



# Effect of Plant Density and Spring Planting Dates on Yield and Morpho- (.Physiological Traits of Garlic (*Allium sativum* L

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## Introduction:

Garlic is one of the most important plant in the Alliacea family and is cultivated in many countries around the world due to its medicinal properties. Based on the statistics of Food and Agriculture Organization (FAO), the annual production of garlic in the world is more than 26 million tons and in Iran it is more than 54 thousand tons. The average garlic yield in Iran is about 12 t.ha<sup>-1</sup>, which has a significant difference with the average yield of Asia (19.5 t.ha<sup>-1</sup>) and world average yield (18 t.ha<sup>-1</sup>).

## Material and methods:

In order to investigate the effect of different planting dates in spring and also plant density on yield and some of morpho-physiological traits of garlic a split plot experiment was conducted based on randomized complete block design (RCBD) with three replications. Experimental treatments were three planting dates (March 5, March 25 and April 14) and four planting densities (20, 40, 60 and 80 plant. m<sup>-2</sup>).

## Results:

Based on results the interaction of experimental treatments on garlic yield, leaf weight, plant height, total chlorophyll and carotenoids was significant whereas for harvest index, number of produced cloves in plant, chlorophyll a and relative water content only the effects of planting date and plant density were significant. The highest garlic yield (921 g. m<sup>-2</sup>) observed in planting date of March 5 with density of 80 plants. m<sup>-2</sup> but the lowest yield (317 g. m<sup>-2</sup>) obtained in the last planting date with the lowest plant density. The highest harvest index was related to the first planning date and with delay in planting date, this index was reduced significantly. The lowest number of cloves per plant (3.64) was related to the last planting date. Increasing plant density also decreased the number of produced cloves by 14 percent.

## Conclusion:

In terms of garlic yield, the best planting date in the studied region (with Mediterranean climate) was March 5th. Although increasing plant density resulted in higher yield but because of smaller size of produced bulbs, the marketable yield decreased.

