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FERTILISER RECOMMENDATIONS FOR MATURE TEA

This Advisory Circular replaces the following Circulars issued on the use of fertiliser and dolomite for mature tea.

Circular No	Serial No	Month of Issue	Subject
F 4	04/71	June 1971	Economising on Fertilisers
F 5	10/72	May 1972	Urea as a fertiliser for tea
F 10	04/94	June 1994	Fertiliser recommendations for mature tea
F 11	08/85	June 1985	Fertiliser applications based on potential yield
F 12	03/89	January 1989	Dolomite application for tea soils
F 13	03/93	October 1993	Kieserite-fortified mature tea mixture
F 14	14/94	December 1994	Pre- and post-prune fertiliser mixtures
F 15	05/94	June 1994	Foliar application of zinc sulphate for mature tea
M 4	02/93	April 1993	Spraying of potassium sulphate for drought

1 Introduction

Balanced nutrition plays a key role in the maintenance of tea plantations. The cost of fertiliser application varies from 6 to 12% of the total cost of production. Hence, cost-effective investment in fertiliser is necessary to manage a plantation as a commercially viable enterprise.

The response of the tea plant to NPK fertilisers is influenced by several factors such as climate, soil, plant and cultural practices. These factors vary widely between tea growing regions and therefore the plant response to fertiliser is different in different tea growing regions. In the present fertiliser recommendations for mature tea, regional differences have been taken into consideration in order to optimise productivity and profitability of the land.

2.0 Amelioration of soil pH in mature tea fields

The maintenance of suitable soil pH levels is an important practice in soil fertility management.

2.1 Correction of soil pH with dolomitic limestone

Application of dolomitic limestone is recommended to maintain soil pH between 4.5 and 5.5.

The soil pH should be checked prior to every prune, and the rates of dolomite indicated below should be applied depending on pH level, preferably a few weeks before pruning.

Soil pH	Dolomite (kg/ha)
Below 3.9	2500
From 3.9 up to 4.2	2000
From 4.2 up to 4.5	1500
Above 4.5	1000

2.1.1 Specifications

The dolomitic limestone must have a minimum of 18% MgO, and approximately 100% of particles passing through 30 mesh, and 40 to 60% of particles passing through 100 mesh.

3 Plant Response to ground applied nutrients

The optimum range of N, P and K nutrients (kg/ha/yr) required by seedling and VP teas for maximum yield response in different tea growing regions are given in Table 1.

Table 1 - N, P and K requirements for seedling and VP tea in different tea growing regions

	Up country	**Mid-country**	**Low country**	**Uva**
Seedling tea				
N	90 - 220	90 - 180	90 - 140	90 - 220
P_2O_5	25	25	25	25
K_2O	70	70	50	70 - 100
VP tea				
N	270 - 400	270 - 400	270 - 400	270 - 400
P_2O_5	35	35	35	35
K_2O	100 - 140	100 - 140	100	140

3.1 Basal mixtures

To supply the required nutrients, three basal mixtures have been formulated separately for seedling and VP tea. The designation of each mixture identifies the type of tea and the region.

3.1.1 Designation

ST/UM	-	Seedling tea mixture for up and mid-country
ST/LC	-	Seedling tea mixture for low country
ST/UVA	-	Seedling tea mixture for Uva
VP/UM	-	Mature VP tea mixture for up and mid-country
VP/LC	-	Mature VP tea mixture for low country
VP/UVA	-	Mature VP tea mixture for Uva

3.1.2 Composition

Seedling tea mixtures:

		ST/UM	ST/LC	ST/UVA
Urea	parts	196 (90 N)	196 (90 N)	196 (90 N)
ERP	parts	87 (25 P_2O_5)	86 (25 P_2O_5)	89 (25 P_2O_5)
MOP	parts	117 (70 K_2O)	83 (50 K_2O)	150 (90 K_2O)
		400	365	435

The seedling tea mixtures contain approximately:

ST/UM 400	22.5% N, 6.2% P_2O_5 and 17.6% K_2O
ST/LC 365	24.7% N, 6.7% P_2O_5 and 13.6% K_2O
ST/UVA 435	20.7% N, 5.8% P_2O_5 and 20.7% K_2O

VP tea mixtures:

		VP/UM	VP/LC	VP/UVA
Urea	parts	587 (270 N)	587 (270 N)	587 (270 N)
ERP	parts	123 (35 P_2O_5)	126 (35 P_2O_5)	125 (35 P_2O_5)
MOP	parts	200 (120 K_2O)	167 (100 K_2O)	233 (140 K_2O)
		910	880	945

The VP mixtures contain approximately:

VP/UM 910	29.7% N, 3.9% P_2O_5 and 13.2% K_2O
VP/LC 880	30.7% N, 4.1% P_2O_5 and 11.4% K_2O
VP/UVA 945	28.6% N, 3.8% P_2O_5 and 14.8% K_2O

3.2 Fertiliser applications based on "potential yield"

Calculation of annual N-fertiliser requirement for a given tea field is based on "potential yield". The annual potential yield may be defined as the highest yield achieved in the particular year of the pruning cycle, based on the immediate past three cycles.

