

Assessing the Performance of Chilli (*Capsicum annum* L.) Hybrids TNAU Chilli Hybrid CO 1 and Arka Saanvi in Salem District of Tamil Nadu

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ABSTRACT

India is the world's largest producer, consumer and exporter of chillies in the world. The important states of chilli production are Andhra Pradesh, Orissa, Maharashtra, West Bengal, Karnataka, Rajasthan and Tamil Nadu. In Salem district, area under chilli cultivation is around 1100 ha in the year 2019-20. Among 20 blocks of Salem district, Kolathur block is well known for chilli cultivation in Salem District. Most of the farmers rely upon only the private chilli hybrids, for which they have to spend much more towards seed cost. In this regard, an investigation is required for assessing the performance of high pungent chilli hybrids in Salem district. Hence, an investigation was carried out to assess the performance of high pungent chilli hybrids in Salem district in the year 2021. An on farm trial was conducted in five different locations of Salem district during Kharif season with chilli hybrids Arka Saanvi and TNAU Chilli Hybrid CO 1 with Sierra Hybrid of Private Company namely Mahyco as check hybrid. Results revealed that TNAU Chilli hybrid CO1 recorded highest marketable fruit yield per hectare (24t/ha) followed by Arka Saanvi (21t/ha) which might be due to the more number of marketable fruits per plant in TNAU Chilli hybrid CO1. Farmers preference as well as market preference in Salem District for TNAU Chilli Hybrid CO 1 is more than Arka Saanvi because of its bigger size fruits with more number of fruits with high pungency. With regard to benefit cost ratio, Arka Saanvi and Sierra recorded 2.50 and 1.79 respectively as against 2.71 in TNAU Chilli hybrid CO 1.

Keywords— Chilli, *Capsicum annum*, Hybrids, Arka Saanvi, TNAU Chilli Hybrid CO 1, Performance, On Farm Trial

1. Introduction

Salem district was established during 1790 and it gave birth to Dharmapuri, Krishnagiri, and Namakkal districts subsequently. The geographical area of Salem District is 5245 sq.km. Salem district is geologist paradise, surrounded by hills and the landscape dotted with hillocks. It is known for mangoes, silver ornament, textiles, sago industries, and steel production. Salem has got 20 blocks; Average temperature is 320 C, maximum and 19.6 degree minimum with humidity ranging from 39 to 85%. During South West monsoon, a rainfall of 545 mm and during NE monsoon 564.2 mm was recorded. Net sown area is 22,33,70 ha and area sown more than once 81670 ha. Area under horticultural crops is 39765 ha and area under chilli is 520 ha in Salem District. Chilli is being cultivated in plains as well as in hilly areas too in Salem.

Chilli is an important spice cum vegetable crop which is grown throughout India. It has acquired the status of World's most popular vegetable crop due to its wider adaptability to various agro climatic conditions (Gupta *et al.*, 2015). It is a perennial plant but commonly cultivated as an annual (Rick, 1978) India is the world's largest producer, consumer and exporter of chillies in the world. The important states of chilli production are Andhra Pradesh, Orissa, Maharashtra, West Bengal,

Karnataka, Rajasthan and Tamil Nadu. Chillies are used as an ingredient to add flavour, pungency and colour to most dishes. In Salem district, the area under horticultural crops is 39765 ha and area under chilli cultivation is around 1100 ha in the year 2019-20. Among 20 blocks of Salem district, Kolathur block is well known for chilli cultivation in Salem District.

Generally diverse parents are expected to give high hybrid vigour and it is also often possible to combine desired alleles in regular fashion without waiting for longer term (Shankar *et al.*, 2015). Hence, usually hybrids show better fitness and breeding value than their parents. Higher yield and better fruit quality are universally desired (Triveni *et al.*, 2017 and Vilas *et al.* 2015). Private hybrids are ruling in the market as well as among the farmers though these hybrids show less pungency. But the cost of private hybrid seeds is so high which accounts more proportion of the farmers expenditure towards cost of cultivation. Hence, an investigation is needed to assess the performance of high pungent chilli hybrids Arka Saanvi and TNAU chilli hybrid CO 1 in the farmers fields of Salem district. Similar works were done by Malathi *et.al.* (2021) in chilli, Malathi *et.al.* (2021) in tomato and Rajamanickam and Arokiamary (2022) in moringa.

