

Chapter 8:

Reading COTMAN Analysis Reports

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The COTMAN™ analysis routine allows the user to produce SQUAREMAN and BOLLMAN reports. Prior to generating reports, the user can select from all available farms and years. Users can choose from pre-defined report formats and/or define custom report formats by selecting from all of the available report options. When reports are generated, a Web browser displays an index of thumbnail graphs with hyperlinks that allows the user to navigate to individual field-level reports or to farm-level summary reports.

SQUAREMAN analysis uses SquareMap, first fruiting node, and stand count data to analyze plant growth and fruiting form retention. The analysis is conducted during the squaring period before first flower. Reports can display graphs of plant development, information about plant structure and plant vigor, square shed rates, per-acre populations of plants, and retained fruiting forms. Descriptions of SQUAREMAN report items available in field detail reports and farm-level summary tables are presented in Tables 1 and 2.

BOLLMAN analysis uses *nodes above white flower* (NAWF) and local weather data to analyze plant maturity and calculate heat unit accumulation. The analysis is conducted from first flower until defoliation. Descriptions of BOLLMAN report items available in field detail reports and farm-level summary tables are presented in Tables 3 and 4.

Viewing Reports

Graph Thumbnail Report

When reports are generated, a Web browser window opens to display thumbnail-sized nodal development graphs of all fields that were selected for analysis. The graphical index allows a quick review of growth patterns across all fields to help identify particular fields that warrant ad-

ditional attention (Fig. 1). Each graph is labeled below with the field name. The graph thumbnail is a hyperlink to the detailed field report. The farm summary tables can be viewed by clicking on the labeled hyperlink at the top of the graphs.

Farm-Level Summary Report

This report displays the farm-level summary table(s) selected for the analysis. The header displays key data about the farm. Each table displays information about each field selected from the farm. By default, fields are listed in alphabetical order in the table. However, that order can be changed by defining a custom report where fields are sorted on the values of another item in the table. For example, fields can be listed in order of maturity by sorting on the date that NAWF=5. The farm summary tables can be used to quickly compare fields on characteristics of interest. The field name is a hyperlink to the detailed report for that field (Fig. 2).

Field Detail Report

Each field detail report is presented in a separate Web page and controls are provided to browse through those reports or return to the graph thumbnail screen.

Defining Custom Reports

The user can define and save custom report formats for the Field Detail Reports of each analysis type. Only one Field Detail Report can be selected for each analysis. Custom Farm Summary Tables can also be defined and saved. Each table is restricted to the number of items that can be printed using standard paper (8 1/2" x 11") in portrait mode. The number of items per table varies depending on the column width required to print each included item. Multiple tables can be selected for each analysis.

Table 1. SQUAREMAN Field Detail Report Items.

