**Tracing the origin of Korean invasive populations of the spotted lanternfly, *Lycorma delicatula* (Hemiptera: Fulgoridae)**

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**Supplementary material 2**

**Table S1.** Pairwise *F*ST divergences between 38 different geographical populations of the soybean aphid. Pairwise G test values are above the diagonal and pairwise *F*ST values are below the diagonal. Red and bold *F*ST values mean those significantly different from zero at *P* < 0.001.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 　 | KR06-CA | KR07-SL | KR08-SG | KR09-GG | KR09-JE | KR09-GB | KR09-GW | KR10-SL | KR10-IN | KR10-NY | KR10-SW | KR10-IC | KR10-AS | KR10-CA | KR10-CY | KR10-NS | KR10-GC | KR10-GJ | KR10-BA | KR10-KJ |
| / KR06-CA | - | 2.568  | 1.567  | 2.036  | 1.978  | 2.339  | 1.882  | 1.539  | 1.900  | 1.779  | 2.160  | 2.576  | 3.084  | 2.833  | 2.083  | 2.058  | 2.236  | 2.298  | 1.628  | 2.233  |
| / KR07-SL | 0.089  | - | 2.823  | 3.270  | 6.579  | 6.571  | 3.177  | 2.976  | 3.358  | 3.929  | 2.949  | 2.686  | 3.759  | 5.834  | 5.536  | 4.872  | 2.270  | 2.967  | 3.000  | 2.594  |
| / KR08-SG | 0.138  | 0.081  | - | 21.302  | 10.132  | 2.839  | 13.906  | 29.619  | 16.665  | 6.281  | 4.851  | 4.447  | 4.929  | 6.296  | 5.222  | 13.191  | 8.371  | 7.391  | 24.022  | 18.819  |
| / KR09-GG | 0.109  | 0.071  | 0.012  | - | 13.517  | 9.554  | 10.357  | 102.631 | 15.583  | 12.922  | 12.077  | 19.686  | 15.483  | 22.898  | 13.456  | 67.870  | 11.886  | 13.411  | 24.093  | 18.379  |
| / KR09-JE | 0.112  | **0.037**  | **0.024**  | **0.018**  | - | 7.319  | 18.951  | 12.505  | 46.566  | Infinity | 12.269  | 6.019  | 9.802  | 11.114  | 20.497  | 61.025  | 6.868  | 5.049  | 12.887  | 8.834  |
| / KR09-GB | 0.097  | **0.037**  | 0.081  | **0.026**  | **0.033**  | - | 2.316  | 4.724  | 5.228  | 9.671  | 5.060  | 7.419  | 8.151  | 8.017  | 25.234  | 21.661  | 4.401  | 12.023  | 5.018  | 4.237  |
| / KR09-GW | 0.117  | 0.073  | 0.018  | 0.024  | **0.013**  | 0.097  | - | 12.584  | 8.434  | 9.429  | 5.639  | 4.503  | 4.678  | 7.162  | 4.587  | 6.901  | 4.964  | 4.162  | 5.834  | 6.743  |
| / KR10-SL | 0.140  | 0.077  | **0.008**  | **0.002**  | **0.020**  | 0.050  | 0.019  | - | 22.813  | 13.374  | 33.903  | 14.319  | 7.476  | 10.792  | 12.120  | 247.275 | 9.917  | 11.672  | 94.447  | 32.951  |
| / KR10-IN | 0.116  | 0.069  | 0.015  | 0.016  | **0.005**  | 0.046  | 0.029  | **0.011**  | - | 15.493  | 8.908  | 5.384  | 5.819  | 7.587  | 9.037  | 21.913  | 8.510  | 7.173  | 21.209  | 10.361  |
| / KR10-NY | 0.123  | 0.060  | 0.038  | 0.019  | **-0.004**  | **0.025**  | 0.026  | 0.018  | 0.016  | - | 7.521  | 5.494  | 6.836  | 5.761  | 7.737  | 11.999  | 7.841  | 7.987  | 9.962  | 10.620  |
| / KR10-SW | 0.104  | 0.078  | 0.049  | 0.020  | **0.020**  | 0.047  | 0.042  | **0.007**  | 0.027  | 0.032  | - | Infinity | 28.820  | 18.269  | 17.405  | 19.544  | 8.749  | 8.682  | 12.083  | 15.910  |
| / KR10-IC | 0.088  | 0.085  | 0.053  | **0.013**  | 0.040  | **0.033**  | 0.053  | **0.017**  | 0.044  | 0.044  | **-0.003**  | - | Infinity | Infinity | 44.633  | 31.760  | 11.042  | 9.006  | 11.460  | 24.700  |
| / KR10-AS | 0.075  | 0.062  | 0.048  | 0.016  | 0.025  | **0.030**  | 0.051  | 0.032  | 0.041  | 0.035  | **0.009**  | **-0.004**  | - | 567.932 | 19.718  | 29.547  | 15.745  | 18.351  | 23.905  | 80.919  |
| / KR10-CA | 0.081  | 0.041  | 0.038  | 0.011  | 0.022  | **0.030**  | 0.034  | 0.023  | 0.032  | 0.042  | 0.014  | **-0.000**  | **0.000**  | - | 454.295 | 126.013 | 7.875  | 8.280  | 10.754  | 9.726  |
| / KR10-CY | 0.107  | 0.043  | 0.046  | 0.018  | **0.012**  | **0.010**  | 0.052  | 0.020  | 0.027  | 0.031  | 0.014  | **0.006**  | **0.013**  | **0.001**  | - | Infinity | 8.182  | 5.903  | 16.608  | 8.449  |
| / KR10-NS | 0.108  | 0.049  | **0.019**  | **0.004**  | **0.004**  | **0.011**  | 0.035  | **0.001**  | **0.011**  | **0.020**  | **0.013**  | **0.008**  | **0.008**  | **0.002**  | **-0.010**  | - | 12.771  | 8.891  | Infinity | 19.373  |
| / KR10-GC | 0.101  | 0.099  | 0.029  | 0.021  | 0.035  | 0.054  | 0.048  | 0.025  | 0.029  | 0.031  | 0.028  | 0.022  | **0.016**  | 0.031  | 0.030  | 0.019  | - | 17.087  | 39.686  | 79.368  |
| / KR10-GJ | 0.098  | 0.078  | 0.033  | 0.018  | 0.047  | **0.020**  | 0.057  | 0.021  | 0.034  | 0.030  | 0.028  | 0.027  | **0.013**  | 0.029  | 0.041  | 0.027  | **0.014**  | - | 18.951  | Infinity |
