**Table S1. Salient features of parents and checks**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No.** | **Parent** | **Source** | **Feature** |
| 1. | IIHR 2852 | AVRDC, Taiwan | Semi-determinate plant, light green foliage, fruits are of pear shape. |
| 2. | IIHR 2853 | AVRDC, Taiwan | Semi-Determinate, deep green foliage, oblate-round fruits. |
| 3. | IIHR 2886 | IIHR, Bengaluru | Determinate, deep green foliage, oblate-round fruits. |
| 4. | IIHR 2888 | IIHR, Bengaluru | Semi-determinate, deep green foliage, oblate-round fruits. |
| 5. | IIHR 2898 | AVRDC, Taiwan | Semi-determinate, deep green foliage, obovoid fruits. |
| 6. | IIHR 2919 | IIHR, Bengaluru | Semi-determinate, Potato leaf type light green foliage, Cylindrical shaped fruits. |
| 7. | IIHR 5-3-7-5 | IIHR, Bengaluru | Determinate plant growth habit, dark green foliage, |
| 8. | IIHR 2913 | IIVR, Varanasi | Determinate type, rectangular shaped fruits  |
| 9. | TLBR-6 | IIHR, Bengaluru | Determinate type, thick broad green leaves. |
| 10. | IIHR 2902 | AVRDC, Taiwan | Semi determinate, deep green foliage, oblate-round fruits. |
| 11. | IIHR 2907 | AVRDC, Taiwan | Semi determinate, Sparse foliage and fruiting, Flat fruits. |
| **Checks** |
| 1. | Punjab chhuhara | PAU, Ludhiana | Dwarf, Bushy with dense foliage. Pear shaped and medium size fruit.  |
| 2. | Abhinava | Syngenta seeds | High yielding commercial F1 hybrid, semi determinate, oblong fruits. |

**Table S2. ANOVA for parents and hybrids for yield and quality traits in Tomato**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Source of variation** | **D.F.** | **Plant height**  | **Days to 50 % flowering** | **No. of flowers per cluster** | **Number of fruits per cluster** | **Fruit set percentage (%)** | **No. of fruits per plant** | **Average fruit weight**  |
| REP | 2 | 27.54 | 9.87\* | 0.05 | 0.02 | 20.55 | 301.98 | 1.50 |
| Treatment | 65 | 442.49\*\* | 7.60\*\* | 1.86\*\* | 0.80\* | 139.10\*\* | 180.69\*\* | 1076.67\*\* |
| PAR | 10 | 583.40\*\* | 6.78\*\* | 1.20\* | 1.24\*\* | 106.40\* | 201.98\*\* | 756.19\* |
| F1 | 54 | 416.15\*\* | 7.16\*\* | 1.93\*\* | 0.71\* | 145.06\*\* | 127.51\* | 1129.77\*\* |
| PVF1 | 1 | 455.88\*\* | 39.60\*\* | 4.80\*\* | 1.46\*\* | 144.06\*\* | 2839.82\*\* | 1414.05\*\* |
| EROR | 130 | 18.750 | 1.28 | 0.02 | 0.02 | 9.67 | 9.58 | 7.75 |
| **Source of variation** | **D.F.** | **Number of locules** | **Total soluble solids** | **Pericarp thickness**  | **Fruit firmness** | **Yield per plant** | **PDI (%)** |  |
| REP | 2 | 0.01 | 0.03 | 0.06 | 0.12 | 3.81 | 543.92 |
| Treatment | 65 | 3.10\*\* | 0.60\*\* | 3.45\*\* | 1.81\*\* | 0.68\*\* | 938.00\*\* |
| PAR | 10 | 5.13\*\* | 0.43\*\* | 5.99\*\* | 2.18\*\* | 0.67\* | 1330.47\*\* |
| F1 | 54 | 2.72\*\* | 0.64\*\* | 3.03\*\* | 1.73\*\* | 0.58\* | 815.94\*\* |
| PVF1 | 1 | 3.57\*\* | 0.40 | 0.68\* | 2.53\*\* | 5.97\*\* | 3604.32\*\* |
| EROR | 130 | 0.01 | 0.05 | 0.04 | 0.03 | 0.04 | 20.85 |

