The Turkey National Inventory and Plant Genetic Resources Activities of AARI

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REPUBLIC OF TURKEY
MINISTRY OF AGRICULTURE
AND FORESTRY

TAGEM

R&D - INNOVATION

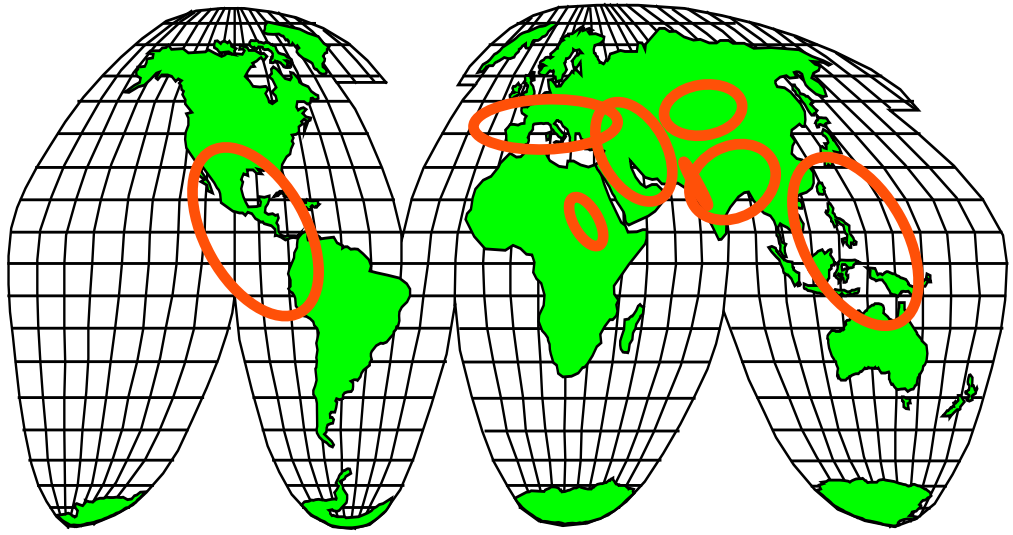
Biodiversity in Turkey

Our country is in a unique position in terms of plant genetic diversity.

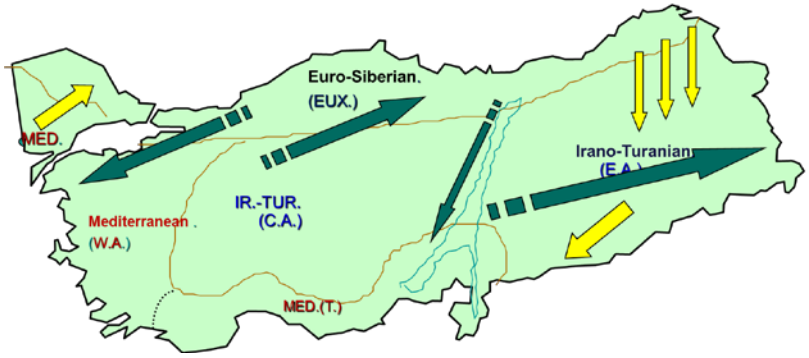
Turkish flora includes

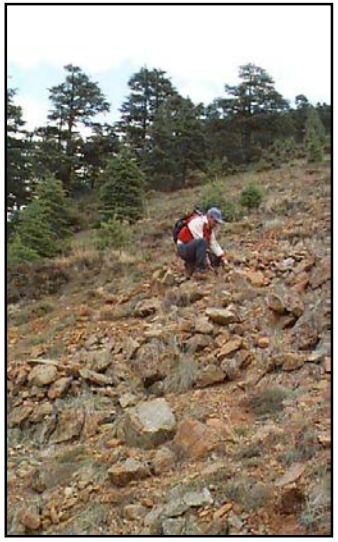
ca. 11.707 PLANT TAXA, 30% ENDEMIC

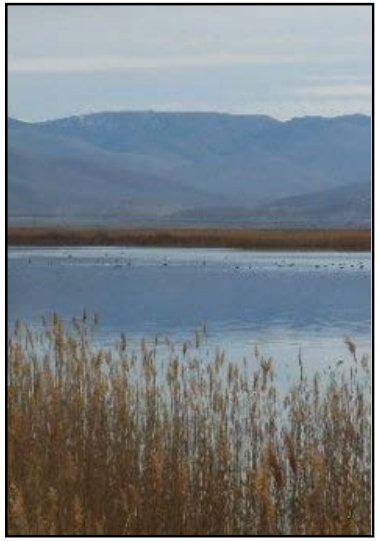
- 3 FLORISTIC REGIONS
- HIGH SPECIES ENDEMISM
- 3 MAIN ECOSYSTEM
- 7 CLIMATIC REGIONS
- ORIGIN CENTER
- DOMESTICATION CENTER
- MICRO GENE CENTER



