

TABLE OF CONTENTS

Meet Mark Weimer	1
Meet Gil Waibel	1
Karnal Bunt Threatens U.S. Exports and Interstate Movement of Wheat	2
Karnal Bunt and Seed Wheat	4
Spring Nitrogen for Winter Wheat	5
Certified Crop Adviser Exams	6
Soil & Water Conservation Society International Conference	6
Groundwater Monitoring of Pesticide Continues in Weld County	6
Parshall Flumes	7
Alfalfa and Perennial Forages Management Clinic Videotapes Now Available	8
Subsoil Sampling for Better Fertilizer Recommendations	8
Jeri Dreher is Leaving	9

MEET MARK WEIMER

I grew up between my mother's home in Denver, Colorado, and the family farm in southeast North Dakota. While I was a junior in high school, I began farming 500 acres of my own, in addition to working on the family farm. In the spring of 1995, I graduated from Colorado State University with a BS in Agricultural Business. While attending Colorado State University, I started working for John Shanahan as a work-study student in the fall of 1992 in the Variety Testing program. I was hired for the Research Associate's position in this program in February of this year.

I was recently married in August of 1995. My wife's name is Kristi. She is currently in her last clinical affiliation of Physical Therapist Assistant School.

My interests are hunting, reloading rifle and pistol rounds, and waterskiing. □Weimer

MEET GIL WAIBEL

Gil Waibel has joined the Colorado State Seed Laboratory as its new "Seed Lab Manager". Gil will be assuming much of the purity and noxious testing that was done by Connie Ramirez, who retired recently. Connie will continue to work in the Lab part-time. Marilyn Milhous conducts most of the germination and tetrazolium (TZ) tests. The Seed Lab serves the State of Colorado (inspection samples), Colorado Seed Growers Association, Federal Seed Storage Lab, other governmental agencies and the public.

Prior to working for the Colorado State Seed Lab, Gil worked for Asgrow Seed Company in Twin Falls, Idaho; Ferry-Morse Seed Company in Modesto, California; Minnesota Crop Improvement Association in St. Paul, Minnesota; and with the USDA Federal Seed Laboratory in Beltsville, Maryland and Minneapolis,

Minnesota. In the middle of the seed testing career outlined above, Gil had the opportunity to dairy farm for 10 years near Taylors Falls, Minnesota. This farm consisted of 200 acres of alfalfa and corn, and about 80 head of registered Holsteins.

The Colorado State Seed Lab, led by the efforts of Dr. Arnold Larsen and Anna Lute, has contributed greatly to the seed industry. One of the major responsibilities now is to continue the high standards and contributions of the past, while keeping the Lab financially solvent. The Lab must justify its existence by meeting the needs of its customers. The immediate challenge is to identify if there are any new kinds of testing the Lab can do. Developing vigor tests on certain species could help some Colorado Seed Growers manage and market their seed lots. Finding lower cost germination tests for farmers who want to plant their own seed (seed lots not for sale) is also a possibility. Seed clinics or presentations may be necessary to develop the need for new kinds of testing. While exploring new ways to serve its customers, the Seed Lab must continue to meet their current needs. These are some of the challenges facing the Colorado State Seed Lab as it prepares for its future.

Gil can be reached at (970) 491-6406. He is in room E10 of the Plant Sciences Building at Colorado State University. Anyone interested is welcome to visit, discuss seed analysis, or tour the Seed Lab.

•Stanelle

KARNAL BUNT THREATENS U.S. EXPORTS AND INTERSTATE MOVEMENT OF WHEAT

On March 11, due to a confirmed find of Karnal bunt (*Tilletia indica*) in Arizona, the USDA Animal Plant Health Inspection Service (APHIS), stopped all wheat grain and seed exports to 21 countries. It has now been confirmed that the karnal bunt disease has been found in New Mexico and Texas as well. As a result, Montana and North Dakota

have announced quarantines of states where karnal bunt is found. Other states are considering similar action.

