

EQ #2- WHAT ARE PESTICIDES? WHAT ARE THE RISKS & BENEFITS



TODAY WE WILL LEARN

- WHAT IS A PESTICIDE?
- WHAT ARE THE CHARACTERISTICS AND TYPES OF PESTICIDES?
- WHAT ARE THE BENEFITS AND RISKS OF USING PESTICIDES?
- HOW ARE PESTICIDES REGULATED IN THE U.S.?
- ARE THERE VIABLE ALTERNATIVES TO PESTICIDES?

WARM-UP #1 - SPIDERS

CASE STUDY

- **READ THE CASE STUDY ABOUT SPIDERS ON FARMS IN CHINA. ANSWER THE Q'S IN YOUR INB ON THE LEFT SIDE.**
- **1. HOW ARE SPIDERS A TYPE OF “PESTICIDE?”**
- 2. LIST TWO OTHER EXAMPLES OF PLANTS, INSECTS OR ANIMALS THAT YOU KNOW OF THAT PLAY AN IMPORTANT ROLE AS PREDATOR IN AN ECOSYSTEM.**
- 3. HOW DO YOU FEEL ABOUT SPIDERS IN YOUR HOUSE? WHAT DO YOU DO WITH THEM?**
- 4. LIST TWO OTHER FUN FACTS YOU READ FROM THE ARTICLE.**

DO WE HAVE A SIGNIFICANT PEST PROBLEM?

- PESTS HURT PRODUCTION AND PROFITS IN AGRICULTURE AND INDUSTRY AND SPREAD DISEASE. THEY ARE WORTH CONTROLLING.
- WORLDWIDE, ONLY ABOUT 100 SPECIES OF PESTS CAUSE 90% OF ALL DAMAGE TO AGRICULTURE CROPS. BUT MANY PESTICIDES KILL ALL LIVING ORGANISMS.

WHY DO WE NEED PESTICIDES? WE HAVE A ROLE



- **HUMAN ACTIVITIES HAVE DISRUPTED NATURE'S ABILITY TO CHECK AND BALANCE PEST POPULATIONS.**
- **CLEARING FORESTS, BUILDING ROADS, FILLING WETLANDS & FARMING**

WHY ARE PESTS A PROBLEM?

- THEY COMPETE WITH PEOPLE FOR FOOD
- SPREAD DISEASE
- INVADE GARDENS AND LAWNS
- CAUSE STRUCTURAL DAMAGE TO BUILDINGS
- ARE A NUISANCE

WHAT IS A PESTICIDE?

■ IS ANY SUBSTANCE THAT KILLS AN UNWANTED ORGANISM

■ TYPES-

■ HERBICIDE (PLANTS)

■ INSECTICIDE (BUGS)

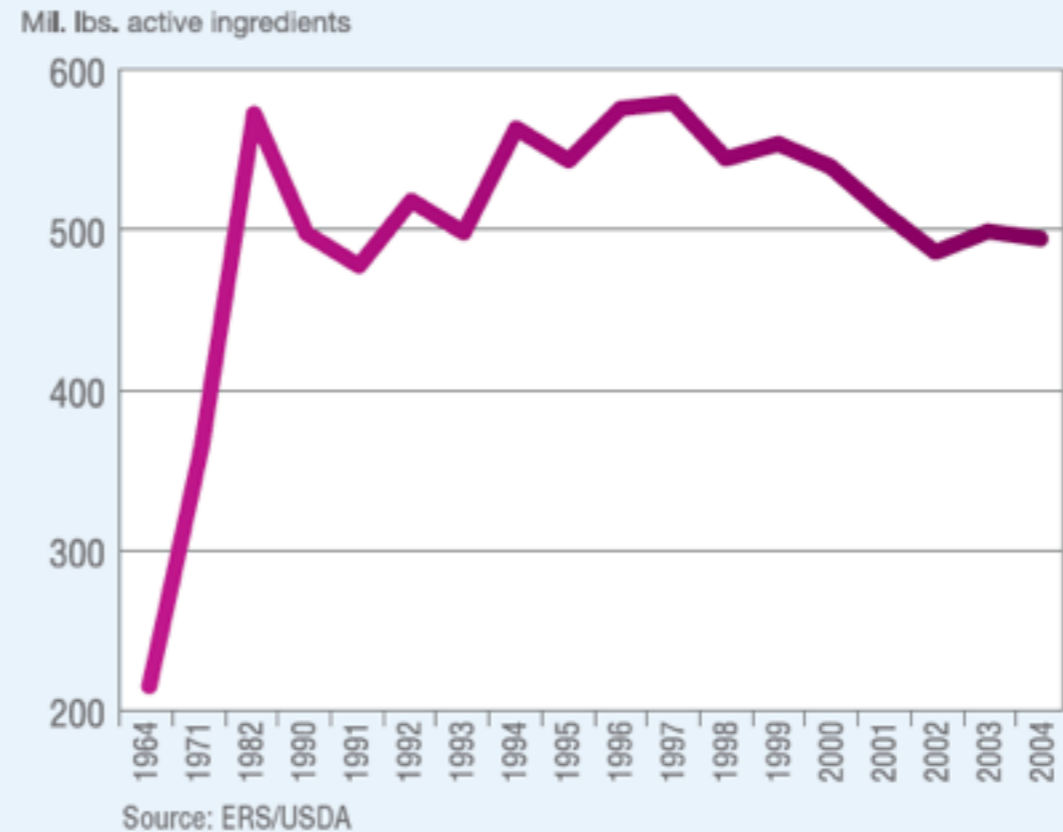
■ RODENTICIDE (RODENTS)

