# FLORISTIC SURVEY AND PHYTOSOCIOLOGICAL ANALYSIS OF ROADSIDE COMMUNITIES OF NH-24 OF MORADABAD DISTRICT

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**Abstract:** Floristic survey and phytosociological analysis of Delhi road (NH-24) of the district showed 85Angiosperms belonging to 27 families, which included exotics as well as medicinal plants. Among eighty five recorded species, *Partheniumhysterophorus* is emerged as a leading speciesin all study sites with highest IVI followed by *Cynodondactylon,Achyranthesaspera*and*Sidaacuta*whereas *Fagoniacretica*recorded lowest IVI in the selected sites of the study area.

**Keywords:** Floristic survey, Phytosociology, NH-24 Moradabad

## INTRODUCTION

In Moradabad, roads are continuously increasing at a fast rate; and roadsides occupy a very broad area of the District. Ecologically unique roadside communities provide enormous opportunities for investigations and roadsides are great frontiers awaiting science and society (Allem,1997; Rench *et al*., 2005). Physico-chemical disturbance is widely recognized as a primary influence on plant community composition and the spread of invasive exotics (Larson, 2003; Arevalo *et al*., 2005;Beena *et al*., 2010). Pollutants on roadsides include high amount of different heavy metals (Ullmenn *et al*., 1995; Akbar *et al*., 2003; Ahmed *et al*., 2004; Li *et al*., 2004; Rentch *et al*.,2005) and other gaseous hydrocarbons (Latimer *et al*. 1990). Trampling and crushing by people and vehicles are the common physical disturbances. Resilient species of contaminated environments are believed to be reliable indicators of pollution and disturbance. In general, tolerant plants in metal contaminated environments are excluders, accumulators or hyper accumulators. Phytosociological analysis of natural vegetation is recognized as an efficient and appropriate method to select out useful plant species from natural communities (Way,1977; Wester and Juvik, 1983; Lausi and Nmiis, 1985). According to Ray and George (2009) native plants growing on contaminated sites, especially in subtropical and tropical areas are expected to have the potential for phytoremediation. However, practically no literature is found describing roadside vegetation in Moradabad, which is one of the biodiversity-rich and fast urbanizing city of Uttar Pradesh, India. Therefore, roadsides of this city are expected to be rich in unique pollution tolerant and resilient species, which may be ecologically relevant as indicators of pollutions or otherwise economically significant. The present investigation was to identify the species richness and the degree of resilience of different roadside species on the basis of certain phytosociological parameters.

## MATERIAL AND METHOD

Moradabad district is located at latitude $28^0$ 5'N and longitude $78^0$ 48' E and covers an area of 3806.7 sq.km. The area is characterized by periodic occurrence of hot summers, moderate rains and cold winters. The maximum and minimum atmospheric temperatures are $44.2^0$C and $4^0$C respectively. The average rainfall varies between 800 to 1000 mm. The relative humidity is up to 90% in monsoon season and in drier part of the year it decreases to less than 20%.Twelve sites were selected for sampling of vegetation along NH-24 (Delhi Road), two inter-city highways (MBD-Amroha road and MBD-Rampur road) and two rural roads. These sites were repeatedly sampled at different months during the year 2014. Species were identified using the taxonomic key of Babu (1977) and Duthie (1994).The vegetation sampling was conducted randomly to determine the density, frequency and cover values. The importance value index (IVI) for each species was obtained by direct summation of relative density, relative frequency and relative cover following Misra (1968). A FORTRAN based computer package TWINSPAN was used to analyse and classify the data. A dendrogram was built from the top down for the association analysis.

## RESULT AND DISCUSSION

The vegetation observed at twelve different sites differs considerably, which could be attributed to the change in the soil properties due to availability of industrial effluents. In the present study 304 quadrats were established and a total of 85angiosperm species were recorded in this study. Dominant and co-dominant species were sorted according to maximum importance value in each stand (Table 1). TWINSPAN classified the data into two major

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groups/communities, four sub-groups/communities and eight sub-divisions shown in Fig -1. Total number of plant species were recorded 85, out of which 49 plant species were found in major group 1 while 36 species were found in major group 2. The division of groups into sub-groups is based on the presence or absence of one species or the other. *Partheniumhysterophorus* L. exhibited maximum IVI in all twelve sites and it is interesting to note that it replaced *Achyranthesaspera*L. completely in S-3, S-4, S-5 and S-11. *Partheniumhysterophorus* L. is emerged as a leading species and showed association with 9 species in S-10, with 10 species in S-11 and S-12, with 11 species in S-8, with 12 species in S-1and S-6, with 13 species in S-3 and S-4, with 14 species in S-5 and S-7, and with 15 species in S-2 and S-9. *Desmostachyabipinnata* (L.) Stapf. showed close association with *Alhagipseudalhagi*Desv and *Fagoniacretica* L. in S-2, S-3,S-5, S-7 and S-9.

