

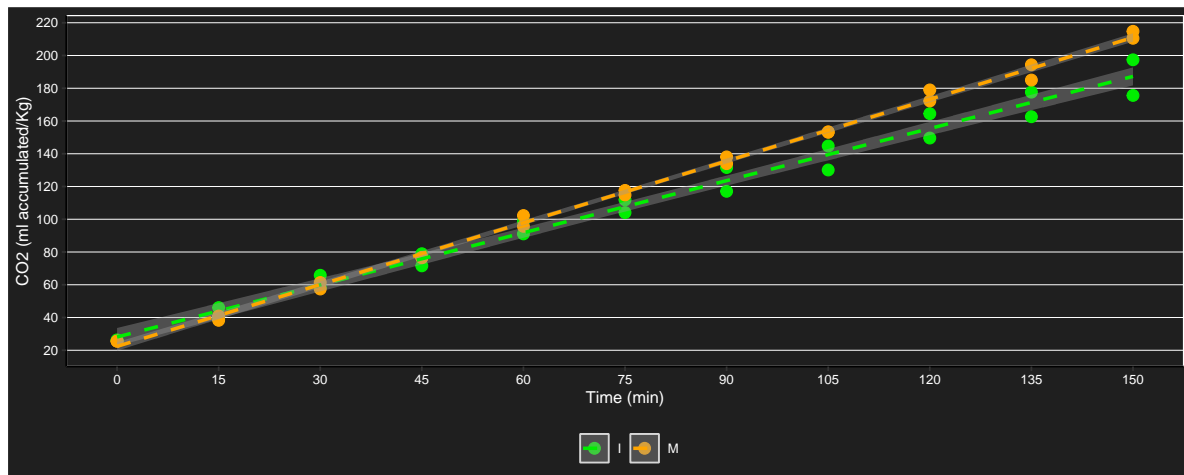
Respiration essay in *Hexachlamys edulis*



Figure 1: A caption

Immature and mature ubajay fruits were selected and randomly distributed in 4 jars, 2 immature and 2 mature, then respiration was quantified from accumulated CO₂ every 15 minutes for 150 minutes.

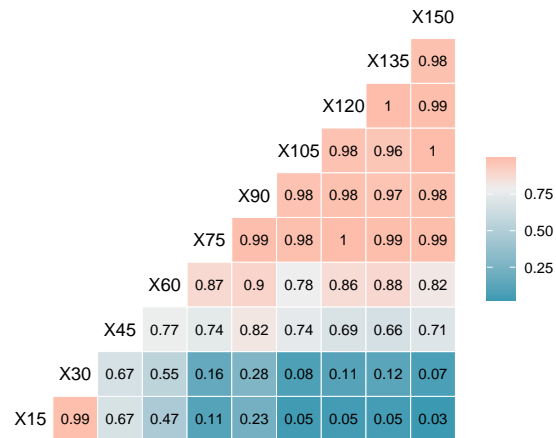
CO2 acumulation



Descriptive table

```
## # A tibble: 20 x 7
## # Groups:   time_min [10]
##   time_min matu carbon_ac_n carbon_ac_Mean carbon_ac_sd carbon_ac_min carbon_ac_max
##   <fct>     <fct>      <int>      <dbl>      <dbl>      <dbl>      <dbl>
## 1 15      I          2       42.5       4.97       39.0       46.1
## 2 15      M          2       39.6       1.86       38.3       40.9
## 3 30      I          2       62.2       5.13       58.5       65.8
## 4 30      M          2       59.4       2.79       57.4       61.4
## 5 45      I          2       75.2       5.23       71.5       78.9
## 6 45      M          2       76.6       0.110      76.6       76.7
## 7 60      I          2       94.9       5.39       91.1       98.7
## 8 60      M          2       99.0       4.66       95.7      102.
## 9 75      I          2      108.       5.50      104.      112.
## 10 75     M          2      116.       1.97      115.      118.
## 11 90      I          2      124.      10.3      117.      132.
## 12 90     M          2      136.       2.91      134.      138.
## 13 105     I          2      137.      10.4      130.      145.
## 14 105    M          2      153.      0.221     153.      153.
## 15 120     I          2      157.      10.5      150.      164.
## 16 120    M          2      176.       4.77     172.      179.
## 17 135     I          2      170.      10.6      163.      178.
## 18 135    M          2      190.       6.59     185.      194.
## 19 150     I          2      186.     15.4      176.      197.
## 20 150    M          2      213.       3.02     211.      215.
```

