

**TO: PROFESSOR LUCY IRUNGU DVC (RPE)**

**FROM : DR. FLORENCE A. OYIEKE , SCHOOL OF BIOLOGICAL SCIENCES, C.B.P.S**

**RE: QUARTELY PROGRESS REPORT FOR DEANS COMMITTEE FUNDED PROJECT**

**RESEARCH PROJECT TITLE: PREVENTION OF JIGGER INFESTATION USING A BIOLOGICAL REPELLENT IN MURUKA AND GAICHANJIRU SUB LOCATIONS**

### **SHORT SUMMARY OF THE RESEARCH PROJECT.**

This study is being conducted in two rural communities that are affected with jigger flea infestation, a condition known as tungiasis namely Gaichanjiru and Muruka in Muranga County.

Control strategies of tungiasis in Kenya have been chemical- based because currently there is no commercial market for biological products targeting the disease. A promising biological repellent namely Zanzarin<sup>R</sup> will be used. This repellent was selected for the study due its advantages over chemicals and drugs. Zanzarin<sup>R</sup> has been reported to reduce tungiasis in Brazil but similar data is lacking for the Kenyan situation hence the purpose for this study.

Muranga county in Central province was selected as a study sites due to reported high prevalence of tungiasis. Prior to the studies, meetings with community health workers and community leaders have been held and the objectives explained. Approval for the study protocol has been sought from the National Council for Science and technology and attained as per the attached documents. Informed consent has been sought from all adult participants and from the parents or legal guardians of minors evidenced by signed consent forms from each homestead..

Affected individuals aged 1-66 have been randomized into two cohorts- A, and B as summarized on fig. 1. (Appendix I ) Recruited individuals will receive a twice daily application of Zanzarin<sup>R</sup> for four weeks to reduce the jigger infestation to zero. Members of cohort A will receive Zanzarin<sup>R</sup> twice daily for eight weeks. Cohort B will not receive treatment with the repellent and thus will serve as the control. Monthly data will be recorded over an intervention period of 8 weeks at each study site for the first phase of the study with effect from 1st July 2012. There will be a wash out phase for four weeks in August 2012. The second intervention phase will start in October 2012; . Members of cohort B will receive Zanzarin<sup>R</sup> twice daily for eight weeks. Cohort A will not receive treatment with the repellent and thus will serve as the control. Monthly data will be recorded over an intervention period of 8 weeks at each study site for the second phase of the study.

This study aims at Determining the :-

1. 1. Determining the Jigger flea infestation at Gaichanjiru and Muruka sub locations in Muranga county

2. Assessing variations in jigger flea infestation rates among male, females and children in both study sites
3. Efficacy of Zanzarin<sup>R</sup> as a repellent against the jigger flea.

Results of the study will :-

1. Contribute to the limited epidemiological databank with regard to tungiasis in Kenya.
2. Establish the efficacy of Zanzarin<sup>R</sup> in controlling jigger flea infestation.
3. Open new pathways for cost-effective control of tungiasis

#### **RESULTS ACHIEVED SO FAR**

##### **A: Field visits.**

Two day field visits have been undertaken on a monthly basis between Feb and May 2012 .

##### **B : Table 1. Preliminary survey**

<b>Task/objective</b>	<b>Date /year 2012</b>	<b>Activities and Results</b>
	<b>January</b>	<ul style="list-style-type: none"> <li>➤ Seeking of authority from NCST to conduct research.</li> <li>➤ Drafting of consent forms.</li> <li>➤ Processing of Research grant advance.</li> <li>➤ Drafting of questionnaires</li> </ul>
<b>1.Preliminary survey of Muranga study sites</b>	<b>February</b>	<ul style="list-style-type: none"> <li>➤ Meeting with Eunice Ndungu ; CEO ofjigger&amp; poverty eradication NGO.</li> <li>➤ Telephone conversation with the area Chief.</li> <li>➤ Meetings held with an Assistant Chief Mr. Kimani.</li> <li>➤ Meeting with the Headmaster and Deputy head of Githage Primary School.</li> <li>➤ Meeting with heads of primary schools</li> <li>➤ Formulation / drafting of Questionnaires.</li> </ul>

