



RESEARCH ARTICLE

AGRO-MORPHOLOGICAL CHARACTERIZATION OF FARMERS' VARIETIES OF RICE
(*Oryza sativa* L.) FOLLOWING DUS GUIDE LINES

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ARTICLE INFO

Article History:

Received 16th June, 2017
Received in revised form
20th July, 2017
Accepted 23rd August, 2017
Published online 29th September, 2017

Key words:

Agro-morphological characterization,
Farmers' varieties of rice,
DUS test, PPV &FR.

ABSTRACT

The present study was carried out to characterize seventy five farmers' varieties of rice using twenty nine agro-morphological characters following DUS guide lines during *Rabi* 2012. A majority of varieties found to possess green basal leaf sheath colour (70), medium pubescence of leaf blade (38), presence of auricles (72) with light purple colour (66), split shape (74) and light purple (65) colour of ligule, semi erect attitude at early (39) and late (44) stages of flag leaf, late time of heading (39), absence of anthocyanin colouration of lemma apex (50) and stem nodes (64), white colour (57) of stigma, medium stem length (43), medium length (43) and semi-straight curvature (50) of panicle main axis (49), medium density of pubescence (35) and white colour tip (33) of lemma, absence (42) and tip only distribution (23) and yellowish white colour (22) of awns, semi erect attitude (48) and well exerted (34) panicle, straw colour sterile lemma (69), medium 1000 grain weight (38) and decorticated grain length (44), narrow decorticated grain width (75), short slender decorticated grain shape (60), white colour decorticated grain (33) and absence of decorticated grain aroma. This study will be useful for breeders, researchers and farmers to identify and choose the restoration and conservation of beneficial genes for crop improvement and also to seek protection under Protection of Plant Varieties and Farmer's Rights Act.

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Citation: Swapna, K., Farzana Jabeen, Subba Rao, L.V. and Sruthi, K. 2017. "Agro-morphological characterization of farmers' varieties of rice (*oryza sativa* L.) following dus guide lines", *International Journal of Current Research*, 9, (09), 56980-56986.

INTRODUCTION

Rice (*Oryza sativa* L.) is the most important cereal of the world providing 21% of global human per capita energy and 15% of per capita protein (Maclean et al., 2002). The process of dispersal during domestication, rice has evolved into a tremendously broad base for genetic diversity as reflected by number of land races existing today (Shivapriya and Hittalmani, 2006). India is one of the centres of origin for rice, a large number of native varieties and landraces having unique characteristics and great adaptability are grown in different agro-climatic zones. Characterization of germplasm is very important for identifying new genes and further useful for varietal identification. Rao et al. (2013) characterized sixty-five land races of rice for the establishment of the distinctness among land races and concluded that characterization would be useful for conservation of beneficial genes for getting protection under Protection of Plant Varieties and Farmer's Rights Act. But, limited work has been done on characterization of local rice land races.

Therefore, systematic attempts have to be made to make a total inventory of this valuable gene pool for quantifying the availability of new useful genes of this resource. Besides, it is very important to protect bio-piracy and geographical indications and issues related IPR. Therefore, the present experiment was undertaken to study the qualitative agro-morphological characterization of seventy five farmers' varieties of rice.

MATERIALS AND METHODS

Seventy five rice farmers' varieties were obtained from different districts of Orissa given in Table 1 and transplanted in the Randomized Block Design with 3 replications during *Rabi*, 2012 at DRR farm, ICRISAT Campus, Patancheru, Hyderabad, situated at 17.53° N latitude, 78.27° E longitude and altitude of 545m above mean sea level. In each replication, single seedling was transplanted per hill in 6 rows with 20 x 20 cm spacing. All necessary cultural operations and management practices were employed as and when necessary. Observations were recorded according to the National Test Guidelines for DUS test in rice which was developed by Directorate of Rice Research Rajendranagar, Hyderabad. The observation of

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various characteristics was recorded at different stages of growth with appropriate procedures as per the DUS test guidelines of PPV & FR Act, 2001. The traits studied were Basal leaf Sheath colour, Pubescence of Leaf blade surface, Auricles, Anthocyanin colouration of auricles, Shape of ligule, Colour of ligule, Attitude of Flag leaf blade, Time of heading, Anthocyanin colouration of apex of lemma, Colour of stigma, Stem Length, Anthocyanin colouration of nodes, Panicle length of main axis, Curvature of Panicle main axis, Colour of awns, Density of pubescence of lemma, Colour of tip of lemma, Panicle awns, Distribution of awns, Attitude of panicle branches, Panicle exertion, Sterile lemma colour, 1000 grain Weight, Decorticated grain length, Decorticated grain width, Decorticated grain shape, Decorticated grain colour, Decorticated grain Aroma.

