

THE INFLUENCE OF CORM WEIGHT ON VEGETATIVE  
GROWTH OF HINDI BANANA CULTIVAR

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\* تأثير وزن الكورمة على النمو الخضري لنباتات الموز الهنتى

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ملخص البحث

أجرى هذا البحث خلال موسمى ١٩٨٦ - ١٩٨٧ بمحطة التجارب بكلية الزراعة - جامعة القاهرة بالجيزة - وقد درس تأثير وزن الكورمة على النمو الخضري لنباتات الموز الهنتى .

وتم تصنيف الكورمات على أساس وزنها الى تسعة مجموعات كما يلى :-

- ١ - كورمات وزنها أكثر من ٢٠٠٠ جم
- ٢ - كورمات يتراوح وزنها من ١٧٥٠ - ٢٠٠٠ جم
- ٣ - كورمات يتراوح وزنها من ١٥٠٠ - ١٧٥٠ جم
- ٤ - كورمات يتراوح وزنها من ١٢٥٠ - ١٥٠٠ جم
- ٥ - كورمات يتراوح وزنها من ١٠٠٠ - ١٢٥٠ جم
- ٦ - كورمات يتراوح وزنها من ٧٥٠ - ١٠٠٠ جم
- ٧ - كورمات يتراوح وزنها من ٥٠٠ - ٧٥٠ جم
- ٨ - كورمات يتراوح وزنها من ٢٥٠ - ٥٠٠ جم
- ٩ - كورمات وزنها أقل من ٢٥٠ جم .

ويمكن تلخيص أهم النتائج كما يلى :-

- ١ - تم تبرعم الكورمات زنة ١٠٠٠ - ١٧٥٠ جم بالكامل وكذلك انبثاق الورقة الأولى مبكرا بسبعة أيام عن باقى الأوزان الأخرى .

- ٢ - أعطت الكورمات التي يتراوح وزنها بين ١٠٠٠ - ١٧٥٠ جم أعلى عدد من الأوراق الكلية المتكونة حتى أغسطس وإلى نهاية فترة المشتل وأعطت أيضا أعلى عدد من الأوراق الخضراء .
- ٣ - أعطت الكورمات زنة ١٠٠٠ - ١٢٥٠ جم أطول ساق كانب في أغسطس وأيضا أطول وأكبر ساق كانب حتى نهاية فترة المشتل وأعطت كذلك أعلى عدد من الخلفات الكلية لكل نبات .
- ٤ - كان تأثير وزن الكورمات على طول وعرض ومساحة الورقة وطول عنقها غير معنوي .

#### ABSTRACT

This investigation was carried out during the 1986/1987 seasons at the nursery of Faculty of Agric., Cairo University, on corms of Hindi banana cultivar. Effect of corm weight on the vegetative growth of Hindi banana plants was studied. The results showed the following:

Hindi corms weighted between 1000-1750 gm. completed sprouting and emergence of the first leaf, 7 days earlier than other weights. Also revealed the highest number of total and green leaves. Corms weighted 1000-1250 gm. resulted the highest length, circumference of pseudo stem, highest number of suckers per plant. The effect of corm weight on leaf length, width, area and length of leaf petiole were not significant.

#### INTRODUCTION

Banana is one of the oldest fruits known to mankind (Madhava-Rato, 1984). Its origin appears to be Southeast Asia, Easter Malaysia and the Philippine Islands (Simmonds, 1960 and Freibery, 1966).

Africa represents 50% of the total world production followed by Asia and America 25% each. The commercial production for export originates mainly from the countries in central and South America and to some extent from Africa (Simmonds, 1960).

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Total planted area of this crop in Egypt is about 18000 feddans which produced 202789 tons with an average yield of 11.3 tons/fed. Hindi (Musa cavendish) is the most popular cultivar grown in Egypt, which represents 80% to the total area of banana (Ministry of Agric., A.R.E., 1986). This investigation was carried out to detect the effect of corm weight on vegetative growth of Hindi cultivar at the nursery.

