(Fig. 9). The synergids are hooked and the egg hangs down below the synergids. The three antipodal cells are ephemeral.

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1. Garudamma, G. K., *J. Indian bot. Soc.*, 1956, **35**, 222.
2. —, *Ibid.*, 1957, **36**, 227.
3. Gavde, S. G., *J. biol. Sci. India*, 1963, **6**. 11.
4. Ghosh, R. B., *Curr. Sci.*, 1962, **31**, 165.
*5. Juliano, J. B , *Philipp. J. Agri.*, 1934, **23**, 11.
6. —, *Ibid.*, 1934, **23**, 49.
*7. Karsten, G., *Flora*, 1891, **90**, 36.
*8. Mauritzon, J., *Bot. Notiset.*, 1935, p. 490.
9. Nair, M. C., *Rev. Internac. Bot. Exptl.*, 1958, **10**, 145.
10. —, *J. Indian bot. Soc.*, 1959, **38**, 353.
11. —, *Ibid.*, 1959, **38**, 367.
12. Nair and Kanta, *Ibid.*, 1961, **40**, 382.
13. Narasimhachar, S. G., *Curr. Sci.*, 1936, **5**, 298.
14. Narayana, L. L., *J. Indian bot. Soc.*, 1958, **37**, 147.
*15. Paetow, W., *Planta*, 1931, **14**, 441.
*16. Wiger, *J. Diss. Lund.*, 1935.
*17. —, *Notiser*, 1936, p. 585.

* Original not seen.

EVALUATION OF INTERRELATIONSHIP BETWEEN CATION EXCHANGE CAPACITY OF LEAF AND ROOT IN ARECANUT, *ARECA CATECHU* L.

IN recent days, root cation exchange capacity measurements have provided a promising tool in soil fertility and plant nutrition studies. Cation exchange capacity (CEC) of roots which is reported to be correlated with yield[5] and cation accumulation in plant tops[2] also shows a linear relationship with its content of uronic acid[4]. The CEC-uronic acid relationship holds good not only for the root but for leaf as well. The uronic acid content of leaf is more than that of root because of the fact that CO_2 evolves also from compounds which do not take part in the cation exchange process[4]. Efforts have been made here to examine the relationship between CEC of leaf and root of arecanut, *Areca catechu* and study their related mineral nutrition problems.

Initial work was confined to the standardization of a leaf sampling method which would give representative CEC value without much variation. For this purpose, about a two-year old arecanut seedling of VTL-local was selected. Spindle was taken as zero and the leaves in the seedling were numbered upward down. Leaflets were collected at base, middle and tip positions from both the sides of leaf and for all the leaves of the seedling. Leaf sampling was made from three seedlings selected at random from the nursery. Simultaneously, root samples were also collected from these seedlings by the procedure adopted earlier[6]. Leaf samples were washed with distilled water. Plant samples comprising of root and leaf were dried separately in an oven at 80° C, milled to pass through 1 mm sieve and their CEC determined by adopting Crooke's method[1]. A perusal of the data presented in Table I shows that although the middle leaflets of first leaf showed the highest CEC, it was more consistent in the middle leaflets of second leaf, and, therefore, future sampling of leaf was done from the middle leaflets of second leaf for CEC estimation.

TABLE I

CEC of arecanut leaf as affected by position and leaf number

(Expressed on oven dry basis as meq/100 g)

Leaf number \ Leaflet position	Base	Middle	Tip	Mean (leaf)
1	13·490	14·386	13·253	13·710
2	13·013	14·050	13·410	13·491
3	12·876	13·330	13·410	13·205
4	12·780	13·093	13·250	13·041
Mean (position)	13·039	13·714	13·330	13·362
LSD (Position)				0·238*
LSD (Leaf number)				0·275*
LSD (Leaf position × Leaf number)				0·477*

* Significant at 5% level of probability.

TABLE II

Table of coefficients of correlation

Interaction		value
Root CEC *vs* Leaf CEC	..	+0·834‡
Root CEC *vs* Ca+Mg+K	..	−0·217 NS
Root CEC *vs* K/Ca+Mg	..	−0·361 NS
Root CEC *vs* P	..	+0·505 NS
Leaf CEC *vs* Ca+Mg+K	..	−0·043 NS
Leaf CEC *vs* K/Ca+Mg	..	−0·412 NS
Leaf CEC *vs* P	..	+0·266 NS

‡ Significant at 0·1% level probability, NS = Non-significant.

