|  |
| --- |
| Table S1. Taxonomic keys of *Tuberculatus* aphid species used in this study |
| Ant-attended | Host plant1 | Body color of viviparous alate adult | A pair of spinal abdominal processes | The necessity of sequence2 |
| *T. capitatus* | *Q. acutissima*, *Q. variabilis* | Pale green,Pale yellow | Medium |  |
| *T. fulviabdominalis* | *Q. dentata*,*Q. serrata* | Citron green | Medium | Yes |
| *T. indicus* | *Q. serrata,**Q. aliena* var. *pellucida* | Citron green | Medium | Yes |
| *T. kuricola* | *C. crenata* | Brown, Gray, Yellow | Inconspicuous |  |
| *T. macrotuberculatus* | *Q. dentata* | Dark green | Medium |  |
| *T. pappus* | *Q. mongolica* | Yellow-green | Medium |  |
| *T. pilosulus* | *Q. serrata* | Citron green | Medium | Yes |
| *T. quercicola* | *Q. crispula*, *Q. mongolica* | Grayish green | Medium |  |
| *T. stigmatus* | *Q. serrata*,*Q. dentata* | Black | Conspicuous |  |
| *T.* sp. B | *Q. dentata* | Pale gray | Medium |  |
| *T.* sp. E | *Q. serrata* | Yellow-green | Medium |  |
| Non-attended |  |  |  |  |
| *T. higuchii* A-type | *Q. crispula,* *Q. serrata*,*Q. dentata,* *Q. aliena* | Pale yellow | Conspicuous | Yes |
| *T. higuchii* B-type | *Q. crispula* | Pale yellow | Conspicuous | Yes |
| *T. japonicus* | *Q. dentata* | Olive green | Medium |  |
| *T. kashiwae* A-type | *Q. crispula* | Pale yellow | Inconspicuous | Yes |
| *T. kashiwae* B-type | *Q. crispula* | Pale yellow | Inconspicuous | Yes |
| *T. paiki* | *Q. dentata* | Pale yellow | Medium |  |
| *T. pilosus* | *Q. phillyraeoides*, *Q. glauca*,*L. edulis* | Brown, Gray | Conspicuous |  |
| *T. querciformosanus* | *Q. dentata* | Pale yellow | Conspicuous |  |
| *T. yokoyamai* | *Q. dentata* | Pale yellow | Medium | Yes |
| *T*. sp. C | *Q. dentata* | Citron green | Medium |  |
| *T*. sp. D | *Q. dentata* | Pale yellow | Medium | Yes |
| *T*. sp. F | *Q. mongolica* | Pale yellow | Medium | Yes |
| (Note) 1. Genus of the host plant, *C*, *L*, and *Q*, stand for *Castanea*, *Lithocarpus*, and *Quercus*.2. For sequence, the barcoding region was amplified using the primer pairs of *LCO1490* and *HCO2198* (Table 2). |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Table S2. Collection sites of *Tuberculatus* aphid species |  |  |  |  |  |  |
| Species | 　 | Place | City/Town | Country/Prefecture | Host plant1 | *N*2 | Collector3 | *Wol*+4 | Sequence5 |
| *T. capitatus* | 1 | Arafuneko | Shimonita | Gunma | *Q. acutissima* | 4 | TK | 4 |  |
|  | 2 | Hora | Matsumoto | Nagano | *Q. acutissima* | 7 | IY | 7 |  |
|  | 3 | Saitamashintoshin | Saitama | Saitama | *Q. acutissima* | 2 | SS | 2 |  |
|  | 4 | Ome | Koto-ku | Tokyo | *Q. acutissima* | 2 | SS | 2 |  |
|  | 5 | Shimomizo | Sagamihara | Kanagawa | *Q. acutissima* | 3 | SS | 3 |  |
