Integrated pest management options to improve maize forage yield and quality for small-scale dairy farmers in central Kenya

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Project’s aims include...

- To assess effects of
  - maize streak virus disease and weeding regimes on forage yield and quality
  - the animal on disease and weed transmission

- To quantify
  - Economic implications of diseases and weeding regimes on maize grain and forage.

- To promote
  - Sustainable IPM in maize forage smallholder dairying in the central Kenyan highlands.
This paper...

- Importance of maize as forage for smallholders
- Impact of weeds and diseases on forage yield and quality
  - Farmers’ perceptions
  - Experimental studies
- Integrated control

Maize research in Kenya should not ignore maize forage.
Kenyan dairy herd density.

From, Omore et al. 1999, Smallholder Dairy Project RRA
In Kiambu District ...

- Dairy livestock ownership is a crucial element in poverty alleviation for many in Kiambu (population 744010).
- 48% of 189709 households stall feed dairy cattle.
Annual usage scores for forages in Kiambu in 2001 (Project RRA)

- Maize Thinnings: 6%
- Napier: 40%
- Green stover: 10%
- Grass: 15%
- Hay: 3%
- Banana stems: 4%
- Other: 8%
- Dry stover: 8%
- Weeds from maize crop: 5%
- Other weeds: 1%
Forage supplies in Kiambu

- Napier grass is the main forage contributing 40% of feed supplies
- The maize crop itself (thinnings and stover) contributes 24% to feed supplies
- Weeds in the maize crop are 5%
- Forage is in short supply especially from January to March.

*Project's RRA (McLeod et al., 2001).*
Impact of weeds on stover yield
Farmers' perception: 0 = no effect; 5 = high impact

- Digitaria abyssinica
- Cyperus spp
- Tagetes minuta
- Other grass
- Commelina spp
- Chenopodium spp
- Bidens pilosa
- Other
- Oxalis sinuatum
- Other
Impact of weeds on crude protein

W1: weed free   W2: unweeded
W3: herbicide   W4: handweeded
Impact of weeds on digestible dry matter

W1: weed free  W2: unweeded  W3: herbicide  W4: handweeded

Digestible DM, t/ha

Stover  Thinnings  Weeds  Forage

W1  W2  W3  W4
Digestible dry matter and crude protein (%) of some edible weeds
Impacts of pests and diseases on stover yield

Farmers' perception: 0 = no effect; 5 = high impact

- MSV
- Stem borer
- Cut-worm
- Blight
- Aphids
- Weevils/gr. b...
- Smuts
- Other
- Leaf spot
- Local names

Graph showing the perceived impacts of various pests and diseases on stover yield.
Maize streak virus disease was ranked as the most serious in effect on yields and the most difficult to control.
Infecting young maize plants with maize streak virus disease

Vials contain leaf hoppers fed previously on infected plants
Effect of level and time of maize streak infection on thinnings yield

25 % Infection

100 % Infection

Time of infection after emergence (days)

Thinnings (DM t/ha)
Time of maize streak infection on thinnings yield of maize cultivars

![Graph showing the effect of infection time on thinnings yield for different maize cultivars.](image-url)
Conclusions

- Napier grass is the main forage but the maize crop (thinnings, stover and weeds) contributes 29% to forage
- Farmers in Kenya clearly perceive MSVD and weeds as major problems
- Resistant cultivars and weeding can alleviate effects
- Participatory research is continuing to add habitat management (push-pull) system for maize stalk borer control
Stakeholders & Collaborators
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"Views expressed are not necessarily those of DFID"

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