

# Lathyrus ms3: Selective agents

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## Data preparation

Load data, keep variables needed and merge

```
data_selag<-read.table("C:/Users/user/Dropbox/SU/Projects/lathyrus/lathyrus_ms1/data/clean/alldata_weathl  
mean_weather<-read.table("C:/Users/user/Dropbox/SU/Projects/lathyrus/lathyrus_ms1/data/clean/mean_weathl
```

```
data_selag<-data_selag[c(1:7,9:10,12,14:15,17:18,21,22)]  
data_selag$n_fl<-data_selag$cum_n_fl  
data_selag$cum_n_fl<-NULL  
mean_weather<-mean_weather[c(1,115:118)]  
data_selag<-merge(data_selag,mean_weather,by="year")%>%  
  arrange(.,id)  
  
data_selag<-anti_join(data_selag,subset(data_selag,is.na(FFD)&is.na(grazing)&  
  is.na(shoot_vol)&is.na(n_fr)&is.na(n_ovules)&  
  is.na(n_seeds)&is.na(n_intact_seeds)&  
  is.na(n_fl))) # Remove rows with all these NAs  
data_selag<-subset(data_selag,year!=1995) # Remove data from 1995 because of problems with predation  
names(data_selag)
```

##	[1]	"year"	"FFD"	"id"	"ruta"
##	[5]	"genet"	"data"	"vernal"	"grazing"
##	[9]	"shoot_vol"	"n_fr"	"n_ovules"	"FFD_corr"
##	[13]	"period"	"n_seeds"	"n_intact_seeds"	"n_fl"
##	[17]	"mean_3"	"mean_4"	"mean_5"	"mean_6"

List of variables in data set:

- year
- FFD: first flowering date (as number of days from vernal equinox)
- id: individual identifier (including “old” for individuals in period 1987-1996 and “new” for individuals in period 2006-2017)
- ruta, genet: identifiers for plots and ids in old data
- data: 1 if data available, 0 if not
- vernal: date of vernal equinox in each year
- grazing: proportion of grazing by deer
- shoot\_vol: shoot volume

- n\_fr: number of fruits
- n\_ovules: number of ovules
- FFD\_corr: first flowering date (as a date)
- period: "old" for 1987-1996 and "new" for 2006-2017
- n\_seeds: number of seeds
- n\_intact\_seeds: number of intact (non-predated) seeds
- n\_fl: number of flowers
- mean\_3/4/5/6: average of daily mean temperatures for March/April/May/June

Interactions that we will focus on:

- Pollination: number of seeds per flower
- Seed predation: proportion of seeds escaping predation
- Grazing (by deer) before flowering: proportion of grazing

Calculate fruit set, seed set, number of seeds per fruit, number of seeds per flower, proportion of predated seeds

```
data_selag<-data_selag%>%
  mutate(fruit_set=n_fr/n_fl,seed_set=ifelse(fruit_set==0,0,n_seeds/n_ovules),
         n_seeds_per_fr=ifelse(fruit_set==0,0,n_seeds/n_fr),
         n_seeds_per_fl=n_seeds/n_fl,
         prop_seeds_esc=ifelse(n_seeds==0,NA,1-((n_seeds-n_intact_seeds)/n_seeds)),
         prop_pred_seeds=ifelse(n_seeds==0,NA,(n_seeds-n_intact_seeds)/n_seeds),
         n_pred_seeds=n_seeds-n_intact_seeds)
```

Using only mean temperatures. Using grazing as a proportion, and for 2008-2015 use values of proportion of aboveground volume. - 1987-1996: grazing = proportion of flowers removed - 2006: grazing = proportion of grazed shoots - 2007-2015: grazing = proportion of aboveground volume removed - 2016-2017: grazing = proportion of flowers removed

