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Scanning Electron Microscopic Studies on Leaf Surface Trichomes in Mulberry and Its Influence on Rearing Performance of Silkworm *Bombyx mori* L.

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The type of trichomes, their density and pattern of distribution on leaves of 16 genotypes of mulberry, belonging to both diploid and polyploid categories, were studied by scanning electron microscope. The present investigation was undertaken to find out the relationship of physical attributes, especially the density and trichome types with higher acceptability and better rearing performance by the silkworm *Bombyx mori* L. Two types of trichomes, glandular and non-glandular types were observed on both the leaf surfaces of all the mulberry genotypes studied. In general, greater densities of trichomes were observed on the abaxial surface than the adaxial surface of leaves in most of the genotypes. Distribution of glandular trichomes were more in abaxial surface and non-glandular trichomes were more in adaxial surface. Overall, distribution of glandular and non-glandular trichomes per unit area of leaf did not follow any regular pattern. When leaves of those genotypes were fed to silkworms, trichome density was found to be significantly negatively correlated with the survival of larvae *i.e.*, effective rate of rearing, but trichome density did not influence the economic characters of rearing. As the distribution of glandular trichomes (GT) and non-glandular trichomes (NGT) did not follow any definite pattern, no relation could be established between the GT and NGT densities with silkworm rearing performance. However, the ratio of GT and NGT in a particular genotype influenced the rearing parameters, higher the ratios better the rearing performance. High GT and NGT ratio (> 1.00) was found positively significant when correlated with economic parameters *viz.*, larval weight, single cocoon weight and single shell weight. The study is useful in screening different mulberry genotypes for their better acceptability to silkworm and higher rearing performance at the early stage of selection without actually conducting the rearing.

Key words: Trichomes, Glandular and non-glandular types, Silkworm rearing, Rearing parameters, Mulberry, *Bombyx mori*, Scanning electron microscope

Introduction

Plants exhibit wide variation in types and densities of trichomes within the families. Trichomes are the epidermal appendages that consists of one or more cells derived from a single proto-dermal cell (Uphof, 1962). In many plants, trichoms have been used to classify genera and species (Metcalf and Chalk, 1979; Mehta *et al.*, 1979) including mulberry (Katsumata, 1971, 1972; Fujita and Uchikawa, 1986). The role of trichomes in plant defense against herbivory is known since long (Callahan, 1957; Beck, 1965; Levin, 1973; Norris and Kogan, 1980; Jermy, 1984). Pubescence is considered as a resistant factor that interferes with insect feeding. The purely mechanical effects of the pubescence depends on four main characteristics of the trichomes *viz.*, density, erectness, length and shape (Norris and Kogan, 1980). The foliar trichomes when present in high density are reported to cause phys-

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ical hindrance and discourage phytophagous insects and affects acceptability of foliage (Singh *et al.*, 1971; Levin, 1973).

In general, two types of trichomes were found distributed on both the surfaces of leaves. Glandular trichomes in some cases were reported to synthesize, metabolize, accumulate and secrete a variety of substances (Norris and Kogan, 1980; William *et al.*, 1984; Purushothaman and Vasanth, 1988; Pedro *et al.*, 1991; Werker, 1993). The secretions from glandular trichomes probably play a role to attract the pollinators (Ascensao *et al.*, 1995). However, the specific function of each trichome type is not known yet.

Though trichomes play a major role in acceptability as feed by insects, no documented evidence is still available in mulberry that correlates the leaf trichomes in mulberry and the rearing performance of silkworm, *Bombyx mori* L. when fed on these leaves. This prompted to take up a study on the variation in the distribution and morphology of leaf trichomes in few representative genotypes of mulberry in order to determine the physical attributes that may influence the acceptability and rearing performance of silkworm, *Bombyx mori* L. The ultimate objective of the study is to identify a marker based on trichome morphology, which may help in the selection process during early stage of selection for short-listing the genotypes when rearing test could not be conducted due to the less quantity of leaf available from single mulberry plant.

Materials and Methods

Plant material

Sixteen mulberry genotypes belonging to diploid, triploid, tetraploid and hexaploid (Table 1) grown under similar conditions in the germplasm bank of Central Sericultural Research and Training Inistitute, Mysore, India were selected for the present study.

