importance of these observations lies in the fact that it is possible to use this beneficial effect of symbiotic association existing under natural condition to reduce the application of phosphatic fertilizers to a great extent in mulberry cultivation specially under tropical condition without any reduction in the leaf yield. It is also possible to reduce the phosphatic fertilization to a great extent in mulberry cultivation by introducing an efficient strain of VA mycorrhiza in the rhizosphere of mulberry plants where the efficient strain of local endophytes is not available in the soil to increase the leaf yield. Besides these it may also be possible to use this beneficial effect of symbiosis to combat soil-borne root infecting pathogens and root nematodes.

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AN INDUCED LEAF DIFFERENTIATION MUTANT IN *SESAMUM INDICUM* L.

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DEVELOPMENTAL mutants affecting laminar growth are of interest as they influence the plant form and growth rate[1,2] and may involve only a small number of genetic substitutions[3]. In addition to their use in the genetic manipulation of plant architecture amenable for combine harvest and improved yield at higher densities reported in various crop plants, the modified leaf types are valuable for basic studies on source-sink relationships, relative distribution of assimilates between vegetative and reproductive parts[2] and the evolution of leaf form in relation to distinct adaptive differences as in some geographical forms of *Sesamum*[4].

In a mutation breeding programme on *Sesamum* for resistance to charcoal rot using locally adapted cultivars in Venezuela, a narrow lamina mutation with only vestiges of lamina around the veins was detected in 1985 in a progeny in the M 4 generation of a variety Ven-52. The material was derived from an initial seed treatment of a dose of 60 kr of γ-radiation from a ^{60}Co source. The secondary and tertiary veins of the lamina were disorganized in growth similar to the leaf mutants in cotton reported by Dilday *et al*[5]. The number and the size of capsules and seed size in the mutant were comparable to its normal counterpart. However, seed set in crosses with the mutant as female was low. This mutant is of practical interest as chemical defoliants and dessicants are sprayed on the crop before harvest for easy mechanical harvest to get seeds free from tiny leaf bits. This mutant can reduce the cost of such a treatment. The genetics of this character was analysed in the subsequent generations and reported in this paper.

The selfed progeny Ven 52-4-N_4-H_{32} in the M 4 generation segregated with 236 plants with normal lamina and 22 with narrow lamina, χ^2 (1df) for 15:1 being 2.8539 (P 0.05–0.10) indicating that the mutant genotype is duplicate-recessive. To confirm the segregation pattern, the next generation was examined with the selfed progenies of 44 randomly selected normals and 33 narrow lamina segregants (table 1) and six crosses, including reciprocals between

Table 1 *Segregation for narrow leaf in selfed progenies in Sesamum*

Group/ segregation ratio	No. of progenies	No. of segregants: Normal lamina	No. of segregants: Narrow lamina	Total	χ^2 1 df	*P*	χ^2 (heterogeneity)	*P*
A (15 : 1)	15	1339	85	1424	0.2394	0.50–0.75	12.4980 (14 df)	0.50–0.75
B (3 : 1)	12	486	159	645	0.0419	0.75–0.90	8.5884 (11 df)	0.50–0.75
C (all normal)	17	1160	0	1160	—	—	—	—
	42	2985	244	3229				
D (all narrow lamina)	33	0	1820	1820	—	—	—	—

Table 2 *Segregation for narrow leaf in crosses between sibs in Sesamum*

Cross	No. of segregants: Normal lamina	No. of segregants: Narrow lamina	Total	Segregation pattern	χ^2 (1 df)	*P*	Genotypes of cross
8674 Normal × narrow	27	5	32	3 : 1	1.5000	(0.20–0.50)	$L_{n_1}l_{n_1}L_{n_2}l_{n_2} \times l_{n_1}l_{n_1}l_{n_2}l_{n_2}$
8676 Narrow × normal	28	12	40	3 : 1	0·5333	(0.30–0.50)	$l_{n_1}l_{n_1}l_{n_2}l_{n_2} \times L_{n_1}l_{n_1}L_{n_2}l_{n_2}$
8677 Narrow × normal	16	5	21	3 : 1	0.0159	(0.70–0.90)	$l_{n_1}l_{n_1}l_{n_2}l_{n_2} \times L_{n_1}l_{n_1}L_{n_2}l_{n_2}$
	71	22	93	3 : 1	0.0896	(0.75–0.90)	
				χ^2 heterogeneity (2 df) = 1.9596 (*P*. 0.25–0.50)			
8675 Narrow × normal	23	18	41	1 : 1	0.6090	(0.30–0.50)	$l_{n_1}l_{n_1}l_{n_2}l_{n_2} \times L_{n_1}l_{n_1}l_{n_2}l_{n_2}$
8678 Narrow × normal	46	0	46	(1 : 0)	—	—	$l_{n_1}l_{n_1}l_{n_2}l_{n_2} \times L_{n_1}L_{n_1}L_{n_2}L_{n_2}$
8679 Narrow × narrow	0	25	25	(0 : 1)	—	—	$l_{n_1}l_{n_1}l_{n_2}l_{n_2} \times l_{n_1}l_{n_1}l_{n_2}l_{n_2}$

normal and narrow lamina sibs and one cross between two narrow lamina sibs (table 2). Standard χ^2 analysis was used to test for deviations from the expected segregation ratios for heterogeneity.

