



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

ARCHIVIO ISTITUZIONALE DELLA RICERCA

Alma Mater Studiorum Università di Bologna Archivio istituzionale della ricerca

IDPlanT: the Italian database of plant translocation

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

IDPlanT: the Italian database of plant translocation / Abeli T.; D'Agostino M.; Orsenigo S.; Bartolucci F.; Accogli R.; Albani Rocchetti G.; Alessandrelli C.; Amadori A.; Amato F.; Angiolini C.; Assini S.; Bacchetta G.; Banfi E.; Bonini I.; Bonito A.; Borettini M.L.; Brancaleoni L.; Brusa G.; Buldrini F.; Carruggio F.; Carta A.; Castagnini P.; Cerabolini B.E.L.; Ceriani R.M.; Ciaschetti G.; Citterio S.; Clementi U.; Cogoni D.; Congiu A.; Conti F.; Crescente M.F.; Crosti R.; Cuenca A.; D'Antraccoli M.; Dallai D.; De Andreis R.; Deidda A.; Dessi C.; De Vitis M.; Di Cecco V.; Di Cecco M.; Di Giustino A.; Di Martino L.; Di Noto G.; Domina G.; Fabrini G.; Farris F.; Fieroni P.; Fiore A.; Fosti F.; Galasso G.; Garfi G.; Gentile G.; Geraci A.; Gerdol R.; Gheza G.; Giusso del Galdo G.; Gratani L.; La Placa G.; Landi M.; Loi T.; Luzzaro A.; Alfredo M.; Magnani C.; Magnani S.; Mantino F.; Mariotti M.G.; Martinelli V.; Mastrullo S.; Medagli P.; Minuto L.; Nonis D.; Palumbo M.; Paolillo P.; Pata 180 Peruzzi A.; Peruzzi M.S.; Rainini F.; Ravera S.; Rossi G.; Sanna N.; Santini C.; Sau S.; Schettino A.; Schicchi R.; Sciandrello S.; Sgarbi E.; Gristina A.S.; Troia A.; Varone L.; Villa M.; Zappa E.; Fenu G. - In: PLANT BIOSYSTEMS. - ISSN 1126-3504. - STAMPA. - 155:6(2021), pp. 1174-1177. [10.1080/11263504.2021.1985004]

Terms of use:

Some rights reserved. The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (<https://cris.unibo.it/>).
When citing, please refer to the published version.

(Article begins on next page)

This is the final peer-reviewed accepted manuscript of:

Abeli, T., D'Agostino, M., Orsenigo, S., Bartolucci, F., Accogli, R., Albani Rocchetti, G., . . . Fenu, G. (2021). IDPlanT: The italian database of plant translocation. *Plant Biosystems*, 155(6), 1174-1177

The final published version is available online at
<https://doi.org/10.1080/11263504.2021.1985004>

Rights / License:

The terms and conditions for the reuse of this version of the manuscript are specified in the publishing policy. For all terms of use and more information see the publisher's website.

This item was downloaded from IRIS Università di Bologna (<https://cris.unibo.it/>)

When citing, please refer to the published version.



Plant Biosystems - An International Journal Dealing with all Aspects of Plant Biology

