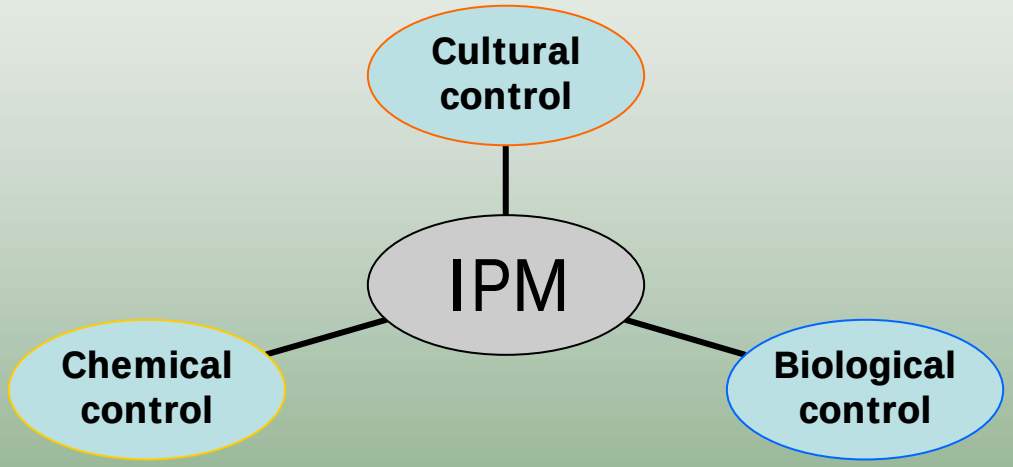
INTEGRATED PEST MANAGEMENT IN GROUNDNUT PRODUCTION



USER GUIDE

INTRODUCTION

This brochure is developed for master trainers, service providers and Farmer Field School facilitators in response to the critical need to provide user-friendly training and reference materials on integrated pest management (IPM) in groundnut production.

What is IPM?

Integrated pest management (IPM) is an approach, which combines different pest control techniques and integrates them into the overall farming system. It relies on host plant resistance, biological control and cultural practices, with pesticides introduced only when these non-chemical control methods fail to maintain pest populations below economically damaging levels.

Fundamental principles of IPM

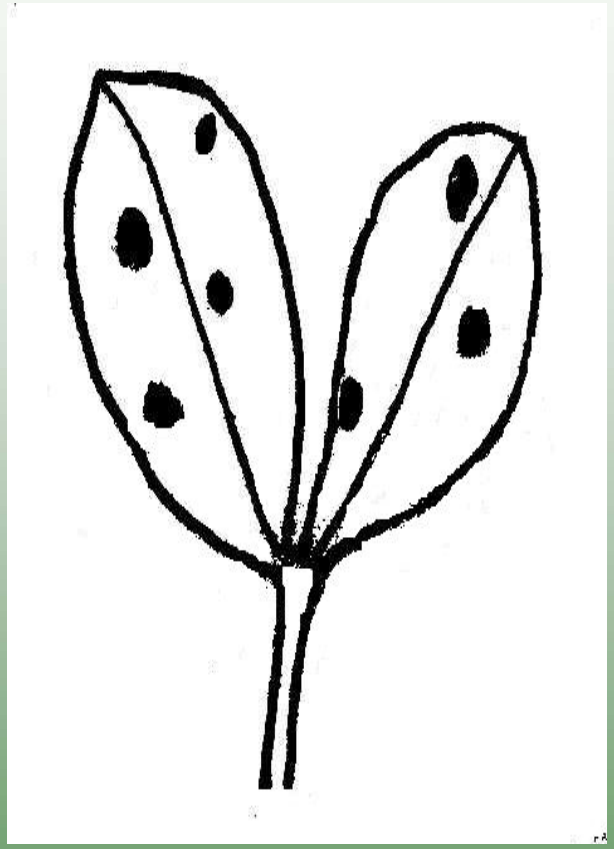
1. Integration of the management of any given pest into the overall farming system
2. Use of biological measures (including plant breeding, agronomic practices, and biological control by natural enemies) to create an environment, which discourages the build-up of pests and diseases.
3. Pesticides are used only as a last resort, when other measures fail to maintain pest populations below economically damaging levels;
4. The objective is to manage pest and disease levels, through regular monitoring and surveillance, not to eradicate them totally
5. Control measures are selected and implemented to minimize hazards to human health and the environment.

