AgriCos e-Newsletter
ISSN: 2582-7049
AgriCos e-Newsletter
Open Access Multidisciplinary Monthly Online Magazine
Volume: 02 Issue: 10 October 2021 Article No: 09

Importance of Soil Test and Collection of Soil Sample

Yeshe A. S.[1] and Gourkhede P. H.[2]
[1]M.Sc. (Agri) and [2]Assistant Professor, Department of Soil Science and Agriculture Chemistry, VNMKV, Parbhani, (M. S.) India.

SUMMARY

Soil Testing became an important practice for determining the need for lime and fertilizer. This change was brought about by several factors. Mechanization led to increased crop yields. As crop nutrient removal increased with these higher yields, soil reserves of certain plant nutrients, particularly P and K, began to be depleted, resulting in nutrient deficiencies and lower yields. In response to these problems, there was a concerted effort to develop soil-testing methods that could identify P and K deficiencies in different regions. These initial efforts later were expanded to include soil tests for other plant nutrients, such as calcium (Ca), magnesium (Mg), boron (B), sulfur (S), Cu, Fe, Mn, molybdenum (Mo), and Zn. Soil testing now is widely accepted as a valuable tool that can be used to identify the economically optimum rates of nutrients required by most crops. A soil test is important for several reasons: to optimize crop production, to protect the environment from contamination by runoff and leaching of excess fertilizers, to aid in the diagnosis of plant culture problems, to improve the nutritional balance of the growing media and to save money and conserve energy by applying only the amount of fertilizer needed. Pre- plant media analyses provide an indication of potential nutrient deficiencies, pH imbalance or excess soluble salts. This is particularly important for growers who mix their own media. Media testing during the growing season is an important tool for managing crop nutrition and soluble salts levels. To use this tool effectively, you must know how to take a media sample to send for analysis or for in-house testing, and be able to interpret media test results.

INTRODUCTION

Soil Testing is well recognized as an important technique to assess inherent nutrient supplying capacity of soil to the growing plants. The effects of soil testing on proper plant growth were well demonstrated in front of the farmers under different schemes viz. through Front line demonstrations on seed and pulses all the plots of selected plots receive fertilizers as per soil testing reports which further helped in improving the cost-benefit ratio (Bhatt and Sharma, 2013). Basic aim of the soil testing is to identifying the nutrient supplying power of the soils so as the recommendations for the fertilizer use could be made efficiently just to strengthen the soil solution pool from where plants took nutrients.

Different techniques can be used alone or in combination with each other but the soil testing is still most commonly employed technique (Dev, 1997). Soil testing helps us to maintain such a level of nutrient ion concentration in the soil solution pool so that plants absorb them so that no nutrient deficiency faced by plant while at the same time avoid it's losses. initially during 1955, soil testing was initiated in the country by setting up of 16 soil testing laboratories. Government of India interested to increase the soil analyzing capacity of these laboratories so that more and more could use adequate amount of fertilizers after knowing the inherent nutrient supplying power of the soil. Analyzing more number of samples does not indicate the fulfillment of objective of establishing soil testing laboratories till the fertilizers were applied as per soil testing report. But this execution is not possible through the adequate scientific support followed by equal contribution of field /extension persons which ultimately convey the message to the ultimate user i.e farmer. Planners and agriculturalists have recognized the utility of the service fully but it suffers due to a number of factors viz. inadequate scientific supports, improper sampling technique, unawareness of the farmers etc. in its execution. One of the most important factors affecting the success of soil testing programme is the proper and scientific soil sampling. After soil sampling, the soil samples were air dried, ground and sieved for carrying out the chemical analysis of soils which further helps in quick characterization of the fertility status of soils and predicting the nutrient requirement of crops. Texture, structure, pH, electrical conductivity, Organic carbon (%), available Phosphorus and potassium (Kg/ha) are the important parameters analyzed in the lab. Soil testing helps us in identifying the nutrient deficient areas from nondeficient ones so that fertilizer use could be aimed to improve the economic optimum yield per hectare. The national interest would be to obtain the maximum yield from the area under cultivation so as to feed the increasing population while the farmer's interest is to obtain the maximum benefit. Generally farmers tried to put higher doses of fertilizers into his field without taken into account the inherent fertility of his field which resulted in increase in the cost of crop production. The concept of balanced nutrition of crops also guides the use of plant nutrients in a definite proportion (as per soil test reports) as required by the crops. Soil testing has long been accepted as a unique tool for judicious use of fertilizer, thus it also take care of the soil quality as a whole.

Objectives of soil testing:

The main objectives of the soil testing are

- To assess the inherent soil fertility status and recommend optimum dose which differ from plot to plot.
- To quantify the extent of soil degradation viz. soil sodicity, acidity, salinity and suggest effective remedial measures.
- To collect soil testing data of site and preparing its fertility map.
- To maintain the natural resources(by applying rational use of fertilizers) viz. soil and water for the future generations by taken into consideration the need of present population.

