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Effect of Organic Manures on Quality Parameters of Scented Rice (*Oryza sativa* L.)

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A B S T R A C T

A field experiment was conducted at Instructional cum Research Farm, Barrister Thakur Chhedilal College of Agriculture and Research Station, IGKV, Bilaspur, (C.G.). During *Kharif* 2020 with a view to study the "Effect of organic manures on quality parameters of scented rice (*Oryza sativa* L.)". The rice variety Vishnubhog was used to grown and treatment was replicated three times in randomized block design (RBD). The soil of experimental field was clay loam soil. There were fertilizer application nitrogen, phosphorus and potassium and Manures application Recommended amount of compost, cow dunk, green leaf manure (GLM) and rock phosphate were applied at different concentrations in rice in nine treatment *viz*., T_1: - 100% RDN through Compost, T_2:- 100% RDN through Green leaf manure, T_3:- Decomposed cow dung enriched with rock phosphate amendment(7.59q/ha), T_4:- 100% RDN through Compost + Decomposed cow dung enriched with rock phosphate amendment (7.59q/ha^{-1}), T_5:- 100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment(7.59q/ha^{-1}), T_6 :- 100% RDN through FYM enriched with consortia, T_7:- Decomposed cow dung enriched with rock phosphate @ (12q/ha^{-1}), T_8:- 100% RDF 60:40:30 kg NPK ha^{-1} andT_9:- Control (No NPK).The quality parameters like Paddy length (mm), breadth (mm) and paddy L:B and Kernel length, breadth and Kernel L:B; were superior in the treatment T_8(100% RDF (60:40:30) NPK kgha^{-1}), stand first in position and T_7 (100% RDN through green leaf manure + Decomposed cow dung enriched with Decomposed cow dung enriched with rock phosphate @ (12qha^{-1}), stand in second order of preference. However, treatment T_6 comes in next in order. Therefore, it may be concluded that treatment T_8 (100% RDF (60:40:30) NPK kg ha^{-1}) may be prefer for higher growth and yield with quality in rice.

Introduction

Rice (*Oryza sativa* L.) is the second most widely consumed cereal in the world next to wheat. It is the most important and extensively cultivated food crop grown in tropical and sub tropical region which provides half of the daily food for one of every three person on the earth. About 70% of the world population takes rice as staple food while in Asia alone, more than 2 billion people 60-70% of their energy intake from rice and its derivatives (Kumari *et al.*, 2014).

Rice is the major crop in India and occupies the largest cropped area of 43.19 million ha with annual production of 110.15 million tons and productivity of 2.55 tons/ha (Anonymous, 2017). Total production of rice during 2019-20 is estimated at record 117.47 million tonnes. In 2018, Chhattisgarh produced 10.5 million tonnes of paddy with an average annual rainfall of around 1,207 mm; the net sown area of the state is 47.75 lakh (4.7million) hectares, which is 34 percent of the state's total geographical area. Aromatic or scented (fragrant) rice has occupied a prime position in Indian society not only because of its high quality, but also because it has been considered auspicious. The basmati type among them is accepted as the best scented, longest and slender rice in the world and the Indian subcontinent continues to be its home land.

In Chhattisgarh state rice occupies major area of 3.74 million ha. Total production of rice in Chhattisgarh is 5749.07 million tons, productivity 1482/ha and total area under rice 43.79 ha with production of 109.70 million tons with productivity 2494 kg/ha (Anonymous, 2019). The Chhattisgarh extends south east of Madhya Pradesh from 170 46'N to 240 5' N latitude and from 800 15' E to 840 20' E longitude. Chhattisgarh has a tremendous agricultural potential with a diversity of soil and climate, mountains, plateau, rivers, natural vegetation and forest. It is unique in sense in many ways. The temperature goes down up to 1 ^{0}C in Chilpi and Surguja. The rainfall ranges from 800 mm to 1700 mm in different years. Diversified crops and cropping systems are the typical characteristics of Chhattisgarh.

