GTDA 5402
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Assignment 4
2/5/25

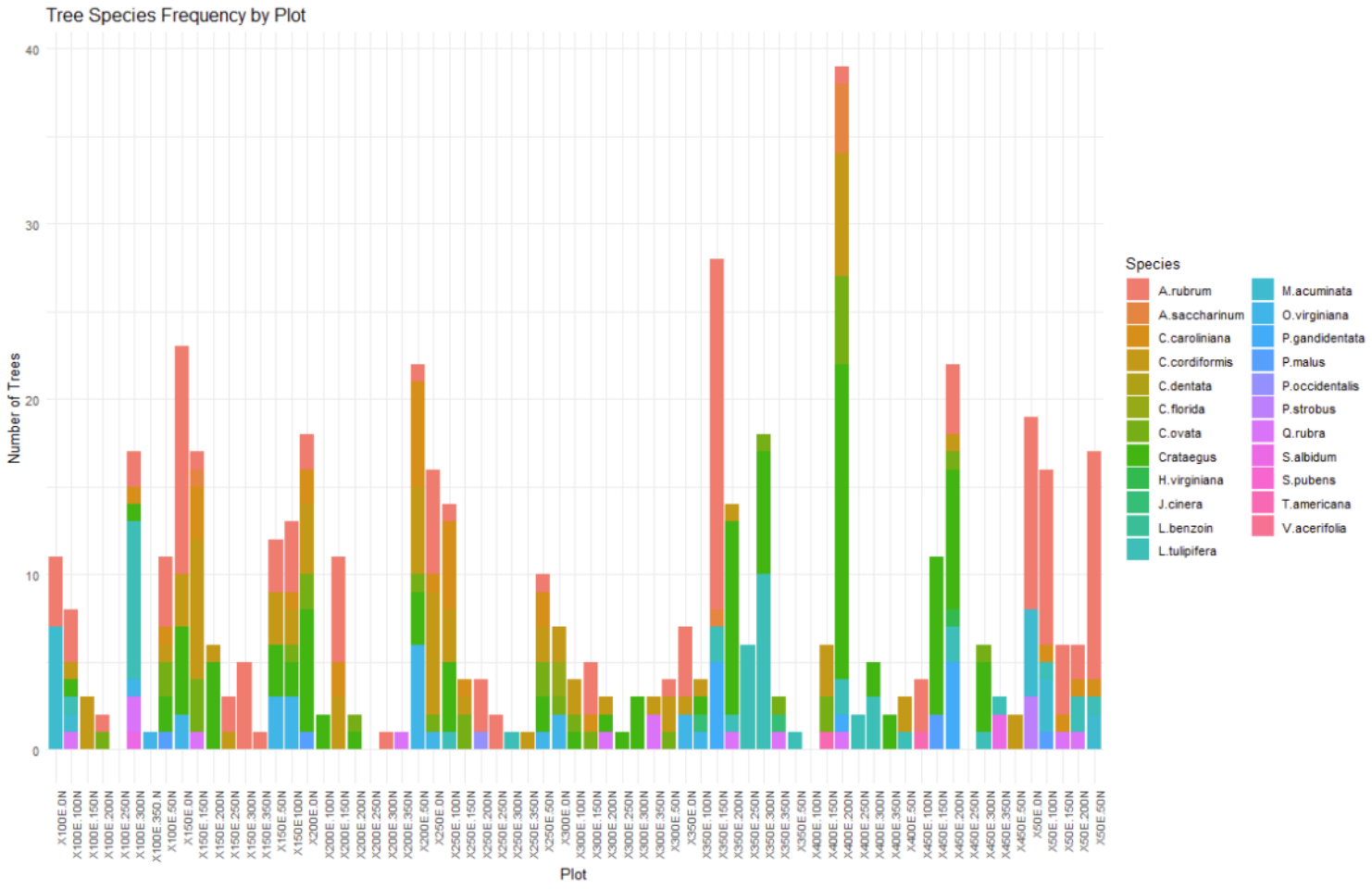
1. Project 1D: Forest Ecology Data

