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BIOLIFE RESEARCH ARTICLE

Air pollution tolerance index of three tree species along national high way-6 between Ainthapalli to Remed, Sambalpur District, Western Odisha, India

A. A. Pradhan[1], S.K. Pattanaya[2]k*, A.K. Bhadra[3] and K. Ekka[4]

[1-4] P.G. Department of Environmental Sciences, Sambalpur University, Jyotivihar, Sambalpur, Odisha, INDIA-768019

*Email: skp.envsu@gmail.com

ABSTRACT

Plants are universal sink of carbon dioxide. Plantation of species along any road helps to trap air polluting dust and carbon dioxide. The plants are also negatively affected by the dust and gaseous emissions from vehicles. Because of industrialization in the Sambalpur region, the number of vehicles passing through National Highway-6 has grown significantly. This has been the root cause of high level air pollution. In response to this, a study was undertaken to evaluate the air pollutant tolerance level of some tree species present along the NH-6 between Ainthapali to Remed of Sambalpur township using Air Pollution Tolerance Index (APTI) approach. The aspects covered in this work are i) Identification and selection of plant species, ii) Analysis of biochemical parameters like total chlorophyll content, leaf extract pH, relative water content, ascorbic acid of selected species and estimation of air pollution tolerance index values for these species, iii) Evaluation of the Dust accumulating capacity of the selected tree species and its relationship with other morphological parameters, iv) Evaluation of relationship between plants morphological parameters, Dust accumulating capacity and APTI. Three different species viz. *Tectona grandis* L.f., *Polyalthia longifolia* (Sonn.) Thw. and *Ficus religiosa* L. were studied at three sites such as Ainthapali (Site-1), Bareipalli (Site-2) and Remed (Site-3). Relative water content (RWC), Hydrogen ion Concentration of leaf extracts (pH), Total Chlorophyll content of leaf (TCH) , Ascorbic acid content of leaf (AA) were estimated. The petiole length, Leaf area and inter-node lengths were also measured. The dust accumulation potentials of three species were determined. Correlation and regression analysis between different parameters were carried out. The species *Tectona Grandis* is highly tolerant to air pollution with average APTI values ranging from 7.13 to 10.33. The established decreasing order for grades is *Tectona grandis* (6) > *Polyalthia longifolia* (5) > *Ficus religiosa* (3). The Dust accumulation potential values are highly correlatable with APTI.

Keywords: Air pollution, Tree species, Sambalpur .

INTRODUCTION

In developing countries like India rapid industrialization and vehicular traffic lead to the deterioration of air quality by releasing toxic gases and other substances to the atmosphere.

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The combustion processes release gases and particulate matter into the air which includes SOx, NOx, CO and soot particles as well as smaller quantities of toxic metals, organic molecules and radioactive isotopes (Bhattacharya et al., 2013, Agbair and Esiefarienrhe, 2009; Chouhan et al., 2011). Vegetation provides a natural means of cleaning the atmosphere with large leaf area for impingement, absorption and accumulation of air pollutants level in the environment (Varshney, 1985; Yan and Hui, 2008; Escobedo et al., 2008; Das and Prasad, 2010). Plants are very important for determining and maintaining ecological balance by actively participating in the cycling of nutrients and gases like carbon dioxide and oxygen etc., but air pollution can directly affect plants via leaves or indirectly via soil acidification (Steubing et al., 1989; Agbaire, 2009; Kumar and Nandini, 2013). Trees act as air pollution sinks and the better performance comes from the pollution tolerant species (Miria and Khan, 2013). By monitoring plants' tolerance towards air pollution, they can be screened and can be considered as biological indicators or monitors of air pollution (Mahecha et al., 2013). This aspect can be effectively used in the planning and development of urban areas.

The effective use of Air Pollution tolerance Index (APTI) of tree species estimated through the values of multi parameters has been discussed by several workers (Agrawal and Tiwari, 1997; Yan and Hui, 2008; Dwivedi and Tripathi, 2007; Dwivedi et al., 2008; Jyothi and Jaya, 2010). The present study examines the APTI values for three plant species alongside the National Highway-6 (NH-6) passing through Sambalpur town in Odisha, India in three different sectors and correlates the dust accumulation potential with APTI.

