SHORT COMMUNICATION

GRAFT AND DODDER TRANSMISSION OF JATROPHA MOSAIC VIRUS DISEASE

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Abstract: The plant of *Jatropha curcas L*. suffer from several diseases, among them Jatropha mosaic virus disease is a newly emerging disease that challenges the productivity of a prospective biofuel crop, *Jatropha curcas*. Jatropha mosaic virus(JMV) disease could not be transmitted either through the vector aphids or through mechanically, but disease could be transmitted by grafting from donor *J. curcas* to healthy *J. curcas* and also from *J. gossypiifolia* to *J. gossypiifolia* but not from *J. curcas* to *J. gosypiifolia* and vice versa and the disease could also be transmitted successfully through dodder. 80% of the dodder transmitted *J.curcas* plant developed distorted symptoms within 15 days after inoculation.

Keywords: JMV, *Jatropha curcas, Jatropha gossypiifolia,*Grafting, Dodder

INTRODUCTION

Jatropha curcas L. is a major commercial biodiesel crop grown on 98 million acres in India. *Jatropha curcas* L. belongs to family Euphorbiaceae and is a drought-resistant bush or small tree Which attain a height of upto eight to ten meters under favourable conditions (Jones and Miller, 1992). *Jatropha curcas* is fast growing plant and can easily be propagated using either seeds or stem cutting. Plants raised from seeds will be more robust, live for longer periods. The propagation of branch cutting is easy and results fast growth of plant and the bush can be expected to start bearing fruit within one year of planting (Kaushick, 2001). Its life span is around 45-50 years (Takeda, 1982). The tree is of significant economic importance for its numerous industrial and mechanical uses. The preparation of all parts of the plant, including seeds, leaves and bark fresh or as a decoction are used in traditional medicine and for the veterinary purposes. The oil extracted from Jatropha seeds is being used as a biofuel for diesel engines thus Jatropha has a great potential to contribute to the renewable energy sources. In India the area under the cultivation of Jatropha is increasing in recent years with the ever increasing demand for fossil fuels that are exhausting at a rapid rate. JMD was first reported on Jatropha plant in Puerto Rico (Bird, 1957). In India JMD was first reported from Karnataka state, South India in (2004) by (Rangaswamy *et al.,* 2005; Aswatha Narayana *et al.,* 2006).Birds (1957) reported that Jatropha mosaic virus disease was transmitted by grafting to weed species such as *J.multifida L.,*
J.podogrica L. and Croton lobatus L. Similarly, graft transmissible nature of mungbean yellow mosaic gemini virus was previously reported by Nariani (1960), Ahmed and Harwood (1973), Chenulu and Verma (1988).The disease also successfully transmitted by dodder to *Jatropha gossypiifolia L.* (Bird, 1957).

MATERIAL AND METHOD

To determine the graft transmission of JMV Infected plants of *Jatropha curcas* maintained in insect proof cage were used as source plants for the study. The diseased scions from JMV infected plants were made into a 'V' shaped structure. The scions were inserted into slanting cut made on the healthy stock plants of *Jatropha*. The grafted portion was tied tightly with a high-density polythene strip. The inoculated plants were kept in insect proof cage for symptom development under observation.
The ability of the dodder (*Cuscuta reflexa* Roxb.), a natural parasite on *Jatropha* to transmit the virus was also tested. Few vines of the dodder were collected from healthy weeds (*Lantana camara*) and allowed to grow on the infected *Jatropha* plants. The dodder developed on the infected *Jatropha* plants were then allowed to grow on the healthy *Jatropha* (3-5 leaf stage) seedling and this set up was maintained for 30 days (Plate-5). Afterwards the target plants were separated from the dodder and maintained for 3-months in an insect proof cage for symptoms development under observation.

RESULT AND DISCUSSION

Table-1 indicated that the virus under study was transmitted by core grafting from donor host *J.cucas* to receptor healthy *J.curcas* and donor host *J.gossypiifolia* to receptor healthy *J.gossypiifolia* as 90% of *J.curcas* plants and 75% of *J.gossypiifolia* plants developed symptoms in 25-30 days and 30-35 days after grafting respectively. None of the *J.curcas* plants grafting with infected *J.gossypiifolia* scions and *J.gossypiifolia* with infected *J.curcas* scions developed any symptoms even after upto 90 days.

Table 1. Transmission of JMV through grafting

S.No.	Donor plant	Receptor plant	No. of plants		Percent transmi-ssion	Time taken for symptoms expression (Days)
			Inoculated	Infected		
1.	*J.curcas*	*J.curcas*	20	18	90	25-30
	J.curcas	*J.gossypiifolia*	20	00	00	---
2.	*J.gossypiifolia*	*J.gossypiifolia*	20	15	78	30-35
	J.gossypiifolia	*J.curcas*	20	00	00	---

It is clear from the table-2 that the JMV was transmitted by dodder from *J.curcas* to *J.curcas*, but not from *J.curcas to J.gossypiifolia, Glycine max, Manihot esculenta* and *Nicotiana tabaccum*. 80% of the dodder transmitted *J.curcas* plants developed distorted symptoms within 15 days after inoculation. These results are in agreement with the findings of Hollings *et al*. (1976) who reported the transmission of a rod shaped East African whitefly (*B. tabaci*) borne sweet potato mild mottle virus via dodder (*Cuscuta compestris* L.) to *Calystegia sepium* R. Br. Prod. successfully.

Table 2. Dodder transmission of JMV

S.No.	Test plants	No. of plants		Percent Transmission	Time taken for symptoms expression (Days)
		Inoculated	Infected		
1.	*J.curcas*	10	08	80	10-15
2.	*J.gossypiifolia*	10	00	00	---
3.	*Glycine max*	10	00	00	---
4.	*Nicotiana tabaccum*	10	00	00	---
5.	*Manihot esculenta*	10	00	00	---

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