

Length-weight relationship and condition factor of ethanol-preserved contemporary and museum *Spratelloides delicatulus*

Introduction

The purpose of this study is to report the length-weight relationship and condition factor of Philippines *Spratelloides delicatulus* (blue sprat; Spratelloididae) from ethanol-preserved museum and contemporary specimens. Additionally, the effect of ethanol preservation on contemporary samples is investigated to establish a correction factor for length-weight relationship and condition factor between fresh and after 1 month of ethanol preservation.

Methods

Museum (USS Albatross) Collection (n = 124)

Specimens were collected by the USS Albatross during the Albatross Philippine Expedition from 1907 to 1910. Specimens were fixed and preserved in ethanol, without formalin. Specimens were collected from four locations:

Mapun Island, Tawi-Tawi, Philippines (USNM 138978). (n = 38). Date: January 8, 1909.

Hamilo Cove, Batangas, Philippines (USNM 138979). (n = 28). Date: July 13, 1908.

Sacol Island, Zamboanga, Philippines (USNM 150772). (n = 26). Date: September 8, 1909.

Mansalay, Oriental Mindoro, Philippines (USNM 138969). (n = 32). Date: June 4, 1908.

Individual specimens were taken out of the ethanol preservation solution. The mouth and gill cavities were drained, then the specimens were dried using Kimtech wipes. Individuals who had their abdominal cavities cut were drained and gently squeezed to remove excess ethanol. The standard and total lengths (mm) were measured using calipers. The mass (g) was measured using an analytical balance. This process was kept consistently within 1-3 minutes, during which time additional ethanol also evaporated.

Contemporary Collection (n = 124)

Samples were collected from Olympia Island, North Bais Bay, Negros Oriental, Philippines (n = 124). Fish were purchased from local fisherman between June 2-12, 2023. Fresh measurements were taken by John Paul Sullera and Rabbi Montegrejo (Negros Oriental State University). Specimens were fixed and preserved in 70% ethanol. Measurements were taken again 1 month after fresh measurements.

Data Analysis

Length-weight Relationship $W=aL^b$

Fulton's Condition Factor $K=100(W/SL^3)$ - for comparison to an ideal weight

Le Cren's Relative Condition Factor $K_n = W/aL^n$ - for comparison to the average weight

Results

Museum (USS Albatross) Collection

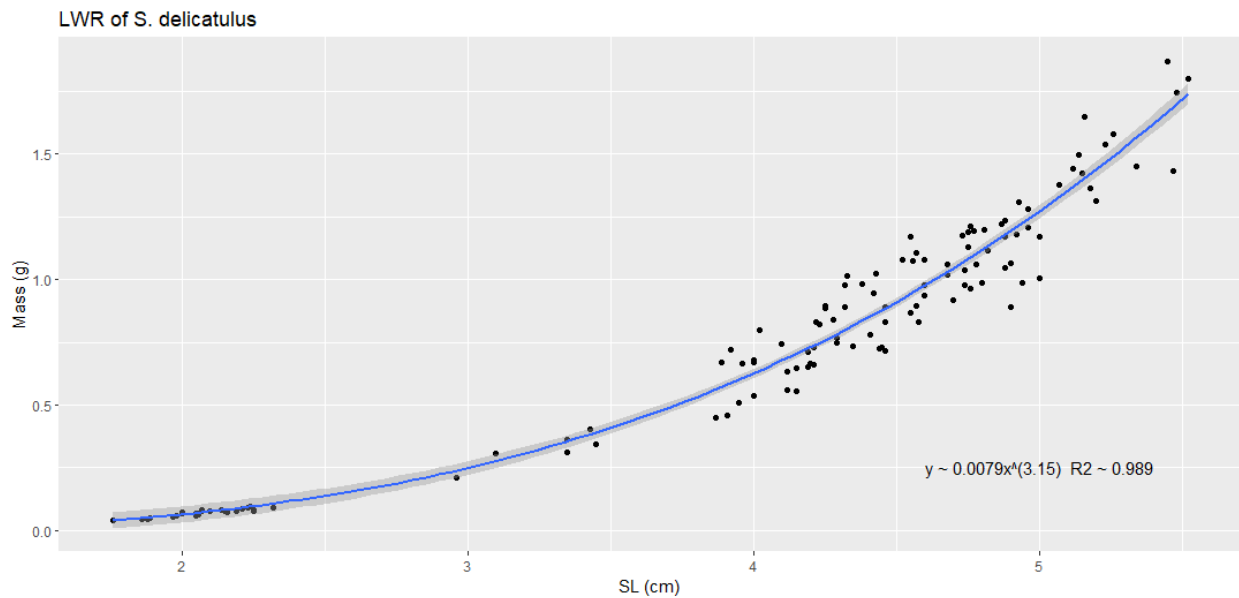


Figure #. (S_delicatulus_LWR_SL.png). The length-weight relationship of museum *Spratelloides delicatulus* specimens collected in 1908 and 1909 from Mapun Island, Hamilo Cove, Sacol Island, and Mansalay (n = 124). Standard length is reported in cm and mass in g.

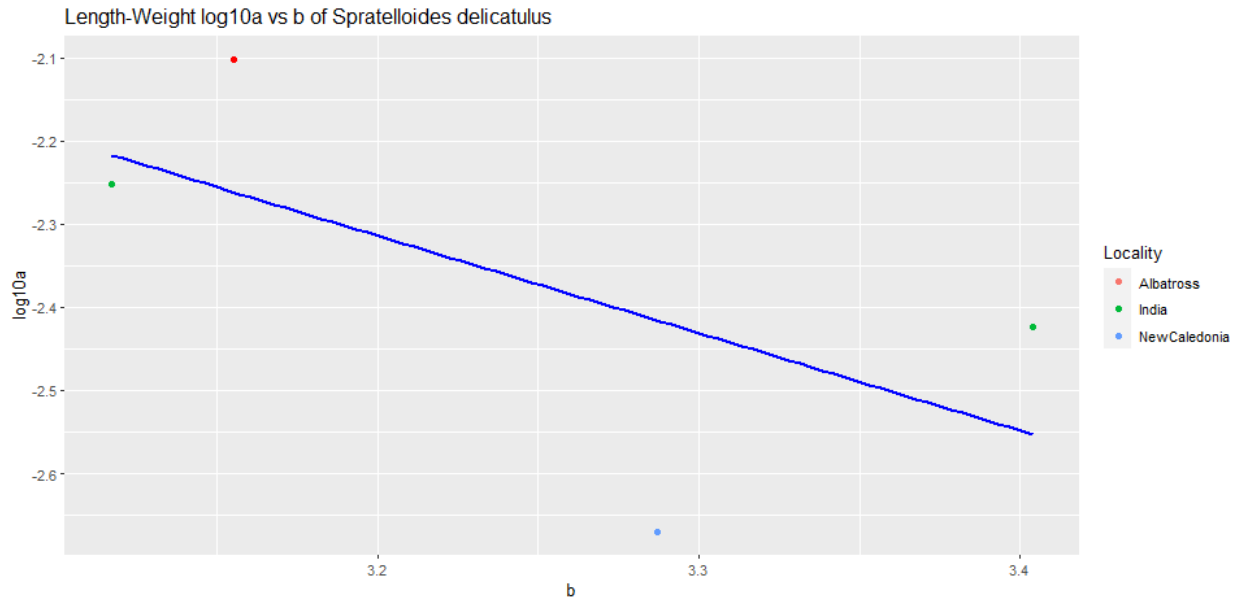


Figure #. (S_delicatulus_log10a_b). The $\log_{10}a$ and b values from the length-weight relationship of *Spratelloides delicatulus* calculated from three different locations.

