## UHURU Data Set Visualization

### Austin Mercado

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### 1. A tip for working with Rmarkdown

The Working directory inside this Rmarkdown r chunk is the following:

```
getwd()
```

## [1] "/home/amercado44/Desktop/Spring2023/Documents"

Note: remember that working directories in a project and an R chunk are not always the same!

## 2. Describing the working data set

## 3. Reading the data set

```
read.csv(file = "../data-raw/ACACIA_DREPANOLOBIUM_SURVEY.txt", sep = "\t")
```

```
##
       SURVEY YEAR
                    SITE BLOCK TREATMENT
                                               PLOT
                                                       ID HEIGHT AXIS1 AXIS2 CIRC
## 1
             1 2012 SOUTH
                                      TOTAL SITOTAL
                                                      581
                                                            2.25
                                                                   2.75
                                                                         2.15 20.0
## 2
             1 2012 SOUTH
                                      TOTAL S1TOTAL
                                                            2.65
                                                                   4.10
                                                                         3.90 28.0
                               1
                                                      582
## 3
             1 2012 SOUTH
                               1
                                     TOTAL S1TOTAL 3111
                                                             1.5
                                                                   1.70
                                                                         0.85 17.0
                                     TOTAL S1TOTAL 3112
                                                                   1.80
## 4
             1 2012 SOUTH
                               1
                                                            2.01
                                                                         1.60 12.0
                                     TOTAL S1TOTAL 3113
## 5
             1 2012 SOUTH
                               1
                                                            1.75
                                                                   1.84
                                                                         1.42 13.0
             1 2012 SOUTH
                                     TOTAL S1TOTAL 3114
                                                                   1.62
## 6
                               1
                                                            1.65
                                                                         0.85 15.0
## 7
             1 2012 SOUTH
                               1
                                     TOTAL S1TOTAL 3115
                                                             1.2
                                                                   1.95
                                                                         0.90
                                                                                9.0
## 8
             1 2012 SOUTH
                               1
                                     TOTAL S1TOTAL 3199
                                                            1.45
                                                                   2.00
                                                                         1.75 12.2
## 9
             1 2012 SOUTH
                               1
                                      MESO
                                             S1MESO
                                                      941
                                                            1.87
                                                                   2.15
                                                                         1.82 13.0
             1 2012 SOUTH
                                      MESO
                                             S1MESO
                                                                   5.55
## 10
                               1
                                                      942
                                                            2.38
                                                                         4.82 35.0
## 11
             1 2012 SOUTH
                               1
                                      MESO
                                             S1MESO
                                                      943
                                                            2.58
                                                                   4.90
                                                                         4.24 24.0
##
  12
             1 2012 SOUTH
                               1
                                      MESO
                                             S1MESO
                                                      944
                                                            2.65
                                                                   3.75
                                                                         3.10 27.0
             1 2012 SOUTH
                                      MESO
                                             S1MESO
                                                            2.35
                                                                   2.34
                                                                         2.05 20.0
##
  13
                               1
                                                      946
  14
             1 2012 SOUTH
                               1
                                      MESO
                                             S1MESO
                                                      947
                                                            1.88
                                                                   2.10
                                                                         1.85 28.0
## 15
             1 2012 SOUTH
                               1
                                      MESO
                                             S1MESO 3116
                                                            2.32
                                                                   3.05
                                                                         2.63 30.0
## 16
             1 2012 SOUTH
                                      MESO
                                             S1MESO 3117
                                                            2.39
                                                                   2.21
                                                                         2.10 13.0
                               1
             1 2012 SOUTH
## 17
                               1
                                      MESO
                                             S1MESO 3118
                                                             2.2
                                                                   1.80
                                                                         1.50 10.0
## 18
             1 2012 SOUTH
                               1
                                      MESO
                                             S1MESO 3119
                                                             1.05
                                                                   0.90
                                                                         0.55
                                                                   1.25
## 19
             1 2012 SOUTH
                               1
                                      MESO
                                             S1MESO 3120
                                                                2
                                                                         1.20 10.0
## 20
             1 2012 SOUTH
                                             S1MESO 3131
                               1
                                      MESO
                                                            1.28
                                                                   1.14
                                                                         1.00 10.0
             1 2012 SOUTH
                                       OPEN
                                             S20PEN
## 21
                                                      341
                                                            dead
                                                                     NA
                                                                            NA
                                                                                 NA
```

| ## 2 | 22 | 1 | 2012 | SOUTH          | 2 | TOTAL. | S2T0TAL            | 3178 | 1.4  | 2.50 | 2.15 18.0 |
|------|----|---|------|----------------|---|--------|--------------------|------|------|------|-----------|
| ## 2 |    |   |      | SOUTH          | 2 |        | S2TOTAL            | 101  | 1.9  | 3.31 | 2.65 15.0 |
| ## 2 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.75 | 2.70 | 2.55 16.0 |
| ## 2 |    |   |      | SOUTH          | 2 | _      | S2TOTAL            |      | 1.8  | 2.75 | 2.30 16.0 |
| ## 2 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.7  | 4.05 | 4.00 35.2 |
| ## 2 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.02 | 2.85 | 1.49 17.0 |
| ## 2 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.9  | 3.10 | 2.85 19.0 |
| ## 2 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.85 | 2.45 | 1.90 19.0 |
|      | 30 |   |      | SOUTH          | 2 |        | S2TOTAL            | 110  | 1.65 | 1.90 | 1.54 17.0 |
| ## 3 |    |   |      | SOUTH          | 2 |        | S2TOTAL            | 111  | 1.4  | 2.35 | 1.45 14.0 |
| ## 3 |    |   |      | SOUTH          | 2 | _      | S2TOTAL            | 113  | 2.5  | 3.25 | 2.30 22.0 |
| ## 3 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.05 | 5.40 | 4.50 33.0 |
| ## 3 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.26 | 3.50 | 3.10 33.0 |
| ## 3 |    |   |      | SOUTH          | 2 |        | S2TOTAL            | 117  | 2.13 | 2.40 | 2.30 20.0 |
| ## 3 |    |   |      | SOUTH          | 2 |        | S2TOTAL            | 118  | 1.8  | 3.15 | 2.55 22.0 |
| ## 3 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.85 | 2.00 | 2.27 20.0 |
|      | 38 |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.55 | 2.15 | 1.80 15.0 |
| ## 3 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.87 | 2.13 | 2.05 13.0 |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.58 | 1.28 | 0.75 11.0 |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      |      |      | 1.75 17.0 |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.05 | 2.10 | 3.28 16.0 |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.75 | 2.45 | 1.45 13.0 |
|      |    |   |      |                |   |        | S2TOTAL<br>S2TOTAL |      | 1.49 | 1.50 | 0.90 10.0 |
| ## 4 |    |   |      | SOUTH<br>SOUTH | 2 |        | S2TOTAL<br>S2TOTAL |      | 1.28 | 2.00 |           |
| ## 4 |    |   |      |                | 2 |        |                    |      | 1.49 | 2.35 | 1.65 13.0 |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.07 | 1.20 | 0.95 11.0 |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.48 | 1.25 | 1.20 9.0  |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.25 | 1.25 | 0.90 10.0 |
| ## 4 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.41 | 1.41 | 1.40 14.0 |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.6  | 1.60 | 1.30 13.0 |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.2  | 1.20 | 1.30 14.0 |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.49 | 1.49 | 1.20 8.0  |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.5  | 1.50 | 1.50 14.0 |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.65 | 1.65 | 2.00 20.0 |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.13 | 1.13 | 1.20 10.0 |
|      | 56 |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.25 | 1.25 | 0.90 10.0 |
|      | 57 |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.1  | 1.20 | 1.10 10.0 |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.2  | 2.70 | 2.40 25.0 |
| ## 5 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.45 | 1.65 | 1.25 10.0 |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.6  | 2.45 |           |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      |      | 2.40 |           |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.5  | 2.40 | 2.15 13.0 |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.03 | 1.20 | 1.00 10.0 |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.14 | 1.90 | 1.70 13.0 |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.2  | 1.90 | 1.65 12.0 |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.05 | 1.10 | 1.00 9.0  |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.8  | 2.60 | 2.40 15.0 |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.2  | 1.00 | 0.95 7.0  |
| ## 6 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.75 | 1.40 | 1.10 10.0 |
| ## 7 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.45 | 3.10 | 1.80 10.0 |
| ## 7 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.17 | 1.20 | 1.10 5.0  |
| ## 7 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 2.15 | 3.10 | 2.58 22.0 |
| ## 7 |    |   |      | SOUTH          | 2 |        | S2TOTAL            |      | 1.7  | 1.70 | 1.40 12.0 |
| ## 7 |    |   |      | SOUTH          | 2 |        | S2T0TAL            |      |      | 2.85 |           |
| ## 7 | 75 | 1 | 2012 | SOUTH          | 2 | TOTAL  | S2TOTAL            | 3133 | 1.26 | 1.95 | 1.75 17.0 |