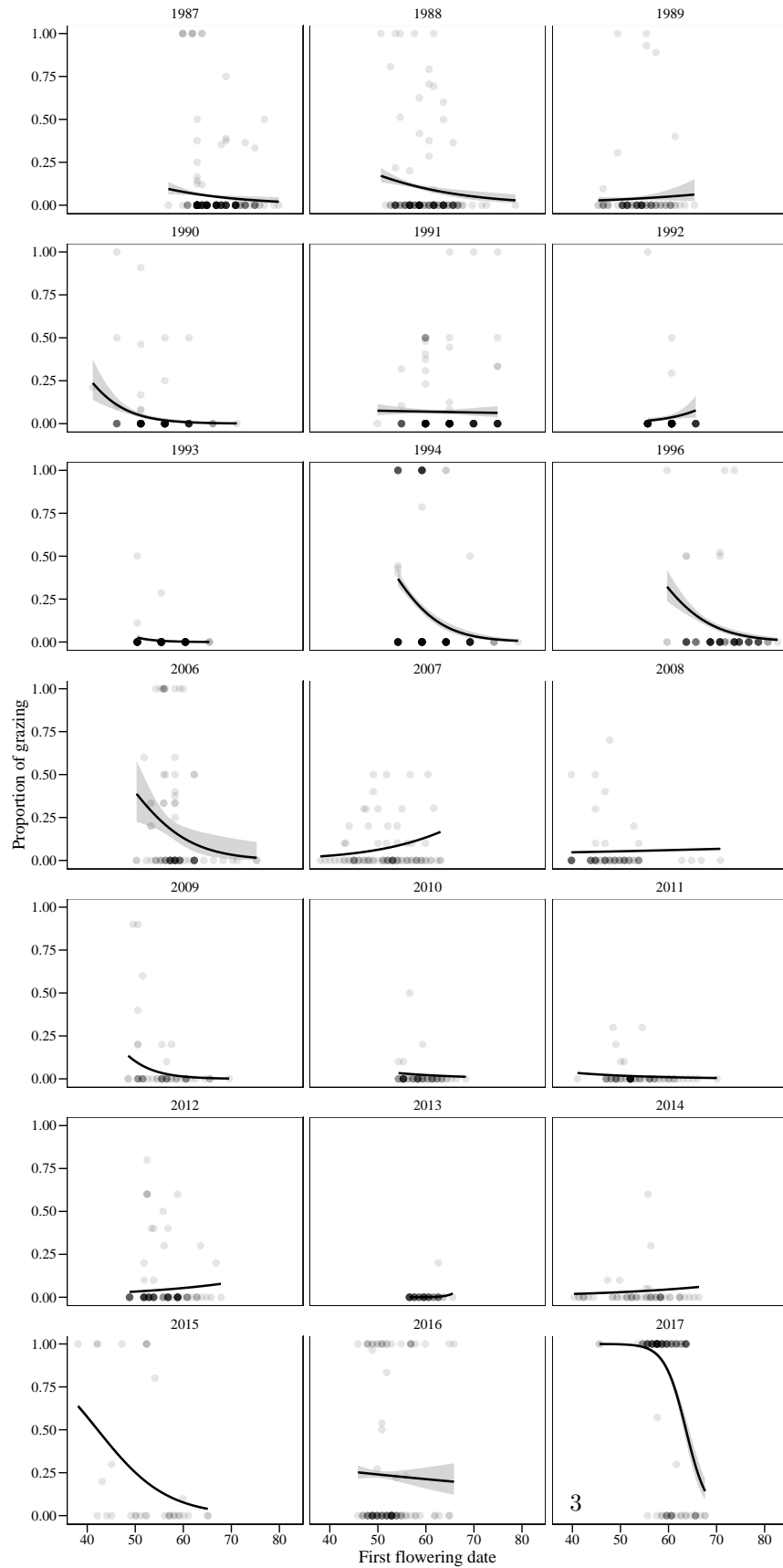
Calculate successes/failures for grazing

