# 1 Running a simple model with no ncp etc

2 Specific leaf area

3   1. Variation due to sppecies is much greater than pop

4   2. Harvard forest has a negative population effect - most souther

5   3. St. Hippolyte (most northern) is positive, but Grant has the largest population effect

6   4. Spitom has the largest positive species effect, Vibcas the most negative

7   5. No clear divide between shrubs and tree species

Table 1: Summary of the intercept only model for SLA across the two years of data (2019 and 2022) (n = 599) with species (n = 18) and population (n = 4).

|	mean	25%	75%	n_eff	Rhat
alpha	21.35	20.69	22.11	578.31	1.01
ACEPEN	2.45	1.09	3.82	2464.13	1.00
ACESPI	1.24	-0.33	2.85	2406.69	1.00
ALNINC	-1.70	-2.46	-0.94	737.69	1.00
AMECAN	-4.20	-5.24	-3.14	1341.23	1.00
AROMEL	-4.22	-5.12	-3.34	1009.50	1.00
BETALL	-0.35	-1.17	0.42	823.56	1.00
BETPAP	-2.28	-3.20	-1.37	1036.84	1.00
BETPOP	-0.55	-1.35	0.25	775.20	1.00
DIELON	1.41	0.58	2.21	869.75	1.00
MYRGAL	1.48	0.61	2.30	918.40	1.00
QUEALB	2.28	0.62	3.90	2537.62	1.00
QUERUB	-1.14	-2.91	0.61	2773.19	1.00
SAMRAC	3.09	2.17	3.94	1024.59	1.00
SORAME	0.32	-0.75	1.40	1412.60	1.00
SPIALB	8.01	7.24	8.76	713.47	1.00
SPITOM	3.95	3.14	4.72	790.82	1.00
VACMYR	-2.17	-3.66	-0.64	2454.05	1.00
VIBCAS	-5.02	-5.79	-4.26	813.01	1.00
GR	0.46	0.02	0.72	560.72	1.02
HF	-0.40	-0.79	-0.03	640.11	1.01
SH	0.19	-0.16	0.42	574.87	1.02
WM	0.12	-0.21	0.36	570.50	1.02
sigma_a_sp	3.82	3.25	4.29	2331.61	1.00
sigma_a_pop	0.95	0.35	1.14	617.86	1.02
sigma_y	7.20	7.08	7.30	3529.72	1.00
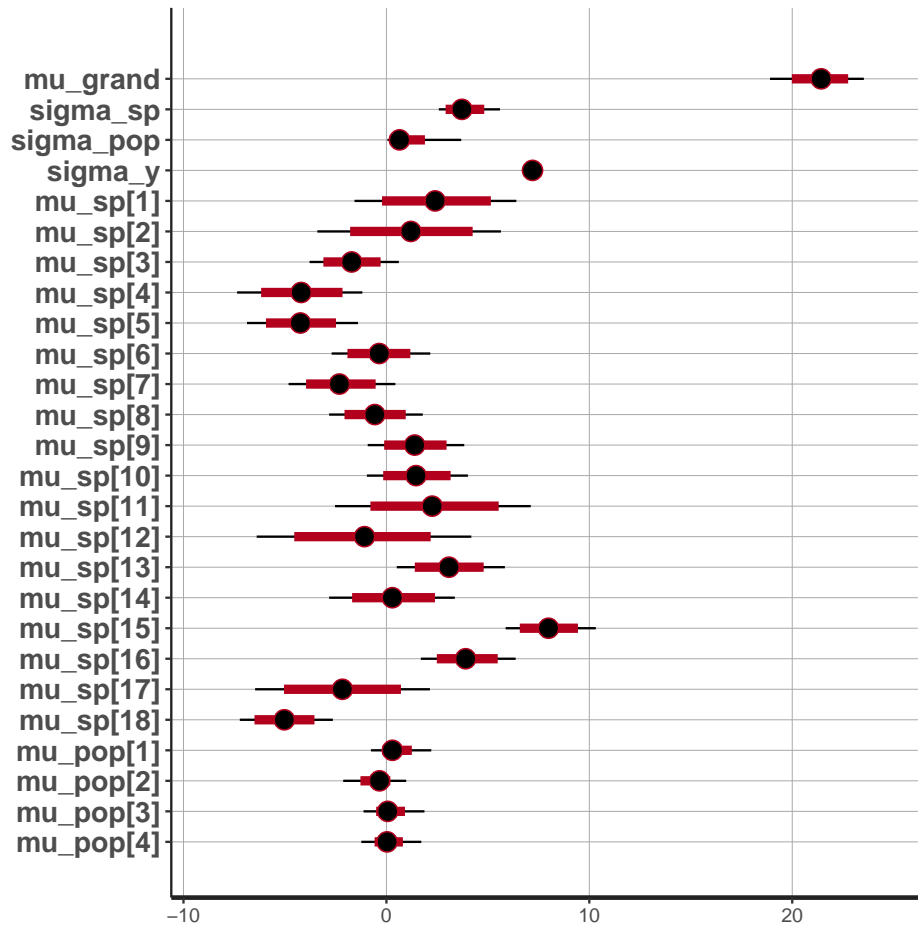
9   1. Similar overall trend with samller spp subset, but slightly stronger responses

