

# One Hundred Years of Wheat Breeding at the Transitional Zone Agricultural Research Institute, Eskişehir, Türkiye

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## ABSTRACT

### Background

Established in 1925 as *Islah-ı Buzr* — the first agricultural research station of the Turkish Republic — the institute in Eskişehir has pursued wheat improvement for a century. At the time of its founding, wheat cultivation in the region relied entirely on farmer-selected landraces. In Eskişehir districts these included Ak buğday, Sarı buğday, Sünter and Kadiroğlu, while the Konya plain was dominated by Kunduru and Akyarnaz types, each occupying distinct ecological niches. These landraces formed the foundational germplasm for systematic breeding.

### Breeding Teams and Programme Structure

Over a century, five successive breeding teams have led the programme — from E. Yektay's pioneering work through to the current team comprising S. Bolat, U. Çelik, I. Dönmez and colleagues. Institutional continuity was ensured by the deliberate overlap of one or two senior researchers between consecutive teams, creating an unbroken chain of scientific knowledge transfer. The programme evolved through three distinct phases: an individual/institutional decision-making phase (1925–1969); a nationally coordinated project phase (1969–1993, Project II-661-2-061); and a structured project-based phase (1993–present) under TAGEM oversight, with defined institutional responsibilities and regional priorities.

### Varieties Released

The institute has released 48 wheat varieties in total — 40 bread wheat (*T. aestivum*) and 8 durum wheat (*T. durum*), spanning rainfed (33) and irrigated (15) target environments. Additional releases include 14 barley, 2 oat and 3 triticale varieties. The breeding pipeline has been supported by extensive multi-location testing across 25 sites in central and western Türkiye, generating over 162,000 plot observations between 1980 and 2025.

### Impact

The programme's impact has been substantial and measurable. Kunduru 1149 — a durum wheat selected from a farmer's market in 1946 and released in 1967 — became a mega-cultivar, reaching 895,079 ha across 32 provinces by 1989–90. Bread wheat Gerek79 achieved even wider adoption, covering 1,423,070 ha in 32 provinces in the same period. By 1990, TZARI-bred varieties collectively occupied approximately 43% of Türkiye's total wheat area.

### Conclusion

Over its first century, TZARI has evolved from a small landrace collection station into a leading national wheat breeding programme with strong international linkages — notably as a founding partner of the International Winter Wheat Improvement Programme (IWWIP, Turkey–CIMMYT–ICARDA, 1986–present). As climate variability and shifting production systems pose new challenges to Central Anatolian agriculture, the institute's accumulated germplasm, methodological expertise and institutional memory provide a vital foundation from which to develop the next generation of resilient, high-yielding varieties.

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**Keywords:** wheat breeding, bread wheat, durum wheat, landraces, variety release, TZARI, Eskişehir, IWWIP, Türkiye