



2021 Sugarcane Fallow Weed Control Program Cost Model

Michael Deliberto and Brian Hilbun

*Department of Agricultural Economics and Agribusiness
Louisiana State University Agricultural Center*

Sugarcane is a perennial crop with seedcane expansion, initial crop planting and succeeding harvests occurring over a period of several years. The fallow period in this production cycle is one in which the older stubble crop is plowed out in late winter/early spring and the field is prepared for planting in late summer later that same year. The control of weeds during the fallow period is critical to the success of the succeeding sugarcane crop.

The fallow period is also that portion of the sugarcane production cycle in which producers have the most flexibility or options in terms of specific tillage practices and weed control programs to be used. Many different combinations of tillage practices are currently being used by producers to plow out the older stubble and for seed bed preparation. A wide variety of herbicides are available for curbing weed pressure in fallow fields. As a result, the choice of specific tillage operations and herbicides applications directly impact the variable cost per acre of any fallow program. This Microsoft Excel® spreadsheet producer decision aid was developed so as to assist sugarcane producers in planning their fallow programs. The cost of current and alternative fallow programs can be estimated within the program (for comparison purposes).

The primary purpose of this model is as a farm planning aid available to sugarcane producers. Tillage/herbicide combinations planned for the coming year can be entered into the model. Total variable cost (TVC) per acre for a fallow program will then be estimated based for the data entered. Here, TVC includes charges for fuel, labor and those herbicide utilized as inputs for operations performed within a fallow program. Sugarcane producers can use this model to determine the specific combination of tillage operations and herbicide applications performed which would meet the goals of obtaining the desired level of weed control at the lowest cost per acre.

This user's guide provides a brief overview of the Sugarcane Fallow Weed Control Program Producer Decision Aid. The spreadsheet model includes a blank fallow program entry worksheet for the user. One additional worksheet is included so as to provide an example of model data entry for an alternative fallow program. The Sugarcane Fallow Weed Control Program Producer Decision Aid Microsoft® Excel spreadsheet model and user's guide is available on the sugarcane crop page of the LSU AgCenter web page at <http://www.lsuagcenter.com/topics/crops/sugarcane/economics>.

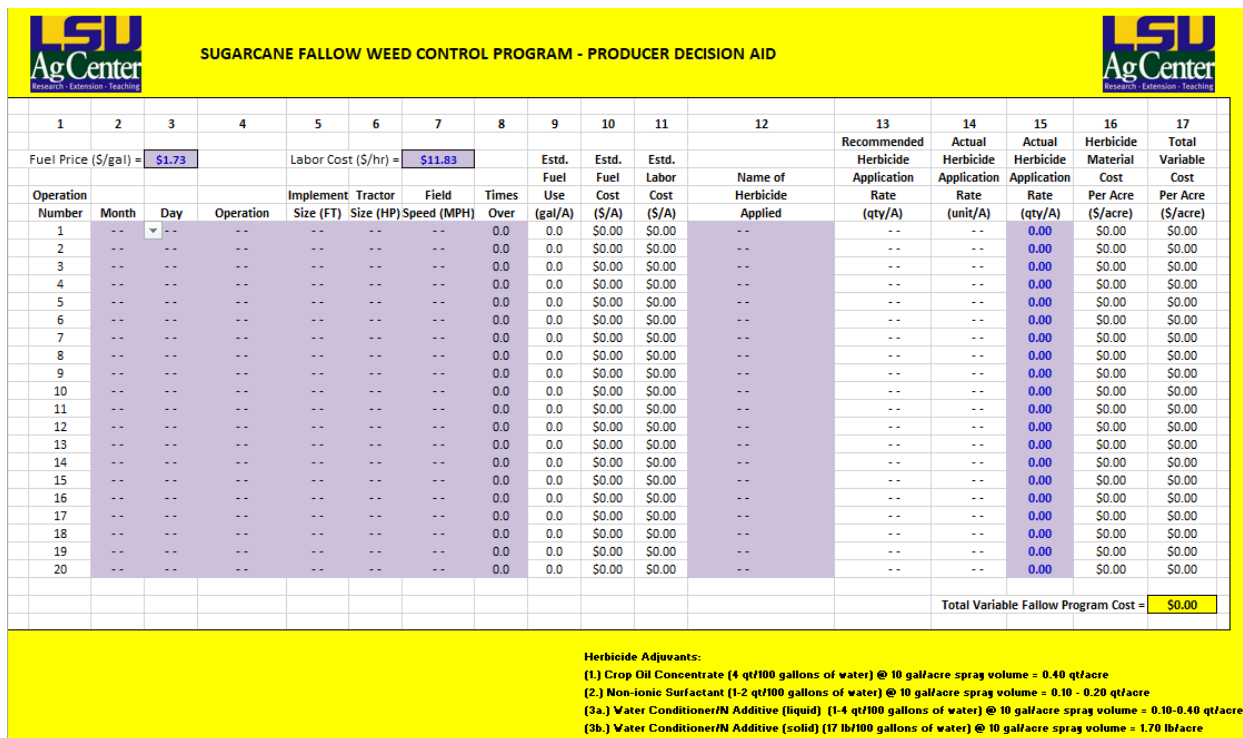
Herbicides listed in Table 1 are recommended for controlling grasses and broadleaf weeds in sugarcane fields during fallow periods.

