# EFFECT OF SOWING DATE ON THE PERFORMANCE FORAGE, SEED YIELD AND QUALITY OF SOME INTRODUCED COWPEA ACCESSIONS

# Abdel-Gawad, K.I.<sup>1</sup>, Rafea. I.EL-Zanaty<sup>1</sup>Sohair. E. D. Elayan<sup>1</sup> and A.M.A. Haggag<sup>2</sup>

1- Agron. Dept, Fac-Agric., Cairo Univ.

2- Komebysal, Minia El-Basal, Alexandria.

# ABSTRACT

Two field trials aimed to evaluate five introduced cowpea genotypes under three planting dates were conduced at the Agricultural Production Technology Station of Cairo University. Five cowpea (*Vigna unguiculata*, L (Walp) accessions i.e., IT 84 E-1-108, IT 83S-689, IT84-840, IT 83S-872 and IT 83S-880, were sown from Nigeria in May 15, May 30 and June 15 in two successive seasons (1993 and 1994). Results showed the optimum date for the cowpea accessions was May 15, as it gave the highest yield of dry pods, seeds, fresh, dry forage and crude protein. The best accession was the IT83S-689 in both seasons.

# INTRODUCTION

The environmental conditions which affect growth reproduction and seed yield of cowpea in Egypt are not well - identified under field conditions. Not only weather parameters but management practices also influence the overall performance of the crop. Akinola and Davies (1978) in Nigeria compared 14 varieties of cowpea for yields of forage and seed from two sowing dates (10 and 31 July). They found that yields ranged from 1048 to 5044, 185 to 920 and 846 to 3321 kg ha<sup>-1</sup> for dry matter, crude protein and seed, respectively, with advantages for spreading over semi-erect types and early ove\ July sowing. Kamara and Godferey-Sam-Aggrey (1979) in Sierra Leone, found that cowpea planted in early September produced the tallest plants and higher grain yields than from planting dates, since they benefited from 90% of the season's rainfall and made use of stored soil moisture. Jadhav et al. (1994) carried out a field experiment during the rainy season of 1990 at India, to evaluate some accessions of cowpea under different dates of sowing. They found that planting on 1 June was more suitable for the accession V, 240. Myaka (1995) found that sowing cowpea between paired rows of maize increased cowpea yields by 57% compared with alternating single rows with maize. Yield of cowpea grown, as a pure stand was not affected by sowing date. Ullah et al (1995) found that seed yields of cowpea decreased with later sowing date from 754 Kg / ha.with sowing on 15 Oct. to 123 Kg / ha. with sowing on 30 Jan. Chikkanna et al (1996) in India, found that sowing cowpea on 28 July gave the highest digestible protein and food energyMyaka and kabissa (1996) found that cowpea yield was unaffected by sowing date in dry seasons and yield were similar with alternating single or double rows. In Egypt, using forage cowpea in summer season recened little attention, therefore this study throw light on the proper planting date of some introduced cowpea accessions under Egyptian conditions.

# MATERIALS AND METHODS

Two field trials were carried out at the Agricultural Production Technology Station of Cairo University, Giza, Egypt, during 1993 and 1994 seasons. A pre-planting application of 100 kg  $P_2O_5$  fad<sup>-1</sup> as calcium superphosphate was incorporated into the soil.

The aim of this part of the study was to evaluate the introduced cowpea *Vigna unguiculata*, L. (Walp) accessions under three planting dates. Five cowpea accessions (IT 84 E-1-108, IT 83 S-689, IT 84-840, IT83 S - 872 and IT 83S-880) introduced by Professor M. S. Radwan (Agron. Dept., Fac. Agric., Cairo Univ.) from Nigeria were planted in May 15, May 30 and June 15 in 1993 and 1994 seasons. A split-plot design with three replications was used in both years. The three seeding dates occupied main plots and accessions were in the subplots. The subplot size was 10.5 m<sup>2</sup>. Proper practices for planting and management of cowpea were used.

