CTFS disturbance_POPULATION CHANGES

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Overview:

In this analysis, I implement Richard Condit's population change model for 4 CTFS plots: BCI, Luquillo, Fushan & Palanan. For mathematical details see: Chisholm *et al.* (2014) *Ecology Letters* **17**, 855-865 [supplemental material]. I use the fitSeveralAbundModel CTFS R function for model implementation. see: http://ctfs.si.edu/Public/CTFSRPackage/index.php/web/tutorials/abundFitModel/index.html

```
### Load the CTFS PACKAGE
load("C:/Users/hogie/Downloads/CTFSRPackage.rdata")

############################## CENSUS FULL FRAMES
#### BCI
load("C:/Users/hogie/Dropbox/CTFS Data/BCI/bci.full.Rdata31Aug2012/bci.full1.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/BCI/bci.full.Rdata31Aug2012/bci.full2.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/BCI/bci.full.Rdata31Aug2012/bci.full3.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/BCI/bci.full.Rdata31Aug2012/bci.full4.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/BCI/bci.full.Rdata31Aug2012/bci.full5.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/BCI/bci.full.Rdata31Aug2012/bci.full6.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/BCI/bci.full.Rdata31Aug2012/bci.full7.rdata")

#### LUQ
load("C:/Users/hogie/Dropbox/CTFS Data/LUQ/luquillo.full1.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/LUQ/luquillo.full2.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/LUQ/luquillo.full3.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/LUQ/luquillo.full4.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/LUQ/luquillo.full5.rdata")

### Fushan
load("C:/Users/hogie/Dropbox/CTFS Data/fs.full.RData")
### For the Fushan data the data are in centimeters.  They need to mutlipied by 10 to get to mm - the c
fs.full1$dbh <- fs.full1$dbh*10
fs.full2$dbh <- fs.full2$dbh*10
fs.full3$dbh <- fs.full3$dbh*10

### fushan data is missing the quad column
fs.full1$quadrat <- gxgy.to.quad(fs.full1$gx, fs.full1$gy, gridsize = 20, plotdim = c(500,500))
fs.full2$quadrat <- gxgy.to.quad(fs.full2$gx, fs.full2$gy, gridsize = 20, plotdim = c(500,500))
fs.full3$quadrat <- gxgy.to.quad(fs.full3$gx, fs.full3$gy, gridsize = 20, plotdim = c(500,500))

#### fushan dates needs to be changed to numeric
fs.full1$date <- as.numeric(fs.full1$date)
fs.full2$date <- as.numeric(fs.full2$date)
fs.full3$date <- as.numeric(fs.full3$date)


### Palanan
load("C:/Users/hogie/Dropbox/CTFS Data/Palanan/palanan.full1.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/Palanan/palanan.full2.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/Palanan/palanan.full3.rdata")
load("C:/Users/hogie/Dropbox/CTFS Data/Palanan/palanan.full4.rdata")
```

```
### For the Palanan data the data are in centimeters.  They need to mutlipied by 10 to get to mm - the c
palanan.full1$dbh <- palanan.full1$dbh*10
palanan.full2$dbh <- palanan.full2$dbh*10
palanan.full3$dbh <- palanan.full3$dbh*10
palanan.full4$dbh <- palanan.full4$dbh*10

#### For the palanan data - census 2 needs to be subset to gx < 200
palanan.full2b <- palanan.full2[palanan.full2$gx <= 200,]

#### species tables
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/Species lists/bci.spptable.rdata")
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/Species lists/lfdp.spptable.rdata")
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/Species lists/palanan.spptable.rdata")
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/Species lists/fushan.spptable.rdata")


lfdp.spptable <- data.frame(lapply(lfdp.spptable, as.character), stringsAsFactors=FALSE)
colnames(lfdp.spptable )[5] <-  "IDlevel"

colnames(fushan.spptable )[8] <-  "IDlevel"
colnames(palanan.spptable )[8] <-  "IDlevel"
```

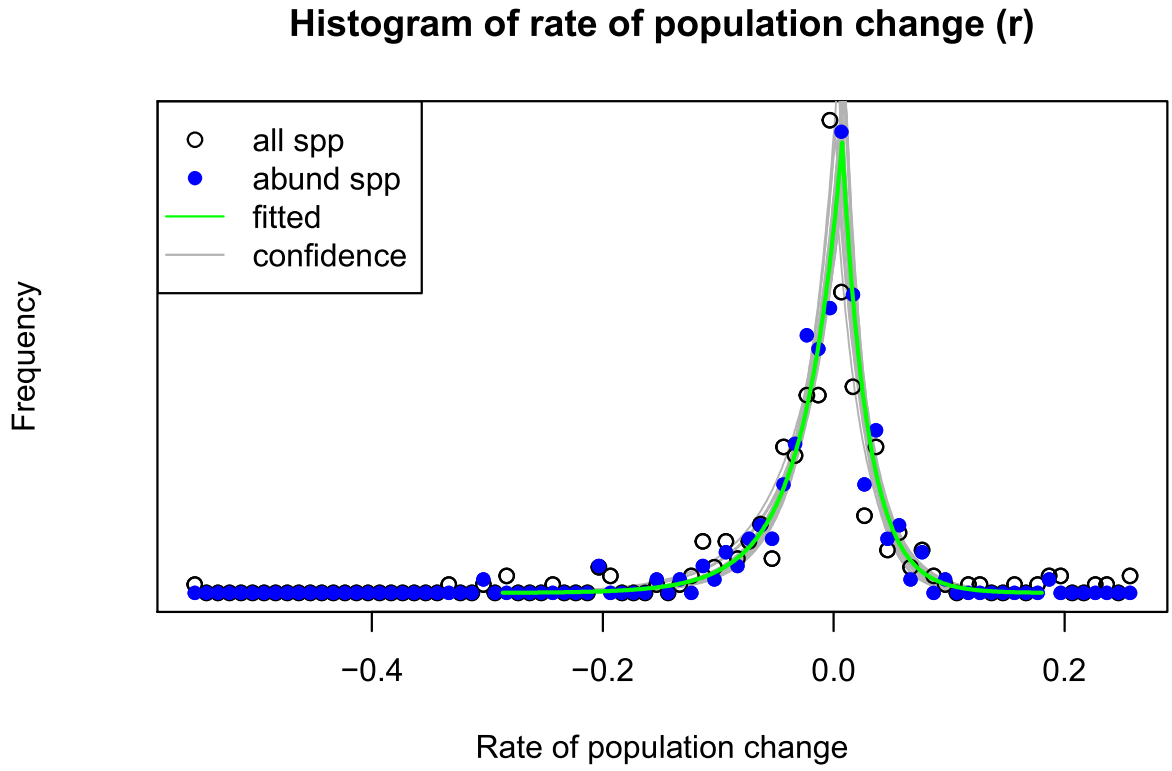
MODELS:

```
###
library(date)

#### Make Models
## BCI
#mod.BCI <- fitSeveralAbundModel(allcns = list(bci.full1, bci.full2, bci.full3, bci.full4, bci.full5, b

### LUQUILLO
#mod.LUQ <- fitSeveralAbundModel(allcns = list(luquillo.full1, luquillo.full2, luquillo.full3, luquillo

### FUSHAN
#mod.FS <- fitSeveralAbundModel(allcns = list(fs.full1, fs.full2, fs.full3),  sptable = fushan.spptable

#### PALANAN
##mod.PAL <- fitSeveralAbundModel(allcns = list(palanan.full1, palanan.full2, palanan.full3, palanan.ful

###### Palanan with census 2b
#palanan.full2b <- palanan.full2[palanan.full2$gx <= 200,]
#mod.PALb <- fitSeveralAbundModel(allcns = list(palanan.full1, palanan.full2b),  sptable = palanan.sppt

#########################################################################################################
###### LOAD PRE MADE & SAVED MDELS
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/CTFS_Disturbance/BCI_AbundFitModel.Rdata")
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/CTFS_Disturbance/LUQ_AbundFitModel.Rdata")
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/CTFS_Disturbance/Fushan_AbundFitModel.Rdata")
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/CTFS_Disturbance/Palanan_AbundFitModel.Rdata")
load("C:/Users/hogie/Dropbox/CTFS China Workshop 2016/CTFS_Disturbance/Palanan.b_AbundFitModel.Rdata")
```

ALL STEMS

BCI - abund model graphic

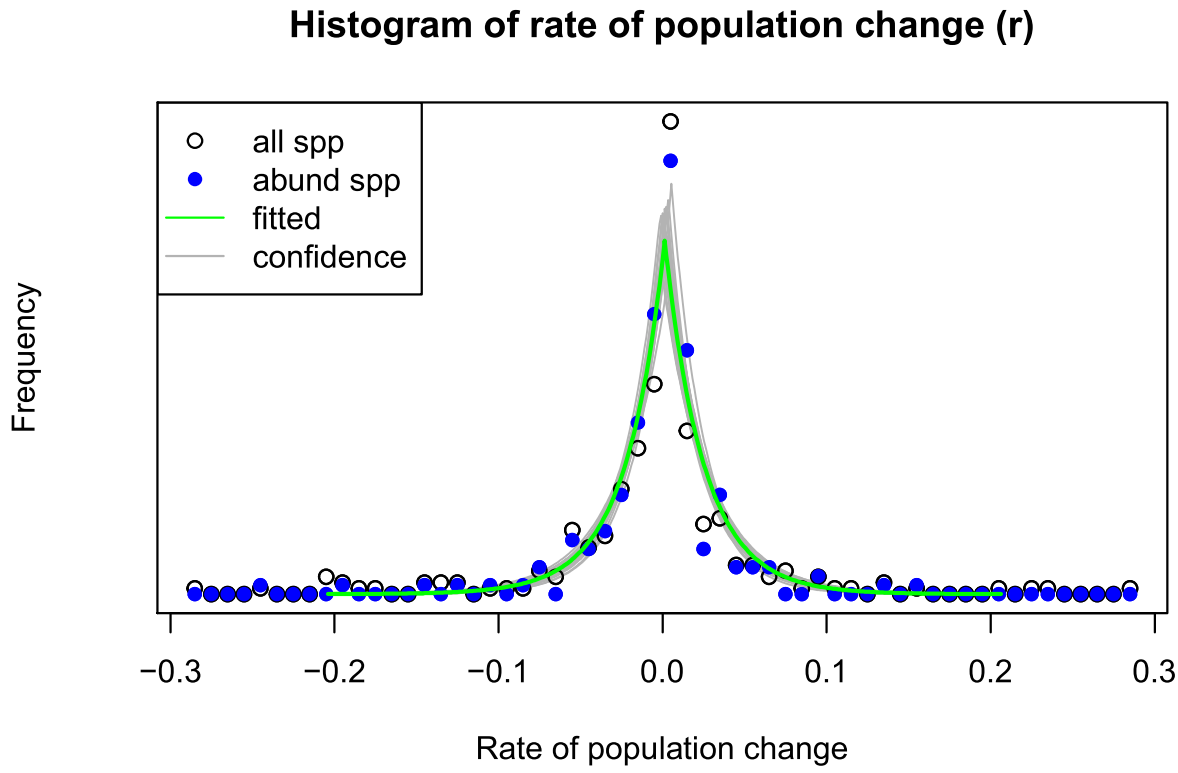
```
graph.abundmodel(mod.BCI$dbh10$census1.2)
```




```
## $Fastest_increases
##          N1   N2    S     time    date1    date2    mortrate   little.r
## paligu  376  661  247 3.053886 8105.625 9228.600 0.137595454 0.18473667
## uniden   25   38   25 2.697463 8176.792 9190.928 0.000000000 0.15522374
## clidde    8   14    7 2.796704 8068.595 9256.214 0.047745989 0.20009834
## ochrpy    4    8    3 2.691700 8181.110 9181.840 0.106877479 0.25751282
## micoar  528  677  389 3.195909 8054.420 9251.310 0.095596265 0.07777913
## ingath   61   78   58 2.649370 8196.134 9185.458 0.019035038 0.09278998
## cha2sc  194  239  190 2.895034 8160.319 9220.697 0.007196491 0.07205628
## cuparu   56   73   49 3.273421 8080.136 9244.732 0.040792615 0.08098799
## eugega  963 1162  917 3.345195 8044.492 9249.944 0.014631716 0.05615354
## pipeco 3142 3706 2548 3.019620 8118.997 9222.475 0.069396421 0.05467364
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## paligu 0.13588183 0.113730162 0.16014194 0.18032204  0.158686886
## uniden 0.02087983 0.005214711 0.05368705 0.11344595  0.057866415
## clidde 0.05147329 0.011534124 0.14182505 0.09051922  0.011743618
## ochrpy 0.07219127 0.013442687 0.20652536 0.08013713 -0.006293772
## micoar 0.09472062 0.079894621 0.11106438 0.07409438  0.056088881
## ingath 0.02580806 0.009265334 0.05195346 0.07350578  0.037857797
```

```
## cha2sc 0.01117779 0.004795496 0.02082084 0.06815358  0.050012274
## cuparu 0.04162054 0.019943798 0.07584387 0.06425516  0.026765746
## eugega 0.01518125 0.011224251 0.01971182 0.05547265  0.047432260
## pipeco 0.06931190 0.063765963 0.07494709 0.05408232  0.047019390
##        uppermeanR
## paligu 0.20271712
## uniden 0.17761928
## clidde 0.18611992
## ochrpy 0.20703428
## micoar 0.09317865
## ingath 0.11682436
## cha2sc 0.08804219
## cuparu 0.10630669
## eugega 0.06430584
## pipeco 0.06083462
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2  mortrate    little.r
## bactc1 241  84  84 3.500939 8002.949 9273.566 0.3010564 -0.30105644
## bactba 111  55  55 3.388399 8024.983 9265.000 0.2072357 -0.20723565
## pipecu 120  65  62 3.012689 8119.954 9219.893 0.2191920 -0.20350736
## bactc2  38  17  17 3.290464 8056.410 9252.538 0.2444557 -0.24445571
## sennda 201 135 114 3.363347 8028.548 9262.585 0.1686137 -0.11834345
## hampap  76  49  41 3.217818 8010.668 9258.138 0.1917950 -0.13640085
## cecrob  61  38  27 3.123925 8036.937 9260.472 0.2609016 -0.15150417
## pipeae 220 159 135 3.275884 8038.308 9247.592 0.1490751 -0.09912540
## solaha 125  89  63 3.055432 8076.493 9240.471 0.2242495 -0.11117163
## conoci 389 279 232 3.555180 7989.365 9270.768 0.1453772 -0.09348825
##          fitmort lowermean uppermean        fitr lowermeanR  uppermeanR
## bactc1 0.2940399 0.2485247 0.3441020 -0.28680172 -0.3340229 -0.23142702
## bactba 0.1990596 0.1502875 0.2541937 -0.18525379 -0.2401891 -0.12050362
## pipecu 0.2086276 0.1578638 0.2676036 -0.18130543 -0.2361194 -0.11635069
## bactc2 0.2152562 0.1310582 0.3219842 -0.15746650 -0.2739561 -0.01871032
## sennda 0.1644371 0.1320543 0.2022090 -0.10869942 -0.1457335 -0.06734650
## hampap 0.1798598 0.1255047 0.2460159 -0.10555368 -0.1681964 -0.03629708
## cecrob 0.2382803 0.1642098 0.3288827 -0.10283418 -0.1893844 -0.01187753
## pipeae 0.1463367 0.1169796 0.1792872 -0.09068358 -0.1243225 -0.05205124
## solaha 0.2156481 0.1640548 0.2749838 -0.08993219 -0.1462279 -0.03037621
## conoci 0.1440045 0.1217764 0.1682341 -0.08958614 -0.1124400 -0.06481954
```

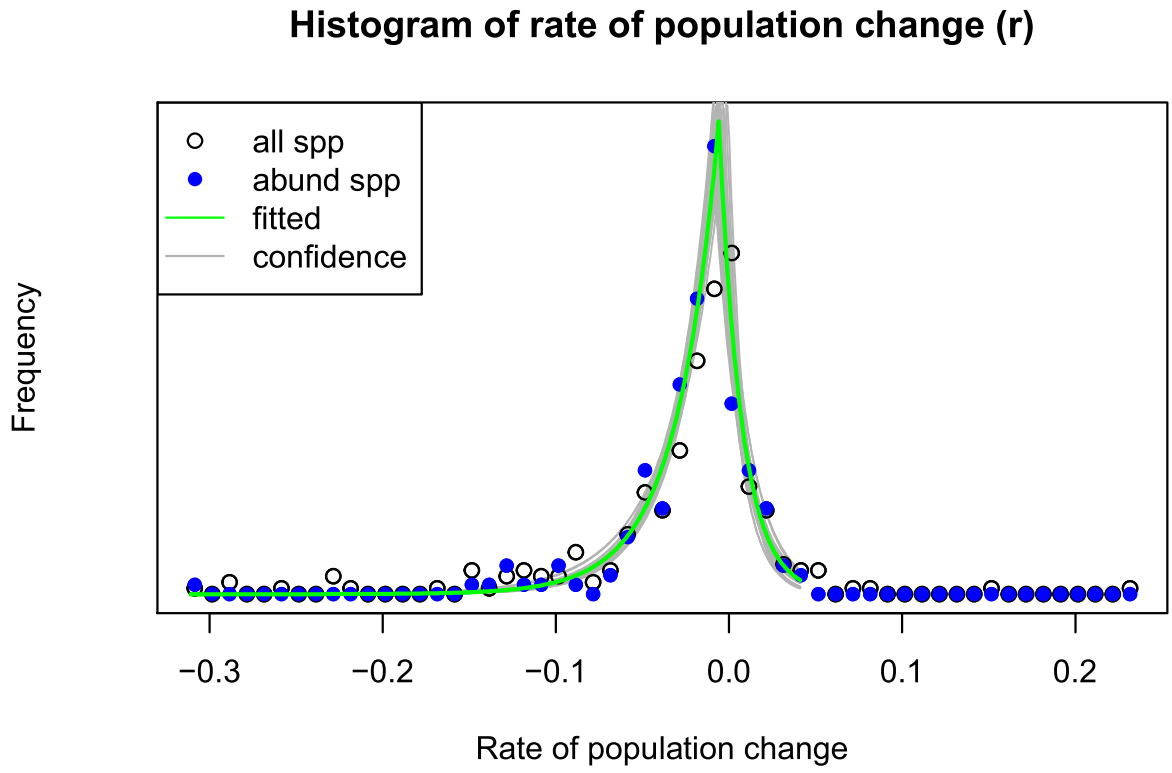
```
graph.abundmodel(mod.BCI$dbh10$census2.3)
```




```
## $Fastest_increases
##         N1   N2   S     time    date1    date2   mortrate   little.r
## psycg1  13   44   8 5.239580 9204.598 11133.74 0.09266158 0.23269808
## cedrod   2    9   2 5.296520 9264.604 11213.23 0.00000000 0.28397462
## urerba   5   17   2 5.335387 9276.895 11234.87 0.17173839 0.22936958
## paligu 657 1474 330 5.239534 9228.595 11146.78 0.13142226 0.15422194
## annosp  71  142  54 5.269783 9277.917 11205.46 0.05193683 0.13153240
## crotbi 621 1013 252 5.251026 9241.012 11161.87 0.17175728 0.09318948
## sponmo  56   92  44 5.230875 9214.555 11133.95 0.04610358 0.09490514
## uniden  29   48  27 5.167994 9189.967 11074.31 0.01382721 0.09750498
## acacme   6   11   6 5.239749 9259.216 11174.59 0.00000000 0.11568032
## appuse   1    3   1 5.289528 9352.000 11284.00 0.00000000 0.20769572
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## psycg1 0.07749025 0.027427631 0.15475597 0.20640048  0.155523582
## cedrod 0.03655539 0.005522335 0.12182524 0.19332850  0.109769328
## urerba 0.10437471 0.024083635 0.25021233 0.16701581  0.088879325
## paligu 0.13076683 0.116415681 0.14577688 0.15324980  0.143511869
## annosp 0.05075079 0.030682963 0.07754980 0.12494350  0.098519240
## crotbi 0.17043270 0.153700724 0.18945107 0.09153368  0.080471879
## sponmo 0.04509822 0.024483913 0.07192704 0.08568050  0.056467107
## uniden 0.02065775 0.006109657 0.04560506 0.08460838  0.053184560
## acacme 0.02615118 0.004826344 0.07251612 0.07021581  0.014331984
## appuse 0.04435133 0.005710745 0.15185930 0.06924840 -0.004496505
##        uppermeanR
## psycg1  0.2569837
## cedrod  0.2901422
```

```
## urerba  0.2498531
## paligu  0.1622680
## annosp  0.1514893
## crotbi  0.1027573
## sponmo  0.1168022
## uniden  0.1198487
## acacme  0.1343541
## appuse  0.1713437
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2  mortrate    little.r
## bactc1   83   23   23 5.296818 9273.000 11209.25 0.2422863 -0.24228631
## bactba   55   20   18 5.245724 9267.500 11188.12 0.2129280 -0.19284297
## pipeco 3702 1771 1520 5.224924 9221.997 11131.14 0.1703686 -0.14111763
## pipeae  159   84   71 5.245245 9248.206 11162.67 0.1537057 -0.12165063
## pipepe  118   68   54 5.281214 9299.786 11230.81 0.1480153 -0.10436556
## bactma  346  217  185 5.292744 9225.656 11162.54 0.1182908 -0.08814737
## cestme  236  157  117 5.264659 9264.386 11187.78 0.1332770 -0.07741926
## acaldi 1195  817  593 5.285073 9269.515 11201.91 0.1325823 -0.07195026
## bactc2   17    6    5 5.286638 9252.538 11185.42 0.2314846 -0.19699740
## geonin   14    3    3 5.309279 9271.500 11209.68 0.2901420 -0.29014202
##          fitmort  lowermean uppermean        fitr  lowermeanR  uppermeanR
## bactc1 0.2331763 0.17143575 0.3038270 -0.20398037 -0.27306489 -0.12855374
## bactba 0.1993379 0.13813910 0.2712346 -0.14371852 -0.21782644 -0.06142619
## pipeco 0.1701569 0.16317875 0.1773590 -0.14058750 -0.14771433 -0.13332947
## pipeae 0.1502244 0.11958514 0.1839674 -0.11066166 -0.14357647 -0.07538784
## pipepe 0.1443872 0.11027540 0.1838949 -0.09134217 -0.12604082 -0.05683376
## bactma 0.1170028 0.09883171 0.1366155 -0.08454251 -0.10304962 -0.06564471
## cestme 0.1311298 0.10791038 0.1569198 -0.07140505 -0.09405039 -0.04609098
## acaldi 0.1322505 0.12154671 0.1430540 -0.07095517 -0.08128004 -0.06040331
## bactc2 0.1938855 0.09556982 0.3333336 -0.06195580 -0.18156505  0.01318991
## geonin 0.2287153 0.10656866 0.4162217 -0.06152283 -0.20875497  0.01956639
```

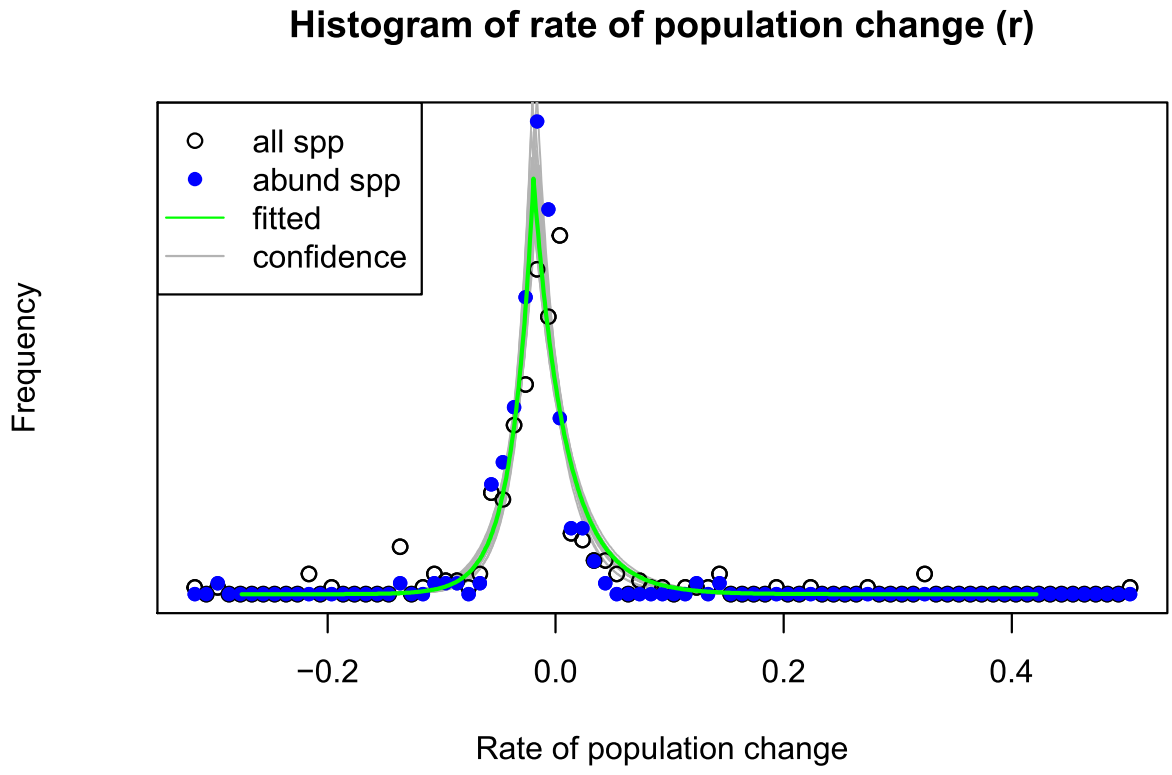
```
graph.abundmodel(mod.BCI$dbh10$census3.4)
```




```
## $Fastest_increases
##         N1  N2   S     time    date1    date2    mortrate   little.r
## micoho  37  48  37 4.787097 11126.90 12876.39 0.000000000 0.05437180
## annosp 142 176 103 4.779910 11205.46 12950.19 0.067176599 0.04490816
## anaxpa 587 695 564 4.906321 11069.73 12859.68 0.008146750 0.03442234
## ingath  95 115  82 4.824688 11085.03 12844.86 0.030500965 0.03959950
## chr2ca 109 128  96 4.763597 11210.50 12947.19 0.026660463 0.03373132
## psycg1  44  57  30 4.792508 11133.74 12879.98 0.079914781 0.05401381
## calolo 890 998 764 4.785444 11147.40 12895.95 0.031899585 0.02393337
## ormocr  70  80  68 4.778403 11245.10 12986.71 0.006066364 0.02794477
## cha2sc 289 324 269 4.785631 11132.08 12881.42 0.014985548 0.02388751
## ingas1 307 342 284 4.760592 11202.85 12938.95 0.016357948 0.02267848
##            fitmort   lowermean  uppermean       fitr   lowermeanR
## micoho 0.011144100 0.002943852 0.02658241 0.04172954  0.018378442
## annosp 0.066370068 0.047458321 0.08864288 0.03534719  0.013659892
## anaxpa 0.008950318 0.005896472 0.01251499 0.03369649  0.027164995
## ingath 0.031526823 0.017536738 0.05055133 0.03083100  0.010389996
## chr2ca 0.028002172 0.015109647 0.04469510 0.02641495  0.008152115
## psycg1 0.074709951 0.041997233 0.11888858 0.02577231 -0.006576000
## calolo 0.032107317 0.026779215 0.03805254 0.02292074  0.015615024
## ormocr 0.011776761 0.003735002 0.02393378 0.02256183  0.005925666
## cha2sc 0.016011005 0.010047489 0.02333137 0.02174209  0.012116029
## ingas1 0.017176808 0.011399001 0.02402710 0.02047177  0.010392731
##        uppermeanR
## micoho 0.07035467
## annosp 0.05927721
```

```
## anaxpa 0.04084611
## ingath 0.05325760
## chr2ca 0.04804145
## psycg1 0.06302131
## calolo 0.03081290
## ormocr 0.04368101
## cha2sc 0.03313848
## ingas1 0.03196648
##
## $Biggest_losses
##          N1  N2   S     time    date1    date2  mortrate    little.r
## pipeco 1770 394 353 4.792279 11131.18 12883.03 0.3364301 -0.31350094
## cestme  157  82  70 4.785187 11187.78 12936.06 0.1688023 -0.13573693
## crotbi 1013 561 413 4.780790 11161.87 12907.45 0.1876727 -0.12360941
## psycde   60  30  20 4.808674 11115.33 12870.22 0.2284647 -0.14414517
## solaha   77  42  24 4.769322 11163.66 12909.01 0.2444271 -0.12709057
## acaldi  817 521 387 4.767818 11201.84 12942.44 0.1567204 -0.09435953
## pipecu   53  29  27 4.826121 11133.48 12889.56 0.1397510 -0.12494425
## pipepe   68  39  35 4.797045 11230.81 12985.54 0.1384518 -0.11589344
## bactc1   23   8   6 4.761451 11209.25 12946.30 0.2822112 -0.22179219
## pipeae   84  51  47 4.803893 11162.67 12916.71 0.1208747 -0.10387224
##          fitmort  lowermean uppermean        fitr lowermeanR   uppermeanR
## pipeco 0.3360690 0.31665930 0.3547142 -0.31083230 -0.3297635 -0.292066464
## cestme 0.1643798 0.13003418 0.2014389 -0.12334208 -0.1591860 -0.086389807
## crotbi 0.1871033 0.17239649 0.2026784 -0.12197962 -0.1369103 -0.107149257
## psycde 0.2161025 0.14959890 0.2949612 -0.10365042 -0.1696308 -0.032856729
## solaha 0.2320941 0.17110821 0.3067883 -0.09515146 -0.1524860 -0.034108766
## acaldi 0.1558109 0.14055747 0.1711125 -0.09243166 -0.1067097 -0.077485729
## pipecu 0.1328641 0.08562696 0.1876628 -0.09133172 -0.1494362 -0.021364167
## pipepe 0.1313339 0.08969540 0.1792826 -0.09075349 -0.1416929 -0.037003430
## bactc1 0.2368950 0.13444861 0.3754079 -0.08597223 -0.2098561  0.001147991
## pipeae 0.1158800 0.08046146 0.1546845 -0.08575555 -0.1259517 -0.041662678
```

