

JIM SMITH - COMPTCHE - 9 MAY 1969 - SUB FERTILIZATION  
 YIELDS BASED ON 3' X 60' MOWED SWATH - GRAB  
 SAMPLES WERE TAKEN AND DRY % CALCULATED. RESULTS  
 ON DRY BASIS

	$\bar{x}$		LBS/ACRE
TSP @ <del>100 LBS P<sub>2</sub>O<sub>5</sub>/A</del> <sup>220 LBS/ACRE</sup>	15.05	a	3642
SSP @ 1000 LBS/AC	14.48	a	3504
SSP @ 500 LBS/ACRE	12.25	a	2965
TVA + S + Mo @ 100 LB P <sub>2</sub> O <sub>5</sub> /A	13.75	a	3328
S @ 100 LBS/ACRE	8.05	b	1978
CHECK	8.07	b	1953

SOURCE OF VAR	d.f.	SS	MS	F <sub>0</sub>	5% F	1% F
TOTAL	23	290.09				
BLOCK	3	44.67				
TREATS	5	198.17	39.43	12.54 <sup>xy</sup>	2.90	4.56
ERROR	15	47.40	3.16			

(LSD<sub>0.05</sub> = 3.37 - omit)

RANGE FERTILIZATION

JAMES M. SMITH - COMPTON

22 MAY 1972

TREATMENT	I	II	III	IV	$\Sigma$	$\bar{X}$
TSP	5	5	3	5	18	4.5
CHECK	2	2	2	2	8	2
SSP@ 10%	9	8	9	8	34	8.5
SSi Sulfur	3	2	2	3	10	2.5
TVA+ST+NO	7	5	7	7	26	6.5
SSP@ 50%	5	4	6	6	21	5.25
	31	26	29	31	117	

SOURCE	d.f.	SS	MS	DF	F, 25 %	101
REPS	3	2.79	.93	1.75		
TREAT	5	119.875	23.975	45.15**	2.70	7.56
SPUR	15	7.96	.53			
TOTAL	23	130.625				
		Se	.728			

RANGE FERTILIZATION

C. GUNTLEY - POTTER VALLEY

MAY 1972

TREATMENT	I	II	III	IV	$\Sigma$	$\bar{X}$	lbs/Acre
A GOLDENTREEBLE	65	87	61	77	290	72.5	6952
B NITROGEN	52	46	45	33	176	44.0	4225
C PHOSPHORUS	52	54	27	45	178	44.5	4273
D SULFUR	49	51	32	50	182	45.5	4369
F NITROGEN + GOLDENTREEBLE	43	45	49	58	195	48.7	4677
CHECK	31	21	16	20	88	22.0	2113
	292	304	250	283	1109		

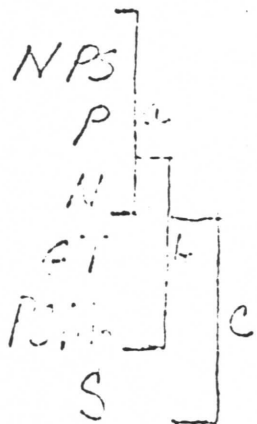
SOURCE	d.f.	MS	F	F <sub>.05</sub>	.01
Rep	3	177.708	2.591		
TREAT	5	1933.64	15.073**	2.90	4.56
ERROR	15	62.575			
Sc		8.281			

Sub Clover Fertilization - C. GUNTLEY - POTTER VALLEY ST. A.  
 COMPARISON OF FERTILIZERS IN  
 SUB CLOVER ESTABLISHMENT  
 PLANTS / 3 FOOT OF ROW

	$\bar{x}$
GT - GOLDEN TREE	2.22
N - AMMONIUM NITRATE	1.78
P - SULFUR FREE PHOSPHORUS	1.42
S - SOIL SULFUR	2.86
PSM <sub>6</sub> - PHOSPHORUS-SULFUR MOLYBDENUM	2.23
NPS - GOLDEN TREE + AMMONIUM NITRATE	1.42

	d.f.	SS	MS	F	sig.	F <sub>1/10</sub>
TOTAL	23	16.15				
BLOCKS	3	4.57	1.52			
TREATMENTS	5	6.32	1.26	3.60*	2.90	4.56
ERROR	15	5.26	.35			

