SAS code and R scripts

1. Example SAS code for analyzing the yield data set in 2006 (L. Zheng and L. Murray)

```
OPTIONS NODATE pageno=1;
data one;
input age farm $ trt $ crop $ rep1yld rep2yld rep3yld @@;
LINES;
1       Alex    2d      d       1383.76 1093.73 1235.5
1       Alex    3u      u       1810    1600    1383.76
1       Alex    4d      d       1482.6  1660.22 988.4
1       Alex    4u      u       1548.493333     1274.266667     1089.833333
1       Alex    5d      d       1220.75 1074.25 1482.6
1       Alex    5u      u       1976.8  1449.653333     1845.133333
1       Alex    5m      m       30      40      50
1       Alex    6d      d       2316    1889.17 1768.5
1       Alex    6u      u       2767.52 2148.52 1747.26
1       Alex    6m      m       25      43.75   62.5
1       Alex    7d      d       1482.6  1220.75 1105.3125
1       Alex    7u      u       1750    1304.325        1267.7325
1       Alex    7m      m       60      50      75
1       Alex    8m      m       85      55      90
1       Edwin   2d      d       643.21  297.29  981.885
1       Edwin   3u      u       293.1   695.056 961.368
1       Edwin   4d      d       566.9375        240     549.5625
1       Edwin   4u      u       655.425 291.3   1018.746667
1       Edwin   5d      d       839.125 1198.75 536.065
1       Edwin   5u      u       867.4333333     776.8   663.5166667
1       Edwin   5m      m       280     230     360
1       Edwin   6d      d       642.2   503.48  271.88
1       Edwin   6u      u       926.4   683.9   390.8
1       Edwin   6m      m       193.75  106.25  6.25
1       Edwin   7d      d       728.25  50.9775 928.15
1       Edwin   7u      u       587.3875        424.8125        687.5
1       Edwin   7m      m       25      40      25
1       Edwin   8m      m       15      230     10
1       Rodolfo 2d      d       53.735  185.63  117.24
1       Rodolfo 3u      u       83.045  174.78  146.55
1       Rodolfo 4d      d       293.1   91.39   512.925
1       Rodolfo 4u      u       154.6916667     73.275  24.425
1       Rodolfo 5d      d       92.815  146.55  97.7
1       Rodolfo 5u      u       293.1   254.02  65.13333333
1       Rodolfo 5m      m       360     330     340
1       Rodolfo 6d      d       244.25  537.35  195.4
1       Rodolfo 6u      u       242.75  310.72  386
1       Rodolfo 6m      m       287.5   275     375
1       Rodolfo 7d      d       61.75   22.23   135.85
1       Rodolfo 7u      u       241.25  84.9625 145.65
1       Rodolfo 7m      m       400     490     700
1       Rodolfo 8m      m       385     285     320
3       Wilson  2d      d       137.137 236.873 274.593
3       Wilson  3u      u       507.832 308.1   355.5
3       Wilson  4d      d       524.9225        135.905 206.275
3       Wilson  4u      u       794.1666667     582.2166667     407.575
3       Wilson  5d      d       248.575 151.375 303.975
3       Wilson  5u      u       894.2333333     431.55  566.24
3       Wilson  5m      m       .       .       .
3       Wilson  6d      d       485.35  1025.43 197.68
3       Wilson  6u      u       627.25  1844.33 494.2
3       Wilson  6m      m       .       .       .
3       Wilson  7d      d       320.33  74.3225 257.4
3       Wilson  7u      u       1119.775        458.63  559.8875
3       Wilson  7m      m       .       .       .
3       Wilson  8m      m       .       .       .
3       Arsenia 2d      d       469.26  391.483 377.412
3       Arsenia 3u      u       536.777 526.219 446.034
3       Arsenia 4d      d       263.725 353.6725        133.47
3       Arsenia 4u      u       514.8   667.2116667     273.475
3       Arsenia 5d      d       427.11  576.105 671.24
```

```