|  | 6 | Kariba | Yokohama | Kanagawa | *Q. acutissima* | 3 | SS | 3 |  |
|  | 7 | Honmoku | Yokohama | Kanagawa | *Q. acutissima* | 3 | SS | 3 |  |
|  | 8 | Soya | Hadano | Kanagawa | *Q. acutissima* | 3 | SS | 3 |  |
|  | 9 | Syonandaira | Hiratsuka | Kanagawa | *Q. acutissima* | 3 | SS | 3 | \* |
|  | 10 | Koyaike park | Itami | Hyogo | *Q. variabilis* | 3 | SS | 3 | \* |
|  | 11 | Kabutoyama park | Nishinomiya | Hyogo | *Q. acutissima* | 4 | SS | 2 |  |
|  | 12 | Ohkurayama park | Kobe | Hyogo | *Q. acutissima* | 7 | SS | 6 | \* |
|  | 13 | Onohama | Kobe | Hyogo | *Q. acutissima* | 3 | SS | 3 |  |
|  | 14 | Minatojima-minamimachi | Kobe | Hyogo | *Q. acutissima* | 5 | SS | 5 |  |
| 　 | 15 | Takatsu | Masuda | Shimane | *Q. acutissima* | 4 | IY | 4 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 56 | 　 | 53 | 　 |
| *T. fulviabdominalis* | 1 | Higashimachi | Shikaoi | Hokkaido | *Q. dentata* | 4 | IY | 0 |  |
|  | 2 | Fuchumachi | Botanic gardens | Toyama | *Q. dentata* | 4 | IY | 0 |  |
|  | 3 | Shimokawai | Nasukarasuyama | Tochigi | *Q. serrata* | 1 | SS | 0 |  |
|  | 4 | Tsukinami | Nasukarasuyama | Tochigi | *Q. serrata* | 1 | SS | 0 |  |
|  | 5 | Akashina-higashikawate | Azumino | Nagano | *Q. dentata* | 3 | IY | 0 |  |
|  | 6 | Honmoku | Yokohama | Kanagawa | *Q. serrata* | 3 | SS | 0 |  |
|  | 7 | Tsutsuzaki | Tsushima | Nagasaki | *Q. dentata* | 19 | IY | 6 | \* |
| 　 | 8 | Daiho | Goto | Nagasaki | *Q. dentata* | 20 | IY | 6 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 55 | 　 | 12 | 　 |
| *T. indicus* | 1 | Suibun | Minamikawachi | Osaka | *Q. serrata* | 8 | SS | 0 |  |
|  | 2 | Kabutoyama forest park | Nishinomiya | Hyogo | *Q. aliena var. pellucida* | 4 | SS | 0 |  |
|  | 3 | Hodenbashi | Nishinomiya | Hyogo | *Q. serrata* | 3 | SS | 0 |  |
|  | 4 | Kamitanigami | Kobe | Hyogo | *Q. serrata* | 5 | SS | 0 |  |
|  | 5 | Tanigami | Kobe | Hyogo | *Q. serrata* | 3 | SS | 0 |  |
|  | 6 | Rokkosan | Kobe | Hyogo | *Q. serrata* | 5 | SS | 0 |  |
|  | 7 | Kano | Kobe | Hyogo | *Q. serrata* | 8 | SS | 0 |  |
|  | 8 | Minatojima-minamimachi | Kobe | Hyogo | *Q. serrata* | 5 | SS | 0 |  |
|  | 9 | Hokudan | Awaji | Hyogo | *Q. serrata* | 1 | IY | 0 |  |
|  | 10 | Seita | Kitakyushu | Fukuoka | *Q. serrata* | 3 | SS | 0 |  |
| 　 | 11 | Kasuya research forest | Sasaguri | Fukuoka | *Q. serrata* | 8 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 53 | 　 | 0 | 　 |
| *T. kuricola* | 1 | Shojinzawa | Shioya | Tochigi | *C. crenata* | 4 | SS | 1 | \* |
|  | 2 | Senoo | Nikko | Tochigi | *C. crenata* | 6 | SS | 5 |  |
|  | 3 | Yatsuomachi | Toyama | Toyama | *C. crenata* | 4 | IY | 1 | \* |
|  | 4 | Shimomizo | Sagamihara | Kanagawa | *C. crenata* | 5 | SS | 0 |  |
|  | 5 | Kojiri | hakonemachi | Kanagawa | *C. crenata* | 10 | SS | 0 |  |
