UNIVERSITY OF IDAHO
College of Agriculture

A Guide For
Fertilizing Idaho Farm Crops

Good fertilization

C. G. PAINTER
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Poor fertilization

IDAHO Agricultural
Extension Service

Bulletin 325
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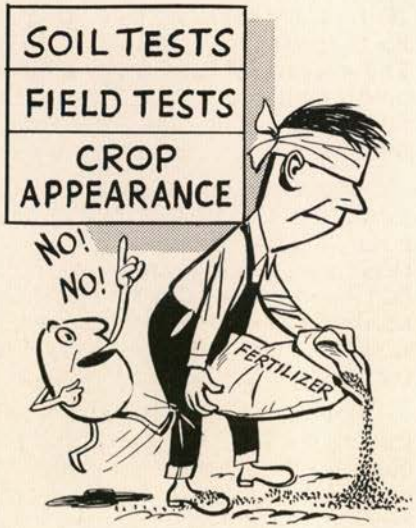
Be Sure

Test your soil to find out the kind and amount of fertilizer it needs. A test takes the guesswork out of the fertility problem. A small investment in a soil test will save large amounts.

Soil tests by the University of Idaho are available to any person in Idaho. See your county extension agent for information about collecting soil samples and the kinds of tests you can get.



The cover illustrations show benefits of proper fertilization on the Len Brady farm in Minidoka County. These potatoes were grown on soil low in fertility. The top picture shows increased growth from a heavy application of nitrogen and phosphate fertilizers. The potatoes in the bottom picture were not fertilized. The yield for the fertilized potatoes was about 300 sacks per acre, compared with about 120 sacks for the unfertilized potatoes.

A Guide for
Fertilizing Idaho Farm Crops

CHARLES G. PAINTER AND G. ORIEN BAKER*

The profit a farmer shows depends as much on his wise use of fertilizers as on any other single factor. This is true whether he is operating a row-crop farm, a dairy farm, or a cattle ranch. The success of any farming operation depends a great deal on the productiveness of the land. To produce, a soil must be fertile. A fertile soil must have a balance of plant nutrients. Commercial fertilizer can provide this balance.

Crops require at least 16 nutrient elements for growth and reproduction. Many soils are unable to supply sufficient amounts of nutrients to produce healthy, high-producing crops. The nutrients that are limiting crop production can be supplied by commercial fertilizers. The longer the soil is cropped, usually the greater is the need to apply commercial fertilizer to supply the nutrients necessary for high production. In 1958, over 100,000 tons of commercial fertilizer, costing more than 9 million dollars, were used in Idaho.

The use of commercial fertilizers is not a cure-all for low-producing soils. Other factors in production, such as disease and insect control, favorable soil structure, proper irrigation and drainage, correct tillage, good seed, weed control, and salinity and alkali correction, must be considered in the over-all production if the potential yield of the area is to be obtained.

Of the 16 plant nutrients used by crops, nitrogen and phosphorus are the two most commonly needed in Idaho soils. In certain areas potash, zinc, boron, iron, sulfur, and molybdenum may be needed to balance the soil fertility. For example, boron, sulfur, and molybdenum are needed in northern Idaho for legume production. In southern Idaho, zinc and iron may be needed on some crops. Soil tests, field trials, and observations are means of picking out these areas.

The University of Idaho has seven branch experiment stations located at various areas throughout Idaho. One of their responsibilities is to conduct fertility studies. In addition, fertilizer experiments are run on farmers' fields.

SOIL TESTS ARE AVAILABLE THROUGH THE UNIVERSITY OF IDAHO AGRICULTURAL EXTENSION AGENTS' OFFICES. Tests every three years are recommended to check on what the soil needs for fertility improvement. A farmer's own demonstrations and observations are important to help determine the need for additional plant nutrients in a certain field.

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Fall application of fertilizer is preferred, except under the following conditions:

SANDY SOIL — On sandy soils, apply nitrogen materials subject to leaching, in the spring. For row crops, apply one-half of nitrogen in seedbed and one-half at the last cultivation.

RAPID RUN-OFF OF WATER — Where water run-off and soil erosion are serious problems, apply all fertilizers in spring.

EXCESSIVE SURFACE SOIL MOISTURE — If a high water table exists or excessive water appears on or near the soil surface, apply nitrogen fertilizers in spring.

