GIZA 6
A NEW VARIETY OF COMMON BEAN

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(Manuscript received 27 May 1990)

Abstract

The present investigation deals with the origin of the common bean Giza 6 varielty . Hybridization was practised between the two varieties Giza 3 and Swiss Blanc to transfer the genetic factors which control the characters of large seed from Swiss Blanc to Giza 3 variety to develop a new variety resistant to common bean masaic virus incorporated with large dry seed. Three lines were selected i.e, 1-1 , 13-16 and 13-6, in 1976 and tested, compared with parents during the years from 1976 tg 1981 . Also , the selected lines were retested again with 4 introduce lines from 1973 to 1988 . Because of the great variation between the plant, individuals within the lines to rust infection, selection of individual plant which exhibited moderate resistance to BCMV and rust inferction was practised. Line 1-1 exhjibited the characterrs of heavy large seeds , high productivity. The selected line, i,e 1-1 was also moderate resistant to BCMV and rust infection line. Line 1-1 is released and given the name Giza , 6.

INTRODUCTION

Commonn bean is an impotant vegetable in A. R. E. The plant breeder can assist in improving the bean production in many ways. The virus and rust diseases are imprtant problems for bean production in Egypt. For local consumption , as well as, export, the heavy or large dry seeds are important.

The present study was undrtaken to incorporate all the desirable characters

exhibited in the cultivars Giza 3 and Swiss Blanc in a new cultivar which demonstarates resistance to virus and rust diseases and produce heavy seed weight and posses high yielding ability.

REVIEW OF LITERATURE

The French variety " Swiss Blanc " was recommended and used in A. R. E. before 1939 (Moustafa & Abd El-Baddi, 1939) for dry seed production based on results form comparative trials. This variety was characterized by heavy , large dry seeds.

" Giza 3 " variety was developed in Egypt by hybridization between the two parents, the French variety " Swiss Blanc " and " Conternder " variety (El-Shamsy et al . 1972). Giza 3 variety Demonstrated high resistance to BCMV.

Yield of common beans was a function of some plant characteristics (Singh and Melhetra 1970, Yassin 1979, sink 2 haliwal 1971and Davis 1989).

Number of days to flowering is influenced by various environmental and genetic factor . Days to flowering was quantitatively inherited by several genes additive in their nature, but over - dominace was expressed for earliness (Dichson, 1967 and Hamed , 1975).

Low heritability for number of pods per plant and number of seeds per pod and seed weight were noticed when crosses were made between light seed weight and heavy seed weight cultivars, diffreneces were found in the degree of environment and in the heritable value of seed weight (Voysest 1970)

There are several studies on the inheritance of resistance to BCMV and selection resistant been cultivars. The virus was recovered from the testa, cotyledons, and embryo of dry infected seeds, and also from the testa, cotyledon, embryo and plriumula of germinating seeds (walkey & Innes 1978, Baggett & Frazier 1981 ,. Bagget *et al* . 1984 , Allavena & Fadd 1985 , Capoor *et al.* 1986 , Ranalli *et al* . 1986, and Davis 1989).

Bean common mosaic virus was one of the first virus diseases reported in the world (Iwanoski, 1894). Since then the seed -born virus has been reported in nearly every country of the world .

Plant infection may reach 100 % in field and yield losses range from 35 % to 98 % (Galvez and Gardenas 1974, Hampton 1975 and Zaumayer & Thomas 1957).

The resistance is conferred by a single recessive gene (Baggett et al . 1966, cfti & Alvarez 1975, Guerra et al . 1971 , Hernandez - Bravol & Galvez 1976 and Zaumayer & thomas 1957).

Another type of resistance to BCMV was noticed , this resistance is conferred by a dominant hypersensitive gene which conditions the black - root reaction . The majority of snap bean cultivars and some of the common bean cultivars developed in United states have derived their resistance from Corbett Refugee. They include Wisconsin Refugee, Idaho Refugee and Refugee U.S.S. (Zaumayer & Thomas 1957). This resisitance has been effective for nearly 50 years . Burke & Silbernagel 1974, Van Rheenen & Muigai 1984 . have suggested that this type of resistance be widely incorporated into commercial cultivars.