Leaf/stem ratio, leaf area (cm<sup>2</sup>), fresh forage yield (t fad<sup>-1</sup>),dry forage yield (t fad<sup>-1</sup>),fodder protein yield (kg fad<sup>-1</sup>),dry pod yield (kg fad<sup>-1</sup>) and seed yield (kg fad<sup>-1</sup>) were recorded. Plants were clipped by a hand-sickle at the end of the season after 120 days after sowing (DAS) during 1993 and 1994 seasons. The forage yield was determined as fresh and dry weight. Pods were picked and threshed for each plot separately four times to determind dry pod and seed yields. The first picking was taken 75 DAS, second one 90 DAS, third one 105 DAS and the fourth 120 DAS in both seasons. Data were statistically analyzed according to Gomez and Gomez (1984). Significance among treatments was tested using Duncan multiple – range tast at 5% levels of significance.

# **RESULTS AND DISCUSSION**

#### Fresh forage yield:

Data in Table 1 exhibit the effect of planting date on fresh forage yield in 1993 and 1994 seasons. No significant differences among planting dates were noticed for fresh forage yield of cowpea accessions in 1993 season, whereas, in 1994 significant differences were observed for fresh forage yield among planting dates.

Planting	Cowpea Accession							
Date	IT 84E-1-108	IT 83S-689	IT 84-840	IT 83S-872	IT 83S-880	Mean		
1993								
May 15	3.17	3.01	2.70	2.50	3.20	2.91		
May 30	2.41	2.62	2.47	3.05	3.21	2.75		
June 15	2.71	2.57	2.48	2.17	2.47	2.47		
Mean	2.77	2.74	2.55	2.57	2.96	NS		
			1994					
May 15	2.67	2.70	2.61	2.77	2.65	2.68 A		
May 30	2.06	2.18	2.17	1.89	2.00	2.06 B		
June 15	1.85	1.87	1.91	1.92	1.77	1.86 B		
Mean	2.19	2.25	2.23	2.19	2.14			

Table (1): Effect of planting date on fresh forage yield of cowpea accessions (ton fad<sup>-1</sup>) in 1993 and 1994 seasons.

In this and following tables means within accession followed by the same letter are not statistically different at 5% level of probability according to LSD.05.

### J. Agric. Sci. Mansoura Univ., 25 (12), December, 2000.

The highest fresh forage yield was gained when cowpea was planted on May 15 (2.68 ton fad<sup>-1</sup>) and the accession IT83 S-689 gave the highest yield (2.25 ton fad<sup>-1</sup>). (Table 1).

#### Dry forage yield:

Data in Table 2 present the effect of planting date on dry forage yield of cowpea accessions in 1993 and 1994 seasons, respectively. No significant differences were noticed among planting dates for dry forage yield in 1993 season. The May 15 planting gave the highest dry forage yield (0.77 ton fad<sup>-1</sup>) and the accession IT83S-880 gave the highest yield (0.67 ton fad<sup>-1</sup>, Table 3). In 1994 season significant differences were found by delaying planting from May 15 to June 15 since leaves contain more protein than stems significantly. among planting dates in dry forage yield of cowpea accessions. The first planting date (May 15) gave a significant value (1.25 ton fad<sup>-1</sup>) and accession IT83S-689 gave the highest yield (1.05 ton fad<sup>-1</sup>). The dry forage yield took the same trend of fresh forage yield. Within each sowing date differences in fresh and dry forage yields between cowpea accessions were not significant.

