Watermelon Bus Project – UD/UMD
Funding Partners: DDA/MDA/FDA/USDA

Watermelon Bus Project Summary

Objective: currently carpet and other hard-to-sanitize materials are used as food contact surfaces in Delmarva vegetable harvests systems. One example is carpet covering refurbished school buses for harvesting watermelons.

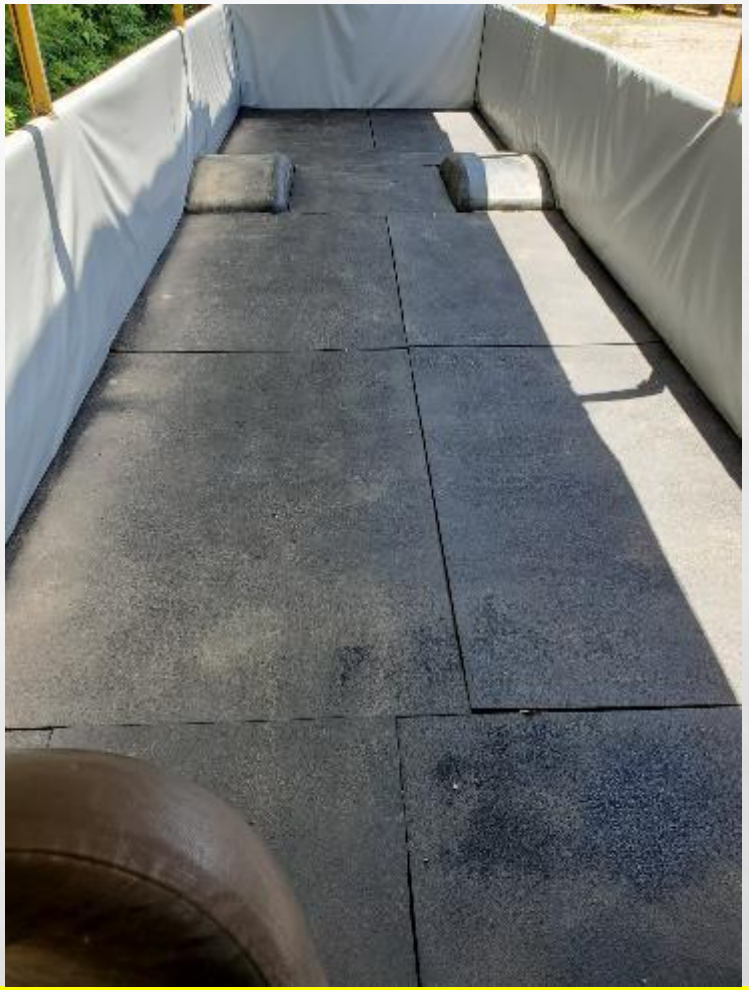
Aim of project: will vinyl and rubber mats in buses be…

1) Easily maintained, cleaned, and sanitized
2) Durable
3) Protect melon quality
4) Economically feasible

…compared to regular bus fleet?

