AGROBASE generation II®

Introductory to Advanced Training Course
Five Day Course Information and Agenda

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Who Should Attend? This course is designed for those who have never or only occasionally used this software – but have at least viewed some of the online tutorials – yet want to increase their basic proficiency, or those who have an intermediate knowledge, or the more advanced users who wish to increase their proficiency in the use of AGROBASE. The more experienced users might not need to take the first two days, those wanting the advanced topics would take the last two days. Trainees not into plant breeding *per se*, but variety testing, or not interested in the plant breeding topics, would focus on the first three days if new to the software, otherwise the second and third days.

Requirements. In all cases, this course assumes a basic competence in the use of computer software and operating systems as well as basic terminology in agronomy and plant breeding. Agronomix Software will assist all trainees well before the course to ensure that AGROBASE is installed on their own laptop computer as a demo or registered version. While trainees can bring their own data files, typically Excel®, with entry lists, experiments, nurseries, etc., the course will use the same data from course training files to create and develop the same AGROBASE training SQL database during the course. The exercises noted below are the main ones, there are many more in the course to facilitate learning.

Day 1- Research Groups, Experiments, Data Import and Export, Trials

This day of instruction is mandatory for all new users, or for those who need to ensure the most basic competency in using AGROBASE. More advanced users, or those who have taken this part of the course previously, could begin on the following day. The topics from this day will be assumed and not covered in the following days of instruction.

8:30 -10:00 am
• Welcome and introductions
• Verify installation of the SQL Server version in all trainee laptops – must be done prior to the course
• Understanding research groups and relational databases
• Creating, accessing, restoring, copying and managing a research group
• Data security, backups, and LAN issues
• Navigating a research group – menus, interface, Help system – DEMO research group as an example
• Using the data explorer to access treatments, experiments, nurseries, trials, locations, years
• Addition and definition of an initial set of data traits for your practice research group
• Managing traits: grouping, exporting, importing
• **Class Exercise**: Creation and initial development of your “practice” research group for this course

10:00-10:15 am
• Refreshment break

10:15 to 12:00 pm
• Addition and definition of locations and location groups
• Treatments (varieties, hybrids, fertilizer levels, herbicides, etc.): their creation, grouping, and use
• Importing treatments from the training Excel file

• Grouping treatments
• Drag and drop
• Finding treatments in the research group
• **Class exercise:** importing sample treatment lists

12:00 to 1:00 pm
• Lunch break, possibly as a group depending upon venue
• Interaction with the course instructor as possible with trainees

1:00 to 3:00 pm
• Designing experiments – RCBD and split plots, other designs depending upon trainee interest
• Exporting experiments to Excel or dBase
• Importing experiments from the training Excel file
• Viewing data in experiments – display options, locking traits, sorting**,** setting trait orders
• System settings, split screens, data entry and validation, etc.
• "Static" traits – their use in experiments, relevance
• **Class exercise:** importing experiments and data into your practice research group

3:00 to 3:15 pm
• Refreshment break

3:15 to 4:30 pm
• Perennial experiments
• Sub-sampling
• Modifying and deleting experiments
• Fillers in experiments, correcting for planting errors
• Grouping experiments
• Grouping and managing multi-location experiments (trials)

4:30 to 5:00 pm
• Review from the day – questions from the day's topics
• Trainee's own time to work on the day's topics
• Interact with instructor on specific questions

Day 2 – Field Planting Plans, Reports, Labels, Data Entry

This day focuses on the practical aspects of laying out experiments, trials and nurseries, and then bringing in data. The trainee will use the experiments created in Day 1 in their practice research group.

8:30 to 10:00 am
• Exporting trials
• Importing a trial from the training Excel file
• Optimizing the use of your research group through grouping experiments, trials, and treatments

10:00 to 10:15 am • Refreshment break

10:15 to 12:00 pm
• Visual design of planting plans
• Creating fields maps and sowing order lists
• Planting and harvest order numbers
• Saving and exporting planting plans to Excel and other file formats
• Management of sites and plans
• **Class exercise:** make your own planting plan(s) using experiments from your practice research group
• Generating reports via the report generator

12:00 to 1:00 pm
• Lunch break, possibly as a group depending upon venue
• Interaction with the course instructor as possible with the group

1:00 to 3:00 pm
• Introduction to the report generator: Designing field books
• Advanced report features – conditional printing, data grouping, report objects, calculations in a report
• Designing labels and barcodes, printing multiple labels, thermal labels
• Sorting and filtering prior to generating reports or labels

• **Class exercise:** make your own reports or labels using your practice research group
• Using the Generation II to Excel “express link”
• Using the AGROBASE Tablet® application to enter data into experiments and nurseries from the field or greenhouse and upload to an AGROBASE database over the internet

3:00 to 3:15 pm
• Refreshment break

3:15 to 4:30 pm
• Import data by relational index
• Importance of import profiles
• Notes on traits in each experiment

• ***4:30 to 5:00 pm***
• Review from the day’s topics, answers for any trainee specific questions
• Trainee’s own time to work on the day’s topics
• Interact with instructor on specific questions

Day 3: Data Manipulation, Analysis, Varietal Comparisons, Images

With the experiments planted and data coming in during the season, this day focuses on data manipulation and calculations, basic analysis of variance, and varietal comparisons.

