

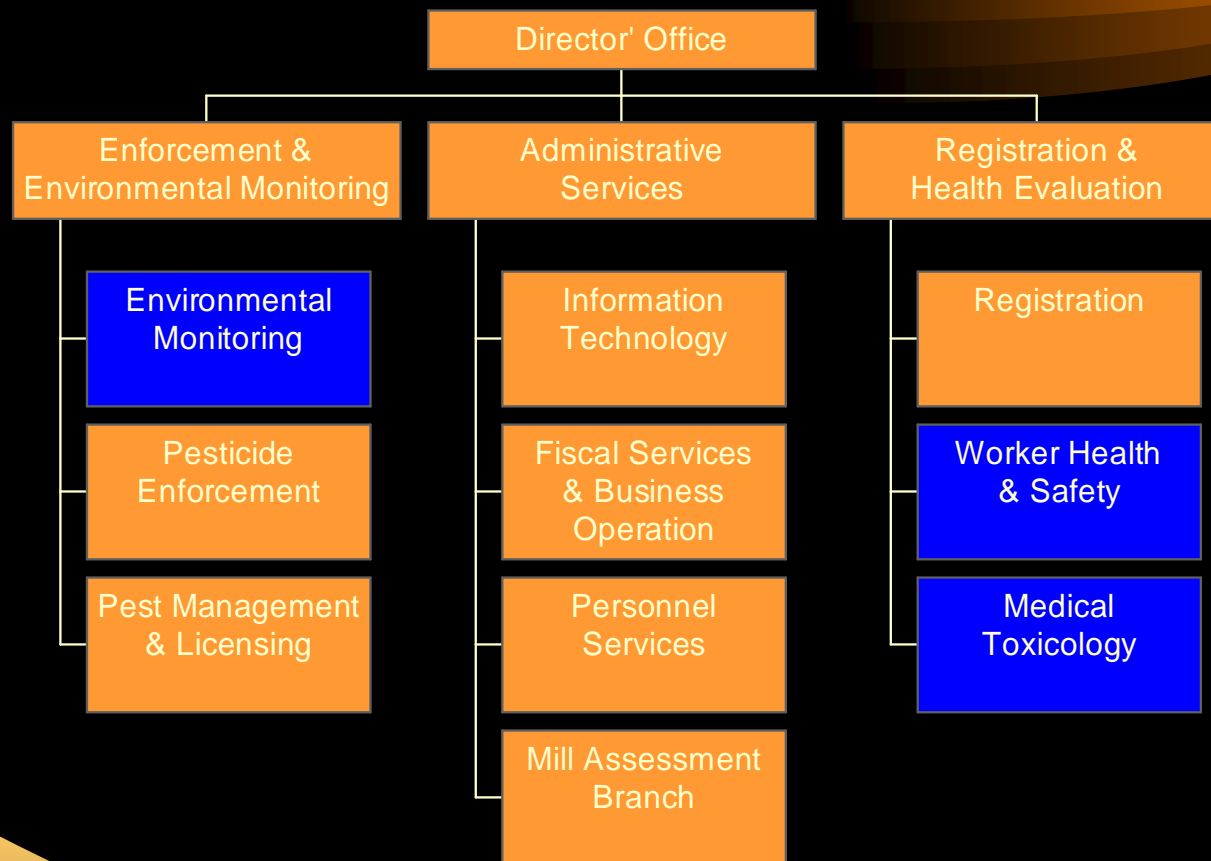
Department of Pesticide Regulation



Dr. Joseph P. Frank, Senior Toxicologist
Exposure Assessment Program
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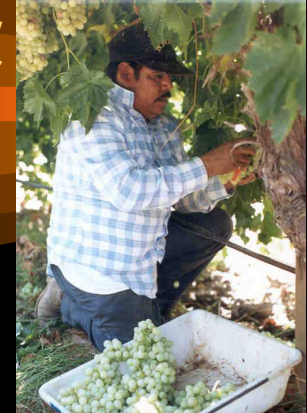


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Types and Number of Products Registered in California

- ~11, 000 products
- ~ 800 active ingredients
 - Agricultural
 - Industrial
 - Institutional
 - Residential



Why Conduct Risk Assessments?

