paspalum root weight example

The TTEST Procedure

Variable: weight

sample means and standard deviations

treat	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
inocul		12	8.9750	4.6384	1.3390	3.9000	19.7000
notinoc		12	13.4917	4.0230	1.1613	6.2000	21.8000
Diff (1-2)	Pooled		-4.5167	4.3416	1.7725		
Diff (1-2)	Satterthwaite		-4.5167		1.7725		

pooled sample standard deviation

check for common population variance:

The ratio of the sample standard deviations 4.6384/4.0230 = 1.1530 is between 1/2 and 2 so the assumption of a common population variance is OK

treat	Method	Mean	95% CL Mean	
inocul		8.9750	6.0279	11.9221
notinoc		13.4917	10.9356	16.0478
Diff (1-2)	Pooled	-4.5167	-8.1925	-0.8408
Diff (1-2)	Satterthwaite	-4.5167	-8.1968	-0.8366

95% confidence interval for mu_(inocul)-mu_(notinoc)

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	22	-2.55	0.0183
Satterthwaite	Unequal	21.569	-2.55	0.0185

.0183 is the P-value for
H_1: mu_(inocul) notequal mu_(notinoc)

divide by 2 to get the P-value .00915 for
H_1: mu_(inocul) < mu_(notinoc)

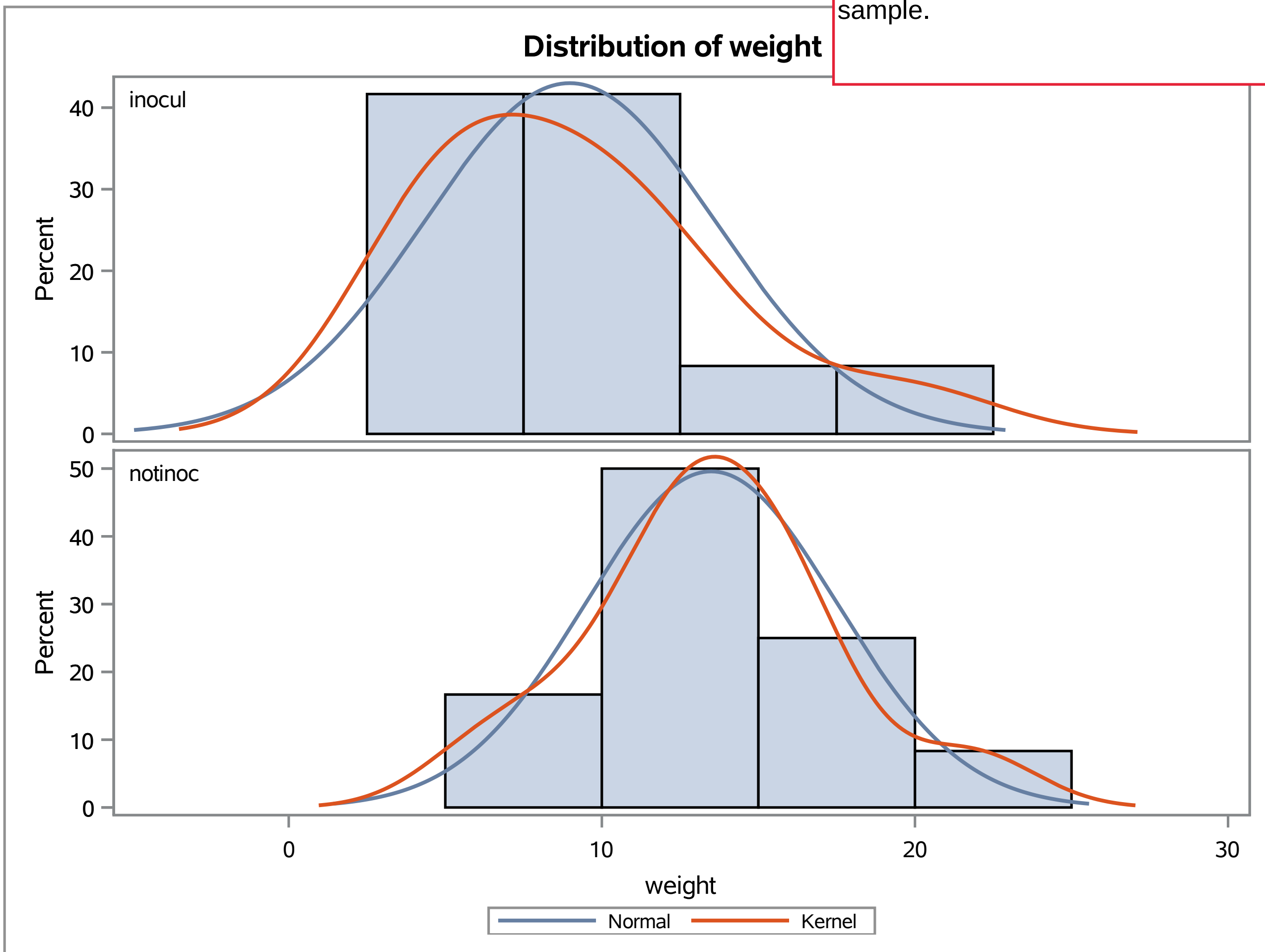
Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	11	11	1.33	0.6450

