2018 Generation 1 Report

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Load data

```
setwd("../")
samplerec<-read.delim("data-raw/GrENE-net_records_sheet1.tsv",fill=T)
demorec<-read.delim("data-raw/GrENE-net_records_sheet2.tsv",fill=T)
sitesinfo<-read.delim("data-raw/GrENE-sites_info - Participants.tsv",fill=T) %>%
  dplyr::filter(NAME!="Moises Exposito-Alonso") %>%
  dplyr::filter(NAME!="Marcelo Sternberg")
```

```
## Warning: package 'bindrcpp' was built under R version 3.4.4
```

```
sitesinfo$NAME<-fc(sitesinfo$NAME)
sitesinfo$LATITUDE
```

```
##  [1] 36.76582 40.54497 41.60969 38.89410 44.97399 47.44977 48.40516
##  [8] 30.85642 49.76498 44.02960       NA 52.08991 48.54149 43.63755
## [15] 44.22528 41.12862 30.28450 40.86150 30.38770       NA 37.04162
## [22] 37.11193 58.25900 36.00143 53.24126 39.66653 46.52226 51.39560
## [29] 52.93864 60.69552 50.00171 52.21383 39.08300 62.39463 40.33413
## [36] 52.40000 47.69210 51.39183 51.49691 50.92540 45.91696 60.30133
## [43] 45.03643 50.95696 41.78861 44.43126 38.54490
```

```
rownames(sitesinfo)<-sitesinfo$SITE_CODE

samplerec$NAME<-sitesinfo[samplerec$Site,"NAME"]
samplerec$LONGITUDE<-sitesinfo[samplerec$Site,"LONGITUDE"]
samplerec$LATITUDE<-sitesinfo[samplerec$Site,"LATITUDE"]

demorec$NAME<-sitesinfo[demorec$Site,"NAME"]
demorec$LONGITUDE<-sitesinfo[demorec$Site,"LONGITUDE"]
demorec$LATITUDE<-sitesinfo[demorec$Site,"LATITUDE"]


samplerec$D<- paste0(substr(samplerec$Date,1,4), "-",
                     substr(samplerec$Date,5,6), "-",
                     substr(samplerec$Date,7,8)
                     )
samplerec$D<- as.Date(samplerec$D)
```

```
## Warning in strptime(xx, f <- "%Y-%m-%d", tz = "GMT"): unknown timezone
## 'zone/tz/2018e.1.0/zoneinfo/Europe/Berlin'
```

```
demorec$D<- paste0(substr(demorec$Date,1,4), "-",
                     substr(demorec$Date,5,6), "-",
                     substr(demorec$Date,7,8)
                     )
demorec$D<- as.Date(demorec$D)
```

Successful sites

```
head(sitesinfo)
```

