Tree Data Analysis

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Tree Data

This dataset contains features of trees (height, width, etc.) from 3 sites: Brighton, Chase Stream and Lily Bay. There are 8 species in this sample.

Table: Data overview.

Site	Tree	Rep	Sp	Year	Height	id
Brighton	1	1	BS	5	4.5	11
Brighton	1	1	BS	10	10.4	11
Brighton	2	1	BS	5	6.8	21
Brighton	2	1	BS	10	13.1	21
Brighton	4	1	BS	5	4.4	41
Brighton	4	1	BS	10	10.3	41

Table: Distribution of site and species.

Site	BS	EL	HL	JL	JP	RP	TL	WS
Brighton	73	106	82	97	85	94	98	101
Chase Stream	102	108	103	105	101	105	108	103
Lily Bay	99	108	102	100	102	101	107	101
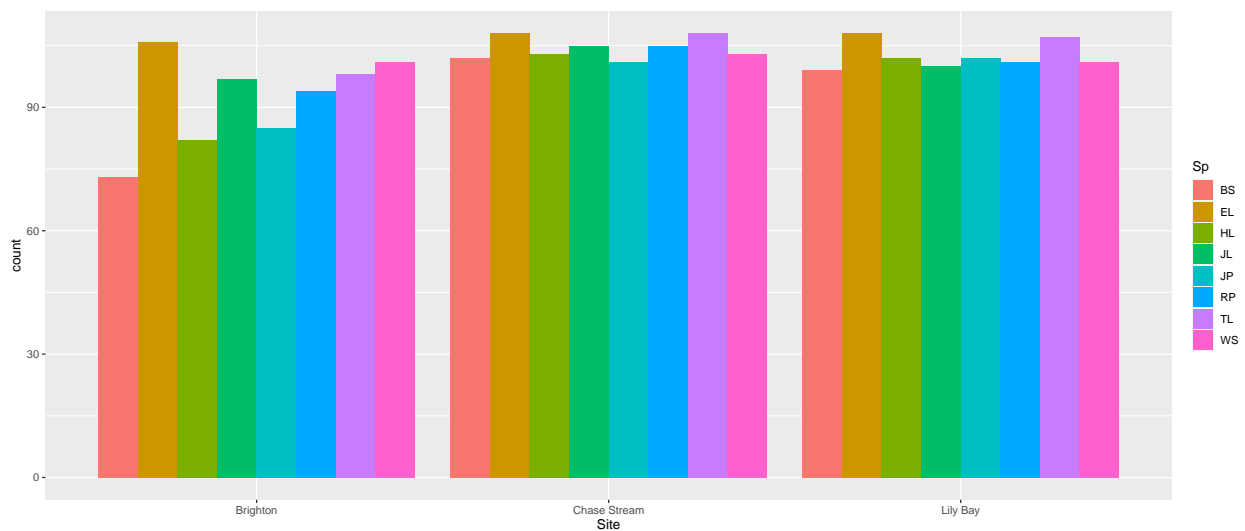
The measurements are collected few years apart: at 5, 10, 15, 16 and 27 years.

