



Measurement and Study of Soil pH and Conductivity in Grape Vineyards

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Abstract

In India, grape vineyards have been facing the problem of diseases like pink berry and the causes of that are still unknown. Many investigators have reported the possible causes of such diseases by studying the effects of overdoses of pesticides, antibiotics and growth regulators. This study was based on biophysical technique such as absorption, fluorescence and thermo luminescence. In recent years, it has been found that many vineyards are facing problems of a new disease referred to as a pink berry. Though the cause of this disease is unknown, it has been observed that the occurrence of the disease is more, where application of fertilizer, pesticides antibiotics and growth regulator is unscientific and heavy. Under such circumstances the study of pH and soil conductivity in grape vineyards becomes necessary. In these regard, we have conducted studies related to pH and conductivity of soil and percentage of pink berry on grape vineyards of different villages in Junnar Tahsil of Maharashtra state for the last three years. In present paper the studies related to the measurement of pH and conductivity of soil was discussed.

Keywords: Grape vineyards; Pink Berry; Soil pH; Soil conductivity; Junnar Tahsil of Maharashtra

Introduction

The Junnar Tahsil is situated at a distance of 100 km north of Pune. The area is rich in irrigation of all manners and the soil is of black cotton type and highly fertile. Grape is one of the important cash crops as it has a large market potential. The farmers are doing their best to get maximum yield and best quality of grapes in the quest of this use of different pesticides and fertilizers is at its peak. Nowadays, this pattern is creating a large problem and the grapes are found to be more vulnerable to different type of diseases. Along with other regular diseases pink berry is appearing on the large scale. Due to this, market value of the grape decreases and consequently farmers are facing economical losses. There are certain remedies to get out of these, but the basic cause of pink berry is still unknown. In this concern, we are studying the physical and chemical properties of soil of grape vineyards. Here we have concentrated our study on pH and electrical conductivity of soil. We were interested in checking whether the relative abundance of pink berry and electrical conductivity of soil does have some correlation?

In Maharashtra grape varieties namely Thomson Seedless and its successor varieties like Sonaka, Tas-a-Ganesh, Sharad Seedless, Thomson Seedless, Thomson white and Jumbo seedless are being cultivated. The grape plant being highly susceptible for disease, application of large scale antibiotic and pesticides is a common practice.

Experimental Work

Material and Methods

Grape soil materials

The soils in which grape varieties like Thomson Seedless and its successor varieties like Sonaka, Tas-a-Ganesh, Sharad Seedless, Thomson Seedless, Thomson White and Jumbo seedless are commonly cultivated were used for present study. The soil samples are collected from different villages in Junnar Tahsil of Pune District where vineyards are cultivated.

Sample Preparation

The twenty grams of filtered soil sample was dissolved into pure distilled water. The materials in the soil present were completely dissolved into the distilled water. Then resultant solution was filtered by using a filter paper to obtain a turbid solution as a filtrate.

Methods

The pH meter was kept on to warm up, and then the reading on the scale was adjusted with the help of set zero reading knob of the instrument. The 0.05 molar solution of potassium hydrogen sulphate was made in distilled water and the glass calomel electrode was inserted into the solution. The two way switch of apparatus was turned to the pH 0 to 7 range side and then adjusted the set buffer knob of the instrument so that the meter scale reads pH value = 4. This adjustment was kept constant. The soil solution was taken into the beaker and glass electrode was dipped into the solution and then pH value was recorded. The pH values were recorded for all other soil samples.

Conductivity meter

The electrical conductivities of the different soil samples were measured by using conductivity meter.

