

TABLE OF CONTENTS

	Page
TABLE OF CONTENTS	i
LIST OF TABLES	ii
LIST OF FIGURES	iii
INTRODUCTION	1
OBJECTIVES	3
LITERATURE REVIEW	4
MATERIALS AND METHODS	18
RESULTS	32
DISCUSSION	67
CONCLUSION	69
LITERATURE CITED	70
APPENDIXS	77

LIST OF TABLES

Table	Page	
1	Typical growth and feed consumption of culture bullfrogs in outdoor pens, 25 to 30°C	5
2	Composition of frog meat and other meat composition	8
3	Fatty acid composition of Bullfrog Oil	9
4	Chemical composition of snail meal (%in dry matter)	12
5	Essential amino acids profile of snail meal (g/16gN)	13
6	Composition of frog feed for experiment 1	19
7	The proximate composition of ingredients used in formulated experimental 1 diets (as fed)	21
8	The proximate composition of experimental diets containing 0 and 1.5% betaine in frog feed	21
9	Composition of frog diets using snail meal substituted for fish meal supplemental with 1.5% betaine	22
10	The proximate composition of experimental diets containing snail meal substituted for fish meal in frog feed	23
11	Feed consume of frog fed with moist and pelleted feed per day	32
12	Growth performance of frog fed pellet and moist feed during 28 days (mean \pm SE)	34
13	Survival rate of frog fed form different diets during 28 days	36
14	Feed efficiency of frog fed different diets during 28 days (mean \pm SE)	38
15	Hematological value and blood osmolarity of frog fed with pelleted feed containing 0 and 1.5% betaine at different temperature	41
16	Water quality during period of frog culture (experiment 1)	45
17	Growth performance of young frog fed diets supplemental 50 and 100% snail meal for fish meal and group of 0% snail with and without betaine for 28 days (mean \pm SE)	47

LIST OF TABLES (Cont'd)

Table	Page
18 Survival rate of young frog fed different diets during 28 days	49
19 Feed efficiency of young frog fed different diets during 28 days (mean \pm SE)	51
20 Water quality during period of young frog culture (experiment 2.1)	55
21 Growth performance of grower frog fed diets supplemental 50 and 100% snail meal for fish meal and group of 0 with and without betaine for 42days(mean \pm SE)	56
22 Survival rate of grower frog fed different diets during 42 days	58
23 Feed efficiency of grower frog fed different diets during 42 days (mean \pm SE)	59
24 Blood osmolality of frog fed 0% and 1.5 % betaine feed challenge at different temperature	62
25 Blood osmolality of frog fed 50% and 100 % snail meal feed challenge at different temperature	62
26 Water quality during period of frog culture (experiment 2.2)	66
 Appendixs Table	
1 Air temperature in the morning and after noon, minimum and maximum water temperature in the morning, minimum and maximum water temperature in the after noon	78
2. Dissolved oxygen, pH, NO ₂ , NH ₃ , orthophosphate and total phosphorus concentration in experiment 1	79
3 Air temperature in the morning and after noon, minimum and maximum water temperature in the morning, minimum and maximum water temperature in the after noon(experiment 2.1)	80

LIST OF TABLES (Cont'd)

Appendix Table	Page
4 Dissolved oxygen, pH, NO ₂ , NH ₃ , orthophosphate and total phosphate concentration in (experiment 2.1)	81
5 Air temperature in the morning and after noon, minimum and maximum water temperature in the morning, minimum and maximum water temperature in the after noon (experiment 2.2)	82
6 Dissolved oxygen, pH, NO ₂ , NH ₃ , orthophosphate and total phosphorus concentration in (experiment 2.2)	83

LIST OF FIGURES

Figure		Page
1	The life cycle of the fluke	14
2	The chemical structure of betaine	16
3	Moist and pellet feed for experiment 1	26
4	Snail meal substituted for fishmeal feed (experiment 2)	26
5	Experimented concrete tank showing indoor lab	27
6	Moist feed for experiment 1	27
7	Growth of frog fed with different form of feed during 28 days	35
8	Survival rate of frog fed different form of diets during 28 days	37
9	The indoor lab air temperature during culture period	42
10	The minimum and maximum water temperature in frog tanks during culture period (experiment 1)	43
11	Growth performance of young frog fed different diets	48
12	Survival rate of young frog fed different diets	49
13	The indoor lab air temperature during culture period (experiment 2.1)	52
14	The minimum and maximum water temperature in the tanks during culture period (experiment 2.1)	53
15	Growth performance of grower frog fed different diets (experiment 2.2)	57
16	Survival rate of grower frog fed different diets (experiment 2.2)	58
17	The a indoor lab air temperature during culture period (experiment 2.2)	63
18	The minimum and maximum water temperature in the tanks during culture period (experiment 2.2)	64