

PhenoApps:

Integrating Free Mobile Apps into Specialty Crop Breeding and Horticultural Programs

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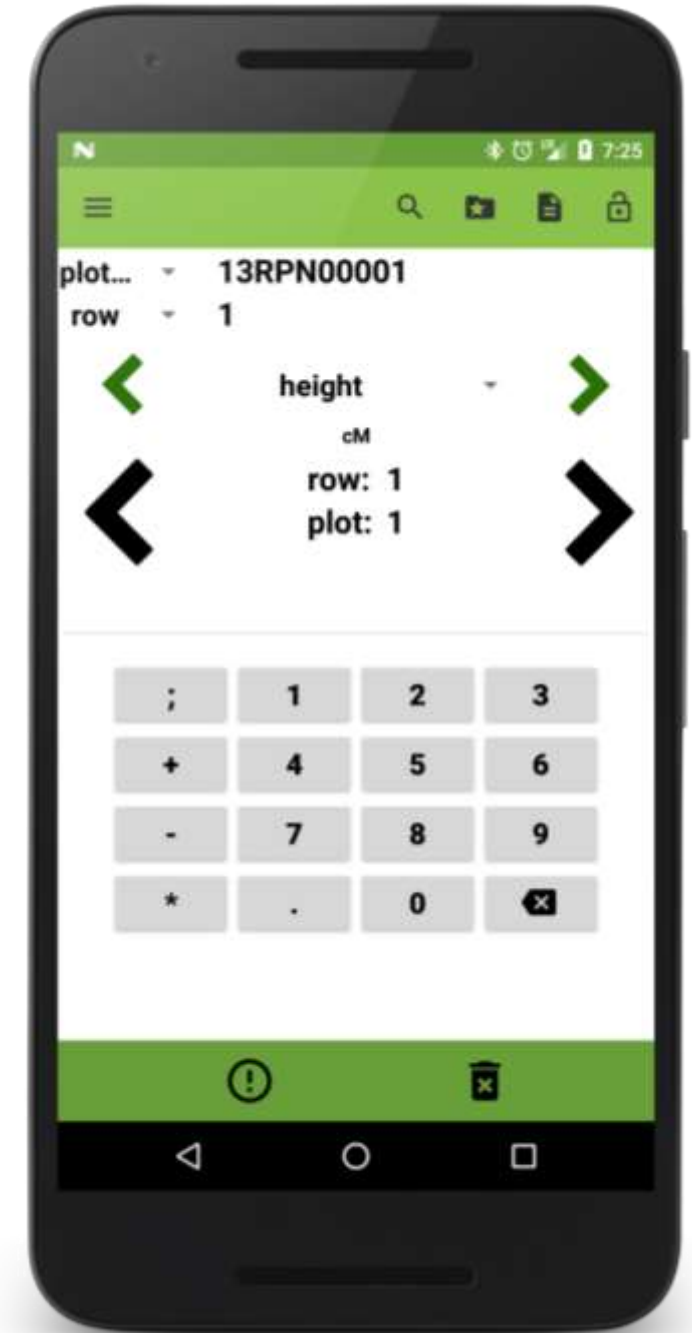






Field Book

- Phenotypic data collection app
- Highly customizable
- Navigate between plots or traits
- Extra plot information displayed
- Manage traits within the app
- Different trait formats and layouts
- 7500+ total installs





