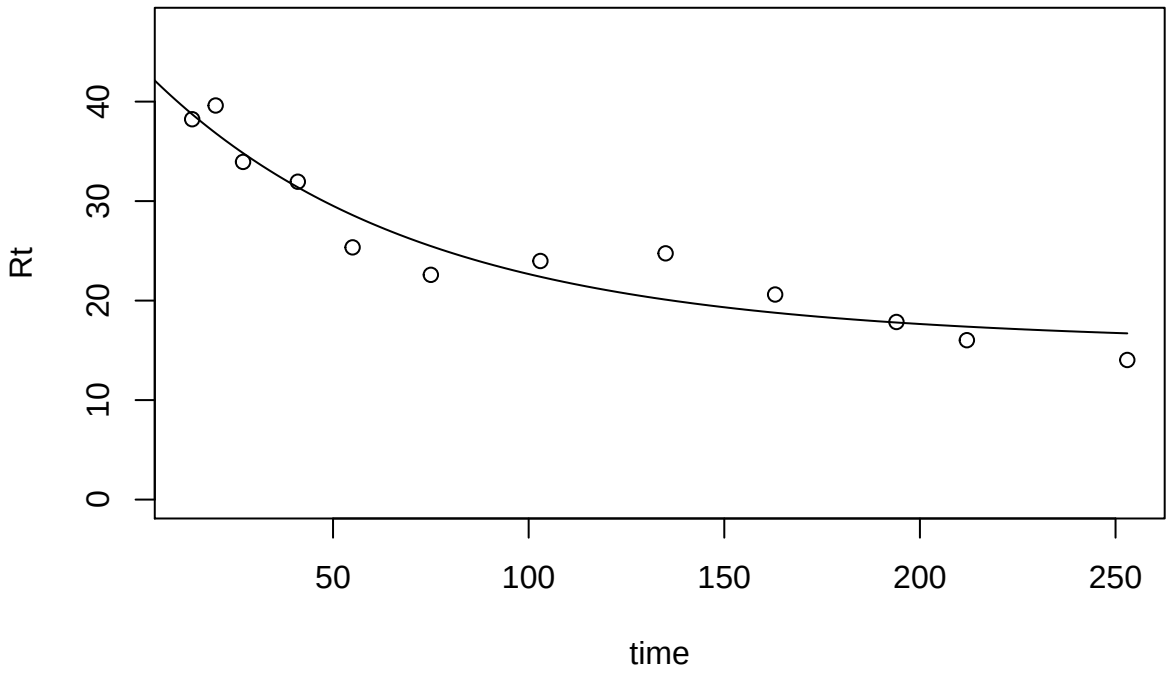

```
## [1] "AIC =  -5.98741384294373"
## [1] "k1= 0.015092262785829"
## [2] "k2= 0.000260777866242065"
## [3] "proportion of C0 in pool 1= 0.0260415320590521"
```



```
## [1] "AIC =  2.63855701808816"
## [1] "k1= 0.0150937930561227"
## [2] "k2= 0.00026078724292038"
## [3] "a21= 0.0150563659523799"
## [4] "a12= 0.000135403038332205"
## [5] "Proportion of C0 in pool 1= 0.0264463727913499"
```

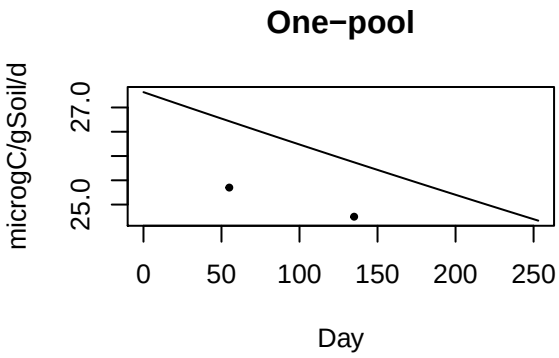


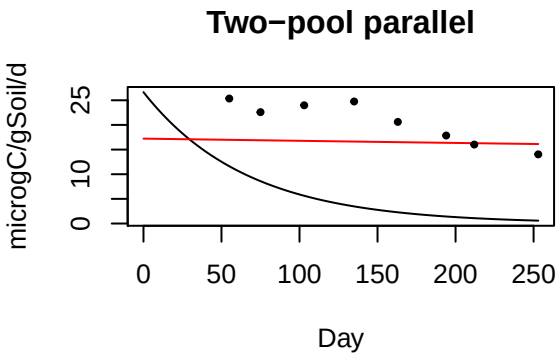

```
## [1] "AIC =  6.63855701671872"
## [1] "k1= 0.0150924810087073"
## [2] "k2= 0.000260779127830934"
## [3] "a21= 0.0125785246673946"
## [4] "Proportion of C0 in pool 1= 0.0263785280404789"
```

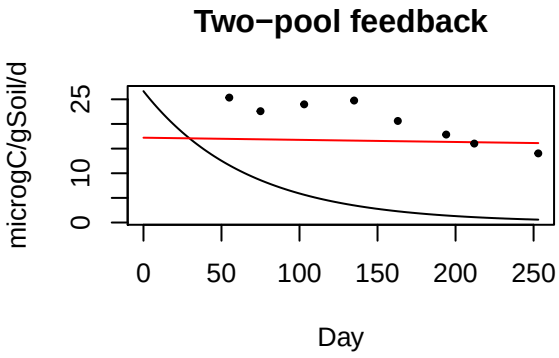


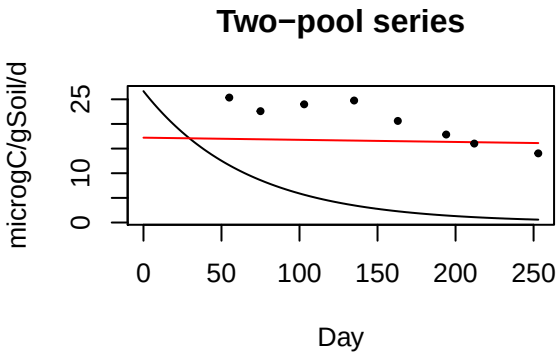

```
## [1] "AIC =  4.63855701359014"
```

```
## Warning: `funs()` was deprecated in dplyr 0.8.0.
## Please use a list of either functions or lambdas:
##
##   # Simple named list:
##   list(mean = mean, median = median)
##
##   # Auto named with `tibble::lst()`:
##   tibble::lst(mean, median)
##
##   # Using lambdas
##   list(~ mean(., trim = .2), ~ median(., na.rm = TRUE))
```



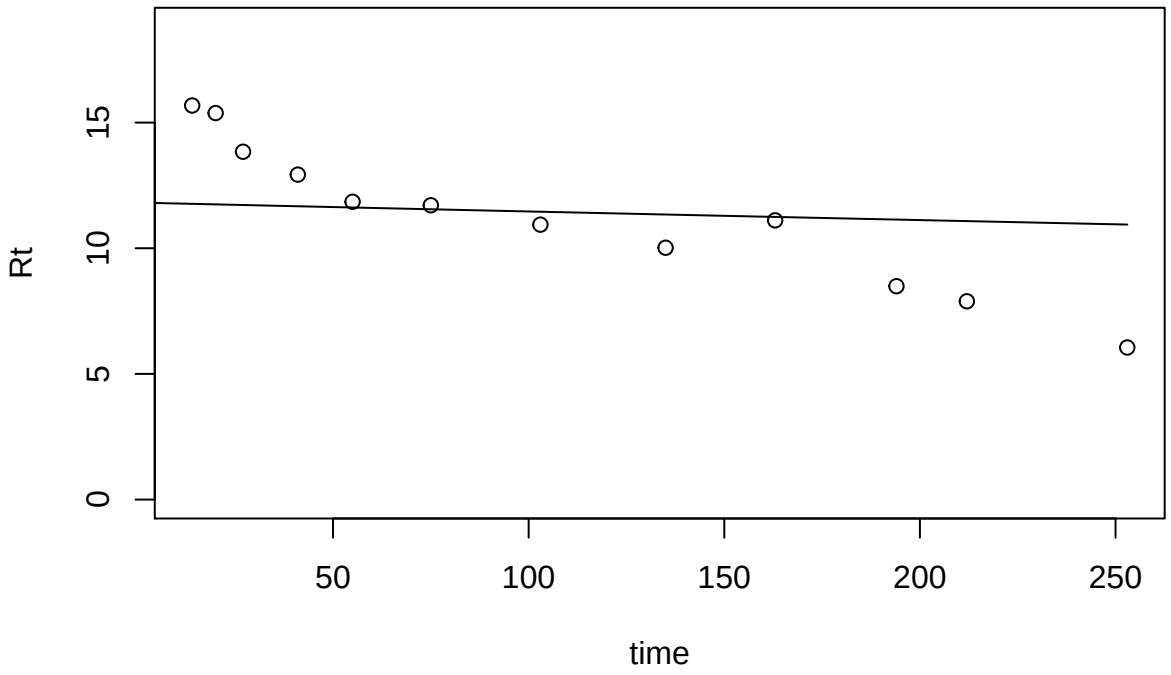



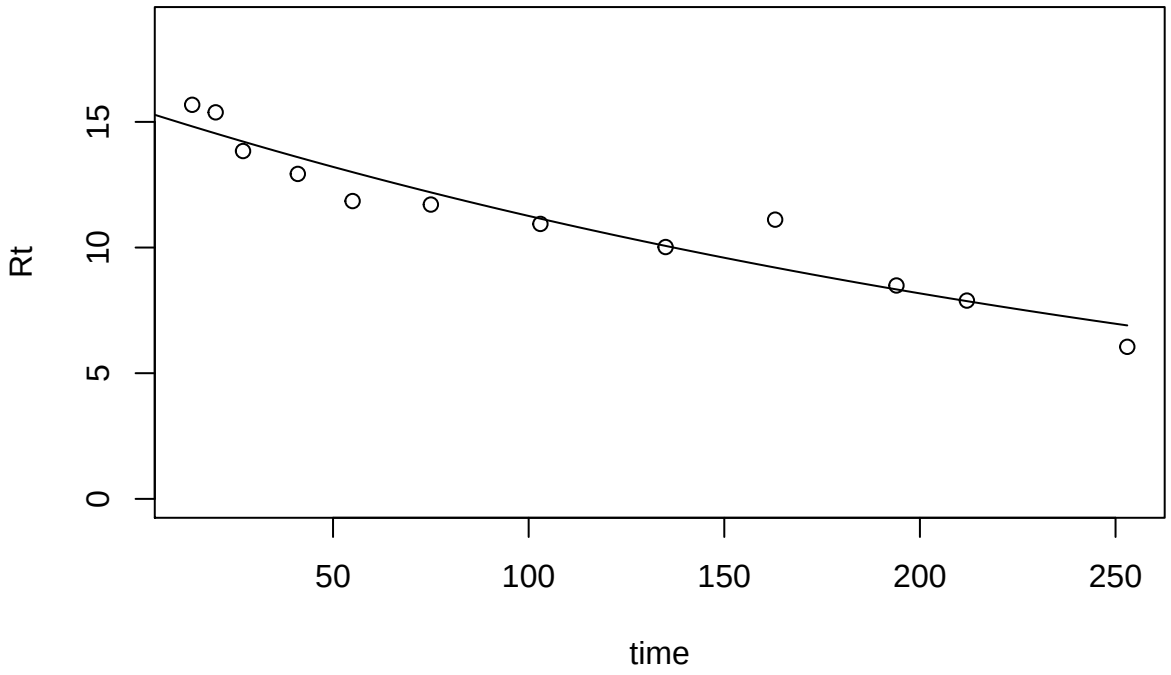




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -5.99 | 0.000403 | NA | NA | NA | NA | -5.92 | 0.988 | NA | NA |
| Two-pool parallel | 2.64 | 0.0151 | 0.000261 | 0.026 | NA | NA | 3.08 | 0.011 | 3740 | 2560 |
| Two-pool feedback | 6.64 | 0.0151 | 0.000261 | 0.0264 | 0.0151 | 0.000135 | 7.79 | 0.00104 | 124 | 46.9 |
| Two-pool series | 4.64 | 0.0151 | 0.000261 | 0.0264 | 0.0126 | NA | 5.39 | 0.00346 | 114 | 46.8 |

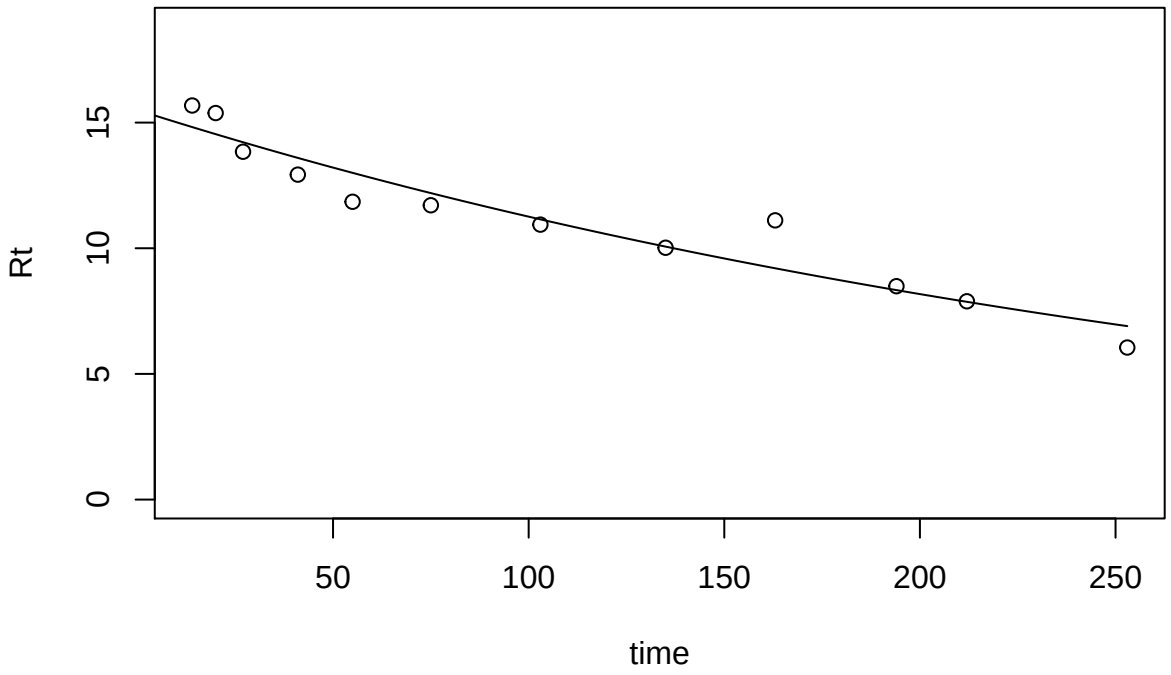
```
## [1] "Best fit parameter:  0.00030378517414575"
```



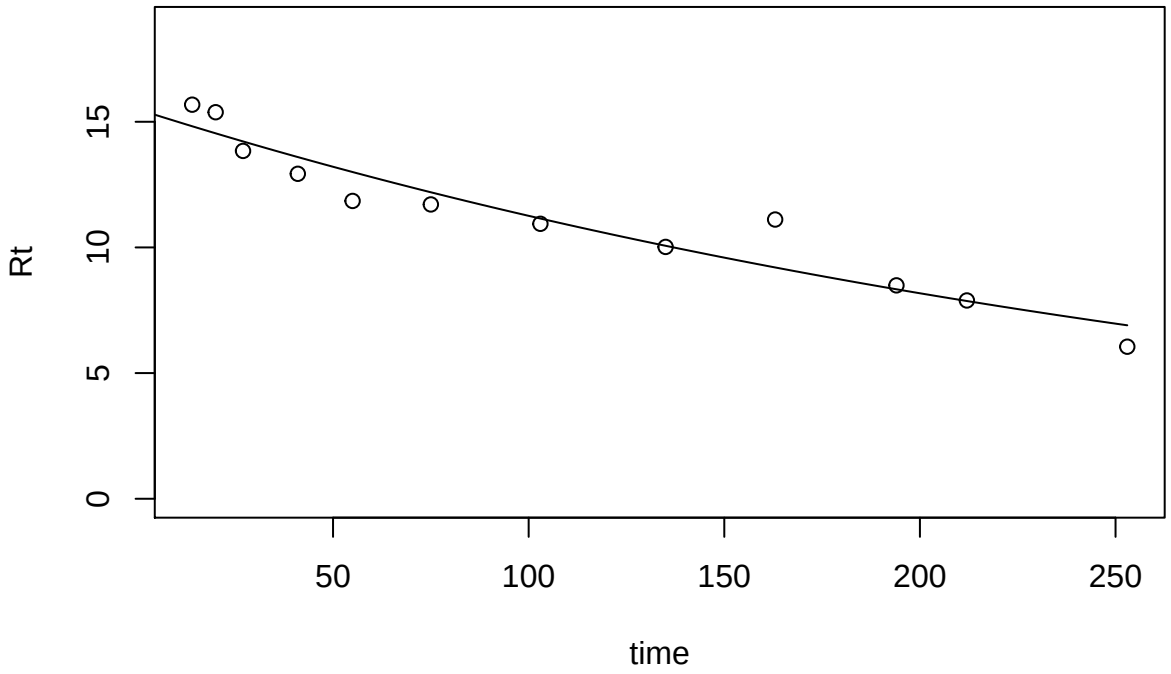

```
## [1] "AIC =  -1.73976315060683"
## [1] "k1= 0.00319824334867691"
## [2] "k2= 6.04844450109164e-11"
## [3] "proportion of C0 in pool 1= 0.124588935535487"
```



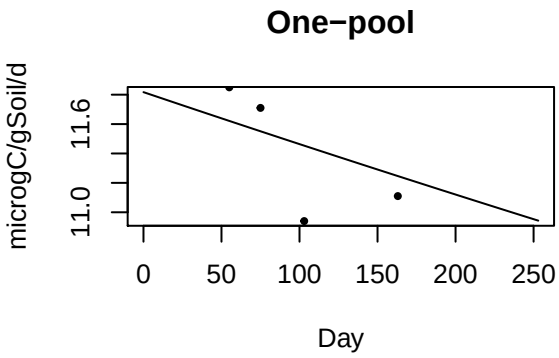

```
## [1] "AIC =  6.80659191613801"
## [1] "k1= 0.00320197034355893"
## [2] "k2= 3.62409117084781e-07"
## [3] "a21= 0.00796070314849268"
## [4] "a12= 0.0018115423817463"
## [5] "Proportion of C0 in pool 1= 0.125347709710371"
```

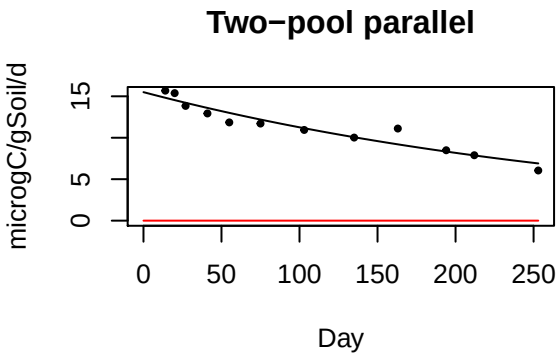


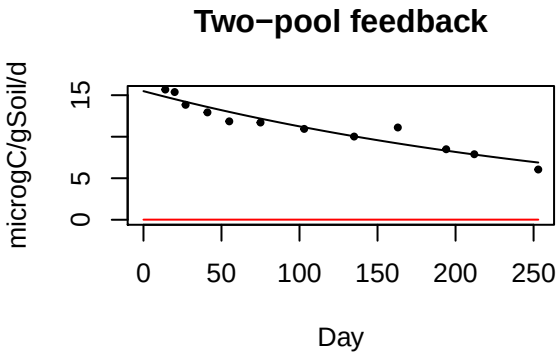

```
## [1] "AIC =  10.806579017723"
## [1] "k1= 0.00319824424861131"
## [2] "k2= 15903.8883588828"
## [3] "a21= 0.999972710538416"
## [4] "Proportion of C0 in pool 1= 0.124588817586036"
```

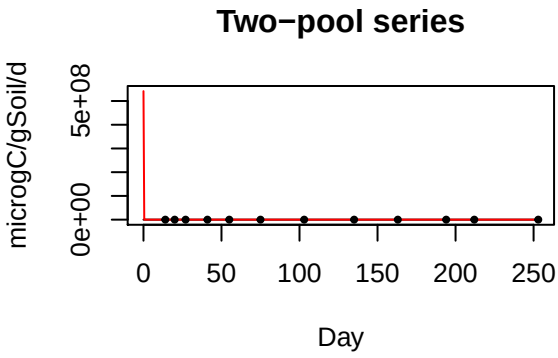



```
## [1] "AIC =  8.80659191831354"
```



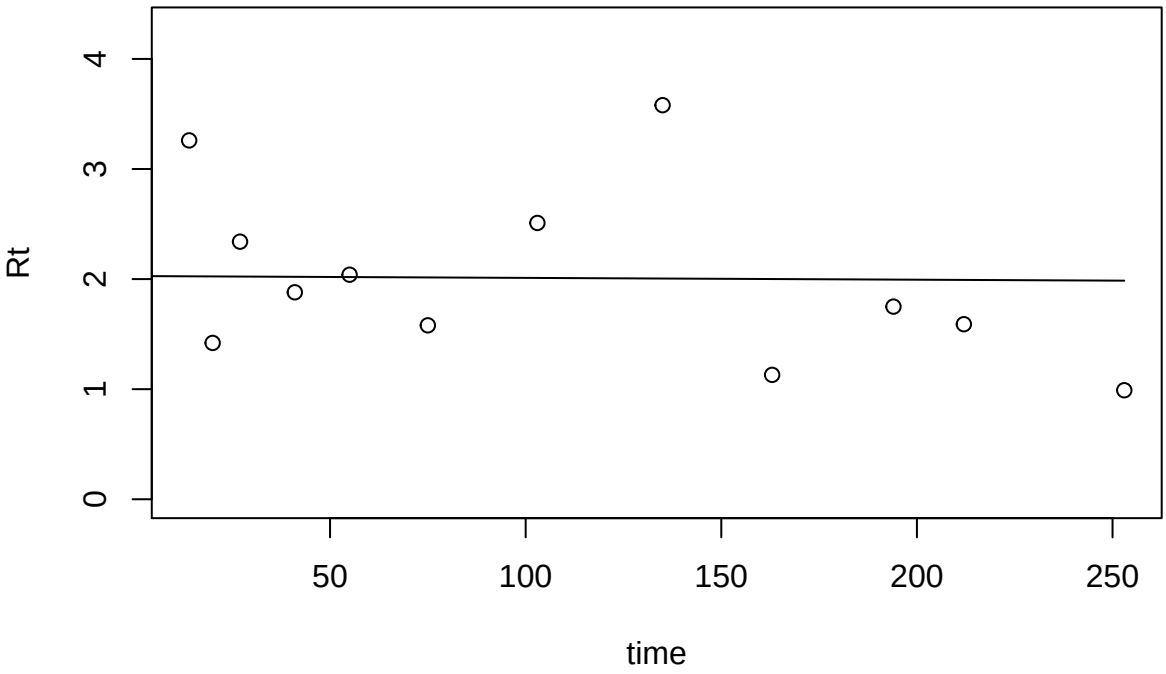



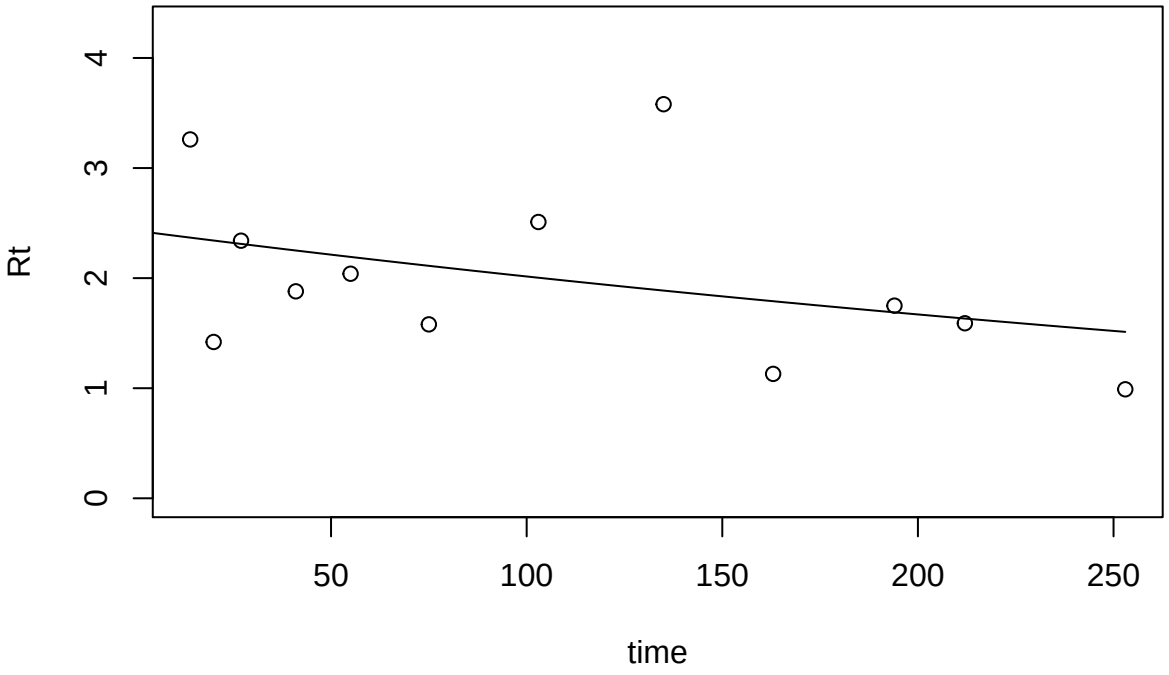




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -1.74 | 0.000304 | NA | NA | NA | NA | -1.67 | 0.987 | NA | NA |
| Two-pool parallel | 6.81 | 0.0032 | 6.05e-11 | 0.125 | NA | NA | 7.25 | 0.0114 | 1.45e+10 | 9.26e+09 |
| Two-pool feedback | 10.8 | 0.0032 | 3.62e-07 | 0.125 | 0.00796 | 0.00181 | 12 | 0.00108 | 22300 | 219 |
| Two-pool series | 8.81 | 0.0032 | 15900 | 0.125 | 1 | NA | 9.56 | 0.0036 | 313 | 217 |

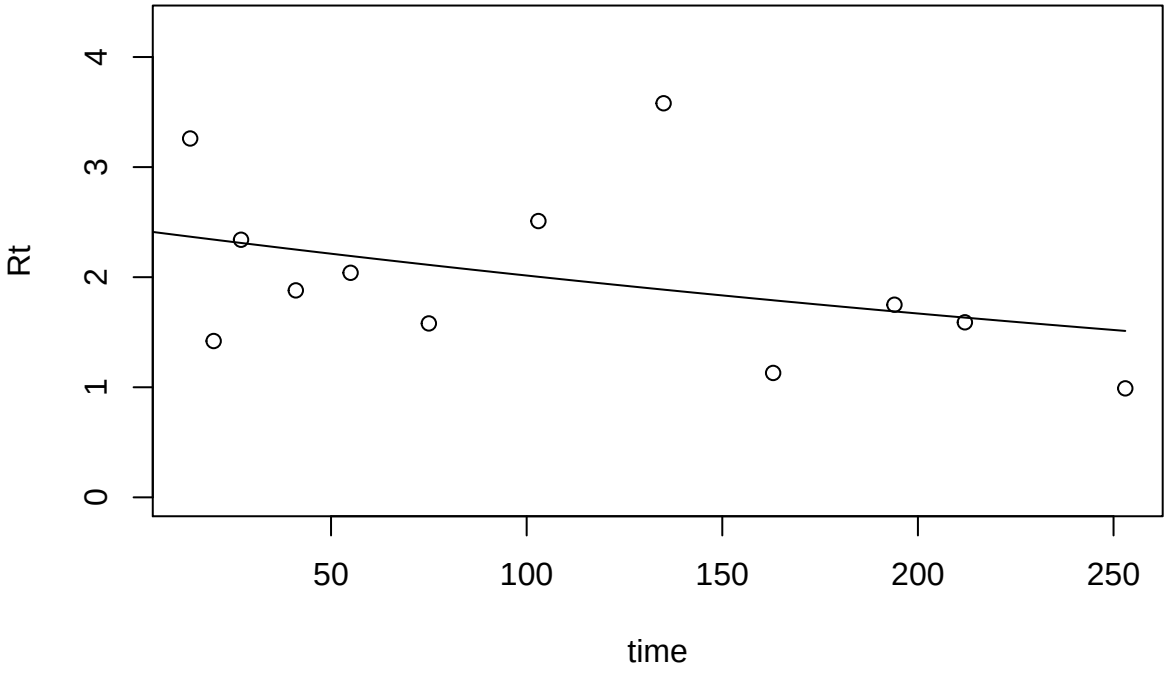
```
## [1] "Best fit parameter:  8.24213438064772e-05"
```



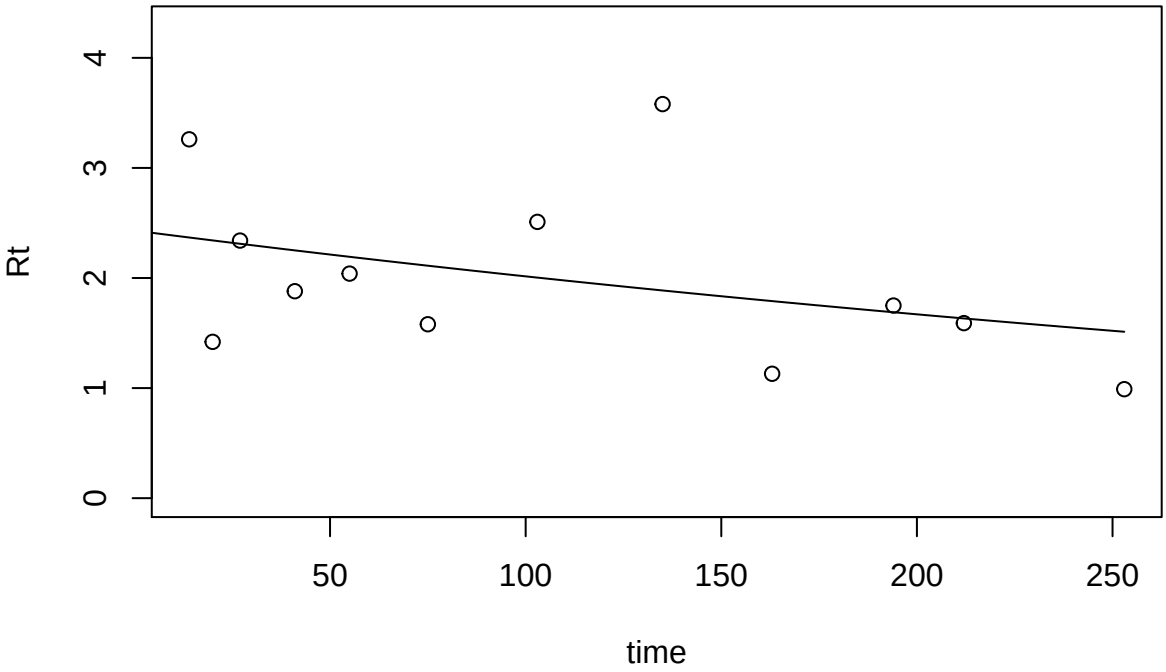
```
## [1] "AIC =  3.10648499857324"
## [1] "k1= 0.00187740763039807"
## [2] "k2= 1.41832680761621e-15"
## [3] "proportion of C0 in pool 1= 0.052639595785619"
```



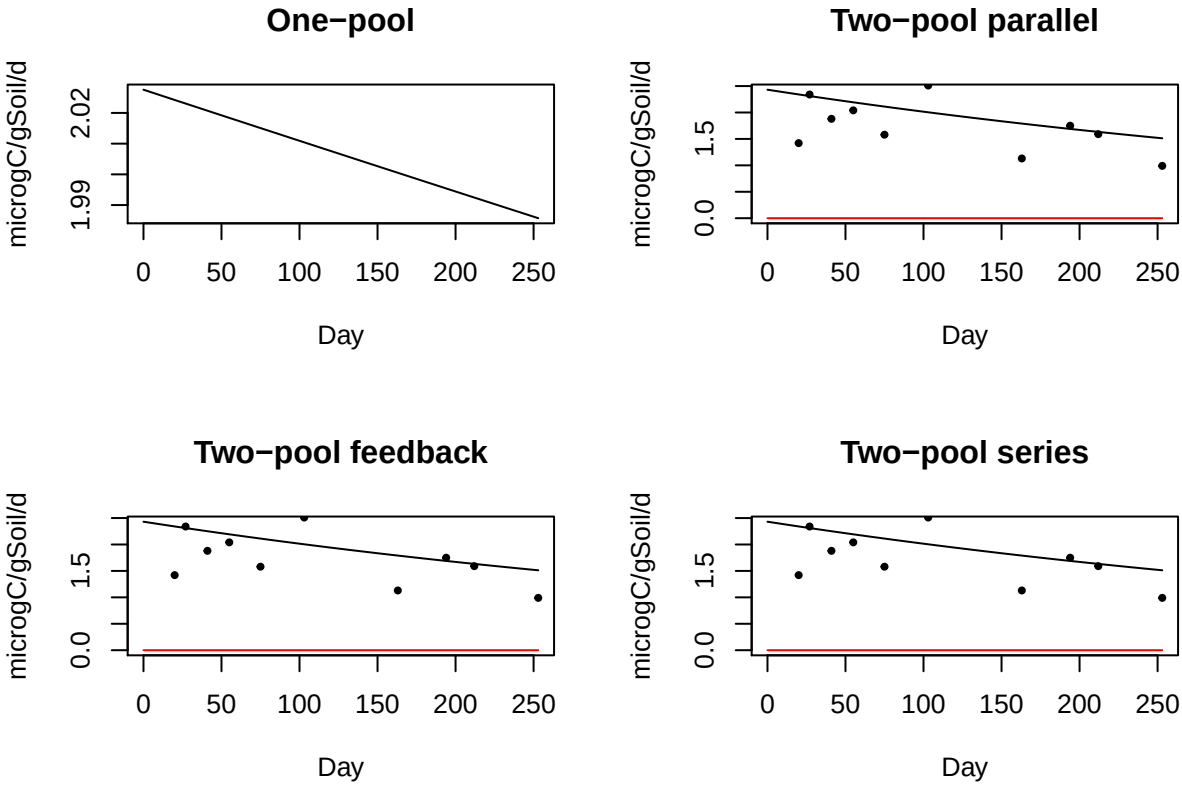

```
## [1] "AIC =  7.41098489340992"
## [1] "k1= 0.001877422471394"
## [2] "k2= 6.30335544914672e-10"
## [3] "a21= 0.0203059317364291"
## [4] "a12= 2.3301706135348e-05"
## [5] "Proportion of C0 in pool 1= 0.0537296647327736"
```



```
## [1] "AIC =  11.4109846906185"
## [1] "k1= 0.0018774097880732"
## [2] "k2= 5.39066422914776e-16"
## [3] "a21= 0.00408629875736288"
## [4] "Proportion of C0 in pool 1= 0.0528554201345068"
```

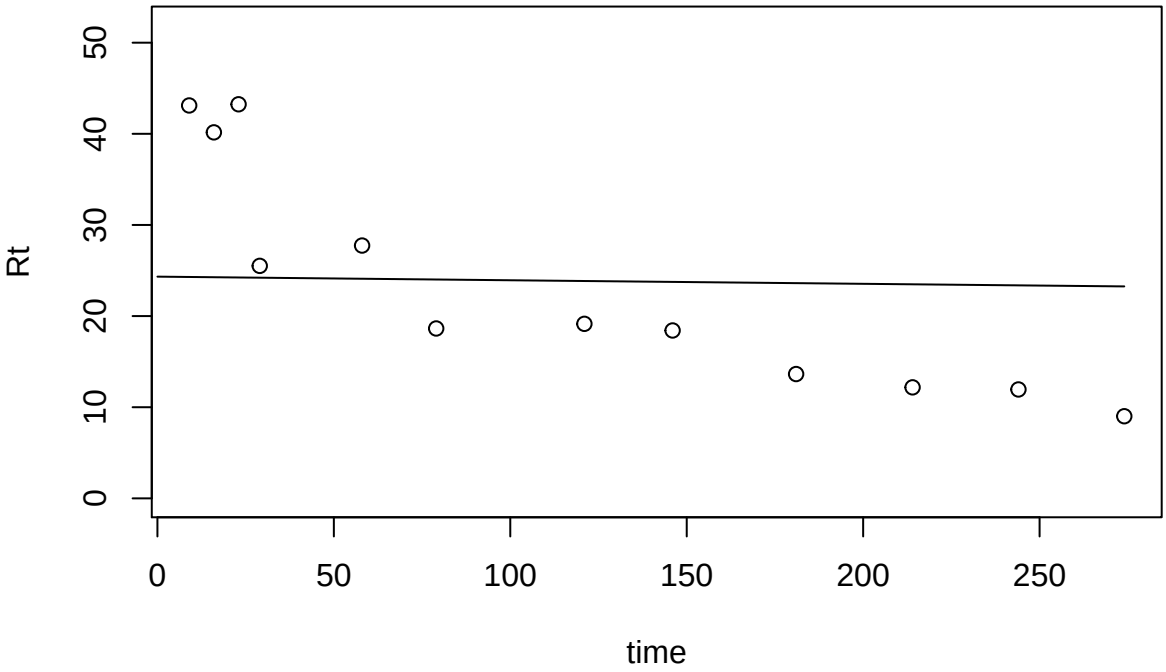



```
## [1] "AIC =  9.41098489340665"
```

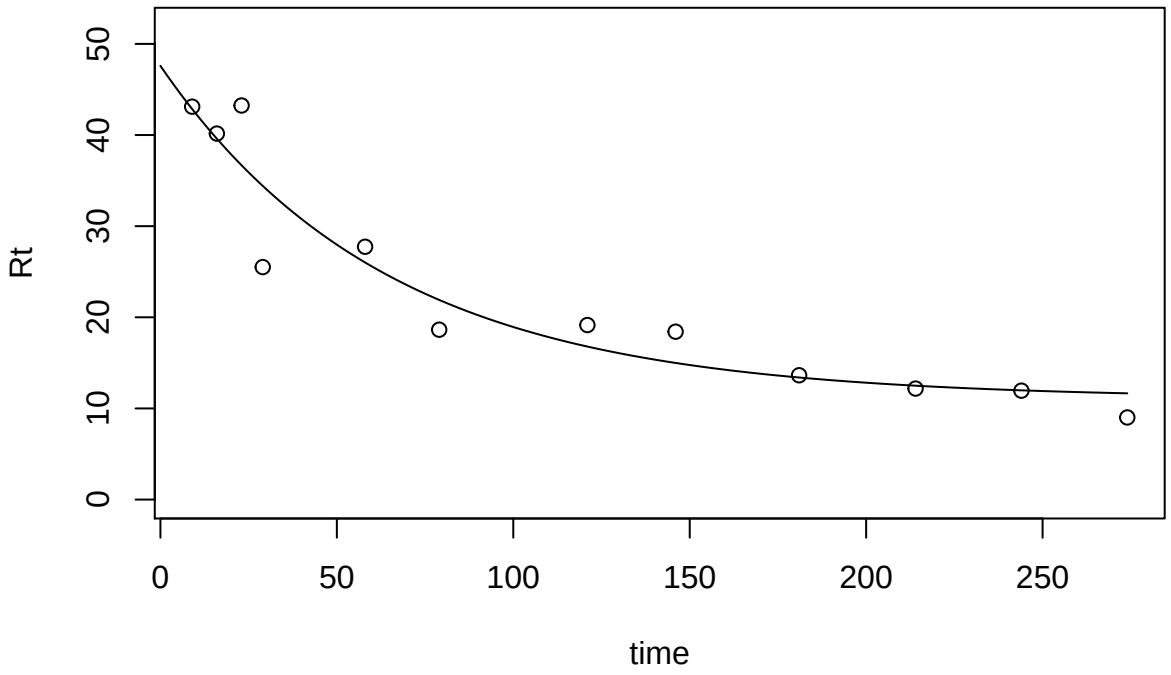


| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 3.11 | 8.24e-05 | NA | NA | NA | NA | 3.18 | 0.904 | NA | NA |
| Two-pool parallel | 7.41 | 0.00188 | 1.42e-15 | 0.0526 | NA | NA | 7.86 | 0.0872 | 6.68e+14 | 4.51e+14 |
| Two-pool feedback | 11.4 | 0.00188 | 6.3e-10 | 0.0537 | 0.0203 | 2.33e-05 | 12.6 | 0.00828 | 32200000 | 380 |
| Two-pool series | 9.41 | 0.00188 | 5.39e-16 | 0.0529 | 0.00409 | NA | 10.2 | 0.0275 | 7.58e+12 | 371 |

