



BYGUM (a tool for **BarnYard Grass Understanding and Management**) gives you new ways to look at the economics of summer weed control in Australian cotton systems. Use it to compare your existing program with new ideas: tweak existing herbicide programs, adjust your crop rotation, or investigate something completely new!

Where does BYGUM come from?

BYGUM is an adjusted version of RIM (Ryegrass Integrated Management), a decision support tool for ryegrass control first developed by Professor David Pannell from UWA and AHRI, with involvement from researchers from various organisations including the Department of Agriculture and Food (DAFWA) with support from GRDC. UWA and AHRI have continued to improve RIM with support from GRDC. To find out more about RIM go to <http://ahri.uwa.edu.au/research/rim/>.



BYGUM takes the well-tested framework of RIM and extends it to northern subtropical Australian farming systems, where summer and winter crops are both used, and fallows are an important part of the system.

What’s new in BYGUM?

Summer cropping (including irrigated and rainfed cotton, sorghum, corn and mungbeans), fallow management, and cover crops are all new. BYGUM also allows for more weed control applications (including herbicides and cultivation).

What do I need to run BYGUM?

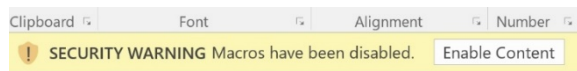
You need a Windows computer, a copy of Microsoft Excel (any version from the last 10 years should do), and a copy of the BYGUM file. The BYGUM file holds both the programming to make BYGUM work, and all your data. There are no external save files to worry about.

How do I start using BYGUM?

BYGUM can be downloaded from the CottonInfo website. Find the BYGUM file on your computer (file name will be similar to BYGUM2016_4_0.xlsm depending on the version), and open it. If you have a recent version of Excel on your computer, BYGUM will start up.

Name	Date modified
BYGUM2016_1.xlsm	21/04/2016 11:25 AM
BYGUM2015_12.xlsm	2/12/2015 11:31 PM

HOWEVER, BYGUM USES MACROS, small programming statements that allow it to do useful things like switch between screens and update the comparison graphs. You need to give Excel



permission to use macros in order to get BYGUM to work. Click on the 'Enable Content' button (or similar message, for older versions of Excel).

Three Steps

BYGUM steps you through three main steps:

- DEFINE the environment for your scenario (the herbicides available, the prices of inputs, the average yield and prices for crops);
- BUILD your strategy (setting up a rotation and the grass weed control tactics used in each phase); and
- COMPARE between scenarios.

To run a scenario, you might make changes to some of the things on the DEFINE page, some of the things on the BUILD page, or both, and then COMPARE the results with other scenarios.

DEFINE page

Here, set up the basics of the system: what crops earn in an average year with no weed competition, what control tactics are available to use on barnyard grass, and their costs and effectiveness; and other important baseline economic and biological factors. The key factors are all on the main DEFINE

1. DEFINE Your Paddock

Main parameters

Wheat	sorghum	Irrig Cotton	Dryland Cotton	Corn	Beans	Cover Crop (Millet)
1.8	4.0	3.3	2.0	14.0	1.0	
275	225	1600	1600	240	800	

Production costs: 48.0 \$/ha
 Operation cost of sprayer: 4.5 \$/ha
 Average area cropped: 2000 ha

BYG Control options

Herbicide	Irrig cotton	D/L cotton	Wheat, Corn & Sorghum	Summer fallow	Irrig cotton	D/L cotton	Corn & Sorghum	Summer fallow
Glyphosate	8	8	8	8	40%	40%	40%	40%
Paraquat	10	10	10	10	95%	95%	95%	95%
Group A	15	15	15	15	95%	95%	95%	95%
Tillage	9	9	9	9	96%	96%	96%	96%
Glyphosate/Paraquat	18	18	18	18	100%	100%	100%	100%
Trifluralin	20	20	20	20	88%	88%	85%	85%
Diuron	15	15	15	15	85%	85%	85%	85%
Pendimethalin	35	35	35	35	82%	80%	80%	80%
s-Metolachlor	30	25	25	30	92%	90%	90%	90%
Fluometuron-Prometryn	60	60	60	60	86%	85%	85%	85%
Glyphosate	11	11	11	8	30%	35%	35%	40%
Glufosinate	18	18	18	18	65%	70%	70%	70%
Paraquat (shielded)	9	9	9	11	90%	90%	90%	95%
Inter-row tillage	9	9	9	8	80%	85%	85%	95%
Group A	15	15	15	15	90%	92%	92%	95%

Save Profile

Paddock name: Test paddock
 Your name: BYGUM

SAVE LOAD BYGUM, Test paddock
 SAVE LOAD BYGUM, Test paddock
 SAVE LOAD BYGUM, Test paddock
 CLEAR LOAD Susceptible, Default

BYGUM Barnyard Grass

10.0 \$/ha
 4.5 \$/ha
 2000 ha
 Last year's BYG population: 2.0 m²
 Low Medium High
 More More

Navigate with the Back and Next buttons between the main pages. Press the BYGUM logo to return to the start page. Hover over the red triangles to see tips on different parts of BYGUM.

page, with some advanced options on the More Prices and More Options pages.