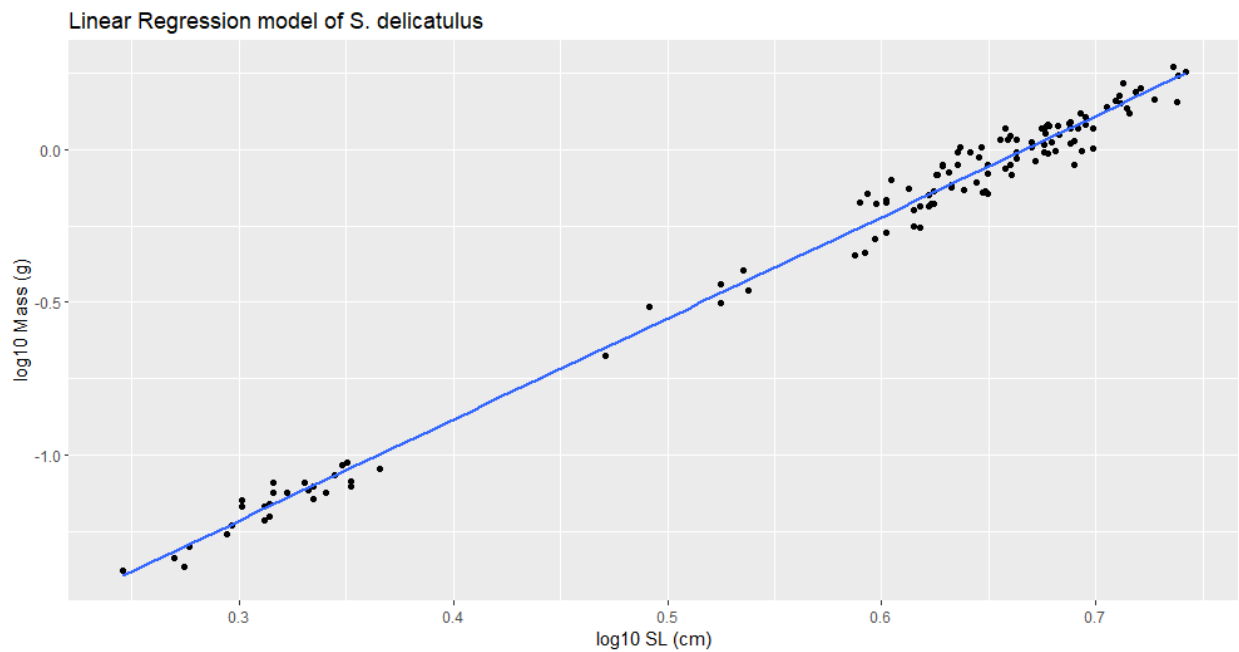


Figure #. (S_delicatulus_lm.png). A linear regression of the \log_{10} mass and standard length of museum *Spratelloides delicatulus* (n = 124).

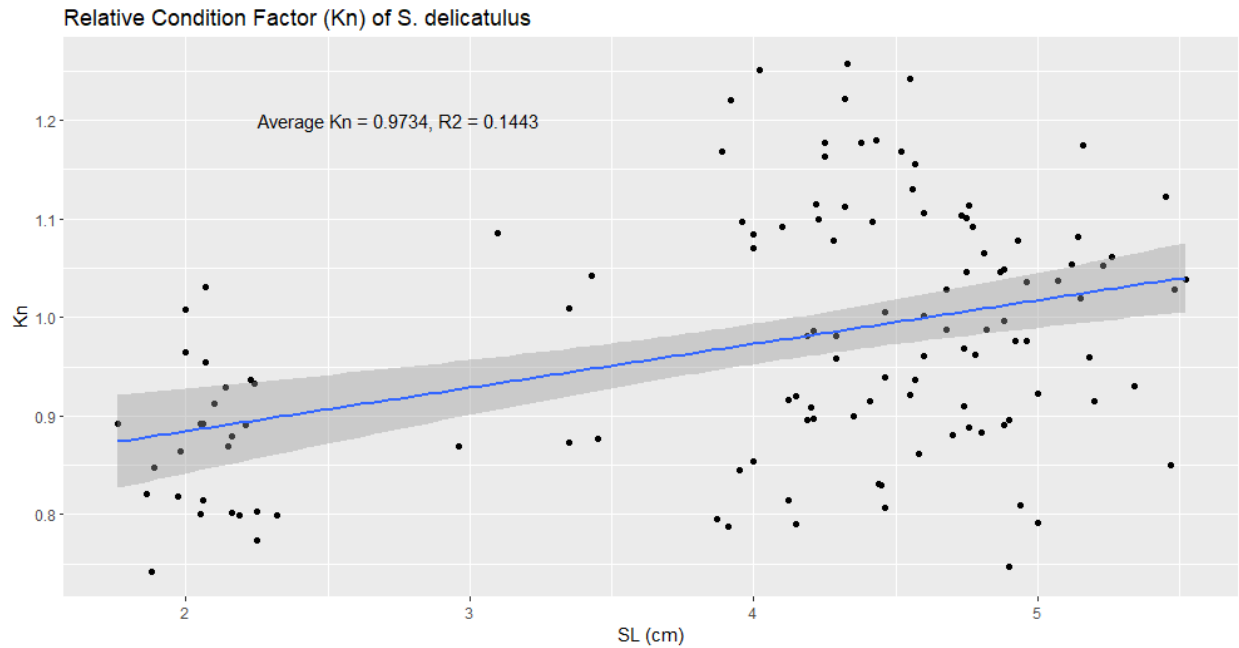


Figure #. (S_delicatulus_kn.png). The relative condition factor and standard length of museum *Spratelloides delicatulus*.

