BuckVolExplr.R

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```
library(ggplot2)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
setwd("D:/Iowa State University/Debinski Lab/Nectar data/MAL")

buckvol15 <- read.csv("nectar analysis/data files/buckvol15.csv", header = T)
buckvol16 <- read.csv("nectar analysis/data files/buckvol16.csv", header = T)
buckvolboth <- rbind(buckvol15,buckvol16)

#Data summaries

summary(buckvol15)
```

```
##          date          plot     treatment      quad         volume
##  2015-06-22: 48   WSR10  : 50   C:229     WSR10NE: 14   Min.   :0.01562
##  2015-06-23: 46   WH12   : 45   H:226     EC3NE  : 13   1st Qu.:0.21818
##  2015-06-21: 39   EH4    : 44             WHSR9SW: 13   Median :0.36364
##  2015-06-24: 39   WHSR9  : 44             EC3SW  : 12   Mean   :0.44440
##  2015-06-20: 35   EC3    : 43             EHSR1SE: 12   3rd Qu.:0.54545
##  2015-06-30: 34   CH5    : 40             WH12NW : 12   Max.   :3.03125
##  (Other)   :214   (Other):189             (Other):379
```

```
summary(buckvol16)
```

```
##          date          plot     treatment      quad         volume
##  2016-06-23:65   WSR10  : 51   C:190     EHSR1SW: 14   Min.   :0.01515
##  2016-06-24:70   WHSR9  : 45   H:186     WSR10NW: 14   1st Qu.:0.04545
##  2016-06-25:58   WH12   : 43             WSR10SE: 14   Median :0.07576
##  2016-06-26:52   CC6    : 40             WSR10NE: 13   Mean   :0.08464
##  2016-06-27:56   CH5    : 30             CC6NW  : 12   3rd Qu.:0.10985
##  2016-06-29:53   CSR7   : 30             CSR7SW : 12   Max.   :0.43939
##  2016-06-30:22   (Other):137             (Other):297
```

```
summary(buckvolboth)
```

```
##          date          plot     treatment      quad         volume
##  2016-06-24: 70   WSR10  :101   C:419     WSR10NE: 27   Min.   :0.01515
##  2016-06-23: 65   WHSR9  : 89   H:412     WSR10NW: 26   1st Qu.:0.07576
##  2016-06-25: 58   WH12   : 88             WSR10SE: 26   Median :0.16364
##  2016-06-27: 56   CC6    : 76             EHSR1SW: 23   Mean   :0.28162
##  2016-06-29: 53   CH5    : 70             ESR2NE : 23   3rd Qu.:0.38182
##  2016-06-26: 52   EH4    : 69             WH12NW : 23   Max.   :3.03125
##  (Other)   :477   (Other):338             (Other):683
```

```
summarize(group_by(buckvol15, treatment), meanVol = mean(volume), sdVolume = sd(volume))
```

