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(RESEARCH ARTICLE)



Categorization of *Cucumis sativus* germplasm depending on agronomic qualities under natural climatic conditions

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Abstract

Cucumis sativus is cultivated all around the world and held an important position in cucurbitaceous crops. Seeds of *Cucumis sativus* have cooling, tonic, diuretic and anthelmintic effect. According to world total production most important and widely cultivated cucurbits have been water melon, *Cucumis sativus*. According to data sheet of area of 2.09 million ha have been under *Cucumis sativus* cultivation and 0.31 million tone yields in return worldwide. There were total 12 different varieties and central devoutness of the study was to compare all these varieties and to know about the best variety among all. After comparing means from data it was conducted that in terms Number of leaves C-3479, C-571 and Sialkot local beard highest number of leaves. All the varieties showed almost similar trend in length of stem and days of flowering. C-3479 possessed highest number of fruits and Sialkot local had lowest number of fruits. The color of flowers as well as shape of stem was almost same in all varieties. In contrast to match Leaf size, length of fruit also sums of fruits.

Keywords: *Cucumis sativus*; Germination; Varieties; Vegetable

1. Introduction

Vegetables have been known from ancient times as fresh and edible parts of herbaceous plants. They play vital role in maintenance of health and help in prevention from a number of diseases. Vegetables have been main source of carbohydrates, vitamin and mineral. Vegetables can be available in different edible forms such as roots, stems, leaves, fruits and seeds. Each edible group have its own contribution [1]. Cucurbit family mostly consist of annual herbs, however some are semi herbs which consists of climbing growth habit and some *Cucumis sativus* and melons have habit of bush. root system is woody and very long along with shallow and tuber habits. Stems are sulcate, angled along with sympodial branch pattern, whereas nodes may be geniculate or non-geniculate. Simple and petiole types of leaves, length of petioles differ. Blade of leaf may be kidney shape, circular or ovate. *Cucumis sativus* consist of unisexual and hermaphrodite flowers. *Cucumis sativus* are known as monoecious flowers because they produce male also female flowers distinctly on same plant [2].

Cucumis sativus have many type of sexual expression ways. Male flower consists of solitary flowers sometimes it is multi flowered and with branching habit. Female flowers are also solitary along with habits of rarely compound shape modified flowers. Their pedicle is sulcate with pubescent. Their fruit size varies from round lobately elongated oval to block shape. Fruit surface may be soft or semi soft to hard with slightly hairy growth on it. Color of fruit varies from

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green to yellow to pale yellow. Sex expression is totally dependent upon a number of environmental factors such as temperature and plant hormones [3]. The goal is to stimulate the ovaries to become fast-growing fruits in *Cucumis sativus*. The results can be induced either by pollination or by parthenocarpy, and by natural (genetically) or chemically by application of growth regulators, Pollination. In the *Cucumis sativus* method, pollination occurs after the pistil of the flower, that is, when the pollen moves onto the stigma. For effective pollination, male and female flowers or perfect flowers should be opened on the same day. Even insects, usually bees, transfer pollen. Manual pollination can be done, but this work requires a lot of work. Unless the plant is parthenocarpic, the fruit yield of the *Cucumis sativus* depends on the pollination [4]. By administering exogenous hormones, it is possible to mimic (indicate) parthenocarpy, mainly auxin and gibberellin, or signs of endogenous growth (natural parthenocarpy). There are inconsistent reports, including the number of genetic behaviors that control parthenocarpy. In *Cucumis sativus*, parthenocarpy is organized by incomplete dominant genes. The degree of parthenocarpy expression in *Cucumis sativus* is considered epigenetic or directly related to environmental changes during the growing season and is more pronounced in lines with more female flowers. The initial mechanism of parthenocarpic *Cucumis sativus* in the fruit is in the undeveloped ovary. It has been reported that an increase in auxin levels in ovarian parthenocarpy induces cell division, and recent studies have shown that the contradiction between cytokine and auxin synthesis in *Cucumis sativus* triggers cell division [5]. *Cucumis sativus* are used as salad and pickling's. Mostly immature fruits are used as salads or picked up as pickles. Fruits have cooling effect also it is very useful for patients of constipation, yellow fever and digestion problems. It is also used for body smoothness and for brain cell development. It contains a toxic substance which is called as cucurbitacin. According to USDA, National Nutrient Data Base 2014, *Cucumis sativus* fruit per 100g contains 3% carbohydrates, 1% protein, 0.5% total fat and 1 % dietary fiber.

According to world total production most important and widely cultivated cucurbits have been water melon, *Cucumis sativus* [6]. According to data sheet of [7] area of 2.09 million ha has been under *Cucumis sativus* cultivation and 0.31 million tone yields in return worldwide. Isolation of desirable genes is very important to get higher yield and better quality [8]. So, a learning was purposed to observe the effect of agro climatic conditions of Faisalabad on a number of different varieties to check effect of climate on yield related traits through germplasm collection.

The aim is to study check the effects of agro-climatic conditions on different varieties in order to examine the effects of climate on yield-related traits through germplasm collection.

2. Material and methods

A wide study related to genetic variability exist for a number of characters. Genetic variation is very important for starting crop improvement process. Greater the genetic variation in a germplasm more will be the chances for the improvement of crop varieties. So gene pool plays an important role for breeding in crop improvement and genetic variation of a crop.

