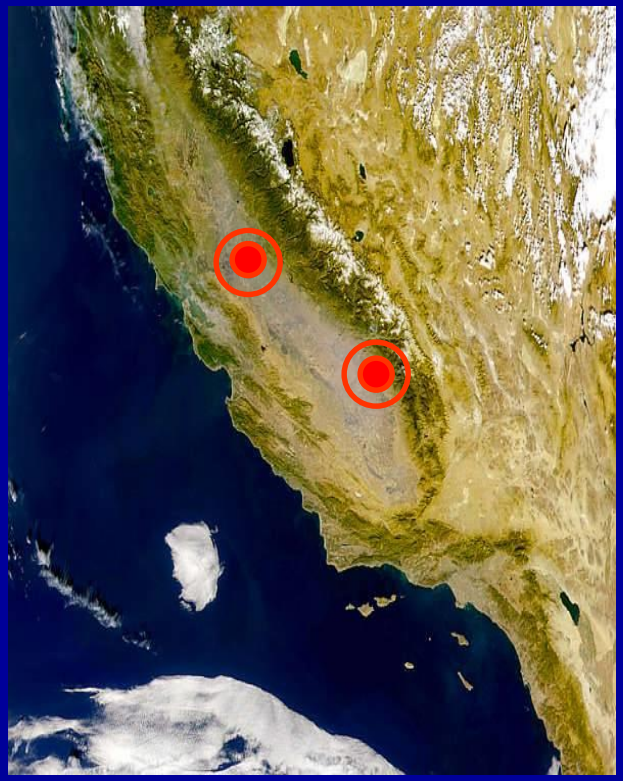
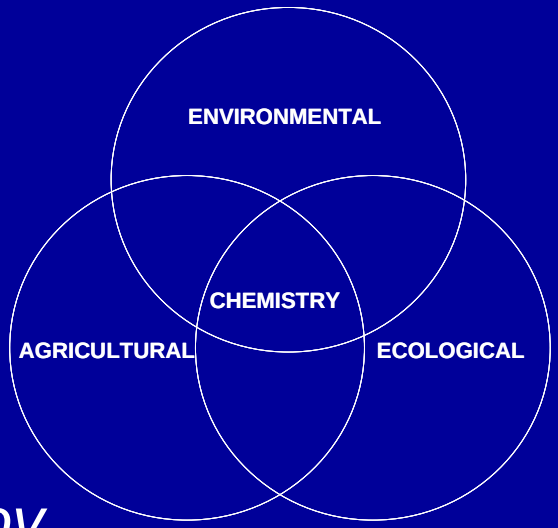
"Trade barriers: 2019 Postharvest update"