Material and Methods

Study area

Sambalpur (21° 27' 58.97'' N and 83° 58' 29.3'' E) is located at an elevation of 154 m above sea level. It is bounded on the north by districts of Sundargarh and Jharsuguda, on the south by the districts of Sonapur and Angul, on the east by the districts of Sundargarh and Deogarh, and on the west by the districts of Bargarh and Jharsuguda and covers an area of 6,657 sq. km (Census of India, 2001).

Climate

Sambalpur with a population of 1,54,164 occupies the sixth position among the principal urban agglomeration of the state of Odisha. The study was carried out alongside national highway-6 between Ainthapali chowk to Remed Chowk, Sambalpur, Odisha which are approximately 4km apart. The locations of Ainthapali, Baraipali and Remed were taken as area 1, 2 and3 respectively for the assessment of air pollution tolerance index, dust collection potential, and leaf morphology of tree species. Three different tree species with varying characteristics were selected which are continuously exposed to vehicular pollution and point sources viz. two rice mills.

Sample Collection

The study was undertaken during the month of October and November, 2013 for a period of 25 days. Plants of three different species namely *Polyalthia longifolia* (Sonn.) Thw., *Ficus religiosa* L. and *Tectona grandis* L.f. were selected from three different areas. The selection of plants was done on the basis of commonness and convenience of the study. The plants sampled from different sampling sites along with their characteristics and scientific name are given in Table - 2.

For sampling, each plant species were marked. Fully mature and healthy leaves were selected and brought to laboratory in polythene bags kept in an ice box to nullify the dust loss from leaf surface and avoid the effect of light and temperature. From each plant, a total of 10 leaves were selected for the analysis of different biochemical parameters, dust collection potential and study of leaf morphological characteristics. Sampling was done in the morning hour between 8am to 10am. The leaves were taken from a fixed height of 1.96 m from the ground level.

Estimation of Dust Collection potential

The upper and lower surfaces of leaves were cleaned using a fine brush. The leaves selected were marked and left for 24 hours. The very next day leaves were cut from the petiole and brought in polythene bags inside an ice box. The leaves with dust were weighed using ANAMED™ Electronic balance Model-M-300DR. Then, the dust load was removed with fine brush kept on a filter or blotting paper and reweighed. The leaf area was calculated by tracing the outline of leaves on graph paper and the area was estimated in unit of cm^2.

The amount of dust collection potential of leaf was calculated by the following equation

$W = (W_1-W_2)/A$

Where, W= Amount of dust (mg/cm^2).

W_1=weight of leaf with dust.

W_2= weight of leaf without dust.

A=Total area of leaf in cm^2.

Leaf Morphology Study

Accumulation of dust particles depends on internodal distances, petiole length, leaf area, orientation, margin, folding and arrangement, hair density, hair type and length (Varshnay and Mitra, 1993). Leaf morphology characters like leaf arrangement, margin, orientation, pubescence, prominent veins, internodal length, petiole length and leaf lamina size were taken and accordingly plus or minus signs are given following the scheme given by Das and Prasad (2010) (Table - 1 and Table - 3). Final grades were calculated for all plant species.

Analysis of Biochemical Parameters

Relative water content (RWC)

Relative water content of leaf was calculated using the formula:

$RWC= [(FW-DW) / (TW-DW)] \times 100$

Where,

FW= Fresh weight of leaf.

DW= Dry weight of leaf.

TW= Turgid weight of leaf.

Fresh weight of leaves were obtained by weighing the fresh leaves .The leaves were then immersed in water overnight (24hour), blotted dry and then weighed to get the turgid weight using ANAMED™ Electronic balance Model-M-300DR. The leaves were dried for 2 hours at 115˚C in hot oven drier to obtain the dry weight (Yan and Hui, 2008).

Leaf pH

0.5gm of leaf was ground to paste and dissolved in 50ml distilled water, filtered and pH was measured according to Singh and Rao (1983) using Systronics Electronic pH meter.

