FROM THE GROUND UP

AGRONOMY NEWS

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SPRING WEED CONTROL IN WINTER WHEAT

Time is rapidly approaching when weed control decisions in winter wheat will have to be made. Most selective herbicides used for weed control in winter wheat require appropriate application timing for maximum performance and minimum crop injury. Some of these herbicides require application soon after the 1993 crop plants break dormancy. An ounce of prevention applied in late March or early April can prevent significant weed problems during or after harvest, as occurred in 1992.

Weeds rob wheat producers of millions of dollars each year. In Colorado, it is estimated that weeds reduce wheat yields by about 10% each year, yet only about 10-15% of the acres receive a herbicide application. Wheat and weeds compete directly for water and nutrients. The effects of reduced water and nutrient supply caused by weed competition may negatively impact wheat at any growth stage. Not as apparent, however, are the effects of competition for sunlight and

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space, also affecting wheat growth and development, especially during early growth stages. Even with ample soil moisture and nutrients, shading by weeds slows wheat leaf development, resulting in reduced wheat vigor.

Actual reduction in wheat yields due to weed pressure for a given field will vary, depending on many factors. However, considerable yield losses have been noted in research with relatively low weed populations. For example, one tansy mustard plant per square foot can reduce wheat yields by 15%, while the same population of blue mustard may reduce yields by 30%.

Earlier germinating weeds compete more with the developing wheat and have greater impact on grain yields. Weeds that emerge in the fall with the winter wheat, such as jointed goat grass, downy brome, and the mustards, are better competitors than those that emerge in the spring. As result, use of preventative cultural practices such as crop rotations are important in minimizing yield loss due to winter annual weeds. It should be emphasized that all non-chemical control practices should be used before resorting to the use of herbicides.

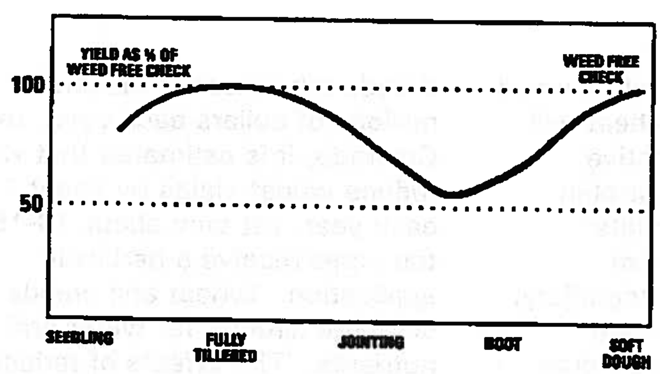

Fig. 1 Stages when wheat injury occurs with 2,4-D plus Banvel

Weed problems that can be managed by spring herbicide treatments include winter annual broadleafs such as the mustards and prickly lettuce, and summer annuals such as kochia, sunflower, lambsquarter, and Russian thistle. Infestations of winter annual grasses such as downy brome or jointed goatgrass cannot be effectively managed with spring herbicide treatments and require other control strategies.

The herbicide treatments that are labeled for spring application in wheat are covered in detail in the 1993 Colorado Pesticide Guide for Field Crops (Colorado State University, Cooperative Extension publication available from Extension offices). The herbicide treatments are divided into two broad categories; 1) soil active types, and 2) contact or burn down types.

The contact herbicides labeled for selective control of weeds in growing wheat consist of 2,4-D, Banvel, Buctril, Bronate, and MCPA. Banvel also has residual soil activity and label restrictions should be carefully followed, particularly for sensitive crops. Many herbicide treatments will provide effective control for broadleaf weed problems. As illustrated for the case of 2,4-D plus Banvel (Figure 1), these herbicide treatments require appropriate timing application providing maximum weed control and avoidance of crop injury. The time window for Banvel application is very specific and requires careful attention to the label. The choice of specific herbicide treatments will vary depending on particular weed problems, since each herbicide or combination have certain strengths and weaknesses. Again, the label should be consulted regarding appropriate treatments.

Weeds rob wheat producers of millions of dollars each year. Weeds compete with wheat for water, nutrients, sunlight, and space.