Site	Year	n
Brighton	5	989
Brighton	10	933
Chase Stream	5	1240
Chase Stream	10	1224
Chase Stream	16	1226
Chase Stream	27	1166
Lily Bay	5	1162
Lily Bay	10	1144
Lily Bay	15	1109
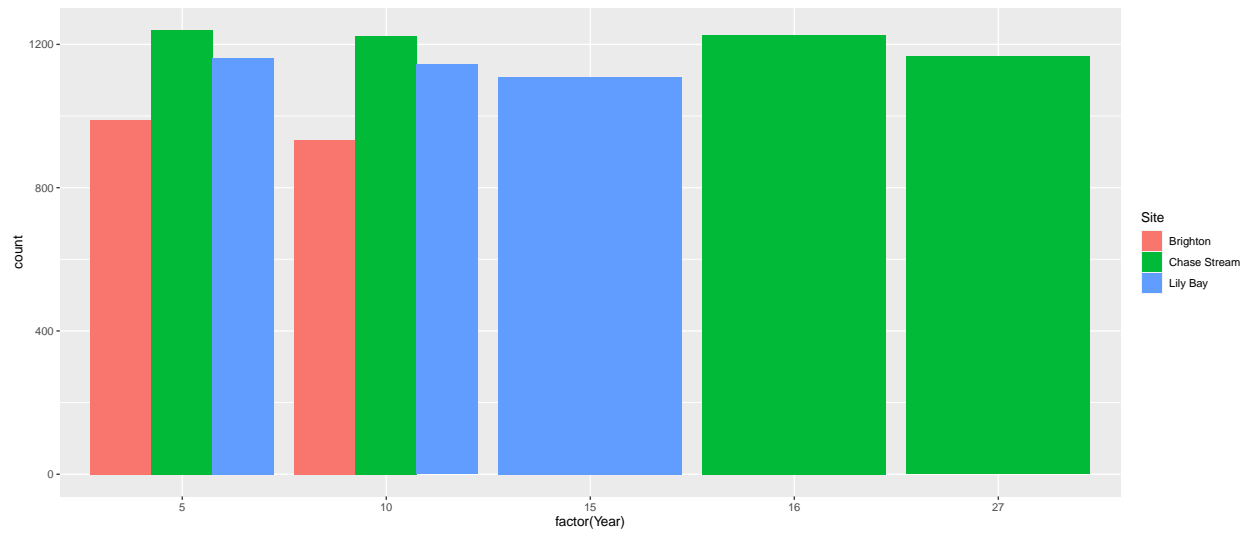
