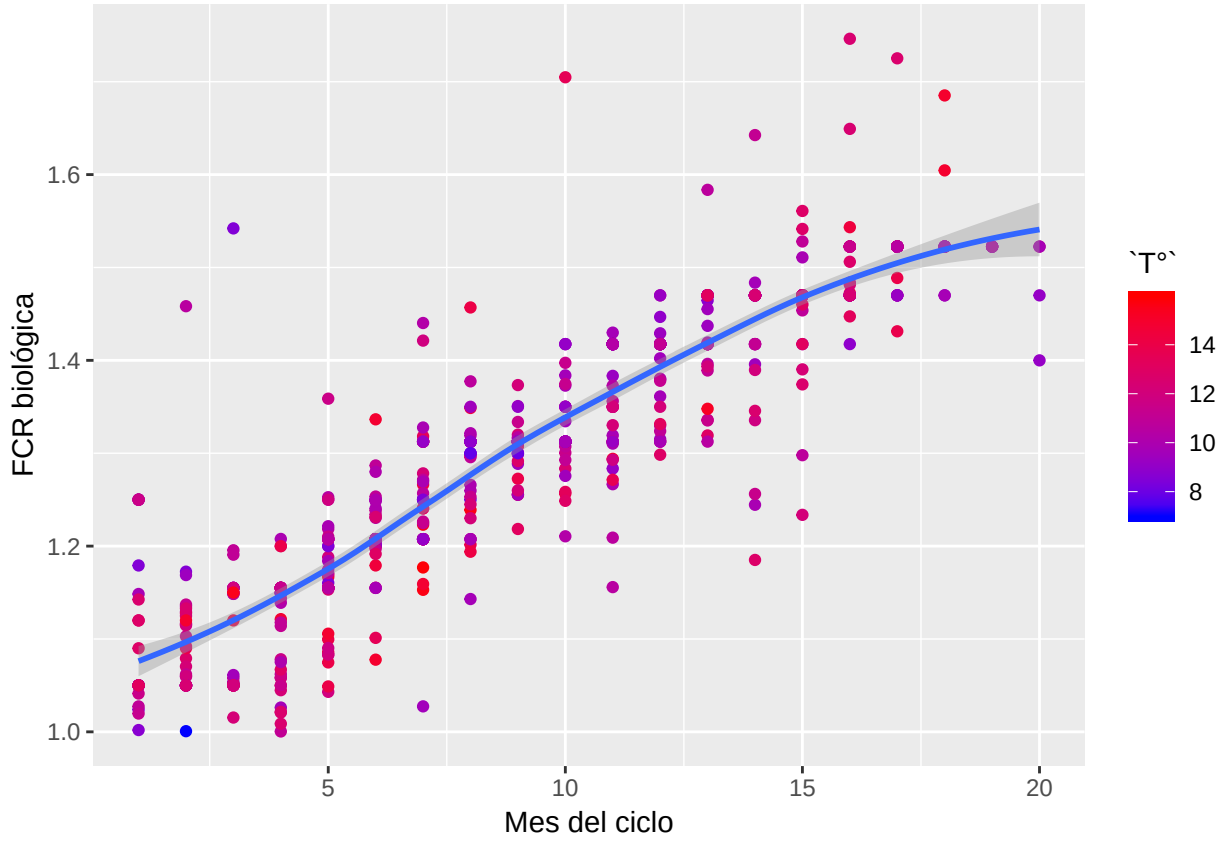
Análisis regresivo para predecir FCR biológica

Introducción

Aquí aparecen los distintos ajustes que probamos para el FCR (food conversion rate) biológico, de acuerdo a los datos que nos entregó Pablo.

Selección de variables predictoras

El siguiente gráfico muestra que la temperatura no parece tener una incidencia significativa en el poder predictivo de los modelos. Queda demostrar esto ajustando modelos multivariados, que también consideren otras variables, como el precio del alimento. Adicionalmente, en el trabajo futuro está ver si el ajuste mejora si creamos distintos modelos dependiendo del mes de siembra.

