

Formatting White Sage Data

Xingyao Chen

6/20/2017

Load field observation data from Gdrive

```
url='docs.google.com/spreadsheets/d/1LKr8Ken8p1jpTGpbn2a_napP6uNJ4sEnN8gdDSEQGxY/edit#gid=1630939193'
mydat=read.csv(text=gsheet2text(url, format='csv'))
```

```
## No encoding supplied: defaulting to UTF-8.
```

```
names(mydat)
```

```
## [1] "Patch.ID..sp..patch."
## [2] "Species"
## [3] "Date"
## [4] "Experiment.Week"
## [5] "Location"
## [6] "Plant.Number"
## [7] "Start.Time"
## [8] "End.Time"
## [9] "Avg.open.flowers.per.inflorescence"
## [10] "Total.inflorescences"
## [11] "Honeybees"
## [12] "Butterflies.Moths"
## [13] "Bees.flies.wasps"
## [14] "Notes"
## [15] "Observer"
## [16] "Treatment"
## [17] "X.Florets"
## [18] "TotVolNec.µL."
## [19] "Vol.Flw.µL."
## [20] "Vol..Added.µL."
## [21] "BRIX.1"
## [22] "BRIX.2"
## [23] "Sugar.µg."
## [24] "Sug.Flw.µg."
## [25] "Notes.1"
```

```
size=strsplit(as.character(mydat$Location), ' ')
df=as.data.frame(t(matrix(unlist(size), 3)))
names(df)=c('non', 'Pair', 'Size')
mydat=cbind(mydat, df[,2:3])
head(mydat)
```

##	Patch.ID..sp..patch.	Species	Date	Experiment.Week	Location
## 1	BOY	Sa Ap	5/17/2017	1	Pair 1 Small
## 2	BOB	Sa Ap	5/17/2017	1	Pair 1 Large
## 3	YOB	Sa Ap	5/17/2017	1	Pair 2 Small
## 4	YBO	Sa Ap	5/17/2017	1	Pair 2 Large
## 5	BYB	Sa Ap	5/17/2017	1	Pair 3 Small
## 6	OYO	Sa Ap	5/17/2017	1	Pair 3 Large

```
## Plant.Number Start.Time End.Time Avg.open.flowers.per.inflorescence
## 1 1 11:32 11:47 45.8
## 2 1 11:08 11:23 67.2
## 3 1 11:17 11:27 54.0
## 4 1 11:39 11:49 57.0
## 5 1 10:59 11:14 33.6
## 6 1 11:36 11:51 63.0
## Total.inflorescences Honeybees Butterflies.Moths Bees.flies.wasps
## 1 33 1 1 NA
## 2 82 13 NA NA
## 3 10 0 NA NA
## 4 19 5 NA 2
## 5 11 0 NA NA
## 6 33 4 NA 1
## Notes Observer Treatment X.Florets TotVolNec.pL. Vol.Flw.pL.
## 1 Xingyao NA NA NA NA
## 2 1 Hummingbird Xingyao NA NA NA NA
## 3 Joanna NA NA NA NA
## 4 2 flew around Joanna NA NA NA NA
## 5 Matt NA NA NA NA
## 6 Matt NA NA NA NA
## Vol..Added.pL. BRIX.1 BRIX.2 Sugar.pg. Sug.Flw.pg. Notes.1 Pair Size
## 1 NA NA NA NA NA NA 1 Small
## 2 NA NA NA NA NA NA 1 Large
## 3 NA NA NA NA NA NA 2 Small
## 4 NA NA NA NA NA NA 2 Large
## 5 NA NA NA NA NA NA 3 Small
## 6 NA NA NA NA NA NA 3 Large
```

```
mydat$Total.Flowers=mydat$Avg.open.flowers.per.inflorescenc*mydat$Total.inflorescences
```

```
mydat_small=mydat[, c('Date', 'Experiment.Week', 'Location', 'Plant.Number', 'Pair', 'Size', 'Start.Time',
                      'End.Time', 'Avg.open.flowers.per.inflorescence', 'Total.inflorescences', 'Total.Flowers')]
```

```
summary(mydat_small)
```

```
## Date Experiment.Week Location Plant.Number
## 5/17/2017:12 Min. :1.000 Pair 2 Large: 7 Min. :1.000
## 5/23/2017:12 1st Qu.:2.000 Pair 2 Small: 7 1st Qu.:1.000
## 5/25/2017:12 Median :3.000 Pair 4 Large: 7 Median :1.000
## 5/30/2017:12 Mean :2.714 Pair 4 Small: 7 Mean :1.357
## 6/2/2017 :12 3rd Qu.:4.000 Pair 5 Large: 7 3rd Qu.:2.000
## 6/6/2017 :12 Max. :4.000 Pair 5 Small: 7 Max. :2.000
## 6/8/2017 :12 (Other) :42
## Pair Size Start.Time End.Time
## 2 :14 Large:42 10:33 : 6 10:48 : 6
## 4 :14 Small:42 10:55 : 4 11:10 : 4
## 5 :14 10:11 : 3 10:27 : 3
## 6 :14 11:44 : 3 11:35 : 3
## 1 :10 10:12 : 2 11:49 : 3
## 3 :10 10:22 : 2 11:59 : 3
## (Other): 8 (Other):64 (Other):62
## Avg.open.flowers.per.inflorescence Total.inflorescences Total.Flowers
## Min. : 5.20 Min. : 4.00 Min. : 39.0
## 1st Qu.: 24.80 1st Qu.: 9.75 1st Qu.: 268.1
## Median : 31.50 Median :15.00 Median : 453.0
```

```

## Mean      : 35.56          Mean      :22.04          Mean      : 936.6
## 3rd Qu.: 42.65          3rd Qu.:30.00          3rd Qu.:1221.2
## Max.      :106.33        Max.      :82.00          Max.      :7868.4
##
## Honeybees
## Min.      : 0.00
## 1st Qu.: 2.75
## Median :12.00
## Mean      :16.15
## 3rd Qu.:27.00
## Max.      :56.00
##

