



**EVALUATION OF BUTTERFLY PEA (*Clitoria ternatea* L.)
AS A NON-TRADITIONAL LEGUME FORAGE CROP
UNDER WATER STRESS CONDITIONS, PLANTING
DATES AND PLANT DENSITIES IN NEWLY
RECLAIMED SOILS**

BY

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B. Sc. Agric. Sci. (Agronomy), Fac. Of Agric., Fayoum Univ., 2007

M. Sc. Agric. Sci. (Agronomy), Fac. Of Agric., Fayoum Univ., 2013

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ABSTRACT

Performance of clitoria as uncommon legume forage plant under effects of two planting dates *viz.*, May 20 (P₁) and June 20 (P₂), three water irrigation regimes *viz.*, 100% (I₁₀₀), 80% (I₈₀) and 60% (I₆₀) of allowable soil moisture depletion (ASMD) and three intra-ridge spacings *viz.*, 10 cm (D₁₀), 15 cm (D₁₅) and 20 cm (D₂₀) among hills corresponding to 140, 93.33 and 70 thousand plants fed.⁻¹, respectively, and their interactions was studied in sandy loam soil at Demo experimental farm of the faculty of Agriculture, Fayoum University, Egypt, during 2015 and 2016 growing seasons (summer and fall). Planting date had a significant effect on all studied attributes *e.g.*, growth, physio-biochemical, quality and yield of forage clitoria through the various cuttings except leaflet thickness and leaf chlorophyll content in the 2nd cutting also RGR and LAR in the 3rd cutting in both seasons and IWUE in the 1st season. Early planting date (May 20) gave the highest number of leaves per plant, LAI and leaves/stem ratio in the three cuttings, number of branches per plant and stem diameter in the 1st and 2nd cuttings and plant height, fresh weight per plant, dry weight per plant, MSI, AGR, fresh forage yield and dry forage yield in the 1st and 3rd cuttings in both seasons.

Water irrigation regimes significantly influenced all studied attributes throughout various cuttings. Fully irrigated plants I₁₀₀ recorded the highest LAI in the 1st and 3rd cuttings also RWC and LAR in the 2nd and 3rd cuttings in both seasons and carbohydrate content in the 2nd and 3rd cuttings during the 1st season besides dry weight per plant and dry forage yield in all cuttings, MSI and fresh forage yield in the 2nd and 3rd cuttings and fresh weight per plant and AGR in the 1st and 3rd cuttings during the 2nd season. However, moderately irrigated plants I₈₀ recorded the highest dry weight per plant, AGR and dry forage yield in the three cuttings, fresh forage yield in the 2nd and 3rd cuttings also fresh weight per plant and NAR in the 1st and 3rd cuttings during the 1st season as well carbohydrate content in the 2nd and 3rd cuttings during the 2nd season.

The effect of planting density was significant on all studied attributes throughout various cuttings with the exception of fiber content in the 1st cutting as well leaves/stem ratio and contents of chlorophyll, proline and ash in the 3rd cutting in both seasons. Low plant density D₂₀ had the highest number of leaves per plant, number of branches per plant, fresh weight per plant and dry weight per plant in the three cuttings, stem diameter, AGR and NAR in the 1st and 2nd cuttings in both seasons, carbohydrate content in the 1st and 3rd cuttings during the 1st season in addition to ash content in the 1st and 2nd cuttings and leaflet thickness in the 2nd and 3rd cuttings during the 2nd season. While, high plant density D₁₀ significantly registered the highest plant height, LAI, fresh forage yield and dry forage yield in the three cuttings and LAR in the 1st and 2nd cuttings in both seasons further protein content in the three cuttings and ash content in the 1st and 2nd cuttings during the 1st season as well as carbohydrate content in the three cuttings during the 2nd season.

There were significant effects due to the P x I interaction on all attributes except EL in the 1st cutting, leaf chlorophyll content, MSI, RGR and fat content in the 2nd cutting and stem diameter in 3rd cutting in both seasons and IWUE in the 2nd season. Likewise, there were significant effects due to the P x D interaction on all attributes except number of branches per plant, RWC and MSI in the 1st cutting, plant height, stem diameter, NAR and fat in the 2nd cutting and RWC in 3rd cutting in both seasons and IWUE in the 2nd season. The I x D interaction had significant effects on all attributes except stem diameter in the 1st cutting besides AGR, RGR and NAR in

3rd cutting in both seasons and cumulative dry forage yield in the 2nd season. The P x I x D interaction had a significant effect on all studied attributes except plant height in the 1st cutting, stem diameter, dry weight per plant, AGR, RGR and dry forage yield in the 2nd cutting and fresh forage yield in 3rd cutting in both seasons as well as cumulative fresh forage yield in the 1st season and cumulative dry forage yield and IWUE in the 2nd season.

In general the results of this study suggested that early planting date on May 20, irrigating with I₁₀₀ (3248.08 and 3073.29 m³ fed.⁻¹) or I₈₀ (2598.47 and 2458.63 m³ fed.⁻¹) for both seasons, respectively, and planting at D₁₀ cm corresponding to 140 thousand plants fed.⁻¹ could be recommended as a well agronomic practices techniques for maximizing forage productivity with acceptable quality indices thereby can saving 20% of irrigation water required for this plant besides planting winter crops in appropriate time without delaying in newly reclaimed soils under the environmental conditions of Fayoum region.

Key words: *Clitoria ternatea* L., planting date, water stress, plant density, growth and physio-biochemical attributes, forage yield, forage quality indices and newly reclaimed soils.