| ## | 76  | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3134 | 1.11        | 1.95       | 1.50 | 10.0       |
|----|-----|---|------|-------|--------|-------|---------|------|-------------|------------|------|------------|
| ## | 77  | 1 | 2012 | SOUTH | 2      |       | S2T0TAL |      | 1.14        | 1.32       |      | 10.0       |
|    | 78  | 1 | 2012 | SOUTH | 2      |       | S2TOTAL |      | 1.26        | 1.60       |      | 10.0       |
|    | 79  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.3         | 1.40       | 0.80 |            |
|    | 80  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.29        | 1.44       |      | 13.0       |
| ## |     |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.31        | 1.35       | 1.15 | 7.0        |
|    | 82  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.15        | 1.70       |      | 10.0       |
|    | 83  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.10        | 3.40       |      | 15.0       |
|    | 84  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.47        | 2.10       | 1.61 | 8.0        |
| ## |     |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.05        | 1.79       | 1.50 |            |
|    | 86  |   |      | SOUTH | 2      |       | S2TOTAL |      | 2.1         | 4.90       | 3.75 |            |
| ## |     |   |      | SOUTH | 2      |       | S2TOTAL |      |             |            |      | 13.0       |
|    |     |   |      |       |        |       |         |      | 1.99        | 1.80       |      |            |
|    | 88  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.42        | 1.90       |      | 14.0       |
| ## |     |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.5         | 2.11       |      | 12.0       |
|    | 90  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.06        | 1.05       | 0.85 | 4.0        |
| ## |     |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.49        | 1.50       |      | 13.0       |
|    | 92  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.8         | 1.60       |      | 14.0       |
|    | 93  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.93        | 1.74       |      | 14.0       |
|    | 94  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.2         | 1.60       |      | 10.0       |
| ## |     |   |      | SOUTH | 2      |       | S2T0TAL |      | 1.65        | 1.25       |      | 11.0       |
| ## |     |   |      | SOUTH | 2      |       | S2T0TAL |      | 1.52        | 1.49       |      | 12.0       |
| ## | 97  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.43        | 2.05       |      | 13.0       |
| ## | 98  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.25        | 1.40       | 1.25 | 13.0       |
| ## | 99  |   |      | SOUTH | 2      |       | S2TOTAL |      | 1.88        | 2.65       | 2.64 | 20.0       |
| ## | 100 |   |      | SOUTH | 2      | TOTAL | S2TOTAL | 3179 | 1.03        | 1.40       | 0.60 | 13.0       |
| ## | 101 | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3180 | 1.1         | 1.30       | 1.20 | 10.0       |
| ## | 102 | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3191 | 1.4         | 1.05       | 1.00 | 10.0       |
| ## | 103 | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3192 | 1.05        | 1.55       | 0.90 | 10.0       |
| ## | 104 | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3193 | 1.18        | 1.20       | 1.00 | 7.0        |
| ## | 105 | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3194 | 1.4         | 1.30       | 1.85 | 13.0       |
| ## | 106 | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3195 | 1.37        | 2.67       | 2.19 | 19.0       |
| ## | 107 | 1 | 2012 | SOUTH | 2      | TOTAL | S2TOTAL | 3196 | 1.32        | 2.15       | 1.55 | 11.0       |
| ## | 108 | 1 | 2012 | SOUTH | 2      | MEGA  | S2MEGA  | 182  | 1.55        | 2.20       | 1.20 | 20.0       |
| ## | 109 | 1 | 2012 | SOUTH | 2      | MEGA  | S2MEGA  | 183  | 1.3         | 1.80       | 0.90 | 8.0        |
| ## | 110 | 1 | 2012 | SOUTH | 2      | MEGA  | S2MEGA  | 184  | 1.24        | 1.20       | 1.20 | 25.0       |
| ## | 111 | 1 | 2012 | SOUTH | 2      | MEGA  | S2MEGA  | 185  | 1.5         | 2.10       | 1.75 | 16.0       |
| ## | 112 | 1 | 2012 | SOUTH | 2      | MEGA  | S2MEGA  | 186  | 1.65        | 2.50       | 2.20 | 15.0       |
| ## | 113 | 1 | 2012 | SOUTH | 2      | MEGA  | S2MEGA  | 187  | 2.17        | 2.00       | 1.20 | 15.0       |
|    | 114 |   |      | SOUTH | 2      | MEGA  |         | 188  | 1.28        | 1.60       | 1.50 |            |
| ## | 115 |   |      | SOUTH | 2      | MEGA  |         | 189  | 1.07        | 1.50       | 1.50 |            |
|    | 116 |   |      | SOUTH | 2      | MEGA  | S2MEGA  |      | 0.67        | 1.00       | 0.80 | 8.0        |
|    | 117 |   |      | SOUTH | 2      | MEGA  | S2MEGA  |      | 0.68        | 0.70       | 0.60 | 4.0        |
|    | 118 |   |      | SOUTH | 2      | MEGA  | S2MEGA  |      | 1.87        | 1.60       | 1.40 | 9.0        |
|    | 119 |   |      | SOUTH | 2      | MEGA  | S2MEGA  |      | 1.35        | 1.90       | 1.50 |            |
|    | 120 |   |      | SOUTH | 2      | MEGA  | S2MEGA  |      | 1.75        | 2.10       | 2.10 |            |
|    | 121 |   |      | SOUTH | 2      | MESO  | S2MESO  |      | 1.75        | 3.30       | 2.50 |            |
|    | 122 |   |      | SOUTH | 2      | MESO  | S2MESO  | 463  | 1.64        | 2.30       | 2.00 |            |
|    | 123 |   |      | SOUTH | 2      | MESO  | S2MESO  |      | 1.42        | 0.90       | 0.80 |            |
|    | 123 |   |      | SOUTH | 3      | OPEN  | S30PEN  |      | dead        | NA         | NA   | NA         |
|    | 124 |   |      | SOUTH | 3      | OPEN  | S30PEN  |      | 0.9         | 1.30       |      | 11.0       |
|    |     |   |      | SOUTH |        |       |         |      |             |            |      |            |
|    | 126 |   |      |       | 3<br>3 |       | SSTOTAL |      | dead<br>1 2 | NA<br>2 60 | NA   | NA<br>15 O |
|    | 127 |   |      | SOUTH |        |       | SSTOTAL |      | 1.8         | 2.60       | 2.60 |            |
|    | 128 |   |      | SOUTH | 3      |       | SSTOTAL |      | 2.47        | 3.10       | 2.20 |            |
| ## | 129 | 1 | 2012 | SOUTH | 3      | IUIAL | S3TOTAL | 1064 | 2.15        | 1.60       | 1.10 | 17.0       |

