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Sanjay Kumar Jangde
Department of Horticulture, College of Agriculture (RVSKV) Indore, Madhya Pradesh, India

Rajiv Dixit
Indira Gandhi Krishi Vishwavidyalaya, Krishak Nagar, Raipur, CG, Chhattisgarh, India

RK Jaiswal
Department of Horticulture, College of Agriculture (RVSKV) Indore, Madhya Pradesh, India

Rajeshwari Kurre
Indira Gandhi Krishi Vishwavidyalaya, Krishak Nagar, Raipur, Chhattisgarh, India

Correspondence
Sanjay Kumar Jangde
Department of Horticulture, College of Agriculture (RVSKV) Indore, Madhya Pradesh, India

Assess the economic viability of different variety / hybrid of okra [*Abelmoschus esculentus* (L.) Moench.]

Sanjay Kumar Jangde, Rajiv Dixit, RK Jaiswal and Rajeshwari Kurre

Abstract
The present investigation entitled "Assess the economic viability of different variety / hybrid of okra was conducted at the Research Farm of Department of Horticulture, College of Agriculture, Indore (M.P.) during late *kharif* the year 2015-2016. The experimental materials for the present investigation were comprised of fifteen varieties (Parbhani Kranti, Jhilmil, No.55, Shakti, Arya Mohini, Sahiba, NO.64, Okra Hrita, Sarmili, Hisar Unnat, Sonal, Shaan, Cos.2106, Ns-801 Saarika of the okra. These varieties were sown in experimental field, Randomized Block Design with three replications. Observations were recorded for morphological, phenological, yield and quality parameters were evaluated as per standard procedure. The silent features of the present investigation are as under: The significantly highest marketable fruit yield of 142.64 q/ha and net return of Rs 213960 /ha along with benefit cost ratio 3.27 was obtained under okra variety Saarika. The minimum incidence of both insects and diseases was recorded in variety Saarika and the maximum incidence was noted in Cos.2106.

Keywords: Economic viability, variety / hybrid, okra, *Abelmoschus esculentus* (L.) Moench

Introduction
Okra [*Abelmoschus esculentus* (L.) Moench] belongs to the Malvaceae family. It is a native to tropical Africa where it serves as a staple vegetable crop (Indian Government, 2008; Kochhar, 1986; Hammon and Van Stolen, 1989) [6, 4]. Hammon and Van Stolen (1989) [4] also reported that there are 2,283 accessions out of which 2,029 were collected from the African continent of which 1,769 are from West Africa. The crop is therefore far more heavily represented in West Africa than in any other part of the world (Hammon and Van Stolen, 1989) [4]. It is an annual crop with a life-span ranging from 1 to 5 months depending on the species. The seeds are round, greyish and relatively large (about 1.5 to 3 mm).

The importance of the crop as a vegetable lies in its wide acceptability due mainly to its flavour and viscosity which aids easy consumption of bulky and relatively hard foods like cassava pastes and pounded yam (NIHORT, 1987) [8], in addition to being rich in vitamins A, B and C. The leaves also contain higher quantities of protein (2.7 to 3.0%) than the pods, and a significant amount of riboflavin and folic acid (Martin *et al*., 1979; Adelusi *et al*., 2006; Hegazi and Hamideldin, 2010) [7, 1, 5]. These popular uses of okra have fuelled an increasing demand for the crop, and a search for simple but viable ways of increasing supply of the product, independent of man- power and adequacy of farming conditions. Thus, attention has gradually shifted towards improving the genetic quality of the species through plant breeding and selection.

It is a very wide range of adoptable crop and can be grown with considerable success on a wide range of soils and under variable environmental conditions. In India, it is grown twice in a year for getting regular supply. In the country, a large number of okra varieties are grown, the variation occurs with regards to quantitative and qualitative traits. The plant height, number of primary branches per plant, number of fruits per plant, size of fruit i.e. length as well as weight of fruits are the yield contributing characters while, colour of fruit and fiber content determine the quality of fruit. Chaudhary *et al.* (2006) [2] reported that Nourth Konkan Maharastra the growing of all okra hybrids as well as Antara found profitable. The highest net returns (Rs. 85769 /ha) were obtained due to the cultivation of Rashmi hybrid. All hybrids except Tulsi were more profitable than Antara. Sharma *et al.* (2011) [9] found that Jawaharlal Nehru Krishi Vishwa Vidyalaya Jabalpur Madhya Pradesh the application of80:60:60 kg NPK

per ha recorded the highest net return of Rs. 46,152 /ha and gave maximum benefit: cost ratio of Rs. 2.68.

Materials and Methods

This chapter comprises the details about the materials used and the methods adopted during the course of present investigation entitled "Evaluation of different varieties/hybrids of okra [*Abelmoschus esculentus* (L.) Moench.] under late sown condition of malwa region.'' carried out in late *Kharif* season during the year 2015-16.

Experimental site

The present experiment was laid out in the field of the Research Farm of Department of Horticulture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, College of Agriculture, Indore during Kharif season, 2015-2016. The land topography of the experimental site was almost uniform with an adequate surface drainage. The internal drainage of the experimental was good.

