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Characterization and evaluation of local germplasm finger millet *(Eleusine coracana* (L.) Gaertn.)

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Abstract
Among 40 genotypes studied, the genotype DHFM-32 (days to 50 percent flowering), DHFM-38 (days to maturity), DHFM-12 (plant height) DHFM-18 (number of tillers per plant and number of productive tillers per plant), DHFM-39 (main ear head length), DHFM-31 (number of fingers per ear head), DHFM-27 (100 ml volume per weight), DHFM-18 (grain yield per plant), DHFM-12 (grain iron content), DHFM-40 (grain calcium content) showed high performance for the respective characters. The variability for grain yield was ranged between 6.33 to 39.33 g. Along with other yield contributing characters also showed good amount of variability. Days to 50 per cent flowering ranged between 77.66 to 113.00 days with mean 93.43 days. Other characters also recorded large range of variability *viz*.; days to maturity (115.00 to 156.66 days), plant height (75.33 to 137.33 cm), number of tillers per plant (2.00 to 8.46), number of productive tillers per plant (2.00 to 8.10), main earhead length (6.00 to 13.00 cm), number fingers per earhead (4.00 to 10.33), 100 ml volume weight (57.00 to 119.33 g), grain iron content (1.52 to 12.42 mg/100 g) and grain calcium content (180 to 416mg/100 g).

Keywords: characterization, evaluation, local germplasm, finger millet

Introduction
Millet is a collective term referring to a number of small seeded annuals grasses that are cultivated as grain crops, primarily on marginal lands in dry areas in temperate, subtropical and tropical regions. Finger millet, (*Eleusine coracana*(L.) Gaertn.), is also known as African millet, ragi, nachani, nagali. Finger millet (*Eleusine coracana* (L.) Gaertn.), is one among highly utilized belong to family Poaceae and it ranks 4th in the importance of world. Finger millet is originated from Ethiopia. It is allopolyploid with chromosome number 2n=4x=36 and evolved from a cross between two diploid species *Eleusine indica* (AA) and *Eleusine floccifolia* or *Eleusine tristachya* (BB) as genome contributors (Hiremat and Salimath, 1992) [5]. Finger millet is mostly self-pollinating with some amount of cross pollination (1%) mediated by wind (Jansen and Ong, 1996, Purseglove, 1972) [6, 8]. It is important staple food in parts of eastern and Central Africa and India. Finger millet is very adaptable to a wide range of environmental and climatic conditions, thrives at higher elevations than most other tropical cereals and tolerates salinity better than moist cereals. It is important cereal in Karnataka. It is intensively grown in Karnataka, Tamil Nadu, Andhra Pradesh, Orissa, Bihar, Gujarat, Maharashtra and in the hilly regions of Uttar Pradesh, Himachal Pradesh with a total area of 2.5 million hectares and 2.2 million tons of production. The basic information on the existence of genetic variability in a population is essentially for any successful plant breeding programme. Genetic improvement through conventional breeding approaches depends mainly on the availability of diverse germplasm and presence of enormous genetic variability. The characterization and evaluation are important pre-requisite for effective utilization of germplasm and also to identify source of useful genes. An insight into the nature and magnitude of genetic variability present in the gene pool is of immerse value for starting any systematic breeding programme because the presence of considerable genetic variability in the base material ensure better chances of evolving desirable plant type. Hence, an attempt was made to estimate the extent of variation for yield contributing traits in 40 genotypes.

