



**DAIRYLAND**  
Laboratories, Inc.

Totally independent laboratory providing extensive testing of Feed, Forage, Soil, Manure and Water.



**DAIRYLAND**  
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**By the Numbers**

**1958**

Dairyland Laboratories established

**>115**

Feed, soil, and water parameters analyzed

**>70**

Trained chemists, technicians and support personnel

**>42**

States with Dairyland customers

**>20**

Countries served

**4**

Dairyland Laboratories locations

**>15**

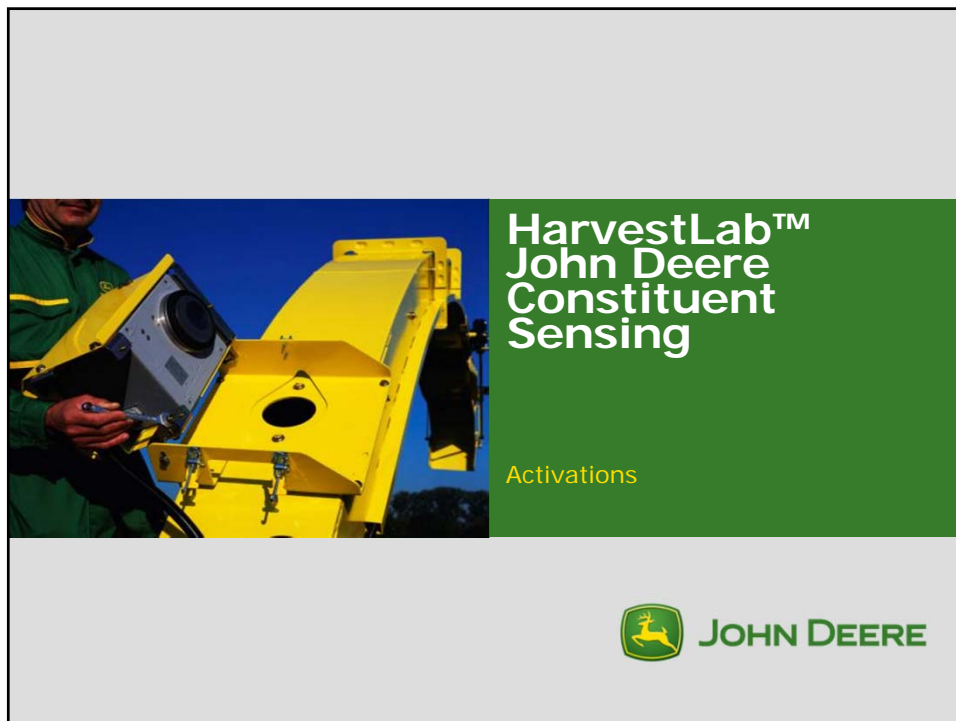
Partner lab locations worldwide

**3**

Generations of family-owned, service-oriented enterprise

Dairyland Laboratories role with *on farm NIR*.

- Do not own or sell any instruments.
- Collaborate with NIR Instrument manufactures in building calibrations for specific applications.



HarvestLab™  
John Deere  
Constituent  
Sensing

Activations



JOHN DEERE

The image is a promotional graphic for John Deere's HarvestLab™ Constituent Sensing technology. It features a photograph of a person in a green jacket working on a yellow John Deere harrow. The background is split into a light grey top section and a green bottom section. The text 'HarvestLab™ John Deere Constituent Sensing' is prominently displayed in white on the green background. Below this, the word 'Activations' is written in a smaller, yellow font. At the bottom right, the John Deere logo (a leaping deer) and the brand name 'JOHN DEERE' are shown in green.