Materials and Methods

A field experiment was conducted at Barrister Thakur Chhedilal College of Agriculture and Research Station, Bilaspur (Chhattisgarh) university of Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh) during *Kharif* 2020. The Research Farm is situated at 22.09˚N latitude, 82.15˚E longitude and at an altitude of 298 m above mean sea level. The region falls under the Eastern plateau and hill region (Agro-climatic zone-VII) of India. Chhattisgarh state is classified into three agro-climatic zones, of which Bilaspur falls under the Chhattisgarh plains zone of the state. The texture of soil of experimental field was clay loam soil. The soil was neutral in reaction, medium in organic carbon, low in nitrogen and medium in phosphorus and potash content.

Recommended amount of compost, cow dunk, green leaf manure (GLM) and rock phosphate were applied as per treatment as basal before transplanting. The manure was applied uniformly in plots by using broadcasting method. The chemical composition of green leaf manure was N (Nitrogen 3.5%), P (Phosphorus 0.60%), K (Potassium 1.25%), composition of compost was N (Nitrogen 0.5%), P (Phosphorus 0.15%), K (Potassium 0.5%), and composition of farm yard manure was N (Nitrogen 0.5%), P (Phosphorus 0.15%), K (Potassium 0.43%). Observations were recorded on randomly tagged competitive plants of each treatment for all the parameters separately. Recorded observations were averaged over replication to get treatment mean.

Results and Discussion

Data pertaining of different organic manures on quality characters of scented rice influenced by various treatments has been given in Table.1 & 2 and Fig 1, 2, 3, 4, 5 & 6.

The highest paddy length was recorded (6.00 mm) with treatment T_8 (100% RDF (60:40:30) kg NPK ha^{-1}) which was at par with 100% RDN through green leaf manure + Decomposed cow dung enriched with Decomposed cow dung enriched with rock phosphate @ (12qha^{-1}) (T_7), 100% RDN through FYM enriched with consortia (T_6) and 100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1}) (T_5), while the lowest paddy length was observed under control treatment Control (No NPK) (T_9) (5.43 mm). Swaroopa *et al.*, (2015) reported that Quality

parameters were recorded highest with the application of 150% RDN while lowest were recorded in 75% RDN.

Significantly higher paddy breadth was also recorded (2.40 mm) under 100% RDF (60:40:30) kg NPK ha^{-1} (T_8) except 100% RDN through Compost +Decomposed cowdung enriched with rock phosphate amendment (7.59qha^{-1}) (T_4) and 100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1}) (T_5) which was statically at par with Decomposed cow dung enriched with rock phosphate @ (12q ha^{-1}) (T_7). The lowest paddy breadth was observed (1.83 mm) under control treatment Control (No NPK) (T_9). Bora *et al.,* (2014) revealed that among the different treatments application of enriched compost at 2.5 t ha^{-1}, noticed the maximum quality parameters like length (8.38 mm) and breadth (2.62 mm) of grain.

The paddy L:B scented rice was not influences due to application of different treatment combination. Higher paddy L:B was recorded under treatment T_9 (Control (No NPK)) (2.96), which was at par with treatment T_1 (100% RDN through Compost), T_2 (100% RDN through Green leaf manure) and T_3 (Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})). The lowest paddy L:B was recorded under treatment T_8 (100% RDF (60:40:30) kg NPK ha^{-1}) (2.50). Sahu *et al.,* (2015) revealed that among scented rice varieties, higher length and breadth of paddy (8.52 mm and 2.56 mm), kernel (6.08 and 2.17), and length of kernel after cooking (9.21mm) were highest under Badshahbhog.

The highest kernel length was recorded (7.53 mm) with treatment T_8 (100% RDF (60:40:30) kg NPK ha^{-1}) which was at par with 100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1}) (T_5), 100% RDN through Compost + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1}) (T_4) and 100% RDN through FYM enriched with consortia (T_6), while the lowest kernel length was observed under control treatment Control (No NPK) (T_9) (7.19 mm).

Similar results were also supported by Dahiphale *et al.,* (2003) and Singh *et al.,* (2005). The highest fertility level of nitrogen 225 kg N ha^{-1} recorded significantly maximum quality parameter viz. kernel length (9.4 mm) and kernel length after cooking (10.9 mm). Similar results were also found in Mishra *et al.,* (2015).

Significantly higher kernel breadth was also recorded (2.50 mm) under 100% RDF (60:40:30) kg NPK ha^{-1} (T_8), which was statically at par with 100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1}) (T_5)and 100% RDN through Compost + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1}) (T_4). The lowest kernel breadth was observed (2.21 mm) under control treatment Control (No NPK) (T_9). Similar results were also found by Sharma (2002) and Sangeetha *et al.,* (2013).