3       Arsenia 5u      u       617.76  703.2666667     1078.236667
3       Arsenia 5m      m       245     291.6   280
3       Arsenia 6d      d       294.32  899.97  497.88
3       Arsenia 6u      u       637.06  1179.23 360.58
3       Arsenia 6m      m       226     291.625 255.25
3       Arsenia 7d      d       222.5325        326.155 495.0825
3       Arsenia 7u      u       600.3075        589.615 426.1725
3       Arsenia 7m      m       437.5   495.5   466.5
3       Arsenia 8m      m       262.5   309.2   268.3
3       Sim     2d      d       119.922 343.65  416.938
3       Sim     3u      u       428.85  795.97  665.85
3       Sim     4d      d       500.325 457.44  471.735
3       Sim     4u      u       543.4333333     397.0833333     577.0666667
3       Sim     5d      d       1014.36 524.15  655.185
3       Sim     5u      u       540.7   559.4166667     637.6666667
3       Sim     5m      m       150     160     140
3       Sim     6d      d       600.32  628.98  711.89
3       Sim     6u      u       383.6   767.2   815.16
3       Sim     6m      m       125     162.5   162.5
3       Sim     7d      d       398.16  286.77  350.2275
3       Sim     7u      u       603.125 721.3   455.525
3       Sim     7m      m       375     250     250
3       Sim     8m      m       150     200     140
;

PROC PRINT data=one;
 TITLE 'Yield 2006 DATA';
 RUN;

 data two; set one;
 rep = 1; yield =rep1yld; output;
 rep = 2; yield =rep2yld; output;
 rep = 3; yield =rep3yld; output;
 run;
proc print data=two;
 run;

/*Dinorado data*/
proc mixed data = two covtest cl;
 where crop = 'd';
 class age farm rep trt;
 model yield = trt age trt*age/ddfm=satterth outp=newd;
 random farm(age) rep(farm age) trt*farm(age);
 lsmeans age trt age*trt/cl;
 lsmeans trt/diff adjust=TUKEY;
 lsmeans age*trt/diff slice=age;
 run;

proc print data=newd;
 run;
 proc univariate normal plot data=newd;
 var resid;
 run;

/*UPL Ri-5 data*/
proc mixed data = two covtest cl;
 where crop = 'u';
 class age farm rep trt;
 model yield = trt age trt*age/ddfm=satterth outp=newu;
 random farm(age) rep(farm age) trt*farm(age);
 lsmeans age trt age*trt/cl;
 lsmeans trt/diff adjust=TUKEY;
 lsmeans age*trt/diff slice=age;
 run;

proc print data=newu;
 run;
proc univariate normal plot data=newu;
 var resid;
 run;
```

```
/*Mungbean data*/
proc mixed data = two covtest cl;
 where crop = 'm';
 class age farm rep trt;
 model yield = trt age trt*age/ddfm=satterth outp=newm;
 random farm(age) rep(farm age) trt*farm(age);
 lsmeans age trt age*trt/cl;
 lsmeans trt/diff adjust=TUKEY;
 lsmeans age*trt/diff slice=age;
 run;

proc print data=newm;
 run;

proc univariate normal plot data=newm;
 var resid;
 run;

proc glimmix data = two;
 where crop = 'm';
 class age farm rep trt;
 model yield  = trt age trt*age/dist=gamma link=log ddfm=satterth;
 random farm(age) rep(farm age) trt*farm(age);
 lsmeans age trt age*trt/cl ilink;
 lsmeans trt/diff adjust=TUKEY ilink;
 lsmeans age*trt/diff slice=age ilink;
 run;
```

2. Example SAS code for analyzing the yield data set in 2007-2008 (L. Zheng and L. Murray)

```
OPTIONS NODATE pageno=1;
data one;
input year $ age farm $ trt $ crop $ rep1yld rep2yld rep3yld @@;
LINES;
2007   1      Naje   2d     d      1055.5058      1141.0853      256.9767
2007   1      Naje   3u     u      1469.186       1780.4651      1865.3876
2007   1      Naje   4d     d      751.4535       1095.7365      188.88075
2007   1      Naje   4u     u      1508.436667    1936.175667    1296.673167
2007   1      Naje   5d     d      737.5   5734.399       225.349
2007   1      Naje   5u     u      1894.38 2096.124       1149.483333
2007   1      Naje   5m     m      400     276     300