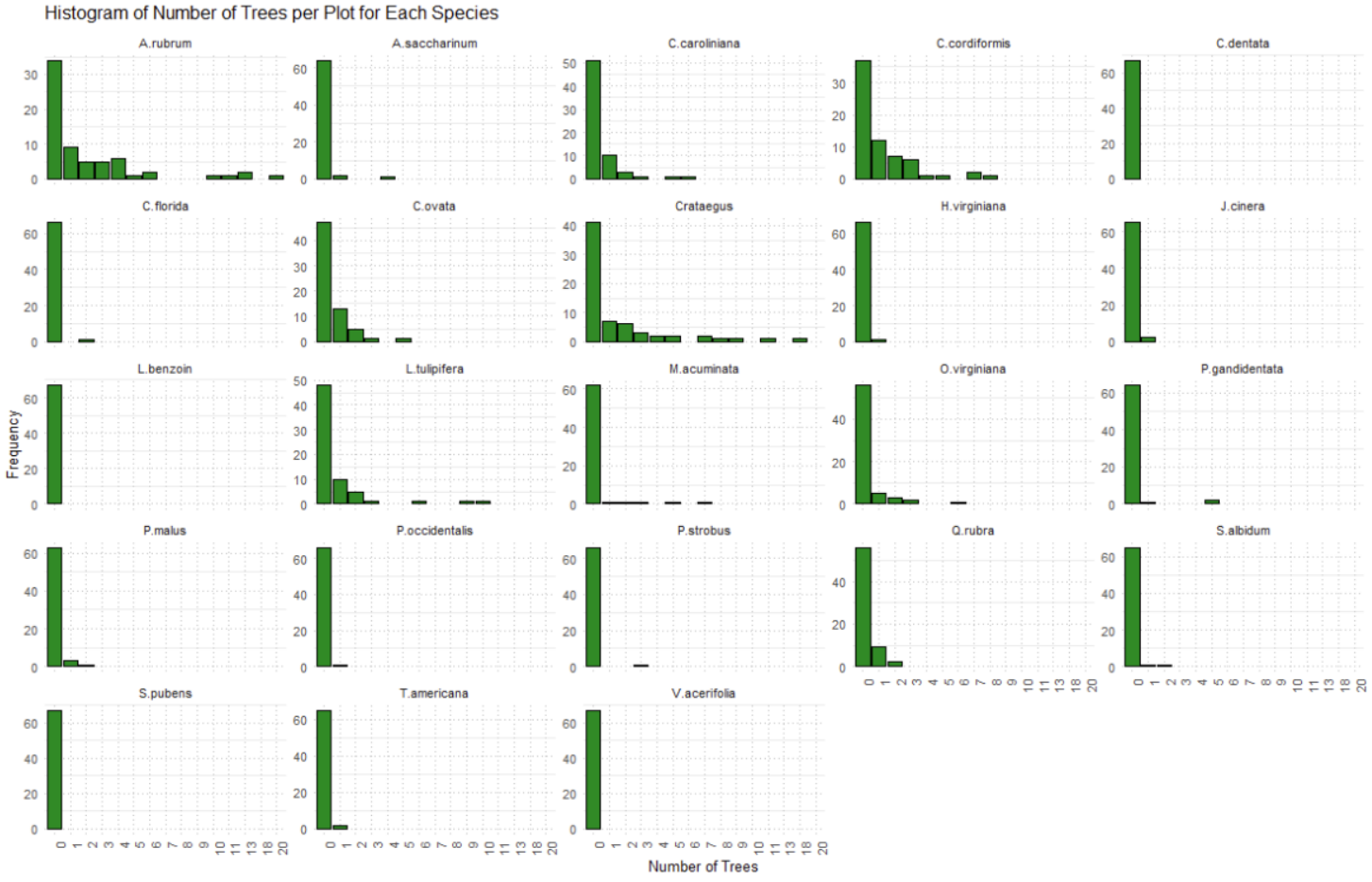
2. Numerical Summary of Variables of Interest: compute summary statistics for each species of interest

