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A Comparative Study on Productivity of some Mungbean Varieties Grown in Sandy Soil

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TWO field experiments were conducted in 2001 and 2002 summer seasons to compare 23 introduced mung bean (*Vigna radiata* L. Wilczek) varieties imported from Taiwan (VC-1,VC-2,.....,VC-23) and Australian variety (King) alongside a registered local check (Kawmy-1) used as a control. The trails were conducted in a private farm at Al-Nagah village south Al-Tahrir Province Al-Behaira Governorate, Egypt. Correlation coefficient among the studied characters in 25 varieties in both seasons were calculated.

King variety was superior to the other varieties in seed index, seed yield/plant /fed. and biological yield/fed. VC-3, VC-5 produced highest number of pods/plant and seeds /pod but kawmy-1 gave the highest number of seeds/plant.

King variety produced the highest seed yield either per plant or per fed, also biological yield /fed and the greatest seed index. VC-13 recorded the first order in harvest index.

Calculated data show that seed yield /fed. Has strong positive correlation with biological yield /fed., seed yield /plant seed index. In both seasons, number of pods, seeds/plant in the first season and harvest index in the second season. Biological yield /fed exhibited significant positive correlations with seeds yield / plant/fed. in both seasons, seed index in 2nd season and number. of seeds/plant in 1st season.

Keywords: Mungbean, Varieties, Sandy soil, Correlation coefficient.

Mung bean (*Vigna radiata* L. Wilczek) is a summer pulse crop with short duration (70-90 days) and high nutritive value. The seeds contain 22-28% protein, 60-65% carbohydrates, 1-1.5% fat, 3.5-4.5% fibres and 4.5-5.5% ash. It has many effective uses, green pods in cooking as peas, sprout rich in vitamins and amino acids. This crop can be used for both seeds and forage since it can produce a large amount of biomass and then recover after grazing to yield abundant seeds, (Lawn & Ahn, 1985) and can be used in broilers diets as a non-traditional feed stuff (El-khimsawy *et al.*, 1998). There were significant differences between introduced varieties in Egypt (Ashour *et al.*, 1992). Australian variety (King) is a promising variety under Egyptian conditions in many regions beside kawmy-1 the local registered variety (El-Kramany, 2001; El-Kramany *et al.*, 2001; Zeidan *et al.*, 2001 and Amany, 2002).

Improvement in mungbean through selection is on important criterian as productivity in this crop is very low. Selection procedure is more difficult for a trait when the heritability is low or is not easily and precisely measurable. Indirect selection in such a situation is more effective and study of correlation among different economic traits is very essential for an effective selection programme because selection for one or more traits results in correlated response for several other traits and sequence of variation will also be influenced. Hence, it is very essential for a plant breeder to know about genotypic and phenotypic correlation for yield and its contributing traits in segregating generations.

Under Egyptian conditions there were shortage in production of summer legumes for both seeds and forage. Therefore, this study was carried out to investigate the varietal differences in productivity of mungbean for seeds and forage also, calculate correlation coefficient among all the studied characters of 25 varieties cultivated in sandy soil under Egyptian conditions.

Material and Methods

Two field experiments were carried out in private farm at Al Nagah village, El Tahadi sector, south Al-Tahrir, Al-Behaira Governorate, Egypt during the two summer seasons 2001 and 2002.

The material under study were 25 varieties of mungbean seeds included kawmy-1 the local registered variety, king variety which imported from Australia and 23 genotypes imported from Asian Vegetable Research for Development Centre (AVRDC) Taiwan. In 1996 the 23 genotypes imported and evaluated by the project: Evaluation of Growth and Productivity of Munghean under Egyptian Conditions, Academy of scientific research and technology, (Ashour, 2000). Genotypes were adapted for 5 seasons under Egyptian conditions before these trials.

The experimental soil was analyzed according to the method described by Chapman & Pratt (1978). Soil texture was sandy with the following characteristics: Sand 94% pH 8.3, calcium carbonate 3.3%, organic matter 0.65%, EC 0.75 m mhos/cm^3, total N 3.29mg N/100g and 1.7mg P/100g Soil respectively.