```
## Source: local data frame [2 x 3]
##
##   treatment   meanVol  sdVolume
##      (fctr)     (dbl)     (dbl)
## 1         C 0.5224432 0.4286155
## 2         H 0.3653227 0.3151584
```

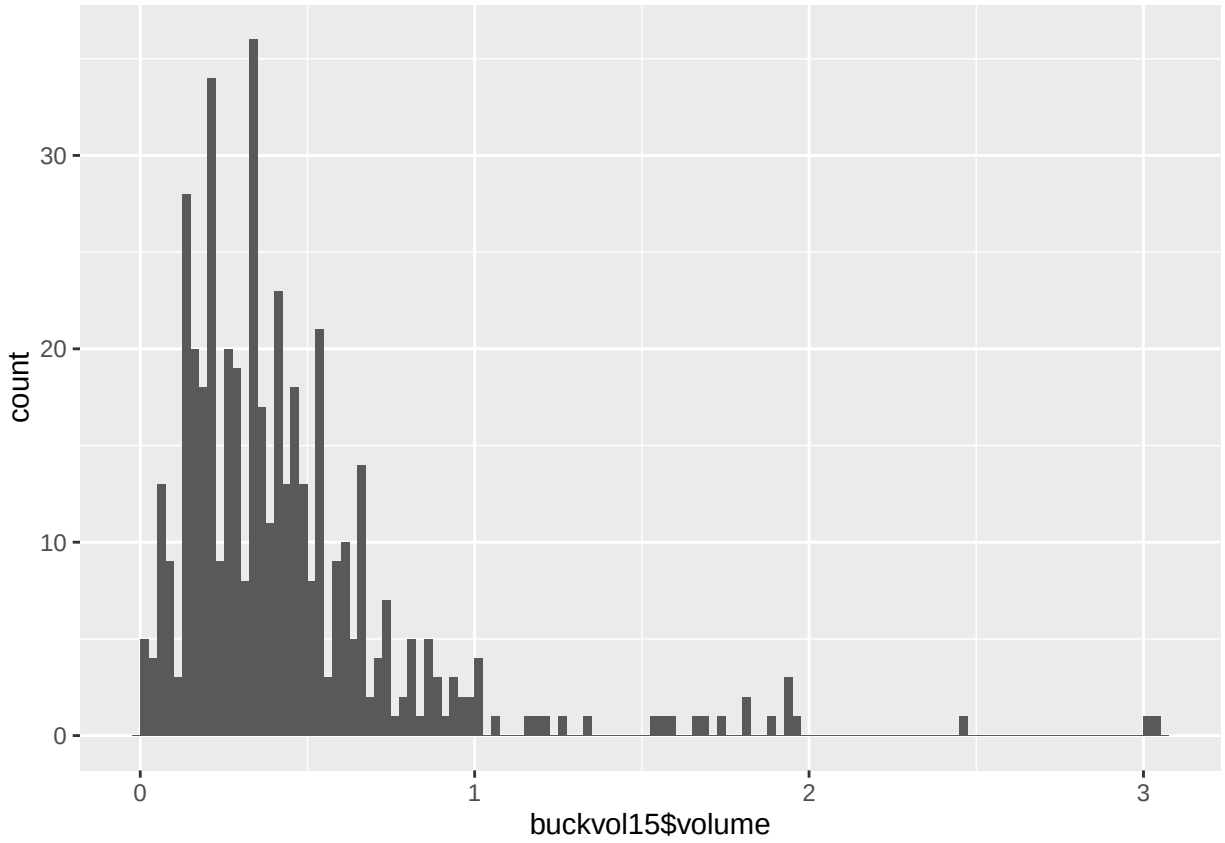
```
summarize(group_by(buckvol16, treatment), meanVol = mean(volume), sdVolume = sd(volume))
```

```