Many bean cultivars were evaluated by several investigators and selected for resistance to rust diseases caused by Uromyces Phaseoli .

Resistance to bean rust reaction range from immunity, through various consisltent type of hypersensitive, non - sporulating or sporulation necrotic reaction, to very small or intermediate , uredia (Ballantyne 1978 , Harter & Zaumayer 1941 and Stavely et al . 1983).

Genetic studies of resistance have shown that reaction grade is controlled by single dominant gene and that there are many such genes in beans (Ballantne 1978 , Christ & Groth 1982 a, De Cavalho et al . 1978, Grafton et al . 1985 , Kolner & Groth 1984, Meiners 1981, Stavely 1984 a and 1984b , Stavely & Grafton 1985, and Zaumayer & Harter 1941).

MATERIALS AND METHODS

The two common bean varieties " phaseolus vulgaris L. " Giza 3 " and " Swiss Blanc " , used in this study, were selected as parents from a group of varieties that had been tested. Selection of the two parents was based on productivity, size of white dry seeds and resistance to bean common mosaic virus.

1 . Initial crossing and selection:

" Giza 3 " was crossed with " Swiss Blanc " at the Vegetable Research Department , Horticultural Research Institute, Dokki , A. R. E. in spring 1969 and fall 1969. In F2 and F3 generation , seeds of parents and their progenties were planter in the field at the same farm in non replicated observational plots. Each plot consisted of 20 plants in a single row . Individual plant selection within lines throughout the segregating generations (F2 - F4), took place in summer and fall seasons of 1971 and summer season of 1972. The poor appearing lines were discareded, the selection based on weight of white colored seed, susceptibility to virus infection and high dry yielding capacity

Three lines, designated as 1-1 , 13-6 and 13-6 and were selected

2 . Evalution of the Selected Lines :

The three selected lines dessignated as 1-1 , 13 -6 and 13-6, and their parents , i.e. Giza 3 and Swiss blanc were evaluated in field trials at various locations for previous characters, i.e. seed weight, productivity, resistance to virus. And because of the great variation noticed between the parents within the lines to rust infection especially in the fall seasons, evaluation of rust resistance was added throughout the generations (F5 - F14) during the period 1973 and 1981.

Selection of individual plants was practised within lines for further seed propagation .

Virus and rust diseases were evaluated under natural field infection . The evaluation of rust diseases was practised in the fall seasons, the favourable time of rust disease spread. A scale 1-5 was used to identify the severity of disease infection , where 1 was immune and 5 was highly susceptiible.

The layout of the experiments was R.C.B. of four replicfations. Each plot consisted of 2 rows of 5 meters in length and 70 cm wide.

When the stability of the previous characters was achieved, the two parents, i.e. Giza 3 and Swiss Blanc and local variety Giza 4 and 5 intoduced cultivars, i.e. 1470 (BAT 1274 X (Alubia PC X G45) (; 1500 (G 3638 X ICAL - 22) , 1483 (ICAL - 24 X CG-9620 X Sanilac), 1484 (Jubila X ICAL - 24). The latter cultivar were imported from CIAT organization in Colombia.

The layout of the field experimemts in this latter trials was similar to the previous ones with on exception that the number of the rows was duplicated.

Agrikcultural practices were used according to the recommendations of Ministry of Agriculture . Data were analyzed statistically according to the standard methods (snedecor and Cochran , 1967).

RESULTS AND DISCUSSION

1- Total yield :

a) Productivity of selected lines and their parents : Table 1. presents the average of dry seed yield of El-Kanater El - Khayria experiment Starion (during 1976 to 1981) in the fall and summer seasons.

The data showed clear differences between the productivity of the selected lines, i.e. 1-1 , 13 -16 and their parents. i.e. Giza 3 and Swiss blanc in summer experiments. The selected lines outyielded the parents, except in year 1980 the yield of line 13-16 was similar to that of Giza 3. In the fall seasons, the same trend was echibited in most of the experiments. The dry seeds yield of the line 13-16 was similar to the yield of the parent Giza 3 in the fall season 1987 , whereas the yield of line 13-6 was statistically equal with the yield of the same parent in fall season of 1979. The three lines outyielded both parents in fall season of 1981.

b) Productivity of th selected lines , local and introduced varieties.

able 1. Total yield of dry seed for selected lines of common bean and their parents during fall and summer seasons of the years 1976 to 1981 at El-Kanter EL-Khyria experiment Station.

