GETTING STARTED GUIDE

Trimble® Variety Tracking System

Version 6.1
Revision A
March 2012

Trimble

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Release Notice

This is the March 2012 release (Revision A) of the *Trimble Variety Tracking Getting Started Guide*. It applies to version 6.1 of the FmX integrated display firmware.

Product Warranty Information

For applicable product warranty information, please refer to the Warranty Card included with this Trimble product, or consult your Trimble reseller.

Introduction

This *Getting Started Guide* gives a high-level explanation of how to use the Trimble® Variety Tracking system.

Getting the most out of the Trimble Variety Tracking system

This section is an overview of the key elements that are required to use the Variety Tracking system to best advantage. Read this before you start the installation and setup procedures.

Installation

The Trimble Variety Tracking System relies on a good installation of the optical sensors. To ensure the best results:

- Install the optical sensors in the location described in the *Installation Guide*.
- If the desired location is not achievable, install the optical sensors as high as possible, but no more than 6 inches (15 cm) below the top spindle of the elevator.
- Installing the sensors lower than 36 inches (90 cm) above the bottom spindle will give unacceptable results.
- Ensure that there is no opportunity for interference between the optical sensors or the retaining brackets and any moving parts on the combine. Be especially aware of chains, belts, pulleys, and tensioning rods, and keep in mind that their range of motion may be much greater during operation than when standing still.
- Ensure that the optical sensors will not move out of alignment during operation.
- Ensure that the optical sensors will not sense the paddle support bracket. Refer to the *Installation Guide* for more information.

Tare calibration

The quality of the Tare Calibration is critical to getting good accuracy, particularly at low flow rates. To ensure the best results:

- Check the tare daily.
- When performing the tare calibration, run the system at the same speed as you would normally use during operation.
- Running the system empty, look at the elevator speed. This number must be correct, typically between 12–20 Hz.
- Run the tare calibration. The tare value represents the measured thickness of the paddles, and should be approximately correct—it is more important that the number is consistent than that is exactly right.
- If the measured value is considerably higher than expected, check the entered values for paddle spacing, and check that the optical sensors are not being obscured by the support brackets on the paddles.

- If the measured value is considerably lower than expected, recheck the entered paddle spacing and the elevator speed. If both are correct, low tare should not be a problem.
- *Tare Deviation* indicates how much variation there is in the measurement of the paddle size. Normally, this number should be less than ¼ the size of the paddle itself. If this number is excessively large, check the installation for interference or opportunities for excessive vibration, like a poorly-tensioned elevator chain.

Flow calibration

Calibrating the Trimble Yield Monitor system across the full range of flows will improve the accuracy of the system. To get a good calibration, do the following:

- Select calibration loads where the conditions are consistent; where the crop quality is even, the ground is as level as possible, and the passes are as long as possible. Keep the combine speed constant during the entire run.
- Collect loads that are as large as is practical without sacrificing consistency.
- Collect as many different calibration loads as possible, with each load at a different flow rate. To accomplish this, you can run the system at different speeds, or harvest partial header widths.
- If you still have significant errors in the calibrations, check the noise level during harvesting. If this figure is above 30%, check for interference with the optical sensors, or opportunities for excessive vibration. If your paddles are very worn, they may need to be replaced.

Pitch/Roll calibration

The Trimble Yield Monitor system corrects for the pitch and roll of the combine. To benefit from this feature:

- Perform the pitch/roll calibration as described in the owner's manual
- The system has correction parameters for each tilt direction that you can adjust to improve performance. Use the following table when you decide how to adjust these parameters.

Note – *The pitch sensitivity adjustment depends on whether your sensor is mounted in front of or behind the center of the paddle:*

Tilt angle	Sensor position	Yield reading too high	Yield reading too low
Left roll		Increase left roll sensitivity	Decrease left roll sensitivity
Right roll		Increase right roll sensitivity	Decrease right roll sensitivity
Backward pitch	Forward of center	Decrease backward pitch sensitivity	Increase backward pitch sensitivity
	Aft of center	Increase backward pitch sensitivity	Decrease backward pitch sensitivity
Forward pitch	Forward of center	Increase forward pitch sensitivity	Decrease forward pitch sensitivity
	Aft of center	Decrease forward pitch sensitivity	Increase forward pitch sensitivity

- To start, adjust the sensitivity numbers in increments of 0.2.

Test weight

The Trimble Yield Monitor system measures the volume of grain passing through the combine, and estimates the weight by multiplying the measured volume by the test weight. Therefore, an accurate measurement of test weight is required in order to achieve an accurate total weight measurement. To ensure the best results:

- Recheck the test weight whenever the field conditions change significantly, either when harvesting different varieties, or when the moisture level of the crop changes.
- Take several samples of test weight on calibration loads, and use the average of these samples when calibrating.

Operation

How you operate your combine can also affect your accuracy. Consider the following:

- Calibration will be most effective if you operate your combine at the same conditions as you used during calibration.
- Frequent starts and stops during a load could degrade the overall accuracy of the load.

Preparing for installation

Before you begin the installation, make sure that:

- The combine has a header height sensor. If it does not, order one from your combine dealer or from Trimble (P/N 85494-00).
- The grain elevator chain is clean and tight.
- The grain elevator paddles are clean and have no excessive wear, including “cupping”. If the paddles are excessively worn, replace them.

The recommended optical sensor mounting location will not interfere with any moving parts or tensioning rods. If the recommended location is not available on your combine, find another suitable location.

Calibrating the system

To calibrate the Yield Sensor and Moisture Sensor, use either the Single-Load Calibration or the Multi-Load Calibration. Before starting either procedure, keep the following in mind:

- Use the same load type for both Yield and Moisture calibration.
- To achieve the highest accuracy, perform the Multi-Load Calibration procedure.