LSD<sub>.05</sub> = .77



# GUNTLEY - POTTER VALLEY - FERTILIZER ON SUB CLOVER

NO. OF SEEDLINGS / 3 FEET OF ROW

SOURCE OF VAR. d.f. SS MS OF 5%<sup>F</sup> 10%

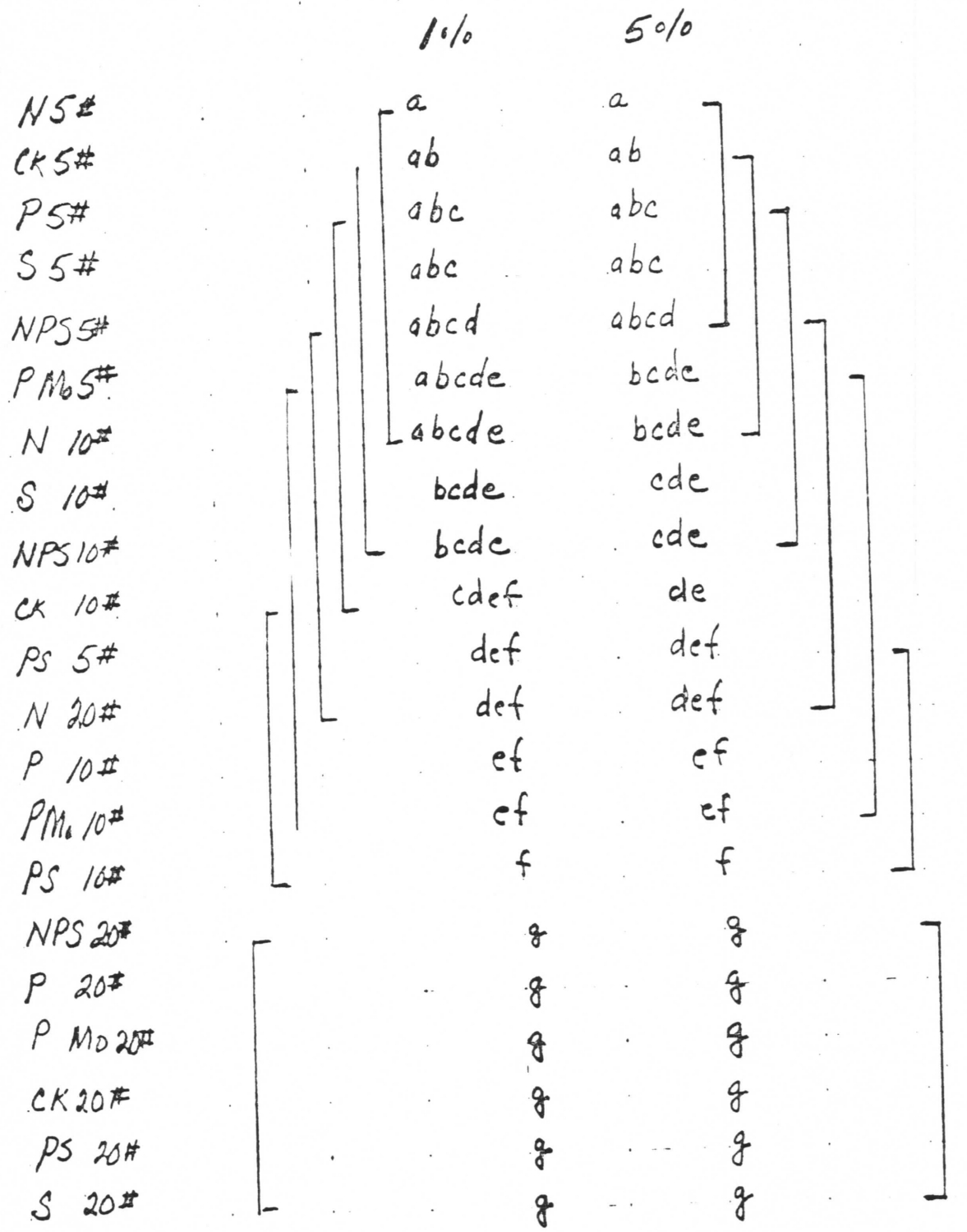
TOTAL	83	7115				
BLOCKS	6	5112	2039			
TREATMENTS	11	863	78	**	4.59	1.94 2.54
ERROR	66	1130	17			

