CT-SJ-03-3

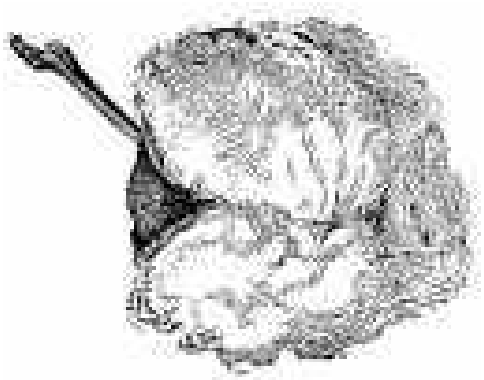
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2003

SAMPLE COSTS TO PRODUCE

COTTON

TRANSGENIC HERBICIDE-RESISTANT ACALA VARIETY



SAN JOAQUIN VALLEY

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COST TO PRODUCE COTTON - TRANSGENIC HERBICIDE-RESISTANT ACALA VARIETY SAN JOAQUIN VALLEY - 2003

CONTENTS

INTRODUCTION

Sample costs for Transgenic Herbicide-Resistant Acala cotton production in the San Joaquin Valley (SJV) are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production procedures considered typical for growing conditions in the San Joaquin Valley region. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices used in this study may not be applicable to your situation. A blank *Your Cost* column is provided to enter your actual costs on Tables 1 and 2.

For an explanation of calculations used for the study refer to the Assumptions or call the Department of Agricultural and Resource Economics, University of California- Davis, (530) 752-3589 or the UC Farm Advisor in the county of interest**.**

Sample cost and return studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis. Current studies can be downloaded from the department website at http://coststudies.ucdavis.edu or obtained from selected county UC Cooperative Extension offices.

University of California and United States Department of Agriculture, Federal Crop Insurance Program Cooperating

ASSUMPTIONS

The following assumptions give background information relevant to the values shown in Tables 1 to 6 and pertain to sample costs for producing Transgenic Herbicide-Resistant Acala cotton in the San Joaquin Valley region. This study also assumes the grower will partially participate in the government crop programs under the Farm Security and Rural Investment Act of 2002. **The costs figures are based on typical cultural practices for 38 and 40-inch rows used by farmers in the San Joaquin Valley and are not University of California recommendations. The specific costs shown are for the herbicide-resistant variety with resistance to the herbicide glyphosate, but similar production costs and returns are likely to apply to the other herbicide-resistant (Buctril resistance) transgenic Acala variety also available in 2003.** Some farming practices described may not be used during every production year or on every farm, while some operations not described may be needed. *The use of trade names in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products.*

Land. The farm consists of 1,500 acres of non-contiguous land, which includes 750 acres rented and planted to cotton - 375 to transgenic Acala and 375 to regular Acala. The remaining acres are planted to other field and row crops including processing tomatoes, corn, wheat, alfalfa, barley, onions, garlic, carrots, lettuce and broccoli. Land rental costs are described in the "Cash Overhead Costs" section of the text and tables. The owner manages the farm.

Production Operating Costs

Tables 1-3 show the costs associated with ground preparation, planting, growing, and harvesting cotton. Land preparation is done from October to March and the crop is harvested in October and November. The crop year in this study is November to November.

Land Preparation. The ground is ripped or subsoiled in two passes, 2 to 3 feet deep, to break up compaction, which affects root penetration and water infiltration. In this study subsoiling is done once every three years and one-third of the cost is allocated to the crop each year. The ground is then disced twice with a stubble disc to break up large clods and smooth the surface. The ground is again disced twice with a finish disc (offset disc) - once while applying an herbicide and once to further incorporate the herbicide and smooth the surface. Afterwards the beds are listed.

Planting. A transgenic, herbicide-resistant Acala cotton variety is seeded at an average rate of 15.0 pounds per acre during April. Cotton is planted using a six-row planter on 38 or 40-inch beds. Seed populations range from a low of about 30,000 to as much as 85,000 plants per acre. Yields are generally not significantly affected by plant populations ranging from about 30,000 to 60,000 plants per acre, but average final plant population targets for most growers and varieties are generally in the 35,000 to 50,000 plants per acre range in most parts of the SJV when on 38 or 40-inch row spacing. Seed costs for transgenic, herbicide-resistant cotton include a technology fee. Technology fees may vary with the transgenic trait (in this case, resistance to the herbicide glyphosate versus the herbicide Buctril), the company controlling the trait, and the perceived value to the producer that the company supplying the trait associates with the transgenic trait or traits. The current technology fee for the transgenic variety with resistance to the herbicide glyphosate, in an approved Acala variety is $54 per 50 pounds or about $1.08 per pound of seed. This amount may change with the resistance trait (in this case, glyphosate resistance or Buctril resistance) and with decisions made by the company controlling the transgenic trait. This amount is in addition to the amount charged for the basic seed and seed treatments. The seed cost includes the San Joaquin Valley Cotton Board assessment. (See Assessment Section).

