

***New Phytologist* Supporting Information**

Article title: Fine root production in a chronosequence of mature reforested mangroves

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The following Supporting Information is available for this article:

Notes S1 R script describing the GLMM model

```
library("glmmTMB")
library("AICcmodavg")
library("car")
library("emmeans")

setwd("C:/Users/Me/Desktop")
input_data <- read.csv ("Rootprod_CanGio_2019.csv", header=TRUE)

root_data <- data.frame (prod = input_data$root_production,
                        age = input_data$age_cat,
                        depth = input_data$depth_cat,
                        tube = input_data$tube,
                        angle = input_data$angle,
                        rep = input_data$measurement_time)

model_test_1 <- glmmTMB (prod ~ (age + depth + (age * depth) + (1|tube) + (1|rep)), data =
root_data, family = tweedie)
AICc (model_test_1, second.ord = TRUE)
summary(model_test_1)

anova1 = Anova (model_test_1, test.statistic = "Chisq", component = "cond", type = 3)
emm_age = emmeans (model_test_1, "age")
emm_depth = emmeans (model_test_1, "depth")
emm_int = emmeans (model_test_1, specs = c("depth", "age"))
emm_pairs = emmeans (model_test_1, specs = pairwise ~ age*depth)

summary (emm_age, infer = TRUE, type = "response")
summary (emm_depth, infer = TRUE, type = "response")
summary (emm_int, infer = TRUE, type = "response")
summary (emm_pairs)
```

