# RECRUITMENT BOTTLENECK IN APHYLLOUS *VANILLA* SEEDLINGS FACING DROUGHT CONDITIONS

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The following Supporting Information is available for this article:

Supplementary Figures S1-S9

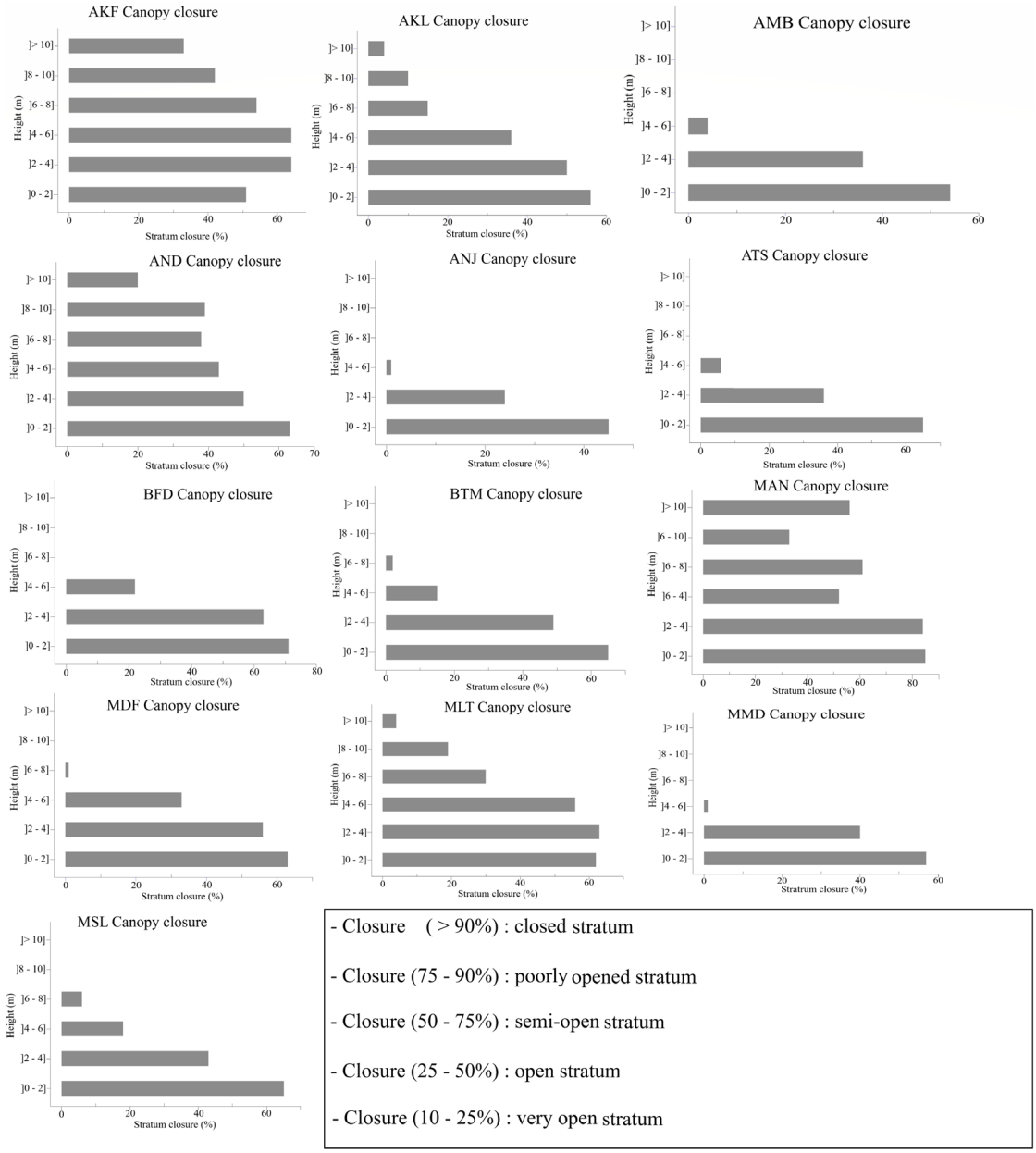


FIGURE S1. Stratum closure rates for the thirteen study sites.

