



Good Morning!

*Pesticide Use and Safety/Integrated
Pest Management:
An Abbreviated Discussion Based
on Chapter 6*



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Why Have This Talk?

- When using pesticides, safety is the first order of business.
- Protect yourself and others.
- Protect the environment.
- Remember – some pesticides can kill.
- Accidents happen

What is a Pesticide?



- Any substance used to control a pest, or to reduce the unwanted or harmful effects of a pest.
- Insecticides, fungicides, herbicide, nematicides, rodenticides and others

Who Uses These Pesticides?



- Almost everyone (including Master Gardeners)
- Private Applicators
- Registered Technician
- Commercial Applicators

Other reasons . . .



- ~ 22,000 registered pesticides
 - includes disinfectants, cleaners, non-agricultural products

More on Pesticides



- 1,500 restricted-use pesticides
- Less than half are agricultural

Restricted Use Pesticides

Extremely hazardous to humans,
[animals] and/or the environment ...

May only be purchased or applied by
certified applicators who have the
knowledge to use these pesticides
safely and effectively.

The Pesticide Label



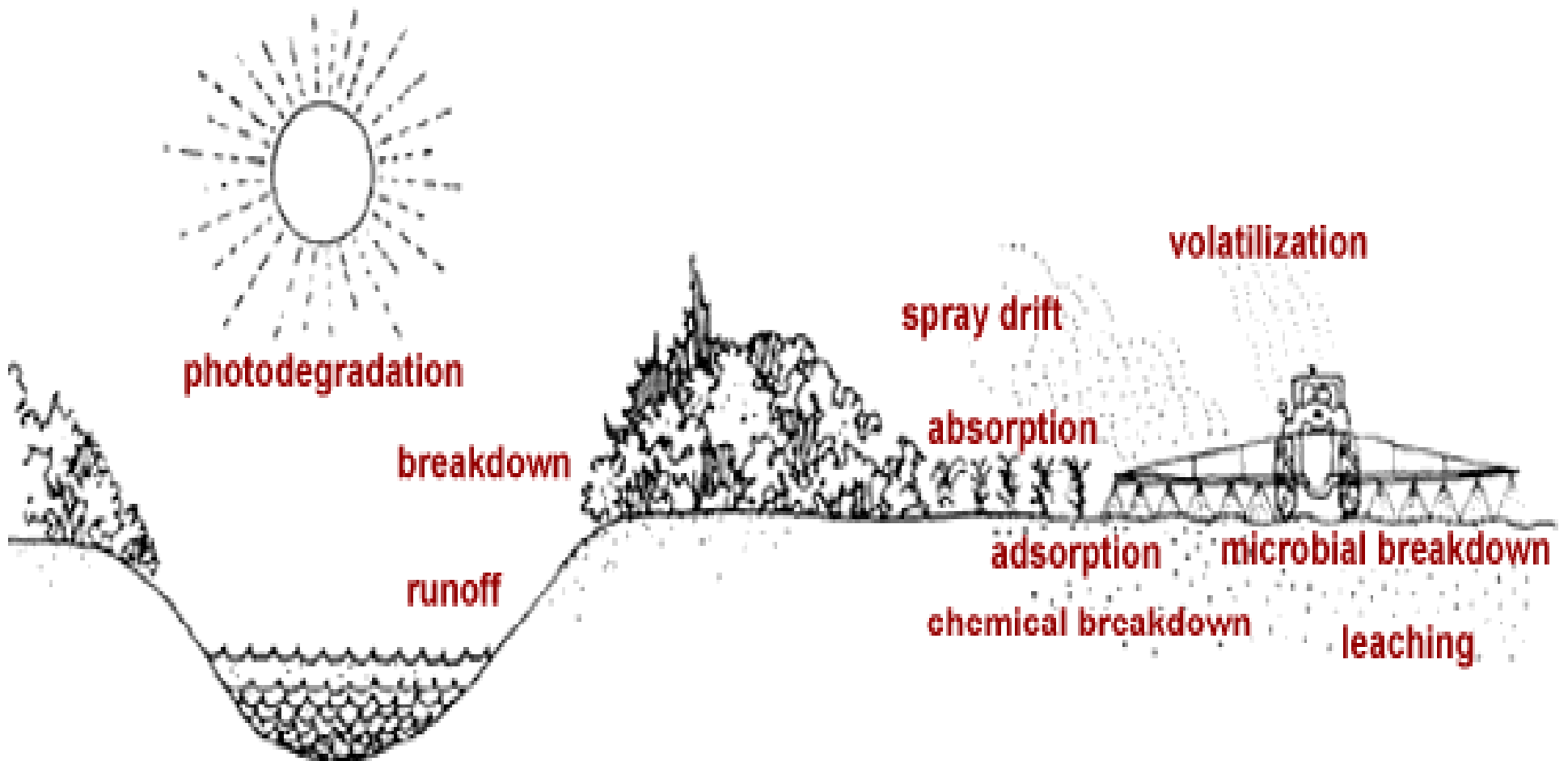
- **Label** – information printed on, or attached to, the container.
- **Labeling** – the label itself, plus all other information you receive from the manufacturer about the product when you buy it.

