Imperial AGRICULTURAL BRIEFS

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CONSERVATION TILLAGE FIELD DAY

Herman Meister

A Conservation Tillage Research and Farmer Innovation Conference was recently held at the University of California West Side Research and Extension Center near Five Points, California.

As farming inputs grow more costly, some farmers are looking at conservation tillage (CT) as a way to save time and money. The idea of "conservation tillage" is that fewer trips across field will save on labor and fuel, and reduce the negative impacts on the soil and environment.

Conservation tillage is defined as a farming process that leaves more than 30 percent of the soil surface covered with crop residue. Typical "conventional tillage" systems incorporate most crop residue into the soil. Conservation tillage systems can also be collectively identified as no-till, minimum till, reduced till, zone till, strip till, or ridge till, mulch till and possibly other terms in other parts of the country.

Conservation tillage was used on 35.5 percent (106.2 million acres) of the planted acres in the U.S. last year, leaving 184.3 million acres farmed with conventional tillage. No-till systems increased almost 7 percent in the last two years, breaking the 50 million-acre mark for the first time last year. (Conservation Technology Information Center, West Lafayette, IN.) No-till comprises almost 50% of the CT acreage.

Benefits

Economically, it is reported that CT can reduce labor by 60% and time by 55% by requiring fewer operations to plant and grow the crop. Fuel consumption has been decreased by as much as 82% in some cases. There is less capital investment in machinery and less wear and tear on machinery due to fewer operations across the field.

Agronomically, soil compaction is reduced, organic matter is increased, moisture is conserved with the mulch, and water penetration is increased. These characteristics add up to improved soil tilth and productivity.

Environmentally, crop residues will reduce wind erosion and less tillage trips will result in less dust. Crop residues decrease water erosion resulting in reduced loss of nutrients and pesticides from the fields.

California Status

Despite all these benefits and despite the fact that in the Midwest there has been a 300 % increase in the adoption of CT systems, CT is being used on less than 1 % of California farms. California growers indicate that the primary reason for this is that there is a lack of successful examples of CT systems in irrigated farms in California.

Serious research in California on CT began in the mid 90's, but progress has been slow due to the various crop rotation schemes in California's diversified agriculture as compared to a system of basically corn, cotton, or soybeans in the Midwest. The majority of California's cropland is irrigated due to the arid and semi-arid conditions of the West as compared to the Midwest which is rainfall driven. The irrigation water contains as much as a ton of dissolved salts per acre-foot of water. In order to prevent the build-up of salts, the soil profile needs deep tillage to allow water penetration and leaching of salts.

Another difficulty in our desert area is the retention of organic matter. The high soil temperatures increase biological activity, which metabolizes crop residues in as little as 30 days.

A long-term research project called the "Irrigated Agriculture Conservation Tillage" project is being established at UC Davis in the Sacramento area to study some of these soil-water-plant interactions. Communications are underway to determine if it is feasible to undertake a similar project in the Imperial Valley.

FORAGE OATS

Juan N. Guerrero

Oats (*Avena sativa* L.) have been planted in the irrigated deserts for years as an alternative short-term winter forage. With the new weed-free hay program coming into existence next year, winter oats might be a good candidate for that program. There is not much formal information in California regarding forage oats. Given the dearth of information regarding forage oats in the desert during the winter, the following recommendations will now be presented.

Land preparation

Prepare the ground as for wheat: stubble disk, 2 regular discings, float, list borders, and 125 lb N injected.

Planting

Oats may be planted from early December through the middle of January. As of today, we are expected to have another "El Niño" wet winter, so a planting after Christmas with an expected April harvest, this year, might be a better option. The recommended seeding rate is 75-100 lb/acre.

Varieties

In the irrigated desert, the following varieties have been planted; Kanota, Montezuma, Cayuse, and Swan. In Central Valley variety trials, Swan has yielded the most hay.

Fertility

During the growing season about 160 lb N, water-run, should be applied. Oat hay, like sudangrass hay, may have nitrate accumulation problems. To avoid nitrate problems, no fertilizer should be applied later than the boot stage of growth. The boot stage of growth is when a "bump" may be felt at the stem base. This bump is the flower node.

Harvest

If the oats are cut at the boot stage, the crop may regrow and a second harvest may be possible. Harvesting at the boot stage, however, will result in lower hay yields at a time of year, February/March, when hay drying is quite difficult. If the regrowth occurs during hot weather, which might be possible during April and May, the oats, a cool-season grass, growth might be reduced. Locally, the most accepted stage of growth for the harvesting of oat hay is the soft dough stage. At the soft dough stage of growth, hay quality might be reduced but hay yields are increased. Oat hay is an excellent horse feed. Remember, to qualify the hay as weed-free, the field must be inspected and certified by the local agricultural commissioner's office.

