

MCMC Diagnostics

2023-10-12

```
# Raftery-Lewis diagnostic (Raftery and Lewis, 1992)
raftery.diag(JM_sample1[, par_name])
```

```
## [[1]]
##
## Quantile (q) = 0.025
## Accuracy (r) = +/- 0.005
## Probability (s) = 0.95
##
##          Burn-in Total Lower bound Dependence
##          (M)    (N)   (Nmin) factor (I)
## Y.mix_rep[2]    6 11040  3746      2.95
## Y.mix_rep[4]    6 11040  3746      2.95
## Y.mix_rep[6]    6 11040  3746      2.95
## Y.mix_rep[8]    6 11502  3746      3.07
## Y.mix_rep[9]    6 11130  3746      2.97
## Y.mix_rep[12]   6 11040  3746      2.95
## Y.mix_rep[13]   6 11313  3746      3.02
## Y.mix_rep[14]   6 11223  3746      3.00
## Y.mix_rep[16]   6 11406  3746      3.04
## Y.mix_rep[17]   6 11223  3746      3.00
## Y.mix_rep[18]   6 11502  3746      3.07
## Y.mix_rep[23]   6 11313  3746      3.02
## Y.mix_rep[25]   6 11313  3746      3.02
## Y.mix_rep[26]   6 11223  3746      3.00
## Y.mix_rep[27]   6 11313  3746      3.02
## Y.mix_rep[28]   6 11313  3746      3.02
## Y.mix_rep[30]   6 11502  3746      3.07
## Y.mix_rep[31]   6 10860  3746      2.90
## Y.mix_rep[32]   6 11223  3746      3.00
## Y.mix_rep[33]   6 11982  3746      3.20
## Y.mix_rep[34]   6 10770  3746      2.88
## Y.mix_rep[36]   6 11223  3746      3.00
## Y.mix_rep[38]   6 11691  3746      3.12
## Y.mix_rep[39]   6 11223  3746      3.00
## Y.mix_rep[40]   6 11130  3746      2.97
## Y.mix_rep[41]   6 11130  3746      2.97
## Y.mix_rep[42]   6 11502  3746      3.07
## Y.mix_rep[43]   6 11223  3746      3.00
## Y.mix_rep[46]   6 11406  3746      3.04
## Y.mix_rep[47]   6 11595  3746      3.10
## Y.mix_rep[48]   6 11406  3746      3.04
## Y.mix_rep[54]   6 11223  3746      3.00
## Y.mix_rep[55]   6 11691  3746      3.12
```

```

## Y.mix_rep[57] 6    11313 3746    3.02
## Y.mix_rep[58] 6    11406 3746    3.04
## Y.mix_rep[59] 6    11040 3746    2.95
## Y.mix_rep[62] 6    11040 3746    2.95
## Y.mix_rep[64] 6    11406 3746    3.04
## Y.mix_rep[65] 6    11406 3746    3.04
## Y.mix_rep[66] 6    11223 3746    3.00
## Y.mix_rep[68] 6    11502 3746    3.07
## Y.mix_rep[69] 6    11130 3746    2.97
## Y.mix_rep[70] 6    11364 3746    3.03
## Y.mix_rep[71] 6    11088 3746    2.96
## Y.mix_rep[73] 6    11130 3746    2.97
## Y.mix_rep[77] 6    11406 3746    3.04
## Y.mix_rep[78] 6    11787 3746    3.15
## Y.mix_rep[79] 6    11406 3746    3.04
## Y.mix_rep[80] 6    11406 3746    3.04
## Y.mix_rep[81] 6    10950 3746    2.92
## Y.mix_rep[82] 6    11313 3746    3.02
## Y.mix_rep[83] 6    11130 3746    2.97
## Y.mix_rep[85] 6    11040 3746    2.95
## Y.mix_rep[90] 6    11313 3746    3.02
## Y.mix_rep[93] 6    11223 3746    3.00
## Y.mix_rep[94] 6    11691 3746    3.12
## Y.mix_rep[96] 6    11130 3746    2.97
## Y.mix_rep[97] 6    11406 3746    3.04
## Y.mix_rep[98] 6    11502 3746    3.07
## Y.mix_rep[99] 6    11223 3746    3.00
## Y.mix_rep[102] 6   11595 3746    3.10
## Y.mix_rep[106] 6   11313 3746    3.02
## Y.mix_rep[107] 6   11502 3746    3.07
## Y.mix_rep[108] 6   11313 3746    3.02
## Y.mix_rep[109] 6   11223 3746    3.00
## Y.mix_rep[110] 6   11088 3746    2.96
## Y.mix_rep[111] 6   11223 3746    3.00
## Y.mix_rep[112] 6   10950 3746    2.92
## Y.mix_rep[113] 6   11313 3746    3.02
## Y.mix_rep[114] 6   11601 3746    3.10
## Y.mix_rep[115] 6   11313 3746    3.02
## Y.mix_rep[116] 6   10950 3746    2.92
## Y.mix_rep[117] 6   10950 3746    2.92
## Y.mix_rep[118] 6   11316 3746    3.02
## Y.mix_rep[119] 6   11313 3746    3.02
## Y.mix_rep[120] 6   11223 3746    3.00
## Y.mix_rep[121] 6   11130 3746    2.97
## Y.mix_rep[122] 6   11223 3746    3.00
## Y.mix_rep[124] 6   11787 3746    3.15
## Y.mix_rep[128] 6   11502 3746    3.07
## Y.mix_rep[129] 6   11313 3746    3.02
## Y.mix_rep[130] 6   11040 3746    2.95
## Y.mix_rep[131] 6   10950 3746    2.92
## Y.mix_rep[132] 6   11502 3746    3.07
## Y.mix_rep[133] 6   11595 3746    3.10
## Y.mix_rep[134] 6   11313 3746    3.02
## Y.mix_rep[135] 6   10950 3746    2.92

```

```

## Y.mix_rep[136] 6      11040 3746      2.95
## Y.mix_rep[137] 6      11223 3746      3.00
## Y.mix_rep[138] 6      11313 3746      3.02
## Y.mix_rep[139] 6      11223 3746      3.00
## Y.mix_rep[140] 6      11130 3746      2.97
## Y.mix_rep[141] 6      11313 3746      3.02
## Y.mix_rep[142] 6      10950 3746      2.92
## Y.mix_rep[143] 6      11130 3746      2.97
## Y.mix_rep[147] 6      11223 3746      3.00
## Y.mix_rep[148] 6      11223 3746      3.00
## Y.mix_rep[149] 6      11595 3746      3.10
## Y.mix_rep[150] 6      11313 3746      3.02
## Y.mix_rep[151] 6      11406 3746      3.04
## Y.mix_rep[152] 6      11595 3746      3.10
## Y.mix_rep[153] 6      11595 3746      3.10
## Y.mix_rep[155] 6      11313 3746      3.02
## Y.mix_rep[157] 6      11223 3746      3.00
## Y.mix_rep[158] 6      11040 3746      2.95
## Y.mix_rep[160] 6      11040 3746      2.95
## Y.mix_rep[161] 6      11223 3746      3.00
## Y.mix_rep[163] 6      10860 3746      2.90
## Y.mix_rep[164] 6      11502 3746      3.07
## Y.mix_rep[166] 6      11406 3746      3.04
## Y.mix_rep[168] 6      11502 3746      3.07
## Y.mix_rep[169] 6      11313 3746      3.02
## Y.mix_rep[170] 6      11223 3746      3.00
## Y.mix_rep[171] 6      11223 3746      3.00
## Y.mix_rep[172] 6      11412 3746      3.05
## Y.mix_rep[173] 6      11313 3746      3.02
## Y.mix_rep[174] 6      11406 3746      3.04
## Y.mix_rep[176] 6      11502 3746      3.07
## Y.mix_rep[177] 6      11502 3746      3.07
## Y.mix_rep[178] 6      11040 3746      2.95
## Y.mix_rep[181] 6      11130 3746      2.97
## Y.mix_rep[183] 6      11130 3746      2.97
## Y.mix_rep[184] 6      11502 3746      3.07
## Y.mix_rep[185] 3      11220 3746      3.00
## Y.mix_rep[186] 6      11223 3746      3.00
## Y.mix_rep[189] 6      10770 3746      2.88
## Y.mix_rep[191] 6      10860 3746      2.90
## Y.mix_rep[192] 6      11313 3746      3.02
## Y.mix_rep[193] 6      10860 3746      2.90
## Y.mix_rep[194] 6      11502 3746      3.07
## Y.mix_rep[196] 6      11691 3746      3.12
## Y.mix_rep[197] 6      11313 3746      3.02
## Y.mix_rep[198] 6      11313 3746      3.02
## Y.mix_rep[199] 6      11040 3746      2.95
## Y.mix_rep[205] 6      11313 3746      3.02
## Y.mix_rep[206] 6      11313 3746      3.02
## Y.mix_rep[208] 6      11406 3746      3.04
## Y.mix_rep[210] 6      11223 3746      3.00
## Y.mix_rep[212] 6      11595 3746      3.10
## Y.mix_rep[213] 6      11313 3746      3.02
## Y.mix_rep[214] 6      10950 3746      2.92

```

```

## Y.mix_rep[215] 6      11040 3746      2.95
## Y.mix_rep[217] 6      11364 3746      3.03
## Y.mix_rep[219] 6      11595 3746      3.10
## Y.mix_rep[220] 6      11364 3746      3.03
## Y.mix_rep[221] 6      11502 3746      3.07
## Y.mix_rep[223] 6      11502 3746      3.07
## Y.mix_rep[225] 6      11130 3746      2.97
## Y.mix_rep[226] 6      11691 3746      3.12
## Y.mix_rep[227] 6      11595 3746      3.10
## Y.mix_rep[228] 6      10860 3746      2.90
## Y.mix_rep[229] 6      11502 3746      3.07
## Y.mix_rep[230] 6      11313 3746      3.02
## Y.mix_rep[231] 6      11313 3746      3.02
## Y.mix_rep[232] 6      11595 3746      3.10
## Y.mix_rep[233] 6      11130 3746      2.97
## Y.mix_rep[234] 6      11130 3746      2.97
## Y.mix_rep[236] 6      11313 3746      3.02
## Y.mix_rep[237] 6      11223 3746      3.00
## Y.mix_rep[238] 6      11313 3746      3.02
## Y.mix_rep[239] 6      11223 3746      3.00
## Y.mix_rep[240] 6      11502 3746      3.07
## Y.mix_rep[241] 6      11223 3746      3.00
## Y.mix_rep[242] 6      11130 3746      2.97
## Y.mix_rep[243] 6      10950 3746      2.92
## Y.mix_rep[244] 6      11130 3746      2.97
## Y.mix_rep[245] 6      11223 3746      3.00
## Y.mix_rep[246] 6      11313 3746      3.02
## Y.mix_rep[248] 6      11130 3746      2.97
## Y.mix_rep[250] 6      11313 3746      3.02
## Y.mix_rep[251] 6      11040 3746      2.95
## Y.mix_rep[252] 6      11223 3746      3.00
## Y.mix_rep[253] 6      11223 3746      3.00
## Y.mix_rep[255] 6      11223 3746      3.00
## Y.mix_rep[256] 6      11691 3746      3.12
## Y.mix_rep[257] 6      11130 3746      2.97
## Y.mix_rep[258] 6      11406 3746      3.04
## Y.mix_rep[259] 6      11406 3746      3.04
## Y.mix_rep[261] 6      11691 3746      3.12
## Y.mix_rep[262] 6      11505 3746      3.07
## Y.mix_rep[263] 6      11040 3746      2.95
## Y.mix_rep[265] 6      11040 3746      2.95
## Y.mix_rep[266] 6      11313 3746      3.02
## Y.mix_rep[267] 6      11595 3746      3.10
## Y.mix_rep[268] 6      11691 3746      3.12
## Y.mix_rep[269] 6      11502 3746      3.07
## Y.mix_rep[271] 6      11502 3746      3.07
## Y.mix_rep[274] 6      11595 3746      3.10
## Y.mix_rep[275] 6      11223 3746      3.00
## Y.mix_rep[277] 6      10950 3746      2.92
## Y.mix_rep[279] 6      11223 3746      3.00
## Y.mix_rep[280] 6      10950 3746      2.92
## Y.mix_rep[282] 6      11223 3746      3.00
## Y.mix_rep[283] 6      11130 3746      2.97
## Y.mix_rep[284] 6      11406 3746      3.04

```

```

##  Y.mix_rep[285] 6      11313 3746      3.02
##  Y.mix_rep[286] 6      11040 3746      2.95
##  Y.mix_rep[289] 6      11787 3746      3.15
##  Y.mix_rep[291] 6      11040 3746      2.95
##  Y.mix_rep[292] 6      11130 3746      2.97
##  Y.mix_rep[293] 6      11502 3746      3.07
##  Y.mix_rep[294] 6      11787 3746      3.15
##  Y.mix_rep[295] 6      10950 3746      2.92
##  Y.mix_rep[296] 6      11406 3746      3.04
##  Y.mix_rep[300] 6      11406 3746      3.04
##  Y.mix_rep[302] 6      11133 3746      2.97
##  Y.mix_rep[303] 6      11406 3746      3.04
##  Y.mix_rep[304] 6      11313 3746      3.02
##  Y.mix_rep[305] 6      11313 3746      3.02
##  Y.mix_rep[306] 6      11223 3746      3.00
##  Y.mix_rep[307] 6      11595 3746      3.10
##  Y.mix_rep[308] 6      10950 3746      2.92
##  Y.mix_rep[309] 6      11040 3746      2.95
##  Y.mix_rep[310] 6      11406 3746      3.04
##  Y.mix_rep[311] 6      11406 3746      3.04
##  Y.mix_rep[314] 6      11502 3746      3.07
##  Y.mix_rep[315] 6      11595 3746      3.10
##  Y.mix_rep[316] 6      11130 3746      2.97
##  Y.mix_rep[317] 6      10950 3746      2.92
##  Y.mix_rep[318] 6      11406 3746      3.04
##  Y.mix_rep[319] 6      11223 3746      3.00
##  Y.mix_rep[320] 6      11313 3746      3.02
##  Y.mix_rep[321] 6      11313 3746      3.02
##  Y.mix_rep[322] 6      11406 3746      3.04
##  Y.mix_rep[323] 6      11040 3746      2.95
##  Y.mix_rep[324] 6      11040 3746      2.95
##  Y.mix_rep[325] 6      11130 3746      2.97
##  Y.mix_rep[327] 6      10821 3746      2.89
##  Y.mix_rep[328] 6      11502 3746      3.07
##  Y.mix_rep[329] 6      11223 3746      3.00
##  Y.mix_rep[330] 6      11406 3746      3.04
##  Y.mix_rep[331] 6      10950 3746      2.92
##  Y.mix_rep[332] 6      11223 3746      3.00
##  Y.mix_rep[334] 6      11130 3746      2.97
##  Y.mix_rep[335] 6      10950 3746      2.92
##  Y.mix_rep[336] 6      11502 3746      3.07
##  Y.mix_rep[337] 6      11595 3746      3.10
##  Y.mix_rep[338] 6      10950 3746      2.92
##  Y.mix_rep[339] 6      10860 3746      2.90
##  Y.mix_rep[340] 6      11040 3746      2.95
##
##
##  [[2]]
##
##  Quantile (q) = 0.025
##  Accuracy (r) = +/- 0.005
##  Probability (s) = 0.95
##
##          Burn-in Total Lower bound Dependence

```

	(M)	(N)	(Nmin)	factor (I)
## Y.mix_rep[2]	6	11040	3746	2.95
## Y.mix_rep[4]	6	11223	3746	3.00
## Y.mix_rep[6]	6	11223	3746	3.00
## Y.mix_rep[8]	6	11223	3746	3.00
## Y.mix_rep[9]	6	11691	3746	3.12
## Y.mix_rep[12]	6	11691	3746	3.12
## Y.mix_rep[13]	6	11313	3746	3.02
## Y.mix_rep[14]	6	11601	3746	3.10
## Y.mix_rep[16]	6	11502	3746	3.07
## Y.mix_rep[17]	6	11313	3746	3.02
## Y.mix_rep[18]	6	11406	3746	3.04
## Y.mix_rep[23]	6	11313	3746	3.02
## Y.mix_rep[25]	6	11040	3746	2.95
## Y.mix_rep[26]	6	11691	3746	3.12
## Y.mix_rep[27]	6	11787	3746	3.15
## Y.mix_rep[28]	6	11406	3746	3.04
## Y.mix_rep[30]	6	11130	3746	2.97
## Y.mix_rep[31]	6	11313	3746	3.02
## Y.mix_rep[32]	6	11406	3746	3.04
## Y.mix_rep[33]	6	11313	3746	3.02
## Y.mix_rep[34]	6	10950	3746	2.92
## Y.mix_rep[36]	6	11406	3746	3.04
## Y.mix_rep[38]	6	11313	3746	3.02
## Y.mix_rep[39]	6	11691	3746	3.12
## Y.mix_rep[40]	6	11595	3746	3.10
## Y.mix_rep[41]	6	10860	3746	2.90
## Y.mix_rep[42]	6	11040	3746	2.95
## Y.mix_rep[43]	6	10770	3746	2.88
## Y.mix_rep[46]	6	11313	3746	3.02
## Y.mix_rep[47]	6	11223	3746	3.00
## Y.mix_rep[48]	6	11406	3746	3.04
## Y.mix_rep[54]	6	11313	3746	3.02
## Y.mix_rep[55]	6	10860	3746	2.90
## Y.mix_rep[57]	6	11223	3746	3.00
## Y.mix_rep[58]	6	11040	3746	2.95
## Y.mix_rep[59]	6	11502	3746	3.07
## Y.mix_rep[62]	6	11502	3746	3.07
## Y.mix_rep[64]	6	11691	3746	3.12
## Y.mix_rep[65]	6	11040	3746	2.95
## Y.mix_rep[66]	3	11220	3746	3.00
## Y.mix_rep[68]	6	11406	3746	3.04
## Y.mix_rep[69]	6	11313	3746	3.02
## Y.mix_rep[70]	6	11502	3746	3.07
## Y.mix_rep[71]	6	11406	3746	3.04
## Y.mix_rep[73]	6	11691	3746	3.12
## Y.mix_rep[77]	6	11886	3746	3.17
## Y.mix_rep[78]	6	11223	3746	3.00
## Y.mix_rep[79]	6	11223	3746	3.00
## Y.mix_rep[80]	6	11223	3746	3.00
## Y.mix_rep[81]	6	11406	3746	3.04
## Y.mix_rep[82]	6	11982	3746	3.20
## Y.mix_rep[83]	6	11040	3746	2.95
## Y.mix_rep[85]	6	10950	3746	2.92

```

## Y.mix_rep[90] 6      11691 3746      3.12
## Y.mix_rep[93] 6      11040 3746      2.95
## Y.mix_rep[94] 6      11040 3746      2.95
## Y.mix_rep[96] 6      11313 3746      3.02
## Y.mix_rep[97] 6      11040 3746      2.95
## Y.mix_rep[98] 6      11313 3746      3.02
## Y.mix_rep[99] 6      11595 3746      3.10
## Y.mix_rep[102] 6     11502 3746      3.07
## Y.mix_rep[106] 6     11130 3746      2.97
## Y.mix_rep[107] 6     11406 3746      3.04
## Y.mix_rep[108] 6     11313 3746      3.02
## Y.mix_rep[109] 6     11406 3746      3.04
## Y.mix_rep[110] 6     11553 3746      3.08
## Y.mix_rep[111] 6     11313 3746      3.02
## Y.mix_rep[112] 6     11223 3746      3.00
## Y.mix_rep[113] 6     11223 3746      3.00
## Y.mix_rep[114] 6     11040 3746      2.95
## Y.mix_rep[115] 6     11313 3746      3.02
## Y.mix_rep[116] 6     11313 3746      3.02
## Y.mix_rep[117] 6     11223 3746      3.00
## Y.mix_rep[118] 6     11223 3746      3.00
## Y.mix_rep[119] 6     11130 3746      2.97
## Y.mix_rep[120] 6     11406 3746      3.04
## Y.mix_rep[121] 6     11502 3746      3.07
## Y.mix_rep[122] 6     11130 3746      2.97
## Y.mix_rep[124] 6     11502 3746      3.07
## Y.mix_rep[128] 6     10860 3746      2.90
## Y.mix_rep[129] 6     11406 3746      3.04
## Y.mix_rep[130] 6     11130 3746      2.97
## Y.mix_rep[131] 6     11223 3746      3.00
## Y.mix_rep[132] 6     11040 3746      2.95
## Y.mix_rep[133] 6     11595 3746      3.10
## Y.mix_rep[134] 6     11691 3746      3.12
## Y.mix_rep[135] 6     11406 3746      3.04
## Y.mix_rep[136] 6     11595 3746      3.10
## Y.mix_rep[137] 6     11595 3746      3.10
## Y.mix_rep[138] 6     11223 3746      3.00
## Y.mix_rep[139] 6     11595 3746      3.10
## Y.mix_rep[140] 6     11406 3746      3.04
## Y.mix_rep[141] 6     10950 3746      2.92
## Y.mix_rep[142] 6     11595 3746      3.10
## Y.mix_rep[143] 6     10950 3746      2.92
## Y.mix_rep[147] 6     11223 3746      3.00
## Y.mix_rep[148] 6     11313 3746      3.02
## Y.mix_rep[149] 6     11313 3746      3.02
## Y.mix_rep[150] 6     11787 3746      3.15
## Y.mix_rep[151] 6     10770 3746      2.88
## Y.mix_rep[152] 6     11223 3746      3.00
## Y.mix_rep[153] 6     11223 3746      3.00
## Y.mix_rep[155] 6     11313 3746      3.02
## Y.mix_rep[157] 6     11130 3746      2.97
## Y.mix_rep[158] 6     11130 3746      2.97
## Y.mix_rep[160] 6     11040 3746      2.95
## Y.mix_rep[161] 6     11595 3746      3.10

```

```

## Y.mix_rep[163] 6      11787 3746      3.15
## Y.mix_rep[164] 6      10950 3746      2.92
## Y.mix_rep[166] 6      11313 3746      3.02
## Y.mix_rep[168] 6      11130 3746      2.97
## Y.mix_rep[169] 6      11313 3746      3.02
## Y.mix_rep[170] 6      11502 3746      3.07
## Y.mix_rep[171] 6      11040 3746      2.95
## Y.mix_rep[172] 6      11691 3746      3.12
## Y.mix_rep[173] 6      11040 3746      2.95
## Y.mix_rep[174] 6      11223 3746      3.00
## Y.mix_rep[176] 6      11691 3746      3.12
## Y.mix_rep[177] 6      11406 3746      3.04
## Y.mix_rep[178] 6      11406 3746      3.04
## Y.mix_rep[181] 6      11040 3746      2.95
## Y.mix_rep[183] 6      11691 3746      3.12
## Y.mix_rep[184] 6      11223 3746      3.00
## Y.mix_rep[185] 6      11313 3746      3.02
## Y.mix_rep[186] 6      11040 3746      2.95
## Y.mix_rep[189] 6      11313 3746      3.02
## Y.mix_rep[191] 6      11130 3746      2.97
## Y.mix_rep[192] 6      11502 3746      3.07
## Y.mix_rep[193] 6      11787 3746      3.15
## Y.mix_rep[194] 6      11313 3746      3.02
## Y.mix_rep[196] 6      11223 3746      3.00
## Y.mix_rep[197] 6      11130 3746      2.97
## Y.mix_rep[198] 6      11982 3746      3.20
## Y.mix_rep[199] 6      11040 3746      2.95
## Y.mix_rep[205] 6      10860 3746      2.90
## Y.mix_rep[206] 6      11595 3746      3.10
## Y.mix_rep[208] 6      11223 3746      3.00
## Y.mix_rep[210] 6      11040 3746      2.95
## Y.mix_rep[212] 6      11130 3746      2.97
## Y.mix_rep[213] 6      11313 3746      3.02
## Y.mix_rep[214] 6      11502 3746      3.07
## Y.mix_rep[215] 6      11502 3746      3.07
## Y.mix_rep[217] 6      11502 3746      3.07
## Y.mix_rep[219] 6      11040 3746      2.95
## Y.mix_rep[220] 6      11130 3746      2.97
## Y.mix_rep[221] 6      11595 3746      3.10
## Y.mix_rep[223] 6      10860 3746      2.90
## Y.mix_rep[225] 6      11130 3746      2.97
## Y.mix_rep[226] 6      11040 3746      2.95
## Y.mix_rep[227] 6      11223 3746      3.00
## Y.mix_rep[228] 6      11406 3746      3.04
## Y.mix_rep[229] 6      11595 3746      3.10
## Y.mix_rep[230] 6      11130 3746      2.97
## Y.mix_rep[231] 6      11130 3746      2.97
## Y.mix_rep[232] 6      11313 3746      3.02
## Y.mix_rep[233] 3      11220 3746      3.00
## Y.mix_rep[234] 6      11502 3746      3.07
## Y.mix_rep[236] 6      11406 3746      3.04
## Y.mix_rep[237] 6      11595 3746      3.10
## Y.mix_rep[238] 6      10860 3746      2.90
## Y.mix_rep[239] 6      11595 3746      3.10

```

## Y.mix_rep[240] 6	11316 3746	3.02
## Y.mix_rep[241] 6	11502 3746	3.07
## Y.mix_rep[242] 6	11313 3746	3.02
## Y.mix_rep[243] 6	11595 3746	3.10
## Y.mix_rep[244] 6	11982 3746	3.20
## Y.mix_rep[245] 6	11040 3746	2.95
## Y.mix_rep[246] 6	11223 3746	3.00
## Y.mix_rep[248] 6	11595 3746	3.10
## Y.mix_rep[250] 6	11502 3746	3.07
## Y.mix_rep[251] 6	11223 3746	3.00
## Y.mix_rep[252] 6	11502 3746	3.07
## Y.mix_rep[253] 6	11502 3746	3.07
## Y.mix_rep[255] 6	11223 3746	3.00
## Y.mix_rep[256] 6	10950 3746	2.92
## Y.mix_rep[257] 6	11406 3746	3.04
## Y.mix_rep[258] 6	11595 3746	3.10
## Y.mix_rep[259] 6	11223 3746	3.00
## Y.mix_rep[261] 6	11223 3746	3.00
## Y.mix_rep[262] 6	10950 3746	2.92
## Y.mix_rep[263] 6	11886 3746	3.17
## Y.mix_rep[265] 3	11220 3746	3.00
## Y.mix_rep[266] 6	11223 3746	3.00
## Y.mix_rep[267] 6	10860 3746	2.90
## Y.mix_rep[268] 6	11406 3746	3.04
## Y.mix_rep[269] 6	10770 3746	2.88
## Y.mix_rep[271] 6	11040 3746	2.95
## Y.mix_rep[274] 6	11595 3746	3.10
## Y.mix_rep[275] 6	11595 3746	3.10
## Y.mix_rep[277] 6	11130 3746	2.97
## Y.mix_rep[279] 6	11595 3746	3.10
## Y.mix_rep[280] 6	11313 3746	3.02
## Y.mix_rep[282] 6	11406 3746	3.04
## Y.mix_rep[283] 6	11406 3746	3.04
## Y.mix_rep[284] 6	11040 3746	2.95
## Y.mix_rep[285] 6	11130 3746	2.97
## Y.mix_rep[286] 6	11595 3746	3.10
## Y.mix_rep[289] 6	11223 3746	3.00
## Y.mix_rep[291] 6	10770 3746	2.88
## Y.mix_rep[292] 6	11223 3746	3.00
## Y.mix_rep[293] 6	11223 3746	3.00
## Y.mix_rep[294] 6	10860 3746	2.90
## Y.mix_rep[295] 6	11223 3746	3.00
## Y.mix_rep[296] 6	11130 3746	2.97
## Y.mix_rep[300] 6	11595 3746	3.10
## Y.mix_rep[302] 6	11313 3746	3.02
## Y.mix_rep[303] 6	11313 3746	3.02
## Y.mix_rep[304] 6	11040 3746	2.95
## Y.mix_rep[305] 6	11595 3746	3.10
## Y.mix_rep[306] 6	11406 3746	3.04
## Y.mix_rep[307] 6	11040 3746	2.95
## Y.mix_rep[308] 6	11313 3746	3.02
## Y.mix_rep[309] 6	11223 3746	3.00
## Y.mix_rep[310] 6	11040 3746	2.95
## Y.mix_rep[311] 6	10950 3746	2.92

```

## Y.mix_rep[314] 6      11505 3746      3.07
## Y.mix_rep[315] 6      11223 3746      3.00
## Y.mix_rep[316] 6      11223 3746      3.00
## Y.mix_rep[317] 6      11502 3746      3.07
## Y.mix_rep[318] 6      11223 3746      3.00
## Y.mix_rep[319] 6      11502 3746      3.07
## Y.mix_rep[320] 6      11223 3746      3.00
## Y.mix_rep[321] 6      11130 3746      2.97
## Y.mix_rep[322] 6      10860 3746      2.90
## Y.mix_rep[323] 6      11040 3746      2.95
## Y.mix_rep[324] 6      11595 3746      3.10
## Y.mix_rep[325] 6      11313 3746      3.02
## Y.mix_rep[327] 6      11313 3746      3.02
## Y.mix_rep[328] 6      10860 3746      2.90
## Y.mix_rep[329] 6      11595 3746      3.10
## Y.mix_rep[330] 6      11313 3746      3.02
## Y.mix_rep[331] 6      11313 3746      3.02
## Y.mix_rep[332] 6      11088 3746      2.96
## Y.mix_rep[334] 6      11223 3746      3.00
## Y.mix_rep[335] 6      11313 3746      3.02
## Y.mix_rep[336] 6      11313 3746      3.02
## Y.mix_rep[337] 6      11223 3746      3.00
## Y.mix_rep[338] 6      11040 3746      2.95
## Y.mix_rep[339] 6      11406 3746      3.04
## Y.mix_rep[340] 6      11502 3746      3.07

```

```

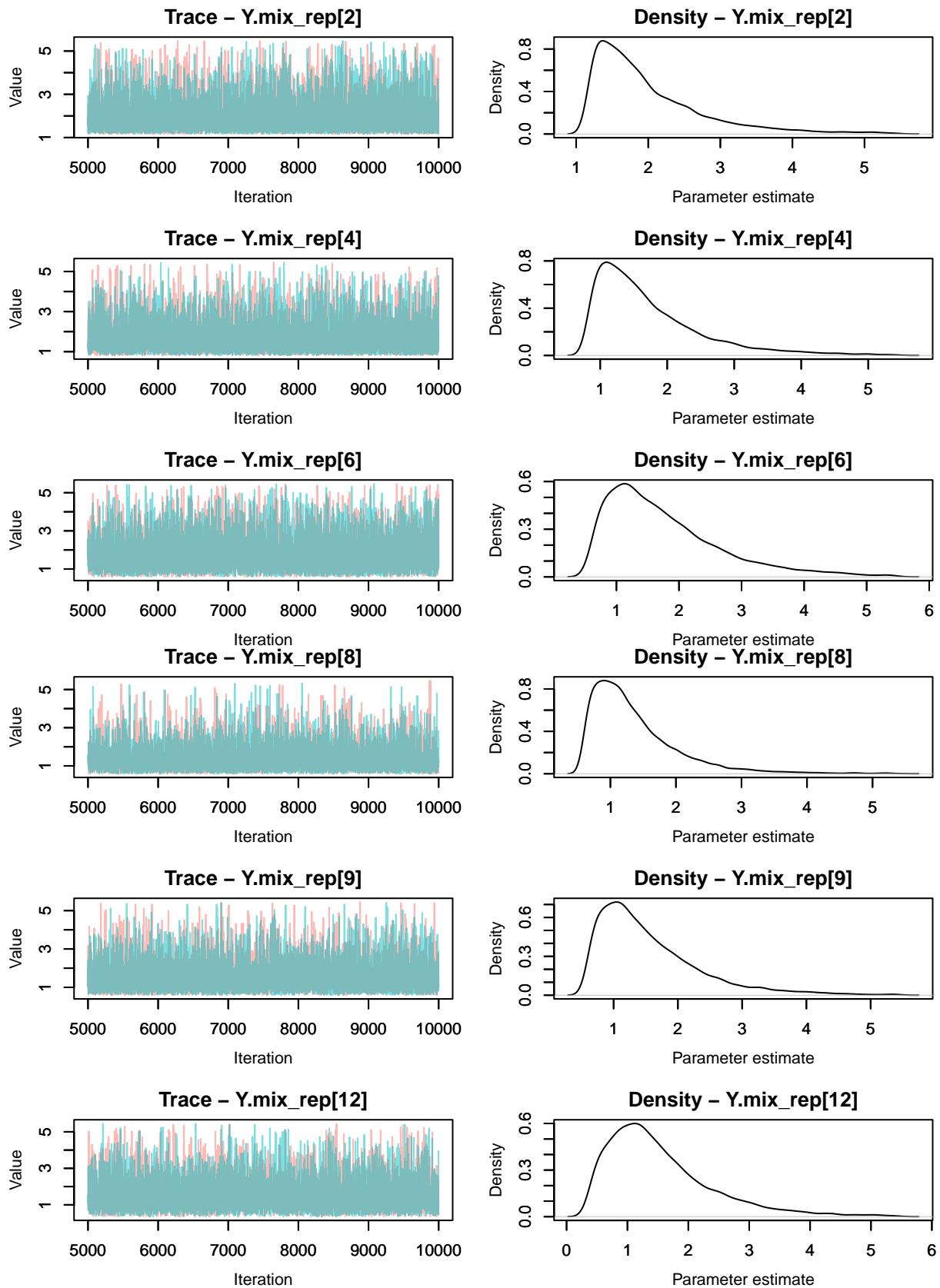
# Minimum required number of MCMC samples to ensure that sufficient samples had
# been collected to achieve good accuracy is 3746. We had 10,000 per chain
# (10,000 × 2 = 20,000).

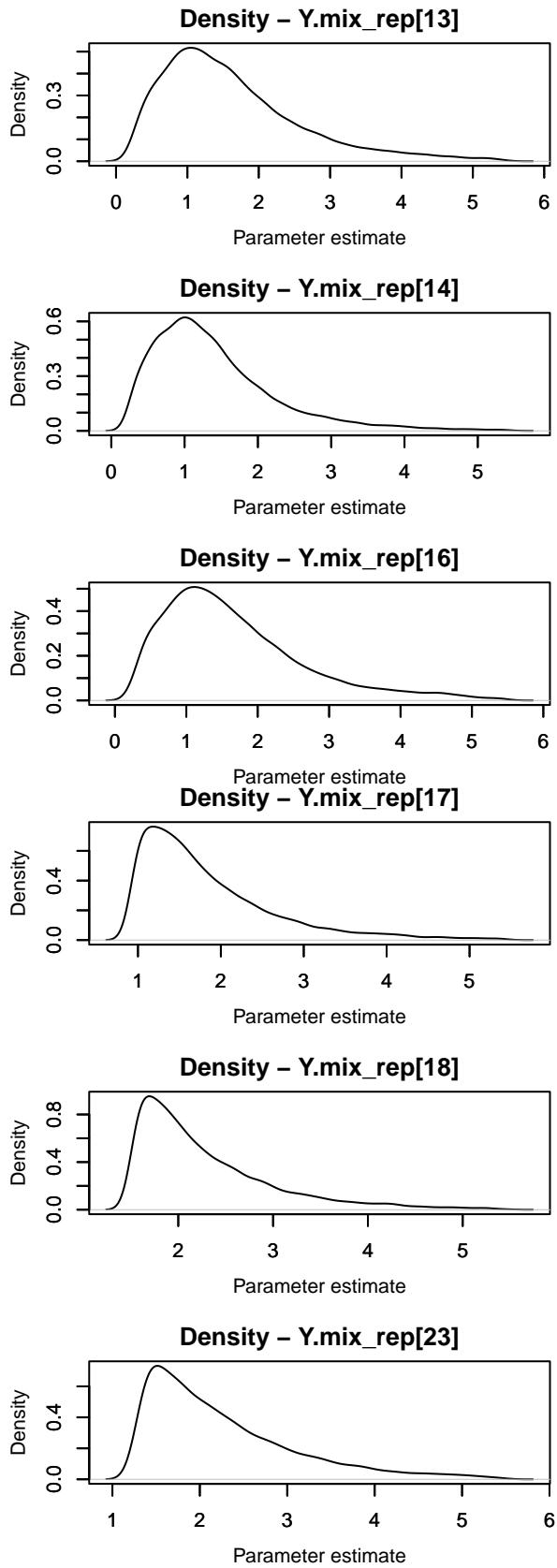
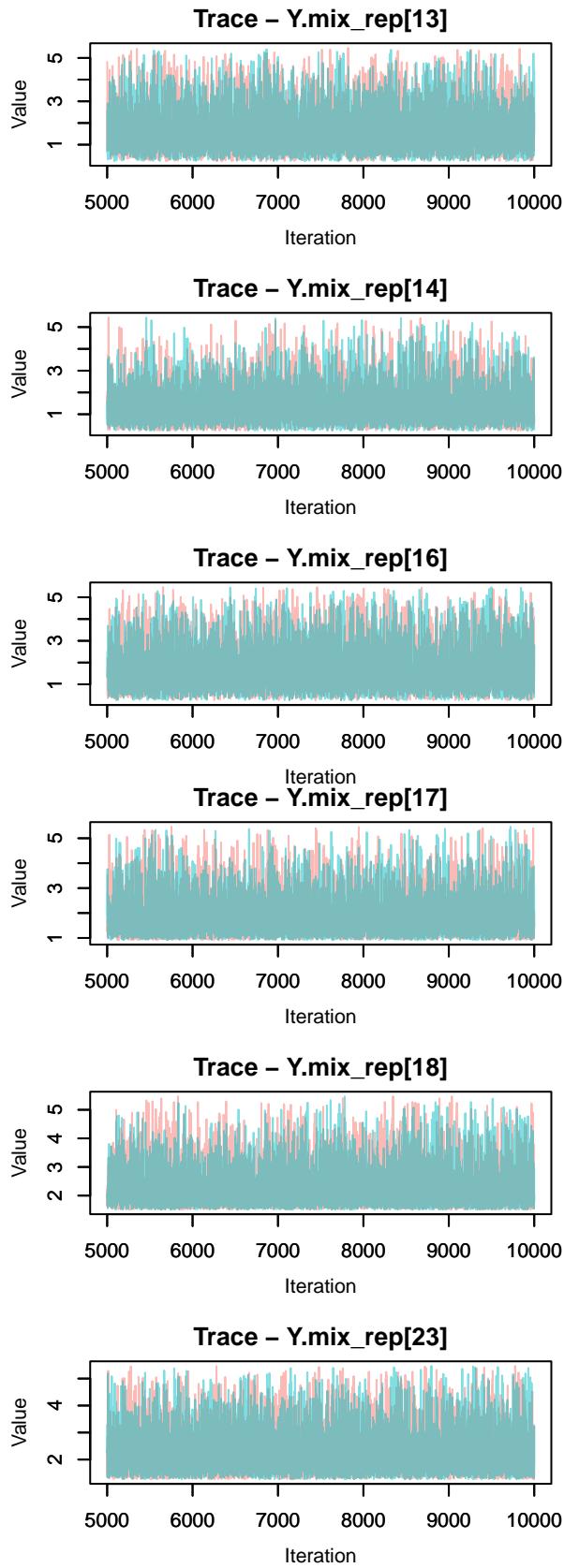
```