Integrated Pest Management technologies

A. Cultural

- *Crop rotation*

Since leaf spot pathogens survive mainly in crop debris, crop rotation can significantly reduce the incidence of the disease



Leaf Spot infestation

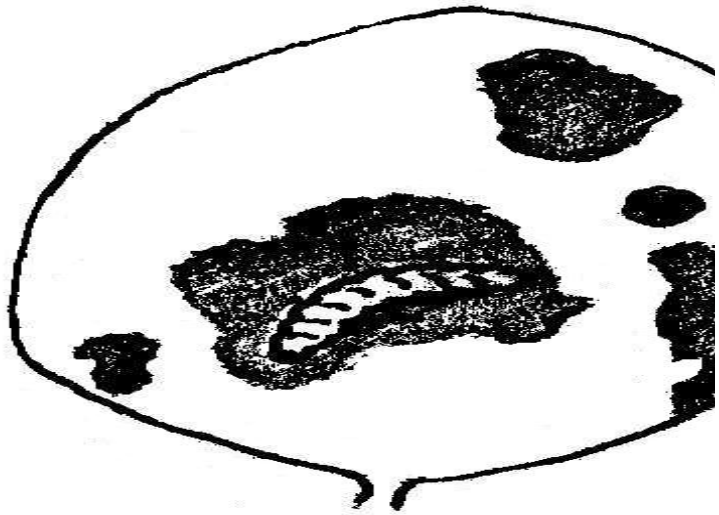
Note:
From field observations during the first season of 2004, it was observed that the disease (leaf spot) appears when rainfall disappears soon after planting. However, with sufficient rainfall the affected plants recover from the attack. Therefore there is no need to take action using chemical means when rainfall is sufficient

- *Avoiding pests and diseases*

Leaf miners being a second season pest can be avoided by not growing the crop during this time

- *Timely planting*

Timely planting can reduce the incidenc ease



Leaf Miner infestation

- *Resistant varieties*

Varieties like Serenut 2, 3 and 4, Igola 1, which are resistant to rosette disease are available and these eliminate the need for spraying insecticides to control aphids

- *Good hygiene/crop sanitary measures*

Burying crop residues during land preparation or removing them for making compost can significantly reduce the incidence of leaf spot disease

- *Improving the soil*

For farmers who can afford artificial fertilizers, application of single super phosphate (SSP) at the rate of 40-50 kg per acre or triple super phosphate (TSP) at 32-36 kg per acre will boost yield. SSP or TSP should be worked into the soil before planting.

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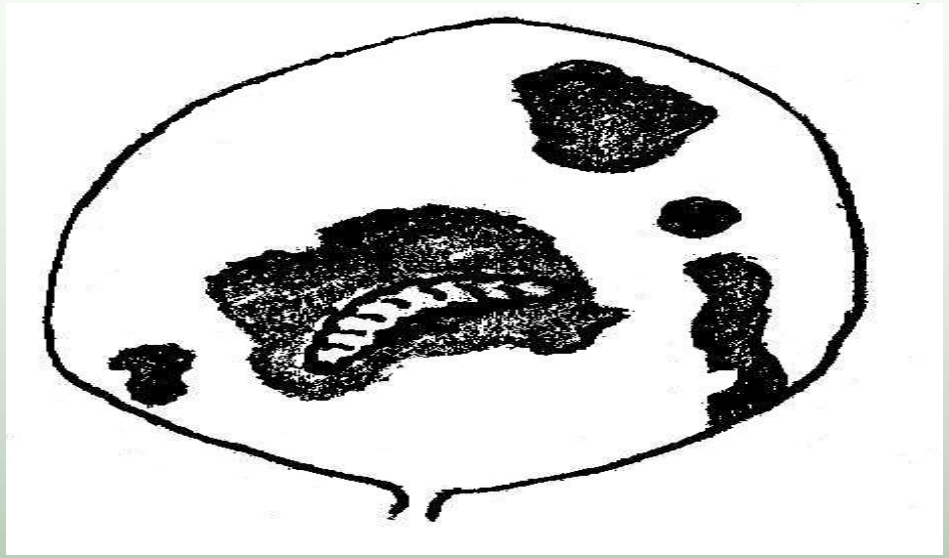

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B. Biological control

Conservation of natural enemies (insects which eat other pests). Natural enemies can be identified by placing the insect and the natural enemy in a glass jar with a perforated lid and observe. One will eat the other

