

MINISTRY OF AGRICULTURE, FORESTRY & FISHERIES

INTRODUCTION TO PESTICIDES

Agricultural Training course
Georgetown, 31st May 2005
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INTRODUCTION

Two centuries ago there was no scientific bases for plant protection activities. Therefore primitive plant protection measures were employed, for example wheat was soaked in salt water, use of vinegar, ash among others. However, more than 2700 years ago the Greeks utilized sulfur as a fungicide while the Chinese in this same period used arsenical compounds as insecticides.

2500 BC First records of insecticides eg the Sumerians were using sulphur compounds to control insects and mites

400 AD Ko Hung an alchemist recommended a root application of white arsenic when transplanting rice to protect against insect pests

1750-1880 Crop protection became more extensive and international trade promoted the discovery of the botanical insecticides pyrethrum and derris

Early 1800's Appearance of first books and papers devoted entirely to pest control covering cultural control, biological control, varietal control, physical and chemical control

1840 Potato blight (*Phytophthora infestans*) outbreak in Ireland, England and Belgium leading to widespread famine.

1885 Beadeaux mixture, new generation of pesticides followed until the 1950's which were restricted due to toxicity. More selective and less toxic pesticides developed


1874 First synthetic organic insecticide DDT produce (39/40) and banned in the 1970's

DDT was the spring board for other pesticides


1896 First selective herbicide, iron sulphate, was found to kill broad leaf weeds

Use of inorganic compounds as herbicides:

Copper sulphate, Sulfuric acid, etc



Cheap



Quick break down
Dependency on climatic condition
Very high toxicity

1920's and 30's

There was a technological and chemical revolution in all areas. Research led to the development of chemical pesticides and fungicides (DDT: 1939 –recognition of its properties)

1940's and 50's

Huge increase in number of pesticides available. Chemicals were thought to be the miracle cure for all problems

1960's

Rachel Carson wrote *The Silent Spring* - the first wide read warning of pesticide overuse.

Realized the critical link of insects in the food chain.

Began searching for the more "natural" remedies of our ancestors

1970's

Came up with the concept of IPM - Integrated Pest Management. Instead of annihilating the insect population - manage the pest.

1980's

Development of "softer insecticides" - less harmful to beneficial insects and the environment.

Lots of research on low rate materials (1 oz/active ingredient per acre rather than 2 lbs.)

1993 > 504 insect spp are known to be resistant to at least one formulation of insecticide and at least 17 species of insect species are resistant to all major classes of insecticide. 150 fungi and other plant pathogens are resistant and several plant pathogens are resistant to nearly all systemic fungicides used against them. Five kinds of rats are known to be resistant to the chemicals that are used against them. Resistance to herbicides have been documented in over 100 weed biotypes and 84 species (Cate and Hinkle 1994).

1990's

Lots of focus on development of bio-rationals - materials based on some type of biological insect hormone or venom - things found to poison insects - and then synthetically reproduce those things. Plants have defense mechanisms - exploit those. (cayenne pepper extract, plant material extracts, etc.)

Chemicals that disrupt pest behavior, not kill them (pheromones, chemosterilants).

Pheromones are insect hormones.

Spot treatments - treat only infected areas.

"Scout" your area to determine threshold levels - how much damage can you withstand before you need to take action.

Manages pests, but allows beneficials to exist

WHY THE INTROCUCTION?

There are 68 000 insect Spp, 40 000 Spp of Fungus and many more micro organisms, the large proportion of which alter the normal development of plants.

Food must be produced to sustain a growing world population

Globally one third of crops are lost due to pests and in Latin America 40% of everything is lost due to weeds and diseases.

GLOBAL PEST DAMAGE

COMODITY	LOST DUE TO PEST (%)
CEREALS	38
IRISH POTATO	32
VEGETABLES	45
CITRUS, GRAPES & OTHER FRUITS	29