VIBS613 - Homework 7

Daniel Osorio - dcosorioh@tamu.edu
Department of Veterinary Integrative Biosciences
Texas A&M University

1. In a quest to make bigger frogs, scientists started with a random bred population of frogs with an average weight of 500 g. They chose a group with average weight 600 g to be the parents of the next generation. A few other facts: $V_E = 1340$, $V_A = 870$, $V_D = 410$.

   a) What is the genetic variance (V_G)?

   $$\begin{aligned} V_G &= V_A + V_D \\ V_G &= 870 + 410 \\ V_G &= 1280 \end{aligned}$$

   b) What is the total variance (V_T)?

   $$\begin{aligned} V_T &= V_G + V_E \\ V_T &= 1280 + 1340 \\ V_T &= 2620 \end{aligned}$$

   c) What is the broad sense heritability (H)?

   $$\begin{aligned} H &= \frac{V_G}{V_T} \\ H &= \frac{1280}{2620} \\ H &= 0{,}4885 \end{aligned}$$

   d) What is the narrow sense heritability (h)?

   $$\begin{aligned} h &= \frac{V_A}{V_T} \\ h &= \frac{870}{2620} \\ h &= 0{,}332 \end{aligned}$$

   e) What is the mean weight of the next generation?

   $$\begin{aligned} h &= \frac{nextGenM - originalM}{selectedM - originalM} \\ nextGenM - originalM &= (selectedM - originalM) \times h \\ nextGenM &= ((selectedM - originalM) \times h) + originalM \\ nextGenM &= ((600g - 500g) \times 0{,}332) + 500g \\ nextGenM &= (100g \times 0{,}332) + 500g \\ nextGenM &= 33{,}2g + 500g \\ nextGenM &= 533{,}2g \end{aligned}$$