Evaluation and Morphological Characteristics of some Newly–Introduce Grape Cultivars under Egyptian Environmental Conditions

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ABSTRACT

The present study was conducted for evaluating the morphological characteristics of newly introduce grape cultivars namely Starlight, Sugrafourteen, Midnight Beauty and Autumn crisp under the environmental Egyptian conditions, during three successive seasons 2019, 2020 & 2021 in private vineyard located at El-Sadat city Monofia governorate. The vines were five years old and planted in sandy loam soil. The results showed that all cultivars had fully opened tip, tip of tendrils was tri-fid except midnight beauty had di-tri fid, tendrils. Flower sexual organs had fully developed stamens and fully developed gynoecium. Mature leaf was very large, shape of blade was pentagonal in starlight and Midnight Beauty but it was circular in Sugrafourteen and Autumn crisp. Depth of the upper lateral sinuses in starlight was deep and in Sugrafourteen was very shallow, while it was very deep in midnight Beauty and shallow in Autumn crisp. The arrangement of lobs of upper sinuses was slightly overlapped in starlight and Autumn crisp cvs., closed in Sografourteen cv. but strongly overlapped in Miednight Beauty cv. Arrangements of lobes of petioles were wide open in all cultivars except Sugrafourteen cv. was slight overlapped. Petiole shape was club shaped in Sugrafourteen but u-shape in the other cultivars, Type of margin was irregularly dentate and the apical tooth was pointed. All cultivars were seedless. Starlight and Sugrafourteen were "early ripening", Midnight Beauty was" early-medium" ripening but Autumn crisp "late" cultivars. Bunch was big in all cultivars (more than 500g) and dense. Berry was large size in all cultivars with broad ellipsoid shape in Starlight ovoid shape in Sugrafourteen and cylindroid shape in Midnight Beauty and Autumn crisp cvs. Berry skin color was pink in Starlight cv., red in Sugrafourteen, black in Midnight beauty cv. and yellow green in Autumn crisp. The studied cultivars were characterized by good vegetative growth, yield and fruit quality. It is advised to prune Sugrafourteen cv. to cane pruning system while the other cultivars with spure pruning system.

Keywords: Grape**,** Starlight, Sugrafourteen, Midnight Beauty, Autumn crisp and Morphological.

INTRODUCTION

Grape (*Vitis vinifera* L.) is among the most frequently grown fruit trees in the world and has been used for thousands of years to produce fresh fruit, dried fruit, and wine. In order to create new cultivars, many of the world's hundreds of grape varieties have been crossed with other grape species or kinds. (Azuma et al. 2011). Because there are so many table grapes and wine grape cultivars being produced, collected germplasm, and private gardens, accurate characterization is very important. Understanding phonological traits (time of bud burst, version, ripening time), genotype resistance or tolerance to pests or diseases, and various vine yard practices (pruning and harvest criteria), which are described in many amplographic albums, is crucial Goussard, (2008) and Robinson et al. (2012).

Starlight is a red seedless early-season cultivar, it competes with Flame Seedless. This variety features oval-shaped berries that range

in size from medium to large, and it has a medium storage capacity. The Volcani grape breeder was responsible for the selection.

Midnight Beauty is a hybrid created by cross breeding Fantasy Seedless with unnamed seedling 17-138 in May 1990 by David W. Cain in Wasco, Kern County, California. It was first propagated asexually in December, 1992, and the US plant patent was granted in June, 1998. Midnight Beauty is a registered variety of Sun World International LLP, California. Midnight Beauty is a seedless black grape with medium to large elongated berries

Sugrafourteen seedless has ned berries that are consistently oval-shaped. This grape variety has a crisp, juicy flavour that is subtly sweet. A registered cultivar owned by Sun World International LLP in California is called Sugrafourteen Seedless. Moderately vigorous with cane pruning. Medium high vigor and cane pruned.

Autumn crisp is a late-season green grape without seeds. Large, spherical berries with a lovely milky pale green-yellow skin are produced by this plant. Autumn crisp is a registered variety of Sun World International LLP, California.

For the characterization and identification of genotypes, more than 150 descriptions are offered. Among them, a variety of morphological patterns, molecular genetic markers, and phonological impressions can be detected. Morphological observations are primarily based on the characteristics of the shoot, bud, leaf, bunch, berry, and seed, which indicate their qualitative (such as colour, density, shape), as well as quantitative (such as size, number, weight) attributes. Reproductive organs, i.e., berries, flowers, bundles, and bunches all have useful traits that can be used to identify them (OIV, 2009), and Pesti et al. (2023) mentioned that a variety of descriptor lists, manuals, and ampelographic studies are available for identification based on the inter-intraspecific morphological heterogeneity. The majority of features are found in the leaves among the organs, while the young shoot, bunch, and berry are also crucial for genotype definition.

For vineyard improvement and optimum production, measurements of grape parameters that affect product quality are necessary **(**Carrara et al. 2008). In this regard, numerous studies were conducted for the assessment and features of the grape varieties. Olmo (1946), Kamel (1964), Winkler et al (1965), Brooks (1972), and Otmo (1972). Watt (1983), Walker and Boursiqote et al. (1998), Gaser (2006), Ates et al., (2011), Basheer-Salimia (2015), Carka et al. (2015), El-Morsy et al. (2017), Mohammed and Tarbia (2017), Abouse (2019), Ahmed and Abd-El-Aziz (2021). In recent years, a large number of new varieties with various biological and economic-technological characteristics have been introduced. These varieties have not been studied from the standpoint of their adaptation to the environmental conditions. The main aim of this investigation was to aimers the morphological characterization of four newly-introduced grape cultivars, namely, Starlight, Sugrafourteen, Midnight Beauty, and Autumn Crisp, under environmental Egyptian conditions.