```

Load nectar data from Gdrive

```

## No encoding supplied: defaulting to UTF-8.

## [1] "Date"                "Experiment.Week"
## [3] "Observer"            "Patch.ID..color.code."
## [5] "Location"            "Plant.number"
## [7] "Species..4.letter.code." "Number.of.flowers.used"
## [9] "Size.of.Microcap..uL." "Nectar.collected..cm."
## [11] "BRIX"                "Notes"
## [13] "Length.of.Microcap..cm." "volume.of.nectar..pl."
## [15] "sugar.concentration"    "sugar.content..pg."
## [17] "X"                    "X.1"
## [19] "X.2"                  "X.3"
## [21] "X.4"                  "X.5"

##      Date      Experiment.Week  Observer  Patch.ID..color.code.
## 5/18/2017: 60   Min.      :1.000   Joanna :80   OYO      : 26
## 5/24/2017: 56   1st Qu.:2.000   John   :79   BOB      : 25
## 5/31/2017:111   Median :3.000   Matt   :71   BYB      : 25
## 6/7/2017 : 60   Mean      :2.596   Xingyao:57  OBY      : 25
##                                     3rd Qu.:3.000   YBY      : 25
##                                     Max.      :4.000   BOY      : 24
##                                     (Other):137

##      Location      Plant.number  Species..4.letter.code.
## Pair 4 Large: 25   Min.      :1.000   Sa Ap:287
## Pair 4 Small: 25   1st Qu.:1.000
## Pair 2 Large: 24   Median :1.000
## Pair 2 Small: 24   Mean      :1.317
## Pair 6 Large: 24   3rd Qu.:2.000
## Pair 5 Small: 23   Max.      :2.000
## (Other)          :142

## Number.of.flowers.used Size.of.Microcap..uL. Nectar.collected..cm.
## Min.      : 1.000      Min.      :2.000      Min.      :0.000
## 1st Qu.: 1.000      1st Qu.:2.000      1st Qu.:0.800
## Median : 1.000      Median :2.000      Median :1.500
## Mean      : 1.571      Mean      :2.585      Mean      :1.844
## 3rd Qu.: 2.000      3rd Qu.:2.000      3rd Qu.:2.600
## Max.      :10.000      Max.      :5.000      Max.      :7.400
## NA's      :61

##      BRIX                                     Notes

