It is the time to think about our environment which is not our rather than global concern. As an Indian citizen, we must aware to the upcoming threats which may responsible for environmental degradation. The lithosphere may contain heavy metals which regulate the geochemical cycles as well as biochemical balances of earth, but due to anthropogenic activity leads to drastical change (Sebastiani et. al., 2004). Due to Pollution of heavy metals, human health is under risk which leads to different environmental problems such as microbial deactivation, crop yields, soil fertility etc. (Yang et al., 2005). Pollution is directly proportional with the large scale industrialization within a region and it becomes severe where neither precaution nor any environmental norms for checking pollution has exist (Pilon-Smits, 2005).

The biochemical and physiological process of vascular plants are altered due to heavy metals accumulation (Macfarlane et al., 2003). Photosynthetic rate is reduced due to toxic activity of these heavy metals which alternatively hamper the growth and productivity (Van Assche and Clijsters, 1983). According to some scientist, pH is another most important factor in soil solution for detection of pollution level of that area (King, 1988).The proposal of Elliott et al. (1986) regarding the adsorption phenomenon under acidic conditions is more important for controlling metal bioavailability, on other side the alkaline conditions is influenced while precipitation reactions. The exposure of these pollutants to the leaves indirectly cause a reduction in the concentration of their photosynthetic pigments viz., chlorophyll which affects the plant productivity, germination of seeds, length of pedicles, and number of flowers inflorescence (Nithamathi, et.al. 2005). Hence, plants can be used as bioindicators in various field of research (Joshi, 1997). Besides chlorophyll, ascorbic acid, water consumption and leaf pH were also affected. APTI of Some Plant Species also studies in West Midnapore Distric (Maity and Mondal, 2015).

VII. A - MATERIALS AND METHODOLOGY

Methodology:

1. **Total Chlorophyll Content (TCh):** Fresh leaves of approx 3 grms were blended then extracted with 80% acetone in a volume of10 ml of and kept for 15 minutes for better extraction. Then the liquid portion (upper surface) was separated into another test tube and centrifuged for 3 minutes at 2,500rpm. The supernatant was collected and measurement of absorbance was done at a range 645nm and 663nm using sys-tronics UV spectrophotometer. (Arnon.D.I. 1949).

$$\text{Chlorophyll a} = 12.7Dx\ 663 - 2.69\ Dx\ 645 \times V/1000W\ \text{mg/g}$$

$$\text{Chlorophyll b} = 22.9Dx\ 645 - 4.68\ Dx\ 663 \times V/1000W\ \text{mg/}$$

$$\text{TCh} = \text{Chlorophyll a} + \text{b mg/g}$$

Where, Dx = Absorbance of the extract at the wavelength in nm, V = total volume

of the chlorophyll solution (ml), and W = weight of the tissue extract (g).

2. **Leaf extract pH:** Approx 5g of fresh leaves was homogenized in morter-pistle by mixed with in 10ml distilled water. Then upper surface was filtrated from the mixture and the pH was determined after proper calibration of pH meter-HI 98130 with different buffer solution of pH 4, pH 7 and pH 9 (Agbaire and Esiefarienrhe, 2009).

3. **Relative Water Content of Leaf (RWC):** Fresh leaves of approx 5 gram. were weighed and kept overnight under water in marshy condition. Then blotting

paper was used to remove water and weighed to get the turgid weight. Then, again the leaves were dried in hot air oven for overnight at 70°C and again weighed to obtain the dry weight.(Singh.A. 1977) Calculations were made using the formula:

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

Where, FW = Fresh weight, DW = dry weight, and TW = turgid weight.

4. **Ascorbic Acid (AA) content:** Approx 1grm of leaf sample was measured and taken in a test tube containing 4ml oxalic acid – EDTA extracting solution. Then 1ml of orthophosphoric acid was added followed by 1ml 5% tetraoxosulphate (vi) acid, 3ml of water, 2ml of ammonium molybdate. The solution was kept for incubation at room temperature for 15 minutes. Then the absorbance spectrum at range of 760nm was measured with UV-Vis spectrophotometer. The concentration of ascorbic acid was measured and calculated against a standard ascorbic acid curve (Bajaj and Kaur, 1981). The measurement of ascorbic acid content was done by Titrimetric method (Sadasivam, 1987) using 2,6, Dichlorophenol indo phenol dye. 500mg of leaf sample was extracted with 4% oxalic acid and then titrated against the dye until pink colour develops. Similarly a blank is also developed.

