FROM THE GROUND UP

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AGRONOMY NEWS

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BEAUTY AND THE BEAN

Seeds of dry edible common beans grown throughout the world vary immensely in color, size, shape, and texture. In the U.S alone, there are 11 commercial classes of dry edible common beans which have specific USDA grading standards, including; pinto, small white, navy, great northern, light red kidney, dark red kidney, pink, Red Mexican, black, yellow eye, and cranberry. Other bean types are also marketed in the U.S., such as Anasazi (red and white pattern, in which sale by name is protected by a registered trade mark), bollito (small dull red), calypso (black and white patterned), that do not have USDA grading standards. Bean seed color, shape, and size preferences throughout the world are extremely variable. The Dominican Republic and Columbia favor large red beans with a cream colored mottling. Many countries in east Africa prefer mixed beans with red, white, and patterned colors all blended together. Peru and Mexico favor cream, tan, and black beans. Brazil and Venezuela favor black or tan colored beans. Archaeologists have excavated beautiful multicolored beans buried with Andean and Aztec Indians in South and Central America,

respectively. Archeological records indicate that beans were consumed as fresh pods and seed by Indians in Peru over 8,000 years ago and in Mexico over 7,000 years ago. The dried seed wasn't thought to be consumed until about 6,000 years ago, when the Indian culture began to make pottery, which made boiling of the dried seed possible. Daniel Debouck, an internationally recognized expert on common bean diversity, has suggested that ancient Indian farmers selected beans for yield, taste, and pest resistance, but also for aesthetic value. He said, "Selection of bean seeds to feed not only the body, but also the spirit may help explain the incredible diversity of beans." He further said, "The variability (in seed color) is astonishing...unmatched, perhaps in any other crop." Brightly colored bean seeds were embroidered onto shrouds covering mummies excavated by archaeologists in Peru. Twenty centuries later, the seed colors have still not faded. Beans were also painted on ceramics and embroidered onto weavings by pre-Hispanic Americans. Today, in the high Andes of South America, parents grow small plots of bright colored round beans for their children to use as marbles.

"Selection of bean seeds to feed not only the body, but also the spirit, may help explain the incredible diversity of beans."

The color and type of dry bean produced in many regions of the world are related to either the wild species growing in the region or the seed type that was first introduced to the area. For example, in many parts of Central and South America, the local market types grown today resemble the wild species growing in the area. Large red kidney types are grown in regions of South America where the wild species have large red kidney shaped seed. In Guatemala and the coastal regions of the Mexican Yucatan Peninsula, black beans are grown in the same region where wild species have black seed. In the U.S., pinto and medium size white seeded beans were grown by the Native Americans in the High Plains region. Today, pinto and great northern types are the primary market classes grown in this region. The pinto and great northern types were originally introduced from the highlands of Central Mexico where they are both cultivated and grow wild today.

The diversity of variation for seed color found in beans is also found for many other its plant and seed characteristics. Some bean seeds are even popped by frying in hot oil. The bean crop is grown and consumed in climates from the humid tropics to the northern temperate regions of Canada and Northern Europe. It is this wealth of plant variation that make beans both nutritious to eat and beautiful. ¤Brick

Reference

Walter, A. 1982. Beauty: A reason behind genetic diversity in beans. CIAT International Newsletter. 11(2):10.

CHANGES IN THE COLORADO SEED LAB

Anyone involved in the Colorado Seed Industry has probably heard that there will be some changes in the Colorado Seed Lab. The retirement of the director, Dr. Arnold Larsen, has necessitated the need for a review of the activities of the lab.

Currently, the lab is housed in the Department of Weed Science and Plant Pathology. Although the physical location of the lab will remain the same, as of July 1, 1994, the lab will be under the jurisdiction of the Department of Agronomy. The lab will

continue to process seed samples and employ seed analysts who are certified under the Association of Official Seed Analysts. The administrative functions of the lab will be handled by the Department of Agronomy under the supervision of Dr. Lee Sommers, Department Head, and Jim Stanelle, Extension Seed Certification Specialist.

To many customers, this change will probably not even be noticeable. The lab will continue to process certification samples, state regulatory samples, and contract samples for the National Seed Storage Lab. It is necessary to have a public, non-biased lab to perform these types of tests and to assure that results are considered beyond reproach.

Although the location of the Colorado Seed Lab will remain the same, after July 1, 1994, the lab will be under the jurisdiction of the Department of Agronomy.

Having the lab at CSU provides a mechanism for training not only seed analysts, but also provides part of a complete education for students in agronomy and other disciplines.

Dr. Larsen's expertise will be obviously missed. It is our desire to attempt to continue quality service as much as possible.

In addition to the samples already mentioned, the lab will continue to accept service samples from any individuals or companies needing the services of the lab. In some cases, these type of samples may be considered lower priority and reporting times may be therefore longer during busier seasons.

The big difference in services will be that the lab will no longer have a director with the expertise of Dr. Larsen. It may be more difficult to get help with questions involving specific problems in seed testing. Lab and department personnel will be available to assist in any questions that come up.