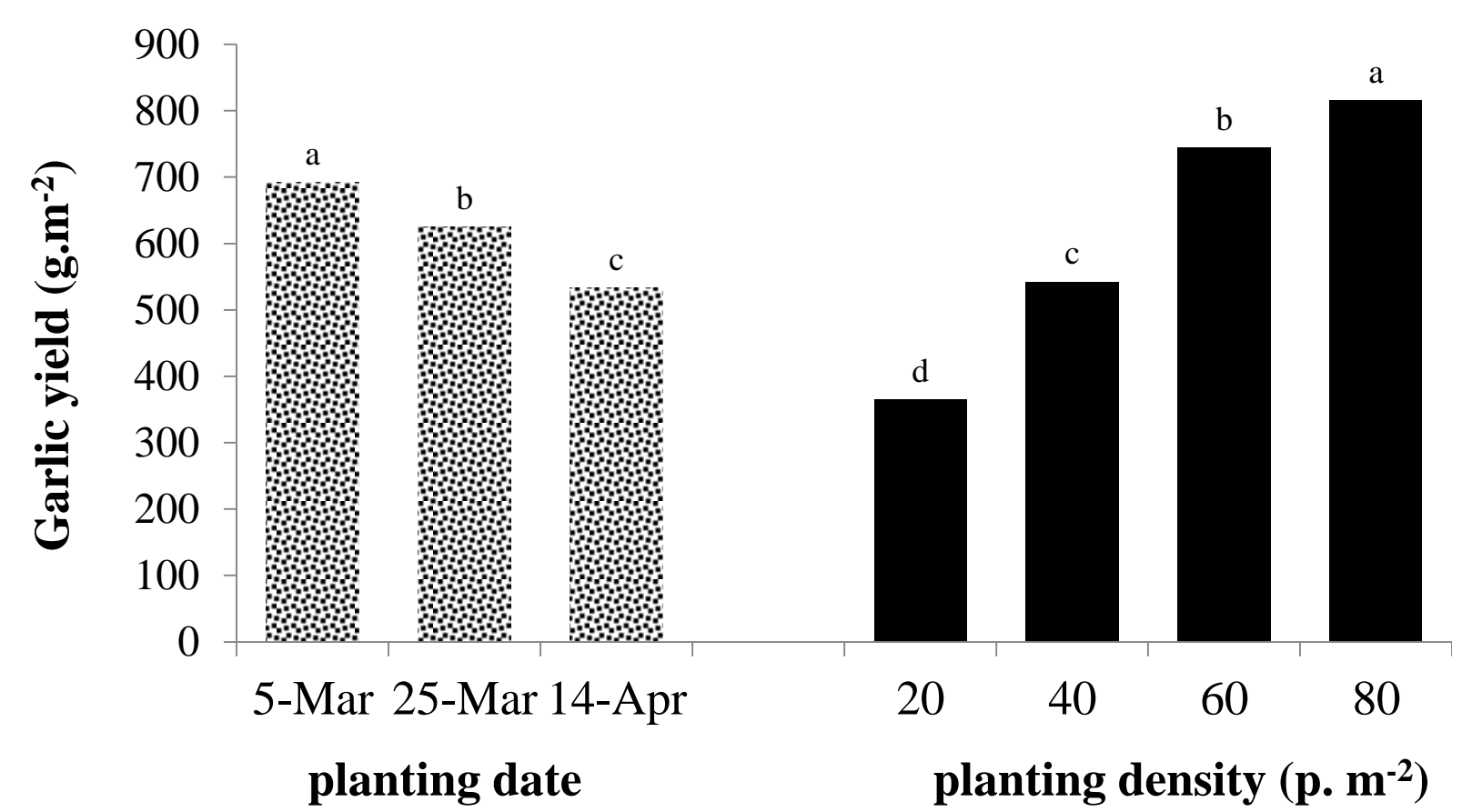


Fig.1. Effect of planting date and density on garlic yield

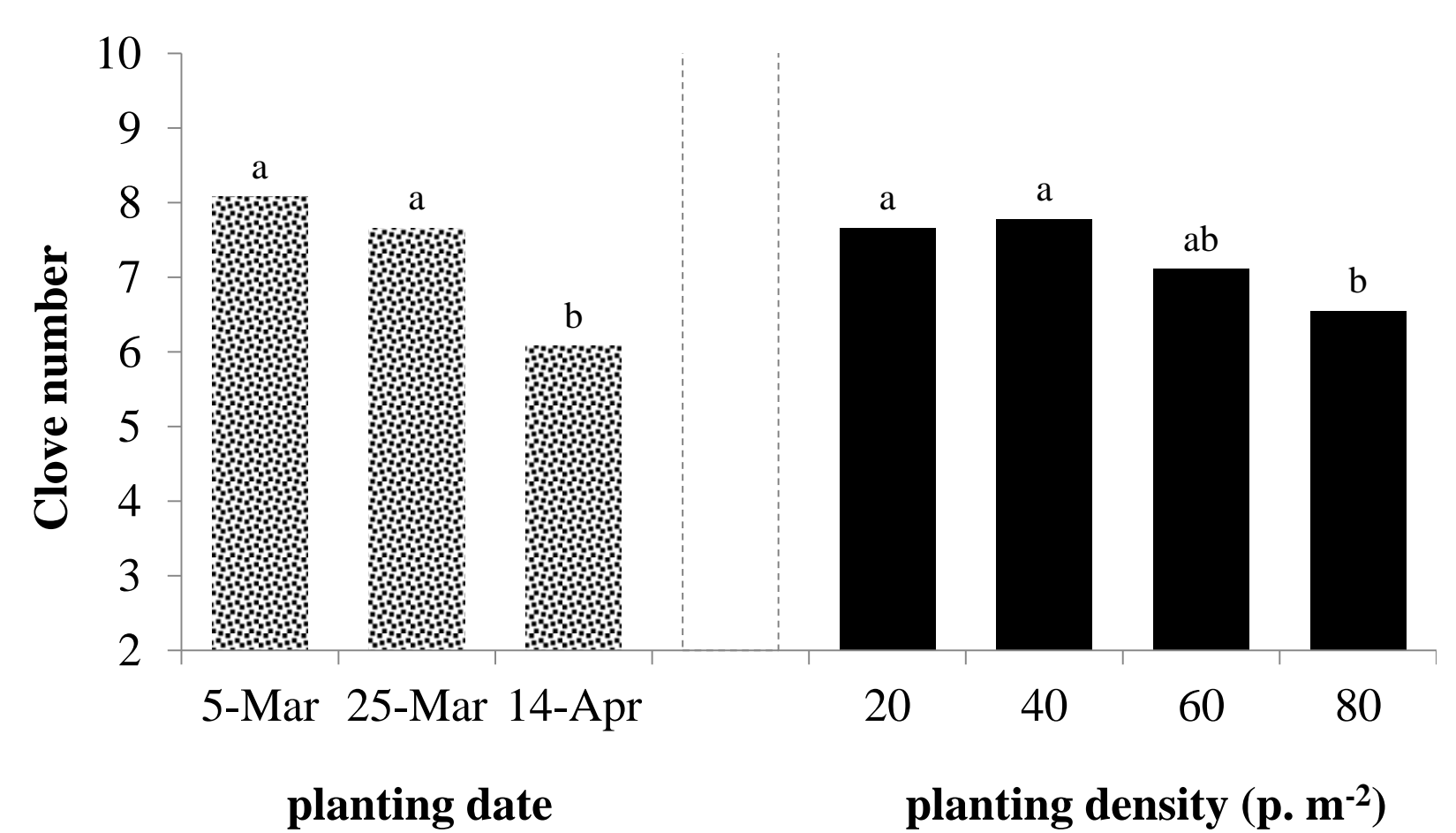


