LTVR 2019 point framer shrubs

2022-12-05

Load the library "read_excel" to import multiple excel sheets into in R.

```
library("tidyverse")
library("readxl")
```

Read data.

```
file<-"/Users/owner/Downloads/LTVR_2019_PF_shrubs.xlsx"
# Name of the sheets
shrub<-excel_sheets(file )
shrub
```

```
## [1] "WBS_core_shrubs" "LOS_core_shrubs" "MBS_core_shrubs"
```

WBS site

```
wbs<-read_excel( file , sheet =  "WBS_core_shrubs" )
wbs<-wbs[!is.na(wbs$Stem_Diameter),]
#for (i in c(1:max(wbs$Stem_Count))){  print(i)}
#wbs %>% separate(Stem_Diameter)
head(wbs)
```

```
## # A tibble: 6 x 16
##   Site   plot Date                Recor~1 Obser~2 Species Height Crown~3 Max_D~4
##   <chr> <dbl> <dttm>              <chr>   <chr>   <chr>    <dbl>   <dbl>   <dbl>
## 1 wbs1     22 2019-05-28 00:00:00 drew    katie   artrw8      36      21     100
## 2 wbs1     17 2019-05-28 00:00:00 katie   drew    artrw8      43      35      77
## 3 wbs1     18 2019-05-28 00:00:00 drew    katie   artrw8      63      52     105
## 4 wbs1     15 2019-05-28 00:00:00 katie   drew    artrw8      59      45     123
## 5 wbs1      8 2019-05-28 00:00:00 drew    katie   artrw8      53      39      70
## 6 wbs1      8 2019-05-28 00:00:00 drew    katie   chvi8       16      12      21
## # ... with 7 more variables: Max_Perp <dbl>, Min_Diam <dbl>,
## #   Crown_Density <dbl>, Stem_Count <dbl>, Stem_Diameter <chr>, Tag <dbl>,
## #   Notes <chr>, and abbreviated variable names 1: Recorder, 2: Observer1,
## #   3: Crown_Depth, 4: Max_Diam
```

The basal area of a shrub is the sum of the cross-sectional areas of stems.

