Journal of Fundamental and Applied Sciences

ISSN 1112-9867

Available online at http://www.jfas.info

Research Article

EVALUATION OF THE LENTIL CROP GROWTH INDEXES IN THE KHORRAMABAD CLIMATE CONDITIONS

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Published online: 05 June 2016

ABSTRACT

Quantitative analysis of growth, A method for identifying the movement of photosynthesis in plants by measuring the dry matter production during the growing season And to explain and Plant response to environmental conditions provides. In order to study growth parameters, including LAI, CGR, RGR and TDM Philip variety of lentil crop experiment in a randomized complete block design with three replications in 2014 in a field research was conducted in the city of Khorramabad. The need to review these indicators to determine trends during the period of plant growth the plant during its growth, which helps to better manage farm.

Keywords: Lentil crop; LAI; CGR; RGR; TDM.

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doi: http://dx.doi.org/10.4314/jfas.8vi2s.8

1. INTRODUCTION

Lentil crop species Lens culinaris, subsp culinaris of the family Fabaceae The value of its initial production capacity of about 25% high-quality protein And its ability to stabilize soil nitrogen in crop rotation in marginal dry places. (Cubero, 1981). Lentils in terms of nutritional value and protein content is generally between 23 to 27 percent of the beans are easy to digest And is one of the most important products for the poor people, The high protein content of lentils and drought resistance, which allows rainfed put it among the important crop plants (Anvar, 1993. Bagheri et

al, 1997). Lentil bean acreage in the world's third goal. The continent of Asia which is 68 percent of the total world production of lentils in 1977 accounted for itself (Bagheri et al, 1997). Quantitative analysis of growth, a way to understand the photosynthesis in plants by measuring the movement of dry matter production during the growing season Plant response to environmental conditions to explain and provide. (Wilson ,1981 and Major ,1980). The factors that determine the growth yield is used, Growth indexes are named and of great importance (Manaffee and Kloepper. 1994) Among the most important indicators of growth in crop analysis is used We can CGR, NAR, durable leaf area, leaf area index, relative growth rate and leaf area ratio mentioned. To analyze the growth, leaf area and dry weight is necessary to measure two parameters And other indicators of growth will be achieved through the calculation. The analysis can be based on plant growth and did land at a certain level. (Gholami, 2000, Wallace et al, 1972).

2. MATERIALS AND METHODS

To evaluate the physiological parameters of lentil crop grown under dryland conditions, experimental block design Complete with 3 replications per year 2014 The field research was conducted in the city of Khorramabad In this experiment, Filip-92-12L cultivar That cultivar is suitable and commonly used in the cultivation area Sampling at 15 days after sowing began and was repeated every 15 days A total of six samples were collected. Equivalent to 0.5 square meters per sample surface with respect to border And 15 cm margin from the beginning of the blocks were picked and transported to the laboratory And then determining leaf area index and dry weight, growth parameters were determined using the following formula (Koochaki and Sarmadnia, 2005).

LAI = LA/GA

CGR= $(W_2 - W_1) / (T_2 - T_1) \times A$

RGR=$(1/W_1) \times (dw / dt)$

$T_2 - T_1$= The interval between two sampling

LAI= Leaf area index

TDM= Total dry matter

dw /dt = Biomass per unit of time

W_1= Dry weight in the first sampling

W_2= Dry weight in the second sampling

CGR= Crop growth rate

RGR= Relative growth rate

3. RESULTS AND DISCUSSION

3.1. Investigation the lentil crop growth curve

In ways that are quantitatively evaluated in terms of growth, Growth analysis said. The methods to explain and the interpretation response of plants to environmental conditions used And a better understanding of photosynthesis in plants transfer materials indicated (Tesar, 1984., Koochaki and Sarmadnia, 2005). It is Necessity to evaluate these indexes to determine the growth of plants during the growth season Which helps better management the field, for example, when the plant's maximum leaf area index or maximum dry matter, It is recommended that proper practices to be applied in this stages, which will eventually lead to increase in yield. The Growth Indexes has been studied in this research are:

Total dry matter (TDM), Leaf area index (LAI), Relative growth rate (RGR), Crop growth rate (CGR).

