

Managing E. coli in vegetable wash water



Vern Grubinger
Dec. 13, 2017





Nobody wants to get sick from what we consume

Cause	Annual Deaths (U.S.)
Cigarette smoking	480,000
Diabetes	76,000
Healthcare infections	75,000
Suicide	43,000
Accidental poisoning	42,000
Injury by firearms	34,000
Antibiotic resistance	23,000
Accidental drowning	3,400
Foodborne illness	3,000
Produce-borne illness	750

https://www.cdc.gov/nchs/data/nvsr/nvsr65/nvsr65_04.pdf

<https://www.cdc.gov/healthreport/publications/compendium.pdf>

<https://www.cdc.gov/nchs/fastats/deaths.htm>

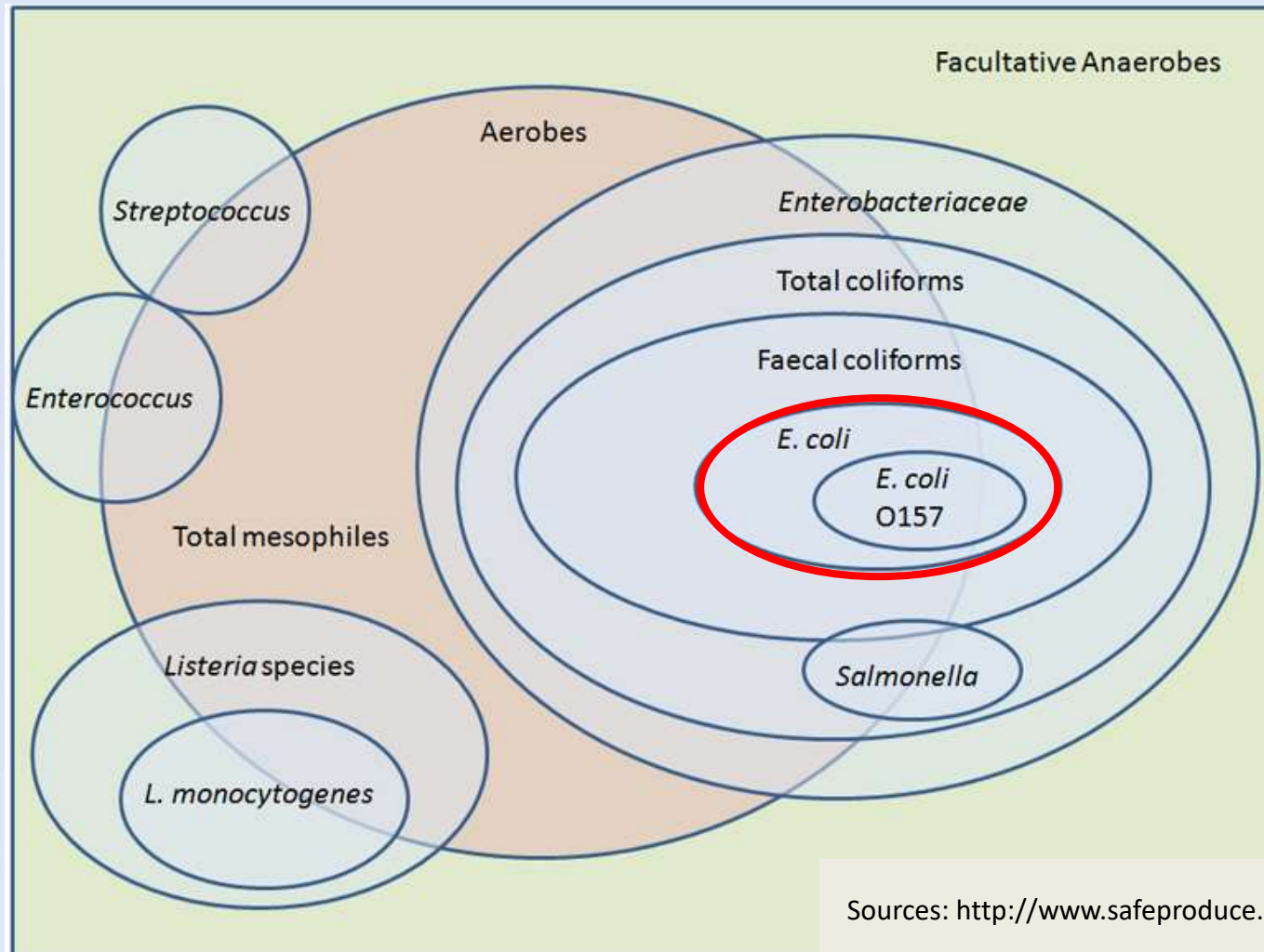


