## TABLE S1. Summary of sequencing and reads' processing.

|                      | Melon  | *S. nigrum* | *M. sylvestris* | *E. elaterium* (year 2020) | *E. elaterium* (year 2021) |
|----------------------|--------|-------------|-----------------|-----------------------------|-----------------------------|
| Raw reads            | 95,674,756 | 96,683,858 | 96,873,136      | 94,242,046                  | 105,494,586                 |
| Clean reads          | 92,331,320 | 93,638,414 | 93,264,932      | 90,636,792                  | 95,330,384                  |
| Host mappings        | 47,884,140 | -          | -               | -                           | -                           |
| Filter reads         | 44,447,180 | -          | -               | -                           | -                           |
| Contigs              | 31,876   | 68,239      | 64,738          | 47,717                      | 16,106                      |
**TABLE S2** Primers and probes used for viral detection by qRT-PCR.

| Virus   | Target gene | Amplicon size | Primer/Probe   | Sequence                                                                 |
|---------|-------------|---------------|----------------|--------------------------------------------------------------------------|
| MNSV    | RdRp        | 101 bp        | Forward        | 5'-CTCGCTGGGTCTGTACTTC-3'                                                |
|         |             |               | Reverse        | 5'-CCTAAACATACAGTTGCGTG-3'                                               |
|         |             |               | Probe          | 5'-FAM-CCCAGACAT/ZEN/GACCCAGTTTCCTCA-BHQ1-3'                             |
| CMV     | CP          | 161 bp        | Forward        | 5'-GAAGCTTGGTTTCGGCATTC-3'                                               |
|         |             |               | Reverse        | 5'-ACTGATAACAGTACCGTG-3'                                                 |
|         |             |               | Probe          | 5'-FAM-TGCGGAAATTTGATTCTACCGTG-G-BHQ1-3'                                 |
| TMGMV   | CP          | 106 bp        | Forward        | GTAGCTATAAGGGCTTCAATCA                                                   |
|         |             |               | Reverse        | TGGTCCARACAAAGTCCACTA                                                    |
|         |             |               | Probe          | 5'-6-FAM-TGAACCTGGTTCTGGAAGCCAT-BHQ 3'                                   |
| CCYV    | RdRp        | 91 bp         | Forward        | 5'-GTTTACACACCCTTGAGTTT-3'                                               |
|         |             |               | Reverse        | 5'-TGAAATTAGGCTGGCTTCCA-3'                                               |
|         |             |               | Probe          | 5'-HEX-TCTACTCGGAAAAGGTGAAAGCCAT-G-BHQ1-3'                               |
| ToLCNDV | CP          | 144 bp        | Forward        | 5'-CCAACCAGAACCTCAAGATT-3'                                               |
|         |             |               | Reverse        | 5'-TGCACTACGTTTCCTCCATCA-3'                                              |
|         |             |               | Probe          | 5'-HEX-TAGCACAAGGCTGCACCATA-BHQ-1-3'                                    |
| CmEV    | RdRp        | 129 bp        | Forward        | 5'-TTGGAGTTGATCCAAACGTATA-3'                                             |
|         |             |               | Reverse        | 5'-CCAGTCAACCGCATACCCTC-3'                                               |
|         |             |               | Probe          | 5'-TGGAAGAAATGCTAGGATGGTGGAGA-3'                                         |
| WMV     | CP          | 102 bp        | Forward        | 5'-ATTTCCTGACGCGACGAA-3'                                                 |
|         |             |               | Reverse        | 5'-CTAAATTCCCTGCTCTCAATTTCT-3'                                          |
|         |             |               | Probe          | 5'-FAM-TGAAACTCTGGTTCTGATATGCTC-IB® FQ-3'                                |
| CABYV   | CP          | 58 bp         | Forward        | 5'-GAGCGKTGGACGGCTAARCA-3'                                               |
|         |             |               | Reverse        | 5'-TGGTCTTGCCGTGATCCTRTG-3'                                              |
|         |             |               | Probe          | 5'-FAM-ATCAACGGGATGGAATG-IB® FQ-3'                                       |
| Contig ID | Length (nt) | Host | Viral species | Fragments | % of nt | Accession number |
|-----------|-------------|------|---------------|-----------|---------|----------------|
| k141_14574 | 5158 | M | Cucumis melo alphaendornavirus | - | 92.40 % | gi|1181747088|KX641269.1 |
| k141_29085 | 8551 | M | Cucurbit chlorotic yellows virus | RNA 1 | 99.88 % | gi|399142386|JN641883.1 |
| k141_18754 | 8002 | M | Watermelon mosaic virus | RNA 2 | 99.83 % | gi|289526328|ABS23789.1 |
| k141_14435 | 6154 | M | Cucurbit aphid-borne yellows virus | - | 99.15 % | gi|326468188|JF273461.1 |
| k141_21575 | 1321 | M | Cucumber mosaic virus | RNA 3 | 98.46 % | gi|326468188|JF273461.1 |
| k141_109 | 4199 | M | Melon necrotic spot virus | - | 97.14 % | gi|1695685772|MK604924.1 |
| k141_10185 | 1948 | M | Tomato leaf curl new delhi virus | DNA A | 99.85 % | gi|1976373550|LC596380.1 |
| k141_46034 | 643 | M | Tobacco mild green mosaic virus | - | 99.22 % | gi|1485815685|MH730970.1 |
| k141_3324 | 2651 | EE | Cucurbit aphid-borne yellows virus | - | 97.39 % | gi|388325696|JF939814.1 |
| k141_10185 | 1948 | EE | Tomato leaf curl new delhi virus | DNA A | 99.85 % | gi|1976373550|LC596380.1 |
| k141_46034 | 643 | EE | Tobacco mild green mosaic virus | DNA B | 99.67 % | gi|1485815685|MH730970.1 |
| k141_10942 | 2629 | EE | Turnip yellows virus | - | 99.22 % | gi|1485815685|MH730970.1 |
| k141_13206 | 9061 | EE | Cucurbit yellow stunting disorder virus | DNA A | 99.77 % | gi|1464332248|EF547827.1 |
| k141_1043 | 5043 | EE | Cucurbit yellow stunting disorder virus | DNA B | 99.84 % | gi|13091654|AY240781.1 |
| k141_52574 | 3786 | SN | Tomato yellow mottle associated virus | - | 97.21 % | gi|2208169437|OM827247.1 |
| k141_31540 | 7536 | SN | Potato virus Y | - | 92.44 % | gi|1881044940|MT200665.1 |
| k141_63224 | 767 | SN | Moroccan pepper virus | - | 96.35 % | gi|309392145|JX197071.1 |
| k141_61722 | 559 | SN | Tomato yellow leaf curl Sardinia virus | - | 99.82 % | gi|351439372|JK953604.1 |
| k141_24792 | 2082 | MS | Tomato yellow mottle associated virus | - | 65.03 % | gi|1158622146|KY075646.1 |
| k141_3496 | 13122 | MS | Eggplant mottled dwarf nucleorhabdovirus | - | 90.21 % | gi|594201519|K995081.1 |
| k141_3857 | 2579 | MS | Potato virus Y | - | 93.52 % | gi|1881044940|MT200665.1 |
| k141_49773 | 1500 | MS | Malva vein clearing virus | - | 89.22 % | gi|1808995387|MN116683.1 |
| k141_9830 | 1072 | MS | Malva vein clearing virus | - | 83.44 % | gi|1808995387|MN116683.1 |
| k141_37018 | 6933 | MS | Malva vein clearing virus | - | 87.64 % | gi|1808995387|MN116683.1 |
| k141_66058 | 2708 | MS | Chickpea chlorotic dwarf virus | - | 95.57 % | gi|725826289|KM229817.1 |

aM; Melon, EE: Ecballium elaterium, SN: Solanum nigrum, MS: Malva sylvestris.
bPercentage of identity at nucleotide level of the contig with the viral species.
cThe accession of the virus isolate that showed higher identity with the contig via website blastn.
**TABLE S4** Description of the melon and weed samples' and collection sites.

