Seasonality of parasites and effectiveness of anti-parasitic treatments in village chicken in Mbeere District, Kenya

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Introduction

- Poultry production is a growing and an economically important industry in Kenya.
- It contributes to the livelihood of approximately 21million people.
- Due to shortage of land for agriculture many people in rural areas have opted for poultry production.
- Poultry population is approx. 32 million birds (Kenya Bureau of Standards):
  - 6 million (19%) are commercial hybrids
  - 26 million (81%) are indigenous

Introduction cont....

Major challenges in poultry production:

- Diseases(e.g. helminthosis, Newcastle and Gumboro)
- Poor management
- Poor nutrition
- Predation
- Theft

Endo and ectoparasites are common in village chickens because they scavenge and forage, picking up infective stages of parasites

Introduction cont…

- Effects of endo-parasites on birds include:
  - competition for nutrients,
  - sucking blood causing anaemia,
  - diarrhoea and/or obstruction of intestines.

- This leads to lowered productivity (reduction in weight gain, decreased egg production) and/or mortality.

- Ecto-parasites are important as blood suckers, vectors or aetiological agents of disease.

Introduction cont....

- Previous studies (Maina 2005 and Sabuni 2009) have established:
  - Prevalence and intensity of endo, ecto and hemoparasites among different age groups and sexes of birds, farm and market birds and ecological zones of origin.
  - Pathological lesions associated with the parasites.
- No studies done on:
  - Seasonality of parasite carriage and intensity.
  - Anti-parasitic treatments being used.
  - Effectiveness of the anti-parasitic treatments.

This study will address the identified gaps with the goal of improving the control of ecto and endoparasites in indigenous poultry .

Ecto and Endo Parasites

- Has been shown that most farmers do not deworm their chicken and are not aware of the existence of parasitism(Ndegwa et al 1998).

Endoparasites

- Commonly occurring helminths in chicken according to Permin and Hansen(1998) are:

Trematodes	
Prosthogonimus species	Bursa of fabricius,cloaca,rectum
Echinnostoma revolutum	Caecum,rectum

Nematodes	
Name	Location(Predilection site)
Oxyspirura mansomi	Eye
Syngamus Trachea	Trachea and lungs
Gongylonema ingluvicola	Oesophagus, crop
Dispharnyx nasuta	Oesophagus, proventriculus
Tetramere species	Proventriculus
Acuaria humulosa	Gizzard
Ascaridia galli	Small intestine, occasionary oviduct
Capillaria species	Entire intestinal tracts
Heterakis species	Caeca
Allodapa suctoria	Caeca
Cestodes	
Raillietina species	Small intestine
Davaenea proglottina	Small intestine
Choanotaenia species	Small intestine
Hymenolepis species	Small intestine

Ectoparasites

Parasite	Predilection site
Fowl tick*: Argas persicus*	Skin
Mites*:Dermanyssus gallinae,* *Ornithonyssus sylvarium, O. bursa* *Cnemidocoptes mutans*	Skin Under the skin on legs,occasionary on combs and wattles
Flea*: Echidnophaga gallinacea*	Head
Lice*: Menacathus stramineus* *Menopon gallinae* *Cuclotogaster heterographus*	Skin Body feathers shaft Head. Can also be found on the neck, other body parts

Haemoparasites

Protozoa	Rickettsia	Parts of the body affected
Leucocytozoon species: *L. caulleryi, L. sabrazes*i		Leucocytes
Plasmodium species: *P. gallinaceum*		Erythrocytes
Haemoproteus species		Erythrocytes
	*Aegyptinell*a species: *A. pullorum, A. mushkovskii*	Erythrocytes
	Eperythrozoon species	Erythrocytes
	*Haemobartonell*a species	Erythrocytes

Antiparasitic treatments

- **Different anthelmintics that are commonly used**

Trade name of drug	Active compound	Preparations	Parasite they act on
Ascarex Piperax	Piperazine citrate	Powder	Roundworms
Levazan Levaside Polystrongle	Levamisole	Liquid	Roundworms

OBJECTIVES AND HYPOTHESIS

Overall objective

To determine seasonality of parasite carriage and intensity of infections in village chicken, types and methods of anti-parasitic treatments and effectiveness of selected anthelmintics

Specific objectives

1. To collect baseline data on local treatments used against parasites in Mbeere District
2. To establish the seasonality of parasite types and intensity in the village chicken.
3. To determine the effectiveness of selected anthelmintics used on village chicken.