3.2. Total dry matter (TDM)

The high yield depends on high dry matter production per unit area. The results of these experiments indicate that the dry matter accumulation during the growth season lentil crop is different, but the three main stages of growth in Figure 1 is indivisible:

The first stage) stage of slowly growth or gradual, due to the small size of the leaves dry matter production is low.

The second stage) stage of rapid growth is due to leaf photosynthesis and preparation, plant dry weight increased.

Third Stage) In this stage, to coincide with the transfer materials of organs, seeds, leaf loss due to the effects of shading, The aging and lack of sufficient ability for photosynthesis and preparation, plant dry matter accumulation has been fixed and even reduced (Major. and, et al. 1978).

One of the important factors in determining yield especially plant in dry matter, is the plant height, This means that with increased consumption of fertilizers increased plant height increases, and biological yield will be more.

The leaves of the plant are the most important photosynthetic shoot. LAI by Watson as the best measure of dry matter production capacity is proposed. At the start of the wheat plant growth to reproductive growth, the most important organs of photosynthesis in the plant leaves And after flowering, flag leaf and stems to take a major share of duties And leaves the upper shoot and shading due to The aging, begin to fall out (Berkenkamp. B. 1973, Campbel and Kondra , 197**8**). Since the maximum leaf area index at the time of flowering takes place (Campbel and Kondra, 1978), Each size is greater leaf area at this time as the plant has been able to use better and more solar radiation And be more photosynthetic production finds (Rao and Mendham. 1991), That ultimately the number of potentially affected tillers and grain yield (Freyman and et al. 1973).

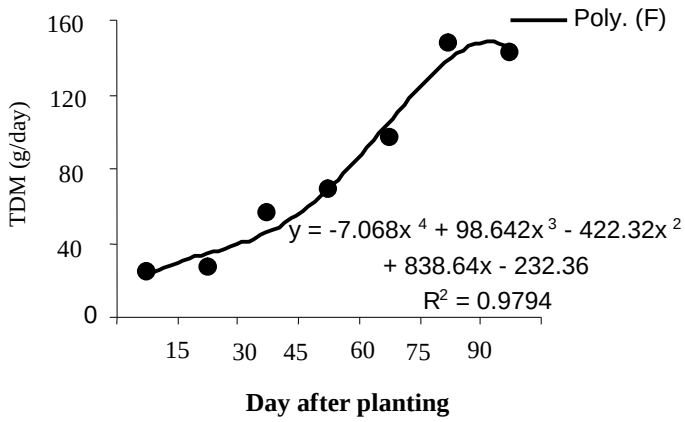

Fig.1. The process of dry matter accumulation in lentil cultivar Philip

3.3. Crop growth rate (CGR)

In this study, Crop growth rate (CGR), In the early stages of growth and tillering stage due to the lack of vegetation Low light absorption, slowly growth due to the small size of the leaves (The main levels of photosynthetic) The process was slow. By leaving the stage slowly growth and increased leaf area and thus better advantage the sun, the increased dry matter production per unit

area and consequently crop growth rate has also increased. The crop growth rate has been reached in the early stages of grain filling. At this time the plants also had the maximum leaf area index. With the arrival of the plant to limit the effects of shading on the growth of the upper extremity on the lower leaves, Reducing the photosynthtic power of the plants The aging and falling leaves, crop growth rate is drastically reduced (Figure 2). This process corresponded with the results of other researchers (Koochaki and Sarmadnia, 2005, Major and et al 1978).

