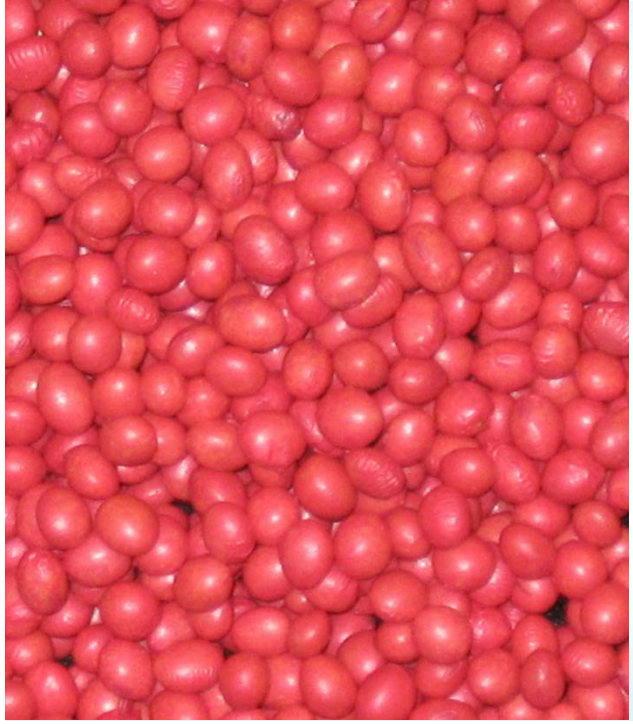




Science For A Better Life

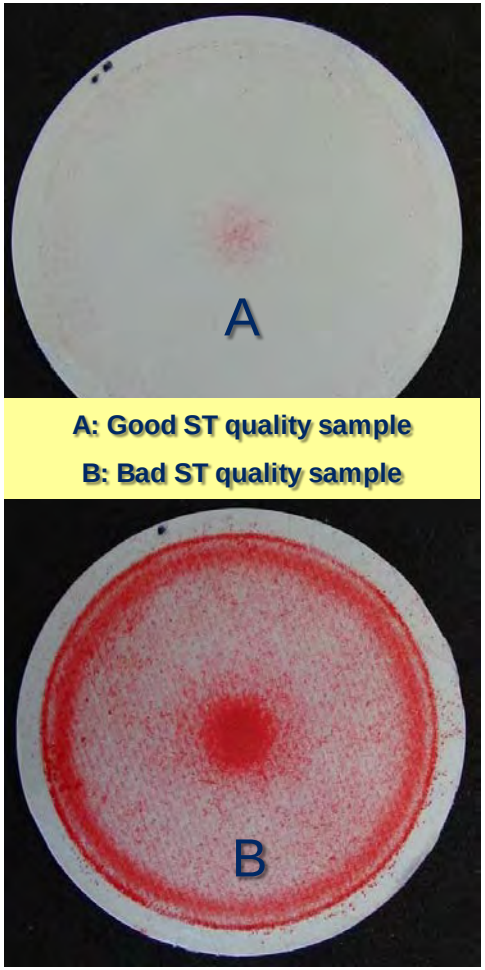
Talc Replacement Update

EPA/USDA Pollinator Summit

March 5, 2013

Role of Coatings

- Principal goal of coatings is to reduce dust abrasion.
- Another key requirement is seed flow…both during the treating process and at planting time.
- As an industry we continue to work to improve performance in both areas.
- Current coatings are unable to completely eliminate the need for planter lubricants



