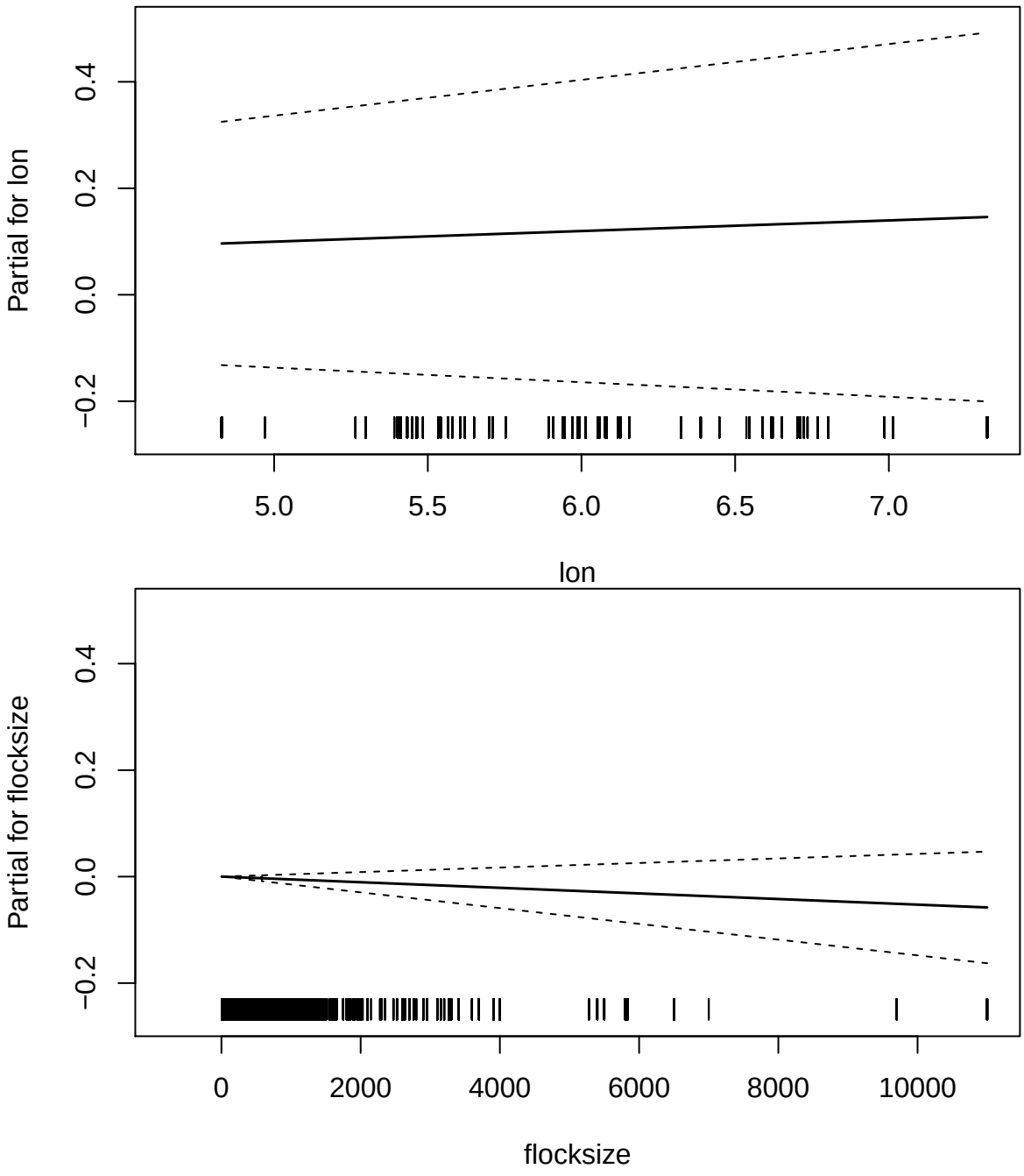
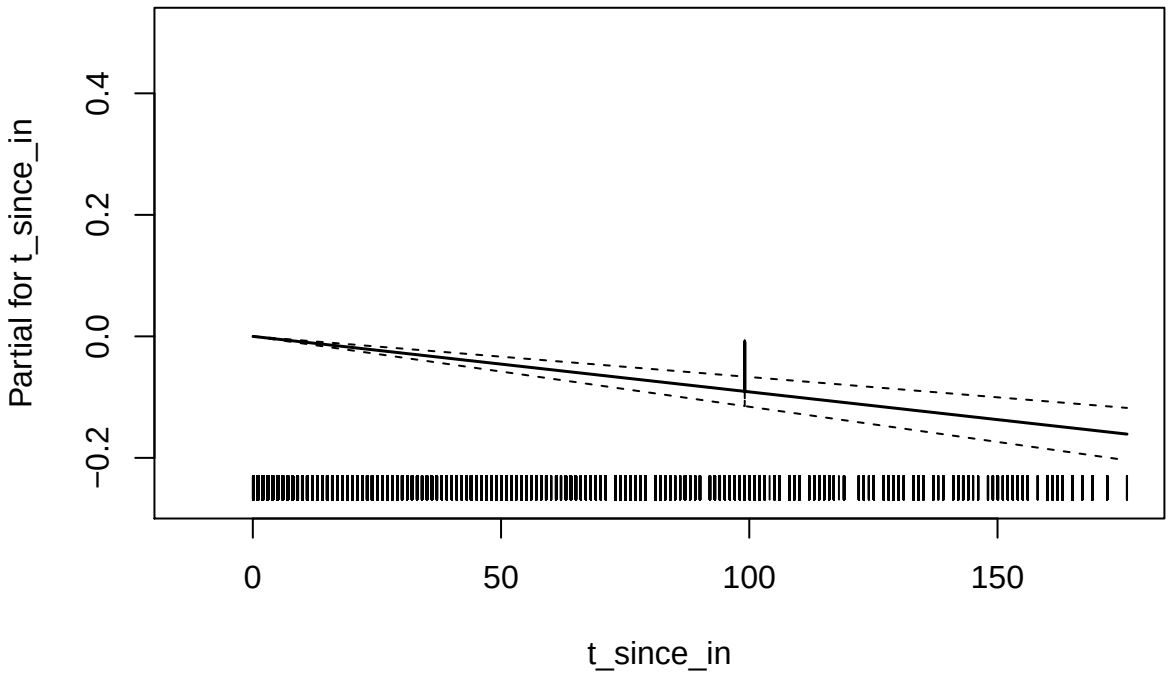
Model summaries