#### MATERIALS AND METHODS

This study was carried out in season 1986/1987 at the experimental orchard, Horticulture Department, Faculty of Agriculture, Cairo University, Giza, to study the effect of corm weight on vegetative growth of Hindi banana. Corms were classified according to their weight to nine groups as follows:-

- 1- Corms weighted over than 200 gm.
- 2- Corms weighted from 1750 to 2000 gm.
- 3- Corms weighted from 1500 to 1750 gm.
- 4- Corms weighted from 1250 to 1500 gm.
- 5- Corms weighted from 1000 to 1250 gm.
- 6- Corms weighted from 750 to 1000 gm.
- 7- Corms weighted from 500 to 750 gm.
- 8- Corms weighted from 250 to 500 gm.
- 9- Corms weighted less than 250 gm.

In early March 5th, of 1986 season twenty corms from every group were planted in plastic bags contained a mixture of 80% soil and 20% peat moss. One corm only was planted in every bag and there were found replicates. Bags of all groups received the same cultural nursery practices.



During the period of the nursery, some morphological measurements were carried out either at specific intervals or by the end of the season. The following parameters were recorded:-

- 1) Sprouting percentage: Number of sprouted corms were recorded every 7 days and then were calculated as a percentage using the following equation:-

$$\frac{\text{No. of sprouted corms}}{\text{Total No. of corms}} \times 100$$

- 2) The period per days for emergence of the first leaf: Number of corms which emerged the first leaf were counted every 7 days, also percentage of corms which showed the first leaf were calculated according to the following equation:-

$$\frac{\text{No. of corms which emerged the first leaf}}{\text{Total No. of corms}} \times 100$$

- 3) Number of leaves emerged before the appearance of the first sucker was recorded.
- 4) Number of emerged leaves/plant was monthly counted.
- 5) Accumulated number of emerged leaves/plant was added monthly.
- 6) Number of emerged suckers/plant was recorded in monthly intervals till the end of nursery period.
- 7) Leaf dimensions and leaf area: At the end of nursery period measurements of length and width of leaf blade were carried out on the third later most leaves per plant according to Hewitt (1955). Area per leaf blade was calculated through multiplication of length by width in the middle of leaf blade.
- 8) Length and circumference of pseudostem: Length was measured at the end of August and at the end of nursery period. Circumference was measured at the end of nursery period only.

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- 9) Number of green leaves/plant: was counted at the end of the nursery period.

Obtained data were subjected to analysis of variance according to Snedecor (1959).

## RESULTS AND DISCUSSION

Table (1) presents the effect of corm weight on sprouting percentage of Hindi banana during the 1986/1987 season. It was noticed that corms of all weights started to sprout after 30 days from planting, except those less than 500 gm., which started to sprout 14 days later. After 30 days from planting corms ranged in weight between 1000-1750 gm. revealed 22.5-41.8% sprouting, while corms more than 1750 gm. or less than 1000 gm. in weight revealed 9.2% sprouting.

Corms ranged in weight between 1000 to 1750 gm. completed their sprouting after 51 days from planting, by about 7 days earlier than corms heavier or lighter in weight.

In this respect, Simmonds (1960), suggested that the initial growth would be more rapid due to large rhizome pieces, and Kohli and Rajendra (1973), who found that bits of 200-200 gm. proved superiority for maximum sprouting and root formation.

It is clear from the results summarized in Table (2) that 9% corms weighted between 750 to 2000 gm., the emergence of the first leaf after 55 days from planting, while corms of other weights started it 7 days later. Corms weighted between 1000 to 1750 gm. completed the emergence of the first leaf after 76 days from planting, while corms heavier or lighter in weight completed it later, by 7 and 14 days respectively. These results are in agreement with

Table (1) :

Effect of corm weight on sprouting percentage of Hindi banana cultivar during the 1986/1987 season .

Character	Sprouting percentage				
	No. of days from planting to sprouting .				
	30	37	44	51	58
Corm weight					
Corm over than 2000 gm.	9.2	9.2	50.6	84.4	100
Corm from 1750 to 2000 gm.	9.2	20.5	65.2	84.4	100
Corm from 1500 to 1750 gm.	22.5	32.0	65.2	100	100
Corm from 1250 to 1500 gm.	32.3	32.3	65.2	100	100
Corm from 1000 to 1250 gm.	41.8	41.8	75.5	100	100
Corm from 750 to 1000 gm.	9.2	9.2	65.2	84.4	100
Corm from 500 to 750 gm.	9.2	9.2	42.3	75.5	100
Corm from 250 to 500 gm.	0.0	0.0	31.2	75.5	100
Corm less than 250 gm.	0.0	0.0	22.1	75.7	100



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Table (2) :

Effect of corm weight on the period (per days) from planting to the appearance of the first leaf of Hindi banana cultivar during the 1986/1987 season .