| ## 130   |  |  |             |   |   |  |       |         |      |      |      |           |
|--|--|--|-------------|---|---|--|-------|---------|------|------|------|-----------|
| ## 133   | ##   | 130  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 1066 | 1.7  | 2.50 | 2.15 15.0 |
| ## 133   | ##   | 131  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 1066 | 1.9  | 1.80 | 1.50 20.0 |
| ## 134   | ##   | 132  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 1067 | 1.95 | 2.10 | 1.90 13.0 |
| ## 135   | ##   | 133  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 1068 | 1.8  | 1.70 | 1.40 13.0 |
| ## 136   | ##   | 134  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 1069 | 1.4  | 2.00 | 1.60 14.0 |
| ## 137   | ##   | 135  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 1070 | 1    | 1.30 | 1.20 7.0  |
| ## 138   | ##   | 136  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2139 | 1.75 | 1.20 | 1.10 13.0 |
| ## 149   | ##   | 137  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2140 | 1.28 | 1.50 | 0.95 4.0  |
| ## 140   | ##   | 138  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2151 | 1    | 1.40 | 1.20 4.0  |
| ## 141   | ##   | 139  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2152 | 1.45 | 1.50 | 1.30 10.0 |
| ## 142   | ##   | 140  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2153 | 1    | 1.00 | 0.75 8.0  |
| ## 143   | ##   | 141  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2154 | 1.03 | 1.00 | 0.90 6.0  |
| ## 144   | ##   | 142  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2155 | 1.51 | 2.00 | 1.80 12.0 |
| ## 145   | ##   | 143  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2156 | 1.17 | 1.10 | 0.90 10.0 |
| ## 146   | ##   | 144  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2157 | 1.33 | 1.90 | 1.85 14.0 |
| ## 146   | ##   | 145  | 1           | 2012  | SOUTH   | 3  | TOTAL | S3TOTAL | 2158 | 1.3  | 1.10 | 0.85 8.0  |
| ## 147   | ##   | 146  | 1           | 2012  | SOUTH   |  | TOTAL | S3TOTAL | 2159 |      | 1.10 | 0.90 10.0 |
| ## 148   | ##   | 147  | 1           | 2012  | SOUTH   |  | TOTAL | S3TOTAL | 2160 |      |      | 1.40 13.0 |
| ## 149   | ##   | 148  | 1           | 2012  | SOUTH   |  |       |         |      |      | 1.40 | 1.00 5.0  |
| ## 150   | ##   | 149  |             |   |   |  |       |         |      |      |      | 0.95 7.0  |
| ## 151   |  |  |             |   |   |  |       |         |      |      |      |           |
| ## 152   |  |  |             |   |   |  |       |         |      |      |      |           |
| ## 153   |  |  |             |   |   |  |       |         |      |      |      |           |
| ## 154   |  |  |             |   |   |  |       |         |      |      |      |           |
| ## 155   |  |  |             |   |   |  |       |         |      |      |      |           |
| ## 156   |  |  |             |   |   |  |       |         |      |      |      |           |
| ## 157   |  | 100  | -           | 2012  | 200111  |  |       |         |      |      |      |           |
| ## 1 0 0 10 CS ## 2 0 0 150 TP ## 3 2 1 50 TP ## 5 0 0 20 CS ## 6 0 0 0 0 E ## 7 0 0 0 0 E ## 8 0 0 25 CS ## 9 0 0 0 50 TP ## 11 0 0 5 CS ## 11 0 0 60 TP ## 12 0 0 60 TP ## 13 0 0 CS ## 15 0 0 CS ## 15 0 0 CS ## 17 0 0 TP ## 18 0 0 CS ## 18 0 CS ## 19 0 CS ## 19 0 CS ## 10 CS ## 11 0 CS ## 11 0 CS ## 12 0 CS ## 14 0 CS ## 15 0 CS ## 15 0 CS ## 16 0 CS ## 17 0 CS ## 18 0 CS ## 19 0 CS ## 18 0 CS ## 19 0 CS ## 19 0 CS ## 10 CS ## 11 0 CS ## 11 0 CS ## 12 0 CS ## 15 0 CS ## 15 0 CS ## 15 0 CS ## 15 0 CS ## 16 0 CS ## 17 0 CS ## 18 0 CS ## 19 0 CS ## 10 CS ## 11 0 CS ## 12 0 CS ## 12 0 CS ## 13 0 CS ## 14 0 CS ## 15 0 CS ## 15 0 CS ## 15 0 CS  | ##   | 156  | 1           | 2012  | SOUTH   | 3  | MESO  | S3MESO  | 1421 | 1.95 | 2.20 | 1.60 13.0 |
| ## 1 0 0 150 TP  ## 3 2 1 50 TP  ## 4 0 0 75 CS  ## 6 0 0 0 E  ## 7 0 0 0 E  ## 8 0 0 25 CS  ## 9 0 0 0 TP  ## 11 0 0 5 CS  ## 11 0 0 5 CS  ## 12 0 60 TP  ## 13 0 0 60 TP  ## 14 2 0 60 CS  ## 15 2 0 0 CS  ## 16 0 0 0 TP  ## 17 0 0 CS  ## 18 0 0 CS  ## 18 0 0 TP  ## 19 0 CS  ## 10 0 TP  ## 11 0 TP  ## 12 0 TP  ## 12 0 TP  ## 13 0 TP  ## 14 2 TP  ## 15 2 TP  ## 16 TP  ## 17 TP  ## 18 TP  ## 18 TP  ## 19 TP  ## 10 TP  ## 10 TP  ## 11 TP  ## 12 TP  ## 13 TP  ## 14 TP  ## 15 TP  ## 15 TP  ## 16 TP  ## 16 TP  ## 17 TP  ## 18 TP  ## 18 TP  ## 19 TP  ## 18 TP  ## 19 TP  ## 19 TP  ## 19 TP  ## 10 TP  ## 20 TP  ## 21 TP  ## 21 TP  ## 21 TP  ## 23 TP  ## 24 TP  ## 25 TP  ## 26 TP  ## 26 TP  ## 27 TP  ## 28 TP  ## 28 TP  ## 29 TP  ## 20 T |  |  |             |   |   |  |       |         |      |      |      |           |
| ## 2   | ##   | 157  | 1           | 2012  | SOUTH   | 3  |       |         |      |      |      |           |
| ## 3   | ##<br>##                                     | 157  | 1<br>FLOWER | 2012<br>S BUDS  | SOUTH<br>FRUITS   | 3<br>ANT   |       |         |      |      |      |           |
| ## 4 0 0 75 CS  ## 5 0 0 0 20 CS  ## 6 0 0 0 0 E  ## 7 0 0 0 0 CS  ## 8 0 0 25 CS  ## 9 0 0 0 TP  ## 10 0 0 50 TP  ## 11 0 0 5 CS  ## 12 0 60 CS  ## 15 2 0 60 CS  ## 16 0 0 0 TP  ## 17 0 0 CS  ## 18 0 0 CS  ## 19 0 0 CS  ## 19 0 0 TP  ## 17 0 0 CS  ## 18 0 0 TP  ## 19 0 0 TP  ## 18 0 0 TP  ## 19 0 0 TP  ## 19 0 0 TP  ## 20 0 TP  ## 21 NA NA NA  ## 22 0 0 5 CS  ## 23 0 0 45 CS  ## 24 40 50 35 CS  | ##<br>##<br>##                               | 157<br>1   | 1<br>FLOWER | 2012<br>S BUDS<br>O (   | SOUTH<br>FRUITS<br>10   | 3<br>ANT<br>CS   |       |         |      |      |      |           |
| ## 5   | ##<br>##<br>##<br>##                         | 157<br>1<br>2  | 1<br>FLOWER | 2012<br>S BUDS<br>0 (   | SOUTH S FRUITS 10 150   | 3<br>ANT<br>CS<br>TP   |       |         |      |      |      |           |
| ## 6   | ##<br>##<br>##<br>##                         | 157<br>1<br>2<br>3   | 1<br>FLOWER | 2012<br>S BUDS<br>0 (<br>0 (<br>2 1   | SOUTH S FRUITS 10 150 L 50  | 3<br>ANT<br>CS<br>TP<br>TP   |       |         |      |      |      |           |
| ## 7 0 0 0 0 CS  ## 8 0 0 0 25 CS  ## 9 0 0 0 TP  ## 10 0 0 50 TP  ## 11 0 0 5 CS  ## 12 0 0 60 TP  ## 13 0 0 60 TP  ## 14 2 0 60 CS  ## 15 2 0 0 CS  ## 16 0 0 0 TP  ## 17 0 0 0 TP  ## 18 0 0 0 CS  ## 19 0 0 0 CS  ## 19 0 0 0 TP  ## 20 0 0 0 TP  ## 21 NA NA NA  ## 22 0 0 5 CS  ## 23 0 0 45 CS  ## 24 40 50 35 CS   | ##<br>##<br>##<br>##<br>##                   | 157<br>1<br>2<br>3<br>4  | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (0<br>2 1   | SOUTH<br>S FRUITS<br>) 10<br>) 150<br>L 50<br>) 75  | 3<br>ANT<br>CS<br>TP<br>TP<br>CS   |       |         |      |      |      |           |
| ## 8   | ##<br>##<br>##<br>##<br>##                   | 157<br>1<br>2<br>3<br>4<br>5   | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (2<br>1<br>0 (0                                   | SOUTH 5 FRUITS 10 150 50 75 20  | 3 ANT CS TP TP CS CS   |       |         |      |      |      |           |
| ## 9 0 0 0 TP ## 10 0 0 50 TP ## 11 0 0 5 CS ## 12 0 0 60 TP ## 14 2 0 60 CS ## 15 2 0 0 CS ## 16 0 0 0 TP ## 17 0 0 0 TP ## 18 0 0 0 CS ## 19 0 0 CS ## 19 0 0 TP ## 20 0 0 TP ## 21 NA NA NA ## 22 0 0 5 CS ## 23 0 0 45 CS ## 24 40 50 35 CS  | ##<br>##<br>##<br>##<br>##                   | 157<br>1<br>2<br>3<br>4<br>5<br>6  | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (0<br>2 1<br>0 (0<br>0 (0                         | SOUTH 5 FRUITS 10 10 150 50 75 0 20 0 0   | 3 ANT CS TP TP CS CS CS  |       |         |      |      |      |           |
| ## 10 0 0 50 TP  ## 11 0 0 5 CS  ## 12 0 0 60 TP  ## 13 0 0 60 TP  ## 14 2 0 60 CS  ## 15 2 0 0 CS  ## 16 0 0 0 TP  ## 17 0 0 0 TP  ## 18 0 0 0 CS  ## 19 0 0 0 CM  ## 20 0 0 0 TP  ## 21 NA NA NA  ## 22 0 0 5 CS  ## 23 0 0 45 CS  ## 24 40 50 35 CS   | ##<br>##<br>##<br>##<br>##<br>##             | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7   | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (0<br>2 1<br>0 (0<br>0 (0<br>0 (0                 | SOUTH 5 FRUITS 10 150 1 50 75 0 20 0 0  | 3 ANT CS TP TP CS CS CS E  |       |         |      |      |      |           |
| ## 11 0 0 5 CS  ## 12 0 0 60 TP  ## 13 0 0 60 TP  ## 14 2 0 60 CS  ## 15 2 0 0 CS  ## 16 0 0 0 TP  ## 17 0 0 0 TP  ## 18 0 0 0 CS  ## 19 0 0 0 CM  ## 20 0 0 0 TP  ## 21 NA NA NA  ## 22 0 0 5 CS  ## 23 0 0 45 CS  ## 24 40 50 35 CS  | ##<br>##<br>##<br>##<br>##<br>##             | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8  | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (2<br>2 1<br>0 (0<br>0 (0<br>0 (0                 | SOUTH 5 FRUITS 10 150 1 50 75 20 0 0 0 0 0 25   | 3 ANT CS TP TP CS CS CS E CS CS  |       |         |      |      |      |           |
| ## 12  0  0  60  TP  ## 13  0  0  60  TP  ## 14  2  0  60  CS  ## 15  2  0  0  CS  ## 16  0  0  TP  ## 17  0  0  TP  ## 18  0  0  CS  ## 19  0  0  CM  ## 20  0  0  TP  ## 21  NA NA NA  ## 22  0  0  5  CS  ## 23  0  0  45  CS  ## 24  40  50  35  CS  | ##<br>##<br>##<br>##<br>##<br>##<br>##       | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9   | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0                | SOUTH S FRUITS 10 150 50 75 20 0 0 0 25 0 0   | 3 ANT CS TP TP CS CS CS E CS TP  |       |         |      |      |      |           |
| ## 13  | ##<br>##<br>##<br>##<br>##<br>##<br>##       | 157<br>1 2 3 4 5 6 7 8 9 10  | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0        | SOUTH 5 FRUITS 10 150 1 50 75 20 0 0 0 25 0 0 50  | ANT CS TP TP CS CS CS E CS TP TP TP  |       |         |      |      |      |           |
| ## 14  | ######################################       | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11   | 1<br>FLOWER | 2012<br>S BUDS<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 (0<br>0 ( | SOUTH 5 FRUITS 10 10 150 1 50 75 0 20 0 0 0 25 0 0 0 50 0 50  | ANT CS TP TP CS CS E CS TP TP TP CS  |       |         |      |      |      |           |
| ## 15  | ##<br>##<br>##<br>##<br>##<br>##<br>##<br>## | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12   | 1<br>FLOWER | 2012 0  | SOUTH 5 FRUITS 10 150 1 50 75 0 20 0 0 0 25 0 0 50 0 50 0 60  | ANT CS TP TP CS CS E CS TP TP CS TP  |       |         |      |      |      |           |
| ## 16  | ######################################       | 157<br>1 2 3 4 5 6 7 8 9 10 11 12 13   | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH 5 FRUITS 10 150 1 50 75 0 20 0 0 0 25 0 0 50 0 50 0 60  | ANT CS TP TP CS CS E CS TP TP TP TP TP   |       |         |      |      |      |           |
| ## 17  | ## ## ## ## ## ## ## ## ## ## ## ## ##       | 157<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14  | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH 5 FRUITS 10 150 1 50 75 20 0 0 0 25 0 0 50 0 50 0 60 0 60   | ANT CS TP TP CS CS E CS TP TP TP CS TP TP CS   |       |         |      |      |      |           |
| ## 18  | ######################################       | 157<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15   | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH S FRUITS 10 150 150 75 20 0 0 0 0 0 25 0 0 0 50 0 60 0 60 0 0   | ANT CS TP TP CS CS E CS TP TP TP CS CS TP TP CS CS TP  |       |         |      |      |      |           |
| ## 19  | ###################                          | 157<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16  | 1<br>FLOWER | 2012 00 (00 (00 (00 (00 (00 (00 (00 (00 (00                                   | SOUTH S FRUITS 10 150 150 75 20 0 0 0 25 0 0 0 50 0 60 0 60 0 0 0   | 3 ANT CS TP TP CS CS E CS TP TP CS TP TP CS TP TP CS TP  |       |         |      |      |      |           |
| ## 20 0 0 0 TP  ## 21 NA NA NA  ## 22 0 0 5 CS  ## 23 0 0 45 CS  ## 24 40 50 35 CS   | ####################                         | 157  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17   | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH S FRUITS 10 150 150 75 20 0 0 0 25 0 0 50 0 60 0 60 0 0 0 0   | 3 ANT CS TP TP CS CS E CS TP TP CS TP   |       |         |      |      |      |           |
| ## 21 NA NA NA<br>## 22 0 0 5 CS<br>## 23 0 0 45 CS<br>## 24 40 50 35 CS   | ######################                       | 157  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18  | 1 FLOWER    | 2012  0   | SOUTH S FRUITS 10 150 150 20 0 0 0 0 0 50 0 50 0 60 0 60 0 0 0 0 0 0 0  | 3 ANT CS TP TP CS CS E CS TP TP CS TP TP CS TP TP CS CS  |       |         |      |      |      |           |
| ## 22  | ########################                     | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18                         | 1 FLOWER    | 2012 S BUDS 0   | SOUTH S FRUITS 10 150 150 1 50 0 75 0 20 0 0 0 50 0 50 0 60 0 60 0 0 0 0 0 0  | ANT CS TP TP CS CS E CS TP TP CS TP TP CS CS TP TP CS CS TP TP CS CS TP  |       |         |      |      |      |           |
| ## 23 0 0 45 CS<br>## 24 40 50 35 CS   | ######################################       | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20             | 1 FLOWER    | 2012 S BUDS 0   | SOUTH S FRUITS 10 150 150 150 075 000 000 000 000 000 000 000 000 0   | ANT CS TP TP CS CS E CS TP TP CS TP TP CS CS TP TP CS CS TP TP CS CS TP  |       |         |      |      |      |           |
| ## 24 40 50 35 CS  | ##########################                   | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21       | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH S FRUITS 10 150 150 75 20 0 0 0 25 0 0 0 50 0 60 0 60 0 60 0 0 0 0 0 0 0 0 0 0 0 0  | 3 ANT CS TP TP CS CS E CS TP TP CS TP TP CS TP TP CS TP                        |       |         |      |      |      |           |
|  | ##############################               | 157<br>1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>11<br>12<br>13<br>14<br>15<br>16<br>17<br>18<br>19<br>20<br>21<br>22 | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH S FRUITS 10 150 150 75 20 0 0 0 25 0 0 0 50 0 60 0 60 0 60    | ANT CS TP TP CS CS TP TP CS CS |       |         |      |      |      |           |
| ## 20  | ##########################                   | 157<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23   | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH S FRUITS 10 150 150 75 20 0 0 0 25 0 0 0 50 0 60 0 60 | 3 ANT CS TP TP CS CS TP TP CS TP TP CS TP TP CS CS                 |       |         |      |      |      |           |
|  | ################################             | 157<br>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24  | 1<br>FLOWER | 2012 S BUDS 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (0 0 (                            | SOUTH S FRUITS 10 150 150 75 20 0 0 0 25 0 0 0 50 0 60 0 60 0 60                                | 3 ANT CS TP TP CS CS TP TP CS TP TP CS CS TP           |       |         |      |      |      |           |