| Site ID | Localization | Sampling date | Species (Variety) | Sample ID | Pool ID | Symptoms |
|---------|--------------|---------------|------------------|-----------|---------|----------|
| **Site 1** Cartagena | | | Melon (Charentais) | 17.06.2020 | 7Pool | yellowing |
| | | | | 17.06.2020 | 8 | mosaic |
| | | | | 24.06.2020 | 9 | yellowing |
| | | | E. elaterium | 24.06.2020 | 54Pool | yellowing |
| | | | | 24.06.2020 | 55 | yellowing |
| | | | | 24.06.2020 | 56 | mosaic |
| | | | | 24.06.2020 | 57 | yellowing |
| | | | | 24.06.2020 | 58 | yellowing |
| | | | | 24.06.2020 | 59 | yellowing |
| | | | | 24.06.2020 | 60 | yellowing |
| | | | S. nigrum | 24.06.2020 | 10Pool | Asymptomatic |
| | | | | 17.06.2020 | 10 | Chlorosis in older leaves |
| | | | | 17.06.2020 | 11 | Chlorosis in older leaves |
| | | | | 17.06.2020 | 12 | Chlorosis in older leaves |
| | | | | 17.06.2020 | 13 | Chlorosis in older leaves |
| | | | | 17.06.2020 | 14 | Chlorosis in older leaves |
| | | | | 17.06.2020 | 15 | Chlorosis in older leaves |
| | | | | 17.06.2020 | 16 | Chlorosis in older leaves |
| | | | | 17.06.2020 | 17 | Mosaic |
| | | | | 17.06.2020 | 18 | Mosaic |
| | | | | 17.06.2020 | 19 | Asymptomatic |
| | | | | 17.06.2020 | 20 | chlorotic spots |
| | | | | 17.06.2020 | 21 | Asymptomatic |
| | | | | 17.06.2020 | 22 | Asymptomatic |
| | | | | 17.06.2020 | 23 | Mosaic in young leaves |
| | | | | 17.06.2020 | 24 | Asymptomatic |
| | | | | 17.06.2020 | 25 | Asymptomatic |
| | | | | 17.06.2020 | 26 | Leaf distortion |
| | | | | 17.06.2020 | 27 | Asymptomatic |
| | | | | 17.06.2020 | 28 | Asymptomatic |
| | | | | 17.06.2020 | 29 | Yellowing |
| | | | | 17.06.2020 | 30 | Asymptomatic |
| **Site 2** Cartagena | | | Melon (Charentais) | 17.06.2020 | 32Pool | Chlorotic spots |
| | | | | 07.07.2020 | 101 | mosaic |
| | | | | 07.07.2020 | 102 | mosaic |
| | | | | 07.07.2020 | 103 | mosaic |
| | | | | 07.07.2020 | 104 | mosaic |
| | | | | 07.07.2020 | 105 | nascent mosaic |
| | | | | 07.07.2020 | 106 | yellowing |
| | | | | 07.07.2020 | 107 | yellowing |
| | | | | 07.07.2020 | 108 | yellowing |
| | | | | 07.07.2020 | 109 | yellowing |
| | | | | 07.07.2020 | 110 | New delhi symptoms |
| | | | E. elaterium | 17.06.2020 | 33Pool | Yellowing |
| | | | | 17.06.2020 | 33 | Yellowing |
| | | | | 17.06.2020 | 35 | Yellowing |
| Date       | ID   | Symptom Description                          |
|------------|------|----------------------------------------------|
| 17.06.2020 | 36   | Yellowing                                    |
| 17.06.2020 | 37   | Yellowing                                    |
| 17.06.2020 | 38   | Yellowing                                    |
| 17.06.2020 | 39   | Asymptomatic                                 |
| 17.06.2020 | 40   | Asymptomatic                                 |
| 17.06.2020 | 41   | Asymptomatic                                 |
| 17.06.2020 | 42   | Mosaic                                       |
| 17.06.2020 | 43   | Chlorotic spots (insect)                     |
| 17.06.2020 | 44   | Mosaic                                       |
| 17.06.2020 | 45   | Asymptomatic                                 |
| 17.06.2020 | 46   | Asymptomatic                                 |
| 17.06.2020 | 47   | chlorotic spots (mites)                      |
| 17.06.2020 | 48   | chlorotic spots (mites)                      |
| 17.06.2020 | 49   | Asymptomatic                                 |
| 17.06.2020 | 50   | Asymptomatic                                 |
| 17.06.2020 | 51   | Asymptomatic                                 |
| 17.06.2020 | 52   | Asymptomatic                                 |
| 17.06.2020 | 53   | Asymptomatic                                 |
| 17.06.2020 | 54   | Asymptomatic                                 |
| 24.06.2020 | 60   | mosaic                                       |
| 24.06.2020 | 61   | mosaic                                       |
| 14.07.2020 | 143  | New delhi symptoms                           |
| 14.07.2020 | 144  | mosaic                                       |
| 14.07.2020 | 145  | mosaic                                       |
| 14.07.2020 | 146  | mosaic                                       |
| 14.07.2020 | 147  | mosaic                                       |
| 14.07.2020 | 148  | yellowing                                    |
| 14.07.2020 | 149  | yellowing                                    |
| 14.07.2020 | 150  | yellowing                                    |
| 14.07.2020 | 151  | yellowing                                    |
| 14.07.2020 | 152  | yellowing                                    |
| 24.06.2020 | 62   | mosaic                                       |
| 24.06.2020 | 63   | Yellowing                                    |
| 24.06.2020 | 64   | leaf malformation + yellowing                |
| 24.06.2020 | 65   | leaf malformation + yellowing                |
| 24.06.2020 | 66   | leaf malformation                            |
| 24.06.2020 | 67   | leaf malformation                            |
| 24.06.2020 | 68   | Asymptomatic                                 |
| 24.06.2020 | 69   | Asymptomatic                                 |
| 24.06.2020 | 70   | Nascent chlorosis                            |
| 24.06.2020 | 71   | Asymptomatic                                 |
| 24.06.2020 | 72   | Asymptomatic                                 |
| 24.06.2020 | 73   | Nascent chlorosis                            |
| 24.06.2020 | 74   | Asymptomatic                                 |
| 24.06.2020 | 75   | Asymptomatic                                 |
| 24.06.2020 | 76   | chlorotic spots                              |
| 24.06.2020 | 77   | Asymptomatic                                 |
| 24.06.2020 | 78   | Yellowing                                    |
| 24.06.2020 | 79   | Yellowing                                    |
| 24.06.2020 | 80   | Yellowing                                    |
| 24.06.2020 | 81   | Yellowing                                    |
| Date       | Site | Location    | Plant Type | Details                                      |
|------------|------|-------------|------------|----------------------------------------------|
| 24.06.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 82 mosaic                                     |
| 24.06.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 83 mosaic                                     |
| 24.06.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 84 leaf curling, internods shortening, yellowing |
| 24.06.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 85 leaf curling, internods shortening, yellowing |
| 24.06.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 86 leaf curling, internods shortening, yellowing |
| 24.06.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 87 yellowing + mosaic                          |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 111 mosaic                                     |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 112 mosaic                                     |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 113 mosaic                                     |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 114 yellowing                                  |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 115 yellowing                                  |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 116 yellowing                                  |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 117 New delhi symptoms                        |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 118 New delhi symptoms                        |
| 07.07.2020 | 4    | Lo Jurado   | Melon (Piel de Sapo) | 119 New delhi symptoms                        |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 88 Yellowing (insects)                        |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 89 Yellowing (insects)                        |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 90 Yellowing (insects)                        |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 91 Yellowing (insects)                        |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 92 Asymptomatic                               |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 93 Yellowing (insects)                        |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 94 Asymptomatic                               |
| 24.06.2020 | 4    | Lo Jurado   | E. elaterium | 95 Asymptomatic                               |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 120 Asymptomatic                              |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 121 Asymptomatic                              |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 122 Asymptomatic                              |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 123 Asymptomatic                              |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 124 Asymptomatic                              |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 125 Asymptomatic                              |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 126 Asymptomatic                              |