| / KR10-BA | 0.133  | 0.077  | **0.010**  | **0.010**  | **0.019**  | 0.047  | 0.041  | 0.003  | 0.012  | 0.024  | 0.020  | 0.021  | **0.010**  | 0.023  | 0.015  | **-0.002**  | **0.006**  | **0.013**  | - | Infinity |
| / KR10-KJ | 0.101  | 0.088  | **0.013**  | **0.013**  | **0.028**  | **0.056**  | **0.036**  | **0.008**  | **0.024**  | **0.023**  | **0.015**  | **0.010**  | **0.003**  | 0.025  | 0.029  | **0.013**  | **0.003**  | **-0.004**  | **-0.003**  | - |
| / KR10-AD | 0.121  | 0.071  | 0.074  | 0.049  | 0.052  | 0.049  | **0.067**  | 0.040  | 0.056  | 0.074  | 0.038  | 0.055  | 0.047  | 0.046  | 0.048  | 0.028  | 0.101  | 0.061  | 0.059  | 0.058  |
| / KR10-YC | 0.121  | 0.082  | 0.059  | 0.067  | 0.085  | 0.093  | 0.095  | 0.090  | 0.087  | 0.117  | 0.111  | 0.100  | 0.057  | 0.063  | 0.089  | 0.065  | 0.093  | 0.054  | 0.072  | 0.064  |
| / KR10-SJ | 0.159  | 0.092  | 0.088  | 0.092  | 0.105  | 0.055  | 0.130  | 0.095  | 0.073  | 0.086  | 0.135  | 0.137  | 0.113  | 0.112  | 0.112  | 0.085  | 0.106  | 0.052  | 0.088  | 0.080  |
| / KR11-CW | 0.261  | 0.283  | 0.183  | 0.221  | 0.289  | 0.408  | 0.219  | 0.240  | 0.191  | 0.289  | 0.289  | 0.307  | 0.301  | 0.260  | 0.284  | 0.244  | 0.272  | 0.266  | 0.248  | 0.272  |
| / KR11-SC | 0.147  | 0.102  | 0.115  | 0.098  | 0.065  | 0.121  | 0.115  | 0.099  | 0.087  | 0.078  | 0.071  | 0.069  | 0.065  | 0.077  | 0.075  | 0.079  | 0.081  | 0.111  | 0.084  | 0.081  |
| / CN09-BJ | 0.105  | 0.124  | 0.173  | 0.165  | 0.154  | 0.133  | 0.195  | 0.172  | 0.153  | 0.178  | 0.140  | 0.145  | 0.137  | 0.132  | 0.141  | 0.139  | 0.148  | 0.138  | 0.160  | 0.150  |
| / CN10-TJ | 0.192  | 0.163  | 0.227  | 0.203  | 0.212  | 0.164  | 0.251  | 0.209  | 0.213  | 0.233  | 0.175  | 0.178  | 0.176  | 0.165  | 0.152  | 0.160  | 0.194  | 0.193  | 0.198  | 0.210  |
| / CN11-YT | 0.151  | 0.122  | 0.108  | 0.104  | 0.108  | 0.089  | 0.136  | 0.103  | 0.091  | 0.104  | 0.118  | 0.102  | 0.107  | 0.095  | 0.095  | 0.080  | 0.088  | 0.099  | 0.101  | 0.102  |
| / CN11-HY | 0.164  | 0.177  | 0.130  | 0.127  | 0.123  | 0.127  | 0.159  | 0.140  | 0.100  | 0.113  | 0.146  | 0.136  | 0.131  | 0.137  | 0.132  | 0.114  | 0.094  | 0.130  | 0.124  | 0.132  |
| / CN11-QD | 0.162  | 0.113  | 0.077  | 0.067  | 0.065  | **0.049**  | 0.119  | 0.070  | 0.045  | 0.080  | 0.076  | 0.072  | 0.076  | 0.074  | 0.048  | 0.038  | 0.072  | 0.078  | 0.050  | 0.085  |
| / CN11-LY | 0.161  | 0.087  | 0.086  | 0.071  | 0.069  | 0.059  | 0.121  | 0.077  | 0.073  | 0.078  | 0.073  | 0.073  | 0.074  | 0.071  | 0.061  | 0.061  | 0.069  | 0.069  | 0.066  | 0.093  |
| / CN11-RZ | 0.182  | 0.099  | 0.071  | 0.060  | 0.057  | 0.065  | 0.102  | 0.058  | 0.051  | 0.076  | 0.065  | 0.083  | 0.077  | 0.060  | 0.057  | 0.041  | 0.069  | 0.076  | 0.055  | 0.095  |
| / CN11-LG | 0.165  | 0.096  | 0.052  | 0.039  | 0.050  | 0.077  | 0.072  | 0.037  | 0.045  | 0.071  | 0.048  | 0.052  | 0.063  | 0.033  | 0.034  | 0.023  | 0.044  | 0.075  | 0.040  | 0.076  |
| / CN10-SH | 0.105  | 0.068  | 0.021  | 0.015  | **0.003**  | **0.037**  | 0.037  | 0.017  | **0.006**  | **0.022**  | **0.019**  | **0.017**  | **0.010**  | **0.015**  | **0.008**  | **-0.004**  | **0.012**  | 0.032  | **-0.000**  | **0.015**  |
| / CN10-NB | 0.201  | 0.230  | 0.257  | 0.249  | 0.263  | 0.206  | 0.293  | 0.279  | 0.239  | 0.254  | 0.265  | 0.232  | 0.218  | 0.224  | 0.224  | 0.220  | 0.198  | 0.226  | 0.225  | 0.221  |
| / CN10-TT | 0.198  | 0.186  | 0.196  | 0.192  | 0.202  | 0.145  | 0.234  | 0.213  | 0.198  | 0.194  | 0.207  | 0.185  | 0.168  | 0.177  | 0.171  | 0.165  | 0.148  | 0.171  | 0.172  | 0.170  |
| / CN10-LA | 0.228  | 0.239  | 0.248  | 0.243  | 0.264  | 0.187  | 0.292  | 0.264  | 0.251  | 0.254  | 0.259  | 0.221  | 0.218  | 0.225  | 0.224  | 0.218  | 0.201  | 0.218  | 0.224  | 0.217  |
| / JP10-HS | 0.140  | 0.111  | 0.099  | 0.098  | 0.125  | 0.111  | 0.115  | 0.129  | 0.129  | 0.150  | 0.147  | 0.131  | 0.102  | 0.097  | 0.130  | 0.097  | 0.142  | 0.111  | 0.127  | 0.123  |

**Table S1.** (continued)

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | KR10-AD | KR10-YC | KR10-SJ | KR11-CW | KR11-SC | CN09-BJ | CN10-TJ | CN11-YT | CN11-HY | CN11-QD | CN11-LY | CN11-RZ | CN11-LG | CN10-SH | CN10-NB | CN10-TT | CN10-LA | JP10-HS |
| / KR06-CA | 1.809  | 1.821  | 1.322  | 0.707  | 1.450  | 2.134  | 1.051  | 1.405  | 1.270  | 1.290  | 1.304  | 1.122  | 1.263  | 2.130  | 0.991  | 1.012  | 0.846  | 1.535  |