**Produce safety requires thinking about pathogens in water
(GAPs, FSMA , CAPS)**

photo: <http://gutschurch.com/>

generic E.coli is used as a 'proxy' for microbial risk

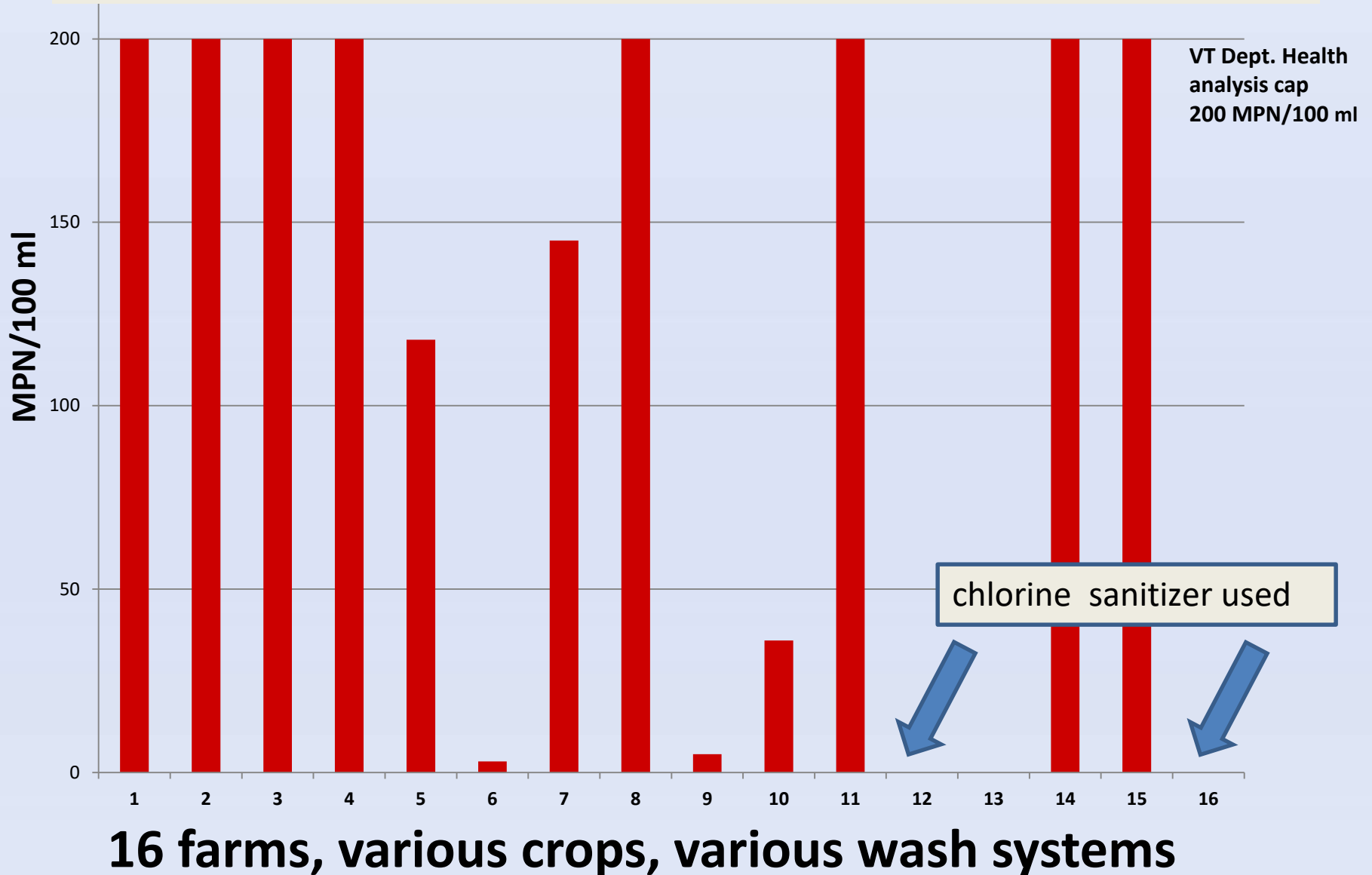
Escherichia coli bacteria live in the intestines of people and animals. Most are harmless, some strains are pathogenic.