strong anthocyanin colouration on lemma apex. Fifty seven varieties showed white colour, 3 varieties light purple and 15 varieties showed purple colour stigma. Very short stem length found in 2 varieties, short in 22 varieties, medium in 43 varieties and 8 varieties have long stem length. 64 varieties were exhibited no anthocyanin colouration and 11 varieties exhibited anthocyanin colouration on stem nodes. one variety with very short length, 17 varieties were with short length, 43 were with medium, 12 were with long and 2 varieties have very long length main axis of panicles. Five varieties showed straight main axis, 50 varieties semi-straight, 8 varieties deflexed and 12 varieties exhibited drooping curvature of panicle axis. Out of seventy five varieties 33 varieties possessed awns, among these 33 varieties, 22 varieties were exhibited yellowish white, one variety yellowish brown, one

Table 1. Details of farmers' varieties of rice in the study

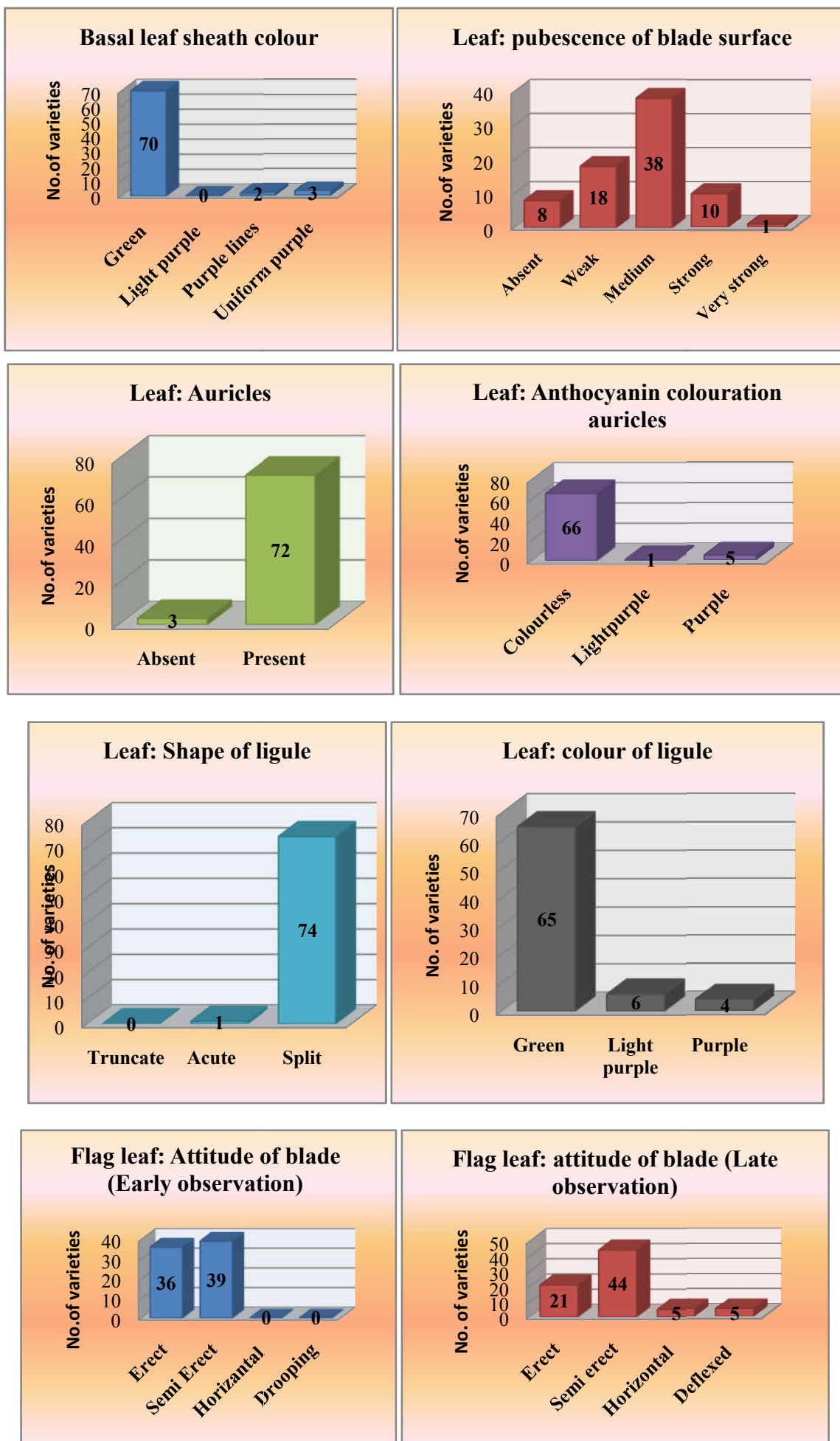
S. No.	Name of the farmers' variety	Place of collection	Sl.No	Name of the farmers' variety	Place of collection	Sl. No	Name of the farmers' variety	Place of collection
1	Kohila	Nuapada	26	Bodikaberi	Malkangiri	51	Kalajira	Sambalpur
2	Bitisapari	Nuapada	27	Bakka	Malkangiri	52	Malkadua	Sambalpur
3	Kantadomer	Nuapada	28	Kakudimanji	Malkangiri	53	Saria	Sambalpur
