**Supplementary Materials**

Table S2. Malaysian weedy rice morphotype code based on parameters stated in Table S1

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| Weedy rice population | Morphotypes codes |
| **Seed codes** | **Feature codes** |
| Strawhull awnless (SH) | SH001 | SH-S1-L0-A0-P3-Ht1-Pb1 |
| SH002 | SH-S1-L0-A0-P1-Ht1-Pb1 |
| SH003 | SH-S2-L0-A0-P3-Ht1-Pb2 |
| SH004 | SH-S2-L0-A0-P1-Ht1-Pb1 |
| SH005 | SH-S2-L0-A0-P2-Ht1-Pb1 |
| SH006 | SH-S2-L0-A0-P2-Ht1-Pb2 |
| SH007 | SH-S1-L0-A0-P1-Ht2-Pb1 |
| SH008 | SH-S1-L0-A0-P2-Ht2-Pb1 |
| SH009 | SH-S2-L0-A0-P2-Ht2-Pb1 |
| SH011 | SH-S1-L0-A0-P2-Ht1-Pb2 |
| SH012 | SH-S1-L0-A0-P2-Ht1-Pb1 |
| SH013 | SH-S1-L0-A0-P3-Ht2-Pb1 |
| SH014 | SH-S2-L0-A0-P1-Ht2-Pb1 |
| SH015 | SH-S1-L0-A0-P1-Ht2-Pb2 |
| SH016 | SH-S2-L0-A0-P3-Ht1-Pb1 |
| SH017 | SH-S1-L0-A0-P3-Ht1-Pb1 |
| Strawhull awned (SHA) | SHA001 | SHA-S2-L1-A1-P1-Ht1-Pb1 |
| SHA002 | SHA-S2-L1-A2-P2-Ht1-Pb2 |
| SHA004 | SHA-S2-L1-A1-P1-Ht1-Pb1 |
| SHA005 | SHA-S2-L1-A1-P2-Ht1-Pb2 |
| SHA006 | SHA-S1-L1-A1-P1-Ht2-Pb1 |
| SHA007 | SHA-S2-L1-A1-P2-Ht1-Pb1 |
| SHA008 | SHA-S1-L1-A1-P3-Ht1-Pb1 |
| SHA009 | SHA-S2-L1-A1-P1-Ht1-Pb2 |
| SHA010 | SHA-S1-L1-A1-P2-Ht1-Pb2 |
| SHA011 | SHA-S1-L1-A1-P2-Ht2-Pb1 |
| SHA012 | SHA-S2-L1-A2-P3-Ht1-Pb1 |
| SHA013 | SHA-S2-L1-A1-P1-Ht2-Pb1 |
| SHA014 | SHA-S1-L1-A1-P1-Ht1-Pb2 |
| SHA015 | SHA-S1-L2-A1-P1-Ht1-Pb1 |
| SHA017 | SHA-S1-L1-A1-P1-Ht2-Pb2 |
| SHA018 | SHA-S2-L1-A2-P1-Ht1-Pb1 |
| SHA019 | SHA-S1-L1-A1-P2-Ht1-Pb1 |
| SHA020 | SHA-S2-L1-A1-P2-Ht1-Pb2 |
| SHA021 | SHA-S1-L1-A1-P1-Ht1-Pb2 |
| Brownhull awnless (BR) | BR001 | BR-S2-L0-A0-P2-Ht2-Pb1 |
| BR002 | BR-S2-L0-A0-P3-Ht1-Pb1 |
| BR003 | BR-S2-L0-A0-P2-Ht1-Pb1 |
| BR004 | BR-S2-L0-A0-P1-Ht1-Pb1 |
| BR005 | BR-S2-L0-A0-P3-Ht2-Pb1 |
| BR006 | BR-S2-L0-A0-P3-Ht1-Pb2 |
| BR007 | BR-S2-L0-A0-P2-Ht1-Pb2 |
| BR008 | BR-S1-L0-A0-P3-Ht1-Pb1 |
| BR009 | BR-S1-L0-A0-P3-Ht1-Pb2 |
| BR010 | BR-S1-L0-A0-P2-Ht1-Pb2 |
| BR011 | BR-S2-L0-A0-P4-Ht1-Pb2 |
| BR016 | BR-S2-L0-A0-P2-Ht1-Pb2 |
| Brownhull awned (BRA) | BRA001 | BRA-S2- L1-A1-P3-Ht1-Pb2 |
| BRA003 | BRA-S2- L1-A2-P3-Ht2-Pb1 |
| BRA005 | BRA-S1-L1-A1-P2-Ht1-Pb1 |
| BRA006 | BRA-S2-L1-A1-P3-Ht2-Pb1 |
| BRA007 | BRA-S1-L1-A1-P3-Ht1-Pb1 |
| BRA008 | BRA-S2-L1-A1-P2-Ht1-Pb1 |
| BRA009 | BRA-S2-L1-A1-P3-Ht1-Pb1 |
| BRA010 | BRA-S2-L1-A1-P2-Ht1-Pb1 |
| BRA019 | BRA-S1-L1-A1-P2-Ht1-Pb1 |
| BRA020 | BRA-S2-L1-A1-P2-Ht1-Pb1 |
| BRA022 | BRA-S2-L1-A1-P3-Ht1-Pb1 |
| Blackhull awnless (BH) | BH001 | BH-S2-L0-A0-P2-Ht1-Pb2 |
| BH002 | BH-S2-L0-A0-P2-Ht1-Pb1 |
| Blackhull awned (BHA) | BHA001 | BHA-S2-L1-A1-P2-Ht1-Pb2 |
| BHA002 | BHA-S2-L1-A1-P2-Ht1-Pb2 |
| BHA004 | BHA-S1-L1-A1-P2-Ht1-Pb2 |
| BHA005 | BHA-S2-L1-A2-P2-Ht1-Pb2 |
| BHA006 | BHA-S2-L1-A1-P2-Ht2-Pb2 |
| BHA016 | BHA-S?-L1-A2-P?-Ht1-Pb2 |