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## A report on durum wheat quality in Turkey

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**SUMMARY** - Durum wheat with its production and export potential is an important crop in Turkey. Turkey produces 2.1-4.8 million tons of durum wheat; utilizes 839,000 tons of bulgur and 346,000 tons of pasta; exports 700 tons of bulgur and 12,802 tons of pasta. More emphasis is given to durum wheat research in recent years to obtain high yielding, good quality, and biotic-abiotic stress resistant cultivars. Quality Laboratory in Field Crops Central Research Institute serves as a National Laboratory and is a member of European Durum Wheat Network. The Laboratory participates in research activities by identifying quality germplasm, analyzing breeding material, and defining areas for quality durum wheat production.

**Key words:** Durum wheat, bulgur, pasta, price policy, biotic stress, abiotic stress.

**RESUME** - "Rapport sur la qualité du blé dur en Turquie". Le blé dur, en raison de son potentiel de production et d'exportation, est une culture importante en Turquie. La Turquie produit 2,1-4,8 millions de tonnes de blé dur ; elle consomme 839.000 tonnes de bulghur et 346.000 tonnes de pâtes ; elle exporte 700 tonnes de bulghur et 12.802 tonnes de pâtes. Pendant ces dernières années, la recherche portant sur le blé dur a connu un essor visant à obtenir des cultivars à haut rendement, de bonne qualité, et résistants aux stress biotiques et abiotiques. Le Laboratoire de Qualité à l'Institut Central de Recherches sur les Grandes Cultures agit en tant que laboratoire national et figure comme membre au sein de Réseau Européen pour le Blé Dur. Ce laboratoire participe aux activités de recherche en identifiant le germoplasme de qualité, en analysant du matériel pour la sélection, et en déterminant les zones pour la production de blé dur de qualité.

**Mots-clés :** Blé dur, bulghur, pâtes, politique des prix, stress biotique, stress abiotique.

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### Introduction

Durum wheat is a traditionally important crop in Turkey. Its importance still continues due to production and export potential. A decrease in durum wheat production happened in last years, resulted even in a large import in 1993.

No separate statistical data is available for durum wheat in Turkey. Some estimation methods have been applied to figure out durum wheat production in the country (Table 1). Differences among estimated figures are large.

### Durum wheat in Turkey

There are some constraints to durum wheat production. These are the following:

(i) Price policy: price given to durum wheat in Turkey is not enough to compete with bread wheat. An average yield advantage of bread wheat over durum wheat is 8% in one of the State farms for a period of ten years. But extra price given to durum wheat is 4% bread wheat; then, is harmed by unpredicted drought periods in the same period.

(ii) Abiotic stresses: cold and drought are major limiting factors of durum wheat production. Cold seasons harm durum wheat more and result in a poorly developed crop in spring.

(iii) Biotic stresses: durum wheat diseases are mainly yellow rust, loose smut, common bunt, septoria, leaf rust, stem rust, barley yellow dwarf virus, root and foot diseases, and powdery mildew. The importance of these diseases changes from region to region. The first three are prevalent in colder zones while the rest is in mild coastal areas.

Table 1. Figures for area and production estimated from wheat data (State Institute of Statistics, 1983-1992)

Year	Area estimated (1000 ha)	Production estimated (million t)
1983	2300	1.8-4.1
1984	2250	1.9-4.3
1985	2338	1.9-4.3
1986	2338	2.1-4.8
1987	2358	2.1-4.8
1988	2359	2.3-5.1
1989	2338	1.8-4.1
1990	2363	2.2-5.0
1991	2408	2.2-5.0
1992	2400	2.1-4.8

Durum wheat grain is mainly utilized in the following ways in Turkey (State Institute of Statistics, 1991): (i) pasta 346,000 tons (27.5% of durum wheat production); (ii) bulgur 839,000 tons (66.5% of durum wheat production); (iii) other 75,000 tons (6.0% of durum wheat production).

Emphasis given to the quality of durum wheat in the breeding stage has not been fully pronounced yet in newly released cultivars. But some improvement has been made. Physical and pasta qualities of some recent durum wheat cultivars are given in Table 2.

Table 2. Qualities of some durum wheat cultivars

Cultivar	Quality	
	Physical	Pasta
Diyarbakır 81	average	good
Balcalı 85	good	average
Ege 88	average	average
Şam I	average	good
Çakmak 79	average	average
Kızıltan 91	good	average

"Kızıltan 91", with higher yield potential and better quality than "Çakmak 79", has a potential in durum wheat areas of Central Anatolian Plateau and Transitional Zones.

Besides genetic potential, environment is still the main factor governing quality in durum wheat. While Central Anatolian Plateau and Transitional Zones are suitable for quality durum wheat production, Coastal areas are not. "Kundurur 1149", an old landrace cultivar, is still the highest quality durum wheat cultivar in the first zone. "Gediz 75" is a good quality cultivar in the second zone.

Quality Laboratory in Field Crops Central Research Institute serves as a national Laboratory. The Laboratory has a spaghetti production unit consisting of a pre-mixer, a vacuum, a drying cabinet, and a cooking unit. Tests carried out on durum wheat are given in Table 3.

Table 3. Quality parameters used in the Laboratory

Wheat	Semolina	Spaghetti
1000 kernel weight	Protein	Spaghetti making test
Test weight	Ash	Sensory test on cooking spaghetti
Kernel distribution	Pigment	Cooking quality analysis in pasta
Hardness	Gluten	
Vitreousness	Sedimentation	
	Falling Number	
	Alveograph	
	Mixograph	
	Farinograph	

The laboratory analyzes durum wheat breeding material from all research institutes in Turkey. In addition to breeding material the laboratory analyzes durum wheat samples of cultivars grown in different regions to find out areas suitable for quality durum wheat growing.

Analyses carried out on durum wheat material are SDS (Sedimentation Test), color (spectrophotometer), TOM (total organic matter), and electrophoresis.

Quality Laboratory of Field Crops Central Research Institute serving all Turkey, is a reference laboratory and a member of European Durum Network.

The laboratory is involved in research activities via identifying quality germplasm, analyzing breeding material, and defining areas for quality durum wheat production.

Quality improvement through breeding is possible, since wide variation exists in breeding material. Further studies, however, to incorporate yield and quality should be carried out.

Testing breeding material helped breeders to improve better quality durum wheat cultivars. A recent cultivar, Kiziltan 91, has higher yield and quality properties.

Since quality is determined by environment and genotype, the laboratory tries to define suitable and non-suitable areas for quality durum wheat production. Central Anatolian Plateau and Transitional Zones are suitable for high quality durum wheat production. Coastal areas, on the other hand, are not suitable for durum wheat production.

## References

State Institute of Statistics (1983-1992). *Agricultural Statistics*. State Institute Publications. Ankara.