| / KR07-SL | 3.280  | 2.791  | 2.464  | 0.632  | 2.190  | 1.758  | 1.280  | 1.791  | 1.160  | 1.967  | 2.622  | 2.270  | 2.358  | 3.409  | 0.836  | 1.094  | 0.797  | 1.996  |
| / KR08-SG | 3.133  | 4.001  | 2.594  | 1.115  | 1.925  | 1.191  | 0.853  | 2.055  | 1.672  | 3.018  | 2.671  | 3.254  | 4.573  | 11.886  | 0.723  | 1.025  | 0.757  | 2.272  |
| / KR09-GG | 4.817  | 3.468  | 2.462  | 0.879  | 2.290  | 1.270  | 0.983  | 2.157  | 1.726  | 3.481  | 3.267  | 3.948  | 6.150  | 16.676  | 0.755  | 1.054  | 0.779  | 2.290  |
| / KR09-JE | 4.604  | 2.691  | 2.141  | 0.614  | 3.569  | 1.371  | 0.929  | 2.055  | 1.776  | 3.581  | 3.349  | 4.131  | 4.743  | 84.784  | 0.700  | 0.991  | 0.696  | 1.753  |
| / KR09-GB | 4.903  | 2.446  | 4.267  | 0.363  | 1.817  | 1.633  | 1.273  | 2.569  | 1.717  | 4.855  | 4.004  | 3.599  | 3.001  | 6.532  | 0.962  | 1.478  | 1.088  | 2.001  |
| / KR09-GW | 3.487  | 2.369  | 1.667  | 0.891  | 1.929  | 1.033  | 0.747  | 1.583  | 1.318  | 1.843  | 1.818  | 2.210  | 3.201  | 6.481  | 0.603  | 0.820  | 0.607  | 1.915  |
| / KR10-SL | 6.030  | 2.517  | 2.369  | 0.790  | 2.278  | 1.199  | 0.947  | 2.166  | 1.529  | 3.327  | 3.012  | 4.089  | 6.540  | 14.430  | 0.647  | 0.925  | 0.698  | 1.681  |
| / KR10-IN | 4.226  | 2.622  | 3.164  | 1.057  | 2.632  | 1.389  | 0.924  | 2.502  | 2.255  | 5.286  | 3.172  | 4.617  | 5.309  | 39.307  | 0.798  | 1.013  | 0.748  | 1.692  |
| / KR10-NY | 3.150  | 1.880  | 2.670  | 0.615  | 2.967  | 1.155  | 0.824  | 2.164  | 1.967  | 2.857  | 2.955  | 3.056  | 3.282  | 11.124  | 0.733  | 1.041  | 0.733  | 1.419  |
| / KR10-SW | 6.279  | 1.999  | 1.596  | 0.616  | 3.269  | 1.530  | 1.175  | 1.863  | 1.467  | 3.041  | 3.194  | 3.614  | 4.958  | 12.812  | 0.695  | 0.960  | 0.717  | 1.447  |
| / KR10-IC | 4.297  | 2.246  | 1.570  | 0.564  | 3.352  | 1.470  | 1.152  | 2.192  | 1.591  | 3.234  | 3.164  | 2.755  | 4.566  | 14.370  | 0.829  | 1.104  | 0.879  | 1.657  |
| / KR10-AS | 5.075  | 4.166  | 1.958  | 0.580  | 3.593  | 1.576  | 1.172  | 2.089  | 1.653  | 3.030  | 3.151  | 2.990  | 3.733  | 24.236  | 0.899  | 1.238  | 0.895  | 2.206  |
| / KR10-CA | 5.180  | 3.727  | 1.972  | 0.710  | 2.978  | 1.648  | 1.262  | 2.393  | 1.577  | 3.132  | 3.279  | 3.921  | 7.226  | 16.037  | 0.865  | 1.164  | 0.860  | 2.328  |
| / KR10-CY | 4.936  | 2.550  | 1.991  | 0.631  | 3.065  | 1.520  | 1.394  | 2.388  | 1.642  | 4.916  | 3.828  | 4.147  | 7.206  | 31.966  | 0.866  | 1.208  | 0.864  | 1.678  |
| / KR10-NS | 8.753  | 3.625  | 2.700  | 0.774  | 2.914  | 1.555  | 1.312  | 2.894  | 1.947  | 6.301  | 3.875  | 5.921  | 10.841  | Infinity | 0.886  | 1.267  | 0.895  | 2.338  |
| / KR10-GC | 2.220  | 2.449  | 2.110  | 0.668  | 2.820  | 1.436  | 1.037  | 2.595  | 2.421  | 3.244  | 3.349  | 3.373  | 5.434  | 20.583  | 1.013  | 1.435  | 0.996  | 1.510  |
| / KR10-GJ | 3.829  | 4.385  | 4.539  | 0.688  | 1.999  | 1.564  | 1.046  | 2.278  | 1.675  | 2.952  | 3.370  | 3.050  | 3.070  | 7.624  | 0.858  | 1.208  | 0.896  | 1.997  |
| / KR10-BA | 4.003  | 3.237  | 2.606  | 0.757  | 2.722  | 1.309  | 1.015  | 2.229  | 1.759  | 4.753  | 3.519  | 4.263  | 5.963  | Infinity | 0.862  | 1.202  | 0.866  | 1.716  |
| / KR10-KJ | 4.025  | 3.676  | 2.873  | 0.669  | 2.848  | 1.420  | 0.939  | 2.213  | 1.641  | 2.686  | 2.430  | 2.385  | 3.040  | 16.932  | 0.880  | 1.220  | 0.903  | 1.786  |
| / KR10-AD | - | 2.827  | 1.983  | 0.612  | 1.492  | 1.227  | 0.964  | 1.379  | 0.921  | 1.928  | 1.465  | 2.003  | 2.046  | 3.822  | 0.606  | 0.798  | 0.624  | 2.354  |
| / KR10-YC | 0.081  | - | 2.424  | 0.934  | 1.032  | 1.329  | 0.874  | 1.338  | 1.000  | 1.775  | 1.629  | 1.841  | 1.801  | 2.844  | 0.692  | 0.868  | 0.700  | 3.378  |
| / KR10-SJ | 0.112  | 0.093  | - | 0.674  | 1.184  | 0.946  | 0.704  | 2.405  | 1.410  | 1.847  | 1.483  | 1.661  | 1.473  | 2.448  | 0.820  | 1.048  | 0.856  | 1.588  |
| / KR11-CW | 0.290  | 0.211  | 0.271  | - | 0.460  | 0.520  | 0.335  | 0.650  | 0.524  | 0.669  | 0.523  | 0.575  | 0.596  | 0.792  | 0.340  | 0.391  | 0.368  | 0.578  |
| / KR11-SC | 0.144  | 0.195  | 0.174  | 0.352  | - | 1.117  | 0.863  | 2.341  | 1.697  | 1.917  | 1.924  | 1.709  | 1.940  | 4.093  | 0.828  | 1.201  | 0.824  | 0.955  |
| / CN09-BJ | 0.169  | 0.158  | 0.209  | 0.325  | 0.183  | - | 4.719  | 1.298  | 1.031  | 1.362  | 1.390  | 1.315  | 1.136  | 1.588  | 0.750  | 0.909  | 0.682  | 0.995  |
| / CN10-TJ | 0.206  | 0.222  | 0.262  | 0.427  | 0.225  | 0.050  | - | 0.938  | 0.649  | 0.968  | 1.001  | 1.046  | 0.971  | 1.117  | 0.650  | 0.934  | 0.675  | 0.751  |
