

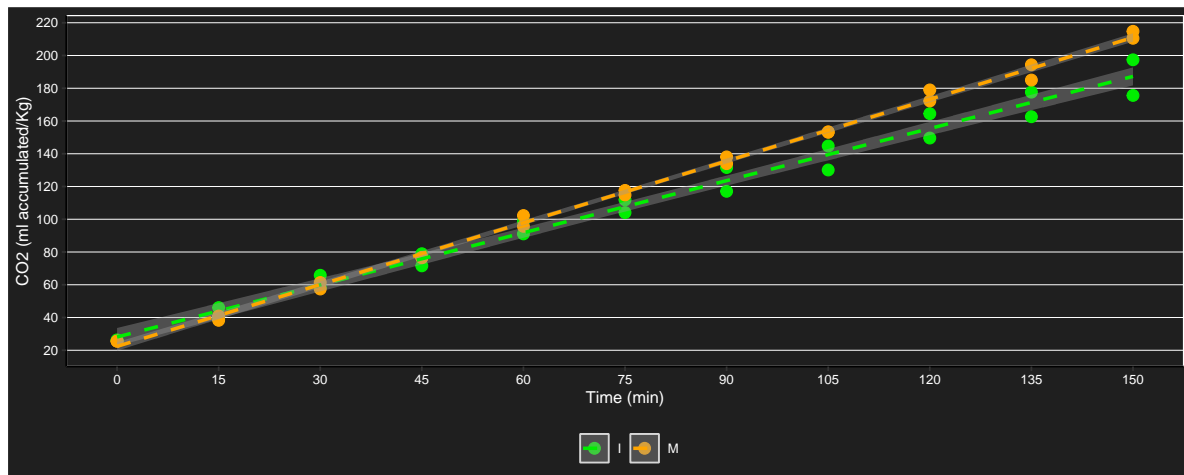
Respiration essay in *Hexachlamys edulis*



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.