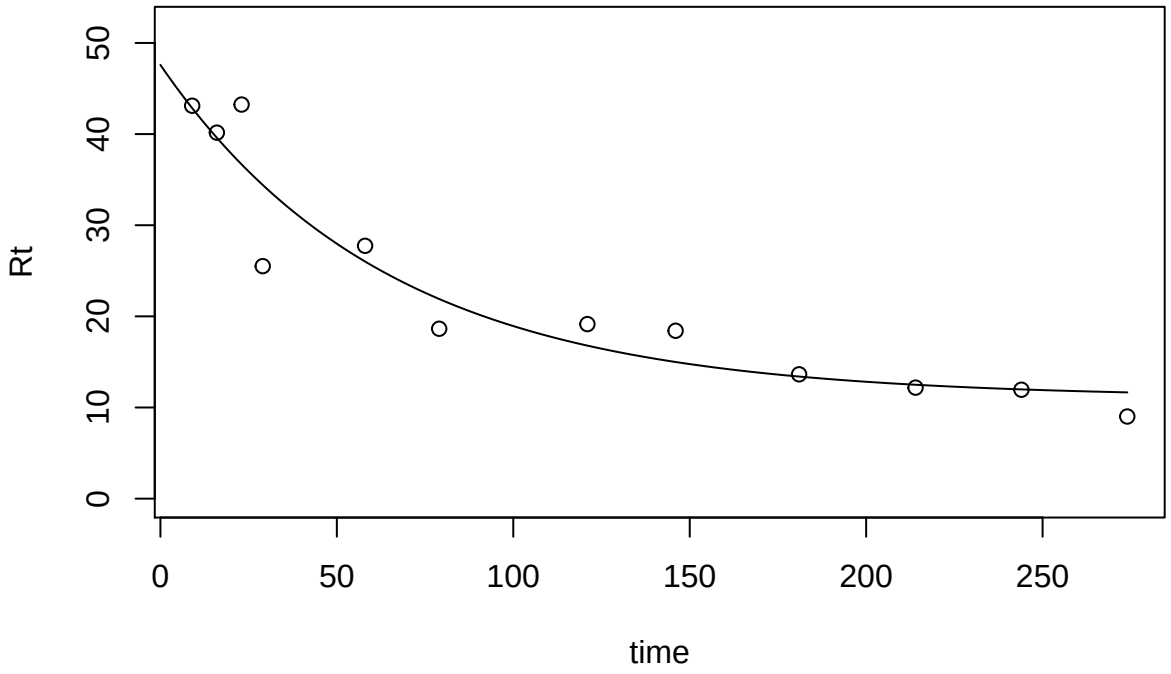
```
## [1] "Best fit parameter:  0.000164377960100005"
```




```
## [1] "AIC =  -7.81429981906655"
## [1] "k1= 0.0155629374597262"
## [2] "k2= 7.81870742766466e-05"
## [3] "proportion of C0 in pool 1= 0.0157170152888846"
```

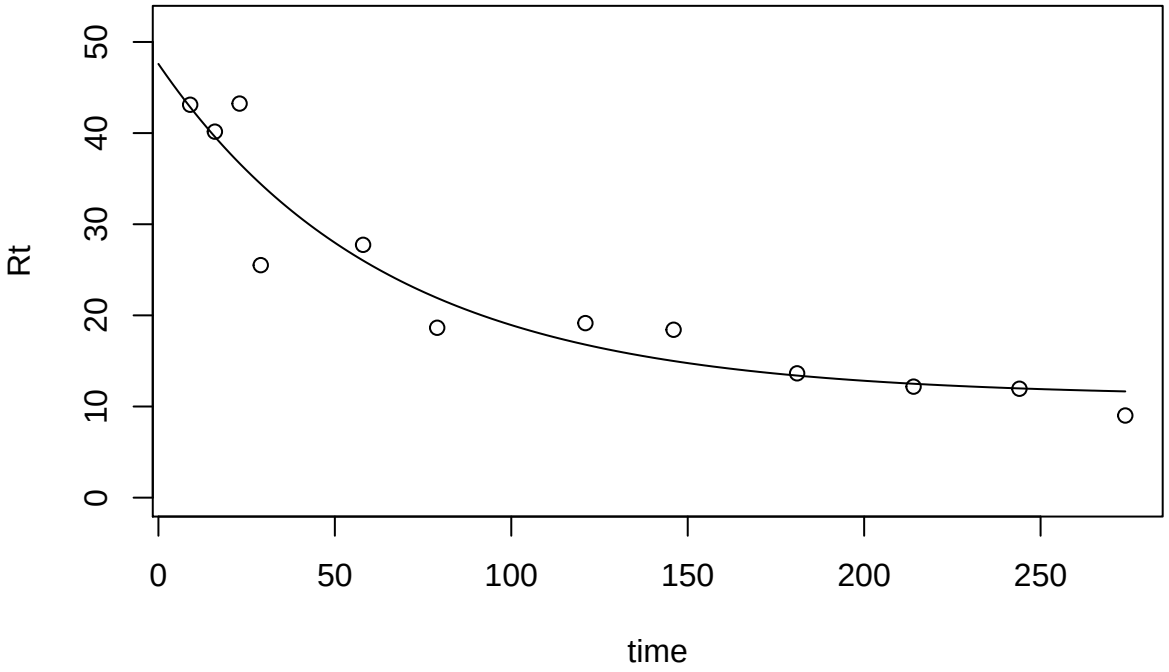



```
## [1] "AIC =  0.808287427266547"
## [1] "k1= 0.0155630559283005"
## [2] "k2= 7.8187430689412e-05"
## [3] "a21= 0.00510242465025346"
## [4] "a12= 1.14617471150269e-05"
## [5] "Proportion of C0 in pool 1= 0.0157977342692736"
```

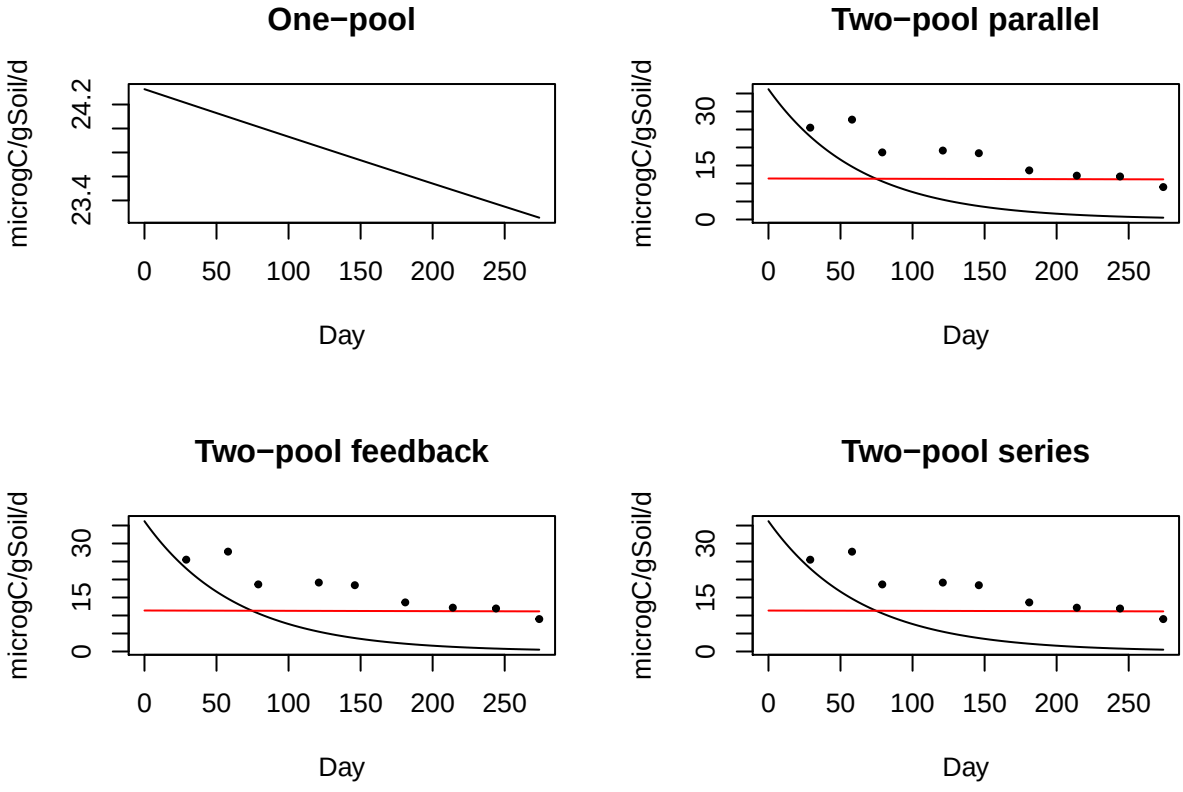



```
## [1] "AIC =  4.80828741836564"
## [1] "k1= 0.0155632386936482"
## [2] "k2= 7.81879677095883e-05"
## [3] "a21= 0.0661354733219663"
```

```
## [4] "Proportion of C0 in pool 1= 0.0168357887367246"
```



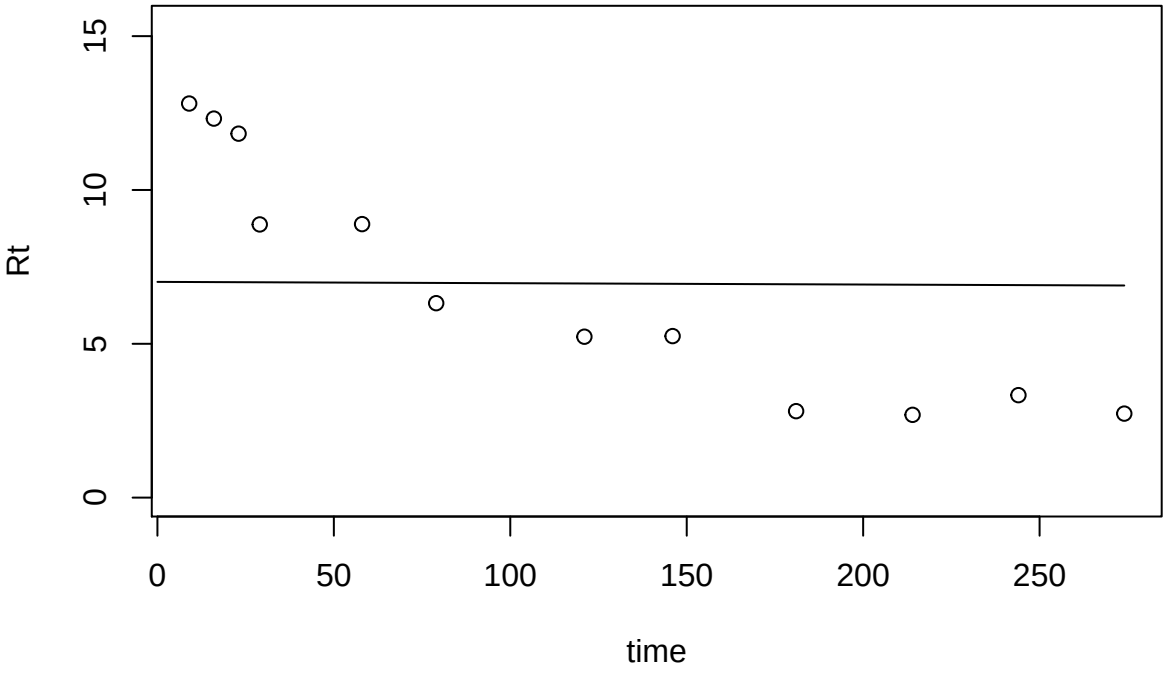

```
## [1] "AIC =  2.8082874285956"
```



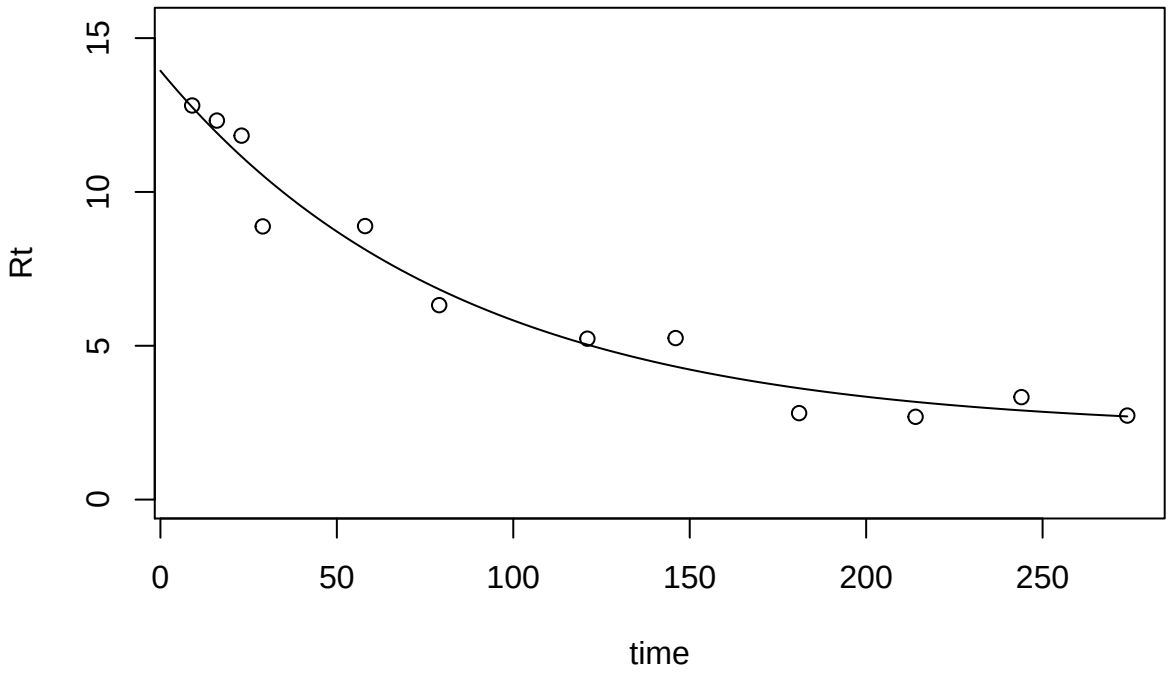

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -7.81 | 0.000164 | NA | NA | NA | NA | -7.74 | 0.988 | NA | NA |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool parallel | 0.808 | 0.0156 | 7.82e-05 | 0.0157 | NA | NA | 1.25 | 0.011 | 12600 | 8660 |
| Two-pool feedback | 4.81 | 0.0156 | 7.82e-05 | 0.0158 | 0.0051 | 1.15e-05 | 5.96 | 0.00104 | 130 | 44.9 |
| Two-pool series | 2.81 | 0.0156 | 7.82e-05 | 0.0168 | 0.0661 | NA | 3.56 | 0.00346 | 910 | 49.2 |

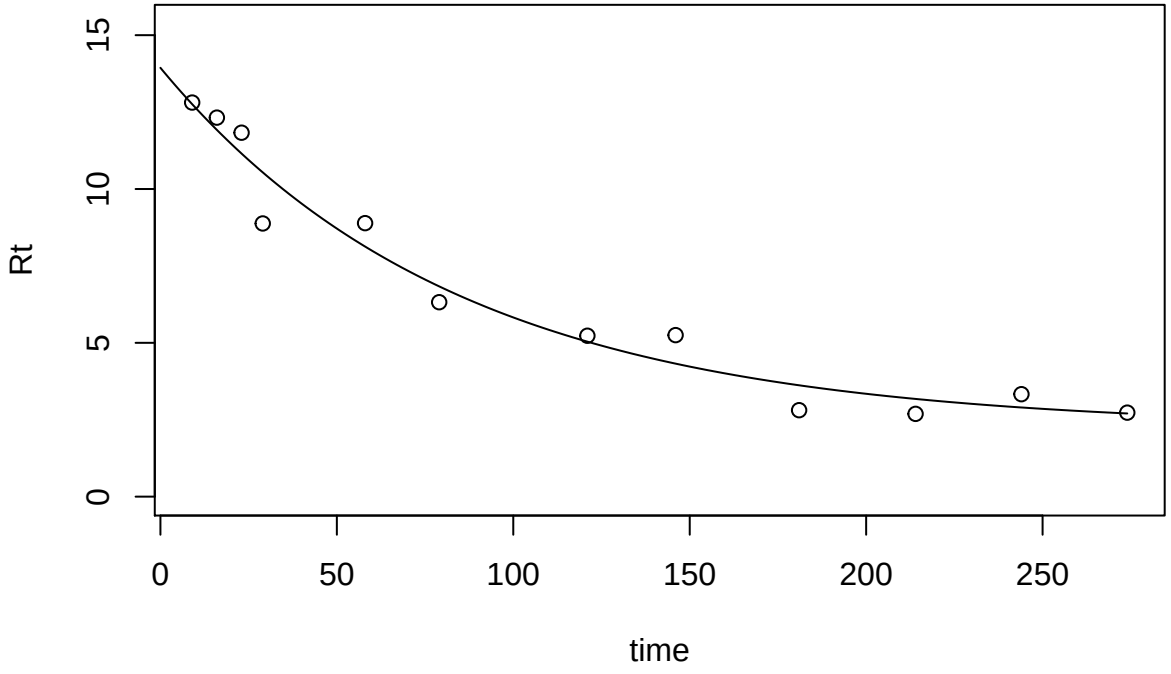
```
## [1] "Best fit parameter:  6.15098855886231e-05"
```




```
## [1] "AIC =  -3.22674946093462"
## [1] "k1= 0.011860187616892"
## [2] "k2= 2.0021019339137e-05"
## [3] "proportion of C0 in pool 1= 0.00863659599407324"
```

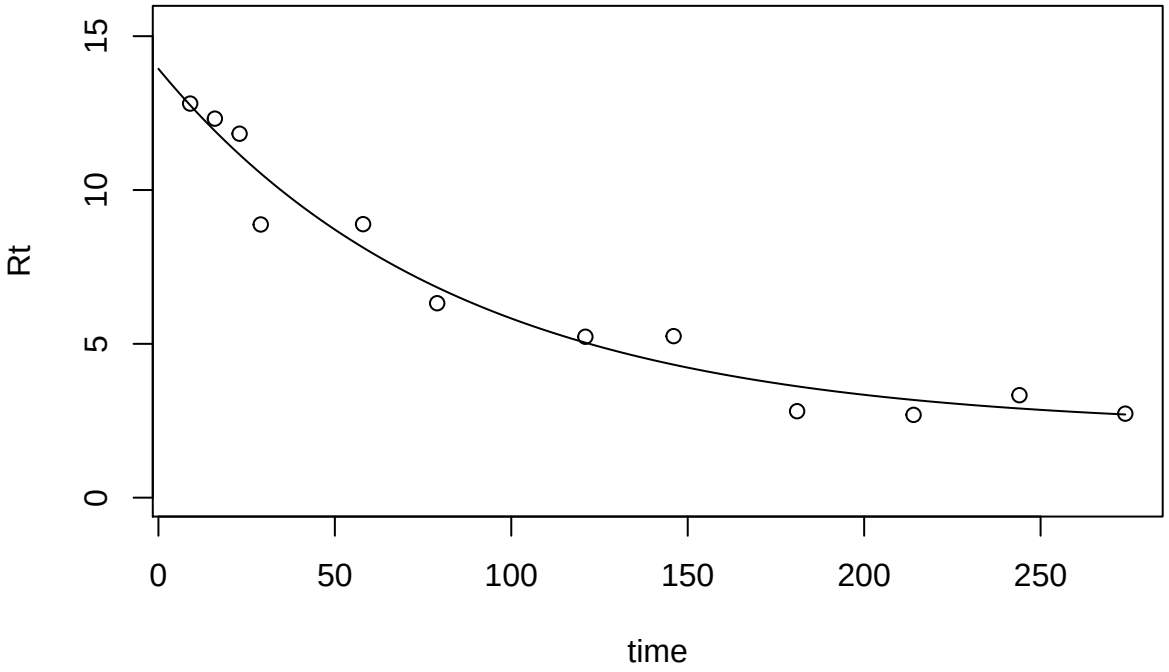



```
## [1] "AIC =  7.32176204826833"
## [1] "k1= 0.0118601908970435"
## [2] "k2= 2.00213554746793e-05"
## [3] "a21= 0.185170014439325"
## [4] "a12= 8.84076029425973e-05"
## [5] "Proportion of C0 in pool 1= 0.0106034760322332"
```

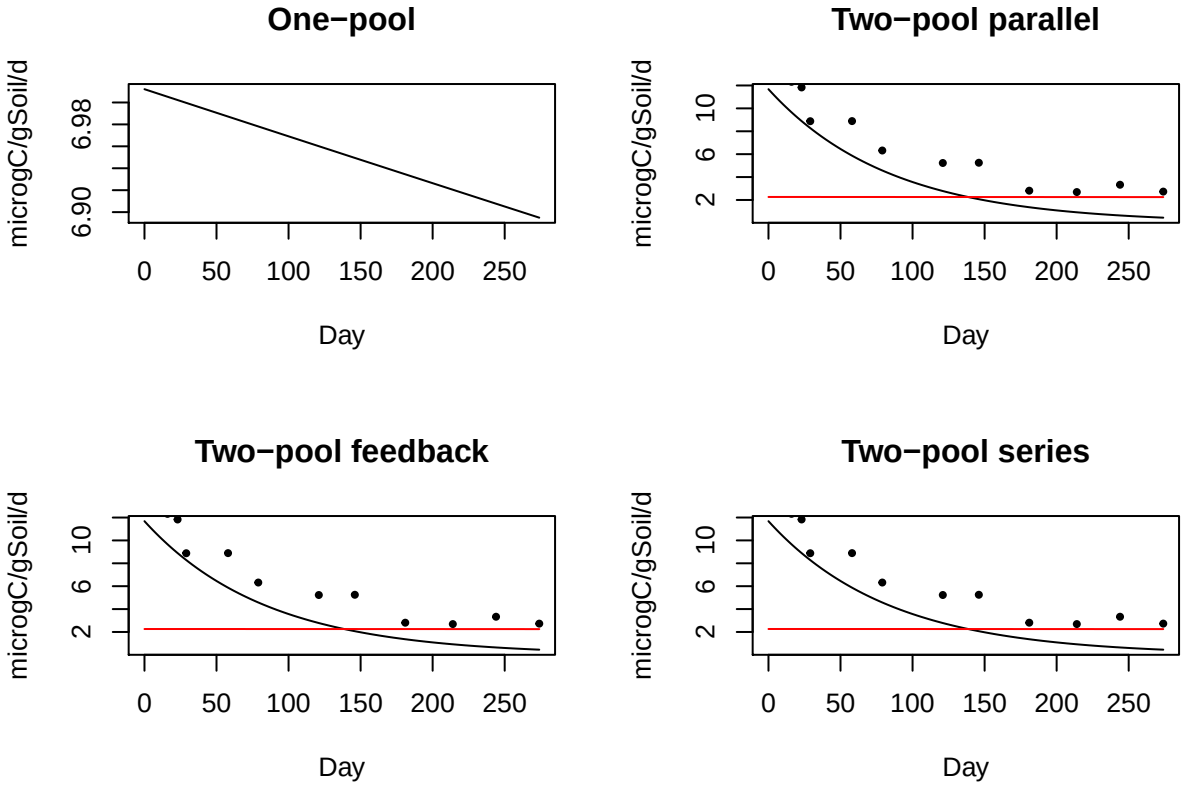



```
## [1] "AIC =  11.3217620482424"
## [1] "k1= 0.0118601881602318"
## [2] "k2= 2.00210202177963e-05"
## [3] "a21= 0.131038067384944"
```

```
## [4] "Proportion of C0 in pool 1= 0.00994149589679288"
```



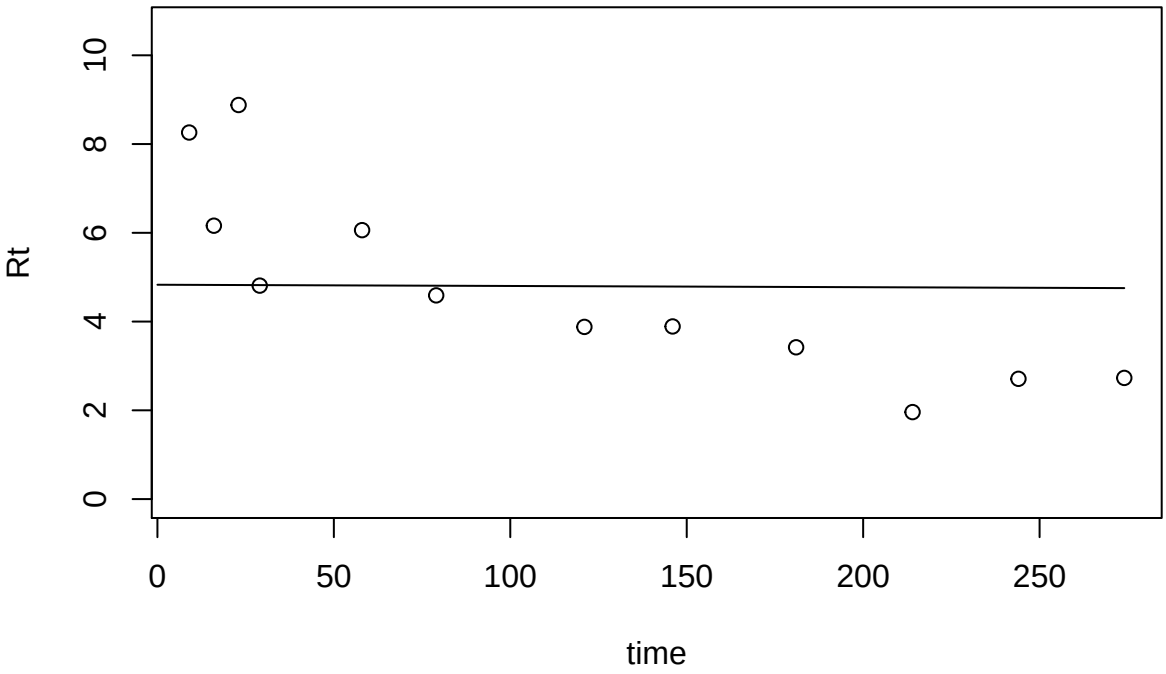

```
## [1] "AIC =  9.32176204774769"
```



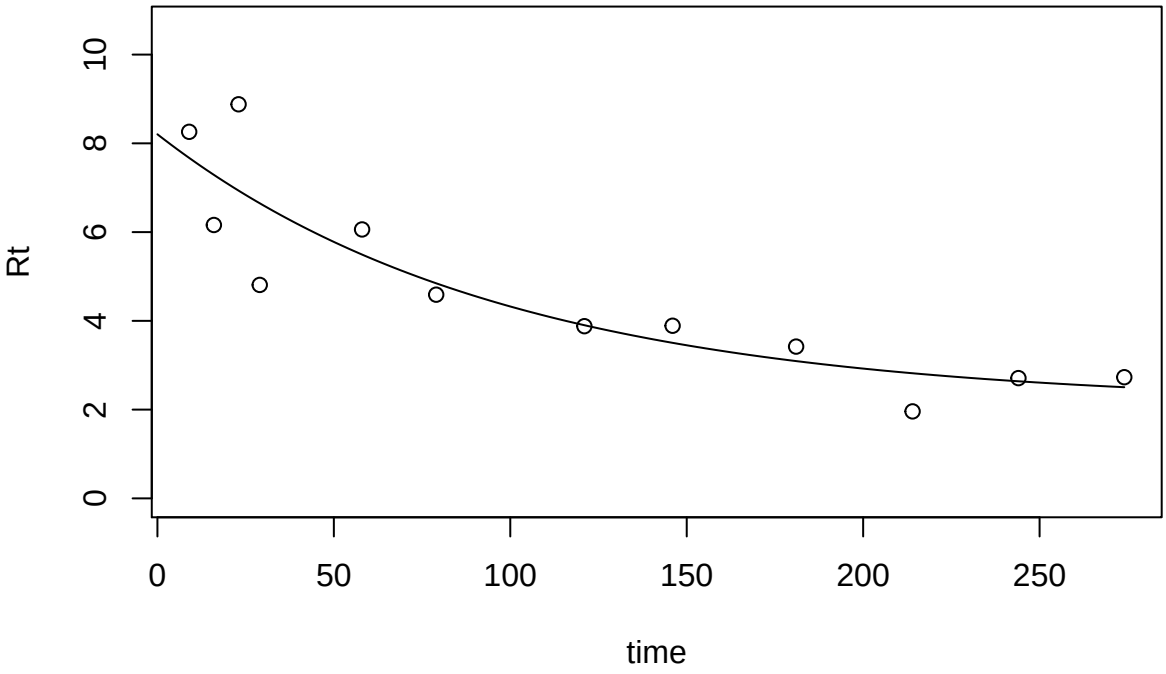

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -3.23 | 6.15e-05 | NA | NA | NA | NA | -3.16 | 0.995 | NA | NA |
| Two-pool parallel | 7.32 | 0.0119 | 2e-05 | 0.00864 | NA | NA | 7.77 | 0.00423 | 49500 | 34200 |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool feedback | 11.3 | 0.0119 | 2e-05 | 0.0106 | 0.185 | 8.84e-05 | 12.5 | 0.000402 | 9330 | 80.2 |
| Two-pool series | 9.32 | 0.0119 | 2e-05 | 0.00994 | 0.131 | NA | 10.1 | 0.00133 | 6630 | 72.2 |

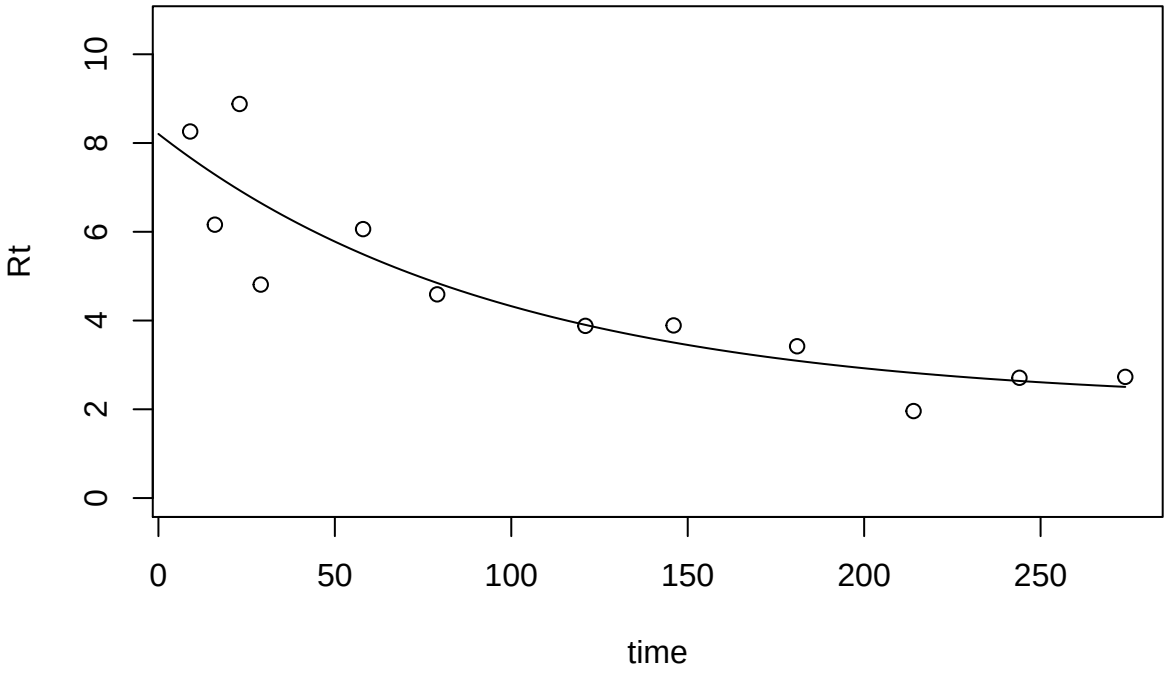
```
## [1] "Best fit parameter:  5.75656182117629e-05"
```



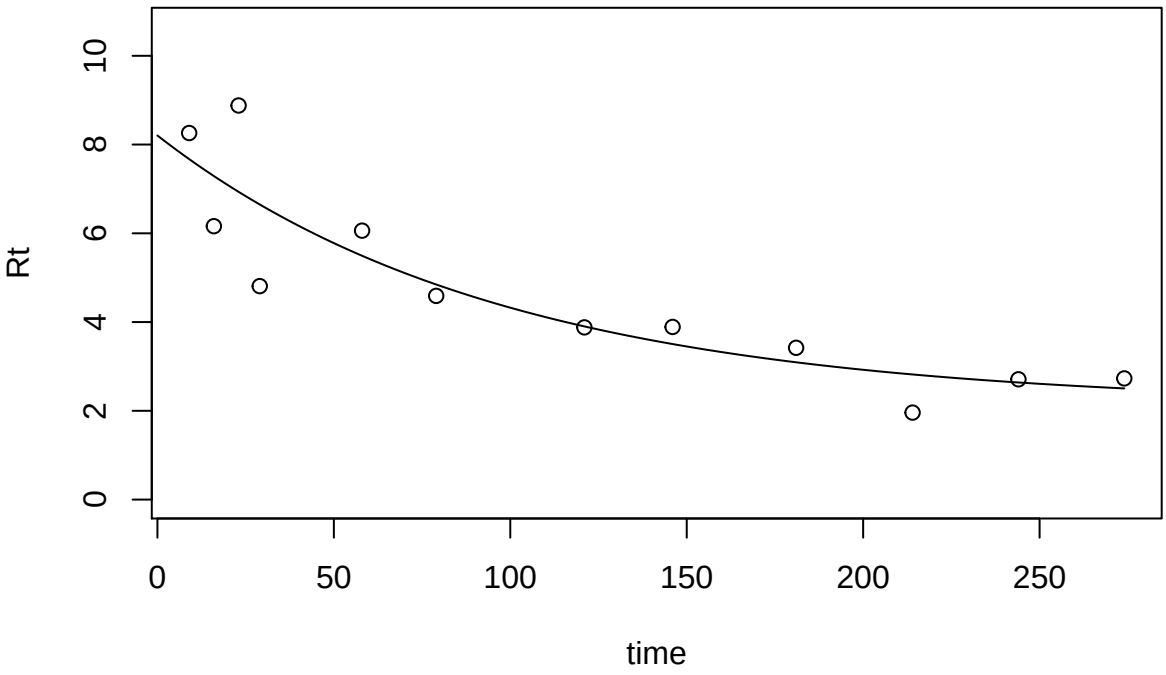

```
## [1] "AIC =  -0.906684007132037"
## [1] "k1= 0.0102247754511577"
## [2] "k2= 2.58406403862285e-05"
## [3] "proportion of C0 in pool 1= 0.00705420478081703"
```



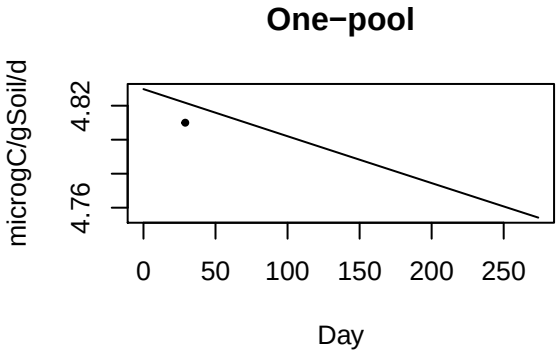
```
## [1] "AIC =  6.31952304378451"
## [1] "k1= 0.0102247972461209"
## [2] "k2= 2.58470785797412e-05"
## [3] "a21= 0.207060346072286"
## [4] "a12= 0.00119044147678549"
## [5] "Proportion of C0 in pool 1= 0.00890512294178403"
```

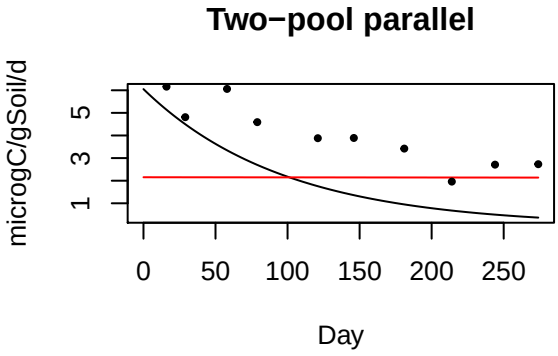


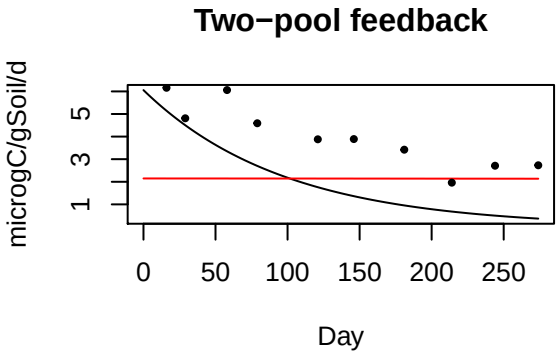

```
## [1] "AIC =  10.3195230437784"
## [1] "k1= 0.0102248414654212"
## [2] "k2= 2.58407815419969e-05"
## [3] "a21= 0.00923808452333119"
## [4] "Proportion of C0 in pool 1= 0.0071200420889761"
```

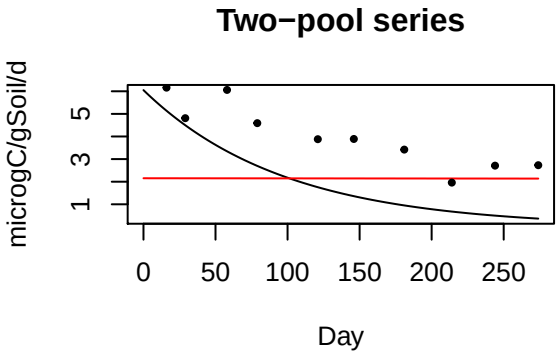



```
## [1] "AIC =  8.31952304240013"
```



