```
library(tidyverse)
source("scripts/functions.R")
df <- read.csv("data/main.csv")
set.seed(12042014)
```

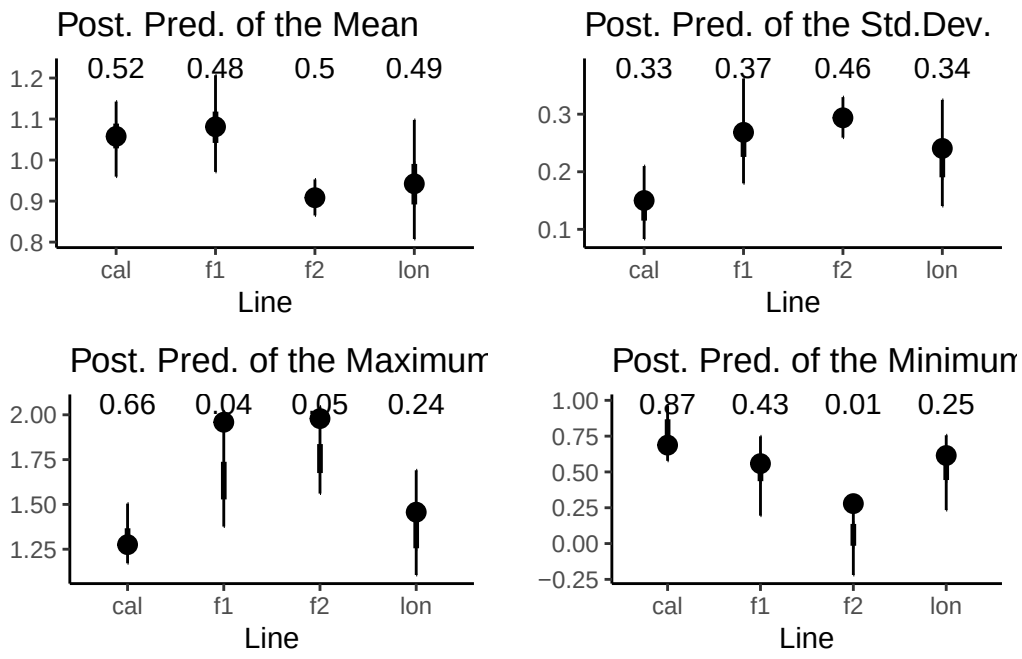
The Bayesian Bootstrap

$$w \sim Dirichlet(\alpha)$$
$$\mu = \sum_{i=1}^{n} w_i x_i$$
$$\sigma = \sqrt{\sum_{i=1}^{n} w_i (x_i - \sum_{i=1}^{n} w_i x_i)^2}$$