Field Book - Traits

Numeric

Categorical

Percent

Date

Boolean

Photo

Text

Disease Rating

Location

Counter

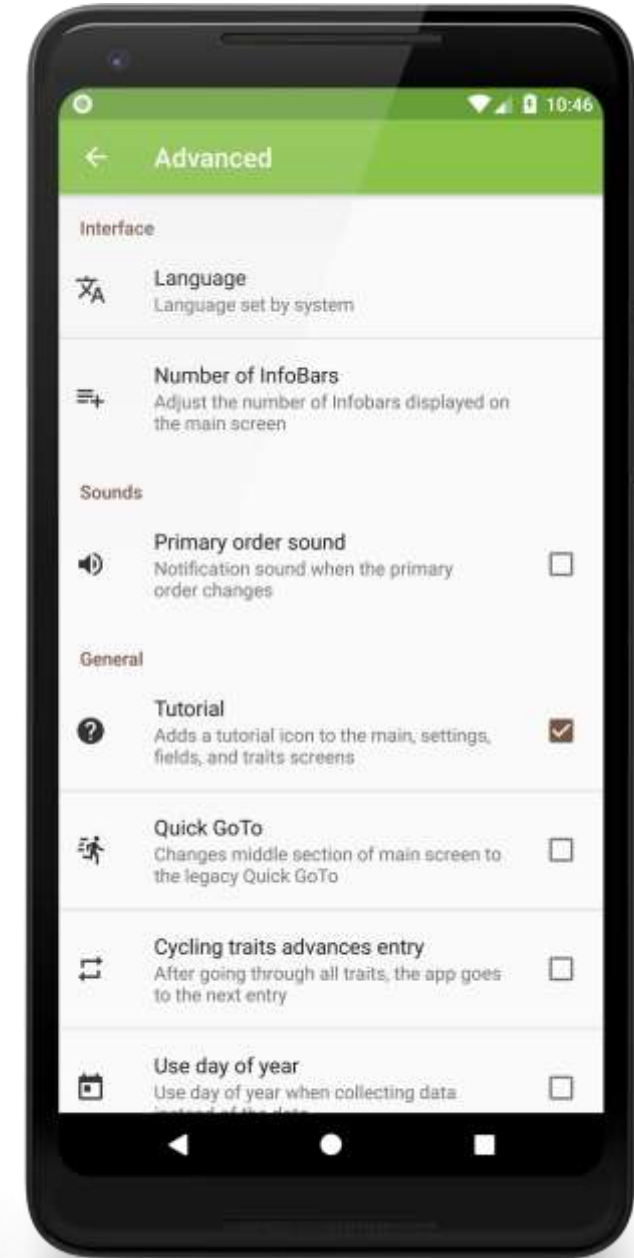
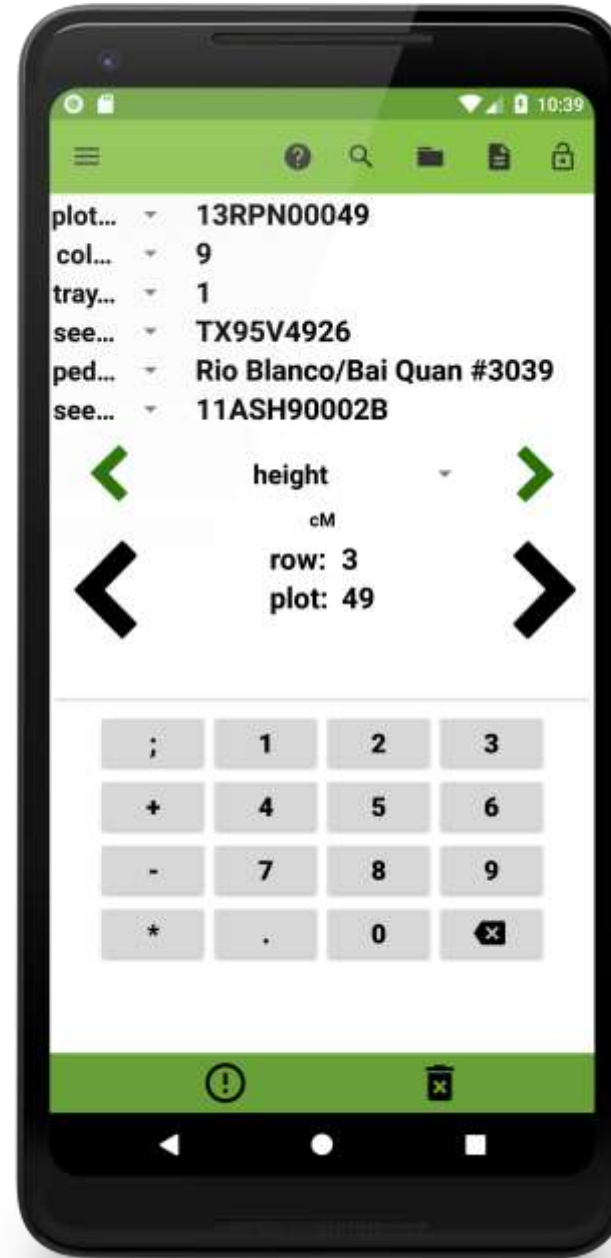
Multicat