GROUP	ITEM	DESCRIPTION
Graphs	Height/Node Graph	A plot of plant height and height-to-node ratio (HNR) for each SquareMap sampling date. The horizontal axis shows days after planting. The left vertical axis shows plant height in inches while the right vertical axis shows the HNR in inches. The HNR is the average internode length between main-stem branches, both sympodial and monopodial.
	NAFS/NAWF Graph	Graph of field nodal development compared to Target Development Curve (TDC): The vertical axis displays nodes above first square pre-flower (calculated from SQUAREMAN data) and nodes above white flower (NAWF) after first flower. The horizontal axis shows Days After Planting. The TDC serves as a standard for comparing plant development. It assumes first square at 35 days after planting with the addition of one new main-stem node every 2.7 days until first flower at 60 days after planting. At first flower the TDC shows 9.25 NAWF. After first flower the production of new main-stem nodes slows and the number of NAWF declines. The TDC expects NAWF to equal 5 (physiological cutout) at 80 days after planting.
Plant Structure	Days Per Node	The average number of days for each main-stem branch added between the latest two consecutive SquareMap sampling dates. This measure is calculated for the latest two consecutive SquareMap sampling dates by dividing the change in number of main-stem branches by the number of days between sampling dates. For reference, the TDC uses 2.7 days per node before first flower. For this measure, the effects of sampling errors can be large and erratic values may occur. This statistic is included because some users have gained confidence in it, but there are no COTMAN recommendations associated with this measure.
	Elongation Rate	The average increase in height for each main-stem sympodial branch added between each consecutive pair of SquareMap sampling dates. This measure is calculated for the latest two consecutive SquareMap sampling dates by dividing the change in plant height by the change in number of main-stem branches between sampling dates. For this measure, the effects of sampling errors can be large and erratic values may occur. This statistic is included because some users have gained confidence in it, but there are no COTMAN recommendations associated with this measure.
	First Fruiting Node	Average node number of first sympodial/fruitlet branch. The first fruiting node number is entered using the Add/Modify a Field routine. The data is collected only once per season so this statistic does not change across time.
	Fruiting Nodes/Plant	Three items are included with this choice: 1. Fruiting Nodes - Average number of sympodial branches (main-stem fruiting branches) per plant on each sampling date for the field. 2. Squaring Nodes - Average number of main-stem sympodial branches that have not yet set a first-position flower on each sampling date. 3. Post-flower Nodes - Average number of main-stem sympodial branches that have already set a first-position flower on each sampling date.
	Height/Node Ratio (HNR)	HNR on each sampling date for the field. This is the average internode length in inches between main-stem branches, both sympodial and monopodial. If a statistically significant difference is detected between consecutive sampling dates, "+" or "-" will be displayed to the right of the ratio on the later date. A "+" indicates a significant increase, and a "-" indicates a significant decrease compared to the previous sampling date.
	Plant Height Retained Fruit/Plant	Field average plant height (inches) on each sampling date. Average number of first-position fruiting forms retained per plant on each sampling date for the field.
	Total Nodes/Plant	Average number of main-stem sympodial plus monopodial branches on each sampling date for the field.

continued

Table 1. Continued.

GROUP	ITEM	DESCRIPTION
Populations	Bolls/Acre	Number of retained first-position bolls per acre on each sampling date. This item will only have a value if SquareMap data is collected after first flower. Stand count data for the field is required in order to calculate this statistic.
	Fruit/Acre	Number of retained first-position fruiting forms (squares plus bolls) per acre on each sampling date. Stand count data for the field is required in order to calculate this statistic.
	Plant/Acre	Number of plants per acre. Stand count data for the field is required in order to calculate this statistic. This statistic will not change across the season, because stand count data is only collected once per season.
	Squares/Acre	Number of retained first-position squares per acre on each sampling date. Stand count data for the field is required in order to calculate this statistic.
Shed Rate	% Boll Shed	Percent of first-position bolls that were shed at each sampling date.
	% Other Square Shed	Percent of first-position squares below the top three that were shed at each sampling date.
	% Small Square Shed	Percent of the top three first-position squares that were shed at each sampling date.
	% Square Shed	Percent of first-position squares that were shed at each sampling date. If a statistically significant difference is detected between consecutive sampling dates, "+" or "-" will be displayed to the right of the rate on the later date. A "+" indicates a significant increase, and a "-" indicates a significant decrease compared to the previous sampling date.
	% Total Shed	Percent of first-position fruiting forms (squares plus bolls) that were shed at each sampling date.
	Node specific % Shed	Node-specific percent of first-position fruiting forms that were shed at each sampling date. Node 1 is the upper-most sympodial/fruiting branch, Node 2 is the second highest branch, etc. Note that the higher node numbers represent branches lower on the plants. Rates calculated for the lower branches may be based on fewer plants than those closer to the top.
	Site Level	% Boll Shed
% Other Square Shed		Site-specific percent of first-position squares below the top three that were shed at the latest sampling date.
% Small Square Shed		Site-specific percent of the top three first-position squares that were shed at the latest sampling date.
% Square Shed		Site-specific percent of first-position squares that were shed at the latest sampling date.
% Total Shed		Site-specific percent of first-position fruiting forms (squares plus bolls) that were shed at the latest sampling date.
Fruiting Nodes/Plant		Three items are included with this choice: <ol style="list-style-type: none"> 1. Fruiting Nodes - Site-specific average number of sympodial branches (main-stem fruiting branches) per plant on the latest sampling date for the field. 2. Squaring Nodes - Site-specific average number of main-stem sympodial branches that have not yet set a first-position flower on the latest sampling date. 3. Post-flower Nodes - Site-specific average number of main-stem sympodial branches that have already set a first-position flower on the latest sampling date.
Height/Node Ratio		Site-specific HNR on the latest sampling date for the field. This is the average internode length in inches between main-stem branches, both sympodial and monopodial.
Node specific % Shed	Site and node-specific percent of first-position fruiting forms that were shed at the latest sampling date. Node 1 is the upper-most sympodial/fruiting branch, Node 2 is the second highest branch, etc. Note that the higher node numbers represent branches lower on the plants.	

