Imperial AGRICULTURAL BRIEFS

COOPERATIVE EXTENSION
UNIVERSITY OF CALIFORNIA

Features

April 2003

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Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with U.S. Department of Agriculture
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BERMUDAGRASS FORAGE

Juan N. Guerrero

If *long-term* hay and forage production is a goal for any individual grower in the desert valleys of southeastern California, bermudagrass (***Cynodon dactylon***) should be considered. Bermudagrass production already is a long established crop in the Imperial Valley, but *primarily* for seed production *and* if the hay markets are good, for hay production as well. Traditionally common bermudagrass or in some cases "giant" variety have been the cultivars most prevalent locally. Both common and the giant varieties are propagated by seed.

If livestock grazing and hay production (not seed production) are the primary considerations for a particular producer, then there several bermudagrass cultivars that are much more productive than common or giant bermudagrasses.

Coastal Coastal bermudagrass has been grown in the southern US since the 40's. Coastal is much more drought tolerant than common and in numerous studies produces about 6 times more hay than common.

Coastcross Coastcross bermudagrass is a hybrid between Coastal and an African variety. It yields about the same as Coastal but is more digestible than Coastal. Coastcross gives 30 to 40% higher steer weight gains than Coastal.

Tifton 78 Tifton 78 is a hybrid between Tifton 44 and *Callie* bermudagrass. It is immune to bermudagrass rust. It produces about 36% greater steer weight gains per acre than Coastal.

Tifton 85 Tifton 85 was released from the Tifton station in 1993. It has proven to have superior forage characteristics. It is hybrid between an African variety and Tifton 68. It is quite cold tolerant, tall, has wide leaves, and very digestible. Fertilized with copious amounts of N, Tifton 85 produced steer gains of 1.47 lb/d for 6 months.

The following table is a recommendation from the USDA-ARS from Tifton, GA regarding their bermudagrass research.

Our choice	hybrid	winter survival	gain/ac grazed	digestibility	protein	rust
1	Tifton 85	3.5	147%	1	1	0
2	Tifton 78	3.5	136%	2	2	0
3	Tifton 44	1	119%	4	3	0
4	Coastal	3	100%	6	3	0
5	Callie	9	118%	2	2	9
6	Coastcross	9	140%	1	1	0

Source: USDA-ARS, Tifton, GA.
Ratings: 1=best, 9=poorest, 0=no rust and no seed

Except for Callie bermudagrass, all of the above varieties produce no seed and must be planted by sprigs. There are bermudagrass sprig diggers and planters in the Imperial Valley. Bermudagrass is a salt tolerant crop and can grow on heavy ground. For a long-term pasture or for long-term hay production, bermudagrass hay is a viable option. After the initial established costs have been amortized, the annual costs of permanent bermudagrass consist of fertilizer, water, and baling costs; a cheap crop to grow. For horse pastures, bermudagrass is an excellent choice. For those wishing to background cattle during the summer, prior to a feedlot finish, improved bermudagrass pasture is also a good choice.

ROUNDUP-READY ALFALFA

Herman Meister

Roundup-Ready alfalfa is closer to becoming a reality with an anticipated release of a few varieties as early as 2004. Monsanto has contracted to have Forage Genetics manage the seed increases for companies who wish to participate in the herbicide tolerant program. Some issues still need to be worked out with some foreign countries concerning the acceptance of genetically modified (GM) hay.

Roundup-Ready alfalfa is being perceived by some farmers to be the answer to weed control problems in hay. It will definitely help us control some problem weeds such as annual sowthistle and sprangle top. I perceive it as another tool to supplement weed control strategies already in place. Higher rates of Roundup will be necessary to control some weeds like malva and knotweed. Pursuit and Raptor perform well on malva, but these herbicides have moderate to long plant-back restrictions. Crop rotation situations favor the use of Roundup-Ready alfalfa the last year of production.

Each farmer will have to evaluate his own fields in lieu of weed history before planting a GM alfalfa variety to determine if it is an economic viability. Application costs, technology fees, and drift hazard will have to be considered. The location of the field in relation to the probability of a high value produce crop being planted adjacent to Roundup-Ready alfalfa is a consideration.

