



PHYTOTAXA

157

Revision of the genus *Tulipa* L. (Liliaceae) in Turkey

İSMAİL EKER¹, MEHMET TEKİN BABAÇ¹ & MEHMET KOYUNCU²

¹Department of Biology, Faculty of Science and Literature, Abant İzzet Baysal University, Gököy, TR 14280, Bolu, Turkey;
email: tuliphunter@hotmail.com

²Department of Pharmaceutic Botany, Faculty of Pharmacy, Ankara University, Tandoğan, TR 06100, Ankara, Turkey



Magnolia Press
Auckland, New Zealand

Eker *et al.*

Revision of the genus *Tulipa* L. (Liliaceae) in Turkey

(*Phytotaxa* 157)

112 pp.; 30 cm.

29 Jan. 2014

ISBN 978-1-77557-328-9 (paperback)

ISBN 978-1-77557-329-6 (Online edition)

FIRST PUBLISHED IN 2014 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: magnolia@mapress.com

<http://www.mapress.com/phytotaxa/>

© 2014 Magnolia Press

All rights reserved.

No part of this publication may be reproduced, stored, transmitted or disseminated, in any form, or by any means, without prior written permission from the publisher, to whom all requests to reproduce copyright material should be directed in writing.

This authorization does not extend to any other kind of copying, by any means, in any form, and for any purpose other than private research use.

ISSN 1179-3155 (Print edition)

ISSN 1179-3163 (Online edition)

Table of Contents

Abstract	3
Introduction	3
Material and Methods	7
Morphological Analyses	7
Cytotaxonomical Analyses	12
Results	13
Discussion	17
Conclusions	24
Taxonomic treatment	27
Diagnostic Key to the Turkish Species of <i>Tulipa</i>	28
ENUMERATION OF SPECIES	29
Acknowledgements	93
References	94
Appendix I	99
Appendix II	111

Abstract

To address taxonomic problems stemming from treatments in the *Flora of Turkey* and other publications, *Tulipa* is revised for Turkey. Following detailed morphological and cytotaxonomic studies of the taxa, *Tulipa* in Turkey has been found to be represented by 17 species, two subspecies and two varieties (in total 19 taxa). A new key for the species and detailed descriptions of taxa are provided, as are synonyms and typification as far as possible, distribution, habitat types, localities and conservation status of all taxa. These studies are based on approximately 1000 fresh and 2000 herbarium specimens. Adopting the classification of Van Raamsdonk & De Vries, *Tulipa* is divided into two subgenera, *Eriostemones* and *Tulipa*, which were previously treated as sections by Marais in *Flora of Turkey* following Boissier's classification. *Tulipa* subgenus *Eriostemones* is divided into two sections following Baker's treatment: *Sylvestres* and *Saxatiles*. However, section *Sylvestres* is again divided into two subsections following Baker and Hall's treatments: *Sylvestres* and *Biflores* (here described). Section *Saxatiles* is further divided into three subsections, with the addition of two new subsections: *Saxatiles*, *Orphanidetes* and *Humiles*. The type subgenus *Tulipa* is divided into two sections: *Tulipa* and *Clusianae*. In subsection *Humiles*, *T. pulchella* is accepted at species rank, having usually been placed as a synonym of *T. humilis*. Some previously uncollected species (*T. raddii* and *T. saxatilis*) and a doubtful record (*T. clusiana*), after the first collection of material in Turkey, have been recollected and verified.

Key words: Flora of Turkey, Liliaceae, Tulipeae

Introduction

Tulipa Linnaeus (1753: 305) is a member of Liliaceae, which was formerly treated as a large family, Liliaceae *sensu lato*. According to Cronquist (1981), Liliaceae consisted of about 280 genera and nearly 4000 species, but more recently on the basis of molecular studies the family has been broken into segregate families in several orders; these include families such as Smilacaceae (Liliales), Asparagaceae (Asparagales), Nartheciaceae (Dioscoreales), Liliaceae *s.s.* (Liliales), Colchicaceae (Liliales) etc. (APG III 2009, Reveal & Chase 2011). According to the most recent phylogenetic studies (Rønsted *et al.* 2005, Fay *et al.* 2006, APG III 2009), Liliaceae include 15 genera: *Amana* Honda (1935: 20), *Calochortus* Pursh (1814: 240), *Cardiocrinum* (Endlicher, 1836: 141) Lindley (1847: 205), *Clintonia* Rafin (1818: 266), *Medeola* Linnaeus (1753: 339), *Erythronium* Linnaeus (1753: 305), *Fritillaria* Linnaeus (1753: 303), *Gagea* Salisbury (1806: 555), *Lilium* Linnaeus (1753: 302) (including *Nomocharis*), *Notholirion* Wallich ex Boissier (1882: 190), *Scoliopus* Torrey (1857: 145), *Prosartes* Don (1839: 48), *Streptopus* Michaux (1803: 200), *Tricyrtis* Wallich (1826: 61) and *Tulipa*. They are mostly distributed in steppes and mountain meadows of temperate and subtropical regions of the Northern Hemisphere, especially Asia (Simpson 2006) except for *Clintonia*, *Medeola*, *Scoliopus*, *Prosartes*, and *Streptopus*, which are plants of temperate deciduous forests. Hayashi & Kawano (2000) and Patterson & Givnish (2002) supported Liliaceae *sensu* Tamura, based on plastid DNA sequence data: *rbcL/matK* and *rbcL/ndhF*, respectively. Takhtajan (1997) included *Tulipa* in