On pastures, split applications of nitrogen are preferred to give a more uniform growth of forage throughout the grazing season. Apply one-half in fall or early spring and one-half in mid-summer.

How you apply the fertilizer depends on equipment available and cost of application. Research available in Idaho does not show any increased benefit from banding over broadcasting. Good results will be obtained from either method. When practical, all fertilizer should be worked into seedbed. Broadcasting on established crops such as alfalfa or pasture is satisfactory. Apply as early as possible.

The kind and amount of commercial fertilizer that each farmer should apply to a field depends on many factors, such as potential yield, natural soil fertility, crop grown, cropping rotation, amount and kind of crop residue returned to soil, livestock manure used, green-legume manure used, and available soil moisture.

The fertilizer recommendations suggested in this bulletin are based on the above factors as shown from research, field demonstrations, and observations in crop production under Idaho's soil and climatic conditions. The recommendations are of a general nature and should be used as a guide in fitting fertilizer recommendations to local conditions. Every farmer should increase or decrease the amount of fertilizer suggested in accordance with observed results on his own farm.

AREA BREAKDOWN FOR GENERAL RATES OF FERTILIZER ON BOTH IRRIGATED AND NON-IRRIGATED SOILS ARE SHOWN ON MAPS ON OPPOSITE PAGE.

The amount of fertilizer recommended per acre in the tables is given in pounds of plant nutrients of N, P_2O_5, and K_2O in the order named.

For example, a recommendation of 120-120-0 means 120 lbs. total nitrogen, 120 lbs. available P_2O_5, and 0 lbs. K_2O per acre. To determine the pounds of fertilizer to apply per acre, divide the pounds of plant nutrient recommended by the percentage of the plant nutrient present in the fertilizer.

$$\frac{\text{Pounds of plant nutrient to be applied per acre}}{\text{Percent of plant nutrient in fertilizer to be used}} = \text{Pounds per acre of fertilizer needed per acre}$$

Example: Recommendation—120-120-80.
Fertilizer used:

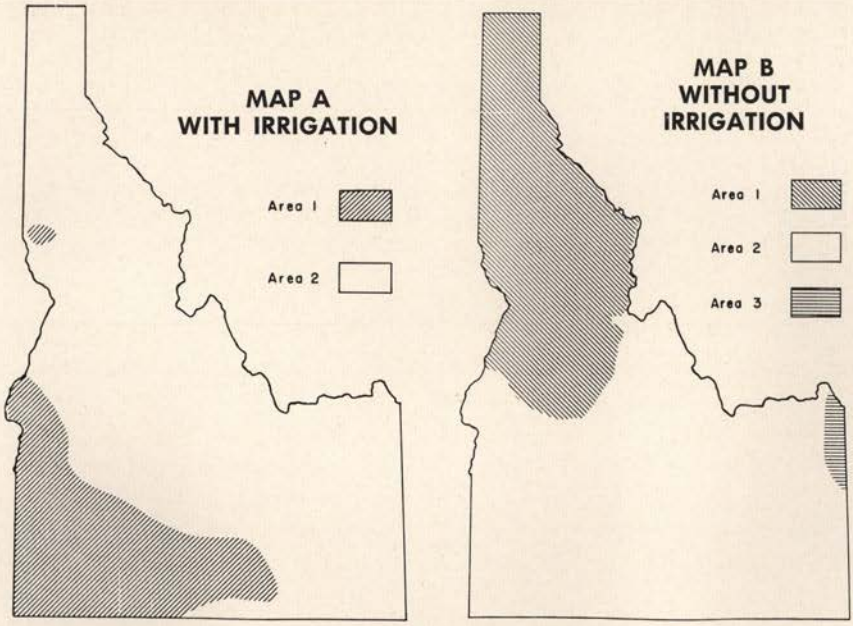
Nitrogen carrier contains 33 percent total nitrogen
Phosphorus carrier contains 42 percent available P_2O_5
Potassium carrier contains 60 percent K_2O (potash)

$$\text{Nitrogen fertilizer needed} = \frac{120}{0.33} = 364 \text{ pounds per acre.}$$

$$\text{Phosphorus fertilizer needed} = \frac{120}{0.42} = 286 \text{ pounds per acre.}$$

$$\text{Potassium fertilizer needed} = \frac{80}{0.60} = 133 \text{ pounds per acre.}$$

Any fertilizer or combination of materials which supplies the approximate amounts recommended can be used. The following table lists the main fertilizer carriers of plant nutrients available in Idaho.