```

```

## Min. :0.0000 :155
## 1st Qu.:0.1100 Unbagged : 60
## Median :0.1700 Bagged : 54
## Mean :0.1673 No visible nectar : 3
## 3rd Qu.:0.2275 Nectar only collected from 3 flowers: 2
## Max. :0.3650 no nectar available : 2
## (Other) : 11
## Length.of.Microcap..cm. volume.of.nectar..pl. sugar.concentration
## Min. :3.20 Min. :0.0000 0 : 19
## 1st Qu.:3.20 1st Qu.:0.5031 0.52 : 4
## Median :3.20 Median :0.9375 0.525 : 4
## Mean :3.98 Mean :1.1675 0.42 : 3
## 3rd Qu.:3.20 3rd Qu.:1.6313 0.47 : 3
## Max. :7.20 Max. :4.6250 0.5468965517: 3
## (Other) :251
## sugar.content..pg. X X.1 X.2
## 0 : 19 Min. :0.750 Min. :0.3958 Min. :0.3784
## 0.328125: 3 1st Qu.:1.153 1st Qu.:0.4316 1st Qu.:0.4758
## 0.99125 : 3 Median :1.367 Median :0.4855 Median :0.6222
## #DIV/0! : 2 Mean :1.457 Mean :0.5060 Mean :0.6469
## 0.12375 : 2 3rd Qu.:1.705 3rd Qu.:0.5324 3rd Qu.:0.7561
## 0.21375 : 2 Max. :2.749 Max. :0.8492 Max. :1.1754
## (Other) :256 NA's :271 NA's :271 NA's :271
## X.3 X.4 X.5
## Min. :0.1068 Min. :0.03427 Min. :0.07959
## 1st Qu.:0.3257 1st Qu.:0.05248 1st Qu.:0.17450
## Median :0.6957 Median :0.08186 Median :0.20819
## Mean :0.7296 Mean :0.16847 Mean :0.27760
## 3rd Qu.:1.0402 3rd Qu.:0.15850 3rd Qu.:0.34731
## Max. :1.5262 Max. :0.66733 Max. :0.75548
## NA's :271 NA's :271 NA's :271

## Warning: NAs introduced by coercion

## Warning: NAs introduced by coercion

## Experiment.Week Location Plant.number Pair
## Min. :1.00 Pair 2 Small: 23 Min. :1.000 4 :45
## 1st Qu.:2.00 Pair 4 Large: 23 1st Qu.:1.000 2 :43
## Median :3.00 Pair 4 Small: 22 Median :1.000 5 :41
## Mean :2.67 Pair 5 Large: 21 Mean :1.337 3 :39
## 3rd Qu.:3.00 Pair 2 Large: 20 3rd Qu.:2.000 6 :38
## Max. :4.00 Pair 3 Large: 20 Max. :2.000 1 :37
## (Other) :135 (Other):21
## Size volume.of.nectar..pl. sugar.concentration sugar.content..pg.
## Large:133 Min. :0.1250 Min. :0.0740 Min. :0.01497
## Small:131 1st Qu.:0.5625 1st Qu.:0.4293 1st Qu.:0.33375
## Median :1.0417 Median :0.5169 Median :0.53875
## Mean :1.2389 Mean :0.5369 Mean :0.61774
## 3rd Qu.:1.7500 3rd Qu.:0.6180 3rd Qu.:0.81645
## Max. :4.6250 Max. :1.2833 Max. :2.74500
##

