**Population genetics of the blueberry gall midge *Dasineura oxycoccana* (Diptera: Cecidomyiidae) on blueberry and cranberry, with testing the invasion scenarios**

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**Supplementary material 2: Tables S1-S4**

**Table S1.** Collection data for 31 different geographical and/or host-associated populations of *Dasineura oxycoccana* collected from blueberry and cranberry in Korea and US analyzed in this study

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Collection No. | Population ID | Country | Host plant | No. of individuals | Collection site | GPS-N | GPS-E | Date (YYYY-MM-DD) |
| 1 | KR-B-UW | KOREA | blueberry | 20 | Uiwang | 37°19'59.8"N | 126°58'52.0"E | 2013-05-15 |
| 2 | KR-B-GJ | KOREA | blueberry | 17 | Gwangju | 37°28'03.4"N | 127°20'14.3"E | 2012-09-27 |
| 3 | KR-B-HS1 | KOREA | blueberry | 23 | Hwaseong | 37°14'13.8"N | 126°42'46.7"E | 2012-06-26 |
| 4 | KR-B-HS2 | KOREA | blueberry | 12 | Hwaseong | 37°09'59.0"N | 126°49'37.5"E | 2012-06-13 |
| 5 | KR-B-KY | KOREA | blueberry | 20 | Koyang | 37°41'34.7"N | 126°42'23.4"E | 2012-07-11 |
| 6 | KR-B-PT | KOREA | blueberry | 2 | Pyeongtataek | 36°59'54.6"N | 127°04'00.4"E | 2012-10-18 |
| 7 | KR-B-HE | KOREA | blueberry | 18 | Hweongseong | 37°27'02.4"N | 128°03'00.7"E | 2012-09-27 |
| 8 | KR-B-CW | KOREA | blueberry | 20 | Cheongwon | 36°44'38.2"N | 127°33'23.3"E | 2012-06-28 |
| 9 | KR-B-YD | KOREA | blueberry | 39 | Yeongdong | 36°05'22.6"N | 127°40'21.7"E | 2012-05-24 |
| 10 | KR-B-DA | KOREA | blueberry | 15 | Dangjin | 36°51'11.4"N | 126°33'09.4"E | 2012-03-23 |
| 11 | KR-B-CA | KOREA | blueberry | 20 | Cheonan | 36°57'18.3"N | 127°11'12.9"E | 2012-06-28 |
| 12 | KR-B-DJ | KOREA | blueberry | 9 | Daejeon | 36°16'05.3"N | 127°19'03.0"E | 2012-09-28 |
| 13 | KR-B-YS | KOREA | blueberry | 8 | Yesan | 36°35'11.7"N | 126°51'09.1"E | 2012-05-29 |
| 14 | KR-B-IS | KOREA | blueberry | 20 | Imsil | 35°35'44.4"N | 127°16'00.2"E | 2013-06-05 |
| 15 | KR-B-SC | KOREA | blueberry | 20 | Sunchang | 35°30'19.1"N | 127°00'09.1"E | 2012-07-03 |
| 16 | KR-B-HW | KOREA | blueberry | 20 | Hwasun | 34°52'24.3"N | 127°02'27.0"E | 2012-07-04 |
| 17 | KR-B-BH1 | KOREA | blueberry | 13 | Bonghwa1 | 36°50'24.4"N | 128°46'04.2"E | 2013-05-19 |
| 18 | KR-B-BH2 | KOREA | blueberry | 7 | Bonghwa2 | 36°50'24.4"N | 128°46'04.2"E | 2013-05-19 |
| 19 | KR-B-SJ | KOREA | blueberry | 31 | Sangju | 36°32'22.2"N | 128°03'28.6"E | 2011-08-10 |
| 20 | KR-B-NH | KOREA | blueberry | 20 | Namhae | 34°49'00.4"N | 127°55'36.0"E | 2012-07-04 |
| 21 | KR-B-JJ1 | KOREA | blueberry | 11 | Jeju | 33°21'60.0"N | 126°21'20.7"E | 2013-07-31 |
| 22 | KR-B-JJ2 | KOREA | blueberry | 19 | Jeju | 33°27'55.4"N | 126°24'29.2"E | 2013-07-10 |
| 23 | US-B-GA1 | USA | blueberry | 8 | Georgia | 31°02'22.6"N | 82°55'55.8"W | 2012-07-06 |
| 24 | US-B-GA2 | USA | blueberry | 9 | Georgia | 31°12'17.5"N | 82°28'28.2"W | 2012-07-07 |
