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UPSCALING OF NEW WHEAT VARIETIES IN SEED CHAIN FOR ENHANCED PRODUCTIVITY

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ABSTRACT

Breeder seed (BS) indents reflect the adoption of new varieties in the seed chain, and it is always desired that a higher varietal replacement rate and lower varietal age be maintained to ensure higher productivity. Seed acts as a vehicle to carry improved technologies at farmers' doorstep. Wheat is one of the crops in India where elevated productivity is being achieved through the release of new varieties and further inclusion of such varieties in the seed multiplication chain. Efforts are streamlined to provide seeds of the new varieties to the farmers to accelerate the seed replacement rate and ensure the wheat breeding programme achieves the transfer of genetic gains. Although certain old varieties like Lok1, PBW-343, PBW-373 and PBW-226 continue in breeder seed indents, several new wheat varieties are available, which can replace the old ones.

INTRODUCTION

Development, deployment and diffusion of efficient technologies in terms of climate resilience and high yielding varieties/hybrids are required to attain desired growth in agricultural production (Singh *et al*., 2020). Seed is the primary and most effective agricultural input, and quality seeds of improved varieties play a crucial role in crop production (Chauhan *et al*., 2016). Genetic enhancements made by crop improvement can be translated into higher productivity by deploying newly developed varieties at farmers' fields. Development and deployment of high yielding resistant varieties in the seed chain is the most effective and economic way to improve production and productivity. ICAR-IIWBR is a nodal agency to coordinate breeder seed production of wheat through 35 BSP centres spread across the country. Various government agencies, including the Department of Agriculture Cooperation and Farmers Welfare, are being made to phase out old varieties from the seed chain.

SHARE OF BREEDER SEED INDENTS BY DIFFERENT INDENTING AGENCIES

During 2020-21, a breeder seed indent of 17066.35q of 163 wheat varieties was received from the Department of Agricultural Cooperation & Farmers' Welfare, New Delhi, for production and supply to fourteen states, six public sector agencies (NSC, IFFDC, Kribhco, NFL, Hindustan Insecticide Ltd. and NAFED) and National Seed Association of India (NSAI). Among the indenting agencies, private seed companies under the umbrella of NSAI has a maximum indent of 4511.50q, followed by Uttar Pradesh (2985.0 q), Madhya Pradesh (2511.30q) and NSC (1423.00q). The maximum indent was received for HD 3086 (1700.60q), followed by HD 2967(1659.00q) and DBW187 (1617.35q) (Anonymous, 2021a).

In the total BS Indent, four indenting agencies *viz*., NSAI (55.68%) followed by Maharashtra (15.52%), Chhattisgarh (12.93%), Uttarakhand (5.17%) and National Seed Corporation (4.23%) contributed to the tune of a total 1159.70q of the indent of more than 20 years old (24) varieties during 2020-21 (Table 1). Out of total breeder seed indent, 84.77 % share is from the 10 years old varieties, 8.44% share is from 10-20 years old varieties, and only 6.8% share is from more than 20 years old varieties (Anonymous, 2021b).

TOP TEN INDENTED WHEAT VARIETIES IN SEED CHAIN DURING 2020-21

All the top ten indented varieties which share >55% in the total indent are less than 7 years old except HD-2851(Pusa Vishesh), released in 2005, which has 352.10q (9^{th} rank) of breeder seed indent mainly given by NSAI (Table 2). The most prominent variety in seed chain is Pusa Gautami (HD-3086), released in 2014 by ICAR-IARI, New Delhi, having an indent of 1700 q, followed by HD-2967 released in 2014 by ICAR-IARI, New Delhi. However, recently released varieties DBW-187 (2019), HD-3226 (2019) and DBW-222 (2020) also showed higher preference by indenting agencies having indent of 1659 q, 1151 q and 506.3q, respectively.