Official Journal of the Societa Botanica Italiana

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/tplb20>

IDPlanT: The Italian Database of Plant Translocation

Thomas Abeli, Martina D'Agostino, Simone Orsenigo, Fabrizio Bartolucci, Rita Accogli, Giulia Albani Rocchetti, Claudia Alessandrelli, Arianna Amadori, Filippo Amato, Claudia Angiolini, Silvia Assini, Gianluigi Bacchetta, Enrico Banfi, Ilaria Bonini, Andrea Bonito, Maria Luisa Borettini, Lisa Brancaleoni, Guido Brusa, Fabrizio Buldrini, Francesca Carruggio, Angelino Carta, Paolo Castagnini, Bruno Enrico Leone Cerabolini, Roberta Maria Ceriani, Giampiero Ciaschetti, Sandra Citterio, Umberto Clementi, Donatella Cogoni, Angelino Congiu, Fabio Conti, Maria Fiore Crescente, Roberto Crosti, Alba Cuenca, Marco D'Antraccoli, Daniele Dallai, Rossella De Andreis, Angela Deidda, Carlo Dessì, Marcello De Vitis, Valter Di Cecco, Mirella Di Cecco, Attilio Di Giustino, Luciano Di Martino, Giuseppe Di Noto, Gianniantonio Domina, Giuseppe Fabrini, Emmanuele Farris, Roberto Fiorentin, Bruno Foggi, Luigi Forte, Gabriele Galasso, Giuseppe Garfi, Carmelo Gentile, Rodolfo Gentili, Anna Geraci, Renato Gerdol, Gabriele Gheza, Gianpietro Giusso del Galdo, Loretta Gratani, Gaetano La Placa, Marco Landi, Tonino Loi, Alessandra Luzzaro, Alfredo Maccioni, Claudio Magnani, Sara Magrini, Francesca Mantino, Mauro G. Mariotti, Valentino Martinelli, Savino Mastrullo, Pietro Medagli, Luigi Minuto, Domitilla Nonis, Maria Elena Palumbo, Luca Paoli, Salvatore Pasta, Lorenzo Peruzzi, Simon Pierce, Maria Silvia Pinna, Franco Rainini, Sonia Ravera, Graziano Rossi, Nicola Sanna, Claudio Santini, Silvia Sau, Aldo Schettino, Rosario Schicchi, Saverio Sciandrello, Elisabetta Sgarbi, Alessandro Silvestre Gristina, Angelo Troia, Laura Varone, Mauro Villa, Elena Zappa & Giuseppe Fenu

To cite this article: Thomas Abeli, Martina D'Agostino, Simone Orsenigo, Fabrizio Bartolucci, Rita Accogli, Giulia Albani Rocchetti, Claudia Alessandrelli, Arianna Amadori, Filippo Amato, Claudia Angiolini, Silvia Assini, Gianluigi Bacchetta, Enrico Banfi, Ilaria Bonini, Andrea Bonito, Maria Luisa Borettini, Lisa Brancaleoni, Guido Brusa, Fabrizio Buldrini, Francesca Carruggio, Angelino Carta, Paolo Castagnini, Bruno Enrico Leone Cerabolini, Roberta Maria Ceriani, Giampiero Ciaschetti, Sandra Citterio, Umberto Clementi, Donatella Cogoni, Angelino Congiu, Fabio Conti, Maria Fiore Crescente, Roberto Crosti, Alba Cuenca, Marco D'Antraccoli, Daniele Dallai, Rossella De Andreis, Angela Deidda, Carlo Dessì, Marcello De Vitis, Valter Di Cecco, Mirella Di Cecco, Attilio Di Giustino, Luciano Di Martino, Giuseppe Di Noto, Gianniantonio Domina, Giuseppe Fabrini, Emmanuele Farris, Roberto Fiorentin, Bruno Foggi, Luigi Forte, Gabriele Galasso, Giuseppe Garfi, Carmelo Gentile, Rodolfo Gentili, Anna Geraci, Renato Gerdol, Gabriele Gheza, Gianpietro Giusso del Galdo, Loretta Gratani, Gaetano La Placa, Marco Landi, Tonino Loi, Alessandra Luzzaro, Alfredo Maccioni, Claudio Magnani, Sara Magrini, Francesca Mantino, Mauro G. Mariotti, Valentino Martinelli, Savino Mastrullo, Pietro Medagli, Luigi Minuto, Domitilla Nonis, Maria Elena Palumbo, Luca Paoli, Salvatore Pasta, Lorenzo Peruzzi, Simon Pierce, Maria Silvia Pinna, Franco Rainini, Sonia Ravera, Graziano Rossi, Nicola Sanna, Claudio Santini, Silvia Sau, Aldo Schettino, Rosario Schicchi, Saverio Sciandrello, Elisabetta Sgarbi, Alessandro Silvestre Gristina, Angelo Troia, Laura Varone, Mauro Villa, Elena Zappa & Giuseppe Fenu (2021): IDPlanT: The Italian Database of Plant

To link to this article: <https://doi.org/10.1080/11263504.2021.1985004>



Accepted author version posted online: 27
Sep 2021.



