ARM
by Gylling Data Management, Inc.
The Software Solution for Your Research Data Needs
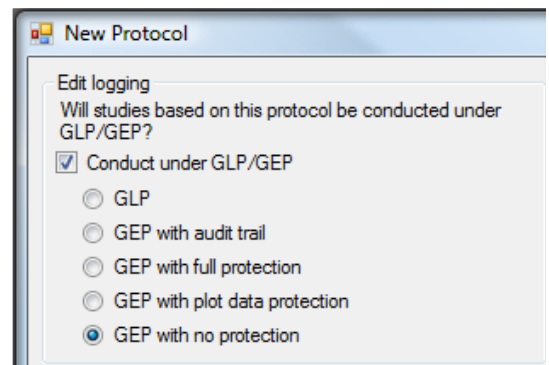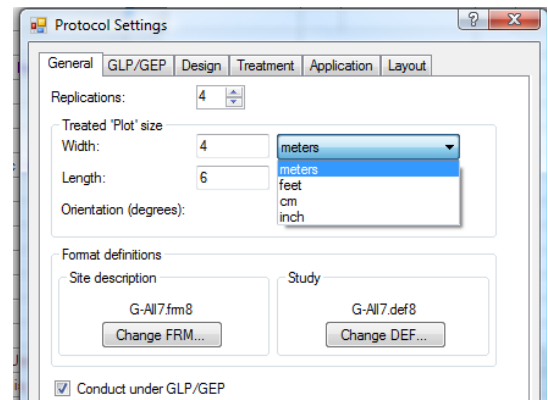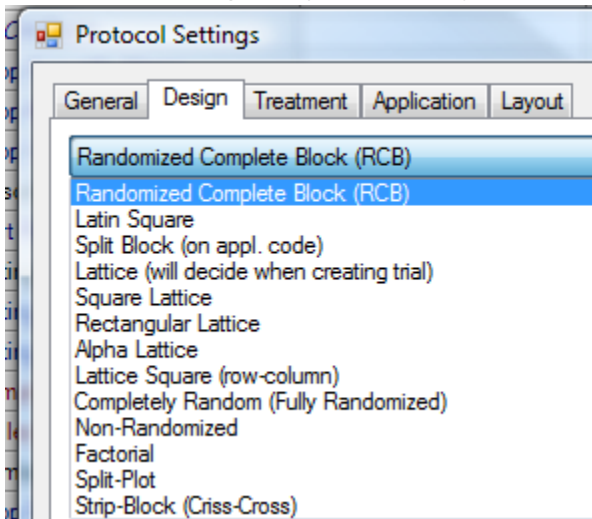*Website:* *www.gdmdata.com*   *Email:* *staff@gdmdata.com*

Why Use ARM Software?

- The ARM is software for **establishing**, **managing**, and **summarizing** of herbicide, insecticide, fungicide, seed/variety, fertilizer, general non-chemical, nematicide, and plant growth regulator research on single field or greenhouse trials.

- Managing plant science research data saves time throughout the research season while creating trials, collecting and analyzing data. ARM produces the reports required for successful and timely trial management. Summary reports include integrated statistical analysis that automatically selects appropriate analysis of variance according to selected statistical design.

- It is a respected standard throughout the crop production and crop protection industry in more than 70 countries, many companies and hundreds of universities.

ARM designer has worked with crop protection research for more than thirty years, and understands research needs. We encourage client questions and ideas as GDM does not charge for our support. Many ARM features are suggestions from our current clients.

ARM Overview

- Trial Size: Up to 999 treatments, assessment data columns, and subsamples per trial.
- Randomize and appropriately analyze trials as randomized complete block, completely random, split block by application, Latin square, non-randomized, factorial, split-plot, and strip-block (criss cross), Lattice (will decide when creating trial); Square Lattice, Rectangular Lattice, Alpha Lattice, Lattice Square (row-column).

- Multi-language: US English, International English, French, German, Italian, Spanish, Portuguese, Polish, Korean, Japanese.
- Optionally conduct under GLP/GEP compliance.
- Transform data using built-in arcsine square root, log, Abbott's % of Untreated, Henderson-Tilton or square root transformations. Average, Count, and Sum Subsamples functions ignore missing data.
- Wide variety of reports with many report options to print to paper, screen, Excel, Word Processor, Adobe PDF or File.