*Triumfettapentanda*A. Rich. and*Chenopodiummurale* L. were found together in seven sites but with different frequencies. Study revealed that 26 species (30.6% of total species) are well known medicinal plants described in many of the books on Ayurvedic Medicine in India and are presently using by local people. 53% of the total species found on roadsides were exotics. Among the total exotics 78% (35 species) were dicots and only 22% (10 species) were monocots. If the percentage of exotic species on roadsides is equated to the degree of disturbing environmental influence on the integrity of roadside communities, the Moradabad roads with 53% exotics, (45 species), irrespective of seasons or regions, could be assessed as highly disturbed; however, none of the exotics observed were of nationally notified species for control and prevention of spread.
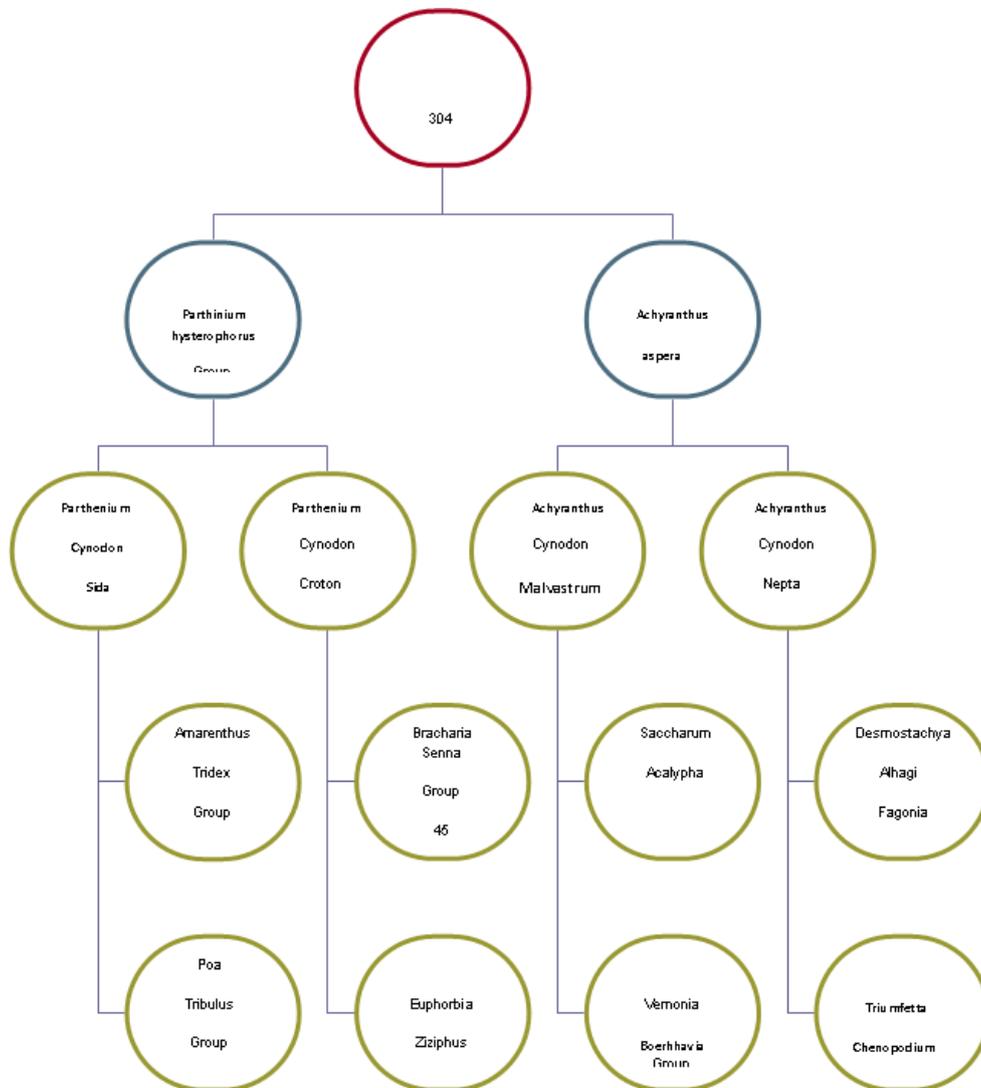


**Fig 1.** Dendrogram showing the results through TWINSPAN
Total number of quadrats = 304
Total number of species    = 85
Number of species in major group 1 =49
Number of species in major group 2 =36

