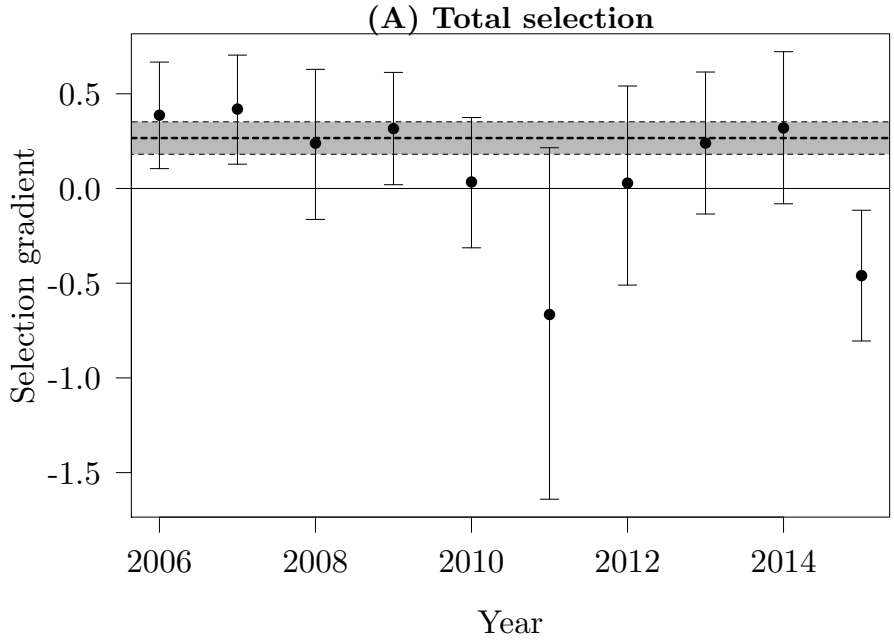
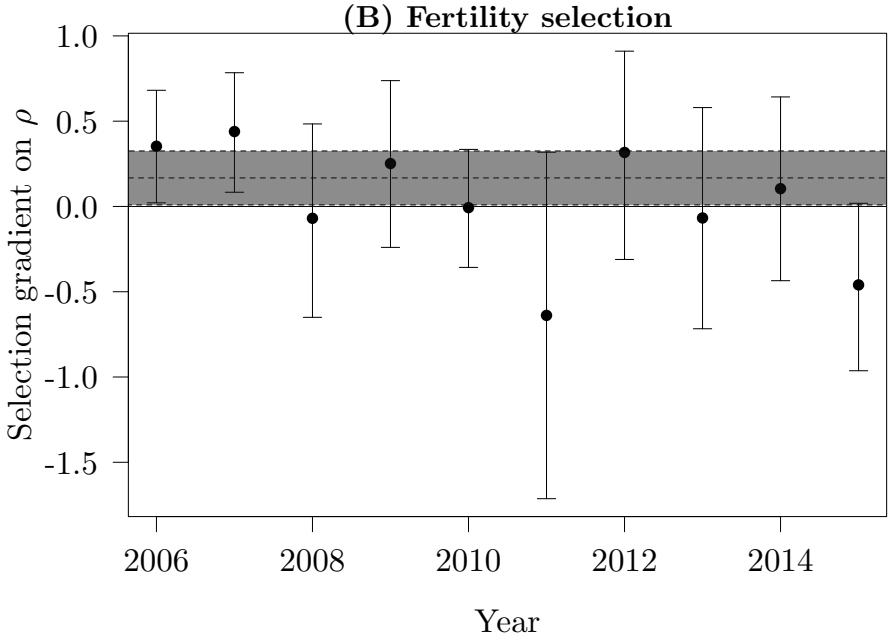
```
setPar()
plot(SelByYear, x=2006:2015, ylim=c(min( CISelByYear), max( CISelByYear)), xlab="Year", ylab
abline(h=0)
arrows(x0 = 2006:2015,x1 = 2006:2015,code = 3, y0 = CISelByYear[1,],
       y1 = CISelByYear[2,], angle = 90,length = 0.1)
m0all <- glm(Fitness ~ 1 + StMass + Sex +Age , data=YearPheno, family=poisson)
abline(h=coefficients(m0all)[2], lty=2, lwd=5)
sm0all <- summary(m0all)
lowm0all <- coefficients(m0all)[2]+1.96*sm0all$coefficients[2,2]
highm0all <- coefficients(m0all)[2]-1.96*sm0all$coefficients[2,2]
polygon(x=c(2005,2016,2016,2005),y=c(lowm0all,lowm0all, highm0all, highm0all),
        fillOddEven = TRUE, col=rgb(0.1,0.1,0.1,0.3), lty=2)
```