■ FUNGICIDE (FUNGUS)

HOW MUCH DO WE USE?

Total Pesticide Use in the United States, 1964-2004

Total pesticide use in the United States, as measured by the pounds of active ingredients in the products applied (which includes herbicides, insecticides, and fungicides), rose steadily between 1964 and 1982, but has leveled off over the last few decades. It declined by nearly 14 percent between 1997 and 2004, in part as a result of the wide adoption of genetically modified seeds (for corn, soybeans, and cotton) which incorporate protection against certain pests.



WHAT IS A FIRST GENERATION PESTICIDE?

- **FIRST GENERATION PESTICIDES ARE**
 - * NATURALLY OCCURRING
 - * MANY DERIVED FROM PLANTS
 - * NOT HUMAN-MADE
 - * USED MORE BEFORE WWII
- **SOME WERE HIGHLY TOXIC (USED IN 1600s)**
 - * MERCURY
 - * ARSENIC
 - * LEAD
- **PLANT EXTRACTS & BOTANICALS-**
PYRETHRUM, NICOTINE- ARE MUCH LESS
TOXIC & PERSISTENT

WHAT IS A SECOND GENERATION PESTICIDE?

- ARE SYNTHETIC / HUMAN-MADE MADE ORGANIC CHEMICAL COMPOUNDS
- INVOLVE LONG CHEMICAL CHAINS; MANY ACTIVE INGREDIENTS
- MADE AFTER WWII (DDT)
- MANY ARE HIGHLY TOXIC AND PERSISTENT
- MANY ARE BROAD SPECTRUM- TOXIC TO MANY PESTS AND NON-PEST SPECIES (DDT)

WHAT IS PERSISTENCE

- IS THE LENGTH OF TIME A PESTICIDE REMAINS DEADLY IN THE ENVIRONMENT
- CAN BE MANY YEARS / DECADES
- IS BIOLOGICALLY MAGNIFIED IN FOOD WEBS

Pair Share

(in your INB LEFT side)

- Brainstorm a list of FIVE substances you or your family or friends use to get rid of a pest in your home or yard
- Add DDT and to your list
- Decide if this substance is FIRST or SECOND generation by putting a 1 or 2 next to it.
- Why?

VENN DIAGRAM

- CREATE A VENN DIAGRAM IN YOUR INB THAT COMPARES AND CONTRASTS...
FIRST & SECOND GENERATION PESTICIDES.

- INCLUDE FOR EACH-
 - * **DEFINITION**
 - * **CHARACTERISTICS**
 - * **EXAMPLES &**
 - * **TRADE-OFFS**

Name : _____ **Venn Diagram**

Math-Aids.Com

THE CASE FOR PESTICIDES

- SAVE HUMAN LIVES
- INCREASE FOOD SUPPLIES AT LOWER COST
(INITIALLY)
- WORKS BETTER AND FASTER THAN ALTERNATIVES
- HEALTH RISKS ARE LESS SIGNIFICANT THAN
OVERALL BENEFITS
- NEWER PESTICIDES ARE SAFER AND CAN BE USED
AT LOWER RATES NOW.

THE CASE AGAINST PESTICIDES

- CAN KILL NON-TARGET AND NATURAL CONTROL SPECIES
- ARE PERSISTENT (STAY DEADLY) AND DON'T STAY PUT (GET INTO WATER AND AIR)
- CAUSE HUMAN HEALTH DISEASES AND SICKNESS
- CAN HARM WILDLIFE
- CAN CAUSE AN INCREASE IN OTHER PEST SPECIES
- GENETIC RESISTANCE

MONDAY / TUESDAY

- WRAP UP NOTES ON PESTICIDES (EQ #2)
- WHAT ALTERNATIVES TO PESTICIDES ARE AVAILABLE?
- HOW ARE PESTICIDES REGULATED?
- WHAT IS INTEGRATED PEST MANAGEMENT (IPM)?