Submit your article to this journal [↗](#)



View related articles [↗](#)



CrossMark

View Crossmark data [↗](#)

RAPID REPORT

IDPlanT: The Italian Database of Plant Translocation

Thomas Abeli¹, Martina D'Agostino¹, Simone Orsenigo², Fabrizio Bartolucci³, Rita Accogli⁴, Giulia Albani Rocchetti¹, Claudia Alessandrelli⁵, Arianna Amadori⁶, Filippo Amato⁷, Claudia Angiolini⁸, Silvia Assini⁹, Gianluigi Bacchetta¹⁰, Enrico Banfi¹¹, Iaria Bonini¹², Andrea Bonito¹³, Maria Luisa Borettini¹⁴, Lisa Brancaleoni¹⁵, Guido Brusa¹⁶, Fabrizio Buldrini¹⁷, Francesca Carruggio¹⁸, Angelino Carta¹⁹, Paolo Castagnini¹², Bruno Enrico Leone Cerabolini²⁰, Roberta Maria Ceriani²¹, Giampiero Ciaschetti²², Sandra Citterio²³, Umberto Clementi²⁴, Donatella Cogoni²⁵, Angelino Congiu²⁶, Fabio Conti²⁷, Maria Fiore Crescente¹³, Roberto Crosti²⁸, Alba Cuenca²⁹, Marco D'Antraccoli³⁰, Daniele Dallai³¹, Rossella De Andreis³², Angela Deidda³³, Carlo Dessì³³, Marcello De Vitis³⁴, Valter Di Cecco³⁵, Mirella Di Cecco³⁶, Attilio Di Giustino³⁷, Luciano Di Martino²², Giuseppe Di Noto³⁸, Gianniantonio Domina³⁹, Giuseppe Fabrini⁴⁰, Emmanuele Farris⁴¹, Roberto Fiorentin⁴², Bruno Foggi⁴³, Luigi Forte^{44,45}, Gabriele Galasso⁴⁶, Giuseppe Garfi⁴⁷, Carmelo Gentile⁵, Rodolfo Gentili⁴⁸, Anna Geraci⁴⁹, Renato Gerdol⁵⁰, Gabriele Gheza⁵¹, Gianpietro Giusso del Galdo⁵², Loretta Gratani¹³, Gaetano La Placa⁷, Marco Landi¹², Tonino Loi³³, Alessandra Luzzaro¹⁶, Alfredo Maccioni⁶, Claudio Magnani¹⁴, Sara Magrini⁵³, Francesca Mantino⁵⁴, Mauro G. Mariotti⁵⁵, Valentino Martinelli⁵⁶, Savino Mastrullo⁵⁷, Pietro Medagli⁵⁸, Luigi Minuto⁵⁹, Domitilla Nonis⁶⁰, Maria Elena Palumbo⁶, Luca Paoli¹⁹, Salvatore Pasta⁶¹, Lorenzo Peruzzi⁶², Simon Pierce⁶³, Maria Silvia Pinna²⁹, Franco Rainini⁶⁴, Sonia Ravera⁷, Graziano Rossi⁶⁵, Nicola Sanna⁶⁶, Claudio Santini⁶⁷, Silvia Sau⁶⁸, Aldo Schettino⁶⁹, Rosario Schicchi⁴⁹, Saverio Sciandrello⁷⁰, Elisabetta Sgarbi⁷¹, Alessandro Silvestre Gristina⁶¹, Angelo Troia⁷², Laura Varone⁷³, Mauro Villa⁷⁴, Elena Zappa⁷⁵, Giuseppe Fenu²⁹

¹Università degli Studi Roma Tre Facoltà di Scienza Matematiche Fisiche e Naturali, Roma, 00154 Italy

²Università degli Studi di Pavia, Department of Earth and Environmental Sciences, Pavia, 27100 Italy

³Università di Camerino, Barisciano, Italy

⁴Università del Salento, Lecce, 73100 Italy

⁵Ente Parco Nazionale d'Abruzzo Lazio e Molise, Pescasseroli, 67032 Italy

⁶Università degli Studi di Sassari, Sassari, 07100 Italy

⁷Università degli Studi di Palermo, Palermo, 90133 Italy

⁸Dip. Scienze della Vita, Siena, Italy

⁹Pavia University, Scienze della Terra e dell'Ambiente - Sez. Ecologia del Territorio, Pavia, 27100 Italy