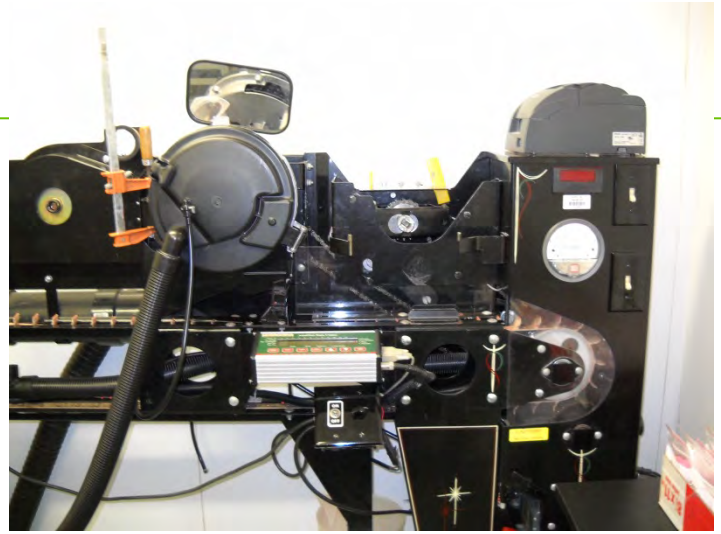
Background

- Seed flow and planting uniformity are issues with the sophisticated pneumatic planters in use today.
- The use of planter lubricants in pneumatic planters is a standard recommendation by planter manufacturers, the principle purpose of which is to reduce seed-to-seed friction and improve uniformity of planting.
- The type of product varies by manufacturer but talc, graphite, and combinations of talc and graphite are the products currently in use today.
- The application occurs at planting time by the grower.
- The role of this extra dry product at planting time and it's potential effect on the amount of dust released from the planter exhaust has been raised as a possible contributor to exposure of seed treatment active to bees.
- As a result of this concern, Bayer CropScience began looking at possible alternatives that would reduce the dust emitted from pneumatic planters.

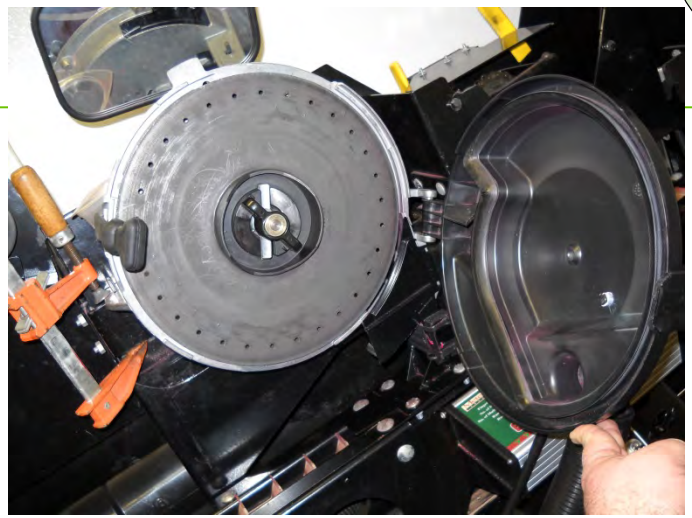
Initial Results on Talc Replacement

- Initial studies were conducted in a laboratory setting using planting equipment that mimics commercial pneumatic planters.
- Substantial reductions in total dust emitted were observed.
- In addition to reductions in total dust, substantial reductions in the amount of active ingredient (a.i.) was also observed.
- Based on these promising lab studies, limited field trials with corn growers were conducted in 2012 to evaluate the effectiveness in commercial planters with positive results.