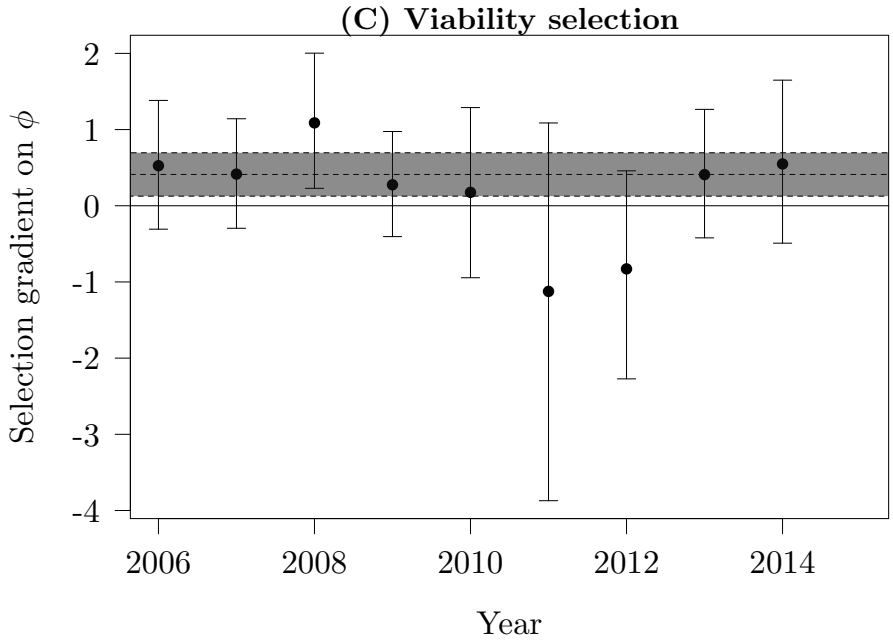

```
#points(x=2006:2015,y=unlist(coefficients(mmRnoCorfitness)£Year["StMass"]), pch=17)
```

```
setPar()
plot(SelByYearRho, x=2006:2015, ylim=c(min( CISelByYearRho), max( CISelByYearRho)), xlab="Ye
abline(h=0)
sd(SelByYearRho)

## [1] 0.3521055

arrows(x0 = 2006:2015,x1 = 2006:2015,code = 3, y0 = CISelByYearRho[1,],
```

```
       y1 = CISelByYearRho[2,], angle = 90,length = 0.1)
m0allRho <- glm(Rho ~ 1 + StMass + Sex , data=YearPheno[YearPheno$Age=="A",], family=quasipo
abline(h=coefficients(m0allRho)[2], lty=2)
sm0allRho <- summary(m0allRho)
lowm0allRho <- coefficients(m0allRho)[2]+1.96*sm0allRho$coefficients[2,2]
highm0allRho <- coefficients(m0allRho)[2]-1.96*sm0allRho$coefficients[2,2]
polygon(x=c(2005,2016,2016,2005),y=c(lowm0allRho,lowm0allRho, highm0allRho, highm0allRho),
        fillOddEven = TRUE, col=rgb(0.1,0.1,0.1,0.5), lty=2)
```




```
setPar()
plot(SelByYearPhi, x=2006:2015, ylim=c(min( CISelByYearPhi, na.rm=TRUE), max( CISelByYearPhi
abline(h=0)
arrows(x0 = 2006:2015,x1 = 2006:2015,code = 3, y0 = CISelByYearPhi[1,],
       y1 = CISelByYearPhi[2,], angle = 90,length = 0.1)
m0allphi <- glm(Phi ~ 1 + StMass + Sex +Age , data=YearPheno[YearPheno$Year<2015,], family=b
abline(h=coefficients(m0allphi)[2], lty=2)
sm0allphi <- summary(m0allphi)
lowm0allphi <- coefficients(m0allphi)[2]+1.96*sm0allphi$coefficients[2,2]
highm0allphi <- coefficients(m0allphi)[2]-1.96*sm0allphi$coefficients[2,2]
polygon(x=c(2005,2016,2016,2005),y=c(lowm0allphi,lowm0allphi, highm0allphi, highm0allphi),
        fillOddEven = TRUE, col=rgb(0.1,0.1,0.1,0.5), lty=2 )
```



Correlation fertility viability

```
cor.test(YearPheno$Phi,YearPheno$Rho)

##
##  Pearson's product-moment correlation
##
## data:  YearPheno$Phi and YearPheno$Rho
## t = -1.9473, df = 1292, p-value = 0.05171
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.1082724891  0.0003989614
## sample estimates:
##         cor
## -0.05409695
```

```
sd(SelByYear)

## [1] 0.3689205

coefficients(m0all)[2]

##    StMass
## 0.2663751

mean(SeSelByYear)
```

```
## [1] 0.2129145

sm0all

##
## Call:
## glm(formula = Fitness ~ 1 + StMass + Sex + Age, family = poisson,
##     data = YearPheno)
##
## Deviance Residuals:
##     Min       1Q   Median       3Q      Max
## -3.0411  -1.0989  -0.9829   0.8946   4.6194
##
## Coefficients:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)  0.80415    0.05341  15.055  < 2e-16 ***
## StMass       0.26638    0.04373   6.091 1.12e-09 ***
## SexMale     -0.06913    0.04788  -1.444    0.149
## AgeJ        -1.15530    0.09571 -12.070  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##     Null deviance: 3572.2  on 1267  degrees of freedom
## Residual deviance: 2440.6  on 1264  degrees of freedom
##   (26 observations deleted due to missingness)
## AIC: 4220.8
##
## Number of Fisher Scoring iterations: 6
```

Test of fluctuation of selection on fitness.

```
logLik(mmRRfitness)

## 'log Lik.' -1986.242 (df=7)

logLik(mmRIfitness)

## 'log Lik.' -1990.887 (df=5)

anova(mmRIfitness,mmRRfitness)

## Data: YearPheno[!is.na(YearPheno$StMass), ]
## Models:
## mmRIfitness: Fitness ~ 1 + StMass + Sex + Age + (1 | Year)
## mmRRfitness: Fitness ~ 1 + StMass + Sex + Age + (1 + Mass | Year)
```

```
##             Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## mmRIfitness  5 3991.8 4017.5 -1990.9   3981.8
## mmRRfitness  7 3986.5 4022.5 -1986.2   3972.5 9.2891      2   0.009614 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```