Extract on performance of wheat biology essay

Science, Biology

An experiment will be conducted to evaluate the comparative effect of moringa leaf and flower extract on performance of wheat. The experiment will be laid out in randomized complete block design having four replications with a net plot size of 6 m × 1. 8 m. The experiment will consist of following treatments (T1 = Control; T2 = Water spray; T3 = 1% Moringa leaf extract; T4 = 1% Moringa flower extract; T5 = 3% Moringa leaf extract; T6 = 3% Moringa flower extract; T7 = 5% Moringa leaf extract; T8 = 5% Moringa flower extract). Data on growth and yield attributes will be recorded following the standard procedures. The data obtained will be analyzed statistically using Fisher's analysis of variance technique and differences among treatments' means will be compared by using least significant difference test (LSD) at 5% probability level.

UNIVERSITY OF AGRICULTURE, FAISALABAD

DEPARTMENT OF AGRONOMY

Synopsis for M. Sc. (Hons) Degree

TITLE: Comparative Effect of Moringa Leaf and Flower Extract on Performance of Wheat

a) Date of Admission: 08-10-2011

b) Date of Initiation: 26-11-2012

c) Probable Duration: 7 Months

PERSONNEL:

a) Name of the Student: Rana Fiaz-ul-Haq (2007-ag-1978)b) Supervisor: Dr. Sardar Alam Cheemac) Supervisory Committee: Dr. Sardar Alam Cheema (Chairman)Dr. Muhammad Farooq (Member)Dr. S. M. A Basra (Member)

NEED FOR THE PROJECT

Wheat is the second most vital cereal crop of the world (FAOSTAT, 2011). It is the staple food of Pakistan and many other countries of the world. Although, Pakistan has attained self-sufficiency in wheat production during last several years but our average yield is less than the other developing world (FAOSTAT, 2011), and even ours neighbor developing country i. e. India. Many factors are responsible for our low average wheat yield but the most significant are poor crop management practices, poor fertility levels of our soil (Tahir et al., 2009) and improper nutrient application (Ali et al., 2008). Although our commercial fertilizer play an important role in improving the growth and yield of our major cereal and cash crops, but role of natural and synthetic plant growth promoter cannot be ignored in improving the plant growth and development. These plant growth promoters/plant hormones have been reported to increase yield of many crops through positive influence on growth and development. Moringa belongs to the family Moringaceae having 13 species until discovred. Moringa oleifera L. is the most common known and utilized species. M. oleifera is native to the sub-Himalayan regions of northwest India and Pakistan (Fahey, 2005). It is also indigenous to many other countries in Southeast Asia, Africa, Arabia, Caribbean islands, and South America (Fahey, 2005). Moringa (Moringa oleifera L.) has gained much importance in the recent days due to its multiple used and benefits to agriculture and industry (Ashfaq et al., 2012). Regarded as a miracle plant, all the parts of moringa plant are used for medicinal and other purposes. Recently, the roles of aqueous extracts of various parts in enhancing plant growth and productivity have been

explored, making it even more valuable plant species (Ashfaq et al., 2012). Positive effects of foliar applied Moringa oleifera has been noticed in many crops and vegetables like onions, bell pepper, sorghum, soya beans, coffee, tea, melon, chili and maize (Fuglie, 2001). Leaves of M. oleifera are rich in zeatin, a cytokinin in addition to other growth enhancing compounds like ascorbates, phenolic and minerals like Ca, K, and Fe that makes it an excellent crop growth enhancer (Anjorin et al., 2010). Moringa leaf extract is best used as plant growth enhancer (Phiri and Mbewe, 2010). Foidle (1999) reported that foliar application of MLE increased 94% and 65% yield in reddish and bean respectively. Foidle et al. (2001) showed that foliar spray of Moringa accelerated growth of young plants and the sprayed plants were firmer, more resistant to pests and disease, have longer life-span, heavier roots, stems and leaves, produced more and larger fruits. Similarly in recent study, Mvumi et al. (2013) reported that application of moringa extract increased the growth and yield of maize and beans. From the above paragraphs, it’s evident that moringa extracts has positive role in improving the productivity of many crops. So this study was carried out to evaluate the comparative effect of moringa leaf and flower extract on performance of wheat.

REVIEW OF LITERATURE

Various plant growth regulators/hormones have ability to enhance the yield through affecting internal processes of plants. Price (1985) found that fresh Moringa leaves extract act as good and effective plant growth hormone and he found an increase of 25-30% in yiled of different crops like maize, onions, soya, sorghum, coffee and melon. In later studies, it was found that it was

