

Research Notes**Pollen fertility studies in *Jatropha* L.**

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Abstract

Pollen fertility percentage is conducted for 10 *Jatropha* species and an interspecific backcrossing hybrid between *Jatropha curcas* x *Jatropha integerrima* (BC₃F₁). Totally nine species namely *Jatropha villosa* var. *villosa*, *Jatropha villosa* var. *villosa*, *Jatropha multifida*, *Jatropha podagrica*, *Jatropha maheswarii*, *Jatropha glandulifera*, *Jatropha gossypifolia*, *Jatropha integerrima* and *Jatropha curcas* had more than 84 per cent of pollen fertility. BC₃F₁ hybrid recorded the highest pollen fertility percentage of 97.54, while *Jatropha tanjorensis* had 0.16 per cent of pollen fertility which amounts to near sterility.

Key words: *Jatropha*, interspecific, pollen fertility.

Jatropha L. is a morphologically diverse genus comprising of 176 species and it is generally grown as live fence in almost all parts of India (Heller, 1996). In India, 12 species have been recorded so far and they showed wide variation for vegetative and floral characters and oil content (Paramathma *et al.*, 2004). Variation in nuclear number of the male gametophyte of Euphorbiaceae, out of 24 tribes, 18 had exclusively binucleate (II) pollen, 3 exclusively trinucleate (III), and 3 had both binucleate and trinucleate pollen (Webster and Rupert, 1973). Two attempted crosses involving *Jatropha curcas* L. and *Jatropha cathartica* Teran., *Jatropha curcas* L. and *Jatropha podagrica* Hook. were reported by Dehgan (1984). Progenies of these crosses were nearly sterile as shown by 5 and 4 % of stainable pollen respectively. Pollen fertility percentages of species such as *Jatropha curcas* L., *Jatropha podagrica* Hook., *Jatropha multifida* L. and *Jatropha integerrima* Jacq. were also reported. Sujatha and Prabakaran (1997) reported the fertility status of different species of the genus *Jatropha*. They reported that species such as *J. integerrima* Jacq, *J. curcas*, *J. multifida*, *J. podagrica*, *J. gossypifolia* and *J. glandulifera* were fertiles. *J. integerrima* Rosea was partially sterile and *J. tanjorensis* was a fully sterile species in the genus *Jatropha*.

Ten species and an interspecific hybrid were used for the pollen fertility study. They are: (1) *Jatropha villosa* var. *villosa* Wight.; (2) *Jatropha villosa* var. *villosa* Wight & Ramen (3) *Jatropha multifida* L. ;

(4) *Jatropha podagrica* Hook. ; (5) *Jatropha maheswarii* Subram and Nayar.; (6) *Jatropha glandulifera* Roxb. ; (7) *Jatropha gossypifolia* L.; (8) *Jatropha tanjorensis* Ellis and Saroja. ; (9) *Jatropha integerrima* Jacq. ; (10) *Jatropha curcas* L. and (11) *Jatropha curcas* x *Jatropha integerrima* (BC₃F₁). Fully opened fresh flowers were taken for study. Anthers were placed on the slide and cut open and gently tapped to shed the pollen grains. The anther wall and other debris were completely removed. A drop of potassium iodide (KI) stain was used for pollen staining. Fully stained pollen grains were recorded as fertile and those partially stained or fully unstained or shrunken were counted as sterile.

$$\text{Pollen fertility (\%)} = \frac{\text{No. of fertile pollen}}{\text{Total no. of pollen}} \times 100$$
$$\text{Pollen sterility \%} = 100 - \text{pollen fertility per centage}$$

In order to understand the pollination behaviour of the genus *Jatropha*, pollen fertility studies were undertaken in ten species and BC₃F₁ hybrid and the results are given below. Out of 10 species studied for pollen fertility per cent; nine species had more than 84 per cent of pollen fertility (Table 1). BC₃F₁ hybrid recorded the highest pollen fertility percentage of 97.54 (Fig 1), while *Jatropha tanjorensis* had 0.16 per cent of pollen fertility which amounts to near sterility. Similar results have been reported by Sujatha and Prabakaran (1997). In *Jatropha*



tanjorensis, very few stained pollen grains were observed but such grains were bigger than the pollens observed in other species (Fig 2).

References

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Table 1: Pollen fertility percentage of different species of *Jatropha*

S. No	Name of the Species	Total no, of pollen grains observed	Total no, of stained grains	Total no, of un-stained grains	Total no, of shrunken grains	Total no, of partially stained grains	Pollen fertility %
1	<i>Jatropha villosa</i> var. <i>villosa</i>	457	388	54	15	nil	84.90
2	<i>Jatropha villosa</i> var. <i>ramnadensis</i>	457	398	52	7	nil	86.19
3	<i>Jatropha multifida</i>	503	474	10	10	9	93.52
4	<i>Jatropha podagrica</i>	584	524	11	36	14	89.55
5	<i>Jatropha maheswarii</i>	387	349	30	8	nil	90.58
6	<i>Jatropha glandulifera</i>	537	521	9	6	nil	96.81
7	<i>Jatropha gossypifolia</i>	463	427	25	11	nil	92.22
8	<i>Jatropha tanjorensis</i>	605	37	25	543	nil	0.16
9	<i>Jatropha integerrima</i>	526	492	11	23	nil	93.11
10	<i>Jatropha curcas</i>	548	507	17	24	nil	92.10
11	<i>Jatropha curcas</i> x <i>Jatropha integerrima</i> (BC ₃ F ₁)	588	575	6	7	nil	97.54