Some of the original 21 countries have now agreed to continue to accept wheat from the USA. Japan, which was not on the list has also agreed to continue to accept U.S. wheat. Several of the countries listed in the APHIS stop order (i.e., Russia, Ukraine, China) are major importers of U.S. wheat. China has agreed to accept wheat, but only until April 1. The export stoppage is due to the fact that karnal bunt is subject to international quarantine and any country where the fungus is confirmed is automatically quarantined if the importing country lists it in their quarantine laws.

On March 21 USDA Secretary Dan Glickman took action to invoke a "declaration of extraordinary emergency" which allows the government to take a wide range of actions within states to control and eradicate the outbreak.

Karnal bunt is a smut fungus disease. It is not harmful to humans or animals but attacks the grains of the wheat and turns them to masses of smelly, microscopic black powdery spores. Karnal bunt was first found and quarantined in Gila Bend, Arizona in early March. Although the original Karnal bunt find in Arizona is limited to 4 varieties of durum wheat: Reva, Durex, Ocotillo and Kronos, it is generally considered to be a much more important problem in bread wheats and as such could pose a significant problem for Colorado hard red winter wheat areas and the spring wheat area in the San Luis Valley.

While the fungus can cause losses in yield and quality, these are frequently minor. In India, where the disease occurs yearly, yield losses are on average about 0.5%, but in some fields with highly susceptible varieties, losses can range from 20-40% with as much as

It has now been confirmed that the karnal bunt disease has been found in New Mexico and Texas.

89% of the grains being infected. In contrast, the Arizona sample is reported to have an incidence of about 0.1%. Its major importance is in effecting exports to countries that have a quarantine against the fungus.

The disease gets its name from the town, Karnal, India where it was first found. It is now limited mostly to the middle east, the sub-continent (i.e., India, Afghanistan, and Pakistan) but was found in Mexico several years ago. While the fungus is seed borne, it is thought that the Arizona infestation may have come from smut spores blown from Mexico.

Several kinds of smut diseases are found in Colorado but none are a significant problem in eastern Colorado.

Several kinds of smut diseases are found in Colorado but none are a significant problem in eastern Colorado. For the last ten years we have conducted spring and summer wheat surveys in support of the APHIS export phytosanitary requirements. Neither Karnal bunt nor flag smut (*Urocystis agropyri*) have ever been found or even suspect plants observed. Other states in our area have been conducting surveys as well. Nebraska, North Dakota, Oklahoma, South Dakota, and Texas report that no Karnal bunt has been found.

It should be noted that Karnal bunt, unless a heavy infection is present, is difficult to detect in the field, because frequently only a few grains may be infected (i.e., partial bunt) and the bunt sorus remains covered until threshed. Examination of harvested grains is most effective in detecting the disease. Protocols have been worked out for these examinations and Seed Testing of America (STA) of Longmont (800) 426-9124 has informed us that they plan to test for Karnal bunt once the necessary permits have been obtained.

Smut diseases

There are numerous smut diseases that can attack wheat and other small grains. The following are the smut disease known to be in the state and not known in Colorado.

Smut diseases known in Colorado

Common Bunt (*Tilletia tritici* & *T. laevis*)
syn, hill bunt, stinking smut
Dwarf Bunt (*Tilletia controversa*)*
Loose Smut (*Ustilago tritici*)

*West slope of Rocky Mountains only.

Smut diseases not reported in Colorado*

Flag smut (*Urocystis agropyri*)
Karnal Bunt (*Tilletia indica*,
syn *Neovossia indica*)

*Both are quarantine targets by many countries and states.

Of the smut diseases known in the state, only dwarf bunt causes problems, and at that only on the west slope in the Yellow Jacket area of southwest Colorado and in northwest (i.e., Hayden etc). It is only in these areas that the snow cover remains long enough for the disease to develop. Even common bunt and stinking smut are only occasionally found on the high plains, and then only when snow cover is heavy and lingers into spring.

Karnal bunt development

Teliospores in the soil germinated in the spring/summer form spores (sporidia) which are carried by air movement or splashing rain to the florets during flowering. Optimum weather conditions for infection are warm temperatures (max. 19-23 C, min. 8-10 C) and high humidity or showers (or overhead irrigation). Infection of individual kernels takes place. Karnal bunt is not a systemic smut such as common and dwarf bunt. The fungus does not invade the embryo and partially bunted kernels may germinate and produce normal plants.

