Mesopotamia Environmental Journal **ISSN 2410-2598**
Mesop. environ. j. 2016, Vol.2, No.2:19-26.

Anatomical variation of some halophytes from different sites in Babylon Provinus ,Iraq

Batool M. Hassan Al-Adily[1] **Hikmet Abbas Al-Ani[2]**
Maysson Mahdi Salih Al-Taee[1]

1 College of Science , University of Babylon ,Iraq

2 College of Agriculture , University Baghdad of ,Iraq

Corresponding author: batool_aladily@yahoo.com

To cite this article:

Al-Adily, B. M. H.; Al-Ani, H. A. and Al-Taee, M. M. S. Anatomical variation of some halophytes from different sites in Babylon Provinus ,Iraq.*Mesop. environ. j*., 2016, Vol. 2, No.2, pp. 19-26.

Abstract

Four halophytes species *Cressa cretica, Aluropus lagopides, Alhagi maurorum* and *Juncus acutus* L.were chosen from four sites within Babylon Provinus o study their stem anatomical adaptations to elevated soil salinity. Adaptations vary among species and main aptations were increased in fibers content in each of them *;* while number of vascular bundle decease in both , *Alhagi maurorum* and *uncus acutus* L, and cortex thickness decrease in *Alhagi maurorum* but increased in *Cressa cretica* .

Keywords; salinity, adaptations, stem anatomy, halophytes.

Introduction

Each plant act as biological system which is opened on the surrounding factors, thus it will effected by them, which mean it will modulate& formative by them [1].Elevated salinity of soil induce major impact on halophytes [2],and the mechanism that enables such plants to thrive on salt effected soils is complex and involve many anatomical modifications[3]. In many studied cases were very spescifity that salinity effected on special tissues or cells types, like increased sclerification and number of vascular bands in stem and[4]d halophytes tend to have rich with succulent cells[5].& produce a secondary xylem as result

to the activity of cambium zone [6].while some halophytes like *Gazania harleauin* L. reduced theire xylem and phloem areas[7].as well as the *Atriplex halimus* [8].

Babylon Governorate includes a large areas that effected by salinity in different levels ranged between 77mmoh/cm and 130mmoh/cm [9].So this study was done to explain the effect of these levels on stem anatomy of *Cressa cretica*, *Aluropus lagopides*, *Alhagi maurorum* and *Juncus acutus* L. as dominant natural halophytes in this governorate.

Materials and methods

In Summer of 2013 four sites within Babylon Governorate were chosen(fig1 and table 1) to collect the halophytes. Site A (Al-Findya) located at Baghdad –Hilla road about 20km to the north of Babylon Governorate , site B (Al- Hashimia) about 21km to the east located at Diwania –Hilla road , site C (Soq Amir) was about 35km to the east-south, and site D (Al-Kifil) about 25km to the south of f hilla city . The studied halophytes were *Cressa cretica*, *Aluropus lagopides*, *Alhagi maurorum* were found in all sites, while *Juncus acutus* L. apcence n site B . Plants putted in clean plastic containers and prong to lab to classified , then slides were prepared from halophytes stems after boiling them for some minuets with D.W. then cut handmade by razor blade and finally stained with fast green and sefraneen stains respectively to study by microscope [10].

Table 1: he studied sites locations and the salinity of their soils represented by electrical conductivity (EC) and pH [11].

Site	E	N	pH	EC(mmoh/cm)
A	44° 26	32° 33'	8.75	100
B	44 °34	32° 22'	8.6	130
C	44° 33'	32° 18'	8.4	124
D	44 °24'	32° 22'	8.7	77

