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Research Article

Effect of nitrogen fertilizer on yield components of sun flower

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ABSTRACT

Sunflower (*Helianthus annuus* L.) is gaining popularity as an oilseed and a feedstock crop, because it shares several positive agronomic features with other common oil crops such as canola and soybean, yields well in a variety of conditions and can be grown easily and profitably at both small farms and large field scale. The assessment of plant N nutrition status is far more complex than that of plant water status, because both in-soil and in-plant biological processes directly interfere with N availability and uptake, and even under optimum conditions, N concentration in the plant diminishes continuously during crop development. The field experiment was laid out factorial with randomized complete block design with three replications. Treatments included variaty (Record and Azargol) and nitrogen fertilizer (Control, 100 kg/ha, 125 kg/ha, 150 kg/ha, 175 kg/ha, 200 kg/ha). Analysis of variance showed that the effect of variety and nitrogen fertilizer on all characteristics was significant. The maximum of capitule dry weight, Leaf dry weight, and Stem dry weight and Plant height of treatments Record was obtained. Nitrogen management in agro-ecosystems has been extensively studied due to its importance in improving crop yield and quality, and in mitigating the negative effects of fertilizer N losses such as nitrate contamination of groundwater, eutrophication of surface water, and greenhouse effect.

Key words: Variety, Sun flower, Nitrogen fertilizer

INTRODUCTION

Sunflower (*Helianthus annuus* L.) is gaining popularity as an oilseed and a feedstock crop, because it shares several positive agronomic features with other common oil crops such as canola and soybean, yields well in a variety of conditions and can be grown easily and profitably at both small farms and large field scale. In addition, seeds from non-oilseed sunflower types are popular as a snack and bird food. In Greece, sunflower is principally grown in the northern part of the country (70% of the total sunflower area), mostly as a rainfed rotation partner to winter cereals (Kallivroussis *et al*., 2002).The assessment of plant N nutrition status is far more complex than that of plant water status, because both in-soil and in-plant biological processes directly interfere with N availability and uptake, and even under optimum conditions, N concentration in the plant diminishes continuously during crop development (Van Keulen and Seligman, 1987). The cause of this decline is linked firstly to N dilution within the plant volume. Plant N is mainly located in metabolically active aerial plant parts, and is thus related more directly to plant surface than to plant volume. As a plant grows, the proportion (in weight) of structural and storage tissues, which are relatively poor in N, increases. As a consequence, the average plant N concentration diminishes. At the crop level, the relationship between plant N content and its surface also results from the close relationship between the shoot N concentration and the incident solar irradiance (Gastal and Lemaire, 2002). Within the canopy, leaves exposed directly to solar radiation have the highest N concentration, which optimizes N use relative to carbon assimilation. Three-quarters of total reduced N in the leaf may be connected with photosynthesis, mostly in the form of RuBP carboxylase and chlorophyll. In order to measure plant N nutrition status, several indices have been designed in recent decades. Overman *et al*. (1995) developed a model where growth was related to fertilizer application. However, the actual amount of N available for the plant, including mineralized soil organic N, is not considered, making that approach difficult to extrapolate to different scenarios (Jeuffroy *et al*., 2002). Analysis of crop development basis on incremental distinct events, namely Pheno stage Such as seedling emergence, Flower initiation and emergence of flower will be easier the