Biodiversity in Turkey





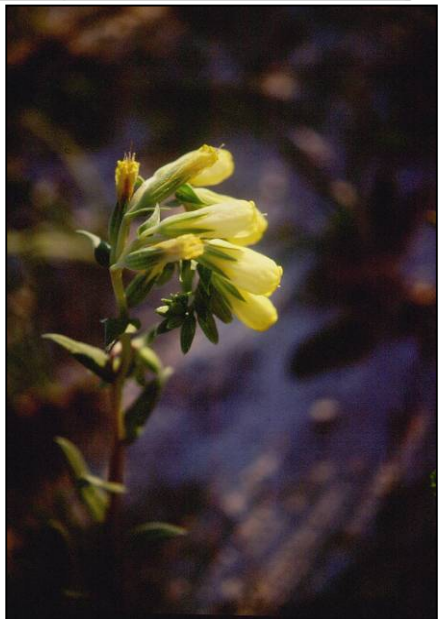


Biodiversity in Turkey

Number of species

Those are number of species which are also indicated /determined in the Turkey's Plants List (Vascular Plants). ISBN 9786056042577

Plants	Described Species	Endemic Species
Clubmoss (*Lycopodiophyta*)	13	1
Ferns (*Pteridophyta*)	73	2
Unenclosed seeds (*Gymnospermae*)	42	6
Enclosed seeds (*Angiospermae*)	11579	3640
Total	11707	3649



Biodiversity in Turkey

ENDEMISM

- **Endemics are spread throughout the country, but are almost absent from Trace. The largest number of endemics occurs in the Mediterranean region and the Irano-Turanian region. Many genera well developed in Anatolia.**

  Mountainous parts of S&SE Anatolia
  - Central Taurus Mt..
  - Southern Anatolian Diagonal

- Largest number of endemics

  Mediterranean (1946)

  Irano- Turanian (1181)

  Euro-Siberian (256)

Salvia smyrnea

Thymus zygoides var. *lycaonicus*

Anthemis* (Cota) *dipsacea

Asperula daphneola

Linum aretioides

Biodiversity in Turkey

Centre of Origin: Wild Relatives of Crops

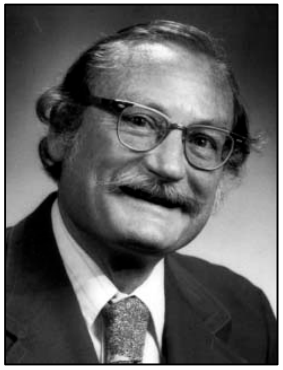
Cereals	*Wheat, Barley, Oats, Rye*
Food legumes	*Pea, Chickpea, Lentil*
Forages	*Vetch, grasspea*
Industrial crops	*Beets, Flax*
Fruits	*Carrots, Lettuce, Brassicas, Celery, Radish, Mustard, Plum, Apple, Pear, Almond, Hazelnut, Pistachio, Olive, Cornel cherry, Cherries, Berries (Blackberry, Strawberry etc.)*

Biodiversity in Turkey

- Farmers have been domesticating crops since BC. 7000 years in Turkey.
  - selection adapted phenotypes from wild populations
  - in ‘centers of origin’
  - result: landraces

Biodiversity in Turkey

pioneers



- **1925-1927**
  - **P. ZHUKOVSKII**
    - **Zhukovsky, P. 1933. La Turque Agricole. Moskow.**
    - **Kıpçak, C. H. Nauruzhan ve S. Türkistanlı. 1951. 'Türkiyenin Zirai Bünyesi. Türkiye Şeker Fabrikalan A.Ş. No.20. (Turkish translation).**
    - **“Plant richness of Anatolia is a huge and powerful wealth in the hands of the breeder”**
- **1925-1935**
  - **Mirza GÖKGÖL**
    - **Identified about 18.000 types of wheat and among them 256 new varieties**
    - **Gökgöl, M. 1935. Türkiye’nin Bugdayları. Tom I. stanbul.**
    - **Gökgöl, M. 1939. Türkiye’nin Bugdayları. Tom II. stanbul.**
    - **Gökgöl, M. 1937Şimali-Şarki Anadolu yaylasında ziraat araştırmaları. Kenan Basımevii.**
    - **Gökgöl, M.1937.Doğu Karadeniz Bölgesi’nde Bir Araştırma Gezisi. İstanbul.**
- **1948**
  - **Jack HARLAN and Osman TOSUN**
    - **Harlan, J.R. 1950. Adventure on Turkish exploration trip. Farmer Stockman. April.**
    - **C.O.QualsetJack R. Harlan (1917-1998): Plant Explorer, Archaeobotanist, Geneticist, and Plant Breeder 1**
    - **Dworkin,S.2010. The Viking in the Wheat Field: A Scientist's Struggle to Preserve the World's Harvest. Walker & Company.**
    - **The biography of Bent Skovmand ,1945–2007**

PGR Program of Turkey

1963 The program started with agreement between UN/FAO and Turkish Government

1964 at Crop Research and Introduction Center (CRIC=AARI), *ex situ* conservation started