There is height measurement for years after 10 in Brighton and year after 15 in Lily Bay.
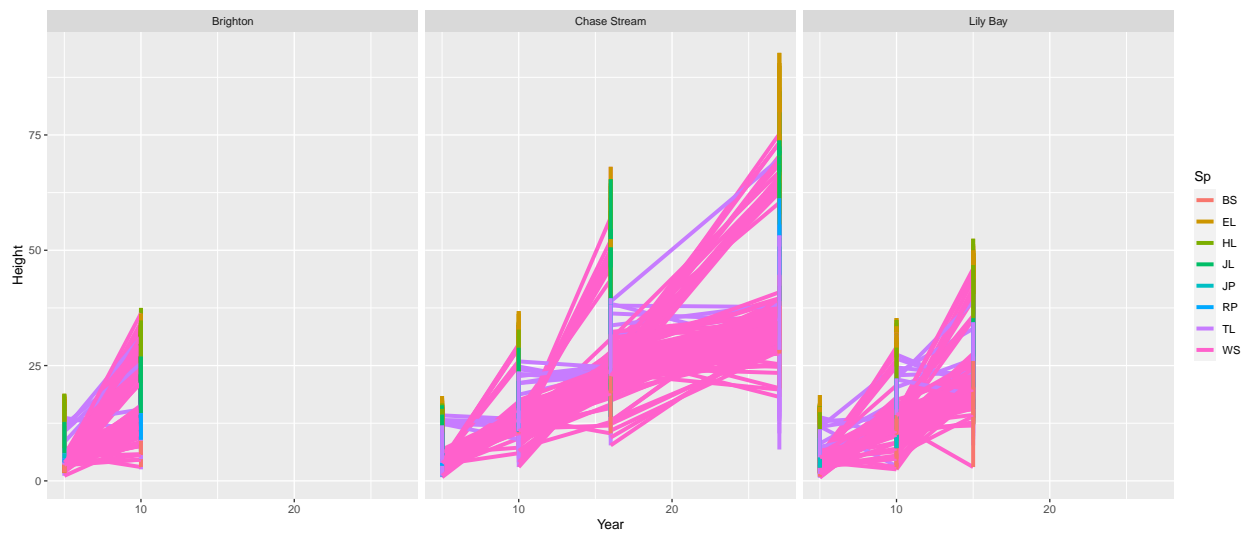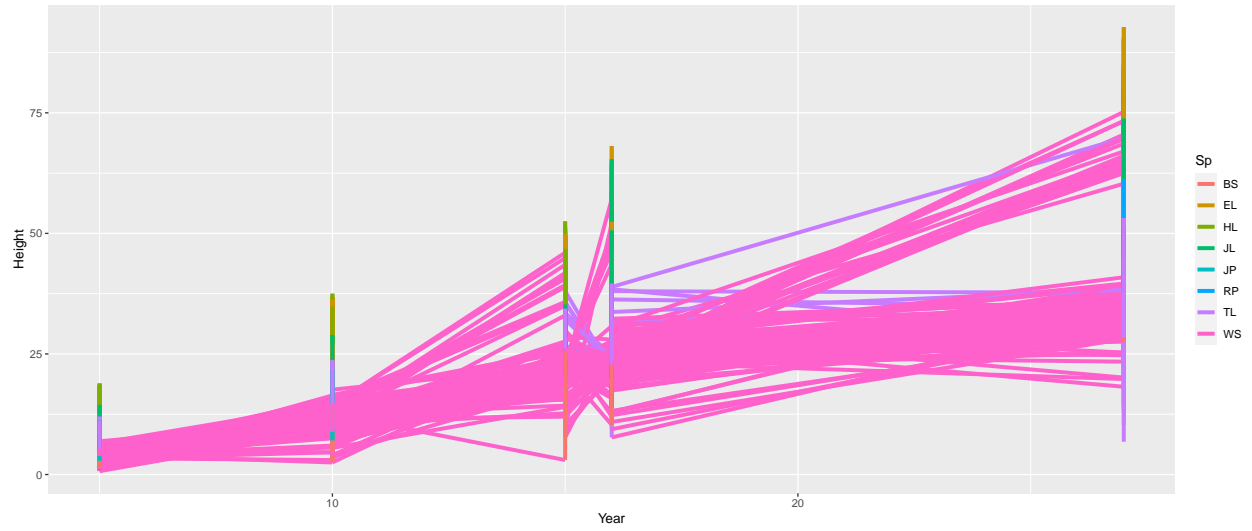
GP Model for Tree Height