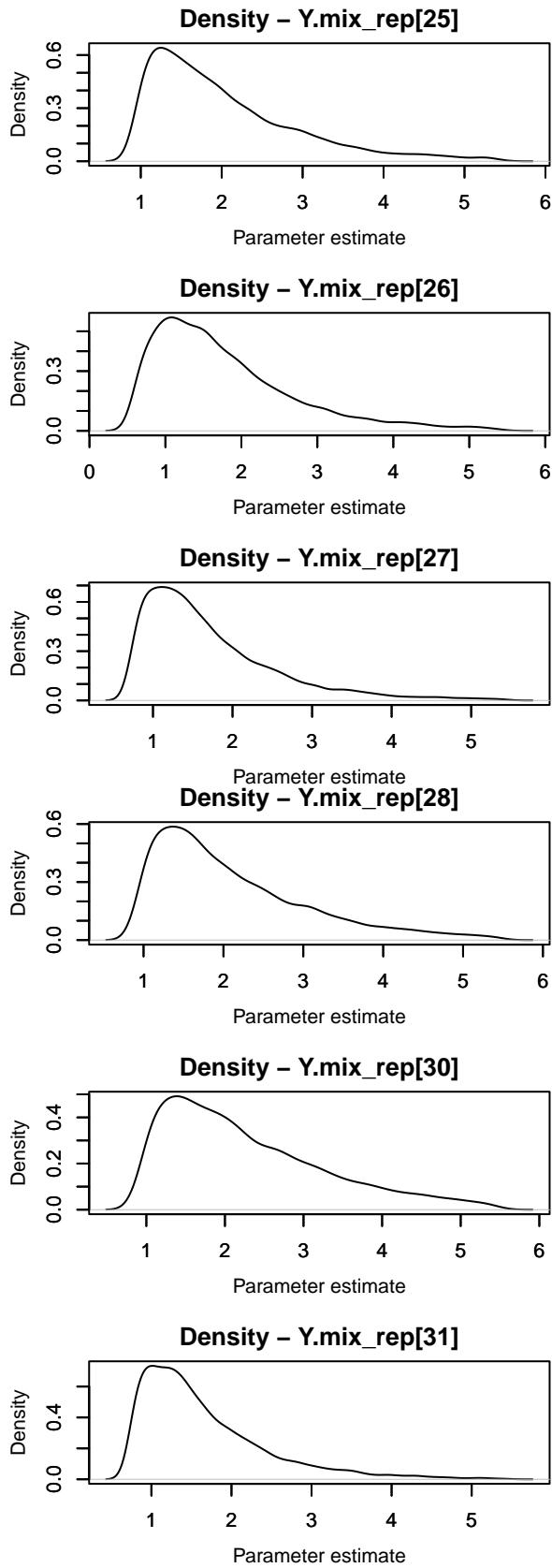
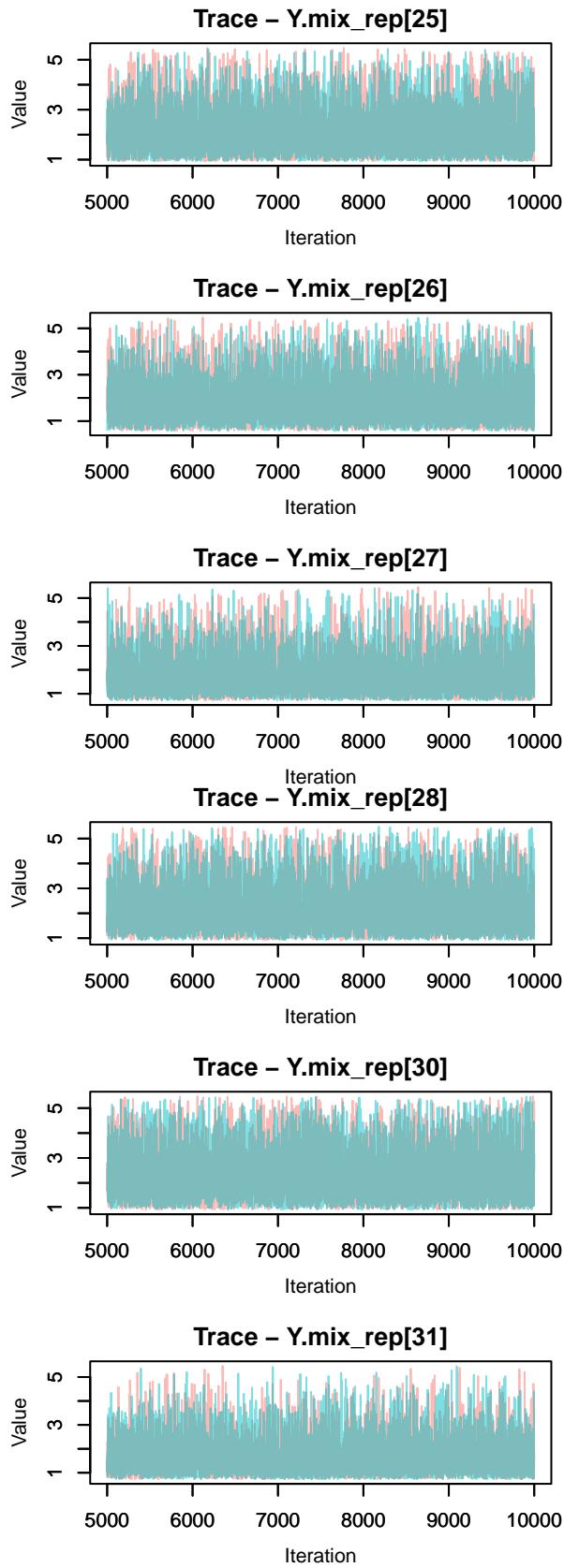
```

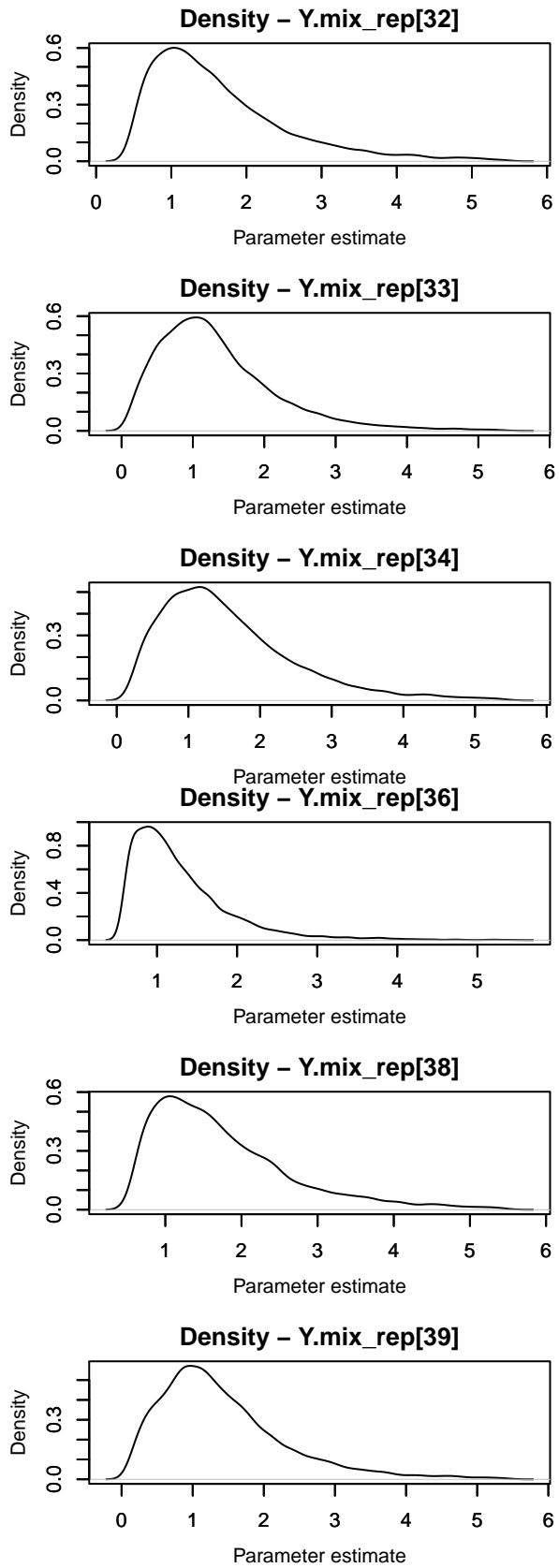
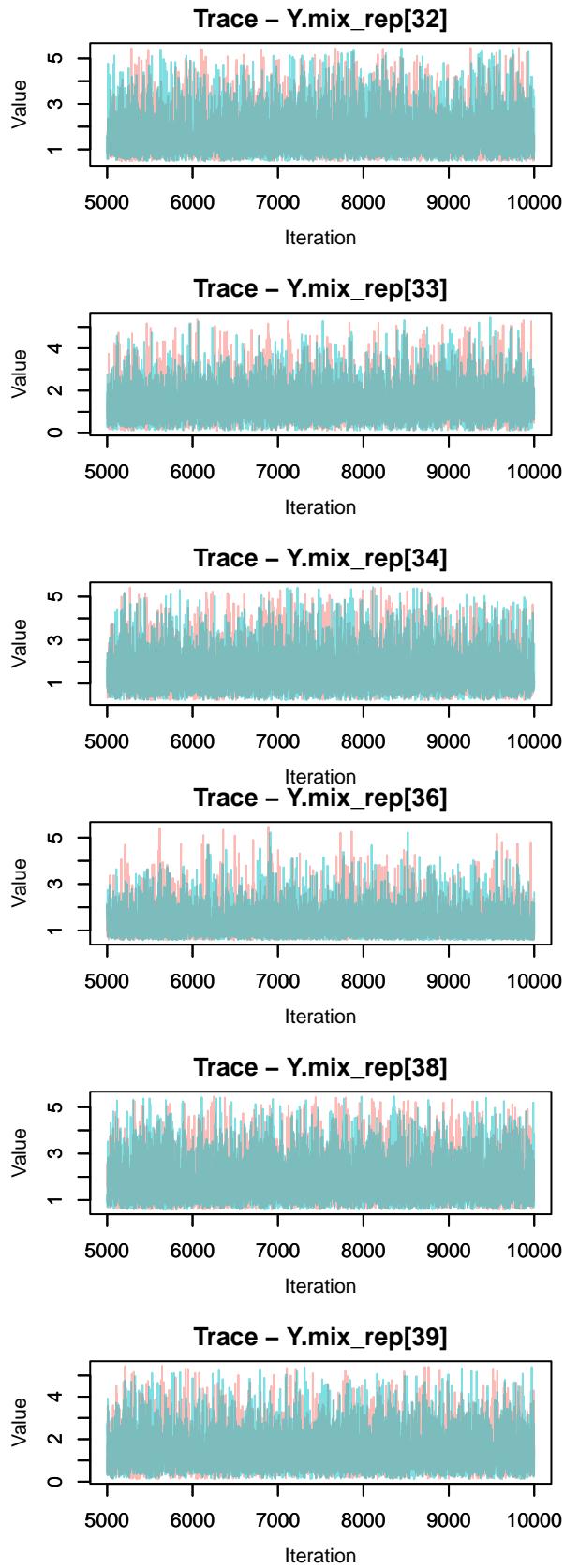
# For the Goodness of fit test, it is only the distribution of Y.mix_rep
# (OS prediction) that we are interested in. Here we plot the traceplot of the
# Y.mix_rep of all patients with censored death time.
MCMCvis::MCMCtrace(JM_sample1, params = par_name, exact = TRUE, ISB = FALSE, pdf = FALSE)

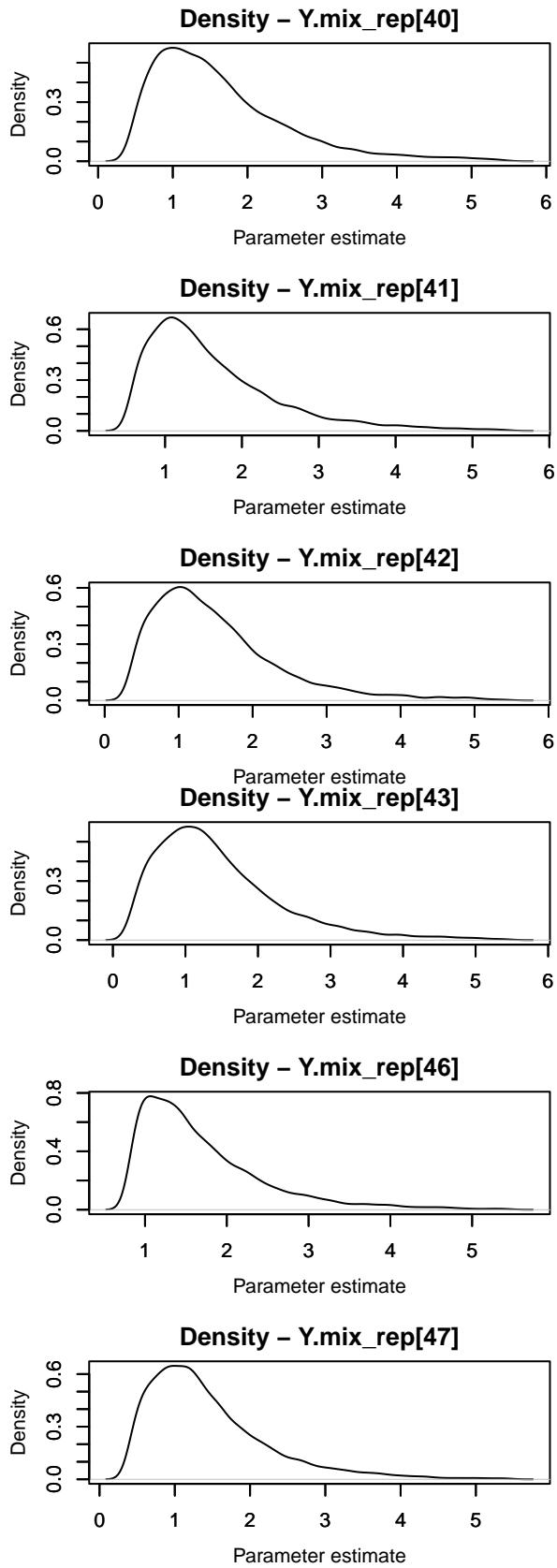
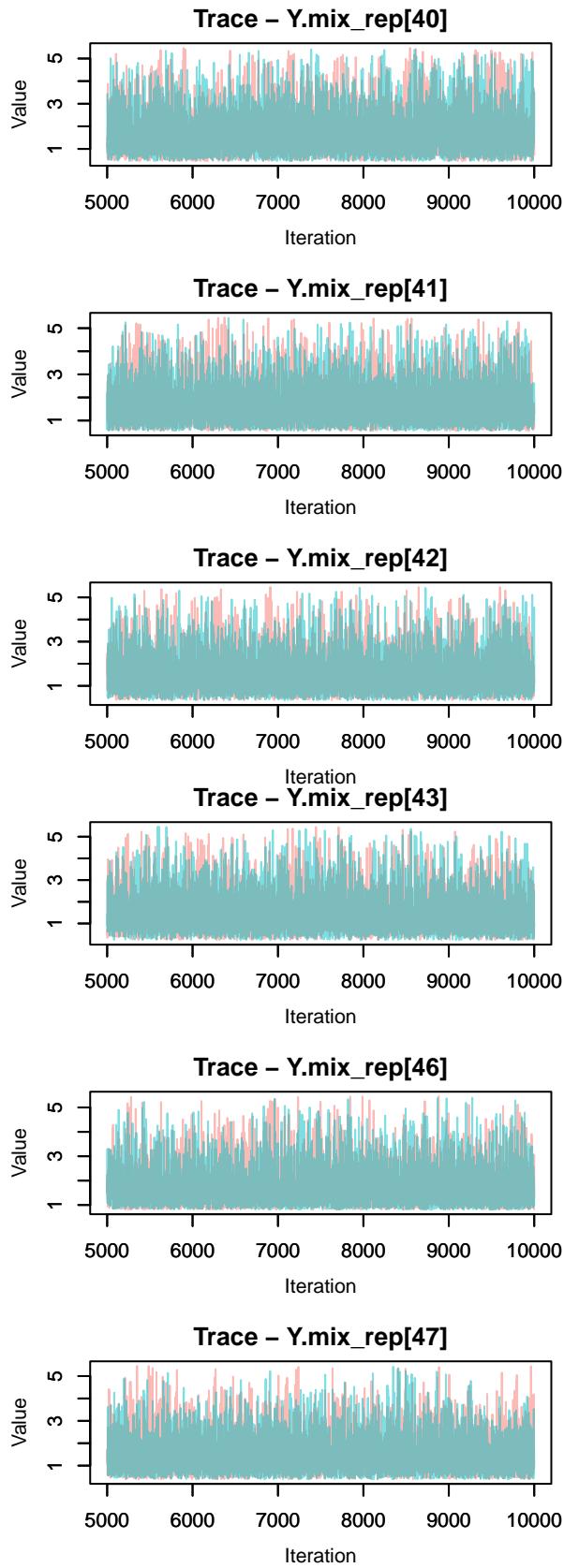
```

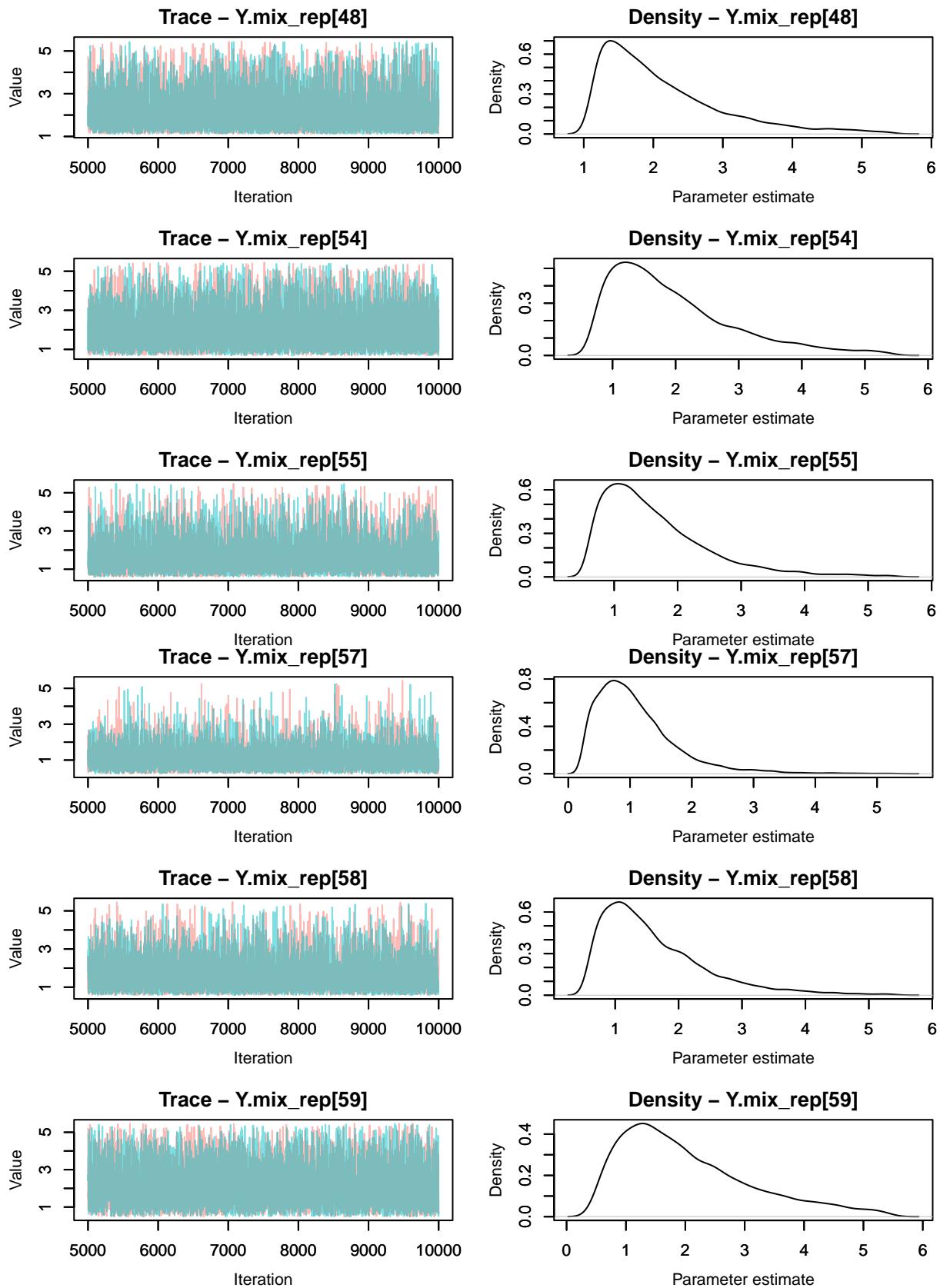


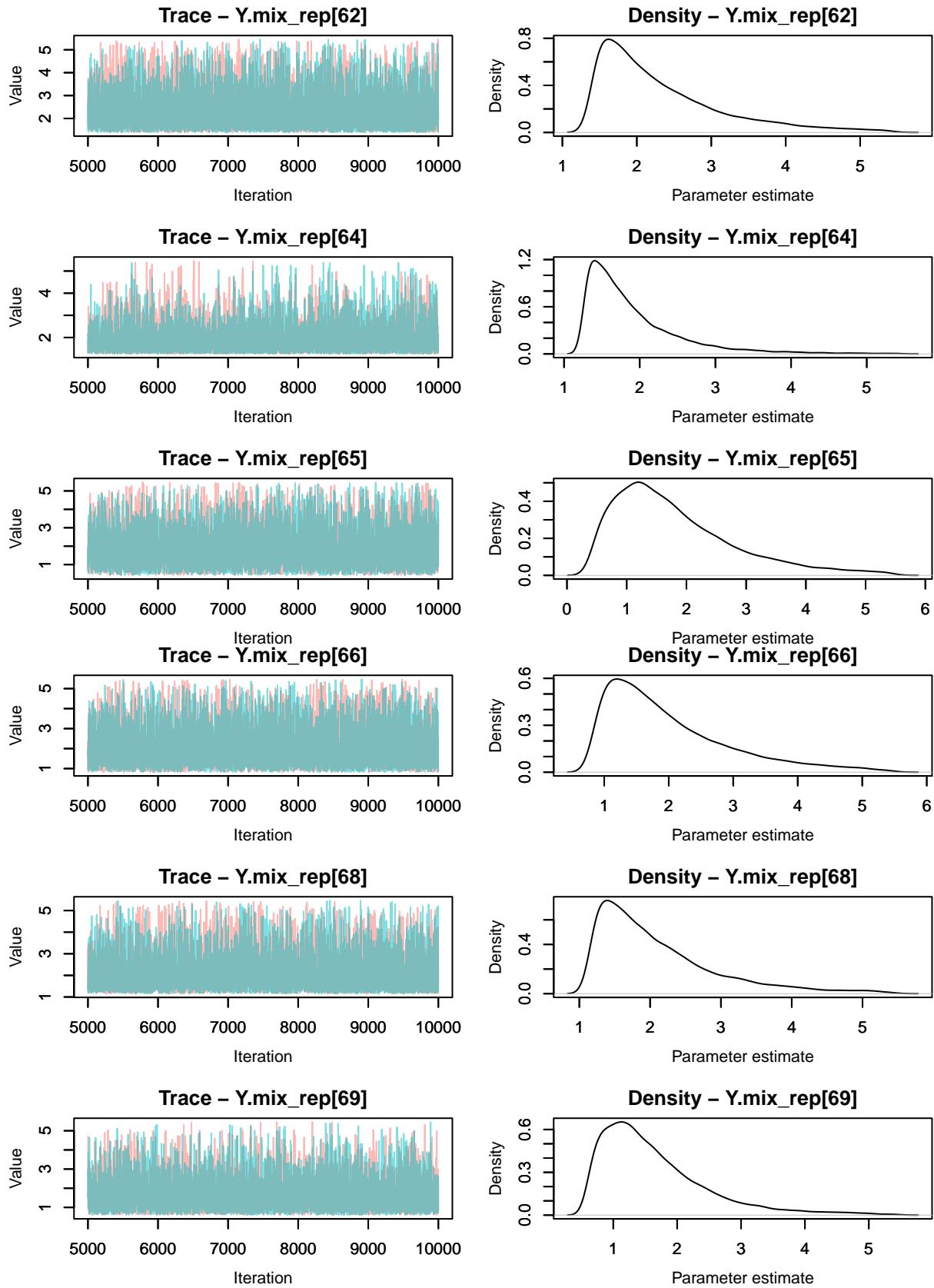


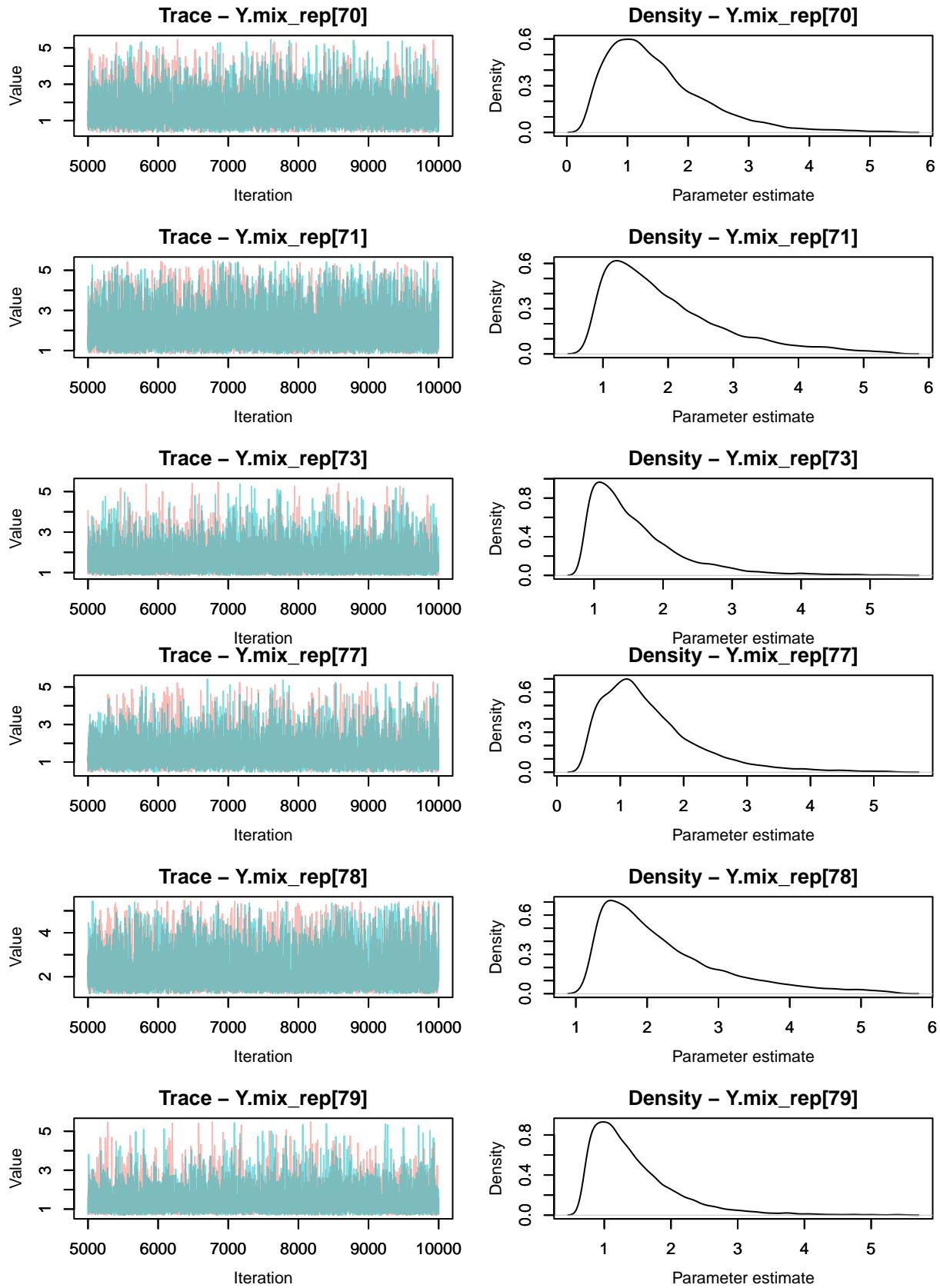


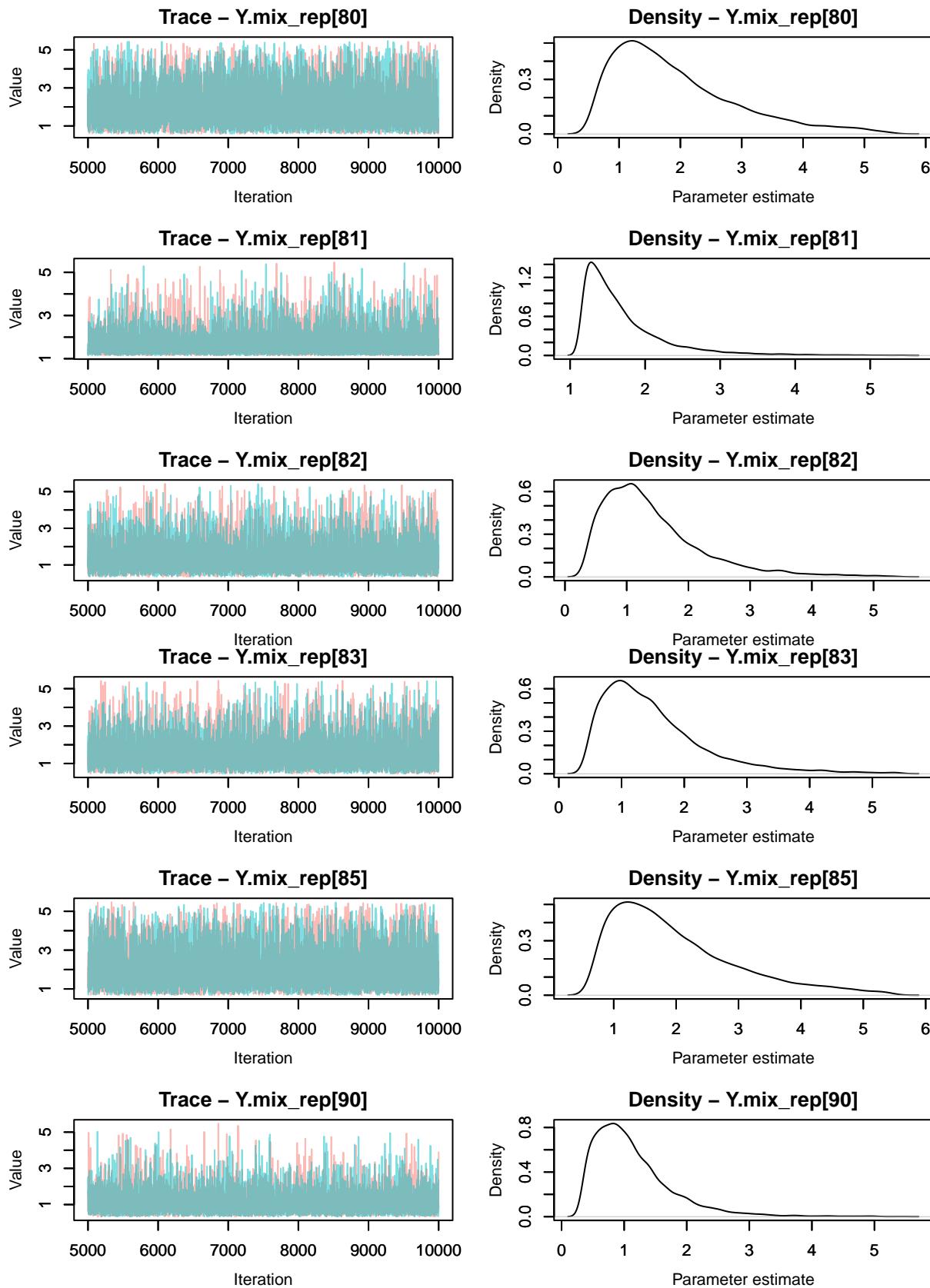


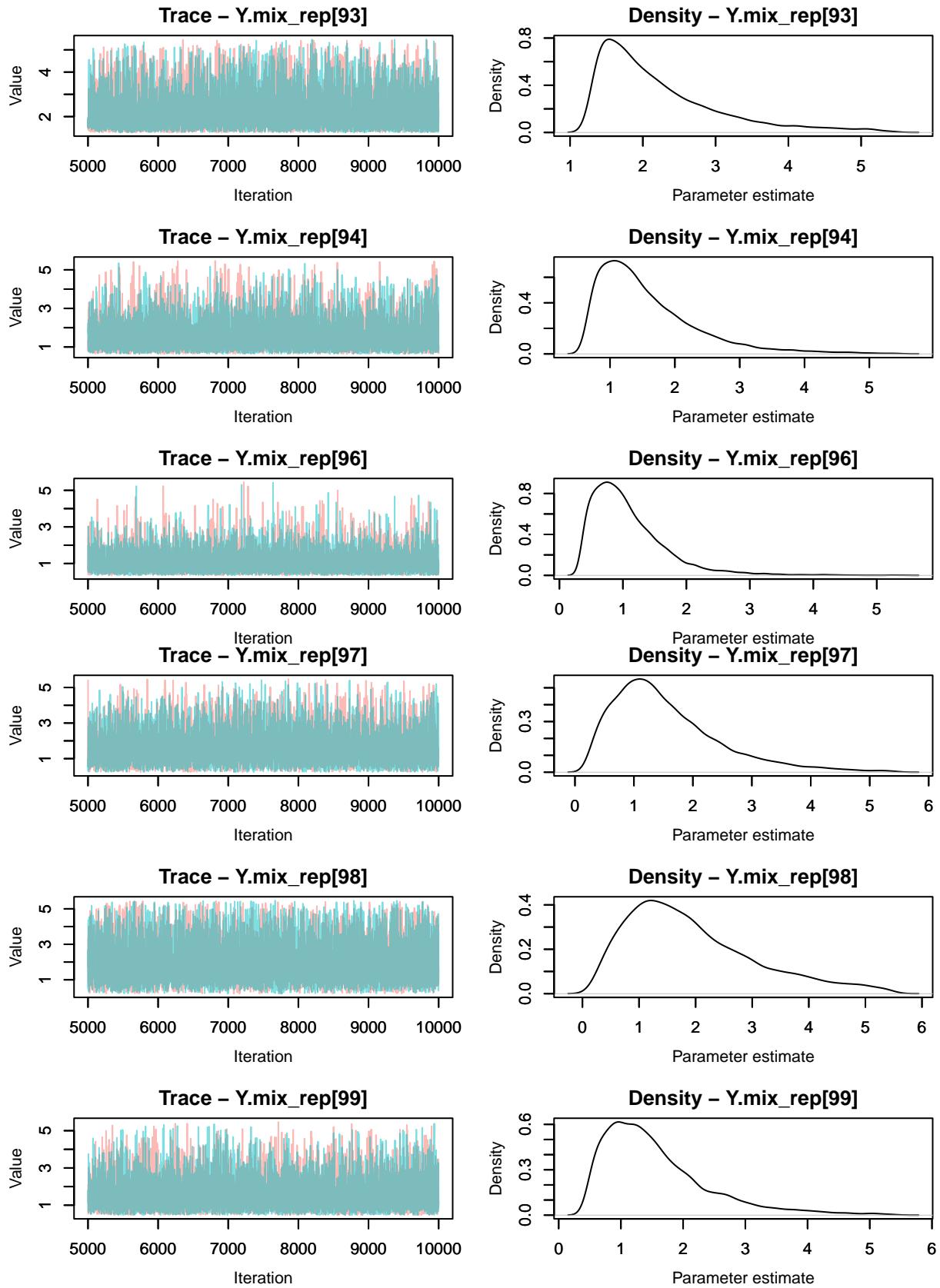


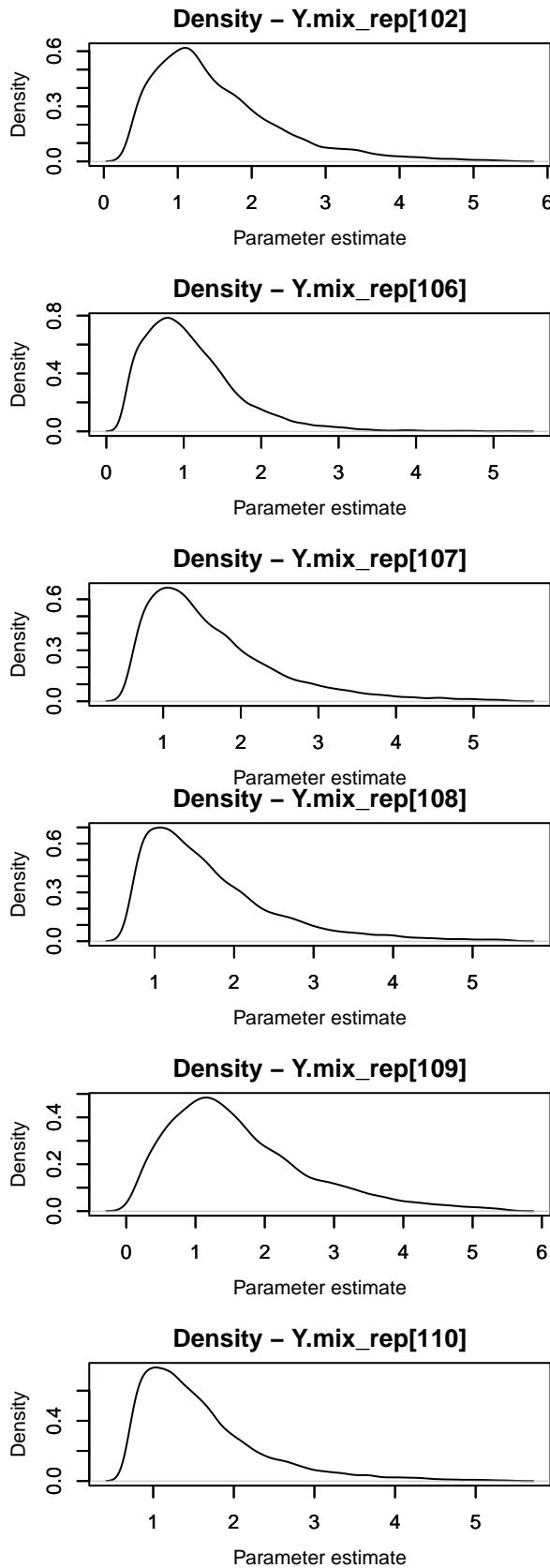
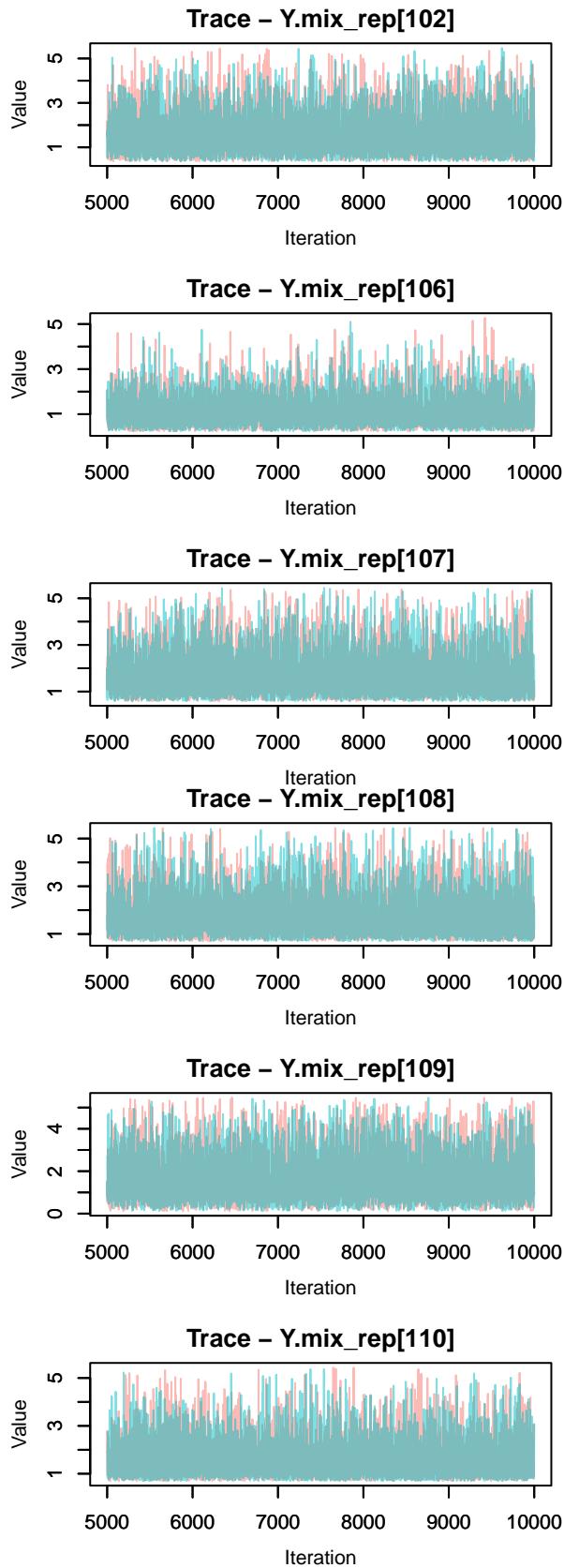


