Journal of AgriSearch 4(3):179-183
An Open Access International Peer Reviewed Quarterly
ISSN : 2348-8808 (Print), 2348-8867 (Online)
http://dx.doi.org/10.21921/jas.v4i03.9018

Evaluation of Finger Millet Varieties under Rainfed Condition of Eastern India

MK SINGH*, VINOD KUMAR[1] AND SHAMBHU PRASAD
Department of Agronomy, Bihar Agricultural University, Sabour, Bhagalpu, Bihar, India

ARTICLE INFO

Received on	:	10.08.2017
Accepted on	:	31.08.2017
Published online	:	05.09.2017

ABSTRACT

A field experiment was carried out during the kharif of 2014 and 2015 to evaluate the yield potential, economics and thermal utilization in eleven finger millet varieties under the rainfed condition of the sub-humid environment of South Bihar of Eastern India. Results revealed that the significantly higher grain yield (20.41 q ha^{-1}), net returns (Rs 25301) and B: C ratio (1.51) was with the finger millet variety 'GPU 67' but was being at par to 'GPU28'and 'RAU-8', and significantly superior over remaining varieties. The highest heat units (1535.1°C day), helio-thermal units (7519.7°C day hours), phenothermal index (19.4 °C days day^{-1}) were recorded with variety 'GPU 67' followed by 'RAU 8' and 'GPU 28' and lowest in 'VL 149' at 50 % anthesis stage. Similarly, the highest growing degree days (2100 °C day), helio-thermal units (11035.8 °C day hours) were noted with 'GPU 67' followed by 'RAU 8' and 'GPU 28' at maturity. The highest heat use efficiency (0.97 kg ha^{-1} °C day) and helio-thermal use efficiency (0.19 kg ha^{-1} °C day hour) were in 'GPU 67' followed by 'VL 315'.

Key words: Finger millet, varieties, climate resilience, crop adaptation

INTRODUCTION

Selective utilization of crops and varieties in recent times have threatened agrobiodiversity leading to rapid erosion of natural resources and consequently affecting nutritional security (Singh *et al.,* 2008). One of the possible pathways for conservation of such neglected agrobiodiversity resources is to bring them into use thereby making them viable crops within the contemporary social and economic context (Singh *et al.,* 2009). Climate change portends less and erratic rain, more heat, reduced water availability and increased malnutrition (Prakash *et al.,* 2017). Under such situation finger millet crop can withstand these challenges and produce multiple securities (food, fodder, health, nutrition, livelihood and ecological). All these qualities of millet farming system make them climate change compliant crops and helping in mitigation of climate change. Basically finger millet (Eleusine coracana) is extreme drought tolerant tropical crop mostly suitable for dry regions. Finger millet follows a predictable pattern of growth from planting through physiological maturity. Meteorological indices viz., growing degree days (GDD), heliothermal unit (HTU), and photo-thermal unit (PTU) based on air temperature, changes phenological behavior and growth parameters Due to variations in daily minimum and maximum temperatures from year to year and between locations, the number of days from planting to physiological maturity varies (Prakash *et al.,* 2015). These meteorological indices are better system to estimate the crop development. Climatic events viz, temperature is one of the most important parameter that affects the growth, development and phenology of the crop (Kalra *et al.,* 2008). Influence of temperature on phenology and yield of crop can be studied under field condition through accumulated heat unit system (Pandey *et al.,* 2010). Plants have a different heat requirement to attain the certain growth stages (Prasad *et al.,* 2017). A change in optimum temperature during different phenological stage of a crop adversely affects the initiation and duration of different phenophases and finally crop yield. It is therefore indispensable to have knowledge of correct duration of phenophases in a particular environment and their association with yield yield, hence keeping these things in view, the present investigation was undertaken.

