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PETAL VENATION OF *GALPHIMIA GRACILIS* BARTL. (MALPHIGIACEAE)

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Abstract: Petal venation of *Galphimia gracilis* Bratl. (Malphigiaceae) has been worked out in details. Among the different types of anastomoses, type I is most frequent and type II and type III are less in amount and other intermediate types are type IV and type VI in accordance with percentage of anastomoses. Total numbers of dichotomies in each petal varies from 15 to 25.

Keywords: Petal venation; Galphiamiagracilis; Malphigiaceae



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INTRODUCTION

The vascularization pattern in petal is known as petal venation. *Galphimia gracilis* Bartl. (Eng. name: slender golden shower, ver. name: yellow thryallis) is a native to eastern Mexico. It is a cultivated ornamental shrubs in flowering season Nov. to Feb..The plant belongs to the family Malpighiaceae (Barbados cherryfamily) of the order Malpighiales within the Rosids sub group of Eudicot (APG II) Malpighiaceae having 75 genera and approximate 1300 species.

From the economic point of view this plant has some medicinal properties and is used as a source of vitamins. This plants are beautifulhedge plants of the garden.

The study of petal venation received the attention of workers in different types in tracing phylogeny after the remarksthat petal venation shows diversity. Petal venation of irregular flower has been carried out by many workers (Datta and Saha , 1968 ; Subramanyam and Nair , 1973; Gupta, 1982), whereas petal venation of regular flower has been documented by many workers (Arnott and Tucker ,1963,1964;Banerjee and Mukherjee ,1970;Banerjee ,1972,1976 and Saha and Mukherjee, 2012).

The perusal of available literature it appears that venation of petals is especially significant at the species and also in generic level too. There is no work on the petal venation of *Galphimia gracilis*. Petal

venation may provide important clues to evolutionary development and also important for better understanding of this plant and also important for it's identify .Therefore, the present work on the detailed study of petal venation of this species has been undertaken to show its taxonomic status.

MATERIALS AND METHODS

Fully open flowers of *Galphimia gracilis* Bartl. were collected from the gardens of Kalyani Notified Area Authority during the period of December to February 2013.The fresh materials were preserved in FAA(5 ml Formalin ;5 ml Acetic acid and 90 ml Ethyl alcohol) ,preserved flowers were taken in different (2%, 3%,4%,5%) NaOH solution for 2 days then the solution was heated to clear the petals .In another process, preserved materials were taken saturated chloral hydrate solution for 3 days. After aforesaid procedure studied materials or petals stained in 0.5% aqueous safranin solution and mounted in 70% phenol glycerin solution and were sealed with 58°-60° (paraffin wax). Randomly selected petals were studied under the simple dissecting microscope and drawn the venation pattern with the help of prism type Camera-Lucida. About 30 petals of were selected from the mass of petals in different localities for this study. Number of dichotomies in proximal, median and distal end anastomoses in different petals were

calculated in each petal after the work of Foster(1966).

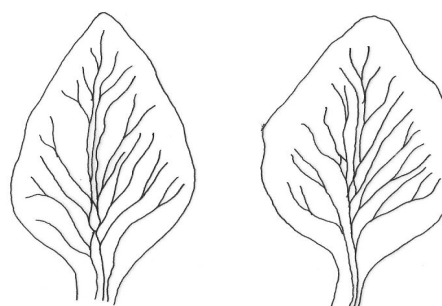
RESULTS AND DISCUSSION

Each flower consist of five ovate to obovate free petals with obtuse apex unequally developed cuneate base entire margin. The petal size more or less equal .The size 10mm .X 5mm. to 8mm.X 3mm.The basic pattern of petal venation at the base ,varies from 2-3 traced condition . After short distance it divides and redivides dichotomously and some parts of petals show anastomosis, but the number of anastomosis is extremely low .Types of and anastomoses of the studied petals are shown in table 1 containing 30 figures of petals.

Total number of dichotomies in each varies from 15 (fig. 15) to 25 (fig. 28) Table 1. Average percentage of dichotomies is highest in central or medial region (53.54%) which is minimum in distal region (14.31%) .But basal region of petal has about 32.15% dichotomies. So dichotomies are prevalent in central region .The interesting feature of petal venation of *Galphimia* is that – veins do not reach the margin of the petals and the terminal end of petal vasculature is always very apart from the margin.

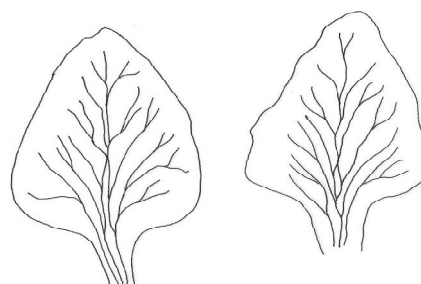
The number of anastomoses is each petal varies from one to two only and even no anastomosis has been observed in some petals (13 petals out of 30 petals) .Anastomoses have been observed all parts of the petals.

Majority types of anastomoses (Type I to type VI except of V) of veins as recognized by Foster (1966, 1968) are seen in the studied petals.