```

Calculate aerege and variance data for each plant

```
##average of 5 flowers
volume=acast(nect_small[,c(1:2,6)], Experiment.Week~Location, mean)

## Using volume.of.nectar..pl. as value column: use value.var to override.
conc=acast(nect_small[,c(1:2, 7)], Experiment.Week~Location, mean)

## Using sugar.concentration as value column: use value.var to override.
content=acast(nect_small[,c(1:2,8)], Experiment.Week~Location, mean)

## Using sugar.content..pg. as value column: use value.var to override.
##variance of 5 flowers
volume_var=acast(nect_small[,c(1:2,6)], Experiment.Week~Location, var)

## Using volume.of.nectar..pl. as value column: use value.var to override.
conc_var=acast(nect_small[,c(1:2, 7)], Experiment.Week~Location, var)

## Using sugar.concentration as value column: use value.var to override.
content_var=acast(nect_small[,c(1:2,8)], Experiment.Week~Location, var)

## Using sugar.content..pg. as value column: use value.var to override.
#et rid of NAs
booNA=!is.na(melt(volume)$value)

vol=na.omit(melt(volume))
sugar.conc=na.omit(melt(conc))
sugar.content=na.omit(melt(content))

vol_var=melt(volume_var)[booNA,]
sugar.conc_var=melt(conc_var)[booNA,]
sugar.content_var=melt(content_var)[booNA,]

#construct new ndata frame
mean_nect=cbind(vol[,1:2], data.frame(vol$value, sugar.conc$value, sugar.content$value, vol_var$value, ,
names(mean_nect)=c("Experiment.Week", "Location", 'Volume', "Sugar_conc", 'Sugar_content', 'Volume_var'
mean_nect=mean_nect[order(mean_nect$Experiment.Week), ]
head(mean_nect)

##      Experiment.Week      Location Volume Sugar_conc Sugar_content
## 1                1 Pair 1 Large 1.52500  0.3901161    0.6286875
## 5                1 Pair 1 Small 2.03125  0.4363683    0.8229688
## 9                1 Pair 2 Large 1.42500  0.7117435    0.9761250
## 13               1 Pair 2 Small 2.13750  0.5114641    1.0748750
## 17               1 Pair 3 Large 1.22500  0.5620000    0.6601250
## 21               1 Pair 3 Small 1.78125  0.6100000    1.1479687
##      Volume_var Sugar_conc_var Sugar_content_var
## 1      0.4621094      0.007908169      0.123056758
## 5      0.5846354      0.012977286      0.006413379
## 9      0.7175781      0.024039983      0.207072148
## 13     0.3933594      0.006545876      0.099862139
## 17     1.1828125      0.007320000      0.308158281
```

```
## 21 1.8867188 0.012200000 1.137324316
```

Merge field obs data with nectar data

```
#Each week's nectar data must be duplicated
add1=mean_nect[mean_nect$Experiment.Week==1,]
add2=mean_nect[mean_nect$Experiment.Week==2,]
add3=mean_nect[mean_nect$Experiment.Week==3,]
add4=mean_nect[mean_nect$Experiment.Week==4,]

#Excepted for week 1
mean_nect=rbind(mean_nect[mean_nect$Experiment.Week==1,], add2,add2, add3, add3, add4, add4)

#make sure they are the same order
mean_nect=mean_nect[order(mean_nect$Location), ]
mydat_small=mydat_small[order(mydat_small$Location), ]
#commence the merge
merged=cbind(mydat_small, mean_nect)
#uh oh, remove duplicate names
names(merged)

## [1] "Date"
## [2] "Experiment.Week"
## [3] "Location"
## [4] "Plant.Number"
## [5] "Pair"
## [6] "Size"
## [7] "Start.Time"
## [8] "End.Time"
## [9] "Avg.open.flowers.per.inflorescence"
## [10] "Total.inflorescences"
## [11] "Total.Flowers"
## [12] "Honeybees"
## [13] "Experiment.Week"
## [14] "Location"
## [15] "Volume"
## [16] "Sugar_conc"
## [17] "Sugar_content"
## [18] "Volume_var"
## [19] "Sugar_conc_var"
## [20] "Sugar_content_var"

merged=merged[, -c(13:14)]
```