Contemporary - Figures

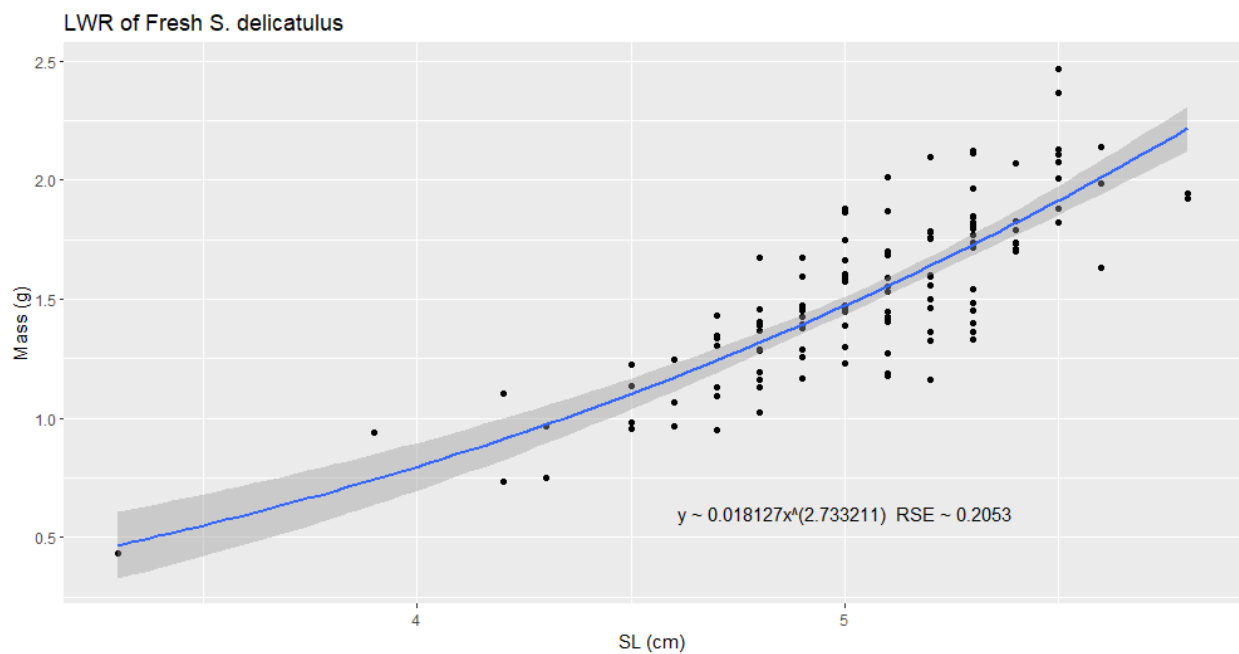


Figure #. (S_delicatulus_LWR_SL_2_fresh.png). The length-weight relationship of freshly caught contemporary *Spratelloides delicatulus* specimens collected in 2023 from Bais Bay ($n = 124$). Standard length is reported in cm and mass in g.

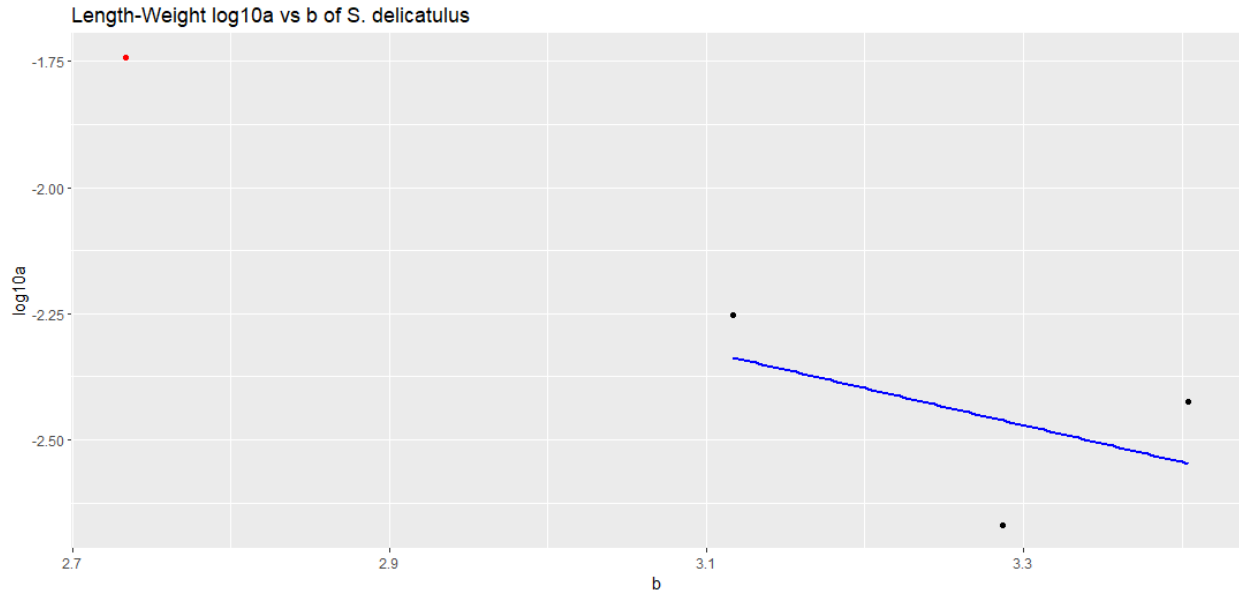


Figure #. (S_delicatulus_log10a_b_fresh.png). The $\log_{10}a$ and b values from the length-weight relationship of freshly caught contemporary *Spratelloides delicatulus* and those from three other studies.