Assuming duplicate recessive control for the mutant phenotype, the pattern of segregation of the 44 random progenies, the observed and expected distribution of the groups, segregating for normal vs narrow lamina in the ratios of 15 : 1 (A) and 3 : 1 (B) and the non-segregating (C) classes revealed good fit and homogeneity within each group. All the 33 progenies of narrow lamina segregants (D) bred true for the same as expected. The relative proportion of the 44 progenies of groups A, B and C was as expected in the ratio of 4 : 4 : 7 under duplicate recessive control of narrow leaf (χ^2 2df = 1.0556; *P* 0.50–0.75).

The segregation in the crosses between narrow lamina and normal sibs revealed no reciprocal differences and confirmed that the abnormal leaf mutant is homozygous-recessive for two loci. The normal phenotype could be homozygous dominant or heterozygous for one or both the loci. The two loci are designated as $L_{n_1} - l_{n_1}$ and $L_{n_2} - l_{n_2}$.

The vascular system in the lamina of the mutant was poor with only 1–2 vascular bundles/microscopic field (× 900) compared to 8–10 in the normal plants. This effect was not evident in the vascular system of the main stem, branches or the inflorescence indicating a localized pleitropic effect on the leaf only. The incorporation of the narrow lamina alleles into the genetic background of superior yielding phenotypes could be useful for improved higher harvest index and for basic physiological studies.

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COCCIDOXENOIDES PEREGRINA: A NEW PARASITOID OF *PLANOCOCCUS CITRI* IN INDIA

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IN recent years the mealybug *Planococcus citri* (Risso) has become a very serious pest of citrus in India. Insecticides failed to give adequate control of the pest in citrus orchards. During our search for natural enemies of *P. citri* in 1986–87, an encyrtid parasitoid, *Coccidoxenoides peregrina* (Timberlake) was collected from *P. citri* infested citrus orchards around Bangalore. This tiny wasp was found to produce 10–30% parasitism of *P. citri* in the field.

C. peregrina was found to attack other mealybug species, viz. *Maconellicoccus hirsutus* (Green) and *Ferrisia virgata* (Ckll.) besides *P. citri* but the development was successfully completed only on *P. citri*. This uniparental internal parasitoid was found to attack all the nymphal instars of mealybug including crawlers. Both male and female mealybugs were found parasitized by *C. peregrina*. It took 23–27 days to complete its development. Adults survived for 4–9 days at the room temperature of 28 ± 2°C.

Perusal of literature revealed that although several parasitoids and predators have been reported on *P. citri* infesting citrus in India[1,2] the present record of *C. peregrina* appears to be first on *P. citri*. *C. peregrina* has been earlier described by Timberlake as *Pauridia peregrina*[3]. This parasitoid is earlier reported to be native to South China, Japan, Philippines, Hawai, Fiji and Uganda[4–6]. *C. peregrina* was also utilized for the control of *P. citri* in California[7], Italy[6] and Bermuda[8]. Since the parasitoid is readily available in India, the mass rearing of *C. peregrina* on *P. citri* and releases in citrus orchards will be useful to suppress the population of *P. citri*.

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ENCENTRIDOPHORUS SIMILIS (ACARINA: UNIONICOLIDAE) AN ACTIVE PREDATOR OF MOSQUITO LARVAE

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PREDATORY feeding behaviour of certain species of mites has been reported earlier[1–4]. In order to study the biology of autochthonous predatory and parasitic mites of mosquitoes, free-living and parasitic water mites were collected from an uncultivated paddy field and from adult mosquitoes within Trivandrum city limits during February to April. The area of collection is characterized by the presence of highly polluted water rich in organic matter, thick growth of aquatic vegetation and a variety of aquatic organisms like ostracods, copepods, nymphs of dragon and damsel flies, etc.

Among the free-living mites collected, adult females of *Encentridophorus similis* belonging to the family Unionicolidae were found to actively predate on first instar larvae of *Aedes albopictus*. So far no report has appeared on mites belonging to family Unionicolidae feeding on mosquito larvae. During