the EU-SYNTHESIS programme, and also we are grateful to the directors and curators of P, MPU and G for information about de Candolle's collection. Finally, we would like to give special thanks to Ali A. Dönmez from Hacettepe University and Mustafa Ünal from Abant İzzet Baysal University for their nomenclatural help.

References

- Abbott, L.A., Bisby, F.A. & Rogers, D.J. (1985) *Taxonomic analyses in biology*. Columbia University Press, New York, 336 pp.
- Ali, S.I. & Qaiser, M. (2007) *Flora of Pakistan*, 215, Liliaceae. Missouri Botanical Garden Press, St. Louis, 108 pp.
- Al-Eisawi, D.M. (1998) *Field guide to flowers of Jordan and neighbouring countries*. UNDP, Al-Rai Print Shop, Amman, 296 pp.
- Almeida, M.T. & Bisby, F.A. (1984) A simple method for establishing taxonomic characters from measurement data. *Taxon* 33: 405–409.
<http://dx.doi.org/10.2307/1220978>
- Angiosperm Phylogeny Group [APG] (2009) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG III. *Botanical Journal of the Linnean Society* 161: 105–121.
<http://dx.doi.org/10.1111/j.1095-8339.2009.00996.x>
- Anthos (2013) Anthos, sistema de información sobre las plantas de España. Available online at <http://www.anthos.es/index.php?lang=en>, accessed 9 August 2013.
- Baker, J.G. (1874) Revision of the genera and species of Tulipeae. *Journal of the Linnean Society, Botany* 14: 275–296.
- Baker, J.G. (1883a) The species of *Tulipa*. *Gardener's Chronicle* 19: 626, 668, 691, 788.
- Baker, J.G. (1883b) The species of *Tulipa*. *Gardener's Chronicle* 20: 11, 12, 71, 153, 168–169, 233–234, 266.
- Baker, J.G. (1891) *Tulipa sintenisii*. *Gardeners' Chronicle* (3rd series) 9: 330.
- Baker, J.G. (1894) *Tulipa sprengeri*. *The Gardener's Chronicle* (3rd series) 15: 716.
- Başak, N. & Özhatay, N. (1997) Cytotaxonomical notes on the genus *Tulipa* L. (Liliaceae) in European Turkey. *Bocconea* 5: 727–731.
- Baytop, T. (1975) The genus *Tulipa* in European Turkey. *İstanbul Üniversitesi Eczacılık Fakültesi Mecmuası* 11: 167–170.
- Baytop, T. (1998) *İstanbul Lalesi*, T.C. Kültür Bakanlığı Yayınları, Ankara, 66 pp.
- Beniston, N.T. & Beniston, W.S. (1984) *Fleurs D'Algérie*. Entreprise Nationale du Livre Alger, Algérie, 359 pp.
- Boissier P.E. (1844) *Tulipa undulatifolia*. *Diagnoses Plantarum Orientalium Novarum* 5: 57.
- Boissier, P.E. (1884) Section *Eriostemones*. *Flora Orientalis* V: 191
- Bonnet, E. & Barratte, G. (1896) *Catalogue raisonné des plantes vasculaires de la Tunisie*. Imprimerie Nationale, Paris, 519 pp.
- Borg, J. (1927) *Descriptive flora of the Maltese islands including the ferns and flowering plants*. Malta Government Printing Office, 846 pp.
- Boulos, L. (2005) *Tulipa*. *Flora of Egypt*, vol 4, Al Hadara, Cairo. pp. 39–41.
- Bryan, J. & Griffiths, M. (1995) *Manual of bulbs*. Timber Press, Portland, 383 pp.
- Candolle A.P. de (1805) *Tulipa oculus-solis*. In: Lamarck, J.B. de & Candolle, A.P. de (eds), *Flore Francaise*, Vol. 3, Paris, pp. 200.
- Cavanilles, A.J. (1802) *Descripción de las plantas*, vol 2. Imprenta Real, Madrid, 448 pp.
- Celesti-Grapow, L., Pretto, F., Carli, E. & Blasi, C. (2010) *Flora vascolare alloctona e invasiva delle regioni d'Italia*. Casa Editrice Università La Sapienza, Rome, 206 pp.
- Chaudhary, S.A. (2001) *Flora of the Kingdom of Saudi Arabia*, Vol. III. Ministry of Agriculture & Water, National Agriculture & Water Research Center, Riyadh, 230 pp.
- Christenhusz, M.J.M., Fay, M.F. & Govaerts, R. (2013) Proposal to reject the name *Tulipa praecox* Cav. *Taxon* 62: 404.
<http://dx.doi.org/10.12705/622.19>
- Christenhusz, M.J.M., Govaerts, R., David, J.C., Hall, T., Borland, K., Roberts, P.S., Tuomisto, A., Buerki, S., Chase, M.W. & Fay, M.F. (2013) Tiptoe through the tulips - cultural history, molecular phylogenetics and classification of *Tulipa* (Liliaceae). *Botanical Journal of the Linnean Society* 172: 280–328.
<http://dx.doi.org/10.1111/boj.12061>
- Ciocârlan, V. (2000) *Tulipa. Flora ilustrată a României*. Editura Ceres, Bucarest, pp. 903–904.
- Coşkunçelebi, K., Terzioğlu, S., Türkmen, Z., Makbul, S. & Usta, A. (2008) A comparative study on two closely related *Tulipa* L. taxa from NE Anatolia. *Plant Systematics and Evolution* 276: 191–198.
<http://dx.doi.org/10.1007/s00606-008-0094-z>
- Cronquist, A. (1981) Liliaceae. *An integrated system of classification of flowering plants*. Columbia University, New York, pp. 1208–1211.
- Danin, A. (2013). Flora of Israel online. Available online at <http://flora.huji.ac.il/>. accessed 31 December 2013.
- Diklić, N. (1975) *Tulipa*. In: Josifović, M. (ed), *Flore de la Republique Socialiste de Serbia*, vol. VII, Classe des Sciences Naturelles et Mathématiques, Belgrade, pp. 534–537.
- Dobbs, L. (2003) *Tulip — 70 stunning varieties of the world's favorite flower*, St Martin's, New York, 104 pp.
- Edmondson, J.R. (1984) *Erythronium* L. In: Davis, P. H. (ed), *Flora of Turkey and the east Aegean islands*, Vol 8. Edinburgh