**Table 1.** Data sheet showing IVI of dominant species at twelve sites of NH-24 of Moradabad.

| S.N. | Name of Species | IVI | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S-1 | S-2 | S-3 | S-4 | S-5 | S-6 | S-7 | S-8 | S-9 | S-10 | S-11 | S-12 |
| 1. | Partheniumhysterophorus L. | 17.10 | 19.05 | 22.00 | 21.50 | 20.70 | 15.90 | 16.00 | 21.12 | 14.56 | 11.54 | 21.00 | 11.60 |
| 2. | Cynodondactylon (L.) Pers | 16.30 | 12.88 | 17.82 | 8.91 | 5.10 | 14.70 | 11.90 | 13.14 | 13.67 | 11.43 | 12.89 | 11.00 |
| 3. | Achyranthesaspera L. | 8.50 | 9.50 | --- | --- | --- | 10.26 | 9.78 | 19.32 | 6.83 | 8.12 | --- | 18.55 |
| 4. | SidaacutaBurm f. | --- | --- | 6.99 | 11.20 | 19.45 | --- | 13.10 | --- | 21.67 | 14.23 | --- | --- |
| 5. | Croton bonplandianus Boil. | --- | 8.12 | --- | 6.75 | --- | 5.87 | 7.02 | 9.12 | 7.20 | --- | --- | 12.43 |
| 6. | Malvastrumcoromandelianum(L.)Grackle | 8.20 | --- | --- | 12.45 | --- | 6.44 | --- | 7.00 | 12.88 | 3.66 | --- | 4.43 |
| 7. | Nepetahindostana (B.Heyne ex Roth) Haines | 3.68 | 6.0 | 6.10 | --- | 12.00 | 9.45 | 10.60 | -- | -- | --- | 6.67 | --- |
| 8. | Amaranthusspinosus L. | 3.96 | 6.00 | --- | --- | --- | 4.97 | 9.00 | 5.00 | --- | 9.34 | -- | 13.96 |
| 9. | Tridaxprocumbens (L.) L. | 5.77 | | 8.78 | 7.70 | --- | 11.00 | --- | 8.60 | --- | --- | 9.66 | --- |
| 10. | Brachiariaramosa (L.) Stapf | --- | 11.78 | --- | --- | 6.00 | --- | 8.43 | --- | 11.12 | --- | 5.00 | --- |
| 11. | Senna occidentalis (L.) Link | --- | 7.92 | --- | 6.66 | --- | --- | 5.56 | --- | --- | 7.80 | --- | 11.23 |
| 12 | AcalyphaindicaL. | 3.56 | --- | 7.80 | --- | --- | 4.26 | --- | 8.12 | 5.12 | --- | 9.20 | --- |
| 13. | Saccharummunja L. | --- | 3.30 | 8.55 | --- | 12.60 | --- | --- | --- | --- | 8.57 | --- | 4.50 |
| 14. | Euphorbia hirta L. | 7.67 | --- | --- | 4.43 | 5.70 | 4.90 | --- | 6.60 | --- | --- | 6.56 | --- |
| 15. | Desmostachyabipinnata (L.)Stapf. | --- | 7.22 | 5.00 | --- | 8.57 | --- | 3.00 | --- | 7.10 | --- | --- | --- |
| 16. | Poaannua L. | 5.03 | --- | 4.40 | 3.85 | --- | 4.89 | --- | 5.08 | --- | --- | --- | --- |
| 17. | Tribulusterristris L. | --- | --- | 3.63 | --- | --- | --- | 5.95 | 5.44 | 6.56 | --- | 4.67 | --- |
| 18. | VernoniacinereaLess. | --- | 3.00 | --- | 3.34 | 3.43 | 3.70 | --- | --- | 3.66 | --- | --- | 6.00 |
| 19. | BoerhaaviadiffusaL. | 4.77 | --- | 5.12 | --- | --- | 3.03 | 4.13 | --- | --- | 3.44 | --- | 3.34 |
| 20. | Ziziphusnummularia (Burm.f.) Wight &Arn | 3.56 | 3.87 | --- | 3.09 | 3.12 | --- | --- | --- | 3.00 | --- | 3.80 | --- |
| 21. | ErigeronbonariensisL. | --- | --- | --- | 3.67 | 3.40 | --- | --- | 3.14 | --- | 2.90 | 3.00 | 3.11 |
| 22. | Triumfettapentanda A. Rich. | 2.80 | 2.45 | --- | --- | --- | 2.90 | 3.00 | --- | 2.40 | 2.80 | --- | 2.80 |
| 23. | ChenopodiummuraleL. | 2.80 | 2.50 | --- | --- | --- | 2.80 | 1.80 | --- | 3.00 | 2.00 | --- | 2.00 |
| 24. | AlhagipseudalhagiDesv. | --- | 3.45 | 3.50 | --- | 3.00 | --- | 2.90 | --- | 3.65 | --- | --- | --- |
| 25. | Fagoniacretica L. | --- | 2.86 | 3.80 | --- | 2.23 | --- | 2.36 | --- | 4.85 | --- | --- | --- |

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