MATERIALS AND METHODS

During the period 2019–2021, the study was conducted in a private vineyard located at EL-Sadat city, Menofia governorate on five year-old seedless grapevine cultivars namely Starlight, Sugrafourteen, Midnight Beauty (sugar thirteen), and Autumn Crisp (sugar thirty-five). Vine were planted in a sandy loam soil spaced 3×2m apart and irrigated by drip irrigation system and trellised by Spanish parron system .Three replicates for each cultivar were taken where each replicate consisted of six grapevine with completely randomized design. All grapevines were given the same horticultural practices recommended

by the Ministry of Agriculture and land reclamation, such as fertilization, irrigation, disease management, and pest management. The weather conditions through the experiment time were as follows: average air temperature (18–31 °C), relative humidity (55–65%), and daily sunshine hours (10.6–11.9 h).

Evaluation study of morphological characteristics was carried out according to the International Ampelographic Registered schedule (Cosmos et al., 1958), the International Plant Genetic Resources Institute (IPGRI), office international for Vine and Wine (OIV) and the International Union for the Protection of New Varieties of plants (UPOV).

The veins were subjected to the following characteristics:-

- **Time of bud burst:** Very early, early – **medium**-late and very late
- **Young Shoot:** Openness of tip – prostrate **hairs** on the tip – anthocyanin coloration of prostrate hairs on tip-erect hairs on tip
- **Young leaf:** Color of upper side of blade - **prostrate** hairs between main veins on lower side of blade –erect hairs on main veins on lower side of blade.
- **Shoot**: Attitude (before tying)-color of dorsal side and ventral side of Internodes – color of dorsal side and ventral side of nodes –length and thickness of internodes.
- **Tendrils:** Number of consecutive tendrils-tip of tendrils – length and color of tendrils.
- **Flower:** Time of bloom –flower sexual organs.

-**Mature leaf:**

Area, surface, thickness, shape of blade-number of lobes, colour, profit in crocs section, number of lobs, depth of upper lateral sinuses, arrangement of lobes of upper lateral sinus ,arrangement of lobes of petiole Sinus -petiole shape, petiole sinus limited by veins, length of petiole compared to length of middle vein, leaf margin (apical tooth, length of teeth, length/width, number of teeth and type of margin - shape of teeth)-proportion of main veins on the upper side of the blade with anthocyanin **c**oloration**,** prostrate hairs between main veins on the lower side of the blade**,** erect hairs on main veins on lower side of blade.

- **Time of ripening:**

Yield per vine

Bunch : weight, density, shape, length, wide and length of peduncle.

- **Berry:**

Size, weight, length, diameter, shape, color of skin, ease of detachment, thicken of skin, anthocyanin coloration of flesh, firmness of flesh, and particular flavor.

- **Total soluble solids (TSS)** was determined by using a hand refractometer.
- **Acidity** (grams of tartaric acid/100 ml juice) was measured according to the method described by (AOAC 2006)
- **TSS/acid ratio.**
- **Seeds:** Formation of seeds
- **Wood shoot:** Main color-relief of surface
- **Bud fertility:**

Fifty buds for each node position (1 to 10) were examined to determine coefficient of bud fertility which was calculated by dividing average number of bunches per vine by the total number of buds/vine for the studied cultivars according to Prasad and Pandey (1969).

Experimental design and statistical analysis:

Completely randomized design was adopted for this investigation. The obtained data were statistically analyzed according to Snedcor and Cochran (1990). The new LSD values were calculated at the 5% level to be used as a comparison tool between cultivar means.

RESULTS AND DISCUSSION

Evaluation of morphological characteristics for Starlight, Sugrafourteen,

Midnight Beauty and Autumn crisp grape cultivars are presented in tables (1, 2, 3 and 4) and illustrated in figures (1, 2, 3, 4 and 5).

- Time of beginning of bud burst:-

Time of beginning of bud burst recorded at 50% of buds on 50% of plants, was in the first week of February "early" in Starlight, the second week "early" in Sugrafourteen, the last week of February "early" medium in Midnight Beauty, and the third week of March" late" in Autumn crisp grape cultivars.

-Young shoot:-

All the studied cultivars were fully opened for openness of the tip with. Spare prostrate hairs on tip except Autumn crisp cultivar was medium. The anthocyanin of the prostrate hairs on tip in Starlight, Midnight Beauty, and Autumn crisp was absent, but it was weak in Sugrafourteen. All studied cultivars had medium erect hairs on the tip.

- Young leaf:-

The color of the upper side of the blade was green with anthocyanin spots in Sugrafourteen, Midnight Beauty, and Autumn crisp grape cultivars, while it was green in Starlight grape cultivar. The prostrate hairs between main veins on the lower side of the blade were very spare in Starlight and Sugrafourteen cultivars but they were spare in Midnight Beauty and Autumn crisp the erect hairs on main veins on the lower side of blade were spare in all cultivars under studies.