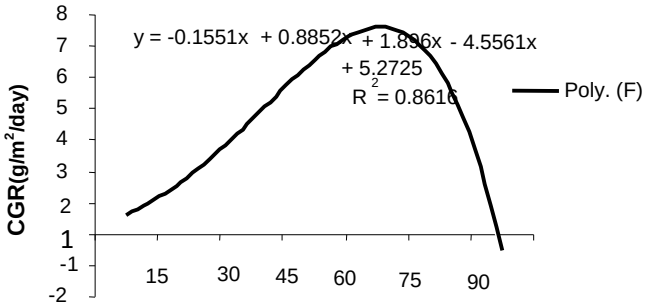

Fig.2. The crop growth rate in lentil cultivar Philip

3.4. Relative growth rate (RGR)

Relative growth rate, the growth rate in terms of the size increase per unit time is expressed. Decreasing the Relative growth rate of plants during the growing season (Koochaki et al, 1997), Due to increased structure tissue is metabolically active tissue of the structure. Also shading leaves and lower leaves age also affects the size of the loss (Koochaki and Sarmadnia, 2005). The reason for this decline in the relative growth rate and reduce the amount of increase plant age, Of the lower leaves in the shade at the end of the growing season than the beginning of it; Severe loss leaves at the end of the growing season is the time of maturity And not metabolically active tissue, in other words, do not play a role in growth, The RGR of all treatments from their maximum values in early growth is declining. The maximum amount of RGR at the beginning of the growing season to the fact that In the early stages of growth in the number and level of leaves is not enough to get full of solar radiation. (Gholami, 2000) (Figure 3).

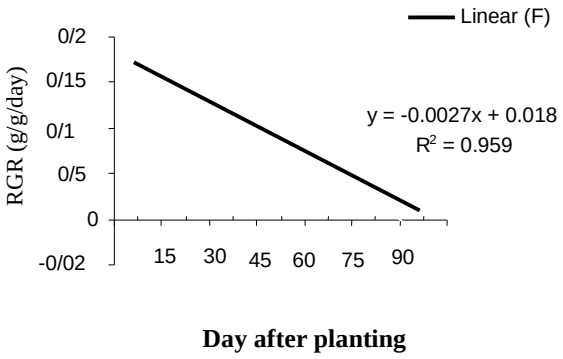

Fig.3. Relative growth rate in lentil cultivar Philip

3.5. Leaf area index (LAI)

LAI is the leaf area than the ground surface occupied by plant And much sooner in high density to low density reaches its maximum. Although later than the maximum leaf area index in the low density limit reached But its value is higher leaf photosynthetic organs are the most important. LAI Leaf area index by Watson (1952) Investigation and size of the index in Figure 4 is shown.

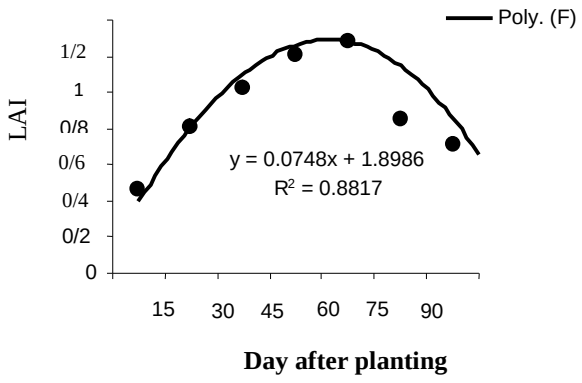

Fig.4. Leaf area index in lentil cultivar Philip

4. CONCLUSIONS

Quantitative analysis of growth with value growth and crop production is considered. Accurate understanding of the physiological processes controlling the yield and the optimum use of them in agronomy to increase crop yield potential,It is of great importance identifying and studying the physiological growth indexes in the analysis of the factors affecting yield and its components And stability, it determines the amount of dry matter production, which in turn is a measure of yield components. The purpose of calculating the growth components describe how the plant response to environmental conditions. It is necessity to evaluate the indexes to determine the growth of plants during the growing season.

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How to cite this article:
F. Fateminick. Evaluation of the lentil crop growth indexes in the Khorramabad climate conditions. J. Fundam. Appl. Sci., 2016, *8(2S), 124-131*.