Maps showing Area Breakdown for Fertilizing Idaho Crops

FERTILIZER CARRIERS OF PLANT NUTRIENTS

Percent of plant nutrients*

Fertilizer	Total Nitrogen	Available P_2O_5	Water-soluble K_2O	Zinc	Iron	Molybdenum	Sulfur	Boron
Nitrogen carriers								
Ammonium nitrate	33.5	—	—	—	—	—	—	—
Ammonium sulfate	21.	—	—	—	—	—	24	—
Anhydrous ammonia	82	—	—	—	—	—	—	—
Aqua ammonia	20	—	—	—	—	—	—	—
Calcium nitrate	15.5	—	—	—	—	—	—	—
Cyanamid	21	—	—	—	—	—	—	—
Urea	45	—	—	—	—	—	—	—
Solutions	32-42	—	—	—	—	—	—	—
Phosphorus carriers								
Treble superphosphate	—	42-52	—	—	—	—	1	—
Single superphosphate	—	19-21	—	—	—	—	10	—
Phosphoric acid	—	52	—	—	—	—	—	—
Meta phosphates	—	63	—	—	—	—	—	—
Rock phosphate	—	1-4	—	—	—	—	—	—
Potash materials								
Muriate of potash	—	—	50-62	—	—	—	—	—
Sulphate of potash	—	—	48-51	—	—	—	21-26	—
Nitrogen and phosphorus carriers								
Ammonium phosphates								
11-48-0	11	48	—	—	—	—	—	—
16-20-0	16	20	—	—	—	—	14	—
21-53-0	21	53	—	—	—	—	—	—
Ammoniate phosphates								
5-19-0	5	19	—	—	—	—	—	—
6-30-0	6	30	—	—	—	—	—	—
10-10-0	10	10	—	—	—	—	—	—
10-20-0	10	20	—	—	—	—	—	—
Ammonium nitrate phosphates (mixtures)								
23-23-0	23	23	—	—	—	—	—	—
24-20-0	24	20	—	—	—	—	—	—
27-14-0	27	14	—	—	—	—	—	—

FERTILIZER CARRIERS OF PLANT NUTRIENTS

Percent of plant nutrients*

Fertilizer	Total Nitrogen	Available P_2O_5	Water-soluble K_2O	Zinc	Iron	Molybdenum	Sulfur	Boron
Nitric phosphates								
20-20-0	20	20	—	—	—	—	—	—
20-10-0	20	10	—	—	—	—	—	—
16-16-8	16	16	8	—	—	—	—	—
14-14-14	14	14	14	—	—	—	—	—
Solutions	7-8	21-24	—	—	—	—	—	—
Mixed carriers of nitrogen, P_2O_5, and K_2O	1-22	2-32	1-20	—	—	—	—	—
Boron carriers								
Anhydrous Rasorite	—	—	—	—	—	—	—	20.2
Borax, granular	—	—	—	—	—	—	—	11.3
Plant food borates	—	—	—	—	—	—	—	14.3
Water soluble compounds								
Solubor	—	—	—	—	—	—	—	20.5
Borospray	—	—	—	—	—	—	—	18.5
Borated gypsum	—	—	—	—	—	—	—	1.0-1.5
Iron carriers								
Ferrous sulfate	—	—	—	—	25	—	—	—
Molybdenum								
Sodium molybdate	—	—	—	—	—	39	—	—
Zinc carriers								
Zinc sulfate	—	—	—	22-35	—	—	—	—
Zinc M-N-S	8	—	—	12	—	—	18	—
Zinc Oxide	—	—	—	80	—	—	—	—
Sulfur carriers								
Gypsum	—	—	—	—	—	—	16-18	—
Soil sulfur	—	—	—	—	—	—	10-99	—

* Check label on containers for the percent nutrients.

