Agronomy Notes

October 2004 Issue

University of California Cooperative Extension

Colusa, Sutter, Yuba and Glenn Counties

Wheat and Barley Varieties for the 2005 Crop

Doug Munier, Jerry Schmierer, Cass Mutters, Kent Brittan, Mick Canevari & Lee Jackson

Choosing a good wheat or barley variety for the 2005 crop has never been more important. The extended wet and cool spring weather of 2003 was very favorable for disease development, but the continuing development of new strains of the wheat stripe disease may be a more important factor to consider in selecting wheat varieties to plant for the 2005 crop.

This article summarizes UCCE variety testing in the Sacramento Valley for wheat and barley, under both irrigated and rain fed conditions. Be careful when reviewing the tables to note whether they are for **irrigated**, or **rain fed** conditions. In the tables, three year average results are shown with a gray background.

Wheat Yields

This year's wheat yields in the Sacramento Valley were severely impacted by wheat stripe rust disease. New races of wheat stripe rust are continuing to develop. Many previously resistant varieties: Anza, Yolo, Klasic, Serra and Yecora Rojo, had high levels of stripe rust throughout the Central Valley in the 2003 and 2004 crops. Express' grain yields and quality were less effected, but were much lower in the 2003 and 2004 trials.

The yield results for eleven Sacramento Valley UC Cooperative Extension trials from 2002 to 2004 are given in Table 1. Summit is the highest yielding variety over these three years, averaging 6,000 pounds per acre. Over this same three years Express' grain yield is about 2,000 pounds per acre less yield than Summit, averaging 3,880 pounds per acre.

The three year average Express' yields are higher because this variety was not even moderately effected by wheat stripe rust in the 2002 trials. However, Express' three year average yield was decreased by severe shattering losses in the 2002 UC Davis trial.

Wheat Protein

The new variety, Summit, is a good option if yield is more important than producing high protein grain. Summit's protein content is usually in between Express' protein and the much lower protein varieties like Yolo and Anza. The protein results are shown in Table 2. In UCCE trials over the three year period, 2002 to 2004, Express averaged 0.8 percent protein higher than Summit.

Even if Express has produced high protein grain before, it is a much riskier choice this year. If Express is planted, then a fungicide application may be needed in the spring. Express' severe yield reductions in 2003 were likely due to a combination of new strains of wheat stripe rust disease and the extended wet spring weather of 2003. With the very dry 2004 spring, Express yields were still moderately reduced by stripe rust.

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Wheat Milling versus Feed Grain

The anticipated price difference between milling quality grain and feed grain will be an important factor in selecting a wheat variety this year.

Another important option is to try to raise the protein levels of Summit and Stander to milling quality with additional nitrogen. Many UC trials over the past 15 years have shown a 1 to 2 percent increase in protein by the addition of 40 pounds of actual nitrogen during the late boot stage to early flowering stage. Given the very high yields of these two varieties this would be a good time to try this, on at least a limited acreage.

Wheat Stripe Rust Ratings

Wheat stripe rust ratings for the four 2004 Sacramento Valley trials are shown in Table 3. Be sure to read the disease rating scale in the heading of the table. The ratings range from 1 to a maximum of 8, but a rating of a 4 could be as high as 49 percent infection of the flag leaf. Summit and Blanca Grande had very low areas of the flag leaf affected by stripe rust, less than 4 percent.

Rain Fed Wheat

Since there were only two two rain fed wheat trials in the Sacramento Valley during the last three years, three additional trials from the San Joaquin Valley are also shown in Table 4. The Glenn 2003 trial had severe wheat stripe rust disease, but the newer tolerant varieties produced yields similar to irrigated wheat. With the dry spring, the Glenn County 2004 rain fed yields were reduced to about one-half of the better 2003 yields.

Irrigated Barley

Barley is not commonly grown in the Sacramento Valley. Barley is not effected by wheat stripe rust, but has a new similar disease of its own, barley stripe rust. This disease first appeared in the late 1990's and eliminated many barley varieties and decreased the barley acreage statewide.

However, there are two new barley varieties, UC 937 and UC 933, which have good resistance to barley stripe rust. They also have resistance to scald and net blotch, diseases that are at least partially responsible for barley not commonly being grown in the Sacramento Valley. **This disease resistance has been weakening in the past two years.** However, as long as this disease resistance lasts, it makes barley an option in the Sacramento Valley. Table 5 is a yield summary of six trials over a three year period for several barley varieties.