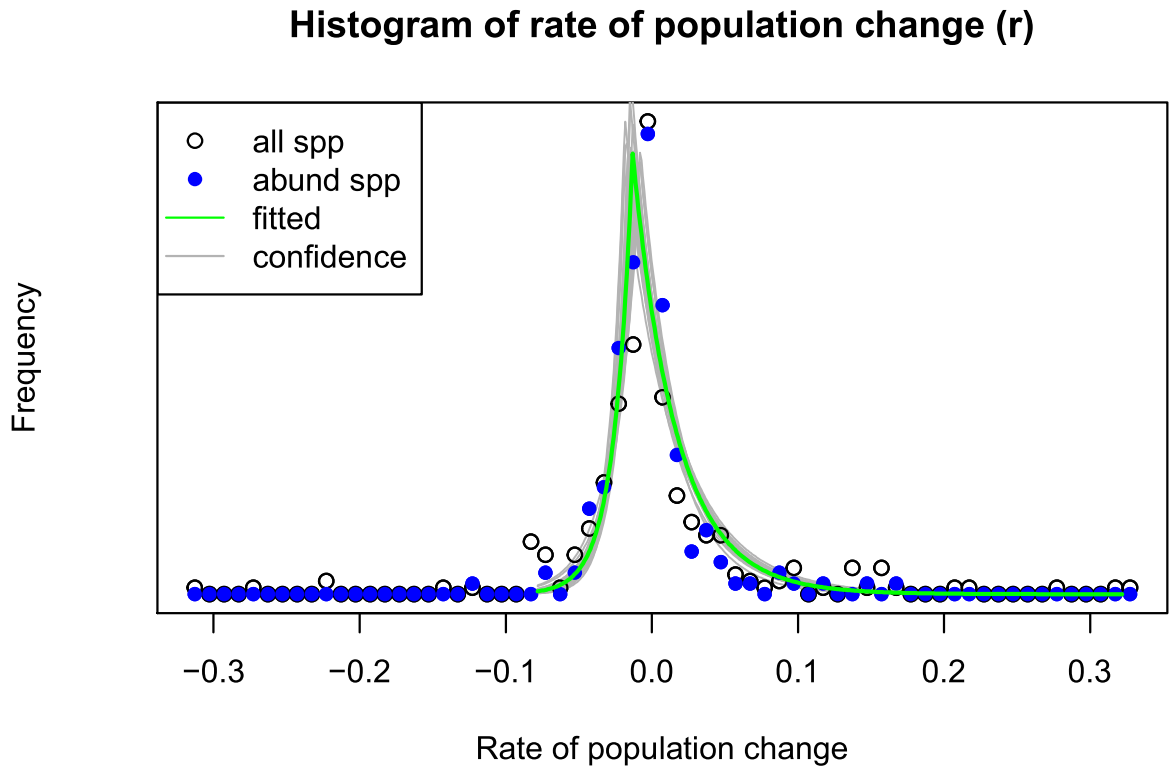
```
graph.abundmodel(mod.BCI$dbh10$census4.5)
```




```
## $Fastest_increases
##         N1  N2   S     time    date1    date2   mortrate  little.r
## cecrlo   1  12   1 4.969463 12966.53 14786.72 0.00000000 0.5000352
## conobr   2  10   2 4.995659 13000.92 14821.51 0.00000000 0.3221673
## tremin   1   5   1 4.957321 12970.28 14786.89 0.00000000 0.3246588
## tri4ga   1   5   1 4.932598 12891.31 14712.96 0.00000000 0.3262860
## cecrob  50 102  35 4.987202 12936.51 14754.41 0.07151805 0.1429559
## cecrin 377 714 307 4.986315 12938.29 14759.26 0.04119223 0.1280781
## pipeca   1   4   0 4.993008 12937.91 14764.27        Inf 0.2776471
## clidde   5  13   0 4.993714 12924.04 14746.79        Inf 0.1913429
## ingam1   1   3   1 5.001930 12859.38 14686.33 0.00000000 0.2196377
## ardiba   3   6   3 5.017961 13016.60 14846.77 0.00000000 0.1381332
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## cecrlo 0.05053995 0.008574025 0.16044602 0.42179610  0.321843681
## conobr 0.04133989 0.008591222 0.12339517 0.23996768  0.146252210
## tremin 0.04724388 0.008518653 0.14283302 0.18448379  0.078992529
## tri4ga 0.04811129 0.008413558 0.14883794 0.18434696  0.071532647
## cecrob 0.06813807 0.039190975 0.10703312 0.13381733  0.101511670
## cecrin 0.04138012 0.031954756 0.05128995 0.12698775  0.114691569
## pipeca 0.08781690 0.016730400 0.28433351 0.11753155 -0.003292663
## clidde 0.24795343 0.066502705 0.61117232 0.10415439  0.006318778
## ingam1 0.04814638 0.009112486 0.14916219 0.08031846 -0.016789216
## ardiba 0.03675779 0.007722550 0.10280437 0.06631147 -0.007740293
##        uppermeanR
## cecrlo  0.5255130
## conobr  0.3439102
```

```
## tremin  0.3102094
## tri4ga  0.3142406
## cecrob  0.1672570
## cecrin  0.1389560
## pipeca  0.2759135
## clidde  0.2108517
## ingam1  0.2063492
## ardiba  0.1601131
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## pipeco 394  92  78 4.990523 12883.45 14707.84 0.32454354 -0.29146489
## bactma 176 103 100 4.970845 12908.22 14726.12 0.11372590 -0.10777946
## crotbi 561 358 202 4.996741 12907.50 14732.36 0.20442388 -0.08989618
## pipeae  52  26  19 4.985419 12915.86 14739.28 0.20194989 -0.13903490
## cestme  82  50  43 5.001576 12937.25 14760.29 0.12906314 -0.09890807
## pipea1  38  22  21 4.992318 12899.18 14723.58 0.11879525 -0.10947693
## ingama 539 397 320 4.984502 12946.31 14765.42 0.10460315 -0.06134601
## micoar 799 600 353 4.982634 12921.51 14742.44 0.16394799 -0.05748591
## psycde  30  15   7 5.007580 12868.88 14694.21 0.29061687 -0.13841959
## ade1tr 219 163 155 4.977840 12949.39 14766.79 0.06943707 -0.05932725
##          fitmort  lowermean  uppermean        fitr  lowermeanR
## pipeco 0.3208923 0.28138720 0.36078450 -0.27547191 -0.31357885
## bactma 0.1113087 0.08697769 0.13730318 -0.09756222 -0.12506723
## crotbi 0.2032990 0.18246322 0.22461318 -0.08501431 -0.10382287
## pipeae 0.1860055 0.12724280 0.26041504 -0.08324595 -0.15246789
## cestme 0.1232403 0.08723743 0.16409027 -0.07557804 -0.11841730
## pipea1 0.1078473 0.06361897 0.16728149 -0.06361982 -0.12389998
## ingama 0.1036853 0.09029313 0.11796583 -0.05846778 -0.07335069
## micoar 0.1629171 0.14708354 0.17934307 -0.05479852 -0.06899693
## psycde 0.2494467 0.14997597 0.37816970 -0.05422257 -0.13733225
## ade1tr 0.0683285 0.05342049 0.08557884 -0.05421210 -0.07094221
##          uppermeanR
## pipeco -0.237259990
## bactma -0.065424846
## crotbi -0.065213802
## pipeae -0.020328882
## cestme -0.028333778
## pipea1 -0.010664306
## ingama -0.043220402
## micoar -0.040811815
## psycde -0.002116884
## ade1tr -0.034658600
```

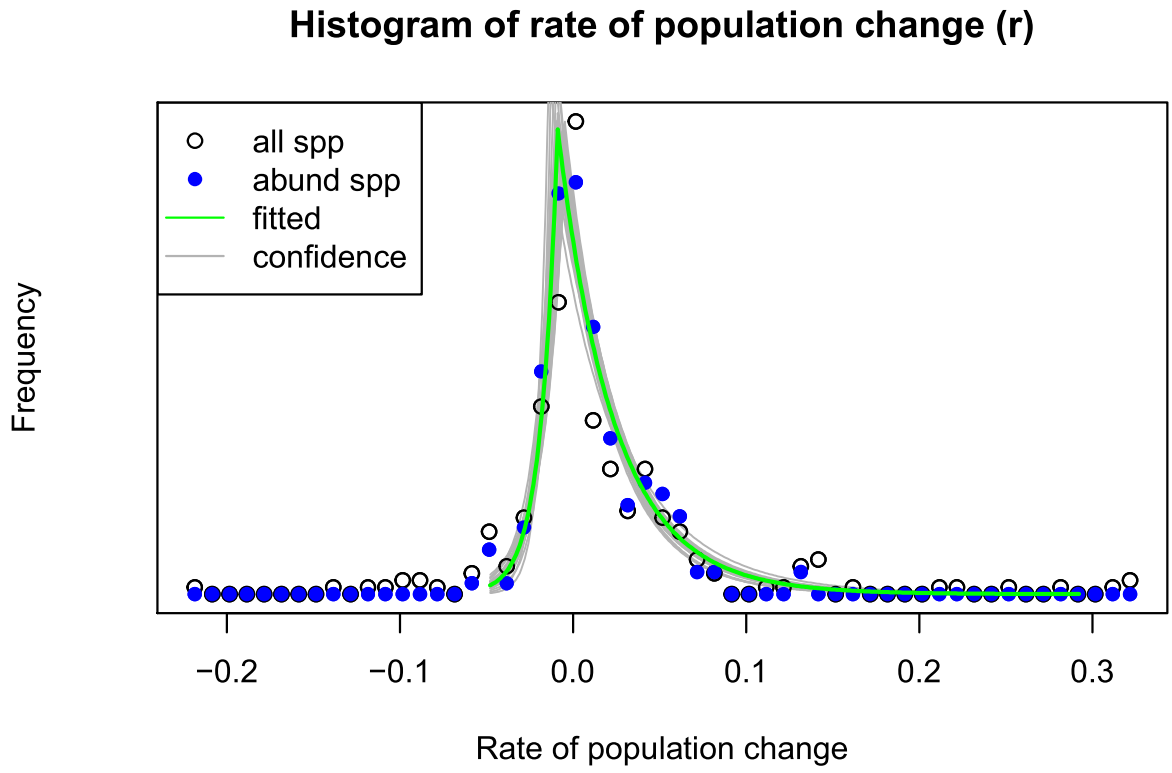
```
graph.abundmodel(mod.BCI$dbh10$census5.6)
```




```
## $Fastest_increases
##         N1  N2  S     time    date1    date2   mortrate  little.r
## hampap  27 142 14 5.045182 14747.58 16591.97 0.13017954 0.3290248
## psycli  23  65 13 4.997371 14805.70 16633.72 0.11416901 0.2078879
## ficubu   1   5  1 5.059683 14744.72 16590.42 0.00000000 0.3180907
## cecrob 102 235 62 5.031581 14754.41 16593.09 0.09894274 0.1658748
## pse1se  16  35 14 5.046528 14772.50 16617.42 0.02646005 0.1551085
## sennda  65 134 41 5.053391 14755.56 16598.53 0.09118931 0.1431618
## acacme  10  22 10 5.056624 14736.91 16588.75 0.00000000 0.1559256
## solast   1   4  0 5.074733 14768.49 16612.58        Inf 0.2731758
## tremin   5  11  5 5.049575 14786.89 16630.26 0.00000000 0.1561433
## pourbi  59 104 50 5.014327 14658.46 16491.17 0.03300830 0.1130468
##           fitmort   lowermean  uppermean      fitr lowermeanR uppermeanR
## hampap 0.11409779 0.060737482 0.18839295 0.3222962 0.29108188  0.3543885
## psycli 0.09988474 0.048822582 0.17176074 0.1922603 0.14986508  0.2386087
## ficubu 0.04639888 0.007147396 0.14912243 0.1884384 0.08479841  0.3181209
## cecrob 0.09638217 0.067629694 0.12981336 0.1621523 0.13874151  0.1838716
## pse1se 0.03268919 0.009862708 0.07336497 0.1358503 0.08945629  0.1861525
## sennda 0.08649356 0.054737082 0.12624679 0.1358194 0.10600006  0.1663082
## acacme 0.02239862 0.005003175 0.05746375 0.1283957 0.07502174  0.1906397
## solast 0.09084232 0.014534287 0.29208313 0.1178807 0.00717358  0.2570699
## tremin 0.02952709 0.006027164 0.08153750 0.1075009 0.04136734  0.1875535
## pourbi 0.03429676 0.016986590 0.05711289 0.1065677 0.07944429  0.1368381
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2   mortrate    little.r
```

```
## pipeco   92   49   34 5.031457 14707.84 16549.69 0.19784093 -0.12520595
## xyl2ol   94   66   65 5.035398 14718.81 16559.95 0.07326284 -0.07023081
## psycho 3936 3120 2635 5.047635 14750.46 16595.06 0.07949898 -0.04602789
## uniden   26    0    0 5.041120 14674.72 16516.40        Inf        -Inf
## guarsp 1036  824  761 5.040347 14747.26 16588.72 0.06120393 -0.04542383
## aegipa   62   44   41 5.037230 14724.12 16566.45 0.08210114 -0.06808201
## poular 1403 1162 1140 5.033791 14758.62 16597.52 0.04123821 -0.03744099
## ery1co  113   89   84 5.041099 14738.20 16578.84 0.05883062 -0.04736099
## ingasa  249  205  191 5.034665 14733.86 16573.44 0.05267073 -0.03862082
## zantpr  113   90   83 5.043997 14732.82 16574.30 0.06117118 -0.04511862
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## pipeco 0.18917769 0.14117985 0.24502519 -0.07818721 -0.12856531
## xyl2ol 0.07165948 0.04735039 0.10002476 -0.05111208 -0.08212555
## psycho 0.07931253 0.07483923 0.08390397 -0.04563237 -0.05017022
## uniden 0.64619141 0.33132478 1.24721998 -0.04415451 -0.14952418
## guarsp 0.06094376 0.05414088 0.06798597 -0.04403160 -0.05175685
## aegipa 0.07753663 0.04845882 0.11432408 -0.03816536 -0.07774843
## poular 0.04125752 0.03638783 0.04643442 -0.03685854 -0.04179788
## ery1co 0.05786107 0.03898823 0.08013918 -0.03503595 -0.05820658
## ingasa 0.05220558 0.03993356 0.06609044 -0.03357079 -0.04840299
## zantpr 0.05946498 0.03962634 0.08300338 -0.03282641 -0.05657998
##          uppermeanR
## pipeco -0.024323943
## xyl2ol -0.015848903
## psycho -0.040859315
## uniden  0.005933646
## guarsp -0.035975214
## aegipa -0.005218415
## poular -0.031253649
## ery1co -0.011477890
## ingasa -0.016823118
## zantpr -0.009409926
```

```
graph.abundmodel(mod.BCI$dbh10$census6.7)
```

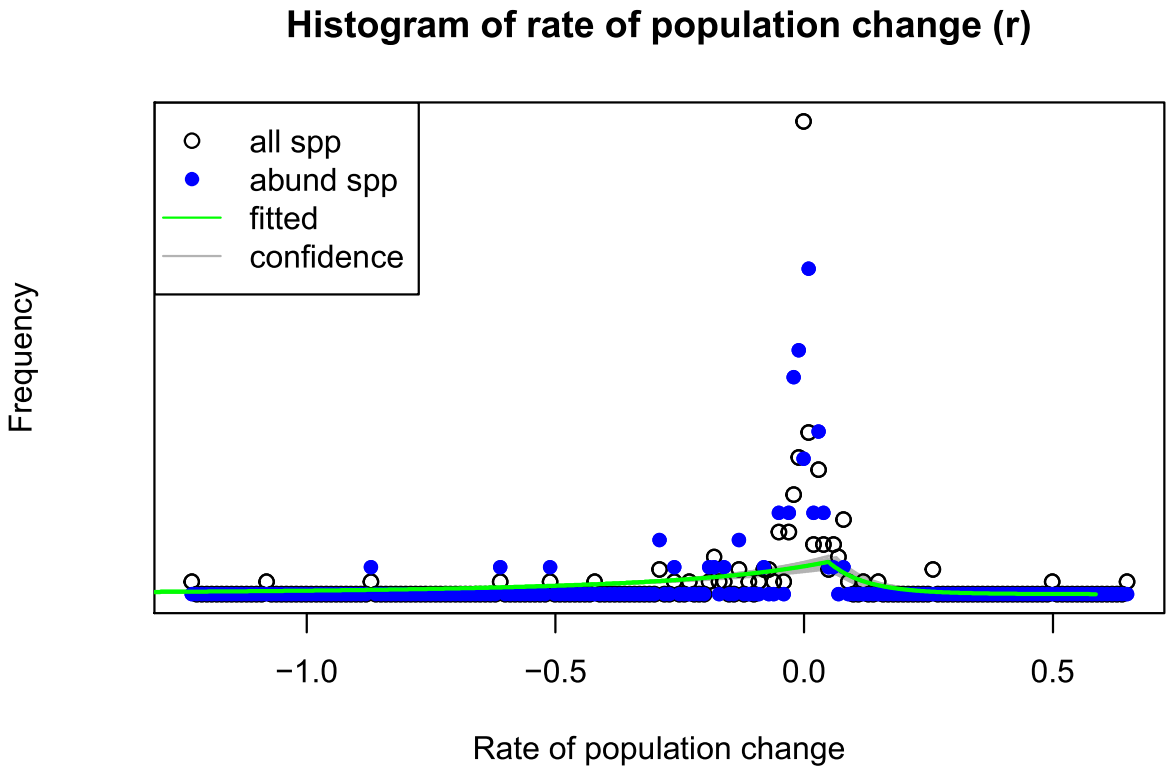



```
## $Fastest_increases
##         N1  N2   S     time    date1    date2    mortrate  little.r
## tremin  11  51  11 4.959963 16630.26 18441.88 0.000000000 0.3092624
## pit1ma   4  19   4 4.899292 16555.85 18345.32 0.000000000 0.3180347
## bactc1   2  10   2 4.991311 16606.42 18420.77 0.000000000 0.3224479
## psycde  13  38   5 4.971872 16538.88 18352.79 0.192183436 0.2157410
## psycra   2   7   1 4.989654 16552.53 18367.65 0.138916886 0.2510721
## acacme  22  48  21 4.971971 16588.75 18404.25 0.009356454 0.1569113
## colugl   1   4   1 4.989644 16545.65 18365.40 0.000000000 0.2778343
## ingama 400 767 282 4.960452 16605.76 18419.18 0.070468871 0.1312425
## nectgl 114 214  82 4.955558 16621.74 18433.94 0.066486807 0.1270851
## ingapu  31  57  25 4.966910 16607.24 18421.19 0.043308894 0.1226243
##           fitmort   lowermean  uppermean      fitr lowermeanR uppermeanR
## tremin 0.02338181 0.005438059 0.05606114 0.2929345 0.24616453  0.3444072
## pit1ma 0.03351672 0.007355193 0.09169188 0.2758129 0.20126973  0.3533618
## bactc1 0.03762397 0.008019879 0.11178596 0.2491999 0.15582909  0.3617378
## psycde 0.13665322 0.054410210 0.26220076 0.1906326 0.13438882  0.2519541
## psycra 0.06291575 0.014035550 0.17759080 0.1553462 0.05765897  0.2758115
## acacme 0.02101413 0.006536868 0.04687882 0.1449714 0.10373543  0.1909362
## colugl 0.04583312 0.009127188 0.14837278 0.1443174 0.03747797  0.2775534
## ingama 0.07007049 0.057390178 0.08328801 0.1302988 0.11769131  0.1433239
## nectgl 0.06454055 0.044351111 0.08910954 0.1232045 0.10116700  0.1470728
## ingapu 0.04277298 0.018543768 0.07742373 0.1104578 0.07458550  0.1502624
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2   mortrate    little.r
```

```
## psycho 3120 2453 2143 4.961933 16595.06 18406.74 0.07570161 -0.04847330
## cecrin 1144  890  519 4.982968 16600.49 18418.04 0.15861678 -0.05038457
## ery1co   89   68   66 4.967968 16578.84 18393.42 0.06018188 -0.05417279
## poular 1162  993  946 4.965350 16597.52 18411.38 0.04141810 -0.03165281
## cappfr 2749 2400 2324 4.963289 16609.11 18421.15 0.03383792 -0.02735454
## hassfl  484  418  373 4.975441 16576.02 18392.89 0.05235848 -0.02946543
## xyl2ol   66   53   53 4.969075 16559.95 18375.09 0.04414561 -0.04414561
## guarsp  824  725  642 4.965550 16588.72 18402.51 0.05026276 -0.02577738
## pterro 1378 1223 1091 4.971690 16568.68 18384.37 0.04697366 -0.02400116
## poutre 1205 1084  972 4.970955 16588.73 18403.09 0.04322692 -0.02128800
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## psycho 0.07561895 0.07076902 0.08033965 -0.04793454 -0.05262630
## cecrin 0.15790823 0.14529051 0.17111005 -0.04680806 -0.05816412
## ery1co 0.05862079 0.03796177 0.08309497 -0.03224076 -0.06206911
## poular 0.04134467 0.03609466 0.04718406 -0.03046075 -0.03645260
## cappfr 0.03386742 0.03056241 0.03713276 -0.02688167 -0.03032988
## hassfl 0.05225513 0.04299099 0.06316381 -0.02582663 -0.03708633
## xyl2ol 0.04400462 0.02475651 0.06894062 -0.02382773 -0.05067365
## guarsp 0.05013825 0.04283598 0.05750218 -0.02379365 -0.03192330
## pterro 0.04698808 0.04177244 0.05281065 -0.02282225 -0.02926343
## poutre 0.04312685 0.03806485 0.04855868 -0.02009504 -0.02632063
##          uppermeanR
## psycho -0.042805193
## cecrin -0.034846500
## ery1co -0.003499018
## poular -0.024157069
## cappfr -0.023340531
## hassfl -0.013725630
## xyl2ol  0.002045826
## guarsp -0.015126627
## pterro -0.016586449
## poutre -0.013877517
```

LUQ - abund model graphic

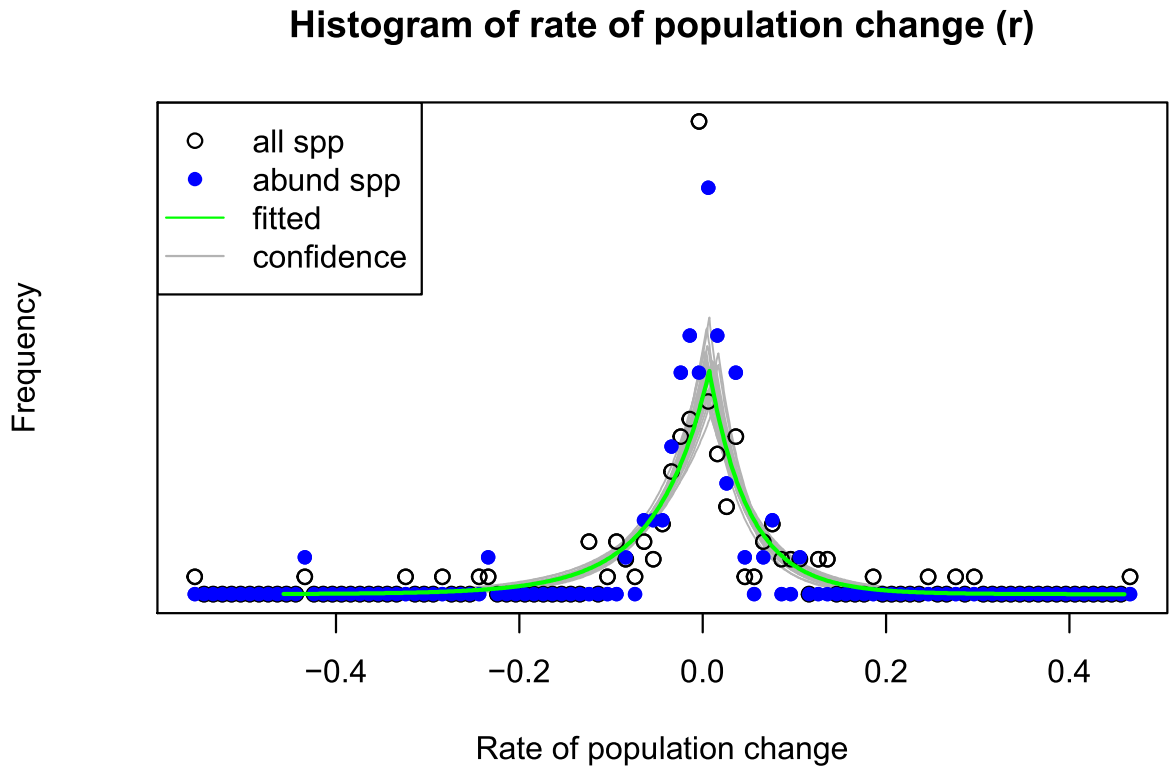
```
graph.abundmodel(mod.LUQ$dbh10$census1.2)
```




```
## $Fastest_increases
##         N1  N2   S     time    date1    date2   mortrate   little.r
## UNIDEN   2  16   1 3.227443 11897.10 12982.47 0.21476667 0.64430002
## PALCRO   1   4   1 2.757016 12227.00 13234.00 0.00000000 0.50282425
## SPACAM   1   2   1 2.642026 12275.00 13240.00 0.00000000 0.26235441
## PIPJAC   1   2   1 2.647502 12227.00 13194.00 0.00000000 0.26181180
## COFARA  23  32  20 2.872366 12208.78 13257.91 0.04865743 0.11497201
## TUROCC   2   3   2 2.643851 12251.00 13216.67 0.00000000 0.15336154
## LAEPRO 187 242 160 3.260228 12010.89 13201.69 0.04782941 0.07908314
## MYRFAL   4   5   4 2.708282 12037.00 13026.20 0.00000000 0.08239303
## SIMAMA   4   5   4 2.687064 11845.75 12827.20 0.00000000 0.08304364
## MICMIR  16  20  13 2.744346 12039.06 13041.43 0.07566079 0.08131029
##           fitmort    lowermean  uppermean       fitr  lowermeanR
## UNIDEN 0.21295864 0.0103629847 0.81728148 0.58753959  0.44228388
## PALCRO 0.07236488 0.0007208886 0.39140893 0.31227424  0.08791922
## SPACAM 0.07657980 0.0002974737 0.43781657 0.10767099 -0.07016252
## PIPJAC 0.08879377 0.0003891066 0.50491119 0.10574934 -0.08778961
## COFARA 0.05031800 0.0111165046 0.11709172 0.09800536  0.03469520
## TUROCC 0.04714201 0.0002032207 0.25536860 0.08939095 -0.04636165
## LAEPRO 0.04813251 0.0317825931 0.06697831 0.07765025  0.05333386
## MYRFAL 0.03077740 0.0002651376 0.15222486 0.06846580 -0.03477043
## SIMAMA 0.02916337 0.0002234939 0.15040742 0.06820900 -0.03127158
## MICMIR 0.07398437 0.0169469426 0.17583842 0.06647256 -0.01129706
##        uppermeanR
## UNIDEN  0.7316352
## PALCRO  0.5736064
```

```
## SPACAM  0.3265459
## PIPJAC  0.3286340
## COFARA  0.1745381
## TUROCC  0.2647118
## LAEPRO  0.1051649
## MYRFAL  0.2221209
## SIMAMA  0.2118461
## MICMIR  0.1660963
##
## $Biggest_losses
##        N1 N2 S     time    date1    date2 mortrate little.r  fitmort
## POTPEL 40  0 0 2.840110 11972.05 13009.40      Inf     -Inf 432.2547
## CLIERO  1  0 0 2.680356 12250.00 13229.00      Inf     -Inf 360.5916
## AESAME  1  0 0 2.707734 12183.00 13172.00      Inf     -Inf 413.1561
## PHYICO 12  0 0 2.761351 12029.08 13037.67      Inf     -Inf 339.5343
## HETCYM 20  0 0 3.005202 12015.50 13113.15      Inf     -Inf 351.5576
## PLUSYM  3  0 0 3.085558 11880.33 13007.33      Inf     -Inf 327.5287
## LUDOCT  1  0 0 3.145791 11877.00 13026.00      Inf     -Inf 377.2471
## ILESID  1  0 0 3.249829 11885.00 13072.00      Inf     -Inf 331.9081
## TERLUQ  1  0 0 4.298426 11168.00 12738.00      Inf     -Inf 264.1354
## CLUCLU  2  0 0 4.425736 11516.00 13132.50      Inf     -Inf 267.2942
##          lowermean uppermean      fitr lowermeanR    uppermeanR
## POTPEL 133.5381589  1850.899 -261.6045  -262.3316 -259.65322195
## CLIERO   0.3395591  1422.672 -260.7243  -277.9752   -0.11285685
## AESAME   0.4750424  1806.950 -257.4590  -275.1521   -0.07243381
## PHYICO   1.9413212  1293.799 -255.4877  -269.8062   -1.10902174
## HETCYM  20.4009962  1435.814 -239.9513  -247.9166  -29.79603778
## PLUSYM   0.9932159  1323.020 -229.1913  -241.4728   -0.40896822
## LUDOCT   1.0309564  1596.582 -224.9833  -236.8412   -0.31433361
## ILESID   0.5687036  1440.833 -216.4244  -229.2640   -0.27650273
## TERLUQ   0.7499614  1209.673 -163.9329  -173.3324   -0.17079669
## CLUCLU   1.3167470  1182.347 -160.6087  -168.3456   -0.34288792
```

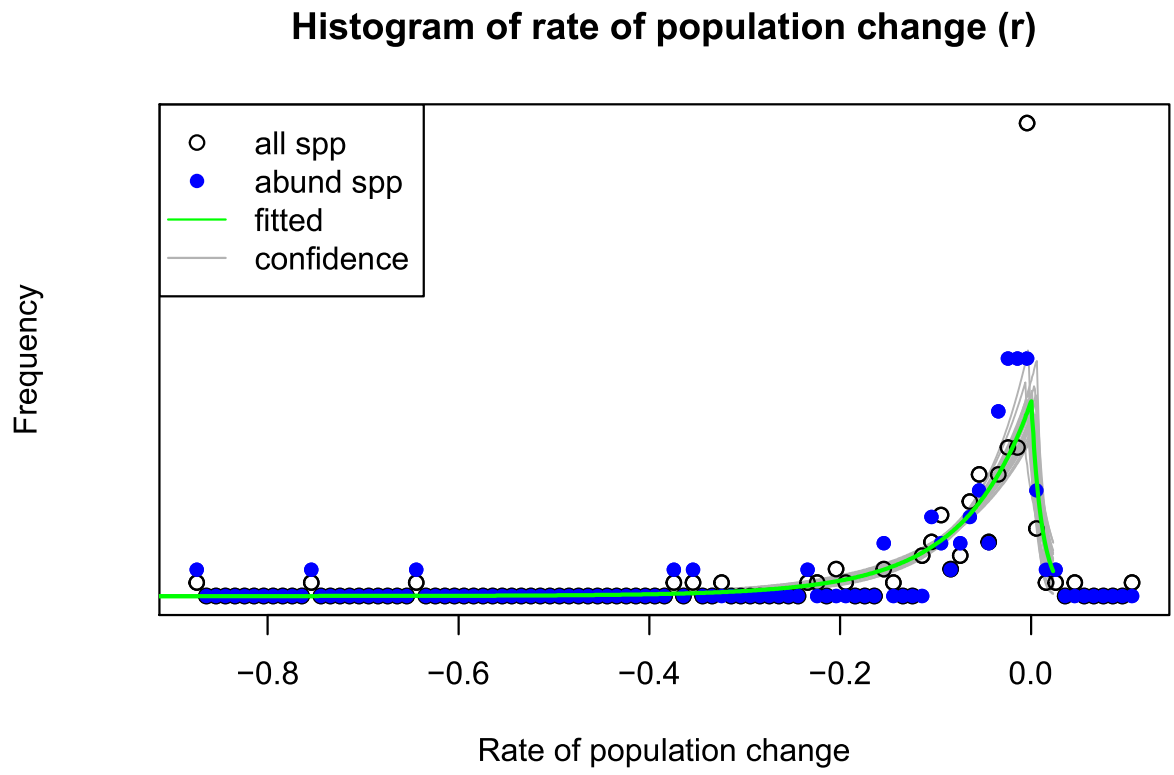
```
graph.abundmodel(mod.LUQ$dbh10$census2.3)
```




```
## $Fastest_increases
##          N1    N2    S     time    date1    date2   mortrate   little.r
## MICRAC   29   432    0 5.849213 13125.79 15196.59        Inf 0.46179368
## CLUROS    3    13    1 5.311978 13301.60 15262.25 0.20681793 0.27604351
## SOLRUG    1     5    0 5.400411 13298.52 15324.50        Inf 0.29802139
## CINELO    4    11    4 5.539232 13304.25 15327.45 0.00000000 0.18262475
## POTUMB    1     4    0 5.671732 13004.80 15021.60        Inf 0.24442171
## PSYBER 6376 11583 1368 5.751445 13172.82 15255.55 0.26761815 0.10379957
## HIBTIL   23    40   16 5.708080 13321.44 15408.62 0.06357751 0.09694771
## GONSPI  204   319    1 5.539650 13155.78 15176.79 0.96001003 0.08070385
## FAROCC  237   363  202 5.380920 13291.48 15256.49 0.02969612 0.07923231
## HENFAS   12    20   11 5.553763 13142.71 15182.10 0.01566710 0.09197829
##           fitmort   lowermean  uppermean       fitr lowermeanR uppermeanR
## MICRAC 1.08935990 0.404499151 3.32688433 0.46028918 0.44375088 0.47626227
## CLUROS 0.16089288 0.028006620 0.43915702 0.22569455 0.13706361 0.31988240
## SOLRUG 0.25272491 0.020371368 1.04752483 0.18388441 0.04717447 0.33084774
## CINELO 0.03025146 0.002718731 0.10331023 0.14712392 0.07519102 0.23554783
## POTUMB 0.24419384 0.016300938 0.95620973 0.12547045 0.01108659 0.27355257
## PSYBER 0.26762448 0.259839162 0.27616425 0.10376966 0.10069754 0.10694526
## HIBTIL 0.06395528 0.028115329 0.11760026 0.08574041 0.04606569 0.13046027
## GONSPI 0.95434660 0.685514495 1.37129424 0.07838510 0.05865721 0.09741311
## FAROCC 0.03003089 0.020664470 0.04031679 0.07822809 0.06516418 0.09281247
## HENFAS 0.02691258 0.005169199 0.07049964 0.07737170 0.03002664 0.13566262
##
## $Biggest_losses
##           N1   N2   S     time    date1    date2  mortrate   little.r
```

```
## TREMIC    28    0   0 5.482155 13175.76 15149.18       Inf       -Inf
## PALRIP 13027 1160 997 5.521404 13176.68 15181.28 0.4654665 -0.4380415
## PIPAMA    44    2   1 5.529755 13032.70 15009.33 0.6843323 -0.5589836
## UNIDEN    16    0   0 5.500342 12982.47 15060.22       Inf       -Inf
## PIPGLA  2011  556   6 5.569847 13189.63 15175.85 1.0439474 -0.2308177
## CITFRU    19    4   4 5.511005 13088.64 15083.60 0.2827333 -0.2827333
## WALPEN     6    0   0 5.517226 13018.25 15011.00       Inf       -Inf
## PIPADU     5    0   0 5.644901 13133.24 15089.67       Inf       -Inf
## EUGEGG     5    0   0 5.511841 13253.20 15266.40       Inf       -Inf
## FICAME     6    1   1 5.489847 13155.00 15099.17 0.3263769 -0.3263769
##          fitmort  lowermean uppermean       fitr lowermeanR  uppermeanR
## TREMIC 1.0472599 0.41673212 2.8836979 -0.4572622 -0.9563783 -0.16782761
## PALRIP 0.4654155 0.45491812 0.4764902 -0.4374403 -0.4478578 -0.42762428
## PIPAMA 0.6475942 0.38830998 1.0284700 -0.4370666 -0.6738642 -0.22950337
## UNIDEN 0.9220903 0.31597378 2.6188707 -0.3279551 -0.7947275 -0.05425110
## PIPGLA 1.0462480 0.91670350 1.2039788 -0.2299397 -0.2451564 -0.21468548
## CITFRU 0.2669765 0.14849310 0.4411381 -0.2025685 -0.3564695 -0.03526090
## WALPEN 0.6858658 0.15694012 2.2863618 -0.1469011 -0.5177702  0.03686044
## PIPADU 0.5743323 0.13529842 1.9041688 -0.1204033 -0.4670908  0.03786081
## EUGEGG 0.5972612 0.12834648 2.0407949 -0.1180543 -0.4773807  0.04373128
## FICAME 0.2687926 0.08677269 0.6171695 -0.1077880 -0.3533617  0.04473825
```

```
graph.abundmodel(mod.LUQ$dbh10$census3.4)
```