Dianting	Courses accession	
	accessions (ton fad <sup>-1</sup> ) in 1993 and 1994 seasons.	
Table (Z):	Effect of planting date on dry forage yield of co	owpea

Planting	Cowpea accession							
Date	IT 84E-1-108	IT 83S-689	IT 84-840	IT 83S-872	IT 83S-880	Mean		
			1993					
May 15	0.91	0.73	0.77	0.64	0.80	0.77		
May 30	0.51	0.67	0.51	0.64	0.66	0.60		
June 15	0.55	0.51	0.49	0.45	0.56	0.51		
Mean	0.66	0.63	0.59	0.58	0.67	NS		
	1994							
May 15	1.28	1.21	1.25	1.25	1.27	1.25 A		
May 30	1.04	1.11	1.03	0.94	0.91	1.01 AB		
June 15	0.79	0.82	0.79	0.79	0.79	0.80 B		
Mean	1.04	1.05	1.03	0.99	0.99			

It was noticed that May 15 planting date gave the highest values of leaf/stem ratio, leaf area, fresh forage yield and dry forage yield. This may be due to the favorable conditions that prevailed during this planting. Planting on May 15 increased dry forage yield of cowpea by 0.17 and 0.26 ton fad<sup>-1</sup> than planting on May 30 and June 15, respectively in 1993 season. Significant respective increases in 1994 season were 0.24 and 0.45 ton fad<sup>1</sup> The interaction between cowpea accession and sowing date was insignificant for the previous traits.

#### Fodder protein yield:

Table 3 shows the effect of planting date on protein yield of cowpea accessions in 1994 season. The data show significant differences between planting dates and accessions and their interaction. Planting on May 15 increased protein yield by 425 and 488 kg. over May 30 planting and June 15 planting, receptively, because leaf/stem ratio and leaf area were

#### Abdel-Gawad, K.I. et al.

reduced.Accessions varied in protein yield in 1994 season. Accession IT83S-880 followed by IT84-840 with no significant differences between them gave the highest protein yield. Accession IT84E-1-108 gave the lowest value of protein yield (Table 3). This could be due to the smaller leaves of accession IT84E-1-108.

 Table (3): Effect of planting date on fodder protein yield of cowpea accessions (kg. fad-1) in 1994 season.

Planting	Cowpea Accession							
Date	IT 84E-1-108	IT 83S-689	IT 84-840	IT 83S-872	IT 83S-880	Mean		
May 15	395 c	662 b	775 a	600 b	789 a	644 A		
May 30	229 de	237 de	198 de	167 de	262 d	219 B		
June 15	208 de	135 e	158 de	147 de	130 e	156 C		
Mean	277 C	345 AB	377 A	305 BC	394 A			

# Dry pod yield:

Table 4 shows the effect of planting date on dry pod yield of cowpea accessions in 1993 and 1994. Planting in May 15 significantly increased total dry pod yield in 1993 season, which gave 956 kg fad<sup>-1</sup>. Respective increases were 443 and 790 kg fad<sup>-1</sup> over May 30 and June 15, respectively. Accession IT83S-872 gave the highest total dry pod yield (604 kg fad<sup>-1</sup>), while accession IT84E-1-108 gave the lowest value of total dry pod yield (447 kg fad<sup>-1</sup>, Table 6). The same trend was found in the second season when May 15 gave the highest value (976 kg fad<sup>-1</sup>) of total dry pod, and the respective increases for May 15 over May 30 and June 15 were 445 and 520 kg fad<sup>-1</sup>. Accession IT83S-689 gave the highest total pod yield (780 kg fad<sup>-1</sup>), while accession IT84-840 gave the lowest yield (543 kg fad<sup>-1</sup>, Table 5).

The increase in pod yield in May 15 may be due to the favorable prevailing conditions and also because planting in May 15 gave the highest dry pod yield at each picking on one hand, and on the other hand it gave two extra pickings over June 15 (Tables 4 and 5). Also, increasing in leaf/stem ratio and leaf area on May 15 may help in producing more dry matter, consequently more pod yields were produced.

