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Comparative performance of different hybrid combinations of oil palm under Sub-Himalayan Terai region of West Bengal

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Abstract

A field experiment was undertaken to assess the performance of eight different *tenera* hybrid combinations of oil palm for their feasibility under Sub-Himalayan Terai region of West Bengal. All the yield characters studied showed improvement in performance, irrespective of the hybrid combinations, throughout the experiment period. An estimated oil yield of 3-3.5 tonnes can be obtained from a hectare of oil palm.

Key words: Oil palm, Fresh Fruit Bunches (FFB), Sub-Himalayan Terai, *tenera* hybrids

Introduction

The oil palm (*Elaeis guineensis* Jacq.) is one of the top edible oil yielding crops in terms of yield with an output of about 4-5 tonnes of oil per hectare. It is also considered to be the cheapest edible oil available in the world. It is a comparatively new crop in the Sub-Himalayan Terai Region. In a perennial crop like this, an understanding of the trend in yield is very essential for planning future strategies including establishment of processing facilities. Keeping the above fact in view, an evaluation trial was laid out at the Research Centre of Central Plantation Crops Research Institute, Mohitnagar in West Bengal in order to assess the merit of the different *tenera* hybrid combinations of oil palm in this region.

Materials and Methods

The experiment was initiated during 1988 with eight combinations of *dura x pisifera* oil palm hybrids at CPCRI, Regional Station, Mohitnagar. The combinations tried were 128Dx283P, 26Dx98P, 11Dx1P, 41Dx5P, 271Dx266P, 34Dx1P, 3Dx5P and 128Dx1P. The experiment was laid out in a Randomized Block design with four replications. The Mohitnagar Research Centre experiences a comprehensive phase of cold weather (September 15 to March 15) with the lowest temperature touching 5-6 ^{0}C during December. The maximum temperature during the summer months reaches a maximum of 35 ^{0}C and the place receives an annual rainfall of about 3500 mm, distributed mainly during July to September. The region comes under the Sub-Himalayan Terai region of West Bengal. The palms were planted at a spacing of 9 m and 9 m and received a fertilizer dose of 1000:800:1200 g NPK/ palm/year applied in two splits during May-June and September-October. The fertilizers were applied in the form of urea, rock phosphate and muriate of potash. Magnesium sulphate was applied at the rate of 1000g per palm every year. The crop was maintained as rain fed except for some life-saving irrigation. Four palms from each replication were used for recording data on number of bunches harvested and fresh weight of bunches (FFB) etc. during 1997-2000. Harvest data were compiled on calendar year basis to

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obtain the annual yield. The leaf production data was also recorded in these palms for four years, during the pre-bearing phase (1994-1997).

Results and Discussions

The annual leaf production for the data available for 1994-97 was studied and once the palms came to bearing, recording of vegetative characters was stopped. The annual leaf production was observed to be affected by both the hybrid combinations and the period of study. It has been interestingly found that the leaf production went on decreasing from 1994 to 1997 (Table 1) with increase in bunch yield of the palms. The annual leaf production decreased from 18.87 per palm during 1994 to 11.90 during 1997. A pooled data of the 4 years revealed that the higher number of leaves (15.76 per palm per year) was produced by the hybrid combination 41Dx5P followed by 34Dx1P (15.68 numbers of leaves). The annual leaf production was observed to be least (15.16) in the hybrid combination 3Dx5P. The interaction effect of both the parameters also produced significant result with a maximum of 19.7 leaves produced by the combination 11Dx1P during the year 1994.

Table 1. Leaf production in *tenera* hybrid combinations of oil palm

Hybrid (DxP) combinations	Annual leaf production/palm				
	1994	*1995*	*1996*	*1997*	***Mean***
128Dx283P	18.60	15.50	14.80	11.81	*15.18*
26D x 98P	18.50	15.70	15.53	12.66	*15.60*
11Dx1P	19.70	15.41	15.84	11.18	*15.53*
41Dx 5P	18.39	16.60	16.34	11.69	*15.76*
271Dx266P	19.00	15.90	14.15	12.50	*15.39*
34Dx1P	19.30	16.09	15.64	11.69	*15.68*
3Dx5P	18.00	16.60	14.15	11.90	*15.16*
128Dx1P	19.50	15.41	15.32	11.79	*15.50*
Mean	*18.87*	*15.90*	*15.21*	*11.90*	
	Year	Treatment		Y x T	
C.D. (0.05)	0.298	0.400		0.795	

A perusal of the data revealed that (Table 2) the bunch production increased over the years from 1997 to 2000. There was a significant rise in bunch production from 4.26 during 1997 to 5.43 during 1998 and 9.53 during 1999. However, the increase in bunch production was minimal (9.78 bunches) during the year 2000 when compared to the previous year (1999). The influence of the different hybrid combinations for the bunch production was non-significant. However, the four year pooled data revealed that, maximum number of bunches (8.27/palm/year) was produced by the combination 26Dx 98P. The interaction effect between treatment and year was also found to be non-significant for this character with a maximum of 11.5 bunches produced by the combination 26Dx 98P during the year 2000.