Fig.2. Effect of planting date and density on produced clove in bulb

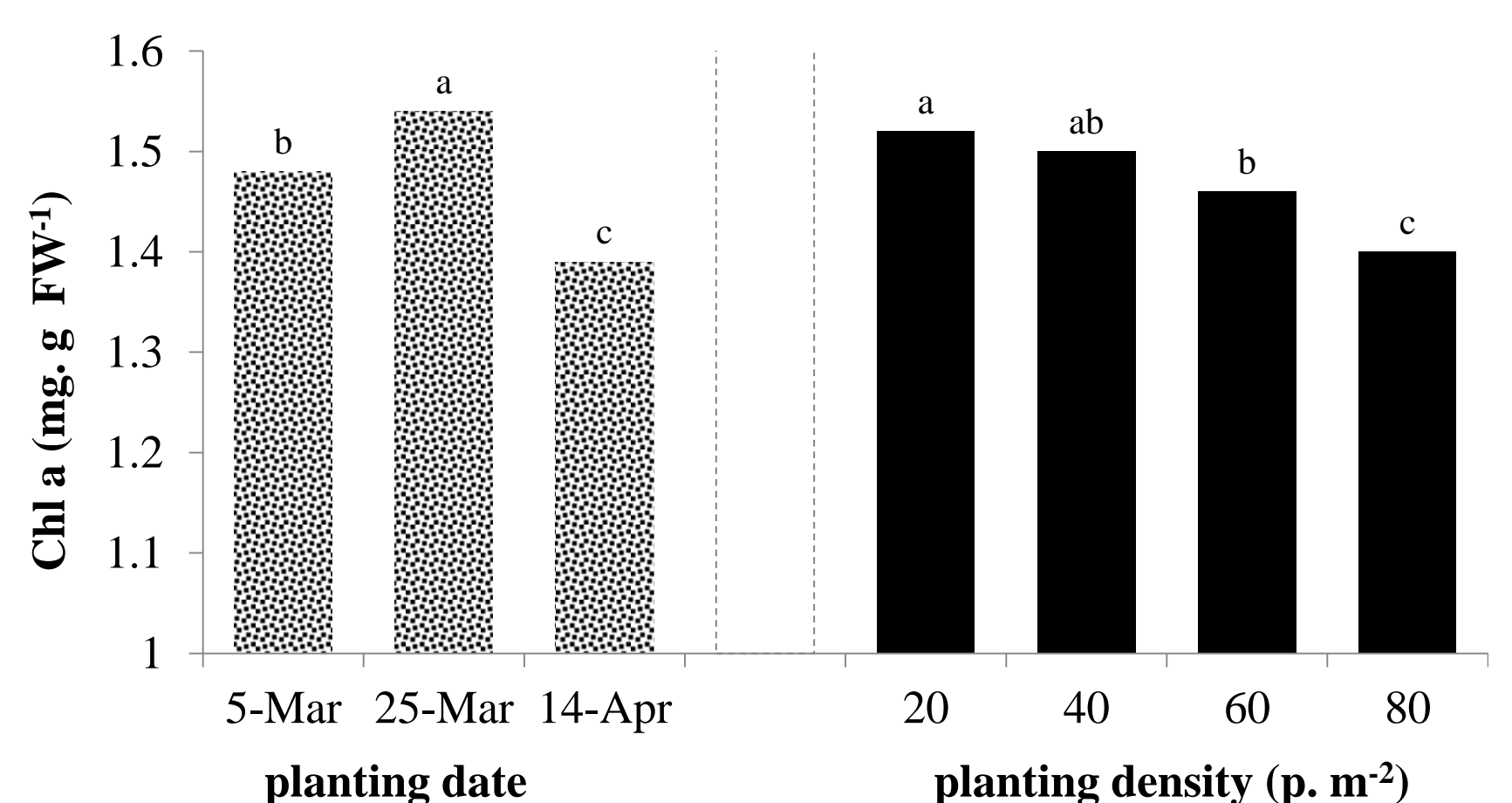


Fig 3. Effect of planting date and density on Chlorophyll a