Data Transformations

Transformations

- ○ Square root   SQR(X+.5)
- ○ Log   LOG(X+1)
- ○ Average subsamples
- ○ Sum subsamples
- ○ Abbott (% of Untreated)
- ○ Henderson-Tilton
- ○ AUDPC (or AUAPC)
- ○ Standardized AUDPC (SAUDPC=average AUDPC per day)
- ○ User formula

- ○ Arcsine square root percent
- ○ % Incidence (0 = none)
- ○ % Incidence (1 = none)
- ○ Schneider-Orelli

Formula

Options

- ☐ Limit calculated values to positive
- ☐ Calculate one value per 'Plot' experimental unit if sub

Convert data column number: `1`
Store in data column number: `8`
Number of decimals accuracy: `2`

[Excel] [Word Processor] [Adobe PDF] [File]

Format:
- ● Columns as tables
  - ☐ Use tab separated columns when required to keep section borders
- ○ Tab separated columns
- ○ Locked objects

Adjust table cell left/right margin by: `-0.076cm`
Adjust table column width by: `0.102cm`

Print to
- [Excel]
- [Word Processor]
- [Adobe PDF]
- [File]

Assessment Map - Column 5

401	402	403	404	405
301	302	303	304	305
201	202	203	204	205
101	102	103	104	105

Properties

Tabs: Color description | Options | Treatment Description

Color description

0.66 to 1.73	7.06 to 8.13
1.73 to 2.79	9.2 to 10.26
2.79 to 3.86	10.26 to 11.33
3.86 to 4.93	

[Previous Data]
[Next Data]
[Print]

Print Reports

Available Reports

- ⊞ Protocol
- ⊟ Trial
  - Assessment Footnotes
  - Data Collection
  - Data Verification
  - ⊞ Labels
  - Map
  - ⊞ Multi-Trial Labels
  - ⊞ Other
  - Product Amount Totals
  - Schedule
  - Signs
  - Site Description
  - Spray/Seeding Plan
  - Status Report
  - ⊟ Summary
    - Assessment Data Summary
    - AOV Means Table
    - Factorial AOV Table
    - Correlations
    - Dose-Response Analysis
    - Standardized Summary
  - Tour Report
  - Treatment LST Comments
  - Trial Audit Trail
  - Trial Comments
  - Trial Map
  - Trial Treatments

Site Description Report Options

Tabs: Global - General | Global - Page Heading | Global - Borders | Site Description | Site Description Page Setup

Empty fields
- ○ Print blanks
- ● Print nothing

Field prompts
- ☑ Bold print
- ☑ Skip for empty fields

Compression
- ☑ Compress report

Compresses out blank lines only when set to "Print Nothing" and "Skip for Empty Fields."

- ☑ Print selected sections

List validation comments
`Comment 1 ▼`

- ☑ Keep with previous page
- ☐ Print study rules
- ☑ Use fixed-width font

"Use fixed-width font" is ignored when formats or tables are used.

Gylling Data Manage[ment]

An assessment of the efficacy of TUB and other fungicides for the control of
Septoria Diseases in winter wheat
Trial ID: G-All7_Fung   Protocol ID: G-All7_Fung
Location: Gembloux   Study Director: R.E. Cearch
Investigator: Your Name

Pest Code			SEPTTR	ZZYYFY		
Crop Code			TRZAW	TRZAW	TRZAW	
Part Rated			LEAF2 P	LEAGRE P	GRAIN C	
Rating Date			Jul-2-2008	Jul-15-2008	Aug-7-2008	Au
Rating Type			CONTRO	AREA	YIELD	
Rating Unit			%UNCK	%AREA	KG	
Days After First/Last Applic.			78 29	91 7	114 30	
Trt-Eval Interval			29 DA-B	11 DA-C	30 DA-C	
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	8	9	10	
1 Untreated Check		ABC	0.00 c	2.50 b	7.55 b	7.
2 TUB	0.5 l/ha	ABC	88.74 ab	22.50 ab	8.20 a	8.
3 TUB	1 l/ha	ABC	95.62 a	33.00 a	8.16 a	8.
4 TILT 250	0.5 l/ha	ABC	85.11 ab	29.00 a	8.20 a	8.
5 MICO 60	1.5 l/ha	ABC	74.09 b	17.50 ab	8.16 a	8.
LSD (P=.05)			12.750	19.667	0.360	
Standard Deviation			8.275	12.765	0.234	
CV			12.04	61.07	2.9	
Bartlett's X2			6.963	12.131	2.316	
P(Bartlett's X2)			0.073	0.016*	0.678	