Table 1. Recommended herbicides for sugarcane fallow weed control programs.

<i>Herbicide</i>	<i>Appl. Rate</i>	<i>Unit</i>	<i>Price per Unit</i>
2,4-D Amine	1.0-1.5	Qt / Acre	\$3.70
AAtrex 4L	2.0 - 4.0	Qt / Acre	\$4.46
Aim 2EC	1.0 - 2.0	Oz / Acre	\$5.00
Atrazine 4L	2.0 - 4.0	Qt / Acre	\$3.00
Atrazine 90DF	2.22 - 4.44	Lb / Acre	\$3.59
Classic 25 DG	0.5 - 2.0	Oz / Acre	\$16.86
Direx 4L	2.4 - 3.0	Qt / Acre	\$6.04
Direx 80 DF	3.0 - 3.75	Lb / Acre	\$5.09
Envoke 75 WG	0.15 - 0.20	Oz / Acre	\$90.00
Generic glyphosate (4L)	1.0 - 2.0	Qt / Acre	\$5.00
Generic Paraquat 3L	2.0	Pt / Acre	\$2.50
Gramoxone Max	3.0	Pt / Acre	\$4.16
Karmex 80 DF	3.0 - 3.75	Lb / Acre	\$5.93
Permit 75DF	0.67 - 1.33	Oz / Acre	\$15.00
Prowl 3.3EC	3.0	Qt / Acre	\$11.52
Roundup Orig Max 5.5L	0.7 - 1.4	Qt / Acre	\$12.00
Roundup Original 4L	1.0 - 2.0	Qt / Acre	\$12.00
Roundup Power Max 5.5L	0.7 - 1.4	Qt / Acre	\$6.08
Roundup WeatherMax 5.5L	0.7 - 1.4	Qt / Acre	\$8.32
Sencor DF	1.5 - 2.0	Lb / Acre	\$14.25
Valor SX 51WG	3.0 - 4.0	Oz / Acre	\$5.83
Weedmaster/Brash	1.5	Pt / Acre	\$11.52
Z-Crop Oil Concentrate	0.4	Qt / Acre	\$5.72
Z-Non-ionic Surfactant	0.10 - 0.2	Qt / Acre	\$6.60
Z-Water Conditioner/N Additive (liquid)	0.10 - 0.4	Qt / Acre	\$3.35
Z-Water Conditioner/N Additive (solid)	1.7	Lb / Acre	\$0.44

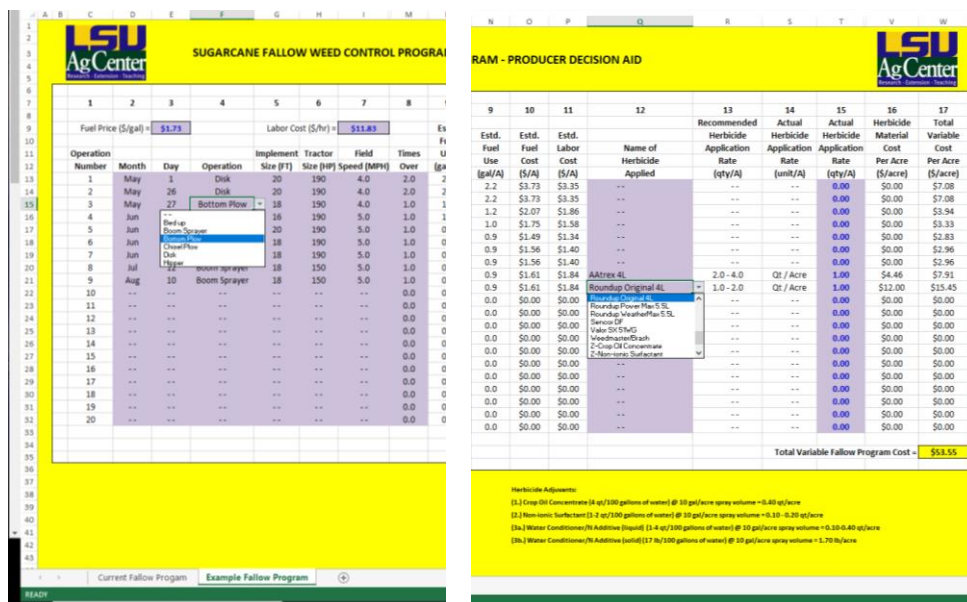
The recommended application rate will appear in the spreadsheet decision aid *once* an herbicide is selected from the drop down menu. Although the listing/order of these herbicides cannot be altered by the user, the price (cost) of the herbicides can be changed. Input prices for the included herbicides were entered into the model prior to the time of publication. However, it should be borne in mind that herbicide prices subject to change. Users of this model are advised to alter these herbicides prices to reflect current price levels at the time of use. Prices entered in the model should be in the same units as for the recommended application rates.