APHIDS AS PESTS OF ALFALFA

Eric T. Natwick

Cowpea aphid, *Aphis craccivora* Koch, the only black aphids on alfalfa, has become a concern among growers for the past several years. Historically, cowpea aphid was an occasional invader of new stands of alfalfa during the fall and winter and occasionally infesting older alfalfa stands, but not causing economic injury. During December of 1998, cowpea aphid built to economically damaging levels on alfalfa in Imperial County, California. During the spring of 1999, cowpea aphid infestations appeared in high and low desert alfalfa growing regions of California and is now reported as an alfalfa pest in several western states.

Cowpea is a small insect (1.4 to 2 mm long), dark to black aphid. Adults are shiny black and immature aphids may be lightly dusted with wax. Colonies start on the growing points of the host plant, but unabated can quickly infest the entire plant. Cowpea aphid has a broad host range with a marked preference for Leguminosae, but is found on plants in several plant families including weed and crop species.

Treatment thresholds have not been established for cowpea aphid on alfalfa. If a rapidly growing population of cowpea aphid threatens an alfalfa field, treatment with an insecticide may be warranted, just as we would treat fields to prevent heavy infestations of blue alfalfa aphid, pea aphid or spotted alfalfa aphid. When alfalfa stands become heavily infested with aphids, an insecticide treatment can prevent yield loss, due to stunting and leaf drop, and quality loss, due to contamination with honeydew and sooty molds.

Honeydew is excrement of sugars, water and amino acids that can foul harvest equipment and supports the growth of sooty molds, lowering alfalfa quality. Cowpea aphid has been observed attacking both forage and seed alfalfa and can be found in low desert alfalfa during both winter and summer months. Aphid parasites, *Lysiphibus* sp. and *Diaraetiella* sp., have been observed attacking cowpea aphids along with numerous aphid predators including bigeyed bugs, damsel bugs, lacewings, lady beetles, and syrphid fly larvae.

Pea aphid, *Acyrthosiphon pisum* (Harris), is a serious pest of alfalfa during the spring months in the low desert. Pea aphid is distinguished from blue alfalfa aphid by lighter antennae with dark bands at each joint. Blue alfalfa aphids have uniformly dark antennae. Pea aphids first appears in December or January but are usually less abundant than blue alfalfa aphid until later in the spring, but pea aphid may persist into early summer as they are more heat tolerant. They are found over most of the plant. Heavy infestations can deposit large quantities of honeydew (a sugary excrement), fouling harvest equipment. Honeydew supports the growth of sooty molds lowering hay quality. Regrowth may be stunted following cuttings with moderate to heavy aphid populations. Several species of predacious bugs and parasitic wasps attack pea aphid. Sample alfalfa fields by taking 5 to 6 stem samples in at least 5 locations per field weekly when aphids appear, then every 2 to 3 days as numbers approach the treatment threshold of 40 to 50 aphids per stem for plants under 10 inches, 70 to 80 per stem for plants 10 to 20 inches tall and more than 100 aphids per stem for plants over 20 inches tall.

Blue alfalfa aphid, *A. kondoi* Shinji, is a serious pest during the winter and spring months in the low desert. Blue alfalfa aphid is distinguished from pea aphid by uniformly dark antennae. Pea aphids have lighter antennae with dark bands at each joint. The blue alfalfa aphid first appears in December or January when it may be more abundant than pea aphid. Both species are common throughout the spring, but pea aphid is more heat tolerant and may persist into early summer. In susceptible alfalfa varieties, blue alfalfa aphid may stunt growth and infested plants have smaller leaves, shorter internodes, leaf curling, yellowing, and leaf drop. Several species of predacious bugs and parasitic wasps attack these aphids. Sample alfalfa fields weekly when aphids appear, then every 2 to 3 days as numbers approach the treatment threshold of 40 to 50 blue alfalfa aphids per stem.

Spotted alfalfa aphid (*Therioaphis maculata*) was introduced into Arizona and California in the 1950's, causing sever damage. A combination of introduced parasites and resistant varieties brought the pest under control, but it still occasionally causes problems if susceptible varieties are grown. Spotted alfalfa aphid is capable of stunting susceptible varieties and high-density infestations deposit honeydew. Since 1996, a few growers in Imperial Valley and Palo Verde Valley have had spotted alfalfa aphid appear in highly resistant alfalfa varieties. The reasons for the appearance of spotted alfalfa aphid in highly resistant varieties are being investigated. There have been few reports of crop loss or need for insecticide application in alfalfa cultivars highly resistant to spotted alfalfa aphid. It is reasonable to believe that cultivars highly resistant spotted alfalfa aphid will continue to keep the pest in check along with the indigenous and introduced natural enemies.