Irrigation. In this study a water cost of $60 per acre-foot is used. Grower applied water ranges from 2.0 to 3.5 acre feet based upon soil type, irrigation method, water application uniformity, crop rooting depth in some soils, evaporation, and runoff. Based on current information it is estimated that 2.5 acre-feet of water is applied during the growing season for cotton in this region, though this amount is dependent upon soil and climatic factors. Water cost for irrigation represents a combination of district water and pumped water. Price per acre-foot for water will vary by grower depending on the irrigation district and its limits on available water, and energy costs for running irrigation wells where groundwater is available as a backup water supply. Water costs depending on irrigation district or pumping variables can range from $20 per acre-foot to over $140 per acre-foot for late season irrigation in water-short districts.

In this example, the rented land has an irrigation system adequate to irrigate the total cotton acreage. The irrigation system cost, since this is rented land for cotton production, is included as part of the land rental cost, which is under the category described as "Cash Overhead Costs". A ditch-based furrow irrigation system is assumed for this example.

Fertilization. Nitrogen is the primary nutrient applied to cotton throughout the growing season. UN-32 (32-0-0) is sidedressed at a rate of 150 pounds of N per acre during the month of May. A fertilizer applicator is rented from the supplying fertilizer dealer to sidedress the N. Thirty pounds of N as UN-32 is water run in July. The labor cost for applying the water run N is included in the irrigations costs. A foliar application of potassium nitrate (13-0-45) at 1.3 pounds of N per acre is mixed with the growth regulator and applied in late-June or July. The desirability of this foliar nutrient application is largely dependent upon the yield potential of the plant and relative plant vigor (i.e. the better the yield potential on the plant, or the lower the plant vigor, the more likely that a favorable, cost-effective response will be obtained with the foliar nutrient application).

Cotton is very responsive to nitrogen, but excessive applications can cause rank or vegetative growth and lead to increased pest problems, poor defoliation, lower yields, and nitrate leaching. If the crop rotation included heavily-fertilized vegetable crops or alfalfa, or if dairy waste or manure applications are common practices on individual fields, residual soil nitrogen and even potassium may be high. These situations would then present an opportunity to reduce input costs and lower applied nitrogen, resulting in fewer problems with excessive growth and leaching losses.

Pest Management. The pesticides, rates, and cultural practices mentioned in this cost study are listed in the *UC IPM Pest Management Guidelines - Cotton.* **Pesticides mentioned in this study are not recommendations, but those commonly used in the region.** For information and pesticide use permits, contact the local county Agricultural Commissioner's office. For information on other pesticides available, pest identification, monitoring, and management, visit the UC IPM website at www.ipm.ucdavis.edu. **Pest control costs can vary considerably each year depending upon local conditions and pests in any given year. Ranges can be as dramatic as $50 per acre for one year and $200 the next.**

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition the PCA or Agronomist consultant will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. In this study, a fee is allocated for a PCA.

Insects. Some transgenic varieties incorporate resistance to insect pests, and such traits will impact insect management options and costs. The transgenic varieties represented in this cost study, however, are transgenic only in resistance to the herbicide glyphosate (another herbicide-resistant variety is available with

resistance to Buctril herbicide), so this would be expected to have little or no impact on insect or mite management practices or control costs. In future years, varieties which incorporate several transgenic traits such as insect and herbicide resistance will become available, and this will change the discussion.

In this study, pest management is for mites, aphids, and lygus. An aerial application of Zephyr is made in May for mite control, Warrior insecticide in June for lygus control, and Provado insecticide in July for aphid control. Monitoring of insect populations is necessary to determine if and when to treat the crop.

Lygus bugs feed on the squares (flower buds) and small fruit (bolls). Damaged squares will usually drop off while damaged bolls at a minimum may have stained lint and damaged seeds, or can be lost if damaged when bolls are less than 10 to 12 days of age past the flowering date. In cases where there are repeated or sustained infestations of lygus bugs, it is not uncommon for growers to need more than the assumed one insecticide application for lygus control.

Aphids cause physical damage to the leaves and/or contaminate the lint with their honeydew production. Also, their feeding may reduce the carbohydrates needed for boll maturation, resulting in yield loss. Mites feeding on the leaves reduce plant vigor and result in extensive defoliation.

Cost estimates do not include insecticide applications for beet armyworm control. In some years and/or locations, beet armyworm can develop into populations capable of causing significant yield reductions. Their control may be an additional expense.

Cost estimates also do not include control measures for silverleaf whitefly, which can be a major late-season pest in parts of the southern and even central San Joaquin Valley. Silverleaf whitefly has the potential to cause sticky cotton and reduce the value of cotton lint (fiber). Insect growth regulators and insecticides are available to aid in control, but costs are highly variable by location and timing of infestations, choice of control measures and number of applications required. Similarly, if aphid problems continue into the late-season when bolls open and cotton lint is exposed to aphid honeydew, another insecticide application in addition to the assumed one application may be required to prevent sticky cotton.