| ## | 26 | 0 | 0 | 20  | TP    |
|----|----|---|---|-----|-------|
| ## | 27 | 0 | 0 | 70  | CS    |
| ## | 28 | 0 | 0 | 125 | CM    |
| ## | 29 | 0 | 0 | 200 | CM    |
| ## | 30 | 0 | 0 | 10  | CS    |
| ## | 31 | 0 | 0 | 0   | CS    |
| ## | 32 | 0 | 0 | 35  | TP    |
| ## | 33 | 0 | 0 | 300 | CM    |
| ## | 34 | 2 | 2 | 100 | CS    |
| ## | 35 | 0 | 0 | 30  | CM    |
| ## | 36 | 0 | 0 | 50  | TP    |
| ## | 37 | 0 | 0 | 10  | CM    |
| ## | 38 | 0 | 0 | 25  | CS    |
| ## | 39 | 0 | 0 | 15  | TP    |
| ## | 40 | 0 | 0 | 0   | TP    |
| ## | 41 | 0 | 0 | 15  | TP    |
| ## | 42 | 0 | 0 | 0   | TP    |
| ## | 43 | 0 | 0 | 40  | TP    |
| ## | 44 | 0 | 0 | 0   | TP    |
| ## | 45 | 0 | 0 | 15  | CM    |
| ## | 46 | 0 | 0 | 0   | CM    |
| ## | 47 | 0 | 0 | 0   | TP    |
| ## | 48 | 0 | 0 | 0   | TP    |
| ## | 49 | 0 | 0 | 1   | TP    |
| ## | 50 | 0 | 0 | 20  | TP    |
| ## | 51 | 0 | 0 | 0   | TP    |
| ## | 52 | 0 | 0 | 0   | TP    |
| ## | 53 | 0 | 0 | 20  | TP    |
| ## | 54 | 0 | 0 | 0   | TP    |
| ## | 55 | 0 | 0 | 0   | CN    |
| ## | 56 | 0 | 0 | 0   | CN    |
| ## | 57 | 0 | 0 | 0   | TP    |
| ## | 58 | 0 | 0 | 5   | TP    |
| ## | 59 | 0 | 0 | 0   | TP    |
| ## | 60 | 0 | 0 | 25  | TP    |
| ## | 61 | 0 | 0 | 25  | TP    |
| ## | 62 | 0 | 0 | 20  | TP    |
| ## | 63 | 0 | 0 | 0   | TP    |
| ## | 64 | 0 | 0 | 10  | CS    |
| ## | 65 | 1 | 0 | 25  | CS    |
| ## | 66 | 0 | 0 | 0   | TP    |
| ## | 67 | 0 | 0 | 10  | TP    |
| ## | 68 | 0 | 0 | 0   | TP    |
| ## | 69 | 0 | 0 | 0   | TP    |
| ## | 70 | 0 | 0 | 0   | TP    |
| ## | 71 | 0 | 0 | 0   | TP    |
| ## | 72 | 0 | 0 | 0   | CS    |
| ## | 73 | 0 | 0 | 0   | CS    |
| ## | 74 | 0 | 0 | 25  | AB_TP |
| ## | 75 | 0 | 0 | 0   | TP    |
| ## | 76 | 0 | 0 | 0   | TP    |
| ## | 77 | 0 | 0 | 0   | TP    |
| ## | 78 | 0 | 0 | 0   | CS    |
| ## | 79 | 0 | 0 | 0   | CS    |
|    | -  | - |   | -   |       |

| ## 80  | 0  | 0  | 0   | CS |
|--------|----|----|-----|----|
| ## 81  | 0  | 0  | 0   | CS |
| ## 82  | 0  | 0  | 5   | CS |
| ## 83  | 6  | 0  | 0   | CS |
|        | 0  |    |     |    |
| ## 84  |    | 0  | 0   | CS |
| ## 85  | 0  | 0  | 1   | CS |
| ## 86  | 0  | 0  | 25  | CS |
| ## 87  | 0  | 0  | 0   | CS |
| ## 88  | 0  | 0  | 0   | CS |
| ## 89  | 0  | 0  | 10  | CS |
| ## 90  | 0  | 0  | 0   | CS |
| ## 91  | 0  | 0  | 35  | CS |
| ## 92  | 0  | 0  | 0   | CS |
| ## 93  | 0  | 0  | 0   | CS |
| ## 94  | 0  | 0  | 0   | CS |
| ## 95  | 0  | 0  | 0   | CS |
| ## 96  | 0  | 0  | 20  | CS |
| ## 97  | 0  | 0  | 0   | CS |
| ## 98  | 0  | 0  | 0   | CM |
| ## 99  | 0  | 0  | 100 | CM |
| ## 100 | 0  | 0  | 0   | CS |
| ## 101 | 0  | 0  | 0   | CS |
| ## 102 | 0  | 0  | 0   | CS |
| ## 103 | 0  | 0  | 0   | CM |
| ## 103 | 0  | 0  | 0   | TP |
| ## 105 | 0  | 0  | 30  | CS |
| ## 105 | 0  | 0  | 50  | TP |
| ## 100 | 0  | 0  | 10  | CS |
| ## 107 | 0  | 0  | 0   | CS |
| ## 100 | 0  | 0  | 15  | CS |
|        | 0  |    | 10  |    |
|        |    | 0  |     | CS |
| ## 111 | 5  | 0  | 200 | CS |
| ## 112 | 0  | 0  | 80  | CS |
| ## 113 | 0  | 0  | 150 | TP |
| ## 114 | 0  | 0  | 40  | TP |
| ## 115 | 0  | 0  | 60  | TP |
| ## 116 | 0  | 0  | 0   | CS |
| ## 117 | 0  | 0  | 0   | TP |
| ## 118 | 0  | 0  | 40  | CS |
| ## 119 | 0  | 0  | 20  | CS |
| ## 120 | 0  | 0  | 75  | TP |
| ## 121 | 0  | 0  | 20  | CM |
| ## 122 | 0  | 0  | 0   | TP |
| ## 123 | 0  | 0  | 0   | E  |
| ## 124 | NA | NA | NA  |    |
| ## 125 | 0  | 0  | 0   | TP |
| ## 126 | NA | NA | NA  |    |
| ## 127 | 0  | 0  | 50  | TP |
| ## 128 | 0  | 0  | 0   | TP |
| ## 129 | 0  | 0  | 0   | TP |
| ## 130 | 0  | 0  | 2   | TP |
| ## 131 | 0  | 0  | 25  | TP |
| ## 132 | 0  | 0  | 0   | TP |
| ## 133 | 0  | 0  | 0   | TP |
| -      | -  | -  | -   |    |

```
## 134
                                 TP
                    0
## 135
              0
                    0
                            0
                                 TP
## 136
                    0
                            0
                                 TP
## 137
              0
                    0
                            0
                                 ΤP
## 138
              0
                    0
                            0
                                 TP
## 139
              0
                    0
                            0
                                 TP
## 140
              0
                    0
                            0
                                 TP
## 141
                    0
                            0
              0
                                 TP
## 142
              0
                    0
                            0
                                 TP
## 143
              0
                    0
                            0
                                 TP
## 144
              0
                    0
                            0
                                 TP
## 145
                    0
                            0
                                 ΤP
              0
## 146
              0
                    0
                            0
                                 TP
                            0
## 147
              0
                    0
                                 ΤP
## 148
              0
                    0
                            8
                                 TP
## 149
              0
                    0
                            0
                                 TP
## 150
              0
                    0
                            0
                                 TP
## 151
                            0
                    0
                                 TP
## 152
              0
                    0
                           0
                                 TP
## 153
              0
                    0
                           0
                                 TP
## 154
              0
                    0
                           0
                                 TP
## 155
                    0
                           20
                                 TP
## 156
              0
                    0
                            2
                                 CS
## 157
             NA
                   NA
```

Assign the data to a variable so we can work we can work with it

```
ACACIA <- read.csv(file = "../data-raw/ACACIA_DREPANOLOBIUM_SURVEY.txt", sep = "\t")
```

## 4. Quality Control Check

str(ACACIA)

```
head(ACACIA)
##
     SURVEY YEAR SITE BLOCK TREATMENT
                                          PLOT
                                                 ID HEIGHT AXIS1 AXIS2 CIRC
## 1
          1 2012 SOUTH
                           1
                                 TOTAL S1TOTAL
                                                581
                                                      2.25 2.75 2.15
                                                                          20
## 2
          1 2012 SOUTH
                                 TOTAL S1TOTAL 582
                                                      2.65 4.10
                                                                  3.90
                                                                          28
                           1
## 3
          1 2012 SOUTH
                           1
                                 TOTAL S1TOTAL 3111
                                                       1.5 1.70 0.85
                                                                          17
## 4
          1 2012 SOUTH
                           1
                                 TOTAL S1TOTAL 3112
                                                      2.01 1.80 1.60
                                                                         12
## 5
          1 2012 SOUTH
                                 TOTAL S1TOTAL 3113
                                                      1.75 1.84 1.42
                                                                          13
          1 2012 SOUTH
## 6
                           1
                                 TOTAL S1TOTAL 3114
                                                      1.65 1.62 0.85
                                                                          15
    FLOWERS BUDS FRUITS ANT
##
## 1
           0
                0
                      10
                          CS
## 2
           0
                0
                     150
                          TP
## 3
           2
                         TP
                      50
                1
## 4
           0
                0
                      75
                          CS
## 5
           0
                0
                      20
                         CS
## 6
```

```
## 'data.frame': 157 obs. of 15 variables:
## $ SURVEY : int 1 1 1 1 1 1 1 1 1 ...
## $ YEAR
           ## $ SITE
            : chr "SOUTH" "SOUTH" "SOUTH" ...
## $ BLOCK
            : int 1 1 1 1 1 1 1 1 1 ...
## $ TREATMENT: chr "TOTAL" "TOTAL" "TOTAL" "TOTAL" ...
## $ PLOT
          : chr "S1TOTAL" "S1TOTAL" "S1TOTAL" "S1TOTAL" ...
## $ ID
             : int 581 582 3111 3112 3113 3114 3115 3199 941 942 ...
## $ HEIGHT
            : chr "2.25" "2.65" "1.5" "2.01" ...
## $ AXIS1
          : num 2.75 4.1 1.7 1.8 1.84 1.62 1.95 2 2.15 5.55 ...
## $ AXIS2
            : num 2.15 3.9 0.85 1.6 1.42 0.85 0.9 1.75 1.82 4.82 ...
            : num 20 28 17 12 13 15 9 12.2 13 35 ...
## $ CIRC
## $ FLOWERS : int 0 0 2 0 0 0 0 0 0 ...
## $ BUDS
            : int 0010000000...
## $ FRUITS : int 10 150 50 75 20 0 0 25 0 50 ...
             : chr "CS" "TP" "TP" "CS" ...
   $ ANT
```