UC 937 had severe shattering losses in the Butte 2002 trial resulting in a much lower yield than UC 933. UC 937 has a weakness of losing entire heads if winds occur after the grain is mature. Harvesting UC 937 as soon as it is mature will be important if windy weather occurs. UC 937 is capable of very similar yields to UC 933, but must be managed carefully to avoid severe shattering losses.

Rain Fed Barley

There were only two rain fed barley trials in the Sacramento Valley in 2002-2004, so the results of several trials from the southern part of the San Joaquin Valley are included in Table 6. The good growing conditions in the 2003 Glenn County trial and the extended wet spring resulted in yields similar to irrigated conditions.

Summary

There are fewer choices of both wheat and barley varieties for the 2005 crop, but there are several good ones of both wheat and barley. However, in this rapidly changing disease situation, **consider planting more than one variety to decrease your risk of severe losses** from any varietal characteristic effecting wheat and barley yields and quality.

Table 1. 2002-2004 yield results from eleven Sacramento Valley UCCE wheat variety trials.

Wheat Varieties	Average 2002-04 11 Loc-Yr	Butte 2004	Butte 2003	Butte 2002	Colusa 2004	Colusa 2003	UC Davis 2004	UC Davis 2003	UC Davis 2002	Sac-SJ Delta 2004	Sac-SJ Delta 2003	Sac-SJ Delta 2002
ANZA	3790 (8)	4780 (9)	2750 (8)	6700 (5)	5510 (11)	2710 (8)	3170 (11)	2420 (9)	4470 (3)	1640 (9)	3510 (7)	4040 (4)
YECORA ROJO	2480 (9)	4760 (10)	1920 (10)	5420 (13)	4090 (12)	660 (10)	1760 (12)	980 (10)	3660 (7)	240 (13)	360 (10)	3390 (10)
SERRA	3790 (7)	5400 (4)	3770 (7)	5500 (11)	5920 (9)	2700 (9)	3490 (10)	2730 (8)	4700 (2)	1460 (10)	2530 (9)	3520 (8)
EXPRESS	3880 (6)	4590 (12)	4040 (5)	5450 (12)	6150 (8)	3870 (7)	4920 (7)	3350 (7)	1790 (13)	1850 (7)	3200 (8)	3460 (9)
STANDER	5260 (3)	5440 (3)	4980 (3)	6880 (3)	6230 (6)	6110 (2)	4940 (6)	5540 (3)	5650 (1)	2360 (6)	5980 (3)	3780 (6)
SUMMIT	6000 (1)	5560 (2)	6000 (1)	7610 (1)	6870 (2)	7570 (1)	6440 (1)	6260 (1)	4120 (6)	4180 (2)	7310 (1)	4030 (5)
BLANCA GRANDE	5470 (2)	5030 (7)	4460 (4)	7170 (2)	7090 (1)	6050 (3)	6200 (2)	6040 (2)	4140 (5)	3230 (3)	6540 (2)	4180 (3)
BETH HASHITA	4340 (5)	5400 (5)	3880 (6)	6100 (7)	6200 (7)	4810 (6)	4890 (8)	4700 (4)	2280 (12)	1140 (11)	5720 (4)	2600 (13)
CLEAR WHITE	4830 (4)	4600 (11)	2640 (9)	6520 (6)	6760 (3)	5560 (4)	5530 (4)	4370 (6)	3420 (9)	4390 (1)	5160 (6)	4180 (2)
Triticale Varieties												
TRICAL 105		5420 (2)			6950 (1)		5970 (2)			2080 (3)		
TRICAL 96		4870 (3)			6830 (2)		4710 (3)			3250 (2)		
TRICAL 111		5540 (1)			6600 (3)		6200 (1)			4010 (1)		
CV	10	8.5	14.6	8.6	6.3	12.7	6.8	10.8	10.7	25.7	6.8	14.8
$LSD_{(.05)}$	180	620	660	760	540	560	480	450	590	930	310	770

Table 2. 2004 **irrigated** wheat grain protein summary for the Sacramento Valley.

