SOIL FERTILITY STATUS OF RESEARCH FARM KOONT FIELDS, RAWALPINDI, PUNJAB

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ABSTRACT

This study was conducted to assess the soil fertility status of olive, citrus, sunflower, maize and grapes fields of Research Farm, Koont, Rawalpindi. During the study soil samples of these fields were analyzed for pH, ECe and organic matter. The results of the soil analysis indicated that soil pH is alkaline due to calcareous nature of soil. It has a good pH value almost neutral which is optimum for maximum growth for most of the crops. Soil electrical conductivity of examined fields was less than 4 dSm-1. Electrical conductivity of these fields is normal, so there is no danger of the excessiveness of toxic salts. Citrus field is the best on because it has low ECe value. Organic matter ranged from 0.23 to 1.16 percent. Organic matter is also present in sufficient quantities which show soil is productive

INTRODUCTION

Nutrient is a substance used by an organism to survive, grow, and reproduce. There are seventeen most important nutrients for plants. Plants must obtain the following mineral nutrients from their growing medium (Akhter *et al., 2007).*These elements stay beneath soil as salt. So plants consume these elements as ion. The macronutrients are consumed in larger quantities; hydrogen, oxygen, nitrogen and carbon contribute to over 95% of a plants entire biomass on a dry matter weight basis. Micronutrients are present in plant tissue in quantities measured in parts per million, ranging from 0.1 to 200 ppm, or less than 0.02% dry weight. Most soil conditions across the world can provide plants adapted to that climate and soil with sufficient nutrition for a complete life cycle, without the addition of nutrients as fertilizer (Marschner, 2012). A number of factors and their interaction impede sustainable growth in agriculture. Among these factors depletion of soil fertility through mining of soil nutrients from cropped area is real threat to food security and environmental degradation. Most of the soils in Pakistan have poor status of available plant nutrients and cannot support optimum levels of

crop productivity. Widespread nutritional deficiencies losses occur of relatively fertile soils layers by water erosion, coupled with continuous nutrient mining by crops in Pothwar area of Pakistan (Rashid *et al*., 1997).Soil salinization is one of the major factors that contribute to land degradation and decrease in crop yield (Al Yassin, 2005; Anjum *et al*, 2005).Salt-affected soils are characterized by high concentrations of soluble salts and low organic matter and nitrogen content (Lodhi *et al*, 2009). The negative effects of salinization are intensified by the low levels of soil organic matter (Muhammad *et al*, 2008) and decreasing stability of soil structure, i.e. The tendency to slake, disperse and swell under specific conditions (Qadir and Oster, 2002).The primary objective of soil testing is to help making soil test based fertilizer use recommendations. It helps in applying different nutrients in balanced ratio so as to get maximum efficiency of the applied fertilizers and profitable crop production (Motsara, 2002). Soil test measure some fraction of total supply of nutrients in the soil and indicate its available nutrient level. There is need to assess the latest fertility status of different fields of university research farm area for rational use of fertilizers to maintain the soil fertility and crop to check the soil alkalinity or acidity.The information generated from this study was very helpful for sustainable crop production.

MATERIALS AND METHODS

Soil samples were taken from the different fields of research farm Koont Punjab Rawalpindi at depth of 0-20 cm. Preparation of samples including tagging, air drying and then sieving though 2mm size sieve of stainless steel was done. Prepared samples were stored in plastic bags. Soil pH was calibrated (Thomas, 1996). Electrical conductivity was determined (Mclean, 1982).Organic matter was determined (Walkley, 1947). Descriptive statistics was applied and data obtained was subjected to the analysis of mean, standard deviation and correlations (Steel *et al.,* 1997).

RESULTS AND DISCUSSION

Soil pH was obvious from the research study that the soils of the mostly fields are neutral to alkaline in nature. Values of pH ranged from 7.12 to 7.72 at 0 to 20 cm depth. Standard deviation values are 0.20to 0.22 at 0 to 20 cm depth. The pH of soil was alkaline due to

calcareous nature of soil. It has a good pH value almost neutral which is optimum for maximum growth for most of the crops. Rizwan *et al.,* (2012) was reported that Chakwal soils are alkaline having 7.0 to 8.27 pH range with an average of 7.4. Motsara, (2002) investigated that soil microorganism activity reduced at pH5. Soil pH also affects the availability of plant nutrients. Soil electrical conductivity of examined fields was less than 4 dSm^{-1} (Table -1) as indicated by the information provided by Rizwan *et al.,* (2012) extended from 0.10 to 0.47 dSm^{-1} at 0 to 20 cm depth. Electrical conductivity of these fields is normal, so there is no danger of the excessiveness of toxic salts. Citrus field is the best on because it has low ECe value. Organic matter ranged from 0.231 to 1.160 percent with mean estimation value of 0.702 and 0.171 as standard deviation. The information demonstrated that the upper layer of soil has higher organic matter (table -1). Organic matter is also present in sufficient quantities which show soil is productive. Mafongoya *et al.,* (2000) reported that the release of inorganic forms of N, P and other organically- bound nutrients in soil is functionally associated with carbon mineralization.

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Table1; Soil fertility status of olive, citrus, sunflower, maize and grapes fields at Research Farm Koont, Rawalpindi.

Field	pH			ECe(dSm^{-1})			OM(%)		
	Ranges	Mean	SD	Ranges	Mean	SD	Ranges	Mean	SD
Olive	7.33-7.77	7.53	0.15	0.30-0.39	0.34	0.02	0.46-1.01	0.73	0.27
Citrus	7.21-7.66	7.45	0.12	0.25-0.33	0.29	0.02	0.46-2.70	1.58	1.12
Sunflower	7.52 - 7.76	7.67	0.06	0.25 - 0.41	0.34	0.04	0.27 - 1.11	0.69	0.42
Maize	7.63 - 7.78	7.71	0.05	0.36 - 0.43	0.39	0.04	0.43 – 1.98	0.31	0.16
Grapes	7.67 - 7.97	7.80	0.08	0.31 - 0.41	0.33	0.62	0.65 - 1.53	1.09	0.44