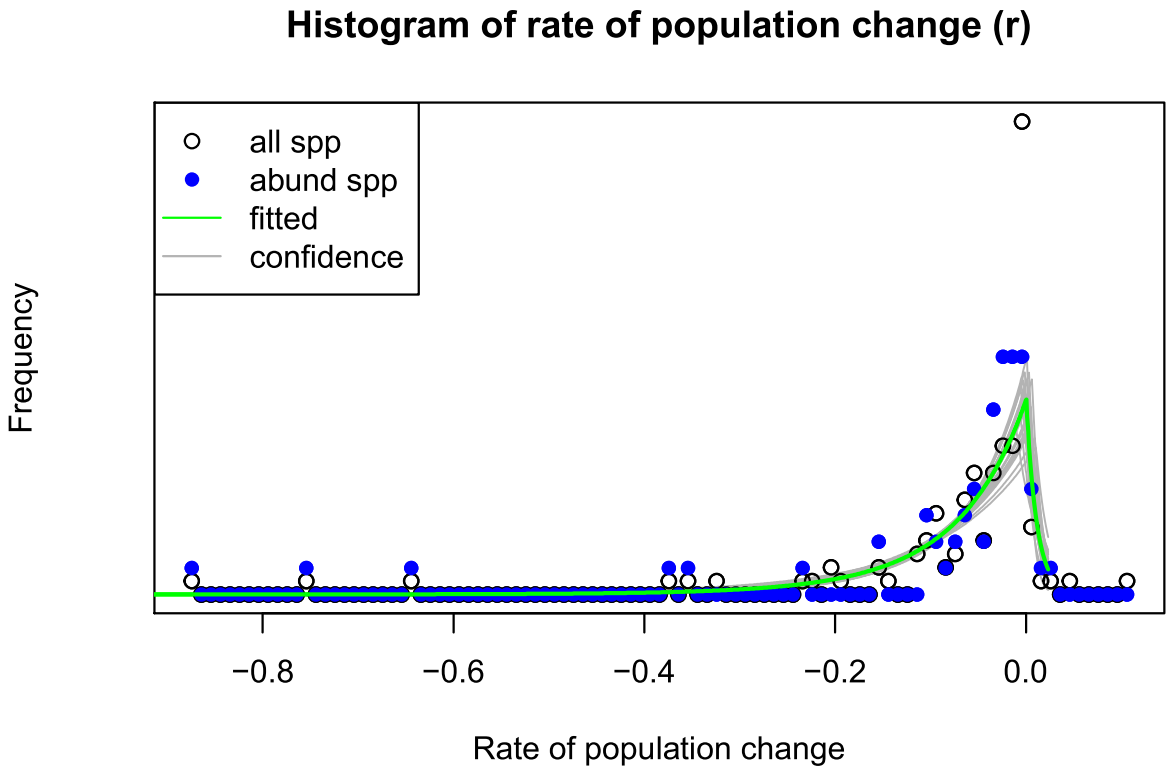



```
## $Fastest_increases
##           N1   N2    S     time    date1    date2    mortrate      little.r
## PREMON 7604 8614 7223 5.156496 15141.92 17023.16 0.009968793  0.0241858727
```

```
## CLUROS   13   22    7 4.934254 15262.25 17060.93 0.125457508  0.1066205953
## CALCAL   72   79   69 4.938582 15286.12 17080.82 0.008617780  0.0187871202
## PSESPU  155  160  151 5.205315 15115.43 17013.93 0.005022804  0.0060992842
## COCSWA   57   58   56 5.213983 15092.98 16997.39 0.003394636  0.0033355962
## FAROCC  363  368  330 4.989472 15256.49 17080.89 0.019102257  0.0027417939
## EUGDOM   51   53   43 5.120657 15132.27 17006.21 0.033321020  0.0075119815
## ROYBOR   43   43   43 5.063050 15207.47 17060.40 0.000000000  0.0000000000
## SPACAM    4    5    4 5.161396 15185.00 17070.20 0.000000000  0.0432331753
## MYRLEP  203  202  192 5.328243 14973.24 16913.83 0.010455718 -0.0009268124
##            fitmort   lowermean  uppermean          fitr    lowermeanR
## PREMON 0.010012090 0.009025291 0.01103044  0.0241394609  2.232334e-02
## CLUROS 0.116701778 0.044679998 0.22742825  0.0231059131 -1.541884e-02
## CALCAL 0.012105268 0.003850526 0.02554988  0.0131237367 -8.639687e-05
## PSESPU 0.007032354 0.002711165 0.01354966  0.0052455022 -1.884179e-03
## COCSWA 0.008647699 0.002159572 0.02028245  0.0027955287 -8.511601e-03
## FAROCC 0.019501912 0.013524047 0.02642863  0.0018609339 -5.705021e-03
## EUGDOM 0.035057437 0.016169276 0.06129650  0.0005500517 -1.913090e-02
## ROYBOR 0.007920910 0.001405766 0.02105552  0.0003610549 -1.083091e-02
## SPACAM 0.035612575 0.005184165 0.11362254  0.0003316511 -4.315208e-02
## MYRLEP 0.011663505 0.006038333 0.01872631 -0.0008981892 -8.143425e-03
##         uppermeanR
## PREMON 0.025990340
## CLUROS 0.085182543
## CALCAL 0.030085465
## PSESPU 0.015338103
## COCSWA 0.018781097
## FAROCC 0.010230582
## EUGDOM 0.022031007
## ROYBOR 0.016244420
## SPACAM 0.043909343
## MYRLEP 0.008036081
##
## $Biggest_losses
##           N1   N2    S     time    date1    date2  mortrate   little.r
## PIPHIS    84    0    0 5.084710 15140.97 17069.47       Inf       -Inf
## MICRAC   432    5    2 5.071495 15196.59 17057.66 1.0599002 -0.8792255
## PIPGLA   556   13    6 4.979489 15175.85 17073.33 0.9095329 -0.7542579
## GONSPI   319   12   12 5.108306 15176.79 17053.96 0.6421472 -0.6421472
## PSYBER 11583 1801 1636 4.970513 15255.55 17109.83 0.3937791 -0.3744476
## PALRIP  1160  186  139 5.229801 15181.28 16978.22 0.4056944 -0.3499996
## NEULOB    10    0    0 5.264066 15081.60 17004.30       Inf       -Inf
## UREBAC   292   85   79 5.254650 15073.83 16988.69 0.2487903 -0.2348591
## HIBTIL    40   15   11 4.804561 15408.62 17162.84 0.2686997 -0.2041454
## CITFRU     4    0    0 5.296372 15083.60 16982.71       Inf       -Inf
##          fitmort lowermean uppermean       fitr lowermeanR   uppermeanR
## PIPHIS 1.5050374 0.6894388 4.0080819 -0.9370968 -1.9903272 -0.462673837
## MICRAC 1.0525482 0.8127294 1.3685095 -0.8411745 -1.0055913 -0.668146593
## PIPGLA 0.9046489 0.7570299 1.0739567 -0.7377140 -0.8436886 -0.630174180
## GONSPI 0.6402664 0.5380933 0.7523691 -0.6233330 -0.7307974 -0.515633470
## PSYBER 0.3940028 0.3848939 0.4029530 -0.3741560 -0.3826298 -0.365292352
## PALRIP 0.4053228 0.3764734 0.4350965 -0.3485211 -0.3741318 -0.322279764
## NEULOB 0.8484960 0.2529481 2.5273566 -0.3433774 -0.9873651 -0.029823260
## UREBAC 0.2477642 0.2130416 0.2852139 -0.2310454 -0.2662155 -0.195567515
## HIBTIL 0.2617164 0.1721228 0.3686285 -0.1783622 -0.2658071 -0.081443601
```

```
## CITFRU 0.5619703 0.1130277 1.8359775 -0.1703829 -0.6288040  0.008036957
```

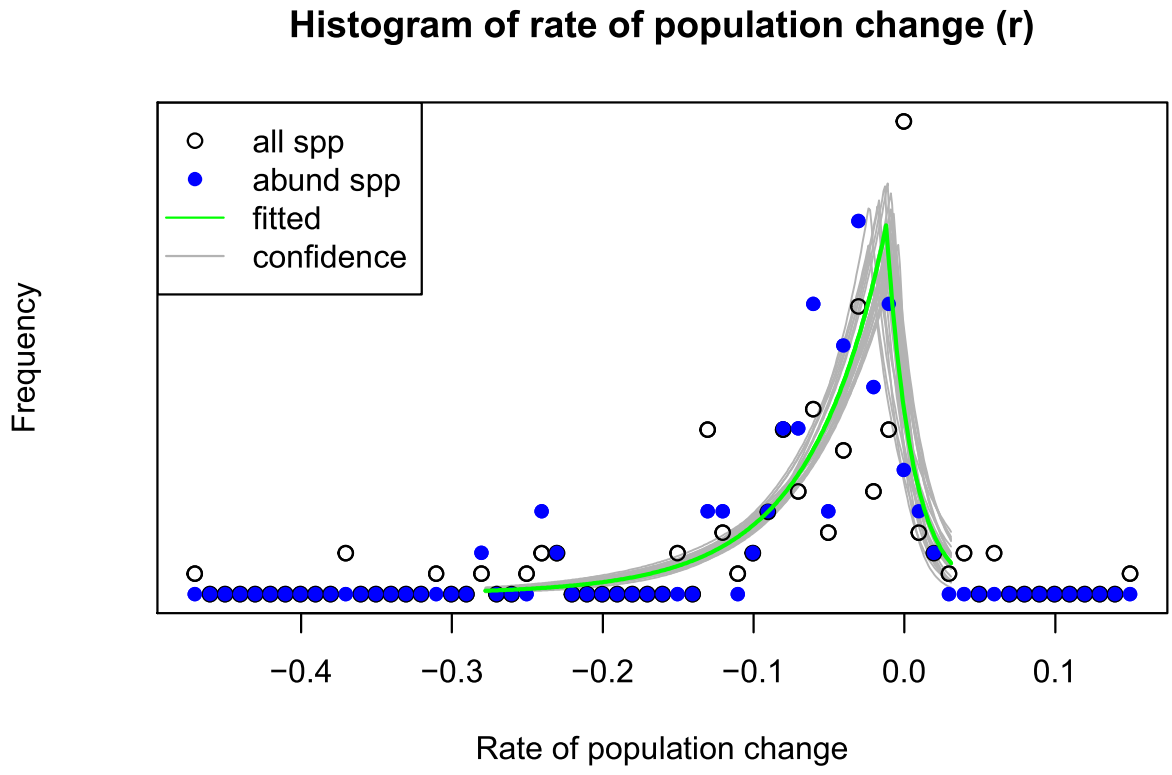
```
graph.abundmodel(mod.LUQ$dbh10$census3.4)
```




```
## $Fastest_increases
##          N1   N2    S     time    date1    date2    mortrate      little.r
## PREMON 7604 8614 7223 5.156496 15141.92 17023.16 0.009968793  0.0241858727
## CLUROS   13   22    7 4.934254 15262.25 17060.93 0.125457508  0.1066205953
## CALCAL   72   79   69 4.938582 15286.12 17080.82 0.008617780  0.0187871202
## PSESPU  155  160  151 5.205315 15115.43 17013.93 0.005022804  0.0060992842
## COCSWA   57   58   56 5.213983 15092.98 16997.39 0.003394636  0.0033355962
## FAROCC  363  368  330 4.989472 15256.49 17080.89 0.019102257  0.0027417939
## EUGDOM   51   53   43 5.120657 15132.27 17006.21 0.033321020  0.0075119815
## ROYBOR   43   43   43 5.063050 15207.47 17060.40 0.000000000  0.0000000000
## SPACAM    4    5    4 5.161396 15185.00 17070.20 0.000000000  0.0432331753
## MYRLEP  203  202  192 5.328243 14973.24 16913.83 0.010455718 -0.0009268124
##            fitmort   lowermean  uppermean          fitr    lowermeanR
## PREMON 0.010012090 0.009025291 0.01103044  0.0241394609  2.232334e-02
## CLUROS 0.116701778 0.044679998 0.22742825  0.0231059131 -1.541884e-02
## CALCAL 0.012105268 0.003850526 0.02554988  0.0131237367 -8.639687e-05
## PSESPU 0.007032354 0.002711165 0.01354966  0.0052455022 -1.884179e-03
## COCSWA 0.008647699 0.002159572 0.02028245  0.0027955287 -8.511601e-03
## FAROCC 0.019501912 0.013524047 0.02642863  0.0018609339 -5.705021e-03
## EUGDOM 0.035057437 0.016169276 0.06129650  0.0005500517 -1.913090e-02
## ROYBOR 0.007920910 0.001405766 0.02105552  0.0003610549 -1.083091e-02
## SPACAM 0.035612575 0.005184165 0.11362254  0.0003316511 -4.315208e-02
## MYRLEP 0.011663505 0.006038333 0.01872631 -0.0008981892 -8.143425e-03
```

```
##         uppermeanR
## PREMON 0.025990340
## CLUROS 0.085182543
## CALCAL 0.030085465
## PSESPU 0.015338103
## COCSWA 0.018781097
## FAROCC 0.010230582
## EUGDOM 0.022031007
## ROYBOR 0.016244420
## SPACAM 0.043909343
## MYRLEP 0.008036081
##
## $Biggest_losses
##           N1   N2    S     time    date1    date2  mortrate   little.r
## PIPHIS    84    0    0 5.084710 15140.97 17069.47       Inf       -Inf
## MICRAC   432    5    2 5.071495 15196.59 17057.66 1.0599002 -0.8792255
## PIPGLA   556   13    6 4.979489 15175.85 17073.33 0.9095329 -0.7542579
## GONSPI   319   12   12 5.108306 15176.79 17053.96 0.6421472 -0.6421472
## PSYBER 11583 1801 1636 4.970513 15255.55 17109.83 0.3937791 -0.3744476
## PALRIP  1160  186  139 5.229801 15181.28 16978.22 0.4056944 -0.3499996
## NEULOB    10    0    0 5.264066 15081.60 17004.30       Inf       -Inf
## UREBAC   292   85   79 5.254650 15073.83 16988.69 0.2487903 -0.2348591
## HIBTIL    40   15   11 4.804561 15408.62 17162.84 0.2686997 -0.2041454
## CITFRU     4    0    0 5.296372 15083.60 16982.71       Inf       -Inf
##          fitmort lowermean uppermean       fitr lowermeanR   uppermeanR
## PIPHIS 1.5050374 0.6894388 4.0080819 -0.9370968 -1.9903272 -0.462673837
## MICRAC 1.0525482 0.8127294 1.3685095 -0.8411745 -1.0055913 -0.668146593
## PIPGLA 0.9046489 0.7570299 1.0739567 -0.7377140 -0.8436886 -0.630174180
## GONSPI 0.6402664 0.5380933 0.7523691 -0.6233330 -0.7307974 -0.515633470
## PSYBER 0.3940028 0.3848939 0.4029530 -0.3741560 -0.3826298 -0.365292352
## PALRIP 0.4053228 0.3764734 0.4350965 -0.3485211 -0.3741318 -0.322279764
## NEULOB 0.8484960 0.2529481 2.5273566 -0.3433774 -0.9873651 -0.029823260
## UREBAC 0.2477642 0.2130416 0.2852139 -0.2310454 -0.2662155 -0.195567515
## HIBTIL 0.2617164 0.1721228 0.3686285 -0.1783622 -0.2658071 -0.081443601
## CITFRU 0.5619703 0.1130277 1.8359775 -0.1703829 -0.6288040  0.008036957
```

```
graph.abundmodel(mod.LUQ$dbh10$census4.5)
```

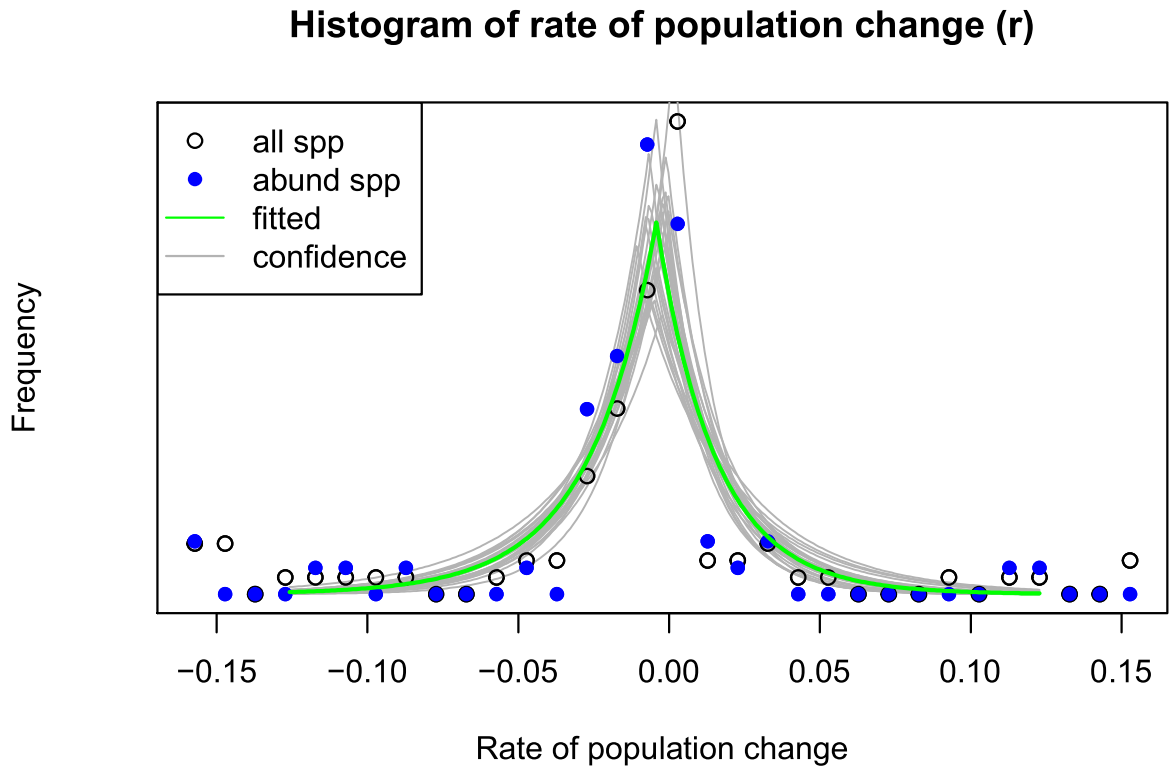



```
## $Fastest_increases
##          N1   N2    S     time    date1    date2    mortrate    little.r
## MICRAC    5   11    1 5.323295 17057.66 18982.94 0.302338692 0.148114547
## CLUROS   22   30   18 5.248694 17060.93 18963.68 0.038232499 0.059091827
## FICTRI   19   22   19 5.298259 17002.95 18938.14 0.000000000 0.027670124
## PREMON 8614 9331 8254 5.252332 17023.16 18940.73 0.008127980 0.015222457
## PSESPU  160  170  155 5.279594 17013.93 18942.44 0.006013474 0.011482819
## MYRLEP  202  207  194 5.325987 16913.83 18858.04 0.007587240 0.004590904
## OCOMOS   15   16   15 5.271732 16976.40 18913.00 0.000000000 0.012242376
## CHOVEN   10   11   10 5.254832 17008.36 18917.73 0.000000000 0.018137628
## MANIND    4    5    4 5.265435 16987.00 18910.20 0.000000000 0.042378942
## GENAME    3    4    3 5.246863 16990.91 18983.80 0.000000000 0.054829348
##            fitmort   lowermean   uppermean         fitr   lowermeanR
## MICRAC 0.207439209 0.054331201 0.487162812 0.0318580841 -0.027961658
## CLUROS 0.042288436 0.014476398 0.083996621 0.0317158580 -0.005448803
## FICTRI 0.015795826 0.003242482 0.040514551 0.0160522064 -0.009567121
## PREMON 0.008176868 0.007364969 0.008978915 0.0151704734  0.013706663
## PSESPU 0.008400334 0.003621736 0.015409642 0.0105929756  0.001891119
## MYRLEP 0.009427216 0.004497912 0.016009619 0.0042285955 -0.003292788
## OCOMOS 0.018566710 0.003730665 0.049666783 0.0032720266 -0.023039136
## CHOVEN 0.023426893 0.004688865 0.060565890 0.0020719947 -0.028309932
## MANIND 0.039292299 0.006266543 0.112028889 0.0004572367 -0.044658494
## GENAME 0.045031638 0.007667490 0.133860957 0.0001721340 -0.048601595
##        uppermeanR
## MICRAC 0.12227134
## CLUROS 0.07860495
```

```
## FICTRI 0.05075881
## PREMON 0.01670070
## PSESPU 0.02180079
## MYRLEP 0.01332527
## OCOMOS 0.03833123
## CHOVEN 0.04220014
## MANIND 0.06152995
## GENAME 0.06527143
##
## $Biggest_losses
##          N1  N2   S     time    date1    date2  mortrate   little.r
## PSYBER 1801 422 258 5.209082 17109.83 18984.54 0.3730288 -0.2785696
## PSYBRA 1471 411 366 5.206206 17093.78 18998.80 0.2671935 -0.2449201
## PALRIP  186  52  43 5.282130 16978.22 18902.99 0.2772644 -0.2412858
## UREBAC   85  26  13 5.221641 16988.69 18904.74 0.3596000 -0.2268549
## GONSPI   12   1   1 5.226101 17053.96 18959.84 0.4754800 -0.4754800
## MICAFF   20   6   4 5.219426 17109.03 18988.00 0.3083553 -0.2306715
## COCSPP    7   1   1 5.217170 17039.37 18954.00 0.3729819 -0.3729819
## CINELO    7   1   1 5.267625 17091.54 19003.90 0.3694094 -0.3694094
## MICPRA  790 415 373 5.247379 17041.32 18939.18 0.1430151 -0.1226811
## OCOSIN   95  49  46 5.259241 17043.39 18956.71 0.1378974 -0.1258844
##          fitmort  lowermean uppermean       fitr lowermeanR   uppermeanR
## PSYBER 0.3732030 0.35070118 0.3956375 -0.2778089 -0.2948935 -0.261116414
## PSYBRA 0.2669455 0.25044729 0.2842034 -0.2440151 -0.2603149 -0.226958142
## PALRIP 0.2741341 0.22739148 0.3263274 -0.2326427 -0.2781821 -0.184508444
## UREBAC 0.3501702 0.26332375 0.4547019 -0.2085202 -0.2747208 -0.139511887
## GONSPI 0.3799891 0.16936872 0.6997445 -0.1907658 -0.4829914 -0.013346850
## MICAFF 0.2765136 0.15082469 0.4496292 -0.1632537 -0.2988963 -0.035200240
## COCSPP 0.2774347 0.10255611 0.5798812 -0.1268301 -0.3635793  0.002837938
## CINELO 0.2799667 0.09535743 0.6237442 -0.1226794 -0.3711356  0.002616686
## MICPRA 0.1426579 0.12890970 0.1583549 -0.1220360 -0.1364844 -0.107128149
## OCOSIN 0.1353197 0.09955984 0.1765186 -0.1177009 -0.1544675 -0.074386693
```

FUSHAN - abund model graphic

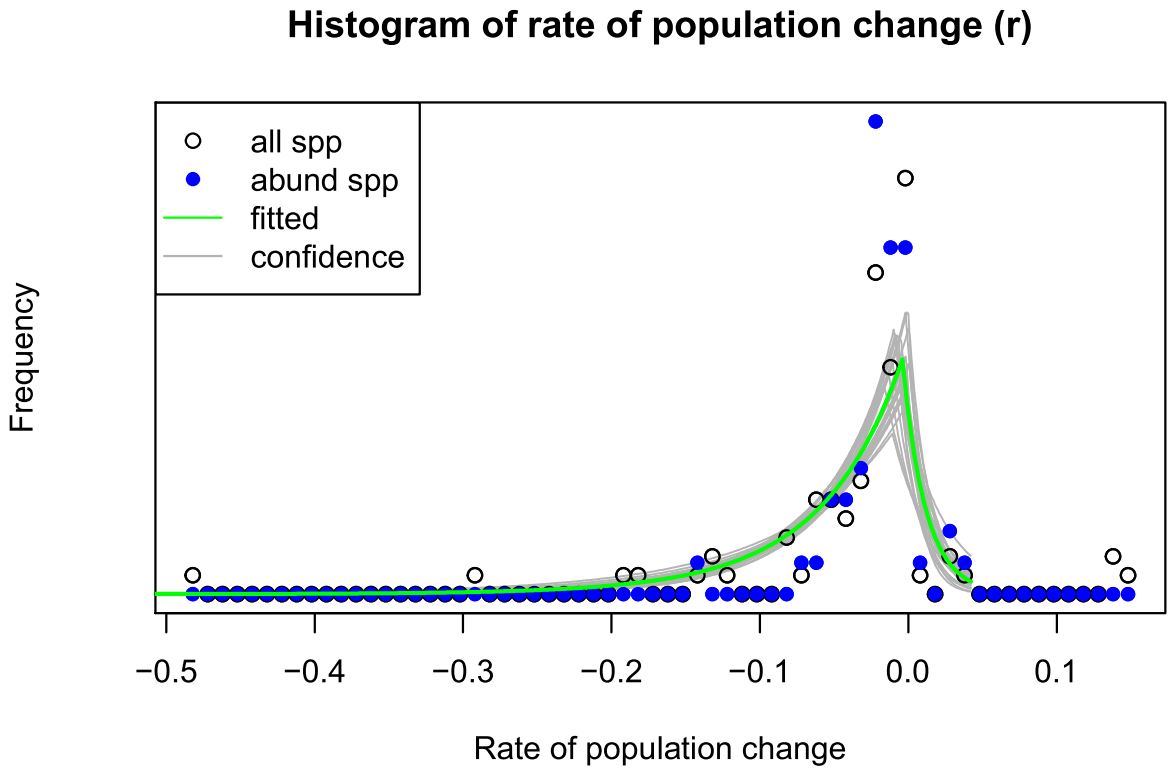
```
graph.abundmodel(mod.FS$dbh10$census1.2)
```




```
## $Fastest_increases
##           N1    N2     S     time    date1    date2    mortrate   little.r
## LASIFO   287   515   220 4.631569 12567.11 14258.80 0.057400564 0.12623901
## LASIMI    53    90    37 4.762414 12482.57 14222.04 0.075460471 0.11118684
## LASICU     2     4     2 4.681040 12636.50 14346.25 0.000000000 0.14807545
## CYATLE     3     6     2 4.469215 12630.33 14262.71 0.090724001 0.15509370
## BLASCO 19983 23241 14488 4.636299 12510.96 14204.37 0.069357309 0.03257686
## CYATPO  2502  2859  2437 4.589312 12548.71 14224.84 0.005735639 0.02906351
## ARDIQU  1375  1538  1276 4.548717 12551.47 14212.89 0.016427390 0.02462874
## FICUFO    24    29    19 4.910248 12384.71 14178.18 0.047576995 0.03854021
## ALNIPT     2     3     2 4.367785 12595.00 14190.33 0.000000000 0.09283084
## ILEXFI   498   534   484 4.564596 12508.34 14175.56 0.006247031 0.01529068
##            fitmort   lowermean   uppermean       fitr   lowermeanR
## LASIFO 0.056577671 0.043627188 0.071027471 0.12310417  0.108421879
## LASIMI 0.069908895 0.040831130 0.108293413 0.09615974  0.061568967
## LASICU 0.030443018 0.003858807 0.107419109 0.04558360 -0.013259353
## CYATLE 0.057213886 0.008013368 0.189591722 0.04494472 -0.018459237
## BLASCO 0.069306582 0.067519964 0.071220689 0.03250154  0.030324010
## CYATPO 0.005883794 0.004538403 0.007331188 0.02903108  0.025729891
## ARDIQU 0.016505445 0.013271914 0.019877684 0.02430850  0.019223641
## FICUFO 0.042813402 0.017041734 0.084594340 0.01902937 -0.010631949
## ALNIPT 0.033488272 0.003528584 0.117225684 0.01787336 -0.029163614
## ILEXFI 0.006883479 0.003889996 0.010528518 0.01507333  0.009355289
##        uppermeanR
## LASIFO 0.13842684
## LASIMI 0.13316314
```

```
## LASICU 0.12927665
## CYATLE 0.13434202
## BLASCO 0.03463718
## CYATPO 0.03233073
## ARDIQU 0.02953882
## FICUFO 0.06304336
## ALNIPT 0.08994211
## ILEXFI 0.02231185
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2   mortrate    little.r
## SYMPWI   81   39   33 4.505242 12579.84 14225.38 0.19931038 -0.16223045
## ARALDE   64   30   30 4.681511 12479.33 14189.25 0.16184640 -0.16184640
## CALLKO  294  170  136 4.595539 12496.15 14174.67 0.16775504 -0.11919849
## OREOPE   58   35   31 4.580223 12606.64 14279.56 0.13677407 -0.11027736
## CALLTI   62   41   38 4.588994 12495.52 14171.65 0.10667877 -0.09012048
## ENGERO 8078 6426 6052 4.636168 12497.27 14190.64 0.06228323 -0.04934939
## SYMPHE   34   26   26 4.565608 12553.50 14221.09 0.05875756 -0.05875756
## PERRAR   10    5    4 4.740016 12504.80 14236.09 0.19330962 -0.14623308
## CINNAU  432  376  323 4.656480 12451.43 14152.21 0.06244486 -0.02981575
## GLOCAC 2322 2047 1961 4.607229 12510.62 14193.41 0.03667592 -0.02735996
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## SYMPWI 0.19048899 0.13893987 0.25435535 -0.12580303 -0.18470098
## ARALDE 0.15185263 0.10393006 0.21011646 -0.12389835 -0.18188185
## CALLKO 0.16556425 0.13907546 0.19383403 -0.11153053 -0.13870710
## OREOPE 0.12845393 0.08584125 0.18225548 -0.07627199 -0.13089981
## CALLTI 0.10116877 0.06388768 0.14430228 -0.06455787 -0.11068104
## ENGERO 0.06225690 0.05957274 0.06499969 -0.04922992 -0.05206097
## SYMPHE 0.05464412 0.02673123 0.09634385 -0.03401733 -0.07461422
## PERRAR 0.14212377 0.05269674 0.28310303 -0.03138243 -0.12842875
## CINNAU 0.06198206 0.05091065 0.07371963 -0.02734051 -0.04019013
## GLOCAC 0.03662966 0.03293322 0.04049434 -0.02711318 -0.03090329
##         uppermeanR
## SYMPWI -0.05827704
## ARALDE -0.05148546
## CALLKO -0.08327440
## OREOPE -0.01458857
## CALLTI -0.01009526
## ENGERO -0.04610993
## SYMPHE  0.01011984
## PERRAR  0.02223117
## CINNAU -0.01361517
## GLOCAC -0.02298980
```

```
graph.abundmodel(mod.FS$dbh10$census2.3)
```

