

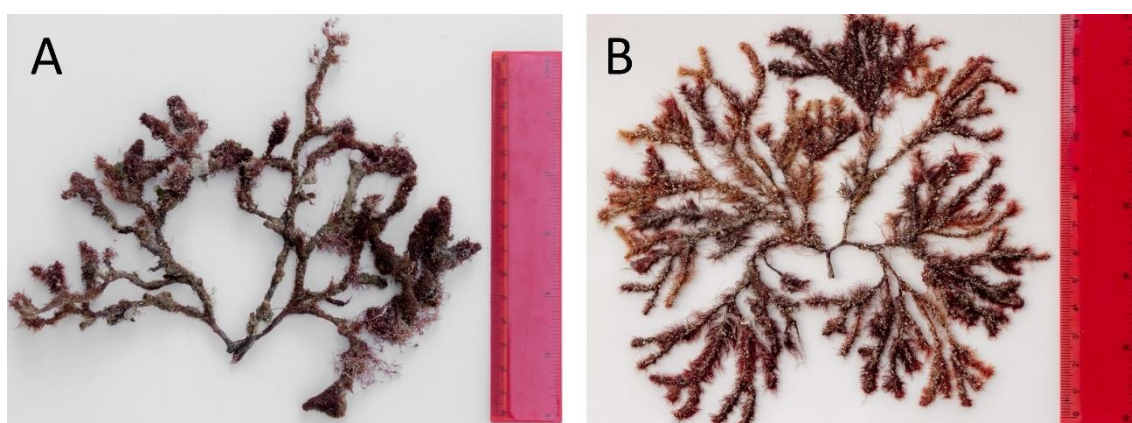
SUPPLEMENTARY MATERIAL

**On the presence of *Digenea simplex* (Wulfen) C. Agardh (Rhodomelaceae, Ceramiales) in the northern Adriatic**

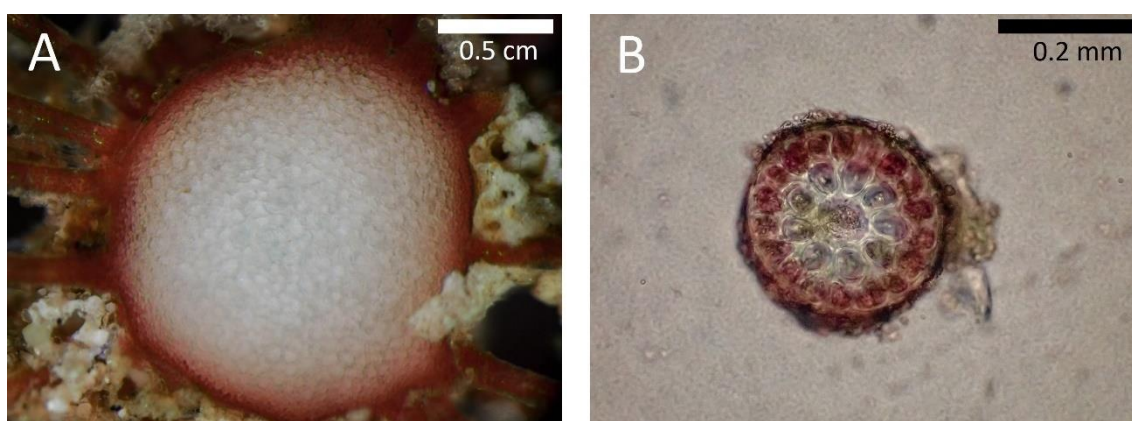
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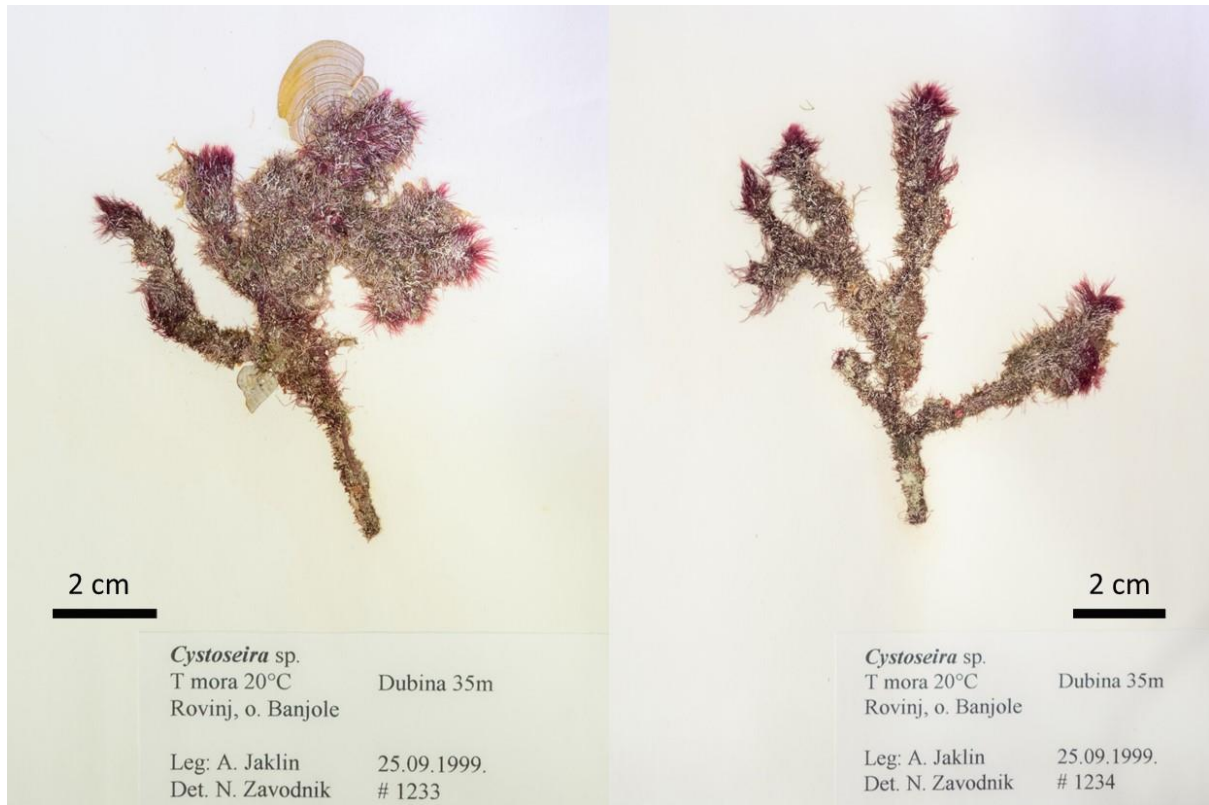
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**Fig. S1.** Collected *Digenea simplex* specimens: washed ashore in Plava laguna – Poreč on 23 March 2021 (A); from the herbarium specimen collected in Pical – Poreč on 26 December 2020 (B). Both specimens (although specimen A is more damaged) show hairy determinate axes extending as tufts from the central, branching indeterminate axes, a hallmark of this species.



**Fig. S2.** Dissection of *Digenea simplex* thallus parts: a transverse dissection of the indeterminate axis below the apex with a tightly packed cell mass surrounded by an outer layer with radially growing determinate axes (A); a transverse dissection of determinate branches, with a pericentral cell layer around an axial cell and a single outer cell layer (B). Samples were taken off a live specimen from Funtana.



**Fig. S3.