

LEAF CUTICULAR AND GROSS MORPHOLOGICAL VARIATIONS IN *EUPHORBIA GENICULATA* CAUSED BY ENVIRONMENTAL POLLUTION.

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Abstract: Samples of *Euphorbia geniculata* were studied with reference to detect relationship between environmental pollution, The gross morphological features are studied. samples collected from Hatnur, Deepnagar, Duskheda and Varangoan areas The data were statistically analyzed for detecting the relationship between environmental pollution and cuticular morphological features. The final conclusion was that the stomatal frequency decreased as pollution increased while Trichome density increased when pollution increases.

Key Words: *Euphorbia geniculata*- Cuticular features- environmental pollution.

INTRODUCTION

Thermal power plant (Deepnagar) and Paper mill near Duskheda are situated around the bank of Tapti river. Thermal power plant releases the hot water and ash water in Tapti river, subsequently paper mill effluent also released in Tapti river. So Tapti water get polluted in Bhusawal Tahasil (M.S.) Earlier researchers reported het morphological features, leaf cuticular features ie. stomatal frequency, Trichome density were the most sensitive for the pollution levels. The main moto of this study is to detect the polluted water effects of Tapti river to cuticular and morphological features of *Euphorbia geniculata*.

MATEIALS AND METHODS

Samples of *Euphorbia geniculata* were collected from different areas near Tapti river ie. 1) Hatnur – Non polluted. 2) Hot water of Thermal power plant (T.P.P.) before mixing in river Tapti. 3) Hot water of T.P.P. after mixing the water in river Tapti. 4) Ash water released from Thermal power plant mixes in river water near Varangoan. 5) Polluted water of a paper mill. Great care was taken during the collection of samples that collection is from uniform conditions to minimizing the overall changes in cuticular features occur by microhabitat factor i.e. soil moisture, temperature.

Macroscopic data was recorded as leaf length, Length width ratio, petiole length, were recorded at each area. Microscopic data like stomatal frequency, stomatal size, trichome density were observed. For the measurement of stomatal frequency, stomatal size and trichome density, Ocular micrometer and Stage micrometer has been used.

Table 1.: Relative degree of pollution level.

Locality	Relative degree	Source of pollution
Hatnur	+	Non polluted area
T.P.P.hot after mixing in river	++	T.P.P.
T.P.P hot water before mixing	+++	Hot water of T.P.P. (alum added)
Ash water	++	T.P.P.(with high quantity of Ash)
Paper mill	++++	Paper mill

Observation under 45X, \pm standard deviation.

Table-2: Vegetative and cuticular characteristics of *Euphorbia geniculata*.

Trait	A	B	C	D	E
Leaf length	5.7 \pm 0.18	4.6 \pm 0.37	3.2 \pm 0.65	5.0 \pm 0.22	4.7 \pm 0.09
Leaf width	1.7 \pm 0.17	1.2 \pm 0.17	1.5 \pm 0.30	1.9 \pm 0.13	2.1 \pm 0.17
L\W ratio	3.35 \pm 0.22	3.83 \pm 0.21	2.13 \pm 0.21	2.63 \pm 0.19	2.23 \pm 0.18
Petiole length	1.31 \pm 0.09	0.83 \pm 0.09	0.65 \pm 0.07	0.94 \pm 0.06	1.21 \pm 0.07
Stomatal freq.	112 \pm 2.6	97.5 \pm 2.54	92.9 \pm 3.65	105.44 \pm 1.65	81.7 \pm 1.66
Stomatal size	39-50.8	44.1-52.4	45.3-49.2	34.4-48.2	54-49.2
Trichome Density	10	13.3	24.6	17.6	4.5

Observation under 45X \pm -standard deviation.

RESULTS AND DISCUSSION

Stomatal frequency shows effective pattern in relation to environmental pollution, stomatal frequency ranges from 112 to 81.7. means when pollution increases stomatal size increases. Trichome density is also striking feature varied from 4 to 10 cm²/unit area. It is observed that as pollution decreases the trichome density also increases.

Present observation indicates that “stomatal frequency decreases as the pollution level increases”. Hatnur area which is non polluted. Chakraborty and Gupta (1981) and Jafari *et al* (1979) noticed that as the pollution level increases stomatal frequency also increases. The impact of environmental pollution on cuticular features of plants is well documented by (Solberg and Adams 1956; Heggsted 1968; Heck and Taylor 1973; Sharma and Tyree 1973; Yunus and Ahmad 1979). Sharma (1977), Sharma and Butler (1973, 1975) reported that stomatal frequency decrease, density and length of trichome increase in the leaves from polluted area. Whereas Nicholas and Quinn (1980), Sharma *et al* (1980), Inamdar and Chaudhari (1984) reported that the stomatal frequency decreases in the polluted area. My observations are also similar with earlier workers.

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