| 07.07.2020 | 4    | Lo Jurado   | E. elaterium | 127 Chlorotic spots                           |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 153 mosaic                                     |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 154 mosaic                                     |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 155 mosaic                                     |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 156 mosaic                                     |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 157 mosaic                                     |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 158 yellowing                                  |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 159 yellowing                                  |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 160 yellowing                                  |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 161 yellowing                                  |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 162 yellowing                                  |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 163 yellowing                                  |
| 16.07.2020 | 5    | Aguillas    | Melon (Amarillo) | 164 New delhi symptoms                        |
| 16.07.2020 | 6    | Santomera   | E. elaterium  | 172 Asymptomatic                              |
| 16.07.2020 | 6    | Santomera   | E. elaterium  | 173 Yellowing                                  |
| 16.07.2020 | 6    | Santomera   | E. elaterium  | 174 Asymptomatic                              |
| 16.07.2020 | 6    | Santomera   | E. elaterium  | 175 Asymptomatic                              |
| 16.07.2020 | 6    | Santomera   | E. elaterium  | 176 Asymptomatic                              |
| 16.07.2020 | 6    | Santomera   | E. elaterium  | 177 Asymptomatic                              |
| Date    | Code | Site | Collecting Place | Plant Species | Disease | Symptoms |
|---------|------|------|------------------|---------------|---------|----------|
| 16.07.2020 | 178  | S. nigrum | Site 7 Villamanrique Melon (Piel de Sapo) | Asymptomatic | Mosaic | Yellowing |
| 16.07.2020 | 179  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 180  | S. nigrum | | Yellowing | | |
| 16.07.2020 | 181  | S. nigrum | | Chlorotic spots | | |
| 16.07.2020 | 182  | S. nigrum | | Asymptomatic | Mosaic | |
| 16.07.2020 | 183  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 184  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 185  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 186  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 187  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 188  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 189  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 190  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 191  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 192  | S. nigrum | | Asymptomatic | Yellowing | |
| 16.07.2020 | 193  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 194  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 195  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 196  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 197  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 198  | S. nigrum | | Asymptomatic | Yellowing | |
| 16.07.2020 | 199  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 200  | S. nigrum | | Asymptomatic | fungi symptoms | |
| 16.07.2020 | 201  | S. nigrum | | Asymptomatic | | |
| 16.07.2020 | 202  | S. nigrum | | Asymptomatic | Mosaic (severity 4.5/5) | |
| 16.07.2020 | 203  | S. nigrum | | Asymptomatic | Mosaic (severity 3.5/5) | |
| 16.07.2020 | 204  | S. nigrum | | Asymptomatic | Mosaic (severity 2.5/5) | |
| 16.07.2020 | 205  | S. nigrum | | Asymptomatic | Mosaic (severity 2/5) | |
| 16.07.2020 | 206  | S. nigrum | | Asymptomatic | Mosaic (severity 2/5) | |
| 16.07.2020 | 207  | S. nigrum | | Asymptomatic | Mosaic (severity 2/5) | |
| 16.07.2020 | 208  | S. nigrum | | Asymptomatic | Mosaic (severity 1.5/5) | |
| 16.07.2020 | 209  | S. nigrum | | Asymptomatic | Yellowing | |
| 16.07.2020 | 210  | S. nigrum | | Asymptomatic | Yellowing | |
| 16.07.2020 | 211  | S. nigrum | | Asymptomatic | Yellowing | |
| 22.07.2020 | 202  | M. sylvestris | | Asymptomatic | Mosaic (severity 4.5/5) | |
| 22.07.2020 | 203  | M. sylvestris | | Asymptomatic | Mosaic (severity 3.5/5) | |
| 22.07.2020 | 204  | M. sylvestris | | Asymptomatic | Mosaic (severity 2.5/5) | |
| 22.07.2020 | 205  | M. sylvestris | | Asymptomatic | Mosaic (severity 2/5) | |
| 22.07.2020 | 206  | M. sylvestris | | Asymptomatic | Mosaic (severity 2/5) | |
| 22.07.2020 | 207  | M. sylvestris | | Asymptomatic | Mosaic (severity 2/5) | |
| 22.07.2020 | 208  | M. sylvestris | | Asymptomatic | Mosaic (severity 1.5/5) | |
| 22.07.2020 | 209  | M. sylvestris | | Asymptomatic | Yellowing | |
| 22.07.2020 | 210  | M. sylvestris | | Asymptomatic | Yellowing | |
| 22.07.2020 | 211  | M. sylvestris | | Asymptomatic | Yellowing | |
| 22.07.2020 | 212  | E. elaterium | | Asymptomatic | Leaf malformation + vein clearing | |
| 22.07.2020 | 213  | E. elaterium | | Asymptomatic | Vein clearing and malformation in the new leaves | |
| 22.07.2020 | 214  | E. elaterium | | Asymptomatic | Vein clearing in younger leaves | |
| 22.07.2020 | 215  | E. elaterium | | Asymptomatic | vein clearing and malformation of young leaves | |
| 22.07.2020 | 216  | E. elaterium | | Asymptomatic | Malformation of young leaves | |
| 22.07.2020 | 217  | E. elaterium | | Asymptomatic | chlorotic spots and malformation of new leaves | |
| 22.07.2020 | 218  | S. nigrum | | Asymptomatic | Yellowing | |
| 22.07.2020 | 219  | S. nigrum | | Asymptomatic | Small chlorotic spots (mites probably) | |
| 22.07.2020 | 220  | S. nigrum | | Asymptomatic | | |
| Site 8 | Villaconejos | 22.07.2020 | 221 | Yellowing |
|-------|--------------|------------|-----|-----------|
|       |              | 22.07.2020 | 222 | Yellowing |
|       |              | 22.07.2020 | 223 | Mosaic (severity 5/5) |
|       |              | 22.07.2020 | 224 | Mosaic (severity 5/5) |
|       |              | 22.07.2020 | 225 | Mosaic (severity 5/5) |
|       |              | 22.07.2020 | 226 | Mosaic (severity 5/5) |
|       |              | 22.07.2020 | 227 | Mosaic (severity 5/5) |
|       |              | 22.07.2020 | 228 | Mosaic (severity 4/5) |
|       |              | 22.07.2020 | 229 | Mosaic (severity 3/5) |
|       |              | 22.07.2020 | 230 | Mosaic (severity 2/5) |
|       |              | 22.07.2020 | 231 | Mosaic (severity 2/5) |
|       |              | 22.07.2020 | 232 | Mosaic (severity 2/5) |
|       | Melon (Piel de Sapo) | 22.07.2020 | 233 | Yellowing + leaf malformation |
|       |              | 22.07.2020 | 234 | Asymptomatic |
|       |              | 22.07.2020 | 235 | Asymptomatic |
|       |              | 22.07.2020 | 236 | Asymptomatic |
|       |              | 22.07.2020 | 237 | Asymptomatic |
|       |              | 22.07.2020 | 238 | Asymptomatic |
|       |              | 22.07.2020 | 239 | Asymptomatic |
|       |              | 22.07.2020 | 240 | Yellowing |
|       | E. elaterium | 22.07.2020 | 241 | Asymptomatic |
|       |              | 22.07.2020 | 242 | Asymptomatic |
|       |              | 22.07.2020 | 243 | Asymptomatic |
|       |              | 22.07.2020 | 244 | Asymptomatic |
|       |              | 22.07.2020 | 245 | Asymptomatic |
|       |              | 22.07.2020 | 246 | Yellowing |
|       | M. sylvestris | 22.07.2020 | 255 | Asymptomatic |
|       |              | 22.07.2020 | 256 | Asymptomatic |
|       |              | 22.07.2020 | 257 | Asymptomatic |
|       |              | 22.07.2020 | 258 | Yellowing |
|       |              | 22.07.2020 | 259 | Asymptomatic |
|       |              | 22.07.2020 | 260 | Asymptomatic |
|       |              | 22.07.2020 | 261 | Asymptomatic |
|       |              | 22.07.2020 | 277 | Asymptomatic |
|       |              | 22.07.2020 | 278 | Asymptomatic |
|       |              | 22.07.2020 | 279 | Asymptomatic |
|       |              | 22.07.2020 | 280 | Asymptomatic |
|       |              | 22.07.2020 | 281 | Asymptomatic |
|       |              | 22.07.2020 | 282 | Asymptomatic |
|       |              | 22.07.2020 | 283 | Asymptomatic |
|       |              | 22.07.2020 | 284 | Yellowing |
|       |              | 22.07.2020 | 285 | Asymptomatic |
|       |              | 22.07.2020 | 286 | Asymptomatic |
|       |              | 22.07.2020 | 287 | Asymptomatic |
|       |              | 22.07.2020 | 288 | Asymptomatic |
|       |              | 22.07.2020 | 289 | Asymptomatic |
|       |              | 22.07.2020 | 290 | Asymptomatic |
|       |              | 22.07.2020 | 291 | Asymptomatic |

