Report: Testing hybrid vigor in the lab in response to Eimeria

Alice

26 August 2018
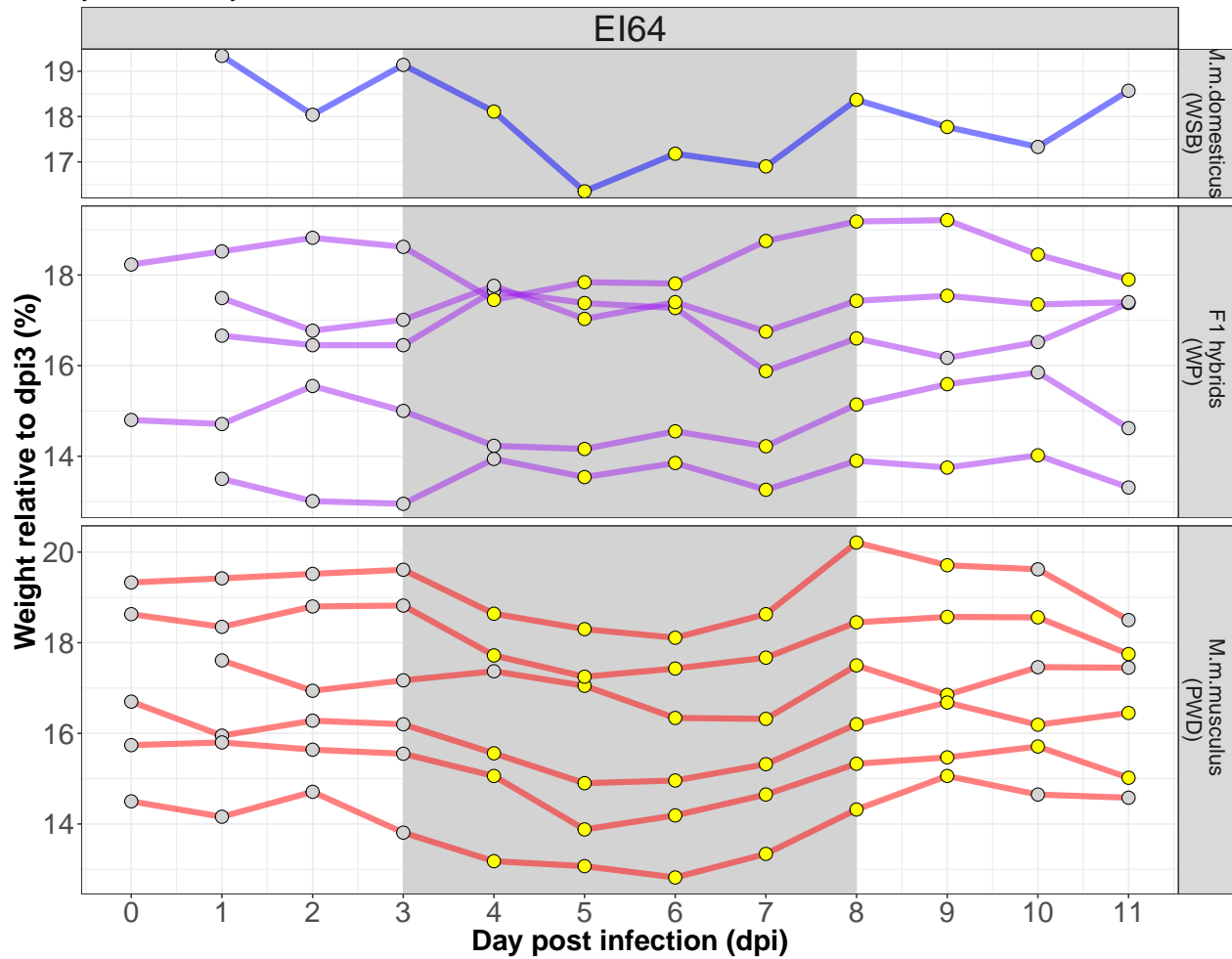
Contents

Expe_001, March 2017, Francisca's experiment. infection with E64 and Eflab

1. Weight loss

Weight along experiment compared to dpi3
yellow : oocysts detected in feces

Relative weight along experiment compared to dpi3
yellow : oocysts detected in feces

Mean relative weight along experiment compared to dpi3

For statistical analysis, we compare the maximum relative weight loss between the different groups. We limit our analysis to the period : dpi3 to dpi8 (symptomatic period for E64 strain).

Maximum weigth loss during the symptomatic phase
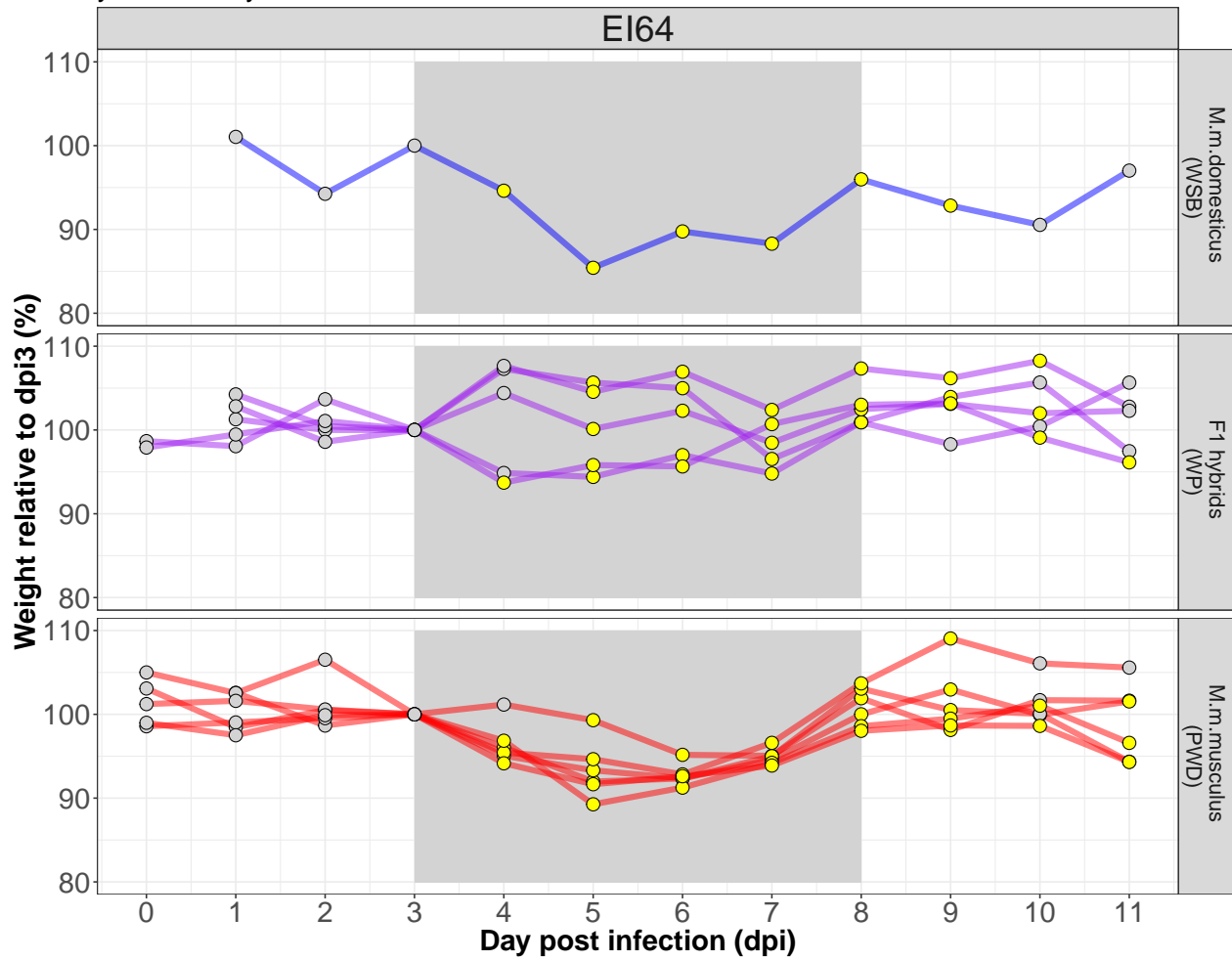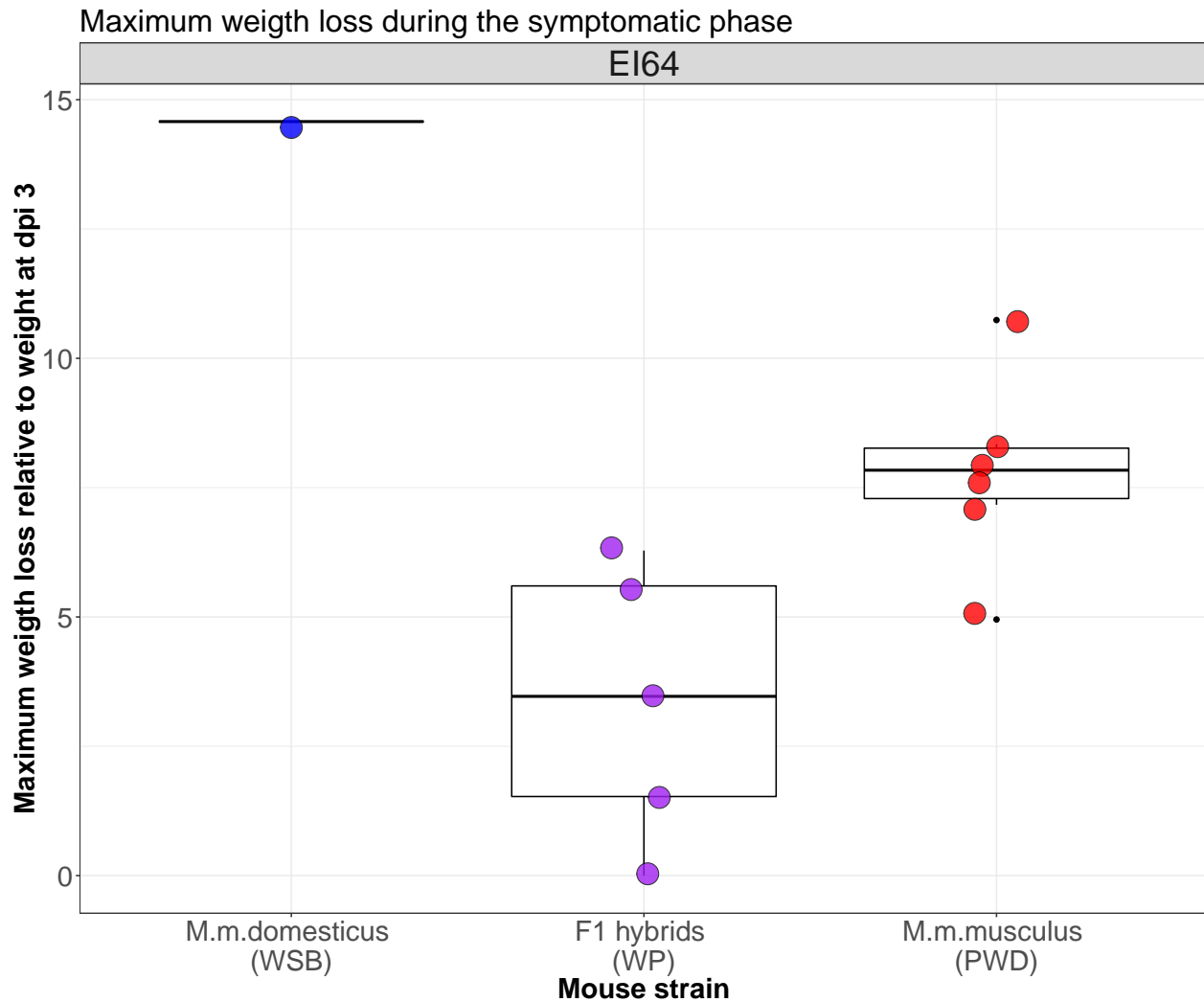

```
##
## Call:
## lm(formula = relativeWeight ~ Mouse_strain, data = max.loss_001)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.9271 -0.9534 -0.0448  0.9445  3.3754
##
## Coefficients:
##                                Estimate Std. Error t value Pr(>|t|)
## (Intercept)                      85.423      2.254  37.890 3.08e-11 ***
## Mouse_strainF1 hybrids \n(WP)    11.201      2.470   4.536  0.00141 **
## Mouse_strainM.m.musculus \n(PWD)  6.764      2.435   2.778  0.02148 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 2.254 on 9 degrees of freedom
## Multiple R-squared:  0.7311, Adjusted R-squared:  0.6714
## F-statistic: 12.24 on 2 and 9 DF,  p-value: 0.002711
```
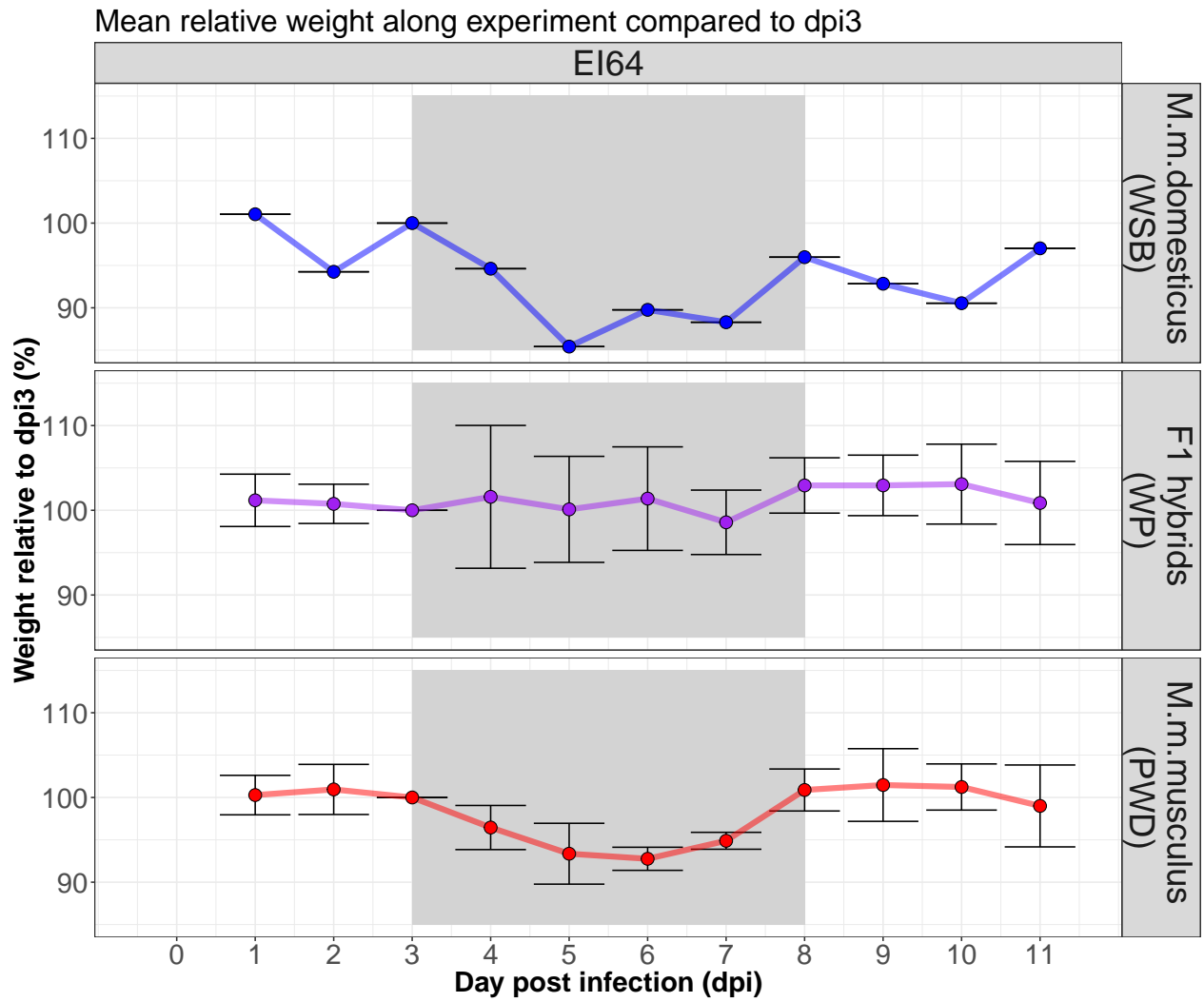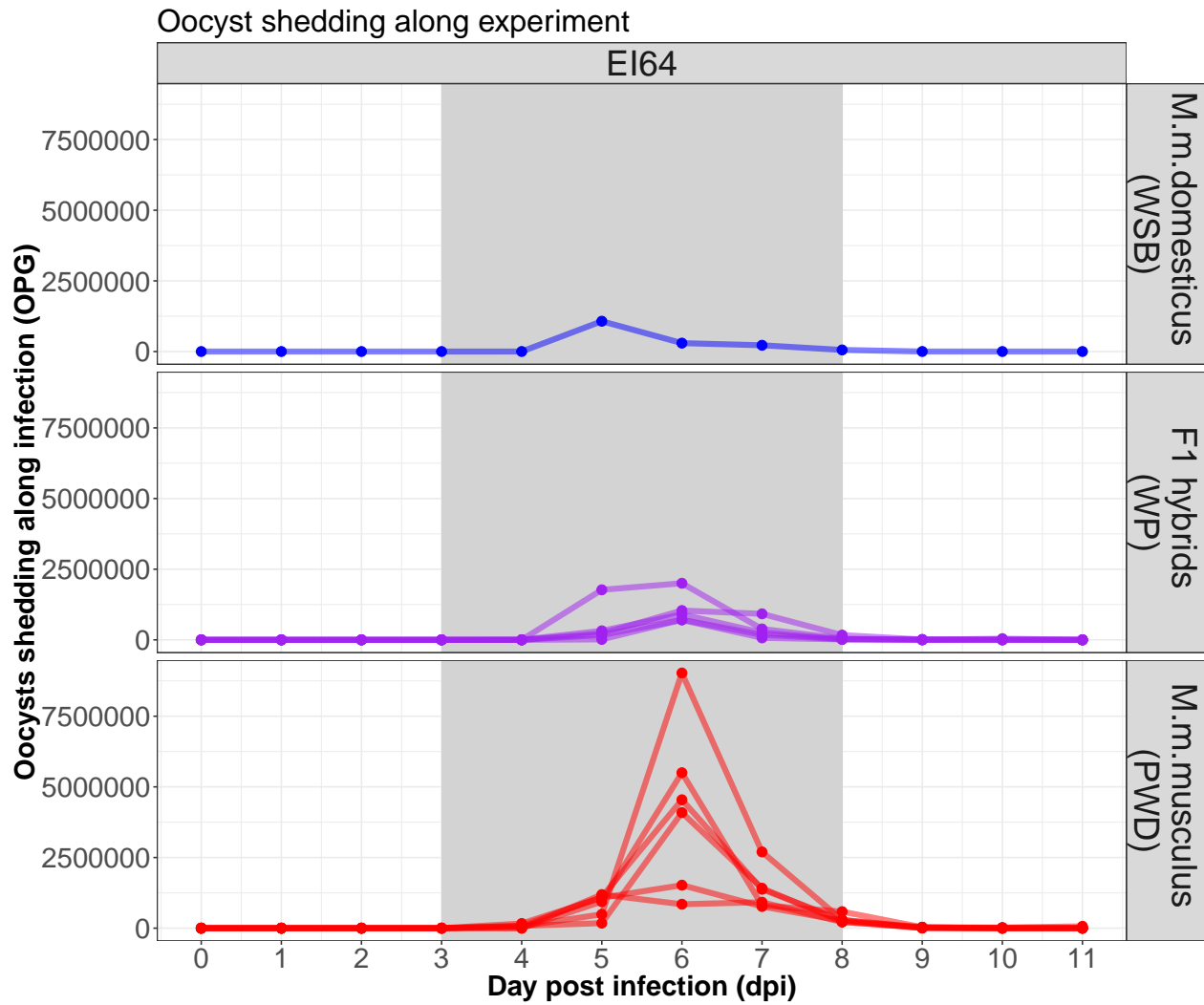
2. Parasite shedding