Wheat Varieties	Average 2002-04 10 Loc-Yr	2004 Butte	2004 Colusa	2004 UC Davis	2004 Sac/SJ Delta
ANZA	11.2 (9)	8.9	10.8	11.6	13.1
YECORA ROJO	12.8 (3)	9.9	12.0	13.4	13.6
SERRA	12.5 (6)	10.7	10.8	13.5	14.0
EXPRESS	13.5 (1)	13.3	12.7	13.8	14.8
STANDER	12.5 (5)	10.2	11.5	13.1	13.6
STELLAR		10.8	12.7	13.6	14.2
SUMMIT	12.7 (4)	11.3	11.7	13.1	13.6
BLANCA GRANDE	13.0 (2)	9.8	12.6	13.5	15.0
BETH HASHITA	12.4 (7)	10.8	11.9	12.6	14.7
CLEAR WHITE	12.4 (8)	12.2	11.6	12.4	13.1
$LSD_{(.05)}$	0.5				

Table 3. 2004 wheat **stripe rust** summary for the Sacramento Valley.

Wheat Varieties	Average 2004 5 Locations	Butte	Colusa	UC Davis	Sac-SJ Delta	Glenn
ANZA	6.1 (10)	6.3	5.8	6.5	5.0	7.0
YECORA ROJO	8.0 (11)	8.0	7.8	8.0	8.0	8.0
SERRA	3.9 (8)	2.3	3.0	5.5	4.8	4.0
EXPRESS	2.8 (7)	1.3	2.8	3.5	4.5	1.8
STANDER	4.3 (9)	3.5	4.8	4.3	4.3	4.8
STELLAR	1.8 (4)	1.0	1.0	1.5	4.5	1.0
SUMMIT	1.2 (2)	1.0	1.0	1.3	1.8	1.0
BLANCA GRANDE	1.0 (1)	1.0	1.0	1.0	1.0	1.0
BETH HASHITA	1.5 (3)	1.3	1.0	1.8	2.3	1.0
CLEAR WHITE	1.9 (5)	1.3	1.5	2.8	2.8	1.0
WINCAL 14	2.1 (6)	1.8	1.3	3.3	2.8	1.5
Triticale Varieties						
TRICAL 105	1.0 (1)	1.0	1.0	1.0	1.0	1.0
TRICAL 96	3.3 (3)	1.8	1.0	5.0	5.8	2.8
TRICAL 111	1.1 (2)	1.0	1.0	1.0	1.3	1.0
CV	22.6	32.7	23.4	26.1	19.2	14.2
$LSD_{(.05)}$	0.3	1.0	0.7	1.0	0.8	0.5

Table 4. 2002-04 Central Valley **rainfed wheat** yield summary.

Wheat Varieties	Average 2002-04 5 Loc-Yr	Glenn 2004	Glenn 2003	Glenn 2004	Tulare 2003	Tulare 2002
ANZA	1742 (8)	2680 (10)	2070 (9)	760 (11)	1580 (9)	1620 (4)
YECORA ROJO	1944 (7)	2830 (9)	2210 (8)	1230 (2)	1790 (5)	1660 (2)
SERRA	2148 (6)	3230 (6)	2380 (7)	1140 (7)	2290 (1)	1700 (1)
EXPRESS	2346 (5)	3450 (3)	3770 (6)	1210 (3)	1860 (4)	1440 (8)
STANDER	2402 (3)	2860 (8)	5050 (2)	790 (10)	1680 (8)	1630 (3)
SUMMIT	2702 (1)	3440 (4)	5780 (1)	1160 (5)	1790 (6)	1340 (10)
BLANCA GRANDE	2356 (4)	3280 (5)	3860 (5)	1420 (1)	1760 (7)	1460 (6)
BETH HASHITA	2404 (2)	3610 (1)	4210 (4)	1190 (4)	1570 (10)	1440 (7)
Triticale Varieties						
TRICAL 105		3110 (1)		460 (2)		
TRICAL 96		2840 (3)		580 (1)		
TRICAL 111		3030 (2)		190 (3)		
CV	26.2	10.6	32.9	18.5	15.3	18.9
$LSD_{(.05)}$	350	460	1280	260	380	400

Yields are in pounds per acre and the numbers in parentheses indicate the relative rank in the column.

The Rating Scale: 1=0-3%; 2=4-14%; 3=15-29%; 4=30-49%; 5=50-69% 6=70-84%; 7=85-95%; 8=96-100%

Table 5. 2002-04 Sacramento Valley **irrigated barley** yield summary.