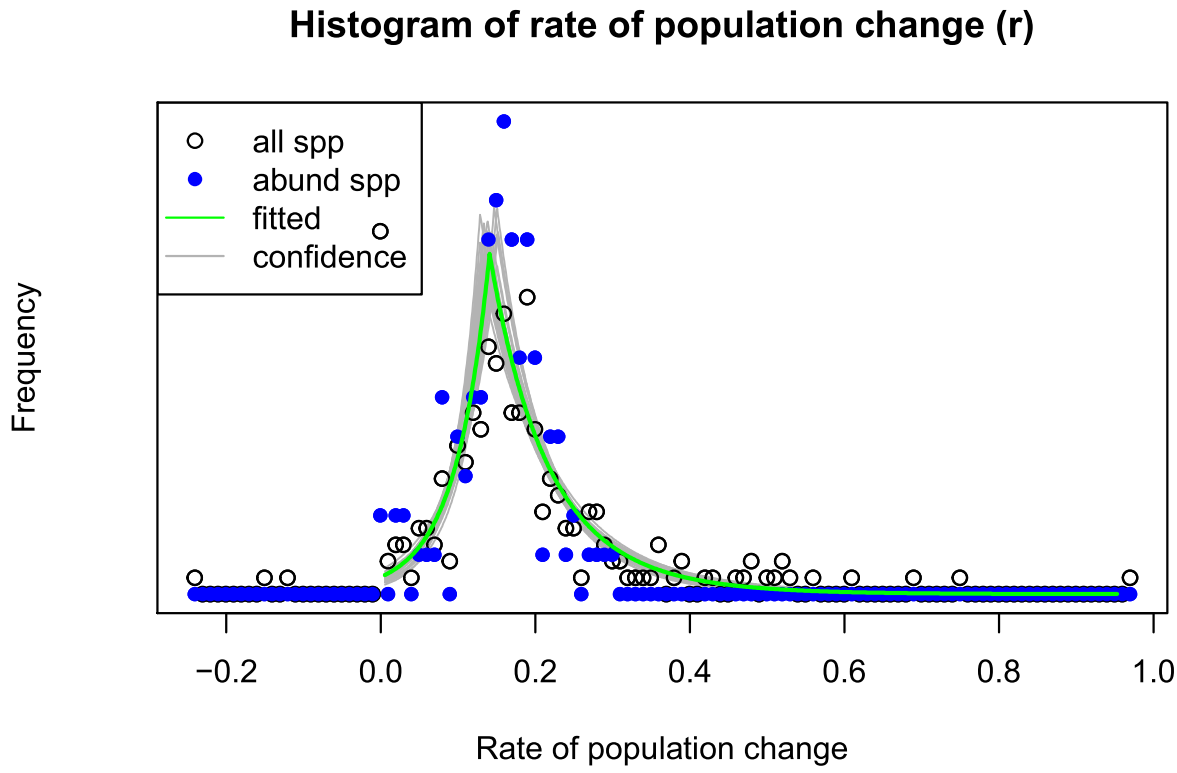



```
## $Fastest_increases
##           N1    N2     S     time    date1    date2    mortrate
## BLASCO 21554 26757 14295 5.063048 14204.34 16051.34 0.081107577
## LASICU     3     6     2 5.051204 14349.33 16194.29 0.080270977
## LASIFO   489   551   368 5.040616 14259.14 16104.87 0.056397785
## LASIMI    84    98    63 4.997554 14221.47 16050.33 0.057564580
## CALLFO     1     2     1 5.013005 14159.00 15934.00 0.000000000
## HYDRCH     1     2     1 4.769336 14222.00 16111.00 0.000000000
## SYMPSE    88    91    88 5.080528 14153.50 16012.56 0.000000000
## EURYLO  1696  1705  1513 5.046941 14215.04 16057.65 0.022623228
## CRYPCH   301   300   289 5.072305 14158.65 16010.48 0.008020728
## ILEXRO   178   177   171 5.044898 14178.32 16020.62 0.007952588
##             little.r     fitmort    lowermean  uppermean          fitr
## BLASCO  0.0427084021 0.081098722 0.0792157022 0.08298352  0.0426365737
## LASICU  0.1372241421 0.067319417 0.0093054821 0.21881375  0.0298420366
## LASIFO  0.0236820918 0.056046677 0.0463565391 0.06727704  0.0212466379
## LASIMI  0.0308452281 0.057058503 0.0347477187 0.08484428  0.0195881949
## CALLFO  0.1382698021 0.051824945 0.0040394141 0.19300587  0.0111346553
## HYDRCH  0.1453341032 0.051815084 0.0051886080 0.19954579  0.0103026733
## SYMPSE  0.0065982698 0.004145442 0.0007174253 0.01085621  0.0063921383
## EURYLO  0.0010486695 0.022697536 0.0194203773 0.02617015  0.0010180211
## CRYPCH -0.0006560706 0.008876444 0.0048326683 0.01428855 -0.0005720903
## ILEXRO -0.0011167357 0.009182748 0.0041283337 0.01609565 -0.0009928491
##          lowermeanR  uppermeanR
## BLASCO  0.040731023 0.044483258
## LASICU -0.031375808 0.117074950
```

```
## LASIFO  0.010004175 0.032900505
## LASIMI -0.003375232 0.046640624
## CALLFO -0.055293558 0.087071569
## HYDRCH -0.054332561 0.087116078
## SYMPSE -0.001711511 0.018692803
## EURYLO -0.003090326 0.005164040
## CRYPCH -0.005956531 0.006238786
## ILEXRO -0.007936162 0.007965394
##
## $Biggest_losses
##          N1 N2  S     time    date1    date2  mortrate   little.r
## CYATPO 2854  0  0 5.068028 14224.76 16073.37       Inf       -Inf
## CYATSP  118  0  0 5.054444 14236.58 16095.47       Inf       -Inf
## SYMPWI   36  3  3 5.101757 14230.19 16084.21 0.4870688 -0.4870688
## OREOPE   33 13 12 5.024249 14281.24 16095.36 0.2013437 -0.1854124
## ARALDE   28 11 11 4.939767 14185.16 16018.03 0.1891403 -0.1891403
## CALLKO  157 78 51 5.028838 14176.81 16017.53 0.2235945 -0.1391051
## CYATLE    5  0  0 5.045859 14254.00 16091.33       Inf       -Inf
## MAESJA   31 17  9 5.036590 14216.41 16065.78 0.2455555 -0.1192819
## STYRFO    4  1  1 4.765229 14205.80 15963.40 0.2909187 -0.2909187
## ARDISI    8  4  4 5.075975 14196.88 16050.88 0.1365545 -0.1365545
##          fitmort  lowermean uppermean        fitr lowermeanR  uppermeanR
## CYATPO 2.3534139 1.42405960 4.9632218 -1.66182528 -2.8431984 -1.16572867
## CYATSP 1.4529756 0.73615747 3.5346911 -0.81573491 -1.4644246 -0.47993615
## SYMPWI 0.4555655 0.29083830 0.6774626 -0.37406433 -0.5865517 -0.17895591
## OREOPE 0.1908879 0.11572500 0.2836028 -0.15282842 -0.2368183 -0.05976979
## ARALDE 0.1758974 0.10644873 0.2728036 -0.15027458 -0.2352537 -0.04240081
## CALLKO 0.2204662 0.17957251 0.2688495 -0.13358766 -0.1727329 -0.09342958
## CYATLE 0.4997102 0.11042922 1.6598591 -0.11540577 -0.4273042  0.01391086
## MAESJA 0.2313606 0.14085929 0.3484358 -0.09294336 -0.1806807 -0.01102533
## STYRFO 0.2015678 0.04693745 0.5106062 -0.08138194 -0.2907923  0.01652701
## ARDISI 0.1186037 0.03922108 0.2511125 -0.07266497 -0.1782217  0.01482441
```

PALANAN - abund model graphic

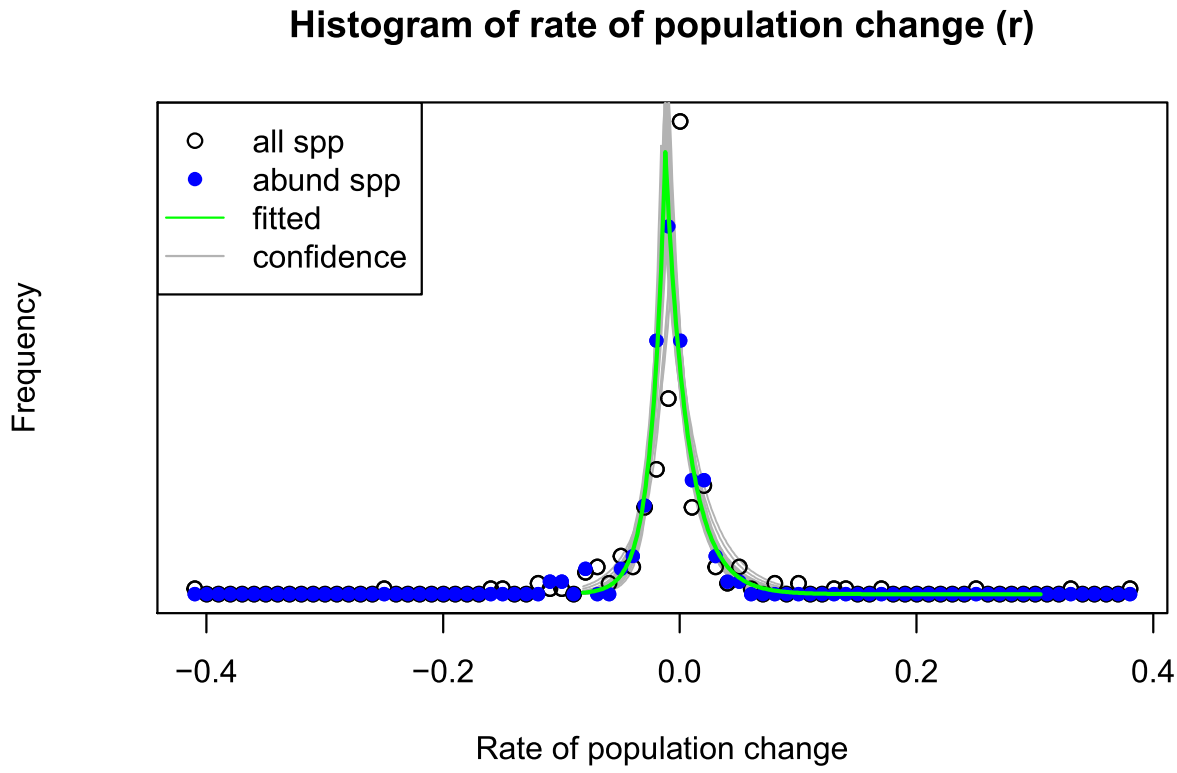
```
graph.abundmodel(mod.PAL$dbh10$census1.2)
```




```
## $Fastest_increases
##        N1 N2 S     time    date1 date2   mortrate  little.r    fitmort
## BARRPT  1 41 0 3.832991 12645.00 14045        Inf 0.9688444 0.04404860
## PALAPH  2 30 2 3.623546 12721.50 14045 0.00000000 0.7473482 0.02958345
## DPLSFA  1 13 1 3.748118 12676.00 14045 0.00000000 0.6843300 0.03094353
## TURPSP  2 15 2 3.331964 12828.00 14045 0.00000000 0.6047193 0.02973645
## MACABI 13 82 6 3.593113 12732.62 14045 0.21518662 0.5125833 0.10333612
## ARTOTR  4 25 4 3.446954 12786.00 14045 0.00000000 0.5316524 0.02661840
## LCSKCP  4 27 3 3.665982 12706.00 14045 0.07847340 0.5208816 0.03835632
## CANAAS  5 30 5 3.456810 12782.40 14045 0.00000000 0.5183274 0.02760708
## PTSPCE  5 27 4 3.373032 12813.00 14045 0.06615518 0.4999653 0.03742640
## BHESPA  1  7 1 3.498973 12767.00 14045 0.00000000 0.5561375 0.03145423
##          lowermean  uppermean      fitr lowermeanR uppermeanR
## BARRPT 0.011690694 0.11349627 0.9534627  0.8770782  1.0323051
## PALAPH 0.007398943 0.07364605 0.7236873  0.6281703  0.8227746
## DPLSFA 0.007611549 0.08092044 0.6323550  0.5004764  0.7655181
## TURPSP 0.007886666 0.08032017 0.5533198  0.4234177  0.6918551
## MACABI 0.038080002 0.20303584 0.5041521  0.4491585  0.5618307
## ARTOTR 0.007164159 0.06661387 0.5020421  0.4029236  0.6059733
## LCSKCP 0.010045354 0.10037099 0.4932582  0.4037263  0.5909854
## CANAAS 0.007006144 0.06972662 0.4921246  0.4028846  0.5885238
## PTSPCE 0.010668486 0.09347026 0.4743002  0.3767857  0.5819929
## BHESPA 0.008039445 0.08501149 0.4594123  0.2883777  0.6515302
##
## $Biggest_losses
##         N1  N2   S     time    date1 date2    mortrate     little.r
```

```
## CHISCE 242 243 161 3.643061 12714.37 14045 0.111865637  0.001131937
## VATIMA  79  79  77 3.717100 12687.33 14045 0.006898504  0.000000000
## PHYLRA 349 375 329 3.766545 12669.27 14045 0.015667984  0.019076926
## GARCLF  35  36  30 3.640716 12715.23 14045 0.042340762  0.007737730
## MALLMO   9   4   4 3.300023 12839.67 14045 0.245734730 -0.245734730
## AGLAAR  96 105  91 3.722450 12685.38 14045 0.014369214  0.024073433
## LEEAHA 421 467 280 3.688730 12697.69 14045 0.110564661  0.028111684
## CODILU 220 244 206 3.626881 12720.28 14045 0.018128905  0.028548135
## KAYEPA  21  22  19 3.767283 12669.00 14045 0.026566485  0.012348427
## DIPTHA  26  28  23 3.654294 12710.27 14045 0.033550210  0.020279698
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## CHISCE 0.10606532 0.084252172 0.12979206 0.00520715 -0.020562196
## VATIMA 0.01378094 0.005819636 0.02680213 0.00572664 -0.012469006
## PHYLRA 0.01669868 0.010532730 0.02459848 0.02042975  0.009691349
## GARCLF 0.03667461 0.015099542 0.07146885 0.02704069 -0.019281646
## MALLMO 0.09682971 0.034826811 0.21518296 0.02902709 -0.202685894
## AGLAAR 0.01800502 0.008436316 0.03252720 0.02950003  0.007291948
## LEEAHA 0.10782457 0.090614515 0.12727220 0.02976025  0.011137336
## CODILU 0.01945505 0.011626616 0.02972283 0.03088162  0.015663896
## KAYEPA 0.02837007 0.009938201 0.06018245 0.04042444 -0.016936843
## DIPTHA 0.03147500 0.012201166 0.06394831 0.04413745 -0.009274340
##        uppermeanR
## CHISCE 0.03141255
## VATIMA 0.03401801
## PHYLRA 0.03295471
## GARCLF 0.09290488
## MALLMO 0.17886940
## AGLAAR 0.05930167
## LEEAHA 0.04922926
## CODILU 0.04905100
## KAYEPA 0.11936743
## DIPTHA 0.11809668
```

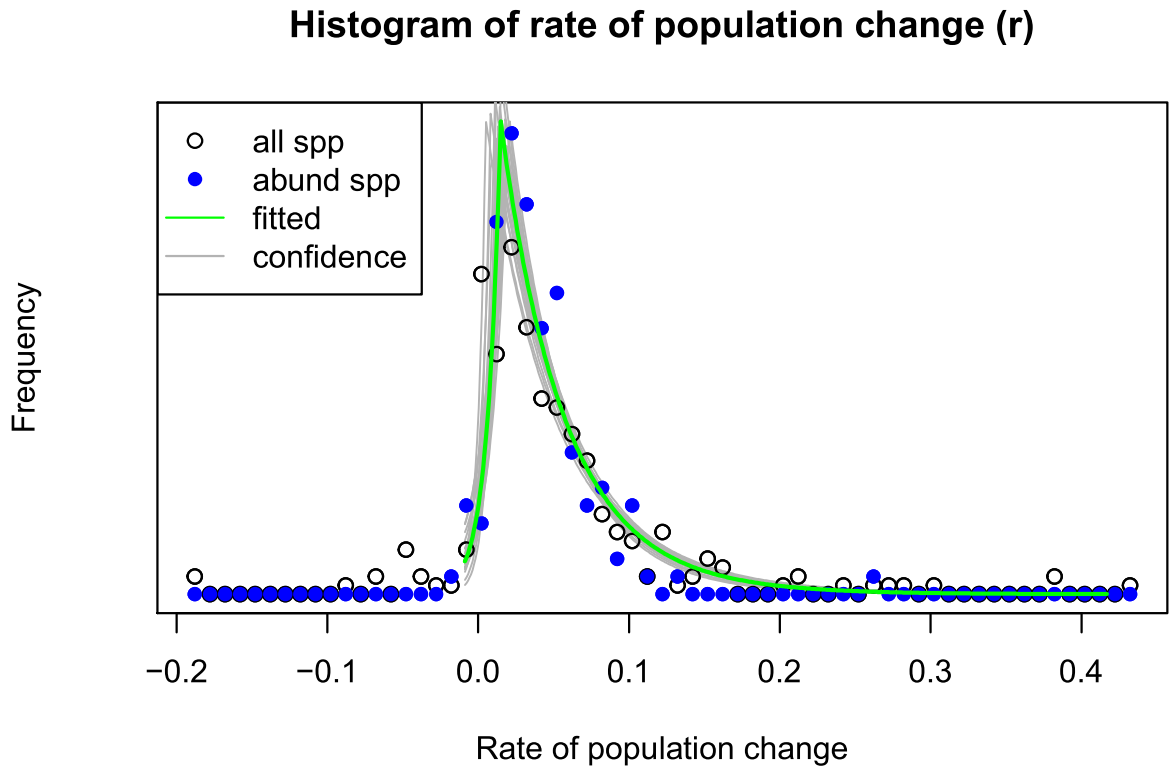
```
graph.abundmodel(mod.PALb$dbh10$census1.2)
```




```
## $Fastest_increases
##         N1  N2   S     time    date1 date2   mortrate   little.r
## MACATA  10  37   7 3.457084 12782.30 14045 0.10317219 0.37844980
## PALAPH   2   5   2 3.623546 12721.50 14045 0.00000000 0.25287132
## FICULF  10  16   9 3.485832 12771.80 14045 0.03022536 0.13483257
## STERCP   1   3   1 3.290897 12843.00 14045 0.00000000 0.33383373
## DYSOCB  94 112  86 3.586905 12734.88 14045 0.02479784 0.04884548
## KIBAEL   6  10   5 3.748118 12676.00 14045 0.04864350 0.13628857
## PTERIN 151 174 121 3.737420 12679.91 14045 0.05926261 0.03793404
## FICUVR   9  13   7 3.502624 12765.67 14045 0.07175033 0.10498552
## SLOAJA  38  45  33 3.643359 12714.26 14045 0.03872212 0.04640672
## CHIOCO  23  28  18 3.621105 12722.39 14045 0.06769272 0.05432327
##           fitmort  lowermean  uppermean       fitr   lowermeanR uppermeanR
## MACATA 0.07955852 0.02825931 0.16845562 0.30505945  0.225840590 0.38520398
## PALAPH 0.05647618 0.01690311 0.14190648 0.06289006 -0.014121656 0.17557316
## FICULF 0.05029503 0.01738977 0.10965283 0.05693027 -0.006250081 0.13509283
## STERCP 0.06165326 0.01732671 0.15907510 0.05353363 -0.018198486 0.17107712
## DYSOCB 0.03070857 0.01668021 0.04913387 0.03938807  0.015577341 0.06900933
## KIBAEL 0.05828559 0.01864439 0.12910074 0.03849180 -0.015680379 0.11976497
## PTERIN 0.05933848 0.04036547 0.08262983 0.02917436  0.005363116 0.05629734
## FICUVR 0.06589685 0.02216180 0.14070986 0.02640674 -0.020157350 0.09946919
## SLOAJA 0.04534885 0.02147819 0.07887513 0.02398862 -0.010849096 0.07094284
## CHIOCO 0.06415122 0.02837927 0.11922209 0.01696743 -0.020114195 0.06947297
##
## $Biggest_losses
##         N1  N2   S     time    date1 date2   mortrate    little.r
```

```
## CHISCE 242 165 134 3.643061 12714.37 14045 0.16225309 -0.10512924
## LEEAHA 421 293 154 3.688730 12697.69 14045 0.27263587 -0.09826151
## CLAOEU 178 135 114 3.528290 12756.29 14045 0.12628926 -0.07836906
## CYRTOB 186 140  94 3.536081 12753.45 14045 0.19299665 -0.08034437
## SYZYEV 433 381 332 3.601804 12729.44 14045 0.07374159 -0.03552063
## LITSGB 144 124 113 3.620275 12722.69 14045 0.06696327 -0.04130397
## MACAGR 142 118  79 3.516499 12760.60 14045 0.16675083 -0.05264964
## SHORNE 661 596 550 3.718266 12686.90 14045 0.04944120 -0.02783909
## PSUVLU  88  75  68 3.627963 12719.89 14045 0.07106717 -0.04406017
## PRARSB 886 802 640 3.609084 12726.78 14045 0.09011949 -0.02759934
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## CHISCE 0.15773210 0.12820973 0.19033182 -0.08186479 -0.11498166
## LEEAHA 0.26758491 0.23501704 0.30181549 -0.08107174 -0.10921348
## CLAOEU 0.12126575 0.09386070 0.15256600 -0.05255008 -0.08859016
## CYRTOB 0.18534369 0.15009082 0.22655438 -0.04935434 -0.09241700
## SYZYEV 0.07323915 0.06047842 0.08800736 -0.02954405 -0.04542085
## LITSGB 0.06616172 0.04592450 0.09020944 -0.02693638 -0.05198730
## MACAGR 0.15814488 0.12154609 0.19903067 -0.02681912 -0.06288155
## SHORNE 0.04963042 0.04083596 0.05931831 -0.02523585 -0.03528543
## PSUVLU 0.06893921 0.04360800 0.10129057 -0.02438894 -0.05655635
## PRARSB 0.08963177 0.07881269 0.10095973 -0.02403769 -0.03654789
##           uppermeanR
## CHISCE -4.504561e-02
## LEEAHA -5.172320e-02
## CLAOEU -1.626930e-02
## CYRTOB -1.249690e-02
## SYZYEV -1.326493e-02
## LITSGB -5.736183e-03
## MACAGR -4.670014e-06
## SHORNE -1.442396e-02
## PSUVLU  3.667371e-03
## PRARSB -1.199829e-02
```

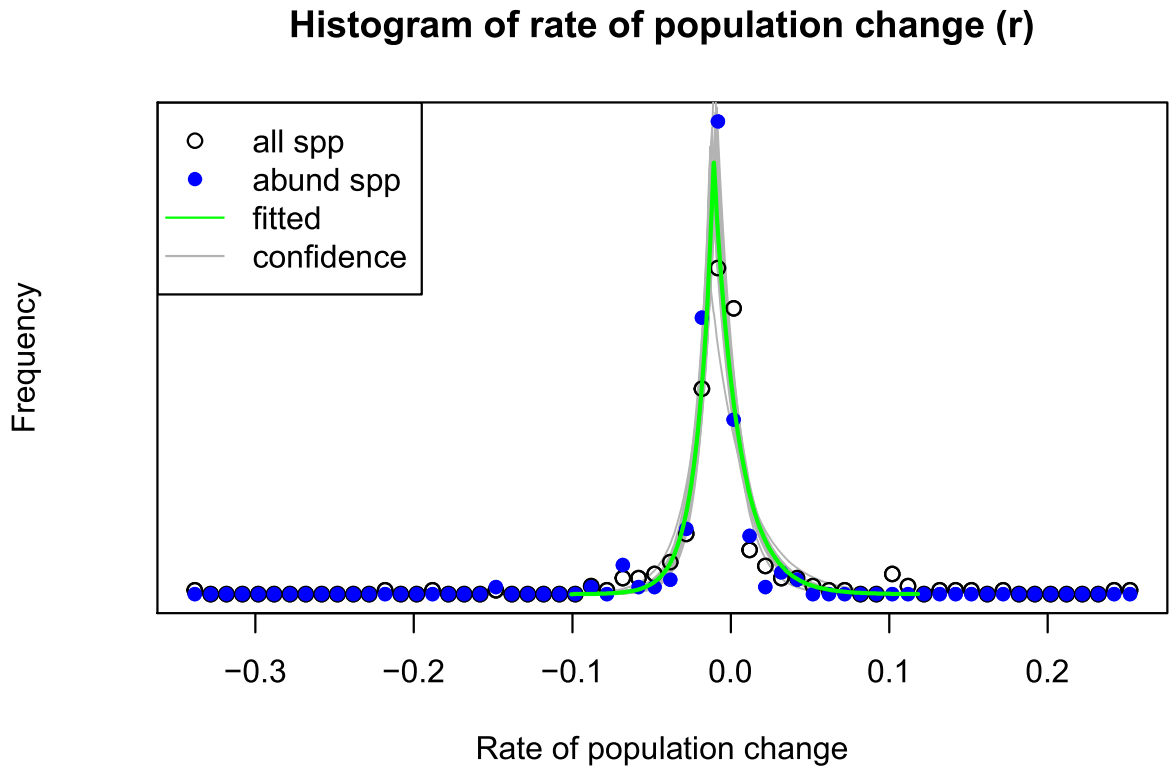
```
graph.abundmodel(mod.PAL$dbh10$census2.3)
```




```
## $Fastest_increases
##         N1   N2   S     time date1    date2    mortrate  little.r
## MALLMO   4   48   4 5.795517 14045 16157.23 0.000000000 0.4287636
## CLERMC  10   87   7 5.721287 14045 16133.81 0.062341735 0.3781183
## PIPTAS   1    9   1 5.730930 14045 16133.80 0.000000000 0.3833976
## MACATA  44  251  39 5.787303 14045 16158.35 0.020843558 0.3008765
## FICULF  25  119  24 5.745608 14045 16143.58 0.007104904 0.2715548
## FICUCO 221 1024 199 5.760142 14045 16148.40 0.018204043 0.2661929
## FICURC  41  140  37 5.766294 14045 16150.14 0.017802449 0.2129739
## FICUFK   1    5   1 5.748939 14045 16144.80 0.000000000 0.2799539
## FICUVR  34  108  29 5.784037 14045 16157.62 0.027500636 0.1998208
## OCTOSU   3   10   2 5.738784 14045 16141.09 0.070653486 0.2097958
##           fitmort   lowermean  uppermean      fitr lowermeanR uppermeanR
## MALLMO 0.01662328 0.004879706 0.03868736 0.4171275 0.37060411  0.4672082
## CLERMC 0.02877670 0.010608708 0.06265239 0.3721013 0.33516307  0.4072474
## PIPTAS 0.01860285 0.005271902 0.04643513 0.3288014 0.23660989  0.4313202
## MACATA 0.01925148 0.008522009 0.03483034 0.2986387 0.27889296  0.3190079
## FICULF 0.01364394 0.005045343 0.02788138 0.2676522 0.24089898  0.2952393
## FICUCO 0.01791241 0.011612002 0.02555314 0.2657824 0.25614222  0.2755464
## FICURC 0.01741621 0.007385095 0.03304189 0.2094704 0.18433696  0.2338454
## FICUFK 0.01889677 0.005580955 0.04690140 0.2025076 0.11118769  0.3185047
## FICUVR 0.02272099 0.010133118 0.04221576 0.1955951 0.16721899  0.2247729
## OCTOSU 0.02210135 0.007003456 0.05147941 0.1701770 0.09848627  0.2605805
##
## $Biggest_losses
##          N1   N2    S     time date1    date2   mortrate      little.r
```

```
## CHISCE  241  220  178 5.736775 14045 16137.95 0.05281947 -0.0158920988
## SYZYEV  540  521  461 5.734127 14045 16138.11 0.02758416 -0.0062466520
## LEEAHA  456  435  248 5.724386 14045 16133.46 0.10639814 -0.0082361283
## SHORPO  269  264  248 5.792581 14045 16159.02 0.01403220 -0.0032390182
## DIPTHA   28   22   22 5.723282 14045 16135.55 0.04213703 -0.0421370251
## DIOSBU  190  186  171 5.767396 14045 16150.97 0.01826830 -0.0036892555
## SHORGU  230  229  207 5.762600 14045 16149.16 0.01828350 -0.0007561353
## SHORNE 1328 1362 1157 5.796100 14045 16160.48 0.02378213  0.0043615807
## SYZYLS   69   67   62 5.824408 14045 16172.36 0.01836618 -0.0050501076
## DRYPMI  289  293  243 5.736936 14045 16139.38 0.03021913  0.0023960387
##           fitmort   lowermean  uppermean          fitr    lowermeanR
## CHISCE 0.04961186 0.037847345 0.06224554 -0.0087379585 -0.0241574740
## SYZYEV 0.02695093 0.021514354 0.03321836 -0.0042414061 -0.0118800540
## LEEAHA 0.10296309 0.089194179 0.11836522 -0.0025325919 -0.0164906000
## SHORPO 0.01442344 0.009511142 0.02030428 -0.0008274422 -0.0083403742
## DIPTHA 0.02931782 0.013335552 0.05305802  0.0004657687 -0.0413669325
## DIOSBU 0.01787025 0.011239780 0.02590679  0.0006592174 -0.0095980984
## SHORGU 0.01815571 0.012154081 0.02577713  0.0027540101 -0.0068327151
## SHORNE 0.02355064 0.020083781 0.02726415  0.0051197266  0.0004268288
## SYZYLS 0.01796194 0.009231776 0.03056744  0.0051426570 -0.0122277710
## DRYPMI 0.02881518 0.020908233 0.03786926  0.0060809859 -0.0046574290
##         uppermeanR
## CHISCE 0.008438550
## SYZYEV 0.003896876
## LEEAHA 0.011779580
## SHORPO 0.008666006
## DIPTHA 0.034426331
## DIOSBU 0.012820042
## SHORGU 0.013764104
## SHORNE 0.009997271
## SYZYLS 0.024482399
## DRYPMI 0.017068697
```

```
graph.abundmodel(mod.PAL$dbh10$census3.4)
```