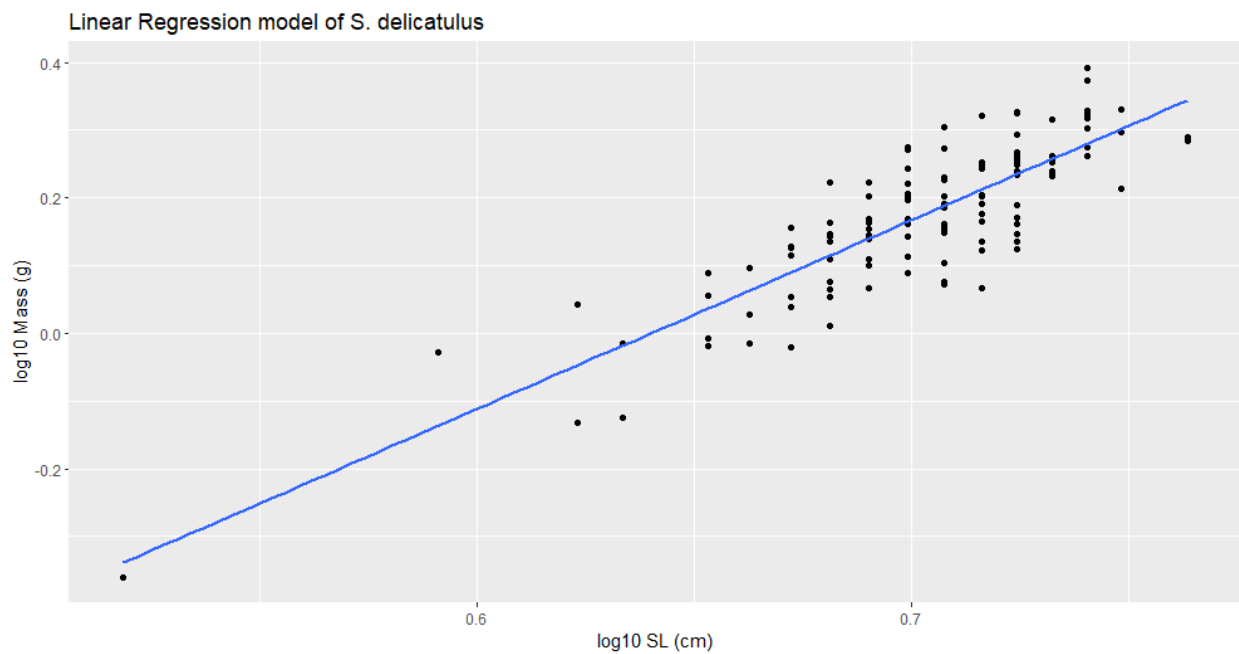


Figure #. (S_delicatulus_lm_fresh.png). A linear regression of the \log_{10} mass and standard length of freshly caught contemporary *Spratelloides delicatulus* from Bais Bay, Philippines ($n = 124$).

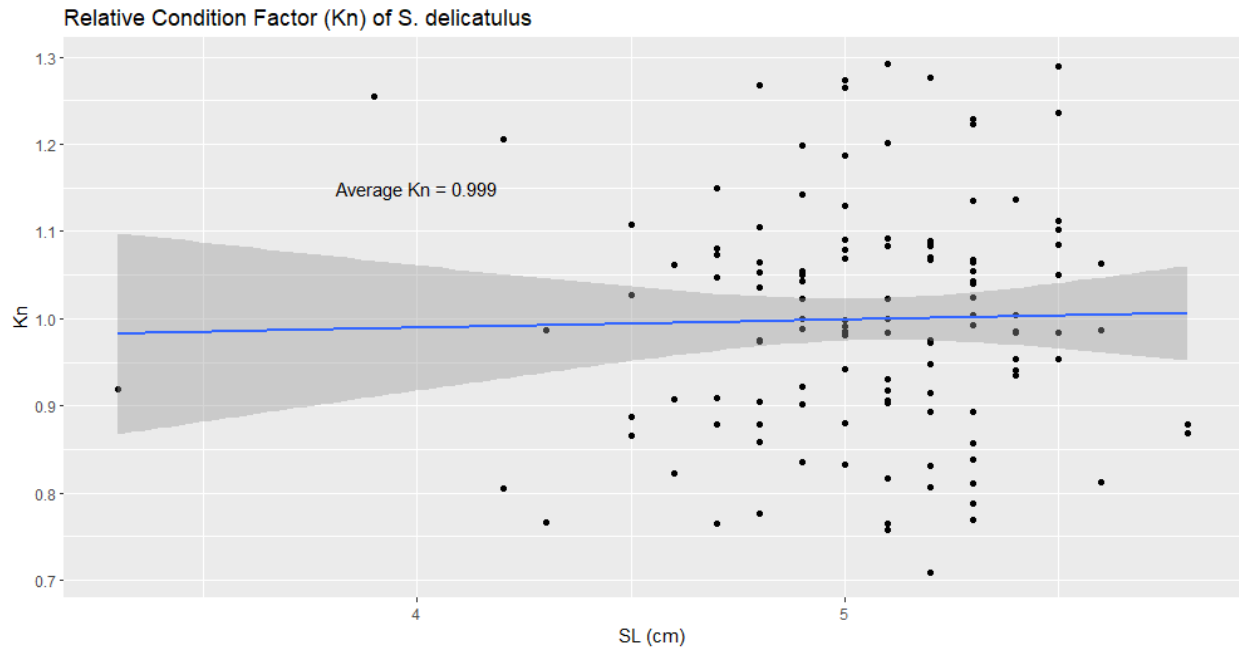


Figure #. (S_delicatulus_kn_fresh.png). The relative condition factor and standard length of freshly caught, contemporary *Spratelloides delicatulus*.

Matching - Figures

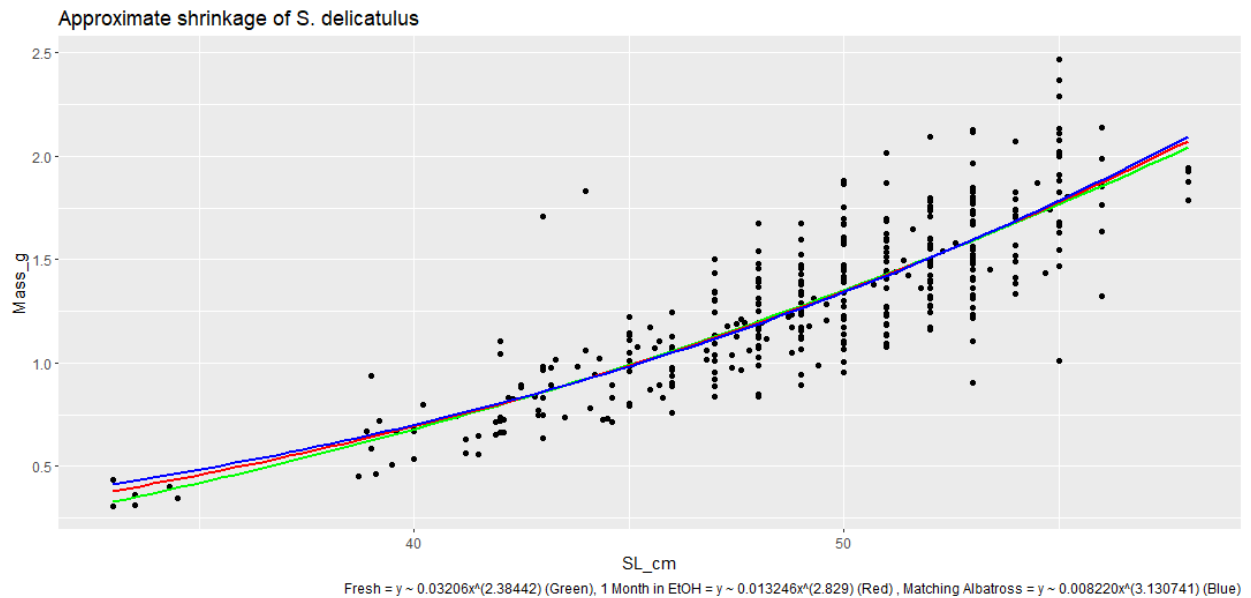


Figure #. (S_delicatulus_shrink.png). The length-weight relationship of freshly caught contemporary ($n = 124$), 1 month preserved contemporary ($n = 124$), and 115 year old museum ($n = 124$) *Spratelloides delicatulus* specimens. Standard length is reported in cm and mass in g.