A GUIDE FOR FERTILIZING CROPS GROWN UNDER IRRIGATION IN IDAHO

AREA 1 — VEGETABLE CROPS (SEE MAP A)

Crop	Pounds of plant nutrients to apply per acre				
	$N-P_2O_5-K_2O$	$N-P_2O_5-K_2O$	$N-P_2O_5-K_2O$	$N-P_2O_5-K_2O$	$N-P_2O_5-K_2O$
	Following a row crop or non-legume green manure	Following alfalfa—crop removed	Following a legume green manure where one ton per acre of air-dry hay is plowed under	Following grain or grass, stubble removed (See Note 4)	New land just cleared from sagebrush
Asparagus	140-120-0	100-120-0	80-120-0	160-120-0	140-120-0
Beans—Snap	0-0-0	0-0-0	0-0-0	60-0-0	60-0-0
Lima					
Root Crops: Beets, Carrots, Parsnips, Rutabagas, Turnips	140-80-0	100-80-0	80-80-0	160-80-0	140-80-0
Vine Crops: Cucumbers, Muskmelons, Pumpkins, Squash, Watermelons	80-60-0	40-60-0	20-60-0	100-60-0	80-60-0
Leaf Crops: Broccoli, Cabbage, Cauliflower, Lettuce	100-60-0	60-60-0	40-60-0	120-60-0	100-60-0
Bulb Crops:					
Onions	140-120-0	100-120-0	80-120-0	160-120-0	140-120-0
Garlic	100-60-0	60-60-0	40-60-0	120-60-0	100-60-0
Peas—row or broadcast	40-40-0	0-40-0	0-40-0	60-40-0	40-40-0
Sweet Corn	120-60-0	80-60-0	60-60-0	140-60-0	120-60-0
Mint	80-40-0	40-40-0	20-40-0	100-40-0	80-40-0

Factors changing rates as shown

1. A **soil test** is the best guide to the amount of P_2O_5 to apply. When soil levels are low, increase rates 40 lbs. per acre; when high, decrease rates 60-120 lbs. per acre.
2. Reduce P_2O_5 rates 2 lbs. per acre for each ton of manure applied.
3. Reduce nitrogen rates 4 lbs. per acre for each ton of manure applied.
4. When grain stubble is returned to soil, apply an additional 20 lbs. nitrogen per ton of straw on row crops and grains.
5. Apply potash (60-120 lbs. K_2O per acre) where soil tests indicate a low level and where irrigation water is low in this nutrient; or where trials on farm have shown an economical return on dollars invested.
6. Additional nitrogen may be required on pastures.
7. If zinc deficiency symptoms appear on other crops, apply 10 lbs. zinc per acre in seed bed.

A GUIDE FOR FERTILIZING CROPS GROWN UNDER IRRIGATION IN IDAHO

AREA 1 — FIELD CROPS (SEE MAP A)

Pounds of plant nutrients to apply per acre

Crop	N-P_2O_5-K_2O Following a row crop or non-legume green manure	N-P_2O_5-K_2O Following alfalfa—crop removed	N-P_2O_5-K_2O Following a legume green manure where one ton per acre of air-dry hay is plowed under	N-P_2O_5-K_2O Following grain or grass, stubble removed (See Note 4)	N-P_2O_5-K_2O New land just cleared from sagebrush
Alfalfa	0-120-0	0-120-0	—	0-120-0	0-120-0
Clovers	0-120-0	—	—	0-120-0	0-120-0
Peas	0-80-0	0-80-0	0-80-0	0-80-0	0-80-0
Beans	0-0-0	0-0-0	0-0-0	60-0-0	60-0-0
Beets	140-120-0	100-120-0	80-120-0	160-120-0	140-120-0
Potatoes	140-120-0	100-120-0	80-120-0	160-120-0	140-120-0
Field Corn	140-60-0	100-60-0	80-60-0	160-60-0	140-60-0
Tomatoes	180-120-0	140-120-0	120-120-0	200-120-0	180-120-0
Small grain	60-0-0	20-0-0	0-0-0	80-0-0	80-0-0
Grass legume pasture New seeding	40-80-0	—	—	60-80-0	60-80-0
	Use 100-80-0 on established pastures with less than 25-30 per cent legumes				
New seeding—grass for seed production	40-40-0	0-40-0	0-40-0	60-40-0	60-40-0
Established	Use 80-40-0 after establishment				
Lawns	Apply two applications per year of one lb. nitrogen per 1000 sq. ft. for grass. If legumes are preferred in mixture, apply one lb. P_2O_5 per 1000 sq. ft.				
Gardens	Apply in seed bed 2 lbs. nitrogen and 2 lbs. P_2O_5 per 1000 sq. ft.				
Hops	120-120-0	Apply 20-30 lbs. zinc per acre every 4 years.			

