Plant Archives Vol. 17 No. 2, 2017 pp. 1293-1296 ***ISSN 0972-5210***

PERFORMANCE OF GINGELLY VARIETY YLM-66 (SARADA) UNDER RAIN FED CONDITIONS IN THE HAT ZONE (ANDHRA PRADESH), INDIA

V. Govardhan Rao*[1] and P. Venkata Ramana[2]

Asst. Prof (Plant Pathology)[1] and SMA (SS & AC)[2]

College of Horticulture, Dr.Y.S.R. Horticulture University, Parvathipuram-535 504, Vizianagaram-Dist (A.P.), India.

Abstract

The results revealed that the maximum average number of capsules per plant and number of seeds per capsule (103.41 and 70.31) were obtained under improved technology over to farmer's practices (71.99 and 66.36) thus, there were 43.64 per cent more capsules per plant and 7.6 per cent seeds per capsule under improved technology as compared to local check. The maximum average test weight of sesame seeds (3.18 g) was recorded under improved technology over local check (2.66 g). The seed yields of sesame under improved technology ranged between 6.4 to 6.8 q ha-1 with average yield of 6.5 q ha^{-1} which was 53.72 per cent higher over the farmer's practice (4.25 q ha^{-1}). However, maximum average net returns (Rs.12,914 ha^{-1}) as well as benefit cost ratio (2.49) were recorded under improved technologies as compared to farmer's practice (Rs.7,740 ha^{-1} and 2.20).

Key words : YLM-66, sesamum, yield performance, BC ratio.

Introduction

Sesame or gingelly (*Sesamum indicum* L.) commonly known as til (hindi) is an ancient oilseed crop grown in India and perhaps the oldest oilseed crop in the world. It is grown in an area of 7.54 million hectares with a production of 3.34 million tonnes in the world with a productivity of 443 kg ha^{-1}. India is the largest producer of sesame in the world. It also ranks first in the world in terms of sesame-growing area (24%) with about 1.8 million hectares with a total production of 0.76 million tonnes and productivity of 422 kg ha^{-1} (FAI, 2012). The crop is now grown in a wide range of environments, extending from semi-arid tropics and subtropics to temperate regions. Consequently, the crop has a large diversity in cultivars and cultural systems. This probably indicates a great opportunity for a prolonged and higher increase in productivity of sesame. Sesame seeds may be eaten fried, mixed with sugar or in the form of sweat meals and oil is used as a cooking oil in southern India. It is also used for anointing the body, for manufacturing perfumed oils and for medicinal purposes. Sesame cake is a rich source of protein, carbohydrates and minerals, such as calcium and phosphorus. Increase in sesame productivity is about 2% for Ethiopia and India and 2.8% for China in the period of 2000-2011 (FAO, 2012).

In general, average productivity of sesame continues to be lower (144-234 kg ha^{-1}) than expected from agricultural technology for the last 20 years, mainly due to its cultivation on marginal lands, under poor management and without inputs except seed. The major constraints responsible for lower yield are inappropriate production technologies *viz*; broadcast method of sowing, no use of fertilizers and untimely weed management (Khalque and Begum, 1991). The greatest limitations of increasing in productivity of crop are inadequate supply of nutrients and poor production practices are poor in native fertility (Singh and Khan, 2003). The continuous use of local variety and poor production technologies by farmers may not sustain soil fertility, productivity and profitability of sesame crop. In order to realise this opportunity, an analysis is needed of the major current constraints limiting sesame productivity in India.

However, use of improved variety (YLM- 66) and

Author for correspondence : E-mail: vgrao2007@gmail.com

production technologies is required to improve the soil health as well as to achieve sustainable crop productivity. Thus, use of improved production technologies of sesame offers a great scope for increasing productivity and profitability. The yield of sesame can be increased by 21-53% with adoption of improved technologies such as improved variety, recommended dose of fertilizer, weed management and plant protection. Keeping this in view, frontline demonstrations on sesame was undertaken to improve the productivity and profitability of sesame with latest improved production technologies on farmer's fields.