4	Kusuma	Nuapada	29	Kalachudi	Malkangiri	54	Bagadachinamal	Sambalpur
5	Biramani	Nuapada	30	Umurichudi	Malkangiri	55	Pnenin	Sambalpur
6	Kharakoili	Nuapada	31	Pugakals	Malkangiri	56	Padma	Ganjam
7	Setka	Nuapada	32	Butachudi	Malkangiri	57	Mahulakunchi	Ganjam
8	Gelei	Nuapada	33	Butasori	Malkangiri	58	Katakichampa	Ganjam
9	Lalgori	Kalahandi	34	Ratanchudi	Malkangiri	59	Govindabhoga	Ganjam
10	Hiran	Nuapada	35	Sikla	Malkangiri	60	Kundo	Raigada
11	Chinger	Nuapada	36	Khursudi	Malkangiri	61	Dasaharadhan	Raigada
12	Paugi	Nuapada	37	Kinari	Malkangiri	62	Parakunja	Raigada
13	Danisaria	Baragarh	38	Kanakamasuri	Malkangiri	63	Bhattasakuli	Raigada
14	Karni	Baragarh	39	Marfal	Malkangiri	64	Kandsuri	Raigada
15	Harishankar	Baragarh	40	Lalkain	Kalahandi	65	Kading	Raigada
16	Dengabari	Baragarh	41	Pora	Kalahandi	66	Asumakundo	Raigada
17	Khandabhutta	Keonjhar	42	Sitabhog	Kalahandi	67	Kakudia	Raigada
18	Malati	Keonjhar	43	Gotra B	Kalahandi	68	Guakati	Sundargarh
19	Kainchi	Keonjhar	44	Sunakhadi	Kalahandi	69	Samudra	Sundargarh
20	Keral	Keonjhar	45	Sadhana	Kalahandi	70	Agnyasal	Sundargarh
21	Badrangi	Keonjhar	46	Badkleshari	Malkangiri	71	Kalagoda	Sundargarh
22	Chingudi	Keonjhar	47	Jaygopal	Kalahandi	72	Chheligudi	Keonjhar
23	Jhitpiti	Keonjhar	48	Basantinhog	Sambalpur	73	Aganisali	Keonjhar
24	Kabirangi	Keonjhar	49	Karnga	Sambalpur	74	Baikani	Cuttack
25	Kanhei	Malkangiri	50	Raajamani	Sambalpur	75	Mahulata	Cuttack

