

Contrasting between- and within-rows stem profiles in poplar plantations - Available data

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General scope

Assessment of poplar profiles sensitivity to competition anisotropy and to plantation density. Three plots have been established in a poplar plantation of XX years in XXXXXX, where poplar rows are alternated with rows of other less fast growing species (XXX, XXX). Distance between the stems along the plantation rows are XXX m. Distances between the rows vary between the plots: 4 m, 4.5 m and 5 m. Hence the distances between the pollar rows are the double of these figures. Each plot includes 12 stems from two facing rows. Based on TLS data stem profiles from two orthogonal vertical crosssections have been determined: one along the rows direction and the other in between-rows direction. Profiles have been sampled systematically adopting different segment lengths (Segm_lenght) estimating stem crossection width (diam_btw_rows and diam_wti_rows) at different heights along the stem (Sect_height)

[MEMO: credo sia opportuno ricordarsi di guardare Rubio-Cuadrado Á, Bravo-Oviedo A, Mutke S, Del Río M (2018). Climate effects on growth differ according to height and diameter along the stem in Pinus pinaster Ait. iForest 11: 237-242. – doi: 10.3832/ifor2318-011 [online 2018-03-12]

Setup and fetch the data

```
library(tidyverse)
library(magrittr)
library(ggplot2)
TLSderivedDiam <- read.csv("expData2.csv")
```

Data synthesis

```
library(knitr)
TLSderivedDiam %T>%
  str() %>%
  select(tesi, treid, length_toppo) %>%
```

```
unique() %$$
kable(table(tesi, treid), align = 'c',
caption = "Number of 'Segm_length' levels by tree")
```

```
## 'data.frame': 5724 obs. of 8 variables:
## $ tesi : Factor w/ 3 levels "V400","V450",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ length_toppo : num 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 ...
## $ treid : Factor w/ 12 levels "s01","s02","s03",...: 1 1 1 1 1 1 1 1 1 1 ...
## $ slice : num 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 ...
## $ diam_btw_rows: num 0.417 0.403 0.397 0.388 0.383 ...
## $ diam_wti_rows: num 0.388 0.377 0.37 0.367 0.362 ...
## $ xcentro : num 0.306 0.307 0.31 0.313 0.312 ...
## $ ycentro : num 0.427 0.425 0.421 0.417 0.412 ...
```

Table 1: Number of 'Segm_length' levels by tree

	s01	s02	s03	s04	s05	s06	s07	s08	s09	s10	s11	s12
V400	5	5	5	5	5	5	5	5	5	5	5	5
V450	5	5	5	5	5	5	5	5	5	5	5	5
V500	5	5	5	5	5	5	5	5	5	5	5	5

```
TLsderivedDiam %>%
select(length_toppo, slice) %>%
unique() %$$
kable(t(table(length_toppo)), align = 'c',
caption = "Number of measured sections by 'Sect_length' levels")
```

Table 2: Number of measured sections by 'Sect_length' levels

0.1	0.2	0.3	0.4	0.5
70	35	23	17	14

```
summarize_all_numeric <- function(df, stats = c("count.not.na", "min", "max"), ...) {
count.not.na <- function(x) sum(!is.na(x))
out <- cbind(stat = stats[1], summarize_if(df, is.numeric, stats[1], ...))
for(s in stats[-1])
out <- rbind(out, cbind(stat = s, summarize_if(df, is.numeric, s, ...)))
return(out)
}
```

```
TLsderivedDiam %>%
summarize_all_numeric() %>%
kable(align = 'c', caption = "Statistics for all numeric variables")
```

Table 3: Statistics for all numeric variables

stat	length_toppo	slice	diam_btw_rows	diam_wti_rows	xcentro	ycentro
count.not.na	5724.0	5724.0	5194	5194	5194	5194
min	0.1	0.1	NA	NA	NA	NA
max	0.5	7.0	NA	NA	NA	NA

```

TLSderivedDiam %>%
  select(- ends_with("centro")) %>%
  summarize_all_numeric(stats=c("min", "median", "mean", "max"), na.rm = T) %>%
  kable(align = 'c', caption = "Extended statistics for main numeric variables")