continued

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Table 1. Continued.

GROUP	ITEM	DESCRIPTION
		Rates calculated for the lower branches may be based on fewer plants than those closer to the top.
	Plant Height	Site-specific field average plant height (inches) on the latest sampling date.
	Retained Fruit/ Plant	Site-specific average number of first-position fruiting forms retained per plant on the latest sampling date for the field.
	Total Nodes/ Plant	Site-specific average number of main-stem sympodial plus monopodial branches on the latest sampling date for the field.
Growth Analysis/ Nodes	Analysis/ Recom- mendations	Evaluations of plant development, shed rate trends and height-to-node trends. Three sets of evaluations are performed: 1. Plant developmental pace for the latest two consecutive sampling dates and the number of sympodial branches at the latest sampling date are evaluated in relation to the TDC. Consideration is also included for the square shed rate at the latest sampling date. 2. Square shed rates for the latest two consecutive sampling dates are evaluated for statistically significant increases or decreases. 3. HNR for the latest two consecutive sampling dates are evaluated for statistically significant increases or decreases.
	Field Notes	Table of date-specific notes recorded for the field. Notes are entered in the Field Notes routine located on the Farm/Field menu.

Table 2. SQAUREMAN Farm Summary Report Items.

GROUP	ITEM	DESCRIPTION
Field Info	Acreage	Field acreage
	Irrigation Status	Field irrigation status (irrigated/not irrigated)
	Last Sampling Date	Date of latest SquareMap data collection
	Planting Date	Field planting date
	Replant Percentage	Field replant percentage
	Soil Type	Soil type
	Variety	Variety (Cultivar) planted in field
Plant Structure	Boll Nodes/Plant	Average number of main-stem sympodial branches that have already set a first-position flower at the latest sampling date. This item will only have a value if SquareMap data is collected after first flower.
	Days Per Node	The average number of days for each main-stem branch added between the latest two consecutive SquareMap sampling dates. This measure is calculated for the latest two consecutive SquareMap sampling dates by dividing the change in number of main-stem branches by the number of days between sampling dates. For reference, the Target Development Curve (TDC) uses 2.7 days per node before first flower. For this measure, the effects of sampling errors can be large and erratic values may occur. This statistic is included because some users have gained confidence in it, but there are no COTMAN recommendations associated with this measure.
	Develop. Pace Analysis	Rate of main-stem sympodial branch production between the latest two sampling dates compared to the TDC. The field will be evaluated as "Fast," "Slow," "Normal," or "None." "Fast" indicates that new main-stem branches were produced more rapidly than that depicted on the TDC. "Slow" indicates that new main-stem branches were produced more slowly than that depicted on the TDC. This can indicate environmental or other stresses. "Normal" indicates that the rate of new main-stem branch production was in the range of that depicted on the TDC.

continued

Table 2. Continued.

