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| Supplementary Table S1. Summary of *V. dubia* locations. |
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| **Country** | **Earliest record** | **Record Category** | **Inst.4** | **References** |
| **Lit.1** | **Spec.2** | **PC3** |  |  |
| Algeria | 1854 | 2 | - | rare | - | (Cosson and Maisonneuve 1854; Quezel and Santa 1962) |
| Austria | 1859 | - | 33 | - | A | (Herbarium WU; BioCASE; GBIF Austria; Naturalis) |
| Azerbaijan | 1976 | 1 | - | - | - | (Tzvelev 1976) |
| Belgium | 1853 | - | 4 | - | B | (Naturalis; BioCASE) |
| Bulgaria | 1999 | 1 | 10 | present | C | (BioCASE; Edinburgh; GBIF; Herbarium WU; Pavlova et al. 2003) |
| Croatia | 2009 | 2 | - | - | - | (Pandža 2010; Mareković et al. 2009) |
| Czech Republic | 1906 | 1 | 7 | rare | D | (Danihelka et al. 2012, GBIF; BioCASE; Naturalis) |
| Egypt | - | - | - | absent | - | - |
| Finland | 2002 | - | 1 | - | F | (BioCASE) |
| France | 1830 | - | 66 | - | H | (BioCASE; GBIF; MNHN; Naturalis) |
| Germany | 1854 | 1 | 54 | - | I | (BioCASE; GBIF – Austria; Herbarium WU; Herbaria of the University and ETH Zürich; GBIF; Naturalis) |
| Greece | 1989 | - | 14 | - | J | (BioCASE; GBIF; Herbarium WU; GBIF-Sweden) |
| Hungary | 1899 | 2 | 14 | - |  K | (Herbarium WU; GBIF; BioCASE; Naturalis; Bauer 2012; GBIF - Austria) |
| Iran | 2007 | - | 2 | - | X | (Herbarium WU; Ghahremaninejad et al. 2012) |
| Iraq | 1968 | absent | - | - | - | (Bor 1968) |
| Italy | 1919 | 11 | 5 | - | L | (Bicknell 1896; Selvi 2010; Pignatti 1982; Conti et al. 2005; Herbarium WU; BioCASE) |
| Kuwait | 1987 | absent | - | - | - | (Al Rawi 1987; Boulos 1988) |
| Libya | 1988 | absent | - | - | - | (Hossain et al. 1988) |
| Macedonia | 2015 | - | - | present | - | - |
| Morocco | 2018 | absent | - | present | - | (Maire 1952) |
| Moldova | 1966 | 1 | 1 | - | M | (Tzvelev 1976; Naturalis) |
| Montenegro | 2002 | - | 1 | - | - | (Herbarium WU) |
| Netherlands | 1936 | - | 1 | - | N | (Naturalis) |
| Palestine/Israel | 1932 | absent | - | - | - | (Post 1932) |
| Poland | 1998 | 1 | - | - | - | (Frey and Paszko 1998) |
| Romania | 1913 | 2 | 4 | - | O | (Naturalis; BioCASE; Merce et al. 2007; Sârbu et al. 2009) |
| Russia | 1963 | 2 | 2 | - | P | (Tzvelev 1976; Komarov 1963; Olga Demina, and Alexey Shipunov, PC) |
| Saudi Arabia | 1978 | absent | - | absent | - | (Migahid 1978; Mandaville 1990) |
| Serbia | 2012 | 1 | - | present | - | (Panjković et al. 2012) |
| Slovakia | 1906 | 1 | 8 | rare | Q | (Naturalis; BioCASE; GBIF; Turis et al. 2014) |
| Spain | 1861 | 41 | 91 | - | R | (BioCASE; Anthos; Morales 2003; López et al. 2011; BioCASE; GBIF; Anthos) |
| Syria | - | absent | - | - | - | (Post 1932) |
| Tunisia | - | absent | - | absent | - | (Maire 1952) |
| Turkey | 1856 | 13 | 16 | present | S | (Edinburgh; GBIF; Naturalis, Davis 1965; Arabaci and Yildiz 2004; Licim et al. 2008; Duran and Dural 2003; Ocak et al. 2009) |
| Ukraine | 1901 | 2 | 33 | - | T | (Didukh et al. 2004; Tzvelev 1976; GBIF; Herbarium WU; BioCASE) |
| United Kingdom | 1986 | 1 | - | - | - | (Copping 1987) |

