Vetiver grass: a tool to manage crop pests

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Vetiver and Farmers

Vetiver and Farmers

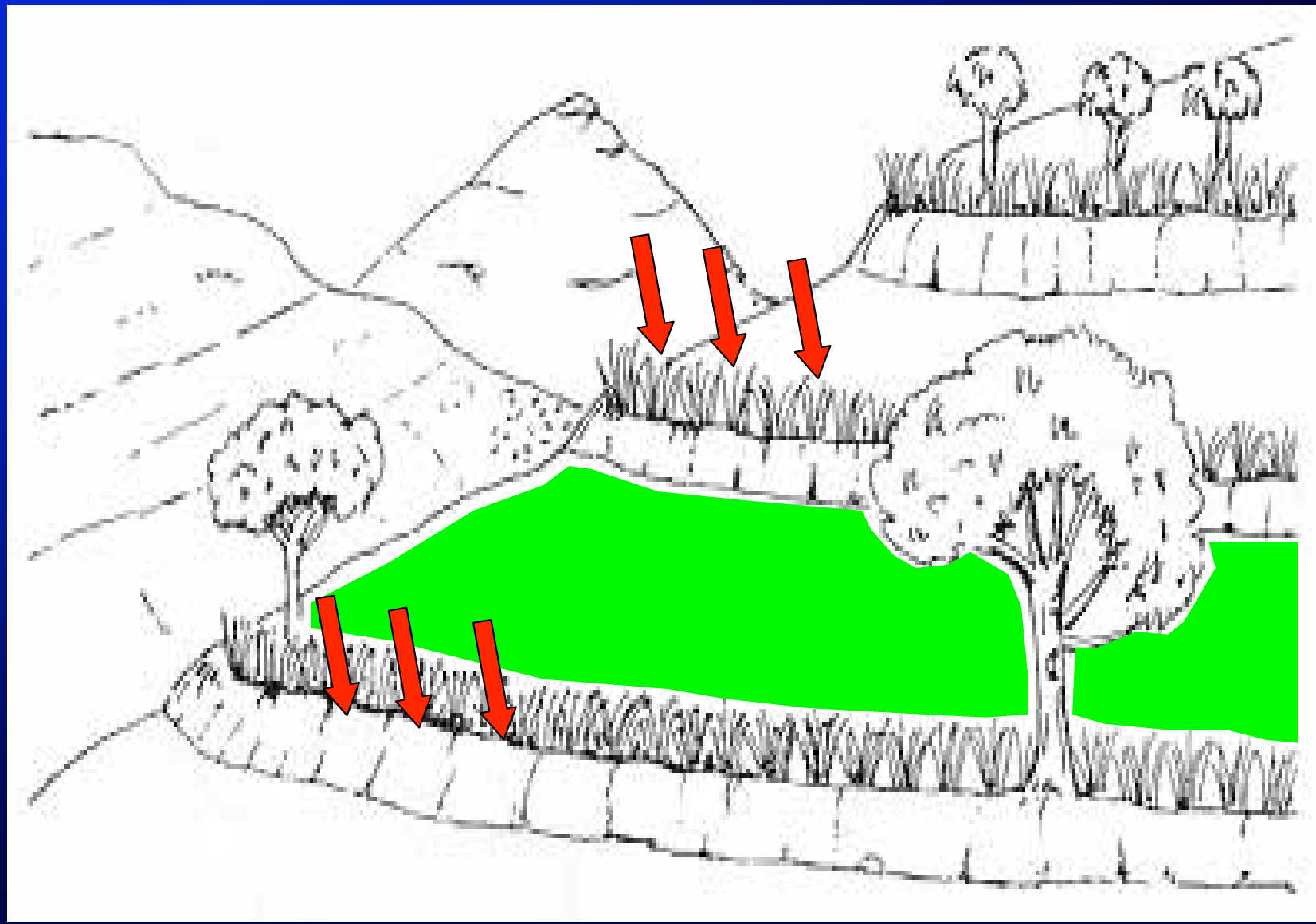
- for stem borer control: farmer has to walk 10 km with 20 kg knapsack for 1ha.

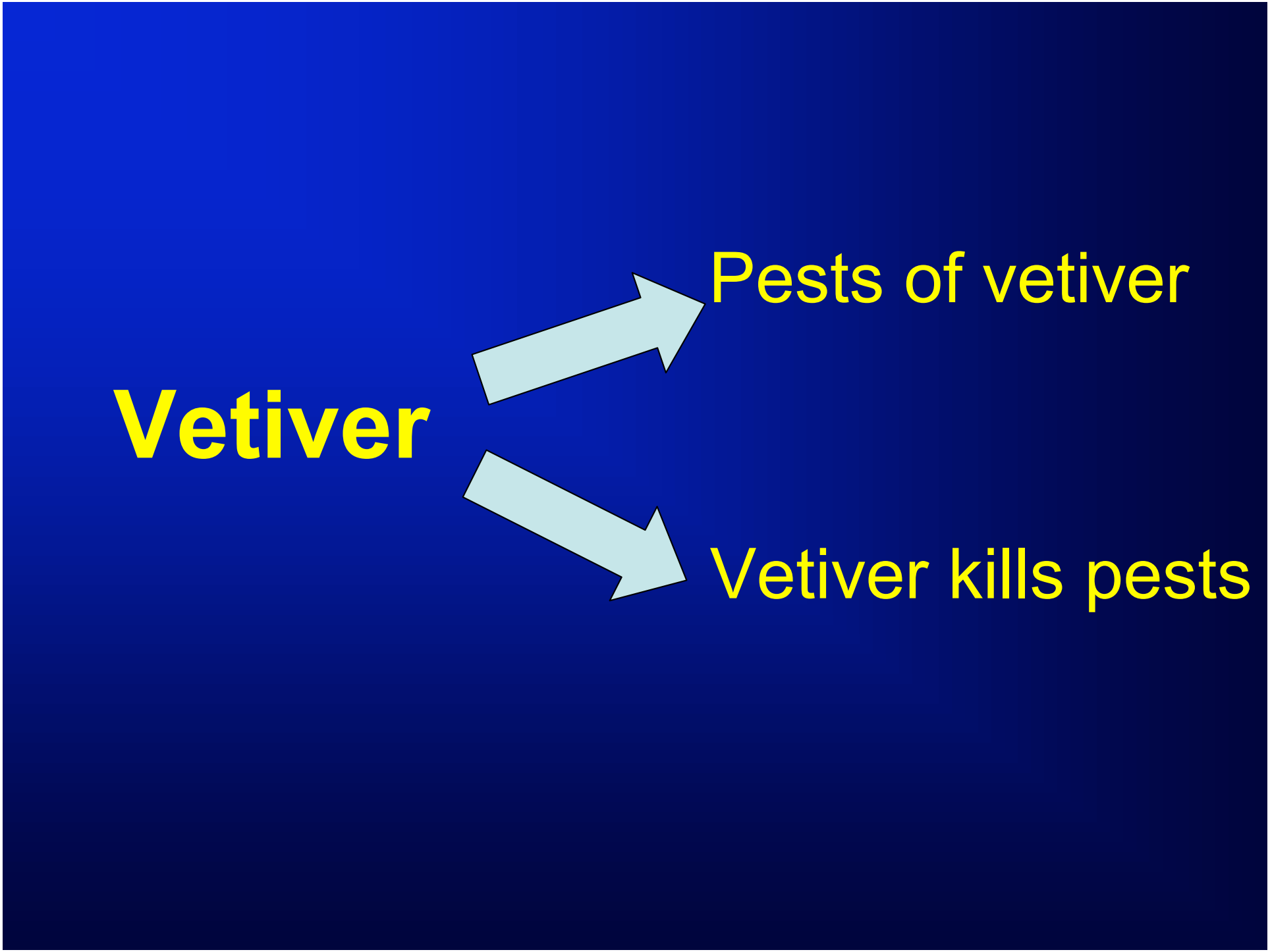
- farmer has to carry 300 l (kg) of water to the field for each hectare

Aims of presentation:

- to show how Vetiver can help people
- role of Vetiver grass technology (VT) in pest management