Assuming the tree heights for each of the species as a function over time, we analyze the data in functional data analysis approach. For each species, we combine data from all three sites and model the mean functions of the tree heights. We have combined the variables `Tree` and `Rep` to create an `id` variable. Gaussian kernel has been for the estimation.
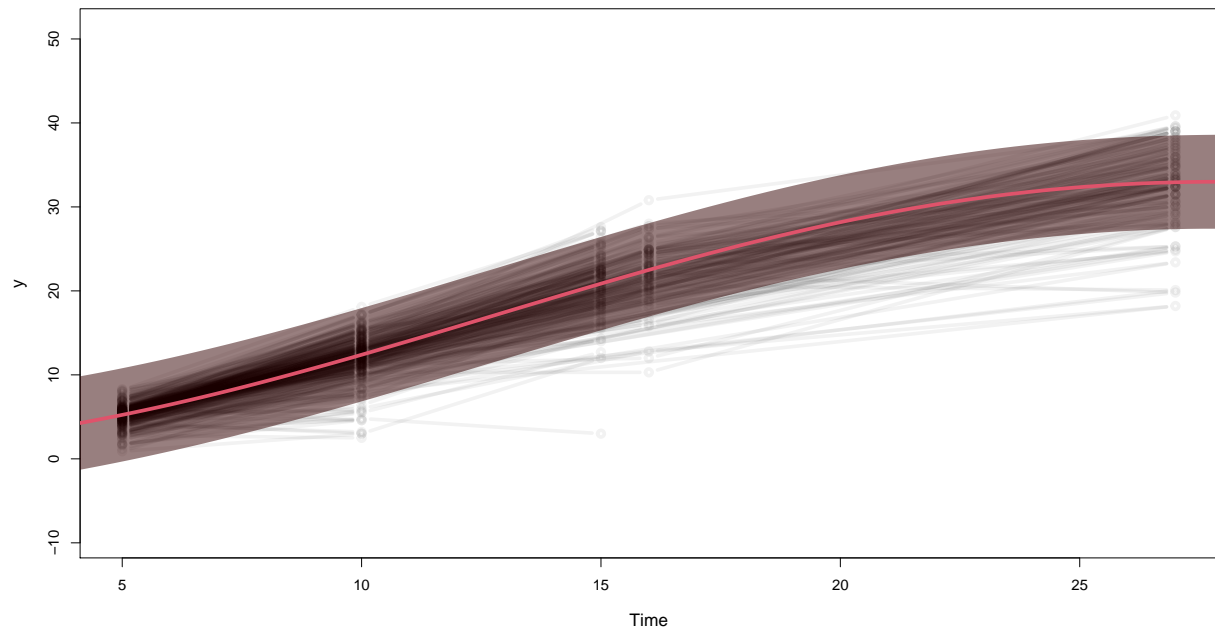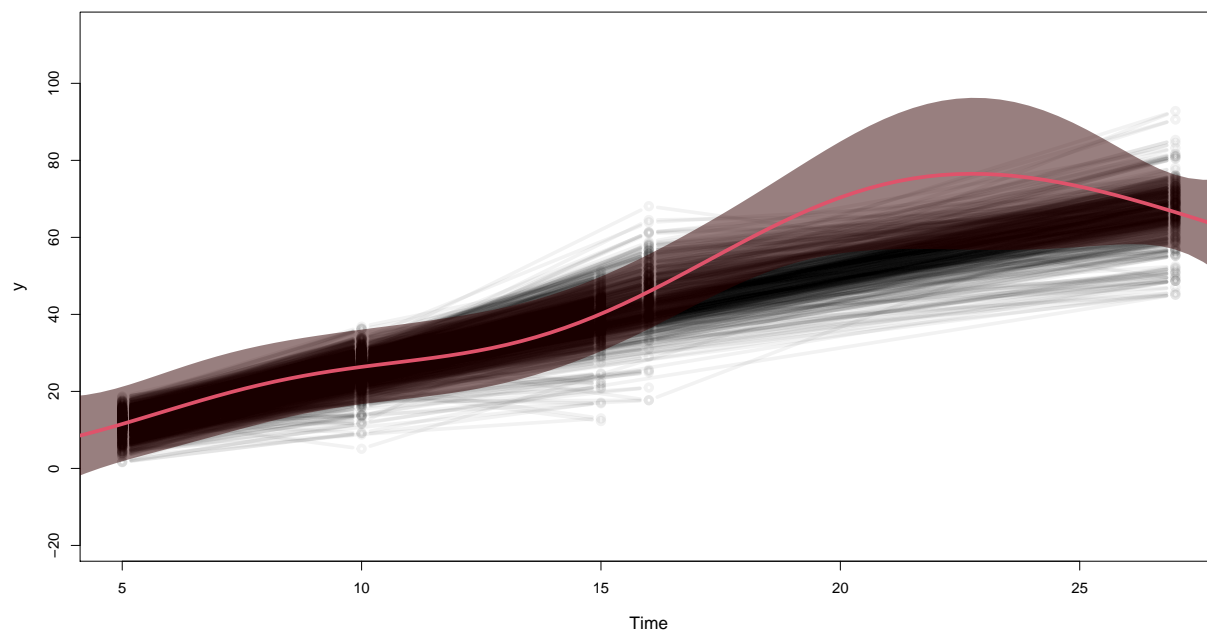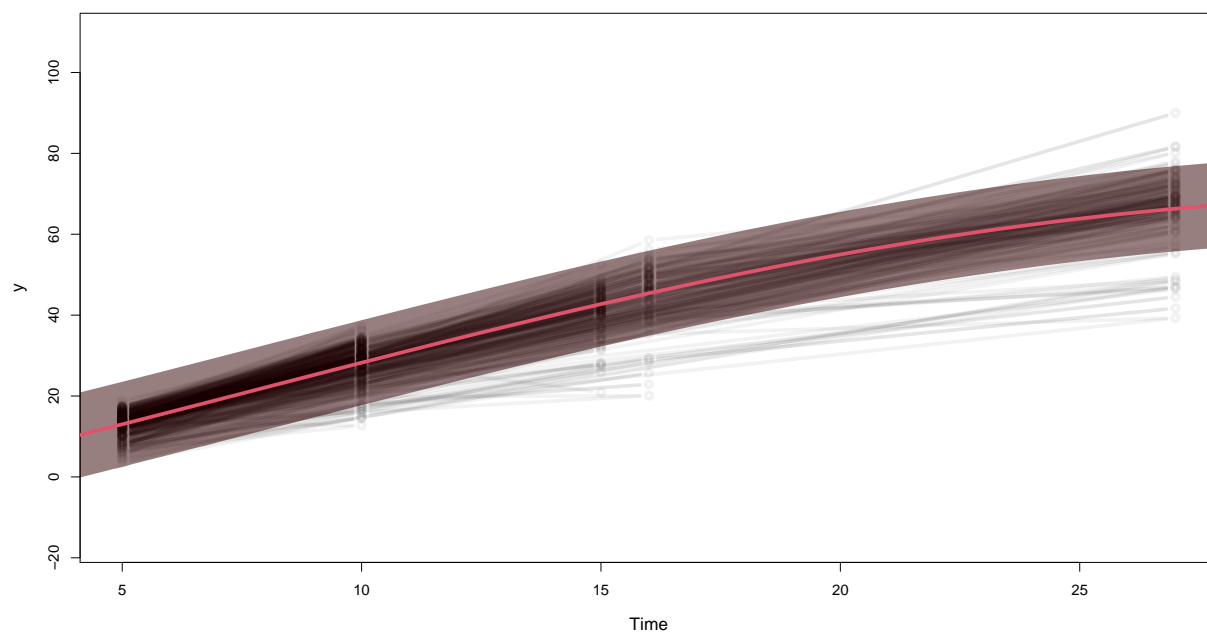