Audio



Field Book v4.1

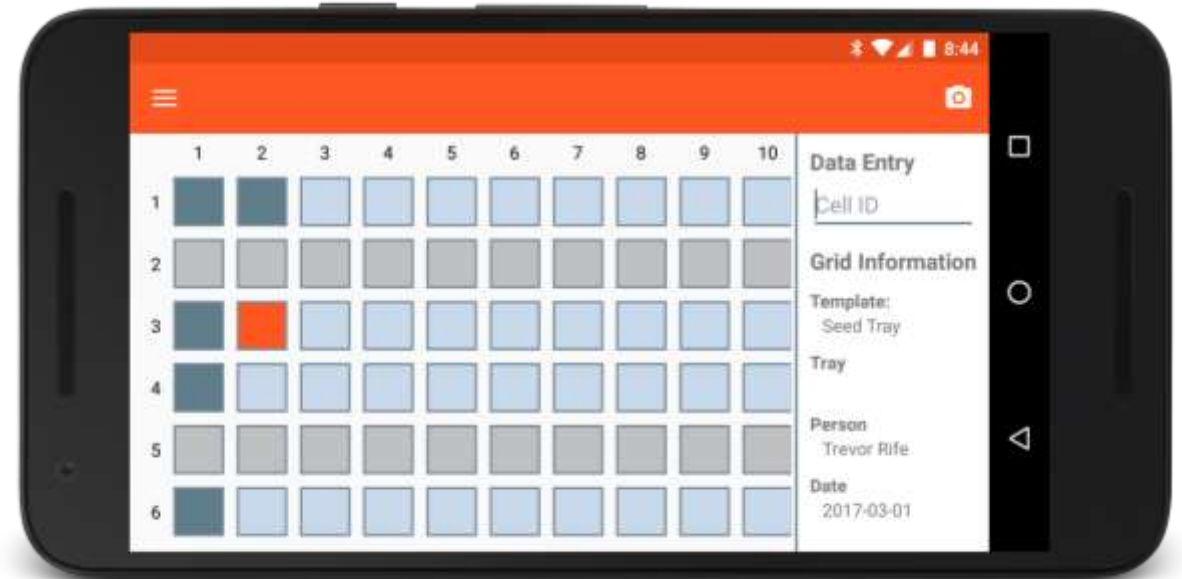
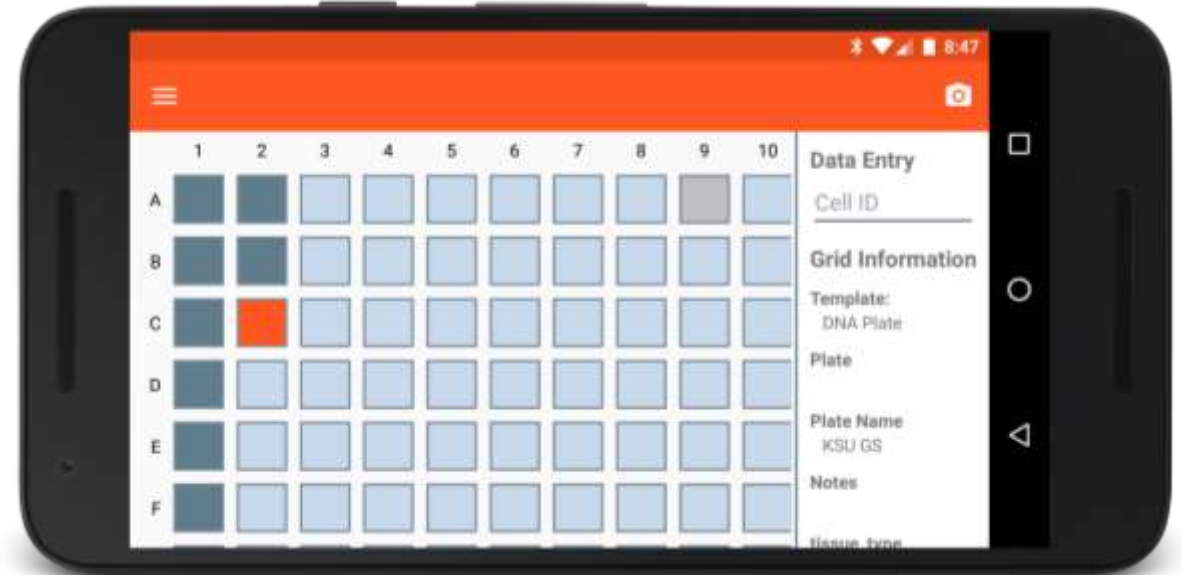
- Additional InfoBars
- Updated preferences
- Hardware navigation
- Updated for newest Android
- Bug fixes





Coordinate v2

- Organize samples in grids
- Create custom templates
 - Exclude rows, columns
 - Change naming schemes
 - Add custom metadata fields
 - Import/Export templates
- Default templates
 - DNA plates
 - Seed trays
- Projects
 - Export multiple grids together





