Seasonal fluctuations in the major nutrient composition of cashew leaf tissue (Anacardium occidentale L)

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INTRODUCTION

Cashew (*Anacardium occidentale. L*) is a perennial crop, grown on the denuded hill slopes of Kerala, Karnataka and Maharashtra, mainly to control soil erosion. The crop strives hard for its nutrients and water as these plants are seldom fertilised and irrigated.

This study was undertaken to understand the fluctuations in nutrient uptake patterns during its growth phases in relation to climatic factors and also to incorporate this information in fertiliser recommendations.

MATERIALS AND METHODS

Four 10-year old cashew trees grown under normal management were the test plants for this study. These trees did not receive any fertiliser during the course of study to avoid the possible influence of fertilisers on leaf tissue concentration of NPK.

Fully matured leaves from all round the trees were collected at 30 days interval starting from January to December. Leaf samples were processed and analysed for their NPK contents.

Taking into consideration the lowest concentration as a base figure, percentage increases were calculated over a period of one year. Daily rainfall, maximum and minimum temperatures, sunshine's hours and rate of evaporation were also recorded during the period under study.

RESULTS AND DISCUSSIONS

Nitrogen: Lowest percentage of leaf nitrogen was recorded during the month of April, just before the completion of fruiting season. Further, build up of this element in the plant system was almost static during May, June and July months. The rate of build up was at low magnitude upto October and thereafter abruptly increased, reaching its peak during the month of December i.e. just before flowering. From January to April a progressive decline in this nutrient was observed. (Fig. 1)

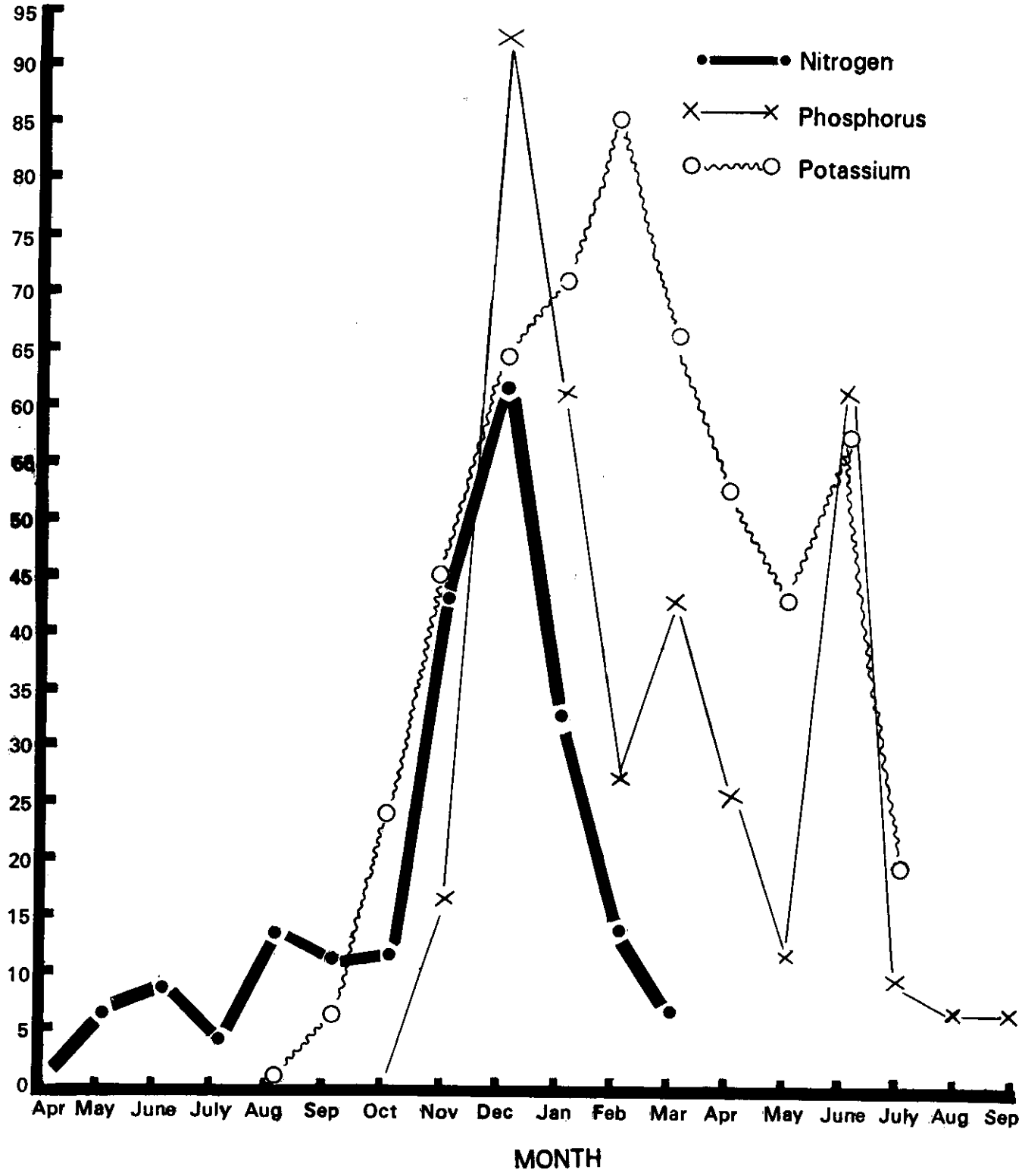
Phosphorus: Phosphorus content of leaf was almost static from May to October with an exception during the month of June which could not sustain further. Just before the initiation of the reproductive phase i.e, December, the *P* content of leaf had an abrupt peak and thereafter steadily declined till April (Fig. 1).