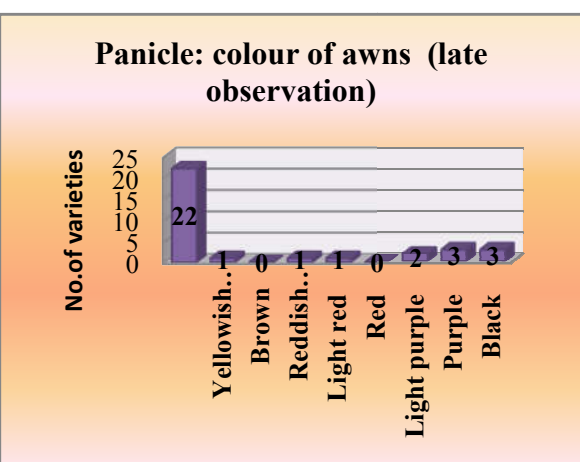
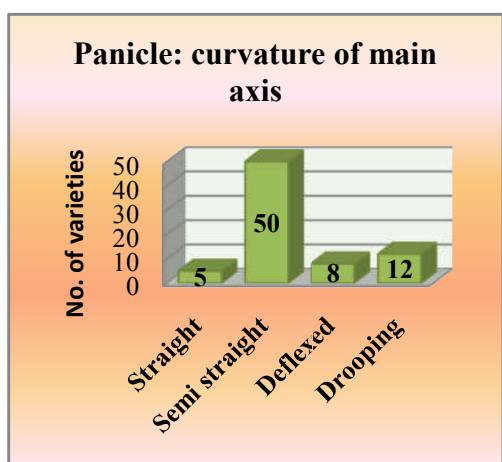
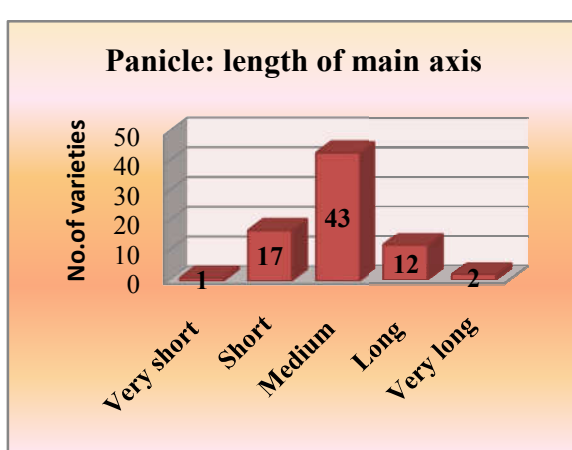
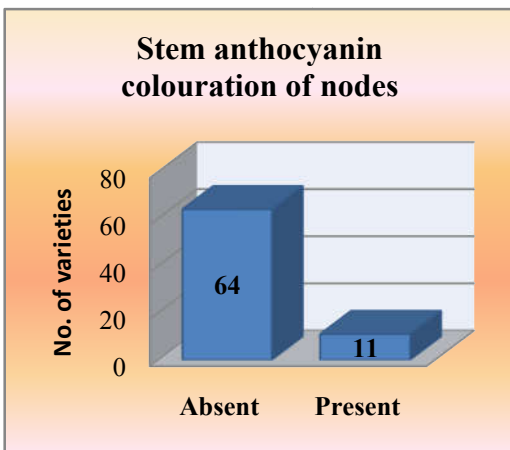