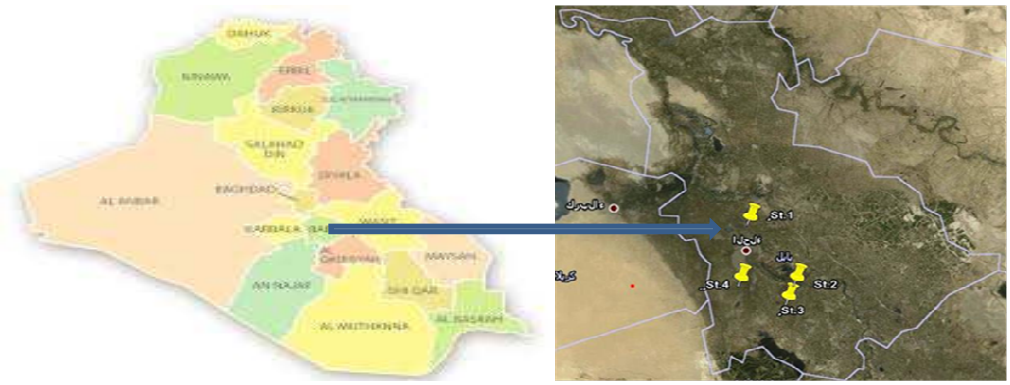


Fig 1: The Map of study sites within Babylon Provinus

Results and Discussion

Results showed that salinity affecting on stem tissues, and the response of stem tissues differ according to both degree of salinity and halophytes species. It was noticed that salinity bring about adverse effects on stem anatomical characteristics as fallowing:

Cressa cretica Xylem and phloem area of stem was increased slightly when soil salinity increased and the largest was seen in section B(plate 1) where soil have a high salinity among the four sites. This result showed the well adapted tissues and it agreed with previous results has done on *Cynodon dactylon* L. This increasing in very saline soil may play important role in conditions of both water uptake, transport, and evaporation; and photosynthesis enzymes activity particularly adverse saline conditions [12].. Stem content of fibers was increased in elevates salinity as a result to change in growth of cells. Pink crystals were founded in high density in both pith and parenchymal cells. Its high density in stem may be related to the fact that of that accumulation carbohydrates in response to salinity stress is thought to have important role in the osmotic adjustment in salt tolerant plants [13].Pith area reduced in stem that grow in elevated salinity. Both cortex and epidermis increased, which disagree with results deals with non-halophytic plants like *Gazania harlequin* L. [7]..

Aluropus lagopides Soil salinity induced well growth of fiber in stem, and this fibers formed a thick closed ring under the cortex. Fiber area was larger in section B (plate 2), which relaxed well adaptive to this environment. Salinity reduced the number of vascular band, and this results agreed with that obtained by Habibe *et al*[14].. Pith cell tend to be thickness. It believed that the elevated concentrations of ions in soil like sulfate induce forming a continuous sclerinchema cylinder constituted by living fiber to enable plant to compartmentalize ions in addition to their well- known mechanical sport role[15].Pith area increases as anatomical adaptation to increasing in soil salinity.

Alhagi maurorum Studied sections of its stem showed well formation of distinguish cells within pith as salt collection cells(plate 3). Salinity induce growth of Fibers, thus it was much in section from elevated soil salinity, while cortex tend to be reduced. This anatomical character vary among plants according to species, that it was increased in *Solanium lycopersicon* L. [16]but decrease in *Gazania harlequin* L. [7].

Juncus acutus L. the main differences in anatomical characters were in fibers and vascular band. Fibers form distinguish ring under cortex, and higher fibers contents was in section C(plate 4) where EC of soil is 130 mmoh/cm. Number of vascular bands reduced where salinity increased, so the width of them were degreased also, and this anatomical change was agreed with previous study on *Raphanus sativus* L. [17].The band sheath cells tend to be less distinguish, may due to injury by salinity.

Plate 1: cross sections (x10) in stem of ***Cressa cretica*** in the sites of stydy (A: Al-Findya, B: Al-Hashimya, C:Soq Amir, and D:A-Kifil).

