Inheritance of some Important Economic Characters in Snake Cucumber

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ABSTRACT

This research was performed at Agriculture Research Station, Ismailia, Egypt during the period of 2019 and 2020 to evaluate some inbred lines of Snake cucumber for some economic characters and determine their variability, heritability and correlation. The study consisted of twenty-three Snake cucumber inbred lines arranged in randomized complete block design (RCBD) with three replicates. Results indicated the presence of substantial variability among the genotypes. The high estimates of genotypic coefficient of variation, phenotypic coefficient of variation and broad-sense heritability for all studied characters indicated that they were highly heritable and selection can be imposed. The phenotypic correlation for total yield/plant with number of fruits/plant, sex ratio and fruit weight were significant. However, the inbred lines 4, 14 and 17 had the best yield and fruit quality. Thus, it is recommended for an effective selection of those characters which could be selected for cultivar improvement and cross breeding program.

Key words: Snake cucumber, Genetic Variability, Heritability, Correlation.

INTRODUCTION

Snake cucumber (*Cucumis melo* var *flexuosus*) belongs to family Cucurbitaceae. It is an important vegetable crop, namely serpent cucumber (Solmaz et al, 2016) or Snake cucumber. Snake cucumber is a type of long and slender fruit which tastes likecucumber and used when immature as an alternative to cucumber (Nuñez et al, 2008). The skin is very thin and bumpless andfruitsare always used without peeling (Abdel-Ghani and Mahadeen, 2014).

There is a high variability among Snake cucumber landraces in terms of morphological characters, yield and fruit attributes (Abdrabou et al, 2021)**.**Snake cucumber plants have an out crossing habit, thus landraces and local cultivars are populations of random mating individuals (Youssef, 2018). Genetic variability studies mainly provide the essential information about the genetic components of the population. The progress in Snake cucumber breeding depends mainly on the magnitude of genetic variability present in the population and it is necessary to evaluate the genetic parameters such as genetic coefficient of variation, heritability and genetic advance (Abd El-Salam et al, 2010).

High heritability for quantitative traits offers the better scope selection genotypes in the early segregating generations. Broad sense heritability magnitudes in Snake cucumber were high for number of fruits/plant, yield/plant, fruit length and fruit shape index (Abd El-Salam et al, 2010), so phenotypic selection for these traits would be reasonably effective. In addition, it has been documented that there is a correlation between the number of primary branches and stem length, the length of the fruit with the stem, the pubescence of the stem and the ratio of female to male flowers, as well as the association of fruit thickness with stem length and fruit color with pubescence (Mohamed et al. 2010).

Youssef (2018) found that estimates of phenotypic variance (σ^2_{ph}) were larger than the corresponding genotypic variance (σ^2_g) for all examined traits in snake cucumber. Moreover, close estimates of phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) were noted in all characters (stem length (cm), total yield as number (thousand feddan-1) and weight of fruits (ton feddan-1), average fruit weight (g), fruit length (cm), fruit diameter (cm). Shape index of fruits was calculated as fruit

length/fruit diameter ratio), which imply the contribution to phenotypic expression of these characters are mostly due to genetic factors, while the environmental ones were not great importance. Although genotypic coefficient of variation revealed the extent of genetic variability present in the genotypes for various traits, it does not provide full scope to assess the heritable variation. Burton (1952) suggested that GCV (Genotypic coefficient of variation) together with heritability estimates would give the best insight into the extent of the advance to be expected by selection. Heritability helps in determining the influence of environment in expression of the characters and the extent to which improvement is possible after selection (Yadav et al. 2012). Abd El-Salam et al. (2009) indicated that broad sense heritability in Snake cucumber was high for number of fruits/plant, yield/plant and fruit length, meanwhile, it was moderate for fruit diameter trait.

Despite the large variation that had been observed among Snake cucumber cultivars, the efforts for development of new and superior varieties are still limited. Substantial effort has to be directed towards genetic breeding of existing cultivars (Youssef, 2018).