** Misidentified and mislabelled *Digenea simplex* specimens collected in 1999 near Banjole island, misplaced within the herbarium collection in the Center for Marine Research, Rovinj.

**Table S1.** Expanded table showing historical records of *Digenea simplex* in the Adriatic Sea. Data is organised chronologically, except where there is no available date of record. Sources are represented by numerals: 1 - de Wulfen, 1803; 2 - Agardh, 1822; 3 - Naccari, 1828; 4 - Algae Herbarium Portal; 5 - Muséum national d'Histoire naturelle, Paris, France Collection: Cryptogams (PC); 6 - Battelli and Alberti, 2003; 7 - Munda, 2000; 8 - Vatova, 1928; 9 - Ercegović, 1966; 10 - Ercegović, 1980; 11 - Špan, 1980; 12 - Herbarium collection of the Center for Marine Research, Rovinj; 13 - Adam Mickiewicz University in Poznań. Natural History Collections of the Faculty of Biology AMU; 14 - Alexander J., Gross J. 2024. The University and Jepson Herbaria – Algae. Version 1.12. Berkeley Natural History Museums. Notes: \*Indirect source, not included in the paper; \*\*True collector was likely Hohenacker, year of collection is likely earlier; \*\*\*Misidentifications, for record purposes; \*\*\*\*Recently found misplaced specimen from Rovinj, marked as *Cystoseira* sp.; \*\*\*\*\*Illegible name.

