

## Supplementary material

Article title: Tree hollows can affect epiphyte species composition

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**Table S1.** Attributes of studied trees and hollows.

| Tree ID | Hollow ID | Tree species                    | Tree height (m) | Stem diameter (cm) | Azimuth (°) | Hollow length (cm) | Hollow width (cm) | Hollow size (cm <sup>2</sup> ) | Hollow height (m) |
|---------|-----------|---------------------------------|-----------------|--------------------|-------------|--------------------|-------------------|--------------------------------|-------------------|
| 1       | 1         | <i>Aria japonica</i>            | 17.5            | 36.3               | 196         | 70.0               | 14.0              | 769.7                          | 5.45              |
| 2       | 2         | <i>Aria japonica</i>            | 16.6            | 79.6               | 315         | 53.0               | 8.0               | 333.0                          | 7.30              |
| 3       | 3         | <i>Aria japonica</i>            | 15.1            | 43.6               | 50          | 50.0               | 18.0              | 706.9                          | 3.01              |
| 4       | 4         | <i>Aria japonica</i>            | 12.9            | 35.0               | 70          | 5.0                | 5.0               | 19.6                           | 6.20              |
| 5       | 5         | <i>Aria japonica</i>            | NA*             | 18.1               | 315         | 4.5                | 2.5               | 8.8                            | 7.36              |
| 6       | 6         | <i>Aria japonica</i>            | 12.4            | 35.7               | 225         | 13.0               | 7.5               | 76.6                           | 0.68              |
| 6       | 7         | <i>Aria japonica</i>            | 12.4            | 24.2               | 225         | 25.0               | 3.5               | 68.7                           | 2.00              |
| 7       | 8         | <i>Cercidiphyllum japonicum</i> | 18.5            | 47.7               | 219         | 20.0               | 6.0               | 94.2                           | 3.07              |
| 8       | 9         | <i>Cercidiphyllum japonicum</i> | 19.5            | 59.8               | 100         | 11.0               | 5.0               | 43.2                           | 5.98              |
| 9       | 10        | <i>Cercidiphyllum japonicum</i> | 22.0            | 48.7               | 242         | 15.0               | 9.0               | 106.0                          | 11.15             |
| 9       | 11        | <i>Cercidiphyllum japonicum</i> | 22.0            | 55.7               | 226         | 10.0               | 5.0               | 39.3                           | 6.45              |

\* NA = Not available (missing data).

**Table S2.** Number of observations of the bryophyte species in Nikko, central Japan.

| Species                                                                      | <i>Aria japonica</i> |       | <i>Cercidiphyllum japonicum</i> |       |
|------------------------------------------------------------------------------|----------------------|-------|---------------------------------|-------|
|                                                                              | Above                | Below | Above                           | Below |
| <i>Anomodon tristis</i> (Ces.) Sull.                                         | 5                    | 10    | 8                               | 12    |
| <i>Barbula</i> sp.                                                           | 2                    | 2     | 4                               | 6     |
| <i>Boulaya mittenii</i> (Broth.) Cardot                                      | 3                    | 4     | 0                               | 0     |
| <i>Bryum</i> sp.                                                             | 1                    | 0     | 0                               | 0     |
| <i>Chiloscyphus minor</i> (Nees) J.J.Engel & R.M.Schust.                     | 1                    | 0     | 0                               | 0     |
| <i>Dicranum viride</i> var. <i>hakkodense</i> (Cardot) Takaki                | 8                    | 12    | 0                               | 0     |
| <i>Entodon scabridens</i> Lindb.                                             | 6                    | 7     | 0                               | 0     |
| <i>Frullania ericoides</i> (Nees) Mont.                                      | 3                    | 2     | 0                               | 1     |
| <i>Frullania tamarisci</i> subsp. <i>obscura</i> (Verd.) S.Hatt.             | 6                    | 6     | 3                               | 0     |
| <i>Frullania valida</i> Stephani                                             | 4                    | 9     | 7                               | 6     |
| <i>Helicodontium doii</i> (Sakurai) Taoda                                    | 0                    | 1     | 0                               | 0     |
| <i>Iwatsukiella leucotricha</i> (Mitt.) W.R.Buck & H.A.Crum                  | 10                   | 6     | 0                               | 0     |
| <i>Lejeunea ulicina</i> (Taylor) Gottsche, Lindenb. & Nees                   | 0                    | 1     | 0                               | 0     |
| <i>Leucodon</i> sp.                                                          | 0                    | 0     | 5                               | 5     |
| <i>Nipponolejeunea pilifera</i> (Stephani) S.Hatt.                           | 5                    | 5     | 0                               | 0     |
| <i>Okamuraea hakoniensis</i> (Mitt.) Broth.                                  | 6                    | 6     | 0                               | 0     |
| <i>Orthotrichum consobrinum</i> Cardot                                       | 5                    | 7     | 0                               | 0     |
| <i>Plagiochila porelloides</i> (Torr. ex Nees) Lindenb.                      | 1                    | 3     | 0                               | 0     |
| <i>Porella vernicosa</i> Lindb.                                              | 0                    | 0     | 0                               | 2     |
| <i>Pylaisia subcircinata</i> Cardot                                          | 1                    | 1     | 3                               | 5     |
| <i>Pylaisiadelphina tristoviridis</i> (Broth.) Afonina, H.Tsubota & Ignatova | 0                    | 4     | 0                               | 0     |
| <i>Pylaisiadelphina yokohamae</i> (Broth.) W.R.Buck                          | 11                   | 12    | 3                               | 0     |
| <i>Radula japonica</i> Gottsche ex Stephani                                  | 4                    | 0     | 0                               | 0     |
| <i>Rauiella fujisana</i> (Paris) Reimers                                     | 1                    | 3     | 2                               | 3     |
| <i>Ulota japonica</i> (Sull. & Lesq.) Mitt.                                  | 15                   | 10    | 2                               | 0     |