Malawi: soil erosion management



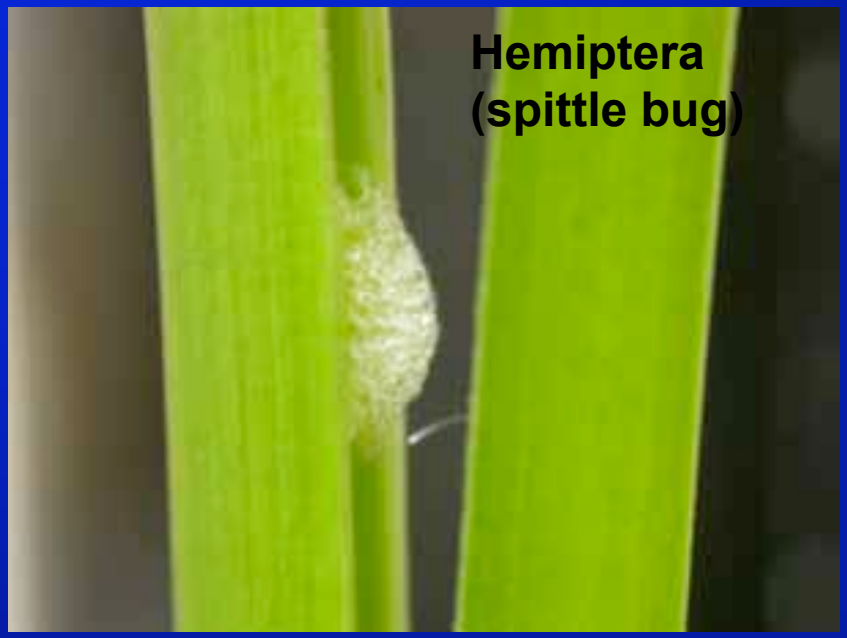

Vetiver
Pests of vetiver
Vetiver kills pests

Insect pests of vetiver

Hemiptera sucking bug damage (Venezuela)


Dead heart
Worm hole


Mussel scale


Hemiptera
(spittle bug)


Hemiptera
(sucking bug)


Homoptera
(sucking bug)

Insect pests of crops

Vetiver helps people

Stem borer in sorghum

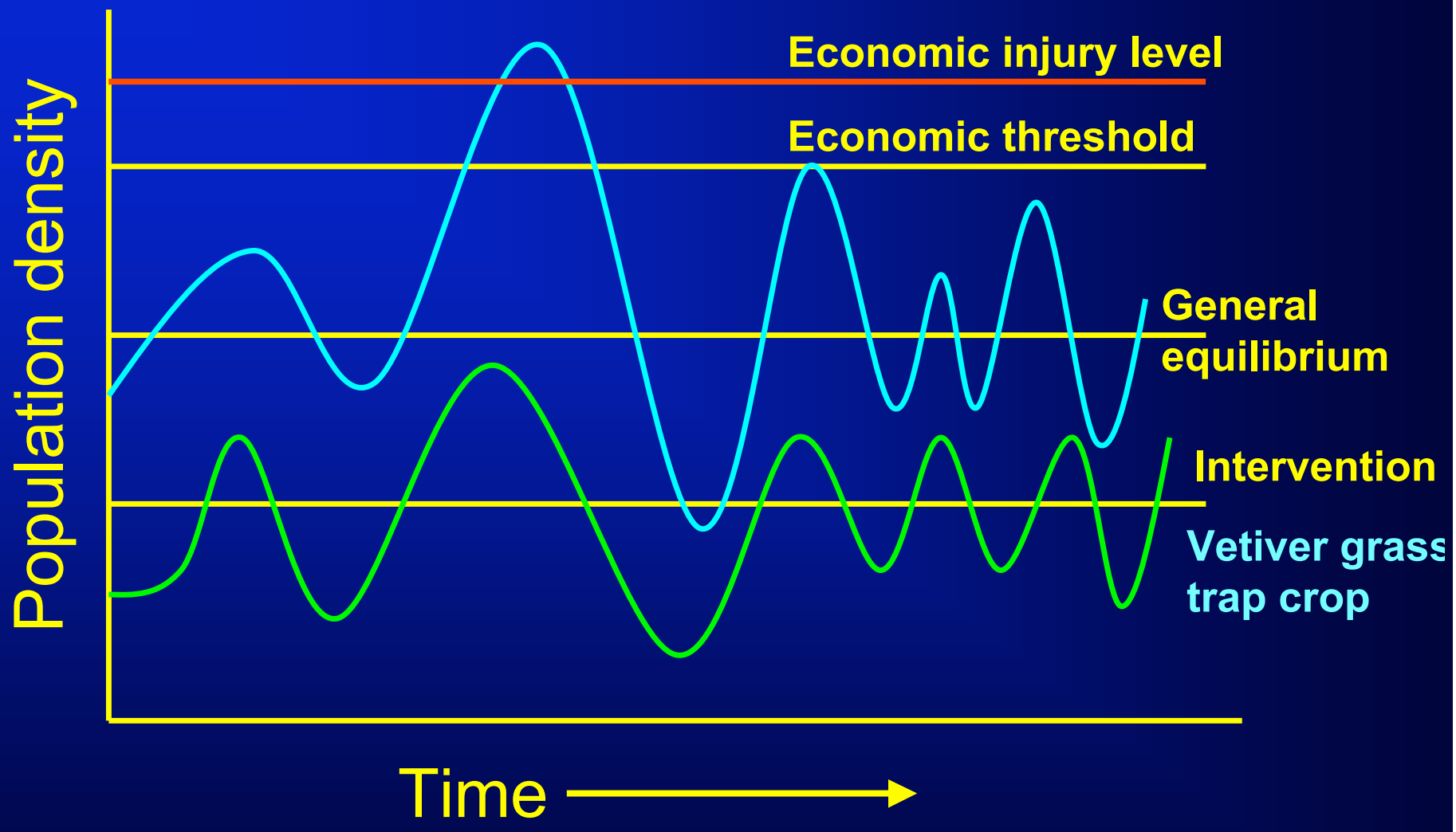
Damage to maize

What is Integrated Pest Management (IPM) ?

A system that uses:

- all suitable techniques
- in a compatible manner
- to suppress pest populations

Aim of IPM


Economic injury level
Economic threshold
General equilibrium
Intervention
Vetiver grass trap crop
Population density
Time