## Source: local data frame [2 x 3]
##
##   treatment    meanVol   sdVolume
##      (fctr)      (dbl)      (dbl)
## 1         C 0.08847687 0.06126738
## 2         H 0.08072662 0.04864575
```

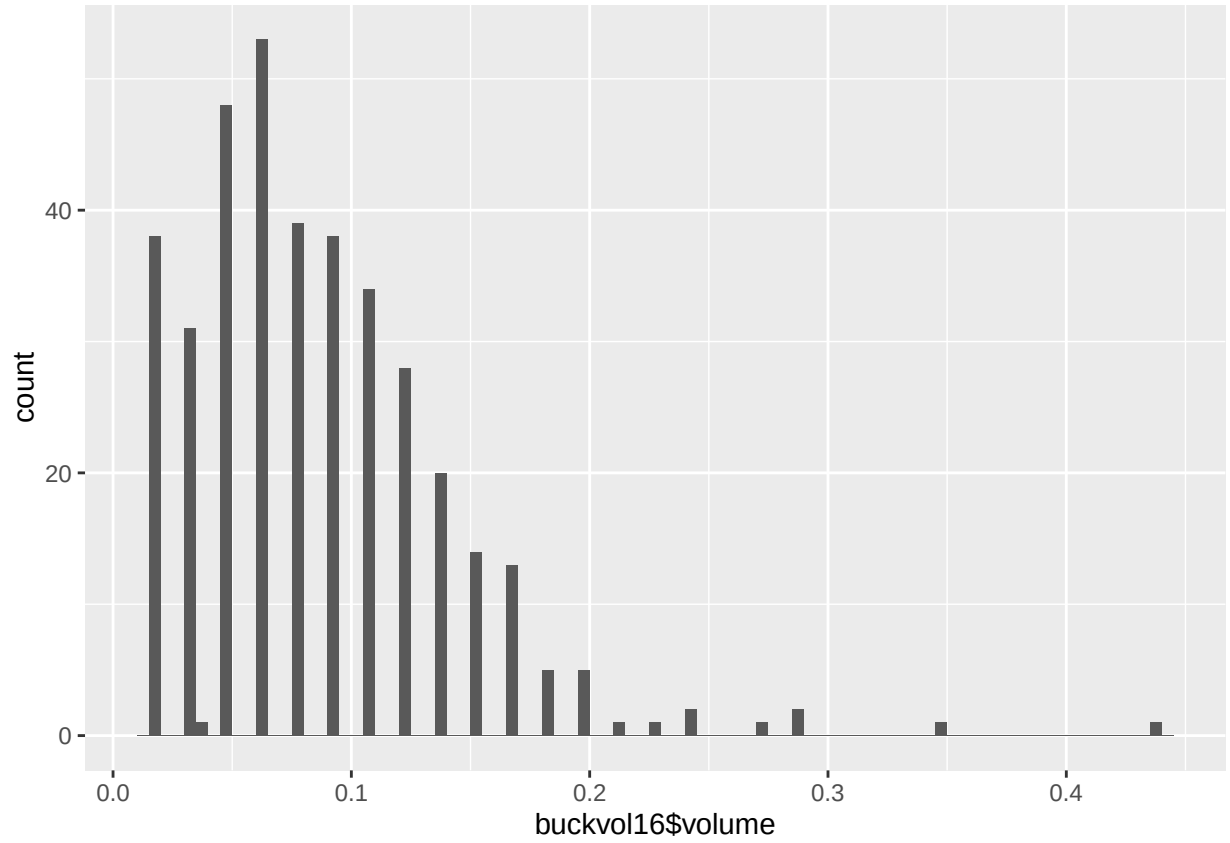
```
summarize(group_by(buckvolboth, treatment), meanVol = mean(volume), sdVolume = sd(volume))
```

