

## Original Research Article

# Performance of New Identified Fodder Maize Genotype “IAFM 2015-48” in Chhattisgarh

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## ABSTRACT

A field study was conducted at IGKV, RMD CARS Ambikapur, Chhattisgarh to assess the performance of new fodder maize genotypes. Six new fodder maize genotypes: IAFM 2015-15, IAFM 2015-26, IAFM 2015-38, IAFM 2015-48, IAFM 2017-09 and IAFM 2017-18 were evaluated along with check J 1006 and African tall. IAFM 2015-48 was found better in terms of green fodder yield with 8.41% superiority over J 1006 and 5.12% superiority over African tall. IAFM 2015-48 also has desirable quality traits like low acid detergent fibre (39.2%), low natural detergent fibre (61.5%) and high in vitro dry matter digestibility (59.1%) in comparison to both national checks. Thus study recommends IAFM 2015-48 as potential fodder maize genotype in Chhattisgarh.

### Keywords

Fodder maize,  
Genotype,  
IAFM 2015-48

## Introduction

Maize is an important green as well as dry fodder as digestibility of its fodder is better than sorghum, *bajra* and other non-forage crops. Maize does not have any anti-quality factor unlike some other fodder crops. To breed fodder maize, high biomass, fast growth, prolificacy and digestibility are most important traits. For increasing biomass, tall landraces need to be funneled in (Dillon *et al.*, 2020). It is a very convenient crop for forage production due to the high production of green mass per unit area (12-25 t total dry matter per hectare), high energy content of dry matter and quality of biomass for silage.

The leaves, stalks, and tassels serve as feed for domestic animals, either in the form of fodder or as stover. The grain is extremely nourishing, with roughly 70-72% consumable carbohydrates, 4 - 4.5% fats and oils and 9.5-11% proteins. Selection for taller plants with more number of broader and longer leaves with thicker stem will be significant for the improvement of green fodder yield (Kapoor and Batra, 2015).

Chhattisgarh state is well known for rice crop but now maize is also emerged as one of the most remunerative crop for farmers. Agricultural animals of the state are generally fed dry paddy straw, which is not too

nutritious. The state is also characterized as reservoir of germplasm of different crops including maize. A collection of maize germplasm was made locally in Surguja district, in which some of them were found tall, leafy just like fodder maize. Keeping fodder maize in view, few of the collected maize germplasms were improved and nominated in national and state trials from 2016-17 to 2019-20 to identify best fodder maize genotypes having higher green fodder yield and quality suitable for entire Chhattisgarh. Among maize germplasm, genotype “IAFM 2015-48” was found better in comparison to national checks J1006 by 8.41% and African Tall by 5.12% in two year state trial in terms of green fodder yield (q/ha). It is at par with these two national checks in overall performance for four years (Table 1, 2 & 3).

IAFM 2015-48 has desirable quality traits

like low ACID DETERGENT FIBRE (39.2%), LOW NATURAL DETERGENT FIBRE (61.5%) and high IN VITRO DRY MATTER DIGESTIBILITY (59.1%) in comparison to both national checks. Above mentioned quality characters makes this fodder much more palatable and digestible, particularly very good for gestational (pregnant) and lactating animals. In addition to this IAFM 2015-48 also has other desirable characters like 6.06 q/ha/day green fodder yield, 1.23 q/ha/day dry matter yield, 6.1 q/ha crude protein yield, 7.7 % crude protein, 182.2 cm plant height and 0.63 leaf-stem ratio. Traits like plant height, leafiness (leaf length, leaf width, stem girth, number of leaves per plant) and dry matter yield are positively correlated with green fodder yield (Table 4 & 5). Under national screening it is also found moderately resistant against Leaf blight and Banded leaf & sheath blight and Stem borer (Table 6).

