

Handwritten marks at the top of the page, including a large 'X' and some illegible scribbles.

EFFECT OF PLANTING DATES, POPULATION DENSITY,
NITROGENIOUS AND PHOSPHATIC FERTILIZERS
ON THE YIELD OF EGYPTIAN CLOVER

By

AHMED ABC EL-NAGA KANDIL

B.Sc. (Agric.) Ain Shams University, 1968

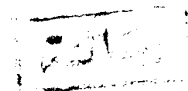
Thesis

Submitted in partial fulfilment
of the requirements for the degree of

MASTER OF SCIENCE

IN

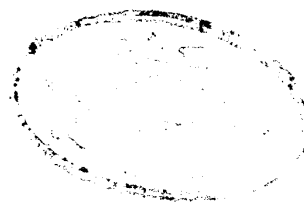
Agronomy



Handwritten notes on the left margin: '333' and 'A.A'.

Agronomy Department
Faculty of Agriculture
Ain Shams University

5324



1973

EXAMINATION AND THESIS REPORT

Major field: Agronomy

Title of Thesis: Effect of planting dates, population density, nitrogenous and phosphatic fertilizers on the yield of Egyptian clover

Sy: Ahmed Abo El-Naga Kandil.

Approved by:

..Hilal..Z..Hattat

.....R. P. Mew

... 4. 4. Shalaby

Committee in charge.

Date: / /1973



ACKNOWLEDGEMENT

The writer wishes to express his thanks to Dr. M.Y. Shalaby, Professor of Agronomy, Faculty of Agriculture, Ain Shams University, for suggesting the problem, supervising and guidance throughout the course of this study. He would like also to express his thanks to Dr. A. El-Marakby and Dr. K.El-Shouny for their encouragement during this study.

He would also like to thank the Dean of the Higher Institute of Agriculture at Mansoura, for his encouragement.

CONTENTS

	Page
I- INTRODUCTION	1
II- REVIEW OF LITERATURE.....	3
III- MATERIALS AND METHODS.....	27
IV- RESULTS.....	39
A. Germination percent.....	39
Seed germination percent in the field.....	39
B. Forage characters.....	42
1- Stem length.....	42
2- Number of stems per plant.....	52
3- Leaf to total stem plus leaf ratio in green and dry matter.....	62
C. Dry matter analysis.....	71
1- Amounts of total nitrogen in dry matter of blades plus petioles.....	71
2- Amounts of total phosphorus in dry matter of blades plus petioles.....	80
3- Amounts of total potassium in dry matter blades plus petioles.....	89
4- Amounts of total nitrogen in dry matter stems plus sheaths.....	98
5- Amounts of total phosphorus in dry matter of stem plus sheaths.....	107
6- Amounts of total potassium in dry matter of stem plus sheaths.....	116
D. Forage yield.....	125
1- Green yield per faddan.....	125
2- Dry yield per faddan.....	136
E. Straw and seed characters at harvest.....	146
1- Plant height.....	146
2- Number of stems per plant.....	150
3- Number of heads per plant.....	155
4- Number of seeds per head.....	159
5- Specific gravity of seeds.....	164
F. Seed yield at harvest.....	168
1- Seed yield per faddan.....	168
2- Straw yield per faddan.....	172

	Page
V- DISCUSSION.....	177
A- Germination percent.....	177
B- Forage characters.....	178
C- Dry matter analysis.....	184
D- Forage yield.....	199
E- Straw and seed characters at harvest..	208
F- Seed yield at harvest.....	214
VI- SUMMARY.....	218
VII- LITERATURE CITED.....	234
ARABIC SUMMARY.	

I. INTRODUCTION

Egyptian clover, Trifolium alexandrinum L., is the main and most important winter forage crop in ARE. Its annual cultivated area amounts to about 2.3 millions feddan, one-half of this area is allotted for temporary clover preceding cotton and the rest for permanent clover. Increasing the yield per unite area for this crop is of great national interest, to meet the increasing demand for animal feed. This could be achieved more easily by proper choice of variety and adjustment of suitable cultural practices such as planting dates, rate of seeding, nitrogenous and phosphatic fertilizers.