MATERIALS AND METHODS

Field experiment was carried out at Dry land Research Station, Krishi Vigyan Kendra, Munger during kharif season of 2014 and 2015 to evaluate the yield potential, economics and thermal utilization of finger millet varieties under the rainfed condition of sub-humid sub-tropical environment of South Bihar. The sandy-loam soil of the experimental field was low in organic carbon (0.26%), available N (182.5 kg/ha), and available P_2O_5 (19.5 kg/ha) and medium in K_2O (168.6 kg/ha) content, having pH 6.8. Experiment was laid out in randomised block design and replicated thrice with eleven finger millet varieties viz. VL 149, VL 315, VL324, GPU 28, GPU 45, GPU 67, A 404, JWM 1, BM 2, RAU 3 and RAU 8(check). Seed are sown in line at 22.5 cm on 10th July 2014 and 1st July 2015 and Fertilizer dose of 50 kg N, 40 kg P_2O_5 and 25 kg K_2O ha^{-1} was applied. Full dose of Phosphorus as di-ammonium phosphate (DAP) and potassium as murate of potash (MOP) were applied as basal. Nitrogen as urea was applied in 3 splits, 1/3 at sowing as basal application, 1/3 at tillering after rains and remaining 1/3 at boot leaf stage. The grain, stover and biological yield were recorded as per treatments and expressed in q ha^{-1}. Meteorological data, viz., rainfall, relative humidity, maximum and minimum temperature, bright sunshine hours were recorded from

[1]Krishi Vigyan Kendra, Munger, Bihar Agricultural University, Bihar, India
*Corresponding Author Email: mahesh.agro@gmail.com

Agrometeorological observatory, Bihar Agricultural University, and District Agriculture Office (DAO) Munger. Total precipitation recorded during the crop growing season in 2014 and 2015, was 512.8 and 777.8 mm, respectively. Dry spell affected the crop at dough stage in 2014 whereas, during 2015 at flowering and dough stage (23 August-19 Sep). Other cultural operations and plant protection measures were followed as per the recommendations.

Agrometeorological indices

Agrometeorological indices viz. Growing degree days (GDD), helio-thermal units (HTU), pheno-thermal index (PTI), heat use efficiency (HUE), and helio-thermal use efficiency were computed using the daily meteorological data. Base temperature of 10 oC was used for computation of GDD on daily basis (Leong and Ong, 1983). The Agro meteorological indices were computed during different growth phases (tiller stage, flage leaf stage, anthesis stage, and at maturity) by adopting the procedure laid out by Rajput (1980).

Growing Degree Days (GDD)

Cumulative heat units (HU) were determined by summing the daily mean temperature above base temperature and are expressed in oC day. The GDD accumulated by the crop for different phenological stages were computed as under:

$$\text{GDD}\ (^{\circ}\text{C day}) = \sum_{a}^{b} \left(\frac{T_{max} + T_{min}}{2} - T_b \right)$$

Where,

a = Date of start of a phenophase;

b = Date of end of the phenophase

T_{max} = Daily maximum temperature (°C);

T_{min} = Daily minimum temperature (°C)

T_b = Minimum threshold/base (°C)

Heliothermal unit (HTU)

HTU for a day represent the product of heat unit and bright sunshine hours for that day and are expressed in oC day hours. The index HTU serves to be effective in taking into account and expressing the effect of varying ambient temperature on the duration between the phenological events for comparing the crop response to the ambient temperature between phenological stages. Helio-thermal unit was calculated using the formula given by Rajput (1980). Sums of HTU for particular phenophases of interest were determined according to the equation:

HTU (°C day hours) = Σ (HU x BSS) Where, BSS = Bright sunshine hrs

Phenothermal Index (PTI)

Phenothermal index (PTI), the ratio of degree days to the number of days between two phenological stages was calculated as per following formula (Sastry and Chakravarty, 1982).

$$\text{PTI}\ (^{\circ}\text{C days day}^{-1}) = \frac{\text{Degree days consumed between two phenological stages}}{\text{Number of days between two phenological stages}}$$

Heat use efficiency (HUE):

HUE was calculated by using the formula:

$$\text{HUE}\ (\text{kg ha}^{-1}\ ^{\circ}\text{C day}) = \frac{\text{Yield / Total dry matter (kg ha}^{-1})}{\text{Accumulated GDDs (oday)}}$$

Helio-thermal use efficiency (HTUE):

HTUE for grain and total dry matter was obtained as under:

$$\text{HTUE}\ (\text{kg ha}^{-1}\ \text{oC day hour}) = \frac{\text{Yield / Total dry matter (kg ha}^{-1})}{\text{Accumulated HTU (oday hour)}}$$

RESULTS AND DISCUSSION

Crop weather conditions

The total precipitation recorded during the crop growing season in 2014 and 2015, was 512.8 and 777.8 mm, respectively. In the first year 2014, the amount of precipitation was less where equal distribution of precipitation occurred with 27 rainy days whereas, during second year 2015 total crop season rainfall was more 777.8 mm with 30 rainy days and fluctuated variably high during crop growing period. Dry spell affected the crop at dough stage in 2014 whereas, during 2015 at flowering and dough stage (23rd August-19th Sep) and created stress environment which resulted lower yield. Well distributed rainfall throughout the crop growth period of 2014 resulted in lower mean air temperature and sunshine hours as compared to 2015.

