

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	i
LIST OF TABLES	ii
LIST OF FIGURS	iii
LIST OF APPENDICES	v
ABSTRACT	vii
ABSTRACT (Arabic)	ix
CHAPTER ONE: INTRODUCTION	1
CHAPTER TWO: LITERATURE REVIEW	4
2.1 Tree species under study	4
2.1.1 <i>Acacia tortilis</i>	4
2.1.2 <i>Acacia seyal</i>	5
2.1.3 <i>Acacia mellifera</i>	8
2.1.4 <i>Eucalyptus camaldulensis</i>	9
2.2 General characteristics of trees to be planted in arid lands	11
2.3 Requirements for Tree growth	12
2.4 Salt tolerance	14
2.4.1 Soil salinity	14
2.4.2 Effect of salinity on plants	16
2.4.2.1 Growth inhibition	16
2.4.2.2 Toxicity	18
2.4.2.3 Water Stress	19
2.4.3 Categories of salinity response	19
2.4.4 Tolerance	21
2.4.5 Variation of plants salt tolerance	23
2.4.6 Salt affected soil in the Sudan	24
2.4.6.1 Gezira	25
2.4.6.2 Northern Sudan	25
2.4.6.2 The area south of Khartoum	27

CHAPTER HREE: MATERIALS AND METHODS 28

3.1 Introduction 28
3.2 Tree species 28
3.3 Soil source and properties..... 28
3.4 Experiment design28
3.5 Experiment one 28
3.5.1 Saline solutions (treatments) 28
3.5.2 Plant materials and nursery establishment 29
3.6 Experiment two29
3.6.1 Experiment description and treatments 29
3.7 Plant parameter 30
3.7.1 Plant height 30
3.7.2 Root length and weight 30
3.8 Soil parameter 30
3.9 Data analysis 31

CHAPTER FOUR: RESULTS 33

4.1 Experiment one..... 33
4.1.1 Effect of irrigation with saline water on plant height (cm) 33
4.1.2 Effect of irrigation with saline water on *Acacia mellifera*..... 34
4.1.3 Effect of irrigation with saline water on *Eucalyptus camaldulensis*34
4.1.4 Effect of irrigation with saline water on *Acacia tortilis* 35
4.1.5 Effect of irrigation with saline water on *Acacia Seyal* 35
4.1.6 Effect of irrigation with saline water on root length (cm) after
12 weeks 44
4.1.7 Effect of irrigation with saline water on root dry weight (g)
after 12 weeks 44
4.1.8 Effect of irrigation with saline water on shoot dry weight (g) after
12 weeks 45
4.2 Experiment two 51
4.2.1 Effect of soil salinity on plant height 51
4.2.2 Effect of salinity on *Acacia mellifera*
51
4.2.3 Effect of salinity on *Eucalyptus camaldulensis* 52
4.2.4 Effect of salinity on *Acacia tortilis* 52
4.2.5 Effect of salinity on *Acacia seyal*52
4.2.6 Effect of salinity on root length after 12 weeks61
4.2.7 Effect of salinity on root dry weight (g) after 12 weeks 61

4.2.8 Effect of salinity on shoot dry weight (g) after 12 weeks 62

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND

RECOMMENATIONS68

5.1 Effect of salt stress on plant growth..... 68

5.2 Effect of salt stress on shoot dry weight 69

5.3 Effect of salt stress on root length and root dry weight 70

Conclusions and recommendations..... 71

Conclusions 71

Recommendations 72

REFERENCE 73

APPENDICES 87