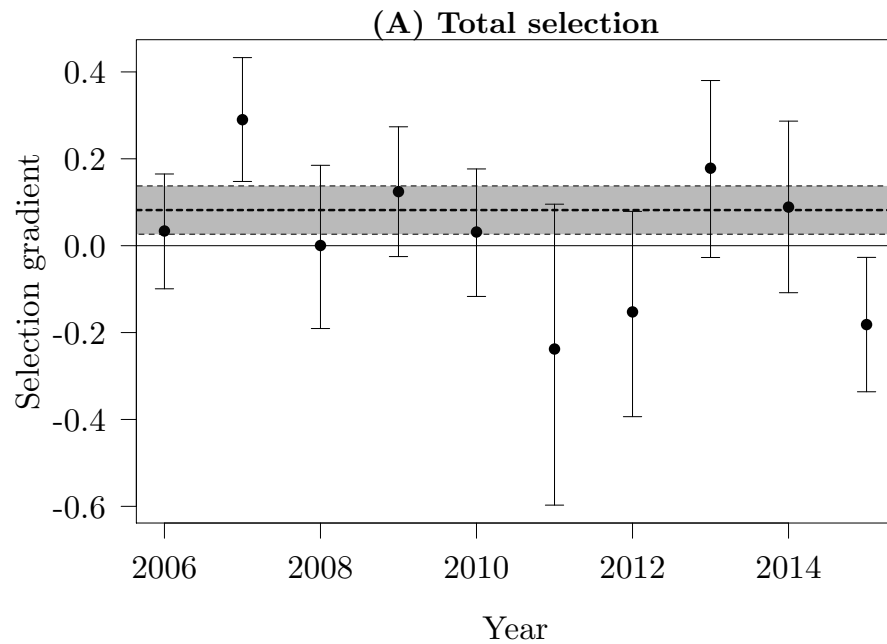


```

setPar()
plot(SelAByYear, x=2006:2015, ylim=c(min( CIselAByYear), max( CIselAByYear)), xlab="Year", y
abline(h=0)
arrows(x0 = 2006:2015,x1 = 2006:2015,code = 3, y0 = CIselAByYear[1,],
      y1 = CIselAByYear[2,], angle = 90,length = 0.1)
abline(h=coefficients(mOall)[2], lty=2, lwd=5)
lowmOall <- coefficients(mOall)[2]+1.96*smOall$coefficients[2,2]
highmOall <- coefficients(mOall)[2]-1.96*smOall$coefficients[2,2]
polygon(x=c(2005,2016,2016,2005),y=c(lowmOall,lowmOall, highmOall, highmOall),
      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)

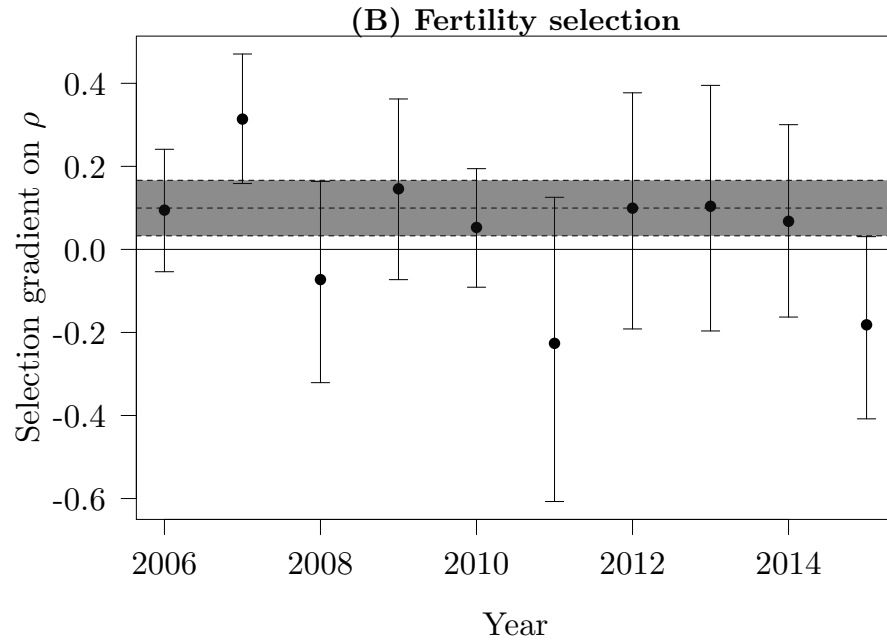
```

```

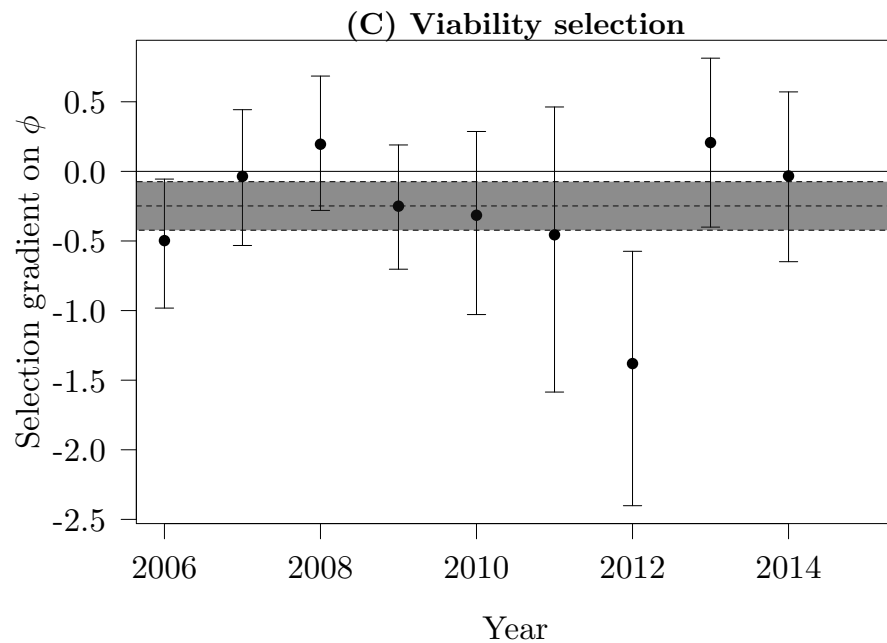
setPar()
plot(SelAByYearRho, x=2006:2015, ylim=c(min( CIselAByYearRho), max( CIselAByYearRho)), xlab=
abline(h=0)
arrows(x0 = 2006:2015,x1 = 2006:2015,code = 3, y0 = CIselAByYearRho[1,],
      y1 = CIselAByYearRho[2,], angle = 90,length = 0.1)
abline(h=coefficients(mOallRho)[2], lty=2)
smOallRho <- summary(mOallRho)
lowmOallRho <- coefficients(mOallRho)[2]+1.96*smOallRho$coefficients[2,2]
highmOallRho <- coefficients(mOallRho)[2]-1.96*smOallRho$coefficients[2,2]
polygon(x=c(2005,2016,2016,2005),y=c(lowmOallRho,lowmOallRho, highmOallRho, highmOallRho),