#### ACACIA

| ## |    | SURVEY | YEAR | SITE  | ${\tt BLOCK}$ | TREATMENT | PLOT    | ID   | HEIGHT | AXIS1 | AXIS2 | CIRC |
|----|----|--------|------|-------|---------------|-----------|---------|------|--------|-------|-------|------|
| ## | 1  | 1      | 2012 | SOUTH | 1             | TOTAL     | S1TOTAL | 581  | 2.25   | 2.75  | 2.15  | 20.0 |
| ## | 2  | 1      | 2012 | SOUTH | 1             | TOTAL     | S1TOTAL | 582  | 2.65   | 4.10  | 3.90  | 28.0 |
| ## | 3  |        |      | SOUTH | 1             | TOTAL     | S1TOTAL | 3111 | 1.5    | 1.70  | 0.85  | 17.0 |
| ## | 4  | 1      | 2012 | SOUTH | 1             | TOTAL     | S1TOTAL | 3112 | 2.01   | 1.80  | 1.60  | 12.0 |
| ## | 5  | 1      | 2012 | SOUTH | 1             | TOTAL     | S1TOTAL | 3113 | 1.75   | 1.84  | 1.42  | 13.0 |
| ## | 6  | 1      | 2012 | SOUTH | 1             | TOTAL     | S1TOTAL | 3114 | 1.65   | 1.62  | 0.85  | 15.0 |
| ## | 7  |        |      | SOUTH | 1             | TOTAL     | S1TOTAL | 3115 | 1.2    | 1.95  | 0.90  | 9.0  |
| ## | 8  | 1      | 2012 | SOUTH | 1             | TOTAL     | S1TOTAL | 3199 | 1.45   | 2.00  | 1.75  | 12.2 |
| ## | 9  | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 941  | 1.87   | 2.15  | 1.82  | 13.0 |
| ## | 10 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 942  | 2.38   | 5.55  | 4.82  | 35.0 |
| ## | 11 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 943  | 2.58   | 4.90  | 4.24  | 24.0 |
| ## | 12 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 944  | 2.65   | 3.75  | 3.10  | 27.0 |
| ## | 13 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 946  | 2.35   | 2.34  | 2.05  | 20.0 |
| ## | 14 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 947  | 1.88   | 2.10  | 1.85  | 28.0 |
| ## | 15 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 3116 | 2.32   | 3.05  | 2.63  | 30.0 |
| ## | 16 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 3117 | 2.39   | 2.21  | 2.10  | 13.0 |
| ## | 17 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 3118 | 2.2    | 1.80  | 1.50  | 10.0 |
| ## | 18 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 3119 | 1.05   | 0.90  | 0.55  | 8.0  |
| ## | 19 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 3120 | 2      | 1.25  | 1.20  | 10.0 |
| ## | 20 | 1      | 2012 | SOUTH | 1             | MESO      | S1MESO  | 3131 | 1.28   | 1.14  | 1.00  | 10.0 |
| ## | 21 | 1      | 2012 | SOUTH | 2             | OPEN      | S20PEN  | 341  | dead   | NA    | NA    | NA   |
| ## | 22 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 3178 | 1.4    | 2.50  | 2.15  | 18.0 |
| ## | 23 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 101  | 1.9    | 3.31  | 2.65  | 15.0 |
| ## | 24 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 102  | 1.75   | 2.70  | 2.55  | 16.0 |
| ## | 25 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 103  | 1.8    | 2.75  | 2.30  | 16.0 |
| ## | 26 | 1      | 2012 | SOUTH | 2             |           | S2T0TAL | 104  | 2.7    | 4.05  | 4.00  | 35.2 |
| ## | 27 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 105  | 2.02   | 2.85  | 1.49  | 17.0 |
| ## | 28 | 1      | 2012 | SOUTH | 2             |           | S2T0TAL | 108  | 1.9    | 3.10  | 2.85  | 19.0 |
| ## | 29 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 109  | 1.85   | 2.45  | 1.90  | 19.0 |
| ## | 30 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2TOTAL | 110  | 1.65   | 1.90  | 1.54  | 17.0 |
|    | 31 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 111  | 1.4    | 2.35  | 1.45  | 14.0 |
| ## | 32 |        |      | SOUTH | 2             |           | S2T0TAL | 113  | 2.5    | 3.25  |       | 22.0 |
| ## | 33 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2T0TAL | 115  | 2.05   | 5.40  | 4.50  | 33.0 |
| ## | 34 | 1      | 2012 | SOUTH | 2             | TOTAL     | S2TOTAL | 116  | 2.26   | 3.50  | 3.10  | 33.0 |

| ## | 35 | 1 | 2012 | SOUTH | 2 | TOTAL. | S2TOTAL            | 117  | 2.13         | 2.40         | 2.30 20.0 |
|----|----|---|------|-------|---|--------|--------------------|------|--------------|--------------|-----------|
| ## |    |   |      | SOUTH | 2 | _      | S2TOTAL            | 118  | 1.8          | 3.15         | 2.55 22.0 |
| ## |    | 1 | 2012 | SOUTH | 2 |        | S2TOTAL            |      | 1.85         | 2.00         | 2.27 20.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.5          | 2.15         | 1.80 15.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.87         | 2.34         | 2.05 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.58         | 1.28         | 0.75 11.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 2.05         | 2.10         | 1.75 17.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.75         | 2.45         | 3.28 16.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.49         | 1.50         | 1.45 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.28         | 2.00         | 0.90 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.49         | 2.35         | 1.65 13.0 |
| ## |    |   |      | SOUTH | 2 | _      | S2TOTAL            |      | 1.07         | 1.20         | 0.95 11.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.48         | 1.25         | 1.20 9.0  |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.25         | 1.25         | 0.90 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.41         | 1.41         | 1.40 14.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.41         | 1.60         | 1.30 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.0          | 1.20         | 1.30 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.49         | 1.49         | 1.20 8.0  |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.49         | 1.50         | 1.50 14.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      |              |              | 2.00 20.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.65         | 1.65         | 1.20 10.0 |
| ## |    |   |      | SOUTH | 2 | _      | S2TOTAL            |      | 1.13<br>1.25 | 1.13<br>1.25 | 0.90 10.0 |
|    |    |   |      |       |   |        | S2TOTAL            |      |              |              |           |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL<br>S2TOTAL |      | 1.1          | 1.20         | 1.10 10.0 |
| ## |    |   |      | SOUTH | 2 |        |                    |      | 2.2          | 2.70         | 2.40 25.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.45         | 1.65         | 1.25 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.6          | 2.45         | 2.10 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.55         | 2.40         | 1.80 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.5          | 2.40         | 2.15 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.03         | 1.20         | 1.00 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 2.14         | 1.90         | 1.70 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.2          | 1.90         | 1.65 12.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.05         | 1.10         | 1.00 9.0  |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.8          | 2.60         | 2.40 15.0 |
|    | 68 |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.2          | 1.00         | 0.95 7.0  |
| ## |    |   |      | SOUTH | 2 | _      | S2TOTAL            |      | 1.75         | 1.40         | 1.10 10.0 |
|    | 70 |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.45         | 3.10         | 1.80 10.0 |
| ## |    | _ |      | SOUTH | 2 |        | S2TOTAL            |      | 1.17         | 1.20         | 1.10 5.0  |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 2.15         | 3.10         | 2.58 22.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.7          | 1.70         | 1.40 12.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      |              | 2.85         |           |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      |              | 1.95         | 1.75 17.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.11         | 1.95         | 1.50 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.14         | 1.32         | 1.05 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.26         | 1.60         | 1.40 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.3          | 1.40         | 0.80 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.29         | 1.44         | 1.35 13.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.31         | 1.35         | 1.15 7.0  |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.15         | 1.70         | 1.28 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.87         | 3.40         | 1.85 15.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.47         | 2.10         | 1.61 8.0  |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 1.05         | 1.79         | 1.50 10.0 |
| ## |    |   |      | SOUTH | 2 |        | S2TOTAL            |      | 2.1          | 4.90         | 3.75 25.0 |
| ## |    |   |      | SOUTH | 2 |        | S2T0TAL            |      |              | 1.80         | 1.35 13.0 |
| ## | 88 | 1 | 2012 | SOUTH | 2 | TOTAL  | S2TOTAL            | 3156 | 1.42         | 1.90         | 1.80 14.0 |