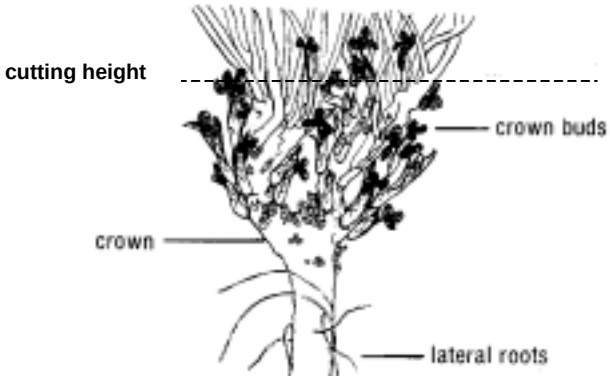
The subject of pollen transfer is an issue when Roundup-Ready alfalfa hay fields have bloom next to non-Roundup-Ready alfalfa seed fields. Every attempt will be made to encourage farmers to cut the alfalfa before bloom develops in any case. For seed made on Roundup-Ready varieties, there will be some hay-to-seed distance requirements to provide adequate isolation. Volunteer alfalfa along edges of fields and roads can also act as a "bridge" to transfer pollen to non-Roundup Ready varieties. Also the IPM technique of "strip cutting" alfalfa will have implications involving pollen transfer depending on the situation.

The other long-term issue is resistance of weeds to Roundup due to the increased use of the product on a wide spectrum of weeds several times a year. This is another reason that Roundup-Ready alfalfa should be considered as another tool in the arsenal to control weeds and not a panacea for all our weed problems.

ALFALFA CUTTING HEIGHT

Herman Meister

Recommendations regarding cutting height of alfalfa are designed to maximize yield while maintaining high forage quality and stand longevity. Imperial Valley hay growers generally cut hay around the 2-3 inch height depending on the time of year.



Alfalfa Yield

Some research indicates that dry matter yields are higher for shorter cutting heights as compared to leaving taller stubble (Sheaffer, C., G. Lacefield, and Vern L Marble, 1988). Obtaining higher yields with shorter cutting heights requires that the plants are healthy and that the carbohydrate root reserves are adequate for successful plant re-growth.

Alfalfa Quality

One of the reasons for leaving taller stubble is to improve the quality of the forage harvested. The lowest sections of the plant are typically higher in fiber and have fewer leaves. By eliminating the high fiber basal stem sections, the quality of the forage may be increased and some yield may be sacrificed.

Crown Development is the Key

Studies have shown that "crown" buds contribute more to yield than do "axillary" buds. Early alfalfa growth is primarily from crown buds. This development depends on temperature and

available root energy reserves. Crown development will vary due to variety, age, and nutrition. A good practice is to set the cutting height just above the majority of the crowns in your field. This will insure optimum yields and preserve the stand life. A cutting height of 3 inches resulted in prolonged stand life compared to a 1 inch cutting height in an Arizona study.

KEYS TO UNDERSTANDING ORGANIC FERTILIZERS AND AMENDMENTS

Keith S. Mayberry

The term "organic" refers to whether the material is carbon based or not. Most organic products are derived from plant or animal materials and they include manures, plant residues, marine derived organic products, harvesting and processing residues, sewage sludge, green manures, and wood derived products.

The effect of a product on plant growth determines whether to classify a product as an amendment or a fertilizer. If the product improves the supply of available nutrients in the soil then it is classified as fertilizer. If the product improves plant growth indirectly such as by improving soil tilth or water penetration, then the product is classifieds as an amendment. If composted leaves (an amendment) are compared with ammonium nitrate (a fertilizer), the difference is clear-cut. However it is more difficult to categorize steer manure as it easily fits into both categories.