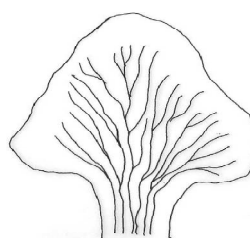
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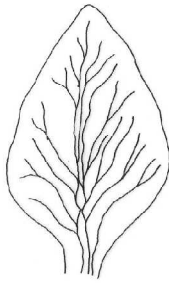
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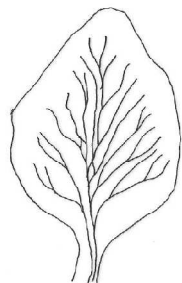
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Figs 1-5 Venation pattern of *Galphimiagracilis* Bratl. — 2 mm

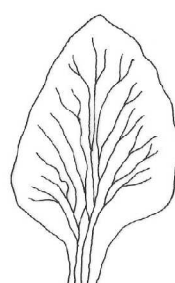
Figs 6-10 Venation pattern of *Galphimiagracilis* Bratl. 2 mm



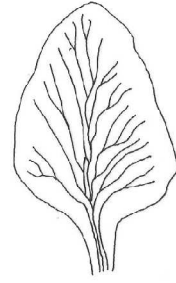
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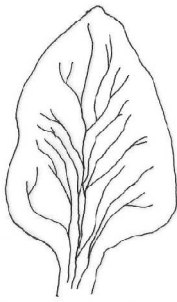
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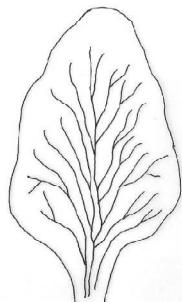
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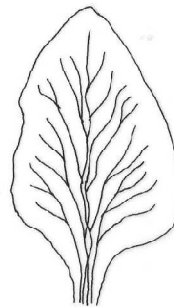
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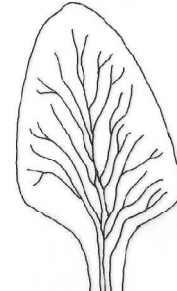
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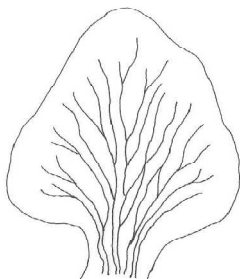
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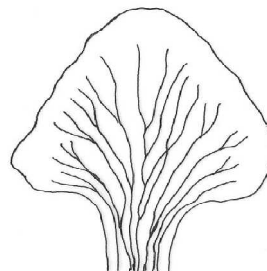
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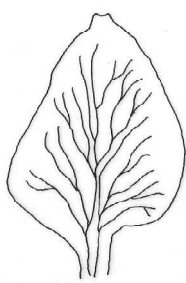
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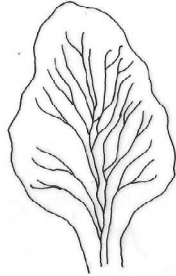
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Figs 11-15 Venation pattern of *Galphimiagracilis* Bratl. — 2 mm

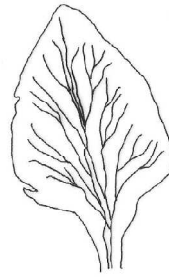
Figs 16-20 Venation pattern of *Galphimia gracilis* Bratl. — 2 mm