The objectives of this study are to evaluate some snake cucumber inbred lines for the genetic improvement and investigate the potential for introducing variations by examining some genetic factors that affect economic characters.

MATERIALS AND METHODS

This study was conducted at Agriculture Research station, Ismailia, Egypt during the period of 2019 and 2020. The experiment focused on the genetic analysis of morphological and yield traits of twenty- three genotypes of snake cucumber which were collected from Vegetable Breeding Department of Horticulture Research Institute, gene bank of Sweden, open pollinate varieties from Pakistan and by personal effort of the researcher. Twenty three Snake cucumber inbred lines collected from diverse sources (Table 1) were self-pollinated at Ismailia Vegetable Research Farm (IS.V.R. F), Egypt for 4 generations (2017, 2018) to have pure inbred lines.

Table (1). Sources and performance of Snake cucumber accessions were used in the current study.

Inbred line	Color of fruits		Region
Line 1	White	Qthaa Bedaa	Wady Natron, Behaira
Line 2	green		Giza
Line 3	Light green	Qthaa Bedaa	Wady Natron, Behaira
Line 4	Dark green	Qthaa	Ismailia
Line 5	White	Fakahany	Wady Natron, Behaira
Line 6	Light green	Qthaa	Abo-Hamaad, Sharkia
Line 7	Light green	Qthaa (Balady)	Cairo
line 8	White	Qthaa Bedaa	Al-Barout, Beni Swif
line 9	Dark green	Qthaa	Tahta, Sohag
Line 10	Dark green	Qthaa (Agoury)	Menia Al-kamh, Sharkia
Line 11	White	Qthaa	Ismailia
Line 12	Light green	Fakahany	Wady Natron, Behaira
Line 13	Dark green	Qthaa	Abo-Hamaad, Sharkia
Line 14	green	Qthaa (Balady)	Veg. Bred. Dep.
Line 15	Dark green	Matrohy	Veg. Bred. Dep.
Line 16	green		Gene bank of Sweden
Line 17	Dark green	Katify	Veget. Bred. Dep.
Line 18	Dark green		Gene bank of Sweden
Line 19	Dark green		Gene bank of Sweden
Line 20	Dark green		Gene bank of Sweden
Line 21	White		Gene bank of Sweden

Line 22	Dark green	Pakistan
Line 23	Light green	Pakistan

Seeds of 23 inbred line were directly planted for horticultural evaluation in Agriculture Research Station, Ismailia under open field conditions on 10th March, 2019 and 1st March, 2020 using a randomized complete block design (RCBD) with three replicates. Each experimental plot was 15 m long, 150 cm wide and 50 cm a part between plants (were about 7 plants) and drip irrigation system was used. All agricultural practices were carried out according to the recommendation of Ministry of Agriculture, Egypt. Data were collected on morphological characters of Snake cucumber which included flower, stem and fruit characteristics of marketing maturity stage. The observations were recorded on individual plants basis and the average was calculated for the following morphological characters:

- Shoot number until 1st female flower anthesis: The node number on the plant on which the first female flower appeared.
- Sex ratio (%) = (number of female flowers / number of male flowers) ×100 after 70 days from planting.
- Main stem length from the surface of the soil to the end of main stem.
- Leaf area Using (Li-cor, Pennsylvania) for the Leaf of number 5 from the plant down.
- Number of fruits / plant estimated at the end of the season as total number of immature fruits harvested from the line divided by the number of plants of the plot.
- Fruit weight.
- Fruit length.
- Fruit diameter determined by measuring the diameter of the fruit after making a cut in a half fruit from the beginning to middle.
- Fruit shape index fruit length/width ratio.
- Total yield/plant was recorded as total fruits harvested per plant.