Fig. S1 Root identification protocol

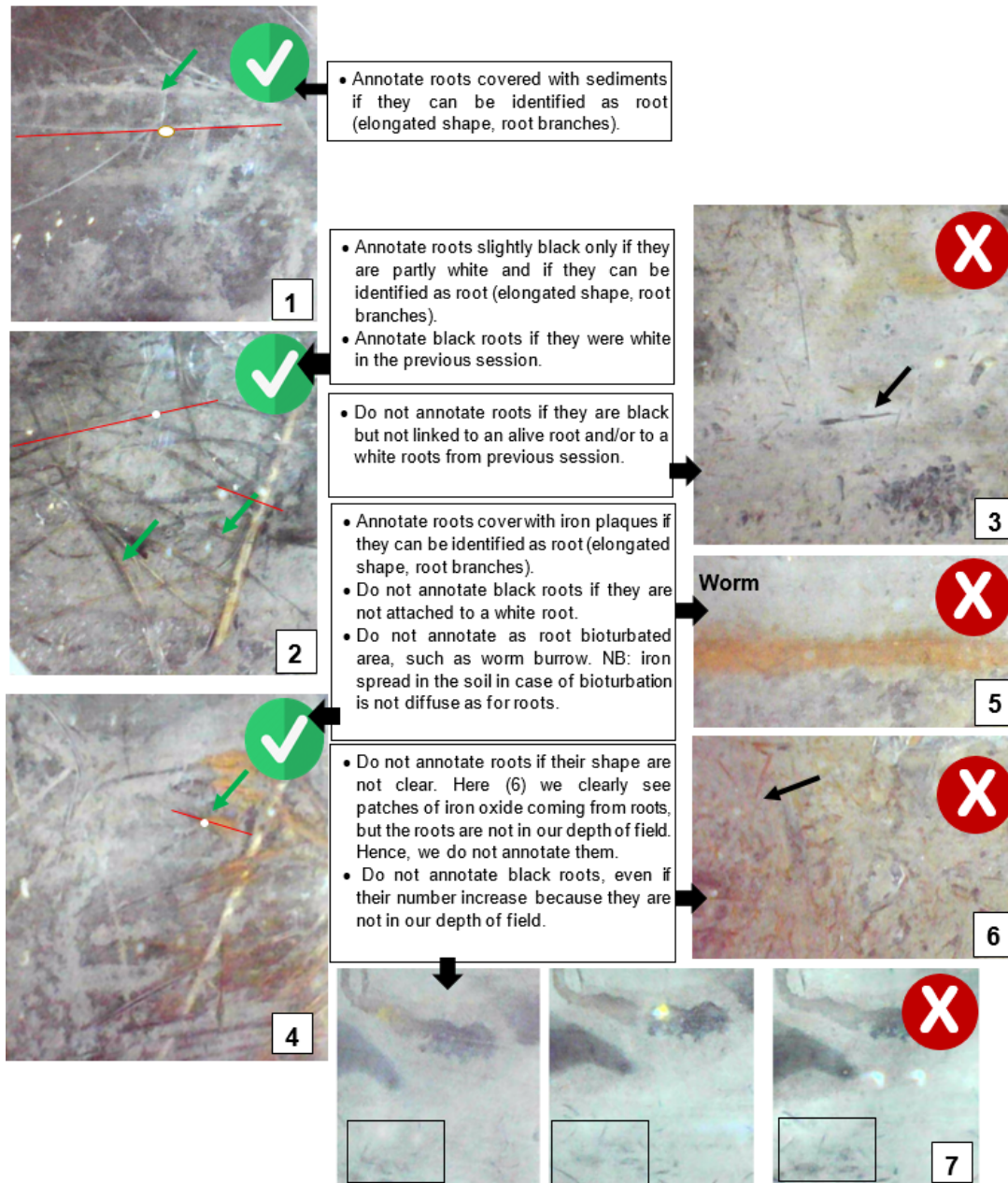


Table S1 Measured and estimated marginal mean fine root production according to age, depth, and their two-way interaction age × depth. Estimated marginal means are the fitted sample means from the GLMM. Error terms (\pm) indicate sample standard deviations for measured marginal means; and standard error for estimated marginal means. Significance indicates the probability that estimated marginal means are different from zero, based on t-ratio. N/A indicates that t-ratio and significance are not applicable because they cannot be defined for a sample in which all measurements are equal to zero.

Factor	Level	Measured marginal mean production (mm cm⁻² d⁻¹)	Estimated marginal mean production (mm cm⁻² d⁻¹)	t-ratio	Significance
<i>age</i>	27 yr	0.1241 (\pm 0.2495)	0.0000 (\pm 0.0016)	0.002	0.998
	32 yr	0.0628 (\pm 0.1058)	0.0312 (\pm 0.0132)	8.183	< 0.001
	40 yr	0.0173 (\pm 0.0483)	0.0086 (\pm 0.0039)	10.388	< 0.001
<i>depth</i>	8–10 cm	0.1715 (\pm 0.2718)	0.0649 (\pm 0.0187)	9.468	< 0.001
	30–32 cm	0.0741 (\pm 0.1220)	0.0318 (\pm 0.0096)	11.453	< 0.001
	50–52 cm	0.0137 (\pm 0.0358)	0.0097 (\pm 0.0031)	14.663	< 0.001
	70–72 cm	0.0128 (\pm 0.0448)	0.0000 (\pm 0.0000)	0.002	0.998
<i>age × depth</i>	27 yr, 8–10 cm	0.3516 (\pm 0.3780)	0.2505 (\pm 0.1094)	3.169	0.002
	27 yr, 30–32 cm	0.1358 (\pm 0.1661)	0.1005 (\pm 0.0451)	5.125	< 0.001
	27 yr, 50–52 cm	0.0089 (\pm 0.0222)	0.0065 (\pm 0.0036)	9.182	< 0.001
	27 yr, 70–72 cm	0.0000 (\pm 0.0000)	0.0000 (\pm 0.0000)	N/A	N/A
	32 yr, 8–10 cm	0.1479 (\pm 0.1485)	0.1253 (\pm 0.0555)	4.686	< 0.001
	32 yr, 30–32 cm	0.0733 (\pm 0.0914)	0.0616 (\pm 0.0283)	6.073	< 0.001
	32 yr, 50–52 cm	0.0129 (\pm 0.0274)	0.0105 (\pm 0.0055)	8.736	< 0.001
	32 yr, 70–72 cm	0.0170 (\pm 0.0468)	0.0118 (\pm 0.0061)	8.554	< 0.001
	40 yr, 8–10 cm	0.0150 (\pm 0.0373)	0.0087 (\pm 0.0048)	8.687	< 0.001
	40 yr, 30–32 cm	0.0134 (\pm 0.0424)	0.0052 (\pm 0.0030)	9.006	< 0.001
	40 yr, 50–52 cm	0.0194 (\pm 0.0510)	0.0136 (\pm 0.0070)	8.390	< 0.001
	40 yr, 70–72 cm	0.0215 (\pm 0.0605)	0.0089 (\pm 0.0049)	8.491	< 0.001