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possible through technology development. Availability of high yielding varieties to the farmers is one the reason of increased production and productivity of agricultural commodity with the use of identified technologies. These experiments were designed to identify high yielding genotypes of wheat for the farmers of eastern Terai of the country.

Materials and Methodology

Regional Varietal Trial (Early Sown)
The Regional Varietal Trial (RVT) of wheat (early set) was seeded in Randomized Complete Block Design (RCBD) with three replications in both years 2014 and 2015. The same methodologies were applied in RVT (late) for the both years. The plot size of 10 m² was maintained with row to row spacing of 25 cm and seeding was done continuously. The fertilizer was applied at the rate of 100:50:25 NPK kg/ha. Complete dose of phosphorus and potassium, and half dose of nitrogenous fertilizer were applied as basal dose and remaining half dose of nitrogenous fertilizer was applied in two split doses, that is, in 25 and 45 days after seeding. Two irrigations before each top dressing of the fertilizer were also applied. The RVT early was seeded in 13 December 2014 and 11 December 2015 in first and second year's experiment. Total eighteen genotypes namely BL 3264, BL 4018, BL 3555, BL 4341, BL 4350, BL 4012, BL 3401, BL 3978, BL 4318, NL 1140, NL 1164, NL 1177, BL 4406, BL 4407, NL 1191, NL 1194 were included in the experiment of 2014. Traits like days to heading, days to maturity, plant height (cm), panicle length (cm), spikes/m² and grain yield traits were studied in the experiment of both year 2014 and 2015. MSTAT-C and Excel software were used to analyze the data.

Result and Discussion

Regional Varietal Trial (Early Sown) 2015
Out of the sixteen genotypes included in the RVT (early sown) experiment of 2015, the longest days to heading (78 days) and maturity (106 days) was observed in BL 4463 genotype whereas BL 3978 genotype was found early in heading (71 days) and maturity (99 days). The highest plant height (89.86 cm) was observed in BL 4406 Similarly NL 1177 identified as dwarf (71.80 cm) amongst the tested genotypes. Regarding panicle length of the tested genotypes, longest panicle (11.20 cm) was found in BL 4463 and panicle of BL 3263 and BL 4335 was observed short (8.80cm). The difference in tillers/m² and grains/spike among the tested entries was not found significant. The bold grains (45.47 gm of 1000 grains) were found in BL 4335 whereas low 1000 grain weight (30.03 gm) was found in NL 1190 genotype (Table-1). BL 4018 recorded the highest grain yield (3166 kg/ha) whereas BL 4012 (3083 kg/ha) and NL 1207 (3080 kg/ha) identified as second top yielding genotypes in the RVT (early sown) of 2015. The difference in grain yield due to genotypes was found significant. BL 4018 produced 25 percent higher grain yield than standard check Bhrikuti (2527 kg/ha) whereas NL 1207 produced 22 percent more grain yield compared to the same check variety (Table1).

Regional Varietal Trial (Late Sown) 2014
Out of the eighteen genotypes included in the experiment of RVT (early sown) conducted in 2014, NL 1177 genotype was observed late in heading (74 days) and maturity (104 days). Similarly, BL 4018 genotype was found most early in heading (64 days) and maturity (95 days). Similarly NL 1193 also found early days to heading (64 days) and maturity (95 days). Similarly NL 1193 also found early days to heading (64 days) and maturity (95 days). In case of plant height and panicle length, highest plant height (97.13 cm) was observed in BL 3978 genotype whereas the shortest plant height was observed in the standard check variety (84.07 cm). The longest panicle (13.33 cm) was found in BL 4341 genotype whereas shortest panicle was observed in NL 1193 (Table-2). These characters of the tested genotypes found...
significantly different due to genotypes. The highest grain yield (3939 kg/ha) was produced by the genotype BL 3555 followed by the genotype BL 4018 (3453 kg/ha). The high yielding genotype BL 3555 recorded 38 percent more grain yield than standard check variety, Aditya (2860 kg/ha) and 73 percent more grain yield than the next standard check variety, Bhrikuti (2282 kg/ha). The difference in grain yield due to genotypes was found significant (Table 2).

