Cooperative Extension
Colorado State University, Fort Collins, Colorado 80523

Colorado State University

AGRON-  -GRAM

November, 1990

TABLE OF CONTENTS

COLORADO SEED GROWERS ANNUAL MEETING

The Colorado Seed Growers Association (CSGA) Annual Meeting will be held on **November 29 and 30** at the Embassy Suites Southeast, in Denver. Extension Personnel involved with the certified seed program are invited. The schedule is as follows:

Thursday, November 29

8:00A Registration and Coffee -Yosemite
9:15 General Session
9:30 Commodity Committee Meetings
Small Grains, Dry Beans and Grasses

12:00P Seed Growers Luncheon
1:30 Colorado Seed Growers Association
Annual Business Meeting
5:30 Seed Growers/Seedsmens
Association Social

Friday, November 30

8:00A Registration and Coffee - Yosemite
8:45 Plant Variety Protection Workshop
Opening Remarks
Gene Ford
Colorado Seed Growers Association
Gene Millstein
Colorado Seedsmens Association
President Albert Yates
Colorado State University
Seed Certification and PVP
Seeds of Promise Slide Show
What is PVP?
Don Hijar, Garrison Seed Company
The Seed Grower and PVP
Gil Perry, Perry Bros. Seed Co.
A Case Study in PVP
Ken Madden, Pioneer Hi-Bred Int'l.
Making PVP Work
Bruce Stein, Asgrow Seed Co.
Question and Answer on PVP

12:15P Lunch
1:30 Marketing Your Product
Always Buy Colorado
Pat Duran, ABC Program
Kansas White Wheat Program
Ken Syms, KS White Wheat Assn
Colorado Wheat Bread
Darrell Hanavan, Colorado Wheat Administrative Committee
3:15 *Colorado Water Quality*
Bill O'Hare, National Hog Farms
3:45 *A Look at the National Seed Storage Lab*
Loren Weisner, NSSL Curator
6:00 Social Hour
7:30 Banquet
8:30 *Comedy and Country Tune Wrangling*
Masterson and Blackburn

There should be a lot of good information given that will be of interest to Extension

workers. Registration forms will be sent shortly. If you do not receive one, call Colorado Seed Growers Office, 303/491-6202, for details. (Stanelle)

DRYLAND WHEAT PROTEIN LEVEL AND NITROGEN MANAGEMENT

Using nitrogen fertilizer will increase the grain protein level. Therefore, farmers can determine if their nitrogen fertilizer rate was adequate from grain protein levels. The following classification is suggested for practical purposes. If grain protein level is less than 10%, the rate of nitrogen fertilizer was probably lower than optimal. If grain protein level is between 10% and 11%, it is hard to tell whether fertilizer nitrogen rate was adequate. But if grain protein level is more than 11%, nitrogen fertilization rate was probably adequate.

Another question is whether one can determine the optimum rate of nitrogen fertilizer to apply to wheat by knowing the protein level. The answer is negative, as can be observed from Table 1.

Table 1 Percent grain protein as related to maximum yields

% Grain Protein (Range)	Relative Yield % of Maximum (Range)
8-9	65-90
9-10	65-93
10-11	40-100
11-13	85-100

In summary, farmers should use grain protein to determine the adequacy of nitrogen fertilizer rates. But, grain protein level cannot be used to make a fertilizer recommendation because protein level is affected by yield, drought, and other factors in addition to the nitrogen fertilizer rate. The results also showed that nitrogen fertilization increased grain protein level regardless of yield response to nitrogen. (Soltanpour)

NITROGEN FIXATION

Nitrogen fertilizer prices are expected to rise soon because of higher oil prices and producers will be looking for ways to reduce plant nutrient costs. A legume rotation will provide some needed nitrogen for optimum yields in other crops. Nitrogen fixation is again being thought of as a source of nutrients.

Legumes have the ability to live in mutual cooperation (symbiosis) with nitrogen fixing bacteria such as Rhizobium which form nodules on their roots. The plant furnishes the necessary energy used by these bacteria enabling them to fix nitrogen from the air.

Soon after a legume seedling germinates, rhizobia invade the root hairs forming nodules. The presence of nodules does not guarantee that nitrogen is being fixed. Healthy nodules are pink when cut open while ineffective nodules may be brown or white in color.

Rhizobia are host specific. Some types will effectively inoculate alfalfa and sweetclover while other types are necessary to inoculate clover, vetch, trefoil, beans and other legumes.

Factors affecting nodule effectiveness depend of the kind of legume, type of rhizobia, conditions present in the soil, and presence of necessary plant nutrients (other than nitrogen) to maintain plant health.

better than high temperatures. Soils high in nitrogen reduce nitrogen fixation. The rate of nitrogen fixation from annual plants is expected to increase until plant maturity, and then decrease to zero with plant senescence, then releasing the remaining nitrogen. The rate of nitrogen fixation on perennial plants such as alfalfa is expected to remain constant as long as growing conditions remain the same over years. Any deviation such as a soil pH change or reduction of alfalfa stand would change the rate of nitrogen fixation. Relative annual rates of nitrogen fixation by different legumes are in Table 2.

Table 2 Annual nitrogen fixation from various sources.

Source	N_2 fixed-lb/A
Alfalfa	115-535
Lupin	135-150
Soybeans	50-85
Sweetclover	120
Vetch	80
Clover (other)	90-140

The nitrogen values listed do not indicate net additional amounts added to the soil. Growing plants such as alfalfa will use about 200 pounds of nitrogen per acre, depending on yield and growing conditions. Soil tests on growing fields of alfalfa show extremely low levels of nitrogen. When the crop is destroyed, and the rotation is continued, 50-100 lbs/A of additional nitrogen for crop use can be expected. Thirty pounds of nitrogen is expected from a previous crop of dry beans.