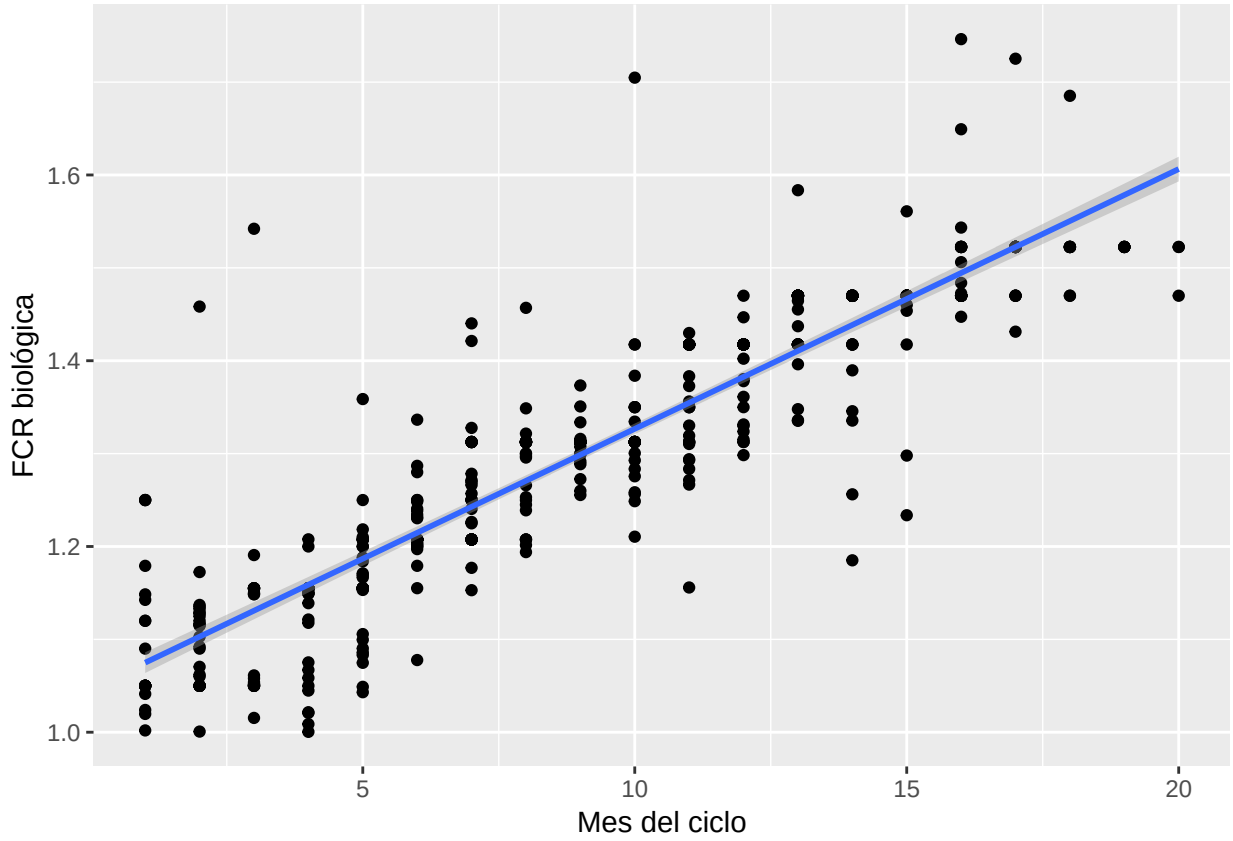


Regresión lineal

```
##
## Call:
## lm(formula = FCB.mes ~ counter, data = train.data)
##
## Residuals:
##       Min        1Q   Median       3Q      Max
## -0.25343 -0.03181  0.00003  0.03145  0.41123
##
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 1.0469502  0.0061806  169.39   <2e-16 ***
## counter     0.0279716  0.0005817   48.09   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06493 on 514 degrees of freedom
## Multiple R-squared:  0.8181, Adjusted R-squared:  0.8178
## F-statistic:  2312 on 1 and 514 DF,  p-value: < 2.2e-16
```

```
##         RMSE       R2
## 1 0.06126055 0.847596
```