Many long time users of the seed lab will be contacted in future months to assess their needs. We hope that each user of the Colorado Seed Lab will receive the best possible service. ▫Stanelle

HEARING DATES SET FOR NEW AG CHEMICAL BULK STORAGE REGULATIONS

The 1993 Colorado Legislature amended SB 90-126 to clarify the threshold requirements for mandatory agricultural chemical containment facilities. You may recall that the original bill mandated secondary containment and mixing pads for any operation which exceeded 55,000 pounds of formulated ag chemical annually. This figure caused considerable heartburn for many operators because the state Attorney General interpreted it to mean the total of chemical plus mix water. Including water in the calculation of the 55,000 pound threshold brought many small operators under the scope of the law. The Legislature saw fit to amend this as a rider on the ill-fated Pesticide Preemption Bill.

The law now requires that any agricultural chemical facility in Colorado that handles bulk chemicals in excess of the following levels must have approved containment facilities.

<u>Pesticides</u>
Secondary containment is required if:

1. Pesticide is stored in containers larger than 55 gallons that are not DOT approved.

2. Pesticide is stored in any container larger than 6,000 gallons.

Mixing and loading pads are required if:

1. You mix and load at one site annually more than
   a. 500 gallons liquid pesticide, or
   b. 3,000 pounds dry pesticide, or
   c. 1,500 pounds A.I. of a combination of liquid and dry product.

Fertilizers

Secondary containment and mixing pads are required if:

1. Liquid fertilizer is stored in bulk quantity greater than 5,000 gallons, or

2. Dry fertilizer is stored in bulk in quantity greater than 5,000 pounds.

If you know of anyone who may be impacted and wishes to comment on the rules and regulations for chemical containment, advise them of the upcoming hearings.

These thresholds have been written into statute and are not likely to change. However, the associated rules and regulations have not yet been adopted by the Colorado Agriculture Commission. We have been working on these regulations for the last 1 1/2 years and they are now in the final draft prior to formal public hearing. The purpose of the rules and regulations is to provide minimum standards for implementing the containment requirements of SB 90-126. The regulations cover specific requirements for secondary containment of bulk pesticides, mixing and loading pads, secondary containment of bulk commercial fertilizers, and management of these facilities. Exemption for chemigation and field mixing are also spelled out in the rules.

Formal public hearings are a required aspect of the rule making procedures in Colorado. These hearings are held to allow affected parties the opportunity to comment on how rules may impact their operations. The Colorado Department of Agriculture has decided to hold public hearings around the state due to the potential for these rules to have an economic impact on production agriculture. If you know of anyone who may be impacted and wishes to comment on the rules and regulations for chemical containment, advise them of the upcoming hearings.

Hearings will be held at 9:30 a.m. each day at the following locations:

Lamar **January 31, 1994**
Lamar Community College

Alamosa **February 2, 1994**
Adams State College

Grand Junction **February 8, 1994**
Mesa State College

Sterling **February 23, 1994**
Northeastern Jr. College

February 28, 1994 **Lakewood**
Colorado Department of Agriculture

Any interested party may file with the Commissioner of Agriculture or present at the hearings, written data, view, or arguments with respect to the proposed rules and regulations and may present the same orally unless the Commissioner deems it unnecessary.

Following the hearings, it is anticipated that the containment regulations will be adopted effective July 1, 1994. A three year phase-in period will follow the adoption of the rules. If you need more information or want a copy of the rules and regulations, call Reagan Waskom at (303)491-6201. ▫Waskom

SUBMITTING WATER SAMPLES FOR ANALYSIS

Obtaining a representative water sample is a first step towards determining water quality. Water samples should be placed in plastic containers that can be sealed tightly with plastic caps. Sample containers should be at least four fluid ounces. A four ounce sample is enough to do major cations (Ca, Mg, Na, K), major anions (CO_3, HCO_3, Cl, SO_4, NO_3), pH, and electrical conductivity. If additional testing is required, more sample would be necessary.

Bottles should be rinsed with water prior to taking the sample. If soap is used to clean containers, the bottles should be rinsed thoroughly prior to sampling since detergent can contain some phosphorus and other minerals which may contaminate the water sample.

Water, water, everywhere and is it safe to drink?

When obtaining samples, there are generally two points at which samples may be taken. The first point is at the primary source such as a well head, spring, or lake prior to entering the household plumbing system or undergoing any on-site treatment. The second point is at the site of consumption such as the kitchen water faucet where the water has passed through the household plumbing. Samples from the secondary site within the household may be influenced by the effect the plumbing has on water quality.

To sample the primary water source, allow water to flow about five minutes from a faucet on the main line, if available or as near the water source as possible. The five minute purging process will help remove any sediment that may have settled into the well casing or pipes and allow the sampling of fresh ground or surface water.

