

## Part A

# Potassium for Yield and Quality of Mulberry Leaf in Relation to Silkworm Cocoon Production

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Potassium (K) is a key element in the nutrition of mulberry (*Morus indica* L.), the sole plant used in silkworm (*Bombyx mori* L.) cocoon production. The mulberry production area of India covers 0.281 million ha and has an average foliage productivity of 25 to 30 t/ha/yr. Top quality mulberry leaves with high K content stimulate the growth and pupal development of silkworms and increase both egg and silk production. The present investigation was conducted to optimise the K level and application method for increased yield and quality of mulberry leaves.

Experiments were conducted at four farmer field locations in the state of Karnataka with the M<sub>5</sub> mulberry variety. Potassium treatments consisted of four K levels applied at 120, 160, 200, and 240 kg/K<sub>2</sub>O/ha/yr as potassium chloride (KCl) in six splits plus one percent foliar KCl spray. The control treatment included only 120 kg K<sub>2</sub>O/ha applied in two splits. All treatments had basal doses of nitrogen (N) and phosphorus (P), applied at 280-120 kg N-P<sub>2</sub>O<sub>5</sub>/ha/yr. Nitrogen was split six times over the growing season while P was split over two applications.

Both mulberry leaf yield and quality parameters, viz., K and chlorophyll contents in leaves, were significantly influenced by successive levels of applied K (Table 1). Total leaf yield per hectare was high-

Table 1. Mulberry leaf yield and quality as influenced by graded levels of applied K.

kg K <sub>2</sub> O/ha in soil + 1 % foliar spray	Total leaf yield in different locations, kg/ha/yr				K content, %	Total chlorophyll, mg/g fresh weight
	MRS	KDB	KNH	MH	MRS	MRS
120 <sup>1</sup>	29,040	35,718	32,932	35,547	1.90	2.06
160 <sup>1</sup>	31,881	38,221	37,252	39,352	2.95	2.30
200 <sup>1</sup>	33,027	42,997	37,827	40,743	2.31	2.32
240 <sup>1</sup>	33,449	41,684	38,130	42,004	2.38	2.32
120 <sup>2</sup>	22,694	37,714	33,274	38,235	2.04	2.02
F. test	*	*	*	*	*	*
S.Em ±	—	—	—	—	0.03	0.03
C.D. at 5%	2,066	823	426	760	0.10	0.09

MRS – Main Research Station, KDB – Kadabagere, KNH – Kannahalli, MH – Marasanahalli

<sup>1</sup>Six splits, <sup>2</sup>two splits (control)

est with the application of 240 kg  $K_2O/ha/yr$ . Leaf K content was also highest at 2.38 percent with the application of 240 kg  $K_2O/ha/yr$ . Chlorophyll content was highest at 2.32 mg/g with the application rate of 200 or 240 kg  $K_2O/ha/yr$ .



A healthy stand of mulberry crop grown with balanced K fertilization, ready for cutting.

Mature worm weight, single cocoon weight, shell weight, shell percentage, and filament length also increased significantly with graded levels of applied K, and highest values were obtained by applying 240 kg  $K_2O/ha/yr$  (Table 2).

Table 2. Post cocoon parameters as influenced by feeding silkworm with mulberry leaves fertilized with graded levels of K.

kg $K_2O/ha$ in soil + 1 % foliar spray	Mature worm wt., g (10)	Single cocoon wt., g	Shell wt., g	Shell percentage %	Filament length, m	Filament denier
120 <sup>1</sup>	24.8	1.36	0.211	23.2	794	1.93
160 <sup>1</sup>	26.1	1.46	0.227	23.2	846	1.93
200 <sup>1</sup>	26.7	1.45	0.228	23.4	845	1.93
240 <sup>1</sup>	27.1	1.46	0.233	23.6	861	1.93
120 <sup>2</sup>	25.7	1.42	0.220	23.2	813	1.93
F. test	*	*	*	*	*	NS
S.Em ±	0.17	0.009	0.002	0.12	4.09	0.003
C.D. at 5%	0.54	0.030	0.005	0.36	12.60	–

<sup>1</sup>Six splits, <sup>2</sup>two splits (control) NS - Not significant

These results clearly reveal the usefulness of K in mulberry leaf and silkworm production. The current K recommendation for the areas tested is 120 kg  $K_2O/ha/yr$  applied in two splits. Higher leaf yield and quality and, in turn, silkworm growth and cocoon production are accomplished with double (240 kg  $K_2O/ha/yr$ ) the present recommendation, applied as six splits in combination with one percent KCl foliar spray. However, the net return per rupee invested was highest with 200 kg  $K_2O/ha/yr$ . The maximum net return per rupee at the four respective test locations was 1.60, 1.78, 1.57, and 1.98. **BCI**

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