AOV Means Table Report Options

Tabs: Pre-mix Ingredient | Fields to Print | Global - General | Global - Page Heading | Global - Borders
AOV Means Table Report Options | General Summary | General Summary Page Setup

Mean comparison test
Test: Student-Newman-Keuls
Significance level: 5%
☑ Use FAOV complete error for split-plot trials
☑ Only when significant AOV treatment P(F)

Mean sorting
○ None
○ Ascending
○ Descending
☑ Print one sorted mean column per page

Adjusted treatment mean
☑ Use adjusted mean as primary mean
☑ Calculate adjusted mean only when justified by AOV

Calculated %'s
Reported decimals
○ 0 (95%)
● 1 (95.3%)
○ 2 (95.37%)
☐ Print untreated value from original data column for calculated % relative (Abbott) values

Mean descriptions
☑ Minimum and maximum
☐ Standard deviation
☐ Adjusted mean (when available)
Arranged
○ Beside mean   ● Under mean

Analysis method
● Traditional AOV
○ Least square estimation

AOV Table
○ None
● Brief
○ Full
☑ Report both adjusted and unadjusted terms

Descriptive statistics
☑ LSD (or HSD if Tukey's)
☑ Coefficient of variation (CV)
☑ Standard deviation
☐ Grand mean
☑ Bartlett's homogeneity of variance
☐ Friedman's method for randomized blocks
☑ Skewness
☑ Kurtosis

☑ Exclude untreated treatment(s) from analysis

6/21/2008 (G-All7_Herb)

Gylling Data Management

Determination of the efficacy and lowest effective dose rate o[f]
monocotyle and volunteer grass weeds in Winter Rape when appli[ed]
Trial ID: G-All7_Herb   Protocol ID: G-All7_Herb
Location: GERMANY   Study Director: R.E. Cearch
Project ID: Investigator: Your Name
Sponsor Contact:

Trt	Trt Code	Trt Description
1	1	Untreated Check
2	2	HERB 1 50 g AI/ha A
3	3	HERB 1 80 g AI/ha A
4	4	HERB 1 100 g AI/ha A
5	5	STANDARD 125 g AI/ha A

401 5	402 4	403 3	404 1	405 2
301 3	302 2	303 1	304 5	305 4
201 5	202 4	203 3	204 1	205 2
101 4				

Jun-21-2008 (G-All7_Fung)

Spray/Seeding Plan Report Options

Tabs: Product Amount Totals | Pre-mix Ingredient | Fields to Print | Sort
Global - General | Global - Page Heading | Global - Borders
Spray/Seeding Plan | Spray/Seeding Plan Page Setup

Product amounts based on
● Mix size
○ Area of one 'Plot' experimental unit
○ Area of one treatment

Application code
☑ Sort by
☐ Print selected

☑ Expanded page header
☐ Large 'Plot' experimental unit numbers
☑ List calculation equations
☑ List product amount totals...   [Options...]
  ● Include all application codes in study
  ○ Include only selected application codes
☑ Weigh liquid formulations (requires density)

Treatments
☐ List ingredients for pre-mixes...   [Options...]

[Fields To Print...]
[Sort Options...]

Spray/Seeding Plan A

Gylling Data Management, Inc.