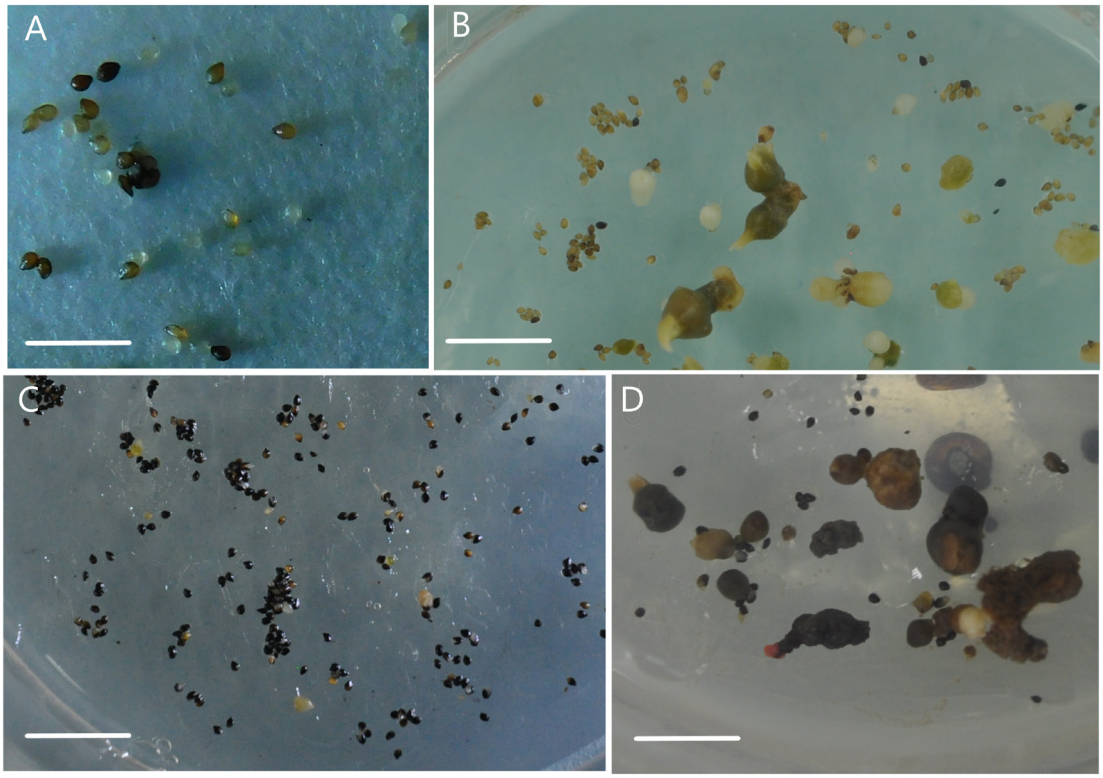


Figure S2. Aseptic culture of aphyllous vanilla seeds. (**A**). Immature (white) and mature (black) seeds of aphyllous vanilla. (**B**) Germination of immature seeds after 38 weeks of culture. (**C**) Germination of mature seeds after 38 weeks of culture. (**D**) Necrotic protocorms after 18 weeks of culture on M4 medium. Bar (A) = 1 mm; Bar (B, D) = 5 mm; Bar (C) = 2 mm. Photographs by Botomanga A.