Factors changing rates as shown

1. A **soil test** is the best guide to the amount of P_2O_5 to apply. When soil levels are low, increase rates 40 lbs. per acre; when high, decrease rates 60-120 lbs. per acre.
2. Reduce P_2O_5 rates 2 lbs. per acre for each ton of manure applied.
3. Reduce nitrogen rates 4 lbs. per acre for each ton of manure applied.
4. When grain stubble is returned to soil, apply an additional 20 lbs. nitrogen per ton of straw on row crops and grains.
5. Apply potash (60-120 lbs. K_2O per acre) where soil tests indicate a low level and where irrigation water is low in this nutrient; or where trials on farm have shown an economical return on dollars invested.
6. Additional nitrogen may be required on pastures.
7. If zinc deficiency symptoms appear on other crops, apply 10 lbs. zinc per acre in seed bed.

A GUIDE FOR FERTILIZING CROPS GROWN UNDER IRRIGATION IN IDAHO

AREA 2 — FIELD CROPS (SEE MAP A)*

Crop	Pounds of plant nutrients to apply per acre				
	$N\text{-}P_2O_5\text{-}K_2O$	$N\text{-}P_2O_5\text{-}K_2O$	$N\text{-}P_2O_5\text{-}K_2O$	$N\text{-}P_2O_5\text{-}K_2O$	$N\text{-}P_2O_5\text{-}K_2O$
	Following a row crop or non-legume green manure	Following alfalfa—crop removed	Following a legume green manure where one ton per acre of air-dry hay is plowed under	Following grain or grass, stubble removed (See Note 4)	New land just cleared from sagebrush
Alfalfa	0-80-0	0-80-0	—	0-80-0	0-80-0
Clovers	0-80-0	—	—	0-80-0	0-80-0
Peas	0-60-0	0-60-0	0-60-0	0-60-0	0-60-0
Beans	0-0-0	0-0-0	0-0-0	60-0-0	60-0-0
Beets	100-80-0	60-80-0	40-80-0	120-80-0	100-80-0
Potatoes	100-80-0	60-80-0	40-80-0	120-80-0	100-80-0
Field Corn	100-40-0	60-40-0	40-40-0	120-40-0	100-40-0
Small grain	60-0-0	20-0-0	0-0-0	80-0-0	80-0-0
Grass legume pasture New seeding	40-80-0	—	—	60-80-0	60-80-0
	Use 100-80-0 on established pastures with less than 25-30 per cent legumes.				
New seeding—grass for seed production	40-40-0	0-40-0	0-40-0	60-40-0	60-40-0
Established	Use 80-40-0 after establishment				
Lawns	Apply two applications per year of one lb. nitrogen per 1000 sq. ft. for grass. If legumes are preferred in mixture, apply one lb. P_2O_5 per 1000 sq. ft.				
Gardens	Apply in seed bed 2 lbs. nitrogen and 2 lbs. P_2O_5 per 1000 sq. ft.				

Factors changing rates as shown

1. A **soil test** is the best guide to the amount of P_2O_5 to apply. When soil levels are low, increase rates 40 lbs. per acre; when high, decrease rates 60-80 lbs. per acre.
2. Reduce P_2O_5 rates 2 lbs. per acre for each ton of manure applied.
3. Reduce nitrogen rates 4 lbs. per acre for each ton of manure applied.
4. When grain stubble is returned to soil, apply an additional 20 lbs. nitrogen per ton of straw on row crops and grains.
5. Apply potash (60-80 lbs. K_2O per acre) where soil tests indicate a low level and where irrigation water is low in this nutrient; or where trials on farm have shown an economical return on dollars invested.
6. Additional nitrogen may be required on pastures.
7. If zinc deficiency symptoms appear on other crops, apply 10 lbs. zinc per acre in seed bed.

* In Northern Idaho, apply boron and sulfur at rates suggested for non-irrigated crops.

