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**Ajay Kumar**  
Department of Seed Science & Technology, C.S.A.U.A. & T. Kanpur, Uttar Pradesh, India

**Jai Prakash Gupta**  
Institute of Agriculture Sciences, Bundelkhand University Jhansi, Uttar Pradesh, India

**Pankaj Kumar**  
Department of Seed Science & Technology, C.C.S. University Meerut, Uttar Pradesh, India

## Performance of wheat (*Triticum aestivum* L.) varieties regarding seed quality parameters

**Ajay Kumar, Jai Prakash Gupta and Pankaj Kumar**

### Abstract

An experiment was carried out at Seed Testing Laboratory, Department of Seed Science & Technology, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur during 2013-14. The freshly harvested varieties of wheat *viz.*, K-307 (V<sub>1</sub>), K-9162 (V<sub>2</sub>), K-8027 (V<sub>3</sub>), K-9107 (V<sub>4</sub>), K-9644 (V<sub>5</sub>), K-402 (V<sub>6</sub>), K-9351 (V<sub>7</sub>), NW2036 (V<sub>8</sub>), K-1006 (V<sub>9</sub>) and DBW-14 (V<sub>10</sub>) were taken from Section of Rabi Cereals, evaluated for various seed quality parameters and vigour tests *viz.*, 1000 Seed / grain weight (g.), standard germination test (%), seedling length (cm.), seedling dry weight (g.), seed vigour index-I, seed vigour index-II, chlorophyll intensity(%), fat content (%), protein content (%), brick gravel test (%) and field emergence test (%). On the basis of performance of ten wheat variety K8027 stood first position, K9162 on second, K1006 on third, K9644 on fourth and K9107 on fifth position, remaining other five varieties of wheat K0307, K0402, K9351, NW2036 and DBW14 had significantly inferior performance than the other varieties of wheat because these had low vigour during experiment.

**Keywords:** Wheat varieties, seed quality parameters, seed vigour tests etc.

### Introduction

Wheat (*Triticum aestivum* L. em Thell.) is the first important and strategic cereal crop for the majority of world's populations. It is the most important staple food of about two billion people (36% of the world population). Worldwide, wheat provides nearly 55% of the carbohydrates and 20% of the food calories consumed globally. It exceeds in acreage and production every other grain crop (including rice, maize, etc.) and is therefore, the most important cereal grain crop of the world, which is cultivated over a wide range of climatic conditions and the understanding of genetics and genome organization using molecular markers is of great value for genetic and plant breeding purposes. The grass family *Poaceae* (*Gramineae*) includes major crop plants such as wheat (*Triticum aestivum* L.), barley (*Hordeum vulgare* L.), oat (*Avena sativa* L.), rye (*Secale cereale* L.), maize (*Zea mays* L.) and rice (*Oryza sativa* L.). *Triticeae* is one of the tribes containing more than 15 genera and 300 species including wheat and barley. Wheat belongs to the tribe *Triticeae* (= *Hordeae*) in the grass family *Poaceae* (*Gramineae*) in which one to several flowered spikelets are sessile and alternate on opposite sides of the rachis forming a true spike.

Wheat (*Triticum aestivum* L.) is the main cereal crop in India. The total area under the crop is about 29.8 million hectares in the country. The production of wheat in the country has increased significantly from 75.81 million MT in 2006-07 to an all time record high of 95.05 million MT in 2013-14. The productivity of wheat which was 2602 kg/hectare in 2004-05 has increased to 3234 kg/hectare in 2013-14. The major increase in the productivity of wheat has observed in the states of Haryana, Punjab and Uttar Pradesh. Uttar Pradesh stood first in area and production of wheat.

### Material and Methods

The present investigation entitled with "Performance of wheat varieties regarding seed quality parameters". Seed vigour studies were on the ten varieties of wheat (*Triticum aestivum* L.) *viz.*, K-307 (V<sub>1</sub>), K-9162 (V<sub>2</sub>), K-8027 (V<sub>3</sub>), K-9107 (V<sub>4</sub>), K-9644 (V<sub>5</sub>), K-402 (V<sub>6</sub>), K-9351 (V<sub>7</sub>), NW2036 (V<sub>8</sub>), K-1006 (V<sub>9</sub>) and DBW-14 (V<sub>10</sub>). various seed quality parameters and vigour have tested in the Seed Testing Laboratory at Department Seed Science & Technology, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur during 2013-14, for various seed quality parameters and vigour tests *viz.* 1000 Seed / grain weight (g.), standard germination test (%), seedling length (cm.), seedling dry weight (g.), seed vigour index-I, seed vigour index-II, chlorophyll intensity(%), fat content (%), protein content (%), brick gravel test (%) and field emergence test (%) were studied. These were employed in order to find out the suitable varieties in various tests on the basis of their performance and in order to predict the

### Correspondence

**Ajay Kumar**  
Department of Seed Science & Technology, C.S.A.U.A. & T. Kanpur, Uttar Pradesh, India

plant stand producing potentials of the varieties. In order to test the validity of performance of each varieties statistical analysis was done in accordance to Completely Randomised Block Design (CRD) for all the laboratory observation and Randomised Completely Block Design (RBD) for field observation.