Agrometeorological indices

The agrometeorological indices (GDD, HTU and PTI) during different phenophases of finger millet varieties are presented in Table 1. Highest values of heat units (586.1 °C day), helio-thermal units (3224.5 °C day hours), pheno-thermal index (16.4 oC days day-1) were noticed in variety 'RAU 8' followed by GPU 28 and A404 this was due to late tillering in these varieties.

The panicle initiation stage highest heat units (1273.1 °C day), heliothermal units (6190.2 °C day hours), phenol-thermal index (18.7 °C days day-1) were noticed in variety 'GPU 67' followed by 'RAU 8' and 'GPU 28' this was due to higher number of days taken to panicle initiation stage by these varieties. At 50 % anthesis stage the highest heat unit (1535.1 °C day), heliothermal units (7519.7 °C day hours), phenothermal index (19.4 °C days day^{-1}) were noticed in variety 'GPU 67' followed by 'RAU 8', 'A404' and 'GPU 28'. At maturity stage the highest heat units (2100 °C day), heliothermal units (11035.8 °C day hours) were noticed in variety 'GPU 67' followed by 'GPU 28' and 'RAU 8' and lowest in 'RAU 3'. It might be due to longer duration of these cultivars (Prakash *et al.*, 2017). The highest heat use efficiency (0.97 kg ha^{-1} °C day) and Heliothermal use efficiency (0.19 kg ha^{-1} °C day hour) were noticed in variety 'GPU 67' followed by 'VL 315', VL 149 and 'GPU 45'

Growth attributes

The growth characters viz., plant height, no of tillers plants^{-1} was significant. The tallest plant (111 cm) was in variety 'GPU 28' which was on par to 'RAU 3' and 'RAU 8' and significantly more over remaining varieties. The number of tillers plants-1 was significantly higher (4.26) in 'RAU 8' which remained at par to all the varieties except 'BM 2', 'A 404' and 'VL 324'. This might be due to better growing conditions such as temperature, light, humidity and rainfall to fully exploit genetic potentiality of crop (Salunke *et al.*, 2003). The

Table1: Meteorological indices and phenophases occurrence of finger millet varieties (mean data 2014 and 2015)

Varieties	Active tillering			Panicle Initiation			50% Anthesis			Harvest stage			HUE (kg ha-1 ºC day)			HTUE (kg ha-1 º C day hour)		
	HU	HTU	PTI	HU	HTU	PTI	HU	HTU	PTI	HU	HTU	PTI	Grain	Straw	Biological	Grain	Straw	Biological
VL 149	489.5	2720.2	16.1	1005.4	5055.8	18.8	1264.8	6199.6	18.5	1877.2	9733.0	18.3	0.93	1.91	2.85	0.18	0.37	0.55
VL 315	508.6	2825.7	16.2	1050.1	5299.4	18.7	1302.2	6332.7	18.9	1861.4	9600.2	18.2	0.96	1.96	2.91	0.19	0.38	0.56
VL324	489.5	2720.2	16.1	1050.4	5358.4	18.7	1283.1	6234.7	18.6	1853.3	9523.3	18.4	0.93	2.03	2.95	0.18	0.39	0.57
GPU 67	527.1	2906.8	16.2	1273.1	6190.2	18.7	1535.1	7519.7	19.4	2099.8	11035.8	16.3	0.97	1.82	2.80	0.19	0.35	0.53
A 404	547.3	3053.7	16.3	1246.2	6113.7	18.6	1525.6	7480.0	18.6	1893.4	9902.2	17.6	0.76	1.72	2.48	0.15	0.33	0.47
JWM 1	527.1	2906.8	16.2	1050.1	5299.4	18.7	1302.2	6332.7	18.7	1888.7	9858.3	18.1	0.78	1.71	2.49	0.15	0.33	0.48
BM 2	547.3	3053.7	16.3	1237.3	6080.6	18.6	1495.2	7293.8	18.2	1937.1	10156.8	17.8	0.81	1.68	2.49	0.15	0.32	0.47
RAU 3	470.6	2542.7	16.1	1031.4	5195.0	18.7	1283.1	6234.7	18.6	1827.0	9319.6	18.4	0.86	1.99	2.85	0.17	0.39	0.56
RAU 8	586.1	3224.5	16.4	1255.1	6128.8	18.6	1535.1	7519.7	19.3	2027.2	10674.9	16.7	0.92	1.92	2.84	0.17	0.36	0.54
GPU 28	547.3	3053.7	16.3	1255.1	6128.8	18.6	1515.5	7439.4	19.1	2051.5	10825.0	16.8	0.91	1.67	2.58	0.17	0.32	0.49
GPU 45	508.6	2825.7	16.2	1145.5	5788.8	18.7	1398.3	6765.6	18.7	1901.3	9911.7	18.0	0.92	1.72	2.65	0.18	0.33	0.51