```
## Source: local data frame [2 x 3]
##
##   treatment   meanVol  sdVolume
##      (fctr)     (dbl)     (dbl)
## 1         C 0.3256566 0.3856019
## 2         H 0.2368400 0.2748577
```

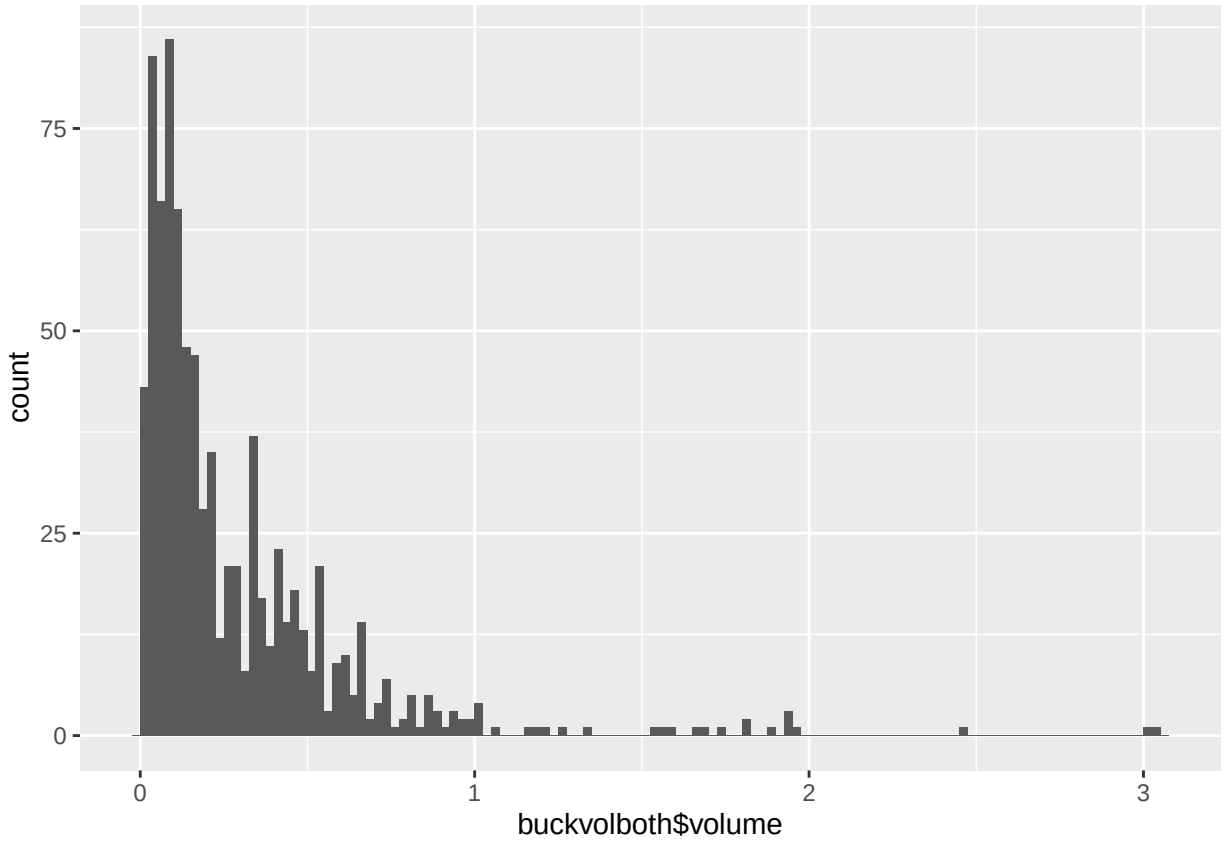
```
qplot(buckvol15$volume, binwidth = .025)
```



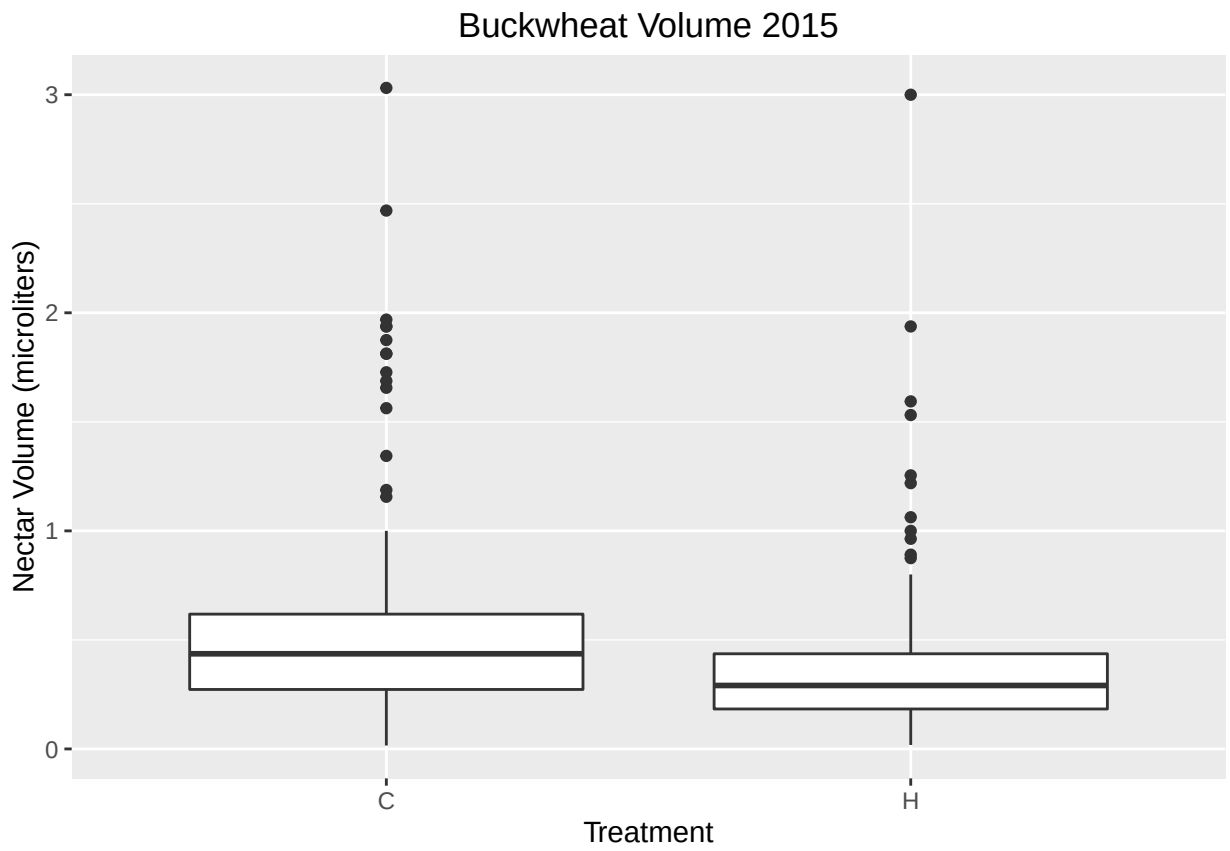