Calibration

1. Verify that all YM Setup Parameters are correct.
2. Calibrate the *Header Height*.
3. Calibrate the *Temperature*.

4. Calibrate the *Roll Offset*.
5. Calibrate the *Yield Sensor Tare*.

   If the Average Tare Deviation is equivalent to or greater than the thickness of the elevator chain paddle, the system may encounter a large amount of noise. “Noise” can be introduced into the system by any of the following factors:

   - Paddles contacting the Yield Sensor optical lens.
   - Yield Sensor optical lens obstructed.
   - Yield Sensor(s) loose.
   - Elevator chain with excessive slack; paddles flopping up/down.
   - Tensioning rod contacting yield sensors.
   - Excessive paddle wear causing large quantities of grain to fall back down the elevator between the elevator wall and the outside of the paddles.

   To check the Noise percentage of the system, turn the combine separator on at full engine RPM and then select *Yield Monitoring / Diagnostics / Status* to see the Noise percentage. If this is very high, check the aspects listed.

Note – *If the Frequency Deviation is high, you may have an inconsistent Elevator RPM and may need to inspect the performance of your clean grain elevator pulleys, bearings, chain, and so on.*

6. Select one of the following calibration methods:

   - *Speed method*. Uses a consistent speed variable to calibrate for Low, Medium, and High flows.

   a. Conduct a calibration load of 3,000-6,000 lbs. at your normal constant speed.
   b. Repeat this procedure for one load at 1 mph less than the normal operating speed; one load at 2 mph less than then normal operating speed; and one load at 1 mph higher than then normal operating speed.

   This provides a calibration curve for Low, Medium, and High flow variations throughout the course of Harvest.

   An example of calibration loads using this method is as follows:

   Load 1 = 4,547 lbs. @ 4 mph

   Load 2 = 3,834 lbs. @ 3 mph

   Load 3 = 2,764 lbs. @ 2mph

   Load 4 = 5,768 lbs. @ 5 mph

- *Cut Width method*, Uses a consistent cut width variable to calibrate for Low, Medium, and High flows.

a. Conduct a calibration load of 3,000-6,000 lbs. at your normal constant speed with a 100% cut width (12 rows at 30 ft).

b. Repeat this procedure for one load at 75% of the normal cut width (8 rows at 20 ft); one load at 50% of normal cut width (6 rows at 15 ft); and one load at 25% of normal cut width (3 rows at 7.5 ft) at the same constant speed.

This provides a calibration curve for Low, Medium, and High

Flow variations throughout the course of Harvest.

An example of calibration loads using this method is as follows:

Load 1 = 5,768 lbs. @ 4 mph @ 100%

Load 2 = 4,547 lbs. @ 4 mph @ 75%

Load 3 = 3,834 lbs. @ 4 mph @ 50%

Load 4 = 2,764 lbs. @ 4 mph @ 25%

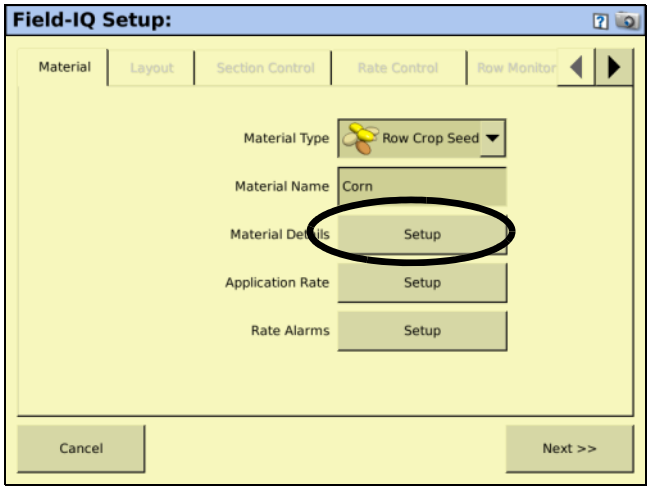
Note – *It is highly recommended that you conduct a minimum of three calibration loads to ensure that the system provides accurate readings for all low, medium, and high flows throughout harvest. If you conduct a Single Load calibration, this may result in poor accuracy performance when Harvesting outside the Flow range at which the system was initially calibrated.*

7. In the *Yield Sensor Calibration* screen for each load:
   - Enter the *Actual Scale Weight*
   - Enter the *Actual Test Weight* (average of a minimum of three test weight measurements)
   - Select each load for which the *Actual Weight* and *Test Weight* will be calibrated
8. Tap **Update Calibration**.
9. Tap **Apply Calibration**.
10. In the *Moisture Sensor Calibration* screen for each load:
    - Enter the *Actual Moisture*
    - Select each load for which the *Actual Moisture* will be calibrated.
11. Tap **Update Calibration**.
12. Tap **Apply Calibration**.

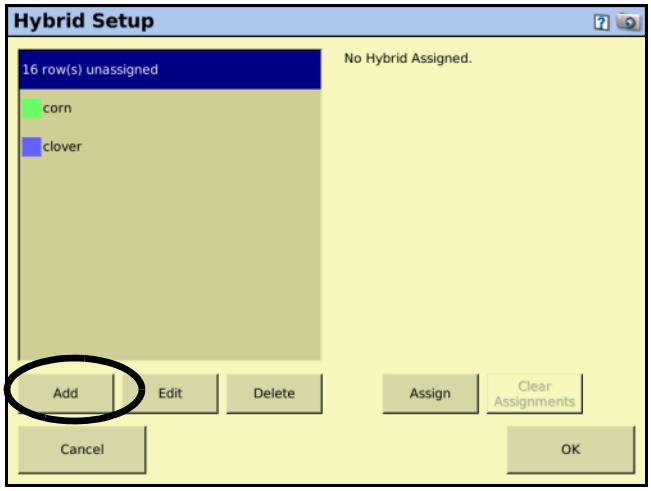
Recording varieties during planting: FmX display