2. Experimental Methods or Methodology

Chilli is also known as hot pepper or pimento. It is a self pollinated crop and chasmogamous in nature in which flower opens only after pollination. However 2 to 96% out crossing was observed under open pollination by means of insects (Hasanuzzamman *et al.* (2012). Chasmogamy is a plant reproductive mechanism in which pollination occurs in chasmogamous flowers (cross-pollinated have the advantage of sexual reproduction between two different parents, resulting in sexual recombination and genetically distinct seeds). Apart from its traditional use, it found its place in pharmaceutical industries (due to the presence of Capsaicin) for therapeutic and prophylactic and ayurvedic medicine and processed food industries as source of natural colour extractant (due to the presence of the biochemical Capsanthin) in the food items. It is considered as a vitamin capsule as they are excellent source of vitamin A, C and E (Durust *et al.* 1997). To meet the high demand of chilli due to increase in population, for increasing the productivity of the crop, hybrids should be considered for cultivation. The hybrid chilli plant yields 61% higher as compared to open pollinated varieties (Prasad *et al.* 2019 and Malathi and Veeraragavathatham (2004)).

Hence, this investigation had been carried out to assess the per se performance of high pungent chilli hybrids Arka Saanvi and TNAU chilli hybrid CO 1 in the farmers fields of Salem district. Primary data was collected on various aspects of chilli cultivation. A field experiment was conducted as an on farm trial in five different locations of Kolathur village and Veerapandy blocks in Salem district during Kharif season of 2021 in chilli using hybrids Arka Saanvi and TNAU Chilli Hybrid CO 1 with Sierra Hybrid of Mahyco (drought and powdery mildew tolerant hybrid with medium pungency fruits of more than 10 cm long and diameter of 1.1 to 1.3 cm) as check hybrid. The mean performance of different traits such as plant height, fruit length, fruit girth, fruit weight, number of fruits per plant, fruit yield per hectare, net returns per hectare and benefit cost ratio have been recorded and data was subjected to statistical analysis (Panse and Sukhatme, 1985).

3. Results and Discussion

The results (Table 1.) showed that TNAU chilli hybrid CO 1 recorded highest individual fruit weight of 27 g followed by Arka Saanvi (25g). TNAU chilli hybrid CO 1 recorded an individual fruit weight of 27g but higher individual fruit weight (28g) was recorded by Sierra hybrid. Arka Saanvi recorded lesser fruit weight of 25g.

The plants of TNAU chilli hybrid CO 1 were medium tall and less spreading (83 cm plant height), fruits pendent with length of 11 cm and fruit girth of 1.15 cm. The unripe fully matured fruits of TNAU chilli hybrid CO 1 were light green in colour, elongated, tapering towards the tip and 11 cm long with more pungency. The fruits were moderately resistant to fruit rot disease throughout the crop duration of around 210 days.

The special characters of Arka Saanvi were a high yielding chilli F1 hybrid suitable for green and dry chilli market. The plants were medium tall & spreading (80 cm plant height), fruits pendent with length of 8.2 cm and fruit girth of 1.2 cm. The fruits were firm, medium pungent, green colour and turned red on maturity, surface was smooth turn to medium wrinkled on maturity and tolerant to chilli leaf curl virus.

Regarding yield attribute, TNAU Chilli hybrid CO1 recorded highest yield per hectare (24t/ha) followed by Arka Saanvi (21t/ha) which might be due to the more number of fruits per plant in TNAU Chilli hybrid CO1 hybrid. Farmers preference as well as market preference in Salem District is more for TNAU Chilli Hybrid than Arka Saanvi because of its bigger size fruits with more number of fruits of high pungency.

Regarding BC ratio, Arka Saanvi and Sierra recorded 2.50 and 1.79 respectively as against highest BC ratio of 2.71 in TNAU Chilli hybrid CO 1.

Table 1. Per se performance of different hybrids of chilli in Salem Districts

Technology Option	Plant height (cm)	Fruit length (cm)	Fruit girth (cm)	Fruit weight (g)	Number of fruits per plant	Yield (green chilli) (t/ha)	Net Returns(Rs. in lakh./ha)	B:C ratio
Technology 1 Arka Saanvi	80	8.2	1.20	25.0	210	21.0	2.50	2.19
Technology 2 TNAU Chilli hybrid CO1	83	11.0	1.15	27.0	235	24.0	3.50	2.71
Farmers Practice Sierra hybrid	93	11.2	1.25	28.0	175	17	1.90	1.79
Mean	85.33	10.13	1.19	26.67	206.67	20.67		
CD5%	2.23	0.25	0.06	1.81	4.5	0.64		
CD1%	3.24	0.36	0.08	2.64	6.54	0.93		
SEd	0.97	0.11	0.03	0.79	1.95	0.28		
CV(%)	1.79	1.66	3.34	4.66	1.49	2.13		