The kernel L:B scented rice was not influenced due to application of different treatment combination. Higher paddy L:B was recorded (3.84) under treatment T_8 (100% RDF (60:40:30) kg NPK ha^{-1}), which was at par with treatment T_9 (Control (No NPK)), T_1 (100% RDN through Compost) and T_2 (100% RDN through Green leaf manure).

The lowest kernel L:B was recorded (3.09) under treatment T_5 (100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})). Quality of the crop, being the varietal (genetical) character, is affected by the environment including fertilization similar findings were supported by (Dixit and Gupta, 2000).

The quality parameters like paddy length (mm), breadth (mm), and L:B ratio; kernel length (mm), breadth (mm) and L:B ratio were significantly superior in the treatment T_8(100% RDF (60:40:30) NPK kgha^{-1}).

Table.1 Paddy length, breadth and paddy L:B of scented rice as influenced by organic manures.

Treatments	Paddy length (mm)	Paddy breadth (mm)	Paddy L:B
T_1 :100% RDN through Compost	5.47	1.87	**2.93**
T_2 :100% RDN through Green leaf manure	5.60	1.93	**2.90**
T_3 :Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})	5.67	1.95	**2.90**
T_4 :100% RDN through Compost + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})	5.90	2.30	**2.57**
T_5 :100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})	5.93	2.35	**2.53**
T_6 :100% RDN through FYM enriched with	5.73	1.97	**2.92**
T_7 :Decomposed cow dung enriched with rock phosphate @ (12q ha^{-1})	5.87	2.17	**2.71**
T_8 :100% RDF (60:40:30) kg NPK ha^{-1}	6.00	2.40	**2.50**
T_9 :Control (No NPK)	5.43	1.83	**2.96**
SEm (±)	**0.12**	**0.04**	**0.07**
CD (5%) =	**0.38**	**0.19**	**0.23**

Table.2 Kernel length, breadth and Kernel L:B after cooking of scented rice as influenced by organic manures.

Treatments	Kernel length (mm)	Kernel breadth (mm)	Kernel L:B
T_1:100% RDN through Compost	7.20	2.22	**3.32**
T_2:100% RDN through Green leaf manure	7.25	2.25	**3.30**
T_3:Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})	7.32	2.31	**3.24**
T_4:100% RDN through Compost + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})	7.48	2.45	**3.11**
T_5:100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1})	7.50	2.47	**3.09**
T_6:100% RDN through FYM enriched with consortia	7.35	2.35	**3.19**
T_7:Decomposed cow dung enriched with rock phosphate @ (12q ha^{-1})	7.40	2.40	**3.15**
T_8:100% RDF (60:40:30) kg NPK ha^{-1}	7.53	2.50	**3.84**
T_9:Control (No NPK)	7.19	2.21	**3.34**
SEm (±)	**0.04**	**0.11**	**0.06**
CD (5%) =	**0.14**	**0.33**	**0.21**

Fig.1 Paddy length (mm)