Cultivars	1976	1977	1980	Average	1978	1979	1981	Average	General Average
Parents									
Giza 3	0.758 b	0.82 1 b	0.980 c	0.862	0.921 b	0.980 b	0.691 b	0.864	0.863
Swiss Blanc	0.665 b	0.705 c	0.740 d	0.703	0.730 c	0.820 c	0.524 c	0.691	0.697
Selected lines									
1-1	1.030 a	1.211 a	1.520 a	1.253	1.100 a	1.123 a	0.825 a	1.016	1.134
13 - 6	1.009 a	1.054 a	1.215 a	1.092	1.090 a	1.011 ab	0.783 a	0.961	1.026
13 - 16	1.240 a	1.002 a	1.111 bc	1.117	0.950 ab	1.101 a	0.841 a	0.964	1.040
Average	0.945	0.958	1.113	1.005	0.958	1.007	0.732	0.899	0.952

* Values with an alphabetical letter (s) in common do not differ significantly from each other, at 5 % level of probability

As line 1-1 showed superiority in yielding ability , and in other characters as will be shown later, over the other lines , so it was evaluated alone with new introductions as shown in Table 2. Again the productivity of line 1-1 surpassed that of the new introductions and the local varieties in most cases in the fall and summer seasons of the years from 1984-1986.

Table 2. Total yield of dry seeds (kg/Plot) for the cultivars at El-Kanater El-Khayria exp. sfarion during fall and summer seasons of the years from 1984 to 1986.

Cultivars	Fall 1984	Summer 1985	Fall 1985	Summer 1986	Fall 1986	Cultivars
Giza 3	2.532 ab	2.045 b	2.310 bc	1.890 b	2.270 b	2.210
Giza 3	2.047 bc	1.870 bc	2.355 bc	1.955 b	2.600 ab	2.165
Swiss Blanc	2.692 ab	1.490 bc	2.490 b	1.875 b	2.150 bc	2.130
L. 1 - 1	3.255 a	2.850 a	3.090 a	2.865 a	2.925 a	2.997
1470	1.541 c	2.700 a	1.740 c	2.460 a	1.725 c	2.033
1500	2.111 c	2.210 b	2.220 bc	2.300 ab	2.120 bc	2.192
1483	2.449 ab	1.450 c	2.265 bc	1.420 c	2.340 ab	1.984
1484	3.240 a	1.820 bc	2.400 b	2.025 b	2.515 ab	2.400
Averrage	2.483	2.054	2.358	2.098	2.325	2.263

values with an aphabetical letter(s) in common do not differ significantly from each other, at 5% level of probability.

2. Period for Blooming :

Data in Table 3 indicate that 25 % of the plants of the parents and their progenies bloomed after a perioid of 39 to 40 days from planting without any appreciable difference between them.

Table 3. Period in days for folowering of 25 % of the plants in the fall and summer seasons of the years from 1974 to 1976.

Cultivars	Fall 1974	Fall 1975	Summer 1976	Average
Parents				
Giza 3	39.21	39.33	40.31	39.61
Swiss Blanc	39.20	39.42	40.81	39.81
Selected lines				
1 - 1	39.30	39.28	40.21	39.60
13 - 6	39.73	39.75	40.75	40.07
13 - 16	39.51	39.66	40.66	39.94
Averrage	39.43	39.48	40.54	38.81

3. Weight of the seeds :

Figure 1 shows the weight, in grams. of 100 - seeds of the selected lines and their parents in four seasons started 1976, to fall 1981 . It is clear that the weight of seeds of the selected lines was improving through individual plant selection within lines and inbreeding. (Figure 1) . The weight of the seeds of all lines were improved, whereas the weights of seeds of the parents were almost constant through the four seasons . Data in Table 4 for the seed weights , in fall 1981, which was the last season for selection for seed weight , indicate that one of the parents, i.e. Swiss Blanc Produced heavy seeds, whereas the second parent Giza 3 resulted in light seeds. Seed weight of lines 1-1 and 13-16 was very close to the heavy seeds parent, whereas the third line was intermediate between the two parents. These tesults were Confirmed , when the data was statistically analyzed in 1981 as shown in Table 4 .