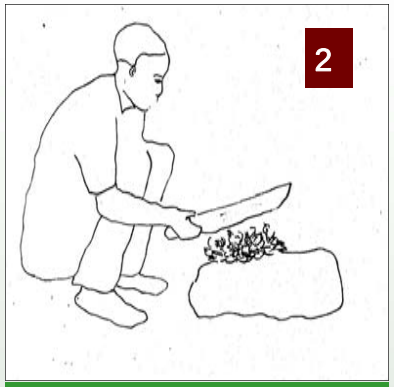
C. Chemical control

- Use of natural pesticides
- Use of synthetic pesticides

Integrated Pest management in Groundnut production

A. Natural pesticides: Preparation and use

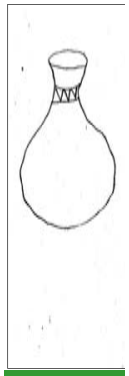
Collect about 1 kg of marigold leaves (2 large handfuls), 1 kg of wild sunflower (2 large handfuls), a handful of red pepper fruits, handful of mature black jack seeds. Material collection takes about 20 minutes if readily available within the locality



Chop or pound the ingredients.

Put chopped material in any container like a jerry can, pot etc

Add 5 litres of water (10 'tumpecos')



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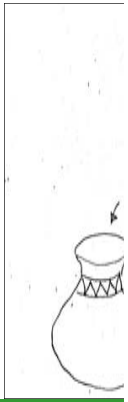


Then dilute in an (1:1)

Filter the solut normally takes solution is reac

Natural pesticides

- Are free pesticides
- Minimize the destruction of beneficial soil organisms and conserve nature

Natural pesticides

These are pesticides derived from plants (botanical products). Many of the natural pesticides do not kill the pests but repel them from the field

Application

It is best to apply the pesticide when there is no dew on the crop, and no rainfall is predicted soon.

Apply 20 litres of the pesticide in an area of one acre. using either a spray pump or a basin and broom.

The number of times to spray is determined by pest build-up in the garden

Equipment and materials required to make and use natural pesticides

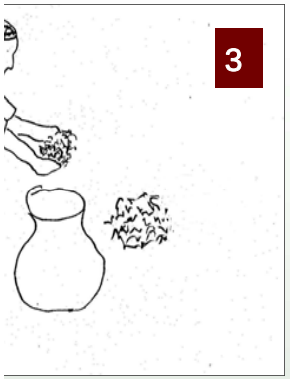
-Spray pumps/broom and basin
-'Panga'
-Jerry can/pot/'debe'
-20 litres of water (one jerry can of water)
-Firewood (Needed in case we need to boil the ingredients)
-Piece of cloth

Ingredients commonly used for making natural pesticides

Mexican marigold (Tagetes minuta)
Wild sunflower (Tithornia diversiflora)
Black jack (Bidens pilosa)
Lantana camara
Red pepper
One piece of bar soap

Effective against

- Aphids
- Leaf miners at the early stages, before the leaves are curled up



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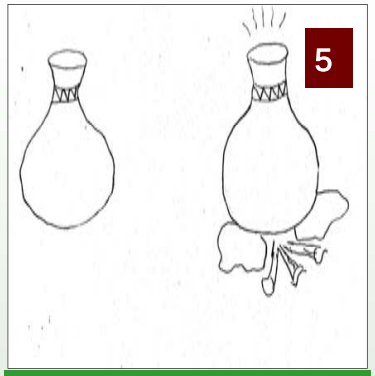
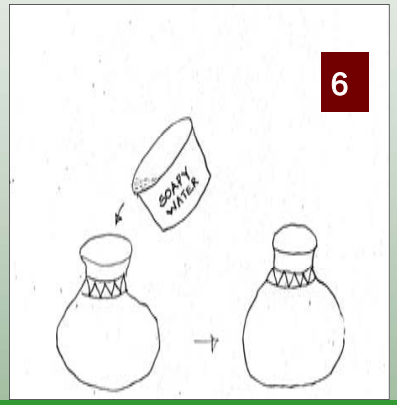


Leave to stand for 4-8 days or boil for 20 minutes and let it cool.



Then dilute in an equal amount of soapy water (1:1)

Filter the solution using a cloth. Filtering normally takes about 10 minutes and the solution is ready for use.

