

# FROM THE GROUND UP

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# AGRONOMY NEWS

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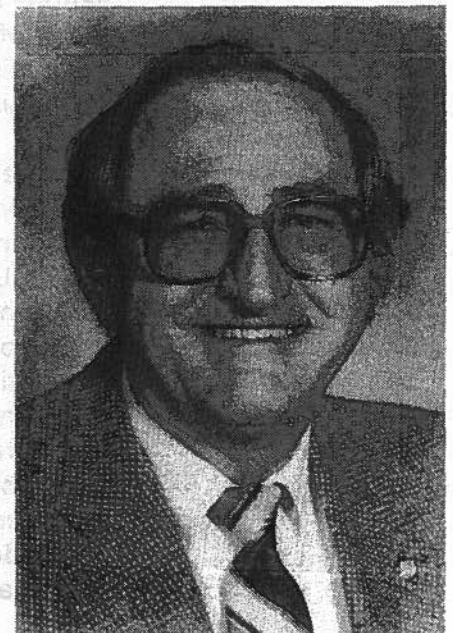
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## BOB CROISSANT RETIRES

Robert L. Croissant, Extension Agronomist, will retire from Colorado State University on March 31, 1995. Bob will be honored at an afternoon reception on March 24, 1995 from 3:00 to 5:00 p.m. in the Long's Peak Room at the Lory Student Center, Colorado State University. You are encouraged to attend the reception.

Bob has devoted his entire career to serving people in the agricultural community in various Extension Education capacities. He began his Extension career as an Assistant County Agent for Logan County in 1957 and remained there until 1961. During his tenure in Logan County, he supervised a large grasshopper control program. From 1961 to 1978, he served as an



**Remember Bob Croissant's farewell party at Longs Peak Room on March 24, 1995 from 3-5 p.m.**

Agricultural Extension agent for Kit Carson County and the Golden Plains region. From 1978 to 1985, he served as Regional Extension Agronomist and Associate Professor for eastern Colorado. During the 1978-85 period, Bob also established and maintained a regionally recognized Corn Variety Testing Program. In 1985, he moved to the CSU campus and has been an Extension Agronomist since then. In 1991, he was promoted to Professor. He served as the Extension Program Coordinator, Field Crop Specialist, and Newsletter Editor for the Department of Soil and Crop Sciences during this time. He was also an Associate Editor for the Journal of Agronomic Education.

These and many other of his activities have made significant contributions to Colorado agriculture. Bob's knowledge and wisdom will be missed by all. We wish Bob and his family well in his retirement. ▫Shanahan

#### **UPDATE ON GROUNDWATER ISSUES IN THE SOUTH PLATTE BASIN**

There has been a great deal of groundwater quality data generated recently in the South Platte basin by various researchers and agencies. As a result of this work, there has been much discussion of how to best address contamination problems.

Representatives from the U.S. Geological Survey (USGS), Colorado Department of Health & Environment, and CSU were recently asked to advise Ag Commissioner Tom Kourlis on the status of groundwater and pollution prevention programs in the South Platte. All of the above parties believe that there are significant NO<sub>3</sub> contamination problems in the aquifer directly related to agricultural activities. The USGS has concluded that the single most significant NO<sub>3</sub> source in the aquifer is

animal manure applied to crop lands. Additionally, their research indicates the average age of the water in the alluvial aquifer is approximately 8-20 years old.

Commissioner Kourlis believes that the state should not implement an Agricultural Management Area (AMA) in the South Platte at this time. While designation of an AMA only formally identifies that groundwater is vulnerable to impacts from agriculture, it is widely perceived as the tightening of regulations on ag producers. Once an AMA is designated, it is possible for the commissioner to require the implementation of prescribed agricultural practices or BMPs.

The Commissioner feels that at this time, it is inappropriate to declare an AMA for two reasons. First, the BMPs have just been published and there has not been an adequate opportunity for voluntary adoption by producers. Secondly, since it appears that a major source of NO<sub>3</sub> is from manure applications, and since manure is not addressed specifically by SB 90-126, it may be inappropriate to address the problem under this law.