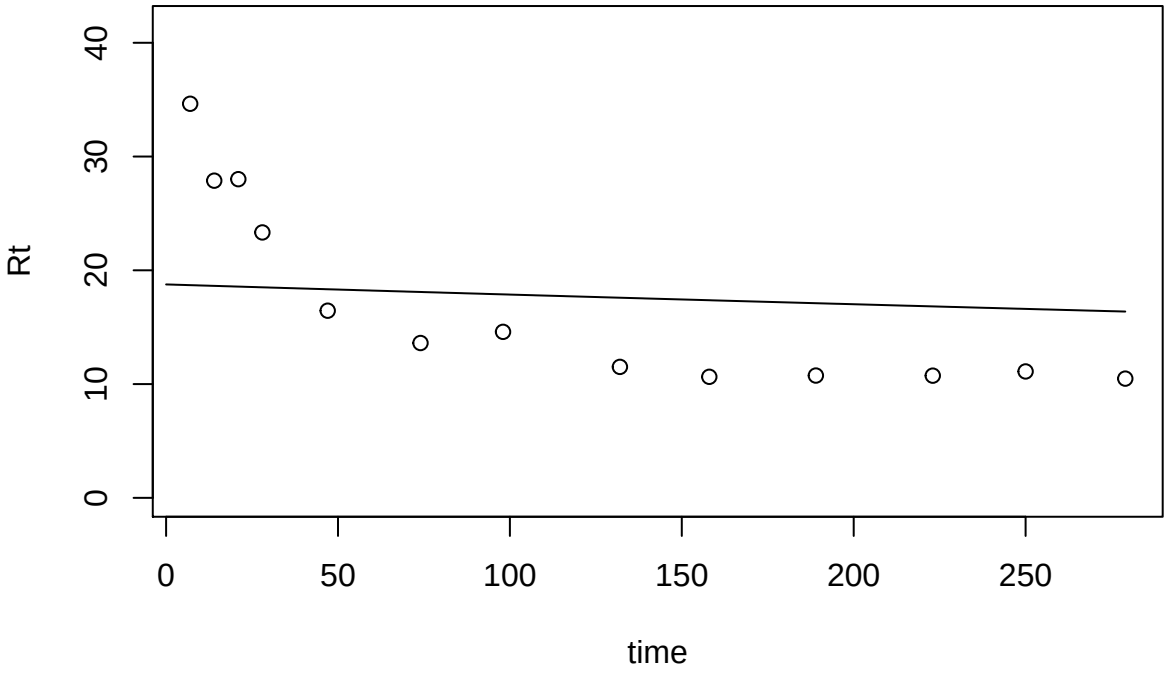



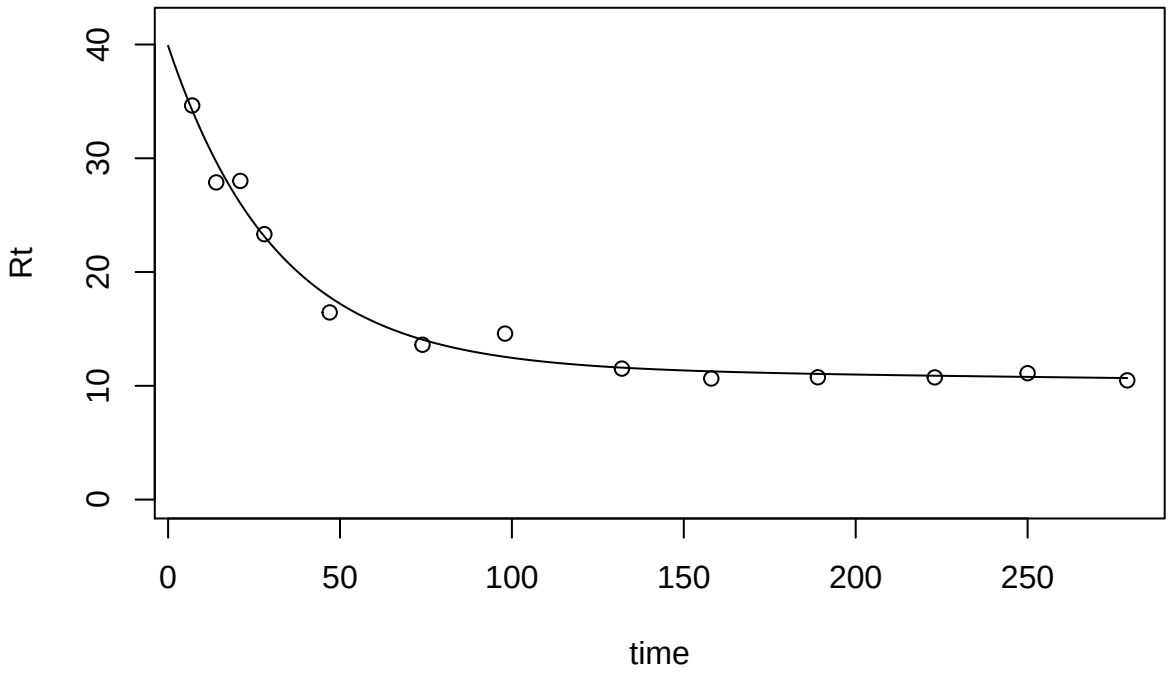

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrTq05 | |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -0.907 | 5.76e-05 | NA | NA | NA | NA | -0.835 | 0.976 | NA | NA |
| Two-pool parallel | 6.32 | 0.0102 | 2.58e-05 | 0.00705 | NA | NA | 6.76 | 0.0218 | 38400 | 26500 |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTr | Tq05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool feedback | 10.3 | 0.0102 | 2.58e-05 | 0.00891 | 0.207 | 0.00119 | 11.5 | 0.00207 | 8110 | 97.3 |
| Two-pool series | 8.32 | 0.0102 | 2.58e-05 | 0.00712 | 0.00924 | NA | 9.07 | 0.00688 | 455 | 68.7 |

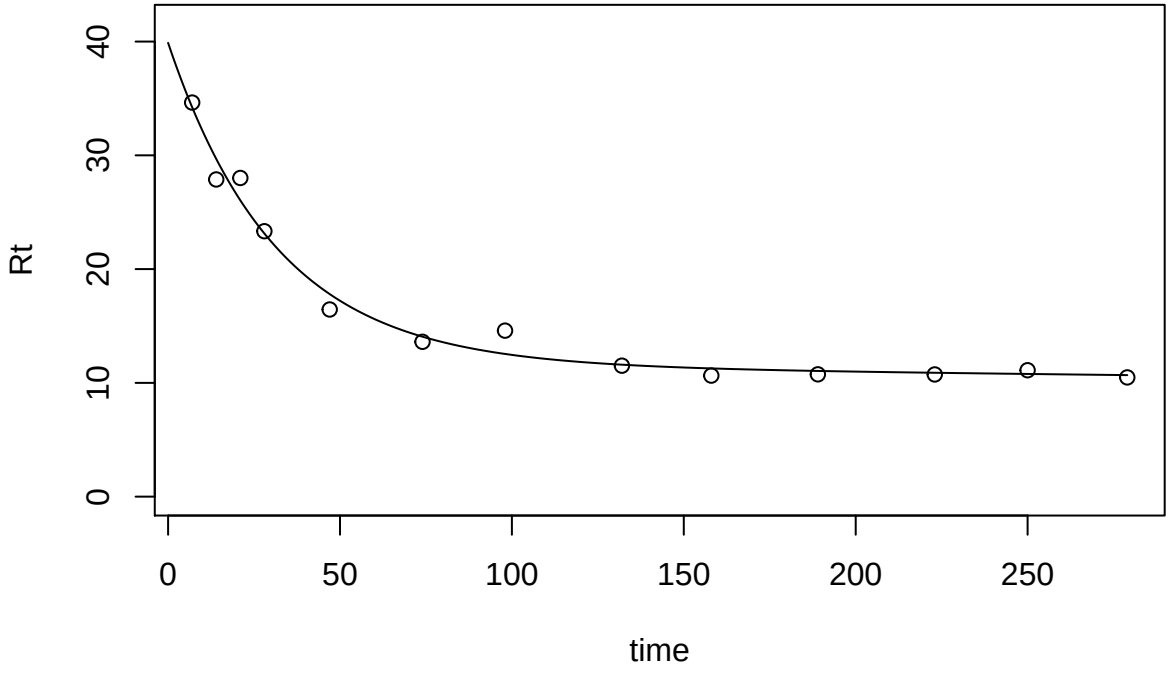
```
## [1] "Best fit parameter:  0.000487261749531337"
```




```
## [1] "AIC =  -6.00467091396116"
## [1] "k1= 0.0318152528695958"
## [2] "k2= 0.000309481170579252"
## [3] "proportion of C0 in pool 1= 0.023063389990544"
```

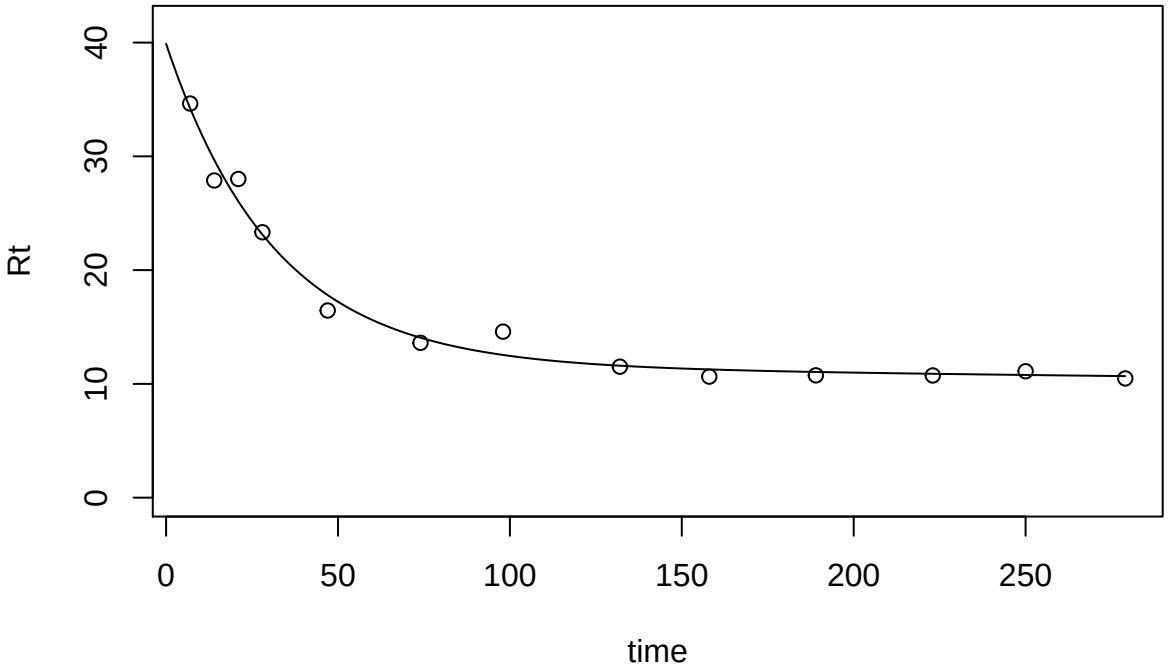



```
## [1] "AIC =  5.82162035249932"
## [1] "k1= 0.0318152557558373"
## [2] "k2= 0.000309481362291063"
## [3] "a21= 0.117358690839699"
## [4] "a12= 5.00425881233557e-06"
## [5] "Proportion of C0 in pool 1= 0.0261641793280764"
```

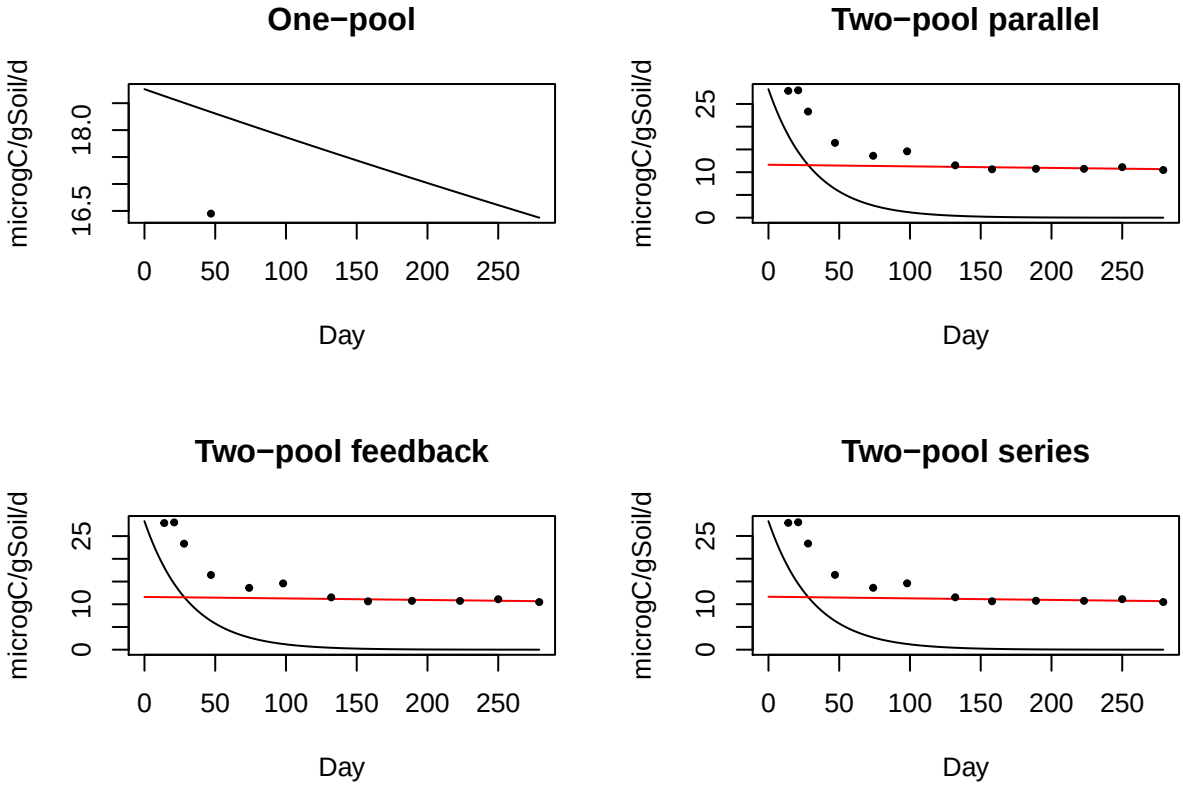



```
## [1] "AIC =  9.82162035248076"
## [1] "k1= 0.0318152550234987"
## [2] "k2= 0.000309481176652274"
## [3] "a21= 0.000334589448196254"
```

```
## [4] "Proportion of C0 in pool 1= 0.0230711779368876"
```



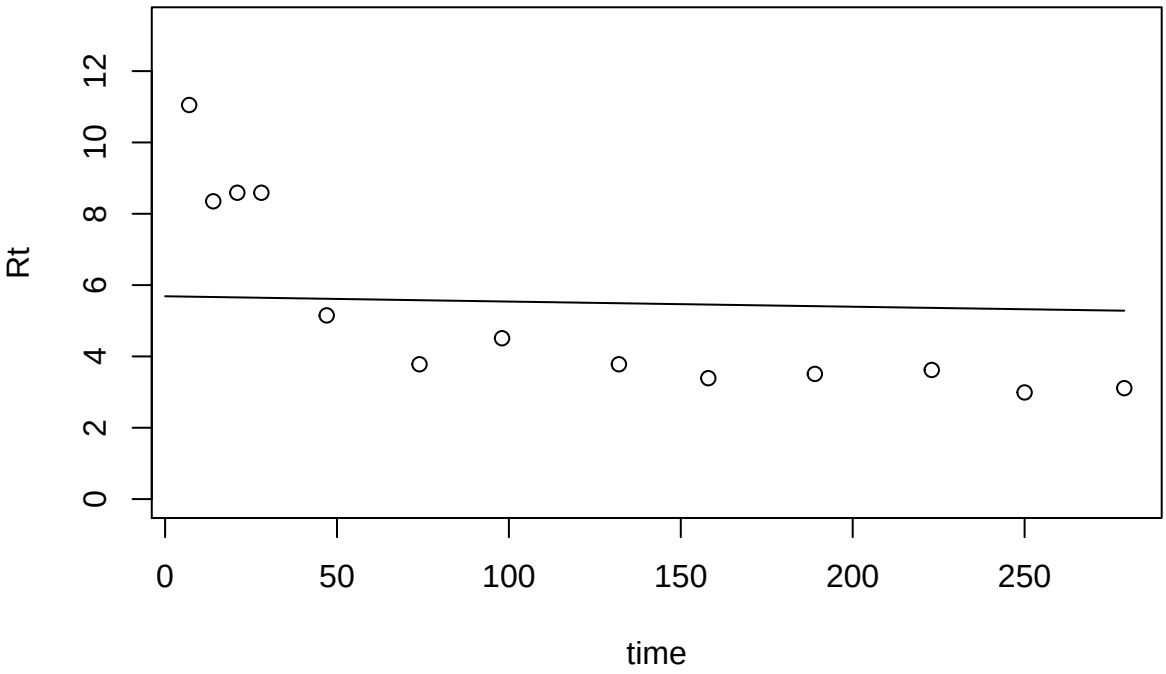

```
## [1] "AIC =  7.82162035248763"
```



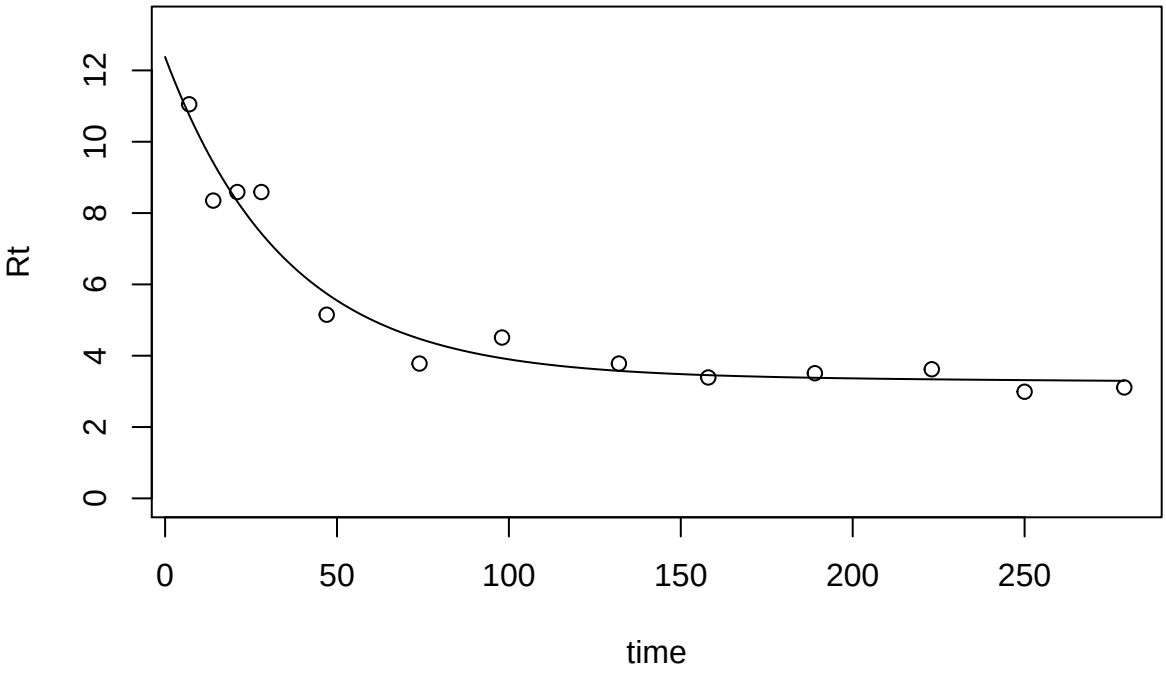

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -6 | 0.000487 | NA | NA | NA | NA | -5.93 | 0.998 | NA | NA |
| Two-pool parallel | 5.82 | 0.0318 | 0.000309 | 0.0231 | NA | NA | 6.27 | 0.00224 | 3160 | 2160 |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool feedback | 9.82 | 0.0318 | 0.000309 | 0.0262 | 0.117 | 5e-06 | 11 | 0.000212 | 411 | 26.2 |
| Two-pool series | 7.82 | 0.0318 | 0.000309 | 0.0231 | 0.000335 | NA | 8.58 | 0.000705 | 32.5 | 21.8 |

```
## [1] "Best fit parameter:  0.000264501829409079"
```




```
## [1] "AIC =  -1.68031551364261"
## [1] "k1= 0.0286710351336274"
## [2] "k2= 0.000162636056062079"
## [3] "proportion of C0 in pool 1= 0.0144869496041807"
```



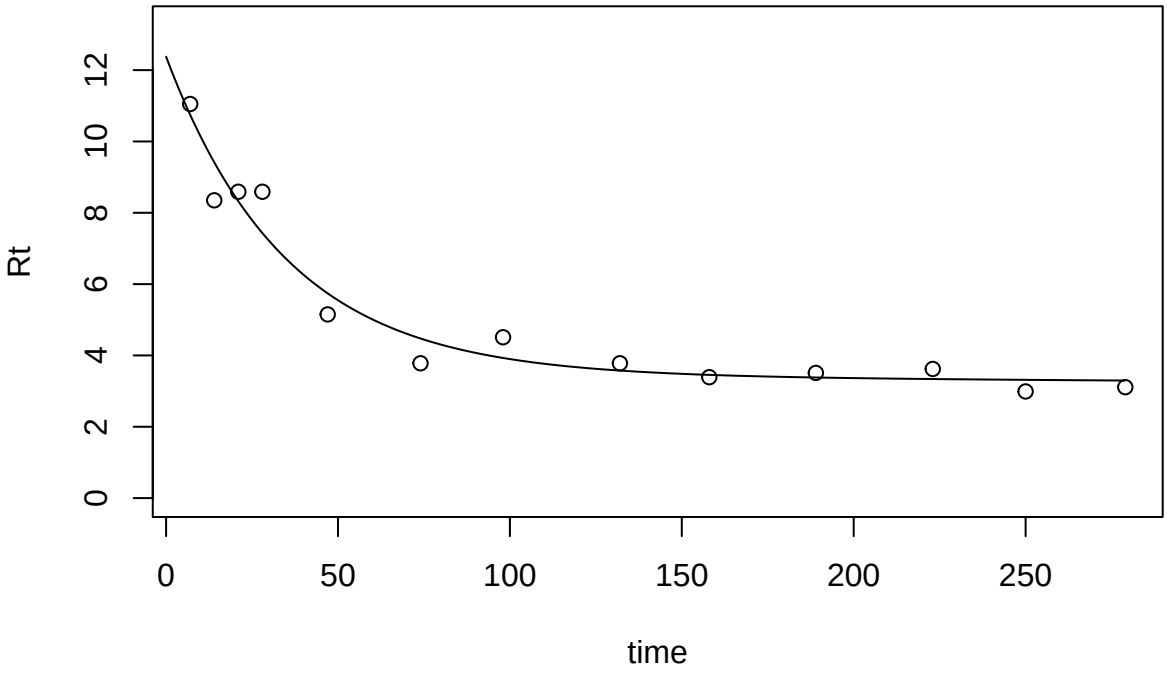
```
## [1] "AIC =  8.31276212960286"
## [1] "k1= 0.0286710389357861"
## [2] "k2= 0.000162636829946412"
## [3] "a21= 0.255010817537469"
## [4] "a12= 1.84994035916652e-05"
## [5] "Proportion of C0 in pool 1= 0.0194839581482329"
```

```
## [1] "AIC =  12.3127621292705"
```

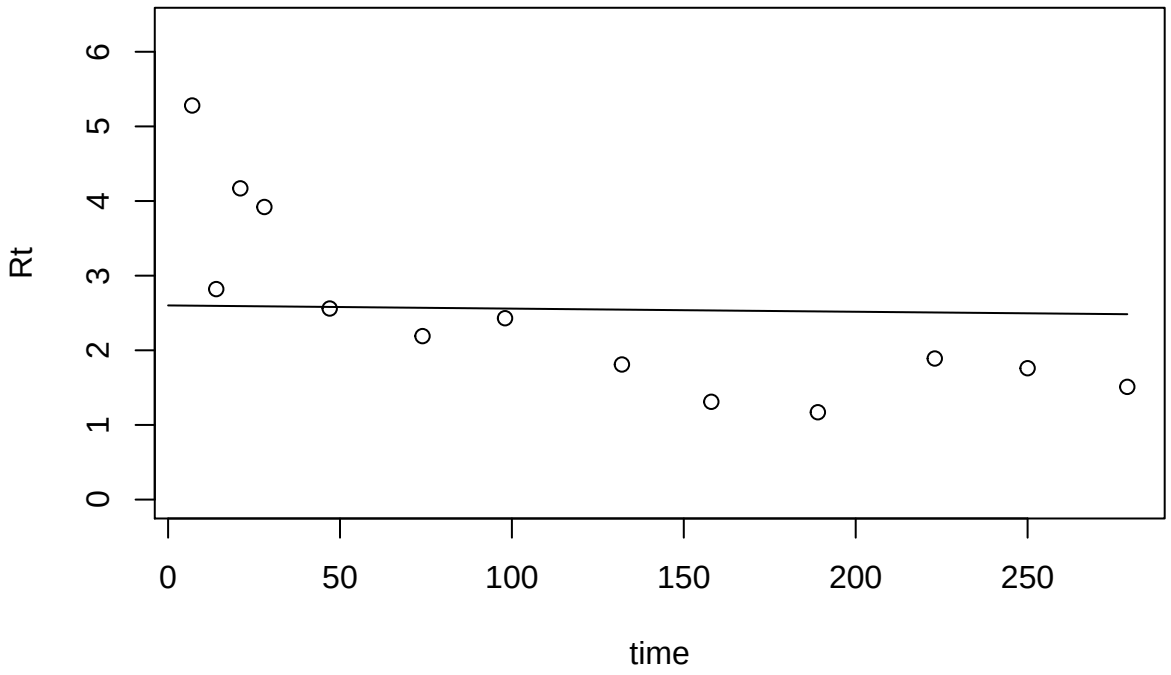
```
## Warning in newf - reff: longer object length is not a multiple of shorter object
## length
```

```
## Warning in del - (newf - reff)/delt[j]: longer object length is not a multiple
## of shorter object length
```

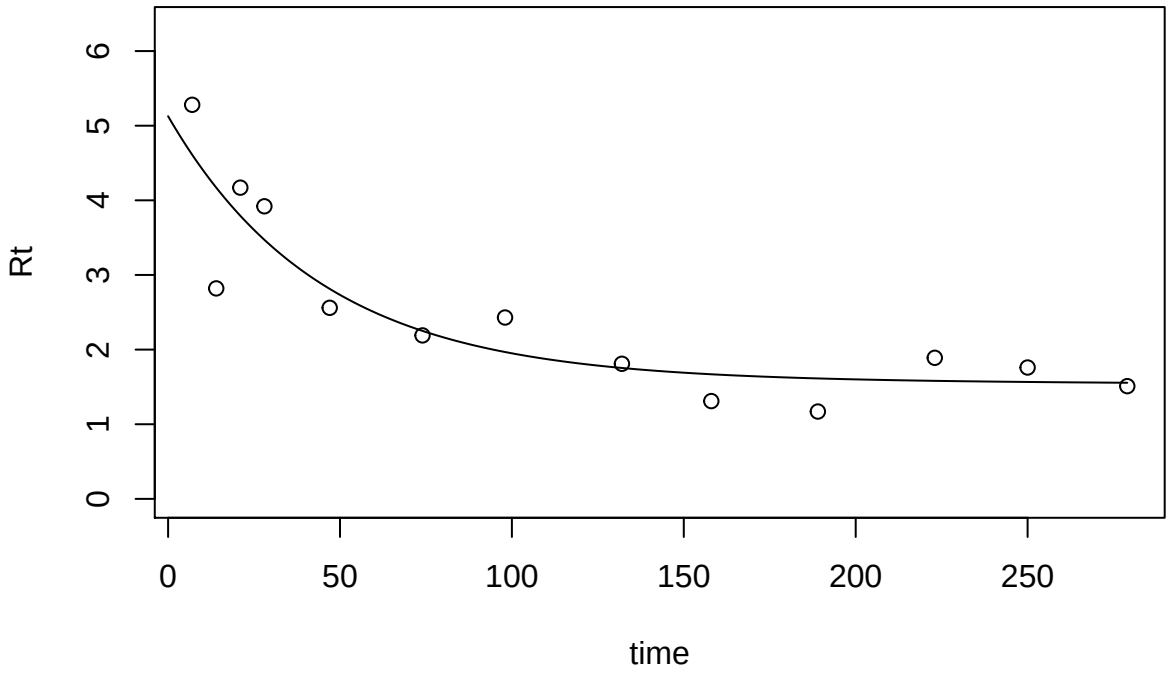
```
## Error in jacob[, j] <- del: number of items to replace is not a multiple of replacement length
```



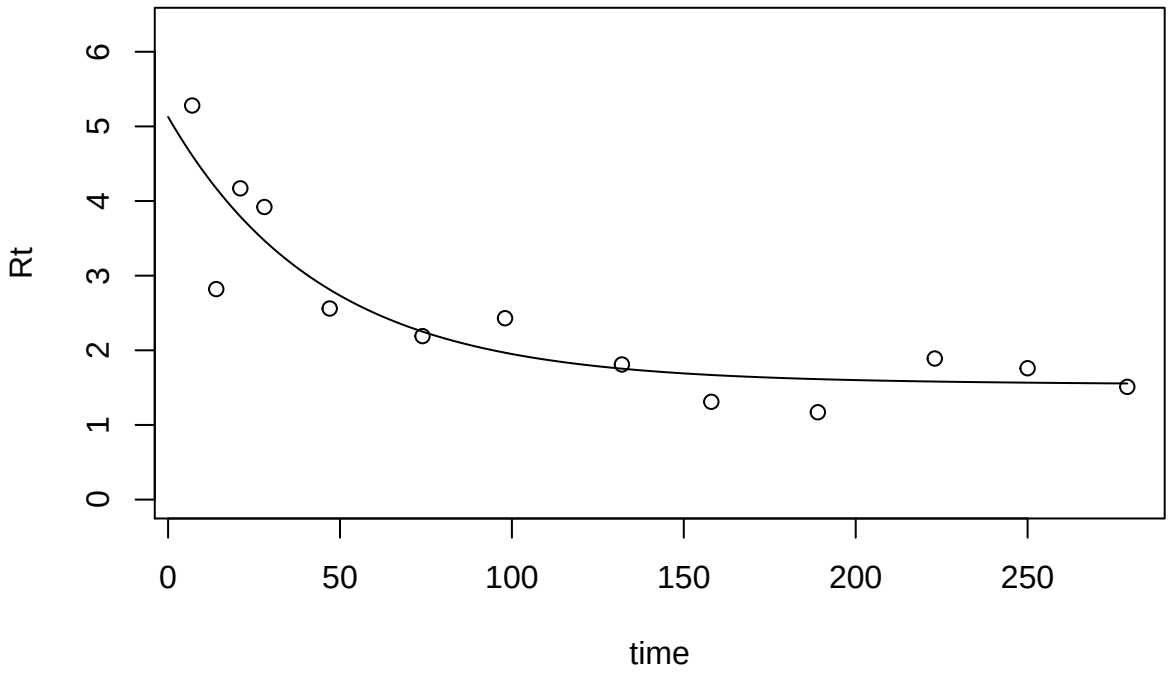

```
## [1] "Best fit parameter:  0.000165681703309829"
```



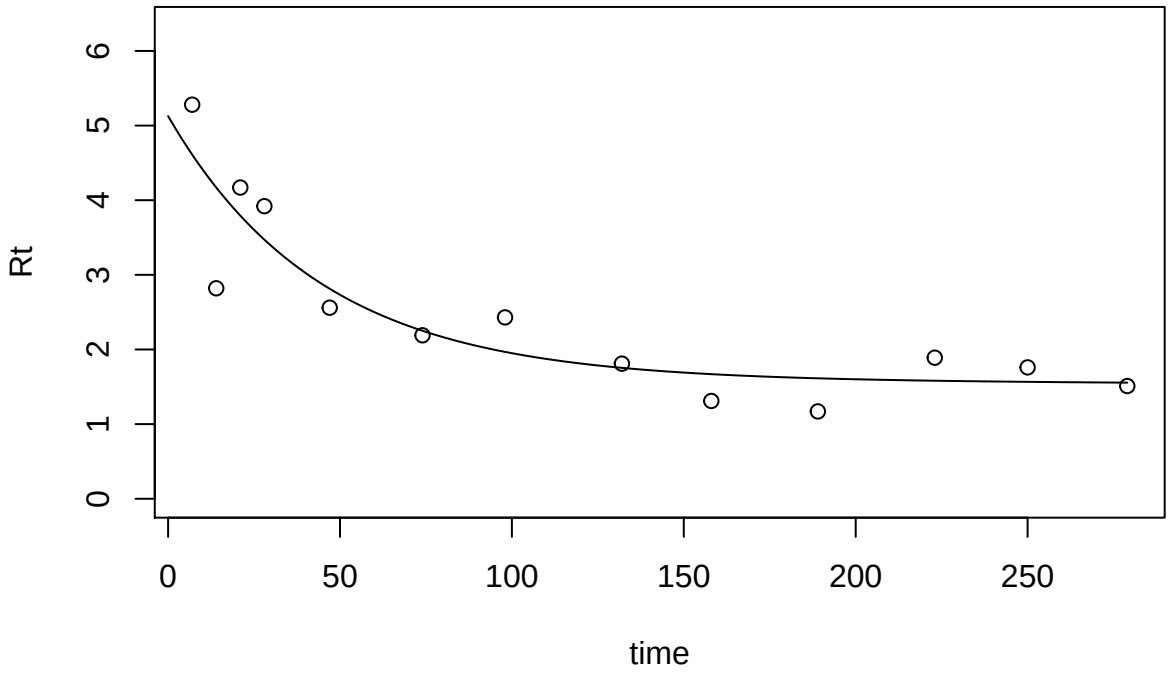

```
## [1] "AIC =  1.41720736720913"
## [1] "k1= 0.0224975127136578"
## [2] "k2= 0.00010255632716396"
## [3] "proportion of C0 in pool 1= 0.0100028312323819"
```



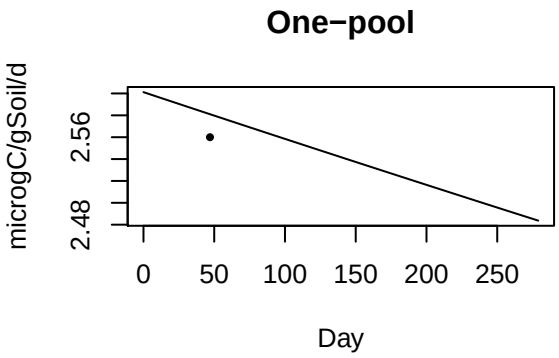

```
## [1] "AIC =  8.70644122446377"
## [1] "k1= 0.0224976627839474"
## [2] "k2= 0.000102566992350661"
## [3] "a21= 0.307835912723464"
## [4] "a12= 0.000331123238998143"
## [5] "Proportion of C0 in pool 1= 0.0144824220194438"
```

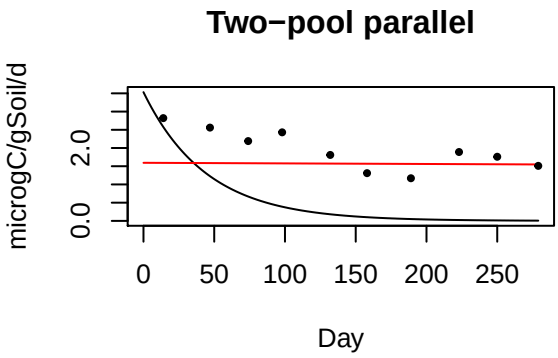


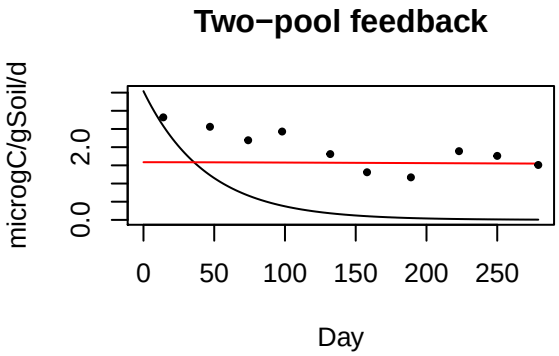

```
## [1] "AIC =  12.7064412244644"
## [1] "k1= 0.0224975242309493"
## [2] "k2= 0.00010255634160918"
## [3] "a21= 0.249616066480975"
## [4] "Proportion of C0 in pool 1= 0.0133504892479089"
```

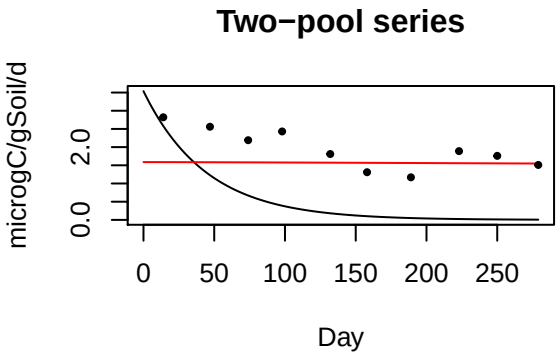



```
## [1] "AIC =  10.7064412230675"
```



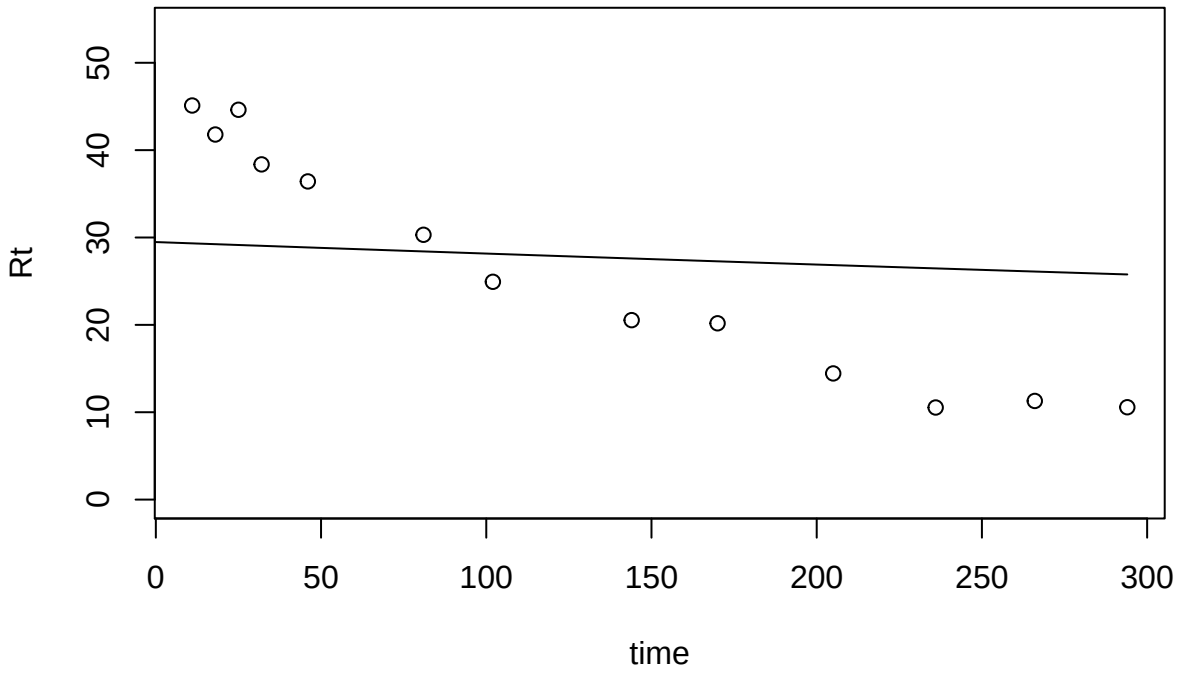



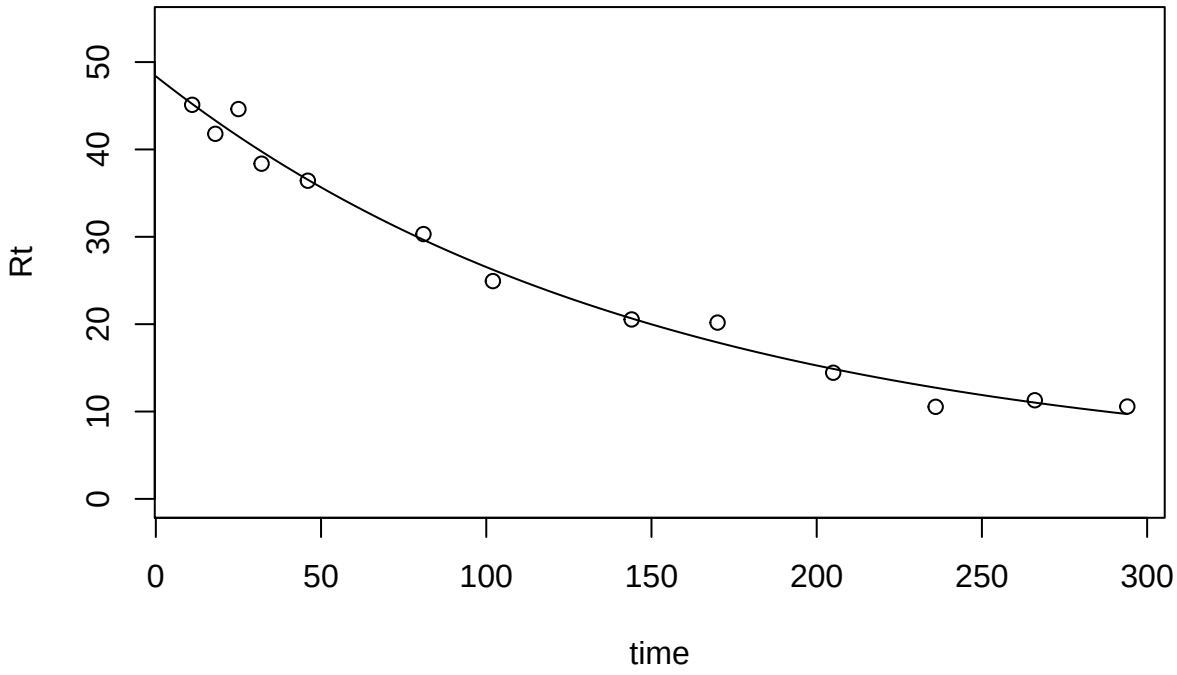




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 1.42 | 0.000166 | NA | NA | NA | NA | 1.49 | 0.977 | NA | NA |
| Two-pool parallel | 8.71 | 0.0225 | 0.000103 | 0.01 | NA | NA | 9.15 | 0.0212 | 9650 | 6660 |
| Two-pool feedback | 12.7 | 0.0225 | 0.000103 | 0.0145 | 0.308 | 0.000331 | 13.9 | 0.00201 | 3050 | 56.8 |
| Two-pool series | 10.7 | 0.0225 | 0.000103 | 0.0134 | 0.25 | NA | 11.5 | 0.00667 | 2480 | 48.7 |