5. **APTI:** The air pollution tolerance indices of three common mistletoes were determined by the following standard method (Singh and Rao, 1983). The formula of APTI is given as

$$APTI = [A (T+P) + R]/10$$

Where, A = Ascorbic Acid content (mg/g), T = Total Chlorophyll content

(mg/g), P = pH of leaf extract, and R = Relative Water content of leaf (%).

VII. B - RESULT AND DISCUSSION

BIOCHEMICAL ANALYSIS:

1. Chlorophyll content estimation

Pollution measurement can be done on the basis of chlorophyll estimation which is an important criterion. Loss in total chlorophyll of plant depends on the degree of pollution but it is observed less effective in case of air pollution.

The experimented result was summarizing as follows:

In our result, the chlorophyll content level reduced from 11.08 to 9.45 in case of *Macrosolen cochinchinensis.* Similarly, it is reduced from15.39 to 7.87 in case of *Loranthus parasiticus* and 18.23 to 18.20 *Viscum album* it is reduced from, so it is more sensitive but *Macrosolen cochinchinensis* is highly tolerance according to reduction result of chlorophyll estimation.

2. Analysis of pH value

Changes in pH Clead to alter different physiological process in plant which is an indicatoion of environmental pollution. Stomatal response is influenced by pH. It is observed that low pH of leaves are more susceptible to pollution than the neutral pH.

pH value which we have observed for different plant sample are summarize as follows:

In our result pH value of leaf extract of control plant and pollution area plant of different plant species sample i.e *Macrosolen cochinchinensis* is 6.3 (C) and 6.0 (P), *Loranthus parasiticus* 15.39 (C) and 5.6 (P) and *Viscum album* 6.2 (C) and 6.1 (P) are given respectively. From our result it can be concluded that *Lorenthus parasiticus* shows lower pH value, indicates as a susceptible in polluting condition; but in case of *Macrosolen*

cochinchinensis there are little change of pH value so, it should be treated as a pollution tolerating plant.

3. Relative water content estimation

Water is the main components in plants for food transport and minerals. It is observed that those plants which have the capacity to content maximum water are highly tolerable to pollution (Tanaka et.al. 1982).

In our result amount of relative water content of control plant and pollutant plant sample i.e *Macrosolen cochinchinensis* is 3.29 (C) and 3.10 (P), *Loranthus parasiticus* 2.48 (C) and 2.19 (P) and *Viscum album* 3.19 (C) and 3.13 (P). From our result can be concluded that *Macrosolen cochinchinensis* is highly resistant to pollution because it shows very minute change of relative water content than control plant.

4. Ascorbic acid content estimation

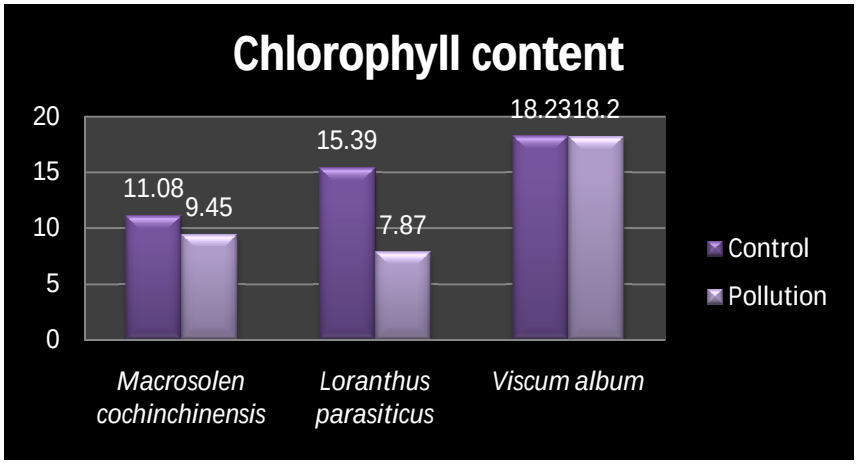
In pollution measurement, estimation of ascorbic acid content is an important criterion. Ascorbic acid being a strong reluctant protects chloroplast against sulphur dioxide induced H_2O_2, O^{2-} and OH accumulation. Similarly, it protects chlorophyll inactivation and increase defense mechanism in plants.

In our result, the ascorbic acid content of control plant and pollutant plant sample i.e *Macrosolen cochinchinensis* is 0.186 (C) and 0.156 (P), *Loranthus parasiticus* 0.091 (C) and 0.049 (P) and *Viscum album* 0.165 (C) and 0.159 (P) are given respectively. The above results show that in *Macrosolen cochinchinensis* that this plant has high defensive mechanism for tolerating pollution.