Family size model: SOVON data

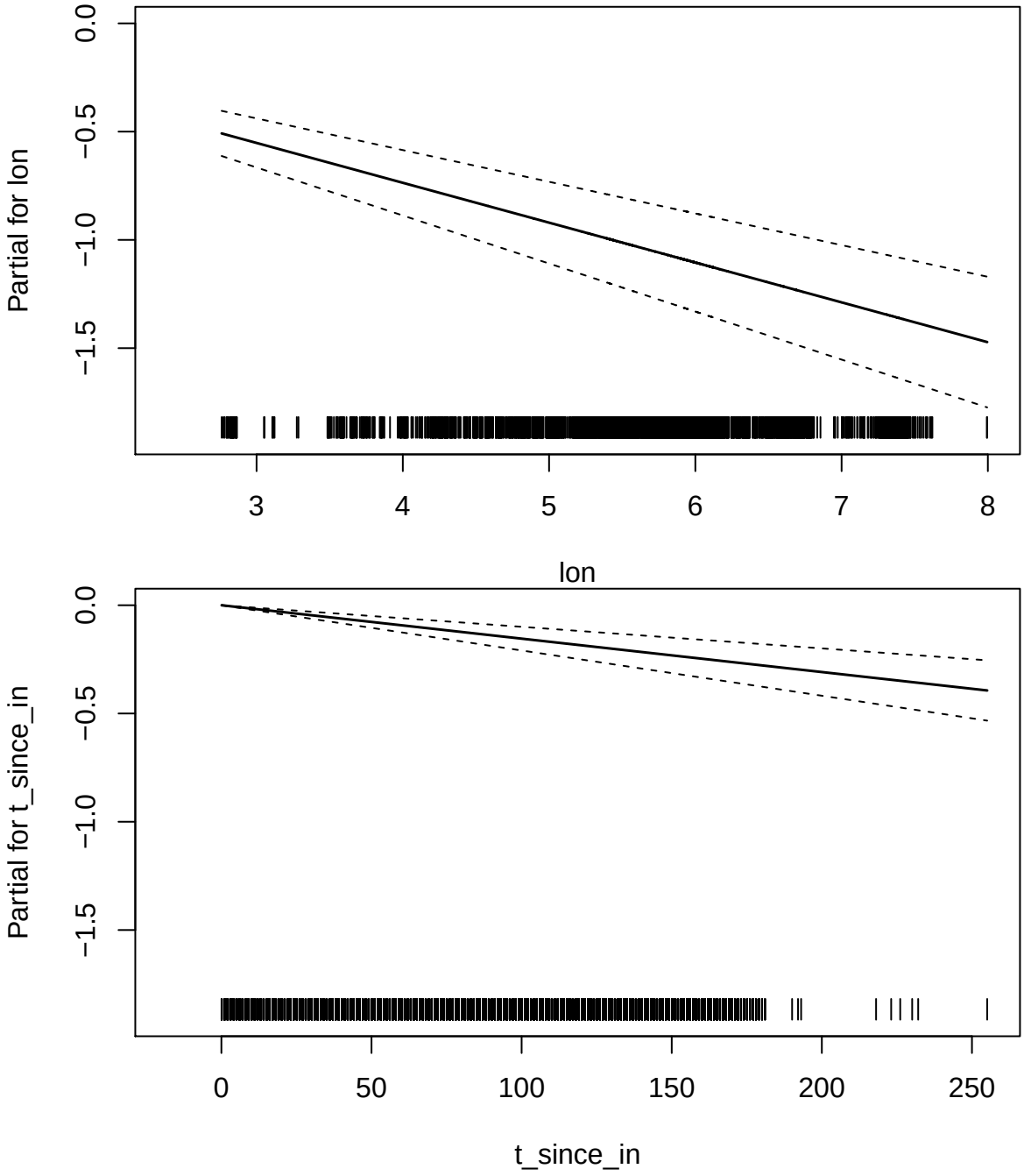
```
##
## Family: poisson
## Link function: log
##
## Formula:
## famsize ~ lon + flocksize + t_since_in + s(Food_type, bs = "re") +
##     s(Observer, bs = "re") + s(Breeding_year, bs = "re") + s(Site_name,
##     bs = "re")
##
## Parametric coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)  5.190e-01  1.534e-01   3.384 0.000716 ***
## lon          1.994e-02  2.366e-02   0.843 0.399301
## flocksize   -5.263e-06  4.765e-06  -1.104 0.269431
## t_since_in  -9.136e-04  1.224e-04  -7.463 8.43e-14 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                     edf Ref.df  Chi.sq  p-value
## s(Food_type)      4.524     27   21.43  0.15743
## s(Observer)      12.578     16 1115.32 1.43e-06 ***
## s(Breeding_year) 13.839     15 4595.32  < 2e-16 ***
## s(Site_name)     67.513    474  619.18  0.00434 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.0891   Deviance explained = 10.3%
## fREML =  40149  Scale est. = 1         n = 34149
```


Partial for lon
0.4
0.2
0.0
−0.2
5.0
5.5
6.0
6.5
7.0
lon
Partial for flocksize
0.4
0.2
0.0
−0.2
0
2000
4000
6000
8000
10000
flocksize