Statistical analysis:

All obtained data from the two seasons were subjected to statistical analysis. Collected data were subjected to analysis of variance (ANOVA) using statistics 8 software version 8.0 (2003) and correlation was also estimated. Least significant differences (LSD) were computed at the 5% level to compare the determined averages. Coefficient of variability values were estimated depends on phenotypic (P.C.V) and genotypic (G.C.V) variances using the next equation.

$$\text{P.C.V}=\sqrt{\frac{vph}{x}}\times 100 \text{ , G.C.V}=\sqrt{\frac{vg}{x}}\times 100$$

Whereas = $\sqrt{vph}$ = phenotypic standard deviation,$\sqrt{vg}$= Genotypic standard deviation and X= Genotypes means Sivasubramanian and Menan (1973) and heritability (h2) h2=Vg/Vp (Vg the variation in genotype and Vp the variation in phenotype). was calculated according to Johnson et al. (1955).

RESULTS AND DISCUSSIONS

The general analysis of variance showed significant differences among the twenty-three Snake cucumber inbred lines for all ten studied characters in 2019 and 2020 (Table 2).

Obtained data on shoot number until 1st female flower anthesis of 23 Snake cucumber inbred lines are presented in Table (2). Line 6 showed the lowest number of shoots until 1st female flower anthesis (second shoot) in both seasons (1.8 and 1.7, respectively) followed by Line1, Line 8, Line 11, Line 12 and Line 21without significant among them in both 2019 and 2020 seasons. However, Line 9, Line 3, Line 13 and Line 23 showed the highest value of first female flower anthesis in both seasons.

For main stem length, inbred lines Line 4, Line 5, Line 16 and Line 22 had the highest values of main stem length in both seasons with no significant differences among them in the two seasons (Table 2). However, Line 18 gave the lowest main stem length in the two seasons (69.1 and 74.4, respectively) followed by Line 6 with non-significant differences between them. These results agreed with Abdrabou et al. (2021) who evaluated fifteen cultivars of Snake cucumber and found values of main stem length ranged from 184.5 to 272.7 cm.

Concerning leaf area character, Line 20 gave the lowest values of leaf area (40.3 and 42.6 in 2019 and 2020, respectively), followed by Line 15 with non-significant differences between them (Table 2). On the other hand, the inbred lines 22 and 3 had the highest values of leaf area with non-significant differences

between them but with significant differences among them and the other inbred lines.

Regarding sex ratio trait, the inbred Line 14 showed the highest values of sex ratio in both seasons (12.7 and 12.4 % in 2019 and 2020, respectively) followed by Line 2 with significant differences between them (Table 2). Line 23 and Line 11 gave the lowest values of sex ratio in the two seasons with non-significant differences between them. These results are in agreement with Abdrabou et al (2021) who evaluated fifteen cultivars of Snake cucumber and found high variation of sex ratio values in both two seasons.

Table (2). Mean performance of vegetative and flowering characters of 23 Snake cucumber inbred lines in two seasons (2019-2020).

Characters	Number of shoot until 1st female flower anthesis		Main stem length (cm)		Leaf area (cm^2)		Sex ratio (%)	
Inbred line	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**
Line 1	2.3	2.0	235.5	240.8	52.7	50.4	2.9	2.7
Line 2	2.6	2.9	203.5	208.8	60.9	62.2	8.8	8.6
Line 3	5.2	5.4	233.7	239.0	75.0	77.3	6.6	6.2
Line 4	3.5	3.2	260.9	264.2	57.6	55.3	4.4	4.7
Line 5	3.2	2.8	278.1	280.4	65.0	67.1	5.0	4.7
Line 6	1.8	1.7	086.5	091.8	43.2	45.5	5.1	4.7
Line 7	3.4	3.0	095.2	091.9	49.5	51.8	6.0	5.7
line 8	2.4	2.1	128.5	134.8	46.2	43.9	3.6	3.9
line 9	5.7	5.5	243.3	248.6	53.2	55.5	7.1	6.7
Line 10	2.4	2.7	092.7	098.0	56.1	58.4	4.2	3.9
Line 11	2.3	2.0	148.1	154.4	55.2	52.9	1.8	2.1
Line 12	2.5	2.1	141.1	146.4	49.8	52.1	3.1	2.7
Line 13	5.2	5.1	128.9	134.2	54.4	56.7	2.1	1.8
Line 14	2.9	2.6	186.7	192.0	63.8	60.5	12.7	12.4
Line 15	2.9	2.5	231.1	237.4	40.8	43.1	5.1	4.7
Line 16	4.3	4.0	272.7	278.0	62.0	60.7	3.9	4.2
Line 17	2.9	2.5	239.9	246.2	53.3	55.6	6.5	6.1
Line 18	2.7	2.4	069.1	074.4	52.3	54.6	5.6	5.9
Line 19	3.4	3.1	121.9	128.2	61.0	58.7	3.6	3.2
Line 20	3.6	3.3	229.7	235.0	40.3	42.6	5.3	5.0
Line 21	2.3	2.0	241.5	247.8	62.9	65.2	7.2	7.5
Line 22	2.2	2.5	263.7	269.0	78.9	81.2	4.4	4.0
Line 23	5.0	5.1	113.1	119.4	47.7	45.4	1.7	1.3
LSD at 5%	1.2	0.9	45.6	48.9	07.6	08.9	0.3	0.1