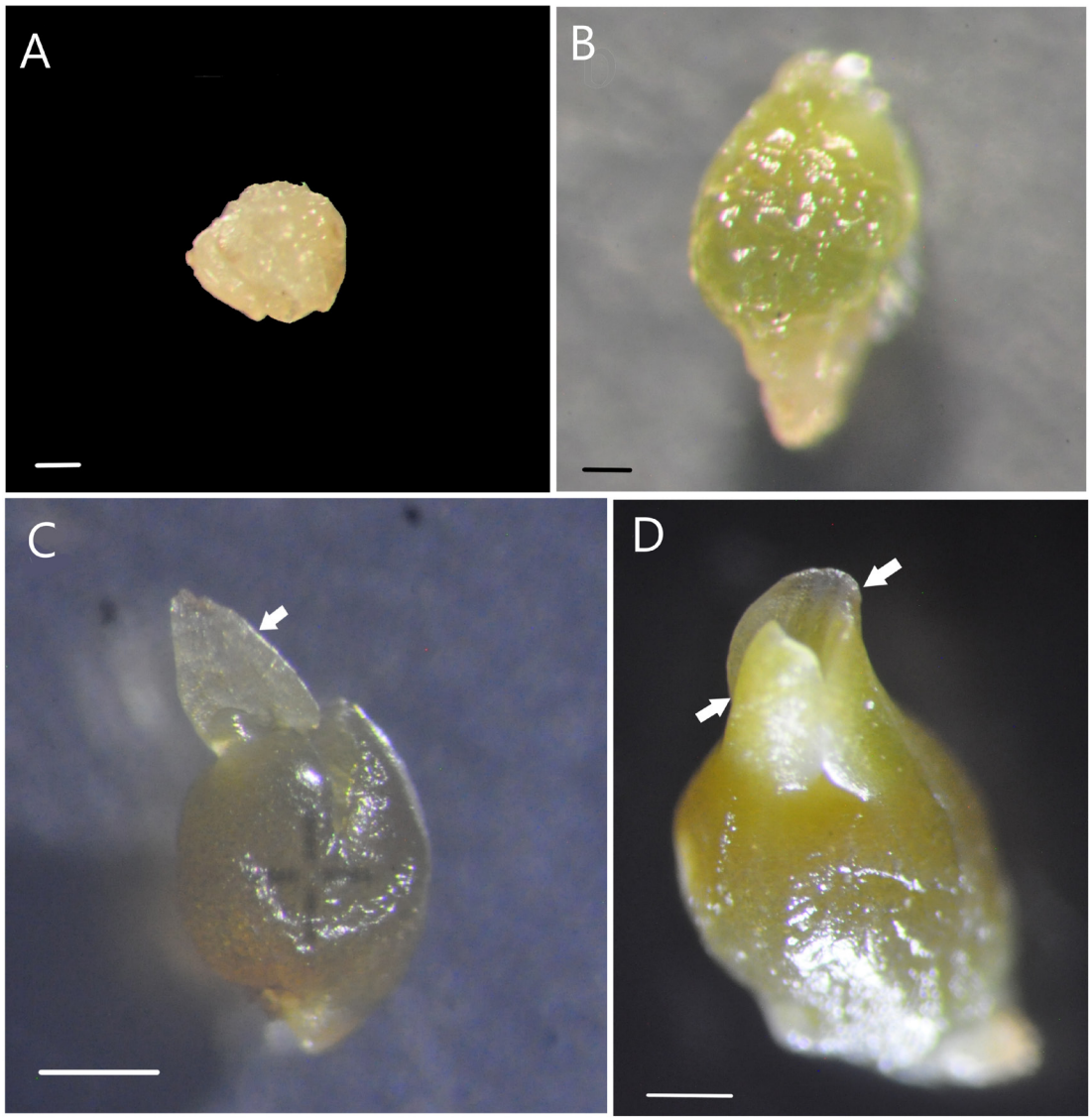


FIGURE S3. Description of the developmental stages of *V. madagascariensis* protocorms cultivated in vitro. (**A**). Stage 1 : protocorm barely emerged from the seed coat, white in color, with an average size of 0.35 ± 0.02 mm. (**B**). Stage 2 : protocorm having acquired a green coloration, with an average size of 0.83 ± 0.07 mm. (**C**). Stage 3 : protocorm with a cotyledon (arrow) and an average size of 1.15 ± 0.30 mm. (**D**) Stage 4 : protocorm with a cotyledon and one leaf primordial (arrows) and an average size of 2.94 ± 0.37 mm. Bar (A) = 0.2 mm; Bar (B) = 0.5 mm; Bar (C) = 1 mm; Bar (D) = 1 cm. Photographs by Botomanga A.

