Imperial AGRICULTURAL BRIEFS

Cooperative Extension
University of California

November 2004

Our Website is http://ceimperial.ucdavis.edu

Imperial Valley Wheat Production Trial Results

Herman Meister

Imperial Valley farmers report that wheat yields from the 2004 crop were about one ton lower than yields in 2003. Above normal temperatures for much of March is blamed for reducing yields by forcing maturity of the crop at an undesirably rapid rate.

Selecting a wheat variety to plant can be a difficult process. Generally, when we look at test results, we key on the variety with the highest production and protein percentages. Other characteristics such as disease resistance, lodging, plant height, susceptibility to shatter, and various milling traits are equally important.

In reviewing the wheat variety trials conducted at the Desert Research and Education Center by Dr. Jackson, UCD Agronomist, the yields are listed with a number in parenthesis indicating the ranking of the overall comparison of the varieties (Table 1, 2004 Imperial Valley Durum Wheat Test, Normal Irrigation). A summary of 5 years of production data is shown in Table 2. Commercial and experimental varieties are compared together. Kronos and Orita, two of the most commonly planted varieties in the Valley for the past several years, were 20th and 7th respectively. Based on this information alone, one would be tempted to switch to the newer higher yielding varieties. The reason growers continue to plant Kronos and Orita is because of the desirable milling characteristics of these varieties (color and gluten). In this case and many others, what the market demands is a very important issue. For more details, go the Agronomy web site http://agronomy.ucdavis.edu/agronomy/. Click on "Agronomy Progress Reports" to choose the report of interest. Then choose the tables pertaining to the Imperial Valley data.

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Table 1. 2004 IMPERIAL VALLEY DURUM WHEAT TEST, NORMAL IRRIGATION

Entry	Name	Yield (lbs/acre)		Test Wt (lbs/bu)	1000 Kernel Wt (g)	Plant Ht (in)	Lodging (soft dough)	Lodging (harvest)	Days to Head (from 1/1)	Days to Mature (from 1/1)	BYDV
819	BRAVADUR	4960	(21)	59.8	37.4	34	2.5	5.0	94	139	1.0
878	DURAKING	6680	(1)	61.5	31.0	31	1.0	3.0	92	139	1.0
947	KOFA	5230	(18)	59.3	43.0	34	1.5	4.3	92	136	1.8
951	KRONOS	5100	(20)	58.5	36.4	32	4.5	5.5	92	137	1.0
983	RIA	5380	(12)	60.5	38.2	34	1.3	4.3	96	139	1.3
1024	MOHAWK	5280	(15)	60.0	39.7	33	2.3	5.3	92	137	1.0
1166	CROWN	5240	(17)	59.0	39.4	34	1.0	3.5	93	139	2.3
1179	MATT	4890	(24)	59.8	42.7	34	7.0	6.0	91	138	1.3
1210	PLATINUM	4100	(27)	61.3	28.2	31	1.0	4.8	94	136	1.8
1211	TOPPER	6360	(3)	61.5	38.1	35	1.0	2.0	98	143	1.0
1215	ORITA	5730	(7)	59.0	39.6	33	1.0	2.5	95	142	1.3
1250	YU 895-130	5460	(9)	60.5	32.2	32	1.0	4.5	92	136	1.5
1253	CANDURA	5820	(6)	59.8	35.6	35	1.5	4.0	94	139	1.0
1304	WWW D5384-2	4430	(26)	58.3	31.4	33	1.0	4.5	95	137	3.0
1375	ORO	5400	(11)	58.8	42.9	36	1.0	2.5	99	142	1.3
1425	BZ 898-63	5450	(10)	61.5	39.2	33	1.0	2.8	92	140	1.5
1426	YU801-45	6070	(4)	60.0	42.1	34	1.3	4.8	91	138	1.0
1429	RSIOOWV50064	5330	(14)	59.8	34.7	31	1.0	3.3	93	138	1.0
1434	WWW D8227	5690	(8)	61.8	37.6	35	1.0	1.8	98	142	1.5
1435	WWW D8270	5140	(19)	60.0	34.8	32	4.0	5.0	94	138	1.0
1436	WWW D9737	4450	(25)	56.8	30.5	32	1.0	4.8	99	137	1.0
1439	APB D99-425	5270	(16)	60.0	38.0	34	1.0	3.8	91	136	1.0
1440	APB D00-627	5330	(13)	60.5	41.2	35	1.0	4.0	89	136	1.0
1441	APB D00-232	6420	(2)	61.5	43.2	36	1.0	3.3	90	137	1.0
1442	APB D00GE-5	4960	(22)	60.8	35.3	37	4.8	5.5	89	136	1.3
1443	APB D00AZ-248	5860	(5)	60.5	39.4	31	1.0	4.0	91	138	1.0
1444	APB D990D-82	4940	(23)	59.5	45.0	33	1.0	4.5	89	135	1.8
	MEAN	5370		60.0	37.6	33	1.8	4.0	93	138	1.3
	CV	9.6		2.2	-	5.1	43.3	15.5	1.3	0.5	48.4
	LSD (.05)	720		1.9	-	2	1.1	0.9	2	1	0.9