1976 NPGRRP established

1979 Projects started to conduct

1991 NPGRRP reorganized

1992 Convention of Bio-diversity (CBD) signed, National PGR Regulation published

1993 *In situ* Conservation of wild plants applied

1998 National Plan for *In situ* Conservation prepared and CBD ratified

1999 *In situ* (on farm) Conservation of landraces project started

2018 National PGR Regulation started to revise

AARI Responsible for National Coordination

Ex Situ Conservation of PGR in Turkey

- SEED GENE BANKS
  - National GB at AARI in İzmir
  - Turkey GB at FCCRI in Ankara
    (101 063 total no. of accession)

- FIELD GENE BANKS
  - (at 18 field gene banks, incl. AARI)
    (8871 No. of accession)

- CRYO-PRESERVATION
  - (studies on mint & garlic)

Objectives of
National Plant Genetic Resources Research Programme (NPGRRP)

Survey & Collection

Conservation
- *Ex situ*
- *In situ*

Evaluation & Utilization

Documentation

- Land races
- Wild and weedy relatives
- Economically important other species and endemic plants of Turkey

Genebank Material

Plant Genetic Resources studies
Survey and Collection






Priority within collecting: Landraces

Wild relatives of cultivated crops

National Genebank Since 1974

Orthodox seed samples of plant genetic resources originated from Turkey are preserved in National Seed Gene Bank - Aegean Agricultural Research Institute - İzmir.

The National seed gene bank cover important national *ex situ* collections.

	Short-term Storage	Medium-term Storage	Long-term Storage
Temperature (°C)	+4	0	-20
Moisture (%)	6 - 8	6 - 8	6
Storage volume (m^3)	127	361	191
Space available	Yes	Yes	Yes
Viability monitoring	-	10 y	10 y

