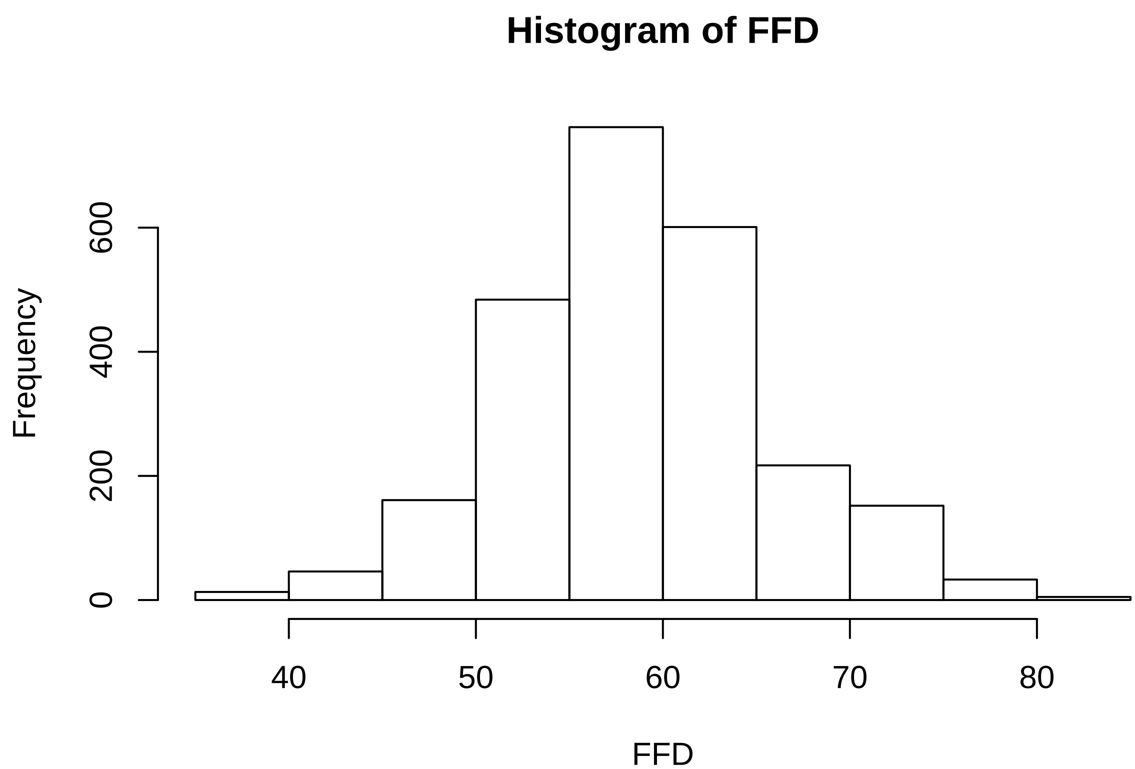
Yearly selection models

Select data and look at variables

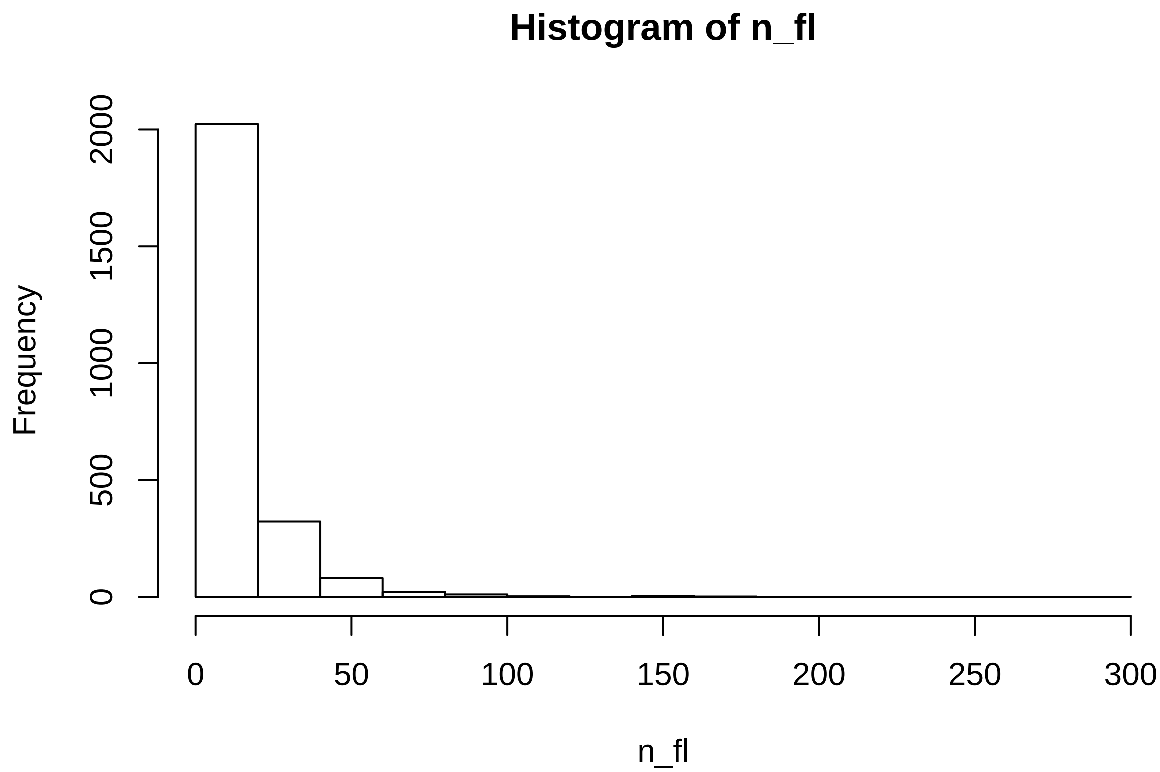
```
data_sel<-subset(alldata_weather_subs,!is.na(n_fl)&!is.na(FFD))
nrow(subset(data_sel,is.na(n_intact_seeds))) #No NAs for seed data
```

```
## [1] 0
```

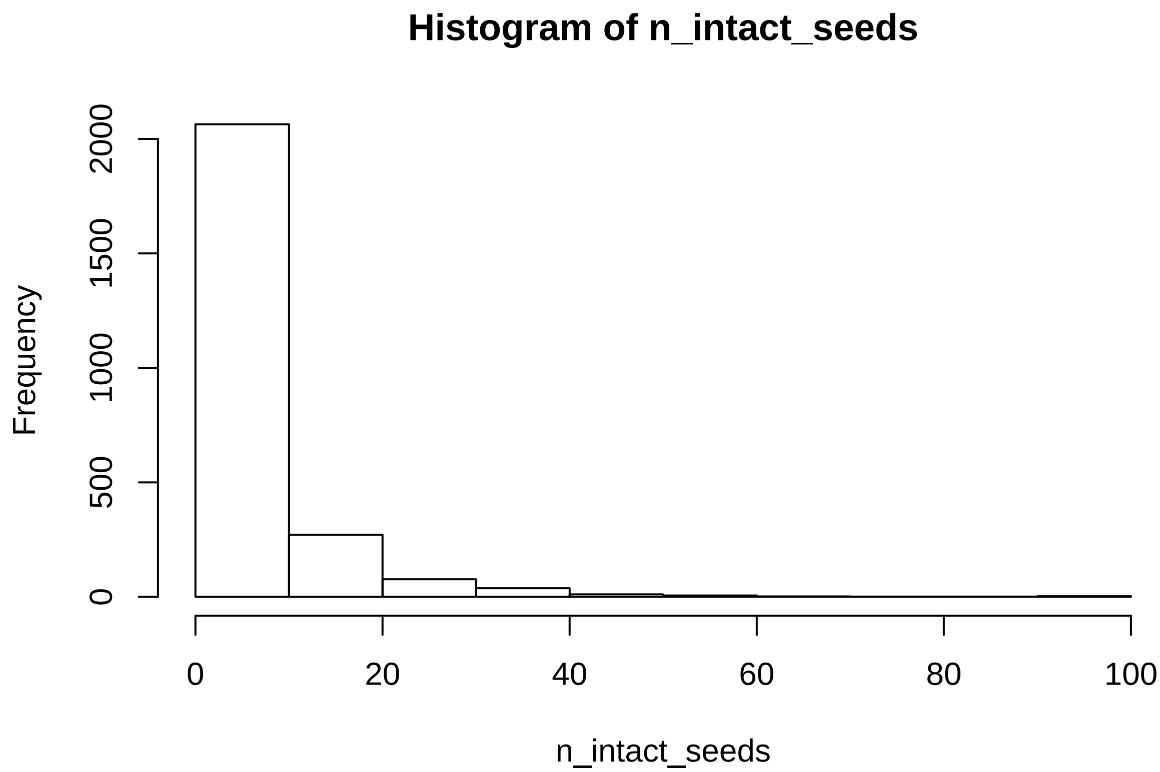
```
with(data_sel,hist(FFD))
```




```
with(data_sel,hist(n_fl))
```




```r
with(data_sel,hist(n_intact_seeds))
```



Calculation of relative fitness and standardized traits (relativization and standardization done within each year)

```
data_sel<-data.frame(
  data_sel %>%
  group_by(year) %>%
  mutate(n_intact_seeds_rel=n_intact_seeds/mean(n_intact_seeds)) %>% #Relative fitness
  mutate(FFD_std=(FFD-mean(FFD))/sd(FFD)) %>%  #Standardized FFD
  mutate(n_fl_std=(n_fl-mean(n_fl))/sd(n_fl))) #Standardized n_fl
```

Phenotypic selection models

```
Anova(lm(n_intact_seeds_rel ~ FFD_std+FFD_std:year, data = data_sel),type="II")
```

```
## Anova Table (Type II tests)
##
## Response: n_intact_seeds_rel
##               Sum Sq   Df  F value  Pr(>F)
## FFD_std        446.8    1 107.6082 < 2e-16 ***
## FFD_std:year   147.4   21   1.6906 0.02561 *
## Residuals    10177.0 2451
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#Not sure about type - II for interactions?
#Selection for early flowering differs among years
Anova(lm(n_intact_seeds_rel ~ FFD_std+FFD_std:year+n_fl_std+n_fl_std:year, data = data_sel),type="II")
```

```
## Anova Table (Type II tests)
##
## Response: n_intact_seeds_rel
##               Sum Sq   Df F value    Pr(>F)
## FFD_std        124.2    1 31.1826  2.61e-08 ***
## n_fl_std       294.0    1 73.8418 < 2.2e-16 ***
## FFD_std:year    64.1   21  0.7663 0.7639502
## year:n_fl_std  210.8   21  2.5206 0.0001585 ***
## Residuals     9672.2 2429
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#Selection for early flowering does not differ among years

Anova(update(lm(n_intact_seeds_rel ~ (FFD_std+I(FFD_std^2))*year, data = data_sel),.~.-year),type="II")
```

```
## Anova Table (Type II tests)
##
## Response: n_intact_seeds_rel
##                    Sum Sq   Df  F value    Pr(>F)
## FFD_std             431.0    1 103.5358 < 2.2e-16 ***
## I(FFD_std^2)          5.2    1   1.2381  0.265939
## FFD_std:year        167.7   21   1.9179  0.007227 **
## I(FFD_std^2):year    61.0   21   0.6982  0.838871
## Residuals         10110.8 2429
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Anova(update(lm(n_intact_seeds_rel ~ (FFD_std+I(FFD_std^2)+n_fl_std+I(n_fl_std^2)+FFD_std:n_fl_std)
                *year, data = data_sel),.~.-year),type="II")
```

```
## Anova Table (Type II tests)
##
## Response: n_intact_seeds_rel
##                       Sum Sq   Df F value    Pr(>F)
## FFD_std                 78.5    1 19.6454 9.748e-06 ***
## I(FFD_std^2)             2.4    1  0.6098  0.434946
## n_fl_std               202.0    1 50.5391 1.541e-12 ***
## I(n_fl_std^2)           20.0    1  5.0067  0.025342 *
## FFD_std:n_fl_std         6.8    1  1.6939  0.193217
## FFD_std:year            66.8   21  0.7963  0.727277
## I(FFD_std^2):year       45.6   21  0.5429  0.953976
## n_fl_std:year          167.2   21  1.9914  0.004694 **
## I(n_fl_std^2):year      65.6   21  0.7817  0.745327
## FFD_std:n_fl_std:year   49.7   21  0.5924  0.926446
## Residuals             9445.4 2363
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#No evidence of non-linear selection
```