Rating scale for diseases (area of flag-1 leaf affected) and lodging: 1 = 0-3%, 2 = 4-14%, 3 = 15-29%, 4 = 30-49%, 5 = 50-69%, 6 = 70-84%, 7 = 85-95%, 8 = 96-100%.

BYDV ratings (see scale above) were based on percentage of plants showing foliar symptoms.

Numbers in parentheses indicate relative rank in column.

Table 2

UNIVERSITY OF CALIFORNIA DURUM WHEAT VARIETY TRIAL RESULTS
DESERT RESEARCH AND EXTENSION CENTER - HOLTVILLE, CA

	Mean Yield in Pounds per Acre						Percent Protein at 12% moisture						Percent Lodging at Harvest					
CULTIVAR	**2004**	**2003**	**2002**	**2001**	**2000**	**Average**	**2004**	**2003**	**2002**	**2001**	**2000**	**Average**	**2004**	**2003**	**2002**	**2001**	**2000**	**Average**
Duraking	6,880	7,560	8,520	8,410	5,060	**7,286**	13.7	14.0	13.1	13.0	15.1	**13.8**	30.0	28.0	12.0	9	2	**16.2**
Kronos	5,100	7,050	7,470	8,300	5,260	**6,636**	14.1	14.3	14.2	14.3	14.5	**14.3**	55.0	45.0	65.0	75	13	**50.6**
Mohawk	5,280	7,100	7,200	8,030	4,610	**6,444**	13.8	14.8	13.1	13.6	15.0	**14.1**	53.0	43.0	65.0	81	10	**44.4**
Orita	5,730	7,150	8,110	8,640	5,140	**6,954**	14.2	15.1	14.4	15.2	15.3	**15.0**	25.0	23.0	12.5	9	0	**13.9**
Deluxe	*	7,560	8,120	8,310	4,990	**7,245**	*	15.2	14.0	14.2	14.9	**14.6**	*	33.0	22.0	11	1	**16.8**
Topper	6,360	7,750	8,150	8,630	4,870	**7,152**	13.9	13.7	12.7	13.6	14.0	**13.5**	20.0	20.0	9.5	15	0	**12.9**
Platinum	4,100	7,700	7,170	7,890	5,030	**6,378**	13.5	13.3	13.7	13.6	14.9	**13.9**	48.0	43.0	50.0	60	15	**43.2**
Tacna	*	*	7,530	7,560	5,240	**6,777**	*	*	15.1	15.5	15.0	**15.2**	*	*	30.0	25	3	**19.3**
Crown	5,240	7,390	7,970	8,280	4,540	**6,684**	14.2	13.4	14.2	13.6	14.9	**14.0**	35.0	33.0	22.0	9	0	**19.8**
Kofa	5,230	7,010	7,180	7,450	4,650	**6,304**	14.2	13.0	14.0	14.3	15.4	**14.2**	43.0	45.0	55.0	50	7	**40.0**
Matt	4,890	6,500	7,120	7,310	4,740	**6,112**	14.3	15.0	14.0	14.3	15.0	**14.6**	60.0	50.0	45.0	70	13	**47.6**
Ria	5,380	7,210	7,890	7,220	4,490	**6,438**	14.0	13.5	14.9	14.1	14.6	**14.3**	43.0	35.0	40.0	70	13	**40.2**
Oro	5,400	8,070	7,780			**7,083**	13.7	13.2	13.6			**13.5**	25.0	30.0	30.0			**28.3**
Candura	5,820	6,780				**6,300**	14.3	13.9				**13.9**	40.0	38.0				**39.0**
Baravdur	4,960	6,630				**5,795**	14.0	13.6				**13.6**	50.0	28.0				**39.0**