University Press, Edinburgh, p. 311.

- Eker, İ. & Babaç, M.T. (2010) *Tulipa koyuncui* Eker & Babaç *sp. nov.* (Liliaceae) from east Anatolia. *Nordic Journal of Botany* 28: 324–328.
<http://dx.doi.org/10.1111/j.1756-1051.2009.00591.x>
- Eker, İ. (2012) *Tulipa*. In: Güner, A., Aslan, S., Ekim, T., Vural, M. & Babaç, M.T. (eds), *Türkiye Bitkileri Listesi (Damarlı Bitkiler)*. Nezahat Gökyiğit Botanik Bahçesi ve Flora Araştırmaları Derneği Yayını, İstanbul, pp. 610–612.
- Ekim, T. & Güner, A. (1986) The Anatolian diagonal: fact or fiction? *Proceedings of the Royal Society of Edinburgh* 89B: 69–77.
- Ekim, T., Koyuncu, M., Güner, A., Erik, S., Yıldız, B. & Vural, M. (1991) *Türkiye'nin ekonomik değer taşıyan geofitleri üzerinde taksonomik ve ekolojik araştırmalar*, Tarım Orman ve Köyişleri Bakanlığı O.G.M., Ankara. 111 pp. (in Turkish)
- Ekim, T., Koyuncu, M., Vural, M. Duman, H. Aytaç, Z. & Adıgüzel, N. (2000) *Türkiye bitkileri kırmızı kitabı (Turkish red data book)*, Türkiye Tabiatını Koruma Derneği, Ankara, 251 pp. (in Turkish)
- Elçi, Ş. (1982) *Sitogenetikte Gözlemler ve Araştırma Yöntemleri*, Fırat Üniversitesi Fen-Edebiyat Fakültesi Yayınları, Elazığ, pp. 21–66.
- Erik, S. (1995) Türkiye'nin yok olan ve tehlike altındaki bitkileri, *Ot Sistematik Botanik Dergisi* 2: 111–122.
- Fay, M.F., Chase, M.W., Rønsted, N., Devey, D.S., Pillon, Y., Pires, J.C., Petersen, G., Seberg, O. & Davis, J.I. (2006) Phylogenetics of Liliales: summarized evidence from combined analyses of five plastid and one mitochondrial loci. *Aliso* 22: 559–565.
- Fedorov, A.A. (2001) *Tulipa*. In: Fedorov, A.A. (ed), *Flora of Russia, The European parts and bordering regions*, Vol. 4, Balkema, Rotterdam, pp. 336–341.
- Feinbrun-Dothan, N. (1986) *Tulipa*. In: Zohari, M., Feinbrun-Dothan, N. (eds), *Flora Palaestina* 4. The Israel Academy of Sciences and Humanities, Jerusalem, pp. 39–43.
- Fomin, A.V. (1908) *Tulipa mucronata*. *Věstník Tiflisskago Botaniceskago Sada* 9: 13.
- Fomin, A.V. (1908) *Tulipa kaghyzmanica*. *Věstník Tiflisskago Botaniceskago Sada* 9: 13.
- Frey, J.F. (1896) *Tulipa brachyanthera*. *Bulletin de l'Herbier Boissier* 4: 187.
- Frey, J.F. (1896) *Tulipa galatica*. *Bulletin de l'Herbier Boissier* 4: 186.
- Frey, J.F. (1896) *Tulipa lutea*. *Bulletin de l'Herbier Boissier* 4: 185.
- Ghahreman, A., Attar, F. & Ghahremaninejad, F. (2007) A new species of *Tulipa* (Liliaceae) from western Iran. *Novon* 17: 437–439.
[http://dx.doi.org/10.3417/1055-3177\(2007\)17\[437:ansotl\]2.0.co;2](http://dx.doi.org/10.3417/1055-3177(2007)17[437:ansotl]2.0.co;2)
- Govaerts, R. (2013) *Tulipa*. In: Govaerts, R. (ed), *World checklist of selected plant families*: RBG Kew, UK. <http://apps.kew.org/wcsp/qsearch.do> (accessed 01 March 2013).