A GUIDE FOR FERTILIZING FRUIT CROPS IN IDAHO

ALL AREAS (SEE MAPS A AND B)

Pounds of plant nutrients to apply			Time and method of application
N	P_2O_5	K_2O	
Depends on tree performance. As a general recommendation use 1/5 lb. of amm. sulfate per year of tree's age. A 15-year-old tree would require 3 pounds of amm. sulfate or its equivalent.	Fruit trees seldom respond directly to phosphate fertilization. If cover crops require phosphate, follow recommendation on field crops and the tree will indirectly benefit.	In most orchard soils, sufficient potash is present for satisfactory production of quality fruit.	Apply at least 6 weeks before bloom. When heavy rate is used, a split application may be preferred. In such case one half is applied in the fall and the remainder 6 weeks before bloom. **Method.** Apply broadcast from a few feet of the trunk of the tree to 2 to 3 feet beyond the spread of the branches. **Response** is not always readily apparent on good soils, but moderate annual applications of nitrogen will result in greater production over a period of years. **Color.** Too much nitrogen reduces color; hence it should be applied well before bloom to increase set and assure its use before coloring of fruit. **Maturity.** As a rule, too much nitrogen delays maturity with most fruits.
	Use soil test to determine needs of these two nutrients.		

Apply Only if Deficiency is Known to Exist

Element needed	Symptoms	Recommendations and time of application
Zinc	Rosette or Little leaf (Rosetted small, narrow leaves, often chlorotic between veins)	Spray fifteen pounds of 36% zinc sulfate to 100 gallons of water as late dormant spray usually in February or early March for correction.
Iron	Chlorosis (Characteristic yellowing of foliage with leaf veins remaining green except in very severe cases)	Salts of iron such as iron ammonium citrate, placed in 00 capsules in holes 3/8" in diameter bored 3" apart in a spiral pattern around the tree and sealed with grafting wax, asphalt tree healing compound, or some other sealing material, have given good results Care should be taken that the outer end of the capsule is ¼" from cambium layer to avoid injury. Apply in March or April for best results. Treatment is about 80% effective and lasts 2 years. Ferrous sulfate sprays at 4 lbs. per 100 gallons on the foliage have given varied results on apples, pears, peaches. Treatment is most effective when leaves are young. Some burning will result. Various iron chelates have given fair results at the rate of 1 lb. to 100 gallons of water.
Boron (Only known to occur in northern Idaho)	Internal or external cork, misshapen fruit, cracked fruit, and premature dropping of fruit. The symptoms may include dieback and witches broom.	Borax at the rate of 30-40 lbs. per acre or ½ lb. per tree, once every three years, broadcast evenly on the soil in the fall will usually correct this disorder. The equivalent boron may be applied in other carriers. Sprays may also be used. Solubor or Borospray can be applied at ½ lb. per hundred gallons of water anytime when the trees are in leaf. Apply one lb. when first used on trees. Sprays are considered more effective when applied during the first or second cover.

A GUIDE FOR FERTILIZING CROPS GROWN WITHOUT IRRIGATION IN IDAHO

AREA 1 (SEE MAP B)

Pounds of plant nutrients to apply per acre

Crop	$N-P_2O_5-K_2O$ After fallow	$N-P_2O_5-K_2O$ Following green manure	$N-P_2O_5-K_2O$ Following grain or grass	$N-P_2O_5-K_2O$ Following peas
Wheat	30-0-0	0-0-0	50-0-0	40-0-0
Barley or oats	20-0-0	0-0-0	40-0-0	30-0-0
Grass seed				
New seeding	0-0-0	0-0-0	60-0-0	30-0-0
Established stand	—	—	60-0-0	
Grass legume pasture				
New seeding	20-0-0	0-0-0	40-0-0	30-0-0
Use 60-0-0 on established pastures with less than 25-30 per cent legumes				
Peas	0-0-0	0-0-0	0-0-0	0-0-0
Alfalfa or clover hay	0-0-0	0-0-0	0-0-0	0-0-0
Sweet clover	0-0-0	0-0-0	0-0-0	0-0-0
Clover seed	0-0-0	0-0-0	0-0-0	0-0-0