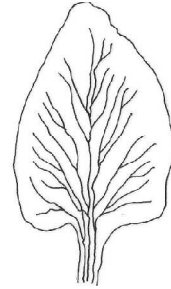
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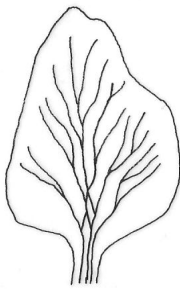
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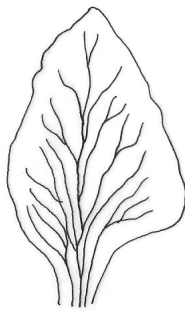
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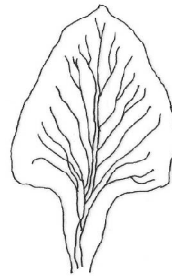
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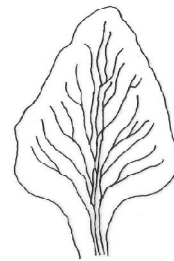
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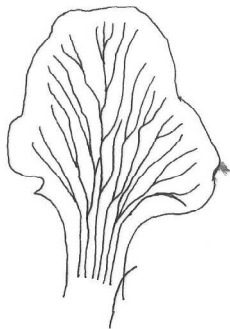
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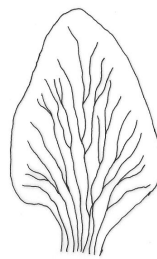
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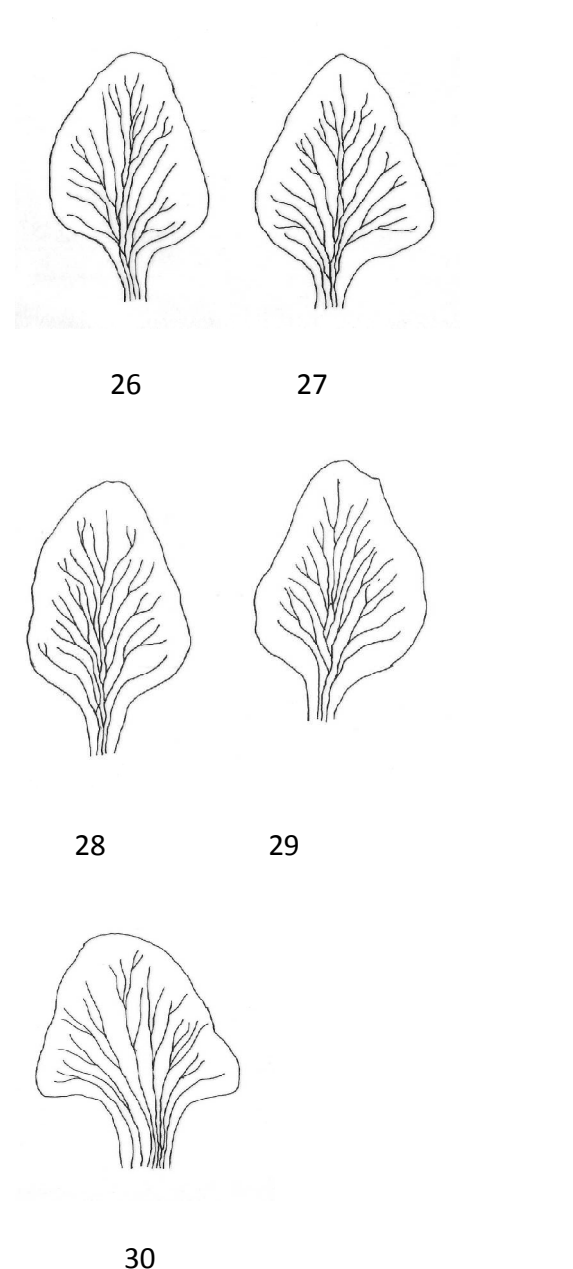


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Figs 21-25 Venation pattern of *Galphimiagracilis* Bratl. — 2 mm



Figs 26-30 Venation pattern of *Galphimiagracilis* Bratl. _____ 2 mm

The venation of petals in *Galphimia gracilis* is essentially open and dichotomous type, as has been noted in the leaves of *Circaeaster* by Foster (1971) and petals from different taxa by Arnott and Tucker

(1963, 64), Banerjee and Mukherjee (1970) and Banerjee (1972, 1976).

Foster (1966, 1968) has reported 6 types of anastomoses in the angiosperms petals. Present study is more less identical with the study of Foster (*l.c.*) 5 types (except type V) of petal venation has been noted from the present taxa. Type I is most prevalent (57.89%). The other higher categories are type IV and type VI and the percentage anastomoses is 15.79%. Minimum percentage of anastomoses has been noted as type II and type III (5.26%). Type V has not been observed from the present taxa. It has also been seen that maximum percentage of anastomoses is seen in medial region of the petals, which is low in basal part and extremely low in apical part of petals.

Petal venation of *Galphimia gracilis* indicates that it has predominant free dichotomous types of venation which is usually seen in some primitive dicots as well as in ferns. At the sometime percentage of different categories of anastomoses are extremely low. Therefore, the taxon can be regarded as one of the primitive taxon on the basis of petal venation.

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Table I. Table 1: Showing the number of dichotomies and anastomosis and types of anastomosis in studied *Galphimia gracilis* petals

Figure No.	Number of dichotomies			Total no. of dichotomies in each petal	Number of anastomosis	Types of anastomosis
	Basal region	Central region	Distal region			
1	6	12	4	22	1	III
2	4	15	2	21	2	I,II
3	4	13	3	20	0	-
4	8	8	1	17	1	I
5	7	9	3	19	0	-
6	3	10	4	17	0	-
7	4	12	2	18	0	-
8	6	12	3	21	1	I
9	8	11	3	22	0	-
10	5	10	2	17	2	IV,IV
11	9	9	4	22	0	-
12	4	11	4	19	1	VI
13	7	7	2	16	1	I
14	6	13	4	23	1	I
15	3	12	0	15	1	IV
16	9	9	2	20	0	-
17	8	10	3	21	1	I
18	6	8	2	16	1	I
19	8	8	1	17	0	-
20	4	11	4	19	0	-
21	7	11	4	22	2	I,VI
22	9	12	2	23	0	-
23	8	8	6	22	1	I
24	8	9	3	20	1	VI
25	8	10	0	18	0	-
26	8	8	5	21	0	-

27	9	13	2	24	1	I
28	7	14	4	25	0	-
29	6	11	3	20	1	I
30	2	12	3	17	0	-

Table II: Showing the percentage of different types of anastomosis

Types of Anastomosis	Percentage of anastomosis
Type I	57.89%
Type II	5.26%
Type III	5.26%
Type IV	15.79%
Type V	0
Type VI	15.79%

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