**Table.1** Other features of IAFM 2015-48

a) Plant height	:	185-195 cm
b) Distinguishing morphological characters	:	Days to 50% tasselling : 48 to 52 days Leaf stem ratio : 0.63 Ear Height : 85-95 cm Ear Length : 14-16 cm No. of kernel row/ear : 10-12 100 seed weight : 23-27 g
c) Maturity	:	90-95 days (seed to seed) 50-60 days (Green fodder)
d) Maturity group	:	Medium (90 - 95 days)
h) Quality of produce	:	Better quality
Grain quality	:	White seeded
Fodder quality	:	Crude protein yield (q/ha) 5.5 Crude protein % 8.0 Acid Detergent Fibre % (ADF%) 39.2 Neutral Detergent Fibre % (NDF%) 61.5 In Vitro Dry Matter Digestibility (IVDMD %) 59.1

**Table.1** Performance of IAFM 2015-48 in State multi-location trial (Forage Maize 2018-19 & 2019-20): Green fodder yield (q/ha)

Entries	2018-19 (3 locations)				2019-20 (3 locations)				Grand Mean	% superiority of IAFM 2015-48 over J 1006	% superiority of IAFM 2015-48 over African tall
	Raipur	Ambikapur	Jagdalspur	Mean	Raipur	Ambikapur	Jagdalspur	Mean			
<b>IAFM 2015-48</b>	<b>195.6</b>	<b>545.8</b>	<b>558.3</b>	<b>433.2</b>	<b>218.6</b>	<b>344.2</b>	<b>303.2</b>	<b>288.7</b>	<b>361.0</b>	<b>8.41</b>	<b>5.12</b>
J 1006 (NC)	212.9	543.9	514.6	423.8	192.6	276.6	257.2	242.1	333.0		
African Tall (NC)	245.4	524.1	509.6	426.4	201.9	303.6	275.6	260.4	343.4		

**Table.2** Performance of IAFM 2015-48 in National trials - Green Forage Yield (q/ha)

Entries	Hill Zone	North West Zone	North East Zone	Central Zone	South Zone	All India Average	
<b>Forage Maize 2016-17 (IVT)</b>	<b>Average (3 locations)</b>	<b>Average (4 locations)</b>	<b>Average (5 locations)</b>	<b>Average (6 locations)</b>	<b>Average (5 locations)</b>	<b>Average (23 locations)</b>	<b>Rank</b>
<b>IAFM-2015-48</b>	<b>298.0</b>	<b>296.7</b>	<b>341.0</b>	<b>402.7</b>	<b>434.0</b>	<b>358.2</b>	<b>8</b>
J-1006 (NC)	324.3	411.5	384.7	450.8	421.7	402.6	1
African Tall (NC)	321.3	336.0	386.8	482.3	423.4	399.3	2
<b>Mean</b>	<b>299.9</b>	<b>326.5</b>	<b>358.7</b>	<b>414.8</b>	<b>420.8</b>	<b>368.9</b>	
<b>Forage Maize 2016-17 (AVT 1-2)</b>			<b>North East Zone</b>		<b>South Zone</b>	<b>All India Average</b>	
			<b>Average (5 locations)</b>		<b>Average (4 locations)</b>	<b>Average (09 locations)</b>	<b>Rank</b>
<b>IAFM-2015-48</b>	-	-	<b>295.5</b>	-	<b>305.7</b>	<b>300.6</b>	9
J-1006 (NC)	-	-	358.2	-	390.1	374.1	2
African Tall (NC)	-	-	308.5	-	398.8	353.7	5
<b>Mean</b>	-	-	<b>313.6</b>	-	<b>359.5</b>	<b>336.5</b>	

**Table.3** Overall performance of IAFM 2015-48 in State and National trial (2016-17 to 2019-20): Green fodder yield (q/ha)