MSD.05 = 3.35

	$\bar{x}$	
NITROGEN	12.1	a
NITROGEN - PHOSPHORUS - SULFUR	17.3	b
CHECK	18.0	b
PHOSPHORUS	18.7	b
SULFUR	19.3	b
PHOSPHORUS - MOLYBDENUM	20.5	bc
PHOSPHORUS - SULFUR	23.4	c

CHARLES GUNTLEY - POTTER 28 JAN 1970

TOTAL INCHES WITH SUBCLOVER PLANTS  
36 INCHES OF ROW



Sta 69. 01. 17

# SOIL COVER FERTILIZATION - FROST - WILDLIFE 3YR SUMMARY

LBS/ACRE AVERAGE PRODUCTION

TREATMENT	1969	1970	1971	TOTAL
0-20-0	4169	4455	4375	12999
0-38-0-20S	3459	7922	8326	19707
SOIL SULFUR	3193	6923	8525	18641
CHECK	2012	2717	2614	7343

	LBS OF INCREASE	VALUE AT 6¢/LB	COST PER ACRE	NET RETURN PER ACRE
0-20-0	5656	\$42.42	\$12.50	\$29.92
0-38-0-20S	12424	\$93.18	\$13.25	\$79.93
SOIL SULFUR	11298	\$84.18	\$4.50	\$79.68
CHECK	—	—	—	—

1971. 05. 21  
 1970. 05. 13  
 1969. 05

SUB FERTILIZATION R. FROST WILLITS YIELD DATA 21 MAY 1971

TREATMENT	$\bar{x}$	YIELD IN LBS/ACRE
0-20-0	45.56	4375
0-38-0-20S	87.33	8386
SOIL SULFUR	88.78	8525
CHECK	27.22	2614

d.f. 35 MS OF 5% F 10/0

TOTAL	11	2729.37				
BLOCKS	2	2.79	1.39			
TREATMENT	3	8515.81	2538.6	80.80	4.76	9.78
ERROR	6	210.77	35.13			

LSD.05 = 11.84



SUB CLOVER FERTILIZATION - FROST-WILLITS 1969-1971

HARVEST DATA AIR DRY FORAGE

SUMMARY OF 3 YEARS DATA

TREATMENT	$\bar{X}$	LBS/ACRE $\bar{X}$	LBS/ACRE TOTAL
A. 0-20-0	45.07	4328	12984
B. 0-38-0-205	68.66	6593	19779
C. SOIL SULFUR	64.71	6214	18644
D. CHECK	26.49	2544	7632

	df	S.S.	MS	OF	5%	F	1%
TOTAL	35	20745.54					
BLOCKS	2	54.48	27.24				
YEARS	2	5396.61	2698.31	261.21	3.44	5.72	
TREATMENT	3	10042.17	3347.39	324.05	3.05	4.82	
YEAR X TREATMENT	6	5979.6	996.6	82.57	2.55	3.76	
ERROR	22	227.33	10.33				

	<u>.05</u>	<u>.01</u>
LSD YEARS	2.716	3.692
TREATMENT	3.131	4.256
YRS X TREATMENT	4.707	13.269

Frost-Willits - Sub Fertilization 13 MAY 1970

Plot Yield in Grams/sq ft air dry forage

Plot #	Yield			Σ	Mean	Treat	Rep I	II	III	Σ	Mean	SE
1 A	75	56	42	57.7	46.4	A	57.7	39.7	41.7	139.1	46.4	44.5
2 B	89	85	68	80.7	82.5	B	80.7	79.7	87.0	247.4	82.5	79.2
3 C	68	83	70	73.7	72.1	C	73.7	68.0	79.7	216.4	72.1	69.2
4 D	28	22	32	27.3	28.3	D	27.3	37.0	20.7	85.0	28.3	27.1
5 B	53	72	81	79.7			239.4	229.4	224.1	687.7		
6 C	65	69	75	68.0								
7 II	32	29	50	37.0			C = 394	33.9				
8 H	38	26	55	39.7			B = 38.2					
9 C	76	76	72	74.7			T = 5435.9					
10 B	73	110	78	87.0								
11 D	18	27	17	20.7								
12 A	32	45	48	41.7								