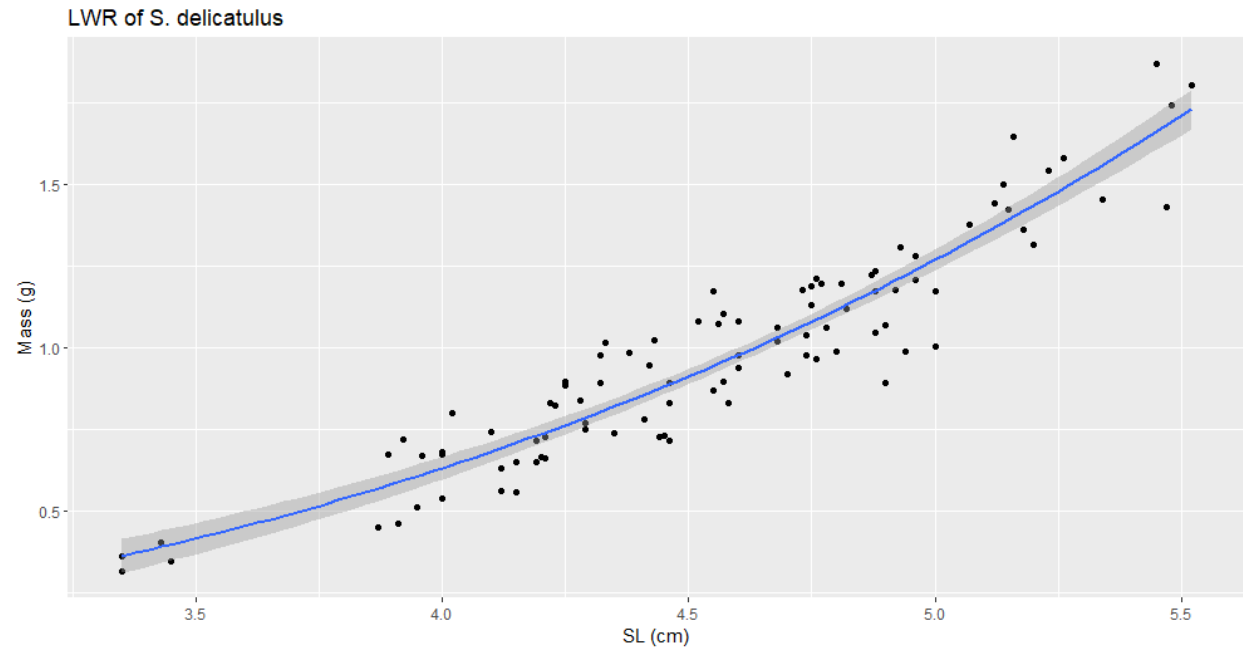


Figure #. (S_delicatulus_LWR_SL_matching.png).

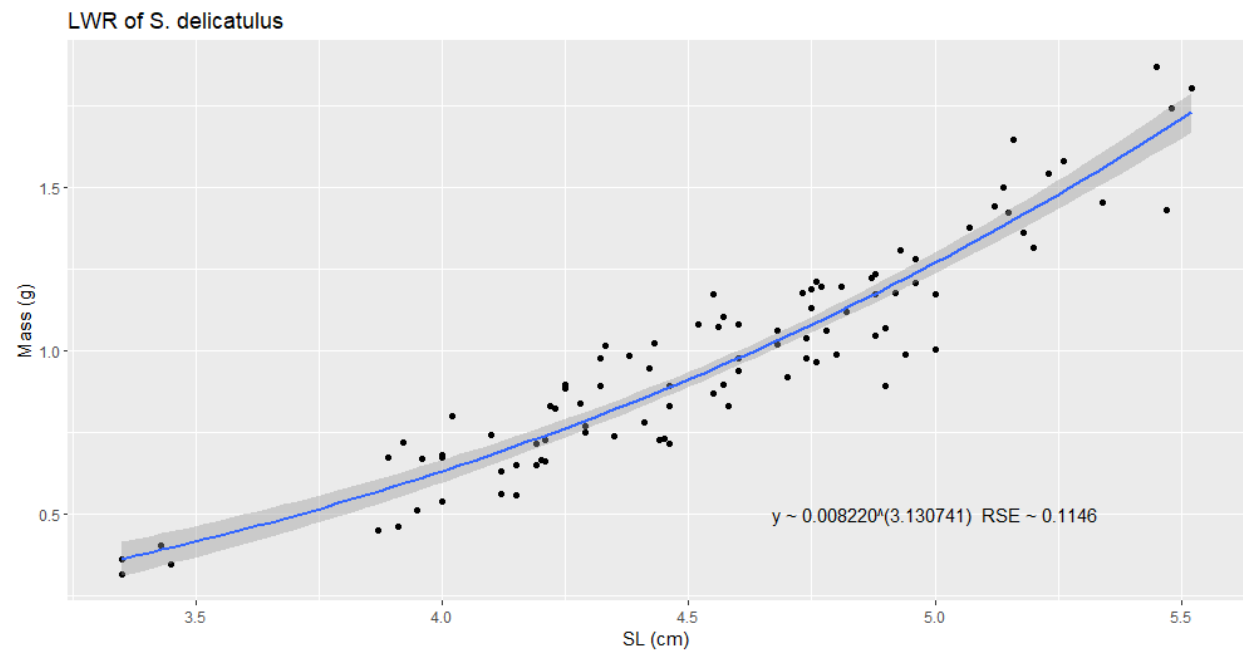


Figure #. (S_delicatulus_LWR_SL_2_matching.png).