8:30 to 10:00 am
• Transformation (calculation) of data in your research group
• Building functions and logical conditions (filters)
• Managing calculated traits
• Transformation scales for categorical and other types of data
• Graphs – bar, line, point, 3D and trend maps of field data

10:00 to 10:15 am
• Refreshment break

10:15 to 12:00 pm
• Linear models, options, and basic understanding ANOVA output
• The R to AGROBASE Generation II Link
• Modified augmented design Type 2 for early generation yield testing
• Incomplete block and alpha design analyses
• Nearest-neighbor spatial analyses of yield trials
• Combined multi-location analyses, non-orthogonal situations, missing values
• Saving analyses to MS-Word® or Adobe Acrobat®
Note: Only a very basic knowledge of statistics is assumed

12:00 to 1:00 pm
• Lunch break, possibly as a group depending upon venue
• Interaction with the course instructor as possible with the group

1:00 to 3:00 pm
• Performing multiple single analyses of variance
• Accessing other analyses in Generation II – histograms, descriptive statistics, regression, correlation
• Viewing means stored from analyses of variance for single factor experiments
• Computing ranks, percent of checks or varieties
• System settings for displays
• Generating reports from means tables
• Creating selection indices and new groups of varieties or hybrids
• Strategies for completing the yield testing cycle from one year to the next
• Data visualization: biplots, box plots

3:00 to 3:15 pm
• Refreshment break

3:15 to 4:30 pm
• Varietal comparisons – context in Generation II
• Head-to-Head comparisons of varieties or hybrids over years and locations

• Rolling average summaries across multi-year trials for unbalanced data sets
• Performance grid to view relative varietal performance across locations within a year
• GxE analyses with stored means
• Hybrid performance analysis for *gca* and *sca* across experiments, locations, and years
• **Image Display Module:** Image display for treatments, traits, plots, experiments

4:30 to 5:00 pm
• Review from the day's topics, answers for any trainee specific questions
• Trainee's own time to work on the day's topics
• Interact with instructor on specific questions

Day 4 - Plant Breeding System: Parents, Crosses, Populations, Nurseries

This day focuses entirely on the breeding system. This would be an introduction if you have never used the software before, or a refresher to help in "fine tuning" the software if you are a more advanced user. We will try to accommodate as many different crops and breeding schemes – whether self-pollinating, hybrid development, clonal crops breeding, and more.

8:30 to 10:00 am
• Identifying genotypes with desirable traits – querying the research group
• Parental genotypes for a breeding program – grouping, history, etc.
• **Class Exercise:** Importing lists of parents from the trainee Excel file
• Generating crosses for various breeding schemes – self-pollinating**,** cross pollinating, polycrossing, cytoplasmic male sterile systems, synthetics, etc.
• Confirming and managing crosses
• Developing populations from crosses
• Cross prediction

10:00 to 10:15 am
• Refreshment break

10:15 to 12:00 pm
• Developing nurseries with populations and other genetic material
• Making selections and segregating populations, clones, doubled haploids, etc.
• Viewing data from previous nurseries within a current nursery
• Pollination nurseries for hybrid seed production and with more control on layout of parents and inbreds
• **Class exercise:** Make your own crosses from your own parental lists, then design populations, nurseries, make selections – learn to follow the "basic cycle" in Generation II

12:00 to 1:00 pm
• Lunch break, possibly as a group depending upon venue
• Interaction with the course instructor as possible with the group

1:00 to 3:00 pm
• Developing crosses using breeding methods from within a nursery
• Importing pollination records, managing pollination records
• Viewing histories of populations
• Making backcrosses – with or without parental segregation
• Managing populations
• Grouping populations, nurseries
• Finding parents or populations in the breeding system
• Importing populations and crosses
• Relating the breeding system to the agronomic system
• Renaming populations – using the renaming tool
• **Class exercise:** Making crosses from within a nursery, learning more about breeding events

3:00 to 3:15 pm
• Refreshment break

3:15 to 4:30 pm
• Dendrograms – seeing the connections across generations
• Line x Tester experiments and analyses, diallel experiments, gca, sca
• Questions and synthesis of the day's instruction

• Individual interaction with the instructor as time permits
• Review of exercises and assistance from instructor as time permits

Day 5 – Seed Inventory and Advanced Topics

This day will presume a basic to intermediate competence in using the software. The main focus is the seed inventory module. The more advanced features are those not covered in the course already.

8:30 to 10:00 am: Seed Inventory
• Creating seed lots from experiments or nurseries
• Creating seed lots from populations, treatments, or parents
• Creating and assigning seed lot locations
• Seed lot traits, seed inventory system settings, seed lot units
• Managing seed lots – splitting, merging, modifying, editing

10:00 to 10:15 am
• Refreshment break

10:15 to 12:00 pm: Seed Inventory: Continued
• Viewing seed lots and using the main seed inventory node
• Creating seed lot equations
• Allocating seed lots to experiments or nurseries
• Seed lot traits, importing seed lot information into the seed inventory system

12:00 to 1:00 pm
• Lunch break, possibly as a group depending upon venue
• Interaction with the course instructor as possible with the group

1:00 to 1:30 pm: Functions and Expressions - Review
• This material, sent as a PDF before the course, will be covered in response to specific user questions on functions, expressions for searching, filtering, calculations, and the AGROBASE special functions.
• **Class exercise:** Writing functions and expressions for your particular needs

1:30 to 3:00 pm
• Further customization of AGROBASE as per specific requests: Reports, labels, breeding system naming rules, etc.

• ***3:00 to 3:15 pm***
• Refreshment break

3:15 to 4:00 pm
• Final questions and synthesis
• Individual interaction with the instructor as time permits