* = Not Tested

Compiled by Michael Rethwisch (Farm Advisor, UCCE - Riverside County) & Herman Meister (Farm Advisor - Imperial County) from UC-Davis Agronomy Progress Reports.
These reports are available at:
http://agric.ucdavis.edu/crops/cereals/cereal.htm
(November 2003)

Comparison of fungicides for control of onion downy mildew, 2004

Thomas Turini

Downy mildew of onions, which is caused by *Peronospora destructor*, is a disease that can become severe and widespread in Imperial County. In addition, Stemphillium leaf blight, *Stemphylium vesicarium*,, frequently appears on onions. Symptoms are characterized by oval tan to purple lesions on leaf blades. Stemphillium leaf blight is usually associated with downy mildew lesions or other injuries.

To compare efficacy of new and registered fungicides against onion downy mildew, and investigate application timing influence on control, we conducted a study at the Imperial Valley Research Center in Brawley, CA. On 6 October 2003, onion seed was sown into six (6) rows per bed and irrigated. Each plot consisted of four 40-inch beds 30-ft long. The experimental design was a six replication randomized complete block. Treatments are listed in Table 1. Materials were applied in 30 gal of water per acre with a CO_2 pressurized backpack sprayer at 30 psi. A 4-nozzle spray boom with Teejet 8002 flat fan nozzles spaced 19-in apart was used for all applications. On 21 Apr, the percentage leaf surface covered with downy mildew symptoms of each of 10 plants per plot was rated and recorded. Stemphillium leaf blight was also present in the experiment, so the number of Stemphillium lesions on each of ten plants per plot was recorded. Analysis of variance was performed and means were separated with least significant difference (LSD) P 0.05.

All materials provided a significant level of control (P=0.05) of both downy mildew and Stemphium leaf blotch as compared to the untreated control. Under the conditions of this study, Maneb 75DF, TD-2398, Quadris tank mixed with Maneb 75DF, Switch tank mixed with Maneb 75DF, Forum tank mixed with Penetrator Plus, Forum tank mixed with Maneb 75DF and Penetrator Plus, Tanos tank mixed with Maneb 75DF and rotated with Maneb 75DF, Acrobat 50WP with Maneb 75DF and Penetrator Plus, Ridomil Gold Bravo WP rotated with Maneb 75 DF, and Reason 500SC with Bond rotated with Maneb 75DF were among the best performing materials. Forum with Penetrator Plus performed better than Forum alone. No phytotoxicity symptoms were observed.

Table 1

Treatment, units/acre	Downy mildew (%) [z]	Stemphillium (# lesions/ plant) [y]
Maneb 75DF 2.0 lbs (C,D,F)…….…….…… …….	0.3	0.0
TD-2398 3 pts (C,D,F)……..…….……	0.8	0.0
Quadris 12.8 fl oz + Maneb 75DF 2.0 lb (C,D,F)……..	0.5	0.0
Switch 14 oz + Maneb 75DF 2.0 lb (C,D,F)…..…….	1.2	0.1
Forum 6.1 fl oz + [w] Penetrator plus 2.0 pts (C,D,F)……..…	1.5	0.0
Forum 6.1 fl oz + Maneb 75DF 1.5 lbs + Penetrator plus 2.0 pts (C,D,F)…..	3.3	0.0
Tanos 50WP 8 oz + Maneb 75DF 2.0 lbs (C, F)/ [v] Maneb 75DF 2.0 lbs (D)	4.3	0.1
Acrobat 50WP 6.4 oz + Maneb 75DF 1.5 lb + Penetrator Plus 2.0 pt……	4.5	0.2
Ridomil Gold Bravo WP 2.0 lb (C, F) /Maneb 75DF 2.0 lb (D)……	4.7	0.0
Ridomil Gold Bravo WP 2.0 lb (A, D)/Maneb 75DF 2.0 lb (B, E)……...	5.5	0.0
Reason 500SC 5.5 fl oz + Bond 0.1% (C, F)/ Maneb 75DF 2.0 lbs (D)…….	9.3	0.2
Forum 6.1 fl oz (C,D,F)……..……...	14.7	0.4
Cuprofix MZ Dispers 3.5 lb (C,D,F)……..…….……...	16.7	0.4
Cuprofix MZ Dispers 7.25 lb (C,D,F)[x]……..…….	17.0	0.3
Untreated Control……..…….....	28.0	1.2
LSD (P=0.05)	9.6	0.6