Character Corm weight	Appearance of first leaf percentage						
	Days from planting						
	55	62	69	76	83	90	97
Corm over than 2000 gm.	0.0	31.2	51.2	85.5	100	100	100
Corm from 1750 to 2000 gm.	9.0	41.4	64.4	85.5	100	100	100
Corm from 1500 to 1750 gm.	9.0	51.5	74.3	100	100	100	100
Corm from 1250 to 1500 gm.	9.0	51.5	74.3	100	100	100	100
Corm from 1000 to 1250 gm.	9.0	64.3	84.5	100	100	100	100
Corm from 750 to 1000 gm.	9.0	41.4	64.4	85.5	100	100	100
Corm from 500 to 750 gm.	0.0	21.7	41.4	65.4	85.5	100	100
Corm from 250 to 500 gm.	0.0	8.0	31.5	51.6	85.5	100	100
Corm less than 250 gm.	0.0	8.0	21.6	42.3	74.2	85.5	100

Table (3):

Effect of corm weight on the emerged of different leaf type of Hindi banana cultivar during the 1986/1987 seasons.

Character	Average No. of emerged leaves before the appearance of the first sucker .	Average No. of emerged leaves till the end of August .	Average No. of total leaves at the end of nursery .	Average No. of green leaves at the end of nursery .
Corm weight				
Corm over than 2000 gm.	9.50	15.90	20.38	6.50
Corm from 1750 to 2000 gm.	11.50	16.38	20.48	6.59
Corm from 1500 to 1750 gm.	11.50	16.95	20.58	6.90
Corm from 1250 to 1500 gm.	11.62	17.30	21.16	6.90
Corm from 1000 to 1250 gm.	11.75	17.60	22.60	8.27
Corm from 750 to 1000 gm.	11.85	16.05	20.16	6.38
Corm from 500 to 750 gm.	12.16	15.61	20.00	5.90
Corm from 250 to 500 gm.	12.33	15.48	19.38	5.90
Corm less than 250 gm.	13.25	15.25	19.27	5.00
New L.S.D. at 5 %	1.25	1.06	0.25	1.10



those of Cheema et al. (1954) who found that very small suckers of Basrai banana prolonged the growing period, and Samuels (1977), who indicated that, corms ranged in weight from 908 to 1362 gm. were considered optimal in size on initial planting growth.

As for the effect of corm weight on the total number of leaves emerged before the appearance of the first sucker, it is clear that, the first sucker was produced after the emergence of 9.5 leaves and 13.25 leaves from corms weighted more than 2000 gm. or less than 250 gm. respectively.

Nevertheless, the lower was the weight of corm the higher number of leaves were produced before the emergence of the first sucker (Table 3).

Regarding the effect of corm weight on total number of leaves emerged till the end of August and the period of nursery, it is obvious that, highest number of total leaves counted per plant at the end of August (between 16.95-17.60 leaves/plant), while at the end of nursery stage at well 20.58-22.60 leaves/plant, were emerged from corms weighted between 1000-1750 gm., while less number of leaves were emerged from heavier or lighter corms.

Number of green leaves at the end of nursery stage followed the same mentioned trend noticed in total number of emerged leaves per plant counted either at the end of August or the end of nursery stage. In other words, corms weighted between 1000-1750 gm. produced 6.90 to 8.27 green leaves per plant at the end of nursery stage, while lighter or heavier corms counted less numbers. Berrill (1960) support our results in this respect, who indicated that, the best sizes as planting materials for banana were pieces of corm weighting 2 to 4 Lb. . Turner (1972), pointed out that growth of lateral buds (suckers) began on the parent after 12 leaves were produced. Mostafa (1979), on Maghraby cv. added that total leaf per plant varied between 17.3-27.28.