10   2. Species level estimates are different though

Table 2: Summary of the intercept only model for SLA in 2022 (n = 446) with species still alive by 2022(n = 13) and population (n = 4).

|	mean	25%	75%	n_eff	Rhat
alpha	21.17	20.27	22.13	481.32	1.00
ACEPEN	2.71	1.17	4.25	1378.96	1.00
ALNINC	-1.53	-2.44	-0.63	655.56	1.00
AMECAN	-4.13	-5.28	-2.96	973.53	1.00
AROMEL	-4.11	-5.15	-3.07	865.17	1.00
BETALL	-0.22	-1.19	0.75	686.36	1.00
BETPAP	-2.16	-3.17	-1.13	788.64	1.00
BETPOP	-0.37	-1.29	0.54	669.90	1.00
DIELON	1.62	0.61	2.56	703.71	1.00
MYRGAL	1.64	0.65	2.67	735.50	1.00
SAMRAC	3.29	2.24	4.29	810.81	1.00
SPIALB	8.22	7.34	9.10	645.03	1.00
SPITOM	4.16	3.21	5.06	683.53	1.00
VIBCAS	-4.90	-5.83	-3.99	697.15	1.00
GR	0.49	0.02	0.81	543.80	1.00
HF	-0.45	-0.85	-0.04	635.54	1.00
SH	0.23	-0.17	0.51	569.42	1.00
WM	0.12	-0.25	0.39	586.04	1.00
sigma_a_sp	4.36	3.63	4.93	1801.74	1.00
sigma_a_pop	1.05	0.40	1.26	563.11	1.00
sigma_y	7.33	7.22	7.44	2647.75	1.00
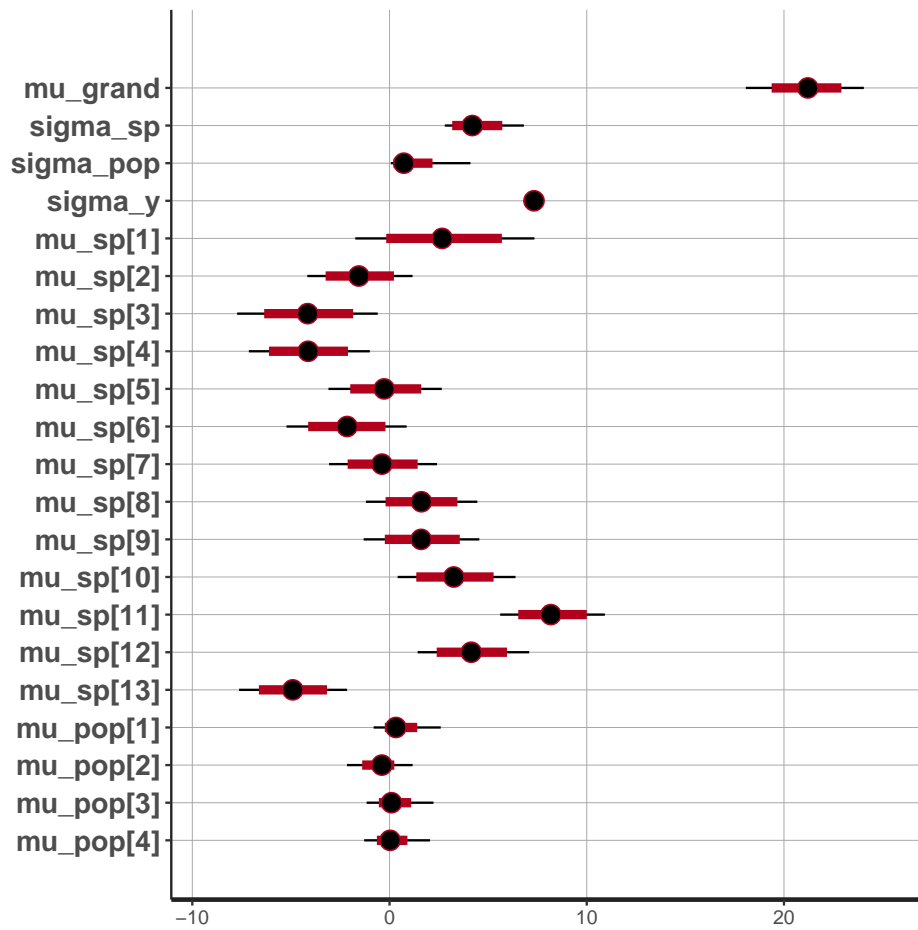
11