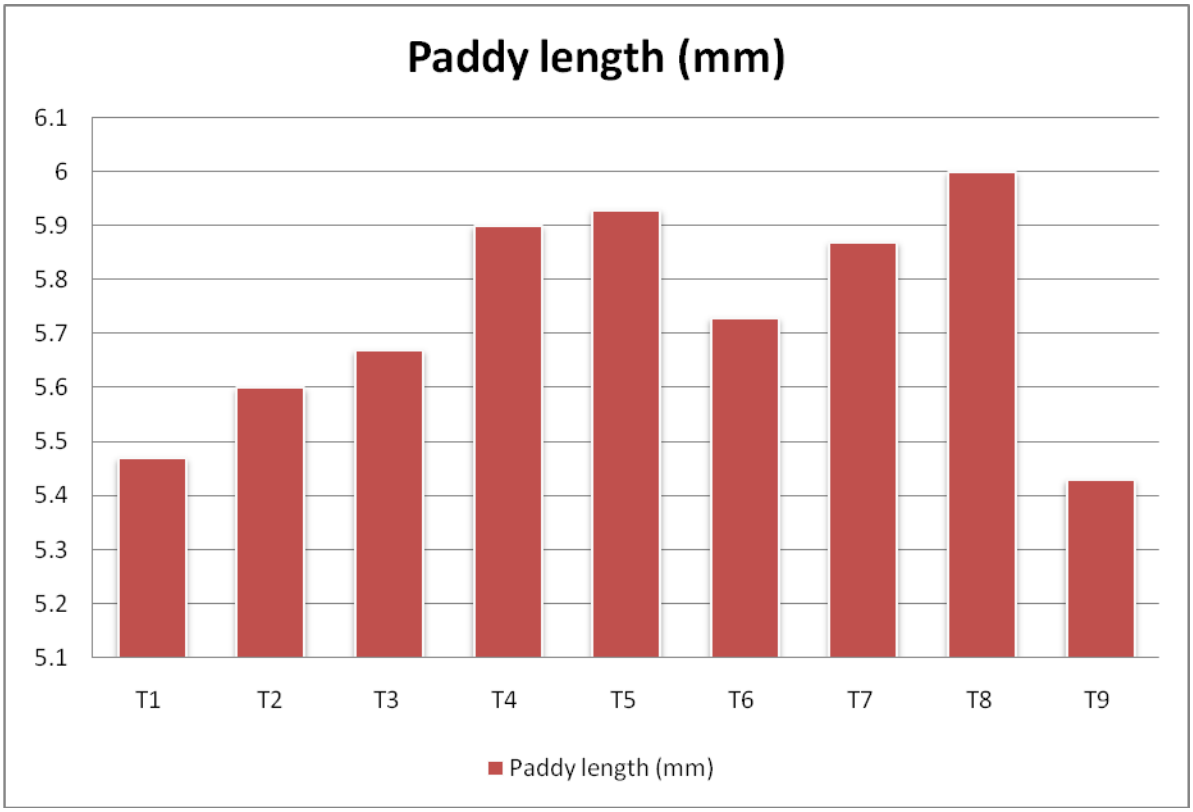

Fig.2 Paddy breadth (mm)