**Second year survey**

| Site 3 | Torre-Pacheco | 26.07.2021 | E. elaterium | 255Pool |
|--------|---------------|------------|--------------|---------|
|        |               | 26.07.2021 | 255 | Asymptomatic |
|        |               | 26.07.2021 | 256 | Asymptomatic |
|        |               | 26.07.2021 | 257 | Asymptomatic |
|        |               | 26.07.2021 | 258 | Yellowing |
|        |               | 26.07.2021 | 259 | Asymptomatic |
|        |               | 26.07.2021 | 260 | Asymptomatic |
|        |               | 26.07.2021 | 261 | Asymptomatic |
|        |               | 26.07.2021 | 277 | Asymptomatic |
|        |               | 26.07.2021 | 278 | Asymptomatic |
|        |               | 26.07.2021 | 279 | Asymptomatic |
|        |               | 26.07.2021 | 280 | Asymptomatic |
|        |               | 26.07.2021 | 281 | Asymptomatic |
|        |               | 26.07.2021 | 282 | Asymptomatic |
|        |               | 26.07.2021 | 283 | Asymptomatic |
|        |               | 26.07.2021 | 284 | Yellowing |
|        |               | 26.07.2021 | 285 | Asymptomatic |
|        |               | 26.07.2021 | 286 | Asymptomatic |
|        |               | 26.07.2021 | 287 | Asymptomatic |
|        |               | 26.07.2021 | 288 | Asymptomatic |
|        |               | 26.07.2021 | 289 | Asymptomatic |
|        |               | 26.07.2021 | 290 | Asymptomatic |
|        |               | 26.07.2021 | 291 | Asymptomatic |

| Site 4 | Lo-Jurado | 26.07.2021 | E. elaterium | 277Pool |
|--------|-----------|------------|--------------|---------|
|        |           | 26.07.2021 | 284 | Yellowing |
|        |           | 26.07.2021 | 285 | Asymptomatic |
|        |           | 26.07.2021 | 286 | Asymptomatic |
|        |           | 26.07.2021 | 287 | Asymptomatic |
|        |           | 26.07.2021 | 288 | Asymptomatic |
|        |           | 26.07.2021 | 289 | Asymptomatic |
|        |           | 26.07.2021 | 290 | Asymptomatic |
|        |           | 26.07.2021 | 291 | Asymptomatic |
| Site 6 | Santomera | 26.07.2021 | E. elaterium | 293Pool |
|-------|-----------|-------------|--------------|---------|
|       |           |             | 292          | Asymtomatic |
|       |           |             | 293          | Asymtomatic |
|       |           |             | 294          | Asymtomatic |
|       |           |             | 295          | Asymtomatic |
|       |           |             | 296          | Asymtomatic |
|       |           |             | 297          | Asymtomatic |
|       |           |             | 298          | Asymtomatic |
|       |           |             | 299          | Asymtomatic |
|       |           |             | 300          | Asymtomatic |
|       |           |             | 301          | Asymtomatic |
|       |           |             | 302          | Asymtomatic |
**TABLE S5** Detection of TMGMV in Melon samples at 8 and 15 days post-inoculation (dpi) by qRT-PCR.

| Plant ID | plant part  | dpi | Ct value |
|----------|-------------|-----|----------|
| 1        | Cotyledon   | 8   | 24.7     |
|          | Second Leaf | 15  | 33.9     |
| 2        | Cotyledon   | 8   | 28.7     |
|          | Second Leaf | 15  | -        |
| 3        | Cotyledon   | 8   | 28.0     |
|          | Second Leaf | 15  | -        |
| 4        | Cotyledon   | 8   | 25.5     |
|          | Second Leaf | 15  | -        |
| 5        | Cotyledon   | 8   | 23.5     |
|          | Second Leaf | 15  | -        |
| 6        | Cotyledon   | 8   | 25.0     |
|          | Second Leaf | 15  | -        |
| 7        | Cotyledon   | 8   | 23.4     |
|          | Second Leaf | 15  | 33.3     |
| 8        | Cotyledon   | 8   | 24.4     |
|          | Second Leaf | 15  | 30.3     |
| Negative control 1 | Cotyledon | 8 | - |
|          | Second Leaf | 15  | -        |
| Negative control 2 | Cotyledon | 8 | - |
|          | Second Leaf | 15  | -        |
| Negative control 3 | Cotyledon | 8 | - |
|          | Second Leaf | 15  | -        |
| Negative control 4 | Cotyledon | 8 | - |
|          | Second Leaf | 15  | -        |
TABLE S6 Genetic diversity of Cucurbit aphid-borne yellows virus (CABYV) isolates in mean posterior non-synonymous (β) and synonymous (α) positions at each codon of the open reading frame (ORF) 2 for CABYV isolates from melon.