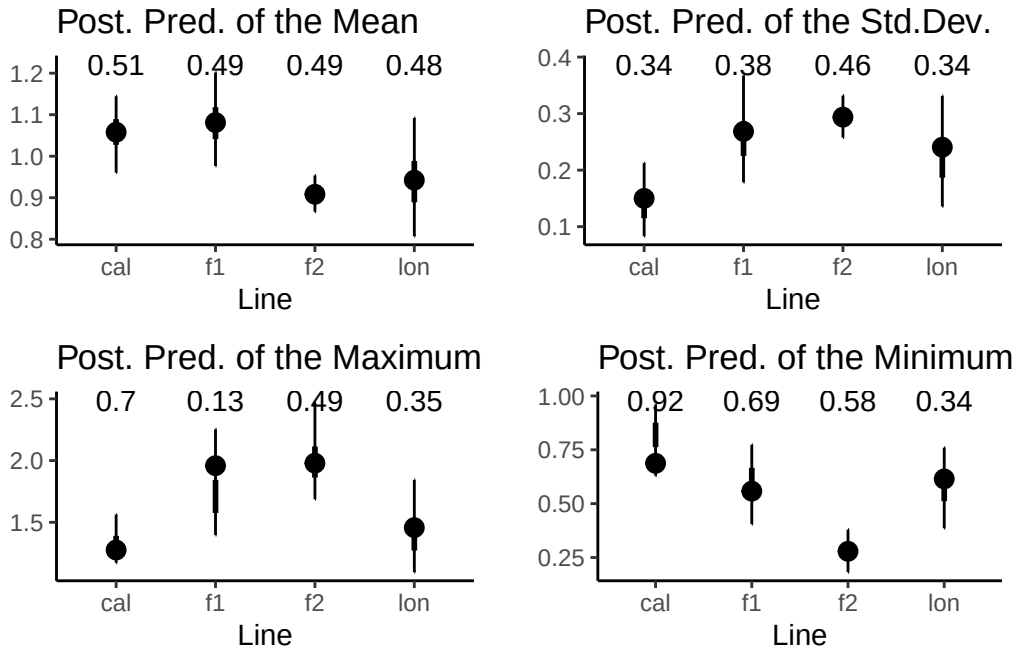
Posterior Predictive Checks

1DAG

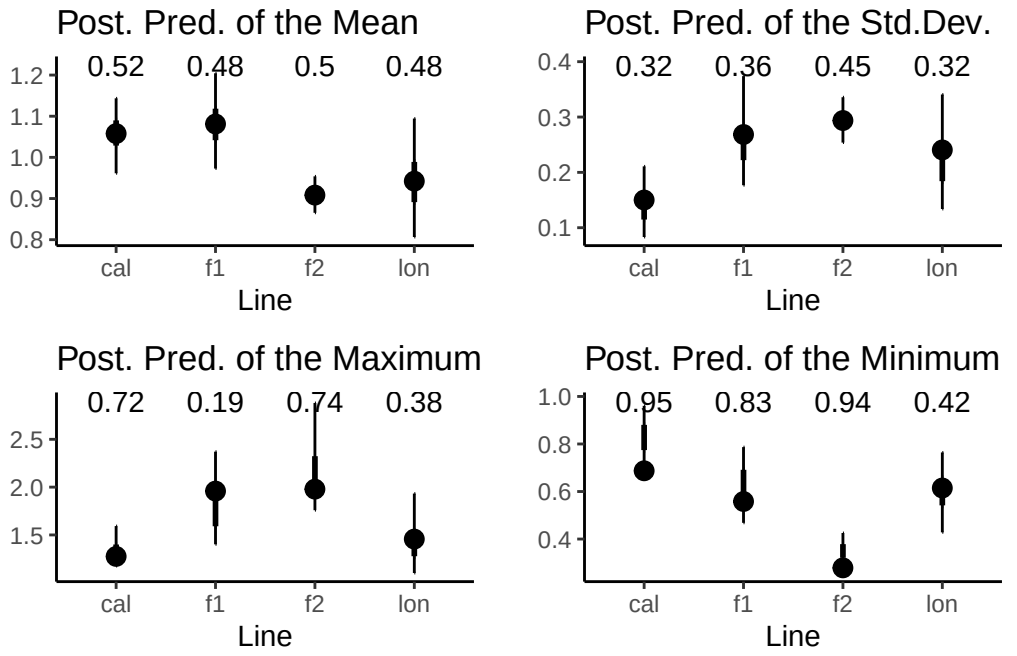
```
post_pred_check(df, "day_4", lik = "normal")
```



```
post_pred_check(df, "day_4", lik = "gamma")
```

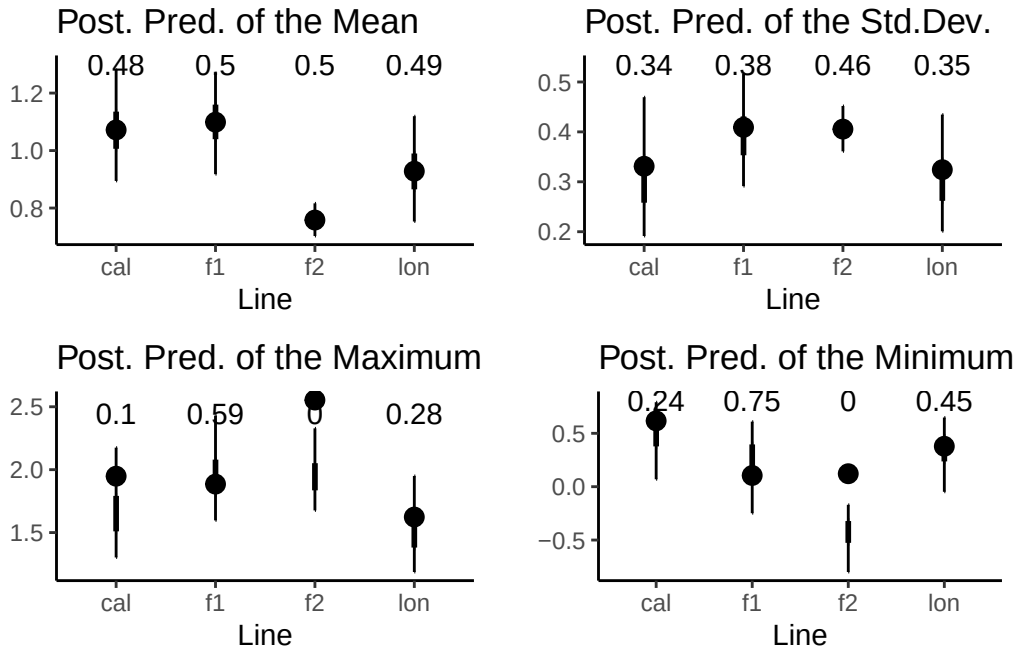



```
post_pred_check(df, "day_4", lik = "log-normal")
```