```
##                         NAME
## 4             Xavier Pic\x97
## 5       Carlos Alonso-Blanco
## 6              Arnald Marcer
## 11            Felix Fritschi
## 23              Peter Tiffin
## 24 Remco Stam, Alex Kutschera
##                                                                                DIARY
## 4  https://drive.google.com/drive/folders/0B4f3N5Tpiv57ZGo5dUNFbXVyV3c?usp=sharing
## 5  https://drive.google.com/drive/folders/0B4f3N5Tpiv57bTFwWEF5RUVjZ1k?usp=sharing
## 6  https://drive.google.com/drive/folders/0B4f3N5Tpiv57MjdsOVNPem1RMWc?usp=sharing
## 11 https://drive.google.com/drive/folders/0B4f3N5Tpiv57QjlZR1pvZ0RCRXc?usp=sharing
## 23 https://drive.google.com/drive/folders/0B4f3N5Tpiv57WlRzMG1RazV0N3M?usp=sharing
## 24 https://drive.google.com/drive/folders/0B4f3N5Tpiv57dnRPWldHVmQ0Z2c?usp=sharing
##    SITE_CODE                  EMAIL
## 4          4      xpico@ebd.csic.es
## 5          5    calonso@cnb.csic.es
## 6          6  arnald.marcer@uab.cat
## 11        11 fritschif@missouri.edu
## 23        23        ptiffin@umn.edu
## 24        24      remco.stam@tum.de
##                                       EMAIL_2
## 4
## 5                            bmendez@cnb.csic.es
## 6
## 11 mjs258@missouri.edu, mcbwb7@mail.missouri.edu;
## 23           burgharl@gmail.com; gorto019@umn.edu
## 24                     alexander.kutschera@tum.de
##                          COLLABORATOR
## 4        Roc\x92o G\x97mez, David Ragel
## 5                  Belen M\x8endez-Vigo
## 6
## 11 associated with Juenger field trials
## 23       Liana Burghardt; Amanda Gorton
## 24                       Alex Kutschera
##
## 4                                                                                Estaci\x97n Biol\
## 5  Carlos Alonso-Blanco\nCentro Nacional de Biotecnolog\x92a. Dpt Gen\x8etica Molecular de Plantas.
## 6                                                                 Edifici C, Campus UAB\nUniversitat Aut\
## 11
## 23
## 24
##             PACKAGE_SENT. PACKAGE_RECEIVED STARTED_EXPERIMENT
## 4                     yes              yes          8.11.2017
## 5                     yes              yes          2.11.2017
## 6                     yes              yes          2.11.2017
## 11                    yes              yes         15.11.2017
## 23 yes, seeds and loggers              yes         23.10.2017
## 24                    yes              yes         21.10.2017
##    X2018_SAMPLES
```

```
## 4
## 5
## 6
## 11
## 23
## 24
##                                                          SITE_NAME
## 4         El Castillejo Botanical Garden, Grazalema National Park
## 5                     National Center of Biotechnology (CNB-CSIC)
## 6  CREAF - Center for Ecological and Forest Applications Research
## 11              University of Missouri, Bradford Research Center
## 23                                       University of Minnesota
## 24                                      Brixen im Thale, Austria
##     LONGITUDE LATITUDE ALTITUDE
## 4   -5.497633 36.76582      329
## 5    3.689585 40.54497      709
## 6    2.171589 41.60969      164
## 11 -92.204800 38.89410
## 23 -93.227728 44.97399
## 24  12.251309 47.44977     1400
##                                            TIME_ZONE
## 4  (UTC+01:00) Bruselas, Copenhague, Madrid, Par\x92s
## 5  (UTC+01:00) Bruselas, Copenhague, Madrid, Par\x92s
## 6  (UTC+01:00) Bruselas, Copenhague, Madrid, Par\x92s
## 11                                             UTC-5
## 23                                             UTC+5
## 