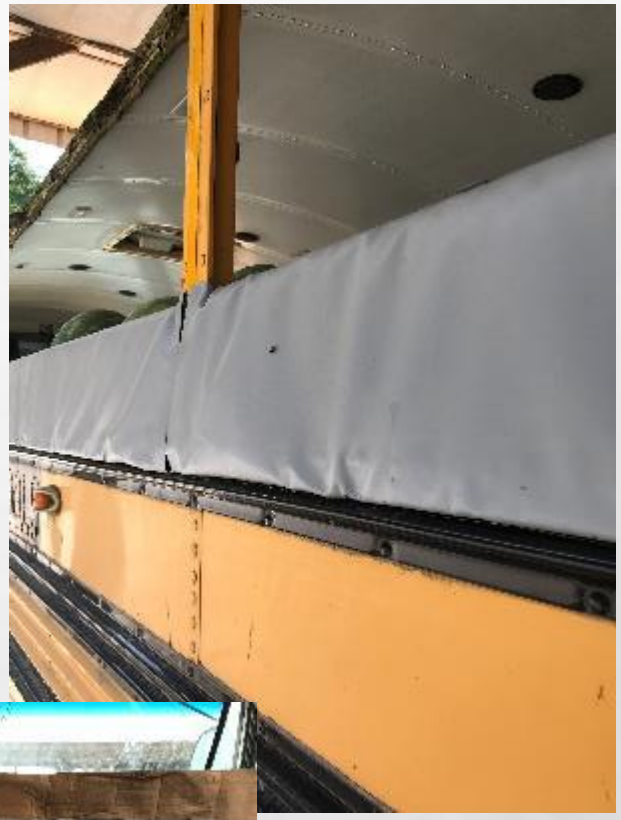
BEFORE

AFTER



OPTION 1 BUS:
CARPETED BUS WITH LINER COVERING
&
RUBBER MATS

OPTION 1…….
CARPETED BUS LINER COVERING MATS-FLOORS



MATS FOR FLOORS-8 TO 10

25 YARDS OF 18 OZ. LINER COVERING

FABRIC CUT & INSTALLED OVER EXISTING CARPET

OUTSIDE ATTACHMENT: VELCRO & SNAPS

FRONT WALL COVER: FRONT OF THE BUS

Option 1 Bus:
Liner over Carpet

AFTER

BEFORE

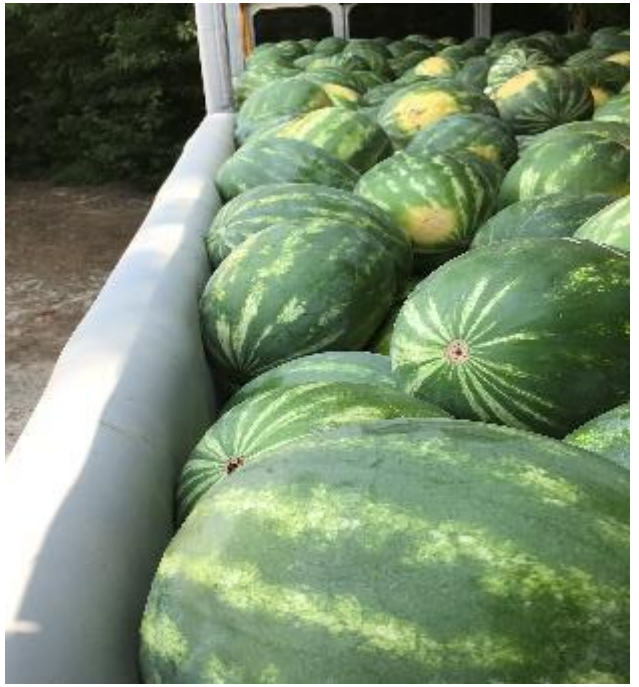
OPTION 2 BUS:
LINER COVERING WITH CUSHION ATTACHED
&
RUBBER MATS

OPTION 2 BUS – PADDED VINYL

Front Wall Cover: Cushioned
25 yds. Of 18 oz. liner
Pro 85 Foam Backing sewed into Liner

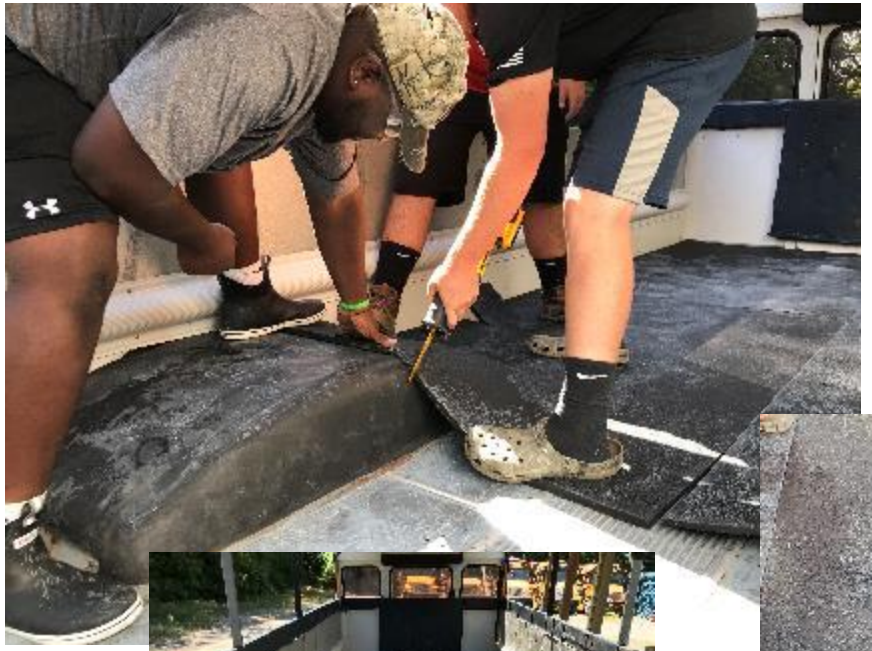
- OUTSIDE WALL ATTACHMENTS (SCREWS)