Figure -1: Location map of the studied stretch on NH-6 with images of the sampling sites; Area -1: Ainthapali, Area-2: Bareipali; Area-3: Remed.
Source of satellite imageries: www. googleearth.com

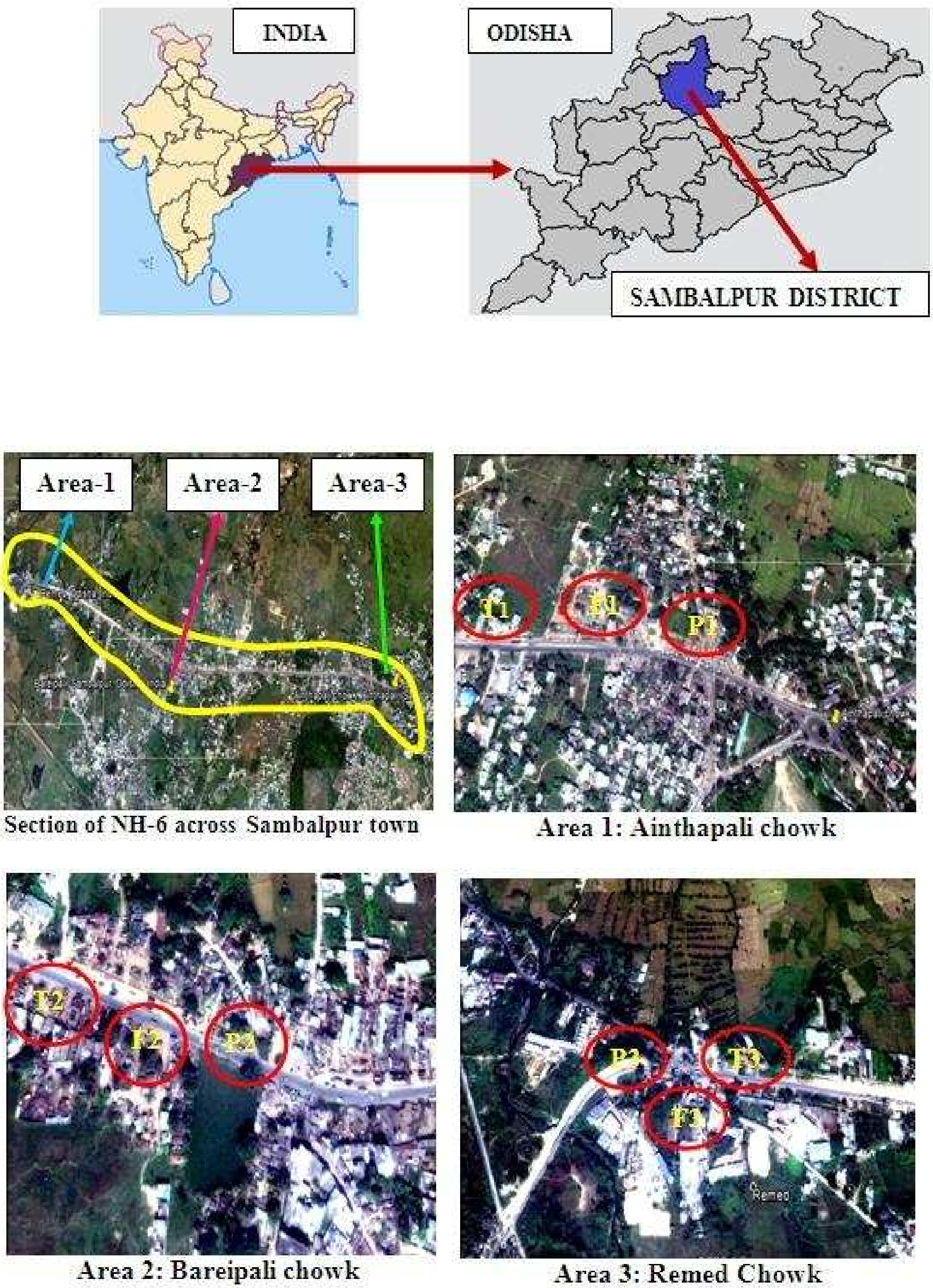


Table-1. Scheme for Leaf morphology characters and grades (Das and Prasad, 2010)

Parameter	Character	Grade
Leaf arrangement	Alternate, spiral and whorled, Opposite and opposite decussate	+, -
Margin	Crenate, dentate and serrate(non entire),entire	+, -
Leaf orientation	Horizontal, Semierect, Erect	++ , + , -
Pubescence	Trichome present, Trichome absent	+, -
Prominent leaf veins	Present, Absent	+, -
Leaf internode	< Average(4.22cm), ≥ Average(4.22cm)	+ , -
Petiole	<Average(3.44cm) , ≥ Average(3.44cm)	+ , -
Leaf Lamina	Large, Medium, Small	++, +, -

Table-2. Description of plant species characteristics sampled.

