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Observation on Poliar Emergence in Some Rhamnaceae

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Abstract: *The present study revealed unicellular, multicellular trichomes and stellate scales on foliar surfaces of six rhamnaceous genera belonging to 12 species. All trichome types are non-glandular and belong to the categories. (i) Unicellular cylindrical (ii) Unicellular bulbous (iii) Unicellular conical (iv) Unicellular two armed (v) Simple filiform (vi) Multicellular two armed and (vii) Stellate scale. They are described in detail. The trichome-stomata relationship belongs to all categories recognised by Rajagopal and Pochaiah (1983). The trichome features are useful for decipherment of texa studied.*

Keywords: Foliar trichomes, Rhamnaceae

I. INTRODUCTION

The epidermal appendages in Rhamnaceae are described by Metcalfe and Chalk (1950). They described simple unicellular or uniseriate trichomes without mentioning any particular taxa. The present study deals with twelve unidentified species. The results of which are summarised in this paper.

II. MATERIALS AND METHODS

Plant materials were obtained from Amboli Ghat (Kolhapur District, Maharashtra), Government Botanic garden's Ooty (Tamilnadu), Waghai (Gujrat). Mahabaleshwar (Satara District), Shendwad (Dhule District), Chinchani Ghat (Nashik District) of Maharashtra and Kothamalai hills (Tamilnadu). The fresh, preserved and herbarium materials were used. The chemical method was followed for the separation of peels (E, 1974). Diluted nitric acid and chromic acid (5-10%) were used in different proportions. In case of herbarium material, the leaves were boiled in water for 5-10 minutes. In some cases the leaf surface is covered with stick fast (Enelbee company, Jogeshwari, Mumbai) and gently peeled off the gum when dried. Similarly a rubber solution is also used. The peels were stained in 1% safranin and semipermanant slides were prepared in 50% glycerin and they are sealed with nail paint / D.P.X. Trichome frequency was calculated as defined by Ghosh and Davis (1973). The cellular sketches were drawn using a camera lucida. The terms describing trichomes are mainly after Ramaya (1962, 1972). The size of trichomes and frequencies were tabulated in Tables. 1&2. Stomata and trichome relationships are after Rajagopal and Pochaiah (1983).

Abbreviations used here: Str-striations : Indicates relation between trichome and stomata.

III. RESULTS AND DISCUSSION

(1) Colubrina asiatica (L.) Brogn

Leaf – Adaxial

Simple filiform nichomes Nonglandu lanniseriate filiform single trichomme observedon laminar region foot one celled Body multicelled all cells nearly equal in length apexacute laateral walls thick cross wall thin (fig1).

Leaf - Abaxial

Trichome is in leaf adaxial Distribution lessonly 3-4 trachoma's near the petiole region trihone slightly curved. Trichone stomata relationship category 1 (fig 2).

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(2) Pomaderds apetala labill

Leaf - adaxial and Abaxial

Stellate Scale: Non - grandular multicellular distributed on both surfaces all over, but most frequently midrib. Many radiating arms originate from the central group of calls all cells thick. This typs resemble a typical stellate type but it bears few cells in the centre. Therefore we designate here this type as stallate Scale

(3) Rhamnus Wightil L

eaf - Adaxial and Abaxial Unicellular Cylindrial Trichone : Non glandular, unicellular, Distribution diffuse more on vein and veinlets apexacute lateral wall thick, stiff, Trichome stomata relationship category 1. (figs 4&5).

(4) Scutia myrtina Kurz

Leaf - Adaxial

Unicellular cylindrical trichome : Nonglandula unicellular Distribution diffuse, mostly on intercostals region foat one called Body one called entire base broader tapering above, apex acute, lateral wall thick Trachoma stomata relationship category 1 & 3 (fig 7 & 8).

(5) Ventilage bombayensis Dalz - Leaf Adaxial and Abaxial Unicellular camcal trichome. Although trichome belongs to the same type unicellular Conical filiform type They very with respect to length breath and leteral wall thickness. Hence they have been iteated here presently into three sub types trichome non glandular uniccellular filiform.

