FROM THE GROUND UP

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AGRONOMY NEWS

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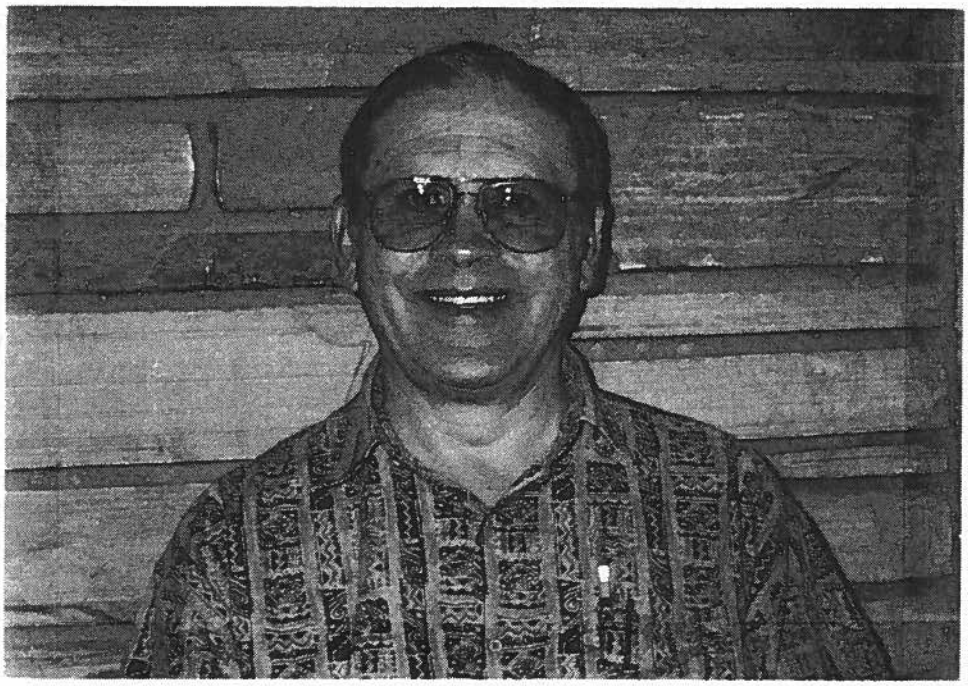
IN MEMORY OF HUNTER FOLLETT



Roy Hunter Follett, 58, of Fort Collins died Wednesday, November 17, 1993, at Poudre Valley Hospital after a lengthy and valiant battle with cancer. Dr. Follett was the Extension Soils Specialist at Colorado State University since 1982. He attended CSU between 1953 and 1969 where he earned his BS, MS, and PhD degrees. Hunter Follett was commissioned as a Reserve Officer in the U.S. Army and attained the rank of Lt. Colonel.

He spent the first years of his career as a soil scientist with the Soil Conservation Service, managing the Soil Testing Laboratory at Colorado State University. He worked as an Extension Soil Specialist at Ohio State University, Kansas State University, and then Colorado State University.

Memorial contributions may be made to the Hunter Follett Graduate Student Memorial Award in care of Colorado State University Foundation, 521 University Services Center, Fort Collins CO 80523 or the First Presbyterian Church Memorial Fund, 531 S College, Fort Collins CO 80524.

Hunter played a key role in the development of the Great Plains Soil Fertility Conference that is held biennially in Denver, Colorado. He was a member of Alpha Zeta, Gamma Sigma Delta, Sigma Xi, Epsilon Sigma Phi, American Society of Agronomy, Soil Science Society of America, Soil and Water Conservation Society, and the American Registry of Certified Professionals in Agronomy.

Honors and awards he received are: Fellow, Soil, and Water Conservation Society of America; Fellow, American Society of Agronomy; Fellow, Soil Science Society of America; Commendation Award, Soil and Water Conservation Society; Distinguished Educator Award, Rocky Mountain Plant Food and Agricultural Chemicals Association; Meritorious Service Award, Epsilon Sigma Phi; Faculty Award of Merit, Colorado Chapter of Gamma Sigma Delta; Outstanding Service Award, Soil and Water Conservation Society; and 1992 Honor Alumnus, Colorado State University College of Agricultural Sciences. Hunter's expertise was recognized throughout the region.