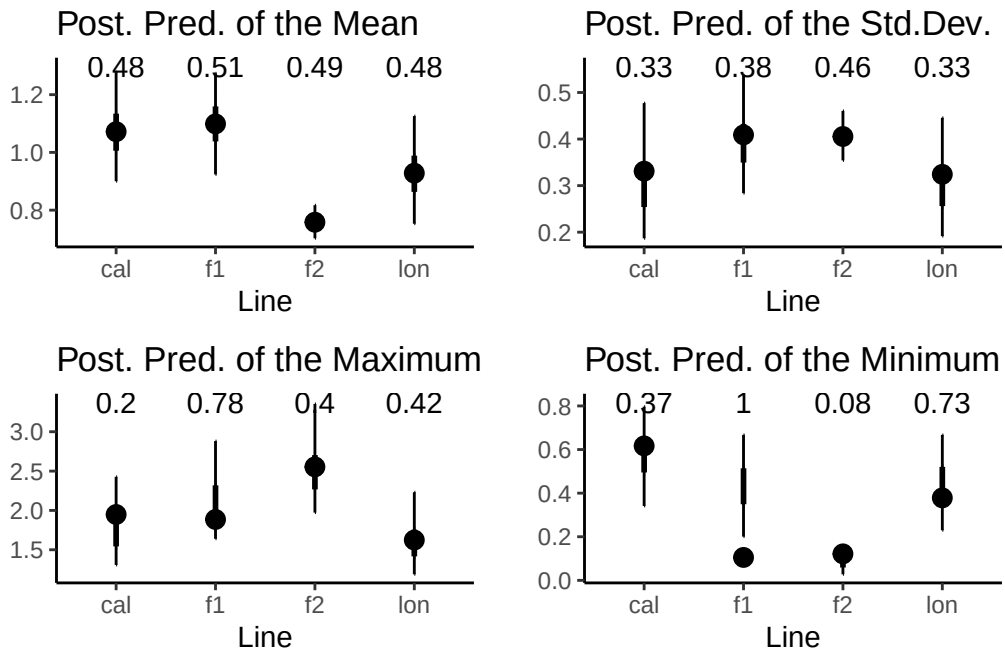


14DAG

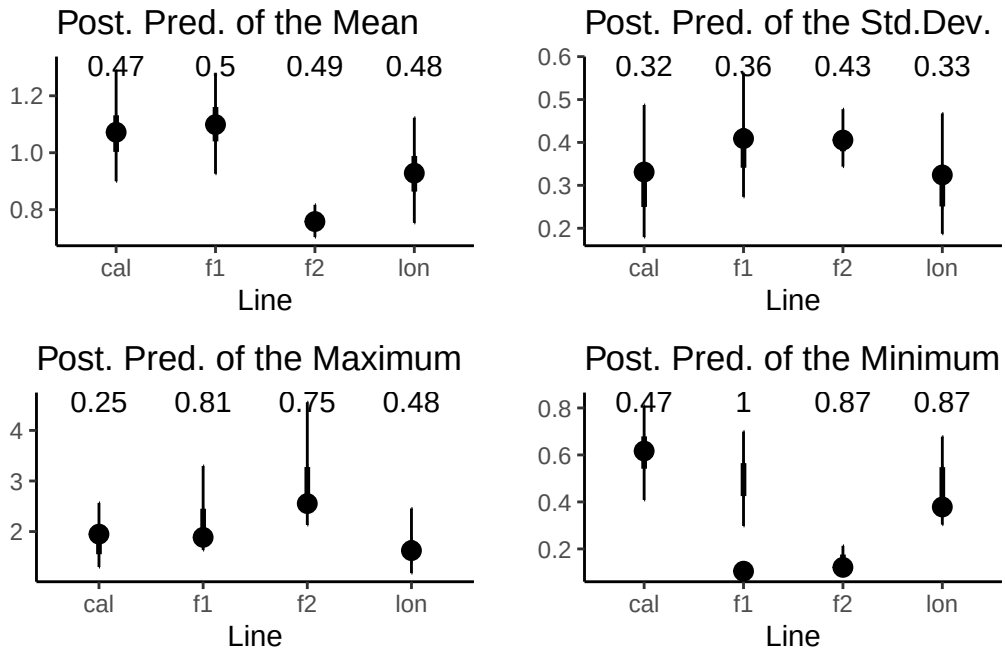
```
post_pred_check(df, "day_17", "normal")
```




```
post_pred_check(df, "day_17", "gamma")
```