Leaf dry matter content

1. variation due to population is twice as great as species

2. There are no strong differences across populations, but estimate is oddly large

3. Spitom has the largest positive species effect, Vibcas the most negative

4. Quite a lot of species level variaiton, ranging from very negative for Samrac to greater positive values for Querub

Table 3: Summary of the intercept only model for LDMC in 2019 and 2022 (n = 599) with species (n = 18) and population (n = 4).

|	mean	25%	75%	n_eff	Rhat
alpha	20.36	13.64	27.03	2325.01	1.00
ACEPEN	-25.12	-35.45	-14.87	3344.96	1.00
ACESPI	10.14	-2.40	22.62	3759.11	1.00
ALNINC	15.55	9.47	21.32	1083.29	1.00
AMECAN	58.46	50.09	66.55	1711.55	1.00
AROMEL	12.02	4.83	18.97	1475.46	1.00
BETALL	3.20	-3.25	9.33	1184.71	1.00
BETPAP	-1.87	-8.70	4.92	1441.84	1.00
BETPOP	20.59	14.35	26.63	1159.22	1.00
DIELON	-2.59	-8.88	3.53	1178.31	1.00
MYRGAL	-17.84	-24.42	-11.41	1345.81	1.00
QUEALB	23.17	10.85	35.05	3095.56	1.00
QUERUB	62.83	48.20	77.23	3277.29	1.00
SAMRAC	-78.06	-85.03	-71.30	1561.70	1.00
SORAME	10.58	2.20	18.67	2028.57	1.00
SPIALB	16.14	10.15	21.95	1090.99	1.00
SPITOM	36.38	30.08	42.58	1140.58	1.00
VACMYR	62.42	50.76	73.79	2760.80	1.00
VIBCAS	-13.84	-19.93	-7.91	1165.10	1.00
GR	306.58	298.06	315.14	1112.33	1.00
HF	309.87	301.26	318.57	1133.73	1.00
SH	304.34	295.74	313.05	1104.73	1.00
WM	308.46	299.85	317.06	1116.44	1.00
sigma_a_sp	30.79	27.65	33.54	2722.96	1.00
sigma_a_pop	77.65	74.05	81.15	4562.14	1.00
sigma_y	49.69	48.96	50.40	5107.31	1.00

18
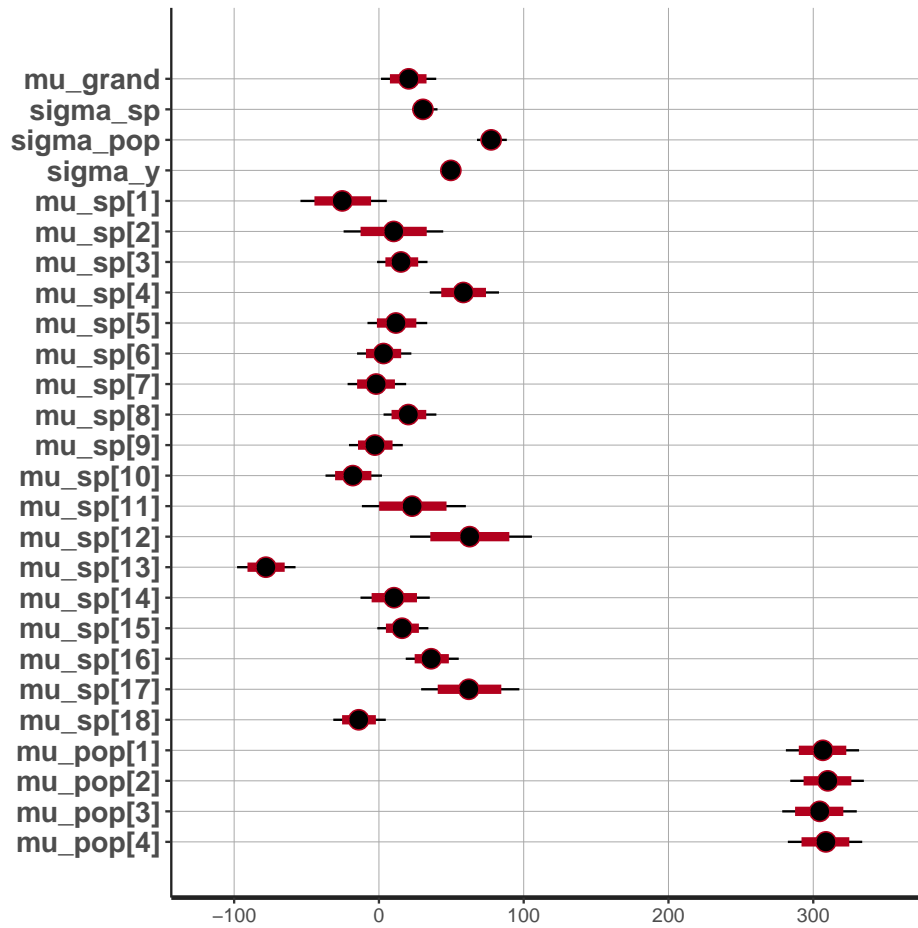
19   1. Variation due to population is about twice that due to species

