

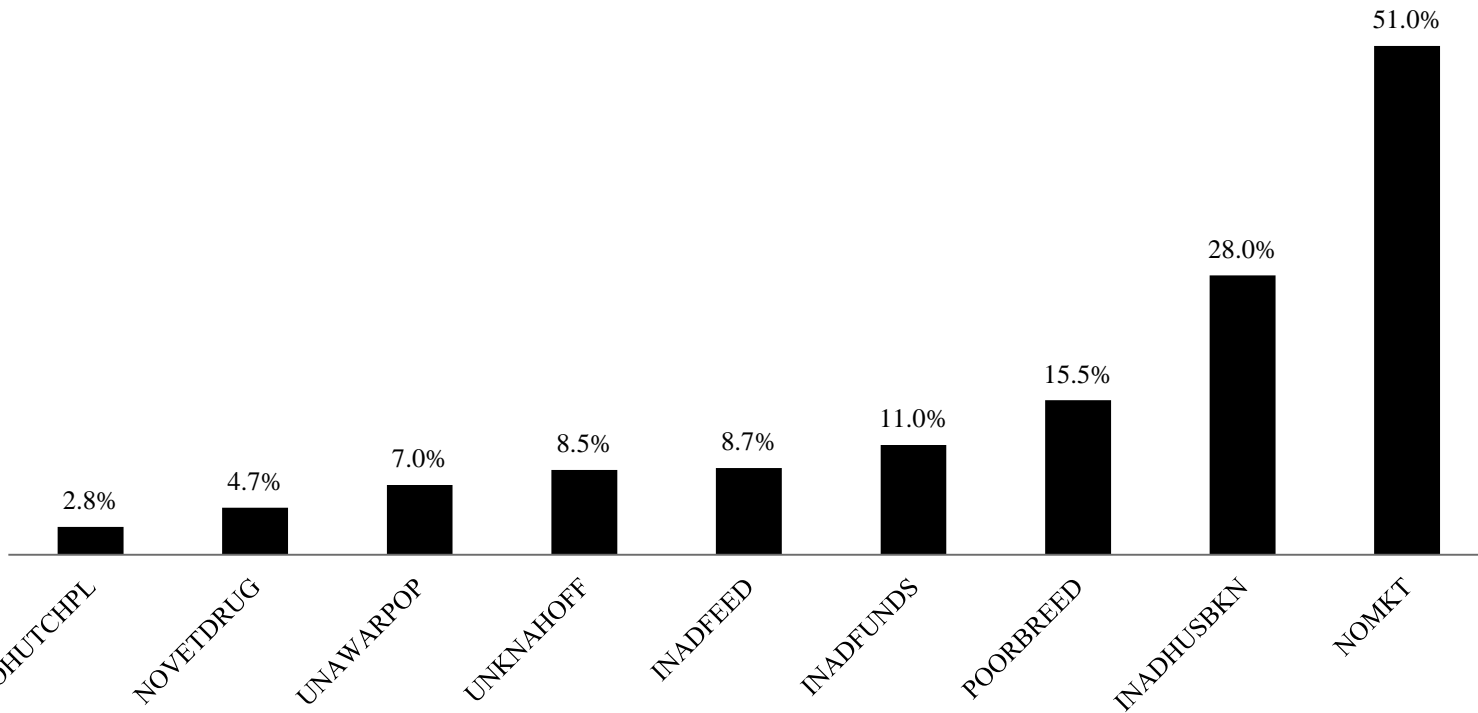
Prevalence and Predisposing factors to diseases of domestic rabbits In Kenya.

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1.0. Introduction

- The domestic rabbit compared with other livestock, is early maturing and high prolific . The meat is white, high in good quality protein content, low fat and caloric contents, contains a higher percent of minerals
- The potential for rabbit production in Kenya is high (**Borter and mwanza, 2011**) due to the rapid expansion and adoption of rabbit farming.
- However diseases of rabbit is a major challenge to rabbit farming in Kenya (Hungu *et al.* 2013; Serem *et al.* 2013).
- Systemic studies on the diseases of domestic are rare, scant (Aleri *et al.* 2012; Ngatia *et al.* 1988).