<p><b>2. Assessment of demographic, socioeconomic and parasitological characteristics of jigger infestations</b></p>	<p><b>Feb- march</b></p>	<ul style="list-style-type: none"> <li>➤ 1<sup>st</sup> field visit to Gaichanjiru sub-location.</li> <li>➤ Visit to the District Commissioner, and delivery of letters of authority to conduct research in Muranga from NCST to the D.C., District Education officer and District Health Officer</li> <li>➤ Recruitment of Ms. Purity Kendi Ndungu as a field Assistant.</li> <li>➤ Questionnaire administration</li> <li>➤ Door to door interviews, arrangement of focused group discussions.</li> <li>➤ Preparation of Data Tables containing raw figures of:- family income, literacy levels, no of participants/household, sanitary status of households, age structure, sex ratios,</li> <li>➤ Data entry on tungiasis stratified according to disease stage I,II,III, IV, Late stage and Lesions altered through manipulation for cohorts A&amp;B, for the pre- intervention has been recorded for all participants at both study sites</li> </ul>
<p><b>3.: Selection of study cohorts/development of study Design</b></p>	<p><b>March- April- May</b></p>	<ul style="list-style-type: none"> <li>➤ field visit to Muruka / Gaichnanjiru sub locations</li> <li>➤ Questionnaire administration- completed</li> <li>➤ Signing of consent forms- completed</li> <li>➤ Groupings of 60 members to comprise cohorts A, at Gaichanjiru and cohort B., at Muruka sub locations.</li> <li>➤ Meeting with local leaders at a Baraza with the assistance of Yunis Ndungu</li> <li>➤ Sensitization of participants with help of local media</li> </ul>
	<p><b>May</b></p>	<ul style="list-style-type: none"> <li>➤ Analysis of preliminary survey data</li> </ul>

C: Table 3-5: .Preliminary raw data

Table 3: Preliminary Socio-demographic tungiasis-associated factors for Gaichanjiru sub location/saba saba area

Household No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Totals	%	
<b>house head</b>																																	
Male	1		1	1	1	1	1		1	1		1	1	1	1		1									1		1	1	1	1	17	56.67
Female		1						1		1						1		1	1	1	1	1	1	1		1	1				13	43.33	
<b>Marital status</b>																																	
Married		1	1	1	1		1	1				1				1	1	1											1		13	43.33	
Widowed/Divorced						1			1	1	1	1				1		1	1	1	1						1			1	11	36.67	
Single	1												1											1	1		1	1			6	20.00	
<b>Sex ratios</b>																																	
Male	2	3	2	4	4	4	6	2	7	2	5	2	4	1	1	1	3	3	1	4	4	6	1	3	1	1	1	0	2	3	83	51.53	
Female	5	5	5	3	5	0	1	5	5	2	4	0	5	1	1	1	6	6	1	2	2	2	2	2	0	1	0	0	5	1	78	48.47	
<b>Children per house hold</b>																																	
0-5yrs	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	6	8.57	
5-12	2	3	2	3	2	0	0	2	2	0	3	0	1	0	0	0	5	3	0	0	0	3	0	2	0	0	0	0	2	0	35	50.00	
13-17	3	3	1	0	2	0	1	1	2	0	3	0	4	0	0	0	0	3	0	0	0	1	1	0	0	0	0	3	1	29	41.43		
<b>Age group (years)</b>																																	
Below 18	4	6	3	3	4	0	3	5	4	0	3	0	2	0	0	1	5	6	0	0	2	6	1	4	0	1	0	0	4	1	68	39.6	
18-24	2	0	0	0	1	0	2	0	2	4	2	1	3	0	0	0	2	0	0	4	2	0	0	0	0	0	0	0	2	2	29	18.2	
24-35	3	0	0	2	2	4	0	0	2	0	3	0	1	1	0	0	1	0	0	0	1	1	0	1	0	0	0	3	0	23	14.5		
35-65	2	2	2	2	2	1	2	2	3	0	1	1	2	1	2	1	0	2	2	1	1	1	1	0	0	1	0	2	1	35	22.0		
Above65	0	1	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	9	5.7		
<b>Literacy level</b>																																	
Basic	1	1	1		1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	27	90	
Secondary				1																											1	1	3.3
Tertiary													1																		2	6.7	
University																																	
<b>Occupation</b>																																	
Wage earner	1											1		1									1								5	16.6	

<b>Unemployed-Retired</b>																																	23	76.6		
																																2	6.6			
<b>Monthly Income</b>																																				
<b>≤ 1,000</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29	96.67		
<b>none</b>																																		1	3.33	
<b>House type</b>																																				
<b>uncemented floor</b>	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29	96.67		
<b>Cemented floor</b>				1																														1	3.33	
<b>Sanitary status</b>																																				
Pit latrine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	100		
Garbage pit				1																														4	13.3	
<b>Source of water</b>																																				
Piped																																				
River	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	28	93.3		
Rain																																				
Borehole																																			2	6.6
<b>Utilities</b>																																				
Fire wood																																				
Kerosine	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	100		
Electricity																																				
Solar																																				
other																																				
<b>Domestic animals</b>																																				
Dog			1	1								1																						5	16.6	
Cat																																		0	0.0	
Goat				2			1						1							3			1										5	16.6		
Sheep												1																						2	6.6	
Cow																																		2	6.6	
Donkey																	1	1																0	0.0	
Pig																																		0	0.0	
Other-chicken			2	60																														2	6.6	