Hypothesis

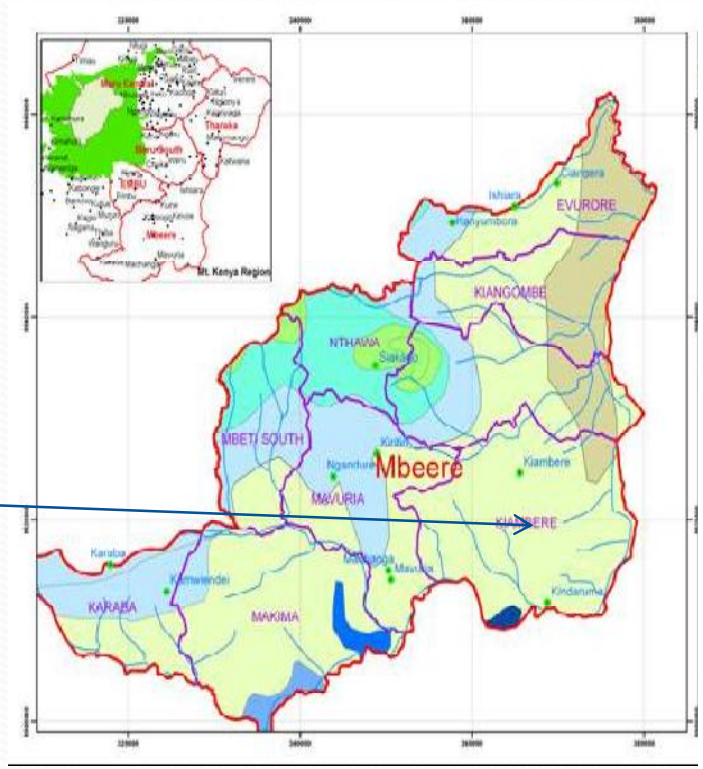
Parasite carriage and intensity of infections varies with seasons and there are effective anti-parasitic treatments used in village chicken in Mbeere District

MATERIALS AND METHODS

Study area

- The research will be conducted in Mbeere District, Eastern Province.
- Area has bimodal rainfall with long rains between March and June and short rains from October to December.
- Rainfall ranges between 500 and 1100 mm/year. Most parts of the district receive less than 550 mm rainfall.
- The temperature ranges between 20-30^{0}C.
- The area has a high population of indigenous chicken approximately 165,090 (KBS)


Turkana_North
LAKE TURKANA
CHALBI
MANDERA WEST
MANDERA EAST
Turkana_Central
Turkana_Central
MOYALE
WAJIR NORTH
MANDERA CENTRAL
Turkana_South
LAISAMIS
MARSABIT
WAJIR EAST
Pokot_North
SAMBURU NORTH
WAJIR WEST
Pokot_Central
KWANZA
West Pokot
SAMBURU CENTRAL
ISIOLO
MARAKWET
EAST POKOT
SAMBURU EAST
WAJIR SOUTH
TESO NORTH
TESO SOUTH
BARINGO NORTH
GARBATULLA
BARINGO CENTRAL
LUGARI
KEIYO
LAIKIPIA WEST
BUSIA
SAMIA
WARENG
IGEMBE
SIAYA
BUTERI
KOIBATEK
LAIKIPIA EAST
TIGANIA
GARISSA
LAGDERA
BONDO
NYANDO
NAKURU
KIRINYAGA
THARAKA
NYERI NORTH
LAKE VICTORIA
MOLO
KYUSO
SUBA
BURET
NAIVASHA
MBEERE
FAFI
BOMET
MIGORI
NAROK NORTH
LARI
MWINGI
YATTA
TRANS MARA
KANGUNDO
KURIA WEST
NAROK SOUTH
MACHAKOS
KITUI
IJARA
KAJIADO NORTH
MWALA
TANA RIVER
NZAUI
MAKUENI
KAJIADO CENTRAL
MUTOMO
LAMU
TANA DELTA
KIBWEZI
LOITOKTOK
MALINDI
TAVETA
TAITA
KILIFI
KALOLENI
KINANGO
MOMBASA
MSAMBWENI
KWALE


