**Table S 4**.

Details of recombination between CLCuMuV and DNA satellites associated with hollyhock and other begomoviruses detected using RDP4.

|  |  |  |  |
| --- | --- | --- | --- |
| **DNA-A** | **Break point begin-end** a | **Parent-like sequences** | **P-Values** |
| **Major Parent** | **Minor parent** | **RDP** | **GENECOV** | **Max Chi** | **Chimera** | **Si Scan** | **3Seq** |
| **CLCuMuV-H1**  | 132-482547-7451304-17332509-2753 | CLCuBaV-[IN:Ban:04].AY705380CLCuMuV-Dar[IN:Sri:CLR07:10].JN678803PaLCuV-Cro[IN:Cro].AJ507777CLCuAlV-Al[PK:Ala804a:96].AJ002452 | BYVMV[Mad].AF241479ToLCPuV-[IN:Pun:05].AY754814ToLCBaV-C[IN:Ban4:97].AF165098ToLCBV-[BD:BD2].AF188481 | 3.224X10-67.055X10-43.436X10-26.916X10-3 | 7.975X10-6--- | 2.533X10-6-8.31X10-1- | 7.38X10-6--2.312X10-2 | -1.973X10-22.481X10-6- | 3.573X10-64.969X10-52.197X10-29.37X10-4 |
| **CLCuMuV-H2**  | 235-4821315-14681647-16732059-2156 | CLCuBaV-[IN:Ban:04].AY705380CLCuMuV-H1 PaLCuV-Cro[IN:Cro].AJ507777CLCuAlV-Al[PK:Ala804a:96].AJ002452 | BYVMV[Mad].AF241479CLCuMuV-H2 ToLCBaV-C[IN:Ban4:97].AF165098ToLCBV-[BD:BD2].AF188481 | 3.224X10-6-3.436X10-26.916X10-3 | 7.975X10-6--- | 2.533X10-61.829X10-58.31X10-1- | 7.38X10-6--2.312X10-2 | -3.808X10-42.481X10-6- | 3.573X10-61.732X10-62.197X10-29.37X10-4 |
| **CLCuMuV-H3** | 121-4821315-27371658-18352059-21562339-2826 | CLCuBaV-[IN:Ban:04].AY705380CLCuMuV-H1 PaLCuV-Cro[IN:Cro].AJ507777CLCuAlV-Al[PK:Ala804a:96].AJ002452CLCuMuV-H2  | BYVMV[Mad].AF241479CLCuMuV- [IN:Sri:CLR07:10].JN678803ToLCBaV-C[IN:Ban4:97].AF165098ToLCBV-[BD:BD2].AF188481CLCuKoV-[IN:Bih:Tom:09].HM461862 | 3.224X10-61.406X10-43.436X10-26.916X10-35.38X10-15 | 7.975X10-61.938X10-2--3.104X10-4 | 2.533X10-61.242X10-228.31X10-1-3.395X10-10 | 7.38X10-61.479X10-26-2.312X10-2- | -2.336X10-102.481X10-6-- | 3.573X10-65.277X10-672.197X10-29.37X10-45.524X10-23 |
| **DNAD1(Alphasatellite)** |
| **H1D1**  | 132-326419-792 | SLCuKaA-[IN:KTK:SnF:11].JX569789AEA-[IN:Pat:rad:08].KF471054 | AYVIA-[IN:Luc:Par:12].JX570736AEA-[PK:OK:13].HG518789 | 4.298X10-33.122X10-4 | 3.346X10-22.173X10-2 | 9.407X10-45.601X10-3 | 2.955X10-34.94X10-3 | 8.286X10-52.684X10-4 | 1.047X10-29.061X10-5 |
| **H1D2**  | 133-326418-830 | SLCuKaA-[IN:KTK:SnF:11].JX569789AEA-[IN:Pat:rad:08].KF471054 | AYVIA-[IN:Luc:Par:12].JX570736AEA-[PK:OK:13].HG518789 | 4.298X10-33.122X10-4 | 3.346X10-22.173X10-2 | 9.407X10-45.601X10-3 | 2.955X10-34.94X10-3 | 8.286X10-52.684X10-4 | 1.047X10-29.061X10-5 |
| **H1D3**  | 128-321856-39 | SLCuKaA-[IN:KTK:SnF:11].JX569789AEA-[PK:OK:13].HG518792 | AYVIA-[IN:Luc:Par:12].JX570736CLCuMuA-[IN::Pan:Cot:12].KF584012 | 4.298X10-36.894X10-10 | 3.346X10-26.298X10-5 | 9.407X10-45.741X10-5 | 2.955X10-35.653X10-6 | 8.286X10-57.936X10-6 | 1.047X10-22.54X10-6 |
| **DNAβ (Betasatellite)** |
| **H1β**  | 856-39 | H3β | H2β | 6.99X10-14 | 2.68X10-17 | 2.577X10-17 | 8.719X10-15 | 3.494X10-21 | 7.566X10-32 |
| **H2β (Non-recombinant)** |
| **H3β**  | 958-1138 | LuLDB-[IN:Lud:Okra:14].KJ614227 | LuLDB-[IN:hol:13].JQ408216 | 2.936X10-5 | 9.25X10-7 | 4.33X10-4 | 8.195X10-9 | 2.866X10-6 | 1.717X10-10 |

NS- Recombination Non-significance

Definition for acronyms in the supplementary Table 1

a The text in the parenthesis of this column indicates ORF’s in which break points are identified