```

Table 4: Extended statistics for main numeric variables

stat	length_toppo	slice	diam_btw_rows	diam_wti_rows
min	0.100000	0.100000	0.2682600	0.2755000
median	0.200000	3.600000	0.3647240	0.3523017
mean	0.218239	3.591195	0.3717815	0.3553265
max	0.500000	7.000000	0.5489389	0.8637758

Plot all profiles

```

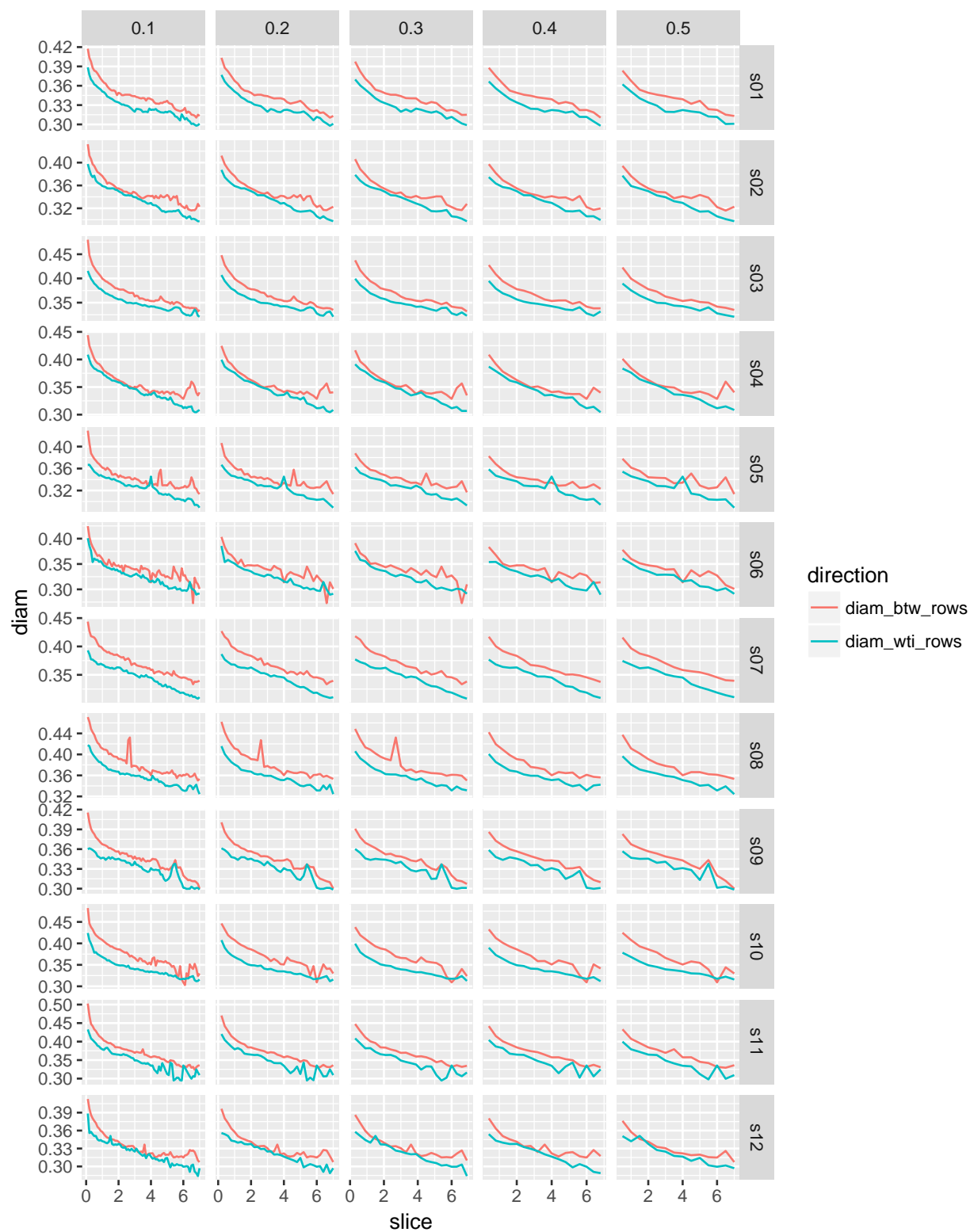
Diameters <- TLSderivedDiam %>%
  select(-ends_with("centro")) %>%
  filter(complete.cases(.)) %>%