Table 4. Weight of 100 seeds in fall season of 1981.

Materials	Weight, in grams, of 100 seeds
Parents	
Giza 3	30.88 ± 0.51
Swiss Blanc	48.15 ± 0.85
Selected lines	
1 - 1	45.79 ± 0.71
13 - 6	35.12 ± 1.15
13 - 16	44.44 ± 1.85

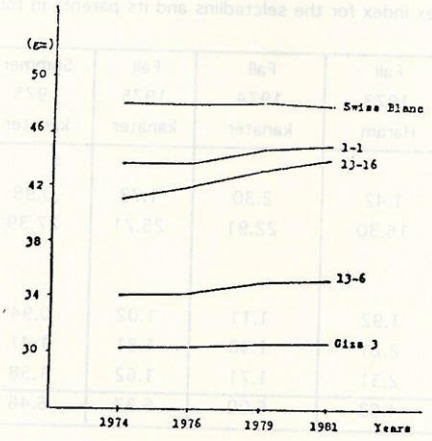

Fig. 1. Weight , in grams. of 100 seeds for the selected lines and their parents in fail seasons of the years 1974, 1976 , 1979 and 1981.

4 . Virus Disease Index :

As shown in Table 5. the selected lines exhibited low virus complex index under condition of natural field transmisssion . The percetage of virus incidence ranged from 1.02 to 2.31 all over the planting seasons. These figures indicate that the three lines were very close to the resistant parent Giza 3 to common bean mosaic virus in which the range of infected plants was from 0.89 to 2.30 .The incidence of infected plants of other parents, Swiss Blanc ranged from 15.30-27.39 percent. Also, the data showed that plants of line 1-1 were the least infected ones when compared with the plants of the other two lines.

Again , line 1-1 was evaluated in the summer sesaons of 1984 and fall seasons of 1986 , with three local varieties and 4 lines introduced from CIAT.

Table 5. Virus complex index for the selctedlins and its parents in four seasons.

Cultivars	Fall 1973 Haram	Fall 1974 kanater	Fall 1975 kanater	Summer 1975 kanater	Average
Parents					
Giza 3	1.42	2.30	1.73	0.98	1.60 a
Swiss Blanc	15.30	22.91	25.71	27.39	22.82 b
Selected lines					
1 - 1	1.92	1.11	1.02	0.94	1.24 a
13 - 6	2.21	1.98	1.81	1.41	1.85 a
13 - 16	2.31	1.71	1.62	1.58	1.80 a
Averrage	4.63	6.00	6.37	6.46	5.86

* Values with an alphabetical letter (s) in common do not differ significantly from each other, at 5 % level of probability.

Data in Table 6 show the virus complex indein line 1-1 comparred with other cultivars. The breeding materials and cultivars could be classified into three categories :

The first category included lin 1-1 , the two local varieties Giza 4 , Giza 3 and the introduced line 1484. The infetion inclence did not excecd 15 %. Plants of line 1-1 were the least infected ones. This category was designated as resistant to virus complex.

The second category included Swiss Blanc variety . The infected plants were less than 20 % and more than 15 % . The variety in this category was classified as susceptihble ones.

The third category in which the infected plants were more than 20 % as in lines 1483 , 1500 and 1470 were considered as highly susceptible.

Table. 6. Virus complex index for cultivars under field cinditions (Kanater, Summer 1984 and fall 1986) (transformed)

Cultivars	Summer 1984	Fall 1976	Average
Giza 3	12.92	9.63	11.27 a
Giza 4	16.43	8.13	12.28 a
Swiss Blanc	16.43	21.13	18.78 ab
Line 1 - 1	3.51	17.46	10.48 a
CV. 1470	45.00	10.94	27.97 b
1500	33.21	11.54	22.35 b
1483	2.72	45.69	24.20 b
1484	8.13	11.54	9.83 a
Average	17.29	17.00	

* Values with an alphabetical letter (s) in common do not differ significantly from each other, at 5 % level of probability.