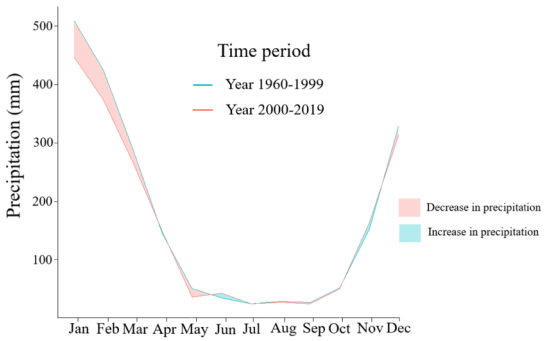


FIGURE S4. Variations in precipitation between the 1960–1999 period (40-year average) and the 2000–2019 period (20-year average) at Maromandia and Ambanja.

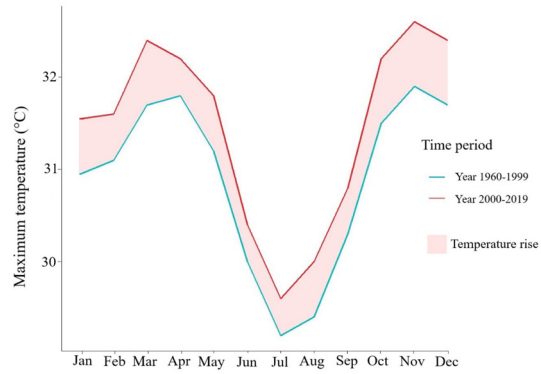


FIGURE S5. Differences in maximum temperatures between the 1960–1999 period (40-year average) and the 2000–2019 period (20-year average) at Maromandia and Ambanja.

