

Turkey

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Improvement of the citrus sector by the setting up of the common conservation strategies
for the free exchange of healthy citrus genetic resources

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- **Project team**

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Citrus distribution map



Citrus varieties

Species/Varieties	Cultivated areas	Area (Ha)	Yield/Ha (q)	Exportation 1000/T
Orange		38.000	950	122
<i>Common</i>				
- Valencia	East. and West. Medit. Reg.	4.000	100	20.0
- Shamouti		2.400	60	12.0
- Finike	West. Medit. Reg.	3.600	90	31.0
- Kozan				
- Dörtyol	East. Medit. Reg.			
<i>Navel</i>		28.000	700	59.0
- Washington	East. and West. Medit. Aegean Reg.			
- Navelina	West. Medit. Reg.			
- Navelate				
- Lanelate				
Mandarins & Mandarin-like		24.900	480	132
- Satsuma	Aegean, East. Medit. and East. Black Sea	11.400	210	
- Fremont	East Medit. Reg.		110	64.0
- Clementine	East. and West. Medit. Reg.		10	
- Minneola	East Medit. Reg.	13.500	100	68.0
- Nova			40	
- Willowleaf	East. and West. Medit. Reg.		10	
Lemons		17.000	400	218
- Kütdiken	East Medit. Reg.	5.100	120	
- Interdonato	East. and West. Medit. Aegean Reg.	6.000	140	
- Italian memeli	East Medit. Reg.	1.700	40	
- Lamas				218
- Molla mehmet		4.200	100	
- Kýbrýs	West. Medit. Reg.			
- Meyer	East Medit. Reg.			
Grapefruits		2.500	135	72.0
- Star Ruby	East Medit. Reg.	1.700	90	
- Redblush				
- Henderson		800	5	65.0
- Rio Red				
- Marsh Seedless	East Medit. Reg.		40	7.0
Total		82.400	1.965	544

Citrus phytosanitary problems

Pathogens		Diseases		References
Virus and virus-like				
OLV-1*	X	Olive Latent Virus-1	X	Martelli <i>et al.</i> , 1996
CVV	X	Inf.variegation/Crinkly leaf	X	Tunar and Yılmaz, 1997; Gürsoy and Baloğlu, 2001
CLRV		Leaf rugose		
CPsV	X	Psorosis	X	Çýnar <i>et al.</i> , 1993 Güllü, 1989 ; Yılmaz, 1997
SDV		Satsuma dwarf	X	Azeri, 1987
CTLV		Tatterleaf/Citrange stunt		
CTV	X	Tristeza	X	Baloğlu, 1988; Kamberoğlu, 2000 Kamberoğlu and Yılmaz, 2001
CVEV		Vein enation/Woody gall	X	Kamberoğlu and Yılmaz, 1995
		Concave gum	X	Çýnar <i>et al.</i> , 1993
		Cristacortis	X	Moreira, 1965; Azeri, 1979
		Impetratura	X	Chapot, 1961; Nas, 1989
CEVd	X	Exocortis	X	Önelge, 1994
CCaVd	X	Cachexia	X	Norman, 1963; Güldür, 1988
CVds	X	Citrus viroids	X	Önelge, 1994
		Chlorotic dwarf disease	X	Çýnar <i>et al.</i> , 1995; Korkmaz, 1997
		Gummy bark	X	Moreira, 1965; Güllü, 1989
Fungus				
<i>Phytophthora sp</i>	X	Phytophthora gummosis	X	Çýnar, 1975; Biçici and Çýnar, 1990
<i>Alternaria alternata f. sp. citri</i>	X	Alternaria Leaf Spot	+	Erkylýç <i>et al.</i> , 1999ab
<i>Phoma tracheiphila</i>		Mal secco	X	Erkylýç, 1988
Bacteria and Bacteria-like				
<i>Pseudomonas syringae</i>		Blast and Black pit	X	Aysan and Çýnar, 1994
<i>X. axonopodis pv citri</i>		Citrus canker		
<i>Candidatus L. asiaticus</i>		Greening		
<i>Candidatus L. africanum</i>				
Nematodes				
<i>Tylenchulus semipenetrans</i>			X	Elekçioğlu, 1995
<i>Pratylenchus vulnus</i>				
Phytoplasmas				
<i>Spiroplasma citri</i>		Stubborn	X	Bové, 1986; Çađlayan, 1987
		Witches' broom		