Oocyst shedding along experiment

Mean oocysts shedding along experiment

Sum of oocysts shed along the experiment
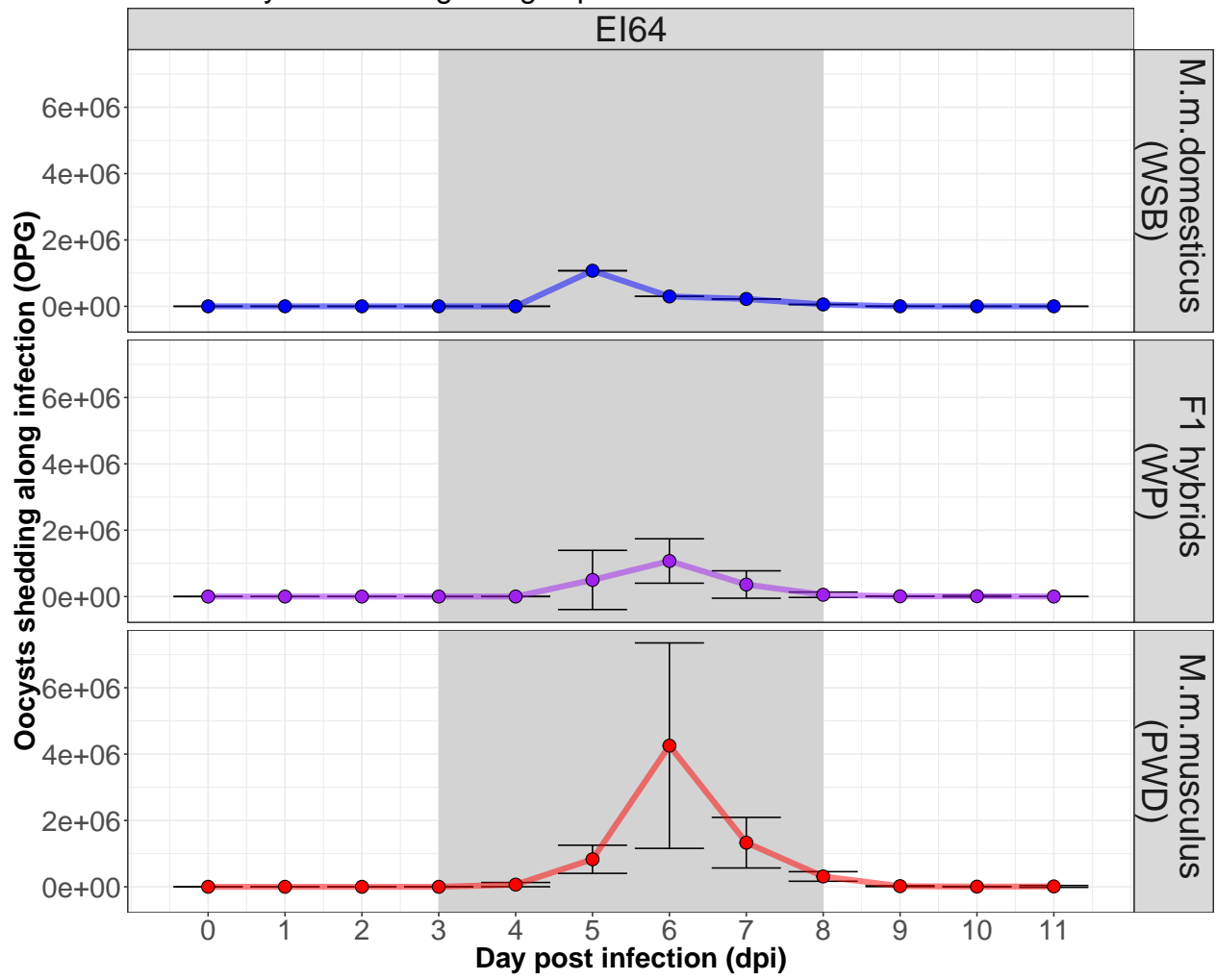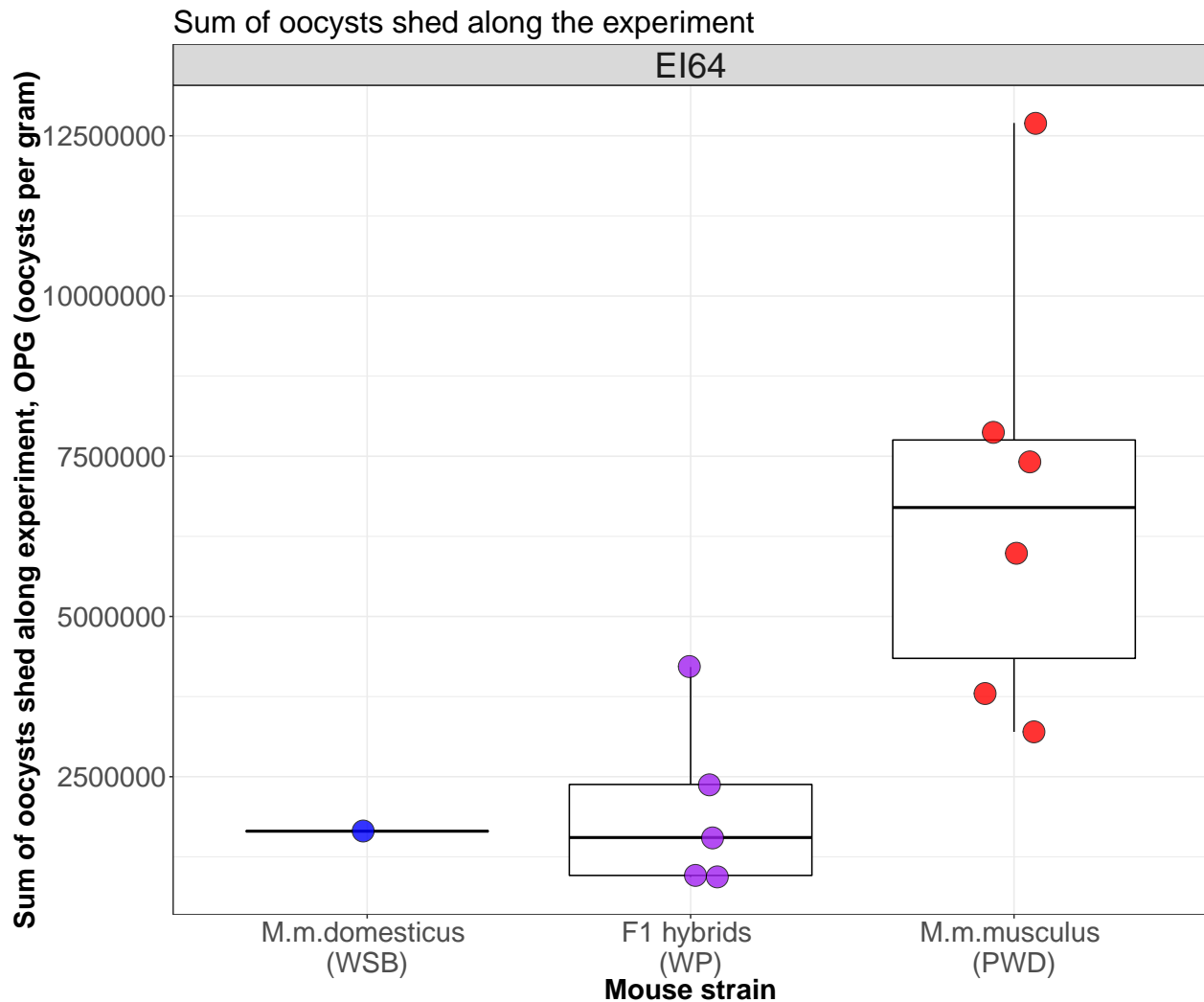


```
## 
## Call:
## lm(formula = sum.oo ~ Mouse_strain, data = sum.oocysts_001)
## 
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3628205 -1053694  -228126   693597  5872235
## 
## Coefficients:
##                               Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    1649898    2716134   0.607    0.559
## Mouse_strainF1 hybrids \n(WP)   357449    2975376   0.120    0.907
## Mouse_strainM.m.musculus \n(PWD) 5177664   2933760   1.765    0.111
## 
## Residual standard error: 2716000 on 9 degrees of freedom
## Multiple R-squared:  0.5187, Adjusted R-squared:  0.4117
## F-statistic: 4.849 on 2 and 9 DF,  p-value: 0.03724
```

