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# Can Residue Decline Curves Help Compliance with Foreign and Secondary MRLs?

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# How are Residue Data Generated?



- Registrants generate residue data based on max use rate, max number of applications, min spray interval, and min PHI.
- Trials to support MRLs are conducted in the country of registration.
- The number of residue trials vary.



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# Residue Data Example: Grapes

Residue Control Number	County/State	EPA Region	PHI	GPA	Residue (ppm) <sup>1</sup>		Total Residue (ppm) <sup>3</sup>
					Analyte		
					BAS  F	BF 	
50 GPA (Treatment 2)							
97131	Yates County, NY	I	14	50	0.75 <sup>2</sup>	0.09 <sup>2</sup>	0.84 <sup>2</sup>
97132	Kern County, CA	X	14	50	0.33	0.08	0.41
97133	Fresno County, CA	X	14	50	0.49	0.11	0.60
97134	Glenn County, CA	X	14	50	0.66	0.09	0.75
97135	Fresno County, CA	X	14	50	0.21	0.04	0.25
97136	Hood River County, OR	XI	14	50	1.34 <sup>2</sup>	0.15 <sup>2</sup>	1.49 <sup>2</sup>
Average Residue (ppm)					0.63	0.09	0.73

# Why are Decline Curves Generated?

- DCs establish the relationship between residues at a range of PHIs. May be affected by:
  - ▶ Application timing/ Size of commodity at application
  - ▶ PreHarvest Interval/ Size of the commodity at harvest
- DCs may not be linear. Depending on properties, compounds may be affected by:
  - ▶ Exposure to Sunlight (photolysis)
  - ▶ Moisture levels (hydrolysis)
  - ▶ Plant uptake
  - ▶ Plant Metabolism