Short Name	Scientific Name	Family	Habit	Characteristics
PL	*Polyalthia longifolia* (Sonn.) Thw.	Annonaceae	Evergreen tree	Compound leaves shapes are like a lance and have wavy edges. Leaves are 8-12cm long and 2-3 cm broad with petiole 0.5-2cm
FR	*Ficus religiosa* L.	Moraceae	Evergreen tree	Simple leaves cordate shape with distinctive extended tip. Leaves are 10-17cm long and 8-12cm broad with a 6-10cm petiole.
TG	*Tectona grandis* L.f.	Lamiaceae	Dry deciduous	Simple leaves elliptic in shape with round base and 6-75cm long and 8-45cm wide with 0.5 to 6cm petiole.

Table-3. Evaluation of three plant species on the basis of their leaf morphology and allotment of final grades. [Arrangement (A), Margin (M), Orientation (O), Pubescence (P), Prominent veins (PV), Leaf Internode (LI), Petiole (P), Leaf Lamina (LL)]

SPECIES	A	M	O	P	PV	LI	P	LL	TOTAL GRADES
PL	+	-	+	-	+	+	+	-	5
FR	+	-	-	-	+	-	-	+	3
TG	+	-	+	+	+	-	-	++	6

Total Chlorophyll content (TCH)

This was carried out in accordance with the procedure given by Arnon (1949). 0.5 g of fresh leaves were blended and then extracted with 10 ml of 80% acetone and left for 15 minutes. The liquid portion was centrifuged at 4000 rpm for 20 minutes. The supernatant was collected and adjusted to volume of 15ml by adding chilled acetone and the absorbance was taken at 645 nm and 663 nm using a spectrophotometer. The instruments used for this purpose are ANAMED^{TM} Electronic balance Model-M-300DR, R-8C Laboratory centrifuge (REME) and SM 1200 UV-VIS Spectrophotometer.

The following calculations were performed to determine TCH:

Chlorophyll a = $(12.7\times DX_{663} - 2.69\times DX_{645}) \times (V/1000W)$ mg/g

Chlorophyll b = $(22.9\times DX_{645} - 4.68\times DX_{663}) \times (V/1000W)$ mg/g

TCH = (chlorophyll a + Chlorophyll b) mg/g

DX=Absorbance of the extract at the wavelength X nm

V=Total volume of the chlorophyll solution (ml)

W= Weight of the tissue extract (g)

Ascorbic Acid (AA):

1gm of leaf sample was weighed and homogenized with 5% Metaphosphoric acid and volume was made up to 10ml adding distilled water. To 1ml of diluted sample, 0.1ml of 5% Metaphosphoric acid was added. Then 2 drops of Bromine water was added to oxidize ascorbic acid in its dihydro form and 1ml of 2, 6 dichlorophenol indophenol was added which turns the solution to pink showing the presence of ascorbic acid. The solution was centrifuged for 10 minutes at 4000 rpm and the supernatant was collected to estimate the ascorbic acid by spectrophotometeric method at 540nm after incubating at 37˚C for 3hours followed with addition of 4ml chilled concentrated H_2SO_4.

Air Pollution Tolerance Index (APTI) :

The APTI value is calculated adopting the formula as per Singh and Rao (1983) and Yan and Hui (2008).

$$APTI = \{A\,(T + P) + R\}/10$$

Where;

A = Ascorbic acid content (mg/g).
P = pH of the leaf extract.
T = Total chlorophyll content (mg/g).
R = Relative leaf water content (%).

Results & Discussion

Plants along the roadside showed significant change in their biochemical characteristics and morphological features. The estimated data of four biochemical parameters viz. Relative water content, $_P$H, total chlorophyll content and ascorbic acid of leaf with the calculated APTI values for three roadside plant species growing along NH-6, Sambalpur are given in Table-4 for the months of October and November, respectively.

It is observed from the tables that APTI value of *Tectona grandis* is high stating its relatively high tolerance towards air pollutants consecutively for the month of October with an average of (9.93) and November with an average of (7.36), followed by *Ficus religiosa* (9.15 for October and 6.23 for November). The average APTI value for *Polyalthia longifolia* was lowest for both the seasons (8.60 for October; 6.18 for November). APTI refers to the ability of a plant to be used as refiner against air pollution. Plants with higher index values are tolerant to air pollution and can be used / planted as a sink to prevent air pollution, while plants with low index value can be used as indicators to levels of pollution (Singh and Rao, 1983). Considering the average values of APTI of each species the air pollution tolerance level for these three species follows the order *Tectona grandis*> *Ficus religiosa*> *Polyalthia longifolia* (Table-4).