|  | 6 | Kabutoyama forest park | Nishinomiya | Hyogo | *C. crenata* | 7 | SS | 0 |  |
|  | 7 | Dojyo | Kobe | Hyogo | *C. crenata* | 3 | SS | 2 |  |
|  | 8 | Shimotanigami | Kobe | Hyogo | *C. crenata* | 8 | SS | 0 |  |
|  | 9 | Rokkosan | Kobe | Hyogo | *C. crenata* | 4 | SS | 3 |  |
|  | 10 | Motoyama | Kobe | Hyogo | *C. crenata* | 3 | SS | 3 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 54 | 　 | 15 | 　 |
| *T. macrotuberculatus* | 1 |  | Teshio | Hokkaido | *Q. dentata* | 2 | IY | 2 | \* |
|  | 2 |  | Tomamae | Hokkaido | *Q. dentata* | 2 | IY | 2 | \* |
|  | 3 | Osyoro | Otaru | Hokkaido | *Q. dentata* | 2 | IY | 2 | \* |
|  | 4 | Shinko-higashi | Ishikari | Hokkaido | *Q. dentata* | 2 | IY | 2 | \* |
|  | 5 |  | Obihiro | Hokkaido | *Q. dentata* | 2 | MS | 2 | \* |
|  | 6 | Bansei | Taiki | Hokkaido | *Q. dentata* | 2 | IY | 2 | \* |
|  | 7 |  | Mukawa | Hokkaido | *Q. dentata* | 2 | IY | 2 | \* |
|  | 8 |  | Erimo | Hokkaido | *Q. dentata* | 2 | IY | 2 | \* |
|  | 9 | Esanmisaki | Hakodate | Hokkaido | *Q. dentata* | 2 | IY | 0 |  |
|  | 10 | Kidzukuri | Tsugaru | Aomori | *Q. dentata* | 2 | IY | 0 |  |
|  | 11 | Kitaura-nyudozaki | Oga | Akita | *Q. dentata* | 2 | IY | 0 |  |
|  | 12 |  | Kisakata | Akita | *Q. dentata* | 2 | IY | 0 |  |
|  | 13 | Iwagasaki | Murakami | Niigata | *Q. dentata* | 2 | IY | 0 |  |
|  | 14 | Maze | Nishikanku | Niigata | *Q. dentata* | 2 | IY | 0 |  |
|  | 15 |  | Kashiwazaki | Niigata | *Q. dentata* | 2 | IY | 0 |  |
|  | 16 | Hodatsushimizu | Hakui | Ishikawa | *Q. dentata* | 4 | IY | 0 |  |
|  | 17 | Hora | Matsumoto | Nagano | *Q. dentata* | 2 | IY | 0 |  |
|  | 18 | Kashiwanoha | Kashiwa | Chiba | *Q. dentata* | 2 | IY | 0 |  |
|  | 19 | Aoya | Tottori | Tottori | *Q. dentata* | 1 | IY | 0 |  |
|  | 20 | Toyofusa | Daisen | Tottori | *Q. dentata* | 2 | IY | 0 |  |
|  | 21 | Hiruzen-kamifukuda | Maniwa | Okayama | *Q. dentata* | 1 | IY | 0 |  |
|  | 22 | Yufu | Beppu | Oita | *Q. dentata* | 8 | IY | 8 | \* |
| 　 | 23 | Tano | Kokonoe | Oita | *Q. dentata* | 4 | IY | 4 | \* |
| 　 | 　 | 　 | 　 | 　 | 　 | 54 | 　 | 28 | 　 |
| *T. pappus* | 1 | Mt. Kariwangsan | Gangwon | South Korea | *Q. mongolica* | 10 | IY | 0 | 　 |
| *T. pilosulus* | 1 | Sugasato | Yuzamachi | Yamagata | *Q. serrata* | 5 | IY | 0 |  |
|  | 2 | Nadachitanihama | Joetsu | Niigata | *Q. serrata* | 3 | SS | 0 |  |
|  | 3 | Senoo | Nikko | Tochigi | *Q. serrata* | 8 | SS | 0 |  |
|  | 4 |  | Nasukarasuyama | Tochigi | *Q. serrata* | 2 | SS | 0 |  |
|  | 5 | Hora | Matsumoto | Nagano | *Q. serrata* | 2 | IY | 0 |  |
|  | 6 | Shintoshin | Saitama | Saitama | *Q. serrata* | 6 | SS | 0 |  |
|  | 7 | Ome | Koto-ku | Tokyo | *Q. serrata* | 5 | SS | 0 |  |
|  | 8 | Honmoku | Yokohama | Kanagawa | *Q. serrata* | 2 | SS | 0 |  |
