BRIEF HISTORY OF PESTICIDES

What is a pesticide

- Any substance or a mixture of substances that prevents, destroys, or repels pests is termed as pesticide. It could be a **chemical substance**, a **biological agent** (such as a virus or bacterium), an **antimicrobial**, or a **disinfectant**.
- Pests include insects, plant pathogens, weeds, molluscs, birds, mammals, fish, nematodes (roundworms), and microbes that destroy property, spread diseases, or are vectors for diseases or cause nuisance.

BRIEF HISTORY OF PESTICIDES

- The present-day **Iraq, Turkey, Syria, and Jordan** were the Fertile Crescent of Mesopotamia about **10,000 years ago**.
- In this region, the practice of agriculture first began when a population of hunter/gatherers started collecting edible seeds.
- As settlement progressed, people in the region started cultivating wheat, barley, peas, lentils, chickpeas, and flax.
- **Eventually farming became the way of life**

BRIEF HISTORY OF PESTICIDES

- Archaeologists have found that along the banks of the Ganges, rice was grown as a domesticated crop in the **sixth millennium BC**.
- During the same time, in south-west Asia, barley, oats, wheat, lentil, and chickpea were cultivated.
- Other crops grown **3000–6000 years ago** include **oilseeds** such as sesame, linseed, mustards, and castor; **legumes** such as mung bean, black gram, horse gram, pigeon pea, field pea, grass pea;
- **Fibre crops** such as cotton; and **fruits** such as jujube, grapes, dates, mango, mulberry, and black plum.
- **Animals** including livestock, sheep, goats, donkeys, dogs, pigs, and horses were also domesticated during the period

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- **In Africa**, about 7500 years ago rice and sorghum were grown in the Sahel region.
- **In China** too, rice and millet were domesticated.
- Potato was domesticated in **South America**.
- Around 3500 BC, corn and squash were cultivated in **Mesoamerica (**North America).
- The **Native Americans** in 2500 BC cultivated sunflower apart from other crops.
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BRIEF HISTORY OF PESTICIDES

- Birds, mammals, microbes, insects, weeds, and so on have always been a threat to crops.
- These pests and diseases have affected the crop yield, with the threat of famine always looming.
- **Even today**, despite the advancements made in agricultural science, a considerable quantity of food products are destroyed due to pests
- To overcome the problems caused by pests and diseases, humans turned towards the use of pesticides.
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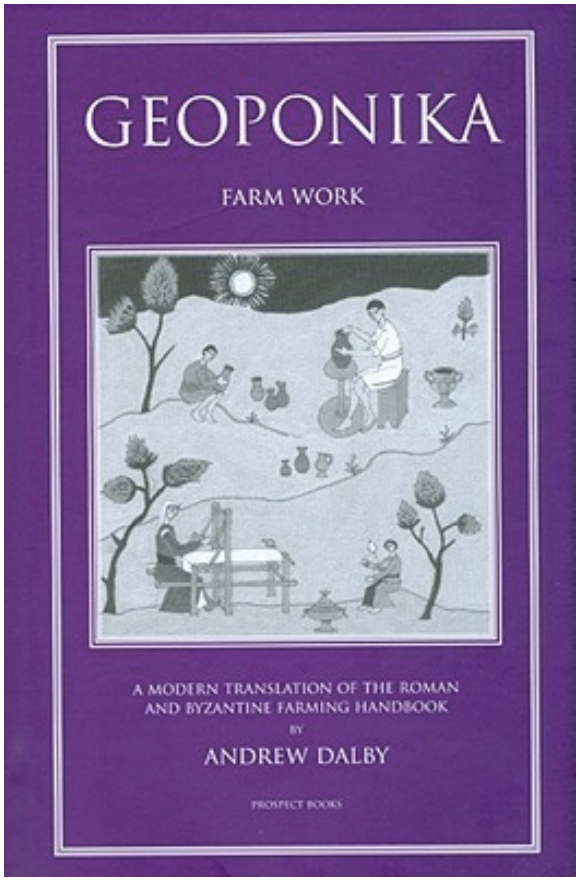
BRIEF HISTORY OF PESTICIDES

- According to records, about **4500 years ago**, **Sumerians** (first Mesopotamian civilization) were the first to use **sulphur** compounds to control insects and mites.
- **Ancient Romans** burnt **sulphur** to kill insect pests and used **salt** to control weeds.
- **Mercury and arsenical compounds** were used by the **Chinese** about 3200 years ago to control body lice
- In **1500 BC**, **Egyptians** produced insecticides against lice, fleas, and wasps.

