

Studies in the biomass production of papaya varieties

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ABSTRACT

Papaya, being dioecious in nature, produces plants having male and female flowers separately on different plants. Cross pollination always occur in the crop. As a result of this phenomenon, there is wide diversity in varietal behaviour of papaya cultivars. With a view to identify the suitability of such standard variety of papaya for cultivation under the agroclimatic conditions of the Gangetic plains of the country, a stage wise study on screening of suitable dwarf varieties of papaya was undertaken in Horticultural garden of C.S.A. Univ. of Agric. and Tech., Kanpur during 2006-07. Seven varieties of papaya namely Surya, HG-05, Pant-1, Pusa Delicious, Selection S-1, Honey Dew and Pusa Nanha, were included in the studies. The maximum germination and survival per cent of papaya seedlings in the field was recorded in Pusa Nanha, while HG-05 variety proved most vigorous and produced the maximum biomass. The other varieties, included in the present study, remained intermediary with regard to biomass production.

Key words : Papaya, Varieties, Biomass production.

The Papaya (*Carica papaya* L.) is an important fruit of tropical and subtropical region of the world. It is native of tropical America and was introduced in India in 16th Century. In India, though it is grown all over the country but important papaya growing states are Karnataka, West Bangal, Assam, Kerla, Andhra Pradesh, Tamilnadu, Bihar, U.P and Maharashtra. In northern India, the occurrence of low temperature and frost restricts its cultivation. Papaya is an evergreen plant and bears flowers and fruits almost in all part of the year and hence, it requires a soil of high fertility and good drainage. Papaya being dioecious in nature produces plants having male and female flowers separately on different plants. Cross pollination always occur in the crop. As a result of these practices, there is wide diversity in varietal behaviour of papaya cultivars. However, some good varieties of papaya have been evolved and the purity of seed of these varieties have been maintained under ideal conditions of production.

With a view to identify the suitability of such standard variety of papaya for cultivation under the agro climatic conditions of central U.P., a stage wise experiment on screening of suitable dwarf varieties of papaya was undertaken.

MATERIALS AND METHODS

The present investigation aimed for suitable dwarf varieties of papaya (*Carica papaya* L.) was undertaken mostly dealing with vegetative growth under the title "Studies in the biomass production in papaya cultivars". Experiment was conducted in the experimental block of

garden of the Department of Horticulture, Chandra Shaker Azad University of Agriculture and Technology Kanpur, U.P. during the year 2006-07.

The Investigation was undertaken with seven varieties of Papaya namely Surya, HG-05, Pusa Delicious, Pant-1, Honey Dew, Selection-1 (S-1) and Pusa Nanha under randomized block design. Observations were recorded on germination and survival percentage of papaya seedlings and growth parameters viz. height of plant (cm), girth of stem (cm), number of leaves per plant, length of leaves (cm), width of leaves (cm), plant spread North- South and East- West (cm), and biomass production of plant (green weight) in kg at monthly interval. Final observations were recorded 7 months after transplanting.

RESULTS AND DISCUSSION

Germination of papaya seed in the present investigation varied significantly with the varieties, Pusa Nanha gave the maximum of 63.33% germination followed by Honey Dew and Pant-1 varieties. Similarly significantly highest percentage of survival was noted under Pusa Nanha (88.00) closely followed by Pusa Delicious (87.33) and Pant-1 (86.66) as compared to all others. Surya variety, however, showed the poorest germination of 34% followed by HG-05 exhibiting 41.00% germination (Table 1). The variation expressed by papaya varieties may be attributed to the varietal behaviour. Similar results were reported by Naik (1949) in papaya.

The vegetative growth like height which is one of the most important parameters of judging growth of plant

Table 1: Germination, growth parameters and survival of different papaya varieties

Variety	Germination %	Survival %	Plant height (Cm)	Stem girth (Cm)	Number of leaves	Leaf Length (Cm)	Leaf width (Cm)	Spreads		Biomass Production Kg/Plant
								N-S (Cm)	E-W (Cm)	
Surya	34.00	39.66	64.0	10.30	13.30	28.00	30.00	119.06	112.66	5.40
HG-05	41.00	38.66	80.66	18.40	36.33	25.66	30.30	143.60	143.43	7.00
Pant-1	56.00	86.66	62.60	14.40	20.33	30.00	33.00	127.26	124.60	5.60
Pusa Delicious	45.00	87.33	74.66	13.66	15.66	30.33	31.00	111.93	112.00	6.20
Selection S-1	54.66	75.66	61.66	13.50	32.00	28.00	33.00	121.16	115.66	6.50
Honey Dew	59.33	74.33	59.66	11.86	16.33	25.33	25.33	100.86	93.36	6.60
Pusa Nanha	63.33	88.00	57.66	14.86	29.00	34.00	39.69	136.03	142.80	6.00
C.D. (P=0.05)	7.307	7.713	4.239	0.840	1.493	2.239	2.462	11.608	11.613	0.450

varied significantly and most dwarf (57.66 cm) plants were noted under Pusa Nanha while HG-05 produced tallest plants (80.66cm) confirming the earlier findings of Jana *et al.* (2006) and Kawarkha *et al.* (2001). Similarly the maximum girth was attained by HG-05 recording 18.40 cm, followed by Pusa Nanha (14.86cm). In the present investigation significantly maximum number of leaves were found in HG-05 (36.33) as compared to Surya which gave lowest (13.30) leaves per plant.

In papaya the number of leaves are limited, therefore, the size of leaf becomes important. Since leaf is the centre of photosynthesis, its size governs the health of the plant. Pusa Nanha showed highest length (34.00cm) and width (39.69cm) of leaf. The finding is in agreement with the reports of Jana *et al.* (2006).

The variety HG-05 attained maximum crown growth measuring 143.60 cm (N - S) and 143.43 cm (E - W). The second vigorous variety expressing higher plant spread was Pusa Nanha with 136.03 cm (North-South) and 142.80 cm (East- West) spread. The poorest plant spread was expressed by Honey Dew with 100.86 and 93.36 cm in (N-S) and (E-W) direction, respectively. These variations in plant spread may be attributed to the fact that papaya is a cross pollinated crop and the plant raised from seed has a mixed inheritance making it highly variable in performance. The findings of the present investigation are in line with the earlier reports of Dwivedi *et al.* (1999) and Jana *et al.* (2006).

Biomass production is the correct judgment of plant growth. The maximum biomass weighing 7.00 Kg was recorded under HG-05 closely followed by S-1 (6.50 Kg) and Pusa Delicious (6.20 Kg). The lowest biomass was

registered under Surya (5.40 Kg) and Honey Dew (6.60 Kg). Similar results were reported by Kawarkha *et al.* (2001) in papaya.

Pusa Nanha gave maximum germination (63.33%), Tallest plants having maximum girth and bio mass were noted under HG-05 variety. This variety, however, produced greater crown growth expressing relatively maximum number of leaves.

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