Materials and Methods
The experimental materials consisting forty germplasm of finger millet collected from Dhule, Nandurbar, Jalgaon, Nashik, Ahmednagar, Pune, Satara and Kolhapur districts of Maharashtra. The experiment was laid out in RBD with three replications at Department of Botany, College of Agriculture, Dhule (MS.) during Kharif 2017. By adopting a spacing of 22.5 cm between rows and 10 cm between plants respectively, at recommended package of practices were followed to raise good and healthy crop stand. Data were collected on eleven yield and yield contributing characters *viz*., days to 50% flowering, days to maturity, plant height (cm), number of tillers per plant, number of productive tillers per plant, main eahead length (cm), number of fingers per earhead, 100 ml volume weight, grain yield per plant (g) and qualitative characters *viz*., grain iron content (mg/100 g), grain calcium content (mg/100 g). The mean of five plants was subjected to statistical analysis. The data for different characters were statistically analyzed for significance by using analysis of variance technique described by Panse and Sukhatme (1985) [7]. The adapted design was Randomized Block Design (RBD) with three replications. The significance of mean sum of square for each character was tested against the corresponding error degrees of freedom using “F” Test (Fisher and Yates, 1967) [3]. Statistical analysis was done by using WINDOSTAT program.

Results and Discussion
The mean performances of 40 genotypes of finger millet for eleven characters studied are presented in Table 1. The

general mean for days to 50 per cent flowering was 93.43 days. The variation in days to 50 per cent flowering ranged between 77.66 (DHFM-6) to 113.00 days (DHFM-32). Ten genotypes were found to be early flowering, twenty genotypes were found in mid-late flowering, while ten genotypes were late flowering when compared with general mean. The genotype DHFM-6 (77.66 days) was recorded significantly the earliest for flowering followed by DHFM-20 (79.33 days), DHFM-19 (80.00 days), DHMB-7 and DHMB-14 (82.33 days).The genotypes DHFM-17 (94.00 days) was the mid late for the flowering followed by DHFM-4 (94.33 days) and DHFM-2 (94.66 days). The genotypes DHFM-32 (113.00 days) was late flowering followed by DHFM-36 (112.33 days) and DHFM-38 (110.00days). The genotype DHFM-6 (115.00 days) was the earliest to mature followed by DHFM-20 (116.66 days) and DHFM-19 (117.33 days). The genotype DHFM-22 (134.66days) was mid late mature followed by DHFM-26 (137.33 days), DHFM-27 (140.00 days). The genotype DHFM-38 (156.66 days) was late mature followed by DHFM-37 (154.66 days), DHFM- 32 (153.33 days). The population mean for this attribute was 134.04 days and variation ranged from 115.00 to 156.66 days. The six genotypes were found statistically significantly earlier than the populations mean (Table-1). The genotype DHFM-12 (137.33 cm) was found tall followed by DHFM-8 (120.00 cm), DHFM-33 (118.00 cm) and DHFM-6 (117.33 cm). The genotypes DHFM-37 (103.00 cm) was found mid tall followed by DHFM-24 (104.00 cm), DHFM-25 and DHFM-31 (104.33) respectively. The genotypes DHFM-23 (75.33 cm) was very dwarf followed by DHFM-10 (83.66 cm), DHFM-11 (85.66 cm) and DHMB-3 and DHFM-32 (88.00 cm) respectively. The population mean for this attribute was 102.23 cm and ranged from 75.33 to 137.33 cm. Among all genotypes six were found dwarf than the population mean (Table-1) The genotypes DHFM-18 (8.46) exhibited significantly higher number of tillers per plant followed by DHFM-36 (8.00), DHFM-40 (8.00) and DHFM-38 (7.50). The general mean for number of tillers per plant was 5.60 and the variation ranged between 2.00 to 8.46. The genotypes DHFM-20 (2.00), DHFM-6 (2.33) and DHFM-19 (3.00) produced less number of tillers per plant. The genotypes DHFM-22 (5.46), DHFM-4, DHFM-12, DHFM-14 (5.66) produced medium number of tillers per plant. Out of 40 genotypes tested, only fifteen genotypes (37.5 per cent) produced more number of tillers than the populations mean (Table 1). The general mean for number of productive tillers per plant was 5.17 and the variation ranged from 2.00 to 8.10. The genotype DHFM-18 (8.10) produced maximum number of productive tillers per plant followed by DHFM-40 and DHFM-38 (7.50). The genotype DHFM-20 (2.00) produced minimum number of productive tillers per plant followed by DHFM-6, DHFM-19 (2.67), and DHFM-9 (3.00). The genotypes DHFM-1 (5.40), DHFM-19 (5.20) and DHFM-23, DHFM-31 (5.33) produced medium number of productive tillers per plant. Only thirteen genotypes (32.5 per cent) produced statistically significant more number of productive tillers per plant than population mean (Table 2).