The APTI values of individual plant species at specific sites showed some variations (Fig.2). This variation could be because of variation in source and microclimatic condition. As in the case of *Polyalthia longifolia* higher values of APTI was observed in Area-2 (Bareipali chowk) i.e. 9.77 (October) and 7.28 (November) in contrast to that of *Ficus religiosa* for which the values were high in Area-3. In case of *Tectona grandis,* APTI value was highest in Area-3 (10.33) and lowest in Area-1 (9.23) for October and in November the APTI was maximum for Area-2 (7.65) and minimum for Area-3 (7.13).

It appears that microclimatic condition plays an important role in biochemistry of plants. The low APTI values of each plant at different sampling sites could be attributed to the accumulation of pollutants on leaf surfaces as a result of increased percentage of dew in the lower part of the atmosphere. Since there was rainfall during sampling period in October, the high APTI values of each plant could be due to the less deposition of dust.

Variation of Biochemical parameters

All the biochemical parameters have importance in the analysis of the sensitivity and tolerance levels of plant species. Air pollution induces change on biochemical parameters of leaves. Plants being stationary and continuously exposed to chemical pollutants from surrounding atmosphere, injury to plants are proportional to the intensity of the air pollution (Raina and Bala, 2011). Therefore, the variation patterns of different parameters are discussed in the following paragraphs.

Total Chlorophyll Content (TCH)

Present study revealed that the total chlorophyll content (TCH) in all plants varied with the time perhaps due to the change in the weather condition (Fig.2). The lowest TCH content was observed during November. It might be due to the high deposition of dust on the leaf surface. Dust deposition prevents diffusion of air and reduces photosynthetic activities thus creating stress on plant metabolism. The low dust accumulation on leaf surface resulted in the high chlorophyll content in October as a result of washout of dust in rain during sampling.

Degradation of photosynthetic pigment is considered as an indicator of air pollution (Ninave *et al*., 2001). The TCH for *Polyalthia longifolia* was higher compared to that of *Tectona grandis* and *Ficus religiosa.* The reason behind this might be evergreen nature of *Polyalthia longifolia.* The TCH was high for *Polyalthia longifolia* at Area-1 & 2 and for *Tectona grandis* at Area-1.

pH extracts of Leaf (TCH)

The average Leaf extract pH is high for *Ficus religiosa* compared to that of *Tectona grandis* and *Polyalthia longifolia.* The leaf extract of *Ficus religiosa* is slightly alkaline for the Area-2. In case of Tectona *grandis,* the leaf extract pH values gradually decrease from Area-1 to Area-3.

Table-4. Air pollution Tolerance Index of three tree species: *Polyalthia longifolia* (Sonn.) Thw. (PL), *Ficus religiosa* L. (FR) & *Tectona grandis* L.f. (TG)

Species	Sites	October					November				
		RWC (%)	pH	TCH (mg/g)	AA (mg/g)	APTI	RWC (%)	pH	TCH (mg/g)	AA (mg/g)	APTI
PL	A	62.318	5.69	4.35	2.45	8.69	45.098	5.90	2.58	1.75	6.00
	B	63.010	5.99	3.91	3.50	9.77	63.010	6.10	2.83	2.25	7.28
	C	56.756	5.51	2.36	2.10	7.33	40.298	5.70	1.72	1.65	5.26
Average		60.690	5.73	3.54	2.68	8.60	49.470	5.90	2.38	1.88	6.18
FR	A	77.972	6.2	2.30	1.95	9.45	47.230	6.70	1.29	1.70	6.08
	B	46.236	8.35	1.69	3.25	7.89	46.236	7.81	1.20	2.00	5.81
	C	73.684	7.44	2.20	2.85	10.12	53.929	6.09	1.37	1.90	6.81
Average		65.960	7.33	2.06	2.68	9.15	49.130	6.87	1.29	1.87	6.23
TG	A	66.806	7.12	3.09	2.50	9.23	57.510	6.97	1.56	1.80	7.29
	B	67.847	6.57	1.32	4.35	10.22	67.847	6.20	1.14	2.15	7.65
	C	72.569	6.39	2.03	3.65	10.33	60.239	5.87	1.54	1.50	7.13
Average		69.070	6.69	2.15	3.50	9.93	61.87	6.35	1.41	1.82	7.36

