Approved crop protection chemicals and biological agents; integrated insect pest, disease, weeds and crop management methods;

Dr. D. Kilalo
Dept of Plant Science and Crop Protection

SEMI's FIELD PESTS AND DISEASE DIAGNOSIS IN SEED CROPS
Outline

- Why approval?
- Key international agreements
- What is common among them
- How they support chemical management
- Laws, regulation and standards that control pesticide usage
- Concerns about pesticide use
- Restricted products
- Seed treatments
- IPM
Why approval?

- Pesticides used are approved for use after undergoing various checks guided by the law of the land.
- There are regulations that guide the manufacture, formulation, importation, packing, distribution and sale.
- The scientific information, effect, value, safety and quality of a pesticide must be affirmed by a regulator and registered before the product can be distributed for use in a country.
Key international agreements on pesticides

Common thread among them

- Reduce harm to human health and environment
- Support pesticide management (labelling, trade and movement, Identification of alternatives)
- Provide information about pesticides (hazards associated with them)
- List of banned and restricted pesticides
Key international agreements on pesticides

They are:

- Stockholm convention: Persistent organic pollutants (POPs) - dirty 12
  - Chemicals that do not break down easily, stay long in environment and can move long distances
  - They bioaccumulate and biomagnify

- World health organization (WHO) classify pesticides according to the level of toxicity and the hazard that may be caused
  - Classified pesticides into I (R), II (Y), III (B) and IV (G)
  - Red highly hazardous (cause acute poisoning)
  - Highly hazardous pesticides to human health and environment are Restricted pesticides
Key international agreements on pesticides

- Rotterdam convention: Prior informed consent
  - Country intending to import must be informed of every danger and goodness alike about the product so that it can make a decision. It covers 33 pesticides and 11 industrial chemicals.

- Montreal protocol: Chemicals that emit gas that is destroying the ozone layer must be managed
  - e.g. methyl bromide (2015) and various fumigants
  - Refrigeration gases, foam foaming, industrial cleaning, fire safety (even gas released from animal rumen)
Laws, regulations and standards

- These concern the use of chemicals under certain conditions and if they are not met, produce will not be marketed where these laws and regulations operate.
- E.g. European Union market, UK, US, Germany, Japan etc.
- Some local markets (Supermarkets)
- In Africa, there are steps towards harmonizing the rules and regulations.
Standards (more for horticulture)

- Have sets of rules of production of a certain produce. They have to be met for the produce to obtain market in the area where the rules prevail. Rules take care of these concerns:
  - Good agricultural practices - include keeping records about what has been used and when? Critical for chemicals where one has to indicate why it was used
  - Traceability
  - Workers health
  - Safety for the workers in the field and when packing
  - Environmental protection to ensure sustainability
Concerns about pesticide dependence

- Pest resistance
- Environmental persistence
- Bioaccumulation: when a chemical accumulates in animal fat (historical fact)
- Biomagnification: when an organism accumulates residues at higher concentrations than the organisms they consume
Concerns about pesticides and the hazards in the environment

- US Environmental Protection Agency (EPA) created in 1970
- Charged with protecting environment and health of humans and animals
  - DDT banned in 1972
- Public concern has led to stringent regulation of pesticides, as well as changes in types of pesticides used
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<th>Internationally restricted pesticides</th>
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<tr>
<td>3-Chloro-1,2-propanediol</td>
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<td>Allyl alcohol</td>
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<td>Alpha hexachlorocyclohexane</td>
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No to restricted products!

- Pesticides subject to international restrictions should not be used to protect seed fields or protect seeds for sale.
- Those that are in Class 1a and 1b restricted by WHO they should only be handled by trained and registered people.
- Persistent organic pollutants
- Ozone depleting substances and
- Pesticides that require prior informed consent for movement.
Seed Treatments

- Chemicals are used to reduce attack from pest and disease and to prevent pests and diseases from attacking BUT
- Use only the chemicals that do not fall within those regulated by the international agreements or banned
- Seeds are mainly treated with thiram, captan, mancozeb, carbendazim, captafol, metalaxyl e.t.c. at 2-4g/Kg
- Some combination products such as carbendazim with pyroquilon or tricyclozole are also used
- Captan-a widely used broad spectrum contact fungicide, however, poor on pythium and is very dusty.
- Metalaxyl-Narrow spectrum systemic fungicide with excellent activity against Pythium.
Seed treatments

- Fludioxonil - broad spectrum contact fungicide, very effective against Fusarium, but poor Pythium activity.

- Thiram only that product with less than 15% qualifies for use, anything above should not be used.

- Benomyl any product with more than 7% should not be used.

- Monceren GT: a combination product - a mix of insecticide and fungicide Imidaclorpid 233g/L + Pencycuron 50g/L + Thiram 107g/L

- Apron star: A combination product (imidaclorpid(20g/Kg)+ metalaxyl (20g/Kg) + difenoconazole (2g/Kg))

- Celest Top: Thiamethoxam 262.5g/L + Fludioxonil 25g/L + Difenoconazole 25g/L
Seed treatments

- Chloropyriphos or monocrotophos or phosalone at 4ml/kg are used as a precaution against early season insect pests.
- Imidaclorprid at 10mls/Kg is also used to protect millets/sorghum against shoot fly incidences.
- Clothianidin at 2g/Kg for control of aphids in managing MLN viruses.
- *Trichoderma viride* (4g/Kg) or *Pseudomonas fluorescens* (10g/Kg) are organisms used to protect field crops against early season diseases.
- During storage seeds may be protected using fumigants such as acrylonitrile (16-20 g/m²), Carbon disulphide (24-32 g/m²), carbon tetra chloride (300-400 g/m²), ethyl bromide (24-30 g/m²), methyl bromide (32 g/m²) and phosphine (3-6 g/t of seeds).
SEMIs UoN

Seed Enterprises Management Institute

University of Nairobi

THANK YOU