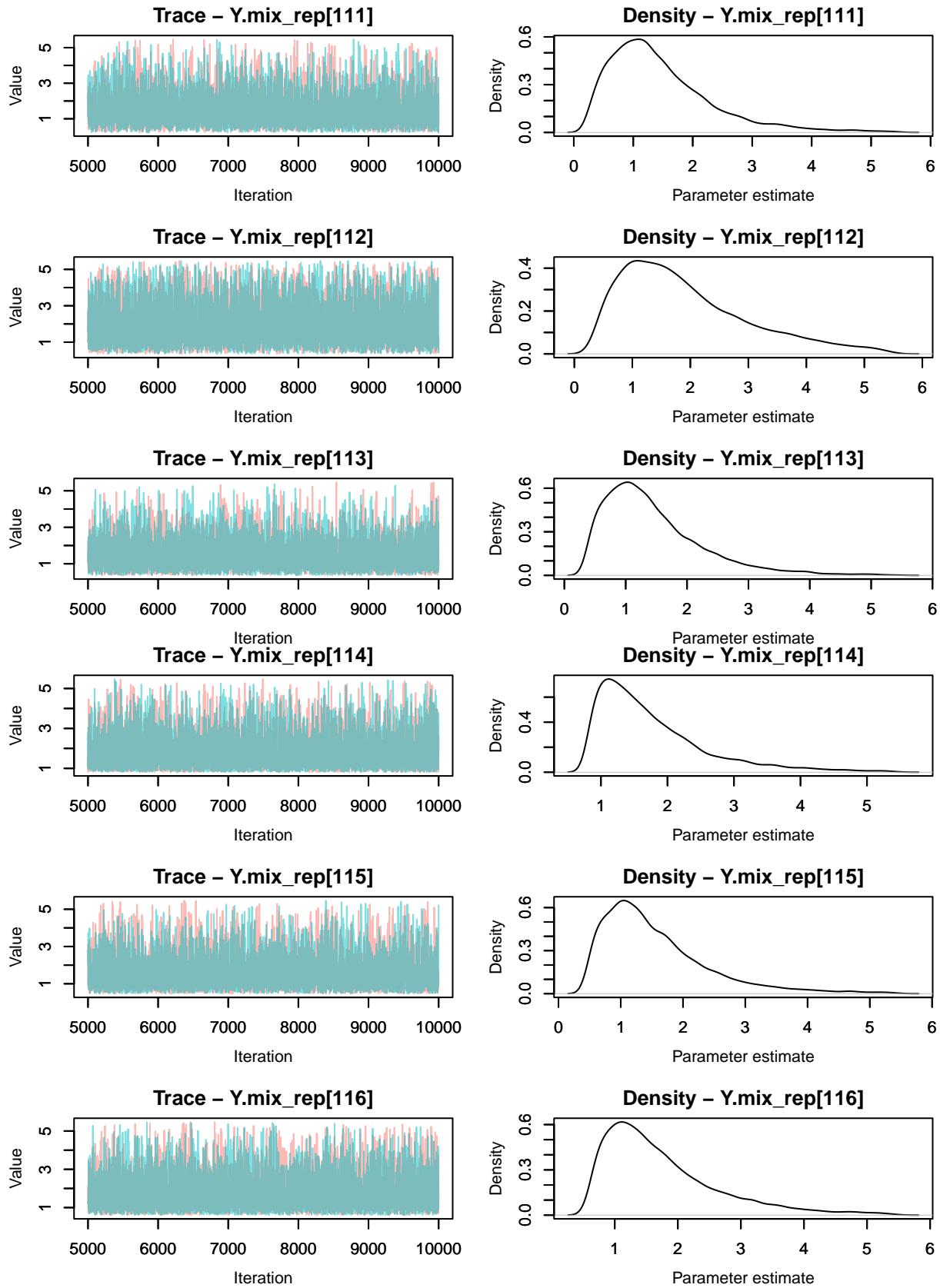


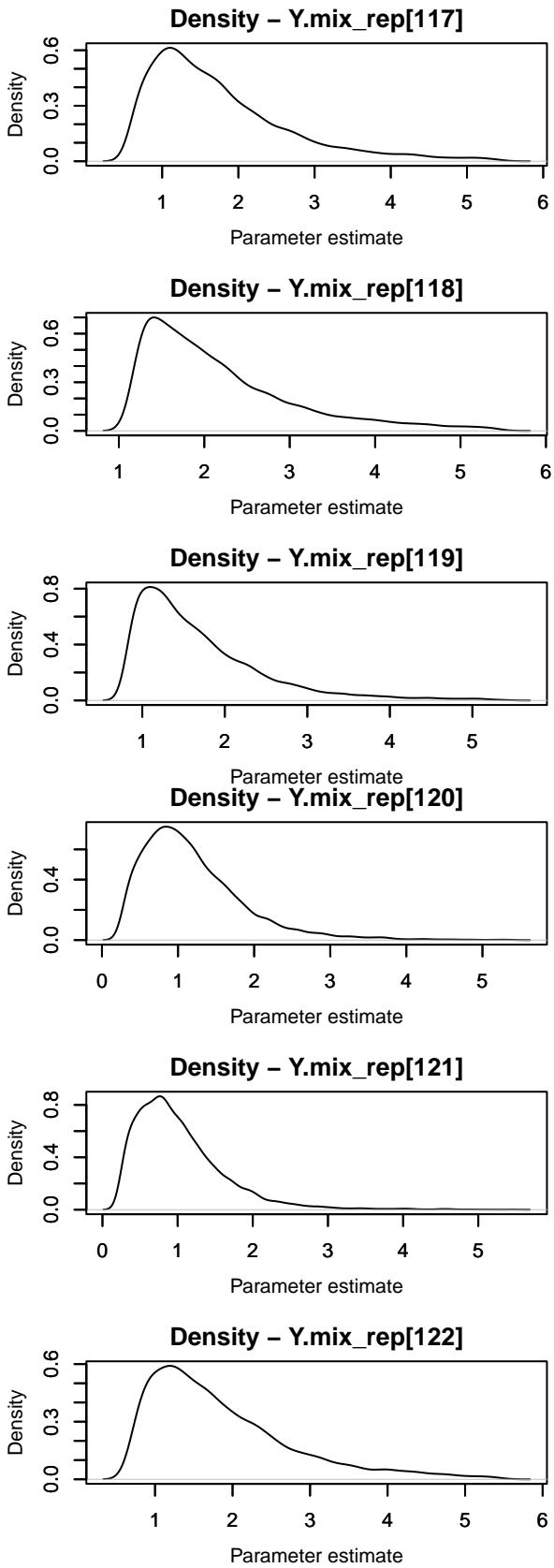
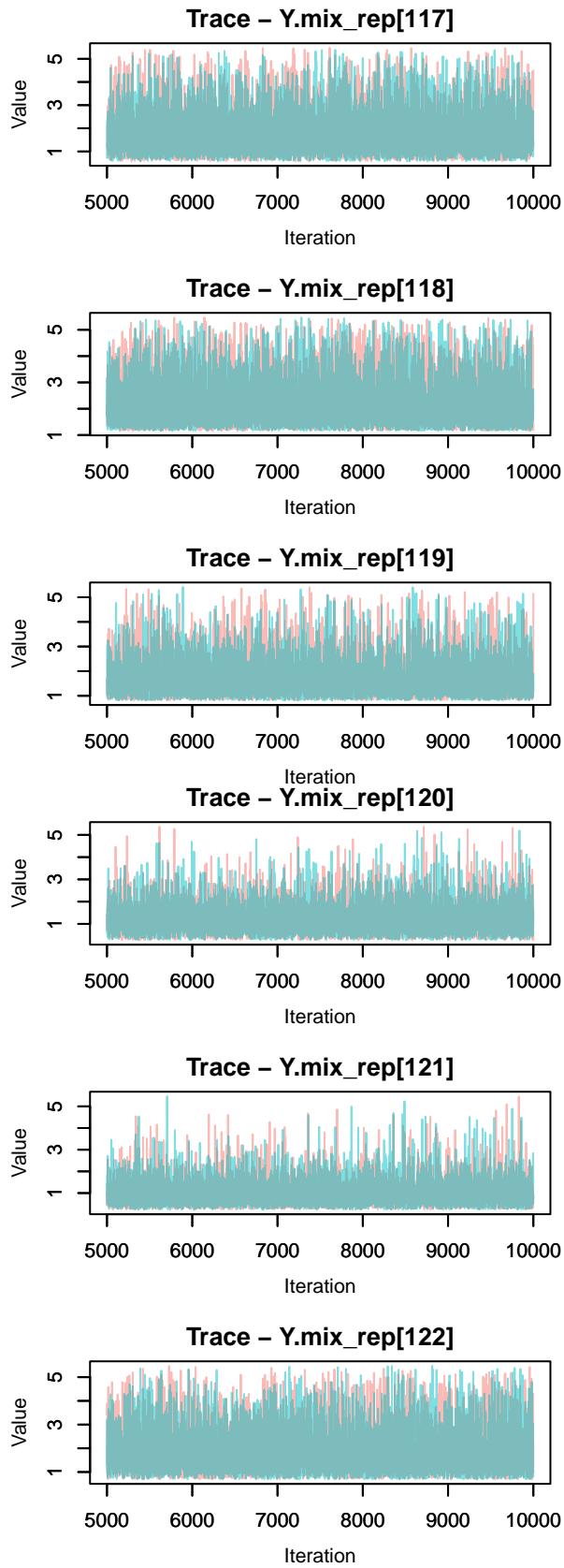


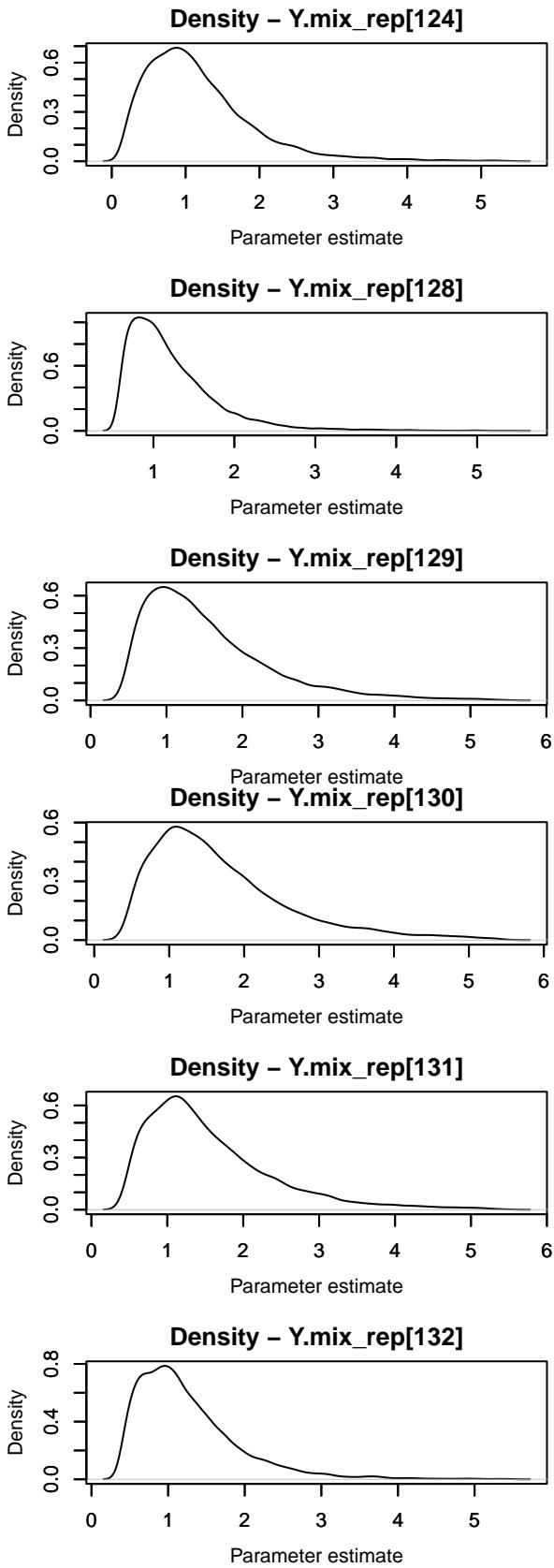
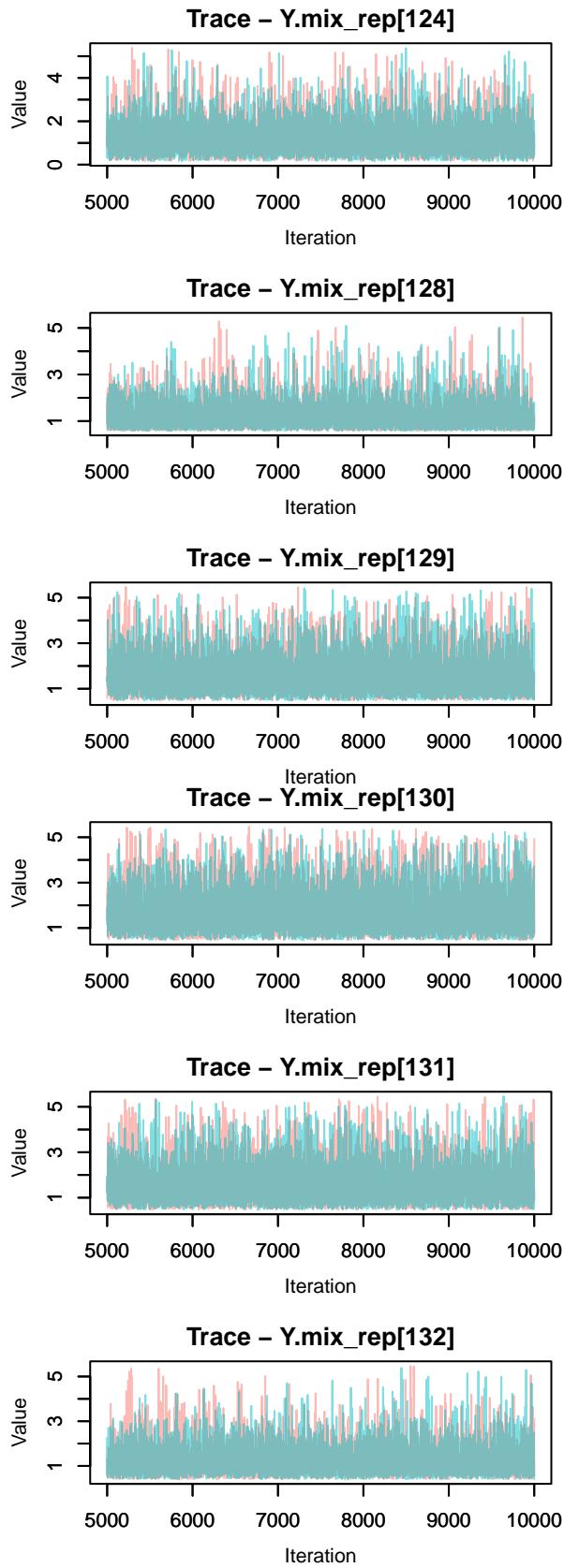


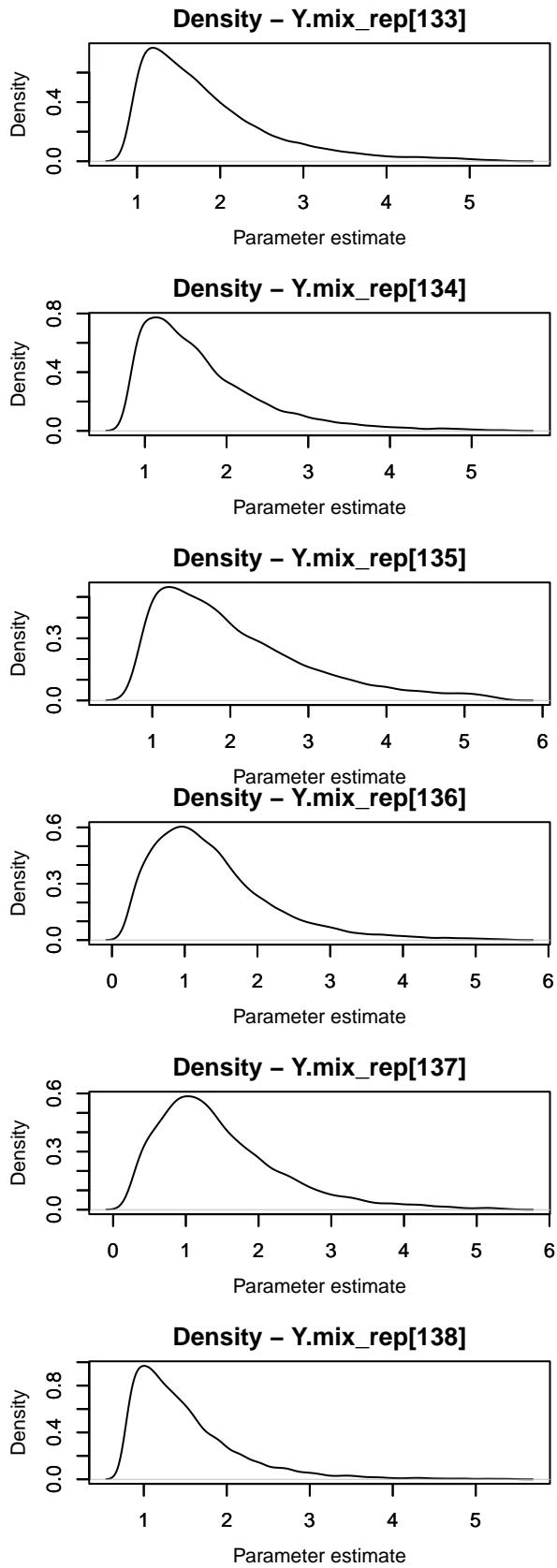
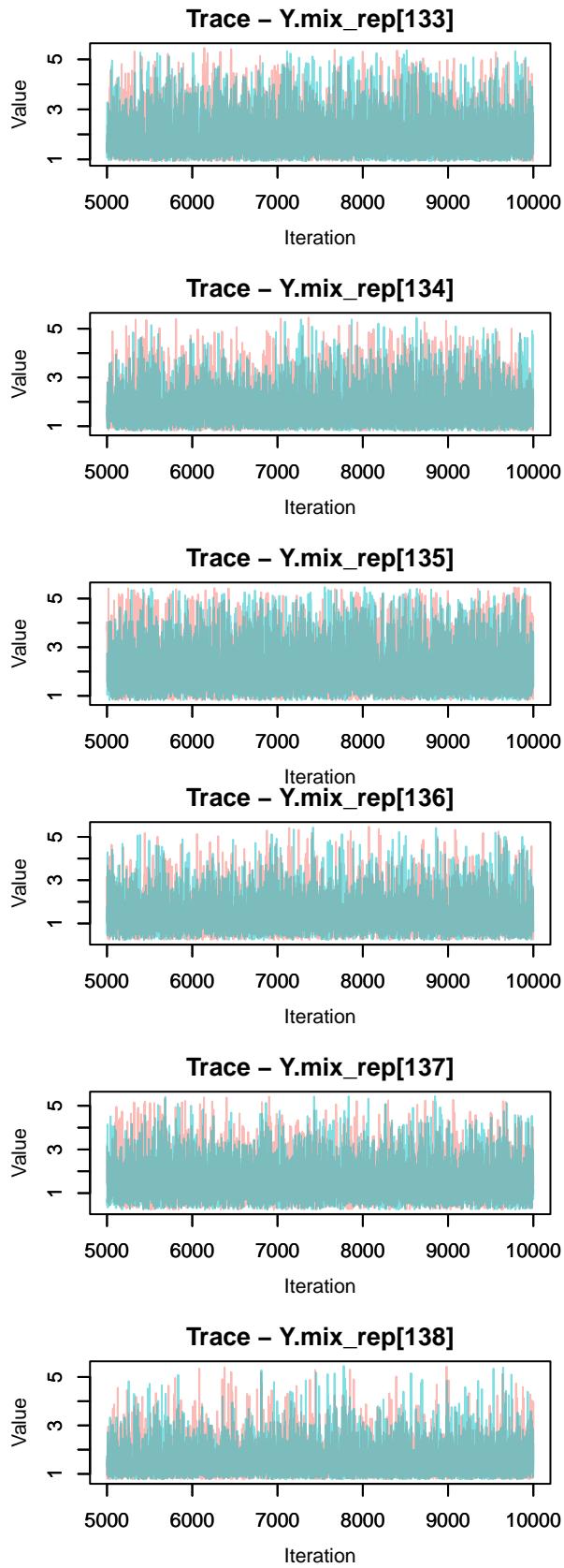


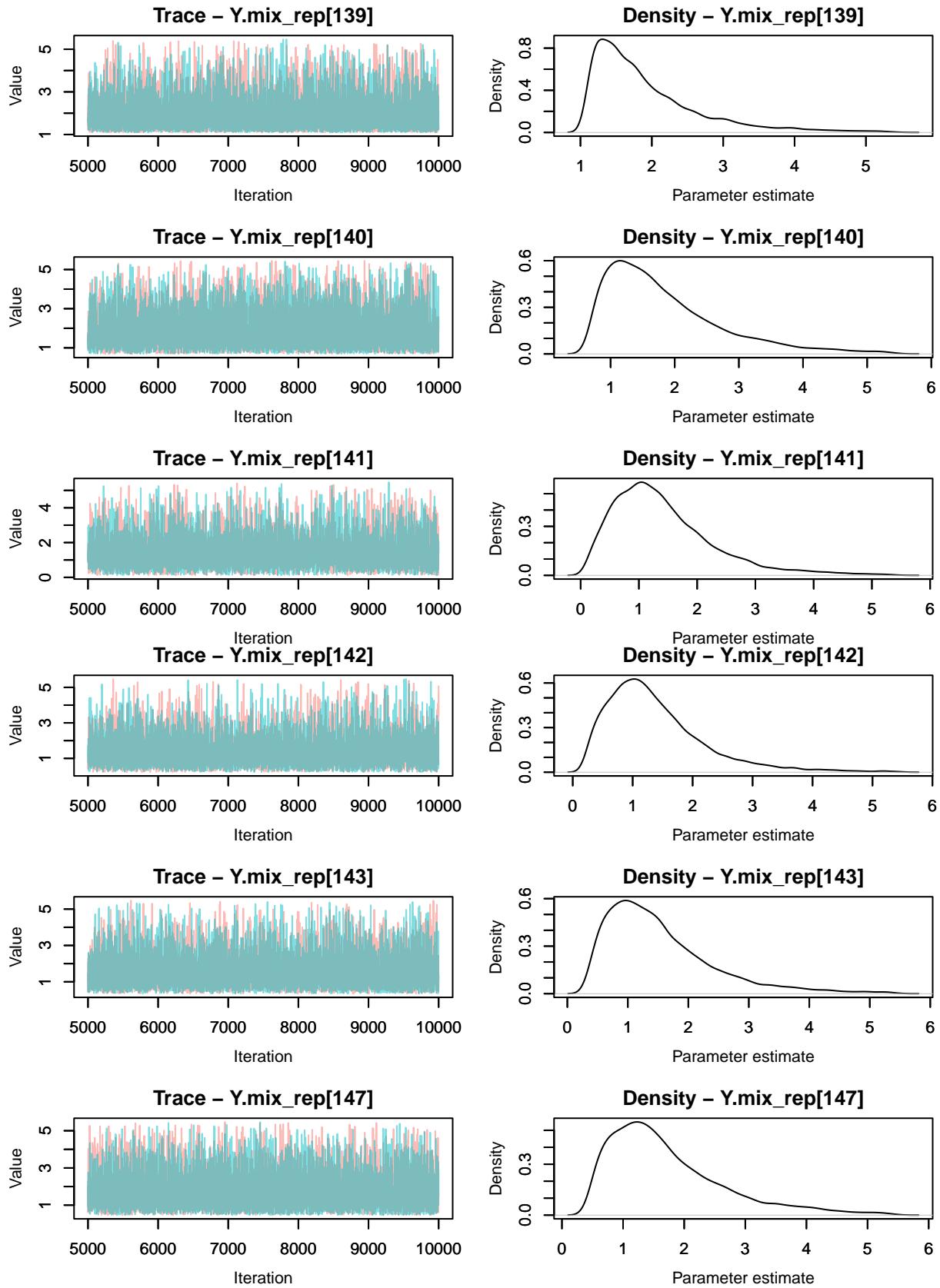


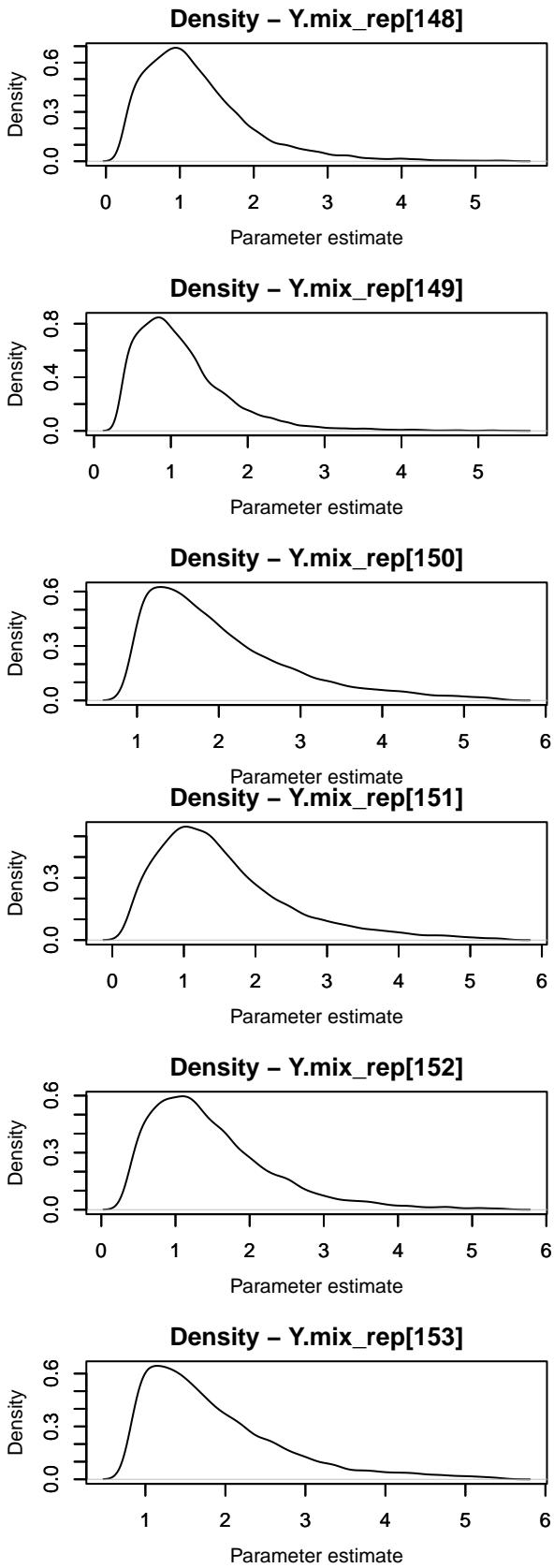
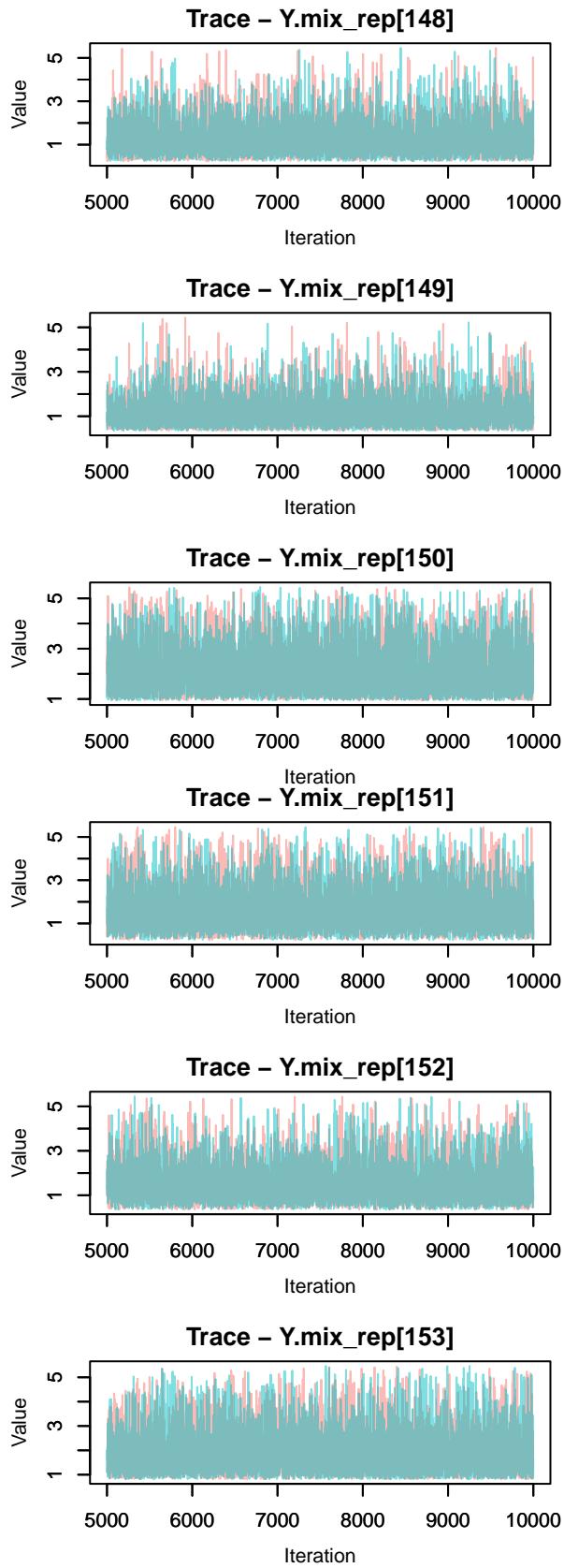


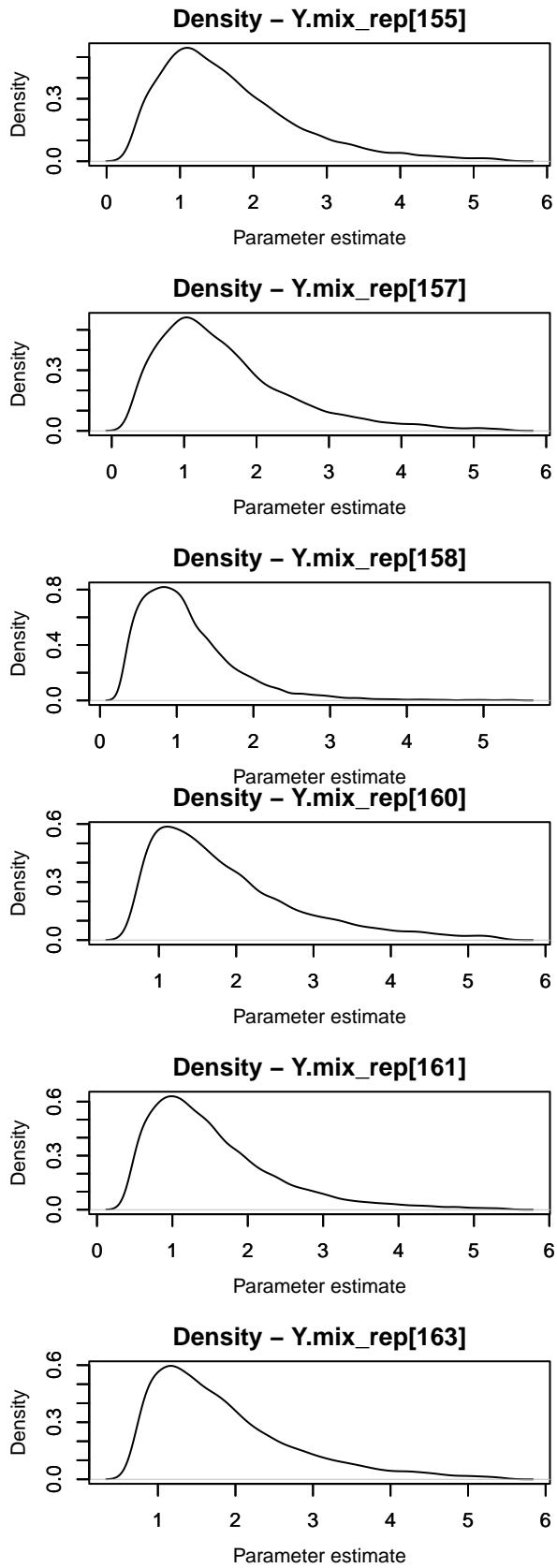
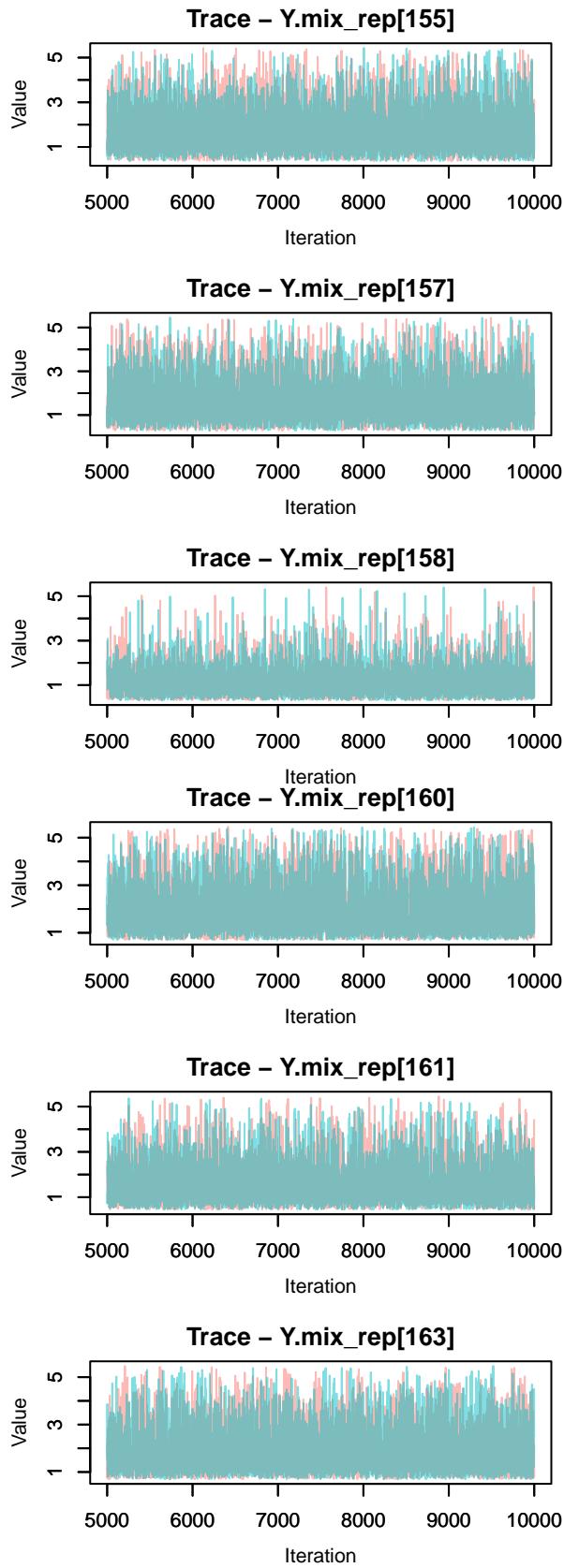


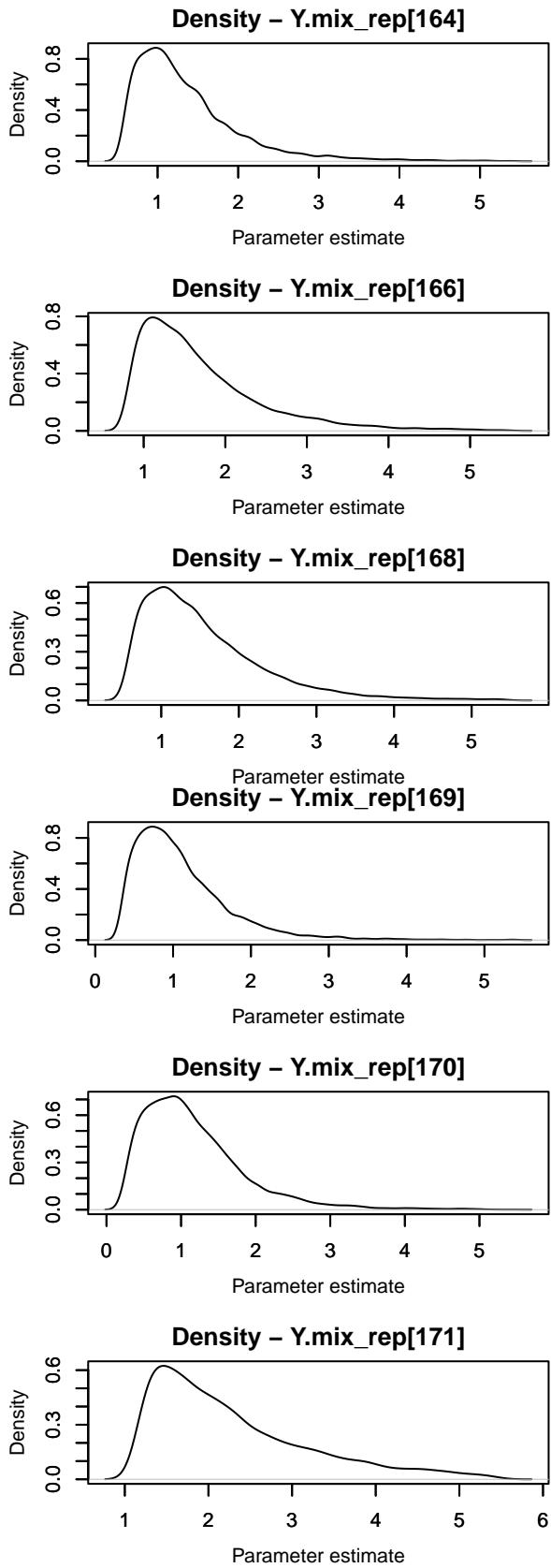
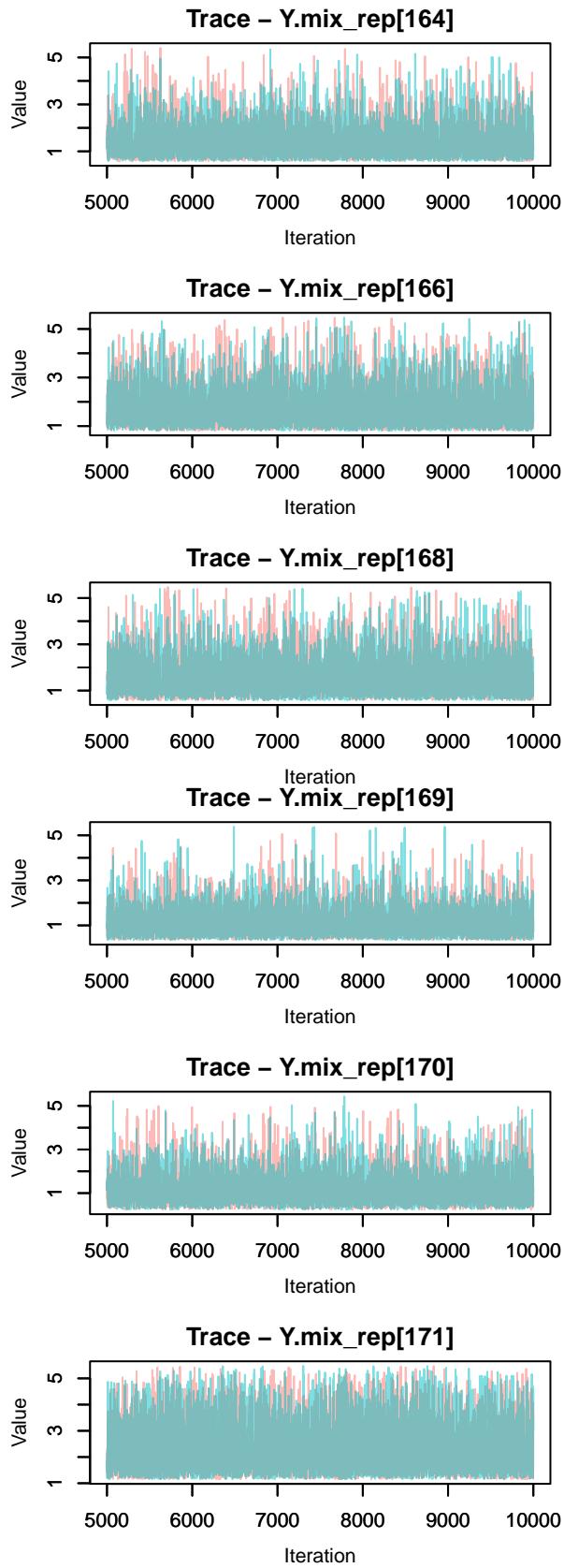