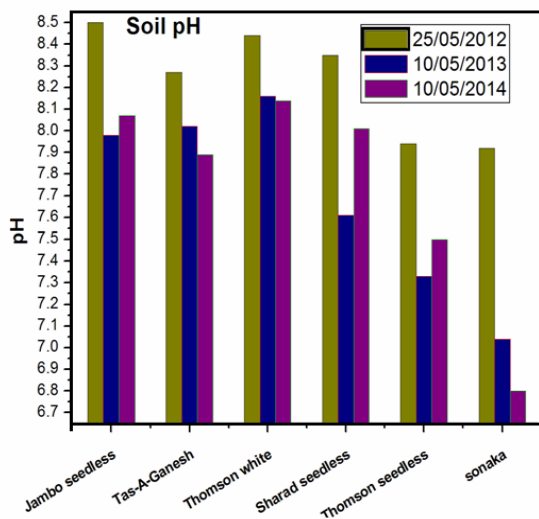


Figure 1 pH against grape varieties

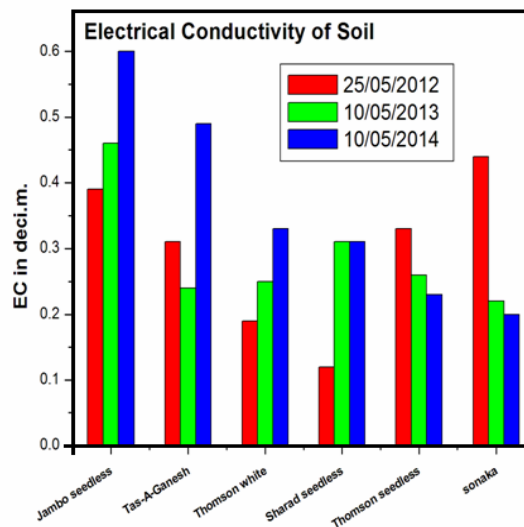


Figure 2 Electrical conductivity against grape varieties

Results and Discussions

It is observed that the soil pH value is less than 6.5 where all varieties of grapes like Sonaka, Jambo seedless, Tas-A-Ganesh, Thomson White, Thomson seedless, Sharad seedless are cultivated in Junnar tahsil. These are the acidic soils. Therefore, pink berry is more in all above varieties of grapes. Figure 1 shows the pH for Jambo seeds is higher while Sonaka it is lower as compared to other varieties during May 2012. Similarly, Thomson white is higher while Sonaka is lower as compared to other varieties for May 2013 and May 2014. Figure 2 shows the electrical conductivity for Sonaka is higher while a sharad seed is lower as compared to other varieties for May 2012.

Similarly, for a Jambo seedless conductivity is higher while Tas-A-Ganesh is lower for May 2013 and Sonaka is lower for May 2014 as compared to other varieties. From Figure 3, it is clear that the soil nutrients (P, K, N) is higher in year 2012 while in year 2014 it is lower as compared to year 2013. Figure 4 shows normal and healthy grapes of Sonaka variety for the year 2012 and Figure 5 shows the affected grapes of pink berry of Sonaka variety for year 2012.

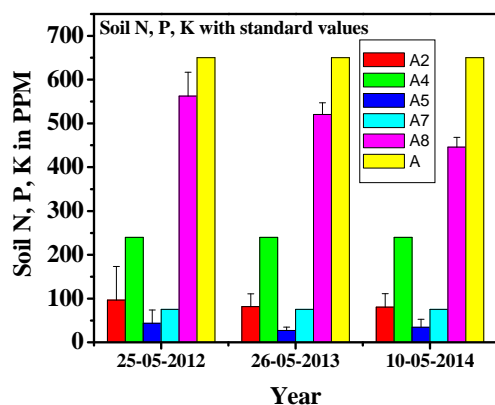


Figure 3. Soil nutrient against year



Figure 4. Normal grapes

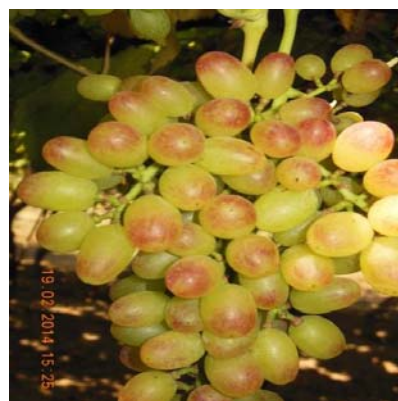


Figure 5 Affected Pink berry



Conclusions

In all varieties of grapes, it is observed that if the soil pH value is less than 6.5 (these are the acidic soils), the occurrence of percentage of pink berry is more. On the other hand if the soil pH is more than or equal to 7 (these are the basic soils) the relative abundance of pink berry is relatively low. It has been observed that the soil having low conductivity i.e. 0.3 m-mho to 1.0 m-mho, the occurrence of pink berry is relatively lower, while for soils having conductivity more than 1.2 m-mho the occurrence of is higher.

In general, for the all the varieties of the grapes, the variation of soil pH and electrical conductivity is correlated with the abundance of pink berry. Of course, only soil pH and conductivity are not the root causes, the other factors such as high rain fall, low temperature, climatic conditions, unscientific use of pesticides and fertilizers are also responsible to certain limited extent. So for all types of grape varieties, the soil pH should as neutral or greater than 7 as possible to reduce the affection of pink berry.

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