Family size model: geese.org data

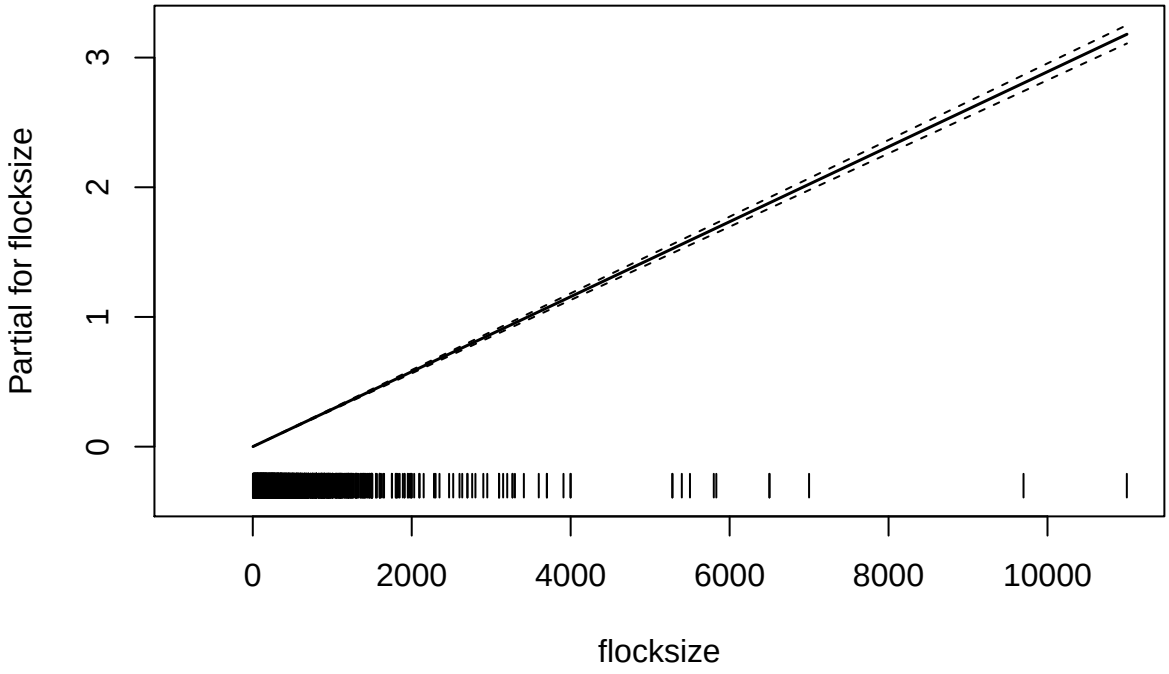
```
##
## Family: poisson
## Link function: log
##
## Formula:
## famsize ~ lon + t_since_in + s(id, bs = "re") + s(breedyr, bs = "re")
##
## Parametric coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)  0.2885284  0.1562318   1.847   0.0648 .
## lon         -0.1840823  0.0188794  -9.750  < 2e-16 ***
## t_since_in  -0.0015432  0.0002732  -5.649 1.62e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                edf Ref.df Chi.sq p-value
## s(id)       0.9624      1  891.1 2.5e-07 ***
## s(breedyr) 14.0776     15  513.8 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.037   Deviance explained = 4.01%
## fREML =  19518  Scale est. = 1         n = 10229
```