Potassium: The lowest concentration of potassium in the leaf was recorded during the month of August. A progressive build up of this element was observed from October to February and thereafter declined at a low magnitude (Fig. 1). The marginal increase in the nitrogen content of the leaf tissues during the month of April, May, June and July probably due to poor availability of this element from the soil. The characteristic nature of the drought in these areas from January to May followed by a heavy monsoon during June and July is likely to cause a severe retardation in the process of mineralisation of this element during the first five months and later due to leaching by heavy rainfall coupled with very low sun-shine hours per day. However, potassium also followed the same trend of nitrogen during the rainy season. With the cessation of rains, the build up of these two elements may be due to improved soil conditions by way of soil moisture availability, increased soil temperature and also sun-shine hours which would have helped in mineralising the native nutrients and effectively utilising radiant energy. The high content of potassium in the leaf tissue during the early dry weather may be to maintain the water potential in the plant system during the reproductive phase.

It has also been observed from the nutrient ratios that the plant accumulates more potassium in relation to nitrogen during dry season to maintain the water potential and vice versa during the wet season, where the plant puts more vegetative growth.

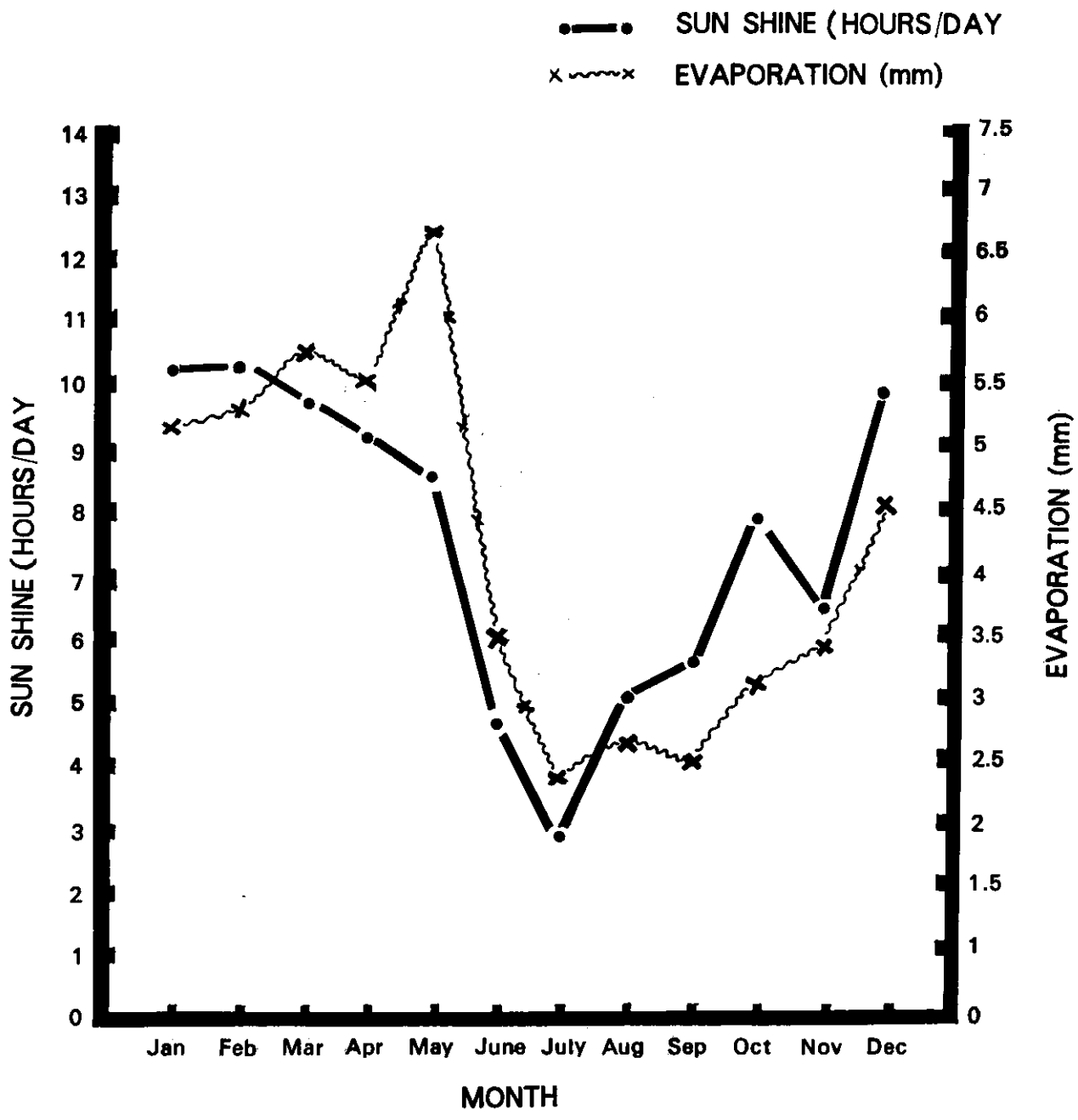
From these studies it could be concluded that under this agro climatic system, the plants strive hard to obtain their nutrients from April to July and thereafter these are slowly built up. Hence, it is prudent to apply half the recommended dose during May–June and the rest during October–November.