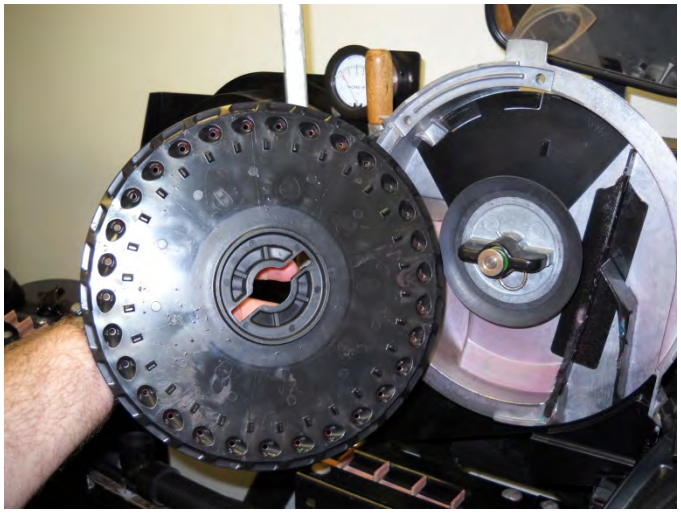
MeterMax Test Stand



JD Vac Meter on Stand



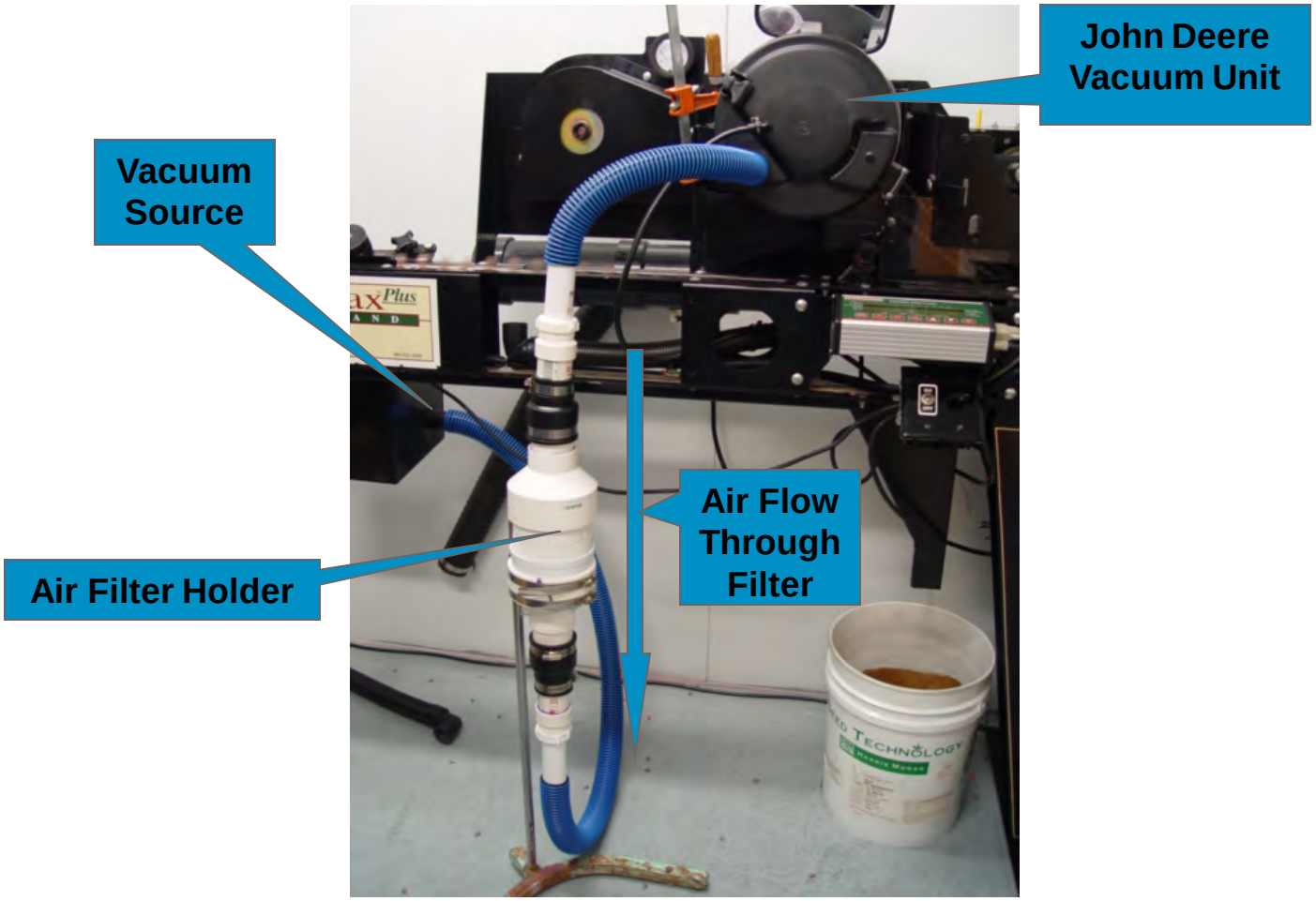
Vacuum Chamber and Back of Disk



Front of Disk and Seed Chamber

Standard Corn Disk

MeterMax Test Stand Modified to Capture Exhaust Dust



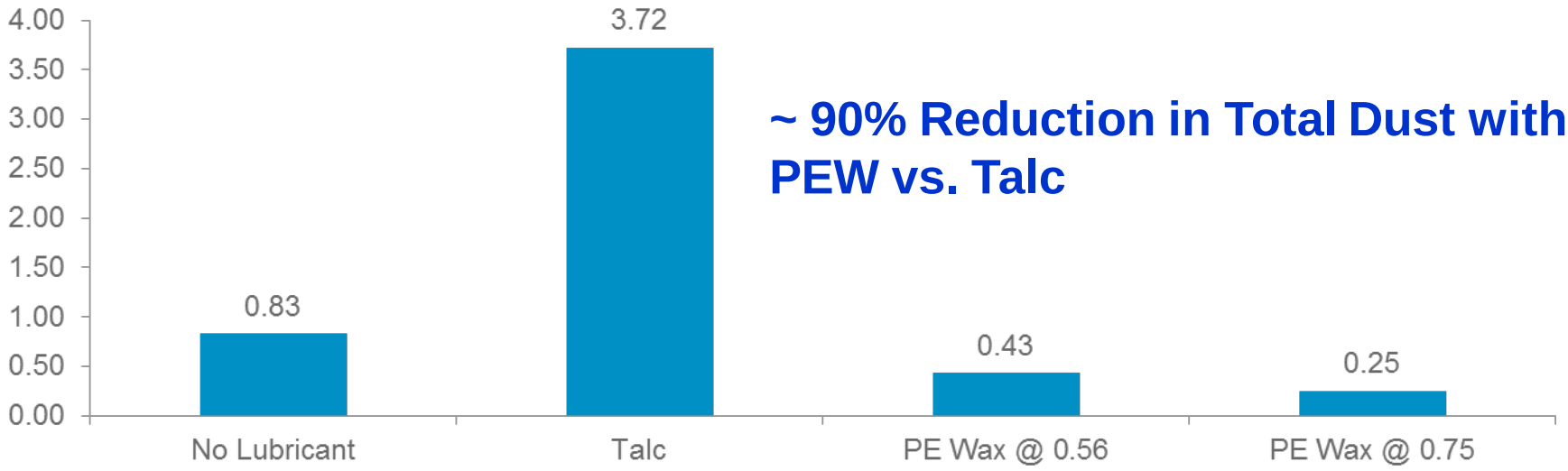
Talc Alternative under Evaluation

- Significant decrease in dust emissions have been observed
  - ~ 90% reductions in total dust vs. talc and ~ 60% reduction in total dust versus graphite
  - ~ 65% reduction in a.i. collected vs. talc and ~ 50% reduction in a.i. versus graphite.