- Ensure the Safe use of Pesticides in State
 - As mandated by:
 - California Food and Agriculture Code
 - Sections 11501, 12824, 12825, 12826, 13121-13135, 14102, and 14103

Stages of Risk Assessment



- Hazard Identification
 - Identify potential adverse effects
- Dose-Response Assessment
 - How are effects related to Dose
- Exposure Assessment
 - How much are people exposed to?
- Risk Characterization
 - What is risk to exposed populations

Risk Assessment Stages



Hazard Identification and Dose-Response
Assessment

Based on Toxicity Studies

Typically Laboratory Animal

May be Human

Exposure Assessment is Based on:

- Animal Studies
- Human Monitoring Studies
- Cultural Practices
- Labels
- Regulations
- Use Patterns

Risk Characterization is:

- Combining:
 - Hazard Identification
 - Dose Response
 - Exposure Assessment
- Reported as Margins of Safety

$$\text{MOS} = \frac{\text{NOAEL}}{\text{Estimated Exposure}}$$

Utility of Pesticide Use Data in Risk Assessment

- Priority Setting
 - All uses considered in RA
 - High use considered in Priority Setting
- Developing Exposure Assessments

Primary Routes of Exposure

- Dermal
- Inhalation
- Oral



Individuals Assessed

- Estimate Exposure
 - Handlers
 - Reentry
 - Bystanders (including offsite)(All potentially exposed)



Exposure Duration

A decorative graphic consisting of a horizontal line that transitions from a dark purple on the left to a bright yellow-orange on the right, with a large, glowing, comet-like tail extending to the right.

- Acute Exposures
 - Single Exposures

- Chronic Exposures
 - Repeated Exposures

Exposure Must Consider Toxicity

- Dose Makes the Poison

Paracelsus

Auroleus Phillipus Theostratus Bombastus von Hohenheim 1493-1541



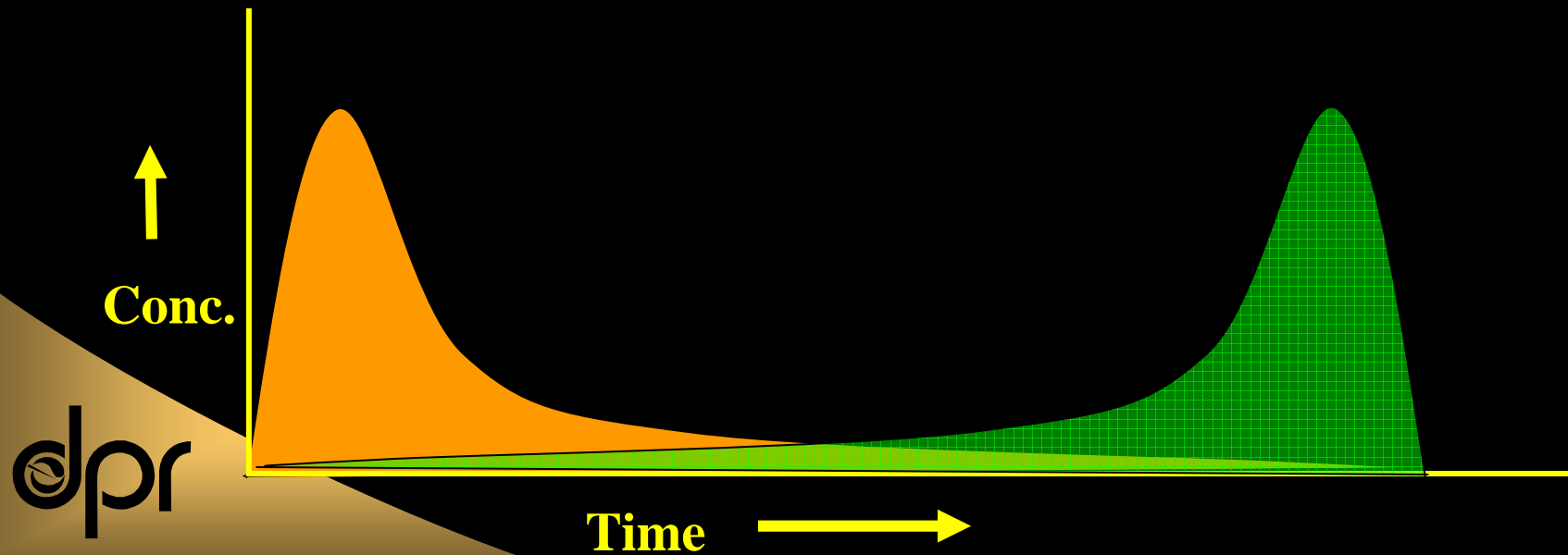
Exposure Must Consider Toxicity



- Acute Effects
 - Shows up within 1 – 7 days
- Chronic Effects
 - Shows up after 1 year

