

Water uptake kinetics

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```
suppressPackageStartupMessages(library("Hmisc"))
```

Water uptake data import

```
fw = read.table("./water_uptake_data.txt",  
                header=T,  
                sep="\t",  
                dec=".",  
                as.is=T)
```

First model for 0 - 32h

Equation for germination phase I and II: $y = f(x) = \sqrt{x}$

```
fit2 = lm(formula = mean_fw ~ sqrt(timepoint), data = fw[1:17,])
summary(fit2)
```

```
##
## Call:
## lm(formula = mean_fw ~ sqrt(timepoint), data = fw[1:17, ])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -3.2381 -0.7906  0.4451  1.0136  1.5595
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    3.2381     0.8830   3.667  0.00229 **
## sqrt(timepoint)  4.1287     0.2208  18.702 8.32e-12 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.385 on 15 degrees of freedom
## Multiple R-squared:  0.9589, Adjusted R-squared:  0.9561
## F-statistic: 349.8 on 1 and 15 DF, p-value: 8.322e-12
```

Second model for 32 - 72h

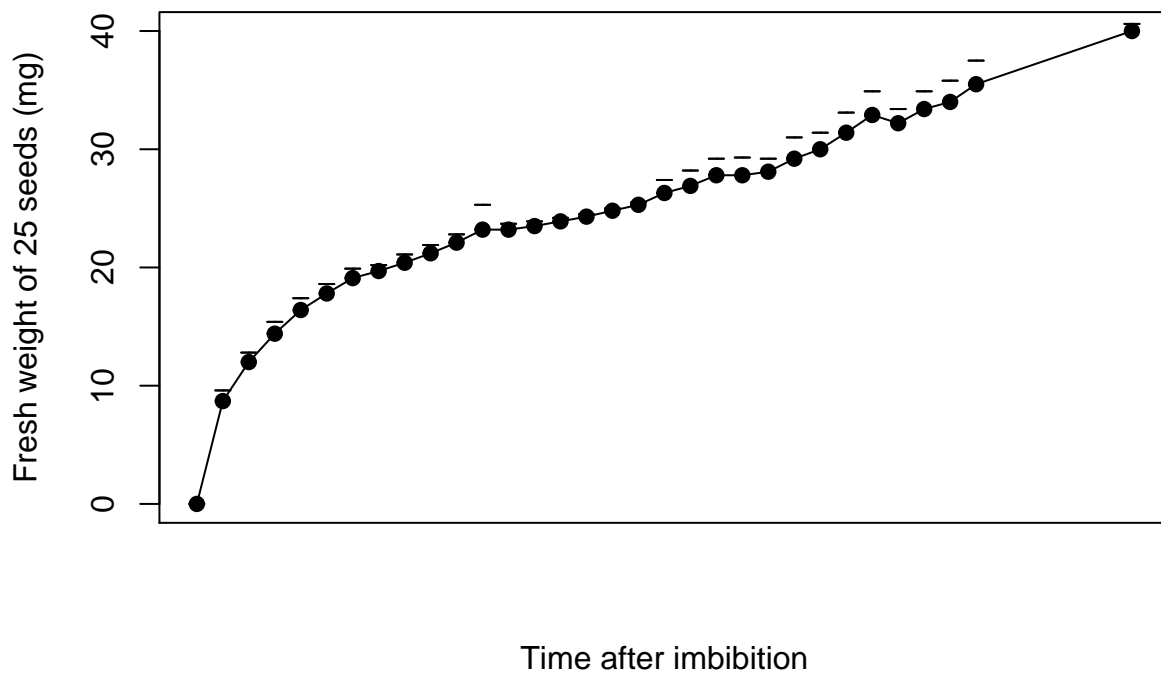
```
fit3 = lm(mean_fw ~ timepoint, data=fw[18:32,])
summary(fit3)
```

```
##
## Call:
## lm(formula = mean_fw ~ timepoint, data = fw[18:32, ])
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.8237 -0.4087  0.1668  0.3573  0.8970
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  11.98768     0.64941   18.46 1.04e-10 ***
## timepoint     0.38491     0.01307   29.45 2.76e-13 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.5052 on 13 degrees of freedom
## Multiple R-squared:  0.9852, Adjusted R-squared:  0.9841
## F-statistic: 867 on 1 and 13 DF, p-value: 2.76e-13
```

Plots

```
with(fw,plot(timepoint,
             mean_fw,
             type="o",
             col="black",
             xaxt="n",
             xlab="Time after imbibition",
             ylab="Fresh weight of 25 seeds (mg)"))
```

```
with(fw,
     errbar(timepoint,
            mean_fw,
            yplus = mean_fw + sd_fw,
            yminus = mean_fw - sd_fw,
            add = TRUE,
            col="black"))
```



Plot with fits overlaid

```
pdf(file = "plot_water_uptake_analysis.pdf", width = 10, height = 7)
with(fw,plot(x = timepoint,
            y = mean_fw,
            type="p",
            col="black",
            xaxt="n",
            xlab="Time after imbibition",
            ylab="Fresh weight of 25 seeds (mg)"))
```

```
with(fw,axis(1,at=c(0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,72),labels=c(0,4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,72))))
```

```
with(fw,lines(timepoint[18:32], predict(fit3),col="red",lwd=2))
with(fw,lines(timepoint[1:17], predict(fit2),col="green",lwd=2))

# legend of plot B
legend(4,40,c("Linear regression 0-32h","Linear regression 34-72h"),lty=c(2,2),lwd=c(2,2),col=c("green",
"red"),bty="n",cex=1.2)
dev.off()

## pdf
## 2
```