RANGE AND PASTURE FERTILIZATION IN SAN MATEO COUNTY

By

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Does it pay to fertilize pastures? What is the best kind of fertilizer to use? What are the most economical rates of application? When is the best time of the year to apply fertilizers? These are some of the questions livestockmen have been asking.

For the past seven years the University of California Farm Advisor's Office has conducted fertility tests and field observations to find answers to these questions. These investigations were started in 1947 by the late John J. McNamara, first farm advisor in San Mateo County, and are being continued today. Twenty-five field tests have been carried out on ranches in the county including most soil types and climatic conditions of the area. In addition, soil samples were taken from 73 different locations throughout the county. These samples were analyzed in the laboratory to determine the phosphorus status of these soils on an area and soil type basis. Results of these 25 field tests together with the chemical examination of 73 soils form the basis of this report. Different rates and kinds of fertilizers were tried on irrigated pastures, seeded dryland pastures, and native range lands.

WHAT RESULTS WERE OBTAINED?

Some of these tests involved the use of single materials like super phosphate on established pasture. In other cases fertilizers containing nitrogen alone were applied in comparison with fertilizers supplying only phosphorus or a combination of nitrogen and phosphorus. In a few cases materials like 16-20-0 which supplies both nitrogen and phosphorus were compared only with the unfertilized pastures.

How About Response to Phosphorus?

In a summary of these 25 tests it was found that 16 of the 25 showed no benefit from adding phosphorus alone or with nitrogen. In 5 cases there was a striking response to phosphorus alone; in 2 cases a slight response; the remaining 2 cases where 16-20-0 was used it was impossible to determine if the increased growth was due to nitrogen or phosphorus or both in the fertilizer.

How About Nitrogen?

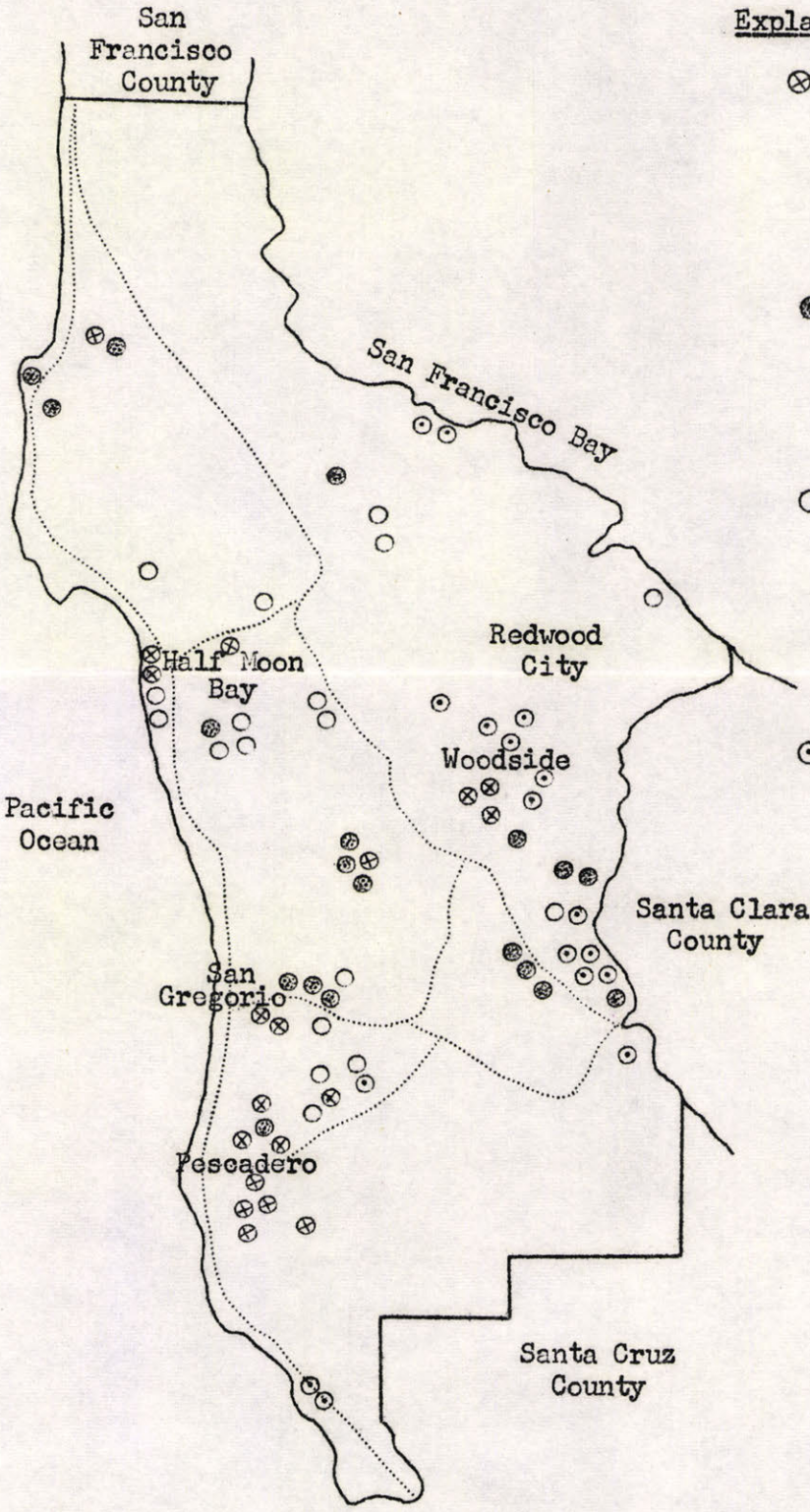
In 14 tests nitrogen was included and gave good response in all but one test. This was on an area that received a heavy application of manure which made the results unreliable. Field observations show that earlier feed can be obtained from nitrogen when adequate moisture is available.

