ARM Training Agenda - 2018 NAICC

1. **Welcome**
2. **ARM Overview**
   a. Logging in
   b. Startup wizard
   c. The ARM window
      i. Window title
      ii. Menu bar, right-click menu (context-specific)
      iii. Toolbar
      iv. Navigation bar
      v. Main editor pane
   d. Review program options
      i. General tab – Measurement unit, Language
      ii. Display tab – Date, time, GPS formats, fonts and colors in ARM
3. **Getting help in ARM**
   a. Contents
   b. Search for Help
      i. Index tab
      ii. Search tab
   c. Topic Help (F1) – current screen/editor – context-specific
   d. Study Definition Help (F5) – current data entry field - context-specific
   e. References (pdf)
      i. Quick Reference – printable overview
      ii. The rest provide details on specific ARM features
   f. How-to Topics – step by step tasks
   g. Tutorial – large introduction PowerPoint
   h. Media – videos
      i. Instead use website: Resources – Video Tutorials
   i. Website – Search, newest info/announcements
4. **Study List**
   a. The list of all files you've opened in ARM – just a *view* of the files, not where they are actually stored.
   b. *Switch to Tutorial study list so all have common files*
   c. Sections of the study list:
      i. Study Grid – the indexed list of ARM files.
         1. 'Selected' column – use to select one or more files to open.
         2. Study ID column – the main identification of a study (should be unique)
      ii. Selected Study tab – way to review the indexed information of the selected (in blue) study.
      iii. Filters section – tool to filter down the list to show only files of interest

    iv. Quick Filter panel – tool to define pre-set filters with a single click, and see currently applied filter

        1. *Whole Field, Everything Except, Filter for 2015-2017 (since numeric field)*

    v. Filter Navigation bar – navigates through the groups on the Filters section

        1. *Select Treatments to show that cursor moves to that section*

  d. Examples of filters

    i. What are trials we've done in the past for a particular product?

        1. Treatment name – using gold box filter list (like Excel filters) – Sure Kill

        2. For these, what were the Crops? Select >1 applies logical OR, so spring and winter wheat included

        3. Then what Pests? *Show additive Active Filter and use Remove Filter button*

    ii. Title field – enter 'example' then right-click 'Contains' instead of an exact match

        1. *Right-click to remove just this filter*

    iii. Completion date – use Filter For button to select from the calendar tool

  e. Study Grid right-click menu

    i. Filter by [contents of field] within that column/field

    ii. Filter for (as we have done above)

    iii. Hide Field/Display All Fields

    iv. Auto-size Column widths to fit contents of table

    v. File management – if done outside of ARM, then Arm doesn't know about it!

  f. Rebuild study list *– toggle out of Tutorial then click Rebuild button.*

    i. Choose a path – the highest-level folder containing all ARM files

    ii. Rebuild method – clear list and start fresh, or add onto existing list

  g. Previous Versions – overview of functionality (not available for Tutorial files)

5. Creating a Protocol

  a. A study has 2 components

    i. Protocol – the plan for an experiment

        1. Treatments to test, planned assessments, study rules

    ii. Trial – the realization of the plan

        1. Randomization, assessment data, site details

        2. Can have several trials per 1 protocol

  b. Select File > New Protocol

    i. Select customization. Usually pick 'Myself…'

    ii. Select Study Definition – what entry fields are used to enter information in the file.

    iii. New Protocol dialog – click Protocol Settings before continuing

  c. Protocol Settings

    i. General tab – replications, plot size (used for product amount calculations)

    ii. Design tab – appropriate plot randomization and analysis for each type

        1. Power and Efficiency tool for planning experiments

  iii. Treatment tab – untreated check, reference, treatment units

  iv. Application tab – liquid product calculations

    1. ARM calculates min mix to cover treated plot area

    2. Specify overage for filling lines/flushing nozzles

  v. Layout tab – customize how randomization is laid out in trial

  vi. Save as Default vs. Save Set to remember current Settings configuration for future

  vii. Close Settings, click OK to generate the protocol

6. Protocol Components

  i. note new items in Nav bar, 'Protocol' in title bar

 b. Editor – consists of many fields where information is entered and stored.

  i. Properties panel – quick access to editor-specific actions

 c. Header – defines page heading on reports

 d. Treatments

  i. Contains fields for formulation information, product rates, etc.

  ii. Treatment view options

  iii. Entering treatments

    1. "Master List" ex. Form Unit – a universal set of options to select from

    2. Rate vs. Other Rate

    3. Application Codes

  iv. Keyboard shortcuts

    1. Single quote ' copies from above

    2. Double quote " copies entire line (in Treatment Name)

  v. Copying from Excel – use provided XLS file

  vi. Multiple components within a single treatment number

  vii. Add an adjuvant to all existing treatments – Paste Special

 e. Protocol Description – group of several editors or tabs to enter data. Tabs depend on study definition selected.

  i. Trial Establishment Guidelines

    1. Keywords field

    2. Trial Location Grid – plan/assign trial IDs to trialist

  ii. Crop/Pest Description – planned crops and pests to study

    1. Repeating Section – multiple instances of a set of fields

  iii. Maintenance tab – field prep/maintenance to apply

  iv. Application tab

    1. Relation to Appl Code entered in treatments

    2. Spray Volume auto-filled from Settings

    3. Application Directions field communicates specific directions to trialist

  v. Crop/Pest Stage at Appl – when applications should occur based on stage

  vi. Site Information

1. RTF field – mini word processor for formatted text, tables, images, etc.

    f. Assessment data - describe planned assessments

        i. In a protocol, only the assessment header is available (no data yet!)