Load BFS Weather Station Data from GDrive (scraped from <https://www.wunderground.com/personal-weather-station/dashboard?ID=KCACLARE11>)

```
url2='docs.google.com/spreadsheets/d/1Wm0LVMGEWBQnz6jsSKjdrzKi5ARMhUAzZMN_chvg7M4/edit?usp=sharing'
weather=read.csv(text=gsheet2text(url2, format='csv'))
```

```
## No encoding supplied: defaulting to UTF-8.
```

```

weather=weather[~which(weather$Time=="Time"),]
names(weather)

## [1] "Date"          "Time"          "Temperature"   "Dew.Point"
## [5] "Humidity"      "Wind"          "Speed"         "Gust"
## [9] "Pressure"      "Precip..Rate." "Precip..Accum." "Solar"

summary(weather)

##          Date          Time          Temperature          Dew.Point          Humidity
## 06/06/2017:159      2:15 AM:      4      59.4°F : 18      56.8°F : 26      91% : 52
## 06/08/2017:156      1:00 PM:      3      59.7°F : 16      56.6°F : 22      89% : 51
## 05/17/2017:154      1:30 PM:      3      60.6°F : 16      51.7°F : 19      92% : 42
## 05/30/2017:154      1:35 AM:      3      59.1°F : 13      57.9°F : 19      87% : 40
## 05/25/2017:151      1:45 AM:      3      59.8°F : 13      48.3°F : 17      86% : 39
## 06/02/2017:151      1:55 AM:      3      59.3°F : 12      51.9°F : 17      88% : 36
## (Other) :149      (Other):1055      (Other):986      (Other):954      (Other):814
##          Wind          Speed          Gust          Pressure
## WNW :354      Omph :284      Omph : 92      29.92in:110
## West :228      1.7mph :119      4.3mph : 68      29.93in: 99
## NW :153      0.9mph :117      5.1mph : 61      29.98in: 95
## WSW : 72      2.6mph : 68      6.8mph : 60      29.91in: 87
## North : 61      6.8mph : 60      7.7mph : 60      29.95in: 78
## NNW : 60      3.4mph : 57      6mph : 59      29.94in: 76
## (Other):146      (Other):369      (Other):674      (Other):529
##          Precip..Rate.          Precip..Accum.          Solar
## 0in :1074      --in :1074      0.625w/m² :435
## Precip. Rate.: 0      Precip. Accum.: 0      145.625w/m² : 8
## :1.875w/m² : 7
## :1060.625w/m² : 6
## :66.875w/m² : 6
## :1058.125w/m² : 5
## (Other) :607

##convert field obs times to POSIX
#Start:
obs_start=paste(merged$Date, merged$Start.Time)
obs_start_pos=as.POSIXct(obs_start , format = "%m/%d/%Y %H:%M")
#End:
obs_end=paste(merged$Date, merged$End.Time)
obs_end_pos=as.POSIXct(obs_end , format = "%m/%d/%Y %H:%M")

#Do the same with the weather data
weatime=paste(weather$Date, weather$Time)
weatime_pos=as.POSIXct(weatime , format = "%m/%d/%Y %H:%M %p")
#
#round to nearest 15 min for easy matching
obs_start_pos_rd=round.POSIXct(obs_start_pos, 'quarter hours')
obs_end_pos_rd=round.POSIXct(obs_end_pos, 'quarter hours')
weatime_pos_rd=round.POSIXct(weatime_pos, 'quarter hours')

#Make some magic (get only the time relevant weather data)
weather_index=c()
for(i in 1:length(obs_start_pos)){