The general mean for main earhead length was 8.78 and the variation ranged from 6.00 cm to 13.00 cm. The genotype DHFM-39 (13.00 cm) produced maximum length of main earhead followed by DHFM-3 (12.33 cm) and DHFM-26 (12.26 cm). While the genotype DHFM-6, DHFM-9, DHFM-16 and DHFM-28 (6.00 cm) followed by genotype DHFM-23 (6.33 cm), DHFM-25 (6.66 cm) recorded minimum length of main earhead length. The genotypes DHFM-10, DHFM-15, DHFM-24, DHFM-27 (9.00 cm) followed by DHFM-35 (9.33 cm) recorded medium earhead length. Only thirteen genotypes (32.5 per cent) exhibited maximum earhead length of main earhead. Among the 40 genotypes, DHFM-31 (10.33) recorded maximum number of fingers per earhead followed by DHFM-30, DHFM-36 (10.00), DHFM-10 (9.06). While DHFM-15 (4.00) produced minimum number of fingers per earhead followed by DHFM-7 (4.66), DHFM-6, DHFM-14, DHFM-27, DHFM-29 (5.00). The genotype DHFM-3 (7.00) produced medium number of fingers per earhead followed by DHFM-37 (7.30) and DHFM-2, DHFM-26, DHFM-35 (7.33) the variation for this trait ranged between 4.00 to 10.33. Nine genotypes recorded statistically significant higher (22.5 per cent) number fingers per earhead over the plant populations mean of 7.03 (Table.2). The genotype DHFM-27 (119.33 g) recorded maximum 100 ml volume weight followed by DHFM-2 (113.66 g), DHFM-6 (107.66 g) While, the genotype DHFM-9 (57.00 g) recorded lowest 100 ml volume weight followed by DHFM-5, DHFM-12 (61.00 g), DHFM-16 (63.00 g) and DHFM-24 (63.33 g). The genotype DHFM-10, (79.00 g) produced medium 100 ml volume weight followed by DHFM-28, DHFM-29, DHFM-35 (80.00 g). The variation for this character as observed between 57.00 g to 119.33 g. Out of all 40 genotypes seven genotypes (22.5) recorded significantly high 100 ml volume weight than population mean of 76.78 g (Table.2). The grain yield per plant ranged between 6.33 g to 39.33 g. Among all 40 genotypes tested only thirteen (32.5 per cent) genotypes recorded significantly superior performance than the population mean 20.16 g. (Table 4.1). The genotypes DHFM-18 (39.33 g) recorded highest grain yield followed by DHFM-36 (33.90) and DHFM-31 (32.40). While the genotype DHFM-16 (6.99 g) produced low grain yield followed by DHFM-6, DHFM-19, DHFM-20 (7.00 g) and DHFM-9 (8.33 g). The genotype DHFM-8 (20.66 g) produced medium grain yield followed by DHFM-1 (21.66), DHFM-11 (21.80 g). The genotype DHFM-3 (12.42 mg) recorded significantly high iron content followed by DHFM-12 (12.35 mg), DHFM-2 (11.86 mg). The genotype DHFM-32 (1.52 mg) followed by DHFM-28 (1.68 mg) and DHFM-23 (2.22 mg) showed lowest iron content. The genotype DHFM-5 (4.65 mg) produced medium iron content followed by DHFM-18 (4.71 mg) and DHFM-21 (4.87 mg).The grain iron content ranged between 1.68 mg to 12.42 mg. Only ten (25 per cent) genotypes recorded significantly superior performance than population mean of 4.65 mg. (Table 4.1). The genotype DHFM-40 (416.33 mg) recorded significantly high calcium content followed by DHFM-17 (415.66 mg) and DHFM-18 (408.00 mg). While the genotype DHFM-14 (180.00 mg) produced low calcium content followed by DHFM-11 (205 mg) and DHFM-35 (207.00 mg). The genotype DHFM-6, DHFM-19 (322.00 mg) produced medium calcium content followed by DHFM-9, DHFM-20 (326.00 mg) and DHFM-22, DHFM-28 (331.00 mg). The grain calcium content ranged between 180.00 mg to 416.33 mg. Only ten (25 per cent) genotypes recorded superior performance than the population mean 308.05 (Table 4.1). Among 40 genotypes studied, the genotype DHFM-32 (days to 50 per ce flowering), DHFM-38 (days to maturity), DHFM-12 (plant height) DHFM-18 (number of tillers per plant and number of productive tillers