Egyptian clover is produced locally under the system of two or three course rotations. Thus it may be preceded by cotton, maize or rice crops. Recent recommendations, claims sowing these preceding crops at early planting dates for higher yield per unit area and this may help harvesting these crops at a comparatively earlier dates. This trend may help sowing Egyptian clover at early dates.

Two justify this work, the two varieties, Miskawi Giza 1 and Wafeer were tried, to compare their yielding

ability under different planting dates, rate of seeding, nitrogenous and phosphatic fertilizers treatments.

Therefore, the main objectives of the present work are:

a) To prove the probability of producing more forage and seed yield per unit area at certain planting dates than the traditional ones done at the present time.

b) To provide estimates with respect to some stem, leaf and seed characters for the two varieties at various planting dates, different rates of seeding, nitrogenous and phosphatic fertilizers.

c) To obtain informations on the effects of varieties, rate of seeding, nitrogenous and phosphatic fertilizers and their interactions at various planting dates on some stem, leaf and seed characters.

These estimates and informations should be important to breeders, agronomists and farmers under the conditions of the ARE.

II- REVIEW OF LITERATURE

The pertinent literature dealing with the effect of planting dates, population density, nitrogenous and phosphatic fertilizers on the yield of Egyptian clover was very few and scarce. Accordingly, it was found necessary to include the literature on other forage crops in this presentation. All the literature will be arranged under the four main headings:

A. Planting dates

Stem length- Radeef (1968) reported that the height of Egyptian clover plants increased successively by the advance of the season, being taller at latter than early stages of growth.

Green yield and dry matter yield- Kennedy and MacKie (1925) found that the Egyptian clover sown in California from late September till early October gives five cuttings till the 1st June. Rather and Megee (1936) reported that frequent cutting of vegetative growth at very early stages would retard the root development and in the meantime would reduce the vigour of plants. Bashaw and Marvin (1955) mentioned that cold weather lead to

increasing the intervals between cuttings and decreasing the average yield of each cutting. Hassan et al. (1961) found that the highest green and dry yield was obtained when the four cutting system was used in both Miskawi and Wafeer.

Seed yield- Hussien (1965) concluded that blooming date was determined by the number of days from sowing to blooming of the first floret in the terminal head (zero head). The blooming period in Fahl, Miskawi and hybrid were 128.97 ± 3.72 , 164.0 ± 2.59 and 147.56 ± 3.27 days.

Soil analysis- El-Hineidy (1947) indicated that the Egyptian soils were usually alkaline (ph about 8) and contained relatively large amounts of phosphorus, most of which being unavailable to the plant under normal condition. Russel (1950) reported that in some cases excess of phosphate over the amount required by the crop might depress the crop yield. This usually occurred in high soils in dry years and had been attributed to the hastening of the maturation process, and consequent reduction of vegetative growth. Williams (1950) concluded that more of the residual phosphorus will accumulate in organic farms under sod condition and thus will be less available than in cultivated soils.

B. Varieties

Stem length- Eashow and Marvin (1955) mentioned that cold weather leads to increasing the intervals between cuttings and decreasing the average yield of each cutting. Abd-El-Raouf et al. (1961) concluded that berseem should not be cut at a height less than 30 cms and that the best height for cutting under the condition of Northern Delta seemed to be at 40 cms as this would increase the yield. Abo-Sayed et al. (1963) indicated that plant height increases with the increase of the period elapsing before cutting. In all treatments the least average plant height was obtained from cuttings occurring during January as a result of cold weather prevailing during this month. They also indicated that the total plant height in each two succeeding cuttings was less than the plant height in one cutting taken after a period equaling to the total period length.

Number of stems- Abd El-Raouf et al. (1961) illustrated the number of branches per one square meter was significantly low in case of berseem cut at 30 cms height and this was especially clear after the third cut. The number of branches in berseem cut at 40 cms was

significantly heigher than when cut at 50 or 60 cms height.