Figure 1: Species: BS
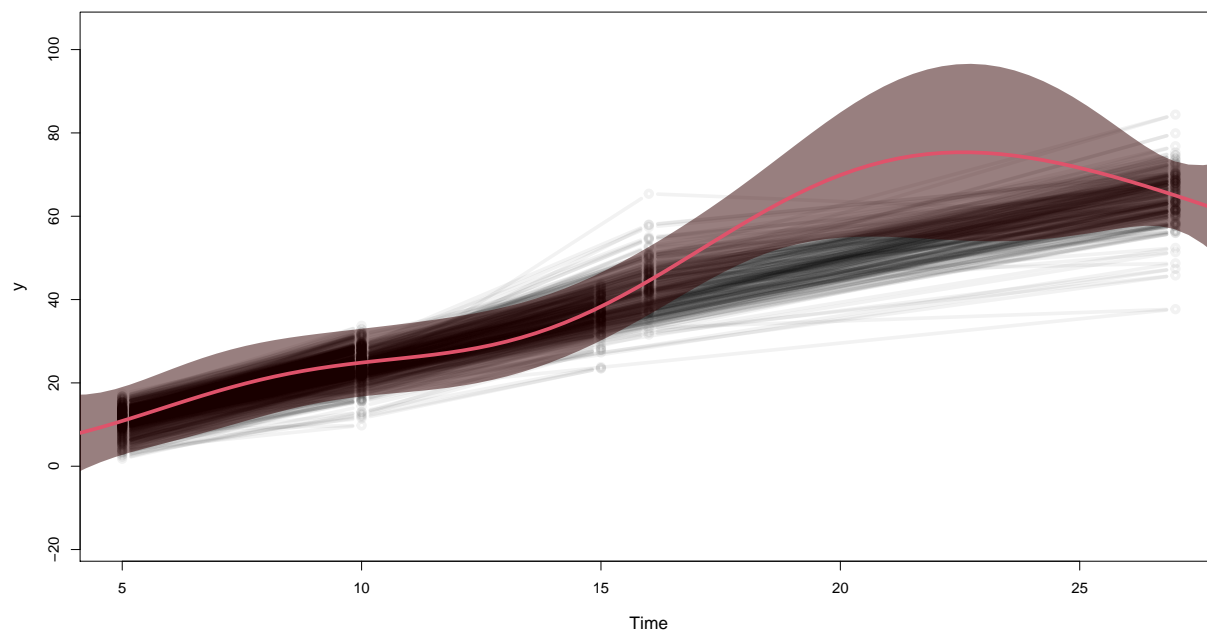
Figure 2: Species : EL
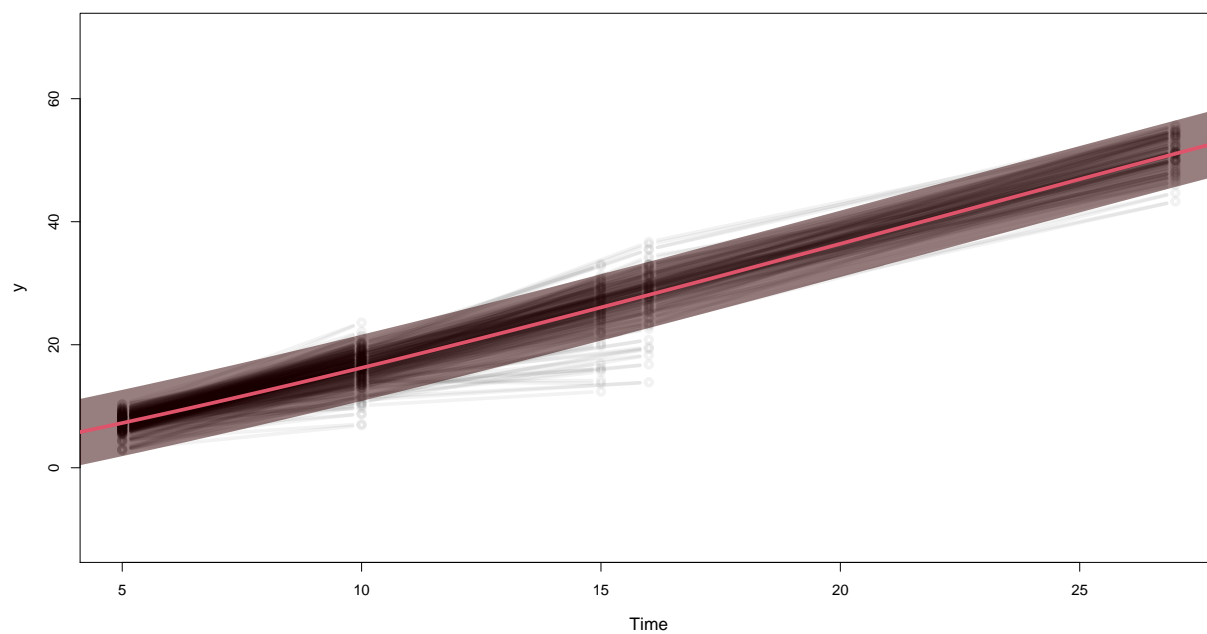