```
qplot(buckvol16$volume, binwidth = .005)
```



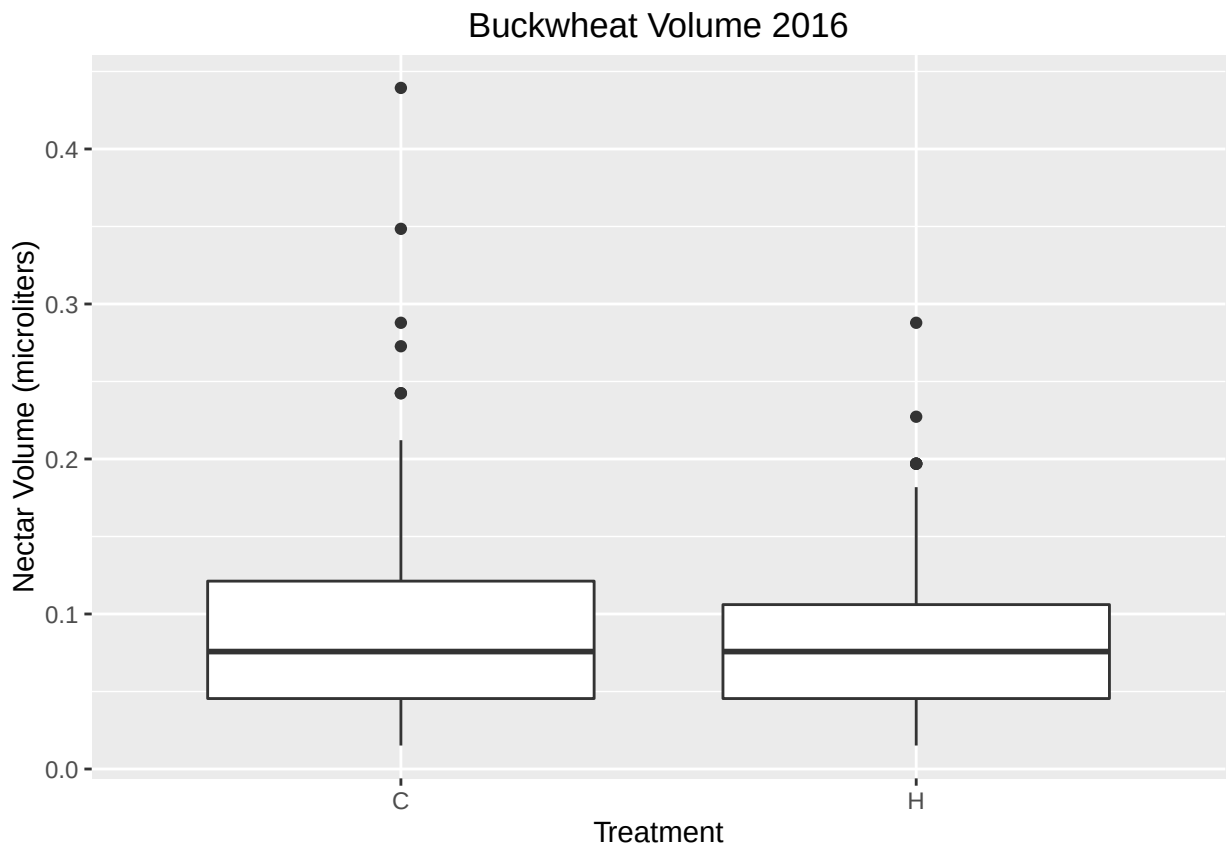