<b>Communication</b> Newspaper T.V Radio Chiefs baraza	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	30	0.0	100	23.3																			
<b>Religion</b> Protestant Catholic Muslim Hindu Evangelical	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12	40	56.7	0.0	0.0	3.3																
<b>Tungiasis status</b> Mild Moderate severe	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	9	30	16	53.4	5	16.6																
<b>Prevention</b> Use of chemicals Natural products Removal by thorns Removal by pin Removal by sterilized needle Ash Pepper Black oil	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	36.7	21	70	6	20	1	3.3	1	3.3	1	3.3	1	3.3

**Table 4: Preliminary Socio-demographic data tungiasis associated factors for Muruka sub location**

Household No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Total	%	
<b>house head</b>																																	
Male		1		1		1	1	1	1	1			1	1	1	1		1						1	1					1	1	19	63.3
Female	1		1		1						1	1							1		1	1			1		1				11	36.7	
<b>Marital status</b>																																	
Married	1		1	1	1	1			1			1	1	1	1	1															1	13	43.3
Widowed/Divorced		1					1			1	1							1			1	1	1									9	30
Single								1									1	1		1					1	1	1					8	26.7
<b>Sex ratios</b>																																	
Male	3	1	1	3	2	1	3	1	2	1	1	4	2	1	2	3	0	0	0	1	1	2	5	3	1	1	2	2	0	2	61	50.4	
Female	2	1	3	4	3	1	1	0	2	0	1	3	2	1	3	5	2	2	2	0	2	5	4	2	0	3	1	1	0	5	60	49.6	
<b>Children per house hold</b>																																	
5yrs	1	0	1	1	1	0	0	0	2	0	0	2	2	0	1	2	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	17	29.7
5-12	0	0	2	1	2	0	0	0	1	0	1	3	1	0	1	3	0	1	1	0	0	0	0	4	2	0	0	0	0	0	2	26	45.6
13-17	0	0	0	1	2	0	1	0	1	0	1	2	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	3	14	24.7	
<b>Age group (yrs)</b>																																	
Below 18	5	0	3	3	5	0	1	0	4	1	1	7	4	0	4	6	1	1	1	0	1	0	2	4	0	0	0	1	0	4	59	53.2	
18-24	0	0	0	2	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4	1	3	0	0	0	1	0	2	13	11.7	
24-35	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2	0	1	0	0	0	1	1	0	1	0	1	1	0	0	3	13	11.7	
35-65	0	0	0	2	0	0	1	0	0	1	1	0	0	0	0	2	0	1	0	1	1	2	1	1	0	3	2	1	0	2	20	18.0	
Above65	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	6	5.4		

<b>Literacy level</b>	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29	96.7						
Basic																																								
Secondary																																								
Tertiary																																								
University																																								
<b>Occupation</b>	1																																							
Wage earner																																								
Unemployed																																								
Retired																																								
<b>Income</b>	1																																							
≤ 1,000																																								
none																																								
<b>Mud house and uncemented floor</b>	1																																							
Cemented floor																																								
<b>Sanitary status</b>	1																																							
Pit latrine																																								
Garbage pit																																								
water																																								
Piped																																								
River																																								
Rain																																								
Borehole																																								
<b>Utilities</b>	1																																							
Fire wood																																								
Kerosine																																								
Electricity																																								
Solar																																								
other																																								
<b>Animals</b>																																								
Dog																																								
Cat																																								
Goat																																								
Sheep																																								
Cow																																								



Donkey Pig Chicken Rabbits				3						1																				0 0 1 2	0.0 0.0 3.3 6.6
<b>Communication</b> Newspaper T.V Radio Chiefs baraza none			1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	24 5 1	80 16.7 3.3	
<b>Religion</b> Protestant Catholic Muslim Hindu Evangelical	1	1	1	1	1		1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	12 16	40 53.3		
<b>Tungiasis status</b> Mild Moderate Severe	√	√	√		√	√	√		√	√		√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	23 3 4	76.6 10.0 13.4	
<b>Prevention</b> Use of chemicals Natural products Removal by thorns Removal by pin Removal by sterilized needle Ash Pepper Black oil		1 1	1 1	1 1		1 1	1 1	1 1		1 1	1 1		1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	13 0 23 5 1	43.3  76.7 16.7 3.3			
																													0 0 0	0.0 0.0 0.0	

**Table 5: Observed factors associated with tungiasis.**

1. Floor of sand or clay
2. Sandy areas outside houses
3. Age  $\leq 14$  years or  $\geq 50$  years
4. Literacy level
5. Presence of animals
6. Use of insecticides indoors
7. Use of soap for bathing
8. water from well /river / tank
9. Regular use of footwear
10. Self-treatment
11. Knowledge/attitude/ practices
12. Wetness/humidity

**D: Parasitological parameters of tungiasis disease stages**



– A brownish–black circular crust with or without surrounding necrosis of the epidermis (dead parasite, stage IV).