While common bunt is related to karnal bunt there are significant differences:

- common bunt can attack all small grains--karnal bunt only attacks bread wheat and to a lesser extent durum wheat and triticale.
- common bunt infects all kernels in a head--karnal bunt only a few ("partial bunt").
- common bunt infects the whole kernel--karnal bunt infects only the embryo end.
- common bunt infects seedlings as they emerge--karnal bunt infects individual flowers in the heads via airborne spores.
- common bunt does not last long in the soil--karnal bunt can last up to 5 years in the soil in warm climates (there are reports that the teliospores in the soil can survive freezing).

Management

Historically, quarantine has been the major approach to control. This approach for the most part has been effective in the prevention of intercontinental spread, but now with the potential for wind dissemination of the teliospores, may be of questionable value with contiguous land masses. Of the other approaches to control, only long rotations and resistant varieties have shown promise.

Seed treatments have proven unable to completely remove the fungus from infested seed and while possibly helping to decrease seed spread will not get all the fungus. Of 47 chemicals tested by staff at the International Wheat and Corn Center (CIMMYT) in Mexico (including PCNB, thiophanate-methyl, captan, imazalil, thiabendazole, tridimefon, and triadimenol) only triphenyltin hydroxide (Du-Ter) induced complete inhibition of teliospore germination. The chemical, on the other hand, did not penetrate the seed sufficiently to kill all the fungus. Carboxin

(Vitavax) used to control loose smut (*Ustilago tritici*) was also ineffective in other tests.

Because the fungus infects during flowering, seed treatments would not have sufficient residual action to protect the flowers. The potential for foliar spraying during flowering is unknown, but will undoubtedly be investigated, especially in wheat seed production.

Planting date manipulation, water management and other cultural practice approaches have not been sufficiently investigated but may offer opportunities to decrease severity when combined with suitable resistant or tolerant varieties. □Brown and Skoglund

KARNAL BUNT AND SEED WHEAT

Although karnal bunt has not been identified in Colorado, some seed treatments may be effective on the fungus if the need arises. Since the disease has, up until now, never been found in the U.S., current treatments have not been labelled for karnal bunt control but there are mechanisms to grant emergency labels to existing treatments that show effectiveness.

The most commonly used wheat treatment, Vitavax, has no activity against karnal bunt. It has been suggested that Dividend and PCNB are the only current treatments that may be effective against the fungus. CIBA Giegi is currently looking at the use of Dividend in combination with a Tilt treatment that could provide near 100% control. This combination reportedly controls both the systemic activity within the seed parent plant as well as any soil produced spores. The labelling for this system is currently used in Mexico. Any labelling of this mixture would probably be for seed production fields only since chemical residues could be found in feed grain produced.

Although karnal bunt has not been identified in Colorado, Dividend and PCNB are the only current treatments that may be effective against the fungus.

There is still quite a bit up in the air about the entire karnal bunt situation, but if the worst case scenario prevails, there could be some assistance for wheat seed growers.
 □Stanelle

SPRING NITROGEN FOR WINTER WHEAT

It is important to make a distinction between spring topdressing and foliar application. Spring topdressing occurs in March (Feekes 3 growth stage), and foliar application occurs in May (minimum 50% ground cover). Topdressing can be liquid or granular, but foliar application is always liquid.

Spring Topdressing

Under conditions where winter survival is a problem, the application of N in the spring allows a producer the opportunity to assess each field's soil moisture, plant population, and crop condition before committing additional fertilizer costs to the crop. However, winter wheat growers' primary concern should be the decision to apply N fertilizer at the proper rate. The proper N rate should be determined based on expected yield, soil testing, and N crediting (see SIA no.544). Their secondary concern should be time of N application. Spring-applied N increases grain yields and protein more than fall- and split-applied N.

Spring-applied N is more available and more profitable to winter wheat than fall-applied N in miarid climates.

