J. Agric. Sci. Mansoura Univ., 33 (6): 3953 - 3960, 2008

PERFORMANCE OF SOME KENAF GENOTYPES UNDER DIFFERENT HARVESTING DATES.

Zedan, Z. S.A.* and A.M. Moussa**
*** Field Crops Res. Inst., A R C, Fiber Crops Res. Dept., Giza.**
**** Field Crops Res. Inst., A R C, Fiber Crops Res. Dept., Gemmeiza.**

ABSTRACT

This investigation was carried out at Gemmeiza Agricultural Research Station, Gharbia governorate , ARC, Egypt during the two succesive seasons of 2006 and 2007. The aim of this investigation was to study the effect of different harvesting dates i.e.,120 ,150 and 180 days from sowing on the yield and it's related characters among eight Kenaf genotypes.

The kenaf strain 158/2/4 achieved highest estimates for plant height, technical length,fruiting zone length,stem diameter, green stalk yield/plant as well as per faddan and fiber yield/fed., while the commercial variety Giza 3 recorded lowest estimates for these characters previously mentioned. On the other hand, Giza 3 ranked first and surpass all remain kenaf genotypes in seed yield and its components in addition to fiber fineness.

Remarkable increment occurried by delaying harvesting date at the third one (180 days from sowing) for green yield and its related characters, seed yield and its components, in addition to fiber length and fiber percentage. Meanwhile, the second harvesting date (150 days from sowing) performed maximum averages for fiber yield/fed., percentages of either fiber and seed oil. The interaction between kenaf genotypes and harvesting dates had a significant effect on all studied characters.

Key wards: Kenaf, *Hibiscus cannabinus*,Genotypes, harvesting Dates, Bast fibers, Technical length, fineness, oil percentage.

INTRODUCTION

Kenaf (*Hibiscus cannabinus* L.) belongs to family Malvaceae and consider as an important member in bast fiber crops group. It is widely cultivated in tropical and subtropical parts of the world for its fibres, which used for making many products. Fiber strands of kenaf ranged from 1.5 to 3 m long, which used for manufacturing rope, cordage, canvas, sacking, carpet, backing, pulp and fishing nets. Kenaf seeds contain about 20% oil, (it is free from the poison material namely Gossipole) which used for salad, cooking, and lubricant oils.

Recentely, Egypt promotes great efforts for extending Kenaf cultivating area to save hard currency paid annually for Jute fiber importation. In addition, kenaf is more tolerant to relatively high soil salinity.

Great efforts had been done to maximize productivity and quality of kenaf especially after decreasing its cultivating area in Egypt during the recent years by releasing new varieties characterized by high yielding ability and best quality in addition to improve different agricultural practices for this crop. In this respect, many investigators studied the difference between kenaf genotypes such as Momtaz *et al.*, (1977), El-Keredy *et al.*, (1978), Salih

(1978), El-Kady (1980), Osman and Momtaz (1982), Webber (1993), ElKady and El-Seweify (1995) and El-Farouk and El-Sweify (1998).

The effect of harvesting date on kenaf was studied by several investigators among of them Higgins and white (1970), Webber and Bledose (1993 and 2002) and Mazumder *et al.*, (2005).

The objective of this study was amied to evaluate some kenaf promising strains released by Fiber Crops Res, Department which compared with commercial variety in addition to imported one in relation to yiled, yield components and technological characters of fiber and seed under three harvesting dates.

MATERIALS AND METHODS

Two field experiments were carried out at Gemmeiza Research Station, El-Gharbia Governorate, during the summer seasons of 2006 and 2007. This investigation was amied to evaluate eight kenaf gentypes (commercial variety, six promising strains and one imported variety) under three different harvesting dates i.e., after 120, 150 and 180 days from sowing concerning green stalk,seed yield and their related characters in addition to fiber and seed quality.The pedigree of the studied genotypes are shown in Table (1).

Table (1) : Pedigrees of the studied kenaf genotypes.

Genotype	Pedigree
Giza 3	Selected from landrase
S.146\4\2\2	Giza 3 x I. 16
S. 108/9	Giza 3 x H. 27
H.119	Giza 4 x S. 16/63/2
S. 153/1/3	Giza 3 x I. 38
S. 158/2/4	S. 105/1 x I. 26
S. 148/2/4	S. 13 x I. 16
Koba	Imported from Bangaladish

A split plot design with four replications was used,The eight kenaf genotypes were randomly distributed, as main plots and the three harvesting dates were randomly assigned to sub plots. The sub plot area was 10.50 m^2, including 7 ridges , 20 cm between hills which cultivated was in one side of the ridge.The sowing dates were 2 th and 10 th of May at 2006 and 2007 summer seasons, respectively.The kenaf seedlings were thinned at 2 plants per each hill.