Figure 1. User interface of the sugarcane fallow weed control program producer decision aid.



Herbicide Adjuncts:
 (1) Crop Oil Concentrate (4 qt/100 gallons of water) @ 10 gal/acre sprag volume = 0.40 qt/acre
 (2) Non-ionic Surfactant (1-2 qt/100 gallons of water) @ 10 gal/acre sprag volume = 0.10 - 0.20 qt/acre
 (3a.) Water Conditioner/N Additive (liquid) (1-4 qt/100 gallons of water) @ 10 gal/acre sprag volume = 0.10-0.40 qt/acre
 (3b.) Water Conditioner/N Additive (solid) (17 lb/100 gallons of water) @ 10 gal/acre sprag volume = 1.70 lb/acre

Figure 2. User interface illustrating the alternative tillage and herbicide options available to the producer.



Herbicide Adjuncts:
 (1) Crop Oil Concentrate (4 qt/100 gallons of water) @ 10 gal/acre sprag volume = 0.40 qt/acre
 (2) Non-ionic Surfactant (1-2 qt/100 gallons of water) @ 10 gal/acre sprag volume = 0.10 - 0.20 qt/acre
 (3a.) Water Conditioner/N Additive (liquid) (1-4 qt/100 gallons of water) @ 10 gal/acre sprag volume = 0.10-0.40 qt/acre
 (3b.) Water Conditioner/N Additive (solid) (17 lb/100 gallons of water) @ 10 gal/acre sprag volume = 1.70 lb/acre

Drop down menus in columns 2-8 allow data entry for fallow operation date, type of operation, implement size, tractor size, field speed and times over (passes over the field). Fuel price (\$/gal) is entered in cell E9. Labor cost (\$/hr.) is entered in cell I9. Up to 20 separate tillage/herbicide fallow field operations can be entered on the worksheet page.

Table 2. Parameter and range option for tillage operations.

Column Number	Parameter	Range
2	Month	January to December
3	Days	1 to 31
4	Operation	Bed-up; Boom Sprayer; Bottom Plow; Chisel Plow; Disk; and Hipper
5	Implement Size (ft)	14; 16; 18; 20; 24; and 30
6	Tractor Size (hp)	75 to 300
7	Field Speed (mph)	1 to 6
8	Times Over	0.5; 1.0; 1.5; and 2.0

Estimated fuel use (gal/A), fuel cost (\$/A) and labor cost (\$/A) are determined based upon the field operation data entered and are indicted in columns 9, 10 and 11.

Herbicides applied as part of a fallow program are selected from drop down menus in column 12. For each herbicide selected, the recommended application rate for that herbicide, based on the Sugarcane Weed Control Guide, is shown in column 13. The actual herbicide rate applied can be entered in column 14. Total herbicide material cost per acre, based upon the actual herbicide application rate entered in column 14 and the corresponding herbicide cost per unit, is shown in column 16.

For each fallow field operation entered, the TVC of that operation is shown in column 17. This TVC per acre value includes fuel and labor charges for the pass over field as well as the material cost of any herbicide applied. These TVC values for each operation summed across all tillage/herbicide application operations entered to estimate a TVC per acre for the specific fallow program entered. This TVC value is estimated and presented in cell W34 (column 17).

Figure 3. Example sugarcane fallow weed control program.