Correlations over time



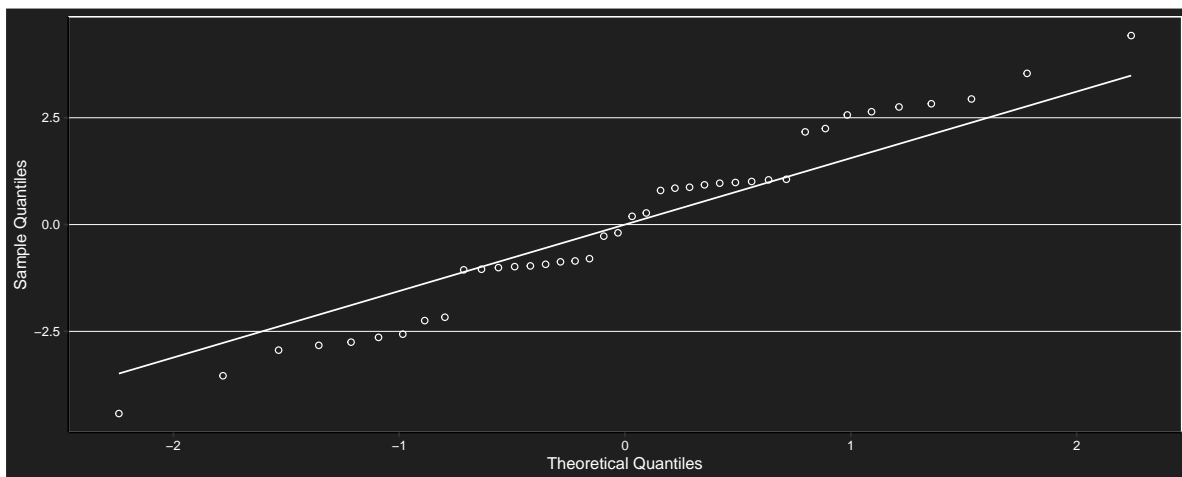
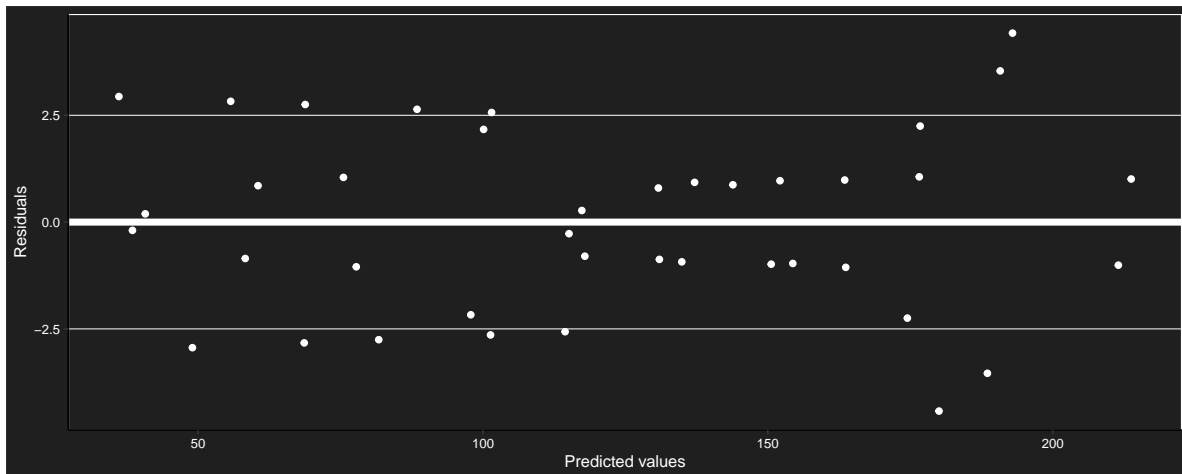
Covariance matrix

```
##          15    30    45    60    75    90   105   120   135   150
## 15  12.28 12.95  7.38  7.79   2.21   7.31   1.73   2.14   2.50   1.66
## 30  12.95 13.93  7.77  9.75   3.59   9.42   3.25   5.23   6.22   4.90
## 45   7.38  7.77  9.77 11.46  13.46  23.37  25.37  27.07  27.76  38.97
## 60   7.79  9.75 11.46 22.55  24.26  38.94  40.66  51.74  56.09  68.14
## 75   2.21  3.59 13.46 24.26  34.14  52.90  62.77  73.57  77.63 102.21
## 90   7.31  9.42 23.37 38.94  52.90  83.40  97.35 112.92 118.82 157.38
## 105  1.73  3.25 25.37 40.66  62.77  97.35 119.47 134.76 140.36 191.45
## 120  2.14  5.23 27.07 51.74  73.57 112.92 134.76 159.43 168.68 220.61
## 135  2.50  6.22 27.76 56.09  77.63 118.82 140.36 168.68 179.37 231.42
## 150  1.66  4.90 38.97 68.14 102.21 157.38 191.45 220.61 231.42 309.86
```