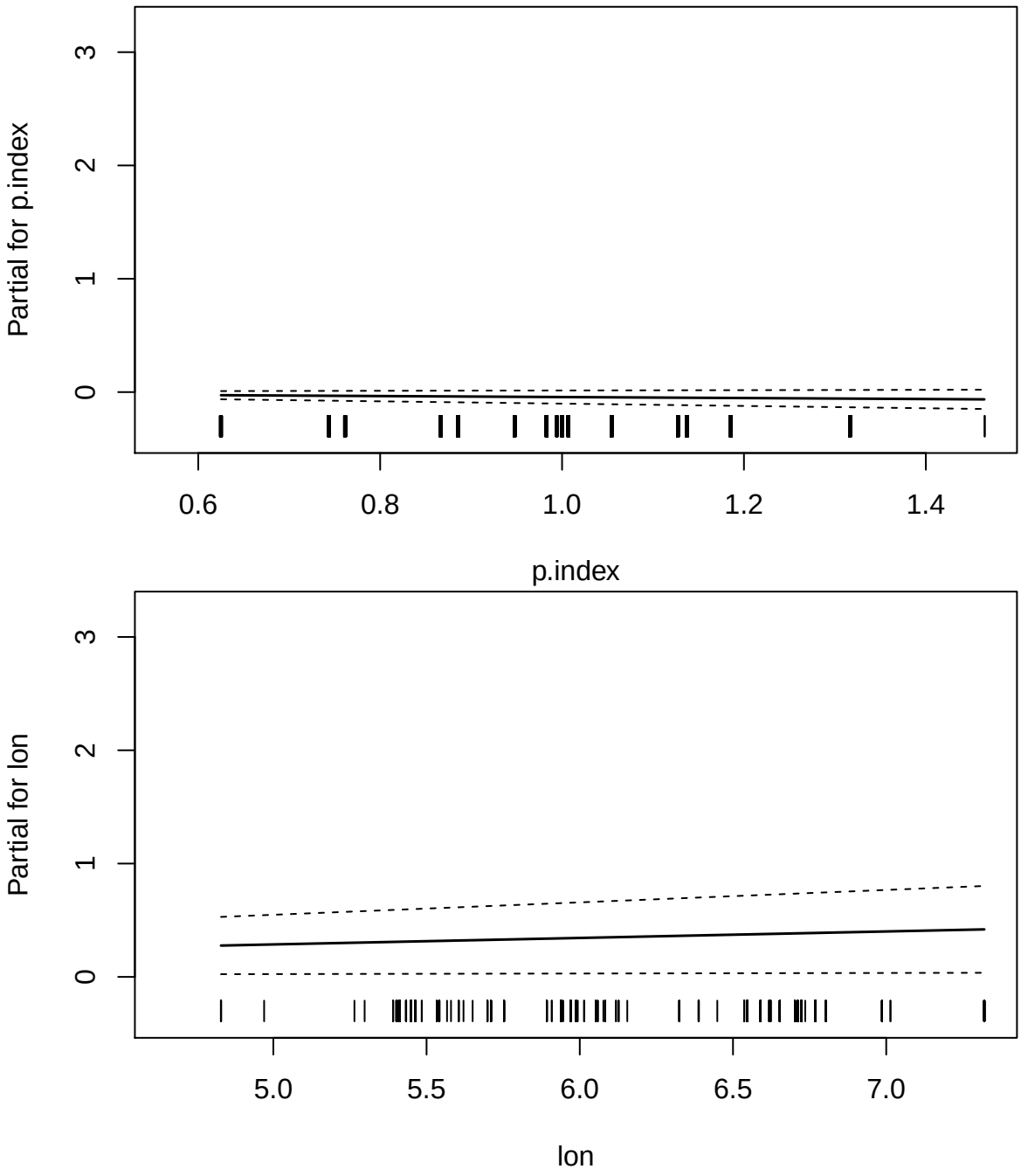


Families in flocks model

```
##
## Family: poisson
## Link function: log
##
## Formula:
## fams ~ flocksize + p.index + lon + s(Breeding_year, bs = "re") +
##     s(Observer, bs = "re") + s(Food_type, bs = "re")
```

```
##
## Parametric coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept) -2.720e+01  3.031e+00  -8.976   <2e-16 ***
## flocksize    2.891e-04  3.230e-06  89.501   <2e-16 ***
## p.index     -4.380e-02  2.901e-02  -1.510   0.1312
## lon          5.728e-02  2.617e-02   2.189   0.0286 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                       edf Ref.df Chi.sq p-value
## s(Breeding_year)  0.991      1  23561  <2e-16 ***
## s(Observer)      15.687     16   8745  <2e-16 ***
## s(Food_type)     25.595     27  18014  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.222   Deviance explained = 38.9%
## fREML =  11362  Scale est. = 1         n = 1721
```