To change a herbicide, or its cost per hectare or effectiveness when used in various crops, simply type in the box like any other Excel spreadsheet. The model will update as soon as changes are made.

BUILD page

Sum 1 W
 D/L Cotton W
 Sorghum W
 D/L Cotton W
 Irrig Cotton W
 Corn W
 Beans W
 Cover crop W
 Winter fallow W
 Summer fallow W

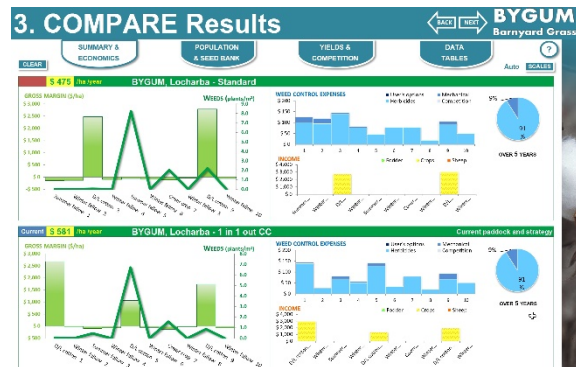
Here, use the drop-down menus to set up a five-year rotation and decide on grass weed control tactics to be used. Basic weed management and economic outputs are updated on the fly at the bottom of the main table.

2. BUILD Your Strategy

Press the 'Show More' button on the right to show graphs of annual weed burdens, control costs, yield value and gross margin, and the average gross margin per year over the five years of the scenario.

Press one of the 'Compare' buttons to send this scenario to the COMPARE page.

Choose enterprise and control options:	Sum 1	Wint 1	Sum 2	Wint 2	Sum 3	Wint 3	Sum 4	Wint 4	Sum 5	Wint 5	
Time of sowing	D/L Cotton	Winter fallow	Summer fallow	Winter fallow	D/L Cotton	Winter fallow	Cover crop	Winter fallow	D/L Cotton	Winter fallow	Average
Soil preparation	V Early	Cultivate	Tickle	Tickle	Glyphosate	Glyphosate/P		Paraquat	Glyphosate/P	Tillage	
Knock down / Double knock			Group A								
Early season residual							Trifluralin				
Sowing method					No-till			No-till			
Crop seeding rate											
Weed control 1	Group A	Glufosinate	Group A		Group A	Group A		Group A	Glyphosate	Glyphosate	
Weed control 2											
Weed control 3	Glyphosate	Glufosinate/Paraquat (sh)									
Layby weed control 4		Durron	Pendimetha	Topping		Topping	Pendimetha	Pendimetha			
Weed control 5											
Weed control 6	Group A	Inter-row ti	Group A				Paraquat (sh)				
Harvest options - Grains											
Harvest options - Other crops		Defol Drop						Defol Drop			
Mature BYO selling seed	0.0		0.0		0.4		0.3		0.4		
Seeds in soil next spring (/m ²)	111		281		6726		889		6371		
Gross margin (\$/ha)	\$2,971	-\$134	-\$164	-\$96	\$1,764	-\$91	-\$120	-\$32	\$1,777	-\$63	



COMPARE pages

The COMPARE function allows you to see two scenarios side by side. Scenarios are loaded into the COMPARE pages by pressing the Compare buttons on the BUILD page. The two scenarios can be compared for costs and economic returns, yield estimates, and weed control success.

Using BYGUM

Here are a few pointers on getting useful information out of BYGUM.

1. Make sure the basic data (prices, yields, other costs) reflect your situation
2. Use the save and load functions to create a range of different DEFINE paddocks, for use in different BUILD scenarios.
3. Play with combinations of weed control tactics (including on glyphosate resistant and susceptible populations) that make sense for your situation. Investigate cost-benefit scenarios for improving weed control.
4. Share scenarios around – all you have to do is save a copy of BYGUM and send it to someone else! You can keep your own file safe and unaltered easily, since different BYGUM files don't share any information. As long as you don't alter the appearance or function of BYGUM, you are free to exchange copies as much as you like, with anyone.
5. Play around. It's easy to get a fresh copy, so don't worry about breaking things. Just give it a go, and see what it can teach you.

BYGUM is a product of the Australian Cotton Research and Development Corporation and Innokas Intellectual Services.

BYGUM has modified RIM with permission from AHRI and the University of Western Australia.

<http://ahri.uwa.edu.au/research/rim/>. RIM was developed by AHRI and UWA, with support from Grains Research and Development Corporation.