

Part B

Effect of Applied Nitrogen and Potassium on Mulberry Leaf Yield and Quality in Relation to Silkworm Cocoon Characters

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Mulberry (*Morus indica* L.) leaf quality plays an important role in the nutrition of silkworm (*Bombyx mori* L.) and, in turn, cocoon and silk production. Leaf quality is dependent on the quantity, timing, method, and nutrient balance of fertilizer applications.

Earlier research indicates mulberry responds to nitrogen (N) since it is a constituent of plant proteins, nucleic acids, and vitamins. Potassium (K) plays an important role in plant biochemical functions, development, and yield of foliage and leaf quality improvement. It was also found to have a stimulating effect on growth of silkworm and silk production (see article on page 18 by M.A. Shankar and S.A. Sriharsha). The present investigation was conducted to find the suitable combined dose of N and K for mulberry variety M₅. The objective was to harvest good quality leaves in order to provide for better silkworm growth and cocoon production.

Experiments were conducted at four farmer field locations in the state of Karnataka with the M₅ mulberry variety. All treatments had a single basal dose of phosphorus (P) applied at 120 kg P₂O₅/ha. Four treatments consisted of selected combinations of two levels of N at 300 and 400 kg N/ha and three levels of K at 120, 160 and 200 kg K₂O/ha,

Table 1. Mulberry leaf yield and quality as influenced by application of N and K at different levels.

Treatment N - K ₂ O kg/ha/yr	Total leaf yield in different locations, kg/ha/yr				Chlorophyll content, mg/g fresh weight	
	MRS	KCP	KDB	SGH	K content, % MRS	MRS
300-120 ¹	29,878	31,761	29,794	26,296	2.05	2.152
400-120 ¹	35,535	33,995	35,414	31,510	2.17	2.527
400-160 ¹	36,091	36,380	36,199	32,467	2.39	2.420
400-200 ¹	37,071	37,379	37,185	33,005	2.42	2.620
300-120 ²	31,072	31,519	29,487	26,092	2.05	2.171
F. test	*	*	*	*	*	*
C.D. at 5%	1,066	1,420	1,434	1,881	0.19	0.21

Blanket application of P at 120 kg P₂O₅ per hectare

¹N and K applied in five equal splits, ²N applied in five splits and K applied in two splits

MRS – Main Research Station, KCP – Kenchanapura, KDB – Kadabagere, SGH – Seegehalli

split five times per year. These treatments were compared to the traditional practice of applying 300-120 kg N-K₂O/ha, split five times per year for N and two times per year for K.



Split application of K along with N increases yield and improves quality of mulberry leaf.

Application of N and K significantly influenced the leaf yield, quality, and cocoon characters of the PM x NB₄D₂ silkworm race. Incorporation of N and K at 400-200 kg N-K₂O/ha/yr in five splits resulted in a higher leaf yield per hectare. Total chlorophyll and moisture contents of leaf tissue also increased and added to overall leaf quality (**Table 1**). Quality parameters of the silkworm such as single cocoon weight and single filament length were also improved with the additional dose of N and K fertilizer (**Table 2**).

Table 2. Silkworm growth and cocoon characters as influenced by application of N and K at different levels.

Treatment N - K ₂ O kg/ha/yr	Mature worm (1) wt., g	Single cocoon wt., g	Shell wt., g	Single filament length, m	Filament denier
300-120 ¹	3.36	1.48	0.238	793	1.94
400-120 ¹	3.64	1.63	0.256	867	1.94
400-160 ¹	3.65	1.64	0.259	866	1.95
400-200 ¹	3.69	1.64	0.277	888	1.95
300-120 ²	3.28	1.50	0.248	781	1.93
F. test	NS	*	*	*	NS
C.D. at 5%	—	0.08	0.048	31.28	—

Blanket application of P at 120 kg P₂O₅ per hectare.

¹N and K applied in five equal splits, ²N applied in five splits and K applied in two splits, NS – Not significant

This research shows that higher doses of N and K are beneficial to mulberry production. Based on the soil type and agro-climatic conditions of the test sites, the application of 400-200 kg N-K₂O ha/yr in five splits resulted in the highest yielding and best quality mulberry plants. The dependence of the silkworm on mulberry highlights the importance of balanced fertilization practices on silkworm health and the subsequent quality of silk spun. This study emphasizes the need for adequate N and K fertilization in order to maintain economic viability in mulberry production centers. **BCI**

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