Setting up varieties

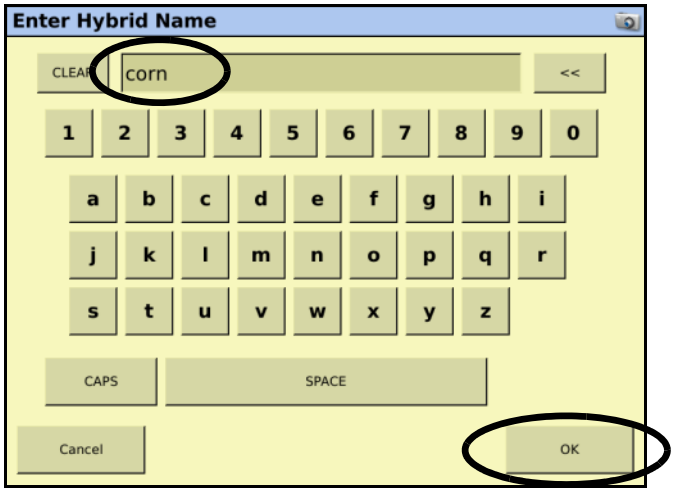
1. Tap **Setup** next to *Material Details*.



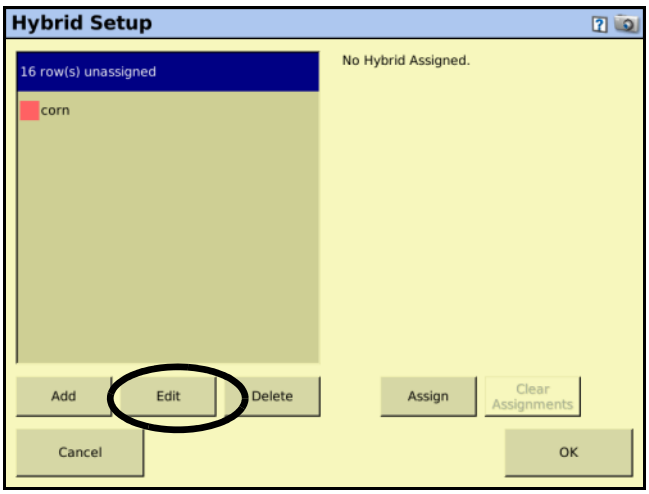
2. To add a new variety, tap **Add**.



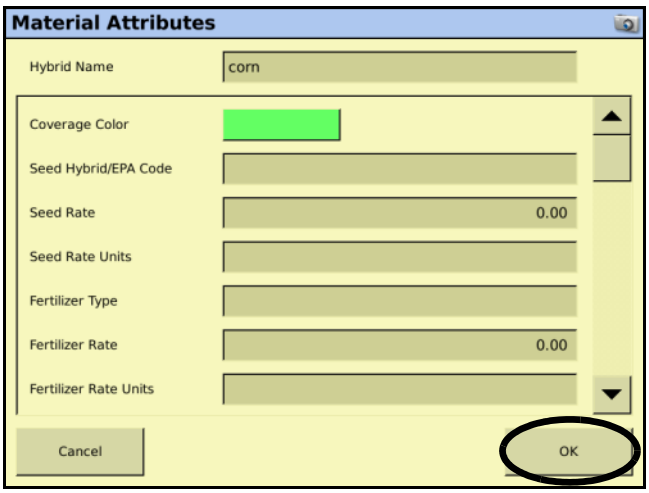
3. Enter the name of the variety and then tap **OK**.



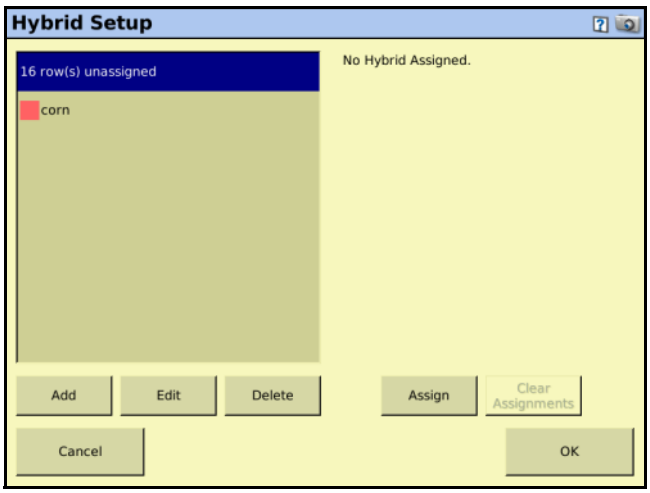
4. Highlight the new variety and then tap **Edit**.



5. Enter the details, select the color of the variety and then tap **OK**.

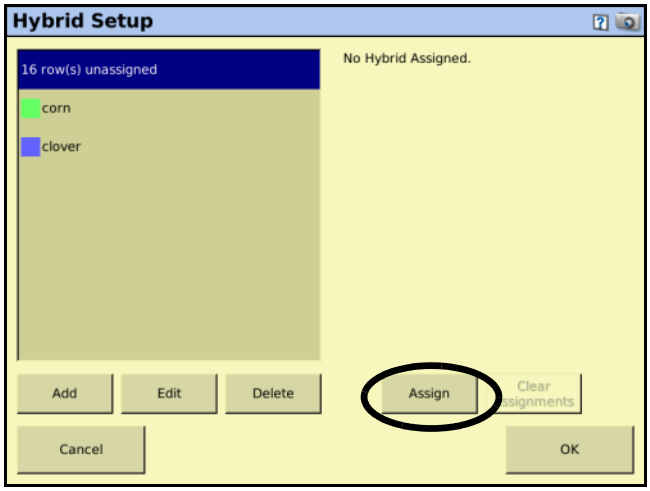


6. To add more varieties, repeat Step 1 through Step 5.
7. To delete a variety, highlight that variety and then tap **Delete**.

