

INSECT PEST MANAGEMENT IN THE ORGANIC PRODUCTION OF TOMATOES

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ORGANIC FARMING

What is organic production?

USDA Definition and Regulations:

USDA National Organic Standards Board (NOSB) definition, April 1995

- “**Organic agriculture** is an ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain and enhance ecological harmony.
- “**Organic**’ is a labeling term that denotes products produced under the authority of the Organic Foods Production Act.
- The principal guidelines for organic production are to use materials and practices that enhance the ecological balance of natural systems and that integrate the parts of the farming system into an ecological whole.
- “**Organic agriculture practices cannot ensure that products are completely free of residues; however, methods are used to minimize pollution from air, soil and water.**
- “Organic food handlers, processors and retailers adhere to standards that maintain the integrity of organic agricultural products. The primary goal of organic agriculture is to optimize the health and productivity of interdependent communities of soil life, plants, animals and people.”

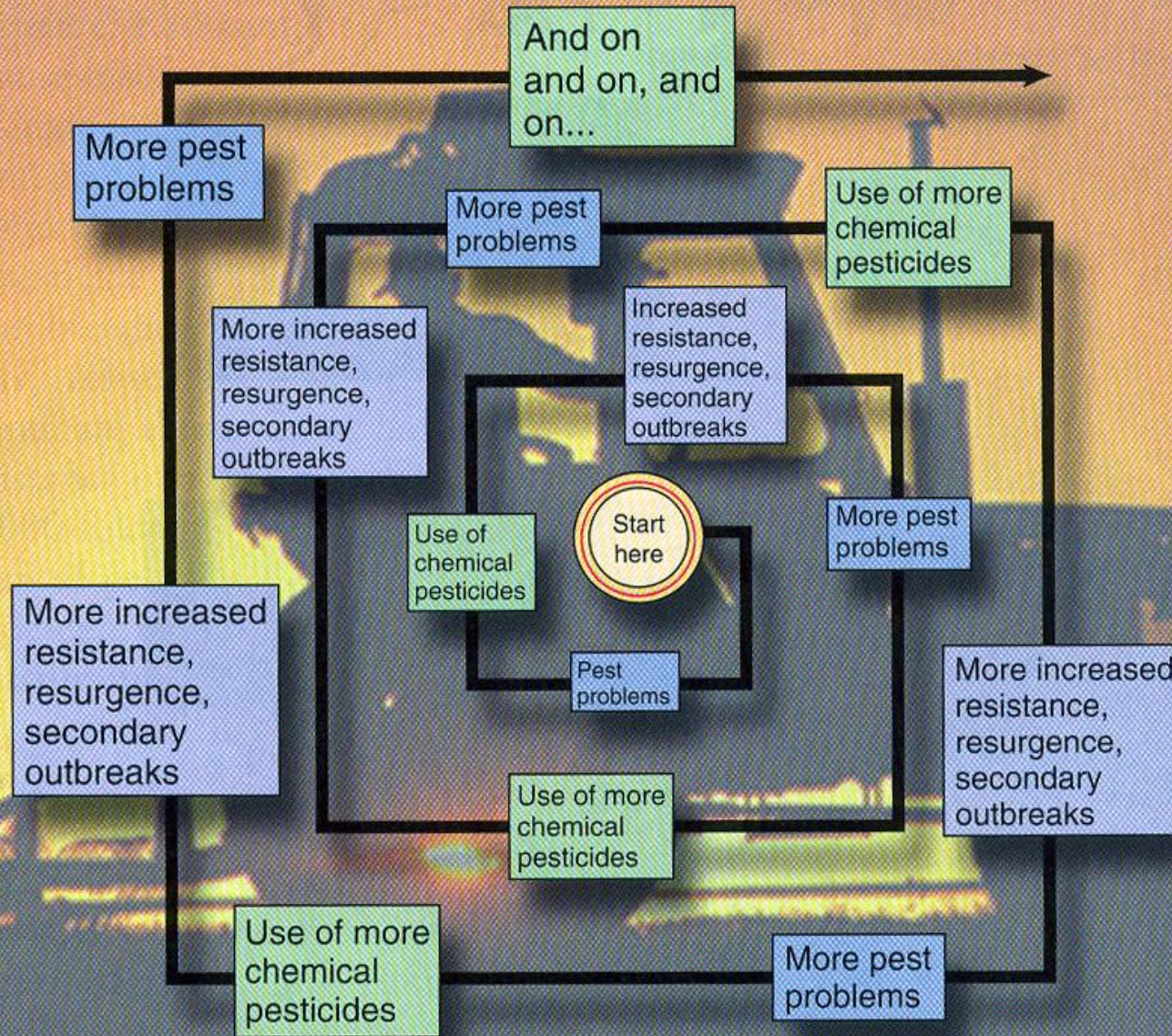
(Source: <https://www.nal.usda.gov/afsic/organic-productionorganic-food-information-access-tools>)