Phenotypic selection models for each year

With only FFD

```
sel_models1<-data_sel %>%
  group_by(year) %>%
```

```r
  do(model = lm(n_intact_seeds_rel ~ FFD_std, data = .))
sel_models1_coefs<-data.frame(sel_models1 %>% tidy(model))
sel_models1_coefs$sig<-ifelse(sel_models1_coefs$p.value<0.05,"*","")
sel_models1_rsq<-data.frame(sel_models1 %>% glance(model))[1:3]
sel_models1_anova<-cbind(
  year=c("1987","1988","1989","1990","1991","1992","1993","1994","1995","1996","2006","2007",
         "2008","2009","2010","2011","2012","2013","2014","2015","2016","2017"),
  variable=rep(c("FFD_std"),22),
   ldply(lapply(as.list(sel_models1)$model,FUN=Anova), function(x) data.frame(x)[1,3:4]))
sel_models1_anova$sig<-ifelse(sel_models1_anova$Pr..F.<0.05,"*","")
kable(sel_models1_coefs)  #FFD * in all years but 1995,2009,2013,2015,2017
```

year	term	estimate	std.error	statistic	p.value	sig
1987	(Intercept)	1.0000000	0.0915849	10.9188251	0.0000000	*
1987	FFD_std	-0.3719280	0.0917780	-4.0524759	0.0000688	*
1988	(Intercept)	1.0000000	0.1060225	9.4319627	0.0000000	*
1988	FFD_std	-0.3019653	0.1063338	-2.8397850	0.0050689	*
1989	(Intercept)	1.0000000	0.1270571	7.8704777	0.0000000	*
1989	FFD_std	-0.6087614	0.1277103	-4.7667351	0.0000067	*
1990	(Intercept)	1.0000000	0.1616679	6.1855183	0.0000000	*
1990	FFD_std	-0.4685032	0.1622792	-2.8870199	0.0045508	*
1991	(Intercept)	1.0000000	0.0777087	12.8685776	0.0000000	*
1991	FFD_std	-0.6619568	0.0779254	-8.4947476	0.0000000	*
1992	(Intercept)	1.0000000	0.1823773	5.4831399	0.0000003	*
1992	FFD_std	-0.4378889	0.1831685	-2.3906346	0.0184576	*
1993	(Intercept)	1.0000000	0.1323285	7.5569497	0.0000000	*
1993	FFD_std	-0.4282364	0.1327039	-3.2270062	0.0014934	*
1994	(Intercept)	1.0000000	0.1794638	5.5721557	0.0000001	*
1994	FFD_std	-0.4294513	0.1799455	-2.3865627	0.0180153	*
1995	(Intercept)	1.0000000	0.2385668	4.1916978	0.0001486	*
1995	FFD_std	-0.1465151	0.2414586	-0.6067919	0.5474180	
1996	(Intercept)	1.0000000	0.1058594	9.4464959	0.0000000	*
1996	FFD_std	-0.3733017	0.1062888	-3.5121447	0.0006240	*
2006	(Intercept)	1.0000000	0.1347269	7.4224224	0.0000000	*
2006	FFD_std	-0.3955237	0.1354493	-2.9200863	0.0044004	*
2007	(Intercept)	1.0000000	0.1101048	9.0822593	0.0000000	*
2007	FFD_std	-0.4249668	0.1106951	-3.8390741	0.0002265	*
2008	(Intercept)	1.0000000	0.1198591	8.3431268	0.0000000	*
2008	FFD_std	-0.5121975	0.1206059	-4.2468684	0.0000587	*
2009	(Intercept)	1.0000000	0.2663471	3.7544998	0.0003993	*
2009	FFD_std	-0.2149129	0.2685574	-0.8002494	0.4267769	
2010	(Intercept)	1.0000000	0.1624538	6.1555960	0.0000000	*
2010	FFD_std	-0.4919611	0.1635627	-3.0077827	0.0036234	*
2011	(Intercept)	1.0000000	0.1951871	5.1232899	0.0000019	*
2011	FFD_std	-0.7085164	0.1963319	-3.6087691	0.0005218	*
2012	(Intercept)	1.0000000	0.1862022	5.3705053	0.0000005	*
2012	FFD_std	-1.0347981	0.1870544	-5.5320699	0.0000002	*
2013	(Intercept)	1.0000000	0.3200235	3.1247708	0.0026297	*
2013	FFD_std	-0.4252879	0.3223680	-1.3192622	0.1915723	
2014	(Intercept)	1.0000000	0.1719726	5.8148792	0.0000002	*
2014	FFD_std	-0.6681021	0.1733539	-3.8539771	0.0002819	*
2015	(Intercept)	1.0000000	0.2280947	4.3841449	0.0001063	*
2015	FFD_std	0.0480660	0.2313302	0.2077810	0.8366396	

year	term	estimate	std.error	statistic	p.value	sig
2016	(Intercept)	1.0000000	0.0953638	10.4861559	0.0000000	*
2016	FFD_std	-0.3509882	0.0957963	-3.6639005	0.0003853	*
2017	(Intercept)	1.0000000	0.4954213	2.0184842	0.0456470	*
2017	FFD_std	0.2817863	0.4973527	0.5665723	0.5720047	

```
kable(sel_models1_rsq)
```

year	r.squared	adj.r.squared
1987	0.0650598	0.0610982
1988	0.0455449	0.0398972
1989	0.1913867	0.1829636
1990	0.0598191	0.0526421
1991	0.2884575	0.2844601
1992	0.0477394	0.0393863
1993	0.0561640	0.0507707
1994	0.0298679	0.0246240
1995	0.0091210	-0.0156510
1996	0.0918238	0.0843797
2006	0.0848221	0.0748745
2007	0.1380804	0.1287117
2008	0.1858683	0.1755628
2009	0.0107377	-0.0060295
2010	0.1116239	0.0992854
2011	0.1342278	0.1239210
2012	0.2208006	0.2135858
2013	0.0253192	0.0107717
2014	0.1958144	0.1826311
2015	0.0012682	-0.0281063
2016	0.1096529	0.1014846
2017	0.0025212	-0.0053329

```
kable(sel_models1_anova)
```

year	variable	F.value	Pr..F.	sig
1987	FFD_std	16.4225607	0.0000688	*
1988	FFD_std	8.0643789	0.0050689	*
1989	FFD_std	22.7217636	0.0000067	*
1990	FFD_std	8.3348839	0.0045508	*
1991	FFD_std	72.1607366	0.0000000	*
1992	FFD_std	5.7151338	0.0184576	*
1993	FFD_std	10.4135689	0.0014934	*
1994	FFD_std	5.6956815	0.0180153	*
1995	FFD_std	0.3681964	0.5474180	
1996	FFD_std	12.3351607	0.0006240	*
2006	FFD_std	8.5269038	0.0044004	*
2007	FFD_std	14.7384898	0.0002265	*
2008	FFD_std	18.0358916	0.0000587	*
2009	FFD_std	0.6403990	0.4267769	
2010	FFD_std	9.0467567	0.0036234	*

year	variable	F.value	Pr..F.	sig
2011	FFD_std	13.0232146	0.0005218	*
2012	FFD_std	30.6037971	0.0000002	*
2013	FFD_std	1.7404528	0.1915723	
2014	FFD_std	14.8531392	0.0002819	*
2015	FFD_std	0.0431729	0.8366396	
2016	FFD_std	13.4241668	0.0003853	*
2017	FFD_std	0.3210042	0.5720047	

With FFD & number of flowers

```
sel_models2<-as.list(data_sel %>%
  group_by(year) %>%
  do(model = lm(n_intact_seeds_rel ~ FFD_std+n_fl_std, data = .)) )
sel_models2<-data_sel %>%
  group_by(year) %>%
  do(model = lm(n_intact_seeds_rel ~ FFD_std+n_fl_std, data = .))
sel_models2_coefs<-data.frame(sel_models2 %>% tidy(model))
sel_models2_coefs$sig<-ifelse(sel_models2_coefs$p.value<0.05,"*","")
sel_models2_rsq<-data.frame(sel_models2 %>% glance(model))[1:3]
sel_models2_anova<-cbind(
  year=c("1987","1987","1988","1988","1989","1989","1990","1990","1991","1991","1992","1992","1993","19
  "1994","1994","1995","1995","1996","1996","2006","2006","2007","2007","2008","2008","2009","2009",
  "2010","2010","2011","2011","2012","2012","2013","2013","2014","2014","2015","2015","2016","2016",
  "2017","2017"),
  variable=rep(c("FFD_std","n_fl_std"),22),
   ldply(lapply(as.list(sel_models2)$model,FUN=Anova), function(x) data.frame(x)[1:2,3:4]))
sel_models2_anova$sig<-ifelse(sel_models2_anova$Pr..F.<0.05,"*","")

kable(sel_models2_coefs)  #FFD * in 1991,1992,1993,2007,2010,2012,2014
```

year	term	estimate	std.error	statistic	p.value	sig
1987	(Intercept)	1.0000000	0.0806475	12.3996342	0.0000000	*
1987	FFD_std	-0.0779057	0.0881928	-0.8833567	0.3779463	
1987	n_fl_std	0.7344574	0.0881928	8.3278594	0.0000000	*
1988	(Intercept)	1.0000000	0.1003991	9.9602439	0.0000000	*
1988	FFD_std	-0.0878159	0.1112680	-0.7892286	0.4310908	
1988	n_fl_std	0.5033133	0.1112680	4.5234322	0.0000115	*
1989	(Intercept)	1.0000000	0.1121671	8.9152722	0.0000000	*
1989	FFD_std	-0.1441208	0.1427321	-1.0097295	0.3151898	
1989	n_fl_std	0.7576835	0.1427321	5.3084320	0.0000007	*
1990	(Intercept)	1.0000000	0.1552273	6.4421661	0.0000000	*
1990	FFD_std	-0.2398513	0.1691158	-1.4182663	0.1585058	
1990	n_fl_std	0.5881817	0.1691158	3.4779815	0.0006877	*
1991	(Intercept)	1.0000000	0.0721812	13.8540252	0.0000000	*
1991	FFD_std	-0.3982279	0.0872502	-4.5642040	0.0000094	*
1991	n_fl_std	0.4723255	0.0872502	5.4134579	0.0000002	*
1992	(Intercept)	1.0000000	0.1830969	5.4615893	0.0000003	*
1992	FFD_std	-0.4628387	0.1992692	-2.3226800	0.0219866	*
1992	n_fl_std	-0.0647689	0.1992692	-0.3250319	0.7457579	
1993	(Intercept)	1.0000000	0.1309488	7.6365702	0.0000000	*
1993	FFD_std	-0.3000375	0.1440021	-2.0835636	0.0386613	*
1993	n_fl_std	0.3124230	0.1440021	2.1695728	0.0313955	*