Normal agricultural practices were done as the usual manure in the ordinary kenaf fields. At harvest time, ten guarded plants at random from each sub plot were used in measurements of yield components. The green, seed and fiber yields per faddan calculated from the hole sub plots area basis.

Characters Studied:

1- Green yield and its components:

Plant height (cm), technical length (cm), fruiting zone length(cm), stem diameter (cm), green stalk yield (g) /plant, green stalks yield (ton) /fed. and fiber yield (ton) /fed..

2- Seed yield and its components :

Number of capsules/plant, number of seeds/capsule, seed index (1000 seed weight in g), seed yield(g) plant and seed yield (kg) /fed.

3- Technological characters :

Fiber length (cm), fiber percentage (%), fiber fineness (Nm) calculated according to Radwan and Momtaz (1966) and seed oil percentage.

Statsitacal analysis:-

Statsitacal analysis was carried out according to the procedures outlined by Snedecor and Cochran (1982). Combined analysis was performed for each character over two growing seasons as described by Le Clerg *et al.*, (1966). The difference between treatment means were tested according to the Least significant difference (L.S.D) method at 5% level of probability.

RESULTS AND DISCUSSION

1- Green yield and its components:-

The results tabulated in Table (2) showed mean values of the eight kenaf genotypes as affected by three harvesting dates from the combined analyssis over the two seasons. Analysis of variance indicated that kenaf genotypes significantly differed in all green yield characters. The promising strain 158/2/4 gave the highest values in plant height, technical length,fruiting zone length, stem diameter, green yield / plant, green yield / fed and fiber yield / fed. The desending order afterwards was S. 153/1/3, Koba, H.119, S. 148/2/4, S. 146/4/2/2, S. 108/9 and the fewest estimates obtained by Giza 3 for the most studied characters. Meanwhile, the kenaf strain 158/2/4 ranked first also concerning fiber yield/fed., which consider as the more important trait, followed by S. 153/1/3, Koba, S. 108/9, H. 119, S. 146/4/2/2, S. 148/2/4 and finally the lowest fiber yield/fed. was recorded by the commercial variety Giza 3. Moreover, the superiority ratios for the promising strain 158/2/4 over the commercial vareity Giza 3 were 15.9%, 13.1%, 33.3%, 13.9%, 21.6%, 16.1% and 39.7% for plant height, technical length, fruiting zone length, stem diameter, green yield/plant, green yield/fed. and fiber yield/fed., respectively.

The present results may be due to differences in genetic constitution of the studied genotypes. Similar results were obtained by Momtaz *et al.*, (1977), El-Keredy *et al.*, (1978), Salih (1978), El-Kady (1980), Osman and Momtaz (1982), El-Kady and El-Seweify (1995) and El-Farouk and El-Sweify (1998).

Regarding havesting dates effect the results revealed that the three harvesting dates significantly differed in plant height, technical length, fruiting zone length, green yield / plant as well as green yield per feddan and fiber yield per feddan. A gradual increment had occurred in all green yield

characters with delaying harvesting date untill the third one at 180 days from sowing, except with fiber yield/fed. where the second harvesting date (150 days old) achieved maximum estimate of 1.56 ton/fad. in comparison with either the first harvesting date (1.31 ton/fad.) or the third one (1.16 ton/fad.)

These results may be due to prolongation in growth period which reflect on dry matter accumulation in the plant organ.

These result is in harmony with those recorded by Higgins and White (1970), Webber and Bledose (1993 and 2002) and Mazumder *et al.*, (2005).

The interaction between Genotypes (G) and harvesting date (H) had a significant effect on all studied characters, by means that each factor depend on the other one in its effect on all green yield traits.

Table 2: Averages of green yield and it`s componenta of eight kenaf genotypes as affected by three harvesting dates (combined analysis of 2006 and 2007 seasons).