In order to examine the relationship between CEC of leaf and root, 13 cultivars of *Areca catechu* L, were included in the present

study. Samples of root and leaf were collected from 4 two-year old seedlings of each cultivar and their CEC estimated. Leaf samples were digested by a biacid mixture of $HClO_4$ and HNO_3 of equal volume and from an aliquot, P, K, Ca and Mg were determined by standard methods. Sum of the cations in leaf was found out by the addition of K, Ca and Mg. Coefficients of correlation were worked out between CEC of leaf, and Ca+Mg+K, K/Ca+Mg and P contents of leaf and CEC of root.

The CEC of leaf representing different cultivars of arecanut varied from 7·373 to 10·207 meq/100 g and it was the highest in the case of VTL-13 which also exhibited the maximum root CEC in an earlier study[6]. A very high *r* value in the order of + 0·834 and significant at 0·1% level of probability was recorded between root and leaf CEC of the cultivars. The pattern of relationships between leaf and root CEC with respect to their individual coefficients of correlation with P, Ca+Mg+K, and K/Ca+Mg of leaf were more or less similar. The negative coefficients of correlation obtained between leaf CEC *vs* K/Ca+Mg and root CEC *vs* K/Ca+Mg probably indicate that the 'Mattson's valence effect' not only operates in root but also in leaf notwithstanding the fact that the leaf does not take part in the function of nutrient absorption directly. It is, however, not evident whether the relationship obtained between leaf and root CEC is mere incidental or that CEC is a physical property of all plant tissues or even if it has got any significance in the mineral nutrition of plants[3] at all. However, by employing leaf CEC as a measure of root CEC, the laborious and time-consuming job of obtaining a representative root sample could perhaps be overcome and, possibly, the scope of applicability of this tool in studying fertility problems associated with arecanut may be widened.

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1. Crooke, W. M., *Pl. Soil*, 1964, **21**, 43.
2. — and Knight, A. H., *Soil Sci.*, 1962, **93**, 365.
3. Huffaker, R. C. and Wallace, A., *Agron. J.*, 1959, **51**, 120.
4. Knight, A. H., Crooke, W. M. and Inkson, R. H. E., *Nature*, 1961, **192**, 142.
5. Mehrotra, C. L. and Saksena, V. P., *Indian J. Agric Sci.*, 1970, **40**, 889.
6. Mohapatra, A. R., Pillai, S. S., Bhat, N. T. and Murthy, K. N., *Ibid.*, 1972 (communicated).

EFFECT OF FLOWERING AND BERRY FORMATION ON TUBER YIELD IN POTATO

Flowering in potato is reported to reduce yield upto 10% and fruit setting by an additional 14%[1]. Mitra and Bose[2] showed that in variety Phulwa, under short days in plains profuse flowering behaviour has no adverse effect on tuber yield. Snell[3] and Proudfoot[4] had, however, shown increased yield of tubers following removal of flower buds. Since limited information is available on this subject, experiments were planned to work out the effect of flowering and fruit setting on the yield in potato. Varieties from both the sterile and fertile groups were taken and grown under long day conditions where blooming takes place in all the varieties.

The experiment was conducted at Kufri station of the Institute. Four profusely flowering varieties, Uptodate and Kufri Kumar from sterile group, and Kufri Safed and President from the fertile group, were planted in a randomised block design with four replications. Two treatments in sterile and three in fertile groups were included. The plants in the four varieties were subjected to the following treatments:

T_1—Nipping the buds after initiation.
T_2—Normal flowering, but no berry development.
T_3—Normal flowering and berry formation.
(T_3 used only in fertile group.)

Four hundred plants in each variety in a treatment of each group were studied. Average yields with standard errors were worked out in each group for each treatment method of analysis of variance was applied to work out significant differences in yields between treatments (Table I).

Analysis of variance revealed that significant gain in tuber yield was observed between the treatments in varieties of sterile group. Where flowering was not allowed the treatment