PESTICIDES DO NOT REPRESENT THE ONLY OPTION AGAINST PESTS

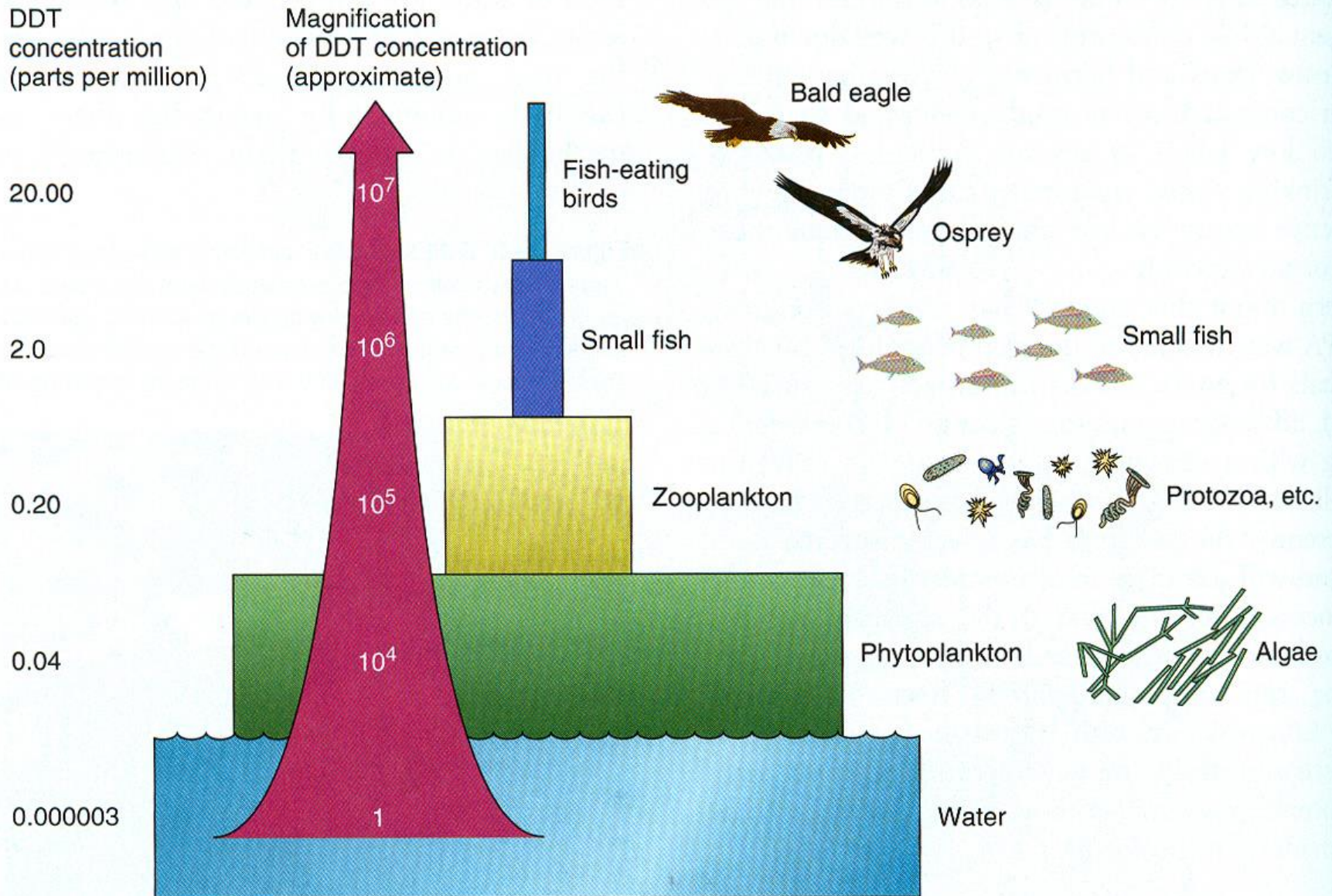
- IF A HAMMER IS ALL YOU HAVE IN YOUR TOOL BOX, EVERY PROBLEM BEGINS TO LOOK LIKE A NAIL
 - HAMMER= PESTICIDES
 - NAIL = EVERY PEST PROBLEM!

DEVELOPMENT OF PESTICIDE RESISTANCE

- Pesticide Treadmill



Biomagnification



PROBLEMS ASSOCIATED WITH PESTICIDES:

Human Health Problems

- ▣ Acute effects:
 - Short-term illness.
 - One or a few exposures (often accidental).
 - High doses.