```

```
fillOddEven = TRUE, col=rgb(0.1,0.1,0.1,0.5), lty=2)
```



```
setPar()
plot(SelAByYearPhi, x=2006:2015, ylim=c(min( CIselAByYearPhi, na.rm=TRUE), max( CIselAByYearPhi, na.rm=TRUE)),
     abline(h=0)
     arrows(x0 = 2006:2015,x1 = 2006:2015,code = 3, y0 = CIselAByYearPhi[1,],
           y1 = CIselAByYearPhi[2,], angle = 90,length = 0.1)
     abline(h=coefficients(m0allphi)[2], lty=2)
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)

## Error in is.data.frame(x):  objet 'SelByYear' introuvable

coefficients(m0all)[2]

##          Ast
## 0.08200326

summary(m0all)[2]
```

```
## $terms
## Fitness ~ 1 + Ast + Sex + Age
## attr("variables")
## list(Fitness, Ast, Sex, Age)
## attr("factors")
##           Ast Sex Age
## Fitness    0  0  0
## Ast         1  0  0
## Sex         0  1  0
## Age         0  0  1
## attr("term.labels")
## [1] "Ast" "Sex" "Age"
## attr("order")
## [1] 1 1 1
## attr("intercept")
## [1] 1
## attr("response")
## [1] 1
## attr(".Environment")
## <environment: R_GlobalEnv>
## attr("predvars")
## list(Fitness, Ast, Sex, Age)
## attr("dataClasses")
##   Fitness      Ast      Sex      Age
## "numeric" "numeric" "factor" "factor"

mean(SeSelByYear)

## Error in mean(SeSelByYear):  objet 'SeSelByYear' introuvable

sm0all

##
## Call:
## glm(formula = Fitness ~ 1 + Ast + Sex + Age, family = quasipoisson,
##      data = YearPheno)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -2.8453  -1.0854  -1.0421   0.8231   4.7406
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  1.05005    0.04408  23.822 < 2e-16 ***
## Ast          0.08200    0.02837   2.890  0.00391 **
## SexMale     -0.06908    0.06832  -1.011  0.31213
```

```

## AgeJ      -1.56364    0.08072 -19.372 < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for quasipoisson family taken to be 1.951902)
##
##      Null deviance: 3597.2  on 1275  degrees of freedom
## Residual deviance: 2479.2  on 1272  degrees of freedom
## (18 observations deleted due to missingness)
## AIC: NA
##
## Number of Fisher Scoring iterations: 6

smOallRho

##
## Call:
## glm(formula = Rho ~ 1 + Ast + Sex, family = quasipoisson, data = YearPheno[YearPheno$Age
##      "A", ])
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -3.0090  -1.4100  -0.3091   0.7326   4.5163
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.83126    0.05606  14.827 < 2e-16 ***
## Ast          0.09956    0.03412   2.918  0.00367 **
## SexMale      0.19760    0.08857   2.231  0.02610 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for quasipoisson family taken to be 2.335516)
##
##      Null deviance: 1347.1  on 527  degrees of freedom
## Residual deviance: 1298.4  on 525  degrees of freedom
## (2 observations deleted due to missingness)
## AIC: NA
##
## Number of Fisher Scoring iterations: 5

smOallphi

##
## Call:
## glm(formula = Phi ~ 1 + Ast + Sex + Age, family = binomial, data = YearPheno[YearPheno$Y