Scanning electron microscopy

Leaf samples were collected from 10^{th} leaf in all the genotypes. Rectangular leaf pieces of Ca. 3 mm^2 were excised from both sides of the mid rib and fixed in 2.5% glutaraldehyde prepared in 0.2 M sodium cacodylate buffer at pH 7.2 for 2 hrs and then washed twice in the same buffer followed by the dehydration in graded ethanol acetone series and dried in a critical point dryer (EMS-850). After drying, the samples were mounted on the copper stubs and coated with a thin layer of gold (20 nm thickness) in a sputter coater (EMS-550). Observations were carried out under a JEOL 100 CX II ASID 4D scanning electron microscope (Tokyo, Japan) at 20 kV. Microphotographs were taken at different magnifications for determining density, type and size of trichomes. Trichome density per unit area of leaf surface and the size (length and width at widest point) were measured on SEM micrographs at a magnification of × 200.

Table 1. List of 16 mulberry genotypes used in the study

Sl. no.	Munberry genotype	Ploidy	Remark
1	Mysore local	Diploid	Indigenous, Cultivated
2	K-2	Diploid	Indigenous, Cultivated
3	V-1	Diploid	Indigenous, Cultivated
4	S-13	Diploid	Indigenous, Cultivated
5	S-36	Diploid	Indigenous, Cultivated
6	*M. multicaulis*	Diploid	Exotic (Indonesia)
7	KNG	Diploid	Exotic (Japan)
8	Roso	Diploid	Exotic (Japan)
9	Kokuso -27	Diploid	Exotic (Japan)
10	Tr-4	Triploid	Evolved, Indigenous
11	Tr-8	Triploid	Evolved, Indigenous
12	Tr-10	Triploid	Evolved, Indigenous
13	S-41	Triploid	Evolved, Indigenous
14	V-1	Tetraploid	Induced , Indigenous
15	*M. laevigata*	Tetraploid	Natural, Wild, Indigenous
16	*M. serrata*	Hexaploid	Natural, Wild, Indigenous

Silkworm rearing

Silkworm rearing was conducted with a bivoltine hybrid namely CSR-2 × CSR-5 on the leaves of test genotypes during March - April, 2002. The layings were brushed and reared with the leaves separately for each mulberry genotype up to the third moult following standard package of practices for young and late age bivoltine silkworm rearing (Kawakami, 2001). After third moult, 300 silkworms from each rearing tray were counted and kept in three trays of 100 each which formed three replications for each mulberry genotype considered for testing and the rearing was continued. Data was recorded on effective rate of rearing (ERR) per 10,000 larvae, which is considered as the measure of acceptability and larval weight, single cocoon weight and single shell weight as the measure of leaf quality. The rearing parameters so recorded were analysed statistically through analysis of variance. Correlation coefficient between rearing parameters and trichome characters were computed as per the method followed by Al Jibouri *et al.* (1958).