- ▣ Chronic effects:
 - Long-term illness.
 - Repeated exposure.
 - Low-level doses.
 - Cancer, sterility, birth defects, neurological problems, immune system problems, Parkinson's disease.

OVERVIEW OF IPM PRACTICES IN ORGANIC FARMING SYSTEMS

- MAJOR CATEGORIES OF PEST MANAGEMENT PRACTICES
- 2) Curative or therapeutic Practices

CURATIVE OR THERAPEUTIC PRACTICES

These are measures that are put in place to deal with existing pest problems. They include

- Use of organic pesticides
- Handpicking
- The use of vacuum equipment (Example: Salad Vac)

PREVENTIVE AND CULTURAL INSECT PEST MANAGEMENT PRACTICES

- Weed management
 - Mulching (reflective mulch)
- Farmscaping
- Trap cropping
- Crop rotation
- Do not stagger plants right next to each other
- Irrigation/water management
- Adequate soil nutrients
- Mulching

CURATIVE PEST MANAGEMENT PRACTICES AGAINST INSECT PESTS

- Early detection
- Correct identification
- Use of relevant action or treatment thresholds
- Use of appropriate organic insecticides
- Follow label instructions
- Rotate insecticides to reduce development of insecticide resistance!
- Size/stage of growth of the insect pest is critical
- Note that some biopesticides are unstable in the presence of sunlight! Spray in the evenings (if possible)

NAME OF PESTS AND OTHER ORGANISMS

- Corn earworm



- Tomato fruitworm

- Cotton bollworm

TOMATO FRUIT WORM



- **Tomato Fruitworm**
- These flying pests place their white, waxy eggs underneath leaves or flower petals. After the striped larvae hatch, they move their way to the fruit, burrowing inside it and chewing large holes. Sometimes, they feed on leaves as well.
- Similar to whitefly scouting, six feet of row should be studied for every 2.5 acres, especially areas that show signs of feeding. While general predators such as pirate bugs will eat eggs, parasitoid wasps will target eggs and larvae.

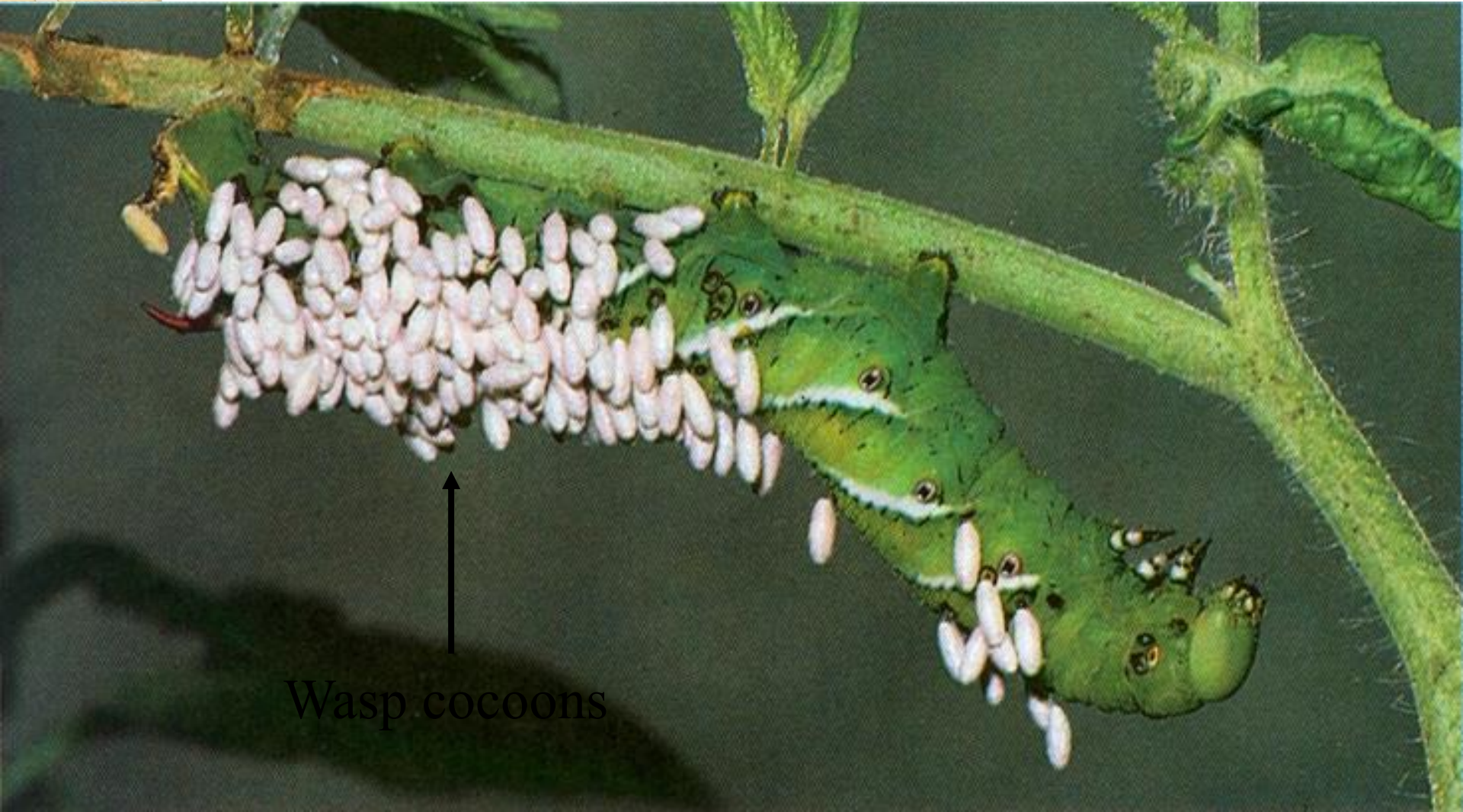
HORN WORM INFESTED WITH PARASOID (PARASITIC WASP)