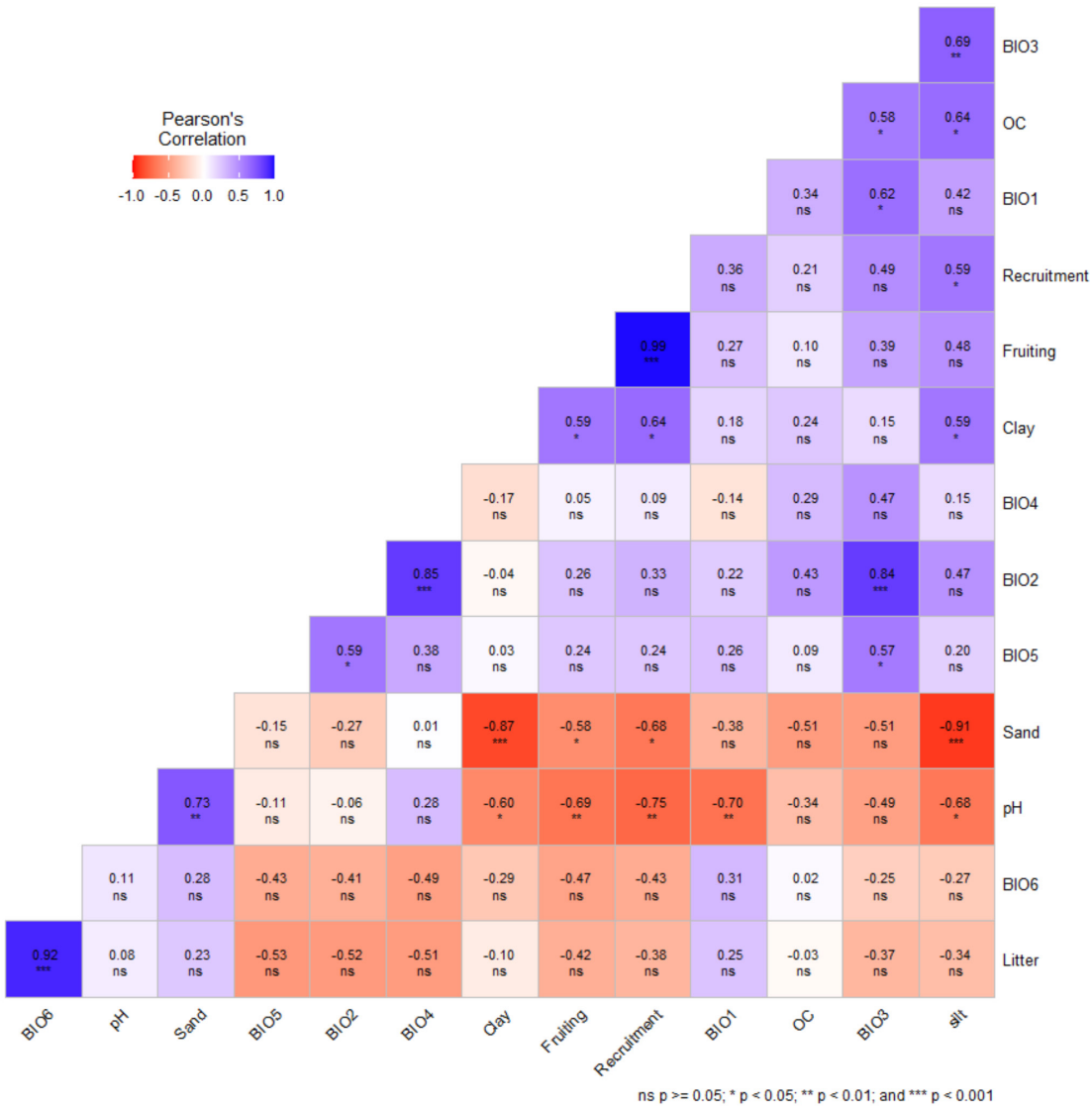


FIGURE S6. Pearson correlation among the environmental factors studied. Environmental variables: Litter: Litter thickness, pH: Soil pH in H20 at 5 cm depth, Sand: Quantity of sand at 5 cm depth, Clay: Quantity of clay at 5 cm depth, Silt: Quantity of silt at 5 cm depth, OC: Quantity of organic carbon at 5 cm depth, BIO1: Annual precipitation, BIO2: Annual Mean Temperature, BIO3: Annual Mean Min Temperature, BIO4: Annual Mean Max Temperature, BIO5: Annual mean Water vapor pressure, BIO6: Canopy closure.