Figure 3: Species : HL
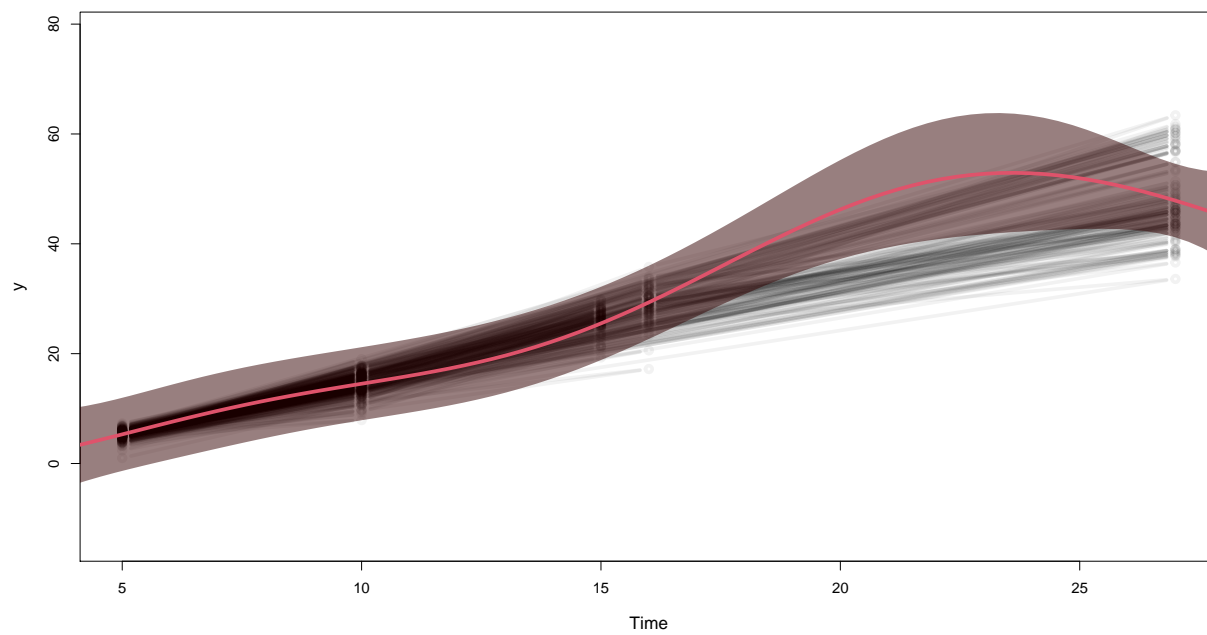
Figure 4: Species : JL
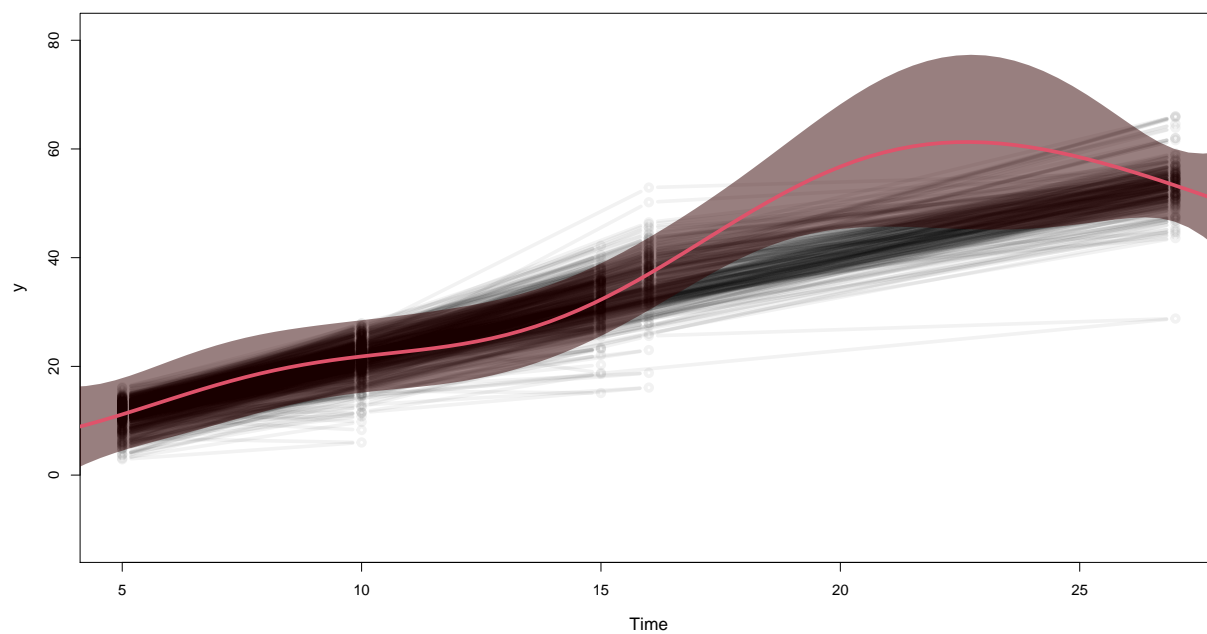