Crop Protection & Quality Unit

Spencer S. Walse





USDA Agricultural Research Service

San Joaquin Valley Agricultural Sciences Center

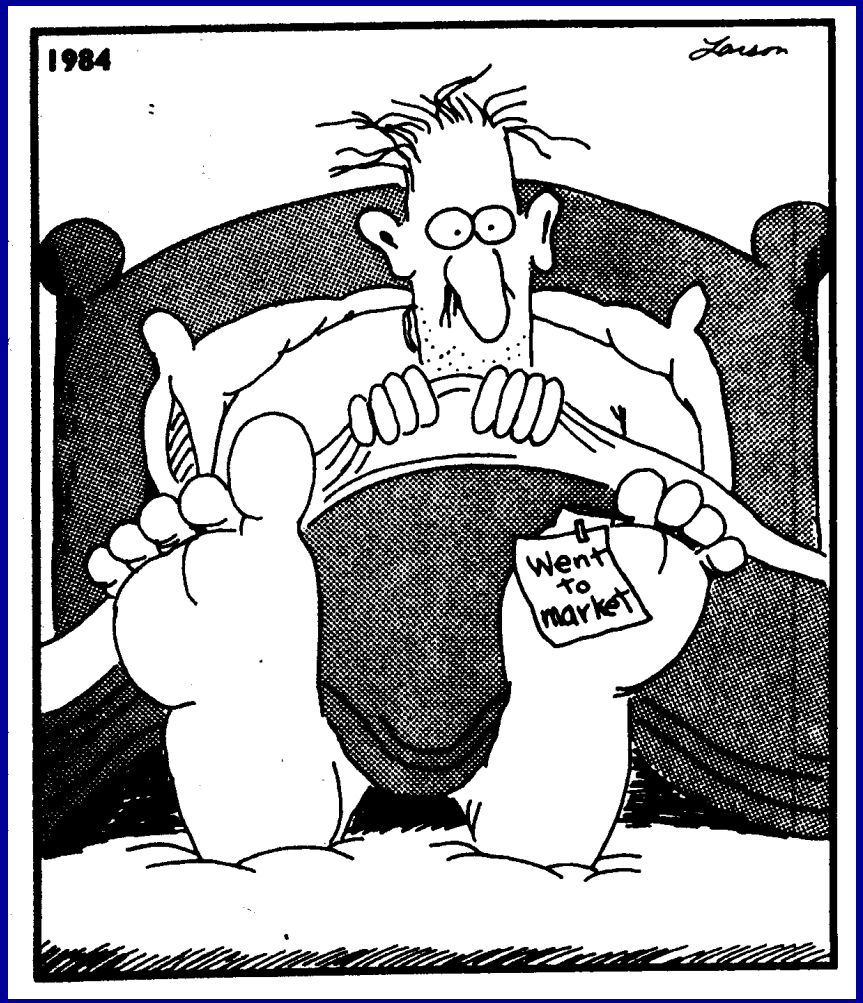
UC DAVIS University of California

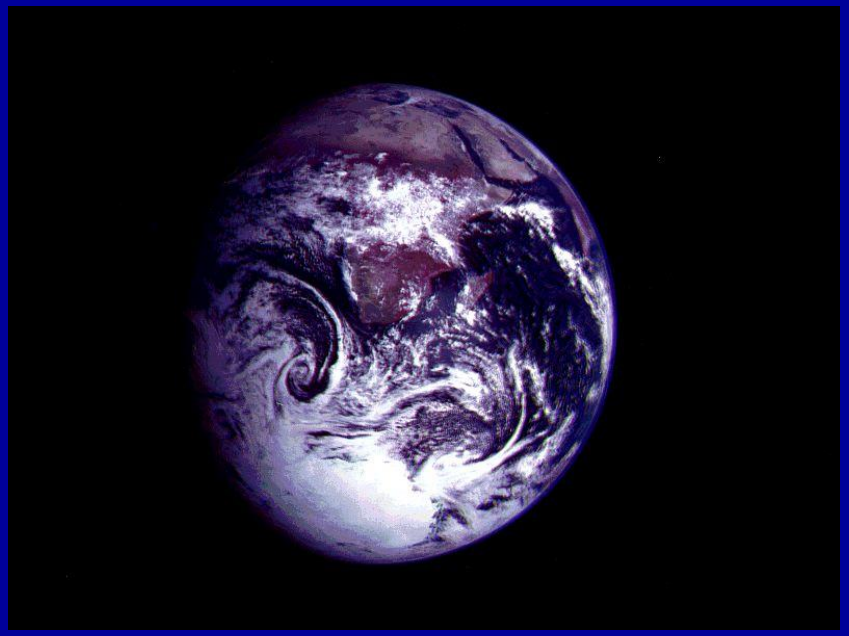
http//fresno.ars.usda.gov

http://agchem.ucdavis.edu/

30,000 ft view – what do we want to do?

(Proactively) Address Consumer & Regulatory Demands…….



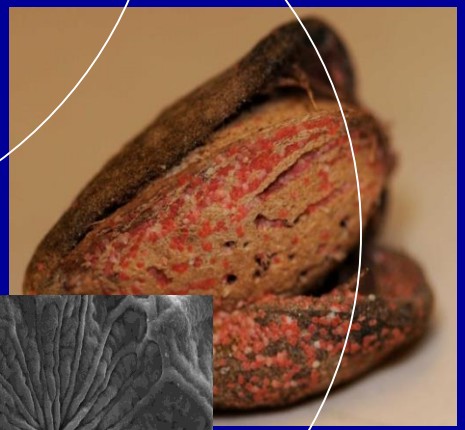


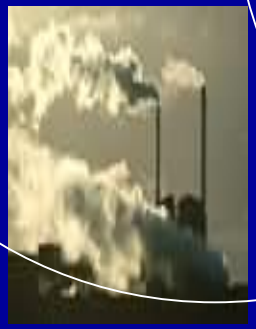
….for the Global Ag. Market

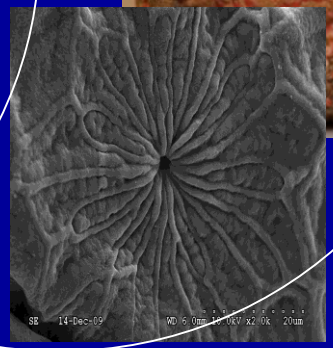
#1 - Agricultural trade is global
(SPS science is the most unpredictable?!?)

politics
economics
science

$







SPS Trade barriers to export – hort.

industry

science

Agricultural Research Service

ARS/University

3rd party!

