

HD 3086: A new wheat variety for irrigated, timely sown condition of North Western Plains Zone of India

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Abstract

A new bread wheat variety, HD3086 (Pusa Gautami) has been released and notified by the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agricultural Crops, Government of India for commercial cultivation under timely sown irrigated conditions of North Western Plains Zone (NWPZ) of the country. HD 3086 has average yield of 5.46 t/ha with yield potential of 7.1 t/ha under timely sown irrigated conditions and showed superiority over checks. It is resistant to yellow rust and brown rust. It has shown superior quality parameters with protein content (12.5%), a sedimentation value (45 ml), best Glu-1 Score (10/10) and good extraction rate (70.5%) meeting all the criteria for superior bread making qualities. This variety has promise for timely sown irrigated planting areas and thus will contribute to increasing wheat production and will alleviate the socio-economic status of farmers of north-western plains in India.

Keywords: Bread wheat, yield, timely sown irrigated condition, disease resistance and quality traits.

1. Introduction

Wheat is the most important food crop of the world. It provides food to 36 per cent of the global population and 20 per cent of the food calories. Wheat cultivation in India is around 29.5 million hectares with the production of 92.3 million tones (Anonymous, 2013). Majority of the wheat area of NWPZ falls under timely sown irrigated crop conditions, in this area needs to resistance with yellow rust and tolerance to terminal heat stress. Improving grain yield is the ultimate aim of wheat improvement programme in India. Yield increase may be effectively tackled on the basis of performance of yield components and related characters.

Development and notification of HD3086: The variety HD 3086 was developed from the cross DBW 14/HD 2733//HUW 468 following modified bulk method. The HD3086, developed by the Division of Genetics, Indian Agricultural Research Institute, New Delhi was released by the Central Sub-Committee on Crop Standards, Notification and Release of Varieties for Agriculture Crops and notified vide S. O. 224 E dated 24th January 2014 for commercial cultivation

under irrigated, timely sown conditions of the North Western Plains Zone (NWPZ) which is largest wheat growing zone of the country and comprises state of Punjab, Haryana, Delhi, Rajasthan (Except Kota and Udaipur Divisions), Western Uttar Pradesh (Except Jhansi Division), Jammu & Kathua district of Jammu & Kashmir, Una district & Paonta Valley of Himanchal Pradesh and Tarai region of Uttarakhand.

Yield superiority and adaptability: This variety was entered in coordinated evaluation trial (NIVT) during 2010-11. Under coordinated trials of AICW & BIP, HD 3086 was evaluated at 55 location during 2010-11 to 2012-13 out of which it occurred 24 times in the first non-significant group indicating its wider adaptability and stable yielding feature (Table 1). HD 3086 has produced an average yield of 54.56 q ha⁻¹ and showed significant superiority of yield over checks variety DBW 17(4.19%). It recorded the yield potential of 71.1q ha⁻¹ at Shikohpur in 2011-12 under timely sown irrigated condition. HD 3086 was early in flowering

Table 1. Summarized yield data of coordinated trials

Item	Year of testing	No. of trials	Proposed Variety		Checks			C. D.
			HD 3086	DBW17	DPW621-50	HD2967	WH1105	
Mean Yield q/ha	2010-11	10	53.8	50.0*	-	-	--	2.7
	2011-12	24	56.6	54.7*	55.4*	-	55.5	0.9
	2012-13	22	52.6	50.6*	53.0	53.3	53.9	1.0
	Mean	--	54.33	51.77	54.2	53.3	54.70	
	Weighted Mean	--	54.56	52.28	54.28	53.30	54.75	--

Table 2. Adaptability to changes in agronomic conditions (2012-13)

Experiment / Item	Agronomic Conditions	Proposed variety		Checks									
		HD 3086		DBW17		DPW621-50		HD2967		PBW550		WH1105	
		Yld	Rk	Yld	Rk	Yld	Rk	Yld	Rk	Yld	Rk	Yld	Rk
Yield (q/ha)	Timely Sown	53.54	4	55.06	1	53.33	6	51.88	7	54.33	2	53.43	5
	Late Sown	43.54	4	44.83	1	44.28	3	42.36	6	42.55	5	42.06	7
	Mean	48.54	4	49.94	1	48.80	3	47.12	7	48.44	5	47.75	6
Yield (q/ha) under recommended condition		53.54	4	55.06	1	55.33	6	51.88	7	54.33	2	53.43	5
Percentage loss over recommended condition		-18.68		-18.58		-16.97		-18.35		-21.68		-21.28	

CD ($P=0.05$). SOWING(A) = 0.52; VARIETY (B) = 1.28; (B within A) = NS; (A within B) = NS

(99 days), maturity (143days) as compared to all the check varieties and possessed boldest grains (TGW 39.0g).

Distinguishing morphological characteristics: Wheat variety HD3086 has semi-erect growth habit and green foliage colour and anthocyanin pigmentation was absent on coleoptile at boot stage. It has semi-erect medium sized having green flag leaf, medium hairy auricles and waxiness was weak on sheath and blade. Peduncle of HD3086 is medium, bent, dense, white coloured non-waxy spike which bear medium white awn. The lower glume has narrow sloping shoulder with long straight beaks. HD3086 possesses amber coloured, oblong, medium sized, hard grain with medium germ width.

Performance in agronomical evaluation: In the agronomical trials of NWPZ conducted under timely sown conditions, HD3086 showed superior performance (53.54 qha⁻¹) in comparison to PBW 621-50 and WH 1105. The phenotypic plasticity of HD3086 is evident from the minimum reduction in yield (18.68 %) as observed under late condition compared to new release variety WH1105 (21.28%). HD 3086 also had highest number of ear-head/m² area under timely and late sown condition compared to all the check varieties. 1000 grain weight under timely sown condition was higher with all check and late sown condition also was higher with all check except PBW550.

Resistance to major disease and pest: In the NWPZ, yellow rust is the main yield reducing biotic factor. HD3086 has higher degree of resistance to yellow rust (ACI 5.3) as compared

to the check DBW 17 (ACI 31.6), DPW621-50 (ACI 20.0) and HD 2967 (ACI 15.1) only WH1105 (ACI 4.4) has sown resistance among all the checks during multi location evaluation. The race specific APR response analysis and SRT against 78S84 and 46S119 pathotype of stripe rust showed high level of resistance in HD3086 at adult plant and seedling stage. HD 3086 also showed resistance reaction to APR study with brown rust pathotype 77-5 and 104-2. In addition, HD3086 also showed resistance reaction to powdery mildew, loose smut and flag smut.

Grain quality: HD3086 has quality parameters as indicated by grain appearance (score 6.2), hectoliter weight (76.9kg/hl) and perfect 10/10 Glu-1 score compared to the check varieties. It also possesses good protein content (12.8%) and comparable sedimentation value of 45ml. It meets all desirable components of better bread and biscuit making qualities that makes it also favorable for industrial purpose.

In nutshell, the high yield potential of variety HD3086 coupled with stress tolerance and plasticity for showing time with resistance to major insect pest and disease makes this variety a suitable choice for the farmers of Punjab, Haryana, Delhi and Western Uttar Pradesh and other part of NWPZ.

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