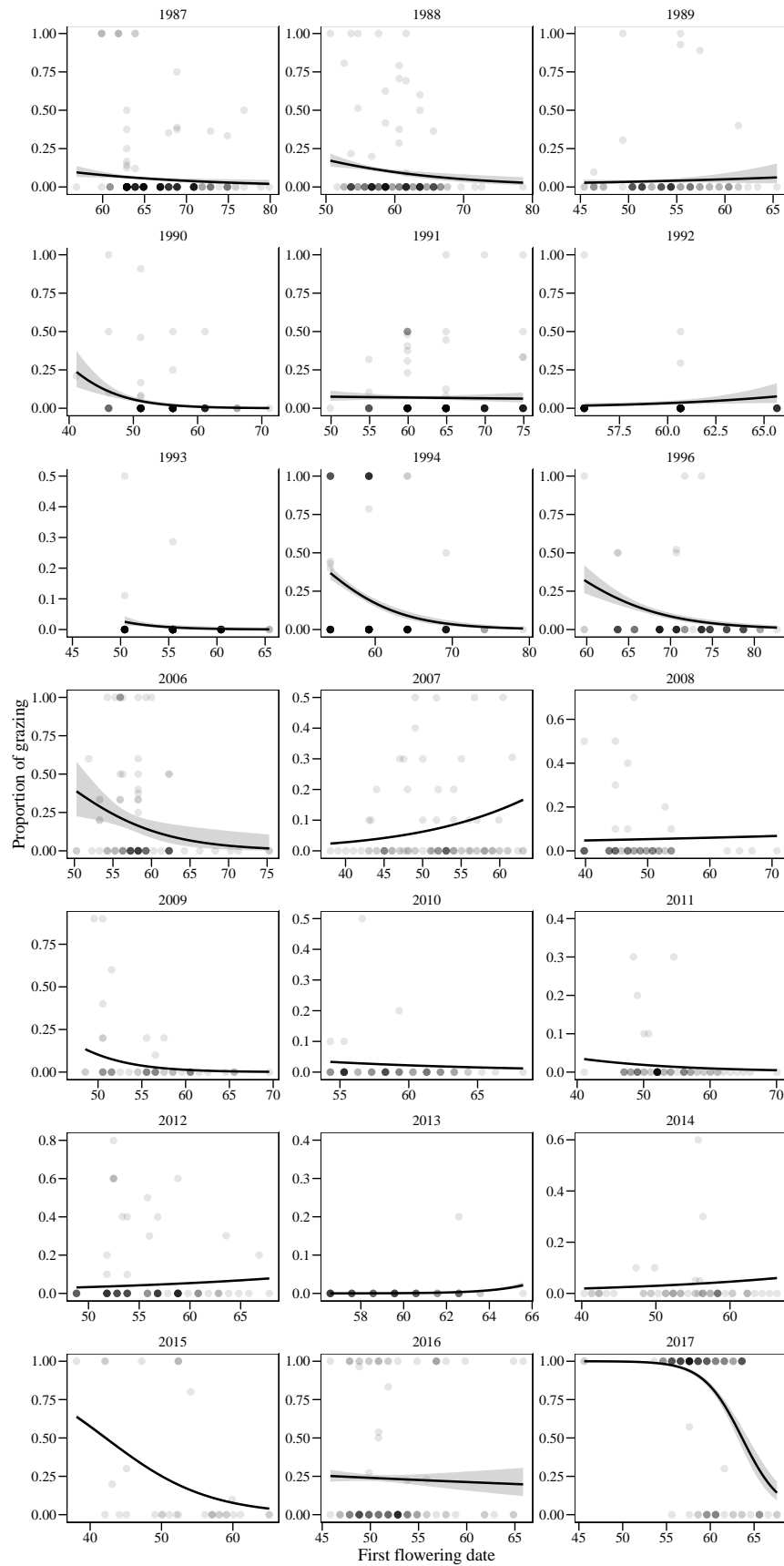
```
data_selag$grazing_success<-round(with(data_selag,ifelse(is.na(grazing_corr),NA,
                                                         ifelse(year<1997|year>2015,grazing_corr*n_fl,
                                                         ifelse(year>2006&year<2016,grazing_corr*shoot_vol,
                                                         999))))))
data_selag$grazing_failure<-round(with(data_selag,ifelse(is.na(grazing_corr),NA,
                                                         ifelse(year<1997|year>2015,n_fl-grazing_success,
                                                         ifelse(year>2006&year<2016,
                                                         shoot_vol-grazing_success,
                                                         999))))))

grazing_success_2006<-read.table(
  "C:/Users/user/Dropbox/SU/Projects/lathyrus/lathyrus_ms3/data/grazing_success_2006.csv",
  header=T,sep=" ",dec=".")
data_selag<-data_selag%>%
  left_join(grazing_success_2006)
data_selag$grazing_success<-with(data_selag,ifelse(year==2006,gr_success,grazing_success))
data_selag$grazing_failure<-with(data_selag,ifelse(year==2006,gr_failure,grazing_failure))
data_selag$gr_success<-NULL
data_selag$gr_failure<-NULL
```