| Site | α^a | β^b | B-α^c | Prob[α>β]^d | Prob[α<β]^e | BayesFactor[α<β]^f |
|------|-----|-----|-------|-------------|-------------|-------------------|
| 1    | 2.499 | 0.768 | -1.732 | 0.675 | 0.266 | 0.609 |
| 2    | 8.692 | 0.344 | -8.348 | 0.998 | 0.001 | 0.001 |
| 3    | 0.802 | 0.389 | -0.413 | 0.608 | 0.330 | 0.829 |
| 4    | 1.313 | 0.358 | -0.954 | 0.667 | 0.277 | 0.645 |
| 5    | 0.578 | 0.465 | -0.113 | 0.527 | 0.408 | 1.159 |
| 6    | 0.595 | 0.410 | -0.186 | 0.560 | 0.375 | 1.007 |
| 7    | 1.944 | 0.392 | -1.552 | 0.821 | 0.142 | 0.279 |
| 8    | 2.699 | 0.381 | -2.318 | 0.850 | 0.119 | 0.226 |
| 9    | 0.771 | 0.387 | -0.385 | 0.605 | 0.333 | 0.838 |
| 10   | 0.867 | 0.388 | -0.479 | 0.614 | 0.325 | 0.809 |
| 11   | 0.866 | 0.398 | -0.468 | 0.608 | 0.331 | 0.831 |
| 12   | 0.741 | 0.412 | -0.329 | 0.586 | 0.351 | 0.911 |
| 13   | 1.037 | 0.470 | -0.567 | 0.730 | 0.220 | 0.476 |
| 14   | 0.874 | 0.471 | -0.403 | 0.574 | 0.366 | 0.969 |
| 15   | 0.880 | 0.411 | -0.469 | 0.603 | 0.337 | 0.854 |
| 16   | 4.007 | 0.358 | -3.649 | 0.724 | 0.229 | 0.499 |
| 17   | 0.578 | 0.465 | -0.113 | 0.527 | 0.408 | 1.159 |
| 18   | 0.829 | 0.889 | 0.060 | 0.606 | 0.332 | 0.837 |
| 19   | 0.661 | 0.423 | -0.239 | 0.567 | 0.369 | 0.982 |
| 20   | 7.116 | 0.760 | -6.356 | 0.919 | 0.055 | 0.098 |
| 21   | 0.682 | 0.405 | -0.277 | 0.580 | 0.356 | 0.929 |
| 22   | 1.591 | 1.724 | 0.133 | 0.393 | 0.517 | 1.797 |
| 23   | 0.863 | 0.421 | -0.442 | 0.595 | 0.344 | 0.883 |
| 24   | 6.082 | 0.396 | -5.685 | 0.980 | 0.012 | 0.020 |
| 25   | 0.801 | 0.392 | -0.409 | 0.606 | 0.332 | 0.837 |
| 26   | 0.596 | 0.391 | -0.205 | 0.571 | 0.363 | 0.956 |
| 27   | 15.241 | 0.388 | -14.853 | 0.999 | 0.001 | 0.001 |
| 28   | 2.865 | 4.139 | 1.274 | 0.254 | 0.616 | 2.693 |
| 29   | 0.595 | 0.403 | -0.192 | 0.564 | 0.370 | 0.989 |
| 30   | 0.798 | 0.421 | -0.377 | 0.589 | 0.350 | 0.904 |
| 31   | 1.749 | 0.475 | -1.273 | 0.779 | 0.178 | 0.365 |
| 32   | 3.527 | 4.542 | 1.015 | 0.265 | 0.595 | 2.475 |
| 33   | 0.594 | 0.429 | -0.165 | 0.548 | 0.386 | 1.058 |
| 34   | 2.628 | 0.381 | -2.247 | 0.849 | 0.120 | 0.229 |
| 35   | 0.683 | 0.395 | -0.288 | 0.587 | 0.349 | 0.901 |
| 36   | 0.863 | 0.421 | -0.442 | 0.595 | 0.344 | 0.883 |
| 37   | 0.596 | 0.391 | -0.205 | 0.571 | 0.363 | 0.956 |
| 38   | 0.627 | 0.392 | -0.235 | 0.578 | 0.357 | 0.933 |
| 39   | 9.111 | 0.390 | -8.721 | 0.993 | 0.004 | 0.006 |
| 40   | 11.847 | 0.384 | -11.463 | 0.997 | 0.002 | 0.003 |
| 41   | 5.531 | 0.337 | -5.195 | 0.964 | 0.026 | 0.045 |
|   |      |     |     |     |     |     |
|---|------|-----|-----|-----|-----|-----|
| 42| 5.129| 0.376| -4.754| 0.952| 0.035| 0.061|
| 43| 0.782| 0.402| -0.381| 0.598| 0.340| 0.868|
| 44| 4.225| 0.386| -3.839| 0.937| 0.046| 0.081|
| 45| 0.734| 1.712| 0.978| 0.203| 0.744| 4.878|
| 46| 0.802| 0.389| -0.413| 0.608| 0.330| 0.829|
| 47| 3.423| 0.378| -3.045| 0.867| 0.105| 0.198|
| 48| 0.880| 0.411| -0.469| 0.603| 0.337| 0.854|
| 49| 0.778| 0.454| -0.323| 0.570| 0.368| 0.981|
| 50| 0.637| 0.791| 0.153| 0.344| 0.596| 2.482|
| 51| 0.782| 0.402| -0.381| 0.598| 0.340| 0.868|
| 52| 6.367| 0.399| -5.969| 0.982| 0.011| 0.018|
| 53| 0.682| 0.410| -0.271| 0.577| 0.359| 0.942|
| 54| 0.780| 0.420| -0.361| 0.587| 0.351| 0.910|
| 55| 2.743| 0.407| -2.337| 0.840| 0.127| 0.244|
| 56| 0.769| 0.406| -0.364| 0.593| 0.345| 0.885|
| 57| 0.865| 0.403| -0.462| 0.605| 0.334| 0.844|
| 58| 0.769| 0.406| -0.364| 0.593| 0.345| 0.885|
| 59| 0.770| 0.401| -0.369| 0.596| 0.342| 0.873|
| 60| 0.783| 0.397| -0.386| 0.600| 0.338| 0.858|
| 61| 4.007| 0.358| -3.649| 0.724| 0.229| 0.499|
| 62| 0.866| 0.395| -0.472| 0.610| 0.329| 0.824|
| 63| 0.768| 0.421| -0.347| 0.584| 0.354| 0.920|
| 64| 1.500| 0.376| -1.124| 0.810| 0.151| 0.300|
| 65| 1.136| 0.464| -0.671| 0.741| 0.211| 0.448|
| 66| 2.013| 0.406| -1.607| 0.819| 0.144| 0.283|
| 67| 15.777| 0.398| -15.378| 0.998| 0.001| 0.002|
| 68| 0.738| 1.017| 0.280| 0.330| 0.611| 2.644|
| 69| 1.434| 0.454| -0.980| 0.767| 0.188| 0.390|
| 70| 0.661| 0.423| -0.239| 0.567| 0.369| 0.982|
| 71| 0.769| 0.408| -0.362| 0.592| 0.346| 0.889|
| 72| 0.741| 0.412| -0.329| 0.586| 0.351| 0.911|
| 73| 0.595| 0.423| -0.171| 0.552| 0.383| 1.043|
| 74| 1.262| 0.448| -0.814| 0.758| 0.196| 0.411|
| 75| 2.955| 0.365| -2.590| 0.864| 0.107| 0.202|
| 76| 2.789| 0.432| -2.356| 0.833| 0.133| 0.258|
| 77| 0.683| 0.389| -0.294| 0.591| 0.346| 0.888|
| 78| 0.778| 0.454| -0.323| 0.570| 0.368| 0.981|
| 79| 10.178| 0.361| -9.817| 0.982| 0.013| 0.021|
| 80| 0.880| 0.411| -0.469| 0.603| 0.337| 0.854|
| 81| 0.769| 0.406| -0.364| 0.593| 0.345| 0.885|
| 82| 2.810| 0.399| -2.411| 0.846| 0.122| 0.233|
| 83| 7.091| 0.337| -6.754| 0.932| 0.053| 0.094|
| 84| 2.840| 0.386| -2.454| 0.852| 0.117| 0.222|
| 85| 1.316| 1.083| -0.233| 0.522| 0.405| 1.146|
| 86| 4.032| 0.964| -3.068| 0.484| 0.464| 1.453|
| 87| 0.725| 0.405| -0.320| 0.588| 0.349| 0.903|
| 88| 2.849| 0.399| -2.450| 0.848| 0.121| 0.231|
|   | 136 | 11.396 | 0.386 | -11.010 | 0.999 | 0.000 | 0.001 |
|---|-----|--------|-------|---------|-------|-------|-------|
| 137| 9.553| 0.333  | -9.220| 0.996   | 0.002 | 0.004 |
| 138| 0.863| 0.421  | -0.442| 0.595   | 0.344 | 0.883 |
| 139| 4.042| 0.440  | -3.602| 0.685   | 0.268 | 0.615 |
| 140| 0.866| 0.395  | -0.472| 0.610   | 0.329 | 0.824 |
| 141| 0.595| 0.423  | -0.171| 0.552   | 0.383 | 1.043 |
| 142| 0.801| 0.392  | -0.409| 0.606   | 0.332 | 0.837 |
| 143| 0.863| 0.421  | -0.442| 0.595   | 0.344 | 0.883 |
| 144| 4.042| 0.440  | -3.602| 0.685   | 0.268 | 0.615 |
| 145| 0.770| 0.401  | -0.369| 0.596   | 0.342 | 0.873 |
| 146| 0.595| 0.403  | -0.192| 0.564   | 0.370 | 0.989 |
| 147| 0.739| 0.867  | 0.127 | 0.351   | 0.589 | 2.414 |
| 148| 5.826| 0.365  | -5.461| 0.961   | 0.028 | 0.049 |
| 149| 0.682| 0.410  | -0.271| 0.577   | 0.359 | 0.942 |
| 150| 4.158| 0.676  | -3.482| 0.541   | 0.408 | 1.158 |
| 151| 34.881| 0.473 | -34.408| 1.000  | 0.000 | 0.000 |
| 152| 0.768| 0.421  | -0.347| 0.584   | 0.354 | 0.920 |
| 153| 0.629| 0.495  | -0.134| 0.530   | 0.407 | 1.152 |
| 154| 16.165| 1.398 | -14.767| 0.972  | 0.008 | 0.013 |
| 155| 0.769| 0.406  | -0.364| 0.593   | 0.345 | 0.885 |
| 156| 1.144| 1.126  | -0.018| 0.493   | 0.433 | 1.284 |
| 157| 0.802| 0.387  | -0.416| 0.609   | 0.329 | 0.824 |
| 158| 2.567| 0.381  | -2.185| 0.847   | 0.121 | 0.232 |
| 159| 0.682| 0.410  | -0.271| 0.577   | 0.359 | 0.942 |
| 160| 1.268| 0.450  | -0.819| 0.758   | 0.196 | 0.410 |
| 161| 0.817| 0.764  | -0.053| 0.381   | 0.559 | 2.128 |
| 162| 11.543| 4.531 | -7.012| 0.650   | 0.161 | 0.323 |
| 163| 0.732| 0.732  | -0.000| 0.377   | 0.562 | 2.159 |
| 164| 0.802| 0.387  | -0.416| 0.609   | 0.329 | 0.824 |
| 165| 0.769| 0.406  | -0.364| 0.593   | 0.345 | 0.885 |
| 166| 7.121| 0.347  | -6.774| 0.991   | 0.006 | 0.010 |
| 167| 1.242| 0.453  | -0.789| 0.755   | 0.198 | 0.416 |
| 168| 5.616| 0.765  | -4.850| 0.890   | 0.076 | 0.139 |
| 169| 0.662| 0.409  | -0.253| 0.575   | 0.361 | 0.949 |
| 170| 3.044| 0.385  | -2.659| 0.858   | 0.112 | 0.212 |
| 171| 4.042| 0.440  | -3.602| 0.685   | 0.268 | 0.615 |
| 172| 2.859| 0.430  | -2.430| 0.894   | 0.079 | 0.144 |
| 173| 0.648| 1.352  | 0.704 | 0.213   | 0.733 | 4.611 |
| 174| 16.203| 0.380 | -15.823| 0.998  | 0.001 | 0.001 |
| 175| 5.539| 0.341  | -5.198| 0.913   | 0.068 | 0.123 |
| 176| 2.645| 0.373  | -2.272| 0.853   | 0.116 | 0.220 |
| 177| 3.567| 0.372  | -3.194| 0.873   | 0.100 | 0.187 |
| 178| 0.866| 0.395  | -0.472| 0.610   | 0.329 | 0.824 |
| 179| 0.768| 0.421  | -0.347| 0.584   | 0.354 | 0.920 |
| 180| 0.770| 0.401  | -0.369| 0.596   | 0.342 | 0.873 |
| 181| 0.866| 0.399  | -0.467| 0.607   | 0.332 | 0.834 |
| 182| 0.579| 0.777  | 0.198 | 0.330   | 0.610 | 2.630 |
|   |     |     |     |     |     |
|---|-----|-----|-----|-----|-----|
| 183| 7.896 | 0.334 | -7.561 | 0.994 | 0.004 |
| 184| 3.436 | 0.395 | -3.040 | 0.861 | 0.110 |
| 185| 0.661 | 0.438 | -0.223 | 0.559 | 0.377 |
| 186| 1.974 | 0.373 | -1.602 | 0.832 | 0.133 |
| 187| 1.274 | 0.450 | -0.824 | 0.758 | 0.196 |
| 188| 3.170 | 0.425 | -2.745 | 0.904 | 0.071 |
| 189| 0.800 | 0.407 | -0.392 | 0.596 | 0.342 |
| 190| 0.874 | 0.471 | -0.403 | 0.574 | 0.366 |
| 191| 0.725 | 0.405 | -0.320 | 0.588 | 0.349 |
| 192| 0.768 | 0.421 | -0.347 | 0.584 | 0.354 |
| 193| 2.095 | 0.374 | -1.722 | 0.836 | 0.130 |
| 194| 0.767 | 0.427 | -0.340 | 0.581 | 0.357 |
| 195| 4.337 | 0.391 | -3.946 | 0.888 | 0.088 |
| 196| 3.506 | 0.446 | -3.060 | 0.847 | 0.122 |
| 197| 3.445 | 0.387 | -3.058 | 0.866 | 0.106 |
| 198| 0.683 | 0.387 | -0.297 | 0.592 | 0.344 |
| 199| 0.767 | 0.427 | -0.340 | 0.581 | 0.357 |
| 200| 0.866 | 0.395 | -0.472 | 0.610 | 0.329 |
| 201| 17.601 | 0.391 | -17.210 | 0.998 | 0.001 |
| 202| 0.683 | 0.389 | -0.294 | 0.591 | 0.346 |
| 203| 0.802 | 0.387 | -0.416 | 0.609 | 0.329 |
| 204| 0.638 | 0.751 | 0.113 | 0.353 | 0.586 |
| 205| 0.801 | 0.392 | -0.409 | 0.606 | 0.332 |
| 206| 2.934 | 0.802 | -2.132 | 0.687 | 0.255 |