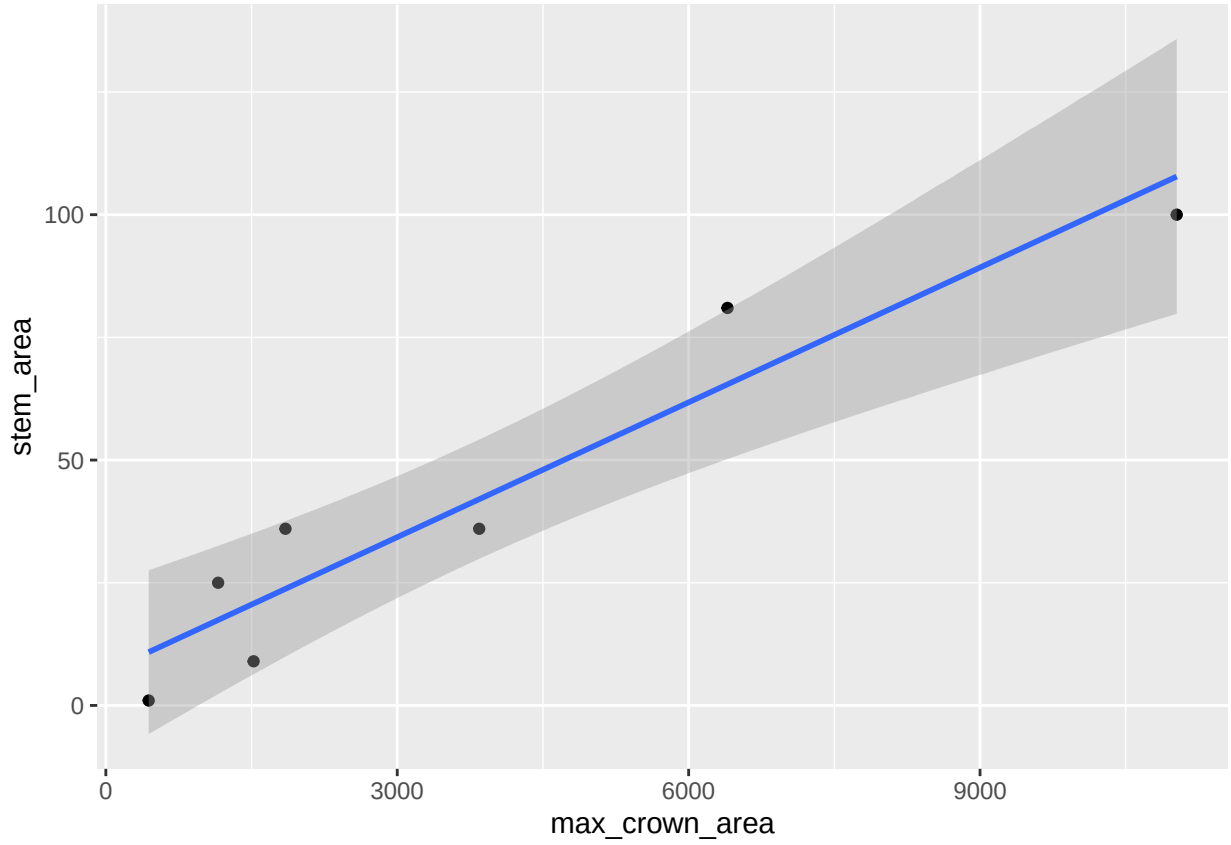
```
#shrub w only one stem
wbs_stem1<-wbs[wbs$Stem_Count==1,]
wbs_stem1$Stem_Diameter<-as.numeric(wbs_stem1$Stem_Diameter)
#wbs_stem1$max_crown_stem<- wbs_stem1$Stem_Diameter^2/wbs_stem1$Max_Diam^2
#wbs_stem1$min_crown_stem<- wbs_stem1$Stem_Diameter^2/wbs_stem1$Min_Diam^2
#summary(wbs_stem1)
```

Fit to the curve y = ax+b, where y is Stem_Diameter^2 and x is crown area.

```
max_crown_area<-wbs_stem1$Max_Diam^2
min_crown_area<-wbs_stem1$Min_Diam^2
stem_area<-wbs_stem1$Stem_Diameter^2

ggplot( wbs_stem1, aes( x= max_crown_area, y= stem_area) ) +
geom_point( ) +
geom_smooth(method=lm)
```

```
## `geom_smooth()` using formula 'y ~ x'
```