Pass001: Nov 2017, passaging 4 isolates (some missing data)

(Eflab, E88, E139, E64) in NMRI. 2 mice per cage. Only OPG recorded

Parasite shedding

Oocyst shedding along experiment
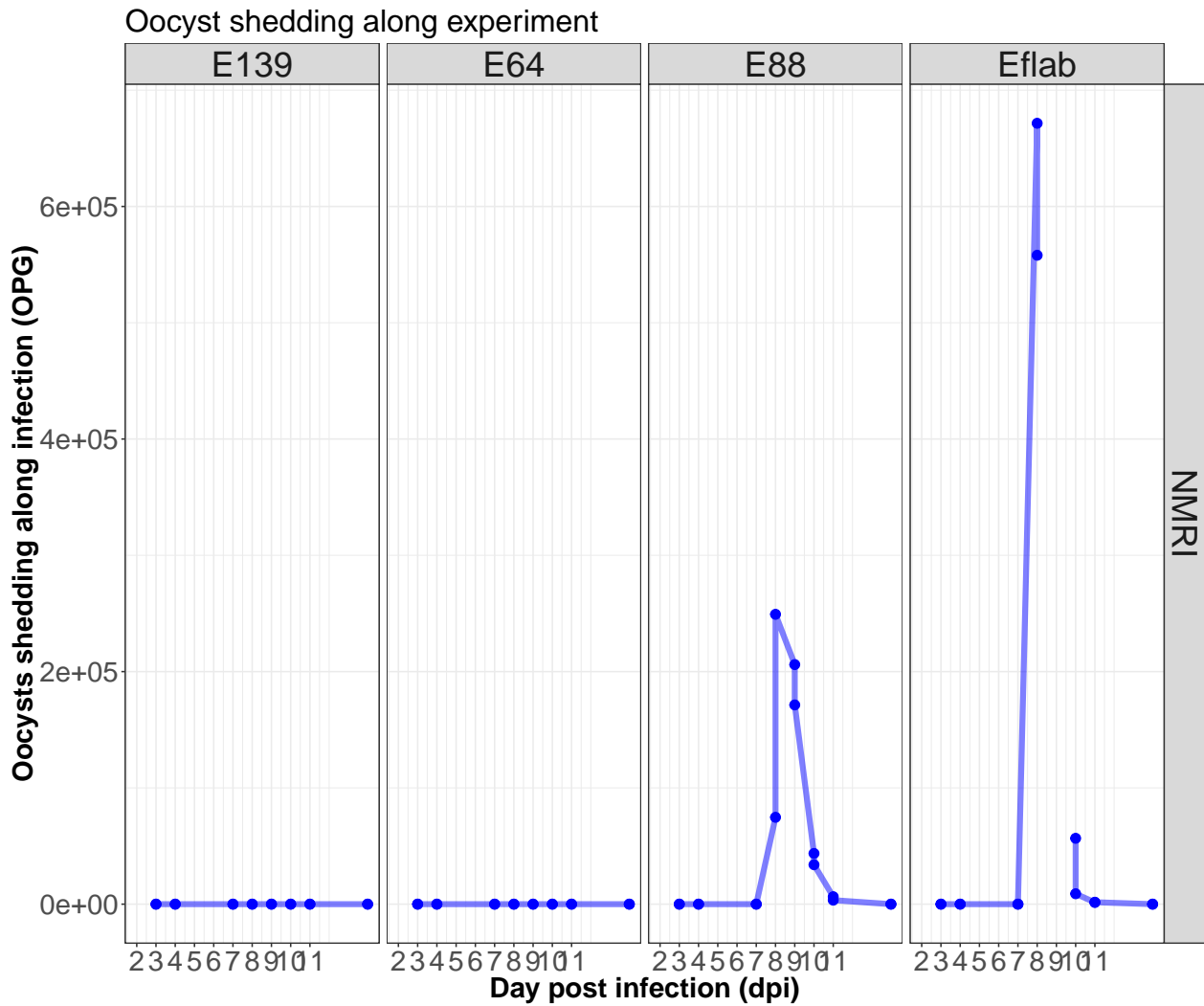
Expe_002: March 2018, NMRI mice infected with 4 *Eimeria* strains (Eflab, E88, E139, E64)

1. Weight loss
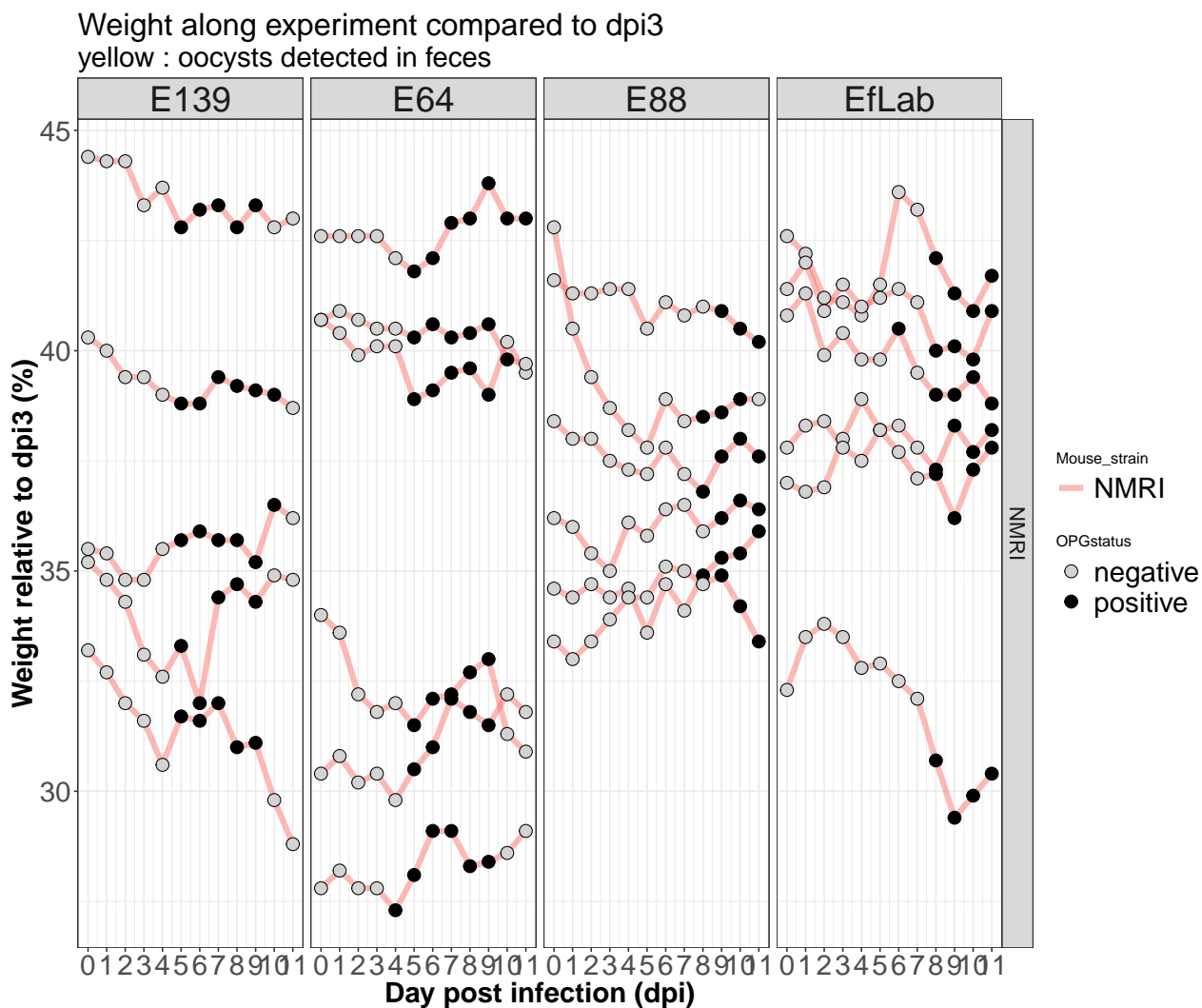
Weight along experiment compared to dpi3
yellow : oocysts detected in feces

Relative weight along experiment compared to dpi3
yellow : oocysts detected in feces