|  | 9 | Soya | Hadano | Kanagawa | *Q. serrata* | 4 | SS | 0 |  |
|  | 10 | Syonandaira | Hiratsuka | Kanagawa | *Q. serrata* | 5 | SS | 0 |  |
|  | 11 | Kojiri | hakonemachi | Kanagawa | *Q. serrata* | 6 | SS | 0 |  |
|  | 12 | Amanoyama | Kawachinagano | Osaka | *Q. serrata* | 5 | SS | 0 |  |
|  | 13 | Kabutoyama forest park | Nishinomiya | Hyogo | *Q. serrata* | 3 | SS | 0 |  |
|  | 14 | Minatojima-minamimachi | Kobe | Hyogo | *Q. serrata* | 12 | SS | 0 |  |
|  | 15 | Saikaibashi Park | Sasebo | Nagasaki | *Q. serrata* | 7 | IY | 1 | \* |
| 　 | 16 | Yufudake PA | Yufu | Oita | *Q. serrata* | 4 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 79 | 　 | 1 | 　 |
| *T. quercicola* | 1 | Notoroko | Abashiri | Hokkaido | *Q. mongolica* | 12 | IY | 6 |  |
|  | 2 | Ikushina | Shari | Hokkaido | *Q. mongolica* | 9 | IY | 1 |  |
|  | 3 | Poroshiri Park | Obihiro | Hokkaido | *Q. crispula* | 9 | IY | 0 |  |
|  | 4 | Biman | Shimizu | Hokkaido | *Q. crispula* | 2 | IY | 0 |  |
|  | 5 |  | Tomakomai | Hokkaido | *Q. crispula* | 2 | IY | 0 |  |
|  | 6 |  | Iwamizawa | Hokkaido | *Q. crispula* | 1 | SA | 1 | \* |
|  | 7 | Nishinopporo | Ebetsu | Hokkaido | *Q. crispula* | 9 | IY | 0 |  |
|  | 8 | Hitsujigaoka | Sapporo | Hokkaido | *Q. mongolica* | 3 | IY | 0 |  |
|  | 9 | Shikabe | Kayabe | Hokkaido | *Q. crispula* | 4 | IY | 0 |  |
|  | 10 | Towadako | Towada | Aomori | *Q. crispula* | 2 | SS | 0 |  |
| 　 | 11 | Omoshirokogen | Yamagata | Yamagata | *Q. crispula* | 1 | IO | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 54 | 　 | 8 | 　 |
| *T. stigmatus* | 1 |  | Kamishihoro | Hokkaido | *Q. dentata* | 2 | AO | 0 |  |
|  | 2 |  | Moriya | Ibaraki | *Q. serrata* | 2 | SS | 0 |  |
|  | 3 |  | Nasukarasuyama | Tochigi | *Q. serrata* | 2 | SS | 0 |  |
|  | 4 | Noro | Chiba | Chiba | *Q. serrata* | 7 | SS | 0 |  |
|  | 5 | Azumano | Yokohama | Kanagawa | *Q. serrata* | 3 | SS | 2 |  |
|  | 6 | Hitorizawa | Yokohama | Kanagawa | *Q. serrata* | 3 | SS | 0 |  |
|  | 7 | Shimomizo | Sagamihara | Kanagawa | *Q. serrata* | 2 | SS | 0 |  |
|  | 8 | Honmoku | Yokohama | Kanagawa | *Q. serrata* | 2 | SS | 0 |  |
|  | 9 |  | Koya | Wakayama | *Q. serrata* | 6 | SS | 3 | \* |
|  | 10 |  | Takeno | Hyogo | *Q. serrata* | 2 | KF | 0 |  |
|  | 11 | Kabutoyama forest park | Nishinomiya | Hyogo | *Q. serrata* | 2 | SS | 0 |  |
|  | 12 | Mayasan | Kobe | Hyogo | *Q. serrata* | 3 | SS | 0 |  |
|  | 13 | Minatojima-minamimachi | Kobe | Hyogo | *Q. serrata* | 2 | SS | 0 |  |
|  | 14 |  |  | Shimane | *Q. serrata* | 6 | IY | 6 |  |
| 　 | 15 | Daiho | Goto | Nagasaki | *Q. dentata* | 12 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 56 | 　 | 11 | 　 |
| *T*. sp. B | 1 | Sanrihama | Saroma | Hokkaido | *Q. dentata* | 12 | IY | 12 | \* |