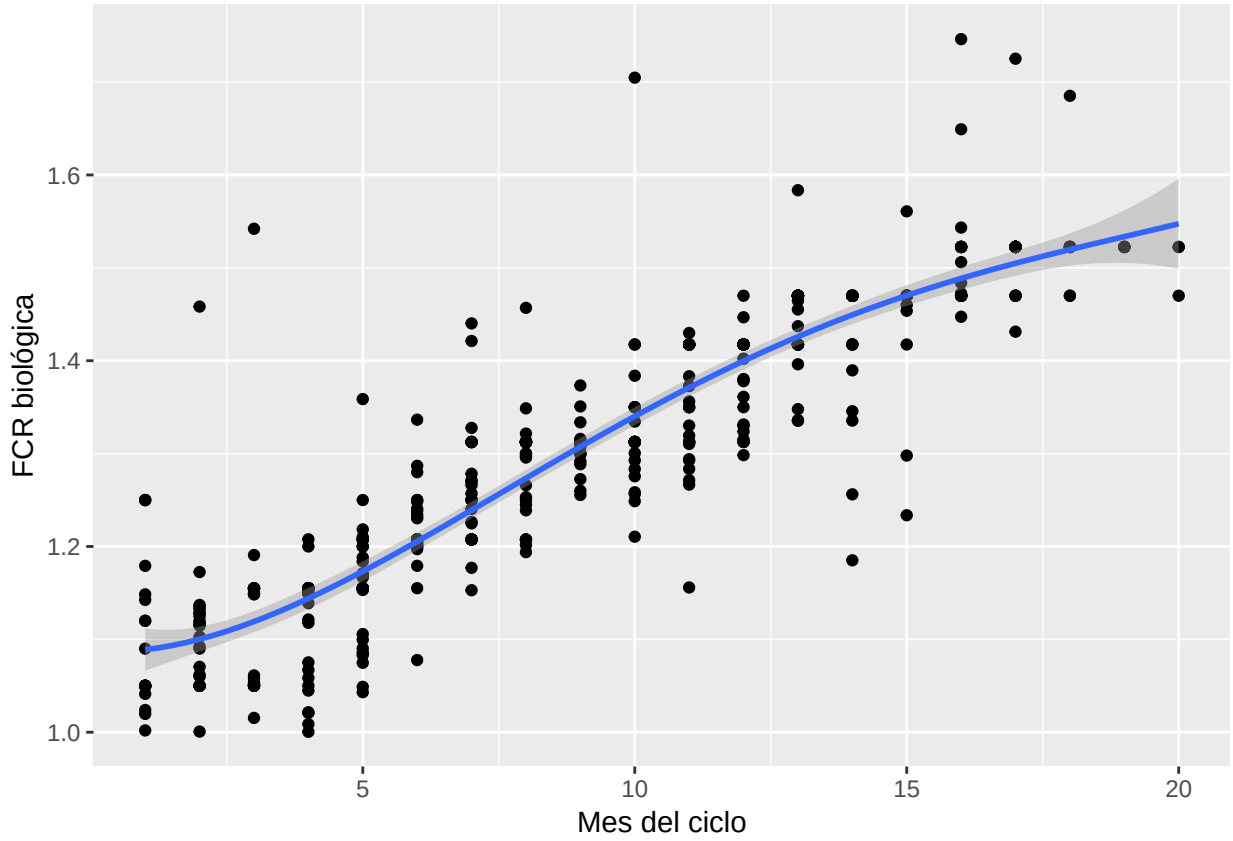


Regresión polinomial de grado 4

```
##
## Call:
## lm(formula = FCB.mes ~ poly(counter, 4, raw = TRUE), data = train.data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.26426 -0.02971  0.00255  0.02788  0.42298
##
## Coefficients:
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    1.087e+00  2.107e-02  51.604   <2e-16 ***
## poly(counter, 4, raw = TRUE)1 -3.820e-03  1.315e-02  -0.290   0.7716
```

```
## poly(counter, 4, raw = TRUE)2  5.836e-03  2.541e-03   2.297   0.0220 *
## poly(counter, 4, raw = TRUE)3 -3.603e-04  1.881e-04  -1.916   0.0559 .
## poly(counter, 4, raw = TRUE)4  6.780e-06  4.691e-06   1.445   0.1490
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06357 on 511 degrees of freedom
## Multiple R-squared:  0.8267, Adjusted R-squared:  0.8253
## F-statistic: 609.4 on 4 and 511 DF,  p-value: < 2.2e-16
```

```
##         RMSE        R2
## 1 0.05866311 0.8610134
```