Table 1: Grain yield and other ancillary characters of wheat at RVT (early set) in RARS, Tarahara during 2015

| S.N. | Genotypes | Days to heading | Days to maturity | Plant height (cm) | Panicle length (cm) | Grains/spike | 1000 grain weight (gm) | Grain yield (kg/ha) |
|------|------------|-----------------|-----------------|------------------|---------------------|-------------|----------------------|-------------------|
| 1    | BL 3263    | 72.00           | 100.00          | 79.86            | 8.80                | 36.67       | 40.65                | 2576.00           |
| 2    | BL 4018    | 71.33           | 99.00           | 88.33            | 10.40               | 43.00       | 40.28                | 3166.00           |
| 3    | BL 3555    | 74.00           | 102.00          | 79.60            | 9.20                | 35.67       | 42.74                | 2763.00           |
| 4    | BL 4012    | 76.00           | 104.00          | 82.00            | 11.00               | 43.33       | 39.48                | 3083.00           |
| 5    | BL 3978    | 71.00           | 99.00           | 87.60            | 9.53                | 30.67       | 40.95                | 2968.00           |
| 6    | BL 4406    | 74.00           | 102.00          | 89.86            | 9.66                | 32.33       | 42.96                | 3017.00           |
| 7    | BL 4407    | 74.67           | 102.00          | 88.80            | 10.13               | 41.67       | 42.60                | 2513.00           |
| 8    | BL 4335    | 75.33           | 103.00          | 86.00            | 8.80                | 32.33       | 45.47                | 2811.00           |
| 9    | BL 4341    | 77.00           | 105.00          | 85.73            | 10.13               | 30.73       | 38.76                | 1714.00           |
| 10   | BL 4463    | 78.00           | 106.00          | 85.06            | 11.20               | 34.33       | 38.69                | 2432.00           |
| 11   | NL 1190    | 76.00           | 104.00          | 76.53            | 8.86                | 35.33       | 30.03                | 1588.00           |
| 12   | NL 1207    | 74.37           | 102.00          | 88.33            | 10.06               | 38.37       | 41.26                | 3080.00           |
| 13   | Bhrikuti   | 76.00           | 104.00          | 87.93            | 9.93                | 34.00       | 37.34                | 2527.00           |
| 14   | Aditya     | 72.00           | 100.00          | 85.33            | 9.26                | 38.33       | 42.72                | 2196.00           |
|      | Grand mean | 74.56           | 102.62          | 84.16            | 9.72                | 35.75       | 39.94                | 2530.00           |

Note: ** = p value <0.01, * = p value < 0.05

Table 2: Grain yield and other ancillary characters of wheat at regional varietal trial (early set) in RARS, Tarahara during 2014