Pesticide Groupings



- **Contact** – kills by touching (insects, fungi, plants)
- **Systemic** – absorbed and circulated
- **Translocated** – absorbed and moves throughout plant.
- **Selective** – affects only specific organisms.
- **Nonselective** – kills broad range of pests.

Fate of Pesticides in the Environment



Pesticide Formulations



- D - Dust
- EC - Emulsifiable Concentrate
- ES - Emulsifiable Suspension
- F - Flowable
- G - Granules
- SC - Soluble Concentrate
- WP - Wettable Powder
- WSP - Water Soluble Powder

Signal Words and Symbols

- **Danger, Poison w/ Skull and Crossbones**
-- Highly toxic, likely to cause acute injury from oral, dermal or inhalation exposure.
- **Warning** – acute illness from oral, dermal or inhalation exposure.
- **Caution** – slightly toxic/relatively non-toxic

Determining Pesticide Hazard



- Lethal Dose (LD₅₀)
- Hazard = Toxicity x Exposure

Signal Words and Symbols

Signal Word	Toxicity	Approximate Human Lethal Dose
Danger/Poison (w/ skull and crossbones)	High	A few drops to a teaspoonful
Warning	Moderate	A teaspoonful to a tablespoonful
Caution	Low, or relatively non-toxic	More than an ounce

What is a Pest?



Organisms may be pests because they harm materials humans need or want, because they are a health risk, or simply because they are a nuisance.

A pest is anything that that damages food, fiber, structures or other things humans need or value.

Pest Identification



- Insect
- Weed
- Disease
- Nematode
- Rodent
- Others

Pest Identification and Pesticides



- Insects -- insecticides
- Weeds -- herbicides
- Diseases -- fungicides
- Nematode -- nematicides
- Rodent -- rodenticides
- Bacteria – bactericides
- and others

Personal Protective Equipment

- Clothing and other devices that are worn to protect the body from contact with pesticides.
- An applicator is legally required to follow all PPE instructions that appear on the label or labeling.

Maintain a Safe Storage Area

- Keep products in their original containers.
- Keep containers closed
- Keep labels legible
- Watch for damage to containers.
- Consider the shelf-life of the product.
- Store granule above liquids, if necessary.
- Store volatile products separately.

Pesticide Storage (continued)



- Prevent water damage.
- Control temperature, as much as possible.
- Properly dispose of chemicals that are no longer useful.

Pesticide Safety and Security



- Only buy what you will use
 - remove old, stored pesticides
- Add fuels and fertilizers to the list

Personal Safety Considerations



- Read the label
- Avoid exposure to pesticides
- Wear necessary PPE
- Check equipment

More Personal Safety *Considerations*



- Avoid accidental spread of pesticides.
- Be prepared for emergencies.
- Keep people and animals out of treated area(s).

