Plant Archives Vol. 19, Supplement 1, 2019 pp. 392-396 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

THE MORPHOLOGICAL CHARACTERS OF GROWTH SWAMP MORNING GLORY WITH DISTANT FROM LEVEL WATER AND EFFECT ON GROWTH OF COMMON REED

[1]AbbassMhson Salman Al- Hmadawi, [2]Rasha AbdulrazzakJawad Al-Taie, [3]Zainab RehmanJassim AL- Malikshah and Afrah Abdul Hussein Ibrahim[4]

[1]Department of Horticulture, Faculty of Agriculture of Agriculture, University of Kufa, Iraq
[2] Department of Plant Production , Faculty of Agriculture of Agriculture, University of Kufa, Iraq
[3]Agricultural Engineers Directorate of Agriculture, Wast, Iraq, [4]Faculty of Jurisprudence, University of Kufa, Iraq

Abstract

In this study, physical characteristics of Swamp morning glory parameters grown in AL-bassya, AL-Najaf Governorate, Iraq were determined, length stem, diameter stem, number branches on mean stem, number branches that end with tendril, number leaves on branches, length petiole length leaf with petiole, latitude of leaf, percentage humidity of leaf, percentage dry matter of leaf, leaf area .total chlorophyll, number flower cluster, number flower on cluster, length of flower and percentage decay with insects bite leaves. This plant planted (2, 1.5, 1, 0.5 and 0) meter from level water of river Euphratesto investigate the effect of its on growth characters of (*Phragmites communis* Trin.) common reed for season 2018. Results show that all of physical characteristics had statistically significant differences. The treatment of (0 - 1.5 meter Decant plant growth from level water of river Euphrates) gave the highest rate of prevent growth reeds and the percentage growth reach zero.
Key words: *Ipomoea aquatica* L., cultivars, physical characteristics, common reed.

Introduction

Swamp morning glory (*Ipomoea aquatica*) belong to genus Ipomoea, which is follows to the Family Convolvulaceae (Bako *et al*., 2002). It was grows in water or on moist soil. Its stems are 2–3 meters (7–10 ft) or longer, rooting at the nodes, and they are hollow, succulent and can float. The leaves vary from typically agitate (arrow head-shaped) to lance late, 5–15 cm (2–6 in) long and 2–8 cm (0.8–3 in) broad. The flowers are trumpet-shaped, 3–5 cm (1–2 in) in diameter, and usually white in color with a mauve centre. Propagation is either by planting cuttings of the stem shoots that will root along nodes or planting the seeds from flowers that produce seed pods (Westphal, 1992). *I. aquatica* originated in tropical Asia (possibly India) and can be found in South and South-East Asia, tropical Africa, South and Central America and Oceania (Stephens and Dowling, 2002). Only in South and South-East Asia is it an important leafy vegetable. It is intensively grown and frequently eaten throughout South-East Asia, Hong Kong, Taiwan and southern China (Hodgkiss, 1978). Regulatory strategies to prevent the world movement and further establishment of exotic pest plants such as *I. aquatica* include foreign prevention (production of weed-free commodities for export to un-infested countries); exclusion (detection and mitigation of weed contaminants in imported products at ports of entry); detection, containments and eradication of incipient infestations, and cost-effective control of widespread species (Westbrooks, 1991). *I. aquatica* is a very useful vegetable crop in tropical countries where it has been cultivated for centuries. However, its potential to harm natural ecosystems, rice and sugarcane production, irrigation systems, and navigation and recreation have prompted its listing as a Federal Noxious Weed in the USA (Patnaik, 1976). *I. aquatica* occurs in moist, marshy, or inundated localities, in shallow pools, ditches, or wet rice fields, from sea level to 1000 m. It forms dense masses and is easily propagated from cuttings (Raju and Reddy, 1993). It is also cultivated as a vegetable in different parts of Asia as well as occurring in the wild and as a weed (Haselwood and Motter, 1966). Fresh, mature seeds display primary dormancy within 15 days after harvest. Natural germination occurs following an after-ripening period and scarification of the seed coat. Dormancy can be broken by various methods of scarification, such as naturally occurring abrasion by soil particles, prolonged microbial attack, or ingestion by animals (Datta and Biswas, 1970). Germination rates of *I. aquatica* seeds are usually less than 60%, with black-seeded types showing higher germination rates than light-coloured seeds. Two to three weeks after sowing, the plants start developing strong lateral branches. After this, the main axis and both lateral branches produce about one leaf every 2-3 days. Flowering starts 48-63 days after sowing (Westphal, 1992). Roots are produced at stem