Juncans Mult. 1/11

D. a  
A. b  
C. c  
B. c

Source of var	d.f	SS	MS	DF	.05	F	.01
TOTAL	11	5822.5					
BLOCKS	2	33.2	19.1				
TREATS	3	5435.9	1812.0	31.19	4.76	9.78	
ERROR	6	348.4	58.1				

MSD =  $t_{.05} = 15.2$

TREAT	Description	Rate	SE
A	SINGLE SUPER PHOSPHATE @ 500 LBS/ACRE	100	60
B	TSP 0-38-0 - 205 @ 265 LBS/ACRE	100	53
C	Sulfur-soil @ 100 LBS/ACRE	✓	100
D	CHECK	✓	✓

RUSSEL FROST - WILLITS - SUB CLOVER FERTILIZATION - MAY 1969

PLOT	CLIP	TOTAL TEST	DRY TEST	% DRY	LBS/100	LBS/100
	PLOT FT <sup>2</sup>	WT LBS	WT GMS	WT GMS	FORAGE	FT <sup>2</sup> DRY
SSP	135	92.1	503	87	17.3	68.22 11.80
TSP	129	62.2	624	106	17.0	48.22 8.20
S	90	36.8	595	97	16.3	40.89 6.67
CHECK	99	14.5	595	150	25.2	14.64 3.52
TSP	81	30.3	602	116	19.3	37.41 7.22
S	78	27.2	673	132	19.6	34.87 6.84
CHECK	84	18.8	453	115	25.4	22.38 5.58
SSP	108	59.4	637	95	14.9	55.00 8.20
S	108	52.9	617	107	17.3	48.98 8.47
TSP	108	49.6	645	118	18.3	45.93 8.40
CHECK	110	19.2	496	136	27.4	17.45 4.78
SSP	108	50.1	574	108	18.8	46.39 8.72

	I	II	III	Σ	$\bar{x}$	<u>LBS/ACRE</u>
SSP @ 100 LBS P <sub>2</sub> O <sub>5</sub> /Acre	11.80	8.20	8.72	28.72	7.57	4169 a
TSP @ 100 " " "	8.20	7.22	8.40	23.82	7.94	3459 a
S @ 100 LBS/Acre	6.67	6.84	8.47	21.98	7.33	3193 a b
CHECK	3.52	5.58	4.78	13.88	4.62	2012 b

SOURCE OF VAR	d.f	SS	MS	F <sub>0</sub>	5% F	1% F
TOTAL	11	50.6				
BLOCKS	2	1.0				
TREATS	3	38.1	12.7	6.65*	5.14	10.92
ERROR	6	11.5	1.91			

LSD<sub>.05</sub> = 2.74

Los Beir

February 25, 1970  
William H. Brooks, III  
Mendocino County Director & Farm Advisor

William E. Martin  
Extension Soils Specialist  
Frost Farm:

Dear Bill:

Some time ago you forwarded, in your annual report material, some data from the subclover fertilization experiments carried out on the Frost farm near Willits, and harvested in May of 1965. I have looked over this data with considerable interest, and would raise certain points regarding your interpretation. First off, it would appear that you have here four treatments comprising almost a factorial in that you were comparing sulfur alone, phosphorus alone, and a combined phosphorus-sulfur treatment. It is true that the sulfur in the combination came from gypsum, and provided 60 S per acre whilst the S alone was from elemental S. I have looked over your analysis of variance, a copy of which with my scratches on it is attached. I believe, in the main, you have proceeded correctly, except for the fact that you looked up the wrong F values of significance. You used values for 6 and 2 degrees of freedom respectively, rather than for 6 and 3.

I note that you have calculated an LSD, and thereafter attempted to use Duncan's manual range, or something like it, to determine which treatments differ from each other significantly.

I had some data similar to this the other day, and got a quite thorough lesson from Tom Little which I will now hasten to pass on to you. It is not quite correct to use the multiple range test on a factorial in which the treatments are included. You will note from your data: that the increase from S was 1181 pounds, the increase from phosphorus was 1447, and the increase from both in single superphosphate was 2157. This would lead one to suspect that P and S are working together. I have taken your data on the attached sheet and have calculated the effects of P and S individually, and separated out the individual degrees of freedom associated with P and S. When we do this, you can see that the average effect of P is significant (almost highly significant with an F value of 1209). The average effect of S, which you missed in your analysis, is significant at the 5 percent level with an F value of 734, while the interaction of P and S is nowhere significant.