- Evaluations in the lab on planting uniformity have shown equivalent results at significantly lower use rates than talc
  - Based on grower feedback, rates of 0.56 and 0.75 oz./cwt. performed equal to or slightly better than talc applied at 4.0 oz./cwt..

Summary of Results

Project Objective	Develop a new lubricant to reduce dust levels from treated seeds during planting so as to mitigate bee's potential exposure to pesticide

Talc versus Polyethylene Wax Lubricant – Gms Total Dust / 100K Seed



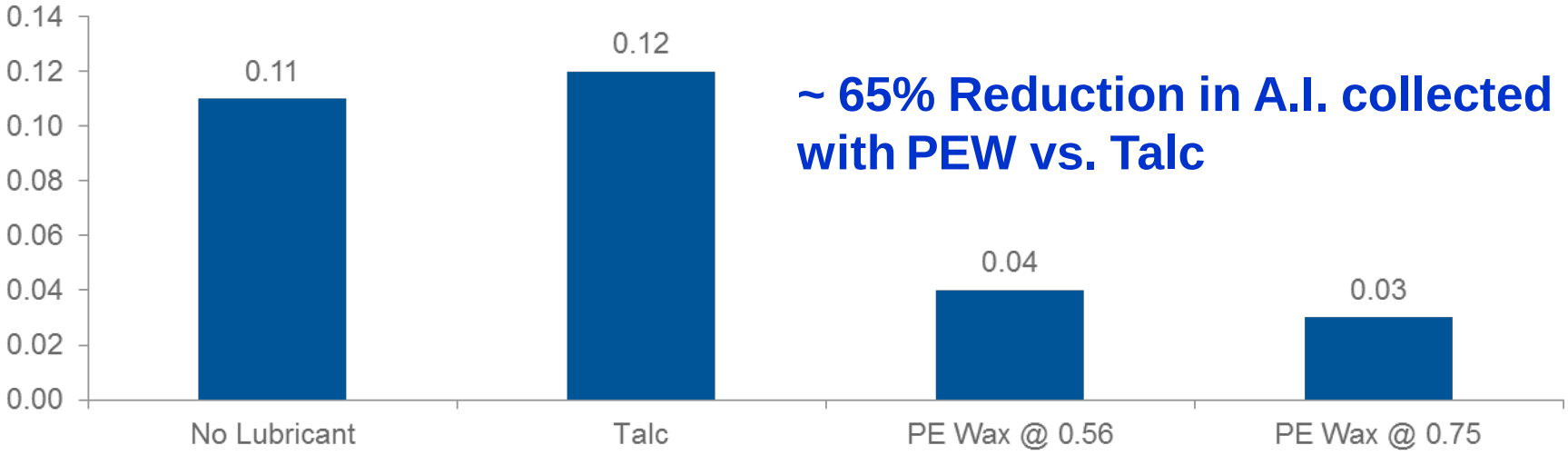
~ 90% Reduction in Total Dust with PEW vs. Talc