\*, \*\* significant at 5% and significant at 1% probability levels, respectively

**Table S3. Mean performance of hybrids for different yield and quality traits in tomato**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Hybrids** | **Plant height** | **Fifty % flowering** | **No. of Flower/Cluster** | **No. of Fruits/Cluster** | **Fruit Set %** | **No. of fruits/Plant** | **Average Fruit Weight** | **No. Of Locules** | **T.S.S** | **Pericarp thickness** | **Fruit Firmness** | **Yield per Plant** |
| IIHR-2853× IIHR-2852 | 99.76 | 26.00 | 5.35 | 3.17 | 53.60 | 43.42 | 60.50 | 3.27 | 4.46 | 4.27 | 6.14 | 2.03 |
| IIHR-2886× IIHR-2852 | 106.97 | 23.00 | 4.60 | 2.57 | 57.79 | 36.09 | 124.67 | 3.80 | 5.06 | 6.49 | 5.86 | 2.75 |
| IIHR-2888× IIHR-2852 | 119.95 | 26.00 | 4.33 | 2.40 | 51.53 | 33.47 | 112.53 | 2.87 | 4.80 | 7.35 | 7.12 | 2.66 |
| IIHR-2898× IIHR-2852 | 103.08 | 26.67 | 5.97 | 3.40 | 56.93 | 39.13 | 69.72 | 2.73 | 4.03 | 4.25 | 6.33 | 2.15 |
| IIHR-2919× IIHR-2852 | 95.99 | 25.00 | 5.37 | 3.20 | 56.65 | 49.57 | 81.00 | 3.00 | 4.50 | 6.30 | 7.58 | 3.17 |
| IIHR-5-3-7-5× IIHR-2852 | 97.16 | 24.33 | 4.65 | 2.60 | 51.60 | 35.41 | 79.08 | 4.20 | 5.16 | 4.71 | 6.65 | 2.14 |
| IIHR-2913× IIHR-2852 | 112.37 | 23.33 | 5.57 | 2.40 | 44.25 | 33.60 | 82.20 | 3.80 | 4.80 | 5.20 | 4.54 | 2.12 |
| TLBR-6× IIHR-2852 | 110.46 | 26.00 | 5.11 | 2.47 | 49.55 | 31.94 | 108.14 | 3.73 | 4.06 | 5.41 | 5.33 | 2.74 |
| IIHR-2902× IIHR-2852 | 145.49 | 23.00 | 4.53 | 2.20 | 47.12 | 23.96 | 149.80 | 5.13 | 5.21 | 6.63 | 7.60 | 2.56 |
| IIHR-2907× IIHR-2852 | 97.05 | 26.00 | 4.37 | 2.60 | 56.02 | 39.15 | 74.10 | 3.87 | 4.78 | 5.69 | 8.12 | 1.92 |
| IIHR-2886× IIHR-2853 | 106.95 | 25.00 | 5.18 | 2.50 | 46.98 | 40.08 | 57.57 | 4.20 | 5.43 | 7.17 | 5.92 | 1.88 |
| IIHR-2888× IIHR-2853 | 121.42 | 23.67 | 5.97 | 2.73 | 45.81 | 38.13 | 92.50 | 5.13 | 4.60 | 5.15 | 5.99 | 2.09 |
| IIHR-2898× IIHR-2853 | 116.64 | 25.33 | 5.47 | 3.80 | 57.20 | 40.01 | 86.73 | 2.93 | 3.92 | 4.70 | 7.62 | 2.27 |
| IIHR-2919× IIHR-2853 | 118.17 | 26.00 | 5.13 | 2.20 | 42.92 | 40.74 | 90.19 | 4.00 | 5.17 | 5.59 | 8.16 | 3.01 |
| IIHR-5-3-7-5× IIHR-2853 | 113.60 | 23.00 | 5.93 | 2.40 | 40.50 | 52.44 | 52.87 | 6.00 | 4.82 | 4.29 | 7.47 | 2.42 |
| IIHR-2913× IIHR-2853 | 104.81 | 28.33 | 6.21 | 2.63 | 42.41 | 32.34 | 120.47 | 3.00 | 4.04 | 7.88 | 5.73 | 2.81 |
| TLBR-6× IIHR-2853 | 104.82 | 23.33 | 5.55 | 2.07 | 37.22 | 29.68 | 86.23 | 4.40 | 4.36 | 5.56 | 6.27 | 1.86 |
| IIHR-2902× IIHR-2853 | 119.28 | 26.00 | 6.15 | 2.80 | 45.52 | 48.10 | 60.80 | 3.00 | 4.16 | 5.93 | 6.01 | 2.95 |
| IIHR-2907× IIHR-2853 | 93.94 | 27.33 | 5.10 | 1.80 | 35.35 | 36.35 | 84.28 | 5.20 | 3.93 | 4.89 | 6.57 | 2.34 |
| IIHR-2888× IIHR-2886 | 94.55 | 23.00 | 4.51 | 1.95 | 43.28 | 35.24 | 101.47 | 3.00 | 4.09 | 6.75 | 6.63 | 2.55 |
| IIHR-2898× IIHR-2886 | 109.93 | 28.00 | 6.17 | 2.72 | 44.02 | 35.61 | 83.37 | 4.13 | 4.44 | 5.19 | 6.35 | 2.19 |
| IIHR-2919× IIHR-2886 | 124.03 | 23.00 | 5.41 | 2.53 | 46.81 | 38.75 | 84.47 | 3.07 | 4.58 | 6.02 | 6.51 | 2.34 |