year	term	estimate	std.error	statistic	p.value	sig
1994	(Intercept)	1.0000000	0.1785389	5.6010190	0.0000001	*
1994	FFD_std	-0.3002982	0.1943117	-1.5454456	0.1239567	
1994	n_fl_std	0.3321273	0.1943117	1.7092501	0.0890906	
1995	(Intercept)	1.0000000	0.2357703	4.2414168	0.0001322	*
1995	FFD_std	0.0183948	0.2661905	0.0691037	0.9452601	
1995	n_fl_std	0.3721466	0.2661905	1.3980463	0.1700002	
1996	(Intercept)	1.0000000	0.0940797	10.6292883	0.0000000	*
1996	FFD_std	-0.1697922	0.1007997	-1.6844507	0.0946724	
1996	n_fl_std	0.5831053	0.1007997	5.7847908	0.0000001	*
2006	(Intercept)	1.0000000	0.1244082	8.0380562	0.0000000	*
2006	FFD_std	-0.2280061	0.1315479	-1.7332548	0.0864376	
2006	n_fl_std	0.5406975	0.1315479	4.1102699	0.0000864	*
2007	(Intercept)	1.0000000	0.1104844	9.0510499	0.0000000	*
2007	FFD_std	-0.3827784	0.1310118	-2.9217097	0.0043900	*
2007	n_fl_std	0.0795626	0.1310118	0.6072935	0.5451685	
2008	(Intercept)	1.0000000	0.0997176	10.0283189	0.0000000	*
2008	FFD_std	-0.2100759	0.1122220	-1.8719669	0.0649596	
2008	n_fl_std	0.6746103	0.1122220	6.0113888	0.0000001	*
2009	(Intercept)	1.0000000	0.2670647	3.7444103	0.0004176	*
2009	FFD_std	-0.0700757	0.3212662	-0.2181236	0.8280984	
2009	n_fl_std	0.2655695	0.3212662	0.8266336	0.4118326	
2010	(Intercept)	1.0000000	0.1635740	6.1134396	0.0000000	*
2010	FFD_std	-0.4783838	0.1945310	-2.4591648	0.0163648	*
2010	n_fl_std	0.0255105	0.1945310	0.1311384	0.8960367	
2011	(Intercept)	1.0000000	0.1832996	5.4555485	0.0000005	*
2011	FFD_std	-0.3007029	0.2181104	-1.3786732	0.1717001	
2011	n_fl_std	0.7633405	0.2181104	3.4997897	0.0007516	*
2012	(Intercept)	1.0000000	0.1778849	5.6216126	0.0000002	*
2012	FFD_std	-0.6654602	0.2096835	-3.1736409	0.0019658	*
2012	n_fl_std	0.7059695	0.2096835	3.3668334	0.0010572	*
2013	(Intercept)	1.0000000	0.3224387	3.1013643	0.0028330	*
2013	FFD_std	-0.4255495	0.3313975	-1.2841059	0.2035944	
2013	n_fl_std	-0.0013175	0.3313975	-0.0039755	0.9968400	
2014	(Intercept)	1.0000000	0.1722283	5.8062475	0.0000003	*
2014	FFD_std	-0.7773420	0.2114498	-3.6762488	0.0005072	*
2014	n_fl_std	-0.1913632	0.2114498	-0.9050057	0.3690821	
2015	(Intercept)	1.0000000	0.2314274	4.3210095	0.0001341	*
2015	FFD_std	0.0830019	0.3146461	0.2637946	0.7935785	
2015	n_fl_std	0.0524562	0.3146461	0.1667149	0.8686117	
2016	(Intercept)	1.0000000	0.0832644	12.0099377	0.0000000	*
2016	FFD_std	-0.0531961	0.0976276	-0.5448877	0.5869542	
2016	n_fl_std	0.5774079	0.0976276	5.9143917	0.0000000	*
2017	(Intercept)	1.0000000	0.4956903	2.0173886	0.0457795	*
2017	FFD_std	-0.0204262	0.5946111	-0.0343521	0.9726507	
2017	n_fl_std	-0.5521131	0.5946111	-0.9285281	0.3549091	

```r
kable(sel_models2_rsq)
```

year	r.squared	adj.r.squared
1987	0.2781054	0.2719617
1988	0.1491710	0.1390421

year	r.squared	adj.r.squared
1989	0.3763711	0.3632421
1990	0.1398546	0.1266216
1991	0.3895315	0.3826335
1992	0.0486289	0.0317905
1993	0.0810241	0.0704612
1994	0.0450308	0.0346507
1995	0.0564101	0.0080209
1996	0.2885756	0.2768165
2006	0.2281226	0.2111582
2007	0.1415595	0.1226926
2008	0.4436301	0.4293642
2009	0.0222569	-0.0114584
2010	0.1118390	0.0868204
2011	0.2455622	0.2273830
2012	0.2954414	0.2822721
2013	0.0253194	-0.0042163
2014	0.2066442	0.1801990
2015	0.0021086	-0.0583696
2016	0.3274761	0.3150220
2017	0.0093002	-0.0064252

```
kable(sel_models2_anova)
```

year	variable	F.value	Pr..F.	sig
1987	FFD_std	0.7803191	0.3779463	
1987	n_fl_std	69.3532416	0.0000000	*
1988	FFD_std	0.6228818	0.4310908	
1988	n_fl_std	20.4614387	0.0000115	*
1989	FFD_std	1.0195537	0.3151898	
1989	n_fl_std	28.1794505	0.0000007	*
1990	FFD_std	2.0114792	0.1585058	
1990	n_fl_std	12.0963551	0.0006877	*
1991	FFD_std	20.8319581	0.0000094	*
1991	n_fl_std	29.3055260	0.0000002	*
1992	FFD_std	5.3948425	0.0219866	*
1992	n_fl_std	0.1056457	0.7457579	
1993	FFD_std	4.3412374	0.0386613	*
1993	n_fl_std	4.7070460	0.0313955	*
1994	FFD_std	2.3884021	0.1239567	
1994	n_fl_std	2.9215359	0.0890906	
1995	FFD_std	0.0047753	0.9452601	
1995	n_fl_std	1.9545335	0.1700002	
1996	FFD_std	2.8373741	0.0946724	
1996	n_fl_std	33.4638045	0.0000001	*
2006	FFD_std	3.0041723	0.0864376	
2006	n_fl_std	16.8943186	0.0000864	*
2007	FFD_std	8.5363875	0.0043900	*
2007	n_fl_std	0.3688054	0.5451685	
2008	FFD_std	3.5042599	0.0649596	
2008	n_fl_std	36.1367949	0.0000001	*
2009	FFD_std	0.0475779	0.8280984	

year	variable	F.value	Pr..F.	sig
2009	n_fl_std	0.6833231	0.4118326	
2010	FFD_std	6.0474915	0.0163648	*
2010	n_fl_std	0.0171973	0.8960367	
2011	FFD_std	1.9007397	0.1717001	
2011	n_fl_std	12.2485281	0.0007516	*
2012	FFD_std	10.0719969	0.0019658	*
2012	n_fl_std	11.3355669	0.0010572	*
2013	FFD_std	1.6489280	0.2035944	
2013	n_fl_std	0.0000158	0.9968400	
2014	FFD_std	13.5148054	0.0005072	*
2014	n_fl_std	0.8190353	0.3690821	
2015	FFD_std	0.0695876	0.7935785	
2015	n_fl_std	0.0277939	0.8686117	
2016	FFD_std	0.2969026	0.5869542	
2016	n_fl_std	34.9800298	0.0000000	*
2017	FFD_std	0.0011801	0.9726507	
2017	n_fl_std	0.8621644	0.3549091	

```
sel_grads_FFD<-subset(sel_models2_coefs,term=="FFD_std")[c(1,3,7)]
sel_grads_FFD #These are the per-year selection gradients for FFD
```

```
##    year    estimate sig
## 2  1987 -0.07790572
## 5  1988 -0.08781589
## 8  1989 -0.14412079
## 11 1990 -0.23985125
## 14 1991 -0.39822789   *
## 17 1992 -0.46283867   *
## 20 1993 -0.30003746   *
## 23 1994 -0.30029817
## 26 1995  0.01839476
## 29 1996 -0.16979216
## 32 2006 -0.22800610
## 35 2007 -0.38277840   *
## 38 2008 -0.21007592
## 41 2009 -0.07007575
## 44 2010 -0.47838381   *
## 47 2011 -0.30070294
## 50 2012 -0.66546024   *
## 53 2013 -0.42554949
## 56 2014 -0.77734197   *
## 59 2015  0.08300195
## 62 2016 -0.05319608
## 65 2017 -0.02042616
```

Non-linear selection

```
sel_models3<-data_sel %>%
  group_by(year) %>%
  do(model = lm(n_intact_seeds_rel ~ FFD_std+I(FFD_std^2)+n_fl_std+I(n_fl_std^2)+FFD_std:n_fl_std
                , data = .))
sel_models3_coefs<-data.frame(sel_models3 %>% tidy(model))
sel_models3_coefs$sig<-ifelse(sel_models3_coefs$p.value<0.05,"*","")
```

```r
sel_models3_rsq<-data.frame(sel_models3 %>% glance(model))[1:3]
sel_models3_anova<-cbind(
  year=c("1987","1987","1987","1987","1987","1988","1988","1988","1988","1988",
         "1989","1989","1989","1989","1989","1990","1990","1990","1990","1990",
         "1991","1991","1991","1991","1991","1992","1992","1992","1992","1992",
         "1993","1993","1993","1993","1993","1994","1994","1994","1994","1994",
         "1995","1995","1995","1995","1995","1996","1996","1996","1996","1996",
         "2006","2006","2006","2006","2006","2007","2007","2007","2007","2007",
         "2008","2008","2008","2008","2008","2009","2009","2009","2009","2009",
         "2010","2010","2010","2010","2010","2011","2011","2011","2011","2011",
         "2012","2012","2012","2012","2012","2013","2013","2013","2013","2013",
         "2014","2014","2014","2014","2014","2015","2015","2015","2015","2015",
         "2016","2016","2016","2016","2016","2017","2017","2017","2017","2017"),
  variable=rep(c("FFD_std","I(FFD_std^2)","n_fl_std","I(n_fl_std^2)","FFD_std:n_fl_std"),22),
   ldply(lapply(as.list(sel_models3)$model,FUN=Anova), function(x) data.frame(x)[1:5,3:4]))
sel_models3_anova$sig<-ifelse(sel_models3_anova$Pr..F.<0.05,"*","")

kable(sel_models3_coefs)
```

year	term	estimate	std.error	statistic	p.value	sig
1987	(Intercept)	1.0695037	0.1148860	9.3092627	0.0000000	*
1987	FFD_std	-0.0122040	0.1145872	-0.1065038	0.9152747	
1987	I(FFD_std^2)	-0.0708598	0.0847675	-0.8359316	0.4040535	
1987	n_fl_std	0.7356695	0.1482948	4.9608586	0.0000014	*
1987	I(n_fl_std^2)	0.0052502	0.0485437	0.1081547	0.9139665	
1987	FFD_std:n_fl_std	0.0104599	0.1803921	0.0579841	0.9538112	
1988	(Intercept)	1.0572781	0.1331494	7.9405426	0.0000000	*
1988	FFD_std	0.0515673	0.1247776	0.4132738	0.6799426	
1988	I(FFD_std^2)	0.0911390	0.0754437	1.2080388	0.2287610	
1988	n_fl_std	0.6410084	0.1887846	3.3954480	0.0008584	*
1988	I(n_fl_std^2)	0.0971103	0.0718155	1.3522197	0.1781555	
1988	FFD_std:n_fl_std	0.5778527	0.1785712	3.2359794	0.0014650	*
1989	(Intercept)	0.9006827	0.1735238	5.1905415	0.0000012	*
1989	FFD_std	-0.1891090	0.1582507	-1.1949962	0.2351600	
1989	I(FFD_std^2)	0.0347796	0.1340940	0.2593676	0.7959311	
1989	n_fl_std	0.6328408	0.2287928	2.7659992	0.0068585	*
1989	I(n_fl_std^2)	0.1028702	0.1537660	0.6690051	0.5051675	
1989	FFD_std:n_fl_std	0.0608388	0.2245227	0.2709693	0.7870217	
1990	(Intercept)	1.1537867	0.1951793	5.9114186	0.0000000	*
1990	FFD_std	-0.1710646	0.1756620	-0.9738281	0.3319931	
1990	I(FFD_std^2)	-0.0490858	0.1196485	-0.4102502	0.6823137	
1990	n_fl_std	1.0279019	0.2522100	4.0755789	0.0000804	*
1990	I(n_fl_std^2)	-0.2426828	0.0761838	-3.1854904	0.0018185	*
1990	FFD_std:n_fl_std	-0.3519460	0.2784606	-1.2638985	0.2085814	
1991	(Intercept)	0.9104917	0.1109030	8.2097993	0.0000000	*
1991	FFD_std	-0.3994336	0.0975447	-4.0948767	0.0000646	*
1991	I(FFD_std^2)	0.0386915	0.0859803	0.4500041	0.6532676	
1991	n_fl_std	0.3693223	0.1284431	2.8753774	0.0045396	*
1991	I(n_fl_std^2)	0.1195535	0.0848676	1.4087068	0.1607063	
1991	FFD_std:n_fl_std	0.1222085	0.1646138	0.7423957	0.4588486	
1992	(Intercept)	1.1696589	0.2593957	4.5091688	0.0000163	*
1992	FFD_std	-0.3235903	0.2126508	-1.5216976	0.1309544	
1992	I(FFD_std^2)	0.0963843	0.1835101	0.5252261	0.6004831	