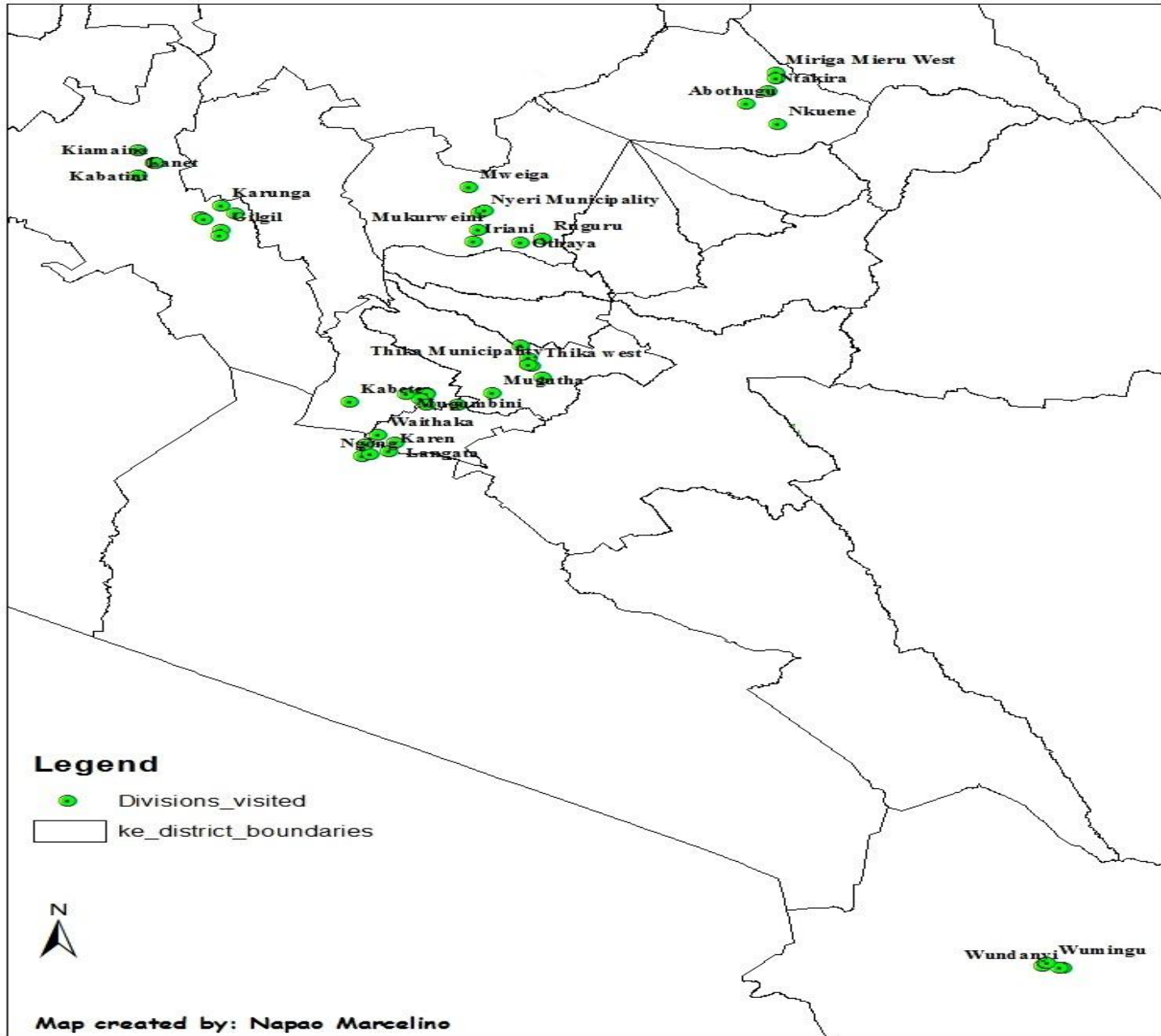


NOMKT=lack of market both for rabbits and rabbit meat. INADHUSBKN=insufficient knowledge on rabbit husbandry practices, POORBREED=poor breeding stocks, INADFUNDS=lack of funds to expand rabbit enterprises, INADFEED=In adequate commercial feeds in the market, UNKNAHOFF=Animal health officers are un knowledgeable of rabbit diseases and treatment, UNAWARPOP=the Kenyan population is un aware of the benefits of rabbit meat, NOVETDRUG=no veterinary drug specific for rabbits and NOHUTCHPL=lack of proper hutch plans (Serem, 2013)

Objectives

- i. To determine the etiology of rabbit diseases in domestic rabbits in the selected areas of Kenya
- ii. To determine the predisposing factors associated with rabbit diseases in the selected areas of Kenya

Study area



Materials and methods

- The study was carried out in sixty one randomly selected rabbit farms within six counties where domestic rabbit keeping is commonly practices in Kenya (Hungu *et al.* 2013; MOLD 2010; Serem *et al.* 2013).
- These areas included: Nairobi county and its surrounding areas , **Kiambu County (Thika town, Kabete and Kikuyu). Nyeri County, Meru County , Nakuru County (Nakuru town and Gilgil) and Taita - Taveta County**
- 80% of all the registered rabbit farms from each location were randomly selected from the list of rabbit keepers obtained from the livestock production offices in each area.

- **To determine the predisposing factors associated with rabbit diseases:**
Structured questionnaires were used to assess the farm husbandry practices, verified through direct observations.

Materials and methods

- **To determine the prevalence & etiology of rabbit diseases**

Clinical examination

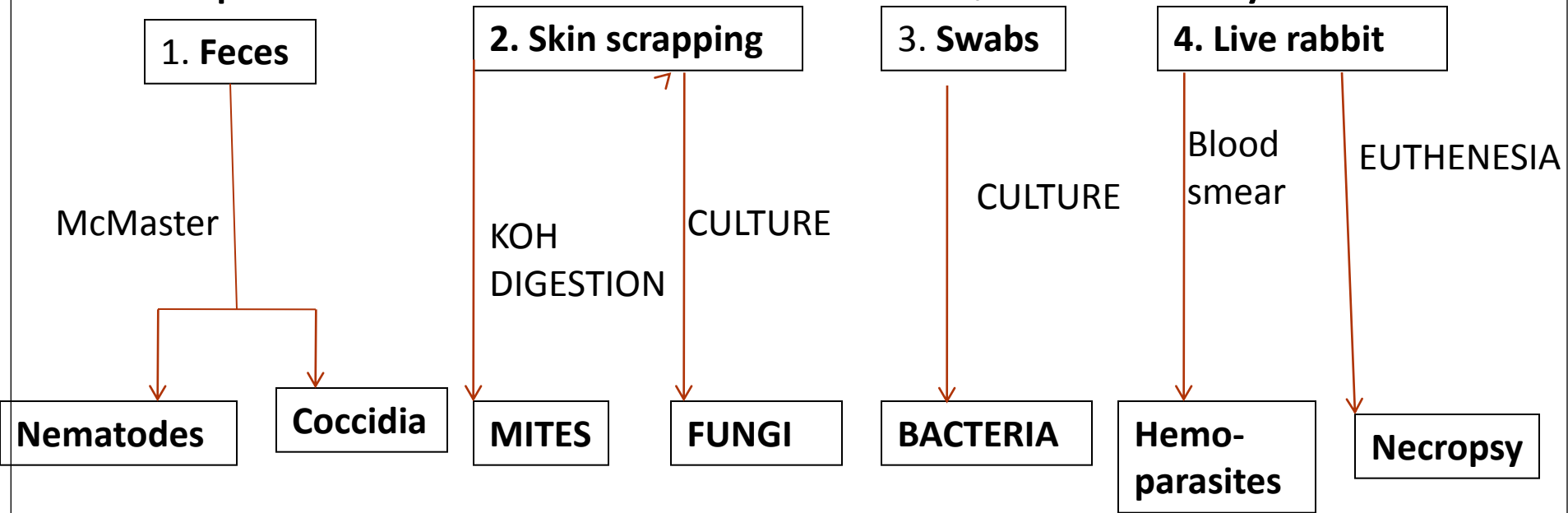
fecal samples

Collection of swabs (conjunctival) and abscess/wounds.