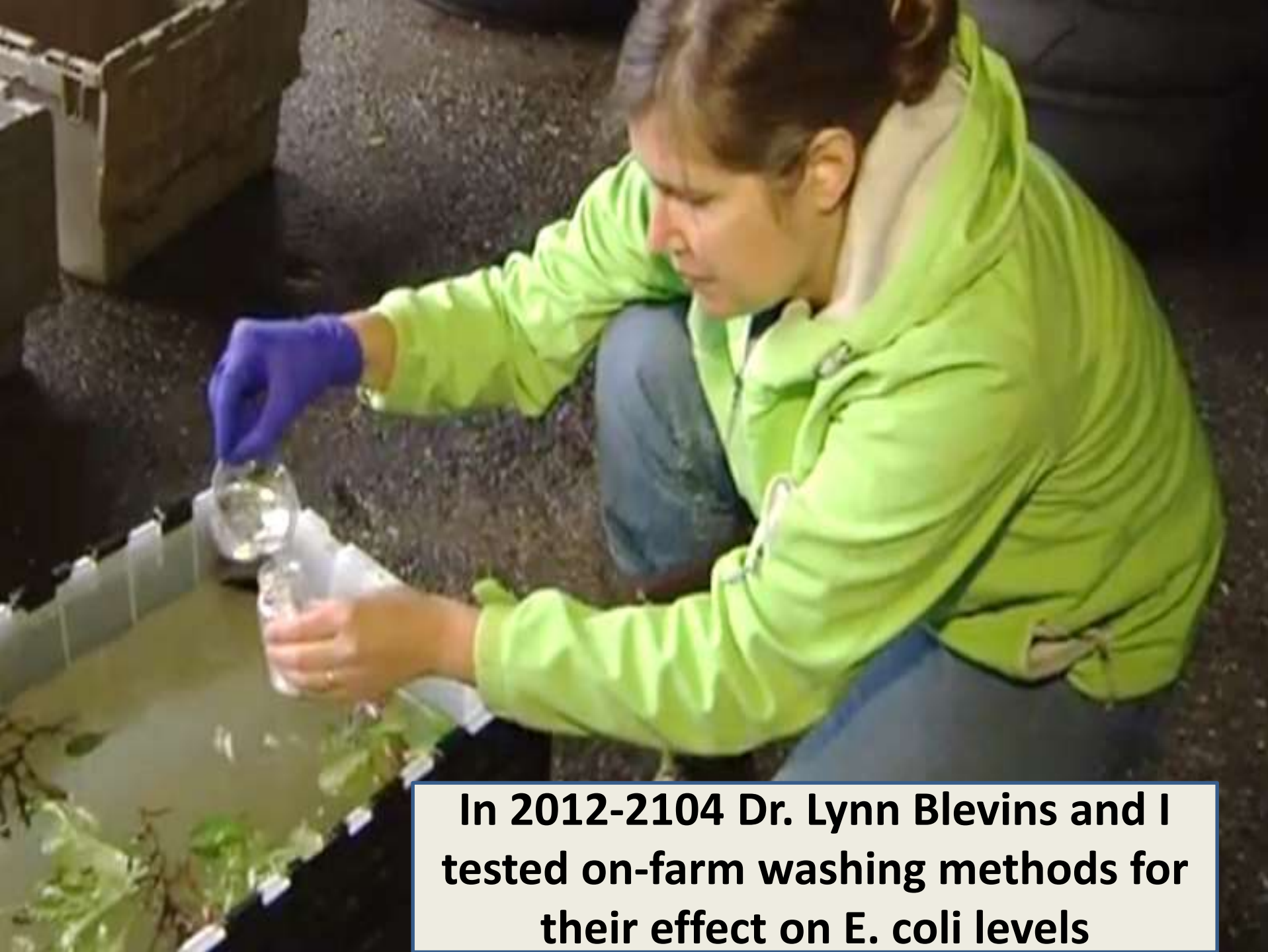


So how much E. coli is in wash water anyway?

**In 2006 we tested for generic E. coli
in vegetable wash water on farms**



Managing the level of potentially harmful bacteria in vegetable wash water is important to reduce the risk of **cross-contamination**, whereby one contaminated item leads to the spread of bacteria onto other items in the same water.



In 2012-2104 Dr. Lynn Blevins and I tested on-farm washing methods for their effect on E. coli levels

**We focused on leafy greens as they are consumed raw
so how they are washed is of particular concern**



single tub wash (rinse)



