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Plant Growth And Water, Gwalior, M.P. (India)

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Abstract
Plant growth depends on water for a number of reasons, especially in a hydroponic garden. Water is the thing that drives the plant transpiration cycle. Without water, plants would not be able to uptake nutrients or transport nutrients within their tissue. While water itself will not cause nutrient uptake problems, the dissolved salts and minerals also present in your water just might. Distilled and reverse osmosis water should show a TDS of zero ppm on a properly calibrated TDS meter. As this number increases, the possibility of a nutrient uptake problem also increases. Plants have been proven to remove harmful airborne harmful contaminants and increase oxygen level which can lead to increased concentration and productivity levels. So, to reap the benefits, we must learn first how to water these greens. The number one killer of houseplants is over-watering. Poor water quality can also be dangerous
Keywords: *plant growth nutrients, chemical and water parameter.*

1. INTRODUCTION

There are three important things that a plant needs in order to grow; sunlight, nutrients and water. If you were to alter any of these necessities in terms of quantity and quality the plant would feel the effects. The uptake of water from the roots, through the xylem and into the rest of the plant is an essential part of a plants ability to photosynthesize. Also, water is necessary to create cell tension, which gives plants their form. Lastly, some minerals, such as calcium, are stored in water and the plant can only access these minerals by up taking water (Graham 2006). Due to the extreme importance of water in the life of a plant, we decided to investigate the effect water quality has on plant growth. Water is an important resource for growing plants. Plants, by weight, are comprised of 90 to 95 percent water. Chemicals in irrigation water can impact the growth of plants, especially container-grown plants, due to their restricted root growth and the high potential for change of soilless media with relatively low buffering capacities. This fact sheet provides target ranges of elements for growing most greenhouse and nursery crops, growth concerns, and interpretation of test results and suggestions for correcting irrigation water problems .The source of irrigation water can affect the quality of the water. Irrigation water quality is determined by measuring the level of dissolved elements it contains. Water quality can vary from source to source. Three sources of water are commonly used by growers: well water, municipal water, and pond water. Well water frequently contains high levels of dissolved elements, especially calcium (Ca) and magnesium (Mg), which can lead to high alkalinity. It is common in areas with limestone bedrock. The chemical composition of well water also varies with

well depth, due to the water being pumped from different aquifers. Municipal water obtained from rivers or lakes commonly has a lower level of dissolved chemicals than well water. Due to chemical purification to meet drinking water quality standards, however, excessively high levels of chloride (Cl) or fluoride (F) may be present and cause a

2. MATERIALS AND METHODS

The samples were collected during the month May 2016 to June 2016. Samples for analysis were collected in sterilized bottles (plastic with acid washed).pH – systronic pH meter Type 361.The total hardness of the water samples were determined by complexometric titration with EDTA using eriochrome black-T as an indicator. Chloride-Argentometric titration Sodium and potassium - flame photometer (128) technique. .

3. RESULTS AND DISCUSSION

The pH required for the optimum growth of plant is 5.4 to 7.0 leaf chlorosis, reduced root growth and decay, stunted shoot growth. Poor flower development are seen in plant/crops to high pH .Appearance of these symptoms is due to influence of pH on the solubility of ions such as Iron. Due to reaction with hydroxyl ions at high pH conditions ferrous form (Fe^{2+}) of iron is transformed in ferric form (Fe^{3+}),which is inactive in plant tissues. pH water samples were varied from 7.2 to 7.9 Hardness of water is due to presence of calcium ion and magnesium ion .Plants require 150 ppm hardness in water, but samples had hardness range from (90-200) ppm; which disturb the calcium and magnesium ratio in water which should be 3:5 .If calcium is excess it blocks the ability of Plants to uptake magnesium which cause .Magnesium deficiency ,whose sign are yellowish green patch near the base of the leaf between the midrib and the outer –edge; with acute deficiency leaves may become entirely yellow –bronze and eventually drops and if in hard water magnesium is excess ,it will cause calcium deficiency in plants ,whose sing are young leaves are affected first and become small and disorted or chlorotic with irregular margins. Spotting or necrotic areas, bud development is inhibited blossom end root and internal decay may also occur and root may be developed.

Sodium and potassium are termed, as alkali metals sodium is abundant in water, because of its compound are readily soluble. In ground water it is generally found to be >5mg per liter .Ground water pollution by sodium salt is an unavoidable phenomenon caused form the return flow of irrigation and disposal of industrial and urban wastes. Sodium water samples were varied from 21.3 mg/L to 44.2 mg/L.

Potassium is involved in maintaining the water status of the plant and the turgor pressure of its cell wall and the opening and closing of the stomata .Potassium is required in the accumulation and translocation of carbohydrates. Plants require 0.26 meq /L .Potassium water samples were varied from 1.5 mg/L to 12.7 mg/L **.**

Chloride in the form of chloride ion is one of the major inorganic anions in water and wastewater. The salty tasted produced by chloride concentrations is variable and dependent on the chemical composition of water some water containing 250mg chloride per liter may have a detectable salty taste . The values of chloride ground water samples were varied from 24.6 mg/L to 63.1 mg/L **.** The chloride is troublesome in irrigation water and harmful for aquatic life.

Parameter	pH	T.H.	Ca^{H}	Na^{+}	K^{+}	Cl^{-}
Point-1(Kharwaya)	7.2	105	80	35.4	12.7	45.1
Point-2(Samaya)	7.5	85	70	30.2	10.3	63.1
Point-3(Fatepur)	7.9	100	60	42.3	1.5	55.3
Point-4(Ladwaya)	7.7	115	75	44.2	10	53.2
Point-5(piperipura)	7.8	95	40	21.3	9.1	24.6
Point-6(Kiratpura)	7.5	135	75	40.2	6.2	50.6
Point-7(Puri)	7.8	105	85	35.2	9.2	41.2

All the value are expressed in mg/L except pH, T.H. = Total hardness, Ca^{H} =Calcium Hardness,

4. CONCLUSION

On the analysis basis it can be concluded that all the tested ground water samples are within permissible limit and ground water are suitable for Irrigation purpose and Plant uses. Reducing the amount of chemical pollution released into the water, soil and air is the easiest way to prevent harm to plants and citizens take steps such as contacting local recycling centers to dispose of toxic chemicals, and using biological methods such as ladybugs, instead of traditional pesticides, to control pests in the yard or garden.

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