24                                               GMT
##                EXPECTED_SOWING ACCESS_SOIL
## 4               Early November         Yes
## 5           2th November, 2017         Yes
## 6  November 2, 16 and 30, 2017         Yes
## 11              Early November         yes
## 23                    Oct 23rd         yes
## 24                late october         yes
##
## 4  http://www.brill-substrate.com/en/professional_substrates/propagation_substrates/propagation_subs
## 5                                                                                                BRIL
## 6                                                                                                BRIL
## 11                                                                  Sungro horticulture professional gr
## 23                                                                                               sunsh
## 24
##                          IBUTON_READER NUMBER_OF_SITES
## 4                                   No               1
## 5                                   no               1
## 6  Received July 11th, 2018. Thank you               1
## 11                                 Yes               1
## 23               no (but have reader)               1
## 24                                  no               1
##                                                  NOTES
## 4
## 5
## 6  Experiment already started, setup and sown Nov. 2, 2017
## 11
## 23
```

```
## 24
##    Pathogen.sampling
## 4                  Y
## 5                  Y
## 6                  Y
## 11                 Y
## 23                 Y
## 24                 Y
```

```
head(samplerec)
```

```
##      X Site                                        Plot     Date
## 1 SOIL   55 from the soil bag while filling the trays 20170927
## 2 SOIL   27 from the soil bag after filling the trays 20170930
## 3 SOIL    5     from soil bag while filling the trays 20171002
## 4 SOIL   56 from the soil bag after filling the trays 20171005
## 5 SOIL   52          from soil bag when filling trays 20171010
## 6 SOIL   53           from bag at start of experiment 20171010
##          Sample_id Number_flowers_collected Comments           NAME
## 1 SOIL-55-20170927                       na                   <NA>
## 2 SOIL-27-20170930                       na          Jake Alexander
## 3  SOIL-5-20171102                       na            Peter Tiffin
## 4 SOIL-56-20171005                                           <NA>
## 5 SOIL-52-20171010                       na                   <NA>
## 6 SOIL-53-20171010                     <NA>                   <NA>
##    LONGITUDE LATITUDE          D
## 1         NA       NA 2017-09-27
## 2   6.576619 46.52226 2017-09-30
## 3 -93.227728 44.97399 2017-10-02
## 4         NA       NA 2017-10-05
## 5         NA       NA 2017-10-10
## 6         NA       NA 2017-10-10
```

```
samplerec %>%
  dplyr::filter(grepl("FH",Sample_id)) %>%
  dplyr::select(Site)  %>%
  unique() %>%  fn %>%
  length
```

```
## [1] 22
```

```
samplerec %>%
  dplyr::filter(grepl("SOIL",Sample_id)) %>%
  dplyr::select(Site)  %>%
  unique() %>%  fn %>%
  length
```

```
## [1] 27
```

```
head(demorec)
```

```
##   Site Plot     Date    Record_id Diagonal_plant_number
## 1    5    1 20180321 5-1-20180321                    50
## 2    5    2 20180321 5-2-20180321                    40
## 3    5    3 20180321 5-3-20180321                    52
## 4    5    4 20180321 5-4-20180321                    45
## 5    5    5 20180321 5-5-20180321                    67
```

