



Faculty Of Science
Tanta University
Chemistry Department



Applications of Radioactive Isotopes in Agriculture γ -Radiation and the Sterile Insect Technique

Mohammed Said Elsemlawy
Muhammed Mahmoud Arafa

Dr: Wael Amer

List of Agricultural Applications :

- **Insect pest management .**
- **Food Irradiation .**
- **Mutation Breeding .**
- **Soil fertility.**
- **Carbon dating .**

➤ Food Irradiation :

* is a safe physical means of food processing and preservation similar to methods such as freezing ,heat treatment .



➤ Mutation Breeding :

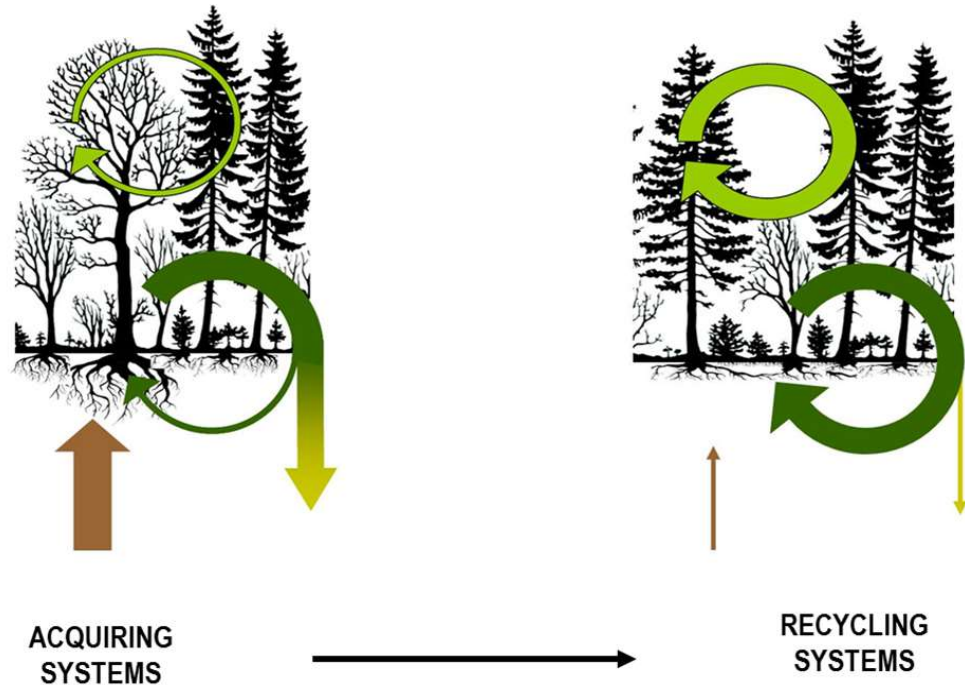
* Improved characteristics are produced using :

- Gamma radiation .
- Related biotechnology .
- Tissue culture technique .



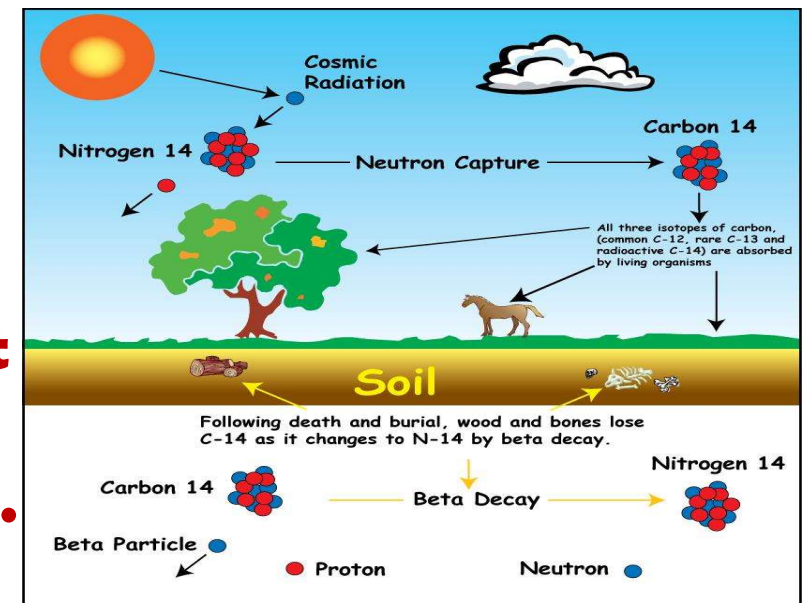
➤ Soil fertility :

*** refers to the ability of a soil to sustain plant growth to provide plant habitat and result in lasting constant yields of high quality.**



➤ Carbon dating :

-Is a radioactive isotope of the element carbon and is produced in the upper atmosphere by radiation from the sun .



Insect pest management:

-Insect pests are serious threat to agricultural productivity ; They not only reduce crop yields but also transmit disease to cultivated crops.

*** Radiolabel pesticides** were used to monitor the persistence of their residues in food items, soil, ground water and environment.

*** Continuous uses of pesticides have negative impacts on the environment and it also results into development of resistance against pesticides in many insect species.**

*** By using nuclear science for developing environmentally friendly alternatives for pest control and control of insects using ionizing radiations.**

Sterile Insect Technique (SIT)

- **This technique relies on application of ionizing radiation as a mean to effectively sterilize male insects without affecting their ability to function in the field and successfully mate with wild female insects.**
- **This technique involves release of large numbers of sterile male insects of the target species in the field crop .**

- **Sterilize male insects compete with the regular male population during sexual reproduction and the eggs produced from their mating are infertile so they produce no offspring**
- **It is highly specific form of "birth control which reduces and eliminates the insect population after two or three generations.**