Marginal model with first-order autoregressive structure

```
## gls(model = (carbon_ac) ~ time_min * matu + basal, data = resp2w,
##      correlation = corAR1(form = ~1 | rep))
```

Assumptions



```
##
## Shapiro-Wilk normality test
##
## data: e
## W = 0.9761627, p-value = 0.549824
```

Model coefficients

```
##      (Intercept)      time_min30      time_min45      time_min60      time_min75      time_min90
## -1088.309859117    19.625054307    32.708423844    52.333478151    65.416847689    81.7847689
##      time_min135    time_min150      matuM      basal    time_min30:matuM    time_min45:matuM
##   127.581516934   143.954392798    24.020301930    43.217057762     0.171220178     4.321220178
## time_min90:matuM time_min105:matuM time_min120:matuM time_min135:matuM time_min150:matuM
##    14.634773444    18.790802965    21.518898568    22.485337162    29.098326710
```

Anova

```
## Denom. DF: 19
```

```
##               numDF      F-value p-value
## (Intercept)      1 12422.59816 <.0001
## time_min        9   497.67981 <.0001
## matu            1    23.52445 0.0001
## basal          1    18.30623 0.0004
## time_min:matu    9     4.64451 0.0024
```

Simple effects

```
## $emmeans
## time_min = 15:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I      29.0559310 3.99641289 4.38   18.3274684   39.7843936
## M      53.0762329 3.99641289 4.26   42.2426703   63.9097956
##
## time_min = 30:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I      48.6809853 3.99641289 4.37   37.9473496   59.4146210
## M      72.8725074 3.99641289 4.38   62.1474410   83.5975738
##
## time_min = 45:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I      61.7643548 3.99641289 4.23   50.9066429   72.6220667
## M      90.1119065 3.99641289 4.30   79.3151857  100.9086272
##
## time_min = 60:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I      81.3894091 3.99641289 4.35   70.6412810   92.1375372
## M     112.4650564 3.99641289 4.37  101.7314207  123.1986921
##
## time_min = 75:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I      94.4727787 3.99641289 4.28   83.6565866  105.2889707
## M     129.7044554 3.99641289 4.31  118.9126401  140.4962708
##
## time_min = 90:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I     110.8456545 3.99641289 4.38  100.1171919  121.5741172
## M     149.5007299 3.99641289 4.26  138.6671673  160.3342926
##
## time_min = 105:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I     123.9290241 3.99641289 4.37  113.1953884  134.6626598
## M     166.7401290 3.99641289 4.38  156.0150626  177.4651953
##
## time_min = 120:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I     143.5540784 3.99641289 4.23  132.6963665  154.4117903
## M     189.0932789 3.99641289 4.30  178.2965581  199.8899996
##
## time_min = 135:
##   matu      emmean      SE    df    lower.CL    upper.CL
## I     156.6374479 3.99641289 4.35  145.8893198  167.3855760
```