(6) Ventilago denticulata willed

Leaf - Adaxial : Trichomes of two types a unicellular conical trachoma's-Non glandular unicellular distribution diffuse, mostly on interecostal region rerely on vein and veinlets. Foot one called elongotal. Body one called long, bradly cylindrical apex obtase, laterial wall thick linear striations present all over the body (fig 13). Trichone as above except the apex is dome shaped (Fig 14).

b. Multicellular two – armed trichome : Non-gladular, multicellular, two-armed. Distribution rarely on intercostal region. Foot one celled, thick walled. Body multicelled, arms uniseriate, cells nearly equal in length; apex obtuse, lateral wall thick, cross walls thin. (Fig. 15).

a. Unicellular conical trichome : Non-glandular, unicellular, unicellular, unbranched. Distribution diffuse, mostly on vein and veinlets, rarely on intercostal region. Foot one celled. Body one celled, narrow cylindrical, apex dome-shaped, lateral wall thick, linear strations present all over the body. Trichome-stomata relationship category 2. (Fig. 16).

b. Unicellular two – armed trichome : Non – glandular, unicellular, two-armed, arms unequal in length. Distribution mostly on vein and veinlets, rarely on intercostal region. Foot one celled. Body one celled, thick, apex broadly obtuse, lateral wall thick (Fig. 17).

c. Unicellular cylindrical trichome : Non-gladular, unicellular. Distributed on vein and veintelets. Foot one celled, broad. Body multicelled, unisesriate, cells of varied length tapering with obtuse to sub cute apex. Lateral walls thick, cross wall thin. (fig 18).

d. Simple filiform trichome : Non-gladular, multicellular. uniseriate. Distribution diffuse, mostly on vein and veinlets. Food one celled, broad. Body multicelled, uniseriate, cells of varied length, tapering with obtuse to acute apex, lateral wall thick, cross walls thin (fig. 19).

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(7) Ziziphus caracutta Roxb.

Leaf - Adaxial:

Unicellular conical trichome : Non-gladular, unicellular. Distribution mostly on vein and veinlets. Foot one celled. Body one celled, conical but bent and short, apex acute, lateral walls thick (fig. 20). Trichome similar to earlier one but distribution on mid-vein cells only and larger than it, obtuse apex (fig. 21).

(8) Ziziphus glabrata Heyne ex Roth.

Leaf – Adaxial and abaxial

Unicellular conical trichome : Non-gladular, unicellular Distribution vein and veinlets only foot one called. Body one celled, nearly conical. Apex acute, lateral wall thin. (fig. 22).