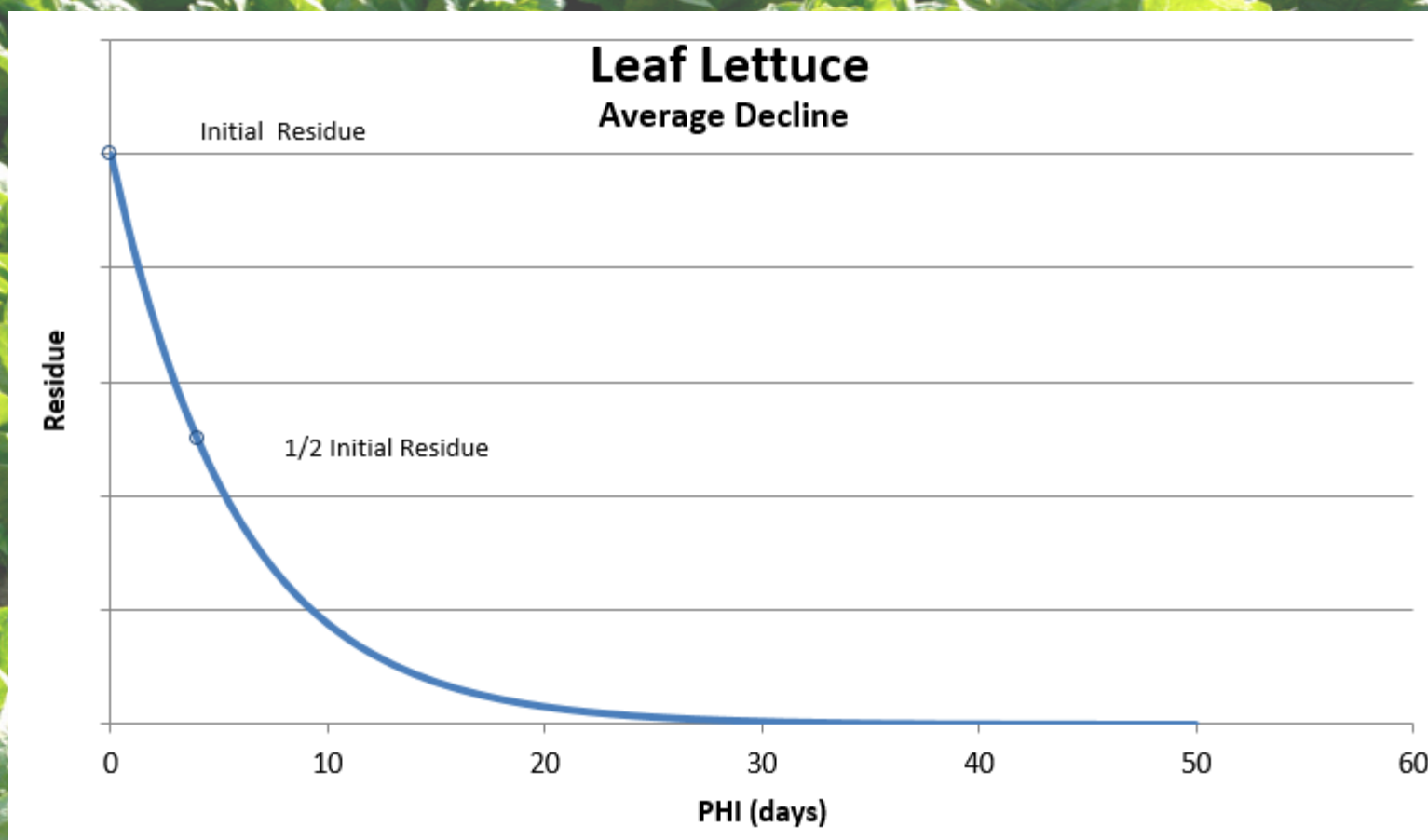




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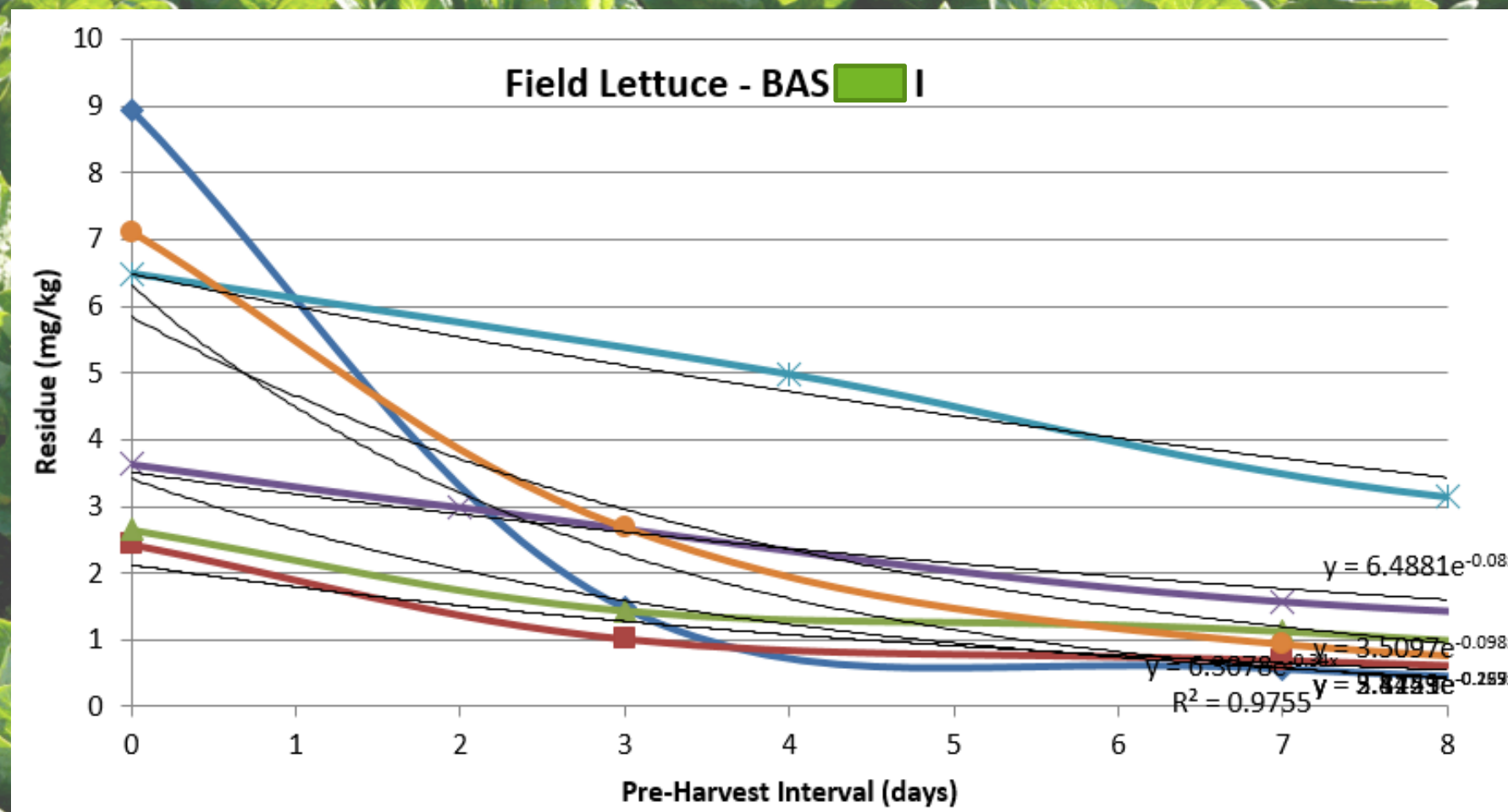
# Decline Curve Example- Textbook