The container and lid should be rinsed three times with the water being sampled. With the water flowing, the container should be filled to the top, with as little air as possible in the container. Seal the container, label it with a waterproof marker, and place the sample in the refrigerator. To sample water at the point of consumption, it is desirable to obtain the sample first thing in the morning, prior to using any water elsewhere in the house. The sample should be taken from a cold water faucet furthest away from where the water enters the house. Do not allow any water to flow prior to taking the sample. Obtain the sample in a clean container, completely filling the container with sample water. Water that has stood in pipes all night will generally have the potential to contain higher levels of heavy metals such as lead, especially if lead solder or lead pipes were used in the household plumbing. Place the sample in the refrigerator until it can be taken or sent to a laboratory. Do not freeze water samples.

Labels on the sample should include name, address, phone number, and location. An information sheet with the name, address, and type of test desired should accompany the sample. Samples should be sent to the laboratory as soon as possible, since some tests have to be done immediately (such as pH) or within 24 hours (such as alkalinity) to be accurate.

A correctly taken water sample will help ensure accurate results. ▫Self

OILSEED CROP RESEARCH IN THE ARKANSAS VALLEY

Oilseed research in 1993 was limited to the evaluation of crambe and safflower. Canola was not planted because of low yield potential, poor oil quality, and insect susceptibility in the 1992 trials.

Crambe is considered a valuable industrial oilseed crop. It is used in the production of oil high in erucic acid, a fatty acid found in oil used in the manufacture of transmission fluids and plastics. Crambe seed contains 32 to 35% oil, of which 50 to 52% is erucic acid. Oil from crambe seed cannot be consumed by humans or monogastric animals because it is toxic. However, it also possess properties which make it an excellent source for the production of industrial coatings, non-polluting paints, plastics, and nylon. Crambe and rapeseed oil are the only vegetable sources of "nylon 1313", a wear-resistant nylon now used in bearings.

Safflower oil is used for human consumption. Safflower is commonly marketed under the name "saffola". There are two types of safflower oil, one which is high in linoleic oil (a polyunsaturated fat), and one high in oleic oil (a monounsaturated fat). Polyunsaturated fats are thought to decrease the risk of heart disease by reducing low density lipoproteins (LDL) in human blood serum cholesterol, therefore reducing the risk of heart disease. Monounsaturated fats are considered to have the ability to reduce the "stickiness" of blood serum cholesterol, thereby reducing clogging of the arteries. Both types are beneficial in the human diet.

Currently, safflower oil is a valuable commodity in world oil markets and premium prices have been paid for it over other edible oils. Crambe and safflower currently have a farmgate value of $10/cwt and $10-12/cwt, respectively.

Replicated field plots were established to determine yield potential and oil content of crambe and safflower in the Arkansas Valley. One hundred and twenty pounds of nitrogen were applied to the plots prior to planting. Two crambe cultivars, Meyer and NMSU 9, and four safflower cultivars, Montola 2000 (high oleic), Girard (high oleic), Finch (a birdseed type), and Carmex 353 (high linoleic), were planted on February 26, 1993. Plots consisted of four-rows, 30 feet in length, spaced 30 inches between rows. Plots were cultivated twice, and irrigated bimonthly. No herbicides or insecticides were applied. Crambe and safflower plots were harvested on 6 August and 10 September, 1993, respectively.

Results

Crambe

Cultivar	Yield (lbs/a)	Testweight (lbs/bu)	Oil %
NMSU 9	1735 a	17.56	17
Meyer	1373 b	13.65	12

NMSU had higher yield, testweight and oil content than Meyer. However, the yield and oil content obtained by NMSU in this trial suggest that economic development of crambe is doubtful in the Arkansas Valley.

Safflower

Cultivar	Yield (lbs/a)	Testweight (lbs/bu)	Oil %
Montola 2000	3172 a	51.3 ns	43.6
Finch	2280 ab	53.1 ns	39.1
Carmex 353	2207 ab	52.2 ns	39.6
Girard	1916 b	52.7 ns	40.3

Safflower varieties also differed for seed yield, but not for testweight. The relatively high seed yield and oil content suggest that safflower may have potential for further economic development. Production costs could be limited by irrigation management. A recommendation from Dr. Jerry Bergman at Montana State University would be to pre-irrigate the field prior to planting to bring the soil to field capacity, then irrigate the second time just prior to bloom. One factor that must be considered during irrigation is that safflower is very sensitive to saturated soils. Hence, the crop cannot be submerged for more than a few hours. However, safflower is very salt tolerant and saline irrigation water should pose no problem.

Oil composition of the seed from these trials has not yet been determined, but climatic data suggest that oliec oil content should be high. If a cultivar such as Montola 2000 produced an oil which had 85-87% oleic oil, it would certainly be a premium monounsaturated fatty oil. Such a monounsaturated fat level would exceed that available in canola or olive oil, and be comparable to high oleic sunflower oil. ▪Johnson

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

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Sincerely,

Robert L. Croissant

Robert L. Croissant
Editor
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WHAT ABOUT BOB?

Bob Croissant was in the hospital for minor surgery Jan. 6. He is at home recuperating and should be back in the office full time in the near future.

Please have patience with our response time and understand that we are trying to handle all requests as quickly as possible.