

Sowmiya M, Manonmani S, Selvi NR, Saraswathi R, Suresh R, Gopalakrishnan C, Raveendran M, Dhamotharan P. Identification of false smut - resistant donors in Rice (*Oryza sativa* L.) and analysis of their morpho-molecular diversity for resistance breeding. Plant Science Today (Early Access). <https://doi.org/10.14719/pst.4242>

**Table 1.** Mean data of the genotypes for all the traits.

| Sl. No. | Genotypes                     | NIPP | NIGPa | NIGP  | PIPP  | PIGPa | DFP    | PH     | NPT   | PL    | NFPP   | NCGP  | PSS   | HSW  | SPY   |
|---------|-------------------------------|------|-------|-------|-------|-------|--------|--------|-------|-------|--------|-------|-------|------|-------|
| 1       | Panamara sambha               | 1.00 | 1.00  | 1.33  | 13.39 | 1.09  | 94.00  | 118.10 | 22.67 | 26.53 | 149.00 | 12.33 | 16.87 | 2.24 | 37.45 |
| 2       | Arupatham sambha              | 4.33 | 1.00  | 6.00  | 25.72 | 1.17  | 98.67  | 122.25 | 22.67 | 24.65 | 119.00 | 13.33 | 19.67 | 1.40 | 16.60 |
| 3       | Channagi                      | 0.00 | 0.00  | 0.00  | 0.00  | 0.71  | 94.33  | 121.33 | 27.00 | 20.70 | 96.00  | 5.50  | 13.85 | 2.23 | 17.48 |
| 4       | Poongar selection             | 1.00 | 1.00  | 1.33  | 10.79 | 1.08  | 83.00  | 107.96 | 28.67 | 22.75 | 155.33 | 10.00 | 13.73 | 2.32 | 26.17 |
| 5       | Kapikar selection             | 0.00 | 0.00  | 0.00  | 0.00  | 0.71  | 111.67 | 107.66 | 33.00 | 21.00 | 119.00 | 15.00 | 19.24 | 1.57 | 31.45 |
| 6       | Varigarudan sambha            | 4.33 | 4.33  | 13.33 | 28.85 | 2.15  | 99.00  | 111.39 | 19.00 | 20.60 | 104.33 | 21.33 | 26.69 | 1.92 | 12.04 |
| 7       | Varigarundam sambha selection | 5.33 | 3.00  | 11.67 | 33.41 | 1.53  | 126.67 | 118.66 | 18.00 | 21.67 | 162.00 | 23.33 | 22.23 | 1.78 | 14.30 |
| 8       | Kama sambha                   | 8.33 | 2.00  | 16.00 | 43.71 | 1.44  | 99.67  | 110.66 | 17.67 | 23.73 | 122.00 | 7.00  | 13.83 | 1.22 | 21.50 |
| 9       | Kama sambha selection         | 1.67 | 1.33  | 2.33  | 17.08 | 1.12  | 95.00  | 123.33 | 19.00 | 23.57 | 170.00 | 20.33 | 20.27 | 1.81 | 19.75 |
| 10      | Karthigai sambha              | 8.00 | 2.00  | 17.33 | 34.52 | 1.57  | 117.33 | 129.92 | 25.00 | 22.23 | 105.00 | 47.00 | 42.72 | 1.10 | 13.73 |
| 11      | Purple puttu                  | 1.00 | 1.00  | 1.00  | 16.81 | 1.17  | 95.67  | 144.02 | 12.00 | 21.07 | 115.00 | 5.33  | 12.12 | 2.13 | 18.76 |
| 12      | Chithan sambha                | 1.00 | 0.67  | 0.67  | 14.61 | 1.00  | 109.67 | 113.34 | 16.00 | 22.30 | 118.00 | 5.00  | 11.87 | 2.18 | 17.58 |
| 13      | Ghandhasala                   | 1.00 | 1.33  | 2.00  | 14.27 | 1.26  | 108.00 | 109.33 | 16.67 | 20.60 | 120.33 | 9.00  | 15.29 | 2.30 | 45.03 |
| 14      | Norungam                      | 1.00 | 0.67  | 0.67  | 14.04 | 1.10  | 92.67  | 121.66 | 18.00 | 21.23 | 90.00  | 4.00  | 12.09 | 2.84 | 28.37 |
| 15      | Kallukar                      | 4.00 | 1.00  | 3.00  | 30.61 | 1.07  | 98.00  | 133.40 | 16.00 | 21.25 | 161.00 | 2.33  | 6.91  | 2.07 | 26.30 |
| 16      | Kallundikar                   | 2.67 | 3.00  | 6.67  | 20.50 | 1.71  | 90.67  | 128.01 | 22.00 | 22.50 | 142.00 | 19.00 | 23.20 | 2.82 | 24.86 |
| 17      | Vadakathi sambha              | 2.00 | 1.00  | 0.67  | 20.08 | 1.17  | 125.67 | 138.67 | 17.00 | 21.20 | 116.33 | 19.00 | 23.28 | 1.63 | 13.87 |
| 18      | Sadai sambha                  | 4.33 | 3.00  | 16.33 | 24.10 | 1.83  | 111.33 | 149.23 | 26.00 | 22.10 | 105.00 | 32.00 | 33.39 | 1.48 | 12.53 |
| 19      | Thulasi vasanai sambha        | 0.00 | 0.00  | 0.00  | 0.00  | 0.71  | 108.33 | 114.85 | 38.00 | 24.00 | 173.33 | 10.00 | 13.81 | 1.84 | 12.05 |
| 20      | Rajamudi                      | 3.00 | 5.67  | 14.67 | 22.43 | 2.42  | 112.33 | 130.02 | 20.67 | 23.60 | 108.33 | 42.67 | 39.25 | 1.66 | 10.51 |
| 21      | Arupatham vellai              | 3.33 | 1.00  | 3.00  | 25.03 | 1.13  | 104.67 | 109.82 | 19.00 | 21.40 | 132.00 | 32.67 | 30.24 | 1.47 | 16.38 |
| 22      | Mangam sambha                 | 3.33 | 1.33  | 3.67  | 24.86 | 1.40  | 114.67 | 111.23 | 19.33 | 19.25 | 92.00  | 6.00  | 14.87 | 1.72 | 15.53 |
| 23      | Burma block                   | 3.00 | 1.00  | 1.33  | 23.41 | 1.41  | 111.67 | 117.43 | 19.00 | 19.67 | 67.33  | 27.67 | 39.54 | 1.47 | 18.70 |
| 24      | Godavari sambha               | 1.00 | 2.00  | 2.00  | 10.37 | 1.48  | 102.00 | 122.95 | 31.00 | 24.15 | 119.00 | 47.67 | 39.33 | 1.39 | 22.57 |