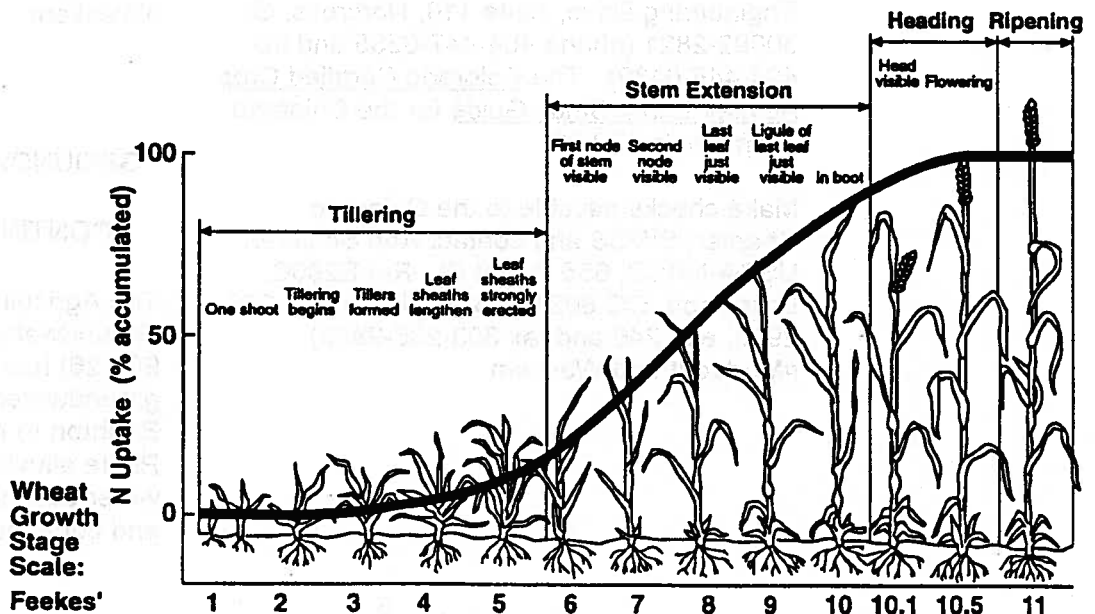
Fall application requires approximately 20% more N than spring application to achieve the same yield and protein content. Spring-applied N is more available and more profitable to winter wheat than fall-applied N in semiarid climates. Nitrogen could be applied up to 60 lb N/acre as UAN liquid solution (32-0-0) or dry NH_4NO_3 (34-0-0) if windy conditions prevail.

Foliar

Foliar application should be based on tissue N (not nitrate) levels. Late tillering (Feekes 5) and early jointing (Feekes 7) are the best growth stages to sample. The best plant part to sample is either the whole plant or the leaves. The critical levels for total N content are:

	Feekes 5	Feekes 7
Whole Plant	32 g/kg	27 g/kg
Leaves	38 g/kg	35 g/kg

If tissue N levels are below the critical levels in the table, then N deficiency will reduce yield, and foliar N application could be beneficial. However, if the wheat is growing, UAN should be diluted with water by 50% in order to keep from burning the crop.
 □Davis



Source: Mark Alley, Virginia Polytechnic Institute and State University

CERTIFIED CROP ADVISER EXAMS

The second Certified Crop Adviser (CCA) exams were held at the Adams County fairgrounds on February 2, 1996. Sixty-one applicants took the National exam and 66 took the Colorado exam. Inclement weather resulted in a lower turnout than expected. Seventy percent of the Colorado applicants passed the National exam, which ranked Colorado as third in the nation (over 3,000 took the National exam with an average state pass rate of 52%). The passing score for the National exam was 79.5% and 70% for the Colorado exam; 54% of the Colorado applicants passed the Colorado exam.

The next CCA exam will be held on Friday, August 2, 1996 at Adams State College in Alamosa. The registration deadline is June 1, 1996 and application forms can be obtained from the National CCA Office, 677 South Segoe Road, Madison, WI 53711 (phone 608-273-8080 and fax 608-273-2081). As a reminder, this will be the last exam where state and federal government employees, including Cooperative Extension personnel, will have the \$100 fee for the National exam waived.