*a* Mean posterior synonymous substitution rate at a site.

*b* Mean posterior non-synonymous substitution rate at a site.

*Mean posterior beta-alpha.

*c* Posterior probability of negative selection at a site.

*d* Posterior probability of positive selection at a site.

*e* Empirical Bayes Factor for positive selection at a site.
TABLE S7 Genetic diversity of Cucurbit aphid-borne yellows virus (CABYV) isolates in mean posterior non-synonymous (β) and synonymous (α) positions at each codon of the open reading frame (ORF) 2 for CABYV isolates from *E. elaterium*.

| Site | α     | β      | B-α    | Prob[α<β] | Prob[α>β] | BayesFactor[α<β] |
|------|-------|--------|--------|-----------|-----------|------------------|
| 1    | 0.648 | 0.332  | -0.316 | 0.619     | 0.315     | 0.860            |
| 2    | 6.415 | 0.218  | -6.197 | 0.998     | 0.001     | 0.002            |
| 3    | 0.694 | 0.315  | -0.379 | 0.640     | 0.295     | 0.782            |
| 4    | 1.271 | 0.274  | -0.997 | 0.723     | 0.222     | 0.534            |
| 5    | 0.491 | 0.408  | -0.083 | 0.523     | 0.407     | 1.285            |
| 6    | 0.542 | 0.337  | -0.205 | 0.589     | 0.341     | 0.969            |
| 7    | 0.542 | 0.336  | -0.206 | 0.590     | 0.340     | 0.965            |
| 8    | 4.215 | 0.255  | -3.960 | 0.962     | 0.028     | 0.053            |
| 9    | 1.804 | 0.285  | -1.519 | 0.868     | 0.103     | 0.215            |
| 10   | 0.717 | 0.321  | -0.396 | 0.638     | 0.297     | 0.792            |
| 11   | 0.717 | 0.321  | -0.396 | 0.638     | 0.297     | 0.791            |
| 12   | 0.646 | 0.339  | -0.307 | 0.614     | 0.320     | 0.881            |
| 13   | 0.440 | 0.407  | -0.033 | 0.496     | 0.431     | 1.418            |
| 14   | 0.725 | 0.398  | -0.327 | 0.590     | 0.347     | 0.993            |
| 15   | 0.738 | 0.334  | -0.404 | 0.632     | 0.304     | 0.818            |
| 16   | 3.510 | 0.559  | -2.951 | 0.585     | 0.365     | 1.076            |
| 17   | 0.491 | 0.408  | -0.083 | 0.523     | 0.407     | 1.285            |
| 18   | 0.577 | 6.090  | 5.513  | 0.007     | 0.980     | 93.727           |
| 19   | 1.412 | 0.333  | -1.079 | 0.825     | 0.139     | 0.302            |
| 20   | 0.638 | 0.328  | -0.309 | 0.620     | 0.314     | 0.854            |
| 21   | 0.607 | 0.336  | -0.271 | 0.608     | 0.325     | 0.900            |
| 22   | 0.594 | 3.686  | 3.091  | 0.062     | 0.909     | 18.610           |
| 23   | 0.641 | 0.682  | 0.041  | 0.377     | 0.563     | 2.406            |
| 24   | 0.479 | 0.394  | -0.084 | 0.524     | 0.404     | 1.270            |
| 25   | 7.184 | 0.220  | -6.963 | 0.996     | 0.002     | 0.004            |
| 26   | 0.544 | 0.319  | -0.225 | 0.604     | 0.326     | 0.904            |
| 27   | 6.895 | 0.228  | -6.667 | 0.996     | 0.003     | 0.005            |
| 28   | 25.754| 0.379  | -25.375| 1.000     | 0.000     | 0.000            |
| 29   | 0.543 | 0.334  | -0.208 | 0.591     | 0.339     | 0.959            |
| 30   | 0.687 | 0.351  | -0.335 | 0.613     | 0.323     | 0.892            |
| 31   | 2.534 | 0.834  | -1.700 | 0.755     | 0.186     | 0.429            |
| 32   | 0.734 | 0.354  | -0.379 | 0.618     | 0.319     | 0.876            |
| 33   | 0.541 | 0.357  | -0.184 | 0.574     | 0.357     | 1.037            |
| 34   | 0.648 | 0.332  | -0.316 | 0.619     | 0.315     | 0.860            |
| 35   | 0.608 | 0.329  | -0.279 | 0.613     | 0.320     | 0.879            |
| 36   | 0.711 | 0.347  | -0.364 | 0.619     | 0.317     | 0.869            |
| 37   | 1.235 | 0.302  | -0.932 | 0.835     | 0.129     | 0.278            |
| 38   | 3.176 | 0.262  | -2.914 | 0.947     | 0.039     | 0.076            |
| 39   | 1.260 | 0.397  | -0.863 | 0.782     | 0.177     | 0.401            |
| 40   | 3.144 | 0.289  | -2.855 | 0.938     | 0.046     | 0.090            |
| 41   | 5.531 | 0.569  | -4.962 | 0.921     | 0.058     | 0.115            |
|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
|   | 42 | 0.541 | 0.355 | -0.186 | 0.575 | 0.355 | 1.030 |
|   | 43 | 2.012 | 0.294 | -1.718 | 0.868 | 0.103 | 0.214 |
|   | 44 | 7.763 | 0.242 | -7.521 | 0.999 | 0.001 | 0.001 |
|   | 45 | 0.680 | 0.343 | -0.337 | 0.617 | 0.318 | 0.871 |
|   | 46 | 0.628 | 0.618 | -0.010 | 0.400 | 0.539 | 2.190 |
|   | 47 | 5.023 | 0.245 | -4.778 | 0.972 | 0.020 | 0.039 |
|   | 48 | 2.328 | 0.298 | -2.030 | 0.874 | 0.098 | 0.204 |
|   | 49 | 0.673 | 0.381 | -0.292 | 0.591 | 0.345 | 0.984 |
|   | 50 | 1.220 | 0.639 | -0.582 | 0.625 | 0.311 | 0.845 |
|   | 51 | 0.683 | 0.324 | -0.359 | 0.631 | 0.304 | 0.815 |
|   | 52 | 6.180 | 0.264 | -5.916 | 0.995 | 0.003 | 0.005 |
|   | 53 | 0.606 | 0.342 | -0.264 | 0.603 | 0.330 | 0.921 |
|   | 54 | 0.680 | 0.343 | -0.337 | 0.617 | 0.318 | 0.871 |
|   | 55 | 4.149 | 0.274 | -3.875 | 0.957 | 0.032 | 0.062 |
|   | 56 | 0.647 | 0.333 | -0.314 | 0.618 | 0.316 | 0.865 |
|   | 57 | 0.714 | 0.333 | -0.381 | 0.629 | 0.307 | 0.828 |
|   | 58 | 0.647 | 0.333 | -0.314 | 0.618 | 0.316 | 0.865 |
|   | 59 | 0.648 | 0.332 | -0.316 | 0.619 | 0.315 | 0.860 |
|   | 60 | 0.662 | 0.324 | -0.338 | 0.628 | 0.307 | 0.827 |
|   | 61 | 4.017 | 0.267 | -3.750 | 0.789 | 0.169 | 0.380 |
|   | 62 | 10.227 | 0.234 | -9.993 | 1.000 | 0.000 | 0.000 |
|   | 63 | 0.644 | 0.353 | -0.292 | 0.604 | 0.331 | 0.924 |
|   | 64 | 0.517 | 0.615 | 0.098 | 0.362 | 0.577 | 2.553 |
|   | 65 | 0.440 | 0.407 | -0.033 | 0.496 | 0.431 | 1.418 |
|   | 66 | 19.401 | 1.142 | -18.259 | 0.998 | 0.000 | 0.000 |