Results

The leaves of mulberry, *Morus* spp. bear numerous non-

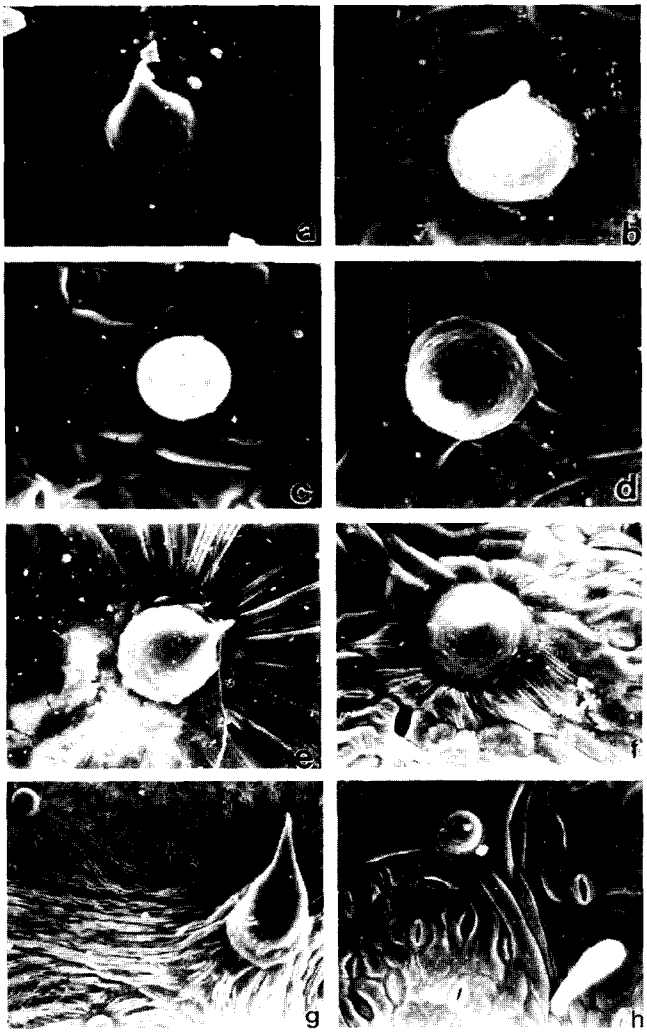

Fig. 1. SEM microphotographs of non-glandular trichomes in various genotypes of mulberry. Cone/dome shaped non-glandular trichomes with small to medium sized projection in Mysore local (1a), K-2 (1b), V-1 (1c), S-13 (1d), S-36 (1e), *M. multicaulis* (1f), Roso (1h) and cone/dome shaped non-glandular trichomes with long projection in KNG (1g). Magnification 1a to 1f at × 1000. 1g at 500. 1h at × 800.

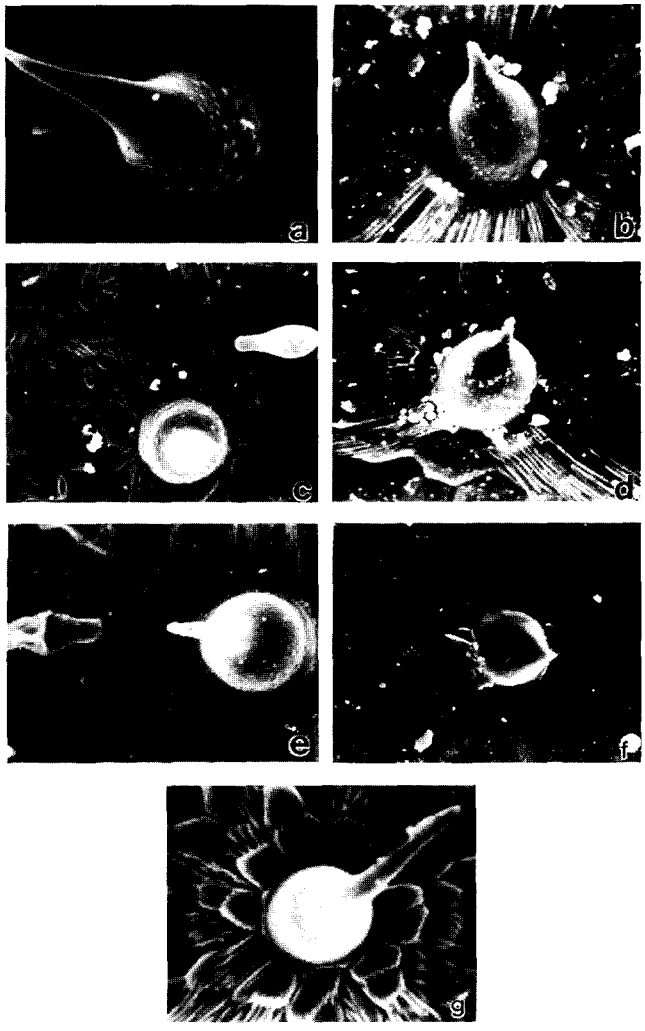

Fig. 2. SEM microphotographs of non-glandular trichomes in various genotypes of mulberry. Cone/dome shaped non-glandular trichomes with small to medium sized projection in Tr-4 (2b), Tr-8 (2c), Tr-10 (2d), V1-4 x (2f) and cone/dome shaped non-glandular trichomes with long sized projection in Kokuso-27 (2a), S-41 (2e) and *M. serrata* (2g). Magnification 2a and 2e at × 1000. 2b, c, d and f at × 800, 2g at × 500.