| IIHR-5-3-7-5× IIHR-2886 | 100.59 | 26.67 | 3.55 | 2.07 | 56.21 | 28.45 | 111.17 | 4.93 | 4.18 | 4.93 | 7.44 | 2.11 |
| IIHR-2913× IIHR-2886 | 98.09 | 24.67 | 4.99 | 2.57 | 51.41 | 33.43 | 90.33 | 3.00 | 3.99 | 5.37 | 6.15 | 2.34 |
| TLBR-6× IIHR-2886 | 112.83 | 26.00 | 4.97 | 1.90 | 38.20 | 27.98 | 114.63 | 3.33 | 4.09 | 6.01 | 7.11 | 1.99 |
| IIHR-2902× IIHR-2886 | 100.50 | 23.67 | 4.71 | 2.53 | 53.76 | 33.26 | 115.84 | 4.00 | 3.57 | 6.18 | 6.05 | 3.20 |
| IIHR-2907× IIHR-2886 | 91.79 | 26.33 | 5.26 | 2.47 | 46.91 | 37.82 | 90.87 | 5.00 | 4.42 | 6.25 | 8.03 | 2.32 |
| IIHR-2898× IIHR-2888 | 93.35 | 24.00 | 5.56 | 3.30 | 59.44 | 29.57 | 85.80 | 3.20 | 4.12 | 4.48 | 6.53 | 2.07 |
| IIHR-2919× IIHR-2888 | 101.95 | 26.67 | 6.07 | 2.93 | 48.34 | 39.32 | 80.03 | 2.93 | 4.72 | 5.98 | 6.96 | 2.60 |
| IIHR-5-3-7-5× IIHR-2888 | 112.91 | 25.33 | 4.15 | 2.43 | 59.02 | 33.98 | 107.46 | 4.13 | 4.51 | 6.97 | 7.15 | 2.12 |
| IIHR-2913× IIHR-2888 | 101.93 | 23.33 | 4.00 | 2.43 | 55.92 | 38.65 | 99.80 | 4.00 | 3.93 | 4.04 | 6.21 | 3.05 |
| TLBR-6× IIHR-2888 | 114.15 | 26.00 | 4.00 | 1.80 | 41.64 | 23.06 | 115.03 | 4.13 | 4.77 | 6.38 | 6.31 | 1.90 |
| IIHR-2902× IIHR-2888 | 107.56 | 23.00 | 5.49 | 3.20 | 60.78 | 40.82 | 93.70 | 4.00 | 4.37 | 4.87 | 6.21 | 2.68 |
| IIHR-2907× IIHR-2888 | 102.42 | 23.67 | 4.77 | 2.60 | 54.59 | 33.59 | 83.57 | 3.80 | 4.10 | 6.07 | 8.14 | 2.37 |
| IIHR-2919× IIHR-2898 | 107.09 | 27.67 | 6.90 | 3.30 | 48.37 | 33.32 | 90.73 | 2.00 | 3.82 | 5.73 | 6.96 | 2.18 |
| IIHR-5-3-7-5× IIHR-2898 | 95.54 | 24.67 | 5.42 | 3.37 | 61.53 | 36.56 | 85.40 | 3.80 | 4.44 | 4.44 | 7.01 | 1.93 |
| IIHR-2913× IIHR-2898 | 88.27 | 25.33 | 5.53 | 3.70 | 57.82 | 38.82 | 116.67 | 4.00 | 3.61 | 6.07 | 6.54 | 3.40 |
| TLBR-6× IIHR-2898 | 120.67 | 26.00 | 4.95 | 2.13 | 44.48 | 28.76 | 111.30 | 3.87 | 4.75 | 5.27 | 5.86 | 2.37 |
| IIHR-2902× IIHR-2898 | 113.22 | 25.67 | 5.49 | 2.33 | 46.05 | 29.08 | 91.17 | 2.80 | 4.44 | 4.45 | 5.72 | 2.20 |
| IIHR-2907× IIHR-2898 | 93.21 | 22.00 | 3.99 | 2.27 | 56.86 | 31.54 | 107.30 | 4.13 | 4.53 | 6.49 | 5.69 | 2.71 |
| IIHR-5-3-7-5× IIHR-2919 | 101.01 | 27.33 | 3.82 | 2.33 | 61.08 | 42.92 | 78.90 | 3.13 | 5.11 | 5.58 | 6.08 | 2.55 |
| IIHR-2913× IIHR-2919 | 103.64 | 25.67 | 5.47 | 2.60 | 47.57 | 40.30 | 94.60 | 2.66 | 4.13 | 6.49 | 5.82 | 3.03 |
| TLBR-6× IIHR-2919 | 91.35 | 25.00 | 5.29 | 3.40 | 64.24 | 34.93 | 122.17 | 3.13 | 4.04 | 4.75 | 6.91 | 2.83 |
| IIHR-2902× IIHR-2919 | 110.65 | 23.33 | 7.17 | 3.13 | 43.73 | 39.64 | 86.93 | 2.73 | 3.63 | 7.17 | 6.47 | 2.75 |
| IIHR-2907× IIHR-2919 | 102.65 | 25.00 | 5.37 | 3.00 | 55.84 | 36.83 | 105.00 | 3.13 | 3.92 | 4.99 | 6.61 | 2.97 |
| IIHR-2913× IIHR-5-3-7-5 | 75.47 | 24.67 | 4.01 | 1.67 | 41.52 | 28.88 | 76.63 | 3.00 | 4.10 | 5.07 | 5.73 | 1.83 |
| TLBR-6× IIHR-5-3-7-5 | 91.30 | 24.00 | 3.44 | 1.87 | 54.16 | 23.66 | 84.90 | 4.13 | 4.61 | 5.27 | 6.32 | 1.52 |