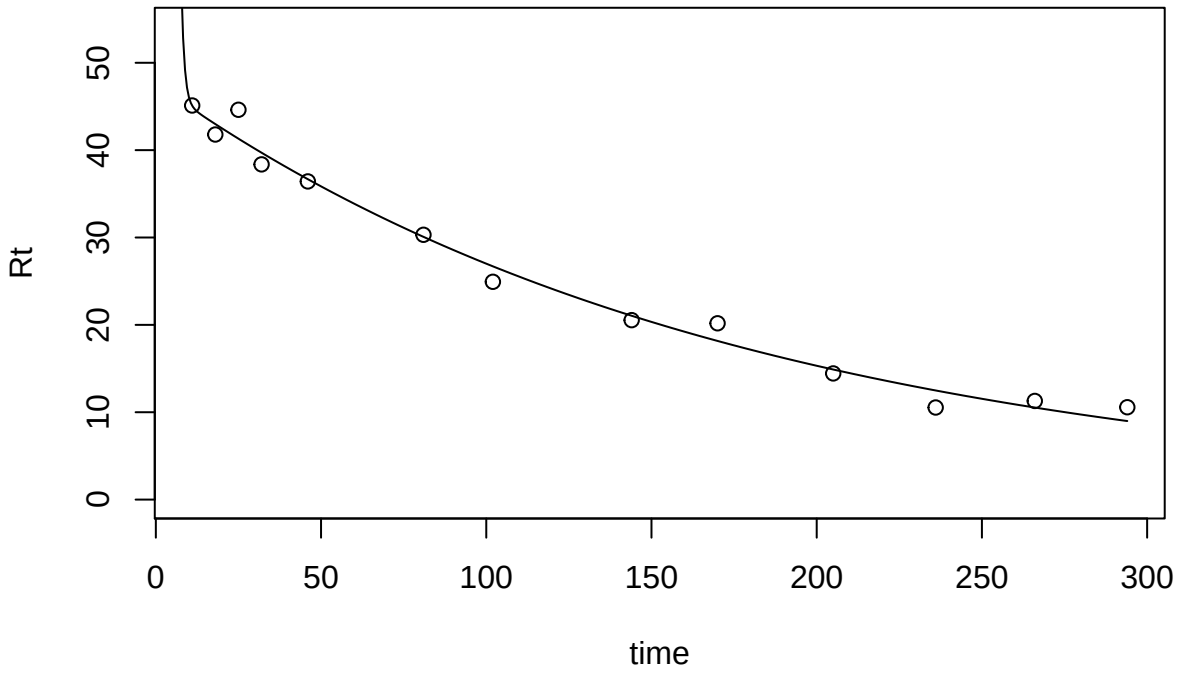
```
## [1] "Best fit parameter:  0.00045701159211573"
```



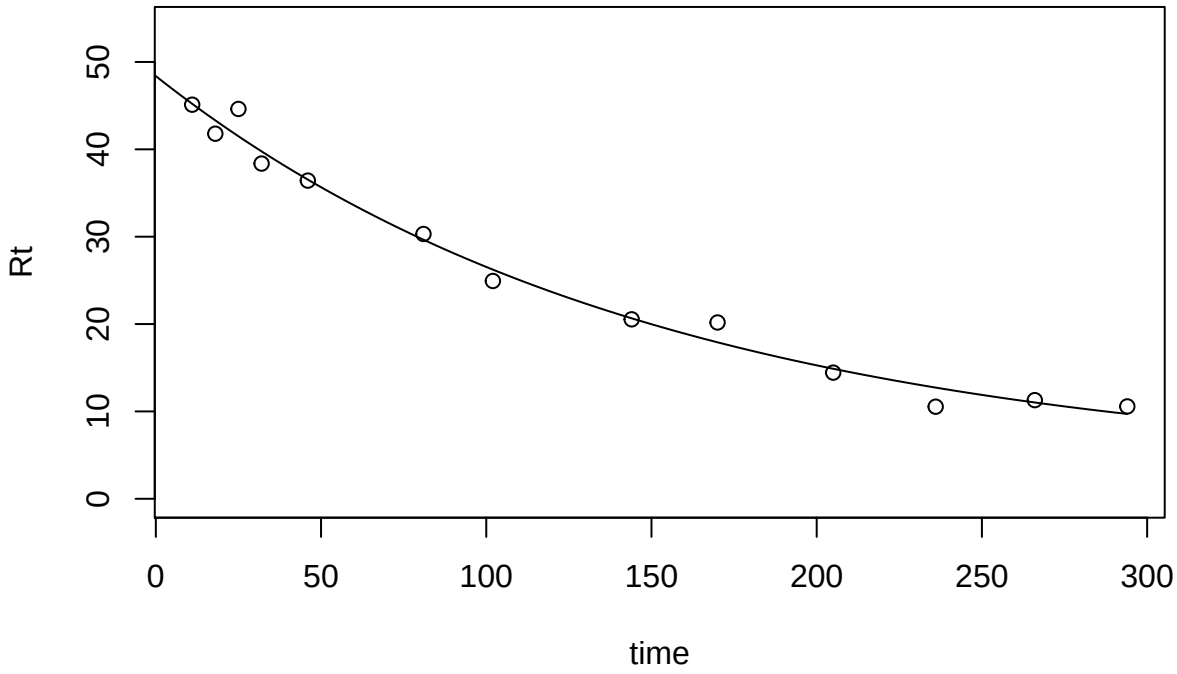

```
## [1] "AIC =  -7.81858291367529"
## [1] "k1= 0.00662984452291994"
## [2] "k2= 5.8136664350411e-05"
## [3] "proportion of C0 in pool 1= 0.105287446797823"
```



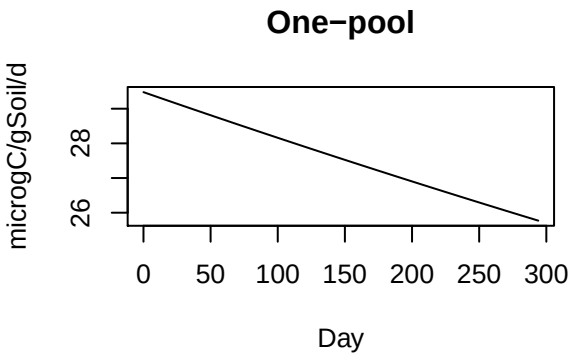

```
## [1] "AIC =  4.5295164636532"
## [1] "k1= 1.09359271282176"
## [2] "k2= 0.00566915450385629"
## [3] "a21= 0.00225688683365138"
## [4] "a12= 2.04324513369825e-06"
## [5] "Proportion of C0 in pool 1= 0.871795127840941"
```

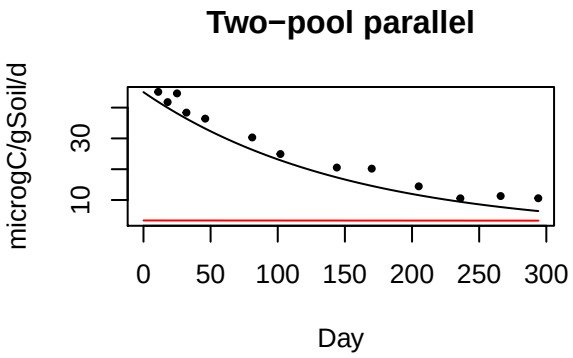


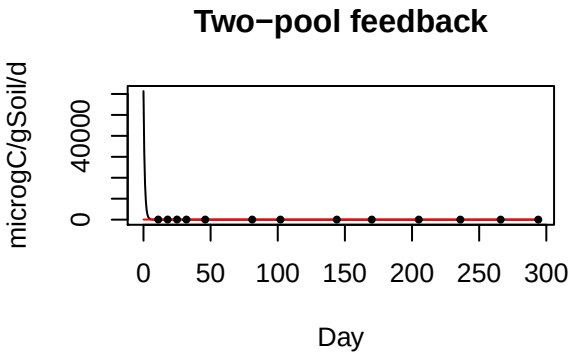

```
## [1] "AIC =  8.40845364813695"
## [1] "k1= 0.00662984435808578"
## [2] "k2= 5.81366557725127e-05"
## [3] "a21= 0.00116198313133498"
## [4] "Proportion of C0 in pool 1= 0.105410983356109"
```

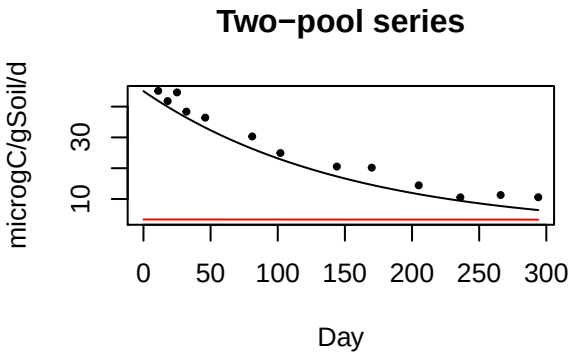



```
## [1] "AIC =  6.52951646357379"
```



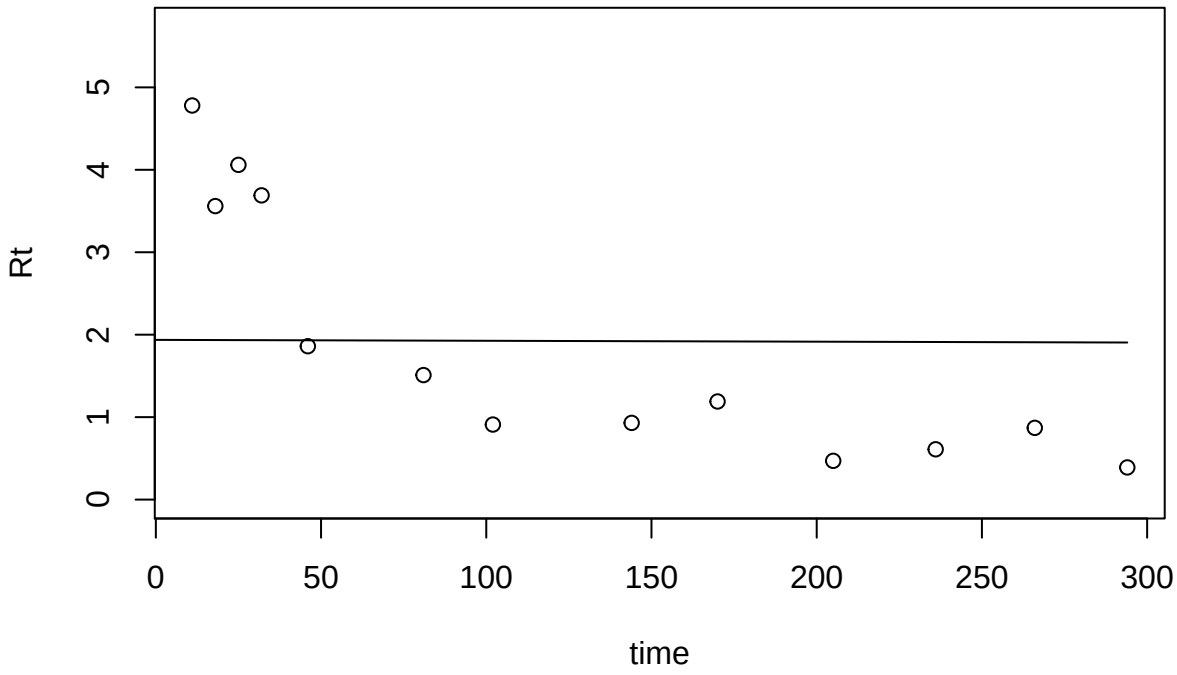



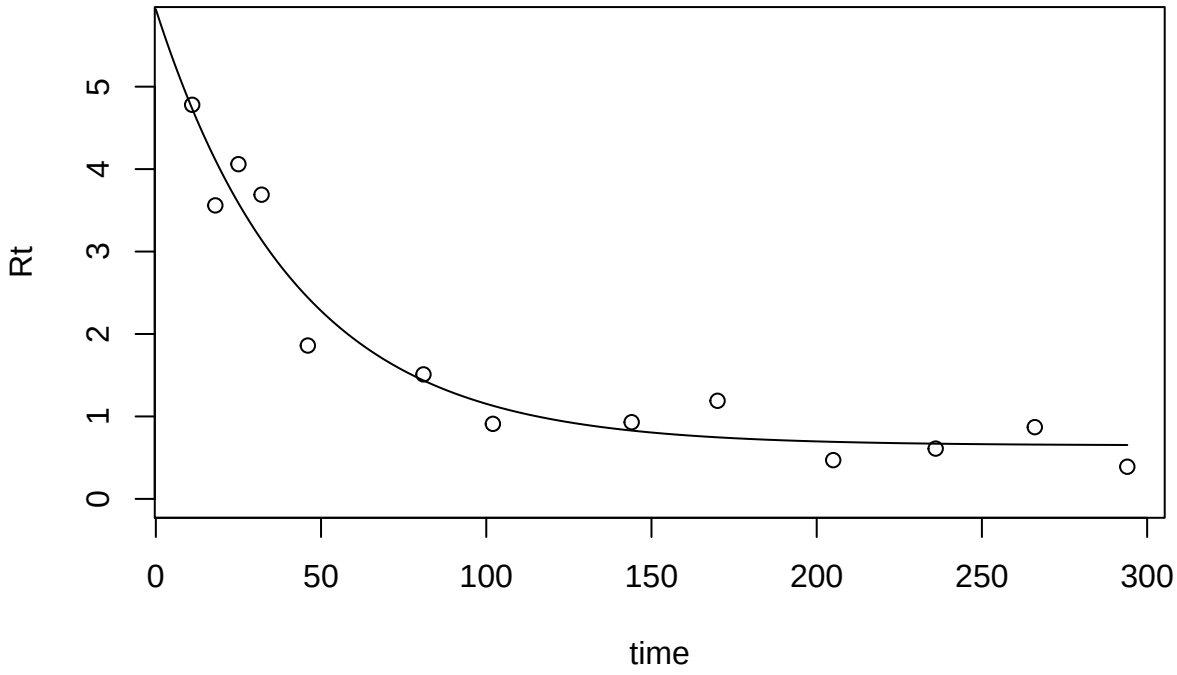




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTr | Tq05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -7.82 | 0.000457 | NA | NA | NA | NA | -7.75 | 0.998 | NA | NA |
| Two-pool parallel | 4.53 | 0.00663 | 5.81e-05 | 0.105 | NA | NA | 4.97 | 0.00173 | 15400 | 10000 |
| Two-pool feedback | 8.41 | 1.09 | 0.00567 | 0.872 | 0.00226 | 2.04e-06 | 9.56 | 0.000174 | 1.31 | 0.636 |
| Two-pool series | 6.53 | 0.00663 | 5.81e-05 | 0.105 | 0.00116 | NA | 7.28 | 0.000543 | 171 | 105 |

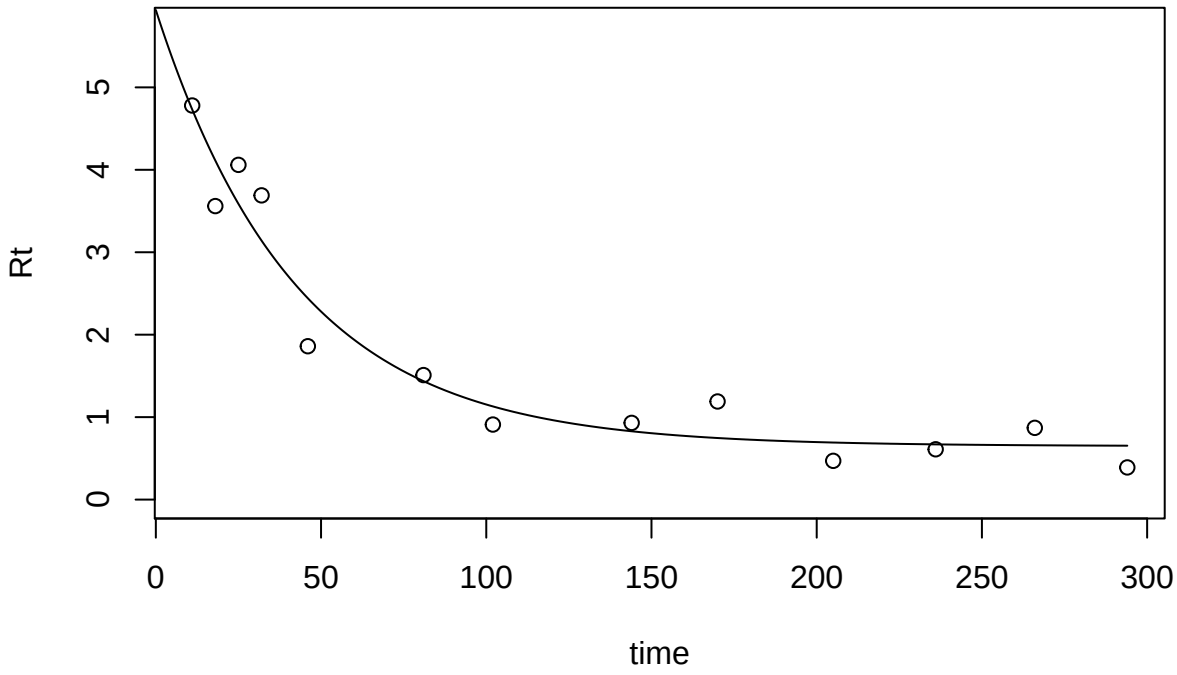
```
## [1] "Best fit parameter:  5.64744132996125e-05"
```



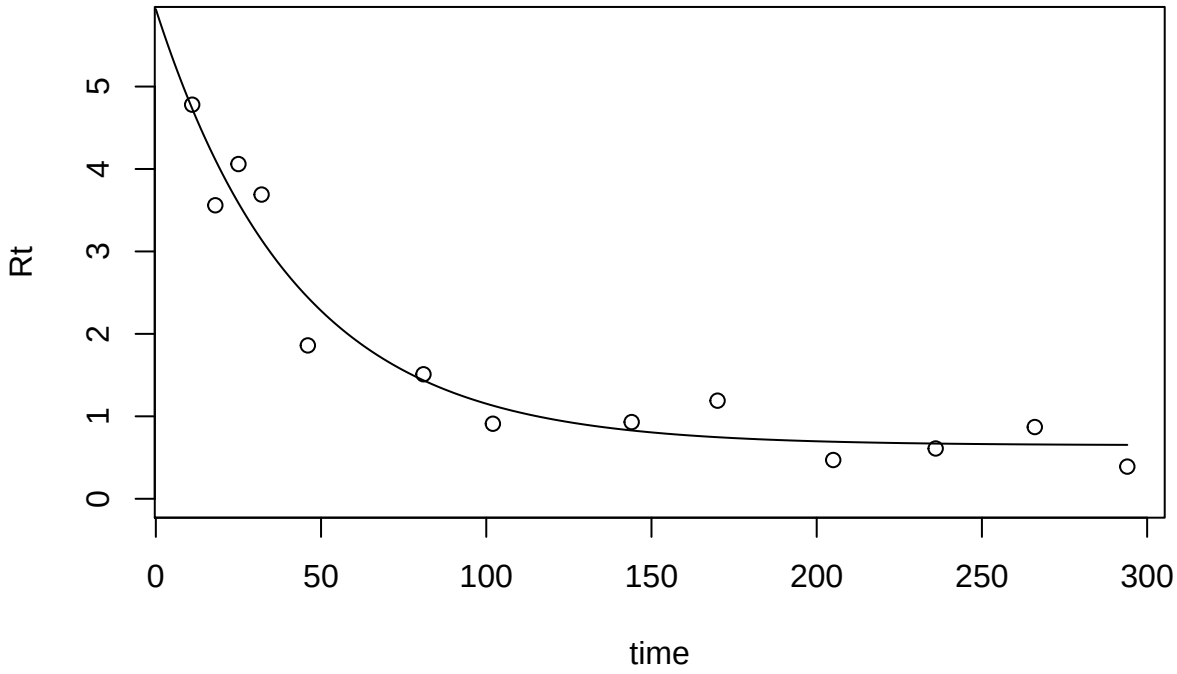

```
## [1] "AIC =  0.450303629212578"
## [1] "k1= 0.023533773898855"
## [2] "k2= 1.91358934549238e-05"
## [3] "proportion of C0 in pool 1= 0.00654828004570918"
```



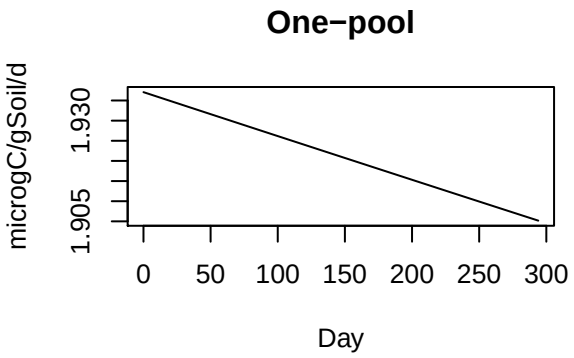

```
## [1] "AIC =  10.1909370061724"
## [1] "k1= 0.0235337758098764"
## [2] "k2= 1.91360868486719e-05"
## [3] "a21= 0.286198617825299"
## [4] "a12= 3.49760570797497e-05"
## [5] "Proportion of C0 in pool 1= 0.00917680081193761"
```

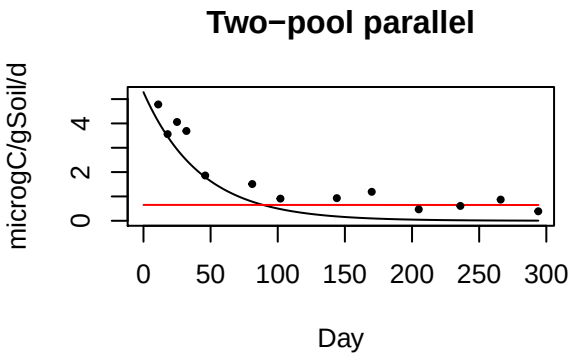


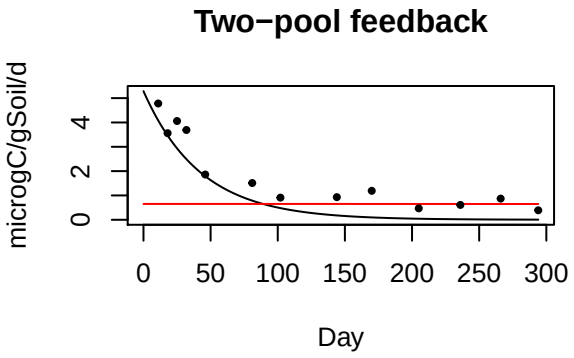

```
## [1] "AIC =  14.1909370053749"
## [1] "k1= 0.0235337741645776"
## [2] "k2= 1.91358936487823e-05"
## [3] "a21= 0.27245730136253"
## [4] "Proportion of C0 in pool 1= 0.00900326336901808"
```

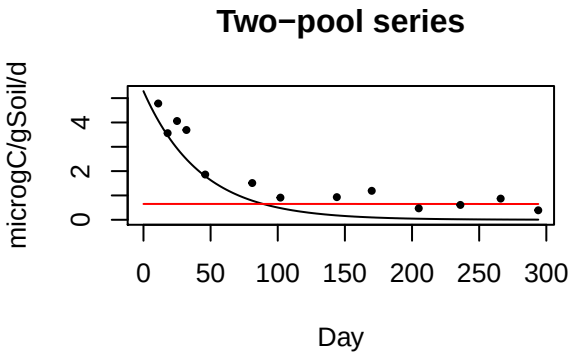



```
## [1] "AIC =  12.1909370057402"
```



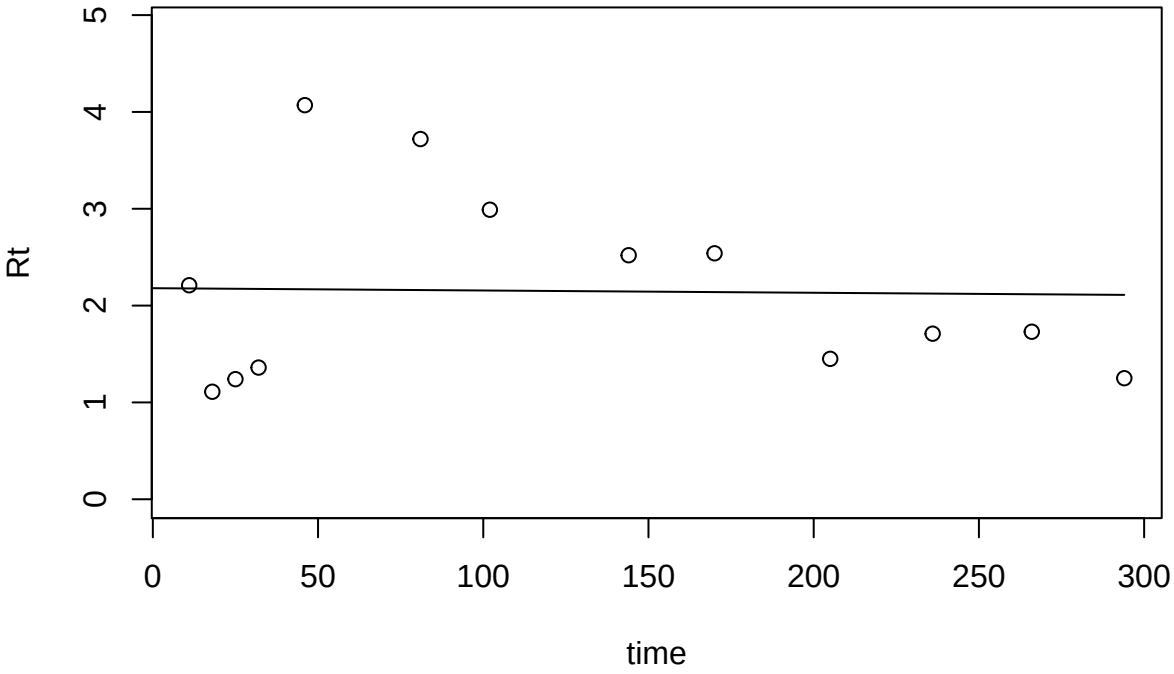



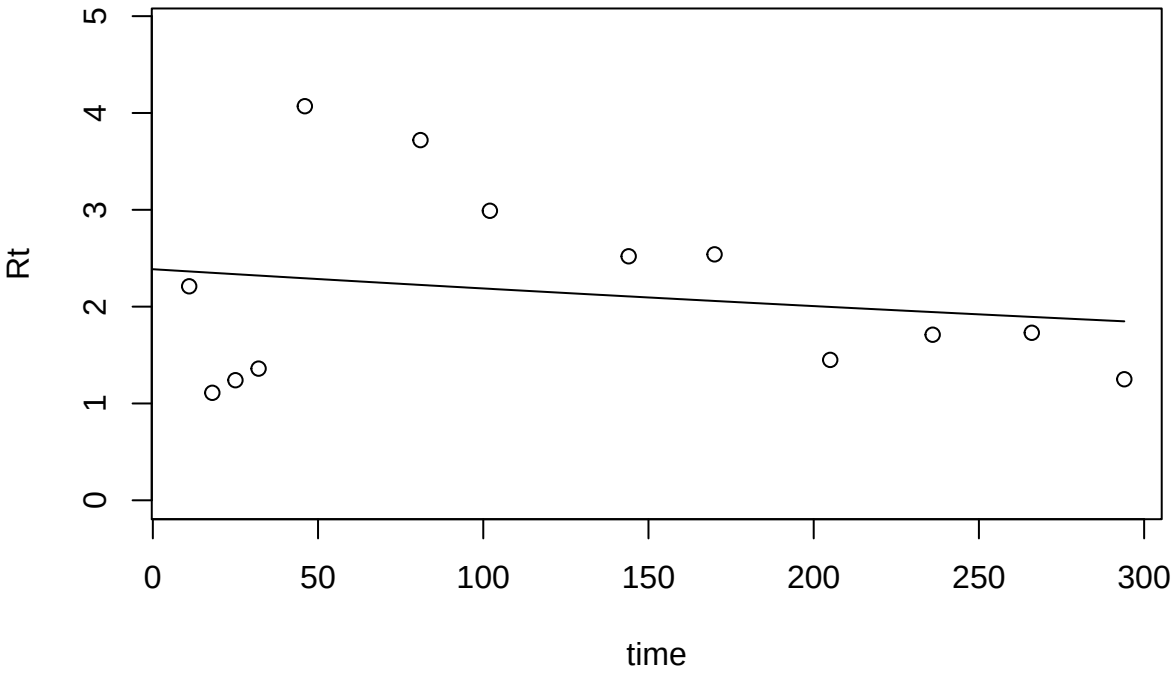




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 0.45 | 5.65e-05 | NA | NA | NA | NA | 0.522 | 0.993 | NA | NA |
| Two-pool parallel | 10.2 | 0.0235 | 1.91e-05 | 0.00655 | NA | NA | 10.6 | 0.00632 | 51900 | 35900 |
| Two-pool feedback | 14.2 | 0.0235 | 1.91e-05 | 0.00918 | 0.286 | 3.5e-05 | 15.3 | 6e-04 | 15000 | 51.2 |
| Two-pool series | 12.2 | 0.0235 | 1.91e-05 | 0.009 | 0.272 | NA | 12.9 | 0.00199 | 14300 | 49.4 |

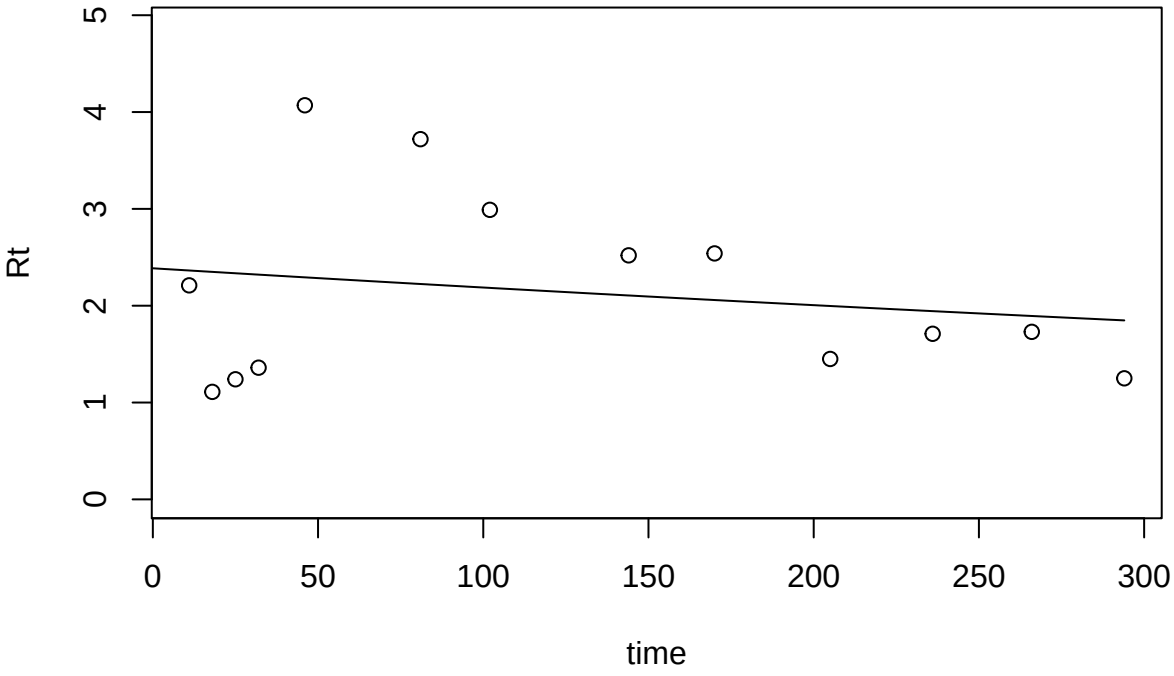
```
## [1] "Best fit parameter:  0.000109530818594525"
```



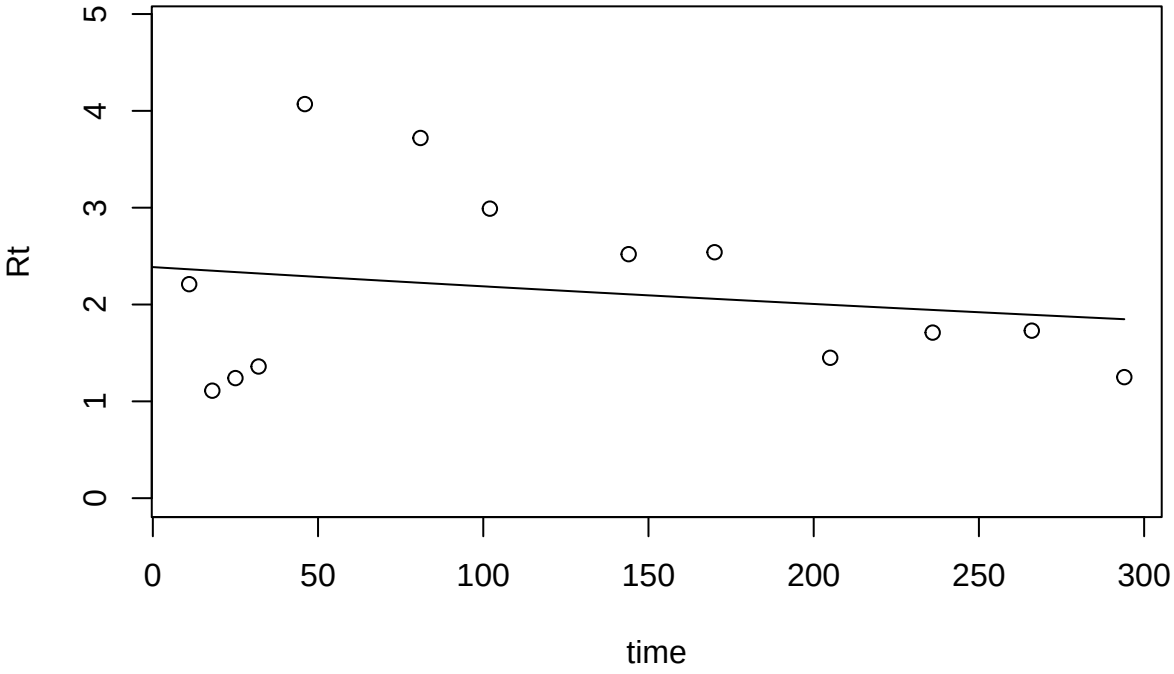
```
## [1] "AIC =  2.29135779760067"
## [1] "k1= 0.000869100029444882"
## [2] "k2= 6.10399286005588e-16"
## [3] "proportion of C0 in pool 1= 0.137981377741316"
```



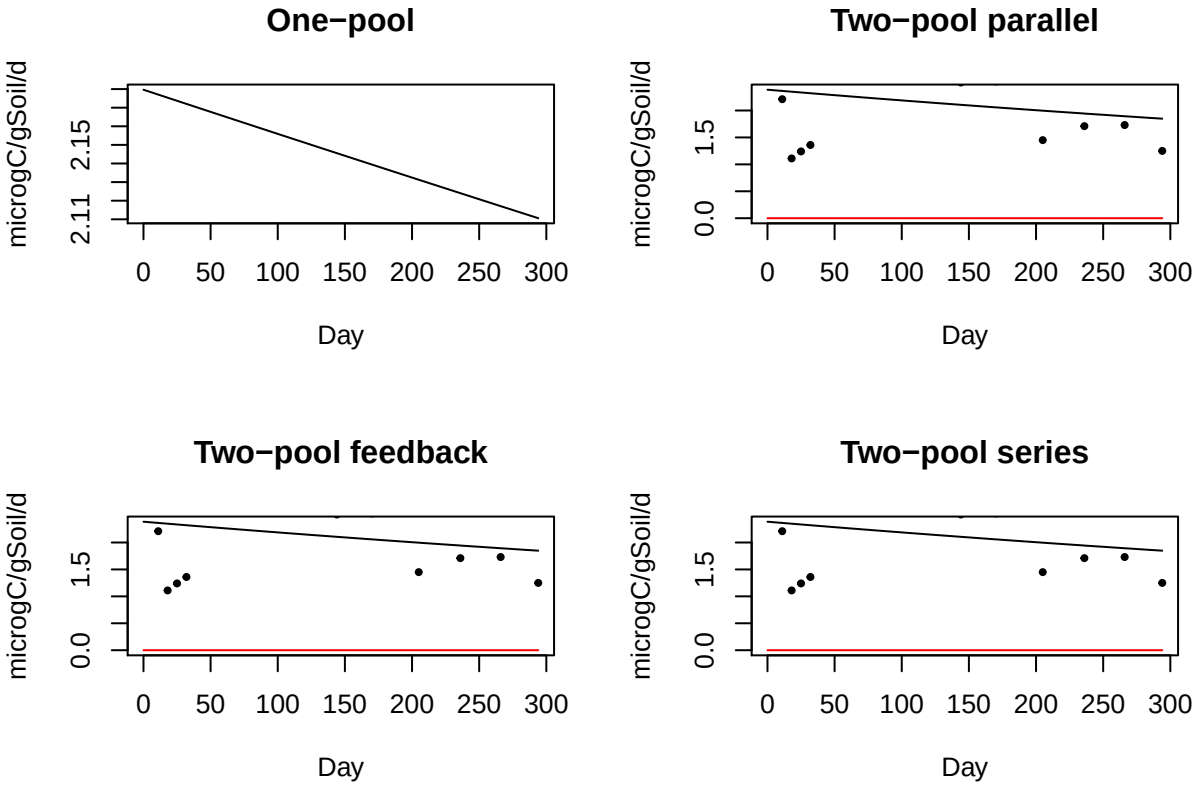

```
## [1] "AIC =  6.35793942867353"
## [1] "k1= 0.000869101301882327"
## [2] "k2= 5.25643392762566e-09"
## [3] "a21= 0.0164728951883217"
## [4] "a12= 0.999919545679198"
## [5] "Proportion of C0 in pool 1= 0.140291305210816"
```



```
## [1] "AIC =  10.3579388610706"
## [1] "k1= 0.000869080848399745"
## [2] "k2= 1.46465593405883e-09"
## [3] "a21= 0.0162489211734555"
## [4] "Proportion of C0 in pool 1= 0.140260461017551"
```

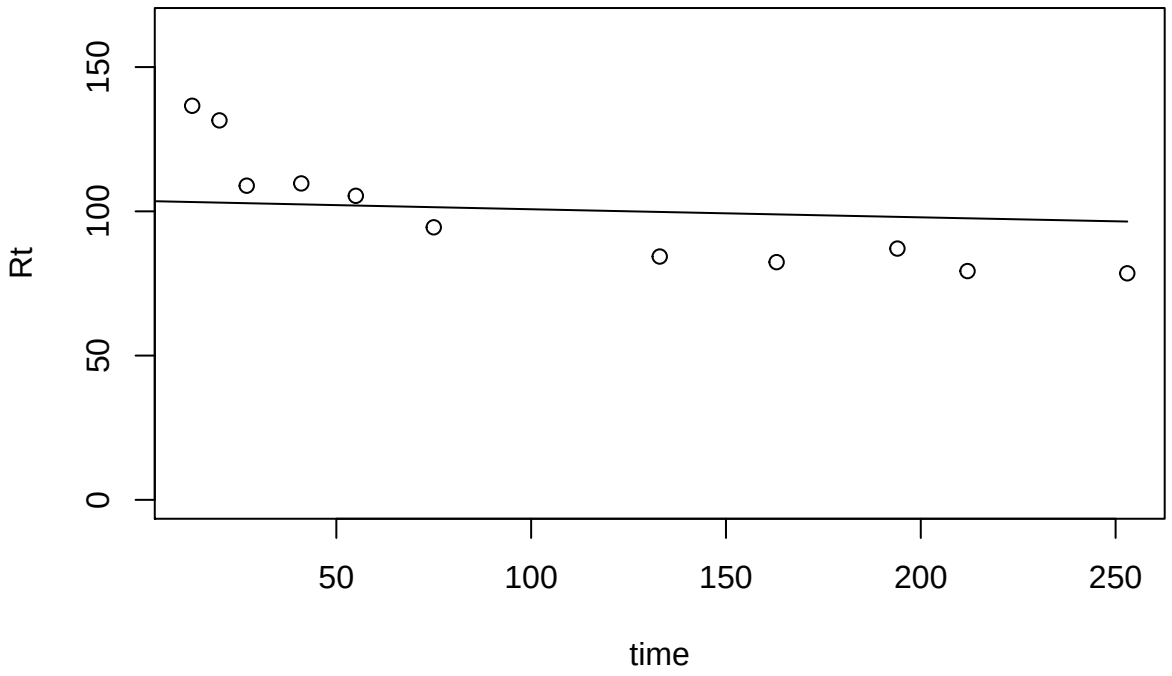



```
## [1] "AIC =  8.35793926718288"
```