¹⁰University of Cagliari, Botanical Sciences, Cagliari, 09123 Italy

¹¹Museo di Storia Naturale di Milano, Sezione di Botanica, Milano, Italy

¹²Università degli Studi di Siena, Siena, 53100 Italy

- ¹³Università degli Studi di Roma La Sapienza, Roma, 00185 Italy
- ¹⁴Guardie Giurate Ecologiche Volontarie, Provincia di Reggio Emilia, Reggio Emilia, Italy
- ¹⁵Università degli Studi di Ferrara, Ferrara, 44121 Italy
- ¹⁶Università degli Studi dell'Insubria, Varese, 21100 Italy
- ¹⁷University of Bologna, Department of Biological, Geological and Environmental Sciences, Bologna, 40126 Italy
- ¹⁸Università degli Studi di Bari "Aldo Moro", Museo Orto Botanico, Bari, 70125 Italy
- ¹⁹Università degli Studi di Pisa, Pisa, Italy
- ²⁰Università degli Studi dell'Insubria, DBSF, Varese, 21100 Italy
- ²¹Native Flora Centre of the Lombardy Region, Galbiate, IT 23851 Italy
- ²²Parco Nazionale della Majella, Sulmona, 67039 Italy
- ²³Università degli Studi di Milano – Bicocca, Dipartimento di Scienze dell'Ambiente e del Territorio e di Scienze della Terra, Milano, I- 20126 Italy
- ²⁴Comunità Montana Alta Valtellina, Bormio (SO), Italy
- ²⁵Università degli Studi di Cagliari, Centro Conservazione Biodiversità (CCB), Dipartimento di Scienze Botaniche, Cagliari, Italy
- ²⁶Oliena (NU), Italy
- ²⁷Centro Ricerche Floristiche dell'Appennino (Università di Camerino - Parco Nazionale del Gran Sasso e Monti della Laga), Barisciano (AQ), Italy
- ²⁸University of Rome La Sapienza, Roma, 00185 Italy
- ²⁹Università degli Studi di Cagliari, Dipartimento di Scienze Botaniche, Cagliari, 09123 Italy
- ³⁰Università di Pisa, Pisa, 56126 Italy
- ³¹Università degli Studi di Modena e Reggio Emilia, Modena, 41121 Italy
- ³²Liceo Scientifico Statale "G. Ferraris", Varese, Italy
- ³³Agenzia Forestas, Cagliari, Italy
- ³⁴Tuscia University, Tuscia Germplasm Bank, largo dell'Università - Blocco C, Viterbo, 01100 Italy
- ³⁵Majella National Park, Sulmona, Italy
- ³⁶Ente Parco Nazionale della Majella, Sulmona (AQ), Italy

- ³⁷Giardino Botanico Gole del Sagittario, Anversa degli Abruzzi (AQ), Italy
- ³⁸Università di Palermo DIIAA, Palermo, 90128 Italy
- ³⁹University of Palermo, Agricultural, Food and Forest Sciences, Palermo, 90128 Italy
- ⁴⁰Sapienza Università di Roma, Dipartimento di Biologia vegetale, Rome, Italy
- ⁴¹Università degli Studi di Sassari, Dipartimento di Scienze Botaniche, Ecologiche e Geologiche, Sassari, 07100 Italy
- ⁴²Veneto Agricoltura, Legnaro, 35020 Italy
- ⁴³University of Florence, Evolutionary Biology - Laboratories of Botany, Florence, Italy
- ⁴⁴Università degli Studi di Bari “Aldo Moro”, Museo Orto Botanico, Bari, Italy
- ⁴⁵Università degli Studi di Bari “Aldo Moro”, Dipartimento di Biologia, Bari, 70125 Italy
- ⁴⁶Museo di Storia Naturale di Milano, Sezione di Botanica, Milano, 20121 Italy
- ⁴⁷CNR-Istituto di Bioscienze e BioRisorse, Palermo, Italy
- ⁴⁸Università degli Studi di Milano-Bicocca, Dipartimento di Scienze dell'Ambiente e del Territorio, Milano, Italy
- ⁴⁹Università degli Studi di Palermo, Biologia ambientale e Biodiversità - Sezione di Scienze Botaniche, Palermo, 90123 Italy
- ⁵⁰University of Ferrara, Ferrara, Italy
- ⁵¹University of Pavia, Earth and Environm Sciences, Pavia, 27100 Italy
- ⁵²University of Catania, Department of Biology, Catania, Italy
- ⁵³Universita degli Studi della Tuscia, Tuscia Germplasm Bank, largo dell'Università - Blocco C, Viterbo, 01100 Italy
- ⁵⁴Botanical Garden Museum, University of Bari “Aldo Moro”, Bari, Italy
- ⁵⁵Genova University, Departmet of Earth Sciences, Environmental and Life, 16136, Italy
- ⁵⁶ERSAF, Bormio, Italy
- ⁵⁷Parco Naturale Regionale Sirente-Velino, Rocca di Mezzo (AQ), Italy
- ⁵⁸University of Salento, DiSTeBA, Lecce, Italy
- ⁵⁹Università degli Studi di Genova, Genova, 16126 Italy
- ⁶⁰Regione Toscana, Firenze, 50129 Italy