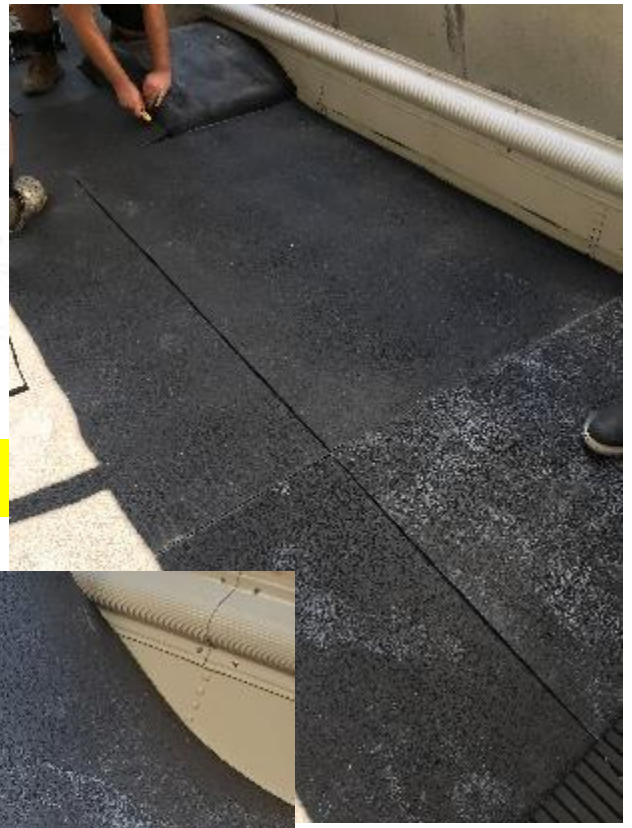
Installed Mats: 8 to 10



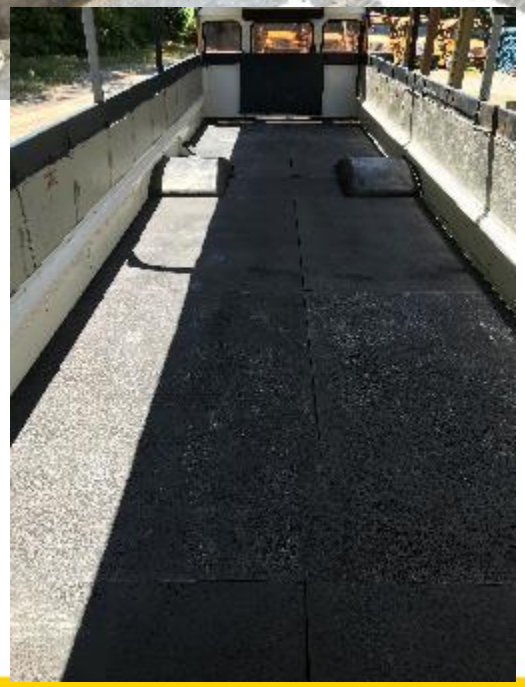
Option 2 Bus: Cushioned Liner

Installation of Rubber Mats





Cost $25 each/8-10/bus



Many obstacles in each of the buses

EVERY BUS IS DIFFERENT

INFORMATION

LOTS OF OBSTACLES

CLEANING & SANITIZING

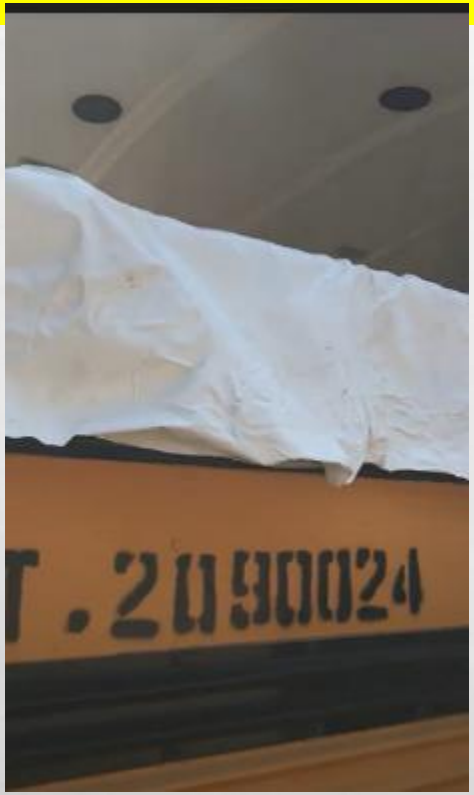
Velcro & Snaps versus Screws

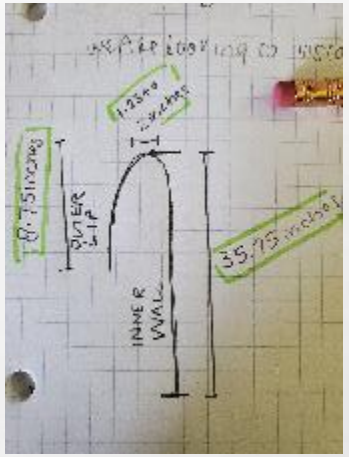
Front Panels-Before

CLEANED WITH A POWER WASHER

Other project idea rejected

SHRINK WRAP





- SAMPLING BUSES CARPET/VINYL/MATS/SIDE WALLS
- PROJECT-COUNTING DAMAGED WATERMELONS VERSUS DIFFERENCE OF BUSES

Watermelon Project Summary

2021 Season

ANGELA FERELLI GRUBER

JANUARY 18 2022

Watermelon Project Summary

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Aim of project: will vinyl and rubber mats in buses be…