Note : Measuring units of HU (°C days), HTU (°C days hr) and PTI (°C days day-1)

significantly highest days taken to 50% anthesis in 'RAU 8' (81 days) but was at par to 'GPU 67', 'GPU 28' and 'A 404' (Table 2). The days taken to maturity were also varies significantly and in 'GPU 67' was maximum (111 days) which was at par to 'GPU 28' and 'RAU 8'. Similar reports has been reported by (Prakash *et al.,* 2017) in his field investigation.

Yield attributes and yield

Yield parameters i.e. number of finger ear^{-1}, finger length, finger weight test weight, grain and stover yield differed significantly among the finger millet varieties (Table 3). The finger millet variety 'GPU 28' recorded significantly more number of finger ear^{-1} (7.33) but was at par to 'GPU 67' and 'GPU 45'. The longer finger was noticed in variety 'GPU 28' (9.60 cm) but at par to 'VL 149' (8.91 cm) and 'GPU 67'(8.88 cm) and these were superior over other varieties.

Lowest finger size was noticed in variety 'BM 2'. The finger weight was significantly higher 10.27 g) in 'GPU 28' which remained at par to 'GPU 67' (10.18 g) and both were superior over other varieties. The test weight of finger grains differs significantly and highest in 'GPU 28' (3.07 g) but was at par to all other varieties except 'A 404'. Average grain yield of finger millet varieties varies significantly. Significantly higher grain yield (20.41 q ha$^{-1)}$ was in variety 'GPU 67' which was comparable to 'RAU 8' (18.63 q ha^{-1}) and 'GPU 28' (18.72 q ha^{-1}) but superior over other varieties. The higher yield may be due to more accumulation heat units, heliothermal units resulted better yield attributes and yield, and similar finding was suggested in sorghum by Salunke (2003).

Straw yield was significantly higher in 'RAU 8' (38.95 q ha^{-1}) which was remained comparable to 'GPU 67' , 'VL 324' and VL 315 but superior over other varieties. That is the result of better growth, dry matter production and more number of tillers plant^{-1} and leaf area was recorded more with the respective varieties (Kumar *et al.,* 2015). The growth duration reflected in attributes like green leaves/plant, dry matter production, which contributed better straw yield. (Bahar *et al.,* 2015 and Prakash *et al.,* 2017).

Economics

Significantly higher net return (Rs 25,301) and B: C ratio (1.51) was in 'GPU 67' which was at par to RAU-8 but was significantly more than remaining varieties (Table 4). This might be due the higher yield associated with the respective cultivars during the experimentation. The similar results were also reported by several research workers in their field investigation (Prakash *et al.,* 2017).

CONCLUSION

It may be concluded from the above study that the finger millet the varieties GPU 67 produced highest yield followed by RAU 8 and GPU 28, more profitable and recommended for cultivation under the rainfed region of south Bihar.