- Shoot:--

Attitude of shoot before tying at all studied cultivars was erect. The color of dorsal side of internodes was green with red strips except for Starlight cultivars, which were green, and the color of ventral sides of internodes was green at all. Colors of dorsal and ventral side of nodes were green at all cultivars and the erect hairs on internodes were spare.

The length of internodes for Starlight, Sugrafourteen, Midnight Beauty, and Autumn crisp was long (12.0, 9.1, 11.88, and 12.2 cm), respectively, and thickness had the values (9.3, 9.5, 10.8, and 12.0 mm), respectively.

- Tendrils:-

The number of consecutive tendrils was less than three in the studied cultivars, and the tip of the tendrils was tri fid in Starlight, Sugrafouteen, and Autumn crisp while it was di-tri in Midnight Beauty. The length of the tendril was long in Starlight and Autumn crisp (16.68 and 17.0 cm), respectively, while it was very long in Sugrafourteen and Autumn Crisp (25.33 and 20.45 cm), respectively. The colour of the tendrils was green in the cultivar under study.

- Flower:-

Time of bloom:-

Data in Table (1) showed that time of bloom for starlight was in last week of March, first week of April for Sugrafourteen, third week of April for Midnight Beauty and second week of May for Autumn crisp. The flower sexual organs had fully developed stamens and fully developed gynoecium for the different cultivars studies.

Some investigations on different cultivars are in harmony with the above results Gaser (2006), Sabir et al (2009), Ates et al. (2011) and EL-Morsy et al. (2017).

Table (1): Evaluation and morphological characteristics of time of burst, young shoot, young leaf, shoot, tendrils and flower for the studies cultivars.

Characteristics \ Cultivars	Starlight	Sugrafourteen	Midnight Beauty	Autumn crisp
- Time of bud burst	First week of February "early"	Second week of February "early"	Last week of February "medium"	Third week of March "late"
- Young Shoot:				
***Opening tip**	Fully open	Fully open	Fully open	Fully open
***Prostrate hairs on tip**	Spare	Spare	Spare	Medium
***Anthocyanin coloration of the prostrate hairs on tip**	Absent	Week	Absent	Absent
***Erect hairs on tip**	Medium	Medium	Medium	Medium
- Young leaf				
***Color of upper side of blade**	Green	Green with anthocyanin spots	Green with anthocyanin spots	Green with anthocyanin spots
***Prostrate hairs between main veins on lower side of blade**	Very spare	Very spare	Spare	Spare
***Erect hairs on main veins on lower side of blade**	Spare	Spare	Spare	Very spare
Shoot				
***Attitude (before tying)**	Erect	Erect	Erect	Erect
***color of dorsal side of internodes**	Green	Green with red strips	Green with red strips	Green with red strips
***color of ventral side of internodes**	Green	Green	Green	Green with red strips
***Color of dorsal side of nodes**	Green	Green	Green	Green
***Color of ventral side of nodes**	Green	Green	Green	Green
***Erect hairs on internodes**	spare	spare	spare	spare
***Length of internodes**	long (12.0cm)	long (9.1cm)	long(11.88cm)	long (12.2cm)
***Thickness of internodes**	Thick(9.3mm)	Thick (9.5mm)	Thick(10.8mm)	Thick(12.0mm)
- Tendrils				
***Number of consecutive**	Less than three	Less than three	Less than three	Less than three
***Tip of tendrils**	Tri fid	Tri fid	di-tri fid	Tri fid
***Long of tendrils**	**Long**	Very long	Very long	Very long
***Color of tendrils**	Green	Green	Green	Green
- Flower				
***Time of bloom**	Last week of March	First week of April	Third week of April	Second week 0f May
***Flower sexual organs**	Fully developed stamens and fully developed	Fully developed stamens and fully developed gynoecium	Fully developed stamens and fully developed gynoecium	Fully developed stamens and fully developed gynoecium

- Mature leaf:

It is important for leaf morphological investigation and it is emphasized that grapevine leaf characteristics without the observation of other organs would be sufficient for the classification of grapevine cultivars (Chadha and Randhawa, 1974).

Leaves at the top and on the base of the shoot are not suitable for comparing the cultivars in contrast to those that are in the middle of the shoot or close to the bunches.

*** Leaf area and Shape:-**

Data in Table (2) showed that all studied cultivars had a very large leaf area with pentagonal shape in Starlight and Midnight Beauty cultivars and circular shape in Sugrafourteen and Autumn crisp cultivars.

*** Leaf surface, thickness and color:-**

Leaf surface was smooth in the all cultivars except for Autumn crisp as it was rough, and the leaf color was green at all. Leaf thickness was medium in Starlight, Sugrafourteen and Midnight Beauty while it was thick in Autumn crisp .Leaf profit in cross section was flat in all cultivars under study.

*** Leaf lobs and sinuses:-**

Number of lobs was five for all cultivars under study. The depth of the upper lateral sinuses in starlight was deep and in Sugrafourteen was very shallow, while it was very deep in Midnight Beauty and shallow in Autumn crisp. The arrangement of the lobs of upper sinuses was slightly overlapped in Starlight and Autumn crisp cvs., closed in Sugrafourteen cv. but strongly overlapped in Midnight Beauty cv. .