1. Stem borers of maize

Life cycle of stem borers

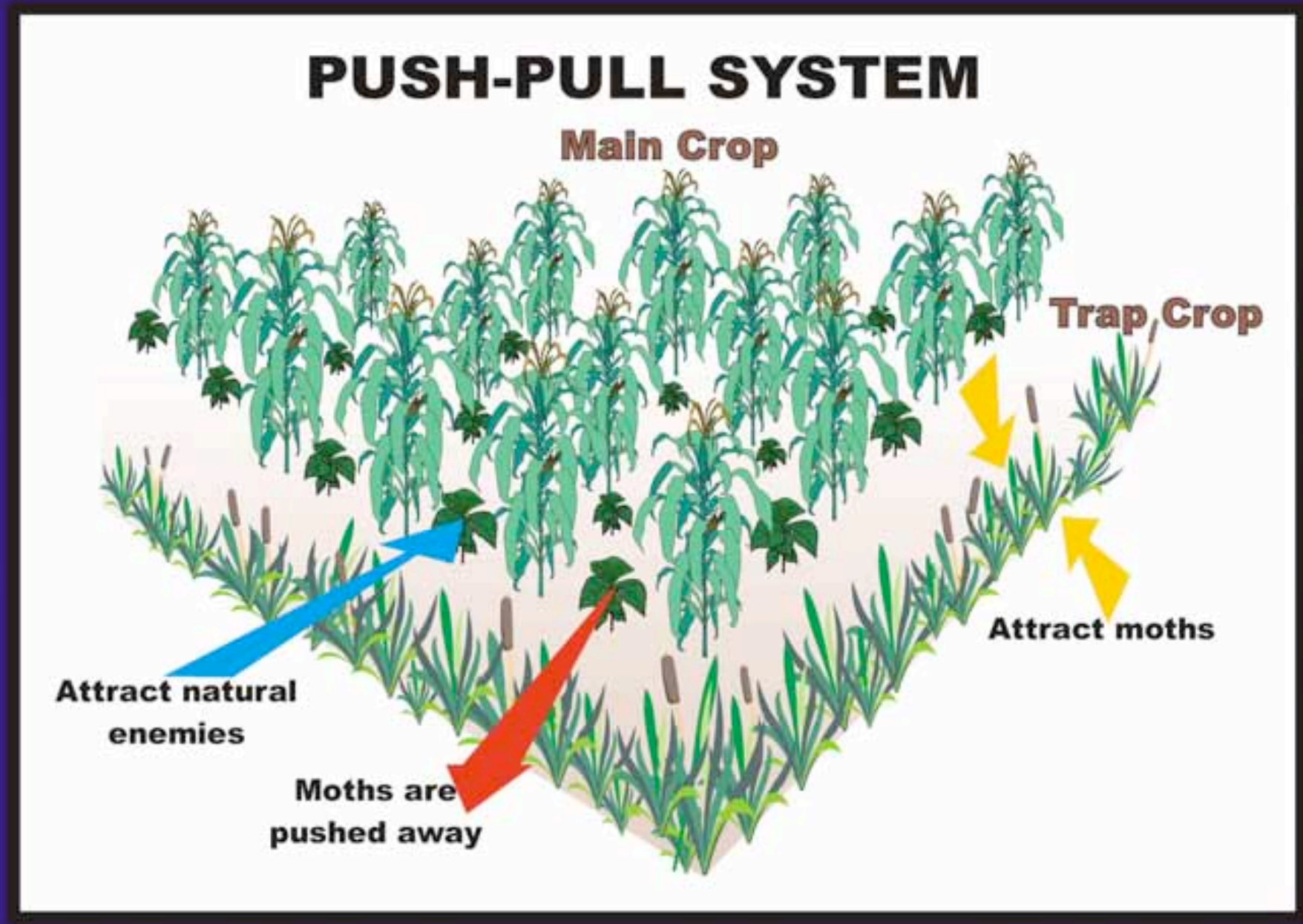
Moth

Eggs

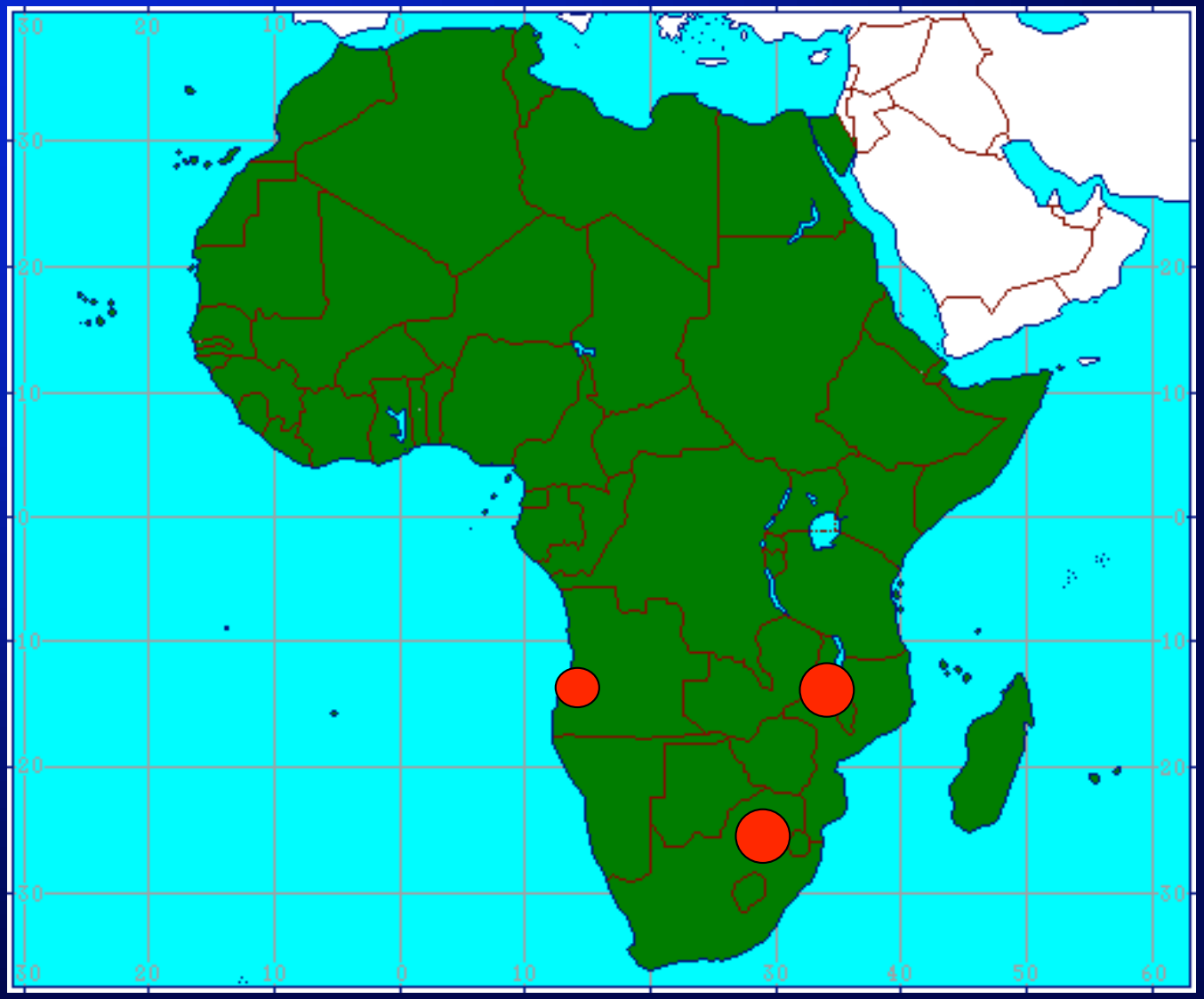
Larvae

Pupae

Habitat management system



Vetiver as biotrap in Africa

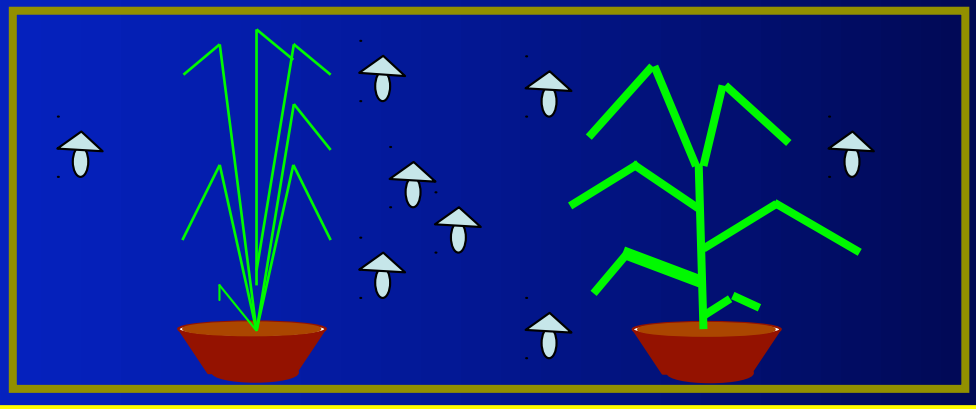


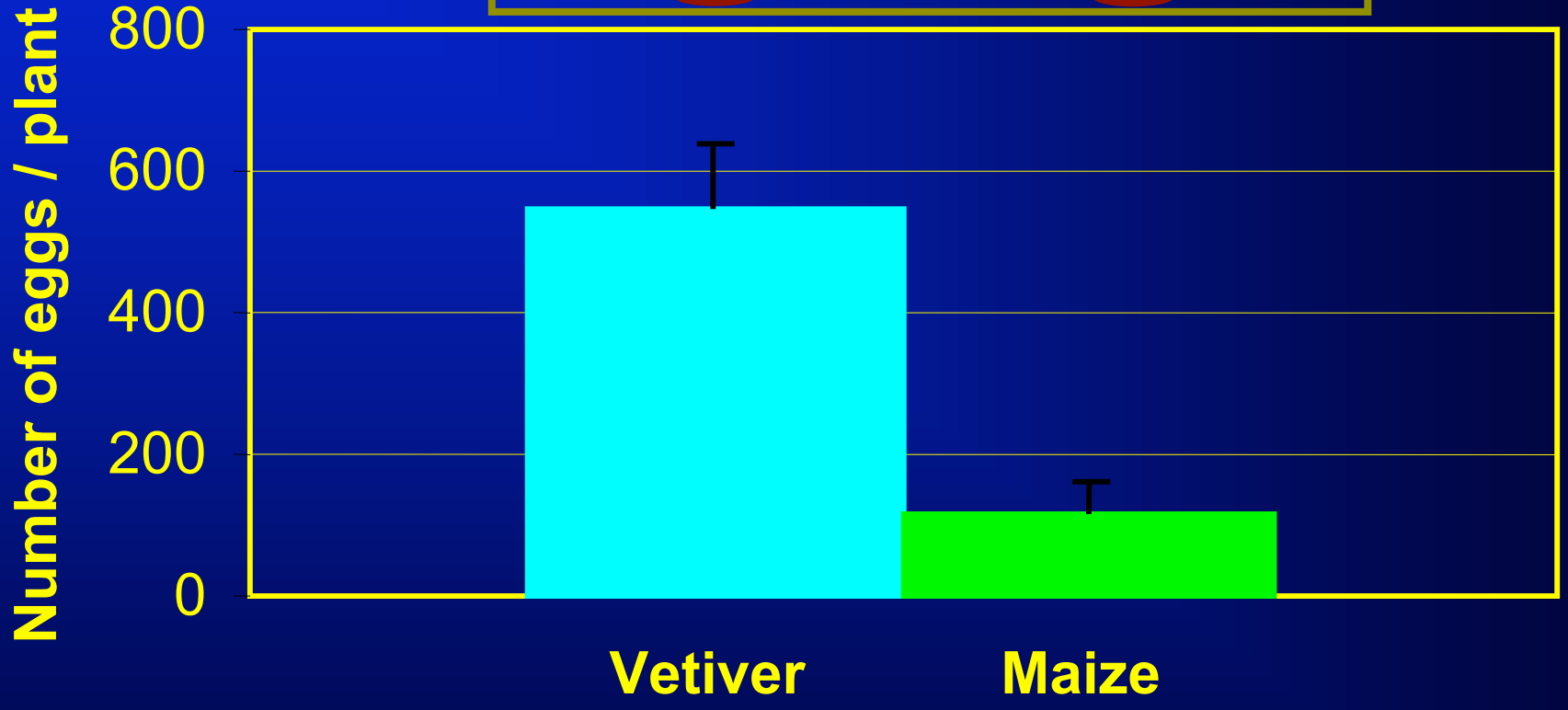

Soil erosion & trap crop

AIMS:

- To evaluate vetiver as trap crop in laboratory and under fields conditions.