glandular and glandular trichomes on both surfaces. All the genotypes have both types of glandular and non-glandular trichomes on both abaxial and adaxial surface of leaf. In general, the non-glandular trichomes are either cone/dome shaped. The non-glandular trichomes are either with small to medium sized projection with pointed tip in M. local, K-2, V-1, S-13, S-36, *M. multicaulis*, Roso, Tr-4, Tr-8, Tr-10, V 1-4 x (Fig. 1a to f, h, Fig. 2b, c, d, f) or, with a bulbous base and long projection having, pointed tip in KNG, Kokuso-27, S-41, *M. serrata* (Fig. 1g, Fig. 2a, e, g). Glandular trichomes are either with uni or multi cellular prominent head and a small stalk in M. local, K-2, V-1, S-36, *M. multicaulis*, KNG, Kokuso-27, Tr-4, S-41, V 1-4 x, *M. laeveigata, M. serrata* (Fig. 3a, b, c, Fig. 3e, f, g, h, Fig. 4a, Fig. 4.c, d, e, f.) or without a clear distinction between head and stalk in S-13 and Tr-10 (Fig. 3d, Fig. 4b).

Distribution of trichomes

On the adaxial surface of leaves, the glandular trichomes are less than the abaxial surface. On the abaxial surface, the picture is opposite where the glandular trichomes are more. Total number of trichomes is more on abaxial surface than that of adaxial surface. The trend was more or less similar in all the mulberry genotypes, whether diploid or polyploid (Table 2). While considering the total density

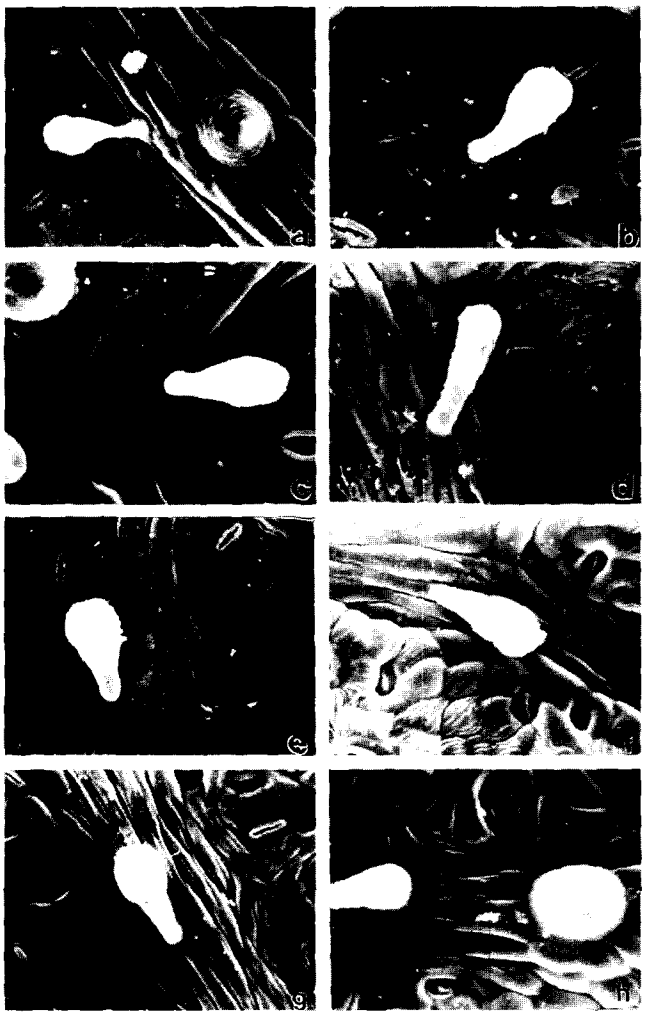

Fig. 3. SEM microphotographs of glandular trichomes in various genotypes of mulberry. Glandular trichomes with uni/multi cellular prominent head and small stalk in Mysore local (3a), K-2 (3b), V-1 (3c), S-36 (3e), *M. multicaulis* (3f), KNG (3g), Kokuso-27 (3h) and glandular trichomes with out clear distinction between head and stalk S-13 (3d). Magnification 3a to 3h all are at × 1000.

of trichomes per mm^2 of leaf, it was observed that sufficient variability exists among the genotypes with respect to glandular trichomes, non-glandular trichomes and total trichomes (Table 3). No definite trend in variability in density was observed between diploid and polyploid genotypes. The density of glandular trichomes per mm^2 varied from 48 in S-36 to 107 in kokuso-27 among diploids, from 50 in S-41 and *M. serrata* to 118 in Tr-10 among polyploids except in V-1 (tetraploid) where the density of glandular trichome was very high (191). In case of non-glandular trichomes, it varied from 42 in V-1 to 157 in KNG among diploids and from 70 in Tr-10 to 253 in *M. serrata* among polyploids.