20   2. Again all populations have similar estimaes

21   3. species level estiamtes are different from the full species model in variable ways across species

Table 4: Summary of the intercept only model for LDMC in 2019 and 2022 (n = 446) with species still alive by 2022 (n = 13) and population (n = 4).

|	mean	25%	75%	n_eff	Rhat
alpha	20.34	13.80	27.09	2412.17	1.00
ACEPEN	-14.31	-25.25	-3.82	2480.55	1.00
ALNINC	28.07	20.76	34.48	907.15	1.00
AMECAN	69.34	60.05	77.72	1246.09	1.00
AROMEL	23.61	15.36	31.29	1221.27	1.00
BETALL	15.56	7.90	22.28	993.63	1.00
BETPAP	10.03	1.96	17.22	1090.83	1.00
BETPOP	32.77	25.33	39.39	926.16	1.00
DIELON	9.82	2.46	16.52	1004.06	1.00
MYRGAL	-5.50	-13.23	1.42	998.32	1.00
SAMRAC	-65.42	-73.05	-58.30	1202.43	1.00
SPIALB	28.60	21.39	34.91	878.64	1.01
SPITOM	48.67	41.24	55.38	928.25	1.01
VIBCAS	-1.34	-8.67	5.11	975.03	1.00
GR	294.16	284.96	303.85	1032.34	1.01
HF	296.90	287.89	306.56	1071.81	1.00
SH	291.17	281.67	300.94	1054.39	1.00
WM	295.76	286.72	305.47	1060.69	1.01
sigma_a_sp	29.15	25.84	31.93	2020.55	1.00
sigma_a_pop	76.06	72.44	79.53	3939.35	1.00
sigma_y	50.22	49.46	50.96	6180.32	1.00

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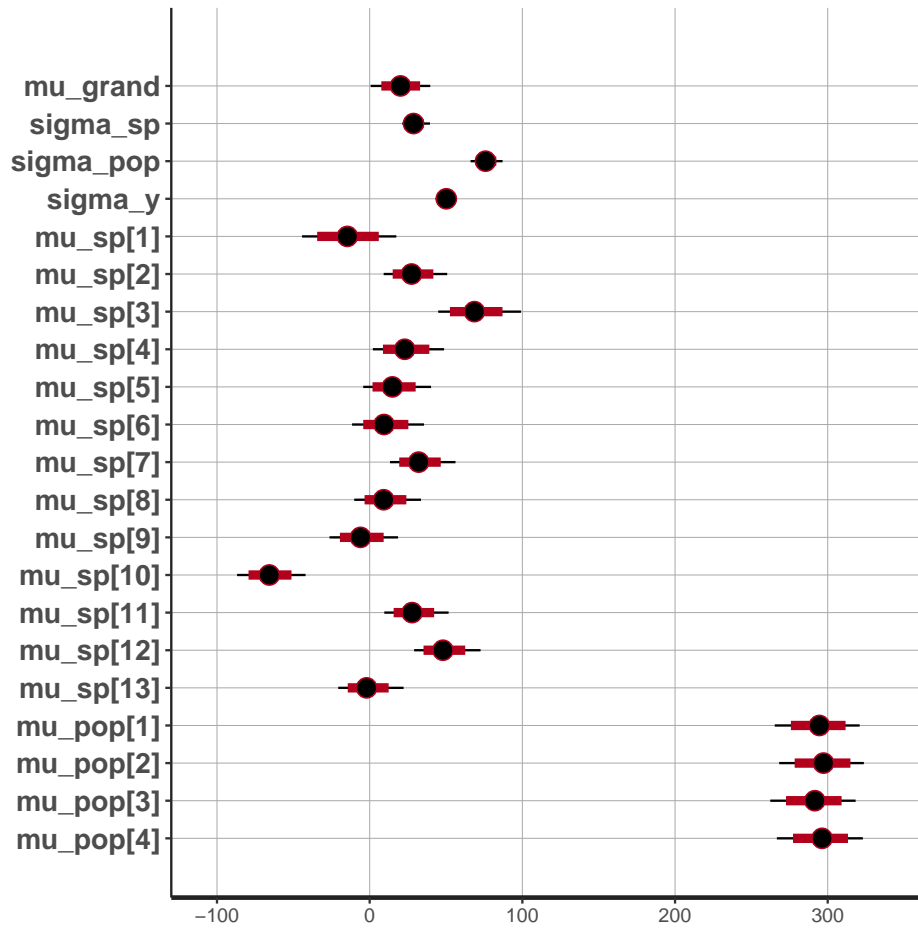
Height