*** Petioles sinus:**

Arrangement of lobs of petiole was wide open in Starlight, Midnight Beauty and Autumn crisp while slightly over lapped in Sugrafourteen, petiole shape was U-shape in all cultivars studied except Sugrafourteen it was club shaped. Length of petiole compared to length of middle vein was moderately shorter in the three cultivars Starlight, Sugrafourteen and Midnight Beauty, yet it was equal in the Autumn crisp cultivars. Petiole sinus limited veins were absent in all studied cultivars.

*** Leaf margin:-**

The apical tooth was pointed in the studied cultivars, and length of the teeth was medium except for Starlight it was short, and length / width of the teeth were medium except Starlight it was large. The shape of teeth was both sides convex in Starlight while it was both side Straight in Sografourteen and it was mixture of both sides' straight and both sides convex in Midnight Beauty and Autumn crisp. The number of teeth was medium (60) in Starlight and many in Sugrafourteen, Midnight Beauty and Autumn Crisp (92, 84, and 67, respectively). The type of margin was irregularly dentate in all cultivars.

The proportion of main veins on the upper side of blade with anthocyanin coloration was absent in the four cultivar studies, and the density of prostar hairs between main veins on lower side of blade was very spare in Starlight and Midnight Beauty, but they were spare in Sugrafourteen and Autumn crisp .The density of erect hairs on main veins on lower side of the blade was spare in the studied cultivars except for Midnight Beauty, it was very spare.

According to (upov) the ratio of depth sinus to the total distance from margin to petiole classified to absent (none except), shallow (extending to loss then ½) medium (extending to about ½) deep (extending $^{2}/_{3}$) very deep (extending to petiole).Sinus may be open, closed, slight overlapped as strongly overlapped. Petiole sums may be very wide open, wide open, half open, slightly open, closed ,slight overlapped half overlapped ,strongly overlapped as very strongly overlapped.

Our results agree with some studies on different cultivars Gsser et al. (1998), Gaser (2006), Rusjan et al. (2015), El-Morsy et al (2017) and Ahmed, Abd-El- Aziz (2021) and Gago et al. (2022).

Table (2): Evaluation and Morphological characteristics of Mature leaf for the studies cultivars.

Characteristics \ Cultivars	Starlight	Sugrafourteen	Midnight Beauty	Autumn crisp
- Mature leaf				
*** Leaf area**	Vary large	Vary large	Vary large	Vary large
*** Leaf Shape of blade**	Pentagonal	Circular	Pentagonal	Circular
*** Leaf surface**	Smooth	Smooth	Smooth	Rough
*** Leaf color**	Green	Green	Green	Green
*** Leaf thickness**	Medium	Medium	Medium	Thick
***Leaf profit in cross section.**	Flat	Flat	Flat	Flat
***Number of lobs.**	Five	Five	Five	Five
***Depth of upper lateral sinuses.**	Deep	Very shallow	Very deep	Shallow
***Arrangement of lobes of upper lateral sinuses.**	Slightly overlapped	Closed	Strongly Overlapped	Slightly overlapped
***Arrangement of lobes of petiole sinus**	Wide open	Slightly overlapped	Wide open	Wide open
***Petiole shape.**	u- shape	Club shipped	u-shape	u- shape
***Length of petiole compared to length of middle vein.**	Moderately shorter	Moderately shorter	Moderately shorter	Equal
***Petiole sinus limited by veins**	Absent	Absent	Absent	Absent
*** Leaf margin:--**				
· **Apical tooth**	Pointed	Pointed	Pointed	Pointed
· **Length of teeth**	Short	Medium	Medium	Medium
· **Length/width of teeth**	large	Medium	Medium	Medium
· **Shape of teeth**	Both sides convex	Both side straight	Mixture of both sides straight and both sides convex	Mixture of both sides straight and both sides convex
· **Number of teeth**	Medium (60)	Many -92	Many -84	Many -67
· **Type of margin**	Irregular dentate	Irregular dentate	Irregular dentate	Irregular dentate
*** Proportion of main veins on upper side of blade wit anthocyanin Coloration**	Absent	Absent	Absent	Absent
*** Density of prostrate hairs between main veins on lower side of blade**	Very spare	Spare	Very spare	Spare
*** Density of erect hairs on main veins on lower side of blade**	Spare	Spare	Very spare	Spare

- Time of beginning of berry ripening:-

Time of beginning berry ripening was classified as very early, early, medium, late, and very late according to (upov).The data in Table (3) showed that Starlight cv. started to ripen in the first week of June, Sugrafourteen cv. in the second week of June, Midnight Beauty cv. in the Third week of June, and the first week of August in Autumn crisp.

From the above results it can be determined t that Starlight and Sugrafourteen were "early" cultivars, Midnight Beauty was" early-medium", and Autumn crisp was a "late" cultivar.

- Bunch and yield/vine:

According to data in Tables (3) and (4), all the studied cultivars had bunches of large size (more than 500 g), with an average (528.0 g) Starlight cv.,(624.7 g) for The yield

per vine, and bunch weight was high significantly in Midnight Beauty and Autumn crisp than Starlight and Sugrafourteen in the three seasons of study.

Bunch density for the all studied cultivars was dense. Bunch shape for Starlight and Sugrafourteen cv was conical, it was shouldered for Midnight Beauty cv. While, it was winged for Autumn crisp cv. length of the peduncle long (more than 3.5cm) in all cultivars under study. Bunch length in Midnight Beauty cv. was the highest one followed by Autumn crisp cv. While bunch width in Sugrafourteen cv. was significantly higher and the lowest one in Starlight cv. in the three seasons of the study.