| IIHR-2902× IIHR-5-3-7-5 | 115.42 | 25.00 | 4.37 | 2.27 | 51.82 | 28.13 | 91.13 | 3.33 | 3.56 | 3.77 | 6.10 | 2.45 |
| IIHR-2907× IIHR-5-3-7-5 | 105.21 | 25.00 | 4.75 | 2.20 | 46.34 | 43.63 | 78.70 | 6.13 | 4.51 | 3.93 | 6.05 | 2.71 |
| TLBR-6× IIHR-2913 | 88.21 | 28.33 | 4.55 | 2.40 | 52.72 | 20.08 | 83.70 | 4.00 | 4.18 | 5.84 | 6.08 | 1.23 |
| IIHR-2902×2913 | 88.06 | 25.33 | 3.88 | 2.53 | 54.65 | 28.31 | 84.03 | 2.80 | 3.55 | 5.49 | 6.98 | 1.90 |
| IIHR-2907× IIHR-2913 | 107.43 | 23.33 | 4.51 | 2.53 | 56.22 | 35.34 | 107.37 | 3.13 | 4.48 | 5.71 | 7.78 | 2.76 |
| IIHR-2902×TLBR-6 | 120.95 | 26.67 | 5.97 | 2.47 | 41.36 | 30.63 | 133.00 | 6.73 | 4.12 | 4.45 | 6.50 | 2.71 |
| IIHR-2907×TLBR-6 | 98.34 | 24.67 | 5.43 | 2.50 | 46.03 | 29.56 | 114.17 | 3.87 | 3.58 | 7.75 | 7.17 | 2.47 |
| IIHR-2907× IIHR-2902 | 96.12 | 23.67 | 4.83 | 2.20 | 45.53 | 28.05 | 112.33 | 5.40 | 4.05 | 7.27 | 6.73 | 2.27 |
| Mean | 104.88 | 25.07 | 5.08 | 2.57 | 50.13 | 34.95 | 94.31 | 3.80 | 4.33 | 5.62 | 6.58 | 2.41 |
| SE m ± | 2.44 | 0.66  | 0.07  | 0.09 | 1.80  | 1.76 | 1.57  | 0.08  | 0.13  | 0.12  | 0.11 | 0.12 |
| C.D. @ 5% | 6.84 | 1.85  | 0.21  | 0.25  | 5.03  | 4.93 | 4.41  | 0.21  | 0.36  | 0.32  | 0.32 | 0.33 |

**Table S4. Estimates of SCA effects for yield and quality traits in tomato**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Hybrids** | **Plant height** | **Fifty % flowering** | **No. of Flower/Cluster** | **No. of Fruits/Cluster** | **Fruit Set %** | **No. of fruits/Plant** | **Average Fruit Weight** | **No. Of Locules** | **T.S.S** | **Pericarp thickness** | **Fruit Firmness** | **PDI** | **Yield per Plant** |
| IIHR-2853× IIHR-2852 | -12.50\*\* | 0.30 | -0.04 | 0.38\*\* | 5.06\* | 2.70 | -28.36\*\* | -0.83\*\* | -0.17 | -1.57\*\* | -0.50\*\* | -3.93 | -0.47\*\* |
| IIHR-2886× IIHR-2852 | 1.92 | -1.87\*\* | -0.17 | 0.00 | 6.13\*\* | 0.89 | 29.73\*\* | 0.22\* | 0.46\*\* | 0.14 | -0.57\*\* | -11.61\*\* | 0.41\*\* |
| IIHR-2888× IIHR-2852 | 12.06\*\* | 1.23\* | -0.45\*\* | -0.39\*\* | -3.59\* | -2.39 | 18.31\*\* | -0.80\*\* | 0.16 | 1.51\*\* | 0.39\*\* | -11.95\*\* | 0.21\*\* |
| IIHR-2898× IIHR-2852 | -1.71 | 1.53\* | 0.58\*\* | 0.23\* | 1.27 | 1.49 | -21.66\*\* | -0.30\*\* | -0.47\*\* | -1.36\*\* | -0.22\* | -7.87\*\* | -0.29 |
| IIHR-2919× IIHR-2852 | -15.21\*\* | -0.69 | -0.15\*\* | 0.01 | 1.47 | 8.28\*\* | -10.29\*\* | 0.34\*\* | -0.24\* | 0.34\*\* | 0.58\*\* | 9.60\*\* | 0.43\*\* |
| IIHR-5-3-7-5× IIHR-2852 | -4.83\* | -0.94 | 0.37\*\* | 0.12 | -2.43 | -2.27 | -8.00\*\* | 0.14\* | 0.36\*\* | -0.37\*\* | 0.05 | -9.75\*\* | -0.05 |
| IIHR-2913× IIHR-2852 | 13.61\*\* | -2.07\*\* | 0.85\*\* | -0.32\*\* | -9.40\*\* | -2.25 | -10.85\*\* | 0.75\*\* | 0.42\*\* | -0.59\*\* | -1.59\*\* | 9.60\*\* | -0.42\*\* |
| TLBR-6× IIHR-2852 | 7.87\*\* | -0.05 | 0.26\* | -0.01 | 0.63 | 1.95 | 2.98 | -0.08 | -0.45\*\* | -0.23\* | -1.03\*\* | -12.59\*\* | 0.56\*\* |
| IIHR-2902× IIHR-2852 | 33.43\*\* | -1.87\*\* | -0.69\*\* | -0.63\*\* | -5.40\*\* | -11.95\*\* | 48.62\*\* | 1.48\*\* | 0.80\*\* | 0.92\*\* | 1.10\*\* | 9.60\*\* | -0.07 |