nodes that come in contact with water or moist soil. New plants can root within a week (Satpathy, 1964). Once roots are established, the plant grows as a trailing vine. Along waterways, the stems spread out over the water surface, forming a dense, tangled network that can obstruct water flow and access to it. Stems that have grown out over water have round, hollow stems and petiolate, basally lobed leaves. Under dry land conditions, *I. aquatica* will grow as an erect herb (Edie and Ho, 1969). *I. aquatica* is thought to be a quantitative short-day plant. It produces optimum yields in the lowland humid tropics that have stable high temperatures and short-day conditions. Optimum growth occurs in full sunlight. Marshy lands and waterlogged soils are ideal for growth of *I. aquatica*. Shallow ponds, ditches, peripheries of deep ponds, tanks, and slopes of wet soils are also suitable. It is adapted to a wide range of soil conditions, with clay soils (heavy or silty) being generally suitable. Soils with a high percentage of organic matter are preferred. The optimum pH range for growth is 5.3-8.5 (Tiwari and Chandra, 1985). Low temperature, shade and salinity are limiting factors for growth of *I. aquatica*. It grows poorly in cold weather but can tolerate light frost that affects only the outer leaves (Pino *et al*., 1996). The seeds can withstand some freezing (Gilbert, 1984). Huang (1981) observed that it does not grow at day/night temperatures below 20/15°C. It has low shade tolerance: plants grown in shade are weak and thin (Tiwara and Chandra, 1985). *I. aquatica* is not tolerant of brackish or salt water (Bako *et al*., 2002). Associated insects include *Metriona circumdata* (George and Venkataraman, 1987) that bite leaves of swamp morning glory. The main objective of this investigation is to study some vegetative growth of plant swamp morning glory and effect on some characterize vegetative growth of varieties reed AL-bassya, AL-Najaf.

Materials and Methods

This study was conducted at the distant (2, 1.5, 1, 0.5 and 0) meter from level water of river Euphrates in AL-Abbasyia. Najaf governorate for the 2018 season on plant swamp morning glory, 3 plants at same size and growth were selected with 3 years of. The experiment included 16 treatments with three replicates. It is adopted according to Randomized Complete Block Design (RCBD) and the results were statistically analyzed according to L.S.D test at the probability level of 5% (Al-Rawi and Khalf Allah, 2000). The experiment involved the following 18 treatments:

- Plants growth from level water of river Euphrates (2 meter).
- Plants growth from level water of river Euphrates (1.5 meter).
- Plants growth from level water of river Euphrates (1 meter).
- Plants growth from level water of river Euphrates (0.5 meter).
- Plants growth from level water of river Euphrates (0 meter).
- Control (without plant swamp morning glory).

The length stem, diameter stem, number branches on mean stem, number branches that end with tendril, number leaves on branches, length petiole length leaf with petiole, latitude of leaf, percentage humidity of leaf, percentage dry matter of leaf, leaf area, total chlorophyll, number flower cluster, number flower on cluster, length of flower according to (Ibrahim, 2010). The percentage of injury of insects bite leaves determined according to (Duatin and Pedro, 1986). Total chlorophyll in leaves mg /100g FW, according to (A.O.A.C., 1985). The vegetative growth parameters of reeds determined according to (AL-Khafagi, 2001).