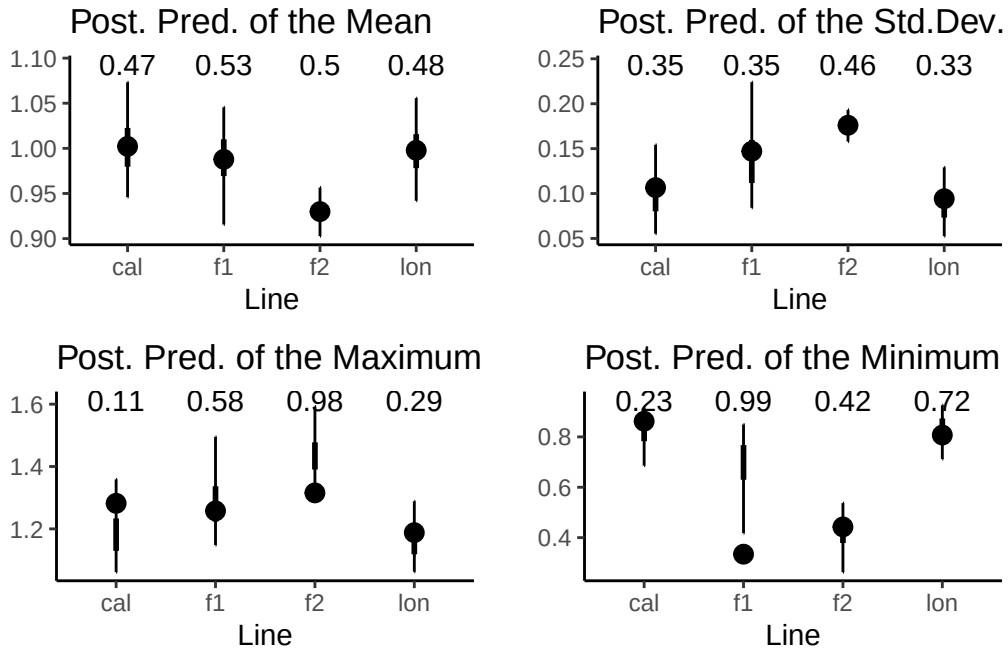



```
post_pred_check(df, "day_17", "log-normal")
```

