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Cytotaxonomic notes on the *Tulipa* species *(Liliaceae)* of European Turkey

Abstract

Başak, N. & Özhatay, N.: Cytotaxonomic notes on the *Tulipa* species *(Liliaceae)* of European Turkey. – Bocconea 5: 727-731. 1997. – ISSN 1120-4060.

Karyotypes are given for the 3 *Tulipa* taxa that occur in European Turkey: *T. sylvestris* subsp. *australis* ($2n = 24, 26$), *T. orphanidea* s.l. – including *T. hageri, T. hellespontica,* and *T. thracica* – ($2n = 36, 48$), and *T. undulatifolia* ($2n = 36$).

Introduction

The genus *Tulipa* is represented by 14 species in Turkey, two of which are endemic (Marais 1984). The present study deals with the taxa found in European Turkey, which Marais (1984) assigns to three species belonging to two sections, as follows: *T.* sect. *Eriostemones* Boiss., with *T. sylvestris* subsp. *australis* (Link) Pamp. and *T. orphanidea* Boiss. & Heldr. s.l. (incl. *T. hageri* Heldr., *T. hellespontica* Degen, and *T. thracica* Davidov); and *T.* sect. *Tulipa,* with *T. undulatifolia* Boiss.

Tulipa sylvestris subsp. *australis* has been reported from European Turkey only quite recently (Dalgıç & Başak 1993). *T. orphanidea* is a very variable species, occurring in S. Greece, Crete and W. Turkey, under which modern treatments (Marais 1984, Baytop & Mathew 1984: 100-106) list many synonyms. In European Turkey, three species had been recognized by earlier authors (Baytop 1975, Webb 1966: 74) that are now included in *T. orphanidea: T. hageri* Heldr., *T. hellespontica* Degen and *T. thracica* Davidov.

Material and methods

All live material for cytological study was collected in natural habitats then cultivated in pots in the garden. Localities are given in Table 1. The chromosome preparations were made using the standard root-tip squash technique described in Özhatay & Özhatay (1981). Permanent slides are deposited at the Department of Botany, University of

Thrace. Chromosome photographs were taken with an Olympus photo-microscope. Drawings were made with the aid of a camera lucida and a Leitz Sm-Lux microscope.

Vouchers (Table 1) are deposited at the herbaria of the Faculty of Pharmacy, University of Istanbul (ISTE) and of the Faculty of Science, University of Thrace (EDTU).

Results

The *Tulipa* species occurring in European Turkey can be identified by means of the following key:

1. Filaments equal, not swollen at their glabrous base; stigma wider than the ovary ..... *T. undulatifolia*
– Filaments unequal, swollen and hairy at the base; stigma narrower than the ovary ... 2.
2. Stem slender; flowers yellow; bud nodding; tepals without a basal dark blotch inside ..... *T. sylvestris*
– Stem robust; flowers orange to dark red; bud erect; tepals with a basal dark blotch inside ..... *T. orphanidea* s. l.

In this paper, *Tulipa orphanidea* is accepted in the broad sense as adopted in *Flora of Turkey* (Marais 1984) and *Flora europaea* (Grey-Wilson & Matthews 1980), pending further studies that may shed new light on the question of its further subdivision. In European Turkey this taxon includes three taxa previously accepted as separate species (Baytop 1975), to be distinguished as follows:

1. Stem and ovary glabrous ..... *T. hageri*
– Stem and ovary pubescent ..... 2.
2. Anthers 3-13 mm; ovary fusiform ..... *T. hellespontica*
– Anthers 2-5.6 mm; ovary globose ..... *T. thracica*

Table 1. Chromosome numbers of *Tulipa* species existing in European Turkey. – All localities are in the square A1(E).

Tulipa	2*n*	Locality	Voucher Nos.
sylvestris subsp. *australis*	24, 36	Edirne: village Don, under *Quercus*	EDTU 4838, ISTE 63911
orphanidea (incl. *T. hageri*)	36	Edirne: Havsa-Babaeski, 5 km from Sinit reservoir	EDTU 1945, ISTE 59946
	36	Edirne: Keşan to village Sarpdere	EDTU 1940, ISTE 59980
	36	Edirne: Havsa-Babaeski	ISTE 59981
	36	Edirne: Havsa-Ağaçlidere area	EDTU 3217, ISTE 60208
	36	Kırklareli: Babaeski, village Mutlu	EDTU 3225
hellespontica	48	Edirne: Keşan-Enez, near village Kılıç	EDTU 3095, ISTE 60129
	48	Edirne: Keşan to village Koruku	EDTU 3097, ISTE 60127
	48	Edirne: Keşan-İpsala, village Esetçe	EDTU 3098, ISTE 60130
	48	Kırklareli: Babaeski, village Mutlu	EDTU 3201, ISTE 60132
thracica	48	Tekirdağ: Kumbağ to village Naip	EDTU 4680
undulatifolia	36	Tekirdağ: Çorlu	EDTU 5401