In general, organic matter is beneficial to soils. In some California soils, organic matter may be as much as 1-2.5% of the soil weight. However, in the low desert of Southern California the organic fraction is rarely over 0.5% except immediately after crop residues are incorporated or if organic products such as animal manure is applied. The intense heat in the low desert drives the soil microorganism activity to a rapid pace and the organic material is decomposed in short order. Only materials resistant to decomposition remain. That is not to say there were not significant benefits derived from the organic material as the microbial by-products of decomposition help to stabilize soil aggregates, improve water penetration, perhaps suppress disease organisms, and to release nutrients for plant growth.

There are a few misconceptions that arise from breaking down crop residue. First, if the residue has roughly 1½ percent nitrogen or more, then adding more nitrogen fertilizer will not speed up decomposition. There are some studies that suggest that too much nitrogen fertilizer even delays residue decomposition. There is an old adage that holds true today; feed the crop and not the soil. This means save the fertilizer dollars until there is an actual crop to be grown.

If crop residue may be a problem in the following crop, then the best method of speeding decomposition is to cut the residue into the smallest pieces possible. This provides maximum surface area for the soil microbes to work. Secondly, keep the soil moist but not saturated nor dry during the period of decomposition. Decomposers will not operate in dry soil.

Steer manure applications on fields were once a common practice. This activity seems to be waning in recent years. Steer manure can be a very beneficial tool when it is applied to heavy clay soils. Some old time farmers worked magic on silty clay soils by applying yearly applications of 15 tons of steer manure per acre during the summer for soil reclamation. The manure improved water penetration, reduced salinity, and added soil nutrients, especially phosphorus. Within a few years, the soils responded and produced excellent crops of head lettuce, carrots and sweet corn. Once the practice of manuring was abandoned, the same fields seem to have reverted to becoming marginal for the production of any crop. If the land is own or rented for long term then the practice of manuring is a good one.

For more information on use and benefits of organic fertilizers and amendments order the publication cited below. This is an excellent reference bulletin for farmers and fertilizer personnel.

Organic Soil Amendments and Fertilizers

Addresses the benefits and value of organic matter, and describes several common organic materials. Includes a glossary of important technical and legal terms and concepts.

Product Code: 21505 1992 $5.00 available at http://anrcatalog.ucdavis.edu or get an order catalog at our office.

EFFICACY OF SELECTED INSECTICIDES AGAINST WESTERN FLOWER THRIPS IN A 2002 COTTON TRIAL

Eric T. Natwick

A thrips insecticide efficacy research trial was conducted at the beginning of the 2002 cotton growing season at the University of California Desert Research and Extension Center in Imperial Valley, CA. A stand of cotton, variety DPL 5415, was established on March 20, 2002. The insecticide treatments and untreated controls were replicated four times in randomized complete design. Plots measured 15 m long and 4 m wide. Insecticide treatments, by trade name, and treatment rates are listed in Table 1. All insecticide treatments were applied with a Lee Spider Spray Trac Tractor 4-row sprayer with three nozzles per row on April 22, 2002.

Western flower thrips, *Frankliniella occidentalis*, were sampled by counting adults and nymphs on ten plants at random in each plot. Thrips adults and nymphs were counted on April 17, 23, 25, 29, May 2, and 6, 2002. Data for thrips, adults and nymphs, were analyzed using analysis of variance for randomized complete block design. Least significant difference was employed for means separations.

The adult thrips mean for the untreated control was significantly greater (P # 0.05) than the adult seasonal means for all insecticide treatments one day after treatment (DAT), Table 1. Orthene 97 had an adult thrips mean that was significantly less than all other insecticide treatments except Actara 25 WG, Provado 1.6F and Vydate CLV at 0.75 lb (AI)/acre 3-DAT. Seven DAT only Actara 25 WG, Vydate CLV at 0.25 lb (AI)/acre, Vydate CLV at 0.75 lb (AI)/acre, and Orthene 97 had significantly fewer adult thrips than the untreated control. Actara 25 WG, Vydate CLV at 0.50 lb (AI)/acre, Vydate CLV at 0.75 lb (AI)/acre, and Orthene 97 all had significantly fewer adult thrips than the untreated control 10-DAT. There were no significant differences among the untreated control and the insecticide treatments 14-DAT.

