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0 10 50 10 100 10 0 10

FALLOW

ON 1111SHMEAD

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50 10

ANNUAL
CROP

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N-S

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Cropping and Fertilizing Wheat and Barley In the Camas Prairie Fairfield Area

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Wheat and barley grown every year with pro-

per fertilization yielded as well as or better than

when grown after fallow without fertilizer. Suc-

cessful annual cropping requires: (1) selecting nor-

Precipitation in the Camas Prairie usually ranges be-tween 14 and 17 inches per year. About three-quarters of it comes in the winter as snow. A high water table is nor-mally found in the spring, even on fields cropped the previous year. Therefore, fallowing does not usually increase the stor-ed soil moisture.

Fallowing does increase available nitrogen and sulfur and helps control weeds. During 3 years, 33 experiments were conducted near Fairfield in Camas County to determine if fertilizers could meet nutrient requirements and if 2, 4-D could replace fallowing for weed control in an annual crop-ping system.

Selecting Fields for Annual Cropping

Most medium-textured soils can be successfully cropped every year. These soils included the Simonton, Brinegar, Rands and Strom series. Some gravel in the soil profile can be tolerated though not so much to restrict root develop-ment and soil moisture movement. Coarse-textured Riceton sandy loam soil produced poor crops of wheat and barley

Comparable bundle yield samples from fallow and annual crop-ping plots on the Arlin Ash mead farm near Fairfield.

mat medium-textured (not droughty) soils, (2)

controlling weeds, and (3) applying adequate

nitrogen and sulfur. In general, annual cropping is

a soil-conserving practice.

when cropped annually because of its low water-holding capacity. Cleek loam has an impervious subsoil so it produced a spotty crop, depending on variations in the subsoil.
Weeds must also be controllable without fallow, for suc-cessful annual cropping. If herbicides such as 2, 4-D or MCP will not control weeds, summerfaliow may be needed. When fallowing for weed control, every effort should be made to eliminate weeds. For example, perennial weeds should not be allowed to grow, nor should annual weeds be allowed to go to seed. However, cultivation during the fallow for other than weed control is usually not warranted.

Balancing Nitrogen and Sulfur

Cereals grown without sulfur (S) were yellow, small and unthrifty, especially when nitrogen (N) was applied under annual cropping (Fig. 1). On soils low in S, as on the Camas Prairie, at least 1 pound of available S is needed for every 10 pounds of N applied. S is available in ammonium sulfate (24% S), gypsum (18% 51 and in several liquid fertilizers. Although ammonium sulfate contains more S than is needed for the N it contains, the extra S will neither harm nor help the yield. A blend of two or more fertilizers can be mixed commercially to provide the desired ratio of N to S (10 to 11. In another study on the Camas Prairie, most of the sulfur from either ammonium sulfate or gypsum leached out of the top 1 foot of soil during the winter." Therefore, either product must be applied in the spring for maximum use by the seed-ling. The fertilizer should be applied before or at planting. Unless elemental sulfur 1100% 5) is ground extremely fine or used in large quantities, it will not provide adequate avail-able sulfur immediately.

Other Fertilizers

Phosphorus, potassium and zinc fertilizers were tested but none proved beneficial in this area. Soil tests for these elements are reliable and should be used for identifying problem areas.

' D. T. Westermann. Unpublished data on alfalfa sulfur relation-ships, 1974 Annual Research Report, Snake River Conservation Research Center, Kimberly.

With Sulfur

\Without Sulfur

25 50 75 100

NITROGEN APPLIED — lbs/A

Fig. 1. Wheat yield response to nitrogen fertilizer with and without adequate sulfur on annually cropped plots
(data from two years).
On Follow

45
0

0

40

35

0

T- 30 ›-

4

25

20

Annually Cropped

50 75 100 15

0

On Follow

25

NITROGEN lbs/A

(Adequate Sulfur Included)

co 25

W 0

T- 20

1 50

0

"-Annual Cropped

25 50 75 100

NITROGEN lbs /A
(Adequate Sulfur Included)
Fig. 2. Wheat yield response to nitrogen rates, with adequate sulfur, under two cropping systems.
Fig. 3. At right: Barley yield response to nitrogen rates under two cropping systems.

Wheat Yields and Quality
Yields of 24 bushels per acre were produced with 75 lbs N/acre (with S) applied to annually cropped wheat or with 25 lbs N/acre (with S) applied to wheat after fallow (Fig. Wheat test weight and protein content were about equal under fallow and annual cropping with various N S application rates. Therefore, on selected fields and with che-mical weed control, annual cropping with sufficient N and S provides an economic advantage.

Barley Yields and Quality
Barley yields from annual cropping with 75 lbs N/acre (with 5) were about equal to yields from fallow plots fertilized with 25 lbs N/acre (38 bushels per acre). Yield curves are shown in Fig. 3.
Barley test weight and kernel size were good from most

treatments, although slightly below malting grade on some nonfertilized annually cropped plots. The protein content was about 9 percent, acceptable for malting but slightly low for feed barley. Other micro-malting tests showed that the bar-ley had a good malting quality.
Therefore, annual cropping barley with proper fertiliza-tion on selected fields where weeds can be controlled pro-vides an economic opportunity.

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