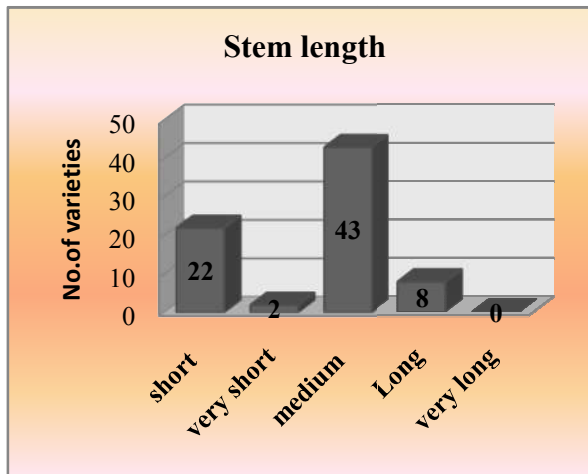
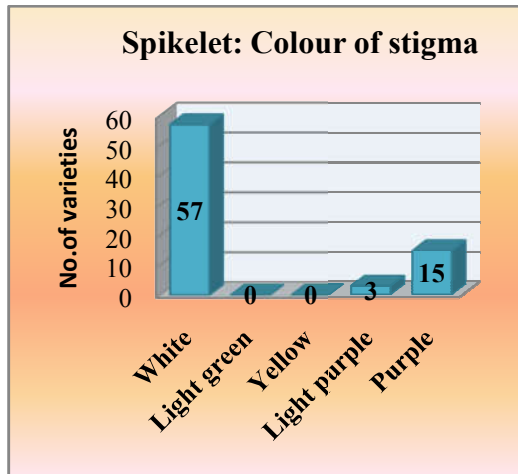
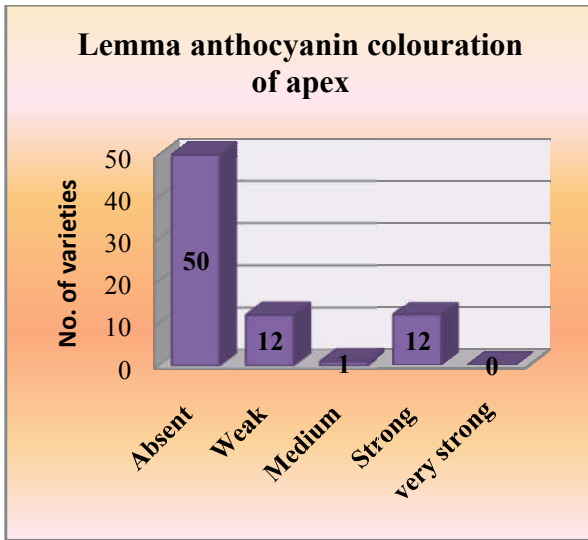
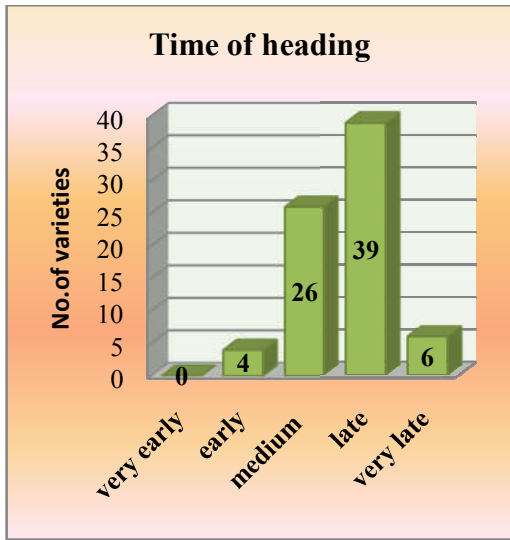
RESULTS AND DISCUSSION