        ii. Enter critical assessments in the protocol

            1. Communicate to trialist what must be recorded

            2. Results in more consistent data when receiving from trialists – a must to summarize from multiple trials (Summary across Trials)

    g. Study Rules – important requirements to enforce in a trial

        i. 'Required' or 'Recommended' data entry fields

        ii. 'Limit validation list' so assessments only select targeted crops/pests

    h. Protocol Reports

        i. Number of trials impact Product Amount Totals

    i. Sending protocols (File - Send To)

        i. Send ARM file, attachments, images, report all together

7. Creating a trial

    a. *Load the ARMcoach_1-02 protocol file provided.*

    b. Several ways to create a trial from a protocol

    c. Trial Location table displays to select which trial to create (if this is empty then does not display)

    d. Trial Map displays with a new randomization based on settings from Protocol. Click Settings to change Layout options

        i. Numbering options

        ii. Starting block/plot offset

        iii. Block/plot increment

        iv. Buffer size

        v. Block size, treatment adjacency

    e. Click Accept Current to accept the randomization and proceed into trial (can still edit map later)

    f. Save the trial file

    g. Another instance of ARM has opened. Can create the additional trials now *(but today pick 'No')*

8. Components of a trial

    a. Header

    b. Treatments

    c. Site Description

        i. General Trial – trial status, initiation/completion dates, GPS coordinates

        ii. Objectives & Conclusions

        iii. Crop/Pest descriptions

        iv. Weather

        v. Application

        vi. Crop/Pest Stage at Application

        vii. Application Equipment

    d. Trial Map

        i. Note Help button in corner (or F1).

        ii. Properties Panel

1. Color by – sets how plots are colored on map

2. Auto-select for move – drag and drop plots on the map to match your field

iii. Options tab – change how plots are displayed on the map

iv. Movement arrows tab – define how you move through the trial

v. Treatment Description tab

vi. Quality tab

1. Improve precision by making blocks as square as possible to fight natural field variation

2. How many times is a treatment on an edge? (if buffer plots then may not matter)

3. Average distance of 1 trt compared to all other trts across replicates – want a balance

a. New option for spatially balanced randomization (on Design settings)

e. Assessment Data

i. Describing assessments

1. Same header as in the protocol. Now we have space for data

2. Protocol writers will fill in headers with critical information they expect back. It is important to leave the pre-filled headers as-is, to maintain the protocol writer's structure when they receive the data back to combine the data.

3. Overview of header fields (from trialist perspective this time)

ii. Plot data components/elements

1. Numeric value

2. Additional documentation/description:

a. Textual Comment

b. Attach an image

c. GPS coordinates

d. Barcode

e. Mark as damaged – preserves data value yet analyses as missing

f. Enter a value + comment + damaged -> shows red triangle and strikethrough

iii. Methods to enter assessment data

1. Direct typing

2. Keyboard shortcuts – for filling a column with same value

a. Type 'z' and 'c' or 'h' gives 0 and 100 and auto-advances the cursor

b. Single quote pastes info from cell directly above

c. Copy value and select whole column to paste

3. Excel Rating Shell – just define the process, don't actually do it

4. Copy and Paste from a spreadsheet

a. Paste 1 data column w/ plot column – "Be sure to include Plot numbers in the paste, so ARM can match up the data with the plot"

b. Paste 1 data column w/o plot column – "Otherwise, must be certain that ARM is sorted same as your copied data"

5. TDC (give full tutorial now)

a. Tablet Data Entry Options:

          i.   sort and cursor order,

          ii.   data column selection (2 data columns)

          iii.   'Auto-launch Camera App option'

    b.   Image options – how to rename image files when copying to trial folder. Great time-saver!

    c.   Window – Dock – Right to align ARM and camera on-screen (ARM remembers the last setup)

    d.   On-screen keypad, shortcut buttons.

    e.   Enter a value then take a picture. Attaches to plot and moves cursor to next plot.

    f.   'Trial GPS Coordinates' feature

    iv.   Attach image – batch from file

9. Data Review

10. Reporting

    a.   Site description
        i.   Dividing and rearranging site description tabs using Selected Tabs

    b.   Summary (data analysis)
        i.   Assessment data
        ii.   AOV Means Table
            1.   Manually selecting treatments, data columns, data header rows, and replicates to analyze
            2.   Using views to control the reported data columns, column order, and data header rows
            3.   Understanding the LSD range reported for data transformed with an automatic data correction
            4.   Advanced features
                a.   Post-hoc power analysis
                b.   Spatial adjustment
        iii.   Dose-response, using "Dose-Response Dicamba" tutorial trial
        iv.   Correlations
    c.   Graphs

11. Sending Trial Results

    a.   File – Send To
    b.   Communicate using cloud storage (e.g. Dropbox)

Additional topics, if time:

- Assessment View options
- Migrate Studies and Settings to a new computer
- Sharing validation lists
- Multi-factor studies (*have a video on this)
- Field Maps
- Power and Efficiency table
- (more) Study Rules
- Task Scheduler