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Study of some Soil Parameters at Barsoli Village, Near Dhatav Midc Area, Tal. Roha, Dist. Raighd (M.S.) India

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ABSTRACT

In the present investigation the physicochemical study of soil is based on various parameters like temperature, Organic Carbon, pH and Conductivity, Salinity, Alkalinity, Iron etc. Four representative samples were obtained during October 2017 to October 2018 from Barsoli village and analyzed in the laboratory. This study leads to the conclusion of the nutrient's quantity present in soil of at Barsoli, near Dhatav MIDC area, Dist. Raigad (Maharashtra). Results show that all the selected sites of this area have normal level of contents except iron. This information will help farmers to solve the problems related to soil nutrients, amount of which fertilizers to be used to increase the yield of crops.

1. Introduction

Soil is a dynamic natural body developed as a result of pedogenic process during weathering of rock. It consists of mineral and organic constituent exhibits definite physical chemical and biological properties has variable depth over the surface of earth and provide a suitable medium for plant growth. Soil mainly consists of 50% pore space (air &water) and 50%solid phase, the solid phase is broadly composed of 45%mineral matter 55 % organic constituents. The inorganic component consists of various secondary minerals like silicate clays iron oxide, some quartz, mica and felspars. The gaseous phase of soil consists of same nitrogen and oxygen. They contain as of air but carbon dioxide conc. is much higher. The soil analysis is essential for getting the maximum yield as it provide the knowledge of soil components nutrients and there deficiency in a particular part of soil. (H.kaur, 1980).The soil is a complex organization being made up some eight constituent namely Water holding capacity, organic matter, soil moisture, and variable other parameter.

Doran and Parkin (1994) suggested that soil quality assessments could be used as a management tool or aid to help farmers select specific management practices and as a measure of sustainability. They also suggested that approaches used to define and assess soil quality should be tailored for specific applications such as sustainable production, environmental quality, and animal or human health. Soil quality may also provide a focal point or vocabulary for communication between scientists and non-scientists, if the concept can be clearly defined. Several definitions have been proposed in an attempt to define soil quality, but unlike air quality or water quality for which the U.S. has established standards through legislation, the concept remains difficult to define and quantify. (Doran and Parkin, 1994) stated that a common link among all proposed soil quality definitions was the capacity of soil to "function" effectively at the present time and in the future. They proposed defining soil quality as: The capacity of a soil to function within the ecosystem boundaries to sustain biological productivity, maintain environmental quality, and promote animal health. These measurements were suggested because they reflect resistance of soil to erosion (Luk, 1979). Soil carbon content has been suggested as a soil quality indicator because decreases in this parameter can be directly related to decreased water stability of both macro- and micro aggregates (Churchman and Tate, 1987).

The soil pollution due to sewage is also very high. Several diseases are inflicted in human being due to pathogenic forms present in the soil. It is the need of time that we have to study the physicochemical parameter of soil to know its quality. four samples were collected from various parts of the Barsoli and its physico - chemical analysis have been performed to know different parameter like Colour, Temperature, Texture, pH, Electrical conductivity, salinity, alkalinity, water holding capacity, Organic matter, Determination of iron, soil moisture.

2. Background and Literature Review

Traditional agriculture, especially in tropical countries, has a long history of using intercropping systems. However, these systems usually involve annual herbaceous or perennial woody plants. Little research has focused in perennial herbaceous poly cultures for grain agriculture, especially in a temperate climate. Certainly, rangeland and pasture research considers herbaceous perennials, but only for their use in vegetative growth, not for seed or fruit production. The Land Institute is one of the few places where research is being conducted for the development of using perennial grasses for grain production (Soule and Piper, 1992).However; managers of forage production have long recognized the importance of legumes in grassland agriculture. Numerous pasture studies suggest legumes, especially clovers (Trifolium sp.), grown with pasture grasses improve soil fertility and reduce dependency on N fertilizer (Barnes et al., 1995).Soil-plant interactions between grasses and legumes represent a mutualistic relationship (Ledgard and Steele, 1992). When soil N is low, legumes have the advantage over grasses as they are able to fix N2. They compete less for soil N, resulting in more soil N available for grasses. N concentrations in tall fescue herbage have shown positive correlations to white clover proportions in grass-clover mixtures (Mallarino and Wedin, 1990).

