

PDF - RESPONSE OF WHEAT (*TRITICUM AESTIVUM* L.) VARIETIES TO SOWING METHOD AND FERTILIZER TREATMENTS - researchcub.info

CHAPTER ONE

1.0 INTRODUCTION

Wheat (*Triticum aestivum* L.) belongs to the family Poaceae and ranks first in both area cultivated and production among cereal crops. It contributes more calories and proteins to the world's human diet than any other cereals. Globally, production is estimated at 749 million metric tonnes from about 220.4 million hectares (FAO, 2016). The highest average yields are obtained in Western Europe, with more than 8 t ha⁻¹, in contrast to about 1 t ha⁻¹ in countries of Central and West Asia and West Africa (Rajaram and Braun, 2009). In Nigeria, it is a major crop as it is eaten as bread and other wheat-based products such as cakes, biscuits, macaroni, spaghetti, pasta, etc. (Falaki and Mohammed, 2011). Wheat possesses several health benefits (Heshe et al., 2016) against diseases such as constipation, ischaemic heart disease, diverticulum, appendicitis, diabetes, and obesity especially when utilized as a whole-grain product (Kumar et al., 2011).

Wheat production in Nigeria is presently restricted (because of high temperature and humidity) to areas between latitudes 10-14°N (covering the Sudan and Sahel Savanna zones), during the cold harmattan period between the months of November and February, under irrigation (Olugbemi, 1994). Currently, Nigeria's production stands at 60,000 tonnes from about 51,000 hectares (Anon., 2016). Cereal yield is generally low in soils of West Africa because of low soil phosphorus and nitrogen (Okpara and Igwe, 2014).

Nigeria's Savanna soils are generally low in organic matter (Abdulkadir and Abu, 2013; Lawal and Girei, 2013), nitrogen and phosphorus (Adeosun, 2008; Lawan and Girei, 2013). Wheat in Nigeria is produced in the Savanna zone, and continuous cultivation which had replaced the traditional shifting cultivation causes soil nutrient and fertility depletion, structure degradation, reduced water infiltration, increased run off and erosion (Odunze, 2003; Lawal, 2012). Excessive use of chemical fertilizers causes soil and water pollution (Elhassan et al., 2010; Zhang et al., 2010; Lawal and Girei 2013). In recent times, attention has been directed towards organic fertilizers owing to hazardous environmental consequences and high cost of inorganic fertilizers (Jilani et al., 2007; Chaudhry et al., 2009; Shiyam and Binang, 2011; Oyedeji et al., 2014).

Integrated plant nutrient management enhances soil productivity and sustains crop production (Dilshad et al., 2010; Aslam et al., 2011a). Farmyard manure (FYM) significantly influenced the soil organic matter concentration (%) in soil as compared to application of recommended NPK (Aslam et al., 2011b; Abbas and Fadul 2013).

Generally, combined application of organic manure and chemical fertilizer improves soil fertility, soil physical and chemical properties and increases crop yields (Ezekiel, 2010; Liu et al., 2010). FYM is one of the organic fertilizers used by Nigeria's peasant farmers. Benefits of FYM and in combination with inorganic fertilizer have been reported in wheat (Ali et al. 2011; Jibrin and Fagam, 2012; Khan et al., 2013a, Zahoor, 2014) and other crops such as maize (Shah et al., 2009; Achieng et al., 2013, Adesoji, 2013; Zehirun et al., 2013), millet (Sadiq et al., 2012; Bakhshwain et al., 2013) sorghum (Ahmad et al., 2007) soybean (Bhattacharyya et al., 2008) etc. Traditionally wheat is planted using broadcast method (Abbass et al., 2009) and recently there is a shift from the broadcast to drilling (Soomro et al., 2009; Amin et al., 2013a; Naresh et al., 2014). However, there are still conflicting results on the various methods owing to relative advantages and ultimate yield as broadcasting is easy to do, while drilling is easy

to weed. Carver (2005) investigated the impact of different crop establishment methods in winterwheat. Broadcasting method produced the most effective spatial arrangements. However, there was no consistent relationship between any of the spatial arrangement and subsequent yield performance. Singh et al. (2005) reported in India, that in wheat, strip drilling resulted in higher growth and grain yield than the broadcasting. However, Ahuja et al. (1996) recorded higher grain yield in broadcasting compared to drilling. In a recent study in India Abbas et al. (2009) also reported higher yield in broadcast than drilling at 15, 22.5 and 30 cm spaced rows. More recent studies indicated higher yield in drill method over broadcasting (Amin et al., 2013a; Naresh et al., 2014). Performance of different varieties of wheat under different management and environmental condition is of interest to the agronomist. Over the years, several wheat varieties have been developed and released in Nigeria (Miko, 2012). These varieties vary in their response to management and environmental condition. Significant differences in grain yield among wheat varieties were reported in various wheat growing areas of Nigeria; Bauchi (Jibrin and Fagam, 2012), Borno (Bibinu et al., 2016), Kano (Falaki and Mohammed 2011) and Sokoto (Sokoto and Singh, 2013). Similarly, variation in yield and yield components of wheat varieties under organic (Jibrin and Fagam, 2012; Abbas and Fadul 2013), inorganic (Asargew et al. 2014; Farrokh and Farrokh 2014) and their combinations (Akhtar et al., 2011; Zahoor, 2014) were also reported in Asia and other parts of the globe.

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