```
## 6    5    6 20180321 5-6-20180321                    50
##   Off.diagonal_plant_number Total_plant_number.optional.
## 1                        37
## 2                        49
## 3                        48
## 4                        55
## 5                        58
## 6                        43
##   Mean.fruits.per.plant SD.fruits.per.plant
## 1                    NA                  NA
## 2                    NA                  NA
## 3                    NA                  NA
## 4                    NA                  NA
## 5                    NA                  NA
## 6                    NA                  NA
##                                                                                                                       Comm
## 1 The two cohorts of germination very clear with small and large plants. See pictures from the same
## 2 The two cohorts of germination very clear with small and large plants. See pictures from the same
## 3 The two cohorts of germination very clear with small and large plants. See pictures from the same
## 4 The two cohorts of germination very clear with small and large plants. See pictures from the same
## 5 The two cohorts of germination very clear with small and large plants. See pictures from the same
## 6 The two cohorts of germination very clear with small and large plants. See pictures from the same
##          NAME LONGITUDE LATITUDE          D
## 1 Peter Tiffin -93.22773 44.97399 2018-03-21
## 2 Peter Tiffin -93.22773 44.97399 2018-03-21
## 3 Peter Tiffin -93.22773 44.97399 2018-03-21
## 4 Peter Tiffin -93.22773 44.97399 2018-03-21
## 5 Peter Tiffin -93.22773 44.97399 2018-03-21
## 6 Peter Tiffin -93.22773 44.97399 2018-03-21
```

```
demorec %>%
  dplyr::select(Site)  %>%
  unique() %>%  fn %>%
  length
```

```
## [1] 20
```

```
dplyr::filter(sitesinfo, SITE_CODE %in%
setdiff(fn(sitesinfo$SITE_CODE),
        fn((samplerec %>%
          dplyr::filter(grepl("FH",Sample_id)) %>%
          dplyr::select(Site) %>% unique)
        ))
) %>%
  dplyr::select(NAME)
```

```
##                    NAME
## 1   Carlos Alonso-Blanco
## 2           Peter Tiffin
## 3           Merav Seifan
## 4       John Stinchcombe
## 5       John Stinchcombe
## 6           Rob Colautti
## 7           Steve Franks
## 8           Steve Franks
```