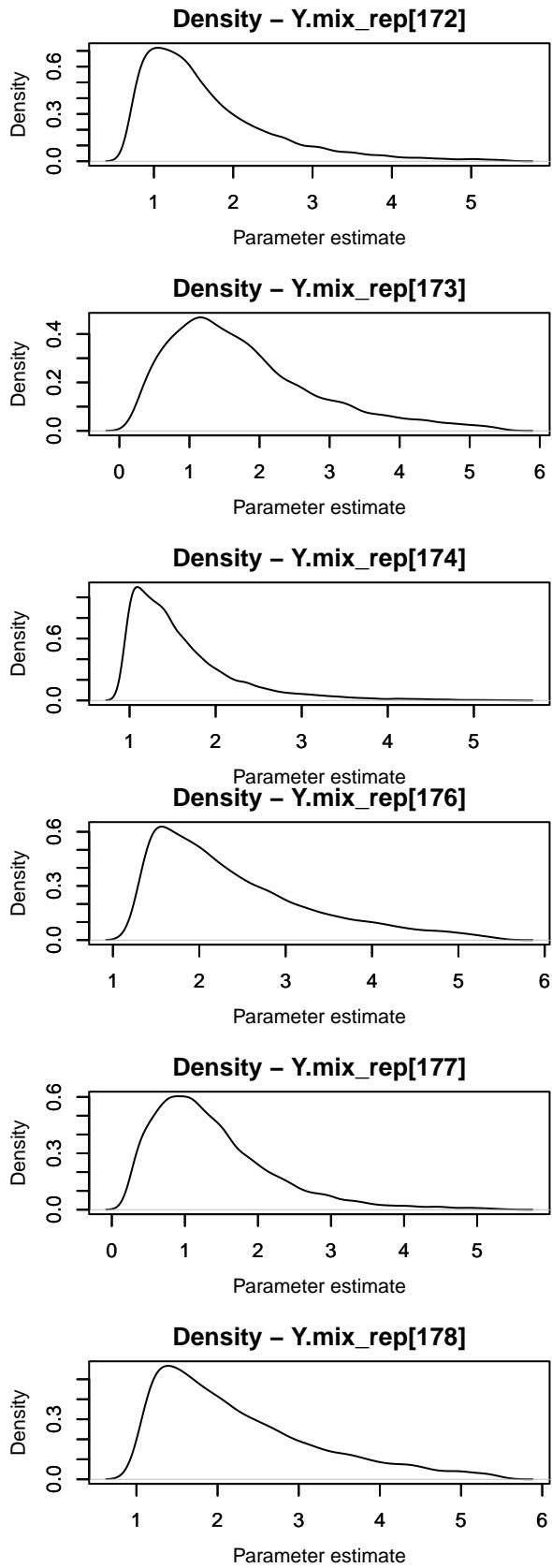
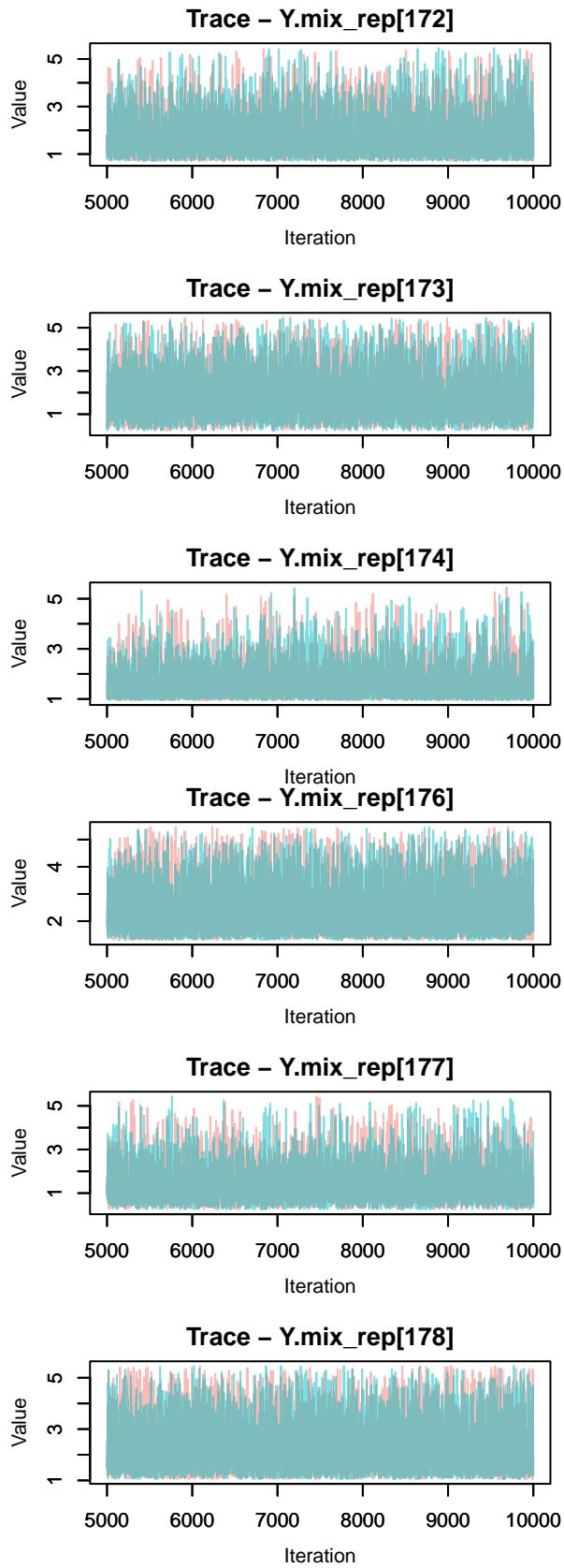


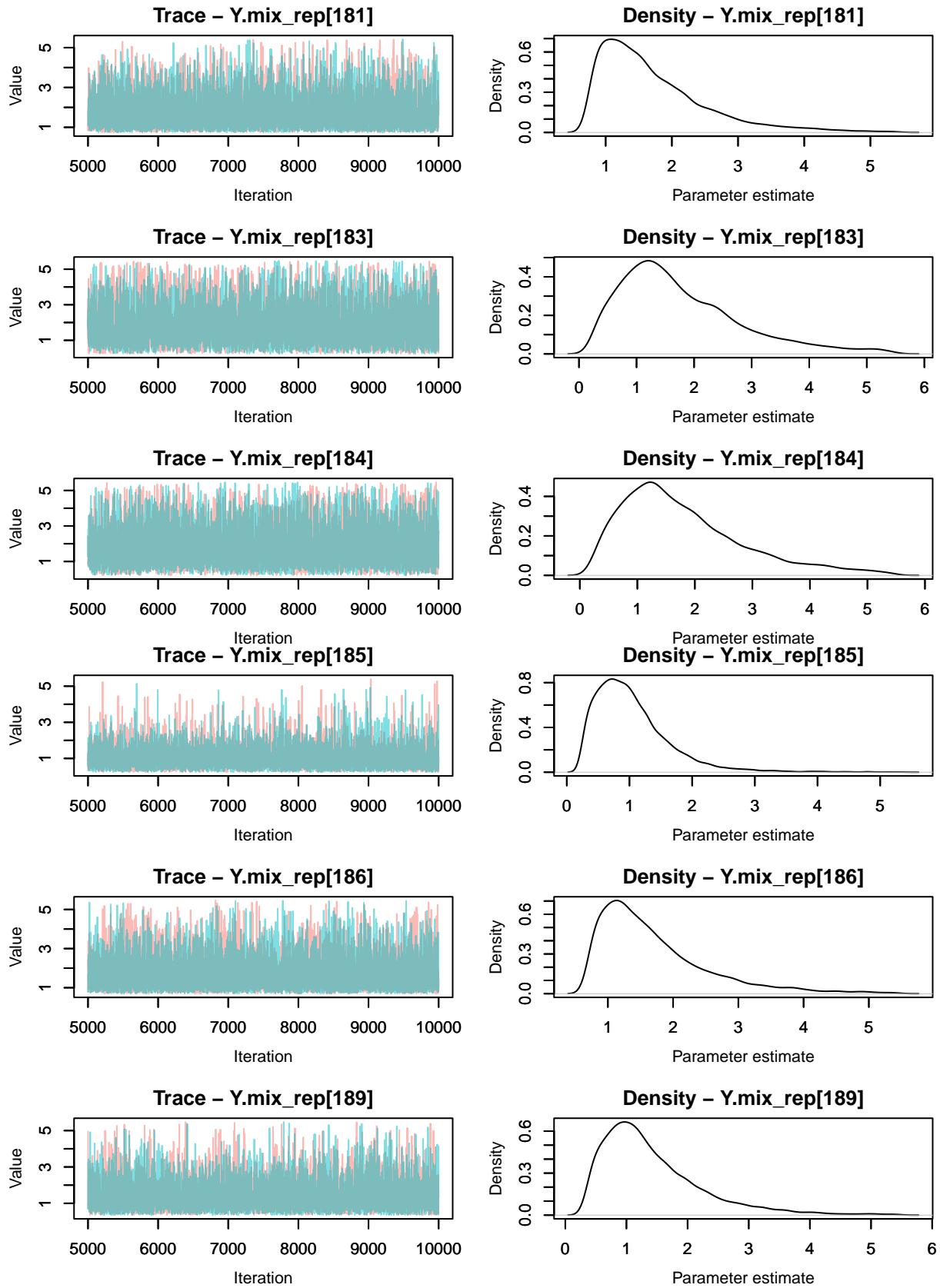


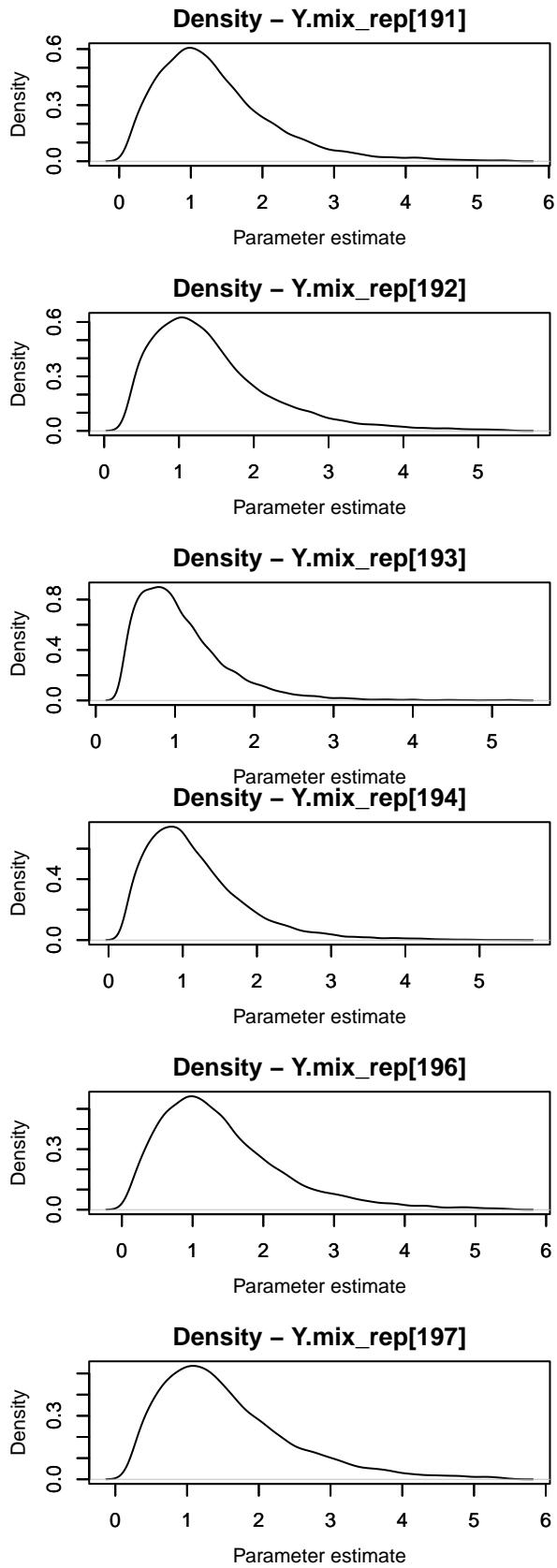
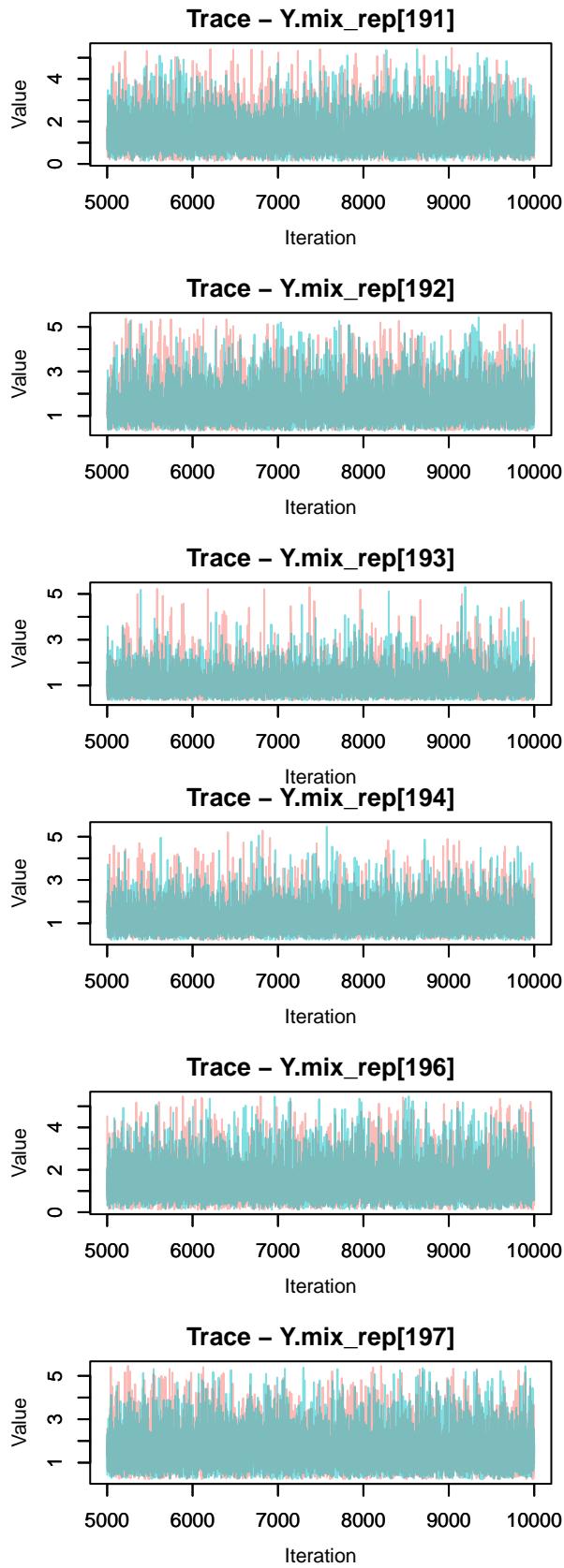


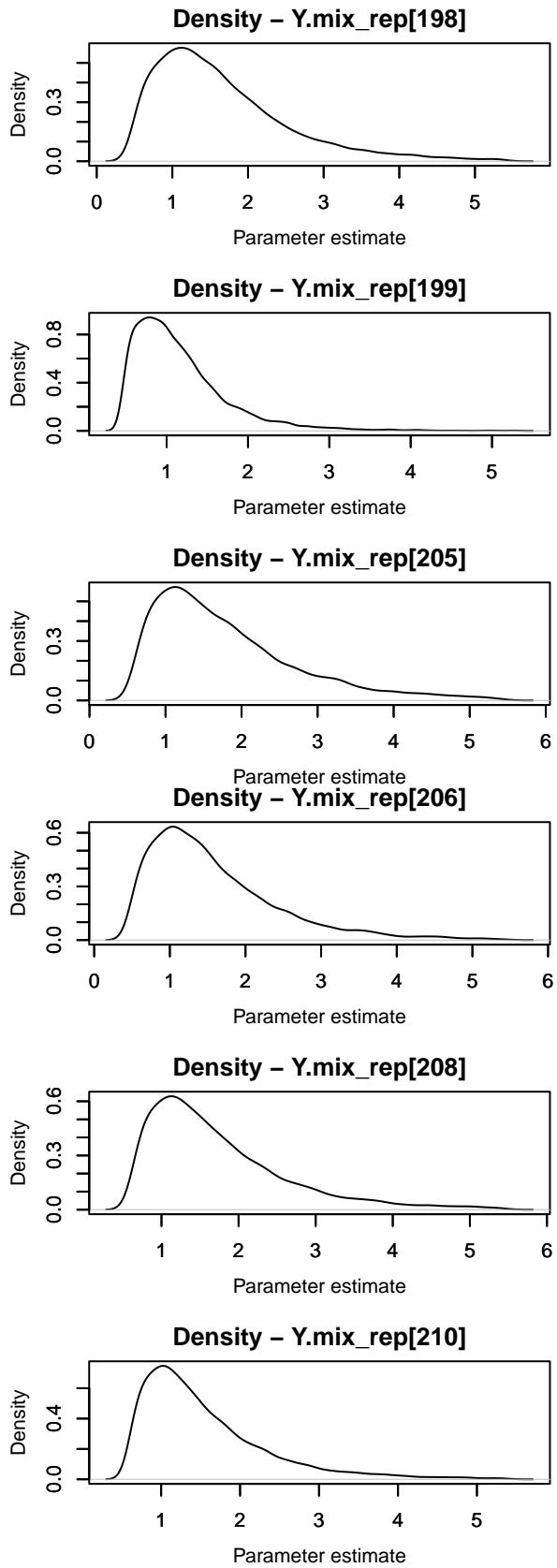
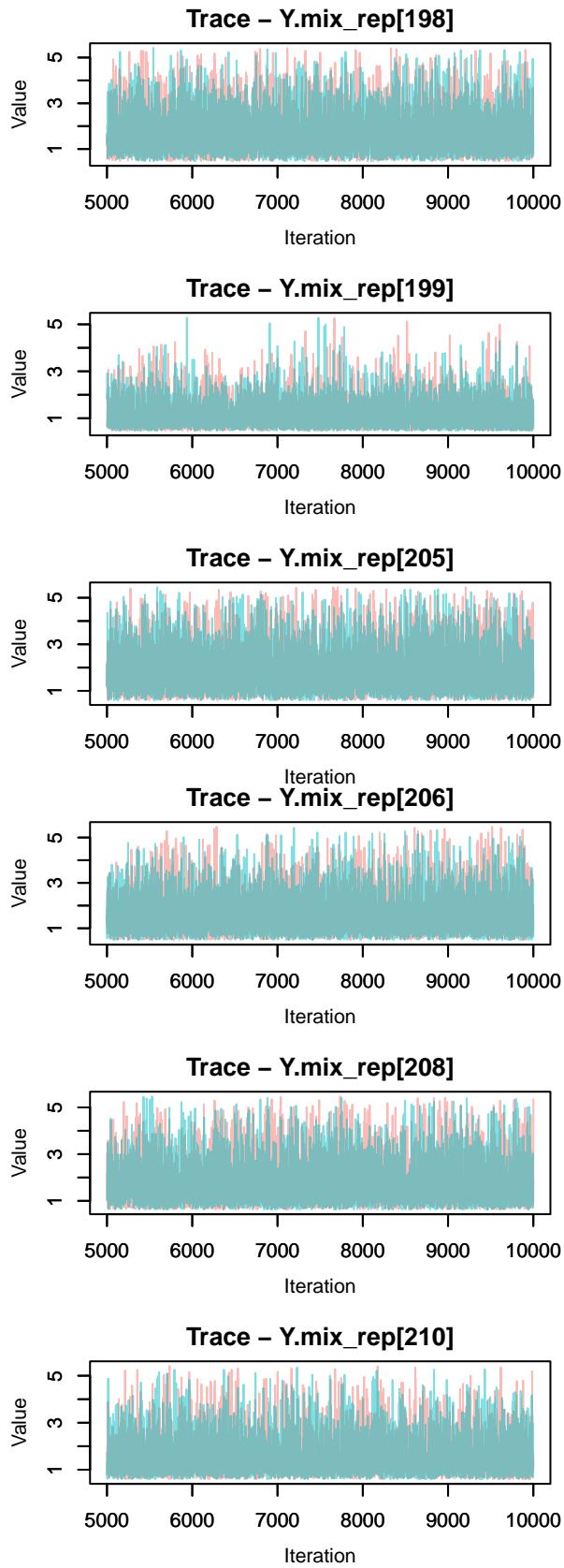


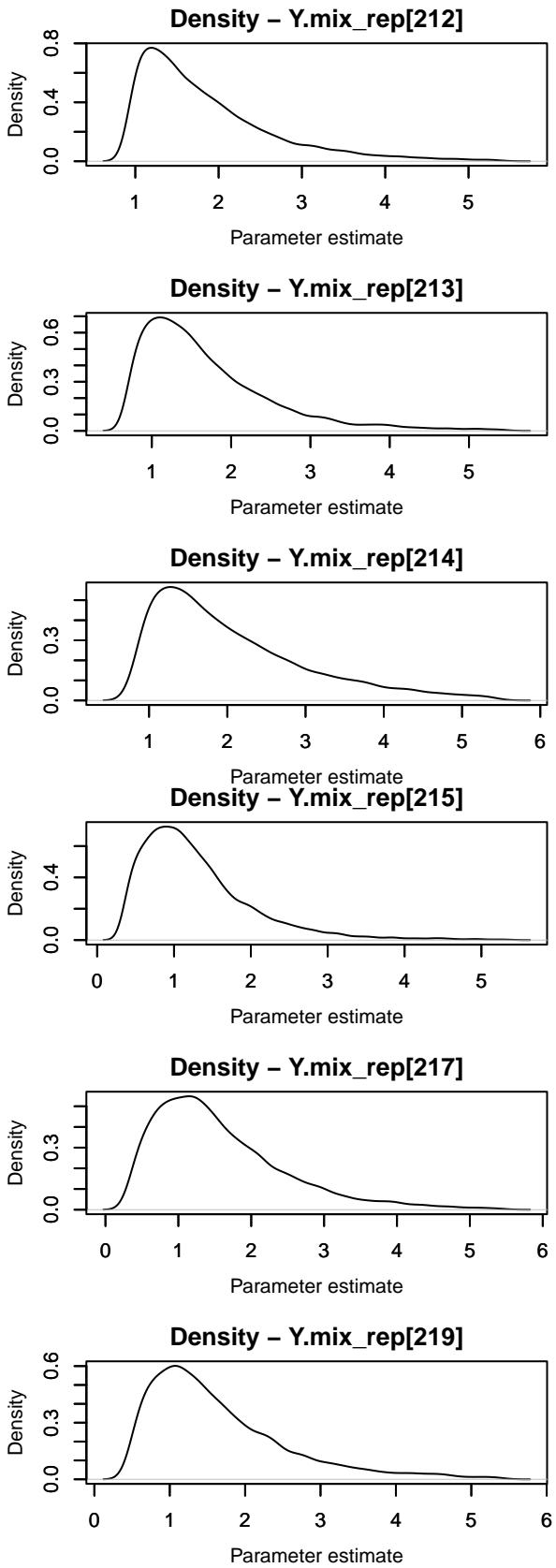
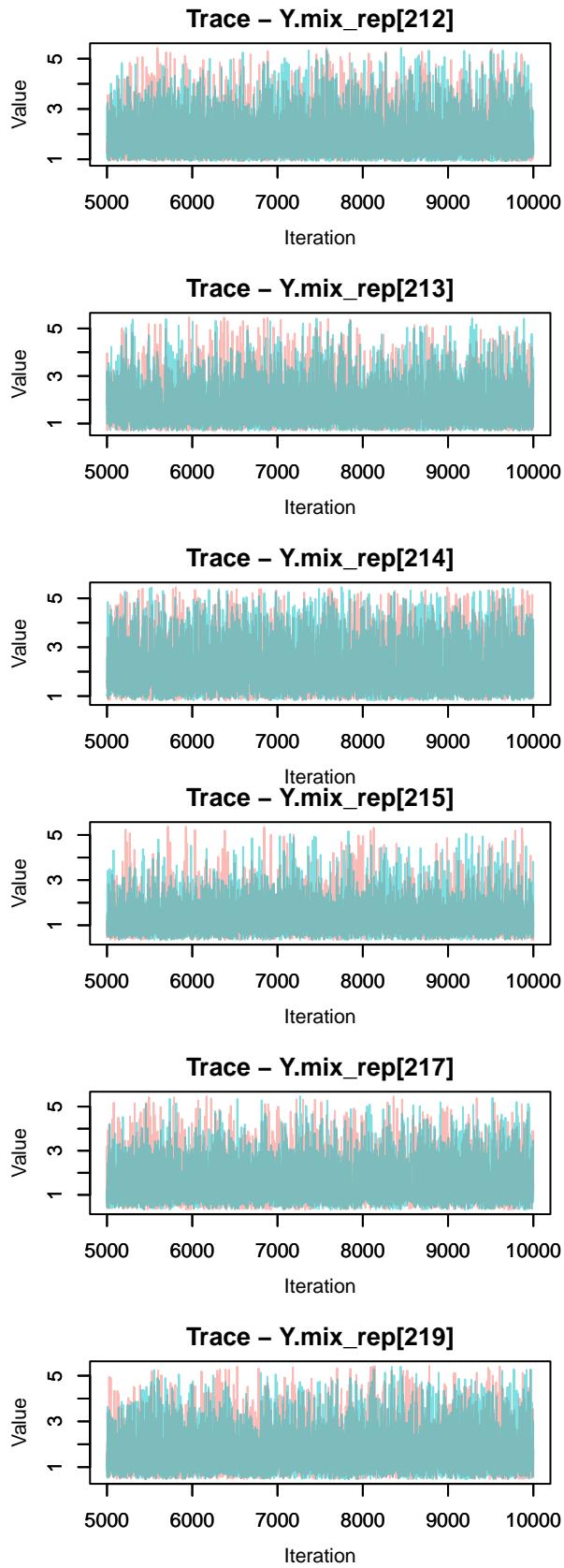


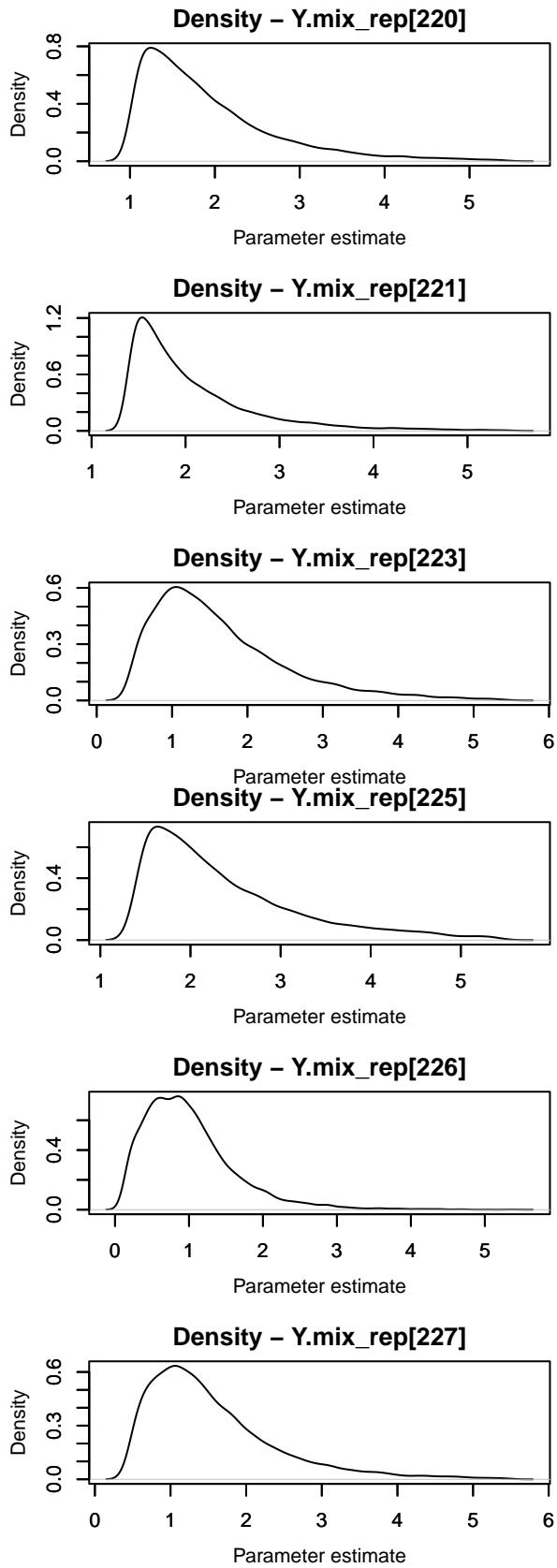
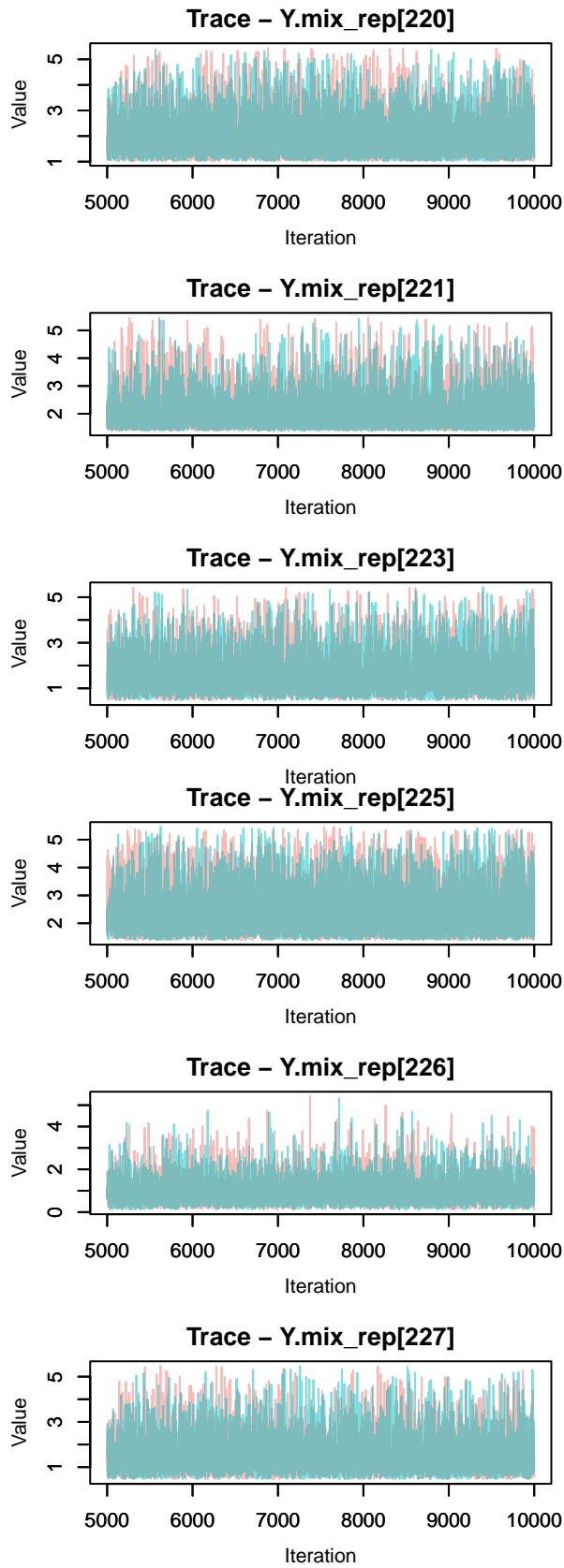


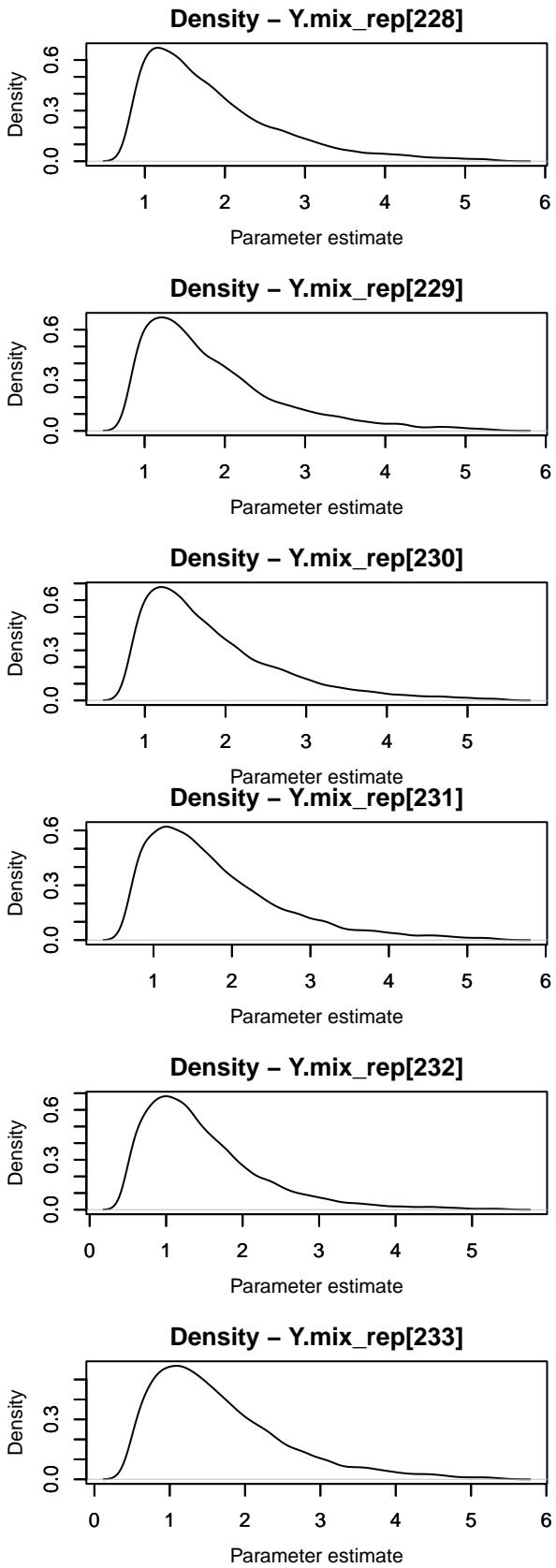
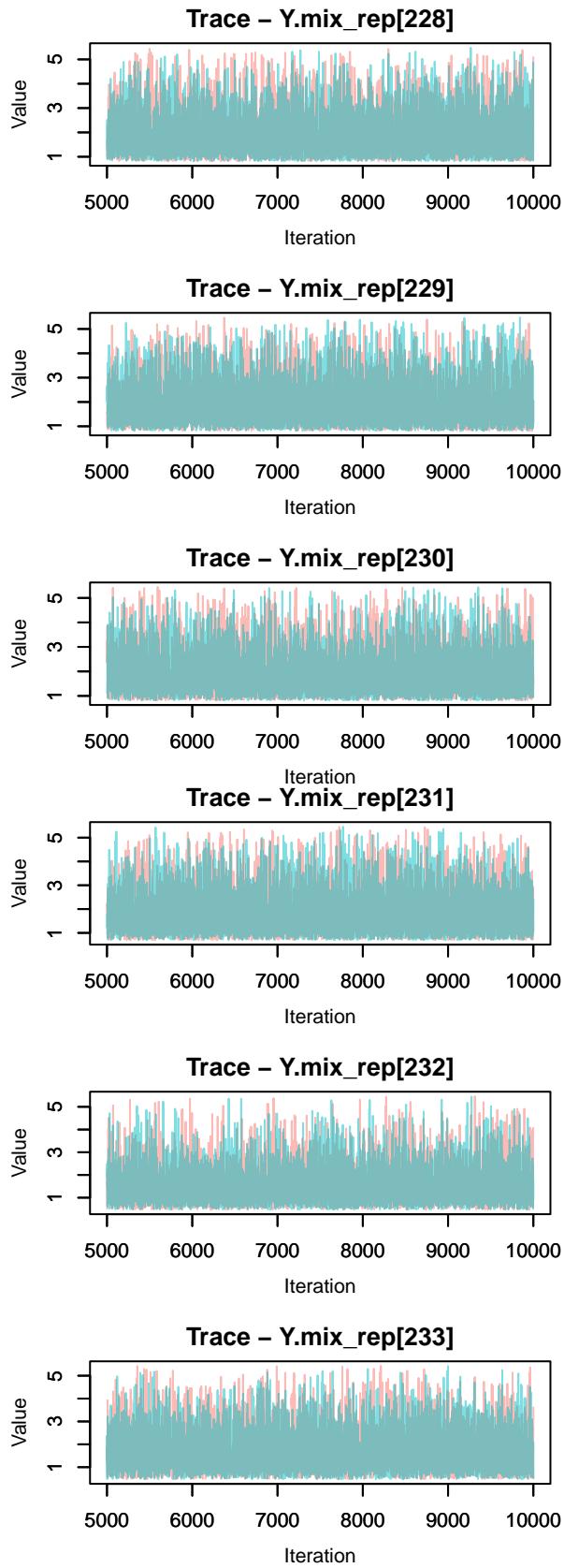