1) Easily maintained, cleaned, and sanitized
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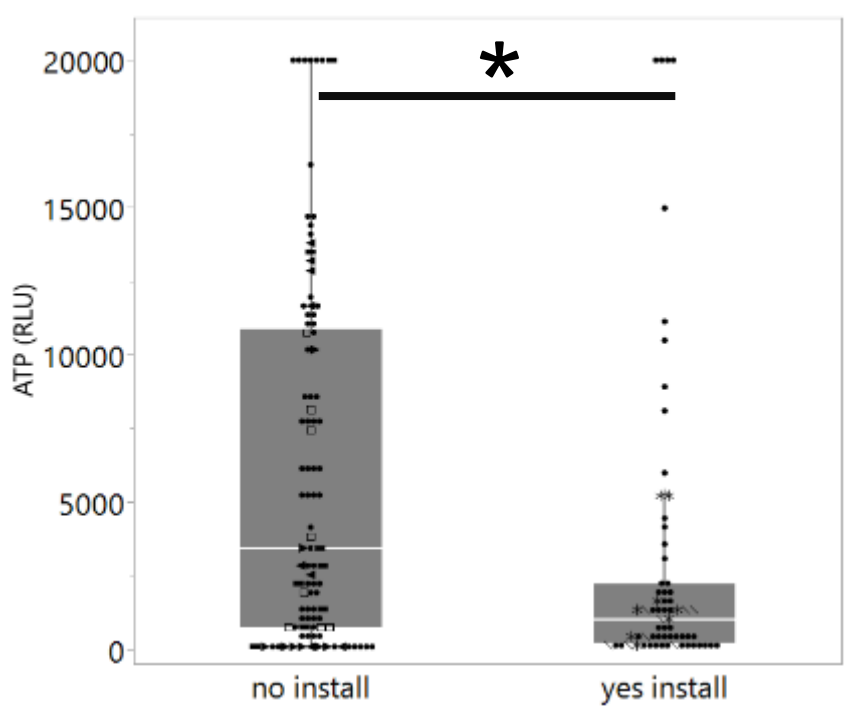
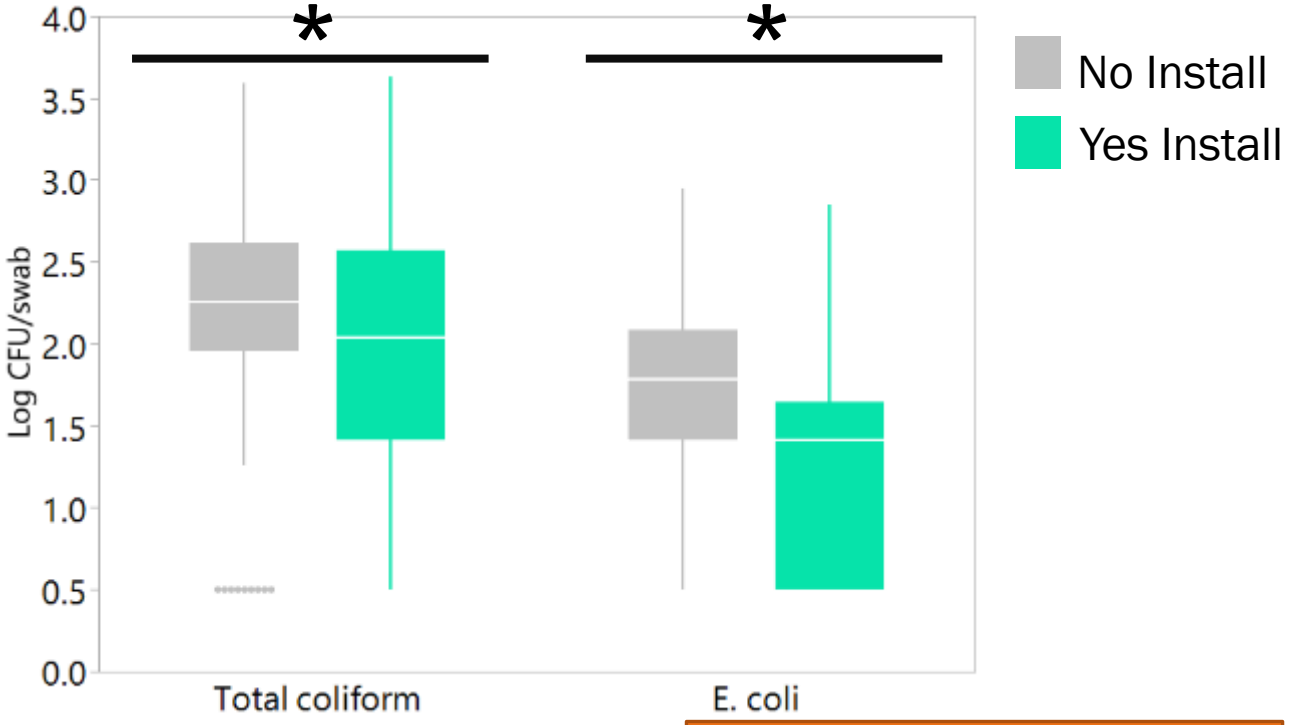
Hygeina ATP, coliform, E. coli *counts*

Melon harvest counts

…compared to regular bus fleet?