|  | 2 | Kashiwa Park | Biei | Hokkaido | *Q. dentata* | 6 | IY | 6 |  |
|  | 3 | Biman | Shimizu | Hokkaido | *Q. dentata* | 1 | TH | 1 |  |
| 　 | 4 | Kawanishi | Obihiro | Hokkaido | *Q. dentata* | 12 | IY | 12 | \* |
| 　 | 　 | 　 | 　 | 　 |  | 31 | 　 | 31 | 　 |
| *T*. sp. E | 1 | Mt. Kariwangsan | Gangwon | South Korea | *Q. serrata* | 9 | IY | 0 | 　 |
| *T. higuchii* A-type | 1 | Shinko-higashi | Ishikari | Hokkaido | *Q. crispula* | 3 | IY | 0 |  |
|  | 2 |  | Tomakomai | Hokkaido | *Q. crispula* | 5 | IY | 0 |  |
|  | 3 | Hokkaido University | Sapporo | Hokkaido | *Q. crispula* | 11 | IY | 1 |  |
|  | 4 | Fuchumachi | Botanic gardens | Toyama | *Q. dentata* | 4 | TY | 0 |  |
|  | 5 | Shimomizo | Sagamihara | Kanagawa | *Q. serrata* | 4 | SS | 4 |  |
|  | 6 | Honmoku | Yokohama | Kanagawa | *Q. crispula* | 8 | SS | 2 | \* |
|  | 7 |  | Motohakone | Kanagawa | *Q. crispula* | 8 | SS | 0 |  |
|  | 8 | Okuike | Ashiya | Hyogo | *Q. serrata* | 7 | SS | 0 |  |
|  | 9 | Hodenbashi | Nishinomiya | Hyogo | *Q. crispula* | 2 | SS | 0 |  |
|  | 10 | Rokkosan | Kobe | Hyogo | *Q. serrata* | 4 | SS | 0 |  |
|  | 11 | Mayasan | Kobe | Hyogo | *Q. serrata* | 4 | SS | 0 |  |
|  | 12 | Higashida | Kitakyushu | Fukuoka | *Q. serrata* | 4 | SS | 0 |  |
|  | 13 | Kasuya research forest | Sasaguri | Fukuoka | *Q. serrata* | 4 | SS | 1 | \* |
| 　 | 14 | Kariwangsan | Gangwon | South Korea | *Q. aliena* | 3 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 71 | 　 | 8 | 　 |
| *T. higuchii* B-type | 1 | Nishinopporo | Ebetsu | Hokkaido | *Q. crispula* | 1 | IY | 1 |  |
|  | 2 | Shinko-higashi | Ishikari | Hokkaido | *Q. crispula* | 1 | IY | 0 |  |
|  | 3 | Hokkaido University | Sapporo | Hokkaido | *Q. crispula* | 10 | IY | 0 |  |
|  | 4 |  | Tomakomai | Hokkaido | *Q. crispula* | 11 | IY | 6 | \*\* |
|  | 5 | Tamozawa | Nikko | Tochigi | *Q. crispula* | 6 | SS | 1 |  |
|  | 6 | Nanasawa | Atsugi | Kanagawa | *Q. crispula* | 7 | SS | 0 |  |
| 　 | 7 | 　 | Motohakone | Kanagawa | *Q. crispula* | 6 | SS | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 42 | 　 | 8 | 　 |
| *T. japonicus* | 1 | Sanrihama | Saroma | Hokkaido | *Q. dentata* | 4 | IY | 0 |  |
|  | 2 |  | Tomamae | Hokkaido | *Q. dentata* | 4 | IY | 0 |  |
|  | 3 | Nishinopporo | Ebetsu | Hokkaido | *Q. dentata* | 4 | IY | 0 |  |
|  | 4 | Shinko-higashi | Ishikari | Hokkaido | *Q. dentata* | 20 | IY | 0 |  |
|  | 5 | Kidzukuri | Tsugaru | Aomori | *Q. dentata* | 1 | IY | 0 |  |
|  | 6 | Zouzouhana | Wajima | Ishikawa | *Q. dentata* | 10 | IY | 0 |  |
|  | 7 |  | Beppu | Oita | *Q. dentata* | 16 | IY | 1 | \* |
| 　 | 　 | 　 | 　 | 　 | 　 | 59 | 　 | 1 | 　 |
| *T. kashiwae* A-type | 1 | Poroshiri Park | Obihiro | Hokkaido | *Q. crispula* | 4 | IY | 0 |  |