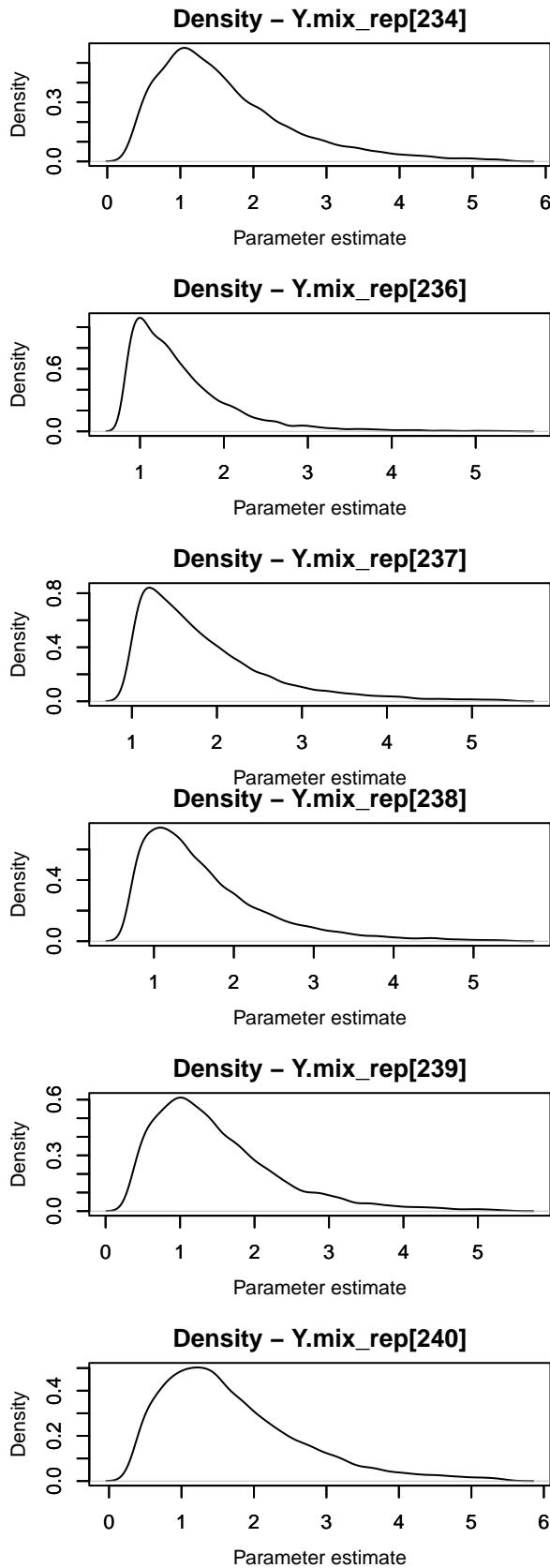
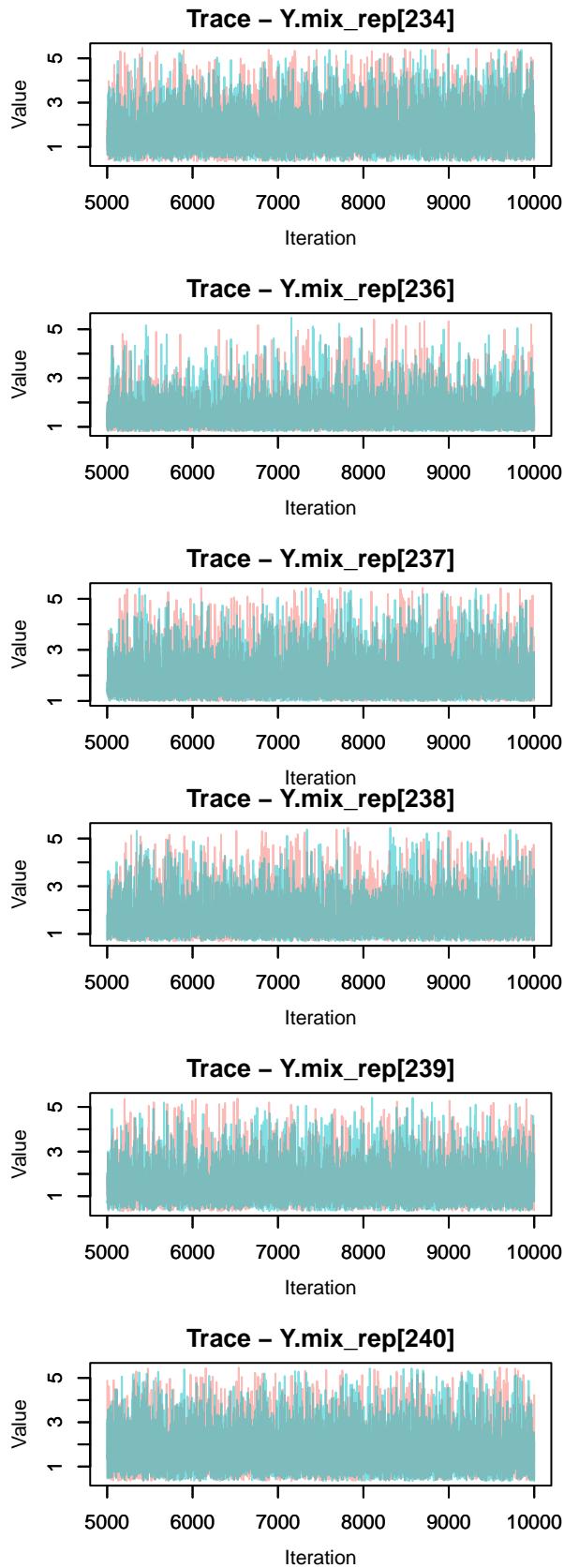


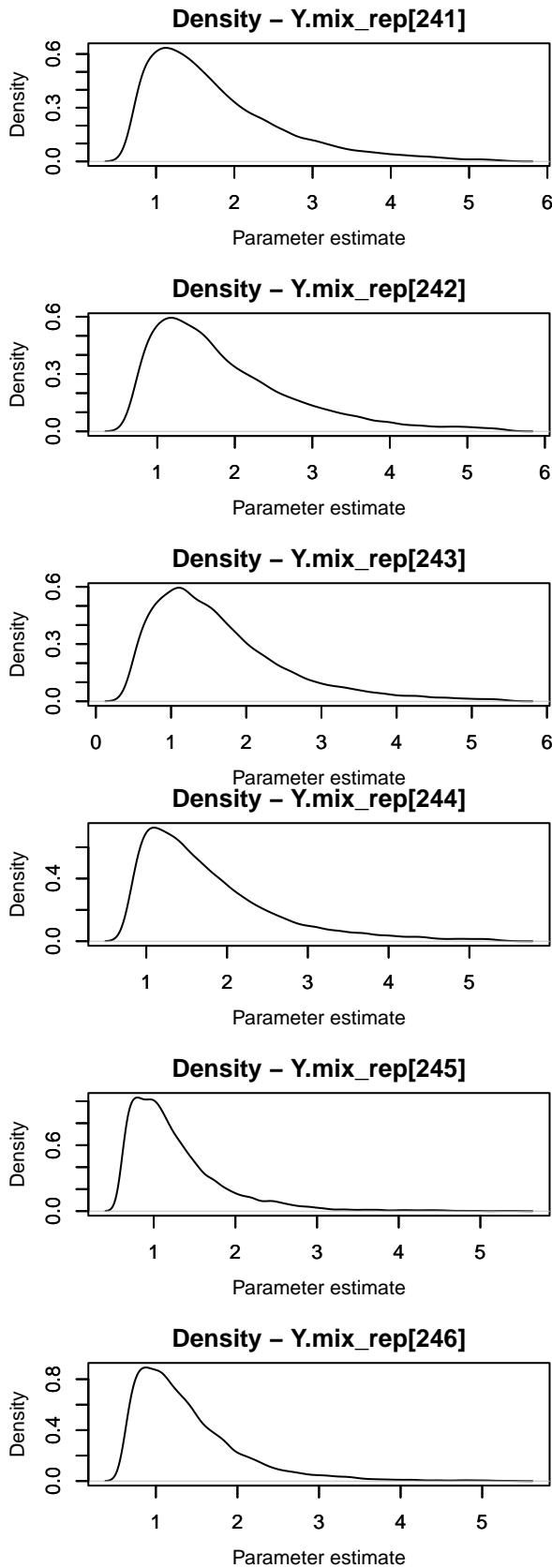
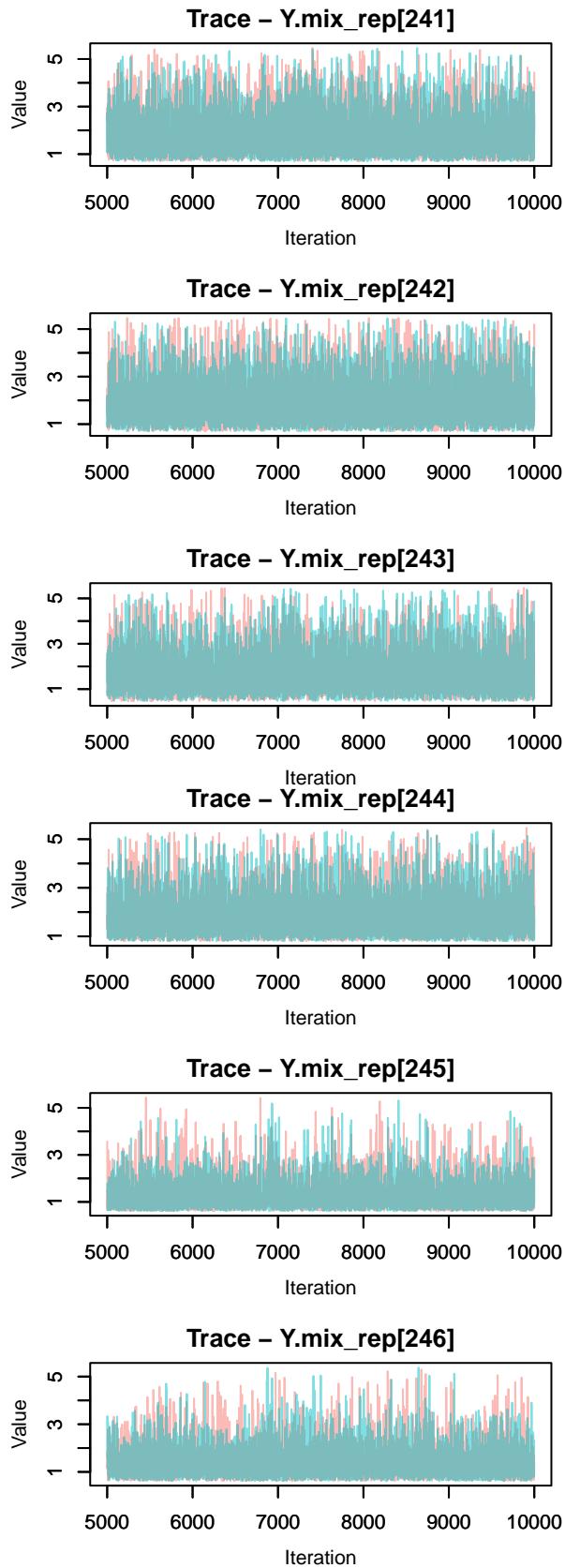


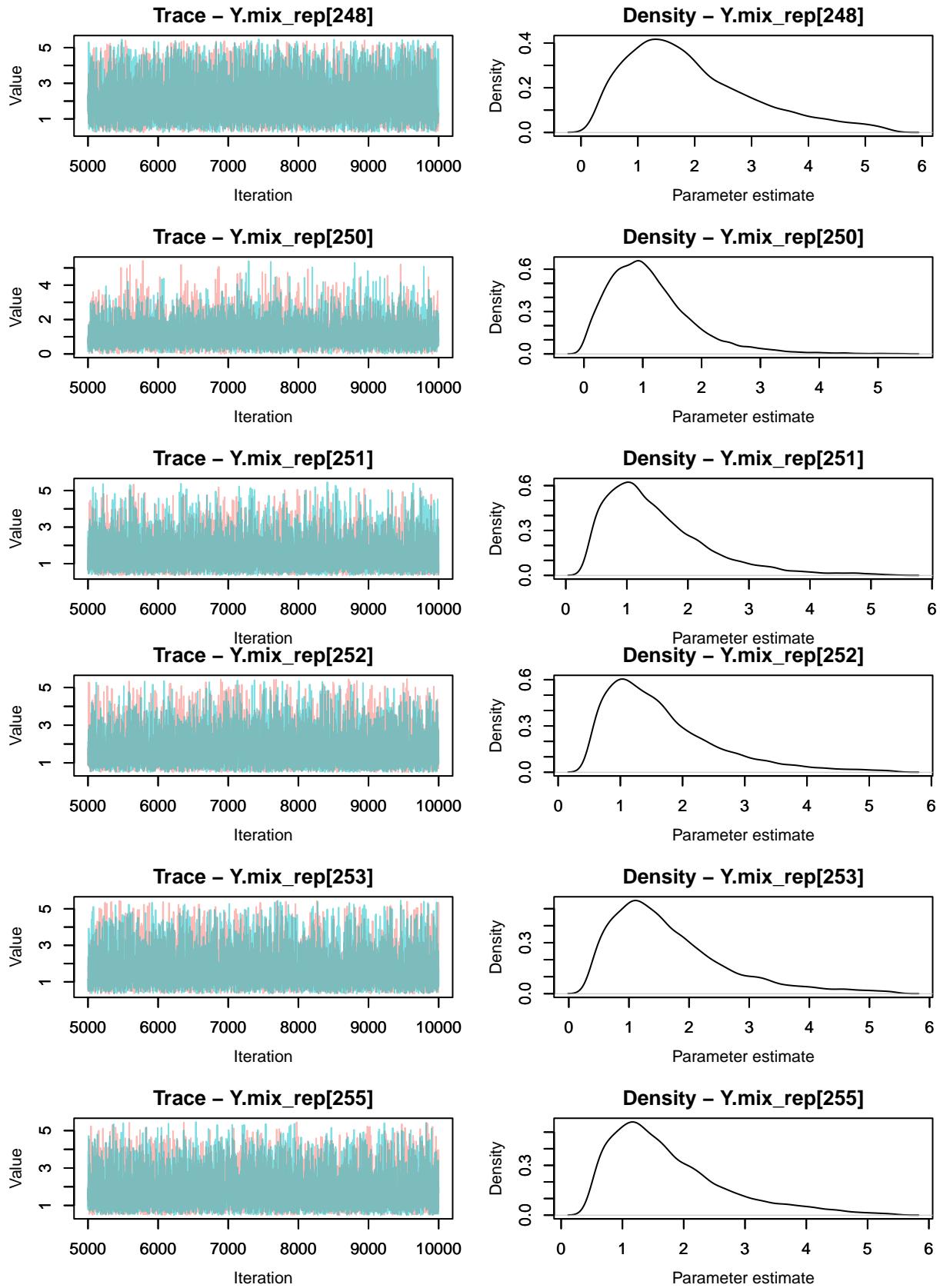


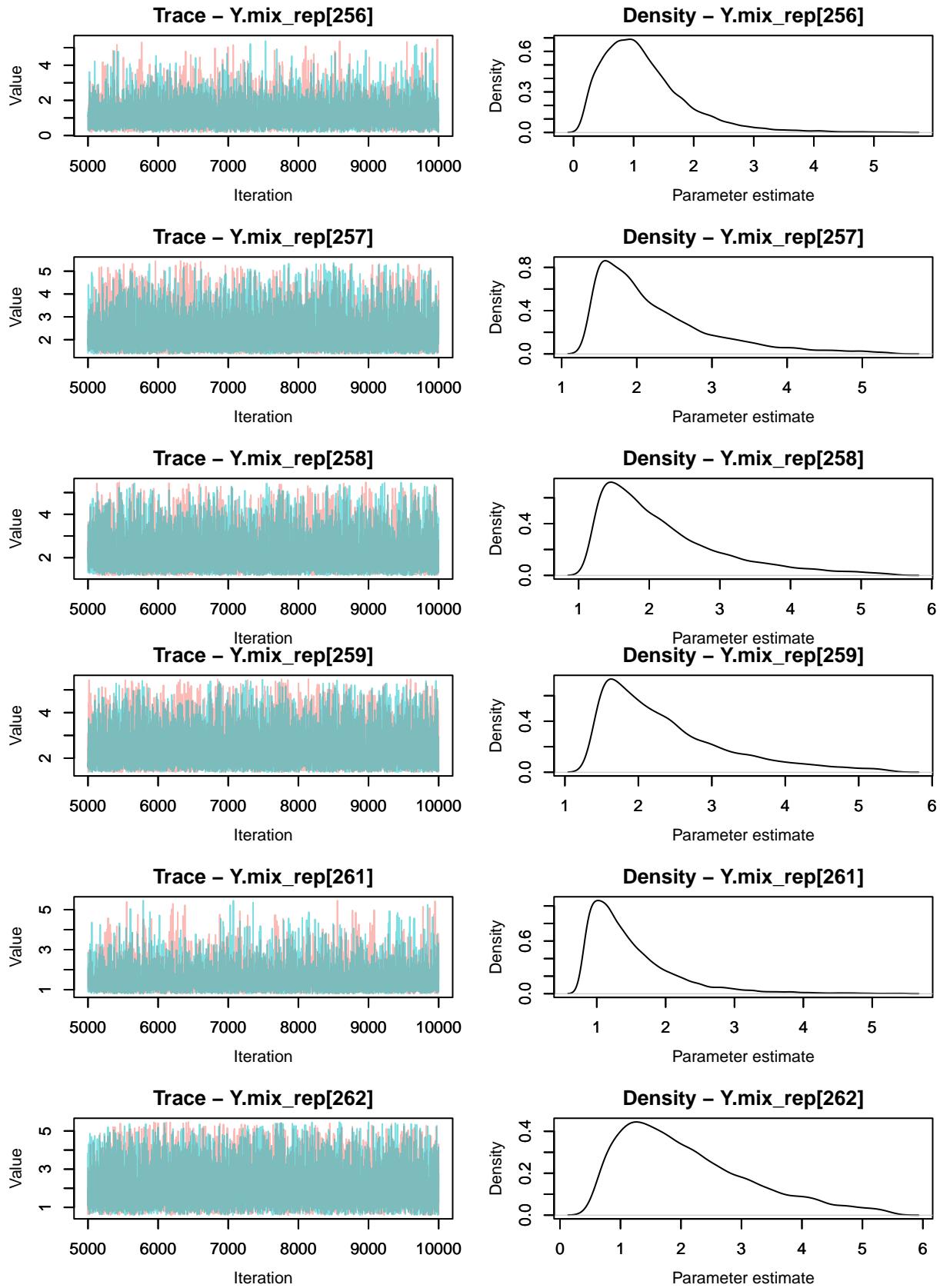


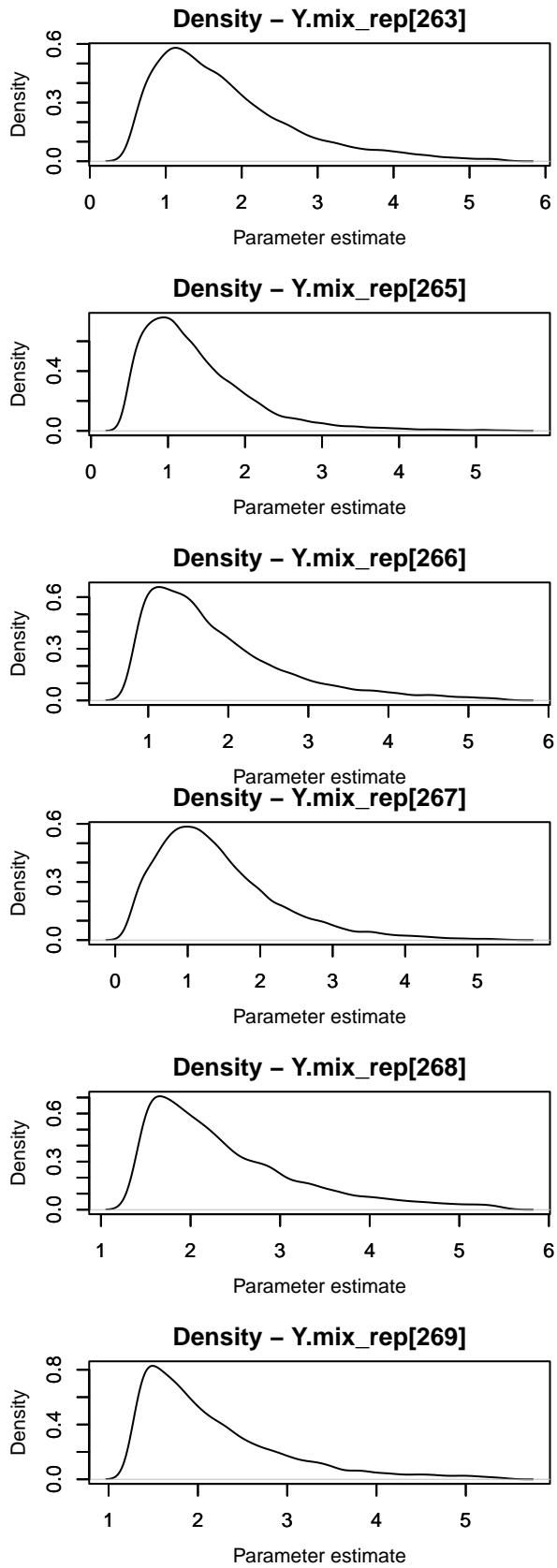
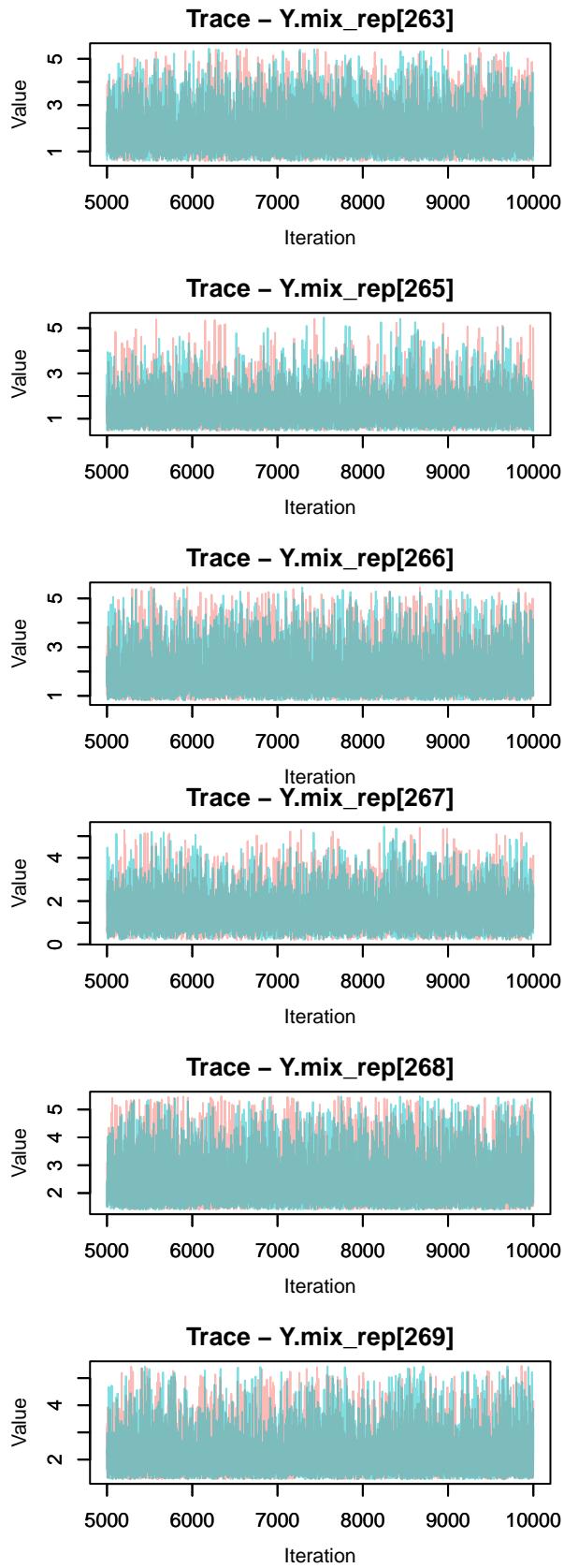


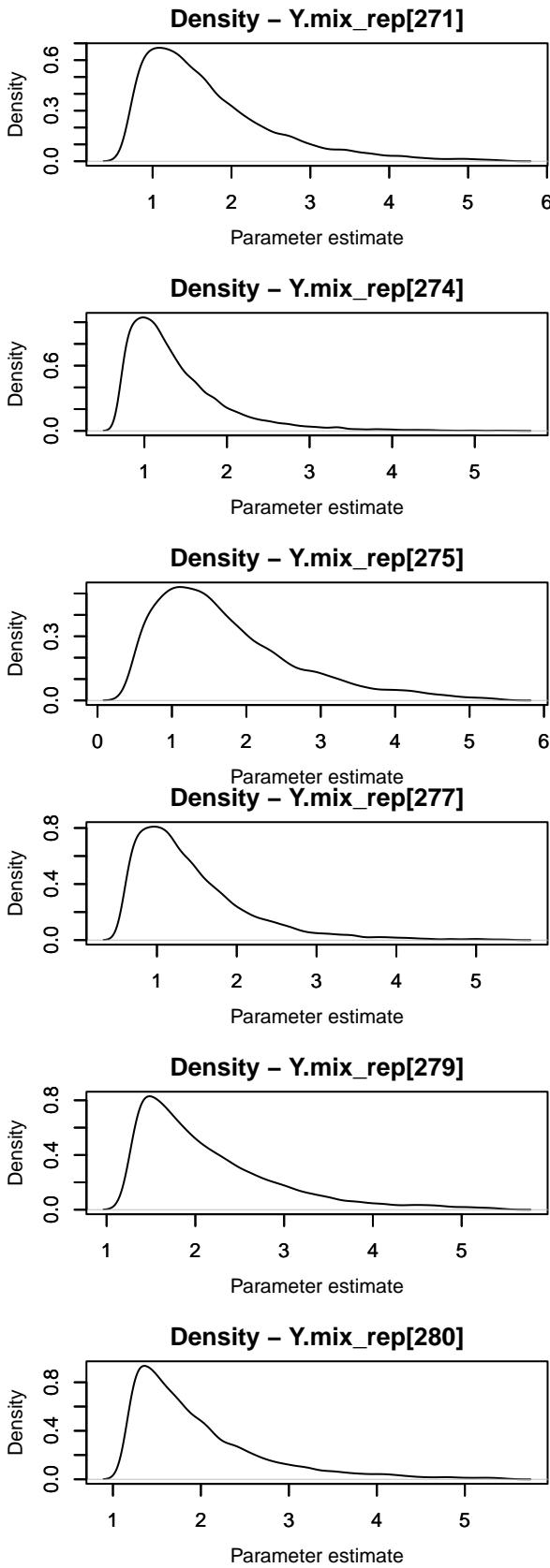
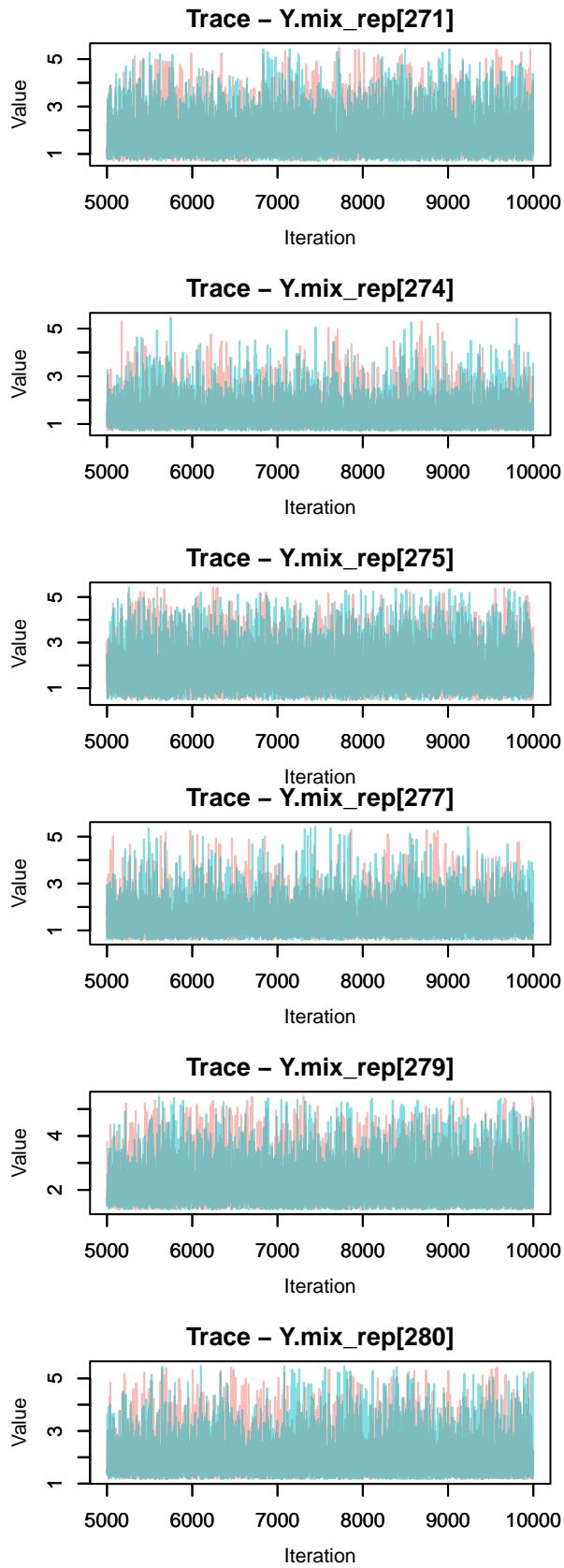


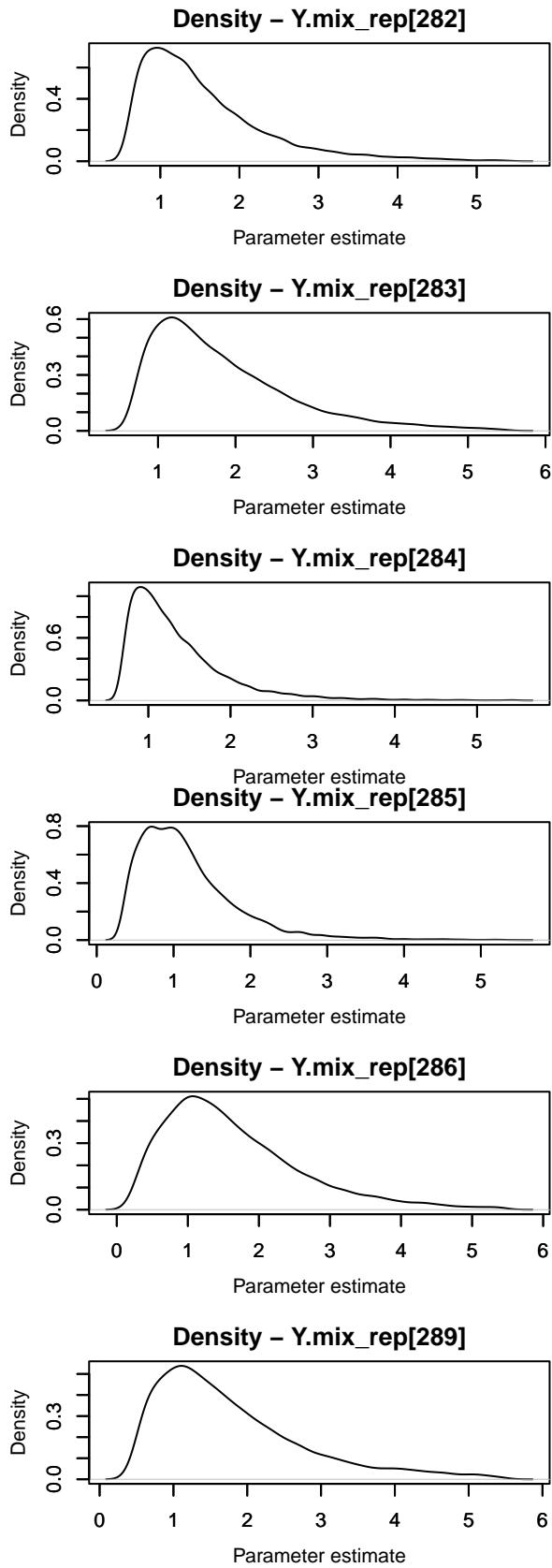
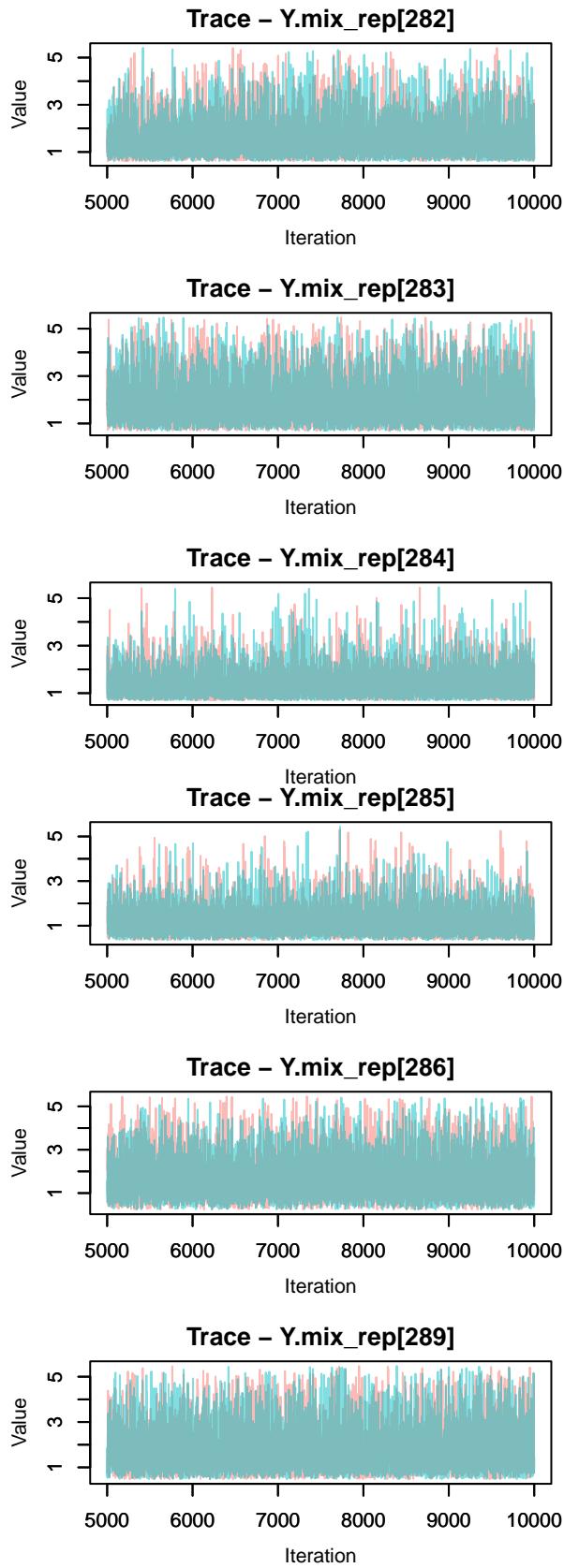


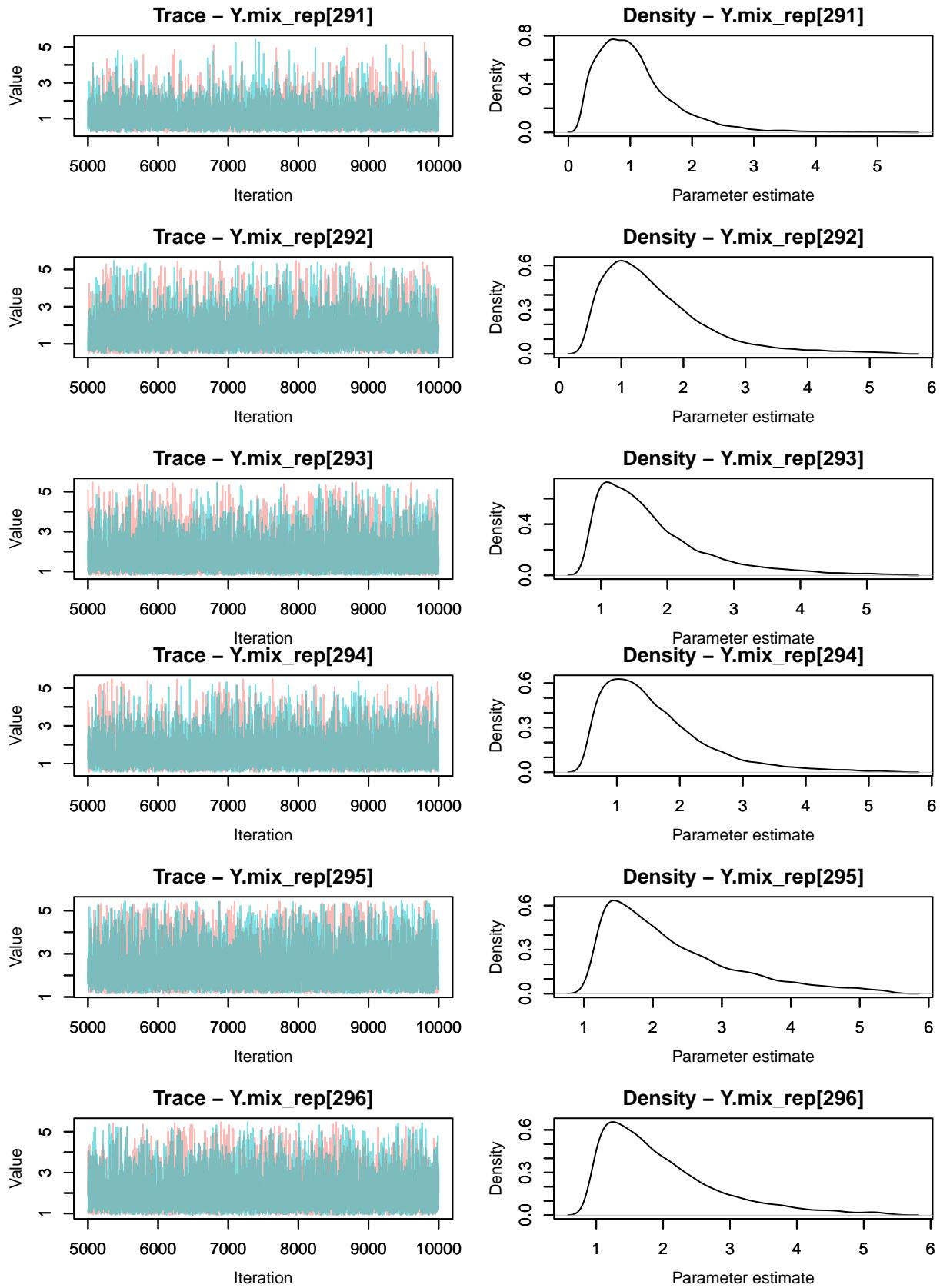


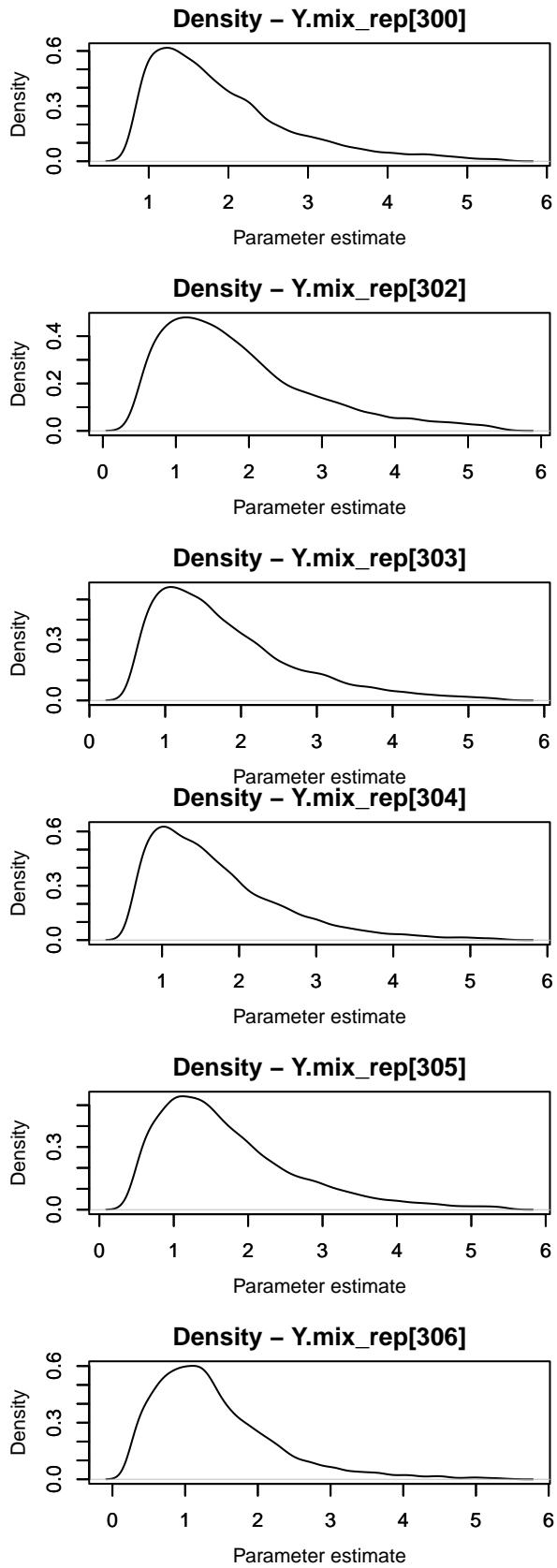
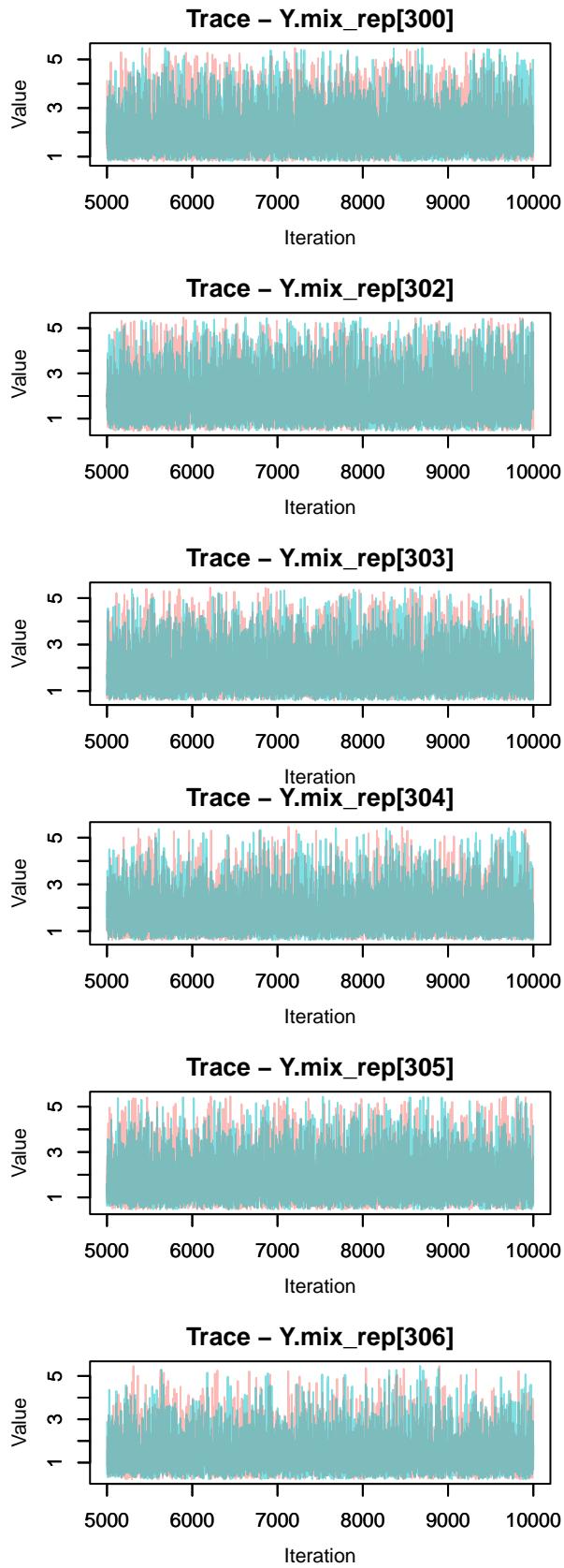