Data in Table 3 showed that inbred Line 21gave the highest number of fruits per plant (8.7 and 8.4 in 2019 and 2020, respectively) followed by Line 15 in the first season and Line 20 in the second season with no significant differences among them. Abdrabou et al (2021) found that number of fruits per plant of the studied inbred lines had wide range (from 4.7 to 15.80 fruits).

Data obtained on fruit weight are illustrated in Table (3). fruit weight trait ranged from 120.5 g to 425.0 g in the first season and from 126.7 g to 421.0 g in the second season. Line 21 and Line 22 gave the heaviest fruits (above 400 g in both two seasons), while, the lightest fruits were obtained from inbred Line 15 (120.5 and 126.7 g in 2019 and 2020, respectively). These results partially agree with findings of Abdrabou et al (2021) who evaluated fifteen cultivars of Snake cucumber and found that values of fruit weight ranged from 130.4 to 379.0 g.

Concerning fruit length trait, the obtained data indicated that Line 21 showed the longest fruits (38.5 cm and 39.6 cm in 2019 and 2020, respectively) followed by Line 22 (35.1 cm and 36.7 cm in 2019 and 2020, respectively) with non-significant differences between them but with significant differences among them and the other studied inbred lines (Table 3). However, the shortest fruits were obtained in the inbred Line 20 (13.0 and 13.7 cm in 2019

and 2020, respectively). These results in harmony with the results of Youssef (2018) who reported that values of fruit length ranged from 28.53 cm to 36.84cm.

Obtained data on fruit diameter trait of 23 Snake cucumber inbred lines are presented in Table (3).Values of fruit diameter ranged from 4.1 cm to 7.1 cm and from 4.2 cm to 7.5 cm for in 2019 and 2020 seasons, respectively. In the first season Line 8 and Line 18 gave the highest values of fruit diameter (7.1 cm), while, Line 2 showed the lowest value (4.1 cm). In the second season, the Line 8 gave the highest value of fruit diameter (7.5 cm) followed by Line 18 (7.3 cm) with non-significant differences between them, while, Line 11 showed the lowest value (4.2 cm).Youssef (2018) reported that values of fruit diameter ranged from 3.13 to 4.53 cm.

Regarding to fruit shape index character, data of 23 Snake cucumber inbred lines showed that Line 22 gave the highest values in both two seasons (6.5) followed by Line 4 with significant differences between them in the second season only. The lowest values of fruit shape index were obtained on Line20, Line 7, Line 6, Line 18 and Line 10 in the first season without significant differences among them, meanwhile, in the second season Line 20 and Line 7 gave the lowest values (2.8) followed by the Line 10 with non-significant differences among them.

The obtained data on total yield per plant are illustrated in Table (3). Total yield per plant ranged from 0.4 kg to 2.9 kg in the first season, meanwhile, it ranged from 0.7 kg to 3.5 kg in the second season. Line 2 and Line 21 gave the highest values of yield/plant in the first season (2.9 kg) followed by Line 22 with non-significant differences among them, meanwhile, in the second season, Line 21 gave the highest value of yield/plant (3.5 kg) followed by Line 22(3.3 kg) with non-significant differences between them. The lowest values of total yield per plant were recorded on Line 10, Line 13 and Line 3 in the first season without significant differences among them, meanwhile, in the second season the Line 10 and Line 13 gave the lowest value (0.7 kg). Youssef (2018**)** reported that values of total yield/plant ranged from 4.40 to 7.51 kg.