Materials and Methods

The frontline demonstrations were conducted on 50 farmer's fields of five adopted villages of in Rampachodavaramag agency area, East Godavari district, HighAltitude and Tribal area region of Andhra Pradesh during *Rabi* seasons of 2011 to 2016 in rainfed condition on light to medium soil with low to medium fertility status under sesame-gram cropping system. Each demonstration was conducted on an area of 0.40 ha and the same area adjacent to the demonstration plot was kept as farmer's practices. The package of improved production technologies included short duration, phillody (mycoplasma) resistant varieties of sesame, YLM-66 was sown. Seeds were treated with Thiram @ 2.5g kg^{-1} seed for prevention of seed borne diseases and inoculated with PSB @ 20 g kg^{-1} seed for increasing the availability of phosphorus to crop roots. Seed sowing was done between Rabi with a seed rate of 5 kg ha-1 and line sowing with spacing was 45 cm between rows and 10 cm between plants in the row. Recommended dose of fertilizer (60:30:15:40 NPKS kg ha^{-1}) were supplied through urea, single super phosphate and muriate of potash. Full doses of phosphorus, potassium and ½ dose of nitrogen were applied as basal.

The remaining half amount of nitrogen was topdressed in two split doses at 30 DAS and 45 DAS. Weed control was done by used pre-emergence weedicide, Pendimethalin @ 1 kg a.i ha^{-1} and once hand weeding at 25 DAS for effective control of weed. Thinning should be done scrupulously to ensure recommended plant spacing within a row. The first thinning is done invariably 14 days after sowing and the second thinning 21 days after sowing. The crop was harvested 15 after the leaves turn yellow and start dropping while the capsules are still greenish-yellow.

Results and Discussion

The data on yield attributing characters of sesame for 5 years are presented in table 1 revealed that number of capsule per plant under improved variety (YLM-66) and production technology were 134.63, 116.12, 75.45, 96.13 and 96.64 as against local check (farmer's practice) which was being 98.26, 75.63, 35.81, 71.66 and 70.61 during the year 2011, 2012, 2013, 2014 and 2015, respectively.

Percentages increased in number of capsules per plant under improved technology were 37.01, 55.66, 72.22, 31.36 and 36.86 per cent over the local check (farmer's practice). The average number of capsules per plant were 103.41 under improved technology and 71.99 under local check, thus there was 31.42 per cent more capsules per plant under improved technology as compared to local check. Increased number of seeds per capsule, number of capsules per plant, and dry matter production increased with improved technologies (Olowe and Busari, 1994). The average number of seeds per capsule observed in improved production technology was 70.31 as compared to 65.36 in local check. In the year 2011, 2012, 2013, 2014 and 2015, the number of seeds per capsule under improved technology and local check were recorded 75.63 and 71.15,71.54 and 70.53, 62.20 and 60.67, 70.38 and 61.23 and 71.82 and 63.25, respectively. The percentages increased in seeds per capsule under improved technology during these years were 6.3, 1.4, 2.5, 14.9 and 13.5, respectively with and over all average 7.6 seeds per capsule. As regards data on test weight of seed showed that during the years 2011, 2012, 2013, 2014 and 2015, test weight of sesame seeds under improved technology and local check were 3.31 and 2.81 g, 3.18 and 2.72 g, 2.97 and 2.45 g, 3.21 and 2.61 g and 3.23 and 2.72 g, respectively with an average test weight 3.18 g under improved technology and 2.66 g under local check. The per cent increased in test weight under improved technology during above years were found to be 17.8, 16.9, 21.2, 23.0 and 18.8 per cent with an average of 19.5 per cent.

The increased seed yield with improved technologies was mainly because of line sowing, use of *Phytopthora* and *Phyllody* resistant variety, integrated nutrient management and timely weed management. Fertiliser response has been widely studied in other countries and the extent of the response depends on many factors: with high yielding varieties higher fertiliser rates are needed and also in cases of lower soil fertility (Tripathi and Rajput, 2007). Sometimes micronutrients and improvement of cation exchange capacity proved helpful by of humix (Abo-El-Wafa and Abd-El-Lattief, 2006). Hegde (1998) also reported that continuous use of integrated nutrient management to increase the productivity by 36% as

Table 1 : Yield attributing characters of sesame.