The field ploughed twice and ridged. The plot included 5 rows 4 metre long and 0.5 m apart with total area 10m^2. Hill spacing was 20 cm within the row, 3-5 seeds in each hill. Seeds were sown in the third week of June in both seasons. Irrigation took place immediately after sowing according to a sprinkler system (Zoon system). Thinning was carried out 21 days after sowing to secure two plants per hill. Organic manure at the rate of 10 m^3/fed was added during seed bed preparation time. NPK were added at the rate of 20Kg N/fed as ammonium nitrate 33% N, 15Kg P_2O_5 /fed as calcium superphosphate 15.5% P_2O_2 (before

sowing) and 10Kg K_2O/fed as potassium sulphate 48% K_2O. The experimental design was randomized complete block with three replicates.

At harvest twenty plants were chosen randomly from the two central rows to measure yield attributes but the whole plot was harvested for determination seed and biological yield / fed.

The following data were recorded 1-Number of pods /plant 2-number of seeds/pod, 3-number of seeds/plant, 4- Seeds yield / plant, 5-Seed yield / fed 6-Seed index, 7-Biological yield / fed., 8- Harvest index (seed yield/ biological yield).

Data were statistically analyzed according to Snedecor & Cochran (1982). Combined analysis of the two seasons was made and the treatment means were compared by LSD test at level of 5% probability. The collected data were subjected to statistical analysis (Steel & Torrie, 1980) ; the phenotypic correlation coefficient among all the studied characters were calculated using covariance analysis.

Results and Discussion

Table 1 shows the combined analysis of the two seasons 2001 and 2002. Data presented in Table show significant differences between varieties for all studied characters.

1.Number of Pods/Plant

The present finding indicated that VC-3 plants produced the greatest number of pods / plant, king came the second, VC-2 was the third, VC-4 was the fourth; this result was in accordance with those obtained by El-Kramany (2001).

2.Number of seeds/ Pod and / Plant

Data presented in Table 1 clear that VC-5, VC-4, Kawmy-1 and King recorded the high four order. VC-5 produced the greatest number. of seeds/pod 9.4 and Kawmy-1 produced the greatest number of seeds/plant.

3.Seed yield/Plant

Table 1 shows the superiority of VC-4 in seed yield/plant followed by king, VC-5 and VC-15; these varieties recorded progressive consequence in number of pods/plant, number of seeds/pod and /plant, (El Kramany, 2001 and Zeidan *et al.*, 2001) reported the excellence of the same varieties under Egyptian conditions.

4.Seed index

Results in Table 1 indicated that king variety produced the heaviest 1000 seeds (seed index), VC-14 came second, VC-9 came third and VC-15 came fourth seed index is indicator for seeds size, these character may be reflect on seed yield/plant thus king variety came in the first order for both characters.

TABLE 1. Comparison between 25 mungbean genotypes for yield and yield components (Combined analysis of 2001 and 2002 seasons).

Characters / Genotypes	Number of			Seed index	Seed g/plant	Yield kg/fed	Biological yield Ton/fed	Harvest index
	Pods/plant	*Seeds/pod*	*Seeds/plant*					
VC – 1	17.33	6.75	120	47	5.78	580	2.518	0.2315
2	27	8.10	220	51	11.45	800	3.36	0.2359
3	28	7.20	202	45.5	12.10	789	3.32	0.2367
4	26	8.89	237	62.6	15.10	804	3.42	0.2314
5	24.50	9.40	234	55	13.60	788	3.33	0.2382
6	17	7.88	131	61	7.38	690	3.00	0.2299
7	18	7.85	139	55	7.18	664	2.97	0.2228
8	17.50	8.00	136	44.6	5.41	582	2.85	0.2162
9	13.33	6.55	82	65	5.30	794	3.05	0.2289
10	15.50	6.11	93	50.5	4.06	600	2.77	0.2144
11	16.50	6.81	107	55	5.06	631	2.85	0.2247
12	15.50	6.63	99	57.6	4.88	678	2.93	0.2323
13	17	4.55	80	62	6.46	686	2.60	0.2643
14	19	4.60	89	65	4.51	789	3.15	0.2504
15	21.50	8.80	185	63.5	13.30	786	3.43	0.2301
16	15.50	5.60	86	55.5	4.30	662	3.05	0.2151
17	15.50	6.40	98	59.8	4.65	677	2.95	0.2316
18	16.50	8.00	132	49.5	5.21	695	3.15	0.2195
19	17	8.00	138	47.8	4.76	691	3.07	0.2311
20	17	8.60	146	61.8	5.41	686	3.01	0.2313
21	22	4.86	106	56	9.03	791	3.22	0.2453
22	21	5.71	117	41.8	5.66	523	2.50	0.2069
VC-23	18.5	7.00	129	41	4.80	533	2.47	0.2163
King	27.5	8.81	235	66	15.13	840	3.62	0.2340
Kawmy-1	24	9.25	239	35	7.75	724	3.02	0.2423
Mean	19.52	7.21	143	54	7.53	699	3.02	0.2304
L.S.D at 5%	0.852	0.215	2.216	1.738	0.047	5.024	0.037	0.0018

