

Example 18-1

```

title1 " "; options nodate nonumber ls=80 nocenter; data soybean;
input block $ phosphorus variety $ y @@; cards;
B1 0 v1 53.5 B1 0 v2 44.8 B1 0 v3 50.7
B1 30 v1 60.6 B1 30 v2 51 B1 30 v3 54.9
B1 60 v1 60.8 B1 60 v2 51.5 B1 60 v3 59.4
B1 120 v1 59.6 B1 120 v2 49.9 B1 120 v3 64.7
B2 0 v1 62.2 B2 0 v2 52.5 B2 0 v3 61.4
B2 30 v1 68.8 B2 30 v2 58.7 B2 30 v3 64.9
B2 60 v1 70.9 B2 60 v2 59.4 B2 60 v3 70
B2 120 v1 67.8 B2 120 v2 58.1 B2 120 v3 74.4
B3 0 v1 53.4 B3 0 v2 43.1 B3 0 v3 50.6
B3 30 v1 59.5 B3 30 v2 49.6 B3 30 v3 54.8
B3 60 v1 61 B3 60 v2 49.7 B3 60 v3 60.5
B3 120 v1 60.3 B3 120 v2 49.5 B3 120 v3 65
;

```

```

proc glm;
class block phosphorus variety;
model y = block variety block*variety phosphorus phosphorus*variety;
random block block*variety /test;
lsmeans phosphorus*variety /out=abmeans;
run;

```

```

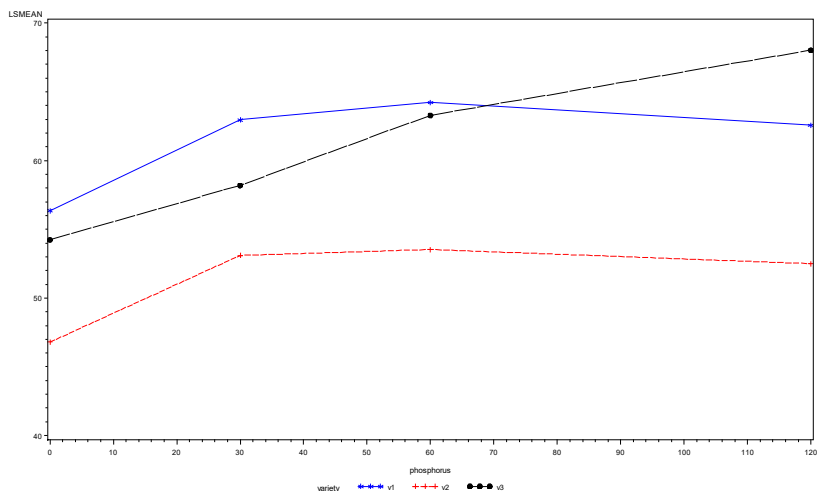
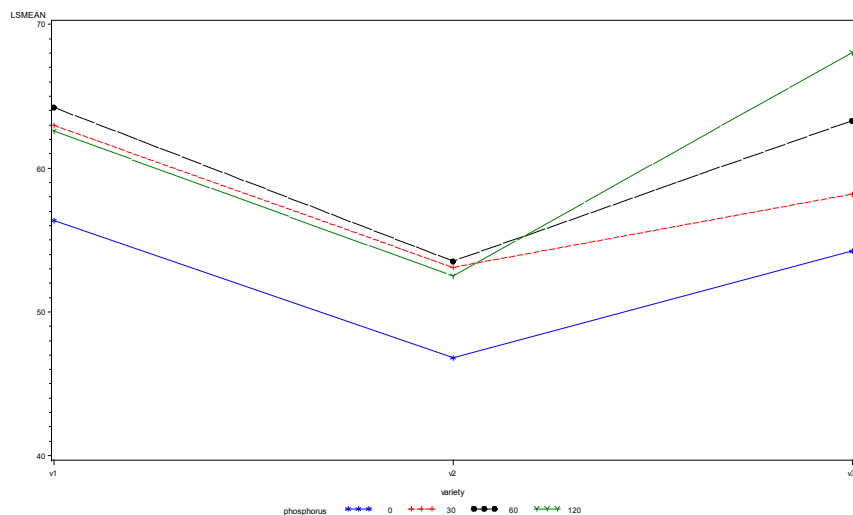
symbol1 i=join l=1 v=star c=blue;
symbol2 i=join l=3 v=plus c=red;
symbol3 i=join l=5 v=dot c=black;
symbol4 i=join l=7 v=Y c=green;

```

```

proc gplot data=abmeans;
plot lsmean*variety=phosphorus;
plot lsmean*phosphorus=variety;
run; quit;

```



Dependent Variable: y

Source	DF	Type III SS	Mean Square	F Value	Pr > F
block	2	671.807222	335.903611	204.73	<.0001
variety	2	763.250556	381.625278	232.60	<.0001
Error	4	6.562778	1.640694		
Error: MS(block*variety)					

Source	DF	Type III SS	Mean Square	F Value	Pr > F
block*variety	4	6.562778	1.640694	7.24	0.0012
phosphorus	3	408.371944	136.123981	601.04	<.0001
phosphorus*variety	6	117.413889	19.568981	86.40	<.0001
Error: MS(Error)	18	4.076667	0.226481		

```

proc mixed data=soybean;
class block phosphorus variety;
model y = variety phosphorus phosphorus*variety;
random block block*variety;
lsmeans phosphorus*variety /pdiff cl adj=tukey;
run;

```

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
variety	2	4	232.60	<.0001
phosphorus	3	18	601.04	<.0001
phosphorus*variety	6	18	86.40	<.0001

Differences of Least Squares Means

Effect	variety	phosphorus	_variety	_phosphorus	Adj P	Alpha
phosphorus*variety	v1	0	v1	30	<.0001	0.05
phosphorus*variety	v1	0	v1	60	<.0001	0.05
phosphorus*variety	v1	0	v1	120	<.0001	0.05
phosphorus*variety	v1	30	v1	60	0.1189	0.05
phosphorus*variety	v1	30	v1	120	0.9945	0.05
phosphorus*variety	v1	60	v1	120	0.0163	0.05

...

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