```
qplot(buckvolboth$volume, binwidth = .025)
```



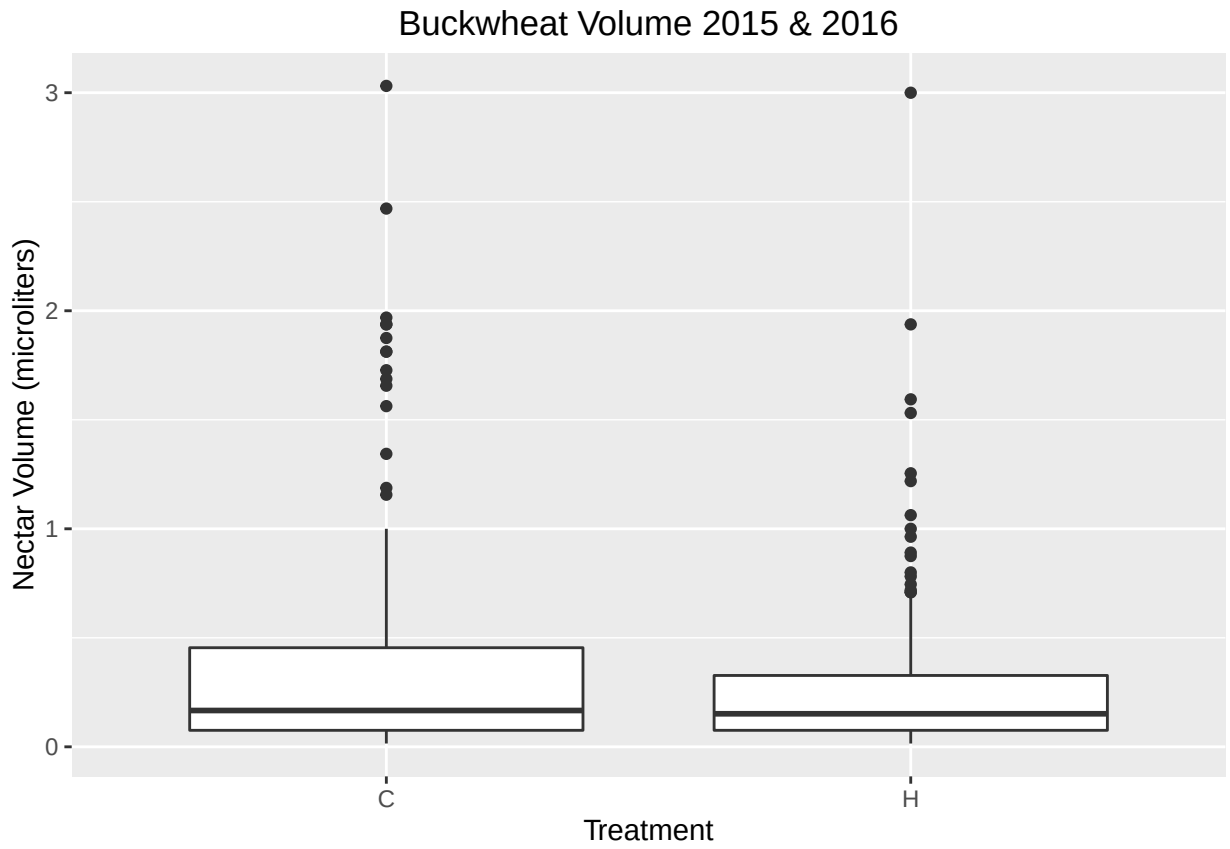