Proper Disposal of Pesticides

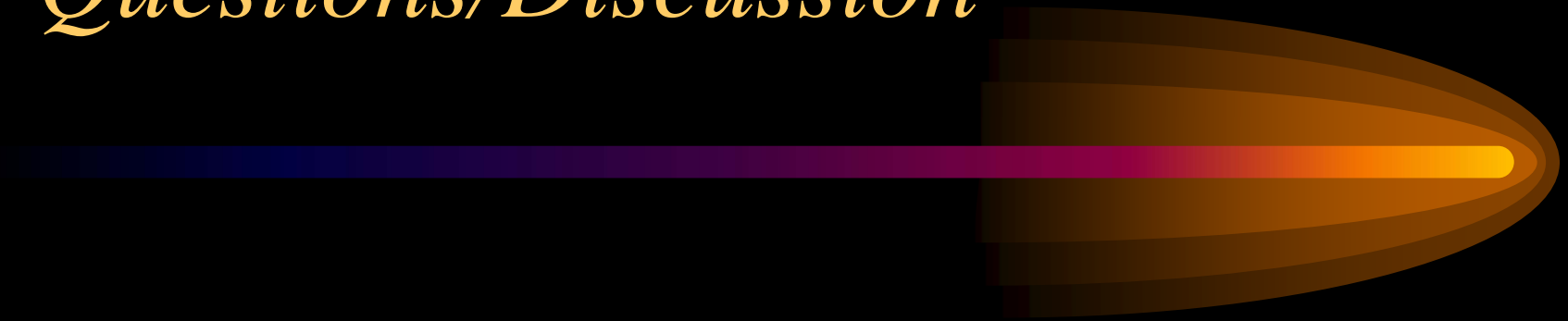
- See label statements about disposal.
- Excess pesticides
 - VPPSA, SPSA, professional companies
- Triple-rinse or pressure-rinse containers

One more point about safe use and storage of chemicals



**Keep Out of Reach of
Children!**

Questions/Discussion



*Some Thoughts on Integrated
Pest Management: Monitoring
the Home Landscape*



Our Discussion Shifts




- **Integrated Pest Management (IPM)**
- Sustainable Landscape Management
- Plant Health Care and maybe more

We will focus on, and talk about, ways to reduce polluting behavior.



Integrated Pest Management (IPM)



A management program for maintaining a healthy and aesthetically pleasing landscape, while minimizing the environmental effects of pesticides.

Integrated Pest Management (IPM)



-- combining appropriate pest control tactics into a single plan (strategy) to reduce pests and their damage to an acceptable level.

IPM



An approach to managing
pests in a way that is sensitive
to the environment

Pest Management

. . . the reduction of pest problems by actions selected after the life systems of the pests are understood and the ecological as well as economic consequences of these actions have been predicted, as accurately as possible, to be in the best interest of mankind".

Rabb, R. L. and F. E. Guthrie, 1970.

Pest Management



. . . the reduction of pest problems, by actions selected after the life systems of the pests are understood . . .

Integrated Pest Management (IPM)



- Utilization of all available strategies to reduce pest damage below threshold levels (*economic / aesthetic threshold*)
- Examples:
selecting disease resistant plants, hand picking insects, amending soil, applying Milky Spore disease, and applying insecticides

Principles of IPM

- Potentially harmful pests will exist.
- View entire landscape as management ecosystem.
- Use of natural control agents is maximized.

Principles of IPM cont'd

- Any management procedure may produce unexpected and undesirable results.
- Management approach should be interdisciplinary.

Elements in IPM Program



- Goals
- Thresholds
- Monitoring
- Recordkeeping
- Evaluate practices at end of season.