- Berry:-

Berry attired large size in studied cultivars and it was broad ellipsoid shape in Starlight cv., obtuse ovoid shape in Sugrafourteen cv. and cylindrical shape in Midnight Beauty and Autumn crisp cv. Berry color of skin was pink in Starlight beauty cv. and in Sugrafourteen, black in Midnight Beauty cv. and yellow green in Autumn crisp cv. All the studies cultivars was difficult detachment from Peduncle except Autumn crisp it was moderately and thin of skin (all cultivars),Absent anthocyanin of flesh and very firm of flesh. Juiciness of flesh was scarcely juicy at starlight, Sugrafourteen and Midnight Beauty but it was slightly juicy in Autumn crisp .Particular flavor was light muscat in Starlight and Autumn crisp while none in Sugrafourteen and Midnight Beauty.

Data from Table (4) cleared that berry weight, size and length in Autumn crisp cv. was high significantly than the other cultivars followed by Midnight Beauty while the lowest was starlight. Concerning chemical properties of berries, data revealed that Autumn crisp cv. contained the to lowest percentage of acidly and the highest value of TSS/acid ratio in the three seasons.

- Seeds:-

All the studies cultivars were seedless and formation of seeds was rudimentary in Starlight and Sugrafourteen but it was absent in Midnight Beauty and Autumn crisp cvs. The cultivars differ from each other by their morphological characteristics and sizes of bunches and berries, phenology; time of harvest, productivity and quality indices (Sabir et al, 2010) & (Ates et al , 2011).

Berry size, color, and shape attributes are of primary importance in the perceived quality and overall acceptability to consumer preference (Sabir et al 2010) & (Eyduran et al 2015).

The above results go in line with many investigation for different cultivars (Fawzy, 1998; Gaser et al. 1998; Gaser, 2006; Basheer 2015; Mohamed and Tarbia, 2017; El-Morsy et al. 2017; Ahmed and Abd-El-Aziz 2021 and Gago et al. 2022).

- Woody shoot:-

Main color of woody shoot was light brown in Starlight cv., yellowish brown in Sugrafouteen cv., reddish brown in Midnight Beauty and dark brown in Autumn crisp cv. Relief of surface of the wood shoot was straits in all the cultivars except Autumn crisp it was ribbed.

Table (3): Evaluation and morphological characteristics of time of ripening, bunch, berry, seeds and wood shoot for studies cultivars.

Cultivars / Characteristics	Starlight	Sugrafourteen	Midnight Beauty	Autumn crisp
- Time of beginning of berry ripening:-	First week of June "early"	Second week of June "early"	Third week of June "early to medium"	First week of August "late"
- Bunch:-				
*** Size**	Large	Large	Large	Large
*** Density**	Dense	Dense	Dense	Dense
*** Shape**	Conical	Conical	Shouldered	Winged
*** Length of peduncle**	Long	Long	Long	Long
- Berry:-				
*** Size**	Large	Large	Large	Large
*** Shape**	Broad ellipsoid	Obtuse ovoid	Cylindrical	Cylindrical
*** Color of skin**	Pink	Red	Black	Yellow green
*** Ease of detachment from Pedi**	Difficult	Difficult	Difficult	Moderately easy
*** Thickness of skin**	Thin	Thin	Thin	Thin
***Anthocyanin coloration of flesh**	Absent	Absent	Absent	Absent
*** Firmness of flesh**	Very firm	Very firm	Very firm	Very firm
*** Juiciness of flesh**	Scarcely juicy	Scarcely juicy	Scarcely juicy	Slightly juicy
***Particular flavor**	Light Muscat	None	None	None
*** Formation of seeds**	Rudimentary "seedless"	Rudimentary "seedless"	Absent seedless""	Absent seedless
- Woody shoot:-				
*** Main color**	Light brown	Yellowish brown	Reddish brown	Dork brown
*** Relief of surface**	Striate	Striate	Striate	Green with ribbed

Table (4): Some physical and chemical characteristics of bunches and berries for the studies cultivars in 2019, 2020 and 2021 seasons.