Collection of skin/ear scrapings

Collection of live rabbits

Samples collected from each farm \$ laboratory tests



County	Number of farms visited	Average number of rabbits/ farm ± SD
Nyeri	7	61.86 ± 49.83
Kiambu	17	59.24 ± 50.43
Nairobi	13	59.92 ± 43.79
Meru	6	48.00 ± 41.55
Nakuru	12	34.78 ± 26.36
Taita- Taveta	6	24.17 ± 13.50
Total	61	2680

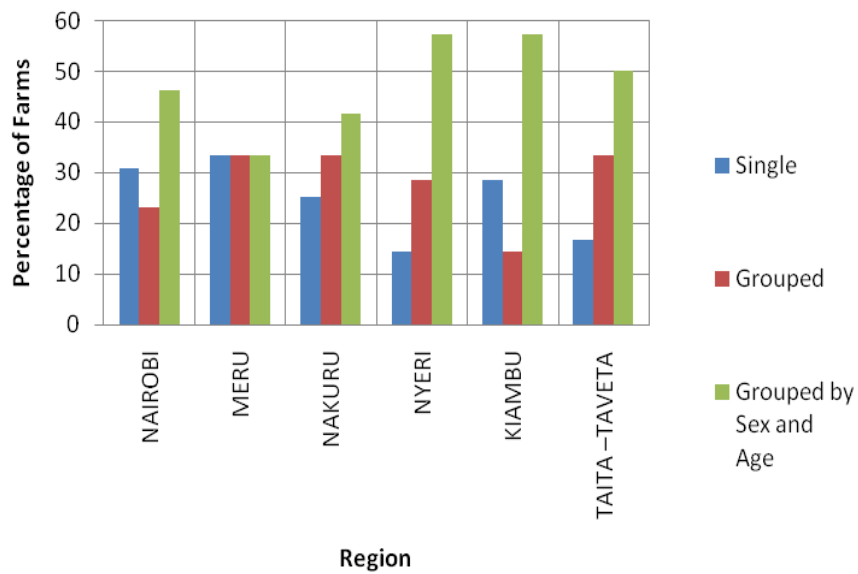
HOUSING: Indoor , outdoor, tiered cages, one level cages, cage maintainaance