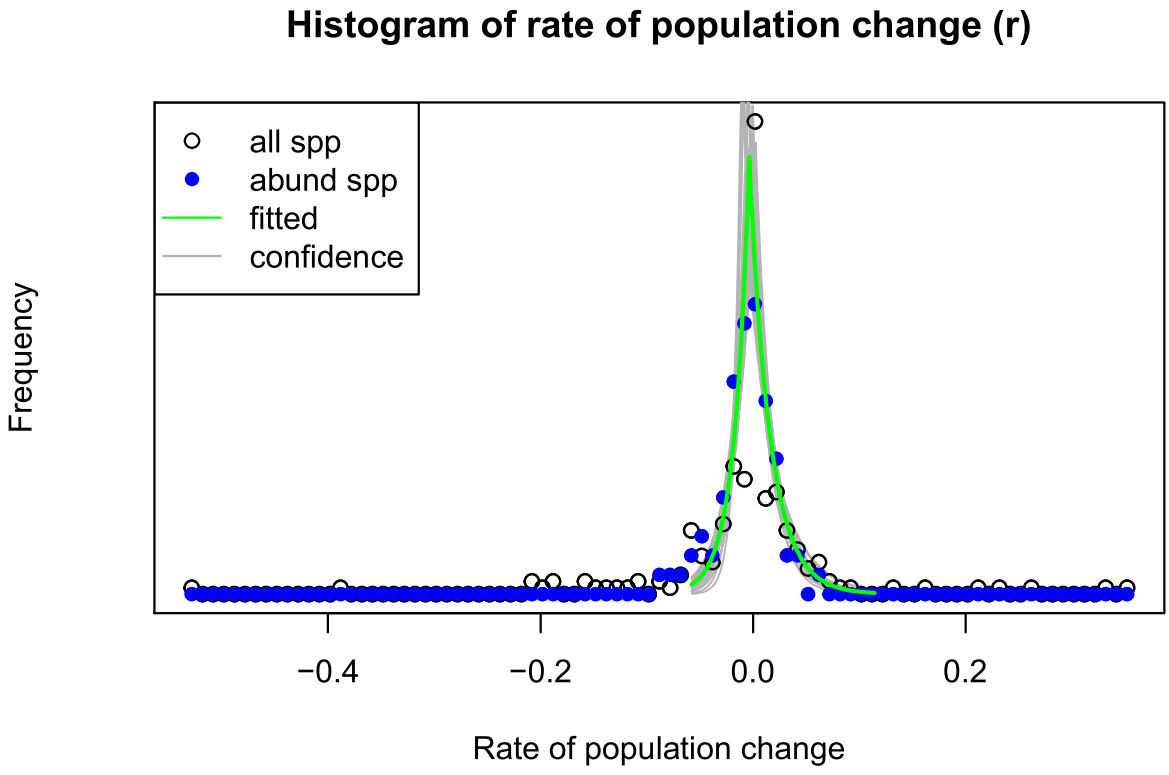

```
## $Fastest_increases
##          N1   N2   S     time    date1    date2   mortrate   little.r
## CCRP01    1    5   1 6.482683 16126.00 18493.80 0.00000000 0.24826725
## DYSO07    1    5   1 6.539630 16115.00 18503.60 0.00000000 0.24610533
## GLOCTR    3    9   3 6.506046 16122.00 18498.33 0.00000000 0.16886021
## GLOCSB    5   13   5 6.468362 16122.20 18484.77 0.00000000 0.14772077
## STERCP    3    7   3 6.507219 16115.67 18492.43 0.00000000 0.13020890
## GLOCSF    2    5   2 6.446543 16150.00 18504.60 0.00000000 0.14213675
## FICUCO 1022 1369 810 6.447624 16148.46 18503.94 0.03605709 0.04533749
## MACAOV    3    6   3 6.344513 16193.33 18510.67 0.00000000 0.10925144
## MACABI  129  168  93 6.411645 16166.25 18509.92 0.05103416 0.04119872
## DPLSTI   10   15  10 6.450011 16150.08 18504.39 0.00000000 0.06286270
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## CCRP01 0.02682094 0.007208268 0.06730008 0.11892174  0.052449809
## DYSO07 0.02741509 0.007194548 0.07373554 0.11819533  0.055301118
## GLOCTR 0.02453338 0.006705706 0.06180431 0.09622396  0.038829821
## GLOCSB 0.02123811 0.006105877 0.04956175 0.09515417  0.048912630
## STERCP 0.02366102 0.006444331 0.05537620 0.05852426  0.007968490
## GLOCSF 0.02517874 0.007279294 0.06278749 0.05435419  0.001130199
## FICUCO 0.03588557 0.031024764 0.04098485 0.04472316  0.038380904
## MACAOV 0.02509328 0.006885157 0.06579301 0.04082892 -0.006036512
## MACABI 0.04843219 0.034721159 0.06454418 0.03634426  0.019976474
## DPLSTI 0.01830003 0.005281201 0.04258722 0.03605973  0.003116466
##        uppermeanR
## CCRP01 0.19936052
## DYSO07 0.20045037
```

```
## GLOCTR 0.16489263
## GLOCSB 0.15003383
## STERCP 0.12303733
## GLOCSF 0.12053162
## FICUCO 0.05081084
## MACAOV 0.10237870
## MACABI 0.05383605
## DPLSTI 0.07613027
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## MLSTMA 103  41  29 6.412470 16167.59 18511.39 0.19765133 -0.14365088
## MALLMO  48  14  12 6.442676 16157.23 18512.85 0.21517368 -0.19124718
## LEEAHA 431 278 262 6.472242 16133.65 18496.13 0.07690744 -0.06774885
## MACATA 251 162 126 6.431358 16158.35 18507.31 0.10715793 -0.06808151
## LEEAIN 306 203 187 6.435905 16159.06 18508.50 0.07652016 -0.06376401
## CLERMC  87  48  26 6.467842 16133.81 18497.38 0.18674104 -0.09194830
## CLAOEU 276 192 163 6.441288 16145.34 18502.08 0.08176170 -0.05634051
## LCSKCP  65  41  34 6.452576 16148.04 18503.23 0.10042916 -0.07141570
## ASTRCA  86  65  61 6.473875 16129.10 18494.89 0.05305531 -0.04324459
## TURPSP  31  22  21 6.367661 16191.15 18518.41 0.06116292 -0.05385725
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## MLSTMA 0.18084688 0.14149300 0.22979795 -0.10079409 -0.14785629
## MALLMO 0.17624734 0.11929425 0.24817841 -0.07647012 -0.15781239
## LEEAHA 0.07516819 0.06360169 0.08825433 -0.06399663 -0.07603248
## MACATA 0.10371295 0.08589535 0.12340869 -0.05938097 -0.07858838
## LEEAIN 0.07425770 0.06162592 0.08791125 -0.05847311 -0.07233124
## CLERMC 0.16890516 0.12486786 0.21864754 -0.05460560 -0.09668843
## CLAOEU 0.07914577 0.06518355 0.09482478 -0.05013327 -0.06506227
## LCSKCP 0.08833949 0.05885299 0.12421385 -0.04099493 -0.07765846
## ASTRCA 0.04873780 0.03133974 0.06831538 -0.03091519 -0.05280412
## TURPSP 0.04921414 0.02650548 0.08302886 -0.02585607 -0.05796958
##          uppermeanR
## MLSTMA -0.052552156
## MALLMO -0.013255261
## LEEAHA -0.052034379
## MACATA -0.039450167
## LEEAIN -0.043060783
## CLERMC -0.013292156
## CLAOEU -0.032911606
## LCSKCP -0.008370274
## ASTRCA -0.009159229
## TURPSP  0.001766096
```

Large Stems (>10cm

BCI - abund model graphic

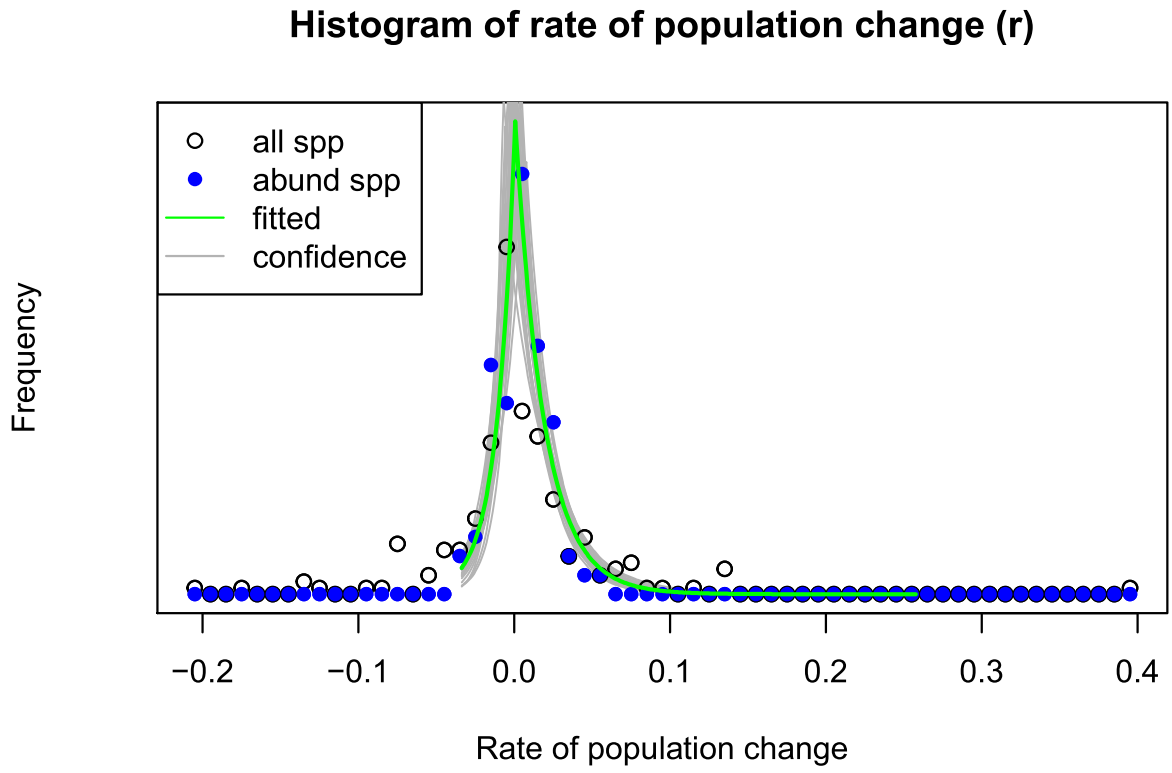
```
graph.abundmodel(mod.BCI$dbh100$census1.2)
```




```
## $Fastest_increases
##          N1   N2    S     time    date1    date2    mortrate   little.r
## uniden    3    7    3 2.579838 8176.792 9190.928 0.000000000 0.32843069
## vismba    1    3    1 3.113849 8121.767 9227.216 0.000000000 0.35281489
## chr1ec    2    5    1 3.956651 8002.513 9266.386 0.175185336 0.23158242
## ochrpy    2    4    2 2.656182 8181.110 9181.840 0.000000000 0.26095623
## xyl1ma   79   99   75 3.592592 7962.242 9269.470 0.014463023 0.06281593
## ocotce   24   30   24 3.094004 8043.701 9250.325 0.000000000 0.07212129
## acaldi    2    4    2 3.249829 8000.088 9269.469 0.000000000 0.21328729
## faraoc 1227 1399 1113 3.349839 8054.953 9246.011 0.029109784 0.03916174
## drypst  196  228  194 3.849859 7922.925 9292.656 0.002664124 0.03928221
## cou2cu   40   47   39 3.162047 8084.418 9236.190 0.008006779 0.05100119
##            fitmort   lowermean  uppermean       fitr   lowermeanR
## uniden 0.035970985 0.007151961 0.10081149 0.11489172  0.018344676
## vismba 0.042870999 0.007976796 0.12555736 0.07927375 -0.002394371
## chr1ec 0.061715287 0.012308977 0.16982122 0.06299836 -0.006444672
## ochrpy 0.041369386 0.008348498 0.12002248 0.05446923 -0.008707257
## xyl1ma 0.019126576 0.007491860 0.03671516 0.05347177  0.028538003
## ocotce 0.019355149 0.004958834 0.04610625 0.04551368  0.007004766
## acaldi 0.039446578 0.008200220 0.10809605 0.04491631 -0.011931964
## faraoc 0.029263678 0.024057667 0.03472840 0.03846999  0.030301200
## drypst 0.006936794 0.002766445 0.01318000 0.03769329  0.024344919
## cou2cu 0.018716220 0.006034994 0.04252180 0.03638321  0.005177179
##        uppermeanR
## uniden 0.23134474
## vismba 0.19380295
```

```
## chr1ec 0.16341299
## ochrpy 0.15848491
## xyl1ma 0.08168044
## ocotce 0.09765247
## acaldi 0.12148936
## faraoc 0.04678156
## drypst 0.05294996
## cou2cu 0.07695347
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## pterro 134 101  97 3.503643 8068.875 9241.042 0.09222653 -0.08069295
## protpa  61  46  43 3.332563 8094.637 9231.243 0.10492636 -0.08468930
## casear 153 131 124 3.210010 8090.468 9239.792 0.06546906 -0.04836140
## cecrob  38  24  23 3.128170 8036.937 9260.472 0.16050660 -0.14690133
## cecrin 278 246 232 3.167939 8028.653 9259.927 0.05709824 -0.03860225
## zantp1  83  69  66 3.292425 8059.231 9246.356 0.06961005 -0.05610883
## solaha  40  25  21 2.982826 8076.493 9240.471 0.21602231 -0.15756990
## turpoc  69  56  50 3.293708 8027.949 9258.576 0.09778752 -0.06337989
## ingape  24  14  14 4.220853 7853.577 9350.229 0.12769847 -0.12769847
## pla2el  60  51  51 3.224139 8053.715 9247.020 0.05040693 -0.05040693
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## pterro 0.08826913 0.06219061 0.11901603 -0.05771199 -0.09174427
## protpa 0.09443805 0.05521950 0.14643783 -0.03471310 -0.09101235
## casear 0.06283954 0.04140624 0.08827523 -0.03344557 -0.06045885
## cecrob 0.13477488 0.07240098 0.21685778 -0.03282454 -0.12794066
## cecrin 0.05572887 0.04144478 0.07287068 -0.03038141 -0.04945577
## zantp1 0.06541789 0.03960609 0.09970773 -0.02949796 -0.06665573
## solaha 0.18191210 0.10750310 0.27294150 -0.02895373 -0.11905980
## turpoc 0.08995085 0.05445118 0.13633008 -0.02605055 -0.07294722
## ingape 0.10532455 0.04914068 0.18236924 -0.02549941 -0.10314185
## pla2el 0.04804569 0.02400813 0.08156797 -0.02432715 -0.05931345
##          uppermeanR
## pterro -0.015257677
## protpa  0.005839039
## casear -0.003500130
## cecrob  0.014098780
## cecrin -0.008518882
## zantp1  0.005122534
## solaha  0.019053198
## turpoc  0.009053340
## ingape  0.019143826
## pla2el  0.009687500
```

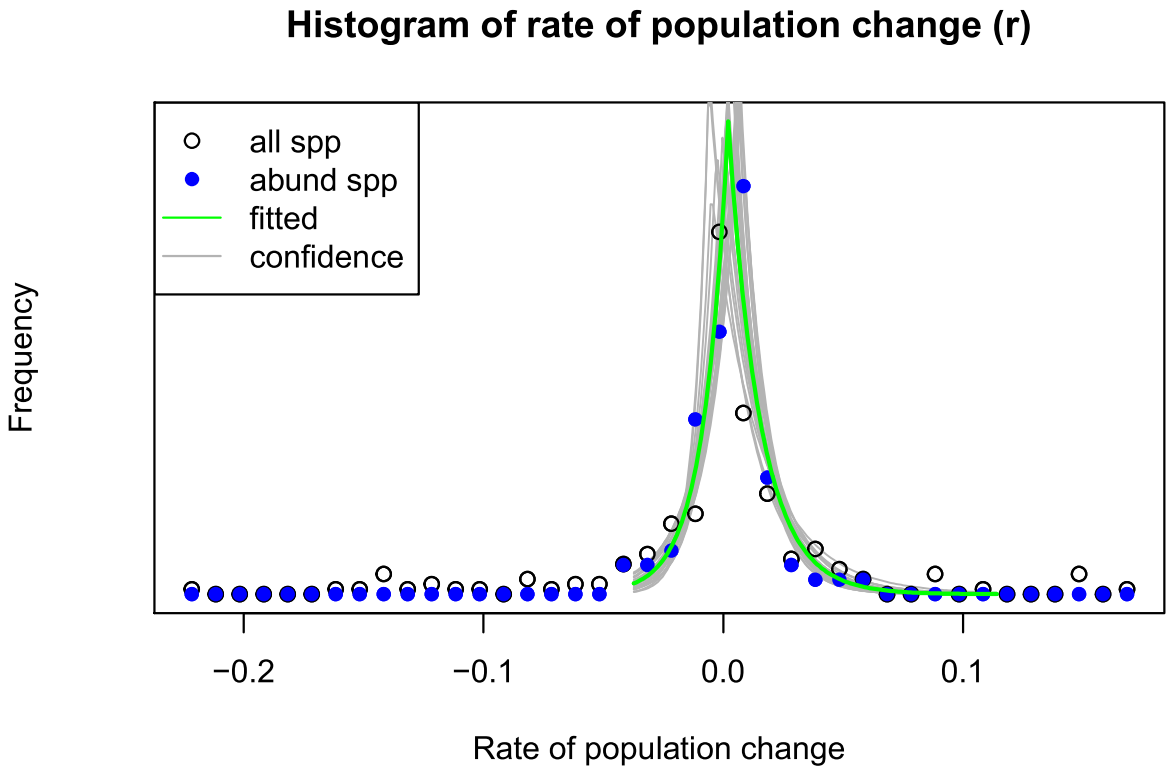
```
graph.abundmodel(mod.BCI$dbh100$census2.3)
```




```
## $Fastest_increases
##         N1  N2  S     time    date1    date2    mortrate   little.r
## micoaf   1   8  1 5.276181 9208.177 11114.25 0.000000000 0.39411871
## laetth  17  25 16 5.237087 9241.851 11158.89 0.011576019 0.07364064
## ingath   6  11  4 5.230980 9185.488 11085.03 0.077512267 0.11587424
## ocotpu  12  18 11 5.245722 9240.342 11163.75 0.016587111 0.07729443
## zantbe 108 141 89 5.242095 9231.289 11145.69 0.036911745 0.05086300
## xyl1ma  99 128 95 5.300272 9269.446 11204.74 0.007781291 0.04847118
## cupasy  29  40 24 5.209887 9248.602 11166.90 0.036323631 0.06172565
## ingas1  14  20 13 5.262540 9269.026 11202.85 0.014082167 0.06777619
## perexa  14  20 13 5.294482 9187.401 11092.88 0.013997209 0.06736730
## uniden   7  11  6 5.137121 9189.967 11074.31 0.030007214 0.08798414
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## micoaf 0.03349252 0.004938457 0.11640222 0.25831342  0.168546784
## laetth 0.01879062 0.004543985 0.04468872 0.05187088  0.015207452
## ingath 0.05108769 0.012290681 0.13873953 0.04953819 -0.001972291
## ocotpu 0.02319731 0.005295271 0.05772517 0.04726307  0.009383514
## zantbe 0.03563129 0.021802743 0.05307112 0.04519815  0.025808597
## xyl1ma 0.01062507 0.004182633 0.01989765 0.04506886  0.029277599
## cupasy 0.03387829 0.012659378 0.06568861 0.04412911  0.011003383
## ingas1 0.02123085 0.004793396 0.05353395 0.04294045  0.006728749
## perexa 0.02156347 0.005120910 0.05198115 0.04188589  0.007727996
## uniden 0.03189515 0.006172834 0.08576260 0.03906163 -0.001041109
##        uppermeanR
## micoaf 0.37119057
## laetth 0.09605942
```

```
## ingath 0.11895936
## ocotpu 0.09717228
## zantbe 0.06679615
## xyl1ma 0.06317241
## cupasy 0.08069125
## ingas1 0.09023947
## perexa 0.08865851
## uniden 0.10064635
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## ery1co  47  31  30 5.271504 9246.948 11170.13 0.08516550 -0.07894529
## soroaf  43  29  25 5.271703 9257.306 11178.29 0.10287460 -0.07472051
## pterro 101  82  74 5.308743 9240.836 11161.98 0.05859305 -0.03925624
## lindla  78  66  64 5.339528 9261.237 11206.46 0.03704930 -0.03128630
## solaha  25  13   9 5.231183 9240.471 11163.66 0.19530022 -0.12500546
## tropra  48  38  35 5.276536 9274.961 11203.73 0.05985990 -0.04427428
## maquco 201 177 159 5.260812 9253.538 11174.83 0.04455600 -0.02417026
## eugega  25  16  15 5.264255 9249.962 11173.69 0.09703664 -0.08477687
## guarsp  93  80  73 5.275784 9256.990 11181.62 0.04589651 -0.02854038
## sympgl  37  29  27 5.308061 9279.782 11210.14 0.05935897 -0.04589663
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## ery1co 0.07797706 0.04450495 0.12002197 -0.03377268 -0.08443373
## soroaf 0.09332141 0.05521699 0.14159444 -0.02589144 -0.07778395
## pterro 0.05644403 0.03668201 0.07970404 -0.02474966 -0.05040811
## lindla 0.03606976 0.02039740 0.05699107 -0.01961783 -0.04224725
## solaha 0.16257333 0.08695985 0.26167839 -0.01813536 -0.08208958
## tropra 0.05498836 0.03052920 0.08850735 -0.01793964 -0.05252918
## maquco 0.04375147 0.03161368 0.05835158 -0.01767810 -0.03357201
## eugega 0.08193521 0.03887762 0.14186312 -0.01718449 -0.07827689
## guarsp 0.04410793 0.02708804 0.06467446 -0.01622507 -0.03941484
## sympgl 0.05469837 0.02775154 0.09205254 -0.01573062 -0.05299443
##           uppermeanR
## ery1co  0.0059933933
## soroaf  0.0106051642
## pterro  0.0019477950
## lindla  0.0039638543
## solaha  0.0177378792
## tropra  0.0116839166
## maquco -0.0002780095
## eugega  0.0176933380
## guarsp  0.0050980141
## sympgl  0.0151067445
```

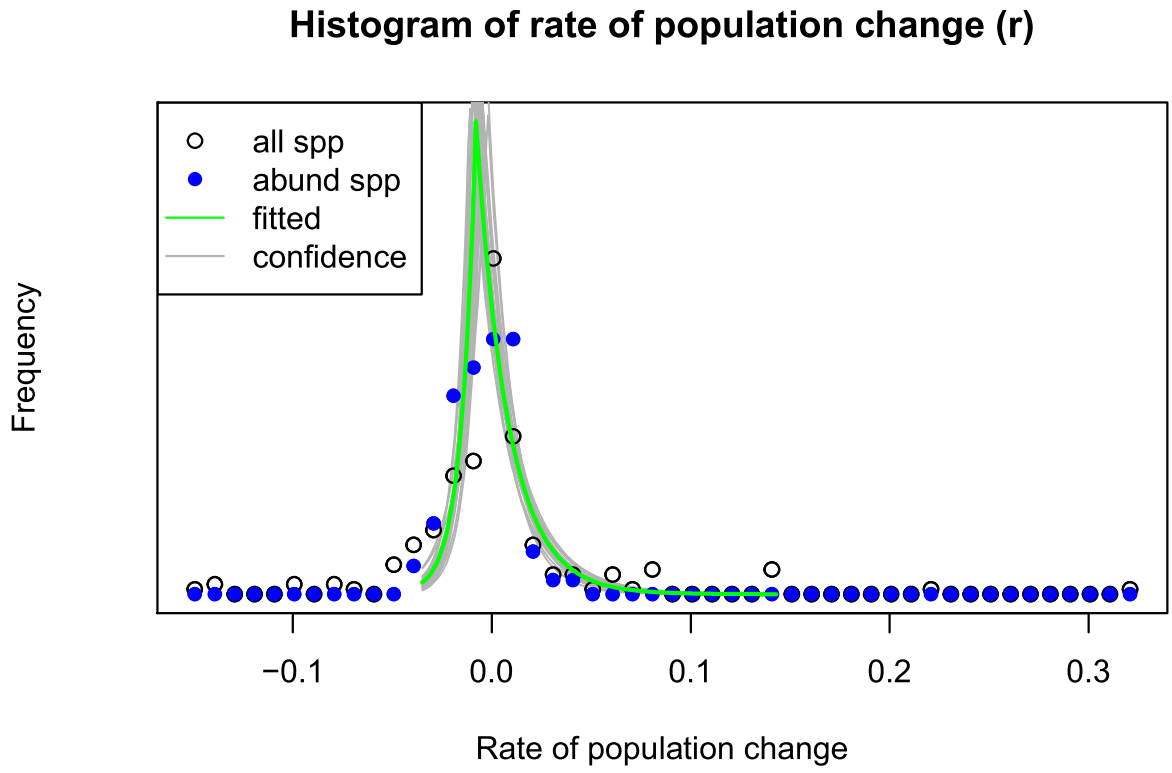
```
graph.abundmodel(mod.BCI$dbh100$census3.4)
```




```
## $Fastest_increases
##         N1  N2   S     time    date1    date2   mortrate   little.r
## ingath  11  25  10 4.801289 11085.03 12844.86 0.01985096 0.17099169
## ingape  12  20  11 4.768554 11289.03 13032.05 0.01824691 0.10712380
## ingas1  20  27  18 4.779438 11202.85 12938.95 0.02204454 0.06279077
## crotbi  75  98  41 4.803124 11161.87 12907.45 0.12573401 0.05568862
## ingaqu  53  67  45 4.780141 11196.06 12939.15 0.03423108 0.04903635
## ocotob  26  35  21 4.773854 11187.47 12930.24 0.04473830 0.06226658
## lacmpa  42  51  42 4.777174 11165.18 12912.34 0.00000000 0.04064244
## ocotpu  18  23  17 4.862309 11163.56 12910.92 0.01175541 0.05041277
## annosp  22  27  22 4.796005 11205.46 12950.19 0.00000000 0.04270104
## cordbi 285 324 260 4.813458 11127.90 12881.21 0.01907310 0.02664495
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## ingath 0.02432786 0.006671537 0.05780962 0.11506531 0.0667680706
## ingape 0.02384418 0.006435279 0.05660961 0.06018374 0.0163085074
## ingas1 0.02417881 0.007817808 0.05530647 0.03447971 0.0029945378
## crotbi 0.11369295 0.077825505 0.15654088 0.03356672 0.0039608008
## ingaqu 0.03233786 0.014979861 0.05514768 0.03354269 0.0082429795
## ocotob 0.03862480 0.014131943 0.07602051 0.03336215 0.0024034772
## lacmpa 0.00972005 0.002791062 0.02314892 0.03070676 0.0116864815
## ocotpu 0.01869354 0.005735696 0.04318168 0.02716556 0.0006178652
## annosp 0.01342867 0.003517778 0.03301340 0.02558478 0.0032461466
## cordbi 0.01937676 0.012940321 0.02697969 0.02450948 0.0141061485
##        uppermeanR
## ingath 0.17211161
## ingape 0.11300844
```

```
## ingas1 0.07441665
## crotbi 0.06773120
## ingaqu 0.06271115
## ocotob 0.07590714
## lacmpa 0.05667654
## ocotpu 0.06523358
## annosp 0.05698658
## cordbi 0.03669726
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2   mortrate    little.r
## cordla  444  365  340 4.773101 11181.77 12927.13 0.05591311 -0.04104820
## casear  121  103   99 4.781032 11169.63 12914.37 0.04197225 -0.03368761
## guatdu  277  244  232 4.765765 11172.06 12917.74 0.03719868 -0.02661677
## guarsp   81   67   64 4.766598 11181.65 12926.44 0.04942017 -0.03980963
## ade1tr  106   92   85 4.734616 11215.49 12950.03 0.04663268 -0.02991806
## hampap   25   13   11 4.797830 11192.69 12930.06 0.17111497 -0.13629630
## tratas   48   40   38 4.796386 11168.08 12915.76 0.04870643 -0.03801228
## ast1st  217  201  201 4.764643 11194.28 12935.62 0.01607517 -0.01607517
## tri2tu 1781 1677 1605 4.770062 11210.56 12948.47 0.02181340 -0.01261378
## tropra   38   32   32 4.793977 11203.73 12948.33 0.03584712 -0.03584712
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## cordla 0.05508042 0.04515446 0.06604009 -0.03730048 -0.04935304
## casear 0.04039129 0.02517207 0.05853244 -0.02212945 -0.04193753
## guatdu 0.03649513 0.02692730 0.04776434 -0.02202301 -0.03409151
## guarsp 0.04610552 0.02776219 0.06822341 -0.02025176 -0.04860138
## ade1tr 0.04460934 0.02782991 0.06641068 -0.01576614 -0.03809884
## hampap 0.13122933 0.06986900 0.21379978 -0.01370596 -0.07821512
## tratas 0.04345227 0.02150758 0.07396619 -0.01316496 -0.04359169
## ast1st 0.01666982 0.01035815 0.02477301 -0.01274696 -0.02099512
## tri2tu 0.02184658 0.01871575 0.02501029 -0.01215464 -0.01590003
## tropra 0.03278259 0.01458827 0.05818141 -0.01212696 -0.04086184
##          uppermeanR
## cordla -0.024330266
## casear  0.001186684
## guatdu -0.006316119
## guarsp  0.005551534
## ade1tr  0.006228624
## hampap  0.020375340
## tratas  0.012573208
## ast1st -0.001408771
## tri2tu -0.008039746
## tropra  0.013653237
```

