



ENVIS Centre on "Plants and Pollution"

CSIR-National Botanical Research Institute, Lucknow



Sponsored by Ministry of Environment, Forest and Climate Change,
Government of India

The Environmental Information System (ENVIS) Centre at CSIR-National Botanical Research Institute is focused on the theme of "Plants and Pollution". The Centre started functioning as ENVIS Centre in January 2005. ENVIS-NBRI systematically collects, compiles and disseminates data on diverse aspects of "Plants and Pollution" together, which is providing data of immense use to several research organizations, town planners, policy makers, teachers, students and other stakeholders. ENVIS-NBRI covers national and international scientific data on all kinds of pollution with reference to plant kingdom. The data include effects of different pollutants on plant kingdom, and how plant resources can be used to mitigate specific pollutants.



Website Home Page

ENVIS Centre on Plants and Pollution
Established by CSIR-National Botanical Research Institute, Lucknow
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PLANTS SCIENCE • Diseases • Ecology • Identification • Herbicide	LABOUR SERVICE 7 Labs across 80 states No fee tested around Green industry waste	EMPLOYMENT NUMBER 24 International Publications 2017-2019 - Graduate Jobs Available positions: 1500000 JOB LEVELS Last Updated: 10/10/2017	BOOK CONTENT • Climate Change • Water • Law of National Parks • Green Herbicide
GLOSSARY See All Last Updated: 07/09/2017	MAJOR ACTIVITY • Plant Biotechnology • National Symposium • Green Herbicide Last Updated: 09/10/2017	PERFORMANCE REPORT Website View Search Page Messages Herbicide Herbicide Herbicide SEARCH	BIOGEOGRAPHY See All Herbicide Herbicide Last Updated: 10/10/2017

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ENVIS-NBRI GREEN PLANNER



PLANTS FOR AIR POLLUTION CONTROL

The "Green Planner" is a database to provide information on different plants for mitigating air pollution. These plants can be planted on roadside, road-dividers, in the greenbelts, and in indoor premises. The plantation of such locally suitable and pollutant mitigant plants will help to ameliorate the deleterious effects of different air pollutants from industrial emissions, vehicular exhausts, and indoor premises. The plant list in the Green Planner provides the botanical and common names, of pollution tolerant and mitigant plants, their distribution in India and suitable planting sites, along with economic and ecological benefits as well as other relevant information. An android mobile application, namely, "Green Planner App" has also been developed for its wide use to different stakeholders. The user can download it from the "Google Play Store".



ENVIS-NBRI DATABASE

Database

Sulphur dioxide

Sulphur dioxide is a primary air pollutant. The largest source of SO₂ in the atmosphere is the burning of fossil fuels (Coal, Oil, Petroleum) by thermal power plants, petroleum refineries, ore (pyrite, galena) extracting industries and vehicular emissions.

Environmental effects of SO₂:

SO₂ reacts with water, oxygen and other chemicals in the atmosphere to form sulphuric acid, which damages the vegetation and soil deterioration. When the concentration of SO₂ increased >20 µg/m³ causes plant injury by inhibiting the process of photosynthesis.



SO₂ damage on pine needles

References and Numerical data

Higher plants	Effects	Indicator	Remediation
Bryophytes	Effects	Indicator	Remediation
Lichens	Effects	Indicator	Remediation

References

Title	Responses of <i>Trichilia dregeana</i> leaves to sulphur dioxide pollution: A comparison of morphological, physiological and biochemical biomarkers
Author Name	Minoli Appalassamy, Bobby Varghese, Riyad Ismail, Suresh
Journal Name	Atmospheric Pollution Research
Year	2016
Volume and Issue	148
Pages	300-306
Abstracts	Industrial zones in eThekwin, South Africa, such as the South Durban Basin (SDB) are often characterised by extremely poor air quality owing to industrial emissions. This study investigated the effects of SO ₂ .

Numerical data

Pollution level	Annual Mean Concentrations Range (µg/m ³)					
	Industrial Residential, Rural & others areas		Ecological Sensitive Area			
	SO ₂	NO ₂	PM ₁₀	SO ₂	NO ₂	PM ₁₀
Low (L)	0-25	0-20	0-30	0-10	0-15	0-30
Moderate (M)	26-50	21-40	31-60	11-20	16-30	31-60
High (H)	51-75	41-60	61-90	21-30	31-45	61-90
Critical (C)	>75	>60	>90	>30	>45	>90

Source: Annual Report CPCB 2014-15

34 Database

Heavy Metals

- Nickel
- Chromium
- Cadmium
- Copper
- Lead
- Mercury
- Arsenic
- Zinc
- Iron
- Metal/Metalloid

Pesticides

- Endosulphan
- Lindane
- Neonicotinoids
- Organophosphate
- Carbofurans
- Nitrogen Fertilizer

Gases

- Ozone
- Fluoride
- Biogas
- Green House Gases
- Sulphur dioxide
- Nitrogen Oxides
- Hydrocarbon
- Carbon Monoxide

Suspended Particulate Matter

Bioremediation

Indoor Air Pollutants

Nanoparticulate

Acid Rain

Smog

Waste Land Management

Climate Change

- Role of Plants in CO₂ Sequestration
- Climate Change-CO₂ Enrichment
- Climate Change-Methane

Plants as monitor of pollution

Biomonitoring is one of the cost-effective and simple ways for investing the environmental quality and refers to process that uses living organisms to obtain quantitative information on environmental quality. Bioindicators and bioaccumulators that provide quantitative information on levels of pollution and allow the identification of change in the course of time are defined as "biomonitors". Some of the essential characteristics of biomonitors are (1) the organism must be capable of accumulating metals in measurable amounts; (2) the organism or the relevant part of it, must be readily available, in terms of quality and distribution, to make unbiased sampling possible; (3) the study must be repeatable; and (4) the cost of collection and analysis should be acceptable.

This article provides the possibility of monitoring pollution using biomonitoring potential of lower plants- lichens, bryophytes, pteridophytes and algae.

Bryophytes

With the objective to find out the bioindicator species of Bryophytes in the Mussoorie (Uttaranchal) for monitoring the air pollution at the spots of heavy automobile traffic movement, a preliminary survey of the Bryophyte Herbarium specimens collected from different localities of Mussoorie have been carried out. It has been critically observed that a thalloid liverwort *Plagiochama appendiculatum* L. is the most commonly and luxuriantly growing taxon at nearly all the sites surveyed.

Besides *P. appendiculatum* other liverwort found was *Marchantia paleacea* Bertol. A moss *Mium marginatum* (with) P. Beauv. was also growing luxuriantly in these areas. The heavy metal analysis revealed a fair amount of Pb, Cu, Zn, Ni and Mn accumulation in the samples (*P. appendiculatum* and *M. marginatum*) collected from different area. These observation have been validated in control laboratory experiment exposing the plants to different concentration of load (Nath et al., 2011).



ENVIS-NBRI PUBLICATIONS & OUTREACH

Newsletters (Quarterly) | Case Study (Annual) | Bibliography (Annual)



Awareness Programme by ENVIS-NBRI Center

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