TABLE III

AVERAGE NUMBER OF ROOTS ON BASAL FRAGMENTS AFTER 14 DAYS' CULTURE WITH APICAL END ON SM AGAR ± IAA (0.1 μGM/ML) + KINETIN (MEANS OF 10 ESTIMATES)

IAA	KINETIN CONC (μGM/ML)			
	1.0	0.1	0.01	0
Present	0	2.0	3.0	3.6
Absent	0	0	0.5	0

μgm/ml of kinetin and partly suppressed by 0.1 and 0.01 μgm/ml of kinetin.

2. In the absence of auxin, 1.0 μgm/ml of kinetin suppressed the elongation of such fragments on sucrose mineral agar.

3. The increase in fresh weight and dry weight induced in apical sunflower fragments cultured on sucrose mineral agar by 1 μgm/ml of IAA was not significantly changed by the presence of kinetin at a concentration of 1, 0.1 or 0.01 μgm/ml.

4. In the absence of auxin, 1.0 and 0.1 μgm/ml kinetin produced a significant increase in fresh and dry weight of these fragments which was about half that produced by 1 μgm/ml of IAA.

5. The initiation of adventitious roots induced by 0.1 μgm/ml of IAA applied to the apical end of basal sunflower fragments was inhibited completely by 1.0 μgm/ml of kinetin and partially by 0.1 μgm/ml kinetin.

6. In the absence of auxin, kinetin did not induce the initiation of adventitious roots in these fragments.

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ANESTHETIZATION BY DI-ETHYL ETHER AND THE TRANSPORT OF FOLIAR APPLIED RADIOCALCIUM[1,2,3]

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The absence of downward transport of Ca^{45} in higher plants has been reported by Bledsoe (1), Norton (4), Martin (3), and others. It has been subsequently determined in our laboratory that there is little or no transport of Ca^{45} through graft unions of herbaceous plants involving reversed polarity (2). This has suggested the possible role of polarity in the movement of calcium. That polarity in plants might be temporarily suspended by mild anesthesia has been recorded by Went and Thimann (5).

Accordingly, $Ca^{45}Cl_2$ was applied dropwise to one of the two fully expanded primary leaves of the bean (*Phaseolus vulgaris*, var. Black Valentine). Plants with a Ca^{45}-treated primary leaf were then grouped as follows:

(a) The primary leaf treated with Ca^{45} was exposed for 96 hours in a 500-ml glass jar at room temperature to vapors from 25 ml of ether (diethyl).
(b) The leaf opposite the Ca^{45}-treated leaf was exposed to ether as in (a) above.
(c) The Ca^{45}-treated leaf was placed in a comparable glass jar with no ether.
(d) The leaf opposite the Ca^{45}-treated leaf was placed in a comparable glass jar with no ether.

Plants were harvested after the designated 96 hours of exposure and autoradiograms were prepared as described by Wittwer and Lundahl (6).

In contrast to previous experiments demonstrating the absence of downward transport of calcium in plants, exposure of the Ca^{45}-treated leaf to ether resulted in considerable transport of Ca^{45} out of the leaf and into other parts of the plant including the roots (fig 1). When the primary leaf opposite the Ca^{45}-treated leaf was subjected to ether vapors (group b) some basipetal transport of Ca^{45} was noted within the leaf itself. No transport, however, occurred out of the Ca^{45}-treated leaf when the opposite leaf was anesthetized. Likewise, no appreciable basipetal transport of Ca^{45} was evident from the site of application in either group (c) or (d). Under the conditions described the leaves subjected to ether vapors and to Ca^{45} exhibited no visible injury and no modification.