| IIHR-2907× IIHR-2852 | -4.54 | 1.00 | -0.31\*\* | 0.03 | 3.98\* | 3.00 | -22.35\*\* | -0.40\*\* | 0.20 | -0.82\*\* | 0.88\*\* | 9.60\*\* | -0.58\*\* |
| IIHR-2886× IIHR-2853 | -2.56 | -0.28 | -0.09 | 0.18\* | 3.15 | 4.47\* | -33.25\*\* | -0.22\* | 1.07\*\* | 1.05\*\* | -0.56\*\* | 6.73\*\* | -0.36\*\* |
| IIHR-2888× IIHR-2853 | 9.06\*\* | -1.51\* | 0.69\*\* | 0.18\* | -0.48 | 1.85 | 2.39 | 0.61\*\* | 0.20 | -0.45\*\* | -0.77\*\* | 8.67\*\* | -0.25\*\* |
| IIHR-2898× IIHR-2853 | 7.37\*\* | -0.20 | 0.41\*\* | 0.87\*\* | 9.37\*\* | 1.97 | -0.54 | -0.95\*\* | -0.34\*\* | -0.69\*\* | 1.02\*\* | 5.13\* | -0.08 |
| IIHR-2919× IIHR-2853 | 2.49 | -0.10 | -0.87\*\* | -0.74\*\* | -4.42\* | -0.95 | 2.99 | 0.49\*\* | 0.65\*\* | -0.13 | 1.12\*\* | -3.83 | 0.37\*\* |
| IIHR-5-3-7-5× IIHR-2853 | 7.14\*\* | -2.69\*\* | 1.16\*\* | 0.17 | -5.67\*\* | 16.34\*\* | -30.11\*\* | 1.10\*\* | 0.26\* | -0.56\*\* | 0.82\*\* | -23.19\*\* | 0.31\*\* |
| IIHR-2913× IIHR-2853 | 1.59 | 2.51\*\* | 1.00\*\* | 0.15 | -3.41\* | 3.92\* | 31.51\*\* | -0.89\*\* | -0.08 | 2.31\*\* | -0.45\*\* | -3.83 | 0.36\*\* |
| TLBR-6× IIHR-2853 | -2.23 | -3.12\*\* | 0.21\* | -0.16 | -3.86\* | -0.71 | -14.82\*\* | -0.26\*\* | 0.08 | 0.14 | -0.14 | 9.00\*\* | -0.21\*\* |
| IIHR-2902× IIHR-2853 | 2.75 | 0.71 | 0.44\*\* | 0.21\* | 0.82 | 11.77\*\* | -36.27\*\* | -1.49\*\* | -0.04 | 0.44\*\* | -0.53\*\* | -3.83 | 0.41\*\* |
| IIHR-2907× IIHR-2853 | -12.13\*\* | 1.92\* | -0.08 | -0.52\*\* | -8.85\*\* | -0.20 | -8.07\*\* | 0.07 | -0.40\*\* | -1.39\*\* | -0.71\*\* | -3.83 | -0.06 |
| IIHR-2888× IIHR-2886 | -10.58\*\* | -1.35\* | -0.14 | -0.37\*\* | -7.14\*\* | 4.48\* | 5.29\*\* | -0.99\*\* | -0.25\* | 0.63\*\* | 0.07 | 5.39\* | 0.36\*\* |
| IIHR-2898× IIHR-2886 | 7.89\*\* | 3.28\*\* | 0.90\*\* | 0.02 | -6.93\*\* | 3.08 | -9.98\*\* | 0.77\*\* | 0.21 | -0.71\*\* | -0.04 | 8.30\*\* | -0.01 |
| IIHR-2919× IIHR-2886 | 15.57\*\* | -2.28\*\* | 0.02 | -0.18\* | -3.66\* | 2.56 | -8.79\*\* | 0.08 | 0.10 | -0.20 | -0.31\*\* | -11.61\*\* | -0.13 |
| IIHR-5-3-7-5× IIHR-2886 | 1.35 | 1.79\* | -0.59\*\* | 0.06 | 6.91\*\* | -2.12 | 22.12\*\* | 0.55\*\* | -0.32\*\* | -0.43\*\* | 1.01\*\* | 10.22\*\* | 0.16\* |
| IIHR-2913× IIHR-2886 | 2.09 | -0.33 | 0.39\*\* | 0.30\*\* | 2.46 | 2.68 | -4.68\* | -0.37\*\* | -0.10 | -0.70\*\* | 0.18 | -11.61\*\* | 0.05 |
| TLBR-6× IIHR-2886 | 12.99\*\* | 0.35 | 0.24\* | -0.10 | -6.00\*\* | 3.11 | 7.50\*\* | -0.80\*\* | -0.13 | 0.08 | 0.91\*\* | 9.21\*\* | 0.07 |
| IIHR-2902× IIHR-2886 | -8.80\*\* | -0.79 | -0.39\*\* | 0.16 | 5.94\*\* | 2.45 | 12.69\*\* | 0.02 | -0.55\*\* | 0.19 | -0.28\* | -11.61\*\* | 0.83\*\* |
| IIHR-2907× IIHR-2886 | -7.05\*\* | 1.74\*\* | 0.69\*\* | 0.36\*\* | -0.41 | 6.78\*\* | -7.55\*\* | 0.40\*\* | 0.12 | -0.54\*\* | 0.95\*\* | -11.61\*\* | 0.08 |
| IIHR-2898× IIHR-2888 | -11.53\*\* | -0.61 | 0.29\* | 0.36\*\* | 5.03\* | -3.61\* | -6.82\*\* | -0.25\*\* | -0.14 | -0.91\*\* | -0.14 | 5.37\* | -0.22\*\* |