Steps of an IPM Program



- Pest Identification
- Goal(s) for pest control
- Know what tactics are available
- Evaluate risks and benefits of each tactic
- Choose the most effective strategy with the least harm to people and the environment.
- Use each tactic correctly.

Components of an effective IPM program



Monitoring: Regular scouting

Diagnosis: Identification of plants and pests

Control strategies: Effective decision-making

Evaluation: Learn from experience


Monitoring & Diagnosis



Look for symptoms and signs of pests.

Symptoms - a plant's reaction to a pest.

Signs - the actual pest.



*First, know what normal
is for the plant in
question.*

Learn to Recognize Plant Parts and Characteristics that Resemble Problems.

- Seed pods like galls, or galls themselves.
- Seeds on juniper
- Variegated plants
- Crepe myrtle and the exfoliating bark
- *Magnolia grandiflora* and pines losing leaves and needles

More Elements in IPM Program

- Know damage symptoms and signs of pest(s)
- Analyze the damage
- Decide when and how to control pest(s) – know thresholds
- Use a pesticide or not

Landscape Design



- Right plant, right place
- Use insect and disease resistant plants
- Design diversity into the grounds
- Plant trees and shrubs according to recommendations

Maintaining the Yard

- Know when and how to prune plants
- Use mulch around plants
- Irrigate drought-sensitive plants during extended periods of dry weather
- Protect plants from mechanical injury

Managing Turfgrass

- Choose adapted varieties
- Apply lime and fertilizer based on soil test results
- Seed/over-seed at the proper time
- Mow turf at the recommended height

Turfgrass Management Continued . . .



- Aerate turf to relieve soil compaction
- *Irrigate* in periods of drought
- Turf needs about 1” of water per week

Why Utilize IPM?

- Insects and diseases can, and do, develop resistance to pesticides.
- Chemical use reduces the populations of beneficial insects.
- There are unintended, adverse effects to non-target organisms.
- Pesticide exposure and human health

Why Utilize IPM? (continued)



- People are becoming more cautious concerning the use of chemicals/pesticides.
- Money may be saved on the purchase of chemicals.
- Environmental impacts of chemicals and pesticides are reduced.