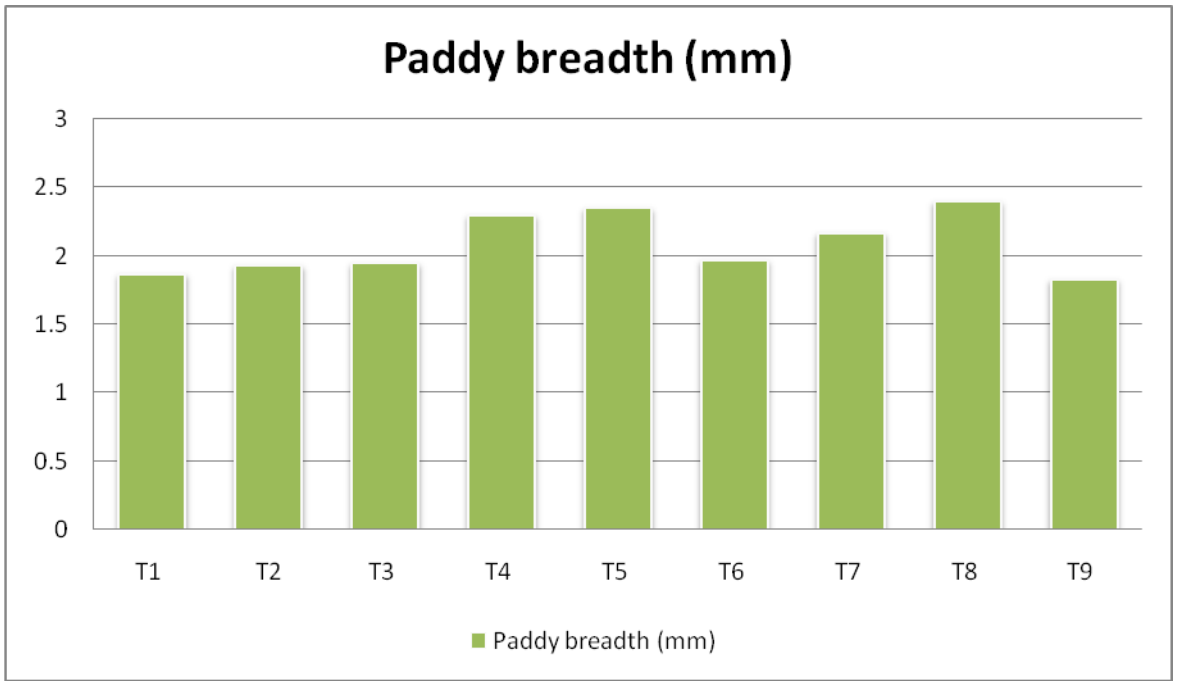

Fig.3 Paddy L:B

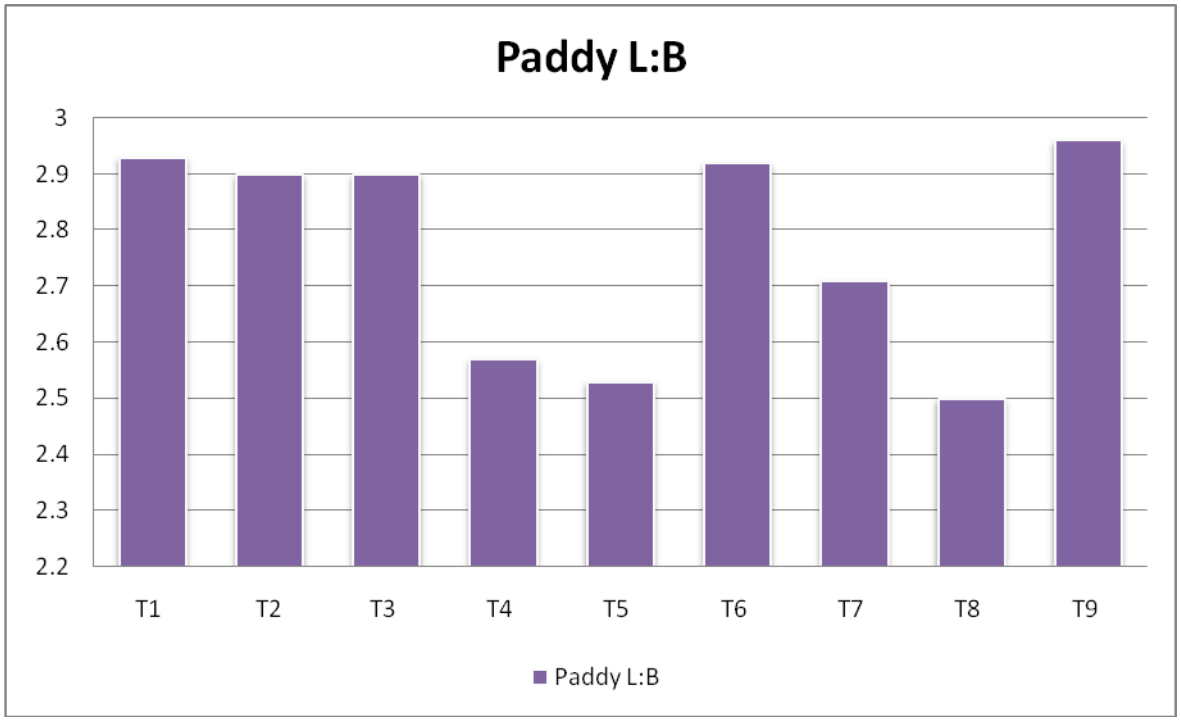

Fig.4 Kernel length (mm)