WARM-UP Q'S

- 1. DESCRIBE THE DIFFERENCE BETWEEN 1ST AND 2ND GENERATION PESTICIDES. GIVE AN EXAMPLE OF EACH.
- 2. WHICH IS MORE HARMFUL? WHY?
- 3. WHAT ARE THE KEY RISKS OF 2ND GENERATION PESTICIDES? WHAT ARE TWO BENEFITS?

WHAT CHARACTERISTICS WOULD AN IDEAL PESTICIDE HAVE?

- AFFECTS ONLY TARGETED PEST AND NOT OTHER SPECIES.
- NO DEVELOPMENT OF GENETIC RESISTANCE
- BREAKS DOWN QUICKLY IN THE ENVIRONMENT
- IS MORE COST-EFFECTIVE THAN DOING NOTHING
- IS THIS POSSIBLE???

PESTICIDE FILM CLIPS

- **BED BUGS-** [HTTPS://VIMEO.COM/23592801](https://vimeo.com/23592801)
- **DDT IN AFRICA-**
[HTTPS://WWW.YOUTUBE.COM/WATCH?
V=KHWQANDRTSQ](https://www.youtube.com/watch?v=KHWQANDRTSQ)

DDT & MALARIA

PREVENTION-FOLLOW UP

- **MILLIONS DIE EACH YEAR FROM MALARIA**
- **DDT SPRAYED INDOORS AND USED WITH BED NETS TO PREVENT MALARIA FROM MOSQUITOES**
- **DDT NOT USED AS MUCH TODAY BECAUSE MOSQUITOES DEVELOPED RESISTANCE AND HAVE EVOLVED TO BE ABLE TO TOLERATE DDT**
- **THIS TOLERANCE MAKES THEM RESISTANT TO OTHER PESTICIDES, TOO.**

PESTICIDE LAWS & REGULATIONS

- THERE IS ONLY ONE MAIN LAW- THE FEDERAL INSECTICIDE, FUNGICIDE & RODENTICIDE ACT (FIFRA).
- PESTICIDES ARE EVALUATED, REGULATED AND TESTED UNDER THE LAW.
- FIFRA IS A FEDERAL LAW AND IS ENFORCED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA).
- THE LAW IS OUTDATED AND POORLY ENFORCED
- CHEMICAL COMPANIES THEMSELVES TEST PRODUCTS & REPORT RISKS.

ALTERNATIVES TO 2ND GENERATION PESTICIDES

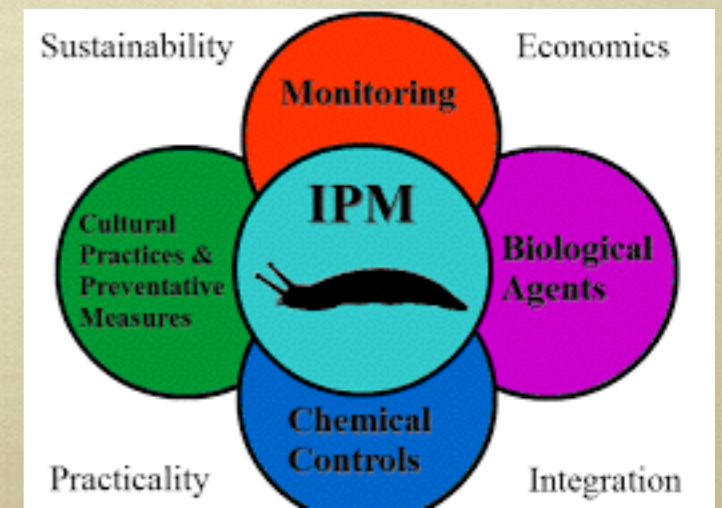
- **TREAT CONDITIONS NOT JUST PROBLEM**
- **ADJUST CULTIVATION PRACTICES**
- **USE GENETICALLY-RESISTANT PLANTS**
- **USE BIOLOGICAL PEST CONTROL (LIKE THE SPIDER)**
- **PROMOTE INSECT BIRTH CONTROL (FRONTLINE)**
- **USE HORMONES & PHEROMONES TO DISCOURAGE PESTS.**

ACTIVITY- 10 REASONS TO NOT USE PESTICIDES

- **READ THE LIST**
- **STAR YOUR TOP THREE REASONS—THE ONES THAT SEEM MOST IMPORTANT**
- **PAIR SHARE YOUR THREE WITH A PARTNER WHAT & WHY YOU PICKED THESE**
- **ON A LEFT SIDE, LIST THE TOP THREE REASONS FROM THE ARTICLE THAT YOU THINK ARE MOST CONVINCING. TELL WHY YOU CHOSE EACH.**

WHAT IS IPM?

