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FALL FERTILIZATION IN IDAHO



C. G. Painter
G. O. Baker
R. W. Harder

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FALL FERTILIZATION IN IDAHO

Under most Idaho conditions, fall fertilization is considered a desirable practice for both irrigated and dry-land crops. Phosphorus, potassium, sulfur, zinc and boron, where needed, can be applied in the fall with satisfactory yield increases more generally than nitrogen.

Nitrogen may be used to advantage in the fall on soils that are well but not excessively drained. Fall-applied nitrogen may be lost by denitrification when applied to soils that are poorly drained and from very sandy soils where it may be leached below the root zone.

Advantages of Fall Fertilization

- More convenient—work is not as pressing and the soil is dry so there is no problem in getting the fertilizer equipment on the land.
- There is normally a better supply of the different fertilizers available in the fall. Fall purchase helps the fertilizer dealer spread his sales over a longer period and makes it possible for him to give better service to his customers.
- No delay in planting.
- Less soil compaction from equipment as soil is generally drier in fall.
- Material can be worked into seedbed on fall-seeded crops.

Disadvantages of Fall Fertilization

- Where financing is necessary, the loan must be for a longer period.
- The fertilizer applied for a specific crop in the fall may not be adapted to another crop if conditions make it necessary to change plans.
- Loss of nitrogen may occur under certain soil conditions such as poor drainage, excessive leaching and soil erosion.

Idaho Research Has Shown

- Application of phosphate can be made at any time except when the ground is frozen.
- There is a carry-over effect from phosphorus and it is related to the rate of application.
- On eroded ridges and knobs testing low in available phosphorus, fall-applied phosphor-

On poorly drained soils, soils subject to excessive leaching and grass pastures, most of the nitrogen should be applied in the spring. Split applications of nitrogen on pastures during growing season give greater yields and more uniformity in grazing.



us has increased wheat yields. The average results from 10 experiments in 1962 are shown in Table 1.

Table 1. Fertilizer Response of Winter Wheat Grown on Eroded Ridges and Nobs Testing Low in Available Phosphorus in the Palouse Area

Fertilizer treatment	Yield bu. per acre	Increase over no fertilizer
No fertilizer	15.7	—
80 pounds P_2O_5 per acre	26.3	10.6
90 pounds nitrogen per acre	18.6	2.9
90 pounds nitrogen plus 80 pounds P_2O_5 per acre	31.6	15.9

The phosphorus fertilizer was worked into seedbed prior to seeding of winter wheat.

- A 15-year study at Moscow, Idaho, Table 2, shows fall-applied nitrogen more effective than spring applications.

Table 2. Fall vs. Spring Fertilization of Continuous Winter Wheat Grown on Palouse Silt Loam

Treatment	Average yield for 15 years	
	Yield bu. per acre	Increase over no fertilizer
No nitrogen	22.0	—
20 pounds nitrogen in spring	27.3	5.3
30 pounds nitrogen in fall	32.1	10.1
40 pounds nitrogen in spring	32.1	10.1

- Off-station investigations near Moscow have shown better results from fall-applied nitrogen on well drained soils. The results of two experiments are shown in Table 3.
- The University of Idaho has not conducted any fall vs. spring fertilizer application on

Table 3. Fall vs. Spring Fertilization of Winter Wheat Average 2 Experiments

Treatment	Yield bu. per acre	Increase over no fertilizer
No nitrogen	34.9	—
50 pounds nitrogen in fall	47.5	12.6
50 pounds nitrogen in spring	41.8	6.9
100 pounds nitrogen in fall	53.0	18.1
100 pounds nitrogen in spring	44.1	9.2

the other cash crops; but the Utah-Idaho Sugar Company has been checking time of fertilizer application on sugar beet production for a period of 15 years. The average results are shown in Table 4. The yield of sugar beets indicates a favorable response to fall-applied fertilizer. Similar results could be expected on other row crops grown in Idaho.