Below listed vegetative and reproductive parameters will be investigated at different level of plant growth stages:

2.1. Plant Material

Seeds of twelve *Cucumis sativus* cultivars were occupied from National Agriculture Research Centre (NARC) Islamabad.

2.2. General Layout of Research

A number of 5 seeds per variety were selected for cultivation in one row with line to line distance of 1.5 ft. Sowing was done by hand. At regular intervals of days' random sample from field were collected and bring in the laboratory for analysis purpose. The whole collection and sampling were done up to four months after sowing.

2.3. Number of Leaves

A number of 5 plants were selected from every block, total number of leaves were noted. Finally, average was taken.

2.4. Leaf Size (cm)

Leaf size was recorded by the support of measuring tape. Maximum length plus width of leaf was recorded and increased to become leaf zone in cm.

2.5. Length of the Stem (cm)

Total vine length was recorded by selection of random plants at the end of flowering season and their average was recorded.

2.6. Specific Shape of the Stem

Assessment was finished through naked eye.

2.7. Number of Fruits / Plant

The whole number of fruits which were picked at every harvest was noted and average value was taken from randomly selected 10 plants.

2.8. Statistical Analysis

The experimented was subjected to randomized complete block design (RCBD). ANOVA analysis as well as variations between mean data observed. Statistics 8.1 software was used to compare the means.

3. Results and discussion

After performing the comparison test of means. It is noted that the results of our research are significant from each other. In the above table of means the lettering is provided as specific alphabets which shows the significant difference of one value from another. The table is based on the confidence interval. Values which do not show lettering they have significant different means.

Table 1 Mean comparison analysis Number of leaves per plant

Verities	Mean comparison
<i>Cucumis sativus</i> VEGA	406ac
C-3479	440c
PICO- 500	301b
KN- 84604105	393ac
C-571	437b
WANDRI- 700	319d
C- 3426	271ad
C- 574	358c
SIALKOT LOCAL	465cd
C-3429	334bc
DESI <i>Cucumis sativus</i>	413c

Table 2 Mean comparison analysis for Leaf Size

Varieties	LS
<i>Cucumis sativus</i> VEGA	23
C-3479	14
PICO- 500	21
KN- 84604105	13
C-571	16
WANDRI- 700	25
C- 3426	19
C- 574	15
SIALKOT LOCAL	21
C-3429	13
DESI <i>Cucumis sativus</i>	18

Table 3 Mean comparison analysis for Length of the Stem

Verities	Mean comparison
<i>Cucumis sativus</i> VEGA	193a
C-3479	174b
PICO- 500	180ab
KN- 84604105	157c
C-571	163b
WANDRI- 700	158bc
C- 3426	164a
C- 574	151c
SIALKOT LOCAL	141ac
C-3429	172ac
DESI <i>Cucumis sativus</i>	184b

Table 4 Mean comparison analysis for Specific Shape of the Stem

Varieties	SOS
<i>Cucumis sativus</i> VEGA	17
C-3479	15.5
PICO- 500	16
KN- 84604105	15
C-571	17.5
WANDRI- 700	13.5
C- 3426	17
C- 574	14.5
SIALKOT LOCAL	16.5
C-3429	13.5
DESI <i>Cucumis sativus</i>	18.5

Table 5 Mean comparison analysis for Number of Fruit per plant

Verities	Mean comparison
<i>Cucumis sativus</i> VEGA	5a
C-3479	7ab
PICO- 500	4c
KN- 84604105	6a
C-571	5a
WANDRI- 700	4b
C- 3426	5b
C- 574	6b
SIALKOT LOCAL	4ab
C-3429	6c
DESI <i>Cucumis sativus</i>	6c

4. Discussion

Cucumis sativus is cultivated all around the world and held an important position in cucurbitaceous crops. Seeds of *Cucumis sativus* have cooling, tonic, diuretic and anthelmintic effect. There were total 12 different varieties and central devoutness of the study was to compare all these varieties and to know about the best variety among all. [9], a Russian scientist first time observed the significance in morphological characters are color, size, shape, texture and taste. After comparing means from data it was conducted that in terms Number of leaves C-3479, C-571 and Sialkot local beard highest number of leaves. All the varieties showed almost similar trend in length of stem and days of flowering. C-3479 possessed highest number of fruits and Sialkot local had lowest number of fruits. The color of flowers as well as shape of stem was almost same in all varieties.

These results were also similar to [10] that superior the genetic changeability in the existing germplasm, improved will be the risks for choosing greater genotypes. Because through the selection of proper germplasm. There are great chances of enhancement in the fruits and yield of the plant. The results of research also matched with [11]. In contrast to match Leaf size, length of fruit also sums of fruits.

5. Conclusion

After comparing means from data it was conducted that in terms Number of leaves C-3479, C-571 and Sialkot local beard highest number of leaves. All the varieties showed almost similar trend in length of stem and days of flowering. C-3479 possessed highest number of fruits and Sialkot local had lowest number of fruits. The color of flowers as well as shape of stem was almost same in all varieties. Because through the selection of proper germplasm. There are great chances of enhancement in the fruits and yields of the plant. In contrast to match Leaf size, length of fruit also sums of fruits.

Compliance with ethical standards

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All authors contribute equally and with well manners.

Disclosure of conflict of interest

No observed conflict of interest among the authors.

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