

Table of Contents

1	Introduction	1
2	Literature Review	4
2.1	Lymphatic Filariasis: Epidemiology and Disease Burden	4
2.2	Physiological Races of <i>W. bancrofti</i>	7
2.3	Prevalence and Distribution of Subperiodic Filariasis	10
2.4	Life History of The Parasite	13
2.5	Ecological Types of <i>W. bancrofti</i>	14
2.6	Entomological Aspects of The Vectors of Diurnally Subperiodic and Periodic Filariasis	16
2.6.1	Ecology	16
2.6.2	Population Dynamics	16
2.6.3	Vector Implication, Infection and Infectivity Status	17
2.6.4	Transmission Dynamics	18
2.6.5	Biting Periodicity	20
2.6.6	Physiological Age Grading, Parity and Survival	21
2.7	Taxonomic Status of <i>Oc. niveus</i>	22
2.8	Control of Subperiodic Bancroftian Filariasis	23
3	Study Area	
3.1	Topography	27
3.2	Climate	27
3.3	Soil Type	29
3.4	Population, Housing & Socio – economic Conditions	29
3.5	Occupation	30
3.6	Crops	30
3.7	Water Supply and Disposal of Sewage Water	32
3.8	Mosquitogenic Conditions	32
3.9	Teressa, an Island Selected for Undertaking Year Long Studies On Transmission	33
4	Prevalence of Infection and Disease Due to Diurnally Subperiodic <i>W. bancrofti</i> and Frequency Distribution of Microfilariae	
4.1	Summary	35
4.2	Introduction	36
4.3	Material and Methods	38
4.3.1	Parasitological and Clinical Surveys	38
4.3.2	Frequency Distribution of mf in Human Host	39
4.3.3	Ethical Considerations	40
4.4	Results	40
4.4.1	Parasitological and Clinical Surveys	40
4.4.2	Distribution Fits and Parameter Estimates	47
4.5	Discussion	53
5	Changes in Population Dynamics of <i>Oc. niveus</i>	
5.1	Summary	59
5.2	Introduction	60
5.3	Material and Methods	61
5.3.1	Meteorological Data	61
5.3.2	Monitoring of Changes in adult population	61
5.3.3	Calculation of the Finite Rate of Natural Increase (λ)	61
5.3.4	Ethical Aspects	62

5.4 Results	63
5.4.1 Meteorological Data	63
5.4.2 Species Composition of Man Landing Mosquito Fauna	68
5.4.3 The Finite Rate of Natural Increase (λ) in Man Landing Population of <i>Oc. niveus</i>	68
5.4.4 Abundance of <i>Oc. niveus</i>	68
5.5 Discussion	73
6 Filarial Infection and Infectivity in <i>Oc. niveus</i>	
6.1 Summary	76
6.2 Introduction	77
6.3 Material and Methods	77
6.3.1 Selection of Sites For Studying Transmission Dynamics Through Year Long Entomological Studies	77
6.3.2 Dissection For Parasite Infection	78
6.3.3 Calculation of Infection and Infectivity Rates	78
6.3.4 Abundance of Infected and Infective Vectors Mosquitoes	79
6.3.5 Host Efficiency of <i>Oc. niveus</i>	79
6.3.6 Statistical Analysis	79
6.4 Results	79
6.4.1 Infection Rate	79
6.4.2 Infectivity Rate	81
6.4.3 Distribution of Different Stages of Parasite in <i>Oc. niveus</i>	85
6.4.4 Abundance of Infected and Infective Vector Mosquitoes	85
6.4.5 Host Efficiency of <i>Oc. niveus</i>	85
6.5 Discussion	88
7 Transmission Dynamics of Filariasis	
7.1 Summary	92
7.2 Introduction	93
7.3 Material and Methods	93
7.3.1 Annual Biting Rate (ABR)	93
7.3.2 Annual Infective Biting Rate (AIBR)	94
7.3.3 Annual Transmission Index (ATI)	94
7.3.4 Risk of Infection Index (RII)	94
7.3.5 Annual Transmission Potential (ATP)	94
7.4 Results	95
7.4.1 Annual Biting Rate (ABR)	95
7.4.2 Annual Infective Biting Rate (AIBR)	95
7.4.3 Annual Transmission Index (ATI)	95
7.4.4 Risk of Infection Index (RII)	97
7.4.5 Annual Transmission Potential (ATP)	97
7.5 Discussion	102
8 Periodicity of Biting Activity of <i>Oc. niveus</i>	
8.1 Summary	106
8.2 Introduction	107
8.3 Material and Methods	107
8.4 Results	108
8.4.1 Biting Periodicity	108
8.5 Discussion	114

9	Physiological Age Grading, Parity and Natural Survival of <i>Oc. niveus</i>	
9.1	Summary ...	117
9.2	Introduction... ..	118
9.3	Material and Methods ...	118
	9.3.1 Determination of Age of the Vector	118
	9.3.2 Abundance of Vector Population in Relation to Age...	119
	9.3.3 Vector Survival ...	119
	9.3.4 Statistical Analysis	120
9.4	Results ...	121
	9.4.1 Parous Rate and Age Composition	121
	9.4.2 Abundance of Vector Population in Relation to Age	121
	9.4.3 Vector Survival...	126
9.5	Discussion... ..	131
10	Parasite Distribution and Loss in <i>Oc. niveus</i>	
10.1	Summary ...	133
10.2	Introduction ...	134
10.3	Material and Methods...	135
10.4	Results ...	136
	10.4.1 Prevalence of Infection in Relation to Mosquito Age and Parasite Stage ...	136
	10.4.2 Distribution of Parasite in Vector ...	136
	10.4.3 Patterns of Parasite Aggregation in The Vector ...	136
	10.4.4 Loss of Parasite in The Vector ...	140
	10.4.5 Parasite Induced Mortality in The Vector Population	140
	10.4.6 Survival Probabilities of The Parasite ...	140
10.5	Discussion... ..	143
11	Summary...	145
12	Conclusions	148
13	Bibliography ...	150