How About Potassium?

In 8 tests, potassium was included alone or in combination with nitrogen and phosphorus. In no case did its addition increase yields.

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RESULTS OF PHOSPHORUS SOIL ANALYSIS IN SAN MATEO COUNTY



LEGEND

Explanation of Phosphate Soil Analysis

⊗ Very high - Over 1 part per million phosphorus available. Extremely seldom that response can be obtained.

◍ High- - - - .3 to 1 part per million phosphate available. Seldom can response be obtained.

○ Medium- - - --.2 to .3 parts per million. May or may not get response. Usually, additional growth is not obtained by phosphorus alone.

⊙ Low - - - - .2 or less parts per million. Phosphorus is definitely lacking and response can be usually obtained.

PHOSPHORUS STATUS OF SAN MATEO COUNTY SOILS

Results of the analysis of 73 different soils made in the county laboratory may be of interest in outlining the areas which do and do not need phosphorus applications. The analytical results may be divided into four groups -- soils very high in phosphorus, those high, those medium, and soils considered low. Results of this county wide survey are shown in the table which follows. For purposes of comparison the soils are broken down into two groups, the valley soils and the hill soils.

Available Phosphorus in San Mateo County Soils*

	Number of Tests in Each Phosphate Group			
	Very High (over 1 ppm)	High (.3-1.0)	Medium (.2-.3)	Low (below .2)
VALLEY SOILS	19	8	5	4
HILL SOILS	none	11	13	13
TOTAL	19	19	18	17

* Using Bingham water soluble phosphate method.

Of the valley soils, 19 were very high in available phosphorus and 8 were high. Some of the very high were on vegetable land with heavy manure history. Only four of this group analyzed as low and these were all in bay saline marsh areas.

None of the 37 hill soils were in the very high phosphorus group. Eleven were in the high group and mainly located in the south-central Skyline district. Most of the 18 medium phosphorus were in the same general area. Seventeen were in the low group. These were in the Woodside or north coastal hills. Location of these samples are shown in the attached outline map of the county.