⁶¹IBBR CNR Palermo, Palermo, 90128 Italy

⁶²University of Pisa, Biology, via Derna 1, Pisa, Italy

⁶³University of Milan, Department of Agricultural and Environmental Sciences, Milan, IT-20133 Italy

⁶⁴Associazione per i Vivai ProNatura, San Giuliano Milanese (MI), Italy

⁶⁵Università di Pavia, Pavia, Italy

⁶⁶Agenzia Forestas, Orgosolo (NU), Italy

⁶⁷Gruppo Flora Modenese, Modena, Italy

⁶⁸Sestu (CA), Italy

⁶⁹Ente Parco Nazionale del Pollino, Potenza, 85048 Italy

⁷⁰Università di Catania, Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Catania, Italy

⁷¹Università degli Studi di Modena e Reggio Emilia, Life Sciences, Via Amendola, 2, Reggio Emilia, 42122 Italy

⁷²Università degli Studi di Palermo, Dipartimento di Biologia ambientale e Biodiversità, Palermo, 90123 Italy

⁷³Sapienza University of Rome, Department of Environmental Biology, Rome, Italy

⁷⁴Centro Flora Autoctona della Lombardia - Parco Monte Barro, Galbiate (LC), Italy

⁷⁵Hanbury Botanic Gardens, University of Genova, Genova, Italy

simone.orsenigo@unipv.it

Abstract

IDPlanT is the Italian Database of Plant Translocation, an initiative of the Nature Conservation Working Group of the Italian Botanical Society. IDPlanT currently includes 185 plant translocations. The establishment of a national database on plant translocation is a key step forward in data sharing and techniques improvement in this field of plant conservation.

Keywords: assisted colonisation; data-sharing; plant conservation; plant reintroduction; population reinforcement; threatened plants

Introduction

Translocation, the intentional movement of species for conservation purposes (IUCN, 2013), has sharply increased in recent decades, as demonstrated by thousands of translocation projects performed worldwide, involving animals (Brichieri-Colombi & Moehrenschrager, 2016), plants (Dalrymple et al., 2012; Fenu et al. 2019) or other organisms such as fungi and lichens (Soorae, 2018, 2021). Despite the fact that translocation techniques are now popular among conservation biologists, tracking translocation outputs and methods are challenging. The main reason for this

challenge is that most translocation cases are not published in the scientific literature, because they have been implemented in the frame of practical conservation actions and are reported in the grey literature. Other reasons for the high proportion of unpublished translocation are that in many cases they have been unsuccessful, or do not address specific research questions worthy of a scientific publication (Godefroid et al., 2011). Recent initiatives like the IUCN Global Reintroduction Perspectives (e.g.: Soorae, 2016, 2018, 2021) represent useful reports of translocations. However, in this case, data are not organised in a way that can facilitate their retrieval and analysis. In this context, databases become essential to organise and provide information on translocation techniques and improve the underlying science (Godefroid & Vanderborght, 2011). Some databases with global and regional coverage are available for various organisms (e.g. TRANSLOC for Europe <http://translocations.in2p3.fr/>) and specifically for birds (Lincoln Park Zoo, 2020). Other regional and national databases are now available for plants (Vicente et al. 2017; Silcock et al., 2019; Trans-Planta <https://www.conservacionvegetal.org/bdtcpe/>), while in other countries the establishment of translocation databases is recommended (Liu et al., 2015). National databases provide important information on the conservation strategy and policy applied at the country level. In Italy, the reinforcement of *Pinus heldreichii* subsp. *leucodermis* (Antoine) E.Murray in the Pollino National Park (Calabria) is the first documented translocation, carried out in 1958 (original datum included in IDPlanT). Recently, many more translocations have been performed (see for instance the IUCN Global Reintroduction Perspectives cited above), but a national repository for Italy is still lacking, preventing conservation biologists and practitioners from benefitting from each other's experience. The main aims of this article are: 1) to announce the creation of the Italian Database of Plant Translocation (IDPlanT), an initiative of the Nature Conservation Working Group of the Italian Botanical Society and 2) to encourage its continued implementation over time.