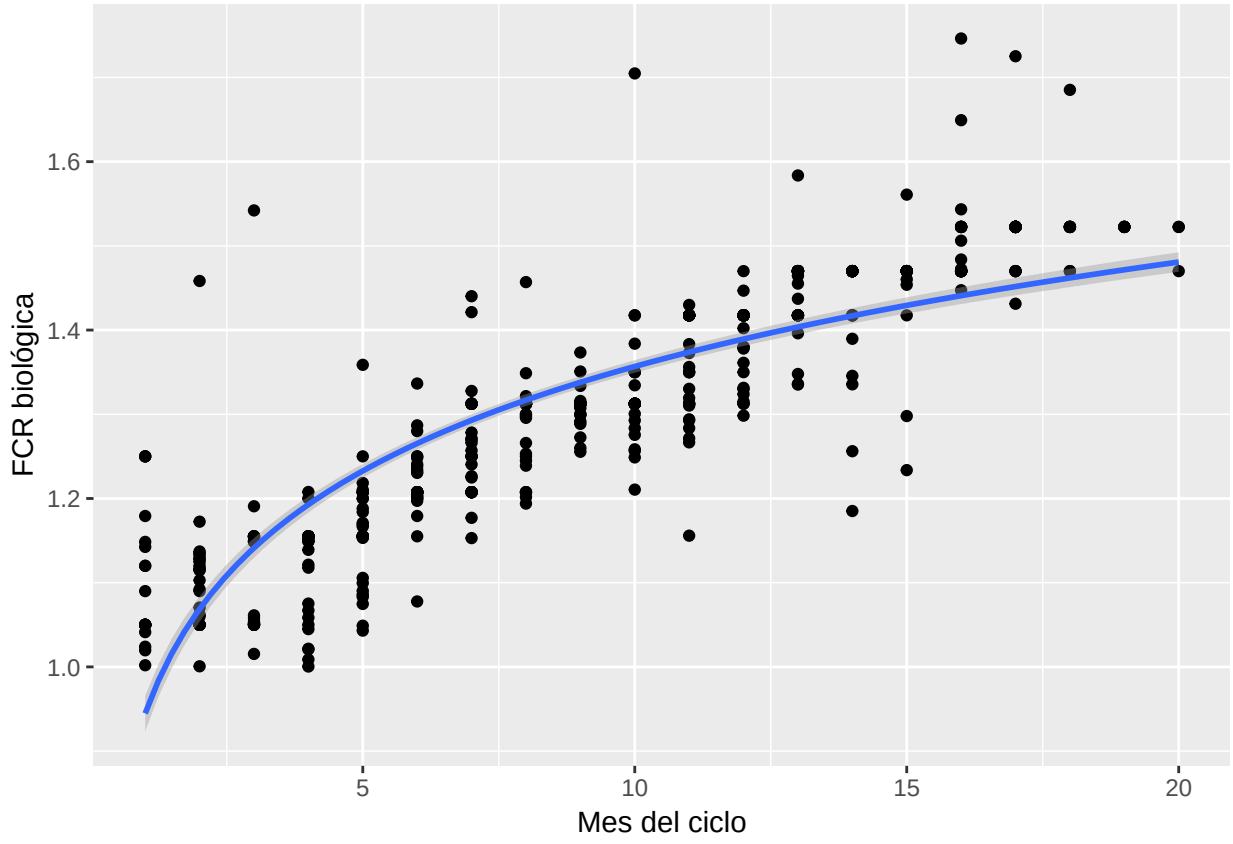


Regresión logarítmica

```
##
## Call:
## lm(formula = FCB.mes ~ log(counter), data = train.data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.23183 -0.05399 -0.00432  0.04424  0.40077
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  0.944756   0.010748   87.90   <2e-16 ***
## log(counter) 0.178926   0.004961   36.07   <2e-16 ***
```

```
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.08102 on 514 degrees of freedom
## Multiple R-squared:  0.7168, Adjusted R-squared:  0.7162
## F-statistic:  1301 on 1 and 514 DF,  p-value: < 2.2e-16
```

```
##         RMSE       R2
## 1 0.07965515 0.7392267
```

