

- in a bio-drainage system. *Irrigation and Drainage Systems.*, 22 (3-4): 271-285.
- [3] Aldesouky, H.S. and Gaber, A.M. (1993). Effect of growth regulators on *Vicia faba* plants irrigated by seawater leaf area, pigments content and photosynthetic activity. *Biol. Plant.*, 35: 519-527.
- [4] Aydin, N.; tugay, M.E.; Sakin, M.A.; Gokmen, S. and Ekiz, H. (2000).
- [5] Determination of yield and quality traits of durum wheat cultivars under TokatKasova condition. *Ortaanadolu” da hububattarmnnsorublarve cozumyollarsempozyumu, Konya, Turkey:* 621- 625.
- [6] Bassu, S.; Asseng, S.; Motzo, R. and Giunta, F. (2009). Optimizing sowing date of durum wheat in a variable Mediterranean environment. *Field Crop Research.*, 111 Issues 1-2B: 109–118.
- [7] Badr, M.A. and El-Shafie, A.M. (2002). Salt tolerance of two wheat varieties and its relation to potassium nutrition. *Al-Azhar Agric. Res.* 35: 115-128.
- [8] Behbout, G.; Torokfavy, E. and Walker, R.R. (1986). Effect of salinity on ionic contents, water relations and gas exchange parameters in some citrus Scion-rootstock combinations. *Sci. Hort.*, 28: 105-116.
- [9] Camilia, Y. El-Dewiny; Hussein, M.M. and Awad, F. (2013). Influence of mono potassium phosphate fertilizer on mitigate The negative effects of high saline irrigation water on onion crop . *Middle East Journal of Agriculture Research*, 3(1): 19-25.
- [10] Delchev, G.; Denev, M. and Denev, D. (2000). Comparative study on Italian and Bulgarian hard wheat varieties regarding their yield and grain quality. *Rasteniiev" dni-Nauki*, 37(9): 765-768.
- [11] El-Hosary, A.A.; Riad, M.E.; Abd El-Fattah, N.R. and Hassan, M.C. (2000). Effect of nitrogen fertilizer treatments on some durum wheat cultivars. *Proc. 9th Conf. Agron., Minufiya Univ.:* 119-133.
- [12] Erchidi, A.E.; Benbella, M.; Talouizte, A.; Royo, C.; Machit, M.M.; Fonzo, D.I. and Araus, J. L. (2000). Relationship between some parameters controlling water loss and grain yield in nine varieties of durum wheat subjected to water stress. *Proc. of a Seminar, Zaragoza, Spain, 12 - 14 April. No.40:* 279-282.
- [13] Ehsanzadeh, P.; Nekoonam M.S.; Azhar, J. N.; Pourhadian, H. and Shaydaee, S. (2009). Growth, chlorophyll, and carotenoids
- [14] concentration of Tetraploid wheat on a solution in high sodium chloride salt: Hulled Versus Free-Threshing Genotypes. *J. of Plant Nutrition*, 32 issue 1: 58–70.
- [15] Ficco, D.B.; Riefolo, C.; Nicastro, G.; De Simone, V.; Di Gesù, A.M.; Beleggia, R.; Platani, C.; Cattivelli, L. and De Vita, P. (2009).
- [16] Phytate and mineral elements concentration in a collection of Italian durum wheat cultivars. *Field Crops Research.*, 111 Issue 3: 235-242.
- [17] Gawish, S.M.; El-Leboudi, A.E.; Abdel Aziz, S.M. and Ahmed, M.R. (1999). Studies on salt tolerance of certain wheat varieties I – Evaluation studies for salt tolerance and growth behavior of plant grown under saline conditions. *Egypt. J. Soil Sci.*, 39(4): 437 - 459.
- [18] Grieve, C.M. and Poss, J.A. (2002). Wheat response to interactive effects of boron and salinity. *J. of Plant Nutrition*, 23(9): 1217– 1226.