- Grey-Wilson, C. & Matthews V. A. (1980) *Tulipa*. In: Tutin, G.T. et al. (eds), *Flora Europaea*, vol. 5. Cambridge University Press, Cambridge, pp. 28–31.
- Grubov, V.I. (1982) *Tulipa*. In: Grubov, V.I. (ed), *Key to the vascular plants of Mongolia (with an atlas)*. Science Publications, Leningrad, pp. 67.
- Guignard, L. (1900) L'appareil sexuel et la double fécondation dans les tulipes. *Annales des Sciences Naturalles Botanique* (ser. viii) 11: 365–387.
- Guinochet, M. & de Vilmorin, R. (1978) *Tulipa*. In: Guinochet, M. & de Vilmorin, R. (1978), *Flore De France*, fascicule 3. Centre national de la recherche scientifique, Paris, pp. 1100–1103.
- Hall, A.D. (1938) *Tulipa aitchisonii*, *Journal of Botany* 76: 313.
- Hall, A.D. (1940) *The genus Tulipa*. Royal Horticultural Society, London, 171 pp.
- Hayashi, K. & Kawano, S. (2000) Molecular systematics of *Lilium* and allied genera (Liliaceae): Phylogenetic relationships among *Lilium* and related genera based on the *rbcL* and *matK* gene sequence data. *Plant Species Biology* 15: 73–93.
- Heldreich, T.H.H. von. (1874) *Tulipa hageri*, *Gartenflora* 23: 97.
- Heldreich, T.H.H. von. (1862) *Tulipa orphanidea*, *Gartenflora* 11: 309, t. 373.
- Herbert, W. (1844) *Tulipa humilis*, *Edwards's Botanical Register* 30(Misc.): 30.
- Hess, H.E., Landolt, E. & Hirzel, R. (1967) *Tulipa*. In: Hess, H.E. et al. (ed), *Flora der Schweiz und angrenzender Gebiete: Band I. Pteridophyta bis Caryophyllaceae*. Birkh?user, Basel and Stuttgart, pp. 549–551.
- Hoog, M.H. (1973) On the origin of *Tulipa*. In: Napier, E. & Platt, J.N.O. (eds), *Lilies and other Liliaceae*. The Royal Horticultural Society, London, pp. 47–64.
- Hooker, W.J. (1827) *Tulipa stellata*. *Curtis's Botanical Magazine* 54: t. 2762.
- Huxley, A. & Taylor, W. (1989) *Tulipa. Flowers of Greece and the Aegean*. Hogarth, London, pp. 147–148.
- IPNI (2012) *The international plant names index*. Published online <http://www.ipni.org> (accessed 15 December 2012).
- IUCN (2001) *The IUCN Red List categories and criteria, version 3.1*. IUCN Species Survival Commission, Gland & Cambridge, 30 pp.
- Juodkaite, R., Naujalis, J.R., Navalinskiene, M. & Samuitiene, M. (2005) Evaluation of tulip (*Tulipa* L.) decorative capacities and resistance to tulip breaking potyvirus in the tulip collection of the Botanical Garden of Vilnius University. *Biologija* 4: 64–70.
- Jafri, S.M.H. & El-Gadi, A. (1978) *Tulipa*. In: Jafri, S.M.H., El-Gadi A. (eds), *Flora of Libya*, vol. 57. Al-Fatteh University Faculty of Science, Department of Botany, Tripoli, pp. 22–24.