Thresholds and Deciding to Apply Controls



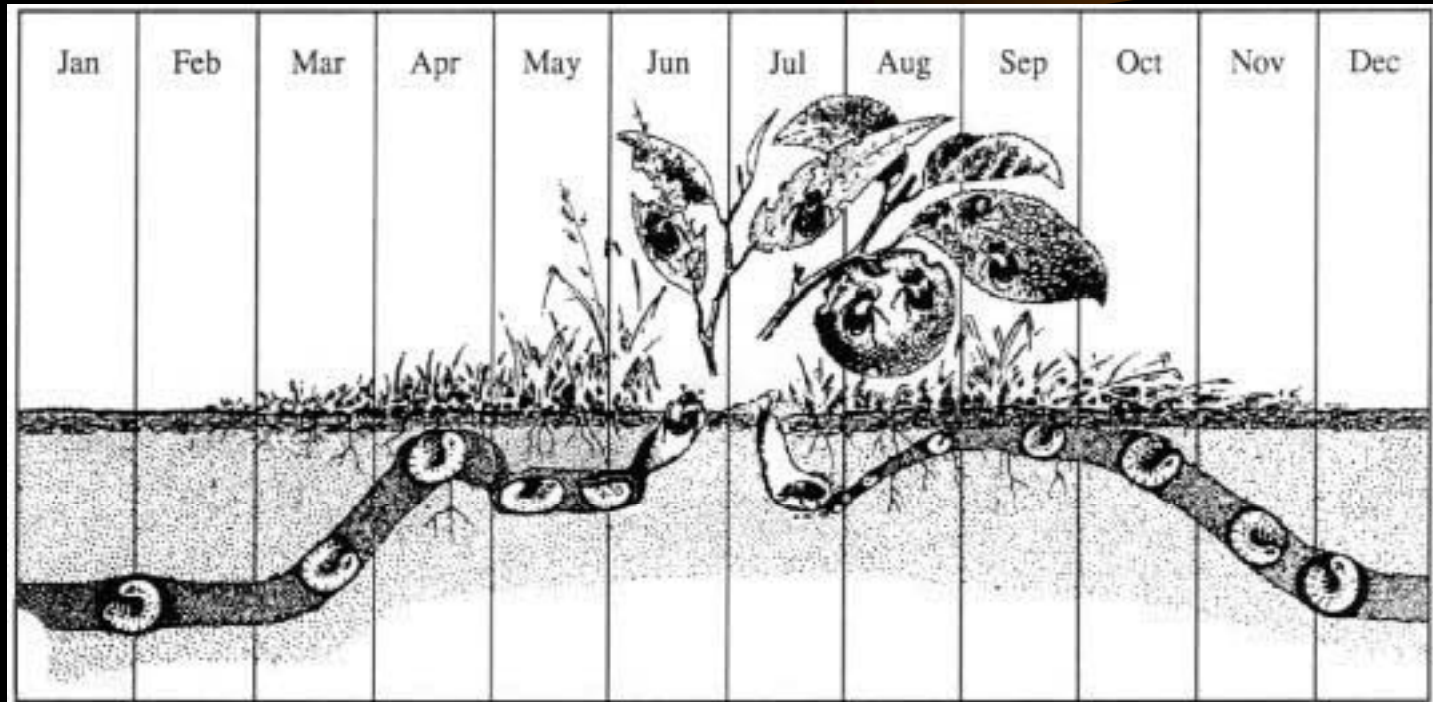
- **What level of the pest population can be tolerated before control measures must be taken?**

Ask the question:

Is it an economic or aesthetic problem?

Identify Problem

- Selecting an applied control
- Timing the applied control



IPM Applied Control

- **Host Resistance**
- **Mechanical**
- **Cultural**
- **Biological**
- **Chemical**
- **Sanitation**

Examples:

VCIA recommended
grass seed, Tanglefoot,
Japanese Beetle traps,
crop rotation, fertilizing,
remove diseased leaf
debris, release lady
beetles, Malathion

IPM Biological Control

- **The use of:**
 - **predators (lady bugs, lacewings)**
 - **parasites (braconid wasps, some nematodes)**
 - **pathogens (*Bacillus thuringiensis*)**

to keep pests below damaging levels.

Beneficial insects

- lady beetles
- praying mantids
- lacewing
- ground beetles
- predatory mites
- assassin bug
- pirate bugs
- predaceous stink bug
- syrphid fly larvae
- parasitic wasps
- spiders

Further Controls....Organic Products

- **Neem Oil**
- **Diatomaceous Earth**
- **Compost tea**
- **Horticultural Oil**
- **Insecticidal soap**
- **Rotenone**
- **Pyrethrin**

