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Evaluation of sponge gourd (*Luffa cylindrica* L.) for fruit yield in Prayagraj Agro-climatic conditions

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Abstract
The present investigation entitled "Evaluation of sponge gourd for fruit yield in Prayagraj agro climatic conditions" was carried out at the field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj in the months of August to November, during the year 2019-2020. The experimental material comprised of 25 genotypes of sponge gourd maintained at the Department of Horticulture, SHUATS, Prayagraj were used as planting material. The sowing of experimental material was done on August 22, 2019. Recommended fertilizer and other cultural package of practices were adopted for better crop growth. All the treatments were replicated three times in a randomized block design. The experimental area was divided into plots of 3.0 x 4.0 m^2 size. Pits of 35 cm x 35 cm x 15 cm size were dug in each plot. Well decomposed farmyard manure @ 25 t ha 1 was incorporated in 720 m^2 experimental area before showing into the pits by mixing with the soil uniformly as basal application and filled up to 3-5 cm above the ground level. The seed sowing was done on August 22, 2019 maintaining a planting distance of 1.5×1m.
From the present investigation it is concluded that the sponge gourd Genotype 2017 / SPG (V-5) resulted in higher yield per plant (4.01 Kg), yield t/h (26.73), polar diameter of fruits (25.86) and radial diameter of fruits (55.80) was found to be best in terms of yield of sponge gourd in Allahabad agro-climatic conditions. This result was successfully found significant.

Keywords: Sponge gourd, genotypes, and yield

Introduction
Sponge gourd [*Luffa aegyptiaca 2n=26*], commonly known as sponge gourd is a member cucurbitaceous family. They have a long history of cultivation in the tropical countries of Asia and Africa. The vernacular names of sponge gourd are kali tori, ghia, tori, dundul, bhol or tarada and ghiraula in different parts of the world. It is now widely cultivated in Malaysia, Korea, Japan, India, Central America, Thailand, Philippines, Indonesia, Taiwan and China for medicinal purpose. Japan is main exporter while, the main importers of sponge gourd are Brazil and U.S.A. In India the crop is widely grown in Uttar Pradesh, Bihar, West Bengal, Orissa, Assam, Andhra Pradesh and Kerala [3]. Nevertheless the estimated area under all the gourds is 4.05 lakh hectares in our country. In Chhattisgarh, sponge gourd is being grown on about 2597 ha. with an annual production of 23447 metric tons [2] particularly in Mahasamund, Kanker, Janjgir-chapa, Raigarh, Korba, Raigarh, Koria district. The plant is an annual vine with tendrils and large, cylindrical pepo (berry) fruit that are edible when young. Sponge gourds are popularly cultivated for harvesting both of mature-green fruit and dry fruit because of its high nutrient value [4, 8] and tough fibrous vascular system [7, 5].
The fruit contains white inner flesh which is fibrous and have similar flavor to bitter melon. The fruit attains the height of 1-2 feet. Fully ripened sponge gourd contains high fiber content which is used as cleansing agent and for making table mats, shoe-soles etc. The sponge gourd is also regarded as an important medicinal plant that needs to be conserved [13]. Immature fruit is used as a vegetable whereas mature sponges are used for cleaning utensils and in the bathroom. Fresh juice of the leaf is used for healing wounds and also used as primer in door and windows by Nepalese farmers.
Dried sponge, which is fibrous, is used in commercial filters and for insulation. The seeds yield is colorless, odorless, tasteless oil that can be used in cooking. Being a warm season crop, it has the ability to tolerate hotter conditions, which makes it suitable for widespread cultivation throughout the tropics. Due to monoecious sex form, ridge gourd is highly cross pollinated and had wide variation in growth and fruit characters. Thus, there is a need to identify stable and superior genotypes through screening of germplasm at large scale for commercial use.

The success of any breeding programme depends upon selection of a proper plant. The efficiency of selection depends on the magnitude and nature of genetic variation in a specific population for effective breeding program. Yield is polygenic in nature and influenced by environmental factors, which complicate the selection process thus, the knowledge of correlation of the traits is necessary for effective selection process.

Materials and Methods

The present investigation entitled "Evaluation of sponge gourd for fruit yield in Prayagraj agro climatic conditions" was carried out at the field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. Prayagraj is situated in the eastern part of U. P. and lays in the center of north gangetic alluvial plains, on the left side of river the Yamuna and comes under sub- tropical zones. The average rainfall in this area is about 1100 mm per annum. Most of which generally occur during winter season. During the period of experiment, the meteorological observation were recorded during entire growth period of the crop, comprises maximum and minimum temperature, rainfall, relative humidity from the month of August to November, during the year 2019-2020. The experimental material comprised of 25 genotypes of sponge gourd maintained at the Department of Horticulture, SHUATS, Prayagraj were used as planting material.

Results and Discussion

The experimental results of the present investigation entitled "Evaluation of sponge gourd for fruit yield in Prayagraj agro climatic conditions" has been conducted at Horticulture Research Farm, Sam Higginbottom University of Agriculture, technology and Science, Prayagraj during the period from August to November 2019.

Table 1: Yield data of fruits in different genotypes of sponge gourd.