GROUP	ITEM	DESCRIPTION
	Develop. Pace Analysis (cont.)	"None" indicates that there is only one sampling date and the rate cannot be determined.
	Elongation Rate	The average increase in height for each main-stem sympodial branch added between the latest two consecutive SquareMap sampling dates. This measure is calculated for the latest two consecutive SquareMap sampling dates by dividing the change in plant height by the change in number of main-stem branches between sampling dates. For this measure, the effects of sampling errors can be large and erratic values may occur. This statistic is included because some users have gained confidence in it, but there are no COTMAN recommendations associated with this measure.
	First Fruiting Node	Average node number of first sympodial/fruiting branch. The first fruiting node number is entered using the Add/Modify a Field routine. The data are collected only once per season so this statistic does not change across time.
	Fruiting Nodes/Plant	Average number of sympodial branches (main-stem fruiting branches) per plant on the latest sampling date for the field.
	Height/Node Ratio	Height to node ratio on the latest sampling date for the field. This is the average internode length in inches between main-stem branches, both sympodial and monopodial.
	Node Structure Analysis	Main-stem sympodial branches at the latest sampling date compared to the TDC. The field will be evaluated as "Above," "Below," or "Target." "Above" indicates that the number of branches is greater in relation to days after planting than that depicted on the TDC. This can indicate that the field started squaring early because of optimal conditions for germination, that the first fruiting node is set low on the plant, and/or that environmental and other conditions allowed vigorous early growth. "Below" indicates that the number of branches is fewer in relation to days after planting than that depicted on the TDC. This can indicate that the field started squaring late because of unfavorable conditions for germination, that the first fruiting node is set high on the plant, and/or that environmental or other stresses have limited growth. "Target" indicates that the number of branches is within the range depicted on the TDC in relation to days after planting.
	Plant Height	Field average plant height (inches) at the latest sampling date.
	Retained Fruit/Plant	Average number of first-position fruiting forms retained per plant on the latest sampling date for the field.
	Squaring Nodes/Plant	Average number of main-stem sympodial branches that have not yet set a first-position flower at the latest sampling date.
	Total Nodes/Plant	Average number of main-stem sympodial plus monopodial branches.
Population	Bolls/Acre	Number of retained first-position bolls per acre at the latest sampling date. This item will only have a value if SquareMap data are collected after first flower. Stand count data for the field are required in order to calculate this statistic.
	Fruit/Acre	Number of retained first-position fruiting forms (squares plus bolls) per acre at the latest sampling date. Stand count data for the field are required in order to calculate this statistic.
	Squares/Acre	Number of retained first-position squares per acre at the latest sampling date. Stand count data for the field are required in order to calculate this statistic.
	Plants/Acre	Number of plants per acre. Stand count data for the field are required in order to calculate this statistic. This statistic will not change across the season because stand count data are only collected once per season.

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Table 2. Continued.

GROUP	ITEM	DESCRIPTION
Shed Rate	% Boll Shed	Percent of first-position bolls that were shed at the latest sampling date.
	% Other Square Shed	Percent of first-position squares below the top three that were shed at the latest sampling date.
	% Small Square Shed	Percent of the top three first-position squares that were shed at the latest sampling date.
	% Square Shed	Percent of first-position squares that were shed at the latest sampling date.
	% Total Shed	Percent of first-position fruiting forms (squares plus bolls) that were shed at the latest sampling date.

Table 3. BOLLMAN Field Detail Report Items.

