بسم الله الرحمن الرحيم


# شبكة المعلومات الجامعية

# التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

## قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها

علي هذه الأفلام قد أعدت دون أية تغيرات

## يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

**To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%**

# بعض الوثائق الاصلية تالفة

بالرسالة صفحات
لم ترد بالاصل

# PHYSIOLOGICAL AND ANATOMICAL STUDIES ON WATER HYACINTH PLANT.

By

**AMIRA MAHMOUD ABD EL-MONEEM HEGAZI**

B.Sc. in Agricultural Science
(Horticulture)
Faculty of Agric., Ain Shams Univ.,1992

A thesis submitted in partial fulfillment

of
the requirements for the degree of

MASTER OF SCIENCE

in
**Agriculture**
(Plant Physiology)

Department of Agricultural Botany
Faculty of Agriculture
Ain shams University

**1998**

**Approval Sheet**

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# ABSTRACT

**AMIRA MAHMOUD ABD EL-MONEEM HEGAZI. Physiological and Anatomical Studies on Water Hyacinth Plant. Master Degree, Ain Shams Univ., Fac., of Agric. Botany Department, 1998.**

Water hyacinth plant infesting the River Nile and some water canals in Egypt were subjected to physiological and anatomical studies. The seasonal studies (winter, spring and summer seasons) on this aqueous noxious weed treated with low unharmful doses of 2,4-D (25, 50 and 100 ppm) aimed to gather information on some growth morphological parameters: plant size (water displacement technique), specific weight and buoyancy, leaf number based on plastochronic scale through the different growth seasons. Leaf area (total blade area, mean leaf blade area and green area of inflated stalks) critical developmental studies were performed over new fields through positional sequential studies. Portional studies revealed the priority of leaf blade, than leaf stalk, ending with connecting isthmus. Exo-application of 2,4-D (the growth substance) induced elongation in the sub-bulbous region, proportionable with concentration. High concentration induced senescence of mother plant and new rosette production. Phytomass studies played an important role in growth studies of:

Percentages of: fresh weight, water content, dry weight on the different bases of: TFM, TDM, and PFM. This gave more elucidation to the internal behaviour of growth parameters of the plant portions.

Salinity tolerance studies revealed that concentration of 38912 ppm induced several damage within 24h. The lethal level was between 6.0-8.0% of sea water. In WW (1766.4 ppm) water hyacinth survived without toxicity. Heavy metals studies: there was low accumulation rate in plants kept in SW but was high inWW and NW treatments. Water hyacinth exhibit wide range of tolerance to heavy metals, suggesting biological infiltration.

The need of anatomical information in water hyacinth is a must. The root tip zonation of the fibrous root was: long root cap region, naked

region (free of root hairs), finally the lateral root region. The three regioned cortex has plenty aerenchyma, the xylem is reduced to tracheids.L.S.reveals the columnar root cap with a special collumellogen. Internally the solid structure of the primary meristems is aereated by large lysigenous cavities. The L.S.,in a lateral root, discovered that in this early stage of development, the calyptra covers the whole root structure as a socket. The rhizome has the anatomical features of a monocot stele. The outer lining three region cortex had a middle aerating region. The closed vascular bundles are scattered within a compact ground parenchymatous tissue having many ergastic sacs storing raphides and tannins. The leaf stomata prevail more in the upper than the lower epidermal layers. Few cases of sunken guard cells on the upper and raised guard cells on the lower epidermal one. The leaf is isobilateral leaf. The reversed vascular bundles support theory of a false blade (is stalk extension). The spongy tissue has chloroaerenchyma. The bundle sheath are large parenchyma free of chloroplasts. The bulbous portion of the leaf stalk has large air cavities formed by a special arrangement of vertical cellular portions, with triple joints alternating upwards with special three armed (bricke) cells.

The isthmus connects the blade to the bulbous stalk. The lack of mechanical tough tissue helps much the phototactic response of the region. There was some longitudinal extensional response differing with 2,4-D concentrations.

The leaf stipule is unique lying on the abaxial side. Two epidermal layers enclose one plane of simple vascular bundle embedded in a simple almost one layered mesophyll. No cuticle was detected. Diaphragms are one layered cellular structures having narrow tri or quadri-cellular spaces. They extend within the air channels of stem and leaves may be for regulating internal somatic aereation.

**Key words:** Water hyacinth - Growth regulators - Morphological and anatomical response.

# ACKNOWLEDGMENT

I wish to express my sincere appreciation and gratitude to Dr. H.A. Tawfik, Professor Emeritus in Agricultural Botany Department, the senior supervisor of thiswork.On priority bases, his exceedingly helpfull criticism, leading guidance, rich information, perfect diagnosis and solution of problems, enriched my poor mind. Moreover, his continuous efforts through wide experience were endless potential sources during writing this thesis.

To Dr. M.A. Mohamed, Professor of Plant Physiology in Agricultural Botany Department,, I find myself obliged to put on record his guidance and sharp advice.

I am greatly indebted to Dr. S.A. Shehata, Associate Professor of Plant Physiology Agric. Botany Department, whose activ guidance during the analysis of different growth regulators, and sincere criticism in these topics were unforgetable.

To my sincere parents, together with my whole family, who are my source of existence, to whom I find my self bearing an unrepayable Dept. May God bless them all. Many thanks to my colleague Miss Ibtsam Abu-El Magd for her fruitful help and offers during exhausting work periods

I find my self very much indepted to all members ofAgricultural Botany Dept and all staff members and workers of my sincere Department.

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