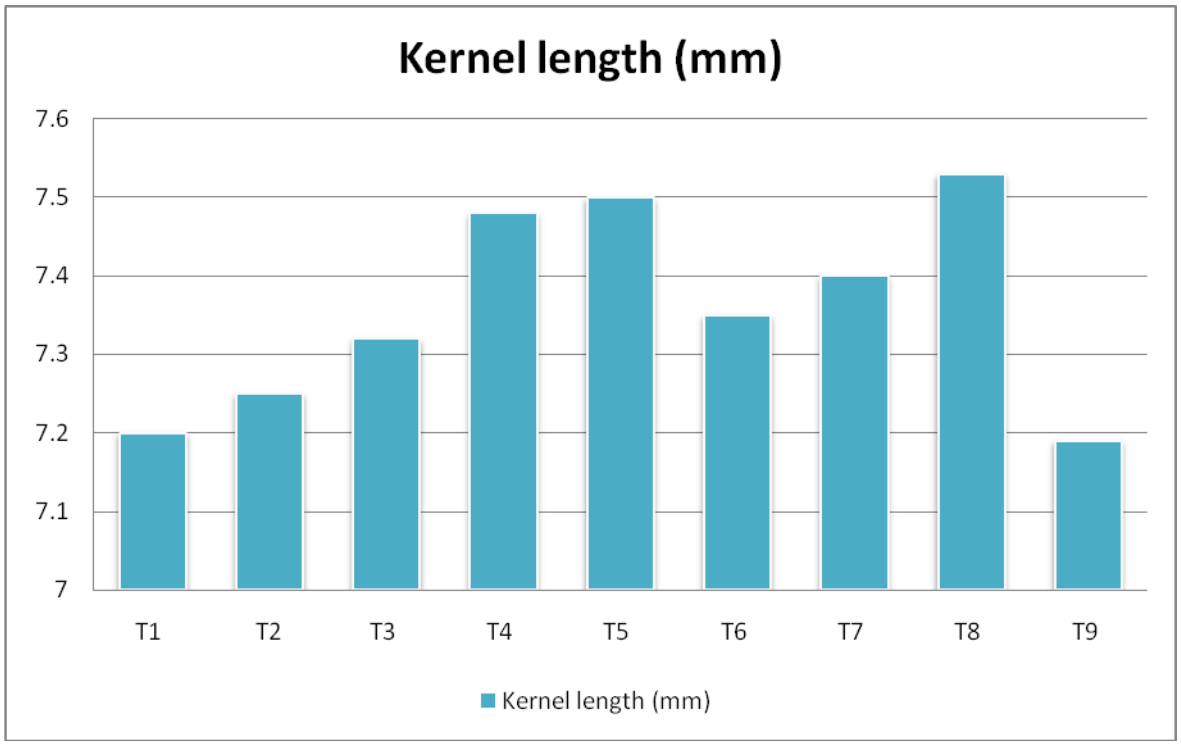

Fig.5 Kernel breadth (mm)