Table (3). Mean performance of fruit quality and yield characters of 23 Snake cucumber inbred lines in 2019 and 2020 seasons.

Characters	Number of fruits/plants		Fruit weight (g)		Fruit length (cm)		Fruit diameter (cm)		Fruit shape index		Total yield/ plant (kg)	
Inbred line	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**	**2019**	**2020**
Line 1	3.8	4.0	287.2	292.8	23.6	25.2	5.0	5.6	4.7	4.5	1.1	1.2
Line 2	7.1	6.8	396.5	393.4	26.6	25.3	4.1	4.3	6.5	5.9	2.9	2.7
Line 3	4.1	3.8	261.4	265.6	27.6	25.2	6.5	6.8	4.2	3.7	0.7	1.0
Line 4	7.2	7.4	271.2	268.1	29.8	28.5	4.4	4.6	6.8	6.2	2.2	2.0
Line 5	7.3	7.6	264.3	268.5	27.1	29.2	6.5	7.0	4.2	4.2	1.6	2.1
Line 6	5.3	5.6	361.3	358.2	20.8	22.4	6.4	6.6	3.3	3.4	2.3	2.1
Line 7	7.2	6.9	176.4	182.6	16.9	15.6	5.3	5.5	3.2	2.8	1.1	1.3
line 8	5.0	5.2	321.4	325.6	29.6	28.2	7.1	7.5	4.2	3.8	1.1	1.7
line 9	5.7	6.0	277.3	283.5	26.6	28.2	5.9	6.1	4.5	4.6	1.9	1.7
Line 10	5.9	6.2	159.9	156.8	17.9	16.6	5.1	5.7	3.5	2.9	0.4	0.7
Line 11	4.8	5.0	191.5	195.7	20.7	21.8	4.6	4.2	4.5	5.2	1.4	1.0
Line 12	4.7	5.0	342.4	346.6	27.8	29.4	4.3	4.5	6.5	6.5	1.9	1.7
Line 13	4.3	4.0	185.9	182.8	20.6	19.3	5.2	5.8	4.0	3.3	0.5	0.7
Line 14	4.3	4.6	240.6	244.8	26.8	28.4	5.4	6.0	5.0	4.7	2.0	1.9
Line 15	8.0	7.7	120.5	126.7	29.2	29.9	5.4	5.6	5.4	5.3	1.2	1.0
Line 16	5.2	5.5	264.8	261.7	29.6	28.3	5.6	6.2	5.3	4.6	0.8	1.4
Line 17	4.2	4.4	226.9	231.1	28.6	30.2	6.0	6.2	4.8	4.9	2.2	2.0
Line 18	3.7	4.0	358.3	355.2	23.6	24.7	7.1	7.3	3.3	3.4	1.2	1.4
Line 19	3.9	3.6	331.6	335.8	27.7	29.3	4.5	4.7	6.2	6.2	1.4	1.2
Line 20	7.8	8.1	157.9	164.1	13.0	13.7	4.3	4.9	3.0	2.8	1.1	1.3
Line 21	8.7	8.4	425.0	421.9	35.1	36.7	6.5	6.6	5.4	5.6	2.9	3.5
Line 22	4.2	4.4	406.8	413.0	38.5	39.6	5.1	5.3	7.5	7.5	2.6	3.3
Line 23	6.9	7.1	206.5	203.4	22.2	20.9	4.2	4.4	5.3	4.8	1.7	1.5
LSD at 5%	1.1	1.3	64.2	61.1	4.2	5.8	0.9	1.1	0.9	0.8	0.3	0.2