BRIEF HISTORY OF PESTICIDES

- ***Geoponika :*** It is a Greek agricultural encyclopedia that lists insecticides used during the **tenth century** and mentions the insecticidal properties of bay, cumin, hellebore, aquill, cedar, absinthe, and pomegranate
- The **London Horticulture Society**, in 1821, suggested that in order to prevent mildew on peaches, **sulphur** should be used.
- **Arsenic** was applied to potato crops in the **United States** when Colorado beetle invaded the crops in 1867.



BRIEF HISTORY OF PESTICIDES

- **In 1892,** potassium dinitro-2-cresylate, the first synthetic pesticide, was marketed in **Germany**.
- **During World War II**, inorganic and biological substances such as Paris green (**copper acetoarsenite), lead arsenate, calcium arsenate, selenium compounds, lime–sulphur, pyrethrum, thiram, mercury, copper sulphate, derris, and nicotine were used.**
- But their amounts and frequency of use were limited, and most pest control practices employed cultural methods

BRIEF HISTORY OF PESTICIDES

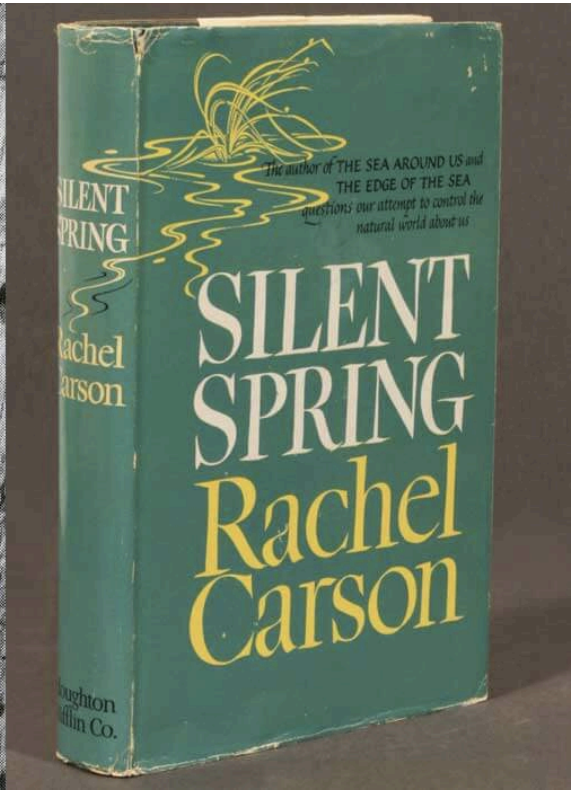
- There was an increased application of pesticides after **World War II**
- Pesticides, such as **DDT, aldrin, BHC, dieldrin, endrin, and 2,4-D** were introduced.
- **Dichlorodiphenyl-trichloroethane (DDT)**, the first synthetic organochlorine insecticide, was discovered in **Switzerland in 1939**.
- **DDT** was used extensively against **head and body lice**, **human disease vectors**, and **agricultural pests** till the 1970s.
- **Benzene hexachloride (BHC)** and chlordane were developed during World War II and **toxaphene** (and heptachlor) slightly later
- **2,4-D (2**,**4**-**Dichlorophenoxyacetic acid)**, an inexpensive and effective insecticide, was used in grass crops, such as corn, to control weeds

BRIEF HISTORY OF PESTICIDES

- By the **late nineteenth century**, farmers in the United States were using Paris green, calcium arsenate, nicotine sulphate, and sulphur to control insect pests in field crops, but often results were poor because of the primitive chemistry and application methods
- Users not aware of the harmful effects of pesticides started using them generously with the aim of sterilizing the pests
- Some pests, under constant chemical pressure, became genetically resistant to pesticides
- Also, pesticides started harming non-target plants and animals, and pesticide residues began appearing in unexpected places.

BRIEF HISTORY OF PESTICIDES

- It was not until the publication of ***Silent Spring*** by Rachel Carson in **1962** that people became aware of the harmful effects of pesticides.
- Carson, in her book, highlighted the risks and consequences of unhibited use of pesticides



BRIEF HISTORY OF PESTICIDES

- At present, **1600 types of pesticides** are available in the market.
- Approximately, **4.4 million tonnes** of pesticides are used every year, at a cost of more than **$20 billion**.
- The United States accounts for **25% of** the pesticide market in the world
- Researchers, as a consequence, focused their research towards finding pest-specific pesticides and cropping methods that were not pesticide- centric.
- Scientists in the **1960s** started working on an alternate approach, known as **integrated pest management (IPM)**

Increase in resistance to pesticides in subsequent generations