EFFECT OF SALT STRESS ON GERMINATION AND GROWTH PERFORMANCE OF VEGETABLE COWPEA

(*Vigna unguiculata*)

BY

SEYID MOHAMED MOULANA SEYIDA HIMAYA

FACULTY OF AGRICULTURE

EASTERN UNIVERSITY

SRI LANKA

2015

ABSTRACT

Salinity is a continuing problem in the arid and semi-arid tracts of the world. This study was conducted in order to evaluate the effect of salinity stress on growth parameters, yield and germination percentage of vegetable cowpea. Research was carried out under laboratory condition and shade house condition. This experiment was laid out in a Completely Randomized Design (CRD) with four treatments and four replicates. The treatment groups were non-saline (T1), 0.5% saline (T2), 1% saline (T3) and 1.5% saline (T4). Data were analyzed using Statistical Analytical System (SAS) and means were separated by Duncan Multiple Range Test (DMRT).

Seeds of vegetable cowpea variety Sene were chosen for this experiment. Filter papers were soaked in a 5ml solution of the respective salt concentration and placed at the bottom of petri dish, 10 seeds were maintained in the Petri dishes. Sixteen plastic buckets were taken and filled with 6 kg of NaCl saturated soil. To achieve different soil salinity levels (0.5%, 1% and 1.5%), dry potting soil was saturated with the treatment sodium chloride concentration. Five seeds of Sene variety of cowpea were sown in each plastic buckets. The treatments were irrigated with respective salt solution after transferring the pots to a shade house when the seedlings had the primary leaves developed. Two weeks after sowing, seedlings were thinned to three plants per pot. One month after planting root length, plant height plant weight and number of branches were recorded. Yield was recorded 55 days after planting. At the end of experiment soil was analyzed for organic matter content, total nitrogen and available phosphorous content.

Results of the laboratory experiment showed that the highest seed germination percentage (100%) was found with the control (0% NaCl) and the lowest seed germination percentage (62.5%) recorded for T4. Same trend was observed for shoot length (2.02 cm), root length (6.07 cm) and fresh weight of seedling (0.54 g/plant).

Results of statistical analysis of pot experiments revealed that salinity made highly significant effects ($p \leq 0.05$) for the investigated parameters. Highest root length (4.47 cm), plant weight (4.12 g), plant height (33.42 cm), number of branches per plant (3.5) and pod yield (2.28 g) were observed in 0% NaCl (control). Where no yield was recorded in treatment T4 (1.5% soil salinity) because of high salt stress there were no flowers formed. Results of soil analysis indicated that highest value for organic matter content (1.28%) was observed for control but it was no significant with T2 and T3. Total nitrogen and available phosphorus content was significantly varied with control.

The study showed that all studied parameters for vegetable cowpea decreased with increasing salinity. Increasing salt concentration negatively affecting germination percentage, seedling growth, vegetative growth and pod yield.

Key words: *Germination percentage, Pod yield, Salinity, Plant height, Plant weight, Root length, Shoot length.*

TABLE OF CONTENTS