The examined species are not so important with respect to their economic value. So, we are not concerned about their distribution pattern. This experiment indicates that the pollution affects the distribution pattern of these plants and it is an indication of pollutant and non-pollutant areas. So, it is not obvious that the parasites are grown well in pollutant areas rather than it flourished in natural vegetation where the level of manmade pollutant is low.

Table - 4: Total Chlorophyll content of three taxa (Control and Pollutant plant)

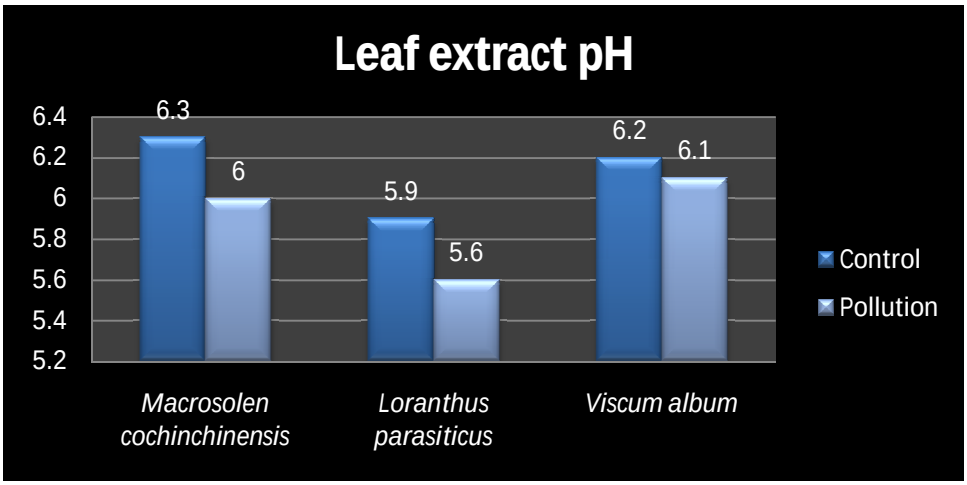
Sl. No.	Plant species	Total chlorophyll	
		C	P
1.	*Macrosolen cochinchinensis*	11.08	9.45
2.	*Loranthus parasiticus*	15.39	7.87
3.	*Viscum album*	18.23	18.20



Graph - 2: Chlorophyll content of three hemiparasitic

Table – 5: Leaf pH of three taxa (Control and Pollutant plant)

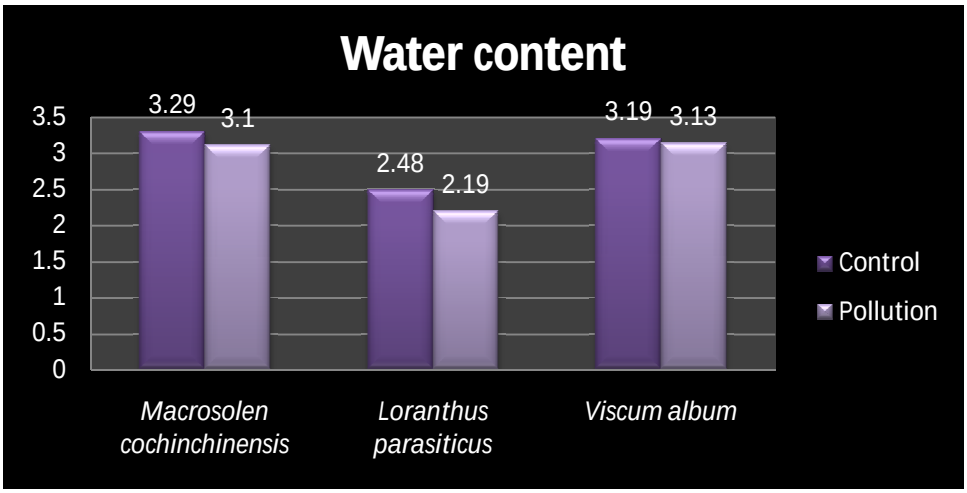
Sl. No.	Plant species	Leaf extract pH	
		C	P
1.	*Macrosolen cochinchinensis*	6.3	6.o
2.	*Loranthus parasiticus*	5.9	5.6
3.	*Viscum album*	6.2	6.1



Graph - 3: pH content of three hemiparasitic taxa

Table – 6: Relative water content (gms) of three taxa (Control and Pollutant plant)