Regarding the effect of corm weight in dimensions, area and length of petiole of Hindi banana leaf at the end of nursery stage. Measurements revealed that leaf length (1.12-1.28 m.), leaf width (0.373-0.411 m.), mean while leaf area (0.48-0.522 m<sup>2</sup>), and leaf petiole length (25.05-30.48 cm.). It was noticed that the effect of corm weight on these properties were non-significant. Obtained results are in agreement with the findings of Gopalan et al. (1958), who claimed that propagation by bits of rhizomes or whole rhizomes of mother plants was equal and similar in both Poovan and Montain varieties. Also, Bartolome and Jungcuan (1962), pointed out that no significant differences in stooling capacity due to planting materials.

The effect of corm weight on length of pseudostem till the end of August, length and circumference of pseudostem at the end of nursery stage and total number of emerged suckers of Hindi banana during 1986/1987 seasons are shown in Table (5). It was observed that, corms ranged between 1000-1250 gm. revealed the highest values of pseudostem length at the end of August, also length and circumference of pseudostem at the end of nursery stage. It is clear from Table (5) that the length and circumference of pseudostem were also with corms heavier in weight than 1250 gm. or lighter than 1000 gm. and more obvious with lighter corms. Obtained results are in harmony with the findings of Berrill (1960), indicated that the best sizes as planting materials were pieces of corms weighting 2 to 4 Lb. . Trochoulias (1966) found that large spearpoints (16 oz.) revealed the best vegetative growth, while bits (1.5-2.5 Lb.) gave the lowest one.

It is clear from Table (5), that corms weighted between 1000-1250 gm. by the end of nursery stage emerged 1.19 suckers per plant and less numbers of suckers were emerged from corms heavier in weight than 1250 gm. or lighter in weight than 1000 gm. . Lower number os emerged suckers was more obvious with lighter corms.



Table (4):  
Effect of corm weight on leaf dimensions of Hindi banana at the end of nursery stage during the 1986/1987 seasons.

Character:	Average length of leaf (m.)	Average width of leaf (m.)	Average area of leaf (m. <sup>2</sup> )	Average length of leaf petiole (cm.)
Corm weight				
Corm over than 2000 gm.	1.25	0.386	0.483	28.53
Corm from 1750 to 2000 gm.	1.24	0.398	0.494	28.76
Corm from 1500 to 1750 gm.	1.28	0.393	0.503	29.26
Corm from 1250 to 1500 gm.	1.26	0.410	0.517	30.06
Corm from 1000 to 1250 gm.	1.27	0.411	0.522	30.48
Corm from 750 to 1000 gm.	1.24	0.385	0.477	27.64
Corm from 500 to 750 gm.	1.22	0.390	0.476	26.17
Corm from 250 to 500 gm.	1.20	0.373	0.448	26.02
Corm less than 250 gm.	1.12	0.373	0.418	25.05
New L.S.D. at 5 %	N.S.	N.S.	N.S.	N.S.



Table (5):

Effect of corm weight on some pseudostem characters and total number of emerged suckers of Hindi banana cultivar during 1986/1987 seasons.

Character	Average length of pseudostem till the end of August (cm.)	Average length of pseudostem at the end of nursery stage (cm.)	Average circumference of pseudostem (cm.)	Average total No. of emerged suckers .
Corm weight				
Corm over than 2000 gm.	91.54	122.30	23.64	0.85
Corm from 1750 to 2000 gm.	92.10	125.62	24.62	0.85
Corm from 1500 to 1750 gm.	94.73	126.61	24.50	0.74
Corm from 1250 to 1500 gm.	97.52	126.75	24.11	0.74
Corm from 1000 to 1250 gm.	100.96	130.93	26.82	1.15
Corm from 750 to 1000 gm.	92.48	119.63	26.51	0.41
Corm from 500 to 750 gm.	91.31	117.08	25.37	0.30
Corm from 250 to 500 gm.	83.20	116.25	20.30	0.19
Corm less than 250 gm.	80.51	111.70	22.00	0.19
New L.S.D. at 5 %	8.35	7.60	3.55	N.S.

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These results are in accordance with those of Nayar et al. (1979) who indicated that the highest number of suckers/plant were produced from the largest suckers (varying in weight from 1.5 to 3.5 kg). Mostafa (1979) on Maghraby cv. found that suckers/plant were 1.25-1.7.

As shown in Table (6), number of monthly emerged leaves per plant varied between 2.44-4.77 during May and between 3.11-4.66 during June. Corms ranged in weight between 1000-1250 gm. revealed the highest number of emerged leaves monthly during the period from July until October as compared with corms of other weights.