The Department of Agriculture is in favor of continuing an educational approach to water quality problems. They believe that livestock feeders and crop producers should voluntarily implement Best Management Practices. This approach increases the importance of University and Extension participation in solving the water quality problem in the South Platte. However, Colorado citizens must be aware that the alluvial aquifer may require as long as 20 years to discharge - and it may take even longer to clean up NO<sub>3</sub> problems using a voluntary approach based upon BMPs. ▫Waskom

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## **CERTIFIED CROP ADVISER EXAM RESULTS**

Colorado registrants generally did well in the National and State Certified Crop Adviser (CCA) exams which were held in Brighton on February 3, 1995. There were 155 Colorado registrants out of 4,792 who took the national exam in 29 states. Eighty-two percent of the Colorado registrants taking the test passed the national exam, compared with 70% across the United States. On the State exam, 72% of the 159 Colorado registrants passed.

At their last meeting, the Colorado CCA Board invited six exam participants to critique the state exam. Some of the main criticisms were: (1) several questions seemed vague or irrelevant; (2) some Performance Objectives were not covered by the exam; (3) many questions were too specific, especially in comparison with those in the National exam; and (4) some type of a study guide (including sample questions) is needed in preparation for the 1996 State exam.

We plan to develop a more comprehensive training manual on crop management in addition to revising the study guide this fall. These should assist those who take the Colorado CCA exam next year, as well as anyone involved in advising growers.

▀Mortvedt, Waskom, and Apley

## **MORE GARBANZO BEAN INFORMATION**

Since writing the short article about garbanzo beans last month, I have had numerous phone calls inquiring about cultural practices and seed sources. I have called several sources in Washington and California for more information.

Planting practices vary from California to Washington. In California, the garbanzo crop is planted in rows on beds 18 to 40 inches wide, with the wider beds planted with two or more rows on a bed. The crop is both sprinkler or furrow irrigated. Planting dates also vary by region; the crop is planted in November as a winter crop in California. Seedlings are very cold tolerant and will tolerate a freeze according to the California producer that I talked to. The main variety grown in California today is 'UC 27', a medium sized "Kabuli" type (large seeded). It was released by the University of California at Davis in 1987 or 1988 for resistance to root rot pathogens. You may buy seed of UC 27 from Helm Bean And Seed Warehouse, P.O. Box 192, Kerman, CA (209-846-7341). Certified seed is sold in 50 pound bags at \$27.50/bag FOB the warehouse. Mr. Stan Murray, Helm Bean and Seed Company's representative, indicated that they could ship the seed to Colorado via UPS, if the buyer is willing to pay the shipping cost. Mr. Murray indicated the seed is treated with fungicides to prevent seedling death due to *Rhizoctonia* and *Pythium*, serious fungal pathogens. The seed is planted with a peat based granular Rhizobium inoculant to provide the plant with nitrogen fixation. The granular product can be placed in the planter box and applied at a rate of about 15lbs/acre. UC 27 is a nonshattering erect variety that is combined directly in California. Flowering and seed set occur from March to May, with subsequent plant desiccation in June and July. In late June to early July, the crop is harvested. Grower prices for No. 1 beans have recently been in the \$25 to \$35 /cwt range, but go lower depending on the domestic supply and demand.

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In the Palouse region of Washington, garbanzos are planted in drill rows 6-8 inches wide and primarily depend on rainfall for their moisture need. Seeding rates are as high as 200 lbs/acre in the better soils and high rainfall regions. Ascochyta has been a serious problem in Washington and growers have adapted a policy of only growing Ascochyta free seed and resistant varieties. Since seed supplies of the Ascochyta resistant varieties released by Washington State University are very limited, I could not find a source of seed stock in Washington. The need to apply a granular form of Rhizobium inoculant was also emphasized by producers in Washington.

A warning about growing garbanzo beans was echoed by everyone I talked to. The plant produces and secretes an organic acid (oxalic or fumatic acid) from the leaves that is very caustic and irritating to the skin. The plant produces this acid as a natural insect defense mechanism. If you walk through a field of garbanzo beans in the flower or pod fill stage, the acid can dissolve your clothes and shoes and cause severe skin irritation. ▫Brick

#### USE OF PURSUIT FOR WEED CONTROL IN ALFALFA

Alfalfa growers now have a new herbicide product for use in their weed management program. PURSUIT, a trademark of American Cyanamid Co., is now labeled for control of over 70 broadleaf and grass weeds in forage alfalfa. It has both contact and soil residual activity on weeds. This product offers much potential for controlling many problematic broadleaf weeds in alfalfa such as Flixweed, Kochia, Pigweed, Russian Thistle, and Tansymustard to name a few. It also

controls or reduces competition from many grass weeds such as Barnyardgrass, Yellow and Green Foxtails, Johnsongrass, as well as many others. PURSUIT, can be applied to both seedling and established stands of alfalfa at 4 and 6 ounces per acre of active ingredient.