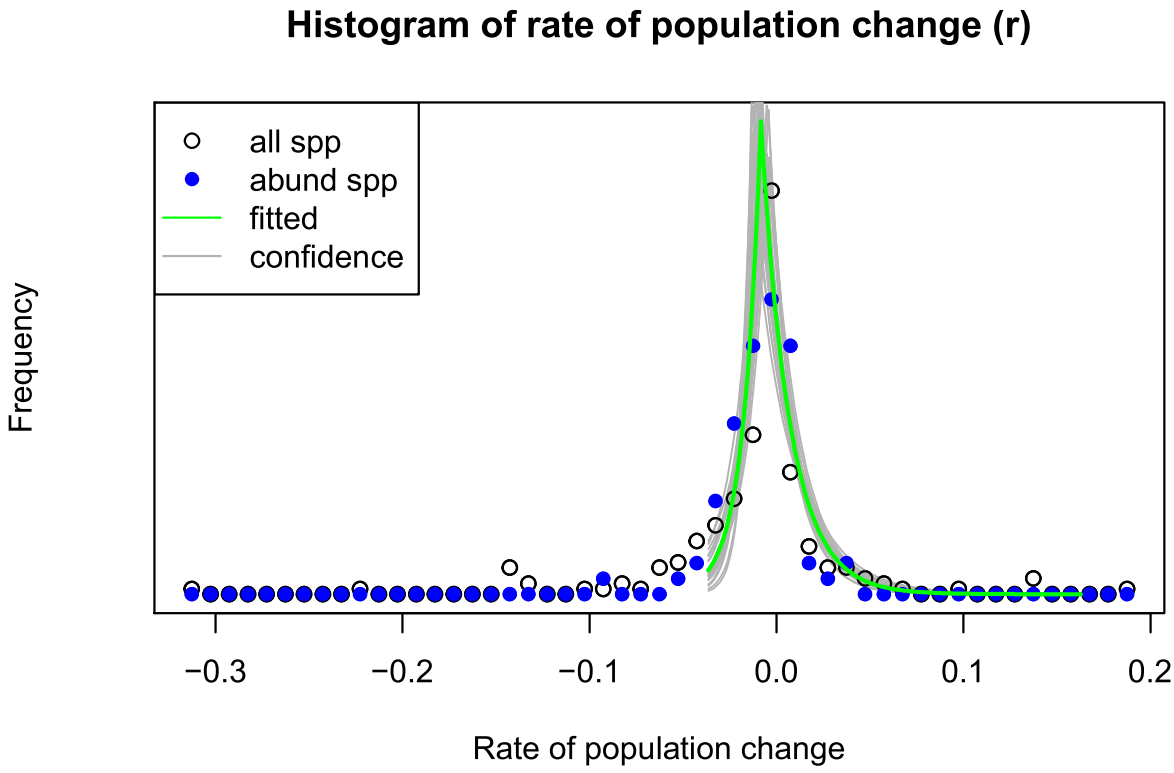
```
graph.abundmodel(mod.BCI$dbh100$census4.5)
```




```
## $Fastest_increases
##        N1  N2  S     time    date1    date2    mortrate   little.r
## cecrlo  1   5   1 4.954090 12966.53 14786.72 0.000000000 0.32487052
## ingath 25  38 24 5.000228 12844.68 14669.77 0.008164026 0.08373825
## tremin  1   3   1 4.929429 12970.28 14786.89 0.000000000 0.22286805
## ingas1 27  40 23 4.998382 12938.79 14759.18 0.032078910 0.07863396
## cha2sc  3   6   3 4.997490 12881.35 14707.91 0.000000000 0.13869905
## cecrob 25  36 17 4.979007 12936.51 14754.41 0.077457710 0.07323611
## gar2in 94 112 89 4.977132 12935.05 14756.57 0.010981910 0.03520182
## cou2cu 55  66 51 4.995248 12898.00 14721.92 0.015115877 0.03649900
## eugega 12  16  9 4.985770 12915.61 14739.40 0.057700626 0.05770063
## colugl  1   2  1 4.944559 12883.10 14699.49 0.000000000 0.14018384
##           fitmort   lowermean  uppermean       fitr    lowermeanR
## cecrlo 0.02800928 0.006114962 0.07956987 0.14331829  0.0615374989
## ingath 0.01769178 0.005836990 0.03899377 0.06429944  0.0328446154
## tremin 0.02843338 0.007174264 0.07404399 0.06006433 -0.0037283883
## ingas1 0.02957862 0.012512281 0.05811798 0.05701075  0.0206469662
## cha2sc 0.02570891 0.006184867 0.07032877 0.04923316 -0.0027365688
## cecrob 0.05799277 0.026026315 0.10255180 0.04092552 -0.0005961399
## gar2in 0.01420501 0.006778368 0.02490117 0.03115299  0.0148939502
## cou2cu 0.01871189 0.007694006 0.03557617 0.02824546  0.0073829267
## eugega 0.04070575 0.013332982 0.08841889 0.02151568 -0.0109303456
## colugl 0.02848133 0.006734161 0.07819617 0.02071381 -0.0153020467
##        uppermeanR
## cecrlo 0.24496671
## ingath 0.10302984
```

```
## tremin 0.14258053
## ingas1 0.09704224
## cha2sc 0.12310156
## cecrob 0.08644082
## gar2in 0.05078243
## cou2cu 0.05219367
## eugega 0.06644849
## colugl 0.08066251
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## cordla 365 296 273 4.985993 12926.83 14748.64 0.05824829 -0.04202531
## poular 755 671 585 4.985050 12936.89 14758.62 0.05117419 -0.02366047
## guetfo  85  73  71 4.968570 12928.42 14746.67 0.03622197 -0.03063091
## hassfl 229 204 186 4.976592 12917.27 14737.24 0.04179071 -0.02322915
## guatdu 244 221 202 4.969699 12918.21 14739.83 0.03801046 -0.01992184
## dendar  87  77  77 4.984368 12876.58 14700.54 0.02449713 -0.02449713
## ingago  49  39  35 4.965738 12921.70 14742.78 0.06775876 -0.04596671
## ade1tr  92  81  77 4.974047 12949.39 14766.79 0.03578236 -0.02560077
## crotbi  98  80  49 5.000765 12907.50 14732.36 0.13860824 -0.04058196
## lindla  64  56  54 4.951196 12951.23 14765.08 0.03431475 -0.02696952
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## cordla 0.05698435 0.04621428 0.06967537 -0.03487700 -0.04834478
## poular 0.05069547 0.04365081 0.05863749 -0.02049206 -0.02927255
## guetfo 0.03448175 0.01931246 0.05373860 -0.01667128 -0.03578316
## hassfl 0.04033905 0.02941897 0.05401958 -0.01642531 -0.02953543
## guatdu 0.03734490 0.02712929 0.04978271 -0.01462091 -0.02685836
## dendar 0.02488239 0.01324427 0.04088496 -0.01461449 -0.02980040
## ingago 0.05763903 0.03254419 0.09071360 -0.01456166 -0.04411174
## ade1tr 0.03419726 0.01974613 0.05190726 -0.01397463 -0.03181750
## crotbi 0.12683573 0.09363314 0.16586919 -0.01395228 -0.04021235
## lindla 0.03178011 0.01711979 0.05430895 -0.01323835 -0.03285840
##           uppermeanR
## cordla -0.0187489561
## poular -0.0113567733
## guetfo  0.0003932515
## hassfl -0.0035568766
## guatdu -0.0030587547
## dendar  0.0016811901
## ingago  0.0084852179
## ade1tr  0.0026606019
## crotbi  0.0055192781
## lindla  0.0056654981
```

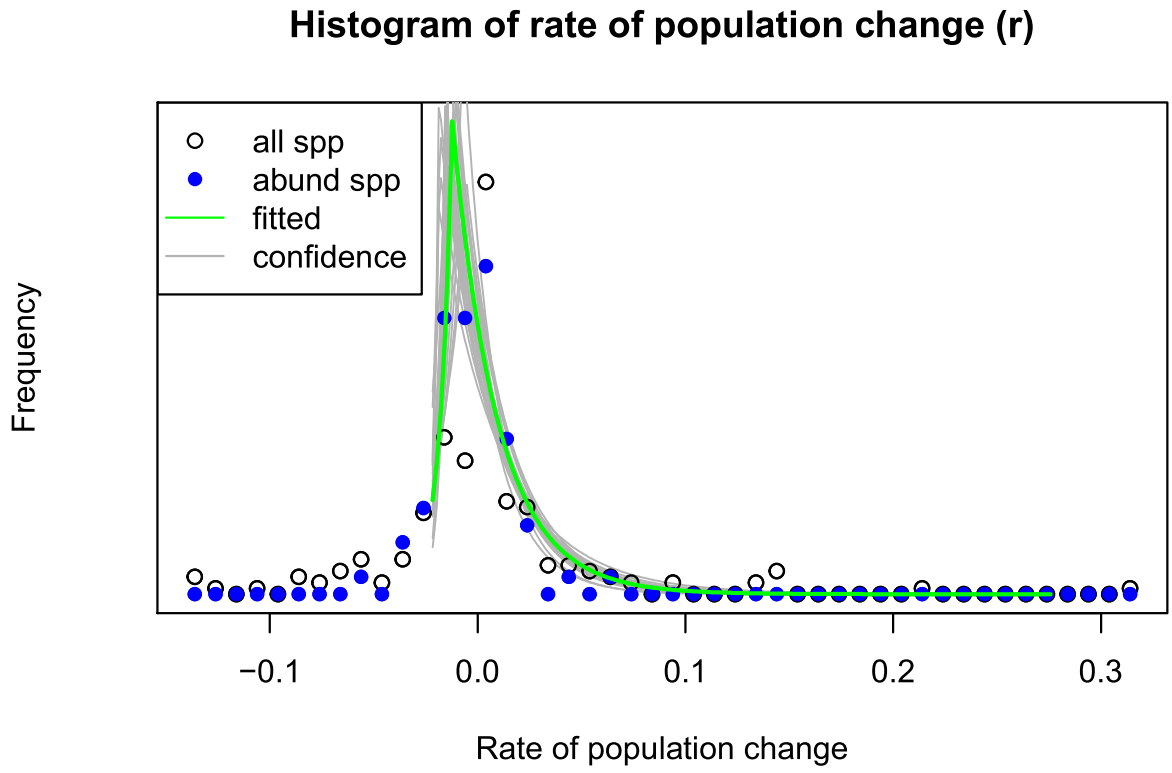
```
graph.abundmodel(mod.BCI$dbh100$census5.6)
```




```
## $Fastest_increases
##         N1  N2   S     time    date1    date2   mortrate   little.r
## cecrob  36  91  23 5.033945 14754.41 16593.09 0.08900071 0.18421745
## ochrpy   4   8   4 5.015743 14667.85 16504.19 0.00000000 0.13819433
## ingas1  40  56  36 5.025051 14759.18 16599.09 0.02096705 0.06695897
## tremin   3   6   3 5.028063 14786.89 16630.26 0.00000000 0.13785571
## cecrin 281 342 239 5.052661 14759.26 16600.49 0.03204077 0.03888171
## xyl1ma 160 193 151 5.042091 14759.02 16600.07 0.01148214 0.03719020
## olmeas  36  45  31 5.032389 14794.51 16633.14 0.02971387 0.04434148
## schipa   3   5   3 5.015195 14678.51 16516.78 0.00000000 0.10185558
## ingath  38  45  35 5.039699 14669.77 16509.43 0.01631806 0.03354890
## gar2in 112 128  98 5.044837 14756.57 16596.70 0.02646892 0.02646892
##           fitmort   lowermean  uppermean       fitr    lowermeanR
## cecrob 0.07683868 0.040531367 0.12163786 0.16356583  0.1287641437
## ochrpy 0.02612185 0.005661514 0.07162863 0.05693684  0.0014879167
## ingas1 0.02370896 0.009380828 0.04548008 0.05212981  0.0249904218
## tremin 0.02785803 0.006613410 0.07373687 0.04642170 -0.0049522546
## cecrin 0.03207471 0.023272865 0.04276220 0.03625918  0.0239645171
## xyl1ma 0.01345517 0.006919396 0.02219973 0.03458351  0.0211315647
## olmeas 0.03016820 0.012690662 0.05749502 0.02825039 -0.0008038154
## schipa 0.02766817 0.005870681 0.07860705 0.02643467 -0.0136429193
## ingath 0.02069644 0.007738476 0.04253154 0.02250380 -0.0023005724
## gar2in 0.02683238 0.015511316 0.04176471 0.02122794  0.0035666415
##        uppermeanR
## cecrob 0.19863367
## ochrpy 0.13142482
```

```
## ingas1 0.08190602
## tremin 0.11605204
## cecrin 0.04940682
## xyl1ma 0.05050075
## olmeas 0.06115663
## schipa 0.09007644
## ingath 0.05375887
## gar2in 0.04139185
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2   mortrate    little.r
## crotbi   80   50   33 5.017007 14732.36 16568.71 0.17650347 -0.09368208
## cordla  296  249  227 5.032230 14748.64 16586.79 0.05274191 -0.03435983
## pterro   68   52   47 5.033520 14728.63 16568.68 0.07338008 -0.05329551
## ast1st  185  160  160 5.035440 14754.62 16593.48 0.02883204 -0.02883204
## guarsp   61   48   46 5.044686 14747.26 16588.72 0.05594649 -0.04750997
## casear   93   77   73 5.048399 14733.91 16576.23 0.04796373 -0.03739682
## turpoc   53   42   39 5.036374 14751.64 16592.89 0.06090299 -0.04618844
## guatdu  221  194  179 5.033399 14739.83 16580.21 0.04187565 -0.02588798
## tri2tu 1569 1426 1360 5.044262 14767.59 16610.89 0.02833988 -0.01894532
## sympgl   27   20   20 5.040586 14774.63 16614.76 0.05953764 -0.05953764
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## crotbi 0.16345463 0.11765729 0.21775338 -0.03642982 -0.08883819
## cordla 0.05189490 0.04014573 0.06458074 -0.02795095 -0.04260608
## pterro 0.06724670 0.04310505 0.09844839 -0.02445143 -0.05842067
## ast1st 0.02884414 0.01913834 0.04116837 -0.02310963 -0.03517474
## guarsp 0.05094083 0.02927249 0.07985431 -0.02296373 -0.05323656
## casear 0.04582260 0.02853478 0.06672782 -0.02226158 -0.04690922
## turpoc 0.05537876 0.03130442 0.08820710 -0.02030513 -0.05165328
## guatdu 0.04128659 0.02957971 0.05397643 -0.01967352 -0.03381433
## tri2tu 0.02828262 0.02441424 0.03235149 -0.01828225 -0.02248458
## sympgl 0.05070114 0.02198824 0.09435791 -0.01756086 -0.05691272
##          uppermeanR
## crotbi -0.002529067
## cordla -0.012468015
## pterro  0.001195074
## ast1st -0.008629097
## guarsp  0.001875705
## casear -0.001920935
## turpoc  0.003923003
## guatdu -0.005388124
## tri2tu -0.014079352
## sympgl  0.011130930
```

```
graph.abundmodel(mod.BCI$dbh100$census6.7)
```

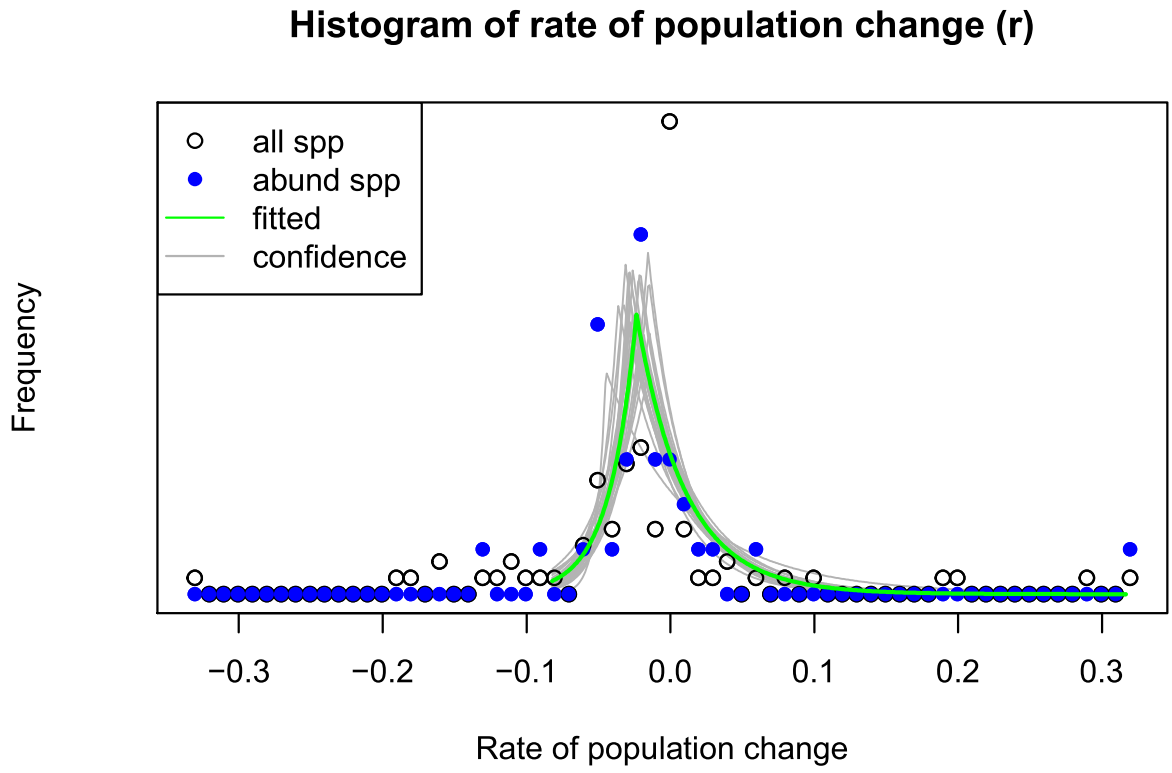



```
## $Fastest_increases
##        N1  N2  S     time    date1    date2   mortrate   little.r
## tremin  6  29  6 4.970225 16630.26 18441.88 0.00000000 0.31699500
## hampap 10  29  7 4.961695 16591.97 18404.46 0.07188571 0.21458611
## gar2ma  8  13  8 4.990049 16577.70 18392.54 0.00000000 0.09729520
## cecrob 91 125 65 5.017431 16593.09 18411.91 0.06706067 0.06327028
## protpa 39  54 35 4.970757 16557.77 18375.36 0.02177004 0.06546737
## cedrod  2   4  2 4.940452 16603.11 18414.04 0.00000000 0.14030036
## schipa  5   8  5 4.993498 16516.78 18335.10 0.00000000 0.09412313
## cuparu  2   4  1 4.983984 16567.98 18386.66 0.13907493 0.13907493
## ingaum 11  16  8 4.968335 16570.29 18386.06 0.06409668 0.07541631
## ingas1 56  70 48 4.967865 16599.09 18411.90 0.03102956 0.04491739
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## tremin 0.02415467 0.006251017 0.06493463 0.27594033  0.215996012
## hampap 0.04742509 0.014744055 0.10876396 0.17706380  0.121488630
## gar2ma 0.02178999 0.005876583 0.05266672 0.05866014  0.009513571
## cecrob 0.06240823 0.040899449 0.08885420 0.05537765  0.028806700
## protpa 0.02462969 0.009624442 0.04722438 0.05499014  0.026029008
## cedrod 0.02918686 0.006480014 0.07713454 0.04638197 -0.009759247
## schipa 0.02651107 0.006274192 0.06844196 0.04379113 -0.004714481
## cuparu 0.04691086 0.011023447 0.12187356 0.03841385 -0.013586722
## ingaum 0.04524832 0.015701457 0.10100818 0.03818329 -0.007642351
## ingas1 0.03055619 0.014767515 0.05318146 0.03703479  0.010242880
##        uppermeanR
## tremin 0.34136177
## hampap 0.23861173
```

```
## gar2ma 0.12150179
## cecrob 0.08215635
## protpa 0.08871186
## cedrod 0.13318173
## schipa 0.10859288
## cuparu 0.12780528
## ingaum 0.09952081
## ingas1 0.06751336
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2   mortrate    little.r
## casear   77   59   57 4.962996 16576.23 18389.34 0.06059932 -0.05365066
## hassfl  182  153  138 4.976820 16576.02 18392.89 0.05560841 -0.03487544
## cordla  249  214  194 4.966777 16586.79 18402.05 0.05025286 -0.03049802
## guatdu  194  167  157 4.992632 16580.21 18394.94 0.04238493 -0.03001710
## ocotwh  184  164  156 5.002581 16639.09 18451.77 0.03299892 -0.02300199
## tri2tu 1426 1313 1232 4.978334 16610.89 18423.44 0.02937418 -0.01658361
## poular  630  577  510 4.973434 16597.52 18411.38 0.04248757 -0.01766939
## eugeoe  187  166  141 4.971135 16589.28 18402.67 0.05679764 -0.02396250
## lindla   50   41   39 4.975186 16602.68 18416.75 0.04994011 -0.03988814
## micoar   71   58   46 4.970090 16583.45 18396.02 0.08733011 -0.04069079
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## casear 0.05627861 0.03408024 0.08356177 -0.02171847 -0.05522805
## hassfl 0.05393864 0.03952430 0.07124734 -0.02109532 -0.04031215
## cordla 0.04852159 0.03672520 0.06246287 -0.02060553 -0.03696526
## guatdu 0.04137851 0.02942838 0.05582441 -0.01964799 -0.03589174
## ocotwh 0.03265402 0.02159985 0.04539218 -0.01641650 -0.02836613
## tri2tu 0.02938866 0.02524242 0.03373912 -0.01563736 -0.02034426
## poular 0.04201689 0.03506600 0.05024303 -0.01519142 -0.02324979
## eugeoe 0.05521530 0.04092351 0.07164757 -0.01500726 -0.02997680
## lindla 0.04563542 0.02436880 0.07447973 -0.01500684 -0.04191721
## micoar 0.07931947 0.05164409 0.11500062 -0.01446604 -0.04059837
##           uppermeanR
## casear -0.0007586982
## hassfl -0.0055035529
## cordla -0.0079629330
## guatdu -0.0068056691
## ocotwh -0.0043822950
## tri2tu -0.0108592903
## poular -0.0075308853
## eugeoe -0.0015647389
## lindla  0.0073872305
## micoar  0.0068855170
```

LUQ - abund model graphic

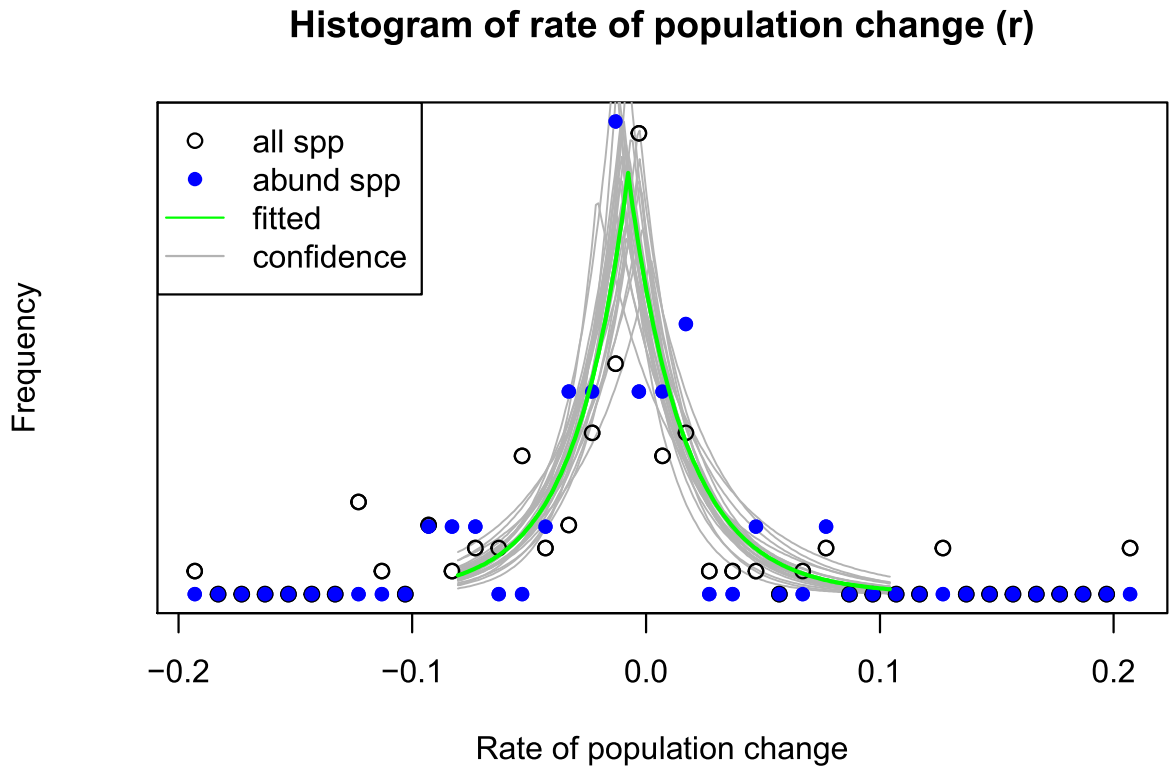
```
graph.abundmodel(mod.LUQ$dbh100$census1.2)
```




```
## $Fastest_increases
##          N1   N2    S     time    date1    date2   mortrate   little.r
## CECSCH  487 1251  435 2.965343 12119.89 13161.31 0.03807927 0.31815357
## TREMIC    3    7    3 2.945067 12153.73 13175.76 0.00000000 0.28770071
## PREMON 4569 5734 4311 4.172145 11622.55 13137.02 0.01393155 0.05443699
## ARDGLA    1    2    1 3.578371 11921.10 12979.09 0.00000000 0.19370467
## BEIPEN    1    2    1 3.479808 11624.50 12895.50 0.00000000 0.19919119
## SCHMOR  179  205  148 3.971032 12139.99 13197.36 0.04789020 0.03415338
## GUTCAR   43   50   39 4.034076 12027.04 13198.36 0.02420343 0.03738722
## SYMMAR    2    3    2 4.038330 12249.68 13353.76 0.00000000 0.10040416
## RONPOR    3    4    3 3.505133 11717.00 12902.57 0.00000000 0.08207450
## MELHER    6    7    6 3.719566 12112.21 13173.53 0.00000000 0.04144319
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## CECSCH 0.03804523 0.028352057 0.04875892 0.31680908  0.301109280
## TREMIC 0.03876942 0.006280338 0.12113060 0.14872499  0.025116315
## PREMON 0.01400531 0.012382334 0.01576164 0.05435588  0.050892189
## ARDGLA 0.04597297 0.007058903 0.14768336 0.04567080 -0.034228418
## BEIPEN 0.04737304 0.006914000 0.15499413 0.04553461 -0.032931923
## SCHMOR 0.04751855 0.033337635 0.06622422 0.03099655  0.011142475
## GUTCAR 0.02799084 0.010473567 0.05613460 0.03077415 -0.001457638
## SYMMAR 0.04102452 0.005776484 0.13154515 0.02827229 -0.039523555
## RONPOR 0.03795912 0.006582998 0.11728916 0.02384209 -0.036540896
## MELHER 0.03049086 0.006240877 0.08757870 0.01624851 -0.034261116
##        uppermeanR
## CECSCH 0.33232038
## TREMIC 0.29945140
```

```
## PREMON 0.05775720
## ARDGLA 0.18251291
## BEIPEN 0.18157141
## SCHMOR 0.05249636
## GUTCAR 0.07103558
## SYMMAR 0.13531329
## RONPOR 0.12307109
## MELHER 0.10164564
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## MYRSPL  54  30  28 4.356898 12052.67 13201.45 0.15074474 -0.13490943
## CHIDOM 129  86  85 4.347644 11767.40 13094.29 0.09595109 -0.09326088
## CASSYL 216 166 151 4.179053 12077.17 13171.81 0.08566500 -0.06300246
## CASARB 983 799 683 4.228518 12062.57 13242.96 0.08610918 -0.04901201
## SAPLAU 121  95  93 4.379493 11833.49 13107.03 0.06009624 -0.05523782
## ORMKRU 104  82  78 4.346262 11821.97 13148.56 0.06619069 -0.05468415
## INGVER  62  49  48 4.405123 11925.13 13114.57 0.05809902 -0.05341827
## MICTET  55  44  40 4.264272 11903.63 13108.96 0.07467950 -0.05232864
## FICAME   9   2   2 4.481862 11658.50 13155.00 0.33559210 -0.33559210
## OCOSIN  54  44  44 4.374832 11969.51 13174.84 0.04681195 -0.04681195
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## MYRSPL 0.13965466 0.08880422 0.19620058 -0.08222671 -0.14925307
## CHIDOM 0.09283301 0.06735289 0.12153496 -0.07873974 -0.10939221
## CASSYL 0.08412482 0.06488734 0.10665718 -0.05492426 -0.07649997
## CASARB 0.08581904 0.07619954 0.09590904 -0.04741778 -0.05780003
## SAPLAU 0.05875083 0.04065196 0.08231195 -0.04604317 -0.06723269
## ORMKRU 0.06454093 0.04335436 0.09194982 -0.04461073 -0.07066164
## INGVER 0.05576572 0.03175052 0.08775111 -0.03952478 -0.06792261
## MICTET 0.06920347 0.04054719 0.10798235 -0.03626467 -0.07043987
## FICAME 0.20872004 0.07803491 0.44021128 -0.03551489 -0.13350156
## OCOSIN 0.04610278 0.02475252 0.07625498 -0.03500915 -0.06130308
##          uppermeanR
## MYRSPL -0.017300890
## CHIDOM -0.039647752
## CASSYL -0.031095812
## CASARB -0.036544651
## SAPLAU -0.020645872
## ORMKRU -0.017307153
## INGVER -0.008182008
## MICTET -0.002749540
## FICAME  0.028265596
## OCOSIN -0.004520282
```