Mean relative weight along experiment compared to dpi0

2. Parasite shedding
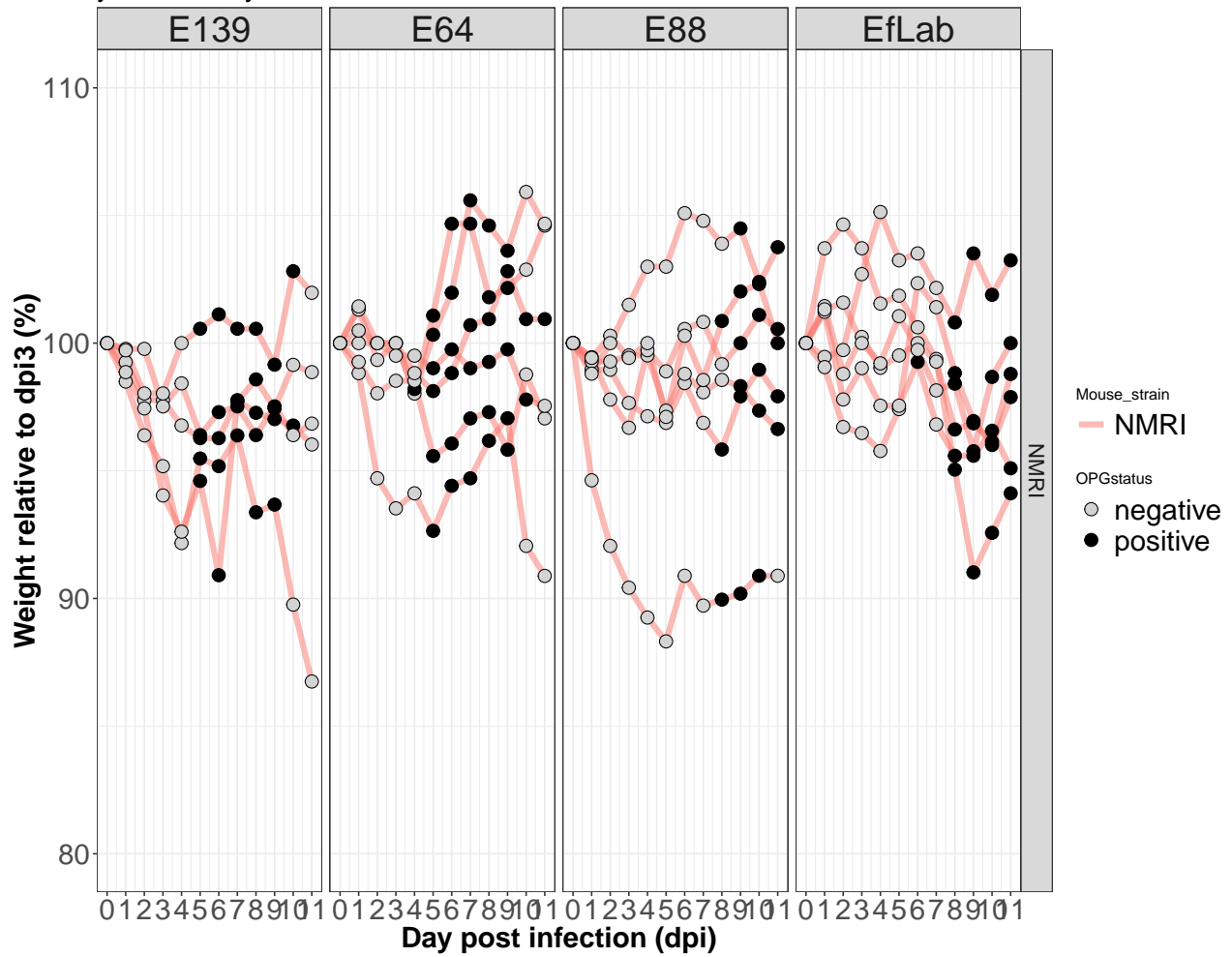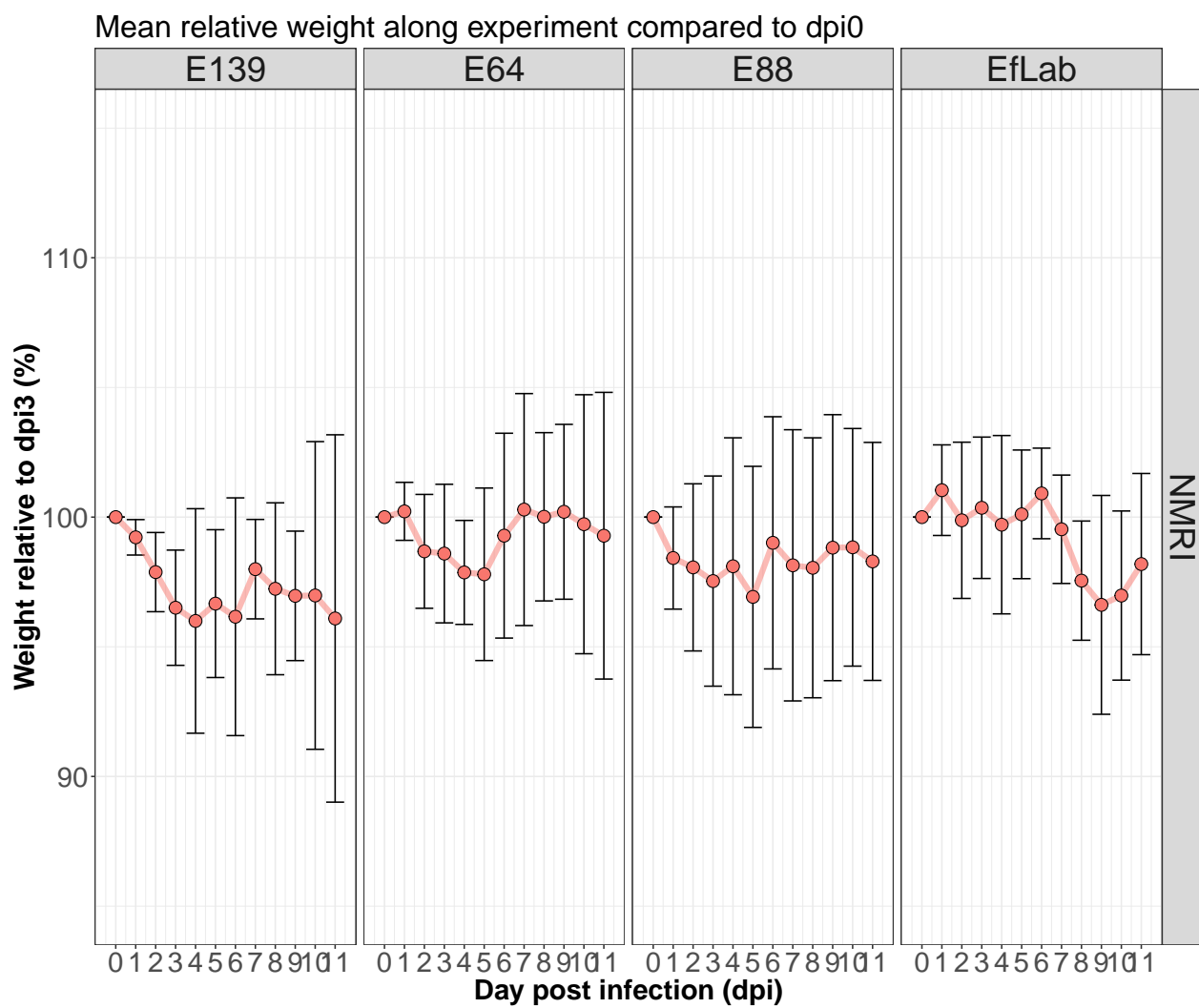
Oocyst shedding along experiment
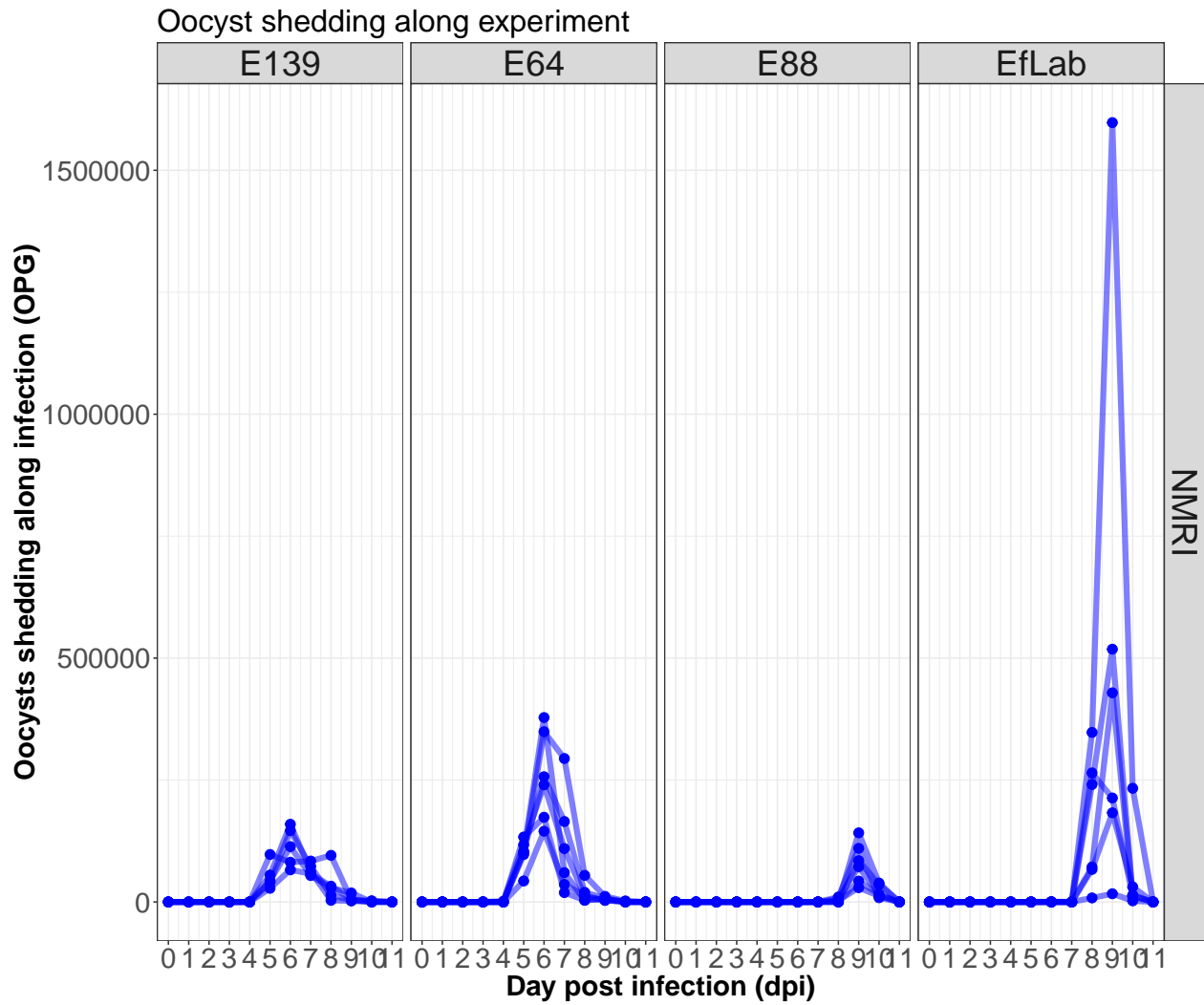
Mean oocysts shedding along experiment

Expe_003 & Expe_004, April-May 2018, first batch Parental strains (F0) BUSNA, STRA, SCHUNT, PWD, infection with Eferrisi (E64 and E139) [2 batches]

1. **Weight loss**

Weight along experiment compared to dpi3
yellow : oocysts detected in feces
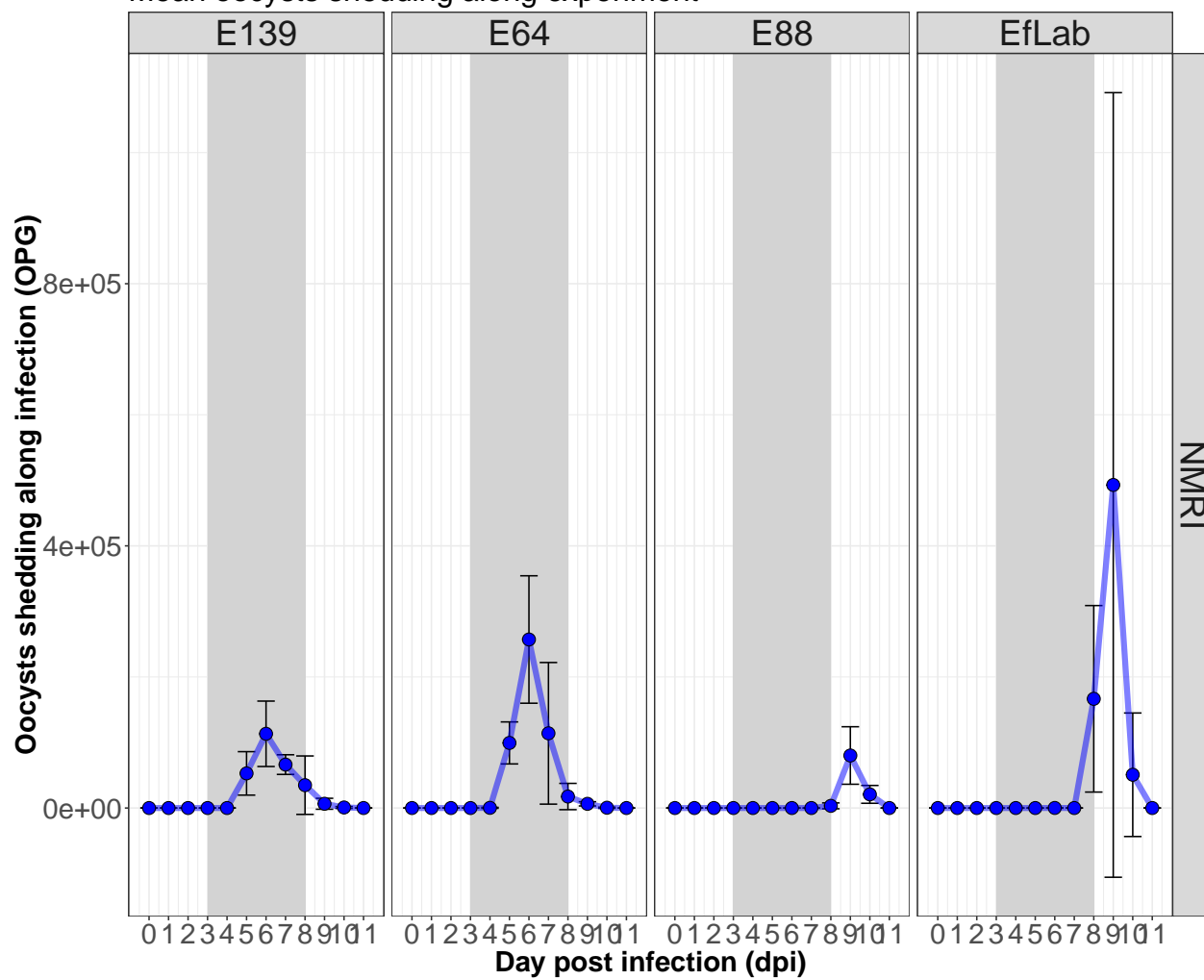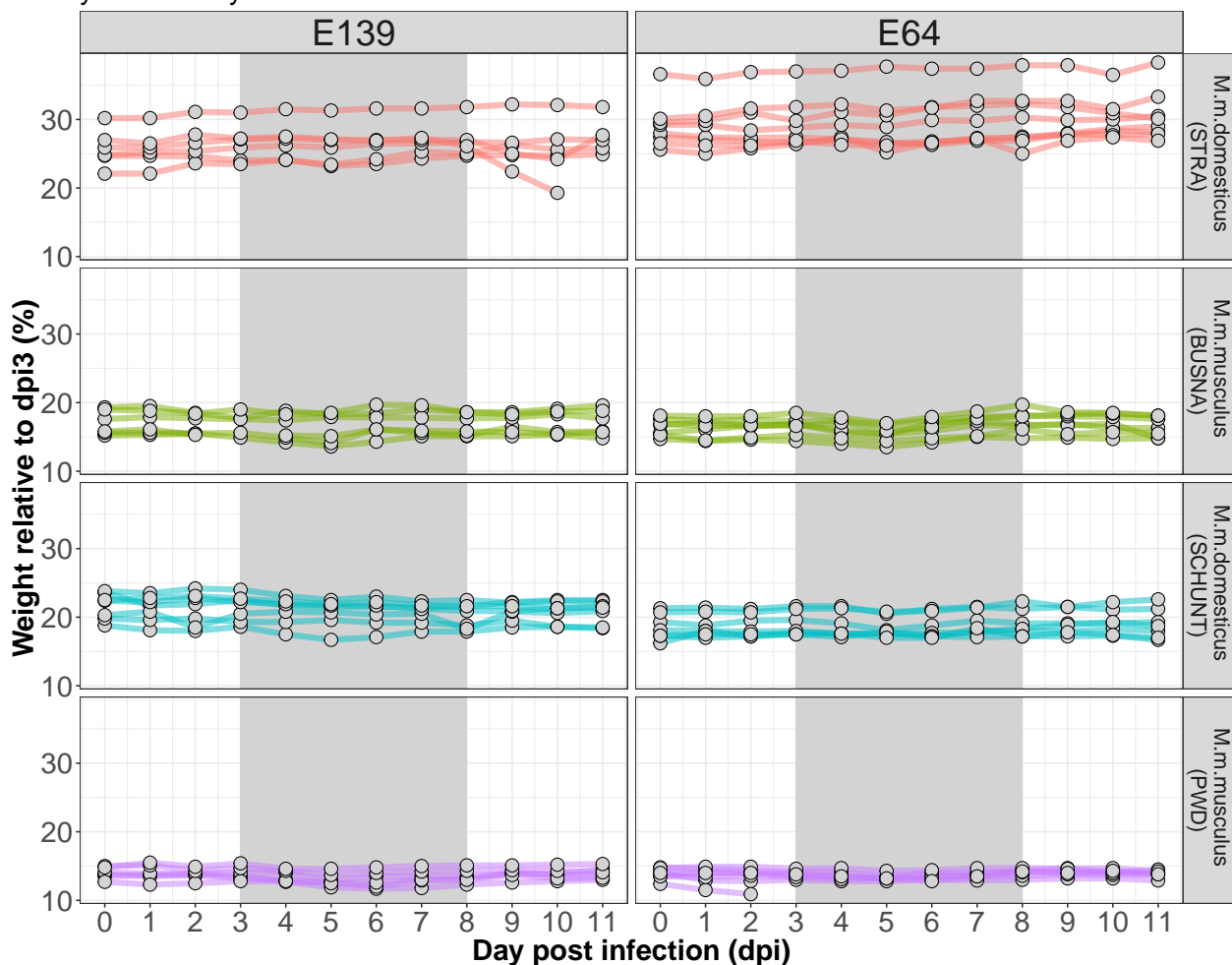
Relative weight along experiment compared to dpi3
yellow : oocysts detected in feces