NPPO

APHIS

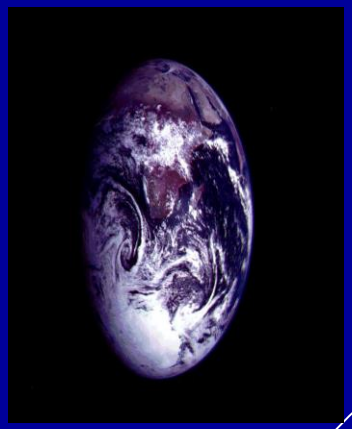
regulatory

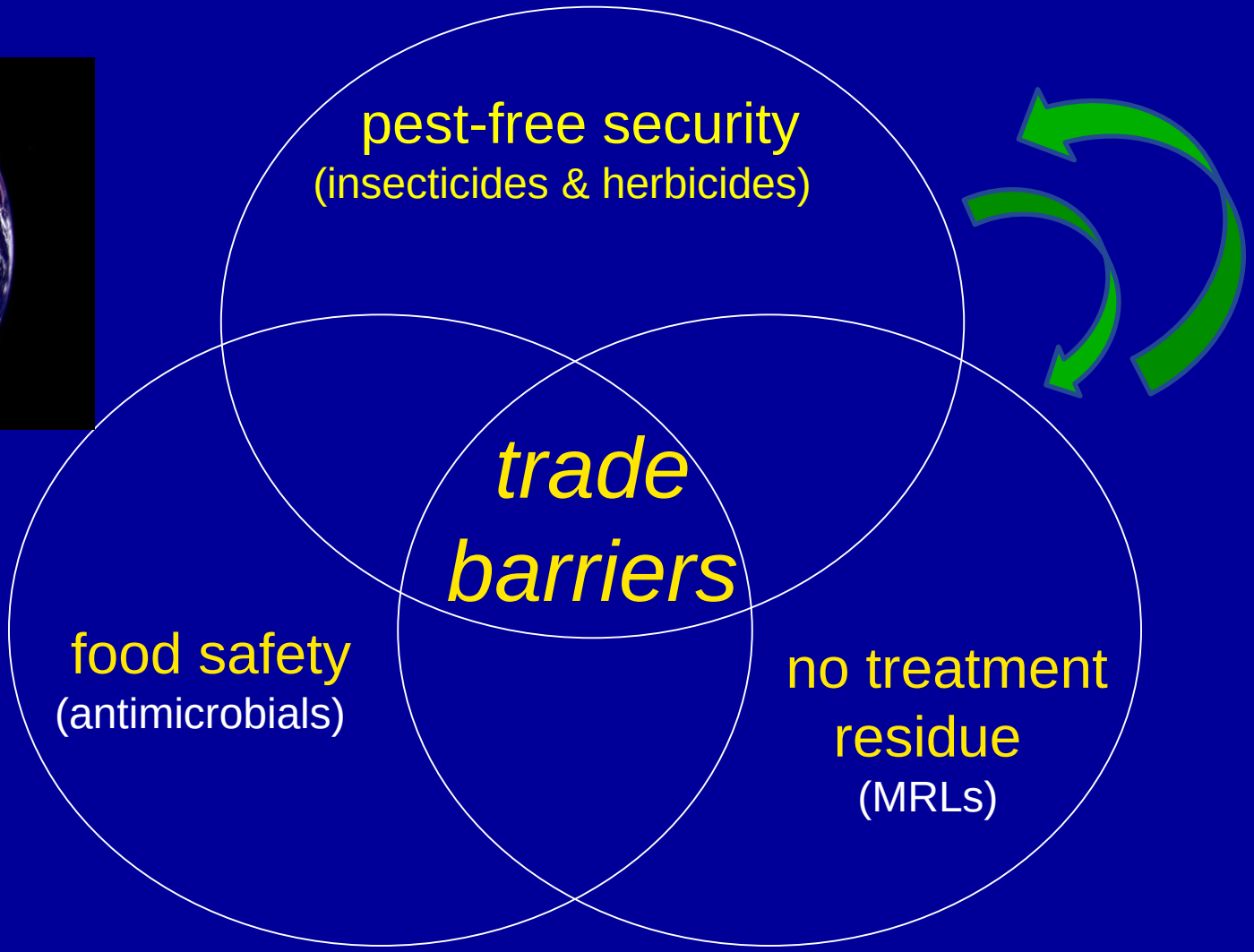
USDA-FAS

USTR

USEPA

SPS vs MRL: Regulatory Demands





Agricultural Conundrum –

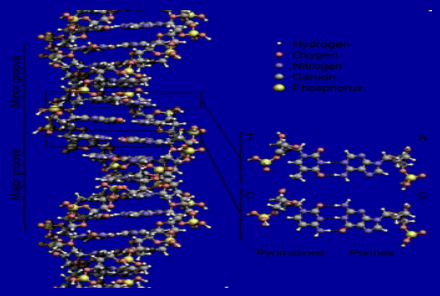
must use chemicals, but can't????

SPS: RETROspective approach

quantitative

uncertainty — certainty

"Pest control based retrospectively through the point of marketing/consumption"



PREPLANT ▼ PRODUCTION ▼ POSTHARVEST

start — "SYSTEM" — finish

"EMOTION"

Consumer → Regulatory Ag. Demands (Phobias)

http://phobialist.com/#I-

"EMOTION"

"FEAR"

- Insectophobia – insects
- Iophobia- poison
- Radiophobia – radiation
- Microbiophobia - microbes (germs)
- Genophobia- Fear of sex (GMO)
- Chemophobia - chemicals
- Chrometophobia - $$ money
- Georgophobia - farms
- Gnosiophobia- knowledge

Fear of the NGO?

Postharvest Fumigation:
SPS & residues

red-head·ed step·child

noun US *informal*

a person or thing that is neglected, unwanted, or mistreated.
"audio has always been something of a red-headed stepchild in the PC world"

1-slide introduction.....

Complexities of Postharvest Fumigant Use

target efficacy

worker- and consumer-exposure

by-stander- and environmental-exposure

CODEX

Pesticides Functional Classes

The pesticide functional classes are based on ...

Below is a complete list of functional classes ...(under brackets the number of pesticides belonging to the functional classes).

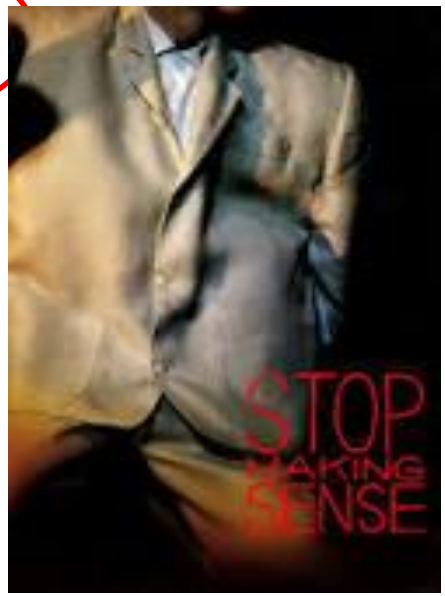
3 postharvest: 323 production

"volatile" : "non-volatile"

"non LC-MS : "LC-MSable"

