

# A Survey of Road Side Flora Growing Under Stress of Auto Exhaust Pollution in City Ghaziabad

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*This paper deals with the survey of different plants growing along the road side in the stressed conditions of auto-exhaust pollution in city Ghaziabad. These are generally herbs, shrubs and trees. Some of them are wild species many of them are economically important. Due to auto-exhaust pollution some of them suffer from visible injuries and have adverse effect on growth. Even some plant species are found comparatively resistant to these stressed conditions of auto-exhaust pollution.*

**Keywords:** Auto-exhaust, Pollution, Herb, Shrub, Tree.

## 1. INTRODUCTION

Ghaziabad is an important industrial town of Western Uttar Pradesh, which comes under National Capital Region [NCR], New Delhi. Ghaziabad border is the only route through which traffic from Delhi enter in U.P. National highway No. 2 (to Hapur), 58 (to Meerut) and 91 (to Bulandshahr) passes through city Ghaziabad. The vicinity of Ghaziabad suffers from tremendous traffic load round the clock mainly at Mohan Nagar crossing, Meerut mod, New bus stand, Hapur chungji, Old bus stand and Lal Kuan etc. The regular increasing vehicular density is posing a serious threat to the vegetation growing along the road side.

## 2. METHODOLOGY

Seasonal survey of the vegetation growing along the road, under the stressed conditions of vehicular exhaust pollution, was conducted during the course of study in city Ghaziabad.

## 3. RESULTS

Various plants e.g. herbs, shrubs and trees, found growing along the road sides are enlisted as follows:-

Botanical Name	Common/Local Name	Family	Habit
<i>Argemone mexicana</i> Linn	Pili Katali	Papaveraceae	Annual herb

<i>Stellaria media</i> (Linn.) Vill	Chick weed	Caryophyllaceae	Annual herb
<i>Abutilon indicum</i> G. Don.	Kanghi	Malvaceae	Annual herb
<i>Aegle marmelos</i> (Linn.) Corr.	Bel	Rutaceae	Perennial tree
<i>Azadirachta indica</i> A. Juss.	Neem	Azadiractaeceae	Perennial tree
<i>Melia azedarach</i> Linn.	Bukain	Azadiractaeceae	Perennial tree
<i>Mangifera indica</i> Linn.	Aam	Anacardiaceae	Perennial tree
<i>Rosa indica</i> Linn.	Gulab	Rosaceae	Perennial shrub
<i>Dalbergia sissoo</i> Roxb.	Shisham	Papilionaceae	Perennial tree
<i>Bauhinia variegata</i> Linn.	Kachnar	Caesalpiniaceae	Perennial tree
<i>Cassia fistula</i> Linn.	Amaltas	Caesalpiniaceae	Perennial tree
<i>Cassia obtusifolia</i> Linn.	Chakunda	Caesalpiniaceae	Annual herb
<i>Cassia occidentalis</i> Linn.	Kasunda	Caesalpiniaceae	Perennial herb
<i>Cassia tora</i> Linn.	Panwar	Caesalpiniaceae	Annual shrub
<i>Acacia nilotica</i> (Linn.) Wild ex. Del. Subsp.indica (Benth) Brenan	Kikar	Mimosaceae	Perennial tree
<i>Albizia lebbek</i> (Linn.)Benth	Siris	Mimosaceae	Perennial tree
<i>Callistemon lanceolatus</i> Sweet	Bottle brush	Myrtaceae	Perennial shrub
<i>Eucalyptus globulus</i> Labill.	Gum tree	Myrtaceae	Perennial tree
<i>Psidium guajava</i> Linn.	Amrood	Myrtaceae	Perennial tree
<i>Ixora coccinea</i> Linn.	Rangan	Rubiaceae	Perennial shrub
<i>Dahlia pinnata</i>	Dahlia	Asteraceae	Annual herb

Cav.			
<i>Eclipta prostrata</i>	Kala bhangra	Asteraceae	Annual herb
Linn.			
<i>Calotropis procera</i>	Aak/Madar	Asclepiadaceae	Perennial shrub
R.Br.			
<i>Alstonia scholaris</i>	Satni	Apocynaceae	Perennial tree
Linn.			
<i>Catharanthus roseus</i>	Sadabahar	Apocynaceae	Annual herb
Linn.			
<i>Nerium indicum</i>	Kaner	Apocynaceae	Perennial shrub
Mill.			
<i>Tabernaemontana divericata</i> (Linn.) R.	Chandni	Apocynaceae	Perennial shrub
Br.ex.Roem & Suhult.			
<i>Datura stramonium</i>	Dhatura	Solanaceae	Annual herb
Linn.			
<i>Thevetia peruviana</i>	Peeli kaner	Apocynaceae	Perennial shrub
Pers.			
<i>Solanum nigrum</i>	Makoi	Solanaceae	Annual herb
Linn.			
<i>Withania somnifera</i>	Asgandh	Solanaceae	Perennial shrub
Dunal			
<i>Boerhaavia diffusa</i>	Santh	Nyctaginaceae	Prostate herb
Linn.			
<i>Bougainvillea</i> sp.	Baganvilas	Nyctaginaceae	Perennial shrub
<i>Achyranthes aspera</i>	Latjeera	Amaranthaceae	Perennial herb
Linn.			
<i>Amaranthus spinosus</i> Linn.	Kante-wali-chaulai	Amaranthaceae	Annual herb
<i>Amaranthus viridis</i> (Syn. <i>Amaranthus gracilis</i> Desf.)	Chaulai	Amaranthaceae	Annual herb
<i>Chenopodium album</i>	Bathu	Chenopodiaceae	Annual herb
Linn.			
<i>Euphorbia hirta</i>	Dudhi	Euphorbiaceae	Annual herb
Linn.			
<i>Phyllanthus niruri</i>	Dhadhani/Mokh	Euphorbiaceae	Annual herb
Linn.			
<i>Ricinus communis</i>	Arandi	Euphorbiaceae	Perennial shrub
Linn.			
<i>Ficus religiosa</i>	Pipal	Moraceae	Perennial tree