Most of the soil active herbicides labeled for selective weed control in wheat consist of sulfonyl-urea herbicides. Glean was the first of these herbicides released, but is no longer labeled for use in Colorado. Other herbicides falling in this category, labeled for use in Colorado, include Ally, Amber, and Harmony Extra. These herbicides, in general, have the same spectrum of weed control, with the main differences being in length of residual soil activity. For example, Ally will provide residual broadleaf weed control for about 4-6 weeks after application, whereas, Harmony Extra has very little residual soil activity. Treatments involving Ally or Amber will, in many cases, provide weed-free wheat stubble after harvest. This provides the producer with added time after wheat harvest to implement other weed control measures.

It has become popular with many producers to combine spring nitrogen fertilizer top-dressing with application of one of the above herbicides. This allows the producer to fine tune fertilizer recommendations based on available soil moisture condition as well and apply appropriate weed control measures.

Another issue that warrants discussion is the recent appearance of weed populations, in particular kochia, exhibiting resistance to sulfonyl urea herbicides. A 1992 survey of Colorado showed that 3% of the fields sampled have kochia resistant to sulfonyl urea (SU) herbicides. If a producers suspects SU resistant kochia is present, then combinations of other herbicides should be used. For example, a mixture using 0.1 oz. (0.1 oz. of active ingredient/A) of Ally and 3-4 oz. of Banvel (along with surfactant) would be a good mixture to combat SU resistant kochia. Sulfonyl-urea herbicide labels specify tank mixtures for the management of resistant weeds.

In summary, it should be reemphasized that weed control in winter wheat production should utilize tillage, crop rotations, clean seed, and other cultural practices. However, judicious use of herbicide applications in the spring can help reduce weed pressure in the wheat crop, and set up a fallow stubble situation where weed problems are minimized.
□Shanahan and Westra

PREPARATION FOR THE 1993 BEAN CROP

It is not too early to plan your 1993 bean crop. Several things to consider include:

1) choice of the market class(es) and varieties to plant

2) the number of dry beans acres that you should plant

3) whether to grow under contract

4) tillage and fertility practices to maximize your economic return and preserve the environment

Most Colorado bean producers grow pinto beans and do not consider producing other market classes such as light red kidney, black, great northern, or small whites. Because of market price differences, production of more than one class may enable you to reduce risk of poor prices in one market class. Varieties in other market classes differ in maturities, permitting distribution of farming operations over a broader time period. Check with local bean processors to determine if they purchase classes other than pinto beans. Most processors have experience with other market classes and they can assist you with variety selection and appropriate cultural practices in your area.

Because of variation in market prices, disease reaction, growth habits, etc., Colorado bean producers might consider producing other market classes such as light red kidney, black, great northern, or small whites in addition to pinto.

Selection of a variety suited to your growing conditions can be done on past experience and current variety test information. To obtain current information about variety test results conducted by the Colorado State University Crop Testing Program, consult the **1992 Dry Bean Crop Testing Report** available at your Cooperative Extension office. In 1992, eight commercial pinto varieties had a mean production 100% or more of the test average over three locations. These varieties are RNK-179, Chase (aka NE 89-5), Bill Z, Othello, RNK-136, RNK-178, UI 129, and Olathe. These varieties differ in maturities, disease reactions, and growth habits. All, except Othello, have vine type plant architecture. In general, Othello is the earliest and RNK-178 and RNK-179 are later maturing varieties. If you plant more than 20 to 30 acres, consider planting more than one variety to diversify your genetic base and spread out harvest operations by choosing varieties which differ in maturity.

The number of acres to plant should not be determined by the market price of beans at planting time. First, determine the number of bean acres that fit your crop rotation, then produce approximately that amount each year. This approach will ensure that you have production during years of high prices. During years of low prices, store your beans, if possible. If you prefer to adjust your bean area based on prices, limit the annual changes to no more than 50 % of the area. The decision regarding contract production should be based on financial considerations specific to your operation and should be made in consultation with an economist.

Tillage and fertility considerations should not be made until soil tests are conducted and potential soil compaction problems evaluated. Soil compaction can be evaluated by inserting a tensiometer or a steel rod into the soil to detect compacted layers. Deep chiseling can alleviate compaction, but should be done when soils are relatively dry and at the appropriate depth. To determine fertility needs, use soil test results and refer to **The Guide to Fertilizer Recommendations in Colorado** hand book or the **Colorado Dry Bean Production and IPM Bulletin** for specific recommendations. Next month we will review fertilizer recommendations. ▫Brick

HEAT UNITS - GROWING DEGREE DAYS

Many times the terms "heat units" and "growing degree days" are used synonymously. **Heat units** is a general term while **growing degree days** is more specific.