- [19] Gupta, N.K., Sunita-Gupta; Arvind-kumar; Gupta-S and Kumer, A. (2001). Effect of water stress on physiological attributes and their relationship with growth and yield of wheat cultivars at different stages. *J. Agron. and Crop Sci.*, 186(1): 55-62.
- [20] Halitligil, M.B.; Akin, A.; biligin, N.; Deniz, Y; Ogretir, K., Altinel, B.; and Isik, Y. (2000). Effect of nitrogen fertilization on yield and nitrogen and water use efficiencies on winter wheat (durum and bread) varieties grown under conditions found in Central Anatolia. *Biology and Fertility of Soil*, 31(2): 175-182.
- [21] Hafsi, M.; Mechmeche, W; Bouamama, L.; Zahharieva, M. and monneveux, P. (2000). Flag leaf senescence, as evaluated by
- [22] numerical image analysis, and its relationship with yield under drought in durum wheat. *J. of Agron. And Crop Sci.*, 185 (4): 275- 280.
- [23] Hussain, S.; Munns, S. and Condon, A. G. (2003). Effect of sodium exclusion trait on chlorophyll retention and growth of durum wheat in saline soil. *Australian Journal of Agricultural Research*, 54, (6): 589- 597.
- [24] Hussein, M.M.; Okasha, El.M. and Abdo, M.M. (2011). Effect of sulphate salinity on growth and photosynthetic pigments of barley varieties. *Res. J. of Agric. & Biol. Sci.*, 7(12): 2091-2096.
- [25] Hussein, M. M.; Abdou, M. A. A. and Soliman, Salwa, E. (2012). Growth and photosynthetic pigments of some Egyptian clover varieties as affected by soil moisture depletion. *Journal of Applied Sciences Research*; 8 Issue 7: 34-53.
- [26] Hussein, M.M.; Okasha, El.M. and Abdo, M.M. (2011). Effect of sulphate salinity on growth and photosynthetic pigments of barley varieties. *Res. J. of Agric. & Biol. Sci.*, 7(12): 2091-2096.
- [27] Hussein, M. M.; Faham, S. Y. and Alva, A. K. (2014). Role of foliar application of nicotinic acid and tryptophan on onion plants response to salinity stress. *Journal of Agricultural Science*, 6(8): 41-51.
- [28] Hussein, M.M.; Abo lilla. B. H.; Mohamed, S. and El-Liethy, S. (2012) Effect of irrigation by salt water using Stroganov solution on anatomical structure of jatropha plants. *Australian J. of Basic and Applied Sci.* (1): 491-496.
- [29] Husmand, S.; Arzani, A.; Maiboly, S.A. and Feize, M. (2005). Evaluation of salt-tolerance genotypes of durum wheat derived from in vitro and field experiments. *Field Crop Research*, 91: 345-354.
- [30] Hu-YunCai; Schmidhalter, U. and Hu-Y.C. (2001). Reduced cellular cross-sectional area in the leaf elongation zone of wheat causes a decrease in dry weight deposition under saline conditions. *Australian J. Plant Physiol.*, 28(2): 165-170.
- [31] Hussein; M.M.; El-Geraty, N.H. and Abo El-Khier, M.S. (2002)
- [32] Endogenous hormones, growth and yield of barley plants as affected by benzyl adenine under different salinity levels. *J. Agric. Sci., Moshtohor, Univ.*, 27(8): 5283-5292.
- [33] James, R.A.; Davenport, R.J. and Munns, R. (2006). Physiological characterization of two genes for Na⁺ exclusion in durum wheat, *Nax1* and *Nax2*. *Plant Physiol.*, 142(4): 1537– 1547.
- [34] Katerji, N.; Mastorilli, M.; van Hoorn, J.W.; Lahmer, F.Z.; Hamdy, A. and Oweis, T. (2009). Durum wheat