Characteristics \ Cultivars	Starlight	Sugrafourteen	Midnight beauty	Autumn crisp	L.S.D at 5%
First season (2019)					
Bunch Weight (g)	518.70	627.00	708.30	701.00	10.28
Bunch length (cm)	20.30	26.30	28.30	27.30	1.61
Bunch width (cm)	17.30	20.00	19.30	18.00	1.25
Bunch peduncle	5.30	5.30	4.30	4.50	0.79
Berry weight (g)	6.60	7.60	7.50	7.70	0.28
Berry size (cm^3)	6.20	7.50	7.40	7.50	0.24
Berry length (cm)	2.60	2.70	2.90	3.10	0.08
Berry diameter (cm)	2.30	2.30	2.00	2.10	0.09
Berry shape	1.10	1.20	1.50	1.40	0.04
TSS (%)	16.30	16.80	16.00	16.80	0.29
Acidity (%)	0.50	0.50	0.60	0.50	0.02
TSS/acid ratio	32.60	33.60	28.10	34.80	1.54
Yield/vine (kg)	15.60	18.80	21.30	21.00	0.32
Second season (2020)					
Bunch weight (g)	535.10	619.90	714.70	701.80	8.1
Bunch length (cm)	20.00	25.70	28.00	26.70	2.09
Bunch width (cm)	17.00	21.00	19.30	18.70	0.91
Bunch peduncle	5.30	4.50	4.70	4.70	0.54
Berry weight (g)	6.40	7.50	7.50	7.70	0.16
Berry size (cm3)	6.20	7.20	7.40	7.50	0.25
Berry length (cm)	2.60	3.50	2.90	3.10	0.07
Berry diameter (cm)	2.30	2.30	1.90	2.20	0.12
Berry shape	1.10	1.20	1.50	1.40	0.04
TSS (%)	16.30	16.50	16.00	16.50	0.36
Acidity (%)	0.50	0.50	0.60	0.50	0.03
TSS/acid ratio	32.70	33.00	29.10	33.00	1.57
Yield/vine (kg)	16.10	18.60	21.50	20.10	0.46
Third season (2021)					
Bunch Weight (g)	533.20	627.30	711.70	705.00	11.99
Bunch length (cm)	20.30	26.00	29.00	27.30	1.9
Bunch width (cm)	18.00	20.00	19.00	18.30	0.87
Bunch peduncle	5.30	5.00	4.70	4.50	0.54
Berry weight (g)	6.60	7.50	7.50	7.80	0.28
Berry size (cm3)	6.30	7.20	7.30	7.70	0.29
Berry length (cm)	2.60	2.70	2.90	3.10	0.07
Berry diameter (cm)	2.30	2.20	2.00	2.10	0.07
Berry shape	1.10	1.20	1.50	1.40	0.03
TSS (%)	16.30	16.50	16.00	16.70	0.39
Acidity (%)	0.50	0.50	0.60	0.50	0.03
TSS/acid ratio	32.70	33.10	28.60	37.10	1.56
Yield/vine (kg)	16.00	18.80	21.40	21.20	0.45

Fig (1): shoot tip, leaves, flower, bunch and berries for starlight Cv.

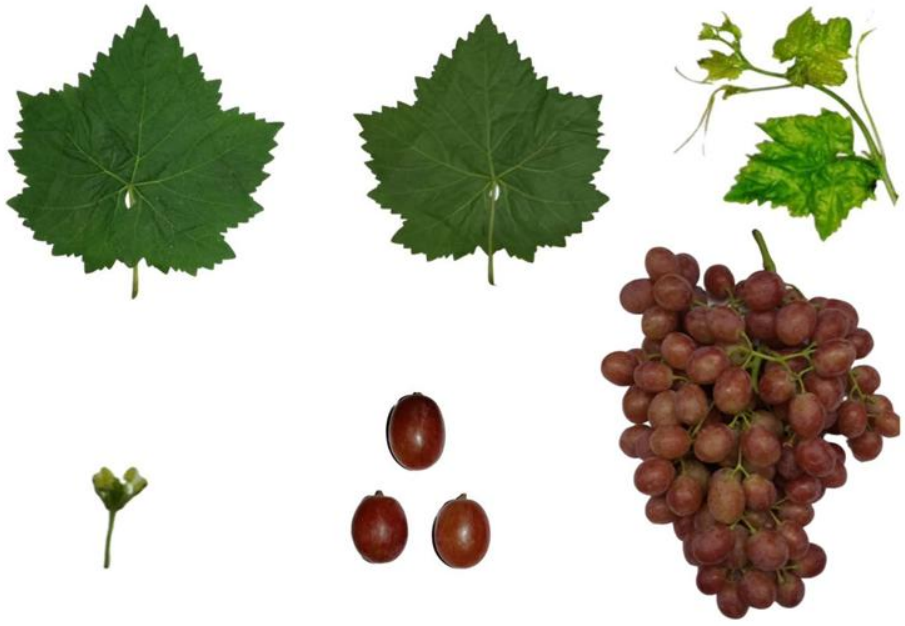

Fig (2): shoot tip, leaves, flower, bunch and berries for Sugrafourteen Cv.

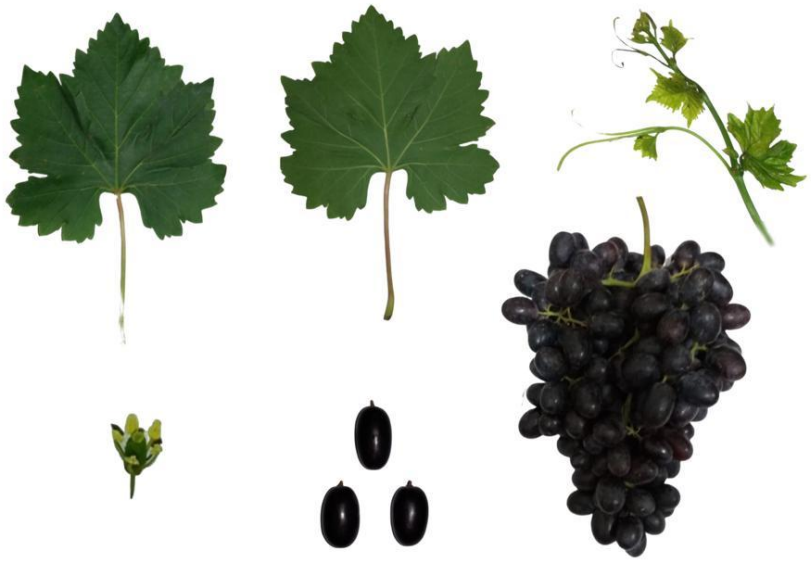

Fig (3): shoot tip, leaves, flower, bunch and berries for Midnight Beauty Cv.