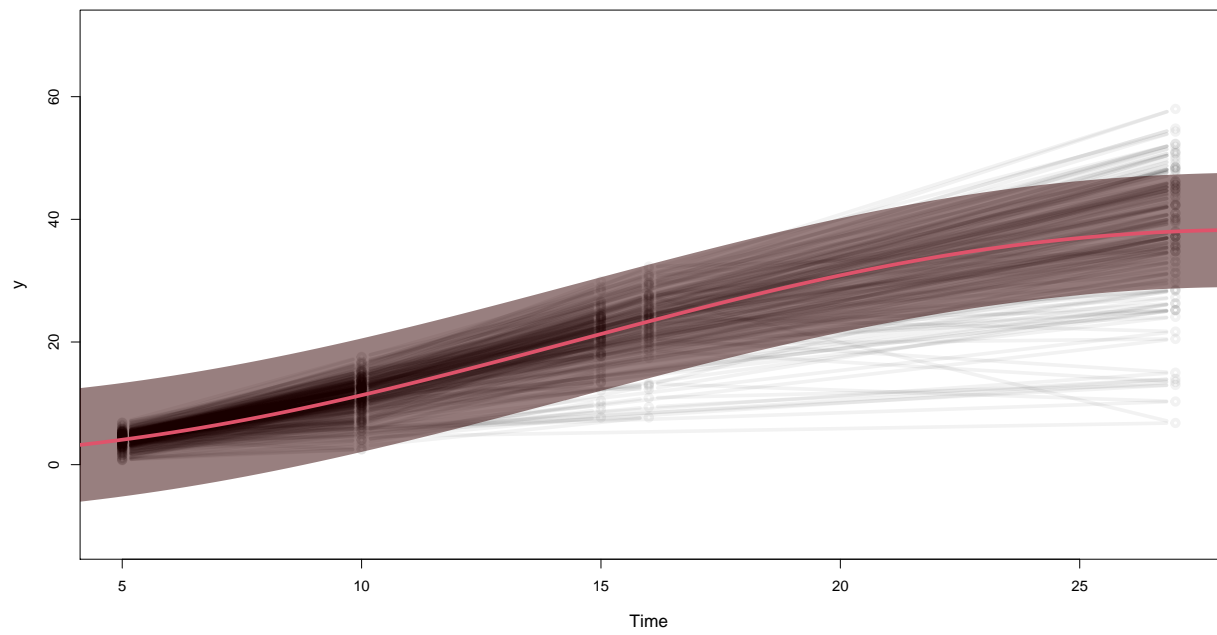Figure 5: Species : JP

Figure 6: Species : RP

Figure 7: Species : TL

6

Figure 8: Species : WS