- and barley productivity in saline drought environments. European Journal of Agronomy, In Press, Corrected Proof, Available online 28 February 2009.
- [35] Khatkar, D.; Khatkar, M.S. and Khatkar, D. (2002). Stage sensitivity of wheat cultivars to short term salinity stress. Indian J. of Plant Physiol., 5(1): 26-31.
- [36] Karam, F.; Kabalan, R.; Breidi, J.; Roupael, Y. and Oweis, T. (2009).
- [37] Yield and water-production functions of two durum wheat cultivars grown under different irrigation and nitrogen regimes. Agricultural Water Management., 96 Issue 4: 603-615.
- [38] Katerji, N.; Van Hoorn, J.W.; Hamd, A. and Mastrorilli, M. (2003). Salinity effect on crop development and yield, analysis of salt tolerance according to several classification methods. Agricultural Water Management., 62 Issue 1: 37-66.
- [39] Katerji, N.; Van Hoorn, J.; Fares, C.; Hamdy, A.; Mastrorilli, M. and Oweis, T.(2005a). Salinity effect on grain quality of two durum wheat varieties differing in salt tolerance. Agricultural Water Management., 75, Issue 2:85-91.
- [40] Katerji, N.; Van Hoorn, J.; Fares, C.; Hamdy, A.; Mastrorilli, M. and Oweis, T.(2005b). Salt tolerance analysis of chickpea, faba bean and durum wheat varieties: II- Durum wheat. Agricultural Water Management., 72 Issue 3:195-207.
- [41] Lingle, S.E.; Wiedenfeld, R.P. and Irvine, J.E. (2000). Sugar cane response to saline irrigation water. J. of Plant Nutr., 23: 469-486.
- [42] Lutts, S.; El-Mansour, M. and Kent, J.M. (2004). Salinity and water stress have controray effects on relationship between growth and cell viability during and after stress exposurre in durum calus. Plant Sci., 167: 9-18.
- [43] Mobarak, El.A.;Sleem, H.A. and Fahmy, H.A. (2009). Technological evaluation of some Italian and Egyptian durum wheat varieties. Egypt. J. Appl. Sci., 24(5A): 224–237.
- [44] Mohammed, B.; Szady, L. and Mariekent, J. (2001). Water deficit effects on solute condition, osmotic adjustment as a function of leaf ageing in three durum wheat cultivars. Performing differentially in arid conditions. Plant Sci., 160 (4): 669-681.,
- [45] M.M. Hussein ,B.H. Abou Leila and N.F. Abdel Hady (2009). Influence of Putrescine on Growth of Barley (*Hordeumvulgare L.*)Grown under Salinity. Egypt. J. Agron., 31 (2): 301–309.
- [46] Panahi, M. V.; Feizi, M.; Khayambashi, B. and Hajiakhondi, H. (2006). Saline condition and its effect on yield of nine durum wheat cultivars.
- [47] Tenth International Water Technology Conference, IWTC10 2006, Alexandria, Egypt.
- [48] Munns, R.; James, R.A. and Läuchli, A. (2006). Approaches to increasing the salt tolerance of wheat and other cereals. Journal of Experimental Botany, 57(5):1025-104..
- [49] Ravi, I.; Khan, F.A.; Poonman,-Sharma-Natu; Ghildiyal, M.C. and Sharma-Natue, P. (2001). Yield response of bread and durum wheat varieties to carbon dioxide enrichment. Indian J. Agric. Sci., 71(7): 444-449.