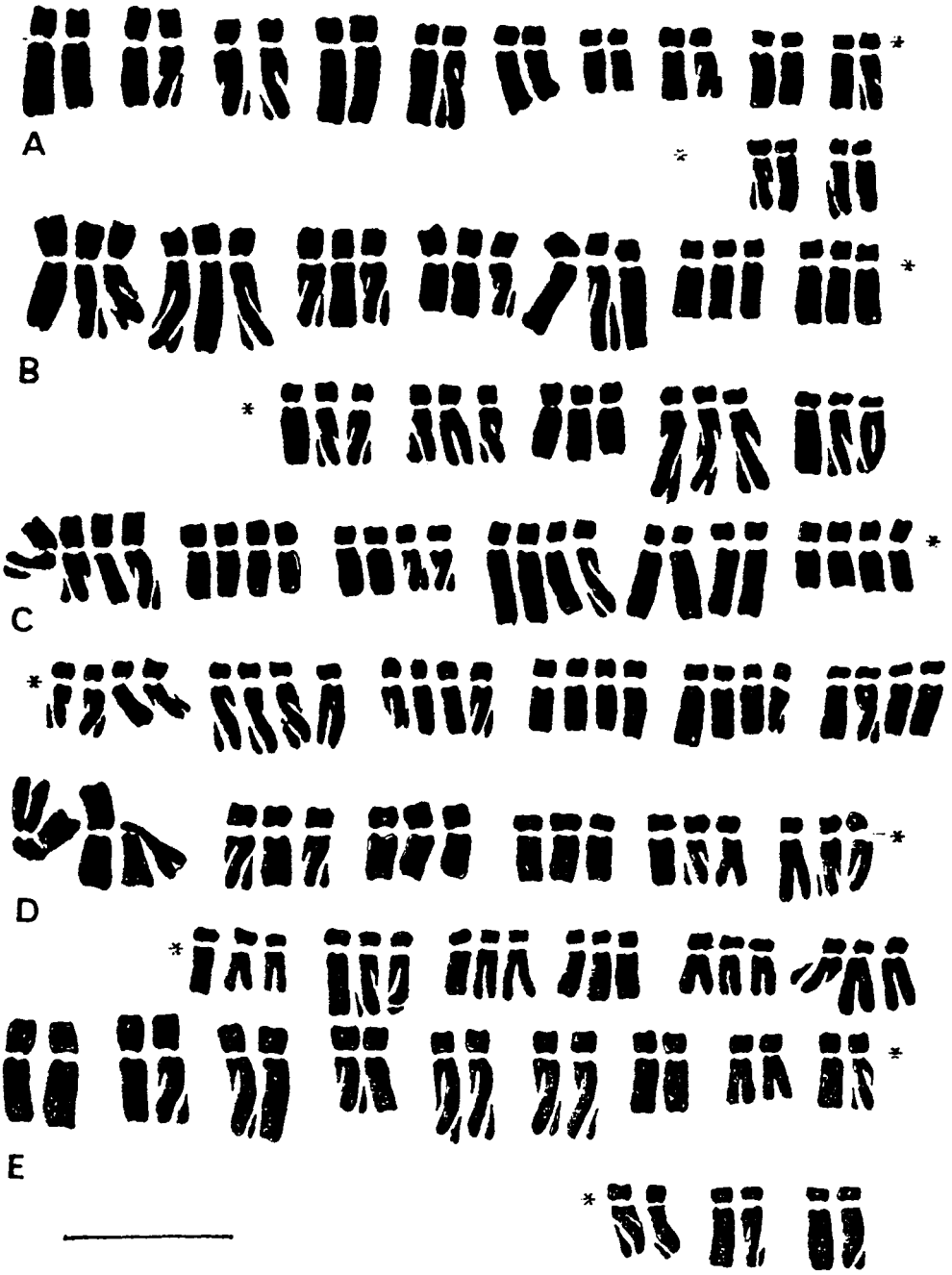

Fig. 1. Karyograms of *Tulipa* taxa of European Turkey. – A, *T. sylvestris* subsp. *australis*, $2n = 24$ (EDTU 4838); B, *T. hageri*, $2n = 36$ (EDTU 1945); C, *T. hellespontica*, $2n = 48$ (EDTU 3095); D, *T. thracica*, $2n = 36$ (EDTU 4680); E, *T. undulatifolia*, $2n = 24$ (EDTU 5401). – Scale bar = 10 µm.