per plant), DHFM-39 (main earhead length), DHFM-31 (number of fingers per earhead), DHFM-27 (100 ml volume per weight), DHFM-18 (grain yield per plant), DHFM-12 (grain iron content), DHFM-40 (grain calcium content) showed high performance for the respective characters. The variability for grain yield was ranged between 6.33 to 39.33 g. Along with other yield contributing characters also showed good amount of variability. Days to 50 per cent flowering ranged between 77.66 to 113.00 days with mean 93.43 days. Other characters also recorded large range of variability *viz.*; days to maturity (115.00 to 156.66 days), plant height (75.33 to 137.33 cm), number of tillers per plant (2.00 to 8.46), number of productive tillers per plant (2.00 to 8.10), main earhead length (6.00 to 13.00 cm), number fingers per earhead (4.00 to 10.33), 100 ml volume weight (57.00 to 119.33 g), grain iron content (1.52 to 12.42 mg/100 g) and grain calcium content (180 to 416mg/100 g). Similar results were found by Bedis *et al.* (2006) [2]. Wolie *et al.* (2013) [11], Reddy *et al.* (2013) [9], Ulaganathani *et al.* (2015) [10] and Auti *et al.* (2017). [1]

Table 1: Mean performance of finger millet genotype

Sr. no	Genotypes	Days to 50 per cent flowering	Days to maturity	Plant height (cm)	No. of tillers /plant	No of productive tillers /plant	Main earhead length (cm)	No of fingers / earhead	100 Ml volume weight	Grain yield / plant	Grain iron content (mg / 100 gm)	Grain calcium content (mg / 100gm)
1	DHFM-1	88.33	125.00	89.00	5.44	5.40	7.66	6.33	66.00	21.66	3.00	284.00
2	DHFM-2	94.66	125.33	95.33	6.66	6.00	7.33	7.33	113.66	17.90	11.86	390.00
3	DHFM-3	85.00	125.33	88.00	6.00	5.33	12.33	7.00	76.00	28.70	12.42	383.33
4	DHFM-4	94.33	129.66	101.00	5.66	5.33	8.00	6.33	95.66	19.80	5.52	354.33
5	DHRM-5	86.66	126.00	95.00	6.66	5.33	10.00	6.66	61.00	18.50	4.65	233.33
6	DHFM-6	77.66	115.00	117.33	2.67	2.33	6.00	5.00	107.66	7.00	3.75	322.00
7	DHFM-7	82.33	123.66	116.33	3.66	3.67	8.33	4.66	71.33	9.00	5.24	343.33
8	DHFM-8	93.00	127.66	120.00	6.66	5.33	10.00	6.66	72.00	20.66	4.31	308.00
9	DHFM-9	83.00	127.33	112.66	3.66	3.00	6.00	6.33	57.00	8.33	3.41	326.00
10	DHFM-10	87.66	127.66	83.66	4.66	4.66	9.00	9.33	79.00	15.20	3.66	254.66
11	DHFM-11	91.66	132.00	85.66	4.00	3.66	7.00	6.66	73.33	21.80	4.32	205.00
12	DHFM-12	92.33	130.00	137.33	5.66	5.66	8.33	6.00	61.00	20.00	12.35	402.66