single 'bubbler' wash



double plastic tub wash



double metal tub wash

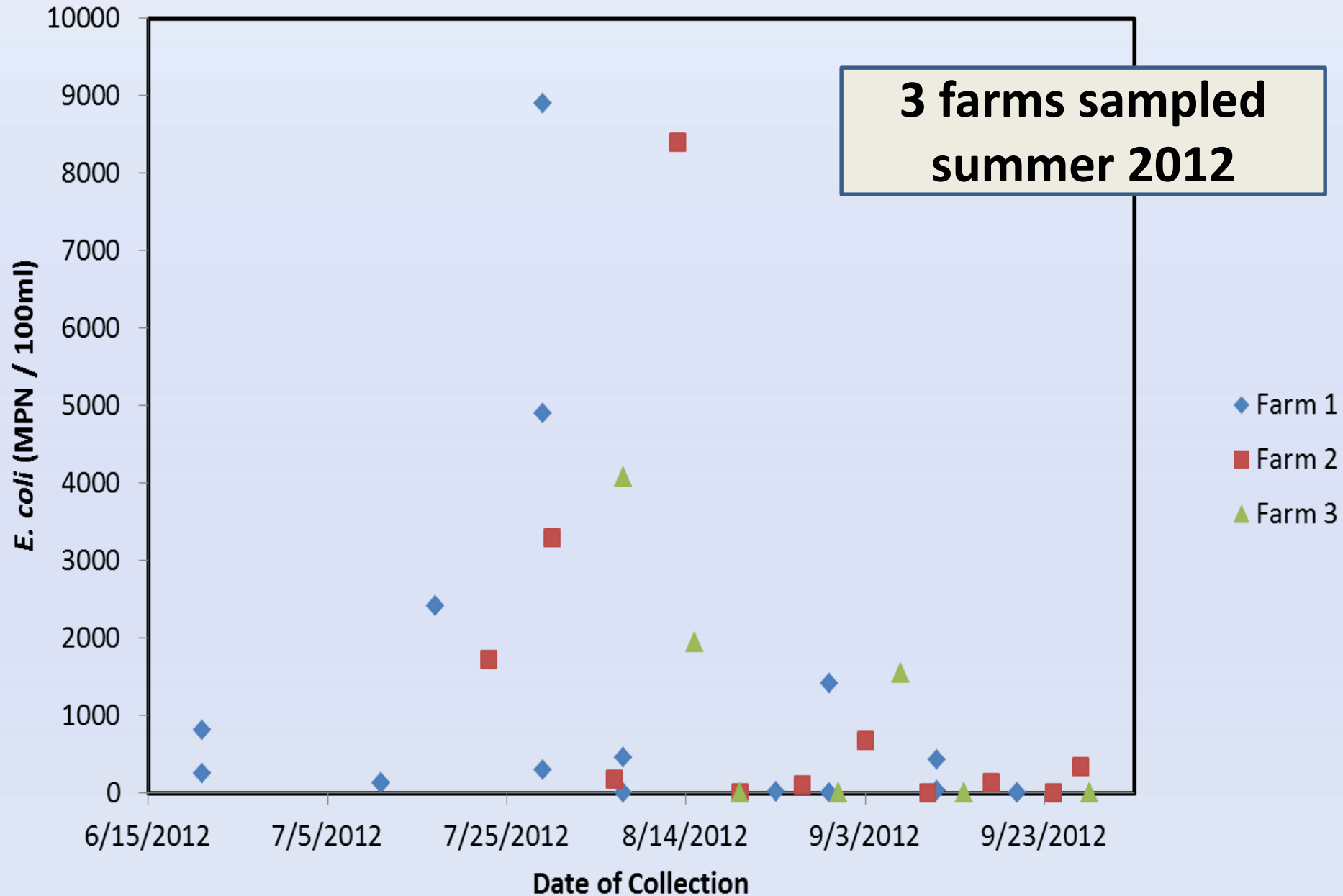


triple stainless sink wash

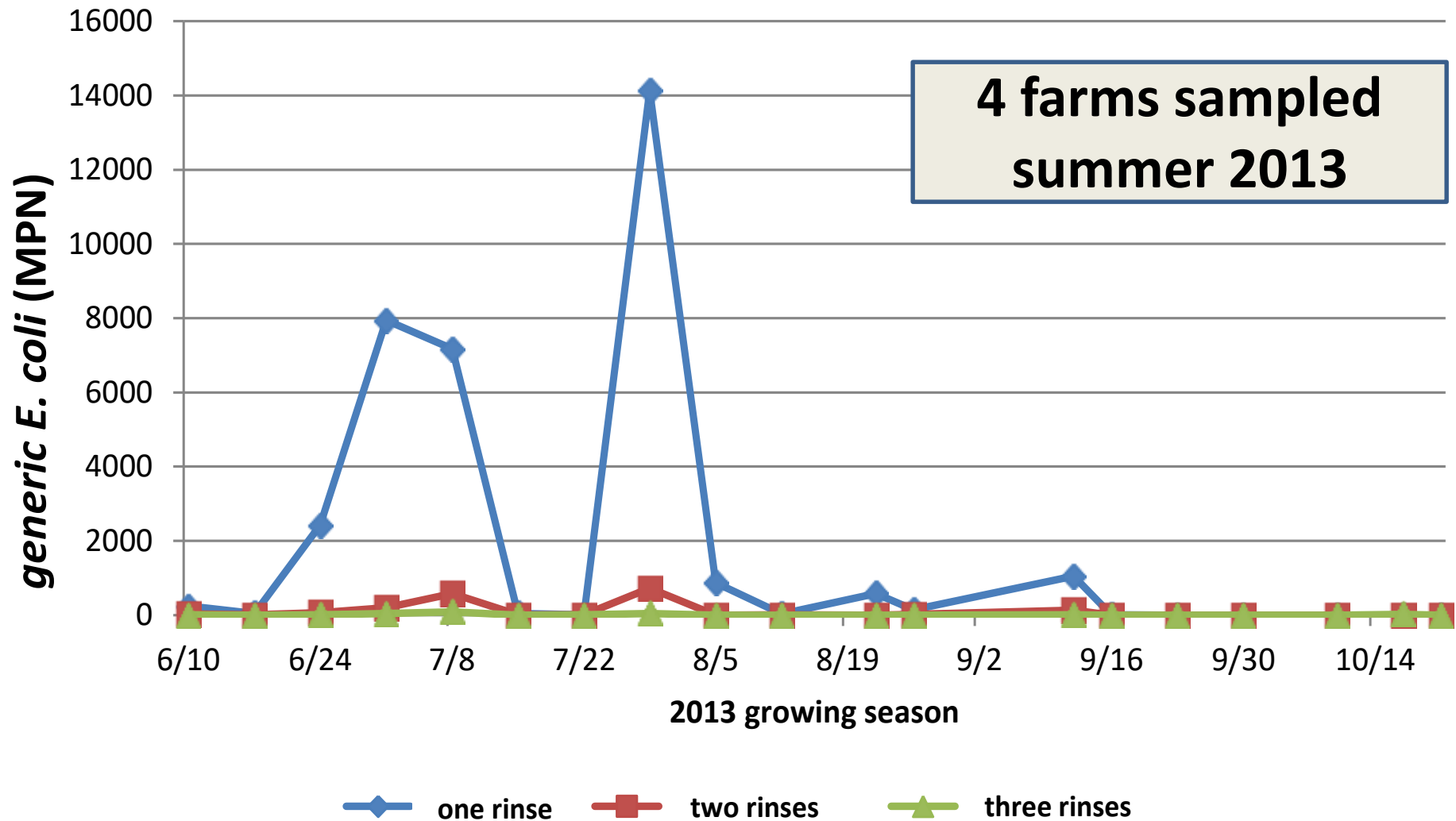


triple tub wash with net system for transfer

Figure 1. *E. coli* count (MPN / 100ml) in first wash by date



E. coli in leafy greens wash water after 1, 2 or 3 rinses



one farm, 24 heads of lettuce, 10 gallons water per rinse

**First
Rinse**

**Second
Rinse**

**Third
Rinse**

↓ 91%

↓ 98%

**Average reduction of *E. coli* in leafy greens wash water,
compared with a single rinse**

We also tested the effect of a low rate of PAA sanitizer (~21 ppm) on E. coli levels



Activated Peroxygen Chemistry

See packet for full instructions



SaniDate® 5.0

SANITIZER / DISINFECTANT
FOR SANITIZING OF HARD, NON-POROUS
SURFACES, STRUCTURES & EQUIPMENT



KEEP OUT OF REACH OF CHILDREN
DANGER - PELIGRO

If listed on outside of label, find someone to explain it to you in detail.
If you do not understand this label, find someone to explain it to you in detail.