Weeds. In late fall or spring (November in this study), a pre-emergent herbicide (Treflan) is applied and incorporated by discing prior to planting, but this operation may be eliminated in many cases. This application will control many early season annual broadleaves and grasses. An "over-the-top" herbicide, Roundup (up to 5th leaf stage) or Buctril, depending upon transgenic variety, is sprayed in May. A post-directed herbicide/layby treatment (Roundup or Buctril) is made in June. The field is cultivated three times, using rolling cultivators. The first cultivation is done prior to planting in March and two are done during the May/June period. Hand hoeing, which is done in June with normal cotton is often eliminated here, therefore it is not included as a cost. Genetically engineered herbicide tolerant cotton varieties with tolerance to glyphosate (Roundup) and bromoxynil (Buctril) provide the grower with an additional management option for weed control. The value in use of an herbicide tolerant variety will depend upon a number of factors including weed species, susceptibility of the dominant weed species in the field to the specific herbicides used, weed density, and cost of alternative herbicides.

Weed management options differ if a conventional cotton variety is planted. Some of the cultural practice assumptions, herbicide materials used, and differences in production cost estimates are shown in the separate cost study entitled "*2003 Sample Costs to Produce Cotton - Acala, 40-Inch Row*".

Growth Regulator & Defoliation. A plant growth regulator (mepiquat chloride, also known as "Pix" or other trade names) is applied near first bloom in combination with the foliar nutrients (nitrogen and potassium) in late-June or July.

Harvest aid chemicals, often also called by the group name "defoliants" are applied in September and/or October. Typical harvest aid applications include two application timings, with materials such as Prep and Ginstar applied in the first application, and a second application 14 days or more later with materials such as Defol and Gramoxone Max. The growth regulator and defoliants are applied by air.

Plant growth regulators control excessive vegetative growth and promote a balance between vegetative and reproductive growth. This results in a more uniform boll set for once over harvesting. Defoliants are applied prior to picking to aid harvest by causing the leaves to drop. Defoliation is essential for efficient mechanical picking. It reduces the amount of trash collected with the cotton, and reduces staining of the lint.

Harvest. The farm in this study owns two four-row cotton harvesters and two module builders. The cotton is dumped from the harvester directly into the module builder that presses loose seed cotton into a dense and economical unit for transportation to the gin. A tractor and tractor driver monitor each module. Two laborers maintain the area - cleaning cotton off the ground, placing a tarp on the finished module, etc. - during the harvest operations.

Custom pickers charges range around $85 per acre for picking and building the module. Growers may choose to own cotton pickers and module builders, purchased either new or used, or hire a custom harvester to perform the harvest. Many factors are important in deciding which harvesting option a grower uses. These factors and appropriate method of analysis are discussed by Blank et al, (1992). Though the report specifically addresses hay harvesting, the same principles and methodology can be used with cotton harvesting.

Yields. The crop yield used in this study is based on an assumed yield of 1,250 pounds of lint and 2,222 pounds of seed per acre for San Joaquin Valley Acala cotton. A very wide range of yields is possible in this production area, depending upon weather and soil conditions, quality of water and nutrient management practices and relative losses due to weed and insect pests. Returns for various lint yields, government support program, and prices are shown in Table 6.

Returns. An estimated price of a $0.70 per pound of lint based on returns over the last five years and the current market is used to calculate returns above several levels of cost. Some cooperative cotton gins pay growers $5 to $25 per bale for seed credits above grower ginning costs. Table 6 indicates the effects on varying grower returns over a range of yields. In this study, every cotton acre is assumed to be covered by program payments. In reality, however, maximum payment limitations may leave some acres uncovered, which will reduce income.

Revenue from federal government programs. A typical cotton farm may receive revenue from three major payment programs under the Farm Security and Rural Investment Act of 2002 (FSRI).

Direct Payments in the FSRI Act pay a predetermined amount per unit of established crop-specific farm program base, but do not require growing the program crop or any other crop. Since these payments are essentially unrelated to cotton production itself, this revenue is not appropriately associated with costs and is not included in the "cotton" revenue in Table 2.

Counter-Cyclical Payment program payments are designed to payout the difference between the legislated target price for the commodity and the national average market price for that marketing year.

However, as with the direct payment program, these counter-cyclical payments are made on the basis of historical base and do not require any program crop production. Therefore it is inappropriate to associate these payments with the production of cotton and they are not included in the "cotton" revenue presented in Table 2**.**

Marketing Loan and Loan Deficiency Payment programs make payments to farmers equal to the difference between the loan rate and the loan repayment rate for each pound of cotton received. Because these payments are tied directly to cotton production, they are included as a part of the revenue from cotton farming in Table 2. The loan rate for cotton is scheduled to be $0.52 per pound for the next six years. The loan program in essence pays the grower the difference between this loan rate and the applicable adjusted world price (AWP), which currently is fluctuating around $0.37. Based on past price relationships, the assumed cotton price of $0.70 used for the analysis below is consistent with a marketing loan benefit of about $0.15 per pound. The grower receives the benefit, regardless of the price he receives for his cotton. Therefore, for the hypothetical farm in this study the revenue is $.85 per pound of production.

Transportation. Transportation costs are based on roundtrip distances from the field to the gin. Most gins within a close radius of the field do not charge because the cost is included in the ginning fee. Longer hauls (over 40 miles round trip) will have a hauling charge. Hauling companies may also have a surcharge for modules less than a minimum weight.

