MORPHO AND LEAF ARCHITECTURE IN CERTAIN GENERA OF ASTERACEAE

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Abstract: Asteraceae (compositae) is widely distributed family of high economic importance. Leaf architecture now considered as one of the significant aspect in taxonomy and helps in identification of genera and species even in absence of flowers. Venation pattern in certain genera of Asteraceae is described. Describtion is based on major venation pattern, nature of primary vein, secondary vein pattern and it's angle of divergence, angle of origin of tertiary vein, presence or absence of percurrents ,areole development and tooth architecture. Detail of the leaf architecture has been studied of all these species. Where in those major venation pattern is similar they can be separated on the basis of minor architectural features.

Index Terms: Asteraceae, leaf architecture, venation.

Introduction-

The classification of plants is mainly based on the morphological and anatomical concepts. Comparative anatomical studies of angiosperms have achieved a remarkable record as anatomical have been employed with great success to the solution of difficult taxonomic problems. The anatomical characters are more fixed than others. There are large number of anatomical characters of systematic importance but as pointed out by Metcalfe and chalk (1950),the systematic anatomist must rely on those characters which are less plastic. One of the important characters of well established taxonomic value is leaf architecture. The leaf architectural study found to be useful for taxonomic purpose Hickey (1971,1973,1979) provided leaf architectural classification in an elaborated manner for dicotyledons. Hickey and Wolfe (1975) provided first systematic summary of dicot leaf architectural features and they demonstrated that a number of lower order leaf architural features including leaf orgnisation ,configuration of first three vein orders and characteristics of leaf margin are significant systematic indicators within dicotyledons and to name a few recently who studied leaf architectural features in different families are Fuller(1995) ,Klucking(1995,1997),Ingole (2002).

Materials and method-

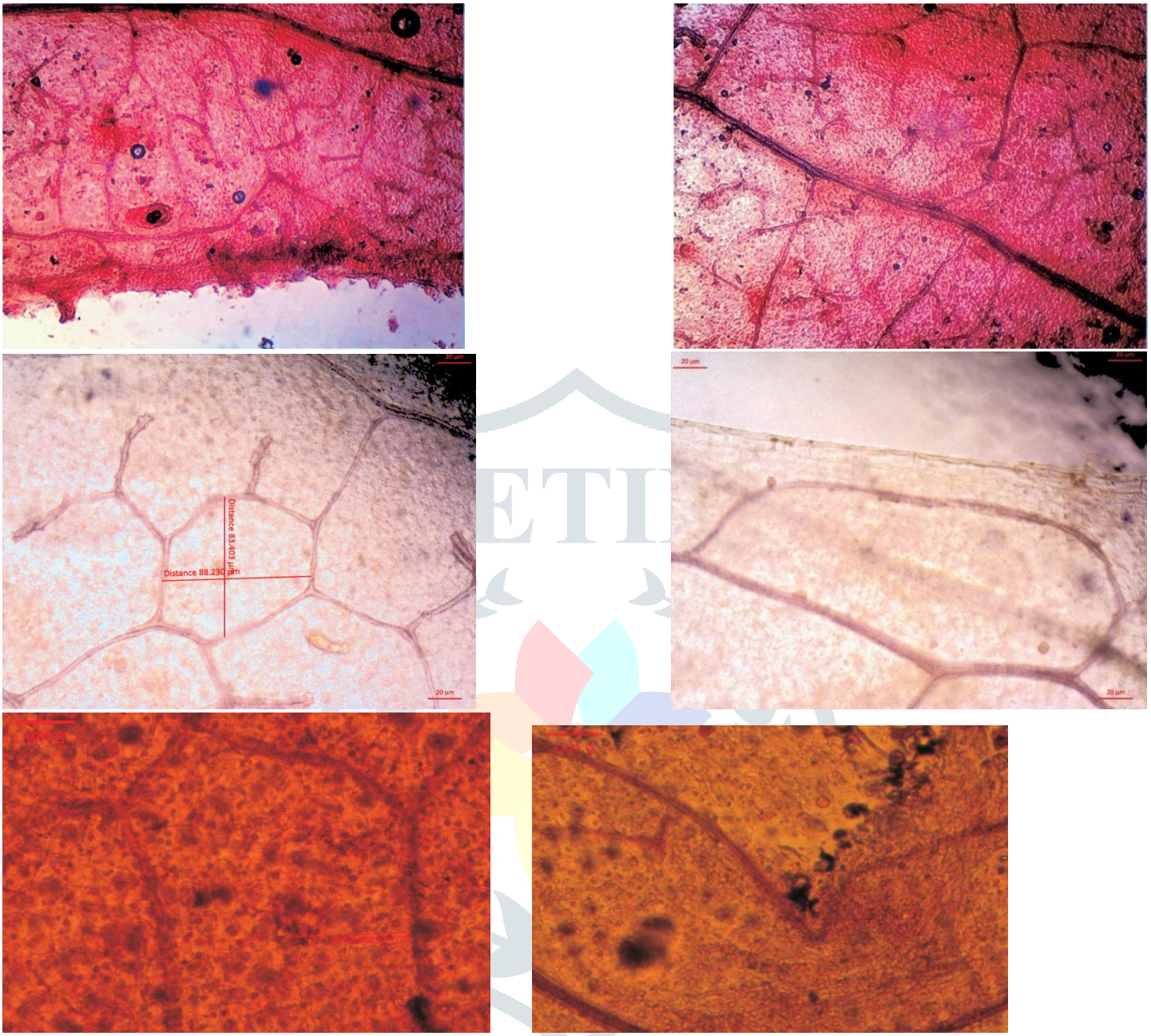
To study the leaf architecture, the mature leaves from both fresh as well as herbarium materials were cleared by treating them with 5% aq. Sodium hydroxide(NaOH) which as repeatedly replaced by fresh solution until leaf material got cleared followed by treatment with 2% acetic acid after washing thoroughly with distilled water, stained with Saffranine .Photographs of cleared whole leaves were snatched by "Kodak Digital still camera".