| 25 | US-B-NJ1 | USA | blueberry | 4 | New Jersey | 39°54'59.7"N | 74°35'48.7"W | 2012-07-03 |
| 26 | US-B-NJ2 | USA | blueberry | 32 | New Jersey | 39°35'24.3"N | 74°46'00.4"W | 2012-07-04 |
| 27 | US-B-NJ3 | USA | blueberry | 35 | New Jersey | 39°42'56.6"N | 74°30'59.1"W | 2012-07-04 |
| 28 | US-B-MG | USA | blueberry | 40 | Michigan | 42°50'23.2"N | 86°09'46.9"W | 2013-06-20 |
| 29 | US-C-NJ4 | USA | cranberry | 40 | New Jersey | 39°42'56.6"N | 74°30'59.1"W | 2013-05-30 |
| 30 | US-C-MA | USA | cranberry | 40 | Massachusetts | 41°52'42.2"N | 70°43'47.1"W | 2013-05-23 |
| 31 | US-C-WC | USA | cranberry | 40 | Wisconsin | 44°22'59.9"N | 89°52'17.9"W | 2013-07-23 |

**Table S2.** Pairwise *F*ST divergence between 31 different geographical and/or host-associated populations of *Dasineura oxycoccana* estimated by ARLEQUIN*.* Values are significantly different at significant level, *P* = 0.001 unless (*P* < 0.001) indicated as bold and underlined

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | KR-B-UW | KR-B-GJ | KR-B-HS1 | KR-B-HS2 | KR-B-KY | KR-B-PT | KR-B-HE | KR-B-CW | KR-B-YD | KR-B-DA | KR-B-CA | KR-B-DJ | KR-B-YS | KR-B-IS | KR-B-SC | KR-B-HW | KR-B-BH1 | KR-B-BH2 | KR-B-SJ | KR-B-NH | KR-B-JJ1 | KR-B-JJ2 | US-B-GA1 | US-B-GA2 | US-B-NJ1 | US-B-NJ2 | US-B-NJ3 | US-B-MG | US-C-NJ4 | US-C-MA |
| KR-B-GJ | 0.092 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-HS1 | 0.059 | 0.075 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-HS2 | 0.097 | 0.006 | 0.057 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-KY | 0.019 | 0.085 | 0.064 | 0.107 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-PT | 0.128 | **-0.024** | 0.113 | 0.054 | 0.117 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-HE | 0.202 | 0.121 | 0.223 | 0.172 | 0.213 | 0.161 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-CW | 0.013 | 0.051 | 0.034 | 0.072 | 0.009 | 0.102 | 0.202 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-YD | 0.024 | 0.093 | 0.052 | 0.104 | 0.031 | 0.113 | 0.217 | 0.036 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-DA | 0.058 | 0.020 | 0.028 | 0.012 | 0.044 | 0.078 | 0.192 | 0.030 | 0.064 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-CA | 0.168 | 0.094 | 0.193 | 0.140 | 0.190 | 0.147 | 0.033 | 0.175 | 0.189 | 0.162 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-DJ | 0.027 | 0.148 | 0.107 | 0.134 | 0.047 | 0.175 | 0.244 | 0.049 | 0.072 | 0.077 | 0.228 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-YS | 0.064 | **-0.018** | 0.071 | 0.042 | 0.054 | 0.034 | 0.165 | 0.021 | 0.079 | 0.013 | 0.138 | 0.096 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-IS | **0.006** | 0.118 | 0.061 | 0.125 | **0.008** | 0.161 | 0.231 | 0.015 | 0.032 | 0.067 | 0.206 | 0.041 | 0.078 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-SC | 0.017 | 0.043 | 0.043 | 