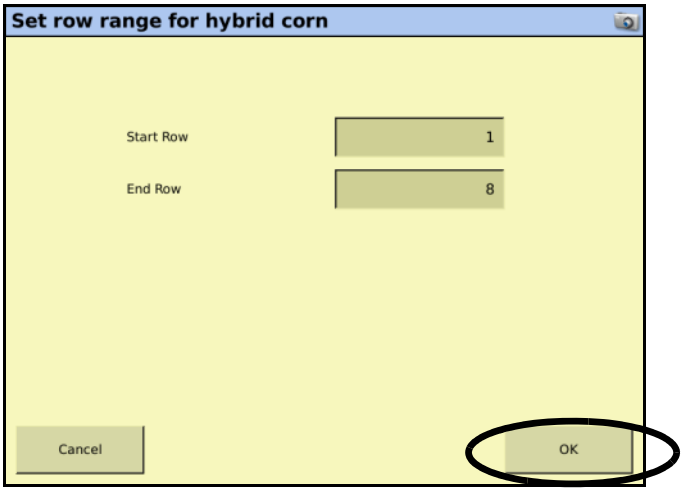


Assigning Varieties

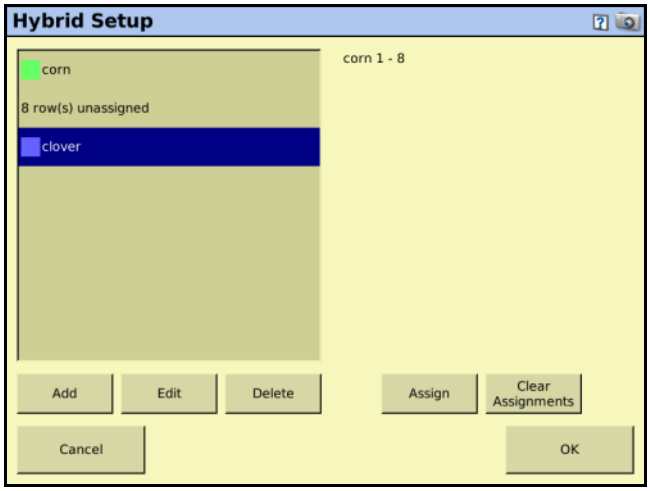
1. Highlight the variety that you want to assign and then tap **Assign**.



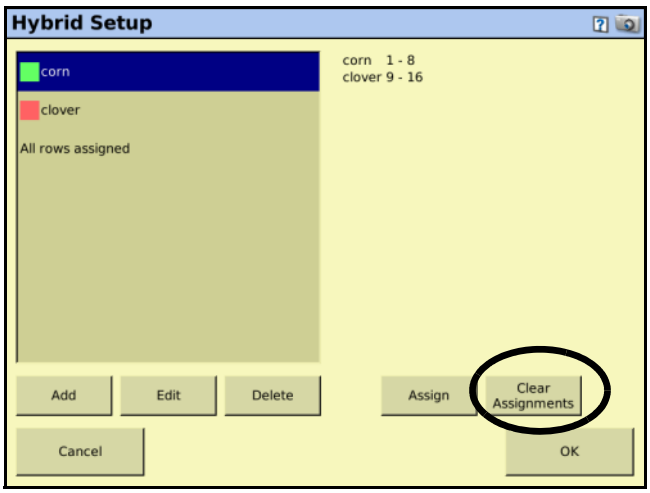
2. Enter the *Start Row* and *Stop Row* and then tap **OK**.



3. To assign another variety, repeat Step 1 and Step 2.



4. To clear all assignment, tap **Clear Assignments**.



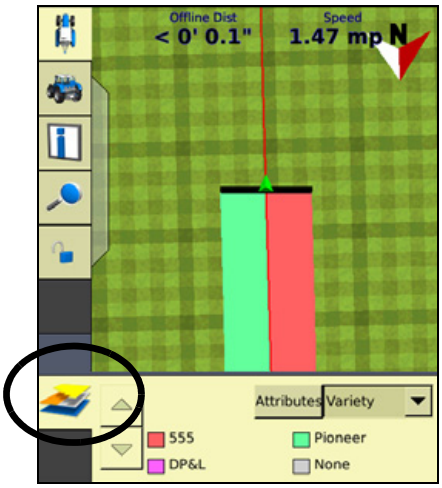
Logging varieties

By default, coverage logging appears yellow in the following screen.

If your planting operation consists of a multi-product application using the Field-IQ® application system, make sure that the planting material is assigned to the primary (or first-configured), layer of the system.

The FmX display allows varieties assignments to be assigned only to the primary of the Field-IQ system.

You can set up ***varieties*** that make it easy to see the difference between different types of coverage:



This enables you to:

- Change product part way through a field, so that you can later identify which parts of the field are covered in which product.
- Plant or apply two or more different products side-by-side and record the locations in your field. For example, you could put corn seed in the left side hoppers on your planter and clover seed in the right side hoppers and track where each set of seeds is planted.

The varieties are assigned to rows on your implement. Specify the number of rows on your implement when you configure it.

Manually creating variety maps: Farm Works software

This is an alternative method (in the Farm Works™ software), to that described in the section Recording varieties during planting: FmX display, page 8.

Writing variety maps to Trimble displays

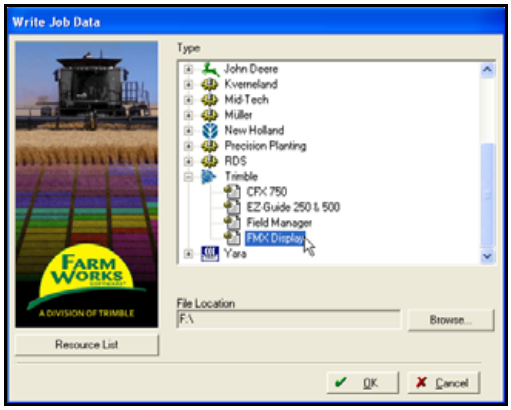
You can use polygon variety maps for the variety locator on devices that have variety locator features. These maps will be included when you select a supported device (such as an FmX display), in the *Write Job Data* dialog.