2007   1      Naje   6d     d      250.194 250     1751.163
2007   1      Naje   6u     u      301.163 452.965 2777.209
2007   1      Naje   6m     m      250     512.5   162.5
2007   1      Naje   7d     d      318.5755       274.254 819.88375
2007   1      Naje   7u     u      1363.80825     1377.20925     2472.07375
2007   1      Naje   7m     m      250     650     350
2007   1      Naje   8m     m      340     340     120
2007   1.5    Sabang 2d     d      755.814 756.7209       1092.3333
2007   1.5    Sabang 3u     u      1046.7752      970.8837       1065.438
2007   1.5    Sabang 4d     d      634.88375      732.55825      1295.72675
2007   1.5    Sabang 4u     u      1134.257167    1239.341167    1167.907
2007   1.5    Sabang 5d     d      879.7675       523.9825       1085.93
2007   1.5    Sabang 5u     u      1373.953333    247.8683333    556.124
2007   1.5    Sabang 5m     m      430     435     480
2007   1.5    Sabang 6d     d      589.767 1087.636       1169.302
2007   1.5    Sabang 6u     u      1368.527       1581.395       1910.31
2007   1.5    Sabang 6m     m      343.75  375     412.5
2007   1.5    Sabang 7d     d      1004.92725     756.376 1277.3255
2007   1.5    Sabang 7u     u      602.79075      1635.06975     1761.24025
2007   1.5    Sabang 7m     m      550     650     500
2007   1.5    Sabang 8m     m      335     320     310
2007   2      Dorolu 2d     d      382.6357       120.5426       72.7035
2007   2      Dorolu 3u     u      593.0233       119.8643       578.1395
2007   2      Dorolu 4d     d      359.73825      62.03975       72.965
2007   2      Dorolu 4u     u      402.6163333    238.8566667    321.7055
2007   2      Dorolu 5d     d      145.349 48.314  365.5525
2007   2      Dorolu 5u     u      727.3256667    79.45733333    670.6976667
2007   2      Dorolu 5m     m      525.4   551     470.2
```

```
2007    2       Dorolu  6d      d       240.504 199.845 294.186
2007    2       Dorolu  6u      u       290.698 239.147 343.624
2007    2       Dorolu  6m      m       323.5   399.125 427.75
2007    2       Dorolu  7d      d       301.841 60.80425        239.24425
2007    2       Dorolu  7u      u       541.13375       122.19  511.36625
2007    2       Dorolu  7m      m       441.5   605     467.5
2007    2       Dorolu  8m      m       448.4   460     223.3
2008    2       Naje    2d      d       1080.9302       1008.8682       833.8605
2008    2       Naje    3u      u       1174.5155       1480.9109       919.186
2008    2       Naje    4d      d       1078.89525      899.0795        1181.64725
2008    2       Naje    4u      u       881.671 1000.3575       881.671
2008    2       Naje    5d      d       1281.815        1845.814        1127.9975
2008    2       Naje    5u      u       848.4066667     1357.450333     1153.833
2008    2       Naje    5m      m       340     330     240
2008    2       Naje    6d      d       1744.587        1231.473        1641.964
2008    2       Naje    6u      u       1729.432        1831.163        1831.163
2008    2       Naje    6m      m       287.5   362.5   312.5
2008    2       Naje    7d      d       1233.6435       719.62525       771.02725
2008    2       Naje    7u      u       1278.26225      1227.13175      945.914
2008    2       Naje    7m      m       375     400     450
2008    2       Naje    8m      m       320     400     300
2008    2.5     Sabang  2d      d       573.4612        427.5807        578.4916
2008    2.5     Sabang  3u      u       837.4806        725.1357        919.186
2008    2.5     Sabang  4d      d       604.2635        377.66475       478.37525
2008    2.5     Sabang  4u      u       851.3135        612.9456667     715.1033333