Ginning. Commercial cotton gins normally keep cottonseed and give growers a credit to cover ginning and transportation costs so most growers do not see a ginning charge. In this study, ginning fees are covered by the seed credit and are not included as a line-item cost. Some gins especially cooperatives may return to the grower a net difference of $5 to $25 per bale between the seed value and ginning costs

Cotton gins charge growers for compressing lint into universal density (UD) bales for shipping. In this study a fee of $7.00 per bale is charged which includes hydraulic compressing, a sample for the merchant, and a loading charge. Some ginners also charge a $1 invoicing fee, but the fee is not included in this study.

Assessments. Most assessments are collected by the gin or handler and deducted from the growers' gross returns. Both mandatory and voluntary assessments are discussed below.

USDA-HVI. The USDA levies a fee for High Volume Instrumentation (HVI) classing. This determines the marketing classification cotton grade. Growers are mandated with a $1.55 per bale fee.

Cotton Incorporated. Cotton Incorporated was created by a federal marketing order and is overseen by the Cotton Board. Cotton Inc. provides funds for industry research and promotion and currently requires growers to pay $1.00 per bale plus a supplemental 0.5% lint assessment on the current gross value lint returns per bale. The supplemental assessment in this study is $1.75 per bale ($0.70 x .005 x 500 lb bale).

Pink Bollworm Project. The California State Department of Food and Agriculture (CDFA) manages and enforces the Pink Bollworm Project. This program, which through detection and legislated postharvest practices, controls pink bollworm in the San Joaquin Valley and other cotton growing districts in the state. The Pink Bollworm Project maintains several control districts to administer the program. Under the project growers are assessed a fee only if cotton is ginned within a project district. CDFA has a current charge of $2.00 per bale.

National Cotton Council. The National Cotton Council, a voluntary organization, collects an assessment to provide lobbying, advocacy, and public relations for the cotton industry at the national level. The current assessment rate paid by growers is $0.45 per bale.

California Cotton Growers And Ginners Association. The California Cotton Growers And Ginners Association assists California cotton growers in advocating their position in the legislature. The growers are charged $0.15 per bale and the ginners are charged $0.15 per bale. Participation in this organization is voluntary.

San Joaquin Valley Cotton Board. The board reviews test program data and approves variety releases. Most of the money goes to the University of California for variety evaluation. The assessment is added to the seed price. The current assessment paid by the grower is $3.75 per planting seed hundredweight. Revenue collected by the board in 2001 averaged $0.85 per producing acre.

Pickup. Two pickups – one-half ton and three-quarter ton – are used on the ranch. It is assumed that each pickup travels 4,998 miles each year for total ranch use.

Labor. Basic hourly wages for workers are $9.51 per hour for machine operators and $8.23 per hour for non-machine workers. Adding 34% for the employers share of federal and state payroll taxes and other benefits raises the total labor costs to $12.74 per hour for machine operators and $11.02 per hour non-machine labor. The labor for operations involving machinery is 20% higher than the operation time to account for the additional time involved in equipment set up, moving, maintenance and repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are $1.11 and $1.58 per gallon, respectively. The cost includes a 2.25% sales tax (effective September 2001) on diesel duel and 7.25% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 1 is determined by multiplying the total hourly operating cost in Table 5 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash production costs and is calculated monthly until harvest at a nominal rate of 7.14% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

Risk. The risks associated with crop production should not be minimized. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect the profitability and economic viability.

Cash Overhead Costs

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, equipment repairs, and management.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.676% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs $1,246 for the entire farm.

Office Expense. Office and business expenses are estimated at $30 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop, and office utilities, and miscellaneous administrative charges.

Land Rent. The land is rented on a cash basis for $125 per acre. The agreement includes the use of the irrigation system on the property.

Investment Repairs. Annual maintenance is calculated as 2% of the purchase price.

Non-Cash Overhead Costs

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is ((Purchase Price - Salvage Value) x Capital Recovery Factor) + (Salvage Value x Interest Rate).

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE, by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for equipment and investments are shown in Table 5.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table that corresponds to the interest rate used and the life of the machine.

Interest Rate. The interest rate of 6.25% used to calculate capital recovery cost is the USDA-ERS's ten-year average of California's agricultural sector long-run rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agriculture sector.

Land. The grower owns 750 acres of row-crop land valued at $3,300 per acre. Values for land with relatively secure irrigation water supplies in the region range from $700 per acre to $5,000 depending upon location and soil conditions. The site for the cotton in this study is rented land enrolled in the government subsidy program.

Building. The buildings are metal buildings erected on a cement slab and cover approximately 2,400 square feet.

Tools. This includes shop tools, hand tools, and miscellaneous field tools. The number is not based upon an actual or average inventory.

Fuel Tanks. Diesel and gasoline fuel tanks with electric pumps are set up in a cement containment pad that meets federal, state, and county regulations.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Table 6. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

ACKNOWLEDGEMENTS

Thank you to the many individuals, businesses and associations in the agricultural industry that provided prices and inputs for this study.