A

B

C

D

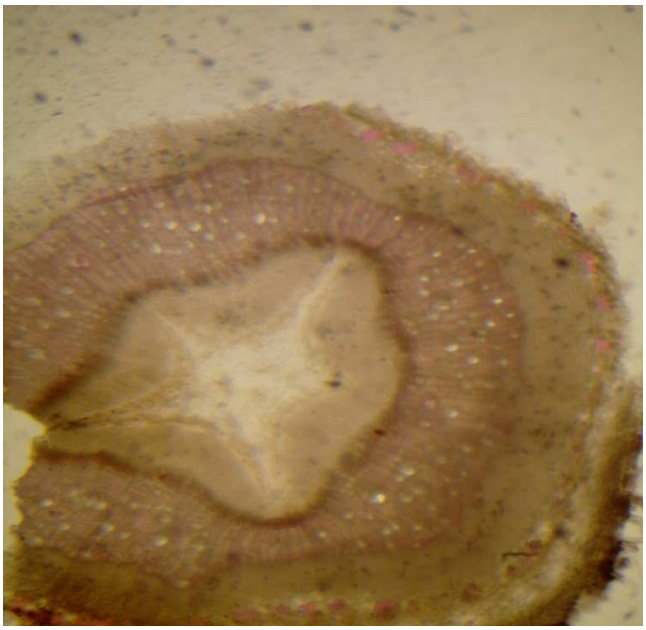
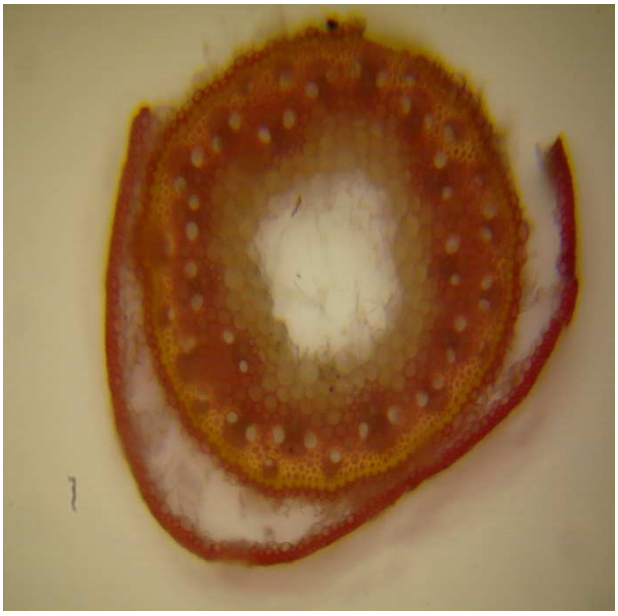


Plate 2: cross sections (x10) in stem of ***Aluropus lagopides*** in the sites of study(A: Al-Findya, B: Al-Hashimya, C:Soq Amir, and D:A-Kifil).

A

B

C



D

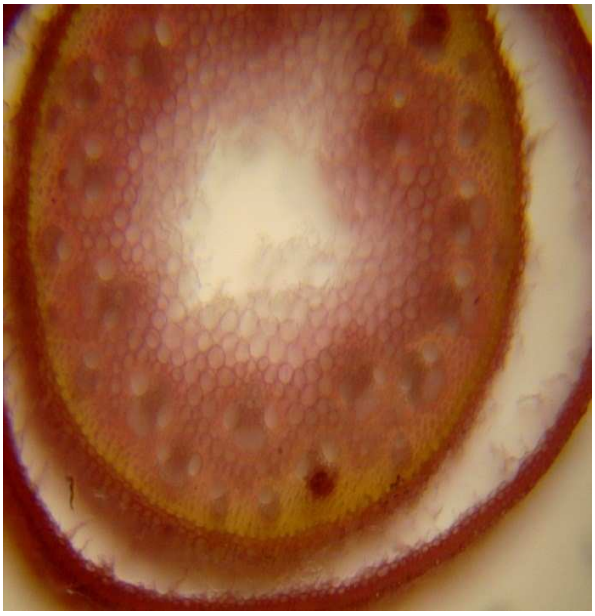
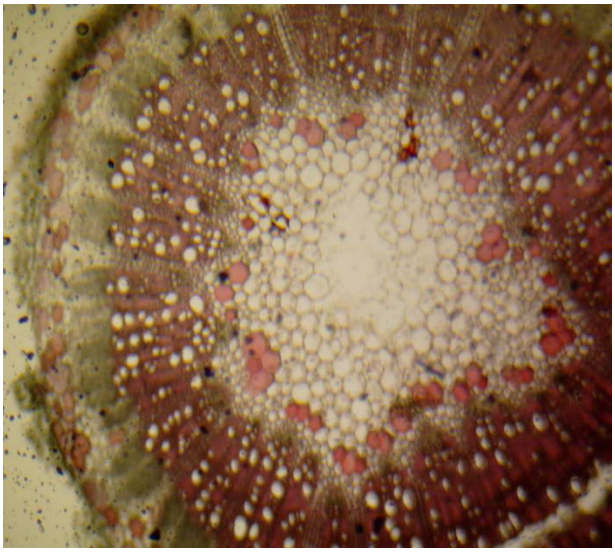