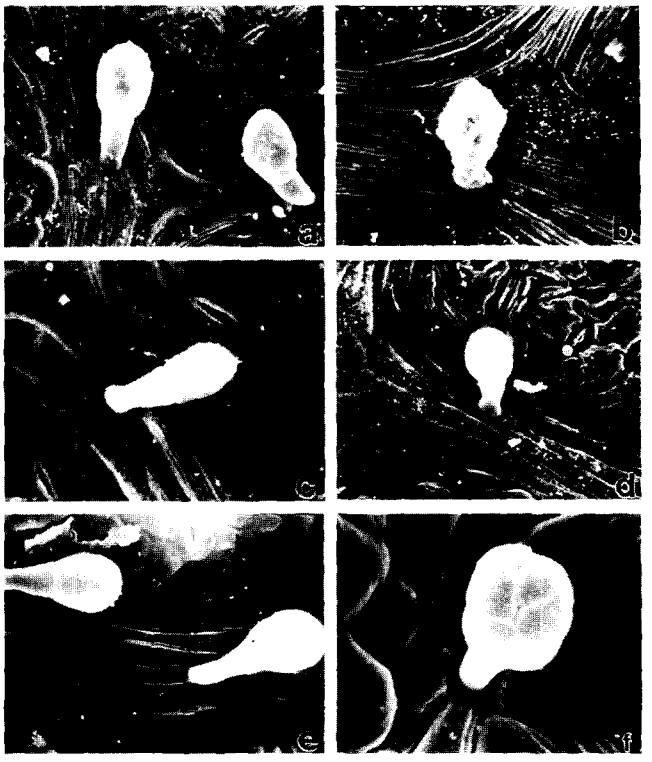

Fig. 4. SEM microphotographs of glandular trichomes in various genotypes of mulberry. Glandular trichomes with uni/multi cellular prominent head and small stalk in Tr-4 (4a), S-41 (4c), V-1-4x (4d), M. *laevigata* (4e), *M.serrata* (4f) and glandular trichomes with uni/multi cellular head with out clear distinction between head and stalk Tr-10 (4b). Magnification 4a to 4f all are at × 1000.

Dimensions of trichomes

Dimensions of foliar trichomes varied with the different mulberry genotypes and trichome type (Table 4). Size variation in glandular trichomes in adaxial and abaxial leaf surface does not vary too much, though slightly bigger sized glandular trichomes were observed in adaxial leaf surface. In general, the length of the glandular trichomes varied from 18.5 μm (kokuso-27) to 29 μm in S-41 (3 x). The size variation of non-glandular trichomes varied quite enormously in all the genotypes. In some genotypes *viz.*, Mysore local, S-36, KNG, Kokuso-27 and *M. serrata* (6 x) larger sized non-glandular trichomes were observed in adaxial surface and in rest of the genotypes, larger sized trichomes were observed in abaxial surface. The average size of non-glandular trichomes varied greatly among the genotypes considered for the study.

Based on the object of the study the adaxial and abaxial surface of leaf was not considered separately as the silkworm larvae consume the leaves with out discrimination of lower and upper surface. As no definite trend in density of different type of trichomes, (glandular and non-glan-

Table 2. Trichome density on leaf surface of 16 varieties of mulberry

Sl. no.	Mulberry variety	Ploidy level	Leaf surface	Trichome density per mm^2		
				Glandular	Non glandular	Total
1	Mysore local	2 x	Adaxial	08	45	53
			Abaxial	48	36	84
2	K-2	2 x	Adaxial	17	36	53
			Abaxial	40	22	62
3	V-1	2 x	Adaxial	11	34	45
			Abaxial	40	08	48
4	S-13	2 x	Adaxial	10	41	51
			Abaxial	60	17	77
5	S-36	2 x	Adaxial	11	25	36
			Abaxial	37	11	48
6	*M. multicaulis*	2 x	Adaxial	14	50	64
			Abaxial	42	31	73
7	KNG	2 x	Adaxial	09	108	117
			Abaxial	98	49	147
8	Roso	2 x	Adaxial	06	69	75
			Abaxial	58	15	73
9	Kokuso -27	2 x	Adaxial	06	123	129
			Abaxial	101	30	131
10	Tr-4	3 x	Adaxial	09	65	74
			Abaxial	84	14	98
11	Tr-8	3 x	Adaxial	10	59	69
			Abaxial	87	17	104
12	Tr-10	3 x	Adaxial	20	50	70
			Abaxial	98	20	118
13	S-41	3 x	Adaxial	14	45	59
			Abaxial	36	39	75
14	V-1	4 x	Adaxial	09	110	119
			Abaxial	182	07	189
15	*M. laevigata*	4 x	Adaxial	11	90	101
			Abaxial	89	30	119
16	*M. serrata*	6 x	Adaxial	08	95	103
			Abaxial	42	158	200