Table 1: Percent share of indenting agencies in total breeder seed indent of wheat *(2020-21)*

Agency	Total Indent	10 years old	10-20 years old	>20 years old
NSAI	4511.40	3116.25	747.55	645.70
% share	***26.43***	***21.54***	***51.90***	***55.68***
Chhattisgarh	758.90	349.00	259.90	150.00
% share	***4.45***	***2.41***	***18.05***	***12.93***
NSC	1423.00	1265.00	109.00	49.00
% share	***8.34***	***8.74***	***7.57***	***4.23***
Maharashtra	287.00	98.50	8.50	180.00
% share	***1.68***	***0.68***	***0.59***	***15.52***
Uttarakhand	434.00	360.00	14.00	60.00
% share	***2.54***	***2.49***	***0.97***	***5.17***
Total Indent	**17066.35**	**14466.4**	**1440.25**	**1159.70**
Total Production	**20146.24**	**16816.55**	**1688.39**	**1641.3**

Table 2: Top ten indented wheat varieties and their breeder seed production 2020-21

S. No.	Variety	Year of Notification	DAC Indent	Breeder Seed Production
1	Pusa Gautami (HD 3086)	2014	1700.60	1528.80
2	HD 2967	2014	1659.00	1734.00
3	DBW 187 (Karan Vandana)	2019	1617.35	2315.00
4	Pusa Yashasvi (HD-3226)	2019	1151.30	1175.00
5	HI 8759 (Pusa Tejas)	2017	846.20	420.00
6	RAJ-4238	2016	676.40	807.41
7	Unnat PBW-343(PBW-723)	2017	593.00	620.00
8	DBW 222	2020	506.30	880.00

9	HD-2851(PusaVishesh)	2005	352.10	360.00
10	JW-3382	2016	308.40	502.00
	Total		**9410.65**	**10342.21**
	Per cent share		**55.1%**	**51.3%**

(source: www.seednet.gov.in)

NEW VARIETIES AVAILABLE FOR REPLACEMENT OF OLD VARIETIES IN WHEAT

Out of 35 breeder seed production centres, three centres *viz*., GBPUA&T, Pantnagar, Lokbharati and ARS, Vijapur contributed to the tune of 81.53 % of breeder seed production of old varieties which are more than 20 years old. Varieties such as LOK-1, PBW-343, PBW-373, PBW-154, PBW-226, GW-273 and GW-496 are still produced by the above centres, which need to be streamlined efforts should be made to phase out these old varieties from the seed chain. Although DAC&FW receives breeder seed indents for above obsolete varieties, GOI, alternative varieties are available, which needs to be promoted by line departments among farmers through FLD's and extension activities.

Table 3: New varieties available for replacement of old varieties in wheat

Variety	Best Replacement	Year of release
Lok-1 (Timely Sown) (CZ)	MP-3382 (MP)	2016
	GW-451 (Gujarat)	2016
	CG-1018 (Chhattisgarh)	2019
Lok-1(Late Sown) (CZ)	CG-1015	2016
	RAJ 4238	2016
	CG-1029	2021
	HI-1634	2021
PBW-343 (Timely Sown)- NWPZ and NEPZ	DBW-187	2020
	HD 3086	2014
PBW-154 (Timely Sown)	DBW-222	2020
	HD-3226	2019
	DBW-187	2020
PBW-373 and PBW-226 (Late Sown)	PBW-771 (LS)	2020
	DBW-173 (LS)	2018
	PBW-752 (LS)	2019
GW-496 (Timely Sown)	GW-451 (Gujarat)	2016

(NWPZ: North Western Plain Zone and NEPZ: North Eastern Plain Zone and CZ: Central Zone)

DBW-187

DBW-222

CONCLUSION

Over time, it is obvious that an old variety becomes susceptible to new diseases and pests, leading to lower yield potential. Farmers accept new varieties/ technologies considering cropping patterns, market value of final produce and availability of resources. New varieties are released considering these factors and thorough multi-location testing across the recommended agro-climatic zones. Due to mega variety status and consumer preference, certain varieties are cultivated by farmers and included in the seed chain. However, many other varieties are available for replacement, which can be promoted among farmers for enhanced productivity.

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