When soil N is depleted from increased grass growth, as with late winter/early spring growth of perennial ryegrass (Lolium perenne L.), for example, legume growth in late spring/summer can be enhanced again by low soil N (Harris, 1987). Wedin andTilman (1990) studied above and belowground litter quality of five perennial grasses grown in

Monoculture and estimated their peak mineralization rates for three years. The species varied widely in both their peak mineralization rates and the amounts of nitrate found in the soil during those peaks. Mineralized N levels in soil are highly variable throughout the year and can come from both plants and total organic N in the soil. Plants may affect soil N levels, while the supply of available N in the soil may affect the growth of plants.

3. Materials and Methods

Study Area-

Raigad is one of the important industrially developed districts in Maharashtra. It lies at the bank of Arabian Sea. The geographical position of it is 17°51`north to 19°80`south latitude and 72°51`east to 73°40`west longitude. The total length of south- north is 150 km and east-west width is 48km.The total geographical area of Raigad district is 6750km². Hilly area is one of the important salient features of Raigad district. In this district there are 14 Talukas. This investigation was carried out at Barsoli, Taluka- Roha.

The latitude of Roha, Maharashtra, India is 18.439472, and the longitude is 73.118263. Roha, Maharashtra, India is located at India country in the Towns place category with the GPS coordinates of 18° 26' 22.0992" N and 73° 7' 5.7468" E.

Soil Analysis-

Analysis of the soil was carried out under the following two major categories:

(a) Physical examination

(b) Chemical examination

Physical and Chemical parameter examination of the soil sample was done by using the standard methods and procedures (Bandela, et al, 2005., Trivedi & Goel 1986, Majmudar and Singh 2005.,Kaur,1980.,Chandak,et al 2017) in the laboratory.

4. Results

A. Physical:

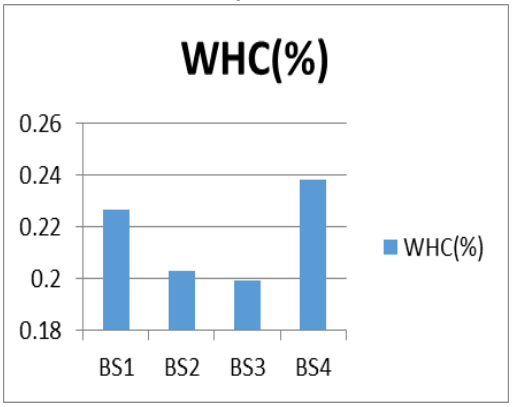
Sr. No	PHYSICAL PARAMETER	BS1	BS2	BS3	BS4
1	Soil colour	Light Red	Light Red	Light Red	Light Red
2	Soil temp	25°c	26°c	25°c	27°c
3	Soil moisture %	80	70	50	65
4	Soil texture	Slit loam	Slit loam	Slit loam	Slit loam

B. Chemical:

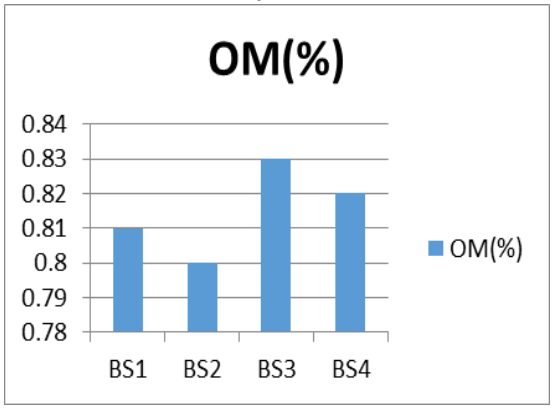
SR. NO.	CHEMICAL PARAMETER	BS1	BS2	BS3	BS4
1	WHC (%)	0.2265	0.2031	0.1995	0.2385
2	ORGANIC MATTER (%)	0.81	0.80	0.83	0.82
3	PH	7.34	7.40	7.38	7.90
4	ALKANILITY (mg/lit.)	2.5	2.3	2.2	2.3
5	CUNDUCTIVITY (mS/cm)	0.640	0.630	0.645	0.650
6	SALINITY (ppm)	580	570	560	568
7	IRON (ppm)	681	685	690	680

BS-Barsoli Village region soil sample

Graph No.1



Graph No.2



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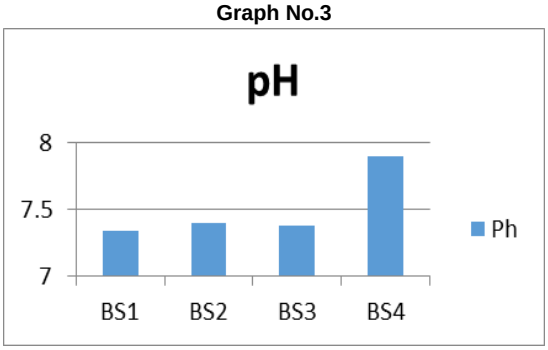

