

LIST OF PLATES

		Page
Plate 3.1	A: Liver powder and mice pellete were used for larval feeding, B: <i>Aedes aegypti</i> larvae feeding on half-cooked liver and C: <i>Culex quinquefasciatus</i> feeding on ground mice pellete	37
Plate 3.2	Immature stages in plastic trays were covered with plastic sheets to prevent contamination with other mosquitoes	38
Plate 3.3	Emerged adults were fed with a 10% sucrose supplemented with 1% vitamin B complex solution soaked in lint cloth and placed inside a small glass bottle	39
Plate 3.4	Wire-caged mouse for blood feeding	39
Plate 3.5	The filter paper containing the eggs was then removed and dried in room temperature for at least one week	40
Plate 3.6	The commercial insecticides used in this study were permethrin, temephos and malathion	41
Plate 3.7	Lots of early 4 th instar larvae were selected and transferred into a small paper cups using wide-mouthed pipette	43
Plate 3.8	Larval bioassay conducted in 300ml disposable paper-cups with 3 replicates for each 5 different of insecticide concentration	44
Plate 3.9	Survived larvae were collected and subjected to selection pressure with thousands of late 4 th instar larvae treated at a concentration of insecticide in 1000ml of tap water to yield 50% mortality	45
Plate 4.1	WHO standard insecticide impregnated papers with malathion 5.0%, permethrin 0.75% and propoxur 0.1%	66
Plate 4.2	WHO adult bioassay test kit	66
Plate 4.3	Exposure tubes covered with black cloth to make sure the adults would be resting on the impregnated paper	67
Plate 4.4	Exposure tubes with permethrin impregnated papers were laid horizontally throughout the test	67

Plate 5.1	Individual mosquitoes of different life stages i.e. egg, 1 st instar (L1), 2 nd instar (L2), 3 rd instar (L3), pupa day 1 (P1), pupa day 2 (P2), adult male, adult female	136
Plate 5.2	Plastic pestle homogenizer to grind the individual sample in microcentrifuge tube with buffer	137
Plate 5.3	Apparatus and chemical reagents used for biochemical assay i.e., A: microcentrifuge tubes, B: plastic pestle, C: Eppendorf, D: microwell plate E: PBS buffer, F: substrate & coupling reagents	137
Plate 5.4	The homogenates were then centrifuged at 14000 rpm for 10 minutes at 4 °C	138
Plate 5.5	The colour intensity result was expressed quantitatively as an absorbance (O.D.) using an ELISA Reader (Dynatec MR 5000) at 450 wavelength	139
Plate 5.6	Biochemical detection and measurement of colour intensity degree of resistance for non-specific esterase enzyme activity us naphthyl acetate as substrate in malathion selected <i>quinquefasciatus</i>	145
Plate 5.7	Biochemical detection and measurement of colour intensity degree of resistance for non-specific esterase enzyme activity us naphthyl acetate as substrate in malathion and permethrin select <i>aegypti</i>	153
Plate 5.8	Biochemical detection and measurement of colour intensity degree of resistance for non-specific esterase enzyme activity us naphthyl acetate as substrate in temephos selected <i>Ae. aegypti</i>	153
Plate 6.1	Chemical reagents used for gel electrophoresis	178
Plate 6.2	Gel cassette, a: glass plate, b: Teflon spacer, c: clamp, d: casting stand,e: comb, f: electrophoresis unit	179
Plate 6.3	Size of glass plates and gel comb	181
Plate 6.4	Separating gel preparation	182
Plate 6.5	Combs were inserted in the stacking gel to form sample wells	184

Plate 6.6	Samples were ground in a small conical Eppendorf tube using plastic homogeniser pestle in 100 μ l of phosphate buffer Solution	185
Plate 6.7	14 μ l of aliquots of the sample solution loaded using gel loading tips into the each well	186
Plate 6.8	Glycerol in a sample causes it to sink really at the bottom of the well	187
Plate 6.9	Electrode buffer (running buffer) added to the upper and lower chamber	187
Plate 6.10	Electrophoresis unit was placed in incubator refrigerator throughout the electrophoresis process	188
Plate 6.11	Gel cassettes were separated with the aid of a single edged razor blade	189
Plate 6.12	After electrophoresis the gel was placed in 50ml PBS for esterase activity staining with incubation period of 10 minutes	190
Plate 6.13	Incubation Petri dish placed on the Belly Dancer	191
Plate 6.14	20 mg α -naphthyl & 20 mg β -naphthyl dissolved in 1 ml acetone and 0.07 g Fast Blue RR salt dissolved in 3ml distilled water added to the gels to stain the esterase enzyme	191
Plate 6.15	The petri dish removed from the Belly Dancer after 10 minutes, when the gels display a pattern of blue bands against a clear background	192
Plate 6.16	After staining, gels were placed in 10% of acetic acid and further analysis on band visualization carried out	192
Plate 6.17	Gels were photographed using Image kit digital (Alpha 2200), monitor com (Dell E771p), printer (Sony UDDB 1395) for further analysis and documentation	193

Plate 6.18	<p>Non-specific esterase isoenzymes of <i>Culex quinquefasciatus</i> of malathion resistant strains by 1st (F61) ,5th (F65) and 10th (F70) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	199
Plate 6.19	<p>Non-specific esterase isoenzymes of <i>Culex quinquefasciatus</i> of permethrin resistant strains by 1st (F54) ,5th (F58) and 10th (F63) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	200
Plate 6.20	<p>Non-specific esterase isoenzymes of <i>Culex quinquefasciatus</i> of susceptible strain F666 and field strain separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A * & A **- Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B* & B** – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	201
Plate 6.21	<p>Non-specific esterase isoenzymes of <i>Aedes aegypti</i> of permethrin resistant strains by 1st (F39) ,5th (F43) and 10th (F48) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	207
Plate 6.22	<p>Non-specific esterase isoenzymes of <i>Aedes aegypti</i> of malathion resistant strains by 1st (F43) ,5th (F47) and 10th (F52) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	208

Plate 6.23	<p>Non-specific esterase isoenzymes of <i>Aedes aegypti</i> of temephos resistant strains by 1st (F42) ,5th (F46) and 10th (F51) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	209
Plate 6.24	<p>Non-specific esterase isoenzymes of <i>Aedes aegypti</i> of susceptible strain F957 and field strain separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A * & A **- Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B* & B** – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	210
Plate 6.25	<p>Non-specific esterase isoenzymes of <i>Aedes albopictus</i> of permethrin resistant strains by 1st (F1) ,5th (F5) and 10th (F10) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	216
Plate 6.26	<p>Non-specific esterase isoenzymes of <i>Aedes albopictus</i> of malathion resistant strains by 1st (F1) ,5th (F5) and 10th (F10) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	217
Plate 6.27	<p>Non-specific esterase isoenzymes of <i>Aedes albopictus</i> of temephos resistant strains by 1st (F1) ,5th (F5) and 10th (F10) generations separated according to the life stages by native polyacrylamide gel electrophoresis.</p> <p>A - Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)</p> <p>B – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)</p>	2.18

Non-specific esterase isoenzymes of *Aedes albopictus* of susceptible strain F14 and field strain separated according to the life stages by native polyacrylamide gel electrophoresis.

A * & **A ****- Egg (lanes 1-2), 1st instar (lanes 3-4), 2nd instar (lanes 5-7), 3rd instar (lanes 8-10)

B * & **B **** – Pupa 1 (lanes 1-2), Pupa 2 (lanes 3-4), Male (lanes 5-7), Female (lanes 8-10)