Knowledge on pest control

Chainarong RATTANAKREETAKUL Department of Plant Pathology Faculty of Agriculture Kamphaeng Saen KASETSART UNIVERSITY Nakhon Pathom 73140 crattan99@yahoo.com



The Irish Potato Famine--continued



In order to feed its people, Ireland relied primarily upon two high-yielding potato varieties.

When the potato disease struck, it resulted in a massive crop failure that lasted five years, 1845-1850.

Encyclopedia Britannica, 2002; Illustrated Lo













Groups of plant pathogens - fungi

- Can cause plant, human, and livestock diseases
- Most cannot be seen without a microscope
- Lack chlorophyll
- Composed of growing structure of delicate, <u>threadlike filaments</u> <u>called hyphae</u>
- Reproduce by forming spores



Groups of plant pathogens - bacteria

- Extremely small organism requiring microscope to be seen
- Bacteria population can increase in number in short time period
- <u>Cells clump together in masses</u> called colonies
- Obtain food from dead or decaying organic matter or living tissue
- Spread plant to plant by wind-driven rain
- Gain entrance through natural plant openings or injuries

Groups of plant pathogens - viruses

- Most familiar because they cause human and animal diseases such as influenza, polio, rabies, smallpox, and warts
- Cause some destructive plant diseases
- Are not complete living systems
- <u>Survive only in living cells</u>
- Transmitted by insects which are called vectors







Integrated Pest Management

Integrated Pest Management is a carefully consideration of all available pest control techniques and subsequent integration of appropriate measured that discourage the development of pest population and keep pesticides and other interventions to levels that are economically justified and reduce or minimized risks to human health and the environment.

IPM emphazies the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms.

(International code of conduct on the distribution and use of pesticides, FAO 2002)



The Three Pillar of IPM : Prevention

Maximum efforts should be made to prevent problems with pests to avoid the need for intervention. This includes the adoption of cultivation techniques and management actions at farm level to prevent or reduce the incidence and intensity of pests.



The Three Pillar of IPM : Observation

Monitoring is the systematic inspection of the crop and it surroundings for the presence stage (egg, larvae) and intensity (population level and infestation level) of development and location of pests. It is one of the most critical activities of IPM, as it will alert the grower about the presence and level of pests, disease and weeds in his crop. This will allow the grower to make a decision on the most appropriate intervention.



The Three Pillar of IPM : Intervention

Difference IPM techniques can be used when monitoring indicates that an action threshold has been reached and that intervention is required to prevent economic impacts on the crops value of the pest will spread in the crops.

Within an IPM program, priority is given to non-chemical methods that reduce the risk to people and the environment.

If further monitoring indicates that control is insufficient, then the use of chemical plant protection products can be considered.



2. BASIC KNOWLEDGE OF IPM

- The Key pests, diseases and weeds that can affect to a crop.
- Potential method, strategy to control the pest.

2.1 Pest informations

- List of relevant insect pests, disease and weeds to the target crop in the area.
- The information of the pest; life stages and their approximately dates of appearance, over wintering condition, photo-guides, economically injury level









2.2 Plant Protection Products

- List of pesticides that can be applied against the pests.
- Some information of pesticides (contact route, does rate, maximum residue limits (MRL), mode of action, reentry interval, pre harvet interval (PHI))



THAILAND Registration Procedure (1) Submission and checking of dossiers (2) Quality analysis and efficacy trial

- (3) Evaluation of data efficacy, toxicity, residues
- (4) Compilation of results of efficacy/ residue trial, quality analysis, data evaluation and label
- (5) Seek approval from Sub-committee for pesticide registration
- (6) Issuance of registration certificate

Maximum Residue Limit				
Pesticide	Food N		/IRL (mg kg ⁻¹)	
	Commodities	EU	USA	FAO
Thiabendazole	Vegetables	0.05-15	0.25-4.0	0.05-15.0
	Fruit	0.05-15	0.4-10.0	5.0-15.0
	Citrus	5	10.0	10.0
	Pome Fruit	-	10.0	3.0
	Cereal grain	0.05	1.0	-
	Egg	0.1	0.1	0.1
	Meat	0.1	0.1	0.05-0.1
	Milk	0.1	0.1	0.2
	Kidney	-	250	1.0
	Liver	-	2.50	0.3
Diflubenzuron	Citrus	No settled	0.5	0.5
	Pome Fruit		0.5	5.0
	Cereal grain		0.02-0.05 ⁰	0.01
	Mushroom		0.2	0.3
	Egg		0.05	0.05
	Meat		0.05	0.05-0.1
	Milk		0.05	0.02
	Nuts		0.06	-

2.3 Alternative protection methods

- Medicinal plant
 - Neem : Azadirachta indicaCitronella grass : Cymbopogon
 - esculentum
 - Galanga : Alpinia galanga
 - Sweetflag : Acorus calamus





- Trichoderma sp.
- Bacillus subtilis
- Bacillus thuringiensis
- Breuveria bassiana
- Metarhizium spp.







4. IPM measures during cropping4.1 Prevention

Cleanliness of the farm

Cultural and technical measures

Conservation of biological control Measure to increasing the biological control agents / prevent using pesticides to kill the natural enemies



4. IPM measures during cropping 4.2 Monitoring and decission support tools Observation of the pest

- Defined the tool and method for scouting / key pest / trapping Record keeping -places / pest / time / method Decission making Change in Pest Population Density Over Time Economic Injury Level Economic Threehold Time

4. IPM measures during cropping 4.3 Intervention

They are several non-chemical methods that can be applied. Incase of pesticide application, the optimal application techniques and the prevention of pesticides resistance.

Mechanical / Physical Control - Destroy the infected parts / removal of pest habitat as weed Semi-chemicals - Attract and kill / Mating confusion / Repellants Biological control

- Apply the natural enemies, antagonistic micro organisms Natural products

- Mineral oils / volatile oils / Soap



5. IPM measures after post-harvest5.1 Post harvest treatments

With non-chemical treatment as heating / freezing / irradiation / washing / CO2 level

5.2 Storage and transportation