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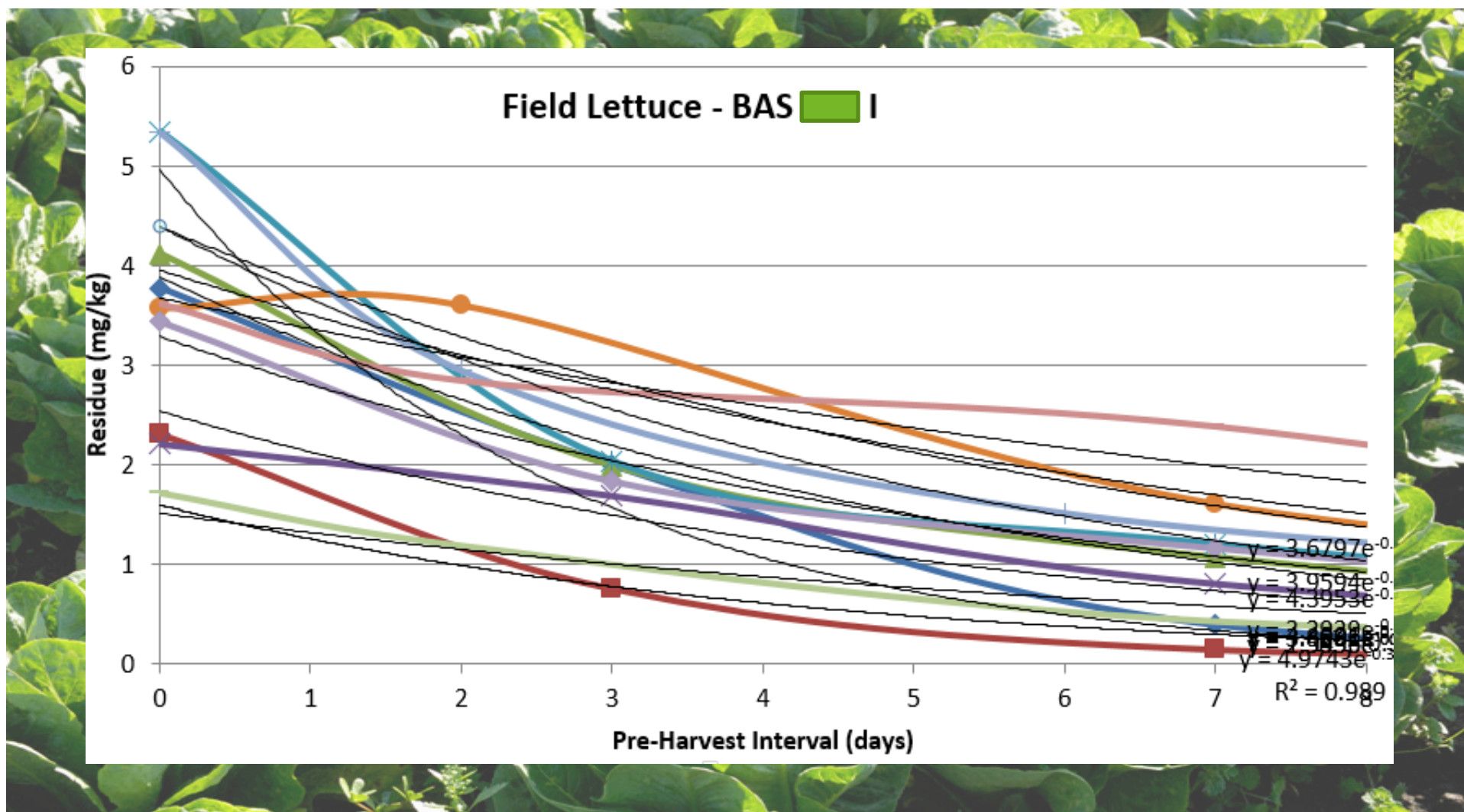
# Decline Curve Example- Lettuce



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# Decline Curve Example- Lettuce



# What is learned from Decline Curve data?

- Provides information to:
  - ▶ Estimate likely residues at PHIs longer than the label.
  - ▶ Estimate total residues compared to parent. May be useful in estimating MRLs where there are different residue definitions.
  - ▶ Estimate residues at an alternative PHI in case of dietary risk concerns at the target PHI.





## What are the Limitations of Decline Curves?

- Few data points provide only a general idea of the behavior of the molecule.
- Like residue trials to support the MRL, trials are conducted at the max rate and number of applications, which may differ from a commercial situation.
- May not be a linear relationship between residue and time, making exact predictions of residues difficult.



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# MRLs vs. Secondary Standards

- MRLs are enforcement and trading standards established by authorities.
- Differences in MRLs are often related to local use patterns or residue definitions.
- Secondary standards are arbitrary standards by retailers or food processors below the actual MRL.

They may include:

- ▶ A list of permitted pesticides
- ▶ Maximum number of pesticides
- ▶ Percentage of the MRL



# Summary

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- DCs are a tool to help predict compliance with foreign or secondary MRLs.
- Limitations have to be realized as numerous factors may affect declines, and the data set may be small.
- Check current MRLs before shipment, as they do sometimes change.
- When possible, it is advisable to test produce prior to export to confirm compliance with lower MRLs.

**Thank You!**

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