Studies on the effect of root exudates of different crops on pigeon pea wilt pathogen (Fusarium udum Butler) and its antagonistic fungi

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ABSTRACT
Plant root exudates are known to affect survival, reproduction and development of various microorganisms in soil through extremely complex phenomenon. Saprophytic and pathogenic activities such as competition and antibiosis of the root microflora are mediated by exudates. An analysis of the effect of different crop root exudates such as groundnut, castor, soybean, sunflower, maize, green gram, hybrid sorghum and resistant pigeon pea revealed high inhibitory effect on conidial germination and radial growth of Fusarium udum. In contrast, the root exudates of local sorghum varieties had less influence on the radial growth of antagonistic fungi viz., Penicillium sp., Trichoderma sp. Aspergillus sp. in the increasing order (6.8, 9.8 and 10 per cent), in spite of promoting germination and radial growth of the wilt pathogen Fusarium udum. However, root exudates of some crops such as groundnut, cotton, hybrid sorghum and resistant pigeon pea on potentiation of Trichoderma viride and inhibition of Fusarium udum conidial germination was also reported with root exudates of sorghum, maize (Bhatnagar, 1995). In this study, an attempt has been made to evaluate the in vitro effect of root exudates of other crops on conidial germination and radial growth of Fusarium udum and its antagonistic fungi so that they could be grown as intercrops in wilt endemic areas.

INTRODUCTION
Pigeon pea is one of the major pulse crops of the tropics and subtropics. The crop is attacked by fungi, bacteria, virus, phytoplasma like organisms and nematodes. However, only a few of them cause economic losses. Fusarium wilt is the most important disease of pigeon pea in India resulting in yield loss up to 67 per cent at maturity and 100 per cent loss in case of infection at pre-pod stage (Kannaiyan and Nene, 1981). Plant root exudates are known to affect survival, reproduction, development of various microorganisms in soil. Saprophytic and pathogenic activities indirectly such as competition and antibiosis by the root microflora are mediated by exudates (Schroth et al. 1963). Gaur and Sharma (1991) established an apparent correlation between wilt incidence, magnitude of Fusarium udum population and population of antagonists of the rhizosphere soil of resistant pigeon pea cultivar SP-15. Promotion of Trichoderma viride and inhibition of Fusarium udum conidial germination was also reported with root exudates of sorghum, maize (Bhatnagar, 1995). In this study, an attempt has been made to evaluate the in vitro effect of root exudates of other crops on conidial germination and radial growth of Fusarium udum and its antagonistic fungi so that they could be grown as intercrops in wilt endemic areas.

MATERIALS AND METHODS
Studies were conducted on effect of root exudates of different crops on wilt pathogen of pigeon pea at ICRISAT, Patencheru, AP during 1997-99. Root exudates of nine crops namely, groundnut, castor, soybean, sunflower, maize, green gram, hybrid sorghum and resistant pigeon pea were tested on conidial germination and radial growth of Fusarium udum. The root exudates filtrate analysis was carried as per the standard method (Odunfa, 1978). Seeds of all crops were surface sterilized with 2.5 per cent sodium hypochlorite solution for 10 minutes. They were then thoroughly rinsed with sterilized water and placed over sterilized moist blotting paper in Petriplates for 72 h at 25°C. The germinating seeds were then transferred on to holed Styrofoam sheet cut to fit the size of 150 ml beaker containing 20 ml of sterilize distilled water. The young seedling were placed in such a way that radicles of the germinating seeds (six per beaker), when passed through holes of the Styrofoam sheet just dipped into the sterile water. The beakers along with young germinated seedling were covered with black paper and...

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