| Name                  | Year | Location       | Region, Country   | Record type | Note  | Source | Hyperlinks  |
|-----------------------|------|----------------|---|-------------|---|--------|---|
| de Wulfen             | 1803 | Adriatic Sea   | N/A   | Observation | Very old literature. Unknown, presumably observed.  | 1      |   |
| Agardh*               | 1820 | N/A            | “Adriatic and Mediterranean: on the coast of Italy, Liburnia and Liguria” | Observation | Very old literature. Indirect find, specimens apparently collected by others. No specific location given. | 2      | <a href="https://doi.org/10.5962/bhl.title.45326">https://doi.org/10.5962/bhl.title.45326</a>   |
| Naccari               | 1828 | Trieste        | Italy   | Observation | Very old literature. Presumably observed, definitely cites older sources. True collector is likely        | 3      | <a href="https://www.biodiversitylibrary.org/item/136968">https://www.biodiversitylibrary.org/item/136968</a>   |
| Keck/<br>Hohenacker** | 1878 | Rovinj/Trieste | N/A   | Herbarium   | Hohenacker. Location uncertain and year of collection may be earlier.                                     | 4      | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1007514">https://macroalgae.org/portal/collections/individual/index.php?occid=1007514</a> |

|             |      |                             |                  |           |   |   |   |
|-------------|------|-----------------------------|------------------|-----------|---|---|---|
| Hauck       | 1878 | Rovinj                      | Istria, Croatia  | Herbarium |   | 5 | <a href="https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0581345">https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0581345</a>               |
| Hansgirg*** | 1885 | Cres                        | Kvarner, Croatia | Herbarium | Wrong ID.   | 4 | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1218827">https://macroalgae.org/portal/collections/individual/index.php?occid=1218827</a> |
| Zaratin     | 1885 | Piran                       | Istria, Slovenia | Herbarium | From published herbarium reviews.<br>Herbarium property of Gian Rinaldo Carli Gymnasium in Koper, Slovenia.   | 6 |   |
| Zaratin     | 1886 | Butaceja islet, Funtana     | Istria, Croatia  | Herbarium | From published herbarium reviews.<br>Herbarium property of Civic Museum of Natural History in Trieste, Italy. | 6 |   |
| Zaratin     | 1886 | Orada islet, Funtana        | Istria, Croatia  | Herbarium | From published herbarium reviews.<br>Herbarium privately owned.   | 6 |   |
| Zaratin     | 1887 | St. Katarina island, Rovinj | Istria, Croatia  | Herbarium | From published herbarium reviews.<br>Herbarium privately owned.   | 6 |   |
| Zaratin     | 1887 | Rovinj                      | Istria, Croatia  | Herbarium | From published herbarium reviews.<br>Herbarium  | 6 |   |

|             |      |                             |                              |           |   |   |   |
|-------------|------|-----------------------------|------------------------------|-----------|---|---|---|
| Zaratin     | 1888 | Pula                        | Istria, Croatia              | Herbarium | property of Civic Museum of Natural History in Trieste, Italy. From published herbarium reviews. Herbarium property of Ruđer Bošković Institute, Center for Marine Research, Rovinj, Croatia. | 6 |   |
| Hansgirg*** | 1889 | Rovinj                      | Istria, Croatia              | Herbarium | Wrong ID.   | 4 | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1218829">https://macroalgae.org/portal/collections/individual/index.php?occid=1218829</a> |
| Hansgirg*** | 1891 | Old torpedo factory, Rijeka | Rijeka bay, Kvarner, Croatia | Herbarium | Wrong ID.   | 4 | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1218826">https://macroalgae.org/portal/collections/individual/index.php?occid=1218826</a> |
| Hansgirg*** | 1891 | Senj                        | Kvarner, Croatia             | Herbarium | Wrong ID.   | 4 | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=398476">https://macroalgae.org/portal/collections/individual/index.php?occid=398476</a>   |
| Hansgirg*** | 1891 | Kaštel Novi                 | Split area, Croatia          | Herbarium | Wrong ID.   | 4 | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1218828">https://macroalgae.org/portal/collections/individual/index.php?occid=1218828</a> |
| Hansgirg*** | 1891 | Split                       | Split area, Croatia          | Herbarium | Wrong ID.   | 4 | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1218831">https://macroalgae.org/portal/collections/individual/index.php?occid=1218831</a> |