| S.N. | Genotypes | Days to heading | Days to maturity | Plant height (cm) | Panicle length (cm) | Spikes/m2 | Grain yield (kg/ha) |
|------|------------|-----------------|-----------------|------------------|---------------------|----------|-------------------|
| 1    | BL 3264    | 66.00           | 96.00           | 92.60            | 10.06               |          | 204.67            | 3088.00           |
| 2    | BL 4018    | 63.67           | 94.67           | 95.46            | 11.00               |          | 260.33            | 3453.00           |
| 3    | BL 3555    | 67.00           | 97.00           | 92.00            | 10.40               |          | 228.00            | 3939.00           |
| 4    | BL 4341    | 69.00           | 98.67           | 95.87            | 13.33               |          | 232.33            | 2654.00           |
| 5    | BL 4350    | 67.67           | 97.33           | 92.47            | 12.73               |          | 193.67            | 2455.00           |
| 6    | BL 4012    | 72.00           | 101.67          | 89.41            | 11.86               |          | 252.33            | 2905.00           |
| 7    | BL 3401    | 70.33           | 100.33          | 90.93            | 11.86               |          | 240.67            | 2326.00           |
| 8    | BL 3978    | 66.00           | 95.33           | 97.13            | 11.86               |          | 224.67            | 2969.00           |
| 9    | BL 4318    | 70.67           | 102.33          | 89.80            | 11.73               |          | 185.00            | 2253.00           |
| 10   | NL 1140    | 69.00           | 100.67          | 87.33            | 11.53               |          | 260.67            | 2447.00           |
| 11   | NL 1164    | 69.33           | 100.33          | 94.67            | 12.93               |          | 216.67            | 2332.00           |
| 12   | NL 1177    | 74.33           | 104.00          | 88.40            | 12.06               |          | 239.33            | 2446.00           |
| 13   | BL 4406    | 66.00           | 99.00           | 92.87            | 10.80               |          | 211.00            | 3018.00           |
| 14   | BL 4407    | 66.33           | 99.33           | 89.73            | 11.80               |          | 205.33            | 2702.00           |
| 15   | NL 1191    | 66.00           | 99.00           | 86.13            | 10.20               |          | 184.67            | 2156.00           |
| 16   | Bhrikuti   | 69.33           | 101.33          | 84.07            | 12.07               |          | 195.00            | 2282.00           |
| 17   | NL 1193    | 64.67           | 94.00           | 92.93            | 10.00               |          | 206.33            | 2669.00           |
| 18   | Aditya     | 65.33           | 95.00           | 93.80            | 10.53               |          | 196.33            | 2860.00           |

Note: ** = p value < 0.01, * = p value < 0.05
Combined analysis of two year’s (2014 & 2015) experimental data of RVT (early set) was also carried out. Amongst the tested genotypes, BL 3555 and BL 4018 identified as high yielding genotypes with the grain yield of 3351 and 3309 kg/ha respectively from over year analysis. BL 3555 recorded 29 and 38 percent higher grain yield than check varieties Aditya and Bhrikuti respectively, and 34 percent more grain yield than national yield of wheat. Similarly, BL 4018 recorded 30 and 37 percent higher grain yield than check varieties Aditya and Bhrikuti respectively, and 32 percent more grain yield than national average. NL 1177 was found late in heading (76 days) and maturity (104 days) whereas BL 4018 and BL 3978 were found early (97 days) in maturity in combined analysis of 2014 and 2015. The highest (92.31 cm) and lowest (76.13 cm) plant height was found in BL 3978 and BL 3264 respectively. The difference in days to heading and maturity, plant height, panicle length and grain yield was found significant due to genotypes in two year’s data analysis. In addition to BL 3555 and BL 4018; BL 4012, BL 3978 and BL 3264 identified as promising genotypes. These promising genotypes recorded 32 to 12 percent more grain yield than the yield of standard check Aditya and 24 to 17 percent higher grain yield than next standard check variety Bhrikuti from the analysis of two year data (Table 3).

### Table 3: Combined analysis of grain yield and other ancillary characters of RVT (early set) at RARS, Tarahara in 2014-15

| S.N. | Genotypes | Days to heading | Days to maturity | Plant height (cm) | Panicle length (cm) | Spikes/m² | Grain yield (kg/ha) |
|------|------------|----------------|-----------------|-------------------|--------------------|-----------|-------------------|
| 1    | BL 3264   | 69.00          | 98.00           | 76.13             | 9.43               | 205.33    | 2832.00           |
| 2    | BL 4018   | 67.50          | 97.16           | 91.00             | 10.70              | 250.17    | 3309.00           |
| 3    | BL 3555   | 70.50          | 99.50           | 85.80             | 9.80               | 215.67    | 3351.00           |
| 4    | BL 4012   | 74.00          | 102.83          | 85.73             | 11.43              | 240.83    | 2994.00           |
| 5    | BL 3978   | 68.50          | 97.17           | 92.31             | 10.70              | 238.67    | 2968.00           |
| 6    | BL 4406   | 70.00          | 100.50          | 91.36             | 10.23              | 197.50    | 2734.00           |
| 7    | BL 4407   | 70.50          | 101.00          | 89.26             | 10.97              | 198.83    | 2608.00           |
| 8    | NL 1177   | 75.83          | 104.33          | 80.10             | 10.57              | 201.33    | 2203.00           |
| 9    | NL 1193   | 69.33          | 98.00           | 89.38             | 9.80               | 205.50    | 2387.00           |
| 10   | BL 4341   | 73.00          | 101.83          | 90.80             | 11.73              | 232.17    | 2184.00           |
| 11   | Bhrikuti  | 72.67          | 102.67          | 86.00             | 11.00              | 213.17    | 2404.00           |
| 12   | Aditya    | 68.67          | 97.50           | 89.57             | 9.90               | 200.83    | 2528.00           |