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Table 1. COSTS PER ACRE to PRODUCE TRANSGENIC ACALA COTTON

SAN JOAQUIN VALLEY 2003

	Operation	Cash and Labor Cost per acre					
Operation	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Rip Fields 1X/3Yrs	0.27	4	7	0	0	11	
Primary Discing 2X	0.25	4	7	0	0	11	
Apply Herbicide - Treflan	0.20	3	4	5	0	12	
Incorporate Herbicide w/Disc	0.14	2	3	0	0	5	
List Beds	0.07	1	1	0	0	2	
Make Ditch	0.06	1	1	0	0	2	
Irrigate (includes labor for water run N)	5.00	55	0	150	0	205	
Fertilizer - Water Run UN32	0.00	0	0	8	0	8	
Close Ditch	0.06	1	1	0	0	2	
Plant	0.12	2	2	38	0	41	
Uncap Beds	0.08	1	1	0	0	2	
Cultivate - 3X	0.31	5	4	0	0	9	
Fertilizer - Sidedress UN32	0.14	2	2	39	2	45	
Weed Control - Over-The-Top Spray	0.20	3	2	9	0	15	
Insect Control - Mites	0.00	0	0	36	8	43	
Weed Control - Post Directed/layby Herbicide	0.20	3	2	9	0	15	
Insect Control - Lygus	0.00	0	0	9	8	16	
Insect Control - Aphids	0.00	0	0	16	8	24	
Apply Growth Regulator & KNO3	0.00	0	0	11	8	18	
Defoliate Cotton 2X	0.00	0	0	43	15	58	
PCA	0.00	0	0	0	12	12	
Pickup Truck Use	0.44	7	2	0	0	9	
TOTAL CULTURAL COSTS	7.54	94	39	372	59	564	
Harvest:							
Harvest	0.30	5	19	0	0	24	
Build Module and Haul	0.30	8	4	0	0	12	
TOTAL HARVEST COSTS	0.60	13	24	0	0	36	
Gin:							
Gin (paid by seed credit)	0.00	0	0	0	0	0	
Gin Compression Charge	0.00	0	0	0	18	18	
TOTAL GIN COSTS	0.00	0	0	0	18	18	
Assessment:							
Assessments	0.00	0	0	17	0	17	
TOTAL ASSESSMENT COSTS	0.00	0	0	17	0	17	
Postharvest:							
Chop Stalks	0.10	2	2	0	0	3	
Disc Residue - 2X	0.24	4	7	0	0	11	
TOTAL POSTHARVEST COSTS	0.34	5	9	0	0	14	
Interest on operating capital @ 7.14%						22	
TOTAL OPERATING COSTS/ACRE		112	72	389	77	671	
Cash Overhead:							
Land Rent Cotton						125	
Office Expense						30	
Liability Insurance						1	
Property Taxes						5	
Property Insurance						3	
Investment Repairs						3	
TOTAL CASH OVERHEAD COSTS						167	
TOTAL CASH COSTS/ACRE						838	

UC COOPERATIVE EXTENSION
Table 1. continued

			Total Costs	Your Costs
Non-Cash Overhead:	Per Producing Acre	Annual Cost Capital Recovery		
Buildings	40	3	3	
Fuel Tanks	4	0	0	
Shop/Field Tools	8	1	1	
Siphon Pipes 3"x 90"	5	1	1	
Service Truck 2-Ton	84	10	10	
Equipment	708	87	87	
TOTAL NON-CASH OVERHEAD COSTS	849	102	102	
TOTAL COSTS/ACRE			941	

UC COOPERATIVE EXTENSION

Table 2. COSTS AND RETURNS PER ACRE to PRODUCE TRANSGENIC ACALA COTTON

SAN JOAQUIN VALLEY - 2003

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Lint	1,250.00	lb	0.70	875	
LDP	1,250.00	lb	0.15	188	
TOTAL GROSS RETURNS				1,063	
OPERATING COSTS					
Herbicide:					
Treflan HFP	1.50	pt	3.50	5	
Roundup Ultra Max	2.50	pt	7.36	18	
Water:					
Water	30.00	acin	5.00	150	
Seed:					
Seed Transgenic	15.00	lb	1.44	22	
Seed Transgenic Tech Fee	15.00	lb	1.08	16	
Insecticide:					
Zephyr	6.00	floz	6.00	36	
Warrior	3.20	oz	2.73	9	
Provado	3.75	oz	4.27	16	
Growth Regulator:					
Pix	0.50	pt	15.16	8	
Fertilizer:					
13-0-46 Solution Grade	10.00	lb	0.32	3	
UN32	180.00	lb N	0.26	47	
Defoliant:					
Prep	2.00	pt	6.24	12	
Ginstar	8.00	floz	1.83	15	
Defol 6	1.00	gal	10.00	10	
Gramoxone Max	1.00	pt	5.78	6	
Assessment:					
Cotton Incorporated	2.50	bale	1.00	3	
Cotton Incorporated Supplemental	2.50	bale	1.75	4	
California Ginners and Cotton Growers	2.50	bale	0.15	0	
National Cotton Council	2.50	bale	0.45	1	
Pink Bollworm Project	2.50	bale	2.00	5	
USDA Classing Fee	2.50	bale	1.4	4	
Rent:					
Fertilizer Applicator	1.00	acre	2.00	2	
Custom:					
Air Application	6.00	acre	7.50	45	
Gin Compression Charge	2.50	bale	7.00	18	
Gin Charge (Paid by seed credit)	2.50	bale	0.00	0	
Contract:					
PCA/Consultant Fee	1.00	acre	12	12	
Labor (machine)	4.19	hrs	12.74	53	
Labor (non-machine)	5.30	hrs	11.02	58	
Fuel - Diesel	31.87	gal	1.11	35	
Lube				5	
Machinery repair				31	
Interest on operating capital @ 7.14%				22	
TOTAL OPERATING COSTS/ACRE				671	
NET RETURNS ABOVE OPERATING COSTS				391	