5 - Evaluation of rust disease :

Data in Table 7 show the percentage of infected plant under natural conditions with rust disesase. The Swiss Blanc variety showed moderate resistance to the infection of rust. Line 1-1 was similar to swiss Blanc, whereas the other parent Giza 3 and the two lines 13-6 and 13-16 were severely as shown in Table 8. line 1-1 and the introduced line 1484 exhibited moderate resisatance to rust disease., There was no appreciable difference between line 1-1 and the parent Swiss Blanc.

The other introduced lines as well as the local varieties were classified as moderatly high and severely susceptible to rust disease.

Table 7. Infection percentage of rust disease at El-kanater field in fall 1978 , 1979 and 1981.

Cultivars	1974	1979	1981	Average
Parents				
Giza 3	3.25 b	3.00 b	3.16 b	3.13
Swiss Blanc	1.52 a	1.50 a	1.75 a	1..59
Selected lines				
1 - 1	1.52 a	1.00 a	1.00 a	1.08
13 - 6	3.11 b	3.44 b	3.33 b	3.29
13 - 16	3.28 b	3.50 b	3.41 b	3.39
Averrage	4.63	6.00	6.46	5.86

* Values with an alphabetical letter (s) in common do not differ significantly from each other, at 5 % level of probability.

Table 8. Infcetion percentage of rust disease at El-kanater field in fall 1978 , 1979 and 1981.

Cultivars	1984	1985	1986	1987	1988	Cultivars
Giza 3	3.4	3.5	3.3	3.5	3.5	3.4 d
Giza 4	3.3	3.3	2.5	3.2	3.0	3.3 d
Swiss Blanc	1.5	1.8	1.8	1.9	1.7	1.7 d
L. 1 - 1	1.5	1.3	1.3	1.0	1.0	1.2 ab
CV. 1470	3.4	3.5	3.2	3.4	3.2	3.3 d
1500	4.0	4.5	4.0	4.3	4.1	4.2 e
1483	2.2	2.5	2.4	2.5	2.4	2.4 c
1484	1.0	1.0	1.0	1.0	1.0	1.0 a
Averrage	17.29			17.00		

* Values with an alphabetical letter (s) in common do not differ significantly from each other, at 5 % level of probability.

Dry seeds of Common bean are of great interset for local consuption and for export . The plant breeder can asssist in improving the bean production and quality in many ways. So, the two varieties Giza 3 and Swiss Blanc were used as parents for the incorporation of several traits possesed by each variety in a new variety charcterized by high yielding ability , dry large, white seeds , resistant to virus and rust infection.

Hybridizetion between the two varieties and selection of individual plants throughout the segregating generations and evaluaation of the various trials were practised through a series of field trials.

The productivity of the selected line 1-1 surpassed that of the two parents in the fall and summer seasons in all years of the trials.

The high yielding ability of line 1-1 is attributed to genes interction transmitted from the two parents and incorporated in a line containing all the favourable alleles for yielding ability .

Inheritance of seed yield exhibited gene interaction when Tempo was imcluded, but without Tempo the inheritance was additive, (Hamed 1975).

Yield of common bean was reported to be a function of some plant chracteristics (Singh and Melhetra 1970, Yassin 1979, and Davis 1989). This line proved its superiority in yielding ability in most cases over the introduced lines and local varieties.

The two parents was almost very similar in blooming dates. The period required for the plants to flower were approximately 40 days with no appreciable difference between the two parents. This trait was found by Dickson (1967) and Hamed, (1975), to exhibit partial dominance, so the progenies were expected to behave similarly. The plants of line 1-1required 39.66 days in order that 25 % of the plants to bloom , the same period required for the plants of the two parents to flower.

The weight of 10 seeds were improved through individual plant selection from one generation to another till it achieved stability in 1981 . Line 1-1 derived its heavy seed weight showed little or no dominance , according to Hamed 1975. Also, lower heritability for seed wieght was noticed by Voyset (1970).