## HarvestLab™ Sensor

### Near Infrared Reflectance Spectroscopy (NIRS) Technology

- HarvestLab™ is patented, from ZEISS:

- ZEISS is a leader in the optics industry
- exclusive partnership with John Deere

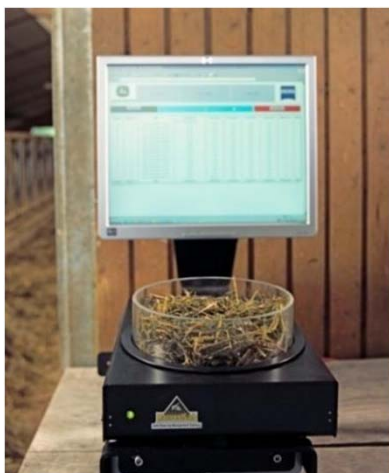
- Installed on the spout to measure in real-time the moisture & constituent values of forage

- No in-field calibration of sensor necessary

- Machine-mounted and/or stationary usage



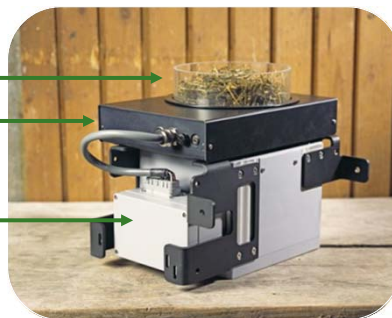
## What is John Deere Constituent Sensing?



## HarvestLab™ - Stationary Unit

### Required Hardware

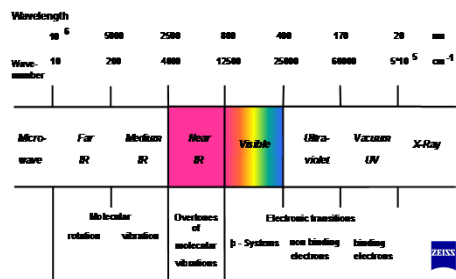
1. Glass bowl
2. Turntable Unit
3. Connection Box
4. Crossover network cable plug in



## Harvest Lab Theory of Operation



## HarvestLab™ – NIR Technology



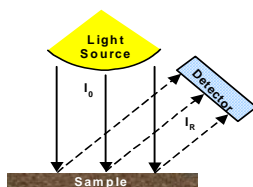
HarvestLab is based on Near Infrared (NIR) technology

Light energy is:

- TRANSMITTED,
  - REFLECTED and
  - ABSORBED
- by materials

NIR can determine if a molecule is present by:

- Measuring reflected light
- Absorbance



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## Moisture Monitoring Using a Koster Tester

- On-farm measurement
- 200 gram sample
- Dried for 45-minutes
- Not integrated into SPFH
- Not mobile

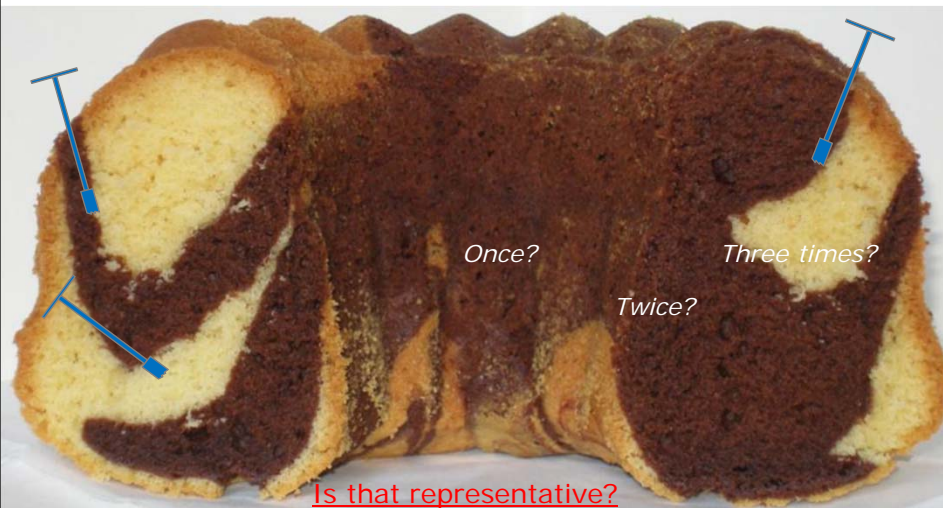


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### Calibration accuracy & sampling

At how many places do you sample?