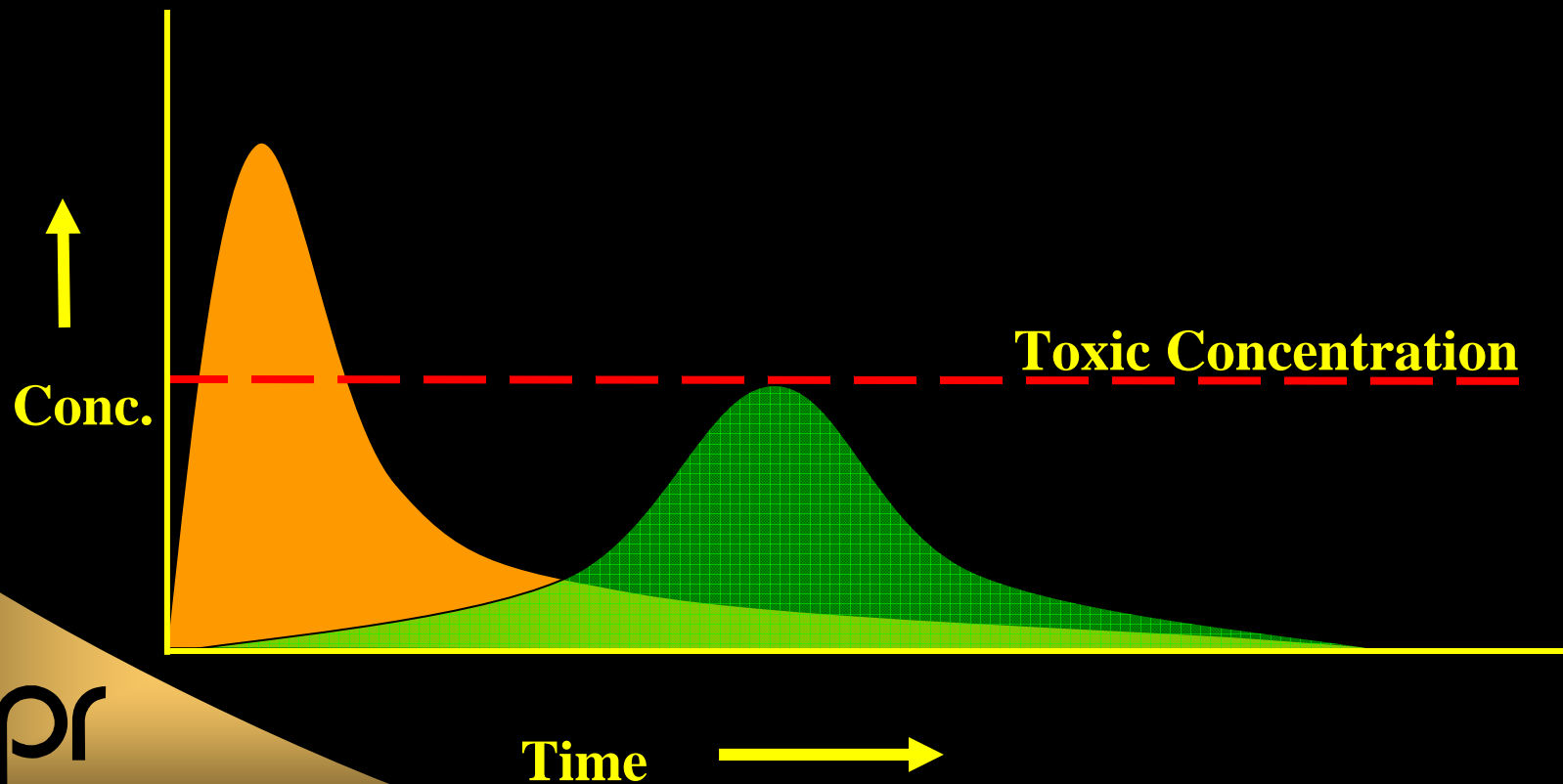
Appearance of Acute Toxicity

- Quick
- Delayed



Acute Toxicity Magnitude

- Magnitude can vary over Time

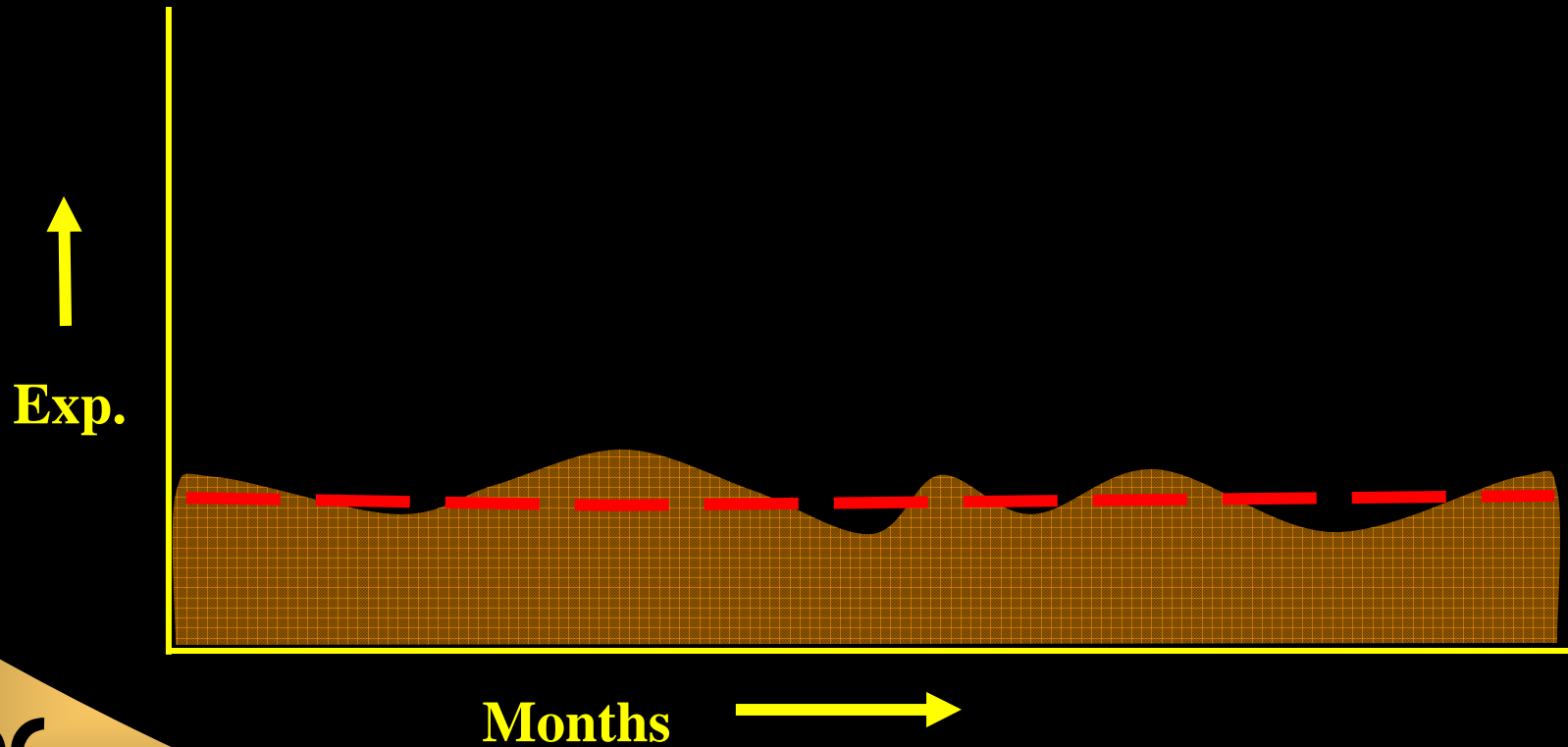


Acute Toxicity Issues

- To Address Some of these Issues
 - DPR Considers Exposure Durations
 - 1 hour (workers, bystanders)
 - 8 hour (workers, bystanders)
 - 24 hour (bystanders)
- Estimate Upper-Bound Exposure

