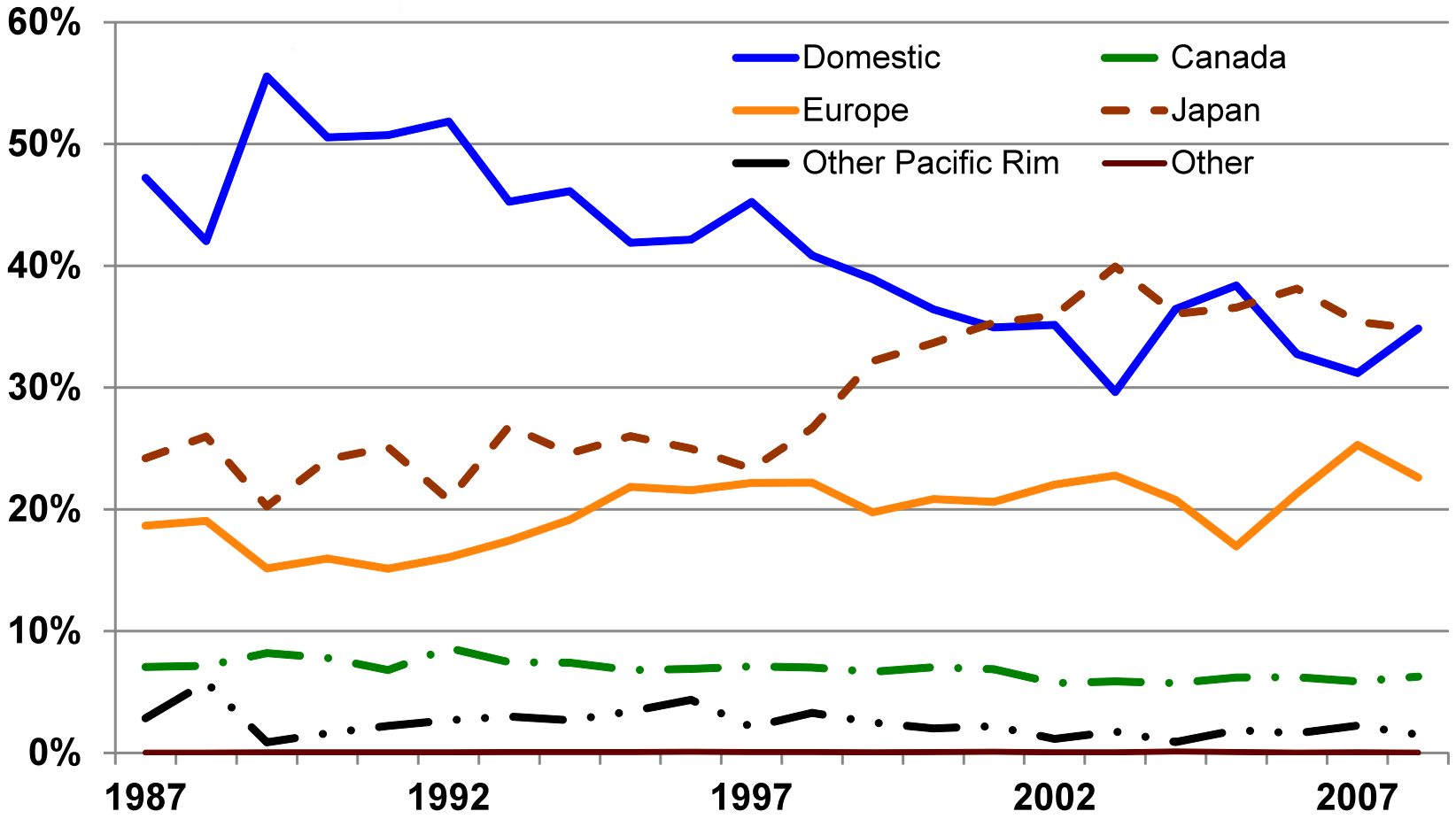

Non-Anticipated Impacts of Residue Tolerances
UF UNIVERSITY of FLORIDA
IFAS Extension
Mark Ritenour
UF/IFAS – Indian River REC

Introduction

- Became involved in MRL issues for Florida's fresh citrus growers & shippers in 2006
  - Japan (2006)
    - Implemented positive list for MRLs
  - EU (2008)
    - MRL Harmonization Regulation (EC) No 396/2005
  - A variety of MRLs for different countries greatly complicates pest control choices for growers and packers.

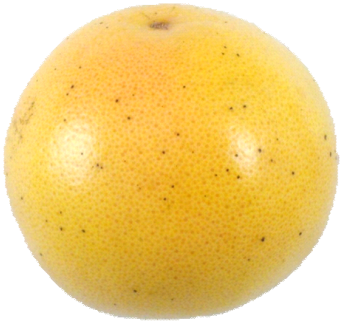
FL Fresh Grapefruit Shipments

Source: FDOC-EMRD (Economic Market and Research



Disease Pressure

Melanose



Extra Class

Class I

Class II

Out of Grade

http://postharvest.ifas.ufl.edu

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- **General Postharvest Information**
- **Citrus Packinghouse Newsletter**
  2010-2019, Index, Archives
- **Topical Index**
  Preharvest, Maturity & Quality, Diseases & Decay Control, Cold Storage, Sanitation & Food Safety, Marketing

Our goal is to generate and disseminate information so that perishable horticultural commodities are delivered to consumers fresh, safe, nutritious and in the form (e.g. ripe or fresh-cut) consumers desire.