```

```

#tms=weatime_pos[which(weatime_pos_rd==obs_start_pos_rd[i]|weatime_pos_rd==obs_start_pos_rd[i]-15*60/
tms=weatime_pos[which(weatime_pos_rd==obs_start_pos_rd[i]|weatime_pos_rd==obs_end_pos_rd[i])]
if(length(tms)==0){
  print(i)
  weather_index[i]=0}
else{
  weather_index[i]=which(weatime_pos_rd==obs_start_pos_rd[i]|weatime_pos_rd==obs_end_pos_rd[i])[1]
}
}
weather_match=weather[weather_index,]

#check the dimention before merging
dim(weather_match)

## [1] 84 12
dim(merged)

```

```

## [1] 84 18

#ayy
#almost there
bee_data_final=cbind(merged, weather_match[,c('Temperature', 'Humidity', 'Wind','Speed','Gust', 'Pressu
bee_data_final$Start.Time=obs_start_pos
bee_data_final$End.Time=obs_end_pos
bee_data_final=bee_data_final[order(bee_data_final$Date),]

```

Include some other important data

```

#We want weather data to be numeric, it's currently a character
bee_data_final$Temperature=as.numeric(sub('%F', '', bee_data_final$Temperature))
bee_data_final$Speed=as.numeric(sub('mph', '', bee_data_final$Speed))
bee_data_final$Solar=as.numeric(sub('w/m2', '', bee_data_final$Solar))

#Is the plant clustered?
bee_data_final$Clustered=(bee_data_final$Pair==2|bee_data_final$Pair==4|bee_data_final$Pair==6|bee_data
#Is the plant in East field?
bee_data_final$East=(bee_data_final$Pair==2|bee_data_final$Pair==1|bee_data_final$Pair==7)

#Is is a hot day? (Threshold is just the mean)
bee_data_final$hotDay=bee_data_final$Temperature>mean(bee_data_final$Temperature)

```

Use the media honeybee each day as the threshold for determining whether a bee visits a certain plance

```

data_dt=split(bee_data_final, bee_data_final$Date)

##median as theshold value
theshold=c()
wholedf=data.frame()
for( i in 1:length(data_dt)){

```



```

threshold[i]=median(data_dt[[i]]$Honeybees)
data_dt[[i]]$visits=(data_dt[[i]]$Honeybees>=threshold[i])
wholedf=rbind(wholedf, data_dt[[i]])
}
#look at the thresholds
threshold

```

```
## [1] 1.5 26.0 2.5 31.5 17.5 18.5 12.5
```

```

#make these into factors
wholedf$Experiment.Week=as.factor(wholedf$Experiment.Week)
wholedf$Plant.Number=as.factor(wholedf$Plant.Number)
wholedf$Pair=as.factor(wholedf$Pair)