Characters / Treament	Plant height (cm)	Technical length (cm)	Fruiting zone length(cm)	Stem diameter (cm)	Green stalk yield (g) /plant	Green staiks yield(ton) /fad	Fiber yield(ton) /fad.
Genotypes							
Giza 3	440.5	380.5	60.0	2.23	811.3	20.500	1.210
S.146/4/2/2	465.8	400.6	65.2	2.08	823.8	21.200	1.370
S. 108/9	457.6	395.5	62.1	2.30	805.4	20.800	1.500
11.119	481.5	413.0	68.5	2.10	849.3	21.500	1.450
S. 153/1/3	495.4	422.2	73.2	2.25	941.5	22.600	1.570
S. 158/2/4	510.4	430.4	80.0	2.35	986.6	23.800	1.690
S. 148/2/4	474.9	409.5	65.4	2.15	835.4	21.700	1.270
Koba	490.6	420.5	70.11	2.18	851.6	22.600	1.550
L.S.D at 0.05%	10.5	4.8	6.4	0.20	11.8	0510	0.080
Harvesting dates							
Harvest after 120 days	419.8	370.5	49.3	2.25	831.7	19.600	1.310
Harvest after 150 days	464.8	391.6	73.2	2.28	855.5	21.500	1.560
Harvest after 180 days	476.7	392.4	96.3	2.29	927.6	22.300	1.160
L.S.D(5%)	15.7	9.6	18.5	n.s	19.6	0.500	0.200
Interaction (G x H) F. test	*	*	*	*	*	*	*

2- Seed yield and its components:-

The results presened in Table (3) illustrated that Giza3 varity gave the highest estimate of number of capsules / plant, number of seeds / capsule, seed index, seed yield / plant and seed yield / faddan. The genotype namely Koba recorded lowest mean values for the characters previously mentioned. Moreover, the regularity as descending order in relation to seed yield/fed. which reprsented the more important trait was as follow; Giza 3 (430.80 kg), S. 148/2/4 (420.80kg), S. 153/1/3 (415.70 kg), S. 158/2/4 (410.80 kg), H. 119 (404.50 kg), S. 146/4/2/2 (390.50 kg), S. 108/9 (370.60

kg) and the lowest average obtained by Koba (350.60 kg). Similar findings were reported by El-Keredy *et al.*, (1978), Salih (1978), El-Kady (1980), Osman and Momtaz (1982), El-Kady and El-Seweify (1995) and El-Farouk and El-Sweify (1998).

Seed yield and its related characters as affected by three different harvesting dates showed that the third harvesting date (180 days after sowing) gave the highest mean values with significant differences between the three harvesting dates for each of number of capsules per plant, number of seeds per capsule, seed index,seed yield/plant and seed yield per feddan. On the other hand, the lowest values of all seed yield and its related characters were obtained by the first harvesting date. Moreover, the third harvesting date superior over the first one by 14.8%, 38.7%, 41.5%, 65.9% and 59.7% for number of capsules per plant, number of seeds per capsule, seed index, seed yield/plant and seed yield per faddan, respectively. These results may be due to prolongation in growth period which reflect on dry matter accumulation in the plant organ. Higgins and white (1970), Webber and Bledose (1993 and 2002) and Mazumder *et al.*, (2005) indicated same results.

Table (3): Averages of seed yield and its compnents for eight Kenaf genotypes as affected by three harvesting dates (combined analysis of 2006 and 2007 seasons)

Characters / Treament	Number of capsules/plant	Number of seeds/capsule	Seed index (g)	Seed yield (g) /plant	Seed yield(kg) / fad.
Genotypes					
Giza 3	51.6	19.5	25.9	28.8	430.80
S.146/4/2/2	48.4	16.6	24.3	25.7	390.50
S. 108/9	41.8	18.0	25.2	20.5	370.60
H. 119	43.9	14.8	23.8	22.3	404.50
S. 153/1/3	48.5	17.9	24.6	25.8	415.70
S. 158/2/4	46.8	17.5	22.9	23.6	410.80
S. 148/2/4	49.20	18.6	23.5	27.4	420.80
Koba	37.30	16.2	21.3	20.2	350.60
L.S.D at 0.05%	0.09	0.08	0.01	0.02	1.30
Harvesting dates					
Harvest after 120 days	55.3	15.5	24.6	20.5	189.0
Harvest after 150 days	58.9	19.8	30.5	31.2	350.5
Harvest after 180 days	63.5	21.5	34.8	34.0	490.8
L.S.D(5%)	0.01	0.02	0.03	1.30	10.30
Interaction (G x H) F. test	*	*	*	*	*

3- Technological characters:-

Mean values of technological characters for eight kenaf genotypes as affected by three harvesting dates as combined analysis over 2006 and 2007 seasons are presented in Table (4).