The untreated control mean for thrips nymphs was significantly greater (P # 0.05) than the means for all insecticide treatments 1-DAT, 3-DAT and 14-DAT, Table 2. The untreated control mean for thrips nymphs was significantly greater than the means for all insecticide treatments except for the Assail® 70 WP Calypso treatments 7-DAT. The thrips nymphs mean for the untreated control was significantly greater than the means for all insecticide treatments except for the Assail® 70 WP 10-DAT.

Although all insecticide treatments provided some thrips control, the Orthene97 at 0.50 lb (AI)/acre and the Vydate CLV at 0.75 lb (AI)/acre provided the highest levels of thrips control and the most consistent residual thrips control.

Mention of trade name, proprietary product, or specific equipment does not constitute a guarantee or warranty by the University of California nor does it imply approval to the exclusion of other products that may be suitable. Some products mentioned in this report are not currently available for use on cotton. Obtain a current label and necessary permits for insecticides prior to application. Read and follow all label directions.

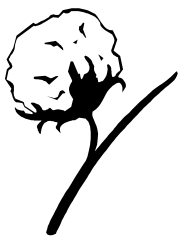


Table 1. Adult Thrips per Ten Cotton Plants Holtville, CA, 2002.[w]

Treatment	lb ai/a	4-DPT[x]	1-DAT[y]	3-DAT	7-DAT	10-DAT	14-DAT	PTM[z]
Control	--------	7.8 a	13.8 a	14.8 a	13.3 a	11.5 a	3.0 a	11.3 a
Assail 70 WP	0.05	8.3 a	4.0 b	6.0 bcd	12.5 ab	8.3 abc	1.5 a	6.5 bc
Calypso	0.094	13.0 a	5.5 b	9.8 ab	10.0 abc	5.3 bcd	3.3 a	6.8 b
Actara 25 WG	0.06	7.5 a	6.3 b	6.3 bcd	5.5 c	3.8 cd	4.0 a	5.2 bcd
Provado 1.6 F	0.05	9.8 a	2.5 b	5.3 bcd	8.0 abc	4.8 bcd	2.0 a	4.5 cd
Vydate CLV	0.25	11.5 a	5.5 b	8.5 bc	5.5 c	9.0 ab	5.0 a	6.7 bc
Vydate CLV	0.50	8.0 a	4.8 b	7.8 bc	8.0 abc	5.0 bcd	3.5 a	5.8 bcd
Vydate CLV	0.75	12.3 a	2.5 b	3.5 cd	4.8 c	5.0 bcd	3.3 a	3.8 d
Orthene 97	0.50	8.0 a	4.0 b	1.8 d	7.3 bc	3.5 d	2.8 a	3.9 d

[w] Mean separations within columns by Least Significant Difference; $P < 0.05$. [x] Days prior to treatment. [y] Days after treatment. [z] Post treatment mean.

Table 2. Thrips Nymphs per Ten Cotton Plants, Holtville, CA, 2001.[w]

Treatment	lb ai/a	4-DPT[x]	1-DAT[y]	3-DAT	7-DAT	10-DAT	14-DAT	PTM[z]
Control	--------	11.3 a	12.3 a	13.0 a	12.8 a	13.5 a	10.0 a	12.3 a
Assail 70 WP	0.05	7.0 a	0.0 b	4.0 bc	9.3 ab	8.3 ab	5.0 bc	5.3 b
Calypso	0.094	11.5 a	1.8 b	2.3 cd	7.8 ab	6.8 bc	3.5 c	4.4 bc
Actara 25 WG	0.06	6.5 a	1.8 b	2.8 cd	2.0 c	3.8 bc	8.3 ab	3.7 bcd
Provado 1.6 F	0.05	5.0 a	1.5 b	2.8 cd	6.0 bc	5.8 bc	2.8 c	3.8 bcd
Vydate CLV	0.25	4.5 a	1.5 b	7.3 b	6.3 bc	2.8 bc	4.8 bc	4.5 bc
Vydate CLV	0.50	5.3 a	0.8 b	2.0 cd	2.5 c	7.0 bc	5.3 bc	3.5 bcd
Vydate CLV	0.75	14.5 a	1.8 b	2.3 cd	2.5 c	2.0 bc	4.8 bc	2.6 cd
Orthene 97	0.50	5.5 a	1.3 b	0.5 d	5.5 bc	1.3 c	2.5 c	2.2 d