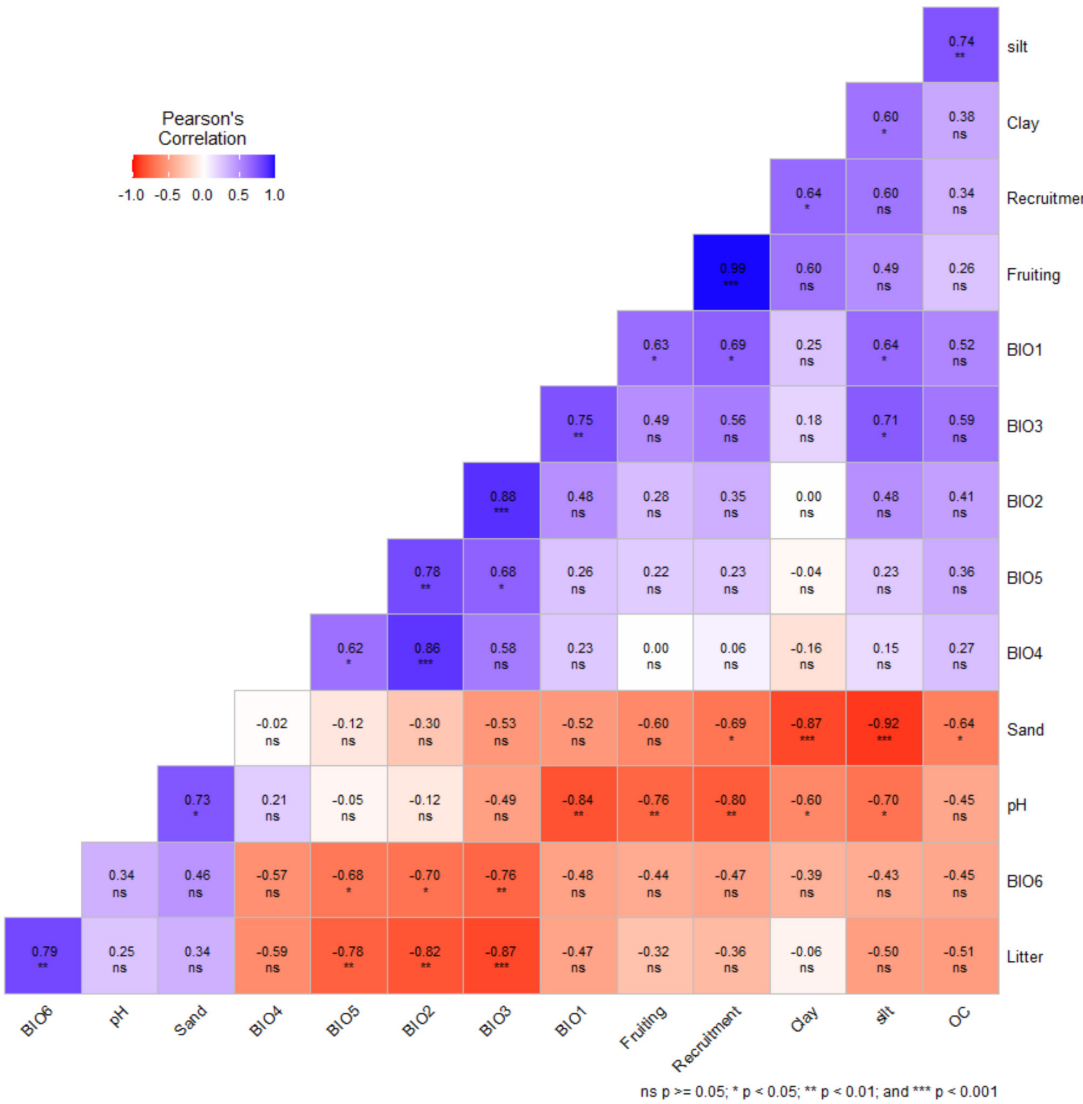


FIGURE S7. Pearson correlation Analysis of environmental variables excluding MAN and AKF. Environmental variables: Litter: Litter thickness, pH: Soil pH in H20 at 5 cm depth, Sand: Quantity of sand at 5 cm depth, Clay: Quantity of clay at 5 cm depth, Silt: Quantity of silt at 5 cm depth, OC: Quantity of organic carbon at 5 cm depth, BIO1: Annual precipitation, BIO2: Annual Mean Temperature, BIO3: Annual Mean Min Temperature, BIO4: Annual Mean Max Temperature, BIO5: Annual mean Water vapor pressure, BIO6: Canopy closure.

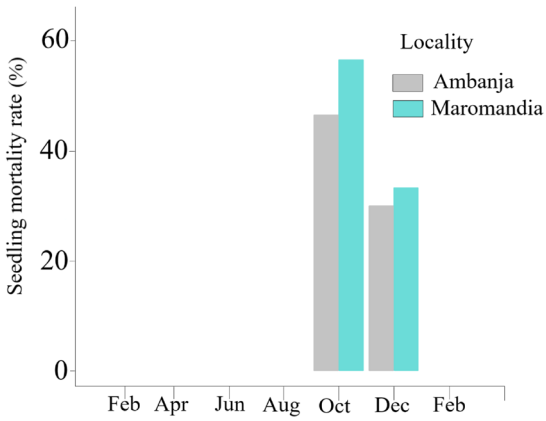


FIGURE S8. Seedling mortality rate after 12 months of development monitoring at the Maromandia and Ambanja sites. Sample sizes were as follows: Ambanja (n = 30), Maromandia (n = 30).

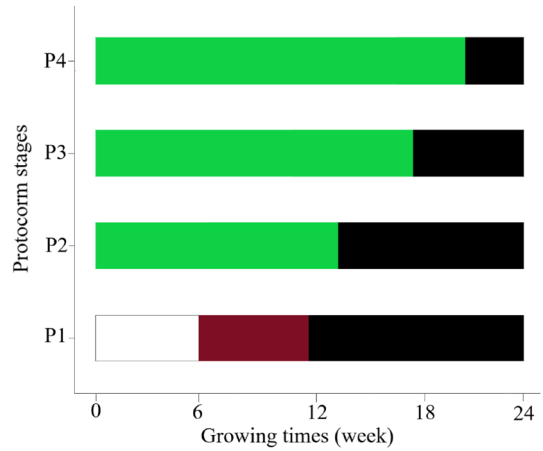


FIGURE S9. Change in coloration of protocorms to black (necrosis) over time on the M4 culture medium. Histogram colors accurately represent the browning of protocorms. For each developmental stage, n = 200.