1. Do one of the following:
   - Select the Write Job Data icon.
   - Select *File* / *Write Job Data*.

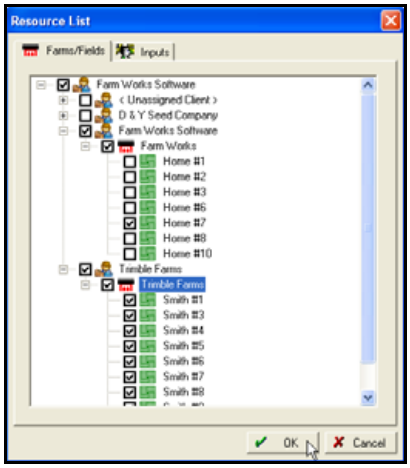
   The *Write Job Data* dialog shows third-party controllers and monitors to which you can write VRA maps, inputs, field names, variety maps, and boundaries.
2. Click the plus sign next to Trimble.

   There are several formats for writing information.

3. Select *FmX Display*:



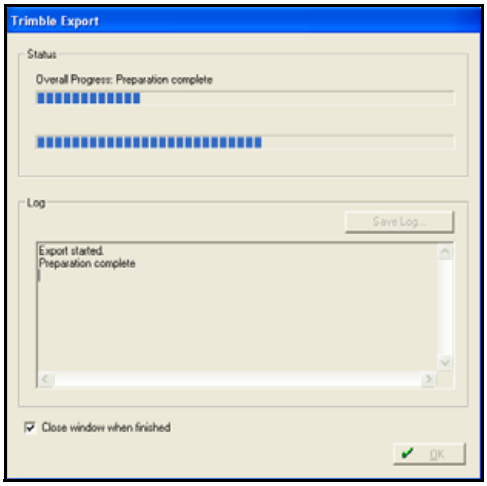
4. Click *Resource List*. Here you can limit the Clients/Farms/Fields and Inputs that will be written out along with the variety map. Click **OK** when done to return to the main *Write Job Data* dialog:



5. Click **Browse** to select the drive that is reading your removable device, such as a Storage Card or USB.

6. Highlight the correct drive in the *Browse for Folder* window and then click **OK**. The correct drive now appears under *File Location*.

7. Click **OK**. A progress screen appears while the software writes the selected information:



Once completed, the main program screen appears.

8. You can now take the card to your device.

Creating a polygon variety map

The Variety Mapping application can automatically create a polygon variety map based on a planting job imported into the Farm Works software using the Read Job Data option. You can use the polygon variety maps for the variety locator on devices that have variety locator features. These maps will be included when you select a supported device (such as an FmX display), in the *Write Job Data* dialog.

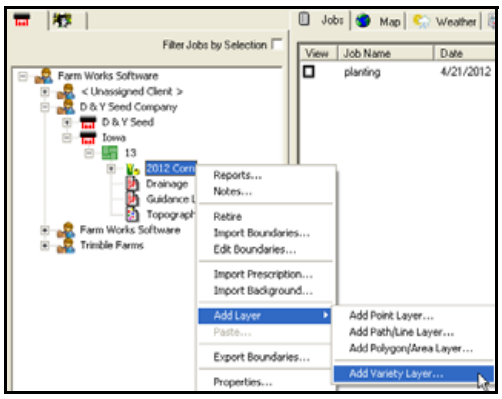
In addition, if you have yield maps, the application will compare the varieties on the polygon variety map to your yield maps to come up with a “yield by variety” that will be included in the Yield Variety report.

You can also use the mapping tools to create a polygon variety map if an imported variety planting map is not available.

Automatically creating polygon variety maps

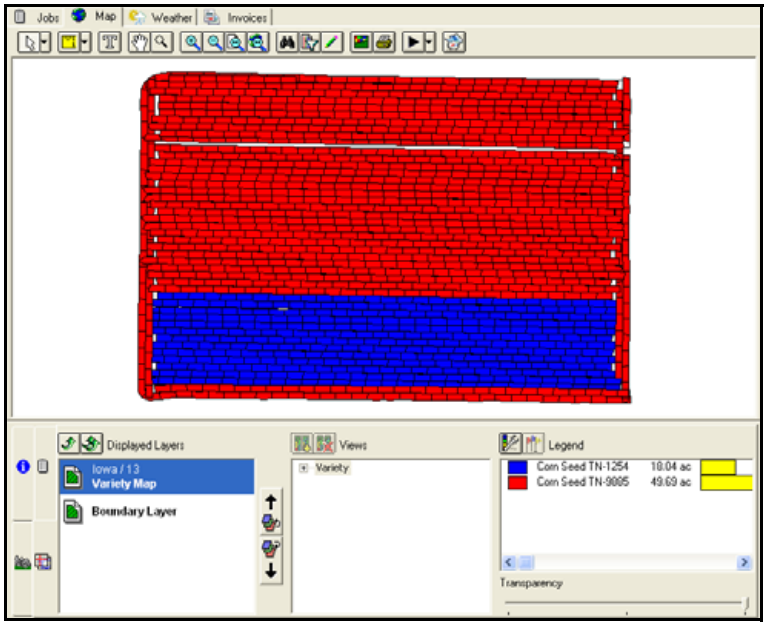
1. In the *Farm* tab, locate the enterprise for the field you want to create a variety map for, such as *2012 Corn*.

