Tritordeum

Tritordeum Asch. & Graebn., family Poaceae

A drought- and salinity-tolerant cereal from the WaterMellon project

01 History and origin

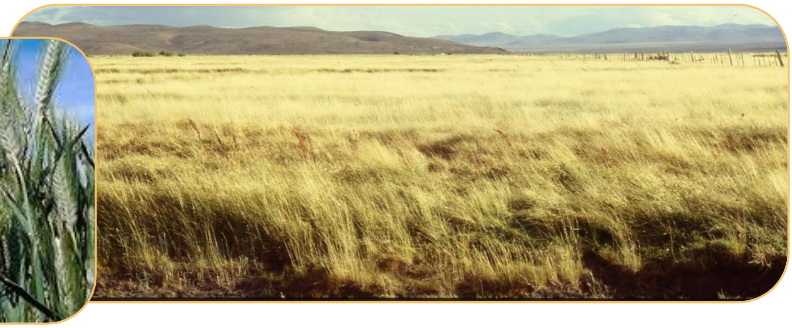
- **Tritordeum** is an **amphiploid cereal** created through artificial hybridisation between **wild barley** (*Hordeum chilense)* and **durum wheat** (*Triticum durum*), producing octoploid or hexaploid Tritordeum respectively.
- It was developed to combine the **agronomic and technological qualities** of **wheat** with the **stress tolerance** and **valuable cereal characteristics of the wild barley** *Hordeum chilense*, thereby creating a new cereal crop for food use.
- This crop has attracted considerable interest because it has a **higher content of fibre**, **unsaturated fatty acids** and antioxidants than traditional wheat varieties.

02 Morphological characteristics

- **Life span:** In the Mediterranean region, it is primarily a **winter crop**. It is sown in autumn and grows during the mild winter, which suits Mediterranean rainfall patterns and helps it compete well in the hot, dry conditions of late season.
- **Roots:** **Fibrous root system typical of cereals**, such as wheat and barley, with good root development and efficient nutrient uptake.
- **Stems:** **Erect culms** of 80–110 cm with good above-ground biomass production.
- **Leaves:** Robust, semi-erect growth habit with broad, deep green leaves.
- **Inflorescence:** **Compact,** slightly bearded ears, similar to those of wheat with a slight hint of barley.
- **Seeds:** **Cereal seeds** (grains) are usually described as elongated and relatively small, with a deep groove and generally a lower grain weight than durum wheat. **1,000 seeds weigh 33–36 g**.

03 Soil and climate requirements

- **Preferred ecosystem:** Best suited to **Mediterranean environments** with **mild winters** and **hot, dry summers**. It is mainly grown as a winter cereal sown in autumn and performs well in arid, low-input conditions.
- **Soil:** Adapted to **a wide range of soils**, but performs best in well-drained, moderately fertile soils. It does not tolerate waterlogged conditions.
- **Temperature:** It is an **autumn-winter cereal** that copes well with typical Mediterranean winters, but its crop can be damaged by severe frost. It is well adapted to hot, dry conditions during the grain-filling stage.
- **Rainfall:** Suitable for **dry Mediterranean farming systems** and valued for its drought tolerance, particularly under water stress conditions in the late season.
- **Salinity**: Considered moderately salt-tolerant, performing better than durum wheat under certain saline conditions.



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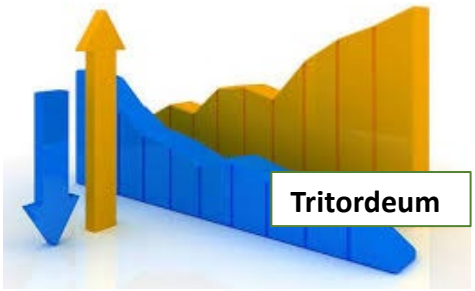
04 Agricultural practices

- **Sowing**: In **the Mediterranean region**, Tritordeum is primarily a **winter cereal** and is usually sown in autumn, between mid-October and mid-November. In colder areas, it can also be sown in spring between mid-February and mid-March.
- **Sowing rate**: Approximately **125–150 kg/ha** in dry soil conditions and **150–180 kg/ha** with irrigation for cereal production. For forage, a study found that approximately 70 kg/ha was the best rate among those tested. Row spacing: 15–20 cm.
- **Sowing depth**: 3–5 cm.
- **Fertilisation**: **Moderate fertiliser requirements**. Nutrient removal is approximately 30–15–20 kg/ha of N-P-K per tonne of harvested yield; for example, a yield of 5 t/ha would require a total of approximately 150 kg of N, 75 kg of P and 100 kg of K.
- **Irrigation**: Well suited to Mediterranean dry-farming systems, with **good drought tolerance**.
- **Weed control**: Similar to wheat/barley.
- **Harvest**: Harvest typically takes place **between June and July** in Mediterranean conditions. For forage, multi-cut systems have been successfully tested, with up to five cuts reported in trials.
- **Yield**: **2.0–5.5 t/ha** depending on genotype and conditions.



05 Global Production & Market Export and Import Value

- Tritordeum is still a **niche cereal** and commercial cultivation has only recently begun; current commercial activity is mainly concentrated in Europe and Australia within an authorised value chain rather than on a large open commodities market. It is marketed more as **a speciality cereal ingredient** than as a globally standardised cereal.

06 Uses

- It is a **versatile cereal** used primarily **in the food industry** for the production of bread, baked goods, pasta and snacks. Bread made from it has a higher protein content (12.4%) and a lower gluten content than wheat.
- It is also suitable for malting and the production of fermented beverages, including beer and spirits.
- Its by-products can be used for **animal feed**, whilst crop residues also show potential for **bioenergy, biofuels, bio-based products** and high-value compounds such as **tricin** (a key component of the grass cell wall and a valuable bioactive flavone with potential applications in healthcare and industry).

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