Effect of **bus install** on ATP, coliform, and *E. coli* counts over the season





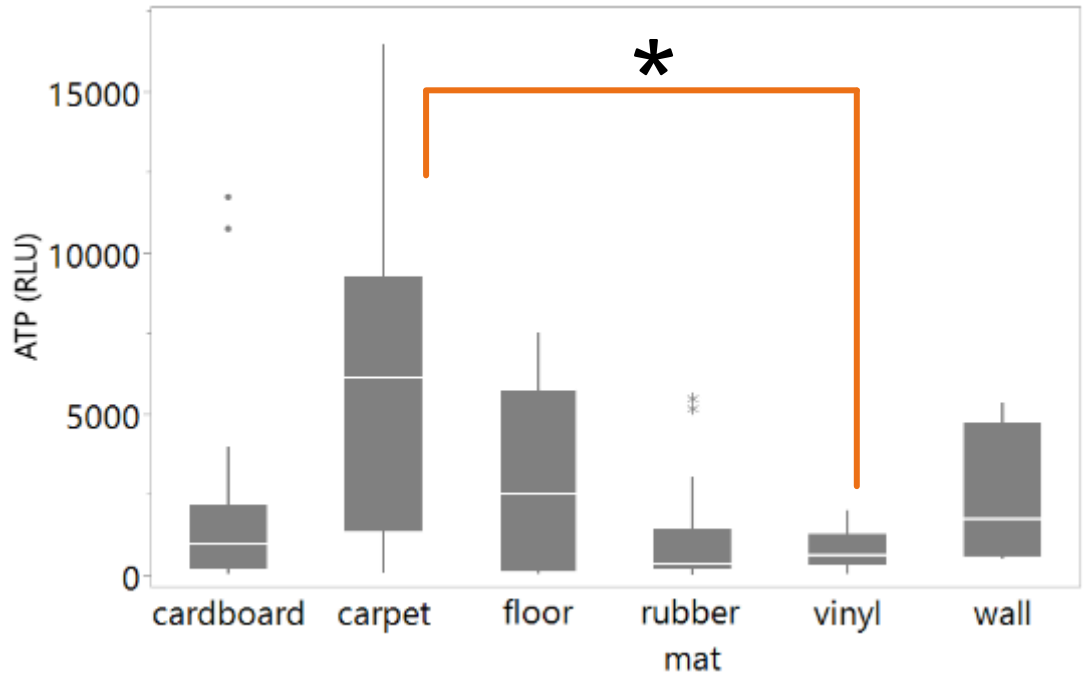
Result: installs returned **significantly lower ATP, coliform, and *E. coli* numbers** over the course of the study compared to buses without installs.

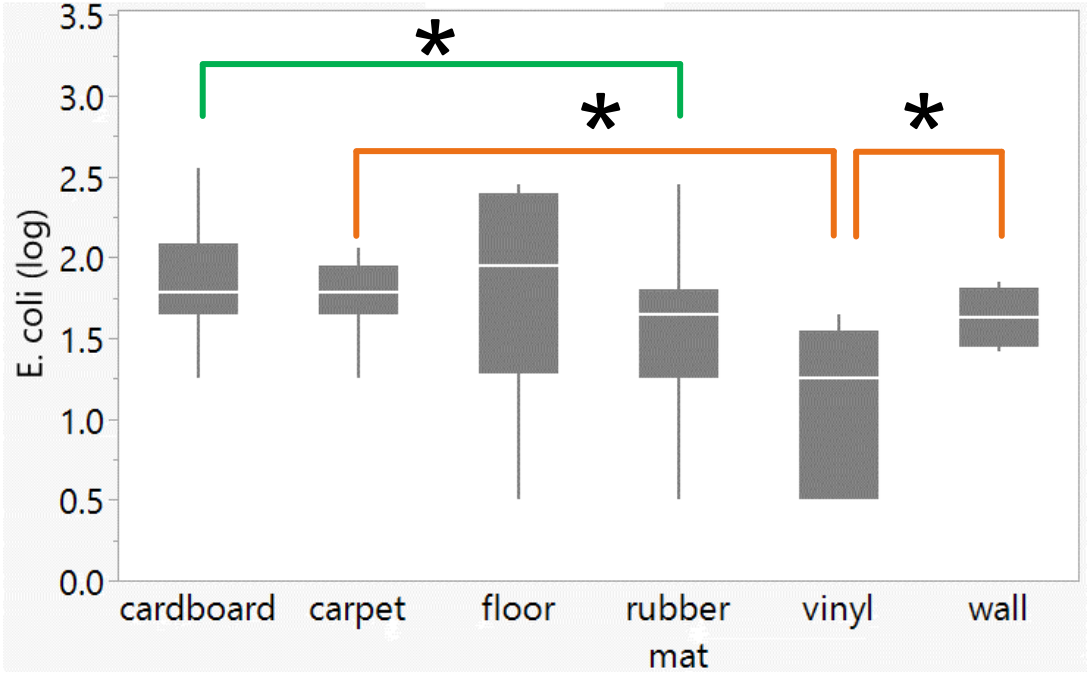
* Means comparison is statistically significant at $p < 0.05$