Packinghouse Day 2014

NEW LOCATION: Packinghouse Day will be held on **Aug. 21st at the IRREC** in Ft. Pierce. Program details can be found in the Upcoming Events section. More...

Mission

To support Florida's diverse Postharvest horticulture industries through research, extension and teaching.

Calendar

- **Upcoming** Events
- **Previous** Events
- **Extension Calendar**

IFAS Resources

- **EDIS**: Postharvest and Handling
- IFAS **Extension**
- IFAS **Research**
- College of Agriculture and Life Sciences (**CALS**)

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Pesticide Residues & Limits

Look up the latest citrus MRLs for selected export markets and other resources for all commodities. More...

Food Safety

For a narrated personal hygiene training presentation for citrus postharvest personnel and much More...

Citrus Black Spot

Information on black spot, as well as government resources. More...

Citrus Canker

Information on canker symptoms, treatments, and fruit decontamination requirements. More...

IFAS Resources

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Careers

- **HortOpportunities:** American Society for Hort. Sci.
- **Academic Careers Online**

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Pesticide Residues & Maximum Limits

UF/IFAS Publications

- **Maximum Residue Limits (MRLs) for Citrus** (50KB pdf)
  For U.S. & Selected Export Markets
  Updated December, 2012.
- UF Pesticide Information Office
  Chemically Speaking Newsletter

Pesticide MRL Web Resources

- **International Maximum Residue Level Database** - USDA Foreign Agricultural Service (FAS).
- **U.S.A. Code of federal regulations** - Go to Title 40, Part 180 found **here,** or **here** for the official list of U.S. MRLs.
  - **Index to Title 40, Part 180**
  - See **Subpart D—Exemptions From Tolerances**
  - See EPA's excellent overview on **Pesticides and Food**
- **European Union** - EU-MRL Pesticide Database--European Commission Directorate General for Health and Consumers.
- **Japan** - MRLs -List of Agricultural Chemicals in Foods--The Japan Food Chemical Research Foundation.
  See: **Grapefruit; Orange; Lemon; Lime; Other citrus.**
  Postharvest fungicides must also be designated by Japan as **Food Additives**.
  Original website on Japan's "**Positive List System for Agricultural Chemical Residues in Foods.**"
  See also MHLW Notification No. 498 (**Exempted Substances**)
- **Canada** - Health Canada.
  Specific MRL information.
- **CODEX Alimentarius** - Pesticide Residues in Food - FAO/WHO Food Standards. CODEX homepage.
- **Taiwan** - See specifically the **Standards for Pesticide Residue Limits in Food** (located at the bottom of the page), as amended June 20, 2012.
- **Korea** - MRL database. For an explanation of their policy's decision tree, go to "**Pesticide MRLs – sorted by food**" on left side of page, and select "English" in upper right corner to see the translation of the decision tree policy. Korea does not accept Codex crop group MRLs.
- **OECD Maximum Residue Limit Calculator** - "With the goal of harmonizing the calculation of MRLs across the OECD, the OECD has developed a MRL Calculator..." Click **here** for discussion of switching from the NAFTA MRL Calculator to the OECD MRL Calculator.

Pesticide Information & Labels

- **U.S. EPA Pesticide Information Website.**

Downloads

Adobe Reader

Resources

Pesticides--EPA

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  - See **Subpart D—Exemptions From Tolerances**
  - See EPA's excellent overview on **Pesticides and Food -Alphabetical list of Substances Generally Regarded as Safe (GRAS)**

- **European Union** - EU-MRL Pesticide Database--
  European Commission Directorate General for Health and Consumers.
  Also see the **Pesticide Action Network (PAN) Europe** for listings of substances banned or authorized in the EU market.

- **Japan** - MRLs -List of Agricultural Chemicals in Foods--

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Pesticides--EPA

Maximum Residue Limits (MRLs) in part-per-million (ppm)

For Citrus - By Country

Because MRLs change frequently, no guarantee is made concerning the accuracy of the below values.
Verify these values with other knowledgeable sources within specific markets of interest.