1. Indoor cages; properly maintained

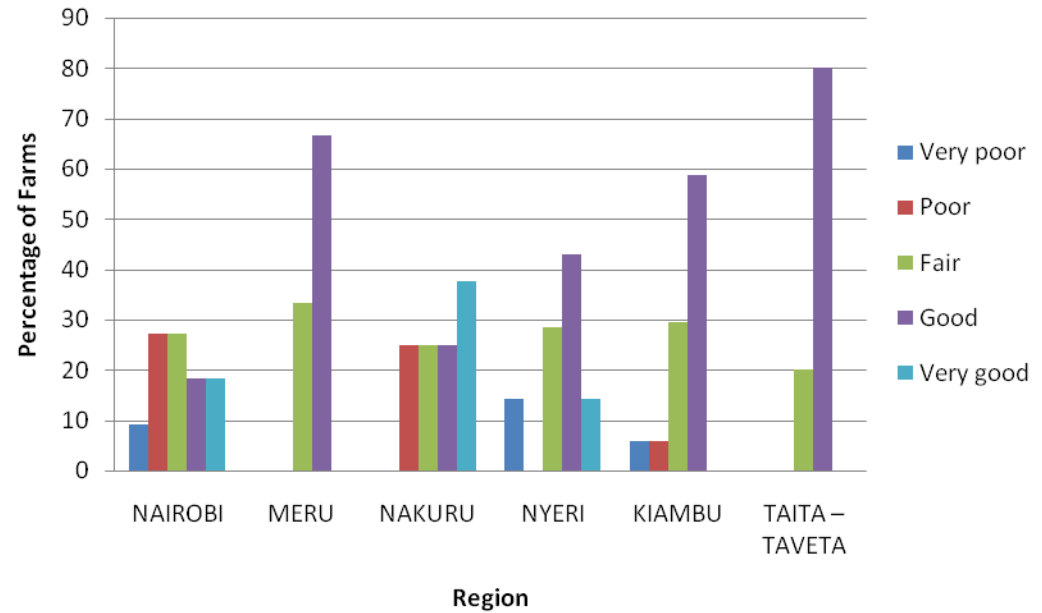


2. Outdoor cages; Poorly maintained,

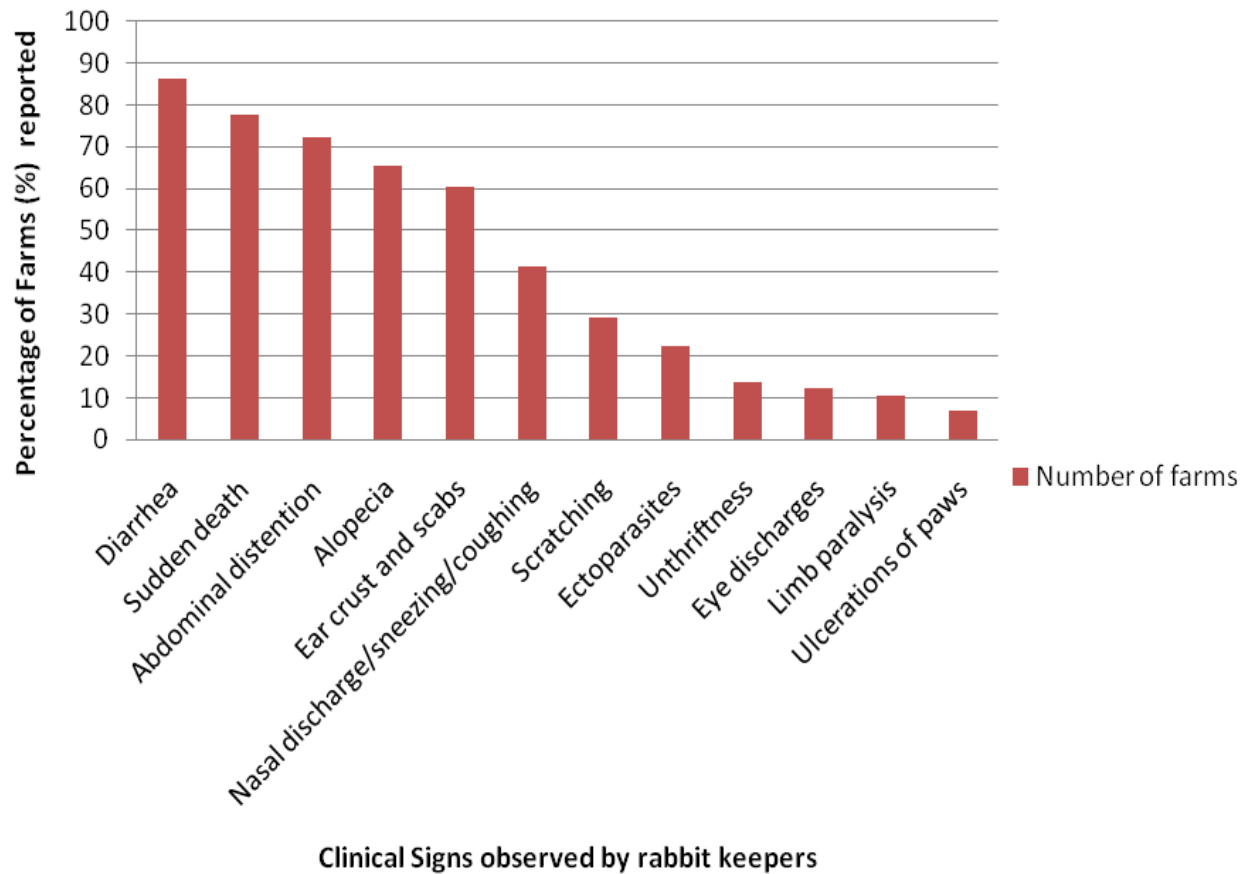


A. Housing methods for rabbit in different sites

B. Housing sanitation scores of the rabbit farms

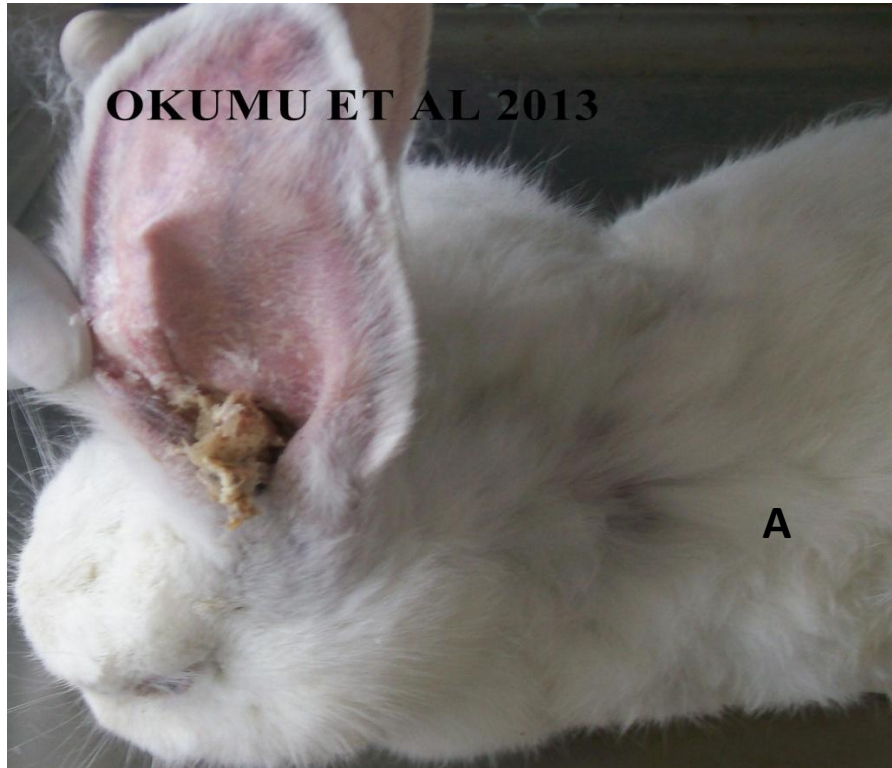


Clinical signs observed in rabbits as reported by keepers



Clinical findings during examination.

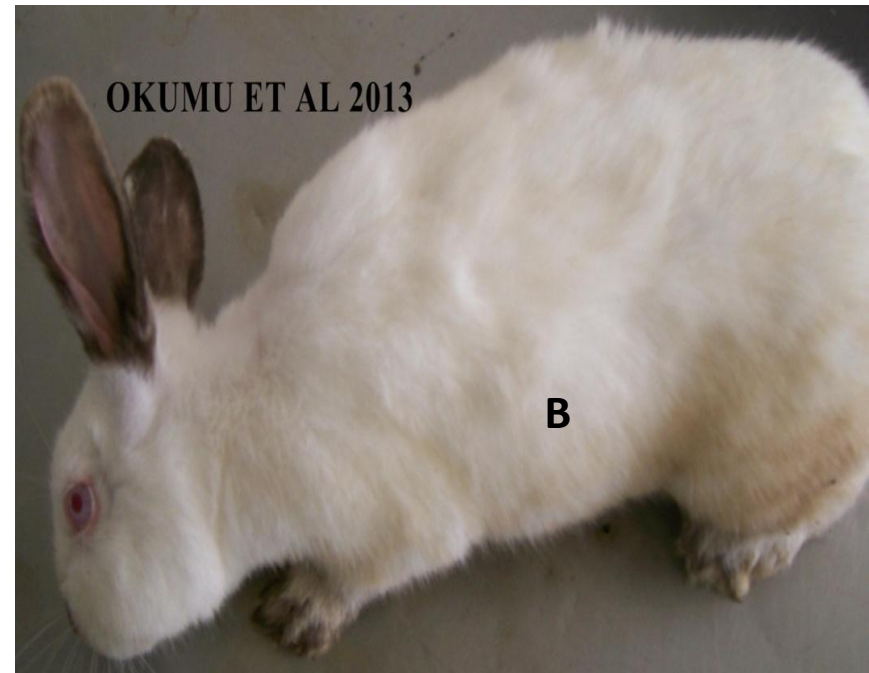
Ear canker and infections/Psoroptes acariosis; 10/61(16.39%), presence of crusts and scabs (A) (50%), abscesses in the ear and head tilting (40%) cases (B). Caused by *Psoroptes cuniculi*



RX; 70% administered mineral oil and glycerol in the ears

Recommended; ivermectin injection organophosphates.