The plants of TNAU Chilli Hybrid CO 1 showed profuse flowering and continuous fruit setting characters with moderately resistance to fruit rot disease in Salem District. The similar results were recorded in Chilli hybrid CO1 in on farm trials conducted in Salem district (*Malathi et.al. 2021*). Arka Saanvi showed medium pungency with tolerance to chilli leaf curl virus. But both are high yielding hybrids suitable for green chilli fruits in Salem District. The same results are similar to the results obtained from the evaluation of tomato hybrids in Salem District (*Malathi and Kohila, 2021*)

CONCLUSION

In Salem District of Tamil Nadu the chilli hybrid namely TNAU chilli hybrid CO 1 and Arka Saanvi recorded higher fresh green fruit yield of 24.0 t/ha and 21.0 t/ha respectively and also highest number of fresh fruits per plant (235) whereas the private hybrid recorded highest individual fruit weight (28g) with lesser number of fruits (175) and lesser marketable fruit yield (17t/ha). TNAU chilli hybrid CO 1 is suitable for chilli growing farmers of Salem district to get higher yield as well as higher net income and benefit cost ratio in chilli.

References

1. Durusut. N.D, Sumengen and Y.Durusut (1997) Ascorbic acid and element content of Trabzon (Turkey), J. of Agric. Food. Chemistry, vol. 45 :2085- 2087

2. Gupta. A.J., Chattoo, M.A. and Lal, S. 2015. Drip irrigation and fertigation technology for improved yield, quality, water and fertilizer use efficiency in hybrid tomato. *Journal of agri-search* 2(2):94-99.
3. Hassanuzzaman M, M.A.Hakkim, J.Fersdous, M.M.Islam, L.Rahman (2012) Combinig ability and heritability analysis for yield and yield attributing characters in chilli landraces. *Plant Omics*.5(4):337
4. Malathi. G, and D. Veeraragavathatham (2004) *Per se* performance and heterosis of two hybrids of chilli (*Capsicum annuum* L. for qualitative traits in three different seasons. *Capsicum and Eggplant Newsletter*, vol. 25, pp. 65-68
5. Malathi. G and P.Kohila (2021) Evaluation of tomato hybrids in Salem district of Tamil Nadu *J. of Krishi Vigyan* 10 (1) : 328-331
6. Malathi G, P.S.Kavitha, R.Vijayan, M.Vijayakumar, and N. Sriram (2021) *Per se* performance of hybrid chillies (*Capsicum annuum* l.) TNAU Chilli Hybrid CO1 and Arka Meghana in Salem district of Tamil Nadu In *International Advanced Research Journal in Science, Engineering and Technology* 8(8) : 488-490
7. Malathi G, Vijayan R, Vijayakumar M, Kohila P and N. Sriram (2021) Assessment of *per se* performance of chilli (*Capsicum annuum* L.) hybrids in Salem District of Tamil Nadu In *International Advanced Research Journal in Science, Engineering and Technology* 8(8) : 480-482
8. Malathi G, M.Vijayakumar, P.Kohila, M.Malarkodi and S.Suganyakanna (2021) Assessment of *per se* performance of tomato (*Solanum lycopersicum* L.) hybrids TNAU Tomato Hybrid CO4 and Arka Vishesh in Salem District of Tamil Nadu In *International Advanced Research Journal in Science, Engineering and Technology* 8(8) : 483-487
9. Pansem V.G. and Sukhatme, P.V. 1985. Statistical methods of agricultural workers. Indian Council of Agricultural Research (ICAR), 87-89.
10. Prasad Basavaraj Purad, H.Usha Nadhini Devi, T.Arumugam and M.Karthikeyan (2019) Growth and performance of different chilli genotypes for yield and yield attributing characters. *J. of Pharmaco and Phytochem* 8(4), pp. 210-213
11. Rajamanickam C and S.Arokiamary (2022) Assessment of moringa varieties for growth and yield characters *J. of Krishi Vigyan* 11 (1) : 7-10
12. Rick, C.M., 1978. The tomato. *Scientific American*. 239:76-87.
13. Shankar. A, Reddy, R.V.S.K., Sujatha. M, and Pratap. M, 2015. Development of superior F₁ hybrids for cmmercial exploitation in tomato (*Solanum lycopersicon* L.), *International Journal of Farm Science*, Vol.4(2):58-69.
14. Triveni. D, Saidaiah, P., Ravinder Reddy. K, and Pandravada, S.R., 2017. Mean performance of the parents and hybrids for yield and yield contributing traits in tomato (*Solanum lycopersicon* L.),” *International Journal of Current Microbiology and applied Sciences*, Vol.6(11):613-619.
15. Vilas. C.A, Rana, M.K, Dhankar. S.K, Vikash Kumar and Yadav, N, 2015. Studies on combining ability analysis for yield and yield related traits in tomato (*Solanum lycopersicon* L.), *Enzyme Engineering*, Vol.4(2):1-5.