Grand Mean F test Genotypes ** ** * ** NS **
Year ** ** ** ** NS *
G x Y ** NS NS * NS
CV% 0.98 1.95 9.09 7.07 16.69 19.93
LSD 1.070 3.023 9.234 0.865 627.4

Note: ** = p <0.01, * = p < 0.05

### Table 4: Grain yield and other ancillary characters of wheat at regional varietal trial (late set) in RARS, Tarahara during 2015

| S.N. | Genotypes | Days to heading | Days to maturity | Plant height (cm) | Panicle length (cm) | Grains/spike | Grain yield (kg/ha) |
|------|------------|----------------|-----------------|-------------------|--------------------|--------------|-------------------|
| 1    | BL 3264   | 65.00          | 92.33           | 86.86             | 8.93               | 36.00        | 2783.00           |
| 2    | BL 4018   | 60.67          | 89.33           | 85.20             | 7.93               | 29.67        | 2864.00           |
| 3    | BL 3555   | 70.00          | 97.33           | 83.40             | 8.27               | 30.33        | 3326.00           |
| 4    | BL 4012   | 70.67          | 98.67           | 82.73             | 9.20               | 36.33        | 3089.00           |
| 5    | BL 3978   | 63.00          | 91.33           | 82.20             | 9.60               | 30.33        | 2436.00           |
| 6    | BL 4406   | 63.67          | 91.67           | 89.07             | 8.63               | 24.33        | 2610.00           |
| 7    | BL 4407   | 64.00          | 92.33           | 86.80             | 10.07              | 24.33        | 2740.00           |
| 8    | NL 1177   | 71.00          | 99.00           | 87.93             | 9.26               | 36.00        | 3359.00           |
| 9    | NL 1193   | 59.33          | 90.67           | 83.00             | 8.26               | 24.67        | 2640.00           |
| 10   | BL 4335   | 63.67          | 91.67           | 82.80             | 9.06               | 27.67        | 2388.00           |
| 11   | BL 4341   | 65.00          | 93.33           | 89.73             | 9.26               | 21.33        | 749.00            |
| 12   | BL 4463   | 73.33          | 101.33          | 85.46             | 8.86               | 27.33        | 1821.00           |
| 13   | NL 1190   | 63.00          | 91.00           | 80.33             | 9.46               | 21.67        | 2303.00           |
| 14   | NL 1207   | 71.00          | 98.67           | 86.13             | 9.06               | 30.33        | 2052.00           |
| 15   | Bhrikuti  | 70.00          | 98.00           | 86.06             | 9.20               | 31.67        | 2699.00           |
| 16   | Aditya    | 62.33          | 90.33           | 84.66             | 9.80               | 35.00        | 2277.00           |

Grand mean F test Genotypes ** ** NS ** NS **
CV% 2.70 2.66 7.17 12.05 6.72 18.52
LSD 4.007 5.625