Effect of material type during harvest period

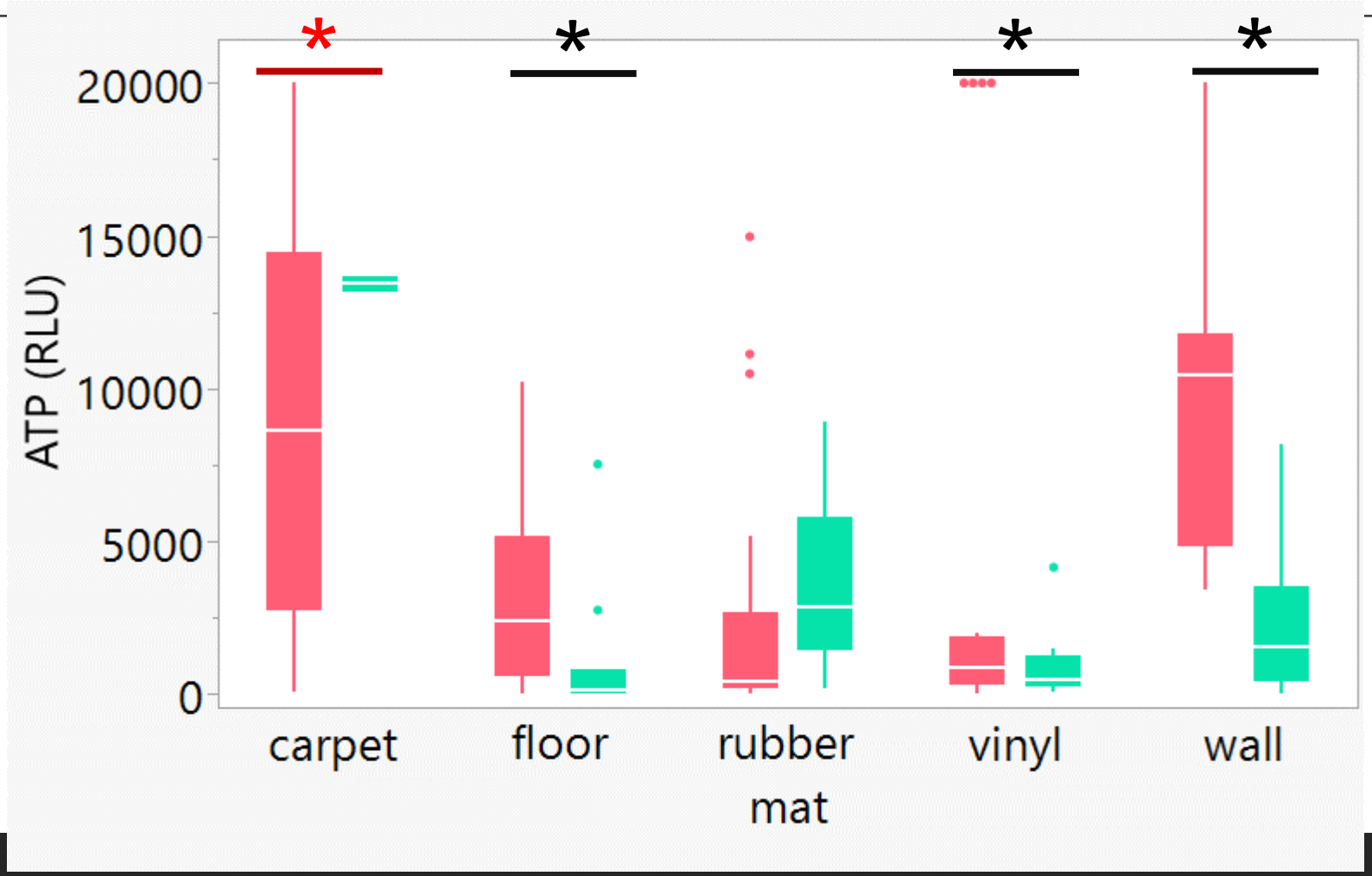
Wall materials: vinyl had significantly lower ATP, coliforms, and *E. coli* compared to carpet, and significantly lower *E. coli* compared to a bare wall.