Treatment No.	Genotypes	Yield per plant (Kg)	Yield t/h	Polar diameter of fruits	Radial diameter (mm) of fruits
T_1	2016 / SPG (V-1)	3.66	24.39	22.81	50.11
T_2	2016 / SPG (V-2)	3.60	23.99	20.18	49.58
T_3	2016 / SPG (V-3)	3.43	22.86	20.36	50.04
T_4	2016 / SPG (V-4)	3.97	26.46	23.50	50.77
T_5	2016 / SPG (V-5)	3.33	22.19	19.82	51.54
T_6	2016 / SPG (V-6)	3.02	20.13	20.47	49.78
T_7	2018 / SPG (HB-1)	3.42	22.79	21.84	49.91
T_8	2018 / SPG (HB-2)	3.88	25.86	20.78	50.29
T_9	2018 / SPG (HB-3)	3.72	24.79	22.30	50.07
T_{10}	2018 / SPG (HB-4)	3.35	22.33	21.55	51.48
T_{11}	2018 / SPG (HB-5)	3.14	20.93	23.12	52.18
T_{12}	2018 / SPG (HB-7)	3.31	22.06	24.43	51.27
T_{13}	2018 / SPG (HB-8)	3.68	24.53	21.51	49.66
T_{14}	2017 / SPG (V-1)	3.21	21.39	23.83	52.98
T_{15}	2017 / SPG (V-2)	3.58	23.86	22.19	51.09
T_{16}	2017 / SPG (V-3)	3.34	22.26	23.86	53.75
T_{17}	2017 / SPG (V-4)	3.33	22.19	24.58	52.83
T_{18}	2017 / SPG (V-5)	4.01	26.73	25.86	55.80
T_{19}	2017 / SPG (V-6)	3.63	24.19	21.78	52.06
T_{20}	2018 / SPG (V-1)	3.31	22.06	24.32	50.87
T_{21}	2018 / SPG (V-2)	3.65	24.53	21.49	51.59
T_{22}	2018 / SPG (V-3)	3.41	22.73	23.83	49.81
T_{23}	2018 / SPG (V-5)	3.28	21.86	21.95	49.94
T_{24}	2018 / SPG (V-6)	3.56	23.73	22.17	50.67
T_{25}	2018 / SPG (V-8)	3.15	20.99	24.05	50.43

Yield per plant (Kg)

The data on yield per plant (Kg) of different genotypes of sponge gourd are presented above. It is evident from the table that there were significant among various genotypes of sponge gourd. The maximum yield per plant (Kg) at maturity time was associated with 2017 / SPG (V-5) (4.01) followed by 2016 / SPG (V-4) (3.97) after that 2018 / SPG (HB-2) (3.88). However the minimum yield per plant (Kg) was with genotype 2016 / SPG (V-6) (3.02). The significant variation in yield per plant might have been due to fruit set percentage, fruit length, number of fruit per vine, fruit weight and fruit width, genetic nature, environmental factor and vigour of the crop and higher uptake of nutrient. [9, 14, 15, 12].

Yield (t/h)

The data on yield t/h of different genotypes of sponge gourd are presented above. It is evident from the table that there were significant among various genotypes of sponge gourd. The maximum yield t/h at maturity time was associated with 2017 / SPG (V-5) (26.73) followed by 2016 / SPG (V-4) (26.46) after that2018 / SPG (HB-2) (25.86). However the minimum yield t/h was with genotype 2016 / SPG (V-6) (20.13). The significant variation in fruit yield might have been due to number of fruits per vine, yield per vine and yield per plot. Similar findings were reported by [6, 1].

Polar diameter (mm) of fruits

The data on polar diameter of fruits of different genotypes of sponge gourd are presented above. It is evident from the table that there were significant among various genotypes of sponge gourd. The maximum polar diameter of fruits at maturity time was associated with 2017 / SPG (V-5) (25.86) followed by 2017 / SPG (V-4) (24.58) after that 2018 / SPG (HB-7) (24.43). However the minimum polar diameter of fruits was with genotype 2016 / SPG (V-5) (19.82). Increasing of fruit yield is mostly influenced by fruit

diameter. The fruit diameter will be high than automatically fruit yield will be also high. The variation in fruit diameter might have been due to genetic factor, environmental factor, hormonal factor and vigour of the crop. The results are in agreement with the finding of [10].

Radial diameter (mm) of fruits

The data on radial diameter of fruits of different genotypes of sponge gourd are presented in Table 3.1 and graphically delineated diameter. The fruit diameter will be high than automatically fruit yield will be also high. The variation in fruit diameter might have been due to genetic factor, environmental factor, hormonal factor and vigor of the crop. The results are in agreement with the finding of [16, 11]. It is evident from the table that there were significant among various genotypes of sponge gourd. The maximum radial diameter of fruits at maturity time was associated with 2017 / SPG (V-5) (55.80) followed by 2017 / SPG (V-3) (53.75) after that 2017 / SPG (V-1) (52.98). However the minimum radial diameter of fruits was with genotype 2016 / SPG (V-2) (49.58). Increasing of fruit yield is mostly influenced by fruit

Conclusion

Based on the results on the present investigation entitled "Evaluation of sponge gourd for fruit yield in Prayagraj agro climatic conditions" this is concluded from the investigation that the Genotype 2017 / SPG (V-5) resulted in higher yield per plant (4.01 Kg), yield t/h (26.73), polar diameter of fruits (25.86) and radial diameter of fruits (55.80) was found to be best in terms of yield of sponge gourd in Allahabad agro-climatic conditions.

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