X= present in the country

Citrus germplasm

Location	Date of creation	N° of accessions*	Characterization		
			morphological	trueness-to-type	sanitary
National					
Antalya Horticultural Research Institute (ATAE)	1936	150	X	X	Partly
Tuzcu Citrus Collection (TCC)	1970	875	Partly	Partly	Partly
Regional					
Alata Horticultural Research Institute (ABKAE)	1972	70	-	-	-
Tea Research Station (TRS)	1933	20	-	-	-
Ege University	1955	20	-	-	-
Akdeniz University	1989	75	-	-	-
Sultanhisar Plant Production Station	1945	20	-	-	-
Iskenderun Plant Production Station	1945	20	-	-	-
Ödemi° CitrusNursery	1950	10	-	-	-
Alanya Citrus Nursery	1945	15	-	-	-
Dalaman Goverment Production Farm	1930	40	-	-	-
Dörtyol Goverment Production Farm	1930	20	-	-	-

List of the Citrus Cultivars at Çukurova University, Adana
"Tuzcu Citrus Collection"

Species or genus	Total of accessions
<i>Citrus</i>	749
<i>Citrus Hybrids</i>	67
<i>Poncirus</i>	23
<i>Fortunella Sp.</i>	8
<i>Eremocitrus</i>	2
<i>Microcitrus</i>	5
<i>Clausena</i>	2
<i>Glycosmis</i>	1
<i>Murraya</i>	1
<i>Pamburus</i>	1
<i>Aegle</i>	1
<i>Aeglopsis</i>	1
<i>Afraegle</i>	1
<i>Atalantia</i>	4
<i>Balsamocitrinae</i>	1
<i>Citropsis</i>	4
<i>Hesperathusa</i>	1
<i>Pleiospermium</i>	1
<i>Severinia</i>	2

Varieties/Species	N° Plants
<i>Citrus amblycarpa</i>	2
<i>Citrus ampullacea</i>	1
<i>Citrus asahikan</i>	1
<i>Citrus assamensis</i>	1
<i>Citrus aurantium</i>	71
<i>Citrus neo - aurantium</i>	1
<i>Citrus aurantifolia</i>	3
<i>Citrus benikoji</i>	1
<i>Citrus bergamia</i>	3
<i>Citrus canaliculata</i>	1
<i>Citrus celebica</i>	1
<i>Citrus clementina</i>	55
<i>Citrus davaoensis</i>	1
<i>Citrus deliciosa</i>	9
<i>Citrus depressa</i>	2
<i>Citrus excelsa</i>	1
<i>Citrus erythrosa</i>	1
<i>Citrus funadoko</i>	1
<i>Citrus halimii</i>	1
<i>Citrus hassaku</i>	1
<i>Citrus hiroschimana</i>	1
<i>Citrus honaju</i>	1
<i>Citrus ichangensis</i>	3
<i>Citrus indica</i>	2
<i>Citrus intermedia</i>	1
<i>Citrus iyo</i>	1
<i>Citrus jambhiri</i>	12
<i>Citrus junos</i>	3

Varieties/Species	N° Plants
<i>Citrus keraji</i>	1
<i>Citrus karna</i>	1
<i>Citrus latifolia</i>	4
<i>Citrus latipes</i>	1
<i>Citrus leiocarpa</i>	1
<i>Citrus limetta</i>	2
<i>Citrus limon</i>	166
<i>Citrus limonia</i>	1
<i>Citrus limonimeditica</i>	1
<i>Citrus longispina</i>	1
<i>Citrus lumia</i>	1
<i>Citrus lycopersicaformis</i>	1
<i>Citrus macrophylla</i>	2
<i>Citrus maderaspatana</i>	1
<i>Citrus madurensis</i>	2
<i>Citrus maxima</i>	4
<i>Citrus megaloxycarpa</i>	1
<i>Citrus medica</i>	6
<i>Citrus micrantha</i>	1
<i>Citrus miaray</i>	1
<i>Citrus moi</i>	1
<i>Citrus montana</i>	1
<i>Citrus natsudaoidai</i>	1
<i>Citrus nippokoreana</i>	1
<i>Citrus nobilis</i>	1
<i>Citrus obovoidea</i>	1
<i>Citrus paradisi</i>	30
<i>Citrus pennivesiculata</i>	1
<i>Citrus pseudogulgul</i>	1
<i>Citrus pyriformis</i>	1
<i>Citrus reticulata</i>	30
<i>Citrus reshni</i>	2
<i>Citrus rokugatsu</i>	1
<i>Citrus rugulosa</i>	1
<i>Citrus shunkokan</i>	1
<i>Citrus sinensis</i>	215
<i>Citrus suhuiensis</i>	1
<i>Citrus sinograndis</i>	1
<i>Citrus southwickii</i>	2
<i>Citrus sphaerocarpa</i>	1
<i>Citrus succosa</i>	1
<i>Citrus sudachi</i>	1
<i>Citrus sulcata</i>	1
<i>Citrus suntara</i>	1
<i>Citrus sunki</i>	1
<i>Citrus tachibana</i>	1
<i>Citrus taiwanica</i>	1
<i>Citrus tamurana</i>	1
<i>Citrus tangerina</i>	2
<i>Citrus tankan</i>	1
<i>Citrus tardiva</i>	1
<i>Citrus tengu</i>	1
<i>Citrus ujukitsu</i>	1
<i>Citrus unshiu</i>	53
<i>Citrus vitiensis</i>	1
<i>Citrus yatsushiro</i>	1
<i>Citrus yuko</i>	1
<i>Citrus volkameriana</i>	3
<i>Citrus webberii</i>	1