- **INTEGRATED PEST MANAGEMENT (IPM) - IS A STRATEGY THAT FOCUSES ON A LONGTERM PREVENTION OF PESTS BY IMITATING NATURE**
- **USES BIOLOGICAL CONTROLS (NATURAL PREDATORS) WHENEVER POSSIBLE**
- **USES CHEMICAL PESTICIDES AS A LAST RESORT ONLY AND IN LIMITED QUANTITIES**



WHAT IS THE PROCESS?

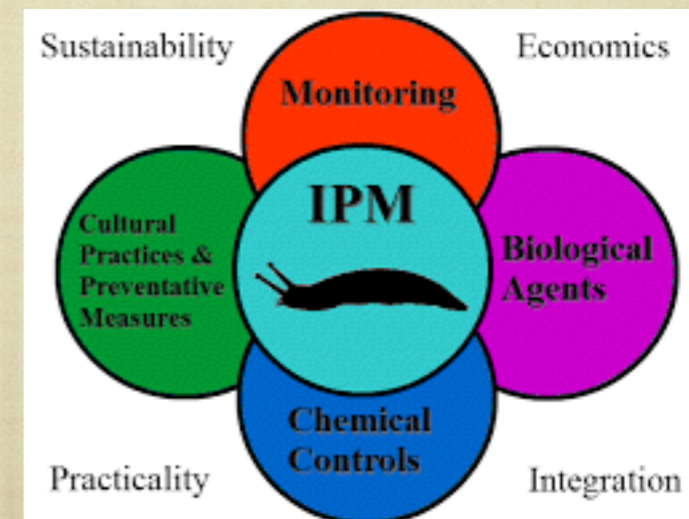
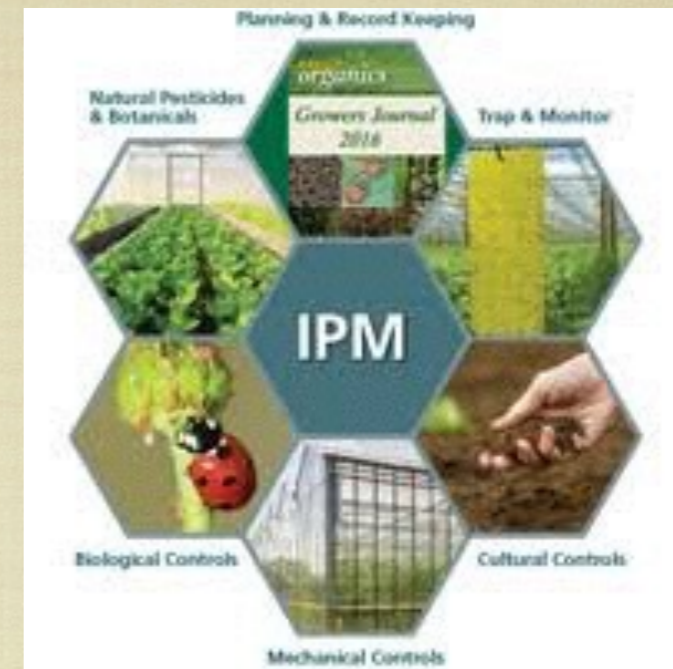
- THE IPM PROCESS FOCUSES ON
- 1. IDENTIFICATION- WHAT IS THE PEST? WHERE IS IT COMING FROM?
- 2. PREVENTION & EXCLUSION- PREVENT THE CONDITIONS
- 3. MONITORING - MONITOR FOR NEW POPULATIONS
- 4. MULTIPLE TACTICS - USES SEVERAL NON-CHEMICAL TACTICS TO DEAL WITH THE PESTS FIRST

WHY IS IPM NOT MORE WIDELY USED?

■ REQUIRES EXPERT KNOWLEDGE

■ SLOWER THAN CONVENTIONAL PESTICIDES

■ INITIAL COSTS MAY BE HIGHER



ACTIVITY- PESTICIDES TRADEOFF POSTER

■ **NOT ASSIGNED THIS YEAR...**

Activity- Pesticide Poster

- Work with a partner; research the tradeoffs of pesticide use. Each of you researches ONE site.
- Create a Poster/Chart that compares THREE KEY Benefits and THREE KEY Risks of pesticides that you think are most important.
- Include a picture or graphic

Pesticides NO-Use the sites on the handout

Pesticides Yes- Use the site on the handout