Cooperative Extension
Colorado State University, Fort Collins, Colorado 80523

Colorado State University

AGRON-  -GRAM

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NEW PUBLICATION

The **Crop and Soil Management in Dryland Agroecosystems**, Colorado State University Agr. Exp. Stn. Tech. Bull. No. TB91-1 (April 1991) has been published. This bulletin has been published each year since 1988 to summarize the research results from the cropping sequences for the three study sites located near Sterling, Stratton and Walsh. The general objective of the project has been to identify dryland crop and soil management systems that will maximize water use efficiency.

A file copy of the bulletin has been sent to each county in the Friday mail bag. A limited number of additional copies of the bulletin can be ordered from our office at no charge. (Follett)

TESTING FOR SOIL SALINITY

Testing for sodium or soil salinity problems is a major part of routine soil testing by the Soil Testing Laboratory. The laboratory assesses a soil for salt by determining the pH and electrical conductivity (EC) on a 1:1 soil:water mixture that has been shaken for 30 minutes. The pH and EC readings are examined according to the following criteria to determine whether a saline or sodic condition exist:

Criteria	Texture	Result
pH 8.5	all	saline-sodic or sodic
EC 0.8	sandy	saline
EC 1.2	clay loams	saline
EC 1.6	clay	saline

If the pH or EC on a 1:1 mixture exceed any of these values, a saturated paste is made to further diagnose salt accumulation. The paste must stand overnight and be brought back to a saturated condition the next day. The pH is then taken by inserting the electrode directly into the paste. Soil is considered sodic if the pH is equal to or greater than 8.5. The EC is then determined on the vacuum filtered extract. The soil is considered very saline if the EC is greater than or equal to 7.0. The soil extract is then analyzed by inductively coupled plasma to determine the levels of calcium, magnesium, and sodium. A sodium adsorption ratio (SAR) is then calculated to determine the feasibility of soil reclamation. If the SAR is greater than or equal to 15, a gypsum requirement is determined to help reclaim the soil.

Generally, SAR's exceeding 15 occur most often when the EC exceeds 7.0 or the pH exceeds 8.5. If the EC is 4.5 or more, a note will be printed indicating that salts are high and growth reduction will occur. The customer is then referred to note 5 on the

back of the form to help them determine ways to reclaim the soil. When turfgrass, beans, or potatoes are the intended crop, an SAR is determined when the EC exceeds 4.5.

Soil salinity evaluations are a very important part of soil analysis in Colorado. Methods used by the Soil Testing Laboratory provide accurate assessment of salts in soils and subsequent reclamation procedures. (Self)

DRY BEAN PRODUCTION FOR 1991

Dry bean production in Colorado set an all-time record in 1990 at 4.295 million bags. Colorado now ranks fourth nationally on dry bean production. Weld county was the leading county with over 1 million bags, followed by Yuma (742,000), Kit Carson (504,000), Morgan (350,000) and Larimer (251,000) counties. These five counties accounted for 67% of Colorado's dry bean crop (Colo. Agriculture Statistics Service).

Projected acres for the nation in 1991 are below 1990, according to the USDA Crop Reporting Service (Table 1). It appears that many growers still have unsold beans, and do not want to produce more until the market looks better.

To prepare for 1991 planting, reserve your seed stocks early, as some varieties are already difficult to find. There are many growers looking for Bill Z's and Othello due to their history of excellent performance in Colorado. However, if your field has a history of white mold problems, you may want to choose a more tolerant variety. The 1990 CSU variety trials had considerable white mold, so you may want to refer to those results. If white mold has been a problem, avoid dense plantings (i.e. narrow rows, high population) to obtain a more "open" canopy. Consider an upright growth habit or bush variety, avoid soil compaction, excessive soil nitrogen, and use proper water management.