Proposed values are not in effect and may never be adopted, but are listed to notify of potential upcoming changes
Abbreviations: G = grapefruit, O = orange, T = tangerine, L = lemon, P=pummelo
Visit http://irrec.ifas.ufl.edu/postharvest/ for more details & updates

Chemical Name	Trade Names (Examples only, not inclusive)	U.S. Citrus	Canada Citrus	CODEX Citrus	EU GF & Orange	Japan GF & Orange	Taiwan GF & Orange	Korea GF & Orange
2,4-D (2,4-Dichlorophenoxyacetic acid)	Citrus Fix, Hivol	6	2	1	1	2	2	2
Abamectin	Agri-Mek, Clinch, Zephyr, ABBA, Epi-mek, Reaper	0.02; 0.01 (P)	0.02	0.01	0.01	0.01	0.01	0.02
Acephate	Acephate, Orthene	0.02			0.01	5	0.05	5
Acequinocyl	Kanemite	0.2	0.35		0.2 (G, L); 0.4 (O, T)	2		1
Acetamiprid	Assail	1	0.5	1	1	2	0.5	0.5
Acibenzolar-S-methyl	Actigard	0.05 (G)			0.02			0.2
Azadirachtin	Aza-Direct, Azatin, Ecozin, Neemix	exempt			0.5; 0.01 lime	exempt	exempt	
Azoxystrobin	Abound, Graduate A+	15	10	15	15	10	10	7 (G); 5 (O)
Bifenazate	Acramite	nonbearing			0.01	0.7		0.1
Bifenthrin	Brigade, Capture, Telstar, Fanfare	0.05		0.05	0.1	2	0.5	0.5
Boscalid	A component of Pristine	1.6		2	2	10		0.5
Bromacil	Bromo, Hyvar	0.1				0.07; 0.05 (O)	0.5	0.1
Buprofezin	Applaud, Centaur	2.5		1	1	2.5; 2 (O)	0.5	0.5
Carbaryl	Sevin	10	10	15	0.01	7	2	0.5
Carfentrazone-ethyl	Aim	0.1			0.01	0.1		0.1
Chlorantraniliprole	Altacor, part of VoliamFlexi	1.4		0.5	0.7	1		1
Chlorpyrifos	Lorsban, Nufos	1	1	1	0.3 (G, O); 0.2 (L) 2.0 (T)	1	1	0.3
Clethodim	Prism	nonbearing			0.1			0.1
Copper	various	exempt	50		20	exempt	exempt	
Cryolite	Kryocide	7					7	
Cyfluthrin		0.2		0.3	0.02	2	0.3	2
Dicofol	Dicofol, Kelthane	6	5		0.02	5	1	1
Difenoconazole	A component of Quadris Top	0.6			0.1	(0.6 proposed)		1
Diflubenzuron	Micromite	0.5 (G, O, T)		0.5	1	3	1	3
Dimethoate	Dimethoate, Cygon	2	1.5	5	0.02	2	2	2
Diuron	Diuron, Direx, Karmex	0.05; 0.5 (L)	1		0.1	0.8 (G); 0.05 (O)	0.05 (G); 0.2 (O)	1
Endosulfan	Endosulfan, Phaser, Thionex	Citrus label canceled July 31, 2012			0.05	0.5	0.01	0.1
EPTC (S-Ethyl dipropylthiocarbamate)	Eptam	0.1			0.01	0.1		
Ethoprop[hos]	Mocap	nonbearing			0.02		0.02	0.02
Fenbuconazole	Enable	1	1		1 (G, O); 0.05 (L, T)	1		0.5

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Unintended Consequences

- Producers cannot segregate blocks for specific markets
- Industry vigilance is required when MRLs for export markets are lower than U.S. MRLs
  - Especially critical because countries change MRLs periodically
  - Limited knowledge of how fast residues of various compounds decline under different production/postharvest conditions

Unintended Consequences

- Potential problems with cross contamination
  - Necessity of using separate, dedicated packing/ processing lines for organic vs. conventional
  - All compounds used on a line must have tolerances for all possible intended markets

Inadvertent Residues

- Improving residue detection methodologies and technology
  - Increased detection does not equate to increased risk
  - However, with increased reports of pesticide residue detections, the public perceives the reports as indications of increased residues (increased risk)

Secondary Standards

- Even more confusing can be individual buyer residue tolerances that are more restrictive that country MRLs
  - These include food processors
- Such tolerances are not widely reported, but must be obtained through communication directly with the buyer
  - **Close and frequent communication with buyers is essential**

Emergency Situations

Insect Vector -

- ***Diaphorina citri*** – Asian citrus psyllid; discovered in FL, June 1998, now widely distributed
- **Huanglongbing** (HLB, or "Greening) discovered in FL, September 2005

Healthy vs. Infected Tree

Fruit Drop

Fruit Characteristics

Conclusions

- Industry must stay current on MRLs for potential markets
  - Industry awareness has increased greatly over the past 10 years
- Reducing MRLs solely based on average previous use can hamper responses to emergency situations (e.g., to eradicate introduced diseases)

Conclusions

- MRL dis-harmony among various markets introduces many potential problems
  - Many producers cannot segregate blocks for specific markets
  - Dedicated equipment is often required to reduce the potential for cross contamination
- Improving residue detection techniques are giving the public the inacurate perception of increased risk


Thank you!
See the UF Postharvest Information Website for more information
http://irrec.ifas.ufl.edu/postharvest/