dular) was available the glandular : non-glandular ratio was considered apart from the total number of trichomes. The glandular: non-glandular trichome ratio varied greatly from 0.20 in *M. serrata* (6 x) to 1.69 in Tr-10 (Table 3). No clear-cut demarcation was noticed between diploid and polyploid group of genotypes studied.

Rearing performance

The rearing performance of CSR-2 × CSR-5 fed with different mulberry genotypes was presented in Table 5. Significant variability in all the rearing parameters was observed among the genotypes. Effective rate of rearing was found to be the maximum in V1-2 x (9688 nos. / 10,000 larvae) followed by Tr-10 (9644 nos. / 10,000 larvae) with a non significant difference between the two. Extremely poor ERR was observed in *M. serrata* (6 x), *M. laeveigata* (4 x) and V-1 (4 x).

In case of larval weight, an interesting feature was found. Though V-1 (4 x) exhibited poor ERR in number, weight of 10 mature larvae was found to be maximum in dular) was available the glandular : non-glandular ratio was considered apart from the total number of trichomes. The glandular: non-glandular trichome ratio varied greatly from 0.20 in *M. serrata* (6 x)

Table 3. Trichome density (per mm^2) on both surfaces of leaves and glandular : non-glandular trichome ratios in 16 mulberry varieties

Sl. no.	Mulberry varieties	Ploidy level	Trichome density per mm^2			GT/NGT
			Glandular	Non-glandular	Total	
1	Mysore local	2 x	56	81	137	0.69
2	K-2	2 x	57	58	115	0.98
3	V-1	2 x	51	42	93	1.21
4	S-13	2 x	70	58	128	1.21
5	S-36	2 x	48	36	84	1.33
6	*M. multicaulis*	2 x	56	81	137	0.69
7	KNG	2 x	107	157	264	0.68
8	Roso	2 x	64	84	148	0.76
9	Kokuso -27	2 x	107	153	260	0.70
10	Tr-4	3 x	93	79	172	1.18
11	Tr-8	3 x	97	76	173	1.28
12	Tr-10	3 x	118	70	188	1.69
13	S-41	3 x	50	84	134	0.60
14	V-1	4 x	191	117	308	1.63
15	*M. laevigata*	4 x	100	120	220	0.83
16	*M. serrata*	6 x	50	253	303	0.20
	C.V. (%)	--	46.3	56.0	40.1	--

GT = Glandular trichome, NGT = Non glandular trichome, C.V. = Coefficient of variation.

Table 4. Trichome size (μm) as observed on leaves of 16 different mulberry varieties

