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The Effect of Different Levels of Urea Fertilizer on Wheat Plant Productivity under Sand Soil Conditions in the Sirte City

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Abstract: *This study aims to using of urea fertilizer on wheat plant productivity under sand soil conditions in the Sirte City. The research was carried out at the Experiment Station, Faculty of Agriculture, Sirte University During the year 2019. This study used a completely randomized design (CRD) consisting of 5 treatments and 3 replications. The order of treatment is as follows: A = Control; B = 100 Kg N/ha = 1.1 g N/pot equivalent to 2.44 g urea/pot; C = 150 Kg N/ha = 1.6 g N/pot equivalent to 3.56 g urea/pot; D = 200 Kg N/ha = 2.2 g N/pot equivalent to 4.89 g urea/pot; E = 250 Kg N/ha = 2.7 g N/pot equivalent to 6.11 g urea/pot. Based on the results and discussion, it can be concluded that the higher the application of urea fertilizer, the higher the growth and production of wheat in sandy soils.*

Key Words:- *Urea fertilize , Wheat Plant, Sirte*

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I. Introduction

In plant production activities, the condition of the soil is often a limiting factor for example because the salt content is too high, too acidic, the soil is sandy or clayey, the soil is polluted by waste, the soil is solid, the soil is paved, the soil is rocky etc., making it unsuitable for cultivating plants, including for wheat cultivation (Widyawati, 2013).

Sandy soil is a problematic planting medium and has many limiting factors for plant growth. Sandy soils are generally low in organic matter content, so they tend to have a single grain structure. Sand has a low ability to hold moisture due to the porous nature of the soil, so that the available water content in the sandy soil is below field capacity, and the high infiltration rate of 2.5-25 cm h-1 compared to 0.001-0.1 cm h-1 on the soil. clay (Putra, 2017). Cultivation of plants on sandy soil has a number of obstacles, namely the low chemical, physical, and biological properties. The coarse texture of the sand causes the application of fertilizer to be easily leached or leached. However, sandy soil can be used as an alternative medium that can replace the function of the soil. However, sandy soil has large pores. The addition of organic matter can improve the physical properties of the soil so that it can hold water optimally. The use of fertilizers on critical land is an absolute necessity (Rajiman et al., 2008).

According to research by Pratiwi (2008) that the application of inorganic fertilizers containing nitrogen such as urea can increase crop production. This is because nitrogen plays an important role in the formation and growth of the vegetative part of plants. Data from soil analysis showed that the experimental soil contained 0.18 nitrogen with low criteria.

For good growth, it is not only important to know how to use fertilizer, the type of fertilizer and the right time of fertilization, but it is also important to know the dose of fertilizer to achieve maximum plant production. One source of nitrogen that is widely used is urea with a content of 45 - 46% N, so it is good for the growth process of spinach plants, especially plants whose leaves are harvested. In addition, urea fertilizer has hygroscopic properties, is easily soluble in water and reacts quickly so that it is quickly absorbed by plant roots. The dose of urea applied to plants will determine the growth of spinach plants (Lingga, 2007), the response of plants to nitrogen is very dependent on soil conditions, types of plants and where they grow (Cahyono, 2003).

The recommended urea dose is 17 kg/ha, or the equivalent of 1.2 g/plant. The assumption is that each hectare of land is planted with 160,000 plants with a spacing of 20 x 25 cm. (Anonymous, 1992). According to research data by Nugroho (2003), the application of urea fertilizer at a dose of 1.8 g/plant gave high yields to the growth of lettuce plants, with a consumption weight of 188.9 g/plant.

II. Literature Review

Urea Fertilizer

Urea fertilizer is a white crystalline solid fertilizer that is highly soluble in water with a content of 46% Nitrogen. Urea became the world's leading source of nitrogen fertilizer in the mid-1970s (Engelstad, 1997). Urea fertilizer is inorganic fertilizer or artificial fertilizer as a source of nitrogen nutrients which can be classified based on the type and nutrient content in a single form and slightly acidic urea fertilizer (Subagyo, 1970).

Urea Pump Dose

The application of urea fertilizer in the soil affects the chemical and biological (biological) properties of the soil. Important chemical and biological functions include ion exchange and chemical buffer, as a storehouse of N, P, and S nutrients, dissolving phosphate by complexing Fe and Al ions in the soil and as a source of energy for soil microorganisms (Notohadiprawiro, 1998).

Williamson and Payne (1971) stated that in general, soils in the tropics lack N. If this condition occurs, the plants will become stunted, flowers will form prematurely and not perfect. In order to improve the nutritional value and at the same time increase the productivity of forage forage in the tropics, it is necessary to supply N. Application of fertilizer, especially N fertilizer, to forage forage is very important to obtain high dry matter and crude protein production.

Nitrogen nutrients contained in Urea fertilizer are very useful for plants for growth and development, including:

1. Make the leaves of plants greener and fresher and contain lots of green leaf grains (chlorophyll) which have a very important role in the process of photosynthesis.
2. Accelerate plant growth (height, number of tillers, branches)
3. Increase plant protein content
4. Can be used for all types of crops, both food crops, horticulture, plantation crops, livestock and fishery businesses (Syarief, 1986).