An assessment of the efficacy of TUB and other fungicides for the control of Septoria Diseases in winter wheat
Trial ID: G-All7_Fung   Protocol ID: G-All7_Fung
Location: Gembloux   Study Director: R.E. Cearch
Investigator: Your Name

Reps: 4   Plots: 2.5 by 10 meters
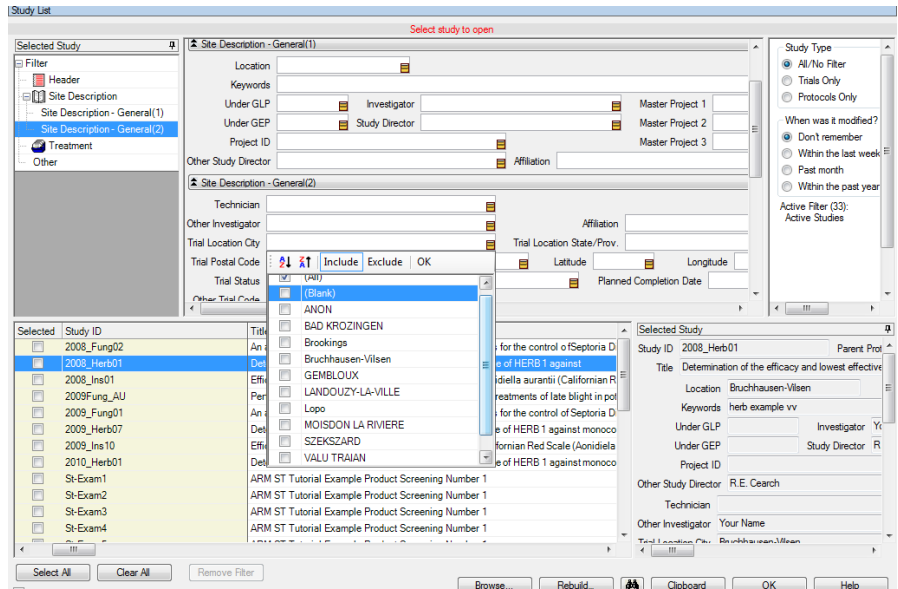Spray vol: 200 l/ha   Mix size: 2.15 liters (min 2.1502)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Appl Unit	Spray Code	Volume Volume	Mix Unit	Mix Size	Amt Unit	Product to Measure	Plot No. Rep. 1	2	3	4
3	TUB	250	G/L	EC	1	l/ha	ABC					10.75 ml/mx	101	202	301	402
1	Untreated Check						ABC						102	205	303	401
4	TILT 250	250	G/L	EC	0.5	l/ha	ABC					5.375 ml/mx	103	204	305	404
2	TUB	250	G/L	EC	0.5	l/ha	ABC					5.375 ml/mx	104	201	302	403
5	MICO 60	600	G/L	EC	1.5	l/ha	ABC	250	L/HA	2.65	Liters	15.9 ml/mx	105	203	304	405

Current ARM Features

ARM will make you more efficient and effective in managing your research studies. It can help improve research quality, and reduce the time required to report results with clean new visual style that is much friendlier for an infrequent ARM user. Someone familiar with ARM will be immediately productive, since all ARM commands and ways of working are fully supported in updated ARM versions.
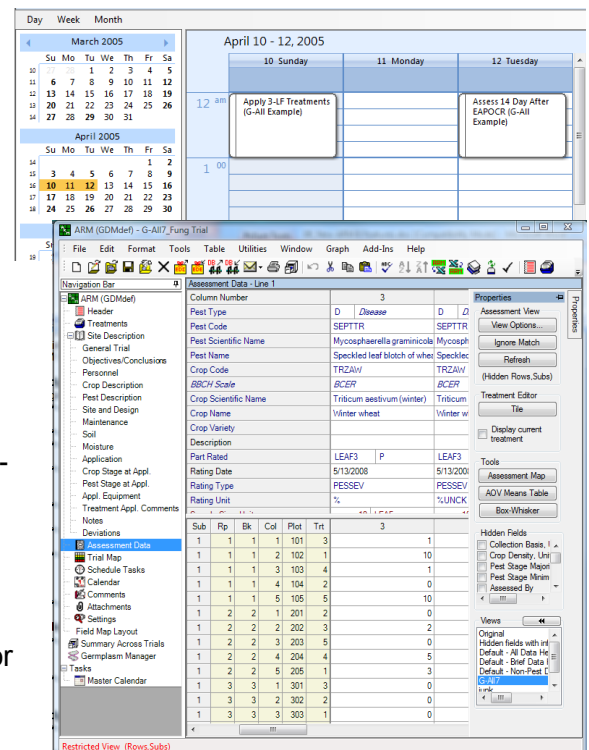
Study List is a table displaying key information about all ARM studies on your PC. The new ARM study list design makes it much easier to view, search, select, and manage studies. New features include:

- ➢ Split-screen design shows study details on easy-to-read form view.
- ➢ More filters to find studies of interest.
- ➢ Easily locate trials containing specific treatment products, crops, or targets.
- ➢ Use new Filters tab to display list of all unique entries in each study list field, such as location or treatment name.
- ➢ File management features to archive, move, rename, or delete study files.
- ➢ Easily hide or display archived (completed) studies.
- ➢ Restore studies to a previous version, to rollback from an accidental change or file corruption caused by a computer hardware failure. (See Automatic Backups for more information.)
- ➢ Launch file tasks from study list, such as printing reports or exporting results.
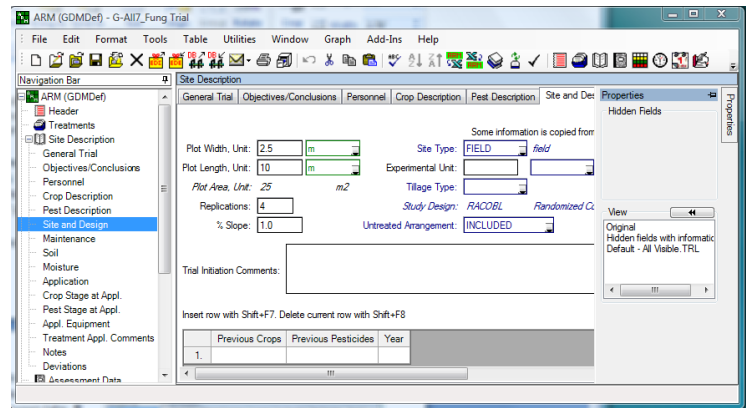
Tasks and Scheduling

- ➢ Study calendar displays scheduled tasks for current study in an Microsoft Outlook style calendar, with choices of day, week, month, and custom views.

- ➢ Master calendar shows scheduled tasks for all trials, with the same view options as for study calendar.
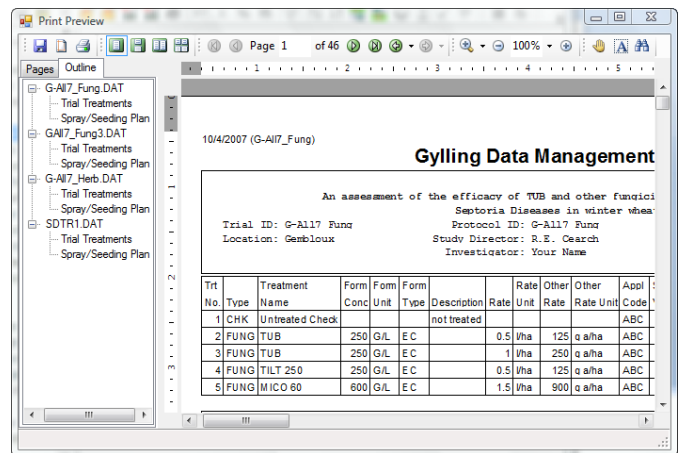
Study Editors

- ➢ Navigation bar shows new study editors, offering a simple one click method to view each editor.
- ➢ Split ARM desktop into horizontal or vertical panels, to display multiple editors.
- ➢ Schedule editor includes a grid view of tasks, to easily insert, move, and copy/paste tasks.
- ➢ New task categories of "Assigned to" and "Task length", with automatic assessment link to "Assessment Timing" for identifying completed tasks.