The application of fertiliser to mature seedling or VP fields should be based on such calculated potential yields. The method of calculation of potential yield for every 12-month period from prune is given below:

Tabulate the annual yield data of each field (kg made tea per ha per year) over the previous 3 cycles (15 years, if the cycle has 5 years). However, if data is not available for three cycles, the data of the past two cycles may be used.

An example is given in Table 2.

Table 2 - Yield record of 12-month periods from pruning (kg made tea/ha/yr)

	Year after prune				
Cycle	**1st**	**2nd**	**3rd**	**4th**	**5th**
1st	1037	2053	1941	1708	926
2nd	884	1893	1826	1573	866
3rd	990	2140	2090	1650	895

The highest achieved yield (potential yield) for a given year in the cycle is underlined. These are 1037, 2140, 2090, 1708 and 926 for the 1st, 2nd, 3rd, 4th, 5th year, respectively.

Select the N-level corresponding to each of the potential yields from Table 3.

Table 3 - Annual requirement of nitrogen for the potential yield

Potential yield (kg made tea per ha per year)	**Requirement of nitrogen (kg N per ha per year)**
Less than 900	90
900-1300	140
1300-1500	160
1500-1700	180
1700-1900	200
1900-2000	220
2000-2500	270
2500-3000	320
3000-3500	360
Above 3500	400

The quantity of nitrogen to be applied in the respective years is therefore:

	1st 12 months	**2nd 12 months**	**3rd 12 months**	**4th 12 months**	**5th 12 months**
Potential yield	1037	2140	2090	1708	926
N to be applied (kg per ha per year)	140	270	270	200	140

Once the quantity of nitrogen per ha per year is determined for each field, the quantity per application is calculated according to the number of applications that is practically possible. The number of applications should be determined on the basis of the agro-climatic conditions, as well as on the cropping pattern of the relevant region.

3.3 Quantity of nutrients, basal mixture and urea, application frequencies and dosages

The quantities of nutrients required, inclusive of the basal mixture and urea, and the applicable frequencies and dosages corresponding to the potential yield category for seedling and VP teas, are given in Tables 4 and 5.

3.4 Foliar and other ground fertiliser applications

Foliar applications of fertiliser for mature tea should be made with knapsack sprayers.

3.4.1 Zinc sulphate

Zinc sulphate is recommended at the rate of 6 and 11 kg per ha per year, for fields yielding less than, and above, 2000 made tea kg per ha per year, respectively. This should be done in four applications, i.e. 1.5 and 2.75 kg in 400 l of water per ha per application. Zinc sulphate should be applied within 7 – 14 days after ground fertiliser application.

3.4.2 Other nutrients

If deficiency symptoms of nitrogen (general yellowing) are observed, apply 2 to 4% of urea. Apply 8 to 16 kg of urea per ha in 400 l of water, as and when necessary.

If deficiency symptoms of manganese (interveinal chlorosis and reddish brown necrotic spots on leaf blade) are observed, test the soil pH. If it is above 5.5, apply 2% manganese sulphate until symptoms disappear, preferably at 3 to 4 week intervals. In addition, withhold the scheduled application of dolomite.

3.4.3 Epsom salt and kieserite for correcting magnesium deficiency

When magnesium deficiency symptoms are observed, spray commercial Epsom salt initially, at the rate of 48 kg per ha per year in four applications, at intervals of three months.

Commercial Epsom salt, zinc sulphate and urea can be mixed together and applied as a single foliar spray, when required. The quantity of urea and Epsom salt could be adjusted depending on the severity of deficiency symptoms. However, do not exceed 5% total salt concentration in the final spray solution.

(N.B. Zinc sulphate and Epsom salt are both salts.)

After application of the above, test the soil for Mg content. If it is below the critical level (60 ppm), apply kieserite at the rate of 125 kg per ha per year by mixing with basal NPK mixture or with urea *in situ*.