Kenaf genotypes exhibited significant differences concerning the studied technological traits.

Fiber length ranged from 361.5 cm in (Giza 3 varity) to 424.5 cm in (S. 158/2/4) with superiority ratio of 17.4%. Respecting fiber percentage, S. 108/9 ranked first in this case (7.19%), while the

Table (4): Averages of technological characters for eight Kenaf genotypes as affected by three harvesting dates (combined analysis of 2006 and 2007 seasons)

Characters / Treament	Fiber length (cm)	Fiber percentage (%)	Fiber fineness (Nm)	Seed oil percentag (%)
Genotypes				
Giza 3	361.5	5.90	119.8	20.5
S.146/4/2/2	395.7	6.46	113.20	18.5
S. 108/9	387.5	7.21	111.5	17.8
11.119	403.8	6.74	114.7	21.4
S. 153/1/3	416.6	6.95	114.5	20.3
S. 158/2/4	424.5	7.10	115.7	18.4
S. 148/2/4	403.8	5.85	113.8	19.7
Koba	417.6	6.90	115.2	16.30
L.S.D at 0.05%	7.12	0.09	0.06	0.11
Harvesting dates				
Harvest after 120 days	363.8	6.90	112.5	12.5
Harvest after 150 days	374.7	7.25	118.2	18.4
Harvest after 180 days	386.7	5.20	108.8	20.8
L.S.D(5%)	1.02	0.06	0.01	0.07
Interaction (G x H) F. test	*	*	*	*

lowest one was S. 148/2/4 genotype (5.85%) with the superiority ratio of 22.9%. For fiber fineness, Giza 3 recorded maximum estimate (119.8 Nm) and the coarsest fiber was S. 108/9 (111.5 Nm) by 7.4% and finally seed oil percentage, H. 119 (21.4%) overcome Koba (16.3%) by 31.3%. It is clear that the tested genotypes differed in technological characters according to the differences in their genetical structure. Similar results were obtaine by Momtaz *et al.*, (1977), El-Keredy *et al.*, (1978), Salih (1978), El-Kady (1980), Osman and Momtaz (1982), El-Kady and El-Seweify (1995) and El-Farouk and El-Sweify (1998)

Regarding havesting dates effect; the three harvesting dates significantly differed in all studied techonlogical characters, where; the third harvesting date gave the highest fiber length (386.7 cm) and seed oil percentage (20.8%), the second harvesting date gave the highest value of fiber percentage (7.25%) and performed the best fiber fineness (118.2 Nm). Similar results reported by Higgins and White (1970), Webber and Bledose (1993) and Mazumder *et al.*, (2005).

The interaction effects between kenaf genotypes and harvesting dates for the most important characters are presented in Table (5).

Table 5: The interaction values of green stalks yield /fad., fiber yield /fad. and seed yield /fad. of kenaf genotypes under three harvesting dates.

Harvestin dates Genotypes	120 days old	150 days old	180 days old	L.S.D. (5%)
Green stalks yield (ton)/fad.				
S. 158/2/4	20.10	21.50	22.70	1.10
Fiber yield (ton)/fad.				
S. 158/2/4	1.12	1.51	1.60	0.07
Seed yield (kg)/fad.				
Giza 3	115.40	300.50	440.20	125.80

The maximum green stalks yield/faddan and fiber yield/faddan obtained by S. 158/2/4 combined with the third harvesting date at 180 days from sowing. Meanwhile, the commercial kenaf variety Giza 3 recorded highesr estimate of seed yield/faddan when delaying harvesting date at also the third one (180 days from sowing).

REFERENCES

El-Farouk and El-Seweify A. H. (1998) Effect of distance between hells on some kenaf genotypes and its retaltion to yield. Egypt. J. Agric. Res. 76 (4) 1549-1563.

El-Kady E. A. F. (1980) Analytical and inheritance studies on economic characters of kenaf (*Hibiscus cannabinus* L.). M. Sc. Thesis Agric. Tanta Univ, Egypt.

El-Kady E.A.F. and El-Seweify A. H. (1995) Evaluation of some kenaf genotypes in relation to yield, yield components and chemical composition of seeds. Egypt J. Applied Sci. 10 (6) 297-305.