EVURORE
KIANGOMBE
NTHAWA
MBETI SOUTH
Mbeere
MWURIA
KIAMBERE
KARABA
MAKIMA

Cont....on materials and methods

Experimental birds

- The target population will include indigenous birds of all ages i.e. chicks<2 months, growers 2-8 months and adults >8months of any sex according to Magwisha *et al* 2002.
- Birds will be obtained from farmers by purposive sampling and each homestead should have at least 10 birds, managed entirely on free range system.
- A sample size of 100 birds will be used as determined by the method described by Martin *et al* (1987). $N = 4pq/L^2$.

  Where; N= sample size, p= prevalence (50%), q= 1-p and L= Limit of error on prevalence taken at 10%

  $= \frac{4 * 0.5 * 0.5}{0.1^2} = 100$

Study design

Cross sectional study will be conducted.

Collection of baseline data

- This will be done using structured questionnaire at the beginning of the study.

Establishment of the seasonality of parasite carriage and intensity

- This will be done in the wet season (October ï December 2011) and dry season (January to March 2012)
- Examination of the birdsôskin for ectoparasites will be carried out as described by Sabuni *et al*. (2010)
- Blood smears will be prepared and examined for haemoparasites (Sabuni *et a*l.2011)
- Examination for endo-parasites will be performed in accordance with the procedures described by Bermudez and Stewart-Brown 2003.

Continuation on study design

Effectiveness of anthelmintics on the village chicken

Experimental design

- Controlled study
- Two birds per homestead will be purchased to determine the initial worm burden.
- 30 village chicken from infected farms will be purchased and transported to Kabete campus.
- The village chicken will be randomly allocated into 3 equal groups (2 treated and 1 control), tagged and housed separately.

  Group 1:Ascarex (Piperazine citrate)-10 birds.

  Group 2:Levamisole-10 birds.

  Group 3:Control (No anthelmintic treatment)-10 birds.
- The anthelmintics will be administered orally as a single dose.
- Birds will be kept separately for 7 days and monitored daily for faecal egg count (MAFF1986) and sacrificed at the end for total worm and egg counts.

Data management

- Data will be entered into Excel spread sheet and analysed using Genstat^{R} Discovery for descriptive statistics .
- Cross tabulations to derive frequency of occurrence of parasite based on season and ages of birds will be performed.
- Chi square statistical method will be used to evaluate association between parasite type based on season and intensity in the different age groups of birds.
- Prevalence will be calculated according to Margolis *et al* 1982.
- Efficacies of anthelmintics will be calculated using the faecal egg count and worm burden in control and treated groups (WAAVP 2003).

Work plan

Activity	Nov	Dec	Jan	Feb	March	April	May	June	July
Field work and Data collection	X	X		X					
Literature review, data analysis and write up			X	X	X	X			
Submission of thesis							X	X	X

Budget

Item	Costs
Cost of deworners and insecticides	10,000
Cost of 200 birds@400 Kshs	30,000
Cost of petridishes,faecal pots,wing tags,slides,coverslips,scapel blade, gloves	30,000
Data cost analysis	15,000
Printing papers	3000
Photocopying costs	2000
Thesis printing and binding	4,000
Travelling costs,meals,commmunication,farmers allowances	48,000
Miscellaneous costs	10000
Total costs	210,000

THANKS