2. Right-click on the enterprise, select *Add Layer* and then select *Add Variety Layer*:



3. The variety layer will be listed under the enterprise. Double-click the Variety Map polygon layer to view it in the *Map* tab:

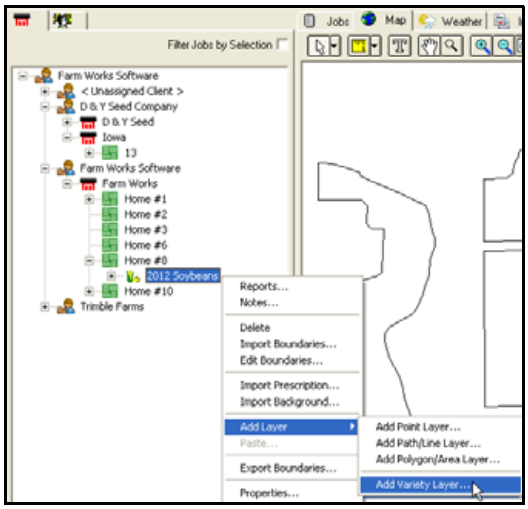
4. The Variety Map appears as a polygon/area map with the different varieties displayed in one map:



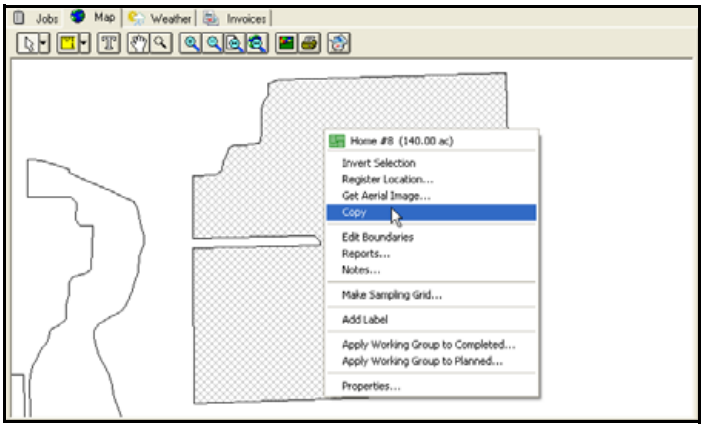
Manually creating polygon variety maps

If you did not use GPS to map where your varieties were planted, there is an option to manually create a polygon variety map. While these maps will not be as accurate as a GPS-created map, they can give a good estimate for use with Variety Locators, and for calculating yield by variety in the Yield Variety Report.

1. In the *Farm* tab, locate the enterprise for the field you want to create a variety map for, such as *2012 Corn*.
2. Right-click on the enterprise, select *Add Layer* and then select *Add Variety Layer*:

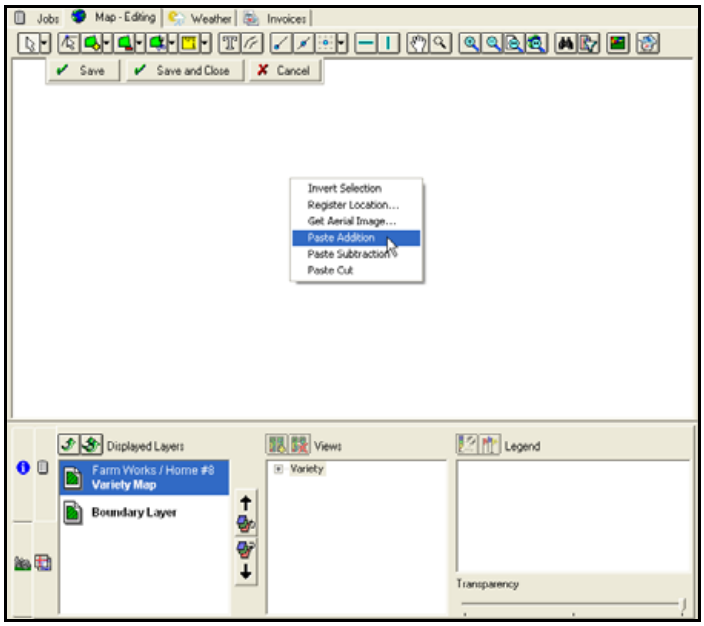


3. Typically, you will want to use your field boundary as a starting point. To do this, click on the field name so that the boundary appears in the *Map* tab. Right-click on the field boundary and then select *Copy*:

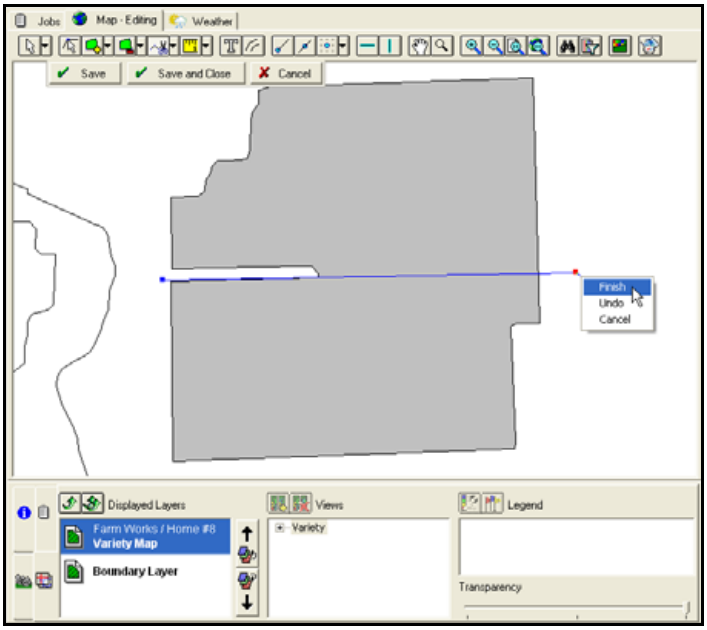


4. The variety layer will be listed under the enterprise. Double-click on the Variety Map polygon layer to view it in the *Map* tab. Since there is not an imported variety planting map, the layer will be blank.
5. With the Variety Layer as the top layer displayed, click Edit Layer .