The genetic factors controlling resistance to common bean mosaic virus was transmitted to line 1-1 from variety Giza 3. El-Shamy *et al.* (1972). reported that Giza 3 demonstrated high resistance to BCMV. Several studies reported that resistance to virus was an inherited character. (Allavena and Fadd 1985; Fadd 1985; Baggett *et al.,* 1966 & 1984; Baggett and Frazier 1981; Burke and Silberanagel 1974; Cafati and Alverez 1975; Capoor *et al.,* 1986; Davis 1989, Galvez and Gordenas 1974; Guerva 1971; Hernandez Bravol and Gavlez 1976; Hampton 1975; Iwanowki 1894; Ranalli *et al .,* 1986 , Van Rheenan and Muigai 1984 Walkey and Innes 1978 , and Zaumayer and Thomas 1957). Cultivar Swiss Blanc Showed moderate resistance to most diseases in this experiment, Confirming previous observation done by various investigators (Annual Report 1984, 1985 , 1986 and 1987). This result showed an avidence that Swiss Blanc Passed genetic factor resistance, and was trasmitted to its progeny line 1-1.

Genetic studies of resistance to rust have shown that reaction grade is controlled by a single dominant gene and that there are many such genes in beans (Ballantyne 1978; Christ and Groth 1982 , De Cavalha *et al.,* 1978; Grafton *et al.,* 1985; kolner and Groth 1984; Meiners 1981; stavely *et al.,* 1983 Stavely 1984 a and b; Stavely and Grafton 1985; Zaumayer and Harter 1941). As it is mentioned that neither parents showed any signs of resistance, so none of the genetic factprs has a dominant nature. So it is proposed that genetic interaction in the new combination is responsible for rust resistance which showed up in line 1-1.

From all aspects it could be concluded that line1-1 could be released as it is characterized by high yieldeing ability large white dry seed and resistance to BCMV and rust.

This line is given the name of Giza 6.

REFERENCES

1. Allavena, A. , and Fadd. 1985 . Maltalhana and Mongano, dry bean varieties resistant to bean common mosaic virus bred using Ethylmethanosulphonate. Sementi Elett, 31(6) : 37 - 38 . (c.f. Abst . on Field Bean, XIV, 3, no. . 0457, 1989).
2. Annual Report 1984, 1985. Agricultural Development system (ADS) Bean activity P.8-12. 1985 , 1986 Agricultural Development system (ADS) Bean activity P.6-11 .
3. Annual report 1985,1989. Africultural development system (ADS) Beanadmety P-10-13.
4. Annual report 1986 , 1987. Aricultural develepment system (ADS) Bean actmuty, P.6-11.
5. Baggett, J. R., W. A. Frazeier, and G. W. Varseveld. 1981. " Oregon 17 " green bean. Hort Science, 16 (2) : 228 - 229 . (c.f. Snap Beans Present Status in the Developing World and Bibliography of Research, 1919 - 1987).
6. Baggett, J. R., W. A. Frazeier, and G. W. Varseveld. 1984. Oregon trial green bean. Hort Sci, 19 (1) : 1934 . (c.f. Snap Beans Present Status in the Developing World and Bibliography of Research, 1919 - 1987).
7. Ballantyne, B. J. 1987 . The genetic bases of resistance to rust, caused by Uromyces appendicultus in bean (Phaseolus vulgaris). Ph. D. Dissertation , sydney Univ. , Sydney , N. S. W. Austrailai. 262 pp. (c. f. Bean Produc. Problems in the Tropics, Center Internat. de Agricultura Tropical , 1989).
8. Burke , D. W. and M. J. Silbernagel 1974. Hypersensitive resistance of bean common mosiac virus in dry filed beans . Improv. Coop. (USA). Ann .Rep., 17 : 22 (c.f. Bean Produce. Problems in the Tropics, Centro Internat. de Agricultura Tropics, Centro INternat. de Agricultura Tropical , 1989).
9. CafatiK, C. R. and A. M. Alvarez. 1975. Mejoramiento en frejoles (Phaseolus virus 1) Y su strain N. Y. 15 Agric Tec. , Santiago , 35 (3) : 125-157 . (c.f.

Bean produc. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989.

