

ENVIROLOGIX™ QuickStix™ Kit for QuickScan YieldGard® Rootworm Corn Bulk Grain

Catalog Number AQ 015 BG

Highlights:

- Use with Common Extraction™ Method
- Results in 5 minutes or less
- Available as 100-strip kits, in bulk packaging, or in QuickCombs™

Contents of Kit:

- 100 QuickStix Strips packed in two moisture-resistant canisters
- 100 transfer pipettes
- 100 reaction cups

Items Not Provided:

- Waring blender, model 31BL91 or equivalent
- Glass jar adapter (Eberbach #E8495)
- Glass Mason jars
- Graduated cylinder
- Tap water
- Protective cover for blender jar while grinding
- QuickScan System (optional, for quantitative results)

For sampling scenarios at different screening or confidence levels, refer to the USDA/GIPSA Excel spreadsheet described below, or call EnviroLogix Technical Support for assistance.

Intended Use

The QuickStix Kit for QuickScan - YieldGard Rootworm Corn Bulk Grain is designed to extract and detect Cry3Bb protein at the levels typically expressed in YieldGard Rootworm corn. The sensitivity of these QuickStix strips is 0.5% (i.e. 1 kernel in a pool of 200).

How the Test Works

In order to detect the Cry3Bb protein expressed by YieldGard Rootworm corn, the sample must first be extracted in tap water to solubilize the protein. Each QuickStix strip has an absorbent pad at each end. The protective tape with the arrow indicates the end of the strip to insert into the reaction cup. The sample will travel up the membrane strip and be absorbed into the larger pad at the top of the strip. The portion of the strip between the protective tape and the absorbent pad at the top of the strip is used to view the reactions as described under “Interpreting the Results.” Results may then be scanned and interpreted quantitatively with the EnviroLogix QuickScan System. Please avoid bending the strips.

Sample Preparation

Step 1: Determine Number and Size of Sub-samples

1. Collect a composite sample according to USDA/ GIPSA instructions found in the reference documents listed in the margin on Page 2:
2. The following is a helpful reference for use in designing a sampling plan: Remund, K.M., Dixon, D.A., Wright D.L., Holden, L.R. “Statistical considerations in seed purity testing for transgenic traits”, Seed Science Research, June 2001, Vol. 11 No.2, pp. 101-119.
3. To select the appropriate sample size, determine the purity standard and the degree of confidence required. Confidence level means the statistical probability that the % of YieldGard Rootworm corn in the lot is below the selected purity standard. Table 1 provides a guideline for determining the number of sub-samples necessary to provide effective screening for different GM concentrations at the 95% and 99% confidence levels.

Table 1 – Corn: Number of 200 kernel sub-samples required

Confidence Level	Screening Level % YieldGard Rootworm Corn			
	5%	1%	0.5%	0.25%
95%	1	2	3	6
99%	2	3	5	9

NOTE: Screening corn at a 0.5% YieldGard Rootworm concentration level, with 95% confidence, would require testing 3 sub-samples of 200 kernels with all sub-samples negative.



USDA References:

- <http://archive.gipsa.usda.gov/reference-library/handbooks/grain-insp/grbook1/bk1.pdf> - USDA Grain Inspection Handbook, Book 1, Grain Sampling.
- <http://archive.gipsa.usda.gov/biotech/sample2.htm> - Guidance document entitled Sampling for the Detection of Biotech Grains.
- <http://archive.gipsa.usda.gov/biotech/sample1.htm> - Practical Application of Sampling for the Detection of Biotech Grains.
- <http://archive.gipsa.usda.gov/biotech/samplingplan1.xls> - This website provides a simple to use Sample Planner (29K Excel Spreadsheet). The planner allows you to enter different assumptions in terms of sample size, number of samples, acceptable quality level and to determine the probability of accepting lots with given concentration levels. It also plots the probabilities in graph form for easy interpretation. Specific data can be saved for documentation and future analyses.

Corn Common Extraction

Grams of Corn x 1.5=mL of water

For example:

$$(100 \times 0.25) = 25g \times 1.5 = 38mL \text{ water}$$



Transfer extract to cup, about 3-4 pipettefuls

Avoid pulling up particles when drawing sample

Step 2: Determine Sub-sample Weight, Jar Size and Grind Times

1. Determine the **average weight** of the individual grain to be tested (count and weigh 100 kernels/seeds, then divide by 100).
2. Calculate the weight of the number of grains to be tested (Number of grains X Average Weight/Grain). Table 2 lists the guidelines for jar size and grinding time according to sample weight.