Results and Discussion

(1) Length stem, diameter stem, number branches on mean stem, number branches that end with tendril, number leaves on branches, length petiole, length leaf with petiole, latitude of leaf , percentage humidity of leaf, percentage dry matter of leaf, leaf area, total chlorophyll, number flower cluster, number flower on cluster, length of flower and percentage of injury of insects bite leaves.

The data in table (1 and 2) indicate that the distant (2, 1.5, 1, 0.5 and 0) meter from level water of river Euphrates led to a significant increased in the length stem, number leaves on branches, percentage humidity of leaf, number flower cluster and number flower on cluster until reached highest rates (6.30 m, 36.16, 90.01%, 10.37 and 14.12) in the treatment level water of river Euphrates in comparison to the lowest values rates (3.12m, 24.51, 87.17%, 5.40 and 6.67) in treatment which level water of river 2 meter, respectively. Also the treatment that level water of river 2 meter gave highest significance result in diameter stem, number branches on mean stem, number branches that end with tendril, length petiole, length leaf with petiole, latitude of leaf, percentage dry matter of leaf, leaf area, total chlorophyll, length of flower and percentage of injury of insects bite leaves they were (5.24 cm, 9.33, 3.20, 12.80 cm, 36.18 cm, 9.30 cm, 12.83%, 160.60 cm^2, 118.46 mg/100g FW, 5.90cm and 2.13%) comparison with lowest rates in the treatment at level water of river they were recorded (1.56 cm, 2.50, 0.00, 6.32 cm, 25.24 cm, 5.00 cm, 9.99%, 101.35cm^2, 98.26 mg/100g FW, 4.17 cm and 1.49%), respectively. The increase in leaf area,

leaf chlorophyll content, number branches on mean stem, number branches that end with tendril, length petiole, length leaf with petiole, latitude of leaf and percentage dry matter of leafin treatment which level water of river 2 meterthat clearly obvious from the previous results could be due to enhanced cell division, metabolism and other biological reactions, in addition to the activation effect of these parameters on photosynthesis and promoting protoplasm formation including RNA and DNA that important for cell division. The increase of this characterize of vegetative growth because of the treatment led to the root system in absorption the nutrients elements in which some of them are parts of chlorophyll which led to increase its quantity in comparison control treatment. This process increases photosynthesis an activate plant growth which led to enhance hormones synthesis (Wagner *et al*., 1999). The percentage of decay with insects bite leaves was increased significantly with increase distant plant swamp morning glory growth from level water of river and the highest significance result was recorded in treatment (2 meters from level water of river), that gave 2.13% comparison with lest rates of percentages 1.49 % in the treatment (at level water of river). The increase in chemical companied of leaves juice in treatment 2 meters from level water of river due to the fact that this compound increase with reduce humidity of leaves and this to attract insects bite leaves.

Compositional analysis of leaves yielded moisture 90%, protein 3%, fiber 0.9%, fat 0.4%, carbohydrate 4.3%, mineral matter 2%, nicotinic acid 0.6 mg/100g, riboflavin 120 mg/100g, vitamin C 137 mg/100g, vitamin E 11 mg/100g and ash 1.4%. (Chitaji and Pinkak, 2015).

(2) The number of common reed in $1m^2$, length common reed, diameter common reed, number branches, length leaf, latitude of leaf, number of leaf and length of inter node.

Data in Table (3) shows that the number of common reed in $1m^2$, length common reed, diameter common reed, number branches, length leaf, latitude of leaf, number of leaf and length of inter node were a significant decreased with decrease distant plant swamp morning glory from level water of river Euphrates and the vegetative growth characters reached to zero in common reed. The Control treatment (without plant swamp morning glory) gave highest significance result they were (25.34, 3.80 m, 1.50 cm, 2.00, 51.68 cm, 5.13 cm, 23.60 and 21.95 cm), respectively comparison with lest rates (0.00) in treatments (1, 0.5 and 0) meter from level water of river. When the plant swamp morning glory grows nearly by water level, the reed growth decreased due the fast growth and the density, large area of leaves of swamp morning glory that reduce the sun light. In addition, it has very strong roots that prevent the growth of reed rhizomesor probably there was an allelopathy effect (Gupta, 2015).