- Acaricide (12)
- Acaricide, Insecticide and Nematocide
- Acaricide and Insecticide (8)
- Aphicide
- Fumigant (3)
- Fungicide (65)
- Generic
- Herbicide (26)
- Insect growth regulator (2)
- Insecticide (78)
- Nematocide (2)
- Plant growth regulator (6)
- Scald control agent
- Storage scald preventer
- Synergist

- Hydrogen Phosphide
- Methyl Bromide
- Sulfuryl fluoride

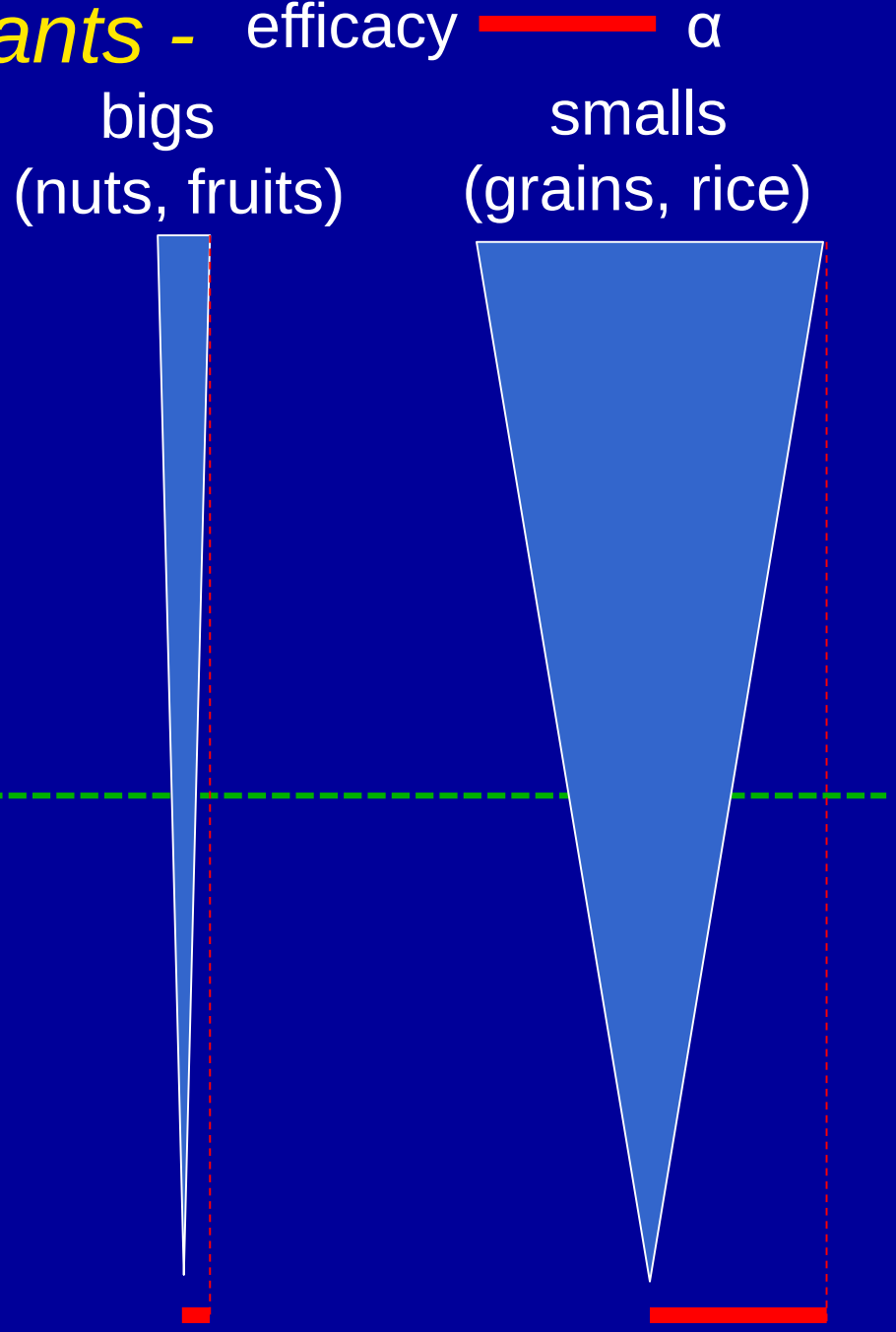


Key considerations (see 2018)
MB, SF, PH3

- Juxtaposition of new labels, (re)registrations, definitions, & complexities with:
  - CODEX
    - residues
      - “volatiles” to “non-volatile” framework
  - Sanitary/Phytosanitary (APHIS & FAO)
    - treatment criterion

Postharvest fumigants - tools in the box

	bp °C
• phosphine	-87
• sulfuryl fluoride	-55
• sulfur dioxide	-10
• methyl bromide	4
• hydrogen cyanide	26
• propylene oxide	34
• ethyl formate	54
• Vapona (non-food)	148
• pyrethrin	170



SPS issues: phosphine PH3

- Commercial phosphine fum for bean thrips
  - Fumigation 250 < [PH3] <750ppmv at T > 40F **PACKED**
  - Tarps, modified reefers, MB chambers, CA rooms
  - Ecofum versus Vaporphos (no pellets)
  - Non-food use, no-tolerance THANKS USEPA!