|   | 67 | 6.486 | 0.234 | -6.252 | 0.994 | 0.004 | 0.008 |
|   | 68 | 0.673 | 0.381 | -0.292 | 0.591 | 0.345 | 0.984 |
|   | 69 | 0.491 | 0.408 | -0.083 | 0.523 | 0.407 | 1.285 |
|   | 70 | 1.412 | 0.333 | -1.079 | 0.825 | 0.139 | 0.302 |
|   | 71 | 0.647 | 0.335 | -0.313 | 0.617 | 0.317 | 0.869 |
|   | 72 | 0.599 | 0.667 | 0.068 | 0.372 | 0.568 | 2.455 |
|   | 73 | 5.278 | 0.247 | -5.031 | 0.987 | 0.008 | 0.016 |
|   | 74 | 7.869 | 0.258 | -7.611 | 1.000 | 0.000 | 0.000 |
|   | 75 | 0.717 | 0.321 | -0.396 | 0.638 | 0.297 | 0.792 |
|   | 76 | 0.673 | 0.381 | -0.292 | 0.591 | 0.345 | 0.984 |
|   | 77 | 0.566 | 0.615 | 0.049 | 0.381 | 0.558 | 2.357 |
|   | 78 | 0.673 | 0.381 | -0.292 | 0.591 | 0.345 | 0.984 |
|   | 79 | 11.983 | 0.252 | -11.731 | 1.000 | 0.000 | 0.000 |
|   | 80 | 9.667 | 0.587 | -9.080 | 0.988 | 0.007 | 0.013 |
|   | 81 | 0.647 | 0.333 | -0.314 | 0.618 | 0.316 | 0.865 |
|   | 82 | 15.713 | 0.306 | -15.407 | 1.000 | 0.000 | 0.000 |
|   | 83 | 18.284 | 0.300 | -17.984 | 1.000 | 0.000 | 0.000 |
|   | 84 | 2.028 | 0.302 | -1.725 | 0.864 | 0.106 | 0.222 |
|   | 85 | 2.040 | 0.361 | -1.679 | 0.886 | 0.087 | 0.177 |
|   | 86 | 4.066 | 0.364 | -3.702 | 0.732 | 0.225 | 0.542 |
|   | 87 | 0.638 | 0.328 | -0.309 | 0.620 | 0.314 | 0.854 |
|   | 88 | 0.687 | 0.351 | -0.335 | 0.613 | 0.323 | 0.892 |
|    |       |       |      |      |       |      |
|----|-------|-------|------|------|-------|------|
| 89 | 0.541 | 0.355 | -0.186 | 0.575 | 0.355 | 1.030 |
| 90 | 0.650 | 0.316 | -0.334 | 0.631 | 0.302 | 0.810 |
| 91 | 0.651 | 0.315 | -0.336 | 0.633 | 0.301 | 0.806 |
| 92 | 5.084 | 0.242 | -4.842 | 0.974 | 0.019 | 0.036 |
| 93 | 0.650 | 0.316 | -0.334 | 0.631 | 0.302 | 0.810 |
| 94 | 7.164 | 0.236 | -6.928 | 0.998 | 0.001 | 0.002 |
| 95 | 1.337 | 0.604 | -0.733 | 0.655 | 0.285 | 0.744 |
| 96 | 0.644 | 0.354 | -0.290 | 0.602 | 0.332 | 0.930 |
| 97 | 0.491 | 0.408 | -0.083 | 0.523 | 0.407 | 1.285 |
| 98 | 7.713 | 0.206 | -7.507 | 1.000 | 0.000 | 0.000 |
| 99 | 2.210 | 0.277 | -1.933 | 0.883 | 0.091 | 0.186 |
|100 | 4.761 | 0.255 | -4.506 | 0.970 | 0.022 | 0.042 |
|101 | 0.657 | 0.715 | 0.059 | 0.372 | 0.569 | 2.466 |
|102 | 1.949 | 0.348 | -1.601 | 0.838 | 0.129 | 0.277 |
|103 | 0.578 | 0.354 | -0.224 | 0.588 | 0.344 | 0.983 |
|104 | 2.031 | 0.302 | -1.728 | 0.865 | 0.106 | 0.222 |
|105 | 0.734 | 0.354 | -0.379 | 0.618 | 0.319 | 0.876 |
|106 | 1.821 | 0.608 | -1.213 | 0.692 | 0.253 | 0.632 |
|107 | 2.010 | 0.803 | -1.207 | 0.416 | 0.529 | 2.099 |
|108 | 0.725 | 0.398 | -0.327 | 0.590 | 0.347 | 0.993 |
|109 | 3.392 | 0.256 | -3.136 | 0.952 | 0.035 | 0.068 |
|110 | 0.648 | 0.332 | -0.316 | 0.619 | 0.315 | 0.860 |
|111 | 4.271 | 0.240 | -4.031 | 0.966 | 0.025 | 0.047 |
|112 | 1.222 | 0.320 | -0.901 | 0.822 | 0.140 | 0.306 |
|113 | 2.205 | 0.343 | -1.861 | 0.849 | 0.120 | 0.255 |
|114 | 0.541 | 0.355 | -0.186 | 0.575 | 0.355 | 1.030 |
|115 | 0.687 | 0.353 | -0.333 | 0.611 | 0.324 | 0.898 |
|116 | 17.426 | 0.390 | -17.036 | 1.000 | 0.000 | 0.000 |
|117 | 2.057 | 0.280 | -1.777 | 0.878 | 0.095 | 0.196 |
|118 | 5.641 | 0.216 | -5.425 | 0.992 | 0.005 | 0.010 |
|119 | 0.693 | 0.320 | -0.373 | 0.636 | 0.299 | 0.798 |
|120 | 0.680 | 0.343 | -0.337 | 0.617 | 0.318 | 0.871 |
|121 | 0.984 | 0.388 | -0.596 | 0.761 | 0.194 | 0.450 |
|122 | 1.260 | 0.920 | -0.340 | 0.486 | 0.438 | 1.457 |
|123 | 0.597 | 0.607 | 0.010 | 0.395 | 0.544 | 2.228 |
|124 | 0.665 | 0.701 | 0.036 | 0.378 | 0.562 | 2.403 |
|125 | 4.066 | 0.364 | -3.702 | 0.732 | 0.225 | 0.542 |
|126 | 1.147 | 0.855 | -0.292 | 0.547 | 0.385 | 1.169 |
|127 | 1.242 | 2.643 | 1.401 | 0.165 | 0.742 | 5.392 |
|128 | 2.239 | 0.293 | -1.945 | 0.874 | 0.098 | 0.204 |
|129 | 4.017 | 0.267 | -3.750 | 0.789 | 0.169 | 0.380 |
|130 | 0.967 | 0.783 | -0.183 | 0.361 | 0.581 | 2.589 |
|131 | 0.580 | 0.336 | -0.244 | 0.601 | 0.331 | 0.924 |
|132 | 0.544 | 0.313 | -0.232 | 0.608 | 0.321 | 0.884 |
|133 | 0.711 | 0.347 | -0.364 | 0.619 | 0.317 | 0.869 |
|134 | 2.192 | 0.296 | -1.896 | 0.872 | 0.100 | 0.208 |
|135 | 0.651 | 0.315 | -0.336 | 0.633 | 0.301 | 0.806 |
|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| 183 | 6.514 | 0.214 | -6.300 | 0.995 | 0.003 | 0.006 |
| 184 | 0.530 | 3.266 | 2.736 | 0.041 | 0.933 | 26.168 |
| 185 | 0.578 | 0.361 | -0.217 | 0.583 | 0.349 | 1.004 |
| 186 | 1.423 | 0.293 | -1.131 | 0.850 | 0.117 | 0.248 |
| 187 | 1.830 | 0.354 | -1.477 | 0.881 | 0.090 | 0.185 |
| 188 | 5.199 | 0.270 | -4.929 | 0.991 | 0.005 | 0.010 |
| 189 | 2.067 | 0.302 | -1.765 | 0.866 | 0.105 | 0.220 |
| 190 | 0.725 | 0.398 | -0.327 | 0.590 | 0.347 | 0.993 |
| 191 | 1.920 | 0.299 | -1.621 | 0.863 | 0.107 | 0.224 |
| 192 | 0.597 | 0.695 | 0.098 | 0.362 | 0.578 | 2.564 |
| 193 | 6.897 | 0.547 | -6.350 | 0.978 | 0.014 | 0.027 |
| 194 | 0.649 | 0.356 | -0.293 | 0.602 | 0.332 | 0.931 |
| 195 | 5.051 | 0.264 | -4.787 | 0.969 | 0.022 | 0.043 |
| 196 | 5.285 | 0.299 | -4.986 | 0.964 | 0.026 | 0.049 |
| 197 | 2.363 | 0.298 | -2.065 | 0.875 | 0.097 | 0.202 |
| 198 | 0.614 | 0.316 | -0.298 | 0.624 | 0.308 | 0.834 |
| 199 | 0.649 | 0.356 | -0.293 | 0.602 | 0.332 | 0.931 |
| 200 | 0.724 | 0.320 | -0.404 | 0.640 | 0.296 | 0.786 |
| 201 | 5.154 | 0.251 | -4.903 | 0.972 | 0.021 | 0.040 |
| 202 | 1.628 | 0.295 | -1.333 | 0.856 | 0.113 | 0.238 |
| 203 | 2.047 | 0.282 | -1.766 | 0.876 | 0.096 | 0.199 |
| 204 | 1.435 | 0.304 | -1.130 | 0.843 | 0.123 | 0.263 |
| 205 | 5.102 | 0.238 | -4.864 | 0.975 | 0.018 | 0.034 |
| 206 | 5.664 | 0.549 | -5.115 | 0.966 | 0.022 | 0.042 |

