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MORPHOLOGICAL AND PHYTOCHEMICAL
STUDIES ON SOME BEANS
OF FAMILIE SOLANACEAE IN EGYPT

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This THESIS has not been submitted for a degree at
this or any other University.

The literature mentioned hereafter shows how far
I have availed myself of the work of the others.

Signed



(S.F. Khalifa)

LIST OF TABLES

Table	Page
(1) Wettstein's Classification.....	10
(2) The attributes and their states arranged in groups according to organs.....	43
(3) The attribute states for all OTU's.....	43
(4) The range of fruit character within the Solanaceae.....	53
(5) The range of trichome character within the Solanaceae.....	57
(6) Phytochemical screening of the alcoholic extract of taxa.....	67
(7) Total carbohydrates.....	69
(8) Free-sugars present in stems and leaves of taxa.	72
(9) Total nitrogen.....	74
(10) Amino acids present in stems and leaves of taxa.	77
(11) Non-volatile organic acids present in stems and leaves of taxa.....	80
(12) Number of spots of alkaloids present in stems and leaves of taxa.....	82
(13) Calculation of % affinity between OTU's (Morphological studies).....	88
(14) Extraction of morphological data on taxa (Attributes and their states of similarity in groups).....	91
(15) Calculation of % affinity between groups (Morphological studies).....	113

LIST OF FIGURES

Figure	Page
(1) Photomicrograph showing striated cuticle.....	55
(2) Histogram of total carbohydrates.....	70
(3) Histogram of total nitrogen.....	75
(4) Dendrogram of the 56 studied solanaceous OTU's...	89

LIST OF PLATES

Plate	Page
(I) Aspect of the flower (Calyx and Corolla characters).....	48
(II) Aspect of the flower (Stamen Characters).....	50
(III) Characters of Fruits.....	52
(IV) Foliar Hairs.....	53
(V) Leaf Anatomy.....	59
(VI) Stem Anatomy.....	63

CONTENTS

	PAGE
SCOPE OF THE THESIS.....	1
PREFACE.....	3
PART I	
<u>SECTION A</u>	
<u>HISTORICAL INTRODUCTION</u>	
1. Systematy.....	6
2. Morphology.....	9
3. Anatomy.....	11
4. Phytochemistry.....	11
<u>SECTION B</u>	
<u>MATERIAL AND METHODS</u>	
MATERIAL.....	12
METHODS.....	
A. MORPHOLOGICAL STUDIES.....	13
B. PHYTOCHEMICAL STUDIES.....	
I. TECHNIQUE	
(i) Paper Chromatography.....	19
(ii) Thin Layer Chromatography (TLC).....	20
II. REAGENTS AND SOLVENTS	
(i) Preliminary Phytochemical Screening.....	21
(ii) Investigation of Carbohydrates.....	23
(iii) Investigation of Nitrogen.....	25
(iv) Investigation of non-Volatile Organic Acids....	26
(v) Investigation of Alkaloids.....	27

III. EXPERIMENTAL

(i) Preliminary Investigation.....	20
(ii) Investigation of Carbohydrates.....	31
(iii) Investigation of Nitrogen.....	34
(iv) Investigation of Non-volatile Organic Acid	37
(v) Investigation of Alkaloids.....	39

PART II

CHOICE OF CHARACTERS AND OBSERVATIONSSECTION A:

<u>MORPHOLOGICAL STUDIES</u>	42
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SECTION B:

<u>PHYTOCHEMICAL STUDIES</u>	55
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(i) Preliminary Investigations Preliminary Phytochemical Screening.....	66
(ii) Investigation of Carbohydrates Estimation of Total Carbohydrates.....	68
Paper Chromatographic Identification of Free sugars.....	68
(iii) Investigation of Nitrogen Estimation of total nitrogen.....	73
Paper chromatographic Identification of Amino acids.....	75
(iv) Investigation of Non-Volatile Organic Acids Paper Chromatographic Identification of Non- Volatile Organic Acids.....	79

(v) Introduction of the book	
• Paper cover and binding of the book.....	13
• Inner Layer Contents and Inventory list.....	14

PART III

SECTION A:

NUMERICAL ANALYSIS

I. METHODS AND EXPRESSION OF DATA.....	85
II. RESULTS AND DISCUSSION OF NUMERICAL ANALYSES	90

SECTION B:

