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. 7 - 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. 45-1

Shasta County
Plot 12 of Quad 31A-2
SW corner Sec. 23, T30N, R7W, MDMB
Slope north - 40%; elevation 1100 feet
Grassland
Fertilized 29 October 1959
(Greenhouse soil sample No. FA60-45-101)

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

Fertilizer Treatment[1/]	Date of sampling	
	13 May 1960	22 May 1961
Check	1843 a	1973 a
S	1560 a	1932 a
P	1673 a	2179 a
PS	1702 a	2045 a
N	3432 b	3372 b
NS	5844 d	3336 b
NP	4940 c	4253 c
NPS	6739 e	4037 bc

[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.

Published by California Division of Forestry, Sacramento, California 95814

Table 2. Per cent ground cover of herbaceous species, 13 May 1960.

Species	Fertilizer Treatment							
	Check	S	P	PS	N	NS	NP	NPS
	- - - - - - - - - - - percent - - - - - - - - - - -							
Grasses								
Aira caryophyllea	+							
Avena fatua	9	5	8	9	23	35	31	42
Briza minor			+	+				
Bromus mollis	3	4	6	4	9	26	11	27
Festuca spp. (annual)	+	+	+		1			
Hordeum hystrix	+							
Melica californica	+							
Poa bulbosa						+		
Poa scabrella	+		+		+	+	+	+
Sitanion hystrix	+	+	+	+	1	2	1	+
Taeniatherum asperum (=Elymus caput-medusae)	4	8	10	6	33	28	33	22
Forbs								
Achyrachaena mollis	+	+	+	+	1	+	+	
Amsinckia intermedia	+	+	+	+	1	1	5	1
Brodiaea hyacinthina	+	+	+	+	+	+	+	+
Brodiaea laxa	+	+	+	+	1	+	+	
Chlorogalum pomeridianum		+	+	+	+	1	1	
Clarkia gracilis	1	3	3	1	7	1	5	2
Erodium cicutarium	1	1	+	+	4	2	7	2
Geranium dissectum	+	+	+	+		+	+	1
Lomatium utriculatum	+	1	1	1	+	1	3	1
Lupinus nanus	+	+	+	+	+		1	
Medicago hispida				+				
Micropus californicus	1	+	+	+	+	+	+	+
Ranunculus californicus	+	+	+	+	1	+	+	+
Sanicula bipinnatifida	+	+		+	+			+
Trifolium olivaceum columbinum			+		+			
Vicia sp.		+	+				1	
Zigadenus fremontii	+	+		+	+	+	+	+
Other species	+	1	+	+	1	1	+	2
TOTAL HERBACEOUS COVER	21	25	30	22	83	98	99	100

Table 3. Per cent ground cover of herbaceous species, 22 May 1961.

Species	Fertilizer Treatment							
	Check	S	P	PS	N	NS	NP	NPS
	- - - - - - - - - - - percent - - - - - - - - - - -							
Grasses								
Aira caryophyllea	+							
Avena fatua	9	8	4	8	41	41	48	41
Bromus mollis	5	6	6	8	5	24	15	17
Festuca spp. (annual)	1	1	1	+	3	2	1	4
Poa bulbosa				+				
Poa scabrella						2		1
Sitanion hystrix	+		+	+	1		1	
Taeniatherum asperum (=Elymus caput-medusae)	8	7	8	11	8	7	9	12
Forbs								
Achyrachaena mollis	1	1			1			
Amsinckia intermedia					2	1	1	
Brodiaea pulchella								1
Chlorogalum pomeridianum								1
Clarkia gracilis	2	4	2	3	5	3	3	2
Convolvulus sp.								1
Erodium cicutarium							1	
Galium sp.								1
Geranium dissectum			1					
Lomatium utriculatum		+	+		1	3		
Lupinus nanus		1	+					
Micropus californicus	1	1	+	1	1			1
Ranunculus californicus		+						
Sanicula bipinnatifida		+						
Trifolium olivaceum columbinum			+					
Vicia sp.	+	+	+					
Zigadenus fremontii	1	+	1			1	1	1
Other species	+	1	1	1	1		1	
TOTAL HERBACEOUS COVER	28	31	24	32	69	84	81	84

COMMENTS:

First year yields indicated a strong primary response to nitrogen, a second order response to sulfur, and a third order response to phosphorus. Major species changes were a large increase in soft chess (Bromus mollis) from nitrogen plus sulfur with or without phosphorus, increased common wild oats (Avena fatua) from NPS, and increased medusahead (Taeniatherum asperum) from nitrogen with or without other elements. Minor changes occurred in amount of fiddleneck (Amsinckia intermedia), farewell-to-spring (Clarkia gracilis), and redstem filaree (Erodium cicutarium).

Second year yields indicated a good carryover of nitrogen and phosphorus. Soft chess showed a differential response to NS. There was a general decrease of medusahead on all treatments with nitrogen probably owing to strong competition of the heavy stand of common wild oats from the first as well as the second year.

Of particular significance is the fact that bur medic (= bur-clover, Medicago hispida) is practically non-existent in the trial area. The trial is located well up the slope just below a ridge. The situation is almost identical to that of trial number 11-5 with respect to position on the slope, direction, and amount of bur medic (See Soil Fertility Study No. 9). However, the situation may be contrasted to that of trial number 45-2 (Soil Fertility Study No. 8) which is a few hundred yards away on a south slope but still well up the slope.