Mean relative weight along experiment compared to dpi3

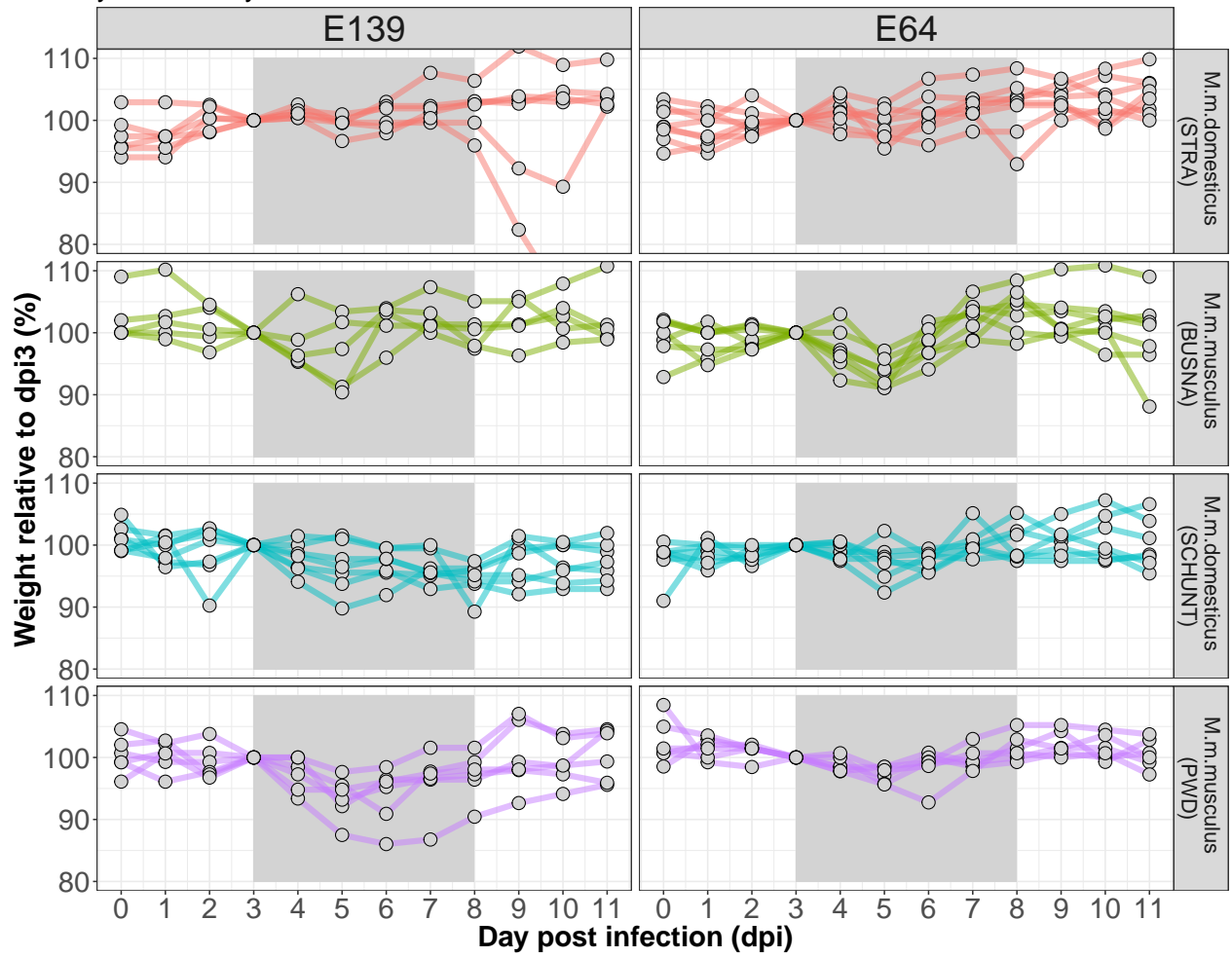For statistical analysis, we compare the maximum relative weight loss between the different groups. We limit our analysis to the period : dpi3 to dpi8 (symptomatic period for E64 strain).

2. Parasite shedding
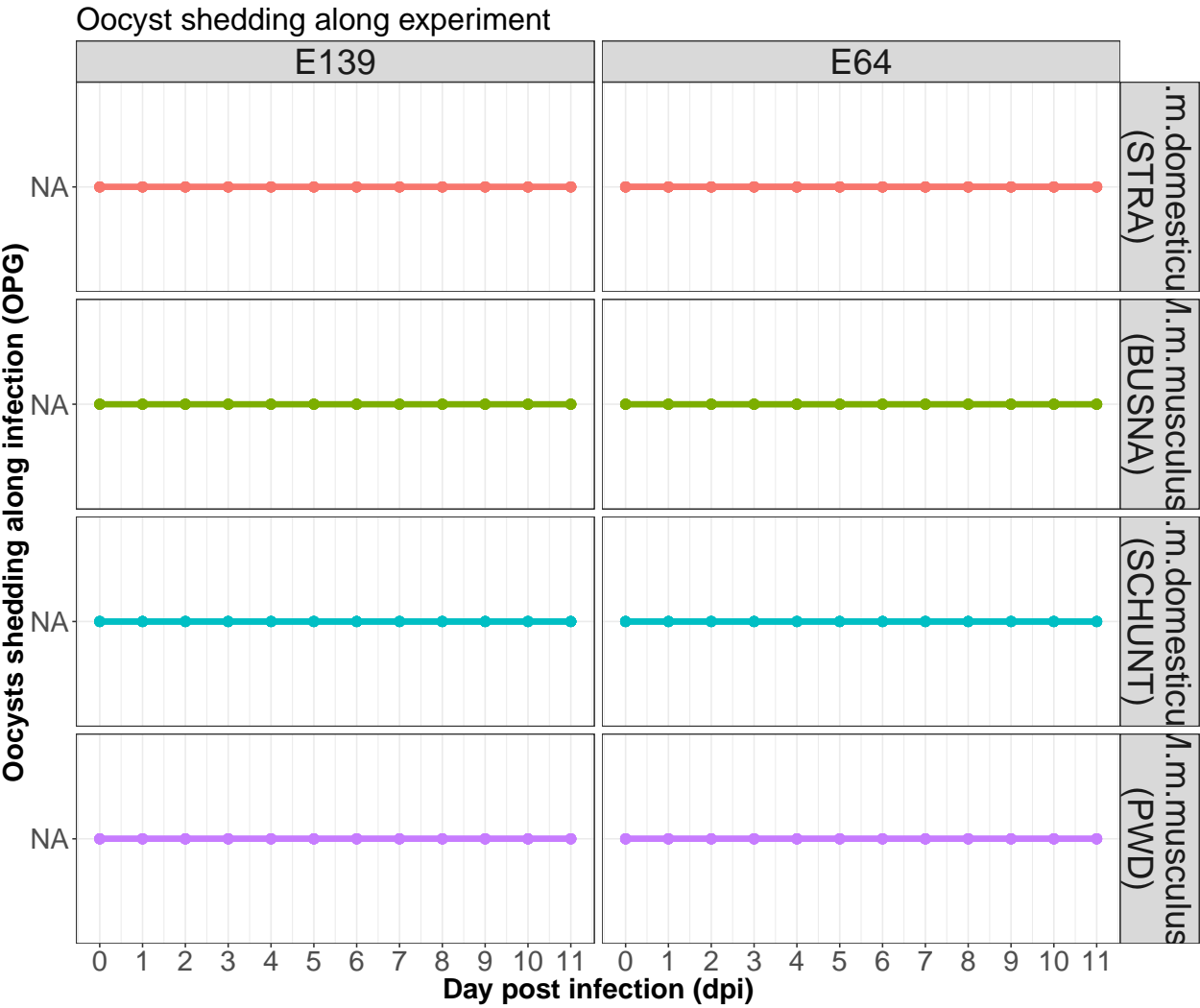
Oocyst shedding along experiment

Mean oocysts shedding along experiment

Oocysts shedding along infection (OPG)

E139   E64

.m.domesticu/.m.musculus (STRA)

.m.musculus (BUSNA)

.m.domesticu/ (SCHUNT)

.m.musculus (PWD)

0 1 2 3 4 5 6 7 8 9 10 11   0 1 2 3 4 5 6 7 8 9 10 11

Day post infection (dpi)

Sum of oocysts shed along the experiment

```
## 
## Call:
## lm(formula = sum.oo ~ Mouse_strain, data = sum.oocysts_003_4)
## 
## Residuals:
##    Min     1Q Median     3Q    Max 
##      0      0      0      0      0 
## 
## Coefficients:
##                                   Estimate Std. Error t value Pr(>|t|)
## (Intercept)                              0          0      NA       NA
## Mouse_strainM.m.musculus \n(BUSNA)       0          0      NA       NA
## Mouse_strainM.m.domesticus \n(SCHUNT)    0          0      NA       NA
## Mouse_strainM.m.musculus \n(PWD)         0          0      NA       NA
## 
## Residual standard error: 0 on 51 degrees of freedom
## Multiple R-squared:    NaN,  Adjusted R-squared:    NaN 
## F-statistic:   NaN on 3 and 51 DF,  p-value: NA
```

Expe_005, July 2018, FULL experiment (parents, intra specific and inter species hybrids) BUSNA, STRA, SCHUNT, PWD, infection with Eferrisi and Efalciformis (E64 and E88)
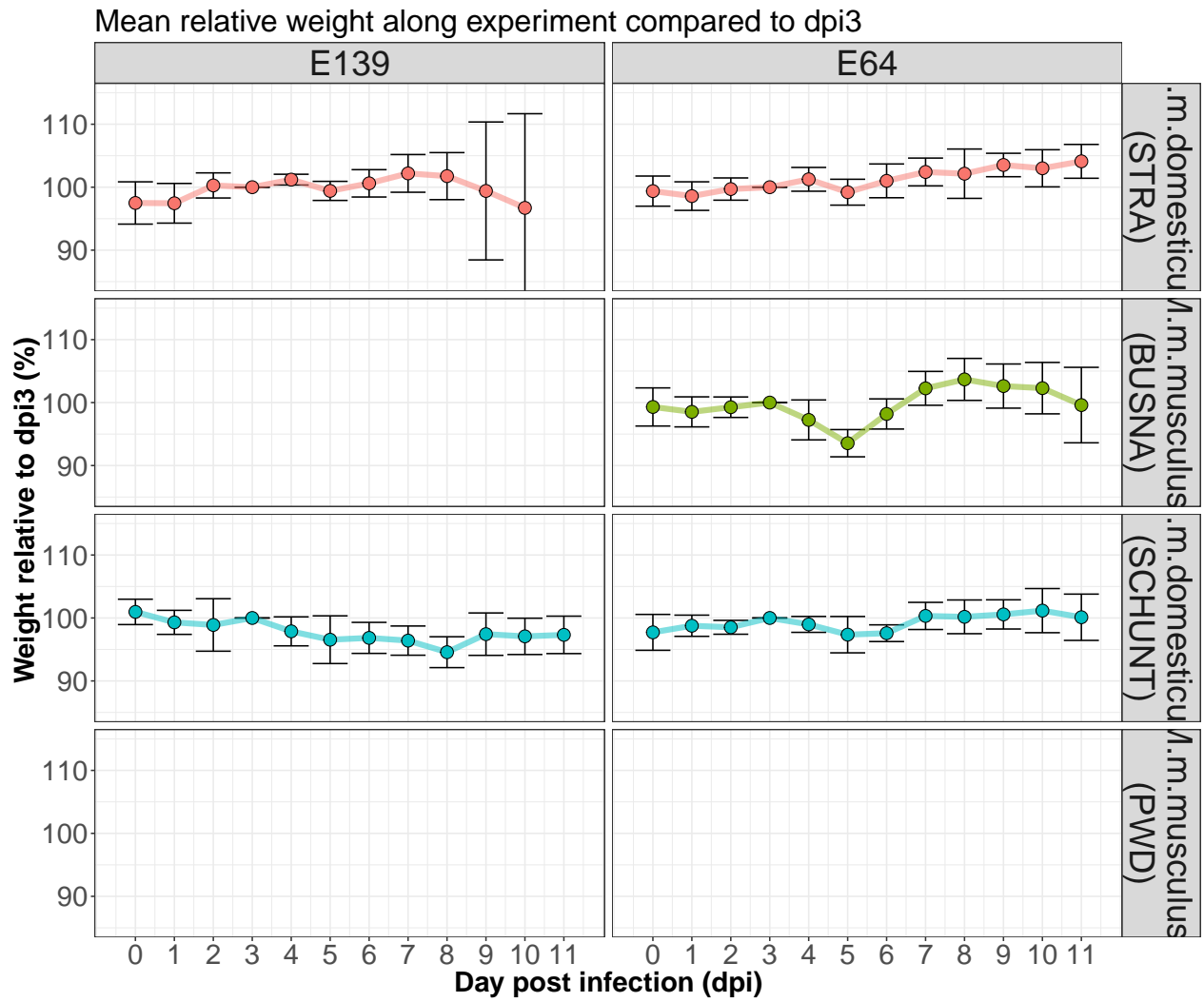
1. Weight loss

Eimeria ferrisi

Weight along experiment compared to dpi3 (E64)
yellow : oocysts detected in feces