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Safety aspects and risks

Natural pesticides do not cause serious risks to the soil, human beings, livestock. However, they have a bitter taste, bad smell and an itching effect on the skin, so when preparing and using, avoid contact with the skin. After handling the pesticides, wash your hands thoroughly with plenty of water and soap.

When using a broom to apply the pesticide it is important to wear protective clothes and gloves, or long sleeved clothes to avoid direct contact with skin.

Labour and cost of preparation and use of natural pesticides

Just like any other farming activity, the labour requirement intensifies with the scarcity of the materials. But on availability, the major cost incurred in collection of the materials and preparation is mainly in terms of time. The time it takes to collect and prepare this pesticide is about 4 hours, and when this time is put into other uses for example casual labouring (opportunity cost), one could earn 1,000/= shilling. Labour hire to apply the botanical costs about 1,000/= with a spray pump, and 3,000/= using a broom but this cost could vary from place to place.

Disadvantages of natural pesticides

- Does not kill most pests and has slow action so may result in pest build up Where materials are scarce, they are not easy to produce
- Are ineffective against pests hidden between leaves, such as leaf miner at a late stage

B. Synthetic pesticides

Dimethoate is a broad-spectrum systemic pesticide (pesticides which gets absorbed into plant tissue), which can be used for controlling many common pests in groundnuts including aphids and leaf miner.

Advantages of synthetic pesticides

Effective in pest control since it kills pests quickly.

Preparation for use

To prepare the chemical for spraying, you need: Marked measuring cup (comes with the pesticide), Water, Pesticide.
Direction for use is normally specified on the pesticide bottle

Safety aspects of the pesticide use

Chemical pesticide are corrosive to the body, pollute the environment and are poisonous to livestock, so during handling users are cautioned to use protective clothing to avoid contact with the skin. After handling wash hands and arms and skin that was in contact with any pesticide with plenty of soap and water.

Figure : Protective clothing for pesticide application

Resources requirement

Chemical pesticides can be expensive so are not appropriate for all farmers. A spray pump is needed for applying the pesticide to the crop.

There are very few stockists in the rural areas who stock synthetic pesticides and they are therefore generally inaccessible to farmers

However, pesticides like dimethoate can be bought from major stockists in big towns.

Disadvantages of synthetic pesticides

- These pesticides can kill useful insects which eat pests
- Equipment for synthetic application is expensive

A case study of the cost-benefit analysis for the different chemical pest control methods in Groundnuts in Tororo district

ITEM	TREATMENT		
	Natural	Synthetic	Control
Amount of pesticide per acre (litres)	20	0.2	0
Unit cost of treatment per litre (shs)	150	15,000	0
Total cost of treatment per acre (shs)	3,000	3,000	0
Yield (kg per acre)	666.67	536.67	468.33
Selling price per kg (shs)	5,000	5,000	5,000
Total returns (shs)	3,333,350	2,683,350	2,341,666.67
Net returns per treatment (shs)	3,330,350	2,680,350	2,338,666.67
Variable costs in shs			
Land hire per acre @ 15,000	15,000	15,000	15,000
Land preparation per acre @ 50,000	50,000	50,000	50,000
Labour for planting: 20 man-days @ shs 1,000	20,000	20,000	20,000
Labour for weeding 2 times: 45 man-days @ shs 1,000	45,000	45,000	45,000
Labour for harvesting: 15 man-days @ shs 2,000	30,000	30,000	30,000
Transporting produce from field to storage to market: estimated @ 10,000	10,000	10,000	10,000
Others costs e.g. packaging material, drying, shelling	10,000	10,000	10,000

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Transporting produce from field to storage to market: estimated @ 10,000	10,000	10,000	10,000
Others costs e.g. packaging material, drying, shelling	10,000	10,000	10,000
Total variable cost	180,000	180,000	180,000
Net benefit	**3,150,350**	**2,500,350**	**2,158,666.67**

*Total returns– Yield times selling price of produce
Note: One litre of dimethoate was selling at shs 15,000/= at the time of compiling this information (Feb. 2004).
Figures used in the calculations were collected from two farmer field schools in Tororo over a period of two seasons in 2004.

Acknowledgements

The groundnut IPM team is indebted to the Tororo district agricultural extension workers, the private service providers especially CASHFARM, Farmer Field School (FFS) facilitators, and the farmers from Mari Pa Were and Wachaki FFSs in Kisoko and Petta Sub-counties respectively in Tororo, for their contribution towards the development of this manual by providing useful information on pest management in groundnuts.

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