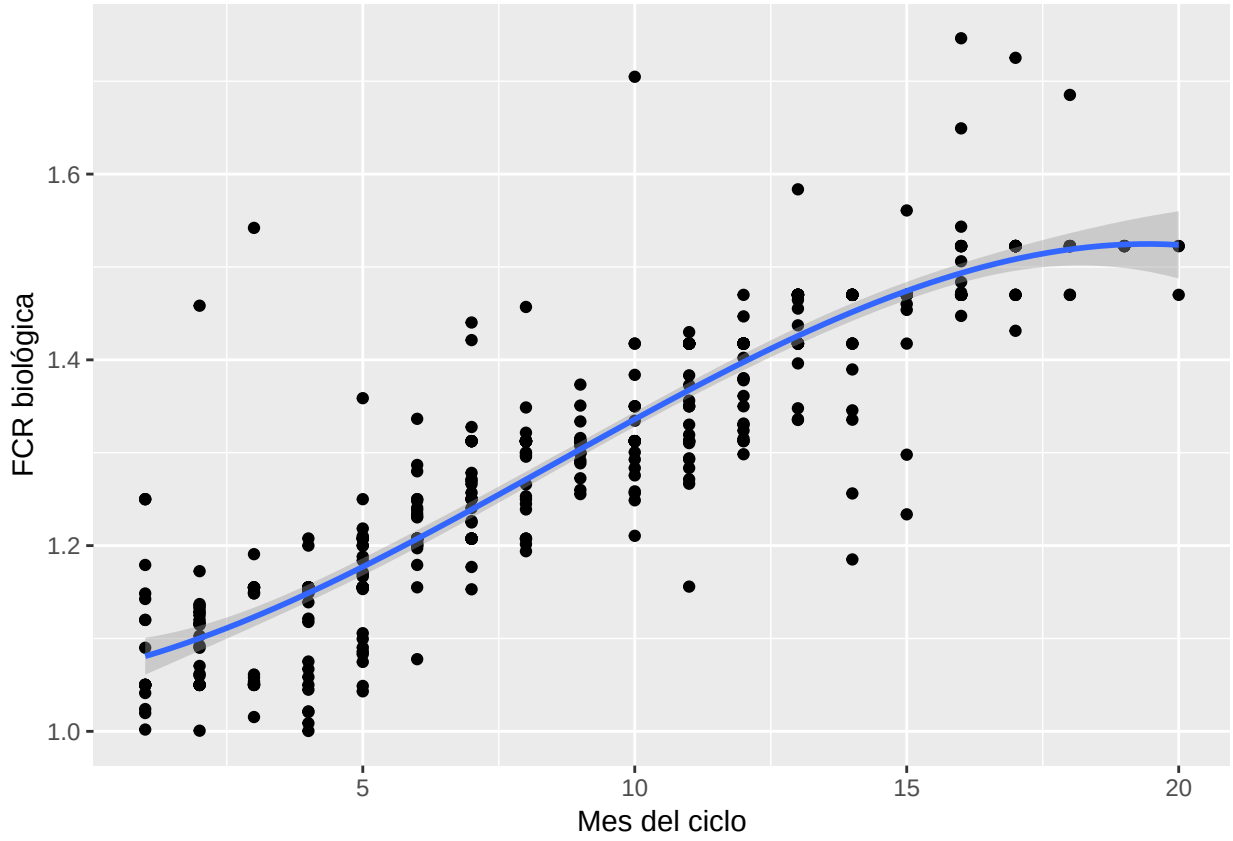


Regresión con splines

```
##
## Call:
## lm(formula = FCB.mes ~ bs(counter, knots = knots), data = train.data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.25868 -0.02916 -0.00133  0.02647  0.43453
##
## Coefficients:
##                              Estimate Std. Error t value Pr(>|t|)
## (Intercept)                   1.10276    0.01321  83.492  < 2e-16 ***
## bs(counter, knots = knots)1 -0.02925    0.02645  -1.106 0.269301
## bs(counter, knots = knots)2  0.06728    0.01982   3.394 0.000742 ***
## bs(counter, knots = knots)3  0.22335    0.02037  10.965  < 2e-16 ***
## bs(counter, knots = knots)4  0.32636    0.02271  14.373  < 2e-16 ***
```

```
## bs(counter, knots = knots)5  0.46105    0.02735  16.857  < 2e-16 ***
## bs(counter, knots = knots)6  0.40762    0.03083  13.223  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06319 on 509 degrees of freedom
## Multiple R-squared:  0.8294, Adjusted R-squared:  0.8274
## F-statistic: 412.5 on 6 and 509 DF,  p-value: < 2.2e-16
```

```
##         RMSE        R2
## 1 0.05802241 0.8647695
```



Modelo aditivo generalizado

```
##
## Family: gaussian
## Link function: identity
##
## Formula:
## FCB.mes ~ s(counter)
##
## Parametric coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 1.310458   0.002758   475.2   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
```

```
## Approximate significance of smooth terms:
##               edf Ref.df     F p-value
## s(counter) 7.461  8.397 300.7  <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## R-sq.(adj) =   0.83   Deviance explained = 83.3%
## GCV = 0.0039892  Scale est. = 0.0039238  n = 516
```

```
##         RMSE        R2
## 1 0.05863538 0.8612651
```