Conclusion

It could be concluded from this experiment that the plant swamp morning glory have the highest result in length stem, diameter stem, number branches on mean stem, number branches that end with tendril, number leaves on branches, length petiole length leaf with petiole, latitude of leaf, percentage humidity of leaf, percentage dry matter of leaf, leaf area, total chlorophyll, number flower cluster, number flower on cluster, length of flower and reduced or prevented common reed from growth.

Table 1 : Effect of distant growth from level water of river Euphrates on Physical characters of stems and leaves of plant swamp morning glory for season 2018.

Distant plant growth from level water of river Euphrates (meter)	Length stem (m)	Diameter stem (cm)	Number branches on mean stem	Number branches that end with tendril	Number leaves on branch	Length petiole (cm)	Length leaf with petiole (cm)	Latitude of leaf (cm)
2	3.12	5.24	9.33	3.20	24.51	12.80	36.18	9.30
1.5	3.87	4.72	6.74	2.33	28.90	10.41	32.64	8.22
1	4.00	3.45	5.15	2.64	33.27	9.55	30.43	6.89
0.5	4.55	2.29	3.94	1.13	34.45	7.86	27.91	5.18
In level water of river	6.30	1.56	2.50	0.00	36.16	6.32	25.24	5.00
L.S.D 0.05	0.79	0.65	1.18	1.05	3.62	0.87	1.86	0.66

Table 2 : Effect of distant growth from level water of river Euphrates on Physical characters of leaves, flowers and percentage decay with insects bite leaves of plant swamp morning glory for season 2018.

Distant plant growth from level water of river Euphrates (meter)	% Humidity of leaf	% Dry matter of leaf	Leaf area cm^2	Total chlorophyll mg /100g	Number flower cluster on branch	Number flower on cluster	Length of flower cm	% of decay with insects bite leaves
2	87.17	12.83	160.60	118.46	5.40	6.67	5.90	2.13
1.5	87.90	12.10	143.93	112.15	7.32	8.19	5.42	2.09
1	88.25	11.75	120.16	105.68	7.98	9.23	4.86	1.85
0.5	88.98	11.02	110.40	102.45	8.18	11.51	4.70	1.63
In level water of river	90.01	9.99	101.35	98.26	10.37	14.12	4.17	1.49
L.S.D 0.05	0.65	0.18	4.68	3.70	1.53	1.46	0.24	0.17

Table 3 : Effect of distant growth of plant swamp morning glory from level water of river Euphrates on growth characters of (*Phragmites communis* Trin) common reed for season 2018.

Distant plant growth from level water of river Euphrates (meter)	Number of reed in $1m^2$	Length of reed (m)	Diameter of reed (cm)	Number of branches	Length leaf of reed (cm)	Latitude leaf of reed (cm)	Number of leaves	Length of inter node (cm)
Control (without plant swamp morning glory)	25.34	3.80	1.50	2.00	51.68	5.13	23.60	21.95
2	5.75	2.57	1.90	1.00	36.45	3.90	19.37	18.19
1.5	1.00	2.35	2.04	1.00	29.52	3.25	14.63	11.55
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.5	0..00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
In level water of river	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
L.S.D 0.05	3.70	1.12	0.50	0.18	2.24	1.75	2.87	3.10

Acknowledgements

The author is thankful to Dr Ali Abid Abojassim and the staff of College of Agriculture for their help in this work.

References

AL-Khafagi, A.B.M. (2001). Effect of dates of burning, dates of application of glyphosate, methods of application and their interaction in controlling common reed. Ph.D. Thesis. Dep. Agronomy. Agric. College. Univ. of Baghdad, Iraq.

AL-Rawi, K.M. and Khalf A.M. (2000). Design and Analysis of Agricultural Experiments. College of Agric. Univ. Mosel, Iraq.

Association of Officinal Analytical Chemist, Official Methods of Analysis (1985). 13th Ed. APAC . Washington . D. C.U.S.A.