[1] Poncho / VOTiVO and Poncho 1250 + VOTiVO in John Deere Vacuum Meter

Summary of Results

Project Objective	Develop a new lubricant to reduce dust levels from treated seeds during planting so as to mitigate bee's potential exposure to pesticide

Talc versus Polyethylene Wax Lubricant – Gms Insecticide Active ingredient Dust Per 100K Seed



~ 65% Reduction in A.I. collected with PEW vs. Talc

[1] Poncho / VOTiVO and Poncho 1250 + VOTiVO in John Deere Vacuum Meter

Talc versus PEW -
Key Objectives Identified

❑ Initiated cooperation and testing with all major planter manufacturers

- John Deere, Case New Holland, Kinze, Great Plains, Agco White, Monosem, and Precision Planting.
- All are supportive of the program and have agreed to conduct internal testing.

❑ BCS initiate testing in southern hemisphere

- Feedback back from trials in New Zealand was positive.

Talc versus PEW -
Key Objectives Identified

- **Large scale field testing program planned by BCS in U.S. and Canada in spring of 2013.**
  - Primary objective is to test in a wide range of planters and geographies where corn is grown across the U.S.
  - Target is minimum of 200,000 acres of corn (Midwest, Midsouth, Southwest, Canada). Feedback from first trial in south Texas was positive

Talc versus PEW
North America – Field Trial Objectives

Comparison to traditional lubricants

- Split planter comparisons (½ of rows with PE Wax and ½ of rows with talc/graphite)

Data to collect

- Environmental conditions – Relative Humidity and Temperature (minimum of dates and location so we can access nearest weather station info)
- Collect singulation data from monitors
  - Provide USB drives for growers to capture data from monitors.
- Stand counts on a percentage of the trials.
- Number of times having to stop the planter to correct problems…PE Wax side vs. talc/graphite side.

First U.S. Field Trial Conducted in South Texas

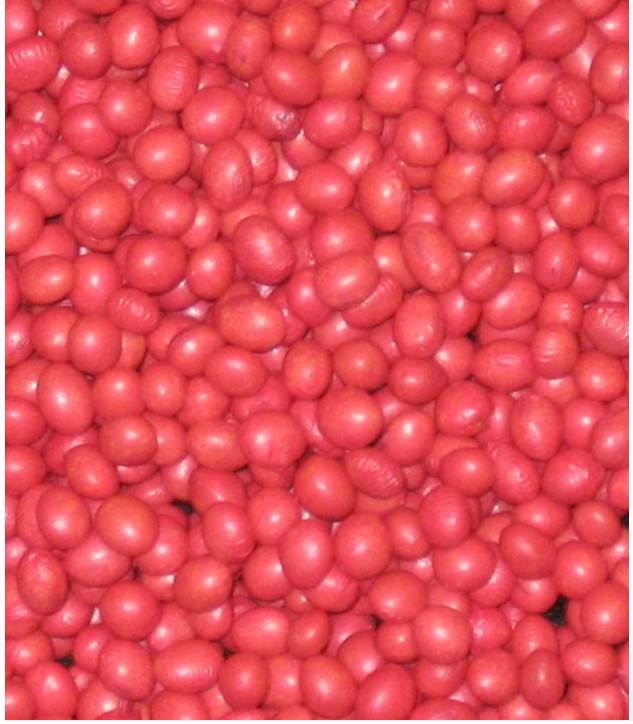
EFP treated seed **Talc**

Planter plate before EFP treated seed was planted

Planter plate after EFP treated seed was planted (2 hours)

Current Status

- All major planter manufacturers have agreed to conduct their own evaluations to confirm performance in their planter designs.
- Confirmation of its effectiveness needs to be confirmed under “real world” conditions through various planter types.
- Large scale field testing program in U.S. and Canada is in progress. If successful our goal is to introduce for the spring 2014 market.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Thank You