- [50] Ribaut, J.M. and Pilet, P.E. (1999). Water stress on growth, osmotic potential, and ABA content of maize roots. Physiol. Plant., 81: 152 -162.
- [51] Ribaut, J.M. and Pilet, P.E. (1994). Water stress and IAA content of maize roots. Planta, 93: 502-507.
- [52] Romero, L.; Belakbir, A.; Ragala, L. and Ruiz, J.M. (1997). Response of plant yield and leaf pigments to saline conditions effectiveness of different rootstocks in lemon plants. Soil Sci. Plant Nutr., 43(4): 856-862.
- [53] Salama, Z.; Fawzi, A.F. and Ganem, S.A. (2000). Growth, nutrients uptake and antioxidant levels in salinized wheat plants. Egypt. J. Physiol., 24(1): 129-148.
- [54] Sarker, A.M.; Rahman, M.S. and Paul, N.K. (1999). Effect of soil moisture on relative leaf water content, chlorophyll, proline and sugar accumulation in wheat. Journal of Agronomy and Crop Science., 183 issue 4: 225–229.
- [55] Sayer, R.; Khomira, H; Kameli, A. and Mosbahi, M. (2008).
- [56] Physiological tests as predictive appreciation for drought tolerance in durum wheat (*Triticum durum L.*). Agron. Res., 6(1): 79- 90.
- [57] Scott, T.K. (1984). Hormonal regulation of development II- The function of hormonal regulation of the cell to whole plant in Encyclopaedia of Plant Physiology. New series: pp180-185, Berlin.SpringerVerlag. Sharma,-Natu, P. (2001). Yield response of durum (*Triticum durum L.*) and bread wheat (*Triticumaestivum L.*) varieties to carbon dioxide enrichment, Indian. J. Agric. Sci., 71(7): 444-449.
- [58] Snedecor, G.W and Cochran, W.G (1980).“Statistical Methods” Iowa State Univ., Iowa, USA.
- [59] Stehno, Z. (2001). Evaluation of yield structure and quality in durum wheat cultivars. Rostlinna, 47 (2): 70-75.
- [60] Steppuhn, H; Volkmar, H. and Miller, P.R. (2001). Salt tolerance of dry bean, field bean, durum wheat and canola crops grown in saline media. Crop Science, 41(6): 1827-1833.
- [61] Tekalign; M.; Richter, C. and Heiligatag, B. (1996). Response of some varieties of durum wheat and tef to salt stress. African Crop Science Journal, 4(4): 423-432.
- [62] Terziev, Z. (2000). Yield and quality of grain of some varieties of wheat, triticale and barley. Rastieniev" dni-Nauki, 37(7): 431-435.
- [63] Thalji, T. and Shalalkeh, G. (1997). Screening wheat and barley genotypes for salinity resistance. J. of Agronomy, 6(1): 75–80.
- [64] Zair, I.; Chlyah, A.; Sabounji, K.; Tittahsen, M. and Chlyah, H. (2003).Salt tolerance improvement in some wheat cultivars after application of in vitro selection pressure . Plant Cell and Organ culture, 73(3): 237–244.
- [65] Zhao, G.Q.; Ma, B.L. and Ren, C.Z. (2007). Growth, gas exchange, chlorophyll fluorescence, and ion content of naked oat in response to salinity. Crop Sci., 47:123-131.
- [67] Zekri, M. and Parsons, L.R. (1992) .Salinity tolerance of citrus root stocks: Effect of salt on root and leaf mineral concentration. Plant and Soil, 147-181.