|    |                            |      |      |       |       |      |        |        |       |       |        |       |       |      |       |
|----|----------------------------|------|------|-------|-------|------|--------|--------|-------|-------|--------|-------|-------|------|-------|
| 25 | Vadivel                    | 2.00 | 1.00 | 2.00  | 29.00 | 1.20 | 118.67 | 112.32 | 8.67  | 24.73 | 107.00 | 61.67 | 49.51 | 1.22 | 11.20 |
| 26 | Karungam                   | 1.33 | 1.00 | 1.00  | 16.38 | 1.15 | 106.67 | 124.33 | 16.67 | 23.00 | 123.00 | 5.33  | 11.72 | 1.82 | 17.50 |
| 27 | Pamani sambha              | 3.00 | 2.00 | 3.33  | 21.72 | 1.60 | 115.67 | 121.33 | 22.00 | 19.25 | 97.00  | 44.67 | 42.78 | 1.84 | 27.24 |
| 28 | Arasambha                  | 1.00 | 0.67 | 1.00  | 11.76 | 1.07 | 119.33 | 117.09 | 24.33 | 22.43 | 95.67  | 27.67 | 32.53 | 2.32 | 29.20 |
| 29 | Koolavalai                 | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 114.33 | 119.69 | 20.00 | 22.37 | 121.00 | 7.67  | 14.58 | 1.12 | 28.20 |
| 30 | Chinna aduku nel           | 8.00 | 1.00 | 8.67  | 39.41 | 1.05 | 112.33 | 158.65 | 20.00 | 25.20 | 168.00 | 52.67 | 34.27 | 1.31 | 27.32 |
| 31 | Periya chandikar           | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 116.00 | 141.58 | 26.33 | 23.25 | 136.00 | 12.00 | 17.29 | 2.70 | 34.98 |
| 32 | RPHP125                    | 4.00 | 2.00 | 5.00  | 29.05 | 1.47 | 71.00  | 117.67 | 17.00 | 21.20 | 120.67 | 25.33 | 27.30 | 1.04 | 20.07 |
| 33 | Kaltikar                   | 2.67 | 1.00 | 3.00  | 17.46 | 1.34 | 104.33 | 101.33 | 29.33 | 23.00 | 77.70  | 44.67 | 49.33 | 0.91 | 15.46 |
| 34 | Earapalli                  | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 105.00 | 138.24 | 23.67 | 19.43 | 96.67  | 31.67 | 34.94 | 2.02 | 24.74 |
| 35 | Kalarkar                   | 3.67 | 2.00 | 6.00  | 21.93 | 1.75 | 116.00 | 125.46 | 26.33 | 23.43 | 78.33  | 26.67 | 35.69 | 1.21 | 23.87 |
| 36 | Sornavari                  | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 105.00 | 90.60  | 14.50 | 18.00 | 58.00  | 26.33 | 42.50 | 1.67 | 16.13 |
| 37 | RPHP103                    | 5.33 | 1.33 | 6.33  | 31.13 | 1.52 | 83.00  | 101.17 | 20.00 | 20.77 | 72.00  | 5.77  | 16.42 | 1.44 | 16.23 |