| / CN11-YT | 0.153  | 0.157  | 0.094  | 0.278  | 0.096  | 0.161  | 0.210  | - | 6.162  | 3.056  | 2.163  | 2.074  | 2.331  | 3.261  | 1.001  | 1.602  | 1.133  | 1.316  |
| / CN11-HY | 0.214  | 0.200  | 0.151  | 0.323  | 0.128  | 0.195  | 0.278  | 0.039  | - | 3.476  | 2.421  | 1.688  | 1.834  | 3.003  | 0.794  | 1.124  | 0.870  | 0.914  |
| / CN11-QD | 0.115  | 0.123  | 0.119  | 0.272  | 0.115  | 0.155  | 0.205  | 0.076  | 0.067  | - | 9.329  | 5.186  | 4.302  | 7.166  | 0.788  | 1.047  | 0.848  | 1.235  |
| / CN11-LY | 0.146  | 0.133  | 0.144  | 0.323  | 0.115  | 0.152  | 0.200  | 0.104  | 0.094  | 0.026  | - | 5.894  | 5.005  | 3.914  | 0.676  | 0.977  | 0.775  | 1.149  |
| / CN11-RZ | 0.111  | 0.120  | 0.131  | 0.303  | 0.128  | 0.160  | 0.193  | 0.108  | 0.129  | 0.046  | 0.041  | - | 21.320  | 4.782  | 0.619  | 0.920  | 0.668  | 1.157  |
| / CN11-LG | 0.109  | 0.122  | 0.145  | 0.295  | 0.114  | 0.180  | 0.205  | 0.097  | 0.120  | 0.055  | 0.048  | 0.012  | - | 7.075  | 0.648  | 0.932  | 0.713  | 1.285  |
| / CN10-SH | 0.061  | 0.081  | 0.093  | 0.240  | 0.058  | 0.136  | 0.183  | 0.071  | 0.077  | 0.034  | 0.060  | 0.050  | 0.034  | - | 0.906  | 1.275  | 0.879  | 1.950  |
| / CN10-NB | 0.292  | 0.265  | 0.234  | 0.423  | 0.232  | 0.250  | 0.278  | 0.200  | 0.239  | 0.241  | 0.270  | 0.288  | 0.278  | 0.216  | - | 3.263  | 4.215  | 0.659  |
| / CN10-TT | 0.239  | 0.224  | 0.193  | 0.390  | 0.172  | 0.216  | 0.211  | 0.135  | 0.182  | 0.193  | 0.204  | 0.214  | 0.212  | 0.164  | 0.071  | - | 5.117  | 0.913  |
| / CN10-LA | 0.286  | 0.263  | 0.226  | 0.405  | 0.233  | 0.268  | 0.270  | 0.181  | 0.223  | 0.228  | 0.244  | 0.272  | 0.260  | 0.221  | 0.056  | 0.047  | - | 0.757  |
| / JP10-HS | 0.096  | 0.069  | 0.136  | 0.302  | 0.207  | 0.201  | 0.250  | 0.160  | 0.215  | 0.168  | 0.179  | 0.178  | 0.163  | 0.114  | 0.275  | 0.215  | 0.248  | - |

**Table S2.** Results of the bottleneck test based on the two mutation models, SMM and TPM, using a nonparametric Wilcoxon signed-rank test

|  |  |  |  |
| --- | --- | --- | --- |
| Pop. ID | Wilcowon signed-rank tests | Mode shift | MODE-Shift |
| TPM | SMM |
| KR06-CA | 0.2593  | 0.1697  | normal | | 0.432 | 0.114 | 0.045 | 0.068 | 0.136 | 0.091 | 0.045 | 0.000 | 0.023 | 0.045 | |
| KR07-SL | 0.1030  | 0.0615  | shifted mode | | 0.282 | 0.308 | 0.077 | 0.051 | 0.026 | 0.103 | 0.000 | 0.128 | 0.000 | 0.026 | |
| KR08-SG | 0.0320  | 0.0067  | normal  | | 0.566 | 0.113 | 0.057 | 0.019 | 0.038 | 0.038 | 0.075 | 0.038 | 0.019 | 0.038 | |
| KR09-GG | 0.0031  | 0.0012  | normal  | | 0.609 | 0.125 | 0.031 | 0.047 | 0.031 | 0.031 | 0.047 | 0.031 | 0.047 | 0.000 | |
| KR09-JE | 0.0415  | 0.0415  | normal  | | 0.351 | 0.216 | 0.081 | 0.081 | 0.000 | 0.000 | 0.135 | 0.054 | 0.054 | 0.027 | |
| KR09-GB | 0.4251  | 0.2847  | shifted mode | | 0.000 | 0.212 | 0.303 | 0.061 | 0.061 | 0.152 | 0.030 | 0.061 | 0.061 | 0.061 | |
| KR09-GW | 0.0415  | 0.0061  | normal  | | 0.477 | 0.159 | 0.068 | 0.068 | 0.023 | 0.023 | 0.091 | 0.000 | 0.045 | 0.045 | |
| KR10-SL | 0.0053  | 0.0017  | normal  | | 0.426 | 0.149 | 0.149 | 0.000 | 0.064 | 0.021 | 0.043 | 0.043 | 0.085 | 0.021 | |
| KR10-IN | 0.1018  | 0.0212  | normal  | | 0.491 | 0.182 | 0.073 | 0.055 | 0.018 | 0.018 | 0.073 | 0.036 | 0.018 | 0.036 | |
| KR10-NY | 0.0046  | 0.0017  | normal  | | 0.490 | 0.204 | 0.041 | 0.041 | 0.020 | 0.061 | 0.020 | 0.020 | 0.102 | 0.000 | |
| KR10-SW | 0.0031  | 0.0006  | normal  | | 0.549 | 0.118 | 0.020 | 0.078 | 0.039 | 0.039 | 0.059 | 0.020 | 0.020 | 0.059 | |
| KR10-IC | 0.0171  | 0.0040  | normal  | | 0.417 | 0.208 | 0.042 | 0.063 | 0.063 | 0.042 | 0.042 | 0.063 | 0.042 | 0.021 | |
| KR10-AS | 0.2119  | 0.0881  | normal  | | 0.293 | 0.293 | 0.024 | 0.049 | 0.122 | 0.049 | 0.049 | 0.024 | 0.073 | 0.024 | |
| KR10-CA | 0.0647  | 0.0067  | normal  | | 0.429 | 0.204 | 0.082 | 0.041 | 0.020 | 0.061 | 0.061 | 0.061 | 0.041 | 0.000 | |
| KR10-CY | 0.0212  | 0.0212  | normal  | | 0.375 | 0.271 | 0.063 | 0.042 | 0.021 | 0.021 | 0.083 | 0.083 | 0.000 | 0.042 | |
| KR10-NS | 0.0171  | 0.0031  | normal  | | 0.564 | 0.091 | 0.109 | 0.018 | 0.018 | 0.018 | 0.073 | 0.091 | 0.000 | 0.018 | |
| KR10-GC | 0.0320  | 0.0031  | normal  | | 0.482 | 0.196 | 0.054 | 0.054 | 0.036 | 0.036 | 0.071 | 0.036 | 0.000 | 0.036 | |
| KR10-GJ | 0.1506  | 0.1167  | normal  | | 0.391 | 0.174 | 0.065 | 0.087 | 0.087 | 0.022 | 0.109 | 0.000 | 0.022 | 0.043 | |