year	term	estimate	std.error	statistic	p.value	sig
1992	n_fl_std	0.4698371	0.3370334	1.3940370	0.1661161	
1992	I(n_fl_std^2)	-0.2013982	0.1116555	-1.8037468	0.0740080	
1992	FFD_std:n_fl_std	0.1716466	0.2521504	0.6807310	0.4974722	
1993	(Intercept)	1.0905872	0.1855686	5.8770020	0.0000000	*
1993	FFD_std	-0.2331117	0.1578170	-1.4771009	0.1414879	
1993	I(FFD_std^2)	0.0206008	0.1193892	0.1725514	0.8632081	
1993	n_fl_std	0.5008903	0.2536732	1.9745496	0.0499294	*
1993	I(n_fl_std^2)	-0.0490544	0.0902515	-0.5435296	0.5874731	
1993	FFD_std:n_fl_std	0.1526750	0.1940275	0.7868728	0.4324455	
1994	(Intercept)	1.0421161	0.2565727	4.0616789	0.0000725	*
1994	FFD_std	-0.2658891	0.2433311	-1.0927048	0.2759757	
1994	I(FFD_std^2)	-0.0177802	0.1710514	-0.1039463	0.9173270	
1994	n_fl_std	0.4383997	0.2817173	1.5561689	0.1214147	
1994	I(n_fl_std^2)	-0.0561453	0.0972931	-0.5770734	0.5646069	
1994	FFD_std:n_fl_std	-0.0812179	0.2358531	-0.3443582	0.7309767	
1995	(Intercept)	1.3459925	0.3745225	3.5938893	0.0009675	*
1995	FFD_std	0.2018072	0.3246316	0.6216499	0.5380892	
1995	I(FFD_std^2)	-0.2285683	0.3075587	-0.7431697	0.4622016	
1995	n_fl_std	0.8674691	0.5150432	1.6842645	0.1007830	
1995	I(n_fl_std^2)	-0.1940471	0.1512681	-1.2828025	0.2077592	
1995	FFD_std:n_fl_std	-0.1538687	0.4431465	-0.3472185	0.7304489	
1996	(Intercept)	1.0985275	0.1419234	7.7402844	0.0000000	*
1996	FFD_std	-0.1655069	0.1092254	-1.5152789	0.1323760	
1996	I(FFD_std^2)	-0.0488930	0.0925082	-0.5285265	0.5981267	
1996	n_fl_std	0.6834019	0.1804443	3.7873296	0.0002411	*
1996	I(n_fl_std^2)	-0.0524238	0.0789387	-0.6641082	0.5079167	
1996	FFD_std:n_fl_std	-0.0056971	0.1387211	-0.0410685	0.9673107	
2006	(Intercept)	1.1615976	0.1337477	8.6849892	0.0000000	*
2006	FFD_std	-0.1483329	0.1553453	-0.9548593	0.3422645	
2006	I(FFD_std^2)	0.1130777	0.0745380	1.5170485	0.1328387	
2006	n_fl_std	1.5433766	0.2378706	6.4883020	0.0000000	*
2006	I(n_fl_std^2)	-0.1648282	0.0623970	-2.6416043	0.0097642	*
2006	FFD_std:n_fl_std	0.3601627	0.2103102	1.7125305	0.0903206	
2007	(Intercept)	0.9815732	0.1586249	6.1880146	0.0000000	*
2007	FFD_std	-0.2479242	0.1451874	-1.7076148	0.0912337	
2007	I(FFD_std^2)	0.2431026	0.1495139	1.6259532	0.1075357	
2007	n_fl_std	0.5403307	0.2698136	2.0026070	0.0482976	*
2007	I(n_fl_std^2)	-0.0154757	0.0749122	-0.2065841	0.8368119	
2007	FFD_std:n_fl_std	0.3941541	0.2660763	1.4813576	0.1420832	
2008	(Intercept)	0.9843853	0.1282922	7.6729943	0.0000000	*
2008	FFD_std	-0.3241241	0.1570157	-2.0642780	0.0424499	*
2008	I(FFD_std^2)	0.0721533	0.0665622	1.0839976	0.2818383	
2008	n_fl_std	0.8285535	0.2108922	3.9288002	0.0001883	*
2008	I(n_fl_std^2)	-0.1005252	0.0827743	-1.2144501	0.2283859	
2008	FFD_std:n_fl_std	-0.0986539	0.2458525	-0.4012729	0.6893602	
2009	(Intercept)	1.8943698	0.4033058	4.6971054	0.0000180	*
2009	FFD_std	0.9186105	0.4482712	2.0492292	0.0452217	*
2009	I(FFD_std^2)	-0.0626484	0.3025368	-0.2070770	0.8367145	
2009	n_fl_std	2.3412986	0.7607277	3.0777089	0.0032499	*
2009	I(n_fl_std^2)	-0.1456065	0.1675936	-0.8688067	0.3887284	
2009	FFD_std:n_fl_std	1.2853730	0.7940478	1.6187603	0.1112198	
2010	(Intercept)	1.1476515	0.2627212	4.3683250	0.0000438	*

year	term	estimate	std.error	statistic	p.value	sig
2010	FFD_std	-0.3044103	0.2611880	-1.1654833	0.2478954	
2010	I(FFD_std^2)	0.1956397	0.1653152	1.1834344	0.2407578	
2010	n_fl_std	0.6117473	0.3834876	1.5952206	0.1153005	
2010	I(n_fl_std^2)	-0.1433445	0.1391728	-1.0299752	0.3066713	
2010	FFD_std:n_fl_std	0.3794815	0.3577730	1.0606768	0.2925897	
2011	(Intercept)	0.7410165	0.2639969	2.8069142	0.0062803	*
2011	FFD_std	-0.5840558	0.3081004	-1.8956670	0.0616154	
2011	I(FFD_std^2)	0.0517437	0.1712146	0.3022153	0.7632723	
2011	n_fl_std	0.4252056	0.3801078	1.1186447	0.2666395	
2011	I(n_fl_std^2)	0.0401968	0.1775753	0.2263648	0.8214951	
2011	FFD_std:n_fl_std	-0.3183722	0.5065314	-0.6285340	0.5314446	
2012	(Intercept)	0.5559600	0.2510678	2.2143819	0.0289849	*
2012	FFD_std	-1.0250419	0.2500524	-4.0993085	0.0000824	*
2012	I(FFD_std^2)	0.3702394	0.1873675	1.9760065	0.0508028	
2012	n_fl_std	0.5262771	0.3918890	1.3429240	0.1822201	
2012	I(n_fl_std^2)	-0.0973823	0.1459070	-0.6674274	0.5059775	
2012	FFD_std:n_fl_std	-0.3349938	0.4303492	-0.7784232	0.4380870	
2013	(Intercept)	1.0003734	0.5371658	1.8623177	0.0672230	
2013	FFD_std	-0.2769202	0.3797226	-0.7292695	0.4685395	
2013	I(FFD_std^2)	0.1780980	0.3624769	0.4913361	0.6248962	
2013	n_fl_std	0.1691522	0.5019523	0.3369886	0.7372455	
2013	I(n_fl_std^2)	-0.0881300	0.3374596	-0.2611572	0.7948231	
2013	FFD_std:n_fl_std	0.4550790	0.4491692	1.0131571	0.3148605	
2014	(Intercept)	0.8661868	0.2458628	3.5230496	0.0008481	*
2014	FFD_std	-0.6135471	0.2287960	-2.6816344	0.0095667	*
2014	I(FFD_std^2)	0.3400106	0.2066816	1.6450935	0.1054548	
2014	n_fl_std	0.0988467	0.3604495	0.2742319	0.7848978	
2014	I(n_fl_std^2)	-0.0243670	0.1429300	-0.1704823	0.8652345	
2014	FFD_std:n_fl_std	0.3147446	0.3514151	0.8956490	0.3742072	
2015	(Intercept)	1.9568387	0.3657597	5.3500661	0.0000087	*
2015	FFD_std	0.2859020	0.2905912	0.9838631	0.3330516	
2015	I(FFD_std^2)	-0.9753178	0.3640841	-2.6788255	0.0118735	*
2015	n_fl_std	0.8696845	0.4117254	2.1122926	0.0430951	*
2015	I(n_fl_std^2)	-0.7020960	0.3098146	-2.2661815	0.0308156	*
2015	FFD_std:n_fl_std	-1.0408931	0.5552089	-1.8747773	0.0705891	
2016	(Intercept)	1.1957146	0.1265717	9.4469366	0.0000000	*
2016	FFD_std	0.2185451	0.1427644	1.5308095	0.1288238	
2016	I(FFD_std^2)	0.0035252	0.0765590	0.0460454	0.9633615	
2016	n_fl_std	0.8274306	0.1770309	4.6739342	0.0000088	*
2016	I(n_fl_std^2)	0.0501440	0.0855992	0.5857998	0.5592671	
2016	FFD_std:n_fl_std	0.4869958	0.1897448	2.5665831	0.0116802	*
2017	(Intercept)	0.9089216	0.6704120	1.3557656	0.1776578	
2017	FFD_std	-0.1913364	0.6331865	-0.3021802	0.7630250	
2017	I(FFD_std^2)	-0.2056510	0.4058771	-0.5066830	0.6132843	
2017	n_fl_std	-1.0750392	0.9749933	-1.1026119	0.2723485	
2017	I(n_fl_std^2)	0.2941794	0.5491987	0.5356521	0.5931663	
2017	FFD_std:n_fl_std	-0.0059586	0.7585858	-0.0078548	0.9937455	

```r
#Correlational selection in 1988, 2016
#Quadratic selection on n_fl in 1990, 2006, 2015 and on FFD in 2015
kable(sel_models3_rsq)
```

year	r.squared	adj.r.squared
1987	0.2818452	0.2663678
1988	0.2029259	0.1787721
1989	0.3805970	0.3469338
1990	0.2054147	0.1741318
1991	0.3972959	0.3799768
1992	0.0808863	0.0391084
1993	0.0873721	0.0606870
1994	0.0474307	0.0211166
1995	0.1079986	-0.0158905
1996	0.2942184	0.2643124
2006	0.4206109	0.3876910
2007	0.1910072	0.1450417
2008	0.4729196	0.4377809
2009	0.1686804	0.0931058
2010	0.1711221	0.1101752
2011	0.2639200	0.2179150
2012	0.3678178	0.3374244
2013	0.0424174	-0.0335812
2014	0.2672590	0.2029835
2015	0.2637203	0.1410070
2016	0.3912740	0.3622871
2017	0.0151461	-0.0248886

```
kable(sel_models3_anova)
```

