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of forests and can grow in an area which is not disturbed. Narenga porphyrocoma is a grass which binds the soil. In such soil we can cultivate vegetables. Macaranga hirsuta is a suitable indicator for plantations of deodar & pine.

✓ Plant as Indicators for minerals -

Plants which indicate the presence of characteristic minerals in the soil is called metallophytes. The following plants grow in presence of specific metals.

✓ Vallozia Candida grows in presence of diamond in soil.

✓ Equisetum arvense,

✓ Lonicera caerulea,

✓ Sapina libanoticum

Thuja species

indicate the presence of gold mineral in soil

✓ Prigonium, oxyfolium

indicates presence

of silver mineral in soil

✓ Stellaria setacea grows in mercury rich soil

✓ V/ Asparagus sps. indicates presence of Uranium.

VI/ Viscaria alpina indicates copper minerals.

VII/ Viola calaminaria, V. lutea are indicators for Zinc ~~prec~~.

VIII/ Salsola nitida, Eurotia ceratoides grow in Boron rich soil.

✓ VII/ Damara ovata, Dacrydium are indicators of Iron mineral.

IX/ Ilex aquifolium grows in aluminum rich soil.

✓ Plant Indicators of fire

Some plants are well adapted to grow in burnt and highly disturbed area as for example, Agrostis hiemalis, Epilobium spicatum, Populus tremuloides, Pteris aquilina & fungus, Pyronema confluens grow in areas subjected to fire.

✓ Plants indicators of Petroleum deposits

Some Protozoans as Pusillids indicate Petroleum deposits in the area. The plants are also the indicator of Petroleum.

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the Plants produce hydrocarbon are called
Petrocrops — Euphorbia, Lathyrus, Euphorbia *naifolia*
Cattar *Calotropis procera*, *Pedicularis* are
Petrocrops.

Plant indicators for pollution

Plants are more sensitive to air
Pollutants than human. Hence, plants can
be used for the bioindicator of environmental
Pollution. Sensitive species can serve as
indicator and resistant species as accumulators
which collect large amount of pollutants without
damage. The plants suffer from high
high concentration of pollutants, i.e. ~~extremely~~ ^{acute} external symptoms such as
chlorosis, discoloration, necrosis & death
of entire plant. Besides morphological
changes, chemical, biochemical, such as
enzymatic parameter, physiological &
fine structure changes occur.

Recently, epidermal
morphology has been studied as indicator
of different pollutants especially SO₂.
Cuticle & epidermis damage can be
used to indicate air pollution.

Org. ways of leaf, decrease
in leaf thickness, cell size, loss of leaves.

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Early senescence may be occur due to smoke
or pollution.

Mosses, lichens and some fungi
are sensitive to SO_2 .
Lichens don't survive in areas
polluted to SO_2 for long time.

High Sulphur content in pine needles
indicates high concentration of SO_2 in atmosphere.
Fluoride content in sorghum leaves indicates
air pollution by a fluoride source can fall
and heavy concentration in Festuca
in the chloroalkaloids.

Bio-indicators

A bioindicator is any species or group of species whose function, population & status can reveal the qualitative status of environment. eg. copepods and other small water crustaceans that are present in many water bodies can be monitored for biochemical, physiological & behavioural changes that may indicate a problem within their ecosystem. Bio-indicators can tell us about cumulative effects of different pollutants in the ecosystem & about how long a problem may have persisted.

A biological monitor or bio monitor is an organism that provides qualitative information on the quality of the environment around it. Therefore, a good monitor of the environment around it will indicate the presence of the pollutant and can also be used in an attempt to provide additional information about the amount and intensity of exposure.

Bio indicators include biological processes, species to assess the quality of the environment & how it changes.