IDPlanT structure

IDPlanT has been developed according to the most recent translocation standards (Godefroid and Vanderborght, 2011). IDPlanT will include translocation of different organisms (algae, bryophytes, lichens, fungi, and vascular plants) and all types of translocations, except for large-scale ecological restoration activities and reforestations. It contains key data for the replicability of the methods reported and for future meta-analysis (Supplementary material 1). Units (i.e., rows) represent the single translocated populations (each one referred to hereafter as a 'case'). The reason for this choice is that every translocation may differ in terms of number and type of propagules and methods of propagation, site selection procedure, release, pre- and post-release interventions, monitoring, etc. Among other information (Supplementary material 1), the database includes data on site manipulation, population aftercare and costs, which are all innovative aspects compared to other databases. Methodological variables are coupled with data concerning the percentage of plant survival, flowering, fruiting, and recruitment observed 1 year and 2 years after plant release and at the end of the monitoring period. This approach partially overcomes the limitations related to the classical declaration of success/failure provided by the authors of each case.

Current status of IDPlanT

Currently (April 2021), IDPlanT contains 185 cases collected through a survey of more than 1,000 Italian botanists, conservation biologists and practitioners, most of whom are members of the Italian Botanical Society. The cases include 117 taxa (29 Italian endemics; Bartolucci et al., 2019): one lichen (*Lobaria pulmonaria* (L.) Hoffm.), one lycophyte (*Isoetes malinverniana* Ces. & De Not.), three ferns (*Asplenium trichomanes* L. subsp. *quadrivalens* D.E.Mey., *Marsilea quadrifolia* L., *Pteris cretica* L.), three gymnosperm species (*Abies nebrodensis* (Lojac.) Mattei, *Ephedra distachya* L. subsp. *distachya*, *Pinus heldreichii* Christ subsp. *leucodermis* (Antoine) E.Murray), and 109 angiosperm species.

A total of 19 taxa are listed in the annexes of the “Habitats” Directive 92/43/EEC and/or in the Bern Convention. Moreover, 30 taxa are listed as threatened with extinction (CR, EN, VU) according to the Italian Red List (Orsenigo et al., 2018, 2021). Most translocations are population reinforcements (51.4%) followed by reintroductions (36.8%), and introductions outside the species range (11.9%, including the assisted colonisation of *Acis nicaeensis* (Ardoino) Lledó, A.P. Davis & M.B. Crespo and *Zelkova sicula* Di Pasq., Garfi & Quézel).

Most translocations were carried out in the last ten years, with a sharp increase in their number in the past two decades, compared to the previous period. Currently, the database covers a period of 62 years (from 1958 to 2020; Figure 1), and translocations are well distributed across the country, with the administrative regions Lombardy, Apulia and Sicily showing the highest number of cases reported (Figure 2).

Conclusion

The establishment of IDPlanT is expected to provide several conservation benefits. First, the database will allow conservation biologists and practitioners to share translocation techniques and outcomes, which are essential to identify best practices and avoid recurrent mistakes. Second, policy makers and other stakeholders, such as sub-national administrative jurisdictions and protected areas, will benefit from this tool for monitoring the conservation activities carried out in Italy. Third, the database will be important for the implementation of the “Habitats” Directive, as it will make conservation practices such as translocations more effective for the restoration of favourable conservation status for Italian policy species (Fenu et al., 2017), also allowing demonstration of the efforts carried out for the conservation of taxa listed in the abovementioned Directive and facilitating the periodical reporting related to the Directive. The establishment of IDPlanT plays a key role in the most recent national initiatives, such as the development of the Italian guidelines for plant translocations (Rossi et al., 2013) and the recent national law (D.M. 02-04-2020, n.98) regulating the reintroduction and reinforcement of native policy species in Italy (Gazzetta Ufficiale, 2020). This, however, does not require the establishment of a database of translocation actions.

An important aspect emerging from a preliminary analysis of the database is that only 25% of cases deal with threatened species (according to the IUCN red lists). This means that most translocations involve species that are only locally threatened or not threatened at all, at the expense of species of high conservation priority at the national or global level. On the other hand, populations of widespread taxa may be threatened or show declining trends locally. Therefore, translocation may be justified especially with taxa or populations of phytogeographic importance (e.g., marginal populations, Abeli et al. 2018). Indeed, coordination among institutions, protected area management authorities, scientists and practitioners is needed to avoid wasting resources for the translocation of species of low conservation priority. Two species (*Agrostemma githago* L. subsp. *githago* and *Piptatherum holciforme* (M.Bieb.) Roem. & Schult. subsp. *holciforme*) are considered as alien species (Galasso et al., 2018). The establishment of a national committee of experts for the evaluation of translocation project proposals before the required authorisations are released would be desirable.

