Analysis_ramping

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First we download the data and remove embty columns

```
data <- read.table(here('data','Ramp_4days.csv'), header = TRUE,
                   sep = ";", dec = ",")
head(data)
```

```
##    ï..ID CTmax Temp  X X.1 X.2 X.3 X.4 X.5 X.6 X.7 X.8 X.9 X.10 X.11 X.12
## 1 FG20-1 39.94   20 NA  NA  NA  NA  NA  NA  NA  NA  NA  NA   NA   NA   NA
## 2 FG20-2 40.07   20 NA  NA  NA  NA  NA  NA  NA  NA  NA  NA   NA   NA   NA
## 3 FG13-1    NA   13 NA  NA  NA  NA  NA  NA  NA  NA  NA  NA   NA   NA   NA
## 4 FG13-2 38.68   13 NA  NA  NA  NA  NA  NA  NA  NA  NA  NA   NA   NA   NA
## 5 FG20-3 41.46   20 NA  NA  NA  NA  NA  NA  NA  NA  NA  NA   NA   NA   NA
## 6 FG13-3 39.49   13 NA  NA  NA  NA  NA  NA  NA  NA  NA  NA   NA   NA   NA
```

```
data <- data[,1:3]
data <- data[complete.cases(data),]
```

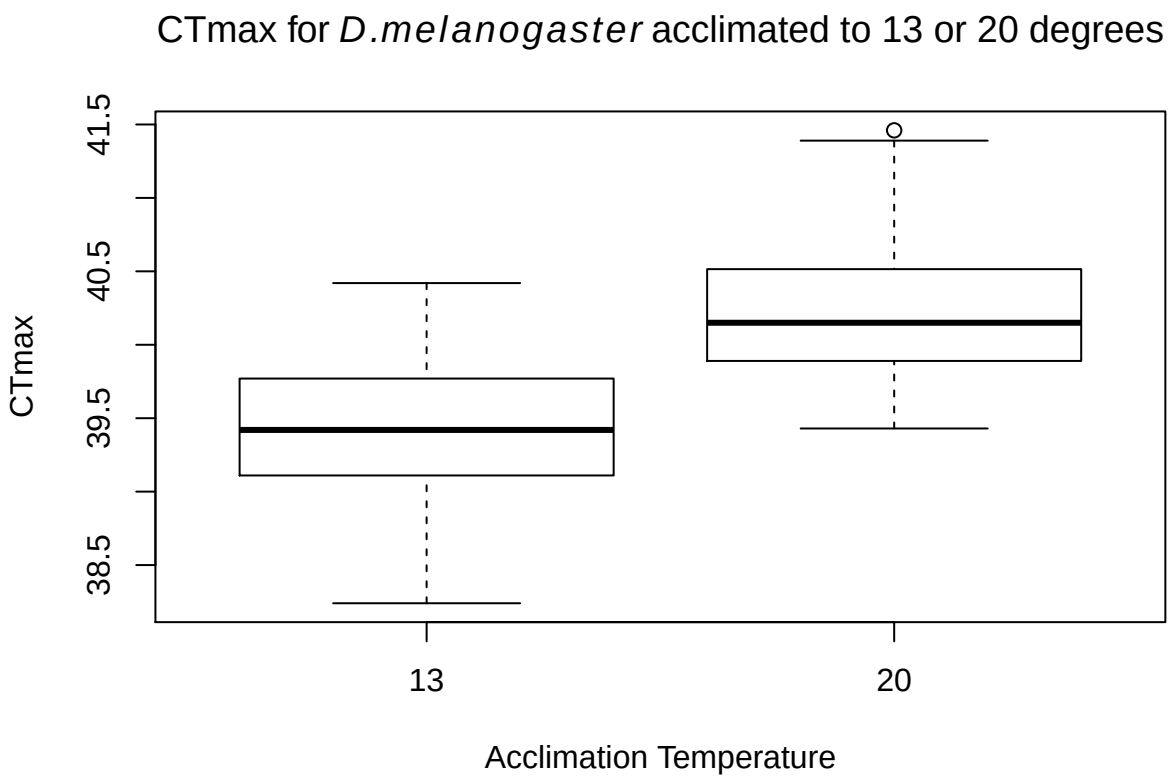
here() should show that your position is in the folder 7.semester else either download 7.semester from github again or create a .Rproj file in the folder on your computer One fly died from water entering the tube and is marked NA so it is removed. Or make a new .Rproj file in the folder 7.semester. There is a problem with the numbers of the so we change that with col.names()

```
colnames(data)<-c('ID',"Ctmax","Temp")
head(data)
```

```
##       ID Ctmax Temp
## 1 FG20-1 39.94   20
## 2 FG20-2 40.07   20
## 4 FG13-2 38.68   13
## 5 FG20-3 41.46   20
## 6 FG13-3 39.49   13
## 7 FG20-4 40.15   20
```

We then compare the two acclimation temperatures first with a boxplot

```
boxplot(data$Ctmax ~ data$Temp, xlab = 'Acclimation Temperature',
        ylab = 'CTmax',
        main = expression('CTmax for' ~italic(D.melanogaster) ~ 'acclimated to 13 or 20 degrees' ))
```



This shows a difference in median Ctmax. To look more finegrained at the distribution of CTmax we use a survival curve

Then we create a survival object with the survival package and make a kaplan-meier curve

```
data$status <- rep(1,75)
data$Survobj <- with(data,Surv(data$Ctmax, event = data$status))
km <- survfit(Survobj ~ Temp, data = data,conf.type = "log-log")
```