A suggested review manual for the National exam is Preparing for the National CCA Exam. It costs \$25.00, and is sold by the Potash & Phosphate Institute, 655 Engineering Drive, Suite 110, Norcross, GA 30092-2821 (phone 404-447-0335 and fax 404-448-0439). The Colorado Certified Crop Adviser Exam Study Guide for the Colorado exam costs \$30.00.

Make checks payable to the Colorado Chapter, SWCS and contact Ron Schierer, USDA-NRCS, 655 Parfet St., Rm E200C, Lakewood, CO 80215-5517 (phone 303-236-2903, ext. 246 and fax 303-236-2896).
□Mortvedt and Waskom

SOIL & WATER CONSERVATION SOCIETY INTERNATIONAL CONFERENCE

The Soil & Water Conservation Society will hold their 51st annual meeting this year in Colorado at Keystone Resort, July 7-10, 1996. CSU Cooperative Extension has agreed to help co-sponsor this event with the Colorado chapter of the SWCS. More than 1,000 people from around the world are expected to attend the 4 day meeting which will include a mixture of plenary sessions, poster presentations, panels, trade show and workshops. Those of you interested in conservation issues are strongly encouraged to attend this conference.

There are still a number of opportunities for CE personnel to help out with the conference logistics. A silent auction will be held as a fund raising activity during the conference and the organizers would especially like to receive donations of "Colorado" items to auction. If you know of anyone willing to donate items for the auction, please let me know. If you are interested in information about the conference or membership in the Soil & Water Conservation Society, please contact me at (970) 491-6201.

□Waskom

GROUNDWATER MONITORING OF PESTICIDES CONTINUES IN WELD COUNTY

The Agricultural Chemicals and Groundwater Protection Program (SB 90-126) has begun a long-term groundwater monitoring program in the Brighton to Kersey stretch of the S. Platte alluvial aquifer to assess trends in water quality. Since irrigated agriculture and confined animal feeding dominate

The next CCA exam will be held on August 2, 1996 in Alamosa and the registration deadline is June 1, 1996.

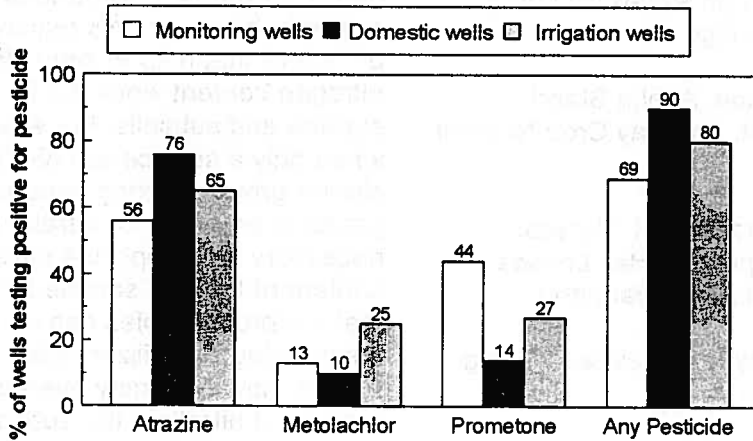
land use in this region, and we have data that indicates that the underlying groundwater has been compromised, our goal is to monitor this aquifer over time to see what trends in water quality may be occurring.

The results from last year's monitoring by the Colorado Department of Health and Environment indicated that over 50% of the irrigation, domestic, and dedicated monitoring wells sampled in this area contained NO₃-N at levels above the drinking water standard (10 ppm). Perhaps more surprising, however, was the number of wells containing traces of pesticide. Many producers in this area believe that Denver's waste water is the main source of NO₃ contamination in Weld county. However, the widespread incidence of agricultural pesticides in groundwater in this area leads us to conclude otherwise. Fortunately, only two drinking water wells sampled thus far contain pesticide at levels that exceed the health advisory level established by the EPA.