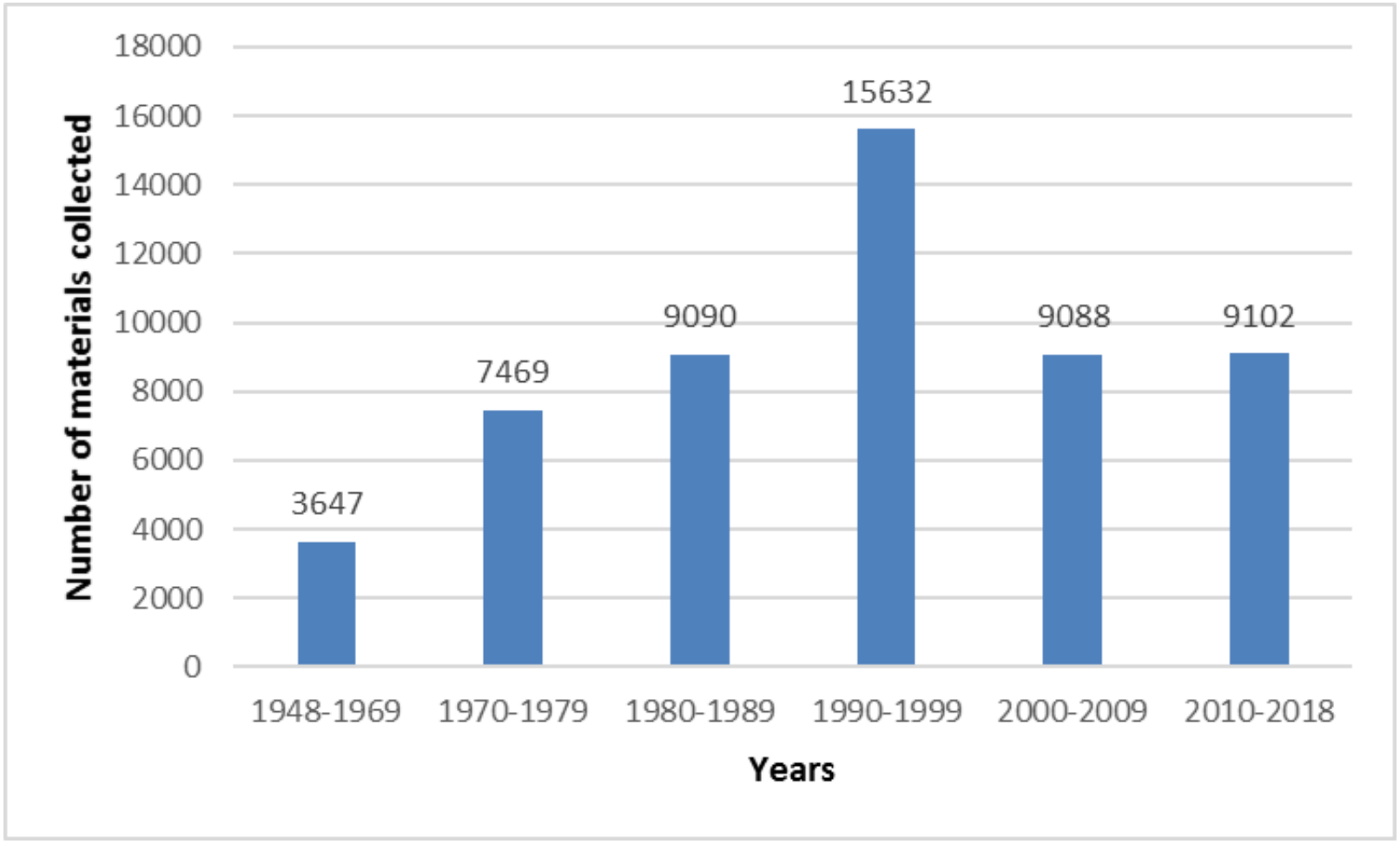
Turkey Seed Genebank Since 2010

	Short-term Storage	Medium-term Storage	Long-term Storage
Temperature (^{0}C)	15	0	-18
Moisture (%)	6-8	6-8	6
Storage volume (m^3)	186	260	260
Space available	Yes	Yes	Yes
Viability monitoring	-	10 y	10 y

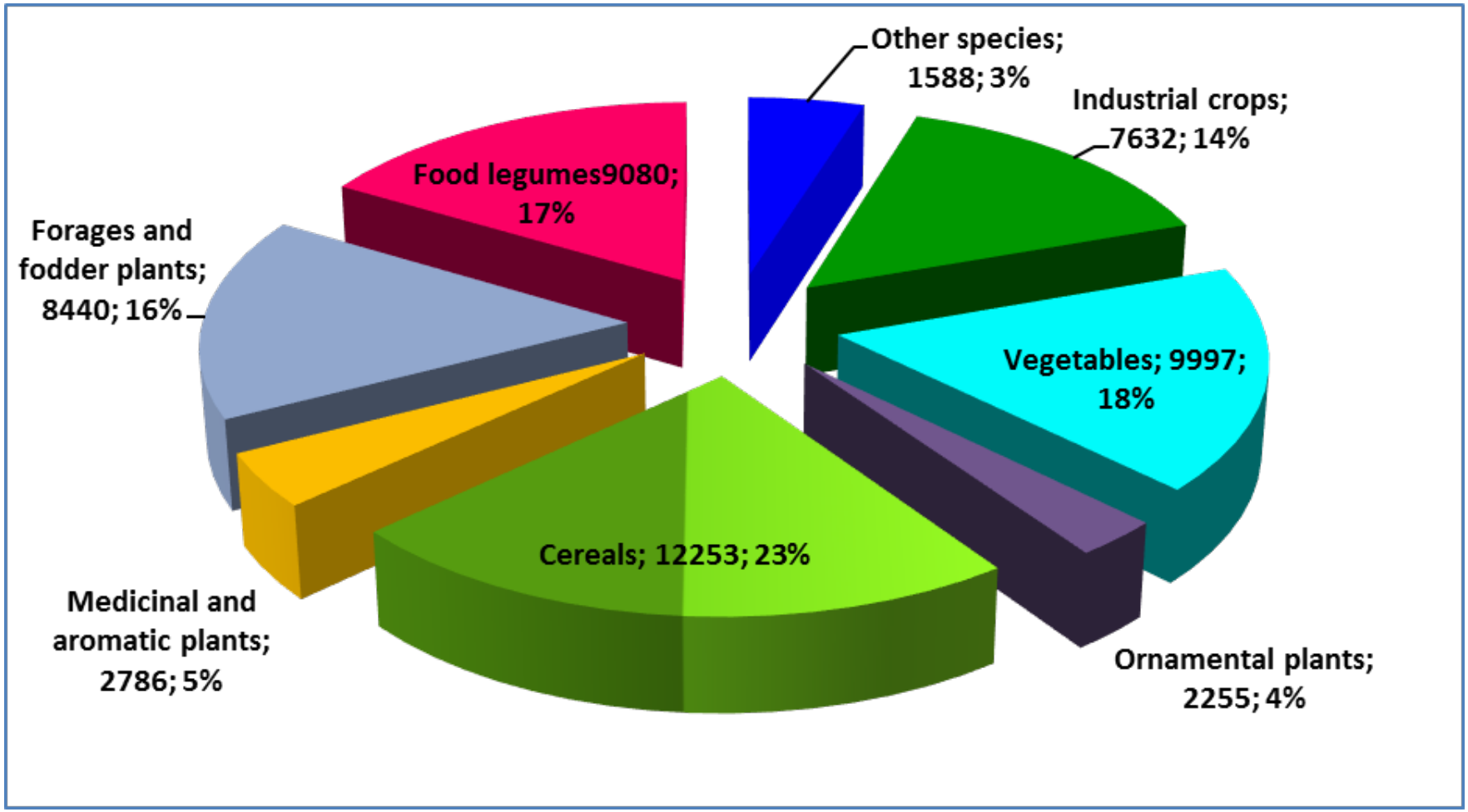
Orthodox seed samples of plant genetic resources originated from Turkey and other countries are conserved in Turkey Seed Gene Bank - Central Research Institute for Field Crops (FCCRI) - Ankara