Plate 3: cross sections (x10) in stem of ***Alhagi*** maurorum in the sites of study (A: Al-Findya, B: Al-Hashimya, C:Soq Amir, and D:A-Kifil).

A

B

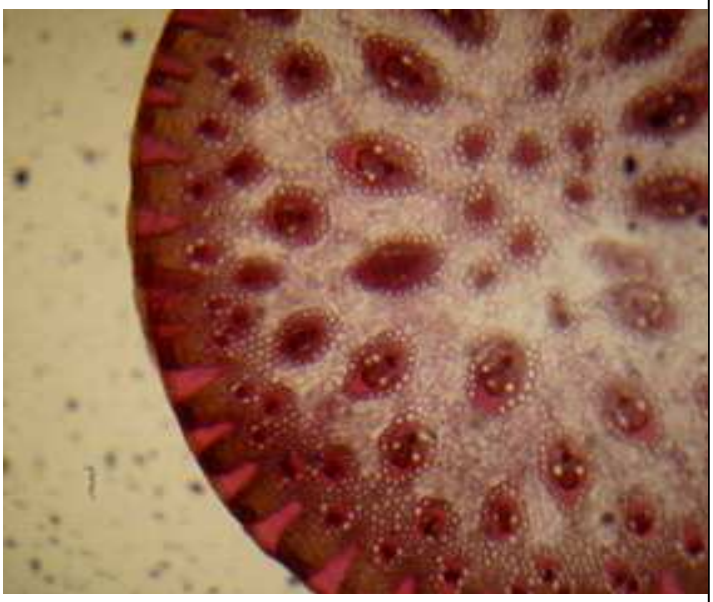
C



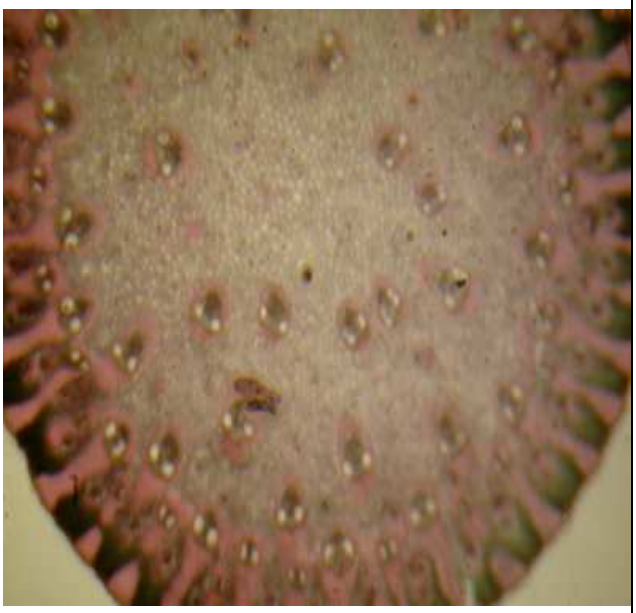
D

Plate 4: cross sections(x10) in stem of ***Juncus*** acutus L. in the sites of study (A: Al-Findya, C:Soq Amir, and D:A-Kifil).

A



C



D

Conclusion :

Salinity bring about adverse effects on stem anatomical characteristics, which include each of stem contents of fibers, vascular bandles, pith, pink crestals and xylom and phloem areas. Halophytes adapted to salinity according to theirs species and salinity levels in their environment.