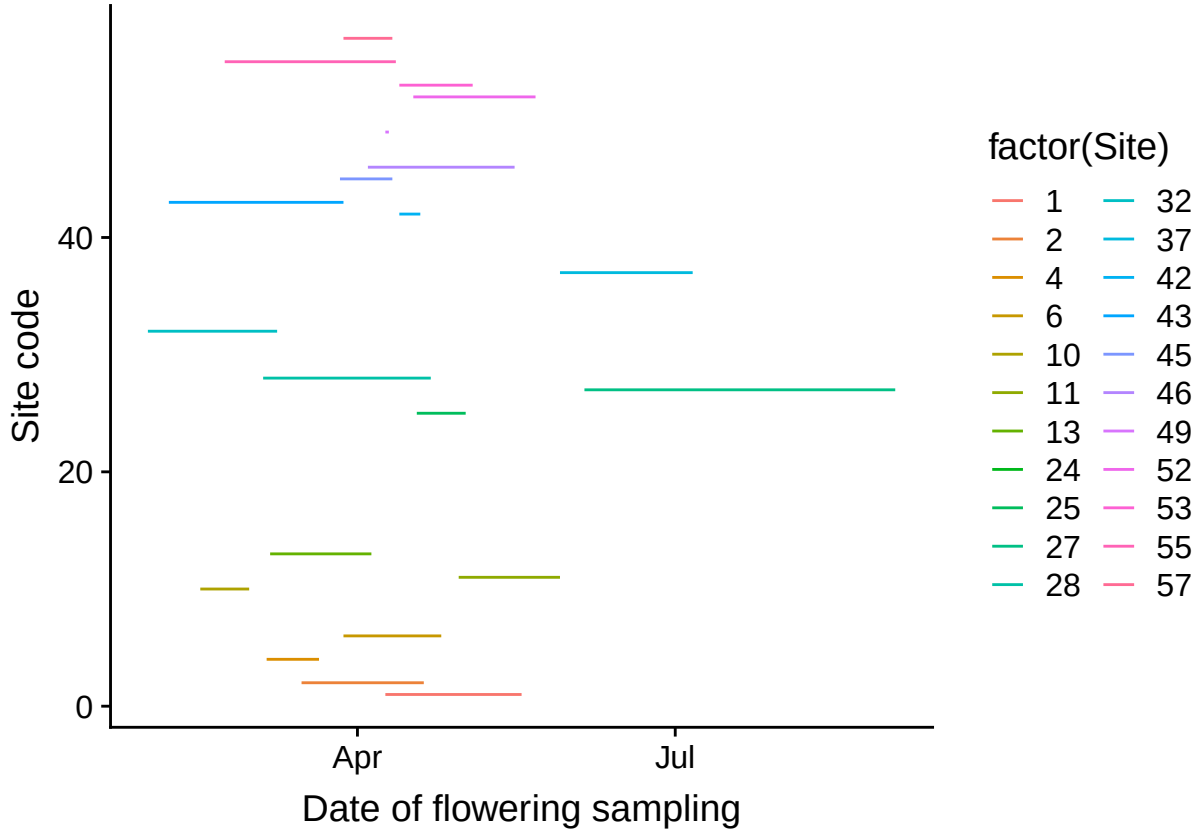
```
## 9           Jasmin Joshi
## 10     Mohamed Abdelaziz
## 11     Mohamed Abdelaziz
## 12        Martijn Herber
## 13        Jake Alexander
## 14           Paula Kover
## 15            David Salt
## 16 Zuzana M\x9fnzbergova
## 17           Svante Holm
## 18           Karin Koehl
## 19     Juliette de Meaux
## 20            Anne Muola
## 21    Jean-Gabriel Valay
## 22        Angela Hancock
## 23         Joy Bergelson
## 24          Steve Keller
## 25         Annie Schmitt
```

```
dplyr::filter(sitesinfo, SITE_CODE %in%
setdiff(fn(sitesinfo$SITE_CODE),
        fn((demorec %>%
          dplyr::select(Site) %>% unique)
        ))
) %>%
  dplyr::select(NAME)
```

```
##                         NAME
## 1               Peter Tiffin
## 2  Remco Stam, Alex Kutschera
## 3  Remco Stam, Alex Kutschera
## 4               Merav Seifan
## 5            John Stinchcombe
## 6            John Stinchcombe
## 7                Rob Colautti
## 8               Steve Franks
## 9                Tom Juenger
## 10              Steve Franks
## 11               Tom Juenger
## 12              Jasmin Joshi
## 13         Mohamed Abdelaziz
## 14         Mohamed Abdelaziz
## 15            Martijn Herber
## 16            Jake Alexander
## 17               Paula Kover
## 18                David Salt
## 19      Zuzana M\x9fnzbergova
## 20               Svante Holm
## 21               Karin Koehl
## 22                Anne Muola
## 23        Jean-Gabriel Valay
## 24            Angela Hancock
## 25             Joy Bergelson
## 26              Steve Keller
## 27             Annie Schmitt
```

Flowering times, demographic time

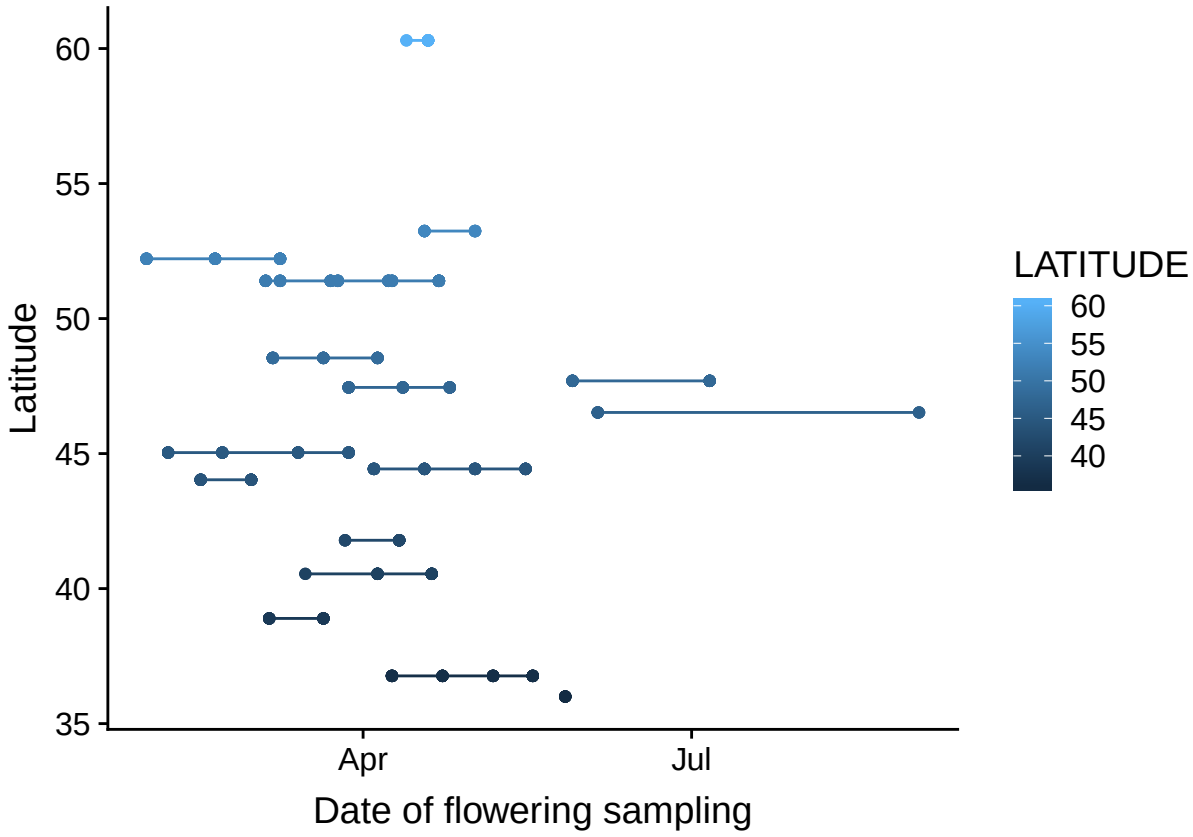
```
samplerec %>%
  dplyr::filter(grepl("FH",Sample_id)) %>%
  ggplot(aes(y=Site, x=D, color=factor(Site))
         ) + geom_line()+
  ylab("Site code")+ xlab("Date of flowering sampling")
```




```
samplerec %>%
  dplyr::filter(grepl("FH",Sample_id)) %>%
  ggplot(aes(y=LATITUDE, x=D, color=LATITUDE,group=Site)
         ) +
  geom_line()+
  geom_point()+
  ylab("Latitude")+ xlab("Date of flowering sampling")
```

```
## Warning: Removed 157 rows containing missing values (geom_path).
```