Table 2: Growth attributes of finger millet varieties during 2014 and 2015

Varieties	Growth attributes of finger millet											
	Plant height (cm)			No of tillers plant^{-1}			50 % Anthesis (days)			Maturity (days)		
	2014	2015	Mean	2014	2015	Mean	2014	2015	Mean	2014	2015	Mean
VL 149	89.65	102.00	95.83	4.29	4.23	4.26	66.00	67.00	66.50	99.33	101.00	100.17
VL 315	94.57	98.34	96.46	3.73	3.44	3.59	67.67	68.67	68.17	98.33	100.33	99.33
VL324	94.97	97.50	96.24	3.43	3.14	3.29	67.33	68.00	67.67	97.02	100.00	98.51
GPU 67	98.45	98.53	98.49	4.25	4.02	4.14	80.00	81.00	80.50	111.67	117.67	114.67
A 404	92.56	96.52	94.54	3.28	3.16	3.22	80.00	81.00	80.50	105.33	98.33	101.83
JWM 1	90.23	93.60	91.92	3.64	3.62	3.63	68.00	69.00	68.50	102.67	99.33	101.00
BM 2	89.75	92.30	91.03	3.51	3.54	3.53	79.00	79.33	79.17	104.33	103.67	104.00
RAU 3	109.52	108.65	109.09	3.46	3.39	3.43	67.33	68.00	67.67	95.67	98.33	97.00
RAU 8	100.25	105.60	102.93	4.25	4.26	4.26	80.00	81.00	80.50	109.67	110.00	109.84
GPU 28	112.00	110.52	111.26	3.94	3.75	3.85	78.67	80.33	79.50	110.00	113.00	111.50
GPU 45	97.85	100.20	99.03	4.06	3.99	4.03	72.67	74.00	73.34	99.67	103.33	101.50
CD (P=0.05)	10.43	10.64	10.54	0.70	0.87	0.79	1.38	0.88	1.13	2.44	2.70	2.57

Table 3: Yield attributes of finger millet varieties during 2014 and 2015

Varieties	Yield attributes											
	No of Fingers ear^{-1}			Earhead length (cm)			Finger weight (g)			Test weight (g)		
	2014	2015	Mean	2014	2015	Mean	2014	2015	Mean	2014	2015	Mean
VL 149	6.30	6.50	6.40	8.95	8.87	8.91	8.70	8.62	8.66	2.95	3.01	2.98
VL 315	5.76	5.68	5.72	7.60	7.48	7.54	6.95	6.82	6.89	2.91	2.98	2.95
VL324	6.45	6.34	6.40	7.20	7.25	7.23	6.57	6.31	6.44	2.94	2.96	2.95
GPU 67	6.34	7.20	6.77	8.30	9.45	8.88	10.12	10.24	10.18	3.06	3.04	3.05
A 404	5.72	5.64	5.68	6.35	5.42	5.89	6.94	6.80	6.87	2.78	2.75	2.77
JWM 1	5.36	5.45	5.41	5.86	5.40	5.63	5.67	5.95	5.81	2.89	2.84	2.87
BM 2	5.72	5.78	5.75	5.61	5.60	5.61	5.87	5.76	5.82	2.68	2.79	2.74
RAU 3	5.87	5.62	5.75	6.54	5.74	6.14	7.21	5.62	6.42	2.95	2.92	2.94
RAU 8	5.74	5.85	5.80	6.67	6.80	6.74	8.20	7.87	8.04	2.85	2.88	2.87
GPU 28	6.90	7.75	7.33	9.32	9.87	9.60	9.98	10.56	10.27	3.07	3.06	3.07
GPU 45	6.75	6.74	6.75	7.76	7.45	7.61	9.12	8.96	9.04	2.97	3.01	2.99
CD (P=0.05)	0.64	0.67	0.66	0.75	0.78	0.77	0.68	0.75	0.72	0.23	0.26	0.25