Chemical Controls



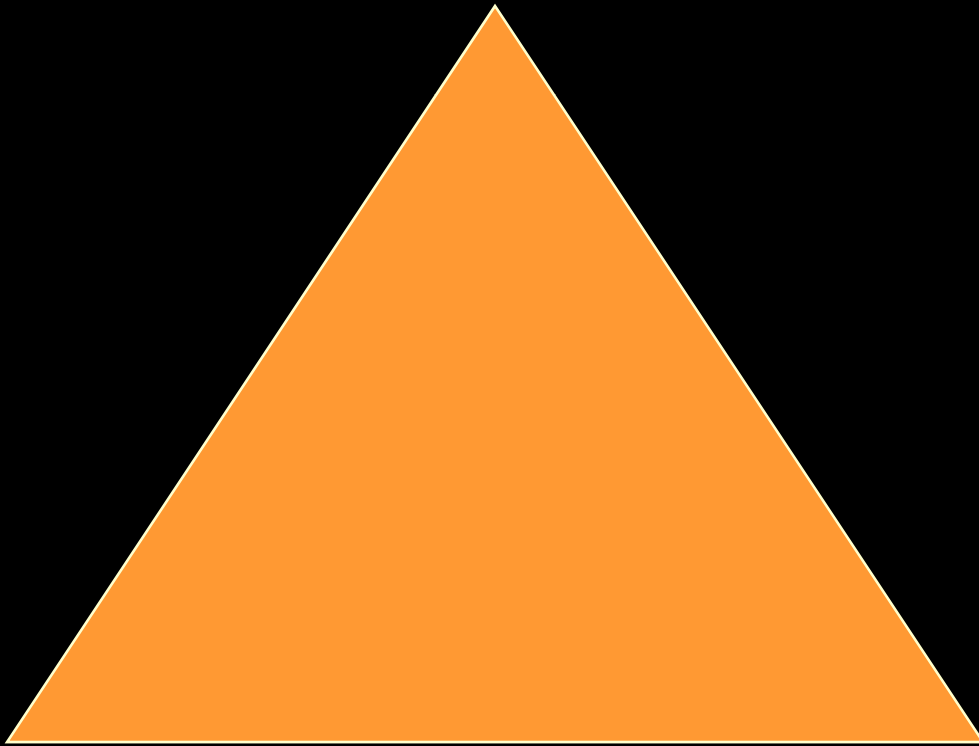
- minimize chemical application
- may be the only effective control
- effective control is only accomplished when problem / pest is positively identified.

Evaluation



- **Take notes and keep records of your IPM practices**
- **Refer to scouting records prior to taking control measures**
- **Use previous year's records to anticipate pest problems**
- **Learn from your mistakes**

The Plant Disease Triangle



Plant Disease --



An abnormal condition of a plant in which its physiology, morphology, and/or development is altered under the continuous influence of a pathogen.

What are the Pathogen?



- Fungi
- Bacteria
- Viruses
- Nematodes

Don't forget the insects.

Biotic and Abiotic Causes



- **Abiotic** -- Non-living; of non-biological origin.
- **Biotic** – Living, biological organisms

Abiotic vs. Biotic

- *Biotic (living)*

- Fungi
- Bacteria
- Nematodes
- Viruses
- Insects
- Parasitic plants

- *Abiotic (non-living)*

- Drought stress
- Over-fertilization
- Over-watering
- Mechanical injury
- Environmental stress

Integrated Pest Management

Exclusion

Eradication

Sanitation

Chemicals

Resistance

Biological Control

Stress Management

Plant Diseases



- Susceptible host
- Suitable environment
- Presence of a virulent pathogen

Pest Management

- Proper cultural practices
- Pest identification
- Remove by hand, if possible
- Use biological methods when available.
- Practice good sanitation
- When a pesticide is necessary, choose the least invasive product.

Pest Management Options



- Identify the pest
- Determine the potential for injury
- Consider management options
- Use the best option
- Keep good records for future years

Get the Weeds Out



- Identify weed before attempting controls
- If necessary, use a pre-emergent control for crabgrass
- Selectively control broadleaf weeds at the appropriate time(s)
- Use “spot” treatments for weed control

Know your weeds



- Grasses
 - Summer
 - Winter

- Broadleaf
 - Summer
 - Winter

Know your weeds



- Winter annual
- Summer annual
- Perennial



WHY . . . ?

Keys to Success



- Changing to a new way of thinking -- maybe.

Pest Management Guide (PMG)

Exercise

What is the name of the leaf spot on Photinia?

What are the crawler dates, treatment dates and chemical control for Euonymus scale?

What would be your recommendation for controlling Oak leaf blister?

Someone just called with a questions about small bags hanging from their shrub. What would be your recommendation?

When is the best time to control chickweed and dandelion in a lawn?



Questions??????.
Discussion . . .



*Thanks for
Your Time!*