#### Seed yield:

Data in Tables 6 and 7 exhibit the effect of planting date on seed yield ton fad<sup>-1</sup> in 1993 and 1994 seasons, respectively. The annual seed yield significantly increased with planting in May 15. Planting in such time increased seed yield by 142.2 and 341.4 kg fad<sup>-1</sup> over planting on May 30 and June 15 respectively, in 1993 season (Table 6). Also, in 1994 season May 15 planting gave the highest seed yield, which was 383.0 kg fad<sup>-1</sup>. Planting on May 15 significantly increased the seed yield by 159.4 and 186.1-kg fad<sup>-1</sup> over May 30 and June 15 plantings, respectively. Accession IT83S-872 gave the highest seed yield in 1993 season (Table 8), whereas accession IT83S-689 gave the highest seed yield in 1994 season (Table 7).

Picking	Planting	Cowpea Accession							
Date	Date	IT 84E-1-108	IT 83S-689	IT 84-840	IT 83S-872	IT 83S-880	Mean		
	May 15	161	83	140	168	116	127		
8/14/93	May 30	116	77	71	57	113	87		
	June 15	-	-	-	-	-			
	Mean	138	80	106	113	115	NS		
	May 15	89	166	144	470	188	211		
9/1/93	May 30	100	151	95	97	76	104		
	June 15	-	-	-	-	-	-		
	Mean	94 B	159 B	120 B	284 A	132 B			
	May 15	393	682	797	506	405	567 A		
9/17/93	May 30	286	412	231	260	225	283 B		
	June 15	76	103	162	142	186	134 C		
	Mean	252	399	397	303	272			
	May 15	46	56	34	28	58	44 A		
10/2/93	May 30	44	31	46	49	28	40 AB		
	June 15	31	37	26	34	33	32 B		
	Mean	40	41	35	37	40			
	May 15	688	986	1115	1172	819	956 A		
Total	May 30	546	671	442	463	442	513 B		
	June 15	107	140	188	176	219	166 C		
	Mean	447	599	582	604	493			

 Table (4): Effect of planting date on dry pod yield of cowpea accessions

 (kg. fad-1) in 1993 season.

Table (5): Effect of planting date on dry pod yield of cowpea accessions (kg. fad<sup>-1</sup>) in 1994 season.

Picking	Planting	,	Cowpea Accession							
Date	Date	IT 84E-1-108	IT 83S-689	IT 84-840	IT 83S-872	IT 83S-880	Mean			
	May 15	47	118	118	134	92	102			
8/15/94	May 30	33	33	30	30	24	30			
	June 15	-	-	-	-	-	-			
	Mean	40 C	76 A	74 A	82 A	58 B				
	May 15	44	84	39	47	59	55 AB			
9/3/94	May 30	42	77	69	67	54	62 A			
	June 15	47	30	46	22	79	45 B			
	Mean	45 B	64 A	51 B	45 B	64 A				
	May 15	797	997	583	455	546	676 A			
9/19/94	May 30	347	420	221	249	387	325 B			
	June 15	367	235	270	505	261	328 B			
	Mean	504	551	358	403	398				
	May 15	93	104	110	59	88	91			
10/4/94	May 30	147	128	91	65	139	114			
	June 15	75	116	53	72	106	85			
	Mean	105	116	85	65	111	NS			
	May 15	982	1300	850	695	785	976 A			
Total	May 30	569	658	411	411	604	531 B			
	June 15	489	381	369	599	446	456 B			
	Mean	680	780	543	568	612				