SPS issues: sulfuryl fluoride SF

- Commercial walnut fum for moths to india
  - Max label applications
  - Tarps, modified reefers, MB chambers, CA rooms
  - India (& AUS) requiring residue data, SF & fluoride (F-)
  - EU mandate for global stewardship – greenhouse potential

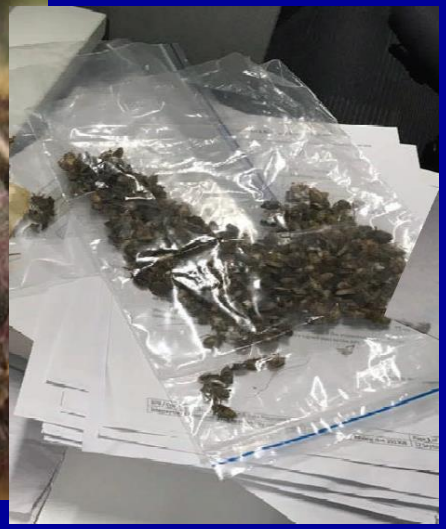
SPS issues: sulfur dioxide SO2

- the MRL issue is a non-volatile (sulfite), "*pseudo*" residue

SPS issues: ethyl formate EF

fumigation to control brown marmorated stinkbug, *Halyomorpha halys*

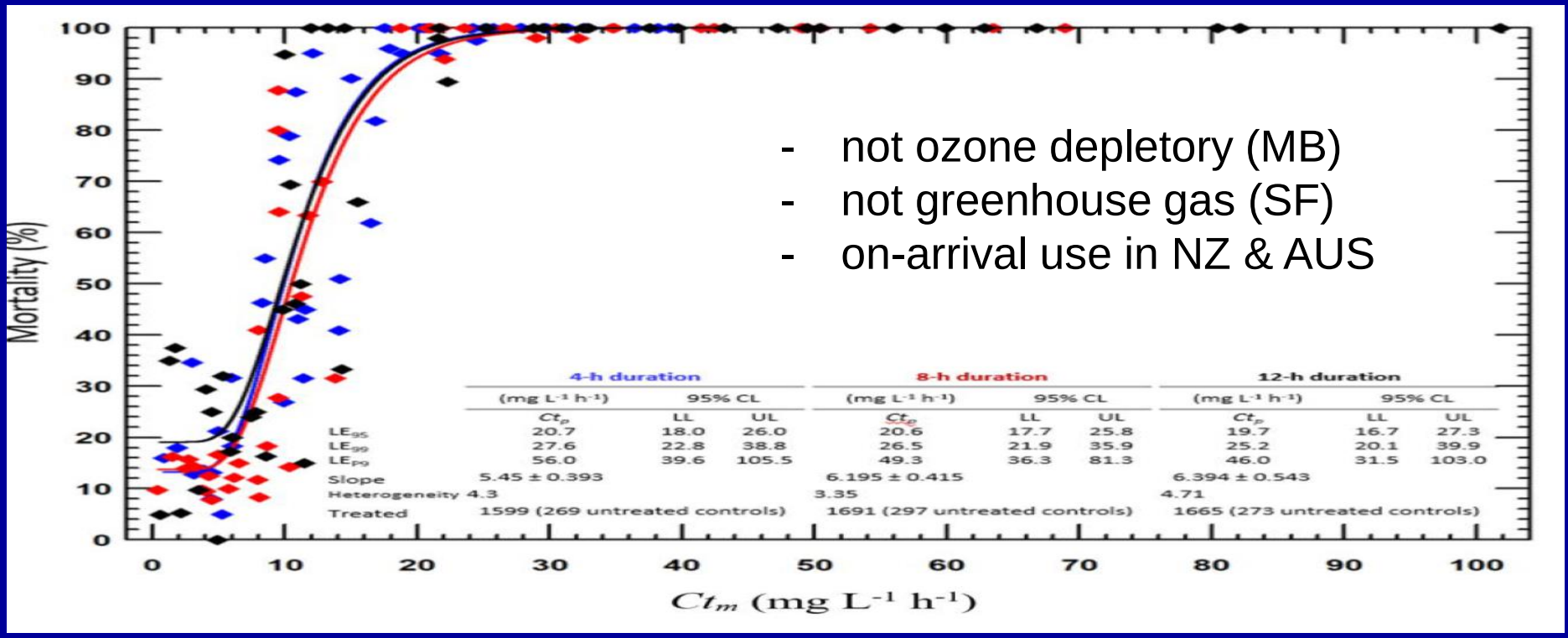
BMSB



EF “smokes” BMSB

Ethyl formate fumigation to control brown marmorated stink bug (Hemiptera: Pentatomidae)

James C. Kawagoe[1], Adelaine E. Abrams[2], and Spencer S. Walse[*1,3]



- not ozone depletory (MB)
- not greenhouse gas (SF)
- on-arrival use in NZ & AUS

Can EF “smoke” ACP?

