

**PERFORMANCE OF SOME MUNG BEAN
VARIETIES UNDER DIFFERENT LEVELS OF
IRRIGATION**

BY

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إلي روح والدتي : التي سهرت وتحملت المشاق من أجلنا

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ABSTRACT

Osama Mustafa Ibrahim Kassab. Performance of some mung bean varieties under different levels of irrigation. Unpublished Doctor of Philosophy Dissertation, Univ. of Ain Shams Faculty of Agriculture, Department of Agronomy, 2000.

Two field experiments were conducted in the Agricultural Experimental Station of the National Research Centre at Shalakan, Kalubia Governorate during 1996 and 1997 seasons in a controlled surface irrigation network. Each experiments included 12 treatments which were the combinations of four irrigation water amounts and three mung bean varieties, i.e. Kawmy-1, Giza-1 and NCM-69 in a split plot design.

Increasing irrigation water amounts increased significantly plant height; No. of branches; fresh weight of leaves, stem, roots, pods and total fresh weight / plant; dry weight of leaves, stem and total plant dry weight. However, No. of leaves and pods / plant as well as dry weight of pods / plant were decreased by higher amounts of irrigation water. Moreover, leaf area (LA), leaf area index (LAI), plant height at harvest and carbohydrates % in seeds were increased by increasing amounts of irrigation. On the other hand, the lowest amounts of irrigation resulted in increase of No. of shuttered, mature and total No. of pods / plant; No. of seeds / plant; weight of pods / plant; weight of seeds / plant; seed index; crop index; harvest index; shelling %; biological, straw and seed yields / fed as well as water use efficiency (WUE). Furthermore, yields of carbohydrates and protein / fed were increased with the lowest amount of irrigation. Irrigation with the medium levels increased significantly specific leaf area (SLA), specific leaf weight (SLW), net assimilation rate (NAR) and relative growth rate (RGR). Whereas, crop growth rate (CGR); N, P, K and protein percents were not significantly affected by irrigation.

Kawmy-1 mung bean variety was significantly superior in some growth and yields criteria as well as WUE. On the other hand, Giza-1 variety showed significant superiority in most growth and yield characters, WUE; seed carbohydrates and K percents and both carbohydrates and protein yields / fed. Whereas, NCM-69 mung bean variety was significantly superior in some growth and yield parameters.

There were negative significant correlations between seed yield / fed. and plant height at different growth stages and at harvest. Whereas, positive significant correlations were obtained between seed yield / fed. and each of No. of leaves / plant; total dry matter / plant; LA; SLW ; NAR; RGR; CGR in some growth stages as well as biological yield / fed. and WUE in both seasons.

Key words : Correlation – Dry matter – Evapotranspiration – green gram - Growth stages – quality – *Vigna radiata* – Water requirements – Water use efficiency – Yield.

CONTENTS

	Page
1. INTRODUCTION.....	1
2. REVIEW OF LITERATURE.....	3
1. Effect of irrigation water regime on growth and growth analysis.....	3
II. Effect of irrigation water regime on yield and its components.....	8
III. Effect of irrigation water regime on seed chemical constituents.....	22
3. MATERIALS AND METHODS.....	25
1. Growth.....	31
II. Leaf growth.....	31
III. Growth analysis.....	32
IV. Yield	32
V. Correlation studies.....	33
VI. Seed chemical composition.....	33
4. RESULTS AND DISCUSSION.....	35
1. Growth.....	35
II. Leaf growth.....	46
III. Growth analysis.....	53
IV. Yield and its related characters.....	59
V. Correlation studies.....	70
1. Correlation coefficients between seed yield / fed. and plant growth, leaf growth and growth analysis parameters.....	70
2. Correlation coefficients between seed yield / fed. and yield related parameters	72
3. Correlation coefficients between seed yield / fed. and some other growth and yield related characters of concluded irrigation treatments and varieties.....	73

	Page
VI. Seed chemical constituents.....	74
5. SUMMARY AND CONCLUSION.....	79
6. REFERENCES.....	87
7. ARABIC SUMMARY.....	

LIST OF TABLES

No.	Page
1. Physical and chemical properties of the experimental soil, at Shalakan, Kalubia in 1996 and 1997 seasons....	27
2. Irrigation date, water amount per irrigations (m^3 / fed.) and total water consumptive use (m^3 / fed. and mm) for different irrigation treatments in mung bean plants at Shalakan, Kalubia 1996 season.....	29
3. Irrigation date, water amount per irrigations (m^3 / fed.) and total water consumptive use (m^3 / fed. and mm) for different irrigation treatments in mung bean plants at Shalakan, Kalubia 1997 season.....	30
4. Effect of irrigation on growth characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.	36
5. Effect of varieties on growth characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.	42
6. Effect of the interaction between irrigation regime and varieties on growth characters mung bean plants at Shalakan, Kalubia during 1996 season.....	47
7. Effect of the interaction between irrigation regime and varieties on growth characters mung bean plants at Shalakan, Kalubia during 1997 season.....	48
8. Effect of irrigation on leaf growth characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	49
9. Effect of varieties on leaf growth characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	52