If applying to a seedling stand, PURSUIT must be applied postemergence. Apply when seedlings are in the second trifoliolate stage or larger and when a majority of the weeds are from one to three inches in size. For low growing weeds such as mustards, apply PURSUIT before the rosette exceeds three inches.

PURSUIT can be applied to established stands in the fall, in the spring (dormant or semi-dormant stands with less than 3 inches of re-growth), or between cuttings. Any application should be made before significant alfalfa growth or regrowth to allow spray application to reach target weeds. Since first cut alfalfa generally has the highest potential for weed competition, PURSUIT application would receive the most benefit from applications made prior to the first cutting.

Thus, if you have established alfalfa fields which have a history with difficult weed problems, you may want to consider using PURSUIT to control these weeds. You will want to begin making plans soon since application for the first cutting will have to be made soon after the alfalfa plant breaks dormancy in late March or early April. Consult your agrichemical dealer or applicator and follow the label directions when applying this product.

▫Shanahan

***Since first cut alfalfa generally has the highest potential for weed competition, PURSUIT application would receive the most benefit from application made prior to the first cutting.***

## **PLANT VARIETY PROTECTION UPDATE**

In the past months, there have been two significant developments upholding the rights of plant breeders. The first item was the settling of the case of *Asgrow v. Winterboer* by the U.S. Supreme Court. To recap the case, the Winterboers sold approximately 10,000 units of an Asgrow variety of soybean seed without Asgrow's permission and in violation of the Plant Variety Protection Act. Asgrow sued and the Winterboers contended that their actions were legal because the PVP Act allowed seed sales by farmers under the "Saved Seed" clause of the Act. Asgrow contended that "saved seed" meant only enough seed could be saved to plant back the original acres and, if it would not be used for replanting, only that limited amount of seed could be sold.

***It is possible that Extension agents who assist farmers in locating seed of protected varieties could be liable if the sale is made without the permission of the variety owner.***

Several court decisions and appeals brought the case to the Supreme Court for a final ruling. In late January, the court's ruling was made public and it upheld the rights of Asgrow and its interpretation of the law. This means that Asgrow's interpretation is now law and a farmer can only sell as much seed as was used to plant his field.

The second significant development is the passage by Congress of the amendment to the Plant Variety Protection Act. Among other things, the new PVP Act has eliminated the "Saved Seed" exemption, put some tighter restraints on those who assist the grower in making illegal sales, and extended the length of protection to 20 years. This law goes into effect on April 4, 1995, and only varieties granted protection after that date will be covered under the new amendment while those protected before that time are still protected under the old statute.

The rules and regulations of the law have not as yet been published, but the law provides for some penalties to seed conditioners and others who assist in making sales of protected varieties. Conditioners who knowingly clean seed of protected varieties that is being resold illegally could also be liable for damages. It is also possible that Extension agents who assist farmers in locating seed of protected varieties could be liable if the sale is made without the permission of the variety owner.

These two developments will ensure that the plant breeding efforts of private companies will continue in the future and that the new varieties being released will have the best genetics which will give maximum production. □Stanelle

## **ALTERNATIVE CROPS IN EASTERN COLORADO**

Alternative crops are defined as crops not currently grown in an area or grown for special markets. These crops require linkage to a market or processing facility outside of an elevator. This frequently means the crop is forward contracted or a marketing agreement is reached prior to planting. The CSU Alternative Crops Program is designed to link producers to markets and, when possible, to assist growers with critical information to participate in value-added processing. A recent example of an alternative crop in the Colorado program is quinoa. Research on quinoa began in 1983. The first commercial crop was grown in 1987. By 1988, the growers had formed the North American Quinoa Growers Association and had purchased a barley dehuller and seed cleaners to

process the grain into "Inca Rice". In 1988, the value of quinoa in Colorado increased to \$728,000 from 500 acres of production. From 1991 to 1994, the crop value has been about \$1.5 million in the San Luis Valley. Quinoa is currently marketed as a whole grain, as pasta, as quinoa flour, as puffed quinoa, and as an additive in dry cereals. Quinoa has displaced virtually no acreage of traditional crops.