- Assessment editor includes a dockable properties dialog with auto-hide.
- Site description editor fully supports displaying and printing proportional fonts. Editor uses a new one row tab list to easily switch between tabs.
- Navigation bar at left lists all site description tabs in a fixed order (an often requested feature).
- Prompts and entry fields are aligned into logical columns on site description and protocol description.
- Prompt columns automatically adjust for different language translation prompt lengths.
- Site and protocol description editors use the current editor font (Tools - Options - Display), the same as other ARM study editors.

Reports

- Adjusting margins or changing page orientation on Print Preview dialog automatically repaginates report.
- New choices to view report thumbnails, zoom, display pages, and select text on Print Preview.
- Print reports to Adobe PDF files with a single button click using included PDF writer.
- Tree view of reports and studies on Print Preview dialog, to easily display a selected report page.
- Automatically create a PDF copy of every printed report, to keep a permanent electronic record.
- Select treatments, assessment columns, and data header rows to print with simple mouse clicks.

Automatic Backups

Study list file management features include automatic backup of study files, providing data protection against hardware problems or accidental study changes.

Help

A new media clips toolbar icon and help menu choice offers easy access to short media clips demonstrating how to perform typical tasks in ARM. Users should require less training and support to use ARM 9 because of the interface and help enhancements.

System Requirements

ARM 9 requirements are based on minimum software required to support Microsoft .NET 2.0 runtime, plus hardware to provide adequate software performance for typical tasks. Recommended system configuration is:

- Windows XP, Windows Vista, or Windows 7
- 1 GHz or faster processor
- 512 MB or more of RAM (2 GB minimum recommended for Vista and Windows 7)
- 400 MB available hard disk space
- 1024 x 768 or higher display resolution
- Mouse or pointing device
- CD-ROM or DVD-ROM to install program and license
- Printer

- ➢ Recommend one physically separate drive (USB flash drive, second hard drive, or network drive) for archiving and backing up ARM studies
- ➢ Optional USB connection for Psion Workabout Pro or other data collector
- ➢ Print to Excel, Push/Pull, and Report Link features require Microsoft Excel 2003 or newer
- ➢ Send To feature requires a MAPI-enabled email program such as Microsoft Outlook

Supported Software Versions Policy

In general, GDM fully supports the current release version of software, and offers limited support for one previous version. For example, when ARM 8 was released in March 2008 it became the 'current release version', and ARM 7 became the 'previous version'. Thus ARM 7 became obsolete in 2012 when ARM 9 was released.

Please note that within a software version listed below, GDM gives free support only for the most recent free maintenance update. Users should always install the most recent free maintenance update before contacting GDM for support.

GDM goal is to support our clients using our software. Many software updates result from clients who share what they wish our software would do, and what new features would be nice to include. We also improve documentation and error handling based on support calls from researchers using our software.

GDM Free Software Support Policy

** GDM provides free support for installations that meet all 9 requirements described below:

1. The installation is your newest purchased ARM version;
2. The most recent released ARM maintenance update for that version is installed;
3. It is a GDM supported program version;
4. The program was installed from a GDM CD or the GDM website (not an unknown installation from another website, CD/DVD, or company);
5. It is installed on a stand-alone Windows PC (not running from a thin client);
6. The PC is running on current service pack of a supported Windows version (with Word, Excel, and Outlook to fully support all ARM features);
7. The Windows version was either pre-installed on a purchased PC, or installed from a Windows installation DVD/CD;
8. The ARM program is run from a Windows user account with all required user rights and permissions for ARM to work properly;
9. The Windows user account has permission to run the ARM Support Viewer (see Using the ARM Support Viewer for more information).

GDM charges $150/hour for support on any system that does not meet all 9 conditions listed above. (Minimum time is 1 hour.)

Examples are for support issues that result from:

- ➢ Installing ARM on a Windows image built by corporate IT, or on Citrix or Terminal Server.
- ➢ Installing a corporate in-house version of an ARM customization on a cooperator or contractor PC when a cooperator/contractor version is available.
- ➢ Moving required ARM folders that are installed by ARM, such as study definition or program folders.
- ➢ There is limited support for GDM software installed on an Apple Macintosh computer, with free support only for questions about the GDM software. GDM cannot answer questions about Macintosh computers, Parallels emulator program, or a supported Windows version installed within Parallels.