```

```
##      2015, ])
```

```
##  
##  
## Deviance Residuals:  
##      Min        1Q      Median        3Q        Max  
## -1.1564  -0.7142  -0.6403  -0.3219   2.5591  
##  
## Coefficients:  
##              Estimate Std. Error z value Pr(>|z|)  
## (Intercept) -1.40121    0.13670 -10.250 < 2e-16 ***  
## Ast         -0.24836    0.08896  -2.792  0.00524 **  
## SexMale     -0.92314    0.15545  -5.939 2.88e-09 ***  
## AgeJ        0.88925    0.16501   5.389 7.09e-08 ***  
## ---  
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1  
##  
## (Dispersion parameter for binomial family taken to be 1)  
##  
##      Null deviance: 1265.4  on 1158  degrees of freedom  
## Residual deviance: 1175.3  on 1155  degrees of freedom  
##      (18 observations deleted due to missingness)  
## AIC: 1183.3  
##  
## Number of Fisher Scoring iterations: 4
```

```
sd(SelByYearPhi,na.rm=T)
```

```
## Error in is.data.frame(x):  objet 'SelByYearPhi' introuvable
```

```
mean(SeSelByYearPhi,na.rm=T)
```

```
## Error in mean(SeSelByYearPhi, na.rm = T): objet 'SeSelByYearPhi'  
introuvable
```

```
sd(SelByYearRho)
```

```
## Error in is.data.frame(x):  objet 'SelByYearRho' introuvable
```

```
mean(SeSelByYearRho)
```

```
## Error in mean(SeSelByYearRho):  objet 'SeSelByYearRho' introuvable
```

```
rounding <- 3
```

```
BetaGlm<- c(paste(round(sm0all$coefficients[2,1],rounding)," (",round(sm0all$coefficients[2,  
paste(round(sm0allRho$coefficients[2,1],rounding)," (",round(sm0allRho$coeffici  
paste(round(sm0allphi$coefficients[2,1],rounding)," (",round(sm0allphi$coeffici
```

```
TabSel <- data.frame(BetaGLM = BetaGlm, B=c(2,3,2), C=c(2,3,2), D=c(2,3,2), E=c(2,3,2), F=c(2,3,2), G=c(2,3,2), H=c(2,3,2), I=c(2,3,2), J=c(2,3,2), K=c(2,3,2), L=c(2,3,2), M=c(2,3,2), N=c(2,3,2), O=c(2,3,2), P=c(2,3,2), Q=c(2,3,2), R=c(2,3,2), S=c(2,3,2), T=c(2,3,2), U=c(2,3,2), V=c(2,3,2), W=c(2,3,2), X=c(2,3,2), Y=c(2,3,2), Z=c(2,3,2))
```

	Table 1:				
0.082 (0.028)	2.000	2.000	2.000	2.000	2.000
0.1 (0.034)	3.000	3.000	3.000	3.000	3.000
-0.248 (0.089)	2.000	2.000	2.000	2.000	2.000

Test of fluctuation of selection on fitness.

```
summary(mmRnoCorfitness)

## Error in summary(mmRnoCorfitness): objet 'mmRnoCorfitness' introuvable

logLik(mmRnoCorfitness)

## Error in logLik(mmRnoCorfitness): objet 'mmRnoCorfitness' introuvable

logLik(mmRIfitness)

## Error in logLik(mmRIfitness): objet 'mmRIfitness' introuvable

anova(mmRIfitness,mmRnoCorfitness)

## Error in anova(mmRIfitness, mmRnoCorfitness): objet 'mmRIfitness'
introuvable

CImmRnoCorfitness

## Error in eval(expr, envir, enclos): objet 'CImmRnoCorfitness' introuvable

sqrt(VarCorr(mmRnoCorfitness)[[2]][1])/summary(mmRnoCorfitness)$coef[2,1]

## Error in eval(expr, envir, enclos): impossible de trouver la fonction
"VarCorr"
```