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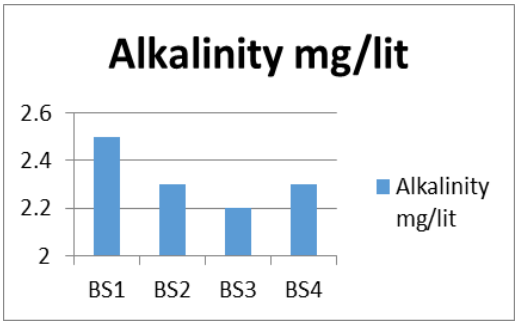

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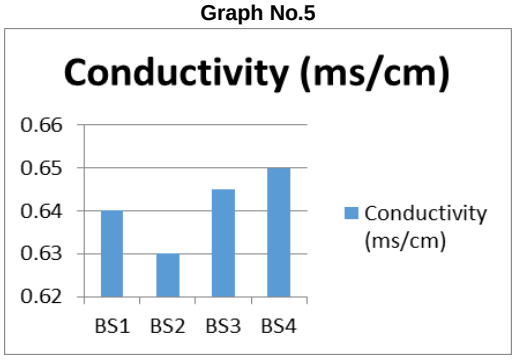

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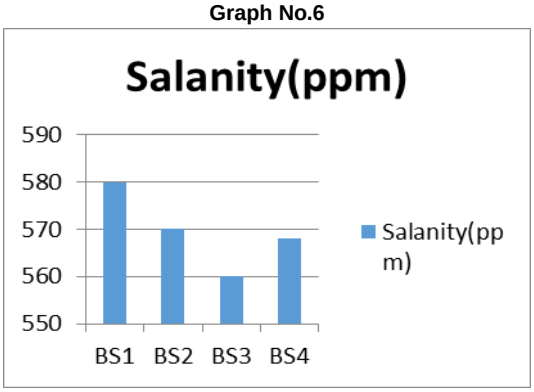

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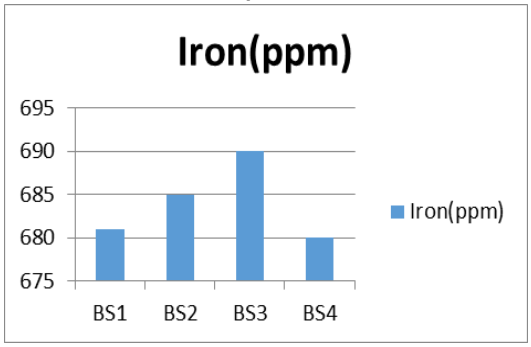

5. Discussion

1) **Soil colour:-**The colour of soil sample at all four site was light reddish.

2) **Soil Temperature:-**Soil temperature is one of the most important soil property that affect crop growth. The major source of heat is sun and heat generated by chemical and biological activity of the soil is negligible (Swanti et al; 2014) In the present investigation the was observed in between 25oc to 27oc

3) **Soil Moisture:-**The amount of soil moisture available at the time of planting is an important consideration when making cropping and fertility decision of soil .Crop yield potential is directly related to stored soil water and growing season rainfall or irrigation .Low moisture availability will limit crop yield and reduce nutrient requirements. In the present study period the moisture content of soil sample varying between 50 to 90 %.

4) **Soil Texture:-**Soil texture is the relative proportion of sand, slit and clay in a soil. Texture of soil directly affect soil water holding capacity, water infiltration rate and indirectly affect soil fertility through cation exchange capacity of soil.(Maiti,2004).In the present investigation the texture of soil is clay loamy.

5) **Water holding capacity: -** water holding capacity is the total amount of water present in and a soil can hold Water holding capacity is the total amount of water a soil can be hold at field capacity. In the present investigation the maximum water holding capacity was observed at BS4 site as 0.2385 and the minimum value was observed at site BS3 as 0.1995(Murali and Rao 2005).For the some selected physicochemical parameters and shown in the table no.2 and also graphically. High level of water holding capacity was affecting on the soil fertility and crop production (M. Swanti et al; 2004).

6) **Organic matter-**Organic matter content is an important source used to determine organic carbon content .Organic carbon is then used to calculate carbon to nitrogen ratio in sample .Soil organic matter is measurement of the amount of plant and animal residue in the soil.

In the present investigation maximum organic carbon was observed at Barsoli sample BS3 site as 0.83 and the minimum was observed at BS2 site as 0.80.It is shown in the table no.2 and also graphically. The soil color is produce by the minerals present and by the organic matter content The dark brown and the black colour in soil indicate that the soil has high organic matter content.Soil organic matter i.e carbon is the basis of soil fertility. Increasing soil organic matter has two benefits i.e helping to mitigate the climate change and improves soil health and fertility (Chandak et al; 2017).