Growing degree days (GDD), the most common term, is used when determining maturity values of corn; however, this system is used with many other crops as well. **Growing degree days** is calculated according to the following formula:

$$GDD=\frac{LowTemp+HighTemp}{2}-BaseTemp$$

The standard way for calculating corn **growing degree days** is to use a minimum temperature of 50° and a maximum of 86°F. The base temperature used is 50°. On a specific day, if the low temperature was 45° and the high was 90°, then adjusted values are 50° and 86°. Then (50 + 86)/2 - 50 = 18 GDD for that day. Temperatures between 50° and 86° are used "as is" in the formula. Succeeding daily calculations are added together for the season.

Base temperatures used may vary by investigator but values most often used are 40°F for cool season crops such as wheat, oats, barley, and canning peas while 50° is used for warm season crops such as corn, sorghum, dry beans, soybeans, and sweet corn. The base temperature is near the point where a particular crop begins growth while the maximum temperature would represent values where growth stops.

If you know of any farmers interested in producing certified seed (especially small grains) this year, please contact Colorado Seed Growers Association at 303/491-6202 as soon as possible.

Various systems may have different correction values and different starting points. The system is used successfully by many corn seed companies who indicate variety maturity using GDD. This system is excellent comparing varieties within the same seed company tested at the same location but may be misleading when someone attempts to compare two different seed company hybrids. Short season hybrids may require as few as 2000 GDD while later hybrids may require over 3000 GDD. Usually GDD values are expressed from emergence to physiological maturity. Other companies may just provide a number of days from emergence to maturity such as 95 to 105 days indicating early maturity while 125 or later represents a late maturing hybrid.

Temperatures are cooler as one goes north and upwards in elevation and warmer as one goes south and closer to sea level. Using the heat unit system allows some estimation of maturity over different zones; however, plants react differently and the best information available is just a very good estimate.

The growing degree days system is also used to determine specific heat requirement for some plant diseases and insects. When used for insects, one can predict when an insect, e.g. coddling moth, emerges in the spring. In some areas, this value may be near 250 GDD where other areas may require slightly different values. The insect will emerge earlier in a warm spring than a cold spring. When using the GDD system for insects, counting usually starts on January 1.

Similar temperature calculating systems are used to determine heating degree days and cooling degree days. ▫Croissant

WILL FARMERS USE SATELLITES?

Farmers once planted their crops by the phases of the moon.
Today, another source in the sky might help them with their planting decisions. Farmers can now receive agricultural information from satellite about planting, growing, harvesting, and even the marketing of their crops.

At this time, more than 1000 Colorado farms have satellite systems which receive agricultural information. The primary use of these systems are to receive current market and weather information. Potential exists for other time-sensitive agricultural information to be broadcast in the visual text. This information could include soil temperatures, growing degree days, water usage, and related disease and pest alerts. Soon these electronic satellite information systems may serve as an informational tool and an educational source. Future enhancements to the systems may include auditory delivery and 2-way interactive satellite communication capabilities.

The cost for a satellite information system dedicated to agriculture information is relatively low, since all equipment is leased. There is a one time initiation fee, in addition to a small monthly rental cost. There are no telephone costs or special equipment needs. Information is current, with 70 pages or more of visual text available 24 hours a day. The visual nature of the system does not contribute to an unwanted accumulation of dated or unwanted information. A printer can be added to the system if hard copies of specific data are needed.

Agricultural information regarding weather and the current market is now being transmitted via satellite. Potential transmissions might include soil temperatures, growing degree days, water usage, related disease and pest alerts. We are definitely approaching the 21st century!

Most of these satellite systems in Colorado consist of a 3 foot dish, pointed toward the southern skies. This dish is placed outdoors, and a coaxial wire up to 75 feet in length connects to a desktop receiving unit and a monitor. Most monitors measure 10 to 14 inches in diameter, with color systems now readily available.