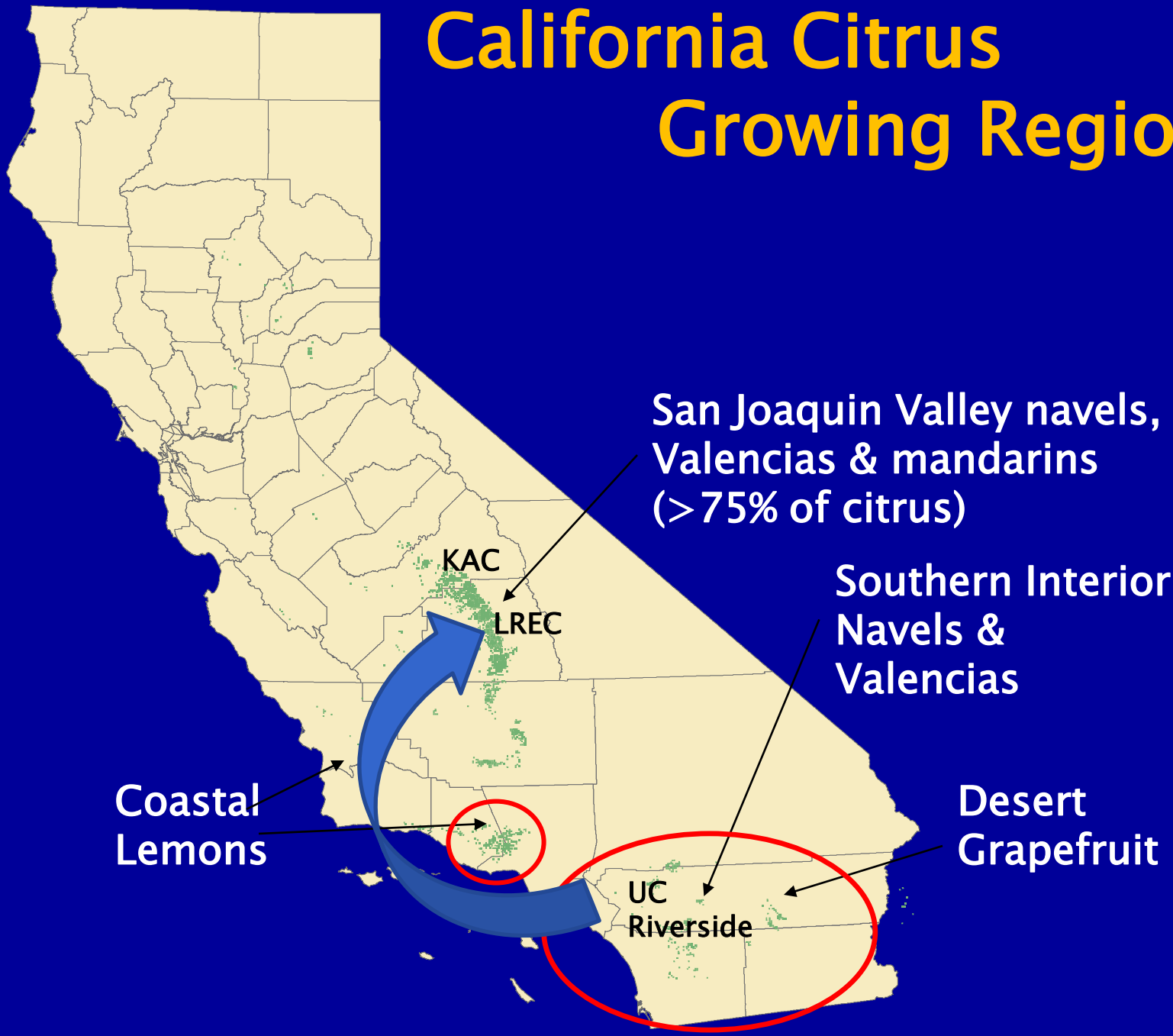
Asian Citrus Psyllid & the Citrus Disease Huanglongbing (HLB)

Huanglongbing

Beth Grafton-Cardwell
Department of Entomology
UC Riverside

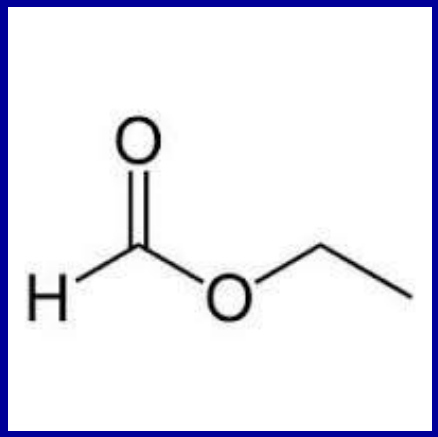
Photography: M. Rogers, S. Halbert and E. Grafton-Cardwell

California Citrus Growing Regions



Key CRB Objective

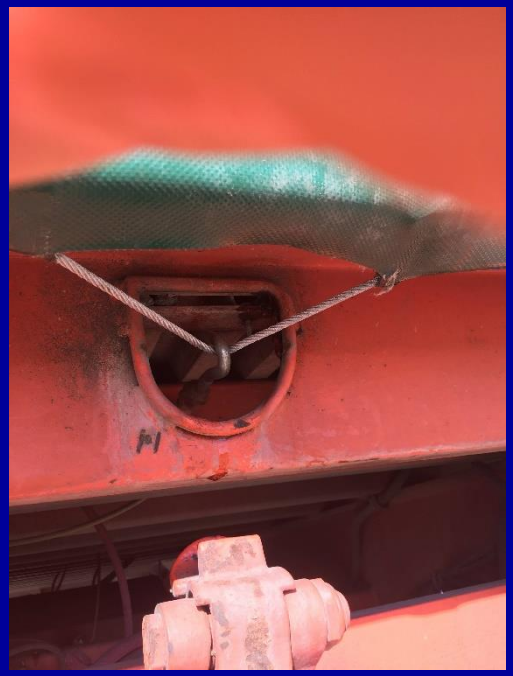
- Ethyl formate “dry” control of ACP in field bins for CDFA Quar – take the treatment to the field
  - Should be easier than fogging (but not registered)



Timeline: Sept >> Oct (1 confirmatory test)