Survivors include his wife, Barbara; a son, Kevin Follett of Fort Collins; a daughter, Karen Irvine of Manhattan, Kansas; a brother, Ronald Follett of Fort Collins; and six grandchildren.

His friends and co-workers will miss him.

UPDATE ON THE CCA PROGRAM

The Certified Crop Advisor (CCA) program is a voluntary certification program open to anyone who provides crop management recommendations to farmers. The purpose is to establish base standards of competence for crop advisors and salespeople who make pesticide and fertilizer recommendations. The goal of the CCA program is to help the agricultural industry meet the challenge of environmental stewardship and enhance the credibility of our profession.

The CCA program was developed by the American Society of Agronomy in cooperation with the agri-chemical industry, Cooperative Extension, and other agricultural organizations. However, the program is designed to be administered at the state level by a board of local representatives. To date, 29 states have initiated the program, including Kansas, Oklahoma, and Nebraska.

The first national exam was given last February to 796 applicants in seven states. The exam consists of 200 multiple choice questions, and there is a $75 fee required. The second national test was given in August to 1700 applicants in 13 states. The pass rate thus far is 69%. The next scheduled exam is February 4, 1994. However, anyone from Colorado wishing to take the test will have to go to Nebraska or Kansas.

The next national exam for the CCA program will be given on February 4, 1994. Interested Colorado applicants will need to travel to Nebraska or Kansas to take the test.

We were hoping to have this program active in Colorado for the 1994 crop season. Unfortunately, industry support in the state has not been sufficient. The Rocky Mountain Plant Food & Agricultural Chemicals Association is considered an essential linkage before Extension moves forward on the CCA program in Colorado. My guess is that with 30 other states actively pursuing the CCA program, and the pressure at the national level for industry certification, Colorado will come on board in the near future. Hopefully, we will have this program available prior to the 1995 crop season.

We anticipate that Extension will be called upon to do some training to prepare applicants for the test. This represents a good opportunity to strengthen and expand some of our existing educational programs as the demand for CCA credentials increases.

If you have questions or comments about the CCA program, give me a call at (303)491-6201. ▫Waskom

QUALITY FACTORS RELATED TO WEATHERED AND DISCOLORED BEANS

Cool, wet environmental conditions during dry bean harvest this season caused many dry edible beans such as pintos to become discolored and/or wrinkled. The discoloration is caused by oxidation of compounds in the seed coat during prolonged exposure to high humidity and rainfall. The time period immediately after undercutting the bean crop coincides with the time of final seed maturation when seed moisture drops from 18 - 20% to a safe, storable moisture content of approximately 12%. After the seed reaches a moisture content of 12%, the hilum, an opening in the seed coat, closes to prevent seeds from rehydrating during storage. The hilum acts as a hygroscopic valve that stays open until seed moisture is reduced to a safe, storable percentage; then it closes to prevent reentry of moisture. The hilum does not completely close until after the seed has dried, usually several days to a week after undercutting. During this period, the seed is vulnerable to rehydration and seed coat oxidation. Cut beans that are rained on or exposed to long periods of high humidity prior to closure of the hilum will show seed coat discoloration.

Are discolored pinto beans less desirable than bright colored ones? The consumer considers pinto seeds that have a dark color to be old or to have been improperly stored. The discoloration associated with aged seed is caused by the same oxidation process as field discolored seed. The difference is the time that it takes to cause the discoloration. In field discolored beans, the oxidation is rapid due to a high moisture content of the seed coat; while in storage, the process is slow since the seed is relatively dry. Since aged bean seed takes longer to cook and sometimes has an off-flavor, it is less desirable to the consumer. The hard-to-cook phenomena of aged seed is related to

the chemical changes that occur during storage. Carbohydrates, proteins, and other compounds react during storage to form compounds which take longer to break down and rehydrate during presoak or cooking. Aged seed may also have a different texture than fresh seed due to the chemical changes during aging. The off-flavor phenomena is usually related to the storage conditions of the seed. Bean seeds are living, breathing organisms, and as such, they utilize oxygen from the environment in which they are stored. Bean seeds stored in the same warehouse as onions or other aromatic produce will take on the flavor of the produce. Even worse, they will take on the flavor of chemicals such as fertilizer or pesticides stored in the vicinity. Consequently, beans should never be stored near other volatile compounds. Since the consumer's selection is influenced by the visual appearance of seed, discolored beans are less desirable. Is seed that was discolored from exposure to moisture during field curing the same as aged seed? No. Compared to non-discolored beans, beans which are discolored due to field conditions are not harder to cook and do not have any off-flavor characteristics. Some processors have electronic eyes to sort discolored seed, but this process is slow and costly. In general, the consumer's eye considers all discolored beans to be caused by aging even though that is not always the case. ¤Brick

An edible bean is not necessarily in the eye of the beholder.