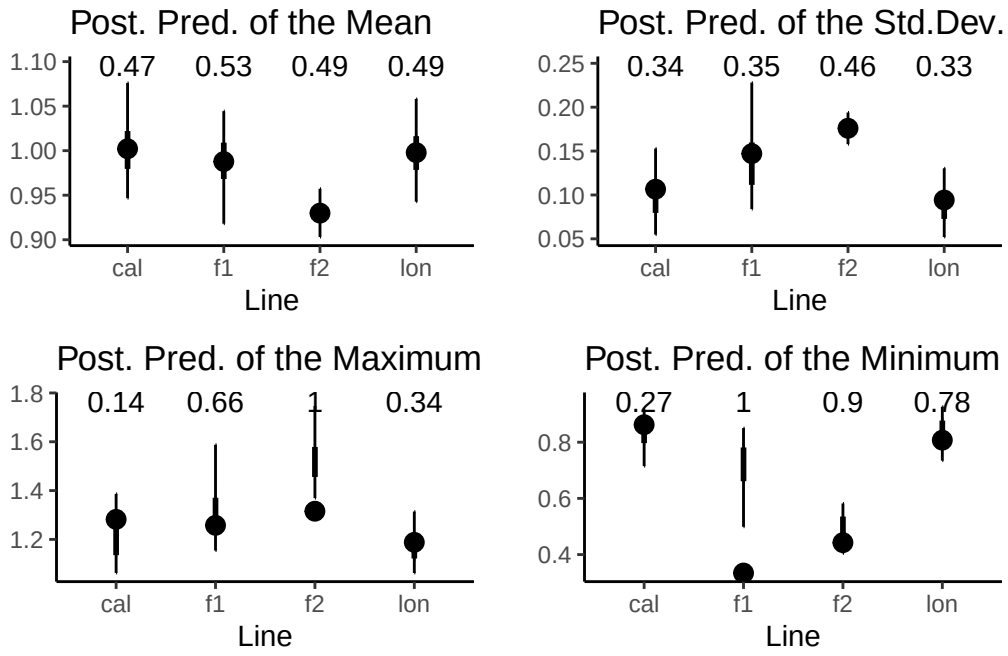


RGR

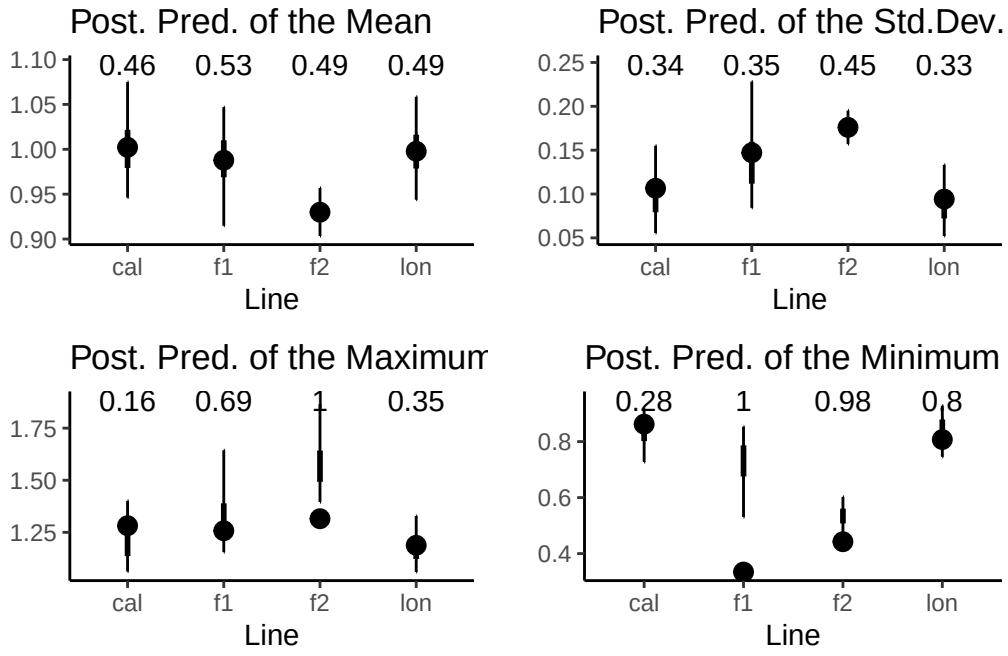
```
post_pred_check(df, "rgr", "normal")
```




```
post_pred_check(df, "rgr", "gamma")
```

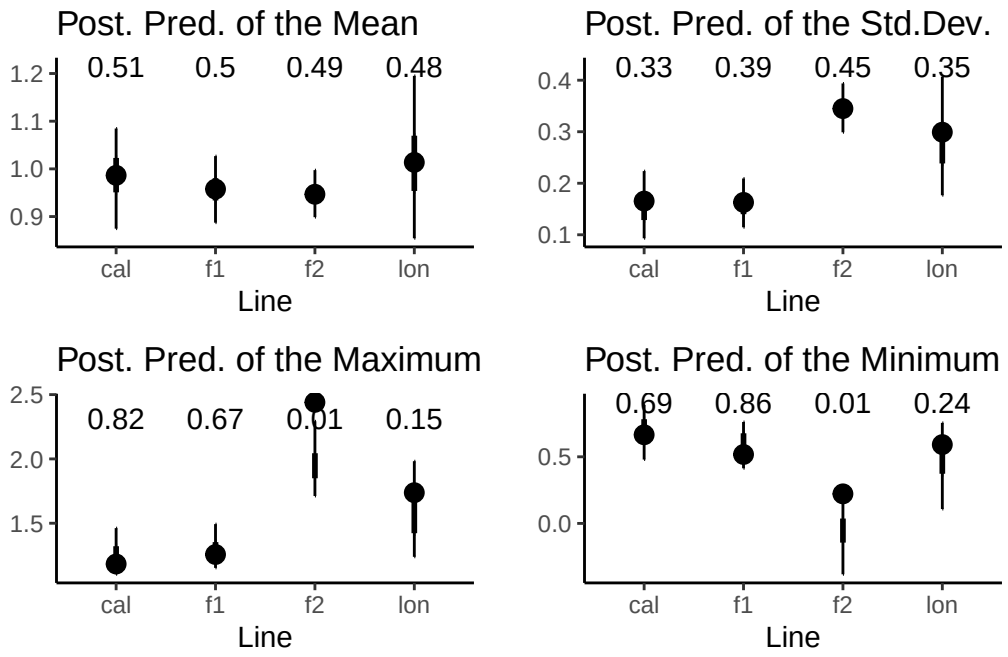


```
post_pred_check(df, "rgr", "log-normal")
```