24   1. variation due to sppecies is much greater than pop, about three times

25   2. Harvard forest and white mountain are positive (the two more southern sites)

26   3. but grant has a much stronger negative effect than St. Hippolyte

27   4. Betpop has the strongest positive response and Vacmyr the strongest negative response

28   5. No clear divide between shrubs and tree species, but possible weak clade differences (all Acer
29   Betula, Quercus, and Spirea have the same sign at least)

Table 5: Summary of the intercept only model for plant height in 2019, 2021, 2022 (n = 302) with species (n = 18) and population (4).

|	mean	25%	75%	n_eff	Rhat
alpha	1.39	1.19	1.59	416.99	1.01
ACEPEN	-0.11	-0.38	0.15	1167.32	1.01
ACESPI	-0.48	-0.85	-0.14	2007.49	1.00
ALNINC	1.75	1.57	1.92	505.74	1.01
AMECAN	0.03	-0.20	0.25	763.69	1.01
AROMEL	-0.66	-0.86	-0.47	639.97	1.01
BETALL	1.10	0.91	1.28	519.50	1.01
BETPAP	1.00	0.81	1.19	623.85	1.01
BETPOP	2.22	2.03	2.40	550.62	1.01
DIELON	-0.70	-0.88	-0.52	542.73	1.01
MYRGAL	-0.69	-0.87	-0.50	596.41	1.01
QUEALB	-0.79	-1.11	-0.45	1591.65	1.00
QUERUB	-0.20	-0.53	0.12	1717.92	1.00
SAMRAC	0.41	0.22	0.60	632.69	1.01
SORAME	-0.73	-0.96	-0.50	776.30	1.01
SPIALB	-0.18	-0.36	-0.01	502.77	1.01
SPITOM	-0.64	-0.83	-0.47	533.17	1.01
VACMYR	-0.91	-1.22	-0.58	1647.09	1.00
VIBCAS	-0.39	-0.57	-0.21	541.49	1.01
GR	-0.20	-0.28	-0.10	427.93	1.01
HF	0.18	0.09	0.29	448.23	1.01
SH	-0.06	-0.15	0.03	435.03	1.01
WM	0.07	-0.02	0.16	439.58	1.01
sigma_a_sp	1.04	0.90	1.15	2612.49	1.00
sigma_a_pop	0.35	0.17	0.39	567.54	1.01
sigma_y	0.94	0.92	0.96	3498.92	1.00

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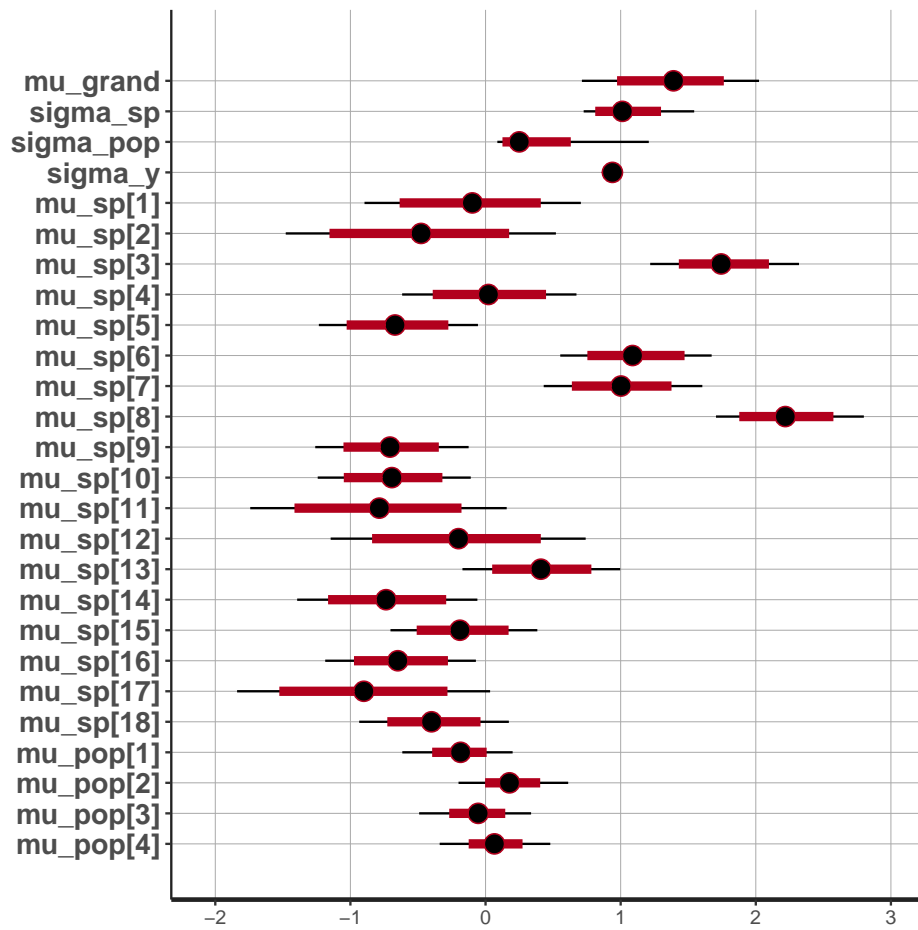
31   1. variation due to sppecies is still much greater than pop