5.Seed and biological yields/fed.

Data presented in Table 1 indicated that there were significant differences between varieties in seed and biological yields/fed.

King variety was the best in both characters followed by VC-4, VC-2 and VC-9 in seed yield but in biological yield VC-15 came in the second order, VC-9 the third and VC-4 was the fourth.

The superiority of king variety may be due to its progressive standing in the all yield attributes, such as number of pods, seeds/plant, seed index and seed yield/plant which in turn were reflected on seed and biological yields.

The progressive consequence of king, VC-4, VC-2 and VC-15 presented by many researchers under Egyptian conditions in many regions, (El Kramany 2001; Zeidan *et al.*, 2001 and Amany, 2002). It can be concluded that these four varieties have more adaptation than other varieties to Egyptian environment they have superiority at many regions in Egypt in both clay and sandy soil (El Kramany 2001) under different row spacing (Zeidan *et al.*, 2001).

6.Harvest index

Table 1 shows that there were significant differences between varietion in harvest index VC-13 record the first order, VC-14 was the second, VC-21 the third and the local variety kawmy -1 came the fourth. It can be concluded that these varieties have sufficiency in seed production.

It can be concluded from the present findings that the tested varieties differed significantly in all studied characters. There were wide range between varieties in every character but generally king variety was the best in weight of 1000 seeds (seed index), seed and biological yield/fed., also came in the second order in umber of pods, seeds/plant and seed yield/plant, but the fourth in number. of seeds/pod. VC-4, VC-5, VC-2, VC-9, VC-14, VC-15 and kawmy-1 recorded the top four orders in all characters thus these varieties selected to kept in breeders mind when make improvement program.

Correlation Coefficient

Data presented in Table 2 show the correlation coefficient among all the studied characters in the 25 varieties during the two growing summer seasons of 2001 (S_1) and 2002 (S_2).

Seed yield/fed. exhibited significant positive correlation with no. of pods, seeds/plant in (S_1), seed index, seed yield/plant and biological yield/fed in both seasons also, with harvest index in (S_2) . Singh & Pathak (1993) reported that seed yield was associated with number of pods/cluster, pods/plant, seeds/pod, 100 seeds weight, plant height and clusters/plant. Giriraj & Kumar (1974) and Naidu & Satyanarayana (1993) also reported that seed yield had positive correlation of yield with number of pods/plant, number of seeds/plant.

Regarding correlation coefficient, data in Table 2 clear that biological yield/fed had a positive and significant correlation with seed yield/plant, seed yield/fed in both seasons, seed index in second season and number of seeds/plant in first season.

Number of pods/plant showed significant positive association with number of seeds/plant (S_1), (S_2). Number of seeds/pod exhibited positive significant association with number of seeds/plant in both seasons and harvest index in (S_1). Number of seeds/plant have positive correlation with seed yield/plant in (S_1) and (S_2).

The present findings indicated that number of pods/plant, number of seeds/plant, seed index, seed yield/plant and biological yield/fed. are main yield contributing components and they should be given due weight-age in making an effective selection programme. Interrelation ship among these components should also be kept in mind while making selection in established or segregating populations.