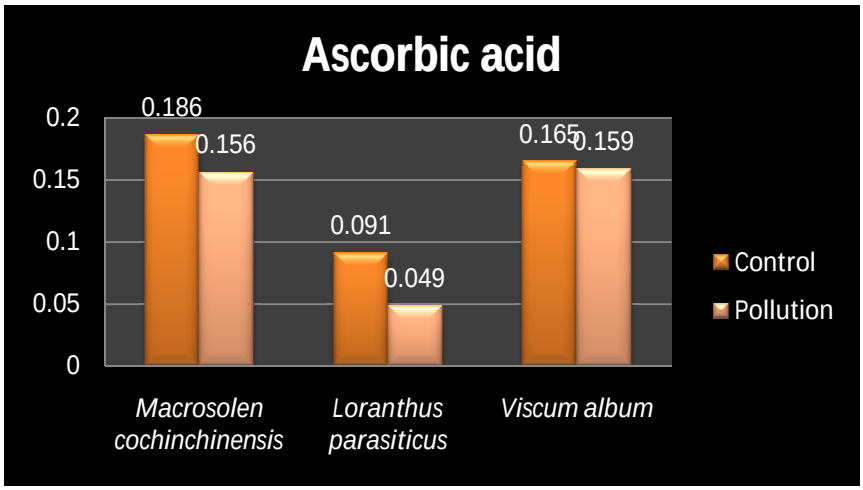
Sl. No.	Plant species	Water content	
		C	P
1.	*Macrosolen cochinchinensis*	3.29	3.10
2.	*Loranthus parasiticus*	2.48	2.19
3.	*Viscum album*	3.19	3.13



Graph - 4: Water content of three hemiparasitic taxa

Table – 7: Ascorbic acid content of three taxa (Control and Pollutant plant)

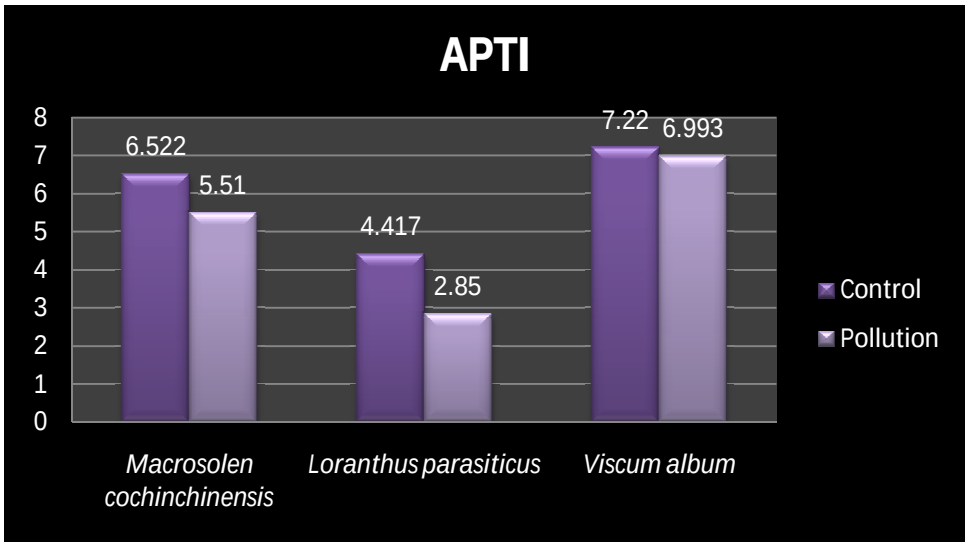
Sl. No.	Plant species	Ascorbic acid	
		C	P
1.	*Macrosolen cochinchinensis*	0.186	0.156
2.	*Loranthus parasiticus*	0.091	0.049
3.	*Viscum album*	0.165	0.159



Graph - 5: Ascorbic acid content of three hemiparasitic taxa

Table – 8: Comparison of different biochemical parameters of three taxa(Control and Pollutant plant)

Sl.No.	Plant species	Total chlorophyll		Leaf extract pH		Ascorbic acid		Relative water content(gms)		APTI	
		C	P	C	P	C	P	C	P	C	P
1.	*Macrosolen cochinchinensis*	11.08	9.45	6.3	6.0	0.186	0.156	3.29	3.10	6.522	5.510
2.	*Loranthus parasiticus*	15.39	7.87	5.9	5.6	0.091	0.049	2.48	2.19	4.417	2.850
3.	*Viscum album*	18.23	18.20	6.2	6.1	0.165	0.159	3.19	3.13	7.220	6.993



Graph - 6: APTI comparison of three hemiparasitic taxa