SEASONAL FLUCTUATION IN THE MAJOR NUTRIENT COMPOSITION OF CASHEW LEAF TISSUE



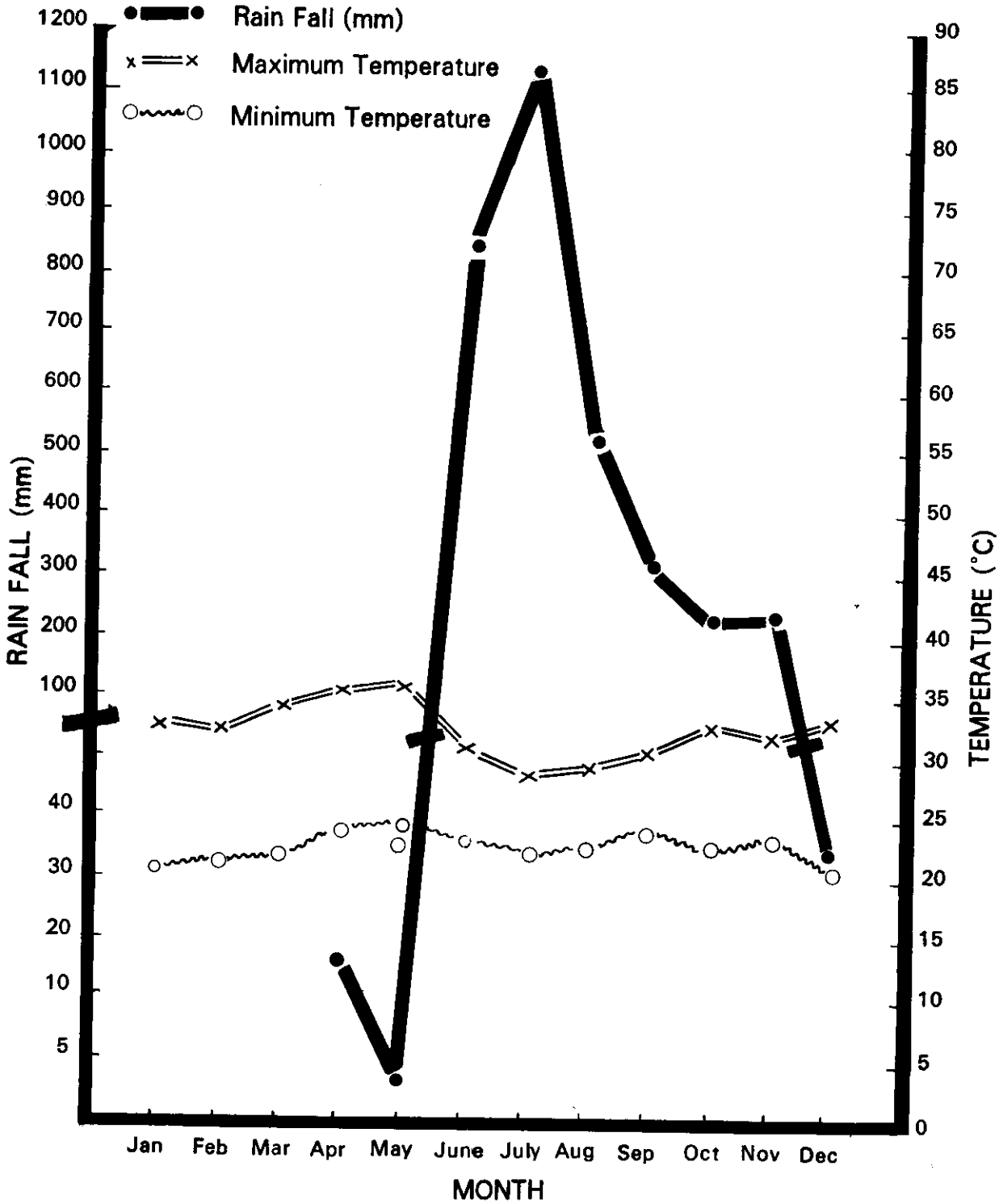
(Fig. 1)

MEAN MONTHLY SUN SHINE (hours per day) AND EVAPORATION (mm)



(Fig. 2)

MEAN MONTHLY RAIN FALL (mm), MAXIMUM TEMPERATURE (°C) and MINIMUM TEMPERATURE



(Fig. 3)

TABLE 1

WEATHER DATA FOR 1979 (MEAN MONTHLY)

Months	Rainfall (mm)	Max-Temp. (°C)	Mini-Temp. (°C)	Sunshine (h/day)	USWB PAN Evaporation (mm)
January	Nil	33.2	20.7	10.1	5.1
February	Nil	33.2	21.1	10.1	5.3
March	Nil	34.9	22.4	9.8	5.7
April	16.8	35.3	24.2	9.1	5.5
May	4.1	35.5	24.5	8.6	6.7
June	841.2	31.6	23.6	4.7	3.5
July	1163.5	26.4	22.6	2.9	2.4
August	528.8	29.2	22.9	5.0	2.7
September	300.4	30.3	23.4	5.6	2.5
October	222.4	32.6	22.9	7.9	3.1
November	223.4	32.4	23.3	6.5	3.4
December	34.6	33.4	21.3	9.9	4.5