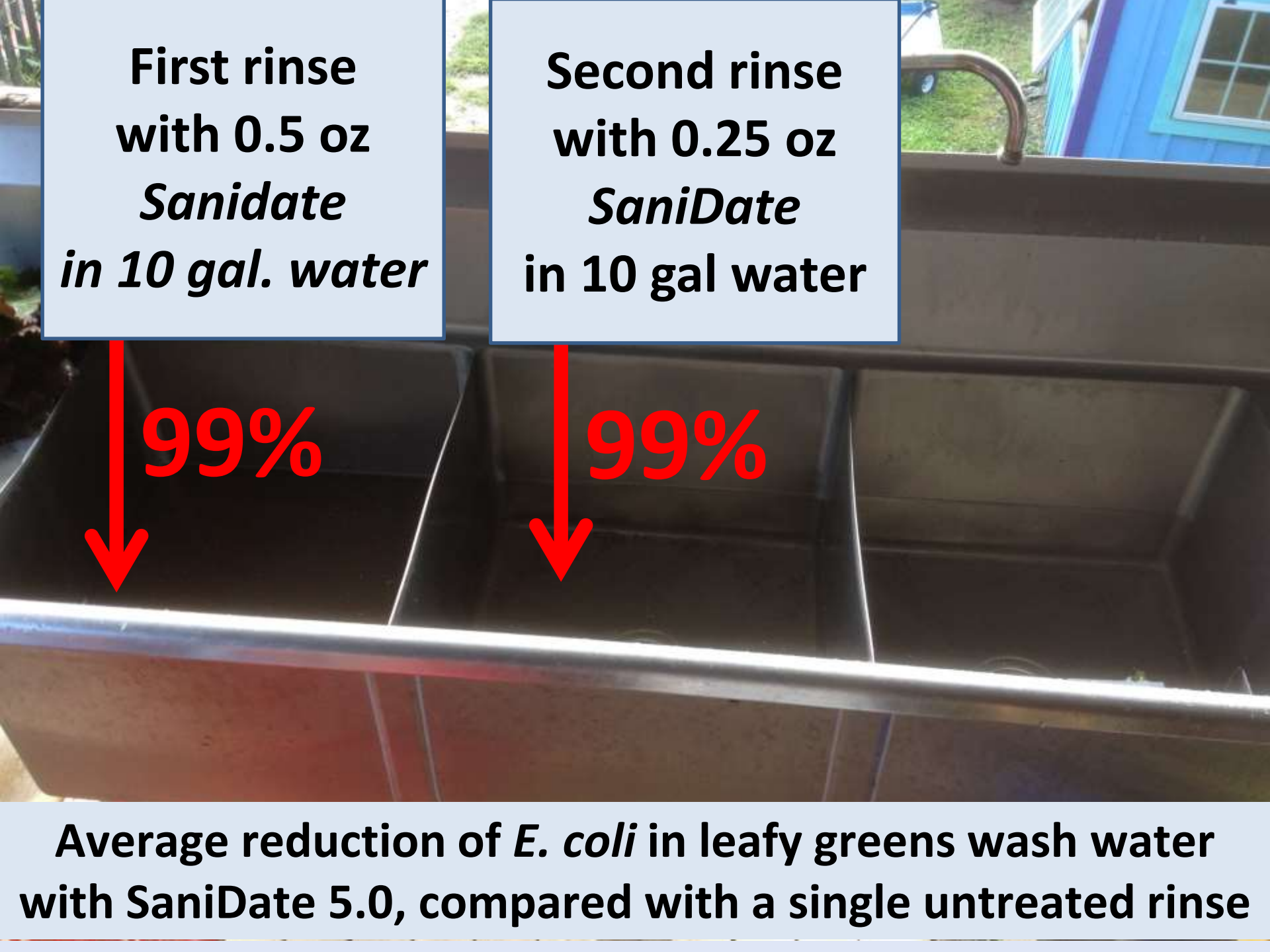
FIRST AID

If in eyes:
• Hold eye open and rinse slowly and gently with water for 15 - 30 minutes.
• If in eyes, continue to rinse until you can see clearly.

FOR COMMERCIAL USE

ACTIVE INGREDIENTS:

25.0%



**First rinse
with 0.5 oz
Sanidate
in 10 gal. water**

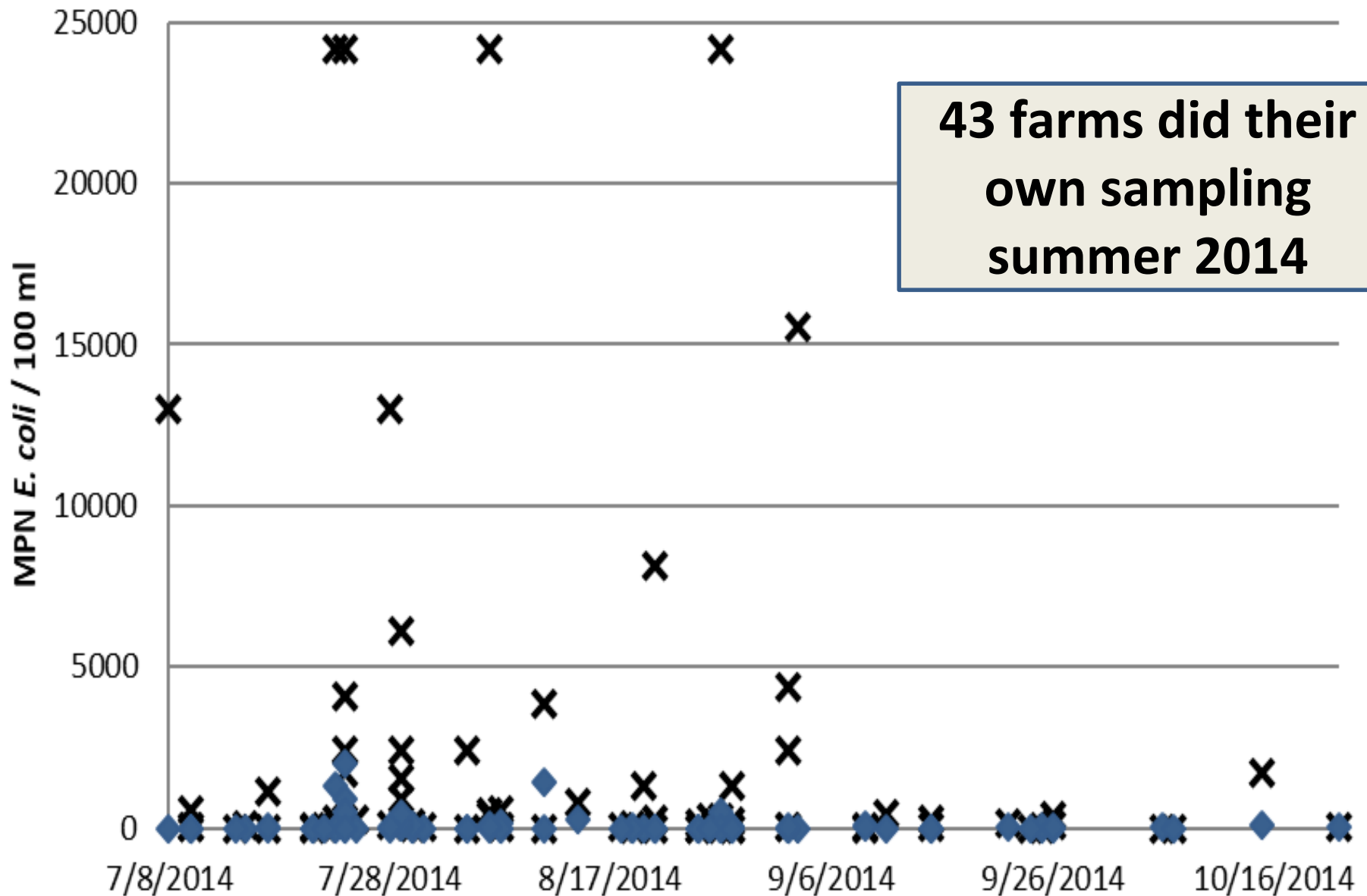
99%

**Second rinse
with 0.25 oz
SaniDate
in 10 gal water**

99%

**Average reduction of *E. coli* in leafy greens wash water
with SaniDate 5.0, compared with a single untreated rinse**

Generic *E. coli* in first wash (X points) and the 'final' wash (diamond points) on 43 farms in 2014. Data combines all types of washing systems and treatments.





turbidity $\neq$ E. coli level

This project funded by:



**NORTHEAST
EXTENSION
RISK MANAGEMENT
EDUCATION**

THE END