|  | 2 | Biman | Shimizu | Hokkaido | *Q. crispula* | 2 | IY | 0 |  |
|  | 3 | Nishinopporo | Ebetsu | Hokkaido | *Q. crispula* | 1 | IY | 0 |  |
| 　 | 4 | Hokkaido University | Sapporo | Hokkaido | *Q. crispula* | 32 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 39 | 　 | 0 | 　 |
| *T. kashiwae* B-type | 1 | Nishinopporo | Ebetsu | Hokkaido | *Q. crispula* | 24 | IY | 0 |  |
|  | 2 |  | Tomakomai | Hokkaido | *Q. crispula* | 7 | IY | 0 |  |
| 　 | 3 | Kojiri | Hakonemachi | Kanagawa | *Q. crispula* | 16 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 47 | 　 | 0 | 　 |
| *T. paiki* | 1 | Sanrihama | Saroma | Hokkaido | *Q. dentata* | 4 | IY | 0 |  |
|  | 2 | Tofutsuko | Abashiri | Hokkaido | *Q. dentata* | 7 | IY | 0 |  |
|  | 3 |  | Tomamae | Hokkaido | *Q. dentata* | 1 | IY | 0 |  |
|  | 4 | Kawanishi | Obihiro | Hokkaido | *Q. dentata* | 4 | IY | 0 |  |
|  | 5 | Shinko-higashi | Ishikari | Hokkaido | *Q. dentata* | 4 | IY | 0 |  |
|  | 6 | Esanmisaki | Hakodate | Hokkaido | *Q. dentata* | 2 | IY | 0 |  |
|  | 7 |  | Shiriyazaki | Aomori | *Q. dentata* | 2 | IY | 0 |  |
|  | 8 | Kidzukuri | Tsugaru | Aomori | *Q. dentata* | 1 | IY | 0 |  |
|  | 9 |  | Shichinohe | Aomori | *Q. dentata* | 2 | IY | 0 |  |
|  | 10 | Iwaki roadside station | Yurihonjo | Akita | *Q. dentata* | 2 | IY | 0 |  |
|  | 11 | Misaki Park | Nikaho | Akita | *Q. dentata* | 2 | IY | 0 |  |
|  | 12 | Zouzouhana | Wajima | Ishikawa | *Q. dentata* | 2 | IY | 0 |  |
|  | 13 | Imagoura | Kami | Hyogo | *Q. dentata* | 2 | IY | 0 |  |
|  | 14 | Toyofusa | Daisen | Tottori | *Q. dentata* | 2 | IY | 0 |  |
|  | 15 | Hiruzen-kamifukuda | Maniwa | Okayama | *Q. dentata* | 4 | IY | 0 |  |
|  | 16 | Geihoku | Kitahiroshima | Hiroshima | *Q. dentata* | 2 | IY | 0 |  |
|  | 17 | Kisuki | Unnan | Shimane | *Q. dentata* | 4 | IY | 1 | \* |
| 　 | 18 | Tano | Kokonoe | Oita | *Q. dentata* | 4 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 51 | 　 | 1 | 　 |
| *T. pilosus* | 1 | Kasumigaseki | Chiyoda | Tokyo | *Q. phillyraeoides* | 4 | SS | 0 |  |
|  | 2 | Honmoku | Yokohama | Kanagawa | *Q. phillyraeoides* | 6 | SS | 0 |  |
|  | 3 | Kitanaka-dori | Yokohama | Kanagawa | *Q. glauca* | 6 | SS | 0 |  |
|  | 4 | Chidori | Kawasaki | Kanagawa | *L. edulis* | 5 | SS | 0 |  |
|  | 5 | Chikko | Osaka | Osaka | *Q. phillyraeoides* | 3 | SS | 0 |  |
|  | 6 | Kano | Kobe | Hyogo | *Q. phillyraeoides* | 5 | SS | 0 |  |
|  | 7 | Wakinohama | Kobe | Hyogo | *Q. phillyraeoides* | 2 | SS | 0 |  |
|  | 8 | Hatoba | Kobe | Hyogo | *Q. phillyraeoides* | 6 | SS | 0 |  |
|  | 9 | Hamabe-dori | Kobe | Hyogo | *Q. glauca* | 6 | SS | 0 |  |
|  | 10 | Saemonbori | Himeji | Hyogo | *Q. glauca* | 8 | SS | 0 |  |
| 　 | 11 | Nishikaigan | Kitakyushu | Fukuoka | *Q. phillyraeoides* | 1 | SS | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 52 | 　 | 0 | 　 |