| ## | 89  | 1 | 2012 | SOUTH | 2 | TOTAL.       | S2T0TAL          | 3157 | 1.5         | 2.11 | 1.75 12.0              |
|----|-----|---|------|-------|---|--------------|------------------|------|-------------|------|------------------------|
| ## |     |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.06        | 1.05 | 0.85 4.0               |
|    | 91  |   |      | SOUTH | 2 | _            | S2TOTAL          |      | 1.49        | 1.50 | 1.15 13.0              |
|    | 92  |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.8         | 1.60 | 1.50 14.0              |
|    | 93  |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.93        | 1.74 | 1.20 14.0              |
| ## |     |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.2         | 1.60 | 1.30 10.0              |
|    | 95  |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.65        | 1.25 | 1.10 11.0              |
|    | 96  |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.52        | 1.49 | 1.10 12.0              |
|    | 97  |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.43        | 2.05 | 1.54 13.0              |
| ## | 98  |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.25        | 1.40 | 1.25 13.0              |
|    | 99  |   |      | SOUTH | 2 | _            | S2TOTAL          |      | 1.88        | 2.65 | 2.64 20.0              |
| ## | 100 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.03        | 1.40 | 0.60 13.0              |
| ## | 101 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.1         | 1.30 | 1.20 10.0              |
| ## | 102 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.4         | 1.05 | 1.00 10.0              |
| ## | 103 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.05        | 1.55 | 0.90 10.0              |
| ## | 103 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.18        | 1.20 | 1.00 7.0               |
| ## | 104 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.4         | 1.30 | 1.85 13.0              |
| ## | 106 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.37        | 2.67 | 2.19 19.0              |
|    | 107 |   |      | SOUTH | 2 |              | S2TOTAL          |      | 1.32        | 2.15 | 1.55 11.0              |
|    | 107 |   |      | SOUTH | 2 |              | S2MEGA           | 182  |             | 2.13 | 1.20 20.0              |
|    | 100 |   |      | SOUTH | 2 | MEGA<br>MEGA | S2MEGA<br>S2MEGA | 183  | 1.55        | 1.80 | 0.90 8.0               |
|    | 110 |   |      | SOUTH | 2 | MEGA         | S2MEGA<br>S2MEGA | 184  | 1.3<br>1.24 | 1.20 | 1.20 25.0              |
|    | 111 |   |      |       |   |              |                  |      |             |      |                        |
|    | 111 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 185  | 1.5         | 2.10 | 1.75 16.0<br>2.20 15.0 |
|    |     |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 186  | 1.65        | 2.50 |                        |
|    | 113 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 187  | 2.17        | 2.00 | 1.20 15.0              |
|    | 114 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 188  | 1.28        | 1.60 | 1.50 10.0              |
|    | 115 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 189  | 1.07        | 1.50 | 1.50 10.0              |
|    | 116 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 190  | 0.67        | 1.00 | 0.80 8.0               |
|    | 117 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 191  | 0.68        | 0.70 | 0.60 4.0               |
|    | 118 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 192  | 1.87        | 1.60 | 1.40 9.0               |
|    | 119 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 193  | 1.35        | 1.90 | 1.50 14.0              |
|    | 120 |   |      | SOUTH | 2 | MEGA         | S2MEGA           | 194  | 1.75        | 2.10 | 2.10 15.0              |
|    | 121 |   |      | SOUTH | 2 | MESO         | S2MESO           | 462  | 1.75        | 3.30 | 2.50 23.0              |
|    | 122 |   |      | SOUTH | 2 | MESO         | S2MESO           | 463  | 1.64        | 2.30 | 2.00 14.0              |
|    | 123 |   |      | SOUTH | 2 | MESO         | S2MES0           |      | 1.42        | 0.90 | 0.80 10.0              |
|    | 124 |   |      | SOUTH | 3 | OPEN         | S30PEN           |      | dead        | NA   | NA NA                  |
|    | 125 |   |      | SOUTH | 3 | OPEN         | S30PEN           |      | 0.9         | 1.30 | 1.10 11.0              |
|    | 126 |   |      | SOUTH | 3 |              | S3TOTAL          |      | dead        | NA   | NA NA                  |
|    | 127 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.8         | 2.60 | 2.60 15.0              |
|    | 128 |   |      | SOUTH | 3 |              | S3TOTAL          |      |             | 3.10 | 2.20 18.0              |
|    | 129 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 2.15        | 1.60 | 1.10 17.0              |
|    | 130 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.7         | 2.50 | 2.15 15.0              |
|    | 131 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.9         | 1.80 | 1.50 20.0              |
|    | 132 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.95        | 2.10 | 1.90 13.0              |
|    | 133 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.8         | 1.70 | 1.40 13.0              |
|    | 134 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.4         | 2.00 | 1.60 14.0              |
|    | 135 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1           | 1.30 | 1.20 7.0               |
|    | 136 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.75        | 1.20 | 1.10 13.0              |
| ## | 137 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.28        | 1.50 | 0.95 4.0               |
|    | 138 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1           | 1.40 | 1.20 4.0               |
|    | 139 |   |      | SOUTH | 3 |              | S3TOTAL          |      | 1.45        | 1.50 | 1.30 10.0              |
| ## | 140 | 1 | 2012 | SOUTH | 3 | TOTAL        | S3TOTAL          | 2153 | 1           | 1.00 | 0.75 8.0               |
| ## | 141 |   |      | SOUTH | 3 |              | S3TOTAL          |      |             | 1.00 | 0.90 6.0               |
| ## | 142 | 1 | 2012 | SOUTH | 3 | TOTAL        | S3TOTAL          | 2155 | 1.51        | 2.00 | 1.80 12.0              |

```
1 2012 SOUTH
                                      TOTAL S3TOTAL 2156
                                                             1.17 1.10 0.90 10.0
## 143
                               3
## 144
             1 2012 SOUTH
                               3
                                      TOTAL S3TOTAL 2157
                                                             1.33 1.90 1.85 14.0
## 145
             1 2012 SOUTH
                                                              1.3 1.10
                                                                          0.85 8.0
                               3
                                      TOTAL S3TOTAL 2158
## 146
             1 2012 SOUTH
                                      TOTAL S3TOTAL 2159
                                                                          0.90 10.0
                               3
                                                             1.13 1.10
## 147
             1 2012 SOUTH
                               3
                                      TOTAL S3TOTAL 2160
                                                             1.58
                                                                   1.40
                                                                          1.40 13.0
             1 2012 SOUTH
## 148
                               3
                                      TOTAL S3TOTAL 2171
                                                             1.06
                                                                  1.40
                                                                          1.00
                                                                                5.0
## 149
             1 2012 SOUTH
                               3
                                      TOTAL S3TOTAL 2172
                                                             1.05
                                                                   1.40
                                                                          0.95
                                                                                7.0
             1 2012 SOUTH
                                3
                                      TOTAL S3TOTAL 2173
                                                                          1.10
## 150
                                                             1.45 1.60
                                                                                 6.0
## 151
             1 2012 SOUTH
                               3
                                      TOTAL S3TOTAL 2174
                                                             1.15
                                                                   1.10
                                                                          0.90
                                                                                 5.0
## 152
             1 2012 SOUTH
                                3
                                      TOTAL S3TOTAL 2175
                                                             1.42 1.45
                                                                          1.30 13.0
                                                                          1.00
## 153
             1 2012 SOUTH
                                3
                                      TOTAL S3TOTAL 2176
                                                             1.02 1.20
                                                                                8.0
                                      TOTAL S3TOTAL 2177
## 154
             1 2012 SOUTH
                                3
                                                              1.4
                                                                   1.20
                                                                          1.00
                                                                                9.0
             1 2012 SOUTH
                                3
                                      TOTAL S3TOTAL 2178
## 155
                                                             1.45
                                                                   2.10
                                                                          2.05 15.0
## 156
             1 2012 SOUTH
                                3
                                       MESO
                                            S3MESO 1421
                                                             1.95
                                                                  2.20
                                                                          1.60 13.0
## 157
             1 2012 SOUTH
                                3
                                       MESO S3MESO 1422
                                                                      NA
                                                                            NA
                                                                                  NA
                                                             dead
##
       FLOWERS BUDS FRUITS
                                ANT
## 1
              0
                   0
                          10
                                CS
## 2
              0
                   0
                         150
                                TP
## 3
                          50
                                TP
              2
                   1
## 4
              0
                   0
                          75
                                CS
## 5
              0
                   0
                          20
                                CS
## 6
              0
                   0
                           0
                                 Ε
## 7
              0
                   0
                           0
                                CS
## 8
              0
                   0
                          25
                                CS
## 9
                           0
                                TP
              0
                   0
## 10
              0
                   0
                          50
                                TP
## 11
              0
                   0
                           5
                                CS
## 12
              0
                   0
                          60
                                TP
## 13
              0
                   0
                          60
                                TP
## 14
              2
                   0
                          60
                                CS
## 15
              2
                   0
                           0
                                CS
## 16
              0
                   0
                           0
                                TP
## 17
              0
                   0
                           0
                                TP
## 18
              0
                   0
                           0
                                CS
## 19
              0
                   0
                           0
                                CM
## 20
              0
                   0
                           0
                                TP
## 21
             NA
                  NA
                          NA
## 22
              0
                   0
                           5
                                CS
## 23
              0
                   0
                          45
                                CS
## 24
             40
                  50
                          35
                                CS
## 25
              8
                   2
                          65
                                CS
## 26
              0
                   0
                          20
                                TP
## 27
                          70
              0
                   0
                                CS
## 28
                   0
              0
                         125
                                CM
## 29
                   0
                         200
              0
                                CM
## 30
              0
                   0
                          10
                                CS
## 31
              0
                   0
                           0
                                CS
## 32
              0
                   0
                          35
                                TP
## 33
              0
                   0
                         300
                                CM
              2
                   2
## 34
                         100
                                CS
## 35
              0
                   0
                          30
                                CM
## 36
              0
                   0
                          50
                                TP
## 37
              0
                   0
                          10
                                CM
## 38
              0
                   0
                          25
                                CS
```

| ## 39          | 0 | 0 | 15      | TP          |
|----------------|---|---|---------|-------------|
| ## 40          | 0 | 0 | 0       | TP          |
| ## 41          | 0 | 0 | 15      | TP          |
| ## 42          | 0 | 0 | 0       | TP          |
| ## 43          | 0 | 0 | 40      | TP          |
| ## 44          | 0 | 0 | 0       | TP          |
| ## 45          | 0 | 0 | 15      | CM          |
| ## 46          | 0 | 0 | 0       | CM          |
| ## 47          | 0 | 0 | 0       | TP          |
| ## 48          | 0 | 0 | 0       | TP          |
| ## 49          | 0 | 0 | 1       | TP          |
| ## 50          | 0 | 0 | 20      | TP          |
| ## 51          | 0 | 0 | 0       | TP          |
| ## 52          | 0 | 0 | 0       | TP          |
| ## 53          | 0 | 0 | 20      | TP          |
| ## 54          | 0 | 0 | 0       | TP          |
| ## 55          | 0 | 0 | 0       | CN          |
| ## 56          | 0 | 0 | 0       | CN          |
| ## 57          | 0 | 0 | 0       | TP          |
| ## 58          | 0 | 0 | 5       | TP          |
| ## 59          | 0 | 0 | 0       | TP          |
| ## 60          | 0 | 0 | 25      | TP          |
| ## 61          | 0 | 0 | 25      | TP          |
| ## 62          | 0 | 0 | 20      | TP          |
| ## 63          | 0 | 0 | 0       | TP          |
| ## 64          | 0 | 0 | 10      | CS          |
| ## 65          | 1 | 0 | 25      | CS          |
| ## 66          | 0 | 0 | 0       | TP          |
| ## 67          | 0 | 0 | 10      | TP          |
| ## 68          | 0 | 0 | 0       | TP          |
| ## 69          | 0 | 0 | 0       | TP          |
| ## 09<br>## 70 | 0 | 0 | 0       | TP          |
| ## 70<br>## 71 | 0 | 0 | 0       | TP          |
| ## 71<br>## 72 | 0 | 0 | 0       | CS          |
|                |   |   |         |             |
| ## 73<br>## 74 | 0 | 0 | 0<br>25 | CS<br>AB_TP |
|                |   | 0 |         | _           |
| ## 75          | 0 | 0 | 0       | TP          |
| ## 76          | 0 | 0 | 0       | TP          |
| ## 77          | 0 | 0 | 0       | TP          |
| ## 78          | 0 | 0 | 0       | CS          |
| ## 79          | 0 | 0 | 0       | CS          |
| ## 80          | 0 | 0 | 0       | CS          |
| ## 81          | 0 | 0 | 0       | CS          |
| ## 82          | 0 | 0 | 5       | CS          |
| ## 83          | 6 | 0 | 0       | CS          |
| ## 84          | 0 | 0 | 0       | CS          |
| ## 85          | 0 | 0 | 1       | CS          |
| ## 86          | 0 | 0 | 25      | CS          |
| ## 87          | 0 | 0 | 0       | CS          |
| ## 88          | 0 | 0 | 0       | CS          |
| ## 89          | 0 | 0 | 10      | CS          |
| ## 90          | 0 | 0 | 0       | CS          |
| ## 91          | 0 | 0 | 35      | CS          |
| ## 92          | 0 | 0 | 0       | CS          |

