FROM THE GROUND UP

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AGRONOMY NEWS

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HANDLING FROST-DAMAGED CORN

As corn harvest approaches, many producers are considering how to manage their frost-damaged corn. The best options for handling frost-damaged corn will depend on the plant stage when frost occurred.

Grain yield potential for corn frozen in the milk stage will be low, and grain will be chaffy. Thus, ensiling may be the best option for handling corn frost-damaged at this stage. Grain yield of corn frozen at the soft dough stage may be reduced by 50% unless stalk, ear, and some of the leaves survived the frost. Test weight will probably be less than 50 lb/bu. Grain will be very wet and will need to be field dried as long as possible before combining (less than 35% moisture). During combining, grain will be susceptible to breakage and the wet cob may break into small pieces increasing foreign material. Reduce cylinder speed as low as possible if grain has dried below 30% moisture. If grain is wetter than 30% moisture, cob breakage may occur, and higher cylinder speed and closer concave setting may be helpful to clean grain. Corn that is frost-killed during the mid-dent stage will contain grain moisture greater than 50% and can be harvested for grain after extended field drying. Grain yields and test weight will be reduced 20 to 30%. If only a portion of the plant was killed

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or if the grain was in the late dent stage before frost, yield loss will be small and test weight close to normal. Frost will not affect grain yield or quality after the plant has reached physiological maturity or black layer formation in the grain. Kernel moisture content will be less than 40% moisture and harvest can occur following normal fall drying.

Drying corn can consume significant amounts of energy (Table 1), sometimes more than all other corn growing and harvesting operations. High fuel costs have greatly heightened farmer interest in energy conservation. There are certain drying/storage decisions and techniques that can reduce energy costs regardless of the drying system or fuel source used.

Table 1. Costs of drying corn to 15% moisture based on gas costing $0.70/gallon and electricity costing $0.05/Kw.

Harvest Moisture	Fuel Consumed Gas	Fuel Consumed Electricity	Cost
%	gal/bu	kwh/bu	$/bu
35	0.472	0.066	0.334
30	0.337	0.049	0.238
25	0.219	0.033	0.155
20	0.109	0.017	0.077

Corn produced for feed on the farm need not be dried if properly stored. In fact, high-moisture (24-30%) corn has a feeding value as good as or better than dry corn.

Corn produced for feed on the farm need not be dried if properly stored. In fact, high-moisture (24-30%) corn has a feeding value as good as or better than dry corn. Whole shelled high-moisture corn can be stored in oxygen-limited silos, but a medium grind is needed for proper packing if wet corn is stored in conventional bunker silos. Wet corn may also be bin stored if preserved with propionic acid. However, acid-treated corn must be used for feed and cannot be sold commercially.

Although corn must be dry enough to store safely, over drying is both costly and unnecessary. The moisture content at which corn can be safely stored depends on climate, length of storage, and grain quality. Corn stored for 12 months in a cool climate should be dried to 14% moisture; whereas corn stored in a warm climate may need to be dried to 11% moisture. Corn stored only during the cold winter months, on the other hand, can be held at a much higher moisture content.

Good storage management can greatly influence the longevity of stored corn. One aspect of management is to initial grain quality and condition. Good quality, clean grain can be stored at higher moisture contents than grain that is damaged or has foreign material present. Aeration is also part of good storage management. With proper aeration, corn can be maintained at 15.5% moisture for at least one year in cool climates before dropping in grade. Keeping the dryer correctly adjusted and maintained minimizes losses in efficiency. A high-speed, high temperature dryer should be operated at the highest allowable temperature that will not damage the grain. ▫Shanahan

(Adapted from the National Corn Handbook, Purdue University)

COMPARISON OF TAM 107 AND RUSSIAN WHEAT APHID RESISTANT (RWA) HALT ACROSS YEARS AND MOISTURE CONDITIONS

Halt yields have been equal to TAM 107 yields across years and moisture conditions.

Halt and TAM 107 have been in small-plot variety and seeding rate trials across eastern Colorado since 1993. A head-to-head comparison of yields and test weights of these two winter wheat varieties was undertaken prior to widespread adoption of Halt to learn as much as possible from historical performance. Mean yields and test weights for the two varieties are found below, grouped by year and by moisture (HM = higher moisture locations which are, for the most part, all location north of I-70 and LM = low moisture locations which are south of I-70).

Contrary to popular belief, Halt yields have been equal to TAM 107 yields across this range of years and moisture conditions. Halt yield in 1993 was somewhat lower than TAM 107 yield but Halt was only included in the higher moisture variety trial locations that year. The test weights of Halt, however, do appear inferior to TAM 107 test weights, especially in higher moisture trials. ▫J.Johnson

No. of paired plots	Trial locations	Yield		Test Weight	
		Halt	Tam 107	Halt	Tam 107
		bu/ac	bu/ac	lb/bu	lb/bu
278	All locations	37.08	37.16	54.7	55.5
126	All HM locations	51.33	51.88	53.1	55.1
152	All LM locations	25.26	24.96	56.1	55.9
20	All 1993	59.31	62.99	56.7	57.3
128	All 1994	27.3	27.73	54.3	54.4
130	All 1995	43.28	42.46	54.9	56.4
50	1994 HM	37.12	36.9	52.6	53.8
78	1994 LM	21	21.86	55.3	54.8
56	1995 HM	61.16	61.28	52.3	55.6
74	1995 LM	29.75	28.22	56.9	57.1

WETLANDS VIDEO AVAILABLE

"Wetlands - Immeasurable Wealth", a video available to citizens and agency personnel interested in wetlands, covers the topics of wetland functions, values, regulations, delineations, and criteria.