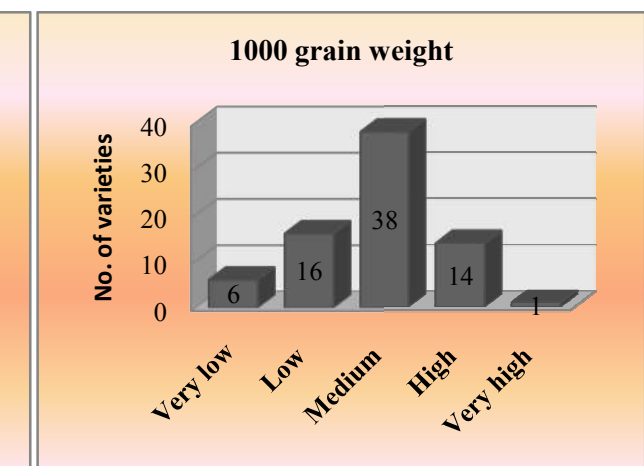
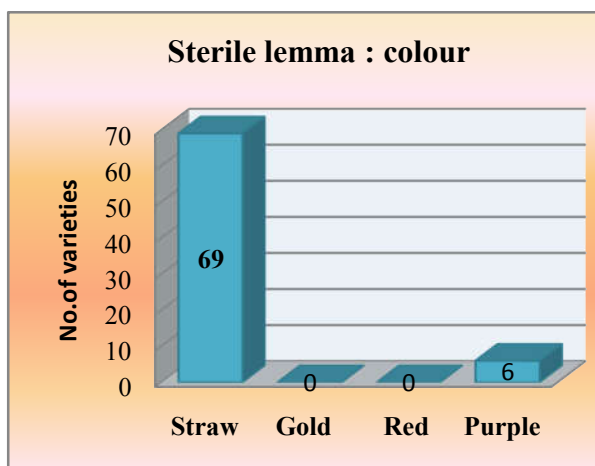
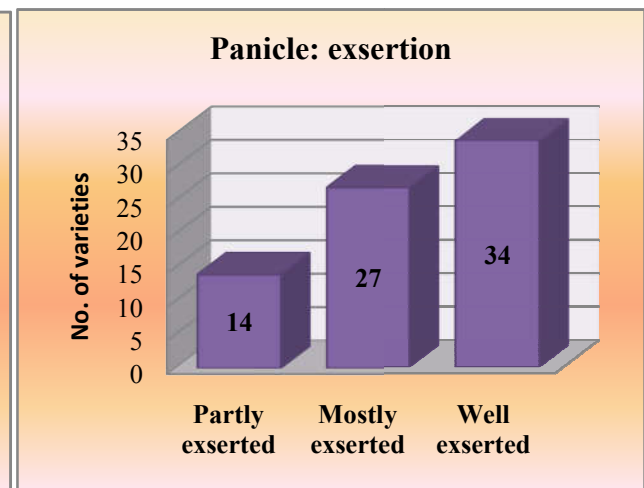
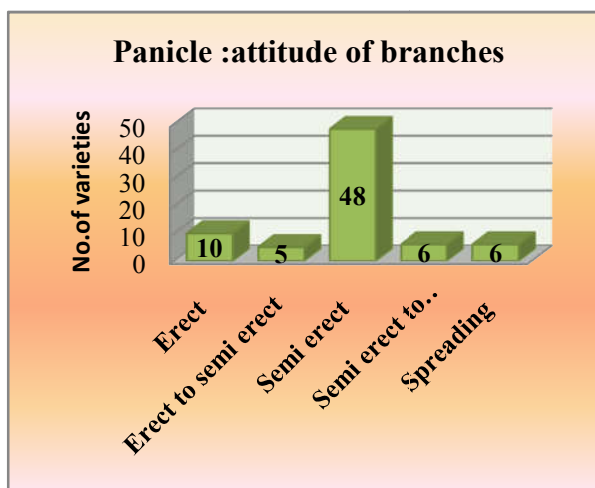
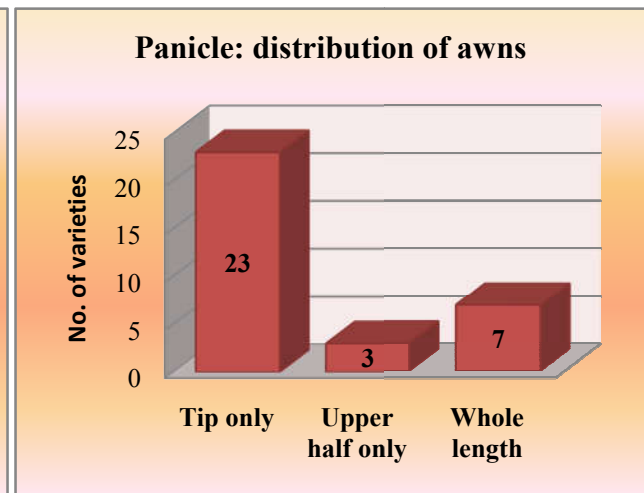
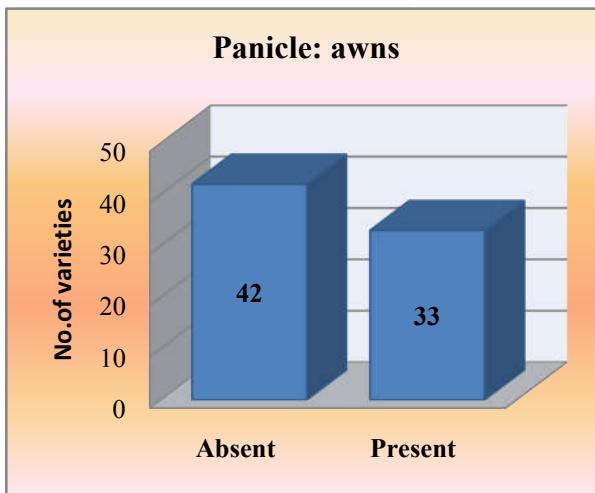
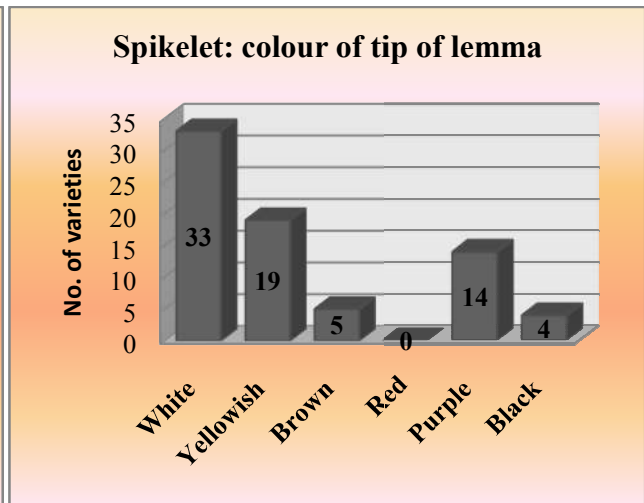
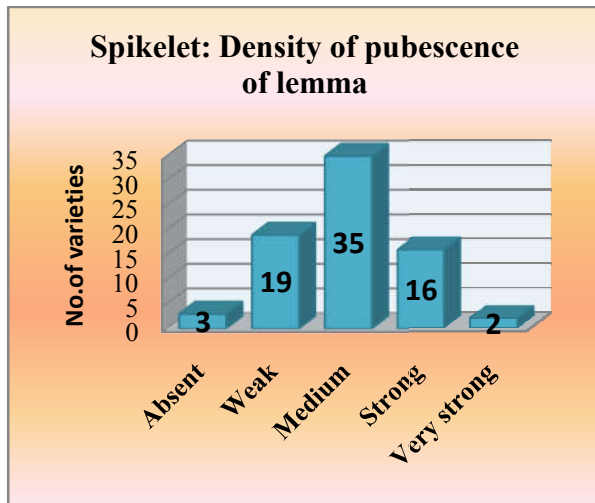
To establish distinctiveness among rice cultivars, 29 characters have been used. Qualitative characters are considered as morphological markers in the identification of landraces of rice, because they are less influenced by environmental changes. Among all seventy five varieties 70 varieties showed green colour, 2 varieties purple lines, 3 varieties showed uniform purple basal leaf sheath colour. 8 varieties showed absence of pubescence, 18 with weak, 38 with medium, 10 with strong and 1 variety showed very strong pubescence on the leaf blade surface. 72 varieties with auricles and 3 varieties without auricles, among these 72 varieties 66 varieties were exhibited colourless, one variety light purple and 5 varieties purple anthocyanin colouration on auricles. Seventy four varieties showed split shape and 1 variety showed acute ligule shape. Truncate ligule shape was not found in these varieties. 21 varieties exhibited erect, 44 varieties semi-erect, 5 varieties horizontal and 5 varieties deflexed attitude of flag leaf blade at late observation. 4 varieties showed early heading, 26 varieties exhibited medium, 39 varieties late and 6 varieties exhibited very late time of heading. Among all seventy five varieties 50 varieties were exhibited no anthocyanin colouration, 12 varieties weak, 1 variety medium and 12 varieties showed