	Page
10 Effect of the interaction between irrigation regime and varieties on leaf growth characters of mung bean plants at Shalakan, Kalubia during 1996 season.....	54
11 Effect of the interaction between irrigation regime and varieties on leaf growth characters of mung bean plants at Shalakan, Kalubia during 1997 season.....	55
12 Effect of irrigation on growth analysis characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	56
13 Effect of varieties on growth analysis characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	58
14 Effect of the interaction between irrigation regime and varieties on growth analysis characters of mung bean plants at Shalakan, Kalubia during 1996 season.....	60
15 Effect of the interaction between irrigation regime and varieties on growth analysis characters of mung bean plants at Shalakan, Kalubia during 1997 season.....	61
16 Effect of irrigation on yield and its related characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	62
17 Effect of varieties on yield and its related characters of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	65
18 Effect of the interaction between irrigation regime and varieties on yield and its related characters of mung bean plants at Shalakan, Kalubia during 1996 season...	68
19 Effect of the interaction between and irrigation regime and varieties on yield its related characters of mung bean plants at Shalakan, Kalubia during 1997 season...	69

	Page
20 Simple correlation coefficients between seed yield / fed. of mung bean and some growth and growth analysis parameters in 1996 and 1997 seasons.....	71
21 Simple correlation coefficients between seed yield / fed. of mung bean and some yield related parameters in 1996 and 1997 seasons.....	72
22 Effect of irrigation on seed chemical constituents of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	76
23 Effect of varieties on seed chemical constituents of mung bean plants at Shalakan, Kalubia in 1996 and 1997 seasons.....	76
24 Effect of the interaction between irrigation regime and varieties on seed chemical constituents of mung bean plants at Shalakan, Kalubia during 1996 season.....	78
25 Effect of the interaction between irrigation regime and varieties on seed chemical constituents of mung been plants at Shalakan, Kalubia during 1997 season.....	78

LIST OF FIGURES

No.	Page
Fig. (1) Schematic diagram of the controlled surface irrigation network.....	26

I. INTRODUCTION

Mung bean or green gram (*Vigna radiata* L.) Wilczek is an early mature summer-growing annual seed legume crop. It is relatively drought tolerant crop. Mung bean has been grown in India and Central Asia since pre-historic centuries. It is now spreading in many other Asian and African countries such as Indonesia, Pakistan, Philippines, Burma, China, Thailand, Taiwan, Ceylan and Queensland in Australia. India is considered the main producer for this crop. It produces about 70% from the world production and cultivates annually 2.4 million hectare with a total production of about 1.5 million ton with 500 Kg / ha under rainy sowing and 2.5 ton / ha under irrigation sowing (**Ashour *et al.*, 1992 and 1994**).

Mung bean is an excellent source of high quality protein. The seeds contain 25-28% protein and 60-65% carbohydrates. The seed protein contains 6.5-8.0% lysine amino acid, so mung bean seeds is considered a supplementary source for foods produced from cereal grains. It has a high digestibility value and free from the flatulence effect associated with other pluses and hence is frequently fed to children. Mung bean is consumed as whole seeds as well as after splitting in different ways. Mung bean foliage can be used as also as feed for cattle (**Ashour *et al.*, 1992 and Hozein, 1998**).

The summer season crops are characterized by high evapotranspiration (ET) when compared with the winter crops. Since mung bean crop is a comparatively new summer crop in Egypt, hence the suitable water requirements of this crop is still unknown. The water requirements of soybean plants were taken in mind when mung bean plants were irrigated because soybean is a very similar legume crop to mung bean. Increasing irrigation amounts for mung bean plants increased most growth and growth analysis criteria (**Pannu and Singh, 1993; Haqqani and Pandey, 1994; Dhawan and Malik, 1995 and Mannan *et al.*, 1996**). Furthermore, seed yield / fed and other related

characters as well as water use efficiency increased by decreasing irrigation amounts (**Singh *et al.*, 1984; Pannu and Singh, 1993-a; Arya and Sharma, 1994 and Gethe *et al.*, 1996).**

The variations among mung bean varieties in growth and growth analysis characters were obtained in many countries of the world as well as in Egypt (**Hadgson *et al.*, 1989; Ashour *et al.*, 1992 and 1994).** Mung bean varieties varied in their seed production and yield attributes (**Yadav and Warsi, 1988; Henry and Daulyy, 1989; Chauhan *et al.*, 1991; Ashour *et al.*, 1992 and Hassan, 1997).**

The present work was designed to realize the following :

- 1) Determine the most suitable irrigation requirements for mung bean plants.
- 2) Study the effect of different irrigation treatments on growth, growth analysis, yield and its related criteria, seed chemical composition as well as water use efficiency.
- 3) Evaluate the growth, yield and quality of some new released mung bean varieties under different irrigation amounts.