Literature1: number of books and journals. Specimen2: number of herbarium specimens and /or human observation without collect samples, more details: **Austria (**33herbarium specimens), **Belgium** (4herbarium specimens), **Bulgaria** (10herbarium specimens), **Czech Republic** (7herbarium specimens), **Finland** (1herbarium specimen), **France (**13herbarium specimens and 53 human records of human observation without collect samples), **Germany** (49herbarium specimens and 5 human records of human observation without collect samples), **Greece** (14herbarium specimens), **Hungary** (14herbarium specimens), **Iran** (2herbarium specimens), **Italy** (5herbarium specimens), **Macedonia** (1human record of human observation without collect sample), **Moldova** (1herbarium specimen), **Montenegro** (1herbarium specimen), **Netherlands** (1herbarium specimens), **Romania** (4herbarium specimens), **Russia** (2human records of human observation without collect samples), **Slovakia** (8herbarium specimens), **Spain** (39herbarium specimens and 52 human records of human observation without collect samples), **Turkey** (16herbarium specimens), **Ukraine** (33herbarium specimens). Personal communication (PC)3: personal communications with botanists and herbarium curators by email. Institution4: The locations of the records, more details: **A** (Herbarium GZU, Vascular Plant Herbarium Oslo, Naturalis Biodiversity Center, Herbarium WU, Biologiezentrum Linz), **B** (Naturalis Biodiversity Center, Museum National d'Histoire naturelle), **C** (Herbarium Berolinense, Universidad de Sevilla, Real Jardín Botánico, Naturhistorisches Museum Wien, Universidad de Santiago de Compostela, Vascular Plant Herbarium, , Museo de Ciencias Naturales de Alava, Universidad de Salamanca), **D** (Vascular Plant Herbarium, Biological Museum, Oskarshamn, Universitat de València, Institute of Botany, Academy of Sciences of the Czech Republic, Museum of Evolution, Naturalis Biodiversity Center), **F** (FMNH), **H** ( Conservatoire botanique national du Bassin parisien, Museum national d'Histoire naturelle, Naturalis Biodiversity Center, Universidad de Salamanca, Universitat de València, Conservatoire Botanique National Alpin, Royal Botanic Garden Edinburgh), **I** ( (Naturalis, , Natural History Museum, Herbarium, Naturhistorisches Museum Wien, Herbaria of the University and ETH Zürich, Senckenberg Gesellschaft für Naturforschung: Senckenberg Forschungsinstitut und Naturmuseum, Vascular Plant Herbarium Oslo, Flora exsiccata Bavarica, Biological Museum, Oskarshamn, Digitization of plant specimens from Rhoen and Vogelsberg, Museum of Natural History Mainz, Herbarium Berolinense, Inatura Dornbirn, Karl-Franzens-Universität Graz, Naturalis Biodiversity Center), **J** ( Lund University, Herbarium Berolinense), **K** (Herbarium Karl-Franzens-Universität Graz, Vascular Plant Herbarium, Real Jardín Botánico, Naturalis Biodiversity Center, Museo Nacional de Historia Natural, Herbarium Universalmuseum Joanneum), **L** (Naturhistorisches Museum Wien, Museo Nacional de Historia Natural, **M** (Museo Nacional de Historia Natural), **N** (Herbarium Jansen and Wachter), **O** (Naturalis Biodiversity Center), **P** (Southern Federal University), **Q** (Herbarium Naturhistorisches Museum Wien, Vascular Plant Herbarium Oslo, National Museum of Natural History, Naturalis Biodiversity Center), **R** (Institut Menorquí d'Estudis, Conservatoire et Jardin botaniques de la Ville de Genève, Universidad de Salamanca, Universitat de València, Universidad de Santiago de Compostela, Real Jardín Botánico, Universidad de León, Museo de Ciencias Naturales de Alava, Universidad de Sevilla, Naturalis Biodiversity Center; Universidad de Navarra), **S** (Naturalis Biodiversity Center, Royal Botanic Garden Edinburgh Herbarium, National Museum of Natural History, Moscow Digital Herbarium - Moscow State University), **T** (Moscow State University Herbarium, Biological Museum herbarium, Oskarshamn, Herbarium of Universität Wien),**X** (Naturhistorisches Museum Wien). Within a category, a dash (–) means no information for presence or absence was found.