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| **Table S1** Fruiting habit traits of the genotypes used in the study | | | | |
| **Sl. No.** | **Genotype** | **Kind of genetic material** | **Source** | **Fruiting habit** |
| 1 | CMS 6B | Advanced breeding line | AVRDC, TAIWAN | Solitary and pendant fruits |
| 2 | CMS 8B | Advanced breeding line | AVRDC, TAIWAN | Solitary and pendant fruits |
| 3 | CMS 10B | Advanced breeding line | AVRDC, TAIWAN | Solitary and pendant fruits |
| 4 | Gowribidanur | Released variety | Local collection, Karnataka | Solitary and pendant fruits |
| 5 | Pant C-1 | Released variety | GB Pant University of Agricultural and Technology (UP) | Solitary and erect fruits |
| 6 | Japani long | Released variety | Pusa, New Delhi | Clustered and erect fruits |
| 7 | Pusa Sadabahar | Released variety | Pusa, New Delhi | Clustered and erect fruits |
| 8 | Phule Jyothi | Released variety | MPKV, Rahuri | Clustered and pendant fruits |

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| **Table S 2** Fruiting habit classes for which F2, Backcrosses and NILs segregated | | | |
| **Sl. No.** | **Crosses** | **Generation Evaluated** | **Fruiting habit classes segregated** |
| 1 | Japani Long × Pant C-1 | F2 and backcross | Clustered and Single |
| 2 | Phule Jyothi × Gowribidanur Local | F2 and backcross | Clustered and Single |
| 3 | Pusa Sadabahar × Pant C-1 | F2 and backcross | Clustered and Single |
| 4 | Pant C-1 × CMS 10B | F2 and backcross | Erect and pendant |
| 5 | Pant C-1 × CMS 6B | F2 and backcross | Erect and pendant |
| 6 | Pusa Sadabahar × Phule Jyothi | F2, backcross and NILs | Erect and pendant |
| 7 | Japani Long × Phule Jyothi | F2 and backcross | Erect and pendant |
| 8 | Phulw Jyothi × Pant C **1** | F2 and backcross | Cluster Erect, Cluster Pendant, Single Erect and Single Pendant |
| 9 | Japani Long × CMS 10B | F2, backcross and NILs | Cluster Erect, Cluster Pendant, Single Erect and Single Pendant |
| 10 | Japani Long × CMS 8B | F2 and backcross | Cluster Erect, Cluster Pendant, Single Erect and Single Pendant |

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| **Table S3** Relationship of fruits node-1 and fruit orientation with fruit yield and its component traits of F2 generation in chilli over two seasons | | | | | | | | | | | | | | | |
| **Crosses** | **Season** | **Phenotypic classes** | **Fruit length (cm)** | | | **Fruits plant-1** | | | **Average fruit weight (g)** | | | **Green fruit yield plant-1 (g)** | | | |
| **Mean** | **F**  **statistic** | **Prob** | **Mean** | **F**  **statistic** | **Prob** | **Mean** | **F**  **statistic** | **Prob** | **Mean** | **F statistic** | **Prob** |
| **Phulw Jyothi × Pant C 1** | **2016 Rainy season** | Cluster Erect | 7.04 | 0.17 | 0.92 | 57.52 | 0.86 | 0.48 | 3.00 | 0.29 | 0.83 | 184.50 | 0.76 | 0.53 |
| Cluster Pendant | 6.99 | 57.55 | 3.44 | 186.20 |
| Single Erect | 6.77 | 66.99 | 3.08 | 199.00 |
| Single Pendant | 7.02 | 85.85 | 3.20 | 278.88 |
| **2017 Rainy season** | Cluster Erect | 8.70 | 0.22 | 0.88 | 30.77 | 1.51 | 0.23 | 4.90 | 0.28 | 0.84 | 153.25 | 1.07 | 0.37 |
| Cluster Pendant | 8.24 | 36.59 | 4.59 | 171.13 |
| Single Erect | 8.40 | 27.04 | 4.57 | 124.44 |
| Single Pendant | 8.46 | 37.17 | 4.50 | 163.32 |
| **Japani Long × CMS 10B** | **2016 Rainy season** | Cluster Erect | 6.85 | 0.26 | 0.85 | 37.09 | 1.04 | 0.38 | 2.65 | 1.63 | 0.19 | 112.50 | 1.67 | 0.18 |
| Cluster Pendant | 8.02 | 82.24 | 2.24 | 178.72 |
| Single Erect | 7.96 | 63.28 | 1.94 | 113.86 |
| Single Pendant | 9.32 | 72.38 | 2.10 | 148.00 |
| **2017 Rainy season** | Cluster Erect | 6.85 | 1.50 | 0.22 | 37.09 | 1.22 | 0.31 | 2.65 | 2.21 | 0.09 | 112.50 | 1.33 | 0.27 |
| Cluster Pendant | 7.75 | 81.56 | 2.20 | 168.87 |
| Single Erect | 7.47 | 62.94 | 1.84 | 110.50 |
| Single Pendant | 8.09 | 66.58 | 2.10 | 139.22 |
| **Japani Long × CMS 8B** | **2016 Rainy season** | Cluster Erect | 7.20 | 3.80 | 0.01 | 33.59 | 1.74 | 0.16 | 2.40 | 0.70 | 0.56 | 78.75 | 1.98 | 0.12 |
| Cluster Pendant | 7.14 | 60.56 | 2.16 | 128.79 |
| Single Erect | 6.59 | 58.85 | 2.11 | 125.91 |
| Single Pendant | 7.65 | 68.47 | 2.27 | 161.09 |
| **2017 Rainy season** | Cluster Erect | 7.54 | 2.17 | 0.10 | 71.56 | 1.12 | 0.35 | 3.03 | 1.53 | 0.21 | 219.25 | 2.22 | 0.09 |
| Cluster Pendant | 8.21 | 70.91 | 2.85 | 207.40 |
| Single Erect | 8.21 | 77.69 | 3.20 | 251.07 |
| Single Pendant | 7.64 | 64.54 | 2.84 | 184.44 |