Control: dusting hutch with carbaryl,



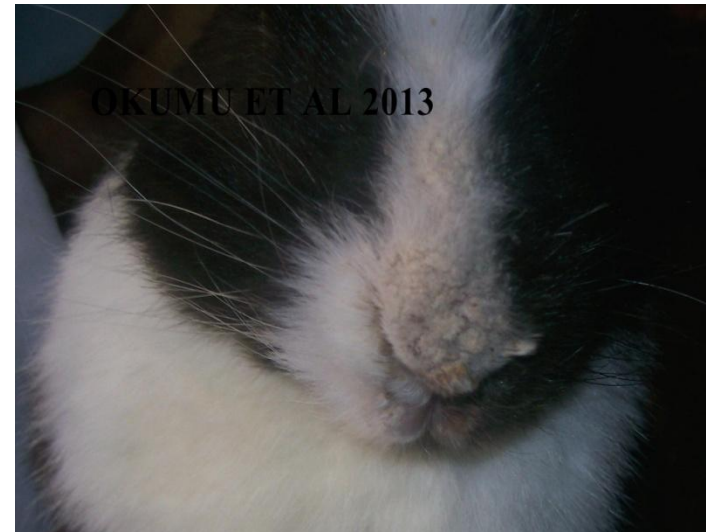
DDX; -Encephalitozoonosis (Wesonga and Munda, 1992)

-Pneumonia (14.75%)

- Pregnancy toxemia (1.64%)

LOCALISED MANGE

occurrence : 8.20% farms



Alopecia, and erythema around nostrils, upper and lower lips, eye and fore paws in case of localized mange caused by *Sarcoptes scabiei* mites in a Newzealand rabbit sampled from Kiambu County (case number KF1).

DDX; fungal infection (3.28%) ,
-Papillomavirus (Wilber. 1999)

CONJUNCTIVITIS

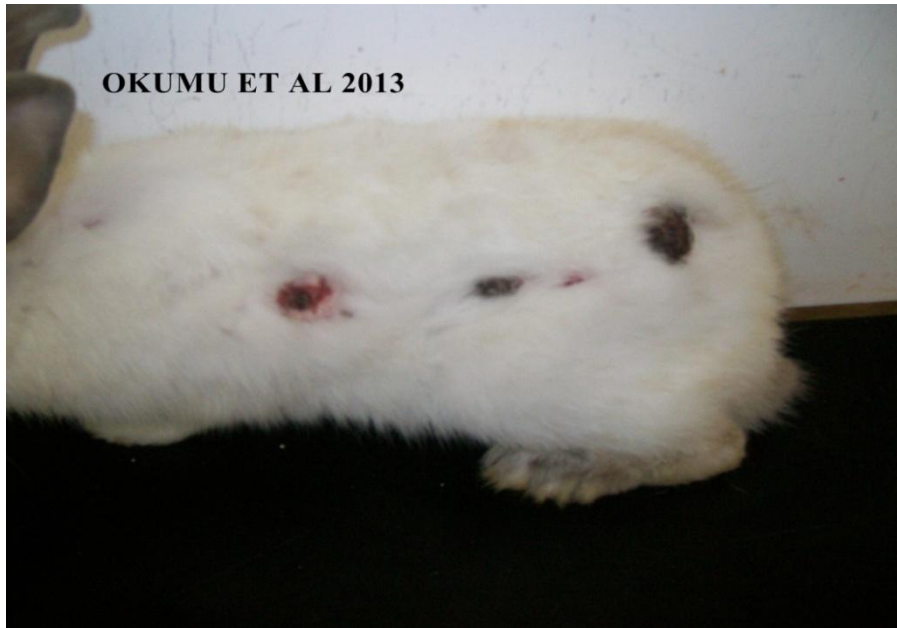


Mucopurulent discharges in a 4 weeks old Newzealand white rabbits diagnosed with *conjunctivitis*. *Staphylococcus aureus* was isolated from the conjunctival swab (Case number APD 001).

Rx; eye drops oxytetracyclines, gentamycin

ABSCESSSES (6.56%)

swellings on the skin palpable on the palpated mainly around the mandible , dorsal vertebrae, scruff and rump, upper eyelid, mandibular , maxillary bone.



Etiology; *Staphylococcus aureus* and
Streptococcus
Pasteurella spp (
DDX; Sore hock, Mite infestation
(mange)
Flea infestation

Predisposing factors to abscess: Trauma (4.92%); fight wound -3.28%, Decubital wounds- 3.28% usually due to splay legs (1.64%), sore hock (1.64%), Overgrown teeth/malocclusion (1.64%),



Bilateral fore and hind splay leg in an eight weeks old rabbit from Nakuru County (Case number NKF7).



Severe sore hock in a rabbit with wet perineum due to urinary incontinence and gangrenous dermatitis and arthritis (Case number 395/2012)

Management of abscesses; sprayed affected areas

Recommended; evaluation and solve the cause.

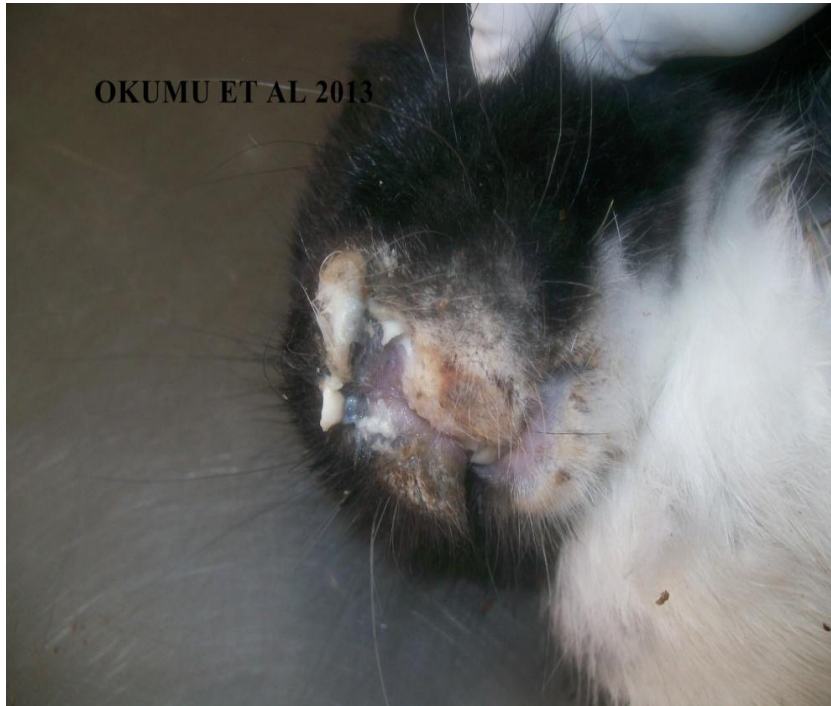
- Selection of breeding stock and proper hutch preparation,
- Slatted (wood, metal, plastic) footrests in the hutches (Rosell and De la Fuente , 2009)
- Isolation newly introduced animals for at least three week environmental disinfection
- Drainage of the abscess if subcutaneous, injectable penicillin