| *T. querciformosanus* | 1 | Sanrihama | Saroma | Hokkaido | *Q. dentata* | 3 | IY | 0 |  |
|  | 2 |  | Tomamae | Hokkaido | *Q. dentata* | 13 | IY | 0 |  |
|  | 3 | Shinko-higashi | Ishikari | Hokkaido | *Q. dentata* | 1 | IY | 0 |  |
|  | 4 | Kidzukuri | Tsugaru | Aomori | *Q. dentata* | 2 | IY | 0 |  |
|  | 5 | Kashiwanoha | Kashiwa | Chiba | *Q. dentata* | 1 | IY | 0 |  |
|  | 6 | Daiho | Goto | Nagasaki | *Q. dentata* | 16 | IY | 0 |  |
|  | 7 | Ikitsuki | Hirado | Nagasaki | *Q. dentata* | 7 | IY | 0 |  |
|  | 8 |  | Beppu | Oita | *Q. dentata* | 5 | IY | 0 |  |
| 　 | 9 | Tano | Kokonoe | Oita | *Q. dentata* | 4 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 52 | 　 | 0 | 　 |
| *T. yokoyamai* | 1 |  | Tomamae | Hokkaido | *Q. dentata* | 15 | IY | 0 |  |
|  | 2 |  | Iwamizawa | Hokkaido | *Q. dentata* | 1 | SA | 0 |  |
| 　 | 3 | 　 | Tomakomai | Hokkaido | *Q. dentata* | 2 | IY | 0 |  |
| 　 | 　 | 　 | 　 | 　 | 　 | 18 | 　 | 0 | 　 |
| *T*. sp. C | 1 | Daiho | Goto | Nagasaki | *Q. dentata* | 41 | IY | 0 | 　 |
| *T*. sp. D | 1 | Minatojima-minamimachi | Kobe | Hyogo | *Q. aliena* | 29 | SS | 0 | \* |
| *T*. sp. F | 1 | Mt. Kariwangsan | Gangwon | South Korea | *Q. mongolica* | 4 | IY | 0 | 　 |
| (Note) 1. Genus of the host plant, *C*, *L*, and *Q*, stand for *Castanea*, *Lithocarpus*, and *Quercus* |  |  |  |  |
| 2. *N* means the number of aphids used in this study. |  |  |  |  |  |  |
| 3. Collectors. SA, S. Akimoto; KF, K. Futami; TH, T. Hironaga; TK, T. Kanbe; AO, A. Otsuki; IO, I. Oshima; MS, M. Sano; SS, S. Sugimoto; IY, I. Yao; TY, T. Yoshino |
| 4. *Wol*+ shows the number of aphid individuals infected by *Wolbachia*. |  |  |  |  |  |
| 5. The symbol, \*, means that one sample in the site was sequenced for the determination of the *Wolbachia* haplotype. |  |

Table S3. Host species list used in the determination of *Wolbachia* supergroups

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| Host species | Generic name | Supergroup | Accession No. |
| *Muscidifurax uniraptor* | Wasp | A | L02882 |
| *Nasonia vitripennis* | Wasp | A | M84688 |
| *Bryobia sarothamni* | Spider mite | B | EU499315 |
| *Bryobia praetiosa* | Clover mite | B | EU499317 |
| *Nasonia vitripennis* | Wasp | B | M84686 |
| *Bemisia tabaci* | Whitefly | B | JN204507 |
| *Onchocerca ochengi* | Nematode | C | AJ010276 |
| *Onchocerca gibsoni* | Nematode | C | AJ276499 |
| *Dirofilaria repens* | Nematode | C | AJ276500 |
| *Dirofilaria immitis* | Nematode | C | Z49261 |
| *Brugia malayi* | Nematode | D | AF051145 |
| *Litomosoides sigmodontis* | Nematode | D | AF069068 |
| *Folsomia candida* | Springtail | E | AF179630 |
| *Mesaphorura macrochaeta* | Springtail | E | AJ422184 |