[w] Mean separations within columns by Least Significant Difference; $P < 0.05$. [x] Days prior to treatment. [y] Days after treatment. [z] Post treatment mean

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LESSEN THE LIKELIHOOD OF FUNGICIDE RESISTANCE PROBLEMS

Thomas A. Turini

When a fungicide is used, fungi resistant to the applied material survive at a higher rate than sensitive individuals. This results in the increase of resistance in the fungal population to subsequent applications of materials with the same mode of action.

The likelihood that a fungus will become resistant to a material partially depends upon the mode of action of the fungicide. Fungicides with a single-site mode of action kill by interfering with a single biological process. Some fungi within a population may have a slightly different biology that allows them to survive exposure to a fungicide with single-site mode of action. Multiple-site fungicides disrupt many processes that are essential to the survival of a fungus. Therefore, it is unlikely that an individual plant will be resistant to a multiple-site fungicide. The mode of action and risk of resistance of selected fungicides are presented in Table 1.

Other factors that influence chances fungicide resistance development includes the period of time the fungal population is exposed to the material and the number of fungi exposed. A fungicide that is applied several times during a season is much more likely to have resistance problems than a fungicide applied once. The larger the population exposed to a fungicide the greater the chance of resistance development. Therefore, fungal pathogens with high rates of reproduction are most likely to develop fungicide resistance. In addition, applying fungicides after the target is widespread in the field exposes a larger population to the material.

Fungicide use patterns can help prevent resistance development. Use fungicides protectively. When the fungicide is on the crop before the disease is widespread, fewer individuals are exposed to the material than if the material is applied to field in which the disease is already severe. Use a tank mix with materials that have a low resistance potential. When multiple applications are necessary, alternate fungicides with different modes of action.

Cultural practices that may help reduce fungicide resistance include using disease resistant varieties, maintaining proper soil fertility, avoiding sites with high disease pressure and rotating crops.

Failure of a fungicide application to control the disease does not necessarily indicate resistance is a problem. Other factors such as improper timing, poor coverage, insufficient rate and low effectiveness of the material can also cause poor disease control. However, many of our fungicides are at risk and careful attention to failures of applications is justified.

Table 1. Properties of selected fungicides.

Class	**Mode of Action (MOA)**	**Single-Site MOA**	**Trade Names of Compound(s)**	**Systemic Activity**	**Resistance Potential**
Benzimidazole	Interferes with the synthesis of DNA	Yes	Benlate, Topsin	Yes	High
Dicarboximide	Inhibits spore germination and fungal growth	No?	*Ronilan, Rovral*	Yes	Moderate
Carbamates	Inactivates enzymes probably inhibiting respiration	No	*Dithane, Maneb, Thiram*	No	Low
Inorganic - Sulfur	Inhibits respiration and forms H2S, which is toxic to most cellular proteins	No	*Various*	No	Low
Isophthalonitrile	Affects various enzymes and metabolic processes	No	*Bravo*	No	Low
Phenylamide	Interferes with RNA polymerase template complex	Yes	Ridomil Gold	Yes	High
Strobilurin	Disrupts electron transport in the mitochondria	Yes	*Cabrio, Flint, Quadris*	Yes	High
Triazole	Inhibits sterol production	Yes	*Bayleton, Folicur, Rally*	Yes	High
Imidazole	Inhibits sterol production	Yes	*Procure*	Yes	High

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 April 1 to June 30 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	April		May		June	
	1-15	16-30	1-15	15-31	1-15	16-30
Calipatria	0.26	0.29	0.32	0.36	0.39	0.40
El Centro (Seeley)	0.24	0.28	0.31	0.34	0.36	0.38
Holtville (Meloland)	0.25	0.28	0.32	0.35	0.38	0.39

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