SHORT COMMUNICATIONS

AGROBACTERIUM TUMEFACIENS-INDUCED TUMOUR FORMATION ON SOME TROPICAL DICOT AND MONOCOT PLANTS

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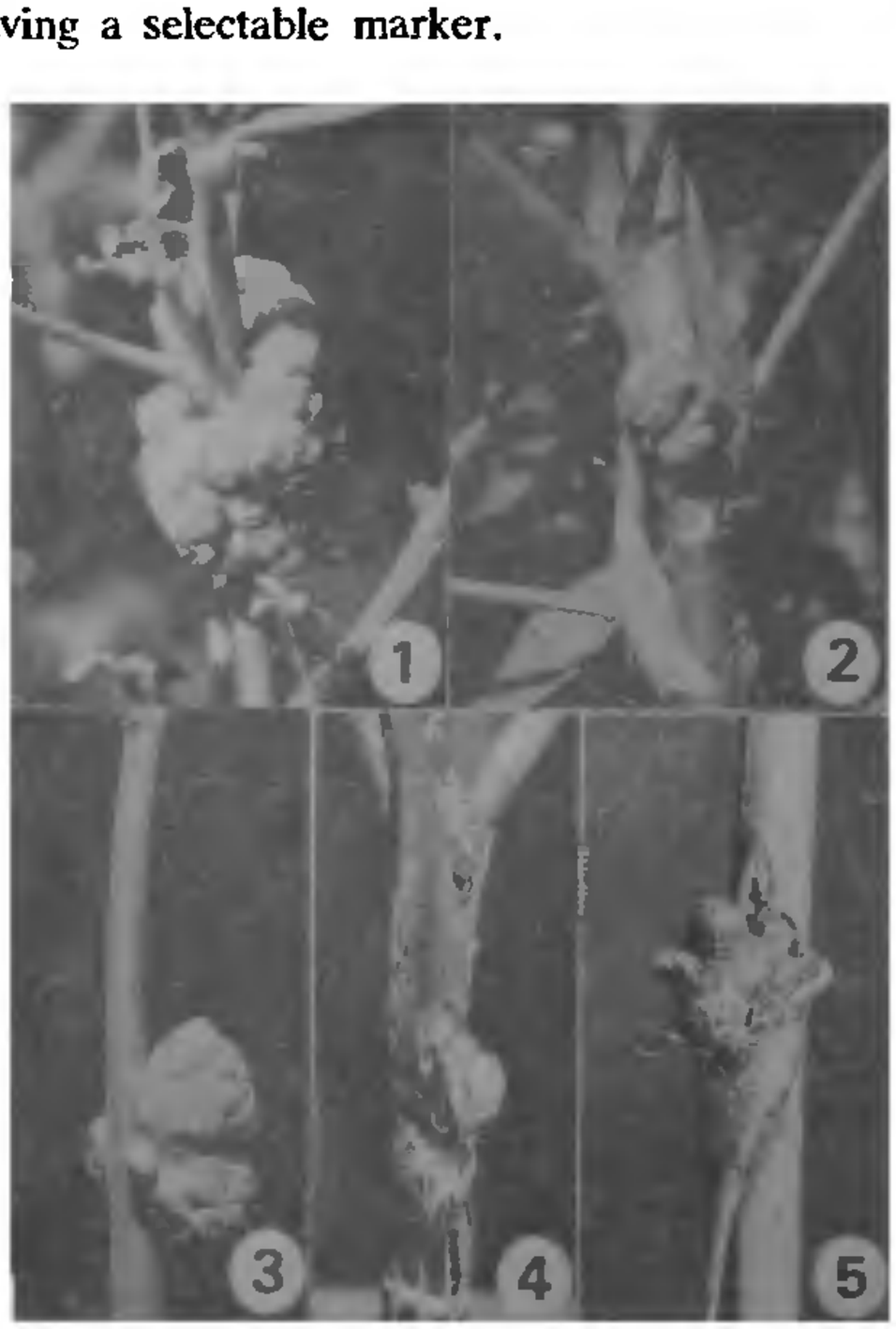
AGROBACTERIUM TUMEFACIENS-induced tumour formation on plants is due to genetic transformation brought about by transfer of a part of the Ti plasmid DNA into the host cell[1,2]. The transferred (T)-DNA covalently integrates into the chromosomal DNA of the host cell[3,4]. This natural transformation system has been developed as 'disarmed' binary[5–8] or co-integrate vectors[9–12] for introducing genes into plant genome. Using such vectors, regeneration of phenotypically normal plants, expression and sexual transmission of bacterial and plant genes has been shown in tobacco, *Petunia* and sunflower[1,2]. Currently, there is wide interest to extend this transformation system to other plant species. The host range of *A. tumefaciens* and related *A. rhizogenes* harbouring Ri plasmid has been summarized[13,14]. The host range is generally confined to dicotyledonous species, though transformation of monocot plants has been reported[15–17]. We have found that several tropical plant species (table 1) not tested earlier[13,14] show tumour formation following *in planta* inoculation with oncogenic strain A 208 harbouring PTiT37. Photographic evidence of tumour formation is presented in figures 1–5. Plants were inoculated after injuring the stem and maintained at 24 ± 1°C during the 24 hr post-inoculation period. The species transformed include important grain legume crops of the tropical and sub-tropical region. Four monocot species, also produced visible tumours which were nopaline positive. The results show the feasibility of genetic transformation in the crop species listed using Ti plasmid based vectors. Efforts are underway to regenerate plants of grain legume species from tissues transformed by *Agrobacterium* strains harbouring 'disarmed' Ti plasmid having a selectable marker.