- Jeanmonod, D. & Gamisans, J. (2007) *Tulipa*. In: *Flora Corsica*. Édisud, Aix-en-Provence, p. 125.
- Kandemir, N. & Özkan, M. (2000) Liliaceae familyasına ait iki endemik takson üzerinde morfolojik ve anatomik çalışmalar. *Fırat Üniversitesi Fen ve Mühendislik Bilimleri Dergisi* 12: 1–17.
- Kitamura, S. (1960) *Tulipa*. In: Kitamura, S. (ed), *Flora of Afghanistan*. Results of Kyoto University Scientific Expedition to the Karakoram and Hindukush 1955, vol. II, Kyoto University, Kyoto, pp. 75–76.
- Koch, J.F.W. (1849) *Tulipa julia*. *Linnaea* 22: 225.
- Koyuncu, M. (2000) *Tulipa biflora* Pallas; bodurlale, çiftelale; Liliaceae (zambakgiller). *The Karaca Arboretum Magazine* 5: 133–136.
- Kroon, G.H. & Jongerius, M.C. (1986) Chromosome numbers of *Tulipa* species and the occurrence of hexaploidy. *Euphytica* 35: 73–76.
- Kunth, K.S. (1843) *Orithyia biflora*. *Enumeratio Plantarum Omnium Hucusque Cognitarum* 4: 227.
- Lauber, K. & Wagner, G. (2007) *Tulipa*. In: Lauber, K. & Wagner, G. (eds), *Flora Helvetica: Flore illustrée de Suisse*, 4. auflage. Haupt, Bern, pp. 1480–1481.
- Ledebour, K.F. von (1853) *Tulipa sylvestris* var. *biflora*. *Flora Rossica sive Enumeratio Plantarum in Totius Imperii Rossici Provinciis Europaeis, Asiaticis, et Americanis Hucusque Observatarum* 4: 136.
- Levesque, R. (2007) *SPSS programming and data management: A guide for SPSS and SAS users*, fourth edition. SPSS, Chicago, 522 pp.
- Link, J.H.F. (1799) *Tulipa australis*. *Journal für die Botanik* 2: 317.
- Linnaeus, C. (1753) *Tulipa sylvestris*. *Species plantarum* 1: 305.
- Linnaeus, C. (1753) *Tulipa gesneriana*. *Species plantarum* 1: 306.
- Maire, R., Guinochet, M. & Quézel, P. (1958) *Tulipa*. In: Maire, R. (ed), *Flore de L'Afrique du Nord*, Vol V, Monocotyledonae: Liliales: Liliaceae. Lechevalier, Paris, pp. 98–105.
- Marais, W. (1980) *Tulipa armena* var. *lycica*. *Kew Bulletin* 35: 258.
<http://dx.doi.org/10.2307/4114569>
- Marais, W. (1984) *Tulipa*. In: Davis, P.H., Mill, R.R., Tan, K. (eds), *Flora of Turkey and the east Aegean islands*, 8, Edinburgh University Press, Edinburgh, pp. 245–263.
- Massart, D.L., Smeyers-Verbeke, J., Capron, X. & Schlesrer, K. (2005) Visual presentation of data by means of box plots. *LC-GC Europe* 18: 215–218.
- Matin, F. & Iranshahr, M. (1998) A new species of the genus *Tulipa* (Liliaceae) from Iran. *Iranian Journal of Botany* 7: 228–229.
- Maunder, M., Cowan, R.S., Stranc, P. & Fay, M.F. (2001) The genetic status and conservation management of two cultivated bulb species extinct in the wild: *Tecophilaea cyanocrocus* (Chile) and *Tulipa sprengeri* (Turkey). *Conservation Genetics* 2: 193–201.
- McNeill, J., Barrie, F.R., Burdet, H.M., Demoulin, V., Hawksworth, D.L., Marhold, K., Nicolson, D.H., Prado, J., Silva, P.C., Skog, J.E., Wiersema, J.H. & Turland, N.J. (eds) (2006) *International code of botanical nomenclature (Vienna Code)*. *Regnum Vegetabile* 146, Gantner, Ruggell, 568 pp.
- Meikle, R.D. (1985) *Tulipa*. In: Meikle, R.D. (ed), *Flora of Cyprus* 2, Bentham-Maxon Trust, Kew, pp. 1596–1599.
- Meyer, R.K. & Krueger, D.D. (2004) *A minitab guide to statistics* (3rd editon). Prentice-Hall, New Jersey, 448 pp.
- Mol, W.E. de. (1925) Het celkundig-erfelijk onderzoek in dienst gesteld van de veredeling der hyacinten, narcissen en tulpen. *Genetica* 7: 111–118.
- Newton, W.C.F. (1927) Chromosome studies in *Tulipa* and some related genera. *Journal of the Linnean Society, Botany* 47: 339–354.
<http://dx.doi.org/10.1111/j.1095-8339.1926.tb00514.x>
- Newton, W.C.F. & Darlington, C.D. (1929) Meiosis in polyploids. I. Triploid and pentaploid tulips. *Journal of Genetics* 21: 1–15.
<http://dx.doi.org/10.1007/bf02983355>
- Nikolić, T. (2000) *Tulipa*. In: Nikolić, T. (ed), *Flora Croatica (Index Florae Croatiae, pars 3)*. *Natura Croatica*, Hrvatski prirodoslovni muzej, Zagreb, p. 159.
- Ocak, A., Alan, S. & Ataşlar, E. (2004) Morphological, anatomical and ecological studies on *Tulipa armena* Boiss. var. *lycica* (Baker) Marais (Liliaceae). *Turkish Journal of Botany* 28: 427–434.
- Özhatay, N. & Koçak, B. (2000) *Tulipa karamanica*. In: Güner, A., Özhatay, N., Ekim, T., Başer, K.H.C., (eds). *Flora of Turkey and the east Aegean islands*, 11(Suppl. II). Edinburgh University Press, Edinburgh, pp. 246.
- Özhatay, N. (2002) Diversity of bulbous monocots in Turkey with special reference. Chromosome numbers. *Pure and Applied Chemistry* 74: 547–555.
- Pallas, P.S. von. 1776 *Tulipa biflora*. *Reise* 3: 727.
- Pampanini, R. (1914) *Tulipa sylvestris* subsp. *australis*. *Bollettino della Societa Botanica Italiana* 114.
- Patterson, T.B. & Givnish, T.J. (2002) Phylogeny, concerted convergence, and phylogenetic niche conservatism in the core Liliales: Insights from *rbcL* and *ndhF* sequence data. *Evolution* 56: 233–252.
<http://dx.doi.org/10.1111/j.0014-3820.2002.tb01334.x>
- Pavlov, N.V. (1958) *Tulipa*. In: Pavlov, N.V. (ed), *Flora of Kazakhstan II*, Kazakhstan Academy of Sciences, Alma-Ata, pp. 199–217 (in Russian).