```
ggplot(buckvol15, aes(x=treatment, y=volume)) + geom_boxplot() +
  xlab("Treatment") +
  ylab("Nectar Volume (microliters)") + ggtitle("Buckwheat Volume 2015")
```




```
ggplot(buckvol16, aes(x=treatment, y=volume)) + geom_boxplot() +
  xlab("Treatment") +
  ylab("Nectar Volume (microliters)") + ggtitle("Buckwheat Volume 2016")
```




```
ggplot(buckvolboth, aes(x=treatment, y=volume)) + geom_boxplot() +
  xlab("Treatment") +
  ylab("Nectar Volume (microliters)") + ggtitle("Buckwheat Volume 2015 & 2016")
```




```
# Homoscedastic?

var15C <- sd(buckvol15$volume[buckvol15$treatment=="C"])^2
var15H <- sd(buckvol15$volume[buckvol15$treatment=="H"])^2
ratio15 <- var15C/var15H
ratio15
```

```
## [1] 1.849601
```

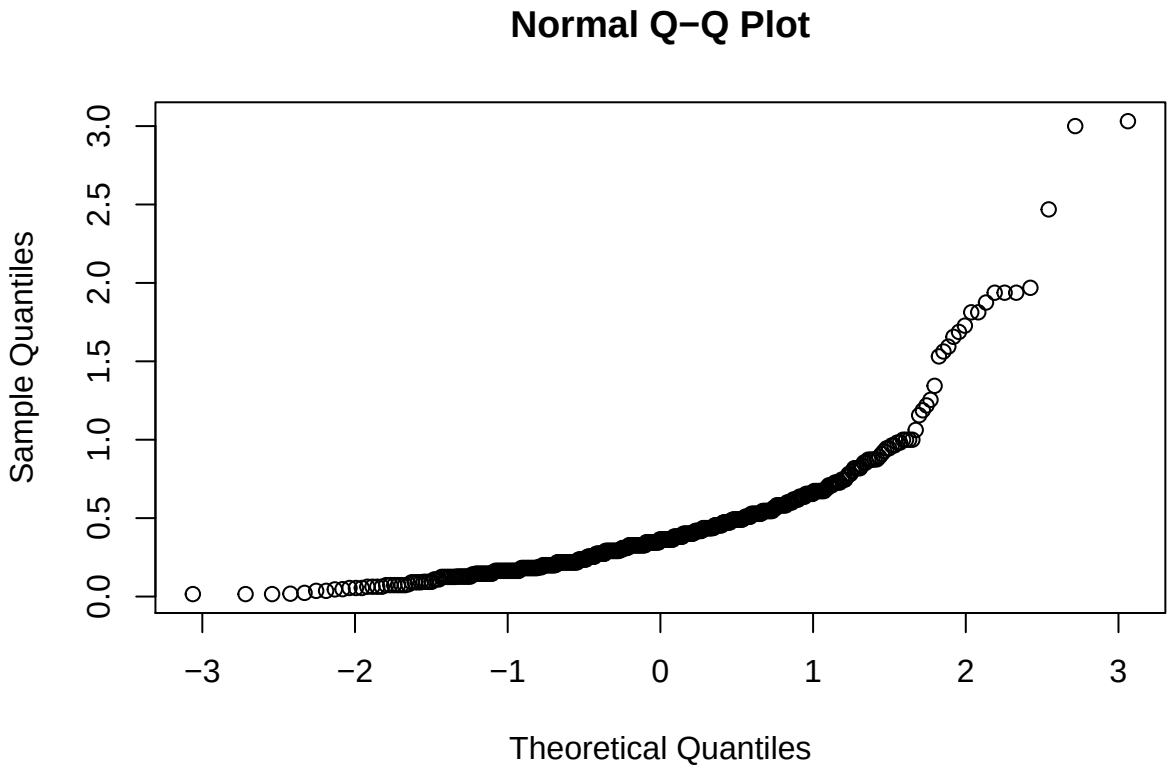
```
var16C <- sd(buckvol16$volume[buckvol16$treatment=="C"])^2
var16H <- sd(buckvol16$volume[buckvol16$treatment=="H"])^2
ratio16 <- var16C/var16H
ratio16
```

```
## [1] 1.586239
```

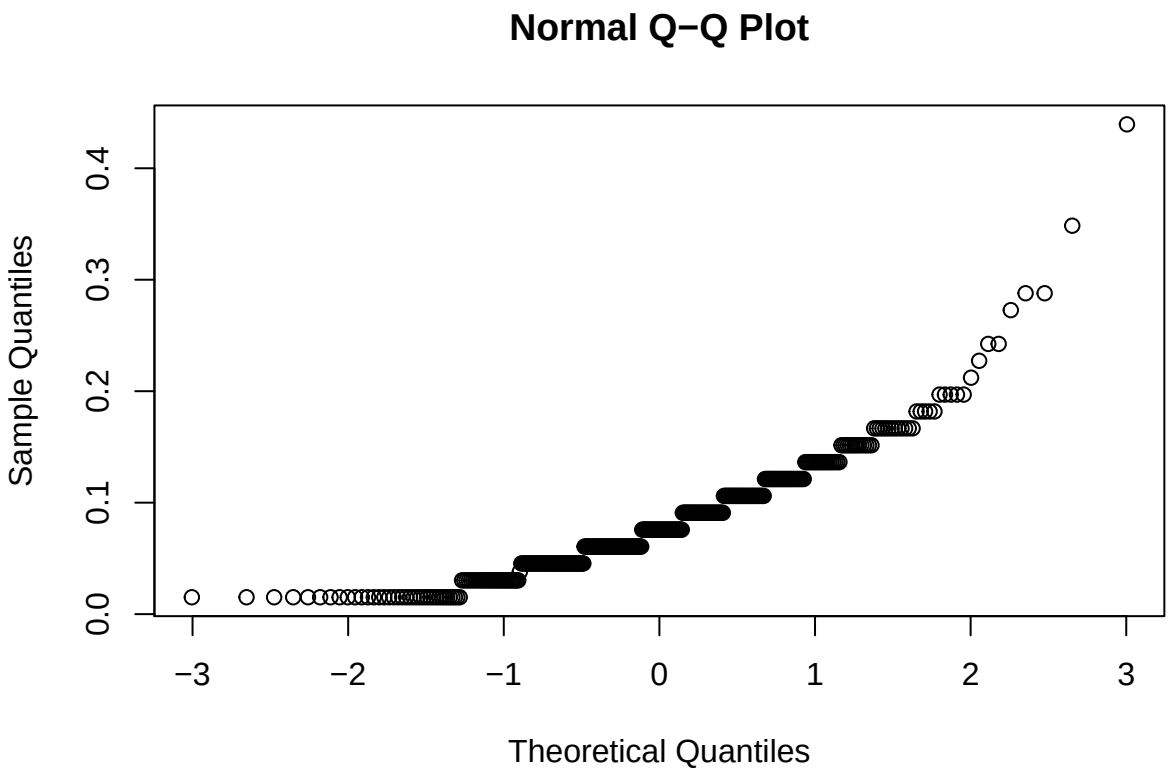
```
varbothC <- sd(buckvolboth$volume[buckvolboth$treatment=="C"])^2
varbothH <- sd(buckvolboth$volume[buckvolboth$treatment=="H"])^2
ratioboth <- varbothC/varbothH
ratioboth
```