Table 2

Commodity	Sub-sample Weight (g)	Jar Size (oz.)	Grind Time (sec.)
Corn	10-25	4	30
	25-65	8	30

Step 3: Prepare the Sample

1. Weigh sample into the appropriate size glass Mason jar and attach jar adapter with blade.
2. Place unit on the Waring blender (or equivalent) and cover with protective cover.
3. Grind sample on high speed for specified grinding time or until the sample has the texture of coffee grounds.
4. Add the volume of tap water calculated by the Common Extraction formula at left. *For example: If testing 200 kernels with an average weight of 0.3g: (200 x 0.3)=60g x 1.5=90mL water.*
5. Cap the jar and shake vigorously for at least 30 seconds, or longer if needed, to thoroughly wet all of the corn in the sample. Sample will begin to settle immediately and liquid can be drawn off at that time. If intending to read the test using QuickScan, be sure to shake for at least 30 seconds, and for accurate results, allow sample to settle for another 30 seconds.
6. Transfer 12 mL of the liquid portion from above the settled sample into the sample cup. The correct depth should be above the bottom of the arrows but below the top of the arrows printed on the combs. Avoid pulling up particles.
7. To prevent cross-contamination, thoroughly clean blender parts and jars to remove dust and residue prior to preparation of each sample. Use a new transfer pipette and reaction cup for each sample.

How to Run the QuickStix Strip Test

1. Allow refrigerated canisters to come to room temperature before opening. Remove the QuickStix Strips to be used. Avoid bending the strips. Reseal the canister immediately.
2. Place the strip into the reaction cup provided, being sure to insert the end indicated by the arrows on the protective tape. The sample will travel up the strip.
3. Allow the strip to develop for 5 minutes before making final assay interpretations. Positive sample results may become obvious much more quickly.
4. To retain the strip, or for use in the QuickScan System, cut off and discard the bottom section of the strip covered by the arrow tape. If reading the test using QuickScan, remember that strips must be read immediately after cutting, while still wet.

NOTE: Use extreme caution to prevent sample-to-sample cross-contamination with grain, fluids, or disposables.



Insert strip into cup—be sure liquid level is at or above the arrows' tips but below the top of the arrow



Any clearly discernable pink Test Line is positive



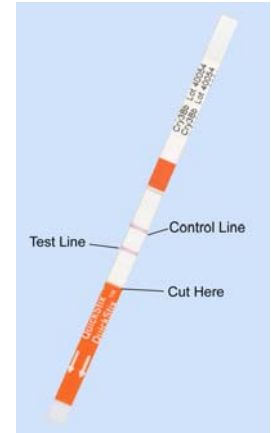
Interpreting the Results

Development of the Control Line within 5 minutes indicates that the strip has functioned properly. Any strip that does not develop a Control Line should be discarded and the sample re-tested using another strip.

If the extract is from a sample containing at least 0.5% YieldGard Rootworm corn (1 kernel in 200), a second line (Test Line) will develop on the membrane strip between the Control Line and the protective tape. *The results should be interpreted as positive for Cry3Bb protein expression.*

If the extract is from a sample containing less than 0.5% YieldGard Rootworm corn, the strip will only develop a control line.

Results may then be scanned and interpreted quantitatively with the QuickScan System. Please consult the QuickScan User Manual for details.



Kit Storage

QuickStix can be stored at room temperature, or refrigerated for a longer shelf life. Note the shelf life on the kit box for each storage temperature. The kit may be used in field applications; however, prolonged exposure to high temperatures may adversely affect the test results. Do not open the desiccated canister until ready to use the test strips.

Precautions and Limitations

- This kit is designed to be read visually as a screen for presence or absence, and is also designed to be quantitative when used with the QuickScan System.
- As with all tests, it is recommended that results be confirmed by an alternate method when necessary.
- The assay has been optimized to be used with the protocol provided in the kit. Deviation from this protocol may invalidate the results of the test.
- The results generated through the proper use of this kit reflect the condition of the working sample directly tested. Extrapolation as to the condition of the originating lot, from which the working sample was derived, should be based on sound sampling procedures and statistical calculations which address random sampling effects, non-random seed lot sampling effects and assay system uncertainty. A negative result obtained when properly testing the working sample does not necessarily mean the originating lot is entirely negative for the analyte or protein in question.
- A strong positive result may safely be interpreted in as little as 2 minutes after sample addition. It is not safe, however, to interpret negative results prior to 5 minutes.
- Protect all components from hot or cold extremes of temperature when not in use. Do not leave in direct sunlight or in a vehicle.



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