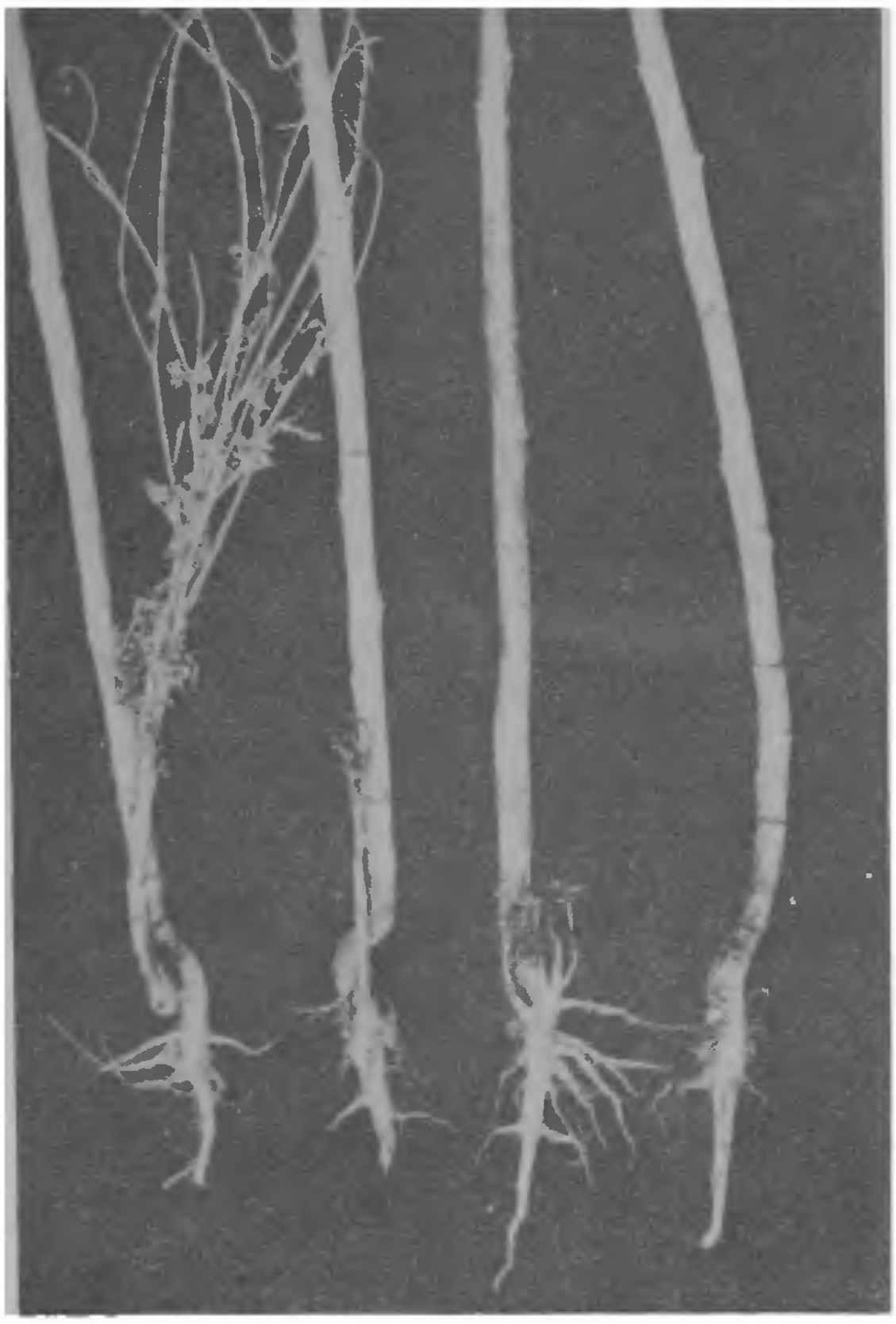

Figure 1. Secondary shoots of various sizes finding their origin from roots of *Brassica* plants.