7) **7.pH:-** Soil pH is measured of the alkalinity & acidity in soil . The pH is very important property of the soil is determined capacity .The PH level range from 0 to 14 .The limit of pH value for soil acidic is less than 7. Neutral value is 7Alkaline is 7.8 to 8.5 and alkali greater than 7. In the present investigation the maximum pH range observed at BS4 site as 7.90 and the minimum was observed at BS1 site as 7.34.It is shown in the table no.2 and also graphically. pH indicate that the alkaline nature of the soil was observed that different soil sample had influence of the pH, affecting on soil fertility (Chandak et al;2017).

8) **Alkalinity:-**Alkali or alkaline soils are clay soil with high pH. Soil alkalinity is a condition that result from the accumulation of soluble salt in soil In the present investigation the range of alkalinity was found to be 2.2 to 2.5 at various sample site the value are given in table .The alkalinity value is high (2.5) at the BS1 and value is low (2.2) at the BS3.shwon in the table no.2 and also graphically. A soil with a high pH tends to contain higher levels of sodium, calcium and magnesium. The availability of nutrients is often limited and plants can become stunted in alkaline soils because they are not as soluble as acidic soils. Alkaline soil may also be known as sweet soil. Alkaline nature of soil affects the plant growth and yield also. Highly alkaline soil requires the management of soil by the use of organic manners (Maiti, 2004).

9) **Electrical conductivity:-**Electrical conductivity is the ability of a material to transmit an electrical current and is commonly express in unit of milli-siemens may be also be reported in a unit of deci-siemens per meter. The electrical conductivity of soil varies depending on the amount of moisture held by soil parameters. The sand has low conductivity silts with medium conductivity and clays have a high conductivity. The total soluble salts are estimated from electrical conductivity of aqueous soil extract.

The electrical conductivity is high at BS4 site as 0.65and low value is 0.63 at BS2.It is shown in the table no.2 and also graphically. The standard value of electrical conductivity in soil normal is <0.8 dsm-1. Whereas normal electrical conductivity ranges from 0.02 to 2.0 mS/cm. The electrical conductivity of the soil increases with the increase concentration ions high level of electrical conductivity effects on fertility of soil and crop yield. (Chandak et al; 2017).

10) **Salinity:-**The soil salinity is a salt content in the soil the effect of salinity is shown when excessive amount of salt enter the plant in the transpiration stream and injure leaf cells which further reduce growth. These values are depending on the electrical conductivity and sodium adsorption ratio (SAR) of soil. Only electrical conductivity is part of routine agricultural soil analysis. This is called the salt specific or ion excess of salinity.

In the present investigation minimum value was recorded as 560 at BS3 site and maximum value was recorded as580 at BS1 site, It is shown in the table no.2 The electrical conductivity is high at BS4 site as 0.65and low value is 0.63 at BS2.It is shown in the table no.2 and also graphically. Salinity of soil depends on two soil parameters used to characterize soil as saline or saline sodic. These are Electrical Conductivity and sodium absorption ratio (Maiti; 2004).

11) **Iron:-**Iron are the major component on the earth crust and hence that of soil which are distributed in varying concentration Therefore trace element profile of the soil is often comparable to the parent rock formation as evident.(Schulte EE;2004).In the present investigation the iron content of the soil sample was measured as minimum value 681ppm at BS1 and maximum value as 690 ppm at BS3 site.

6. Conclusion

1) Under low pH conditions, some nutrients bind tightly to soil particles and as a result they are unavailable to plant.
2) Low pH value also affecting on the growth and survival of soil microorganism.
3) Soil organic matter is the important for soil structure tilt and water infiltration of soil required for plant growth.
4) Soil organic matter level in the study area is having lower values at different site. It may be due to high rainfall in to these areas so that it may be washing out during monsoon season.
5) Hence regular monitoring of soil parameters is essential for the farmers residing in to this area.
6) All the parameters observed in the present study area where in the range of standard levels except few.
7) High level of Fe reduces the availability of manganese for plant growth.
8) Deficiency of Fe causes chlorosis (loss of chlorophyll).
9) Regular monitoring of physico-chemical parameter of soil is essential with respect to plantation and crop yield in the study area. This will helpful to the farmers of this area.
10) In the study area these parameters are positively affecting on plantation except few parameters like Iron. It may be due to impact of industrial pollution of this area.

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