Table 4: Yield and economics of finger millet varieties during 2014 and 2015

Varieties	Grain yield (q ha^{-1})			Straw yield (q ha^{-1})			Harvest index (%)			Net return (Rs ha^{-1})			B:C Ratio		
	2014	2015	Mean	2014	2015	Mean	2014	2015	Mean	2014	2015	Mean	2014	2015	Mean
VL 149	18.74	16.31	17.53	36.01	35.76	35.89	34.26	31.33	32.80	22136	18426	20281	1.32	1.1	1.21
VL 315	18.29	17.26	17.78	36.67	36.13	36.40	33.48	32.34	32.91	21910	19961	20936	1.31	1.19	1.25
VL 324	18.91	15.37	17.14	37.90	37.22	37.56	33.33	29.26	31.30	22967	17455	20211	1.37	1.04	1.21
GPU 67	21.23	19.58	20.41	38.50	37.90	38.20	35.49	34.07	34.78	26627	23974	25301	1.59	1.43	1.51
A 404	16.03	12.86	14.45	32.75	32.24	32.50	32.87	28.47	30.67	17103	12190	14647	1.02	0.73	0.88
JWM 1	16.07	13.42	14.75	32.60	32.02	32.31	33.06	29.53	31.30	17114	12968	15041	1.02	0.77	0.90
BM 2	17.55	13.77	15.66	32.95	32.25	32.60	34.79	29.94	32.37	19444	13568	16506	1.16	0.81	0.99
RAU 3	17.87	13.32	15.60	36.73	36.09	36.41	32.82	27.04	29.93	21059	14035	17547	1.26	0.84	1.05
RAU 8	20.04	17.22	18.63	39.29	38.61	38.95	33.82	30.90	32.36	25080	20637	22859	1.5	1.23	1.37
GPU 28	19.91	17.52	18.72	34.81	33.50	34.16	37.02	34.33	35.68	24384	18784	21584	1.45	1.12	1.29
GPU 45	19.30	15.67	17.49	33.57	31.90	32.74	36.71	32.94	34.83	22495	15213	18854	1.34	0.91	1.13
CD(P=0.05)	1.97	2.08	2.03	2.91	2.80	2.86	3.02	3.41	3.22	3115	3192	3154	0.19	0.19	0.19

REFERENCES

Bahar AH, Adam KI and Ali SAM. 2015. Effect of variety and sowing date on performance of rainfed sorghum (*Sorghum bicolor* L.) grown at Zalingei Locality in Darfur, Sudan. *Journal of Agricultural Science and Engineering* **1**(1): 22-27.

Kalra N, Chakraborty D, Sharma A, Rai HK, Jolly M, Chander S, Kumar RP, Bhadraray S, Barman D, Mittal RB, Lal M and Sehga M. 2008. Effect of increasing temperature on yield of some winter crops in northwest India. *Current Science* **94**(1): 82-88.

Kumar A, Pandey V, Shekh AM and Kumar M. 2008. Growth and yield response of soybean (*Glycine max* L.) in relation to temperature, photoperiod and sunshine duration at Anand, Gujarat, India. *Journal of Agronomy* **1**(2): 45-50.

Leong SK and Ong CK. 1983. The influence of temperature and soil waster deficit on the development and morphology of groundnut (*Arachis hypogaea* L.). *Journal of Experimental Botany* **34**: 1551-1561.

Pandey I B, Pandey RK, Dwived DK and Singh RS. 2010. Phenology, heat unit requirement and yield of wheat (*Triticum aestivum*) variety under different crop growing environment. *The Indian Journal of Agricultural Sciences* **80** (2): 136-140.

Prakash V, Mishra JS, Kumar R, Kumar R, Kumar S, Rao KK, and Bhatt BP. 2017.Thermal utilization and heat use efficiency of sorghum cultivars in middle Indo-Gangetic Plains. *Journal of Agrometeorology* **19** (1): 29-33.

Prakash V, Niwas R, Khichar ML, Sharma DM and Singh B. 2015. Agrometeorological indices and intercepted photosynthetically active radiation in cotton crop under different growing environments. *Journal of Cotton Research and Development* **29**(2): 268-272.

Prasad S, Agrawal KK, Kumar R and Prakash V. 2017. Performance of heat tolerant varieties of wheat to thermal environment and nutrient management. *Journal of Agrometeorology* **19** (3): In Press.

Rajput RP. 1980. Response of soybean crop to climatic and soil environments. Ph.D. Thesis. Indian Agricultural Research Institute, New Delhi, India.

Salunke VD, Deshmukh RV, Aglave BN and Borikar ST. 2003. Evaluation of sorghum genotypes for drought tolerance. *International Sorghum and Millets Newsletter* **44**: 88-90.

Sastry PSN and Chakravarty NVK. 1982. Energy summation indices for wheat crop in India. *Agriculuural Meteorology* **27**: 45-48.

Singh AK, Manibhushan, Chandra N and Bharati RC.2008.Suitable crop varieties for limited irrigated conditions in different agro climatic zones of India. *Int. J. Trop Agr.* **26** (3-4): 491-496.

Singh AK, Singh RV, Singh IP, Chand D, Tyagi V, Singh SP, Dimree S and Singh S.2009.Trait specific crop germplasm available in India. *Prog Agri.* **10** (3): 36-44.

Citation:

Singh MK, Kumar V and Prasad S.2017. Evaluation of finger millet varieties under rainfed condition of Eastern India. *Journal of AgriSearch* **4** (3):179-183