Figure 2. Comparison of normal roots and roots with secondary shoots. No secondary shoot (extreme right); secondary shoot originating (centre); and secondary shoots originated from the bulbous tumor (extreme left).

transformation) in *B. napus* and *B. campestris* by co-cultivation of these varieties with *Agrobacterium tumefaciens* A 722 (octopine plasmid) and C 58 (nopaline plasmid) and *A. rhizogenes* (hairy root plasmid) were noticed[4]. In another case tissue from tomato root gall, induced in vitro by the nematode (*Meloidogyne incognita* (Kofoid & White) Chitwood) turned green when exposed to light and chlorophylls A and B were found[5]. The change of physiological property of root cells by injury due to nematodes causing tumorous growth and then the formation of secondary shoots needs further study.

If the secondary shoots could be synchronized with the main shoot, and the character is brought under the genetic control, a new plant ideotype (like wheat), with higher yield, could be produced.

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PHYTOALEXIN ACCUMULATION IN DIETHYL ETHER TREATED COTYLEDONS OF *CAJANUS CAJAN*

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PLANT tissues are known to accumulate phytoalexins when treated with elicitors which include substances of both biotic and abiotic origin[1–8]. French bean cotyledons accumulate phytoalexins when treated with chloroform[9]. However, no information is available on phytoalexin accumulation in *Cajanus cajan* particularly when the cotyledons are treated with diethyl ether. The present communication reports the

phytoalexin accumulation in *C. cajan* cotyledons on treatment with diethyl ether.

Seeds (20 g) of *C. cajan* (cv UPAS-120) were soaked in distilled water (14 hr), testa were removed and the seeds were split into cotyledons. These cotyledons were kept in a petridish exposed to diethyl ether vapours for 2, 4 . . . . 20 min. Then the petridishes were taken out and incubated at room temperature (30° C) for 96 hr. The phytoalexins were extracted with 70% MeOH and quantitative analysis carried out by HPLC[10] using solvent system of acetonitrile: water (1:1, v/v). For quantitative estimation, known amount of internal standard (carbofuran) was chromatographed along with the crude sample and the resulting peak areas measured to establish the relationship between peak areas and sample weight.

The following formula was used:—

$$K\ (\text{Phytoalexin}) = \frac{\text{Total peak area of phytoalexin} \times \text{Weight of internal standard}}{\text{Peak area of internal standard} \times \text{Weight of phytoalexin}}$$

where K is the capacity factor

$$\text{Weight of Phytoalexin (crude sample)} = \frac{\text{Weight of internal standard} \times \text{Peak area of phytoalexin}}{K\ (\text{Phytoalexin}) \times \text{Peak area of internal standard}}$$

As part of an investigation into the relationship between death of plant cells and subsequent accumulation of isoflavanoids we have assessed the effects of diethyl ether vapours which kill cells very rapidly on cotyledons of *C. cajan*.

After exposure to diethyl ether for 2–10 min cotyledons showed a gradual browning of their surface on incubation for 12 to 96 hr. Isoflavanoids accumulated in the discoloured cotyledons and the amounts of phytoalexin produced become greater as the damage progressed (table 1). Cajanol and cajanin were present at concentrations upto 108.5 $\mu g.g^{-1}$ and 67.8 $\mu g.g^{-1}$. No isoflavonoids were detected in undamaged cotyledons. Cotyledons treated for more than 10 min did not accumulate any of the above compounds. Diethyl ether is very volatile and is unlikely to persist within the treated tissues. The results, therefore, support the suggestion made earlier[9], that the accumulation of phytoalexins can be a direct consequence of death of superficial cells of cotyledons.

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Table 1 *Accumulation of phytoalexin in cotyledons of pigeonpea cv UPAS-120 exposed to diethylether*

Time (min)	Cajanol ($\mu g.g^{-1}$)	Cajanin ($\mu g.g^{-1}$)	Isoprenylated genistein ($\mu g.g^{-1}$)
0	—	—	—
2	18.60 ± 1.14	6.18 ± 2.10	4.86 ± 1.17
4	30.42 ± 2.28	17.41 ± 3.81	12.82 ± 3.16
6	49.41 ± 3.46	31.64 ± 4.51	18.48 ± 1.08
8	66.78 ± 4.18	45.31 ± 2.89	32.31 ± 1.18
10	108.46 ± 5.34	67.84 ± 4.56	46.48 ± 4.30
12	—	—	—
14	—	—	—
16	—	—	—
18	—	—	—
20	—	—	—

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