```
## Warning: Removed 157 rows containing missing values (geom_point).
```




```
lm(fn(samplerec$D - as.Date("2018-01-01")) ~ samplerec$LATITUDE) %>%
  summary
```

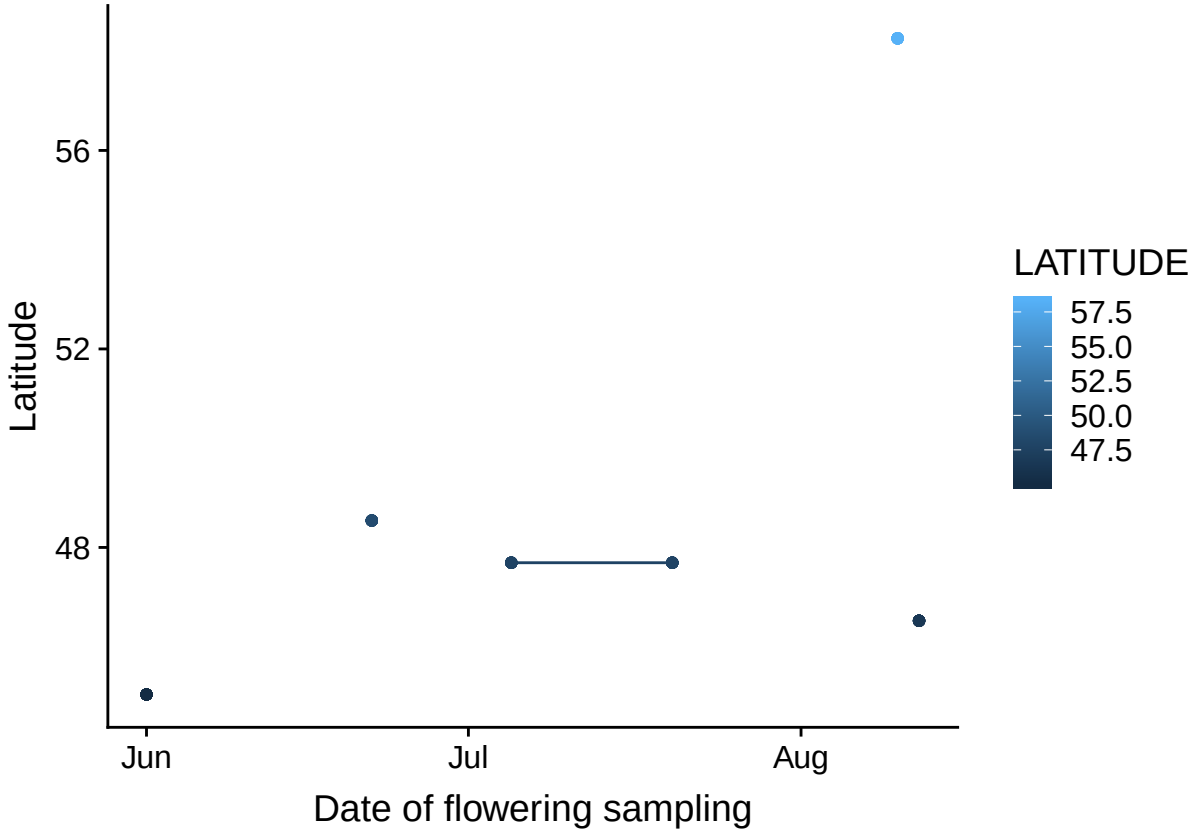
```
##
## Call:
## lm(formula = fn(samplerec$D - as.Date("2018-01-01")) ~ samplerec$LATITUDE)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -195.274  -29.356   -2.791   29.757  141.726
##
## Coefficients:
##                    Estimate Std. Error t value Pr(>|t|)
## (Intercept)         73.5182    19.1700   3.835 0.000139 ***
## samplerec$LATITUDE   0.6181     0.4098   1.508 0.132000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 55.04 on 580 degrees of freedom
##   (200 observations deleted due to missingness)
## Multiple R-squared:  0.003907,   Adjusted R-squared:  0.00219
## F-statistic: 2.275 on 1 and 580 DF,  p-value: 0.132
```

```
samplerec %>%
  dplyr::filter(grepl("SB",Sample_id)) %>%
  ggplot(aes(y=LATITUDE, x=D, color=LATITUDE,group=Site)
         ) +
  geom_line()+
```

```
  geom_point()+
  ylab("Latitude")+ xlab("Date of flowering sampling")
```