|             |      |                       |   |             |   |    |   |
|-------------|------|-----------------------|---|-------------|---|----|---|
| Hansgirg*** | 1891 | Gruž                  | Dubrovnik, Croatia                                      | Herbarium   | Wrong ID.   | 4  | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1218825">https://macroalgae.org/portal/collections/individual/index.php?occid=1218825</a> |
| Lucas       | 1892 | Rovinj                | Istria, Croatia   | Herbarium   | From reviewed field/lab diaries.  | 7  |   |
| Kuckuck     | 1894 | Banjole islet, Rovinj | Istria, Croatia   | Sampled     | From reviewed field/lab diaries.  | 7  |   |
| Kuckuck     | 1895 | Banjole islet, Rovinj | Istria, Croatia   | Sampled     | From reviewed field/lab diaries.  | 7  |   |
| Schiller    | 1907 | Novigrad              | Istria, Croatia   | Herbarium   |   | 4  | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=1203642">https://macroalgae.org/portal/collections/individual/index.php?occid=1203642</a> |
| Vatova      | 1914 | Rovinj                | Istria, Croatia   | Observation | Author's personal observation.  | 8  |   |
| Ercegović   | 1965 | N/A                   | Wider area surrounding Split, central Adriatic, Croatia | Sampled     | Author's personal observation.<br>Unknown exact location, likely kept in field/lab diaries.<br>Potential duplicate. | 9  |   |
| Ercegović   | 1965 | N/A                   | Wider area surrounding Split, central Adriatic, Croatia | Sampled     | Author's personal observation.<br>Unknown exact location, likely kept in field/lab diaries.                         | 10 |   |
| Špan        | 1965 | Hvar island           | Central Adriatic, Croatia                               | Sampled     | Unknown exact location. Likely kept in field/lab diaries.   | 11 |   |

|                  |      |                          |                 |           |  |       |   |
|------------------|------|--------------------------|-----------------|-----------|--|-------|---|
| Zavodnik, N.**** | 1999 | Banjole islet,<br>Rovinj | Istria, Croatia | Herbarium | Recently found<br>misidentified<br>specimen,<br>misplaced among<br>Phaeophyceae<br>(Fig. S3 in<br>Supplementary<br>Material) | 12    |   |
| Hauck            | N/A  | Rovinj                   | Istria, Croatia | Herbarium | Unknown year.  | 4     | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=273328">https://macroalgae.org/portal/collections/individual/index.php?occid=273328</a> |
| Meneghini*****   | N/A  | Dalmatia                 | Croatia         | Herbarium | Illegible name,<br>unknown year and<br>uncertain<br>sampling location.   | 5     | <a href="https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0048446">https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0048446</a>             |
| Zanardini        | N/A  | Pula                     | Istria, Croatia | Herbarium | Unknown year.  | 5     | <a href="https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0048434">https://science.mnhn.fr/institution/mnhn/collection/pc/item/pc0048434</a>             |
| Zanardini        | N/A  | Pula                     | Istria, Croatia | Herbarium | Unknown year,<br>second sample<br>from the same<br>location.   | 5     | <a href="http://coldb.mnhn.fr/catalognumber/mnhn/pc/pc0493338">http://coldb.mnhn.fr/catalognumber/mnhn/pc/pc0493338</a>   |
| Liechtenstern    | N/A  | Rovinj                   | Istria, Croatia | Herbarium | Invalid record<br>date, sample<br>indexed, but<br>unreachable<br>online (see<br>hyperlink).                                  | 13    | <a href="https://www.gbif.org/occurrence/3477931663">https://www.gbif.org/occurrence/3477931663</a>   |
| Radlkofi         | N/A  | Adriatic Sea             | N/A             | Herbarium | Unknown year,<br>missing sample<br>(see hyperlink).  | 4, 14 | <a href="https://macroalgae.org/portal/collections/individual/index.php?occid=719674">https://macroalgae.org/portal/collections/individual/index.php?occid=719674</a> |