13	DHFM-13	96.33	125.66	96.00	6.66	6.33	9.66	8.33	72.00	26.00	6.85	277.00
14	DHFM-14	82.33	122.66	111.66	5.66	5.00	8.33	5.00	82.00	12.00	5.12	180.00
15	DHFM-15	83.00	125.66	111.66	4.00	4.00	9.00	4.00	82.00	11.00	2.84	397.00
16	DHFM-16	83.00	123.33	106.00	4.00	3.66	6.00	5.33	63.00	6.33	3.45	402.00
17	DHFM-17	94.00	142.33	110.33	7.00	5.66	7.33	6.33	65.00	19.33	4.20	415.66
18	DHFM-18	93.00	140.66	104.66	8.46	8.10	10.00	9.06	67.33	39.33	4.71	408.00
19	DHFM-19	80.00	117.33	94.33	3.00	2.67	7.00	8.00	69.66	7.00	3.83	322.00
20	DHFM-20	79.33	116.66	92.66	2.00	2.00	8.00	6.00	106.00	7.00	3.68	326.00
21	DHFM-21	92.00	140.66	101.33	6.46	6.13	7.66	7.66	72.00	21.00	4.87	247.00
22	DHFM-22	91.00	134.66	92.00	5.46	5.13	7.33	9.00	72.00	18.00	3.39	331.00
23	DHFM-23	87.00	127.66	75.33	6.00	5.33	6.33	6.66	74.66	14.00	2.22	277.00
24	DHFM-24	92.33	132.00	104.00	6.00	5.00	9.00	6.33	63.33	18.00	3.61	292.00
25	DHFM-25	92.33	131.00	104.33	4.00	3.67	6.66	8.66	66.00	18.66	3.40	305.00
26	DHFM-26	97.66	137.33	101.66	6.66	6.13	12.26	7.33	80.00	23.40	3.32	259.00
27	DHFM-27	91.00	140.00	95.00	6.06	5.40	9.00	5.00	119.33	19.20	5.58	364.00
28	DHFM-28	85.00	125.00	99.00	3.66	3.66	6.00	8.40	80.00	10.00	1.68	331.00
29	DHFM-29	92.66	131.33	102.00	6.00	5.20	8.33	5.00	80.66	19.66	3.79	268.33
30	DHFM-30	92.66	129.33	101.33	5.00	4.33	6.67	10.00	90.00	15.00	5.61	261.00
31	DHFM-31 (Phule Nachani)	109.33	150.66	104.33	6.00	5.33	8.67	10.33	82.00	32.40	5.70	337.00
32	DHFM-32	113.00	153.33	88.00	5.00	5.00	10.33	7.00	96.00	31.10	1.52	277.00
33	DHFM-33	103.33	150.00	118.00	7.00	6.50	12.00	7.00	74.00	28.80	3.48	241.00
34	DHFM-34	106.00	148.00	111.66	6.66	6.33	11.33	6.33	70.00	28.20	4.62	243.00
35	DHFM-35	104.33	144.33	91.66	6.66	6.67	9.33	7.33	80.00	30.80	2.61	207.00
36	DHFM-36	112.33	152.33	106.00	8.00	7.40	8.40	10.00	73.33	33.90	2.46	295.00
37	DHFM-37	107.33	154.66	103.00	7.40	7.00	10.80	7.30	64.00	26.20	4.39	250.00
38	DHFM-38	110.00	156.66	100.33	7.50	7.20	11.00	7.66	63.33	27.00	3.40	290.00
39	DHFM-39	105.00	151.33	115.00	6.80	6.40	13.00	7.66	66.00	30.00	2.94	295.00
40	DHFM-40	105.00	142.33	106.66	8.00	7.50	12.00	6.33	64.00	24.80	8.48	416.33
	G. Mean	93.43	134.04	102.23	5.60	5.17	8.78	7.03	76.78	20.16	4.65	308.05
	S.E. ±	2.34	3.42	3.89	0.32	0.26	0.30	0.35	2.22	1.16	0.15	13.59
	C.D. at 5 %	6.58	9.65	10.95	0.90	0.74	0.84	0.99	6.26	3.27	0.42	38.28
	C.V. (%)	4.33	4.43	6.59	9.91	8.87	5.94	8.69	5.02	9.98	5.64	7.64

