

Effect of Drought stress and use of Vesicular Arbuscular Mycorrhizal (VAM) fungi (*Glomus mosseae* and *Glomus intraradices*) on Grain yield, Biological yield and Harvest Index on safflower(*Carthamustinctorius* L.)

Naser Hajiketabi*¹, Reza Zarghami², Amir Hasan Omidi³, Mohsen Tarigh Al- Eslami⁴

1. Graduate student of Agriculture, Islamic Azad University, Varamin–Pishva
2. Assistant professor of Agricultural Biotechnology Research Institute, Karaj, Iran
3. Assistant professor of Seed and Plant improvement Institute, Karaj, Iran
4. Member of Young Researchers Club, Azad University, Varamin-Pishva

E-Mail correspondence*: N.ketabi@gmail.com

Abstract

Safflower (*Carthamus tinctorius* L.) has an important role in supplying the needed oilseeds of Iran as a native plant and due to its specific characteristics such as, medicinal and nutritional use of its flowers, high quality vegetable oil due to having more than 90% unsaturated fatty acids; particularly linoleic and oleic acid, a nutritional supplement for livestock and relatively high resistance to environmental stresses such as salinity, drought and cold conditions (Ashkani and Pakniyat, 2003). Vesicular Arbuscular Mycorrhizal (VAM) fungi is one of the biological agents which includes a major part of soil organisms; Mycorrhizal fungi modulates the adverse effects of drought stress in plants (Troehza , 2003). An experiment was carried out during the growing season of 2012 at Agricultural Research Station of Islamic Azad University Varamin–Pishva Branch to evaluate the effect of mycorrhizal and drought stress on safflower yield. A split plot based on randomized complete block design was used with three replications. (complete irrigation, irrigation withholding at 50 percent flowering stage, irrigation withholding at 100 percent flowering and irrigation withholding at grain filling stage) and using mycorrhizal as the sub-factor at three levels (Not using mycorrhizal, using mycorrhizal *Glomus mosseae* species, using mycorrhizal *Glomus intraradices* species).

Mycorrhizal fungi changes plant water relations and also enhance the absorption of nutrients by increasing the root surface or the effective length of the root. Experiments on the traits such as grain yield, biological yield and harvest index, showed significant differences between the effects of drought stress treatments and mycorrhizal fungi treatment at 1% (Grain yield) and 5% (harvest index and biological yield). The highest grain yield, as the most important attribute of the study, was observed in mycorrhizal fungi treatment of *Glomus intraradices* species and mycorrhizal fungi of *Glomus mosseae* species.

The results of this experiment showed that the most sensitive stage of irrigation was in 50 % of flowering stage. Because, withholding the irrigation in flowering stages is more critical than the grain filling stage in safflower (Omidi, 2009). Also, by examining the effects of Mycorrhizal fungi in this experiment determined that the effects of mycorrhizal fungi as biofertilizers could increase yield and reduce the negative effects of stress and maintain the plant under drought stress.

Keywords: Safflower, Mycorrhizal fungi, Grain yield, Harvest Index, Drought Stress

References:

- 1- **Ashkani, J. and H. Pakniyat, 2003.** Evaluation of seed Yield- related characters in spring Safflower (*carthamus tinctorius* L.) Using Factor Analysis. Iran Agri. Res. 22:179-189.
- 2- **Omidi, A.H. 2009.** Effect of drought stress at different growth stages on seed yield and some agro-physiological traits of three spring safflower cultivars. Seed and Plant Production Journal 25(2): 15-31. (In Persian).
- 3- **Troehzaloy nachan T. E. 2003.** Endomycorrhizal fungi survival in continuous corn, soybean and fallow. Agronomy Journal. 95(1): 224-230.



The 1st International Conference on New Ideas in Agriculture
Islamic Azad University Khorasgan Branch
26-27 Jan. 2014, Isfahan, Iran