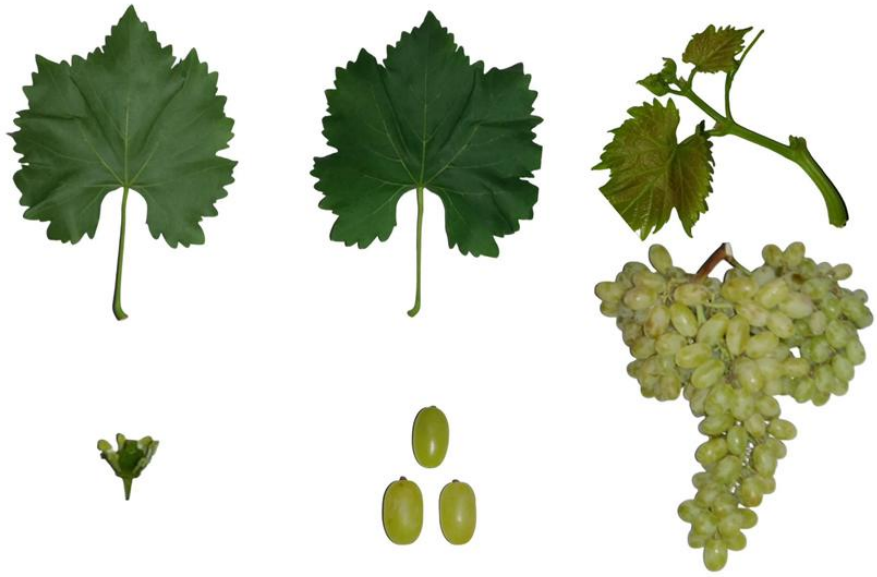

Fig (4): shoot tip, leaves, flower, bunch and berries for Autumn crisp Cv.

- Bud Fertility:-

According to Fig. (5) the high bud fertility was in Autumn crisp cv., followed by Midnight Beauty cv. and the lowest one was in Sugrafourteen cv., It increased gradually from the basal buds up to the middle buds of the cane where it reached its maximum then decreased gradually towards the distal buds. Results in line with those mentioned by Bossins (1965) and Licul (1969) and Monastra (1971). The highest coefficient of bud fertility was obtained at" 5^{th} -9^{th}" node position in Sugrafourteen cv., while it was at "3^{rb} -4^{th} " node position in Autumn crisp cv. and Midnight Beauty cv. but it was"4^{th} -5^{th} node position in starlight cv..

Thus, it could be suggested from the foregoing results to prune Sugrafourteen cv.

to "cane pruning "system and the other cultivars, Starlight cv., Midnight Beauty cv. and Autumn crisp cv., according to "spur pruning" system . In this respect, Abdel–Kowi and El-Yami (1992), Gaser et al. (1998), Gaser, (2006) and El-Morsy (2017). on some different cultivars study but fertility to determine the suitable pruning and training system.

CONCLUSION

The studied cultivars were characterized by good vegetative growth, yield, and fruit quality and proved that Starlight, Sugrafourteen cv., "early" ripping. Midnight Beauty "early-medium" ripping, while, Autumn crisp" late" ripping .All the cultivars are seedless. Starlight berry has a broad ellipsoid shape and a pink color. Sugrafourteen has an ovoid shape with a red color. Midnight Beauty cylindrical shape with black color and Autumn crisp cylindrical shape with yellow green color. Suitable pruning for Sugrafourteen cv., "cane pruning" system while Starlight, Midnight Beauty and Autumn crisp cvs. spur pruning system.