Table 1 USDA Crop Report for March, 1991

	Acres Harvested (1,000)		Intended 1991 (1,000)	
STATE	1989	1990	Acres	% of 1990
CA	180	168	140	80
CO	185	225	210	86
ID	168	178	140	78
KS	21	38	25	63
MI	265	330	310	89
MN	70	136	125	89
MT	6	13	12	89
NE	208	254	220	85
NM	14	14	15	103
NY	31	40	38	93
ND	410	550	500	88
OR		9	9	93
TX		21	16	64
UT	5	4	6	109
WA	43	47	50	104
WY	45	51	46	92
U.S.A.	1,651	2,086	1,873	86

Since dry beans are a high value crop, plant beans in your best fields. Be careful of herbicide carryover (such as atrazine or dicamba) and salinity problems. Beans are more sensitive to both herbicides and soil salinity than most field crops grown in Colorado. Obtain a soil test to determine fertility needs. Apply and incorporate preemergence herbicides according to label specifications.

Plant dry beans when the soil temperature is 60° at planting depth. If the soil is dry, consider pre-irrigating to improve soil moisture

profile. However, pre-irrigation will slow the warming of the soil, and delay planting for several days. Plant 70-80,000 seeds/acre for most dry beans. Beans planted into warm, moist soil will emerge in 5-7 days.
(Brick)

WATER QUALITY

The implementation of Senate Bill 90-126 stipulates that the Commissioner of Agriculture will develop regulations for handling more than 55,000 pounds of finished agriculture product. The Commissioner is waiting for the EPA to publish their regulations prior to the development of state regulations. This delay is intended to assure that Colorado will not conflict with the Federal Government. The delay could be extended as the EPA is not expected to complete draft regulations until later this year, followed by an additional year for review and user input. The final set of EPA regulations may not be available until late 1992 or early 1993. This delay will hinder some users who are planning to renovate their facilities and to comply with the pending regulations. This is unfortunate, but may not be avoidable.

A center pivot used for chemigation is subject to the regulations. When a center pivot is used for chemigation, the final agriculture product will be chemical plus weight of the irrigation water. This should not cause too much difficulty because even if the final agriculture product was defined as the tank mix, an application of liquid N in excess of 100 pound per acre would exceed the 55,000 pound limit.

Also, the implementation of Senate Bill 90-126 stipulates that the Department of Health will develop and implement a monitoring system on ground water quality. To date the monitoring system is still in the organizational stage. Before developing a monitoring plan, it will be necessary to accumulate and review all the existing data on ground water quality. Groundwater quality data has been taken for a number of years by federal, state and local governments, but will require some time to study. The Department of Health is attempting to classify the different aquifers according to their use. The highest standard will be for domestic use. Most aquifers are being used for domestic water supply.

Personal Note: When I accepted this position in January it was understood that it would be an interim position to get the program started, while I was seeking to return to international work. I have now accepted a position with the International Rice Research Institute to lead their program in Egypt. I will be leaving Fort Collins on May 21. I would like to say that I have very much enjoyed the past four months. It was an excellent opportunity for me to become familiar with American agriculture after almost two decades of overseas work. I thoroughly enjoyed discussing the issues with the different users involved in agriculture chemicals be they farmers, dealers, administrators, or homeowners.

As I leave, Mr. Reagan Waskom, III has been identified to fill the position. Reagan is currently the coordinator for field research with the tissue culture laboratory at CSU. His previous experience includes testing hybrid wheat with Rohm & Haas Seeds, Inc. of Plainview, Texas, with hybrid sorghum with Texas A&M and Servi-Tech in Dodge City, Kansas. I am confident he will do a good job in implementing the Bill and developing the necessary "Best Management Practices" in a manner that respects the interest of all involved. (Tinsley)

SOIL TEST TO INSURE PRODUCTIVE PASTURES

Pasture management is a year-round practice that should include soil testing. Although soil testing is routinely recommended when establishing new pastures, it is also an important tool in analyzing and maintaining

correct mineral levels in existing pastures. Soil nutrient levels directly influence growth rate, forage nutritive value, and subsequent pasture longevity. Properly managed and fertilized pastures can replace all the nutrients normally supplied as hay to horses. The resulting decrease in hay costs, storage facility requirements and handling difficulties could result in substantial savings to horse owners.