Chromosome counts for all taxa are given in Table 1. Karyograms made from camera lucida drawings are shown in Fig. 2, and photographs of some somatic metaphase plates, in Fig. 3.

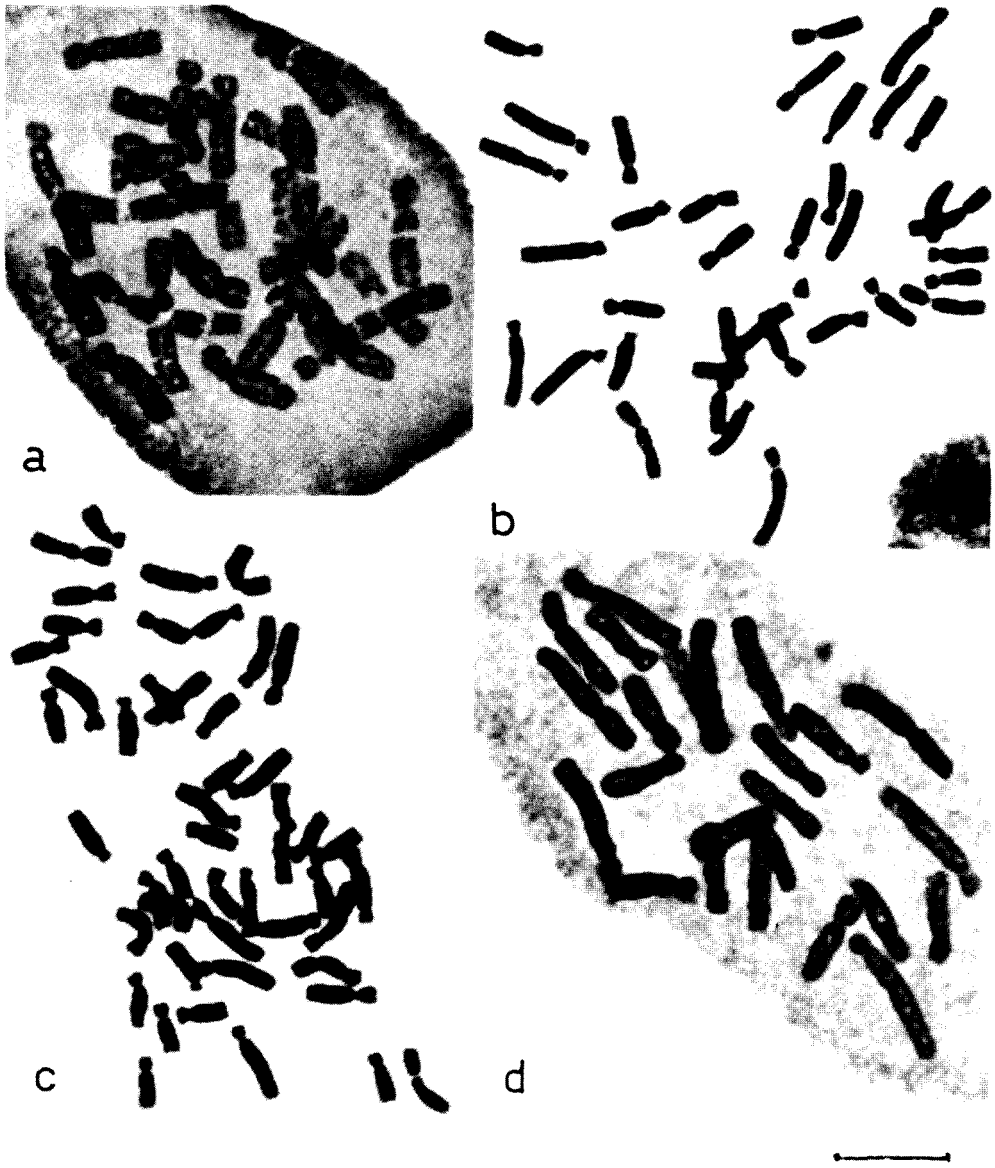

Fig. 2. Metaphase plates of somatic cell divisions of *Tulipa* taxa of European Turkey. – **a,** *T. sylvestris* subsp. *australis*, $2n = 24$; **b,** *T. hageri*, $2n = 36$; **c,** *T. hellespontica*, $2n = 48$; **d,** *T. undulatifolia*. – Scale bar = 10 µm.

Acknowledgement

Financial support by the Research Centre of the University of Thrace is gratefully acknowledged.

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