SUMMARY

The immobility and absence of downward transport of calcium in bean plants has been established with radiocalcium. Bean leaves treated with $Ca^{45}Cl_2$

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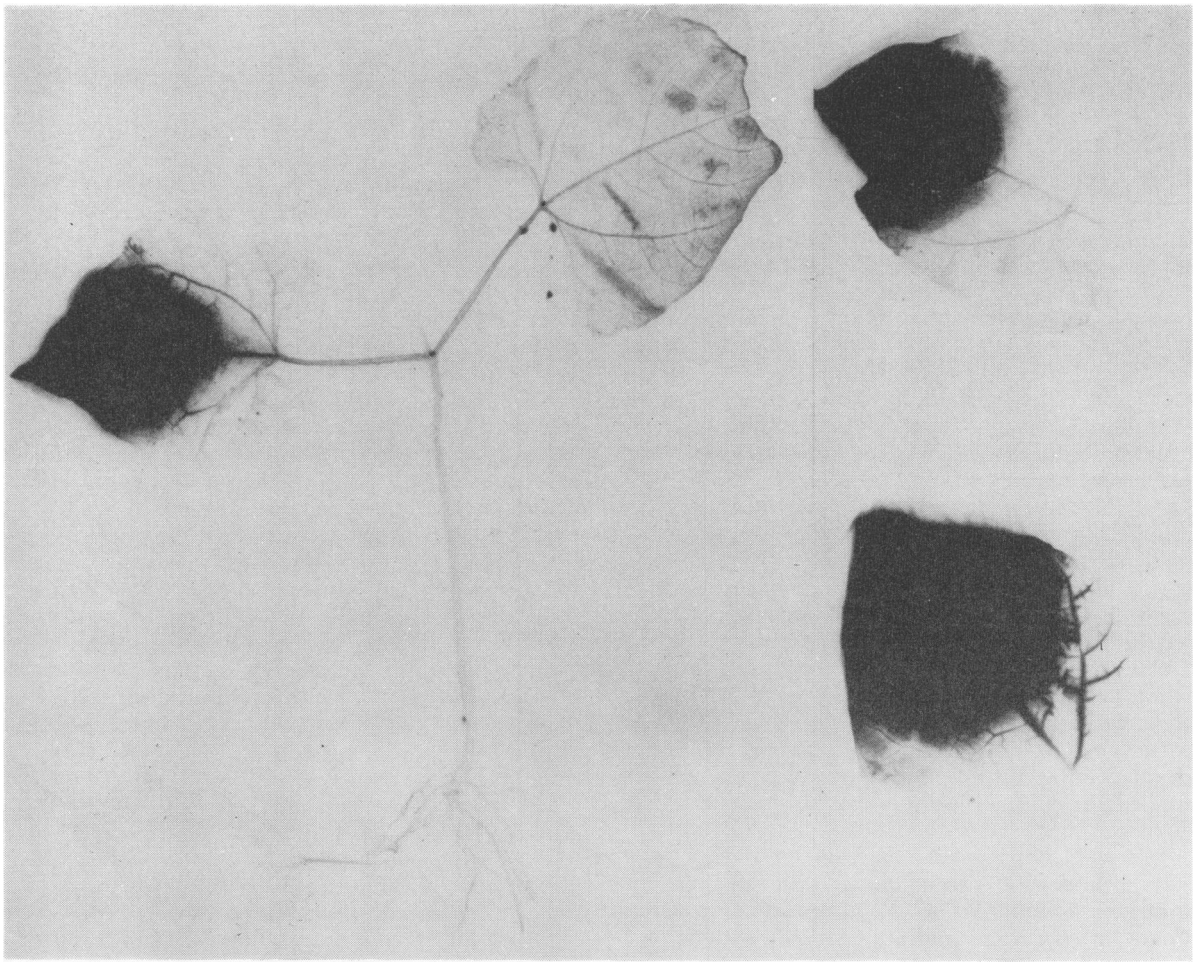

FIG. 1. Autoradiograms showing distribution of foliar applied Ca^{45} in the bean plant. (*Left*) Anesthetized Ca^{45}-treated leaf showing considerable transport out of the treated leaf; (*upper, right*) C^{45}-treated leaf opposite an anesthetized leaf showing very little transport; (*lower, right*) Ca^{45}-treated leaf with no basipetal transport of C^{45} from a plant receiving no anesthetization.

and subsequently anesthetized with di-ethyl ether transported considerable quantities of calcium from the site of application to all other parts of the plant as demonstrated by autoradiography.

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