	Average 2002-04 6 Loc-Yr	Butte 2004	Butte 2003	Butte 2002	UC Davis 2004	UC Davis 2003	UC Davis 2002
UC 603	4970 (5)	4120 (11)	4880 (11)	4070 (7)	5840 (7)	6250 (8)	4630 (4)
MAX	3840 (8)	6420 (1)	7280 (4)	4230 (6)	1660 (11)	3410 (11)	60 (11)
PATTI	5630 (3)	5420 (7)	6760 (5)	5450 (5)	5160 (8)	7600 (6)	3390 (7)
UC 933	6390 (1)	5390 (8)	6620 (7)	6090 (2)	6620 (3)	8570 (2)	5060 (2)
UC 937	5780 (2)	6040 (3)	6690 (6)	3750 (8)	6260 (5)	7670 (5)	4260 (5)
MELTAN	4150 (7)	4970 (9)	4960 (10)	3210 (11)	4090 (9)	5420 (9)	2220 (9)
UC 969	5240 (4)	4350 (10)	6470 (8)	3380 (10)	6310 (4)	6980 (7)	3970 (6)
COMMANDER	4180 (6)	5610 (5)	7520 (2)	3520 (9)	3520 (10)	4690 (10)	220 (10)
CV	10.2	8.6	7.3	19.8	6.4	8.3	21
$LSD_{(.05)}$	320	640	710	1130	510	920	930

Table 6. 2002-04 Central Valley **rainfed barley** yield summary.

Barley Varieties	Average 2002-04 5 Loc-Yr	Glenn 2004	Glenn 2003	Tulare 2004	Tulare 2003	Tulare 2002
UC 603	2736 (5)	3030 (6)	5650 (6)	870 (8)	2190 (5)	1940 (6)
MAX	2106 (8)	2490 (11)	5040 (11)	260 (11)	1320 (11)	1420 (10)
PATTI	2504 (6)	2660 (9)	5200 (10)	650 (10)	2110 (7)	1900 (8)
UC 933	3176 (2)	3500 (3)	6870 (2)	1130 (5)	2450 (3)	1930 (7)
UC 937	3204 (1)	3410 (5)	6530 (4)	1130 (3)	2580 (1)	2370 (1)
MELTAN	2930 (3)	3510 (2)	5320 (9)	1080 (6)	2500 (2)	2240 (2)
UC 969	2864 (4)	2780 (7)	6020 (5)	1130 (2)	2170 (6)	2220 (3)
COMMANDER	2478 (7)	2620 (10)	5620 (7)	780 (9)	2110 (8)	1260 (11)
CV	39.5	14.9	13.0	22.1	11.0	15.3
$LSD_{(.05)}$	520	630	1140	300	340	430

Yields are in pounds per acre and the numbers in parentheses indicate the relative rank in the column.

National Alfalfa Symposium

December 13-15, 2004 * San Diego, California
Addressing Critical Issues for Alfalfa and Other Harvested Forages

Sponsored by:
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Pre-Symposium Tour

Monday, December 13: Educational Tour of Imperial Valley - Agricultural, Local, Historical Sites (optional)

7:30 AM – 8:30 PM: Visit the unique desert agricultural oasis of the Imperial Valley - developed in 1901, the Imperial Valley represents a powerhouse of food production, but is also a flashpoint of urban-agricultural conflicts in southern California. See alfalfa production in December, winter vegetable production, research plots, equipment and irrigation modifications which has made this one of the most productive agricultural areas of the world. PRE-REGISTRATION REQUIRED! ($55 pre-registration includes lunch, transportation, snacks, BBQ dinner and entertainment).

6:00 – 9:00 PM: Exhibitor Setup
7:00 – 9:00 PM: Conference Registration - Pick up your registration early and beat the rush!