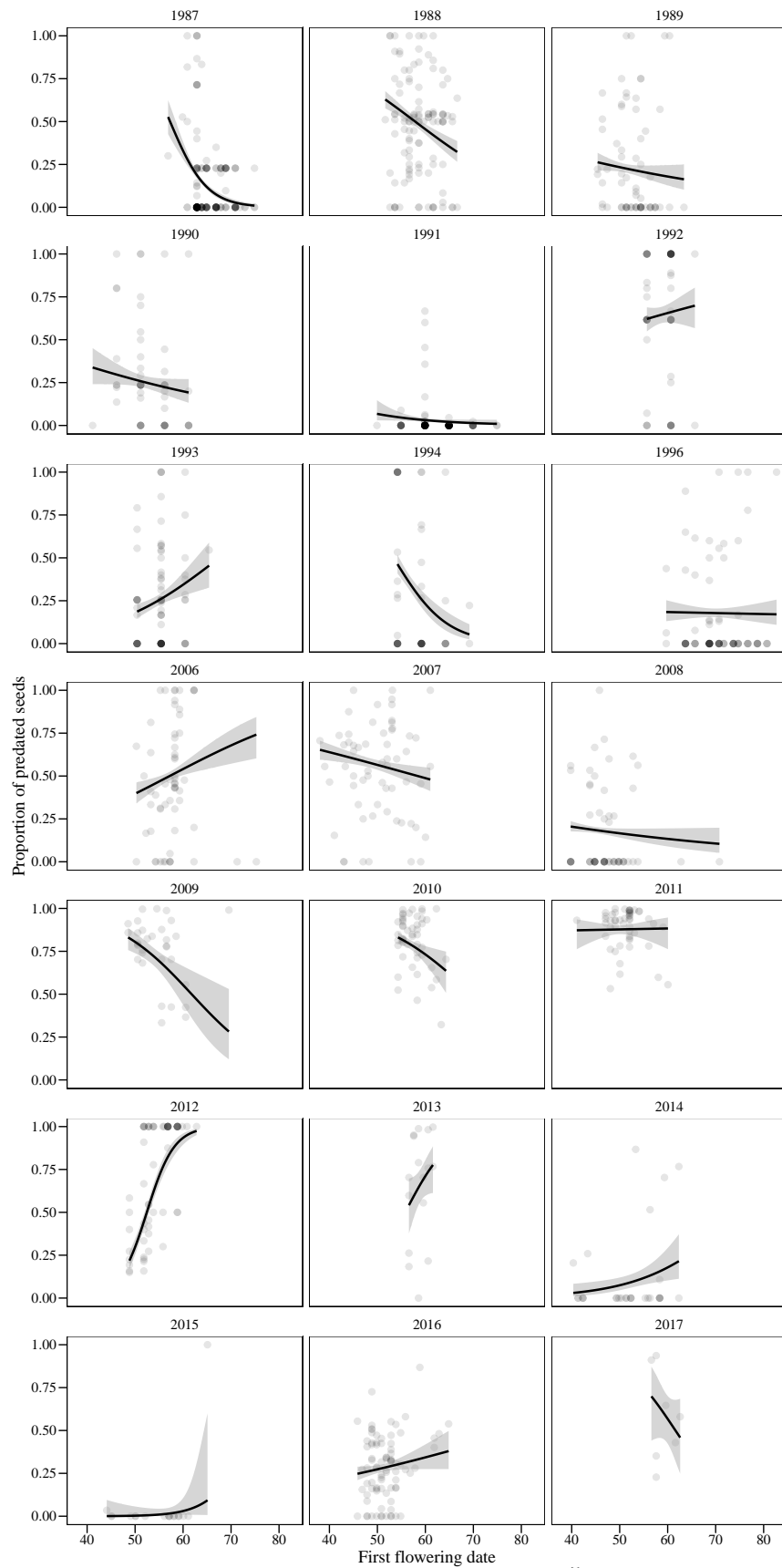
# 1. Raw relationships interactions ~ FFD in different years

