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ORIGINAL ARTICLE

A Study of Drought Stress effect on Physiological and Morphological traits of Wheat

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ABSTRACT
Wheat is the main people in most countries and forms 15 to 18% of food consumption which is used for many purposes such as bread, different pastries, starch, and protein. Drought stress is still in the production of major limitation of crops. Morphological and physiological identification of drought resistance is of highly importance in the improvement of raised problems under drought stress. As a matter of fact, the genetic relationships of each of these processes and their exact relationship with grain yield is unknown. On the other hand the heritability of drought resistant cultivars based on morphological and physiological component modification is proposed as an important solution. This study was conducted to study the drought stress effect on physiological and morphological traits of wheat.
Key words: *wheat, physiologic and morphologic, drought stress*

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INTRODUCTION
Wheat bread (*Triticum aestivum* L) is cultivated in a wide range of environmental conditions in all around the world and has the widest mechanism among cereal species. Land allocated for wheat production in the world is more than any other plants. Iran is generally located in arid and semiarid conditions which main portion of rain occurs in winter and early spring. The country has usually cold winter, short spring and long, hot and arid summers. Wheat value in economic, social and politic is so that it is known as "oil base" in specialized literature. Much of wheat lands planted in Iran are in arid and semiarid regions. Due to lack of water resources and drought yield environment of wheat decreases significantly in these regions. Identification of factors influencing the reduction of grain yield is difficult in harsh environments. Also identifying traits that involved in drought resistance is not simple. Now, since Iran is located in arid region and there is continuously water shortage, production is considered in difficult condition in order to provide food supplies [1].

Concept of stress:
Stress in the result of the abnormal physiological processes and can be obtained by the impact or influence of biological and environmental factors. Namely stress is exposure the organism under the influence of an environment factor and apparently makes a reduction in its output or value [2].

Drought stress:
Low rainfall and its irregular distribution causes drought stress during crop growth period [3]. Drought and the stress resulted by it is the most important and the most common environmental stress, which causes enormous damage to crops worldwide every year, especially in Iran as an arid and semiarid country [4].

Drought stress has severe effects on the growth of three important stages. These steps are:
A) Occurrence and formation of flower
B) Pollination and fertilization
C) Seed formation

In reproductive stage, the plant is particularly sensitive to water. There are many reasons that drought stress limitation prevents the rate of rise of flowering stem cells. Nevertheless it has been proven that by removing the stress of cells it is formed faster than irrigated plants [5].

Stress at pollination and fertilization, reduces the number of grains. Due to the of pollen grains. In addition, drought stress influences the growth of pollen grains and pollen tube in the ovary and ovule tissue. Also wilt stigma pollen tube growth. Stress effect is highly evident in grain filling stage, because potential yield depends on weight and number of grains which this requires full-pollination and accumulation of assimilated in grain. Accumulative substances in seeds are supplied through photosynthesis to grain and nutrient transports from other parts of the plant to grain. One of the physiological changes that occur during the doughtiness is the osmotic pressure. Any increase in the osmotic pressure of the cell. Resulted by stress cooperates in maintaining Tourgesence. Small changes in the status of a plant Tourgesence carries a means that stress through which affects plant metabolism, and need to be considered [6].

The incidence of adverse such as drought, salinity, and heat make plants stressful and influence adversely the growth and yield of crops. In most parts of the world including Iran, incidence of water stress which in the result of rain shortage occurs especially in the steps that crops water requirement and potential evapo-transpiration increases, also it is the most important factor that in the more sensitive stage of crop growth even in arid (dry) areas where irrigation takes place makes difficult the accessibility of high yield by constraints on the development. According to the estimation around 40% of earth lands are in semi-arid regions [6].

Stress effect on photosynthesis respiration, materials transmission

Drought stress by reducing leaf area, pore blockage, reducing protoplasm activities and stabilization of carbon dioxide, reducing protein synthesis and chlorophyll reduces photosynthesis process [7]. Hanson and Hethes have proved that leaf water potential influences directly photosynthesis rate, as water stress increase, photosynthesis reduce to photosynthesis point and directly influences biochemical processes related to photosynthesis and indirectly reduces the login of carbon dioxide into the openings that are closed due to water stress [8].

The conditions of severe respiratory stress, absorption of carbon, assimilate translocation, and transmission of raw materials in a wooden vessel, will rapidly decrease to a very low level, and while hydrolytic activity of the enzyme increases, reduction of assimilates saturates the levels from these substances and finally will lead to the photosynthesis reduction and hunger will happen [9].

Boyer by describing crops physically has stated that moisture stress reduces photosynthesis, premature aging and falling of plant's lower leaves [10]. In terms of deficit, reduction in dry matter may be due to cell swelling pressure resulted from a reduction in the plant's leaf area and a reduction in photosynthesis rate may be due area and a reduction in photosynthesis rate may be due to biochemical limitations resulting from water deficiency including reduction of photosynthetic pigments especially chlorophyll [11].

Stress effect on yield components

Sandhu and Hortpn [12] stated that reducing plant height in drought stress may result from low soil moisture storage. Also Ibrahimi Molla Bashi [13] reported that late season drought stress reduces plant height in wheat genotypes. Fischer and Maurer [14] old and tall cultivars are less susceptible to drought than new semi-dwarf ones. Hadjichristodoulou [15] found that tall varieties have of higher yield compared to dwarf ones in shallow water areas. Sarmadnia [5] stated that the first yield component which is genetically controlled is the number of fertile tillers. However, fertile tillers are closely related to soil moisture regime and fertile tillers increases proportionally to density reduction.

Guttieri et al [16] reported that fertile tillers of wheat reduce as drought occurs from flowering differentiation to heading. According to Elhafid et al [17] drought reduces inoculation of flowers and this has a significant effect on the number of produced seeds. To Fischer and wood [18] moisture stress decreases seed number. The reduction of seed number Npon drought is due to a reduction in spikelets number and seed number per spikelet. Austin [19] also achieved to a similar result in wheat cultivars. Against report of Shakiba et al [20], seed number per ear is influenced by drought more than other parts of the yield. Fischer and Maurer also [14] said that if drought stress tales place at the time of pollination or close to it, seed number will decreases, so the grain will be arguably filled [quoted by 21].

Blum et al [22] and Hassanpanah [23] showed that drought stress reduces seed number and seed weight per ear. Sinha [24], Takami et al [25], Wardella et al [26], Ritchie and Neguen [27] and Hassanpanah [23] reported that drought stress reduces 1000 grains weight and irrigation increases 1000 grains weight.

Plaut Butow [28] found that water deficiency at flowering stage significantly reduces seed formation and its reproductive, and significantly reduces the capacity of assimilate transmission into the seed and reduces the weight of 1000 grains and causes grain shrink. In most studies related to physiological bases of genetic improvement of yield increasing found that throughout the long history of wheat breading there can be seen no change [21]. Thus in a few of studied, a significant increase in biologic yield has been observed during years of study. Also it has been recognized that less than 20% of grain yield increasing is resulted from an increase in biologic yield [29 and 30].

The only exceptional single report is by Hucl and Baker [31] in Canada. They not only found a positive and significant increase for biologic yield within years of study, but also stated that the main increase of grain yield origins from an increase in biologic yield [21]. The studies prove that it is necessary to supply the required water to access to desired yield in wheat agriculture.

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