Years	Yield attributing characters								
	No of capsule /plant			No. of seeds per capsule			Test weight		
	Demo	Check	%increase	Demo	Check	%increase	Demo	Check	%increase
2011-12	134.6	98.26	37.01	75.63	71.15	6.3	3.31	2.81	17.8
2012-13	116.2	75.63	53.66	71.54	70.53	1.4	3.18	2.72	16.9
2013-14	75.45	43.81	72.22	62.20	60.67	2.5	2.97	2.45	21.2
2014-15	94.13	71.66	31.36	70.38	61.23	14.9	3.21	2.61	23.0
2015-16	96.64	70.61	36.86	71.82	63.25	13.5	3.23	2.72	18.8
Mean	103.4	71.99	43.64	70.31	65.36	7.6	3.18	2.66	19.5

Table 2 : Seed yield of sesame as affected by improved and local practices in farmer's fields.

Years	Area (ha)	Demo (no)	Seed yield (q/ha)		% Increase yield
			Demo	Check	
2011-12	**4**	**10**	6.50	4.4	47.73
2012-13	**4**	**10**	6.80	4.5	48.47
2013-14	**4**	**10**	6.72	3.1	116.77
2014-15	**4**	**10**	6.26	4.5	38.19
2015-16	**4**	**10**	6.40	4.6	37.63
Mean	**4**	**10**	6.53	4.2	53.72

Table 3 : Economics of sesame as affected by improved and local practice.

Years	Cost of cultivation		Net returns		BC Ratio	
	Demo	Check	Demo	Check	Demo	Check
2011-12	6920	6348	11470	6852	2.66	2.08
2012-13	7040	5460	8560	4980	2.21	1.91
2013-14	8075	5560	8919	5384	2.1	1.97
2014-15	9620	8225	14366	7872	2	1.96
2015-16	8500	6500	21254	13612	3.5	3.09
Mean	8031	6419	12914	7740	2.49	2.2

compared to local variety of sesame. Kinman and Stark (1954) found that adoption of improved varieties to increased productivity by 32% as compared to local variety of sesame. Improved technology produced higher seed yield in 2011 to 2015 as compared to local check. The reason for this could be the inter plant competition for the moisture and nutrients which could be more severe under local check demonstration (Farmer's practice). Also, the higher weed infestation under the local check as evident from the higher weed cover and reduced the amount of nutrients and water available to the local check. This agrees with the findings of Imoloame *et al*. (2007), who reported the superiority of row planting over broad casting to control weed and that this factor resulted in considerable yield increased and also grain yield increased significantly.

The economic viability of improved technologies over traditional farmer's practices was calculated depending on prevailing prices of inputs and output costs (Table 3). It was found that cost of production of sesame under improved technologies varied from Rs. 6920 to 9620 ha^{-1} with an average of Rs. 8031 ha^{-1} over farmers practice (local check) varied from Rs. 5460 to 8225 ha^{-1} with an average of Rs. 6419 ha^{-1}. Cultivation of sesame under improved technologies gave higher net return which ranged from Rs 8560 to 21254 ha^{-1} with an average of Rs.12914 ha^{-1} as compared to farmer's practices which recorded Rs. 4980 to 13612 ha^{-1} with average of Rs. 7740 ha^{-1}. Tripathi and Rajput (2007) reported that the highest net returns were found with application of 60 kg N, 30 kg P_2O_5 and 15 kg K_2O ha^{-1}. Similar results also have been reported by Khan *et al*. (2009). The improved technologies also gave higher benefit cost ratio, 2.66, 2.21, 2.10, 2.00 and 3.50 as compared to 2.08, 1.91, 1.97, 1.96 and 3.09 under local check in the corresponding years. The results from the current study clearly brought out the potential of improved production technologies in rainfed condition of Andhra Pradesh in India. To get maximum yield of sesame recommended package of practices should be followed by not following any one management practice yield may be reduced severely and it was also observed that delay in sowing, unbalanced does of fertilizer, untimely weed management and plant protection drastically reduced the grain yield of sesame.