actually Zeatin found in Moringa leaves which was involved in increasing the yield of crops. Fuglie (2000) also found that leaf extracts of M. oleifera accelerated growth of young plants, strengthened plants as a whole, improved plants resistance to pests and diseases, increased leaf area duration, increased number of roots, produced more and larger fruits and generally increased yield by 20 to 35%. In a study, Foidle (2001) investigated that when foliar spray of Moringa was applied on the leaves of plants, it enhanced the yield significantly despite the fact that it was applied in very in minute amounts. This study revealed that that moringa leaf extract contain substances that promoted the vegetative growth and grain yield of many crops. In another study, Phiri (2010) found that Moringa oleifera leaf extracts increased the length of radical and hypocotyl length of maize and wheat. He also found that this application as a seed treatment not only improved the vegetative growth but also enhanced the grain yield even applied in very small amounts as a seed treatment. Makkar (1996) reported that fresh Moringa leaves extracts can be used to produce an effective plant growth hormone, increasing yields by 25%-30% for a number of crops such as soya, maize and coffee. Moringa leaf extracts (MLE) was used as foliar application in wheat under field conditions and improvement in 1000 grain weight, biological yield, grain yield and harvest index was noticed when moringa leaf extract was applied at different critical stages of wheat. MLE extended the seasonal leaf area duration, delayed the crop maturity, enhanced grain filling period resulting in greater seed and biological yields in wheat (Yasmeen et al., 2011). In another study, MLE foliar application exhibited larger leaf area in moderately saline soil. MLE foliar spray induced higher leaf total soluble

protein and antioxidants i. e., superoxide dismutase, peroxidase and catalase. MLE foliar sprays contribute more for yield contributing parameters under normal saline conditions (Yasmeen et al., 2012). Ali et al. (2011) reported that MLE increased leaf area, plant height, chlorophyll a and b contents, root fresh and dry weights in maize. In a study, Hussain (2010) used Canola and moringa (Moringa oleifera) extracts as foliar sprays on maize. It was noted that with two sprays of moringa and canola mixture sprayed at 30 and 40 DAS increased maize grain yield by 83 %. In another filed study, Jahangeer (2011) found that two foliar sprays of 3 % moringa increased maize yield by 52 % over control. Exogenous application of MLE at heading stage in late sown wheat (Triticum aestivum) improved 1000-grain weight, biological yield, grain yield, and harvest index compared with control (Basra, 2011).

MATERIALS AND METHODS

The proposed study will be conducted at the Agronomic Research Area, University of Agriculture, Faisalabad during 2012-2013. The experiment will be laid out in randomized complete block design having four replications with a net plot size of 6 m × 1. 8 m. The experiment will comprise of following treatments

TREATMENTS

T1 = ControlT2 = Water sprayT3 = 1% Moringa leaf extractT4 = 1% Moringa flower extractT5 = 3% Moringa leaf extractT6 = 3% Moringa flower extractT7 = 5% Moringa leaf extractT8 = 5% Moringa flower extractThe crop will be sown on November 26, 2012 with the help of hand drill in 22. 5 cm spaced

rows using seed rate of 125 kg ha-1 Fertilizer will be applied @100-90-75 NPK kg ha-1 using urea, DAP and sulphate of potash as the sources.

OBSERVATIONS

Following observations will be recorded during the course of study by using standard procedures. Crop growth rate (g m-2 d-1)Leaf growth rate (g m-2 d-1)Number of tillers (m-2)Number of productive tillers (m-2)Spike length (cm)Number of spikelets per spikeNumber of grains per spike1000-grains weight (g)Biological yield (kg ha-1)Grain yield (kg ha-1)Harvest index (%)

ECONOMIC ANALYSIS

Net field benefits will be calculated by subtracting the total variable cost from the total benefits of each treatment combination. Input and output cost for each treatment combination will converted into Rs. ha-1. Similarly marginal rate of return (MRR) will be calculated according to CIMMYT (1988).

STATISTICAL ANALYSIS

The collected data will be analyzed statistically by employing the Fisher analysis of variance technique (Steel et al., 1997) and treatment means will be compared by using Least Significance Difference (LSD) test at 5% probability level.

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Agronomy, University of Agriculture, Faisalabad, PakistanMakkar, H. P. S. and K. Becker. 1996. Nutritional value and antinutritional components of whole and ethanol extracted Moringa oliefera leaves. Anim. Feed Sci. Tech. 63: 211-228. Mvumi, C., F. Tagwira and A. Z. Chiteka. 2013. Effect of moringa extract on growth and yield of maize and common beans. Greener J. Agric. Sci. 3: 55-62. Phiri, C. 2010. Influence of Moringa oleifera leaf extracts on germination and early seedling development of major cereals. Agri. Biol. J. North Am. 1: 774-777. Phiri, C. and D. N. Mbewe. 2010. Influence of Moringa oleifera leaf extracts on germination and seedling survival of three common legumes. Int. J. Agric. Biol. 12: 315–317Price, M. L. 1985. The Moringa Tree. ECHO, 17391 Durrance Rd., North Ft. Myers FL 33917, USA. Tahir, M., A. Tanveer, T. H. Shah, N. Fiaz and A. Wasaya. 2009. Yield response of wheat (Triticum aestivum L.) to boron application at different growth stages. Pak. J. Life Soc. Sci. 7: 39–42. Yasmeen, A., S. M. A. Basra, I. Afzal and M. Farooq. 2012. Effect of natural and synthetic growth enhancers on antioxidant status of wheat under saline conditions. Plant Growth Regul. Revision submittedYasmeen, A., Y., S. M. A. Basra and A. Wahid. 2011. Performance of late sown wheat in response to foliar application of Moringa oleifera Lam. leaf extract. Chilean J. Agric. Res. 72: 92–97.

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