Technique of Soil Sample Collection:

Soil testing is the only way to determine the fertilizer needs of a crop in a particular field. Soil test is the analysis of soil sample to determine the available nutrient status and physico-chemical properties of soil. The prime step in the soil-testing programme is the collection of soil sample. The fertilizer recommendations for the field crop are generally given on the basis of only a small amount of soil used in the laboratories. Actually, the one to ten grams of soil used for each chemical analysis should represents as accurately as possible the entire six inches (top six inches) of soil, weighing about one million kilogram per acre.

Therefore, it is important that soil samples should be a true representative of the field.

Soil sampling for fertilizer recommendation:

Soil sampling for fertilizer recommendation for the field crops is performed up to a depth of top six inches because the top six inch soil is the area that has the majority of the root activity and secondly the fertilizer application and cultivation operations are mainly confined to this depth. While taking the sample, the surface litter (if any) is removed with a trowel or spade and the soil is collected from the surface to plough depth (0-6 inches) from 8-9 random spots field by giving 'V' shape incision a uniform 2.5 cm thick slice of soil from top to bottom (6 inch depth) is removed and collected in a clean bucket or wide container. To obtain a representative

sample from bulk soil collected from different spots, the soil is poured from bucket or to a piece of clean cloth or paper and is mixed thoroughly. Quartering is then performed to reduce the soil to about 500 g. Quartering is done by mixing sample well, dividing it into 4 equal parts, then rejecting two opposite quarters, mixing the remaining two portions, again dividing into 4 equal parts and rejecting two opposite quarters, and so on. If the soil sample is wet it may be air dried in the shade before packing it in the cloth bag. Care should be taken to avoid soil sampling from unusual area. viz. recently fertilized, old bunds, marshy spots, under the trees, composed pits etc. The cloth bag should be properly marked to identify soil sample. The information sheet encompassing the information like name and address of farmer, depth of soil sampling, crop rotation, irrigation facility, crop history, the fertilizer applied to the previous crop etc. should be enclosed in the cloth bag.

Available Nutrients, kg/acre				
Organic Carbon, %	**Nitrogen**	**P**	**K2O**	**Indication**
<4	110	<5	<55	Low
0.4 - 0.75	110 - 120	5 - 9	55 - 135	Medium
>0.75	>220	9 -20	>135	High
--	--	>20	--	Very High
Soil Reaction: pH (1:2 soil: water suspension) Acidic: Below 6.5 Normal: 6.5 - 7.5 Alkaline: Above 7.5				
Electrical Conductivity, dS/m (Soluble Salts) 1:2 soil: water suspension 0.8 < = Normal 0.8 -1.6 = Critical for salt sensitive salts 1.6 – 2.5 = Critical for Salt tolerant crop				

Five reasons to test your soil:

Gain knowledge about the soil condition and how to improve it

Fertile soils are necessary to grow healthy crops. To improve soil fertility, it needs to be measured first. Soil fertility is determined by the chemical, physical and biological properties of soil. Properties such as soil texture, colour and structure are visible. However, it is impossible to see the chemical composition of soil. This is what needs to be measured and why soil sampling is essential. Soil tests are used to determine the nutrient content and pH level of a soil. With this information the exact type and quantity of fertiliser that needs to be applied to improve soil fertility can be defined.

It is the first step into soil fertility management

With a proper soil fertility management strategy, farmers can maximize the efficiency of nutrients and water use and improve their agricultural productivity. Soil testing is the first step towards proper soil fertility management. Soil testing gives valuable information and helps you improve your soil's health.

Minimise fertiliser expenditures

You will not waste money on unnecessary fertilisers if the exact type and quantity of fertilisers your soil and crops need is known. Moreover, inorganic fertilisers in general and nutrients such as phosphorus and potassium are limited resources. Their prices are increasing over the years and because this trend is set to last it is clever to adapt now to the inevitable changes.

Avoid over-fertilisation

Applying fertiliser without knowing the actual nutrient needs of your soil might lead to over-fertilisation. By testing your soils and receiving fertiliser recommendations, you can avoid using an excessive amount of fertiliser. This is better for your crops and the environment. Fertiliser burn and leaves turning yellow is the

outcome of over-fertilisation for crops. It might also result in nutrient leaching, water pollution and irreversible damages to the surrounding aquatic life.

Avoid soil degradation

Soil degradation is a threat to every farmer. It is estimated that each year 24 billion tonnes of fertile soil are lost due to erosion which is a result of unbalanced soil management. A proper soil management is guaranteed by soil tests followed by the application of the right fertilisers at the right moment. Besides avoiding risks of soil degradation, it is a more efficient and financially more interesting practice. Moreover, soil restoration is a difficult, costly and time-consuming process.

REFERENCES

Rajan Bhatt and Manoj Sharma Importance of soil testing and technique of soil sampling, Panjab Agriculture university,Ludhiana-141004, Punjab, India.

Five reason to test your *soil,agrocares , Nutrient Intelligence*

Image-shutterstock.com