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| **Table S4** Relationship of fruits node-1 and fruit orientation with fruit yield and its component traits of back cross generation in chilli over two seasons | | | | | | | | | | | | | | |
| **Crosses** | **Season** | **Phenotypic classes** | **Fruit length (cm)** | | | **Fruits plant-1** | | | **Average fruit weight (g)** | | | **Green fruit yield plant-1 (g)** | | |
| **Mean** | **‘t’ / F**  **statistic** | **Prob** | **Mean** | **‘t’ / F**  **statistic** | **Prob** | **Mean** | **‘t’ / F**  **statistic** | **Prob** | **Mean** | **‘t’ / F statistic** | **Prob** |
| **Phulw Jyothi × Pant C 1** | **2016 Rainy season** | Single Pendant | 7.12 | -0.28 | 0.79 | 47.19 | 0.54 | 0.61 | 3.00 | 0.56 | 0.59 | 147.25 | 0.52 | 0.62 |
| Cluster Pendant | 7.21 | 35.96 | 2.72 | 109.83 |
| Single Erect | 6.04 | 1.41 | 0.17 | 59.92 | 0.37 | 0.71 | 2.66 | 1.59 | 0.12 | 166.40 | 0.76 | 0.45 |
| Single Pendant | 5.68 | 55.49 | 2.38 | 138.79 |
| **2017 Rainy season** | Single Pendant | 7.81 | -0.11 | 0.91 | 59.29 | 1.38 | 0.17 | 3.42 | -0.27 | 0.79 | 203.33 | 0.93 | 0.36 |
| Cluster Pendant | 7.84 | 50.62 | 3.47 | 179.81 |
| Single Erect | 6.03 | 0.53 | 0.60 | 94.67 | 2.33 | 0.02 | 2.45 | -1.54 | 0.13 | 226.07 | 1.28 | 0.21 |
| Single Pendant | 5.92 | 74.55 | 2.65 | 197.33 |
| **Japani Long × CMS 10B** | **2016 Rainy season** | Cluster Erect | 6.56 | 0.57 | 0.63 | 70.88 | 0.12 | 0.95 | 1.97 | 0.97 | 0.41 | 132.70 | 0.47 | 0.71 |
| Cluster Pendant | 6.51 | 80.53 | 2.09 | 159.25 |
| Single Erect | 6.73 | 80.54 | 2.20 | 181.09 |
| Single Pendant | 6.82 | 75.24 | 2.24 | 156.14 |
| **2017 Rainy season** | Cluster Erect | 6.56 | 0.53 | 0.66 | 70.88 | 0.69 | 0.56 | 1.97 | 1.16 | 0.33 | 132.70 | 0.94 | 0.43 |
| Cluster Pendant | 6.55 | 86.80 | 2.12 | 172.08 |
| Single Erect | 6.64 | 85.17 | 2.23 | 192.70 |
| Single Pendant | 6.86 | 67.70 | 2.28 | 145.68 |
| **Japani Long × CMS 8B** | **2016 Rainy season** | Cluster Erect | 6.63 | 4.42 | 0.01 | 49.74 | 0.67 | 0.58 | 1.94 | 0.36 | 0.78 | 97.15 | 0.53 | 0.67 |
| Cluster Pendant | 7.77 | 66.67 | 1.88 | 128.83 |
| Single Erect | 7.09 | 64.94 | 1.83 | 119.81 |
| Single Pendant | 7.68 | 66.27 | 1.88 | 129.92 |
| **2017 Rainy season** | Cluster Erect | 6.67 | 1.59 | 0.21 | 43.82 | 2.14 | 0.12 | 2.22 | 1.23 | 0.32 | 93.00 | 2.47 | 0.08 |
| Cluster Pendant | 6.40 | 56.59 | 2.34 | 126.38 |
| Single Erect | 7.30 | 82.99 | 2.26 | 174.50 |
| Single Pendant | 7.23 | 45.37 | 2.79 | 106.13 |