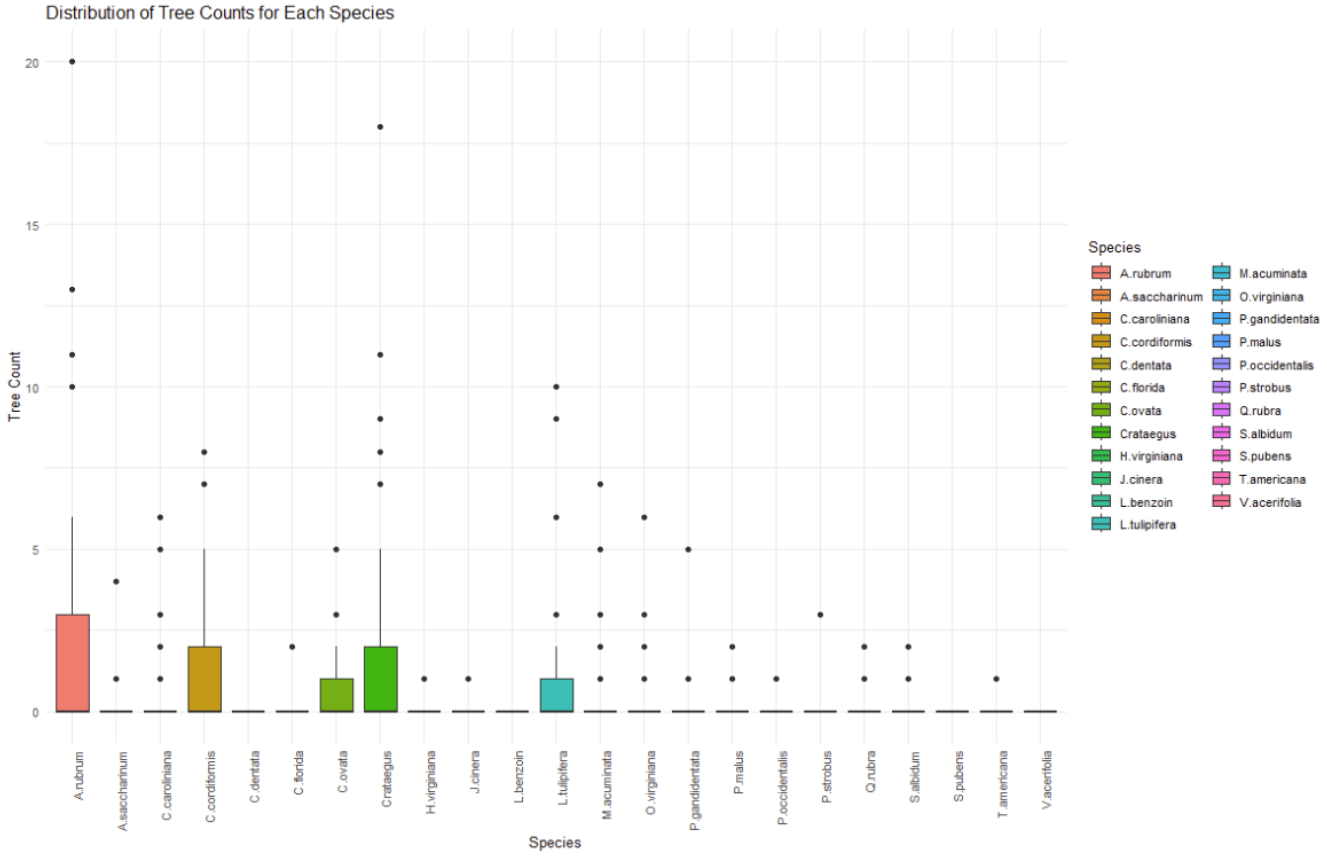
	Species_Total <dbl>	Sample_Mean <dbl>	Std_Dev <dbl>	Variance <dbl>	Min <dbl>	Max <dbl>
A.rubrum	142	2.11940299	3.7437722	14.01582994	0	20
Crataegus	106	1.58208955	3.1629927	10.00452284	0	18
C.cordiformis	75	1.11940299	1.7966500	3.22795115	0	8
L.tulipifera	48	0.71641791	1.8324183	3.35775667	0	10
C.ovata	31	0.46268657	0.8932128	0.79782904	0	5
C.caroliniana	30	0.44776119	1.0910598	1.19041158	0	6
O.virginiana	23	0.34328358	0.9778182	0.95612845	0	6
M.acuminata	18	0.26865672	1.1225254	1.26006332	0	7
Q.rubra	13	0.19402985	0.4683564	0.21935776	0	2
P.gandidentata	11	0.16417910	0.8633447	0.74536409	0	5

1-10 of 23 rows Previous 1 2 3 Next

Graphical Summaries of Variables of Interest:




Histogram of Number of Trees per Plot for Each Species
A.rubrum
A.saccharinum
C.caroliniana
C.cordiformis
C.dentata
C.florida
C.ovata
Crataegus
H.virginiana
J.cinera
L.benzoin
L.tulipifera
M.acuminata
O.virginiana
P.gandidentata
P.malus
P.occidentalis
P.strobus
Q.rubra
S.albidum
S.pubens
T.americana
V.acerifolia
Frequency
Number of Trees


Distribution of Tree Counts for Each Species
Tree Count
Species
A.rubrum
A.saccharinum
C.caroliniana
C.cordiformis
C.dentata
C.florida
C.ovata
Crataegus
H.virginiana
J.cinera
L.benzoin
L.tulipifera
M.acuminata
O.virginiana
P.gandidentata
P.malus
P.occidentalis
P.strobus
Q.rubra
S.albidum
S.pubens
T.americana
V.acerifolia

3. I intend to fit the Poisson distribution to the dataset. The parameter of the Poisson distribution, μ, can be interpreted as the average number of occurrences per unit area. I intend to use the sample mean of the observed frequencies of each species as the estimator for μ. If X~Poisson(μ), the expected value of X = μ and the variance of X is also μ. A random variable is said to have a Poisson distribution with parameter μ if:

$$P(X = x) = \frac{e^{-\mu}\mu^{x}}{x!}, x = 0, 1, 2, 3, \ldots$$

which can be calculated in R using dpois(x, x bar).