0.054 | 0.020 | 0.108 | 0.173 | **0.001** | 0.031 | 0.020 | 0.142 | 0.067 | 0.025 | 0.029 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-HW | 0.013 | 0.086 | 0.040 | 0.078 | 0.031 | 0.120 | 0.222 | 0.014 | 0.033 | 0.034 | 0.193 | 0.027 | 0.040 | 0.020 | 0.020 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-BH1 | 0.115 | 0.072 | 0.152 | 0.117 | 0.136 | 0.123 | 0.177 | 0.111 | 0.114 | 0.118 | 0.144 | 0.176 | 0.082 | 0.145 | 0.101 | 0.108 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-BH2 | 0.157 | 0.084 | 0.173 | 0.135 | 0.172 | 0.104 | 0.094 | 0.154 | 0.164 | 0.143 | 0.036 | 0.216 | 0.116 | 0.191 | 0.140 | 0.176 | 0.141 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-SJ | 0.102 | **-0.033** | 0.084 | 0.022 | 0.082 | **0.002** | 0.150 | 0.073 | 0.096 | 0.033 | 0.131 | 0.131 | 0.006 | 0.109 | 0.061 | 0.091 | 0.078 | 0.118 |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-NH | 0.052 | 0.095 | 0.062 | 0.112 | 0.031 | 0.103 | 0.236 | 0.033 | 0.053 | 0.059 | 0.213 | 0.077 | 0.065 | 0.053 | 0.062 | 0.049 | 0.153 | 0.190 | 0.101 |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-JJ1 | 0.056 | 0.096 | 0.089 | 0.121 | 0.058 | **0.080** | 0.178 | 0.050 | 0.042 | 0.087 | 0.163 | 0.091 | 0.079 | 0.061 | 0.057 | 0.061 | 0.079 | 0.134 | 0.095 | 0.064 |  |  |  |  |  |  |  |  |  |  |
| KR-B-JJ2 | 0.241 | 0.155 | 0.253 | 0.228 | 0.261 | 0.193 | 0.227 | 0.239 | 0.242 | 0.238 | 0.209 | 0.298 | 0.210 | 0.266 | 0.239 | 0.269 | 0.191 | 0.201 | 0.198 | 0.275 | 0.246 |  |  |  |  |  |  |  |  |  |
| US-B-GA1 | 0.200 | 0.158 | 0.236 | 0.212 | 0.225 | 0.181 | 0.214 | 0.212 | 0.211 | 0.219 | 0.196 | 0.261 | 0.196 | 0.232 | 0.204 | 0.238 | 0.204 | 0.194 | 0.183 | 0.250 | 0.222 | 0.115 |  |  |  |  |  |  |  |  |
| US-B-GA2 | 0.195 | 0.103 | 0.203 | 0.154 | 0.227 | 0.141 | 0.203 | 0.196 | 0.210 | 0.178 | 0.165 | 0.269 | 0.165 | 0.241 | 0.181 | 0.222 | 0.196 | 0.184 | 0.142 | 0.235 | 0.230 | 0.142 | 0.134 |  |  |  |  |  |  |  |
| US-B-NJ1 | 0.078 | 0.087 | 0.132 | 0.124 | 0.116 | 0.121 | 0.120 | 0.091 | 0.108 | 0.115 | 0.107 | 0.120 | 0.087 | 0.102 | 0.082 | 0.106 | 0.082 | 0.089 | 0.104 | 0.123 | 0.085 | 0.170 | 0.142 | 0.166 |  |  |  |  |  |  |
| US-B-NJ2 | 0.091 | 0.052 | 0.117 | 0.096 | 0.122 | 0.077 | 0.128 | 0.099 | 0.107 | 0.096 | 0.111 | 0.127 | 0.081 | 0.114 | 0.088 | 0.109 | 0.087 | 0.095 | 0.087 | 0.129 | 0.090 | 0.178 | 0.150 | 0.161 | 0.046 |  |  |  |  |  |
| US-B-NJ3 | 0.098 | 0.060 | 0.102 | 0.094 | 0.118 | 0.090 | 0.137 | 0.098 | 0.105 | 0.085 | 0.125 | 0.128 | 0.078 | 0.115 | 0.081 | 0.111 | 0.104 | 0.112 | 0.087 | 0.141 | 0.098 | 0.186 | 0.166 | 0.165 | 0.077 | 0.021 |  |  |  |  |
| US-B-MG | 0.167 | 0.104 | 0.196 | 0.158 | 0.187 | 0.148 | 0.052 | 0.174 | 0.185 | 0.166 | 0.036 | 0.222 | 0.141 | 0.195 | 0.151 | 0.192 | 0.123 | 0.060 | 0.136 | 0.213 | 0.156 | 0.185 | 0.171 | 0.169 | 0.095 | 0.099 | 0.115 |  |  |  |