National Genebank Collections

National Genebank collection by years



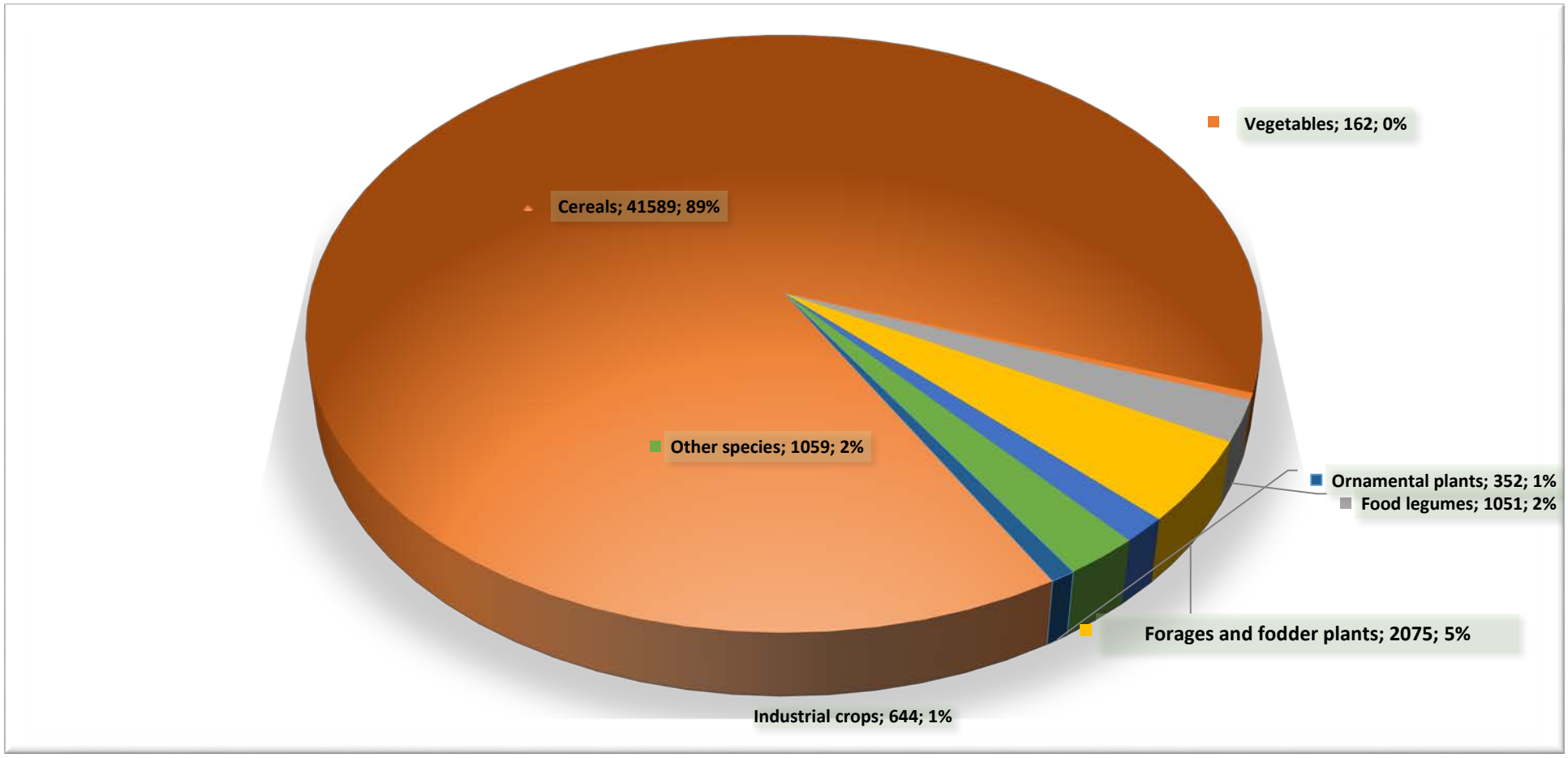
National Genebank Collections



3 298	54 031
No. of species	No. of accession

Safe Dublicates at TurkeySeed genebank of FCCRI

Turkey Seed Genebank Collections

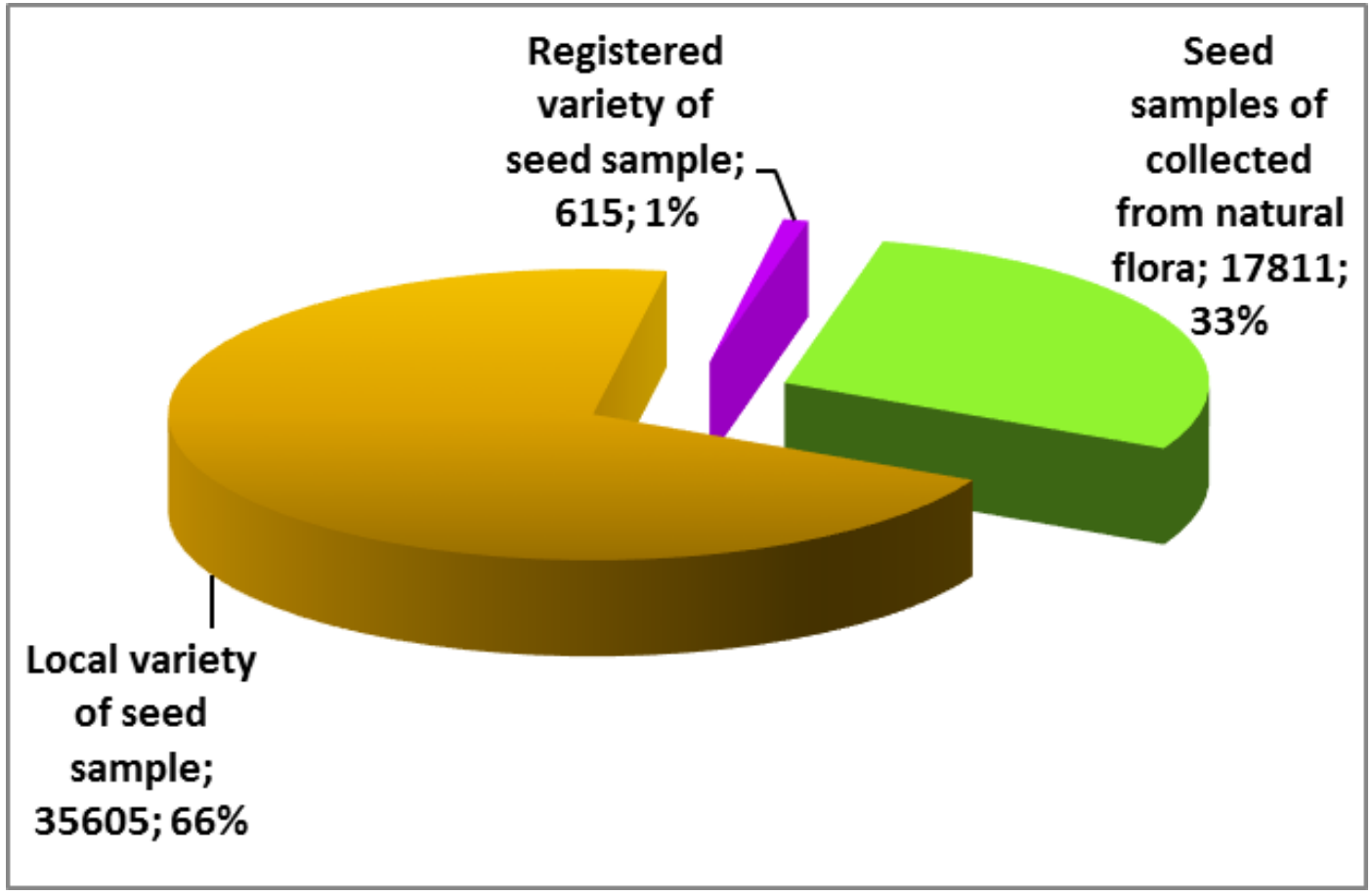


817	46972
No. of species	No. of accession

Safe Dublicates at National genebank of AARI

National Genebank Collections

National genebank collections biological status



Field Genebanks of Turkey

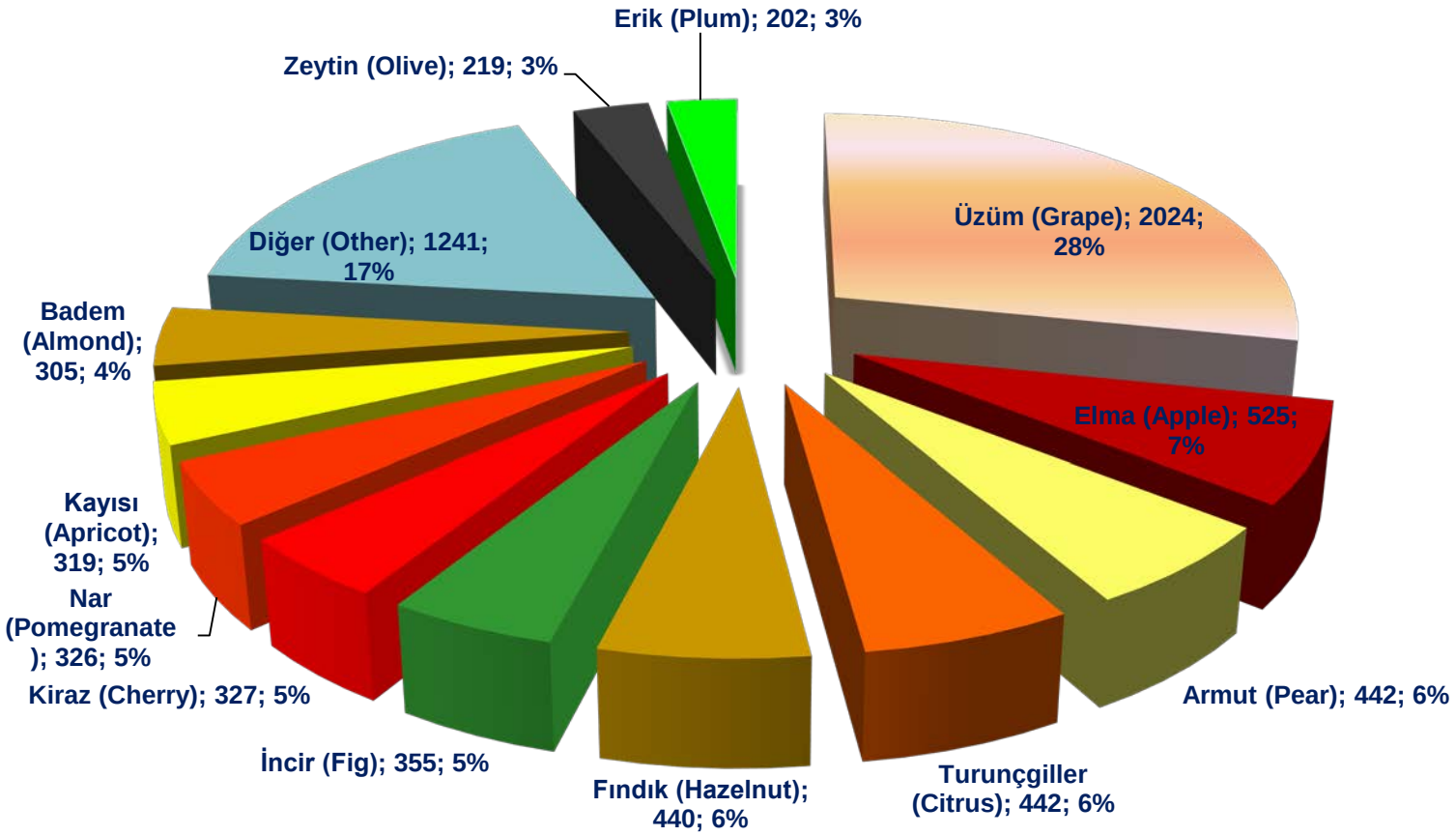
More than 8.000 vegetable accessions