Table 1: Growth of different durum wheat varieties. (after 120 days after sowing)

varieties	Plant height cm.	No of leaves/ mean stem	No of tillers/ plant	Area of leaves/ mean stem	No of spikes /plant	Length of spike cm
Ban. 3	75.0	3.43	3.57	65.9	4.23	13.67
Ban. 1	60.5	2.97	1.67	35.5	2.23	13.87
Soh. 3	79.0	3.77	2.67	69.8	3.57	14.2
Soh. 2	72.7	3.67	2.97	90.0	3.67	14.67
L.S.D. 0.05	7.02	0.46	0.27	20.3	1.02	N.S

Ban. : Banisweaf Soh. : Sohag

Table 2: Effect of irrigation by diluted seawater on growth of durum wheat plants (after 120 days after sowing)

Salt conc. ppm	Plant height cm	No of leaves/ mean stem	No of tillers/ plant	Area of leaves/ mean stem	No of spikes /plant	Length of spike cm.
T.W.	78.1	3.83	3.05	85.40	3.75	15.83
2000	74.5	3.58	2.85	69.30	3.60	14.48
4000	62.8	2.90	2.25	41.20	2.93	11.93
L.S.D. 0.05:	4.69	0.64	0.70	17.90	0.50	1.45

T.W. : Tap water

Table 3: Effect of irrigation by diluted seawater on growth of different durum wheat plants. (after 120 days from sowing)

	Salt conc.	Plant	No. of	No. of	Area of	No. of	Length of
Ban. 3	T.W.	83.3	4.0	3.3	95.3	4.0	15.0
	2000	71.7	3.3	3.7	54.0	4.7	15.3
	4000	70.0	3.0	3.7	48.3	4.0	10.7
Ban. 1	T.W.	69.7	3.3	2.3	44.7	3.0	15.3
	2000	66.7	3.0	1.7	41.0	2.0	14.3
	4000	45.0	2.3	1.0	20.7	1.7	12.0
Soh. 3	T.W.	81.3	4.0	3.3	84.3	3.7	16.3
	2000	81.3	4.0	2.7	69.7	3.7	14.0
	4000	74.3	3.3	2.0	55.3	3.3	12.3
Soh. 2	T.W.	78.0	4.0	3.3	117.3	4.3	16.7
	2000	78.3	4.0	3.3	112.3	4.0	14.3
	4000	61.7	3.0	2.3	40.3	2.7	12.7
L.S.D. at 5%		9.37	N.S	N.S	N.S	N.S	N.S

Ban. = Banisweaf T.W = Tap water

Soh. = Sohag M. stem = Mean stem

Table 4: Effect of irrigation by diluted seawater on photosynthetic pigments of durum wheat plants. (after 120 days from sowing).

Salt conc. ppm	Chl.a	Chl.b	Carotenoids	Chl.a+Chl.b	Chl.a; Chl.b	Chl.a+Chl.b ::Carotenoids
T.W.	5.55	3.85	5.69	9.40	1.44	1.65
2000	6.13	3.87	5.43	10.00	1.58	1.84
4000	7.07	4.00	5.42	11.07	1.77	2.04
L.S.D. 0.05:	1.49	N.S	N.S	1.23

Ban. : Banisweaf Soh. : Sohag

Table 5: Effect of irrigation by diluted seawater on photosynthetic pigments in plants of durum wheat varieties. (after 120 days from sowing)

varieties	Chl.a	Chl.b	Carotenoids	Chl.a+Chl.b	Chl.a; Chl.b	Chl.a+Chl.b ::Carotenoids
Ban. 3	7.10	3.25	4.03	10.35	2.19	2.57
Ban. 1	5.84	3.98	5.61	9.82	1.48	1.75
Soh. 3	6.44	3.23	5.90	9.67	1.99	1.64
Soh. 2	5.60	4.10	5.18	9.70	1.37	1.87
L.S.D. 0.05	1.38	N.S	N.S	N.S

Ban. : Banisweaf Soh. : Sohag

Table 6: Effect of irrigation by diluted seawater on photosynthetic pigments of different durum wheat plants. (after 120 days from sowing)

varieties	Salt conc.	Chl.a	Chl.b	Carotenoids	Chl.a+Chl.b	Chl.a; Chl.b	Chl.a+Chl.b ::Carotenoids
Ban. 3	T.W.	6.88	203	6.38	8.91	3.39	1.40
	2000	6.68	342	5.72	10.10	1.95	1.77
	4000	7.75	430	4.00	12.05	1.80	3.01
Ban. 1	T.W.	5.69	359	4.94	9.28	1.59	1.88
	2000	6.07	383	5.31	9.90	1.59	1.86
	4000	5.78	452	6.57	10.30	1.28	1.57
Soh. 3	T.W.	4.98	373	6.48	8.71	1.34	1.37
	2000	5.65	368	5.78	9.33	1.54	1.61
	4000	8.69	228	5.45	10.97	2.01	2.01
Soh. 2	T.W.	4.63	284	4.95	7.47	1.63	1.51
	2000	6.10	456	4.92	10.66	1.34	2.17
	4000	6.07	491	5.68	10.98	1.24	1.93
L.S.D. at 5%	N.S	N.S	0.73	N.S

Ban. : Banisweaf Soh. : Sohag