SUMMARY AND CONCLUDING REMARKS

(1) APPENDED TAX.....	118
(2) Proposed numerical classification of Solanaceae in Egypt.....	119
(3) Relation of the Proposed System to that of Wettstein (1895).....	122

APPENDIX I	125
APPENDIX II	126
APPENDIX III	127
BIBLIOGRAPHY.....	128
ARABIC SUMMARY.....	1

SCOPE OF THE THESIS

The consulted literature, so far, provides a single classification of the Solanaceae into its minor categories. This classification has been carried out by Wettstein as early as 1895, and since then no other attempt has been done. Wettstein's classification of this family, based on a few attributes, might be discredited since classification should better be made by presenting larger numbers of variation patterns.

In achieving character correlations, the variation patterns expressed by increased number of attributes provide an increasing difficulty when treated separately. Meanwhile, the consideration and evaluation of the pertinent information should be made more or less simultaneously. On the family level this would be rather difficult since the proliferation of characteristics provides too cluttered figures for easy and reliable correlation of variables.

With this idea in mind, and depending on as many attributes as possible, the re-classification of Solanaceae in Egypt is tried by analysing and correlating numerical

Information provided by the computer. The information from the resulting analysis can then be arranged in the form of a dendrogram which indicates similarity between the taxonomic units by the relative positions of its branches.

Two more points seem to be in favour for the selection of Solanaceae. These are; first, the family has long been acknowledged for pharmaceutical substances contained in their herbage and which entitle them to the first rank among plants useful to man. Second; in the latest few years, the Egyptian medicine has been auto-industrialized and almost depending on local resources. Consequently, phytochemical studies become indispensable so as to annotate such chemicals of pharmaceutical value.

P R E F A C E

The cosmopolitan Solanaceae is represented in the wild Egyptian flora by the following 26 species (Montasser and Hassib, 1956; and Tackholm, 1956) :-

Solanum nigrum, S. aethiopicum, S. dubium, S. elaeagnifolium,
S. albicaule, S. unguiculatum, S. incanum, Hyoscyamus pusillus,
H. reticulatus, H. muticus, H. albus, H. aureus, H. desertorum,
Datura stramonium, D. tatula, D. metel (occurrence uncertain),
D. fastuosa, D. innoxia, Lycium vulgare, L. schweinfurthii, L. arabicum,
L. europaeum, L. aschersonii, Withania somnifera, W. obtusifolia and
Nicotiana repanda. Of these, nineteen species are either of
very rare occurrence or rare and only 7 species (nearly one
fourth) are either common or very common.

This poor representation of the Solanaceae in its wild aspect is almost compensated by the relative big number of cultivated members. Four genera of these members are truck crops and represented by Lycopersicon, Solanum, Capisium and Physalis. The former three genera are among the distinct Egyptian field crops while the latter (Physalis) is of very little agricultural importance. The remainder

of the cultivable genera are either homegrown or medicinal. Horticultural genera are represented by Eschschol, Salpichroa, Lochnera, Datura spp., Lycium spp., and Solanum spp. Genera cultivated, under mesophytic conditions, include Atropa, Capiscum spp., Datura spp., Solanum spp., in addition to recent trials to cultivate medicinal Ayoscyanus spp. in their natural habitats. In the latest years, variety and cultivar numbers have increased progressively due to local raising as well as to introduction from abroad. On the other hand, monotypic genera are represented by Atropa, Physalis, Lochnera, Petunia and Salpichroa.

In Egypt, the wild solanaceous members vary in their growth forms from therophytes to nanophanerophytes (Lycium arabicum L. europaeum). Most of them are bi- or multi-regional. However, nonregional species are exemplified by Solanum albicaule and S. unguiculatum; both being confined to Gebel Elba phytogeographic region. The majority of the species belong to the xerophytic community and are among the wild flora of the cultivated fields and irrigation channels.

different α and β to maintain $\alpha + \beta = 1$. When α and β initial values are not specified, the algorithm will increase α and decrease β until their calibration yields as a source for alkaloids production.

PART I

SECTION A :

HISTORICAL INTRODUCTION

SECTION B :

MATERIAL AND METHODS