The average bunch weight was found to follow the same pattern as number of bunches (Table 2). The average bunch weight went on increasing from the year 1997 to 2000; however, the rise was significant during the years 1997 to 1999 and non-significant during 1999

Table 2. Number of bunches and average bunch weight in tenera hybrid combinations of oil palm

Hybrid (DxP) combinations	Bunch production/palm/ year					Average wt. of bunches (kg)				
	1997	*1998*	*1999*	*2000*	***Mean***	*1997*	*1998*	*1999*	*2000*	***Mean***
128Dx283P	3.90	6.31	9.19	9.65	*7.26*	8.64	11.59	14.17	14.29	*12.17*
26D x 98P	3.94	5.50	11.38	11.50	*8.27*	9.33	12.00	12.65	12.90	*11.72*
11Dx1P	4.50	4.75	10.00	9.88	*7.28*	10.39	12.78	14.21	14.70	*13.02*
41Dx 5P	3.63	6.17	8.48	8.81	*6.77*	9.34	12.31	13.22	13.62	*12.12*
271Dx266P	5.46	4.94	9.06	9.49	*7.22*	9.40	11.98	13.44	13.64	*12.11*
34Dx1P	4.42	6.04	10.00	10.19	*7.66*	10.64	12.26	14.32	14.76	*13.00*
3Dx5P	3.73	4.97	9.06	9.56	*6.82*	10.85	11.98	14.04	14.18	*12.76*
128Dx1P	3.79	4.77	9.09	9.21	*6.71*	9.48	13.43	13.98	14.03	*12.73*
Mean	*4.26*	*5.43*	*9.53*	*9.78*		*9.78*	*12.29*	*13.75*	*14.02*	
	Year	Treatment	YxT		Year	Treatment	YxT			
C.D. (0.05)	0.961	NS	NS		1.212	NS	NS			

Table 3. Yield of FFB and estimated oil yield in tenera hybrid combinations of oil palm (9-12 year old)

Hybrid (DxP) combinations	Total FFB/Palm/year (kg)					Estimated oil yield (tonnes/ha)				
	1997	*1998*	*1999*	*2000*	*Mean*	*1997*	*1998*	*1999*	*2000*	*Mean*
128Dx283P	33.10	73.50	129.50	137.51	*93.40*	0.81	1.81	3.19	3.36	*2.29*
26D x 98P	46.03	66.26	140.83	144.88	*99.50*	1.13	1.63	4.05	3.56	*2.59*
11Dx1P	47.03	61.51	141.88	145.66	*99.02*	1.16	1.51	3.49	3.59	*2.44*
41Dx 5P	34.22	75.63	112.38	120.59	*85.71*	0.85	1.86	2.77	2.99	*2.12*
271Dx266P	51.51	59.03	121.09	128.59	*90.06*	1.27	1.46	2.98	3.11	*2.20*
34Dx1P	46.26	74.60	144.61	151.24	*104.18*	1.14	1.84	3.56	3.72	*2.56*
3Dx5P	38.50	59.03	126.94	142.31	*91.69*	0.95	1.46	3.13	3.34	*2.22*
128Dx1P	35.66	64.49	123.60	128.49	*88.66*	0.88	1.59	3.10	3.16	*2.18*
Mean	*41.54*	*66.76*	*130.41*	*137.41*		*1.02*	*1.64*	*3.28*	*3.35*	
	Year	Treatment	YxT		Year	Treatment	YxT			
C.D. (0.05)	0.961	NS	NS		1.212	NS	NS			

and 2000. The pooled data on the average bunch weight revealed that maximum bunch weight (13.02 kg) was recorded in the hybrid combination 11Dx1P followed by 34Dx1P. Highest bunch weight (14.76 kg) was recorded during the year 2000 for the hybrid combination 34Dx1P. The mean bunch weight showed a steadily rising trend with no sharp rise or fall in any of the years. The same trend was also observed by Jacob Mathew *et al.* (1993).

Total FFB per palm (Table 3) was recorded to be highest during the year 2000 (137.41 kg). The FFB/palm increased over the years from 1997 to 2000. However, the rise was significant for the first three years, after which it was non-significant and is in line with the trend observed for bunch production. The varietal effect on the total FFB production was found to be non-significant, however, highest FFB production (average of four years) was recorded (104.18 kg) in the combination 34Dx1P. The interaction effect of variety and year produced a maximum FFB (151.24 kg) in the combination 34x1 during the year 2000.

The estimated oil yield followed the same pattern as of FFB per palm per year. The average oil production was 3.35 t/ha during the year 2000. The treatments did not have any significant effect on this character (Table 3). It was observed that oil production was highest (3.72 t/ha) during the year 2000 in the hybrid combination 34Dx 1P.

This study has conclusively indicated that oil palm can be successfully grown in Sub-Himalayan Terai regions of West Bengal with an expected annual yield of 3.0-3.5mt of palm oil per hectare, from a 12 year old garden, under rain fed conditions. Since moisture stress is one of the main factors limiting female flower production, the yield can be expected to be improved by providing supplementary irrigation as has been reported by Thomas Varghese and Nampoothiri (1986).

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