References

Abo-El-Wafa, A. M. and E. A. Abd-El-Lattief (2006). Response of some sesame (*Sesamum indicum* L.) cultivars to fertilization treatments by micronutrients, biofertilizer and humix. *Assiut Journal of Agricultural Sciences*, **37** : 55-65.

Annual Report (2012). *All India Co-ordinated Research Project (ICAR) on Sesame and Niger*, JNKVV campus, Jabalpur (M. P.), pp. 1-272.

Delgado, M. and D. M. Yermanos (1975). Yield component of sesame (*Sesamum indicum* L.) under different population densities. *Econ.Bot*., **29(1)** : 68-78.

F. A. I. (2012). *Fertiliser Statistics*, Fertiliser Association of India, NewDelhi.

F.A.O. (2012). *FAO Agricultural Production Statistics*, New Delhi.

Gopal, K., R. Jagadeswar and G. P. Babu (2005). Evaluation of sesame (*Sesamum indicum* L.) genotypes for their reactions to powdery mildew and phyllody diseases. *Plant Disease Research Ludhiana*, **20** : 126-130.

Imoloame, E. O., N. A. Gworgwor and S. D. Joshua (2007). Sesame (*Sesamum indicum* L.) weed infestation, yield and yield components as influenced by sowing method and seed trait in Sudan Savanna agro-ecology of Nigeria. *African J. of Agric*., **2(10)** : 528-533.

Khalque, M. A. and D. Begum (1991). *Area and production of oilseed crops, 1988-90*. (In) fifteen years of oilseed research and development in Bangladesh. AST/CIDA. 28: 190.

Khan, M. A. H., N. A. Sultana, M. N. Islam and M. Hasanuzzaman (2009). Yield and yield contributing of sesame as affected by different management practices. *American-Eurasian Journal of ScientificResearch*, **4(3)** : 195-197.

Kinman, M. L. and S. M. Stark (1954). Yield and composition of sesame (*Sesamum indicum* L.) as affected by variety and location. *J. A O. Chem. Soc*., **31(3)** : 104-108.197.

Mkamilo, G. S. and D. Bedigian (2007). In: *PROTA (Plant Resources of Tropical Africa/Ressources végétales de l'Afrique tropicale),Wageningen, Netherlands. http://database.prota.org/search.htm.*Accessed 30 November 2008. (Van der Vossen, H. A. M. & Mkamilo,G. S., eds.).

Olowe, V. I. O. and L. D. Busari (1994). Appropriate plant population and spacing for sesame (*Sesamum indicum* L.) in the southern Guinea Savanna of Nigeria. *Trop. Oil Seeds J*., **2** : 18-27.

Padhi, A. K. and R. K. Panigrahi (2006). Effect of intercropping and crop geometry on productivity, economics, energetic and soil fertility status of maize (*Zea mays*)-based intercropping systems. *Indian Journal of Agronomy*, **51(3)** : 174-7.

Singh, P. K., A. Mohammad, V. Madhu, R. L. Srivastava, K. Kumud and N. Ram (2007). Screening and development of resistant sesame varieties against phytoplasma. *Bulletin of Insectology*, **60** : 303-304.

Singh, Raj and M. A. Khan (2003). Response of clusterbean varieties to fertility levels and cropping systems under arid conditions. In : *Advances in Arid Legume Research*. Henry, A., D. Kumar and N. B. Singh (Eds) Scientific Publishers and Indian Society of Arid Legumes, Jodhpur. pp 225-228.

Tripathi, M. L. and R. L. Rajput (2007). Response of sesame (*Sesamum indicum* L.) genotypes to levels of fertilizers. *Advances in Plant Sciences*, **20** : 521-522.