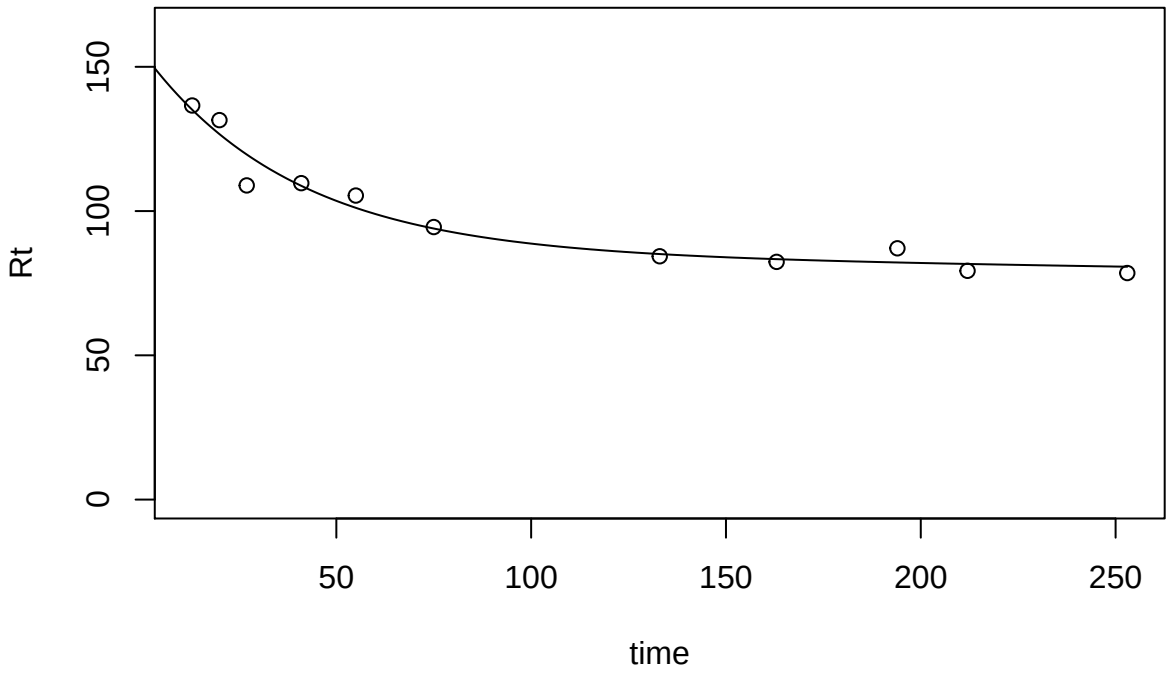


| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 2.29 | 0.00011 | NA | NA | NA | NA | 2.36 | 0.894 | NA | NA |
| Two-pool parallel | 6.36 | 0.000869 | 6.1e-16 | 0.138 | NA | NA | 6.8 | 0.0971 | 1.41e+15 | 8.92e+14 |
| Two-pool feedback | 10.4 | 0.000869 | 5.26e-09 | 0.14 | 0.0165 | 1 | 11.5 | 0.00922 | 3190000 | 817 |
| Two-pool series | 8.36 | 0.000869 | 1.46e-09 | 0.14 | 0.0162 | NA | 9.11 | 0.0306 | 11100000 | 817 |

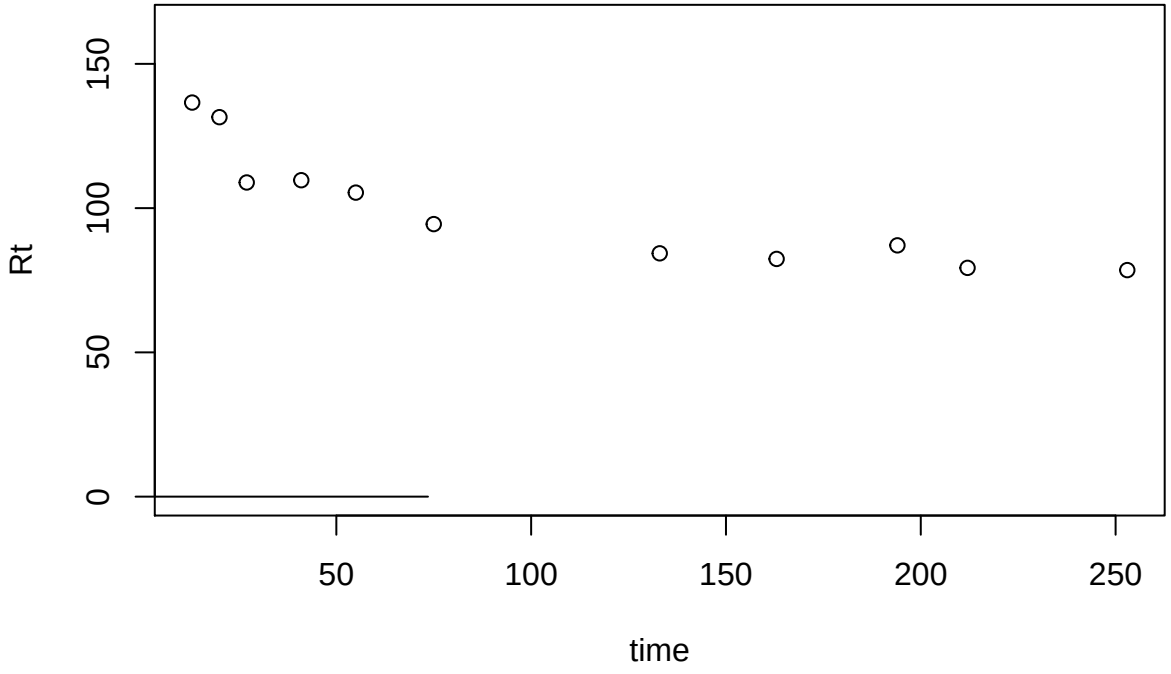
```
## [1] "Best fit parameter:  0.000282298928321179"
```




```
## [1] "AIC =  -9.44685772417838"
## [1] "k1= 0.0260700595376519"
## [2] "k2= 0.000234813097279045"
## [3] "proportion of C0 in pool 1= 0.00731110628740583"
```

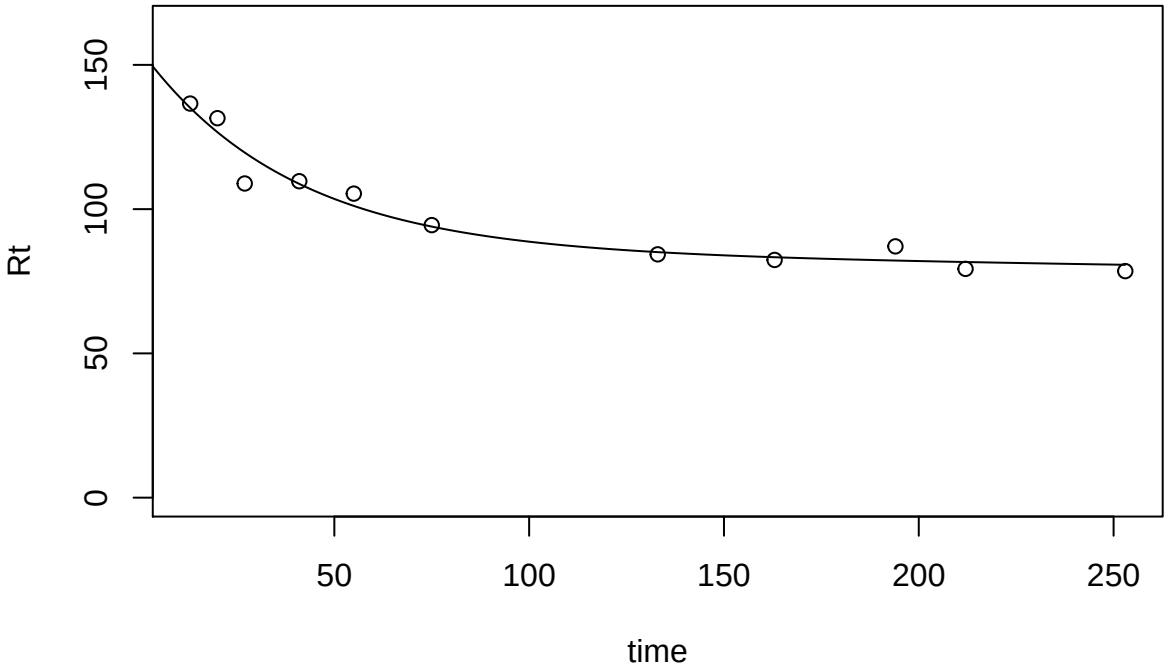



```
## [1] "AIC =  0.242473368276966"
## [1] "k1= 291.35410471206"
## [2] "k2= 5.02741509946906e+54"
## [3] "a21= 0.00011642247566418"
## [4] "a12= 0.999999896884863"
## [5] "Proportion of C0 in pool 1= 0.999884615805176"
```

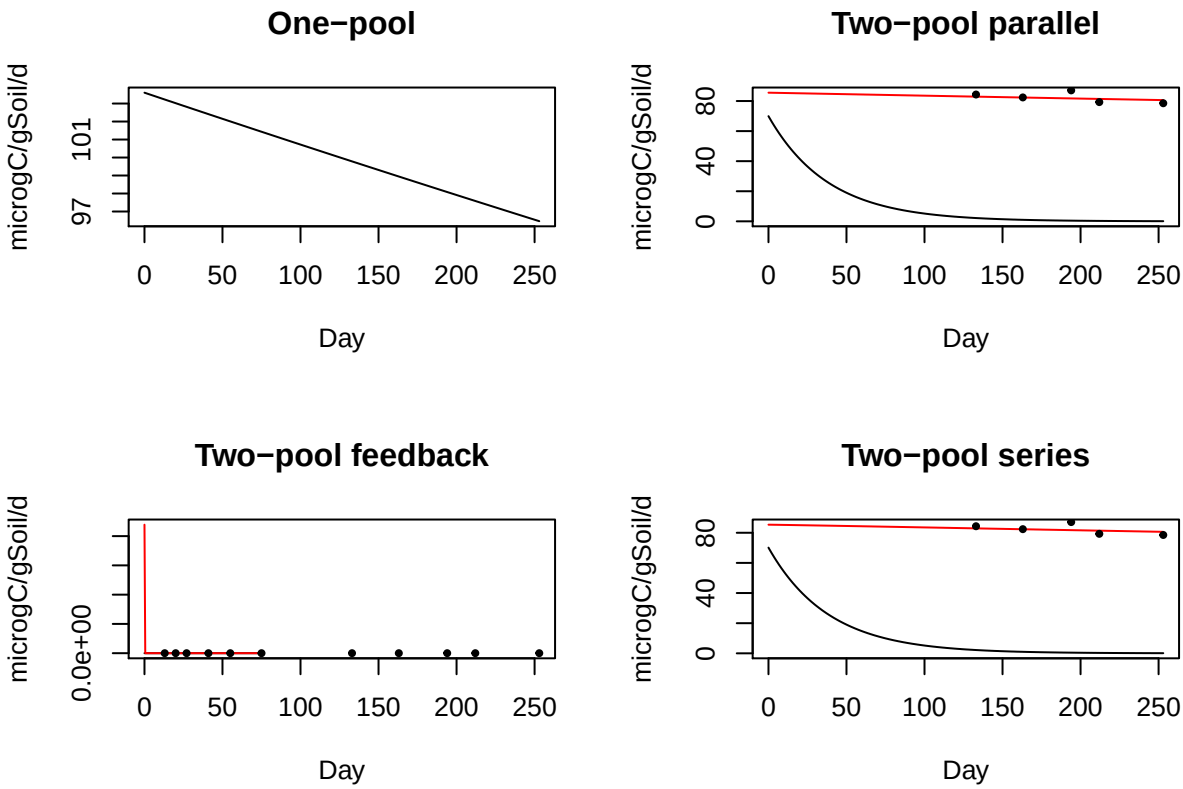



```
## [1] "AIC =  -7.54349671475015"
## [1] "k1= 0.0260701034097434"
## [2] "k2= 0.000234813128822835"
## [3] "a21= 0.230152484235168"
```

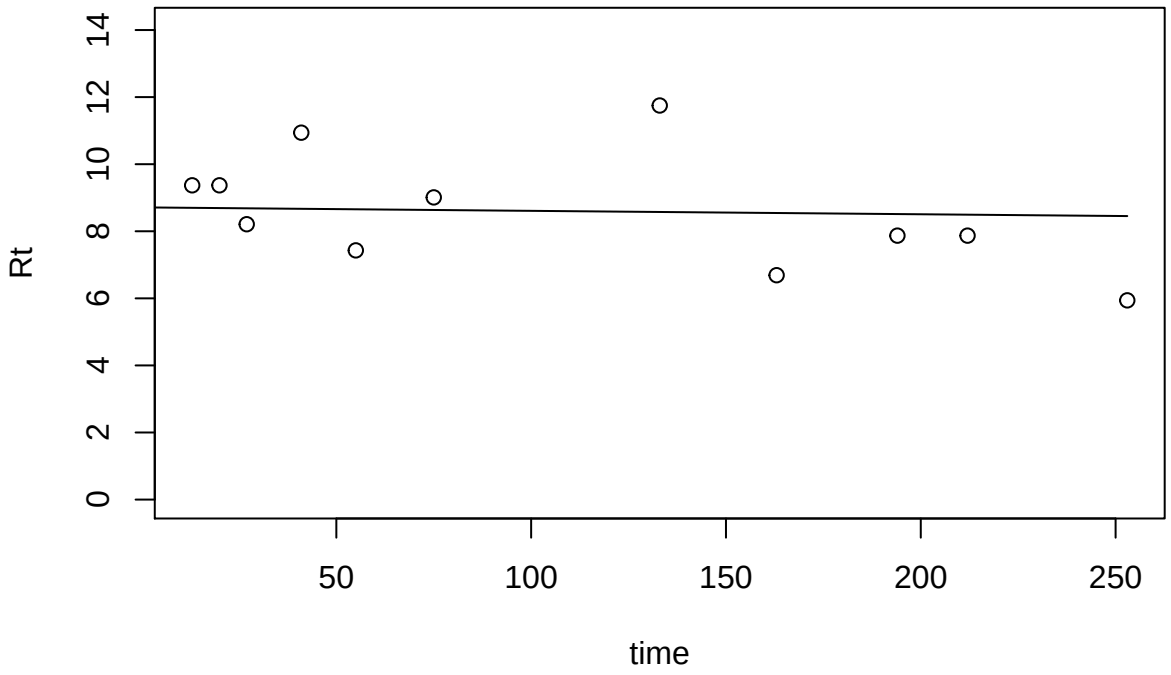
```
## [4] "Proportion of C0 in pool 1= 0.00952267018877268"
```



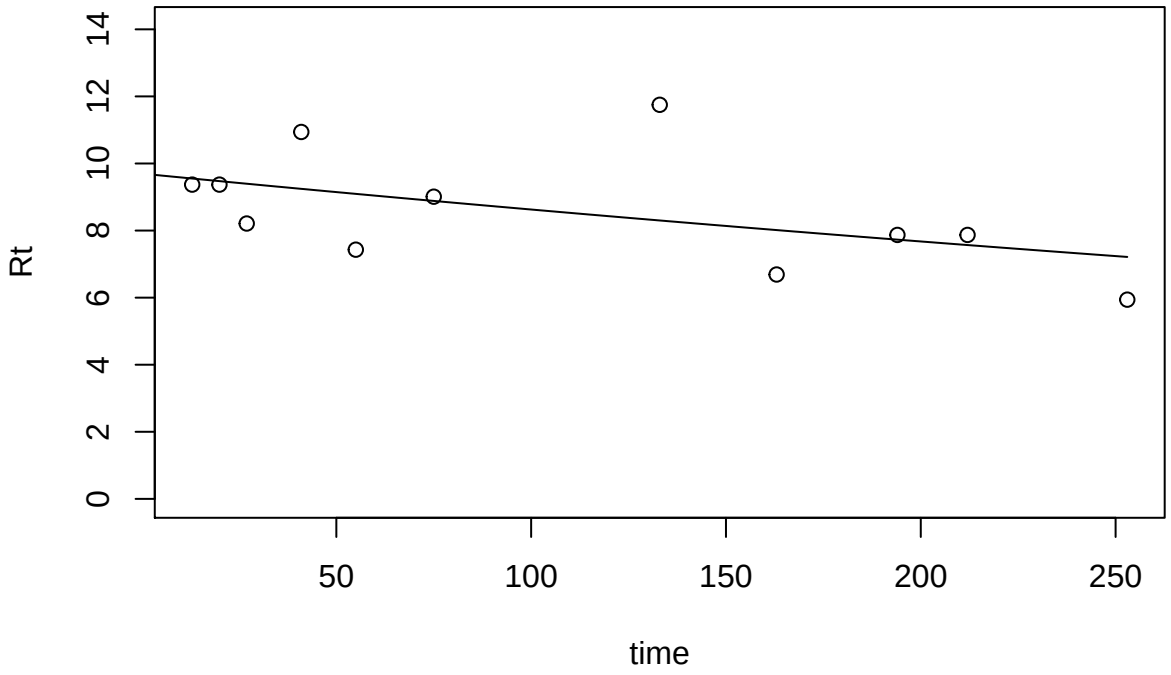

```
## [1] "AIC =  2.24247336803864"
## Error in solve.default(A): system is computationally singular: reciprocal condition number = 2.89732
```



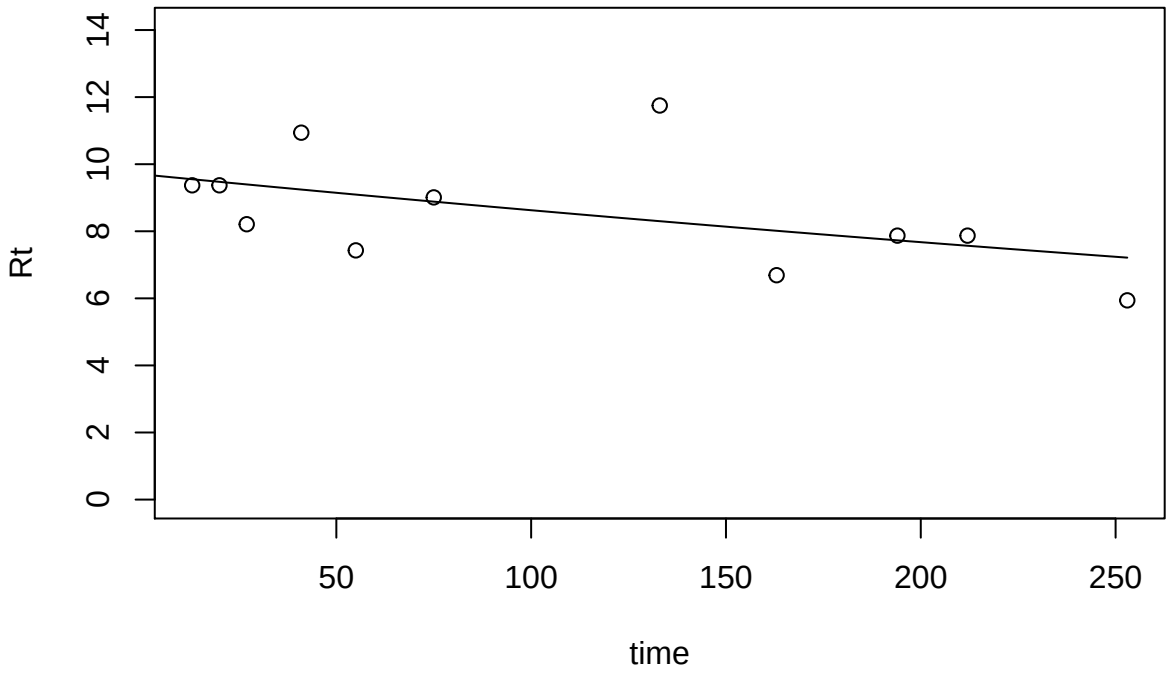

```
## [1] "Best fit parameter:  0.000119347245166188"
```



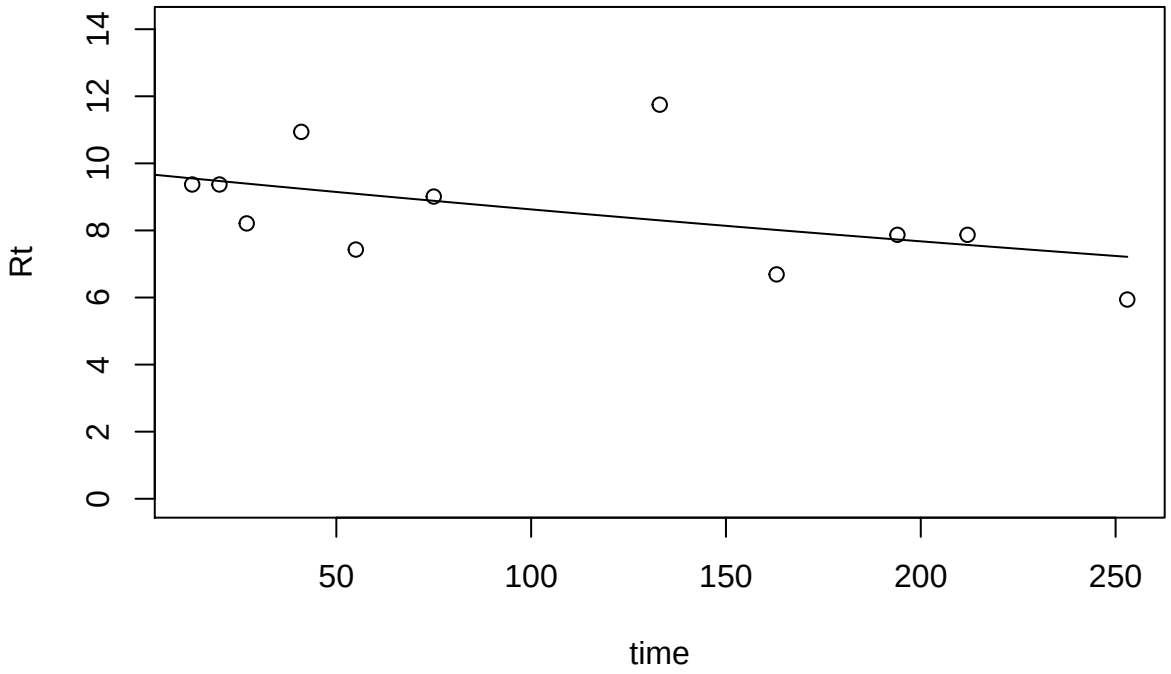

```
## [1] "AIC =  0.0910471523791239"
## [1] "k1= 0.00116976458037056"
## [2] "k2= 6.34368893418919e-11"
## [3] "proportion of C0 in pool 1= 0.113570867562346"
```



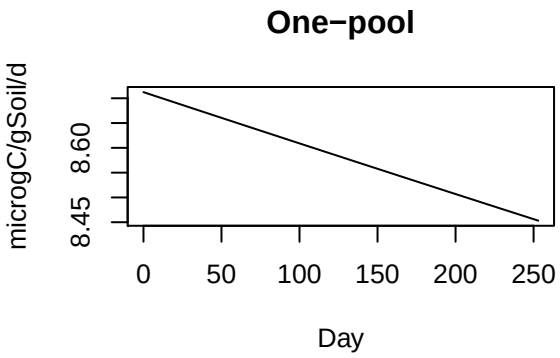

```
## [1] "AIC =  4.56899914443474"
## [1] "k1= 0.00116978181240439"
## [2] "k2= 1.41386824342818e-14"
## [3] "a21= 0.00473987771327772"
## [4] "a12= 9.23743796721332e-06"
## [5] "Proportion of C0 in pool 1= 0.114109767132323"
```

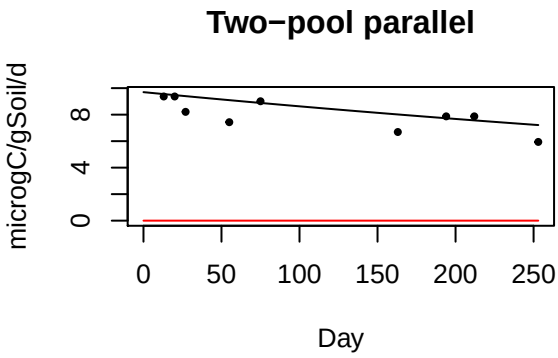


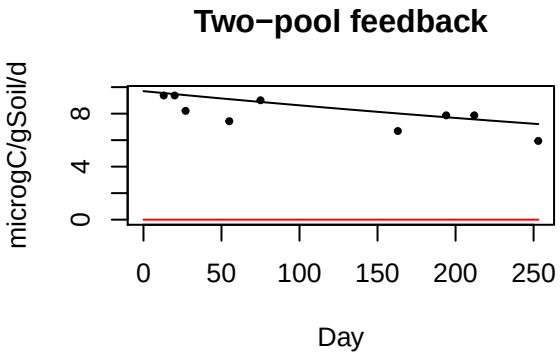

```
## [1] "AIC =  8.56899915749342"
## [1] "k1= 0.0011697592001118"
## [2] "k2= 9.64631546457068e-15"
## [3] "a21= 0.0041644408497909"
## [4] "Proportion of C0 in pool 1= 0.114046023111554"
```

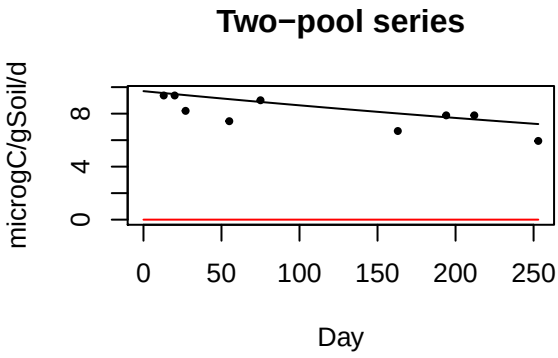



```
## [1] "AIC =  6.56899915862312"
```



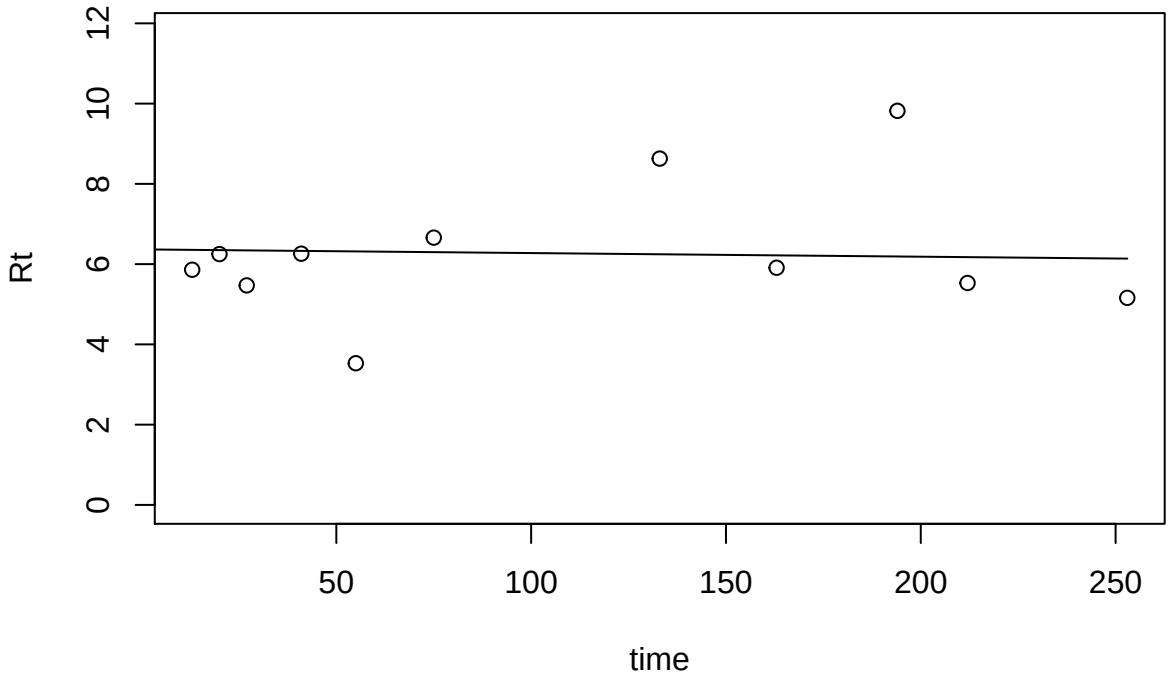



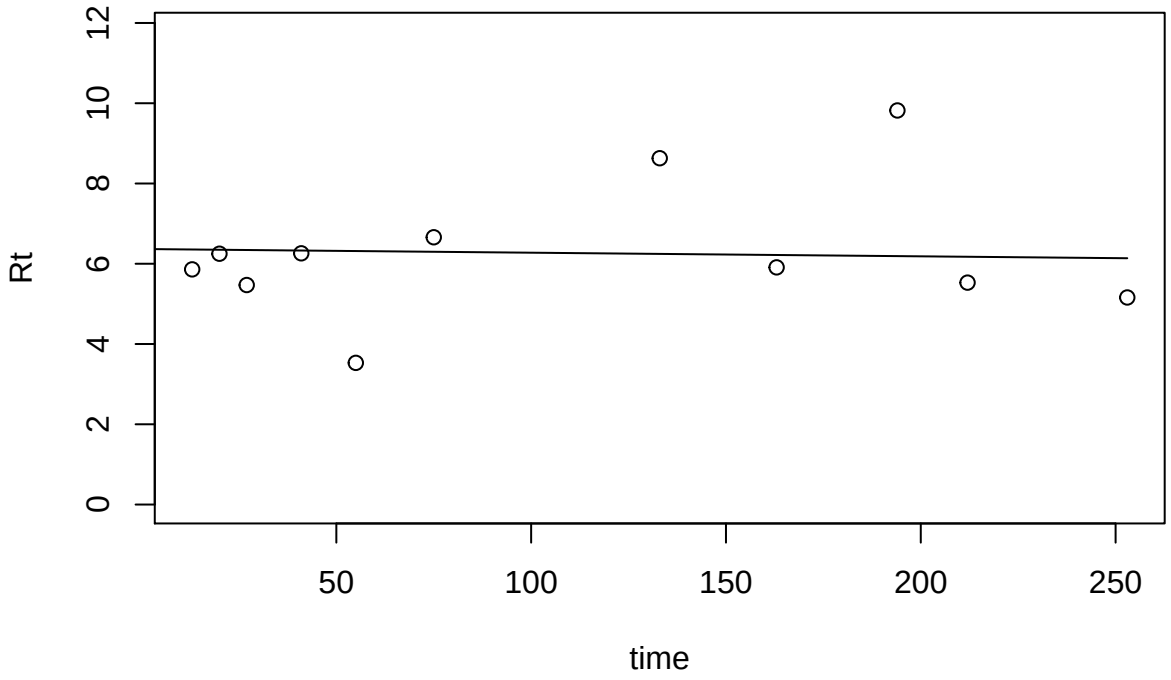




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 0.091 | 0.000119 | NA | NA | NA | NA | 0.162 | 0.912 | NA | NA |
| Two-pool parallel | 4.57 | 0.00117 | 6.34e-11 | 0.114 | NA | NA | 5.01 | 0.0806 | 1.4e+10 | 9.03e+09 |
| Two-pool feedback | 8.57 | 0.00117 | 1.41e-14 | 0.114 | 0.00474 | 9.24e-06 | 9.72 | 0.00765 | 3.35e+11 | 597 |
| Two-pool series | 6.57 | 0.00117 | 9.65e-15 | 0.114 | 0.00416 | NA | 7.32 | 0.0254 | 4.32e+11 | 596 |

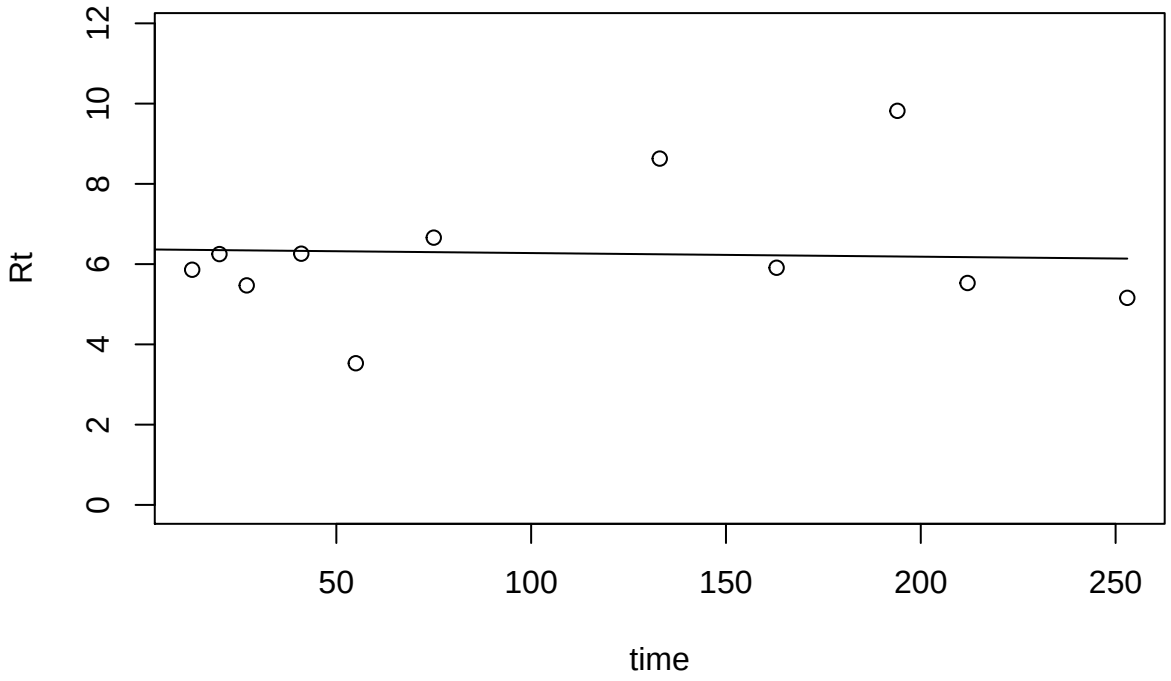
```
## [1] "Best fit parameter:  0.000145377235852588"
```



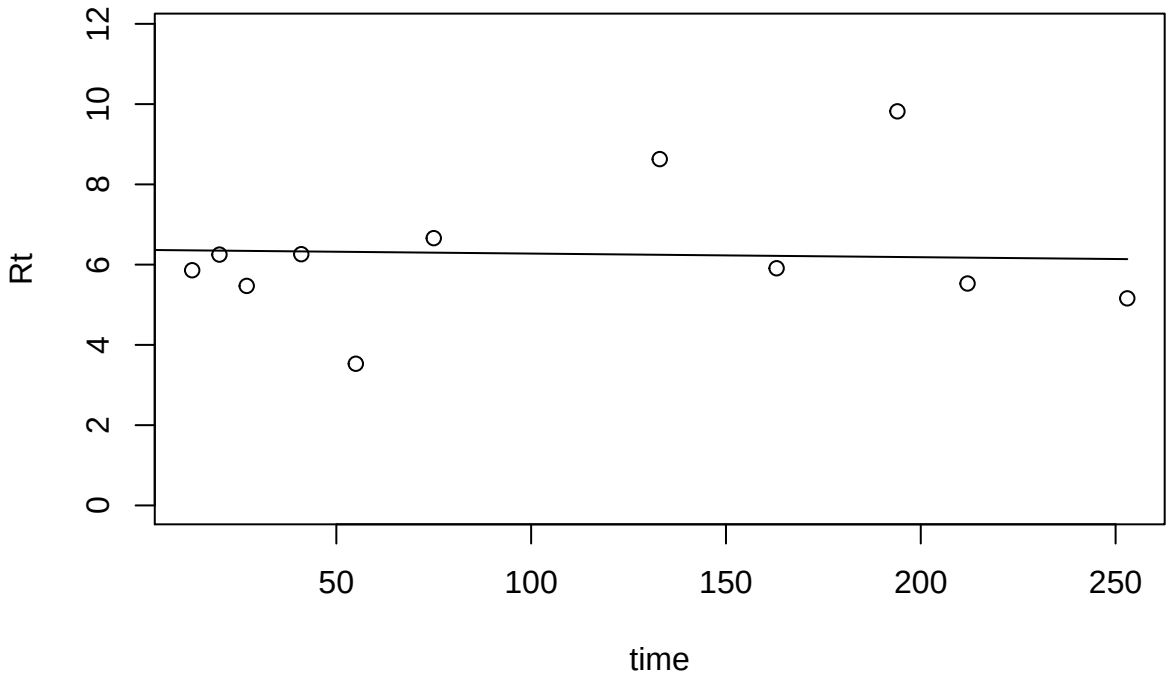

```
## [1] "AIC =  0.0444736795569596"
## [1] "k1= 0.000145375622341567"
## [2] "k2= 0.00014537752335478"
## [3] "proportion of C0 in pool 1= 0.0550324613806066"
```



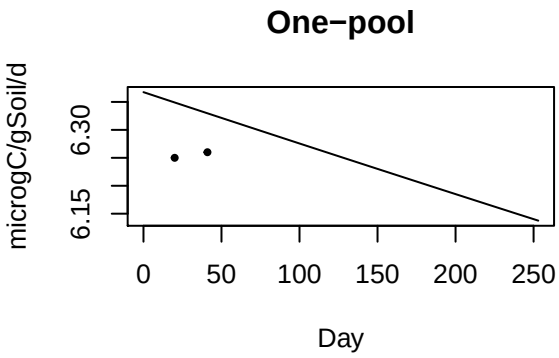

```
## [1] "AIC =  4.04447367951139"
## [1] "k1= 0.000147428263333708"
## [2] "k2= 0.000145450968371235"
## [3] "a21= 0.0212628180564895"
## [4] "a12= 0.000144225153938859"
## [5] "Proportion of C0 in pool 1= 0.046421817963878"
```

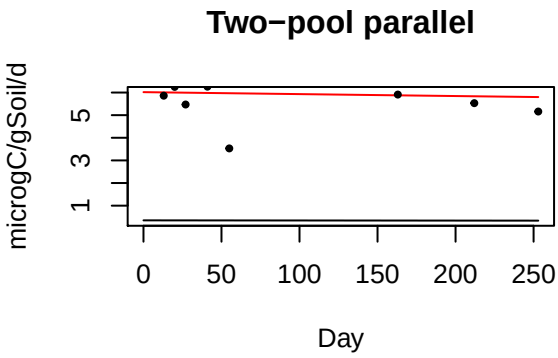


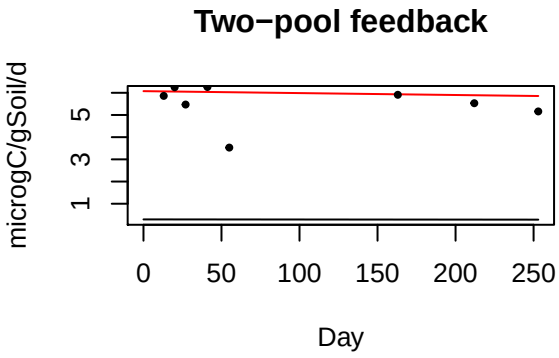

```
## [1] "AIC =  8.04447388977627"
## [1] "k1= 0.000147050958302357"
## [2] "k2= 0.000145438453988793"
## [3] "a21= 0.0211243690472563"
## [4] "Proportion of C0 in pool 1= 0.0409854684019521"
```