- This hornworm has been converted from a foe to an ally.
- By this stage of the infestation the hornworm will either stop feeding or not feed much
- Do not take this out of the farm

Integrated Pest Management

-Use of Natural Enemies to Control Pests



Wasp cocoons

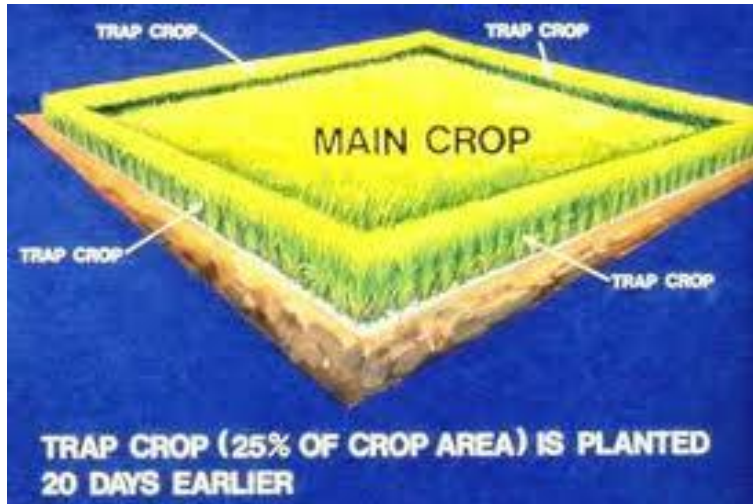
INSECT PESTS OF TOMATO- APHIDS



- **Aphids**, a winged and wingless insect, invade plants in large numbers. The soft-bodied pests use their mouthparts to suck and feed on fruit. A large group of aphids can stunt and distort the leaves, and aphids can spread plant viruses within seconds.
- Many beneficial insects—including ladybird beetles and lacewing larvae—feed on aphids, and fungi can also kill aphids in humid weather. Reflective mulches can attract these pests, distracting them from plants. If there are three to four aphids per plant, then insecticides may be used as a treatment. However, insecticides will not slow down aphid-transmitted plant viruses from spreading.



OVERVIEW OF IPM PRACTICES IN ORGANIC FARMING SYSTEMS: TRAP CROPS



Use trap crops (if possible)

- This may conflict with organic certification programs.
- Collards as trap crops for diamondback moth from cabbage fields
- Southern peas as trap crops for stink bugs to protect tomato plants.
- Sunflowers as trap crops for leaf-footed bugs from tomatoes.

Salad Vac Removing Insect Pests



PESTICIDES

- Are economic poisons
- They are either organic or conventional
- By chemical definition, **organic compounds** are compounds that contain **carbon**.
- **Inorganic** compounds **do not contain carbon**.
- So a poor interpretation of “organic” based on its traditional meaning in chemistry will result in the classification of most modern pesticides as organic pesticides because they contain carbon. **This is however not the traditional definition of an organic pesticide.**
- Insecticides derived from **natural** materials that have been researched and listed by the Organic Material Review Institute (OMRI) are those that are used in **certified “ORGANIC”** farming.
- OMRI (Organic Materials Review Institute)
(Source: <https://www.omri.org/>)

NATURAL PESTICIDES (BIOPESTICIDES)

- Biopesticides are distinguished from conventional chemical pesticides by all or many of the following characteristics:

- 1) Unique mode of action

- 2) Narrow pest range

- 3) Low use volume

- 4) Natural occurrence

There are currently over 241 active ingredients with insecticidal or acaricidal activity in 1,155 biopesticidal products.

ANY QUESTIONS?

**SOUTHEAST
ORGANIC
PARTNERSHIP**

AT TUSKEGEE UNIVERSITY