Number of leaves- Zaher (1947) showed that growth of berseem plants decreased gradually in the successive cuts being the heighest in the first cut and lowest in later cuts. Straub (1948) believed that the phenodeviate character (+3 leaflets) was due to both environmental and gentical factors. Haskell (1954) attributed the phenodeviate character (+3 leaflets) due to environmental effects. Hayes et al. (1955) stated that forage plants bearing many leaves are believed to be of heigh nutrition value. Hanson and Carnahan (1956) indicated that the economic value of forage crops are determined by their higher number of leaves, ratio of leaves to stem, number of branches and tillers.

Leaf to total ratio- Wheeler (1950) pointed out that the most important part of forage plant which is associated with forage quality is the leaf. He stated that the preparation of leaves to stem and the retention of leaves in harvested forage are real measures of forage quality. Leaves contain most of the protein, vitamins and minerals and the total quantities of each of these produced by the plant is measured largely by

the percentage of leaves to stems. Steminess in hay is always an indicator of low nutritive value. Hassan et al. (1961) found that leaf stem ratio was higher in Wafeer in the 1st cut only. They also reported significant difference between Miskawi and Wafeer in leaf-stem ratio in the first cut and this may be due to the high proportion of leaves containing more than three leaflets in the variety Wafeer. They added that the presence of the leaves containing four or five leaflets in the Wafeer decreased in the successive cuts and this might be the reason for the gradual similarity observed in the leaf-stem ratio of both varieties in the 2nd, 3rd and 4th cuts. The decrease in the number of leaves containing four or five leaflets in Wafeer may be due to the fact that this character is not yet completely dominant in this variety. The averages of leaf-stem ratio of Miskawi in the first season for the 1st, 2nd, 3rd and 4th cut were 32.77, 29.82, 26.60 and 25.00 in the green plants, respectively and they were, on dry matter basis 43.00, 40.00, 37.00 and 35.60 in the same order. These averages in the green plants of Wafeer were 36.09, 30.22, 26.80 and 25.15 in the 1st, 2nd, 3rd and 4th cut, respectively and they were on dry matter basis 45.0, 40.0, 38.0 and 36.0 in the same order. They concluded

that the leaf-stem ratio was higher in the 1st cut of both varieties and decreased gradually up to the fourth cut.

Dry matter analysis- Willard (1931) reported that the commonly accepted difference in protein content between red clover and alfalfa is due largely to the fact that alfalfa is usually cut earlier in the season and at earlier stage of maturity than red clover. Sullivan and Wilkins (1948), stated that the nutritive value of forages is determined by the presence of substances that are necessary for the health, growth and productiveness of animals. El-Seify (1956) reported that the protein content of Wafeer is higher than that of Miskawi under the conditions of Bahtim Experimental Farm. Hassan et al. (1961) showed that protein content of both varieties in green and dry matter of plants differed owing to differences in the moisture content. The results showed that Wafeer barseem in all cuts contained higher protein content than that of Miskawi. In 1962-1963 season, the protein content of Miskawi was 18.39, 15.69, 15.33 and 14.7% and that of Wafeer was 20.35%, 16.78%, 16.78%, 15.00% and 15.18% for the 1st, 2nd, 3rd and 4th cut, respectively. Results of the two

seasons, showed that the protein content of both varieties was high in the first cut and decreased gradually in the successive cuts. The higher protein content of Wafeer than that of Miskawi in all cuts might be due to the fact that the Wafeer berseem contained an appreciable number of leaves which consisted more than (3 leaflets). Kabesh (1970) reported that as far as the effect of age of plant on the nitrogen content is concerned, most research workers stated that small plants show high percentage of nitrogen and other minerals, while mature plants show a low percentage of the plant components. Such trend can be explained on the ground that most plants, including legumes, tend to consume most of their mineral demands at an early stage of growth. However, as the plant becomes older, the rate of carbohydrate synthesis will be greater than the mineral consumption, with the result that the least percent values of nitrogen and other nutrients will accompany the maturation of plants.

Green yield and dry matter yield- De Cellis (1911) found, in Italy, that the Egyptian clover gives 3 - 6 cuttings when sown in late October. Sorney (1916), in Algeria, found that the Egyptian clover gave 4 cuttings with a total yield of 45 ton/acre. Foden et al. (1920)