Agricultural related information is updated on a daily and sometimes, minute by minute basis. Weather maps are updated hourly throughout the day. The color systems feature a graphic picture of cloud cover intensity, which includes the Eastern Plains of Colorado.

In addition to farms, many agribusinesses use the satellite systems to stay current. At least 12 of Colorado's county and area Extension offices now have the systems in place. Colorado State University Cooperative Extension has access to 5 pages on the system, and is broadcasting time-sensitive information twice weekly.

The technological advances in satellite communications is now available for use in Colorado agriculture. The primary advantages of disseminating information on the satellite systems are: 1) the availability of the low cost information systems to farmers, and 2) the potential to broadcast information on a statewide, regional, and sometimes localized basis. The potential exists to expand the dissemination of time-sensitive cropping related information typically confined to press releases and newsletters.

The farmers that used to plant their crops by the phases of the moon could not have envisioned the technology that we have available today. The question now becomes how agriculture can harness that technology to enhance the food and fiber system in a rapidly changing world. For more information, contact Steve Johnson, Extension Agent-Larimer County Cooperative Extension at 303/498-7400.
□Johnson

DRYLAND CORN PRODUCTION IN EASTERN COLORADO

Can dryland corn be produced in eastern Colorado? Westfall, Peterson, and Kolberg have shown that dryland corn has produced well at both Sterling and Stratton (5 and 3 years of data, respectively) under no-till management averaging about 72 bu/A for the two highest nitrogen rates (Figure 2). Yield levels of the check plots (0 lb N/A) have been higher at Sterling (54.5 bu/A) than at Stratton (41.3 bu/A), indicating that soil mineralization rates are greater at the Sterling locations. Both sites, however, produce about 1 bu/A of corn for every 1 lb/A of N taken up by the plant.

The corn yield was produced in a wheat-corn-fallow (WCF) rotation.

The amount of precipitation at Sterling and Stratton after wheat harvest (July) to corn planting the following spring (May) has averaged about 12 inches, one inch below average. However, during the corn growth from 1 May to October, the precipitation has averaged about 12 ½ inches, one inch above normal. So the total expected precipitation is about 24.5 inches for the entire cycle for both locations.

The fertilizer treatment and rates for the corn part of the rotation were as follows:

0, 30, 60, and 90 lbs N/A (1987-1989)
0, 35, 70, and 105 lbs N/A (1990-1992)

The fertilizer source-placement-timing treatments were as follows:

Figures 2 and 3 are on the following page.

1. Urea ammonium nitrate pre-plant broadcast (UAN PPB) on soil surface.

2. UAN split placement (UAN SP) of application (30% of N banded below seed at planting plus 70% of N dribbled over the seed after row closures at planting).

3. UAN split timing (UAN ST) of application (30% of N banded below seed at planting and 70% side-dressed below the soil surface when the corn is 12-18 inches high).

4. Granular urea (TVA lignosulfonate-coated) broadcast pre-plant (UREA).

The yield results were averaged and reported under the higher rates of 0, 35, 70, and 105 (Figure 2). The total N uptake (TNU) was calculated along with N fertilizer use efficiency (NUE) using the formula:

$$NUE = \frac{TNU - \text{zero plot } TNU}{N \text{ rate}} \times 100$$

Total N uptake (TNU) increases significantly with increasing N rate (Figure 3). A difference in N uptake of about 32 and 49 lbs N/A was found at Sterling and Stratton, respectively, when going from the 0 to the 105 lbs N/A rate. The two broadcast treatments (UAN PPB and urea) increase yield the greatest at the higher N rates (70 and 105 lbs N/A - Figure 3). Therefore, as expected, band N gives comparable N uptake with lower N rates. ▫Follett

