

Effects of Acid Rain on Trees

Miss. Nameera I. Gazge¹ and Miss. Mariya M. Fahim²

Department of Botany

Anjuman Islam Janjira Degree College of Science, Murud-Janjira, Dist. Raigad^{1,2}

Abstract: Acid rain is a rain form or any other form of precipitation that present acidic and possesses elevated levels of hydrogen ions (low pH). Acid rain is caused by emissions of Sulfur Dioxide and Nitrogen Oxide, which react with the atmospheric water and water vapours to produce acids. Trees and soil are the prime receptor of acid deposition and function as sink. Monocotyledons plants are reported to be relatively less affected by acid rain as compared to dicotyledons plants and young rootlets, leaves and shoots are typically more sensitive to low pH conditions. It also effects the compositions of soil water which is the main medium of nutrient supply for the plants and soil microflora. Acid rain solutions make their entry into the leaf tissue through the cuticle and produce marked effects on tress. Acid rain generally retards the growth of trees by stimulating abnormalities in metabolism of the trees, like photosynthesis, nitrogen and sulphur metabolism, however, there are exceptional cases of promoting growth as well. Studies conducted globe on the exposure of various crop plants to acid rain and its ultimate effects on plant growth and reproduction and draws attention for development of plant types suited to acid rain affected lands.

Keywords: Acid rain, Air pollution, Development, Growth, Plants, Yield, Trees, Global, Water, Soil, etc.

I. INTRODUCTION

Environment suffers many acute problems including pollution due to undesirable change in the physical, chemical and biological characteristics of world. The world is concerned about the increasing environmental pollution. Rapid development of techniques changes on a globe scale cause rapid environmental changes and increase in material needs. Modern tendencies give preference to meeting the material and social needs of populations. Occupants in the vicinity of the industrial units suffer due to intolerable pollution from industrial discharges injurious to health. The environment comprises material factors whose presence is decisive for survival and development of living organisms like oxygen, carbon, hydrogen, nitrogen, and factors regulating the life processes.

Environmental change can also be polluted due to other reasons like application of new materials and plastics in building for the production of furniture, clothes, shoes, household and poisonings etc. Due increase in air pollution is indeed of major effects on global concern as whenever the balance of natural composition of air is also disturbed, it has an adverse effect on environment and living beings. The new evidence is increasingly implicating it as a cause of the rarer but virulent cutaneous malignant melanomas. It impairs the body ability to fight it off and suppresses the efficiency of immune system, making it easier for tumours to take hold and spread. Problem in eyes disease produces like cataracts, eye disorders, damages crops, ecosystem and materials. Air pollution is created by all over the earth crust by burning fossil fuels to run factories, machinery and all forms of transportation as a result the byproducts such as smoke and invisible pollutants which contaminate our atmosphere.

The toxic pollutants present in automobile discharges affect the physiology and biochemistry of living organisms. The impact of such a change could be of sufficient to produce major physical, economic and social dislocations on a global scale. Main air pollutants are Sulphur dioxide derived from coal and fuel oil used in the industry, dust and soot from the industry which represent nuclei for smoke formation, and CO₂ from motor vehicle exhausts which is toxic, causing headaches and even death at high concentrations. The pollutants include oxidants derived from motor vehicle exhaust and industry cause smog which irritates the eyes and reduces visibility, and NO₂ and lead added to fuel and expelled from exhaust which accumulate in the body, smells and

odours may cause discomfort and some are distinctly noxious to the health and general well-being. The industrial sources of odours involve craft mills, oil refineries, cellulose plants, fish meal plants, food processing installations etc. Industrial waste smells and odours usually originate from refuse containers and sewage system. SO₂ is produced in burning of fossil fuels in industries, thermal plants, homes, fertilizer industries and during smelting of metallic ores.

The gaseous SO₂ to SO₃, which in combination with water forms sulphuric acid. The major sources of SO₂ are coal burn in petroleum products, refuse burning, refinery operations and metallurgical operations. SO₂ and SO₃ react with water to form H₂SO₃ and H₂SO₄. Aerosols are chemicals in the form of vapours or fine mist which are present in air, they are used as disinfectants. Fluorides are released air during refinement rocks of aluminium, rock phosphates etc. Gaseous fluorides cause necrosis, chlorosis and abscission of leaves of trees etc. Air is normally used as the source of oxygen and nitrogen which combine in temperature normally reached in the combustion process to form NO and then much of NO gets converted into NO₂. NO is produced in the atmosphere electro-photo-chemically from nitrogen and oxygen. The major source of NO is automobiles, furnaces, boilers etc. Fired furnaces of Gas and coal, power station and common source combustion of wood as well as refuse waste also produce NO and ammonia.

Affected Areas

Affected areas pressed firmly together by acid rain around the globe include most of Eastern Europe from Poland northward into Scandinavia, the eastern third of the United States, https://en.wikipedia.org/wiki/Acid_rain - cite_note-82 and Canada. Distressed areas due to acid rain include the south-eastern coast of China and Taiwan.

II. METHODOLOGY

Technical Solutions

In industries, FGD will remove 95% or more of the SO₂ in the flue gases release in air. A Focus Group Discussion (FGD) is the wet scrubber which is commonly used, is basically machine reaction tower with a fan that extracts hot smoke stack gases from a power plant into the tower release in air. Lime or limestone in slurry form is also used into the tower to mix with the stack gases and combine with the sulphur dioxide present. The CaCO₃ of the limestone produces pH-neutral calcium sulphate that is separated from the wet scrubber. In some areas the sulphates are sold to chemical companies as gypsum, when the density of CaSO₄ is high. In others, they are placed in landfill. The effects of acid rain on trees can last for peer group, as the effects acid rain of pH level change can stimulate the continued leaching of undesirable chemicals into water sources, destroys our nature.

III. LITERATURE REVIEW

Acid Rain and Trees

The minerals and nutrients from the soil that trees need to grow are removed by Acid Rain. Acidic fog and clouds might strip nutrients from plants foliage, leaving them with brown or dead leaves and needles due to Acid.

IV. RESULT AND DISCUSSION

The best solution is not to let the plants come in contact with acid rain which is nearly impossible. So, grow small plants under the shed of a big tree, in the way you will be able to lessen the effect of acid rain on small plants while the big plants can counter it due to the high volume of nutrients and foliage.

V. CONCLUSION AND FUTURE SCOPE

The above survey of literature demonstrates that natural and simulated acid rains effect the germination, growth, biomass, behavior of budding, flowering and leaf abscission, photosynthesis, metabolic processes, enzymes activities, pollen behavior and yield in range of plant species.

An important aspect of tress life is the germination process and seedling growth that forms the health/foundation for subsequent stages. SAR effects at these stages are likely to have effect on plant life. It is evident from the review that most of the crop plants are sensitive to acid rain; there is an urgent need to identify/develop suitable plants cultivars suited to acid rain affected zones. The acid rain may further increase due to an extent causing an acidification of cytoplasm to decrease intracellular pH. The volume of acidic buffering and the mechanism(s) involved in SAR treated plant systems are still unclear and require deeper investigations.

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REFERENCES

- [1] Sulphur dioxide and chloroplast metabolism, Phytochemical Effects of Environmental Compounds, (Saunders JA., L. Kosak-channing, E.E. Conn, eds.), Alseher R., M. Franz, C.W. Geske. (1987). New York, Plenum Publishing Corporation.
- [2] Back J., S. Neuvonen, S. Juttermann. (1994). Plant Cell and Environment- 17, pp. 1009- 1021.
- [3] Environmental impact of acid rain. Buman S. (1985). Yojana 5, pp. 15-18.