Picking	Planting			Cowpea A	ccession		
Date	Date	IT 84E-1-108	IT 83S-689	IT 84-840	IT 83S-872	IT 83S-880	Mean
	May 15	44.14	32.4	32.9	64.1	64.5	47.6
8/14/93	May 30	66.8	38.4	33.4	22.3	54.4	43.0
	June 15						
	Mean	55.4	35.4	33.2	43.2	59.4	NS
	May 15	37.9	92.3	68.6	209.8	83.4	98.4
9/1/93	May 30	45.6	86.6	62.7	83.0	64.2	68.4
	June 15						
	Mean	41.7 B	89.4 AB	65.6 B	146.4 A	73.8 B	
	May 15	183.0	325.3	353.5	246.3	202.3	262.1 A
9/17/93	May 30	140.4	181.5	116.4	151.3	119.5	141.8 B
	June 15	35.39	51.9	72.9	57.7	77.5	59.1 C
	Mean	119.6	186.2	181.0	151.8	133.1	
	May 15	21.1	22.5	7.89	24.9	22.2	19.7 A
10/2/93	May 30	17.9	11.5	19.5	15.0	21.5	17.1 AB
	June 15	12.7	14.3	10.3	13.3	12.7	12.7 B
	Mean	17.2	16.1	12.6	17.7	18.8	
	May 15	286.2	432.7	462.1	545.3	372.4	413.1 A
Total	May 30	270.9	318.1	232.1	268.4	259.8	269.9 B
	June 15	48.1	66.3	83.2	70.7	90.3	71.7 C
	Mean	201.7	272.3	259.2	294.8	229.8	

 Table (6): Effect of planting date on seed yield of cowpea accessions (kg fad<sup>-1</sup>) in 1993 season.

 Table (7): Effect of planting date on seed yield of cowpea accessions (kg. fad-1 ) in 1994 season.

Diaking	Dianting	Cowpea Accession						
Date	Date	IT 84E-1- 108	IT 83S- 689	IT 84 -840	IT 83S- 872	IT 83S- 880	Mean	
	May 15	16.8	35.5	46.5	59.2	30.6	37.7	
8/15/94	May 30	10.4	9.56	9.64	8.79	7.47	9.17	
	June 15							
	Mean	13.6 C	22.5 B	28.0 AB	34.0 A	19.0 B		
	May 15	18.2	32.9	13.1	11.9	23.0	19.8 A	
9/3/94	May 30	12.5	34.4	18.7	31.0	14.6	22.2 A	
	June 15	13.9	10.2	11.9	9.04	26.6	14.3 B	
	Mean	14.8 B	25.8 A	14.5 B	17.3 B	21.4 AB		
	May 15	372.0	420.0	241.9	201.4	208.8	288.8 A	
9/19/94	May 30	169.8	202.6	89.9	92.1	182.4	147.4 B	
	June 15	177.5	105.1	115.0	231.4	108.9	147.6 B	
	Mean	239.8	242.6	148.9	175.0	166.7		
	May 15	42.9	40.9	51.6	24.0	33.1	38.5	
10/4/94	May 30	45.4	53.1	32.5	31.4	60.8	44.6	
	June 15	39.3	45.1	18.0	24.8	47.3	34.9	
	Mean	42.6	46.3	34.0	26.8	47.1	NS	
	May 15	450.1	529.5	353.2	286.7	295.7	383.0 A	
Total	May 30	238.2	299.6	150.8	163.8	265.4	223.6 B	
	June 15	230.8	160.5	145.0	165.3	183.0	196.9 B	
	Mean	306.4	329.9	216.3	238.6	248.0		

Although leaf narrowness may permit good light penetration of the canopy, and promote high whole-plant photosynthesis and hence high seed yield, such advantages seemed not to have been expressed in the seed yield performance of IT83S-872 in 1993 season and IT83S-689 in 1994 season. However, accession IT84E-1-108 that has narrow leaves gave a large total seed yield (306.4 kg fad<sup>-1</sup>) in 1994..The beneficial effect of timely seeding declined with delayed seeding, and could be seen from drastic reduction in dry matter production and seed yield.