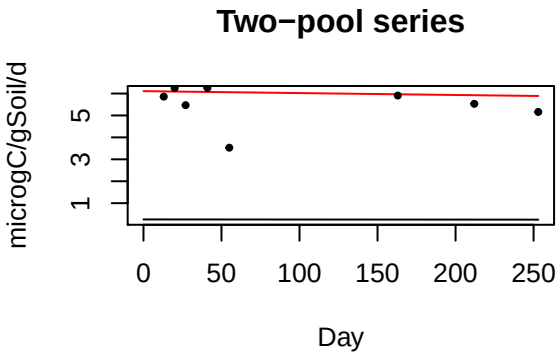



```
## [1] "AIC =  6.04447393160654"
```



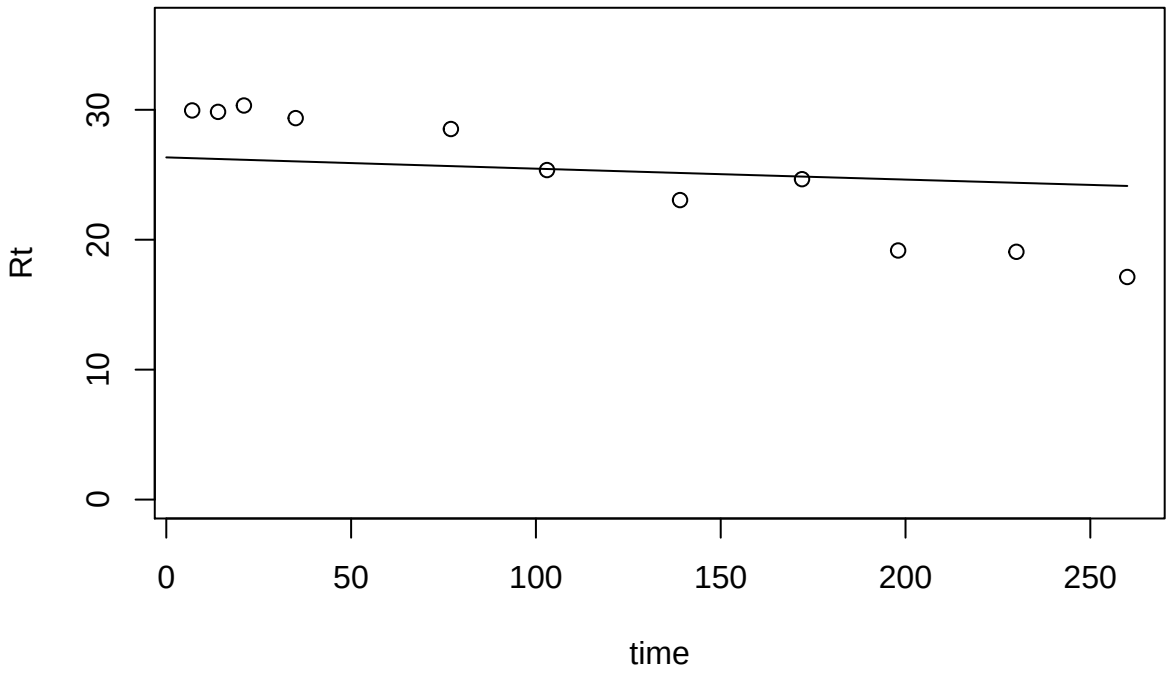



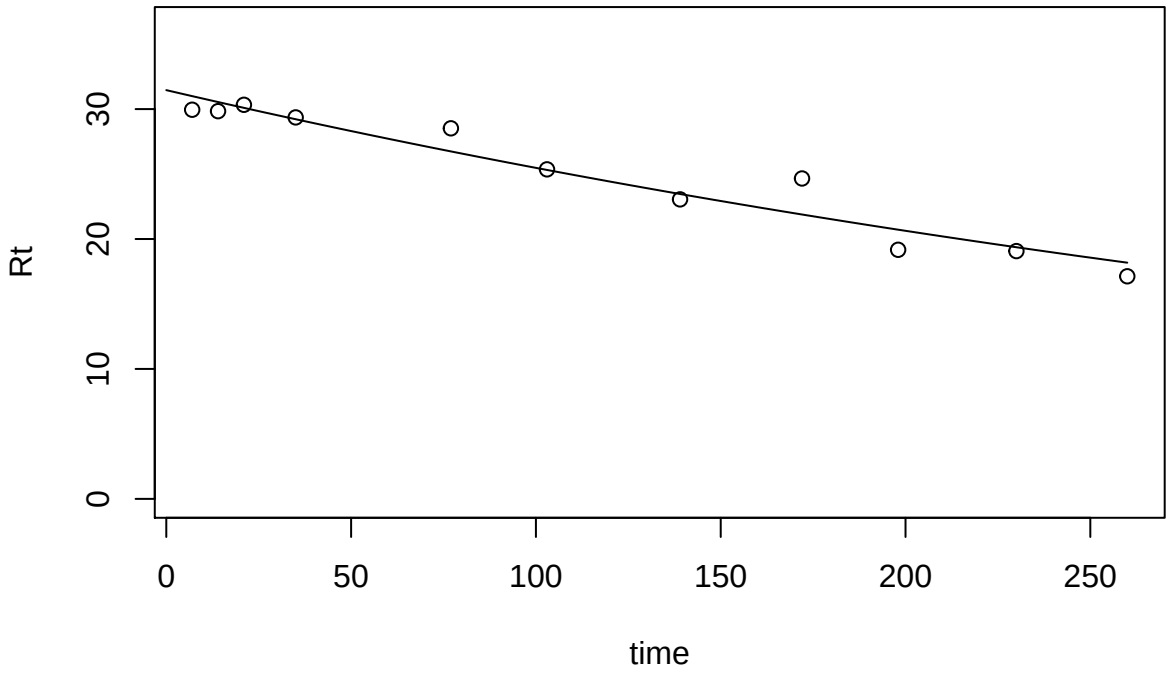




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 0.0445 | 0.000145 | NA | NA | NA | NA | 0.116 | 0.89 | NA | NA |
| Two-pool parallel | 4.04 | 0.000145 | 0.000145 | 0.055 | NA | NA | 4.49 | 0.1 | 6880 | 4770 |
| Two-pool feedback | 8.04 | 0.000147 | 0.000145 | 0.0464 | 0.0213 | 0.000144 | 9.2 | 0.00949 | 6930 | 4800 |
| Two-pool series | 6.04 | 0.000147 | 0.000145 | 0.041 | 0.0211 | NA | 6.8 | 0.0315 | 6950 | 4820 |

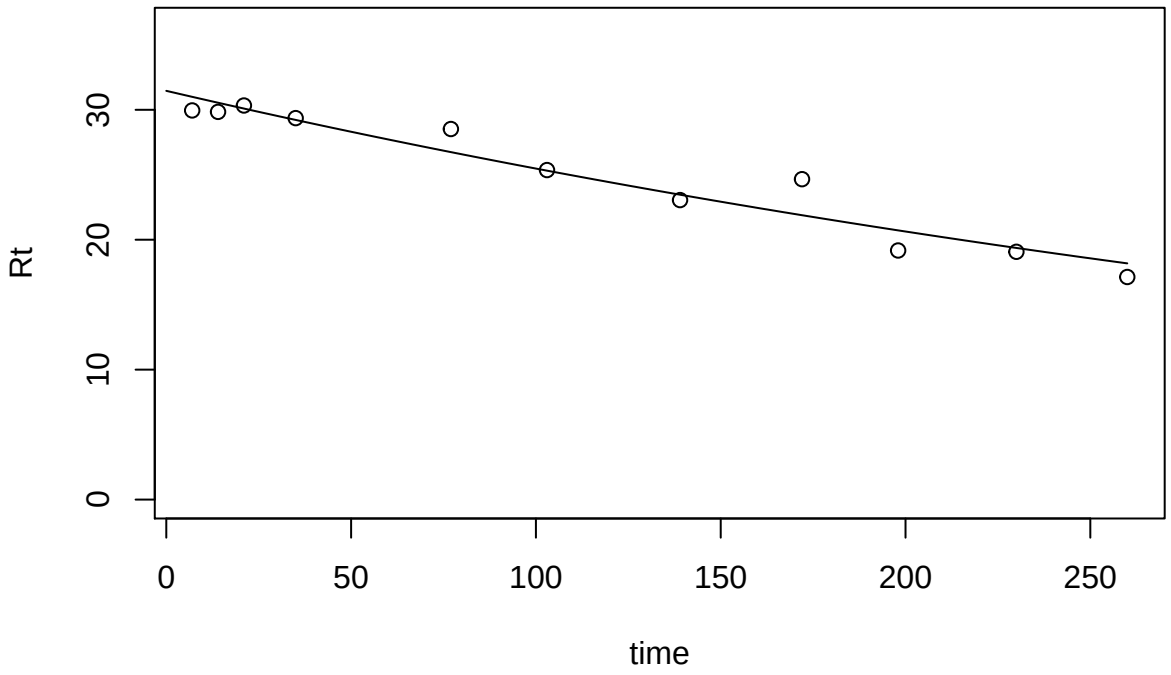
```
## [1] "Best fit parameter:  0.000335499713438368"
```



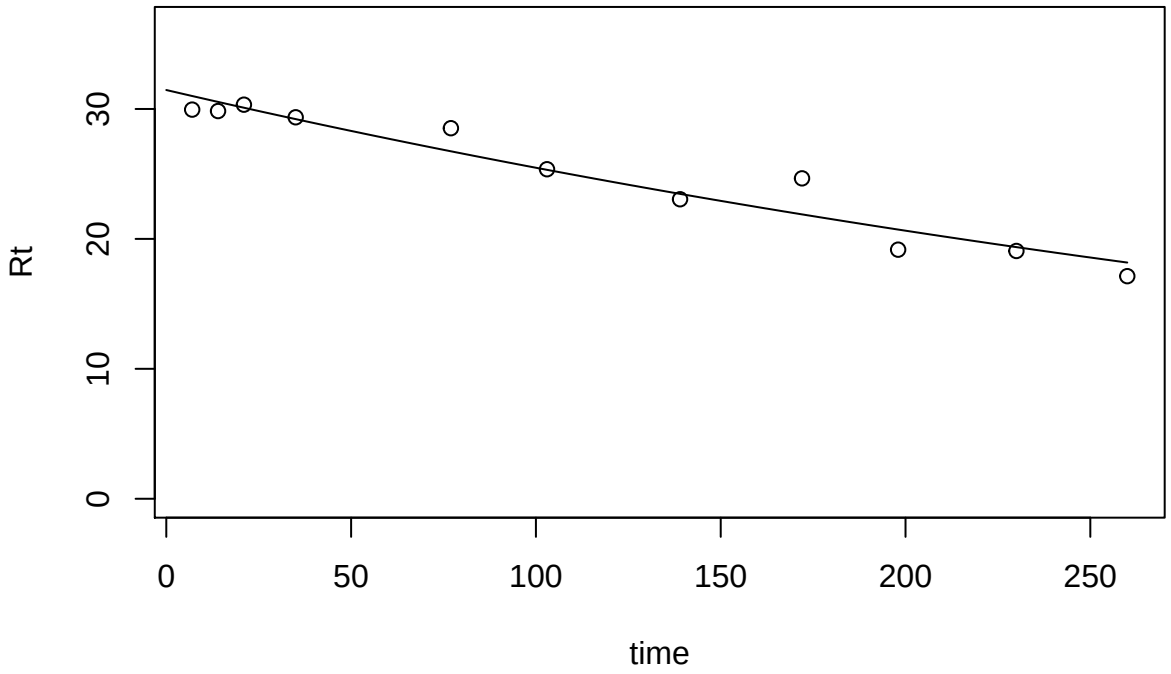

```
## [1] "AIC =  -3.53408355685825"
## [1] "k1= 0.00210922725026572"
## [2] "k2= 5.08548427714153e-12"
## [3] "proportion of C0 in pool 1= 0.189994522174685"
```



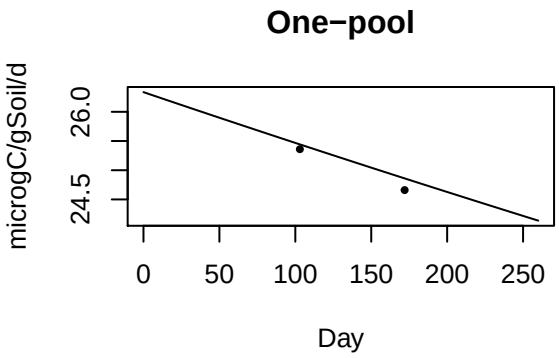

```
## [1] "AIC =  5.21627148968042"
## [1] "k1= 0.00210924530629795"
## [2] "k2= 3.39298003571761e-09"
## [3] "a21= 0.00907620080768623"
## [4] "a12= 0.999970889706854"
## [5] "Proportion of C0 in pool 1= 0.191732894081934"
```

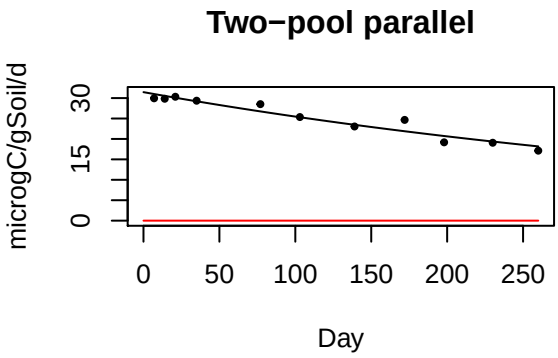


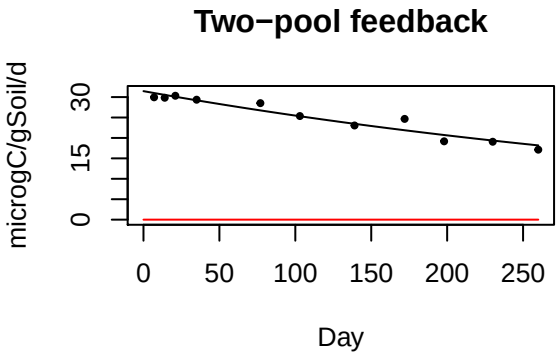

```
## [1] "AIC =  9.21626691376565"
## [1] "k1= 0.00210923866956357"
## [2] "k2= 2.11453819181147e-09"
## [3] "a21= 0.00718737094724903"
## [4] "Proportion of C0 in pool 1= 0.19136807028875"
```

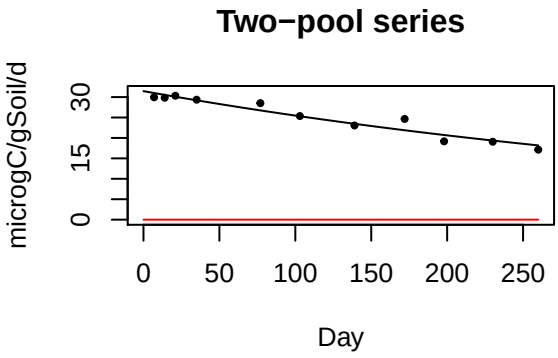



```
## [1] "AIC =  7.21626861507338"
```



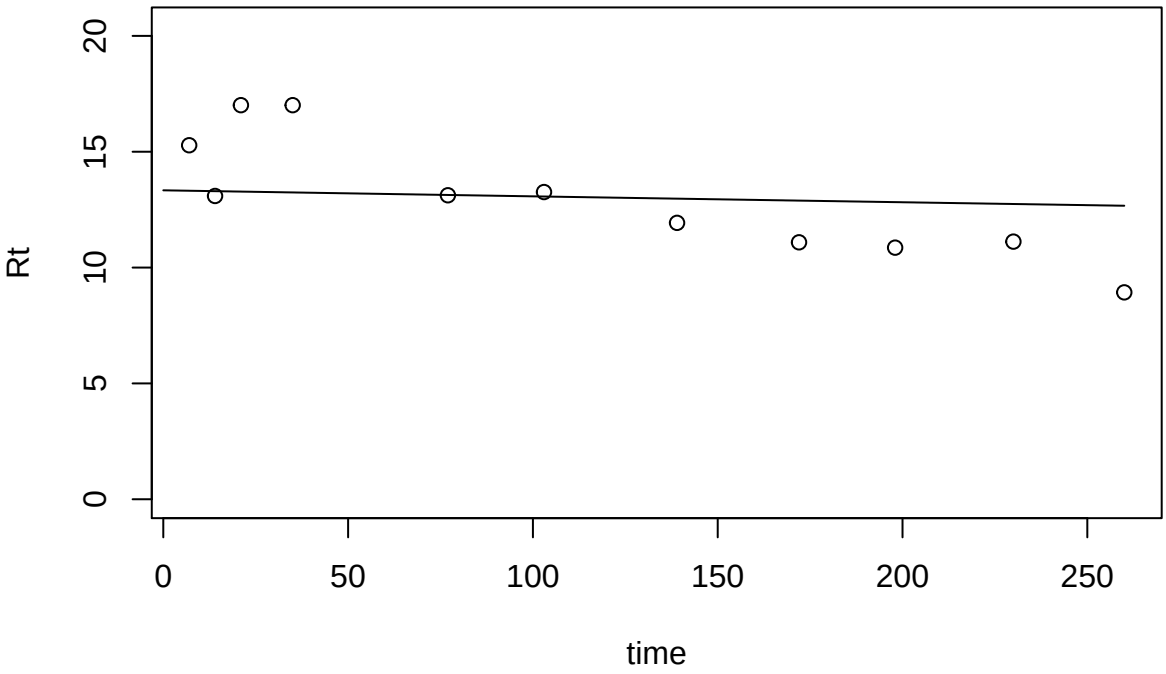



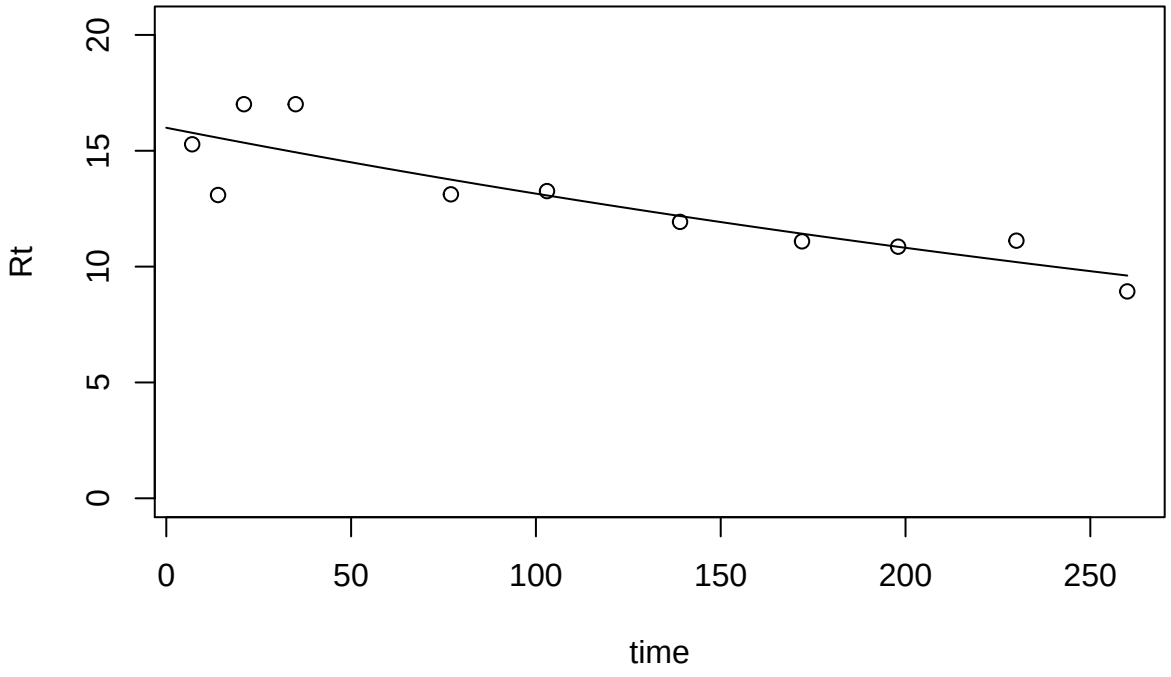




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -3.53 | 0.000335 | NA | NA | NA | NA | -3.46 | 0.989 | NA | NA |
| Two-pool parallel | 5.22 | 0.00211 | 5.09e-12 | 0.19 | NA | NA | 5.66 | 0.0103 | 1.59e+11 | 9.49e+10 |
| Two-pool feedback | 9.22 | 0.00211 | 3.39e-09 | 0.192 | 0.00908 | 1 | 10.4 | 0.00098 | 2700000 | 333 |
| Two-pool series | 7.22 | 0.00211 | 2.11e-09 | 0.191 | 0.00719 | NA | 7.97 | 0.00325 | 3400000 | 332 |

```
## [1] "Best fit parameter:  0.000196967349425644"
```



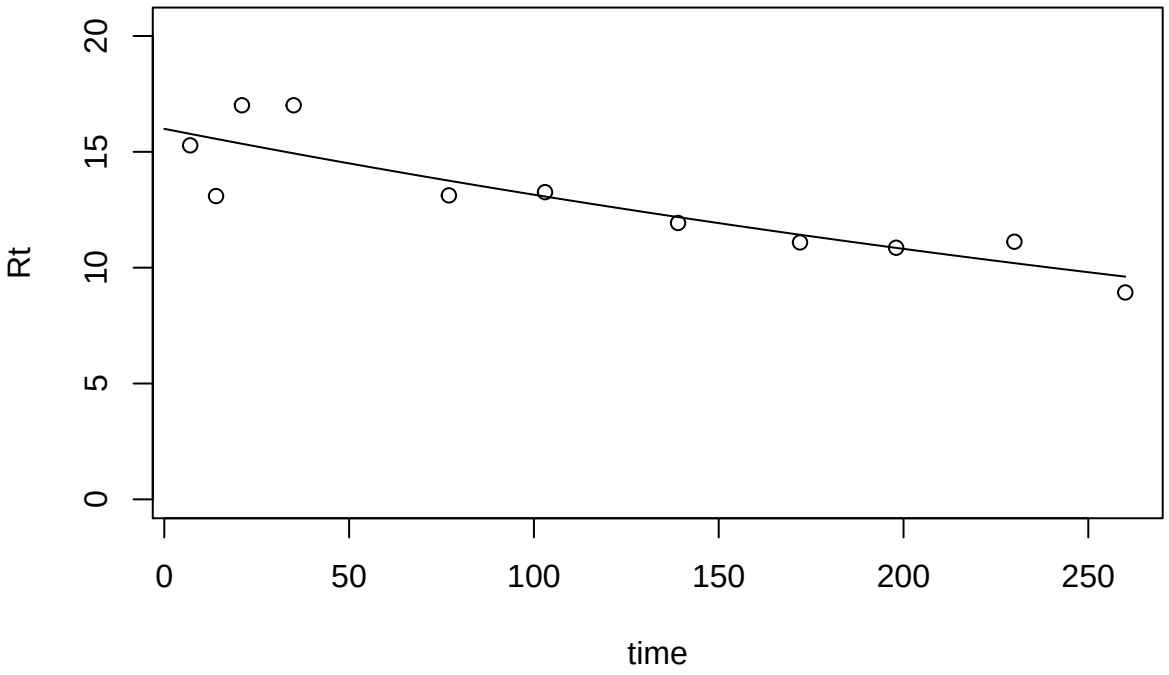
```
## [1] "AIC =  -1.28512827519011"
## [1] "k1= 0.00195757278755336"
## [2] "k2= 1.1851311580858e-11"
## [3] "proportion of C0 in pool 1= 0.120677310281163"
```



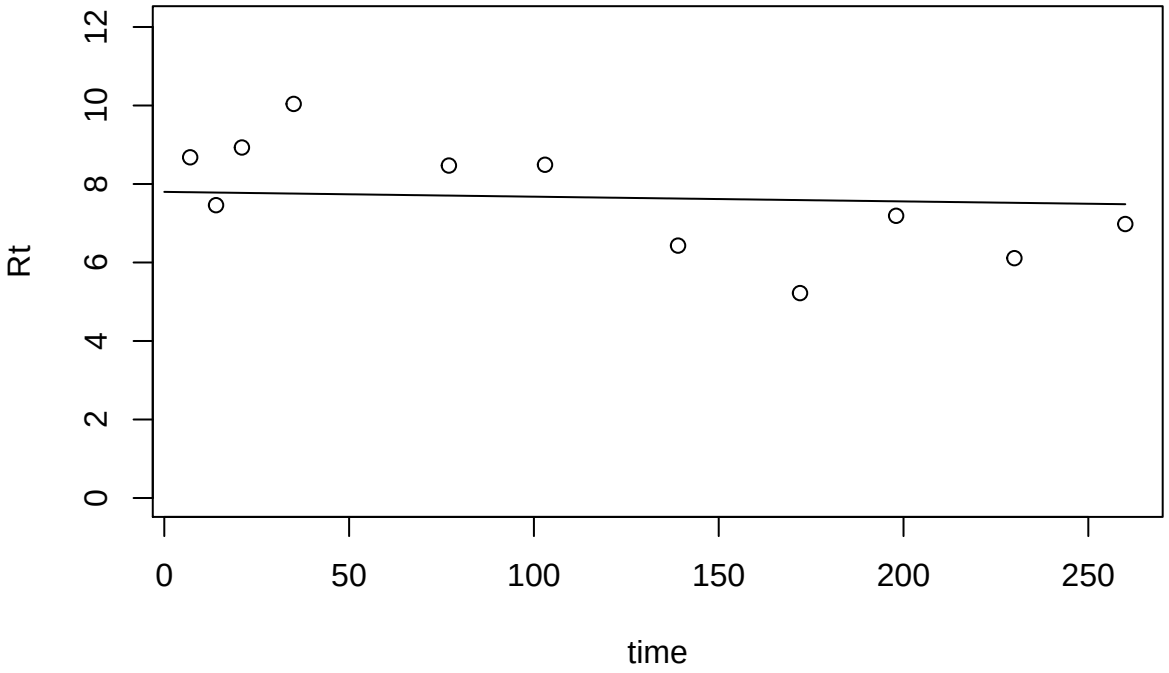

```
## [1] "AIC =  5.3330629908134"
## [1] "k1= 0.00195757290662098"
## [2] "k2= 0"
## [3] "a21= 0.879317546457783"
## [4] "a12= 0.999999952918158"
## [5] "Proportion of C0 in pool 1= 0.999957251002109"
```

```
## [1] "AIC =  9.33306299345742"
## DLSODA-  Warning..Internal T (=R1) and H (=R2) are
##       such that in the machine, T + H = T on the next step
##      (H = step size). Solver will continue anyway.
## In above message, R1 = 0, R2 = 0
##
## DINTDY-  T (=R1) illegal
## In above message, R1 = 0.521042
##
##       T not in interval TCUR - HU (= R1) to TCUR (=R2)
## In above message, R1 = 0, R2 = 0
##
## DINTDY-  T (=R1) illegal
## In above message, R1 = 1.04208
##
##       T not in interval TCUR - HU (= R1) to TCUR (=R2)
## In above message, R1 = 0, R2 = 0
##
## DLSODA-  Trouble in DINTDY.  ITASK = I1, TOUT = R1
## In above message, I1 = 1
##
```

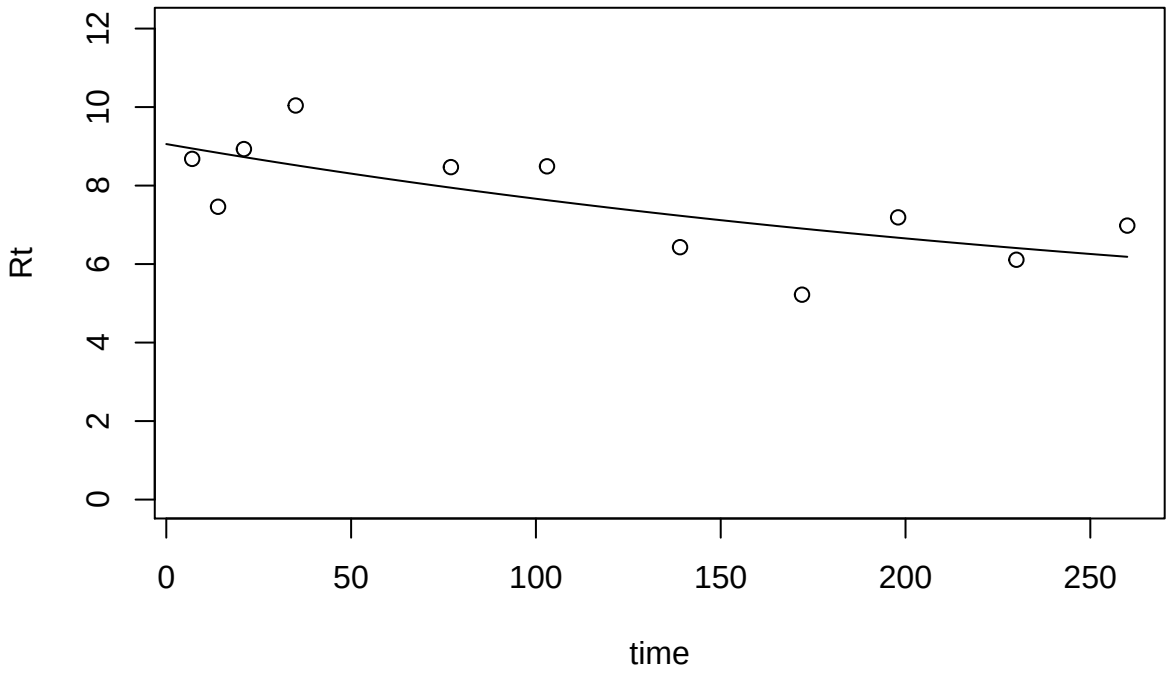
```
## In above message, R1 = 1.04208
##
## Error in lsoda(startValues, t, lsexamp): illegal input detected before taking any integration steps -
```



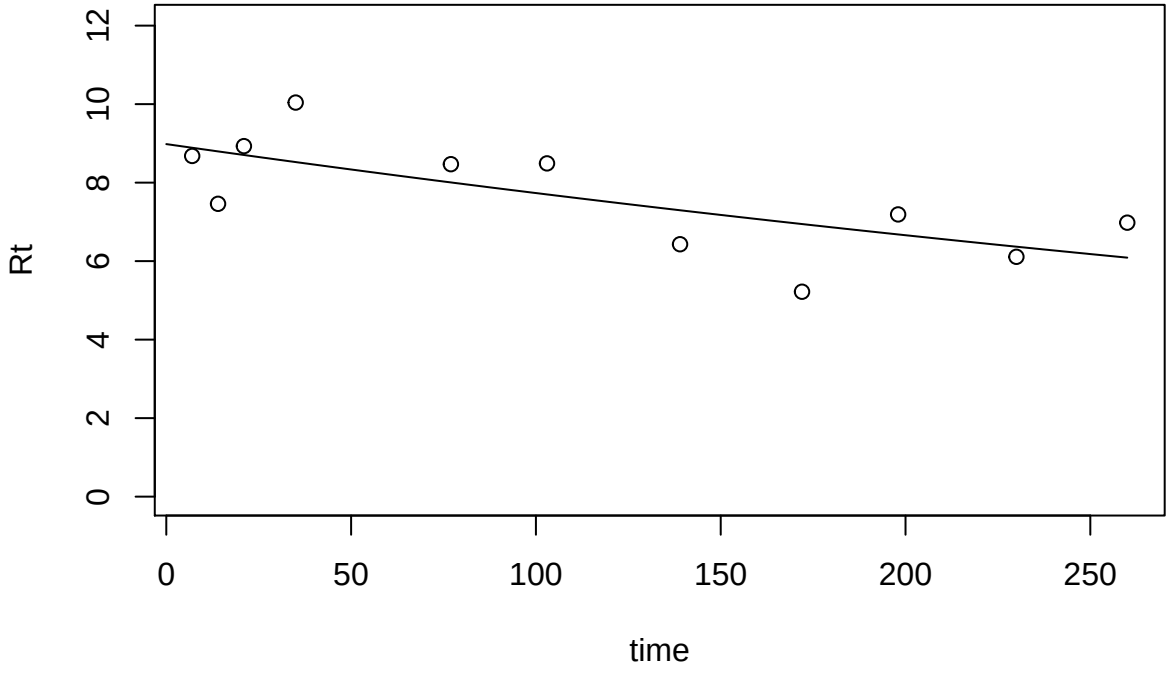

```
## [1] "Best fit parameter:  0.000158197562649163"
```




```
## [1] "AIC =  0.999877350081371"
## [1] "k1= 0.0033189367434419"
## [2] "k2= 8.89592898411101e-05"
## [3] "proportion of C0 in pool 1= 0.0293395584437172"
```

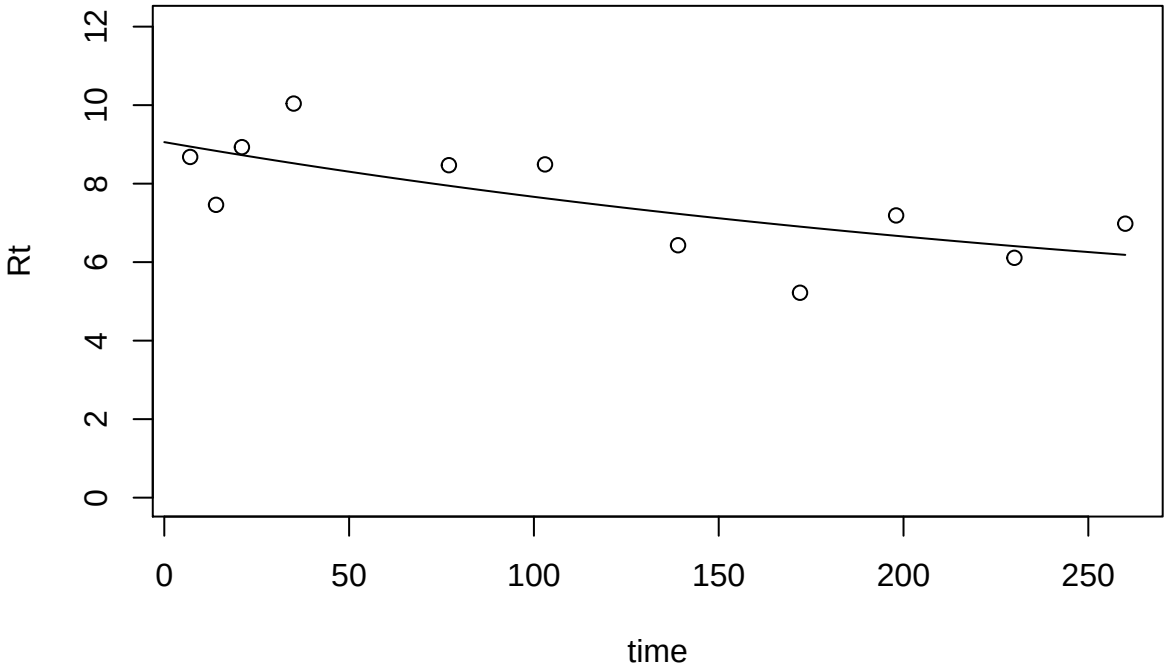



```
## [1] "AIC =  6.23011703858167"
## [1] "k1= 1.61558304913077e-14"
## [2] "k2= 0.00149544016179417"
## [3] "a21= 0.995348678454009"
## [4] "a12= 7.19049059016985e-07"
## [5] "Proportion of C0 in pool 1= 0.878172431992795"
```

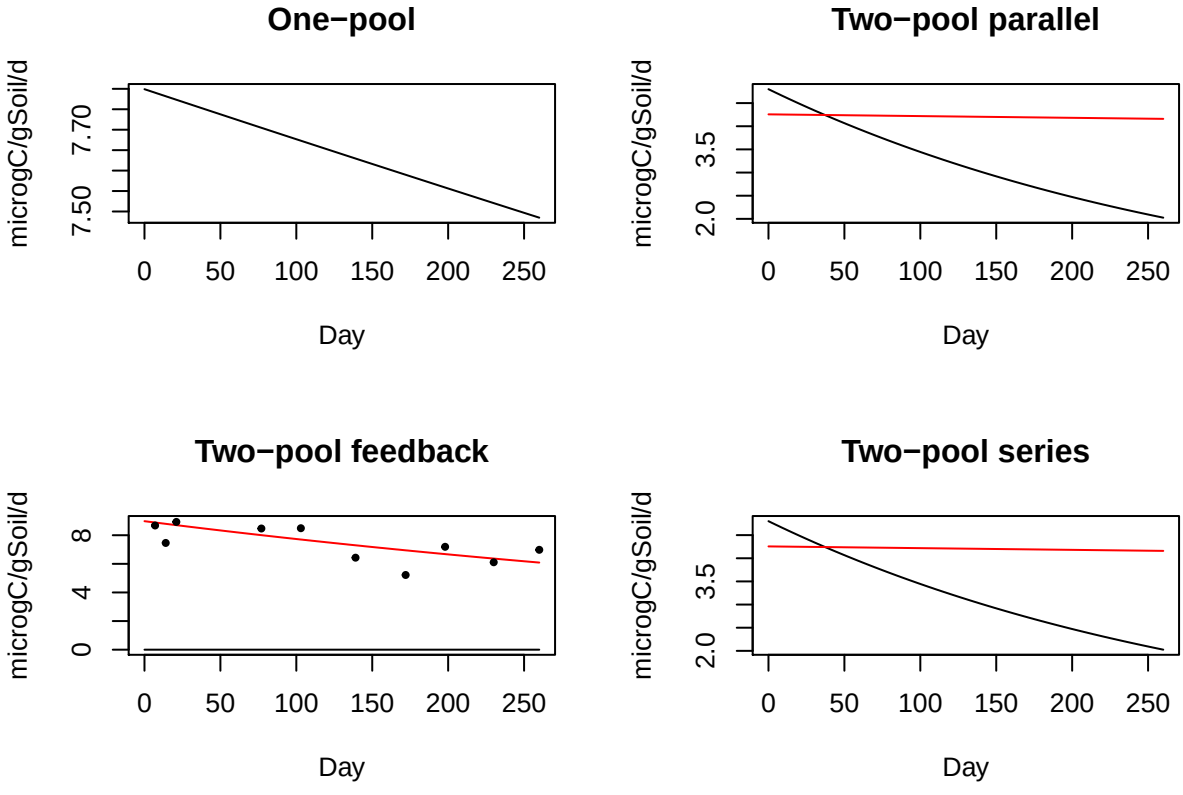



```
## [1] "AIC =  10.2178308807665"
## [1] "k1= 0.00331937102339717"
## [2] "k2= 8.89684110950515e-05"
## [3] "a21= 0.00899811038750409"
```

```
## [4] "Proportion of C0 in pool 1= 0.0296066717439578"
```



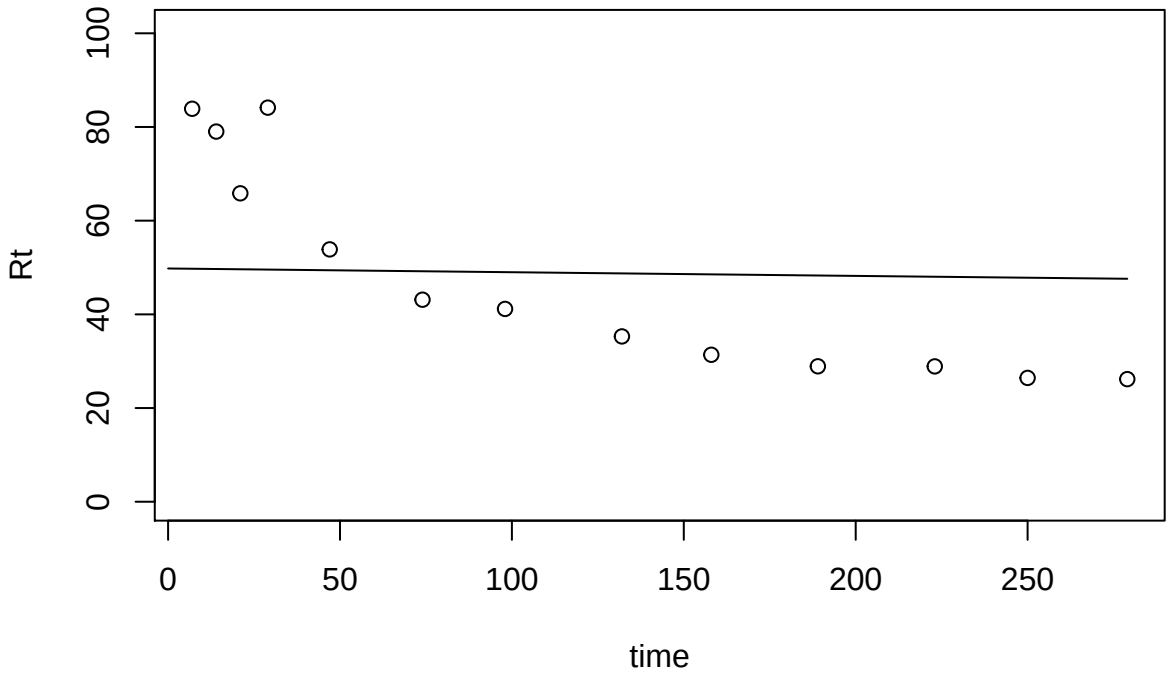

```
## [1] "AIC =  8.23011703769028"
```



