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EFFECT OF SALINITY ON EARLY GROWTH SEEDLING STAGES IN PROSOPIS JULIFLORA (SW) D.C.

Botany

R. Somashekhar*

Azyme Biosciences Private Limited, Jayanagar, Bengaluru, Karnataka, India.
*Corresponding Author

ABSTRACT

A common firewood plant *Prosopis juliflora* studied for salt stress and showed that the shoot length was much affected than that of root at moderate to severe stress, whereas severe stress much affected with reference to high stress in connection with moisture content. The early stage is much prone to stress in growth as well as biomass content as compared to later stage.

KEYWORDS

Firewood, growth parameters, moisture content, Prosopis

Introduction

The rural area is much in need of fuel wood demand than urban. The insufficient supply of firewood is the main causing factor of damage to forest too many areas. In India, traditional form of energy provides more than 80% of the total energy consumption in rural and over 50 % in urban households [1]. The existing biomass and per capita consumption of fuel wood are leading towards a more serious situation. So it is required to evolve system to overcome the problem by studying the bioproductivity of fire wood species on wastelands and to select highly potential genotypes. In the present paper a potential plant Prosopis juliflora, has been investigated for growth and biomass parameters under salt stress conditions.

Materials & Methods

The seeds were washed and cleaned by treated with 50 % H_2SO_4 for 20-30 minutes to break the dormancy. Then seeds were surface sterilized with 50 % $HgCl_2$ followed by washing in sterile distilled water. These seeds were used for petriplate experiments. The salt tolerance study conducted by artificial salinity using NaCl as salt as per the methodology described in USDA manual [2]. The salinity ranges were 0.5 % and 1.0 % level.

10 sets of oven dried petriplates with blotting paper were used for germination studies. The seeds were treated (10 seeds per petriplate) NaCl 0.5 % and 1.0 % for stress studies and one more set with water as control. Each time 5ml of salt solution of 0.5 and 1.0 % and water were added in respective petriplates. Regular observations were made to determine the growth of seedlings under control and salt stress conditions. The salt stress was induced at an interval of one week and observationwere taken every 15 days of interval.

Results

The salt resistance in higher plants is a complex trait which depends on mechanism operating at cellular as well as whole plant level. Growth parameters include root and shoot lengths, similarly fresh and dry weights of the seedlings were recorded in table 1. The growth exhibits clear effect of salinity on seedlings. The decrease in root length of 5.5 % and 11.0 % and shoot length of 36 % and 46 % was caused as compared to control after 60 days. Whereas after 90 days one more observation revealed the decrease in root length of 7.0 % and 4.0 % and shoot length decrease of 20 % and 28 % at 0.5 and 1.0 % salt stress when compared to control.

Biomass like fresh and dry weights of the seedlings was observed. The dry weight determined by keeping the fresh seedlings in oven at 60° C for 6-8 hours. Thus moisture content was removed and the dry weight was measured. It was found that moisture content 77 %, 75 % and 65 % under control, 0.5 and 1.0 % salt level respectively. The data shows that moisture content is retained comparatively better under 0.5 than 1.0 % salt level.

TABLE 1. EFFECT OF GROWTH PARAMETERS AND BIO-MASS STUDIES AT 60 AND 90 DAYS IN P. Juliflora

Treatment	Root length (cm)		Shoot length (cm)		Fresh wt (gm)	Dry wt (gm)	Moisture (%)
(NaCl %)	60	90	60	90	60	90	-
Control	4±0.14	5±0.15	7.5 ± 1.3	12 ± 1.2	0.925	0.72	77.8
0.50%	3.8±0.01	4.5±0.01	5±0.39	9.5±0.04	0.225	0.173	75
1%	3.5±0.14	4±0.12	4±0.89	8±0.09	0.102	0.66	65

Discussion

The review of literature on growth and biomass and economic yield of plant species have been extensively investigated [3-6]. Pigeon pea seedlings have observed that, reduction in root elongation was more than in shoot grown in the petriplates [7]. In our experiments also growth of the root was comparatively more affected than shoot. Results insist that the root is more prone than shoot growth at 0.5 and 1.0 % salt level. Salt induces the reduction of bioproductivity in wheat, barley and maize [8-10]. In the present report also the fresh and dry weights have shown that the less effect in 0.5 % than in 1.0 %. Similarly, loss in dry weight in kenaf also reported [11, 12].

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