| KR10-BA | 0.0053  | 0.0023  | normal  | | 0.479 | 0.104 | 0.104 | 0.063 | 0.021 | 0.021 | 0.104 | 0.042 | 0.042 | 0.021 | |
| KR10-KJ | 0.0615  | 0.0415  | shifted mode | | 0.250 | 0.306 | 0.028 | 0.083 | 0.056 | 0.083 | 0.083 | 0.028 | 0.056 | 0.028 | |
| KR10-AD | 0.3501  | 0.2886  | normal  | | 0.207 | 0.207 | 0.103 | 0.069 | 0.069 | 0.069 | 0.138 | 0.034 | 0.000 | 0.103 | |
| KR10-YC | 0.3667  | 0.2593  | normal  | | 0.308 | 0.205 | 0.103 | 0.051 | 0.026 | 0.026 | 0.128 | 0.077 | 0.051 | 0.026 | |
| KR10-SJ | 0.9739  | 0.9243  | shifted mode | | 0.172 | 0.034 | 0.207 | 0.069 | 0.103 | 0.207 | 0.034 | 0.103 | 0.000 | 0.069 | |
| KR10-CW | 0.7813  | 0.7188  | shifted mode | | 0.154 | 0.000 | 0.231 | 0.154 | 0.077 | 0.077 | 0.000 | 0.154 | 0.000 | 0.154 | |
| KR11-SC | 0.1030  | 0.0337  | normal  | | 0.463 | 0.122 | 0.073 | 0.073 | 0.024 | 0.098 | 0.024 | 0.049 | 0.049 | 0.024 | |
| CN09-BJ | 0.0874  | 0.0615  | normal  | | 0.286 | 0.286 | 0.048 | 0.119 | 0.048 | 0.024 | 0.119 | 0.048 | 0.000 | 0.024 | |
| CN10-TJ | 0.5508  | 0.3823  | normal  | | 0.314 | 0.114 | 0.143 | 0.143 | 0.029 | 0.057 | 0.057 | 0.086 | 0.029 | 0.029 | |
| CN11-YT | 0.7881  | 0.6614  | normal  | | 0.383 | 0.128 | 0.106 | 0.064 | 0.106 | 0.085 | 0.128 | 0.000 | 0.000 | 0.000 | |
| CN11-HY | 0.7114  | 0.5508  | normal  | | 0.375 | 0.050 | 0.175 | 0.075 | 0.125 | 0.050 | 0.100 | 0.050 | 0.000 | 0.000 | |
| CN11-QD | 0.2119  | 0.1167  | normal  | | 0.429 | 0.163 | 0.102 | 0.041 | 0.041 | 0.082 | 0.041 | 0.082 | 0.020 | 0.000 | |
| CN11-LY | 0.8669  | 0.7881  | normal  | | 0.231 | 0.231 | 0.103 | 0.103 | 0.051 | 0.103 | 0.077 | 0.026 | 0.077 | 0.000 | |
| CN11-RZ | 0.2593  | 0.1506  | normal  | | 0.440 | 0.180 | 0.080 | 0.080 | 0.020 | 0.060 | 0.060 | 0.000 | 0.020 | 0.060 | |
| CN11-LG | 0.2119  | 0.1697  | normal  | | 0.404 | 0.191 | 0.128 | 0.043 | 0.000 | 0.021 | 0.085 | 0.043 | 0.085 | 0.000 | |
| CN10-SH | 0.0320  | 0.0040  | normal  | | 0.571 | 0.125 | 0.036 | 0.018 | 0.054 | 0.054 | 0.054 | 0.054 | 0.000 | 0.036 | |
| CN10-NB | 0.0757  | 0.0386  | normal  | | 0.475 | 0.180 | 0.098 | 0.066 | 0.082 | 0.016 | 0.000 | 0.033 | 0.016 | 0.033 | |
| CN10-TT | 0.5452  | 0.1167  | normal  | | 0.466 | 0.155 | 0.138 | 0.069 | 0.052 | 0.017 | 0.052 | 0.034 | 0.017 | 0.000 | |
| CN10-LA | 0.0031  | 0.0009  | normal  | | 0.598 | 0.195 | 0.069 | 0.034 | 0.034 | 0.011 | 0.034 | 0.000 | 0.011 | 0.011 | |
| JP10-HS | 0.9998  | 0.9988  | shifted mode | | 0.077 | 0.192 | 0.077 | 0.154 | 0.077 | 0.154 | 0.154 | 0.077 | 0.038 | 0.000 | |

**Table S3.** Mean assignment rate of individuals into (rows) and from (columns) each population using GeneClass 2 (Piry et al. 2004). Values in bold and underlined indicate the proportions of individuals assigned to the source population. Zero values were excluded from the table. The cells were gradiented according to the size range of the numbers (see note)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 　 | KR06-CA | KR07-SL | KR08-SG | KR09-GG | KR09-JE | KR09-GB | KR09-GW | KR10-SL | KR10-IN | KR10-NY | KR10-SW | KR10-IC | KR10-AS | KR10-CA | KR10-CY | KR10-NS | KR10-GC | KR10-GJ | KR10-BA | KR10-KJ |
| / KR06-CA | **0.401**  | 0.126  | 0.030  | 0.152  | 0.032  | 0.156  | 0.059  | 0.025  | 0.130  | 0.053  | 0.144  | 0.187  | 0.146  | 0.161  | 0.111  | 0.134  | 0.199  | 0.082  | 0.074  | 0.059  |
| / KR07-SL | 0.085  | **0.257**  | 0.166  | 0.213  | 0.144  | 0.257  | 0.039  | 0.136  | 0.176  | 0.212  | 0.152  | 0.179  | 0.141  | 0.215  | 0.241  | 0.276  | 0.201  | 0.174  | 0.156  | 0.083  |
| / KR08-SG | 0.120  | 0.214  | **0.421**  | 0.456  | 0.243  | 0.284  | 0.250  | 0.351  | 0.385  | 0.330  | 0.324  | 0.315  | 0.266  | 0.328  | 0.318  | 0.442  | 0.468  | 0.298  | 0.327  | 0.234  |
| / KR09-GG | 0.141  | 0.180  | 0.303  | **0.436**  | 0.181  | 0.302  | 0.146  | 0.306  | 0.381  | 0.312  | 0.316  | 0.400  | 0.315  | 0.339  | 0.321  | 0.416  | 0.374  | 0.289  | 0.276  | 0.182  |
| / KR09-JE | 0.144  | 0.372  | 0.445  | 0.418  | **0.285**  | 0.297  | 0.221  | 0.322  | 0.422  | 0.365  | 0.452  | 0.284  | 0.223  | 0.318  | 0.386  | 0.422  | 0.478  | 0.275  | 0.279  | 0.190  |
| / KR09-GB | 0.051  | 0.161  | 0.179  | 0.303  | 0.140  | **0.133**  | 0.022  | 0.121  | 0.225  | 0.178  | 0.173  | 0.184  | 0.241  | 0.184  | 0.262  | 0.335  | 0.291  | 0.344  | 0.122  | 0.166  |