Sl. no	Mulberry variety	Ploidy level	Trichome type Glandular			Non-glandular		
			Adaxial (L × W)	Abaxial (L × W)	Average (L × W)	Adaxial (L × W)	Abaxial (L × W)	Average (L × W)
1	Mysore local	2 x	25.0 × 10.0	24.0 × 9.0	24.5 × 9.5	35.0 × 21.0	13.0 × 9.0	24.0 × 15.0
2	K-2	2 x	28.0 × 11.0	27.0 × 12.0	27.5 × 11.5	10.0 × 16.0	58.0 × 22.0	34.0 × 19.0
3	V-1	2 x	34.0 × 9.0	23.0 × 11.0	28.5 × 10.0	7.0 × 16.0	12.0 × 16.0	9.5 × 16.0
4	S-13	2 x	25.0 × 13.0	25.0 × 9.0	25.0 × 11.0	14.0 × 19.0	24.0 × 18.0	19.0 × 18.5
5	S-36	2 x	33.0 × 12.0	25.0 × 12.0	29.0 × 12.0	37.0 × 23.0	29.0 × 22.0	33.0 × 22.5
6	*M .multicaulis*	2 x	25.0 × 13.0	24.0 × 12.0	24.5 × 12.5	14.0 × 18.0	44.0 × 21.0	29.0 × 19.5
7	KNG	2 x	27.0 × 16.0	26.0 × 11.0	26.5 × 13.5	64.0 × 30.0	56.0 × 19.0	60.0 × 24.5
8	Roso	2 x	28.0 × 13.0	24.0 × 10.0	26.0 × 11.5	19.0 × 13.0	51.0 × 17.0	35.0 × 15.0
9	Kokuso -27	2 x	20.0 × 12.0	17.0 × 10.0	18.5 × 11.0	38.0 × 23.0	33.0 × 22.0	35.5 × 22.5
10	Tr-4	3 x	22.0 × 13.0	24.0 × 12.0	23.0 × 12.5	20.0 × 16.0	45.0 × 22.0	32.5 × 19.0
11	Tr-8	3 x	18.0 × 11.0	21.0 × 9.0	19.5 × 10.0	20.0 × 17.0	33.0 × 21.0	26.5 × 19.0
12	Tr-10	3 x	28.0 × 15.0	18.0 × 10.0	23.0 × 12.5	24.0 × 19.0	40.0 × 19.0	32.0 × 19.0
13	S-41	3 x	30.0 × 14.0	28.0 × 13.0	29.0 × 13.5	25.0 × 15.0	63.0 × 29.0	44.0 × 22.0
14	V-1	4 x	20.0 × 11.0	18.0 × 10.0	19.0 × 10.5	19.0 × 12.0	33.0 × 18.0	26.0 × 15.0
15	*M. laevigata*	4 x	27.0 × 14.0	28.0 × 13.0	27.5 × 13.5	18.0 × 17.0	35.0 × 16.0	26.5 × 16.5
16	*M. serrata*	6 x	28.0 × 24.0	24.0 × 19.0	26.0 × 21.5	89.0 × 38.0	89.0 × 23.0	89.0 × 30.5

L : Length in μm and W : Width in μm.

to 1.69 in Tr-10 (Table 3). No clear-cut demarcation was noticed between diploid and polyploid group of genotypes studied.

Rearing performance

The rearing performance of CSR-2 × CSR-5 fed with different mulberry genotypes was presented in Table 5. Sig-

Table 5. Rearing performance of different mulberry varieties with bivoltine silkworm hybrid, CSR-2 x CSR-5 (Season: March - April)

Sl. No.	Mulberry varieties	Ploidy level	ERR* (no.)	Weight of 10 mature larvae (g)	Single cocoon wt. (g)	Single shell wt. (g)
1	Mysore local	2 x	7377	38.00	1.683	0.403
2	K-2	2 x	8577	38.33	1.679	0.408
3	V-1	2 x	9688	51.00	1.849	0.456
4	S-13	2 x	9333	43.00	1.694	0.389
5	S-36	2 x	8400	41.67	1.849	0.445
6	*M. multicaulis*	2 x	6978	37.67	1.588	0.381
7	KNG	2 x	7511	47.67	1.744	0.410
8	Roso	2 x	6800	42.33	1.691	0.396
9	Kokuso -27	2 x	4933	38.00	1.606	0.403
10	Tr-4	3 x	9333	48.00	1.779	0.389
11	Tr-8	3 x	8666	51.00	1.975	0.459
12	Tr-10	3 x	9644	45.00	1.990	0.453
13	S-41	3 x	8000	33.00	1.246	0.281
14	V-1	4 x	4222	54.33	1.956	0.453
15	*M.laevigata*	4 x	4177	44.33	1.765	0.379
16	*M. serrata*	6 x	4000	35.00	1.411	0.296
	C.D. at 5%		441.5	1.106	0.080	0.020

*Effective rate of rearing (ERR) per 10,000 larvae.

nificant variability in all the rearing parameters was observed among the genotypes. Effective rate of rearing was found to be the maximum in V1-2 x (9688 nos. / 10,000 larvae) followed by Tr-10 (9644 nos. / 10,000 larvae) with a non significant difference between the two. Extremely poor ERR was observed in *M. serrata* (6 x), *M. laeveigata* (4 x) and V-1 (4 x).