Linn.	<i>Morus alba</i>	Shahtoot	Moraceae	Perennial tree
Linn.	<i>Cannabis sativa</i>	Bhang	Cannabinaceae	Annual shrub
Linn.	<i>Crinum defixum</i>	Sukhdarshan	Amaryllidaceae	Perennial herb
Ker Gawl	<i>Aloe barbedensis</i>	Gheekunwar	Liliaceae	Perennial herb
Mill.	<i>Commelina benghalensis</i> Linn.	Kankaua	Commelinaceae	Annual herb
(Linn.) Pers.	<i>Cynodon dactylon</i>	Dub ghas	Poaceae	Creeping herb

A variety of plants were found growing along the sides of road viz. wild herbs, shrub, trees and ornamental plants. The empty waste land along the road was dominated by common wild plants and it was found that different plants apparently exhibiting different responses to the stressed conditions of auto-exhaust pollution. Some plants e.g. *Datura* spp., *Chenopodium album* Linn. etc. had thick population along the roads, showed better growth performance, suffered less visible injuries and hence appeared to be comparatively tolerant, Whereas some other plants e.g. *Withania somifera* Dunal., *Amaranthus viridis* (Syn. *Amaranthus gracilis* Desf.) and *Cassia obtusifolia* Linn. etc. appeared to be sensitive, being fewer in number with less density however the number of such plants increased with the increasing distance from the road. It is because of the effect of pollutants emitted from vehicular exhaust. It was noted that the plants growing very close to the road or on the road dividers were having leaves blackish in color instead of green color, due to thick layer of dust and smoke deposited on them. *Nerium indicum* Mill. and *Thevetia peruviana* Pers. growing on the road dividers were suffering from visible leaf injuries and bore dull colored flowers in contrast to the normal flower.

#### 4. DISCUSSION

Survey of the polluted area was conducted and variety of plants i.e. wild herbs, shrubs, ornamental plants and trees etc. growing along the road sides under the impact of vehicular exhaust were enlisted. All these plants are integral part of biodiversity and used as food by tribal sect. of India i.e. *Achyranthus aspera* (leaves) *Amaranthus viridus* (shoot and tender leaves) *Amaranthus spinosus* (leaves), *Bauhinia variegata* (floral bud), *Cassia tora* (tender shoot), *Commelina benghalensis* (leaves), *Solanum nigrum* (ripe berries) and *Chenopodium album* (tender shoot) [1]. *Cynodon dactylon* is commonly used as fodder [2]. *Acaia nitotica* is reported as gum and resin yielding plant [3]. *Acacia nilotica*, *Albizia lebbek* and *Dalbergia sissoo* etc. are some of the important timber yielding plants [4]. *Abutilon indicum*, *Calotropis procera* and *Sida rhombifolia* are fiber yielding plants [5]. The twigs of *Abutilon indicum*, *Aegle marmelos*, *Azadirachta indica*, *Boerhaavia diffusa*, *Cassia fistula*, *Cynodon dactylon* and *Ricinus communis* are used as tooth brushes [6]. *Abutilon indicum*, *Achyranthus aspera*, *Aegle marmelos*, *Azadirachta indica*, *Bauhinia* spp., *Boerhaavia diffusa*, *Cassia fistula*, *Datura metel*, *Datura*

*stramonium*, *Sida cordifolia*, *Solanum nigrum* and *Withania somnifera* are valuable medicinal plants [7,8,9]. There is huge literature which reveals that auto exhaust pollution adversely affect the plants growing in its close vicinity [10,11,12,13]. Response of different plants appeared to be different to stressed conditions of vehicular emission. Some plants i.e. *Withania somnifera*, *Amaranthus viridis*, *Cassia obtusifolia* and *Croton* sps. etc. showed marked increase in their number with increasing distance from the road. Such plants were also prone to pollution injuries, therefore appeared as susceptible. Increase in density of such plants as the distance from the road increased, was perhaps because with the increasing distance away from the site of pollution, the effects of pollutants get minimized. Another category of plants were found growing profusely in close vicinity of roads and were quite healthy (suffered less visible injuries) e.g. *Datura* sps. and *Chenopodium album* etc. *Datura* sps. growing along the roads were recorded with comparatively larger and darker green leaves, tremendous flowering and fruiting etc. [14]. Hence such plant can be categorized as comparatively resistant.

All the wild plants are integral part of bio-diversity. A good number of such plants bear valuable properties, as already mentioned. Large area of agricultural land is along the busy highways and used for farming or as orchard. It is visualized that in near future, the so called wild plants will be cultivated for commercial purpose because of their demand and valuable properties. In that case such extensive seasonal survey investigations will be of immense value and guide lines to decide about the susceptible and tolerant species to vehicular exhaust pollution. Trees e.g. *Azadirachta indica* and *Ficus* sps etc. as suggested by some earlier workers and also on the basis of external appearance, health and growth, as found in the present survey investigations are better adapted to stressed conditions of vehicular exhaust pollution. Therefore more emphasis should be given on their plantation along the busy roads for shade, beauty, timber and finally to keep the environment pollution free. Smith suggested the possibility of using trees as pollution sink [15].

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