NITRATE ANALYSIS IN PLANTS

Plant tissue testing for nitrate can be a useful tool to assess the daily or weekly nutritional status of plants or determine the suitability of a forage crop for livestock use. Accurately determining nitrate in plant tissue is difficult and tedious. In a comparison of laboratories by Utah State University, plant nitrate could vary 30 - 40 % with some variations exceeding 100%.

Although nitrate may be extracted by a number of solutions, including water, it is difficult to separate nitrate from substances that interfere with its analysis. Some extracting regents include cupric sulfate, aluminum sulfate, acetic acid, and water. A critical factor in nitrate analysis of some tissues is the ratio of plant material to extracting solution. A dilution factor of 1:100 or 1:250 should be used in the laboratory if the plant material contains high levels of nitrate. When performing a nitrate test in the field, it is usually sufficient to apply the nitrate powder directly to a cross section of a stem or leaf petiole. When determining nitrate in corn, cut the cornstalk at the base and near the top above the ear node. Apply powder, about the size of a match head on both cuts. If no color develops, the reading is very low. A faint pink color indicates a low reading. Medium red indicates a medium level and a deep red color signals a high reading. Corn plants should be high in nitrate at the base of the stalk and at least medium at the plant top during the vegetative growing period. The nitrate test may also be used on the midrib of a corn leaf, or on the petioles or stems of other plants. Some plants may have reddish pigments that can interfere with the nitrate test. A pigment interference can be avoided by splitting the petiole with a knife and applying the nitrate powder. Press the cut part together that contains the powder. The pigments are not disturbed and the results can be read using the color codes for the stalk test.

A vial method may also be used by using pliers and squeezing approximately one-eight teaspoon of plant material into a vial. Add 5 milliliters of distilled water and mix with the crushed material. Add a pea-sized portion of the nitrate powder, stir, and let stand about one minute. Interpret colors as for the stalk test.

Plant test kits should contain material safety data sheets indicating what chemicals are used and if there are any health hazards. Nitrate testing powders may contain barium sulfate, manganese sulfate, zinc powder, citric acid, sulfanilic acid, and 1-aminonaphthalene. Some chemicals may be considered a health hazard such as 1-aminonaphthalene which is listed as a carcinogen.

The last page of this publication contains a list of tissue testing laboratories in the state of Colorado.

In the laboratory, nitrate may be analyzed using phenoldisulfonic acid, copperized cadmium, zinc reduction, or ion selective electrode (ISE). The ISE method is very popular, though electrodes are greatly influenced by interferences from other elements.

Nitrate analysis can be quite variable; however, it can be part of an overall soil fertility program to assess fertilizer needs. Care should be taken when having nitrate analyzed in forage for livestock feed. Generally forage containing between 5,000 to 10,000 ppm NO_3 is potentially toxic and forage with over 10,000 ppm NO_3 can be quite dangerous. ▫Self

DEVELOPMENT STRATEGIES IN NEW CROPS

With the onset of winter, we often begin to think about next year and a topic of increasing discussion seems to be new crops. There seems to be a belief that new specialty crops are worth more than traditional crops. That can be true, but you must be aware that there is a good reason why we aren't all getting rich from producing new crops.

New crop research lags behind that of conventional crops. There is a lack of information on cultural practices, pests, pest controls, and marketing. The result is that any new crop venture by a grower is a high risk. In the Colorado quinoa project, we focused on insects and even formed a "bug-of- the-month" awareness program. Five years into the program, we realized insect problems were minor compared to yield loss from weeds (50% of the crop annually).