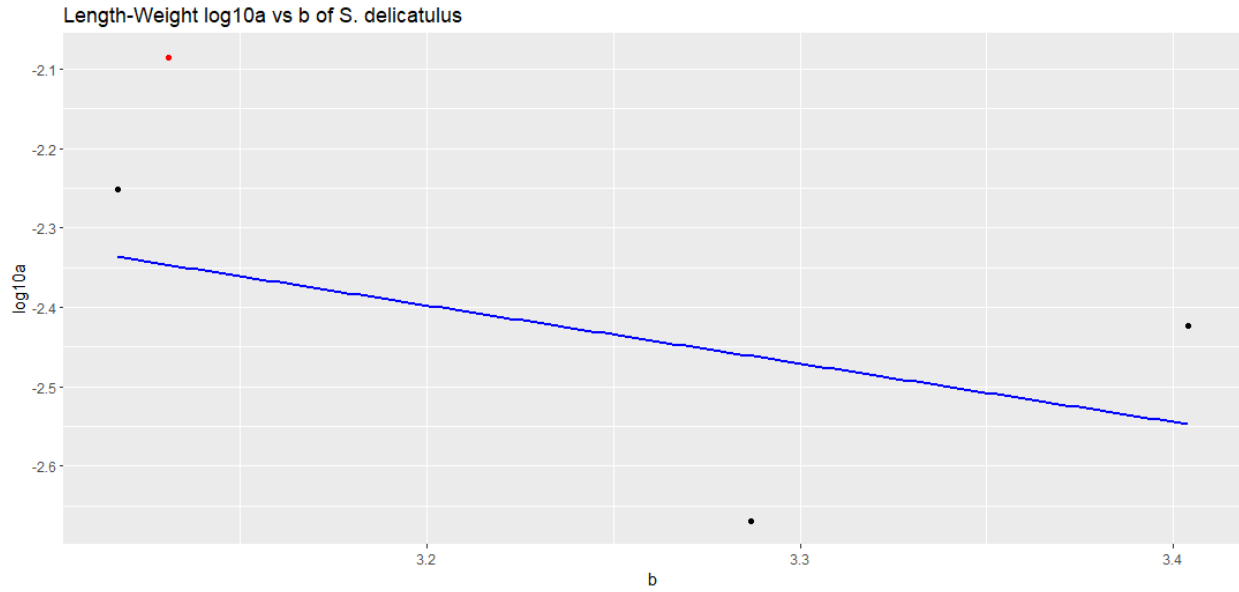


Figure #. (S_delicatulus_log10a_b_matching.png).

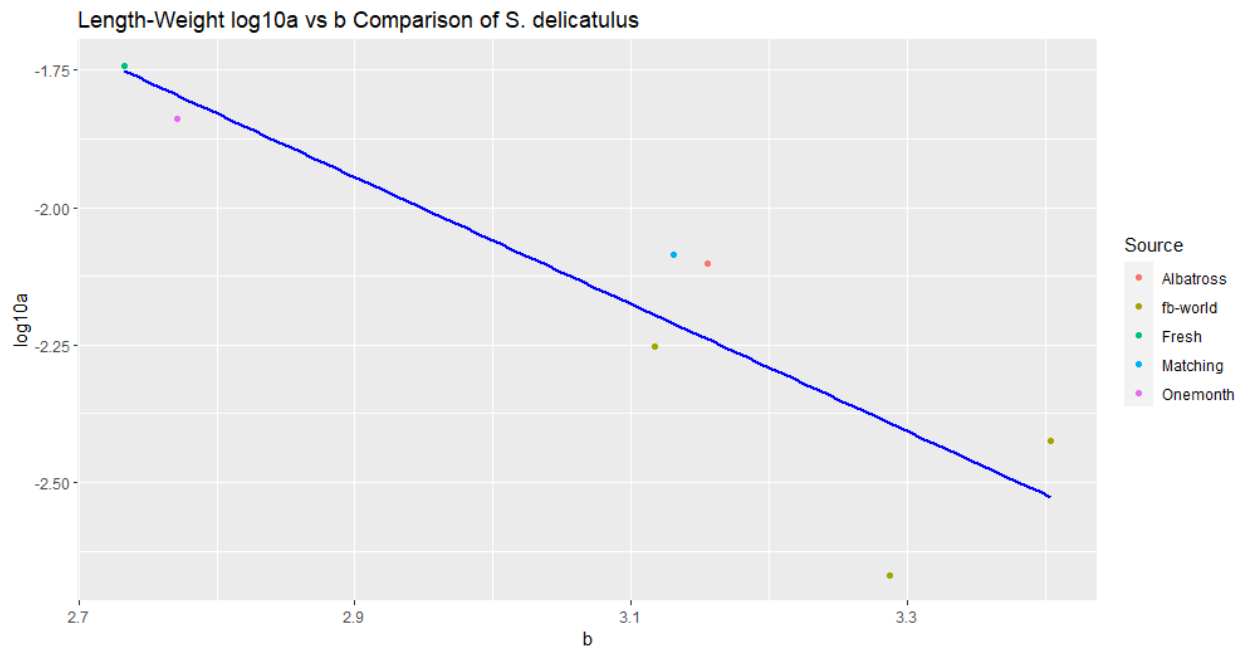


Figure #. (S_delicatulus_log10a_b_comparison.png). The log10a and b values from the length-weight relationship of freshly caught contemporary ($n = 124$), 1 month preserved contemporary ($n = 124$), and 115 year old museum ($n = 124$), and those from other studies as reported by fishbase (fb-world).

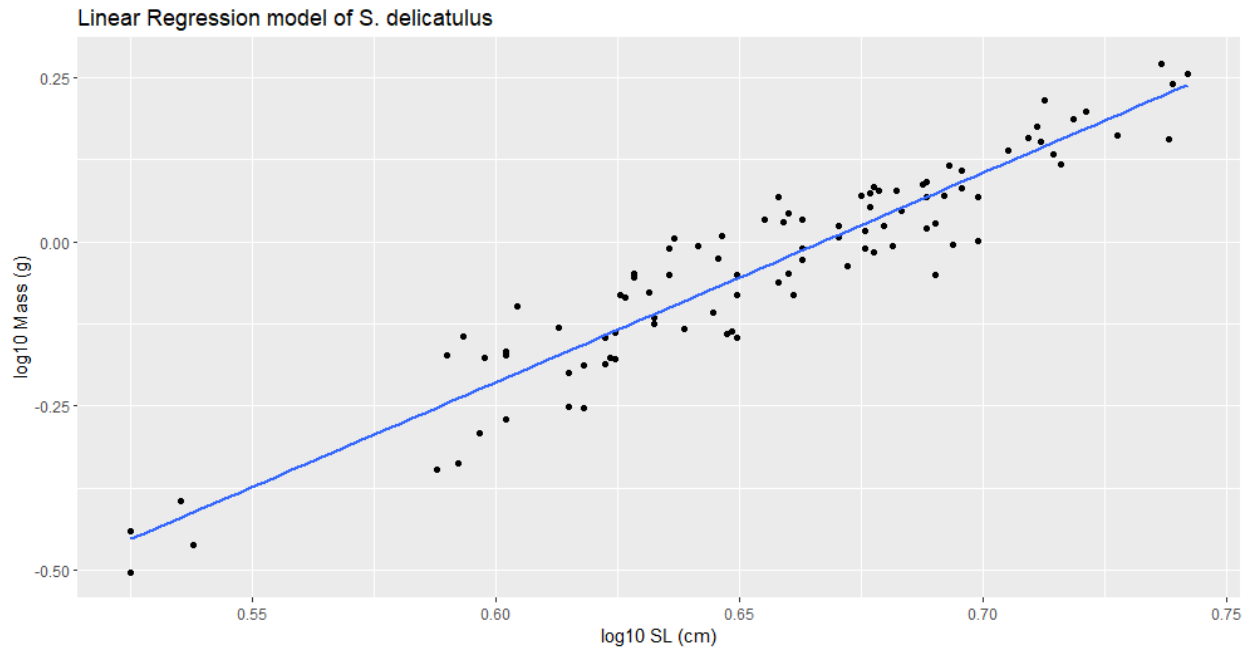


Figure #. (S_delicatulus_lm_matching.png).