**Table S3.** Number of observations of the lichen species in Nikko, central Japan.

| Species                                                        | <i>Aria japonica</i> |       | <i>Cercidiphyllum japonicum</i> |       |
|----------------------------------------------------------------|----------------------|-------|---------------------------------|-------|
|                                                                | Above                | Below | Above                           | Below |
| <i>Acrocordia gemmata</i> (Ach.) A. Massal.                    | 0                    | 0     | 8                               | 7     |
| <i>Amandinea punctata</i> (Hoffm.) Coppins & Scheid.           | 0                    | 0     | 0                               | 1     |
| <i>Anaptychia palmulata</i> (Michx.) Vain.                     | 3                    | 2     | 1                               | 3     |
| <i>Anisomeridium</i> sp.                                       | 11                   | 12    | 3                               | 3     |
| <i>Arthonia</i> sp. 1                                          | 0                    | 0     | 7                               | 4     |
| <i>Arthonia</i> sp. 2                                          | 0                    | 0     | 0                               | 1     |
| <i>Arthothelium</i> sp.                                        | 3                    | 2     | 0                               | 0     |
| <i>Biatora</i> sp. 1                                           | 9                    | 7     | 1                               | 0     |
| <i>Biatora</i> sp. 2                                           | 12                   | 12    | 1                               | 1     |
| <i>Biatora</i> sp. 3                                           | 8                    | 7     | 0                               | 0     |
| <i>Biatora</i> sp. 4                                           | 3                    | 1     | 0                               | 0     |
| <i>Biatora</i> sp. 5                                           | 0                    | 2     | 0                               | 0     |
| <i>Bilimbia</i> sp.                                            | 0                    | 1     | 1                               | 3     |
| <i>Brigantiaea ferruginea</i> (Müll. Arg.) Kashiw. & Kurok.    | 1                    | 1     | 3                               | 3     |
| <i>Buellia disciformis</i> (Fr.) Mudd                          | 0                    | 2     | 0                               | 0     |
| <i>Caloplaca</i> s.lat. sp.                                    | 6                    | 4     | 6                               | 5     |
| <i>Candelariella</i> sp.                                       | 2                    | 3     | 0                               | 0     |
| <i>Canoparmelia</i> cf. <i>texana</i> (Tuck.) Elix & Hale      | 0                    | 1     | 0                               | 0     |
| <i>Chaenothecopsis</i> sp.                                     | 0                    | 0     | 4                               | 5     |
| <i>Cladonia</i> sp. (only phyllocladia)                        | 3                    | 0     | 0                               | 0     |
| <i>Coccocarpia palmicola</i> (Spreng.) Arv. & D.J. Galloway    | 3                    | 2     | 0                               | 0     |
| <i>Coenogonium pineti</i> (Ach.) Vezda                         | 0                    | 1     | 0                               | 0     |
| <i>Collema leptaleum</i> Tuck.                                 | 0                    | 3     | 0                               | 1     |
| <i>Fuscidea arboricola</i> Coppins & Tønsberg                  | 1                    | 0     | 0                               | 0     |
| <i>Fuscidea</i> sp.                                            | 0                    | 2     | 0                               | 0     |
| <i>Graphis scripta</i> (L.) Ach.                               | 0                    | 2     | 1                               | 0     |
| <i>Gyalecta carneola</i> (Ach.) Hellb.                         | 4                    | 4     | 0                               | 0     |
| <i>Gyalidea</i> sp.                                            | 0                    | 1     | 0                               | 0     |
| <i>Heterodermia</i> cf. <i>diademata</i> (Taylor) D.D. Awasthi | 11                   | 12    | 0                               | 0     |
| <i>Julella fallaciosa</i> (Stizenb ex. Arnold) R.C. Harris     | 0                    | 0     | 5                               | 4     |
| <i>Lecanora</i> cf. <i>imshaugii</i> Brodo                     | 1                    | 3     | 0                               | 0     |
| <i>Lecanora sibirica</i> Müll. Arg.                            | 18                   | 20    | 10                              | 7     |
| <i>Lecanora symmicta</i> (Ach.) Ach. agg.                      | 0                    | 1     | 0                               | 0     |
| <i>Lecidella</i> sp.                                           | 1                    | 0     | 0                               | 0     |
| <i>Lepraria</i> sp.                                            | 6                    | 3     | 0                               | 0     |
| <i>Leptogium asiaticum</i> P.M. Jørg.                          | 0                    | 0     | 3                               | 3     |