Note: ** = p <0.01
Regional Varietal Trial (Late Sown) 2015

Out of the tested genotypes, BL 4463 was found late in heading (73 days) and maturity (101 days) whereas standard check Aditya was found earliest in heading (62 days) and maturity (90 days). The difference in heading and maturity days of the tested genotypes was found significant due to genotypes. The difference in plant height, panicle length and spike/m² of the tested genotypes was found non-significant due to genotypes. Maximum number of grains per spike (36) was observed in BL 4012, BL 3264 and NL 1177. Similarly, BL 4335 had lowest number of grains per spike (11). In case of grain yield of the tested genotypes in late sown RVT, NL 1177 recorded the highest grain yield (3359 kg/ha) followed by BL 3555 (3326 kg/ha). BL 4018 and BL 4012 genotypes produced 6 and 13 percent higher grain yield (749 and 3089 kg/ha) than the yield of standard check Bhrikuti (2699 kg/ha). The lowest grain yield (2864 and 3089 kg/ha) than the yield of standard check Aditya was found over year. The difference in number of grains per spike and grain yield of the tested genotypes was found significant due to genotypes (Table 4).

Regional Varietal Trial (Late Sown) 2014

In RVT (late sown) experiment of 2014, the difference in days to heading and maturity, plant height and panicle length were observed significant due to genotypes. But, difference in spikes/m² and grain yield of the tested genotypes was found non-significant due to genotypes. The grain yield of the genotypes included in the experiment was observed relatively low compared with the grain yield of the same genotypes in 2015. Certain lands of regional agricultural research station, Tarahara are sometimes become unfit for winter crop due to excess soil moisture in the field (Anonymous, 2015)

Over year analysis of RVT (late sown) was also carried out. BL 4012 genotype has found late in heading (77 days) and maturity (101 days) whereas BL 4018 and Aditya was found early in heading (63 & 64 days) and maturity (94 & 93 days) in over year analysis of 2014 and 2015. The maturity day of high yielding genotypes BL 3555 and NL 1177 has been found 98 and 100 days respectively. The difference in days to heading and maturity due to genotypes is found significant. In case of plant height, highest plant height has been observed in BL 4341 genotype (89.17 cm) whereas BL 3555 was the dwarf genotype (79.57 cm) in the analysis over year. The difference in panicle length and spikes/m² among the tested genotypes was found non-significant due to genotypes. Regarding the grain yield, NL 1177 produced the highest grain yield (2933 kg/ha) followed by BL 3555 (2764 kg/ha). The difference in grain yield due to genotypes was found significant (Table 5 & Table 6).

Table 5: Grain yield and other ancillary characters of wheat at regional varietal trial (late set) in RARS, Tarahara during 2014

| S.N. | Genotypes | Days to heading (cm) | Days to maturity (cm) | Plant height (cm) | Panicle length (cm) | Grains/spike | Grain yield (kg/ha) |
|------|-----------|---------------------|----------------------|------------------|---------------------|-------------|-------------------|
| 1    | BL 3264   | 65.33               | 95.33                | 76.33            | 8.00                | 180.00      | 2215.00           |
| 2    | BL 4018   | 65.33               | 95.33                | 83.60            | 8.67                | 176.33      | 2399.00           |
| 3    | BL 3555   | 69.00               | 99.00                | 75.73            | 9.03                | 170.33      | 2202.00           |
| 4    | BL 4341   | 70.33               | 100.67               | 88.60            | 9.33                | 168.33      | 1946.00           |
| 5    | BL 4350   | 70.33               | 100.33               | 83.07            | 9.30                | 175.67      | 2045.00           |
| 6    | BL 4012   | 82.67               | 103.33               | 78.87            | 8.80                | 175.33      | 2060.00           |
| 7    | BL 3401   | 70.33               | 100.33               | 82.53            | 9.30                | 177.00      | 2094.00           |
| 8    | BL 3978   | 65.00               | 95.00                | 79.33            | 9.46                | 164.67      | 1746.00           |
| 9    | BL 4316   | 71.33               | 101.33               | 80.00            | 9.66                | 197.00      | 1753.00           |
| 10   | NL 1140   | 69.33               | 99.33                | 71.60            | 9.00                | 149.00      | 1981.00           |
| 11   | NL 1164   | 70.33               | 100.33               | 81.47            | 9.76                | 181.67      | 1914.00           |
| 12   | NL 1177   | 70.67               | 100.67               | 85.93            | 9.50                | 165.00      | 2508.00           |
| 13   | BL 4406   | 64.00               | 94.00                | 86.26            | 9.40                | 183.00      | 2210.00           |
| 14   | BL 4407   | 66.33               | 96.33                | 85.07            | 9.73                | 154.67      | 2289.00           |
| 15   | NL 1191   | 64.00               | 94.00                | 73.46            | 8.37                | 142.33      | 2130.00           |
| 16   | Bhrikuti  | 70.00               | 100.00               | 80.20            | 9.00                | 164.33      | 1913.00           |
| 17   | NL 1193   | 63.00               | 93.00                | 81.13            | 8.40                | 151.00      | 2293.00           |
| 18   | Aditya    | 64.67               | 95.00                | 85.73            | 8.33                | 134.33      | 2437.00           |