Given the importance of a national data repository for plant translocation, we encourage scientists and practitioners working on plant translocation in Italy to contribute to the database. A downloadable data entry form of IDPlanT is available as Supplementary material 1. IDPlanT is managed by the Nature Conservation Working Group of the Italian Botanical Society and the University of Roma Tre, and a summarized version can be viewed at: <https://drive.google.com/drive/folders/1ct8ZNH43Lk8KoX9wPyoO4Ad5EJm1ji9L?usp=sharing>. For enquiries, changes or the addition of new cases to IDPlanT, the Nature Conservation Working Group should be contacted.

Acknowledgments

Authors thank Provincia di Siena, Riserva “Gole del Sagittario”, S. Regina (University of Bari “Aldo Moro”), G. Casazza (University of Genoa), G.I. Suffia, B. Ruffoni, M. Savona, C. Mascarello for their contribution to some of the translocations reported in IDPlanT. The CARE-MEDIFLORA project (<http://www.CARE-MEDIFLORA.eu/>) also wish to acknowledge for financially supporting several translocations in Sardinia and Sicily. We also mention the project “Effects of forest management on threatened macrolichens” developed by the Working Group for Ecology of the Italian Lichen Society for their support to the reintroduction of *Lobaria pulmonaria*. The Grant of Excellence Departments, MIUR-Italy (ARTICOLO 1, COMMI 314 – 337 LEGGE 232/2016) is gratefully acknowledged for support provided to TA.

References

- Abeli T, Vamosi J, Orsenigo S. 2018. The importance of marginal population hotspots of cold-adapted species for research on climate change and conservation. *J Biogeogr.* 45: 977-985.
- Bartolucci F, Peruzzi L, Galasso G, Albano A, Alessandrini A, Ardenghi NMG, Astuti G, Bacchetta G, Ballelli S, Banfi E, et al. 2018. An updated checklist of the vascular flora native to Italy. *Plant Biosyst.* 152(2): 179–303.
- Brichieri-Colombi TA, Moehrensclager A. 2016. Alignment of threat, effort, and perceived success in North American conservation translocations. *Conserv Biol.* 30: 1159-1172.
- Dalrymple SE, Banks E, Stewart GB, Pullin AS. 2012. A meta-analysis of threatened plant reintroductions from across the globe Pages 31–52. In: Maschinski J, Haskins KE, editors. *Plant reintroduction in a changing climate - promises and perils*. Island Press, Washington DC. P. 31-52.
- Fenu G, Bacchetta G, Christodoulou CS, Fournaraki C, Giusso del Galdo GP, Gotsiou P, Kyratzis A, Piazza C, Vicens M, Pinna MS, et al. 2019. An early evaluation of translocation actions for endangered plant species on Mediterranean islands. *Plant Divers.* 41: 94–104.
- Fenu G, Bacchetta G, Giacanelli V, Gargano D, Montagnani C, Orsenigo S, Cogoni D, Rossi G, Conti F, Santangelo A, et al. 2017. Conserving plant diversity in Europe: outcomes, criticisms and perspectives of the Habitats Directive application in Italy. *Biodiv Conserv.* 26: 309-328.
- Galasso G, Conti F, Peruzzi L, Ardenghi NMG, Banfi E, Celesti-Grapow L, Albano A, Alessandrini A, Bacchetta G, Ballelli S, et al. 2018. An updated checklist of the vascular flora alien to Italy. *Plant Biosyst.* 152: 556-592.
- Gazzetta Ufficiale, 2020. Decreto del Ministero dell’ambiente e della tutela del territorio e del mare, 2 Aprile 2020 Criteri per la reintroduzione e il ripopolamento delle specie autoctone di cui all’allegato D del decreto del Presidente della Repubblica 8 settembre 1997, n 357, e per l’immissione di specie e di popolazioni non autoctone (20A02112). *Gazzetta Ufficiale della Repubblica Italiana Serie Generale, Anno 161, Numero 98:2*
- Godefroid S, Piazza C, Rossi G, Buord S, Stevens AD, Agurauja R, Cowell C, Vanderborgh T. 2011. How successful are plant species reintroductions? *Biol Conserv.* 144: 672–682.
- Godefroid S, Vanderborgh T. 2011. Plant reintroductions: the need for a global database. *Biodiv Conserv.* 20: 3683-3688.