A 20 minute educational video on Colorado wetlands has just been produced by CSU Cooperative Extension in conjunction with the USDA-NRCS, USDA-ARS, and USEPA. The video is aimed primarily at Colorado citizens and agency personnel who have an interest in wetlands.

Topics covered in the video include wetland functions, values, regulations, and delineations. One of the main objectives of the tape is to explain wetland determinations on private land. The video may be useful to county Extension staff for outreach programs or for internal training. I have a limited number of copies available for free on a first come, first served basis. Otherwise, you can check the video out from the CSU Office of Instructional Services. Ask for "Wetlands - Immeasurable Wealth," catalogue number 5820.

For those of you wondering about the current status of wetland delineations: The permit process required under the Clean Water Act section 404 for dredge and fill of wetlands remains in effect. Permits to develop wetlands on public lands and on non-agricultural private lands are being evaluated by the US Army Corps of Engineers in cooperation with the US Fish & Wildlife Service and the EPA. What has changed is the way the USDA-Natural Resource Conservation Service (NRCS) is handling the delineations of wetlands on agricultural lands for Farm Program participants.

The wholesale delineation of all wetlands on properties enrolled in the Farm Program is currently on hold by the NRCS. As I am sure most of you know, a great deal of controversy has surrounded this effort. Farm Bureau and other agricultural organizations have brought the "private property rights" issue to the forefront and many legislators have threatened to respond. NRCS decided it was best to wait until wetlands were re-addressed in either the 1995 Farm Bill or the re-authorized Clean Water Act, or until some clearer signals are received from the current administration. There are a number of proposals currently floating around Washington for wetland reforms. However, no one I've talked with seems confident to speculate on what will eventually shake out.

The NRCS is presently delineating wetlands on private property only when specifically asked to do so by a written request from the landowner. If a landowner wants to know if an area of their property is considered a wetland under our current definition, they should contact their local NRCS office. As you might imagine, the number of requests that NRCS is receiving right now is rather small.

USDA has recently established the Wetland Reserve Program which is designed to protect wetlands by granting NRCS a permanent easement on privately owned wetlands. They will pay up to $300 per acre, one time only, for the rights to this agricultural land if the producer agrees not to alter or drain the land. As of this writing, there are 18 signups statewide for this program. If you would like further information about the Wetland Reserve Program or for general information on wetlands determinations, contact Terri Skadeland at the state NRCS office in Lakewood at (303) 236-2913.
▫Waskom

MANURE IS MONEY

Whichever way you look at it, manure is money. It can save you money or it can cost you money. The nutrient content in manure makes it a valuable resource for supplying crop nutrient requirements. But it costs money to store it, to haul it, and to spread it. And when improper manure handling results in contamination of water supplies, there's an environmental cost to all of us which is difficult to quantify. In addition, regulations and enforced improvements in waste handling systems could cost the animal industry as a whole in the near future.

The cattle, sheep, hog, and chicken industries in the state of Colorado produce 41,305 tons N, 15,065 tons P_2O_5, and 28,530 tons K_2O every year.

If the nutrients in these manures were efficiently utilized for crop production, $40 million could be saved in fertilizer costs.

The amounts of manure produced in Colorado and their nutrient contents are listed in Table 1. The cattle, sheep, hog, and chicken industries in the state of Colorado produce 41,305 tons N, 15,065 tons P_2O_5, and 28,530 tons K_2O every year. These figures do not include the horse and turkey populations. If the nutrients in these manures were efficiently utilized for crop production, $40 million could be saved in fertilizer costs. If this manure was applied to the 1,000,000 acres of corn silage planted in Colorado, assuming moderate soil test levels, 75% of the N and P needs could be met with manure nutrients, and almost 200% of the K requirement could be met!

Of course, nutrient uptake is never 100% of applied, and manure nutrients are not 100% available to crops, particularly not in the first year following application. Nonetheless, the fertilizer value of manure is currently undervalued. The fertilizer value of manure could be better understood so that the savings in fertilizer costs could be realized by:

1) Soil testing to determine nutrient requirements
2) Manure testing to evaluate nutrient concentrations
3) Spreader calibration to know manure application amounts
4) Subtracting manure nutrient application amounts from the fertilizer requirements
5) Applying only needed fertilizer amounts

In addition to credits for legumes and N in irrigation water, manure credits should also be given. So, in order to realize the financial benefits of manure application, be sure to calculate the nutrient application amounts from manure application, and reduce your fertilizer application accordingly. You'll be surprised at the money you'll save! ▫Davis

Table 1. Manure production, nutrient content, and fertilizer value in Colorado.

	Cattle	Sheep	Hogs	Chickens	Total
Colorado Population[1]	2,950,000	545,000	500,000	3,930,000	
Annual Manure Production (tons)	5,310,000	436,000	700,000	172,000	6,618,000
N Content[2] (lb/ton)	11.0	23.0	12.9	29.9	
N Production (tons/yr)	29,205	5014	4515	2571	41,305
P_2O_5 Content[2] (lb/ton)	3.7	7.0	7.1	14.3	
P_2O_5 Production (tons/yr)	9824	1526	2485	1230	15,065
K_2O Content[2] (lb/ton)	7.3	21.7	10.9	7.0	
K_2O Production (tons/yr)	19,382	4731	3815	602	28,530
Fertilizer Value ($/yr)[3]					
MAP	6,238,240	969,010	1,577,975	781,050	$9,566,275
Urea	16,975,652	2,937,703	2,484,374	1,441,503	$23,839,232
KCl	4,690,444	1,144,902	923,230	145,684	$6,904,260
					$40,309,767

[1]Colorado Agricultural Statistics, 1995.
[2]Brady, 1974.
[3]MAP $305/ton; Urea $290/ton; KCl $145/ton.

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

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Sincerely,

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