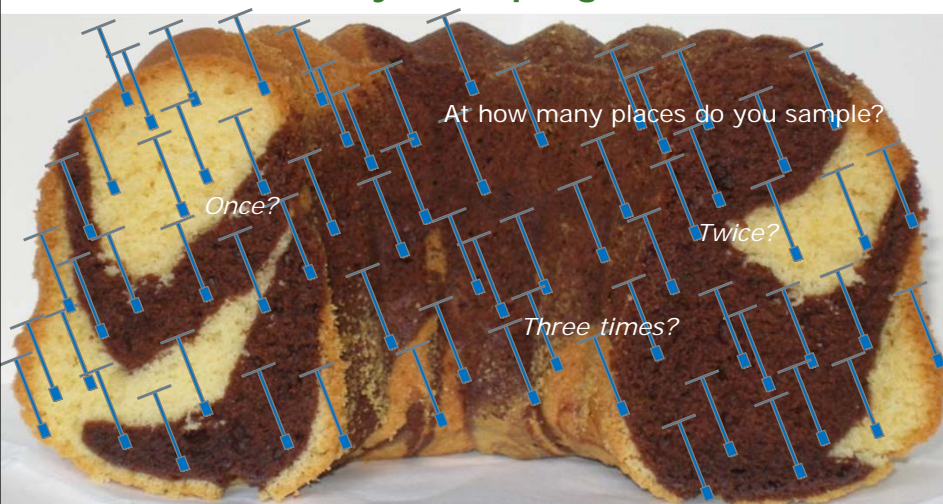


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### Calibration accuracy & sampling

At how many places do you sample?

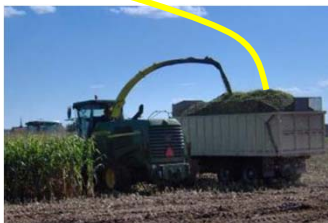


Is that representative? -> It shows at least a pretty good trend were the results are going to (totals/field or  $\bar{x}$  accuracy value over the whole silo stock)

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## Moisture Monitoring Using a Koster Tester



13,6 kgs of Forage in a trailer load



10,000 Smarties



Sample Size

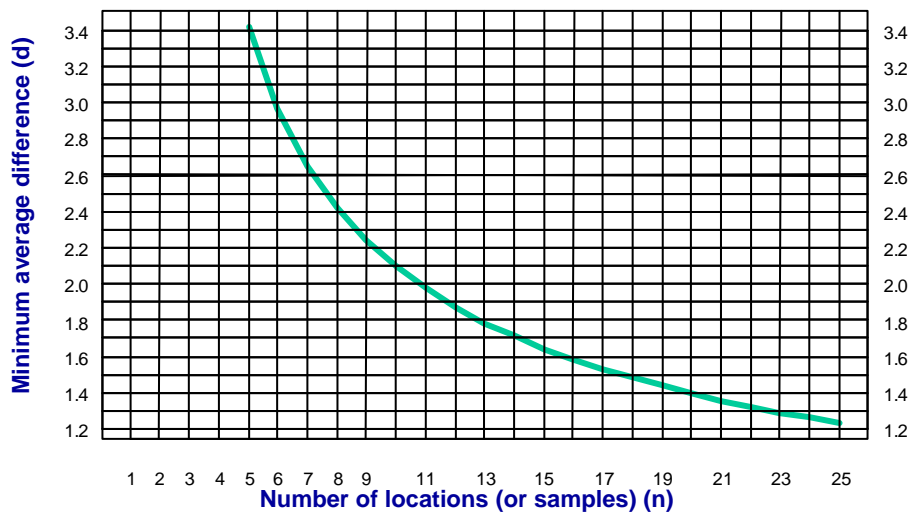


13,6 kgs of Forage in a trailer load

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## Minimum average difference (d) in traits which can be detected with a given number of locations or samples (n)



Source: D.A. Sapienza, Ph.D. August 2000

Forage Products and Nutritional Sciences  
Pioneer Hi-Bred International, Inc.