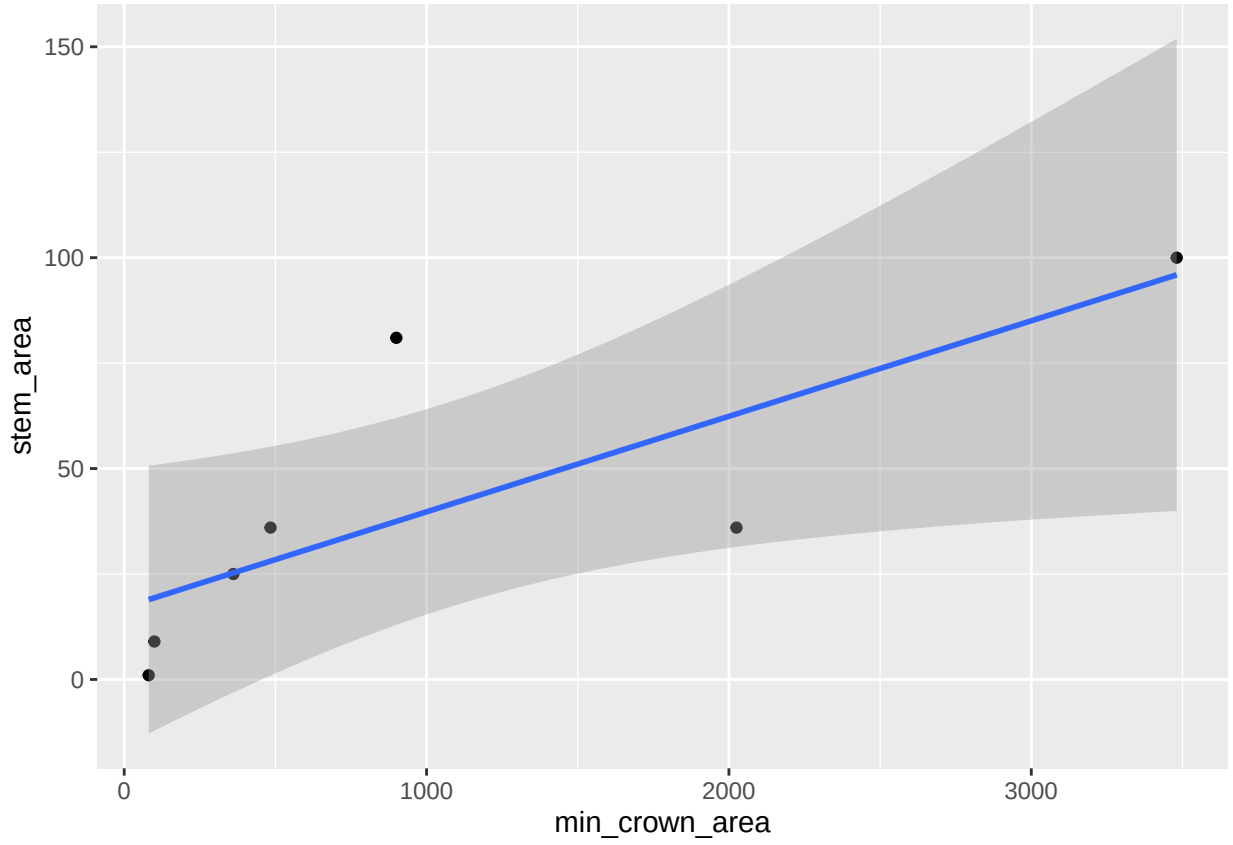



```
summary(lm( stem_area~ max_crown_area))
```

```
##
## Call:
## lm(formula = stem_area ~ max_crown_area)
##
## Residuals:
##       1       2       3       4       5       6       7
##  -7.775  -9.862 -11.751  15.574   7.591  -6.022  12.245
##
## Coefficients:
##                Estimate Std. Error t value Pr(>|t|)
## (Intercept)    6.824141   6.916418   0.987  0.36912
## max_crown_area 0.009157   0.001347   6.798  0.00105 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 12.51 on 5 degrees of freedom
## Multiple R-squared:  0.9024, Adjusted R-squared:  0.8828
## F-statistic: 46.21 on 1 and 5 DF,  p-value: 0.001049
```

```
ggplot( wbs_stem1, aes( x= min_crown_area, y= stem_area) ) +
geom_point( ) +
geom_smooth(method=lm)
```

```
## `geom_smooth()` using formula 'y ~ x'
```




```
summary(lm( stem_area~ min_crown_area))
```

```
##
```

```
## Call:
## lm(formula = stem_area ~ min_crown_area)
##
## Residuals:
##        1        2        3        4        5        6        7
##   4.0697 -17.9335 -10.3638  43.5193  -0.2744 -26.9575   7.9401
##
## Coefficients:
##                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)    17.099146  12.787852   1.337   0.2388
## min_crown_area  0.022646   0.008109   2.793   0.0383 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 25.02 on 5 degrees of freedom
## Multiple R-squared:  0.6094, Adjusted R-squared:  0.5312
## F-statistic:   7.8 on 1 and 5 DF,  p-value: 0.03832
```