| US-C-NJ4 | 0.257 | 0.183 | 0.272 | 0.247 | 0.266 | 0.223 | 0.243 | 0.259 | 0.255 | 0.255 | 0.221 | 0.307 | 0.235 | 0.281 | 0.258 | 0.284 | 0.214 | 0.209 | 0.217 | 0.288 | 0.257 | 0.169 | 0.222 | 0.265 | 0.222 | 0.195 | 0.196 | 0.209 |  |  |
| US-C-MA | 0.279 | 0.213 | 0.306 | 0.285 | 0.300 | 0.273 | 0.268 | 0.291 | 0.283 | 0.289 | 0.242 | 0.339 | 0.249 | 0.300 | 0.272 | 0.308 | 0.245 | 0.265 | 0.238 | 0.336 | 0.303 | 0.229 | 0.267 | 0.301 | 0.245 | 0.220 | 0.213 | 0.235 | 0.121 |  |
| US-C-WC | 0.329 | 0.256 | 0.351 | 0.333 | 0.355 | 0.339 | 0.308 | 0.340 | 0.328 | 0.340 | 0.278 | 0.398 | 0.305 | 0.352 | 0.325 | 0.357 | 0.279 | 0.309 | 0.281 | 0.379 | 0.356 | 0.238 | 0.310 | 0.336 | 0.290 | 0.257 | 0.252 | 0.272 | 0.121 | 0.076 |

**Table S3.** Results of the bottleneck test based on the two mutation models, SMM and TPM, using a nonparametric Wilcoxon signed-rank test. Values in bold indicate detection of the genetic bottleneck (*P* < 0.001, one tail for heterozygote excess)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Pop. ID | No. | Wilcoxon signed-rank tests | | Mode shift |
| TPM | SMM |
| KR-B-UW | 20 | 0.42505 | 0.95386 | normal |
| KR-B-GJ | 17 | 0.99768 | 1.00000 | normal |
| **KR-B-HS1** | **23** | **0.01709** | **0.04614** | **normal** |
| KR-B-HS2 | 12 | 0.68896 | 0.94507 | normal |
| KR-B-KY | 20 | 0.15063 | 0.78809 | normal |
| KR-B-PT | 2 | n/a | n/a | n/a |
| KR-B-HE | 18 | 0.15063 | 0.98291 | normal |
| KR-B-CW | 20 | 0.25928 | 0.96143 | normal |
| KR-B-YD | 39 | 0.95386 | 0.99988 | normal |
| KR-B-DA | 15 | 0.21191 | 0.66138 | normal |
| KR-B-CA | 20 | 0.05493 | 0.80981 | normal |
| KR-B-DJ | 9 | 0.04614 | 0.42505 | shifted |
| KR-B-YS | 8 | n/a | n/a | n/a |
| KR-B-IS | 20 | 0.42505 | 0.97876 | normal |
| KR-B-SC | 20 | 0.63330 | 0.97388 | normal |
| **KR-B-HW** | **20** | **0.00232** | **0.04614** | **shifted** |
| KR-B-BH1 | 13 | 0.91187 | 0.99829 | normal |
| KR-B-BH2 | 7 | 0.02612 | 0.23486 | normal |
| KR-B-SJ | 31 | 0.36670 | 0.99915 | normal |
| KR-B-NH | 20 | 0.13306 | 0.57495 | normal |
| KR-B-JJ1 | 11 | 0.48486 | 0.89819 | normal |
| KR-B-JJ2 | 19 | 0.39551 | 0.95386 | normal |
| US-B-GA1 | 8 | 0.03857 | 0.16968 | shifted |
| US-B-GA2 | 9 | 0.45483 | 0.78809 | normal |
| US-B-NJ1 | 4 | 0.23486 | 0.51514 | shifted |
| US-B-NJ2 | 32 | 0.95386 | 0.99988 | normal |
| US-B-NJ3 | 35 | 0.74072 | 0.98291 | normal |
| US-B-MG | 40 | 0.83032 | 0.99939 | normal |
| US-C-NJ4 | 40 | 0.97388 | 0.99939 | normal |
| US-C-MA | 40 | 0.76758 | 0.99390 | normal |
| US-C-WC | 40 | 0.96802 | 0.99695 | normal |