SUGARCANE FALLOW WEED CONTROL PROGRAM - PRODUCER DECISION AID																																		
1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		
Fuel Price (\$/gal) = \$1.73		Labor Cost (\$/hr) = \$11.83		Estd. Fuel Use (gal/A)		Estd. Fuel Cost (\$/A)		Estd. Labor Cost (\$/A)		Name of Herbicide Applied		Recommended Herbicide Application Rate (qt/A)		Actual Herbicide Application Rate (unit/A)		Actual Herbicide Application Rate (qt/A)		Herbicide Material Cost Per Acre (\$/acre)		Total Variable Cost Per Acre (\$/acre)														
Operation Number	Month	Day	Operation	Implement Size (FT)	Tractor Size (HP)	Field Speed (MPH)	Times Over	Est. Fuel Use (gal/A)	Est. Fuel Cost (\$/A)	Est. Labor Cost (\$/A)																								
1	May	1	Disk	20	190	4.0	2.0	2.2	\$3.73	\$3.35	--	--	--	0.00	\$0.00	\$7.08																		
2	May	26	Disk	20	190	4.0	2.0	2.2	\$3.73	\$3.35	--	--	--	0.00	\$0.00	\$7.08																		
3	May	27	Bottom Plow	18	190	4.0	1.0	1.2	\$2.07	\$1.86	--	--	--	0.00	\$0.00	\$3.94																		
4	Jun	18	Chisel Plow	16	190	5.0	1.0	1.0	\$1.75	\$1.58	--	--	--	0.00	\$0.00	\$3.33																		
5	Jun	21	Disk	20	190	5.0	1.0	0.9	\$1.49	\$1.34	--	--	--	0.00	\$0.00	\$2.83																		
6	Jun	21	Bed up	18	190	5.0	1.0	0.9	\$1.56	\$1.40	--	--	--	0.00	\$0.00	\$2.96																		
7	Jun	22	Bed up	18	190	5.0	1.0	0.9	\$1.56	\$1.40	--	--	--	0.00	\$0.00	\$2.96																		
8	Jul	12	Boom Sprayer	18	150	5.0	1.0	0.9	\$1.61	\$1.84	AAtrex 4L	2.0 - 4.0	Qt / Acre	1.00	\$4.46	\$7.91																		
9	Aug	10	Boom Sprayer	18	150	5.0	1.0	0.9	\$1.61	\$1.84	Roundup Original 4L	1.0 - 2.0	Qt / Acre	1.00	\$12.00	\$15.45																		
10	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
11	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
12	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
13	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
14	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
15	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
16	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
17	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
18	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
19	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
20	--	--	--	--	--	--	0.0	0.0	\$0.00	\$0.00	--	--	--	0.00	\$0.00	\$0.00																		
																Total Variable Fallow Program Cost =		\$53.55																

Herbicide Adjuvants:
 [1.] Crop Oil Concentrate (4 qt/100 gallons of water) @ 10 gal/acre spray volume = 0.40 qt/acre
 [2.] Non-ionic Surfactant (1-2 qt/100 gallons of water) @ 10 gal/acre spray volume = 0.10 - 0.20 qt/acre
 [3a.] Water Conditioner/N Additive (liquid) (1-4 qt/100 gallons of water) @ 10 gal/acre spray volume = 0.10-0.40 qt/acre
 [3b.] Water Conditioner/N Additive (solid) (17 lb/100 gallons of water) @ 10 gal/acre spray volume = 1.70 lb/acre

The above example fallow program (Figure 3) is included in the model so as to illustrate how various tillage operations and herbicide applications would be entered to reflect a complete sugarcane fallow program. Fuel price and labor cost are entered in the appropriate cells, as increases in these two parameters (fuel and labor cost) would have a potentially significant impact on program cost. Within the field operation section, data for each pass over the field, whether for tillage or herbicide application, would be entered on a single line.

The first tillage operation in this program is a disk operation in early May. On the row labeled Operation Number 1, data relevant to this disk operation would be entered through values selected from drop down menus on the spreadsheet row for that particular operation. The month (May) would be selected in column 2, the day (1) would be selected in column 3 and the operation (Disk) would be selected in column 4. Implement size (20 ft) would be selected in column 5, tractor size (190 hp) would be selected in column 6, and field speed (4.0 mph) would be selected in column 7. In this particular fallow program, two passes over the field with a disk are performed in early May. As a result, these two identical tillage operations can be combined into one entry by selecting the appropriate times over number (2.0) in column 8. Two Roundup applications are performed in this program. A 150 hp tractor with a boom sprayer is used to make these applications. Operations 8 and 9 in the table above illustrate how these herbicide applications are entered. In this example, the actual application rate applied of 1.4 qts/A is entered by the user in column 15.

To eliminate or delete an operation already entered in the model, the appropriate selection for no operation (-) can be chosen from the drop down menus on each column. In this example, this menu option would be chosen for the bottom plow operation to be deleted in columns 2 (month), 3 (day), 4 (operation), 5 (implement size), 6 (tractor size), 7 (field speed), and 8 (times over). To enter a tank mix application of more than several herbicides, data on one operation row would be entered to include the tractor and implement data along with the application rate for one of the herbicides. The second herbicide would be entered on the following row with no tractor data entered. Entering the same date for these two entries will indicate to the user that these two rows of entries are for a single tank mix application.

Appreciation is extended to Dr. Michael Salassi and Dr. Jim Griffin for their expertise on this subject area.



Michael A. Deliberto can be contacted in the Department of Agricultural Economics and Agribusiness at (225) 578-7267 or by emailing mdeliberto@agcenter.lsu.edu.