□Waskom

90% of the domestic drinking water wells sampled in the South Platte Alluvial Aquifer from Brighton to Kersey contained detectable traces of pesticide.

Weld County Pesticide Monitoring, 1995



PARSHALL FLUMES

The Agricultural Experiment Station at Colorado State University has been 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.

Last year I put out a request to county staff for help locating flumes to perform a field verification study to test the adjustment procedure. Your response was most helpful and Dr. Steven Abt has asked if I would again solicit your help in locating volunteers that would allow a team of CSU students to locate and access existing Parshall flumes in Colorado. In particular, they would like to locate flumes in the northwest, southwest, Granby and Fort Collins areas of the state. CSU 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 database 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.

If you know of anyone that would allow the student research team access to an existing Parshall flume, please contact:

Dr. Steven R. Abt
 Engineering Research Center
 Colorado State University
 Fort Collins CO 80523
 Tele: 970-491-8203
 FAX: 970-491-8462

Thanks very much for your help with this important project. Please contact me if you have any questions at (970) 491-6201.

□Waskom

**ALFALFA AND PERENNIAL FORAGES
MANAGEMENT CLINIC
VIDEOTAPES NOW AVAILABLE**

Video copies of all sessions of the January 1996 Alfalfa and Perennial Forages Management Clinic have been made and are now available for purchase or library check out. You can purchase individual tapes for \$10 and the whole set of nine tapes for \$60. The tapes can be checked out for one month at a time.

Reference Notebooks for Alfalfa and Perennial Forages are available at the Cooperative Extension Resource Center at a cost of \$50 each. The videotapes and notebooks are designed to complement each other in designing educational programs on forage management.

The nine videos run approximately 15 hours total. Each tape includes one to three topics concerning alfalfa and perennial forages management. The topics for each tape are as follows:

- 1) Growth and Development for Legumes and Alfalfa and Harvest Timing Impact on Perennial Forage Energy Physiology
- 2) Alfalfa Selection, Alfalfa Stand Establishment, and Hay Crop Nutrient Management
- 3) Irrigation Management, Harvest Methods - Impact on Hay Losses, and Chemical Hay Treatments
- 4) Forage Quality Overview and Forage Markets Panel

□Bosley

**SUBSOIL SAMPLING FOR BETTER
FERTILIZER RECOMMENDATIONS**

To make the best use of Colorado State University soil test recommendations for corn, spring seeded small grains, sugar

beets, and sorghum, it is necessary to submit a separate subsoil sample along with a surface sample for laboratory analysis. The surface sample should be a 0-1 foot sample, while the subsoil sample should be 1-2 feet. If sugarbeets are to be grown, it is preferable to send in 0-1', 1-2', 2-3', and 3-4' samples. When the samples are received by the laboratory, it is customary to analyze the surface sample for parameters such as pH, salts, nitrate, phosphorus, and micronutrients. The subsoil sample would only have nitrate analyzed on it.

Nitrogen fertilizer suggestions are done by taking into account the surface and subsoil nitrate level. For corn and sorghum, the nitrogen rates are based on a weighted average of the surface and subsoil nitrate level. For spring seeded small grains and sugarbeets, it is necessary to sum the levels (in ppm) of nitrate-N for the surface and subsoil samples and then obtain the fertilizer N rate from the necessary tables or algorithm.

Nitrogen fertilizer rates can be determined from only surface soil analysis; however, this requires the use of factors that help to simulate what the nitrogen content would be for the surface and subsoils. For example, when only a surface soil (0-1') from a site for growing spring seeded small grains is analyzed for nitrate, it is necessary to multiply the nitrate-N content of the 0-1' sample by 1.67 so that the proper tables can be used for determining N fertilizer rates. The use of factors, however, may over-estimate the amount of nitrate in the subsoil and could reduce the amount of N fertilizer below what is really needed. For example, if 20 ppm nitrate-N is found in the surface 0-1', the application of the factor 1.67 would result in about 33 ppm nitrate-N. If the organic matter was 1.1-2.0%, there would not be any N fertilizer recommendation. If a subsoil sample was submitted and found to be 10 ppm nitrate-N, the N recommendation would

be based on 20 + 10 ppm (30 ppm). The suggested N fertilization rate would then be 15 lbs. per acre instead of zero. Submitting a subsoil sample along with a surface sample helps to determine a more accurate N recommendation. Specific instructions for sampling and using the proper algorithms or factors can be found in the latest Service-In-Action sheets on fertilization practices from Cooperative Extension. □Self