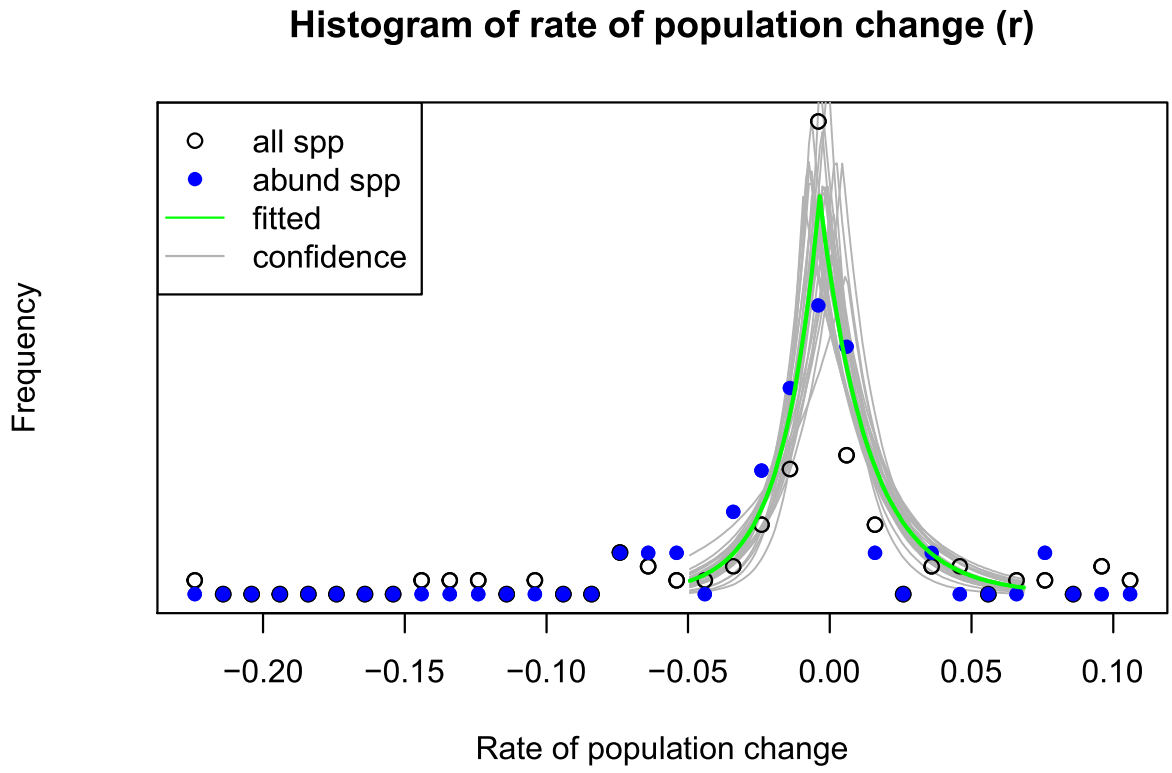
```
graph.abundmodel(mod.LUQ$dbh100$census2.3)
```




```
## $Fastest_increases
##          N1   N2    S     time    date1    date2   mortrate   little.r
## FAROCC    2    6    2 5.408624 13291.48 15256.49 0.00000000 0.20312232
## SCHMOR  205  317  140 5.499584 13197.36 15240.80 0.06934480 0.07925905
## HENFAS    1    3    1 5.378964 13142.71 15182.10 0.00000000 0.20424235
## PREMON 5734 7227 5284 5.483174 13137.02 15141.93 0.01490560 0.04220377
## ARTALT    1    2    1 5.382615 13097.17 15060.22 0.00000000 0.12877518
## GUAULM    1    2    1 5.574264 13193.00 15229.00 0.00000000 0.12434774
## IXOFER    8   10    8 5.560849 12990.31 15011.10 0.00000000 0.04012761
## CECSCH 1251 1398  921 5.481160 13161.31 15187.34 0.05587111 0.02026933
## HIBTIL    2    3    2 5.725759 13321.44 15408.62 0.00000000 0.07081422
## CSSGUI    2    3    2 5.628109 12949.20 14969.23 0.00000000 0.07204287
##           fitmort   lowermean  uppermean       fitr   lowermeanR
## FAROCC 0.03568721 0.005552969 0.10753610 0.10526615  0.021290600
## SCHMOR 0.06854732 0.052370198 0.08647382 0.07610207  0.059219366
## HENFAS 0.04251037 0.006167238 0.14669607 0.06925858 -0.008682793
## PREMON 0.01493132 0.013565339 0.01634058 0.04212655  0.039853052
## ARTALT 0.04326775 0.006101328 0.14607515 0.02566497 -0.033864220
## GUAULM 0.04358466 0.006196252 0.14302908 0.02447706 -0.030849066
## IXOFER 0.02218604 0.004307176 0.06041721 0.02013277 -0.015685033
## CECSCH 0.05575327 0.049767417 0.06197558 0.01967605  0.012846989
## HIBTIL 0.03459161 0.005100071 0.11373952 0.01809525 -0.029277502
## CSSGUI 0.03632821 0.006123726 0.11819044 0.01777743 -0.028982637
##        uppermeanR
## FAROCC 0.20923025
## SCHMOR 0.09301530
```

```
## HENFAS 0.19188412
## PREMON 0.04459373
## ARTALT 0.11721033
## GUAULM 0.11384076
## IXOFER 0.07272384
## CECSCH 0.02647079
## HIBTIL 0.09376401
## CSSGUI 0.08711043
##
## $Biggest_losses
##         N1  N2  S     time    date1    date2   mortrate    little.r
## CHIDOM  86  51 50 5.528161 13094.29 15108.44 0.09810211 -0.09451997
## SAPLAU  95  59 55 5.491465 13107.03 15114.64 0.09952603 -0.08674178
## ORMKRU  82  54 49 5.526556 13148.56 15183.28 0.09316813 -0.07558689
## OCOSIN  44  27 25 5.425885 13174.84 15172.00 0.10418832 -0.09000427
## MYRSPL  30  16 12 5.515803 13201.45 15191.29 0.16612100 -0.11396503
## MICTET  44  27 23 5.491786 13108.96 15089.29 0.11812102 -0.08892421
## BYRSPI 130 103 92 5.590847 13229.85 15245.29 0.06184142 -0.04164047
## TREMIC   7   0  0 5.430723 13175.76 15149.18        Inf        -Inf
## CROPOE  95  78 75 5.534230 12904.46 14939.88 0.04271394 -0.03562701
## CALSQU   6   2  2 5.547798 12860.55 14894.16 0.19802672 -0.19802672
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## CHIDOM 0.09467173 0.06505840 0.12761369 -0.08045813 -0.11431150
## SAPLAU 0.09713548 0.06957772 0.13084191 -0.07429042 -0.10680274
## ORMKRU 0.08890037 0.06115280 0.12325234 -0.06163908 -0.09471971
## OCOSIN 0.09610287 0.05760554 0.14452044 -0.06101302 -0.11097164
## MYRSPL 0.14840216 0.08665808 0.22727530 -0.05959844 -0.13172011
## MICTET 0.10973417 0.06842292 0.16222056 -0.05846071 -0.10853144
## BYRSPI 0.06071094 0.04320131 0.08116339 -0.03546201 -0.05576352
## TREMIC 0.34262824 0.11202416 0.87907071 -0.03461318 -0.14976937
## CROPOE 0.04224946 0.02624332 0.06212319 -0.02982197 -0.04846713
## CALSQU 0.12271502 0.03747527 0.27488525 -0.02795858 -0.13310400
##          uppermeanR
## CHIDOM -0.040054112
## SAPLAU -0.038820689
## ORMKRU -0.023127526
## OCOSIN -0.008345553
## MYRSPL -0.001559713
## MICTET -0.005935855
## BYRSPI -0.013286707
## TREMIC  0.027154824
## CROPOE -0.008026097
## CALSQU  0.032794111
```

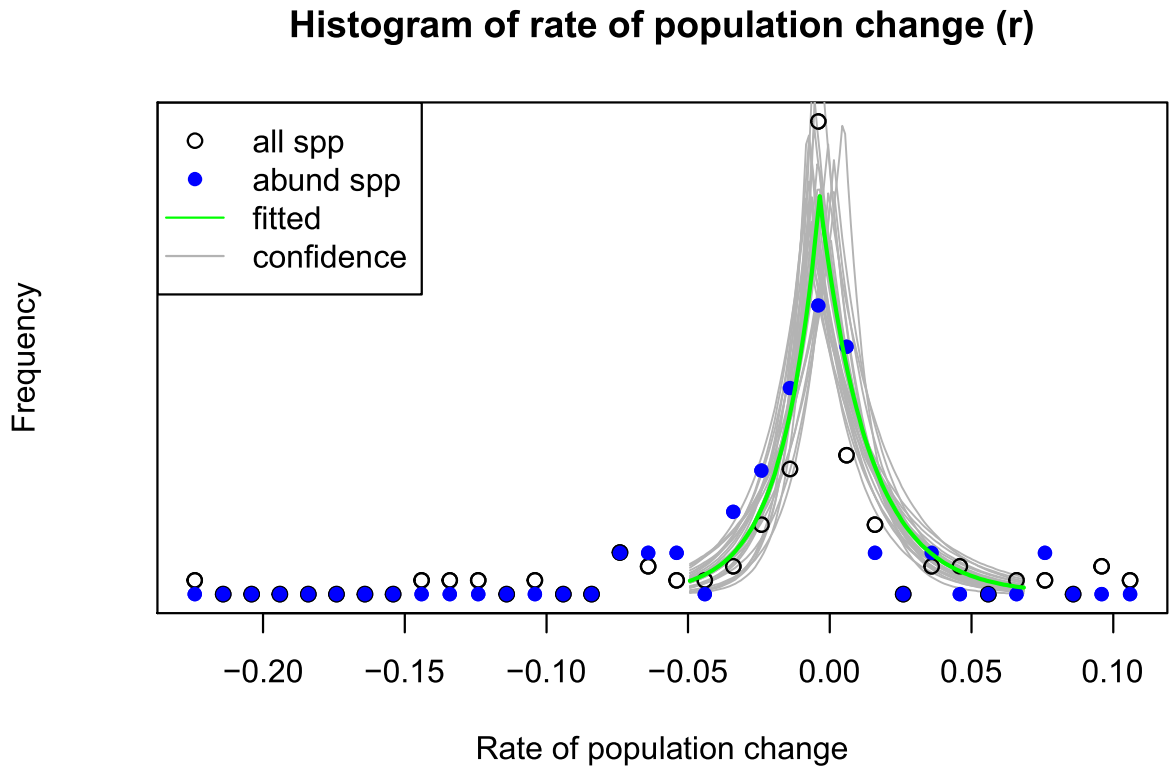
```
graph.abundmodel(mod.LUQ$dbh100$census3.4)
```




```
## $Fastest_increases
##          N1   N2    S     time    date1    date2    mortrate   little.r
## SCHMOR  317  453  284 5.021939 15240.80 17102.17 0.021889459 0.07108615
## MELHER    7   12    7 5.014602 15189.69 17062.30 0.000000000 0.10748540
## HIRRUG   15   21   13 5.283338 15039.39 16954.22 0.027085310 0.06368554
## HENFAS    3    5    3 5.108282 15182.10 17048.91 0.000000000 0.09999950
## CSSGUI    3    5    3 5.345927 14969.23 16923.75 0.000000000 0.09555416
## LAEPRO   58   69   56 5.105282 15215.01 17070.33 0.006873532 0.03401644
## INGVER   43   51   39 5.180462 15136.91 17027.66 0.018847445 0.03293635
## PREMON 7185 7950 6835 5.158428 15141.92 17023.16 0.009681059 0.01961381
## MYRLEP    4    5    4 5.384257 14973.24 16913.83 0.000000000 0.04144370
## EUGSTA   37   40   35 5.283596 14972.20 16924.60 0.010517431 0.01475539
##            fitmort   lowermean  uppermean       fitr   lowermeanR
## SCHMOR 0.021807447 0.015449958 0.02904061 0.06876998  0.057549164
## MELHER 0.018121272 0.002573419 0.05597809 0.05979204  0.010629869
## HIRRUG 0.027049091 0.006410636 0.06691644 0.03702845  0.000244157
## HENFAS 0.023728012 0.002890204 0.07962842 0.03342174 -0.011806804
## CSSGUI 0.021453117 0.002777142 0.07156937 0.03262141 -0.009876512
## LAEPRO 0.010398868 0.002903641 0.02282979 0.02902257  0.011638662
## INGVER 0.019871725 0.006908154 0.04023662 0.02415781  0.001730420
## PREMON 0.009695467 0.008696323 0.01074660 0.01960009  0.017813288
## MYRLEP 0.021765170 0.002766954 0.06947364 0.01146133 -0.016119222
## EUGSTA 0.014611056 0.003976367 0.03294834 0.01054070 -0.006667521
##        uppermeanR
## SCHMOR 0.08087441
## MELHER 0.11845216
```

```
## HIRRUG 0.08590907
## HENFAS 0.10270050
## CSSGUI 0.09671445
## LAEPRO 0.04993152
## INGVER 0.05187364
## PREMON 0.02133182
## MYRLEP 0.05730806
## EUGSTA 0.03565863
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## CASSYL 138  99  86 5.134667 15162.11 17036.00 0.09210069 -0.06468459
## ORMKRU  54  37  37 5.170685 15183.28 17053.89 0.07311723 -0.07311723
## OCOLEU 120  99  92 5.065304 15205.88 17054.05 0.05245552 -0.03797835
## CHIDOM  51  39  37 5.280694 15108.44 17008.10 0.06076999 -0.05080089
## CROPOE  78  65  64 5.423544 14939.88 16907.84 0.03647537 -0.03361668
## TABHET 264 237 236 5.071027 15173.55 17038.67 0.02210939 -0.02127557
## DRYGLA 135 120 114 5.347333 15041.53 16967.35 0.03161881 -0.02202650
## CORSUL 130 118 116 5.197395 15165.73 17029.51 0.02192334 -0.01863430
## CYRRAC  13   9   9 5.380087 14938.73 16897.44 0.06834922 -0.06834922
## FICCIT  12   8   7 5.266993 15115.87 16998.86 0.10233476 -0.07698227
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## CASSYL 0.08963123 0.06539579 0.11593662 -0.04937618 -0.07863301
## ORMKRU 0.06863833 0.04024006 0.10475248 -0.04148318 -0.08372967
## OCOLEU 0.05075900 0.03329204 0.07047999 -0.02753518 -0.05017849
## CHIDOM 0.05593067 0.03170416 0.09122755 -0.02688559 -0.05950886
## CROPOE 0.03542549 0.02072746 0.05627675 -0.02346734 -0.04333632
## TABHET 0.02202603 0.01474988 0.03103540 -0.01886882 -0.02718028
## DRYGLA 0.03107289 0.02010941 0.04478650 -0.01688805 -0.03106323
## CORSUL 0.02185361 0.01233451 0.03411587 -0.01433517 -0.02574709
## CYRRAC 0.05684364 0.01855945 0.12145784 -0.01354417 -0.06429140
## FICCIT 0.07600013 0.02680328 0.15830870 -0.01331931 -0.06597318
##           uppermeanR
## CASSYL -1.859090e-02
## ORMKRU  5.913653e-05
## OCOLEU -3.525328e-03
## CHIDOM  3.611448e-03
## CROPOE -7.835789e-04
## TABHET -7.782874e-03
## DRYGLA -1.322977e-03
## CORSUL -2.420609e-04
## CYRRAC  2.661783e-02
## FICCIT  2.265815e-02
```

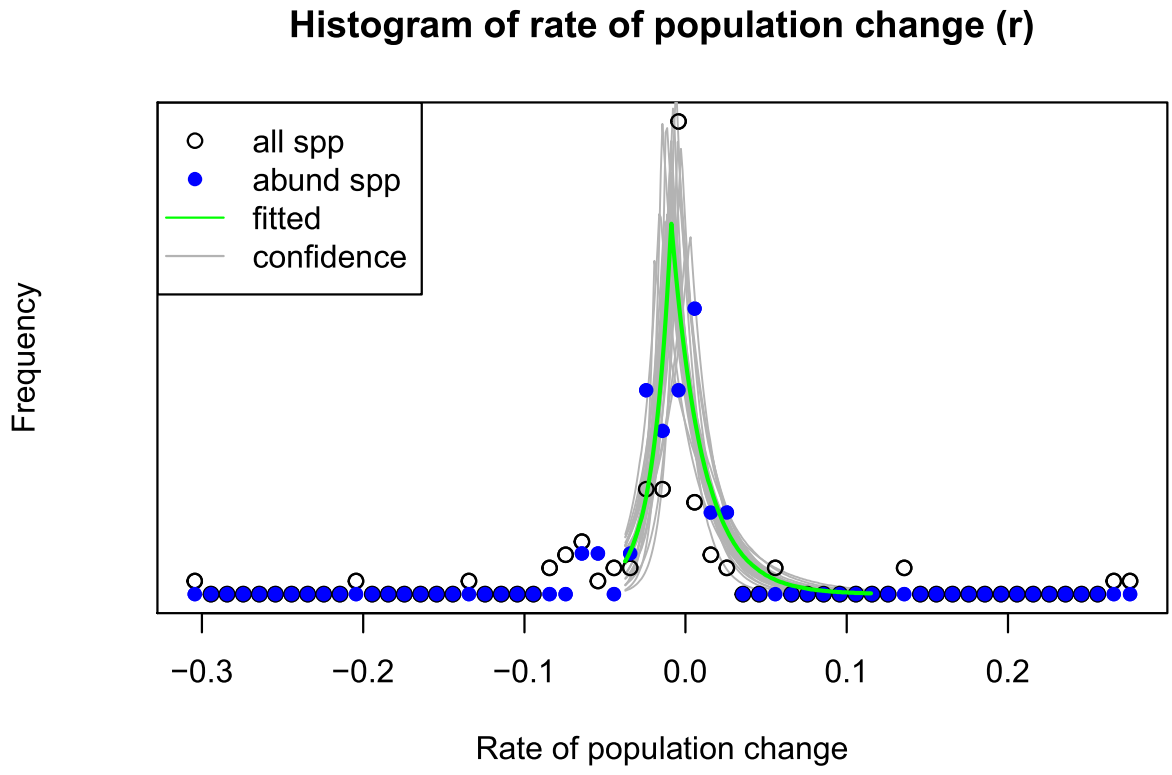
```
graph.abundmodel(mod.LUQ$dbh100$census3.4)
```




```
## $Fastest_increases
##          N1   N2    S     time    date1    date2    mortrate   little.r
## SCHMOR  317  453  284 5.021939 15240.80 17102.17 0.021889459 0.07108615
## MELHER    7   12    7 5.014602 15189.69 17062.30 0.000000000 0.10748540
## HIRRUG   15   21   13 5.283338 15039.39 16954.22 0.027085310 0.06368554
## HENFAS    3    5    3 5.108282 15182.10 17048.91 0.000000000 0.09999950
## CSSGUI    3    5    3 5.345927 14969.23 16923.75 0.000000000 0.09555416
## LAEPRO   58   69   56 5.105282 15215.01 17070.33 0.006873532 0.03401644
## INGVER   43   51   39 5.180462 15136.91 17027.66 0.018847445 0.03293635
## PREMON 7185 7950 6835 5.158428 15141.92 17023.16 0.009681059 0.01961381
## MYRLEP    4    5    4 5.384257 14973.24 16913.83 0.000000000 0.04144370
## EUGSTA   37   40   35 5.283596 14972.20 16924.60 0.010517431 0.01475539
##            fitmort   lowermean  uppermean       fitr   lowermeanR
## SCHMOR 0.021807447 0.015449958 0.02904061 0.06876998  0.057549164
## MELHER 0.018121272 0.002573419 0.05597809 0.05979204  0.010629869
## HIRRUG 0.027049091 0.006410636 0.06691644 0.03702845  0.000244157
## HENFAS 0.023728012 0.002890204 0.07962842 0.03342174 -0.011806804
## CSSGUI 0.021453117 0.002777142 0.07156937 0.03262141 -0.009876512
## LAEPRO 0.010398868 0.002903641 0.02282979 0.02902257  0.011638662
## INGVER 0.019871725 0.006908154 0.04023662 0.02415781  0.001730420
## PREMON 0.009695467 0.008696323 0.01074660 0.01960009  0.017813288
## MYRLEP 0.021765170 0.002766954 0.06947364 0.01146133 -0.016119222
## EUGSTA 0.014611056 0.003976367 0.03294834 0.01054070 -0.006667521
##        uppermeanR
## SCHMOR 0.08087441
## MELHER 0.11845216
```

```
## HIRRUG 0.08590907
## HENFAS 0.10270050
## CSSGUI 0.09671445
## LAEPRO 0.04993152
## INGVER 0.05187364
## PREMON 0.02133182
## MYRLEP 0.05730806
## EUGSTA 0.03565863
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2   mortrate    little.r
## CASSYL 138  99  86 5.134667 15162.11 17036.00 0.09210069 -0.06468459
## ORMKRU  54  37  37 5.170685 15183.28 17053.89 0.07311723 -0.07311723
## OCOLEU 120  99  92 5.065304 15205.88 17054.05 0.05245552 -0.03797835
## CHIDOM  51  39  37 5.280694 15108.44 17008.10 0.06076999 -0.05080089
## CROPOE  78  65  64 5.423544 14939.88 16907.84 0.03647537 -0.03361668
## TABHET 264 237 236 5.071027 15173.55 17038.67 0.02210939 -0.02127557
## DRYGLA 135 120 114 5.347333 15041.53 16967.35 0.03161881 -0.02202650
## CORSUL 130 118 116 5.197395 15165.73 17029.51 0.02192334 -0.01863430
## CYRRAC  13   9   9 5.380087 14938.73 16897.44 0.06834922 -0.06834922
## FICCIT  12   8   7 5.266993 15115.87 16998.86 0.10233476 -0.07698227
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## CASSYL 0.08963123 0.06539579 0.11593662 -0.04937618 -0.07863301
## ORMKRU 0.06863833 0.04024006 0.10475248 -0.04148318 -0.08372967
## OCOLEU 0.05075900 0.03329204 0.07047999 -0.02753518 -0.05017849
## CHIDOM 0.05593067 0.03170416 0.09122755 -0.02688559 -0.05950886
## CROPOE 0.03542549 0.02072746 0.05627675 -0.02346734 -0.04333632
## TABHET 0.02202603 0.01474988 0.03103540 -0.01886882 -0.02718028
## DRYGLA 0.03107289 0.02010941 0.04478650 -0.01688805 -0.03106323
## CORSUL 0.02185361 0.01233451 0.03411587 -0.01433517 -0.02574709
## CYRRAC 0.05684364 0.01855945 0.12145784 -0.01354417 -0.06429140
## FICCIT 0.07600013 0.02680328 0.15830870 -0.01331931 -0.06597318
##           uppermeanR
## CASSYL -1.859090e-02
## ORMKRU  5.913653e-05
## OCOLEU -3.525328e-03
## CHIDOM  3.611448e-03
## CROPOE -7.835789e-04
## TABHET -7.782874e-03
## DRYGLA -1.322977e-03
## CORSUL -2.420609e-04
## CYRRAC  2.661783e-02
## FICCIT  2.265815e-02
```

```
graph.abundmodel(mod.LUQ$dbh100$census4.5)
```

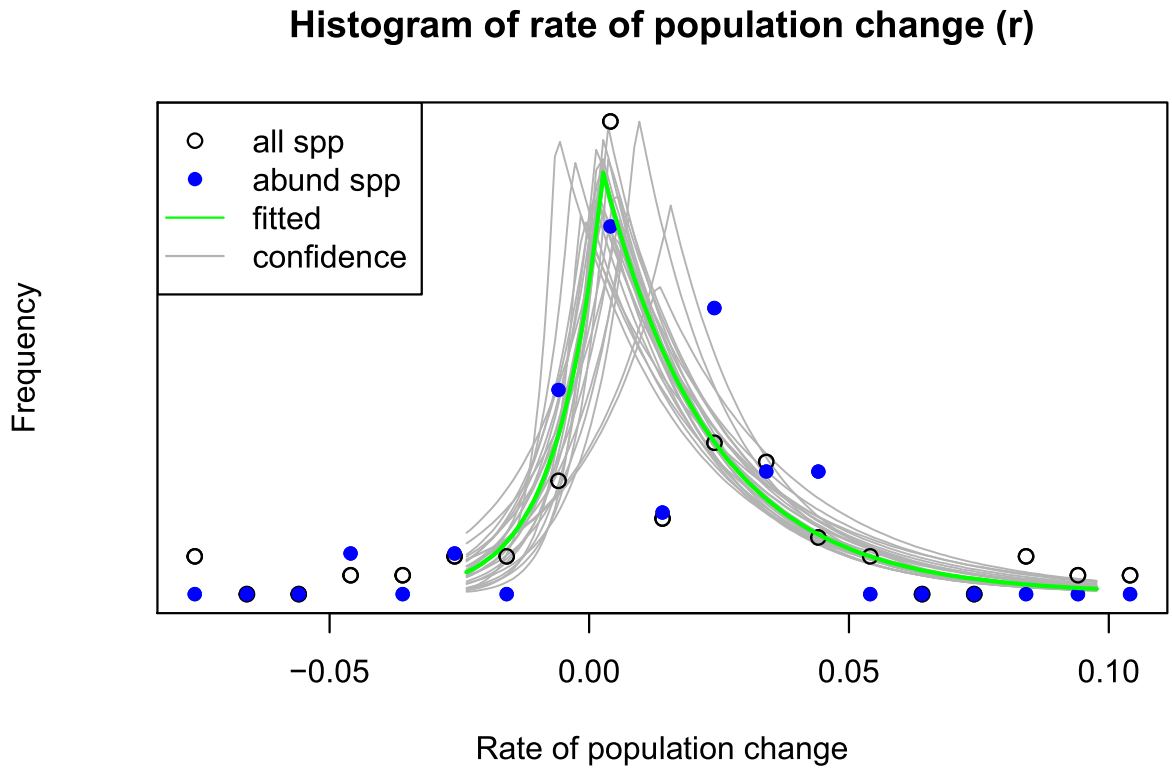



```
## $Fastest_increases
##         N1  N2   S     time    date1    date2    mortrate   little.r
## HIBTIL   1   4   1 5.083504 17162.84 19040.41 0.000000000 0.27270447
## CLUROS   1   4   1 5.168150 17060.93 18963.68 0.000000000 0.26823804
## MELHER  12  16  11 5.145388 17062.30 18965.54 0.016910557 0.05591067
## SWIMAC   1   2   1 5.301848 16974.29 18913.75 0.000000000 0.13073690
## CINMON   1   2   1 5.215606 17113.14 19019.60 0.000000000 0.13289869
## SCHMOR 453 507 420 5.215738 17102.17 18980.64 0.014501767 0.02159213
## ALCFLO  65  73  61 5.234344 17041.63 18941.59 0.012133976 0.02217511
## CHOVEN   3   4   3 5.336071 17008.36 18917.73 0.000000000 0.05391271
## LAEPRO  69  75  65 5.230577 17070.33 18980.71 0.011417331 0.01594119
## TETBAL 135 143 134 5.282322 16969.15 18900.52 0.001407521 0.01089859
##            fitmort   lowermean   uppermean       fitr   lowermeanR
## HIBTIL 0.025519705 0.003241663 0.094485607 0.11561988  0.020509505
## CLUROS 0.026791138 0.003686864 0.095099194 0.11427348  0.021420379
## MELHER 0.021322840 0.004658593 0.056900148 0.03172283 -0.004667264
## SWIMAC 0.024760686 0.003728984 0.084612802 0.02851173 -0.019028257
## CINMON 0.025141467 0.003462966 0.083178535 0.02750299 -0.016763603
## SCHMOR 0.014650663 0.010442560 0.020166624 0.02087674  0.013308105
## ALCFLO 0.013981159 0.005133863 0.026772260 0.01826566  0.002176577
## CHOVEN 0.021848691 0.003398247 0.067985431 0.01474613 -0.018742085
## LAEPRO 0.013112411 0.004778268 0.025860609 0.01363351 -0.002216592
## TETBAL 0.004549075 0.001384032 0.009580967 0.01041650  0.002471745
##        uppermeanR
## HIBTIL 0.22249591
## CLUROS 0.22247419
```

```
## MELHER 0.07879847
## SWIMAC 0.10440330
## CINMON 0.10169597
## SCHMOR 0.02995921
## ALCFLO 0.04039165
## CHOVEN 0.07232994
## LAEPRO 0.03398779
## TETBAL 0.02135963
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2   mortrate    little.r
## CASSYL   99   72   60 5.249644 17036.00 18949.67 0.09539224 -0.06066197
## CROPOE   65   49   49 5.300479 16907.84 18852.77 0.05330970 -0.05330970
## TABHET  237  196  194 5.237039 17038.67 18951.25 0.03822809 -0.03626963
## CECSCH 1418 1222 1176 5.235083 17057.00 18962.71 0.03574510 -0.02841570
## OCOSIN   24   17   17 5.289756 17043.39 18956.71 0.06519025 -0.06519025
## MATDOM  193  172  170 5.303947 16934.08 18867.54 0.02392402 -0.02171887
## CHIDOM   39   32   27 5.306577 17008.10 18925.95 0.06929604 -0.03727935
## DRYGLA  120  107  104 5.290218 16967.35 18893.61 0.02705009 -0.02167452
## MYRSPL   17   12   11 5.203438 17052.53 18962.83 0.08365971 -0.06693781
## OCOLEU   99   89   81 5.231496 17054.05 18965.33 0.03835819 -0.02035431
##           fitmort  lowermean  uppermean        fitr  lowermeanR
## CASSYL 0.09041989 0.06223507 0.12158958 -0.03736467 -0.07215889
## CROPOE 0.04991460 0.02961003 0.07701698 -0.03205158 -0.06173947
## TABHET 0.03762194 0.02707516 0.04942597 -0.03160925 -0.04371777
## CECSCH 0.03561384 0.03120475 0.04005805 -0.02776412 -0.03240621
## OCOSIN 0.05488183 0.02328753 0.10137244 -0.02268219 -0.06883838
## MATDOM 0.02374832 0.01527869 0.03439175 -0.01828582 -0.02782751
## CHIDOM 0.06218824 0.03152506 0.10346664 -0.01719521 -0.05001643
## DRYGLA 0.02683900 0.01616575 0.04050899 -0.01667297 -0.02963116
## MYRSPL 0.06365612 0.02356420 0.12465417 -0.01596053 -0.06287318
## OCOLEU 0.03663006 0.02165018 0.05628994 -0.01433706 -0.03204899
##          uppermeanR
## CASSYL -0.006249100
## CROPOE -0.002805075
## TABHET -0.017005612
## CECSCH -0.022505310
## OCOSIN  0.011924333
## MATDOM -0.006316796
## CHIDOM  0.009916966
## DRYGLA -0.001353612
## MYRSPL  0.019441391
## OCOLEU  0.002432903
```

FUSHAN - abund model graphic

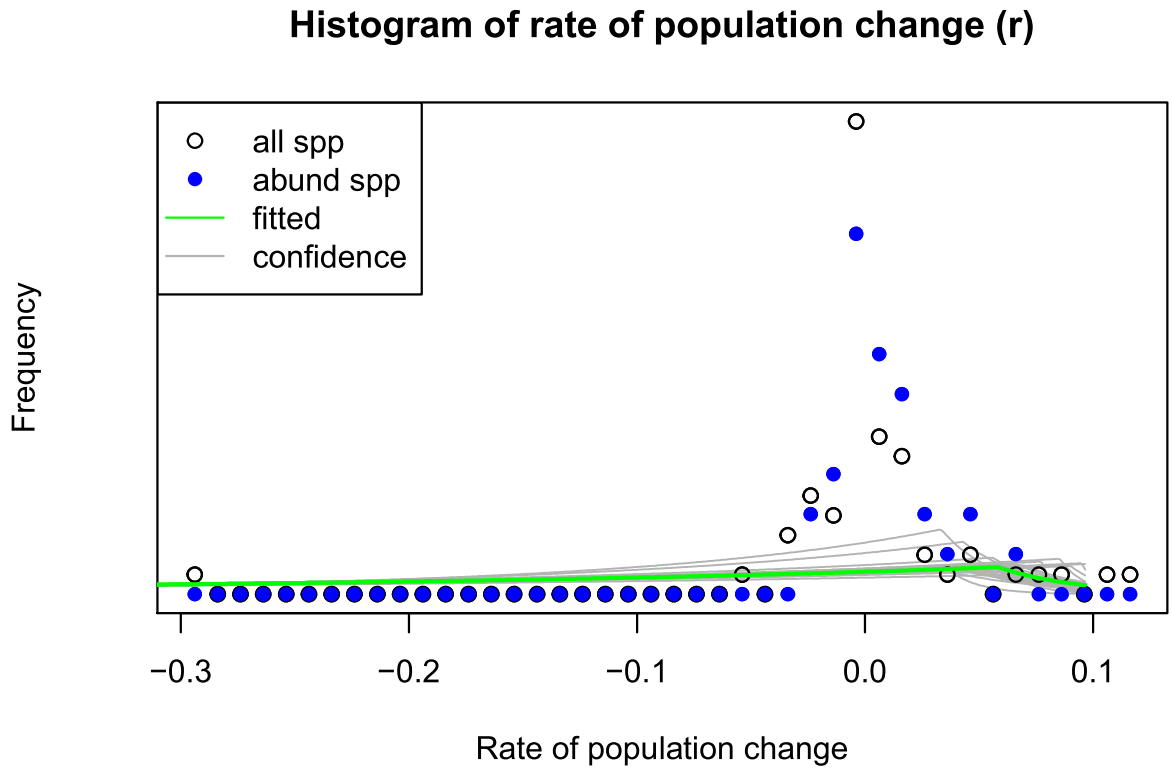
```
graph.abundmodel(mod.FS$dbh100$census1.2)
```




```
## $Fastest_increases
##         N1  N2   S     time    date1    date2    mortrate   little.r
## ELAESY  49  81  46 4.668296 12406.89 14134.31 0.013533610 0.10766858
## CINNAU  14  21  13 4.587518 12451.43 14152.21 0.016154263 0.08838442
## HELIFO 763 944 643 4.632019 12461.39 14165.24 0.036941407 0.04595580
## RANDCO 135 166 131 4.603050 12533.97 14198.29 0.006534244 0.04490783
## SYMPGL  47  60  39 4.614688 12481.87 14181.79 0.040433062 0.05291733
## PASAHR  54  65  50 4.577250 12562.09 14232.16 0.016813816 0.04050537
## PRUNPH 270 316 249 4.572423 12506.58 14182.31 0.017708129 0.03440632
## GLOCAC 447 520 397 4.597229 12510.62 14193.41 0.025803005 0.03290465
## MYRSSE 392 449 370 4.458732 12560.96 14199.44 0.012954093 0.03044835
## ARCHLU   2   3   2 4.768880 12577.84 14286.13 0.000000000 0.08502314
##            fitmort   lowermean  uppermean       fitr   lowermeanR
## ELAESY 0.014216979 0.004680829 0.03107127 0.09796137  0.071523324
## CINNAU 0.016736060 0.003384327 0.04392064 0.06141485  0.022900577
## HELIFO 0.036486406 0.030053124 0.04321708 0.04513745  0.035969173
## RANDCO 0.007990338 0.003260879 0.01489560 0.04267910  0.028258246
## SYMPGL 0.033593325 0.015327893 0.06003989 0.04117391  0.012399851
## PASAHR 0.016071777 0.005852139 0.03255529 0.03352898  0.012201278
## PRUNPH 0.017362511 0.011025119 0.02498334 0.03280178  0.020940111
## GLOCAC 0.025392370 0.018838727 0.03319662 0.03156316  0.021569982
## MYRSSE 0.013098343 0.008250805 0.01882960 0.02952048  0.020059637
## ARCHLU 0.017191647 0.002746558 0.05977272 0.02862057 -0.004360743
##        uppermeanR
## ELAESY 0.13019781
## CINNAU 0.11357991
```

```
## HELIFO 0.05470089
## RANDCO 0.05975324
## SYMPGL 0.07723714
## PASAHR 0.06076370
## PRUNPH 0.04618408
## GLOCAC 0.04193824
## MYRSSE 0.04022794
## ARCHLU 0.08843524
##
## $Biggest_losses
##          N1   N2    S     time    date1    date2    mortrate      little.r
## CYATSP  126  100   86 4.609469 12556.25 14236.41 0.082858692 -0.0501384642
## PYRESH 1980 1791 1697 4.637138 12509.81 14181.30 0.033260789 -0.0216346219
## MACHZU  168  163  155 4.650442 12443.12 14164.69 0.017318540 -0.0064969695
## LIMLUR 1281 1274 1235 4.630810 12501.61 14187.00 0.007897119 -0.0011832630
## ILEXFO   71   68   62 4.697334 12453.81 14148.55 0.028855833 -0.0091907815
## SYMPSE   24   22   21 4.540780 12489.38 14153.50 0.029407147 -0.0191622081
## MELISQ 1906 1913 1836 4.617236 12513.70 14192.86 0.008103876  0.0007939566
## LAGESU   97   96   92 4.705173 12433.96 14161.07 0.011247706 -0.0022024243
## MACHTH 1289 1299 1243 4.599477 12519.82 14200.00 0.007900661  0.0016801938
## GORDAX   27   26   26 4.540472 12522.46 14191.56 0.008311983 -0.0083119834
##            fitmort   lowermean  uppermean          fitr   lowermeanR
## CYATSP 0.077514615 0.054581598 0.10263667 -0.0236516596 -0.056516263
## PYRESH 0.033105415 0.029476053 0.03702540 -0.0208863153 -0.025185617
## MACHZU 0.016904026 0.009304299 0.02703119 -0.0025092166 -0.013233624
## LIMLUR 0.008064639 0.005871686 0.01054800 -0.0007887633 -0.003670271
## ILEXFO 0.026342942 0.012303857 0.04721923 -0.0004974328 -0.017727034
## SYMPSE 0.023018712 0.006743929 0.05155431  0.0003236917 -0.024691342
## MELISQ 0.008202632 0.006483980 0.01018051  0.0009881166 -0.001548990
## LAGESU 0.011939335 0.004794149 0.02245698  0.0015209793 -0.009236981
## MACHTH 0.008048545 0.005927789 0.01045090  0.0019609664 -0.001122759
## GORDAX 0.012502270 0.002816058 0.03151556  0.0020892704 -0.015667893
##          uppermeanR
## CYATSP  0.005869977
## PYRESH -0.016341585
## MACHZU  0.008914174
## LIMLUR  0.002762495
## ILEXFO  0.018491872
## SYMPSE  0.026890522
## MELISQ  0.003851197
## LAGESU  0.016457260
## MACHTH  0.005515637
## GORDAX  0.026363134
```

```
graph.abundmodel(mod.FS$dbh100$census2.3)
```