The optimum time to soil test pastures is during the winter or early spring. Soil testing is an important tool in fertilizer management indicating nutrient status of all fertilizer elements. Recommendations are then given on required amounts of deficient nutrients.

Irrigated pastures will yield higher with additional nitrogen fertilization. The average response to nitrogen fertilizer is about 20 pounds of increased forage or hay (dry weight basis) per pound of nitrogen fertilizer. Nitrogen fertilizer improves the forage quality by increasing the protein content.

Most forages do not contain sufficient P to adequately meet the dietary requirements of cattle and horses. Phosphorus is the second most abundant mineral found in the animal body. The problem of low P in forages, particularly grasses, is magnified by a rapid decline in P concentration as grasses mature. Also, the concentration of P frequently drops during dry weather. Additional fertilizer improves the forage quality in the following ways: (1) higher P concentration of forages, (2) greater palatability, (3) higher feed intake, (4) increased digestibility, (5) increased body weight grain, and (6) increased yields. Phosphorus fertilization can increase forage protein by stimulating the growth of legumes. Fertilization can increase both quality and yield.

Most pastures in Colorado are high in potassium. Potential potassium deficiencies can be determined by soil tests.

In taking soil samples, recommended sampling procedures should be followed to insure that a representative sample is collected. Most fertilizer dealers and county Extension offices have information on proper collection of soil samples and free sample containers. (Follett)

BEAN CONTRACT SUGGESTIONS

(From North Dakota Bean Talk, February 1991 Issue)

Bradley Berg, a Hillsboro, ND attorney, outlined recommendations for new crop production contracts to avoid misunderstanding and misinterpretations by either the grower or the bean dealer. Here is what he says you should do before signing a contract:

1) Insist that the contract contain the legal description of the field upon which beans are to be grown.

2) Do not sign a contract which requires you to deliver any beans in excess of the quantity you contracted.

3) Ask if the contract could specify that if you cannot deliver No. 1 beans, you would be allowed to deliver No. 2 or No. 3 beans. The contract should state the price you would receive for the lower quality beans.

4) Ask that the contract include a provision requiring the grower and the bean company to submit samples of the beans to an independent party to resolve any dispute as to dockage or discounts.

5) Ask that the contract state the date upon which the bean company must accept delivery of the beans. If the company is not able to accept delivery by this date, require that the beans be

graded as of that date and that the grower not be responsible for deterioration of the beans following that date.

6) Insist that the contract clearly state the location where you are required to deliver the beans.

7) Ask about the availability of contracts requiring payment in full upon delivery. The contract should clearly state the dates when the grower is to be paid. The grower should only accept a contract allowing deferred payment for the beans after careful consideration of the risks involved.

8) If at all possible, avoid signing bean contracts which contain liquidated damage clauses. If the contract contains a liquidated damage clause, be sure that you understand fully before signing the contract.

9) Ask that the contract specify that in the event the grower is unable to fully deliver the entire amount of beans required under the contract, that the cost of covering by the bean company be limited to the difference between the contract price and the board price of the beans as of the day the grower notified the bean company of the grower's inability to fully deliver.

10) Before signing a contract with an Act of God clause, be sure that you know how much it is costing you and what it requires you to do. Do not contract the same field with more than one company. If you suspect at any time during the growing season, that you will not be able to fill the contract immediately notify the bean company of this fact in writing. Re-read the Act of God clause and follow its requirements perfectly. Dot you i's and cross your t's. Take pictures of the field and do not plow it down until you have written permission from the bean company.

11) Any changes to a written bean contract should be written on the front or the back of the bean contract, and signed and dated by you and the agent for the bean company. Keep a copy of the amended contract. (Brick)

WATER CONSERVATION AFTER WHEAT HARVEST

Winter wheat yields reflect the success of farmers conserving moisture during the fallow cycle. It is easy to add more fertilizer but if water is the limiting yield factor, then water conservation provides big dividends.