```

```
summary(wholedf)
```

```

##      Date      Experiment.Week      Location  Plant.Number
## 5/17/2017:12    1:12             Pair 2 Large: 7    1:54
## 5/23/2017:12    2:24             Pair 2 Small: 7    2:30
## 5/25/2017:12    3:24             Pair 4 Large: 7
## 5/30/2017:12    4:24             Pair 4 Small: 7
## 6/2/2017 :12                Pair 5 Large: 7
## 6/6/2017 :12                Pair 5 Small: 7
## 6/8/2017 :12                (Other)      :42
##      Pair      Size      Start.Time
## 2      :14    Large:42    Min.      :2017-05-17 10:55:00
## 4      :14    Small:42    1st Qu.:2017-05-23 11:31:30
## 5      :14                Median :2017-05-30 10:33:00
## 6      :14                Mean   :2017-05-29 14:25:28
## 1      :10                3rd Qu.:2017-06-06 10:58:00
## 3      :10                Max.    :2017-06-08 10:41:00
## (Other): 8
##      End.Time      Avg.open.flowers.per.inflorescence
## Min.      :2017-05-17 11:10:00    Min.      : 5.20
## 1st Qu.:2017-05-23 11:57:30    1st Qu.: 24.80
## Median :2017-05-30 10:48:00    Median : 31.50
## Mean   :2017-05-29 16:27:49    Mean   : 35.56
## 3rd Qu.:2017-06-06 11:16:00    3rd Qu.: 42.65
## Max.    :2017-06-08 10:56:00    Max.    :106.33
## NA's      :1
## Total.inflorescences Total.Flowers      Honeybees      Volume
## Min.      : 4.00      Min.      : 39.0    Min.      : 0.00    Min.      :0.1922
## 1st Qu.: 9.75      1st Qu.: 268.1    1st Qu.: 2.75    1st Qu.:0.6437
## Median :15.00      Median : 453.0    Median :12.00    Median :1.2479
## Mean   :22.04      Mean   : 936.6    Mean   :16.15    Mean   :1.2089
## 3rd Qu.:30.00      3rd Qu.:1221.2    3rd Qu.:27.00    3rd Qu.:1.5417
## Max.    :82.00      Max.    :7868.4    Max.    :56.00    Max.    :3.5125
##
##      Sugar_conc      Sugar_content      Volume_var      Sugar_conc_var
## Min.      :0.3374    Min.      :0.08187    Min.      :0.002411    Min.      :0.0003484
## 1st Qu.:0.4465      1st Qu.:0.40485      1st Qu.:0.074749      1st Qu.:0.0076453
## Median :0.5218      Median :0.57525      Median :0.330078      Median :0.0184512
## Mean   :0.5396      Mean   :0.60758      Mean   :0.438194      Mean   :0.0252469
## 3rd Qu.:0.5977      3rd Qu.:0.70422      3rd Qu.:0.705054      3rd Qu.:0.0396439

```

```

## Max. :0.9079 Max. :1.50491 Max. :1.886719 Max. :0.1146572
## NA's :3 NA's :3
## Sugar_content_var Temperature Humidity Wind
## Min. :0.003844 Min. :54.20 66% : 7 West :26
## 1st Qu.:0.033500 1st Qu.:61.50 77% : 7 WNW :17
## Median :0.048026 Median :67.00 64% : 6 SSW :15
## Mean :0.096160 Mean :68.48 72% : 5 SW :12
## 3rd Qu.:0.123057 3rd Qu.:74.70 76% : 5 NW : 6
## Max. :1.137324 Max. :91.90 89% : 5 NNW : 3
## NA's :3 (Other):49 (Other): 5
## Speed Gust Pressure Solar
## Min. :0.00 6mph :11 29.91in:12 Min. : 0.625
## 1st Qu.:1.70 9.4mph :11 30.04in:12 1st Qu.: 265.625
## Median :3.40 11.9mph:10 29.96in:10 Median : 423.125
## Mean :3.29 7.7mph : 9 29.94in: 9 Mean : 511.652
## 3rd Qu.:4.50 6.8mph : 8 29.97in: 8 3rd Qu.: 847.188
## Max. :7.70 10.2mph: 7 29.98in: 8 Max. :1026.875
## (Other):28 (Other):25
## Clustered East hotDay visits
## Mode :logical Mode :logical Mode :logical Mode :logical
## FALSE:38 FALSE:56 FALSE:46 FALSE:42
## TRUE :46 TRUE :28 TRUE :38 TRUE :42
##
##
##
##

```

```

#Export the data into csv
setwd('~/.bee/')
write.csv(wholedf, file="pollinator_visitation_fullData.csv")

```