- Pavord, A. (1999) *The tulip*. Bloomsbury, London, pp. 388.
- Persson, K. (2000) Two new bulbous species from the central Taurus Mountains of Turkey. *New Plantsman* 7: 200–208.
- Polunin, O. (1987) *Tulipa*. In: Polunin, O. (ed), *Flowers of Greece and the Balkans*, Oxford University Press, Oxford, p. 493.
- Post, G.E. & Dinsmore, J.E. (1933) *Tulipa*. In: *Flora of Syria, Palestine and Sinai*, vol. 2. American Press, Beirut, pp. 616–623.
- Raamsdonk, L.W.D. & Vries, T. (1992) Biosystematic studies in *Tulipa* sect. *Eriostemones* (Liliaceae). *Plant Systematics and Evolution* 179: 27–41.
- Raamsdonk, L.W.D. & Vries, T. (1995) Species relationships and taxonomy in *Tulipa* subg. *Tulipa* (Liliaceae). *Plant Systematics and Evolution* 195: 13–44.
<http://dx.doi.org/10.1007/bf00982313>
- Raamsdonk, L.W.D. (1997) *Tulipa sylvestris* In: Wisskirchen et al. (eds.) *Feddes Repertorium* 108: 106.
- Rafinesque, C.S. (1837) *Liriopogon sylvestre*. *Flora telluriana* 2: 35.
- Rafinesque, C.S. (1837) *Liriopogon biflorum*. *Flora telluriana* 2: 35.
- Reboul, E. de. (1822) *Tulipa raddii*. *Nonnullarum specierum Tuliparum notae*, pp. 5.
- Rechinger, K.H. 1990. *Tulipa*. In: *Flora Iranica*, vol. 165, Akademische Druck, Graz, pp. 76–102.
- Redouté, P.J. (1803) *Tulipa clusiana*. *Les Liliacées* 1: t. 37.
- Redouté, P.J. (1804) *Tulipa agenensis*. *Les Liliacées* 1: add. & corr.
- Regel, E.A. von (1873) *Tulipa sylvestris* var. *orphanidea*. *Trudy Imperatorskago S.-Peterburgskago Botaniceskago Sada* 2: 443.
- Regel, E.A. von (1873) *Tulipa sylvestris* var. *pulchella*. *Trudy Imperatorskago S.-Peterburgskago Botaniceskago Sada* 2: 443.
- Regel, E.A. von (1873) *Tulipa aleppensis*. *Trudy Imperatorskago S.-Peterburgskago Botaniceskago Sada* 2: 450.
- Reveal, J.L. & Chase, M.W. (2011) APG III: bibliographical information and synonymy of Magnoliidae. *Phytotaxa* 19: 71–134.
- Richter, K. (1890) *Tulipa praecox* subsp. *raddii*. *Plantae Europaeae* 1: 214.
- Rønsted, N., Law, S., Thornton H., Fay M.F. & Chase M.W. (2005) Molecular phylogenetic evidence for the monophyly of *Fritillaria* and *Lilium* (Liliaceae; Liliales) and the infrageneric classification of *Fritillaria*. *Molecular Phylogenetics and Evolution* 35: 509–527.
<http://dx.doi.org/10.1016/j.ympev.2004.12.023>
- Satıl, F. & Akan, H. (2006) Liliaceae familyasından bazı endemik ve nadir geofitler üzerinde anatomik araştırmalar. *Ekoloji* 15: 21–27.
- Schultes, J.A. & Schultes, J.H. (1829) *Tulipa biebersteiniana*. *Systema vegetabilium* 7: 382.
- Sfikas, G. (1992) *Tulipa*. In: Sfikas, G. (ed), *Wildflowers of Crete*, Efstathiadis Group, Athens, pp. 267–268.
- Shuka, L., Tan, K. & Siljak-Yakovlev, S. (2010) *Tulipa albanica* (Liliaceae), a new species from northeastern Albania. *Phytotaxa* 10: 17–25.
