Note: International articles which appear in *Better Crops with Plant Food* use metric units of measure, such as kilograms and hectares. In general, articles from the U.S. and Canada appearing in this publication use U.S. (formerly called English) units, such as pounds and acres. The units can be converted from one system to the other using multiplication factors provided in the publication. See page 23.

China

Effects of Magnesium Fertilizer on Crops in South China

By Xie Jian-chang, Du Cheng-lin and Ma Mao-tong

BECAUSE OF STRONG WEATHERING, primary minerals containing magnesium (Mg) in most soils of south China have almost completely decomposed, and dominant clay minerals contain no Mg. As a consequence, total Mg content in the soil is very low, only 0.33 percent on average.

In soils derived from neritic deposits, granitic gneiss and granite, it is even lower . . . commonly below 0.05 percent. The non-exchangeable Mg in the soil usually accounts for less than 10 percent of total Mg. Non-exchangeable Mg of more than 200 soil groups averaged less than 10 mg/100g soil, with many of them containing less than 4 mg/100g. Thus, in general, the Mg-supplying potential is rather low in most soils of south China.

Table 1. Area under fruit and economic crops in south China.

Crop	Total area, 1,000 ha	Crop	Total area, 1,000 ha
Sugarcane	1,164	Rapeseed	3,710
Citrus	1,123	Soybean	1,200
Tea	1,060	Peanut	992
Rubber	616	Tobacco	986
Banana	133		

The southern parts of China are important production areas for cash crops, economic forests and fruit trees, **Table 1.** Some crops require relatively high Mg levels, while others are less sensitive to Mg applications. Traditionally Chinese farmers have not used Mg fertilizer. Calcium carbonate added to farm land for liming purposes contains very little Mg. Calcium-magnesium phosphate applied as fertilizer (about 14 percent of phosphate fertilizer used in the whole country) provides only a small quantity of Mg in the soil. As a result, Mg has become deficient in many soils of south China.

In the Taihu lake region the yearly deficit of MgO is 63 kg/ha. Magnesium deficiencies often develop in crops, as illustrated in the photos. In four plantations in Guangdong province, Mg fertilization markedly alleviated Mg deficiency in rubber trees, as shown in **Figure 1.**

Since 1985, over 70 experiments have

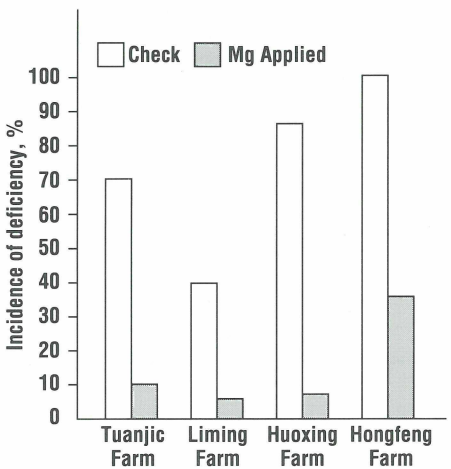

Figure 1. Effect of Mg application on controlling Mg deficiency in rubber trees. (Rate of magnesium sulfate: 0.05-0.25 kg/tree. Investigation made one year after fertilizer added).

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MAGNESIUM-deficient rubber plant in western Guangdong province.

MAGNESIUM-deficient mango plant in western Guangdong province.

Table 2. Effect of Mg fertilizer on crops in south China.

Crop	No. of experiments	Yield, kg/ha		Yield increase	
		NPK	NPKMg	kg/ha	%
Tobacco	8	3,630	4,095	465	12.8
Sugarcane	4	68,100	83,445	15,345	22.5
Peanut	7	3,405	3,570	165	4.9
Rapeseed	3	1,035	1,140	105	10.1
Soybean	2	1,155	1,275	120	10.4
Sweet orange	1	16,155	17,055	900	5.6
Litchi	1	7,905	8,475	570	7.2
Pineapple	3	11,325	12,875	1,550	13.7
Mango	1	3,435	4,035	600	17.5
Banana	1	27,420	29,085	1,665	6.1
Jute	5	1,665	1,950	285	17.1
Chili pepper	1	22,665	27,150	4,485	19.8
Tomato	1	67,365	72,510	5,145	7.6
Cassava	4	17,730	19,845	2,115	11.9
Sweet potato	7	11,535	12,570	1,035	9.0
Corn	3	4,680	4,950	270	5.8

been conducted with related organizations on more than 20 crops grown on different soils. **Table 2** summarizes some of the results. In general, most crops responded favorably to Mg applications. However, little or no effect was shown from Mg application in eight rice experiments.

Magnesium fertilizer application not only increased crop yield but also improved quality on many crops. For example, application of Mg fertilizer significantly improved quality and price of tobacco and had beneficial effects on banana quality and flavor (data not shown).

In southern China, K fertilization has received considerable public attention and promotion. As may be expected, with increased use of K fertilizer, incidences of Mg deficiency have increased.

For example, as shown in **Table 3**, K reduced Mg concentration in rubber saplings. Demand for Mg fertilizer will undoubtedly increase. Research into the correct ratios of K and Mg for specific crops and soil conditions is urgently needed in south China. It is almost certain that the combined use of K and Mg fertilizers will become one of the important issues in balanced fertilization for China in the future. ■

Table 3. Effect of K application on Mg content in different plant parts of rubber saplings.

Rate of K_2O[1] application, g/pot	Mg content, %			Incidence of Mg deficiency, %
	Leaf	Stem	Root	
0	0.25	0.14	0.25	0
3	0.14	0.06	0.21	83.3
9	0.17	0.06	0.18	66.7
18	0.14	0.11	0.19	100.0

[1]As K_2SO_4