| *Mansonella ozzardi* | Nematode | F | AJ279034 |
| *Myrmeleon mobilis* | Antlion | F | DQ068882 |
| *Kalotermes flavicollis* | Termite | F | Y11377 |
| *Zootermopsis nevadensis* | Termite | H | AY764280 |
| *Dipetalonema gracile* | Nematode | H | AJ548802 |
| *Ctenocephalides felis* | Cat flea | I | AY335923 |
| *Orchopeas leucopus* | Rat flea | I | AY335924 |
| *Dipetalonema gracile* | Nematode | J | AJ548802 |
| *Bryobia* sp. | Mite | K | EU499316 |
| *Radopholus similis* | Nematode | L | EU833482 |
| *Tuberolachnus salignus* | Aphid | M | JN384085 |
| *Aphis* sp. | Aphid | M | JN384091 |
| *Toxoptera aurantii* | Aphid | N | JN384094 |
| *Toxoptera aurantii* strain B | Aphid | N | JN384095 |
| *Bemisia tabaci* isolate10 | Whitefly | O | KF454771 |
| *Kaburagia rhusicola* | Aphid | O | MT554837 |
| *Schlechtendalia chinensis* | Aphid | O | MT554838 |
| *Torotrogla cardueli* strain EG044 | Mite | Q | KP114101.1 |
| *Atemnus politus* strain K5 | False scorpion | S | NZ\_WQMQ01000035.1 |
| *Tuberculatus higuchii* B-type | Aphid | B | LC613027 |
| *Tuberculatus kuricola* | Aphid | B | LC613029 |
| *Tuberculatus stigmatus* | Aphid | B | LC613028 |
| *Tuberculatus paiki* | Aphid | B | LC613031 |
| *Tuberculatus macrotuberculatus* sites1-8 & 23 | Aphid | M | LC613021 |
| *Tuberculatus* sp. B | Aphid | M | LC613022 |
| *Tuberculatus quercicola* | Aphid | M | LC613023 |
| *Tuberculatus macrotuberculatus* site 22 | Aphid | N | LC655298 |
| *Tuberculatus capitatus* | Aphid | N | LC613025 |
| *Tuberculatus fulviabdominalis* | Aphid | N | LC613026 |
| *Tuberculatus japonicus* | Aphid | N | LC613030 |
| *Tuberculatus higuchii* A-type | Aphid | O | LC613024 |
|  |  |  |  |

Fig S1. Maps for collection sites and *Wolbachia* infection rates of *Tuberculatus* aphid species.

(Note) Collection sites and pie charts of *Wolbachia* infection rates in ant-attended species of (a) *T. capitatus*, (b) *T. fulviabdominalis* (ful) and *T. indicus* (ind), (c) *T. kuricola*, (d) *T. macrotuberculatus*, (e) *T. pappus* (pap), *T. pilosulus* (pilo), and *T. quercicola* (que), and (f) *T. stigmatus* (sti), *T*. sp. B (B), and *T*. sp. E (E), and non-attended species of (g) *T. higuchii* A-type , (h) *T. higuchii* B-type (B) and *T. japonicus* (japo), (i) *T. kashiwae* A-type (A) and *T. kashiwae* B-type (B), (j) *T. paiki*, (k) *T. pilosus*, and (l) *T. querciformosanus* (qfor), *T. yokoyamai* (yoko), *T*. sp. C (C), *T*. sp. D (D), and *T*. sp. F (F). Black and white in a pie chart indicate the presence and absence of *Wolbachia*, respectively. The numbers in a pie chart divided by “/” mean the number of *Wolbachia*-detected individuals per total individual number collected from the site. The numbers in maps and on/under the lines indicate collection sites listed in Table S2.