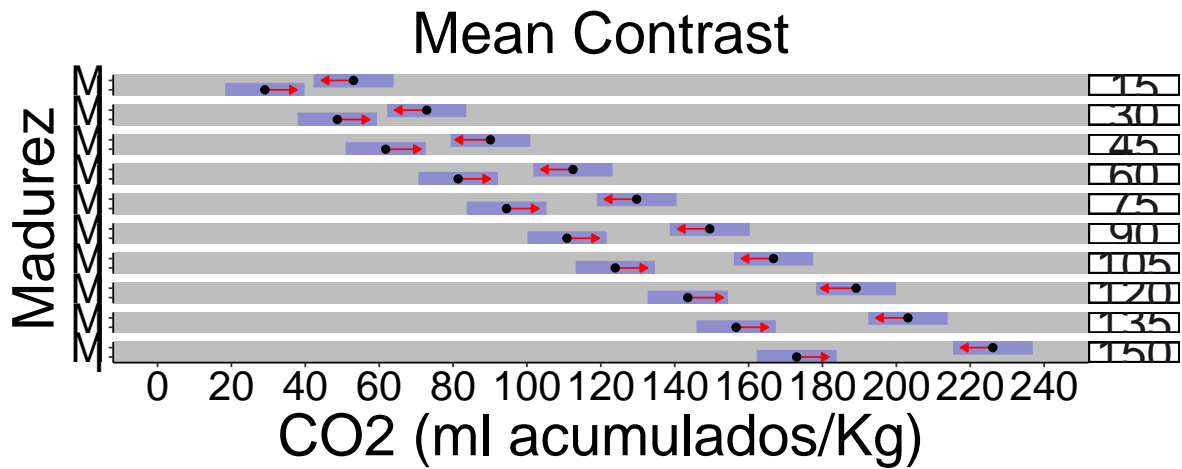
```

## M      203.1430870 3.99641289 4.37 192.4094513 213.8767227
##
## time_min = 150:
##      matu      emmean      SE      df      lower.CL      upper.CL
## I      173.0103238 3.99641289 4.28 162.1941317 183.8265159
## M      226.1289524 3.99641289 4.31 215.3371371 236.9207678
##
## Degrees-of-freedom method: satterthwaite
## Results are given on the ( (not the response) scale.
## Confidence level used: 0.95
##
## $contrasts
## time_min = 15:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -24.0203019 7.19762359 6.29 -3.337 0.0146
##
## time_min = 30:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -24.1915221 7.19762359 6.30 -3.361 0.0141
##
## time_min = 45:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -28.3475516 7.19762359 4.51 -3.938 0.0135
##
## time_min = 60:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -31.0756472 7.19762359 6.28 -4.317 0.0045
##
## time_min = 75:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -35.2316768 7.19762359 6.24 -4.895 0.0024
##
## time_min = 90:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -38.6550754 7.19762359 6.29 -5.371 0.0015
##
## time_min = 105:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -42.8111049 7.19762359 6.30 -5.948 0.0008
##
## time_min = 120:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -45.5392005 7.19762359 4.51 -6.327 0.0021
##
## time_min = 135:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -46.5056391 7.19762359 6.28 -6.461 0.0005
##
## time_min = 150:
##      contrast      estimate      SE      df t.ratio p.value
## I - M      -53.1186286 7.19762359 6.24 -7.380 0.0003
##
## Note: contrasts are still on the ( scale
## Degrees-of-freedom method: satterthwaite

```

Statistically significant differences were found in the CO2 respiration rate in each time between immature and mature *Hexachlamys edulis* fruits.

Comparison chart



Fitted model plot