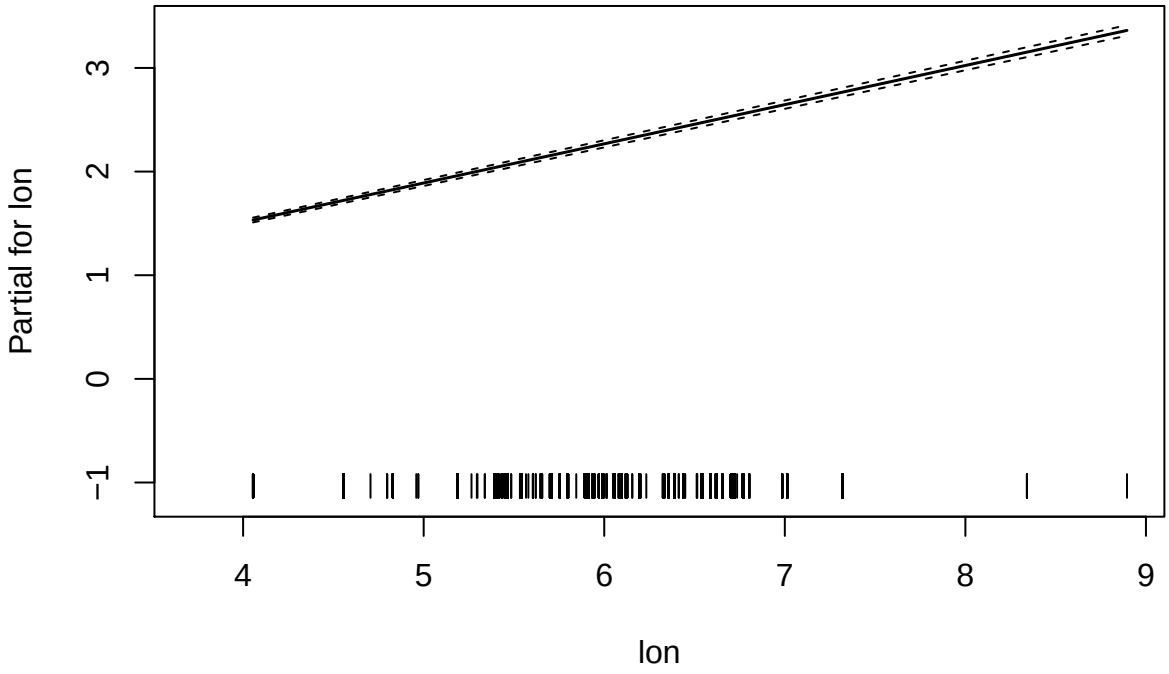
Flock size model

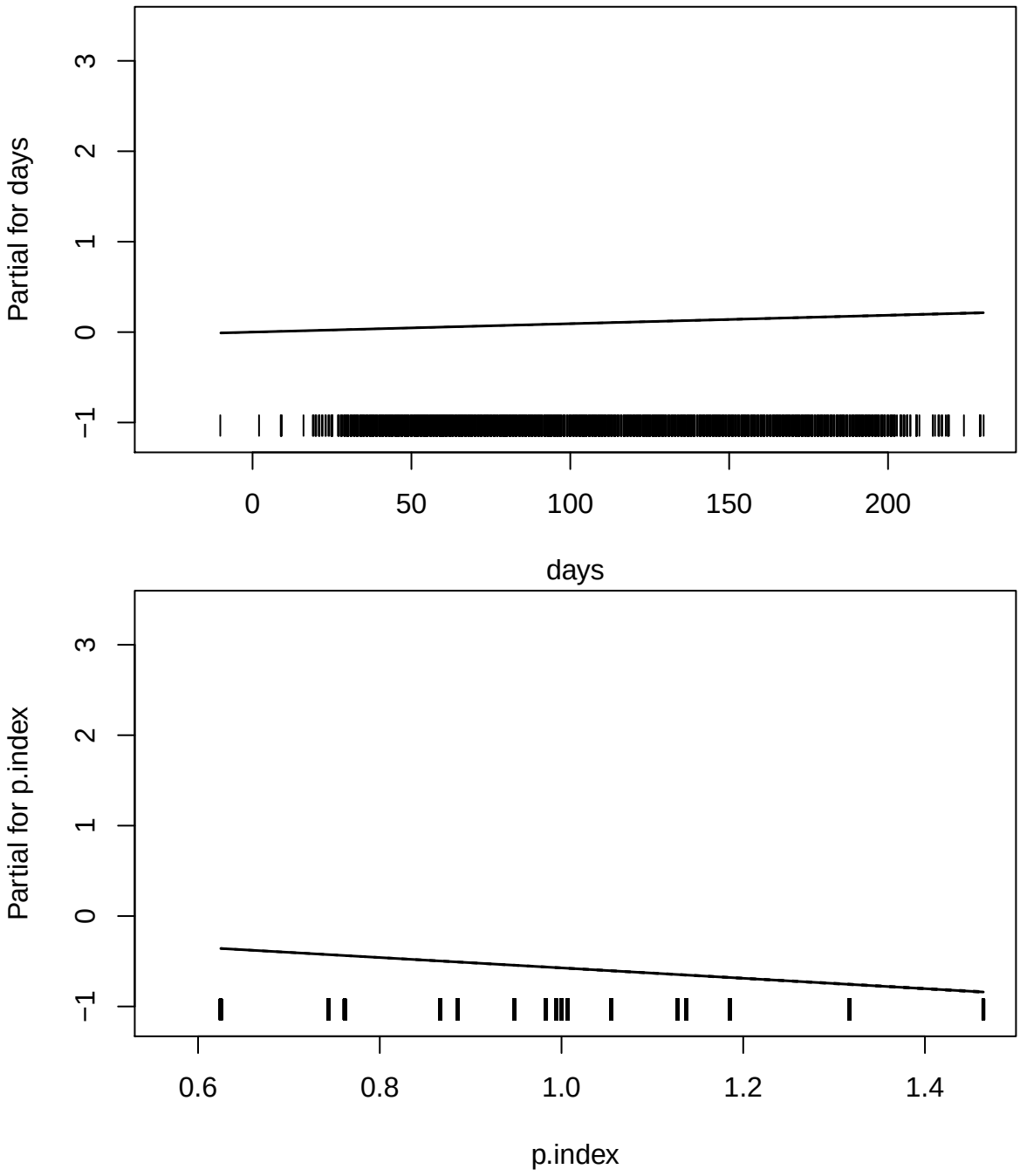
```
##
## Family: poisson
## Link function: log
##
## Formula:
## flocksize ~ lon + days + p.index + s(Breeding_year, bs = "re") +
##     s(Observer, bs = "re") + s(Food_type, bs = "re")
```

```
##
## Parametric coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)  1.190e+01  3.870e-01   30.75   <2e-16 ***
## lon          3.780e-01  2.863e-03  132.00   <2e-16 ***
## days         9.315e-04  1.217e-05   76.54   <2e-16 ***
## p.index     -5.736e-01  2.890e-03 -198.49   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                      edf Ref.df    Chi.sq p-value
## s(Breeding_year)  1.009      1  16113535  <2e-16 ***
## s(Observer)      39.951     40 471142863  <2e-16 ***
## s(Food_type)     41.696     42 102145933  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.137   Deviance explained = 22.6%
## fREML = 2.6744e+06  Scale est. = 1         n = 5702
```

```
## Warning in if (select > m) {: the condition has length > 1 and only the
## first element will be used
```

```
## Warning in if (select <= length(term.labels)) {: the condition has length >
## 1 and only the first element will be used
```