Additional nitrogen release is expected the second year for rotational crops.

It is important to inoculate legume seed with the proper inoculant, prior to planting. To insure viable bacterium, proper care of inoculant and seed prior to planting is mandatory. (Croissant)

THE DRY EDIBLE BEAN CROP IN 1990

Total dry edible bean estimated production in the U.S. for 1990 is estimated by the USDA at 32 million cwt. The production is 32% higher than last year due to a 26% increase in acres planted (1.6 vs 2.1 million acres in 1989 & 1990, respectively), and an average yield increase of 66 pounds per acre. The leading state for production of all bean types was Michigan, followed closely by North Dakota (Table 3).

Table 3 Estimated Dry Bean Crop Report - 1990 USDA

STATE	Hvst Acres x 1000	Lbs Produced x 1000
California	165	3,126
Colorado	220	3,630
Idaho	178	3,560
Kansas	38	665
Michigan	350	5,600
Minnesota	130	1,690
Nebraska	245	4,655
New York	35	595
North Dakota	600	5,400
Texas	230	322
Washington	490	980
Wyoming	510	969
Others	44	844
Total US	2,128	32,036

Total pinto bean production estimation by USDA was highest in the North Dakota/Minnesota region at 3.5 to 4 million cwt, while Colorado ranked second with 3.5 million cwt (Table 4).

Table 4 Total pinto bean production estimated by USDA, 1990.

State	lbs Produced x 1000
North Dakota/Minnesota	3,500-4,000
Colorado	3,500
Nebraska	2,000
Idaho	2,000
Wyoming	1,000-2,000
Other	1,000-2,000

Total pinto production is projected at 13 to 14 million cwt by traders in North Dakota but others have projected higher figures. (Brick)

LOWERING SOIL pH

We are frequently asked how to reduce soil pH on calcareous soils. Lowering the soil pH is difficult, expensive and usually not very beneficial. Good yields can be achieved on soils having a pH 8.0 or higher with proper management.

Elevated pH, that is above 7.0, can make some nutrients less available and as pH increases, availability of these nutrients decreases. Important nutrients that decline in availability with increasing pH are phosphorus (P), iron (Fe), and zinc (Zn). Others may decline in availability but due to high levels in the profile, deficiencies do not occur. Soil testing, then following recommendations, will prevent deficiencies. Adding an acid or an acid-forming amendment to the soil to increase the availability of these nutrients is really not practical.

The action of sulfur in the soil may be described as follows. The pH in calcareous soils is controlled by free lime ($CaCO_3$). Free lime can only be neutralized by an acid-forming amendment such as sulfur (S) or sulfuric acid (H_2SO_4). Sulfuric acid reacts immediately with the soil lime to release soluble calcium. Elemental sulfur must first be oxidized by soil bacteria and react with water to form sulfuric acid. The formation of appreciable amounts of sulfuric acid from elemental sulfur may take several months.

The low rates of sulfur or acid-forming amendments on fertilizers that are being promoted will not be adequate to significantly lower the pH of a calcareous soil. For example, if a soil contains just 1% free lime, it will take about 3 tons of elemental sulfur or 10 tons of pure sulfuric acid to neutralize 1% free lime. This will cost about $1,500 per acre. (Follett)

THE USE OF COMPOSTS AS SOIL AMENDMENTS

Composting is an effective way to utilize waste as fertilizer, to improve soil structure, lower pH, and in some cases, help reclaim salt-affected soils. Composts are derived from a variety of sources. The most common ones come from animal manure and sludge. Compost is just like inorganic fertilizer when added to soil except that a certain proportion of the nutrients contained are tied up in organic fractions unavailable for plant growth until decomposition. The organic fraction must be decomposed to release bound nutrients. When analyzing compost for available nutrient content, the Soil Testing Laboratory uses an ammonium bicarbonate-DTPA (AB-DTPA) extraction. The laboratory also analyzes the compost for total nutrients plus total organic carbon. Total analysis gives an idea of what may become available to plants as the material degrades. It also gives an indication whether heavy metals such as lead, cadmium, or nickel are high. Heavy metal content is an important

consideration when composted sludges are applied. A carbon:nitrogen (C:N) ratio can be calculated from total organic carbon (TOC) and total nitrogen to determine whether nitrogen immobilization will occur. C:N ratio of about 15:1 is desirable as a fertilizer source. Less nitrogen immobilization will occur under this C:N ratio as compared to a ratio of 80:1 for wheat straw.

Inadequately composted manure frequently contain large amounts of fertilizer salts (several thousand ppm) which can increase electrical conductivity and thereby reduce crop yield. Commonly, we receive garden soil from homeowners who previously have put on an excess of poorly composted manure ultimately creating a soil with high salt level. Even though mixing composts with soil will help dilute excessive salts, nutrients and heavy metals, an excessive amount of compost can still be deleterious. We usually suggest that materials be composted for about one year before using as an amendment.

Many municipalities, nurseries, and organic farmers request that composted material meet certain requirements in supplying nutrients and organic matter when used for landscaping, gardens and crop growth. The only way to assess the potential use of compost in fertilizer recommendations is to have it analyzed for available and total nutrients. (Self)

Where trade names are used, no discrimination is intended, and no endorsement by the Cooperative Extension Service is implied.

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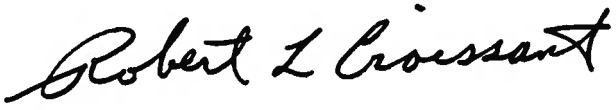
Sincerely,



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