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EFFECT OF POLLUTED WATER OF KALU RIVER ON THE INTERNAL ANATOMY OF LEAF OF ITS VEGETATION

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The effect of polluted water of Kalu river on the internal anatomy of leaf was studied. Thickness of leaf, upper epidermis, pallisade cells, spongy cells, u/l ratio, and spongy cells frequency was observed in 5th leaf of *Aggerantum conyzoides, Alternanthera Bessilis, Amaranthus spinosus, Asteracantha longifolia* and *Celosia argentea*. Polluted water of Kalu river inhibited all the parameters studied.

Keywords : Anatomy; Polluted water

Water pollution causes severe damage to animal and plant life. In many areas pollution caused injury to plants in both natural and cultivated plant communities. The contamination of water body in Ambivali—a present Investigation suburt of Bombay takes place due to dumping of various industrial units. Discharge of their effluents into Kalu river causes water pollution at Ambivali as well as at Titwala 5 K.m away from Ambivali. Present paper deals with effect of polluted water of Kalu river on certain weed plants growing along the bank of the river.

To study the leaf anatomy of *Aggerantnm conyzoides* L., *Alternanthera sessilis* R. Br., *Amaranthus spinosus* L., *Asteracantha longifolia*, Nees and *Celosia argentea* L, fresh collections were made on the same day from Titwala—a less polluted area, Ambivali–a more polluted area and other comparatively clean area which is treated as control.

5th leaf from apex of each plant species was removed, washed throughly with distilled water and fine hand sections (T.S.) were taken. Sections were stained with safranin and mounted in glycerine. 20 sections for each parameter were observed under compound microscope, using 10X Occular and 10X Objective. Frequency of spongy cells was measured by using prism field.

Polluted water of Kalu river inhibited the parameters like thickness of leaf, pallisade cells, spongy cells, upper epidermis, and lower epidermis, frequencies of spongy and palisade cells per unit area (Table 1

Table 1. Effect of Polluted Water of Kalu River on the Internal Anatomy of Leaf of its Vegetation
(Values given are mean ±SE of 20)

Species	Sites	Thickness of pallisade cells (μm)		Thickness of spongy cells (μm)	
		P	%DFC	P	%DFC
Aegerantum conyzoides	I	13.26±0.01	17.79	25.26±0.02	07.67
	II	11.16±0.02	30.81	23.11±0.01	15.53
Alternanthera sessilis	I	17.26±0.01	10.43	27.36±0.02	06.23
	II	15.26±0.01	20.80	23.13±0.01	20.73
Amaranthus spinosus	I	13.26±0.01	12.50	23.11±0.03	04.77
	II	11.36±0.02	25.11	21.26±0.01	12.40
Asteracantha longifolia	I	17.27±0.01	10.09	23.17±0.03	11.66
	II	15.29±0.02	20.40	21.35±0.04	18.60
Celosia argentea	I	17.18±0.02	19.19	19.13±0.13	17.26
	II	15.27±0.01	28.17	16.27±0.11	29.65

Mesophyll tissue ratio		Frequency of pallisade cells/ unit area of leaf		Frequency of spongy cells/ unit are of leaf	
C	P	P	%DFC	P	%DFC
0.58±0.01	0.52±0.02	7.28±0.01	–10.45	6.24±0.03	–10.00
	0.48±0.01	5.13±0.02	–36.90	5.26±0.01	–26.63
0.66±0.01	0.63±0.01	6.24±0.01	–14.16	5.23±0.01	–28.15
	0.65±0.00	5.13±0.03	–29.43	4.26±0.37	–41.48
0.62±0.02	0.57±0.02	6.18±0.13	–14.87	7.26±0.01	–20.48
	0.53±0.01	4.27±0.13	–41.18	4.13±0.37	–54.76
0.73±0.01	0.74±0.02	6.13±0.02	–24.87	8.17±0.03	–20.37
	0.71±0.01	5.16±0.01	–36.76	6.39±0.01	–37.71
0.91±0.03	0.89±0.03	6.16±0.03	–14.20	8.26±0.19	–11.84
	0.93±0.01	4.13±0.01	42.47	6.38±0.17	31.91

Sites I, Titwala; II, Amivali; C, control; DFC, difference from control; P, polluted; –, inhibition.

Table 2. Effect of Polluted Water of Kalu River on the Internal Anatomy of Leaf of its Vegetation (Values given are mean ±SE of 20)

Species	Sites	Leaf thickness (μm)		Thickness of upper epidermis (μm)		Thickness of lower epidermis (μm)		Thickness of epidermis u/1 ratio (μm)	
		P	% DFC	P	% DFC	P	% DFC	C	P
Aegerantum conyzoides	I	71.16±0.13	–11.34	17.13±0.01	–06.18	17.26±0.11	–10.15	0.95±0.01	0.99±0.2
	II	62.19±0.10	–22 51	12.27±0.13	–32.80	13.31±0.11	–30.71		0.92±0 01
Alternanthera sessilis	I	161.19±0.21	–08.56	19.13±0.13	–10.01	17.28±0.02	–08.96	1.12±0.02	1.10±0.01
	II	132.15±0 17	–25.00	13.21±0.17	–37.86	15.26±0.01	–19.59		0.86±0.03
Amaranthus spinosus	I	96.13±0.21	–14.37	15.21±0.27	–06.57	18 27±0.03	–04.89	0.84±0 01	0 83±0.01
	II	63.28±0.17	–43.63	12.21±0.10	–25.00	15.28±0.01	–20.45		0.79±0.02
Asteracantha longifolia	I	113.21±0.11	–10.24	15.38±0.11	–10.99	19.28±0.01	–04.60	0.85±0.02	0.79±0.02
	II	93.26±0.17	–26.06	13.28+0.12	–23.15	17.26±0.02	–14.59		0.76±0 01
Celosia argentea	I	74.21±0.11	–22.92	15.26±0.13	–16.19	19.17±0 11	–09.66	0.85±0.01	0.79±0.01
	II	58.33±0 13	–39.33	13.28±0.15	–27.07	16.19±0.02	–23.70		0.82±0.02

Sites I, Titwala; II, Ambivali; C, control; DFC, difference from control; P, polluted; –, inhibition.

& 2). Maximum inhibition was found in plants collected from Ambivali.

Scheffer and Hedgeock (1955) revealed the specific action of sulphur dioxide on leaves in the forest of north western United states. Solbery and Adams (1956) noticed the collapse of spongy mesophyll and epidermis as affected by sulphor dioxide and fluoride. Salisbury (1927) and Sharma and Butler (1975) stated that the epidermis being the outer most protective layer in all form, the change in surrounding environment such modifications are likely to serve as indicators of environmental pollution. Martin and Clement (1935) stated that plant growing in polluted environmant or area are smaller in size as compared to clean area. From the above study it can be conculded that plants growing in industrial waste water shows inhibitory effect in internal antomy of leaf five plant species studied.

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