| 38 | Ramakuruvaikar             | 5.00 | 2.00 | 6.33  | 24.66 | 1.61 | 78.33  | 116.61 | 28.73 | 23.47 | 96.00  | 33.67 | 36.32 | 1.38 | 23.37 |
| 39 | Murungankar                | 1.67 | 3.00 | 3.67  | 22.97 | 1.73 | 104.33 | 114.00 | 10.67 | 22.73 | 120.33 | 14.00 | 19.94 | 1.27 | 11.17 |
| 40 | IG71                       | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 66.00  | 105.46 | 19.33 | 12.33 | 36.00  | 1.63  | 12.14 | 1.25 | 11.81 |
| 41 | Jeevan sambha              | 1.00 | 2.00 | 2.00  | 13.20 | 1.94 | 108.67 | 118.71 | 19.33 | 17.37 | 61.33  | 1.97  | 10.31 | 1.40 | 11.79 |
| 42 | RPHP104                    | 3.33 | 1.00 | 3.33  | 23.04 | 1.11 | 74.67  | 79.54  | 21.73 | 24.08 | 134.77 | 19.00 | 22.05 | 1.47 | 21.50 |
| 43 | IG49                       | 3.67 | 1.00 | 3.33  | 21.57 | 1.08 | 73.33  | 111.11 | 27.00 | 23.57 | 150.87 | 16.67 | 19.43 | 1.69 | 22.60 |
| 44 | RP-Bio-226                 | 2.00 | 1.00 | 2.00  | 19.96 | 1.11 | 67.33  | 75.12  | 17.20 | 18.13 | 136.33 | 52.00 | 38.12 | 1.27 | 20.01 |
| 45 | RH2-SM-1-2-2               | 6.33 | 2.00 | 10.00 | 47.21 | 1.85 | 78.00  | 124.48 | 11.77 | 21.47 | 68.67  | 13.30 | 26.13 | 2.08 | 16.54 |
| 46 | Red sirumani               | 5.00 | 4.00 | 13.67 | 32.64 | 1.87 | 66.00  | 107.52 | 17.33 | 27.40 | 133.67 | 30.13 | 28.35 | 1.36 | 13.96 |
| 47 | Katta sambha               | 7.33 | 1.67 | 10.67 | 42.98 | 1.20 | 109.67 | 109.62 | 15.80 | 24.10 | 175.00 | 17.87 | 18.64 | 1.92 | 27.48 |
| 48 | Ponmani sambha             | 2.33 | 3.33 | 9.00  | 25.95 | 2.22 | 116.33 | 105.30 | 12.23 | 17.60 | 75.00  | 9.93  | 21.36 | 2.23 | 13.92 |
| 49 | IG75                       | 5.00 | 4.00 | 15.67 | 29.82 | 1.71 | 64.67  | 111.89 | 20.23 | 26.13 | 166.33 | 27.77 | 24.18 | 1.35 | 19.67 |
| 50 | Chinna aduku nel selection | 1.00 | 1.00 | 1.00  | 18.11 | 1.26 | 109.67 | 97.50  | 10.37 | 19.57 | 91.67  | 9.77  | 19.07 | 2.18 | 20.36 |
| 51 | IG12                       | 1.00 | 1.00 | 1.00  | 13.65 | 1.29 | 82.67  | 111.66 | 17.97 | 20.67 | 86.00  | 11.43 | 21.39 | 1.59 | 24.30 |
| 52 | Thillainayagan             | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 105.67 | 131.00 | 21.83 | 21.27 | 92.67  | 24.83 | 31.17 | 1.59 | 18.75 |
| 53 | Vellai kudaivelan          | 5.33 | 2.00 | 11.33 | 40.01 | 1.70 | 93.67  | 128.00 | 12.90 | 22.60 | 83.33  | 13.30 | 23.58 | 1.73 | 11.43 |