UC COOPERATIVE EXTENSION
Table 2. continued

	Value or Cost/Acre	Your Costs
CASH OVERHEAD COSTS:		
Land Rent Cotton	125	
Office Expense	30	
Liability Insurance	1	
Property Taxes	5	
Property Insurance	3	
Investment Repairs	3	
TOTAL CASH OVERHEAD COSTS/ACRE	167	
TOTAL CASH COSTS/ACRE	838	
NON-CASH OVERHEAD COSTS (Capital Recovery)		
Buildings 2,400sqft	3	
Fuel Tanks 2-500 gal	0	
Shop/Field Tools	1	
Siphon Pipes 3"x 90"	1	
Service Truck 2-Ton	10	
Equipment	87	
TOTAL NON-CASH OVERHEAD COSTS/ACRE	102	
TOTAL COSTS/ACRE	941	
NET RETURNS ABOVE TOTAL COSTS	122	

UC COOPERATIVE EXTENSION

Table 3. MONTHLY CASH COSTS PER ACRE to PRODUCE TRANSGENIC ACALA COTTON

SAN JOAQUIN VALLEY - 2003

Beginning: NOV 02 Ending: NOV 03	NOV 02	DEC 02	JAN 03	FEB 03	MAR 03	APR 03	MAY 03	JUN 033	JUL 03	AUG 03	SEP 03	OCT 03	NOV 03	TOTAL
Cultural:														
Rip Fields 1X/3Yrs	11													11
Primary Discing 2X	11													11
Weed: Apply Herbicide	12													12
Incorporate Herbicide	5													5
List Beds	2													2
Make Ditch				1			1		1					2
Irrigate				51				38	77	39				205
Close Ditch				1				1			1			2
Cultivate - 3X (includes preplant)					3		3	3						9
Plant						41								41
Uncap Beds						2								2
Fertilize - Sidedress UN32							45							45
Weed Control - Over-The-Top							15							15
Insect Control - Mites							43							43
Weed Control - Direct/Layby								15						15
Insect Control - Lygus								16						16
Insect Control - Aphids									24					24
Apply Growth Regulator & Fertilizer									18					18
Fertilizer - Water Run UN32									8					8
Defoliate Cotton 2X												58		58
PCA	1	1	1	1	1	1	1	1	1	1	1	1	1	12
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1		9
TOTAL CULTURAL COSTS	43	2	2	54	4	45	108	75	129	40	2	60	1	564
Harvest:														
Harvest													24	24
Build Module													12	12
Gin Compression Charge													18	18
TOTAL HARVEST COSTS													54	54
Assessment:														
Assessments													17	17
TOTAL ASSESSMENT COSTS													17	17
Postharvest:														
Chop Stalks													3	3
Disc Residue - 2X													11	11
TOTAL POSTHARVEST COSTS													14	14
Interest on operating capital	0	0	0	1	1	1	2	2	3	3	3	3	4	22
TOTAL OPERATING COSTS/ACRE	43	2	2	55	5	46	109	76	132	43	5	63	90	671
TOTAL OPERATING COSTS/LB	0.03	0.00	0.00	0.04	0.00	0.04	0.09	0.06	0.11	0.03	0.00	0.05	0.07	0.54
OVERHEAD:														
Land Rent Cotton													125	125
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2	2	30
Liability Insurance			1											1
Property Taxes			3						3					5
Property Insurance						2						2		3
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0		3
TOTAL CASH OVERHEAD COSTS	3	3	6	3	3	4	3	3	5	3	3	4	127	167
TOTAL CASH COSTS/ACRE	46	4	8	57	8	51	112	79	137	46	8	67	217	838
TOTAL CASH COSTS/LB	0.04	0.00	0.01	0.05	0.01	0.04	0.09	0.06	0.11	0.04	0.01	0.05	0.17	0.67

UC COOPERATIVE EXTENSION

Table 4. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, and BUSINESS OVERHEAD