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flowers will be easier. Nitrogen (N) is one of the critical nutrients for crop production and is generally applied in large quantities in form of fertilizer to soils (Malhia *et al*., 2001; Singh *et al*., 2007; Kong *et al*., 2008). However, most plants only utilize less than one-half of fertilizer N applied, and the loss of fertilizer N was high (Zhu, 2000; Zhu and Chen, 2002). Nitrogen management in agro-ecosystems has been extensively studied due to its importance in improving crop yield and quality, and in mitigating the negative effects of fertilizer N losses such as nitrate contamination of groundwater, eutrophication of surface water, and greenhouse effect (Hillin and Hudak, 2003; Alam *et al*., 2006; Dambreville *et al*., 2008). Soil exchangeable inorganic N is the common source of various N losses (Zhu, 2000), whereas the immobilization and release of fertilizer N in soil organic N and fixed NH4+ pools are important processes regulating fertilizer N transformation in soil, and play an important role in controlling soil Potential supply (Mubarak *et al*., 2001). Therefore, a key challenge in minimizing loss of chemical fertilizer N is how to decrease the superfluous accumulation of soil exchangeable inorganic N, accelerate its transformation to other N forms (such as organic N and fixed NH^{4+}), and synchronize the supply of available N with plant uptake during peak periods of crop N demand (Zhu, 2000; Lin *et al*., 2007). Understanding the accumulation of fertilizer N in soil inorganic N pool under different fertilization practices is of considerable importance in developing proper fertilization practice for minimizing fertilizer N loss while maximizing its use efficiency (Lu *et al*., 2010). Amount of Development and growth of plant has determined amount of growth in each of phenological stages of the phenological stages (Phenophases) and evaluation of crop development in relation to environmental conditions. Nitrogen has a major effect on growth among the major nutrients needed by plants (especially the three elements of N, P, K) and the growth of maize plant has been proven various experiments (Salam and Subramanian, 1988) and Plants give it different responses. Maize need to nitrogen is different due to weather conditions, soil type and maize rotation (Bundy *et al*., 1993., Green and Blackmer, 1995). Amount of Nitrogen stored in soil can affect plant growth and development (Muchow 1988; Mccullovgh *et al*., 1994).

MATERIALS AND METHODS

Composite soil sampling

Composite soil sampling was made in the experimental area before the imposition of treatments and was analyzed for physical and chemical characteristics.

Field experiment

The field experiment was laid out factorial with randomized complete block design with three replications.

Treatments

Treatments included variaty (Record and Azargol) and nitrogen fertilizer (Control, 100 kg/ha, 125 kg/ha, 150 kg/ha, 175 kg/ha, 200 kg/ha)

Data collect

Data collected were subjected to statistical analysis by using a computer program SAS. Least Significant Difference test (LSD) at 5 % probability level was applied to compare the differences among treatments` means.

RESULTS AND DISCUSSION

Capitule dry weight

Analysis of variance showed that the effect of variety on capitule dry weight was significant (Table 1). The maximum of capitule dry weight of treatments Record was obtained (Table 2). The minimum of capitule dry weight of treatments Azargol was obtained (Table 2). Analysis of variance showed that the effect of Nitrogen fertilizer on capitule dry weight was significant was significant (Table 1). The maximum of capitule of treatments 200 kg/ha was obtained (Table 2). The minimum of capitule of treatments control was obtained (Table 2).Within the canopy, leaves exposed directly to

Table 1: Anova analysis of the sun flower affected by nitrogen fertilizer and variety

Sov	df	Capitule dry weight	Leaf dry weight	Stem dry weight	Plant height
R	2	11.91	12.02	491.4	2.19
Variety (A)	1	5188.8^{**}	3117.3^{**}	3560.1^{*}	100^{*}
Nitrogen fertilizer (B)	5	2177.3^{**}	2311.8^{**}	2230.4^{**}	40.37^{*}
A*B	5	731.4^{*}	1325.1^{**}	3635.3^{**}	1.00^{ns}
Error	22	188.7	158.1	529.3	13.04
CV	-	18.57	3.79	4.93	3.39

*, **, ns: significant at P<0.05 and P<0.01 and non-significant, respectively.

Table 2: Comparison of different traits affected bynitrogen fertilizer and variety

Treatment	Capitule dry weight	Leaf dry weight	Stem dry weight	Plant height
Variety				
Azargol	61.97b	321.6b	456.4b	107.8a
Record	85.98a	340.2a	476.2a	104.5b
Nitrogen fertilizer				
Control	45.31e	306.8e	436.2c	102.5c
100 kg/ha	60.93de	316.6de	449.3bc	104.6bc
125kg/ha	71.33cd	322.5cd	472.03ab	105abc
150kg/ha	79.40bc	333.6bc	474.1ab	107.3ab
175kg/ha	89.75ab	346.6ab	481.6a	108.6ab
200kg/ha	97.16a	359.5a	484.7a	109.1a

Any two means not sharing a common letter differ significantly from each other at 5% probability.

solar radiation have the highest N concentration, which optimizes N use relative to carbon assimilation. Three-quarters of total reduced N in the leaf may be connected with photosynthesis, mostly in the formof RuBP carboxylase and chlorophyll. In order to measure plant N nutrition status, several indices have been designed in recent decades. Overman *et al*. (1995) developed a model where growth was related to fertilizer application. However, the actual amount of N available for the plant, including mineralized soil organic N, is not considered, making that approach difficult to extrapolate to different scenarios (Jeuffroy *et al*., 2002).

