Bruno Franco
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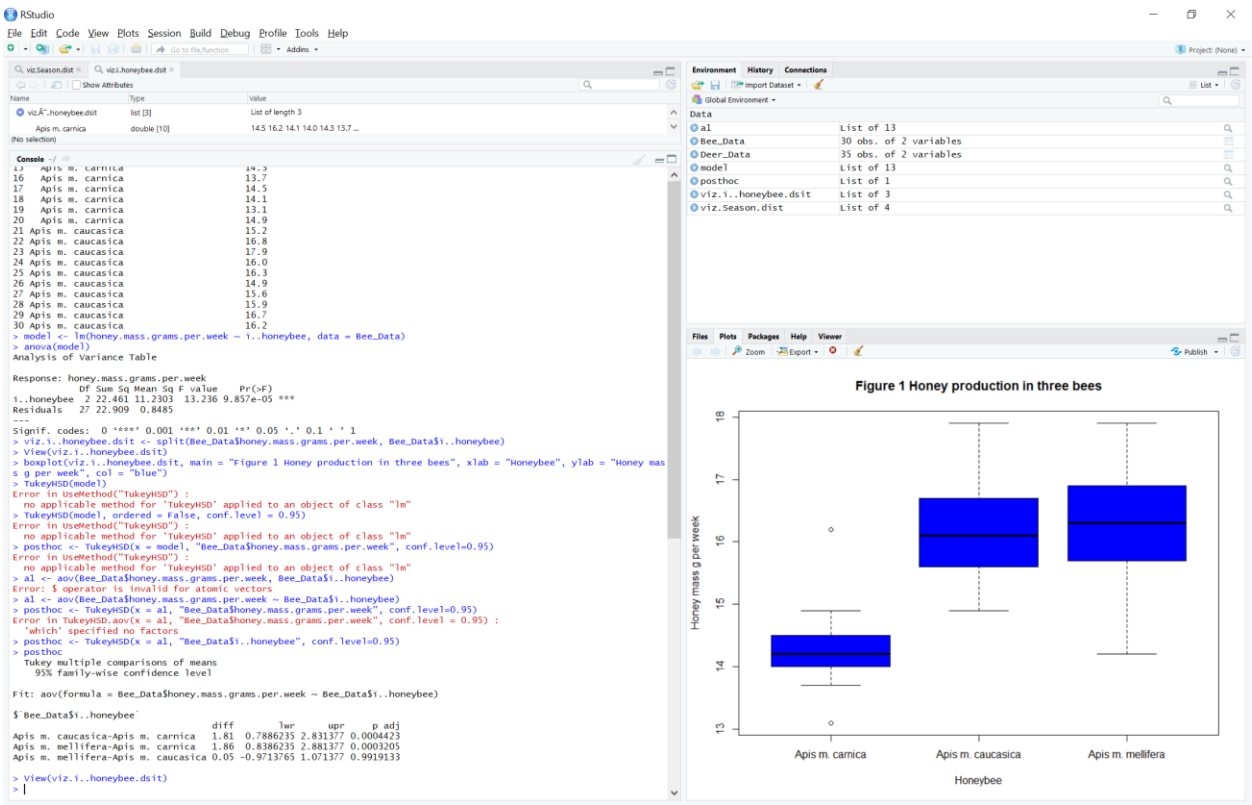
BIOL 603

I tested the effect of three different variety of bees (*Apis m. mellifera*, *A. m. carnica*, and *A. m. caucasica*) on honey production in grams per week. I first randomly selected 10 hives from the three bee varieties. The data were then entered in RStudio and I used a fixed-effects, one-way ANOVA to test my null hypothesis, using honeybee as the treatment and honey mass in g/week as the dependent variable. Alpha was set at 0.05.

Honey production was highest in both *A. m. caucasica* and *A. m. mellifera* and lowest in *A. m. carnica* (Fig. 1). The results of the ANOVA showed that honeybee type had a significant effect on honey production ($F = 13.24$, $df = 2,27$, $P = 9.86e^{-5}$). I thus rejected my null hypothesis that there is no treatment effect of honeybee type. A Tukey's HSD multiple comparison procedure showed honey production with *A. m. caucasica* and *A. m. mellifera* was significantly different than with *A. m. carnica* ($P = 0.0004$ and $P = 0.0003$, respectively), but there were no significant differences between *A. m. caucasica* and *A. m. mellifera*. Furthermore, my results do not mean that other sources of variation in honey production are not present, for example, small sample sizes; future experiments will use larger sample sizes to focus on other effects of honey bee species on honey production rates.



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Analysis of Variance Table

Response: honey.mass.grams.per.week
             Df Sum Sq Mean Sq F value    Pr(>F)
ï..honeybee   2 22.461 11.2303  13.236 9.857e-05 ***
Residuals    27 22.909  0.8485
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  Tukey multiple comparisons of means
    95% family-wise confidence level

Fit: aov(formula = Bee_Data$honey.mass.grams.per.week ~ Bee_Data$ï..honeybee)

$`Bee_Data$ï..honeybee`
                                      diff        lwr      upr     p adj
Apis m. caucasica-Apis m. carnica    1.81  0.7886235 2.831377 0.0004423
Apis m. mellifera-Apis m. carnica    1.86  0.8386235 2.881377 0.0003205
Apis m. mellifera-Apis m. caucasica 0.05 -0.9713765 1.071377 0.9919133
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Figure 1 Honey production in three bees