Most growers lack the ability to direct market or process their crop. Markets may be so distant that profits are eaten up by transportation. Fortunately, some buyers are willing to work with the grower on transportation costs. In 1994, we hope to initiate an edamame soybean (Japanese vegetable soybean harvested as pods with maturity similar to snow peas) industry in the Arkansas Valley. Initial projections indicate the crop will bring about $1.5 million to Colorado in 1994 and that will rise to $7 million in 1995. To make this work, growers will need to contract the crop with the edamame buyer who coordinates picking. The buyer will need to contract blanching, freezing, and packaging with a vegetable processing plant and will also contract with a major West Coast buyer. A lack of coordination would be disastrous for all. For a grower to do this alone would require investment in a processing plant, investment in time, phone, legal assistance, and a working knowledge of Japanese

customs, marketing, and language. Also, enough volume must be produced to interest a buyer.

Buyers are frequently accustomed to dealing with high volume, low unit cost commodities. It takes a real sales job to convince a processor that they will have to pay $0.65 per pound for quinoa when they currently pay $0.04 per pound for wheat. Most of us lack that skill and we will need a middleman to act on our behalf.

In developing a new crop, it is important to be aware of the risks, proceed slowly, and work with others who can provide expertise in processing and marketing.

All of this may sound discouraging but it shouldn't. Lots of homework should be done before growers decide to become involved with a new crop. They must understand the risks, establish a potential market, grow limited quantities (primarily to give away as samples the first year), and work closely with someone to provide expertise. For the soybean growers in the Arkansas Valley, experience in soybean production exists and the change will be in considering soybeans as a fresh market crop rather than a dry bean.

The development of alternative, specialty crops frequently adds a bonus. As a grower gains confidence, new crop quality improves. A buyer then comes back for more and frequently brings a wish list that includes additional new crops. The procedure remains the same: do your homework, get help, define the market, and start small. ¤Johnson

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

1993 COLORADO DRY BEAN PRODUCTION SUMMARY

(Compiled from the Ag Update, Colorado Agricultural Statistics Service, Colorado Department of Agriculture, Volume 13, #20 and #21)

Colorado farmers planted 195,000 acres of dry beans in 1993. Of this, 185,000 acres were harvested with an average yield of 15.5 cwt per acre, totalling 2,868,000 cwt. The farm-gate value of this crop at $29 per cwt is $83,172,000. Acreage planted reflected a 19 percent increase from 1992. Harvested acreage reflected a 16 percent increase from 1992. Although average yield per acre decreased by 5 percent, the increase in acreage made for a 10 percent increase in statewide production. Assuming an average price of $19.20/cwt in 1992 ($50,073,600 farm gate value), the value of the product increased by a factor of 1.66 (166%). Such are the vagaries of crop production.

Dry bean production on a national level also increased this year with acres planted increasing by 13% and acres harvested by 8%. Colorado planted about 11% of the nation's bean acreage. Colorado yields were 9% higher than the national average and provided 12% of the national total production.

Statewide, dry beans ranked behind wheat, hay, corn, and sorghum in acres harvested. Dry beans ranked 4th in total farm-gate value behind hay, wheat, and corn. But, calculating dollar per acre, dry beans were the highest paying crop in 1993, giving the farmer a $449.58 gross per acre (Table 1).

As an interesting sidelight, dry bean acreage was only 3% of the soybean acreage on the national level. ¤Ogg

Table 1. 1993 Colorado Dry Bean Production Summary

Crop	Gate Value $	Acres harvested	$/Acre[1]
Corn	$269,341,200	815,000	330.48
Sorghum	31,454,500	190,000	165.55
Wheat	282,240,900	2,583,000	109.27
All Hay	302,940,000	1,450,000	208.92
Dry Beans	83,172,000	185,000	449.58

[1]Assuming 15.5 cwt/acre and $29/cwt.

Merry

Christmas

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Sincerely,

Robert L Croissant

Robert L. Croissant
Editor
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Accu-Labs
11485 West 48th
Wheatridge, CO 80033
303/423-2766
Jefferson County

ACZ Labs
30400 Downhill Drive
Steamboat Springs CO 80487
303/879-6590
Routt County

Agricultural Consultants, Inc
240 South Main
Brighton CO 80601
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225 Commerce Drive
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303/490-1511
Larimer County

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Larimer County

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Grand Junction CO 81501
303/242-7618
Mesa County

Stuart Environmental Consultant Inc
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714 1/2 6th Street
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