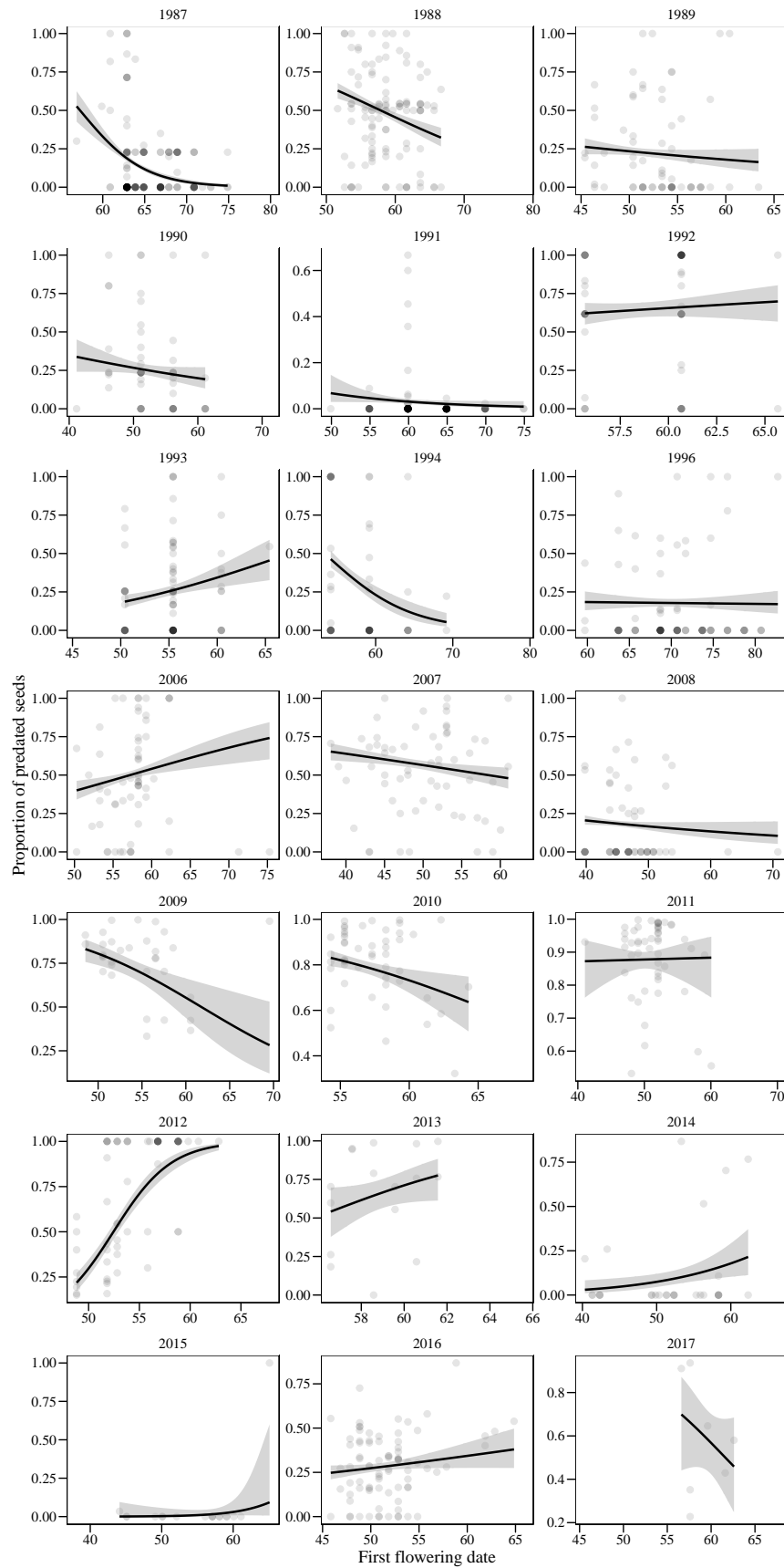
## Grazing





## Proportion of predated seeds





## Number of seeds per flower