|     |                |      |      |       |       |      |        |        |       |       |        |       |       |      |       |
|-----|----------------|------|------|-------|-------|------|--------|--------|-------|-------|--------|-------|-------|------|-------|
| 54  | RPHP163        | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 100.33 | 93.06  | 7.13  | 22.17 | 127.00 | 41.33 | 34.77 | 1.44 | 10.75 |
| 55  | IG18           | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 110.67 | 124.12 | 15.93 | 24.37 | 120.00 | 38.63 | 34.65 | 1.59 | 14.80 |
| 56  | IG28           | 2.00 | 1.00 | 2.00  | 27.66 | 1.23 | 111.67 | 150.34 | 9.30  | 21.20 | 99.33  | 18.97 | 25.90 | 1.55 | 14.87 |
| 57  | Nootripatum    | 7.33 | 4.00 | 23.00 | 58.76 | 2.11 | 116.00 | 111.50 | 10.03 | 22.50 | 101.33 | 44.50 | 41.57 | 1.55 | 13.98 |
| 58  | Muthuvellai    | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 106.00 | 109.44 | 8.40  | 20.50 | 113.33 | 9.87  | 17.18 | 2.04 | 16.16 |
| 59  | Uppumolagai    | 6.67 | 6.00 | 21.00 | 35.66 | 2.51 | 111.67 | 137.49 | 19.63 | 27.00 | 104.00 | 14.23 | 21.73 | 1.67 | 16.84 |
| 60  | Rangoon sambha | 8.33 | 5.67 | 23.67 | 44.59 | 2.20 | 105.33 | 156.24 | 16.90 | 28.00 | 130.67 | 38.53 | 32.91 | 1.47 | 18.58 |
| 61  | CO 43          | 7.67 | 8.00 | 34.33 | 41.95 | 2.78 | 116.67 | 86.11  | 17.17 | 23.33 | 110.57 | 18.50 | 24.14 | 1.55 | 19.23 |
| 62  | RPHP42         | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 112.67 | 130.27 | 11.93 | 30.33 | 109.67 | 6.67  | 14.31 | 1.24 | 13.33 |
| 63  | CO 50          | 9.33 | 9.00 | 33.00 | 50.74 | 2.83 | 114.00 | 93.18  | 15.80 | 27.50 | 120.00 | 21.33 | 24.85 | 1.34 | 18.69 |
| 64  | IG25           | 0.00 | 0.00 | 0.33  | 0.00  | 0.71 | 108.00 | 142.52 | 14.83 | 32.67 | 104.67 | 6.67  | 14.59 | 1.22 | 14.80 |
| Min |                | 0.00 | 0.00 | 0.00  | 0.00  | 0.71 | 64.67  | 75.12  | 7.13  | 12.33 | 36.00  | 1.63  | 6.91  | 0.91 | 10.51 |
| Max |                | 9.33 | 9.00 | 34.33 | 58.76 | 2.83 | 126.67 | 158.65 | 38.00 | 32.67 | 175.00 | 61.67 | 49.51 | 2.84 | 45.03 |
| SD  |                | 2.69 | 1.91 | 8     | 14.89 | 0.55 | 17     | 19.58  | 6.92  | 3.3   | 32.3   | 15.09 | 10.78 | 0.47 | 7.21  |