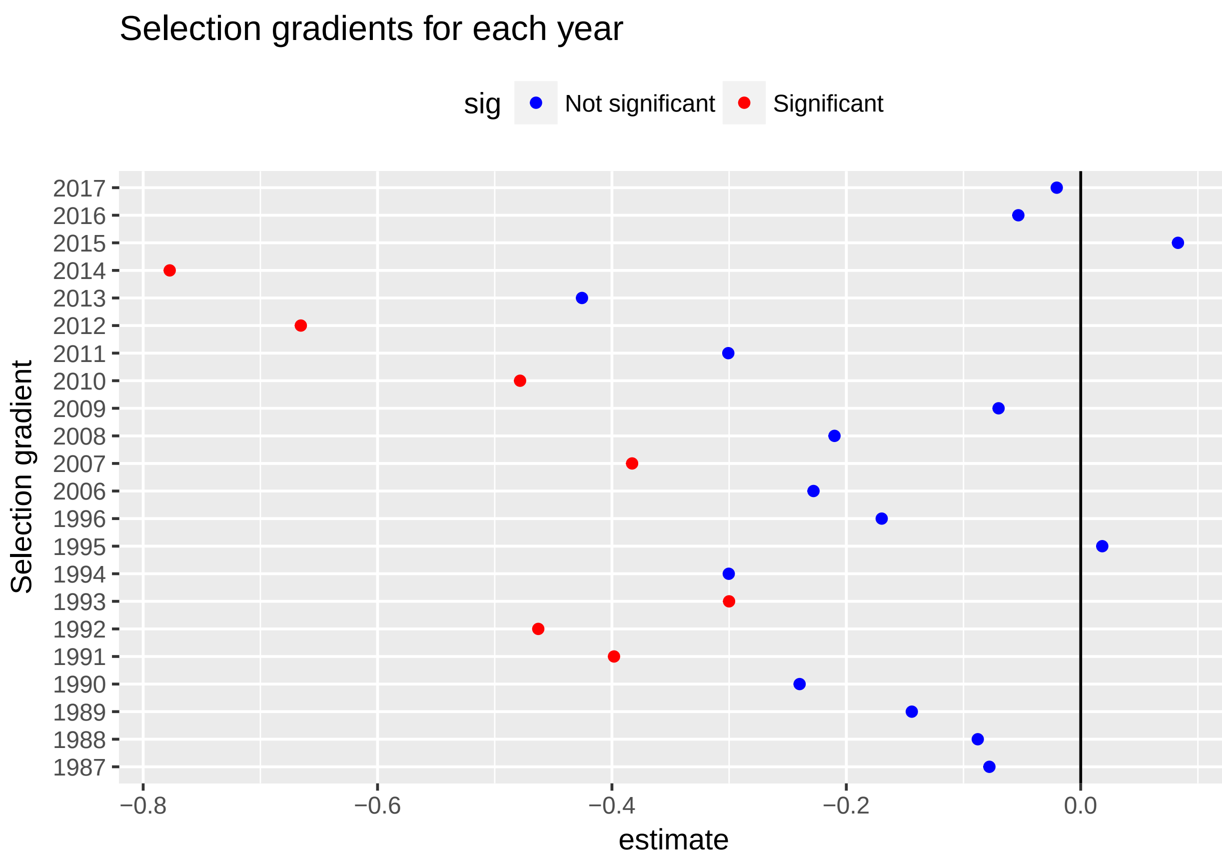
year	variable	F.value	Pr..F.	sig
1987	FFD_std	0.0157473	0.9002457	
1987	I(FFD_std^2)	0.6987816	0.4040535	
1987	n_fl_std	27.7831715	0.0000003	*
1987	I(n_fl_std^2)	0.0116974	0.9139665	
1987	FFD_std:n_fl_std	0.0033622	0.9538112	
1988	FFD_std	0.3162742	0.5746186	
1988	I(FFD_std^2)	1.4593577	0.2287610	
1988	n_fl_std	6.6965130	0.0105215	*
1988	I(n_fl_std^2)	1.8284980	0.1781555	
1988	FFD_std:n_fl_std	10.4715629	0.0014650	*
1989	FFD_std	1.4636489	0.2294499	
1989	I(FFD_std^2)	0.0672715	0.7959311	
1989	n_fl_std	7.9730824	0.0058201	*
1989	I(n_fl_std^2)	0.4475679	0.5051675	
1989	FFD_std:n_fl_std	0.0734244	0.7870217	
1990	FFD_std	0.5337332	0.4663872	
1990	I(FFD_std^2)	0.1683052	0.6823137	
1990	n_fl_std	20.8786629	0.0000114	*
1990	I(n_fl_std^2)	10.1473489	0.0018185	*
1990	FFD_std:n_fl_std	1.5974395	0.2085814	
1991	FFD_std	20.8547707	0.0000093	*
1991	I(FFD_std^2)	0.2025037	0.6532676	
1991	n_fl_std	7.7854453	0.0058546	*
1991	I(n_fl_std^2)	1.9844549	0.1607063	
1991	FFD_std:n_fl_std	0.5511514	0.4588486	

year	variable	F.value	Pr..F.	sig
1992	FFD_std	2.7919117	0.0975840	
1992	I(FFD_std^2)	0.2758624	0.6004831	
1992	n_fl_std	1.5849424	0.2107154	
1992	I(n_fl_std^2)	3.2535026	0.0740080	
1992	FFD_std:n_fl_std	0.4633946	0.4974722	
1993	FFD_std	3.1242200	0.0789203	
1993	I(FFD_std^2)	0.0297740	0.8632081	
1993	n_fl_std	3.3510498	0.0689029	
1993	I(n_fl_std^2)	0.2954244	0.5874731	
1993	FFD_std:n_fl_std	0.6191688	0.4324455	
1994	FFD_std	1.1833370	0.2781241	
1994	I(FFD_std^2)	0.0108048	0.9173270	
1994	n_fl_std	2.5257070	0.1137498	
1994	I(n_fl_std^2)	0.3330138	0.5646069	
1994	FFD_std:n_fl_std	0.1185826	0.7309767	
1995	FFD_std	0.5160813	0.4771550	
1995	I(FFD_std^2)	0.5523012	0.4622016	
1995	n_fl_std	3.1645544	0.0836985	
1995	I(n_fl_std^2)	1.6455822	0.2077592	
1995	FFD_std:n_fl_std	0.1205607	0.7304489	
1996	FFD_std	2.3982139	0.1241518	
1996	I(FFD_std^2)	0.2793402	0.5981267	
1996	n_fl_std	14.3506043	0.0002403	*
1996	I(n_fl_std^2)	0.4410397	0.5079167	
1996	FFD_std:n_fl_std	0.0016866	0.9673107	
2006	FFD_std	0.7568442	0.3866848	
2006	I(FFD_std^2)	2.3014362	0.1328387	
2006	n_fl_std	44.6062382	0.0000000	*
2006	I(n_fl_std^2)	6.9780732	0.0097642	*
2006	FFD_std:n_fl_std	2.9327608	0.0903206	
2007	FFD_std	4.7517566	0.0319384	*
2007	I(FFD_std^2)	2.6437239	0.1075357	
2007	n_fl_std	2.4134752	0.1238843	
2007	I(n_fl_std^2)	0.0426770	0.8368119	
2007	FFD_std:n_fl_std	2.1944204	0.1420832	
2008	FFD_std	4.2407417	0.0429365	*
2008	I(FFD_std^2)	1.1750508	0.2818383	
2008	n_fl_std	17.2183786	0.0000870	*
2008	I(n_fl_std^2)	1.4748889	0.2283859	
2008	FFD_std:n_fl_std	0.1610200	0.6893602	
2009	FFD_std	2.1230700	0.1507814	
2009	I(FFD_std^2)	0.0428809	0.8367145	
2009	n_fl_std	6.9539905	0.0108509	*
2009	I(n_fl_std^2)	0.7548251	0.3887284	
2009	FFD_std:n_fl_std	2.6203850	0.1112198	
2010	FFD_std	2.3826577	0.1273300	
2010	I(FFD_std^2)	1.4005170	0.2407578	
2010	n_fl_std	1.8836772	0.1744269	
2010	I(n_fl_std^2)	1.0608488	0.3066713	
2010	FFD_std:n_fl_std	1.1250352	0.2925897	
2011	FFD_std	3.3775309	0.0698034	
2011	I(FFD_std^2)	0.0913341	0.7632723	

year	variable	F.value	Pr..F.	sig
2011	n_fl_std	2.2198295	0.1401803	
2011	I(n_fl_std^2)	0.0512410	0.8214951	
2011	FFD_std:n_fl_std	0.3950550	0.5314446	
2012	FFD_std	16.1991554	0.0001084	*
2012	I(FFD_std^2)	3.9046017	0.0508028	
2012	n_fl_std	2.4630875	0.1195871	
2012	I(n_fl_std^2)	0.4454593	0.5059775	
2012	FFD_std:n_fl_std	0.6059427	0.4380870	
2013	FFD_std	1.3164480	0.2555691	
2013	I(FFD_std^2)	0.2414111	0.6248962	
2013	n_fl_std	0.0487339	0.8259952	
2013	I(n_fl_std^2)	0.0682031	0.7948231	
2013	FFD_std:n_fl_std	1.0264873	0.3148605	
2014	FFD_std	6.9098271	0.0109980	*
2014	I(FFD_std^2)	2.7063326	0.1054548	
2014	n_fl_std	0.1504880	0.6995144	
2014	I(n_fl_std^2)	0.0290642	0.8652345	
2014	FFD_std:n_fl_std	0.8021871	0.3742072	
2015	FFD_std	0.6941762	0.4113320	
2015	I(FFD_std^2)	7.1761062	0.0118735	*
2015	n_fl_std	3.5442102	0.0694841	
2015	I(n_fl_std^2)	5.1355784	0.0308156	*
2015	FFD_std:n_fl_std	3.5147899	0.0705891	
2016	FFD_std	1.4126611	0.2372964	
2016	I(FFD_std^2)	0.0021202	0.9633615	
2016	n_fl_std	19.6248303	0.0000232	*
2016	I(n_fl_std^2)	0.3431614	0.5592671	
2016	FFD_std:n_fl_std	6.5873490	0.0116802	*
2017	FFD_std	0.0913191	0.7630172	
2017	I(FFD_std^2)	0.2567277	0.6132843	
2017	n_fl_std	1.2812416	0.2598702	
2017	I(n_fl_std^2)	0.2869232	0.5931663	
2017	FFD_std:n_fl_std	0.0000617	0.9937455	

How are yearly selection gradients linked to climatic variables?

```
ggplot(sel_grads_FFD,aes(estimate,year,colour=sig))+geom_point()+ylab("Selection gradient")+
  scale_color_manual(labels = c("Not significant", "Significant"), values = c("blue", "red"))+
  geom_vline(xintercept=0)+ggtitle("Selection gradients for each year")+theme(legend.position="top")
```




```
sel_grads_FFD$signif<-as.factor(with(sel_grads_FFD,ifelse(sig=="*","1","0")))
sel_grads_FFD$sig<-NULL
names(sel_grads_FFD)<-c("year","selgradFFD","sig_selgradFFD")

data_sel_agg<-merge(mean_weather5,sel_grads_FFD)

#Fit univariate linear models of selgradFFD against each predictor
models_selgrads<-lapply(names(data_sel_agg)[c(3:228)], function(x) {
  summary(lm(substitute(selgradFFD ~ scale(i), list(i = as.name(x))),data=data_sel_agg))
})

#Build a table with estimate, p and r square for all fitted models
models_selgrads<-cbind(names(data_sel_agg)[c(3:228)],
              ldply(models_selgrads, function(x) coef(x)[2]),
              ldply(models_selgrads, function(x) coef(x)[8]),
              ldply(models_selgrads, function(x) x$adj.r.square)
      )
names(models_selgrads)<-c("variable","estimate","p","adj.rsquare")
models_selgrads$sig<-ifelse(models_selgrads$p<0.05,"*","") # *=p<0.05

#Order models by R square
kable(arrange(models_selgrads,desc(adj.rsquare)))
```

variable	estimate	p	adj.rsquare	sig
precipitation_3	0.1026375	0.0277854	0.1806719	*
min_7	-0.0995303	0.0335745	0.1669169	*