**Table S3.** Number of observations of the lichen species in Nikko, central Japan (continued).

| Species                                               | <i>Aria japonica</i> |       | <i>Cercidiphyllum japonicum</i> |       |
|-------------------------------------------------------|----------------------|-------|---------------------------------|-------|
|                                                       | Above                | Below | Above                           | Below |
| <i>Leptogium cyanescens</i> (Rabh.) Körb.             | 0                    | 0     | 8                               | 3     |
| <i>Lobaria adscripturiens</i> (Nyl.) Hue              | 0                    | 0     | 3                               | 3     |
| <i>Lobaria spathulata</i> (Inumaru) Yoshim.           | 0                    | 0     | 1                               | 0     |
| <i>Lobaria</i> sp.                                    | 0                    | 1     | 0                               | 0     |
| <i>Lopadium disciforme</i> (Flot.) Kullh.             | 2                    | 0     | 0                               | 0     |
| <i>Melanelixia huei</i> (Asahina) O. Blanco et al.    | 1                    | 0     | 0                               | 0     |
| <i>Melaspilea</i> sp.                                 | 4                    | 0     | 0                               | 0     |
| <i>Menegazzia subsimilis</i> (H. Magn.) R. Sant.      | 8                    | 6     | 0                               | 0     |
| <i>Myelochroa</i> sp.                                 | 3                    | 3     | 0                               | 0     |
| <i>Opegrapha</i> sp.                                  | 0                    | 0     | 4                               | 4     |
| <i>Parmelia fertilis</i> Müll. Arg.                   | 2                    | 3     | 0                               | 0     |
| <i>Parmelia laevior</i> Nyl.                          | 5                    | 1     | 0                               | 0     |
| <i>Parmelia squarrosa</i> Hale                        | 9                    | 6     | 0                               | 0     |
| Parmeliaceae sp.                                      | 1                    | 1     | 0                               | 0     |
| <i>Parmeliella</i> sp.                                | 0                    | 0     | 1                               | 0     |
| <i>Pertusaria</i> sp. 1                               | 0                    | 0     | 4                               | 1     |
| <i>Pertusaria</i> sp. 2                               | 3                    | 0     | 0                               | 0     |
| <i>Pertusaria</i> sp. 3                               | 4                    | 4     | 0                               | 0     |
| <i>Phaeophyscia hispidula</i> (Ach.) Essl.            | 3                    | 0     | 0                               | 2     |
| <i>Phaeophyscia rubropulchra</i> (Degel.) Essl.       | 5                    | 4     | 1                               | 3     |
| <i>Physconia grumosa</i> Kashiw. & Poelt              | 0                    | 0     | 3                               | 2     |
| <i>Platismatia interrupta</i> W.L. Culb. & C.F. Culb. | 3                    | 0     | 0                               | 0     |
| <i>Rinodina</i> cf. <i>buckii</i> Sheard              | 11                   | 13    | 1                               | 0     |
| <i>Rinodina subparieta</i> (Nyl.) Zahlbr.             | 3                    | 4     | 0                               | 0     |
| <i>Rinodina xanthophaea</i> (Nyl.) Zahlbr.            | 3                    | 1     | 0                               | 0     |
| <i>Rinodina</i> sp. 1                                 | 4                    | 6     | 4                               | 2     |
| <i>Rinodina</i> sp. 2                                 | 1                    | 0     | 3                               | 3     |
| <i>Rinodina</i> sp. 3                                 | 3                    | 2     | 0                               | 0     |
| <i>Schismatoma ocellatum</i> (Vain.) Tehler           | 0                    | 0     | 2                               | 1     |
| <i>Strigula</i> sp.                                   | 0                    | 2     | 0                               | 0     |
| <i>Thelotrema nipponicum</i> T. Matsumoto             | 0                    | 0     | 0                               | 1     |
| Lichen sp. 1                                          | 0                    | 0     | 0                               | 1     |
| Lichen sp. 2                                          | 12                   | 7     | 0                               | 0     |
| Lichen sp. 3                                          | 2                    | 2     | 0                               | 0     |
| Lichen sp. 4                                          | 4                    | 5     | 0                               | 0     |