Location and climate

Indore is situated in Malwa plateau region in the Western part of the state at an altitude of 555.5 meters above mean sea level (MSL). It is located at latitude 22.43º N and longitude of 75.66º E. It has sub-tropical climate having a temperature range from 29 ^{0}C – 41 ^{0}C as maximum and 7 ^{0}C – 23 ^{0}C as minimum in summer and winter season, respectively. It is hottest during March to May while coolest in December and January. Relative humidity generally fluctuates between 30 to 85%. In this area, most of the rainfall is received during mid June to early October while winter rains are occasional and uncertain. The average annual rainfall is 941 mm (AICRP, Indore).

Computation of Economics of different treatments:

Several economic indices are available to evaluate the profitability of cropping systems. No single index is capable of giving good comparison of different varieties / hybrids and so a number of indices are used together to assess the economic viability of the system. Since the price of farm products is a quite variable factor, the profitability of the system also changes accordingly. The procedures used for working out economics of different treatments under consideration was as suggested by Yang and Dhondyal (1971) [10]

Gross Monetary Returns (Rs/ha)

Gross returns are the total monetary value of economic produce and byproducts obtained from the crop raised in the different treatments is calculated based on the local market prices.

Cost of Cultivation (Rs/ha)

Cost of cultivation is the total expenditure incurred for raising crop in a treatment. The cost included for this purpose consists of own or hired human labour, owned or hired bullock labour, value of seed, manures, fertilizers, pesticides and herbicides and irrigation charges. A poor farmer may choose a practice with lesser cost of cultivation though it gives lesser profit, because of limited resources.

Net Monetary Returns (Rs/ha)

It is computed by subtracting cost of cultivation from gross returns. It is good indicator of suitability of a cropping system since this represents the actual income of the farmer. Monetary returns for different treatments were calculated with the help of prevailing market rates of produce and different inputs used in the experiments. Net Monetary Returns (Rs/ha) =Gross return (Rs/ha) – Cost of cultivation (Rs/ha)

Benefit cost ratio

It is the ratio of gross returns to cost of cultivation. It is expressed as returns per rupee invested. This index provides an estimate of the benefit a farmer derives for the expenditure have incur in adopting a particular cropping system. Any value above 2.0 is considered safe as the farmer gets Rs. 3.22 for every rupee invested. Benefit cost ratio = Gross return (Rs/ha) / Cost of cultivation (Rs /ha)

Result and Discussion

Higher money value and less cost of cultivation are desirable characters for getting higher returns. Hence, economics of the genotypes was worked out. The data pertaining to economics of different genotypes is depicted in Table 1.

It is revealed from the data obtained that a significantly highest marketable fruit yield of 142.64 q/ha and net return of Rs 1,63,960/ha along with benefit cost ratio 3.27 was obtained under okra genotype Saarika followed by Ns.801 gave fruit yield 138.17 q /ha and net return of Rs 1,57,330/ha with benefit cost ratio of Rs 3.14. While, the lowest marketable fruit yield 108.86 q/ha and net return of Rs 1,32,90/ha along with benefit cost ratio Rs 2.26 was recorded in genotype Cos.2106. Higher money value and less cost of cultivation are desirable characters for getting higher returns. Hence, economics of the treatment was worked out. The date pertaining to economics of different genotypes is depicted in Table 1.

It is revealed form the date obtained that the significantly highest marketable fruit yield of 142.64 q/ha and net return of Rs1,39,960/ha along with benefit cost ratio 3.27 was obtained under okra genotype Saarika followed by Ns-801 gave fruit yield 138.17 q/ha and net return of Rs1,57,330/ha with benefit cost ratio of Rs3.14. While lowest marketable fruit yield 108.86 q/ha and net return of Rs1,13,290/ha along with benefit cost ratio 2.26 was recorded in genotype Cos.2106. Similar results have been reported by Ganeshe *et al*., (1998) [3] reported that the recommended dose of 80 kg N/ha with maximum return of Rs.16293.00.

Table 1: Economics of different genotypes for okra

Treatment symbol	Treatments	Fruit yield (q/ha)	Gross income (Rs/ha)	Expenditure (Rs/ha)	Net income (Rs/ha)	B : C ratio
T_1	Parbhani ranti	117.64	176460	50000	126460	2.52
T_2	Jhilmil	128.41	192615	50000	142615	2.85
T_3	No.55	124.48	186720	50000	136720	2.73
T_4	Shakti	114.47	171195	50000	121195	2.42
T_5	Arya Mohini	124.68	186705	50000	136705	2.73
T_6	Sahiba	122.03	183045	50000	133045	2.66
T_7	NO.64	125.65	188475	50000	138475	2.76

T_8	Okra Hrita	135.02	202530	50000	152530	3.05
T_9	Sarmili	128.52	192780	50000	142780	2.85
T_{10}	Hisar Unnat	129.13	193695	50000	143695	2.87
T_{11}	Sonal	124.13	186199	50000	136199	2.72
T_{12}	Shaan	119.18	178770	50000	128770	2.53
T_{13}	Cos.2106	108.86	163290	50000	113290	2.26
T_{14}	Ns-801	138.17	207330	50000	157330	3.14
T_{15}	Saarika	142.64	213960	50000	163960	3.27

Sale rate of produce was Rs. 1500.00 /q

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