ITEM	DESCRIPTION
SN/NAWF Graph	Graph of field nodal development compared to Target Development Curve (TDC): The vertical axis displays nodes above first square pre-flower (calculated from SQUARE-MAN data) and nodes above white flower (NAWF) after first flower. The horizontal axis shows Days After Planting. The TDC serves as a standard for comparing plant development. It assumes first square at 35 days after planting with the addition of one new main-stem node every 2.7 days until first flower at 60 days after planting. At first flower the TDC shows 9.25 NAWF. After first flower the production of new main-stem nodes slows and the number of NAWF declines. The TDC expects NAWF to equal 5 (physiological cutout) at 80 days after planting.
Cutout Information	Table of information related to field cutout status: <ol style="list-style-type: none"> 1. The first item displays information about actual or projected physiological cutout date (field average NAWF=5) relative to Latest Possible Cutout Date LPCD). The LPCD is location and risk dependent. 2. The second item gives the date or projected date of physiological cutout (NAWF=5). A projected NAWF=5 date is based on linear regression analysis. 3. The third item reports the number of days from planting to NAWF=5. 4. The fourth item reports the LPCD for the location and risk level that were selected in the Add/Modify a Farm routine. 5. The last item reports the cutout type, either "Crop Maturity" where NAWF = 5 before LPCD, or "Weather Restricted" where NAWF is above 5 at the LPCD.
Heat Unit Totals and Dates	Total heat unit (DD60) accumulation from cutout date (NAWF=5 or Latest Possible Cutout), along with a table of dates that the field reached benchmarks of 350, 450, 650, and 850 heat units (HU) after cutout. Heat units are accumulated from the earlier of NAWF=5 Date or Latest Possible Cutout Date. If the field has reached the benchmark accumulation, a date is shown in the "Actual" column. If the field has not reached the benchmark, a date based on average temperatures for the location is shown in the "Projected" column.
NAWF Information	NAWF values for each data collection date. The mean, standard deviation and number of plants are reported.
Field Management Recommendations	Crop termination guidelines based on HU accumulation from cutout. Insecticide termination and defoliation guidelines are reported.
Daily Heat Unit Accumulations	Table of cumulative daily HU (DD60s) from cutout. Information from the local weather station is used if available. An asterisk (*) next to the date indicates that the historical average is substituted. The local weather station is defined in the Add/Modify a Field routine and the local temperature data is entered using the Weather/Daily Temperatures routine. Historical average temperatures are location specific. The location is chosen in the Add/Modify a Farm routine.
Field Notes	Table of date-specific notes recorded for the field. Notes are entered in the Field Notes routine located on the Farm/Field menu.
Site Level Information	Site-specific NAWF values for each data collection date. The mean, standard deviation and number of plants are reported.

Table 4. BOLLMAN Farm Summary Report Items.

GROUP	ITEM	DESCRIPTION
Field Info	Acreage	Field acreage.
	Current NAWF Value	Average field NAWF on latest data collection date.
	Irrigation Status	Field irrigation status (irrigated/not irrigated).
	Last Sampling Date	Date of latest NAWF data collection.
	Planting Date	Field planting date.
	Replant Percentage	Field replant percentage.
	Soil Type	Soil type.
Heat Unit Date	Variety	Variety (Cultivar) planted in field.
	Date, Heat Units=350	Date, 350 HU (DD60) accumulation from cutout.
	Date, Heat Units=450	Date, 450 HU (DD60) accumulation from cutout.
	Date, Heat Units=650	Date, 650 HU (DD60) accumulation from cutout.
Heat Unit Total	Date, Heat Units=850	Date, 850 HU (DD60) accumulation from cutout.
	HU from NAWF=5	HU (DD60) accumulation from date that field average NAWF=5.
	HU from Seasonal Cutout	Heat unit (DD60) accumulation from Latest Possible Cutout Date based on historical weather (only calculated if NAWF=5 was not reached before Latest Possible Cutout Date).
	HU from User's Date	Heat unit accumulation (DD60) from User Defined Cutout Date (optional parameter specified on field definition screen and/or analysis report screen).
NAWF Info	DAP to NAWF=5	Days from planting to date that field average NAWF=5.
	Date, NAWF=5	Date that field average NAWF=5.
	NAWF Std Deviation	Standard deviation of field NAWF values from latest data collection date
	Regression Intercept	Intercept from linear regression used to project NAWF=5 date (only calculated before NAWF=5).
	Regression R Square	R-square from linear regression used to project NAWF=5 date (only calculated before NAWF=5).
	Regression Slope	Slope from linear regression used to project NAWF = 5 date (only calculated before NAWF=5).

