FROM THE GROUND UP

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AGRONOMY NEWS

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WEED CONTROL IN WHEAT STUBBLE

Crop production under dryland cropping systems in the Great Plains is highly dependent on precipitation. With wheat, for example, research has shown that each additional inch of water above the initial yield threshold translates into 4.5 bu/A of grain. Consequently, profits are highly related to water conservation.

Research shows that from 800 to 2,700 lb/A of weed growth can occur after wheat harvest, resulting in from 2 to 6 inches of water use (essentially all of the available soil water). Thus, eliminating weed growth in dryland cropping systems is essential for maximizing soil water accumulation, especially when utilizing intensive cropping systems where corn, millet, or sunflower are to be grown after wheat.

The most critical periods for weed control are 1) during growth of the wheat crop, 2) in the summer and fall after wheat harvest, and 3) in the spring prior to planting or in the fallow

period.

Weed control measures applied during wheat growth, using soil active (i.e. Ally) and contact herbicides (i.e. 2,4-D), will generally produce weed-free wheat stubble after harvest, providing the producer with added time after harvest to implement weed control measures.

Control of weeds after wheat harvest can be done through either the use of tillage or a combination of contact and soil active herbicides. Tillage will provide effective weed control; however, moisture conservation will be greatly reduced compared to weed control via the use of herbicides. Long term research in the Great Plains has demonstrated that up to 60% of fallow or non-crop precipitation can be saved by using herbicides for weed control after harvest versus only 20% by using conventional tillage methods. The key to maximizing water storage efficiency is maintaining wheat crop residue on the soil surface and minimizing or eliminating soil disturbance. Dollars spent for herbicides in this phase give maximum returns compared to any other point in the system.

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If weeds are present at harvest, a herbicide application tailored to weed species present is critical. Apply herbicides in late July to mid-August to control volunteer wheat, downy brome, and jointed goat grass. Various combinations of herbicides with small amounts of atrazine are effective in this role. The specific combination of herbicides applied will also depend on the crop to be planted after wheat. Crops such as corn or millet would be tolerant to atrazine application after wheat harvest. However, one could expect significant crop injury on sunflower if atrazine was applied after wheat harvest. Consult your local Extension agent, ag consultant, or ag chemical supplier to tailor your herbicide program to match your cropping systems.
▫Peterson and Shanahan

DRY BEAN SEEDLING PROBLEMS

Two common problems that occur on dry bean seedlings are herbicide injury and seedling diseases such as damping off and root rot. These problems often result in stand decline but do not completely kill the crop. The decision to destroy the crop and replant with a short season crop such as millet will depend upon the degree of plant damage and extent of area affected.

Dry bean varieties are tolerant to labeled herbicides when used properly. However, herbicide damage can occur due to soil carryover from the previous crop or from aerial drift. Herbicide damage from contaminated soil due to carryover usually cannot be corrected and plant symptoms vary greatly, but generally include: leaf deformation, shortened internodes, swollen hypocotyls, and delayed maturity. Unless the herbicide can be flushed from the soil, the damaged plants will likely not recover and yield reductions will occur. Herbicide damage due to aerial drift is more common than from carryover. In 1989, late aerial applications of Banvel and 2,4-D on wheat seriously damaged many bean fields' beans due to drift. Drs. Phil Westra and Howard Schwartz reported that damage from these herbicides included shortened internodes, small cupped leaves with surface blisters, parallel venation with leaf tip distortion, cobra hood-appearing leaves, and delayed plant development. Once damage has occurred there is very little that can be

done to alleviate the problems. For the most part, plants outgrew the damage, although some yield reductions and delayed maturity occurred. Refer to Service in Action No 2.803 and the Colorado Dry Bean Production and IPM Bulletin No. 548A for more information about herbicide damage and photographs of affected plants.

Dry bean seedlings may suffer from herbicide injury or diseases such as damping off and root rot.