SAN JOAQUIN VALLEY - 2003

ANNUAL EQUIPMENT COSTS

					Cash Overhead		
Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Total
02 105 hp 2wd Tractor	62,000	10	18,314	7,251	271	402	7,824
03 105 hp 4wd Tractor	75,000	10	22,154	8,650	328	486	9,464
03 150 hp 4wd Tractor	110,000	10	32,492	12,687	482	712	13,881
03 230 hp track-type	154,000	10	45,489	17,761	674	997	19,433
03 Cultivator Rolling 20' #1	6,800	5	2,215	1,234	30	45	1,310
03 Cultivator Rolling 20' #2	6,800	5	2,215	1,234	30	45	1,310
03 Disc - Finish 21'	19,595	12	2,714	2,211	75	112	2,398
03 Disc-Stubble 18' #1	42,000	10	7,427	5,217	167	247	5,632
03 Disc-Stubble 18' #2	42,000	10	7,427	5,217	167	247	5,632
03 Ditcher - 8'	7,800	15	749	785	29	43	856
03 Harvester 4-Row #1	265,000	10	49,987	32,684	1,065	1,575	35,324
03 Harvester 4-Row #2	265,000	10	49,987	32,684	1,065	1,575	35,324
03 Lister 6 Row 20'	5,500	12	762	621	21	31	673
03 Module Builder #1	24,000	10	4,244	2,981	95	141	3,218
03 Module Builder #2	24,000	10	4,244	2,981	95	141	3,218
03 Mower-Flail 20'	14,445	15	1,387	1,453	54	79	1,586
03 Pickup - 1/2 Ton	24,000	5	10,756	3,838	117	174	4,129
03 Pickup - 3/4 Ton	28,000	5	12,549	4,477	137	203	4,817
03 Planter-6 Row 20'	15,015	15	1,442	1,511	56	82	1,648
03 Rear Blade - 10'	2,581	18	172	237	9	14	261
03 Saddle Tank 300gal #1	3,218	5	1,048	584	14	21	620
03 Saddle Tank 300gal #2	3,218	5	1,048	584	14	21	620
03 Spray Boom 20' #1	913	3	380	224	4	6	235
03 Spray Boom 20' #2	913	3	380	224	4	6	235
03 Subsoiler 10'	14,800	10	2,617	1,838	59	87	1,984
03 Uncapper-6 row 20'	8,500	10	1,503	1,056	34	50	1,140
TOTAL	1,225,098		283,702	150,127	5,100	7,544	162,770
60% of New Cost *	735,059		170,221	90,076	3,060	4,526	97,662

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Repairs	Total
Buildings 2,400 sqft	60,000	30		4,476	203	300	1,200	6,179
Fuel Tanks 2-500 gal	6,514	20	651	562	24	36	130	752
Service Truck 2-Ton	125,500	10	25,000	15,379	509	752	2,510	19,151
Shop/Field Tools	12,000	15	1,200	1,205	45	66	240	1,556
Siphon Pipes 200 3"x 90"	8,024	10		1,103	27	40	160	1,330
TOTAL INVESTMENT	212,038		26,851	22,725	808	1,194	4,240	28,968

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent Cotton	750	acre	125.00	93,750
Liability Insurance	1,500	acre	0.83	1,246
Office Expense	1,500	acre	30.00	45,000

UC COOPERATIVE EXTENSION
Table 5 HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY - - 2003

			COSTS PER HOUR						
		Actual		Cash Overhead		Operating			
Yr	Description	Hours Used	Capital Recovery	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
03	105 hp 2wd Tractor	1,200.30	3.57	0.14	0.20	2.81	7.78	10.59	14.50
03	105 hp 4wd Tractor	1,600.30	3.24	0.12	0.18	1.94	7.78	9.72	13.27
03	150 hp 4wd Tractor	1,599.50	4.76	0.18	0.27	2.86	11.11	13.97	19.17
03	230 hp track-type	1,600.10	6.66	0.25	0.37	4.00	17.04	21.04	28.32
03	Cultivator Rolling 20' #1	162.20	4.56	0.11	0.17	0.65	0.00	0.65	5.50
03	Cultivator Rolling 20' #2	205.60	3.60	0.09	0.13	0.65	0.00	0.65	4.48
03	Disc - Finish 21'	165.60	8.01	0.27	0.40	3.10	0.00	3.11	11.79
03	Disc-Stubble 18' #1	199.70	15.67	0.50	0.74	6.79	0.00	6.79	23.71
03	Disc-Stubble 18' #2	200.00	15.65	0.50	0.74	6.79	0.00	6.79	23.69
03	Ditcher - 8'	129.50	3.64	0.13	0.20	1.19	0.00	1.19	5.16
03	Harvester 4-Row #1	124.60	157.79	5.14	7.60	38.51	19.26	57.77	228.31
03	Harvester 4-Row #2	124.30	157.79	5.14	7.60	38.51	19.26	57.77	228.31
03	Lister 6 Row 20'	165.90	2.24	0.08	0.11	1.10	0.00	1.10	3.54
03	Module Builder #1	113.60	15.74	0.50	0.75	3.25	0.00	3.25	20.25
03	Module Builder #2	113.60	15.74	0.50	0.75	3.25	0.00	3.25	20.25
03	Mower-Flail 20'	129.60	6.73	0.25	0.37	6.33	0.00	6.33	13.67
03	Pickup - 1/2 Ton	400.30	5.75	0.18	0.26	1.78	2.55	4.33	10.52
03	Pickup - 3/4 Ton	400.30	6.71	0.21	0.30	2.08	2.55	4.63	11.85
03	Planter-6 Row 20'	136.40	6.65	0.24	0.36	2.96	0.00	2.96	10.22
03	Rear Blade - 10'	159.50	0.89	0.04	0.05	0.37	0.00	0.37	1.35
03	Saddle Tank 300gal #1	400.00	0.88	0.02	0.03	0.02	0.00	0.02	0.95
03	Saddle Tank 300gal #2	400.00	0.88	0.02	0.03	0.02	0.00	0.02	0.95
03	Spray Boom 20' #1	500.00	0.27	0.01	0.01	0.25	0.00	0.25	0.53
03	Spray Boom 20' #2	500.00	0.27	0.01	0.01	0.25	0.00	0.25	0.53
03	Subsoiler 10'	200.00	5.52	0.18	0.26	3.34	0.00	3.34	9.29
03	Uncapper-6 row 20'	60.40	10.49	0.34	0.50	1.73	0.00	1.73	13.06