- Simpson, M.G. (2006) *Plant systematics*. Elsevier Academic Press, Canada, 608 pp.
- Sing, N.P. & Sanjappa M. (2006) *Tulipa*. *Fascicles of flora of India* 23, Botanical Survey of India, New Delhi, pp. 97–104.
- Sneath, P.A.H. & Sokal, R.R. (1973) *Numerical taxonomy*. Freeman Press, San Francisco, 573 pp.
- Snogerup, S., Snogerup, B., Phitos D. & Kamari, G. (2001) The flora of Chios Island (Greece). *Botanika Chronika* 14: 188.
- Soó, R. (1973) *Tulipa*. *Synopsis systematico-geobotanica florum vegetationisque Hungariae*, vol V. Akadémiai Kiadó, Budapest, pp. 79–80.
- Soykan, A. & Meriç, Ç. (2012) Morphological and anatomical studies of *Tulipa orphanidea* (Liliaceae). *Phytologia Balcanica* 18: 43–48.
- Sprengel, C.P.J. (1825) *Tulipa saxatilis*. *Systema vegetabilium* 2: 63.
- St. Amans, J.F.B. de (1804) *Tulipa oculus-solis*. *Recueil des travaux de la Société d'agriculture* 1: 75.
- Stojanov, N. & Stefanov B. (1948) *Tulipa*. In: Stojanov, N. & Stefanov B. (eds), *Flora Bulgaria*, edition 3. University Press, Sofia, pp. 248–251.
- Stork, A. (1984) *Tulipes sauvages et cultivées*. Séries documentaire 13. Conservatoire et jardin botaniques, Geneva, 185 pp.
- Takhtajan, A. (1997) *Diversity and classification of flowering plants*. Columbia University Press, New York, pp. 476–487.
- Takhtajan, A.L. (2001) *Flora Armenii*, vol 10 monocotyledones, Gartner, Ruggell, pp. 59–70.
- Tamura, M.N. (1998) Liliaceae. In: Kubitzki, K., Huber, H., Rudall, P.J., Stevens, P.S. & Stützel, T. (eds.), *The families and genera of vascular plants*, Vol. 3. Springer, Berlin, pp. 343–353.
- Tenore, M. (1811–1815) *Tulipa praecox*. In: *Flora Napolitana. Ossia descrizione delle piante indigene del Regno di Napoli e delle piante rare specie di piante esotiche coltivate nei giardini*. Vol. 1. Nella Stamperia Reale, Naples, pp. 170–172.
- Terzioğlu, S. & Coşkunçelebi, K. (2002) *Tulipa gumusana* (Liliaceae), a new species from Turkey, *Annales Botanici Fennici* 39: 149–151.
- Thiers, B. (2012) *Index herbariorum: A global directory of public herbaria and associated staff*. New York Botanical Garden's Virtual Herbarium. <http://sweetgum.nybg.org/ih/> (accessed 16 February 2013).
- Turland N.J., Chilton L. & Press J.R. (1993) *Flora of Cretan area, annotated checklist & atlas*. HMSO publications, London, pp. 186.
- Tuyl, J.M.Van & Creij, M.G.M.Van (2006) *Tulipa gesneriana* and *tulip hybrids*. In: Anderson, N.O., *Flower breeding and genetics: issues, challenges, and opportunities for the 21st century* 23, Springer, Dordrecht, pp. 613–637.
- Xinqi, C. & Mordak, H.V. (2000) *Tulipa* L. In: Xinqi, C. et al. (eds), *Flora of China*, vol. 24, pp. 123–126. <http://>