Major Venation patterns were studied with the help of dissecting ,compound microscope and research stereo zoom binocular microscope. Minor venation patterns and details of leaf architecture were studied under "Labomed Trinocular Digital microscope", with digital imaging camera and image analysis software. Terminology used according to Hickey.

Result and discussion –

Type of venation is pinnate simple craspedodromous, pinnate mixed craspedodromousto parallelodromousin three different ganera Primary vein (1°) is massive; its course is straight. Secondary veins (2°) moderate straight. The angle of divergence is acute and nearly uniform. The intersecondary veins are present, composite. The relative thickness of secondary vein(2°) is thin. Intramarginal vein is absent. Tertiary veins (3°) are present. The angle of origin on exmedial side and admedial is AA/AA acute to RR/RR right the pattern is transverse ramifiedto exmedialramified, the percurrents are absent, their course is thin orthogonal. The relationship to midvein is oblique, the arrangement is predominantly alternate. The vein orders are distinct. Quarternary veins (4°) are thin, their

course is randomely oriented.the highest vein order is 6°, showing excurrent branching at 4°.the marginal ultimate veination is looped to fimbricate. Veinlets are simple, linear, predominantly curved. Areoles are well developed, simple, linear curved, arrangement is random, shapes are pentagonal. Element of tooth architecture are non glandular, course central, origin of vein is direct. Even in absence of flower, though major venation is similar, species can identified by minor venation .



Cleared Portion of Leaf Showing Minor Venation Pattern and Marginal Ultimate Venation (x100)

Table no.1

Details of major leaf architectural features												
	Lamina				Margin	Major venation pattern	Gl.position	Pri.vein	Sec.vein	Angle of divergence	Intersecondary vein	
	Length &width	Shape	Apex	Base								Texture
1.Blumea lacera (Burm. f.) DC.	6-8 x 3-5 cm	Ovate	Acute	Acute	Serrate irregular	Parallelodro-mous	Absent	Massive	Moderate straight	Acute nearly uniform	Absent	Hairy leathery
2.Boltonia seroides Filter L" Her	Obovate broadly lanceolate	Obtuse	Acute	Acute	Entire	Pinnate mixed craspedodro mous	Absent	Massive	Moderate straight	Acute nearly uniform	Absent	Smooth shiny
3.Cyathocline purpurea (Buch.-Ham. ex. D. Don) kuntze	10-15x3-5cm	Lobed	Acute	Auricled	Lobed	Pinnate simple Craspedodro-mous	Absent	Massive	Moderate straight	Acute nearly uniform	Present	Glabrous

Table no.2: Details of minor leaf architectural features

Name of the plant	Tertiary vein	Predominant origin angle	Higher order of venation	Quarternary vein	Quiternary vein	Areoles			Veinlet	Element	Apical	Prim. Vein
						Dev.	Shape	Arrangement				
1.Blumea lacera (Burm. f.) DC.	Exmedial Ramified	AA/AA (Acute)	6^0	Thin orthogonal	Thin	Well developed	Quadrangularpentagonal	Random Medium	Simple Linear curved Branched once	Non glandular	Seaceous	Cen. Direct
2.Boltonia seroides Filter L‟ Her	Random reticulate	RR/RR (Right)	5^0	Thick	Thick	Imperfect	QuadrangularPentagonal	Random Medium	Simple Linear Curved Branched once, twice	Non glandular	Simple	Cen. Direct
3.*Cyathocline purpurea* (Buch.-Ham. ex. D. Don) kuntze	Admedial ramified	AA/AA (Acute)	5^0	Thin orthogonal	Thin	Well developed	Quadrangular pentagonal	Random Medium	Simple Linear curved Branched once	Non glandular.	Simple	Cen. Direct

Conclusion-

The present work revealed that, the investigated species can be diagonosed and separated on the basis of shape of the lamina, basic venation pattern, nature of primary vein, sec. vein patterns and it's divergence angle, angle of origin of tertiary veins, presence and absence of percurrent and their arrangement,quarternary veins,highest vein order,areole development and tooth architectural features.

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