Water conservation in the dryland rotation begins with the current wheat crop. Controlling weeds in growing wheat is beneficial for the current crop and is the first step in water savings during the fallow period.

After harvest, all weeds and volunteer wheat should be controlled after they emerge by tillage, herbicides or a combination of both.

Research data from Akron shows that the biggest difference in water storage systems occurs from July through September. Weeds left uncontrolled during this period will use all of the precipitation that falls from harvest through fall frost if they are allowed to grow unchecked. Ten common broadleaf weed species found in fallow have an average water requirement of 525 lb water per pound of dry matter produced. This is the same water requirement for wheat.

Fallow fields may receive 3 to 6 inches of precipitation each year between harvest until frost, depending on the location, in Colorado. Controlling summer and fall weeds will allow the producer to store up to 50% of this water.

Maximum storage occurs with the least amount of tillage as each operation may allow about .25 to .3 inches of evaporation of stored water. Herbicide applications greatly reduce evaporation by decreasing soil stirring with tillage implements.

Any management allowing standing stubble over winter improves the chance for snow catch and very efficient water storage. Three thousand pounds/acre of surface stubble may reduce evaporation by more than 50%. During these conditions, the surface temperature and wind velocity are reduced allowing the soil to remain wet longer. Subsequent rains then won't have to re-wet soils. Akron data show that each inch of stored water can add 4 to 7 bu/acre to the wheat crop in a wheat-fallow system. With maximum efficiency of water storage, in some locations, it is often possible to add another crop to the rotation for 2 harvest years in a 3 year rotation. (Croissant)

SEED HARVESTING

Last year, just before wheat harvest time, hot, dry conditions caused wheat seed to dry down rapidly resulting in damaged kernels. Damaged seed increased cleanout percentages, lowered seed vigor and in some cases, due to high inert matter, caused the rejection of seedlots for certification . We hope that these conditions do not occur again this year. There are steps that can be taken to reduce seed damage at harvest time.

The optimal time to harvest for minimum losses is when the seed is fully mature and when seed moisture is between 13 and 14%. When early wheat harvest occurs and moisture is high, weather damage losses are less. At late harvest, seeds are lower in moisture, easier to combine, but more weather damage may have taken place. During the wheat harvest in 1990, weather damage was in the form of dry, shrivelled kernels that cracked and broke easily. The optimum harvest time, therefore, falls between these two extremes.

The combine is normally the main cause of damaged seed in the harvest process. Seed, especially very dry seed, is subjected to enormous stress in the combine. High speed cutterbars and reels can cause excessive shatter. However, the cylinder and concaves cause the most damage. The concaves and cylinders should be exactly parallel, and cylinder speed should be slowed so that minimum damage is done to seed. When harvesting seed, you should probably allow a few extra heads to go unthreshed. You may lose a bushel or two an acre yield, but gain back more than that in increased quality seed.

Straw walkers and sieves should be set to remove as much trash as possible and a small amount of good seed as well. Removing a few good kernels here means that you are also removing more of the heavier broken kernels and you should have better quality seed in the bin. Worn augers and elevator chains provide sharp edges and pinch points which can damage delicate kernels. Replace these parts if they are in worn. Always refer to your owners manual or dealer for the best settings when preparing your combine for seed harvest.

Prior to seed harvest, the combine must be thoroughly cleaned before use. A recent study in Kansas showed that several hundred pounds of seed remained in a combine after discharge appeared complete. If you are harvesting for certified seed or just cutting a good looking field for seed to plant back, that several hundred pounds can contaminate even the best seedlot with jointed goatgrass, bindweed, rye or other hazards from previously harvested fields. Simple spots like headers, augers, elevator boots and bins are easy to remember to clean, but you should also clean the inside of the gathering auger tube, connections between chains and elevator cups or belts and areas on the outside of the combine where seed heads or kernels may be lodged. Don't forget to clean out the trucks bins and other

handling equipment as well.