6. In Map Editing, right-click anywhere on the map and then select *Paste Addition* to paste the field boundary to the Variety Map:

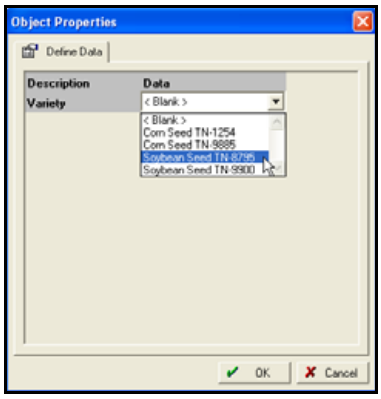


7. From the Split tool list , select *Split Line* to section off the varieties. Click outside the boundary where the split is to begin, click outside the boundary where the split is to end, right-click and then select *Finish*:



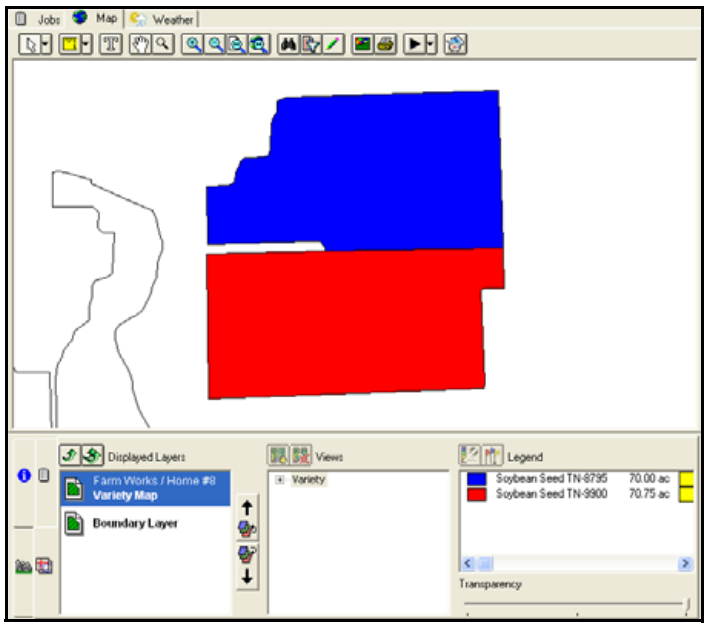
8. With the selection tool , right-click on one of the split sections and then select *Properties*:

9. In the *Object Properties* screen, click in the *Data* field *Variety*. From the drop down list, select the correct variety for that section. Click **OK**:



10. Repeat steps 8 and 9 to assign other sections the correct variety.
11. Click **Save and Close** to save the changes.

The Variety Map now shows the separate varieties with the corresponding legend:



Monitoring yield by variety during harvest: FmX display

Automatic loading

The variety layer is automatically loaded into the background of the FmX display (without the need to import or export data from the Farm Works software), if ***all*** of the following apply:

- The FmX display is running firmware version 6.0 or later.
- You tracked varieties on the display during a Planting or Seeding operation.
- You then changed implements and selected the Harvest operation.
- You added the Yield Monitoring plugin to the active plugins list.

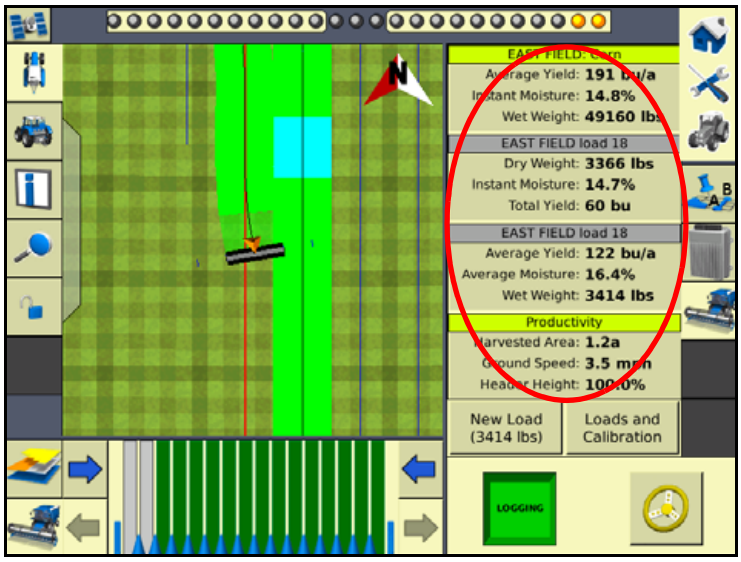
Manual loading

If you ran the Planting operation on an FmX display running firmware earlier than version 6.0, do the following:

- Manually create a variety layer in the Farm Works software, using the polygon construction.
- Export the variety layer back to the FmX display for the next Harvest operation.

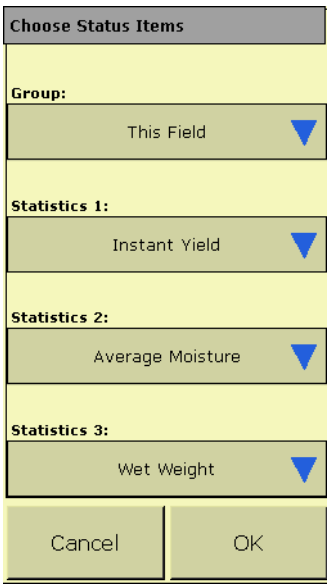
For more details on this subject, and on importing field data from a third-party display, refer to the *Farm Works Mapping Software User Guide*.