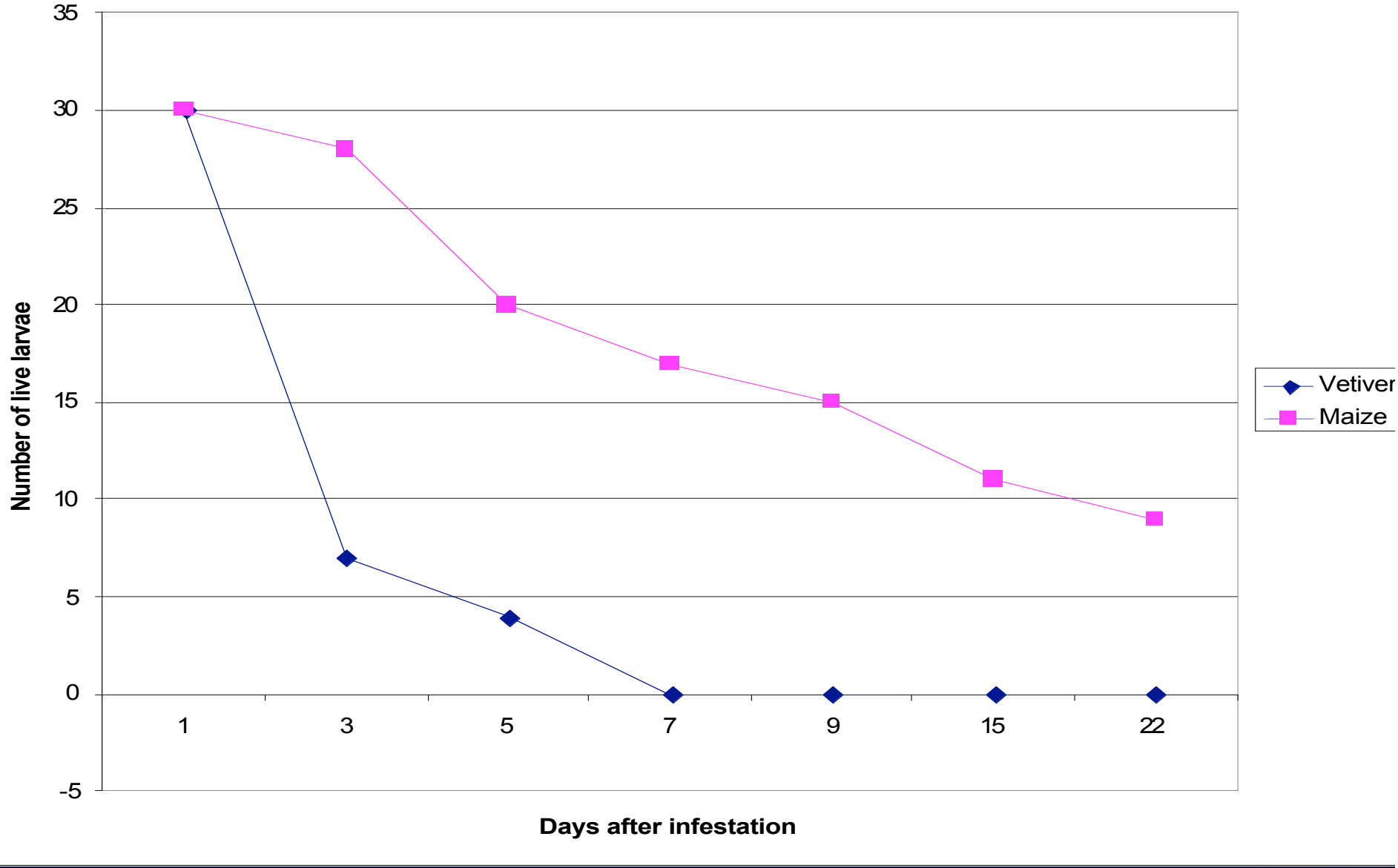
Two-choice tests





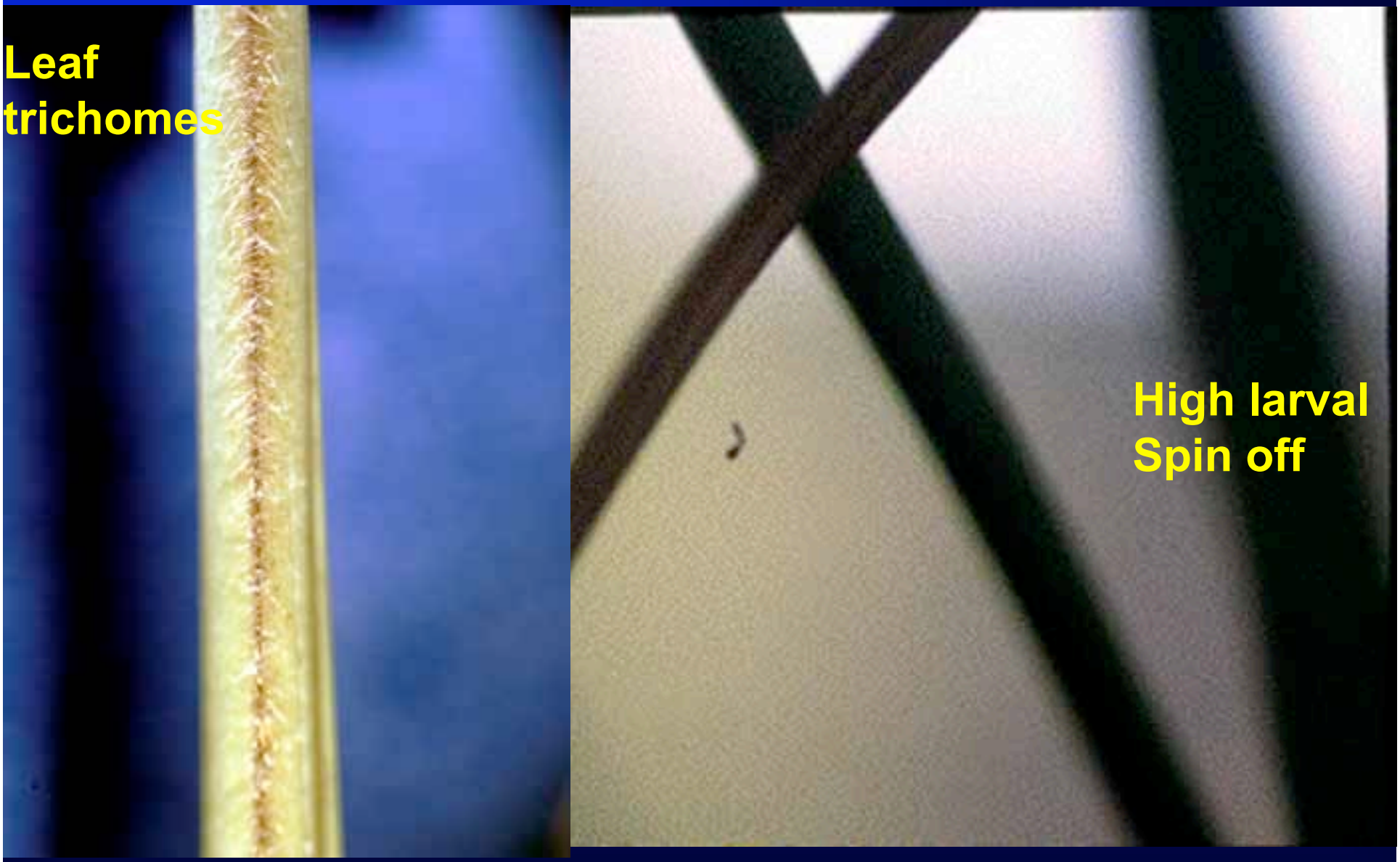
Number of eggs per plant laid by *Chilo* moths in 2-choice tests in cages