Inventory

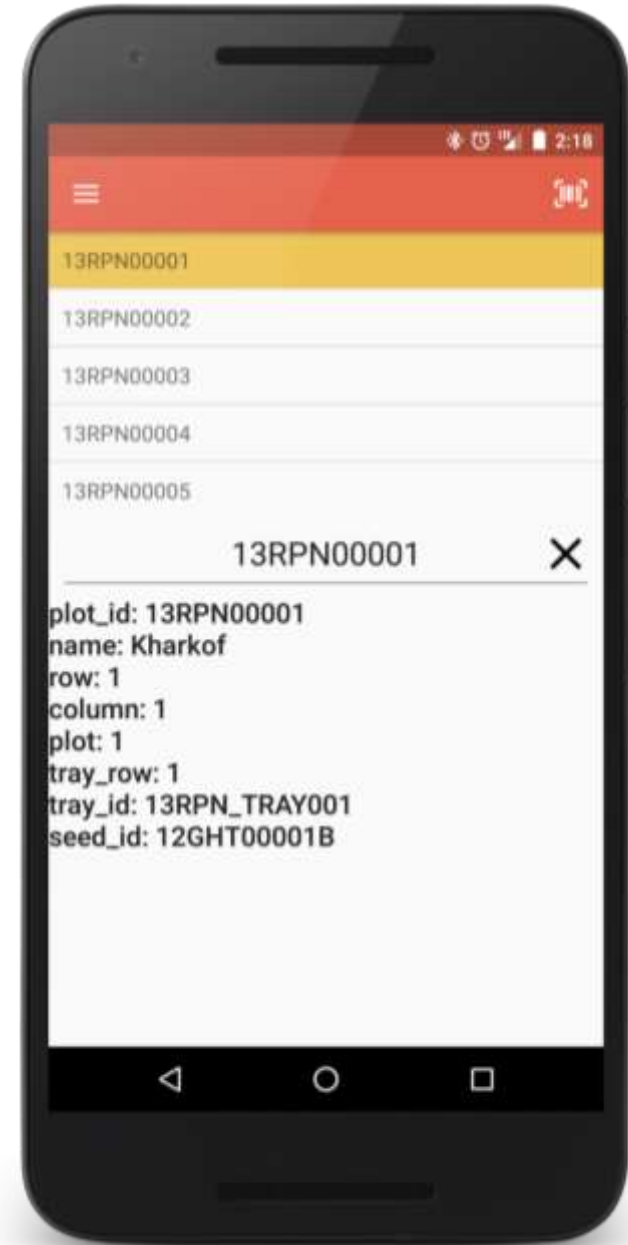
- Associate sample IDs with a specific box
- Simultaneously collect sample weight
- Export to database-ready CSV file





Verify

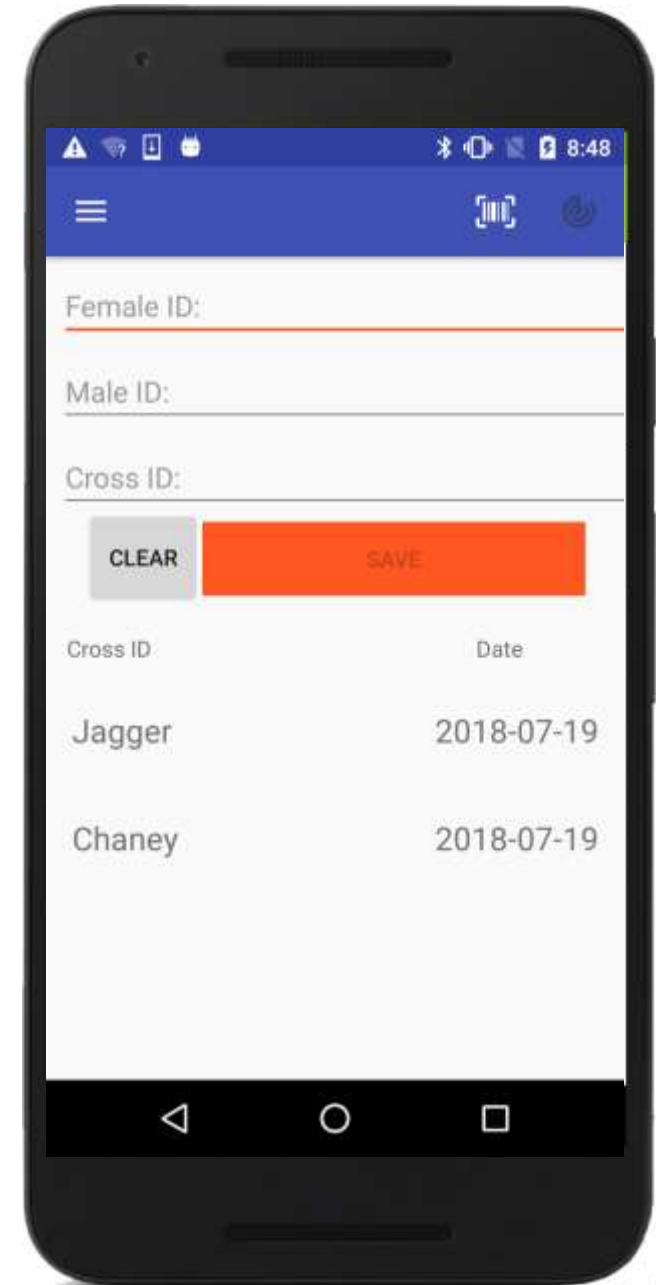
- Data viewing and verification
 1. Import list of entries and data
 2. Select barcode column
 3. Scan entry barcodes
- Different modes:
 - Default: show entry info
 - Order: match entry order
 - Filter: remove scanned items
 - Color: paint scanned items
 - Pair: match individual entries
- Export modified list of entries