| IIHR-2919× IIHR-2888 | -9.34\*\* | 1.48\* | 0.67\*\* | -0.02 | -5.59\* | 2.47 | -12.51\*\* | -0.14\* | 0.21 | 0.26\* | -0.14 | -11.95\*\* | 0.02 |
| IIHR-5-3-7-5× IIHR-2888 | 10.83\*\* | 0.56 | 0.00 | 0.19\* | 6.26\*\* | 2.74 | 19.13\*\* | -0.34\*\* | -0.03 | 2.11\*\* | 0.43\*\* | 11.52\*\* | 0.07 |
| IIHR-2913× IIHR-2888 | 3.08 | -1.56\* | -0.59\*\* | -0.06 | 3.51\* | 7.24\*\* | 5.49\*\* | 0.53\*\* | -0.18 | -1.52\*\* | -0.04 | -11.95\*\* | 0.66\*\* |
| TLBR-6× IIHR-2888 | 11.47\*\* | 0.46 | -0.72\*\* | -0.44\*\* | -6.02\*\* | -2.48 | 8.62\*\* | -0.10 | 0.50\*\* | 0.96\*\* | -0.16 | 6.21\*\* | -0.11\* |
| IIHR-2902× IIHR-2888 | -4.58 | -1.35\* | 0.38\*\* | 0.59\*\* | 9.49\*\* | 9.33\*\* | -8.72\*\* | -0.07 | 0..21 | -0.60\*\* | -0.40\*\* | -11.95\*\* | 0.21\*\* |
| IIHR-2907× IIHR-2888 | 0.72 | -0.82 | 0.19\* | 0.26\* | 3.80\* | 1.88 | -14.13\*\* | -0.89\*\* | -0.22 | -0.21\* | 0.77\*\* | -11.95\*\* | 0.02 |
| IIHR-2919× IIHR-2898 | -1.10 | 2.12\*\* | 0.89\*\* | -0.02 | -6.10\*\* | -5.29\* | 1.01 | -0.44\*\* | -0.55\*\* | 0.22\* | 0.01 | -7.87\*\* | -0.40\*\* |
| IIHR-5-3-7-5× IIHR-2898 | -3.44 | -0.46 | 0.66\*\* | 0.75\*\* | 8.23\*\* | 3.54\* | -1.09 | -0.03 | 0.02 | -0.20 | 0.46\*\* | 6.78\*\* | -0.11\* |
| IIHR-2913× IIHR-2898 | -7.48\*\* | 0.07 | 0.32\*\* | 0.83\*\* | 4.88\*\* | 5.60\* | 25.19\*\* | 1.16\*\* | -0.38\*\* | 0.71\*\* | 0.45\*\* | -7.87\*\* | 1.00\*\* |
| TLBR-6× IIHR-2898 | 21.08\*\* | 0.10 | -0.38\*\* | -0.48\*\* | -3.71\* | 1.45 | 7.72\*\* | 0.26\*\* | 0.60\*\* | 0.07 | -0.45\*\* | 5.47\* | 0.34\*\* |
| IIHR-2902× IIHR-2898 | 4.16 | 0.94 | -0.21\* | -0.64\*\* | -5.76\*\* | -4.16\* | -8.43\*\* | -0.63\*\* | 0.41\*\* | -0.81\*\* | -0.72\*\* | -7.87\*\* | -0.28\*\* |
| IIHR-2907× IIHR-2898 | -5.38\* | -2.84\*\* | -1.18\*\* | -0.44\*\* | 5.54\*\* | -1.92 | 12.42\*\* | 0.07 | 0.32\*\* | 0.41\*\* | -1.50\*\* | -7.87\*\* | 0.35\*\* |
| IIHR-5-3-7-5× IIHR-2919 | -4.38 | 1.64\* | -1.06\*\* | -0.29\* | 8.26\*\* | 6.25\*\* | -6.51\*\* | -0.32\*\* | 0.44\*\* | 0.61\*\* | -0.89\*\* | -9.75\*\* | 0.21\*\* |
| IIHR-2913× IIHR-2919 | 1.48 | -0.15 | 0.13 | -0.28\* | -4.89\*\* | 3.46\* | 3.20\* | 0.51\*\* | -0.11 | 0.81\*\* | -0.70\*\* | 9.60\*\* | 0.35\*\* |
| TLBR-6× IIHR-2919 | -14.64\*\* | -1.46\* | -0.16 | 0.76\*\* | 16.51\*\* | 3.96\* | 18.67\*\* | -0.08 | -0.34\*\* | -0.77\*\* | 0.16 | -2.79 | 0.52\*\* |
| IIHR-2902× IIHR-2919 | -4.82\* | -1.94\*\* | 1.33\*\* | 0.13 | -7.60\*\* | 2.73 | -12.58\*\* | -0.31\*\* | -0.64\*\* | 1.58\*\* | -0.41\*\* | 9.67\*\* | -0.01 |
| IIHR-2907× IIHR-2919 | -2.36 | -0.41 | 0.07 | 0.27\* | 4.99\*\* | -0.29 | 10.20\*\* | -0.54\*\* | -0.52\*\* | -1.40\*\* | -1.01\*\* | 9.60\*\* | 0.33\*\* |
| IIHR-2913× IIHR-5-3-7-5 | -17.47\*\* | -0.74 | -0.77 | -0.50\*\* | -9.76\*\* | -2.34 | -10.54\*\* | -0.84\*\* | -0.18 | 0.25\* | -0.39\*\* | -9.75\*\* | -0.32\*\* |
| TLBR-6× IIHR-5-3-7-5 | -5.48\* | -2.05\*\* | -0.21\*\* | -0.05 | 7.61\*\* | -1.69 | -14.37\*\* | -0.48\*\* | 0.17 | 0.60\*\* | -0.02 | 12.30\*\* | -0.25\*\* |