```
## Warning: Removed 12 rows containing missing values (geom_path).
```

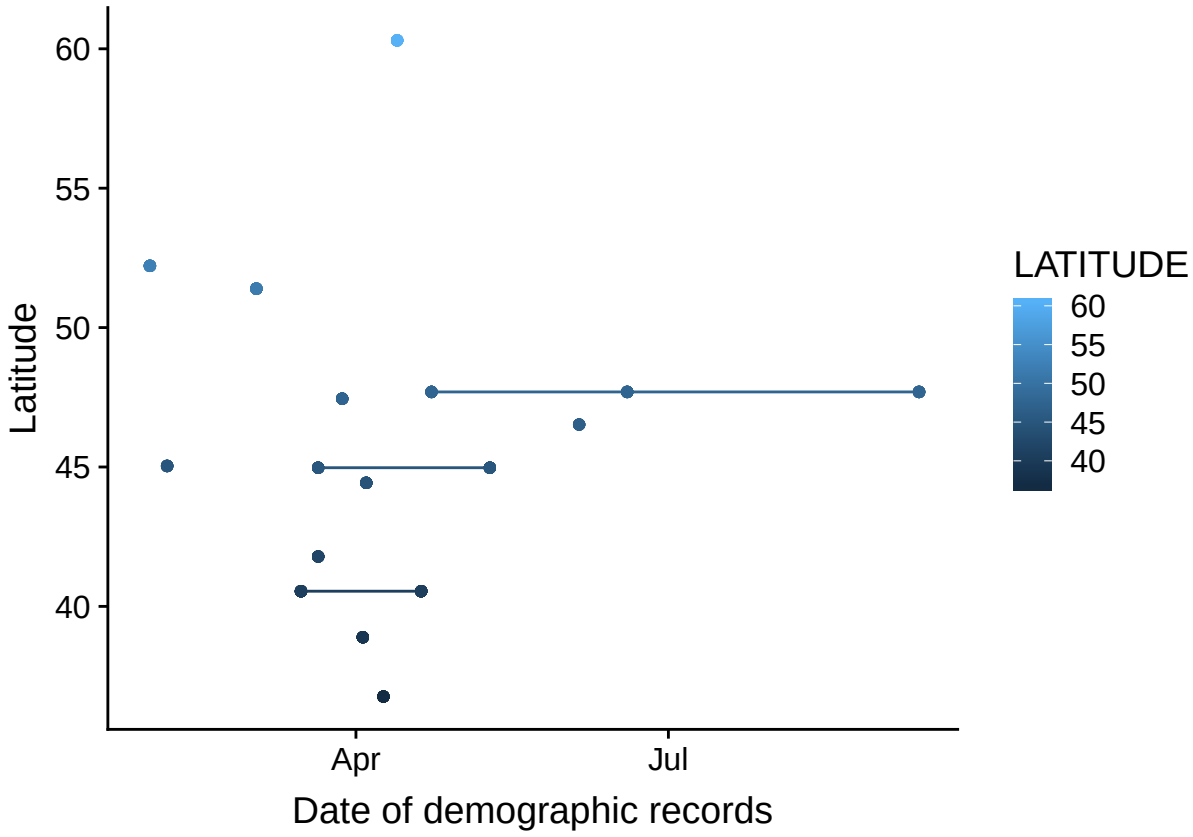
```
## Warning: Removed 12 rows containing missing values (geom_point).
```




```
demorec %>%
  ggplot(aes(y=LATITUDE, x=D, color=LATITUDE,group=Site)
  # ggplot(aes(y=LONGITUDE, x=D, color=LONGITUDE,group=Site)
        ) +
  geom_line()+
  geom_point()+
  ylab("Latitude")+ xlab("Date of demographic records")
```

```
## Warning: Removed 120 rows containing missing values (geom_path).
```

```
## Warning: Removed 120 rows containing missing values (geom_point).
```




```
lm(fn(demorec$D - as.Date("2018-01-01")) ~ demorec$LATITUDE) %>%
  summary
```

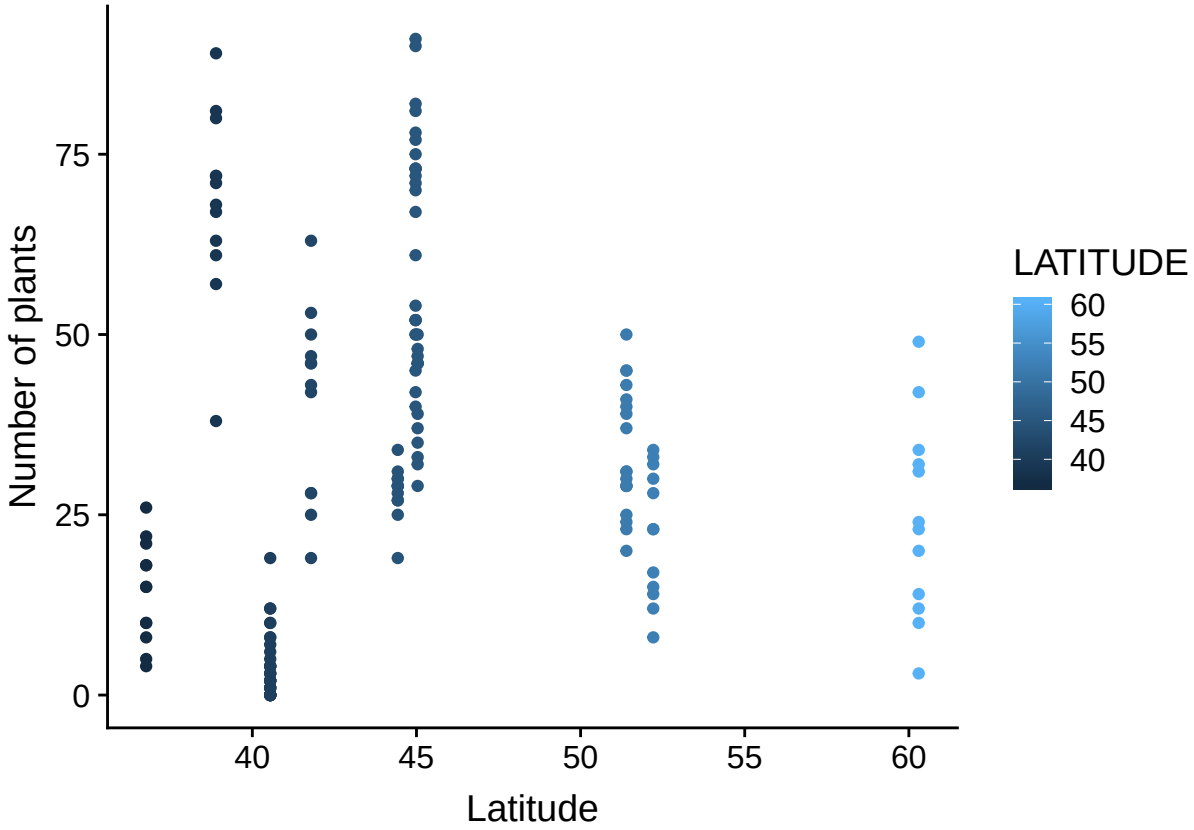
```
##
## Call:
## lm(formula = fn(demorec$D - as.Date("2018-01-01")) ~ demorec$LATITUDE)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -70.85 -25.94  -7.24  11.51 153.51
##
## Coefficients:
##                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)       96.77683   28.51930   3.393 0.000822 ***
## demorec$LATITUDE  0.07795    0.62008   0.126 0.900079
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 50.1 on 215 degrees of freedom
##   (120 observations deleted due to missingness)
## Multiple R-squared:  7.35e-05,   Adjusted R-squared:  -0.004577
## F-statistic: 0.0158 on 1 and 215 DF,  p-value: 0.9001
```

```
demorec %>%
  ggplot(aes(x=LATITUDE, y=fn(Diagonal_plant_number), color=LATITUDE,group=Site)