RWC*=Relative leaf water content,* ***TCH****=Total chlorophyll content;* ***AA****=Ascorbic Acid content;* ***APTI****= Air pollution tolerance Index*

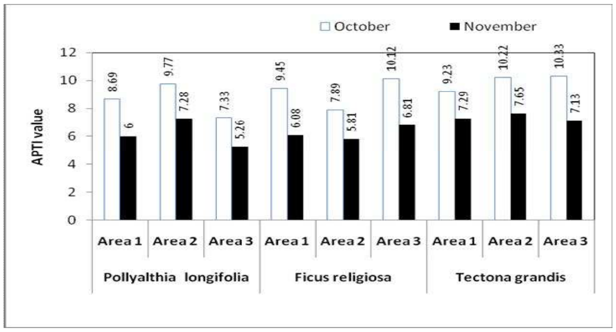
Table-5. Leaf area and dust accumulation potential of three tree species.

Species	Sites	October 2013				November 2013				Average Dust accumulation (mg/cm^2)
		Leaf area (cm^2)	Dust load on leaf			Leaf area (cm^2)	Dust load on leaf			
			W_1(gm)	W_2(gm)	Collection (mg/cm^2)		W_1(gm)	W_2(gm)	Collection (mg/cm^2)	
PL	A	53.67	0.782	.757	0.47	88.30	1.560	1.500	0.68	0.57
	B	45.25	0.824	.812	0.27	79.93	1.180	1.150	0.38	0.32
	C	56.39	0.880	.840	0.71	81.26	1.260	1.170	1.11	0.91
FR	A	152.02	3.470	.396	0.49	94.78	2.480	2.399	0.85	0.67
	B	119.40	2.550	2.501	0.41	132.61	3.300	3.233	0.51	0.46
	C	131.25	3.257	.166	0.69	184.44	5.320	5.142	0.97	0.83
T G	A	292.28	4.198	.508	2.36	426.51	5.100	3.759	3.14	2.75
	B	282.29	4.660	.137	1.85	434.83	6.580	5.686	2.06	1.95
	C	424.26	6.534	.325	2.85	497.55	6.520	5.277	2.50	2.67

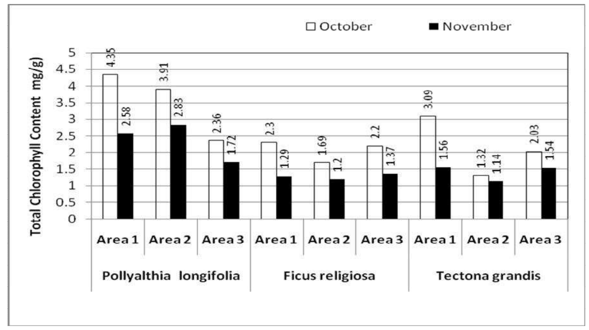
Table-6. Leaf internode and petiole length (cm) of three plant species.

Species	Study Sites	Leaf area (cm^2)	Petiole Length (cm)			Leaf area (cm^2)	Inter-node Length (cm)		
			Oct.	Nov.	Avg.		Oct.	Nov.	Avg.
PL	A	53.67	1.00	1.20	1.10	88.30	2.3	3.2	2.75
	B	45.25	1.20	1.50	1.35	79.93	2.7	3.3	3
	C	56.39	0.90	0.90	0.90	81.26	1.9	2.5	2.2
FR	A	152.02	10.00	10.30	10.15	94.78	5.1	6.3	5.7
	B	119.40	10.30	10.50	10.40	132.61	5.6	6.5	6.05
	C	131.25	9.80	9.90	9.85	184.44	5	4.6	4.8
TG	A	292.28	4.50	3.50	4.00	426.51	18.7	5.4	12.05
	B	282.29	5.50	4.20	4.85	434.83	23.2	16	19.6
	C	424.26	5.30	5.30	5.30	497.55	22	8.4	15.2

Figure-2. Different parametric values for three plant species and correlation between dust collection potential and APTI. a) APTI, b)Total Chlorophyll content (TCH), c) Ascorbic Acid content, d) pH value, e) Relative water content, f) Correlation between APTI and DAP.