Test of fluctuation of selection on fecundity.

```
summary(mmRnoCorrho)

## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: poisson ( log )
## Formula: Rho ~ 1 + Ast + Sex + (1 | Year) + (0 + Ast | Year)
## Data: YearPheno[YearPheno$Age == "A", ]
##
##      AIC      BIC   logLik deviance df.resid
##  2321.0   2342.3  -1155.5   2311.0     523
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -2.4085 -1.1024 -0.1962  0.7370  4.9242
##
```

```

## Random effects:
##   Groups Name      Variance Std.Dev.
##   Year   (Intercept) 0.14129  0.3759
##   Year.1 Ast         0.01221  0.1105
## Number of obs: 528, groups:  Year, 10
##
## Fixed effects:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept)   0.75905    0.12524   6.061 1.35e-09 ***
## Ast           0.05152    0.04389   1.174 0.240515
## SexMale       0.20347    0.05954   3.418 0.000632 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##           (Intr) Ast
## Ast      -0.004
## SexMale -0.179 -0.221

logLik(mmRnoCorrho)

## 'log Lik.' -1155.497 (df=5)

logLik(mmRIrho)

## 'log Lik.' -1161.562 (df=4)

anova(mmRIphi,mmRnoCorphi)

## Data: YearPheno
## Models:
## mmRIphi: Phi ~ 1 + Ast + Sex + Age + (1 | Year) + (0 + Ast | Year)
## mmRnoCorphi: Phi ~ 1 + Ast + Sex + Age + (1 | Year) + (0 + Ast | Year)
##           Df  AIC    BIC logLik deviance Chisq Chi Df Pr(>Chisq)
## mmRIphi      6 1209 1239.9 -598.5    1197
## mmRnoCorphi  6 1209 1239.9 -598.5    1197      0      0      1

CImmRnoCorrho

##           2.5 %    97.5 %
## .sig01      0.24332230 0.6454177
## .sig02      0.05308922 0.2122699
## (Intercept) 0.48580883 1.0262357
## Ast        -0.04783283 0.1405825
## SexMale     0.08633032 0.3203719

sqrt(VarCorr(mmRnoCorrho)[[2]][1])/summary(mmRnoCorrho)$coef[2,1]

## Error in eval(expr, envir, enclos): impossible de trouver la fonction
"VarCorr"

```



Test of fluctuation of selection on viability.

```
summary(mmRnoCorphi)

## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: binomial ( logit )
## Formula: Phi ~ 1 + Ast + Sex + Age + (1 | Year) + (0 + Ast | Year)
## Data: YearPheno
##
##          AIC          BIC    logLik deviance df.resid
##    1209.0    1239.9   -598.5   1197.0     1270
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -1.1810 -0.5474 -0.3842 -0.1338  5.6394
##
## Random effects:
## Groups Name          Variance Std.Dev.
## Year (Intercept) 0.81303  0.9017
## Year.1 Ast      0.01181  0.1087
## Number of obs: 1276, groups: Year, 10
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept) -1.68988    0.32345  -5.225 1.75e-07 ***
## Ast          -0.21713    0.09799  -2.216  0.0267 *
## SexMale      -0.94408    0.15738  -5.999 1.99e-09 ***
## AgeJ         0.86170    0.16900   5.099 3.42e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##          (Intr) Ast    SexMal
## Ast      0.016
## SexMale -0.101 -0.197
## AgeJ     -0.295  0.218 -0.225

anova(mmRIphi,mmRnoCorphi)

## Data: YearPheno
## Models:
## mmRIphi: Phi ~ 1 + Ast + Sex + Age + (1 | Year) + (0 + Ast | Year)
## mmRnoCorphi: Phi ~ 1 + Ast + Sex + Age + (1 | Year) + (0 + Ast | Year)
##              Df   AIC    BIC logLik deviance Chisq Chi Df Pr(>Chisq)
## mmRIphi        6 1209 1239.9 -598.5    1197
## mmRnoCorphi    6 1209 1239.9 -598.5    1197      0      0      1
```

CImmRnoCorphi

##		2.5 %	97.5 %
## .sig01	0.4886831	1.81146590	
## .sig02	0.0000000	0.42541526	
## (Intercept)	-2.4701443	-1.01000454	
## Ast	-0.4434752	-0.01369907	
## SexMale	-1.2570573	-0.63742576	
## AgeJ	0.5334759	1.19940105	