Intercross*

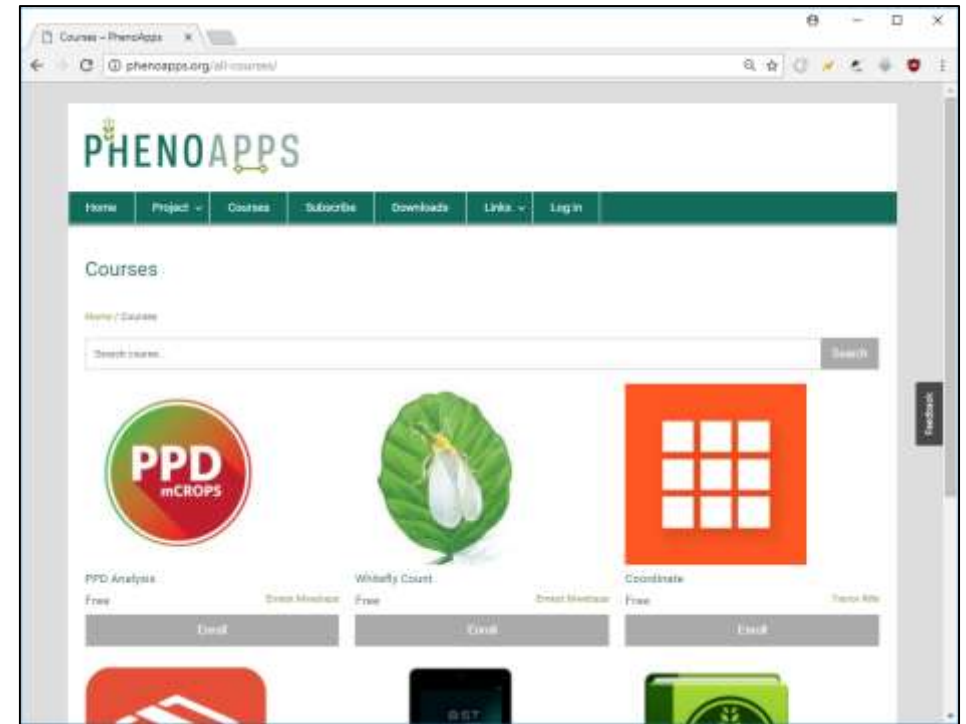
- Manage plant crossing blocks
- Organize parent IDs and cross IDs
- Collect metadata about cross
- Print labels to Zebra portable Bluetooth printer
- Use breeder-friendly names
- Pre-plan crosses





Outreach and Training

- Project website
 - www.phenoapps.org
 - Information about apps and hardware
 - Free courses to guide users
- Workshops
 - Oct 2017 – BARI, India
 - Nov 2017 – Makerere University, Uganda
 - Dec 2017 – Hyderabad, India
 - Feb 2018 – NextGen Cassava, Tanzania
 - Mar 2018 – BGRI, Morocco
 - Jul 2018 – Hackathon, Cornell



Phenotyping Future

- Vast majority of entries in plant breeding are identified by relative location
- Geospatial-based breeding could increase data quality, quantity, and throughput
- Components:
 - 📍 Survey: collect coordinates via RTK GNSS
 - 📍 GeoNav: identify nearest point to breeder
 - 📍 Field Book AR
 - Display information from app
 - Voice control to navigate



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