18 research institutes including AARI

AARI is responsible for germplasm conservation of plum, sour cherry, quince, pomegranate, almond, apricot, satsuma and chestnut genetic resources in field gene bank.

Recaltsitrant seeds and vegetatively propagated planting material such as fruit and ornamental species conserved in field gene banks of 18 institutions operating under General Directorate of Agricultural Research and Policies (GDAR).

General Directorate of Agricultural Research and Policies (GDAR)
Field Gene Bank collection

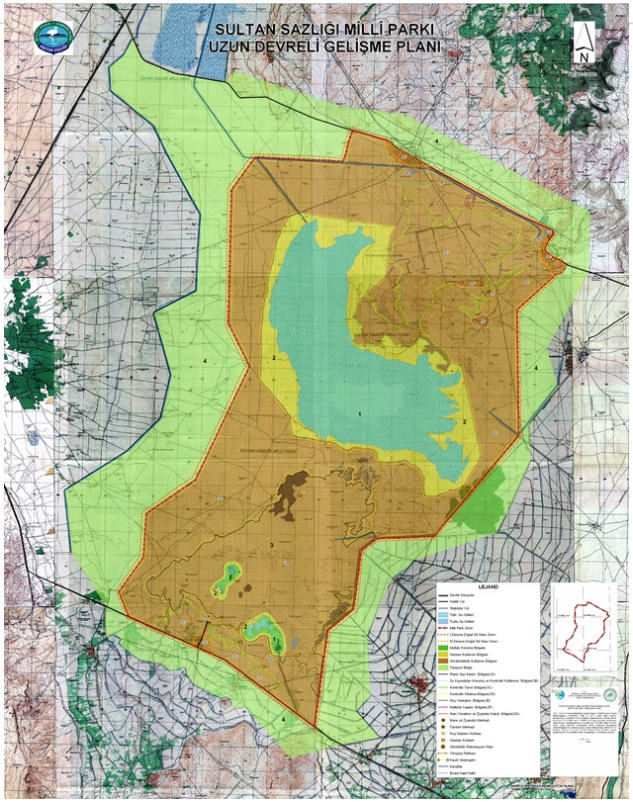


More than 8.000 accessions

In situ Conservation

In scope of the "Project on In situ Conservation of the Genetic Diversity of Turkey" *in situ* conservation of wild chestnut and plum genetic resources in Mount Ida and of wild wheat and legume genetic resources in Central Taurus Mountains (Bolkar and Aladaglar) and Ceylanpinar areas are carried out.

In situ Conservation



In the scope of “Ecosystem Conservation and Management for Threatened Plant Species Project the threatened endemic wetland plant species that are distributed **in Konya, Aksaray, Ankara (Şereflikoçhisar), Isparta and Burdur provinces,** protected in their ecosystems.