variable	estimate	p	adj.rsquare	sig
GDD10__7	-0.0944955	0.0449306	0.1455261	*
GDD3__7	-0.0944955	0.0449306	0.1455261	*
GDD5__7	-0.0944955	0.0449306	0.1455261	*
GDD7__7	-0.0944955	0.0449306	0.1455261	*
GDH3__7	-0.0944955	0.0449306	0.1455261	*
GDH5__7	-0.0944955	0.0449306	0.1455261	*
GDH7__7	-0.0944955	0.0449306	0.1455260	*
GDH10__7	-0.0944700	0.0449948	0.1454206	*
mean__7	-0.0933955	0.0477686	0.1410002	*
max__7	-0.0855566	0.0722021	0.1102837	
GDH7__12	0.0822109	0.0913984	0.0975375	
GDD7__12	0.0821734	0.0915582	0.0974006	
GDH10__12	0.0810705	0.0963552	0.0934000	
GDD10__12	0.0808945	0.0971372	0.0927667	
precipitation__2	-0.0779673	0.1038767	0.0831091	
precipitation__12	-0.0753114	0.1244370	0.0733894	
min__5	-0.0703930	0.1446164	0.0585028	
GDD5__12	0.0703891	0.1527229	0.0574544	
precipitation__w	-0.0699334	0.1474060	0.0570908	
precipitation__8	-0.0698941	0.1476468	0.0569702	
GDH5__12	0.0692590	0.1598029	0.0539481	
precipitation__4	-0.0678055	0.1608185	0.0506729	
GDD10__45	-0.0673984	0.1634784	0.0494676	
GDD10__11	-0.0671702	0.1649831	0.0487950	
GDD10__5	-0.0666352	0.1685469	0.0472277	
precipitation__7	0.0660808	0.1722967	0.0456164	
GDD3__3	-0.0643578	0.1843152	0.0406953	
GDD5__3	-0.0621681	0.2003985	0.0346287	
GDH7__3	-0.0620815	0.2010531	0.0343932	
GDH5__3	-0.0620331	0.2014200	0.0342615	
GDH3__3	-0.0612532	0.2073899	0.0321561	
GDD3__12	0.0595118	0.2304308	0.0260598	
precipitation__10	-0.0574808	0.2379313	0.0223481	
GDH10__45	-0.0568094	0.2436582	0.0206679	
min__11	-0.0561678	0.2492135	0.0190808	
GDH10__5	-0.0555490	0.2546486	0.0175670	
GDH3__12	0.0555673	0.2640348	0.0159742	
max__3	-0.0543484	0.2654083	0.0146780	
GDH10__11	-0.0535828	0.2724192	0.0128684	
GDH7__5	-0.0509283	0.2976215	0.0067937	
GDD3__5	-0.0494003	0.3127583	0.0034369	
GDH5__5	-0.0493266	0.3134998	0.0032777	
GDH3__5	-0.0492515	0.3142573	0.0031154	
GDH7__123	-0.0491361	0.3154218	0.0028670	
GDD7__5	-0.0486300	0.3205635	0.0017834	
min__8	-0.0485504	0.3213767	0.0016140	
max__below__0__w	-0.0484716	0.3221825	0.0014467	
min__9	0.0476338	0.3308298	-0.0003164	
GDH7__45	-0.0475642	0.3315546	-0.0004616	
mean__11	-0.0473144	0.3341620	-0.0009804	
GDD7__3	-0.0468733	0.3387980	-0.0018903	
GDD5__5	-0.0468562	0.3389786	-0.0019254	

variable	estimate	p	adj.rsquare	sig
GDH5_123	-0.0465454	0.3422675	-0.0025609	
GDD5_123	-0.0464508	0.3432725	-0.0027535	
min_10	0.0458022	0.3502102	-0.0040637	
GDD7_45	-0.0457497	0.3507761	-0.0041691	
GDH10_3	-0.0451203	0.3575925	-0.0054215	
GDD3_123	-0.0440910	0.3689032	-0.0074320	
mean_5	-0.0433598	0.3770619	-0.0088322	
GDH10_9	0.0432237	0.3785922	-0.0090903	
GDD10_9	0.0429669	0.3814886	-0.0095750	
GDH5_45	-0.0425574	0.3861321	-0.0103418	
GDH7_9	0.0424844	0.3869637	-0.0104778	
max_2	0.0416964	0.3960005	-0.0119303	
GDH5_9	0.0414959	0.3983179	-0.0122955	
max34	-0.0414767	0.3985410	-0.0123305	
GDH3_9	0.0408688	0.4056166	-0.0134265	
GDD3_9	0.0406789	0.4078407	-0.0137656	
GDD5_9	0.0406789	0.4078407	-0.0137656	
GDD5_45	-0.0406724	0.4079177	-0.0137773	
GDD7_9	0.0402336	0.4130839	-0.0145546	
mean_9	0.0396060	0.4205347	-0.0156518	
GDH3_45	-0.0393287	0.4238498	-0.0161311	
GDH3_123	-0.0393240	0.4239057	-0.0161391	
GDH10_123	-0.0389657	0.4282105	-0.0167534	
GDD3_45	-0.0381175	0.4384930	-0.0181850	
max_10	0.0374218	0.4470246	-0.0193358	
mean_3	-0.0367122	0.4558145	-0.0204876	
FFD	0.0362201	0.4619630	-0.0212736	
prec456	-0.0360283	0.4643709	-0.0215770	
min45	-0.0357384	0.4680221	-0.0220325	
GDD3_10	0.0355902	0.4698955	-0.0222641	
GDD7_123	-0.0354477	0.4716985	-0.0224856	
mean_2	0.0352388	0.4743495	-0.0228090	
GDH3_34	-0.0345046	0.4837262	-0.0239303	
GDH3_10	0.0344851	0.4839768	-0.0239598	
max_5	-0.0341480	0.4883135	-0.0244663	
min_2	0.0341238	0.4886251	-0.0245025	
max_11	-0.0339896	0.4903586	-0.0247027	
GDD3_34	-0.0338871	0.4916835	-0.0248550	
max_b	-0.0337946	0.4928805	-0.0249921	
GDD7_11	-0.0335490	0.4960676	-0.0253543	
GDD3_123456	-0.0332578	0.4998588	-0.0257802	
GDH10_1	-0.0329672	0.5036567	-0.0262017	
GDH3_123456	-0.0323341	0.5119779	-0.0271069	
GDD7_1	-0.0317345	0.5199202	-0.0279481	
precipitation_11	-0.0317187	0.5201309	-0.0279701	
GDH5_123456	-0.0308598	0.5316100	-0.0291470	
max_9	0.0306050	0.5350384	-0.0294899	
precipitation_5	0.0303899	0.5379400	-0.0297772	
GDH5_34	-0.0301712	0.5408984	-0.0300672	
GDH3_11	-0.0300679	0.5422980	-0.0302034	
mean_10	0.0299387	0.5440511	-0.0303732	
precipitation_6	-0.0296752	0.5476356	-0.0307173	

variable	estimate	p	adj.rsquare	sig
GDD10_b	-0.0294240	0.5510620	-0.0310424	
GDD5_123456	-0.0290058	0.5567871	-0.0315774	
GDD5_34	-0.0280986	0.5692981	-0.0327117	
mean45	-0.0280341	0.5701923	-0.0327910	
max45	-0.0278793	0.5723403	-0.0329805	
GDH7_123456	-0.0275927	0.5763288	-0.0333287	
GDH3_b	-0.0274988	0.5776379	-0.0334420	
GDH7_34	-0.0269503	0.5853099	-0.0340959	
GDD3_11	-0.0269240	0.5856786	-0.0341269	
prec45	-0.0268083	0.5873032	-0.0342631	
GDH7_b	-0.0264388	0.5925034	-0.0346939	
GDH5_b	-0.0263907	0.5931813	-0.0347495	
GDH10_b	-0.0263259	0.5940955	-0.0348243	
mean34	-0.0262895	0.5946096	-0.0348662	
GDH5_10	0.0254311	0.6067833	-0.0358384	
max_12	0.0272997	0.5880136	-0.0360725	
mean_below_0_w	-0.0251651	0.6105769	-0.0361331	
GDD3_b	-0.0246679	0.6176921	-0.0366756	
GDD5_10	0.0243829	0.6217864	-0.0369818	
GDD7_123456	-0.0239552	0.6279500	-0.0374344	
GDD10_456	-0.0237078	0.6315268	-0.0376927	
GDD10_123456	-0.0231697	0.6393334	-0.0382450	
min_4	0.0230424	0.6411848	-0.0383738	
mean_b	-0.0227431	0.6455474	-0.0386738	
precipitation_b	0.0220405	0.6558340	-0.0393629	
GDH10_123456	-0.0218876	0.6580808	-0.0395100	
GDH5_11	-0.0216782	0.6611612	-0.0397097	
GDD5_b	-0.0216533	0.6615290	-0.0397333	
min_below_minus5_w	-0.0213724	0.6656703	-0.0399979	
GDH10_34	-0.0212926	0.6668493	-0.0400725	
GDD10_3	0.0206456	0.6764332	-0.0406667	
mean_below_minus5_w	-0.0205614	0.6776833	-0.0407426	
GDH7_456	-0.0203821	0.6803498	-0.0409034	
GDH5_456	-0.0201704	0.6835030	-0.0410914	
GDH3_456	-0.0201041	0.6844911	-0.0411498	
GDD7_456	-0.0200583	0.6851736	-0.0411901	
GDD3_456	-0.0199015	0.6875146	-0.0413273	
GDD7_b	-0.0198987	0.6875558	-0.0413297	
GDD5_456	-0.0198080	0.6889121	-0.0414086	
GDH10_456	-0.0195915	0.6921504	-0.0415954	
GDD10_123	0.0190626	0.7000832	-0.0420431	
min_3	-0.0185255	0.7081698	-0.0424851	
GDH7_11	-0.0184012	0.7100455	-0.0425856	
prec123456	-0.0182779	0.7119085	-0.0426847	
GDD7_34	-0.0182417	0.7124548	-0.0427136	
GDD5_11	-0.0174397	0.7246101	-0.0433402	
GDH5_8	-0.0170667	0.7302849	-0.0436220	
GDD3_8	-0.0170646	0.7303173	-0.0436236	
GDD5_8	-0.0170646	0.7303173	-0.0436236	
GDD7_8	-0.0170646	0.7303173	-0.0436236	
GDH3_8	-0.0170646	0.7303173	-0.0436236	
GDH7_8	-0.0170008	0.7312893	-0.0436712	

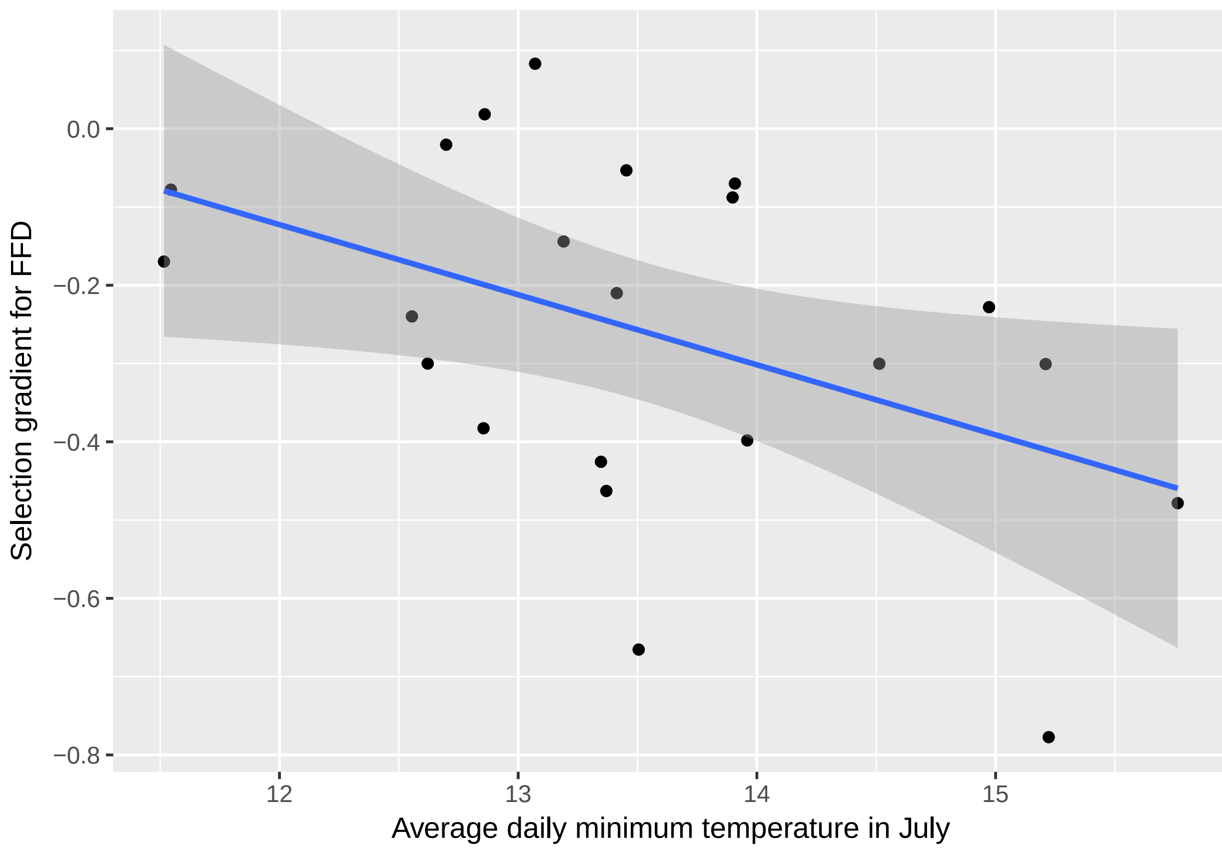
variable	estimate	p	adj.rsquare	sig
GDD10_8	-0.0169438	0.7321586	-0.0437136	
min456	-0.0168331	0.7338472	-0.0437955	
GDH10_8	-0.0166227	0.7370597	-0.0439496	
min_6	0.0165555	0.7380864	-0.0439984	
max_w	0.0157200	0.7508884	-0.0445889	
max456	-0.0149684	0.7624597	-0.0450940	
GDD5_1	-0.0148362	0.7644991	-0.0451802	
GDH3_1	-0.0147253	0.7662128	-0.0452520	
GDD3_1	-0.0144754	0.7700757	-0.0454118	
mean_6	0.0140247	0.7770564	-0.0456930	
prec34	0.0139954	0.7775105	-0.0457110	
mean_8	-0.0136444	0.7829606	-0.0459235	
precipitation_1	-0.0135409	0.7845688	-0.0459851	
GDH7_10	0.0127421	0.7970126	-0.0464448	
GDH5_6	0.0126452	0.7985258	-0.0464987	
mean456	-0.0125965	0.7992861	-0.0465256	
GDH3_6	0.0125592	0.7998694	-0.0465461	
GDD3_6	0.0125578	0.7998912	-0.0465469	
GDD5_6	0.0125578	0.7998912	-0.0465469	
GDH7_6	0.0123173	0.8036507	-0.0466779	
GDD7_6	0.0122518	0.8046752	-0.0467131	
GDD10_6	0.0108735	0.8263048	-0.0474111	
precipitation_9	-0.0108500	0.8266749	-0.0474223	
GDH10_6	0.0104689	0.8326767	-0.0476001	
GDD7_2	0.0097905	0.8433860	-0.0479011	
mean_w	0.0092922	0.8512685	-0.0481093	
max_6	0.0092679	0.8516538	-0.0481192	
min34	-0.0083883	0.8656025	-0.0484592	
GDH10_4	-0.0082788	0.8673415	-0.0484992	
GDH5_1	-0.0082122	0.8684006	-0.0485233	
max123456	-0.0079406	0.8727181	-0.0486193	
mean_12	0.0133528	0.7916555	-0.0486700	
GDD7_10	0.0076113	0.8779579	-0.0487315	
min_w	0.0073619	0.8819293	-0.0488133	
GDH7_1	-0.0067227	0.8921203	-0.0490104	
GDH3_2	0.0066046	0.8940045	-0.0490448	
min123	0.0063473	0.8981128	-0.0491178	
max_8	0.0055287	0.9111991	-0.0493307	
GDD5_2	0.0052944	0.9149482	-0.0493862	
mean_4	0.0048943	0.9213555	-0.0494755	
min_b	-0.0047861	0.9230889	-0.0494984	
max_below_minus5_w	0.0043794	0.9296086	-0.0495800	
GDD10_2	0.0042108	0.9323122	-0.0496117	
max_4	-0.0041174	0.9338113	-0.0496288	
GDH10_10	0.0039381	0.9366880	-0.0496604	
GDD10_4	-0.0035882	0.9423029	-0.0497181	
prec123	0.0033180	0.9466417	-0.0497589	
mean123456	-0.0032389	0.9479120	-0.0497703	
min_1	-0.0030677	0.9506617	-0.0497939	
min_below_0_w	-0.0028497	0.9541638	-0.0498222	
max123	-0.0028463	0.9542188	-0.0498226	
max_1	0.0028424	0.9542812	-0.0498231	