## Features/Benefits



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## Advantages of Harvest Lab for Silage Testing

Dairy and Livestock:

- ***More frequent and convenient sampling***
- Real-time detection of changes in feed/silage quality
- Improved system for managing variations in feed stuffs
- Indication of quality differences between different corn varieties
- Improved silage quality through optimization of ensiling process (AutoLOC, automatic dosing of silage additives)
- Potential for savings



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## On-Board Constituents Sensing

Value of knowing Moisture content:

- Silage size automatically adjusted → AutoLOC
- Automatic inoculants dosing



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## On-Board Constituents Sensing

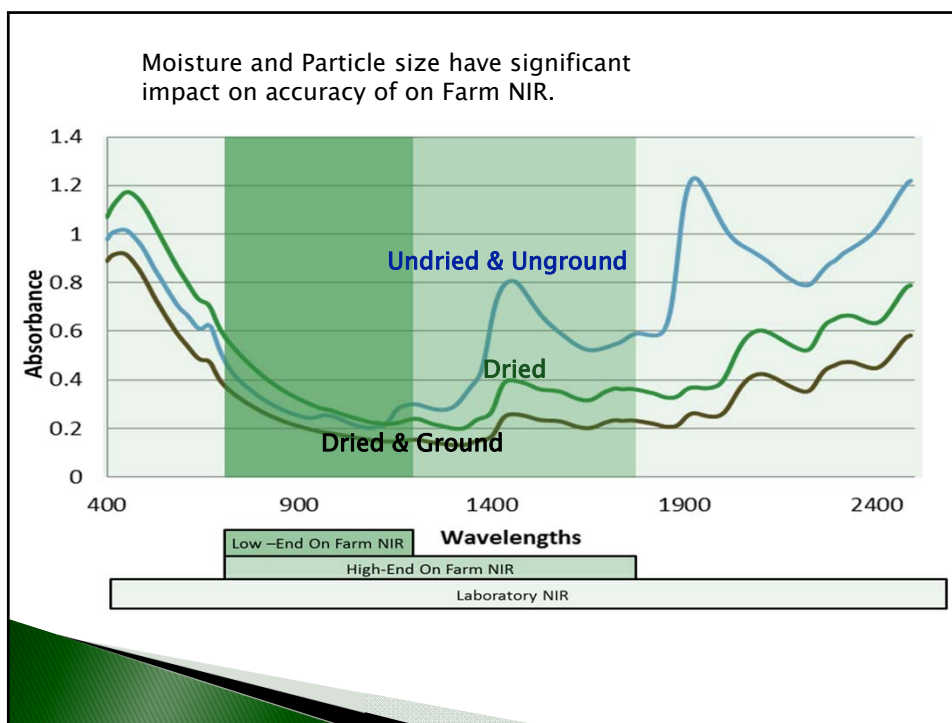
Value of knowing NDF/ADF & Starch content:

- Knowing the quality of silage stored
- Indication of quality differences between different corn varieties
- Helps define fiber needs (hay and straw supply)
- Provides information of starch levels for different varieties
- Biogas: Provides information on methane yield



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## Harvest Lab availability

- Purchase at any John Deere Dealership
- Price is between \$18,000 - \$25,000.
- Includes Harvest Lab, Moisture Calibrations adaptor for Table Top mode.
- Additional calibrations available for CP, ADF, NDF, & Starch

### Advantages Harvest Lab on Farm NIR Technology

***With good calibrations and ongoing support to update the calibrations Harvest Lab does***

- Provides opportunity to sample more frequently - big advantage especially with moisture.
- Faster and safer than ovens or Koster Testers.
- Make quicker decisions on the farm.
- Ability to “rank” or detect changes in constituents i.e. Starch, NDF, Sugar.

### ***Disadvantages of on Farm NIR Instruments.***

- Will only “rank” constituent other than moisture. Starch, NDF etc.
- Moisture peak and non uniform particle size will always be a limitation to provide accurate measurements for constituents other than moisture.



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*Thank you*