```
## [1] 1.96817
```

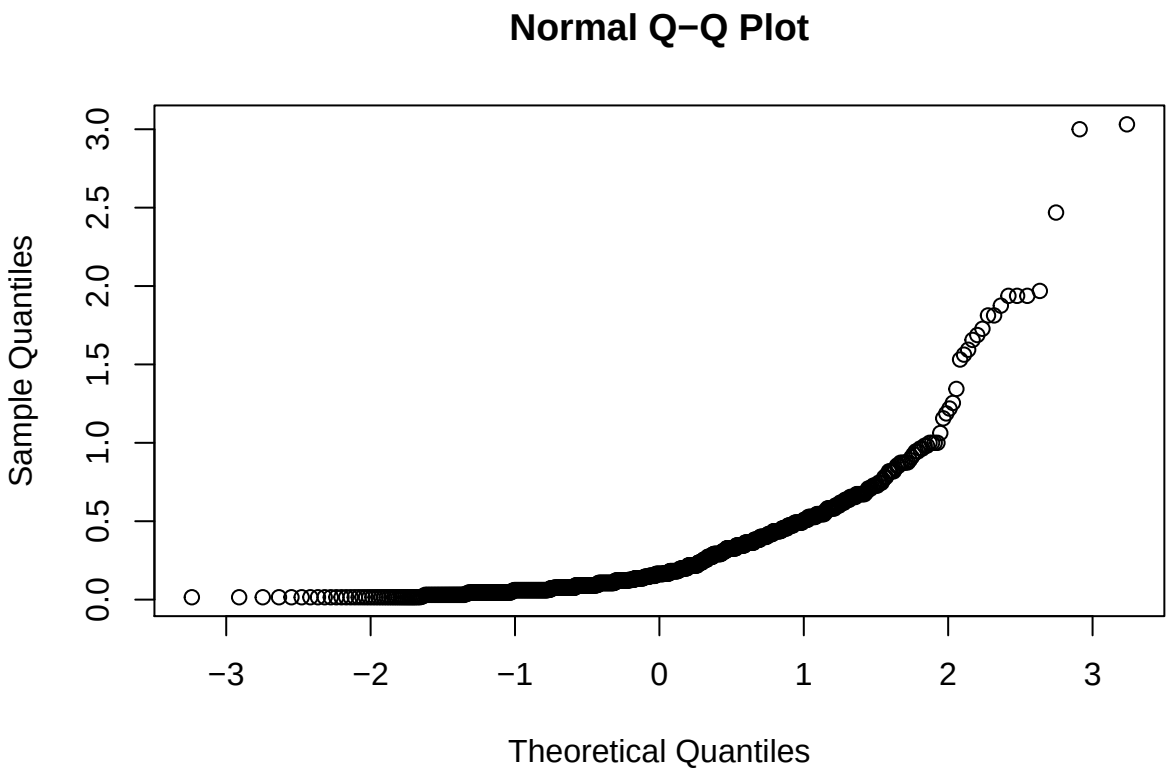
```r
# Q-Q plots

qqnorm(buckvol15$volume)
```




```r
qqnorm(buckvol16$volume)
```




```
qqnorm(buckvolboth$volume)
```


Normal Q−Q Plot
Sample Quantiles
0.0
0.5
1.0
1.5
2.0
2.5
3.0
−3
−2
−1
0
1
2
3
Theoretical Quantiles