Damping off caused by *Pythium* species of fungi can cause seed or seedling decay. The fungus is favored by high soil moisture and moderate to high soil temperatures. Initial symptoms appear as water-soaked seeds or as elongated water-soaked areas on the hypocotyl or primary root. Symptoms usually occur within one to three weeks after planting. The pathogen can extensively prune roots, reduce overall plant growth, or kill the seedling. *Pythium* can also infect mature plant stems or pods when moist warm conditions occur. Root rot caused by *Rhizoctonia* or *Fusarium* do not usually kill the plant, but may cause extensive root pruning. *Rhizoctonia* root rot appears as linear or circular reddish-brown sunken lesions or cankers delimited by a darker brown to reddish-brown margin. The pathogen often invades the central vascular system of the root and lower stem causing a brick-red discoloration. Severely infected plants may die, but often survive. Wet cool soils favor *Rhizoctonia* and over-irrigating with cold well water can provide an ideal environment for development of this pathogen. *Fusarium* root rot symptoms may appear in a circular to irregular shaped area within the field. Plants with symptoms are often stunted and yellow due to plugging of the vascular system. Premature leaf drop and poor pod fill often occur which results in reduced yield.

Disease management for root rots rely on crop rotation, proper planting date, alleviation of soil compaction, and the use of appropriate pesticides. Crop rotation with at least a three year cycle between planting beans can effectively reduce residual populations of all three root rot organisms. Some crops such as potato or sugar beet may support *Rhizoctonia*, so they should not be included in the rotation. Dry beans should be planted in a warm moist soil, approximately 60° F at planting depth at 6:00 A.M.. Planting in cool wet soils slows the rate of germination and may predispose the seedling to root rot pathogens. Where severe root rot problems occur, the bean crop debris should be incorporated into the soil in the fall to reduce pathogen survival. Soil compaction and poor soil drainage enhance root rot disease problems and should be alleviated by deep chiseling. Deep chiseling enhances soil water infiltration, thus preventing the soil from becoming saturated in the upper profile during seedling growth and allowing deep root penetration. Seed and furrow applied fungicides are available to protect seedlings from *Rhizoctonia* and *Pythium*; however, environmental conditions influence their effectiveness. Always read and follow label instructions when applying pesticides. For additional information about root rots of dry beans, refer to Service In Action No. 2.938 by H. F. Schwartz. ▫Brick

HAIL INJURY TO CORN

Corn is increasingly vulnerable to hail damage from emergence through the tassel and pollination stage. Yield losses are from loss of stand, leaf defoliation, and other deviations such as drought, insect damage, ear and stalk damage, and lack of pollination.

To accurately access losses, first determine the growth stage of the plant. Hail occurring at the 6-7 leaf stage will cause very little loss from defoliation. Hail may be severe enough though to reduce stand to unacceptable levels. Plants about 12 inches tall will have the growing point near the soil surface while the growing point will be about 1 inch above the surface on 20 inch tall plants. Hail damaging this growing point will destroy the plant.

Cut the crown of the plant down the middle to determine damage here. Leaf tissue may be 100% destroyed but most likely, leaves will be shredded and subsequent growth will result in "buggy whipping". Cold temperatures may delay recovery and speed of regrowth.

The Department of Agronomy has officially made a name change to the Department of Soil and Crop Sciences.

Methods to estimate yield losses

Yield history should be the basis for loss calculations. Reference to charts and tables should be made from those found in the publication, "Hail Injury to Corn", SIA No. .113, available from your Extension office. This publication was designed to help assess hail losses and help with replanting decisions. Tables and charts were obtained from crop insurance companies and research designed to accurately predict yield after varying hail intensities at various times of the year. It is important to make repeated counts and estimates in the field, then averaging results before making decisions.

If you are in a hail-prone area, it might be helpful to obtain a copy of this SIA for your files. This could save time in estimating hail losses and in a replant decision if you have hail damage.