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

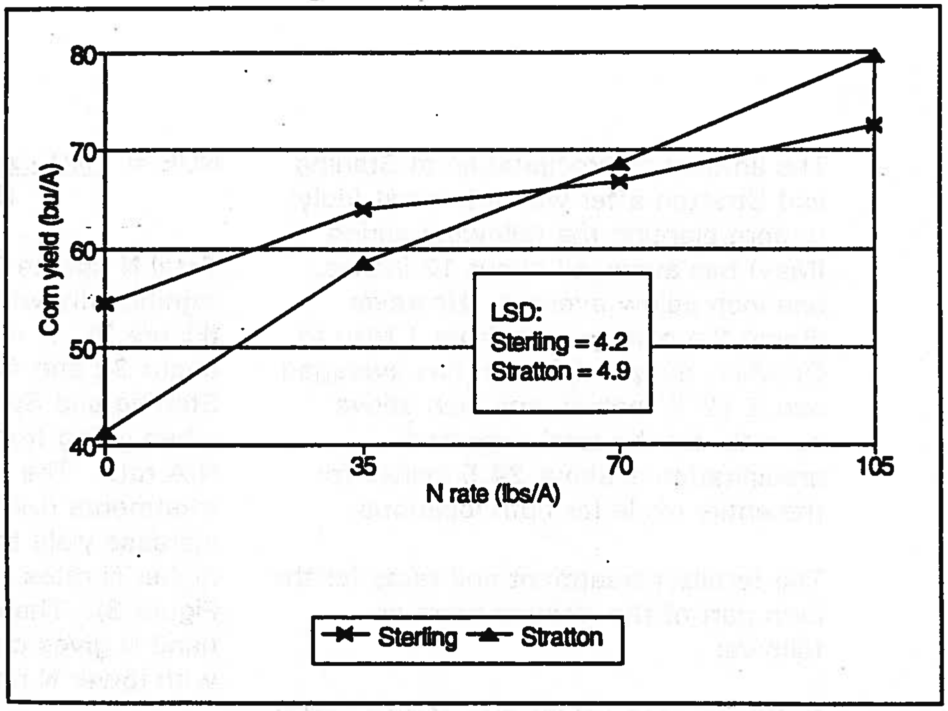

Figure 2. Effect of N rate on dryland corn yields at Sterling (1987-1991) and Stratton, CO (1990-1992)

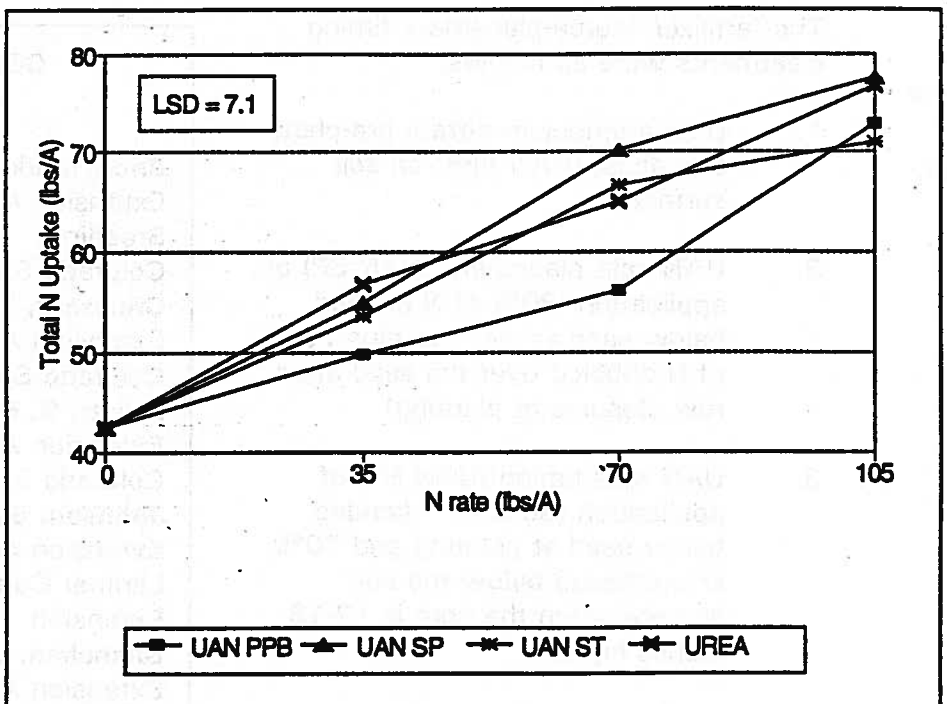

Figure 3. Effect of N source/placement and N rate on total N uptake of dryland corn at Sterling, CO (1987-1991)

Sincerely,

Robert L Croissant

Robert L. Croissant, Editor and Extension Agronomist-Crops