Floor materials: performed similarly in ATP swabs and coliform counts, rubber mat *E. coli* counts significantly lower than cardboard.





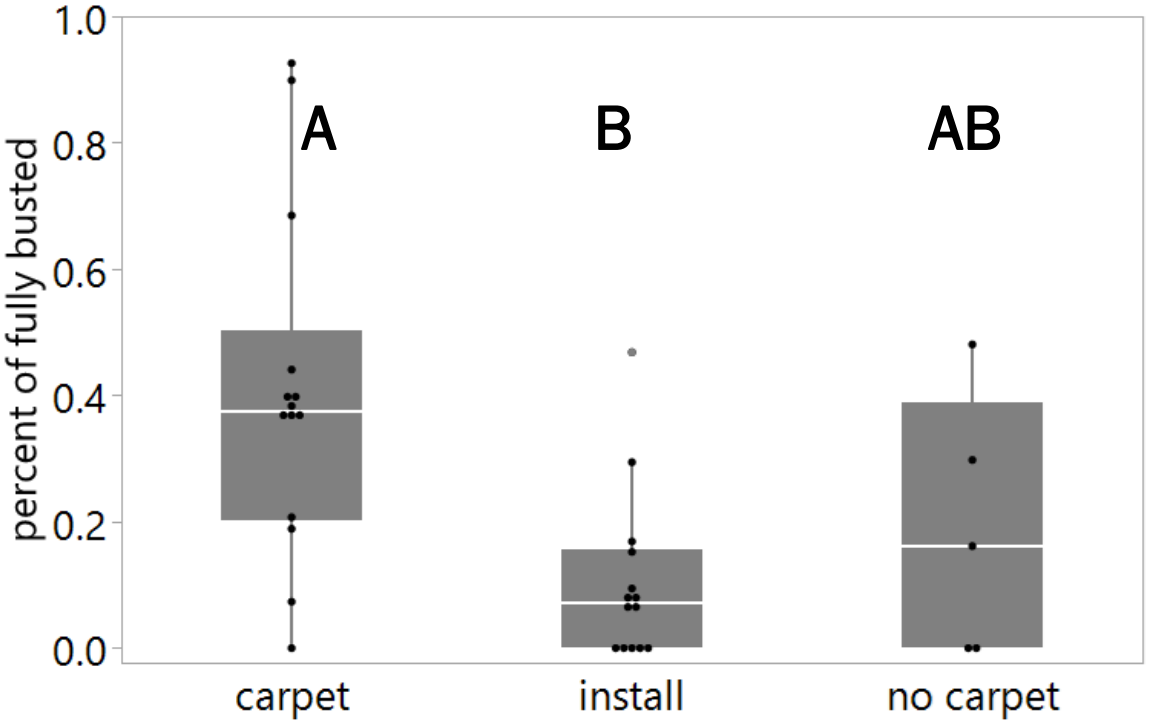
Effect of washing on bus **material** type



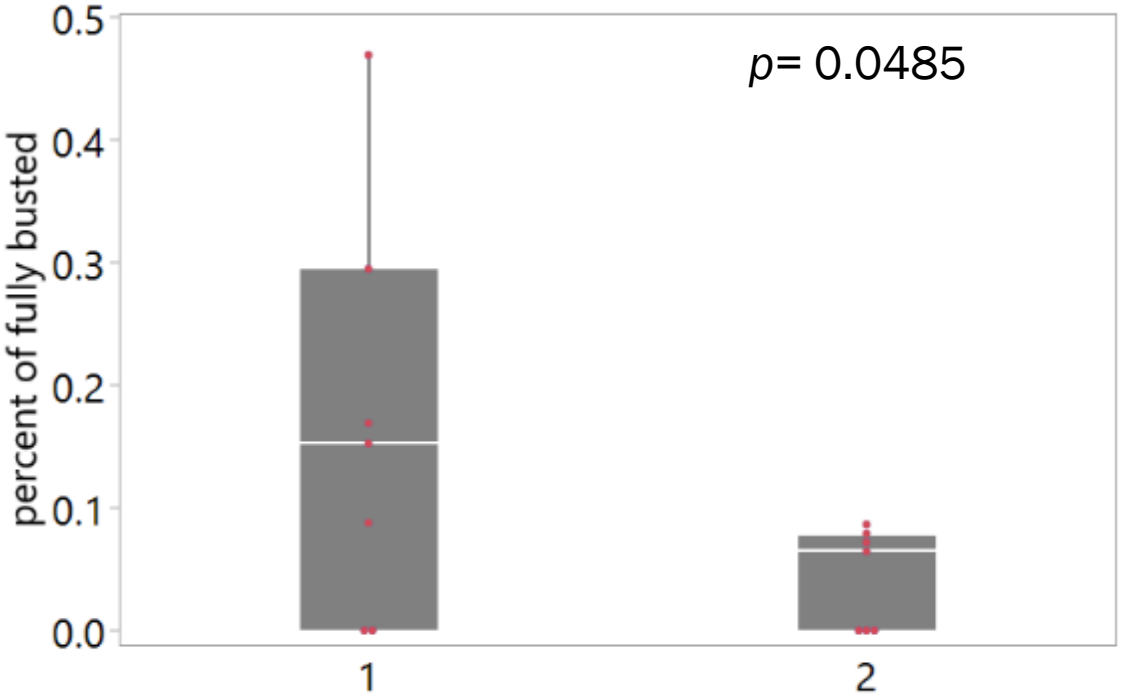
Washing **reduced ATP** levels on vinyl not carpet

