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Evaluation the possibility of hybridization in some important genotypes of *Saintpaulia ionantha*

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ABSTRACT

"Saintpaulia ioantha H.wendele" known as African Violet is a potted plant and it belongs to Gesneriaccea family. For this plant's great popularity, having various kinds of leaves and different colorful flowers, they have great potential in breeding examinations on them. So, in this study 4 genotypes of African Violets had been analyzed. The characteristics had been studied, included flower color, flower type, leaf form, fuzz of leaf, peduncle size and inflorescence. This test had been performed in an absolute random design with 3 repetitions and 5 flower pots, as examinational units. First of all, operation of multilation had been done by anthers cut off at full bloom time .By the next week ovary was growing and maturing around 6 months long. The result of these crosses showed that none of the A×D, A×C, A×B and A×A crosses were able to produce any seeds. Also there were no seeds in B×A cross while in D×B, B×C, B×B crosses we could gain seeds. In the study of the above we could find out that genotype B is the best parent for all the crosses and this genotype could produce the highest number of seeds in this hybridization. The second genotype C, and then is genotype D. Genotype A didn't have a good ability of seed production. Seeds were produced and planted in the culture medium for African violets. Growth speed and the number of resulting seeds had been analyzed and showed that genotype B has a good quality of hybridization. So, this genotype and genotype C in breeding programs can be used as effective parents to have an appropriate return in order to get better output the desired characteristics.

Key words: African violet, breeding, hybridization, morphology, parent

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INTRODUCTION

Saintpaulia ionantha Wendl., commonly known as African violet or Saintpaulia, belongs to the family Gesneriaceae. This species contains many cultivars with varied color and shape and it is a popular commercial plan[1,2]. African violets are classified according gardening color of petals, 6 and 7 shape petals, the number of petals [3] and width of the plant[4]. Breeding seeds of this plant was initiated when transferred to Los Angeles, America started by Armacost & Royston in 1926[5]. hybridization pink, purple, red, is difficult. yellow is the color that is detected by the (Nolan Blansit) (1992)[6]. In addition they increased the range and combination of colors or spot color on the edges of the petals . The breeding actions can be noted spectrum on the leaves or green leaves. Another notable point is that changes does not remain in the plant for a long time, for example, a plant can be changed from one time to another time which indicates the instability of the characters. Hybridization impressive plant size and form. Some

wild forms with a smaller size Standard has been developed by crossing. Sometimes is deformed in miniatures shape. Brownlie hybrid over 111 type and most of them did succeed in creating Wine red color. Farjadi and Naderi produced shimmer with a good dose of gamma radiation for inducing mutation in the African violet by using GY 31[7]. Because of the difficulty in performing the hybridization of certain flowers with certificates, seed production desired, the phenomenon of dominant and recessive traits, and inability of some seed, lack of fertile pollen in some genotypes, it has been a few research on the creation of new varieties[8]. At research the necessary cross was done , and suitable genotypes was identified. Then crosses between seed was done and thus enable them to produce new plants. So this is a first step for breeding and producing a variety of new characteristics.

MATERIALS AND METHODS

Valuable violets was purchased of Parisa Greenhouse. Flower color was select and 5 pots were prepared for each color. Plant Stand Was designed on 3 floors with 4 rows of sun-fluorescent 21-watt bulbs. Factors considered in the breeding and keeping: African violets are free of plant pest or disease, 81 lux light for 12 hours, feeding fertilization, 41 to 51 percent moisture, pH 6.7. ID of violets pot are as in the following table:

Table 1 pot of violets ID

Flower color	number of petals	Leaf form	Type of cork	Shape of petals	size of the plant	Genotype
Violet Blue	Simple flower	Fairly large	Low density	asteroid	Miniature	A
pink	Simple flower	large	Low density	asteroid	Standard	B
viloet	Flower Half double	Fairly large	Low density	Tooth edge	Miniature	C
magenta	Duble flower	large	Low density	Tooth edge	Standard	D

Necessary crosses was conducted in a completely randomized design repeatedly. Self cross Was performed on the all genotypes and characteristics was compared in mother and diallel cross plants.