Leaf dry weight

Analysis of variance showed that the effect of variety on leaf dry weight was significant (Table 1). The maximum of leaf dry weight of treatments Record was obtained (Table 2). The minimum of leaf dry weight of treatments Azargol was obtained (Table 2). Analysis of variance showed that the effect of Nitrogen fertilizer on leaf dry weight was significant was significant (Table 1). The maximum of leaf dry weight of treatments 200 kg/ha was obtained (Table 2). The minimum of leaf dry weight of treatments control was obtained (Table 2). Analysis of crop development basis on incremental distinct events, namely Pheno stage Such as seedling emergence, Flower initiation And emergence of flower will be easier the flowers will be easier. Nitrogen (N) is one of the critical nutrients for crop production and is generally applied in large quantities in form of fertilizer to soils (Malhia *et al*., 2001; Singh *et al*., 2007; Kong *et al*., 2008). However, most plants only utilize less than one-half of fertilizer N applied, and the loss of fertilizer N was high (Zhu, 2000; Zhu and Chen, 2002). Nitrogen management in agro-ecosystems has been extensively studied due to its importance in improving crop yield and quality, and in mitigating the negative effects of fertilizer N losses such as nitrate contamination of groundwater, eutrophication of surface water, and greenhouse effect (Hillin and Hudak, 2003; Alam *et al*., 2006; Dambreville *et al*., 2008).

Stem dry weight

Analysis of variance showed that the effect of variety on stem dry weight was significant (Table 1). The maximum of stem dry weight of Record treatments was obtained (Table 2). The minimum of stem dry weight of treatments Azargol was obtained (Table 2). Analysis of variance showed that the effect of Nitrogen fertilizer on stem dry weight was significant (Table 1). The maximum of stem dry weight of treatments 200 kg/ha was obtained (Table 2). The minimum of stem dry weight of treatments control was obtained (Table 2). Amount of Development and growth of plant has determined amount of growth in each of phenological stages of the phenological stages (Phenophases). And evaluation of crop development in relation to environmental conditions. Nitrogen has a major effect on growth among the major nutrients needed by plants (especially the three elements of N, P, K) and the growth of maize plant has been proven various experiments (Salam and Subramanian, 1988) and Plants give it different responses. Maize need to nitrogen is different due to weather conditions, soil type and maize rotation (Bundy *et al*., 1993., Green and Blackmer, 1995). Amount of Nitrogen stored in soil can affect plant growth and development (Muchow 1988; Mccullovgh *et al*., 1994).

Plant height

Analysis of variance showed that the effect of variety on plant height weight was significant (Table 1). The maximum of plant height of Azargol treatments was obtained (Table 2). The minimum of plant height of treatments Record was obtained (Table 2). Analysis of variance showed that the effect of Nitrogen fertilizer on plant height was significant (Table 1). The maximum of plant height of treatments 200 kg/ha was obtained (Table 2). The minimum of plant height of treatments control was obtained (Table 2). Soil exchangeable inorganic N is the common source of various N losses (Zhu, 2000), whereas the immobilization and release of fertilizer N in soil organic N and fixed NH4+ pools are important processes regulating fertilizer N transformation in soil, and play an important role in controlling soil Potential supply (Mubarak *et al*., 2001). Therefore, a key challenge in minimizing loss of chemical fertilizer N is how to decrease the superfluous accumulation of soil exchangeable inorganic N, accelerate its transformation to other N forms (such as organic N and fixed NH^{4+}), and synchronize the supply of available N with plant uptake during peak periods of crop N demand (Zhu, 2000; Lin *et al*., 2007). Understanding the accumulation of fertilizer N in soil inorganic N pool under different fertilization practices is of considerable importance in developing proper fertilization practice for minimizing fertilizer N loss while maximizing its use efficiency (Lu *et al*., 2010).

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