**The Western Society of Crop Science (WSCS) will meet at ARDEC (Fort Collins), June 19-21, 1995. We will meet in conjunction with the Western Alfalfa Workers and the High Plains Canola Council. We are scheduling tours at this time to visit ag and processing plants in the northern Colorado area and are planning to "show off" value-added Colorado ag products. Please contact Duane Johnson (303)491-7407 or (303)491-7719 if you or your local growers would like to attend.**

In eastern Colorado, there are several potential new crops for dryland and irrigated conditions:

#### **Dryland**

**Proso millet** : The interest in proso is increasing in popularity as a nutritious food for humans. At CSU, the Food Science and Human Nutrition Department is evaluating proso as flaked breakfast cereal.

**Foxtail millet**: Foxtail millet for production of gluten-free pasta is of interest. About 1 in 1,000 U.S. citizens are allergic to wheat, barley, oats, and other glutinous cereals. Market surveys reveal that about 1 per 100 U.S. citizens believe they have a wheat allergy. In 1995, the value of gluten-free product is expected to double. In 1994, approximately \$2.4 million in gluten-free pastas was sold.

**Mungbean**: Mungbean is an excellent dryland legume related to cowpeas, farmed using conventional wheat equipment. The beans, an excellent source of protein, have a high market value when used by the bean sprout industry (\$35/cwt). Mungbeans can be processed into "crystal noodles" and other Asian food products. Mungbeans are typically grown no-till in Asia. The CSU research team is experimenting with mungbeans as an additive in pasta. Dryland yields range from 8-12 cwt/A.

**Chickpea**: Chickpeas, in the milkvetch family, are well suited to dryland production. They are a cool season crop which must be planted very early (March to April) and can produce as much as 12 cwt/A dryland, having a value of \$35/cwt.

**Safflower**: Safflower is used for oil and birdseed. Safflower will tolerate saline soil and must be planted very early. The safflower taproot has the ability to penetrate and loosen subsoil hardpans. It effectively improves soil tilth in Montana where wheat growers regularly report a 10-20% yield increase following safflower. On the negative side, safflower is an aggressive user of stored water and will require a fallow period after the crop. Current prices are \$10-12/cwt.

#### **Irrigated**

**Adzuki bean**: The adzuki bean is small red bean related to cowpeas. The bean is typically sold as a dry bean, canned bean, or a bean paste. Adzuki have generally yielded 14 cwt/A with a farmgate value of \$45-85/cwt. Production is similar to pinto beans.

**Edamame soybean**: Edamame, a product from a specific soybean, is used for the Japanese and Chinese food trade. Fresh frozen green pods are sold as a snack food. Typical yields of 100 cwt per acre (salable pods) will sell at \$12/cwt. Buyers from California are willing to purchase Colorado edamame from the processor at \$152/cwt. Limits are a labor source to pick and sort beans and a flash freezer processing plant. Some market exists for edamame seed production with yields of 14 cwt/A and a value of \$60/cwt.

**Black sesame**: Sesame is a crop which has limited history in the

Central Great Plains. Black sesame (for the color of the seed hull) is virtually unknown in the United States. Current sources are Taiwan and Mainland China. Difficult to establish, black sesame requires excellent seed bed preparation. Once established, it is a tough, durable crop. Harvest is the only main problem since the sesame shatters on drydown. Producers either cut and shock the plants or swath. Swathing will result in a 20-25% loss. Current retail value in Japan is \$2,700/cwt. In the U.S., retail value is \$900/cwt. Current farmgate value is \$80/cwt. Yields in irrigated trials averaged 22 cwt/A shocked and 18 cwt/A swathed. Ten acres have been contracted in Colorado in 1995. All acreage will be in southern Colorado.

***The CSU Alternative Crops Program is designed to link producers to markets and, when possible, to assist growers with critical information to participate in value-added processing.***

**Waxy, naked barley and oats:** Barley used for human consumption is increasing, since it is nutritionally superior to wheat in human diets. USDA scientists discovered that a hullless barley type having a high betaglucan and amylopectin (waxy) content will reduce blood serum cholesterol and increase insulin production in obese (and borderline diabetic) human subjects. Similar results have been obtained from waxy, naked oats. The isolation of the betaglucan-amylopectin from oats is currently marketed as "Oat-trim" and is used as a fat replacement in some low calorie frozen foods. Naked, waxy endosperm types are generally lower yielding than their hulled counterparts. Current yield trials produced an average of 90 bu/a (1 bu=58 lbs) or 52.2 cwt/A. Current market price is \$10/cwt or (\$5.80/bu) for barley. Oat prices are unknown.