Table 2: Classification of cultures for different characters on the basis of general mean and critical differences ($\bar{X} \pm$ C.D.at 5 %)

Sr no.	Name of characters			
1.	Days to 50% flowering Mean= 93.43 C.D. at 5%= 6.58	**Early (≤86.85)**	**Mid late (86.85-100.01)**	**Late (≥100.01)**
		DHFM-3, DHFM-6, DHFM-7, DHFM-9, DHFM-14, DHFM-15, DHFM-16, DHFM-119, DHFM-20, DHFM-28,	DHFM-1, DHFM-2, DHFM-4, DHFM-5, DHFM-8, DHFM-10, DHFM-11, DHFM-12, DHFM-13, DHFM-17, DHFM-18, DHFM-21, DHFM-22, DHFM-23, DHFM-24, DHFM-25, DHFM-26, DHFM-27, DHFM-29, DHFM-30	DHFM-31, DHFM-32, DHFM-33, DHFM-34, DHFM-35, DHFM-36, DHFM-37, DHFM-38, DHFM-39, DHFM-40.
	No. of cultures	10	20	10
	Frequency	25	50	25

	percentage			
2.	Days to maturity Mean=134.04 C.D.at 5%= 9.65	Early (≤124.39)	Mid late (124.39-143.69)	Late (≥143.69)
		DHFM-6, DHFM-7, DHFM-14, DHFM-16, DHFM-19, DHFM-20,	DHFM-1, DHFM-2, DHFM-3, DHFM-4, DHFM-5, DHFM-8, DHFM-9, DHFM-10, DHFM-11, DHFM-12, DHFM-13, DHFM-15, DHFM-17, DHFM-18, DHFM-21, DHFM-22, DHFM-23, DHFM-24, DHFM-25, DHFM-26, DHFM-27, DHFM-28, DHFM-29, DHFM-30, DHFM-40	DHFM-31, DHFM-32, DHFM-33, DHFM-34, DHFM-35, DHFM-36, DHFM-37, DHFM-38, DHFM-39.
	No. of cultures	6	25	9
	Frequency percentage	15	62.5	22.5
3.	Plant height (cm) Mean= 102.23 C.D.at 5%=10.95	Dwarf (≤91.28)	Mid tall (91.28-113.18)	Tall (≥113.18)
		DHFM-1, DHFM-3, DHFM-10, DHFM-11, DHFM-23, DHFM-32,	DHFM-2, DHFM-4, DHFM-5, DHFM-9, DHFM-13, DHFM-14, DHFM-15, DHFM-16, DHFM-17, DHFM-18, DHFM-19, DHFM-20, DHFM-21, DHFM-22, DHFM-24, DHFM-25, DHFM-26, DHFM-27, DHFM-28, DHFM-29, DHFM-30, DHFM-31, DHFM-34, DHFM-35, DHFM-36, DHFM-37, DHFM-38, DHFM-40	DHFM-6, DHFM-7, DHFM-8, DHFM-12, DHFM-33, DHFM-39,
	No. of cultures	6	28	6
	Frequency percentage	15	70	15
4.	No. of tillers / plant Mean= 5.60 C.D. at 5%=0.90	Low (≤4.70)	Medium (4.70-6.5)	High (≥6.5)
		DHFM-6, DHFM-7, DHFM-9, DHFM-10, DHFM-11, DHFM-15, DHFM-16, DHFM-19, DHFM-20, DHFM-25, DHFM-28,	DHFM-1, DHFM-3, DHFM-4, DHFM-12, DHFM-14, DHFM-21, DHFM-22, DHFM-23, DHFM-24, DHFM-27, DHFM-29,DHFM-30, DHFM-31, DHFM-32,	DHFM-2, DHFM-5, DHFM-8, DHFM-13, DHFM-17, DHFM-18, DHFM-26, DHFM-33, DHFM-34, DHFM-35, DHFM-36, DHFM-37, DHFM-38, DHFM-39, DHFM-40
	No. of cultures	11	14	15
	Frequency percentage	27.5	35	37.5
5.	No. of productive tillers / plant Mean=5.17 C.D.at 5%=0.74	Low (≤4.43)	Medium (4.43-5.91)	High (≥5.91)