References

[1]- Grigore M. N., C. Toma, 2008. Ecological anatomy investigations related to some halophyte species from Moldavia. Rom. J. Biol. Plant Biol. Vol. 53 (1): 23-30.
[2]- Grigore M. N., C. Toma, 2006. Evidencing the successive cambia phenomenon on some halophylous representatives among Chenopodiaceae and its possible ecological-adaptive implications. Stud. Com. Complexul Muzeal Şt. Nat. „Ion Borcea" Bacău, 21: 87-93.
[3] Pessarakli ,M. plant and crop stress handbook, new york:marcel dekker inc, ed edition 1999.
[4] Habib, S.,A.; Eisa, S.S.; Farag,E.& Ola,H. A. Morpho- Anatomical Changes in Salt Stressed Kallar Grass(*Leptochloa fusca* L.). *Res. J. Agric& Biol.Sci.*, Vol.8, No. 2: pp.158-16. 2012.
[5] Al-Quran, S. Halophytic vegetation with their conservation in Jordan. *Int. J. Biodvers. Conserv.* , Vol. 4, No. 1: PP. 32-35.2012.
[6] Bercu R., Fagaras,M., and Broasca ,L.anatomical features of *Aster tripolium* (asteraceae) to saline environments. Annals of RSCB , Vol xvii No.1:pp. 271-278.212.
[7] Younis,A. ,Riaz, A., Ahmed,I., Siddique,M.I., Tariq,U., Hameed,M., and Nadeem M. Anatomical change indused by NaCl stress in root and stem of Gazania *harlequin* L. Agri. Communnicatons, Vol.2, No. 3 :pp. 8-1.2014
[8]Tiba,B.B, Denden M., and Boughalleb F. Anatomical changes induced by increasing NaCl salinity in three fodder shrubs, *Nitraria retusa*, *Atriplex halimus* and *Medicago arborea* . Acta. Physiol. Plant , Vol.31, No.5:pp.947-960.2009.
[9] Al-Adily ,B. M. H. Study of some halophytic vegetation environments in Babylon Governorate/Iraq. PhD. Thesis, college of Science –University of Babylon,2013.
[10] Radford, A. E. ; Dikison, W. C. ; Massey, J. R. and Beu, C. R. Vascular plant systematic, Harpar and Raw press, New York,USA,1976.
[11]- Al-Qurainy, F.Hameed , M.; Ashraf, M.;& NAZ, N.. Anatomical adaptation of *Cynodon dactylon* (L). Pers., from the salt range Pakistan, to salinity stress .1.Root& stem anatomy. *Pak. J. Bot.*, (2010),42(1):279-289.
[12] Al-Qurainy, F.Hameed , M.; Ashraf, M.;& NAZ, N.. Anatomical adaptation of *Cynodon dactylon* (L). Pers., from the salt range Pakistan, to salinity stress .1.Root& stem anatomy. *Pak. J. Bot.*, Vol.42, No.1:pp.279-289.2010.
[13] Murakeozy E.P., Nagy Z., Duhaze C., Bouchereau A. Tuba Z. Seasonal changes in the levels of compatible osmolytes in three halophytic species of inland saline vegetation in Hungary. J. Plant Physiology,Vol.160:pp.395-40.2003.
[14] Habib, S.,A.; Eisa, S.S.; Farag,E.& Ola,H. A. Morpho- Anatomical Changes in Salt Stressed Kallar Grass(*Leptochloa fusca* L.).*Res. J. Agric& Biol.Sci.*Vol. 8, No.2:pp.158-166. 2012.
[15] Renoso,H., Sosa,L., Reginata, M., and Luna,V. Histological adaptations induced by sodium sulfate vegetative anatomy of *Prosopis strombulifera* (Lam.)Binth, Agri. Scie, Vol.1, No. 2 :pp.109-119.2005.
[16] Iraki, N. and Al- Tardeh,S. Morphlogical and anatomical responses of two Palestinian tomato (*Solanum lycopersicon* L.) cultivated to salinity during seed germination and early growth stages., African J. Biotech. , Vol.12, No. 30:pp.4788-4797.2013.
[17] Kabar, K., Kilic, S., and Cansolu, K. Effect of some growth regulators on stem anatomy of radish seeding growth under saline NaCl conditions, plant soil environment , Vol. 54, No.10:pp.428-433.2008.