32   2. population level estimates are similar to the full species model

33   3. Species level estimates are quite different

Table 6: Summary of the intercept only model for plant height (n = 257) with species still alive by 2022 (n = 14) and population (4).

|	mean	25%	75%	n_eff	Rhat
alpha	1.55	1.33	1.79	443.03	1.01
ACEPEN	-0.28	-0.57	0.00	933.49	1.00
ALNINC	1.57	1.37	1.78	484.54	1.01
AMECAN	-0.15	-0.38	0.08	612.93	1.00
BETPAP	-0.84	-1.06	-0.62	546.02	1.01
BETPOP	0.92	0.71	1.13	543.67	1.01
BETALL	0.83	0.61	1.05	556.20	1.01
VIBCAS	2.05	1.84	2.26	521.68	1.01
SPIALB	-0.88	-1.08	-0.67	475.20	1.01
SPITOM	-0.86	-1.08	-0.65	539.82	1.01
MYRGAL	0.24	0.01	0.45	569.39	1.01
AROMEL	-0.90	-1.15	-0.65	708.72	1.00
SAMRAC	-0.36	-0.57	-0.16	500.25	1.01
DIELON	-0.82	-1.02	-0.61	504.99	1.01
SORAME	-0.57	-0.77	-0.36	501.06	1.01
GR	-0.18	-0.28	-0.09	479.57	1.01
HF	0.20	0.08	0.28	449.43	1.01
SH	-0.05	-0.15	0.04	455.80	1.01
WM	0.08	-0.03	0.17	461.50	1.01
sigma_a_sp	1.11	0.92	1.25	1559.69	1.00
sigma_a_pop	0.34	0.17	0.39	624.94	1.00
sigma_y	0.94	0.93	0.96	2193.02	1.00
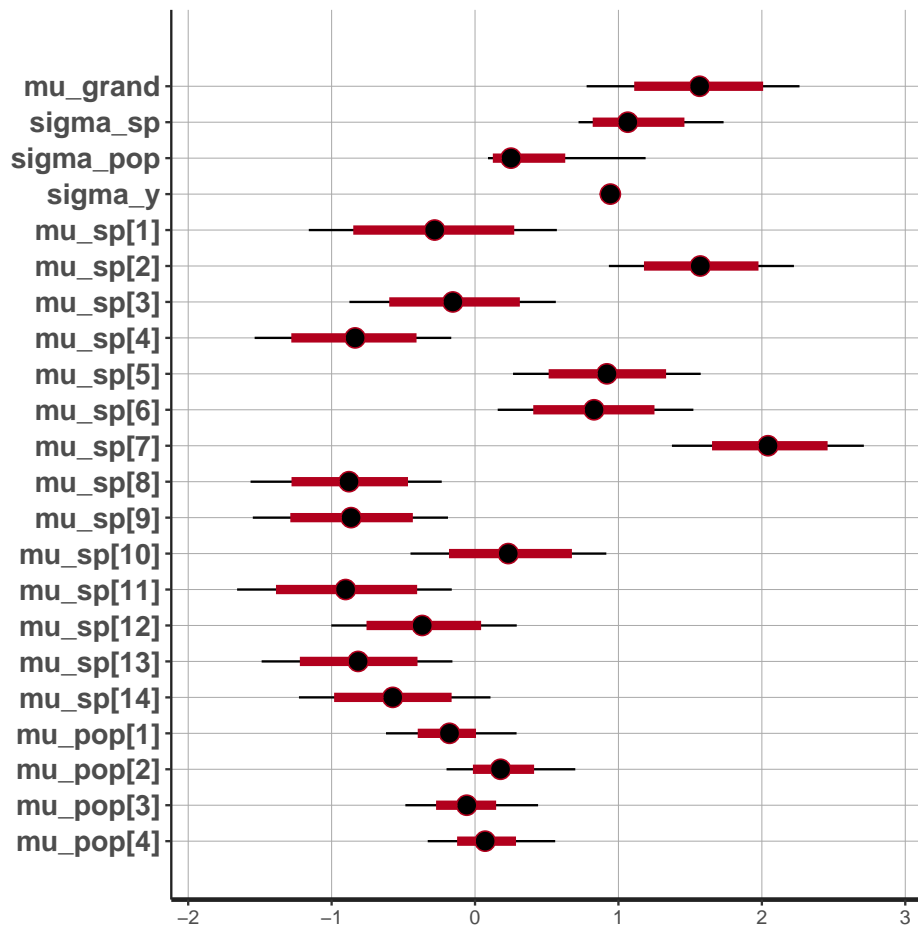
34

Stem specific density

1. variation due to sppecies is much greater than pop; but values are very small

2. Population estimates are essentailly 0

3. Very weak effects across species relative to other species

4. More of a divide, mostly shrubs are negative, trees are positive, but estimates are small

Table 7: Summary of the intercept only model for plant SSD in 2022 (n = 240) with species (n = 12) and population (n = 4).