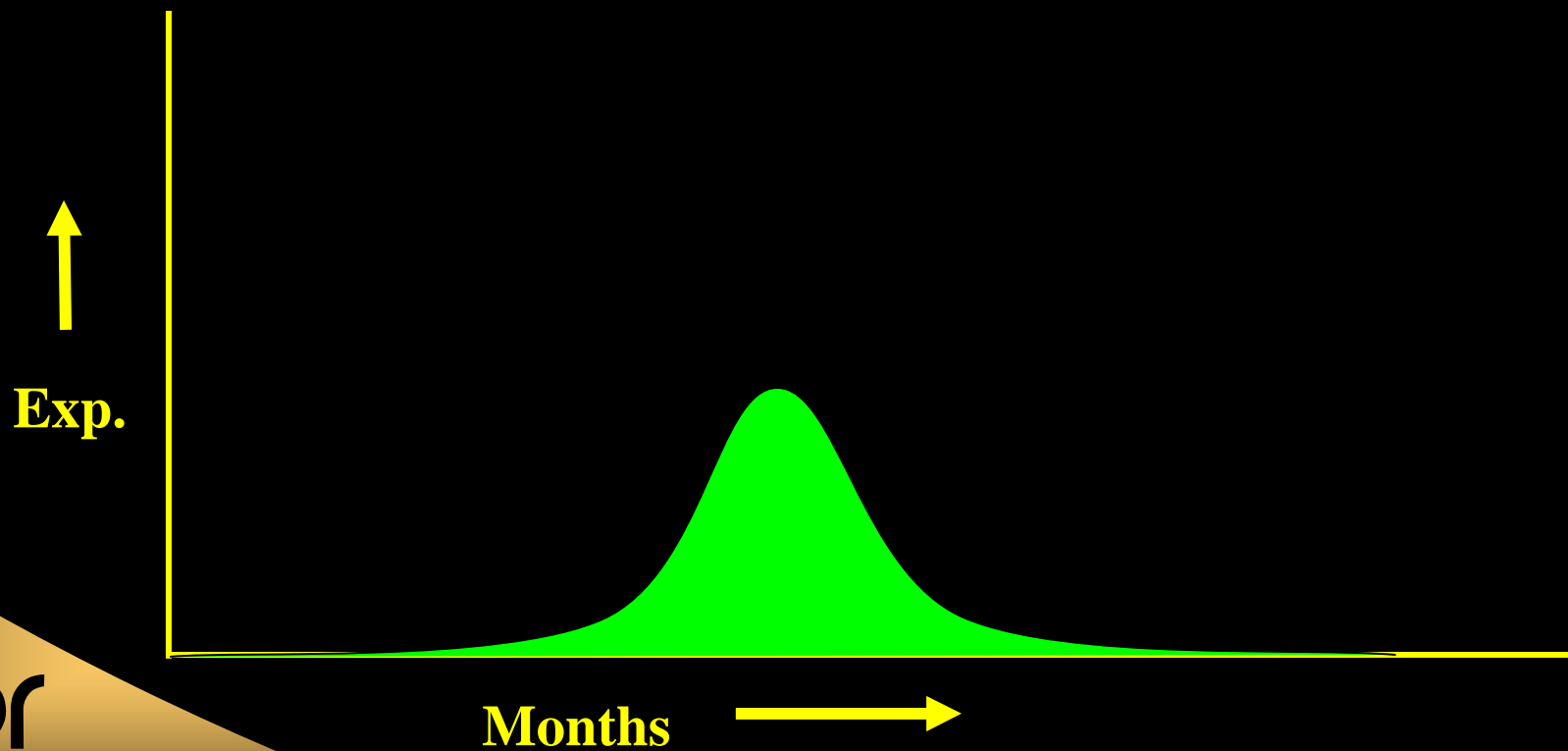
Chronic Exposure Based on Use Patterns

- May be Relatively Constant



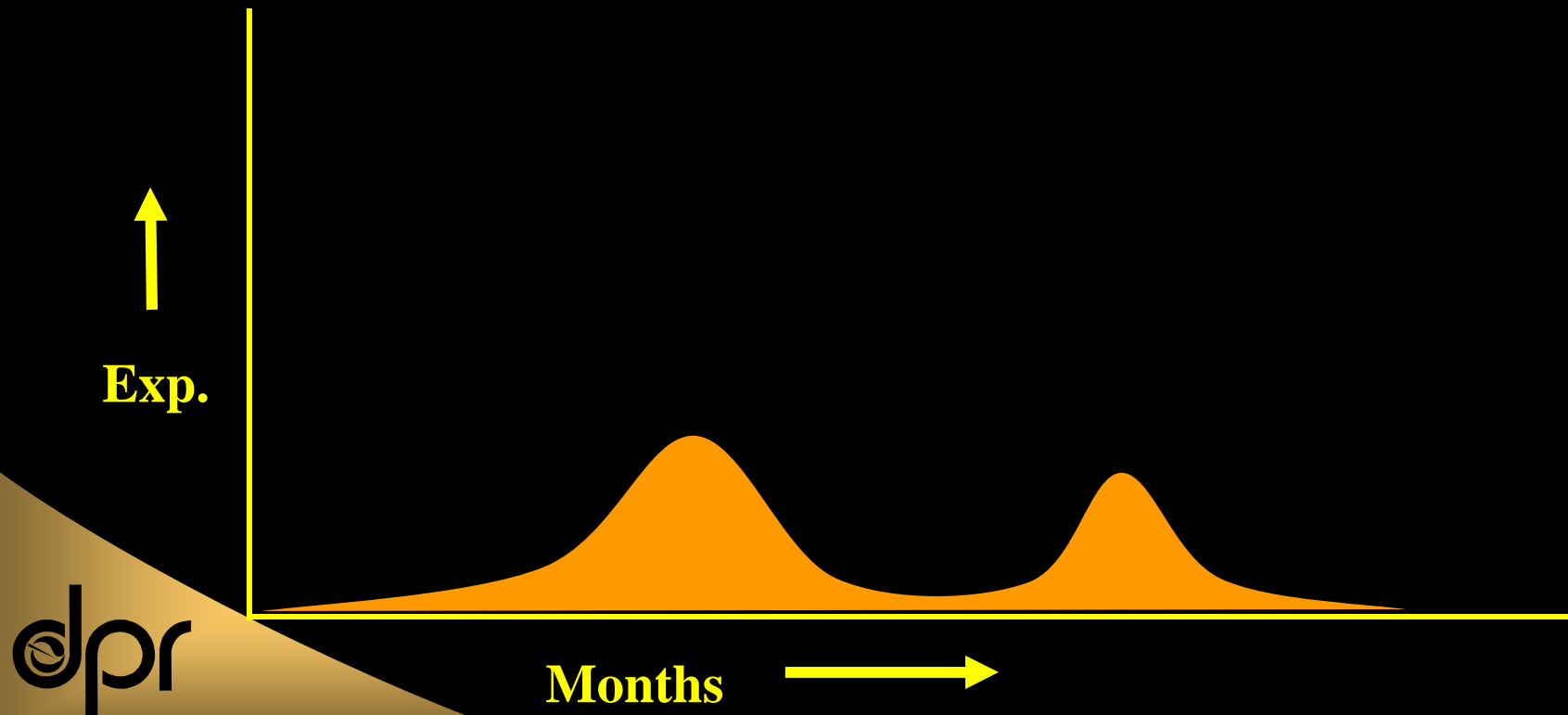
Chronic Exposure Use Patterns

- Exposure May be Seasonal



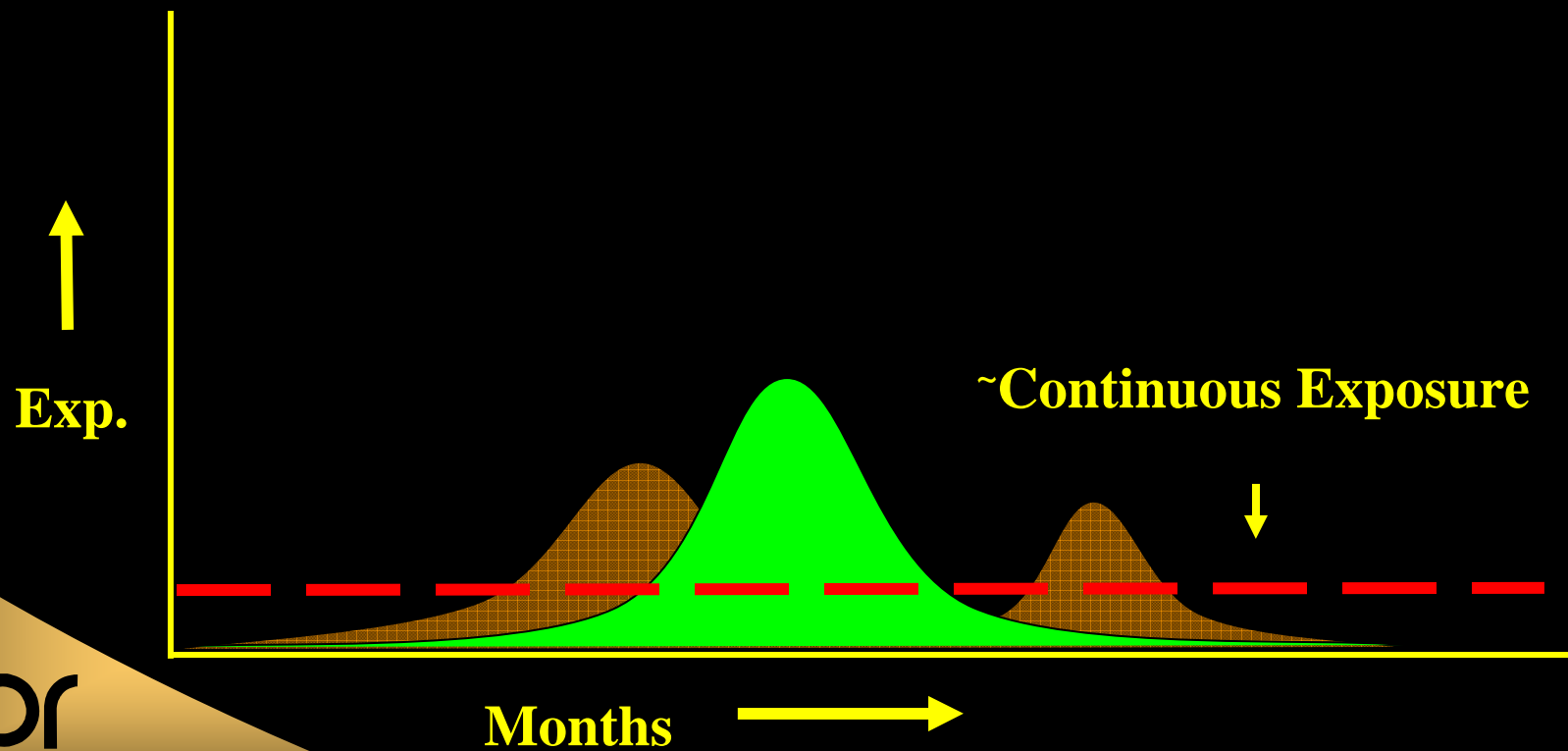
Chronic Exposure Use Patterns