Which shows a clear difference

```
survdiff(Survobj ~Temp, data = data, rho = 0)
```

```
## Call:
## survdiff(formula = Survobj ~ Temp, data = data, rho = 0)
##
##           N Observed Expected (O-E)^2/E (O-E)^2/V
## Temp=13 39       39     19.3     20.23      32.2
## Temp=20 36       36     55.7      6.99      32.2
##
##  Chisq= 32.2  on 1 degrees of freedom, p= 1e-08
```

```
survdiff(Survobj ~Temp, data = data, rho = 1)
```

```
## Call:
```

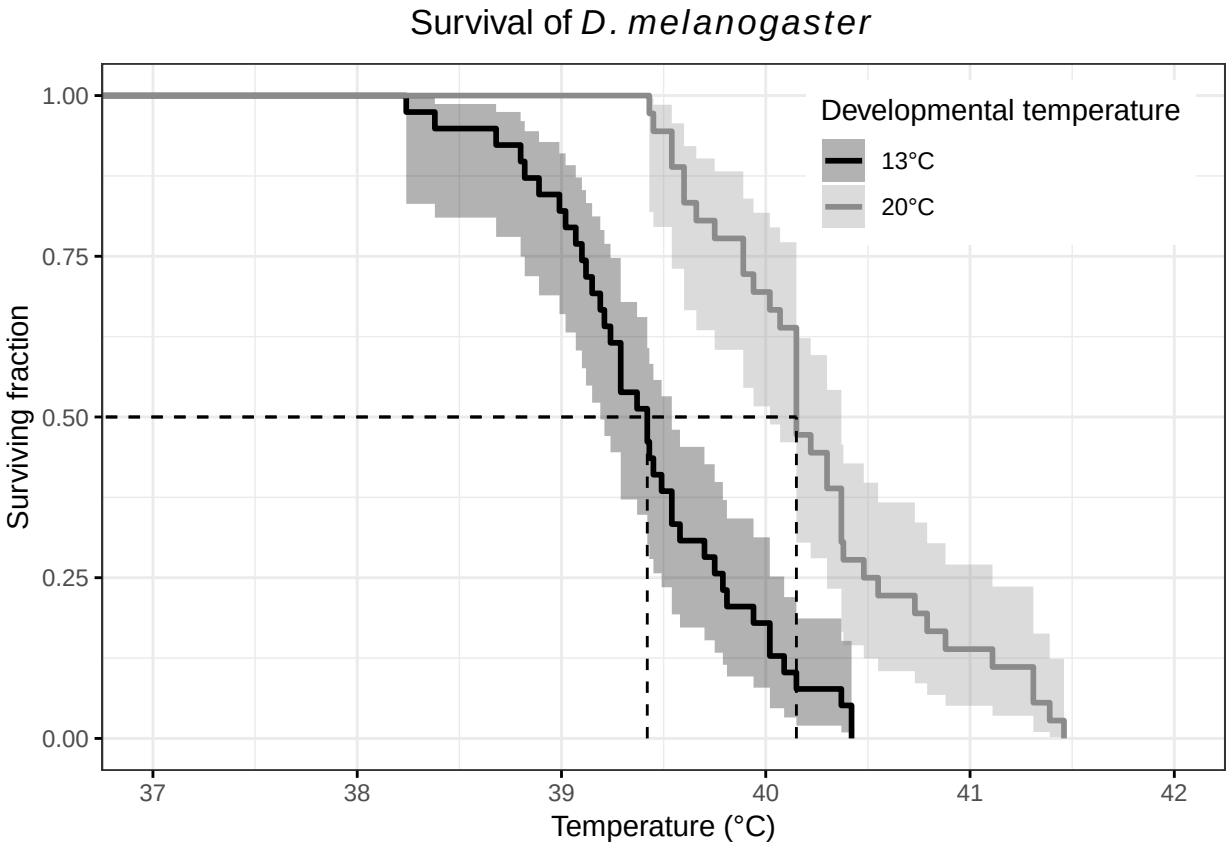
```
## survdiff(formula = Survobj ~ Temp, data = data, rho = 1)
##
##          N Observed Expected (O-E)^2/E (O-E)^2/V
## Temp=13 39     26.9     13.1      14.7      33.4
## Temp=20 36     11.7     25.6       7.5      33.4
##
##  Chisq= 33.4  on 1 degrees of freedom, p= 7e-09
```

```
fit <- coxph(Surv(Ctmax,status) ~Temp, data = data)
summary(fit)
```

```
## Call:
## coxph(formula = Surv(Ctmax, status) ~ Temp, data = data)
##
##   n= 75, number of events= 75
##
##          coef exp(coef) se(coef)      z Pr(>|z|)
## Temp -0.19951   0.81913  0.03769 -5.293  1.2e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
##      exp(coef) exp(-coef) lower .95 upper .95
## Temp    0.8191      1.221    0.7608    0.8819
##
## Concordance= 0.691  (se = 0.02 )
## Rsquare= 0.316   (max possible= 0.999 )
## Likelihood ratio test= 28.49  on 1 df,   p=9e-08
## Wald test            = 28.02  on 1 df,   p=1e-07
## Score (logrank) test = 31.77  on 1 df,   p=2e-08
```

Which both find a significant difference between the groups But we can make a nicer survival curve with a different package survminer and add readable confidence intervals

```
mycols <- c(gray.colors(4,0,0.9))
ggsurvplot(km,data = data, conf.int = TRUE, ggtheme = theme_bw(),
           xlim = c(37,42), xlab = 'Temperature (°C)',ylab = 'Surviving fraction',title = expression('
           legend = c(0.8,0.86), legend.title = 'Developmental temperature',
           legend.labs = c('13°C','20°C'),
           break.x.by = 1, surv.median.line = 'hv')
```



Which very clearly shows the difference between the different acclimation temperatures