www.efloras.org/ (accessed 16 February 2013).

- Valdés, B., Rejdali, M., Achhal El Kadmiri, A., Jury, J.L. & Montserrat, J.M. (2002) *Checklist of vascular plants of northern Morocco with identification keys*, vol II, CSIC, Madrid, pp. 854.
- Véla, E., Hill B. & Della-Casa S. (1999) Liste des plantes vasculaires du département des Bouches-du-Rhône (France). *Bulletin de la Societe Linneenne de Provence* 50: 115–199.
- Veldkamp, J.F. & Zonneveld, B.J.M. (2012) The infrageneric nomenclature of *Tulipa* (Liliaceae). *Plant Systematics and Evolution* 298: 87–92.
<http://dx.doi.org/10.1007/s00606-011-0525-0>
- Vvedensky, A.I. (1935) *Tulipa*. In: Komarov V.L. (ed), *Flora of the USSR*, 4. An USSR, Leningrad, pp. 246–280.
- Vvedensky, A.A. (1941) *Tulipa*. In: Schreder, R.R. et al. (eds), *Flora Uzbekistana*, Tom. 1. Akademii nauk Respubliki Uzbekistan, Tashkent, pp. 473–485 (in Russian).
- Vvedensky, A.I. (1963) In: Ovchinnikov, P.N. (ed), *Flora Tajikistan S.S.R.*, Vol. II. Akademii nauk Respubliki Tajikistan, Leningrad, pp. 249–269 (In Russian).
- Wendelbo, P. (1985) *Tulipa*. In: Townsend, C.C., Guest, E. (eds), *Flora of Iraq*, 8. Ministry of Agriculture and Agrarian Reform, Baghdad, pp. 82–87.
- Wilford, R. (2006) *Tulips—species and hybrids for the gardener*. Timber Press, Portland, 211 pp.
- Zangheri, P. (1976) *Tulipa*. In: Cedam – casa editrice Dott. Antonio Milani (ed), *Flora Italica*, vol 1. Cedam, Padua, pp. 850–851.
- Zarrei, M., Wilkin, P., Fay, M.F., Zarre, S., Ingrouille, M. & Chase, M.W. (2009). Molecular systematics of *Gagea* and *Lloydia* (Liliaceae; Liliales): implications of analyses of nuclear ribosomal and plastid sequences for infrageneric classification. *Annals of Botany* 104: 125–142.
- Zhao, Y.Z. (2003) A new species of the genus *Tulipa* (Liliaceae) from China. *Novon* 13: 277–278.
<http://dx.doi.org/10.2307/3393531>
- Zonneveld, B.J.M. (2009) The systematic value of nuclear genome size for “all” species of *Tulipa* L. (Liliaceae). *Plant Systematics and Evolution* 281: 217–245.
<http://dx.doi.org/10.1007/s00606-009-0203-7>