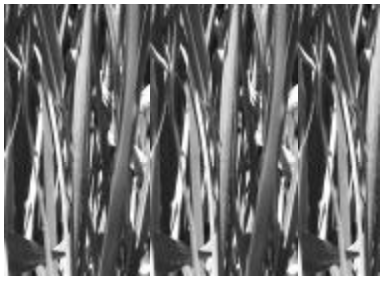
[z] On 21 April, the downy mildew severity on each of 10 plants per plot were rated on a scale of 0 to 5. Roughly based on the percentage of leaf area covered with downy mildew lesions, plants were rated 0 if no symptoms were observed and a plant would have been rated 5 if symptoms were severe. Ratings were converted to percentages.

[y] On 21 April, number of Stemphylium leaf blight lesions per plant were counted on each of 10 plants per plot. Mean number of lesions per plant is presented.

[x] Application dates: A = 13 Feb; B = 24 Feb; C = 25 Feb; D = 8 Mar; E = 31 Mar; F = 1 Apr.

[w] Materials separated by a "+" were tank mixed.

[v] Materials separated by a "/" were applied on different dates.



Muddy pens

Juan N. Guerrero

Average annual rainfall in the Imperial Valley is only 2.85 inches. The wettest months of the year are November, December, January, and February; mean monthly precipitation of 0.36, 0.36, 0.46 and 0.32 inches, respectively. While the irrigated Sonoran Desert is known principally for its torrid summers, winter rains may cause problems for penned cattle. Locally, during the winter, the worst climate related problem for penned cattle is mud, not cold. Cattle in mud 4 to 8 inches deep may have decreased feed intakes of 20%, cattle that don't eat don't gain weight. Cattle in mud 4 to 8 inches deep may have reduced weight gains, 15 to 20%, and have reduced feed efficiency by 10 to 15%. Cattle in mud will gain less weight and the weight that the do gain will be more expensive. Cattle that are belly deep in mud may have reduced feed intakes by as much as 30% and may gain 25% less. Mud is a serious problem for pen-fed cattle.

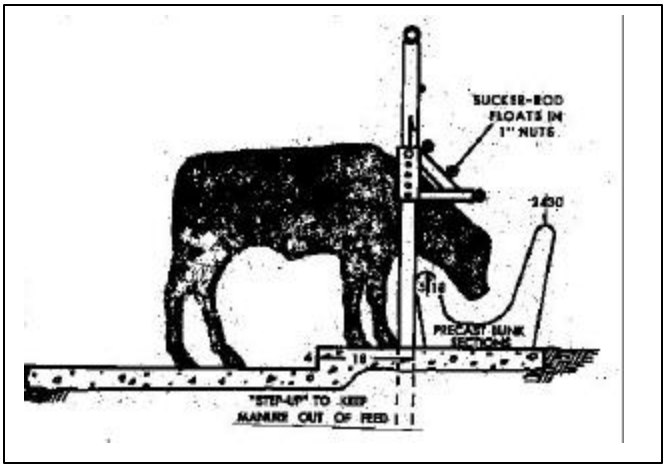
For persons feeding only a few cattle in one small pen, runoff diversion is a good practice to keep pens dry during rainfall events. Building a berm around the high side of the pen to prevent rainfall runoff from the adjacent field will help keep the pen dry. Small cattle pens should also have drainage. Pen runoff may be diverted to an adjacent field. Great care must be taken, however, that pen drainage not flow into canals or irrigation drains. Federal law prohibits the contamination of the nation's waterways from the runoff of cattle pens.