Miscellaneous conditions such **Trichophagy, Urine spray and cannibalism** were also encountered

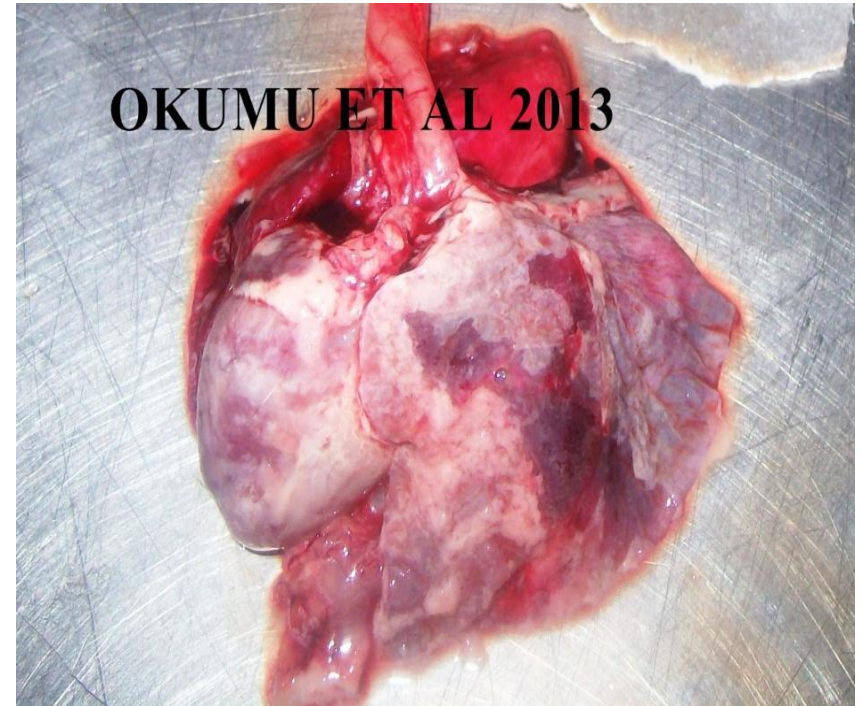
PNEUMONIA (14.75%)

sneezing accompanied with coughing and purulent nasal discharges and licking the upper lips after each bout of sneeze (11.48%)

Etiology: *Pasteurella multocida*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *staphylococcus aureus*



Purulent nasal discharges from a Dutch breed rabbit carcass diagnosed with pneumonia from a farm in Kiambu County



Fibrin cover on the lung surface (arrow 1) and heart pericardium of a rabbit diagnosed with fibrinous pneumonia

Risk factors for pneumonia ; Stress (weather change, pregnancy, weaning)

Management; Proper ventilation during cold/hot weather

Injectable/oral sulphur and antinflammatory drugs eg Dexamethasone

ENTERITIS- 29.51%

Rabbits present with; **rough hair coat** (13.11%), **soiled perineum** (11.48%), **found dead** (8.20%) , **watery diarrhea** (1.64%), **abnormally soft feces** (3.28 %),**ataxia and recumbency** (3.28 %)

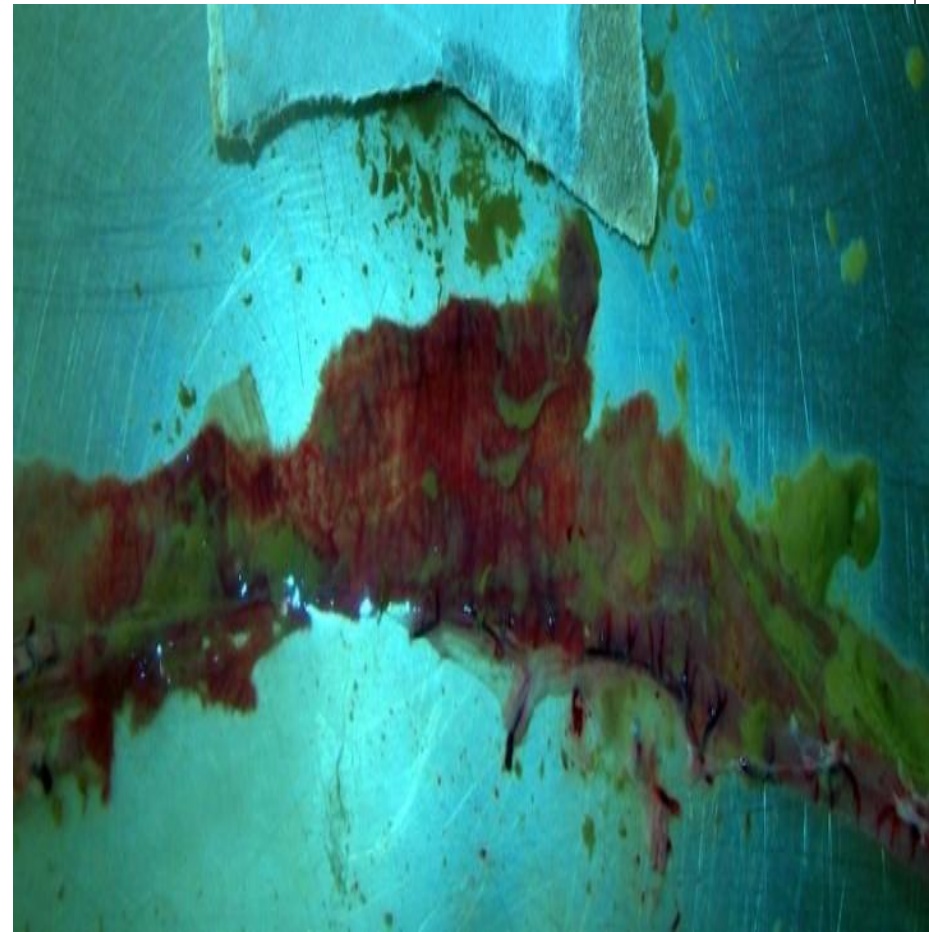
DDX;