Table 1 *Agrobacterium tumefaciens mediated transformation of important tropical crop plants and some monocots*

Dicotyledonous plants		
Cicer arietinum Linn.	–	Chick pea
Cajanus cajan (L.) Millsp.	–	Pigeon pea
Vigna radiata (L.) Wilczek.	–	Mungbean
Vigna mungo (L.) Hepper	–	Black gram
Arachis hypogaea Linn.	–	Groundnut
Glycine max Merr.	–	Soybean
Ricinus communis Linn.	–	Castor
Manihot esculenta Crantz	–	Tapioca
Ipomoea batatas Linn.	–	Sweet potato
Cucurbita moschata Duchesne	–	Pumpkin
Monocotyledonous plants		
Asparagus tetragonous Bresler		
Asparagus sprengeri Regel		
Cordyline terminalis Kunth		
Cordyline rubra Hugel		



Figures 1–5. Tumour-induced by *in planta* inoculation with *Agrobacterium tumefaciens* strain A 208; **1.** *Cicer arietinum* Linn.; **2.** *Arachis hypogaea* L.; **3.** *Cajanus cajan* (L.) Millsp.; **4.** *Cordyline rubra* Hugel; **5.** *Asparagus tetragonous* Bresler.

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BIOLOGICAL ACTIVITY OF SCHIFF BASES AND THEIR METAL COMPLEXES

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THE schiff bases and their metal complexes find remarkable applications in pharmacology. They are known to possess antibacterial[1], antifungal[2] antituberculostic[3] and antitumour activities[4]. In view of its importance, a few of the complexes of Co(II), Ni(II), Cu(II), Zn(II), Cd(II), Hg(II), Sn(IV) and Th (IV) with diazo schiff bases such as 5-phenylazo salicylideneaniline (PASA), 5-phenlazosalicylidene-*o*-aminophenol (PASP) and 5-phenylazosalicylidence-*o*-toluidine (PAST) have been screened for both gram-positive and gram-negative organisms.

Antimicrobial activity of test compounds was assessed against *B. subtilis*, *E. coli*, *K. pneumoniae* and *S. lutea* by cup-plate method[5]. For this purpose, the following new azoschiff base compounds prepared in our laboratory were used. The ligands and complexes were prepared as follows.

5-Phenylazo salicylaldehyde (PAS) was prepared according to the method of Das and Trivedi[6]. The schiff bases were then prepared by refluxing aniline, *o*-toluidine and *o*-aminophenol with PAS, 1:1 molar ratio in alcoholic medium on water bath. The water formed during the reaction was eliminated and the reaction mixture acidified with a few drops of hydrochloric acid. The schiff bases PASA, PASP and PAST thus precipitated after cooling, were filtered, washed and crystallized from ethanol. The melting points were taken in open capillaries and are uncorrected.

The metal complexes were prepared by treating the schiff bases PASA, PASP and PAST dissolved in the least amount of ethanol with metal chlorides in stoichiometric ratio 1:1 (metal:ligand). The reaction mixture was refluxed for about 1-2 hours. The solution was then reduced to a smaller volume on a water bath, the pH raised to about 7 by alcoholic ammonium hydroxide. The respective solid complexes thus separated were filtered, washed with ethanol and dried in a desiccator over fused $CaCl_2$. The complexes were purified by Soxhlet extraction using a suitable solvent. Sub-cultures of the said organisms were prepared in nutrient broth and incubated at 37°C for 24 hr. Nutrient agar plates