Using the Statistics Panel on the display



To customize the status items that appear on your run screen:

1. Tap the area in the panel you would like to edit.
2. In the next tab, tap **Edit Overview**.
3. In the *Choose Status Items* tab, select the items to appear on the run screen:



Select from the following:

Field	Status Item
Group	This Field
	This Load
	Productivity
Statistics 1-3	Instant Moisture
	Average Yield
	Average Moisture
	Total Yield
	Dry Weight
	Wet Weight
	Maximum Yield
	Minimum Yield
	Maximum Moisture
	Minimum Moisture

Creating yield by variety maps: Farm Works software

Creating polygon variety maps

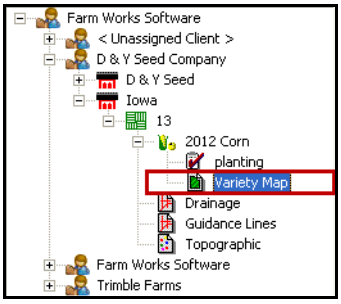
The Mapping software will automatically create a polygon variety map. This map requires a planting job that is associated with a crop enterprise that was imported into the software using the *Read Job Data* option. These polygon variety maps can then be used for the variety locator on the FmX display. Additionally, if you have yield maps, the program compares the varieties on this map to your yield maps and creates a yield by variety that is included on the *Yield Variety Report*.

The Variety Map layer is automatically generated only if the Field is imported into the Farm Works software with a Crop Enterprise assigned to it.

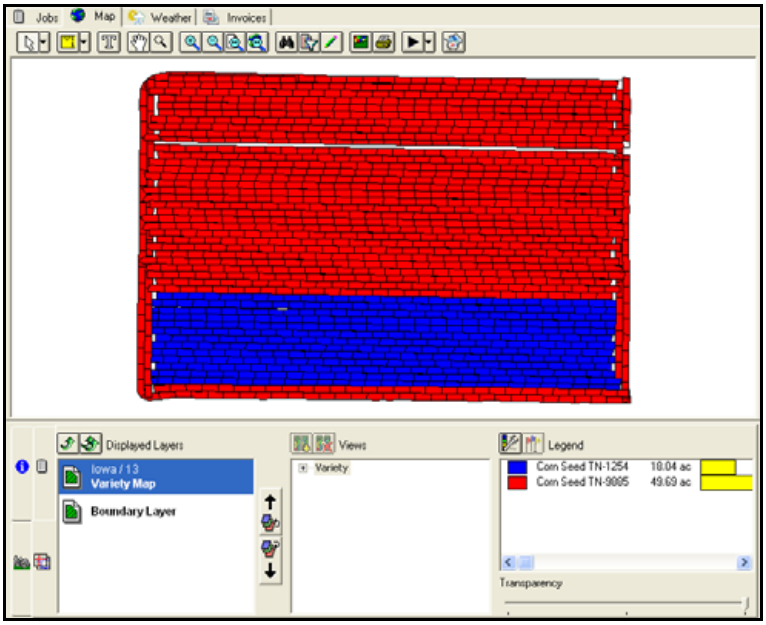
If the field data is imported with an Unassigned Crop Enterprise, you must manually generate a Variety Map layer:

1. To assign the field data to a Crop Enterprise, right-click the event, select *Job Properties* and then assign the correct Crop Enterprise.
2. Right-click on the Crop Enterprise, select *Add Layer* and then select *Add Variety Layer.*
3. Double-click the resulting Variety Layer to make it active in the Farm Works software.
4. Click **Legend** to remove any incorrectly assigned Varieties from the layer and to add all of the correctly recorded varieties to the Variety Layer.

The variety layer is listed under the enterprise:



To view the Variety Map, double-click the *Variety Map* polygon layer. It appears as a polygon/area map with the different varieties displayed in one map.



The polygon variety maps can be used with the Trimble FmX Variety Locator. When you use the "Trimble FmX" option in Write Job data, these variety maps are included in the data that is written to a USB drive. Alternately, when you use the "Resource List" button in the *Connected Farm* tab, the Variety Maps are sent to the selected FmX display along with the other resources.

Yield Variety reports

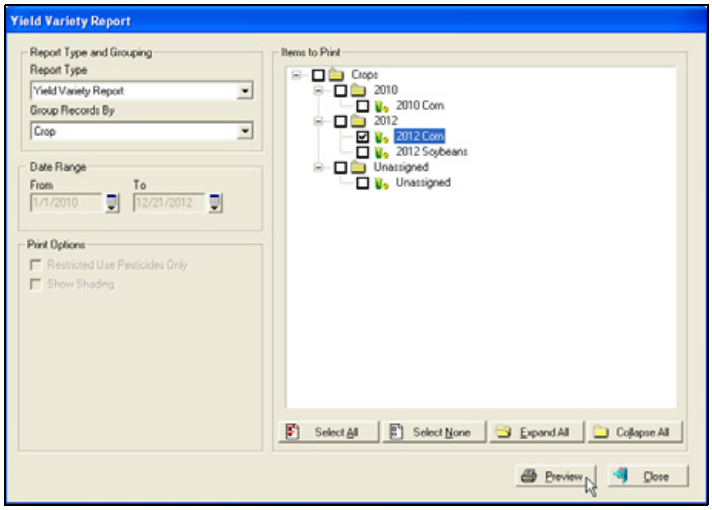
The Yield Variety report uses the polygon variety map and any imported yield data map to create an average yield by variety for a particular commodity. It will then compare the results to give you the average yield for each planted variety.

To take advantage of this feature, you must have a Variety Map and a yield map that are both located under the correct/same enterprise.

To view a Yield Variety report:

1. Do one of the following:
   - Select *Reports* / *All Reports*.
   - Click the Report icon.
2. Click **+** beside the field category or click *Expand All*.
3. Select the *Yield Variety Report* and then click **OK**:

4. Select each item that you want to include in the report or click **Select All** to select all items.



5. Click **Preview**.

The *Print Preview* window shows the first page of the report. To view other pages, click the next page icon **>** or the previous page icon **<**.