Locally, a small rainfall event, as small as 0.25 inch, may cause mud problems in cattle pens. When cattle walk in muddy pens, they expend great amounts of energy merely for locomotion; that same amount of energy may have been used for weight gain. Moreover, in muddy pens, the skin of cattle is in contact with cold, wet mud; which causes greater energy expenditures to maintain normal body temperatures; again, energy that might have gone to weight gain.

Because of the problems that we have with heat in the irrigated Sonoran Desert, we generally place more cattle within a given area, than in the rest of the country. Locally, we recommend from 110 to 150 ft² per head of pen space. On dirt pens, in the rest of the country, from 250 to 500 ft² per head of pen space is generally recommended. Placing so many animals in a given space helps reduce dust problems, an equally unhealthy problem, during the desert summer. However, this practice of placing so many animals within such a small area does have its associative negative effects during winter rains.

Perhaps the best way to maintain feed intake in muddy pens is to construct a concrete apron (Figure 1) along the interior of the feed bunks. Note that there is a small 4" step. From the fence line to the edge of the apron, the apron should be 8 to 10 ft. wide. The apron should also be 4 to 6 inches thick. The use of this cement apron will help prevent the problems associated with muddy cattle pens.

An emergency effort that may be made during wet weather is to place bedding in cattle pens to reduce the effects of muddy pens. Old, weathered hay is the perfect solution.



Soil Potassium Deficiencies

Herman Meister

Recent reports indicate a possible declining trend of potassium (K) in some of the fields in the Imperial Valley. A review of soil analysis records from some growers has shown that soil K levels have decreased from a high of 600 ppm in the mid 1980's to as low as 100 ppm currently (ammonium acetate method). Potassium is an essential nutrient that is taken up in significant amounts by many crops. Potassium is vital to photosynthesis, protein synthesis, and many other functions in plants. Soil test results in the range of 150-200 ppm are generally adequate for most vegetable crops (ammonium acetate method). Contact your local fertilizer representative or independent lab for the latest techniques using grid sampling and variable fertilizer application methods for the most efficient use of K and other fertilizers.

Crops with High Removal Rates of Potassium

Crop	Yield Potential	K2O Requirement
Alfalfa	8 Tons/Acre	480 Lbs/Acre
Bermudagrass	8 Tons/Acre	420 Lbs/Acre
Cotton	3 Bales/Acre	105 Lbs/Acre
Sugar beets	60 Tons/Acre	800 Lbs/Acre
Sugar cane	100 Tons/Acre	610 Lbs/Acre
Wheat	3 Tons/Acre	202 Lbs/Acre

Forms of Potassium

Most soils contain huge amounts of K, frequently 20,000 lbs/Acre or more. Unfortunately, just a small percentage is available to plants over the growing season, often less than 2 %. Soil K exists in three forms: unavailable, slowly available, and available.

Unavailable K – Unavailable K is found in minerals (rocks). The K is released as minerals are weathering, but so slowly as to be unavailable to growing plants in a particular crop year.

Slowly available K – Slowly available K is "fixed" or trapped between layers of soil clays. Clays shrink and swell during wet and dry conditions. Potassium ions can be trapped between these clay layers, becoming unavailable or only slowly released.

Available K – Readily available K is made up of the K found in the soil solution plus the K held in the "exchangeable" form by soil organic matter and clays.

Most soils contain 10 lbs/Acre or less of solution K. This amount will support an actively growing crop for only a few days. As the crop grows, some of the exchangeable K moves into solution. Through the cation exchange process, K is continuously available for plant growth if the soil contains enough K at the beginning of the growing season to supply the crops needs.

Soil Potassium

Plants can utilize either soluble K or exchangeable K for meeting crop requirements. The "K" in different nutrient sources (commercial fertilizers, organic materials, crop residues, and cover crops) transitions to the ionic form of K when it dissolves in the soil solution. Once the K ionizes in solution, several things can happen to the ion.