10. Capoor, S. P., D.G. Rao and D. M. Sawant 1986. Seed transmission of French bean mosaic virus. Ind . Phytopathol., 39 (3) : 343 - 345.
11. Christ, B.J. and J. V, Groth. 1982 a . Inheritance of resistance in three cultivars of bean to the bean rust pathogen and the interaction of virulence and resistance gene. Phytopathology, 72 (7) : 771-773.
12. Davis, J. 1989. Breeding for intercrops with spicial attention to bean for intercropping with maize. Butare Rwanda, Cen. Internacional de Agricultura Tropical , 96. En . Paper presented at Workshop on Research Methods for Cereal / Legume Intercropping in Eastern and Southern Africa. Malawi, 1989. (c.f. Abst . on Field Bean xiv, 2, no. 0348, 1989).
13. De Cavalha, L. P., C. Vieira, and G. M. Chaves. 1978. Hereditariedade da resistanicia a cinco recas fisionlogicas de Uromyces phaseoli var. Typica. Arth . en phaseolus vulgaris L. Fitopatol. Bras ., 3 (2) : 181-185 (c.f. Bean produc. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989).
14. Dickson, M. H. 1967 . Diallel analysis of seven economic characters in snap beans . Crop Science, 7 (3) : 121 - 124.
15. El - Shamy, M. R. , S. H. Nassar and M. S. Attia. 1972 . Giza 3 , a new variety fo snapp white seeded bean resistant to common mosaic virus. Agric. Res . Rev . 93-108.
16. Galvez, G. E. and A. M. Gardenes. 1974. perdidas ecnomicas causadas por el virus del mosaico comun (BCMV) en cuatro variedades de frijol. Proc. Am phytopathol . Soc. , 1 : 121 - 122.
17. Grafton K. F, G. C. Weiser, L. J. Littlefield and J. R. Stavely. 1985. Inheritance of resistance to tow races of leaf rust in dry edible bean . Crop Sci.., 25 (3): 537-539. (c.f. Bean production. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989).
18. Guerra, J. A. Osores and E. Echandi. 1971. Herencia de la resistancia a la raza peruana del virus del mosaico comun del frijol. Turriabla. 21 (2) : 184- 1988. (c.f. Bean produc. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989).
19. Hamed, L. A. 1975. Ingeritance of yield , yield components, number of days frowering, plant hight and incidence of interloucular cavitation of pods in snap bean. ph. D. Thesis, Wisconsin Univ., 1975, 118 p. (c.f. Bean present Status in

the Developing World and Bibliography of Research, 1919-1987).

20. Hampton , R. O. 1975 . The nature of bean yield reduction by bean yellow and bean common mosaic viruses. Phytopathology, 65 (12) : 1342 - 1346.
21. Hernandez Broval ,G. and G. Galvez. 1976. Inheritance of disease resistande of dry bean , phaseolus vulgaris, in the Tropics. I. Rist and CMV. Bean Improv. Coop. Ann. Rep., 19 : 47-48 . (c.f. Bean produc. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989).
22. Harter, L. L. and W. J. Zaumayer. 1941. Diferentiation of physiologicoraces of uromyces phaseoli typica on bean . J. Agric. Res., 62 : 717 - 731.
23. Iwanki , D., 1894. Uber die mosaik krankeit der tabakspflanze . Imp . Akad. Nauk. Izv C acad . Imp. Soc. Perrosbourg Bul., 35 : 67 - 70 . (c.f. Bean produc. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989).
24. Kolner, J. A. and J. V. Groth. 1984. Inheritance of a minute uredinium infection type of bean rust in bean breeding line , 814 . phytopathology , 74 (2) : 205 - 207.
25. Meiners, J. P. 1981. Genetics of disease resistance in edible legumes. Ann Rev. Phytopathol., 19 : 189 - 209.
26. Moustafa, S. and M. Abd El-Badii. 1939. Vegetables in Egypt . 6 th ed . Asria press, Egypt.
27. Ranalli, P., R. Mainin, and G. Burchi. 1986. Fagioline da industria cultivar, temi di raccelts, caratteristich productive e merceologiche. Informature Agrario, 42 (11) : 65 - 68 , 71-74. (c.f. abst. on Field Bean , xiv , 2 no. 0282, 1989).
28. Sink , K.L. and R. S. Melhetra. 1970 . Interrelationship between yield and components in mung bean. Indiana plant Br. Abs., 42, no . 1553.
29. Stavely , J. R. 1984 a. Gentict relationships of resistance in two broadly rust resistant bean. phytopathology, 47 (7) : 834 .
30. Stavely, J. R. 1984 b. Genetic of resistance to Uromyces phaseoli in a phaseolus vulgaris line resitant to most races of the pathogen. phytopatholoty, 74 (3): 339 - 344.
31. Stavely, J. R. and K. F, Grafton. 1985. Genetics of resistance to eight races of uromyces appendicultus in phaseolus vulgaris cultivar Mexico 235. phytopathology, 75 (11) : 1310.
32. Stavely , J. F. , C. F. Freytag , J. R. Steadman. and H. F. Scfhwartz. 1983. Bean rust workshop. Bean Improv. Coop. (USA) An. Rep., 26 : iv-vi . (c.f. Bean pro-

duc. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989).