  gather(direction, diam, starts_with("diam"))

gl <- Diameters %$%
  levels(tesi) %>%
  map(
    ~ Diameters %>%
      filter(tesi == .x) %>%
      ggplot(aes(slice, diam)) +
      geom_line(aes(color = direction)) +
      facet_grid(treid ~ length_toppo, scales = "free") +
      ggtitle(paste0("Tesis: '", .x, "'")) +
      theme(plot.title = element_text(hjust = 0.5))
  )
print(gl)

## [[1]]

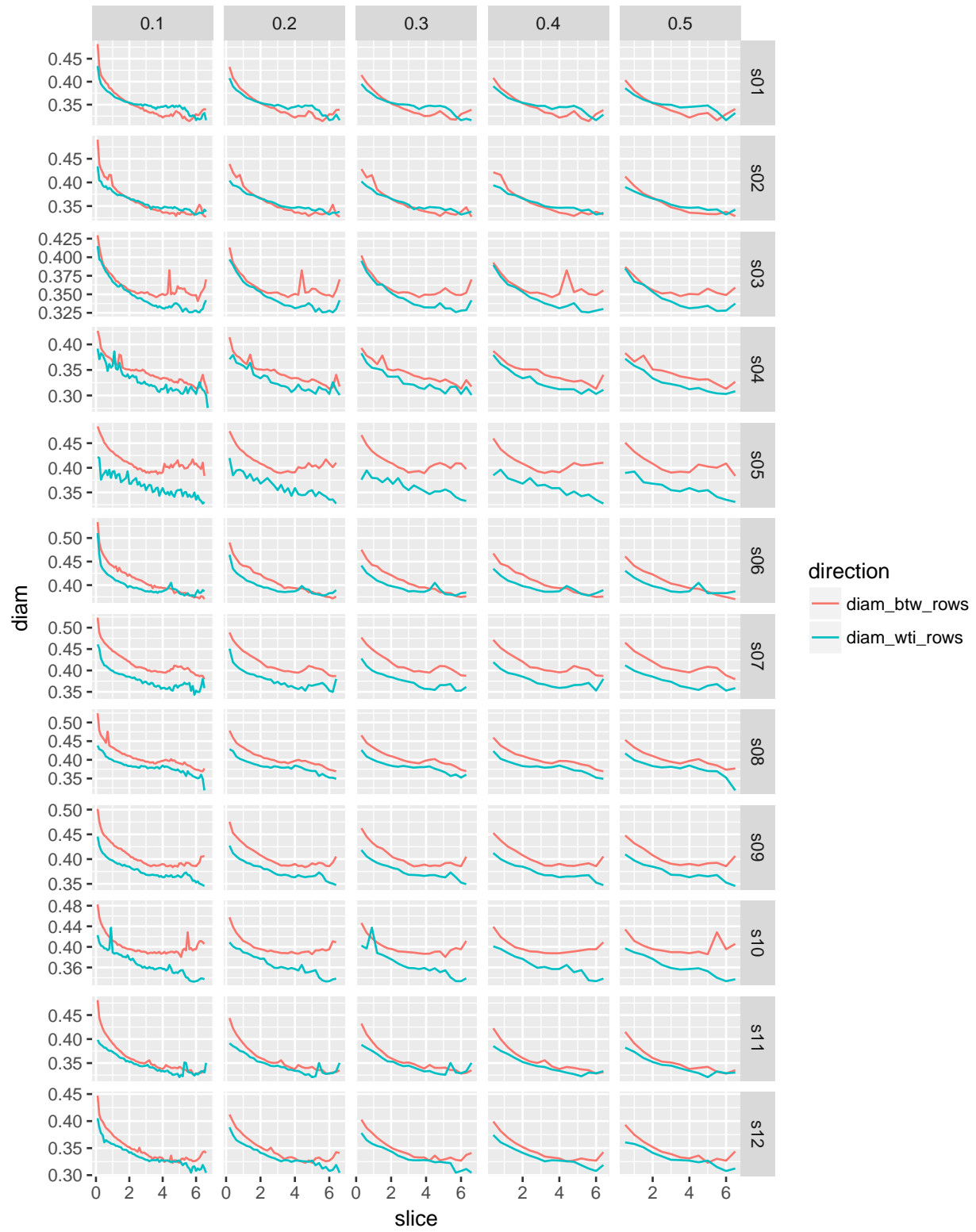
```