BLACK ROT OF CRUCIFERS

Thomas A. Turini

Black rot is a disease caused by the bacterium *Xanthomonas campestris* pv. *campestris*, which can cause substantial losses on cabbage and cauliflower under warm, humid conditions. Although the growing conditions in the low desert are not optimal for the development of this disease, it can be extremely damaging in some seasons.

Recognition of black rot is important but can be difficult because the character of the symptoms of this disease depends upon the environmental conditions. The initial symptoms appear as wedge shaped chlorotic lesions along the leaf margins. As the lesions age, they dry and turn light brown. Black veins in these dry areas are often seen, although they may not always develop. Black discolored vascular tissue will be obvious in the stems and petioles if systemic

infection has occurred. Under cool conditions, there may be infection without symptom expression. Occasionally, there may be symptoms such as small brown specks or stem dieback.

X. campestris pv. *campestris* is usually introduced into a field on transplants and secondary contamination from equipment. In the literature, it has been reported that the bacteria is also capable of surviving in the soil in plant residues that have not decomposed. Weeds that are relatives of cauliflower or cabbage, such as mustard, wild radish and shepherd's purse, can also be important reservoirs of the bacteria.

The pathogen is spread from plant-to-plant by splashing water from rain or sprinklers. In addition workers or equipment can pick up the bacteria by coming in contact with dew from infected plants. Then the bacteria can be spread when the equipment or the workers come in contact with an uninfected plant.

The best control of this disease is by cultural means. Use pathogen-free seed or transplants. Seed should be tested to determine if it is infested. Hot water can be used to reduce the level of infestation, but the treatment is not 100% effective and may reduce germination. Diseased transplants should be avoided. If the transplants are infected, clipping transplants before planting can result in widespread contamination of the plants.

If the disease is detected in a field or part of the field, avoid moving equipment or personnel from the affected area to an unaffected area.

TIME TO PLANT WHEAT

Herman Meister

Land preparations for planting wheat are well under way. One of the next decisions is choosing which variety to plant. Mike Rethwisch, Farm Advisor in Riverside County, has summarized wheat variety trial results for several years into one easily read chart which is enclosed for your convenience.

Lodging is a major concern in growing premium wheat. Please note that there are some major differences between varieties in their susceptibility to lodging. Also, it appears that the overall percent lodging was greater in the Arizona tests.

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

	Mean Yield in Pounds per Acre					Percent Protein at 12% moisture					Percent Lodging at Harvest				
CULTIVAR	**2001**	**2000**	**1999**	**1998**	**Average**	**2001**	**2000**	**1999**	**1998**	**Average**	**2001**	**2000**	**1999**	**1998**	**Average**
Duraking	8,410	5,060	8,330	8,750	**7,638**	13.0	15.1	12.9	12.3	**13.3**	9	2	2	0	**3.3**
Kronos	8,300	5,260	8,310	8,270	**7,535**	14.3	14.5	14.7	12.9	**14.1**	75	13	15	10	**28.1**
Cortez	8,240	4,610	8,030	8,310	**7,298**	14.2	15.5	14.1	12.9	**14.2**	11	1	2	1	**3.8**
Mohawk	8,030	4,610	7,930	8,600	**7,293**	13.6	15.0	13.5	12.6	**13.7**	81	10	11	12	**28.5**
Orita	8,640	5,140	7,920		7,233	15.2	15.3	13.6		14.7	9	0	0		3.0
Deluxe	8,310	4,990	8,360		7,220	14.2	14.9	13.7		14.3	11	1	0		4.0
Topper	8,630	4,870	8,080		7,193	13.6	14.0	13.3		13.6	15	0	1		5.3
Platinum	7,890	5,030	8,140		7,020	13.6	14.9	13.3		13.9	60	15	2		25.7
Westbred 881	7,620	5,100	7,610	7,750	**7,020**	13.0	15.1	14.5	12.2	**13.7**	45	0	2	1	**12.0**
Tacna	7,560	5,240	7,340	7,590	**6,933**	15.5	15.0	15.2	13.9	**14.9**	25	3	4	1	**8.3**
Crown	8,280	4,540	7,910		6,910	13.6	14.9	14.1		14.2	9	0	0		3.0
Kofa	7,450	4,650	7,810	7,670	**6,895**	14.3	15.4	14.2	13.2	**14.3**	50	7	3	1	**15.3**
Ocotillo	7,650	4,960	not tested	7,400	6,670	14.5	15.5	not tested	14.2	14.7	35	3	not tested	0	12.7
Matt	7,310	4,740	7,940		6,663	14.3	15.0	14.2		14.5	70	13	10		31.0
Ria	7,220	4,490	7,880		6,530	14.1	14.6	13.5	12.6	13.7	70	13	2	22	**26.6**
Trump	not tested	4,820	7790		*6,305*	not tested	14.2	13.4		*13.8*	not tested	4	4		*4.0*
Sky	6,750	4,130	not tested		*5,440*	14.0	14.5	not tested		*14.3*	73	13	not tested		*43.0*

NOTE: Bold numbers in average columns represent 4 years, non-bold numbers are 3 year average, italicized are 2 years

Varieties highlighted in grey have averaged greater than 7,000 lbs./acre, greater than 14% protein, and <20% lodging.