Bako, S.P.; Balarabe, M.L. and Ruga, B.T. (2002). Ethnobotanical, economic and nutritive potentials of aquatic vascular flora in the Nigerian Savanna. Recent progress in medicinal plants. Vol 1: Ethnomedicine and pharmacognosy, 177-182.

Chitaji, M. and Pinkak, P. (2015). Pharmacological potentiality and use of Ipomea aquatic Forsk. Asian Journal of Pharmaceutical and Clinical Research, Vol 8, Issue 2.

Datta, S. and Biswas, W. (1970). Germination regulating mechanisms in aquatic angiosperms. Ciencias Naturais, 39: 175-180.

Duatin, C.J. and Pedro, L.B. (1986). Biology and host range of the taro plant hopper, Tarophagusproserpina Kirk. Annals of Tropical Research, 8(2): 72-80.

Edie, H. and Ho, B.(1969). Ipomoea aquatica as a vegetable crop in Hong Kong. Economic Botany, 23: 32-36.

George, M. and Venkataraman, K. (1987). Occurrence and life history of *Cassida circumdata* Herbst (Coleoptera: Chrysomelidae) in Keoladeo National Park, Bharatput, India. Journal of the Bombay Natural History Society, 84(1): 248-253.

Gilbert, K. (1984). A review of the aquatic plant Ipomoea aquatica (water spinach). Report prepared by the Bureau of Aquatic Plant Research and Control, Florida Department. of Natural Resources. USA, USDA.

Gupta, A.K. (2015). Ipomoea aquatica Forssk. swamp morning glory. cultivated plants. CABI. Plants. USDA.gov. 490- 501.

Haselwood, E. and Motter, G. (1966). Handbook of Hawaiian Weeds. Hawaii: Experiment Station of the Hawaiian Sugar Planters' Association.

Hodgkiss, I.J. (1978). Hong Kong freshwater plants. Hong Kong, China: The Urban Council and Urban Services Dept., Govt. Printer.

Huang, H. (1981). Effects of temperature on germination, growth, and dry matter content of two high nutritive value tropical vegetables-edible amaranth and water convolvulus. Memoirs of the-College of Agriculture, National Taiwan University, 21(1): 88-105.

Ibrahim, H.M. (2010). Analysis of plant samples. AL-Menia Unui. Dar AL-Fajar for printing and publishing. Egypt.

Patnaik, S. (1976). Autecology of Ipomoea aquaticaForsk. Journal of the Inland Fisheries Society of India, 8: 77-82.

Pino, M.; Delos, A.; Cardo, F.E.; Terry, E. and Terán, Z. (1996). A study of water spinach (Ipomoea aquatica Forsk) under different cultivation conditions. Cultivar Tropical, 17(2): 39-43.

Raju, R.A. and Reddy, M.N.(1993). Chemical control of swamp morning glory (Ipomoea aquatica Forsk) in drainage water bodies. Integrated weed management for sustainable agriculture. Proceedings of an Indian Society of Weed Science International Symposium, Hisar, India., 1(3): 247-249.

Satpathy, B. (1964). Kalami sag, a new addition to our greens. Indian Farming, 14(8): 12.

Stephens, K.M. and Dowling, R.M. (2002). Wetland plants of Queensland. Collingwood, Victoria, Australia: CSIRO Publishing.

Tiwari, N. and Chandra, V. (1985). Water spinach- its varieties and cultivation. Indian Horticulture, 30(2): 23-24.

Wagner, W.L.; Herbst, D.R. and Sohmer, S.H. (1999). Manual of the Flowering Plants of Hawaii, Revised ed. Honolulu, USA: University of Hawaii Press.

Westbrooks, R.G. (1991). Plant protection issues. I. A commentary on new weeds in the United States. Weed Technology, 5(1): 232-237.

West Phial, E. (1992). Ipomoea aquaticaForssk. In: 't Mannetje L, Jones R, eds. Plant resources of Southeast Asia. No. 4. Forages. Wageningen, Netherlands: Pudoc Scientific Publishers, 164-166.