Parlier 1/30/19 28 curtain-side

Parlier Wildwood 3/22/19

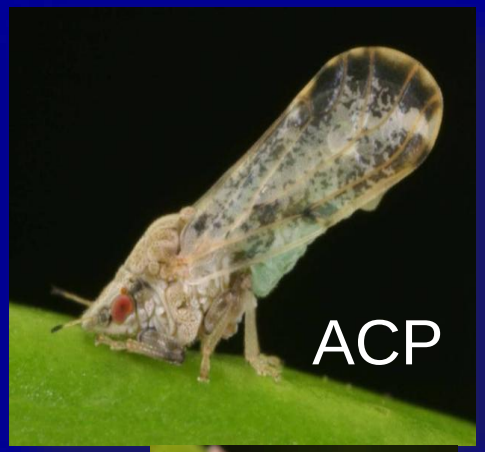


Section	Time (m)			Ct Product
	T10	T32	T60	
A R1	26.46	5.06	0.00	10.09
A R2	25.93	5.19	0.00	9.98
A R3	24.67	5.37	0.00	9.68
Average	25.68	5.21	0.00	9.92
	x ± 0.92	*x ± 0.15*	*x ± 0.00*	*x ± 0.21*
B R1	25.21	5.79	0.00	10.02
B R2	26.10	5.00	0.00	9.95
B R3	26.88	7.31	0.00	11.17
Average	26.06	6.03	0.00	10.38
	x ± 0.84	*x ± 1.17*	*x ± 0.00*	*x ± 0.68*

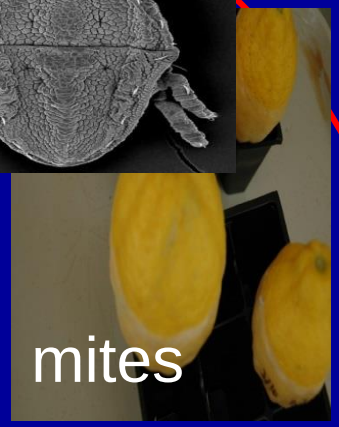
Ethyl formate = surface disinfestation

"as close to harvest as possible – in the field"

pre- versus post-harvest paradigm shift – legal implications



+



ethyl formate residue & MRL insight.....

PART 185—TOLERANCES FOR PESTICIDES IN FOOD

Subpart A [Reserved]

Subpart B—Food Additives Permitted in Food for Human Consumption

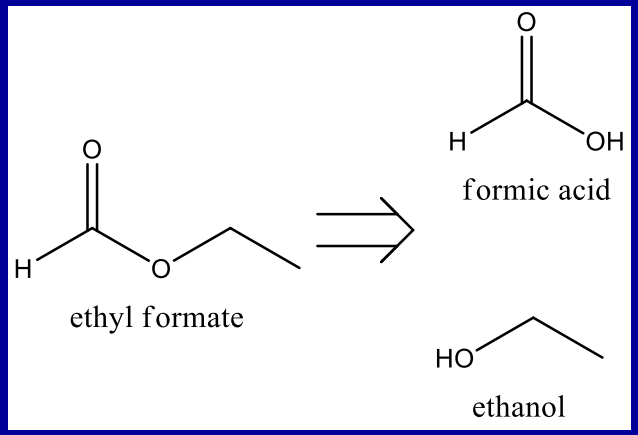
§185.2900 Ethyl formate.

The food additive ethyl formate may be safely used in or on specified dried fruits in accordance with the following prescribed conditions:

(a) It is used or intended for use in or on raisins and dried Zante currants as a bulk and package fumigant.

(b) It is used in accordance with directions registered with the U.S. Environmental Protection Agency, and so used that the total formic acid present free and combined, in the finished product shall not exceed 250 parts per million.

GRAS per § 184.1295



GRAS per § 186.1316

GRAS per § 184.1293

Section 180.910 - Inert ingredients used pre- and post-harvest; exemptions from the requirement of a tolerance.

U.S. Environmental Protection Agency
Office of Pesticide Programs
List of Inert Pesticide Ingredients
List 4B - Other ingredients for which EPA has sufficient information to reasonably conclude that the current use pattern in pesticide products will not adversely affect public health or the environment. - By Chemical Name
Updated August 2004