IUCN (International Union for Conservation of Nature) SSC (Species Survival Commission) 2013. IUCN guidelines for reintroductions and other conservation translocations IUCN SSC, Gland, Switzerland.

Lincoln Park Zoo Avian Reintroduction and Translocation Database Available at: <http://www.lpzoo.org/ARTD> Accessed January 12, 2020.

Liu H, Ren H, Liu Q, Wen X, Maunder M, Gao J. 2015. Translocation of threatened plants as a conservation measure in China. *Conserv Biol.* 29: 1537-1551.

Orsenigo S, Montagnani C, Fenu G, Gargano D, Peruzzi L, Thomas A, Alessandrini A, Bacchetta G, Bartolucci F, Bovio M, et al. 2018. Red Listing plants under full national responsibility: Extinction risk and threats in the vascular flora endemic to Italy. *Biol Conserv.* 224: 213–222.

Orsenigo S, Fenu G, Gargano D, Montagnani C, Abeli T, Alessandrini, Bacchetta G, Bartolucci F, Carta A, Castello M, et al. 2021. Red list of threatened vascular plants in Italy. *Plant Biosyst.* 155: 310-335

Rossi G, Amosso C, Orsenigo S, Abeli T. 2013. Linee guida per la traslocazione di specie vegetali spontanee Quad Cons Natura, 28, MATTM – Ist Sup Protezione e Ricerca Ambientale (ISPRA), Roma ISSN 1592-2901.

Silcock JL, Simmons CL, Monks L, Dillon R, Reiter N, Jusaitis M, Coates DJ. 2019. Threatened plant translocation in Australia: A review. *Biol Conserv.* 236: 211-222

Soorae PS. 2016. Global Reintroduction Perspectives: 2016 Case studies from around the globe IUCN/SSC Reintroduction Specialist Group, Gland, Switzerland and Environment Agency, Abu Dhabi, UAE

Soorae PS. 2018. Global Reintroduction Perspectives: 2018 Case studies from around the globe. IUCN/SSC Reintroduction Specialist Group, Gland, Switzerland and Environment Agency, Abu Dhabi, UAE.

Soorae PS. 2021. Global conservation translocation perspectives: 2021. Case studies from around the globe. Gland, Switzerland: IUCN SSC Conservation Translocation Specialist Group, Environment Agency - Abu Dhabi and Calgary Zoo, Canada.

Vicente Moreno R, Alonso MA, Lara-Romero C, Iriondo JM, García-Fernández A. 2017. Restitución de poblaciones como herramienta de conservación en España. *Conservación Vegetal* 21.

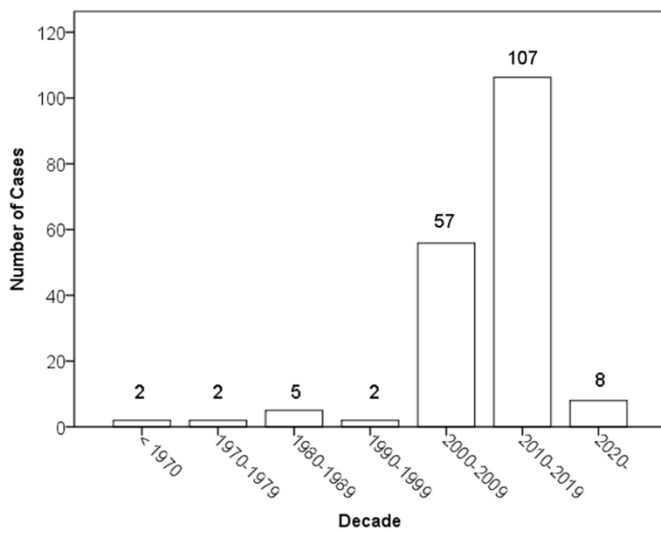


Figure 1. Number of translocations carried out in Italy since the first documented case in 1958.

Accepted Manuscript



Figure 2. Geographical distribution (at the Region level) of translocations carried out in Italy. Numbers indicate the recorded cases for each region.