Relative weight along experiment compared to dpi3 (E64)
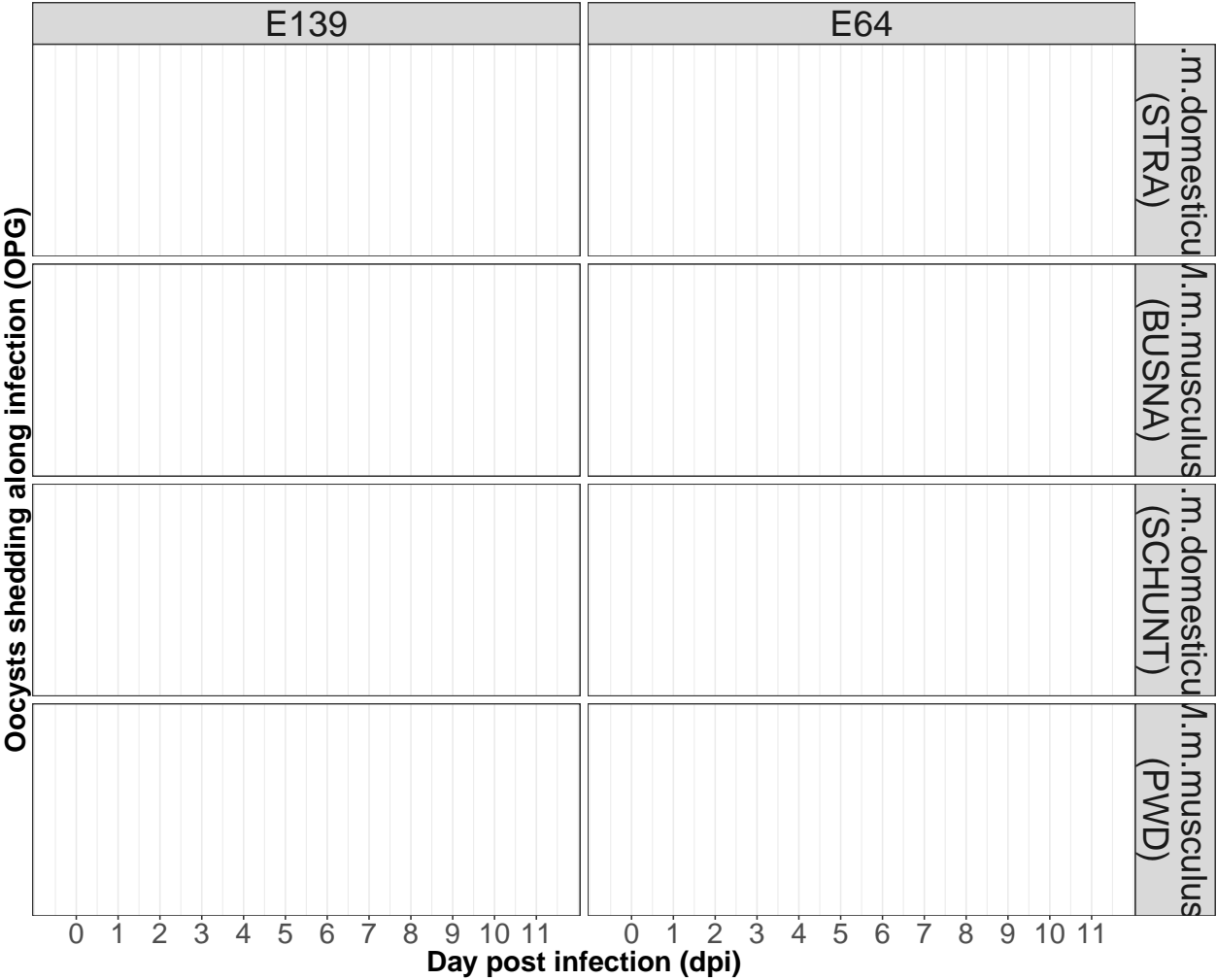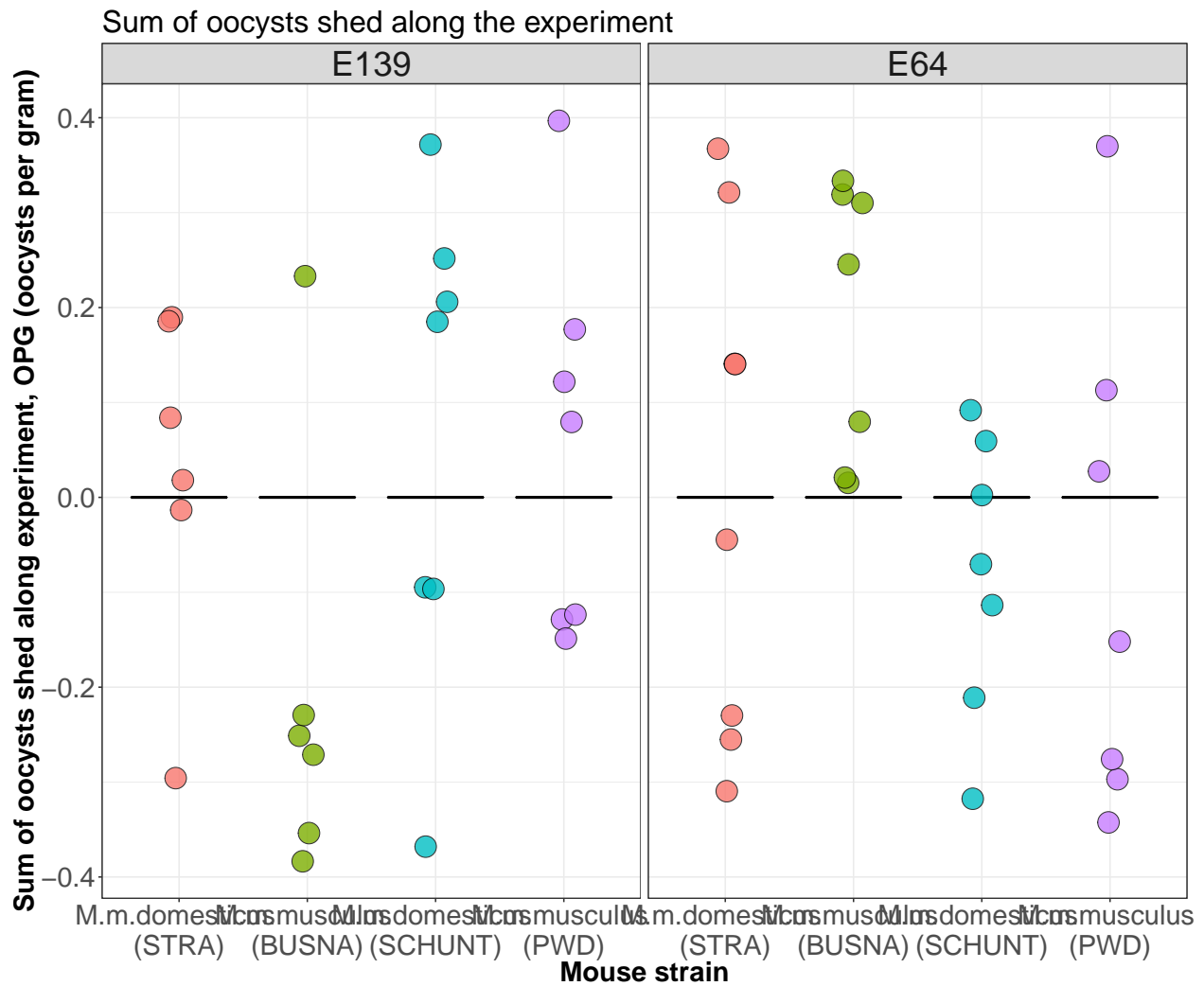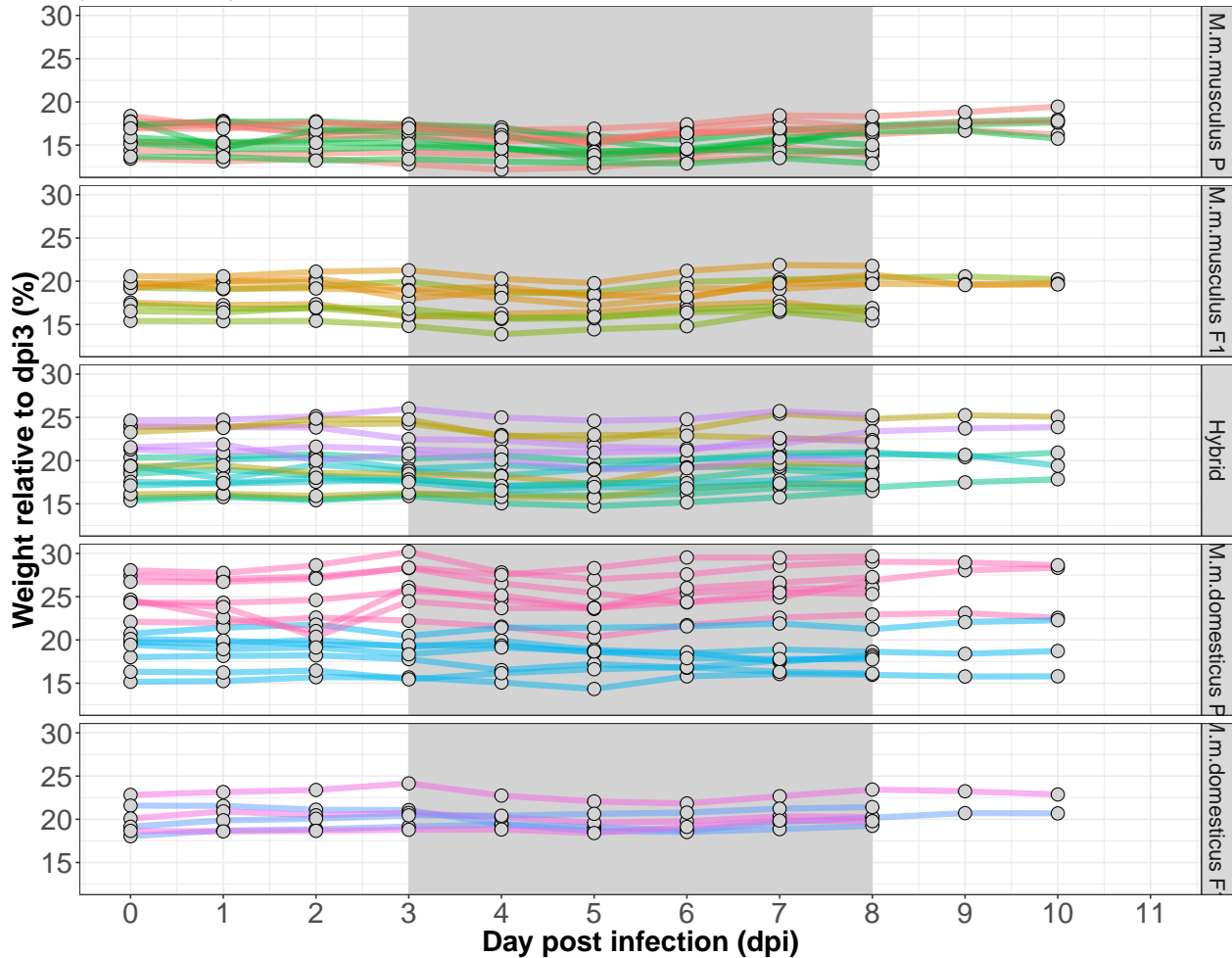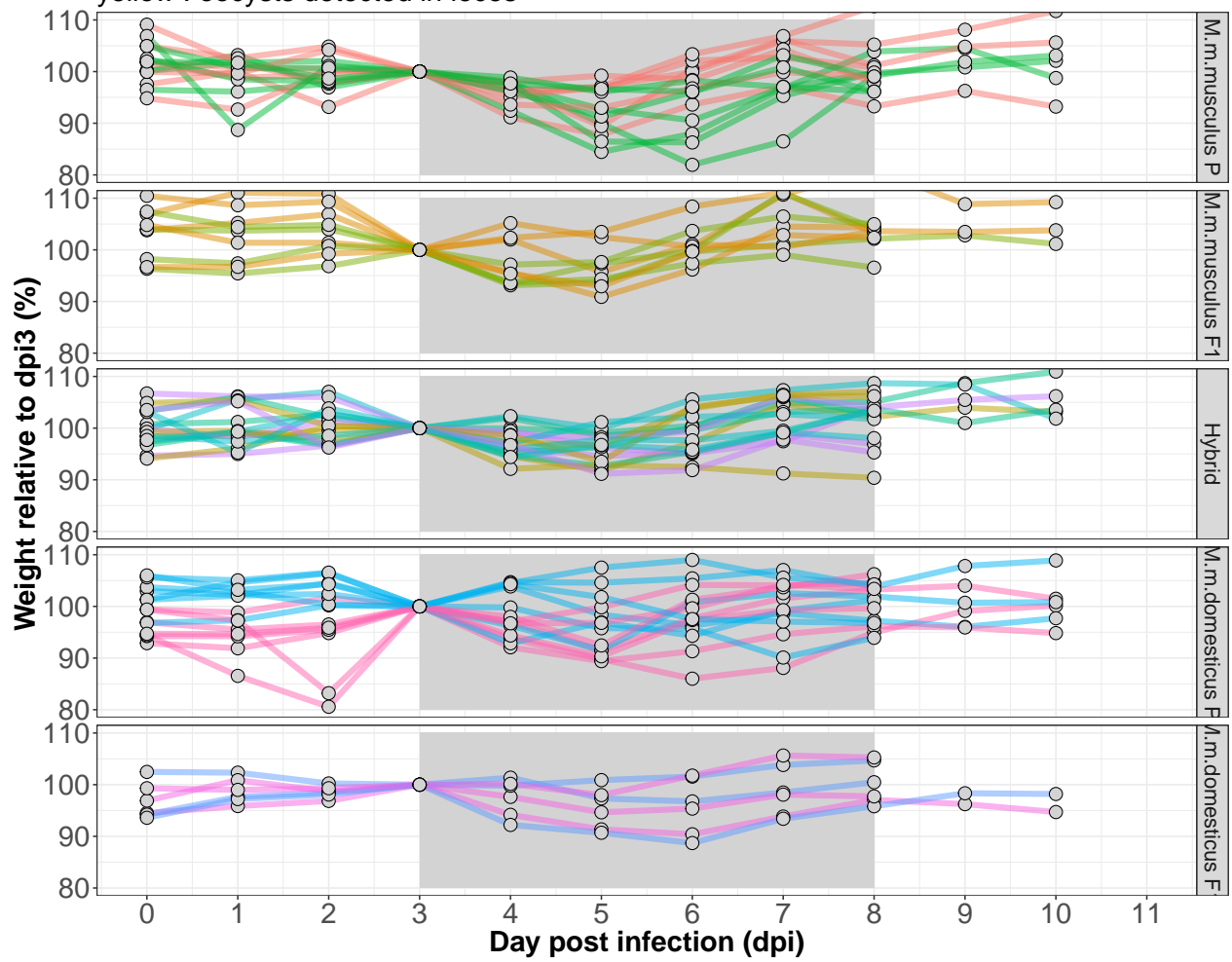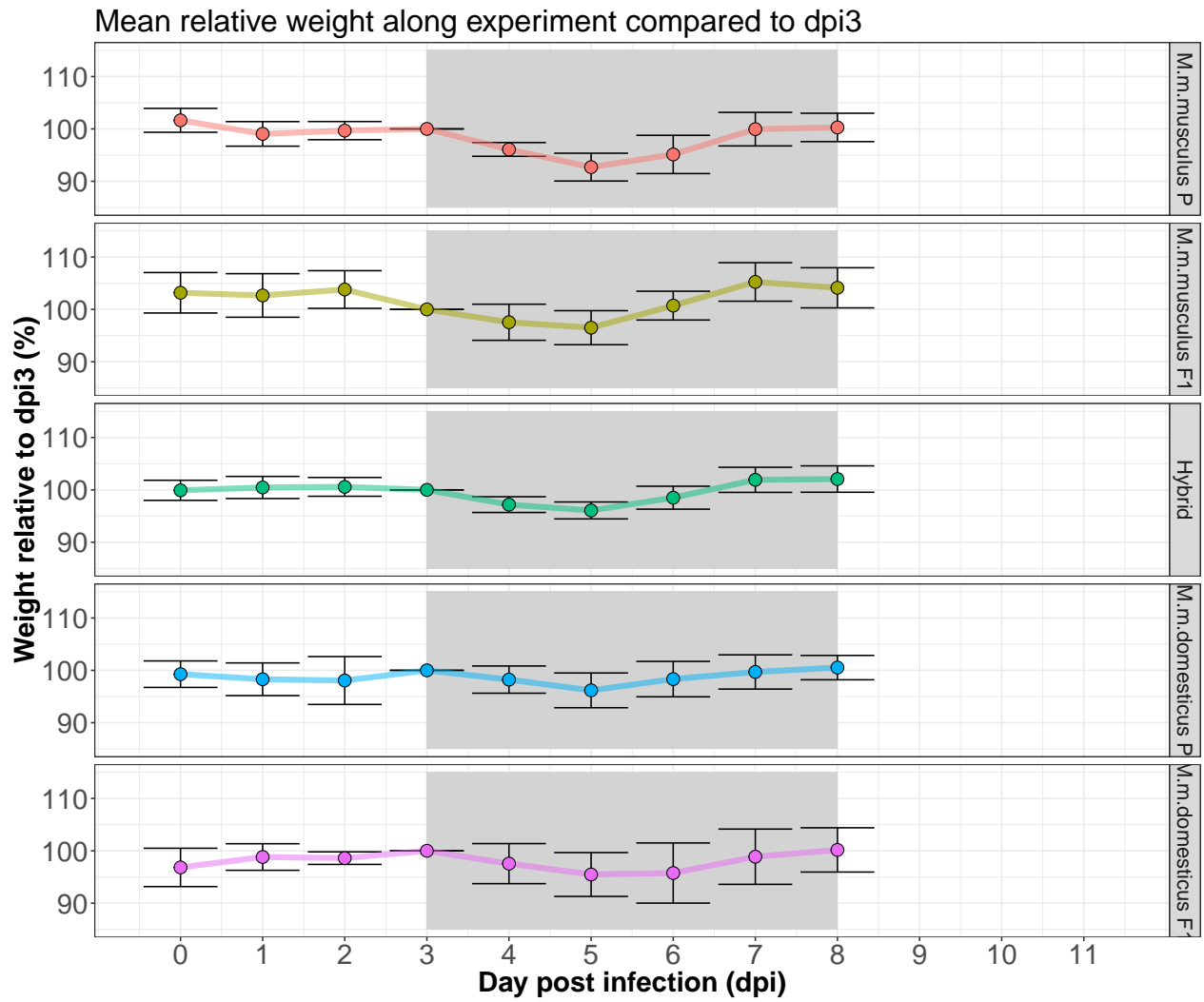yellow : oocysts detected in feces