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FARM: DEMO YEAR: 2006 ANALYSIS DATE: 10/15

Grower: [Demonstration](#) Location: [Arkansas](#) Daily picker capacity: [40](#) Harvest days per week: [7](#) Total acreage: [400](#)
 Days between defoliation and harvest initiation: [14](#) Target harvest completion date: [11/01](#)
 Long term weather: [Marianna, AR, 1948-2006](#) Acceptable weather risk: [50](#)

[FARM LEVEL SUMMARY REPORT](#)

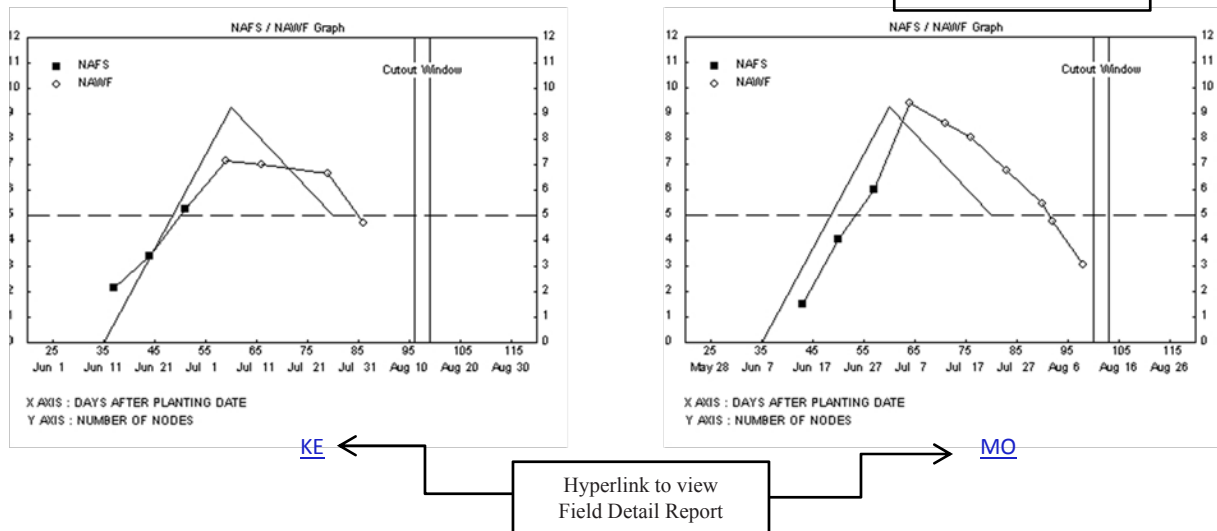


Fig. 1. Graph Thumbnail Report.

FARM: DEMO YEAR: 2006 ANALYSIS DATE: 10/15

Grower: [Demonstration](#) Location: [Arkansas](#) Daily picker capacity: [40](#) Harvest days per week: [7](#) Total acreage: [400](#)
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 Long term weather: [Marianna, AR, 1948-2006](#) Acceptable weather risk: [50](#)

Table Name: **NAWF**

Table Title: **NAWF and Heat Units**

* projected

Field Name	Current NAWF	Date NAWF=5	HU from NAWF=5	HU from Seasonal Cutout	Date, Heat Units=350	Date, Heat Units=850
CO 1250	5.3	-	-	804.5	8/31	10/29*
KE 1134	4.7	7/31	1121.5	-	8/15	9/14
MO 1413	3.1	8/3	1050	-	8/18	9/21
PO 1180	3.85	8/2	1074	-	8/17	9/19
RU 1201	4.67	8/1	1097	-	8/16	9/16

↑
 Hyperlinks to view Field Detail Reports

Fig. 2. Farm Summary Level Report.