### REFERENCES

- Akinola J.O. and J.H. Davies, (1978). Effects of sowing date on forage and seed production of 14 varieties of cowpea (*Vigna unguiculata*). Expl. Agric., I4: 197-203.
- A.O.A.C. (1980). Association of Official Analytical Chemists, Cfficial Methods of Analysis, 13<sup>th</sup> ed. Washington, U.S.A.
- Chikkanna, C; S.Thimmegowda and N.Devakumar (1996). Biomass production and quality of finger millet, cowpea and groundnut under rainfed conditions in alfisols. Mysore J. Agric. Sci., 30(1): 21-26.
- Duncan, D. B. (1955). Multiple range tests and multiple F test. Biometrics 11: 1- 42.
- Gomez, A.K. and A.A. Gomez (1984). Statistical Procedures For Agricultural Research. 2<sup>nd</sup> Ed. A Wiley Inter science Publ. New York.
- Jadhav, A., S.H. Shinde and P.S. Pol (1994). Effect of seeding date on nutrient removal and yield of cowpea (Vigna unguiculata). Indian J. Agron., 39(3): 484-485.
- Kamara, C.S. and W. Godferey-Sam-Aggrey, (1979). Time of planting, rainfall and soil moisture effects on cowpea in Sierra Leone. Expl. Agric. 15: 315-32.
- Myaka, F.A. (1995). Effect of time of planting and planting pattern of different cowpea cultivars on yield of intercropped cowpea and maize in tropical sub-humid environment. Tropical Sci., 35(3): 274-279.
- Myaka, F.A. and J.C.B. Kabissa (1996). Fitting short duration cowpea into a cotton based cropping system in Tanzania : Effect of planting pattern, time of planting cowpea, and insecticide application to the cotton. Exper. Agric., 32(2): 225-0230.
- Ullah, M.; J.Rahman and M.H. Aly, (1995). Effect of sowing date on cowpea (Vigna Unguiculata) Ind. J. Agron. 40 (4): 713-714.

تاثير ميعاد الزراعة على سلوك ومحصول العلف وجودته ومحصول البذور لبعض أصناف لوبيا العلف المستوردة قرنى اسماعيل عبد الجواد' ، رفيعة ابراهيم الزناتى' ، سهير عليان دسوقى عليان' احمد محمد عبد المنعم حجاج' ١- قسم المحاصيل - كلية الزراعة -جامعة االقاهرة ٢- كومبيصل - مينا االبصل - أسكندرية

اجريت تجربتان بمحطة التجارب والبحوث الزراعية بجامعة القاهرة في عام ١٩٩٣ و ١٩٩٤ ، بهدف تقييم ومقارنة بعض اصناف لوبيا العلف المستوردة تحت مواعيد زراعة مختلفة ، ومدى تاقلمها مع الظروف المصرية ، بهدف تحسين العلف الناتج حيث شملت زراعة خمسة اصناف من لوبيا العلف هى: S-882 and IT 83S-880. [ 884-840, IT 83 [ 835-882 ع 2. في ٢ مواعيد الزراعة هى: ١٥ مايو ، ٣٠ مايو ، ١٥ يونيو في موسمى ١٩٩٣ و ١٩٩٤ واستخدم تصميم القطع المنشقة في ٣ مكررات حيث مواعيد الزراعة في القطع الرئيسية والاصناف في القطع المنشقة ودرست الصفات التالية: نسبة الاوراق ، مساحة الاوراق ، حاصل العلف الاخضر (طن/فدان) ، حاصل العلف الجاف (طن/فدان) ، محصول البروتين (كجم/فدان) ، غلة القرون (طن/فدان) ، خاصل العلف الجاف على ان أفضل ميعاد لزراعة أصناف اللوبيا الخمسة المستخدمة هو ١٥ مايو حيث أعطى أعلى غلة للقرون والجافة والبذور ومحصول علف أخضر وجاف وأعلى محصول للبروتين. وبصفة عامة كان أفضل الأصناف هو صنف 1783-683 في كلا الموسمين حيث أعطى أعلى غلة للقرون والجاف والبذور وحاصل العلف الأحسن وباف الأصناف أصناف أوضل الأصناف هو صنف 1783-683 في كلا الموسمين حيث أعطى أعلى غله للقرون والبذور وحاصل العلف الأصناف والجاف والبذور وحاصل العل العلق الأحسن والحامية والأصناف أوضل الأصناف والجاف والبذور وحاصل العلق الأحسن حيث أعطى أوضل الأصناف