variable	estimate	p	adj.rsquare	sig
GDH7_2	0.0022515	0.9637797	-0.0498890	
GDH10_2	0.0019574	0.9685075	-0.0499161	
min123456	0.0019022	0.9693949	-0.0499208	
GDD10_34	0.0017056	0.9725570	-0.0499363	
mean_1	-0.0015349	0.9753036	-0.0499484	
GDD7_4	-0.0015144	0.9756334	-0.0499498	
GDH7_4	-0.0013673	0.9779995	-0.0499591	
GDD3_4	0.0010941	0.9823950	-0.0499738	
GDD3_2	0.0007393	0.9881037	-0.0499880	
GDH3_4	0.0007343	0.9881835	-0.0499882	
mean123	0.0006385	0.9897250	-0.0499911	
GDD5_4	-0.0005709	0.9908122	-0.0499929	
GDH5_4	0.0005324	0.9914318	-0.0499938	
GDD10_10	0.0004712	0.9924166	-0.0499951	
GDH5_2	0.0001102	0.9982260	-0.0499997	
min_12	0.0024277	0.9617287	-0.0525006	

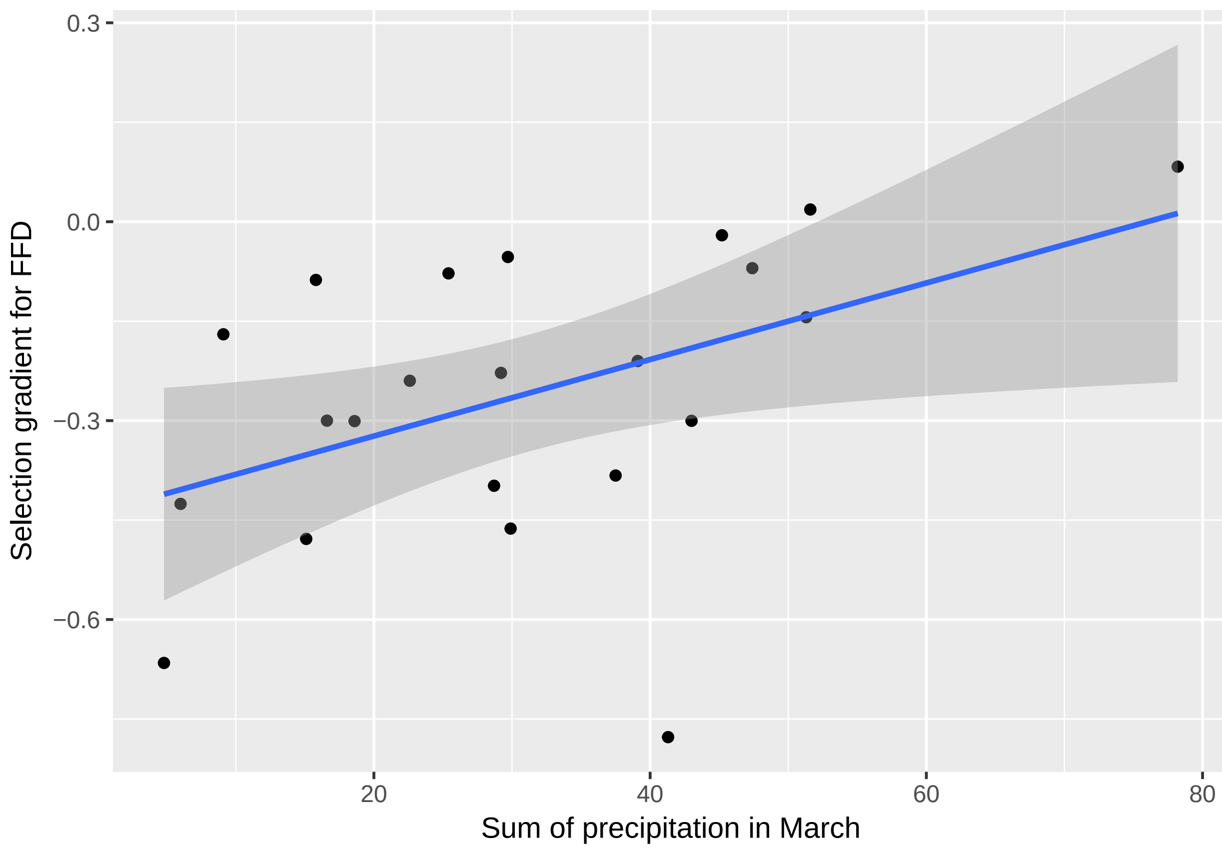
```
#Only precipitation in March and several temperature variables in July are significant
kable(arrange(subset(models_selgrads,sig=="*"),desc(adj.rsquare)))
```

variable	estimate	p	adj.rsquare	sig
precipitation_3	0.1026375	0.0277854	0.1806719	*
min_7	-0.0995303	0.0335745	0.1669169	*
GDD10_7	-0.0944955	0.0449306	0.1455261	*
GDD3_7	-0.0944955	0.0449306	0.1455261	*
GDD5_7	-0.0944955	0.0449306	0.1455261	*
GDD7_7	-0.0944955	0.0449306	0.1455261	*
GDH3_7	-0.0944955	0.0449306	0.1455261	*
GDH5_7	-0.0944955	0.0449306	0.1455261	*
GDH7_7	-0.0944955	0.0449306	0.1455260	*
GDH10_7	-0.0944700	0.0449948	0.1454206	*
mean_7	-0.0933955	0.0477686	0.1410002	*

```
ggplot(data_sel_agg,aes(min_7,selgradFFD))+geom_point()+geom_smooth(method="lm")+
  xlab("Average daily minimum temperature in July")+ylab("Selection gradient for FFD")
```




```
ggplot(data_sel_agg,aes(precipitation_3,selgradFFD))+geom_point()+geom_smooth(method="lm")+
  xlab("Sum of precipitation in March")+ylab("Selection gradient for FFD")
```




```r
#Model with the two best variables: precipitation in March and average daily minimum temp in July
summary(lm(selgradFFD~scale(min_7)+scale(precipitation_3),data=data_sel_agg)) #36% variance explained
```

```
##
## Call:
## lm(formula = selgradFFD ~ scale(min_7) + scale(precipitation_3),
##     data = data_sel_agg)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.42640 -0.03884  0.01495  0.09910  0.29138
##
## Coefficients:
##                        Estimate Std. Error t value Pr(>|t|)
## (Intercept)            -0.25870    0.03742  -6.913 1.36e-06 ***
## scale(min_7)           -0.09770    0.03831  -2.550   0.0196 *
## scale(precipitation_3)  0.10086    0.03831   2.633   0.0164 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1755 on 19 degrees of freedom
## Multiple R-squared:  0.4187, Adjusted R-squared:  0.3575
## F-statistic: 6.842 on 2 and 19 DF,  p-value: 0.005781
```

How are yearly selection gradients linked to mean FFD?

```r
summary(lm(selgradFFD~FFD,data=data_sel_agg)) #No effect of mean FFD
```

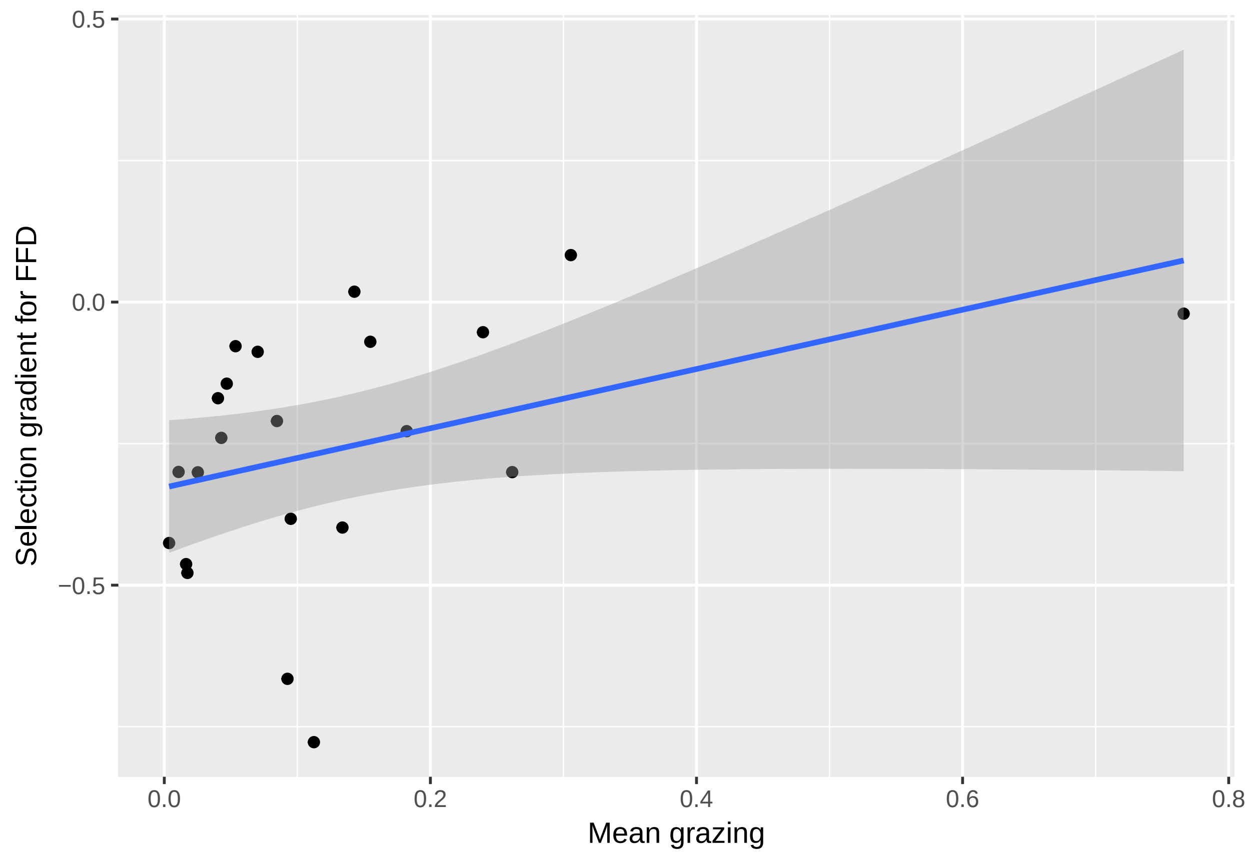
```
##
## Call:
## lm(formula = selgradFFD ~ FFD, data = data_sel_agg)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.49381 -0.15306  0.01658  0.15444  0.37351
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.615286   0.477752  -1.288    0.212
## FFD          0.006147   0.008196   0.750    0.462
##
## Residual standard error: 0.2213 on 20 degrees of freedom
## Multiple R-squared:  0.02736,    Adjusted R-squared:  -0.02127
## F-statistic: 0.5626 on 1 and 20 DF,  p-value: 0.462
```