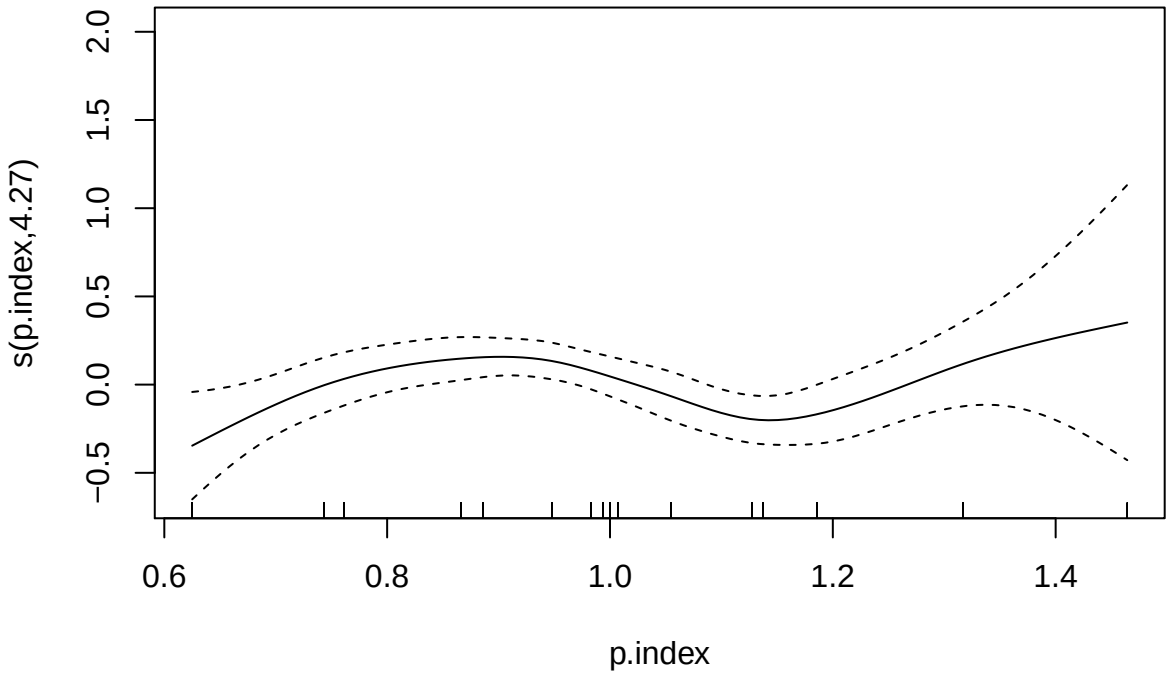


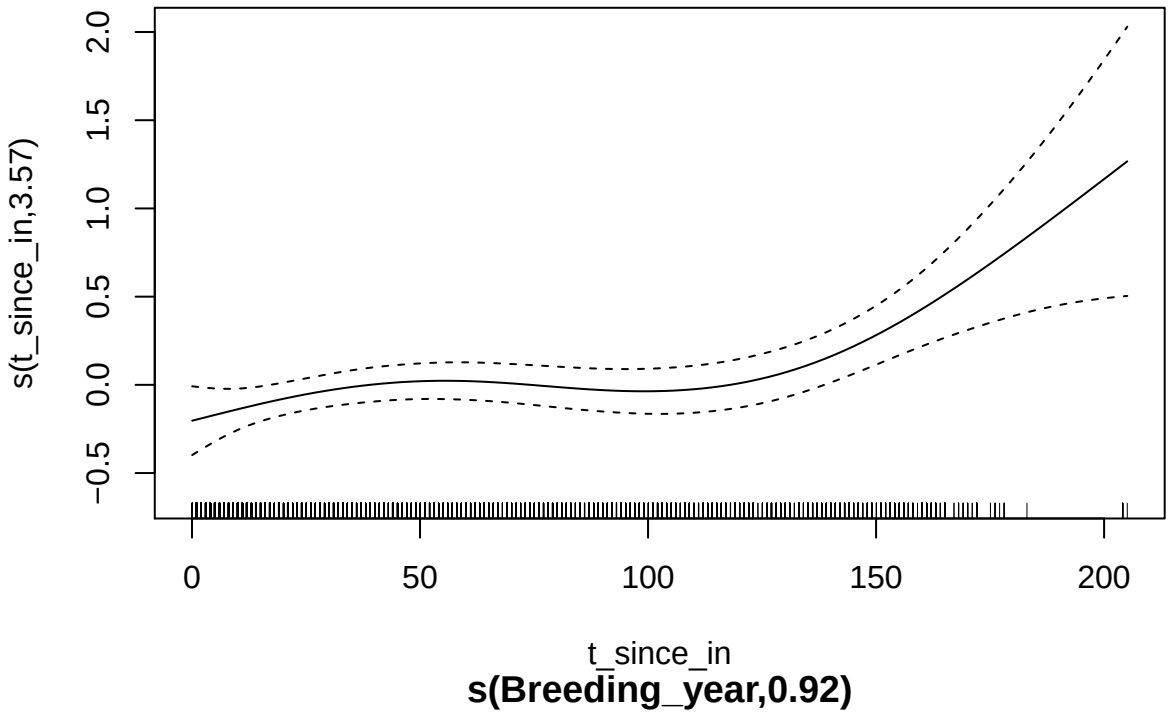


Juvenile proportion model

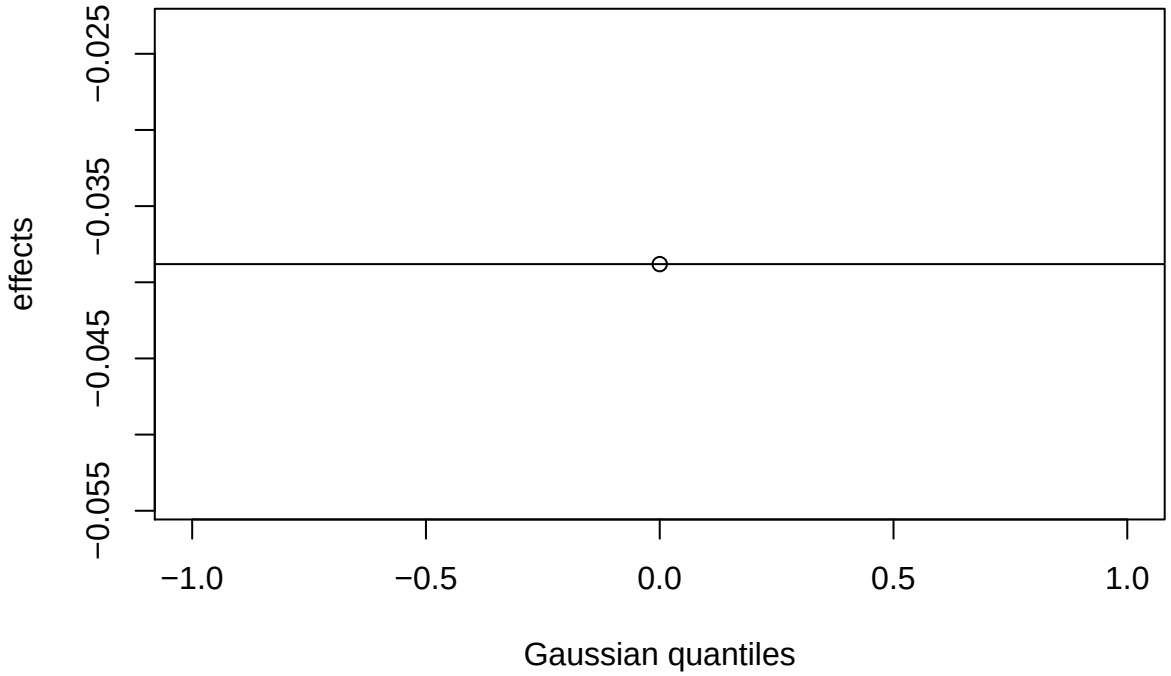
```
##
## Family: binomial
## Link function: logit
##
## Formula:
## propjuv ~ lon + flocksize + s(p.index) + s(t_since_in) + s(Breeding_year,
##     bs = "re") + s(Observer, bs = "re") + s(Food_type, bs = "re")
```