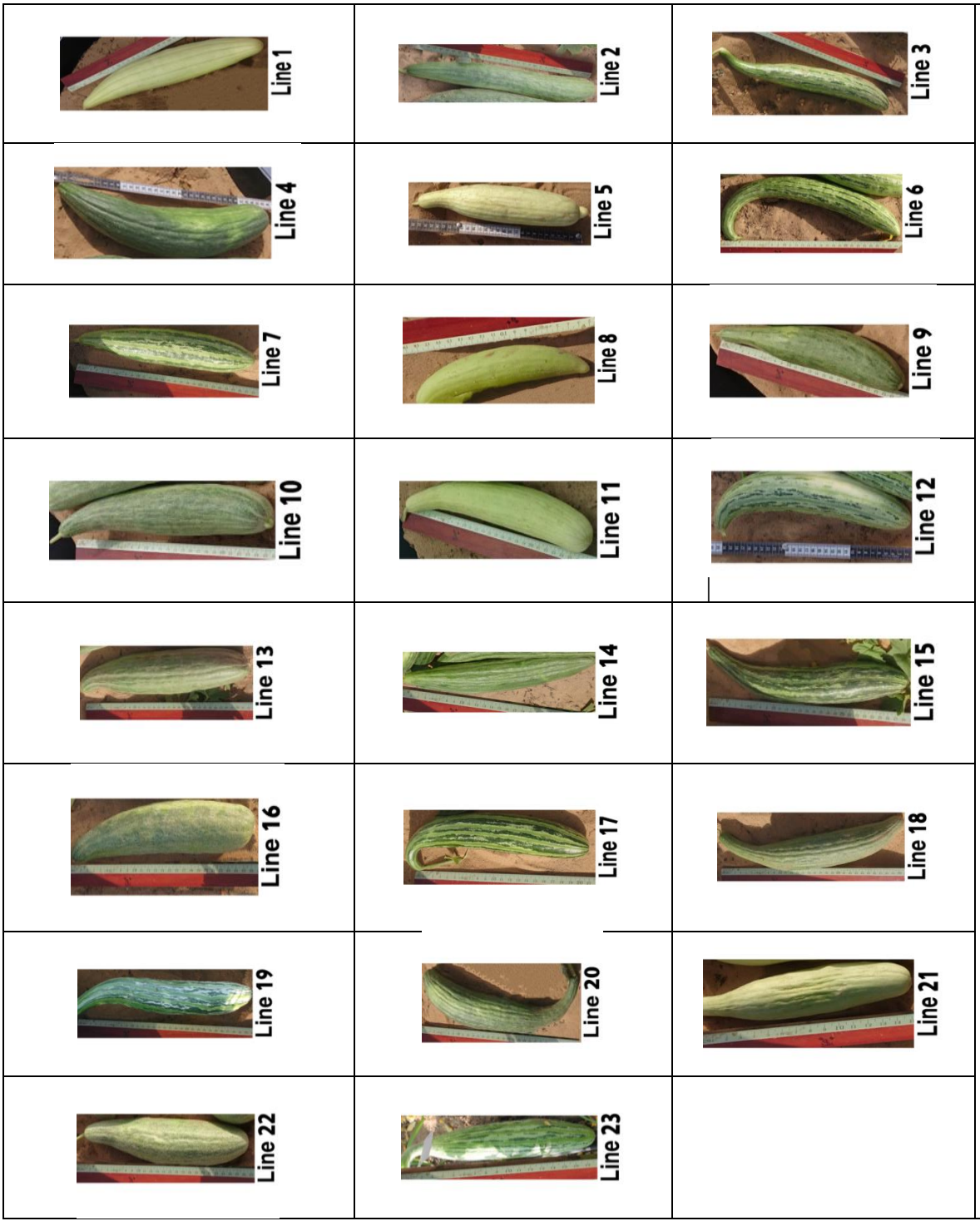

Fig. 1 Fruit characteristics diversity among examined Snake cucumber inbred lines

Genetic studies

Improvement of Snake cucumber largely depends on the nature and magnitude of genetic variability in the population. Genetic variability studies provide basic information regarding the genetic properties of the population. The extent of variability presented in Snake cucumber genotypes was estimated in terms of phenotypic variance (σ2ph), genotypic variance (σ2g), phenotypic coefficient of variation (PCV), genotypic coefficient of variation (GCV) and broad-sense heritability (h^2) as shown in Table (4).