Tesis: 'V400'

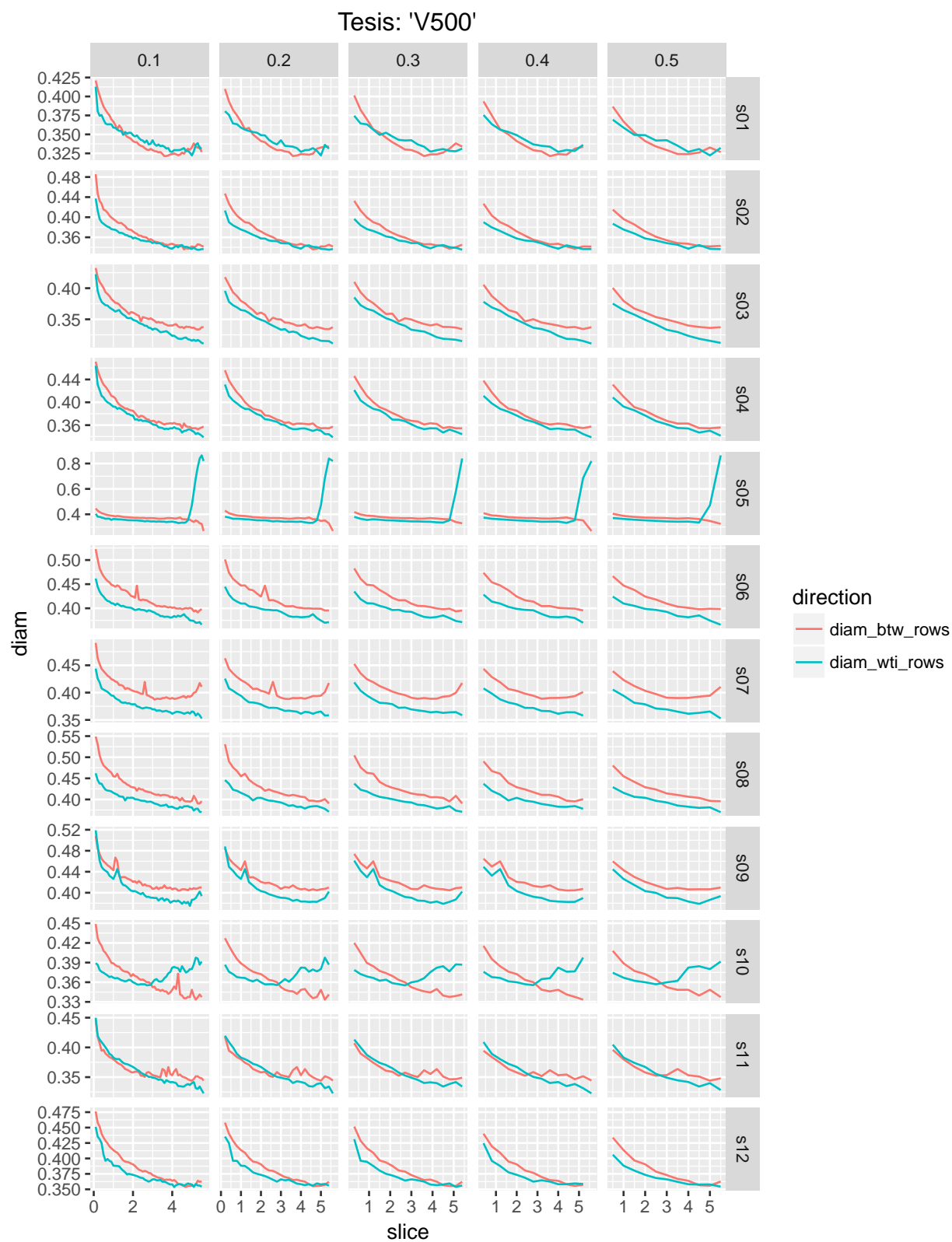


[[2]]

Tesis: 'V450'



[[3]]



[rmarkdown::render("AvailableData.Rmd", encoding="UTF-8")]