



*Short Communication*

## The Effect of vermicompost on yield and yield components of wheat under terminal heat stress conditions in Ahwaz

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### Introduction

Terminal heat stress in Khuzestan province, decrease growth, yield and yield components of wheat. The vermicompost fertilizer improve water reserve and physical and chemical properties of soil. One of the important ways to reduce the negative effect of terminal heat stress on plant is using vermicompost fertilizer in the soil. Using vermicompost fertilizer in agricultural soils lead to increase nutrient elements and conserving the soil water and decrease the negative impacts of drought stress on plant. Generally, vermicompost fertilizer contribute to preserving the moisture storage of the soil and to supply the nutrients required by the plant. In this study, the most important aim is to study the effect of vermicompost fertilizer on bread wheat yield and yield components under terminal heat stress in Ahwaz climatic condition.

### Materials and methods

In order to evaluate the effect of vermicompost fertilizer on growth and yield of wheat in terminal heat stress of Ahwaz, a field experiment using split-plot design based on randomized complete block design with four replicates was conducted in research farm of Agricultural Sciences and Natural Resources University of Khuzestan during (in 31° N, 48° E, 35 Km north-east of Ahwaz, and 20 m above the sea level) 2017-2018 growing season. Experimental factors were three sowing dates (22 Nov., 11 Dec. and 31 Dec.) in main plots and five vermicompost rates (0 (control), 5, 10, 15 and 20 t.ha<sup>-1</sup>) in sub plots.

### Results and discussion

Analysis of variance showed that the effect of sowing date and vermicompost were significant on measured traits. Mean comparison revealed that the highest grain yield (2356 kg.h<sup>-1</sup>) was at the first sowing date and the lowest grain yield (1732 kg.h<sup>-1</sup>) was at the last sowing date. Also, in vermicompost levels, the maximum grain yield (2593 kg.ha<sup>-1</sup>) was in 20 t.ha<sup>-1</sup> of vermicompost application and the minimum grain yield (1566 kg.ha<sup>-1</sup>) was in control of vermicompost.

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## Conclusions

Generally, the results showed that with delay in sowing date and occurrence of terminal heat stress, decreased growth and grain yield of wheat. But, using vermicompost fertilizer decreased the negative impact of drought stress. So that, with increase vermicompost application, increased measured traits. Also, in areas with terminal heat stress after flowering stage, using 20 tons per hectare of vermicompost fertilizer is recommended for maintaining grain yield.

**Keywords:** High temperature after flowering, Organic manure, Khuzestan, Biological yield

**Table 1. Variance analysis of measured traits**

S.O.V	DF	Means of squares (MS)					
		No. of Spike.m <sup>-1</sup>	Grain.spike <sup>-1</sup>	1000 grain wt.	Grain yield	Biological yield	Harvest index
Rep	3	4293.2**	129.1**	5.7*	284038*	3588810*	0.005*
Sowing date (SD)	2	4252.1**	296.4**	17.1**	2155462**	13888163**	0.003**
Ea	6	75.1	1.0	0.5	23631	246578	0.0002
Vermicompost (V)	4	13458.6**	388.2**	23.8**	2078483**	16654540**	0.002 <sup>ns</sup>
SD × V	8	169.5 <sup>ns</sup>	8.8 <sup>ns</sup>	0.2 <sup>ns</sup>	25512 <sup>ns</sup>	264274 <sup>ns</sup>	0.008 <sup>ns</sup>
Eb	36	432.5	11.1	1.4	89099	279069	0.001
CV(%)	-	7.7	14.1	3.0	15.3	7.5	12.4

Ns, \* and \*\*: Non-significant, significant at 5% and 1% probability levels, respectively

**Table 2. Mean comparison of measured traits in different sowing dates**

Sowing date	No. of Spike.m <sup>-1</sup>	Grain.spike <sup>-1</sup>	1000 grain wt.	Grain yield	Biological yield	Harvest index
			g	-----kg.ha <sup>-1</sup> -----		%
Nov. 22	284.1 <sup>a</sup>	28.0 <sup>a</sup>	40.5 <sup>a</sup>	2356 <sup>a</sup>	7958 <sup>a</sup>	29.6 <sup>a</sup>
Dec. 11	272.6 <sup>b</sup>	22.1 <sup>b</sup>	39.7 <sup>b</sup>	1867 <sup>b</sup>	6753 <sup>b</sup>	27.4 <sup>b</sup>
Dec. 31	255.1 <sup>b</sup>	20.7 <sup>c</sup>	38.7 <sup>c</sup>	1732 <sup>c</sup>	6359 <sup>c</sup>	27.1 <sup>b</sup>

Means in each column, followed by a similar letter(s) are not significantly different at 5% probability level using LSD

**Table 3. Mean comparison of measured traits in different vermicompost levels**

Sowing date	No. of Spike.m <sup>-1</sup>	Grain.spike <sup>-1</sup>	1000 grain wt.	Grain yield	Biological yield	Harvest index
t.ha <sup>-1</sup>			g	-----kg.ha <sup>-1</sup> -----		%
0	231.5 <sup>d</sup>	17.7 <sup>d</sup>	37.9 <sup>c</sup>	1566 <sup>d</sup>	5776 <sup>d</sup>	26.4 <sup>b</sup>
5	255.4 <sup>c</sup>	19.2 <sup>c</sup>	38.6 <sup>c</sup>	1662 <sup>d</sup>	6324 <sup>c</sup>	26.8 <sup>b</sup>
10	264.4 <sup>bc</sup>	22.9 <sup>c</sup>	39.7 <sup>b</sup>	1923 <sup>c</sup>	6691 <sup>c</sup>	28.4 <sup>ab</sup>
15	280.0 <sup>b</sup>	26.5 <sup>b</sup>	40.4 <sup>b</sup>	2183 <sup>b</sup>	7531 <sup>b</sup>	28.3 <sup>ab</sup>
20	321.6 <sup>a</sup>	31.7 <sup>a</sup>	41.5 <sup>a</sup>	2593 <sup>a</sup>	8795 <sup>a</sup>	29.7 <sup>a</sup>

Means in each column, followed by a similar letter(s) are not significantly different at 5% probability level using LSD test.