2008    2.5     Sabang  5d      d       608.9145        837.258 507.429
2008    2.5     Sabang  5u      u       853.5746667     1195.004333     1177.932667
2008    2.5     Sabang  5m      m       420     380     240
2008    2.5     Sabang  6d      d       661.001 762.694 661.001
2008    2.5     Sabang  6u      u       1524.419        1422.791        1676.86
2008    2.5     Sabang  6m      m       287.5   325     400
2008    2.5     Sabang  7d      d       662.597 611.628 229.3605
2008    2.5     Sabang  7u      u       855.67825       970.62025       881.221
2008    2.5     Sabang  7m      m       300     200     350
2008    2.5     Sabang  8m      m       340     300     330
2008    3       Dorolu  2d      d       767.2661        888.4134        757.1705
2008    3       Dorolu  3u      u       855.5194        1211.9858       1344.3876
2008    3       Dorolu  4d      d       666.00925       452.38375       816.804
2008    3       Dorolu  4u      u       943.1653333     883.6865        679.7588333
2008    3       Dorolu  5d      d       758.527 1719.328        910.2325
2008    3       Dorolu  5u      u       1184.001        1353.144        879.5433333
2008    3       Dorolu  5m      m       460     440     420
2008    3       Dorolu  6d      d       503.23  1006.46 1761.305
2008    3       Dorolu  6u      u       509.819 1223.566        1529.457
2008    3       Dorolu  6m      m       337.5   287.5   450
2008    3       Dorolu  7d      d       1112.36425      606.74425       581.46325
2008    3       Dorolu  7u      u       1195.79775      636.06275       788.71775
2008    3       Dorolu  7m      m       300     400     500
2008    3       Dorolu  8m      m       440     400     880

;

PROC PRINT data=one;
 TITLE 'Yield 2007 and 2008 DATA';
 RUN;

 data two; set one;
 rep = 1; yield =rep1yld; output;
 rep = 2; yield =rep2yld; output;
 rep = 3; yield =rep3yld; output;
 run;
 proc print data=two;
 run;

/*Dinorado data*/
proc mixed  data=two covtest cl;
 where crop = 'd';
 class year farm rep trt;
 model yield = trt year trt*year/ddfm=satterth outp=newd;
 random farm rep(farm) trt*farm trt*rep(farm) year*farm year*rep(farm)
        year*trt*farm;
```

```
 lsmeans year trt year*trt/cl;
 lsmeans trt/diff adjust=TUKEY;
 LSMEANS year*trt/diff slice=year adjust=TUKEY;
 run;

proc print data=newd;
 run;

proc univariate normal plot data=newd;
 var resid;
 run;

/*UPL Ri-5 data*/
proc mixed data=two covtest cl;
 where crop = 'u';
 class year farm rep trt;
 model yield = trt year trt*year/ddfm=satterth outp=newu;
 random farm rep(farm) trt*farm trt*rep(farm) year*farm year*rep(farm)
        year*trt*farm;
 lsmeans year trt year*trt/cl;
 lsmeans trt/diff adjust=TUKEY;
 LSMEANS year*trt/diff slice=year adjust=TUKEY;
 run;
proc univariate normal plot data=newu;
 var resid;
 run;

/*Mungbean data*/
proc mixed data=two covtest cl;
 where crop = 'm';
 class year farm rep trt;
 model yield = trt year trt*year/ddfm=satterth outp=newm;
 random farm rep(farm) trt*farm trt*rep(farm) year*farm year*rep(farm)
        year*trt*farm;
 lsmeans year trt year*trt/cl;
 lsmeans trt/diff adjust=TUKEY;
 LSMEANS year*trt/diff slice=year adjust=TUKEY;
 run;
```

3. R scripts for Figure 2 (L. Zheng)

```
dat1=read.csv("C:/1.Dat2006yield.per.row_formatted.csv")
dat2=read.csv("C:/1.Dat.0708yield.per.row_formatted.csv")
colnames(dat1)
colnames(dat2)
dat = data.frame(rbind(dat1,dat2))

years = c(2006, 2007, 2008)
Dina=c("2d","4d", "5d", "6d","7d")
UPL=c("3u", "4u", "5u", "6u", "7u")
MB=c("8m", "5m","6m","7m")
trts=c(Dina, UPL, MB)

## put all the yield values in a list because the length of yield in 2006,
## 2007 and 2008 differ.

listd=list()
for(i in 1:length(trts)){#length(trts).