- Intestinal coccidiosis** (47.54%)
- Hepatic coccidiosis** (11.48%)
- Mucoid enteropathy** (8.20%)
- Helminthosis** (3.28%)
- Intestinal obstructions** (3.28%)
- Hemorrhagic typhilitis** (3.28%)
- Bloat**
- Aflatoxicosis/mould poisoning**

INTESTINAL COCCIDIOSIS



**Rabbit carcasses showing matted perineum
Bloating and rough hair coat due to diarrhea in
cases of enteritis caused by *intestinal
coccidiosis***



**An opened segment of the intestines from a
rabbit showing hemorrhages and
congestion on the intestinal mucosa,
yellowish mucoid intestinal content , in a
case of hemorrhagic enteritis due to
*intestinal coccidiosis***

HEPATIC COCCIDIOSIS

Present with emaciation (6.56%), diarrhea (3.28%),

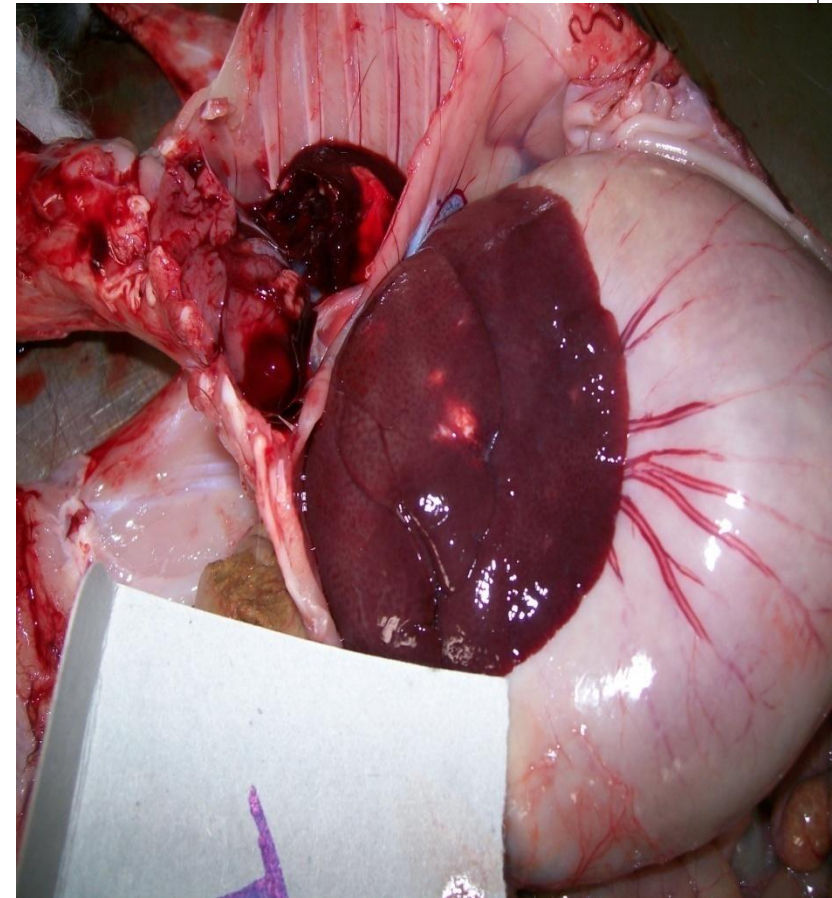


Multi-focal whitish to yellowish nodules on the liver surface and distended gall bladder (A) in a case Hepatic coccidiosis in a rabbit sampled from Meru County (case number Mf5B)