		DHFM-6, DHFM-7, DHFM-9, DHFM-11, DHFM-15, DHFM-16, DHFM-19, DHFM-20, DHFM-25, DHFM-28, DHFM-30	DHFM-1, DHFM-3, DHFM-4, DHFM-5, DHFM-8, DHFM-10, DHFM-12, DHFM-14, DHFM-17, DHFM-22, DHFM-23, DHFM-24, DHFM-27, DHFM-29, DHFM-31, DHFM-32,	DHFM-2, DHFM-13, DHFM-18, DHFM-21, DHFM-26, DHFM-33, DHFM-34, DHFM-35, DHFM-36, DHFM-37, DHFM-38, DHFM-39, DHFM-40
	No. of cultures	11	16	13
	Frequency percentage	27.5	40	32.5
6.	Main earhead length (cm) Mean= 8.78 C.D. at 5%=0.84	Low (≤7.94)	Medium (7.94-9.62)	High (≥9.62)
		DHFM-1, DHFM-2, DHFM-6, DHFM-9, DHFM-11, DHFM-16, DHFM-17, DHFM-23, DHFM-25, DHFM-30,	DHFM-4, DHFM-7, DHFM-10, DHFM-12, DHFM-14, DHFM-15, DHFM-19, DHFM-20, DHFM-21, DFM-22, DHFM-24, DHFM-27, DHFM-28, DHFM-29,	DHFM-3, DHFM-5, DHFM-8, DHFM-13, DHFM-18, DHFM-26, DHFM-32, DHFM-33, DHFM-34, DHFM-37, DHFM-38, DHFM-39, DHFM-40.
	No. of cultures	10	14	13
	Frequency percentage	25	35	32.5
7.	No. of fingers / earhead Mean=7.03 C.D. at 5% =0.99	Low (≤7.03)	Medium (7.03-8.02)	High (≥8.02)
		DHFM-1, DHFM-3, DHFM-4, DHFM-5, DHFM-6, DHFM-7, DHFM-8, DHFM-9, DHFM-11, DHFM-12, DHFM-14, DHFM-15, DHFM-16, DHFM-17, DHFM-20, DHFM-23, DHFM-24, DHFM-27, DHFM-29, DHFM-32, DHFM-33, DHFM-34,	DHFM-2, DHFM-19, DHFM-21, DHFM-26, DHFM-35, DHFM-37, DHFM-38, DHFM-39, DHFM-40	DHFM-10, DHFM-13, DHFM-18, DHFM-22, DHFM-25, DHFM-28, DHFM-30, DHFM-31, DHFM-36,
	No. of cultures	22	9	9
	Frequency percentage	55	22.5	22.5
8.	100 ml volume weight (gm) Mean=76.78 C.D.at 5%=6.26	Low (≤70.52)	Medium (70.52-83.04)	High (≥83.04)
		DHFM-1, DHFM-5, DHFM-9, DHFM-12, DHFM-16, DHFM-17, DHFM-18, DHFM-19, DHFM-24, DHFM-25, DHFM-34, DHFM-37, DHFM-38, DHFM-39, DHFM-40.	DHFM-3, DHFM-7, DHFM-8, DHFM-10, DHFM-11, DHFM-13, DHFM-14, DHFM-15, DHFM-21, DHFM-22, DHFM-23, DHFM-26, DFM-28, DHFM-29, DHFM-31, DHFM-33, DHFM-35, DHFM-36,	DHFM-2, DHFM-4, DHFM-6, DHFM-20, DHFM-27, DHFM-30, DHFM-32,
	No. of cultures	15	18	7
	Frequency percentage	37.5	45	17.5
9.	Grain yield / plant Mean=20.16 C.D. at 5% =3.27	Low (≤16.89)	Medium (16.89-23.43)	High (≥23.43)
		DHFM-6, DHFM-7, DHFM-9, DHFM-10, DHFM-14, DHFM-15, DHFM-16, DHFM-19, DHFM-20, DHFM-23, DHFM-28, DHFM-30	DHFM-1, DHFM-2, DHFM-4, DHFM-5, DHFM-8, DHFM-11, DHFM-12, DHFM-17, DHFM-21, DHFM-22, DHFM-24, DHFM-25, DHFM-26, DHFM-27, DHFM-29	DHFM-3, DHFM-13, DHFM-18, DHFM-31, DHFM-32, DHFM-33, DHFM-34, DHFM-35, DHFM-36, DHFM-37, DHFM-38, DHFM-39, DHFM-40.
	No. of cultures	12	15	13
	Frequency	30	37.5	32.5