Fall-applied phosphorus on surface of established alfalfa crop gives satisfactory results as shown above.

Table 4. Comparison of the Time of Application of Fertilizer on Sugar Beets*

Treatment	Yield of Sugar Beets Per Acre		
	Wash. Tons	Utah Tons	Idaho Tons
Check—(No Fertilizer application)	21.00	15.64	12.55
Plowed down in the fall	26.93	19.02	15.53
Disced into seedbed in spring	25.10	18.15	14.97
Sidedressed after thinning ..	26.53	18.58	14.75
Split $\frac{1}{2}$ at planting, $\frac{1}{2}$ after thinning	26.45	18.65	14.86

*These tests involved nitrogen alone, phosphate fertilizers alone, and mixed fertilizers such as 27-14-0 or 24-20-0. Rates varied in each area. Inasmuch as there were no significant interaction effects, rates and fields have been averaged, and each yield shown above is the average of 20 individual plots.

- Twenty pounds of agricultural borax applied in the fall was as effective as 40 pounds applied in the spring in correcting a boron deficiency in alfalfa in northern Idaho.
- Where sulfur is deficient for crop growth, fall applications are satisfactory.
- While the University of Idaho has not investigated the fall application of zinc, there is evidence which indicates it would be a desirable practice since it does not move in the soil and the residual effect lasts three to five years.
- Spring fertilization with nitrogen has resulted in higher yields than fall fertilization on soils with a slowly permeable subsoil which maintains a temporary perched water table in the winter and spring. Under these conditions it is believed the nitrogen is lost primarily by denitrification and by lateral movement down slope on top of restrictive layer.

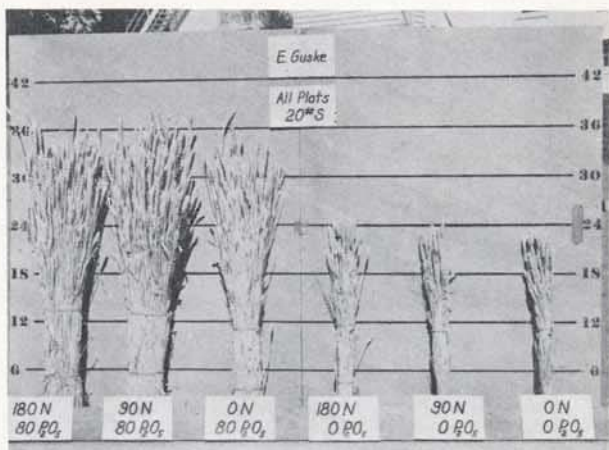
Nitrogen fertilizer applied to grass pasture on a poorly-drained soil near Driggs, Idaho, gave greater yields from spring application as shown in Table 5.

Table 5. Spring vs. Fall Application of Nitrogen on Grass Pasture

Pounds nitrogen per acre	Tons per acre, air-dry hay	
	Spring	Fall
0	1.26	1.29
40	1.95	1.66
80	2.20	1.92
120	2.29	2.01
Average	1.92	1.72

Remember:

- Fall fertilization is a desirable practice under most conditions for Idaho crops.
- When applied in fall, plow under or work fertilizer into seedbed. Don't leave nitrogen materials on bare soil surface.
- All fertilizers can be applied to surface of established crops such as legumes and grasses.
- Most of the nitrogen fertilizer should be applied to grass pastures in spring and summer months with split applications.
- Don't apply nitrogen in fall to poorly-drained soils or to soils subject to excess leaching.
- Soil tests are your best guide to determine what fertilizer you need. Get your samples in early for testing.



Three bundles of grain on left showing effect of fall-applied phosphorus with three nitrogen rates compared with three bundles on right receiving no phosphorus.

Publication was prepared by C. G. Painter, G. O. Baker, and R. W. Harder, Extension Soils Specialist, Soil Technologist, and Associate Soil Scientist, respectively; University of Idaho.