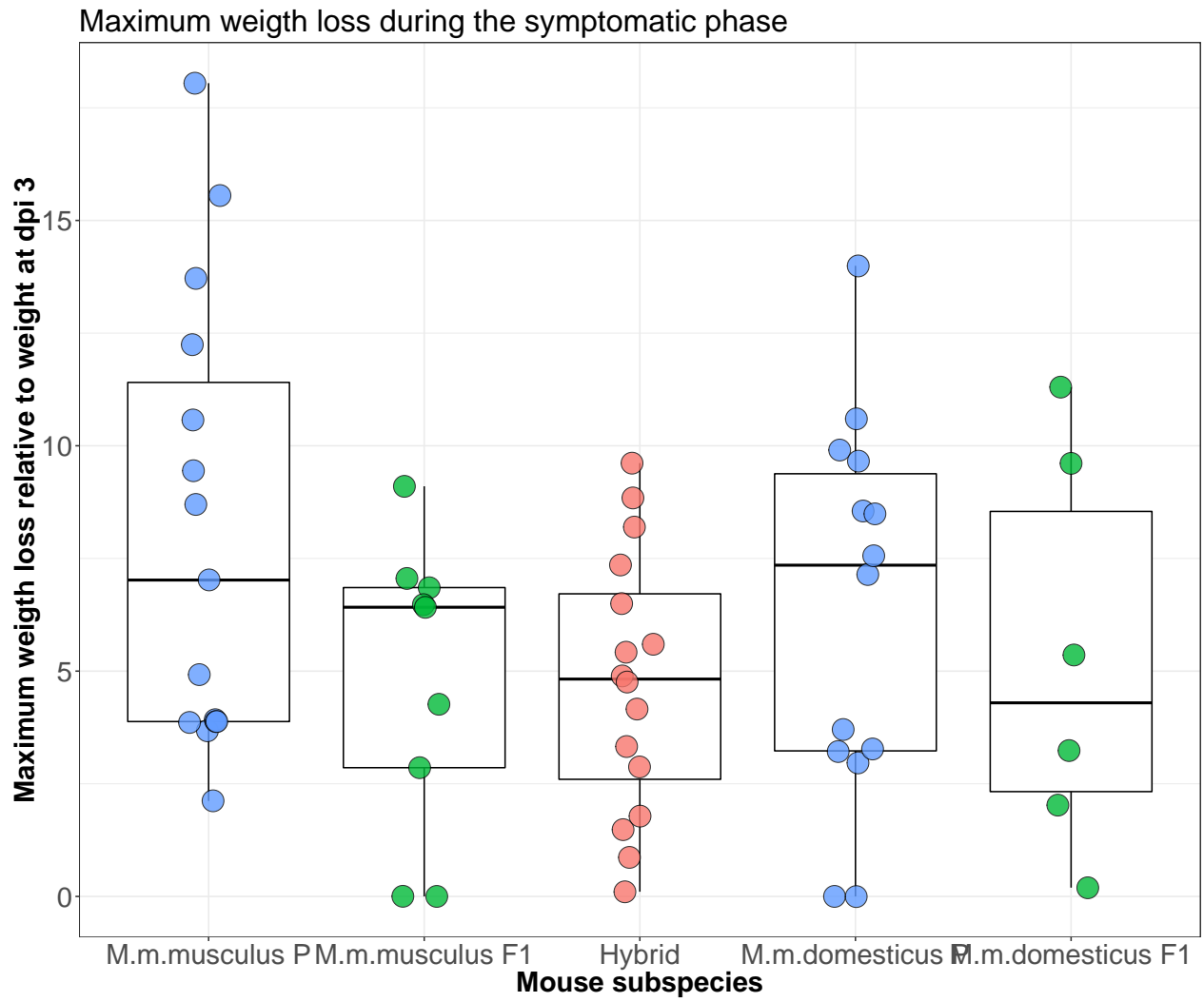Mean relative weight along experiment compared to dpi3

For statistical analysis, we compare the maximum relative weight loss between the different groups. We limit our analysis to the period : dpi3 to dpi8 (symptomatic period for E64 strain).
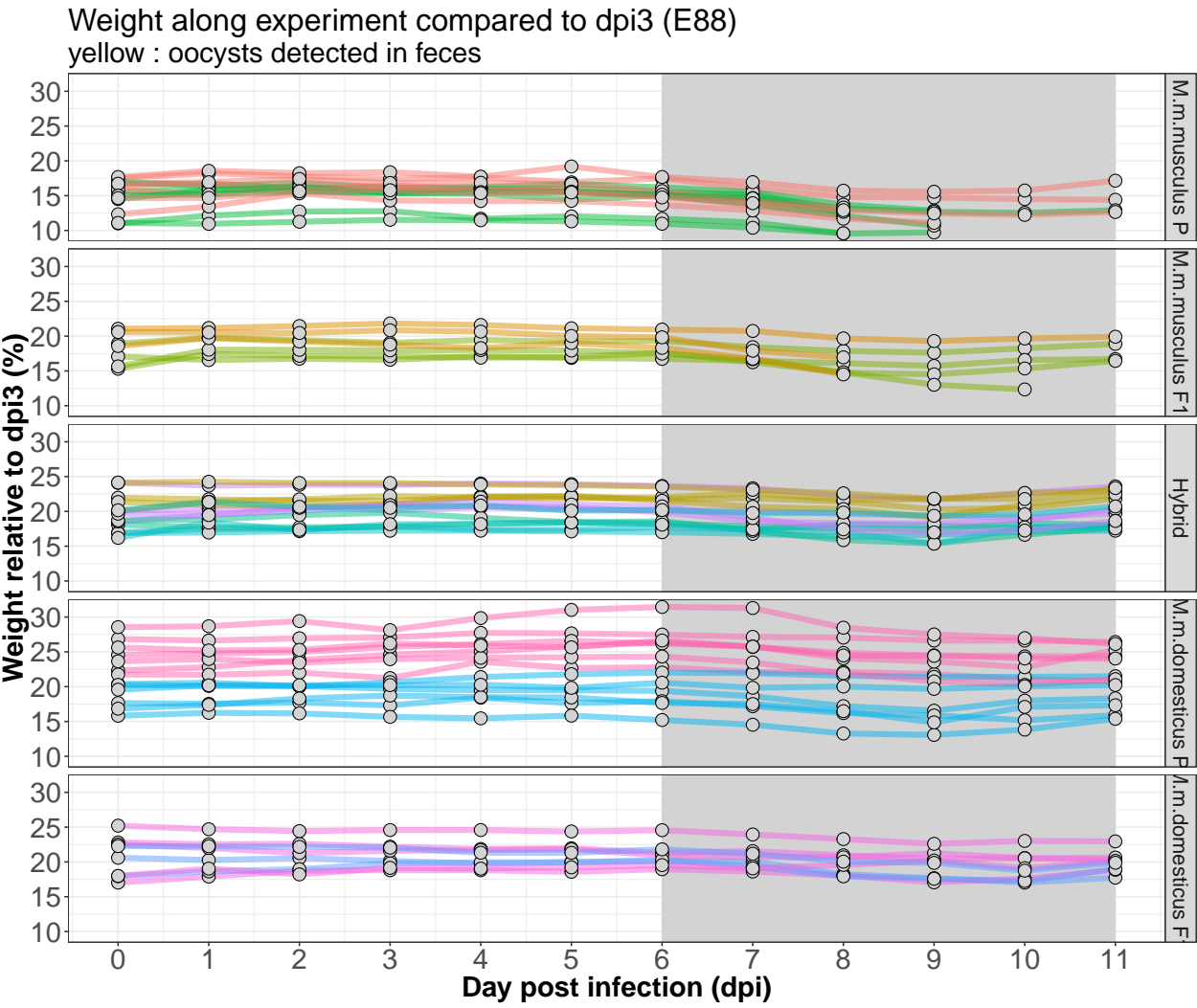
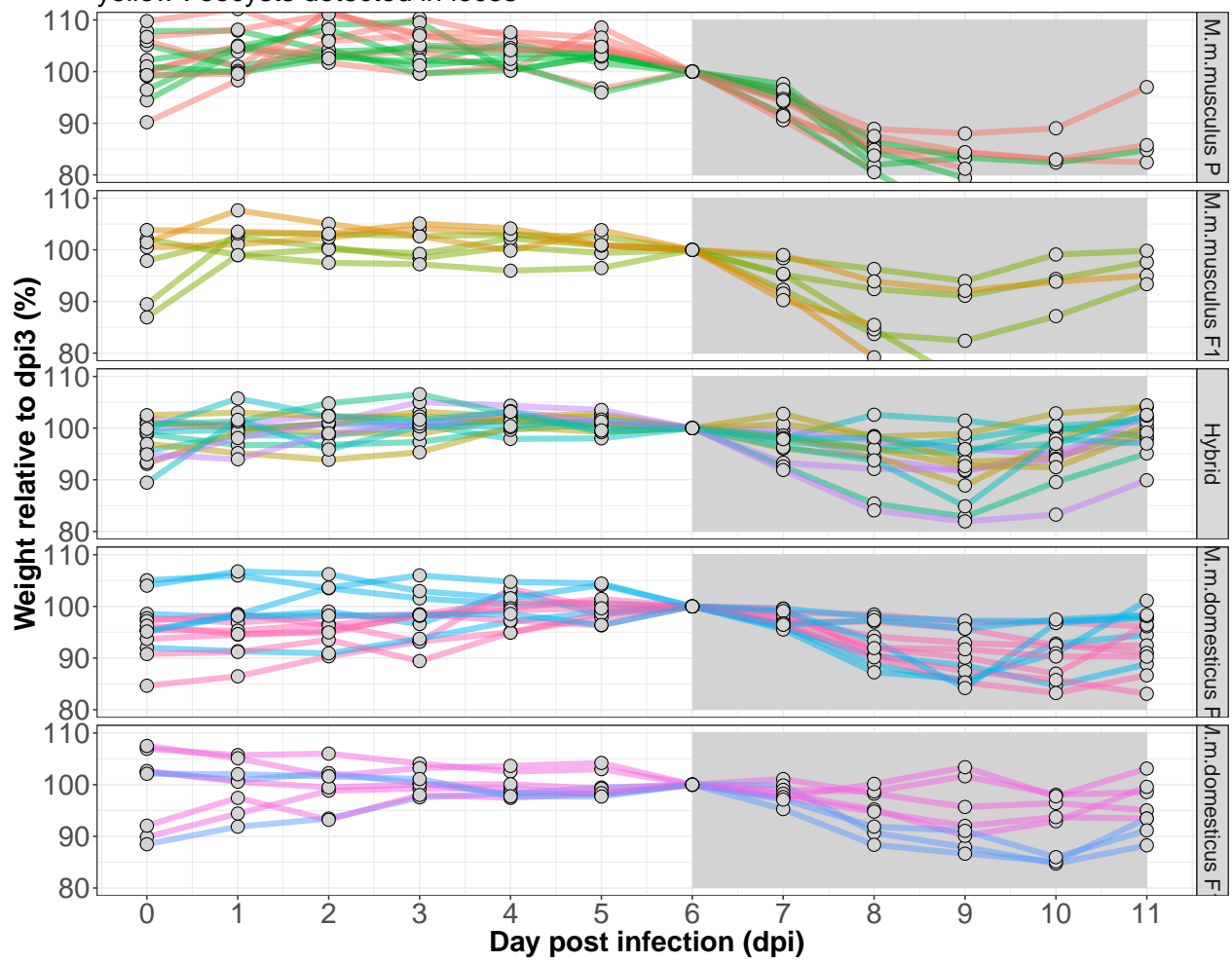## Maximum weigth loss during the symptomatic phase
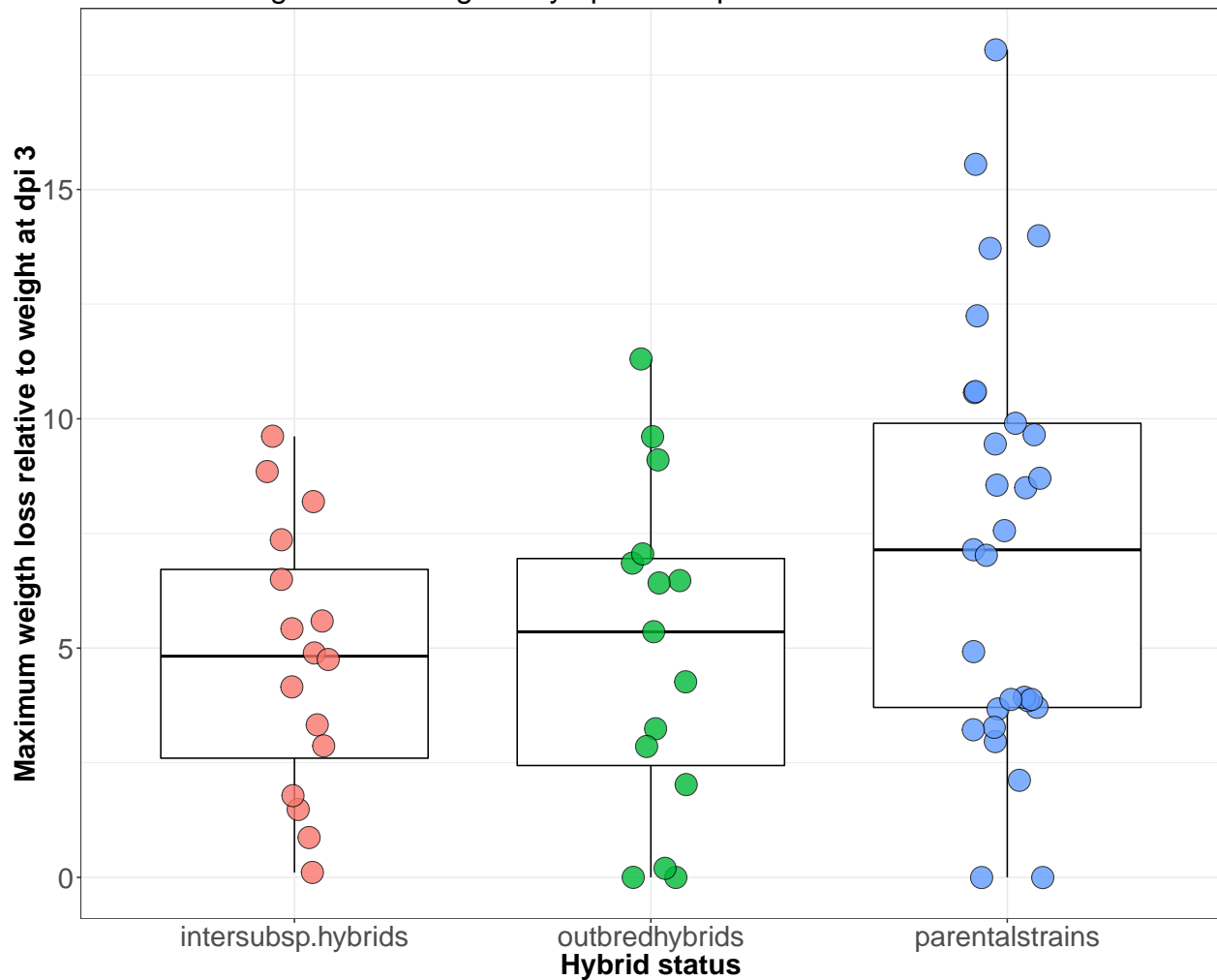

```
##
## Call:
## lm(formula = relativeWeight ~ HybridStatus, data = max.loss_005_E64)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -10.784  -2.451  -0.088   3.381   7.262
##
## Coefficients:
##                            Estimate Std. Error t value Pr(>|t|)
## (Intercept)                 95.2644     0.9968  95.569   <2e-16 ***
## HybridStatusoutbredhybrids  -0.2467     1.4330  -0.172   0.8639
## HybridStatusparentalstrains -2.5264     1.2417  -2.035   0.0466 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.987 on 57 degrees of freedom
## Multiple R-squared:  0.08785,    Adjusted R-squared:  0.05585
## F-statistic: 2.745 on 2 and 57 DF,  p-value: 0.07275
```