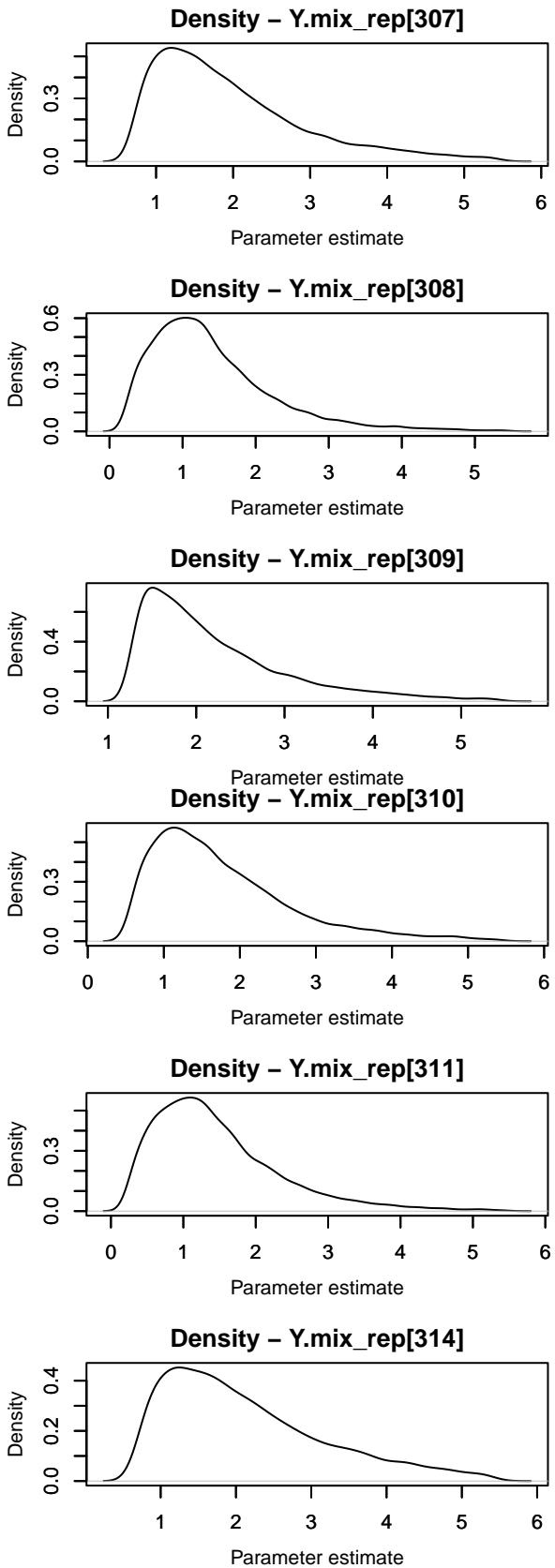
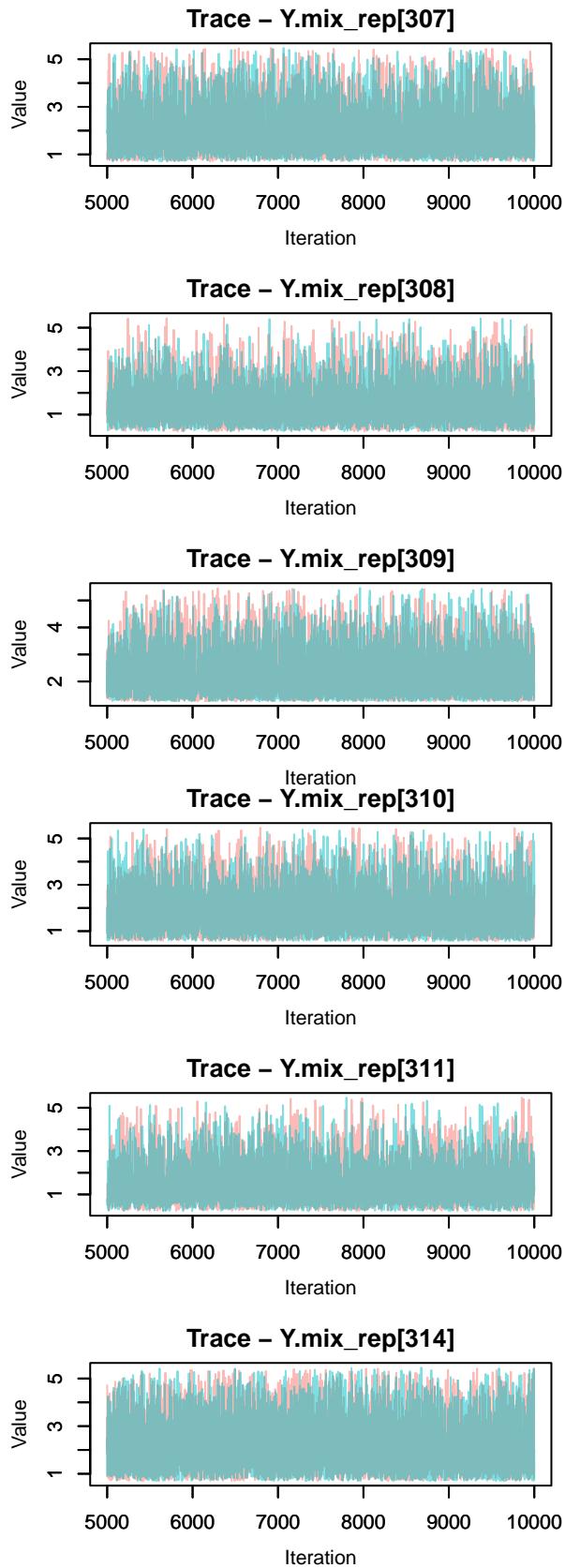


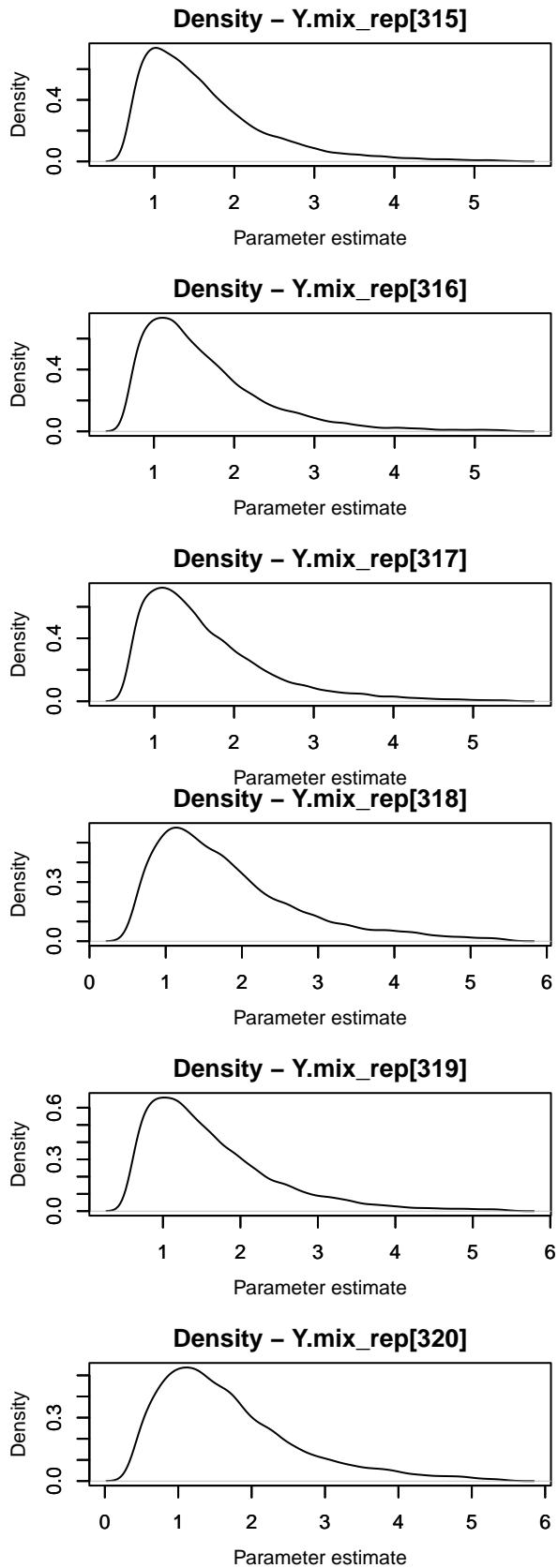
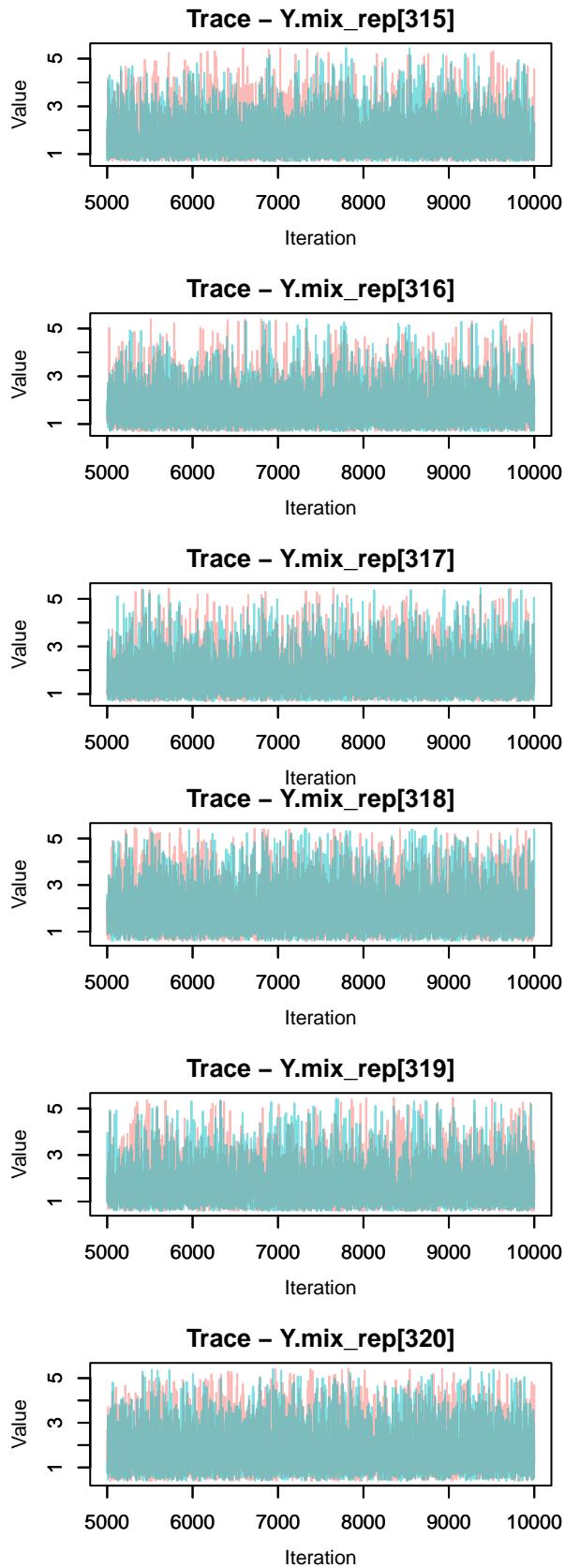


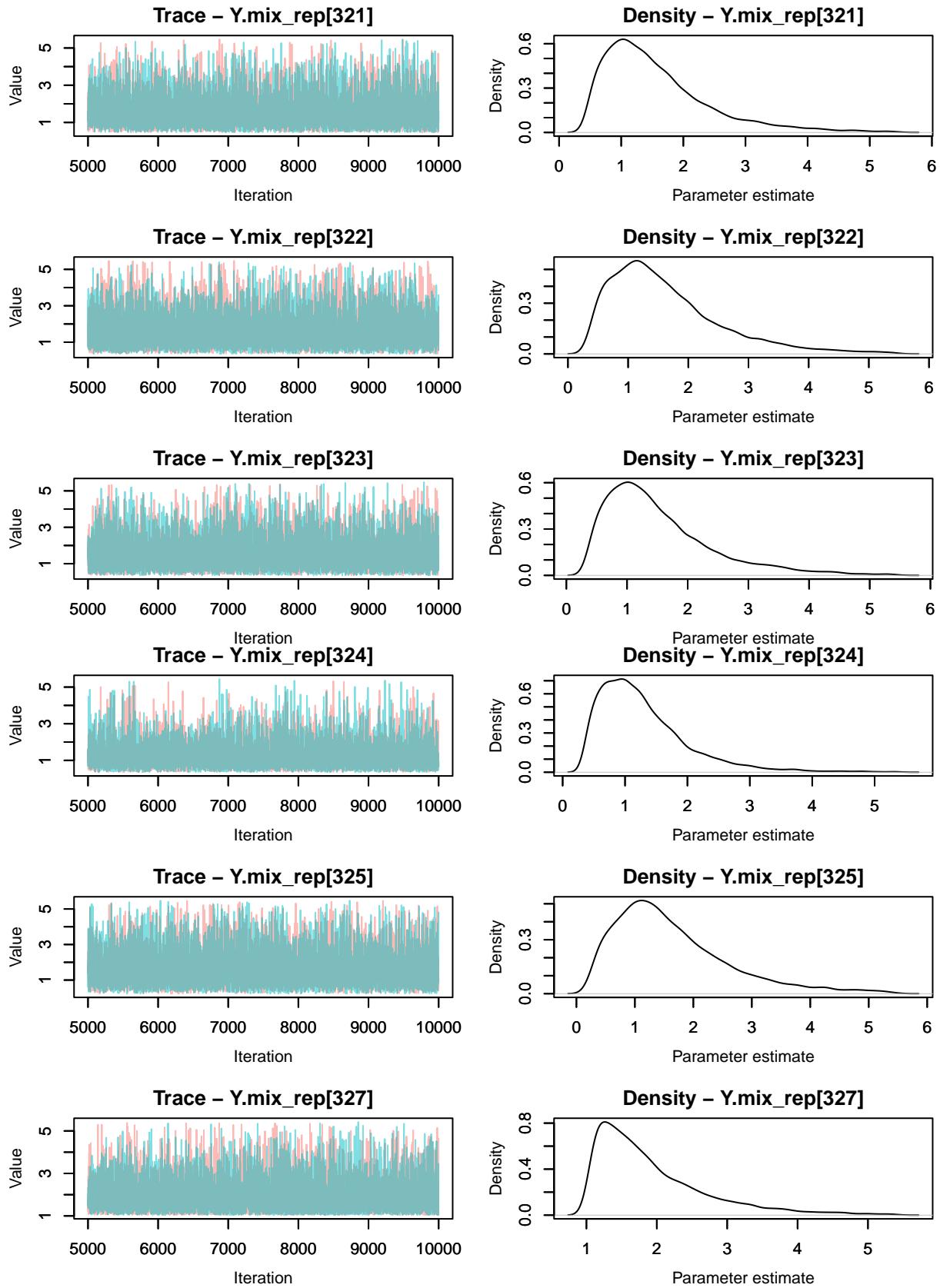


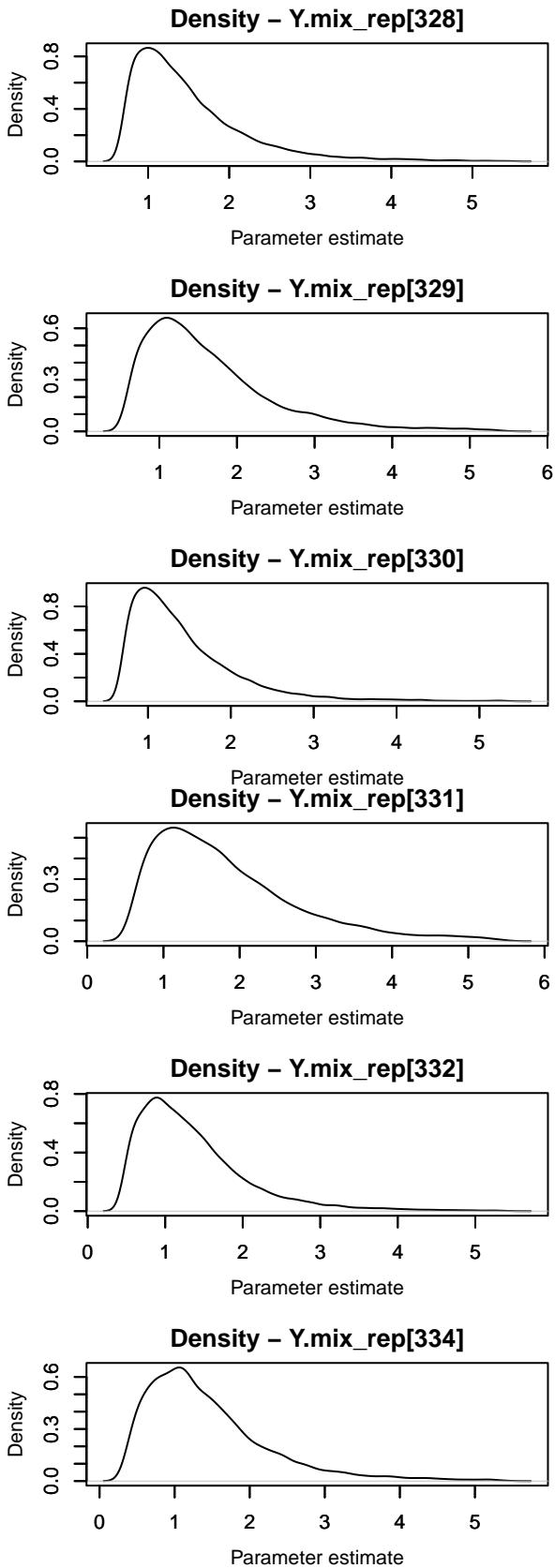
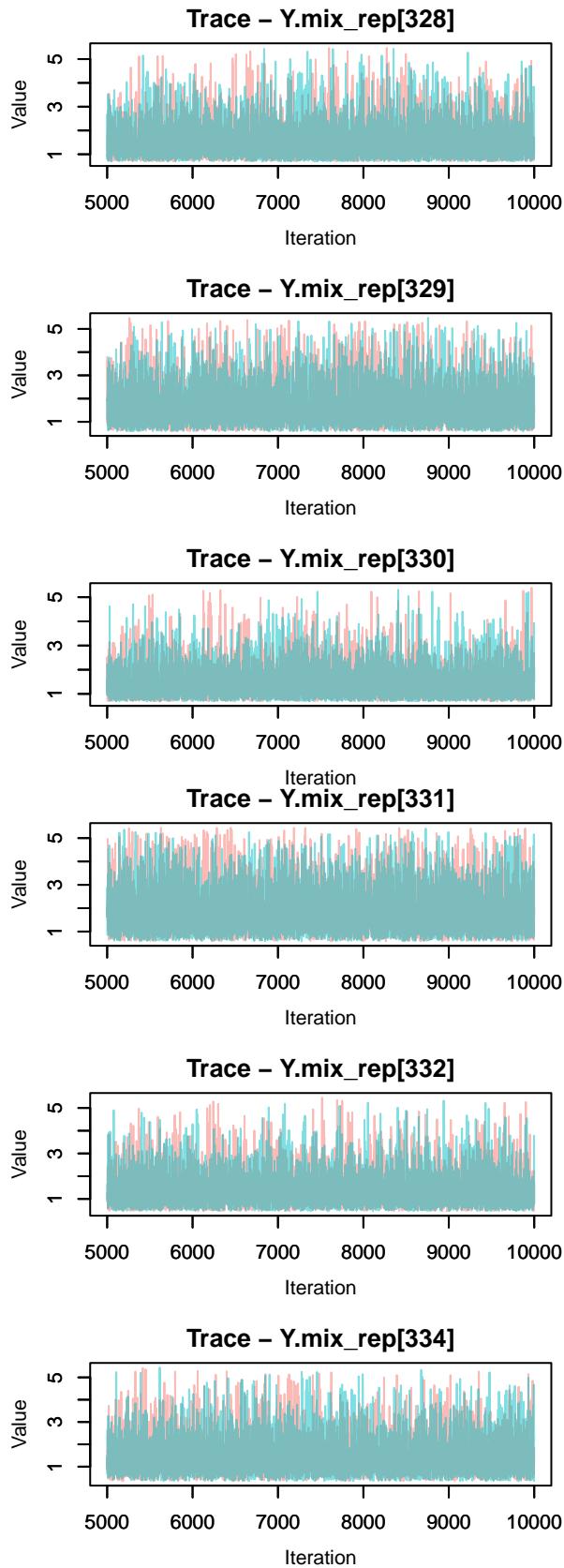


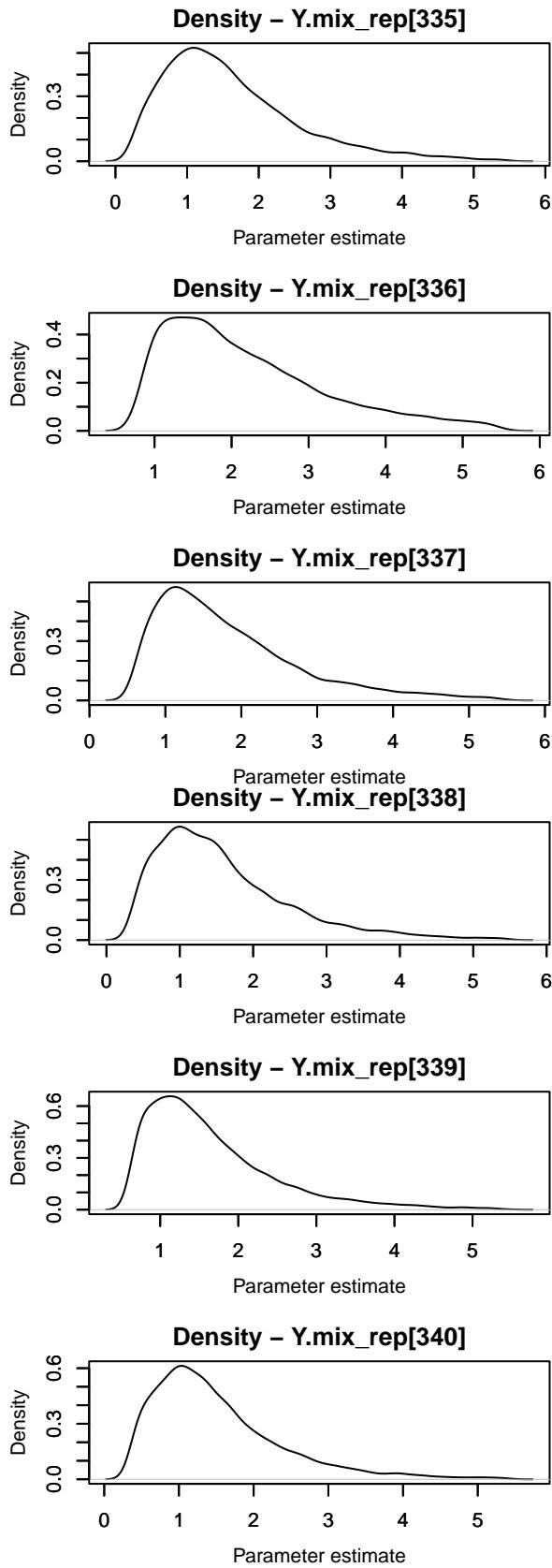
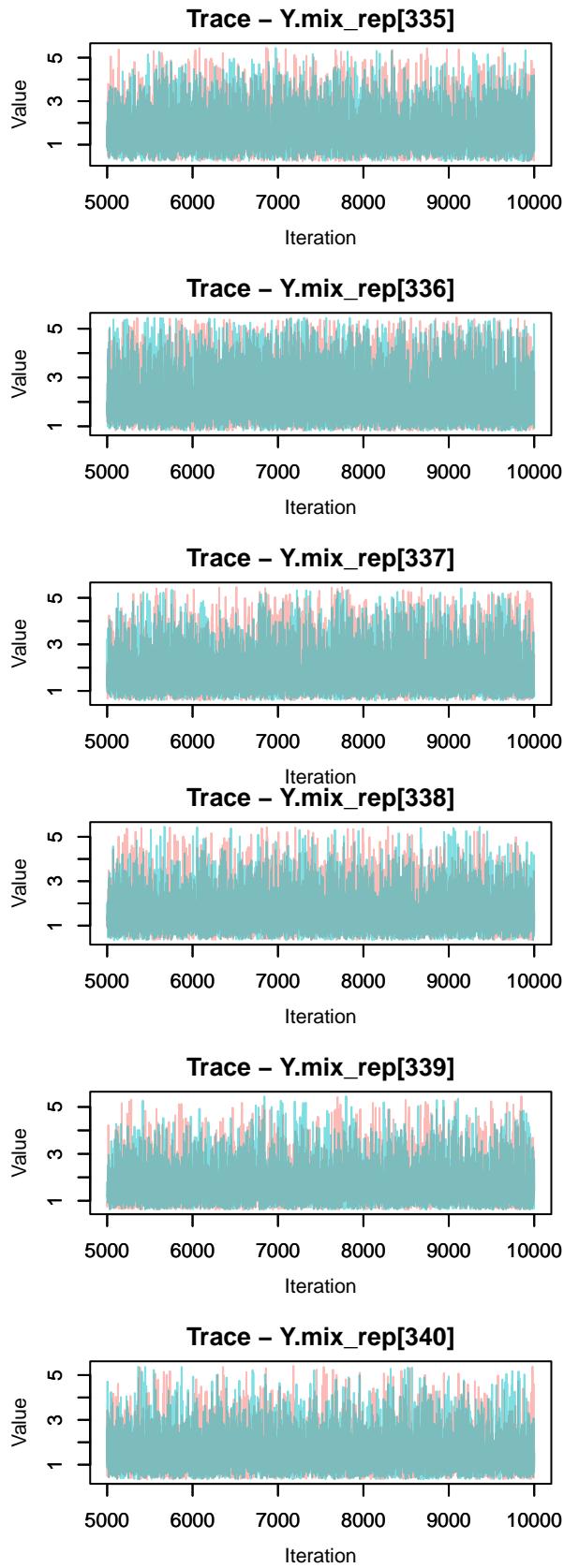








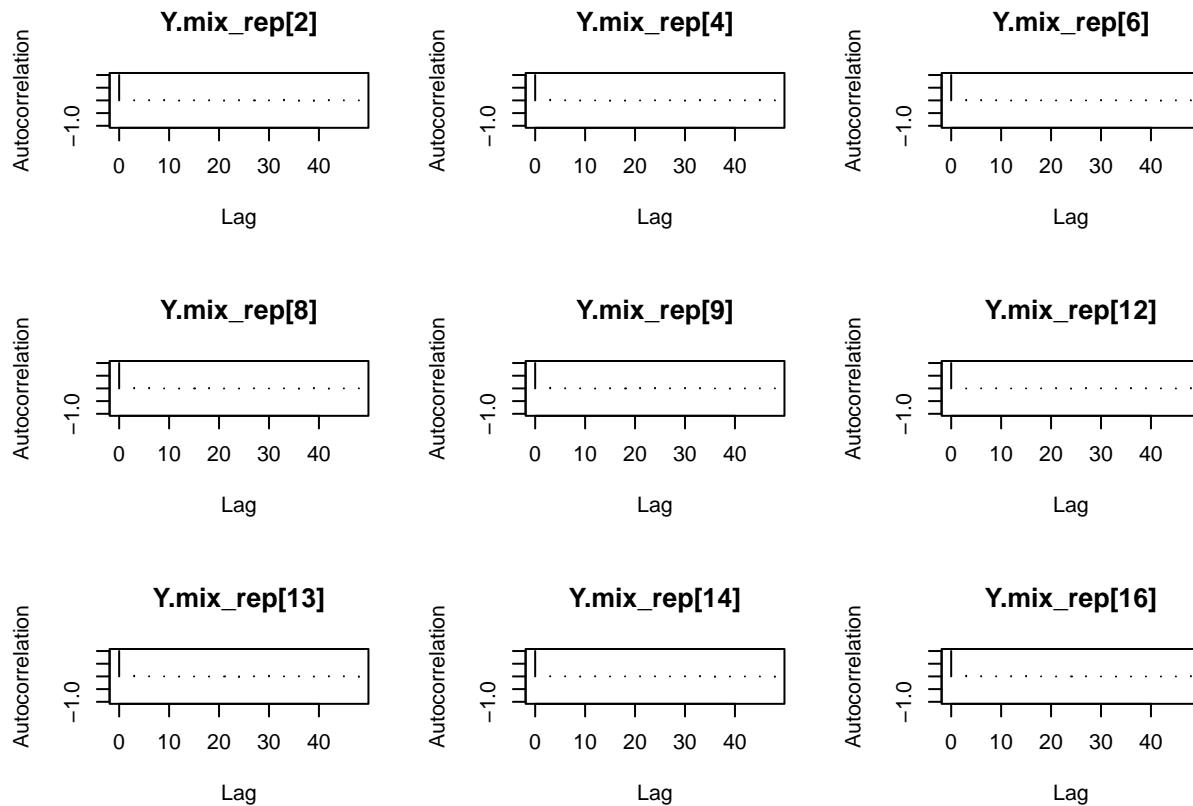


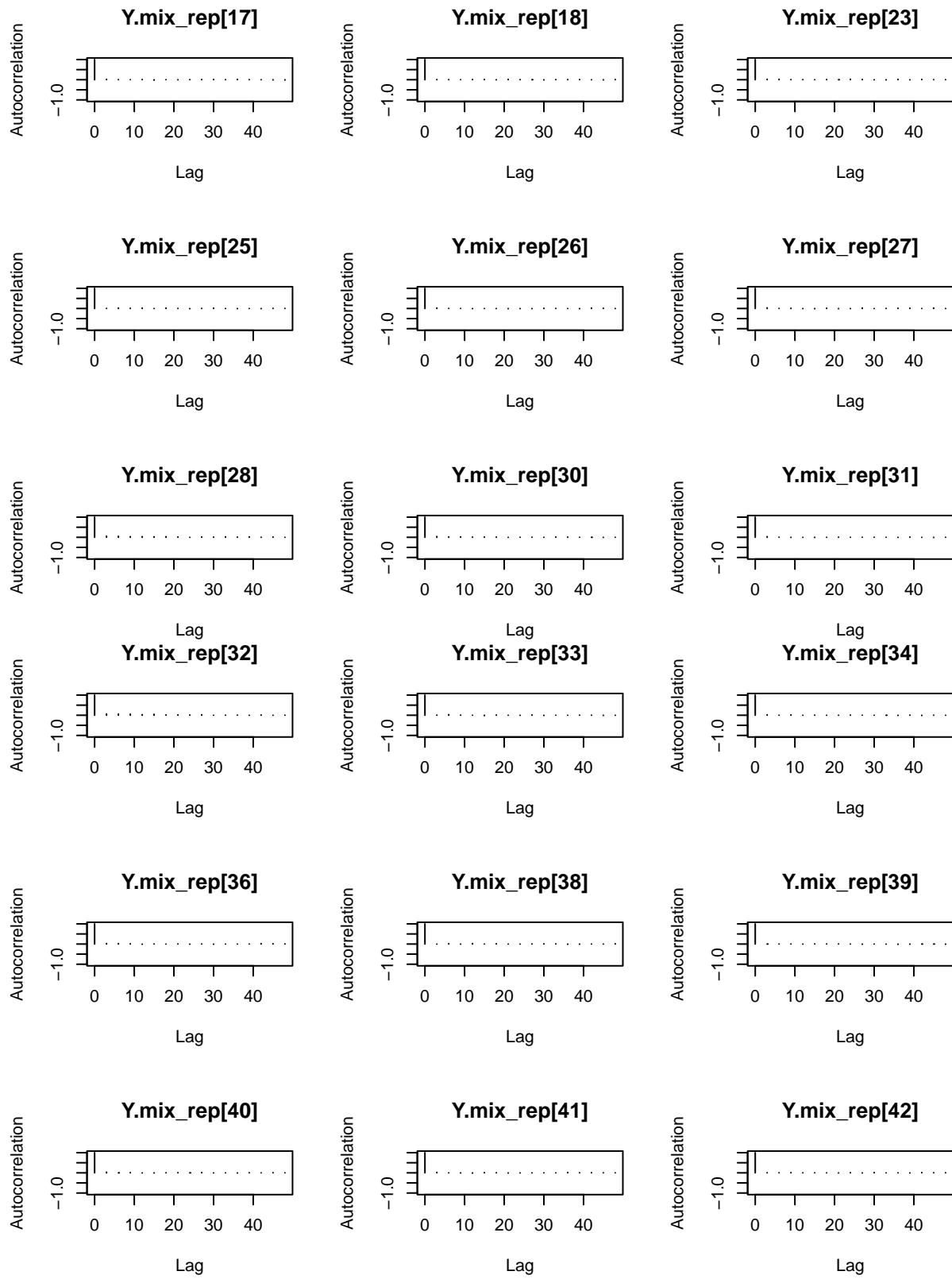


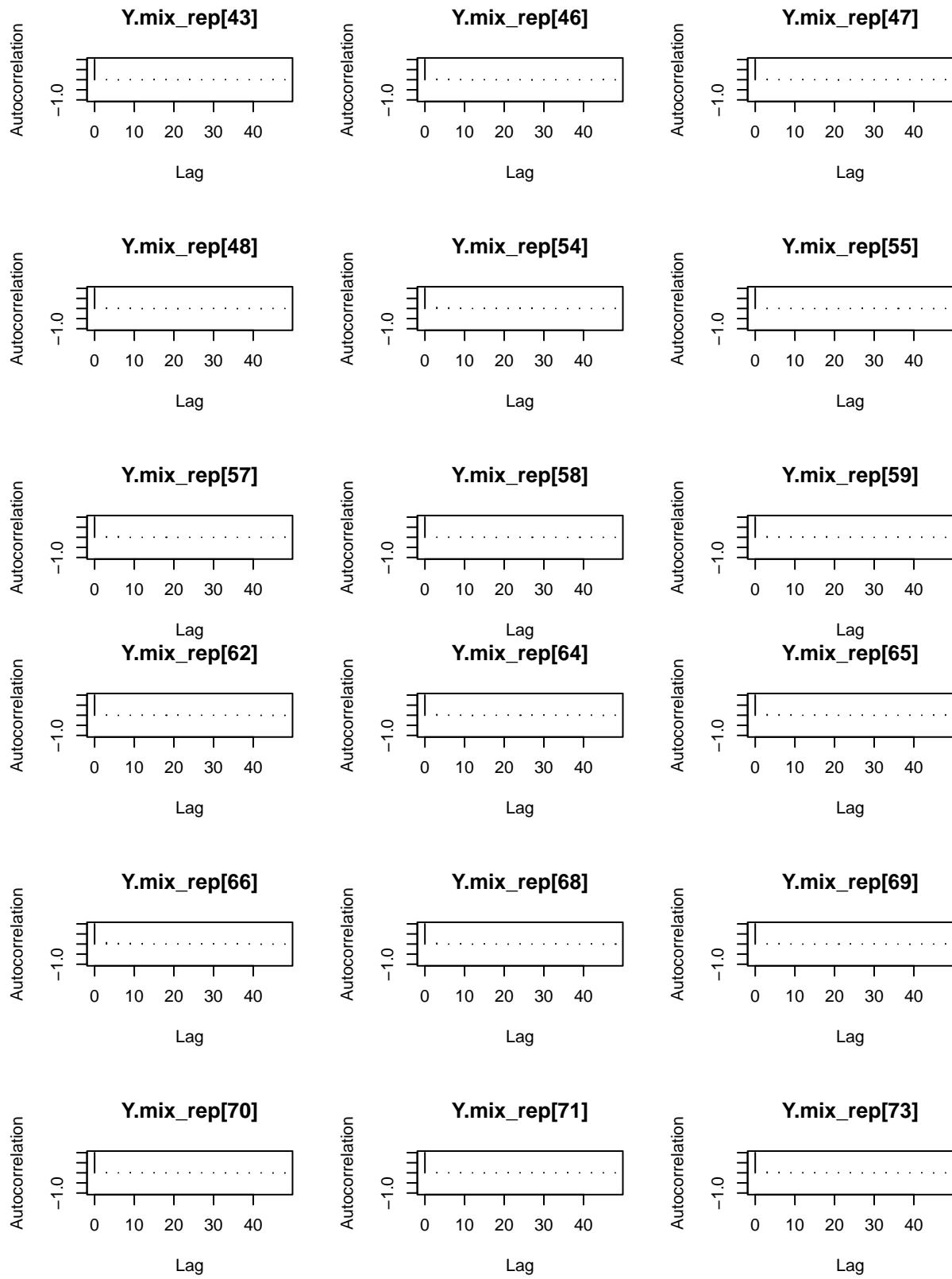
```
# Trace plots show stable samples.
```