(a)



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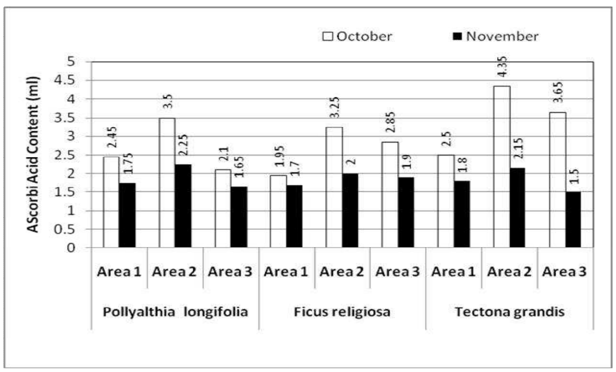

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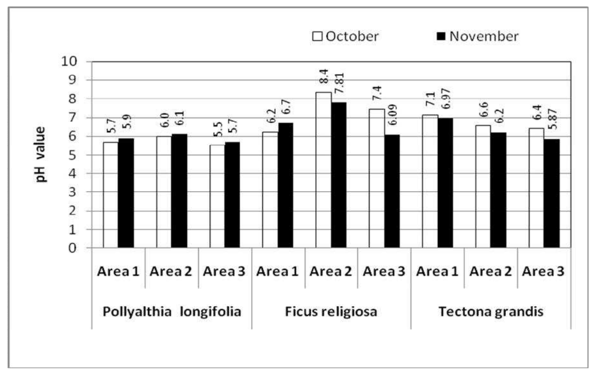

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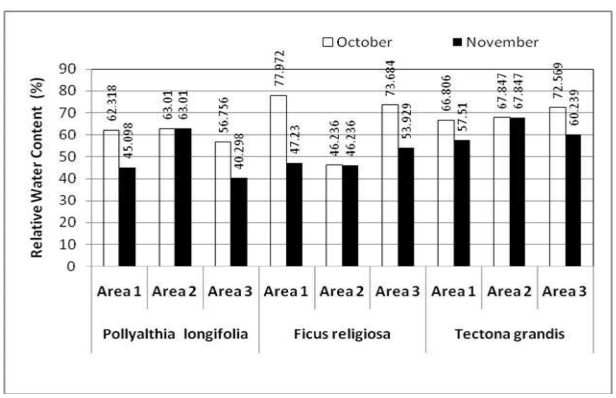

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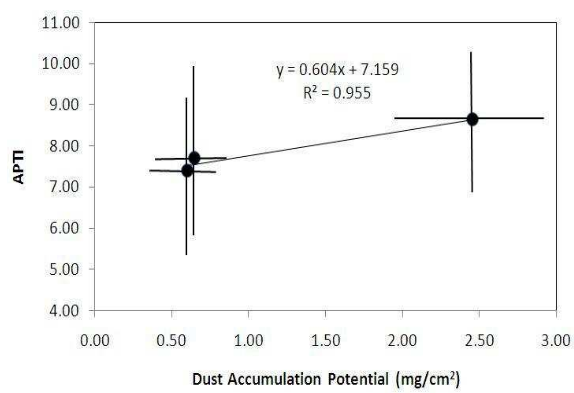

(f)

The average leaf extract pH was lowest for *Polyalthia longifolia* (5.53) and highest for *Ficus religiosa* (7.33) (Fig.2). Singh and Verma (2007) have described that plants with lower pH are more susceptible to air pollution than those with high pH. However, such a relationship is not established in the present study.

Relative water content (RWC)

The average RWC varied from 60.69% to 46.04% in *Polyalthia longifolia*, 65.96% to 47.07% in *Ficus religiosa* and from 69.07% to 59.50% for *Tectona grandis* from the month of October to November (Table-4). The RWC values were found to be high in *Tectona grandis* at different sampling sites both for October and November months (Fig.2). The average RWC values are high for *Tectona* grandis but the seasonal variation in RWC values is high for *Ficus religiosa* and *Polyalthia longifolia*

RWC is the water present in leaf relative to its full turgidity. The high RWC can be explained because of the absence of cuticle or waxy layer in *Tectona grandis* whereas in case of *Ficus religiosa* and *Polyalthia longifolia,* it was less due to presence of waxy layer resulting in the decrease of water absorption in the cell sap. High water content helps the plant to maintain its physiological balance under environmental stress condition when exposed to air pollution (Singare and Talpade, 2013). The RWC values were high during October which may be due to rain during sampling. These values were low in November as the leaves are approaching towards senescence. The plants with high RWC are tolerant to pollutants as indicated by high APTI values for *Tectona grandis.*