| ## 93  | 0  | 0  | 0   | CS |
|--------|----|----|-----|----|
| ## 94  | 0  | 0  | 0   | CS |
| ## 95  | 0  | 0  | 0   | CS |
| ## 96  | 0  | 0  | 20  | CS |
| ## 97  | 0  | 0  | 0   | CS |
| ## 98  | 0  | 0  | 0   | CM |
| ## 99  | 0  | 0  | 100 | CM |
| ## 100 | 0  | 0  | 0   | CS |
| ## 101 | 0  | 0  | 0   | CS |
| ## 102 | 0  | 0  | 0   | CS |
| ## 103 | 0  | 0  | 0   | CM |
| ## 104 | 0  | 0  | 0   | TP |
| ## 105 | 0  | 0  | 30  | CS |
| ## 106 | 0  | 0  | 50  | TP |
| ## 107 | 0  | 0  | 10  | CS |
| ## 108 | 0  | 0  | 0   | CS |
| ## 109 | 0  | 0  | 15  | CS |
| ## 110 | 0  | 0  | 10  | CS |
| ## 111 | 5  | 0  | 200 | CS |
| ## 112 | 0  | 0  | 80  | CS |
| ## 113 | 0  | 0  | 150 | TP |
| ## 114 | 0  | 0  | 40  | TP |
| ## 115 | 0  | 0  | 60  | TP |
| ## 116 | 0  | 0  | 0   | CS |
| ## 117 | 0  | 0  | 0   | TP |
| ## 118 | 0  | 0  | 40  | CS |
| ## 119 | 0  | 0  | 20  | CS |
| ## 120 | 0  | 0  | 75  | TP |
| ## 121 | 0  | 0  | 20  | CM |
| ## 122 | 0  | 0  | 0   | TP |
| ## 123 | 0  | 0  | 0   | Ε  |
| ## 124 | NA | NA | NA  |    |
| ## 125 | 0  | 0  | 0   | TP |
| ## 126 | NA | NA | NA  |    |
| ## 127 | 0  | 0  | 50  | TP |
| ## 128 | 0  | 0  | 0   | TP |
| ## 129 | 0  | 0  | 0   | TP |
| ## 130 | 0  | 0  | 2   | TP |
| ## 131 | 0  | 0  | 25  | TP |
| ## 132 | 0  | 0  | 0   | TP |
| ## 133 | 0  | 0  | 0   | TP |
| ## 134 | 0  | 0  | 0   | TP |
| ## 135 | 0  | 0  | 0   | TP |
| ## 136 | 0  | 0  | 0   | TP |
| ## 137 | 0  | 0  | 0   | TP |
| ## 138 | 0  | 0  | 0   | TP |
| ## 139 | 0  | 0  | 0   | TP |
| ## 140 | 0  | 0  | 0   | TP |
| ## 141 | 0  | 0  | 0   | TP |
| ## 142 | 0  | 0  | 0   | TP |
| ## 143 | 0  | 0  | 0   | TP |
| ## 144 | 0  | 0  | 0   | TP |
| ## 145 | 0  | 0  | 0   | TP |
| ## 146 | 0  | 0  | 0   | TP |
|        | -  | -  | -   |    |

```
## 147
            0
                 0
                        0
                             TP
## 148
                             TР
            0
                 0
                        8
## 149
                 0
                        0
                             TP
## 150
                             TP
                 0
                        0
            0
## 151
            0
                 0
                        0
                             TP
## 152
                        0
                             TP
            0
                 0
## 153
                             TP
            0
                 0
                        0
## 154
            0
                 0
                        0
                             TP
## 155
            0
                 0
                       20
                             TP
## 156
                        2
                             CS
            Ω
                 0
## 157
           NA
                NA
                       NA
numbers <- 1:10
numbers
## [1] 1 2 3 4 5 6 7 8 9 10
numbers[3:6]
## [1] 3 4 5 6
numbers [c(1,5,6,3)]
## [1] 1 5 6 3
class(ACACIA$HEIGHT)
## [1] "character"
is.numeric(ACACIA$HEIGHT)
## [1] FALSE
ACACIA$HEIGHT
    [1] "2.25" "2.65" "1.5" "2.01" "1.75" "1.65" "1.2" "1.45" "1.87" "2.38"
##
##
    [11] "2.58" "2.65" "2.35" "1.88" "2.32" "2.39" "2.2" "1.05" "2" "1.28"
   [21] "dead" "1.4" "1.9" "1.75" "1.8" "2.7" "2.02" "1.9" "1.85" "1.65"
##
    [31] "1.4" "2.5" "2.05" "2.26" "2.13" "1.8" "1.85" "1.5" "1.87" "1.58"
   [41] "2.05" "1.75" "1.49" "1.28" "1.49" "1.07" "1.48" "1.25" "1.41" "1.6"
##
   [51] "1.2" "1.49" "1.5" "1.65" "1.13" "1.25" "1.1" "2.2" "1.45" "1.6"
##
   [61] "1.55" "1.5" "1.03" "2.14" "1.2" "1.05" "1.8" "1.2" "1.75" "1.45"
##
   [71] "1.17" "2.15" "1.7" "1.98" "1.26" "1.11" "1.14" "1.26" "1.3" "1.29"
##
   [81] "1.31" "1.15" "1.87" "1.47" "1.05" "2.1" "1.99" "1.42" "1.5" "1.06"
##
   [91] "1.49" "1.8" "1.93" "1.2" "1.65" "1.52" "1.43" "1.25" "1.88" "1.03"
## [101] "1.1" "1.4" "1.05" "1.18" "1.4" "1.37" "1.32" "1.55" "1.3" "1.24"
## [111] "1.5" "1.65" "2.17" "1.28" "1.07" "0.67" "0.68" "1.87" "1.35" "1.75"
```

"1.75" "1.28" "1"

"1.45" "1"

## [121] "1.75" "1.64" "1.42" "dead" "0.9" "dead" "1.8" "2.47" "2.15" "1.7"

## [141] "1.03" "1.51" "1.17" "1.33" "1.3" "1.13" "1.58" "1.06" "1.05" "1.45"

## [131] "1.9" "1.95" "1.8" "1.4" "1"

## [151] "1.15" "1.42" "1.02" "1.4" "1.45" "1.95" "dead"

#### as.numeric(ACACIA\$HEIGHT)

## Warning: NAs introduced by coercion

```
## [1] 2.25 2.65 1.50 2.01 1.75 1.65 1.20 1.45 1.87 2.38 2.58 2.65 2.35 1.88 2.32 ## [16] 2.39 2.20 1.05 2.00 1.28 NA 1.40 1.90 1.75 1.80 2.70 2.02 1.90 1.85 1.65 ## [31] 1.40 2.50 2.05 2.26 2.13 1.80 1.85 1.50 1.87 1.58 2.05 1.75 1.49 1.28 1.49 ## [46] 1.07 1.48 1.25 1.41 1.60 1.20 1.49 1.50 1.65 1.13 1.25 1.10 2.20 1.45 1.60 ## [61] 1.55 1.50 1.03 2.14 1.20 1.05 1.80 1.20 1.75 1.45 1.17 2.15 1.70 1.98 1.26 ## [76] 1.11 1.14 1.26 1.30 1.29 1.31 1.15 1.87 1.47 1.05 2.10 1.99 1.42 1.50 1.06 ## [91] 1.49 1.80 1.93 1.20 1.65 1.52 1.43 1.25 1.88 1.03 1.10 1.40 1.05 1.18 1.40 ## [106] 1.37 1.32 1.55 1.30 1.24 1.50 1.65 2.17 1.28 1.07 0.67 0.68 1.87 1.35 1.75 ## [121] 1.75 1.64 1.42 NA 0.90 NA 1.80 2.47 2.15 1.70 1.90 1.95 1.80 1.40 1.00 ## [136] 1.75 1.28 1.00 1.45 1.00 1.03 1.51 1.17 1.33 1.30 1.13 1.58 1.06 1.05 1.45 ## [151] 1.15 1.42 1.02 1.40 1.45 1.95 NA
```

We identified that HEIGHT should be numeric and is instead character:

```
ACACIA$HEIGHT <- as.numeric(ACACIA$HEIGHT)
```

## Warning: NAs introduced by coercion

#### ACACIA\$HEIGHT

```
## [1] 2.25 2.65 1.50 2.01 1.75 1.65 1.20 1.45 1.87 2.38 2.58 2.65 2.35 1.88 2.32 ## [16] 2.39 2.20 1.05 2.00 1.28 NA 1.40 1.90 1.75 1.80 2.70 2.02 1.90 1.85 1.65 ## [31] 1.40 2.50 2.05 2.26 2.13 1.80 1.85 1.50 1.87 1.58 2.05 1.75 1.49 1.28 1.49 ## [46] 1.07 1.48 1.25 1.41 1.60 1.20 1.49 1.50 1.65 1.13 1.25 1.10 2.20 1.45 1.60 ## [61] 1.55 1.50 1.03 2.14 1.20 1.05 1.80 1.20 1.75 1.45 1.17 2.15 1.70 1.98 1.26 ## [76] 1.11 1.14 1.26 1.30 1.29 1.31 1.15 1.87 1.47 1.05 2.10 1.99 1.42 1.50 1.06 ## [91] 1.49 1.80 1.93 1.20 1.65 1.52 1.43 1.25 1.88 1.03 1.10 1.40 1.05 1.18 1.40 ## [106] 1.37 1.32 1.55 1.30 1.24 1.50 1.65 2.17 1.28 1.07 0.67 0.68 1.87 1.35 1.75 ## [121] 1.75 1.64 1.42 NA 0.90 NA 1.80 2.47 2.15 1.70 1.90 1.95 1.80 1.40 1.00 ## [136] 1.75 1.28 1.00 1.45 1.00 1.03 1.51 1.17 1.33 1.30 1.13 1.58 1.06 1.05 1.45 ## [151] 1.15 1.42 1.02 1.40 1.45 1.95 NA
```

Coercion in R computer language means that a value was forced to be type, in this case, the word "Dead" cannot be transformed to a number, so it is assigned the NA value

```
ACACIA <- read.csv(file = "../data-raw/ACACIA_DREPANOLOBIUM_SURVEY.txt", sep = "\t", na.strings = "dead is.numeric(ACACIA$HEIGHT)
```

