NITROGEN FERTILIZER LEVELS AND SOWING DATE EFFECTS ON POPCORN (KSC 604 P.C.) YIELD COMPONENTS

BABAK PEYKARESTAN*, SEYED MOHAMMAD REZA SEIFY, ALI MOHAMMAD MODARES SANAVI AND HESHMATOLLAH OMIDI

Department of Agronomy - College of Agriculture - University of Milajerd, Payame Noor- Iran.

Corresponding author. Mobile: 00989188626313. Fax: 00988625553577, E-mail: B_paykarestan@pnu.ac.ir.

ABSTRACT: Popcorn (Zea mays everta Sturt.) is a popular and nutritious snack food. Environmental factors affecting grain yield and yield-related components of popcorn are needed to compensate increasing demand. This research was conducted to determine the effects of nitrogen fertilizer application rates and sowing dates on grain yield and yield-related plant characteristics of popcorn in Arak, located at central part region of IRAN, during 2009 and 2010. The experiment was designed in a randomized complete block design with a split-plot arrangement with three replications. Nitrogen fertilizer levels of check, 120, 180 and 240 kg/ha were arranged in the main plots and sowing dates of Jun 5th, Jun 20th, July 6th and July 21th were arranged in the sub-plots. Popcorn grain yield and yield-related traits were significantly affected by nitrogen fertilizer levels and sowing dates. Our results indicated that suitable nitrogen fertilizer levels and sowing date were 180 kg N/ha and July 6th for popcorn grown as a second crop in Arak ecological conditions.

Key words: Popcorn, Nitrogen, Sowing Date, Yield.

INTRODUCTION

Popcorn (Zea mays everta Sturt.) is a popular and nutritious snack food. Majority of the world’s popcorn production is in the United States. Popcorn cultivation in Turkey is restricted and production value is low, but popularity of popcorn utilization and demand for it are increasing. Experimental results are limited regarding cultural practices for popcorn cultivation. Generally, the cultural practices used for growing dent corn can be used for growing popcorn, with some minor modifications (Ziegler, 2001). Not only genetic potential of hybrid (Halluer, 1994), but also cultural practices such as nitrogen fertilizer rates and plant densities have important effects on popcorn yield (Ziegler et al., 1987). Nitrogen fertilizer is also one of the most important factors affecting plant growth and grain yield of corn hybrids (Russel and Balko, 1980). Optimum plant density is another important factor for high grain yield. Yield can be increased with increased plant density up to a maximum for some maize genotypes grown under a set of particular environmental management conditions and declines when plant density is increased further (Tollenaar et al., 1994).

Roy and Singh (1986) evaluated the effects of nitrogen fertilizer levels and plant densities on popcorn. Grain yield increased with increases in nitrogen fertilizer levels and plant densities, the highest grain yield was obtained at 100 kg N/ha with 80 000 plant ha⁻¹. Thakur and Malhotra (1991) researched 0, 30, 60 and 90 kg N ha⁻¹ nitrogen fertilizer levels and 40, 50 and 60 cm inter-row spacings for popcorn and reported that the highest grain yield was obtained at the narrowest row spacing with the highest nitrogen fertilizer level applied. Ülger (1998) reported the highest popcorn yield as 5850 kg/ha⁻¹, obtained at 250 kg N/ha⁻¹ with 15 cm intrarow and 70 cm inter-row spacing. Özkan (2007) demonstrated that the highest grain yield was obtained at 200 kg N/ha⁻¹ with 4530 kg/ha⁻¹. Findings of Gökmen et al. (2001) indicated that, for maximum grain yield of popcorn, 100-150 kg N/ha⁻¹ should be applied and the plant density should be 7.0 plants m⁻². Sezer and Yanbeyi (1997) demonstrated that ear characteristics were negatively affected by increases in plant densities, although plant height, ear height and grain yield increased with increases in plant densities. Researchers reported that effects of nitrogen fertilizer were positive and the highest grain yield was obtained at 71430 plant