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On the nomenclatural type of *Triticum durum* (Poaceae: Triticeae)

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Abstract

The nomenclatural type of *Triticum durum* is discussed. The name is lectotypified using a specimen collected in the North of Africa and preserved at Herb. P.

Keywords: Desfontaines, Gramineae, lectotype, nomenclature, original material, *Triticum*

Introduction

Triticum Linnaeus (1753: 85) (Poaceae tribe Triticeae) is a very complex genus of approximately 25 wild and domesticated species (Morrison 2007). The infrageneric taxonomy of *Triticum* has been published by several authors (Bowden 1959, Mackey 1966, 1968, 1977, 1989, 2005, Morris & Sears 1967, Dorofeev *et al*. 1979, Van Slageren 1994, Goncharov 2002, Goncharov *et al*. 2009). Currently, the genus is divided into groups based on ploidy levels, cytoplasm types, and genome compositions, and using a molecular genetic approach (see Watanabe *et al*. 2004, Goncharov 2005, Goncharov & Gaidalenok 2005, Golovnina *et al*. 2007, 2009, Goncharov *et al*. 2007, 2008, 2009, Konovalov *et al*. 2010).

Triticum aestivum Linnaeus (1753: 85) is the most important wheat, and is generally treated as a species that is not found in nature. It has been shown that the genome of this species is composed of those of several wild species [e.g., *T. dicoccoides* (Körn. ex Asch. & Graebn.) Schweinfurth (1908: 309, 311, 315) (≡ *T. sativum* var. *dicoccoides* Ascherson & Graebner (1901: 679)), *T. speltoides* (Tausch) Gren. ex Richter (1890: 129) (≡ *Aegilops speltoides* Tausch (1837: 108)), and *T. tauschii* (Cosson) Schmalhausen (1897: 662) (≡ *Aegilops tauschii* Cosson (1849: 69))] (see Zohary & Feldman 1962, Dorofeev *et al*. 1979, Goncharov 2002, 2011, Mackey 2005, Goncharov *et al*. 2009).

The second most important wheat, accounting for more than 10% of the world's wheat production, is hard wheat, *Triticum durum* Desfontaines (1798: 114). Sown especially in warmer and drier climates, their main production regions are the Mediterranean basin, former USSR (mainly in southern steppe belt from European Russia and Ukraine to southern Siberia), India, Australia, the Great Plains in USA and Canada, Argentina, and Mexico. Normally used to produce bread, the low gluten flour makes it especially suitable for making pasta and similar products. Durum wheat evolved presumably from emmer-like ancestors by several mutations, which enabled the free-threshing character. Although it is almost impossible to differentiate 4*x*- and 6*x*-naked wheats among prehistoric remains, material affiliated to *T. durum* subsp. *durum* had been found, at first sporadically, already from the 7/6th mill. BC in Syria, Turkey, and Iran. During later Neolithic periods these wheats gradually gained prominence (Zohary & Hopf 2000, Mackey 2005).

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FIGURE 1. Lectotype of *Triticum durum* Desf., Herb. P (2-D code P00662178). Image courtesy of the herbarium P, reproduced with permission.

The name *Triticum durum* has been, and still is, applied to a plant with culm 70–140 cm, solid or thick-walled and hollow, glabrous at the nodes; leaf blade 7–16 mm wide, puberulent; spike 4–11 cm (excluding awns), dense, laterally compressed; rachis hairy at the nodes and margin, tough; spikelets with 5(–7) florets; glumes (8–)10–12 mm, coriaceous, with a prominent, veined, crested keel and a secondary weak, dentate keel, sometimes pubescent towards the apex; fertile lemma with a stout, scabrid awn up to 20 cm; caryopsis extremely hard; endosperm flinty (Humphries 1980, Morrison 2007). Centres of variation of *T. durum* are in southwestern Asia, the Mediterranean basin, and Ethiopia (see Kimber & Sears 1987, Zohary & Hopf 2000, Mackey 2005, Feldman & Kislev 2007, Luo *et al*. 2007, Moragues *et al*. 2007). Durum wheat is sometimes difficult to separate from other free-threshing wheats.