| / KR09-GW | 0.193  | 0.309  | 0.426  | 0.401  | 0.299  | 0.283  | **0.382**  | 0.353  | 0.385  | 0.377  | 0.342  | 0.328  | 0.239  | 0.432  | 0.322  | 0.398  | 0.534  | 0.253  | 0.280  | 0.267  |
| / KR10-SL | 0.114  | 0.240  | 0.428  | 0.457  | 0.230  | 0.332  | 0.257  | **0.398**  | 0.433  | 0.376  | 0.392  | 0.429  | 0.298  | 0.338  | 0.416  | 0.542  | 0.515  | 0.367  | 0.386  | 0.271  |
| / KR10-IN | 0.118  | 0.208  | 0.294  | 0.389  | 0.201  | 0.264  | 0.183  | 0.271  | **0.460**  | 0.296  | 0.333  | 0.299  | 0.235  | 0.330  | 0.328  | 0.350  | 0.371  | 0.265  | 0.291  | 0.199  |
| / KR10-NY | 0.104  | 0.246  | 0.264  | 0.309  | 0.216  | 0.293  | 0.198  | 0.292  | 0.313  | **0.373**  | 0.245  | 0.257  | 0.206  | 0.210  | 0.276  | 0.386  | 0.399  | 0.283  | 0.281  | 0.206  |
| / KR10-SW | 0.110  | 0.204  | 0.255  | 0.355  | 0.182  | 0.248  | 0.153  | 0.279  | 0.341  | 0.251  | **0.384**  | 0.392  | 0.255  | 0.251  | 0.277  | 0.368  | 0.418  | 0.265  | 0.244  | 0.186  |
| / KR10-IC | 0.095  | 0.141  | 0.204  | 0.382  | 0.068  | 0.232  | 0.112  | 0.282  | 0.251  | 0.201  | 0.300  | **0.364**  | 0.275  | 0.350  | 0.265  | 0.391  | 0.315  | 0.229  | 0.189  | 0.146  |
| / KR10-AS | 0.151  | 0.220  | 0.217  | 0.421  | 0.153  | 0.296  | 0.083  | 0.263  | 0.276  | 0.291  | 0.344  | 0.410  | **0.419**  | 0.304  | 0.291  | 0.406  | 0.396  | 0.294  | 0.252  | 0.211  |
| / KR10-CA | 0.160  | 0.247  | 0.169  | 0.336  | 0.150  | 0.307  | 0.156  | 0.196  | 0.295  | 0.209  | 0.324  | 0.385  | 0.255  | **0.437**  | 0.352  | 0.378  | 0.281  | 0.224  | 0.215  | 0.144  |
| / KR10-CY | 0.074  | 0.202  | 0.209  | 0.330  | 0.195  | 0.320  | 0.111  | 0.226  | 0.328  | 0.310  | 0.305  | 0.340  | 0.254  | 0.302  | **0.431**  | 0.451  | 0.364  | 0.259  | 0.287  | 0.139  |
| / KR10-NS | 0.052  | 0.160  | 0.229  | 0.332  | 0.171  | 0.301  | 0.097  | 0.321  | 0.260  | 0.306  | 0.259  | 0.317  | 0.187  | 0.281  | 0.349  | **0.367**  | 0.336  | 0.201  | 0.244  | 0.096  |
| / KR10-GC | 0.058  | 0.074  | 0.155  | 0.213  | 0.121  | 0.163  | 0.091  | 0.121  | 0.147  | 0.127  | 0.148  | 0.158  | 0.114  | 0.102  | 0.138  | 0.212  | **0.366**  | 0.216  | 0.137  | 0.112  |
| / KR10-GJ | 0.106  | 0.183  | 0.217  | 0.398  | 0.147  | 0.348  | 0.118  | 0.243  | 0.340  | 0.247  | 0.309  | 0.355  | 0.294  | 0.270  | 0.303  | 0.371  | 0.512  | **0.420**  | 0.247  | 0.276  |
| / KR10-BA | 0.036  | 0.175  | 0.315  | 0.396  | 0.218  | 0.289  | 0.169  | 0.342  | 0.444  | 0.326  | 0.332  | 0.365  | 0.326  | 0.248  | 0.377  | 0.505  | 0.566  | 0.321  | **0.350**  | 0.243  |
| / KR10-KJ | 0.073  | 0.139  | 0.202  | 0.265  | 0.176  | 0.299  | 0.081  | 0.211  | 0.298  | 0.291  | 0.230  | 0.259  | 0.267  | 0.212  | 0.228  | 0.393  | 0.479  | 0.323  | 0.268  | **0.296**  |
| / KR10-AD | 0.140  | 0.293  | 0.349  | 0.483  | 0.270  | 0.438  | 0.217  | 0.494  | 0.453  | 0.364  | 0.504  | 0.423  | 0.340  | 0.420  | 0.448  | 0.612  | 0.432  | 0.399  | 0.448  | 0.282  |
| / KR10-YC | 0.090  | 0.263  | 0.239  | 0.405  | 0.199  | 0.291  | 0.128  | 0.244  | 0.278  | 0.188  | 0.197  | 0.285  | 0.336  | 0.321  | 0.293  | 0.408  | 0.383  | 0.304  | 0.212  | 0.231  |
| / KR10-SJ | 0.077  | 0.254  | 0.209  | 0.336  | 0.141  | 0.547  | 0.048  | 0.247  | 0.373  | 0.200  | 0.227  | 0.251  | 0.230  | 0.216  | 0.273  | 0.418  | 0.399  | 0.519  | 0.186  | 0.266  |
| / KR11-CW | 0.491  | 0.550  | 0.824  | 0.712  | 0.487  | 0.334  | 0.629  | 0.654  | 0.796  | 0.551  | 0.476  | 0.506  | 0.518  | 0.627  | 0.508  | 0.752  | 0.688  | 0.331  | 0.662  | 0.627  |
| / KR11-SC | 0.016  | 0.096  | 0.126  | 0.102  | 0.125  | 0.118  | 0.054  | 0.111  | 0.085  | 0.152  | 0.184  | 0.194  | 0.093  | 0.086  | 0.136  | 0.152  | 0.157  | 0.084  | 0.090  | 0.072  |
| / CN09-BJ | 0.016  | 0.029  | 0.009  | 0.015  | 0.001  | 0.033  | 0.005  | 0.002  | 0.003  | 0.007  | 0.010  | 0.018  | 0.001  | 0.009  | 0.015  | 0.046  | 0.042  | 0.005  | 0.010  | 0.002  |
| / CN10-TJ | 0.070  | 0.074  | 0.013  | 0.063  | 0.008  | 0.130  | 0.017  | 0.022  | 0.036  | 0.022  | 0.086  | 0.107  | 0.047  | 0.066  | 0.087  | 0.143  | 0.096  | 0.049  | 0.047  | 0.029  |
| / CN11-YT | 0.007  | 0.010  | 0.035  | 0.050  | 0.018  | 0.086  | 0.009  | 0.049  | 0.055  | 0.046  | 0.026  | 0.075  | 0.030  | 0.064  | 0.048  | 0.121  | 0.057  | 0.028  | 0.023  | 0.010  |
| / CN11-HY | 0.005  | 0.030  | 0.055  | 0.066  | 0.034  | 0.114  | 0.009  | 0.059  | 0.075  | 0.112  | 0.058  | 0.057  | 0.031  | 0.028  | 0.059  | 0.153  | 0.102  | 0.042  | 0.026  | 0.018  |
