

State Cooperative Soil - Vegetation Survey

CALIFORNIA DIVISION OF FORESTRY
Department of Conservation, The Resources Agency

PACIFIC SOUTHWEST FOREST AND RANGE EXPERIMENT STATION
Forest Service, U. S. Department of Agriculture

DIVISION OF AGRICULTURAL SCIENCES
University of California

February

1965

SOIL FERTILITY STUDIES: -NO. 8 - Sehorn series

W. Robert Powell

Department of Agronomy, University of California, Davis

This leaflet, a product of the Soil-Vegetation Survey, is one of a series giving results of greenhouse pot tests and field fertilizer trials on soils primarily associated with range lands. The data indicate fertility status with regard to nitrogen, phosphorus, and sulfur. Field trials also give preliminary data on potential range forage production and species changes resulting from fertilizer treatments. Methods are detailed in: Powell, W. Robert. 1964. Procedures used in range land soil fertility studies. State Cooperative Soil-Vegetation Survey, Calif. Division of Forestry, Sacramento, 15 pp.

FIELD NUTRIENT TRIAL No. 45-2

Shasta County

Shoup Ranch, South of Ono in the Bald Hills

Plot 13 of Quad 31A-2

NW corner Sec. 26, T30N, R7W, MDMB

Slope South - 30%; elevation 1100 feet

Grassland

Fertilized 29 October 1959

(Greenhouse soil sample No. FA60-45-102)

Table 1. Herbage Yields, pounds per acre, oven-dry

Fertilizer Treatment ^{1/}	Date of sampling	
	12 May 1960	5 May 1961
Check	1962 a	3600 a
S	1566 a	3259 a
P	1944 a	3792 a
PS	1740 a	4219 a
N	2880 b	4716 a
NS	2544 b	4099 a
NP	2628 b	4363 a
NPS	4410 c	4836 a

^{1/} N = 150 lb/A of nitrogen in urea; P = 88 lb/A of phosphorus in triple super phosphate; S = 100 lb/A of sulfur in gypsum.

Table 2. Percent ground cover of herbaceous species, 12 May 1960.

Species	Fertilizer Treatment							
	Check	S	P	PS	N	NS	NP	NPS
----- percent -----								
<u>Grasses</u>								
Avena barbata				+	+	+		
Avena fatua	3	2	1	4	6	10	13	19
Bromus mollis	11	12	14	18	11	31	25	31
Bromus rubens	+	+	+	+	1	+	1	+
Festuca spp.	+	1	+	1		+	+	+
Gastridium ventricosum	+	+	1	1	+			+
Taeniatherum asperum (=Elymus caput-medusae)	11	9	13	12	42	17	10	23
<u>Forbs</u>								
Achyrachaena mollis	+	+	+	+	+			
Amsinckia intermedia			+	1		+	1	+
Centaurea solstitialis	+	+	+	+	1	+	3	2
Erodium botrys	4	4	3	2	10	15	7	4
Erodium cicutarium	1	1	1		1	4	10	2
Lomatium utriculatum		+		+				
Lotus sp.	1	+		1				
Lupinus nanus	1	1	+	+	+	+		
Medicago hispida	4	3	5	6	+	4	3	12
Micropus californicus	+	+						3
Plagiobothrys fulvus campestris	1	1	1	+	3	4	9	2
Plantago hookeriana californica	3	2	3	1	5	5	6	1
Trifolium spp.		+	1	2	+	+		+
Other species				+	1			
TOTAL HERBACEOUS COVER	40	36	44	50	82	91	89	99

Table 3. Percent ground cover of herbaceous species, 5 May 1961.

Species	Fertilizer Treatment							
	Check	S	P	PS	N	NS	NP	NPS
----- percent -----								
<u>Grasses</u>								
Avena barbata					1		1	
Avena fatua	6	9	9	10	13	19	15	14
Bromus mollis	24	19	27	12	18	26	21	19
Bromus rubens		1			1	1	1	
Festuca spp.		5	1	5	2		1	1
Taeniatherum asperum (=Elymus caput-medusae)	22	15	20	9	27	9	9	13
<u>Forbs</u>								
Achyrrachaena mollis				1	1		1	
Amsinckia intermedia				1	1	1	7	1
Centaurea solstitialis					2	1		
Erodium botrys	1	2	1	2	4	5	13	1
Erodium cicutarium				1		1		2
Lotus spp.	1	2	1	1	1			
Lupinus nanus	6	3	5	3	1			
Medicago hispida	11	10	7	45	1	11	1	35
Plagiobothrys fulvus campestris	2	4	1		7	8	6	7
Plantago hookeriana californica	1	2	4	1	6	4	6	2
Trifolium spp.	2		2	3				1
TOTAL HERBACEOUS COVER	76	72	78	94	86	86	82	96

COMMENTS:

First year yields indicated a strong response to nitrogen and a further increase with nitrogen plus phosphorus and sulfur. Treatments NS and NP were about the same as N. However, species showed considerable change among the four treatments involving nitrogen and between the nitrogen and no nitrogen treatments. Nitrogen alone greatly increased medusahead (Taeniatherum asperum). Other species that changed from various nitrogen combinations were common wild oats (Avena fatua), soft chess (Bromus mollis), broadleaf filaree (Erodium botrys), red stem filaree (Erodium cicutarium), and bur medic (=bur-clover, Medicago hispida).

No significant differences among treatments were found in the second year but there were strong differential species responses particularly with medusahead and bur medic.

Data from the pot test of soil from this site indicated responses to nitrogen and phosphorus but the field data have clearly indicated a sulfur response in addition.