**Table S4.** Mean assignment rate of 632 *Dasineura oxycoccana* individuals of 31 different geographical and/or host-associated populations into (rows) and from (columns) each population using GENECLASS2. Values in bold and underline indicate the proportions of individuals assigned to the source population (i.e. self-assignment). Values in bold and red indicate the proportions of individuals assigned to the most likely source except for the self-assignment (i.e. the most likely origin). Zero values were excluded from the table.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | KR-B-UW | KR-B-GJ | KR-B-HS1 | KR-B-HS2 | KR-B-KY | KR-B-PT | KR-B-HE | KR-B-CW | KR-B-YD | KR-B-DA | KR-B-CA | KR-B-DJ | KR-B-YS | KR-B-IS | KR-B-SC | KR-B-HW | KR-B-BH1 | KR-B-BH2 | KR-B-SJ | KR-B-NH | KR-B-JJ1 | KR-B-JJ2 | US-B-GA1 | US-B-GA2 | US-B-NJ1 | US-B-NJ2 | US-B-NJ3 | US-B-MG | US-C-NJ4 | US-C-MA | US-C-WC |
| **KOREA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| KR-B-UW | **0.493** | 0.010 |  |  | 0.126 |  |  | 0.128 | 0.227 | 0.024 |  | 0.031 | 0.033 | **0.318** | 0.175 |  |  |  | 0.019 | 0.011 | 0.143 |  |  |  | 0.068 | 0.025 |  |  |  |  |  |
| KR-B-GJ | 0.008 | **0.572** | 0.017 | 0.098 | 0.011 | 0.302 |  | 0.038 | 0.021 | 0.095 |  |  | 0.153 |  | 0.071 |  | 0.027 |  | **0.349** |  |  |  |  | 0.027 | 0.097 | 0.041 | 0.034 |  |  |  |  |
| KR-B-HS1 | 0.345 | 0.122 | **0.499** | 0.391 | 0.126 | 0.015 |  | 0.441 | 0.287 | **0.445** |  |  | 0.233 | 0.292 | 0.400 | 0.108 |  |  | 0.274 | 0.081 | 0.089 |  |  |  | 0.067 | 0.114 | 0.050 |  |  |  |  |
| KR-B-HS2 | 0.023 | **0.350** | 0.012 | **0.319** | 0.006 | 0.027 |  | 0.048 | 0.017 | 0.114 |  |  | 0.221 |  | 0.158 |  | 0.014 |  | 0.404 |  |  |  |  |  | 0.058 | 0.077 | 0.041 |  |  |  |  |
| KR-B-KY | 0.540 | 0.093 | 0.054 | 0.078 | **0.481** |  |  | **0.561** | 0.468 | 0.153 |  | 0.071 | 0.225 | 0.488 | 0.542 | 0.094 | 0.025 |  | 0.223 | 0.142 | 0.255 |  |  |  | 0.090 | 0.160 | 0.031 |  |  |  |  |
| KR-B-PT |  | **0.769** |  | 0.063 |  | **0.000** |  |  |  |  |  |  | 0.346 |  | 0.037 |  | 0.027 |  | 0.293 |  |  |  |  |  | 0.065 | 0.044 |  |  |  |  |  |
| KR-B-HE |  |  |  |  |  |  | **0.470** |  |  |  | 0.183 |  | 0.000 |  |  |  |  | 0.054 |  |  |  |  |  |  | 0.038 |  |  | **0.474** |  |  |  |
| KR-B-CW | 0.275 | 0.065 | 0.023 | 0.070 | 0.200 |  |  | **0.425** | 0.260 | 0.132 |  | 0.020 | 0.296 | 0.237 | **0.432** | 0.031 |  |  | 0.115 | 0.039 | 0.139 |  |  |  | 0.100 | 0.183 | 0.057 |  |  |  |  |
| KR-B-YD | **0.477** | 0.029 | 0.059 | 0.033 | 0.210 |  |  | 0.279 | **0.568** | 0.080 |  | 0.040 | 0.080 | 0.357 | 0.377 | 0.109 | 0.003 |  | 0.041 | 0.091 | 0.307 |  |  |  | 0.066 | 0.091 | 0.038 |  |  |  |  |
| KR-B-DA | 0.176 | 0.216 | 0.138 | 0.302 | 0.111 | 0.011 |  | 0.205 | 0.148 | **0.396** |  | 0.017 | 0.252 | 0.146 | 0.269 | 0.113 | 0.023 |  | **0.287** | 0.122 | 0.071 |  |  |  | 0.060 | 0.184 | 0.051 |  |  |  |  |
| KR-B-CA |  |  |  |  |  |  | 0.058 |  |  |  | **0.388** |  |  |  |  |  |  | 0.165 |  |  |  |  |  |  | 0.029 |  |  | **0.509** |  |  |  |
| KR-B-DJ | **0.708** | 0.058 | 0.016 | 0.079 | 0.241 |  |  | 0.445 | 0.373 | 0.082 |  | **0.469** | 0.146 | 0.505 | 0.380 | 0.023 |  |  | 0.181 | 0.011 | 0.194 |  |  |  | 0.132 | 0.255 | 0.081 |  |  |  |  |