JERI DREHER IS LEAVING

After six years in the Extension Soil and Crop Sciences Office, Jeri Dreher has decided to seek new opportunities. Jeri has taken a position in the Dean's office in the College of Liberal Arts at CSU. She has been an outstanding contributor to all of our programs. Her smiling face and pleasant phone demeanor will be greatly missed. She has been a driving force behind our newsletter and many of our education programs. Jeri's efficiency in our office has helped all of us do our jobs better. Her job performance has exemplified her commitment to public service. We wish Jeri the best in her new job. Please be patient as we hire and train her replacement.

THANKYOU

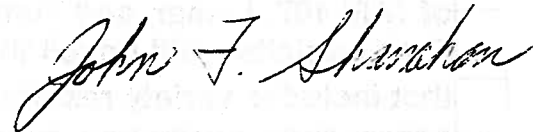
I would like to take this opportunity to thank my co-workers in the Department of Soil & Crop Sciences, Cooperative Extension in Administration, throughout campus and the state, and especially those I have worked most closely with here in Extension Soil & Crop Sciences. It has been challenging, stimulating, and, most importantly, heartwarming. I will miss you all. Namaste.
♥Dreher

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

CONTRIBUTING AUTHORS

Bosley, Bruce,
Extension Agent,
Morgan County
Brown, William M. Jr.,
Extension Plant Pathologist,
Colorado State University
Davis, Jessica G.,
Extension Agronomist-Soils,
Colorado State University
Mortvedt, John J.,
Extension Agronomist,
Colorado State University
Self, James R.,
Manager, Colorado State University
Soil Testing Laboratory
Skoglund, Linnea G.,
Director, Plant Disease Clinic,
Colorado State University
Stanelle, James R.,
Manager, Colorado Seed Growers
Association,
Colorado State University
Waskom Reagan M.,
Extension Agronomist-Water Quality,
Colorado State University
Weimer, Mark,
Research Associate-Crops Testing,
Colorado State University
Westfall, Dwayne G.,
Professor-Soil and Crop Sciences,
Colorado State University

Sincerely,



John F. Shanahan
Editor and Extension Agronomist

Wheat Field Days 1996

★ Stratton	June 10 (Mon)	5:00 p.m. at Miltenberger Bros. farm, Kit Carson County (STRATTON - 4 E on Hwy 24)
★ Sterling	June 11 (Tue)	5:00 p.m. at Gilbert Lindstrom farm, Logan County (STERLING - 1/4 S of Intersec. of Co. Rd 6 & 59)
Walsh	June 17 (Mon)	9:00 a.m. at Research Center in Baca County
Lamar	June 17 (Mon)	1:00 p.m. at John Stulp's in Prowers County
Sheridan Lake	June 17 (Mon)	5:00 p.m. at Eugene Splitter's in Kiowa County
Akron	June 18 (Tue)	8:00 a.m. at Research Station in Washington County
Yuma	June 18 (Tue)	5:00 p.m. at Irrigation Research Foundation Farm
Burlington	June 19 (Wed)	8:00 a.m. at Barry Hinkhouse's in Kit Carson County
Stratton	June 19 (Wed)	10:00 a.m. at Kenny Pottorff's in Kit Carson County
Genoa	June 19 (Wed)	5:00 p.m. at Roy Anderson's in Lincoln County
Briggsdale	June 20 (Thur)	9:00 a.m. at Cary Wickstrom's in NW Morgan County
Ovid	June 20 (Thur)	5:00 p.m. at Jim Carlson's in Sedgwick County
Bennett	June 21 (Fri)	5:00 p.m. at John Sauter's in Adams County
Sidney, NE	June 26 (Wed)	9:00 a.m. at Univ. Nebraska Research Center