Program

Tuesday, December 14: National Alfalfa Symposium

6:30 – 10:00 AM: Registration

MAIN SESSION: INDUSTRY TRENDS

8:00 Welcome and Introduction
8:10 *Dairy market trends* – Jim Hahn, Cenex Land O Lakes, Minneapolis, MN
8:35 *Hay prices and trends in western states* – Seth Hoyt, California Agricultural Statistics Service, Sacramento, CA
9:00 *Influence of quality and season on hay market decisions* - Russell Tronstad, Agricultural and Resource Economics, University of Arizona, Tucson, AZ
9:25 *What are the dynamics of the horse market?* - Ann Rodiek, Fresno State University, Fresno, CA
9:50 Discussion
10:10 BREAK

MAIN SESSION: WATER AND ENVIRONMENTAL ISSUES

10:30 *An environmental balance sheet: what are the key challenges?* - Dan Putnam, UCCE, UC Davis
10:50 *The environmental impacts of N_2 fixation in alfalfa* - Michael Russelle, USDA-ARS, St. Paul, MN
11:10 *Perchlorate in the dairy forage system* - Michael Payne, Department of Environmental Toxicology, UC Davis, CA
11:30 *What are the implications of the water transfers to the Imperial Valley?* - Bruce Kuhn, Imperial Valley Irrigation District, El Centro, CA
11:45 Discussion

12:10 NOON BANQUET LUNCH

(Program continued on other side)

REGISTRATION INFORMATION

Register ONLINE at:
http://alfalfa.ucdavis.edu
OR
PHONE 530-752-1748 to register or request a form mailed or faxed to you.

(December 14 continued)

Concurrent Sessions

1:30 - 5:00 pm

	I. Pest Management	II. Other Forage Crops (repeats)	III. Irrigation and Soils (repeats)	IV. Forage Quality (repeats)	V. Recycling Wastewater with Forage Crops MINI SYMPOSIUM
1:30 pm	*Weevil control* Larry Godfrey, UCCE, UC Davis, CA	*Bermudagrass and kleingrass* - Juan Guerrero and Herman Meister, UCCE, El Centro, CA	*Water use efficiency in flood irrigation* Blaine Hanson, UCCE, UC Davis, CA	*What is alfalfa quality and will it pay?* Garry Lacefield, University of Kentucky, Princeton, KY	*Recycled water - perspectives on wastewater reuse* Stu Pettygrove, UCCE, UC Davis, CA
1:50 pm	*Aphid and whiteflies* Eric Natwick, UCCE, El Centro, CA	*Timothy and orchardgrass hay* - John Kugler, Washington State University, Euphrata, WA	*Matching ET using center pivots* Howard Neibling, University of Idaho, Twin Falls, ID	*Importance of digestibility estimates* Dan Undersander, University of Wisconsin, Madison, WI	*Case history - producting alfalfa with effluent water* Gene Nebeker, Nebeker Farms, Lancaster, CA
2:10 pm	*Summer worms* Les Ehler, Department of Entomology, UC Davis, CA	*Small grain forages* Carol Collar, UCCE, Hanford, CA	*Importance of phosphorus* Rob Mikkelsen, Potash and Phosphate Institute, Davis, CA	*Balancing yield, quality and persistence* Steve Orloff, UCCE, Yreka, CA	*Monitoring soil water and nutrient flows* Grant Poole, UCCE, Lancaster, CA
2:30 pm	*Minor pests* Mike Rethwisch, UCCE, Blythe, CA	*Sorghum/Sudans, BMRs, and millets* Fred Miller, MMR Genetics, Bryan, Texas	*Wheel traffic in alfalfa* Jerry Schmeirer, UCCE, Colusa, CA	*Quality: impacts on animal performance, economics* Richard Zinn, UC Animal Science, El Centro, CA	*Salt management strategies in forage–grazing systems* Steve Kaffka, UCCE, UC Davis, CA
3:00 pm	BREAK				
3:30 pm	*Summer weed control* - Barry Tickes, University of Arizona, Yuma, AZ	*Bermudagrass and kleingrass* - Juan Guerrero and Herman Meister, UCCE, El Centro, CA	*Water use efficiency in flood irrigation* Blaine Hanson, UCCE, UC Davis, CA	*What is alfalfa quality and will it pay?* Garry Lacefield, University of Kentucky, Princeton, KY	*Cow numbers, nitrate, salt, air, what are the environmental limits?* - Thomas Harter, UCCE, UC Davis, CA
3:50 pm	*Nutsedge control* - Bill McClosky, University of Arizona, Tuscon, AZ	*Timothy and orchardgrass hay* - John Kugler, Washington State University, Euphrata, WA	*Matching ET using Center Pivots* Howard Neibling, University of Idaho, Twin Falls, ID	*Importance of digestibility estimates* Dan Undersander, University of Wisconsin, Madison, WI	*Principles of recycling dairy manures through forage crops* Marsha Matthews, UCCE, Modesto, CA
4:10 pm	*High elevation weed Control* - Rob Wilson, UCCE, Susanville, CA	*Small grain forages* Carol Collar, UCCE, Hanford, CA	*Importance of phosphorus* Rob Mikkelsen, Potash and Phosphate Institute, Davis, CA	*Balancing yield, quality and persistence* Steve Orloff, UCCE, Yreka, CA	*Nitrogen mineralization and its importance in organic waste recycling* - Dave Chrohn, UCCE, UC Riverside, CA
4:30 pm	*Controlling rodents* - Terry Salmon, UCCE, San Diego, CA	*Sorghum/Sudans, BMRs, and millets* Fred Miller, MMR Genetics, Bryan, Texas	*Wheel traffic in alfalfa* Jerry Schmeirer, UCCE, Colusa, CA	*Quality: impacts on animal performance, economics* Richard Zinn, UC Animal Science, El Centro, CA	*Engineering aspects of managing dairy lagoon water* Eric Swenson, Engineering Consultant, Modesto, CA
5:00 pm	ADJOURN				