| KR-B-YS | 0.044 | **0.408** | 0.016 | 0.171 | 0.070 | 0.116 |  | 0.189 | 0.055 | 0.120 |  |  | **0.316** | 0.026 | 0.266 |  | 0.048 | 0.012 | 0.359 | 0.010 | 0.012 |  |  |  | 0.143 | 0.168 | 0.038 |  |  |  |  |
| KR-B-IS | **0.573** | 0.013 | 0.038 | 0.015 | 0.212 |  |  | 0.226 | 0.323 | 0.051 |  | 0.033 | 0.053 | **0.503** | 0.230 | 0.054 |  |  | 0.025 | 0.067 | 0.241 |  |  |  | 0.078 | 0.060 |  |  |  |  |  |
| KR-B-SC | **0.272** | 0.088 |  | 0.052 | 0.129 | 0.021 |  | 0.287 | 0.256 | 0.092 |  | 0.008 | 0.146 | 0.168 | **0.451** | 0.012 | 0.011 |  | 0.101 | 0.032 | 0.120 |  |  |  | 0.088 | 0.140 | 0.082 |  |  |  |  |
| KR-B-HW | **0.671** | 0.131 | 0.176 | 0.176 | 0.423 | 0.015 |  | 0.590 | 0.572 | 0.301 |  | 0.064 | 0.348 | 0.571 | 0.584 | **0.473** | 0.014 |  | 0.226 | 0.164 | 0.241 |  |  |  | 0.167 | 0.260 | 0.052 |  |  |  |  |
| KR-B-BH1 |  | 0.067 |  | 0.015 |  | 0.083 |  |  | 0.011 |  |  |  | 0.062 |  |  |  | **0.394** |  | 0.023 |  |  |  |  |  | **0.085** | 0.014 |  |  |  |  |  |
| KR-B-BH2 |  |  |  |  |  |  |  |  |  |  | 0.075 |  |  |  |  |  |  | **0.241** |  |  |  |  |  |  | 0.019 |  |  | **0.214** |  |  |  |
| KR-B-SJ |  | **0.411** |  | 0.130 | 0.006 | 0.084 |  | 0.013 | 0.019 | 0.046 |  |  | 0.179 | 0.004 | 0.064 |  | 0.026 |  | **0.496** |  |  |  |  |  | 0.054 | 0.064 | 0.030 |  |  |  |  |
| KR-B-NH | 0.452 | 0.122 | 0.075 | 0.118 | 0.297 |  |  | 0.445 | 0.446 | 0.233 |  | 0.042 | 0.224 | 0.358 | **0.455** | 0.123 |  |  | 0.176 | **0.499** | 0.235 |  |  |  | 0.117 | 0.177 | 0.020 |  |  |  |  |
| KR-B-JJ1 | 0.104 | 0.021 |  | 0.010 | 0.026 |  |  | 0.044 | **0.174** |  |  | 0.005 | 0.023 | 0.075 | 0.108 |  | 0.025 |  | 0.016 |  | **0.299** |  |  |  | 0.092 | 0.058 | 0.011 |  |  |  |  |
| KR-B-JJ2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **0.383** |  |  | 0.029 |  |  |  |  |  |  |
| **USA** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| US-B-GA1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **0.288** |  |  |  |  |  |  |  |  |
| US-B-GA2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **0.348** | 0.010 |  |  |  |  |  |  |
| US-B-NJ1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **0.080** | 0.103 |  |  |  |  |  |
| US-B-NJ2 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.049 | **0.344** | **0.150** |  |  |  |  |
| US-B-NJ3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.020 | **0.230** | **0.419** |  |  |  |  |
| US-B-MG |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **0.043** |  |  |  |  |  |  | 0.043 |  |  | **0.489** |  |  |  |
| US-C-NJ4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.019 |  |  |  | **0.492** | 0.017 | **0.022** |
| US-C-MA |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.027 |  |  |  | **0.168** | **0.506** | 0.041 |
| US-C-WC |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 0.038 |  |  |  | 0.262 | **0.268** | **0.580** |