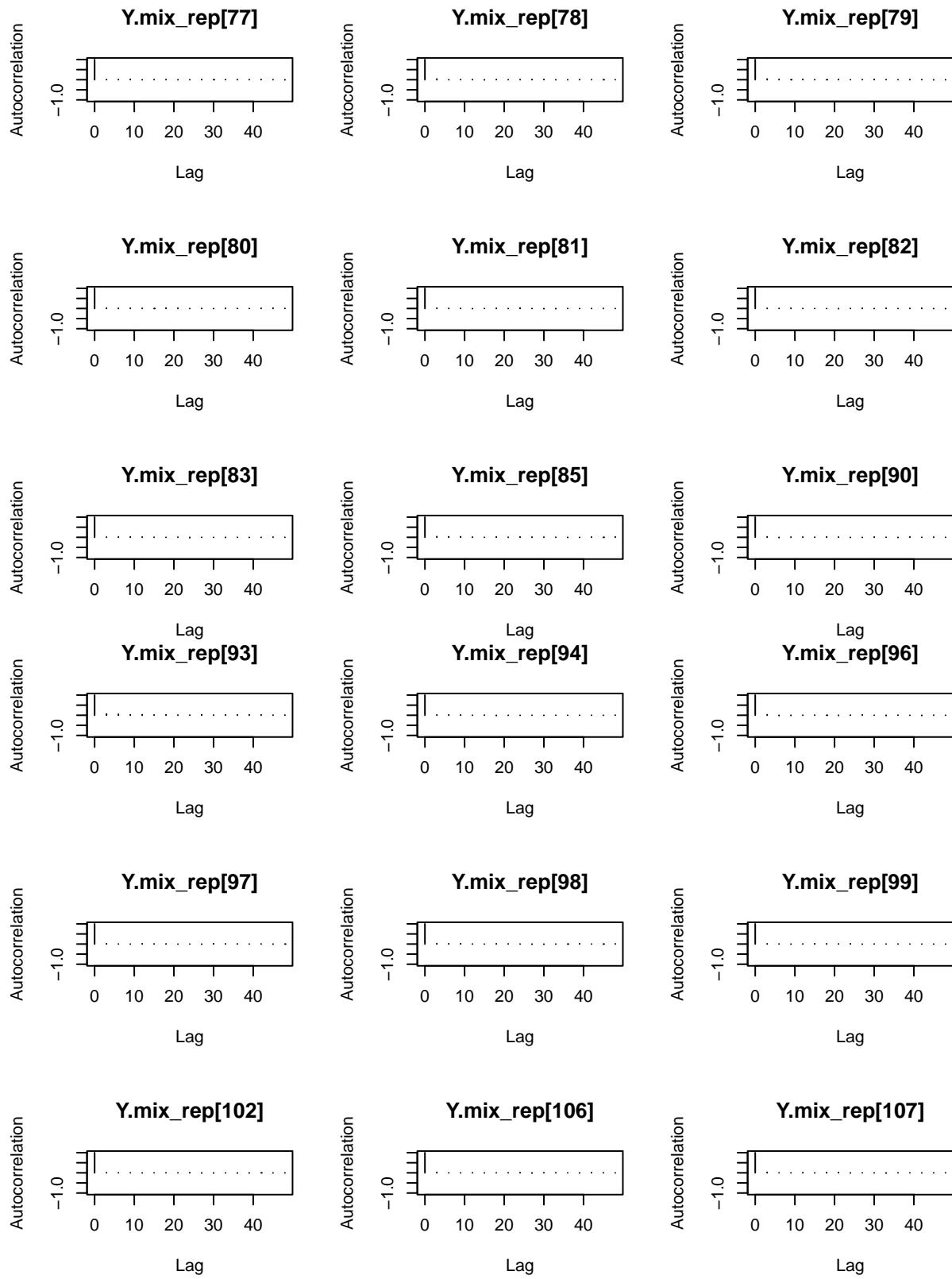
```
# autocorrelation diagnostic
```

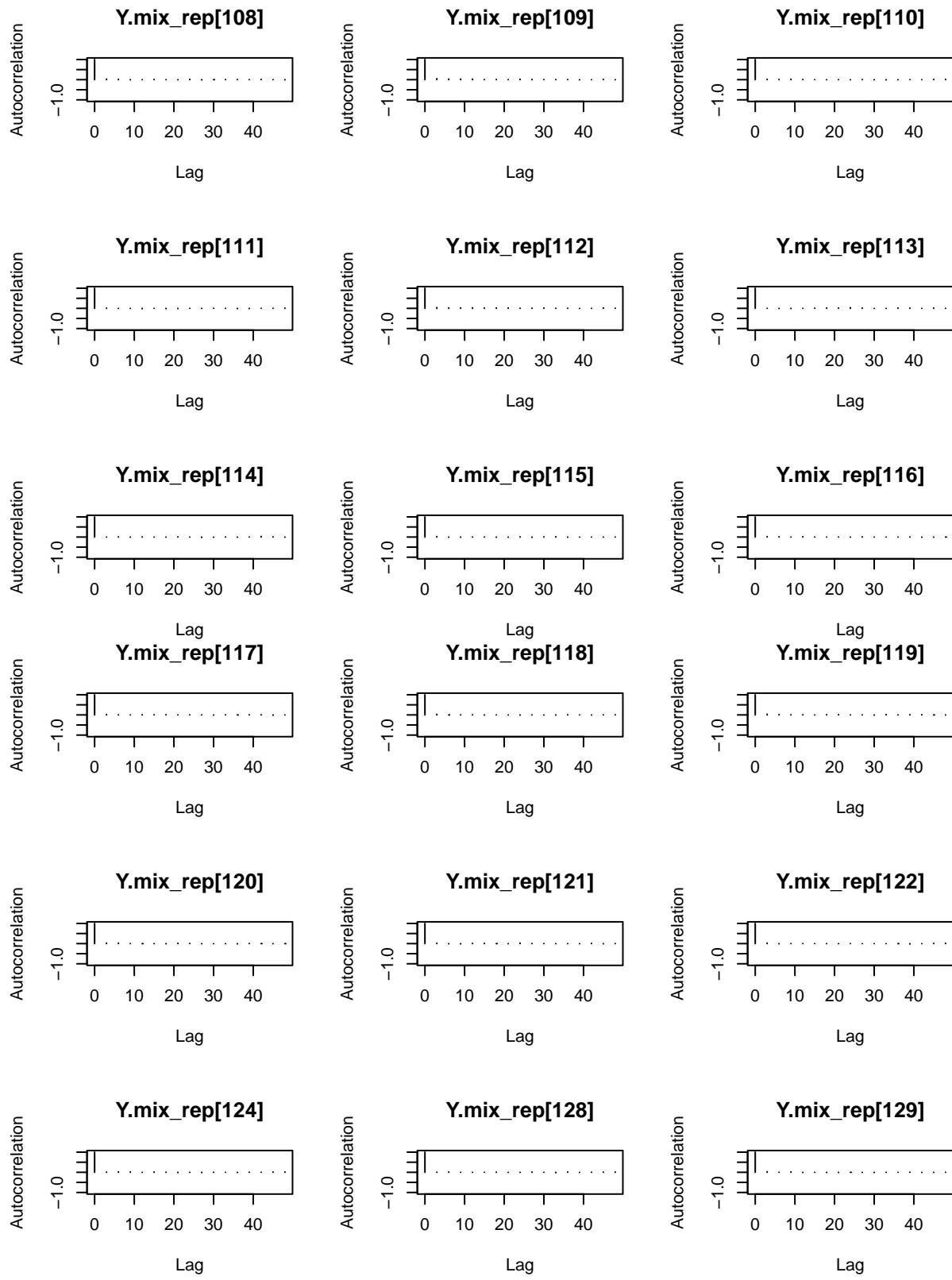
```
autocorr.plot(JM_sample1[[2]][, par_name])
```

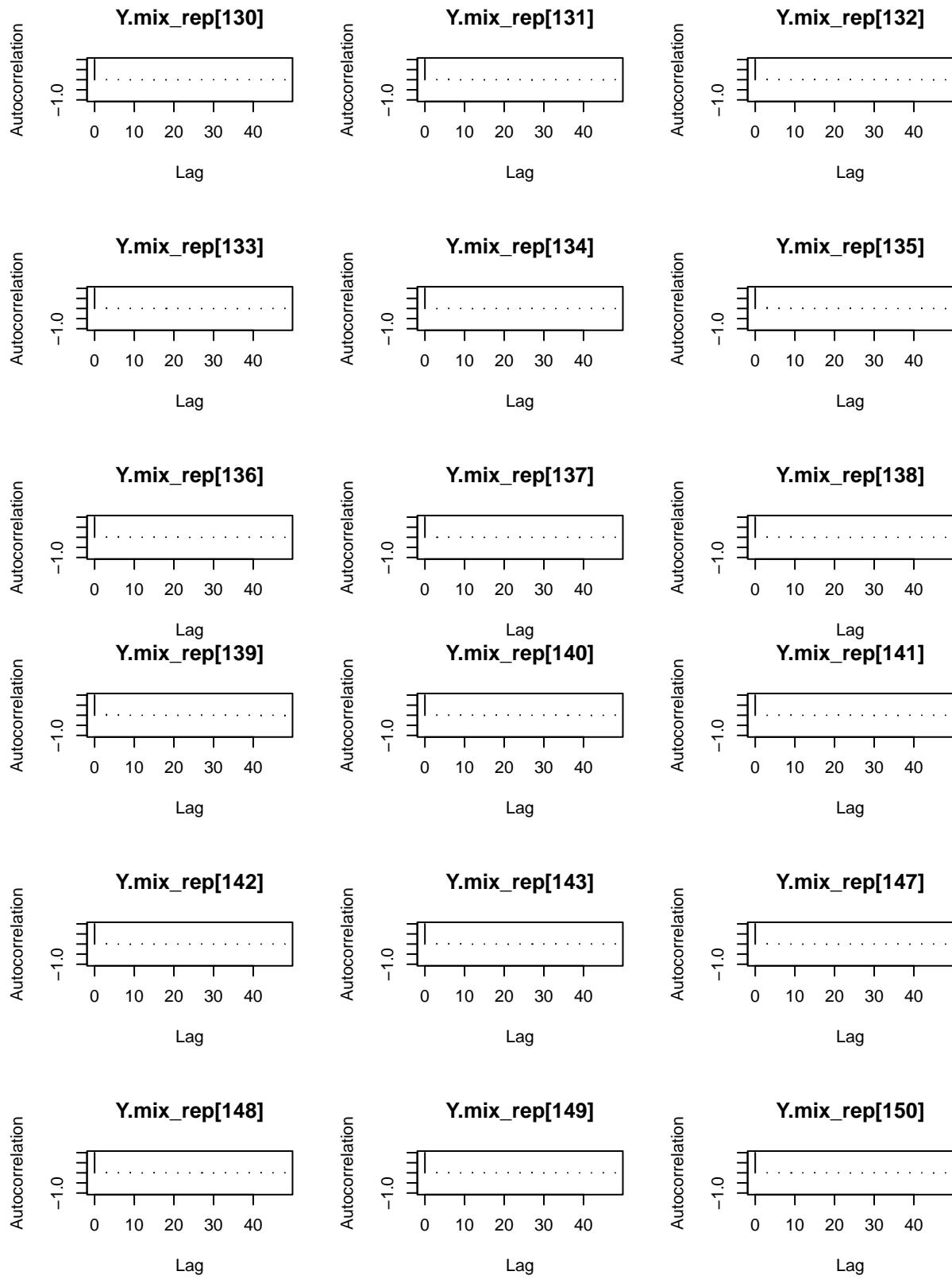


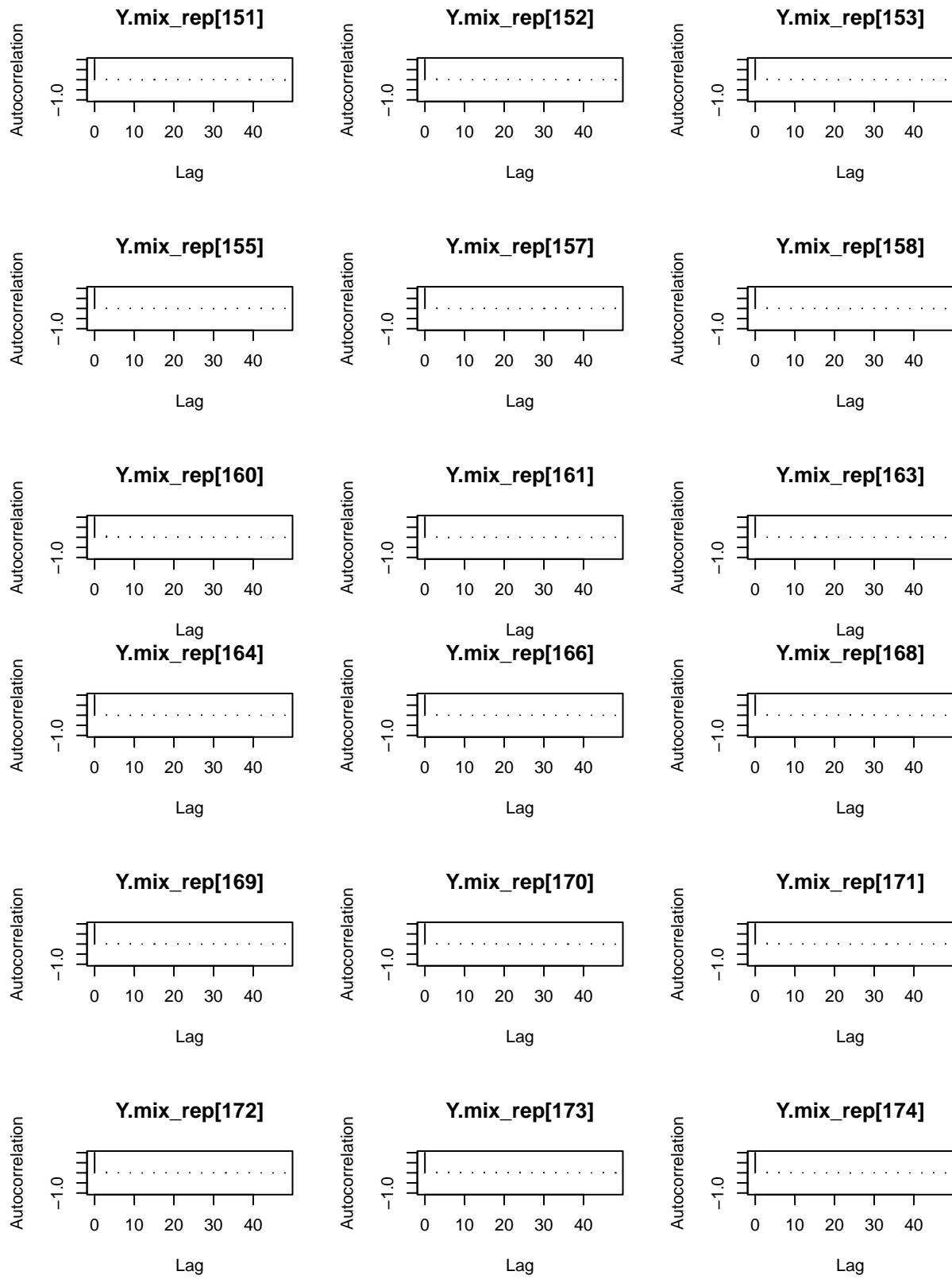


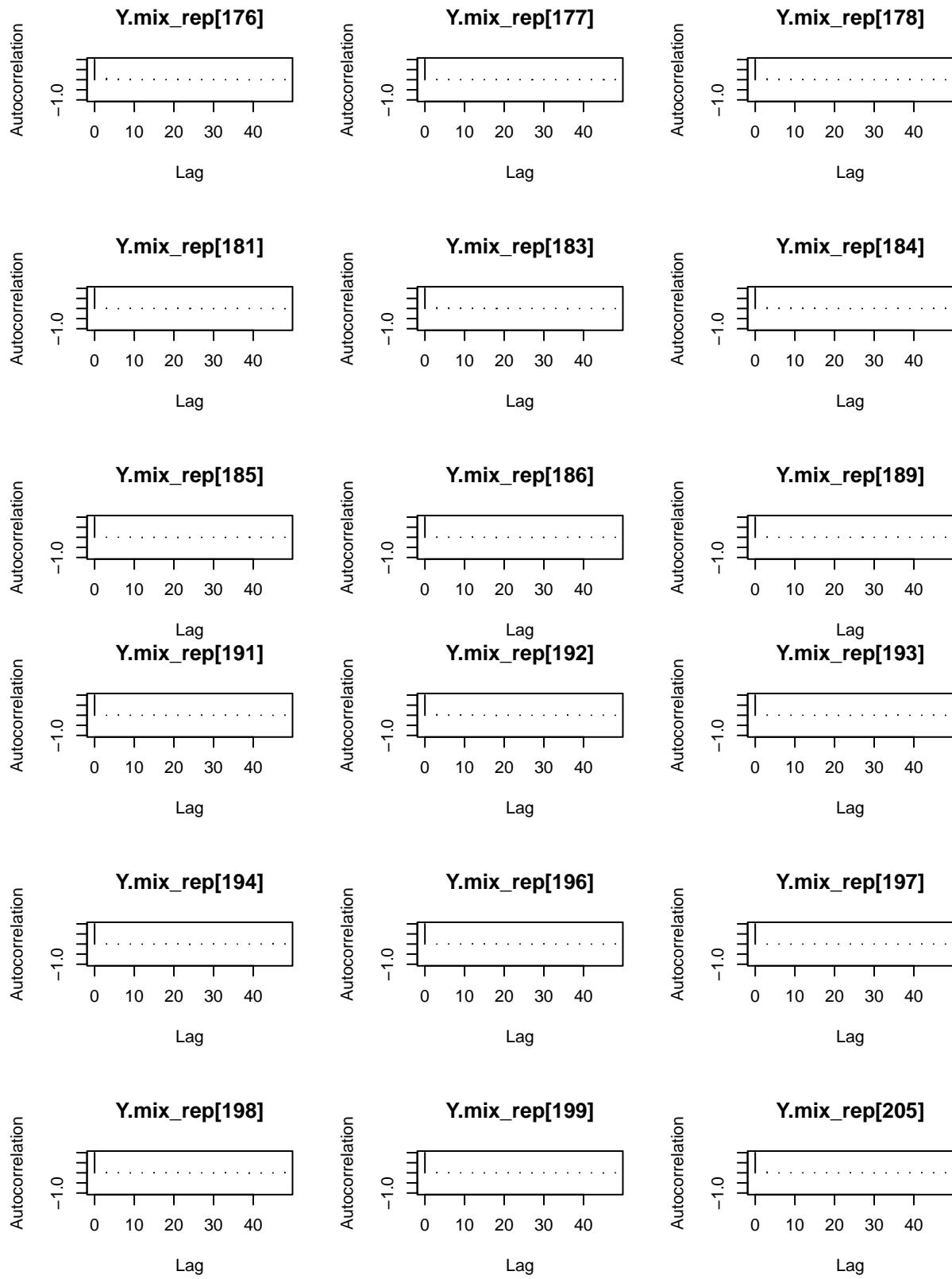


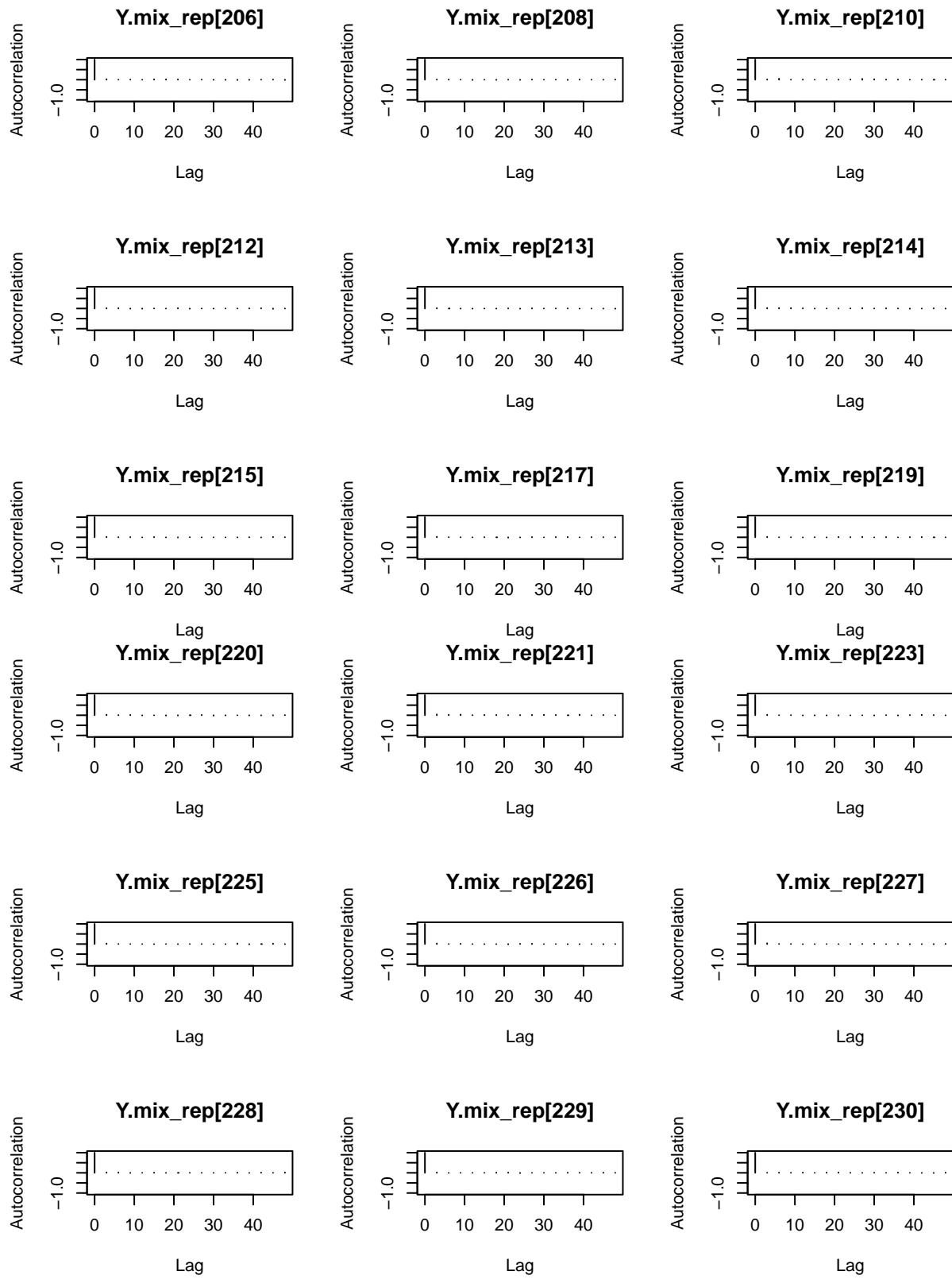


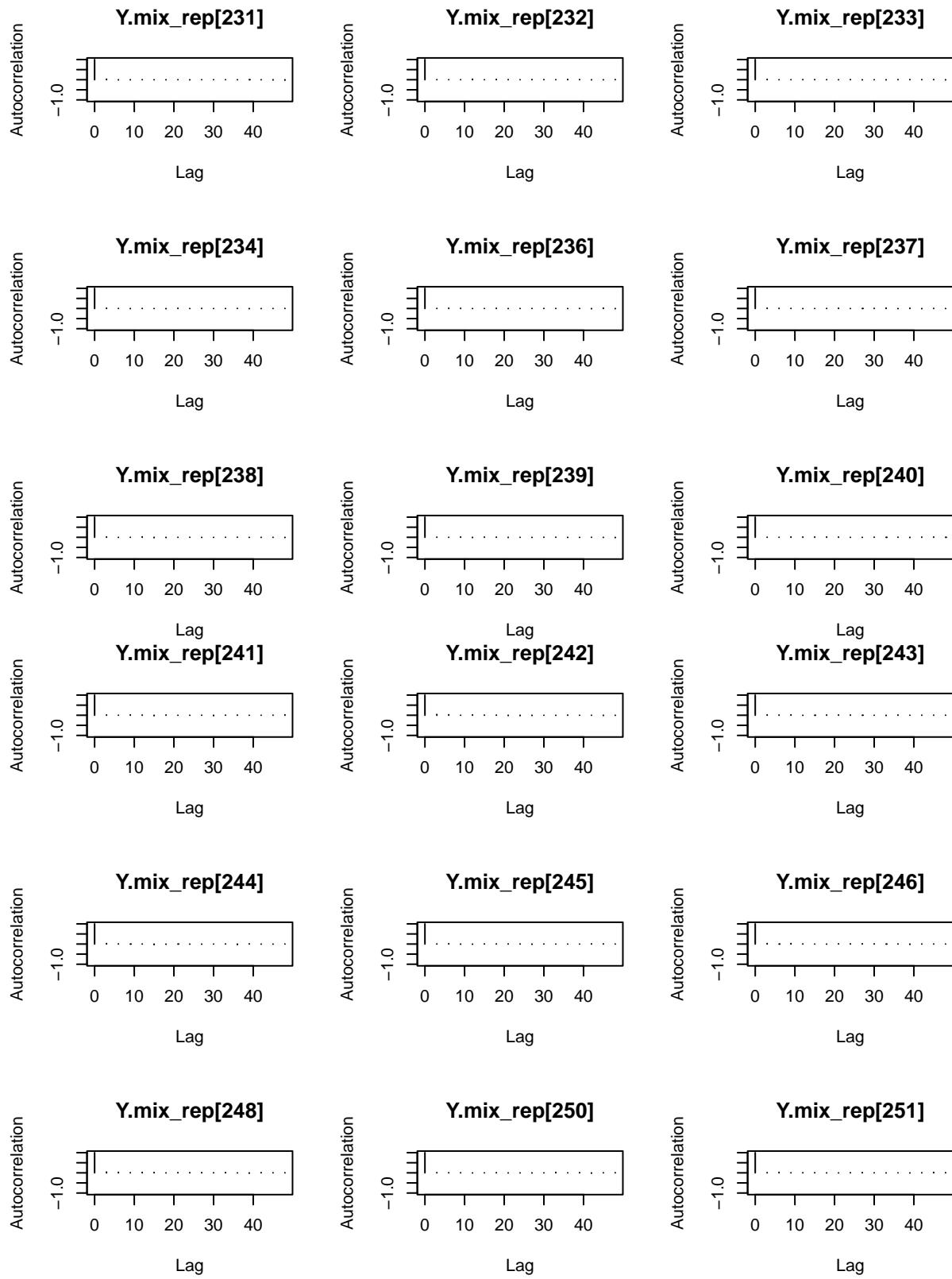


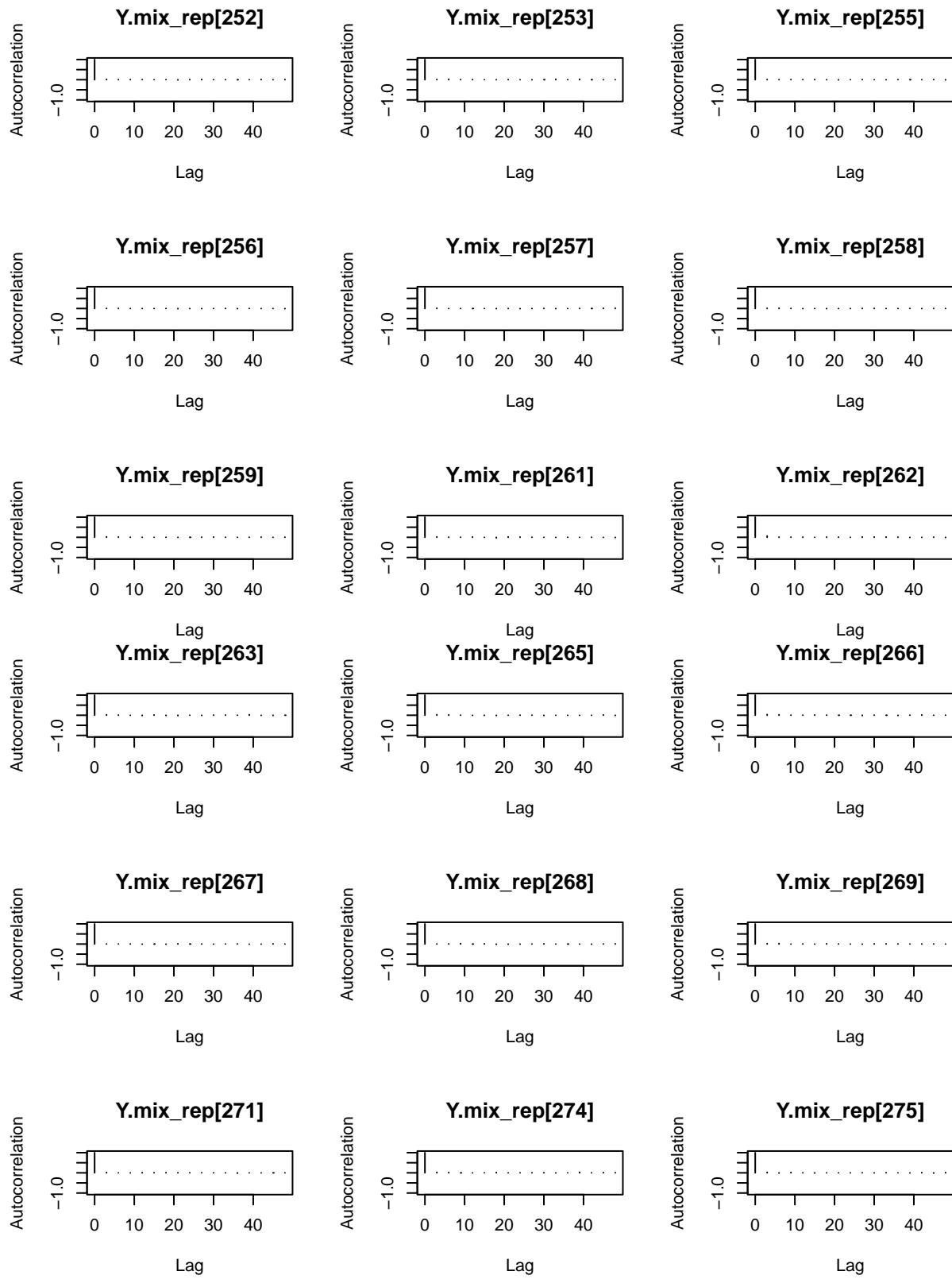


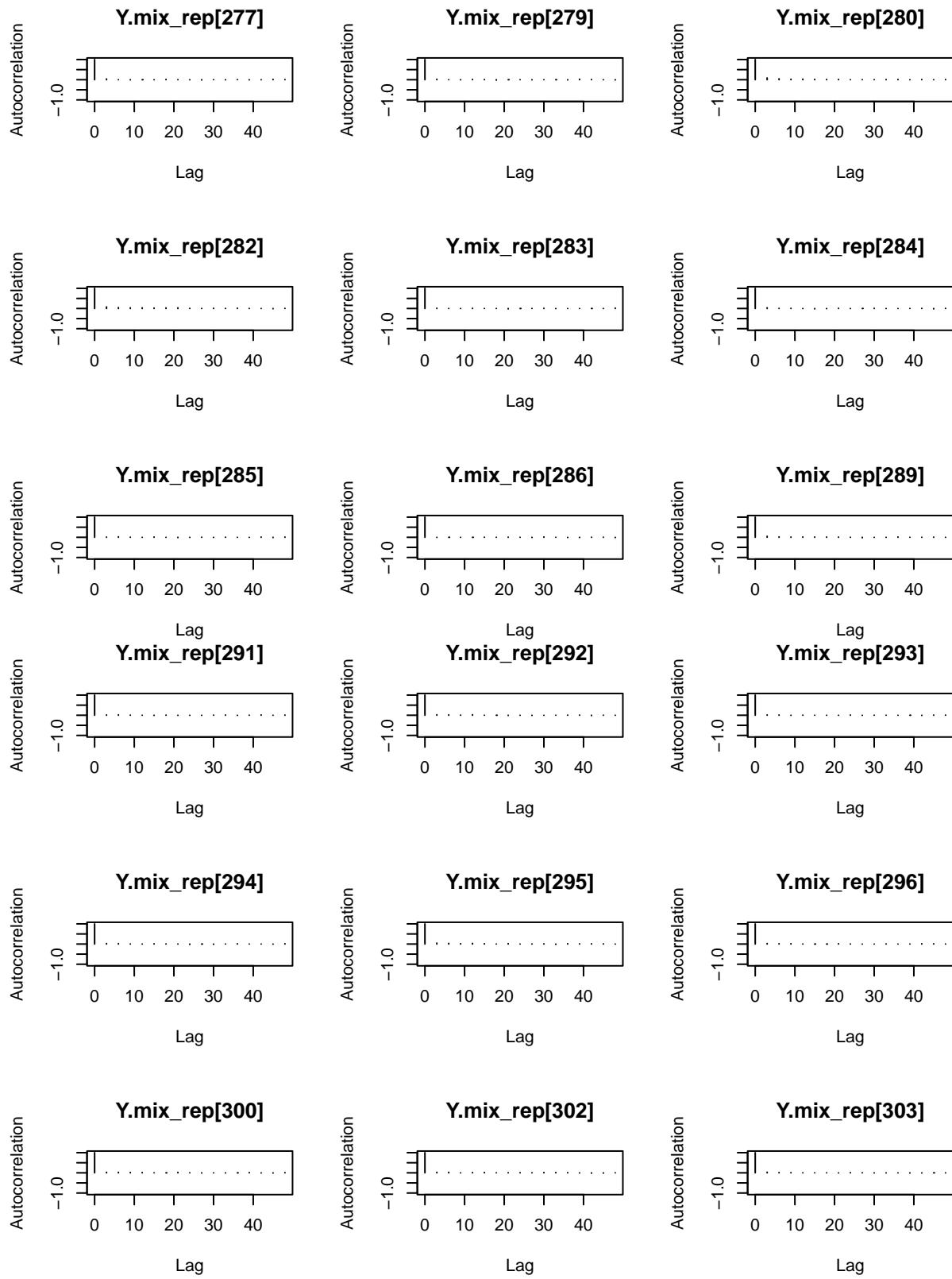


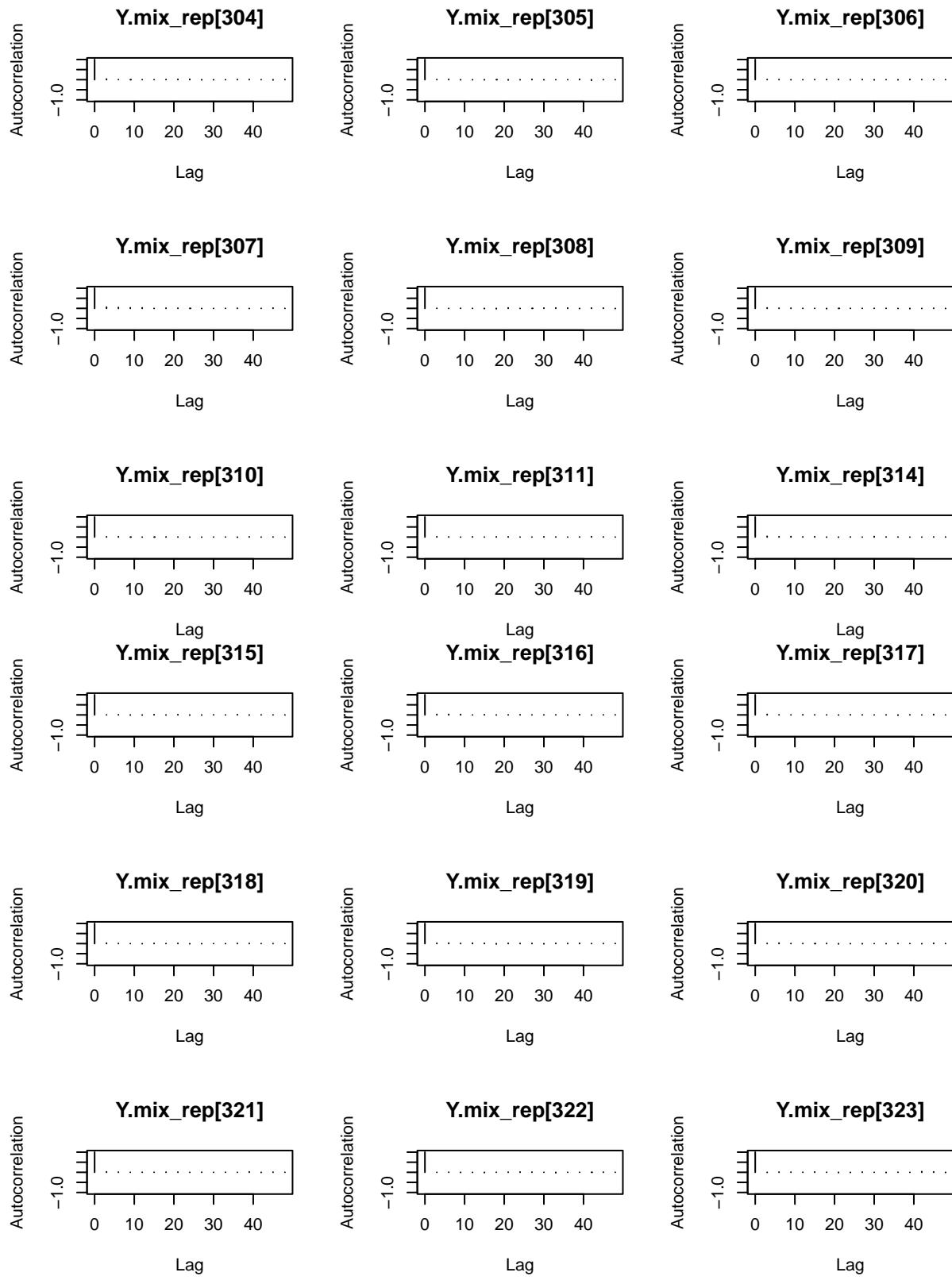


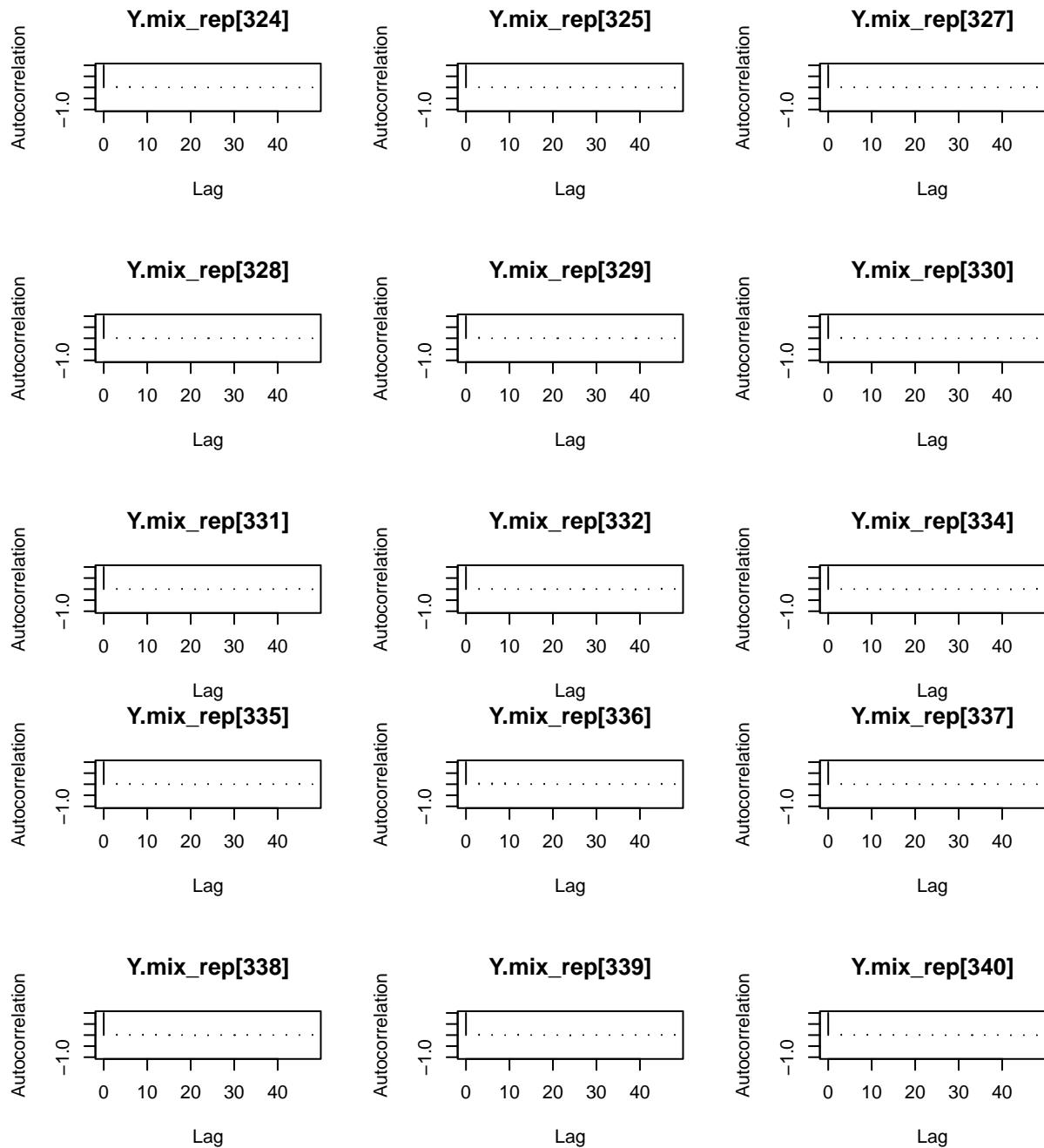












```
# Values are approximately uncorrelated.
```

```
# Heidelberg-Welch diagnostic (Heidelberger and Welch, 1992)
heidel.diag(JM_sample1[[2]][, par_name])
```

```
##  
## Stationarity start p-value  
## test iteration  
## Y.mix_rep[2] passed 1 0.313935  
## Y.mix_rep[4] passed 1 0.222390  
## Y.mix_rep[6] passed 1 0.491982
```