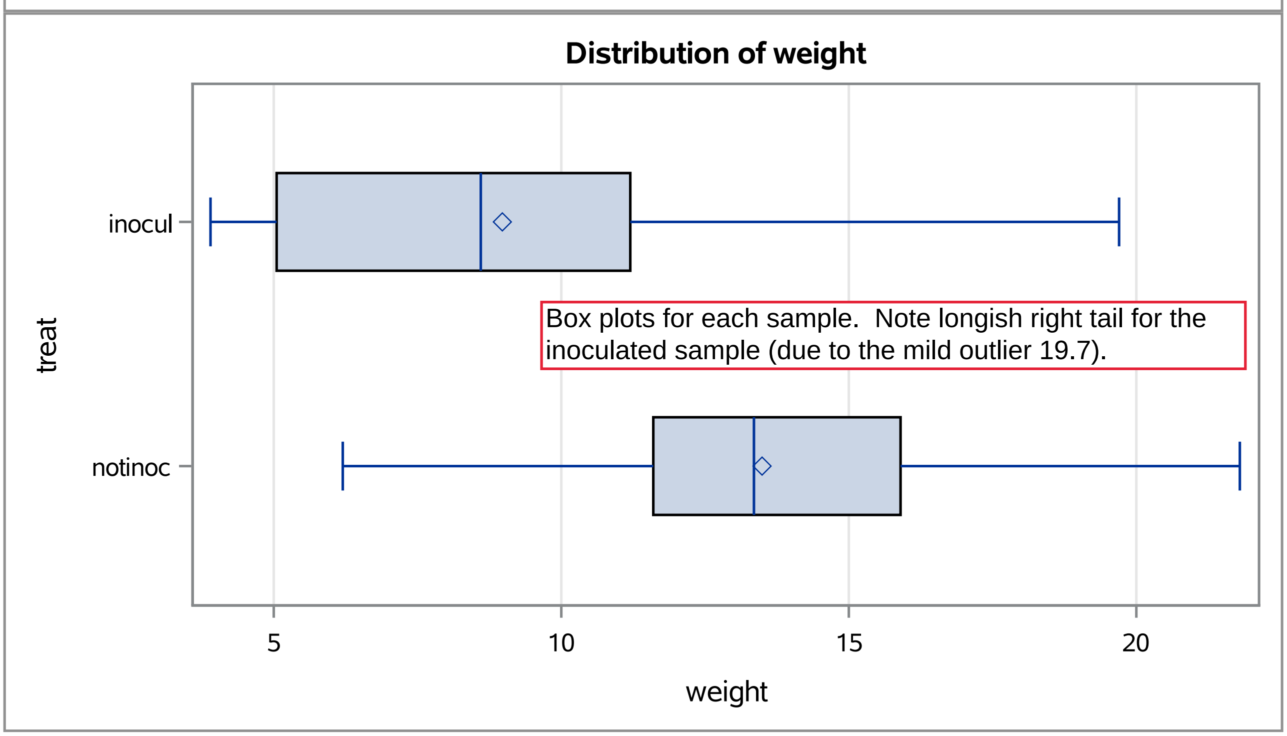
paspalum root weight example

The TTEST Procedure

Variable: weight

Histograms with smoothed histograms (fitted density curves "kernel") and fitted normal density curves for each sample.