Factors changing rates as shown

1. Increase nitrogen rates 20 lbs. per acre on grain and grasses when moisture conditions are favorable or above normal.
2. Apply 60 lbs. P_2O_5 per acre on crops when soil tests indicate a low level.
3. If soil test indicates need for potash, apply 60 lbs. K_2O per acre.
4. Apply 150 lbs. gypsum per acre to alfalfa, clover hays and sweet clover when sulfur has not been used in the rotation. Where boron deficiency is present, substitute borated gypsum for regular gypsum.
5. Apply 40 lbs. borax per acre to alfalfa, clover hays, and sweet clover every third year in deficiency areas if borated gypsum does not correct condition.
6. Apply 100 lbs. of gypsum to peas or clover seed when sulfur has not been used in rotation.
7. Apply molybdenum-containing materials directly to seed according to directions on container.

A GUIDE FOR FERTILIZING CROPS GROWN WITHOUT IRRIGATION IN IDAHO

AREA 2 (SEE MAP B)

Crop	Pounds of plant nutrients to apply per acre N-P_2O_5-K_2O After fallow	N-P_2O_5-K_2O Following green manure	N-P_2O_5-K_2O Following grain or grass
Alfalfa or sweet clover	0-0-0	0-0-0	0-0-0
Grain	20-0-0	0-0-0	30-0-0
Grass for seed	0-0-0	0-0-0	40-0-0 Apply this rate after establishment
Grass legume pasture New seeding	20-0-0	0-0-0	30-0-0

Use 30-0-0 on established pastures with less than 25-30% legumes.

Factors changing rates as shown

1. When soil test shows low P_2O_5 level, apply 60 lbs. P_2O_5 per acre.
2. When moisture conditions are favorable or above normal, increase nitrogen rates on grain and grass 20 lbs. per acre.
3. In higher-rainfall areas (above 16 in.) increase nitrogen rates 20 lbs. per acre.
4. When moisture is below normal, reduce nitrogen rates.
5. If soil test indicates need for potash, apply 40 lbs. K_2O per acre.

A GUIDE FOR FERTILIZING CROPS GROWN WITHOUT IRRIGATION IN IDAHO

AREA 3 (SEE MAP B)

Research at the Tetonia Branch Experiment Station has shown that the nitrogen fertility is sufficient to take care of most crop production. A soil test should be used to determine the need of phosphorus and potassium.

ACKNOWLEDGMENTS

Research personnel of the University of Idaho Agricultural Experiment Station and specialists of the Agricultural Extension Service assisted in preparing this bulletin.

Remember

- Fertilization is only one of several factors needed in good soil management for satisfactory yield and quality of product.
- The amount of nitrogen and phosphorus you need will vary from year to year. Use the fertilizer that fits your crop and soil needs. A reliable soil test will help.
- Do not place nitrogen and potash fertilizers in direct contact with seed. Damage to seed germination and emergence may result.
- Know what is in the fertilizer bag or container. Every fertilizer container or tag should show the guaranteed amount of plant nutrients you are buying. Read it.
- Money spent for commercial fertilizer is a wise investment only when nutrients added are needed to balance soil fertility.

Other University of Idaho Publications on Fertilizers

Nitrogen — What Farmers Should Know About It. Extension Bulletin No. 275.

What Farmers Should Know About Phosphorus. Extension Bulletin No. 276.

Fertilizer Materials For Idaho Farmers. Extension Bulletin No. 283.

Plants Need Food — Know The Signs of Plant Food Deficiency Extension Circular No. 110.

Buy Commercial Fertilizers Wisely. Extension Circular No. 112.

Bean Fertilization In Southern Idaho. Experiment Station Bulletin No. 299.

Residual Influence of Phosphate Fertilizer Applied to a Calcareous Soil Over a Six-Year Period. Research Bulletin No. 41.

Fertilizer Studies on Russet Burbank Potatoes In Southern Idaho. Experiment Station Bulletin No. 281.

Sulfur Uptake and Residual Studies In Northern Idaho Using Radio Sulfur. Research Bulletin No. 42.

Fertilizers For Sweet Corn. Experiment Station Bulletin No. 223.

Copies may be obtained from county agricultural agents; or by writing to the University of Idaho, College of Agriculture, Moscow; or the University of Idaho Agricultural Extension Service, Boise.

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