	percentage			
10.	Grain iron content (mg/100gm) Mean= 4.65 C.D.at 5%= 0.42	Low (≤4.23)	Medium (4.23-5.07)	High (≥5.07)
		DHFM-1, DHFM-6, DHFM-8, DHFM-9, DHFM-10, DHFM-11, DHFM-15, DHFM-16, DHFM-17, DHFM-19, DHFM-20, DHFM-22, DHFM-23, DHFM-24, DHFM-25, DHFM-26, DHFM-28, DHFM-29, DHFM-32, DHFM-33, DHFM-35, DHFM-36, DHFM-38, DHFM-39.	DHFM-5, DHFM-18, DHFM-21, DHFM-34, DFM-37.	DHFM-2, DHFM-3, DHFM-4, DHFM-7, DHFM-12, DHFM-13, DHFM-14, DHFM-27, DHFM-30, DHFM-31, DHFM-40.
	No. of cultures	24	5	11
	Frequency percentage	60	12.5	27.5
11.	Grain calcium content (mg / 100 gm) Mean= 308.05 C.D.at 5%= 38.28	Low (≤ 269.77)	Medium (269.77-346.33)	High (≥346.33)
		DHFM-5, DHFM-10, DHFM-11, DHFM-14, DHFM-21, DHFM-30, DHFM-33, DHFM-34, DHFM-35, DHFM-37,	DHFM-1, DHFM-6, DHFM-7, DHFM-8, DHFM-9, DHFM-13, DHFM-19, DHFM-20, DHFM-22, DHFM-23, DHFM-24, DHFM-25, DHFM-26, DHFM-28, DHFM-29, DHFM-31, DHFM-32, DHFM-36, DHFM-38, DHFM-39.	DHFM-2, DHFM-3, DHFM-4, DHFM-12, DHFM-15, DHFM-16, DHFM-17, DHFM-18, DHFM-27, DHFM-40.
	No. of cultures	10	20	10
	Frequency percentage	25	50	25

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