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EFFECT OF SOIL PH ON THE FUNGAL COMMUNITY AT BHAMRAGAD TALUKA, DISTRICT GADCHEROLI

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Abstract:

One of the most influential factors affecting the microbial community in soil is pH. pH strongly influences abiotic factors, such as carbon availability, nutrient availability, and the solubility of metals. In addition, soil pH may control biotic factors, such as the biomass composition of fungi and bacteria, in both forest and agricultural soils.

Key Words: Fungi, soil pH.

Introduction:

An inherent problem in studying soil pH effects is its varied influence on multiple parameters. Experimentally manipulating the pH of a soil may result in changes in several factors that are hard to separate.[1] Conversely, comparing pH of different natural soils introduces confounding factors, frequently unidentifiable, derived from differences in soil type and management regimen that also vary between soils. The largest effect of pH above pH 4.5 was on fungal and bacterial growth, and there were opposing pH effects.[2] Most commonly encountered genera of fungi in soil are; *Alternaria*, *Aspergillus*, Cladosporium, *Cephalosporium Botrytis*, *Chaetomium*, *Fusarium*, *Mucor*, *Penicillium*, *Verticillium*, *Trichoderma*, *Rhizopus*, *Gliocladium*, *Monilia*, *Pythium*, etc. This resulted in a 30-fold increase in the relative importance of fungi; the influence of pH on fungal growth has been investigated previously. Baath and Arnebrant reported that treatment of forest soils with lime and ash, which resulted in pH changes from about pH 4 to 7 and increased fungal growth about fivefold a Similar study that included 100 different soils sample from areas Ettapali land uses has also been reported.[3,7]

However, one limitation of these observational studies is that it is impossible to determine whether the communities are structured directly or indirectly by pH. In other words, we do not know whether pH itself is the factor shaping these communities, or whether pH may be indirectly related to the observed community changes through many environmental factors (for example, nutrient availability, organic C characteristics, soil moisture regime and vegetation type), which often co-vary with changes in soil pH.[4] Similarly, we do not know whether soil

pH is also correlated with the community composition of fungi, another dominant microbial group in soil.[5] Our objectives for this study were observe the effect of soil pH on the fungal community across the 180-m distance of the Ettapali dist. Gadcheroli.

Material and Methods:

Soil sample were collected from across the babhulgaon taluka in yavatmal district to investigate the direct influence of soil pH on the abundance, taxonomic diversity and composition of the major soil microbial fungi. We sampled along the first 180m of the strip taking 5 cm diameter, 0–23cm depth cores at each sampling position along the gradient. The gradient was sampled every 15m between 0–40 m, and every 5m between 40 and 120m and, then every 10m between the final 120–180m of the gradient. Two fifty soil samples were sieved (2.8mm) in the laboratory, removing apparent roots and stones, and pH was measured using an electronic pH meter.

Result and Discussion:

Spanning a pH range from 4 to 8, showed that there was an increase in bacterial growth with decreased fungal growth was found at higher pH. Thus, suggesting decrease in fungal dominance of decomposition at higher soil pH. The close correlation between the declines in fungal growth as soil pH declines requires explanation. One potential explanation could be independent physiological limitations by pH of the separate decomposer groups; i.e., low hydrogen ion concentrations limit fungal growth. Recent study has demonstrated that changes in soil microbial communities across space are often strongly correlated with differences in soil chemistry. In particular, it has been shown that the composition, and in some cases diversity, of soil fungal communities is often strongly correlated with soil pH. However, bacterial and fungal growth revealed dramatic differences in the activity of these microbial decomposer communities. In contrast, fungal growth was maximal at pH 4.5, and decreased by a factor of more than 5 toward the high pH end.[6]

Sam.No.	pH	Sam.No.	pH	Sam.No.	pH	Sam.No.	pH	Sam.No.	pH
1	7.1	5	7.8	9	7	13	6	17	7.1
2	4.3	6	6	10	7	14	8.3	18	7.6
3	4.8	7	8.2	11	7.1	15	7.8	19	6
4	8.1	8	8.6	12	7.5	16	7.8	20	5

Throughout the Ettapali taluka the measured pH of the soil sample found to be lying in between 4.3 to 8.7. The value of observed soil pH is given in table below. The mainly all soil sample shows basic in nature and some soil sample shows neutral pH. The fungal growth in this range of pH hardly survives. Out of the collected sample the sample collected from river area shows 4.3 pH. This indicates that there is better survival of fungi. From above diagram it clearly shown that the majority of the sample having pH is greater than 6 pH.

Conclusion: In conclusion, this study showed that neutral or slightly alkaline conditions disfavored fungal growth. This resulted in decrease survival of fungi by a pH 8.3 to pH 4.5.

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