In the most frequently used modern classifications, durum wheat is treated differently: as a species with the name *Triticum durum* (Dorofeev *et al*. 1979, Gandilyan 1980, Goncharov 2002), as a subspecies of *T. turgidum* Linnaeus (1753: 86), namely *T. turgidum* subsp. *durum* (Desf.) Husnot (1899: 80) (Kimber & Sears 1987, Van Slageren 1994, GRIN 2022, POWO 2022), or as *Gigachilon polonicum* subsp. *durum* (Desf.) Löve (1984: 497). On the other hand, durum wheat is treated as a group of varieties of *T. turgidum* subsp. *turgidum* conv. ["convarieties"] *durum* (Desf.) Mackey (1966: 268) (see Mackey 1966, 1988). [The term "convariety" is not defined in the International Code of Nomenclature of algae, fungi, and plants (*ICN*, Turland *et al*. 2018), nor in the International Code of Nomenclature for Cultivated Plants (*ICNCP* or *Cultivated Plant Code*, Brickell *et al*. 2016), and it has no official status].

The morphological-geographical variation of *T. durum* wheat is considerable. In the monograph by Dorofeev *et al*. (1979), durum wheat (as a species) is divided into *T. durum* subsp. *durum* and *T. durum* subsp. *horanicum* Vavilov (1964: 47), and about 140 botanical varieties from six "convarieties" had been described, mainly on the basis of different spike and grain characters (Lyapunova 2017). They were distinguished by a combination of signs, such as the presence or absence of pubescent straw under the spike, pubescent or glabrous glumes, roughness of awns (smooth or rough); glume colour (white, red, smoked greyish, black on a white or red background), awn colour (same colour as the glume or black), and grain colour (white, red, or purple).

The purpose of this paper is to contribute to nomenclatural stability by lectotypifying the name *Triticum durum*. This nomenclatural act is important because this name includes many accepted infraspecific taxa (see e.g., Lyapunova 2017). Designation of the type is based on consultation of Desfontaines' original elements. Acronyms of the herbaria consulted are according to Thiers (2022).

Background and typification of the name

Triticum durum Desfontaines (1798: 114)

≡ *Triticum turgidum* subsp. *durum* (Desf.) Husnot (1899: 80)

≡ *Gigachilon polonicum* subsp. *durum* (Desf.) Löve (1984: 497)

≡ *Triticum turgidum* var. *durum* (Desf.) Yan ex Kuo (1987: 48)

≡ *Triticum turgidum* subsp. *durum* (Desf.) Van Slageren (1994: 91), *comb. superf.*

Type (**lectotype** designated here):—[MOROCCO]. Barbaria, s.d., *R.L. Desfontaines s.n* (P, 2-D code P00662178) (Fig. 1).

The protologue of *Triticum durum*, published by Desfontaines (1798: 114), includes the name TRITICUM DURUM followed by a short diagnosis "TRITICUM culmo farcto; glumis pubescentibus, aristatis; spiculis quadrifloris", a complete description of this species in Latin, and a geographical provenance of this species "COLITUR in Barbaria". No illustrations were included in the protologue.

René Louiche Desfontaines (1750–1833) was a French botanist, professor at the Jardin des Plantes in Paris, France. His personal herbarium is now preserved at Herbs. BM, C, CGE, FI (acquired via Webb), LIV, MPU, and P (including PC, P–DESF, P–JU, and P–LA) (Stafleu & Cowan 1976: 627–628).

We have found only a relevant herbarium sheet at Herb. P, with 2-D code P00662178, which contains original material of *T. durum*. The sheet bears two culms with leaves and inflorescences, and four labels. A label is annotated as "Herbier de la Flore Atlantique / donné au Muséum, par M. Desfontaines. / Nº. / Triticum durum", and two labels are handwritten by Desfontaines, both with detailed descriptions of the plant, and the annotation "Colitur in Barbaria" (image available at https://science.mnhn.fr/institution/mnhn/collection/p/item/p00662178). A fourth handwritten label indicated that this specimen was considered as "Holotype" by "G.A. & O.D." in 2009, but this cannot be considered an effective typification since it was not published.

We have not found any other original specimen in any of the consulted herbaria (i.e., BM, C, FI, G, MPU, P), and most likely the specimen at Herb. P is the only original material used by Desfontaines in the description of this name. However, as we cannot exclude that there were more than one specimen of this taxon, we thus consider the specimen

as the lectotype of the name *T. durum*. This specimen at Herb. P is consistent with the traditional concept and current use of the name (see e.g., Humphries 1980, Tan 1985, Morrison 2007).

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