El-Keredy, M. S., Zahran M., Momtaz A. and Nasser El-Din (1978) Effect of nitrogen level and plant population in kenaf yield and its components. J. Agric. Res. Tanta Univ. 4 (1) 69-76.

Higgins, J. J. and White, G. A. (1970) Effects of Plant Population and Harvest Date on Stem Yield and Growth Components of Kenaf in Maryland. Agron J. 62:667-668

Le Clerg. E.W.; Leonard and A.G. Clark. (1966) Field plot technique. Burgross Publishing Co. Minn-Co Polis. Minnesota U.S.A.

Mazumder, B. B.; Nakgawa-izumi, A.; Kuroda, K.; Ohtani, Y. and K, Sameshima.(2005) Evaluation of harvesting time effects on kenaf bast lignin by pyrolysis-gas chromatography. Industrial Crops and Products. 21 (1): 17-24 .

Momtaz A., Shalaby T. A., Selim O. and El-Farouk M. (1977) Relationship between planting date and different levels of nitrogen and their effects on kenaf (*Hibiscus cannabinus* L.). J. Agric. Res. Tanta Univ. 3 (1): 51-67.

Osman R. and Momtaz A. (1982) A comparative study of oil content, fatty acid composition and agronomic characters of five kenaf cultivars. Agric. Res. Rev. 60 (8): 127-139.

Radwan S. R. and Momtaz A. (1966) The technological properities of flax and methods of estimating them. El-Felaha J. (Farming) 46 (5): 446-476 (in Arabic).

Salih F. A. (1978) Effect of population densities and row spacing on kenaf yield and its components in the Kenana area of the Sudan. Acta Agon. Acad. Sci. Hung 27: 349-356.

Senedecor G. W. and Cocharan W. G. (1982) Statistical methods. 7th edition Iowa St. Univ. Press AMS Iowa USA.

Webber C. L. (1993) Yield components of five kenaf cultivars. Agron. J. 85 (3) 533-535.

Webber C. L. and Bledsoe R. E. (1993) Kenaf production, harvesting, processing and products. New York USA John Wiley and Sons Inc. 416-421.

Webber C.L.and Bledsoe R. E. (2002) Plant maturity and kenaf yield components. Industrial Crops and Products. 16 (2): 81-88.

أداء بعض التراكيب الوراثية للتيل تحت مواعيد حصاد مختلفة

سعيد زكي زيدان* و أحمد محمد أحمد موسى **

*** معهد بحوث المحاصيل الحقلية – قسم بحوث محاصيل الألياف بالجيزة**

**** معهد بحوث المحاصيل الحقلية – قسم بحوث محاصيل الألياف – الجميزة**

أجري هذا البحث في محطة البحوث الزراعية بالجميزة- محافظة الغربية في موسمي ٢٠٠٦،٢٠٠٧ لدراسة تأثيرثلاثة مواعيد للحصاد (١٢٠، ١٥٠، ١٨٠ يوم من الزراعة) على المحصول ومكوناته لثمانية تراكيب وراثية من التيل، تم تنفيذ التجربة بتصميم قطع منشقة مرة واحدة في أربع مكررات.

وكانت النتائج كالتالي:-

حققت السلالة ٤/٢/١٥٨ أعلي تقديرات في أرتفاع النبات ، الطول الفعال ،المحصول الأخضر/نبات كما للفدان ، محصول الألياف للفدان. في حين سجل الصنف التجارى جيزة ٣ أقل التقديرات للصفات السابقة. على الجانب الأخر فقد أحتل الصنف جيزة ٣ المكانة الأولى وتفوق على باقى التراكيب الوراثية تحت الدراسة فى محصول البذرة ومكوناتها وكذلك نعومة الألياف.

حدثت زيادة ملحوظة نتيجة تأخير ميعاد الحصاد إلى الميعاد الثالث (١٨٠ يوم من الزراعة) فى صفات المحصول الأخضر ومكوناته وكذلك محصول البذرة ومكوناتها بالإضافة إلى طول الألياف والنسبة المئوية للألياف- بينما حقق الميعاد الثانى (١٥٠ يوم من الزراعة) أعلى قيم فى محصول الألياف / فدان ، النسبة المئوية لكل من الألياف والزيت.

كان التفاعل بين التراكيب الوراثية ومواعيد الحصاد معنويا لجميع الصفات.