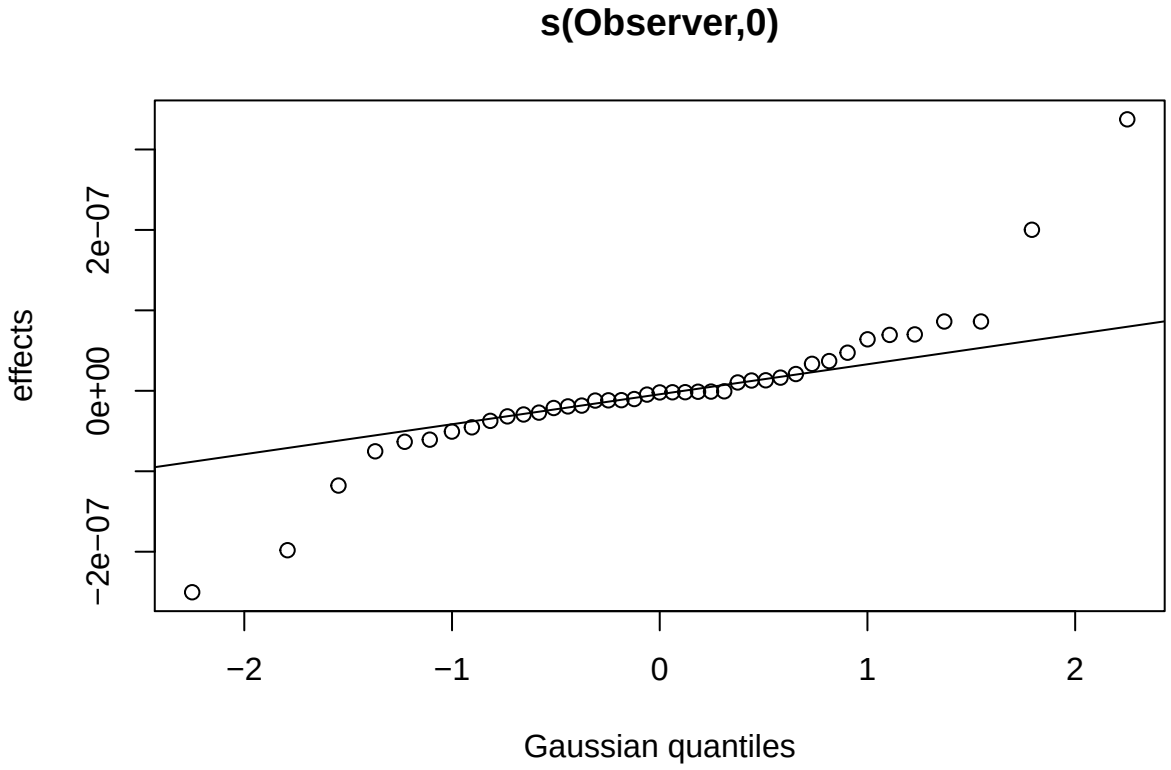
```
##
## Parametric coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)  7.625e+01  2.286e+01   3.336  0.00085 ***
## lon          3.473e-02  3.810e-02   0.912  0.36203
## flocksize   -8.253e-05  4.048e-05  -2.039  0.04146 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Approximate significance of smooth terms:
##                         edf Ref.df Chi.sq  p-value
## s(p.index)       4.275e+00  5.242  18.67 0.002506 **
## s(t_since_in)    3.573e+00  4.470  21.86 0.000417 ***
## s(Breeding_year) 9.208e-01  1.000  11.63 0.000127 ***
## s(Observer)      2.226e-05 40.000   0.00 1.000000
## s(Food_type)     1.969e-05 42.000   0.00 1.000000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =  0.201   Deviance explained = 19.8%
## fREML = 5372.8  Scale est. = 1         n = 5653
```