Install effect on melon quality

Percent of fully busted melons, install (option 1 and option 2 buses pooled) compared to regular fleet



Percent of fully busted melons, option 1 buses (vinyl over carpet) compared to option 2 buses (full padded install)



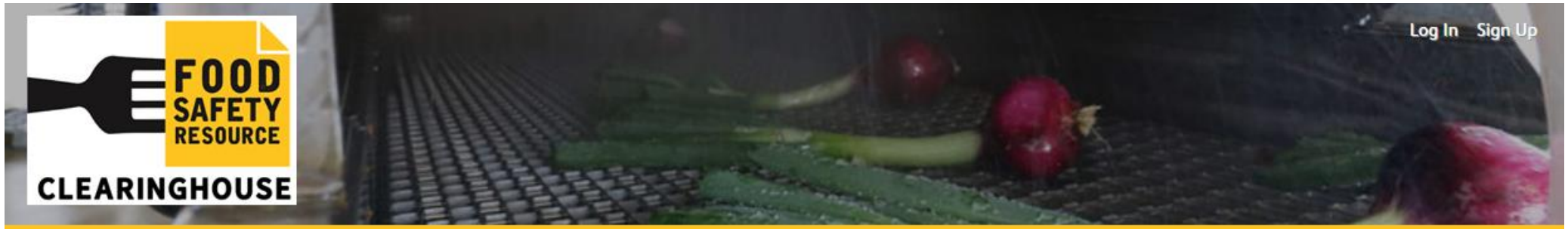
Summary

- Over the course of the season, the installs were lower in ATP and bacterial indicators.
- During harvest…
  - In terms of materials used, the vinyl performed significantly better (had lower *E. coli* counts) compared to a bare bus wall and carpeted wall.
  - All floor materials tested (cardboard, floor, rubber) had similar levels of ATP and coliforms. Rubber mats performed slightly better than cardboard in *E. coli* counts.
- A significantly smaller percentage of melons entered the packing line busted from the install buses compared to carpeted buses.

Bottom Line

- Both retrofit install strategies saved significantly more melons from culling compared to carpeted buses.
- Option one with vinyl over existing carpet cost $399, saved 1734 melons per season and paid for itself in 10 harvest days
- Option two with padded vinyl cost $2371, saved 2567 melons per season and paid for itself over a 45-day harvest season.

Video links to video on the project:
https://www.foodsafetyclearinghouse.org/resources/out-old-and-liner



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Out with the Old and In with A Liner

Added by Angela Marie Ferelli • Last updated December 19, 2022

AUTHOR: Gordon Johnson, Jen Jones, Kalmia Kniel, Angela Ferelli Gruber

TYPE: Case Study, Project, Videos

TOPIC: General (PSR), Produce Safety Rule (PSR), Worker Health, Hygiene & Training, Postharvest Handling & Sanitation

STATE: DE, MD

LANGUAGE: English

A University of Maryland and University of Delaware research study provided preliminary evidence for improving watermelon harvest buses with a change in the food contact surfaces. By using vinyl liners and rubber floor mats that can be cleaned and sanitized, microbial loads were reduced compared to the industry standard of used carpet. The liners and mats also provided cushioning that protected watermelon surfaces against damage during harvest

Upcoming Cost Share Program

- Specialty Crop Block Grant
  - DDA/USDA through DDA Food Products Section
- Will cost share on Bus Retrofits
- Contact Jennifer Jones at UD
  - jbjones@udel.edu
  - (302) 632-8695

Team

- The project was overseen by **Jennifer Jones** UD produce safety program assistant who put the project together.
- Food safety research was done by **Dr. Angela Ferelli** Gruber, University of Maryland (now in industry),She did the microbial safety evaluations.
- Dr. Gordon Johnson and Dr. Kali Kniel were advisors on the project
- Collaboration with an industry partner GrowUSA that provided the material and two designs to retrofit the buses.
- As a part of the project, an educational video on the retrofitting process was developed by the team and was shot and edited by Michele Walfred, University of Delaware Communication Specialist.
- Funding partners: Delaware Department of Agriculture, Maryland Department of Agriculture and the FDA and USDA