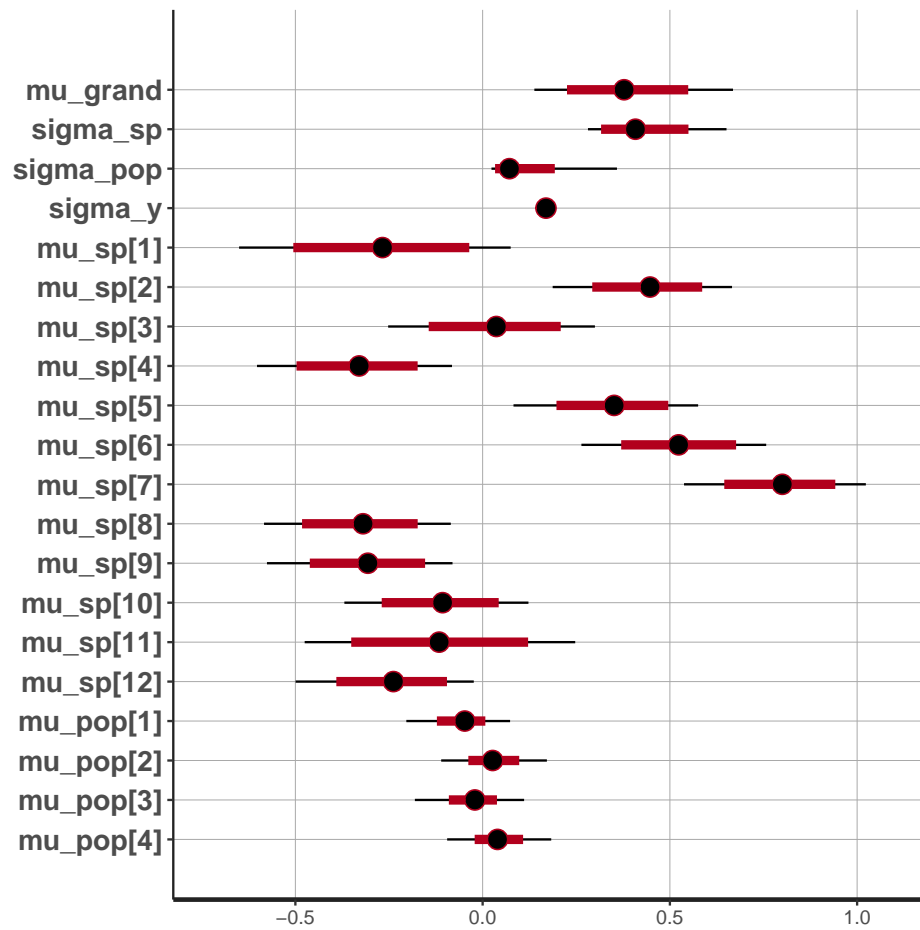|	mean	25%	75%	n_eff	Rhat
alpha	0.44	0.42	0.45	378.00	1.01
ALNINC	-0.02	-0.04	-0.00	425.22	1.01
AMECAN	0.08	0.05	0.10	676.62	1.01
AROMEL	0.07	0.05	0.09	489.93	1.01
BETALL	0.03	0.02	0.05	453.54	1.01
BETPAP	0.04	0.02	0.06	560.61	1.01
BETPOP	0.06	0.04	0.07	459.13	1.01
DIELON	-0.12	-0.14	-0.10	469.54	1.01
MYRGAL	-0.07	-0.08	-0.05	493.18	1.01
SAMRAC	-0.14	-0.16	-0.12	510.04	1.01
SPIALB	-0.00	-0.02	0.02	429.45	1.01
SPITOM	0.02	0.00	0.04	475.36	1.01
VIBCAS	0.06	0.04	0.08	446.64	1.01
GR	0.00	-0.00	0.00	724.72	1.01
HF	0.00	-0.00	0.01	719.06	1.00
SH	-0.00	-0.01	0.00	700.47	1.01
WM	-0.00	-0.00	0.00	738.87	1.01
sigma_a_sp	0.09	0.07	0.10	1071.28	1.00
sigma_a_pop	0.01	0.00	0.01	559.24	1.00
sigma_y	0.06	0.06	0.06	1727.99	1.00

