

RESEARCH ARTICLE

STUDIES ON FLORAL CHARACTERS AND SEX REVERSAL IN *CARICA PAPAYA*

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ABSTRACT

Fruits are the healthiest food with minerals, vitamins, antioxidants etc. Growing fruit trees in home gardens assure fresh and quality fruits. In the present work, cutting the male papaya plant at its base make them to sex reversal and thereby develop into hermaphrodite papaya plant. In the first time of flowering season it produces hermaphrodite flowers but does not produce fruits. All the flowers will drop down, but in second flowering season it develops fruit but they are not bulky, it is elongated. On microscopic studies it is observed that number of ovule development is more in hermaphrodite flowers than in female flower.

Keywords: *Carica papaya*, floral characters, sex reversal, hermaphrodite flower.

1. INTRODUCTION

Fruits are the source of health enhancers as it contains vitamins, anti oxidants, minerals etc. Fruits are one of the favourite diets from very old days to present. Its market value goes on increasing as it contains above said ingredients. Most of the countries have indigenous fruits and also introduced species. In India, Mango, Jack fruit etc are indigenous species. Pineapple, Papaya, Guava, Cherry, Plum, etc were introduced from various countries. Papaya is a tropical fruit which can thrive in many type of soil so an easiest fruit to cultivate. Among the states, Andhra Pradesh, Gujarat, Karnataka, Maharashtra are the leading producers of this fruit. The plant is with a single stem growing about 7- 10 m tall with leaves arranged spirally at the top of the trunk. The fruit which is berry are rich sources of antioxidant nutrients such as carotenes, vitamin C and flavonoids. The minerals such as potassium, copper, and magnesium are present. Papaya contains the digestive enzyme, papain. Papayas may be very helpful for the prevention of atherosclerosis and diabetic heart disease.

Three sexual morphism were noted in Papaya that is male, female, and hermaphrodite. The male produces only pollen and no fruit setting, the female will produce small, inedible fruits if not pollinated, while the hermaphrodite can self-pollinate and produce good fruits. For cultivation hermaphrodites are preferred than female papaya plant. Present study pointed how a male papaya plant in home gardens can be reversed to hermaphrodite plant for getting fruits.

2. MATERIALS AND METHODS

Three flower types were observed the staminate, pistillate and bisexual in different

papaya plants. The male flowers are borne on inflorescence with long stock and each flower have 10 anthers and rudimentary ovary. Female flowers are borne singly or as cymose inflorescence at each axil of newly formed leaves and may be white or yellow which bears bulged ovary but without any anthers. The hermaphrodite plant bears single flowers like female plants but with stamens and not as bulky as its flower.

In the present study, those plant from where male flowers are collected were cut using a sharp knife at its base above 50cm from the ground and observe the changes happening to the plant externally.

3. RESULTS AND DISCUSSION

Male flowers are usually borne as racemose inflorescence (Fig. 1). with about 10 epipetalous stamens arranged as two set with five each (Fig. 8, 9 and 10). Flowers from male plants have rudimentary ovaries and styles (Fig. 3 and 7 C). Female flowers are arranged as singly or cymose inflorescence (2A) without any pendulous axis as found in the male. Individual flowers are bulky with no stamen (Fig. 5). Ovary is large (Fig. 6 and 7 A) with a branched stigma at the tip of ovary. In hermaphroditic plants, flowers are borne at the apical region of the stem and branches in a cymose inflorescence fashion. Individual flowers are tubular (Fig. 2 B) with ten stamens arranged like those in the male flowers (Fig. 4). Staminate flowers from hermaphroditic plants have non-functional rudimentary ovaries and style while hermaphroditic flowers have functional ovaries, style and stigmatic surface. However, the ovaries are much smaller than those of typical females (Fig. 2B). In *Carica papaya*, female flowers are polypetalous while male and hermaphroditic

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flowers are gamopetalous (Fig. 2 ABC). All males and hermaphroditic flowers examined had rudimentary ovaries (Fig. 7 B and C) while the female flowers have bigger and functional ovaries (Fig. 7 A).

The plant grow with branches as we cut the trunk above 50cm from the ground. Only two branches are maintained for present study. In the present work, cutting the male papaya plant make them to sex reversal and there by develop into hermaphrodite papaya plant. In the first time of flowering season it produce hermaphrodite flowers but does not produce any fruits. But in second season it produce fruits. The number of ovule development is more in hermaphrodite (Fig. 11) than in female flower (Fig. 12).



Fig. 1 Fig. 2 A B C



Fig. 3



Fig. 4



Fig. 5



Fig. 6

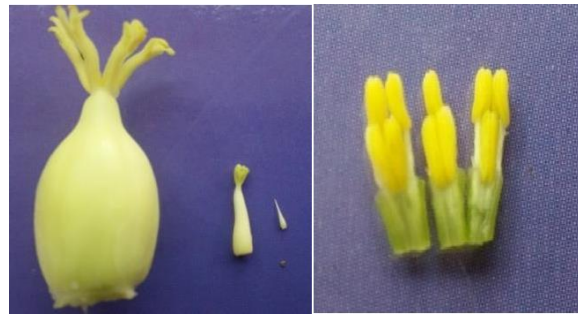


Fig.7 A B C

Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12

In the present study cutting the male plant make the plant reversed to hermaphrodite and produce fruits. Environmental sex determination is well documented in the plant kingdom (1, 2). Such sexual transformation has been reported in *Carica*

papaya (3). The hermaphrodite plant is the preferred type of papaya plant for dependable fruit production, but under certain conditions its flower morphology is unstable and subject to “sex reversal.” (4). The present study pointed the fruit formation in male plant when a stress is given externally to the plant.

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