| / CN11-QD | 0.029  | 0.080  | 0.129  | 0.132  | 0.116  | 0.184  | 0.052  | 0.148  | 0.172  | 0.150  | 0.179  | 0.196  | 0.148  | 0.102  | 0.197  | 0.243  | 0.172  | 0.146  | 0.140  | 0.079  |
| / CN11-LY | 0.008  | 0.157  | 0.146  | 0.107  | 0.123  | 0.138  | 0.019  | 0.122  | 0.134  | 0.186  | 0.200  | 0.124  | 0.096  | 0.037  | 0.141  | 0.214  | 0.213  | 0.137  | 0.081  | 0.073  |
| / CN11-RZ | 0.015  | 0.138  | 0.192  | 0.188  | 0.122  | 0.205  | 0.096  | 0.171  | 0.141  | 0.157  | 0.148  | 0.111  | 0.078  | 0.140  | 0.090  | 0.273  | 0.233  | 0.131  | 0.093  | 0.128  |
| / CN11-LG | 0.025  | 0.109  | 0.247  | 0.257  | 0.154  | 0.233  | 0.133  | 0.204  | 0.246  | 0.214  | 0.251  | 0.184  | 0.121  | 0.207  | 0.180  | 0.325  | 0.341  | 0.153  | 0.139  | 0.133  |
| / CN10-SH | 0.085  | 0.151  | 0.250  | 0.328  | 0.176  | 0.230  | 0.118  | 0.249  | 0.333  | 0.280  | 0.276  | 0.332  | 0.248  | 0.232  | 0.248  | 0.393  | 0.371  | 0.177  | 0.260  | 0.167  |
| / CN10-NB | 0.001  | 0.000  | 0.000  | 0.000  | 0.000  | 0.002  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.001  | 0.000  | 0.000  | 0.000  |
| / CN10-TT | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.004  | 0.000  | 0.000  | 0.000  | 0.001  | 0.000  | 0.000  | 0.000  | 0.000  | 0.001  | 0.002  | 0.004  | 0.000  | 0.000  | 0.000  |
| / CN10-LA | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.001  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.001  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  |
| / JP10-HS | 0.144  | 0.125  | 0.174  | 0.264  | 0.117  | 0.243  | 0.117  | 0.131  | 0.149  | 0.119  | 0.133  | 0.186  | 0.201  | 0.173  | 0.142  | 0.252  | 0.187  | 0.122  | 0.154  | 0.127  |

**Table S3.** (continued)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 　 | KR10-AD | KR10-YC | KR10-SJ | KR11-CW | KR11-SC | CN09-BJ | CN10-TJ | CN11-YT | CN11-HY | CN11-QD | CN11-LY | CN11-RZ | CN11-LG | CN10-SH | CN10-NB | CN10-TT | CN10-LA | JP10-HS |
| / KR06-CA | 0.001  | 0.027  | 0.003  | 0.000  | 0.014  | 0.136  | 0.005  | 0.012  | 0.019  | 0.020  | 0.004  | 0.007  | 0.018  | 0.174  | 0.015  | 0.002  | 0.039  | 0.002  |
| / KR07-SL | 0.027  | 0.077  | 0.048  | 0.000  | 0.039  | 0.169  | 0.011  | 0.048  | 0.015  | 0.116  | 0.108  | 0.042  | 0.078  | 0.260  | 0.002  | 0.003  | 0.024  | 0.004  |
| / KR08-SG | 0.074  | 0.147  | 0.015  | 0.000  | 0.098  | 0.132  | 0.015  | 0.173  | 0.107  | 0.261  | 0.179  | 0.216  | 0.262  | 0.377  | 0.005  | 0.014  | 0.043  | 0.028  |
| / KR09-GG | 0.056  | 0.110  | 0.045  | 0.000  | 0.056  | 0.103  | 0.017  | 0.161  | 0.060  | 0.194  | 0.112  | 0.149  | 0.205  | 0.389  | 0.004  | 0.007  | 0.031  | 0.022  |
| / KR09-JE | 0.080  | 0.145  | 0.031  | 0.000  | 0.148  | 0.137  | 0.011  | 0.241  | 0.107  | 0.300  | 0.198  | 0.252  | 0.290  | 0.466  | 0.007  | 0.007  | 0.027  | 0.021  |
| / KR09-GB | 0.002  | 0.133  | 0.105  | 0.000  | 0.075  | 0.042  | 0.003  | 0.113  | 0.063  | 0.199  | 0.189  | 0.189  | 0.156  | 0.186  | 0.004  | 0.004  | 0.078  | 0.000  |
| / KR09-GW | 0.068  | 0.092  | 0.017  | 0.000  | 0.086  | 0.169  | 0.029  | 0.144  | 0.058  | 0.181  | 0.138  | 0.207  | 0.231  | 0.370  | 0.004  | 0.013  | 0.027  | 0.018  |
| / KR10-SL | 0.096  | 0.105  | 0.038  | 0.000  | 0.131  | 0.126  | 0.012  | 0.202  | 0.084  | 0.258  | 0.194  | 0.196  | 0.264  | 0.396  | 0.002  | 0.009  | 0.035  | 0.006  |
| / KR10-IN | 0.081  | 0.081  | 0.041  | 0.006  | 0.087  | 0.109  | 0.011  | 0.149  | 0.096  | 0.247  | 0.123  | 0.138  | 0.166  | 0.360  | 0.004  | 0.004  | 0.029  | 0.006  |
| / KR10-NY | 0.074  | 0.088  | 0.125  | 0.000  | 0.107  | 0.100  | 0.012  | 0.183  | 0.112  | 0.164  | 0.151  | 0.163  | 0.179  | 0.268  | 0.004  | 0.010  | 0.030  | 0.009  |
| / KR10-SW | 0.063  | 0.062  | 0.033  | 0.000  | 0.087  | 0.104  | 0.010  | 0.101  | 0.043  | 0.178  | 0.110  | 0.139  | 0.193  | 0.364  | 0.002  | 0.006  | 0.033  | 0.002  |
| / KR10-IC | 0.033  | 0.050  | 0.000  | 0.000  | 0.082  | 0.108  | 0.017  | 0.082  | 0.015  | 0.102  | 0.083  | 0.130  | 0.176  | 0.307  | 0.007  | 0.005  | 0.043  | 0.000  |
| / KR10-AS | 0.016  | 0.110  | 0.005  | 0.000  | 0.088  | 0.083  | 0.008  | 0.193  | 0.053  | 0.169  | 0.139  | 0.089  | 0.158  | 0.367  | 0.004  | 0.017  | 0.079  | 0.014  |
| / KR10-CA | 0.037  | 0.081  | 0.007  | 0.000  | 0.031  | 0.117  | 0.013  | 0.080  | 0.022  | 0.112  | 0.067  | 0.056  | 0.135  | 0.304  | 0.003  | 0.007  | 0.024  | 0.002  |