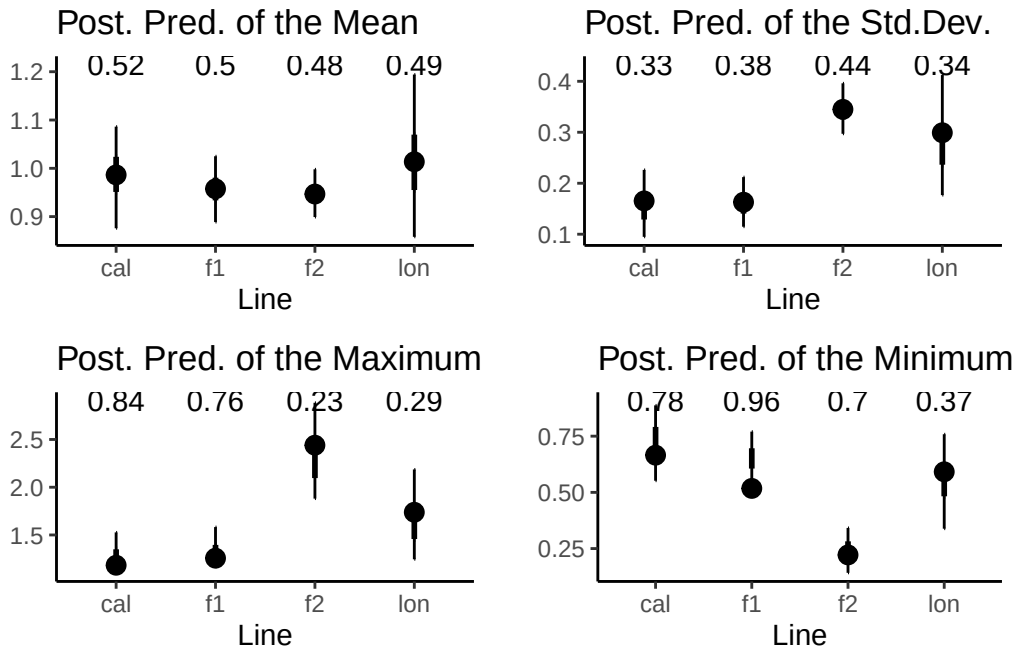


Height

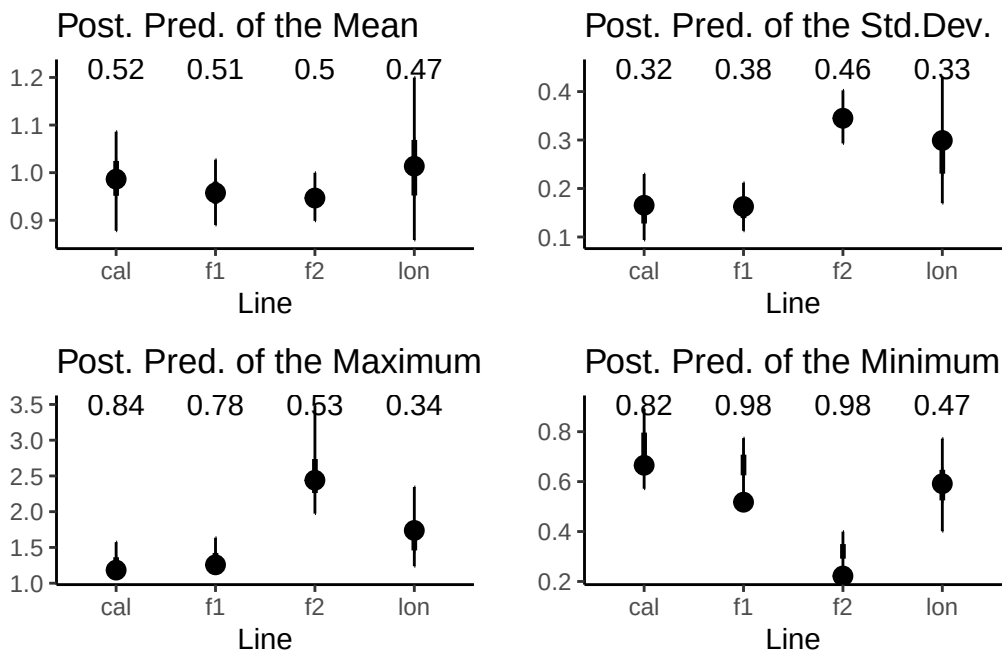
```
post_pred_check(df, "height_122", "normal")
```




```
post_pred_check(df, "height_122", "gamma")
```



```
post_pred_check(df, "height_122", "log-normal")
```