Estimating yield reduction from defoliation

When leaf area is removed, the plant loses its ability to produce dry matter through photosynthesis. The severity of loss depends on the stage of growth and the amount of leaf area removed. Only 6% of the leaf area is exposed at the 7 leaf stage while 100% is exposed at tasseling. Yield from a 100% leaf loss at the 7 leaf stage is small while a 100% leaf loss at tasseling will cause 100% yield loss. Later at the dent stage, a 100% leaf loss will reduce yield about 24-32%.

To estimate percent leaf loss, cut the leaves from the plant and place them on a sheet of paper. Indicate where the actual leaf margin should be and estimate the percent loss. All attached leaf portions should be counted in the leaf area. To improve percent loss estimations, use graph paper and calculate the destroyed area. This should be done on various leaf locations on each plant in different field areas, then average the results together. Percent yield reduction is then estimated by referring to a chart.

Estimating losses from damage on the ear and stalk

Stalk and ear damage losses are confined to bruises caused by hail driven by wind. Yield loss from bruises on the stalk is difficult to access. Many times, severely damaged stalks appear to be more susceptible to stalk rot than other plants. Bruises on the ear result in unfilled areas and losses from hail are predictable. Hail occurring during the tasseling period may destroy normal pollination causing additional losses.

Estimating yield reduction from stand loss

Early season hail may cause significant stand reduction. Assessment of stand loss should be made about one week after the storm. Prior to the 11th leaf stage, yield losses are assessed by referring to a table in SIA .113 but after the 11th leaf stage, losses are on a one to one ratio. ¤Croissant

SOIL SAMPLING SUMMER FALLOW FIELDS

Begin to prepare for next year's wheat crop now:

Take soil samples early to receive results which will help determine need for nitrogen, phosphorus, potassium, sulfur, or other micronutrient fertilizers.

Now is the time to soil test summer fallow fields in preparation for next year's wheat crop. Samples (15 - 20 cores) should be taken to tillage depth (6 - 8 inches) within a uniform area. Subsoil samples to 2 feet depth also should be taken for nitrate-nitrogen analysis. Soil should be sampled and tested early to allow enough time to receive the results to make fertilizer decisions. Early sampling also helps avoid the rush that most soil test labs experience in late August, just prior to planting.

Nitrogen is the major plant nutrient required by wheat, but choosing the proper nitrogen fertilizer rate without knowing the available soil nitrogen levels is difficult. Suggested nitrogen rates are determined by crop needs for the expected wheat yield. Nitrogen fertilizer rates should be decreased by the credit given for the nitrate-nitrogen in soil, as well as nitrogen mineralized from the soil organic matter.

Phosphorus is frequently deficient for dryland wheat. Soils likely to be phosphorus-deficient include severely eroded areas, soils low in organic matter, and soils which contain large amounts of free calcium carbonate (high pH soils).

Phosphorus deficiencies can be predicted by soil testing. Fallow fields should be tested now so phosphate fertilizer can be applied early enough so that it can be incorporated by tillage or applied at planting. Phosphates do not move in soils, so they should be placed in the root zone. Application of phosphate fertilizers with or near the seed is an efficient method.

Winter wheat generally does not respond to potassium, sulfur, or micronutrient fertilizers. Soil testing will help identify those fields which may be deficient in these plant nutrients.

Soil test results, coupled with research results for the area and on-farm experience, will assist in making profitable fertilizer decisions for next year's wheat crop.
¤Mortvedt and Self

SOUTH PLATTE AG TOUR

Colorado State University Cooperative Extension, Northern Colorado Water Conservancy District, and Central Colorado Water Conservancy District are hosting a full-day, no-cost agricultural tour of the front range area of the South Platte Basin on Thursday, August 18, 1994.

The purpose of this tour is to showcase new developments in Best Management Practices for irrigation, nutrient management, manure utilization, and ag chemical management. We will visit on-farm and Experiment Station research and demonstration sites. New production tools such as in-season soil sampling,

improved irrigation systems, chlorophyll measurement, on-farm composting equipment, remote sensing, nutrient management plans, computer modelling, and geographic information systems will be demonstrated and discussed.