**Results and discussion-**

The analysis of present study including various statistical tools with regards to seed vigour studies results so far obtained are being discussed here.

The ten varieties of wheat (*Triticum aestivum* L.) viz., K-307 (V<sub>1</sub>), K-9162 (V<sub>2</sub>), K-8027 (V<sub>3</sub>), K-9107 (V<sub>4</sub>), K-9644 (V<sub>5</sub>), K-402 (V<sub>6</sub>), K-9351 (V<sub>7</sub>), NW2036 (V<sub>8</sub>), K-1006 (V<sub>9</sub>) and DBW-14 (V<sub>10</sub>) were significantly different in all the quality parameters.

These research finding are confirmed by the many researcher as: Chinna and Paul, (1982) [2] in pearl millet, Deshpande and Nayeem (1987) [4], Wani *et al.* (2013) [11] in wheat (*Triticum aestivum* L.), peageon pea (*Cajanus cajan*), Pandey *et al.* (1988) [8] in bottle gourd (*Lagenaria siceraria*), Mahajan and Nayeem (1989) [6] in triticale and wheat, Tomar *et al.* (1990) [10] in lentil (*Lens esculenta*), Dhaiya *et al.* (1997) [3] in chickpea (*Cicer arietinum*), Nautiyal, P. C. (2009) [7] in groundnut (*Arachis hypogea* L.), Singh *et al.* (2002) [9] in rice (*Oryza sativa*), Bhatt *et al.* (2003) in sorghum (*sorghum bicolor*).

Statistical positions of ten varieties of wheat has given in the

following table-1 and table-2 for their performance in various quality parameter and vigour tests viz. 1000 Seed / grain weight (g.), standard germination test (%), seedling length (cm.), seedling dry weight (g.), seed vigour index-I, seed vigour index-II, chlorophyll intensity (%), fat content (%), protein content(%), brick gravel test (%) and field emergence test(%).

The present study revealed that the varieties K-8027, K-9162 and K-1006 were better among ten varieties of wheat (*Triticum aestivum* L.) and they showed significantly higher performance in vigour test as, K-8027 showed significantly maximum value in standard germination (%), seedling length (cm.), seedling dry weight (g.), seed vigour index –I and seed vigour index-II, thus it ranked first position. Next was K-9162 showed maximum vigour in terms of 1000 seed weight (g.), seedling dry weight (g.), seed vigour index –II and protein content (%) and stood on second position, and third place was taken by the variety K-1006 obtained significantly maximum value in seedling length (cm.) seed vigour index –I, brick gravel test(%) and fat content (%)

Fourth rank taken by the variety K-9644 having good vigour in terms of field emergence (%), chlorophyll intensity (%) seedling dry weight (g.), and fifth position was taken by the variety K-9107 with fair vigour in terms of seed vigour index-II, standard germination (%) and 1000 seed weight.

Remaining other five varieties viz., K-307, K-402, K-9361, NW-2036 and DBW-14 had significantly lower performance than the above varieties of wheat.