Table 2 crosses

					repeat
5 flower	♀A×B♂ ♀A×C♂ ♀A×D♂	♀C×A♂ ♀C×B♂ ♀C×D♂	♀B×A♂ ♀B×C♂ ♀B×D♂	♀D×A♂ ♀D×B♂ ♀D×C♂	Repetition 1
5 flower	♀A×C♂ ♀A×D♂ ♀A×B♂	♀C×B♂ ♀C×D♂ ♀C×A♂	♀B×C♂ ♀B×D♂ ♀B×A♂	♀D×B♂ ♀D×C♂ ♀D×A♂	Repetition 2
5 flower	♀A×D♂ ♀A×B♂ ♀A×C♂	♀C×D♂ ♀C×A♂ ♀C×B♂	♀B×D♂ ♀B×A♂ ♀B×C♂	♀D×C♂ ♀D×A♂ ♀D×B♂	Repetition 3

A: Violet Blue, B: pink, C: violet, D: magenta

RESULTS AND DISCUSSION

After a few months fertilized flowers was checked. There has been flower tail alive despite Its flowers were completely dried. It proofed the viability of ovarian activity. ovaries has grown in the and in most lines. in some lines after 3 months, not only inflorescence branch destroyed but also its ovary being vanished. But after opening the dried ovaries, unfortunately, no seed was found at Line A (Violet Blue). The Line B(pink) and C (violet) still retain ovaries with significant growth. 5 to 6 months later, ovaries were opened and tiny brown seeds was observed. After 11 days, the first signs sprouting seeds, small round heart-shaped leaves were observed. 45 days later, the second leaf appears. At this time of the late summer, temperatures sometime 33 ℃ in days and 28 ℃ at nights. The factors of leaf, petiole length, leaf and flower diameter with in 3 repeat was obtained. As well after cross, other factors such as fruit set, fruit size in different repetition, the presence or absence of seeds, germination, seedling development and evaluation be counted. Statistical analysis was performed according to the randomization structure using the Duncan's new multiple range test (DNMRT). Data (mean ± SD) were collected from three experiments each with 3 replicates. Analysis of variance showed that the Line D Magenta and A Violet Blue showed the highest and lowest number of leave with an average of 31 and 15 leaves

respectively. (Line B) violet-blue 57.39 cm ^{2} shown the highest leaf surface whereas(Line C) violet had minimum 34.50 cm ^{2}. Petiole length had significant differences. (Line A) Violet Blue (10.33) and Line C, violet (7cm)

showed maximum and minimum length. Significant differences were observed at number of flower. (Line D) Magenta (20flowers per plant) showed maximum and (Line A) Violet Blue (with 5 flowers per plant) the lowest number. The results of analysis of variance demonstrated significant difference at flower diameter. Line D (4.5cm) have maximum and Line (A), magenta Violet Blue (3.5cm) have a minimum diameter.

Generally according to Table 3, diversity were evaluated which can be used in the production of new varieties. According to Table 4, no significant difference was observed in the genotypes of ovarian growth and germination traits, indicating, distinction between genotypes. On the other hand, public and private heritability, according to the characteristics was low which means control of this trait are other than additive and dominance effects. Based on the Baker for growth ovary trait(0.44), additive and dominance show almost the same effect. But in relation to the value of this trait (0.70) indicating that control these traits are more influenced by additive effects. Between genotypes seed and seedling traits significant differences were observed at 1% level. So it can be concluded that the genetic control of these traits have the largest increasing. The method is based on selective breeding to improve the traits at inbred lines studied, the performance will be highly.

Overall according to the results of most of the traits, the additive was under control. And due to general combining the lines B and C , can be crossed to produce new hybrids and diversify. Then based on direct selection may be used to modify the traits.

Table 3. Analysis of variance examined in 4 lines of violets

Diameter Flowers	Number of flower	Length of Petiole	Surface of leaves	Number of leaves	Degree of freedom	Source of variance
0.5208	128.67	5.6767**	311.13**	114.31**	3	genotype
0.0833	2.58	0.6731	8.33	2.41	8	error
7.29	15.06	9.42	6.73	6.83		cv

*ns, * and **. To be significant, significant at 5 and 1%*

Table 4Analysis of variance combining public and private attribute as the fruit of Griffing method

Seedling number	Germination	Seed Production	Growth ovary	Degree of freedom	Source of variance
3.5097	0.2764^{ns}	0.4444**	0.3500^{ns}	15	Genotype
12.1250	0.9853^{ns}	1.6389**	0.6944^{ns}	3	GCA
2.3229	0.1840^{ns}	0.2639^{ns}	0.3333^{ns}	6	SCA
0.3889	0.0278^{ns}	0.0278^{ns}	0.1944^{ns}	6	Reciprocal
0.0764	0.0556	0.0417	0.0694	32	M'e
5.22	5.21	6.21	2.08		MSGCA/MSSCA
0.64	0.70	0.71	0.44		Ratio Baker
0.87	0.32	0.46	0.34		Public heritability
0.56	0.23	0.32	0.15		Private heritability

*ns, * and **. To be significant, significant at 5 and 1%*

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