| / KR10-CY | 0.020  | 0.027  | 0.003  | 0.000  | 0.113  | 0.074  | 0.005  | 0.173  | 0.066  | 0.203  | 0.139  | 0.093  | 0.168  | 0.352  | 0.005  | 0.005  | 0.032  | 0.000  |
| / KR10-NS | 0.050  | 0.066  | 0.002  | 0.000  | 0.035  | 0.062  | 0.006  | 0.117  | 0.037  | 0.183  | 0.080  | 0.102  | 0.149  | 0.317  | 0.007  | 0.008  | 0.028  | 0.005  |
| / KR10-GC | 0.011  | 0.043  | 0.011  | 0.000  | 0.014  | 0.045  | 0.002  | 0.029  | 0.009  | 0.043  | 0.023  | 0.050  | 0.100  | 0.166  | 0.004  | 0.006  | 0.018  | 0.001  |
| / KR10-GJ | 0.063  | 0.137  | 0.073  | 0.000  | 0.031  | 0.089  | 0.012  | 0.111  | 0.030  | 0.156  | 0.130  | 0.164  | 0.180  | 0.277  | 0.002  | 0.005  | 0.023  | 0.050  |
| / KR10-BA | 0.034  | 0.050  | 0.010  | 0.000  | 0.045  | 0.069  | 0.003  | 0.150  | 0.102  | 0.244  | 0.100  | 0.172  | 0.224  | 0.437  | 0.005  | 0.013  | 0.053  | 0.000  |
| / KR10-KJ | 0.020  | 0.078  | 0.090  | 0.000  | 0.063  | 0.080  | 0.006  | 0.167  | 0.056  | 0.184  | 0.091  | 0.110  | 0.159  | 0.289  | 0.004  | 0.009  | 0.072  | 0.002  |
| / KR10-AD | **0.358**  | 0.235  | 0.113  | 0.000  | 0.067  | 0.166  | 0.045  | 0.139  | 0.027  | 0.198  | 0.058  | 0.163  | 0.167  | 0.423  | 0.002  | 0.009  | 0.017  | 0.021  |
| / KR10-YC | 0.062  | **0.410**  | 0.045  | 0.000  | 0.051  | 0.125  | 0.006  | 0.079  | 0.034  | 0.154  | 0.070  | 0.180  | 0.161  | 0.291  | 0.002  | 0.003  | 0.018  | 0.011  |
| / KR10-SJ | 0.025  | 0.167  | **0.461**  | 0.000  | 0.040  | 0.049  | 0.002  | 0.218  | 0.115  | 0.249  | 0.102  | 0.220  | 0.132  | 0.335  | 0.006  | 0.017  | 0.142  | 0.001  |
| / KR11-CW | 0.255  | 0.642  | 0.041  | **0.470**  | 0.270  | 0.643  | 0.076  | 0.451  | 0.302  | 0.583  | 0.320  | 0.440  | 0.411  | 0.717  | 0.008  | 0.004  | 0.046  | 0.122  |
| / KR11-SC | 0.002  | 0.001  | 0.000  | 0.000  | **0.424**  | 0.043  | 0.002  | 0.205  | 0.097  | 0.179  | 0.122  | 0.116  | 0.104  | 0.226  | 0.002  | 0.026  | 0.050  | 0.000  |
| / CN09-BJ | 0.000  | 0.000  | 0.000  | 0.000  | 0.001  | **0.361**  | 0.137  | 0.002  | 0.002  | 0.004  | 0.003  | 0.005  | 0.005  | 0.047  | 0.010  | 0.001  | 0.001  | 0.000  |
| / CN10-TJ | 0.004  | 0.012  | 0.000  | 0.000  | 0.005  | 0.476  | **0.442**  | 0.009  | 0.001  | 0.016  | 0.005  | 0.006  | 0.010  | 0.082  | 0.010  | 0.006  | 0.012  | 0.000  |
| / CN11-YT | 0.000  | 0.006  | 0.001  | 0.000  | 0.027  | 0.005  | 0.000  | **0.439**  | 0.128  | 0.135  | 0.034  | 0.049  | 0.043  | 0.112  | 0.004  | 0.012  | 0.062  | 0.000  |
| / CN11-HY | 0.000  | 0.001  | 0.000  | 0.000  | 0.045  | 0.010  | 0.000  | 0.344  | **0.382**  | 0.242  | 0.169  | 0.075  | 0.106  | 0.129  | 0.001  | 0.012  | 0.044  | 0.000  |
| / CN11-QD | 0.012  | 0.024  | 0.022  | 0.000  | 0.066  | 0.036  | 0.001  | 0.233  | 0.185  | **0.398**  | 0.259  | 0.150  | 0.157  | 0.254  | 0.003  | 0.003  | 0.041  | 0.011  |
| / CN11-LY | 0.000  | 0.004  | 0.001  | 0.000  | 0.117  | 0.020  | 0.001  | 0.224  | 0.179  | 0.409  | **0.432**  | 0.232  | 0.221  | 0.212  | 0.001  | 0.003  | 0.028  | 0.000  |
| / CN11-RZ | 0.019  | 0.055  | 0.037  | 0.000  | 0.057  | 0.039  | 0.003  | 0.151  | 0.078  | 0.187  | 0.145  | **0.425**  | 0.226  | 0.149  | 0.001  | 0.007  | 0.010  | 0.000  |
| / CN11-LG | 0.019  | 0.045  | 0.022  | 0.000  | 0.088  | 0.048  | 0.004  | 0.215  | 0.143  | 0.234  | 0.180  | 0.392  | **0.432**  | 0.281  | 0.001  | 0.006  | 0.014  | 0.001  |
| / CN10-SH | 0.027  | 0.059  | 0.007  | 0.000  | 0.095  | 0.119  | 0.011  | 0.152  | 0.123  | 0.210  | 0.103  | 0.139  | 0.201  | **0.363**  | 0.011  | 0.009  | 0.057  | 0.018  |
| / CN10-NB | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | **0.369**  | 0.024  | 0.180  | 0.000  |
| / CN10-TT | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.071  | **0.446**  | 0.345  | 0.000  |
| / CN10-LA | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.000  | 0.029  | 0.042  | **0.371**  | 0.000  |
| / JP10-HS | 0.091  | 0.147  | 0.073  | 0.000  | 0.029  | 0.123  | 0.028  | 0.060  | 0.018  | 0.117  | 0.061  | 0.061  | 0.087  | 0.242  | 0.003  | 0.003  | 0.027  | **0.390**  |

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| Note. | gradient | 0.000  | 0.00  | 　 | 0.090  |  ≥ 0.001 | 0.100  |  ≥ 0.1 | 　 | 0.200  |  ≥ 0.2 | 　 | 0.300  |  ≥ 0.3 | 　 | 0.400  |  ≥ 0.4 | 　 | 0.500  | ≥ 0.5 | 　 | 0.600  |  ≥ 0.6 | 　 | 0.700  |  ≥ 0.7 | 　 | 0.800  | ≥ 0.8 |
|  | /range | 　 | 　 | 　 | 　 |  < 0.1 | 　 | 　 |  < 0.2 | 　 | 　 |  < 0.3 | 　 | 　 |  < 0.4 | 　 | 　 |  < 0.5 | 　 | 　 |  < 0.6 | 　 | 　 |  < 0.7 | 　 | 　 |  < 0.8 | 　 | 　 |   |