2. Larval survival



Larvl numbers on vetiver and maize over time

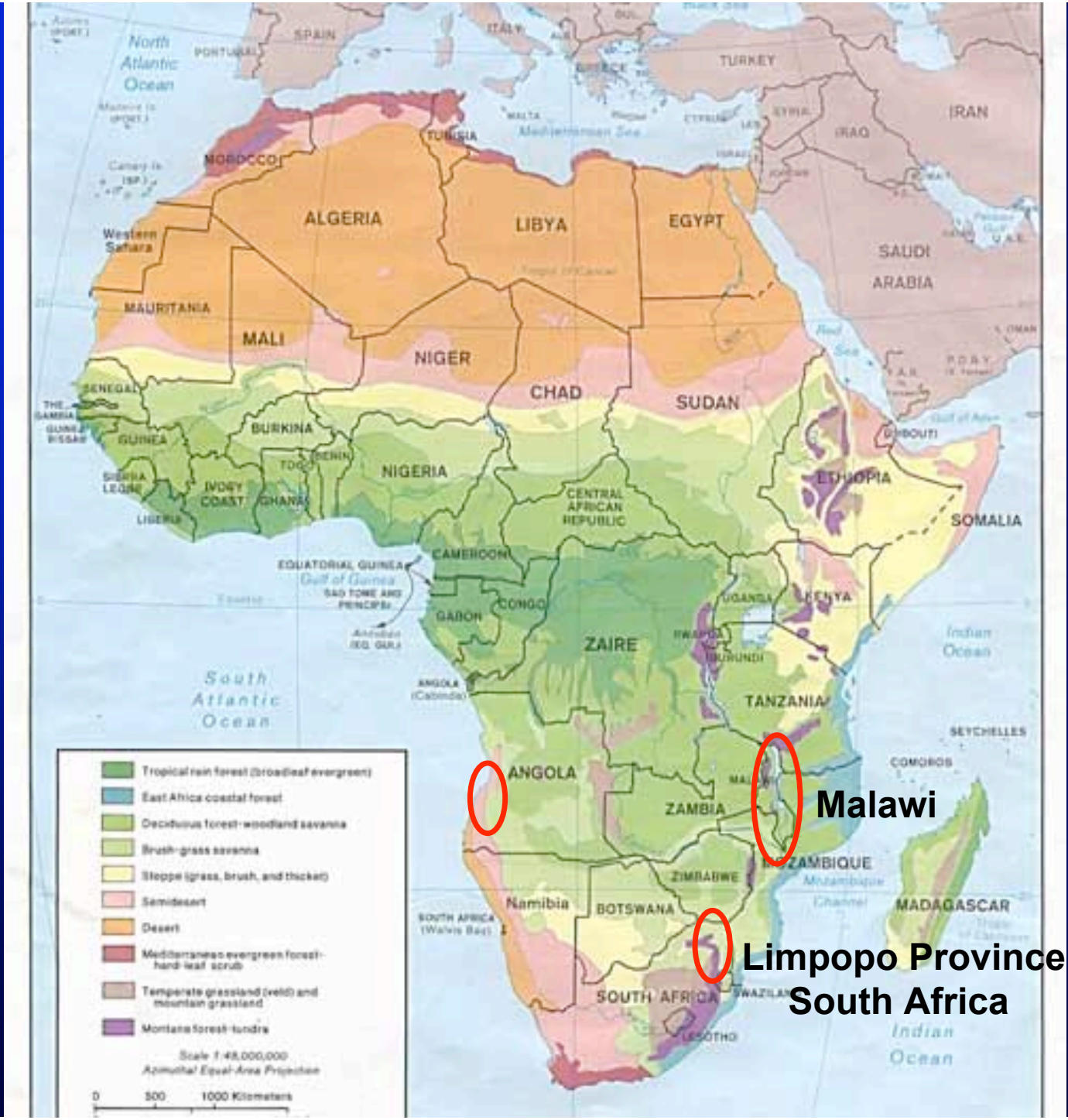
Mortality factors reducing larval survival



3. Field studies

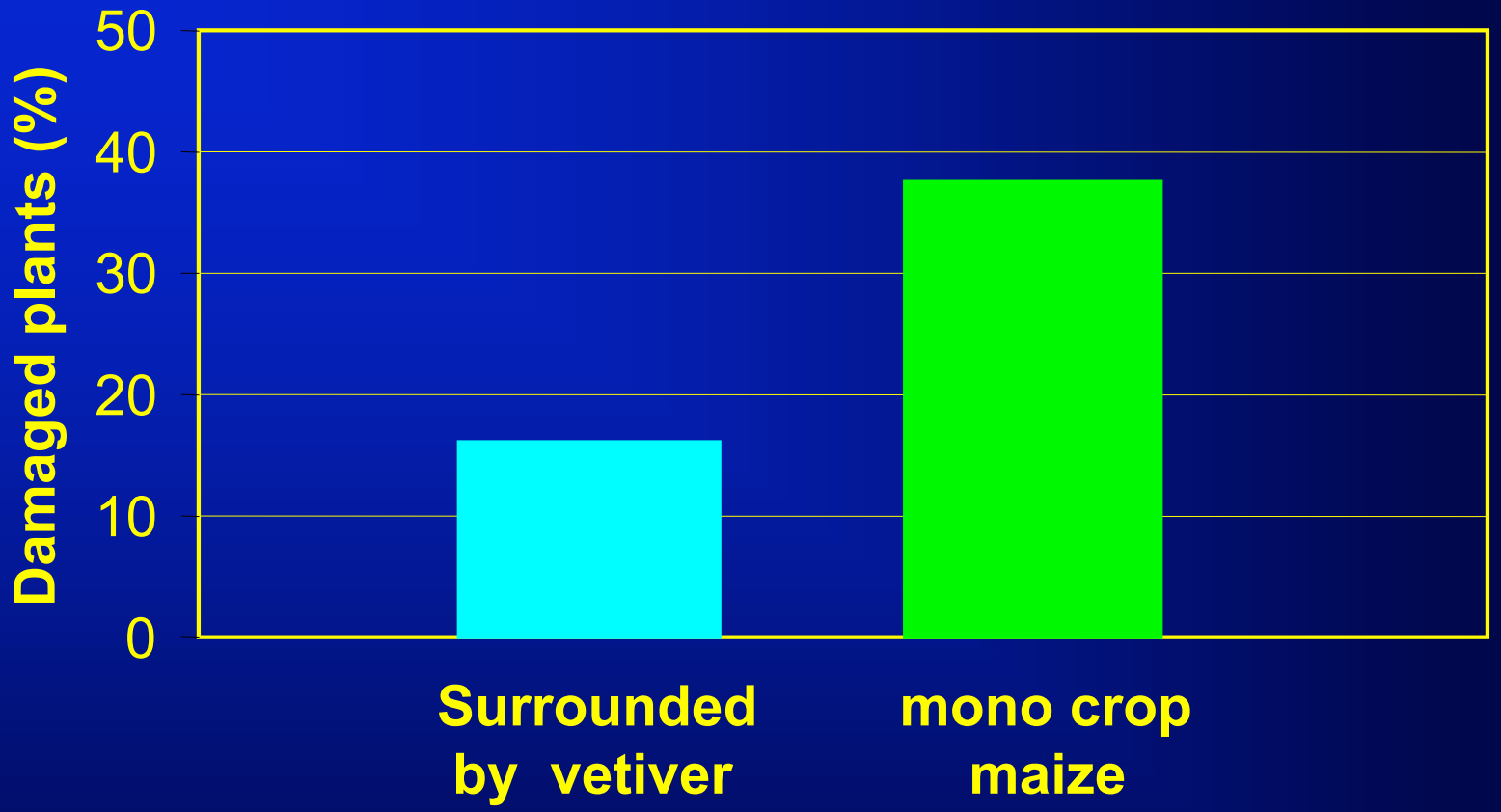
South Africa & Malawi

- Napier grass, vetiver, maize monocrop
- vetiver and maize monocrop


Malawi
Limpopo Province
South Africa
North Atlantic Ocean
South Atlantic Ocean
Indian Ocean
Mediterranean Sea
Gulf of Guinea
Mozambique Channel
SPAIN
PORTUGAL
ITALY
GREECE
TURKEY
IRAN
IRAQ
SYRIA
CYPRUS
LEBANON
ISRAEL
JORDAN
EGYPT
LIBYA
TUNISIA
MOROCCO
ALGERIA
Western Sahara
MAURITANIA
MALI
NIGER
CHAD
SUDAN
SAUDI ARABIA
U.A.E.
OMAN
YEMEN
DJIBOUTI
ETHIOPIA
SOMALIA
SENEGAL
THE GAMBIA
GUINEA-BISSAU
GUINEA
BURKINA
TOGO
BENIN
NIGERIA
SIERRA LEONE
LIBERIA
IVORY COAST
GHANA
CENTRAL AFRICAN REPUBLIC
CAMEROON
EQUATORIAL GUINEA
SAO TOME AND PRINCIPE
GABON
CONGO
ZAIRE
UGANDA
KENYA
RWANDA
BURUNDI
ANGOLA (Cabinda)
TANZANIA
SEYCHELLES
COMOROS
ANGOLA
ZAMBIA
MALAWI
MOZAMBIQUE
ZIMBABWE
Namibia
BOTSWANA
SOUTH AFRICA (Walvis Bay)
MADAGASCAR
SWAZILAND
LESOTHO
SOUTH AFRICA
Tropical rain forest (broadleaf evergreen)
East Africa coastal forest
Deciduous forest-woodland savanna
Brush-grass savanna
Steppe (grass, brush, and thicket)
Semidesert
Desert
Mediterranean evergreen forest-hard-leaf scrub
Temperate grassland (veld) and mountain grassland
Montane forest-tundra
Scale 1:48,000,000
Azimuthal Equal-Area Projection
0
500
1000 Kilometers

