**Table 1**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type** | | | **Name** | **Explanation** | **No. of unique values** |
| *Spatial* | *1) Spatial autocorrelation* | | Moran’s eigenvectors  (MEs) | Spatial effects due to e.g. unmeasured environmental gradients and dispersal of the viruses and/or their vectors, implemented as distance-based Moran’s eigenvectors calculated from the spatial locations of the sampled host plants. | 394 (MEM1)  394 (MEM2)  396 (MEM3) 396 (MEM4) |
| *Environmental* | *2) Habitat-related* | *Quality* | Connectivity | Connectivity of the population with respect to other populations, measured as the Euclidian distances separating populations and calibrated by the species dispersal capacity (Hanski 1999) | 20 |
| Local plant diversity | Shannon diversity index | 20 |
| Agricultural land use | % of the surrounding area, calculated as a proportion of 20m × 20m pixels from a one-km radius from the population falling under this land use category | 20 |
| Host population size | Amount of host plant within the focal population (m2) | 16 |
| *Weather* | Winter severity | Number of severe winter days during winter 2017 (days) | 9 |
| Effective summer day temperature sum | Sum over temperatures of the effective summer days in 2016 (°C) | 12 |
| *3) Host-related* | *Signs of herbivory* | Suck-/ bitemarks | Suck- and/or bitemarks produced by herbivores, recorded during the survey (0/1) | 2 |
| Holes | Holes produced by herbivores, recorded during the survey (0/1) | 2 |
| Moth | Moth pupa, recorded in the survey (0/1) | 2 |
| Miner | Leaf miner damage, recorded in the survey (0/1) | 2 |
| Thrips | Thrips damage, recorded in the survey (0/1) | 2 |
| Spittle | Spittle bug eggs, recorded in the survey (0/1) | 2 |
| *Host size* | Plant size | Plant size = n × A, where *n* is the number of leaves, and leaf area is calculated using the equation of ellipse area: A = πab, where *a* is a half axis of the width of the longest leaf, and *b* is the half axis of the length of the longest leaf | 387 |

**Table 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Covariate** | **Virus A** | **Virus B** | **Coefficient mean** |
|  | | | | |
| *Direct effects* | Connectivity | Geminiviridae | - | -0.15 |
| **Host population size** | **Geminiviridae** | - | **1.0** |
| **Local plant diversity** | **Caulimoviridae** | - | **-0.30** |
| Agricultural land use | Caulimoviridae | - | 0.05 |
| **Spittle** | **Caulimoviridae** | - | **1.54** |
| Moran’s eigenvector 1 | Geminiviridae | - | 0.07 |
| Moran’s eigenvector 2 | Closteroviridae | - | 0.05 |
| Moran’s eigenvector 3 | Caulimoviridae | - | -0.07 |
| Moran’s eigenvector 4 | Caulimoviridae | - | -0.15 |
| Moran’s eigenvector 4 | Geminiviridae | - | 0.01 |
|  | | | | |
| *Indirect effects* | *Connectivity* | Tymoviridae | Secoviridae | 0.06 |
| Tombusviridae | Secoviridae | -0.21 |
| Pospiviroidae | Tymoviridae | 0.23 |
| **Bromoviridae** | **Avsunviroidae** | **-0.64** |
| Host population size | Tymoviridae | Secoviridae | 0.01 |
| Local plant diversity | Tymoviridae | Secoviridae | 0.24 |
| Winter severity | Bromoviridae | Tymoviridae | **-0.25** |
| Geminiviridae | Pospiviroidae | -0.09 |
| Effective summer day temperature sum | **Geminiviridae** | **Virgaviridae** | **0.25** |
| Miner | **Geminiviridae** | **Alphaflexiviridae** | **0.56** |
| **Bromoviridae** | **Tymoviridae** | **0.99** |
| Spittle | **Tombusviridae** | **Secoviridae** | **2.13** |
| **Geminiviridae** | **Alphaflexiviridae** | **0.98** |
| Holes | **Alphaflexiviridae** | **Virgaviridae** | **2.02** |
| Bromoviridae | Tymoviridae | **0.37** |
| Caulimoviridae | Alphaflexiviridae | 0.08 |
| Suck-/bitemarks | **Bromoviridae** | **Avsunviroidae** | **1.5** |
| Moran’s eigenvector 1 | **Betaflexiviridae** | **Secoviridae** | **0.40** |
| Tombusviridae | Secoviridae | 0.07 |
| **Potyviridae** | **Betaflexiviridae** | **0.28** |
| **Fimoviridae** | **Alphaflexiviridae** | **0.65** |
| Geminiviridae | Pospiviroidae | 0.13 |
| Tombusviridae | Bromoviridae | 0.19 |
| Bromoviridae | Pospiviroidae | 0.17 |
| Moran’s eigenvector 2 | Alphaflexiviridae | Virgaviridae | -0.1 |
| **Pospiviroidae** | **Tymoviridae** | **-0.81** |
| Partitiviridae | Caulimoviridae | -0.14 |
| Moran’s eigenvector 3 | Caulimoviridae | Closteroviridae | -0.04 |
| **Caulimoviridae** | **Partitiviridae** | **-0.35** |
| **Geminiviridae** | **Bromoviridae** | **-0.26** |
| Moran’s eigenvector 4 | Partitiviridae | Caulimoviridae | -0.05 |
| **Tymoviridae** | **Pospiviroidae** | **-0.81** |