40
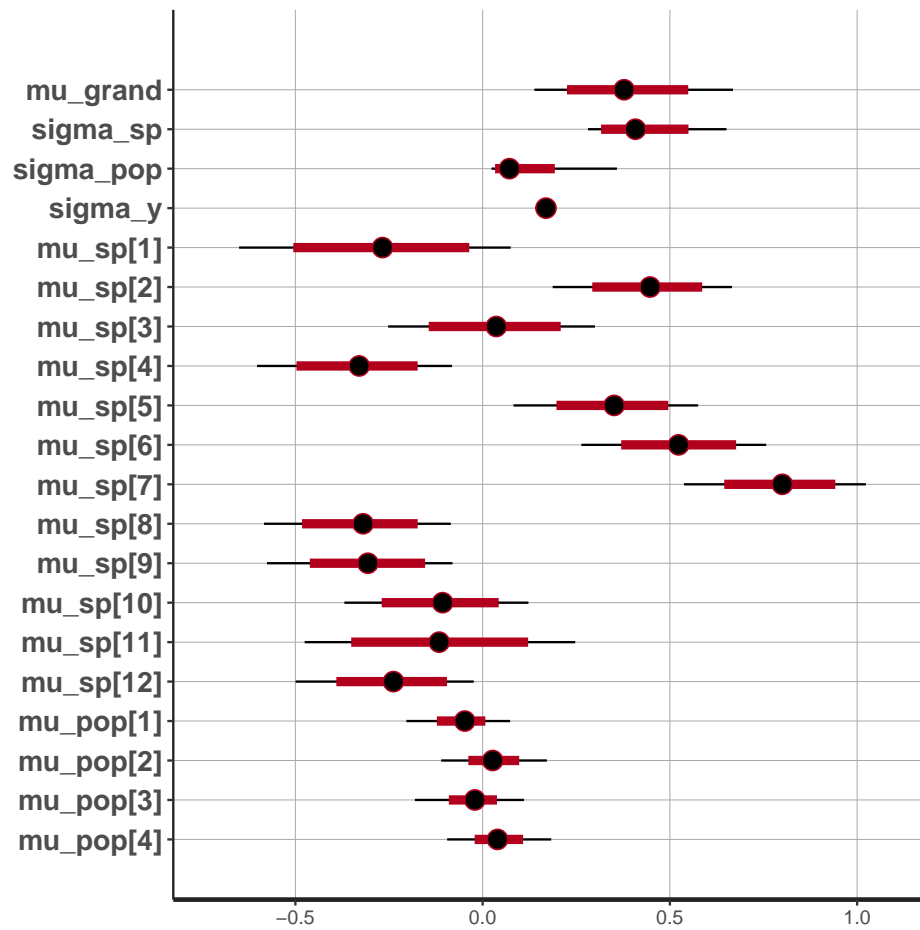
41 Relative Growth Rate

42 1. Variation due to sppecies is much greater than pop, about four times

43 2. The two southern sites are positive, but two more northern sites are negative

44 3. Again Grant has a more negative effect that St. Hippolyte, but effect sizes are small across
45   populations

46 4. There might be some divide, with shrubs having negative estimates, but there are not many trees
47   in this dataset (which excludes any indiviudal that had negative growth over the years)

Table 8: Summary of the intercept only model for plant relative growth rate averaged over 3 years (n = 222) with species (n = 12) and population (n = 4). For this analysis I excluded any individual that had negative growth rates.

	mean	25%	75%	n_eff	Rhat
alpha	0.38	0.30	0.47	565.01	1.01
ACEPEN	-0.27	-0.39	-0.14	1245.20	1.00
ALNINC	0.44	0.37	0.52	637.41	1.01
AMECAN	0.03	-0.06	0.12	840.24	1.01
AROMEL	-0.33	-0.41	-0.25	715.29	1.01
BETALL	0.35	0.27	0.43	648.92	1.01
BETPAP	0.52	0.44	0.60	692.55	1.01
BETPOP	0.80	0.72	0.88	644.22	1.01
DIELON	-0.32	-0.40	-0.24	677.06	1.01
MYRGAL	-0.31	-0.39	-0.22	673.49	1.01
SAMRAC	-0.11	-0.19	-0.03	697.58	1.01
SORAME	-0.11	-0.24	0.02	1326.93	1.00
SPIALB	-0.24	-0.31	-0.16	622.07	1.01
SPITOM	-0.29	-0.37	-0.21	656.81	1.01
VIBCAS	-0.24	-0.31	-0.16	645.10	1.01
GR	-0.05	-0.08	-0.02	542.18	1.01
HF	0.03	-0.00	0.06	552.77	1.00
SH	-0.02	-0.05	0.01	547.36	1.01
WM	0.04	0.01	0.07	531.84	1.01
sigma_a_sp	0.42	0.36	0.47	2254.62	1.00
sigma_a_pop	0.10	0.05	0.11	681.82	1.00
sigma_y	0.17	0.16	0.18	2568.16	1.00