Limpopo Province – South Africa

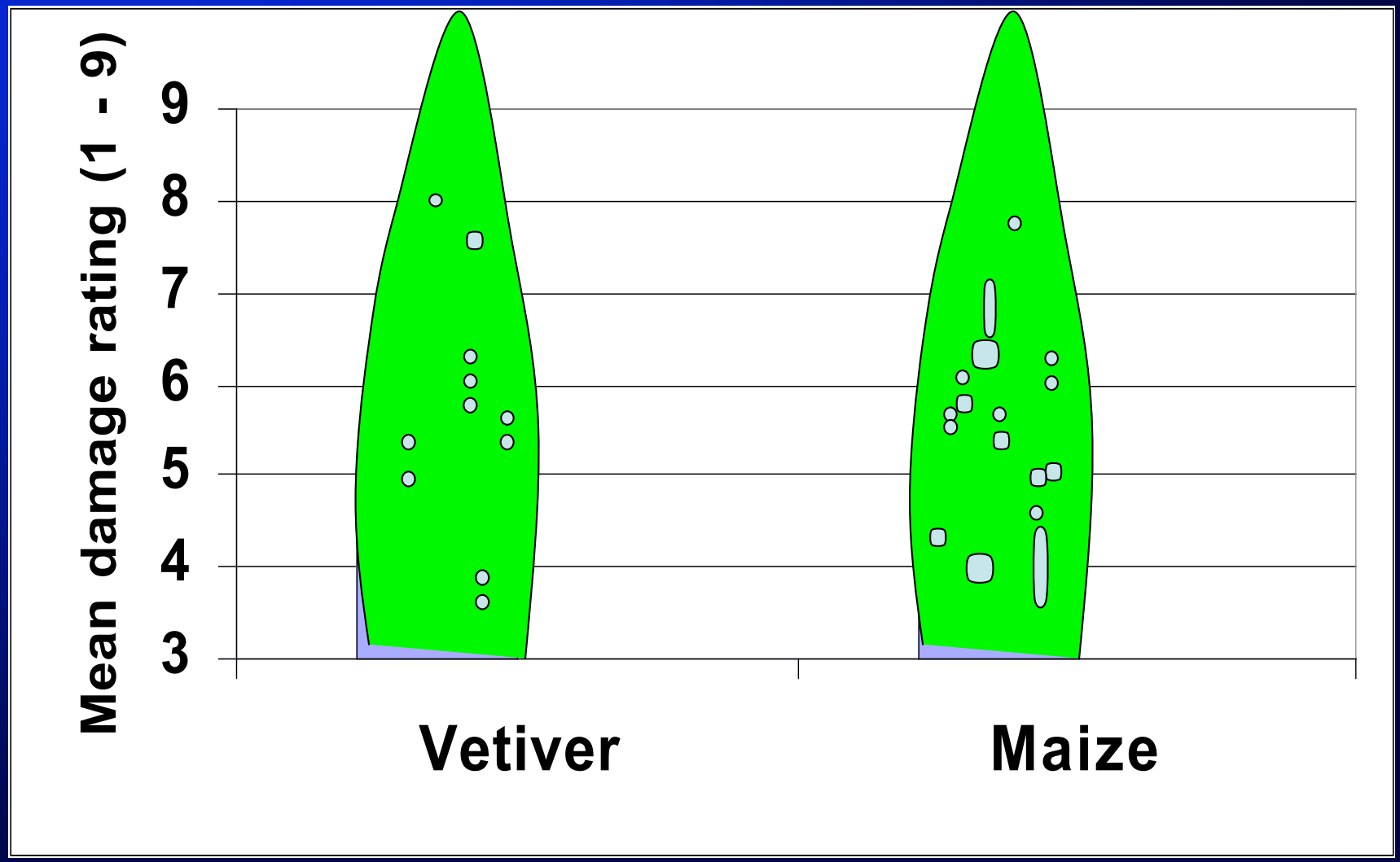
Field experiment (20 x 20 m blocks of maize)

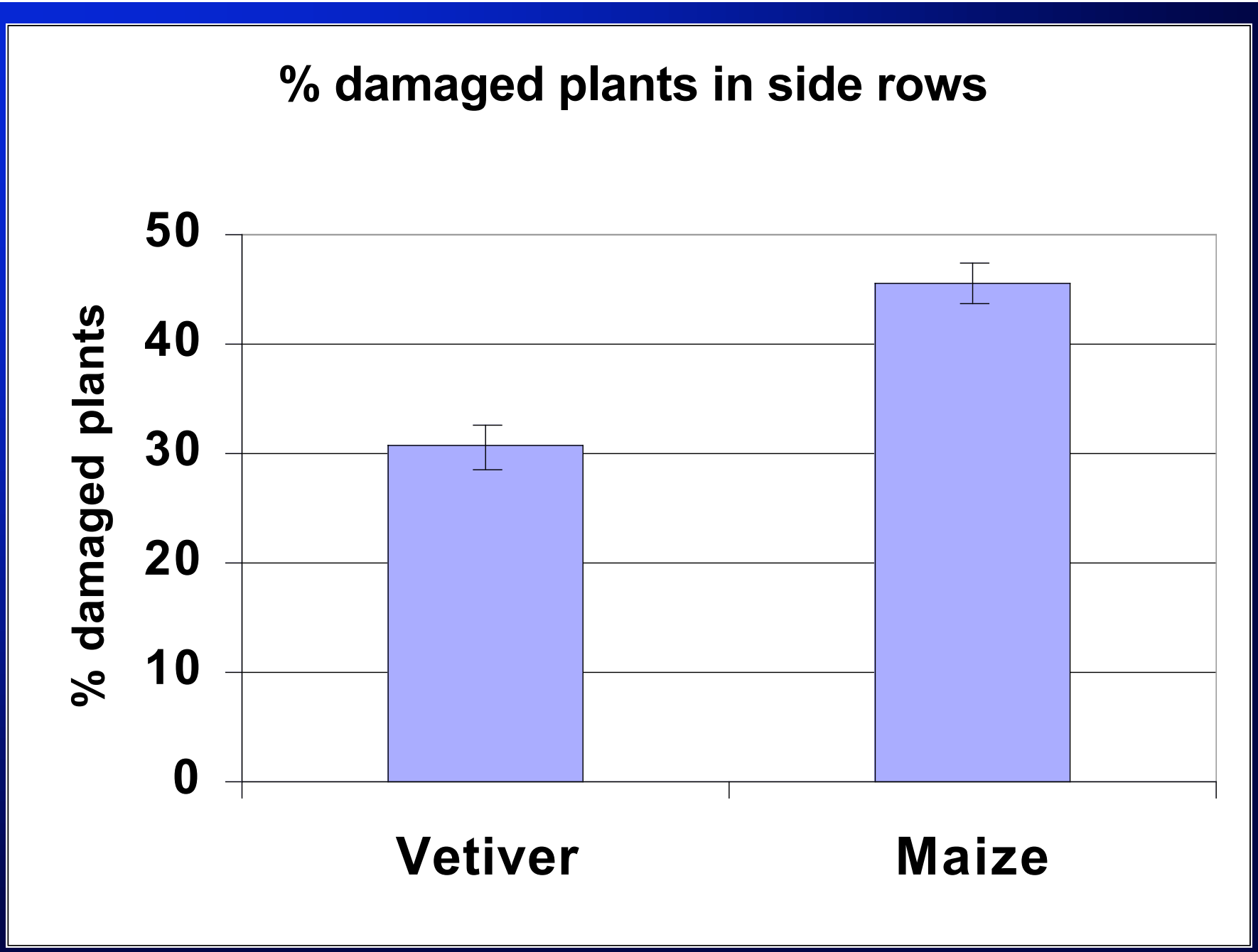


Damaged maize plants (%) in a block of maize surrounded by vetiver

Field experiment in Malawi (Oct 2005+2006)