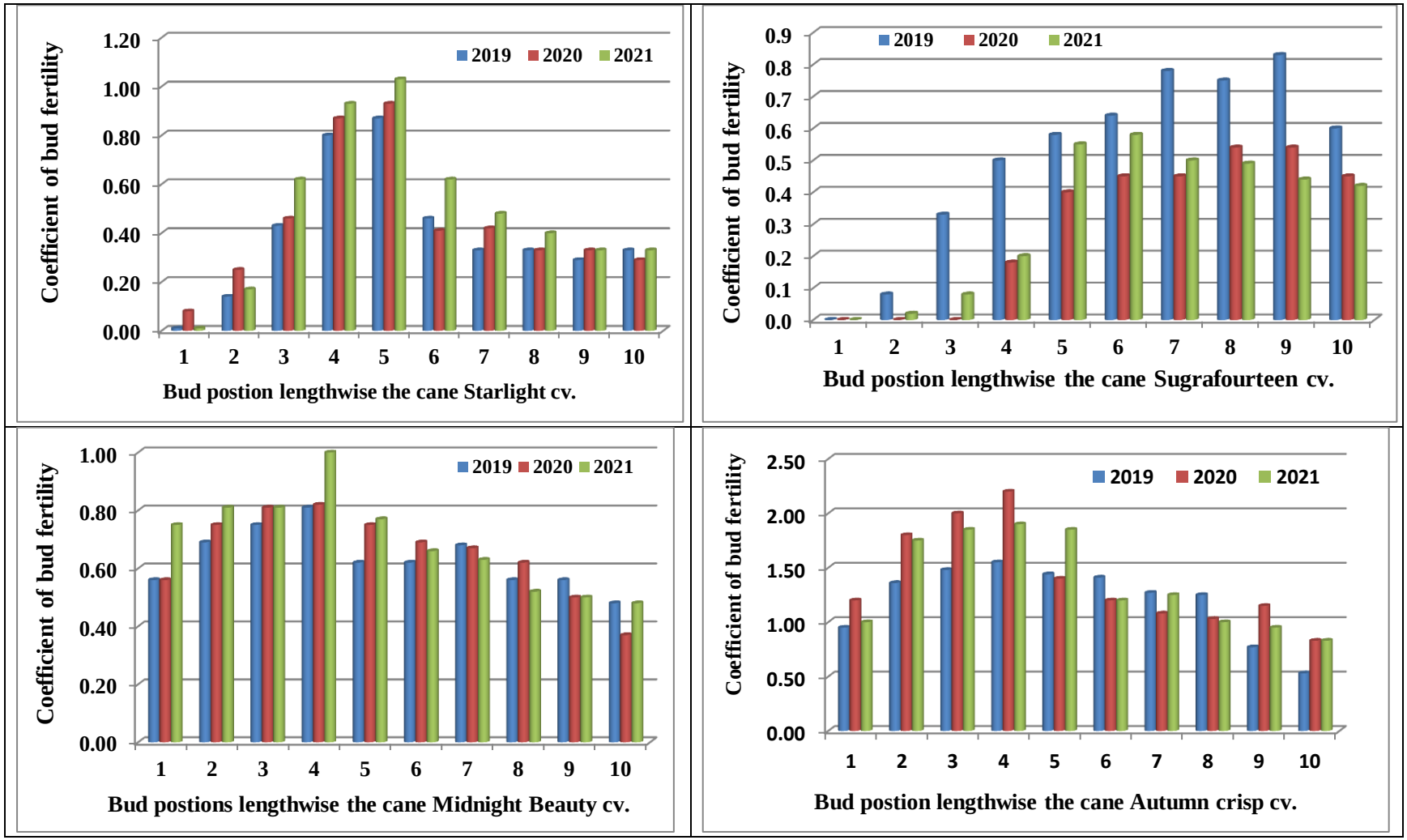

Fig (5): Coefficient of bud fertility in different grape cultivars during 2019, 2020 and 2021 seasons.

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تقيم والتوصيف المرفولوجى لبعض اصناف العنب المستورده حديثا تحت الظروف المصريه

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أجريت هذه الدراسه للتقيم والتوصيف المورفولوجى لأصناف عنب مستورده حديثاً وهي استار لايت، شوجرافورتين، ميد نيت بيوتى واوتم كرسب تحت الظروف البيئيه المصريه. خلال الثلاث سنوات ٢٠١٩، ٢٠٢٠ و٢٠٢١ فى مزرعه خاصة بمدينه السادات– محافظه المنوفيه – مصر. وكان عمر الاشجار ٥ سنوات منزرعه فى أرض رمليه طفليه.

أظهرت النتائج أن جميع الاصناف ذات قمه ناميه كامله التفتح وكان تتابع المحاليق أقل من ثلاثة وكان طرف المحلاق ثلاثى فى جميع الأصناف فيما عدا الصنف ميدنيت بيوتى كان ثنائى– ثلاثى. الاعضاء الجنسيه للأزهار مكتمله تطور الأسديه ومكتمله تطور المتاع. الكامله كانت كبيره جدا وكان شكل نصل الأوراق خماسي فى صنف الاستار لايت والميدنيت بيوتى بينما كان شكل نصل الورقه مستدير فى الشوجرافورتين والاوتم كرسب، وكان عمق التجويف الجانبى العلوى فى صنف الاستار لايت عميق وفى صنف الشجورا فورتين قليل جداً فى العمق بينما كان فى صنف الميدنيت عميق جدا وفى صنف الاوتم كرسب قليل العمق. وكان فصوص التجويف العلوى الجانبى متداخل بسيط فى الاستار لايت والاوتم كرسب ومغلق فى الشوجرا فورتين ولكن متداخل بقوه فى الميد نيت بيوتى. وكان عنق الورقه شكل المضرب فى صنف شوجرا فورتين ولكن باقى الاصناف على شكل "U". و كان شكل التسنين فى الورقه غير منتظم فى جميع الأصناف وشكل السنه العلويه مدببه.

جميع الأصناف لابذريه والصنف الاستار لايت والشوجرافورتين "مبكر النضج" والميد نيت بيوتى "مبكر –متوسط" النضج بينما صنف الاوتم كرسب "متاخر النضج". وكان العنقود كبير فى جميع الأصناف أكثر من "٥٠٠ جرام" وممتلاء والحبه كبيرة الحجم فى جميع الأصناف، بيضاويه عريضة الشكل فى الاستار لايت وبيضاويه الشكل فى الشوجرافورتين وأسطوانيه الشكل فى الميد نيت بيوتى والاوتم كرسب وكان لون قشرة الحبه وردى فى الصنف الاستار وأحمر فى صنف الشوجرا فورتين وأسود فى الميدنيت بيوتى وأخضر مصفر فى الاوتم كرسب. وصفت الاصناف التى تم عليها الدراسه بجودة النمو الخضرى والمحصول وجودة الثمار. يوصى بالتقليم القصبى للصنف شوجرافورتين بينما باقى الاصناف يصلح لها التقليم الدابرى.