- It can be attracted to the surfaces of clay soils and organic matter and held in the exchangeable form until it is taken up by a plant root or exchanged for another cation.
- Some will remain in the soil solution.
- The growing crop will take up some K.
- Part of the K can be leached in sandy soils and high organic soils.
- Part of the K can be "fixed" (converted to an unavailable or slowly available form) in some soils. The fixing capacity of some soils is why soil test do not always reflect the effect of fertilizer applications on increasing K soil test values. Fixed K is not measured in most soil test.

Potassium Movement

Research indicates that K moves very little in clay soils. Unlike nitrogen, K has a tendency to remain exactly where it was applied in the fertilization process. The immobile nature of the nutrient makes it very important to maintain adequate levels of K fertility in the soil to support vigorous plant growth. When K does move, it is by diffusion, and slowly over short distances thorough water film surrounding soil particles.

Crop roots usually contact less than 3% of the soil in which they grow. The total root mass of most crops

Potassium Uptake

Since K is relatively immobile in the soil and reaches the plant primarily by diffusion through the soil solution, any factor that restricts root growth can decrease K uptake.

- Soil aeration-Uptake of K is affected more by poor aeration than most other nutrients. Compaction and minimum tillage systems can limit K uptake and increase deficiency problems.
- Fixation- Soils that trap and hold K in the unavailable form reduce the amount of K for plant uptake.
- Cation exchange capacity (CEC)-In general, soils with high CEC's have greater storage capacity and supplying power for K.
- Soil temperature-Low soil temperatures reduce the availability and uptake of K.
- Soil moisture-Moisture is needed to K to move by diffusion through the soil to plant roots. Both drought stress and excess moisture reduce the uptake of K.

Plant Deficiency Symptoms

Potassium deficiency symptoms show up in different ways on different crops. In general, deficient plants grow slowly and have poorly developed root systems. The stalks are weak and lodging is common. The most striking symptom is the scorching or firing along leaf margins. An exception would be alfalfa, which shows white or yellowish dots along the outer edges of leaves. In cotton, expect to see thick and leathery leaves with some bronzing in the upper part of the canopy mid to late season.

Reference: Soil Fertility Manual, Potash and Phosphate Institute

CIMIS REPORT

Khaled Bali and Steve Burch*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of November 1 to January 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Irrigation Management Unit (339-9082).

Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (visit http://tmdl.ucdavis.edu and click on the CIMIS link).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	November		December		January	
	1-15	16-30	1-15	15-31	1-15	16-31
Calipatria	0.14	0.10	0.07	0.07	0.08	0.09
El Centro (Seeley)	0.13	0.09	0.06	0.06	0.08	0.09
Holtville (Meloland)	0.13	0.10	0.06	0.06	0.08	0.09

* Irrigation Management Unit, Imperial Irrigation District.

REMINDERS

The new Guidelines for 2004-2005 for both
Field Crops and Vegetable Crops
are now on line!
You are welcome to visit our website for the most up to date figures!
Printed copies or CD's are available in our office or
by mail.
http://ceimperial.ucdavis.edu

National Alfalfa Symposium
December 13-15, 2004
San Diego, CA
Addressing critical issues for Alfalfa and Other Harvested Forages

REMINDERS

WORKSHOP

Nitrate Pollution Hazard Index for Irrigated Agriculture in the Southwest

December 10, 2004

Location: UC Desert Research and Extension Center

1004 E. Holton Road, Holtville, CA

Registration begins at 8:00 a.m.

Workshop purpose: Introduce attendees to a new electronically available interactive program to develop field-specific irrigation and nutrient management practices which maintain high yield and reduce groundwater degradation by nitrate based on the hazard index (HI).

Other locations/dates: Reno, NV, November 16; Davis, CA, November 17; Fresno, CA, November 18; Salinas, CA, November 19; Tucson, AZ, TBA

**** Please let us know your name and which workshop (location/date) you will attend by December 1, 2004. Contact by phone at 951-827-4327 or e-mail: christine.french@ucr.edu.**

To simplify our information it is sometimes necessary to use trade names of products or equipment. No endorsement of named products is intended nor is criticism implied of similar products, which are not named

Eric T. Natwick, County Director