**Table 1:** Performance of ten varieties of wheat (*Triticum aestivum* L.) in various quality parameters.

Varieties	Germination In Lab (%)	Seedling Length (cm)	Seedling Dry Weight (gm)	Seed Vigour Index-I	Seed Vigour Index-II	Brick Gravel Test (%)	1000 Seed Weight (gm.)	Germination In Field (%)	Fat/Oil Content (%)	Chlorophyll I Intensity (%)	Protein Content (%)
K-307(V <sub>1</sub> )	98.00 C c	17.95 C bc	0.264 B	1759.10 C bc	25.90 B	50.67 C d	39.19 F f	90.33 A ab	2.23 A ab	42.97 B bc	11.76 C cde
K-9162(V <sub>2</sub> )	98.33 B bc	19.16 B bc	0.322 A	1883.84 B bc	31.68 A	76.33 B bc	49.90 A a	86.00 B bcd	2.19 A ab	45.07 A ab	12.95 B b
K-8027(V <sub>3</sub> )	99.67 A a	24.25 A a	0.338 A	2416.09 A a	33.69 A	52.00 C d	44.42 C c	85.67 B bcd	2.18 A ab	41.40 C c	11.44 D def
K-9107(V <sub>4</sub> )	99.33 A ab	19.03 B bc	0.260 B	1889.90 B bc	25.82 B	71.33 B c	46.62 B b	89.33 A abc	2.11 B ab	42.70 B bc	14.02 A a
K-9644(V <sub>5</sub> )	98.00 C c	18.63 B bc	0.316 A	1826.07 B bc	30.95 A	55.00 C d	34.73 J j	92.00 A a	2.11 B ab	46.33 A a	12.92 B b
K-402(V <sub>6</sub> )	98.67 B abc	17.01 C c	0.302 A	1678.73 C c	29.76 A	94.67 A a	37.30 H h	86.33 B bcd	2.26 A ab	42.47 B bc	10.63 E g
K-9351(V <sub>7</sub> )	97.67 C c	19.53 B b	0.313 A	1909.70 B bc	30.58 A	81.67 B abc	43.38 D d	86.67 B bcd	2.29 A a	43.63 B abc	10.77 E fg
NW2036(V <sub>8</sub> )	98.67 B abc	17.77 C bc	0.283 B	1753.00 C bc	27.95 B	87.33 A ab	35.35 I i	84.33 B d	1.92 C c	41.13 C c	11.17 D efg
K-1006(V <sub>9</sub> )	98.67 B abc	19.59 B b	0.301 A	1932.92 B b	29.69 A	94.00 A a	37.63 G g	85.33 B cd	2.29 A a	44.97 A ab	12.37 C bc
DBW14(V <sub>10</sub> )	97.67 C c	18.73 Bbc	0.286 B	1829.27 B bc	27.97 B	89.33 A ab	41.75 E e	82.67 B d	2.08 B bc	45.10 A ab	12.16 C bcd
Mean	98.47	19.16	0.299	1887.86	29.40	75.23	41.03	86.87	2.17	43.58	12.02
CD at 5%	1.16	2.45	0.063	244.14	6.20	13.20	0.10	4.86	0.18	3.24	0.78

**Table 2**

Standard Germination (%)	Seedling Length (cm.)	Seedling Dry Weight (g.)	Seed Vigour Index-I
K-8027 (99.67)	K-8027(24.25)	K-8027(0.338)	K-8027(2416.10)
K-9107 (99.33)	K-1006(19.60)	K-9162(0.332)	K-1006(1932.91)
K-402(98.67)	K-9351(19.53)	K-9644(0.315)	K-9351(1909.70)
NW-2036(98.67)	K-9162(19.16)	K-9351(0.313)	K-9107(1889.90)
K-1006(98.67)	K-9107(19.03)	K-402(0.302)	K-9162(1883.84)
K-9162(98.33)	DBW-14(18.73)	K-1006(0.301)	DBW-14(1829.27)
K-307 (98.00)	K-9644(18.63)	DBW-14(0.286)	K-9644(1826.07)
K-9644(98.00)	K-307(17.95)	NW-2036(0.283)	K-307(1759.10)
K-9351(97.67)	NW-2036(17.77)	K-307(0.264)	NW-2036(1753.00)
DBW-14(97.67)	K-402(17.01)	K-9107(0.260)	K-402(1678.73)

Seed Vigour Index-II	Brick Gravel Test (%)	1000 grain weight (g.):	Field emergence (%)
K-8027(33.69)	K-402(94.67)	K-9162(49.90)	K-9644 (92.00)
K-9162(31.68)	K-1006(94.00)	K-9107(46.62)	K-307(90.33)
K-9644(30.93)	DBW-14(89.33)	K-8027(44.42)	K-9107(89.33)
K-9351(30.58)	NW-2036(87.33)	K-9351(43.38)	K-9351 (86.67)
K-402(29.76)	K-9351(81.67)	DBW-14(41.75)	K-402 (86.33)
K-1006(19.69)	K-9162(76.33)	K-307(39.19)	K-9162(86.00)
DBW-14(27.97)	K-9107(71.33)	K-1006(37.63)	K-8027(85.67)
NW-2036(27.95)	K-9644(55.00)	K-402(37.30)	K-1006(85.33)
K-307(25.91)	K-8027(52.00)	NW-2036(35.35)	NW-2036(84.33)
K-9107(25.82)	K-307(50.67)	K-9644(34.73)	DBW-14(82.67)

Fat Content (%)	Chlorophyll Intensity (%)	Protein Content (%)
K-1006(2.29)	K-9644(46.33)	K-9107(14.02)
K-9351(2.29)	DBW-14(45.10)	K-9162(12.95)
K-402(2.26)	K-9162(45.07)	K-9644(12.92)
K-307(2.23)	K-1006(44.97)	K-1006(12.37)
K-9162(2.19)	K-9351(43.63)	DBW-14(2.16)
K-8027(2.18)	K-307(42.97)	K-307(11.76)
K-9644(2.11)	K-9107(42.70)	K-8027(11.44)
K-9107(2.11)	K-402(42.47)	NW-2036(11.17)
DBW-14(2.08)	K-8027(41.40)	K-9351(10.77)
NW2036(1.92)	NW-2036(41.13)	K-402(10.63)

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