Damage rating in maize




% damaged plants in side rows
% damaged plants
50
40
30
20
10
0
Vetiver
Maize

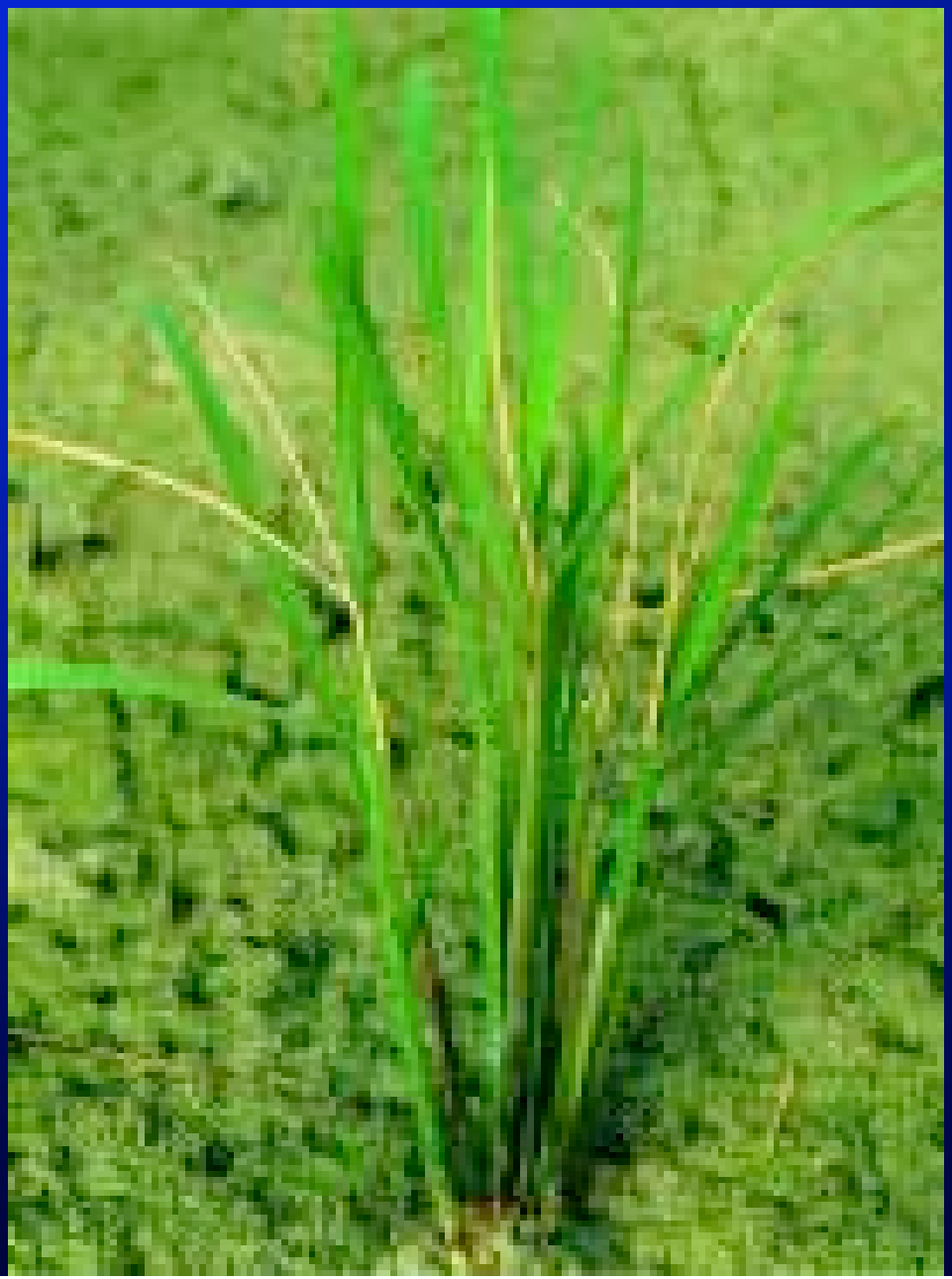
- **Vetiver grass can be a trap crop for *Chilo partellus***
- **More field evaluations needed**

Propose project:
Phillipines
Vietnam
Malawi

Integrated pest management

Vetiver alone is not enough to control pests
It must form part of "crop health management" system

3. Rice stem borers



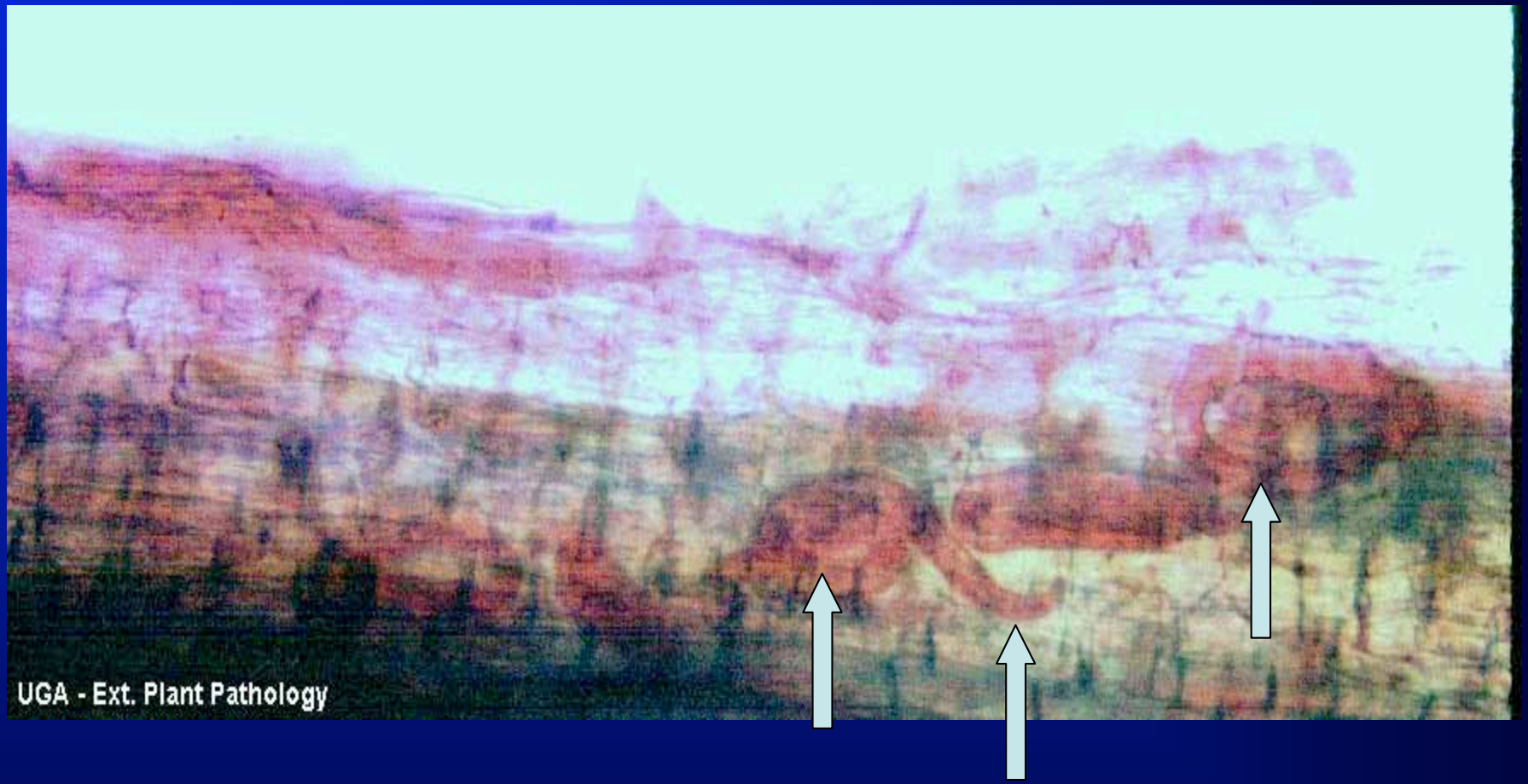
Vietnam
Phillipines
Malawi


White heads in rice

Pyralidae moths

Egg batches of rice stem borers (Pyralidae)

4. Nematodes



Nematodes inside roots


Food garden
Pumpkin
Cabbage
Carrots
Sweet potato
Spinach
Onion

Root knot nematode (*Meloidogyne*) damage

Table 1. *Meloidogyne incognita* race 2 numbers / 50g roots and RF-values on vetiver grass and vegetable crops

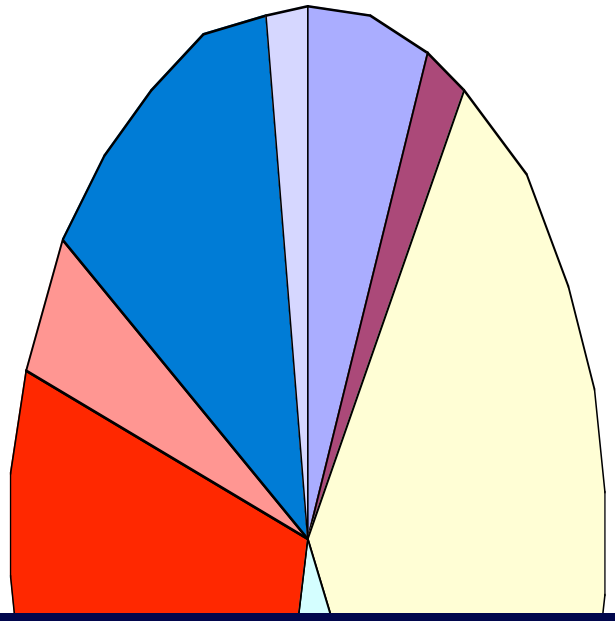
Crop	*M. incognita* numbers per 50 g roots	RF-values
Tomatoes (susceptible control)	266 733 a	93 a
Tobacco	155 867 b	55 b
Watermelon	112 750 bc	39 bc
Green pepper	49 554 c	17 c
Groundnut (resistant control)	141 d	0.05 d
Cotton	28 d	0.01 d
Vetiver	567 d	0.20 d