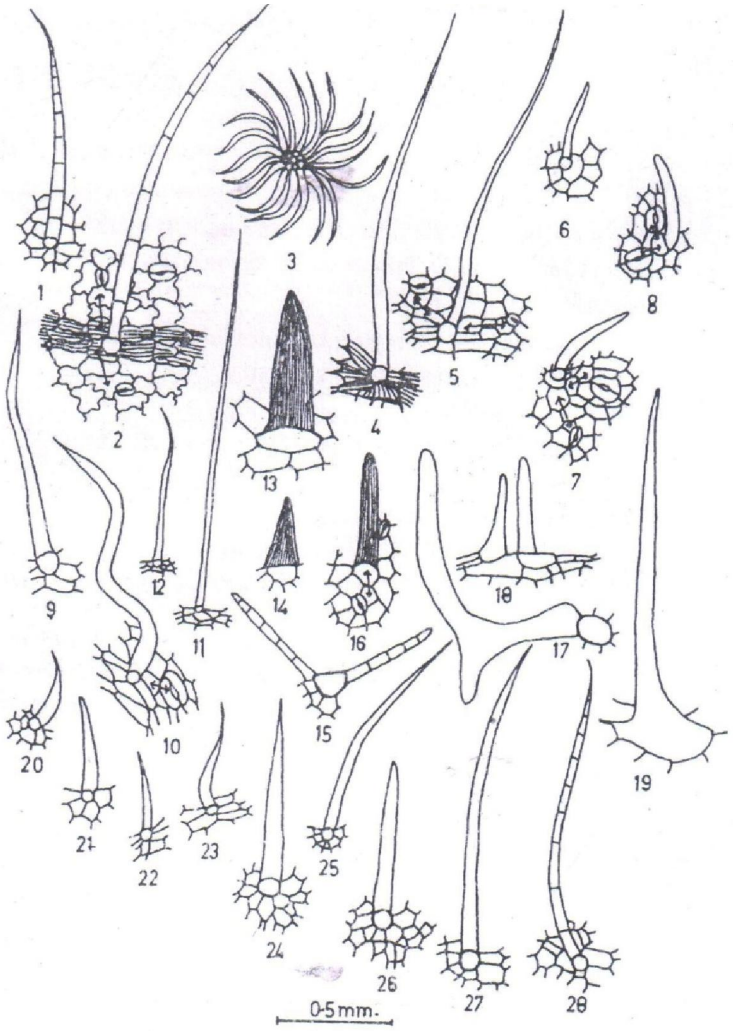

Fig. 1&2 Colubrina asiatica. Fig. 3 Pomaderris apetala. Fig. 4&5 Rhamnus wightii. Fig. 6 to 8 scutia myrtina. Fig. 9 to 12 Ventilago bombayensis. Fig. 13 to 19 Ventilago deaticulata. Fig. 20&21 Ziziphus caracutta. Fig. 22 Ziziphus glabrata. Fig. 23 Ziziphus mauritiana. Fig. 24&25 Ziziphus nummularia. Fig. 26 Ziziphus oenoplia. Fig. 27&28 Ziziphus rugosa.

(9) Ziziphus mauritiana Lam.

Leaf – Adaxial and abaxial

Unicellular conical trichome : Non-gladular, unicellular Distribution everywhere. Foot one called. Body one celled, conical but bents sometime. Apex acute, lateral wall thin. (fig. 23).

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(10) Ziziphus nummularia (Burm. *f.*) Wt. and Arn.

Leaf – Adaxial

Unicellular cylindrical trichome : Non-gladular, unicellular Distribution on vein and veinlets only Foot one celled thick. Body one celled, broader at base, apex acute, lateral walls thick (fig. 24). Trichomes as above, Distribution on vein and veinlets and areolae. Foot one celled. Body one celled, filiform, acute apex, lateral wall thick (fig. 25).

(11) Ziziphus oenoplia (L.) Mill

Leaf – Adaxial

Unicellular conical trichome : Non-gladular, unicellular Distribution mostly on vein and rarely on areolae. Foot one celled. Body one celled, broader at base, narrower upwardly, apex acute, lateral walls thick (fig. 26).

(12) Ziziphus rugosa Lamk.

Leaf – Adaxial

Unicellular conical trichome : Non-gladular, unicellular Distribution or veinlets and areolae. Foot one celled. Body one celled, tapering above, apex acute, lateral walls thick (fig. 27).

Leaf – Adaxial

Simple filiform trichome : Non-gladular, multicellular Distribution mostly on mid-vein. Foot one celled. Body multicelled, uniseriate, tapering above; apex acute, lateral wall thick, cross walls thin (fig. 28).

Trichomes are generally distributed on both foliar sides and belong to (i) Unicellular cylindrical (ii) Unicellular balbous (iii) Unicellular conical (iv) Unicellular two armed (v) Simple filiform (vi) Stellate scale and multicellular two armed types. All are non-glandular.

Table 1: Size of trichomes (µ)