NIPP- number of infected panicles/plant NIGPa-number of infected grains/panicle, NIGP- number of infected grains/plant, PIPP- percentage of infected panicles/plant, PIGPa - percentage of infected grains/panicle, DFF- days to fifty per cent flowering, PH-plant height, PL-panicle length, NPT-number of productive tillers, NFPP -Number of florets/panicle, NCGP- number of chaffy grains/panicle, PSS- percentage of spikelet sterility, HGW- Hundred grain weight, SPW- single panicle weight, SPY- single plant yield.

**Table 2.** Percent contribution of traits to total divergence.

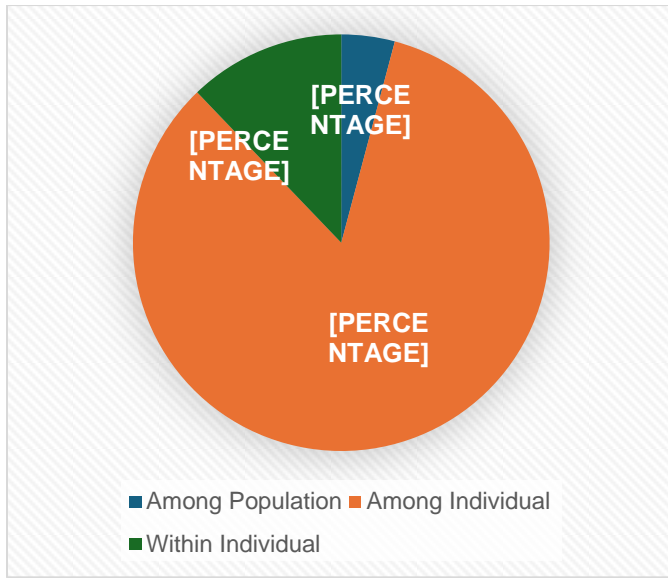
| Traits | Rank | Contribution % |
|--------|------|----------------|
| NIPP   | 142  | 7.04           |
| PIPP   | 203  | 10.07          |
| NIGPa  | 102  | 5.06           |
| NIGP   | 782  | 38.79          |
| PIGPa  | 29   | 1.44           |
| DFF    | 52   | 2.58           |
| PH     | 10   | 0.50           |
| NPT    | 48   | 2.38           |
| PL     | 46   | 2.28           |

|      |     |       |
|------|-----|-------|
| NFPP | 40  | 1.98  |
| NCGP | 336 | 16.67 |
| PSS  | 83  | 4.12  |
| HSW  | 16  | 0.79  |
| SPY  | 127 | 6.29  |

NIPP- number of infected panicles/plant NIGPa-number of infected grains/panicle, NIGP- number of infected grains/plant, PIPP- percentage of infected panicles/plant, PIGPa - percentage of infected grains/panicle, DFF- days to fifty per cent flowering, PH-plant height, PL-panicle length, NPT-number of productive tillers, NFPP -Number of florets/panicle, NCGP- number of chaffy grains/panicle, PSS- percentage of spikelet sterility, HGW- Hundred grain weight, SPW- single panicle weight, SPY- single plant yield.

**Table 3.** Genotype clusters based on Jaccard distance.

| Clusters  | Genotypes   |
|-----------|---|
| Cluster 1 | Panamara sambha, Arupatham sambha, Channagi, Poongar selection, Kapikar selection, Varigarudam sambha selection, Kama sambha, Kama sambha selection, Karthigai sambha, Purple puttu, Chithan sambha |
| Cluster 2 | Varigarudan sambha, Ghandhasala, Vadakathi sambha, Sadai sambha, Thulasi vasanai sambha, Arupatham vellai, Godavari sambha, Arasambha, Periya chandiyar, Murungankar, IG28, RPHP42                  |
| Cluster 3 | Norungam, Rajamudi, Kaltikar, Kalarkar, Sornavari, Ramakuruvaikar, Jeevan sambha, RPHP104, IG49   |
| Cluster 4 | Kallukar, Kallundikar, Pamani sambha, Chinna aduku nel, RPHP103, IG71, katta sambha, ponmani sambha, CO43   |
| Cluster 5 | Mangam sambha, Burma block, Karungam, Koolavalai, Earapalli, RP-Bio-226, RH2-SM-1-2-2, Red sirumani, Vellai kudaivelan, RPHP163, IG18   |
| Cluster 6 | Vadivel, RPHP125, IG75, Chinnadukunel selection, IG12, Thillainayagan, Nootripatum, Muthuvellai, Uppumolagai, Rangoon sambha  |



**Fig. 1.** Molecular variance percentage identified through AMOVA.