In case of larval weight, an interesting feature was found. Though V-1 (4 x) exhibited poor ERR in number, weight of 10 mature larvae was found to be maximum in tetraploid V-1 (54.33 g) followed by diploid V-1 and Tr-8 (both 51.0 g). The lowest value for 10 mature larvae was observed in S-41 (33.0 g) followed by *M. serrata* (35.0 g). Highest value for single cocoon weight was observed in Tr-10 (1.990 g) followed by Tr-8 (1.975 g), tetraploid V-1 (1.956 g) and, diploid V-1 and S-36 both being 1.849 g. Single shell weight was found to be maximum in Tr-8 (0.459 g) followed by 0.456 g in V-1 (2 x) and 0.453 g in both V-1 (4 x) and Tr-10.

Rearing parameters influenced by Trichome density and ratio of glandular : non-glandular type

The correlation coefficient of different rearing parameters with density of trichomes and the ratios between glandular and non-glandular trichomes were computed and presented in Table 6. The trichome density was found to be significantly and negatively correlated with ERR (-0.74).

Table 6. Correlation coefficients of trichome density and glandular : non-glandular ratio with rearing parameters

Rearing parameters	Trichome density	GT/NGT ratio
ERR number per 10,000 larvae brushed	-0.74**	0.46 NS
Larval weight (g)	0.16 NS	0.71**
Single cocoon weight (g)	-0.01 NS	0.83**
Single shell weight (g)	-0.15 NS	0.78**

GT = glandular trichome, NGT = Non-glandular trichome, ** = Significant at 1% Level, NS = Non significant.

Other economic parameters like larval weight, single cocoon weight and single shell weight were not influenced by the density of trichome. Glandular : non-glandular trichome ratio was found correlated positively significant with all the economic parameters like larval weight (0.71), cocoon weight (0.83) and shell weight (0.78).

Discussion

The presence of glandular and non-glandular trichomes on both adaxial and abaxial surface of leaves appears to be characteristic feature in mulberry as the study was con-

ducted with different genotypes varying in their ploidy (diploid, triploid, tetraploid and hexaploid), origin (indigenous and exotic), natural and artificial tetraploid and also cultivated and wild.

The study indicated that the higher density of trichomes reduces the acceptability of leaf by the silkworm. This appears to be mechanical only. This relates to the defense mechanism, which protects the plants from herbivory by reducing acceptability (Levin, 1973) towards the insects. The similar observation was found in the present study. Maximum number of trichomes was observed V-1 (4 x), *M. laevigata* (4 x) and *M. serrata* (6 x) and correspondingly the effective rate of rearing was found to be poor. However, the poor acceptability does not necessarly indicate the poor quality of leaf. Acceptability of V-1 (4 x) by the silkworms was found to be poor owing to the presence of higher number trichomes, but all the other rearing parameters were found to be extremely good when the worms were fed with V-1 (4 x) mulberry leaves. The silkworm, *Bombyx mori* L. is a highly specialized phytophagous insect as it feeds only on mulberry leaf (*Morus* spp.). The silkworm consumes and digests leaves of different mulberry varieties, but the ability to utilize leaf as potential food varies with the variety to variety. The ratio between glandular and non-glandular trichomes was positively correlated with larval weight, cocoon weight and shell weight. The higher glandular : non-glandular trichome ratio in V-1 appears to be the chief cause of superiority in rearing. The study identified that the ratio between glandular and non-glandular trichomes could be considered as an indicator for high quality mulberry leaf. The high ratio indicates superiority of leaf as silkworm food, whereas the low ratio marks the food inferior.

With the present knowledge available, it is difficult to explain how the higher proportion of glandular trichomes makes food superior. It has been proved that the glandular trichomes play a role in secretions of compounds in some plants that may be involved in to attract pollinators (Asĉensão *et al.*, 1995, 1999). For the ease of silkworm, rearing, mulberry plants are kept only under vegetative phase by repeated pruning. Hence, the role of pollinator does not arise. Probably the secretions from the glandular trichomes contain some non-nutrient phago stimulant, which improved the feeding and ultimately lead to the increased growth of larvae and the resulting cocoon. No study has so far been made in mulberry to understand the specific function of each trichome type. Even in other plants, the studies are also limited. Whatever may be the role of different trichome types, the study established the fact that less number of trichomes on leaf makes the leaf more acceptable to silkworm and higher glandular to non-glandular trichome ratio (above 1.00) makes the variety more palatable to the silkworm with the significant gain in rearing parameters like, larval weight, cocoon weight, shell weight. The findings may be considered as very significant to the mulberry breeder as they can identify the potential superior genotypes during early selection process with out going for actual rearing test.

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