Farmers and seed growers spend a lot of time and take pride in their fields. That work can be spoiled by haphazard harvest methods that damage or contaminate the seed that they want to plant. (Stanelle)

WHEAT AND CROP MANAGEMENT FIELD DAYS

On the last page of the newsletter is the schedule of our 1991 Eastern Colorado Wheat and Crop Management Field Days. Dr. Jim Quick, CSU Wheat Breeder, a CSU Entomologist, and I will make presentations at each of the test plot locations. Topics for discussion will be: 1) Performance of wheat varieties presently available, 2) Development of varieties resistant or tolerant to the Russian wheat aphid, 3) New winter triticales as a feed grain and other crops that could be grown in rotation with winter wheat, and 4) Management practices for problems with Russian wheat aphid.

Variety trials are at all locations except Stratton and Sterling, fertility experiments at all dryland locations, feed grain experiments at 6 locations and various kinds of experiments to control Russian aphids at most locations. The Akron location will include discussion of several research projects at the Central Great Plains Research Center. At the Stratton and Sterling locations, long-term experiments with innovative management studies will be explained by Dr. Gary Peterson of the CSU Agronomy Department. Handout information about long-term performance of wheat varieties, fertilization, Russian wheat aphid, triticale, seed size and other management practices will be distributed.

We welcome people from other states at our Colorado field days. The Sidney, Nebraska location is listed because University of Nebraska personnel have invited Colorado people to attend. (Echols)

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

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Sincerely,

Robert L. Croissant
Extension Agronomist - Crops

COLORADO STATE UNIVERSITY
1991 EASTERN COLORADO WHEAT AND CROP MANAGEMENT FIELD DAYS

DATE	TIME	COOPERATOR	COUNTY	DIRECTIONS TO THE FARM
June 17	5:00 p.m.	Bill Stone	Lincoln	PUNKIN CENTER - 4 E on 94 and ⅞ S
June 18	8:00 a.m.	John Stulp	Prowers	LAMAR - 6 S on Hwy 287
June 18	4:00 p.m.	Research Center	Baca	WALSH - ⅛ W, 4 N, 1 W
June 19	8:00 a.m.	Eugene Splitter	Kiowa	SHERIDAN LAKE - ¾ W on 385, 3½ S
June 19	5:00 p.m.	Gary Mulch	Kit Carson	BURLINGTON (IRR) - Peconic 7 S on Rd 55 to Rd N, ⅛ S
June 20	8:00 a.m.	Barry Hinkhouse	Kit Carson	BURLINGTON (DRY) - ¼ S of E Exit of I-70 on 49W
June 20*	5:00 p.m.	Miltenberger Bros.	Kit Carson	STRATTON - 4 E on Hwy 24
June 21	8:00 a.m.	Roy Andersen	Lincoln	GENOA - 9 N, 3¾ E
June 21	12:00 Noon	R. M. Hough	Morgan	FT. MORGAN - 17 S on Co. Rd 19, 3 E, ¾ S
June 24	12:00 Noon	Mark Mertens	Logan	WILLARD - 3 E on 18, ½ S on 17
June 24	5:00 p.m.	Marvin Helzer	Adams	BENNETT - N on 79 to Rd 144, ¼ E
June 25	8:30 a.m.	Research Center	Washington	AKRON - 4 E on Hwy 34
June 25*	5:00 p.m.	Gilbert Lindstrom	Logan	STERLING - ¼ S of Intersec. of Co. Rd 6 & 59
June 26	4:00 p.m.	Jim Carlson	Sedgwick	OVID - 5 S of Hwy 76 to Rd 18, ⅛ S
June 27	5:00 p.m.	Stan Cass	Weld	BRIGGSDALE - 2½ S on 392, ½ E on 84
June 28	9:00 a.m.	Univ. of Neb. Research Center		SIDNEY, NEBRASKA 5 N on 385, 2 W, ½ N

*Gary Peterson's Crop Management Study