33. Van Rheenen, H. A. and S.G. S. Muigi 1984. Control of bean common mosaic by deployment of the dominant gene 1. Neth . J, Plant pathol.,90 (3) : 85 -94 (c.f. Bean produc. Problems in the Tropics, Centro Internal de Agricultura Troics, 1989).
34. Voysest, O. V. 1970. An attempt to overcome the yield dampening effect of negative correlations among yield components in beans. ph. D. Thesis, East Lansing, Michigan State Unive. 115 p. (c.f. Abst . on Field Bean xiv , 2, no. 0499, 1989).
35. Walkey, D. G. A. and N. L. Innes. 1978. Resistance of dwarf French beans to beand common and bean yellow mosaic virus. J. Nat . Inst. Agric. Bot., 14 : 428 - 432. (c.f. Bean present stauts in the Developing World and Biliography of Research , 1919 - 1987).
36. Uassin , T. E. G. 1979. Fasulia (phaseolus vulgaris) in Ed-Damer Sudan. Rudeiba Res. Sta., Am=nn. Rep. 1971 - 1972. (c.f.snap Bean n present stauts in the Developing World and Biliography of Research , 1919 - 1987 Abst .no 873).
37. Snedecor, G. W. and L. L. Cochran. 1967. Statistical Methods. 6 th ed., The Iowa State Unive. press . Am., Iowa State.
38. Zaumayer, W. J. and L. L. Harter. 1941. Inheritance of resistance to six physiologic races of bean rust. J. Agric. Res ., 63 : 599 - 622.
39. Zaumayer, W. J. and H. R. Thomas. 1957. Rust : A monographic study of bean disease and methodes for their control. Rev. ed. Tech. Bull. no . 686 . U. S. Dept. Agric., Washington, d. c. USA, 255 pp (c. f. Bean production problems in the Tropics , Centro Internat . Agric. Trop., , 1989).

جيزة ٦ : صنف جديد من الفاصوليا الجافه

فايق ساويرس فارس – سيد حسن نصار – ابراهيم محفوظ الدسوقى

معهد بحوث البساتين – مركز البحوث الزراعيه – الجيزه

أجرى التهجين بين الصنفين جيزه ٣ وسويس بلان لنقل صفة حجم البذرة الكبيرة من الصنف الأخير الى الصنف جيزة ٣ لإستنباط صنف جديد مقاوم لموزايك الفاصوليا العادى مع حجم البذور البيضاء الكبيرة – انتجت ٣ سلالات تحمل هذه الصفات وهى ١ –١ و ١٣ /١٦ و ٦/٣ فى سنة ١٩٧٦ واختبرت مع الأباء خلا السنوات من ١٩٧٦ الى ١٩٨١ ايضاً اختبرت مع ٤ اصناف مستوردة من سنة ١٩٨٤ حتى ١٩٨٦ . ولقد قيم المقاموم للفيروس فى السلالات الثلاثة المنتجة والأباء وايضاً الأصناف الأربعة المستوردة من سنة ١٩٧٣ الى ١٩٨٨ .

ولقد أنتخبت كبيرة فى النباتات للمقاومة للصدأ بين السلالات الثلاثة المنتخبه لذلك تم إنتخاب نباتات فردية تحمل صفة المقاومة للصدأ مع المقاومة لفيروس موازيك الفاصوليا العادى . ولقد وجد ان السلالة ١ –١ تتميز بكبر حجم البذور ووزنها وكفائتها الإنتاجية العالية .

وايضاً المقاومة للصدأ وفيروس موازيك الفاصوليا العادى . ولقد أطلق ١ سم جيزة ٦ على السلالة ١ – ١.