Ascorbic Acid (AA) Content

Ascorbic acid (AA) is a strong reducer important for cell wall synthesis, defence and cell division and influences the resistance of plants to adverse condition including air pollution (Conklin, 2001). In the study area its content varied from 1.5 to 4.35 mg/g. Maximal seasonal variation in the AA content was observed for *Tectona grandis* (Fig.2). The AA was high for the month of October. The average Ascorbic acid content for the three species for both the months showed the following decreasing trend *Tectona grandis* > *Ficus religiosa* > *Polyalthia longifolia.* The higher ascorbic acid content of the plant is a remark of its tolerance against sulphur dioxide pollution (Chaudhury and Rao, 1977; Varshney and Varshney, 1984). The low values of AA in *Tectona grandis* during November may be attributed to heavy dust load on the leaves because of dew formation.

Relationship between Dust accumulation potential and other morphological parametric values

The leaf area and petiole length and internode lengths for different species in different areas are given in Table-6. It is evident from Table-5 that there was higher dust deposit in November followed by October in each selected species at different sampling sites. The dust accumulation was less in October because of washing out of dust with rain during sampling period. It shows *Tectona grandis* to have maximum dust deposit with an average of (2.46) and *Polyalthia longifolia* was minimum (0.6). The average values are taken from both October and November sampling. Trend of dust accumulation among selected species was *Tectona grandis* >*Ficus religiosa* >*Polyalthia longifolia*. Higher dust deposit may be due the pubescence present in *Tectona grandis* that prevent the dust fall from leaf surface. The lower dust deposit seen in *Polyalthia longifolia* could be attributed to the vertical inclination of leaf resulting in fall of dust due to gravity.

Correlation between different morphological parameters and dust accumulation potential

The petiole and leaf internode lengths (cm) of selected plant species for study has been measured in different sampling sites during October and November 2013 (Table-6). The relationship of petiole length and internode length with dust accumulation potential was assessed for three different species. The internode length is negatively correlated with dust accumulation potential for all the species with the correlation coefficient (r) values for *Polyalthia longifolia*, *Ficus religiosa* and *Tectona grandis* were -0.99, -0.99 and -0.94, respectively. The petiole length also showed negative correlation for *Polyalthia longifolia* (r = -0.99) and *Ficus religiosa* (r = -0.99) but it is poorly defined in the case of *Tectona grandis* (r = -0.26).

The evaluation of the three plant species was done on the basis of leaf morphological characteristics such as leaf arrangement, margin, orientation, pubescence, leaf internode, petiole length and final grades were assigned by taking the number of (+) and (-) signs (Table-1). The established decreasing order for grades is *Tectona grandis* (6) > *Polyalthia longifolia* (5) > *Ficus religiosa* (3). The leaf morphological grades were correlated with dust accumulation potential and APTI and the Dust accumulation potential values were correlated with APTI (Fig.2). While dust accumulation potential is highly positively correlatable with APTI (r = +0.98), the leaf morphological grade is poorly but positively correlatable with APTI (r = +0.58) and moderately with average dust collection potential (r = +0.74). It appears that leaf morphology characteristics have an important role in dust accumulating potential of plant leaves. The sustenance of tree species like *Tectona grandis* on the leaves of which dust accumulation rate is high certainly indicates that this species is highly tolerant to higher level of air pollution.

Conclusion

Plants are good sinks of carbon dioxides. However, the plants are affected by the dusts and gaseous emissions from vehicles alongside any road. Amongst the species selected for investigations along NH-6, between Ainthapali to Remed, near Sambalpur, Odisha, the species *Tectona grandis* is highly tolerant to air pollution with average APTI values ranging from 7.13 to 10.33. The established decreasing order for grades is *Tectona grandis* (6) > *Polyalthia longifolia* (5) > *Ficus religiosa* (3). The Dust accumulation potential values are highly correlatable with APTI. Therefore, this character needs to be estimated and considered in selection of pollution tolerant species and then APTI values can be estimated as a confirmatory test. Changes in the leaf colour and morphology of *Polyalthia longifolia* can be used as an indicator of increase in pollutant load in the air of the studied region. Future research in this direction must include the study on plant characters like height, growth rate, and their relationship with the APTI values.

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Conflict of Interests

Authors declare that there is no conflict of interests regarding the publication of this paper.

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