krishna.singh1976@gmail.com

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Varietal screening of wheat varieties for yield performance against disease resistance for the farmers of district Bijnor (U.P.)

K.K. Singh

Krishi Vigyan Kendra, Bijnor (U.P.)–246 762

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ABSTRACT : A study was undertaken to evaluate the resistance of wheat varieties HD-3059, DBW-90, DBW-71, DBW-16, and PBW-373 against rust diseases and their effect on yield, during Rab-2015-16. Wheat varieties HD-3059 and DBW-90 were produced significantly higher yield of 47.75 qt/ha and 46.50, higher resistance to stripe rust while the old varieties PBW-373 and PBW-226 produced grain yield 35.45 and 38.65 qt/ha with higher susceptibility against rust disease.

Key Words : Wheat (*Triticum aestivum*) varieties, HD-3059 and DBW-90, screening, yield performance, stripe rust disease resistance.

Wheat is the pre-eminent among the world's crops with regards to its antiquity and its importance as a staple food of mankind. Thus wheat plays an important role in food security and poverty alleviation as a strategic crop and has an important role in economy (Anonymous, 1999-Cereal Annual Report) ICARDA Aleppo, Syria. Blum (1988) suggested that breeding for tolerance to drought involves combining good yield potential and the selection of traits that provide drought stress tolerance. India one of the greatest success stories of green revolution is the second largest producer of wheat in the world after china and contributes more than 12% to the global wheat basket. Wheat is the second most important crop after rice in India. In India wheat is grown in about 314.65 lakh ha area with an average productivity of 2750 kg /ha (2014-15), according to Annual Report of Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare Government of India-2016-17. Out of which around one-third (about 11.0 m ha) lies in the state of Uttar Pradesh alone. The productivity of the state is close to the national average as the major constraints are cultivation of old low yielding and disease susceptible varieties, and adoption of poor wheat production technologies. In Bijnor district total area under wheat is about 115000 to 118000 ha. The choice of right varieties under late sown condition is one of the crucial points determining the yield of wheat. The yield and productivity of late sown wheat varieties is less or stagnant due to farmers unawareness about high yielding and disease resistant varieties.

Materials and Methods

The trial was conducted at the Technology Park of Krishi Vigyan Kendra Bijnor, during Rabi 2015-16 to investigate the relative resistance of different wheat varieties against rust disease. In present Study six varieties of wheat namely, HD-3059, DBW-90, DBW-71, DBW-16, and PBW-373 were assessed under unsprayed conditions for their resistance/tolerance against rust disease. Sound seed was sown with a standard plant to plant 20 cm and row to row distance of 15 cm. All the other standard agronomic practices were applied uniformly to each plot. Observations data was recorded according to as per norms.

Results and Discussion

Disease reaction

One of the major objectives of this study is to select the suitable wheat varieties which are resistant to strip rust and other diseases for the district Bijnor. Selected varieties in this study showed different level of susceptibility and resistance to stripe rust (Table-1). Variety HD-3059 and DBW-90 showed high resistance to stripe rust. Variety DBW-16 (8-10% infested to rust) and PBW-373 (14-18% infested to rust) showed Low resistant to stripe rust. Disease reaction is the second most important reason after grain yield. Variety HD-3059 and DBW-90 perform outstandingly in term of disease resistance and better grain yield, so that these varieties will be multiplied and disperse the maximum area in district Bijnor for better yield.

Yield and Economics of wheat varieties

From the data in Table-1 it is quite clear that the per cent increase in the yield over local check FP (PBW-343) 34.19, 31.17, 13.25, and 10.71 for HD-3059, DBW-90, DBW-16, and DBW-71, respectively. The seed yield increased significantly in the range of 39.25 to 47.75 qt/ha in wheat varieties as compared to farmers practice (35.45 qt/ha). This indicates that field demonstrations are quite successful in bridging up yield gaps between improved and farmer practices (Rana *et al.*, 2002). Singh and Rana (2006) reported that seed yield increased up to 20.70 qt/ha by Pusa Barani variety of mustard crop. Singh *et al.* (2013) reported varietal differ-

Table-1: Performance of wheat varieties against disease resistance and better yield.

Name of variety	Releasing year	Potential yield of variety (qt/ha)	Yield (qt/ha)	Yield gap (qt/ha)	Yield incr-eased (% over Check)	Net Return (Rs/ha)	B:C Ratio	Incidence of diseases (%)
HD-3059	2013	59.40	47.75	11.65	34.69	71668.30	2.70	0
DBW-90	2014	66.60	46.50	20.10	31.17	66927.50	2.56	0-2
DBW-71	2013	68.90	39.25	29.65	10.71	49998.75	2.16	0-4
DBW-16	2005	45.00	40.15	4.85	13.25	50735.25	2.15	8-10
Average	**–**	**–**	**43.41**	**16.5625**	**22.455**	**59832.45**	**2.3925**	**–**
PBW-373	1996	43.90	35.45	8.45	–	39255.75	1.85	14-18

ences in the terms of seed yield and yield gaps between newly and old varieties of wheat in late sown condition. Singh *et al.* (2018) also reported that increasing seed yield in wheat variety HD-3059 in different blocks of district Bijnor.

The economics of evaluated varieties depicted in Table-1, indicate that the net return of wheat varieties over farmers practice ranged from 49998.75 to 71668.30 Rs/ha. It is high in HD-3059 (Rs.71668.30). Singh *et al.* (2013) reported about the additional net return in analysis of timely sown wheat varieties. Singh and Rana (2006), who reported about Rs.13149.00/ha of net return in mustard crop. Singh and Singh (2012) also reported about Rs. 111057.84/ha, of net return in basmati rice.

The benefit cost ratio (Table-1), of wheat variety HD-3059 ranked first (2.70) followed by DBW-90 (2.56), DBW-71 (2.16), and DBW-16 (2.15). Hedge (2006) reported that mustard crop by nature is hardy and mostly grow under rainfed condition can impart stability of production system under harsh condition. The benefit cost ratio of HD-2967 was also higher in all the blocks in comparison to local check in district Saharanpur of Utter Pradesh (Singh and Singh, 2015).

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