5. Arthropod diversity and beneficial insects

Natural enemies of pests

Number species per order

Natural enemies



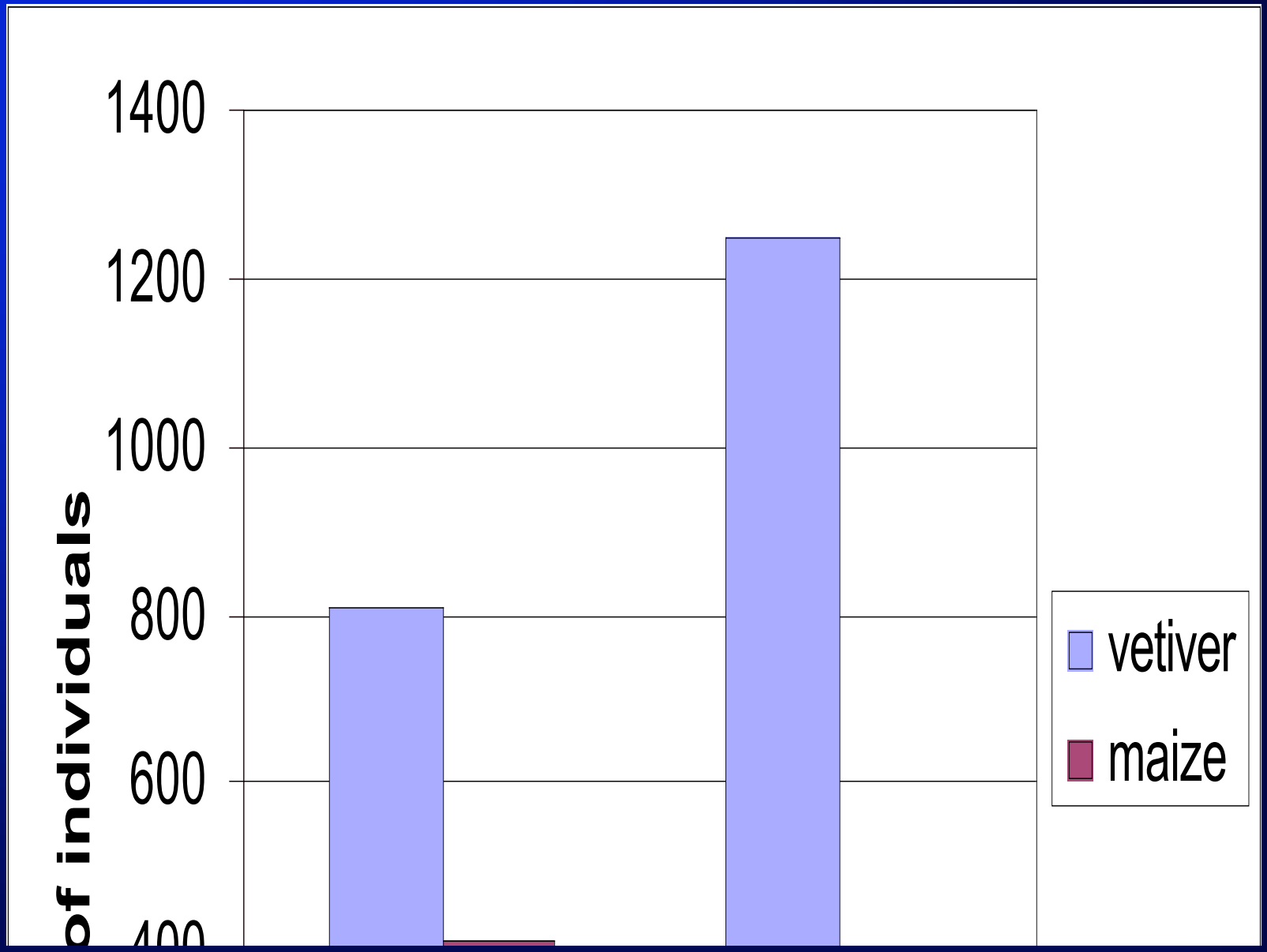
Lepidoptera

Orthoptera

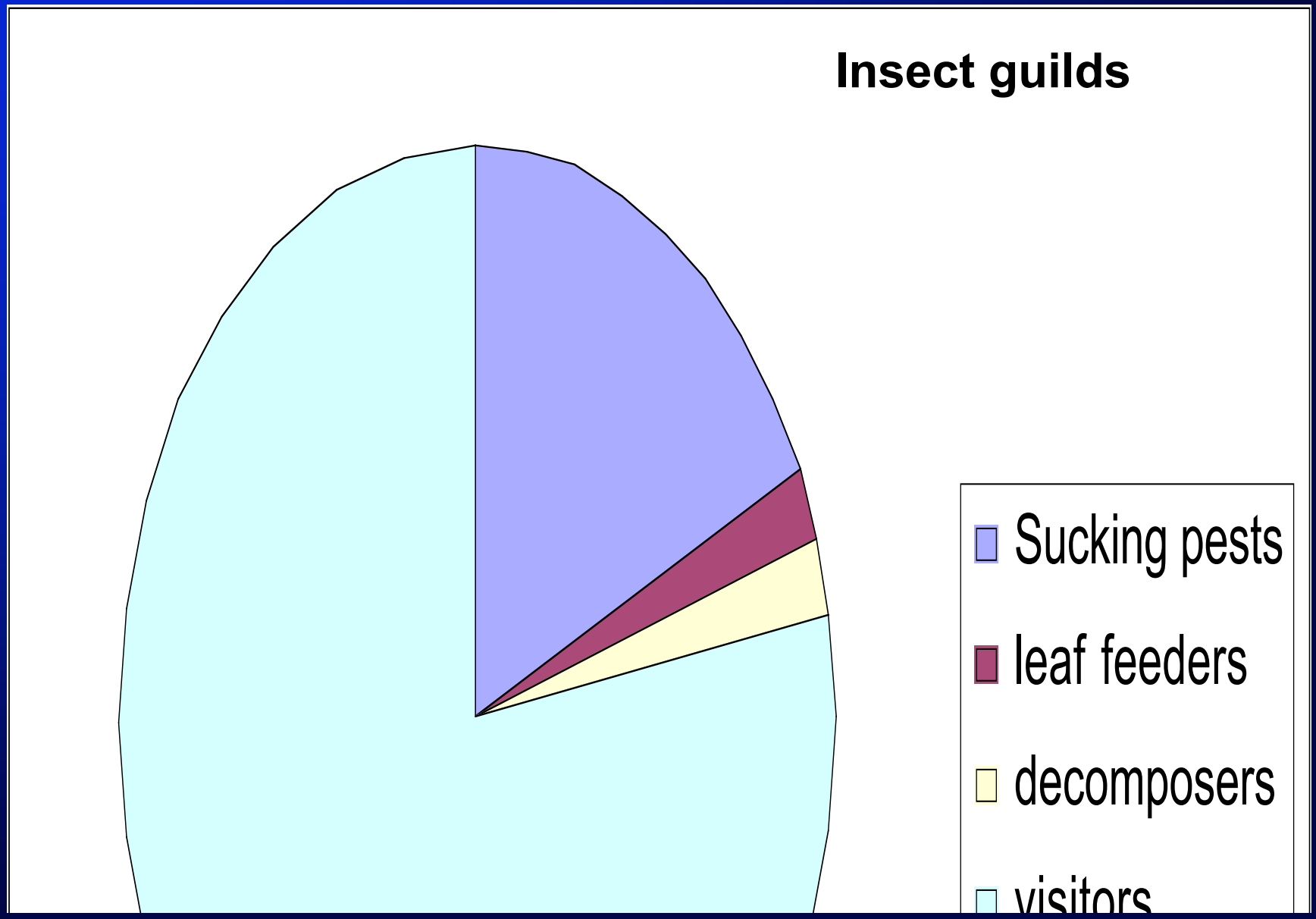
Diptera

Coleoptera

Hymenoptera



Abundance of arthropods per sample during a winter and summer sampling


Insect guilds
Sucking pests
leaf feeders
decomposers
visitors

Pine apple fields
In the eastern Cape

CONCLUSION

- Vetiver grass helps people

Thank you very much !!