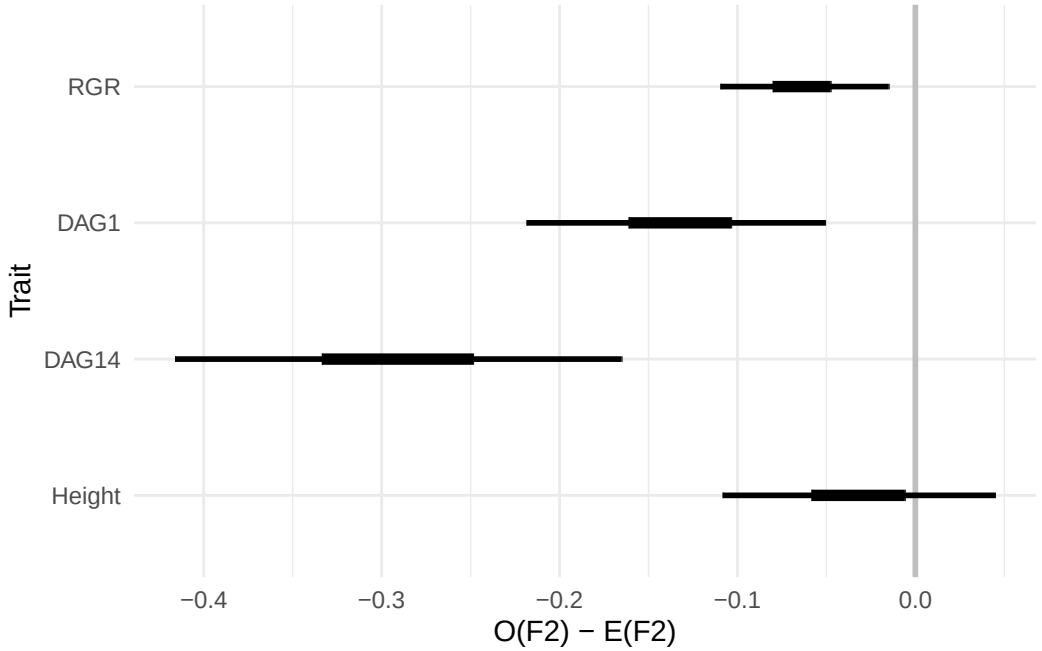


Posterior Predictive Distributions of Delta

```
dag1 <- post_pred(df, "day_4", "gamma")$delta_pp
dag14 <- post_pred(df, "day_17", "gamma")$delta_pp
rgr <- post_pred(df, "rgr", "gamma")$delta_pp
height <- post_pred(df, "height_122", "gamma")$delta_pp

data.frame(DAG1 = dag1, DAG14= dag14,
           RGR = rgr, Height = height) %>%
  pivot_longer(1:4, names_to = "trait", values_to = "delta") %>%
  mutate(trait = factor(trait, levels = c("Height", "DAG14","DAG1", "RGR"))) %>%
  group_by(trait) %>%
  summarise(upr = quantile(delta, .975),
            lwr = quantile(delta, .025),
            upr.5 = quantile(delta, .75),
            lwr.5 = quantile(delta, .25)) %>%
  ggplot() +
  geom_vline(xintercept = 0, color = "grey", linewidth = 1) +
```

```
  geom_errorbarh(aes(y = trait, xmin = lwr, xmax = upr), height = 0,
                 linewidth = 1) +
  geom_errorbarh(aes(y = trait, xmin = lwr.5, xmax = upr.5), height = 0,
                 linewidth = 2) +
  theme_minimal() +
  labs(y = "Trait",
       x = "O(F2) - E(F2)")
```




```
dag1 <- post_pred(df, "day_4", "gamma")$boots
dag1 <- dag1 %>%
  pivot_longer(1:5, names_to = "line", values_to = "trait") %>%
  group_by(line) %>%
  summarise(mu = round(mean(trait),2),
            upr = round(quantile(trait, .975),2),
            lwr = round(quantile(trait, .025),2),
            upr.5 = round(quantile(trait, .75),2),
            lwr.5 = round(quantile(trait, .25),2)) %>%
  mutate(trait = "1DAG")
```

```r
dag14 <- post_pred(df, "day_17", "gamma")$boots
dag14 <- dag14 %>%
  pivot_longer(1:5, names_to = "line", values_to = "trait") %>%
  group_by(line) %>%
  summarise(mu = round(mean(trait),2),
            upr = round(quantile(trait, .975),2),
            lwr = round(quantile(trait, .025),2),
            upr.5 = round(quantile(trait, .75),2),
            lwr.5 = round(quantile(trait, .25),2)) %>%
  mutate(trait = "14DAG")

rgr <- post_pred(df, "rgr", "gamma")$boots
rgr <- rgr %>%
  pivot_longer(1:5, names_to = "line", values_to = "trait") %>%
  group_by(line) %>%
  summarise(mu = round(mean(trait),2),
            upr = round(quantile(trait, .975),2),