| IIHR-2902× IIHR-5-3-7-5 | 9.17\*\* | 0.12 | 0.69\*\* | -0.01 | 1.65 | -3.16 | -4.16\*\* | -1.11\*\* | -0.75\*\* | -0.95\*\* | -0.38\*\* | -9.75\*\* | 0.22\*\* |
| IIHR-2907× IIHR-5-3-7-5 | 9.41\*\* | 0.00 | -0.11\*\* | 0.18\* | -3.32\*\* | 12.11\*\* | -11.87\*\* | 1.05\*\* | 0.02 | -1.60\*\* | -1.17\*\* | -9.75\*\* | 0.60\*\* |
| TLBR-6× IIHR-2913 | -5.33\* | 2.15\*\* | -1.15 | 0.22\* | 6.52\*\* | -5.48\*\* | -21.55\*\* | 0.38\*\* | 0.17 | 0.46\*\* | 0.18 | -12.59\*\* | -0.88\*\* |
| IIHR-2902×2913 | -14.95\*\* | 0.33 | 0.00 | -0.03 | 4.83\*\* | -3.15 | -17.23\*\* | -0.64\*\* | -0.33\*\* | 0.05 | 0.94\*\* | 9.60\*\* | -0.66\*\* |
| IIHR-2907× IIHR-2913 | 14.87\*\* | -1.79\* | 1.00\*\* | 0.26\*\* | 6.91\*\* | 3.65\* | 10.81\*\* | -0.93\*\* | 0.41\*\* | -0.53\*\* | 1.00\*\* | 9.60\*\* | 0.30\*\* |
| IIHR-2902×TLBR-6 | 14.10\*\* | 1.02 | 0.80\*\* | 0.18\* | -3.71\* | 5.03\*\* | 19.62\*\* | 2.52\*\* | 0.08 | -0.84\*\* | 0.25\*\* | -12.59\*\* | 0.55\*\* |
| IIHR-2907×TLBR-6 | 1.94 | -1.10 | 0.79\*\* | 0.48\*\* | 1.45 | 3.74\* | 5.51\* | -0.97\*\* | -0.63\*\* | 1.65\*\* | 0.17 | -12.59\*\* | 0.39\*\* |
| IIHR-2907× IIHR-2902 | -9.75\*\* | -0.92 | -0.18 | -0.17 | -2.65 | -3.70\* | 7.66\*\* | 0.73\*\* | -0.04 | 1.11\*\* | -0.40\*\* | 9.60\*\* | -0.26\*\* |
| SE m ± | 2.09 | 0.54 | 0.07 | 0.08 | 1.50 | 1.52 | 1.34 | 0.06 | 0.10 | 0.09 | 0.09 | 2.21 | 0.09 |
| C.D. @ 5% | 4.65 | 1.21 | 0.17 | 0.17 | 3.33 | 3.31 | 2.87 | 0.13 | 0.23 | 0.21 | 0.21 | 4.89 | 0.21 |

\*, \*\* significant at 5% and significant at 1% probability levels, respectively.

**Table S5. Estimates of heterosis for yield and quality traits in Tomato**

|  |  |
| --- | --- |
| **Plant height**  | **Days to fifty percent flowering** |
| **Top five crosses** | **SCH** | **BPH** | **MPH** | **Top five crosses** | **SCH** | **BPH** | **MPH** |
| IIHR-2902× IIHR-2852IIHR-2919× IIHR-2886IIHR-2888× IIHR-2853IIHR-2902×TLBR-6TLBR-6× IIHR-2898 | 63.96\*\*39.77\*\*36.83\*\*36.31\*\*35.99\*\* | 37.29\*\*-05.1617.17\*\*14.14\*\*24.57\*\* | 46.44\*\*09.44\*11.08\*32.57\*\*39.21\*\* | IIHR-2907× IIHR-2898IIHR-2886× IIHR-2852IIHR-2902× IIHR-2852IIHR-5-3-7-5× IIHR-2853IIHR-2888× IIHR-2886 | -17.50\*\*-13.75\*\*-13.75\*\*-13.75\*\*-13.75\*\* | -16.46\*\*-14.81\*\*-14.81\*\*-15.85\*\*-11.54\*\* | -10.81\*\*-10.39\*\*-13.75\*\*14.81\*\*-08.61\*\* |
| **Number of flowers per cluster** | **Number of fruits per cluster** |
| **Top five crosses** | **SCH** | **BPH** | **MPH** | **Top five crosses** | **SCH** | **BPH** | **MPH** |
| IIHR-2902× IIHR-2919IIHR-2919× IIHR-2898IIHR-2913× IIHR-2853IIHR-2898× IIHR-2886IIHR-2902× IIHR-2853 | 30.78\*\*25.91\*\*13.38\*\*12.65\*\*12.28\*\* | -06.03\*21.34\*\*27.32\*\*19.95\*\*04.15 | 28.28\*\*27.38\*\*37.67\*\*31.63\*\*18.71\*\* | IIHR-2898× IIHR-2853IIHR-2913× IIHR-2898IIHR-2898× IIHR-2852TLBR-6× IIHR-2919IIHR-5-3-7-5× IIHR-2898 | 9.60\*06.7201.93-01.93-02.88 | 16.68\*\*44.16\*\*02.62-03.7731.17\*\* | 60.56\*\*57.45\*\*15.65\*\*29.11\*\*61.60\*\* |