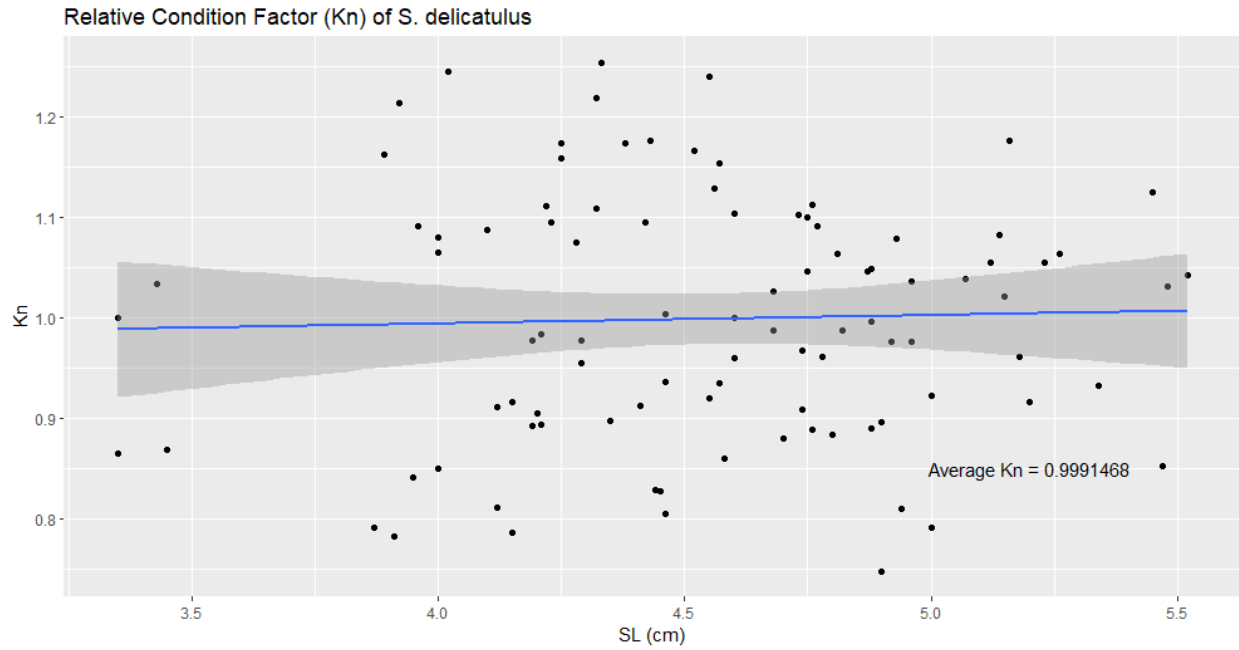


Figure #. (S_delicatulus_kn_matching.png).

One Month – Figures

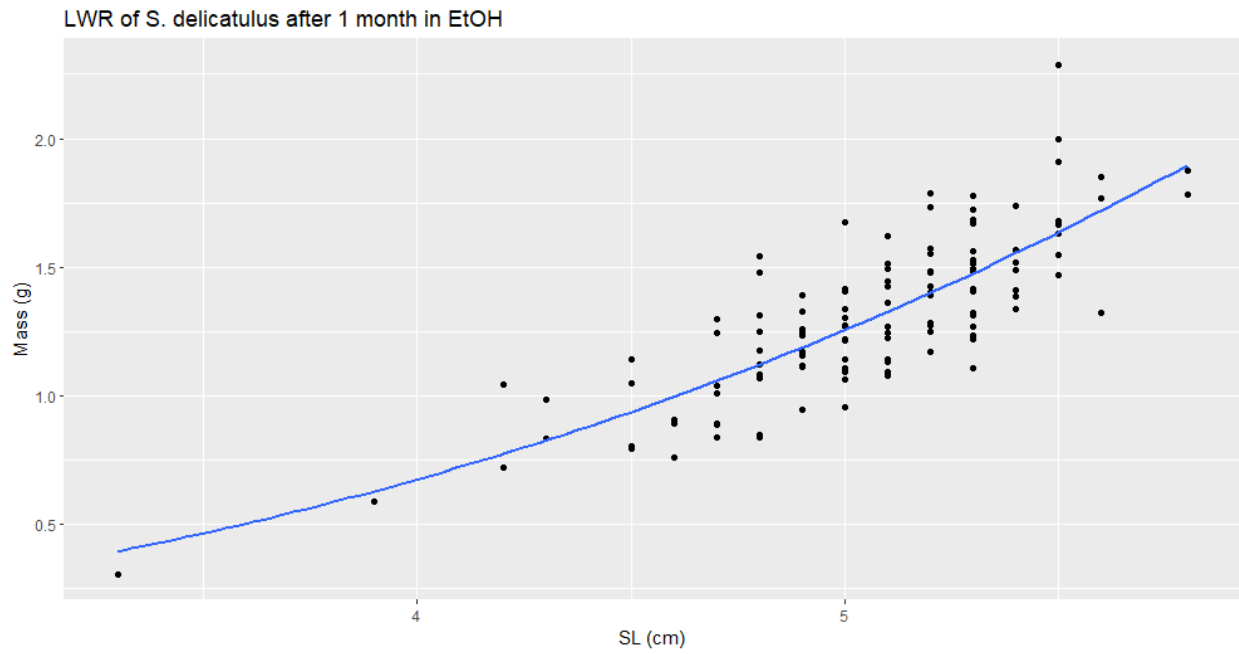


Figure #. (S_delicatulus_LWR_SL_month.png).