Estimates of phenotypic variance were larger than the corresponding genotypic variance for all examined traits. Genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV)

were computed for ten studied characters of 23 Snake cucumber inbred lines (Table 4). The GCV ranged from 26% (fruit shape index) to 72. 4% (total yield per plant). The PCV for different characters ranged from 20.7% (sex ratio) to 74.6% (total yield per plant). Moreover, close estimates of phenotypic coefficient of variation (PCV) and genotypic coefficient of variation (GCV) were noted in all characters, which imply the contribution to phenotypic expression of these characters are mostly due to genetic factors, while the environmental ones were not great importance. Characters having high genotypic coefficient of variation indicate high potential for effective selection. These findings are in agreement with those reported by Rakhi and Rajamony (2005).

High variability ensures better changes of producing new desirable forms. In the present study, high estimates of both P.C.V and G.C.V were registered for the studied traits, *viz.*, shoot number of 1st female flower anthesis (62.0% and 59.4 %, respectively), main stem length(63.5% and 61.6%,respectively) and total yield per plant (74.6% and 72.4%,respectively) which suggest greater phenotypic and genotypic variability among the accession and responsiveness of the attributes for making further improvement by selection .Moderate estimates of GCV and PCV were registered for the traits number of fruits/plant (46.2 % and 41.6%, respectively) and fruit weight (47.1 % and 43.7%, respectively). However, low estimates of GCV and PCV were registered for the traits, *viz.*,leaf area (33.6 % and 32.4%, respectively), sex ratio (20.7 % and 16.8 %, respectively), fruit length (38.7 % and 36.2%, respectively),fruit diameter (29.8 % and 27.2 %, respectively) and fruit shape index (30.6 % and 26.0%, respectively). High amount of fixable variation in Snake cucumber characters had been reported by Youssef (2018).

In the present study, most of the traits exhibited high broad-sense heritability values which ranged from 66.1 % to 94.1% (Table 4). High heritability values obtained for all studied traits suggest that these traits may generally be controlled by additive gene action and hence the phenotype would provide a fairly reliable measure of the inbred line which provides scope for selection based on the phenotypic performance.

In general, we noticed that the differences between phenotypic and genotypic variance for all studied traits were low. In other words, the large portion of phenotypic variance was due to the genetic variance. Consequently, estimated broad-sense heritability showed high values for shoot number of 1st female flower anthesis, main stem length, leaf area, sex ratio, number of fruits/plant, fruit weight, fruit length, fruit diameter, fruit shape index and total yield/plant, indicating that the observed significant phenotypic differences among the studied inbred lines are of genetic nature and there are small environmental effects on the phenotypic variation. Therefore, these characters can be improved through selection based on phenotypic observations in early segregating generations in Snake cucumber germplasm.

Table 4. Estimation of PCV, GCV, h^2 and genetic advance as per cent of mean various characters of 23 Snake cucumber inbred lines in two seasons (2019-2020).

No.	Characters	VE	VG	VP	GCV (%)	PCV (%)	h^2 (%)
1	**Shoot number of 1st female flower anthesis**	0.3	3.2	3.5	59.4	62.0	91.8
2	**Main stem length**	881.5	13631.7	14513.2	61.6	63.5	93.9
3	**Leaf area**	1.9	24.3	26.1	32.4	33.6	92.9
4	**Sex ratio**	41.8	81.3	123.1	16.8	20.7	66.1
5	**Number of fruits/plant**	0.1	0.6	0.8	41.6	46.2	80.9
6	**Fruit weight**	3064.4	19233.1	22297.5	43.7	47.1	86.3
7	**Fruit length**	12.4	88.5	100.9	36.2	38.7	87.7
8	**Fruit diameter**	0.1	0.7	0.9	27.2	29.8	83.7
9	**Fruit shape index**	81.6	215.6	297.2	26.0	30.6	72.5
10	**Total yield/plant**	3.8	61.1	65.0	72.4	74.6	94.1

VE = Error variance, VG = Genotypic variance, VP =Phenotypic variance, GCV= Genotypic coefficient of variation, PCV= Phenotypic coefficient of variation andh2= heritability.