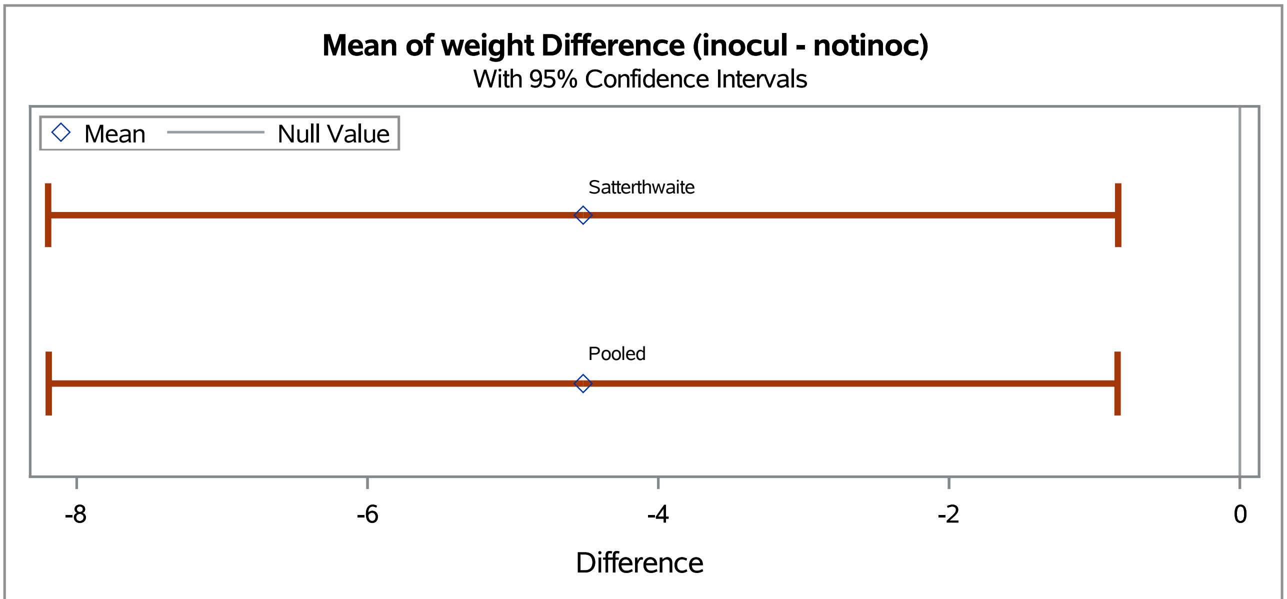


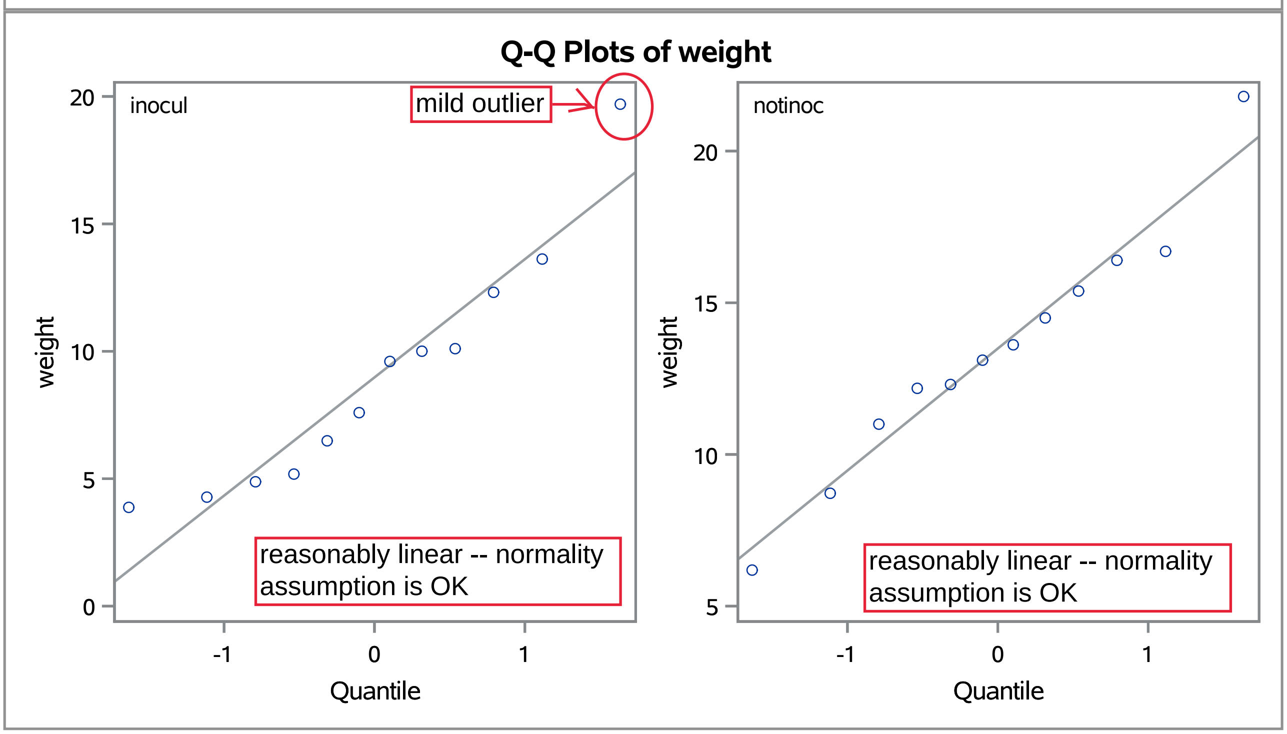
Box plots for each sample. Note longish right tail for the inoculated sample (due to the mild outlier 19.7).