## Y.mix_rep[8]	passed	1	0.418406
## Y.mix_rep[9]	passed	1	0.065581
## Y.mix_rep[12]	passed	1	0.738070
## Y.mix_rep[13]	passed	1	0.055181
## Y.mix_rep[14]	passed	1	0.108238
## Y.mix_rep[16]	passed	1	0.260657
## Y.mix_rep[17]	passed	1	0.179315
## Y.mix_rep[18]	passed	3001	0.088838
## Y.mix_rep[23]	passed	1	0.419974
## Y.mix_rep[25]	passed	1	0.633123
## Y.mix_rep[26]	passed	1	0.322784
## Y.mix_rep[27]	passed	1	0.686247
## Y.mix_rep[28]	passed	1001	0.062017
## Y.mix_rep[30]	passed	1	0.150426
## Y.mix_rep[31]	passed	1	0.116889
## Y.mix_rep[32]	passed	1001	0.074294
## Y.mix_rep[33]	passed	1001	0.921179
## Y.mix_rep[34]	passed	1	0.595903
## Y.mix_rep[36]	passed	1	0.146057
## Y.mix_rep[38]	passed	1001	0.078843
## Y.mix_rep[39]	passed	1	0.276137
## Y.mix_rep[40]	passed	1	0.290786
## Y.mix_rep[41]	passed	1	0.690977
## Y.mix_rep[42]	passed	1	0.102027
## Y.mix_rep[43]	passed	1	0.095162
## Y.mix_rep[46]	passed	1001	0.181436
## Y.mix_rep[47]	passed	4001	0.191820
## Y.mix_rep[48]	passed	1	0.332271
## Y.mix_rep[54]	passed	2001	0.095560
## Y.mix_rep[55]	passed	1	0.623634
## Y.mix_rep[57]	passed	1	0.359264
## Y.mix_rep[58]	passed	1	0.211906
## Y.mix_rep[59]	passed	2001	0.086016
## Y.mix_rep[62]	passed	1001	0.190797
## Y.mix_rep[64]	passed	1	0.248632
## Y.mix_rep[65]	passed	1	0.196023
## Y.mix_rep[66]	passed	1	0.578213
## Y.mix_rep[68]	passed	4001	0.406598
## Y.mix_rep[69]	passed	1	0.486688
## Y.mix_rep[70]	passed	1	0.403528
## Y.mix_rep[71]	passed	2001	0.154345
## Y.mix_rep[73]	passed	1	0.263272
## Y.mix_rep[77]	passed	1	0.323048
## Y.mix_rep[78]	passed	1	0.096932
## Y.mix_rep[79]	passed	1	0.684213
## Y.mix_rep[80]	passed	1	0.054125
## Y.mix_rep[81]	passed	2001	0.115743
## Y.mix_rep[82]	passed	1	0.529665
## Y.mix_rep[83]	passed	1	0.627805
## Y.mix_rep[85]	passed	1001	0.081787
## Y.mix_rep[90]	passed	2001	0.390244
## Y.mix_rep[93]	passed	1	0.598261
## Y.mix_rep[94]	passed	1	0.452898
## Y.mix_rep[96]	passed	1	0.367301

## Y.mix_rep[97] passed	1	0.076282
## Y.mix_rep[98] passed	1	0.759447
## Y.mix_rep[99] passed	1	0.259638
## Y.mix_rep[102] passed	1	0.241594
## Y.mix_rep[106] passed	1	0.095278
## Y.mix_rep[107] passed	1	0.449800
## Y.mix_rep[108] passed	1	0.372316
## Y.mix_rep[109] passed	1	0.207124
## Y.mix_rep[110] failed	NA	0.012572
## Y.mix_rep[111] passed	1	0.098073
## Y.mix_rep[112] passed	2001	0.089280
## Y.mix_rep[113] passed	1	0.169081
## Y.mix_rep[114] passed	1	0.277696
## Y.mix_rep[115] passed	1	0.165025
## Y.mix_rep[116] passed	1001	0.117891
## Y.mix_rep[117] passed	1	0.280309
## Y.mix_rep[118] passed	1	0.289916
## Y.mix_rep[119] passed	1001	0.151486
## Y.mix_rep[120] passed	1	0.179773
## Y.mix_rep[121] passed	1	0.684981
## Y.mix_rep[122] passed	1	0.192779
## Y.mix_rep[124] passed	1	0.693830
## Y.mix_rep[128] passed	1	0.133474
## Y.mix_rep[129] passed	1	0.500348
## Y.mix_rep[130] passed	1	0.323449
## Y.mix_rep[131] passed	1	0.539156
## Y.mix_rep[132] passed	1	0.276346
## Y.mix_rep[133] passed	1001	0.062352
## Y.mix_rep[134] passed	1	0.778560
## Y.mix_rep[135] passed	1	0.168504
## Y.mix_rep[136] passed	1	0.424419
## Y.mix_rep[137] passed	1	0.070770
## Y.mix_rep[138] passed	1	0.948039
## Y.mix_rep[139] passed	1	0.944188
## Y.mix_rep[140] passed	1	0.518004
## Y.mix_rep[141] passed	1	0.885478
## Y.mix_rep[142] passed	1	0.121047
## Y.mix_rep[143] passed	1	0.429299
## Y.mix_rep[147] passed	1	0.190589
## Y.mix_rep[148] passed	1	0.184304
## Y.mix_rep[149] passed	1	0.200001
## Y.mix_rep[150] passed	1	0.105733
## Y.mix_rep[151] passed	1001	0.151816
## Y.mix_rep[152] passed	1001	0.139052
## Y.mix_rep[153] passed	1	0.277433
## Y.mix_rep[155] passed	1	0.760559
## Y.mix_rep[157] passed	1	0.066587
## Y.mix_rep[158] passed	1	0.442525
## Y.mix_rep[160] passed	1	0.378288
## Y.mix_rep[161] failed	NA	0.000641
## Y.mix_rep[163] passed	1	0.210768
## Y.mix_rep[164] passed	1	0.159344
## Y.mix_rep[166] passed	1	0.234650
## Y.mix_rep[168] passed	1	0.262620

## Y.mix_rep[169] passed	1	0.243994
## Y.mix_rep[170] passed	1	0.482468
## Y.mix_rep[171] passed	1	0.228124
## Y.mix_rep[172] passed	1	0.522921
## Y.mix_rep[173] passed	1	0.361285
## Y.mix_rep[174] passed	1	0.925109
## Y.mix_rep[176] passed	1001	0.153563
## Y.mix_rep[177] passed	1001	0.472082
## Y.mix_rep[178] passed	1	0.311690
## Y.mix_rep[181] passed	1	0.430221
## Y.mix_rep[183] passed	1	0.319021
## Y.mix_rep[184] passed	1001	0.149132
## Y.mix_rep[185] passed	1	0.700615
## Y.mix_rep[186] passed	1	0.971193
## Y.mix_rep[189] passed	1001	0.376426
## Y.mix_rep[191] passed	1001	0.233157
## Y.mix_rep[192] passed	1001	0.091519
## Y.mix_rep[193] passed	1	0.187751
## Y.mix_rep[194] passed	1	0.623306
## Y.mix_rep[196] passed	1	0.239011
## Y.mix_rep[197] passed	1	0.085436
## Y.mix_rep[198] passed	1	0.303378
## Y.mix_rep[199] passed	1	0.981266
## Y.mix_rep[205] passed	1	0.248892
## Y.mix_rep[206] passed	1	0.439804
## Y.mix_rep[208] passed	1	0.135325
## Y.mix_rep[210] passed	1	0.074879
## Y.mix_rep[212] passed	1	0.463746
## Y.mix_rep[213] passed	1	0.649379
## Y.mix_rep[214] passed	1	0.170405
## Y.mix_rep[215] passed	1	0.915254
## Y.mix_rep[217] passed	1001	0.129951
## Y.mix_rep[219] passed	1	0.137210
## Y.mix_rep[220] passed	1	0.493594
## Y.mix_rep[221] passed	3001	0.508083
## Y.mix_rep[223] passed	1	0.384329
## Y.mix_rep[225] passed	1001	0.066318
## Y.mix_rep[226] passed	1	0.630320
## Y.mix_rep[227] passed	1	0.154747
## Y.mix_rep[228] passed	1	0.301730
## Y.mix_rep[229] passed	1	0.677855
## Y.mix_rep[230] passed	1	0.110945
## Y.mix_rep[231] passed	1	0.147936
## Y.mix_rep[232] passed	1	0.243311
## Y.mix_rep[233] passed	1001	0.178246
## Y.mix_rep[234] passed	1	0.370904
## Y.mix_rep[236] passed	1	0.179222
## Y.mix_rep[237] passed	1	0.641323
## Y.mix_rep[238] passed	1	0.364631
## Y.mix_rep[239] passed	1	0.443142
## Y.mix_rep[240] passed	1	0.119782
## Y.mix_rep[241] passed	1001	0.139572
## Y.mix_rep[242] passed	1	0.475474
## Y.mix_rep[243] passed	1	0.059115

## Y.mix_rep[244] passed	1	0.485762
## Y.mix_rep[245] passed	1	0.402849
## Y.mix_rep[246] passed	1	0.420551
## Y.mix_rep[248] passed	4001	0.386184
## Y.mix_rep[250] passed	1	0.386081
## Y.mix_rep[251] passed	1	0.505211
## Y.mix_rep[252] passed	1001	0.083404
## Y.mix_rep[253] passed	1	0.227379
## Y.mix_rep[255] passed	1	0.082460
## Y.mix_rep[256] passed	1	0.308210
## Y.mix_rep[257] passed	1	0.630111
## Y.mix_rep[258] passed	1	0.576647
## Y.mix_rep[259] passed	1	0.631177
## Y.mix_rep[261] passed	1	0.777891
## Y.mix_rep[262] passed	1	0.556836
## Y.mix_rep[263] passed	1001	0.217686
## Y.mix_rep[265] passed	1	0.445958
## Y.mix_rep[266] passed	1	0.803622
## Y.mix_rep[267] passed	1	0.057684
## Y.mix_rep[268] passed	3001	0.079013
## Y.mix_rep[269] passed	1	0.177953
## Y.mix_rep[271] passed	1	0.707707
## Y.mix_rep[274] passed	3001	0.124080
## Y.mix_rep[275] passed	1	0.388217
## Y.mix_rep[277] passed	1	0.720564
## Y.mix_rep[279] passed	1	0.455834
## Y.mix_rep[280] passed	1	0.406078
## Y.mix_rep[282] passed	1001	0.090352
## Y.mix_rep[283] passed	1	0.255217
## Y.mix_rep[284] passed	2001	0.407599
## Y.mix_rep[285] passed	1	0.086507
## Y.mix_rep[286] passed	1	0.050508
## Y.mix_rep[289] passed	1	0.530285
## Y.mix_rep[291] passed	1	0.107187
## Y.mix_rep[292] passed	1	0.133639
## Y.mix_rep[293] failed	NA	0.020714
## Y.mix_rep[294] passed	1	0.305299
## Y.mix_rep[295] passed	1	0.389875
## Y.mix_rep[296] passed	1	0.171462
## Y.mix_rep[300] passed	1	0.157569
## Y.mix_rep[302] passed	2001	0.087831
## Y.mix_rep[303] passed	1	0.445695
## Y.mix_rep[304] passed	1	0.298327
## Y.mix_rep[305] passed	1	0.614628
## Y.mix_rep[306] passed	1	0.190056
## Y.mix_rep[307] passed	1001	0.153249
## Y.mix_rep[308] passed	4001	0.171646
## Y.mix_rep[309] passed	1	0.085611
## Y.mix_rep[310] passed	1	0.426240
## Y.mix_rep[311] passed	1	0.604306
## Y.mix_rep[314] passed	1	0.057883
## Y.mix_rep[315] passed	1	0.481905
## Y.mix_rep[316] passed	1	0.324530
## Y.mix_rep[317] passed	1	0.112595

```

## Y.mix_rep[318] passed      1    0.523597
## Y.mix_rep[319] passed      1    0.385594
## Y.mix_rep[320] passed    4001  0.102739
## Y.mix_rep[321] passed      1    0.234925
## Y.mix_rep[322] passed      1    0.105095
## Y.mix_rep[323] passed      1    0.313042
## Y.mix_rep[324] passed      1    0.547890
## Y.mix_rep[325] passed      1    0.323596
## Y.mix_rep[327] passed      1    0.244279
## Y.mix_rep[328] passed      1    0.108135
## Y.mix_rep[329] passed      1    0.254468
## Y.mix_rep[330] passed      1    0.811612
## Y.mix_rep[331] passed      1    0.287951
## Y.mix_rep[332] passed      1    0.438612
## Y.mix_rep[334] passed      1    0.096766
## Y.mix_rep[335] passed    1001  0.196747
## Y.mix_rep[336] passed      1    0.151354
## Y.mix_rep[337] passed      1    0.229500
## Y.mix_rep[338] passed      1    0.054722
## Y.mix_rep[339] passed      1    0.426742
## Y.mix_rep[340] passed      1    0.368894
##
##                                Halfwidth Mean Halfwidth
##                                test
## Y.mix_rep[2]     passed   2.00  0.0163
## Y.mix_rep[4]     passed   1.72  0.0157
## Y.mix_rep[6]     passed   1.77  0.0186
## Y.mix_rep[8]     passed   1.37  0.0135
## Y.mix_rep[9]     passed   1.56  0.0160
## Y.mix_rep[12]    passed   1.54  0.0171
## Y.mix_rep[13]    passed   1.63  0.0192
## Y.mix_rep[14]    passed   1.41  0.0167
## Y.mix_rep[16]    passed   1.68  0.0200
## Y.mix_rep[17]    passed   1.84  0.0159
## Y.mix_rep[18]    passed   2.27  0.0170
## Y.mix_rep[23]    passed   2.26  0.0173
## Y.mix_rep[25]    passed   2.02  0.0192
## Y.mix_rep[26]    passed   1.78  0.0187
## Y.mix_rep[27]    passed   1.73  0.0170
## Y.mix_rep[28]    passed   2.11  0.0246
## Y.mix_rep[30]    passed   2.28  0.0218
## Y.mix_rep[31]    passed   1.66  0.0160
## Y.mix_rep[32]    passed   1.65  0.0237
## Y.mix_rep[33]    passed   1.34  0.0180
## Y.mix_rep[34]    passed   1.56  0.0185
## Y.mix_rep[36]    passed   1.29  0.0129
## Y.mix_rep[38]    passed   1.76  0.0199
## Y.mix_rep[39]    passed   1.42  0.0175
## Y.mix_rep[40]    passed   1.65  0.0184
## Y.mix_rep[41]    passed   1.64  0.0171
## Y.mix_rep[42]    passed   1.52  0.0171
## Y.mix_rep[43]    passed   1.48  0.0174
## Y.mix_rep[46]    passed   1.71  0.0166
## Y.mix_rep[47]    passed   1.44  0.0201

```

```

## Y.mix_rep[48] passed 2.12 0.0178
## Y.mix_rep[54] passed 1.97 0.0253
## Y.mix_rep[55] passed 1.66 0.0166
## Y.mix_rep[57] passed 1.10 0.0141
## Y.mix_rep[58] passed 1.62 0.0162
## Y.mix_rep[59] passed 2.04 0.0282
## Y.mix_rep[62] passed 2.31 0.0171
## Y.mix_rep[64] passed 1.90 0.0130
## Y.mix_rep[65] passed 1.83 0.0215
## Y.mix_rep[66] passed 2.01 0.0216
## Y.mix_rep[68] passed 2.09 0.0219
## Y.mix_rep[69] passed 1.64 0.0171
## Y.mix_rep[70] passed 1.50 0.0168
## Y.mix_rep[71] passed 1.98 0.0203
## Y.mix_rep[73] passed 1.62 0.0143
## Y.mix_rep[77] passed 1.49 0.0157
## Y.mix_rep[78] passed 2.22 0.0173
## Y.mix_rep[79] passed 1.44 0.0139
## Y.mix_rep[80] passed 1.94 0.0221
## Y.mix_rep[81] passed 1.70 0.0123
## Y.mix_rep[82] passed 1.43 0.0161
## Y.mix_rep[83] passed 1.51 0.0171
## Y.mix_rep[85] passed 1.99 0.0227
## Y.mix_rep[90] passed 1.14 0.0152
## Y.mix_rep[93] passed 2.21 0.0212
## Y.mix_rep[94] passed 1.58 0.0160
## Y.mix_rep[96] passed 1.09 0.0119
## Y.mix_rep[97] passed 1.55 0.0184
## Y.mix_rep[98] passed 1.94 0.0237
## Y.mix_rep[99] passed 1.56 0.0165
## Y.mix_rep[102] passed 1.52 0.0169
## Y.mix_rep[106] passed 1.10 0.0128
## Y.mix_rep[107] passed 1.65 0.0173
## Y.mix_rep[108] passed 1.70 0.0172
## Y.mix_rep[109] passed 1.64 0.0229
## Y.mix_rep[110] <NA> NA NA
## Y.mix_rep[111] passed 1.47 0.0172
## Y.mix_rep[112] passed 1.92 0.0281
## Y.mix_rep[113] passed 1.47 0.0177
## Y.mix_rep[114] passed 1.76 0.0159
## Y.mix_rep[115] passed 1.57 0.0171
## Y.mix_rep[116] passed 1.74 0.0189
## Y.mix_rep[117] passed 1.75 0.0183
## Y.mix_rep[118] passed 2.17 0.0175
## Y.mix_rep[119] passed 1.69 0.0167
## Y.mix_rep[120] passed 1.19 0.0139
## Y.mix_rep[121] passed 1.04 0.0127
## Y.mix_rep[122] passed 1.85 0.0184
## Y.mix_rep[124] passed 1.17 0.0151
## Y.mix_rep[128] passed 1.24 0.0114
## Y.mix_rep[129] passed 1.56 0.0171
## Y.mix_rep[130] passed 1.68 0.0178
## Y.mix_rep[131] passed 1.56 0.0167
## Y.mix_rep[132] passed 1.26 0.0142

```

```

## Y.mix_rep[133] passed    1.86 0.0174
## Y.mix_rep[134] passed    1.70 0.0149
## Y.mix_rep[135] passed    2.06 0.0212
## Y.mix_rep[136] passed    1.39 0.0176
## Y.mix_rep[137] passed    1.49 0.0172
## Y.mix_rep[138] passed    1.50 0.0138
## Y.mix_rep[139] passed    1.92 0.0160
## Y.mix_rep[140] passed    1.85 0.0178
## Y.mix_rep[141] passed    1.43 0.0174
## Y.mix_rep[142] passed    1.40 0.0170
## Y.mix_rep[143] passed    1.53 0.0184
## Y.mix_rep[147] passed    1.73 0.0188
## Y.mix_rep[148] passed    1.25 0.0157
## Y.mix_rep[149] passed    1.15 0.0127
## Y.mix_rep[150] passed    2.03 0.0178
## Y.mix_rep[151] passed    1.57 0.0199
## Y.mix_rep[152] passed    1.52 0.0184
## Y.mix_rep[153] passed    1.87 0.0176
## Y.mix_rep[155] passed    1.70 0.0189
## Y.mix_rep[157] passed    1.58 0.0188
## Y.mix_rep[158] passed    1.14 0.0133
## Y.mix_rep[160] passed    1.87 0.0213
## Y.mix_rep[161] <NA>      NA     NA
## Y.mix_rep[163] passed    1.86 0.0179
## Y.mix_rep[164] passed    1.37 0.0134
## Y.mix_rep[166] passed    1.70 0.0153
## Y.mix_rep[168] passed    1.56 0.0160
## Y.mix_rep[169] passed    1.11 0.0130
## Y.mix_rep[170] passed    1.19 0.0147
## Y.mix_rep[171] passed    2.30 0.0196
## Y.mix_rep[172] passed    1.66 0.0166
## Y.mix_rep[173] passed    1.78 0.0249
## Y.mix_rep[174] passed    1.63 0.0137
## Y.mix_rep[176] passed    2.40 0.0221
## Y.mix_rep[177] passed    1.40 0.0181
## Y.mix_rep[178] passed    2.29 0.0216
## Y.mix_rep[181] passed    1.72 0.0166
## Y.mix_rep[183] passed    1.78 0.0235
## Y.mix_rep[184] passed    1.80 0.0248
## Y.mix_rep[185] passed    1.04 0.0118
## Y.mix_rep[186] passed    1.71 0.0165
## Y.mix_rep[189] passed    1.41 0.0172
## Y.mix_rep[191] passed    1.36 0.0176
## Y.mix_rep[192] passed    1.45 0.0180
## Y.mix_rep[193] passed    1.10 0.0118
## Y.mix_rep[194] passed    1.18 0.0139
## Y.mix_rep[196] passed    1.42 0.0174
## Y.mix_rep[197] passed    1.56 0.0181
## Y.mix_rep[198] passed    1.67 0.0182
## Y.mix_rep[199] passed    1.17 0.0117
## Y.mix_rep[205] passed    1.79 0.0190
## Y.mix_rep[206] passed    1.59 0.0173
## Y.mix_rep[208] passed    1.73 0.0171
## Y.mix_rep[210] passed    1.57 0.0184

```

```

## Y.mix_rep[212] passed    1.86 0.0166
## Y.mix_rep[213] passed    1.69 0.0163
## Y.mix_rep[214] passed    2.07 0.0206
## Y.mix_rep[215] passed    1.31 0.0150
## Y.mix_rep[217] passed    1.58 0.0190
## Y.mix_rep[219] passed    1.67 0.0183
## Y.mix_rep[220] passed    1.92 0.0162
## Y.mix_rep[221] passed    2.05 0.0167
## Y.mix_rep[223] passed    1.66 0.0181
## Y.mix_rep[225] passed    2.37 0.0180
## Y.mix_rep[226] passed    1.01 0.0129
## Y.mix_rep[227] passed    1.56 0.0173
## Y.mix_rep[228] passed    1.85 0.0173
## Y.mix_rep[229] passed    1.87 0.0175
## Y.mix_rep[230] passed    1.84 0.0168
## Y.mix_rep[231] passed    1.80 0.0176
## Y.mix_rep[232] passed    1.51 0.0165
## Y.mix_rep[233] passed    1.65 0.0186
## Y.mix_rep[234] passed    1.60 0.0185
## Y.mix_rep[236] passed    1.50 0.0125
## Y.mix_rep[237] passed    1.86 0.0156
## Y.mix_rep[238] passed    1.64 0.0156
## Y.mix_rep[239] passed    1.49 0.0169
## Y.mix_rep[240] passed    1.71 0.0190
## Y.mix_rep[241] passed    1.77 0.0182
## Y.mix_rep[242] passed    1.89 0.0195
## Y.mix_rep[243] passed    1.67 0.0188
## Y.mix_rep[244] passed    1.76 0.0161
## Y.mix_rep[245] passed    1.27 0.0116
## Y.mix_rep[246] passed    1.39 0.0135
## Y.mix_rep[248] passed    1.96 0.0301
## Y.mix_rep[250] passed    1.12 0.0143
## Y.mix_rep[251] passed    1.48 0.0176
## Y.mix_rep[252] passed    1.65 0.0186
## Y.mix_rep[253] passed    1.66 0.0194
## Y.mix_rep[255] passed    1.76 0.0188
## Y.mix_rep[256] passed    1.19 0.0143
## Y.mix_rep[257] passed    2.24 0.0153
## Y.mix_rep[258] passed    2.18 0.0166
## Y.mix_rep[259] passed    2.38 0.0176
## Y.mix_rep[261] passed    1.50 0.0134
## Y.mix_rep[262] passed    2.12 0.0227
## Y.mix_rep[263] passed    1.78 0.0192
## Y.mix_rep[265] passed    1.37 0.0152
## Y.mix_rep[266] passed    1.85 0.0183
## Y.mix_rep[267] passed    1.46 0.0171
## Y.mix_rep[268] passed    2.38 0.0204
## Y.mix_rep[269] passed    2.16 0.0166
## Y.mix_rep[271] passed    1.72 0.0167
## Y.mix_rep[274] passed    1.40 0.0146
## Y.mix_rep[275] passed    1.76 0.0193
## Y.mix_rep[277] passed    1.44 0.0150
## Y.mix_rep[279] passed    2.14 0.0157
## Y.mix_rep[280] passed    1.96 0.0177

```

```

## Y.mix_rep[282] passed    1.57 0.0214
## Y.mix_rep[283] passed    1.86 0.0182
## Y.mix_rep[284] passed    1.37 0.0140
## Y.mix_rep[285] passed    1.18 0.0131
## Y.mix_rep[286] passed    1.65 0.0190
## Y.mix_rep[289] passed    1.80 0.0221
## Y.mix_rep[291] passed    1.11 0.0137
## Y.mix_rep[292] passed    1.57 0.0181
## Y.mix_rep[293] <NA>      NA     NA
## Y.mix_rep[294] passed    1.60 0.0172
## Y.mix_rep[295] passed    2.27 0.0213
## Y.mix_rep[296] passed    1.99 0.0181
## Y.mix_rep[300] passed    1.93 0.0195
## Y.mix_rep[302] passed    1.87 0.0251
## Y.mix_rep[303] passed    1.81 0.0189
## Y.mix_rep[304] passed    1.72 0.0179
## Y.mix_rep[305] passed    1.75 0.0179
## Y.mix_rep[306] passed    1.39 0.0164
## Y.mix_rep[307] passed    1.97 0.0235
## Y.mix_rep[308] passed    1.40 0.0230
## Y.mix_rep[309] passed    2.22 0.0166
## Y.mix_rep[310] passed    1.77 0.0185
## Y.mix_rep[311] passed    1.47 0.0175
## Y.mix_rep[314] passed    2.14 0.0235
## Y.mix_rep[315] passed    1.64 0.0155
## Y.mix_rep[316] passed    1.63 0.0164
## Y.mix_rep[317] passed    1.64 0.0163
## Y.mix_rep[318] passed    1.83 0.0190
## Y.mix_rep[319] passed    1.63 0.0183
## Y.mix_rep[320] passed    1.68 0.0236
## Y.mix_rep[321] passed    1.56 0.0171
## Y.mix_rep[322] passed    1.63 0.0181
## Y.mix_rep[323] passed    1.54 0.0187
## Y.mix_rep[324] passed    1.30 0.0156
## Y.mix_rep[325] passed    1.63 0.0191
## Y.mix_rep[327] passed    1.92 0.0153
## Y.mix_rep[328] passed    1.50 0.0141
## Y.mix_rep[329] passed    1.64 0.0170
## Y.mix_rep[330] passed    1.44 0.0135
## Y.mix_rep[331] passed    1.81 0.0183
## Y.mix_rep[332] passed    1.37 0.0143
## Y.mix_rep[334] passed    1.44 0.0162
## Y.mix_rep[335] passed    1.61 0.0200
## Y.mix_rep[336] passed    2.21 0.0230
## Y.mix_rep[337] passed    1.83 0.0188
## Y.mix_rep[338] passed    1.59 0.0193
## Y.mix_rep[339] passed    1.66 0.0176
## Y.mix_rep[340] passed    1.52 0.0180

```

```

# Gelman-Rubin diagnostic (Gelman and Rubin, 1992)
gelman.diag(JM_sample1[, par_name])

```

```

## Potential scale reduction factors:
##
```

	Point est.	Upper C.I.
## Y.mix_rep[2]	1	1.00
## Y.mix_rep[4]	1	1.00
## Y.mix_rep[6]	1	1.00
## Y.mix_rep[8]	1	1.00
## Y.mix_rep[9]	1	1.00
## Y.mix_rep[12]	1	1.00
## Y.mix_rep[13]	1	1.00
## Y.mix_rep[14]	1	1.00
## Y.mix_rep[16]	1	1.00
## Y.mix_rep[17]	1	1.00
## Y.mix_rep[18]	1	1.00
## Y.mix_rep[23]	1	1.00
## Y.mix_rep[25]	1	1.00
## Y.mix_rep[26]	1	1.00
## Y.mix_rep[27]	1	1.00
## Y.mix_rep[28]	1	1.00
## Y.mix_rep[30]	1	1.00
## Y.mix_rep[31]	1	1.00
## Y.mix_rep[32]	1	1.00
## Y.mix_rep[33]	1	1.00
## Y.mix_rep[34]	1	1.00
## Y.mix_rep[36]	1	1.00
## Y.mix_rep[38]	1	1.00
## Y.mix_rep[39]	1	1.00
## Y.mix_rep[40]	1	1.00
## Y.mix_rep[41]	1	1.00
## Y.mix_rep[42]	1	1.00
## Y.mix_rep[43]	1	1.00
## Y.mix_rep[46]	1	1.00
## Y.mix_rep[47]	1	1.00
## Y.mix_rep[48]	1	1.00
## Y.mix_rep[54]	1	1.00
## Y.mix_rep[55]	1	1.00
## Y.mix_rep[57]	1	1.00
## Y.mix_rep[58]	1	1.00
## Y.mix_rep[59]	1	1.00
## Y.mix_rep[62]	1	1.00
## Y.mix_rep[64]	1	1.00
## Y.mix_rep[65]	1	1.00
## Y.mix_rep[66]	1	1.00
## Y.mix_rep[68]	1	1.00
## Y.mix_rep[69]	1	1.00
## Y.mix_rep[70]	1	1.00
## Y.mix_rep[71]	1	1.00
## Y.mix_rep[73]	1	1.00
## Y.mix_rep[77]	1	1.00
## Y.mix_rep[78]	1	1.00
## Y.mix_rep[79]	1	1.00
## Y.mix_rep[80]	1	1.01
## Y.mix_rep[81]	1	1.00
## Y.mix_rep[82]	1	1.00
## Y.mix_rep[83]	1	1.00
## Y.mix_rep[85]	1	1.00

```

## Y.mix_rep[90]      1      1.00
## Y.mix_rep[93]      1      1.00
## Y.mix_rep[94]      1      1.00
## Y.mix_rep[96]      1      1.00
## Y.mix_rep[97]      1      1.00
## Y.mix_rep[98]      1      1.00
## Y.mix_rep[99]      1      1.00
## Y.mix_rep[102]     1      1.00
## Y.mix_rep[106]     1      1.00
## Y.mix_rep[107]     1      1.00
## Y.mix_rep[108]     1      1.00
## Y.mix_rep[109]     1      1.00
## Y.mix_rep[110]     1      1.00
## Y.mix_rep[111]     1      1.00
## Y.mix_rep[112]     1      1.00
## Y.mix_rep[113]     1      1.00
## Y.mix_rep[114]     1      1.00
## Y.mix_rep[115]     1      1.00
## Y.mix_rep[116]     1      1.00
## Y.mix_rep[117]     1      1.00
## Y.mix_rep[118]     1      1.00
## Y.mix_rep[119]     1      1.00
## Y.mix_rep[120]     1      1.00
## Y.mix_rep[121]     1      1.00
## Y.mix_rep[122]     1      1.00
## Y.mix_rep[124]     1      1.00
## Y.mix_rep[128]     1      1.00
## Y.mix_rep[129]     1      1.00
## Y.mix_rep[130]     1      1.00
## Y.mix_rep[131]     1      1.00
## Y.mix_rep[132]     1      1.00
## Y.mix_rep[133]     1      1.00
## Y.mix_rep[134]     1      1.00
## Y.mix_rep[135]     1      1.00
## Y.mix_rep[136]     1      1.00
## Y.mix_rep[137]     1      1.00
## Y.mix_rep[138]     1      1.00
## Y.mix_rep[139]     1      1.00
## Y.mix_rep[140]     1      1.00
## Y.mix_rep[141]     1      1.00
## Y.mix_rep[142]     1      1.00
## Y.mix_rep[143]     1      1.00
## Y.mix_rep[147]     1      1.00
## Y.mix_rep[148]     1      1.00
## Y.mix_rep[149]     1      1.00
## Y.mix_rep[150]     1      1.00
## Y.mix_rep[151]     1      1.00
## Y.mix_rep[152]     1      1.00
## Y.mix_rep[153]     1      1.00
## Y.mix_rep[155]     1      1.00
## Y.mix_rep[157]     1      1.00
## Y.mix_rep[158]     1      1.00
## Y.mix_rep[160]     1      1.00
## Y.mix_rep[161]     1      1.00

```

```

## Y.mix_rep[163]      1      1.00
## Y.mix_rep[164]      1      1.00
## Y.mix_rep[166]      1      1.00
## Y.mix_rep[168]      1      1.00
## Y.mix_rep[169]      1      1.00
## Y.mix_rep[170]      1      1.00
## Y.mix_rep[171]      1      1.00
## Y.mix_rep[172]      1      1.00
## Y.mix_rep[173]      1      1.00
## Y.mix_rep[174]      1      1.00
## Y.mix_rep[176]      1      1.00
## Y.mix_rep[177]      1      1.00
## Y.mix_rep[178]      1      1.00
## Y.mix_rep[181]      1      1.00
## Y.mix_rep[183]      1      1.00
## Y.mix_rep[184]      1      1.00
## Y.mix_rep[185]      1      1.00
## Y.mix_rep[186]      1      1.00
## Y.mix_rep[189]      1      1.00
## Y.mix_rep[191]      1      1.00
## Y.mix_rep[192]      1      1.00
## Y.mix_rep[193]      1      1.00
## Y.mix_rep[194]      1      1.00
## Y.mix_rep[196]      1      1.00
## Y.mix_rep[197]      1      1.00
## Y.mix_rep[198]      1      1.00
## Y.mix_rep[199]      1      1.00
## Y.mix_rep[205]      1      1.00
## Y.mix_rep[206]      1      1.00
## Y.mix_rep[208]      1      1.00
## Y.mix_rep[210]      1      1.00
## Y.mix_rep[212]      1      1.00
## Y.mix_rep[213]      1      1.00
## Y.mix_rep[214]      1      1.00
## Y.mix_rep[215]      1      1.00
## Y.mix_rep[217]      1      1.01
## Y.mix_rep[219]      1      1.00
## Y.mix_rep[220]      1      1.00
## Y.mix_rep[221]      1      1.00
## Y.mix_rep[223]      1      1.00
## Y.mix_rep[225]      1      1.00
## Y.mix_rep[226]      1      1.00
## Y.mix_rep[227]      1      1.00
## Y.mix_rep[228]      1      1.01
## Y.mix_rep[229]      1      1.00
## Y.mix_rep[230]      1      1.00
## Y.mix_rep[231]      1      1.00
## Y.mix_rep[232]      1      1.00
## Y.mix_rep[233]      1      1.00
## Y.mix_rep[234]      1      1.00
## Y.mix_rep[236]      1      1.00
## Y.mix_rep[237]      1      1.00
## Y.mix_rep[238]      1      1.00
## Y.mix_rep[239]      1      1.00

```

```

## Y.mix_rep[240]      1      1.00
## Y.mix_rep[241]      1      1.00
## Y.mix_rep[242]      1      1.00
## Y.mix_rep[243]      1      1.00
## Y.mix_rep[244]      1      1.00
## Y.mix_rep[245]      1      1.00
## Y.mix_rep[246]      1      1.00
## Y.mix_rep[248]      1      1.00
## Y.mix_rep[250]      1      1.00
## Y.mix_rep[251]      1      1.00
## Y.mix_rep[252]      1      1.00
## Y.mix_rep[253]      1      1.00
## Y.mix_rep[255]      1      1.00
## Y.mix_rep[256]      1      1.00
## Y.mix_rep[257]      1      1.00
## Y.mix_rep[258]      1      1.00
## Y.mix_rep[259]      1      1.00
## Y.mix_rep[261]      1      1.00
## Y.mix_rep[262]      1      1.00
## Y.mix_rep[263]      1      1.00
## Y.mix_rep[265]      1      1.00
## Y.mix_rep[266]      1      1.00
## Y.mix_rep[267]      1      1.00
## Y.mix_rep[268]      1      1.00
## Y.mix_rep[269]      1      1.00
## Y.mix_rep[271]      1      1.00
## Y.mix_rep[274]      1      1.00
## Y.mix_rep[275]      1      1.00
## Y.mix_rep[277]      1      1.00
## Y.mix_rep[279]      1      1.00
## Y.mix_rep[280]      1      1.00
## Y.mix_rep[282]      1      1.01
## Y.mix_rep[283]      1      1.00
## Y.mix_rep[284]      1      1.00
## Y.mix_rep[285]      1      1.00
## Y.mix_rep[286]      1      1.00
## Y.mix_rep[289]      1      1.00
## Y.mix_rep[291]      1      1.00
## Y.mix_rep[292]      1      1.00
## Y.mix_rep[293]      1      1.00
## Y.mix_rep[294]      1      1.00
## Y.mix_rep[295]      1      1.00
## Y.mix_rep[296]      1      1.00
## Y.mix_rep[300]      1      1.00
## Y.mix_rep[302]      1      1.00
## Y.mix_rep[303]      1      1.00
## Y.mix_rep[304]      1      1.00
## Y.mix_rep[305]      1      1.00
## Y.mix_rep[306]      1      1.00
## Y.mix_rep[307]      1      1.00
## Y.mix_rep[308]      1      1.00
## Y.mix_rep[309]      1      1.00
## Y.mix_rep[310]      1      1.00
## Y.mix_rep[311]      1      1.00

```

```

## Y.mix_rep[314]      1      1.00
## Y.mix_rep[315]      1      1.00
## Y.mix_rep[316]      1      1.00
## Y.mix_rep[317]      1      1.00
## Y.mix_rep[318]      1      1.00
## Y.mix_rep[319]      1      1.00
## Y.mix_rep[320]      1      1.00
## Y.mix_rep[321]      1      1.00
## Y.mix_rep[322]      1      1.00
## Y.mix_rep[323]      1      1.00
## Y.mix_rep[324]      1      1.00
## Y.mix_rep[325]      1      1.00
## Y.mix_rep[327]      1      1.00
## Y.mix_rep[328]      1      1.00
## Y.mix_rep[329]      1      1.00
## Y.mix_rep[330]      1      1.00
## Y.mix_rep[331]      1      1.00
## Y.mix_rep[332]      1      1.00
## Y.mix_rep[334]      1      1.00
## Y.mix_rep[335]      1      1.00
## Y.mix_rep[336]      1      1.00
## Y.mix_rep[337]      1      1.00
## Y.mix_rep[338]      1      1.00
## Y.mix_rep[339]      1      1.00
## Y.mix_rep[340]      1      1.00
##
## Multivariate psrf
##
## 1.02

gelman_test = gelman.diag(JM_sample1[, par_name])
# Whether the number of parameters having significant convergence test results exceeds 5%?
length(which(round(gelman_test$psrf[, 1], 1) > 1.2)) / length(par_name) > 0.05

## [1] FALSE

```