## [1] TRUE

#### 5. Accessing elements of a 'data.frame'

It is similar to what we do for vectors, but we have two dimensions

```
ACACIA[1,6]
## [1] "S1TOTAL"
str(ACACIA)
         157 obs. of 15 variables:
## 'data.frame':
## $ SURVEY : int 1 1 1 1 1 1 1 1 1 ...
## $ YEAR
       "SOUTH" "SOUTH" "SOUTH" ...
## $ SITE
       : chr
 $ BLOCK
      : int 1 1 1 1 1 1 1 1 1 1 ...
## $ TREATMENT: chr "TOTAL" "TOTAL" "TOTAL" "TOTAL" ...
## $ PLOT
       : chr
          "S1TOTAL" "S1TOTAL" "S1TOTAL" "S1TOTAL" ...
## $ ID
       : int
          581 582 3111 3112 3113 3114 3115 3199 941 942 ...
       : num 2.25 2.65 1.5 2.01 1.75 1.65 1.2 1.45 1.87 2.38 ...
## $ HEIGHT
## $ AXIS1
       : num 2.75 4.1 1.7 1.8 1.84 1.62 1.95 2 2.15 5.55 ...
## $ AXIS2
       : num
          2.15 3.9 0.85 1.6 1.42 0.85 0.9 1.75 1.82 4.82 ...
##
 $ CIRC
       : num
          20 28 17 12 13 15 9 12.2 13 35 ...
## $ FLOWERS : int 0 0 2 0 0 0 0 0 0 ...
       : int 0010000000...
 $ BUDS
       : int 10 150 50 75 20 0 0 25 0 50 ...
##
 $ FRUITS
       : chr "CS" "TP" "TP" "CS" ...
 $ ANT
All the following are different ways of accessing a column or variable inside a data frame
ACACIA$SURVEY
##
  ## [149] 1 1 1 1 1 1 1 1 1
ACACIA[,1]
  ## [149] 1 1 1 1 1 1 1 1 1
ACACIA[, "SURVEY"]
##
  ## [149] 1 1 1 1 1 1 1 1 1
```

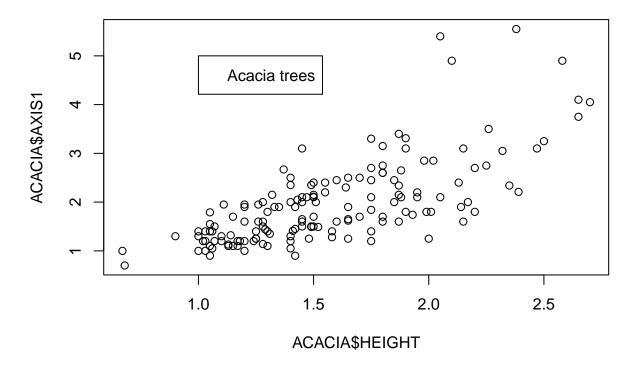
#### 6. Replacing elements in a data frame

```
numbers[5] <- 100
numbers
## [1] 1 2 3 4 100 6 7 8 9 10</pre>
```

## 7. Plotting data with 'ggplot2'

```
plot(x = ACACIA$HEIGHT, y = ACACIA$AXIS1, main = "Acacia height vs Axis1")
?legend
legend(x = 1, y = 5, legend = "Acacia trees")
```

# Acacia height vs Axis1

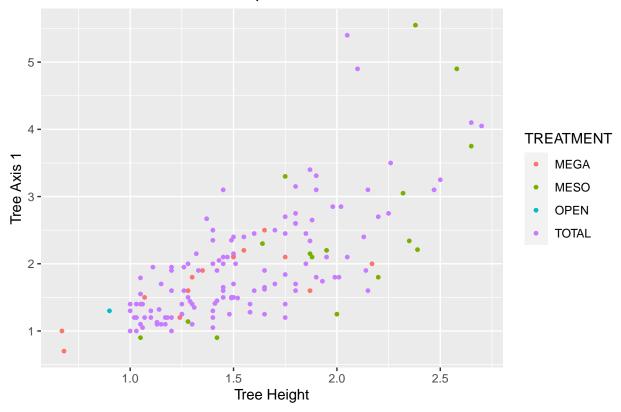


With ggplot, we create layers

```
library(ggplot2)
ggplot(data = ACACIA, mapping = aes(x = HEIGHT, y = AXIS1, color = TREATMENT)) + geom_point(size = 1)
```

## Warning: Removed 4 rows containing missing values (geom\_point).

# Acacia trees size relationships



# colors()

| ## | [1]  | "white"          | "aliceblue"      | "antiquewhite"  |
|----|------|------------------|------------------|-----------------|
| ## | [4]  | "antiquewhite1"  | "antiquewhite2"  | "antiquewhite3" |
| ## | [7]  | "antiquewhite4"  | "aquamarine"     | "aquamarine1"   |
| ## | [10] | "aquamarine2"    | "aquamarine3"    | "aquamarine4"   |
| ## | [13] | "azure"          | "azure1"         | "azure2"        |
| ## | [16] | "azure3"         | "azure4"         | "beige"         |
| ## | [19] | "bisque"         | "bisque1"        | "bisque2"       |
| ## | [22] | "bisque3"        | "bisque4"        | "black"         |
| ## | [25] | "blanchedalmond" | "blue"           | "blue1"         |
| ## | [28] | "blue2"          | "blue3"          | "blue4"         |
| ## | [31] | "blueviolet"     | "brown"          | "brown1"        |
| ## | [34] | "brown2"         | "brown3"         | "brown4"        |
| ## | [37] | "burlywood"      | "burlywood1"     | "burlywood2"    |
| ## | [40] | "burlywood3"     | "burlywood4"     | "cadetblue"     |
| ## | [43] | "cadetblue1"     | "cadetblue2"     | "cadetblue3"    |
| ## | [46] | "cadetblue4"     | "chartreuse"     | "chartreuse1"   |
| ## | [49] | "chartreuse2"    | "chartreuse3"    | "chartreuse4"   |
| ## | [52] | "chocolate"      | "chocolate1"     | "chocolate2"    |
| ## | [55] | "chocolate3"     | "chocolate4"     | "coral"         |
| ## | [58] | "coral1"         | "coral2"         | "coral3"        |
| ## | [61] | "coral4"         | "cornflowerblue" | "cornsilk"      |
| ## | [64] | "cornsilk1"      | "cornsilk2"      | "cornsilk3"     |
| ## | [67] | "cornsilk4"      | "cyan"           | "cyan1"         |
| ## | [70] | "cyan2"          | "cyan3"          | "cyan4"         |

| ## | [73]  | "darkblue"        | "darkcyan"        | "darkgoldenrod"   |
|----|-------|-------------------|-------------------|-------------------|
| ## | [76]  | "darkgoldenrod1"  | "darkgoldenrod2"  | "darkgoldenrod3"  |
| ## | [79]  | "darkgoldenrod4"  | "darkgray"        | "darkgreen"       |
| ## | [82]  | "darkgrey"        | "darkkhaki"       | "darkmagenta"     |
| ## | [85]  | "darkolivegreen"  | "darkolivegreen1" | "darkolivegreen2" |
| ## | [88]  | "darkolivegreen3" | "darkolivegreen4" | "darkorange"      |
| ## | [91]  | "darkorange1"     | "darkorange2"     | "darkorange3"     |
| ## | [94]  | "darkorange4"     | "darkorchid"      | "darkorchid1"     |
| ## | [97]  | "darkorchid2"     | "darkorchid3"     | "darkorchid4"     |
| ## | [100] | "darkred"         | "darksalmon"      | "darkseagreen"    |
| ## | [103] | "darkseagreen1"   | "darkseagreen2"   | "darkseagreen3"   |
| ## | [106] | "darkseagreen4"   | "darkslateblue"   | "darkslategray"   |
| ## | [109] | "darkslategray1"  | "darkslategray2"  | "darkslategray3"  |
| ## | [112] | "darkslategray4"  | "darkslategrey"   | "darkturquoise"   |
| ## | [115] | "darkviolet"      | "deeppink"        | "deeppink1"       |
| ## | [118] | "deeppink2"       | "deeppink3"       | "deeppink4"       |
| ## | [121] | "deepskyblue"     | "deepskyblue1"    | "deepskyblue2"    |
| ## | [124] | "deepskyblue3"    | "deepskyblue4"    | "dimgray"         |
| ## | [127] | "dimgrey"         | "dodgerblue"      | "dodgerblue1"     |
| ## | [130] | "dodgerblue2"     | "dodgerblue3"     | "dodgerblue4"     |
| ## | [133] | "firebrick"       | "firebrick1"      | "firebrick2"      |
| ## | [136] | "firebrick3"      | "firebrick4"      | "floralwhite"     |
| ## | [139] | "forestgreen"     | "gainsboro"       | "ghostwhite"      |
| ## | [142] | "gold"            | "gold1"           | "gold2"           |
| ## | [145] | "gold3"           | "gold4"           | "goldenrod"       |
| ## | [148] | "goldenrod1"      | "goldenrod2"      | "goldenrod3"      |
| ## | [151] | "goldenrod4"      | "gray"            | "gray0"           |
| ## | [154] | "gray1"           | "gray2"           | "gray3"           |
| ## | [157] | "gray4"           | "gray5"           | "gray6"           |
| ## | [160] | "gray7"           | "gray8"           | "gray9"           |
| ## | [163] | "gray10"          | "gray11"          | "gray12"          |
| ## | [166] | "gray13"          | "gray14"          | "gray15"          |
| ## | [169] | "gray16"          | "gray17"          | "gray18"          |
| ## | [172] | "gray19"          | "gray20"          | "gray21"          |
| ## | [175] | "gray22"          | "gray23"          | "gray24"          |
| ## | [178] | "gray25"          | "gray26"          | "gray27"          |
| ## | [181] | "gray28"          | "gray29"          | "gray30"          |
| ## | [184] | "gray31"          | "gray32"          | "gray33"          |
| ## | [187] | "gray34"          | "gray35"          | "gray36"          |
| ## | [190] | "gray37"          | "gray38"          | "gray39"          |
| ## | [193] | "gray40"          | "gray41"          | "gray42"          |
| ## | [196] | "gray43"          | "gray44"          | "gray45"          |
| ## | [199] | "gray46"          | "gray47"          | "gray48"          |
| ## | [202] | "gray49"          | "gray50"          | "gray51"          |
| ## | [205] | "gray52"          | "gray53"          | "gray54"          |
| ## | [208] | "gray55"          | "gray56"          | "gray57"          |
| ## | [211] | "gray58"          | "gray59"          | "gray60"          |
| ## | [214] | "gray61"          | "gray62"          | "gray63"          |
| ## | [217] | "gray64"          | "gray65"          | "gray66"          |
| ## | [220] | "gray67"          | "gray68"          | "gray69"          |
| ## | [223] | "gray70"          | "gray71"          | "gray72"          |
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#### View(ACACIA)