- May Include Multiple Peak Pattern



Chronic Exposure Issues

- Seasonal Exposure is a Concern



Chronic Exposure Questions

- Continuous Chronic Exposure
 - Occurs for More than 7 Days?
 - Significantly Less than 1 Year?
- If yes:
 - Intermediate-Term Exposure Occurs
 - Compare Mean Daily Exposure to Sub-Chronic Toxicology Studies

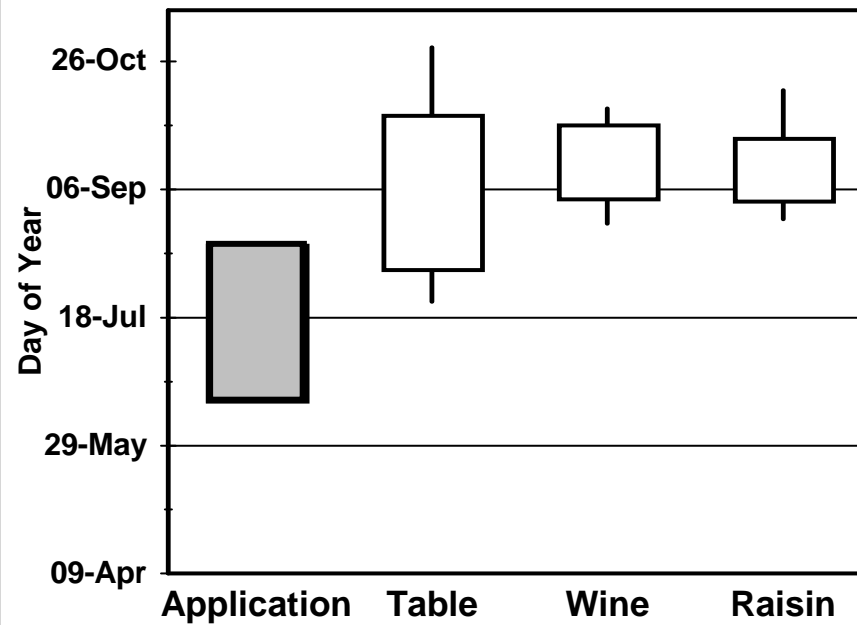
Exposure Assessment

Step 1

- Scoping Process
 - Review All Labels
 - Identify Potential Exposure Scenarios
 - Identify Use Patterns
 - By crop
 - By activity
 - By location