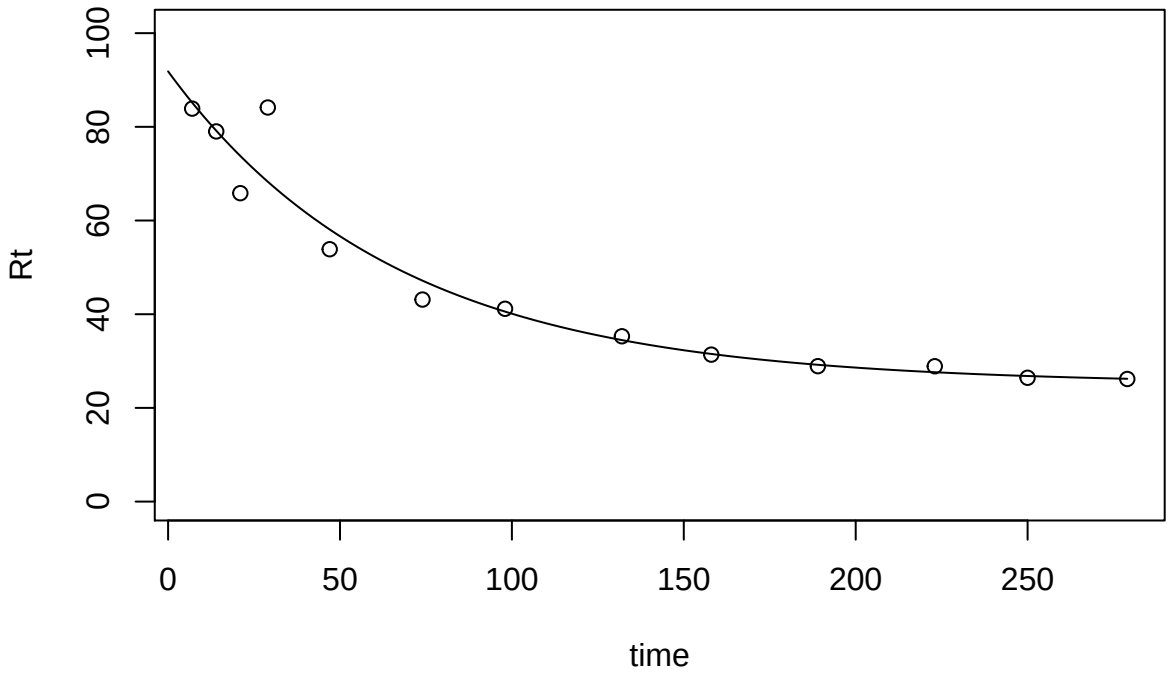

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 1 | 0.000158 | NA | NA | NA | NA | 1.07 | 0.938 | NA | NA |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool parallel | 6.23 | 0.00332 | 8.9e-05 | 0.0293 | NA | NA | 6.67 | 0.0569 | 10900 | 7460 |
| Two-pool feedback | 10.2 | 1.62e-14 | 0.0015 | 0.878 | 0.995 | 7.19e-07 | 11.4 | 0.00544 | 6.19e+13 | 4.29e+13 |
| Two-pool series | 8.23 | 0.00332 | 8.9e-05 | 0.0296 | 0.009 | NA | 8.98 | 0.0179 | 402 | 212 |

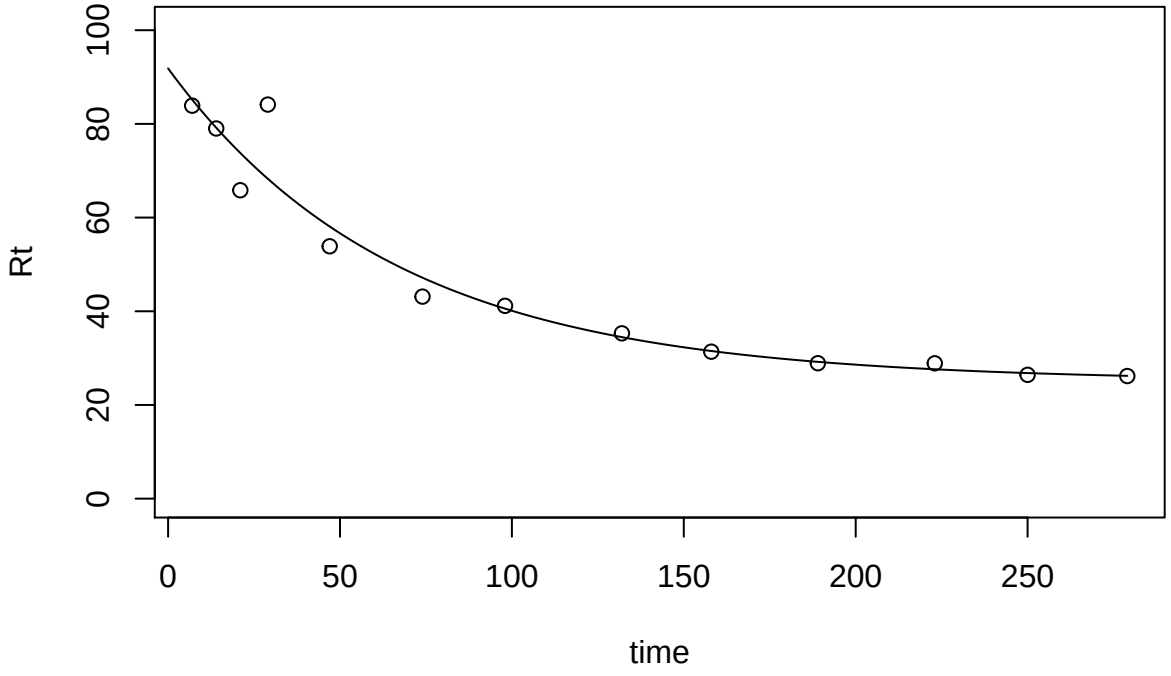
```
## [1] "Best fit parameter:  0.000161612313176492"
```




```
## [1] "AIC =  -10.1798886181018"
## [1] "k1= 0.0151780709760286"
## [2] "k2= 8.51622189858691e-05"
## [3] "proportion of C0 in pool 1= 0.0141080868219208"
```

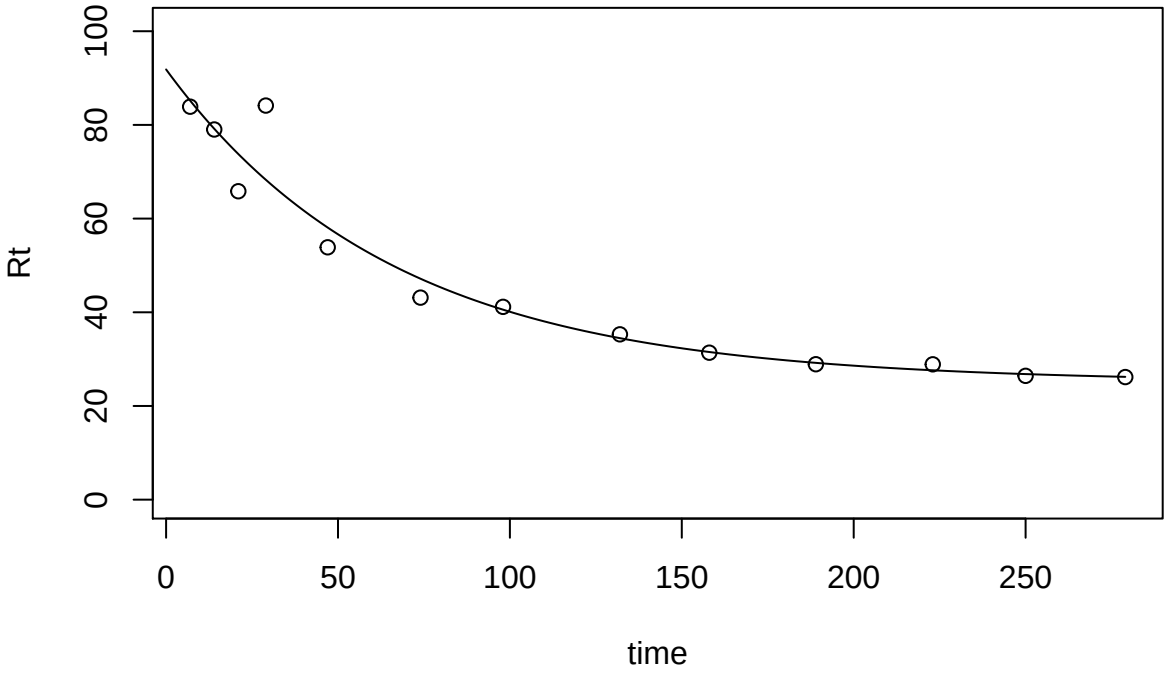



```
## [1] "AIC =  -0.602239576925291"
## [1] "k1= 0.0151780706861711"
## [2] "k2= 8.5162224268528e-05"
## [3] "a21= 0.00523275096935033"
## [4] "a12= 1.2857499359531e-05"
## [5] "Proportion of C0 in pool 1= 0.0141827541316733"
```

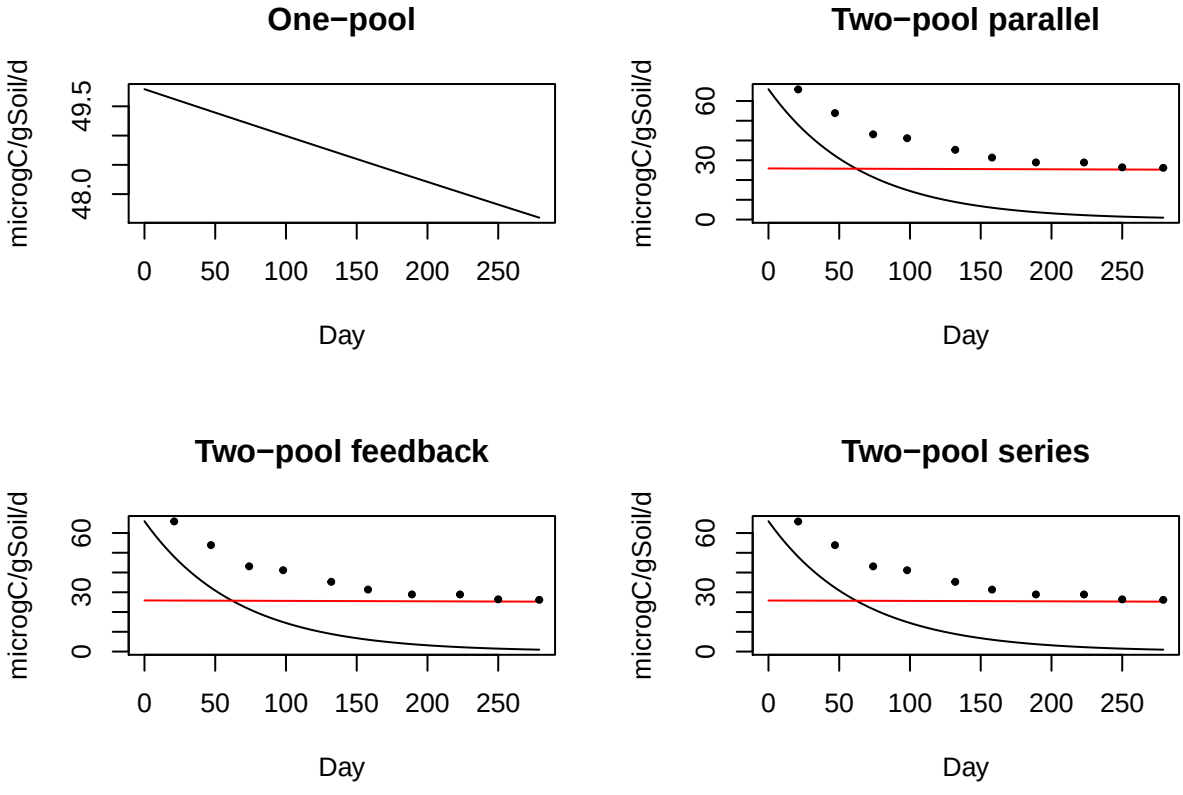



```
## [1] "AIC =  3.3977604225863"
## [1] "k1= 0.0151780144349287"
## [2] "k2= 8.51620620496416e-05"
## [3] "a21= 0.0724906092570533"
```

```
## [4] "Proportion of C0 in pool 1= 0.0152174302892077"
```



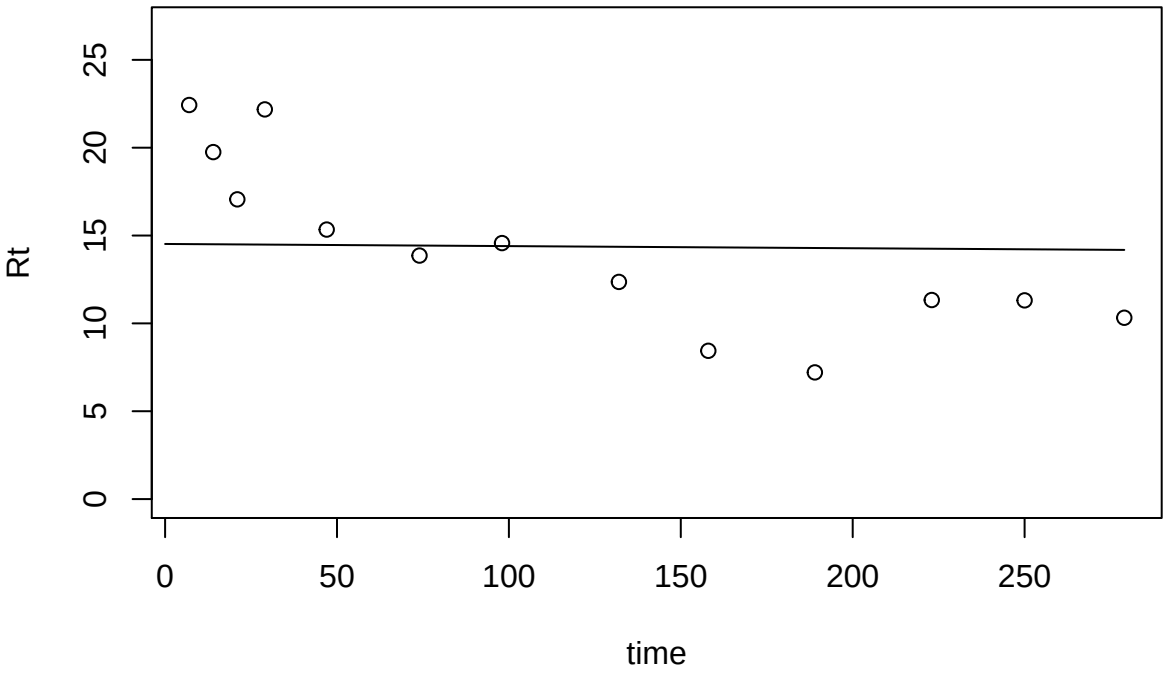

```
## [1] "AIC =  1.39776042210691"
```



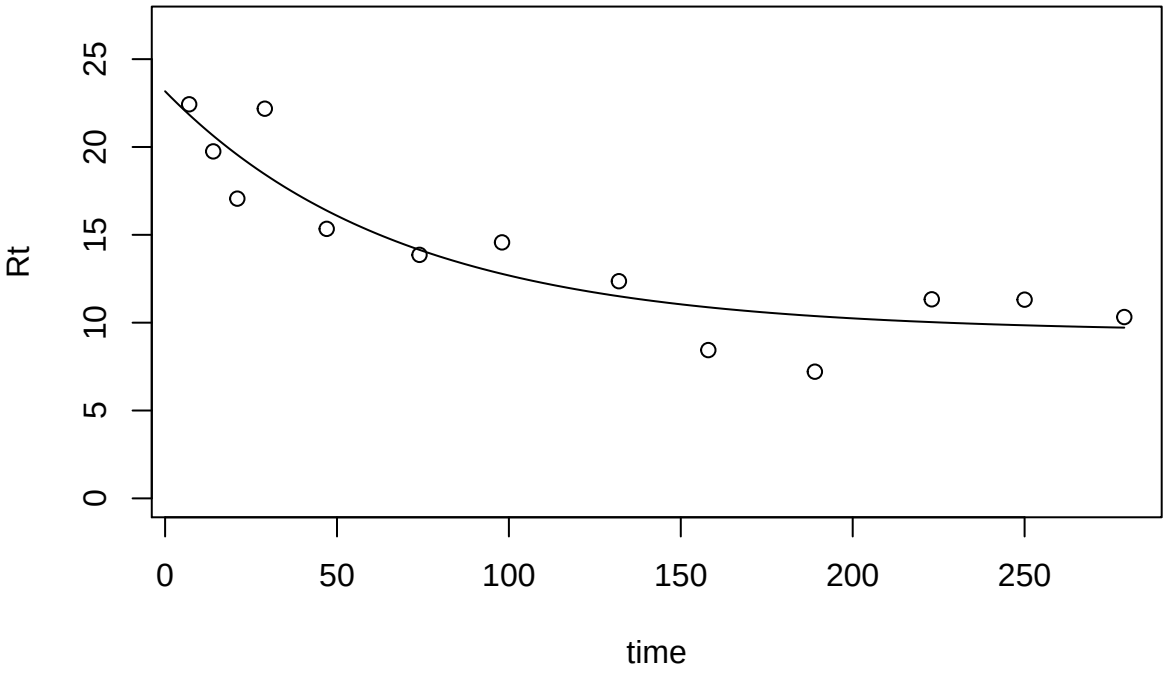

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -10.2 | 0.000162 | NA | NA | NA | NA | -10.1 | 0.992 | NA | NA |
| Two-pool parallel | -0.602 | 0.0152 | 8.52e-05 | 0.0141 | NA | NA | -0.158 | 0.00685 | 11600 | 7970 |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool feedback | 3.4 | 0.0152 | 8.52e-05 | 0.0142 | 0.00523 | 1.29e-05 | 4.55 | 0.000651 | 127 | 46 |
| Two-pool series | 1.4 | 0.0152 | 8.52e-05 | 0.0152 | 0.0725 | NA | 2.15 | 0.00216 | 917 | 51 |

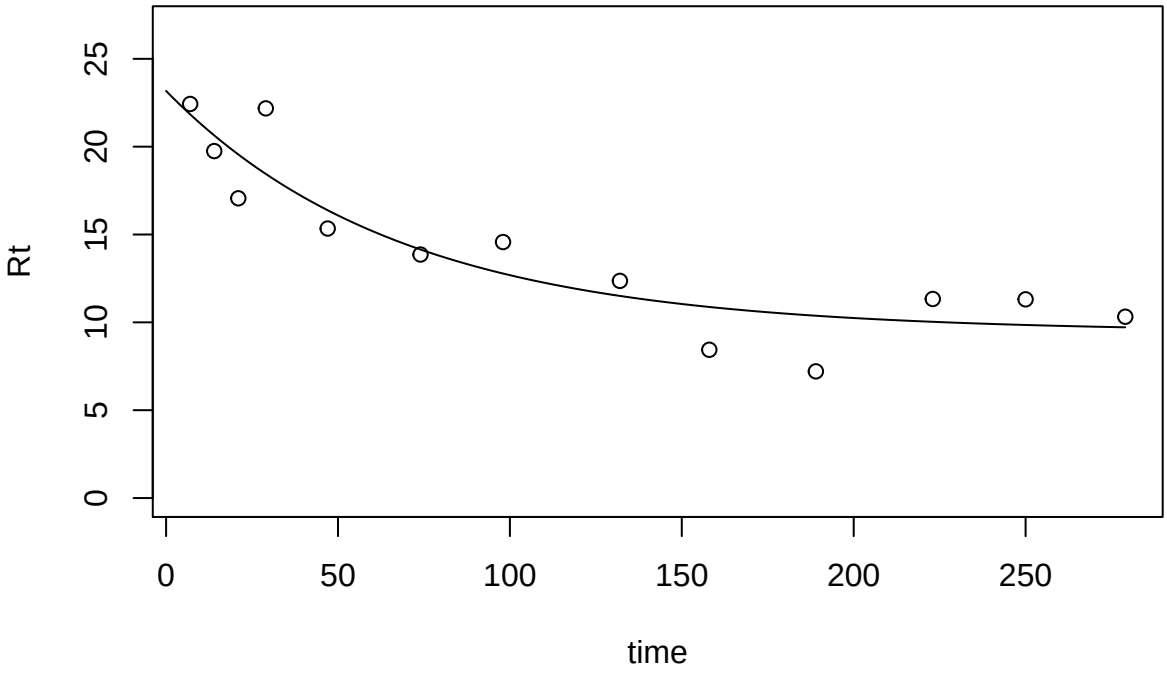
```
## [1] "Best fit parameter:  8.44229645417037e-05"
```



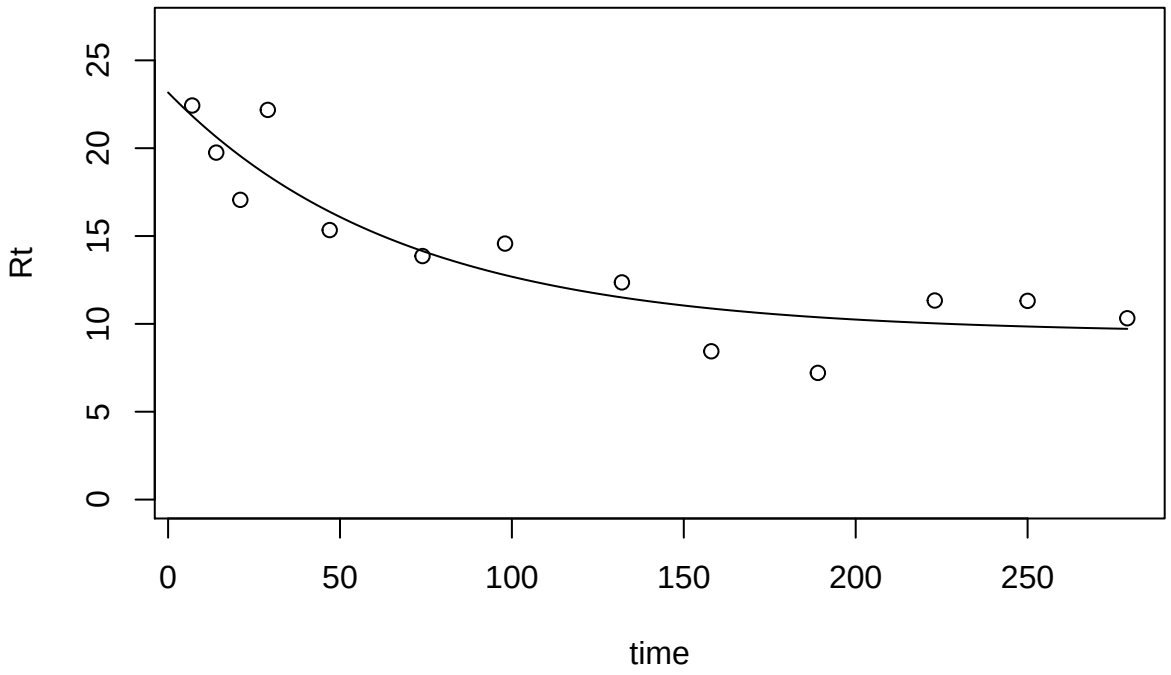

```
## [1] "AIC =  -4.12418342909207"
## [1] "k1= 0.0147573924421278"
## [2] "k2= 5.63943740741383e-05"
## [3] "proportion of C0 in pool 1= 0.00532785781702999"
```



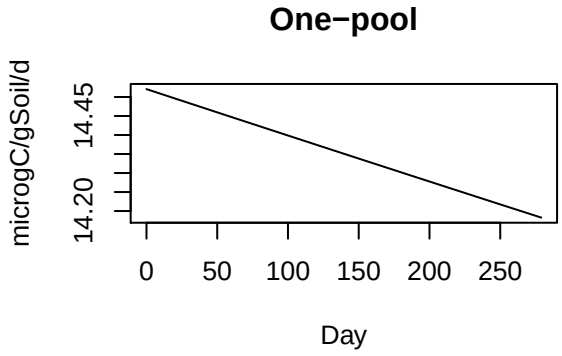
```
## [1] "AIC =  3.44872767117057"
## [1] "k1= 0.0147569018147403"
## [2] "k2= 5.63946537448245e-05"
## [3] "a21= 0.278117224924899"
## [4] "a12= 5.13456535560231e-05"
## [5] "Proportion of C0 in pool 1= 0.00739185233498385"
```

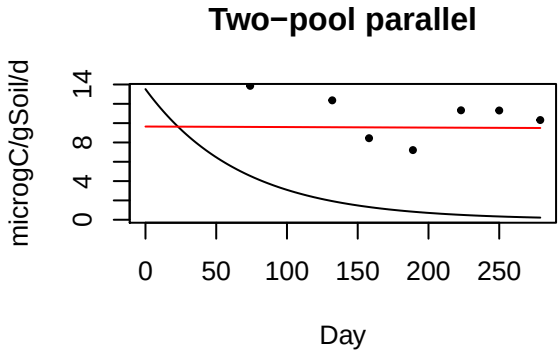


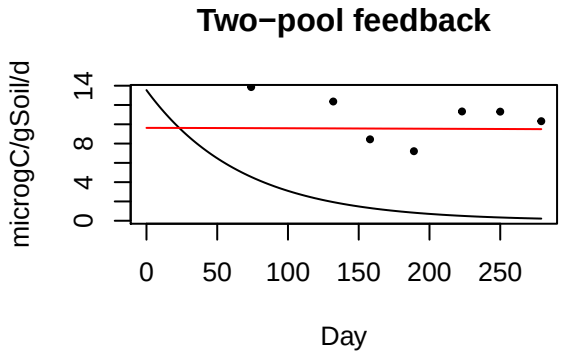

```
## [1] "AIC =  7.44872767075008"
## [1] "k1= 0.0147581394334188"
## [2] "k2= 5.63951766009033e-05"
## [3] "a21= 0.44416338312009"
## [4] "Proportion of C0 in pool 1= 0.00961421749580055"
```

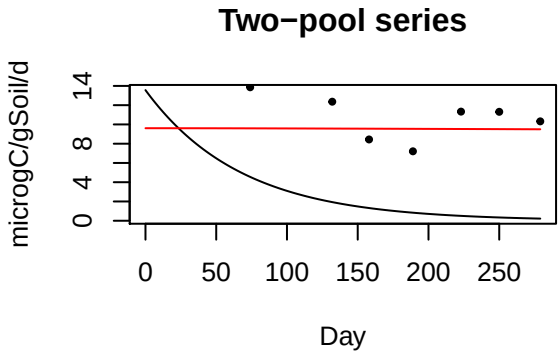



```
## [1] "AIC =  5.44872766512966"
```



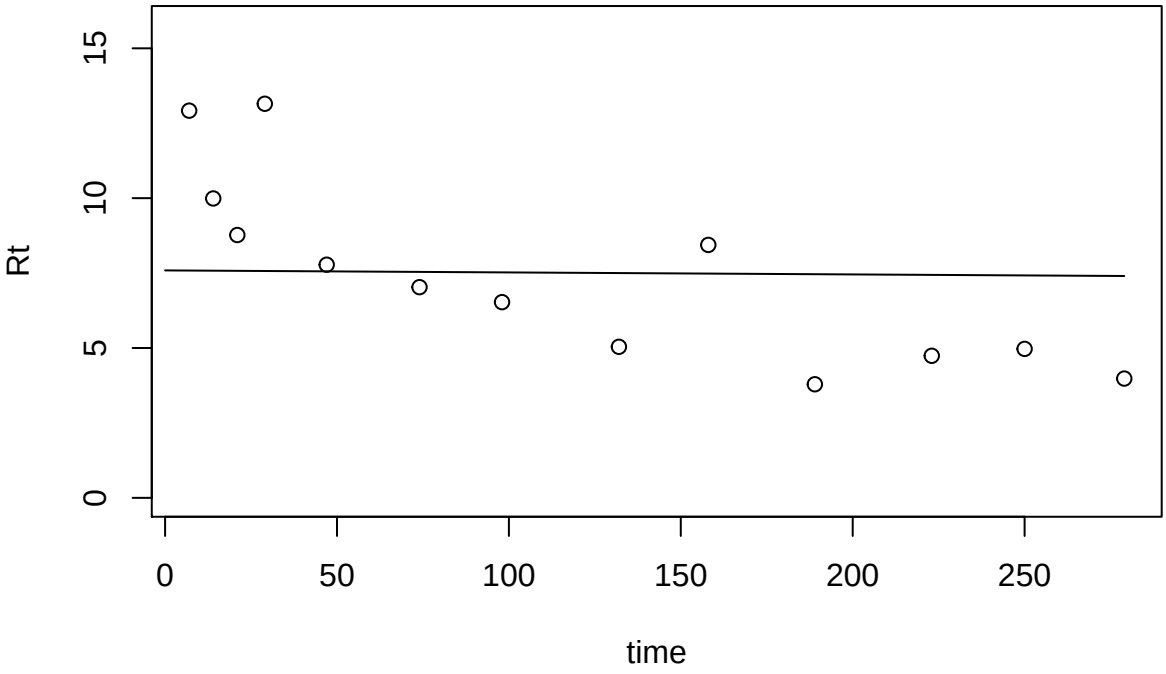



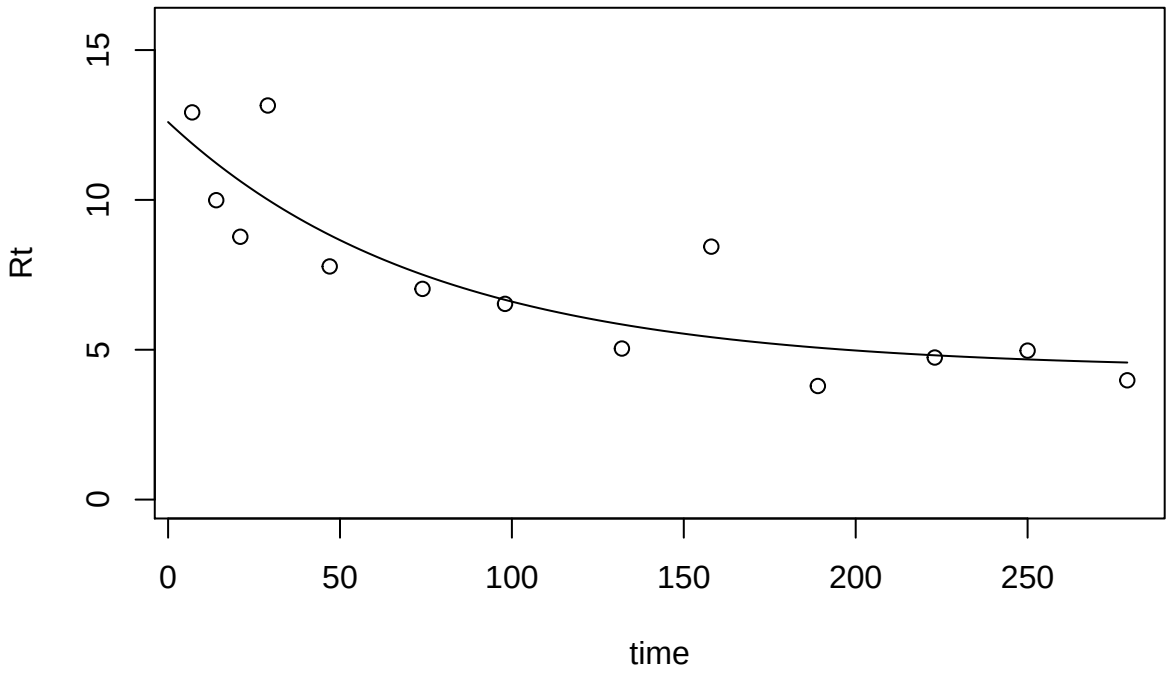

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -4.12 | 8.44e-05 | NA | NA | NA | NA | -4.05 | 0.98 | NA | NA |
| Two-pool parallel | 3.45 | 0.0148 | 5.64e-05 | 0.00533 | NA | NA | 3.89 | 0.0184 | 17600 | 12200 |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool feedback | 7.45 | 0.0148 | 5.64e-05 | 0.00739 | 0.278 | 5.13e-05 | 8.6 | 0.00175 | 5000 | 79.8 |
| Two-pool series | 5.45 | 0.0148 | 5.64e-05 | 0.00961 | 0.444 | NA | 6.2 | 0.00581 | 7940 | 153 |

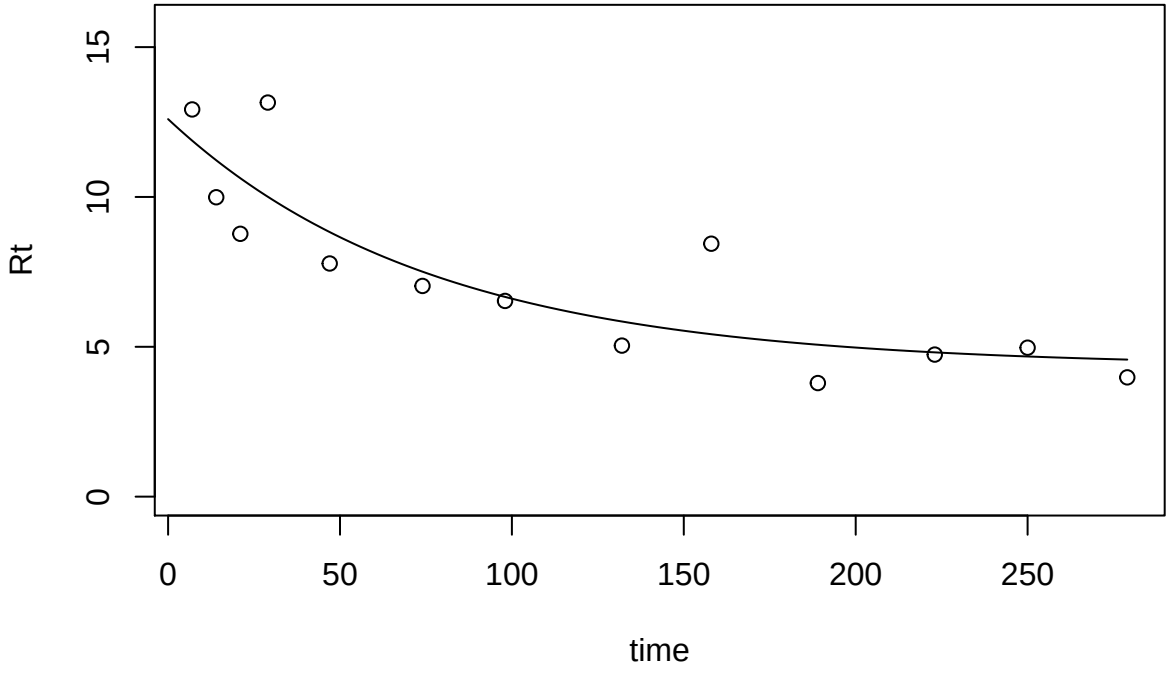
```
## [1] "Best fit parameter:  8.91805453498806e-05"
```




```
## [1] "AIC =  -2.33568519965213"
## [1] "k1= 0.0131081798158036"
## [2] "k2= 5.23967772270187e-05"
## [3] "proportion of C0 in pool 1= 0.00732504099060638"
```

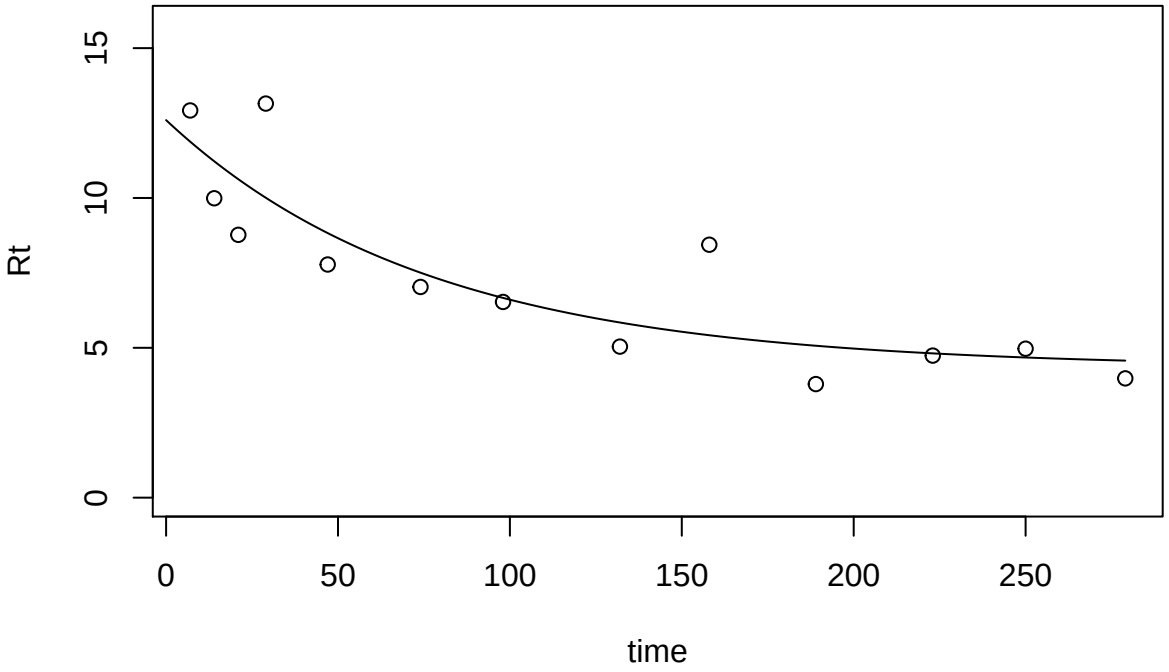



```
## [1] "AIC =  4.38686749619351"
## [1] "k1= 0.0131084847228655"
## [2] "k2= 5.23976589469556e-05"
## [3] "a21= 0.467700828808304"
## [4] "a12= 1.46907085012971e-05"
## [5] "Proportion of C0 in pool 1= 0.0138095376478389"
```