Grand mean 68.44 97.96 81.06 9.05 163.89 2127.00
F test ** ** ** * NS NS
CV% 7.21 1.60 4.79 7.03 10.84 13.79
LSD 11.00 3.496 8.114 1.057.
Table 6: Combined analysis of grain yield and other ancillary characters of RVT (late sown) wheat of 2014 and 2015.

| S.N. | Genotypes   | Days to heading | Days to maturity | Plant height (cm) | Panicle length (cm) | Spikes/m² | Grain yield (kg/ha) |
|------|-------------|-----------------|------------------|-------------------|---------------------|-----------|---------------------|
| 1    | BL 3264     | 65.17           | 93.83            | 81.70             | 8.46                | 194.50    | 2378.00             |
| 2    | BL 4018     | 63.00           | 93.83            | 84.40             | 8.30                | 194.83    | 2632.00             |
| 3    | BL 3555     | 69.50           | 98.16            | 79.57             | 8.65                | 190.50    | 2764.00             |
| 4    | BL 4012     | 76.66           | 101.00           | 80.57             | 9.03                | 186.67    | 2647.00             |
| 5    | BL 3978     | 64.00           | 93.16            | 80.87             | 9.53                | 182.00    | 2091.00             |
| 6    | BL 4406     | 65.00           | 92.83            | 87.67             | 9.01                | 199.67    | 2409.00             |
| 7    | BL 4407     | 65.17           | 94.33            | 85.93             | 9.90                | 163.83    | 2515.00             |
| 8    | NL 1177     | 70.83           | 99.83            | 88.56             | 9.38                | 199.17    | 2933.00             |
| 9    | NL 1193     | 61.17           | 91.83            | 82.21             | 8.33                | 194.13    | 2551.00             |
| 10   | BL 4341     | 67.67           | 97.00            | 89.17             | 9.30                | 173.17    | 1347.00             |
| 11   | Bhrikuti    | 70.00           | 99.00            | 83.13             | 9.10                | 203.17    | 2306.00             |
| 12   | Aditya      | 63.50           | 92.67            | 85.20             | 9.06                | 171.00    | 2357.00             |

Conclusion

BL 3555, BL 4018, BL 4012, BL 3978 and BL 3264 genotypes of wheat produced 12 to 32 percent more grain yield than the standard check Aditya and 17 to 39 percent higher grain yield than next standard check Bhrikuti. Similarly, these promising genotypes recorded 13 to 34 percent more grain than the national average grain yield and 8 to 28 percent higher grain yield than average grain yield eastern Terai. So, above mentioned genotypes have been found promising in early sown condition of eastern Terai and is recommended to verify in farmers field of different agro-environments.

Similarly, NL 1177 and BL 3555 genotypes produced 24 to 17 percent higher grain yield than standard check Aditya and Bhrikuti. These genotypes recorded 17 to 11 percent more grain than the existing national average and 12 to 6 percent higher than average grain yield of eastern Terai. Therefore, it can be concluded that NL 1177 and BL 3555 genotypes are promising for late sown condition of eastern Terai and is recommended to include in outreach research program of different agro-environments.

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