How are yearly selection gradients linked to intensity of grazing?

```r
data_sel_agg<-merge(data_sel_agg,aggregate(grazing~year,data_sel,FUN=mean))
#Added mean grazing per year
summary(lm(selgradFFD~grazing,data=data_sel_agg)) #p=0.0691
```

```
##
## Call:
## lm(formula = selgradFFD ~ grazing, data = data_sel_agg)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.50852 -0.10838  0.01792  0.15651  0.27128
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.32770    0.05676  -5.773  1.2e-05 ***
## grazing      0.52373    0.27261   1.921   0.0691 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2062 on 20 degrees of freedom
## Multiple R-squared:  0.1558, Adjusted R-squared:  0.1136
## F-statistic: 3.691 on 1 and 20 DF,  p-value: 0.06908
```

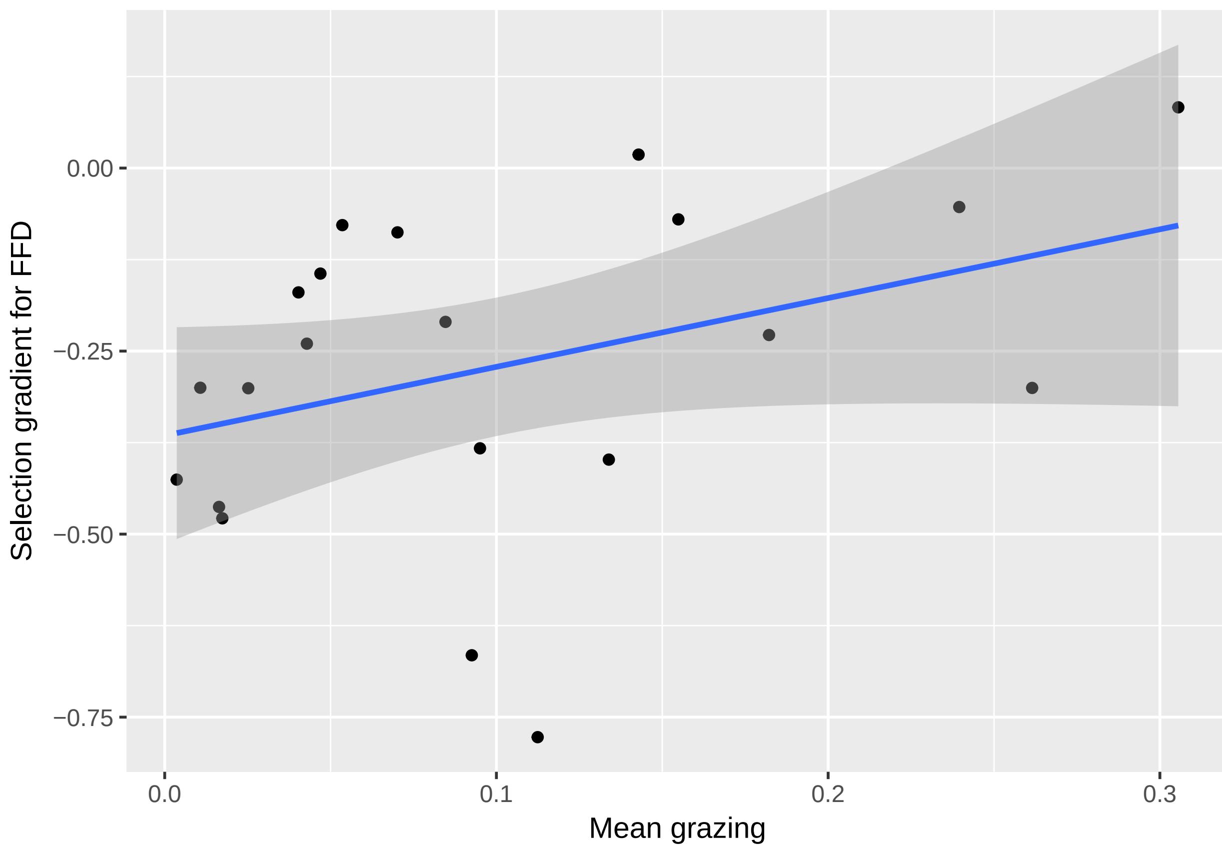
```r
ggplot(data_sel_agg,aes(grazing,selgradFFD))+geom_point()+geom_smooth(method="lm")+
  xlab("Mean grazing")+ylab("Selection gradient for FFD")
```




```
summary(lm(selgradFFD~grazing,data=subset(data_sel_agg,year<2017))) #Removing 2017, worse p=0.0948
```

```
##
## Call:
## lm(formula = selgradFFD ~ grazing, data = subset(data_sel_agg,
##     year < 2017))
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.51753 -0.11281  0.05529  0.15775  0.24963
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) -0.36541    0.07059  -5.176 5.37e-05 ***
## grazing      0.93920    0.53414   1.758   0.0948 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2071 on 19 degrees of freedom
## Multiple R-squared:  0.1399, Adjusted R-squared:  0.09468
## F-statistic: 3.092 on 1 and 19 DF,  p-value: 0.09479
```

```
ggplot(subset(data_sel_agg,year<2017),aes(grazing,selgradFFD))+geom_point()+geom_smooth(method="lm")+
  xlab("Mean grazing")+ylab("Selection gradient for FFD")
```




```
#No effect of grazing (or very low effect?)
```

How are yearly selection gradients linked to seed predation?

```
data_sel$n_pred_seeds<-with(data_sel,n_seeds-n_intact_seeds)
data_sel$prop_pred_seeds<-with(data_sel,
        ifelse(n_seeds==n_intact_seeds,0,
               (data_sel$n_seeds-data_sel$n_intact_seeds)/data_sel$n_seeds))
data_sel_agg<-merge(data_sel_agg,aggregate(prop_pred_seeds~year,data_sel,FUN=mean))
data_sel_agg<-merge(data_sel_agg,aggregate(n_pred_seeds~year,data_sel,FUN=mean))
data_sel_agg<-merge(data_sel_agg,aggregate(n_seeds~year,data_sel,FUN=mean))

#Added mean seed predation (proportion and n of predated seeds) per year
summary(lm(selgradFFD~prop_pred_seeds,data=data_sel_agg)) #NS
```

```
##
## Call:
## lm(formula = selgradFFD ~ prop_pred_seeds, data = data_sel_agg)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.57632 -0.08899  0.03364  0.16258  0.27384
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)     -0.17942    0.07286  -2.463    0.023 *
## prop_pred_seeds -0.39737    0.28453  -1.397    0.178
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2142 on 20 degrees of freedom
## Multiple R-squared:  0.08885,    Adjusted R-squared:  0.0433
## F-statistic:  1.95 on 1 and 20 DF,  p-value: 0.1779
```

```r
summary(lm(selgradFFD~n_pred_seeds,data=data_sel_agg)) #NS
```

```
##
## Call:
## lm(formula = selgradFFD ~ n_pred_seeds, data = data_sel_agg)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -0.5493 -0.1217  0.0331  0.1795  0.3079
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -0.22390    0.06804  -3.291  0.00365 **
## n_pred_seeds -0.01187    0.01669  -0.711  0.48529
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2216 on 20 degrees of freedom
## Multiple R-squared:  0.02465,    Adjusted R-squared:  -0.02411
## F-statistic: 0.5055 on 1 and 20 DF,  p-value: 0.4853
```

How are yearly selection gradients linked to seed predation and fruit/seed set? …

…

Effects of climatic variables on seed predation and grazing

```r
summary(lm(prop_pred_seeds~scale(min_7)+scale(precipitation_3),data=data_sel_agg)) #35% variance explai
```

```
##
## Call:
## lm(formula = prop_pred_seeds ~ scale(min_7) + scale(precipitation_3),
##     data = data_sel_agg)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.233455 -0.066442 -0.003553  0.098957  0.229543
##
## Coefficients:
##                        Estimate Std. Error t value Pr(>|t|)
## (Intercept)             0.19952    0.02814   7.090 9.59e-07 ***
## scale(min_7)            0.08201    0.02881   2.847   0.0103 *
## scale(precipitation_3) -0.06558    0.02881  -2.276   0.0346 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.132 on 19 degrees of freedom
## Multiple R-squared:  0.4159, Adjusted R-squared:  0.3544
## F-statistic: 6.763 on 2 and 19 DF,  p-value: 0.006053
```

```r
summary(glm(prop_pred_seeds~scale(min_7)+scale(precipitation_3),data=data_sel_agg,
            family="binomial")) #Both NS
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial
## glm!
```

```
##
## Call:
## glm(formula = prop_pred_seeds ~ scale(min_7) + scale(precipitation_3),
##     family = "binomial", data = data_sel_agg)
##
## Deviance Residuals:
##      Min        1Q    Median        3Q       Max
## -0.62131  -0.22492  -0.05323   0.18527   0.62304
##
## Coefficients:
##                         Estimate Std. Error z value Pr(>|z|)
## (Intercept)              -1.5222     0.5949  -2.559   0.0105 *
## scale(min_7)              0.4980     0.5476   0.909   0.3631
## scale(precipitation_3)  -0.4827     0.6536  -0.738   0.4603
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 3.7085  on 21  degrees of freedom
## Residual deviance: 2.2066  on 19  degrees of freedom
## AIC: 17.233
##
## Number of Fisher Scoring iterations: 5
```

```r
NagelkerkeR2(glm(prop_pred_seeds~scale(min_7)+scale(precipitation_3),data=data_sel_agg,
            family="binomial")) #But 43% variance explained (?)
```

```
## Warning in eval(family$initialize): non-integer #successes in a binomial
## glm!
```

```
## $N
## [1] 22
##
## $R2
## [1] 0.4253988
```

```r
summary(lm(grazing~scale(min_7)+scale(precipitation_3),data=data_sel_agg)) #16% variance explained
```

```
##
## Call:
## lm(formula = grazing ~ scale(min_7) + scale(precipitation_3),
##     data = data_sel_agg)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.17827 -0.06812 -0.03834  0.01570  0.56402
##
## Coefficients:
##                          Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)             0.131744   0.032250   4.085 0.000631 ***
## scale(min_7)           -0.009886   0.033014  -0.299 0.767851
## scale(precipitation_3)  0.080049   0.033014   2.425 0.025462 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1513 on 19 degrees of freedom
## Multiple R-squared:  0.2399, Adjusted R-squared:  0.1599
## F-statistic: 2.999 on 2 and 19 DF,  p-value: 0.07383
```

```
#Do binomial!
```