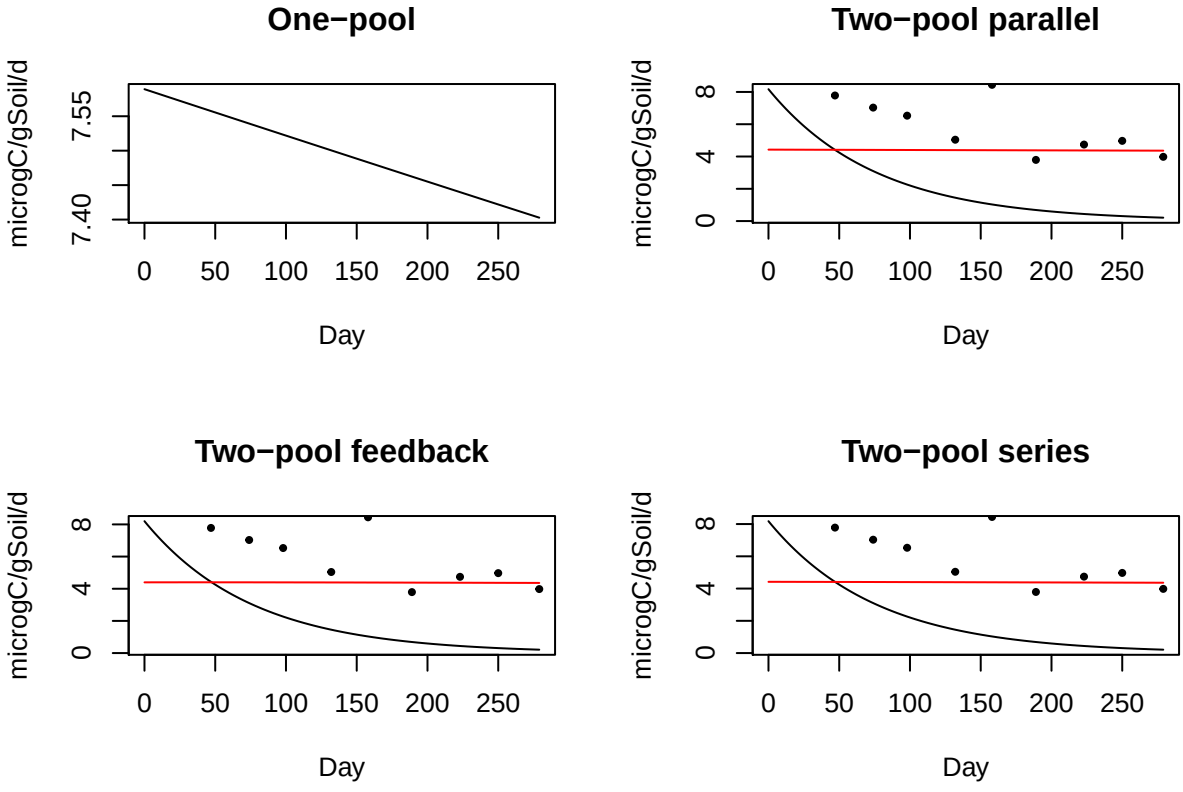



```
## [1] "AIC =  8.38686749638497"
## [1] "k1= 0.0131079378112079"
## [2] "k2= 5.23963655441733e-05"
## [3] "a21= 0.181808600965808"
```

```
## [4] "Proportion of C0 in pool 1= 0.00896085621180198"
```



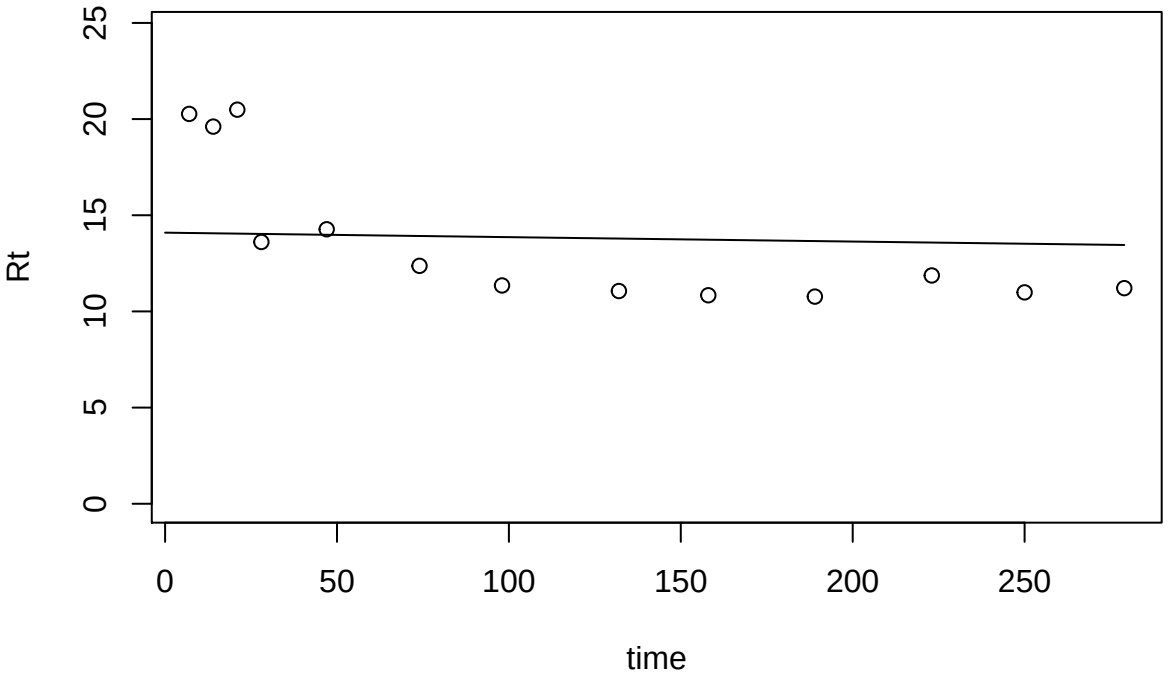

```
## [1] "AIC =  6.38686749554787"
```



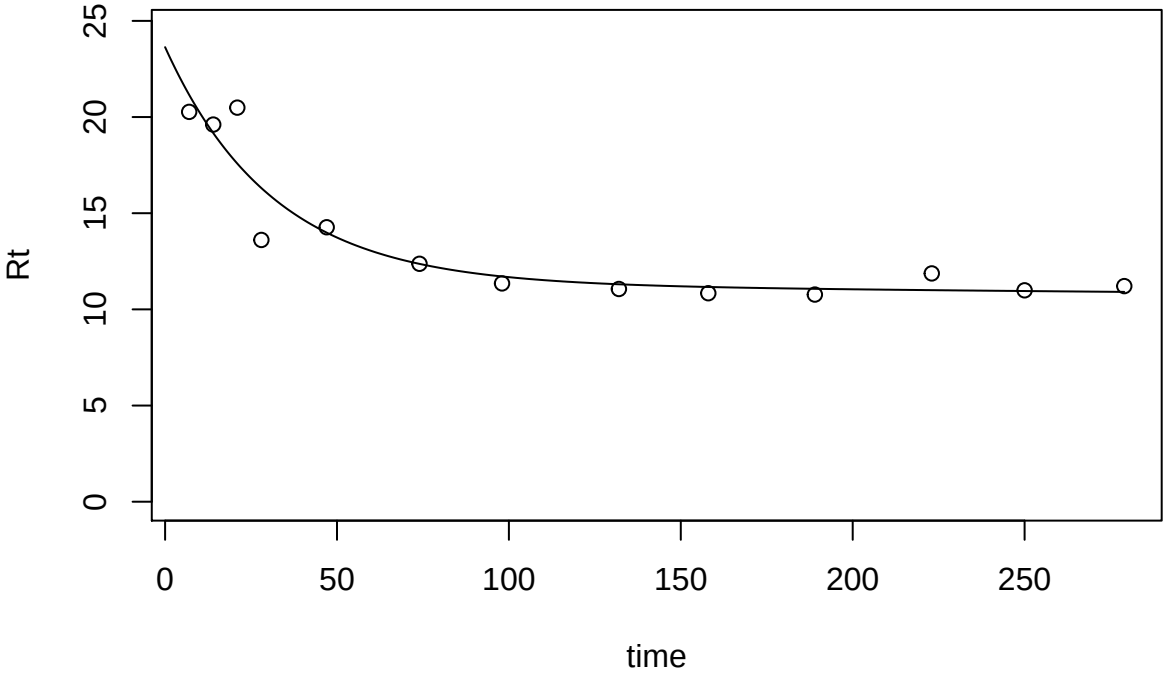

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -2.34 | 8.92e-05 | NA | NA | NA | NA | -2.26 | 0.969 | NA | NA |
| Two-pool parallel | 4.39 | 0.0131 | 5.24e-05 | 0.00733 | NA | NA | 4.83 | 0.0279 | 18900 | 13100 |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool feedback | 8.39 | 0.0131 | 5.24e-05 | 0.0138 | 0.468 | 1.47e-05 | 9.54 | 0.00265 | 9000 | 206 |
| Two-pool series | 6.39 | 0.0131 | 5.24e-05 | 0.00896 | 0.182 | NA | 7.14 | 0.00879 | 3550 | 72 |

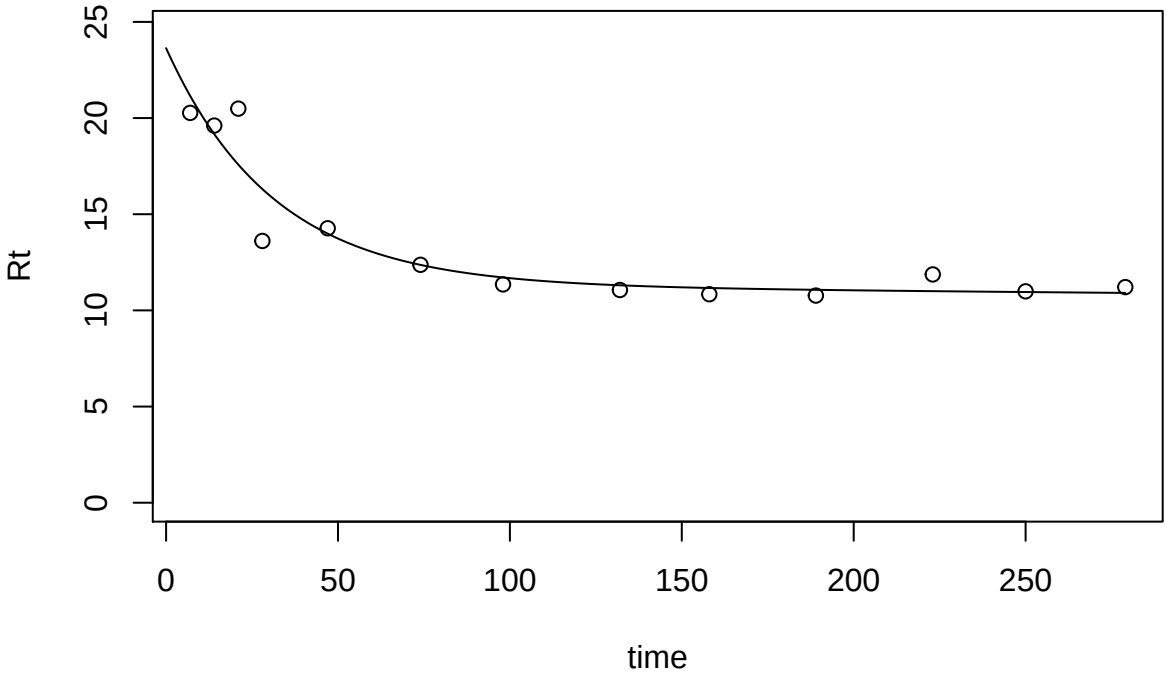
```
## [1] "Best fit parameter:  0.000166604269440522"
```



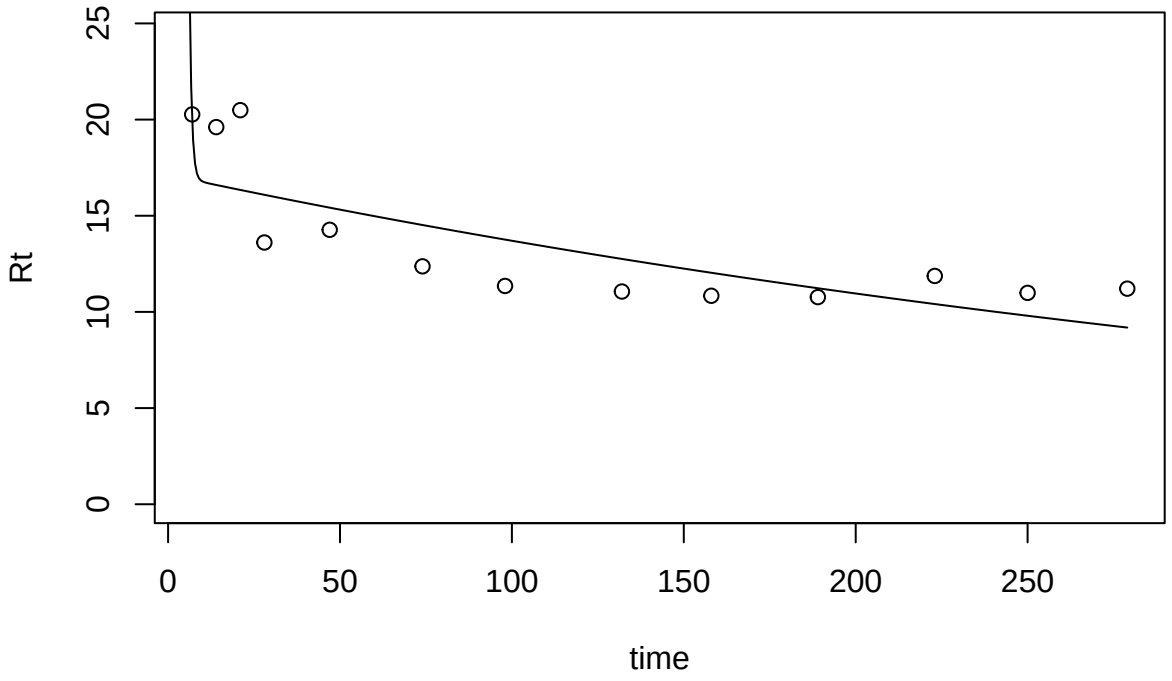

```
## [1] "AIC =  -2.9970453441643"
## [1] "k1= 0.031992223838702"
## [2] "k2= 0.00013446719078615"
## [3] "proportion of C0 in pool 1= 0.00454861143563418"
```



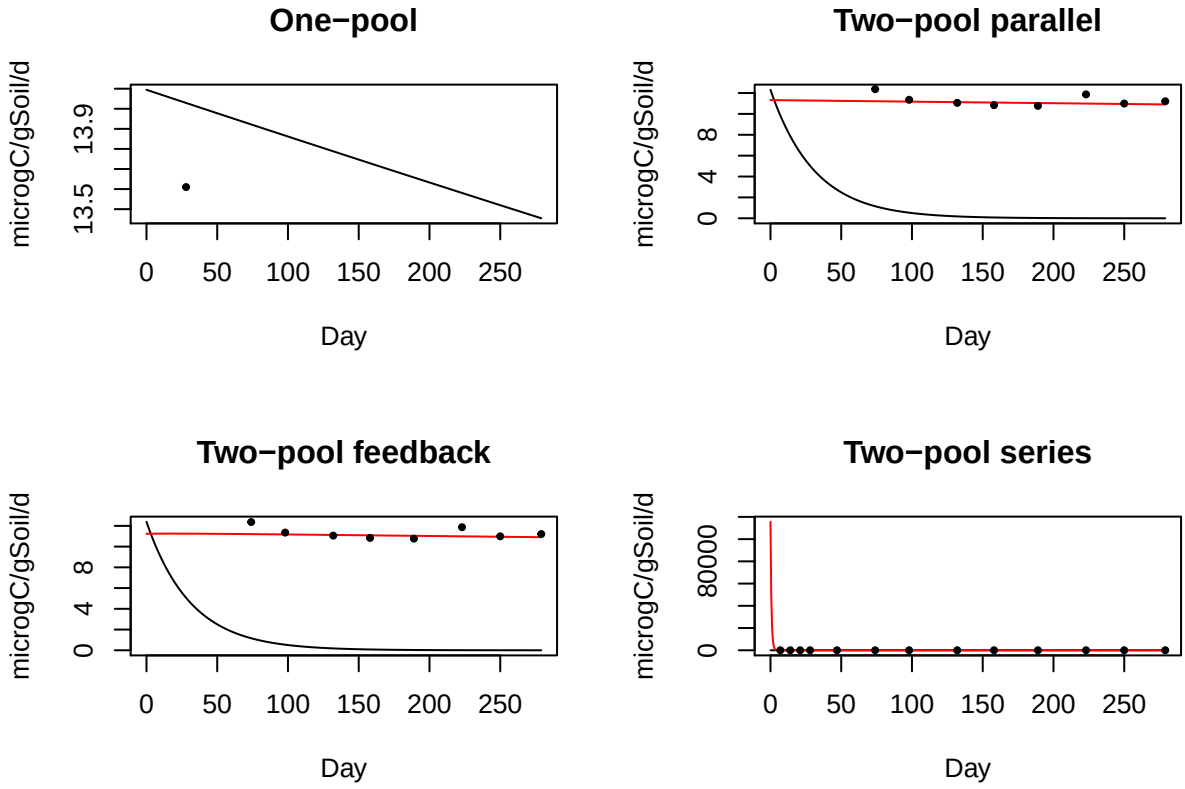
```
## [1] "AIC =  5.34519980507771"
## [1] "k1= 0.0319923773397252"
## [2] "k2= 0.000134468260839696"
## [3] "a21= 0.615109725225159"
## [4] "a12= 1.21998417332847e-05"
## [5] "Proportion of C0 in pool 1= 0.011898244844656"
```




```
## [1] "AIC =  9.34519980511407"
## [1] "k1= 0.00223304370793187"
## [2] "k2= 1.50259004879137"
## [3] "a21= 0.999923353490407"
## [4] "Proportion of C0 in pool 1= 0.0905270175934583"
```



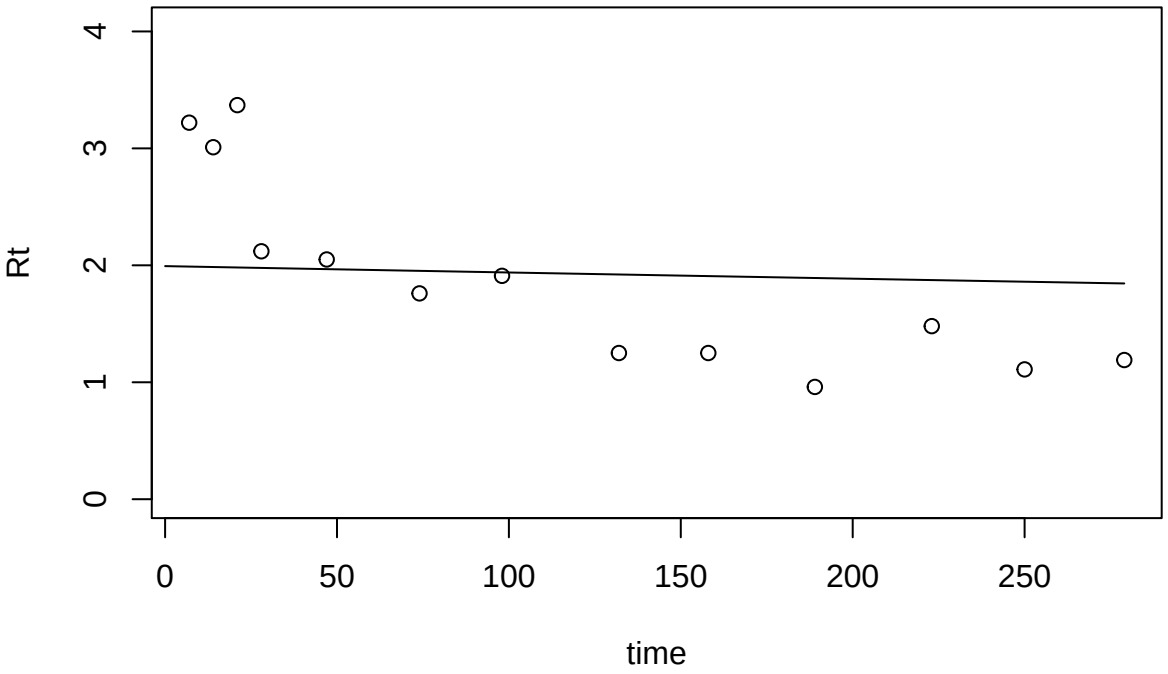

```
## [1] "AIC =  5.06783501553863"
```



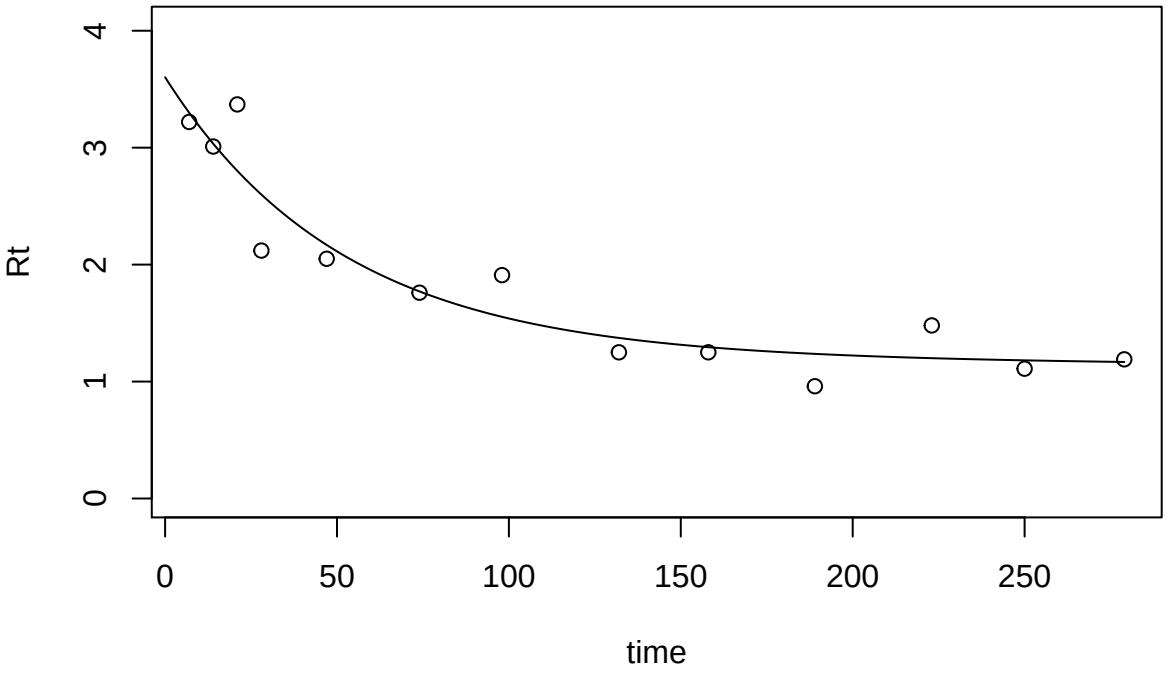

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | -3 | 0.000167 | NA | NA | NA | NA | -2.93 | 0.986 | NA | NA |
| Two-pool parallel | 5.35 | 0.032 | 0.000134 | 0.00455 | NA | NA | 5.79 | 0.0126 | 7400 | 5120 |
| Two-pool feedback | 9.35 | 0.032 | 0.000134 | 0.0119 | 0.615 | 1.22e-05 | 10.5 | 0.0012 | 4610 | 1570 |

| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| Two-pool series | 5.07 | 0.00223 | 1.5 | 0.0905 | 1 | NA | 5.82 | 0.0124 | 448 | 311 |

```
## [1] "Best fit parameter:  0.000276829323631312"
```




```
## [1] "AIC =  3.11207221075435"
## [1] "k1= 0.0192979386001376"
## [2] "k2= 0.000171443166597563"
## [3] "proportion of C0 in pool 1= 0.0171963235732703"
```




```
## [1] "AIC =  11.3901750496049"
```

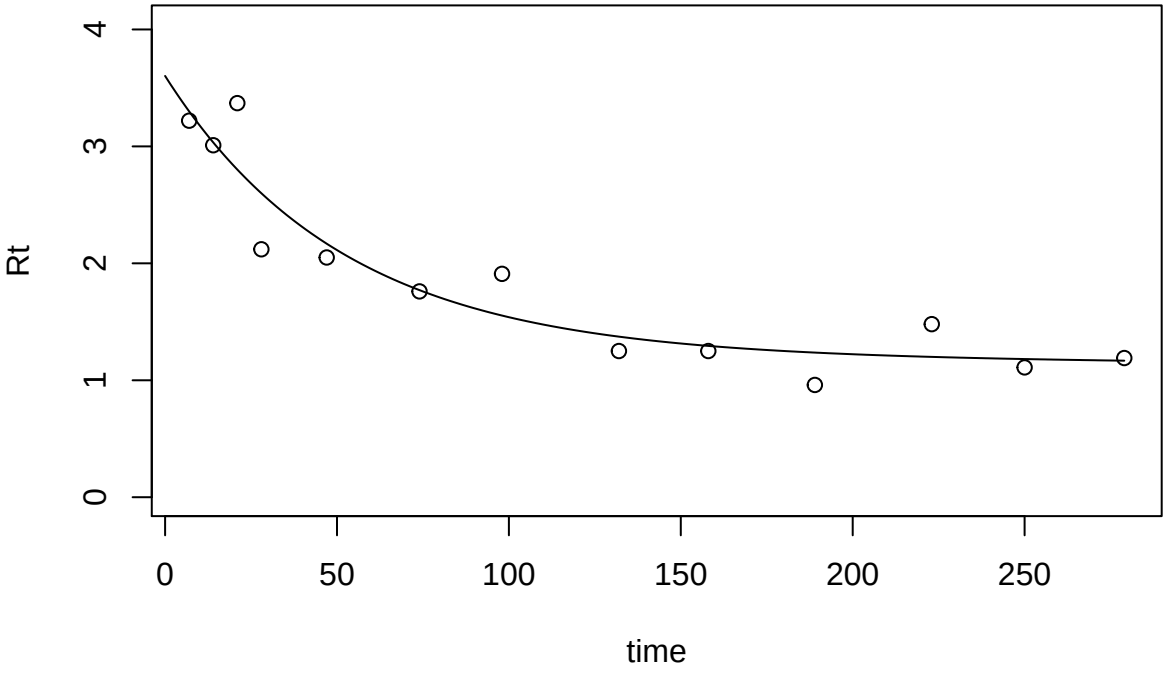
```
## [1] "k1= 0.0192979761742806"
## [2] "k2= 0.000171443297278858"
## [3] "a21= 0.053249348375902"
## [4] "a12= 3.601685607868e-06"
## [5] "Proportion of C0 in pool 1= 0.0181726059580242"
```

```
## [1] "AIC =  15.3901750490748"
```

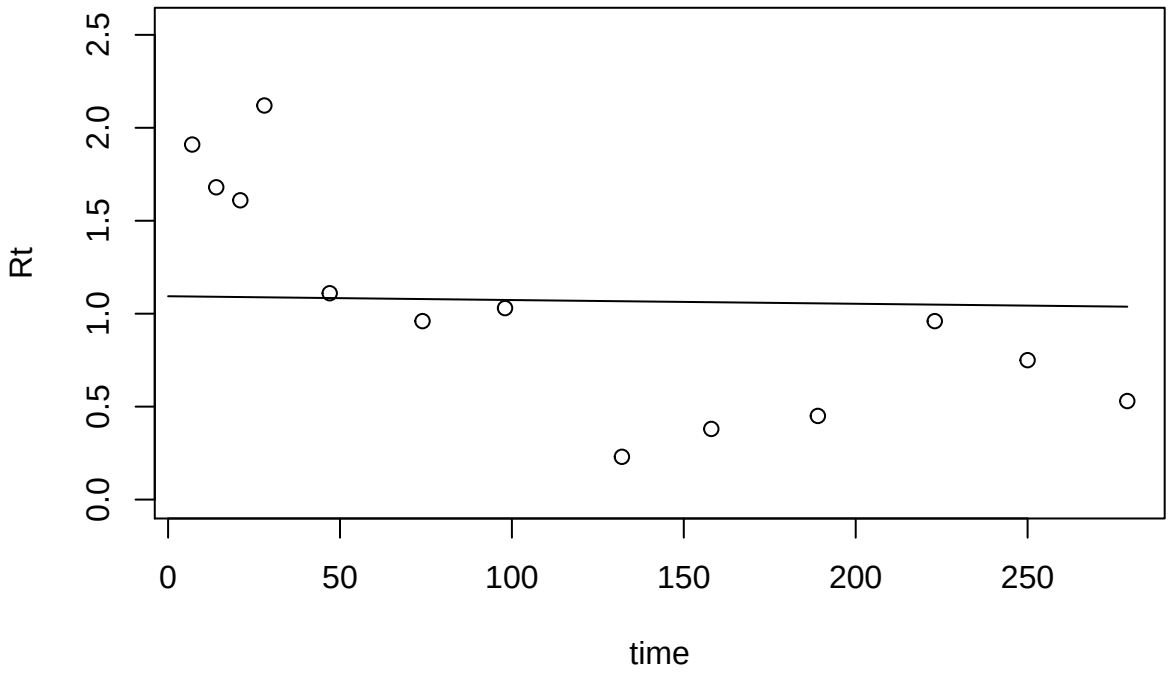
```
## Warning in newf - reff: longer object length is not a multiple of shorter object
## length
```

```
## Warning in del - (newf - reff)/delt[j]: longer object length is not a multiple
## of shorter object length
```

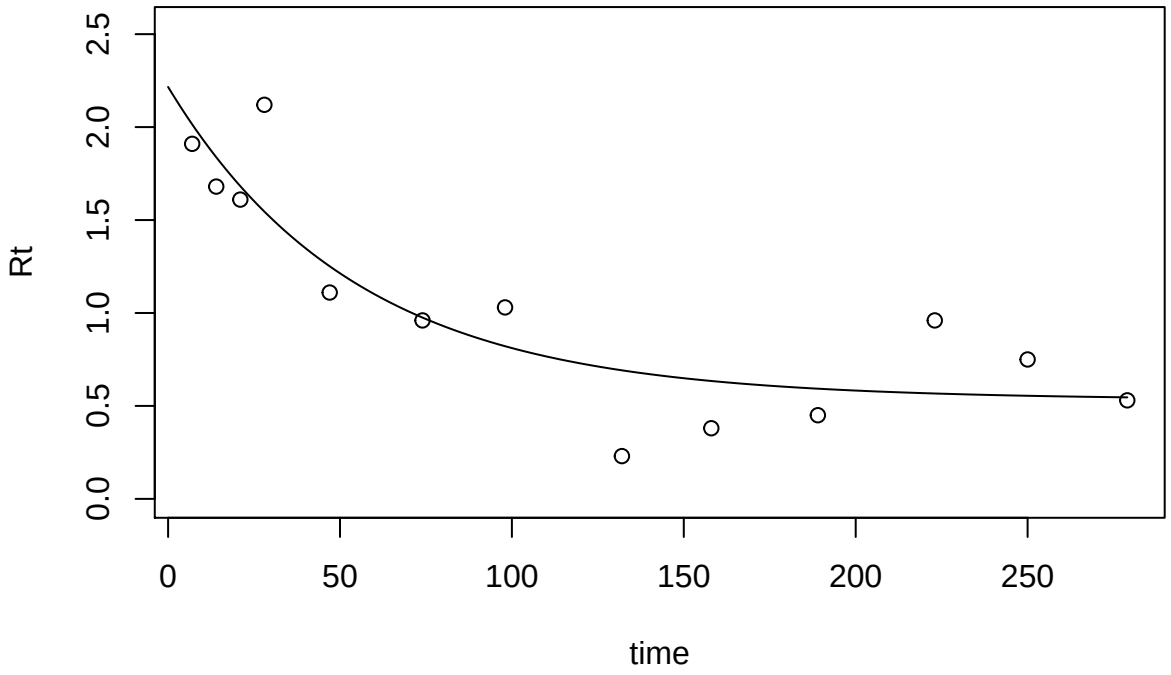
```
## Error in jacob[, j] <- del: number of items to replace is not a multiple of replacement length
```



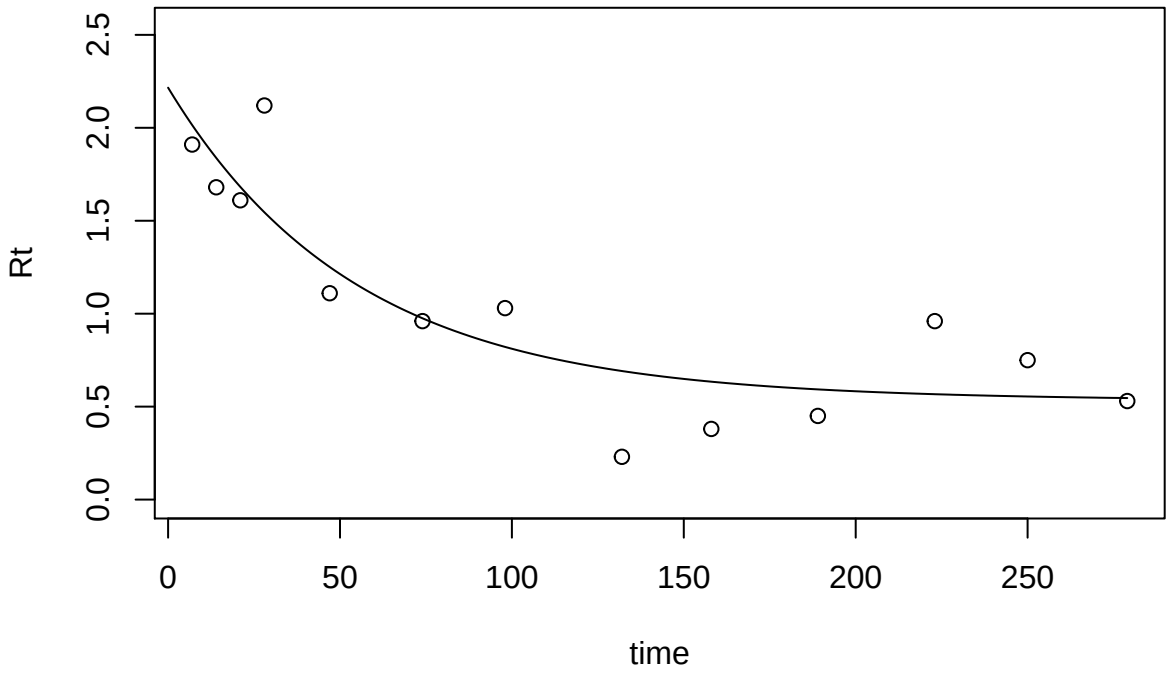

```
## [1] "Best fit parameter:  0.000188597805689679"
```



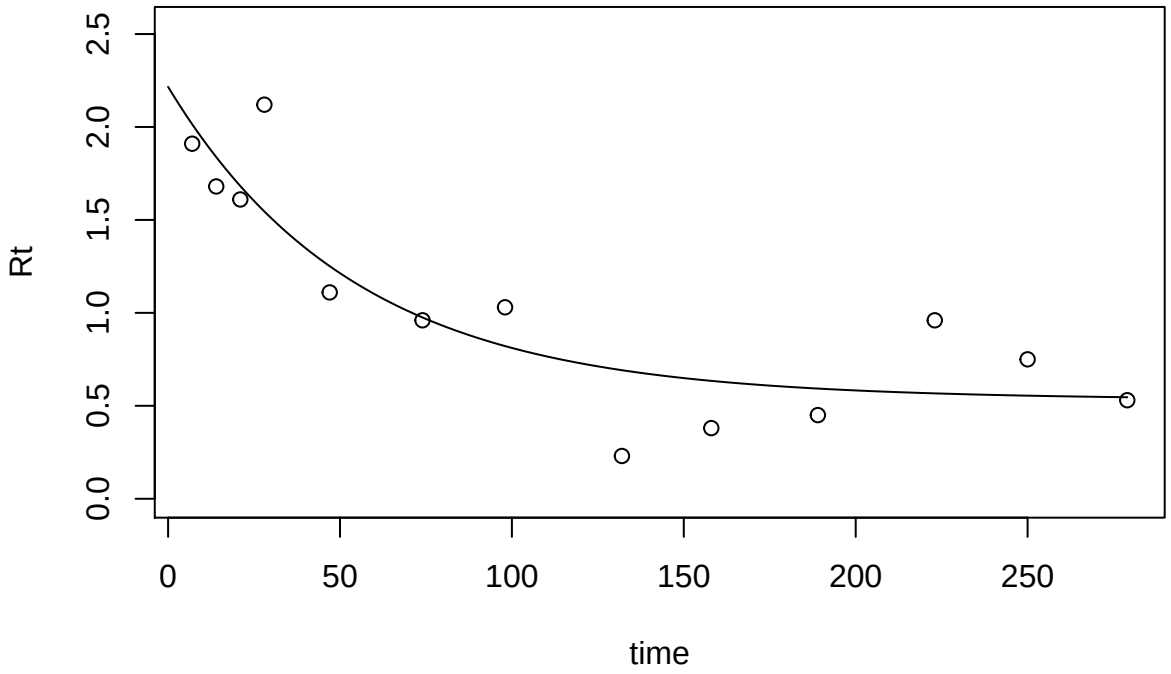

```
## [1] "AIC =  4.23529543635323"
## [1] "k1= 0.0183484567915801"
## [2] "k2= 9.64704798390215e-05"
## [3] "proportion of C0 in pool 1= 0.0156473609915961"
```



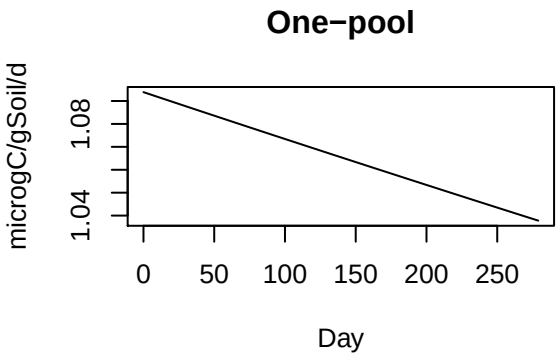

```
## [1] "AIC =  11.283645783737"
## [1] "k1= 0.018346668450402"
## [2] "k2= 9.64665065861177e-05"
## [3] "a21= 0.0737725825937527"
## [4] "a12= 6.3979583055207e-05"
## [5] "Proportion of C0 in pool 1= 0.0169025232295738"
```

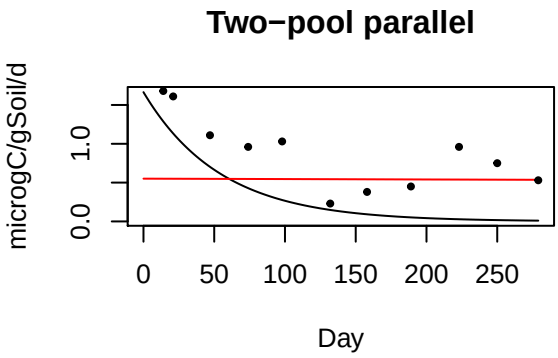


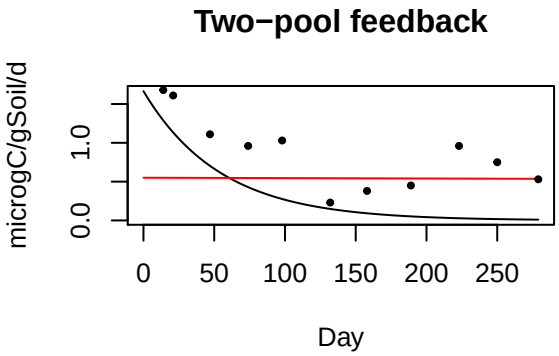

```
## [1] "AIC =  15.283645783067"
## [1] "k1= 0.0183471691127077"
## [2] "k2= 9.64672831566472e-05"
## [3] "a21= 0.0516120011173791"
## [4] "Proportion of C0 in pool 1= 0.0165046466010521"
```

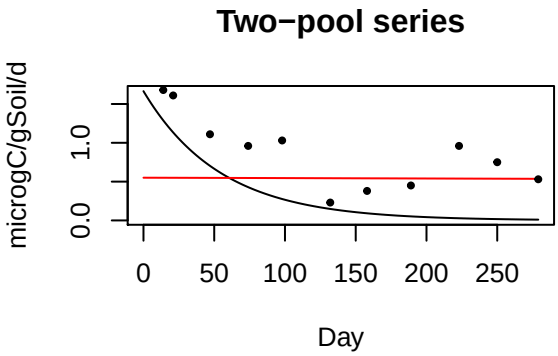



```
## [1] "AIC =  13.2836457856834"
```




| model | AIC | k1 | k2 | C0Inp1 | a21 | a12 | AICc | wi | MeanTrT | q05 |
|---|---|---|---|---|---|---|---|---|---|---|
| One-pool | 4.24 | 0.000189 | NA | NA | NA | NA | 4.31 | 0.974 | NA | NA |
| Two-pool parallel | 11.3 | 0.0183 | 9.65e-05 | 0.0156 | NA | NA | 11.7 | 0.0238 | 10200 | 7020 |
| Two-pool feedback | 15.3 | 0.0183 | 9.65e-05 | 0.0169 | 0.0738 | 6.4e-05 | 16.4 | 0.00226 | 819 | 42.3 |
| Two-pool series | 13.3 | 0.0183 | 9.65e-05 | 0.0165 | 0.0516 | NA | 14 | 0.0075 | 590 | 40.8 |