Entries	Overall performance				
	National trial (IVT, 2016-17)	National trial (AVT 1-2, 2017-18)	CG State MLT (2018-19)	CG State MLT (2019-20)	Overall Mean
<b>IAFM 2015-48</b>	<b>358.2</b>	<b>300.6</b>	<b>433.2</b>	<b>288.7</b>	<b>345.2</b>
J 1006 (NC)	402.6	353.7	423.8	242.1	355.6
African Tall (NC)	399.3	374.1	426.4	260.4	365.1

**Table.4** Performance of IAFM 2015-48 in National trial

Entries	Green Forage Yield (q/ha/day)		Dry Matter Yield (q/ha/day)		Crude Protein Yield (q/ha)		Crude Protein (%)		Plant Height (cm)		Leaf Stem Ratio	
	Average	Rank	Average	Rank	Average	Rank	Average	Rank	Average	Rank	Average	Rank
<b>IAFM-2015-48</b>	<b>6.06</b>	<b>5</b>	<b>1.23</b>	<b>4</b>	<b>6.1</b>	<b>6</b>	<b>7.7</b>	<b>4</b>	<b>182.2</b>	<b>6</b>	<b>0.63</b>	<b>2</b>
J-1006 (NC)	6.23	1	1.22	5	6.9	2	8.4	1	186.2	4	0.63	2
African Tall (NC)	5.90	8	1.18	8	6.4	4	7.4	6	196.5	1	0.66	1
<b>Mean</b>	<b>5.88</b>		<b>1.21</b>		<b>6.3</b>		<b>7.8</b>		<b>182.3</b>		<b>0.61</b>	

**Table.5** Quality Performance of IAFM 2015-48 in National trial

Entries	ADF (%)		NDF (%)		IVDMD (%)	
	Average	Rank	Average	Rank	Average	Rank
<b>IAFM-2015-48</b>	<b>39.2</b>	<b>1</b>	<b>61.5</b>	<b>2</b>	<b>59.1</b>	<b>1</b>
J-1006 (NC)	44.1	5	66.6	8	56.2	5
African Tall (NC)	44.4	6	65.4	5	56.0	6

**Table.6** Screening of IAFM 2015-48 in National Trial

Entries	Palampur			Rahuri	Hyderabad	Bhubaneswar					
	Leaf blight severity (%)	Disease Rating Leaf blight	Disease Reaction	Leaf injury score maize stem borer	Percent stem borer infested plants/ plot	Turci-cum leaf blight (1-5 scale)	Disease reaction	Maydis leaf blight (1-5 scale)	Disease reaction	BLSB (1-9 scale)	Disease reaction
<b>IAFM-2015-48</b>	<b>12</b>	<b>3</b>	<b>MR</b>	<b>1.00</b>	<b>1.67 (7.15)</b>	<b>1.2</b>	<b>R</b>	<b>1.4</b>	<b>R</b>	5	MR
J-1006 (NC)	14	3	MR	1.33	0.67 (2.71)	2.0	R	2.6	MR	5	MR
African Tall (NC)	9	2	R	1.00	0.66 (3.82)	1.2	R	1.2	R	7	S

**Photographs of Forage trials conducted at Ambikapur**



**Fig.1** View of forage maize trial and IAFM 2015-48 plant and ear

Considering all IAFM 2015-48 is found better in terms of quality traits and also it will be found valuable with scientific thought cum slogan by Hon'ble Chief Minister of Chhattisgarh "Chhattisgarh ke chaar chinhari, narua, garua, ghurua au badi, ela bachana hai sangwari"

## **References**

- Dillon, B. S., Sandhu, J. S. and Chanwla, J. S. 2020. Maize for Sustainable Agriculture in Climate Change. National Seminar on 'Maize for Crop Diversification under Changing Climatic Scenario', Ludhiana, Feb 09-10, 2020. Pp 04-09.
- Kapoor, R. and Batra, Chinka. 2015. Genetic variability and association studies in maize (*Zea mays* L.) for green fodder yield. Electronic Journal of Plant Breeding, 6 (1): 233-240.