DDX; Tyzzer's disease
Septicemia/abscesses

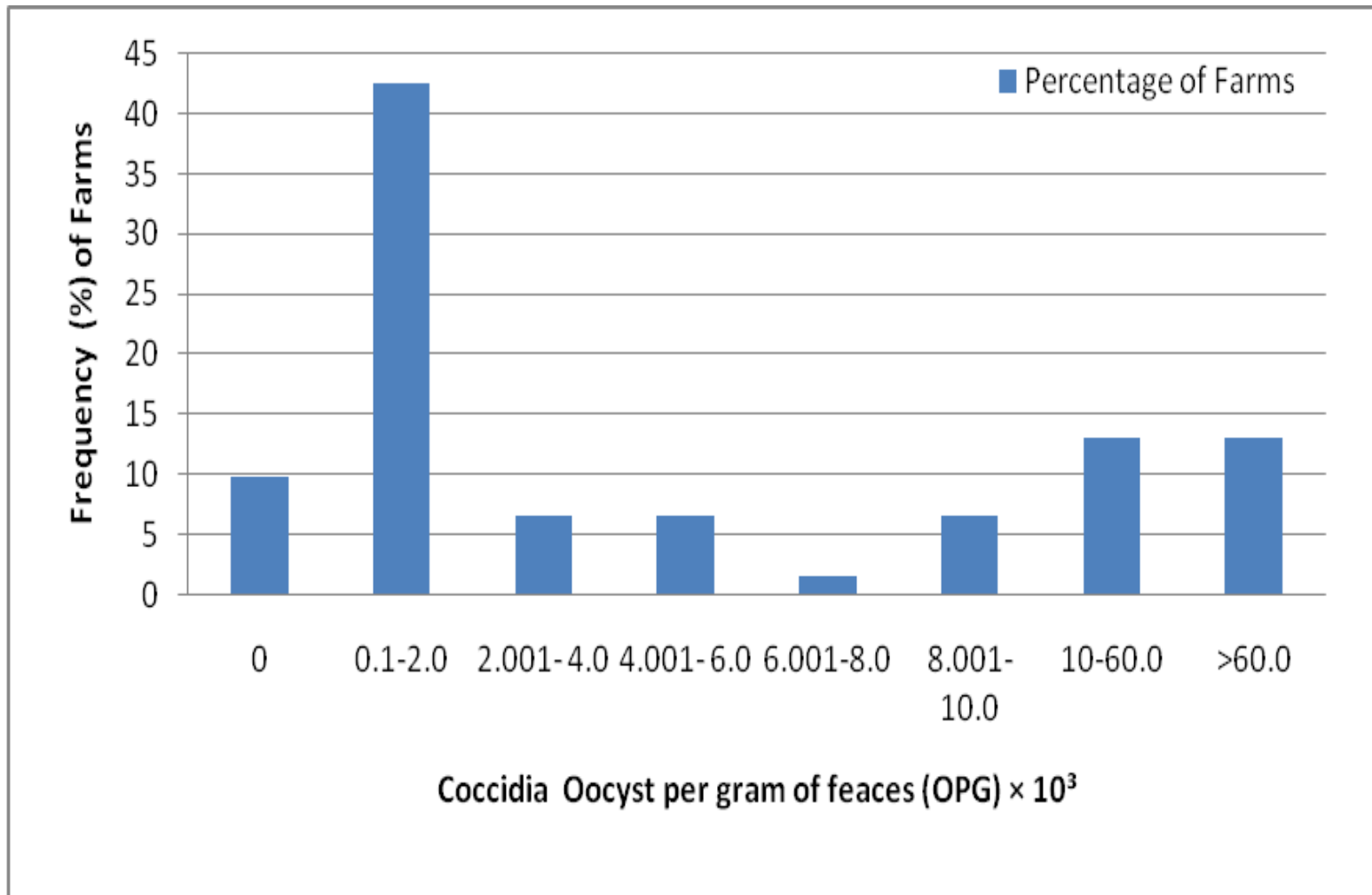
MANAGEMENT

**Hygiene/ cleaning/
proper housing
medical (Oral sulfur)**



Distribution of Coccidian Oocysts count per gram of faeces collected at post mortem from intestines and ceaca in different age groups of the 61 rabbits

Age group (Weeks)	Frequencies of Coccidia Oocyst per gram of faeces (OPG) × 10 ³								
	0	0.1 – 2.0	2.001- 4	4.001-6	6.001-8	8.001- 10	10.001-60	>60.0	Total
Weaners (1 –5)	0	1	1	2	0	2	5	3	14
Growers (6-24)	3	11	2	1	1	0	1	3	23
Adults (>24)	3	14	1	1	0	2	2	2	24
Total	6	26	4	4	1	4	8	8	61



Coccidia Oocysts count per gram of feces (OPG) from rabbit farms from the selected study sites in Kenya

MUCOID ENTEROPATHY

Present with **mucoïd feces** (3.27%), **mortality** (upto 75%), **bloat** (4%)



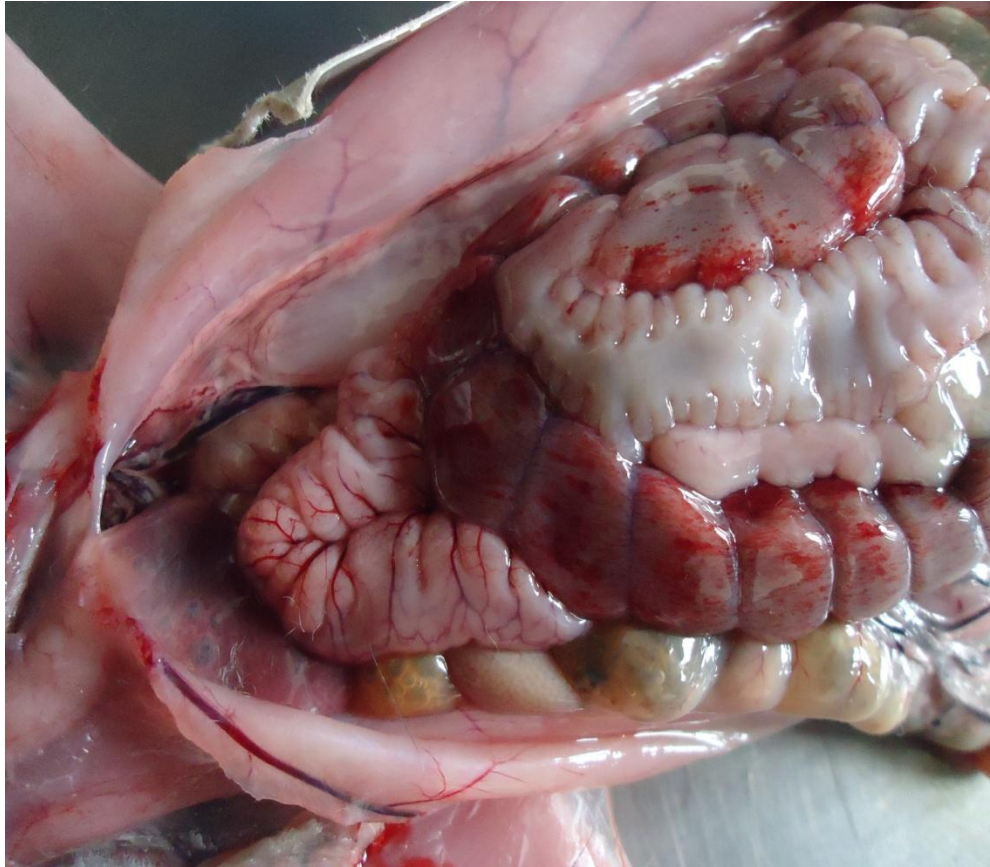
Predisposing factors;

- **Change of feed**
- **Intestinal coccidiosis**
- **Aflatoxicosis/ Mouldy feed**

Copious gelatinous mucoïd content in the cecum of a rabbit from Nairobi County diagnosed with *mucoïd enteropathy*

HEMORRHAGIC TYPHILITIS

Present with **watery diarrhea, bloody diarrhea**



Ecchymotic hemorrhages on the ceecal serosa of a rabbit diagnosed with *hemorrhagic typhilitis*. *E. coli* isolated

Treatment : symptomatic

DDX; mucoid enteropathy, Rabbit hemorrhagic disease

HELMINTHOSIS (3.28%);

considered less pathogenic, Present with emaciation, constipation



Unopened ceacum of a rabbit from Taita- Taveta county showing whitish *Passalurus ambiguus* (Rabbit pin worms) visible through the ceecal mucosa (arrow) in a rabbit diagnosed with helminthosis (Case number TF3).

CONCLUSIONS

- Diarrhea, alopecia and ear crust and scabs are the common clinical signs of domestic rabbit diseases observed by rabbit keepers in Kenya.
- Diseases of the digestive system, skin and the ears are the main causes of morbidity and mortalities in domestic rabbit in Kenya
- The etiological agents involved in causing diseases of domestic rabbits in Kenya are coccidia, bacteria, fungi, fleas, nematodes and mites.
- Location of farm, type and maintenance status of housing structure, housing density, age and genetics of rabbits and presence of potential pathogens including coccidia and bacteria are the risk factors that predispose domestic rabbits to diseases.

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