Compiled by Michael Rethwisch (Farm Advisor, UCCE - Riverside County) from UC-Davis Agronomy Progress Reports.
These reports are available at: *http://agric.ucdavis.edu/crops/cereals/cereal.htm*
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UNIVERSITY OF ARIZONA DURUM WHEAT VARIETY TRIAL RESULTS
DATA FROM YUMA COUNTY LOCATIONS (WELLTON, YUMA)

	MEAN YIELDS IN LBS./ACRE					Percent protein at 12% moisture					PERCENT LODGING				
CULTIVAR	**2001**	**2000**	**1999**	**1998**	**Average**	**2001**	**2000**	**1999**	**1998**	**Average**	**2001**	**2000**	**1999**	**1998**	**Average**
Topper	8,073	7,097	8,785		7,985	11.8	13.9	12.9		12.9	55	0	10		21.7
Duraking	8,113	7,460	7,278	7,795	7,662	11.9	14.0	13.9	13.4	13.3	35	20	8	0	15.8
Cortez		6,498	8,331	7,565	7,465		15.9	14.1	14.3	14.8		0	18	3	7.0
Kronos	6,902	7,133	7,605	7,654	7,324	12.6	14.4	14.4	14.5	14.0	75	70	85	48	69.5
Orita	7,392	6,244	8,313		7,316	13.7	16.7	15.5		15.3	33	18	8		19.7
Crown	7,215	6,462	8,149		7,275	11.9	14.9	14.5		13.8	33	20	15		22.7
Platinum	6,765	6,879	7,986		7,210	12.3	14.1	14.0		13.5	75	45	73		64.3
Deluxe	6,847	6,897	7,750		7,165	13.3	15.5	14.9		14.6	78	35	23		45.3
Tacna	6,942	6,743	7,296	7,603	7,146	14.2	16.2	15.6	15.4	15.4	10	35	13	5	15.8
Ria		6,280	7,677	7,386	7,114	12.6	15.0	14.2	13.9	13.9	65	38	50	15	42.0
Ocotillo	6,316	7,043	7,351	6,848	6,890	14.0	15.3	15.0	15.6	15.0	20	53	5	53	32.8
Mohawk	6,180	6,843	7,187	7,270	6,870	12.7	14.5	14.0	13.7	13.7	88	55	73	45	65.3
Matt	6,888	6,171	7,042	6,566	6,667	12.2	15.3	14.5	15.1	14.3	78	65	85	48	69.0
Bravadur	6,521	6,026		7,040	6,529	12.4	15.4		14.6	14.1	70	38		5	37.7
Kofa	5,899	6,770	6,752	6,387	6,452	13.7	14.9	14.8	15.3	14.7	53	35	53	3	36.0

Varieties that have averaged greater than 7,000 lbs./acre of yield, greater than 14% protein and <20% lodging are highlighted in grey.

Data compiled by Michael Rethwisch (Farm Advisor, UCCE- Riverside County) from University of Arizona College of Agriculture Forage and Grain Reports
(November, 2001)

CIMIS REPORT

Khaled M. 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 October 1 to December 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).

The Irrigation Management Unit (IID) provides farmers with a weekly CIMIS update. Farmers interested in receiving the updated CIMIS report on a weekly basis can call the IID at the above number. Please feel free to call us if you need additional weather information. Or check the latest weather data on the worldwide web. Imperial County Weather Stations:
http://www.ipm.ucdavis.edu/calludt.cgi/WXSTATIONLIST?COUNTY=IM
California weather databases: http://www.ipm.ucdavis.edu/WEATHER/weather1.html
CIMIS web page: http://www.cimis.water.ca.gov/

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

Station	October		November		December	
	1-15	16-31	1-15	15-30	1-15	16-31
Calipatria	0.23	0.19	0.14	0.10	0.07	0.07
El Centro (Seeley)	0.23	0.17	0.13	0.09	0.06	0.06
Holtville (Meloland)	0.23	0.18	0.13	0.10	0.06	0.06

* Irrigation Management Unit, Imperial Irrigation District.

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

Keith S. Mayberry
County Director