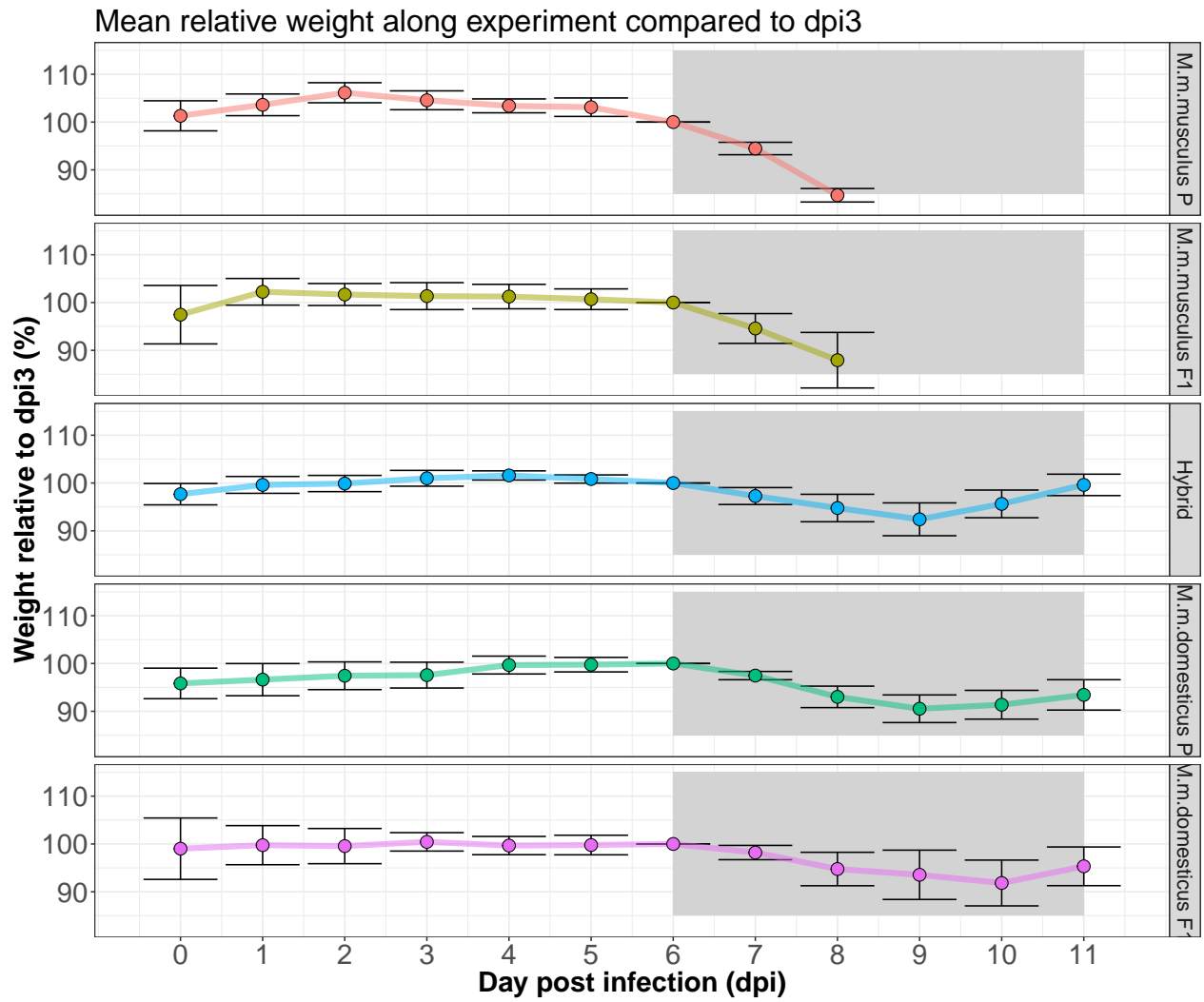Maximum weigth loss during the symptomatic phase

Eimeria falciformis

Weight along experiment compared to dpi3 (E88)
yellow : oocysts detected in feces

Relative weight along experiment compared to dpi3 (E88)
yellow : oocysts detected in feces

Mean relative weight along experiment compared to dpi3

For statistical analysis, we compare the maximum relative weight loss between the different groups. We limit our analysis to the period : dpi7 to dpi11 (symptomatic period for E88 strain).

Maximum weigth loss during the symptomatic phase
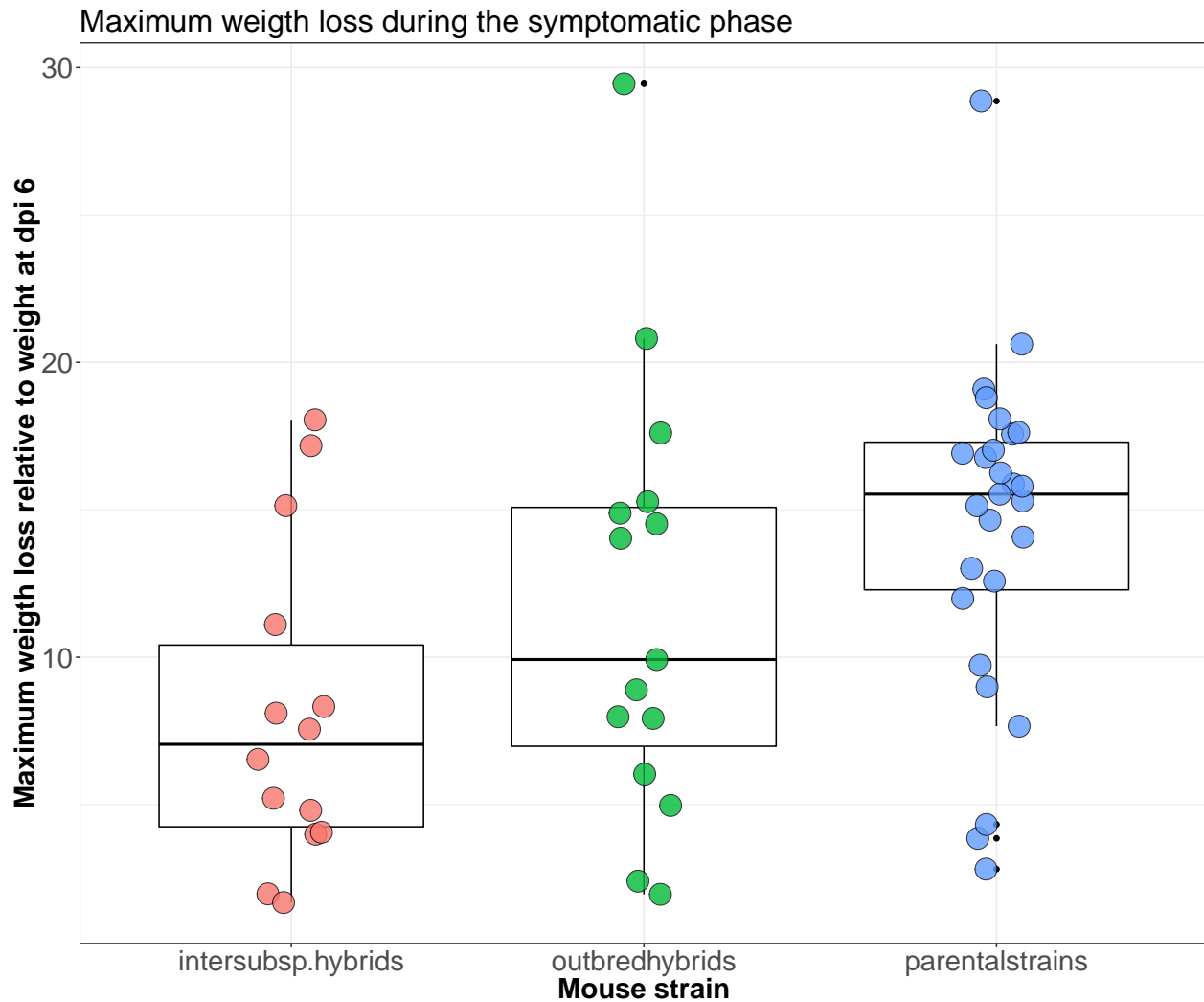
```
##
## Call:
## lm(formula = relativeWeight ~ HybridStatus, data = max.loss_005_E88)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -17.6680  -3.1200  -0.2234   3.9057  11.5879
##
## Coefficients:
##                              Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    91.877      1.620  56.723  < 2e-16 ***
## HybridStatusoutbredhybrids     -3.655      2.252  -1.623  0.11060
## HybridStatusparentalstrains    -6.281      1.996  -3.147  0.00271 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.061 on 53 degrees of freedom
## Multiple R-squared:  0.1583, Adjusted R-squared:  0.1266
## F-statistic: 4.985 on 2 and 53 DF,  p-value: 0.01038
```

Maximum weigth loss during the symptomatic phase