AARI Herbarium and Preservation of Herbarium Specimens

Collected and identified plant samples are preserved at AARI herbarium.

AARI herbarium coded in the "Index Herbarium" with the abbreviation "IZ".

145 Families

517 Genus

1 520 species

35 330 herbarium samples

AARI Fungaryum and Macrofungi Preservation

Identification of the collected macro-fungus samples and their maintenance at AARI fungarium are carried out within the framework of “Macrofungus Genetic Resources Research Project” The number of fungarium samples is 1216.

Data quality in NI

EURISCO descriptors and MCPD are the basis for the data structure

PGR information available in electronic format

- **100 % of passport data**
- **100% of genebank management data**
- **6% of characterization and evaluation data**
- **100 % data about distribution and use of germplasm**

Information and documentation unit in the National Gene Bank - needs:

-Server

- Data base management software

Data quality in NI

National Inventory of Turkey in EURISCO

First formal upload NI 2008

12.998 accessions uploaded

(*Avena sp., Cicer sp., Hordeum sp., Lens sp., Phaseolus sp., Secale sp., Triticum sp*.)

No updates since EURISCO moved to IPK

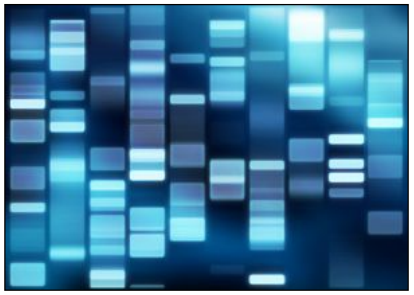
Problems

- NI of Turkey has a different format than EURISCO. The old data is compiling and transferring in relevant structure in EURISCO, step by step.
- The old collection has missing passport data. Especially, in many cases the co-ordinates in the databases are (wholly or partly) missing, imprecise or wrong.
- Characterization and evaluation data is not in systematic way.

Characterization / Evaluation

	SIRA NO	GK NO	TR NO	KAYIT NO	NOT	1)EKİM TARİHİ	2)HASAT TARİHİ	3)% ÇİMLENME ORANI	4)EKİMDEN ÇİMLENMEYE KADAR GEÇEN GÜN SAYISI	5)VEJETASYON GÜN SAYISI	6)OLGUNLAŞMA GÜN SAYISI	7)YAPRAK TİPİ	8)YAPRAKTA TÜYLÜLÜK	9)BİTKİ BOYU(cm)	10)İLK BAKLA YÜKSEKLİĞİ(cm)	11)TANE DÖKME DURUMU		12)TANE KABUK RENGİ	13)TANE YÜZEYİNİN DESENİ	14)TANE YÜZEYİNİN DİKENLİLİĞİ	15)TANE BURUŞUKLUĞU	16)KURAKLIĞA TOLERANS (1-9 SKALASI)	17) %50ÇİÇEKLENMEGÜNSAYISI	18) %50MEYVETUTMAGÜNSAYISI	19)YEŞİLMEYVEBOYU
2	1	GK1	TR773	03.11.08/C	NAAK							YAPILC	YOK	237	37	36 HARİÇ	GK1	krem	yok	YOK	YOK		39	42	13,70
3	2	GK2	TR773	03.11.08/C	NAAK									230	30		GK2	krem	yok				42	40	12,04
4	3	GK3	TR773	03.11.08/C	NAAK									210	42		GK3	krem, açık	yok				42	48	13,90
5	4	GK4	TR773	03.11.08/C	NAAK									195	30		GK4	krem, açık	yok, var				44	50	11,86
6	5	GK5	TR773	03.11.08/C	NAAK									250	40		GK5	taba, krem	yok,var,var,var,yok				53	56	23,10
7	6	GK6	TR773	04.11.08/C	NAAK									235	26		GK6	taba,kızıl	yok,yok				39	44	11,62
8	7	GK7	TR773	04.11.08/C	NAAK									290	50		GK7	taba,kızıl	yok,yok				39	42	12,06

Sayfa1 Sayfa2 Sayfa3



Morphological,
Biotic,
Abiotic,
Molecular

Characterization studies are not at the desired level. %6 of the material in the gene bank was evaluated.

MULTIPLICATION & REGENERATION

Multiplication of collected samples is performed in the field, screenhouses, greenhouses.

- POPULATION STRUCTURE
  - Reproductive Biology
  - Breeding System
  - Ecology
    - Minimum characters observations (Minimum descriptors)

Utilization

Since the establishment of the AARI, plant genetic resources are used in breeding programs.

Utilization

Numerous varieties (275) have been developed and registered by using collections of plant genetic resources of National Gene Bank.

THANK YOU

DANKE

TEŞEKKÜRLER.

http://www.tarim.gov.tr/TAGEM

T.C.
GIDA TARIM VE HAYVANCILIK
BAKANLIĞI

TAGEM
AR-GE & İNOVASYON