5:00 - 6:30 VISIT EXHIBITORS AND ENTER DRAWINGS FOR PRIZES (Exhibition Area)
Visit the exhibitor booths and get your ticket stamped. Some prizes will be awarded this evening with the main prize awarded at lunch tomorrow. No-host bar and snacks.

Wednesday, December 15

6:15 - 8:00 AM CALIFORNIA ALFALFA & FORAGE ASSOCIATION BREAKFAST. Visit with fellow growers and find out what is new about your grower organization. (Complimentary, but tickets required, see CAFA booth)

7:00 – 10:00 AM Registration

MAIN SESSION: PRODUCING A QUALITY HAY PRODUCT

8:05 Introductions
8:05 *Spontaneous heating of hay* Wayne Coblentz, University of Arkansas, Fayetteville, AK
8:30 *Measuring moisture in hay* Glenn Shewmaker, University of Idaho, Twin Falls, ID
8:50 *Nitrates and poisonous weeds in hay* Birgit Puschner, Vet Diagnostic Labs, UC Davis, CA
9:15 *Forage quality, testing, and markets: Where are we going?* Dan Putnam, UCCE, UC Davis, CA
9:45 Discussion
10:00 BREAK

SPECIAL SESSION: BIOTECHNOLOGY ADVANCES IN ALFALFA

10:30 *Biotechnology 101 - All you need to know in a few minutes* - Peggy LeMaux, UCCE, UC Berkely, CA
10:55 *Can genetically enhanced traits be detected in milk or meat?* - Jim Cullor, Director VMRC, Tulare, CA
11:20 *Panel Discussion: Is the market ready for biotech alfalfa?* Mark McCaslin, Forage Genetics, Minneapolis, MN; Jeff Plourd, Exporter; El Centro, CA; Rick Staas, SJ Valley Haygrowers, Tracy, CA; Jim Kuhn, California Alfalfa & Forage Association
12:10 BANQUET LUNCH (Entertainment)
1:30 *Roundup-resistant alfalfa results to date* Mick Canevari, UCCE, Stockton, CA
1:55 *Stewardship Issues for Roundup Ready alfalfa* Bob Wilson, University of Nebraska, Ron Vargas, UCCE, Madera, CA
2:15 *Seed production issues for Roundup Ready alfalfa* Shannon Mueller, UCCE, Fresno, CA
2:35 *Identifying GMO alfalfa in the marketplace* - Tim Woodward, Washington State University, Pasco, WA.
3:00 *What's on the horizon for alfalfa & biotech?* Joe Bouton, Noble Institute, Ardmore, OK
3:30 ADJOURN

National Alfalfa Symposium Registration

Name: _____

Company/Ranch: _____

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_____

City, State, Zip: _____

Pre-symposium tour $55 _____ (includes lunch & dinner)

Pre-registration (before 12/1/04) $150 _____ includes admission for both days, 1 copy of proceedings, 2 banquet lunches, refreshments. Banquet lunch guaranteed only with registration before deadline

Late registration (after 12/1/04) $180 _____

Single day registration: Dec 14 $90 _____ Dec 15 $90 _____

Guest lunch ticket: Dec 14 $27 _____ Dec 15 $27 _____

Additional copy of proceedings $12 _____ (1 copy included with reg)

Translation equipment $10 _____ (from English to Spanish)

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Agronomy Notes

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