         ) +
  geom_point()+
  xlab("Latitude")+ ylab("Number of plants")
```

```
## Warning in unlist(as.numeric(as.matrix(data.frame))): NAs introduced by
## coercion
```

```
## Warning in unlist(as.numeric(as.matrix(data.frame))): NAs introduced by
## coercion
```

```
## Warning: Removed 175 rows containing missing values (geom_point).
```




```
lm(data=na.omit(dplyr::select(demorec,Diagonal_plant_number,LATITUDE)),
               fn(Diagonal_plant_number) ~ poly(LATITUDE,2)) %>%
  summary()
```

```
## Warning in unlist(as.numeric(as.matrix(data.frame))): NAs introduced by
## coercion
```

```
##
## Call:
## lm(formula = fn(Diagonal_plant_number) ~ poly(LATITUDE, 2), data = na.omit(dplyr::select(demorec,
##     Diagonal_plant_number, LATITUDE)))
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -30.432 -17.664  -5.201  12.533  64.049
##
## Coefficients:
##                     Estimate Std. Error t value Pr(>|t|)
## (Intercept)           34.057      1.899  17.937  < 2e-16 ***
## poly(LATITUDE, 2)1    26.126     23.814   1.097  0.27426
## poly(LATITUDE, 2)2 -101.486     26.237  -3.868  0.00016 ***
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 23.23 on 159 degrees of freedom
##   (55 observations deleted due to missingness)
## Multiple R-squared:  0.08863,    Adjusted R-squared:  0.07716
## F-statistic: 7.731 on 2 and 159 DF,  p-value: 0.0006249
```