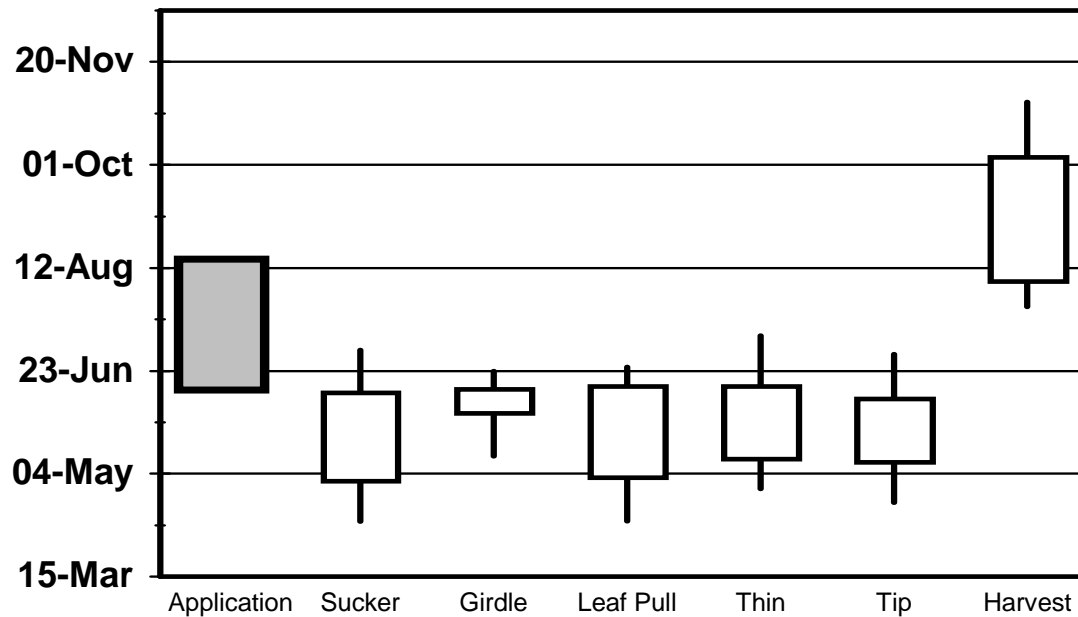
Use Data Patterns

San Joaquin Valley Grape Harvest



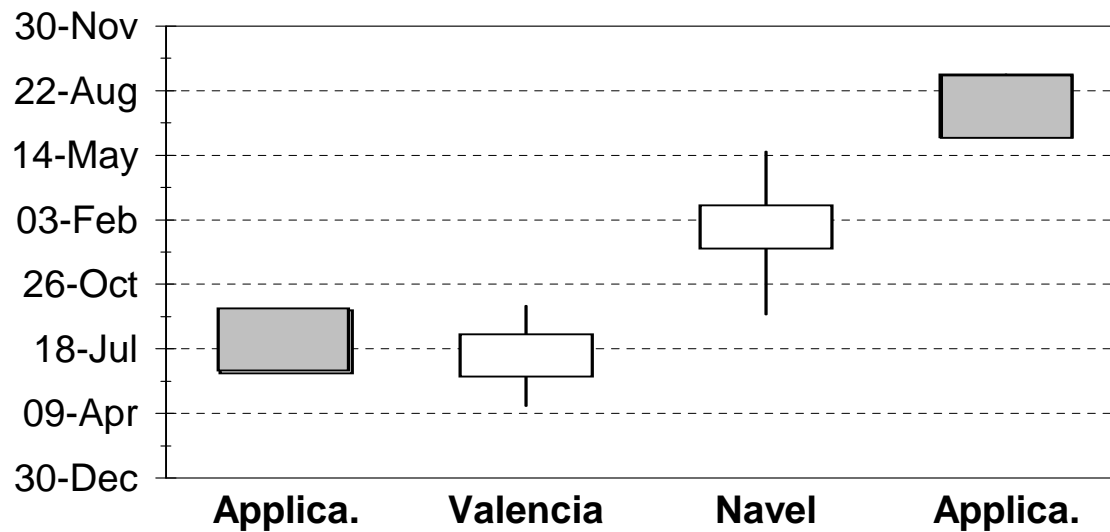
Use Data Patterns

Cultural Activities and Carbaryl Applications in Table Grapes



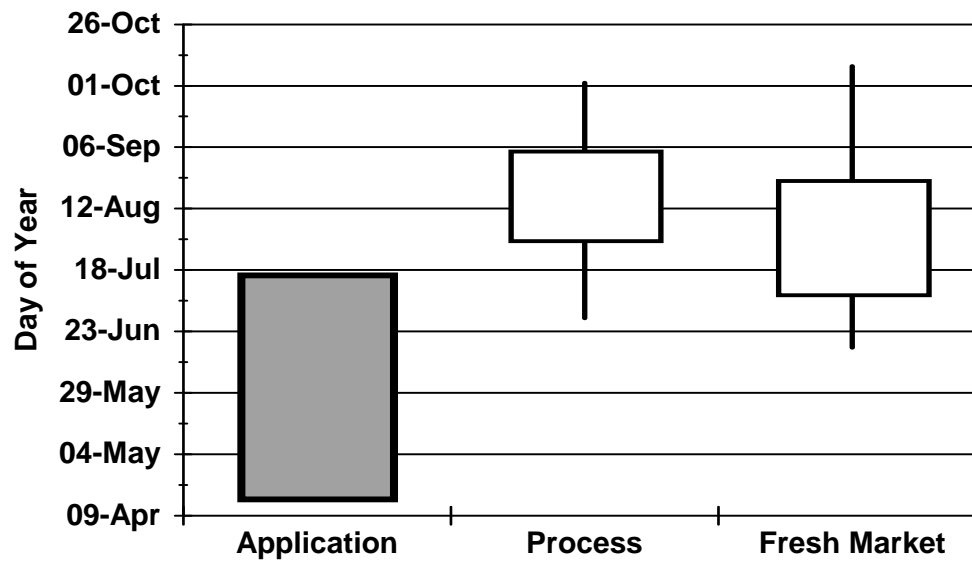
Use Data Patterns

Harvest/Application Timing in Oranges
San Joaquin Valley



Use Data Patterns

Tomato Harvest: San Joaquin Valley
Process and Fresh Market Tomatoes-1994



In Summary

Knowledge of Pesticide Use Patterns:

- Provides the exposure assessor with essential insight into the potential impact of pesticide use.
- Provides opportunities for mitigation of potential harmful effects.

Acknowledgements:

- Dr Sheryl Beauvais
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Questions/Comments



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