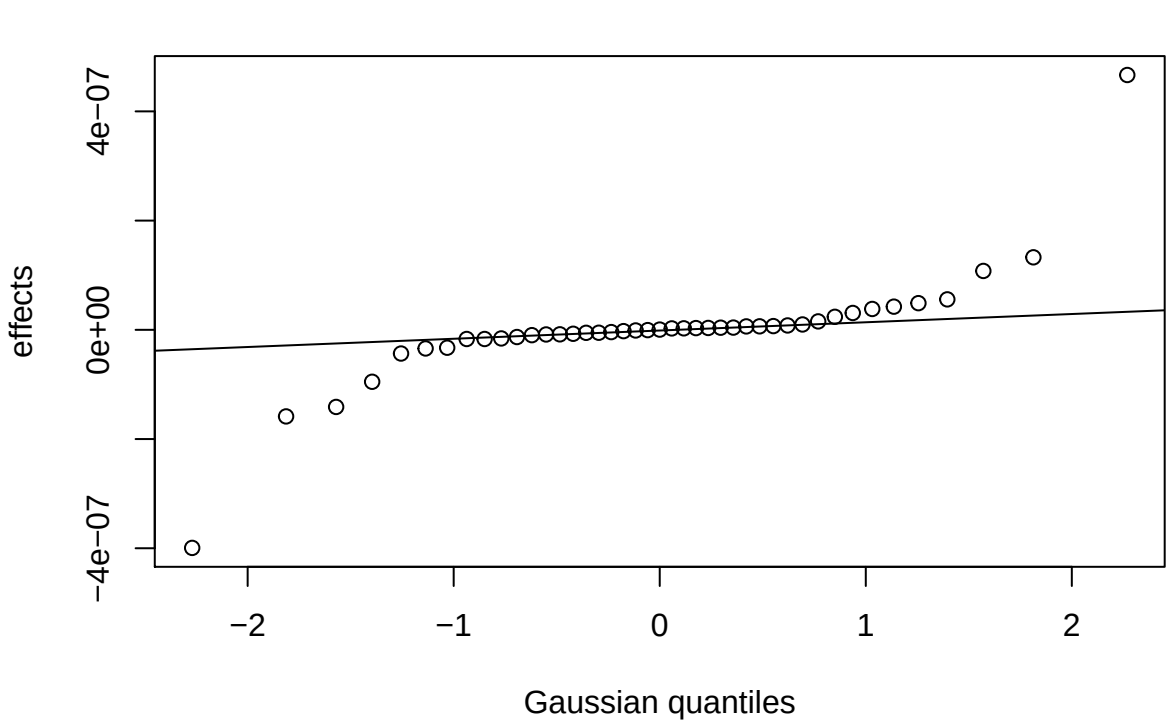


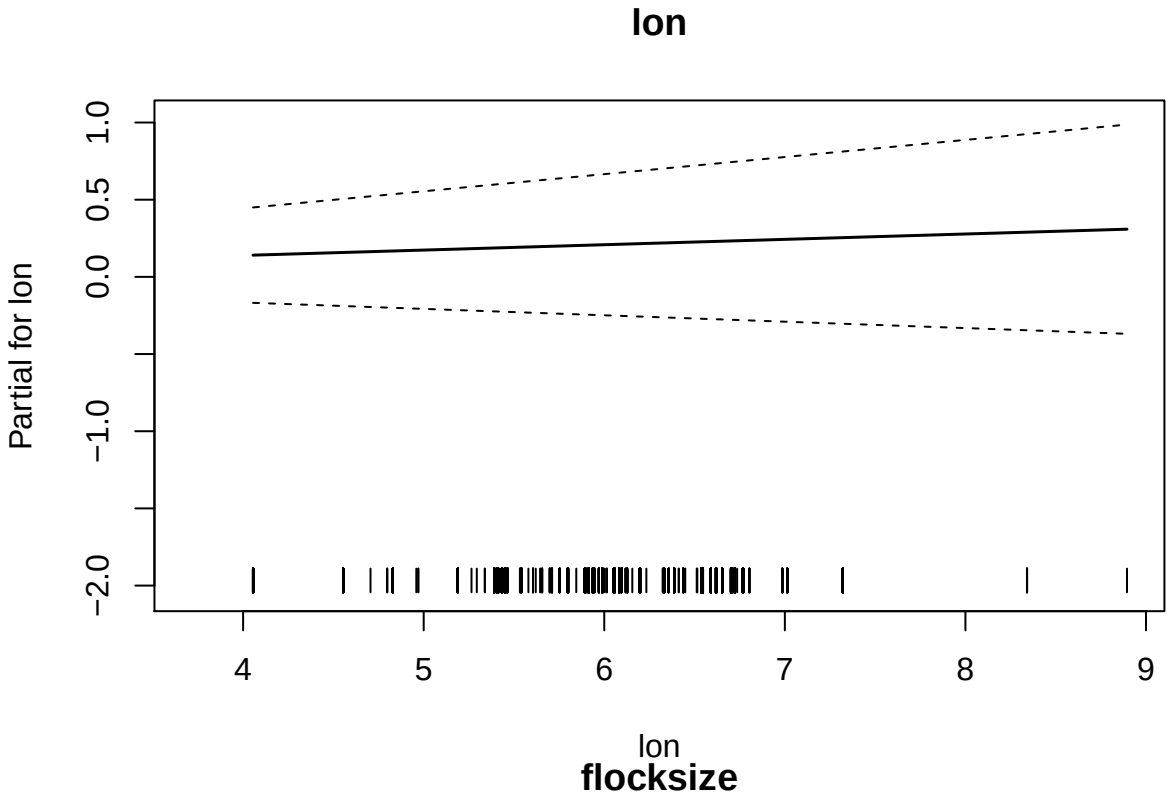


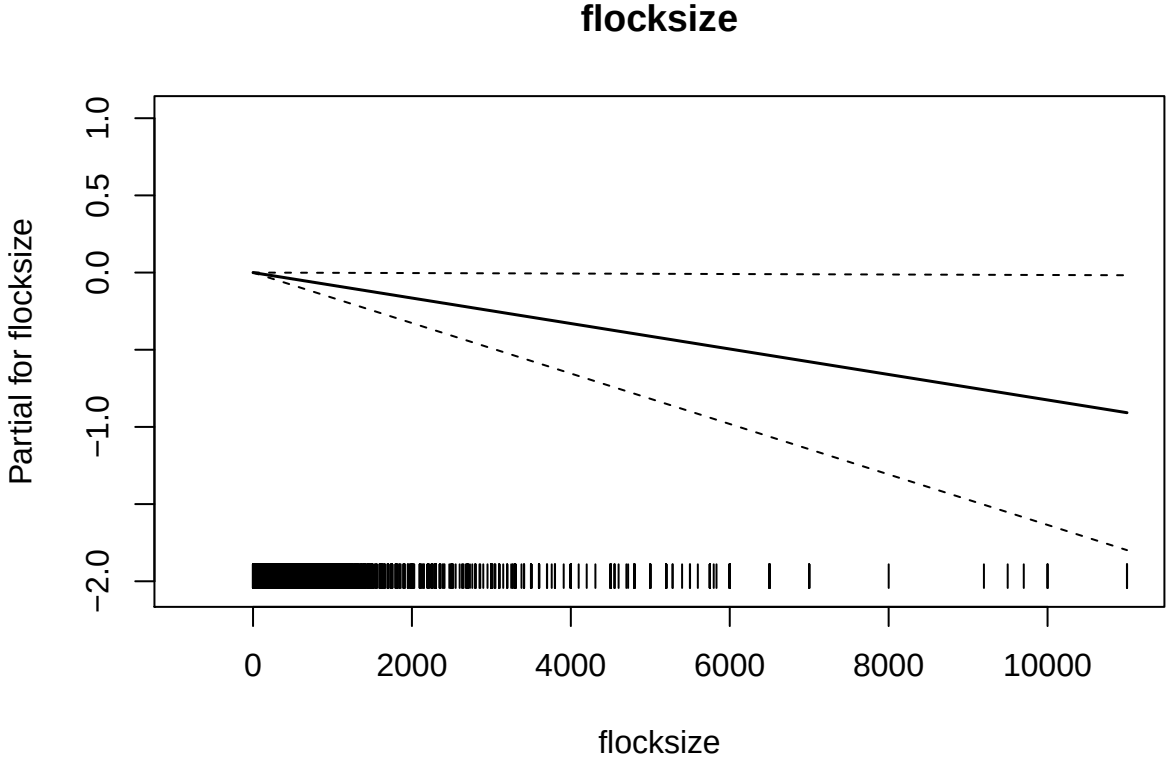
s(Breeding_year,0.92)




s(Observer,0)
effects
2e−07
0e+00
−2e−07
−2
−1
0
1
2
Gaussian quantiles


s(Food_type,0)
effects
4e−07
0e+00
−4e−07
−2
−1
0
1
2
Gaussian quantiles


lon
Partial for lon
1.0
0.5
0.0
−1.0
−2.0
4
5
6
7
8
9
lon


flocksize
Partial for flocksize
1.0
0.5
0.0
−1.0
−2.0
0
2000
4000
6000
8000
10000
flocksize