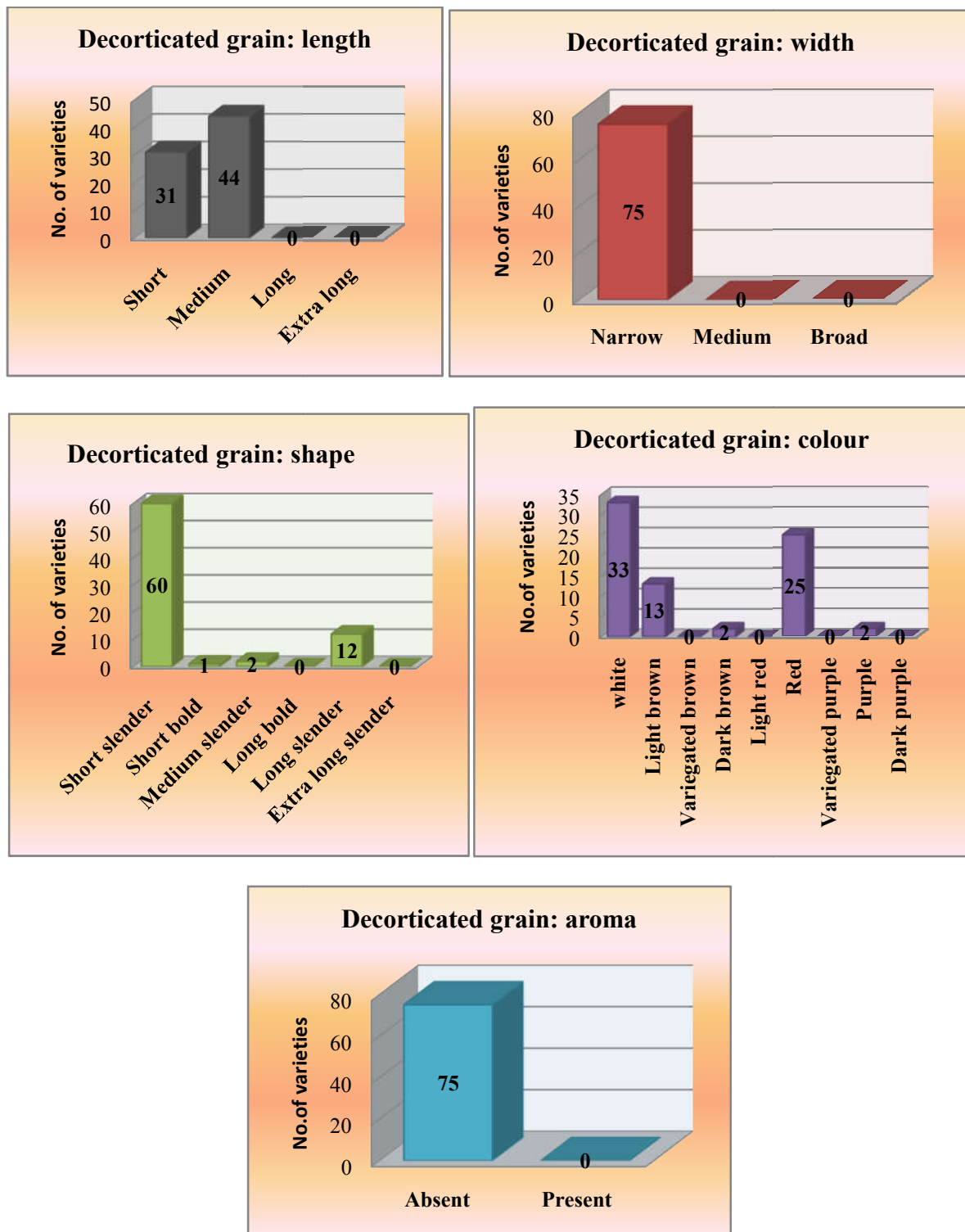
variety reddish brown, one variety with light red, 2 varieties light purple, 3 varieties purple and 3 varieties were possessed black colour awns. 3 varieties were found with absence of pubescence, 19 with weak, 35 with medium, 16 with strong and 2 varieties showed very strong density of pubescence of lemma. Thirty three varieties showed white colour, 19 varieties yellowish, 5 varieties brown colour, 14 varieties purple and 4 varieties showed black colour of tip of lemma. 33 varieties were with awns and 42 varieties were awnless, among these 33 varieties distribution of awns found tip only in 23 varieties, upper half only in 3 varieties and whole length in 7 varieties. 10 varieties exhibited erect, 5 varieties erect to semi-erect, 48 varieties semi-erect, 6 varieties semi-erect to spreading and 6 varieties exhibited spreading attitude of panicle branches. 14 varieties were exhibited partly exerted panicle, 27 varieties mostly exerted and 34 varieties exhibited well exerted panicles. Sixty nine varieties showed straw colour and 6 varieties showed purple colour sterile lemma. very low 1000 grain weight found in 6 varieties, low in 16 varieties, medium in 38 varieties, high in 14 varieties and 1 variety had very high 1000 grain weight. Out of seventy five varieties 31 varieties were possessed short length and 44 varieties medium decorticated grain length. All seventy five varieties possessed narrow width of decorticated grain. 60 varieties were showed

1. Frequency tables of Agro-morphological characters of rice varieties









Short slender shape, one variety with short bold, 2 varieties medium slender and 12 varieties showed long slender shape decorticated grain. 33 varieties were possessed white, 13 varieties light brown, 2 varieties dark brown, 25 varieties red and 2 varieties purple coloured decorticated grain. All seventy five varieties were found without aroma. Characterization of the present experimental material thus revealed considerable variability for most of the morphological characters, indicating their utility in rice variety improvement programme and also useful for breeders, researchers and farmers to identify and choose the restoration and conservation of beneficial genes for crop improvement and also to seek protection under Protection of Plant Varieties and Farmer's Rights Act. These results are in conformity with the reports of Nascimento *et al.* (2011),

Chakrabarty *et al.* (2012), Parikh *et al.* (2012), Sinha and Mishra (2013) and Sarawgi *et al.* (2013). Frequency tables of twenty nine morphological characters of seventy five varieties presented in Figure 1.

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