   for (j in 1:length(years)){
   dats1=dat[dat$year==years[j]&dat$trt==trts[i],][,6:8]
   datr1 = list(c(apply(dats1,2,as.numeric)))
   listd=c(listd,datr1)
   }
}

listd[[8]][4]<-523
# replaces a big outlier 5734.4 in 5d 2007 using the adjacent value 523.
```

```
p=c(1,4,7,10,13)
b=numeric()
for(i in p){
s=c(i-0.50, i, i+0.50)
b=c(b,s)
}
b

par(mar=c(2.4,4.1,1.8,0.8), oma=c(0,0,3,0))
m <- rbind(1,2,3)
layout(m, width = c(4.6,1.4))
layout.show(3)

plot(seq(0,14,by = (14/(2500 - 1))),1:2500,axes=FALSE, type="n",
xaxt='n',yaxt='n',xlab="",ylab="Yield(g/row)")
axis(2, tck = 1,las=1, col = "grey", lty = "dotted",lwd=0.05)
boxplot(listd[c(1:6,13:15,7:12)], add=TRUE,xlim=c(0,14),boxwex=0.30,
col=c(grey(c(0.12,1.24,2.6)/3)),at = b,medcol=c("white"),axes=FALSE)
box()
axis(side=1,at=p,labels=c("monoculture", "RM", "0.2MB","0.5MB", "0.8MB"))
legend("topleft",c("Dinorado"),cex=1)
legend("top", legend=c("2006","2007","2008"),fill=c(grey(c(0.12,1.24,2.6)/3)),ncol=3, bty="n");

plot(seq(0,14,by = (14/(2800 - 1))),1:2800,axes=FALSE, type="n",
xaxt='n',yaxt='n',xlab="",ylab="Yield(g/row)")
axis(2, tck = 1,las=1, col = "grey", lty = "dotted",lwd=0.05)
boxplot(listd[c(16:21,28:30,22:27)],add=TRUE,xlim=c(0,14),col=c(grey(c(0.12,1.24,2.6)/3)),
boxwex=0.30, at = b, medcol=c("white"), axes=FALSE)
box()
axis(side=1,at=p,labels=c("monoculture", "RM","0.2MB", "0.5MB", "0.8MB"))
legend("topleft",c("UPL Ri-5"),cex=1)

plot(seq(0,14,by = (14/(900 - 1))),1:900,axes=FALSE, type="n",
xaxt='n',yaxt='n',xlab="",ylab="Yield(g/row)")
axis(2, tck = 1,las=1, col = "grey", lty = "dotted",lwd=0.05)
boxplot(listd[c(31:33,40:42,34:39)], add=TRUE,xlim=c(0,14), boxwex=0.30,
col=c(grey(c(0.12,1.24,2.6)/3)),at = b[1:12], axes=FALSE, medcol=c("white"))
box()
axis(side=1,at=p[1:4],labels=c("monoculture","0.2MB","0.5MB", "0.8MB"))
legend("topleft",c("Mung Bean"),cex=1)
```

4. R scripts for Figure 3 (L. Zheng)

```
dat1=read.csv("F:/2.Dat.LER2006_formatted for reps.csv")
dat2=read.csv("F:/2.Dat.LER20078_formatted for reps.csv")
colnames(dat1)
colnames(dat2)
dat = data.frame(rbind(dat1,dat2))

years = c(2006, 2007, 2008) # new variable.
trts=c(4, 5, 6, 7)# new variable.

listd=list()
for(i in 1:length(trts)){#length(trts).
   for (j in 1:length(years)){
   dats1=dat[dat$year==years[j]&dat$trt==trts[i],][,5:7]
   datr1 = list(c(apply(dats1,2,as.numeric)))
   listd=c(listd,datr1)
   }
}

# Reorder the list according to the treatment in Table 2.

listd=listd[c(1:3,10:12,4:9)]

p=c(1,4,7,10) # the centers of box plots for each year.
b=numeric()
for(i in p){
s=c(i-0.50, i, i+0.50)
b=c(b,s)
```

```
}
b