| **Fruit set percentage (%)** | **Number of fruits per plant** |
| **Top five crosses** | **SCH** | **BPH** | **MPH** | **Top five crosses** | **SCH** | **BPH** | **MPH** |
| TLBR-6× IIHR-2919IIHR-5-3-7-5× IIHR-2898IIHR-5-3-7-5× IIHR-2919IIHR-2902× IIHR-2888IIHR-2898× IIHR-2888 | 07.7503.2002.4501.96-0.29 | 17.84\*\*25.50\*\*12.05\*17.26\*\*14.87\*\* | 40.78\*\*34.10\*\*25.61\*\*19.36\*\*14.87\*\* | IIHR-5-3-7-5× IIHR-2853IIHR-2919× IIHR-2852IIHR-2902× IIHR-2853IIHR-2907× IIHR-5-3-7-5IIHR-2853× IIHR-2852 | 43.30\*\*35.46\*\*31.45\*\*19.23\*\*18.66\*\* | 114.41\*\*25.25\*\*66.21\*\*124.47\*\*09.71 | 163.30\*\*41.12\*\*80.16\*\*150.68\*\*35.62\*\* |

**Table S5. Continued**

|  |  |
| --- | --- |
| **Average fruit weight** | **Number of locules per fruit** |
| **Top five crosses** | **SCH** | **BPH** | **MPH** | **Top five crosses** | **SCH** | **BPH** | **MPH** |
| IIHR-2902× IIHR-2852IIHR-2902× TLBR-6IIHR-2886× IIHR-2852TLBR-6× IIHR-2919IIHR-2913× IIHR-2853 | 50.40\*\*33.53\*\*25.17\*\*22.66\*\*20.95\*\* | -15.18\*\*22.24\*\*32.76\*\*13.74\*\*-15.18\*\* | 47.80\*\*23.03\*\*35.31\*\*19.57\*\*04.98\*\* | IIHR-2919× IIHR-2898IIHR-2898× IIHR-2852IIHR-2902× IIHR-2919IIHR-2902× IIHR-2898IIHR-2902× IIHR-2913 | -33.33\*\*-08.90\*\*-08.90\*\*-06.67\*-06.67\* | -33.33\*\*-08.89\*\*-28.07\*\*-26.32\*\*-26.32\*\* | 24.05\*\*-08.89\*\*-09.89\*\*-24.05\*\*-17.65\*\* |
| **Total soluble solids** | **Pericarp thickness** |
| **Top five crosses** | **SCH** | **BPH** | **MPH** | **Top five crosses** | **SCH** | **BPH** | **MPH** |
| IIHR-2886× IIHR-2853IIHR-2902× IIHR-2852IIHR-2919× IIHR-2853IIHR-5-3-7-5× IIHR-2852IIHR-5-3-7-5× IIHR-2919 | 6.412.041.251.120.20 | 35.52\*\*19.60\*\*0.9109.48\*-0.13 | 39.71\*\*19.88\*\*16.28\*\*13.82\*\*04.00 | IIHR-2913× IIHR-2853IIHR-2907×TLBR-6IIHR-2888× IIHR-2852IIHR-2907× IIHR-2902IIHR-2902× IIHR-2919 | 24.73\*\*22.67\*\*16.25\*\*14.98\*\*13.50\*\* | 30.66\*\*-10.19\*\*03.72-15.83\*\*38.84\*\* | 44.38\*\*21.21\*\*24.48\*\*8.19\*\*43.95\*\* |
| **Fruit firmness** | **Yield per plant** |
| **Top five crosses** | **SCH** | **BPH** | **MPH** | **Top five crosses** | **SCH** | **BPH** | **MPH** |
| IIHR-2919× IIHR-2853IIHR-2907× IIHR-2888IIHR-2907× IIHR-2852IIHR-2907× IIHR-2886IIHR-2907× IIHR-2913 | 17.74\*\*17.37\*\*17.16\*\*15.78\*\*12.22\*\* | -0.12-03.06-03.22-19.86\*\*-07.31\*\* | 07.22\*\*06.73\*\*05.13\*\*14.75\*\*09.04\*\* | IIHR-2913× IIHR-2898IIHR-2902× IIHR-2886IIHR-2919× IIHR-2852IIHR-2913× IIHR-2888IIHR-2913× IIHR-2919 | 12.79\*06.1605.060.970.53 | 50.15\*\*45.39\*\*15.83\*\*34.41\*\*33.82\*\* | 54.00\*\*81.15\*\*33.38\*\*50.58\*\*41.63\*\* |

\*, \*\* significant at 5% and significant at 1% probability levels, respectively

 **Figure S1. Validation and amplification of *Ty2* gene linked molecular marker in 55 hybrids**

****

 **Figure S2. Validation and amplification of *Ty3* gene linked molecular marker in 55 hybrids**