Non Glandular Trichomes									
Sr. No.	**Name of Plants**	**Leaf Adaxial**				**Leaf Abaxial**			
		Length in range	**Mean**	**Breadth in range**	**Mean**	**Length in range**	**Mean**	**Breadth in range**	**Mean**
1	*Colubrina asiatica*	85-110	97.5	17-18	13.5	85-110	97.5	17-18	13.5
2	*Pomaderris apetala*	80-90	8.5	21-23	22	80-90	8.5	21-23	22
3	* *Rhamnus wightii*	90-140	160.4	12-17	14.5	90-160	162	12-18	15
4	*Scutia myrtina*	40-50	45.9	15-17	16	40-46	43	12-16	14
5	*Ventilago Bombayensis*	145-190	167.5	14-16	15	A	A	A	A
6	*Ventilago Denticulata*	55-80	67.5	140-190	165	140-190	165	25-30	27.2
7	*Ziziphus caracutta*	22-26	24	05-7	06.2	30-36	33	08-10	9
8	*Ziziphus glabrata*	40-58	51.3	08-10	8.7	40-58	51.3	08-50	8.7
9	*Ziziphus mauritiana*	115-120	67.5	08-11	9	110-160	135	08-11	10.02
10	*Ziziphus nummularia*	80-90	85	8-12	10	80-100	90	08-18	13
11	*Ziziphus oenoplia*	20-40	30	10-15	125	90-120	105	08-10	9
12	*Ziziphus rugosa*	24-30	27	10-15	12.5	40-80	60	10-17	13.5

* The figures relate to a mean of ten counts. * A-Absent. * -Herbarium material were used.

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Table 2: Trichomes frequency (per sq. cm.)

Sr. No.	Name of plants	Non Glandular Trichomes		
			Leaf Adaxial	Leaf Abaxial
1	*Colubrina asiatica*	Vein	A	1.2
		Intercostal	2.5	A
2	*Pomaderris apetala*	Vein	1.7	1.9
		Intercostal	3.2	3.5
3	* *Rhamnus wightii*	Vein	2.9	4.9
		Intercostal	1.2	1.3
4	*Scutia myrtina*	Vein	3.5	6.9
		Intercostal	A	A
5	*Ventilago Bombayensis*	Vein	A	2.6
		Intercostal	A	A
6	*Ventilago Denticulata*	Vein	3.5	18.9
		Intercostal	3.9	3.6
7	*Ziziphus caracutta*	Vein	3.5	7.7
		Intercostal	5.9	5.9
8	*Ziziphus glabrata*	Vein	A	4.2
		Intercostal	A	A
9	*Ziziphus mauritiana*	Vein	1.8	10.1
		Intercostal	2.5	25.5
10	*Ziziphus nummularia*	Vein	1.2	1.6
		Intercostal	A	20.5
11	*Ziziphus oenoplia*	Vein	2.5	3.5
		Intercostal	3.2	4.6
12	*Ziziphus rugosa*	Vein	1.10	2.7
		Intercostal	A	A

* The figures relate to a mean of ten counts. * A-Absent. * -Herbarium material were used.

The unicellular types vary with respect to shape, base and arms. Their foot and body cells are always solitary. The foot cells are always solitary in case of multicelllular types. The number of body cells are however variable. The structure of stellate scale is interesting. Its body is distinguishable into (i) Few celled peltate scale (ii) and radiating arms projecting from the scales. It is thus intermediate between stellate tufted trichome and simply peltate scale. The apex is generally acute, obtuse, broadly obtuse or dome shaped. They are mostly unicellular conical, rarely simple filiform on both the surfaces in Colubrina asiatica and on abaxial surface only in case of Ventilago denticulata. Stellate scales are noted on either surface in Pomaderris apetala exclusively. They are distributed diffusely in Rhamnus wightti, Ventilago denticulata, Ziziphus mauritiana and Colubrina asiatica. They are dispersed mostly on vein and veinlets in all species of Ziziphus. Trichome-stomata relationship categories are of three different types. All are observed in the taxa studied. Category 1 is noted in Colubrina asiatica. Rhamnus wightii and Ventilago bombayensis. In Scutia myrtina category 1&2 are seen, whereas category 2 is exclusively noted on abaxial surfaces on Ventilago denticilata. The unicellular trichomes are straited in V. Deticulata especially on adaxial surface, apices being variable. The longest trichome 135 (μ) on adaxial surface is noted in Z mauritiana. The highest trichome frequency (per sq. cm) 5.9 adaxia side in Z caracutta, where as the lowest frequency 1.2 is observed on Rhamunus wightii. The highest trichome frequency 25.5 is observed on abaxial side in Z mauritiana and lowest 1.2 in Colubrina asiatica.

IV. ACKNOWLEDGEMENT

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