



Research Paper

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Cytological studies in the intergeneric progenies of *Carica* and its related genera

■ G.L. VEENA, M.R. DINESH¹ AND A. REKHA¹

Members of the Research Forum

Associated Authors:

¹Division of Fruit Crops, IIHR,
BENGALURU (KARNATAKA)
INDIA

Author for correspondence :

G.L. VEENA

Department of Horticulture,
University of Home Science,
G.K.V.K., BENGALURU
(KARNATAKA) INDIA
Email : veena.lgowda@gmail.com

ABSTRACT : Cytological study was carried out in the intergeneric progenies generated by crossing *Carica papaya* variety Arka Surya and *Vasconcellea cauliflora* as well as in the parents. The observation showed that there was no change in chromosomal number of the intergeneric progenies. All the F₁ and F₂ intergeneric hybrid progenies showed 9 bivalents and normal meiotic division. The presence of normal number of bivalent and univalent indicated that there is normal homology between *C. papaya* and *V. cauliflora*. The ideal time for collection of flower bud sample was observed to be between 10 a.m. to 11 a.m. for the intergeneric progeny hybrids as well as their parents on a bright sunny day. Active meiotic activity and all stages of meiosis from early prophase to tetrad development were observed this time in the cells. Meiotic activity was at its peak at 10.30 a.m. for field grown plants irrespective of flower bud size, which varied from 5- 10 mm.

KEY WORDS : Bivalents, Chromosomes, Intergeneric hybrids, Meiosis, Univalent, Tetrad

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Papaya (*Carica papaya* L.) is one of the most important fruit of tropical and subtropical regions of the world belonging to the family Caricaceae. It is believed to have originated in Central-America with South-Mexico and Costa Rica as origin (De Candolle, 1884). A major limiting factor in papaya production is the presence of viral disease 'Papaya ring spot virus (PRSV) with all the cultivated varieties being highly susceptible to this disease. *Vasconcellea cauliflora* J., (previously known as *Carica cauliflora*) a wild related genera having non-edible fruits is known to be resistant for this viral disease (Jimenez and Horovitz, 1967). One of the methods to develop resistant progenies would be to cross *Vasconcellea cauliflora* with *Carica papaya*. However, these two genera are cross incompatible and earlier attempts to raise progenies have met with little success. Successful attempts to rescue the hybrid embryo from *Carica papaya* and *Vasconcellea cauliflora* have been reported by some workers (Khupse *et al.*, 1980; Manshardt and Wenslaff, 1989; Manshardt, 1995). Success with intergeneric hybridization has been reported in recent times by Dinesh *et al.* (2007) by breaking the intergeneric crossing barrier. It is a proven fact that intergeneric hybrids generally end up with sterility in

large number of progenies. Hence, cytological studies were carried out to see the change in the chromosomal number as a reason for this sterility.

RESEARCH METHODS

Flower buds from hermaphrodite and male flowers of *C. papaya*, *Vasconcellea cauliflora* and their hybrid population from F₁ and F₂ generations were collected from 10 am to 11 am on a bright sunny day. Flower buds were fixed in Farmer's solution consisting of 1 part glacial acetic acid, 3 parts of 95% ethyl alcohol and 1 part of chloroform. (*i.e.*, 60 ml absolute alcohol; 30ml glacial acetic acid; 10ml of chloroform). These buds were then transferred to 70% ethyl alcohol and stored in refrigerator for 24 hours. Meiosis in pollen mother cells (PMC) was examined using acetocarmine technique. Anthers were macerated in a drop of 1% acetocarmine on a glass slide to release the micro sporophyte. Destaining and clearing of slide was done by passing the slide over the flame of spirit lamp. The number of chromosomal pairing at metaphase and the formation of diads, triads, and tetrads were observed under electron microscope.