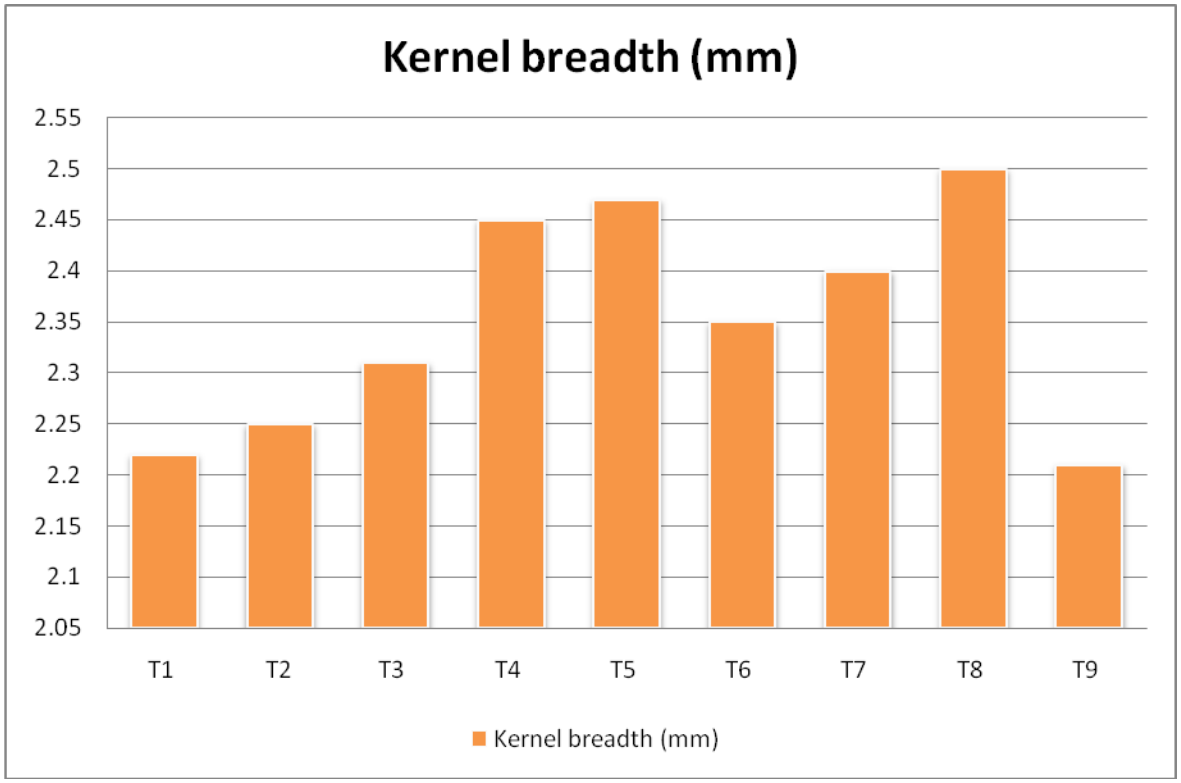

Fig.6 Kernel L:B

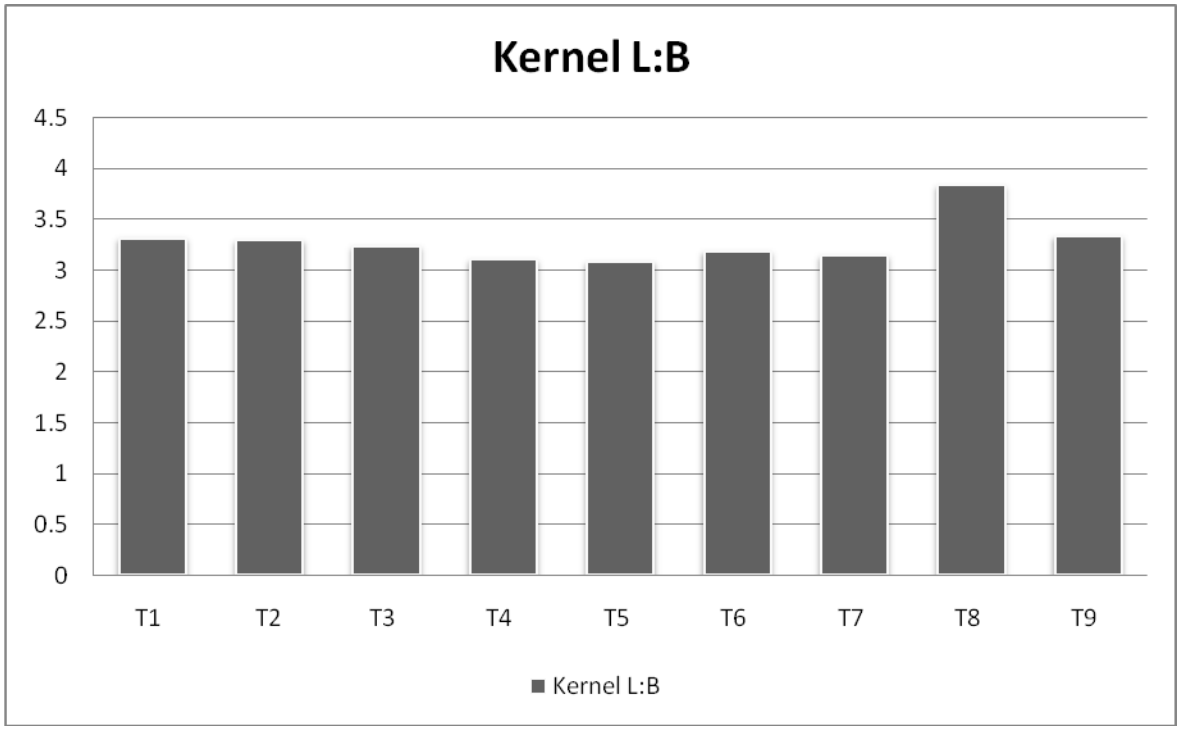

Plate.1 Rice quality parameter analysis at IGKV, Raipur

On the basis of above findings, treatment T_8 (100% RDF (60:40:30) NPK kg ha^{-1}), stand first in position and T_5 (100% RDN through green leaf manure + Decomposed cow dung enriched with rock phosphate amendment (7.59q ha^{-1}), stand in second order of preference. However, treatment T_4 comes in next in order. Therefore, it may be concluded that treatment T_8 (100% RDF (60:40:30) NPK kg ha^{-1}) may be prefer for higher growth and yield in rice.

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