## box plots.

plot(seq(0,13,by = (13/(3.5 - 0))),0:3.5,ylim=c(0,3.5),axes=FALSE, type="n",
xaxt='n',yaxt='n',xlab="",ylab="")
axis(2, tck = 1,las=1, col = "grey", lty = "dotted",lwd=0.05)
boxplot(listd, add=TRUE, xlim=c(0,12),ylim=c(0,3.5),col=c(grey(c(0.12,1.24,2.6)/3)), boxwex=0.30,
at = b, axes=FALSE, medcol=c("white"),ylab="LER", xlab="The mixtures",main=" ")
box()
axis(side=1,at=p,labels=c("RM", "0.2MB","0.5MB", "0.8MB"))
legend("topright",c("2006","2007","2008"),fill=c(grey(c(0.12,1.24,2.6)/3)),cex=0.6)
```

5. R scripts for Figure S3 (L. Zheng)

```
dat1=read.csv("F:/1.Dat2006yield.per.row_formatted.csv")
dat2=read.csv("F:/1.Dat.0708yield.per.row_formatted.csv")
colnames(dat1)
colnames(dat2)
dat = data.frame(rbind(dat1,dat2))
years = c(2006, 2007, 2008)
Dina=c("2d","4d", "5d", "6d","7d")
UPL=c("3u", "4u", "5u", "6u", "7u")
MB=c("8m", "5m","6m","7m")
trts=c(Dina, UPL, MB)
tt=rep(trts,c(rep(3,length(trts))))
year=rep(years,length(trts))

mean.s=numeric()
ses=numeric()
size=numeric()
for(i in 1:length(trts)){#length(trts)
   for (j in 1:length(years)){#length(years)
   dats=dat[dat$year==years[j]&dat$trt==trts[i],][,6:8]
   datr = apply(dats,2,as.numeric)
   means = mean(c(datr),na.rm=T)
   se = sd(c(datr),na.rm=T)
   mean.s=c(mean.s,means)
   ses=c(ses, se)
   size = c(size, length(c(datr))-sum(is.na(datr)))
}
}
mean.s
ses
size

se=ses/sqrt(size)

ll = mean.s-1.96*ses/sqrt(size)
ul = mean.s+1.96*ses/sqrt(size)

mat=data.frame(tt,year, round(cbind(mean.s,se),3), ll, ul)

mat.d=mat[c(1:6,13:15,7:12),]  # CI data for Dinarado.
mat.u=mat[16:30,]  # CI data for UPL.
mat.u=mat.u[c(1:6,13:15,7:12),]
mat.m=mat[-c(1:30),] # CI data for Mung bean.
mat.m=mat.m[c(1:3,10:12,4:9),]

mat.u$tt=rep(c("Monoculture", "RM", "0.2MB","0.5MB","0.8MB"),c(rep(3,5)))
mat.d$tt=rep(c("Monoculture", "RM", "0.2MB","0.5MB","0.8MB"),c(rep(3,5)))
mat.m$tt=rep(c("Monoculture", "0.2MB","0.5MB","0.8MB"),c(rep(3,4)))

mat=rbind(mat.d,mat.u,mat.m)

## 95% CI Plot for yield 2006, 2007 and 2008

x=numeric()
```

```
for(i in 1:5){
xs=c(i-0.15, i, i+0.15)
x=c(x,xs)
}
x

library(plotrix)

par(mar=c(2.4,4.1,1.8,0.8), oma=c(0,0,3,0))
m <- rbind(1,2,3)
layout(m, width = c(4.6,1.4))
layout.show(3)

## plots for Dinorado.
md=matrix(mat.d$mean.s,ncol=5,nrow=3)
rownames(md)=c("2006","2007","2008")
colnames(md)=c("Monoculture","RM","0.2MB","0.5MB","0.8MB")
xs=matrix(x,ncol=5, nrow=3)

suppressWarnings(with(mat.d,
                      plotCI(x,mean.s,2*se,
                             col=as.numeric(year)+20,xlab="", main="",
                             lwd=2,ylab="Mean Yield",
                             ylim=c(min(ll),max(ul)),axes=FALSE)))
box()
axis(side=2,las=1) ## rotate labels for y axis.
axis(side=1,at=1:5,labels=c("monoculture", "RM", "0.2MB","0.5MB", "0.8MB"))  # lables for x axis.
lines(xs[1,],md[1,],type="l",lty=2,col="red")
lines(xs[2,],md[2,],type="l",lty=2,col="green")
lines(xs[3,],md[3,],type="l",lty=2,col="blue")
legend("topright",c("Dinorado"),cex=1)
legend("topleft",
legend=c("2006","2007","2008"),lty=c(1,1,1),col=c("red","green","blue"),ncol=3);