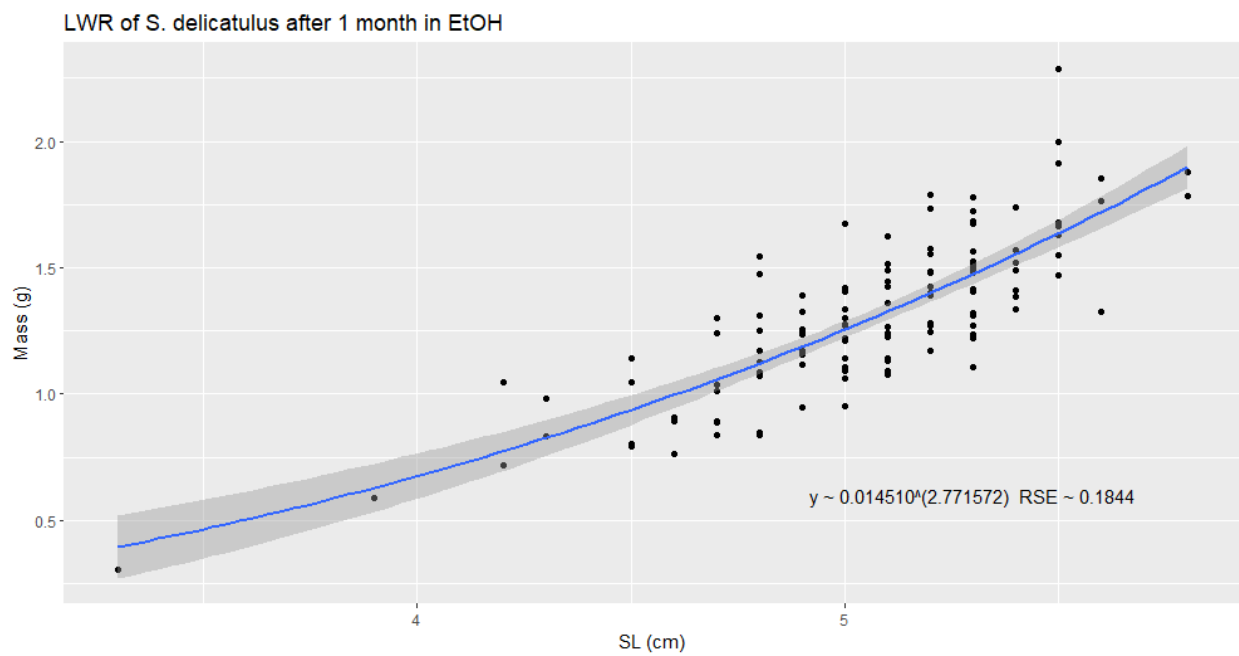


Figure #. (S_delicatulus_LWR_SL_2_month.png).

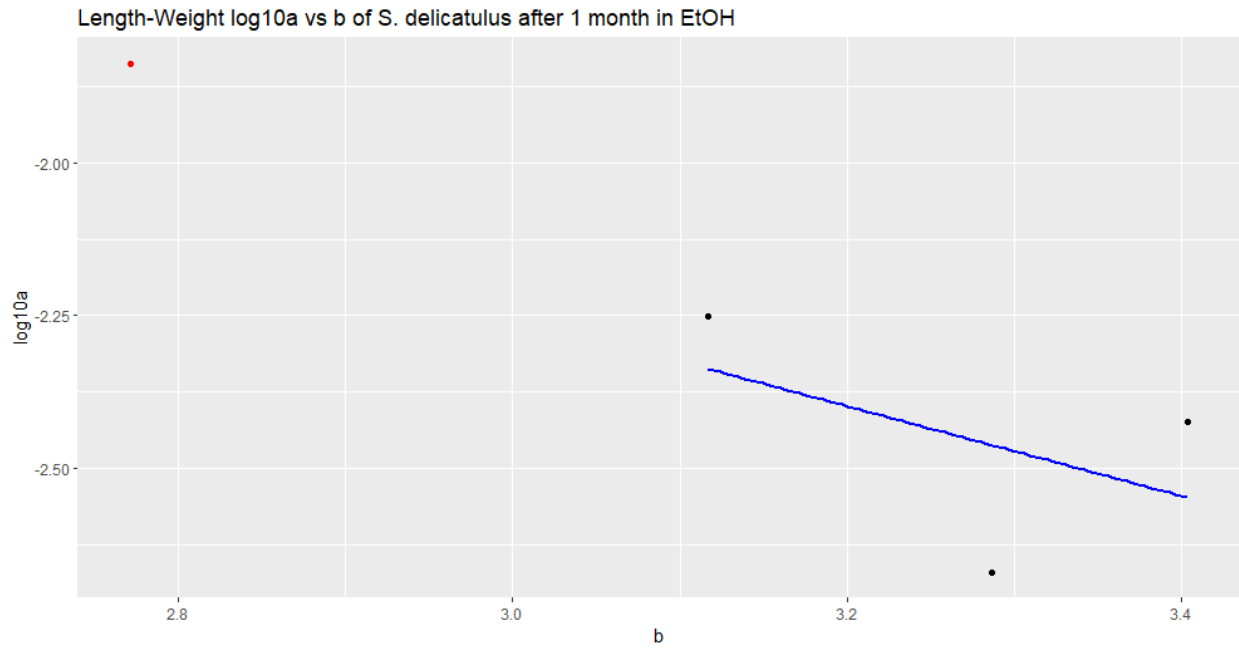


Figure #. (S_delicatulus_log10a_b_month.png).

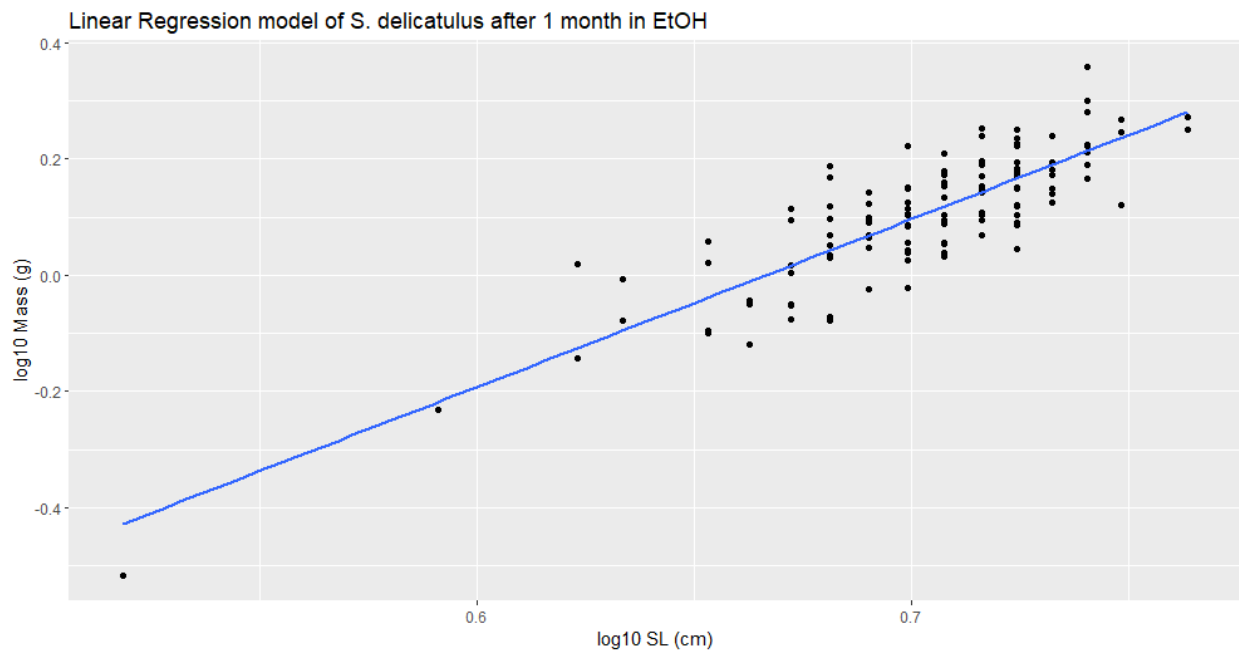


Figure #. (S_delicatulus_lm_month.png).