paspalum root weight example

The TTEST Procedure

Variable: weight





Formal tests of the normality assumption are given below.

paspalum root weight example summary

The UNIVARIATE Procedure
Variable: weight
treat = inocul

summary of fresh root weight for the inoculated sample

Basic Statistical Measures			
Location		**Variability**	
Mean	8.975000	**Std Deviation**	4.63840
Median	8.600000	**Variance**	21.51477
Mode	.	**Range**	15.80000
		Interquartile Range	6.15000

Tests for Normality				
Test	**Statistic**		**p Value**	
Shapiro-Wilk	**W**	0.905711	**Pr < W**	0.1879
Kolmogorov-Smirnov	**D**	0.154181	**Pr > D**	>0.1500
Cramer-von Mises	**W-Sq**	0.053296	**Pr > W-Sq**	>0.2500
Anderson-Darling	**A-Sq**	0.39804	**Pr > A-Sq**	>0.2500

Test for normality assumption for the inoculated sample

The null hypothesis is that the data (the 12 weights) form a random sample from a normal distribution. The large P-value .1879 shows supports for the normality assumption.

This P-value is somewhat small due to the mild outlier and slight skewness to the right.

Quantiles (Definition 5)	
Level	**Quantile**
100% Max	19.70
99%	19.70
95%	19.70
90%	13.60
75% Q3	11.20
50% Median	8.60
25% Q1	5.05
10%	4.30
5%	3.90
1%	3.90
0% Min	3.90

The distribution is somewhat skewed to the right but reasonably symmetric (see the Shapiro-Wilk test to confirm that this is not a problem)

med-min=4.7
max-med=11.1

Extreme Values			
Lowest		**Highest**	
Order	**Value**	**Order**	**Value**
1	3.9	8	10.0
2	4.3	9	10.1
3	4.9	10	12.3
4	5.2	11	13.6
5	6.5	12	19.7

Mild outlier 19.7 (gap of 6.1 from 13.6)

paspalum root weight example summary

The UNIVARIATE Procedure
Variable: weight
treat = notinoc

summary of fresh root weight for the not inoculated sample

Basic Statistical Measures			
Location		Variability	
Mean	13.49167	Std Deviation	4.02299
Median	13.35000	Variance	16.18447
Mode	.	Range	15.60000
		Interquartile Range	4.30000

Tests for Normality				
Test	Statistic		p Value	
Shapiro-Wilk	W	0.97782	Pr < W	0.9735
Kolmogorov-Smirnov	D	0.129247	Pr > D	>0.1500
Cramer-von Mises	W-Sq	0.028647	Pr > W-Sq	>0.2500
Anderson-Darling	A-Sq	0.202913	Pr > A-Sq	>0.2500

Test for normality assumption for the not inoculated sample

The null hypothesis is that the data (the 12 weights) form a random sample from a normal distribution. The large P-value .9735 shows supports for the normality assumption.

Quantiles (Definition 5)	
Level	Quantile
100% Max	21.80
99%	21.80
95%	21.80
90%	16.70
75% Q3	15.90
50% Median	13.35
25% Q1	11.60
10%	8.70
5%	6.20
1%	6.20
0% Min	6.20

The distribution is reasonably symmetric

med-min=7.15
max-med=8.45

(very slight skewness to the right)

Extreme Values			
Lowest		Highest	
Order	Value	Order	Value
1	6.2	8	14.5
2	8.7	9	15.4
3	11.0	10	16.4
4	12.2	11	16.7
5	12.3	12	21.8

no extreme outliers