UC COOPERATIVE EXTENSION
Table 6. RANGING ANALYSIS
SAN JOAQUIN VALLEY - 2003

COSTS PER ACRE AT VARYING YIELD TO PRODUCE TRANSGENIC ACALA COTTON

	YIELD (lbs lint/acre)						
	750	1,000	**1,250**	1,500	1,750	2,000	2,250
OPERATING COSTS/ACRE							
Cultural Cost	564	564	564	564	564	564	564
Harvest Cost	23	30	36	43	49	56	62
Assessment Cost	10	14	17	20	24	27	30
Gin/Compression Cost	10	14	18	21	25	28	32
Postharvest Cost	14	14	14	14	14	14	14
Interest on operating capital	22	22	22	22	23	23	23
TOTAL OPERATING COSTS/ACRE	643	658	671	684	699	712	725
TOTAL OPERATING COSTS/LB	0.86	0.66	0.54	0.46	0.40	0.36	0.32
CASH OVERHEAD COSTS/ACRE	166	167	167	168	168	168	169
TOTAL CASH COSTS/ACRE	809	825	838	852	867	880	894
TOTAL CASH COSTS/LB	1.08	0.83	0.67	0.57	0.50	0.44	0.40
NON-CASH OVERHEAD COSTS/ACRE	107	107	107	108	108	108	108
TOTAL COSTS/ACRE	916	932	945	960	975	988	1,002
TOTAL COSTS/LB	1.22	0.93	0.76	0.64	0.56	0.49	0.45

UC COOPERATIVE EXTENSION
Table 6. continued

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ACALA COTTON

PRICE ($/lb)		YIELD (lbs lint/acre)						
Lint		750	1,000	**1,250**	1,500	1,750	2,000	2,250
	LDP	750	1,000	**1,250**	1,500	1,750	2,000	2,250
0.55	0.15	-118	42	204	366	526	688	850
0.60	0.15	-81	92	267	441	614	788	963
0.65	0.15	-43	142	329	516	701	888	1,075
0.70	**0.15**	-6	192	392	591	789	988	1,188
0.75	0.15	32	242	454	666	876	1,088	1,300
0.80	0.15	70	292	517	741	964	1,188	1,413
0.85	0.15	107	342	579	816	1,051	1,288	1,525

NET RETURNS PER ACRE ABOVE CASH COST FOR ACALA COTTON

PRICE ($/lb)		YIELD (lbs lint/acre)						
Lint		750	1,000	**1,250**	1,500	1,750	2,000	2,250
	LDP	750	1,000	**1,250**	1,500	1,750	2,000	2,250
0.55	0.15	-284	-125	37	198	358	520	681
0.60	0.15	-247	-75	100	273	446	620	794
0.65	0.15	-209	-25	162	348	533	720	906
0.70	**0.15**	-172	25	225	423	621	820	1,019
0.75	0.15	-134	75	287	498	708	920	1,131
0.80	0.15	-97	125	350	573	796	1,020	1,244
0.85	0.15	-59	175	412	648	883	1,120	1,356

NET RETURNS PER ACRE ABOVE TOTAL COST FOR ACALA COTTON

PRICE ($/lb)		YIELD (lbs lint/acre)						
Lint		750	1,000	**1,250**	1,500	1,750	2,000	2,250
	LDP	750	1,000	**1,250**	1,500	1,750	2,000	2,250
0.55	0.15	-391	-232	-70	90	250	412	573
0.60	0.15	-354	-182	-8	165	338	512	686
0.65	0.15	-316	-132	55	240	425	612	798
0.70	**0.15**	-279	-82	118	315	513	712	911
0.75	0.15	-241	-32	180	390	600	812	1,023
0.80	0.15	-204	18	243	465	688	912	1,136
0.85	0.15	-166	68	305	540	775	1,012	1,248

LDF = Loan Deficiency Payment
Bold = Data used in Study