South Platte Ag Tour - August 18, beginning at 9 a.m. at ARDEC. RSVP to Reagan Waskom at (303)491-6201 by August 15.

We will meet at the CSU Agricultural Research, Development, and Education Center (ARDEC) on I-25 at 9:00 a.m. Plan to visit with CSU research and Extension personnel and observe field research on irrigation management, nutrient management, remote sensing, computer operated irrigation systems, and turfgrass research.

Buses will leave ARDEC at 11:00 am for Greeley and stops at various research and demonstration sites. Lunches and a barbecue dinner will be provided by industry sponsors. The buses return to ARDEC at 5:30 and 6:00 p.m.

If you would like to join us for a day in the field with producers and colleagues, please RSVP your attendance to Reagan Waskom at (303)491-6201 by August 15, 1994. ▫Waskom

OILSEED PRODUCTION CONTINUES TO SHOW GROWTH

Interest in oilseed production began in Colorado during the late 1980's. Access to markets in the Midwest, North Central, Southwest and Pacific Coast was costly. With the development of a crushing plant in Goodland, Kansas, all of that changed. The Goodland facility initially was involved in sunflower crushing. In 1993, they added crambe and safflower. Now in 1994, they will add canola. I won't discuss sunflower, as the industry is well developed and not a part of alternative crop development.

During the first three days of June, I attended a meeting of the High Plains Canola Council in Manhattan, Kansas. This was significant, because while the states of Missouri, Kansas, Nebraska, Texas, and Colorado were represented, Colorado was representing 90% of the production in the High Plains region. Also significant was the industry representation including the Goodland processing plant, a major Colorado contractor out of Idaho, a seed company from South Dakota, a processor from Oregon, and a processor/seed company from California. Of all the companies present, only the California representative focused on winter canola. The others were interested in the spring canolas we grow on the Front Range and in the San Luis Valley.

Canola's phenomenal growth in Colorado began in 1986 when a San Luis Valley grower, John Rhoads, asked me to help put out some canola trials. With a little seed money from the State Department of Agriculture, we planted 60 acres and at harvest, John asked what could we do with it? It wasn't economical to send it to Fargo, North Dakota, Chattanooga,Tennessee, Dallas, Texas, or Woodland, California. He toasted it and made something no one had thought of - toasted canola seeds.

From John's humble beginnings, we were able to get canola into the hands of various crushers and they have come back as supporters of canola development in our state. In 1990, canola represented a gross return to Colorado growers of approximately $100,000. In 1993, it represented an estimated $1.5 million industry. From the 65 acres in 1987, Colorado will produce about 7,000 acres in 1994.

The next steps will be developing a heat tolerant spring canola and a winter-hardy winter canola for the Great Plains and the Western Slope. These may still be years away, however.

The next fastest growing crop will be oilseed safflower. From the initial production in 1988 of 400+ acres, oilseed safflower production dropped to zero in 1990 and came back in 1993 at 500 acres. In 1994, approximately 1,200 acres will be planted from the Grand Valley in the west to the Arkansas Valley to the east.

Crambe has fallen back as transportation from the San Luis Valley to Goodland became a problem and quality and quantity of crambe along the Front Range was unacceptable to the industry. ▫Johnson

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

CONGRATULATIONS

Congratulations to Kathryn and Mike Apley on the birth of the new baby boy, Douglas Paul. He was born Monday, June 6 at 5:45 p.m., weighing in at 8 pounds, 2 ounces!

Congratulations to the LeBlanc family, Del, Tricia and Maria on their new family member, Brittany Nicole. She was born on Monday, May 16 at 9:00 p.m., weighing in at 8 pounds, 1 ounce. Tricia is the administrative assistant for the Colorado Seed Growers Association.

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Sincerely,

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