II. Methodology

The research was carried out at the Experiment Station, Faculty of Agriculture, Sirte University During the year 2019. This research used tools consisting of a hoe, a machete, a tape measure, a rope, a cutter, a polybag, a bucket, a sieve. soil and scales. The materials used consisted of wheat (*Triticum aestivum L.*), water, and urea fertilizer.

This study used a completely randomized design (CRD) consisting of 5 treatments and 3 replications. The order of treatment is as follows: A = Control

B = 100 Kg N/ha = 1.1 g N/pot equivalent to 2.44 g urea/pot

C = 150 Kg N/ha = 1.6 g N/pot equivalent to 3.56 g urea/pot

D = 200 Kg N/ha = 2.2 g N/pot equivalent to 4.89 g urea/pot

E = 250 Kg N/ha = 2.7 g N/pot equivalent to 6.11 g urea/pot

III. Results And Discussion

Chlorophyll (unit)

The results of the study on the amount of chlorophyll in wheat can be seen in Table 1 below.

Table 1. The Effect of Urea Fertilizer on the Total Chlorophyll of Wheat Plants

Treatment	Total Chlorophyll (unit)
A	23.45
B	36.74
C	38.76
D	41.09
E	43.65

The average chlorophyll of ganum Gajah given different urea fertilizers is presented in Table 1. It shows that the application of urea fertilizer has an effect on all treatments. This is in accordance with the opinion (Jumin, 1987) that the availability of optimal nitrogen nutrients for plants can increase chlorophyll, where an increase in the volume of fertilizer given will also increase chlorophyll.

Plant Height (cm)

The results of research on plant height in wheat can be seen in Table 2 below.

Table 2. The Effect of Urea Fertilizer on the Total Chlorophyll of Wheat Plants

Treatment	Plant Height (cm)
A	61.03
B	69.65
C	75.65
D	77.42
E	79.99

The average height of wheat plants fed with different urea fertilizers is presented in Table 2. It shows that the level of urea fertilizer has an effect on all treatments. There was a tendency to increase plant height with fertilizer application compared to control (without fertilizer). If the volume of fertilizer given is more, then plant growth will be faster. This is in accordance with the opinion of Tarigan (2009) which states that plants will grow and produce optimally if they are planted in places that meet growth requirements such as environmental factors, namely climate factors and soil properties such as soil pH, nutrient availability, CEC volume of fertilizer given. and others. If environmental factors grow under optimal conditions, growth and yield will be limited by genetic characteristics.

Number of leaves (strands)

The results of the study on the number of leaves on wheat plants can be seen in Table 3 below.

Table 3. The Effect of Urea Fertilizer on the Number of Leaves of Wheat Plants

Treatment	Number of leaves (strands)
A	5.80
B	6.54
C	7.67
D	7.79
E	7.94

The average number of elephant grass leaves fed with different urea fertilizers is presented in Table 3. It shows that the level of urea fertilizer has an effect on all treatments. As the fertilizer level increases, the number of leaves increases. The effect of giving the level of urea fertilizer has an effect on the increase in the number of leaves. This is in accordance with the opinion of Hartadi (1997) that leaf pigmentation is affected by fertilization, which in turn affects the amount of energy received by plants for the process of accelerating leaf addition. elephant grass (Pennisetum purpureum) leaves.

Number of leaves (strands)

The results of the study on leaf width on wheat plants can be seen in Table 4 below.

Table 4. The Effect of Urea Fertilizer on Leaf Width of Wheat Plants

Treatment	Number of leaves (strands)
A	2.34
B	2.55
C	2.78
D	2.83
E	2.91

The average leaf width of elephant grass elephant grass given different urea fertilizers is presented in Table 4. shows that the effect on all treatments. Susetyo (1969) stated that your growth factors are seeds, light conditions and fertilizer application.

Leaf Length(cm)

The results of the study on leaf length on wheat plants can be seen in Table 5 below.

Table 5. Effect of Urea Fertilizer on Leaf Length of Wheat Plants

Treatment	Leaf Length(cm)
A	50.43
B	58.76
C	63.05
D	69.82
E	74.22

The average leaf length of elephant grass elephant grass fed with different urea fertilizers is presented in Table 5. It shows that the application of urea fertilizer has an effect on all treatments.

Dry Matter Production (g/pot)

The results of research on dry matter production in wheat can be seen in Table 6 below.

Table 6. The Effect of Urea Fertilizer on the Production of Dry Matter in Wheat Plants

Treatment	Dry Matter Production (g/pot)
A	21.67
B	38.85
C	49.82
D	57.83
E	61.98

Based on table 6 above, it can be seen that the administration of urea has an effect on all treatments. Urea is able to increase the production of dry matter and the older the plant, the results of photosynthesis in the form of dry matter production are quite good. On the other hand, if the crop is cut at short time intervals, the dry matter production will decrease. This is in accordance with the opinion of Dwijosepoetro (1981) that plant dry matter is strongly influenced by the optimal application of urea fertilizer and the process of photosynthesis. The dry weight formed reflects. The amount of urea and photosynthate fertilizer application as a result of photosynthesis, because dry matter is highly dependent on the level of fertilizer application and the rate of photosynthesis. Agree with Tisdale and Nelson (1975) who argue that plant growth can be shown to one or several organs, which is expressed in dry weight.

IV. Conclusion

Based on the results and discussion, it can be concluded that the higher the application of urea fertilizer, the higher the growth and production of wheat in sandy soils.

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