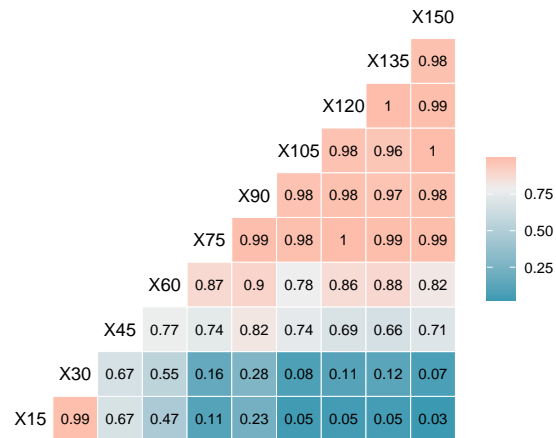
CO2 acumulation



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



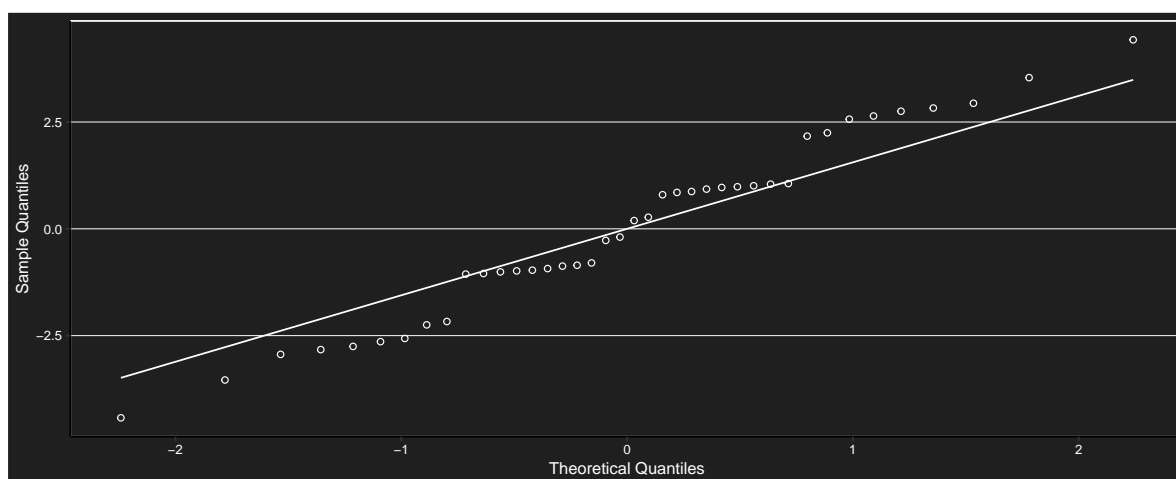
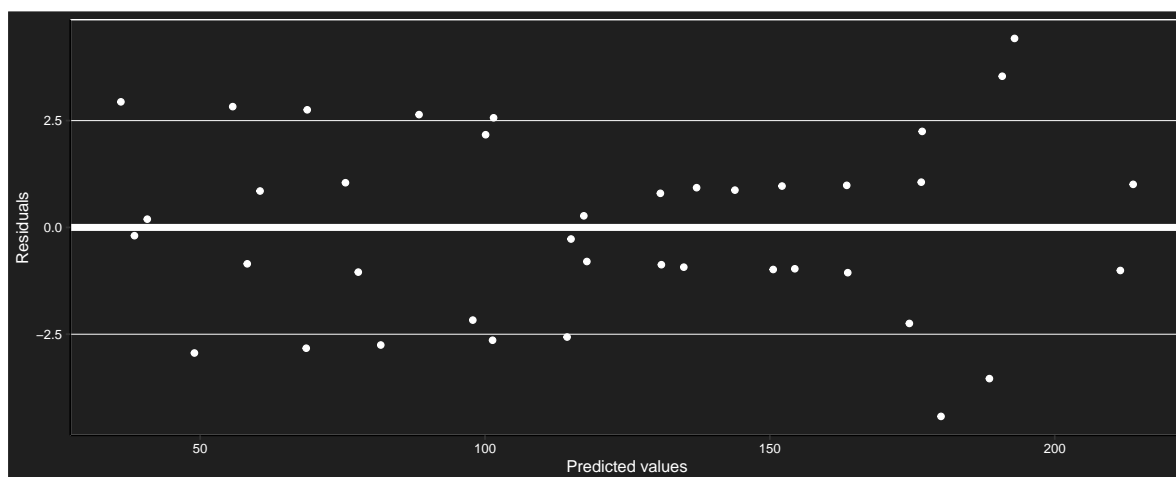
Covariance matrix

```
##          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
## -1088.309859117    19.625054307    32.708423844    52.333478151    65.416847689
##      time_min90      time_min105      time_min120      time_min135      time_min150
##   81.789723552    94.873093090    114.498147397    127.581516934    143.954392798
##      matuM      basal  time_min30:matuM  time_min45:matuM  time_min60:matuM
##   24.020301930    43.217057762     0.171220178     4.327249699     7.055345302
## time_min75:matuM time_min90:matuM time_min105:matuM time_min120:matuM time_min135:matuM
##   11.211374823    14.634773444    18.790802965    21.518898568    22.485337162
## time_min150:matuM
##   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
##
```

```

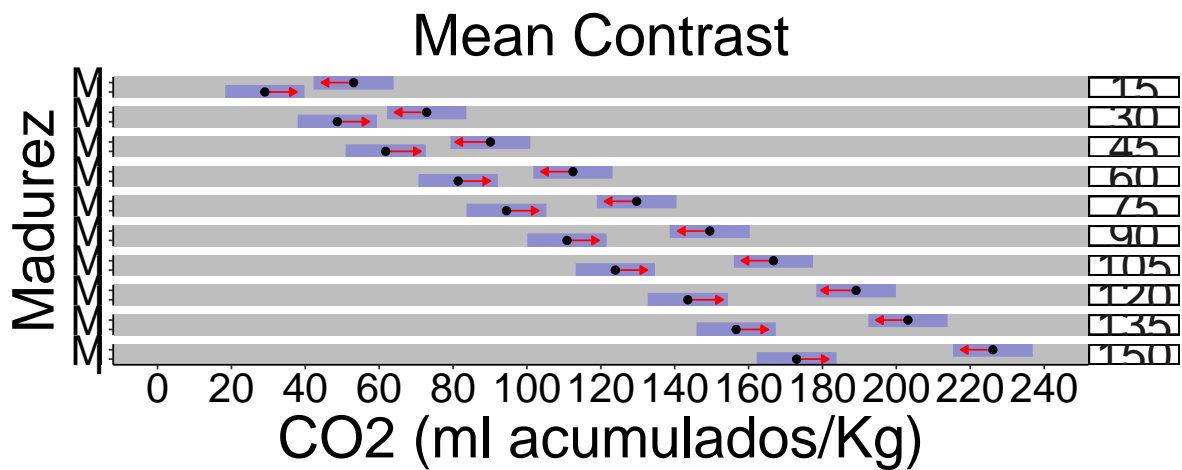
## time_min = 135:
##   matu      emmean      SE    df    lower.CL    upper.CL
##   I      156.6374479 3.99641289 4.35 145.8893198 167.3855760
##   M      203.1430870 3.99641289 4.37 192.4094513 213.8767227
##
## time_min = 150:
##   matu      emmean      SE    df    lower.CL    upper.CL
##   I      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