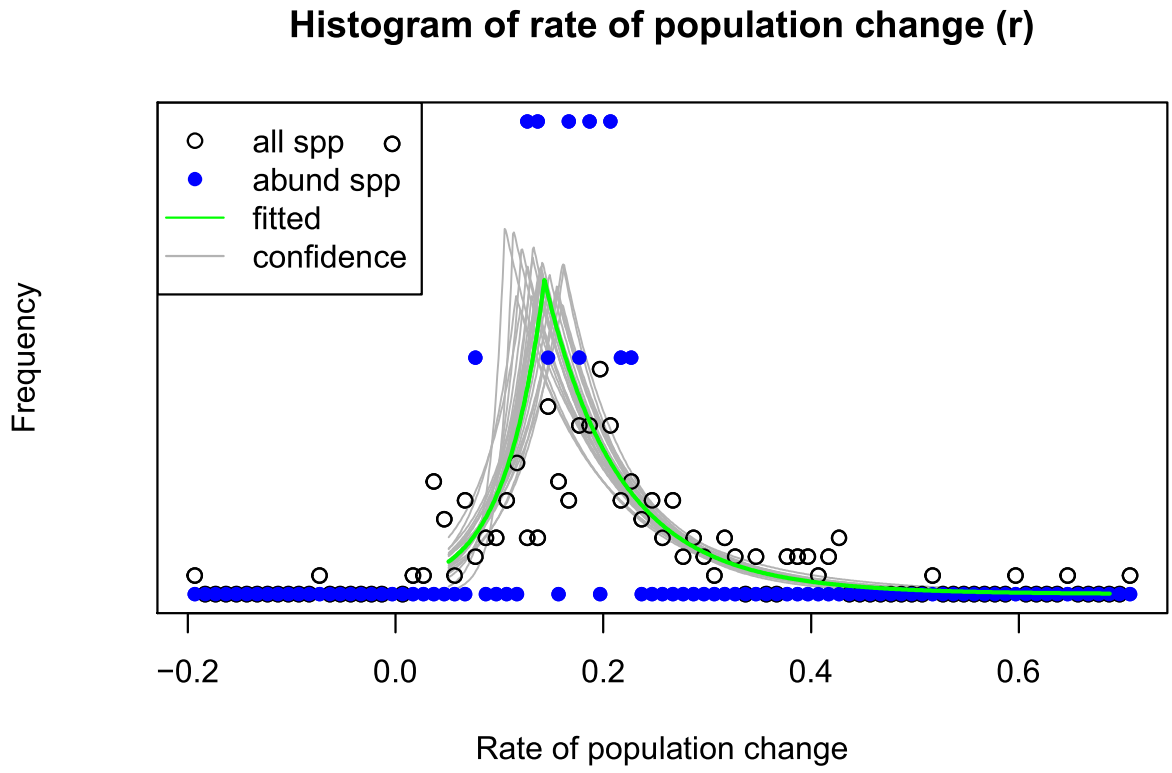



```
## $Fastest_increases
##         N1  N2   S     time    date1    date2    mortrate   little.r
## CINNAU  21  37  19 5.062637 14152.92 16002.02 0.019769037 0.11187756
## ARCHLU   3   5   3 5.007529 14283.73 16138.60 0.000000000 0.10201151
## ELAESY  80 112  73 5.058189 14134.34 15978.79 0.018102761 0.06652029
## MALLPA   9  13   8 5.091816 14249.48 16104.55 0.023131834 0.07221879
## ILEXGO   2   3   2 4.987452 14132.49 15991.16 0.000000000 0.08129705
## SYMPGL  60  75  54 5.036158 14183.01 16036.61 0.020920811 0.04430829
## PASAHR  65  80  62 5.037579 14232.40 16083.36 0.009380077 0.04121808
## DIOSMO 577 690 569 5.067950 14180.76 16031.36 0.002754927 0.03529027
## CINNSU 106 124 101 5.050083 14205.40 16054.57 0.009567879 0.03105741
## MYRSSE 449 514 440 5.085550 14199.49 16056.53 0.003981509 0.02658520
##            fitmort    lowermean   uppermean       fitr  lowermeanR
## CINNAU 0.021278573 2.812632e-03 0.057089664 0.09725502  0.05812121
## ARCHLU 0.015340353 1.134602e-04 0.084723956 0.06971227  0.01090162
## ELAESY 0.018363891 7.293412e-03 0.033741699 0.06513946  0.04450891
## MALLPA 0.024382887 1.516727e-03 0.085766435 0.06009471  0.01478821
## ILEXGO 0.021916521 4.872636e-05 0.133561520 0.05057486 -0.02539305
## SYMPGL 0.021360077 8.181565e-03 0.041125492 0.04467018  0.02014370
## PASAHR 0.009924182 2.261402e-03 0.022536117 0.04224310  0.02245817
## DIOSMO 0.002861772 1.262887e-03 0.005092850 0.03559511  0.02925377
## CINNSU 0.010124391 3.180669e-03 0.019981398 0.03189629  0.01737959
## MYRSSE 0.004106269 1.985173e-03 0.006968449 0.02689370  0.02030397
##        uppermeanR
## CINNAU 0.14400347
## ARCHLU 0.15388891
```

```
## ELAESY 0.08750085
## MALLPA 0.11675616
## ILEXGO 0.14023387
## SYMPGL 0.06948899
## PASAHR 0.06573905
## DIOSMO 0.04192833
## CINNSU 0.05081165
## MYRSSE 0.03453051
##
## $Biggest_losses
##          N1 N2  S     time    date1    date2   mortrate    little.r
## STYRFO    1  0  0 4.240931 14205.80 15963.40        Inf        -Inf
## ERIODE    1  0  0 4.925394 14207.67 16017.33        Inf        -Inf
## CYATPO 2765  0  0 5.068798 14224.76 16073.37        Inf        -Inf
## CYATSP  100  0  0 5.046489 14236.58 16095.47        Inf        -Inf
## CYATLE    2  0  0 5.054073 14254.00 16091.33        Inf        -Inf
## SYMPWI    9  2  2 5.032778 14230.19 16084.21 0.29885629 -0.29885629
## TETRGL    1  1  0 4.921287 14156.00 15963.50        Inf  0.00000000
## TURPFO    4  3  3 5.026010 14326.27 16208.29 0.05723866 -0.05723866
## ILEXFO   68 59 58 5.051890 14148.99 15996.45 0.03148617 -0.02810240
## OSMAMA   19 16 15 5.049692 14181.55 16028.07 0.04681251 -0.03403183
##             fitmort   lowermean    uppermean          fitr    lowermeanR
## STYRFO 257.45530362 0.073527544 1.131251e+03 -161.42516778 -175.68155722
## ERIODE 227.48360437 0.143603955 1.066965e+03 -141.95161520 -151.27074408
## CYATPO 255.77813439 5.987344753 1.175931e+03 -141.06032465 -146.98648049
## CYATSP 250.94424997 1.482752881 1.274940e+03 -140.32291734 -147.63407847
## CYATLE 250.68352725 0.327121777 1.328728e+03 -137.84554325 -147.41954935
## SYMPWI   0.31267539 0.139096958 6.161048e-01   -0.26679729   -0.48536001
## TETRGL   2.63204470 0.027967102 1.888242e+01   -0.07003606   -0.33631968
## TURPFO   0.07826924 0.007968595 2.331569e-01   -0.03028351   -0.15480112
## ILEXFO   0.03214998 0.016214992 5.376129e-02   -0.02473719   -0.04358500
## OSMAMA   0.04953461 0.017069839 1.032752e-01   -0.02368969   -0.07203005
##          uppermeanR
## STYRFO  0.004806859
## ERIODE -0.019548526
## CYATPO -7.694994990
## CYATSP -0.981538773
## CYATLE -0.076224828
## SYMPWI -0.017787630
## TETRGL  0.119200623
## TURPFO  0.083493094
## ILEXFO  0.001788854
## OSMAMA  0.036696051
```

PALANAN - abund model graphic

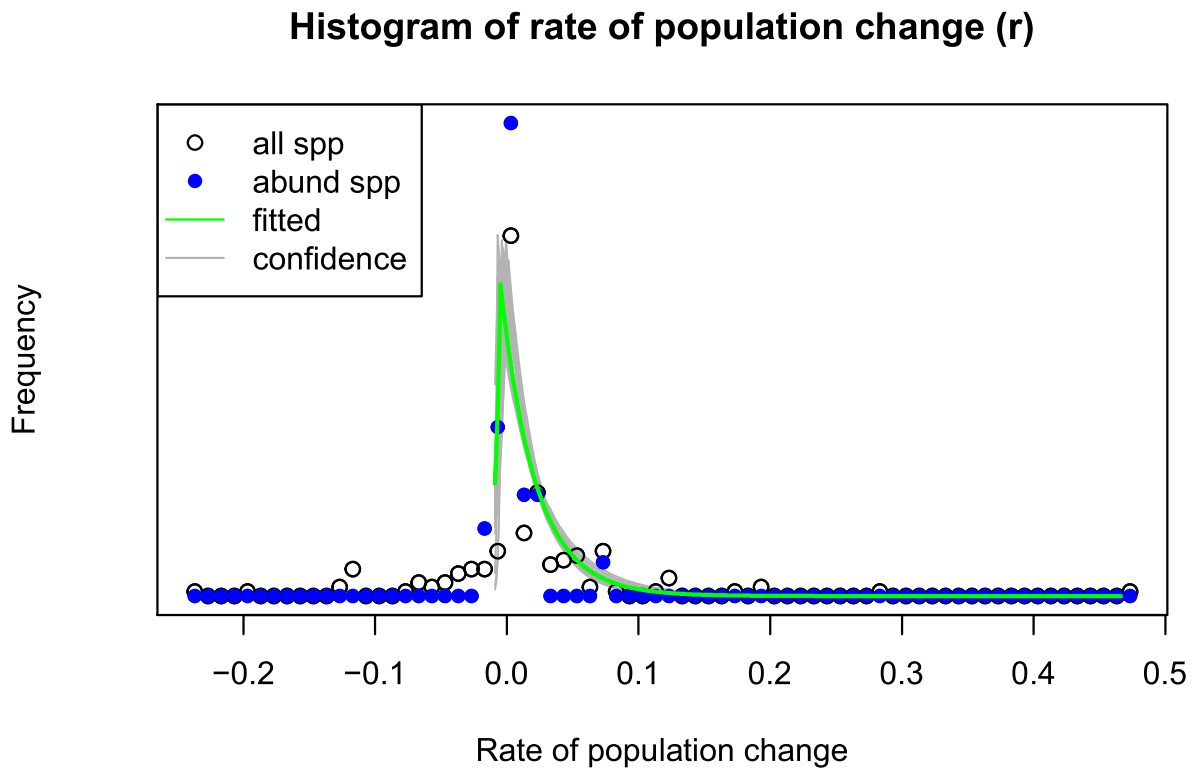
```
graph.abundmodel(mod.PAL$dbh100$census1.2)
```




```
## $Fastest_increases
##         N1 N2 S     time    date1 date2  mortrate  little.r    fitmort
## MACABI  2 29 2 3.761123 12732.62 14045 0.0000000 0.7109975 0.03405722
## ARCHSC  1  9 1 3.373032 12723.04 14045 0.0000000 0.6514093 0.03483127
## ARTOTR  1  8 1 3.498973 12786.00 14045 0.0000000 0.5943005 0.03531239
## DRACED  1  7 1 3.748118 12716.67 14045 0.0000000 0.5191700 0.03443457
## DILLMG  5 22 5 3.490760 12768.07 14045 0.0000000 0.4244361 0.03167366
## ENDOPE  4 17 4 3.352498 12764.00 14045 0.0000000 0.4315942 0.03273318
## SYZYLS  4 19 4 3.792608 12723.18 14045 0.0000000 0.4108373 0.03298993
## PHOEST  9 33 8 3.487026 12724.82 14045 0.0337775 0.3726049 0.03460178
## SYZYBT  6 23 5 3.526352 12759.33 14045 0.0517026 0.3810552 0.03712563
## HAPLLA  2  9 2 3.743190 12677.76 14045 0.0000000 0.4018170 0.03693336
##          lowermean  uppermean      fitr lowermeanR uppermeanR
## MACABI 0.01223679 0.07468930 0.6881619  0.5943443  0.7806053
## ARCHSC 0.01396123 0.07472651 0.5600780  0.3986174  0.7349339
## ARTOTR 0.01349243 0.07595928 0.5043031  0.3449289  0.6913980
## DRACED 0.01289549 0.07328600 0.4311971  0.2713153  0.6097756
## DILLMG 0.01177665 0.06401093 0.3914557  0.2942546  0.5020940
## ENDOPE 0.01228777 0.06799797 0.3839105  0.2728418  0.5124448
## SYZYLS 0.01176675 0.06906776 0.3754296  0.2773179  0.4877463
## PHOEST 0.01384425 0.07024907 0.3505260  0.2722701  0.4374506
## SYZYBT 0.01390142 0.07665850 0.3501157  0.2568854  0.4622595
## HAPLLA 0.01273074 0.07820551 0.3304641  0.2034522  0.4784475
##
## $Biggest_losses
##         N1 N2  S     time    date1 date2    mortrate    little.r    fitmort
```

```
## DRYPLO 44 50 39 3.636033 12716.11 14045 0.033175709  0.03515737 0.03419219
## CHISCE 25 27 18 3.619018 12714.37 14045 0.090771615  0.02126573 0.05628123
## DILLPH 35 42 34 3.718784 12694.42 14045 0.007794897  0.04902720 0.02391546
## DIPTHA 19 22 17 3.608343 12710.27 14045 0.030824572  0.04062903 0.03363212
## GLYCGR  4  3  2 3.894593 12716.40 14045 0.177976807 -0.07386705 0.04813339
## VATIMA 15 18 15 3.708875 12687.33 14045 0.000000000  0.04915818 0.02667796
## PSUVLU 13 15  9 3.633760 12719.89 14045 0.101196777  0.03938093 0.05110519
## SHORGU 60 81 55 3.761538 12683.40 14045 0.023131864  0.07978242 0.02846475
## ASTRCA  8  9  7 3.640657 12726.12 14045 0.036677828  0.03235214 0.03575341
## DYSOAR  8  9  7 3.518138 12758.39 14045 0.037955129  0.03347880 0.03630453
##         lowermean  uppermean       fitr   lowermeanR uppermeanR
## DRYPLO 0.01689038 0.05945011 0.05110061  0.006742742  0.1074725
## CHISCE 0.02869692 0.09928703 0.05754177 -0.012994527  0.1355441
## DILLPH 0.01008739 0.04458645 0.06838611  0.022398929  0.1275143
## DIPTHA 0.01536179 0.06258654 0.07932379  0.009699485  0.1551060
## GLYCGR 0.01848510 0.10981471 0.08828912 -0.071811606  0.2158605
## VATIMA 0.01006935 0.05286734 0.08984275  0.015241004  0.1652888
## PSUVLU 0.02265967 0.09966219 0.09024960  0.001843819  0.1760207
## SHORGU 0.01402857 0.04763241 0.09038940  0.052889036  0.1325433
## ASTRCA 0.01392395 0.07279918 0.10154612 -0.003948468  0.1987163
## DYSOAR 0.01351501 0.07561072 0.10193443  0.001640282  0.1968605
```

```
graph.abundmodel(mod.PAL$dbh100$census2.3)
```

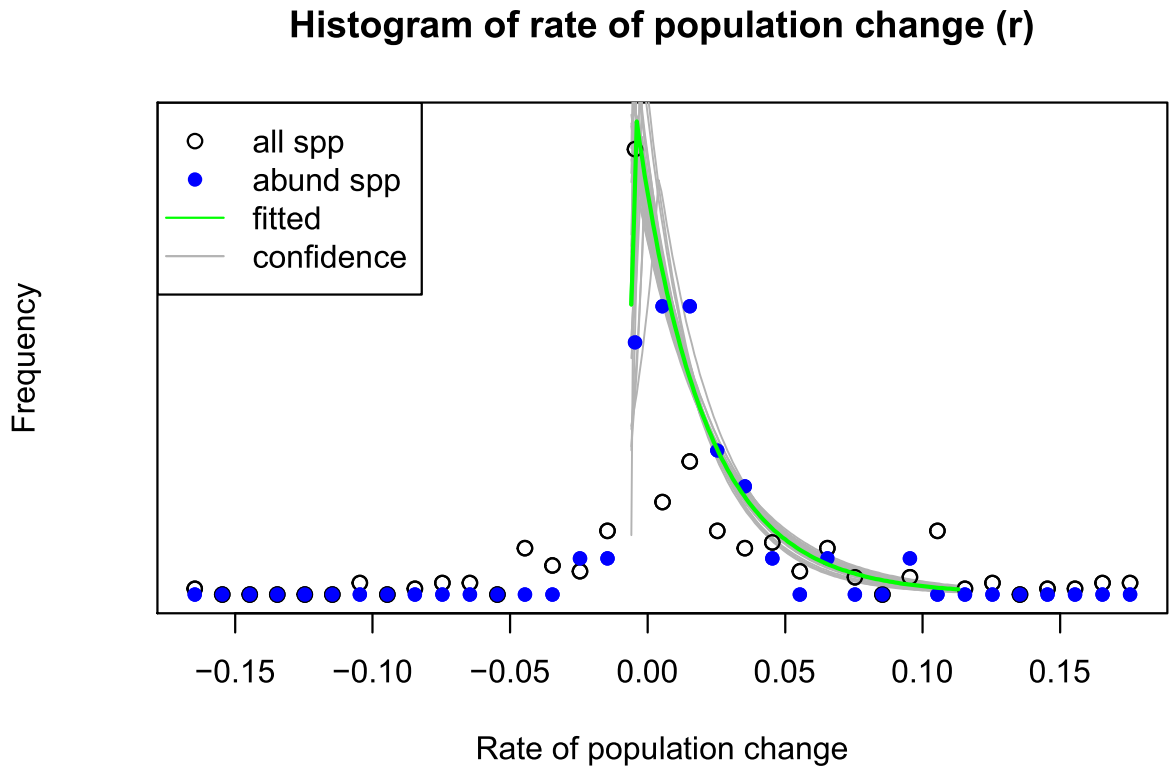



```
## $Fastest_increases
##        N1 N2  S     time date1    date2    mortrate   little.r    fitmort
## MACATA  5 78  3 5.756708 14045 16158.35 0.088735723 0.47722953 0.04388290
```

```
## CLERMC  1  5  0 5.728040 14045 16133.81         Inf 0.28097532 0.04808679
## MALLMO  2  6  2 5.689254 14045 16157.23 0.000000000 0.19310305 0.02234537
## OCTOSU  3  8  2 5.753441 14045 16141.09 0.070473493 0.17047697 0.03500039
## ERYTVA  1  3  1 5.642710 14045 16105.57 0.000000000 0.19469585 0.02542839
## DYSOCB  8 15  8 5.752955 14045 16157.51 0.000000000 0.10926710 0.01682680
## CELTLU  5 10  5 5.792745 14045 16150.22 0.000000000 0.11965782 0.01812355
## FICUFI 35 56 31 5.735934 14045 16158.29 0.021157993 0.08194020 0.02150360
## FICUCO 55 85 52 5.759754 14045 16148.40 0.009738171 0.07557929 0.01263425
## VILLFA  2  4  2 5.748802 14045 16157.02 0.000000000 0.12057245 0.02385745
##          lowermean  uppermean       fitr  lowermeanR uppermeanR
## MACATA 0.010313553 0.11613704 0.46630018 0.427809655 0.50555267
## CLERMC 0.008699110 0.16357738 0.16171863 0.064405865 0.27467423
## MALLMO 0.004157424 0.06544413 0.11303795 0.046557341 0.20593507
## OCTOSU 0.006633854 0.10143898 0.10343307 0.033841837 0.18515223
## ERYTVA 0.003810679 0.08161108 0.08166411 0.010667460 0.18004947
## DYSOCB 0.003189306 0.04628803 0.08098027 0.036760279 0.13509555
## CELTLU 0.003419295 0.05203339 0.08018031 0.026563491 0.14962407
## FICUFI 0.008400890 0.04184355 0.07400114 0.046158025 0.10496793
## FICUCO 0.004566547 0.02538010 0.07151362 0.048953658 0.09699666
## VILLFA 0.003678560 0.07320332 0.05588779 0.001862015 0.13781954
##
## $Biggest_losses
##         N1  N2   S     time date1    date2   mortrate     little.r
## SYZYEV 136 120 111 5.735835 14045 16138.11 0.03541327 -0.021821259
## SHORPA 628 599 542 5.773204 14045 16156.34 0.02550995 -0.008189312
## CYNOIN 107  99  96 5.784730 14045 16151.34 0.01875293 -0.013433467
## ENDICO  37  30  29 5.788105 14045 16153.50 0.04209013 -0.036233023
## SEMECU  76  71  69 5.758016 14045 16146.60 0.01678127 -0.011818908
## DRYPMI  40  37  34 5.734842 14045 16139.38 0.02833887 -0.013594365
## DRYPME 725 719 672 5.769290 14045 16153.26 0.01315817 -0.001440437
## CHISCE  27  22  18 5.726347 14045 16137.95 0.07080694 -0.035763533
## CALOBL  53  51  47 5.795502 14045 16151.90 0.02073061 -0.006637265
## DIPTHA  22  19  18 5.734488 14045 16135.55 0.03499366 -0.025565225
##           fitmort   lowermean  uppermean          fitr   lowermeanR
## SYZYEV 0.03384361 0.022190766 0.04890409 -0.0090043534 -0.024847674
## SHORPA 0.02551110 0.020447356 0.03123351 -0.0064472242 -0.012257822
## CYNOIN 0.01906820 0.010022463 0.03166653 -0.0060386269 -0.017433150
## ENDICO 0.03713108 0.018079204 0.06562178 -0.0045848139 -0.028883269
## SEMECU 0.01758040 0.008248099 0.03018014 -0.0045428739 -0.016240282
## DRYPMI 0.02676473 0.010773730 0.05059112 -0.0013564984 -0.017424867
## DRYPME 0.01334943 0.010115911 0.01714110 -0.0012841669 -0.005568306
## CHISCE 0.05778009 0.028015785 0.10223447 -0.0008641401 -0.022629059
## CALOBL 0.02115374 0.009602973 0.03739953 -0.0005817048 -0.013707505
## DIPTHA 0.03056155 0.011089153 0.06409404 -0.0004712597 -0.023319513
##           uppermeanR
## SYZYEV  3.420923e-03
## SHORPA -7.680117e-05
## CYNOIN  7.372720e-03
## ENDICO  1.769410e-02
## SEMECU  1.030751e-02
## DRYPMI  2.007806e-02
## DRYPME  3.653917e-03
## CHISCE  2.516956e-02
## CALOBL  1.897242e-02
```

```
## DIPTHA  2.681839e-02
```

```
graph.abundmodel(mod.PAL$dbh100$census3.4)
```




```
## $Fastest_increases
##         N1  N2  S     time    date1    date2    mortrate   little.r
## ENDOPE 24  53 23 6.430277 16154.62 18508.16 0.006618629 0.12320436
## CELTLU 10  22 10 6.431211 16150.22 18503.48 0.000000000 0.12259857
## VOACGL  3   8  2 6.418435 16148.05 18501.53 0.063171960 0.15281440
## ARCHSC 11  23 11 6.421212 16154.96 18507.54 0.000000000 0.11486911
## FICUCO 85 161 71 6.448882 16148.46 18503.94 0.027907375 0.09904865
## ANTICM  1   3  1 6.393794 16153.77 18504.00 0.000000000 0.17182478
## DRACED  8  15  8 6.439503 16152.27 18507.00 0.000000000 0.09761757
## SIPHCE  1   3  1 6.502396 16151.85 18505.76 0.000000000 0.16895501
## TRDNPH  1   3  1 6.497833 16125.67 18493.79 0.000000000 0.16907365
## ALLOLE  2   5  1 6.379192 16163.45 18507.16 0.108657514 0.14363742
##           fitmort   lowermean  uppermean       fitr  lowermeanR uppermeanR
## ENDOPE 0.01386773 0.003944191 0.03305370 0.11337174 0.083121209  0.1466412
## CELTLU 0.01490339 0.003273846 0.03584711 0.10199144 0.062024592  0.1483461
## VOACGL 0.03289139 0.006994846 0.09295050 0.09594990 0.032638361  0.1723272
## ARCHSC 0.01456411 0.003184700 0.03794246 0.09572513 0.056966075  0.1416161
## FICUCO 0.02709913 0.015172327 0.04380094 0.09518568 0.077243600  0.1145651
## ANTICM 0.02459072 0.004438229 0.07922512 0.07490607 0.007923399  0.1680180
## DRACED 0.01604832 0.003524843 0.04304945 0.07329388 0.032135186  0.1237729
## SIPHCE 0.02554632 0.004610785 0.07631298 0.07146452 0.010233711  0.1544653
## TRDNPH 0.02592368 0.004768670 0.07847034 0.07092618 0.007900508  0.1588359
## ALLOLE 0.03671918 0.008434307 0.10534455 0.06876440 0.005228034  0.1526559
```

```
##
## $Biggest_losses
##         N1  N2   S     time    date1    date2    mortrate     little.r
## CALOBL  51  43  43 6.430836 16152.14 18503.96 0.026532402 -0.026532402
## PINAMA  39  30  26 6.515009 16148.25 18503.00 0.062235545 -0.040270748
## DILLPH  43  38  37 6.477008 16137.39 18495.92 0.023202410 -0.019085039
## SHORPO 177 171 167 6.426689 16159.02 18505.24 0.009049127 -0.005366088
## SYZYNI 181 175 148 6.431777 16155.60 18505.44 0.031295355 -0.005241328
## STROPH 482 474 436 6.450171 16150.61 18503.44 0.015550265 -0.002594783
## CYNOIN  99  96  87 6.428651 16151.32 18503.54 0.020099354 -0.004786643
## SEMECU  71  67  56 6.444801 16146.89 18502.90 0.036824752 -0.008997526
## DRYPME 719 713 662 6.437861 16153.49 18504.42 0.012829697 -0.001301665
## CHISPA  45  40  30 6.435094 16151.80 18504.36 0.063008418 -0.018303234
##           fitmort   lowermean  uppermean         fitr   lowermeanR
## CALOBL 0.02563602 0.012732838 0.04418259 -0.005955936 -0.025797264
## PINAMA 0.05365524 0.027935531 0.08969420 -0.003969318 -0.028623333
## DILLPH 0.02352572 0.010205040 0.04236503 -0.003393731 -0.020698111
## SHORPO 0.01035774 0.005556085 0.01707676 -0.003343562 -0.009298774
## SYZYNI 0.03076659 0.021209359 0.04215032 -0.002463760 -0.010960264
## STROPH 0.01580438 0.011476451 0.02059540 -0.001989971 -0.007245367
## CYNOIN 0.02009585 0.011106786 0.03204374 -0.001494661 -0.011475393
## SEMECU 0.03443677 0.019967637 0.05366844 -0.001259178 -0.014266050
## DRYPME 0.01300199 0.009868903 0.01657011 -0.001121618 -0.005084108
## CHISPA 0.05562056 0.032147982 0.08724263 -0.001029930 -0.019109165
##         uppermeanR
## CALOBL 0.012038961
## PINAMA 0.015983723
## DILLPH 0.015768067
## SHORPO 0.004612356
## SYZYNI 0.008947278
## STROPH 0.004174730
## CYNOIN 0.011694324
## SEMECU 0.014670862
## DRYPME 0.003375896
## CHISPA 0.020278795
```

```
#### BCI
## small trees
BCI.modmeans <- c(mod.BCI$dbh10$census1.2$means[1], mod.BCI$dbh10$census2.3$means[1], mod.BCI$dbh10$cens

BCI.modupper <- c(mod.BCI$dbh10$census1.2$upper[1], mod.BCI$dbh10$census2.3$upper[1], mod.BCI$dbh10$cens

BCI.modlower <- c(mod.BCI$dbh10$census1.2$lower[1], mod.BCI$dbh10$census2.3$lower[1], mod.BCI$dbh10$cens

BCI.abm.small <- as.data.frame(cbind(census.int = c(1:6), BCI.modmeans, BCI.modlower, BCI.modupper), rou

#### large trees
BCI.modmeans <- c(mod.BCI$dbh100$census1.2$means[1], mod.BCI$dbh100$census2.3$means[1], mod.BCI$dbh100$c

BCI.modupper <- c(mod.BCI$dbh100$census1.2$upper[1], mod.BCI$dbh100$census2.3$upper[1], mod.BCI$dbh100$c

BCI.modlower <- c(mod.BCI$dbh100$census1.2$lower[1], mod.BCI$dbh100$census2.3$lower[1], mod.BCI$dbh100$c

BCI.abm.large <- as.data.frame(cbind(census.int = c(1:6), BCI.modmeans, BCI.modlower, BCI.modupper), rou
```