ethyl formate is coming: Efume®

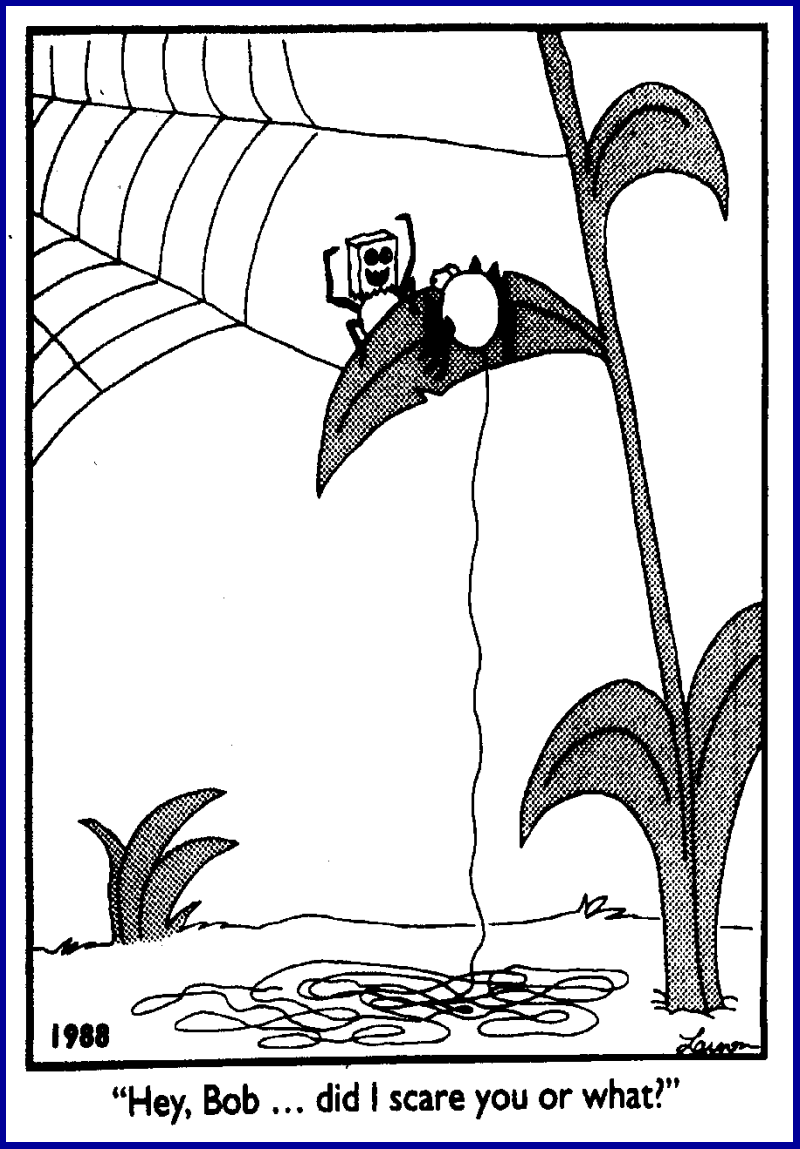
EPA “Biopesticide”

- Traditional “Postharvest”
  - Worker & consumer exposure
  - Off-gassing
  - Residues (ethanol, formic acid)
- Special “citrus use”
  - “Postharvest”, in-field
  - Less human & enviro impact

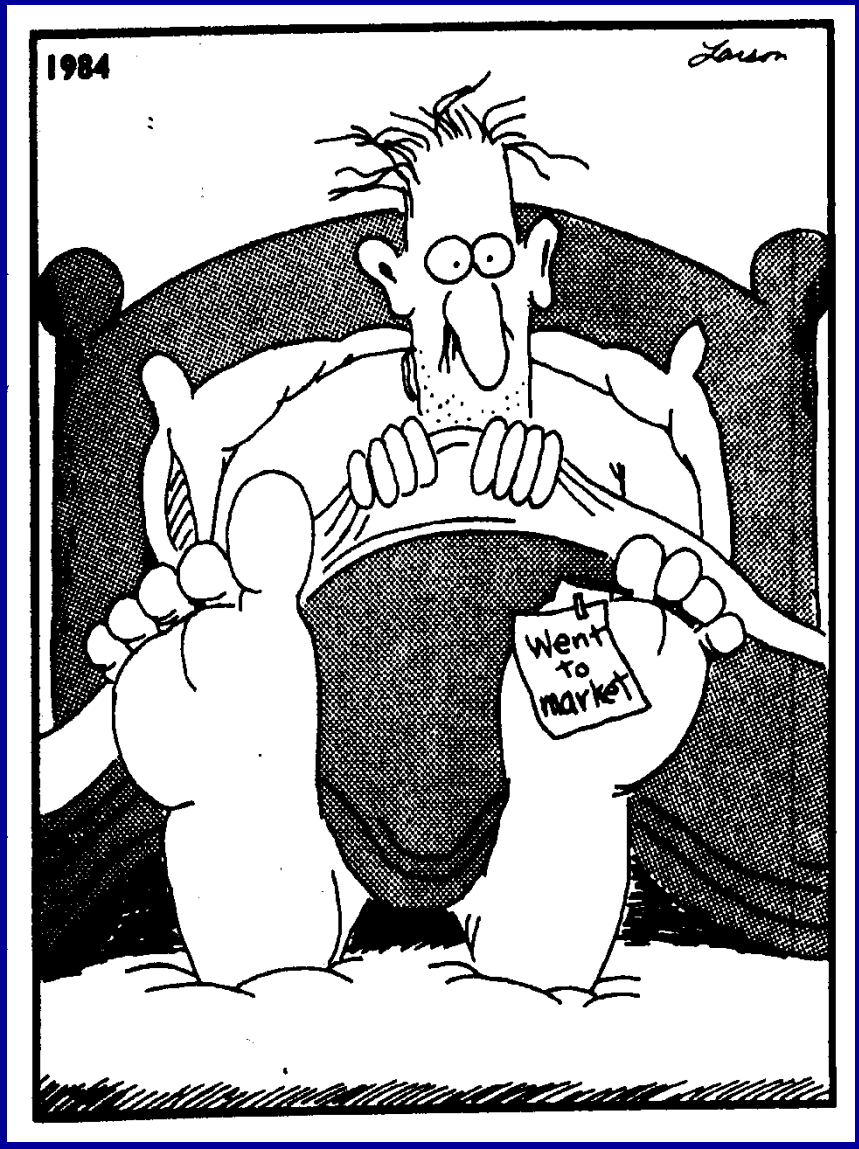
Postharvest Fumigation:
SPS & residues

or

1-slide take home.....



"Hey, Bob … did I scare you or what?"



THANK YOU