It can be concluded that king variety is a promising variety under Egyptian condition in double use (seeds and forage) as summer legume crop, also VC-4, VC-2 and VC-9 are promising varieties produce greater than 800 kg/fed seeds and 3.37-3.45 ton/fed green forage at harvest to decrease the shortage in summer legume forage in Egypt.

TABLE 2. Correlation coefficient among characters studied in 25 mungbean varieties during 2001 and 2002 seasons.

Characters	2	3	4	5	6	7	8
No. of Pods/plant (1) S_1	0.0961	0.7658*	-0.1854	0.3079	0.5898*	0.4274	0.3523
S_2	0.4972	0.8601*	0.0614	0.3444	0.3763	0.1177	0.2573
No. of Seeds/plant (2) S_1		0.6958*	-0.0703	0.2850	0.0097	0.4746	0.5035*
S_2		0.8553*	-0.1709	0.6507*	0.3568	0.3870	0.1815
No. of seeds/pod (3) S_1			-0.3352	0.7003*	0.5066*	0.5796*	0.0551
S_2			-0.1433	0.8756*	0.4855	0.4853	0.3023
Seed index (4) S_1				0.2232	0.5250*	0.3967	0.3493
S_2				0.2510	0.5498*	0.5075*	0.4281
Seed Yield/ Plant (5) S_1					0.6950*	0.6443*	0.2062
S_2					0.6633*	0.6421*	0.4660
SeedYield/fed (6) S_1						0.8583*	0.4275
S_2						0.9531*	0.7677*
Biological Yield/fed (7) S_1							0.2596
S_2							0.5431*
Harves index (8) S_1							
S_2							

S_1 First season S_2 Second season *significant at 5%

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دراسة مقارنة على إنتاجية بعض أصناف فول المانج النامية فى أرض رملية

محمد فاروق القرماني ، محمد سليمان زيدان و ميرفت إسماعيل جبارة

قسم بحوث المحاصيل الحقلية – المركز القومى للبحوث – الجيزة – مصر .

أجريت تجربة حقلية لموسمين صيفيين عامى ٢٠٠١، ٢٠٠٢ لمقارنة ٢٣ صنف فول مانج مستورد من تايوان وصنف كينج المستورد من أستراليا بجوار الصنف المحلى المسجل قومى-١ الذى إستخدم كمقارنة – نفذت التجربة فى مزرعة خاصة بقرية النجاح جنوب مديرية التحرير – محافظة البحيرة – مصر.

أجرى تحليل معامل الإرتباط لكل الصفات المدروسة فى ٢٥ صنف تحت الدراسة فى الموسمين.

أظهر الصنف كينج تفوقا على جميع الأصناف فى صفات دليل البذرة – محصول البذور للنبات وللفدان – المحصول البيولوجى للفدان. أنتج الصنفان فى‌سى٣، فى‌سى-٥ أكبر عدد من القرون للنبات ومن البذور للقرن بينما أعطى الصنف قومى-١ أكبر عدد من البذور للنبات.

أنتج الصنف كينج أكبر محصول بذور للنبات وللفدان وكذا أكبر محصول بيولوجى للفدان وأعطى أكبر دليل حصاد.

سجل الصنف فى‌سى-١٣ المركز الأول فى صفة دليل الحصاد.

- أوضحت نتائج التحليل الإحصائى أن صفة محصول البذور للفدان ترتبط إرتباطا موجبا مع صفات المحصول البيولوجى للفدان – محصول البذور للنبات – ودليل البذرة فى كلا الموسمين ومع صفتى عدد القرون والبذور للنبات فى الموسم الأول فقط ومع صفة دليل الحصاد فى الموسم الثانى فقط.

- أظهرت صفه المحصول البيولوجى للفدان إرتباطا معنويا موجبا مع صفتى محصول بذور الفدان ومحصول بذور النبات فى كلا الموسمين ودليل البذرة فى الموسم الثانى فقط وعدد بذور النبات فى الموسم الأول فقط.