## plots for UPL Ri-5.
ud=matrix(mat.u$mean.s,ncol=5,nrow=3)

suppressWarnings(with(mat.u,
                      plotCI(x,mean.s,2*se,
                             col=as.numeric(year)+20,xlab="",main="",
                             lwd=2,ylab="Mean Yield",
                             ylim=c(min(ll),max(ul)),axes=FALSE)))
box()
axis(side=2,las=1) ## rotate labels
axis(side=1,at=1:5,labels=c("monoculture", "RM", "0.2MB","0.5MB", "0.8MB"))
lines(xs[1,],ud[1,],type="l",lty=2,col="red")
lines(xs[2,],ud[2,],type="l",lty=2,col="green")
lines(xs[3,],ud[3,],type="l",lty=2,col="blue")
legend("topleft",c("UPL Ri-5"),cex=1)

## plots for mung bean.
md=matrix(mat.m$mean.s,ncol=4,nrow=3)
x.m=matrix(x[1:length(mat.m$mean.s)],ncol=4,nrow=3)
suppressWarnings(with(mat.m,
                      plotCI(x[1:length(mean.s)],mean.s,2*se,
                             col=as.numeric(year)+20,xlab="",main="",
                             lwd=2,ylab="Mean Yield",
                             ylim=c(min(ll),max(ul)),axes=FALSE)))

box()
axis(side=2,las=1) ## rotate labels
axis(side=1,at=1:4,labels=c("monoculture", "0.2MB", "0.5MB", "0.8MB"))
lines(x.m[1,],md[1,],type="l",lty=2,col="red")
lines(x.m[2,],md[2,],type="l",lty=2,col="green")
lines(x.m[3,],md[3,],type="l",lty=2,col="blue")
legend("topright",c("Mung Bean"),cex=1)
```

6. R scripts for Figure S4 (L. Zheng)

```
dat1=read.csv("F:/2.Dat.LER2006_formatted for reps.csv")
```

```
dat2=read.csv("F:/2.Dat.LER20078_formatted for reps.csv")
colnames(dat1)
colnames(dat2)
dat = data.frame(rbind(dat1,dat2))

years = c(2006, 2007, 2008) # new variable.
trts=c(4, 5, 6, 7)# new variable.
tt=rep(trts,c(rep(3,length(trts))))
year=rep(years,length(trts))

mean.s=numeric()
ses=numeric()
size=numeric()
for(i in 1:length(trts)){#length(trts)
   for (j in 1:length(years)){#length(years)
   dats=dat[dat$year==years[j]&dat$trt==trts[i],][,5:7]
   datr = apply(dats,2,as.numeric)
   means = mean(c(datr),na.rm=T)
   se = sd(c(datr),na.rm=T)
   mean.s=c(mean.s,means)
   ses=c(ses, se)
   size = c(size, length(c(datr))-sum(is.na(datr)))
}
}
mean.s
ses
size

se=ses/sqrt(size)

ll = mean.s-1.96*ses/sqrt(size)
ul = mean.s+1.96*ses/sqrt(size)


tt=rep(c("RM","0.2MB","0.5MB","0.8MB"),c(rep(3,length(trts))))
mat=data.frame(tt,year, round(cbind(mean.s[c(1:3,10:12,4:9)],se),3), ll, ul)
colnames(mat)=c("Treatment","Year","Mean","SE","LL","UL")

## Make 95% CI Plot for LER 2006, 2007 and 2008


x=numeric()  # x is the vector of location for each CI plot.
for(i in 1:4){
xs=c(i-0.15, i, i+0.15)
x=c(x,xs)
}
x

library(plotrix)

## CI plots.

plot(seq(0.5,4.5,by = (4/(2 - 0))),0:2,ylim=c(0.6,2),axes=FALSE, type="n",
xaxt='n',yaxt='n',xlab="The mixtures",ylab="LER")
axis(2, tck =1,las=1, col = "grey", lty = "dotted",lwd=0.05)

suppressWarnings(with(mat,
                      plotCI(x,mat$Mean,2*mat$SE,
                             col=as.numeric(year)+20,, main="",
                             lwd=2,ylab="",
                             ylim=c(min(mat$LL),max(mat$UL)),add=TRUE,axes=FALSE)))

box()
axis(side=2,las=1) ## rotate labels for y axis.
axis(side=1,at=1:4,labels=c("RM", "0.2MB","0.5MB", "0.8MB"))  # labels for x axis.
legend("topright",c("2006","2007","2008"),lty=c(1,1,1),col=c("red","green","blue"),cex=.6)
```