SUGGESTIONS FOR FERTILIZATION OF IRRIGATED PASTURE

On pasture predominantly grass 50 to 80 lbs. actual nitrogen per acre may pay good dividends. The per cent of actual nitrogen per 100 pounds is listed on the container. Ammonium nitrate (33 1/3-0-0) contains 33-1/3 pounds actual nitrogen. Sulfate of ammonia (21-0-0) contains 21 pounds actual nitrogen. Ammonium phosphate-sulfate (16-20-0) contains 16 pounds nitrogen, 20 pounds phosphorus, and 0 pounds potassium. Nitrogen has given more response over the years than any other single fertilizer. Usually a split application, one-half in spring and one-half in early fall, gives best results.

On pastures predominately legumes 40 to 80 pounds actual phosphorus should be used where its need has been determined. Early fall seems to be the best time for application.

On pastures composed of a mixture of grasses and legumes use of both nitrogen and phosphorus fertilizers may be effective, particularly in stimulating the growth of grasses during the cool, winter season. A rate of 250 to 300 pounds total material of 16-20-0 applied early in the fall will be effective.

SUGGESTIONS FOR FERTILIZATION OF SEEDED DRYLAND PASTURES AND RANGELAND

Increased growth can usually be obtained during the cool, winter season by adding fertilizers in years when excessive rainfall is not encountered. Rates of 50 to 80 pounds actual nitrogen and 40 to 80 pounds phosphate (where needed) give the best results. This is best applied in the early fall months. Tests on annual unimproved range have shown that 50 or more pounds of actual nitrogen would greatly increase the growth of grasses during cool, winter months and may provide substantial feed for grazing at the time when unfertilized ranges are virtually bare. It may well be that the production of early feed by fertilization will not always be profitable when lands are so wet that they cannot be grazed without severely damaging the soil. Pastures overgrazed when extremely wet show low production for the following two or three years.

What About Costs?

The present day costs of fertilizers are about as follows:

Material	Price Per Pound Actual Material	Rate Per Acre	Cost Per Acre
Phosphorus alone	10¢ for P_2O_5	40 to 80 lbs.	$4.00 to $8.00
Nitrogen alone	15¢ for N_2	50 to 80 lbs.	$7.50 to $12.00
Nitrogen plus phosphorus (16-20-0)		200 pounds 400 pounds	Approx. $10.00 Approx. $20.00

Tests are being conducted in San Mateo County and elsewhere in the state by the University of California Agricultural Extension Service to determine if added costs of fertilizer can be offset by increased production either in pounds of beef or pounds of milk. Whether or not this is economically feasible will depend on price of cattle, amount of rainfall, increased feed produced, and type of pasture fertilized. (It is suggested that anyone planning to fertilize pastures and ranges, first try an area of a few acres to find whether or not the extra feed produced offsets the added costs.)

Barnyard manure is one of the best sources of plant nutrients. Every effort should be made to return all manure from barns to pasture lands.

The 25 field trials which have been discussed herein and the fertilizer response obtained are given below. We would like to thank those ranchers who have cooperated with the University of California Agricultural Extension Service in making this information available.

Cooperator	Fertilizer Response		
	Nitrogen alone	Phosphorus alone	16-20-0
Jesse Valladao	*	yes	yes
Joseph Cabral	*	no	yes
Burns Ranch	yes	no	yes
Keyston Ranch	yes	slight	
Frank Goularte	*	no	
Willowside Farm	*	no	
E. B. Towne	*	no	
Pony Tracks Ranch	yes	yes	
Clarence Digges	*	no	
Marsh and Beffa	*	no	
George Bray	yes	no	
James Humphrey	yes	yes	
E. K. Baloun	*	**	yes***
Skyway Ranch	*	no	yes
John A. Marsh	yes	yes	
Chris Mickelsen	yes	slight	
Manuel Souza	*	no	
Norman Souza	*	**	yes***
Pomponio Ranch	yes	no	
Clarence Mendes	yes	no	
Nugget Ranch	yes	no	yes
Alves Dairy	yes	no	
Mrs. Josephine Marsh	yes	no	
Elbert Marsh	yes	yes	
William Sisters	yes	no	

* Nitrogen alone not included in this test.
** Phosphorus alone not included in this test.
*** Only 16-20-0 tested.

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