It was also clear (Table 6) that, the highest numbers of emerged leaves per plant were obtained during the period from May to August 1986, then the numbers decreased gradually and reached to minimum at January and February 1987 (the end of nursery period).

As shown in Table (7), it was obvious that corms ranged in weight between 1000-1250 gm. revealed the highest accumulated number of montly emerged leaves from August, 1986 till February, 1987 as compared with corms of other weights. Corms ranged in weight between 1250-1500 gm. and those ranged in weight 750-1000 gm. were the second and the third in that respect. The lowest accumulated number of monthly emerged leaves was obtained from corms less in weight than 750 gm. . These results confirmed the work of Summerville (1944), indicated that leaf emergence rate was one leaf per week during period of steady growth as compared with one leaf in 20 days under winter conditions. Baghdadi and Keleg (1966), on Maghraby cv. found that, leaf emergence rate was highest in summer and lowest in winter. Also, Samuels (1977), reported that, corms ranging from 908 to 1362 gm. were considered optimal in size on intial plantain growth.



Table (6) :

Effect of corm weight on number of monthly emerged leaves during the period of nursery of Hindi banana cultivar during the 1986/1987 seasons.

Character	Average number of monthly emerged leaves / Plant											
	April 1986	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan. 1987	Feb.	
Corm weight												
Corm over than 2000 gm.	0.0	3.44	4.66	3.66	2.66	1.22	1.22	0.44	0.33	0.11	0.04	
Corm from 1750 to 2000 gm.	0.0	4.77	3.11	3.98	2.33	1.99	0.99	0.67	0.22	0.22	0.00	
Corm from 1500 to 1750 gm.	0.0	2.44	4.66	4.11	2.77	1.55	1.33	0.77	0.15	0.08	0.24	
Corm from 1250 to 1500 gm.	0.0	4.77	4.11	3.77	2.55	1.66	1.00	0.44	0.22	0.00	0.15	
Corm from 1000 to 1250 gm.	0.0	4.00	4.11	4.44	3.11	2.00	1.33	0.33	0.44	0.00	0.35	
Corm from 750 to 1000 gm.	0.0	4.39	4.38	4.05	2.55	1.55	0.39	0.39	0.07	0.00	0.00	
Corm from 500 to 750 gm.	0.0	3.11	4.33	4.11	2.11	1.55	1.11	0.77	0.11	0.08	0.20	
Corm from 250 to 500 gm.	0.0	3.22	4.44	3.97	2.11	1.55	1.11	0.44	0.11	0.05	0.00	
Corm less than 250 gm.	0.0	2.89	4.00	4.22	2.22	1.66	1.00	0.22	0.68	0.00	0.00	



Table (7) :

Effect of corm weight on the accumulated number of monthly emerged leaves during the period of nursery of Hindi banana cultivar during the 1986/1987 season).

Character	Average accumulated number of monthly emerged leaves/plant											
	April 1986	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan. 1987	Feb.	
Corm weight												
Corm over than 2000 gm.	0.0	3.44	8.21	11.98	14.75	16.08	17.41	17.96	18.40	18.62	18.77	
Corm from 1750 to 2000 gm.	0.0	4.77	7.99	11.99	14.43	16.43	16.43	18.21	18.54	18.87	18.87	
Corm from 1500 to 1750 gm.	0.0	2.44	7.21	11.43	14.31	15.97	17.41	18.29	18.51	18.62	18.97	
Corm from 1250 to 1500 gm.	0.0	4.77	9.00	11.87	15.83	17.70	18.41	18.80	19.29	19.30	19.55	
Corm from 1000 to 1250 gm.	0.0	4.00	8.22	12.77	16.00	18.10	19.54	19.98	20.53	20.52	21.00	
Corm from 750 to 1000 gm.	0.0	4.39	8.88	13.05	15.71	17.37	17.87	18.37	18.55	18.52	18.50	
Corm from 500 to 750 gm.	0.0	3.11	7.55	11.77	14.00	15.65	15.87	17.75	17.97	18.08	18.39	
Corm from 250 to 500 gm.	0.0	3.11	7.77	11.77	14.00	15.65	16.87	17.42	17.64	17.77	17.75	
Corm less than 250 gm.	0.0	2.89	7.00	11.33	13.66	15.43	16.54	16.87	17.66	17.60	17.50	

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