Simple correlation coefficient among 23 Snake cucumber inbred lines is presented in Table (5). Results indicated low positive correlation for diameter of fruit with leaf area, fruit length and sex ratio (0.02, 0.21, 0.12, respectively), whereas, moderate negative correlation was recorded with fruit shape index (-0.51) and significant moderate positive correlation for number of fruits/plant with total yield /plant (0.56). The leaf area and fruit length traits had the moderate positive correlation with the most traits. The highest values of correlation were observed among fruit length with fruit shape index and fruit weight with total yield/plant (0.71).

Table 5: Simple correlations coefficient among studied Characters in Snake cucumber inbred lines.

Characters	Fruit diameter	Number of fruits/plant	Leaf area	Fruit length	Sex ratio	Main stem length	Fruit weight	Fruit shape index
Number of fruits / plant	-0.26							
Leaf area	0.02*	-0.24						.
Fruit length	0.21*	-0.22	0.36					
Sex ratio	0.12*	0.14	0.18	0.12				
Main stem length	-0.11	0.23	0.31	0.47	0.22			
Fruit weight	-0.02	-0.15	0.40	0.40	0.23	0.12		
Fruit shape index	-0.51*	-0.05	0.33	0.71*	0.02	0.43	0.41	
Total yield /plant	-0.16	0.56	0.17	0.16	0.30	0.25	0.71*	0.26

CONCLUSION

According to obtained data, it could be concluded that Line 4, Line 14 and Line 17 inbred lines had the best fruit quality namely shape index, and fruit weight. Most characters had high genotypic coefficient of variation it's indicating a high potential of effective selection for these Characters.

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توارث بعض الصفات الاقتصادية الهامة في القثاء

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الملخص العربي

القثاء (*Cucumis melo var flexuosus*) من الخضر المحلية الهامة،يمثل إنتاج القثاء 0.22٪ فقط من إجمالي مساحة الخضار في مصر، و0.26٪ من إجمالي إنتاج الخضروات.تشير هذه البيانات إلى أن إنتاج القثاءقليل بحيث لا يلبي متطلبات الزيادة السكانية في مصر (> 100 مليون)، ويمكن اعتباره من الأنواع المهددة بسبب الجهود البحثية المحدودة لإنتاجه وتحسينه.بالإضافة إلى ذلك، فإن المساحة المزروعة مبعثرة من الشمال إلى الصعيد، مع اختلافات كبيرة في الشكل الظاهري، معظم الاختلافات في شكل ولون الثمار، لذلك تم إجراء البحث في محطة البحوث الزراعية،الإسماعيلية، مصر خلال عامي 2019 و2020 لتقييم بعض السلالات القثاء لبعض الصفات الاقتصادية وقياس الاختلافات بينها ومعامل التوريث والارتباط.احتوت الدراسة ثلاثة وعشرين من السلالات النقية من القثاء مرتبة في تصميم القطاعات العشوائية الكاملة (RCBD) بثلاثة مكررات.وأشارت النتائج إلى وجود اختلافات جوهرية بين التراكيب الوراثية تحت الدراسة وقيم عالية لمعامل الاختلاف الوراثي والمظهري ومعامل التوريث بالمعني الواسع لكل الصفات ودل ذلك على ان الانتخاب لهذه الصفات مفيد بدرجه كبيرة، وكان هناك ارتباط مظهري معنوي بين صفة المحصول الكلي للنبات وعدد الثمار للنبات والنسبة الجنسية ووزن الثمرة، كما ان السلالات (Line 4, Line14 and Line 17) تميزت بأعلى محصول وجودة الثمار، لذلكاوصي باختيار فعال لتلك الصفات التي يمكن اختيارها لتحسين القثاء واستكمال برنامج التهجين عليها.