Johnson

developing a means of determining the accuracy of the Parshall flume under settlement conditions. The study has been testing Parshall flumes in the Hydraulics Laboratory to develop a correction factor for adjusting field measurements. The adjustment procedure was developed to provide the user an accurate flow measurement without having to level or re-construct the flume.

The research team needs to perform a field verification study to test the adjustment procedure. Volunteers are sought that would allow a team of CSU students to locate and access existing Parshall flumes in the State of Colorado. The students will survey the flume to determine the degree of settlement, if any, and indicate the potential measurement error.

Information pertaining to flume age is desirable. The information obtained from the site visits will be entered into a data base for analysis. A copy of the final report derived from the study will be provided to each volunteer. All costs associated with the data collection will be paid by the Colorado Experiment Station.

Anyone that would allow the student research team access to an existing Parshall flume or desiring additional information should contact:

Dr. Steven R. Abt  
Engineering Research Center  
Colorado State University  
Fort Collins CO 80523  
Tele: 303-491-8203  
FAX: 303-491-8462

You may also contact Reagan Waskom with questions at (303)491-6201.

Waskom

#### PARSHALL FLUMES

The Agricultural Experiment Station at Colorado State University has been

## SOIL pH

Much has been written about soil pH, yet many growers are not sure how to use this information when managing their soil. Knowing the soil pH allows you to predict much about plant growth on your soil, whether it be a field or a garden. It has been said that the soil pH gives more information about predicting how plants will grow on a soil than any other parameter.

Soil pH is a measure of the relative acidity or alkalinity of soil. The terms -- acid, neutral or alkaline -- refer to the relative concentrations of hydrogen ions ( $H^+$ ) of hydroxyl ions ( $OH^-$ ) in the soil solution. These concentrations are measured as pH values. An acid soil has a higher concentration of  $H^+$  than  $OH^-$  ions, while an alkaline soil has the opposite. A neutral soil has equal concentrations of these ions.

The pH scale from 0 to 14 is used to describe the relative acidity or alkalinity of a system. Soil is neutral in reaction at the midpoint of this scale (7.0). Because pH is a logarithmic function, each pH unit represents a ten-fold change in relative acidity or alkalinity. For example, pH 8.0 is 10 times as alkaline as pH 7.0.

Soil reaction is important to plant growth because soil pH affects: (1) nutrient availability, (2) soil microbial activity, (3) solubility of toxic substances in soil, and (4) root growth and nutrient uptake. Optimum availability of most plant nutrients is in the pH range from 6.5 to 7.5, but most agricultural crops grow well in the pH range from 5.5 to 8.0.

Soil pH levels above 7.0 can result in decreased availability of phosphorus, iron, and zinc. While availability of other nutrients also may decrease with

increased pH, deficiencies generally are not a serious problem on Colorado soils. Many Colorado soils are calcareous (contain free lime,  $CaCO_3$ ) and are in the pH range from 7.0 to 8.5, so their nutrient availability may not be optimum.

Results of soil tests give the soil pH, organic matter content, salinity level, as well as the relative availability of most nutrients. Following fertilizer recommendations based on soil tests for the crops to be planted will help prevent nutrient deficiencies. Good plant growth can be achieved on soils having a pH of 8.0 or higher if these soils are properly managed.

Some have asked how to decrease the pH of calcareous soils to possibly improve plant growth. Soil pH can be decreased by applying sulfur or acid-forming fertilizers. However, their application at usual rates will not decrease soil pH. For example, it takes about 3 tons of elemental sulfur per acre to neutralize 1% free  $CaCO_3$  in a soil. This could cost about \$1,500 per acre, which is not economical in most cases. However, garden soils and ornamental beds can be amended with powdered elemental sulfur at rates up to 150 pounds per 1,000 square feet to improve the growth of those plants which are sensitive to iron deficiencies. Dust masks should be used when applying powdered sulfur, and this product should be mixed well with the soil to a depth of about 6 inches for maximum effectiveness.

□Mortvedt

**Good management practices, including building or maintaining soil organic matter, improving soil tilth, soil testing and applying recommended rates of fertilizers, proper soil preparation, and planting recommended crop varieties will result in profitable crop production on soils with relatively high soil pH levels.**



***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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