I would point out, Bill, that in reality, at this site, you had a dual deficiency with each factor working almost independently, and with the benefits of P and S additive with no significant interaction. I would suspect that we have a lot of locations where this takes place. The advantage of using a factorial is that we can look at the effects of each nutrient when applied alone, or applied in combination with the other nutrient.

From the Frost test it is now obvious that both P and S as nutrients were effective, and that fertilization at this site should include both nutrients. I am forwarding a copy of your letter to Tom Little for his observation and to give him a chance to call me if I have gotten off base again.

William H. Brooks, III

-2-

February 25, 1970

I am real sorry, Bill, that I did not pick up the samples of fresh material from the lysimeter that you or somebody apparently brought up to the motel. I know that I was supposed to bring some samples back from Dr. Jones, and I thought that the soil samples which Pete very carefully put in my car were the load to come to Davis.

I shall look forward to seeing you at the inoculation meeting that Les is holding at Hopland in March.

Sincerely,

WEM/bp

Enclosures

cc: Tom Little

# RUSSEL FROST - WILLITS - SUB CLOVER FERTILIZATION - MAY 1969

PLOT	CLIP	TOTAL	TEST	DRY TEST	% DRY	LBS/100	LBS/100
	PLOT	WT LBS	WT GMS	WT GMS	FORAGE	FT <sup>2</sup>	FT <sup>2</sup> DRY
SSP	135	92.1	503	87	17.3	68.22	11.80
TSP	129	62.2	624	106	17.0	48.22	8.20
S	90	36.8	595	97	16.3	40.89	6.67
CHECK	99	14.5	595	150	25.2	14.64	3.52
TSP	81	30.3	602	116	19.3	37.41	7.22
S	78	27.2	673	132	19.6	34.87	6.84
CHECK	84	18.8	453	115	25.4	22.38	5.58
SSP	108	59.4	637	95	14.9	55.00	8.20
S	108	52.9	617	107	17.3	48.98	8.47
TSP	108	49.6	645	118	18.3	45.93	8.40
CHECK	110	19.2	496	136	27.4	17.45	4.78
SSP	108	50.1	574	108	18.8	46.39	8.72

Lbs/Ac			I	II	III	Σ	X̄	LBS/ACRE	SVC	
P <sub>2</sub> O <sub>5</sub>	S									
100	60	SSP @ 100 LBS P <sub>2</sub> O <sub>5</sub> /Acre	11.80	8.20	8.72	28.72	9.57	4169	a	2157
100	—	TSP @ 100 " " "	8.20	7.22	8.40	23.82	7.94	3459	a	1447
—	100	S @ 100 LBS/Acre	6.67	6.84	8.47	21.98	7.33	3193	a	b 1181
		CHECK	3.52	5.58	4.78	13.88	4.62	2012	b	b

SOURCE OF VAR d.f SS MS F<sub>0</sub> 5% F 1%

TOTAL 11 50.6

BLOCKS 2 1.0

TREATS 3 38.1 12.7 6.65\*

ERROR 6 11.5 1.91

5.14 10.92  
4.76 9.78 3.6

LSD<sub>0.05</sub> = 2.74

	I	II	III	Z	PD 1000	S +05	PS
PS	11.50	8.20	8.112	28.72	P 5254 V 3586 } 5070 } 3770	} 5070 } 3770	4260
D	8.70	7.77	8.40	72.82			4580
S	6.67	6.84	8.47	21.78			P+S
AK	3.57	5.58	4.78	13.88			
	<u>3019</u>	<u>2784</u>	<u>3037</u>	<u>9840</u>			

Total 7018,374

6512,133 506,241 11

Reps 6522,096 9963 2

Treat 6893,352 381,219 3 127,073 6.63\* (476\*<sup>6 need</sup>)

Quor 115,059 6 19776  
 F 5% 170

Pefferd 6,743,985 231,852 1 12.09\* 599 13.74

Sefferd 6,652,966 140,833 1 7.34\*

PVS 6,570,666 8533 11 (0.44<sup>ns</sup>)