            lwr = round(quantile(trait, .025),2),
            upr.5 = round(quantile(trait, .75),2),
            lwr.5 = round(quantile(trait, .25),2)) %>%
  mutate(trait = "RGR")

height <- post_pred(df, "height_122", "gamma")$boots
height <- height %>%
  pivot_longer(1:5, names_to = "line", values_to = "trait") %>%
  group_by(line) %>%
  summarise(mu = round(mean(trait),2),
            upr = round(quantile(trait, .975),2),
            lwr = round(quantile(trait, .025),2),
            upr.5 = round(quantile(trait, .75),2),
            lwr.5 = round(quantile(trait, .25),2)) %>%
  mutate(trait = "Height")

library(knitr)
library(kableExtra)
```

```
Attaching package: 'kableExtra'

The following object is masked from 'package:dplyr':
```

group_rows

```
tab_dat <- bind_rows(dag1, dag14, rgr, height)

tab_dat %>%
  select(Line = line, Mean = mu, "2.5%" = lwr, "25%" = lwr.5,
         "75%" = upr.5, "97.5%" = upr) %>%
  mutate(Line = case_when(Line == "cal" ~ "Calycinus",
                          Line == "f1" ~ "F1",
                          Line == "f2" ~ "F2",
                          Line == "lon" ~ "Longiflorus",
                          Line == "e_f2" ~ "Expected F2")) %>%
  kbl() %>%
  kable_classic_2() %>%
  add_header_above(c(" " = 1, "Posterior Distribution of Line Mean" = 5)) %>%
  pack_rows("1DAG",1,5) %>%
  pack_rows("14DAG",6,10) %>%
  pack_rows("RGR", 11,15) %>%
  pack_rows("Height",16,20)
```

	Posterior Distribution of Line Mean				
Line	Mean	2.5%	25%	75%	97.5%
1DAG					
Calycinus	1.06	0.99	1.04	1.08	1.12
Expected F2	1.04	0.99	1.02	1.06	1.09
F1	1.08	1.01	1.05	1.11	1.17
F2	0.91	0.88	0.90	0.92	0.94
Longiflorus	0.94	0.84	0.91	0.98	1.05
14DAG					
Calycinus	1.07	0.95	1.02	1.11	1.22
Expected F2	1.05	0.97	1.02	1.08	1.13
F1	1.10	0.97	1.06	1.14	1.22
F2	0.76	0.72	0.74	0.77	0.80
Longiflorus	0.93	0.80	0.88	0.97	1.06
RGR					
Calycinus	1.00	0.96	0.99	1.02	1.06
Expected F2	0.99	0.96	0.99	1.00	1.02
F1	0.99	0.94	0.98	1.00	1.03
F2	0.93	0.91	0.92	0.94	0.95
Longiflorus	1.00	0.96	0.98	1.01	1.04
Height					
Calycinus	0.99	0.91	0.96	1.01	1.06
Expected F2	0.98	0.94	0.96	0.99	1.02
F1	0.96	0.91	0.94	0.97	1.01
F2	0.95	0.91	0.93	0.96	0.98
Longiflorus	1.01	0.91	0.97	1.05	1.14