*aMean posterior synonymous substitution rate at a site.*

*bMean posterior non-synonymous substitution rate at a site.*

*cMean posterior beta-alpha.*

*dPosterior probability of negative selection at a site.*

*ePosterior probability of positive selection at a site.*

*fEmpirical Bayes Factor for positive selection at a site.*
**TABLE S8** Statistically supported migration rates of Cucurbit aphid-borne yellows virus estimated from the ORF2 among sites 1, 2, 3 and 4.

| From (hosta) | To (hosta) | Mean migration rateb | Indicatorc | Bayes Factord |
|--------------|------------|----------------------|-------------|--------------|
| Site2 (EE)   | Site3 (EE) | 1.07                 | 0.97        | 158.17       |
| Site1 (M)    | Site3 (M)  | 0.98                 | 0.91        | 41.95        |
| Site2 (M)    | Site3 (M)  | 1.83                 | 0.87        | 28.89        |
| Site2 (EE)   | Site4 (EE) | 0.99                 | 0.87        | 28.04        |
| Site1 (EE)   | Site4 (EE) | 1.07                 | 0.73        | 11.28        |
| Site1 (M)    | Site4 (M)  | 1.22                 | 0.57        | 5.4          |
| Site3 (M)    | Site4 (M)  | 0.99                 | 0.56        | 5.31         |

*EE: *Ecballium elaterium*; M: Melon.

bUnit: migration event per lineage per year.

cPosterior probability of observing a non-zero migration rate in the sampled trees.

dOnly statistically supported migrations with indicator values > 0.50 and BF > 3 are shown.
TABLE S9 Statistically supported migration rates of Tomato leaf curl New Delhi virus estimated from the AV2 gene among sites 2, 3, and 4.

| From (host) | To (host) | Mean migration rate | Indicator | Bayes Factor |
|-------------|-----------|---------------------|-----------|--------------|
| Site2 (EE)  | Site4 (EE) | 1.01                | 0.91      | 30.24        |
| Site4 (M)   | Site4 (EE) | 1.34                | 0.83      | 15.17        |
| Site3 (EE)  | Site4 (EE) | 1.01                | 0.53      | 3.61         |
| Site3 (M)   | Site4 (EE) | 1.02                | 0.51      | 3.26         |
| Site2 (M)   | Site4 (EE) | 0.97                | 0.51      | 3.23         |

*EE: Ecballium elaterium, M: Melon.

bUnit: migration event per lineage per year.

*Posterior probability of observing a non-zero migration rate in the sampled trees.

*Only statistically supported migrations with indicator values > 0.50 and BF > 3 are shown.
FIG S1 Symptoms in melon and associated weed plants collected during surveys. In melon, mosaics in the upper leaves (A) and yellowing on the basal leaves of older plants (B) were more frequent, whereas leaf-curling, leaf area reduction and internode shortening, and severe stunting (C) were less frequent. Weeds were almost asymptomatic, with few exceptions where we noticed general chlorosis in *Malva sylvestris* (D) and *Ecballium elaterium* (E) and mosaics in the upper leaves of *Solanum nigrum* (F).
FIG S2 Alignment of CABYV amino acid sequences from E. elaterium isolates showing the codons under positive selection in ORF2. A rectangular box represents the amino acid putatively under positive selection.
**FIG S3** Schematic representation showing the pooling and sequencing strategy. Samples were pooled in a first stage by species and site. A second pool was constructed by pooling the first pools by species.