Varieties/Species	N° Plants
Citrus hybrids	
<i>Citrus sinensis</i> x <i>Poncirus trifoliata</i>	26
<i>Citrus paradisi</i> x <i>Poncirus trifoliata</i>	7
<i>Citrus limon</i> x <i>Poncirus trifoliata</i>	5
<i>Citrus aurantium</i> x <i>Poncirus trifoliata</i>	1
<i>Citrus nobilis</i> x <i>Citrus tangerina</i>	1
<i>Citrus reticulata</i> x <i>Citrus sinensis</i>	10
<i>Citrus reticulata</i> x <i>Citrus paradisi</i>	10
<i>Citrus aurantifolia</i> x <i>Fortunella</i> sp	2
<i>Citrus temple</i> x <i>Citrus paradisi</i>	1
<i>Citrus reshni</i> x (<i>Citrus sinensis</i> x <i>Poncirus trifoliata</i>)	1
<i>Citrus reshni</i> x (<i>Citrus paradisi</i> x <i>Poncirus trifoliata</i>)	1
<i>Citrus sunki</i> x (<i>Citrus paradisi</i> x <i>Poncirus trifoliata</i>)	1
(<i>Citrus sinensis</i> x <i>Poncirus trifoliata</i>) x (<i>Citrus reticulata</i> x <i>Fortunella</i> sp)	1
Poncirus	
<i>Poncirus trifoliata</i> (L) Raf.	23
Fortunella sp	
<i>Fortunella margarita</i>	3
<i>Fortunella japonica</i>	2
<i>Fortunella obovata</i>	1
<i>Fortunella polyandra</i>	1
<i>Fortunella hindsii</i>	1
Eremocitrus	
<i>Eremocitrus gluca</i>	1
<i>Eremocitrus hybrid</i> CRC	1
Microcitrus	
<i>Microcitrus australasica</i> CRC 01	1
<i>Microcitrus australasica</i> CRC 02	1
<i>Microcitrus australis</i> CRC 3666 - CRC 3673	2
<i>Microcitrus inodora</i> CRC 3785	1
Clausena	
<i>Clausena excavata</i>	1
<i>Clausena lansium</i>	1
Glycosmis	
<i>Glycosmis pentaphylla</i>	1
Murraya	
<i>Murraya paniculata</i>	1
Pamburus	
<i>Pamburus missionis</i>	1
Aegle	
<i>Aegle marmelos</i>	2
Aeglopsis	
<i>Aeglopsis chevalieri</i>	2
Afraegle	
<i>Afraegle paniculata</i>	1
Atalantia	
<i>Atalantia ceylanica</i> CRC - 01	1
<i>Atalantia ceylanica</i> CRC - 02	1
<i>Atalantia ceylanica</i> CRC - 3287	1
<i>Atalantia citroides</i> CRC 1430	1
Balsamacitrinae	
<i>Balsamocitrus dawei</i>	1
Citropsis	
<i>Citropsis articulata</i>	1
<i>Citropsis dawean</i> CRC 3294	1
<i>Citropsis gabunensis</i> CRC	1
<i>Citropsis gillettiana</i>	1

Varieties/Species	N° Plants
Hesperathusa	
<i>Hesperethusa crenulata</i>	1
Pleiospermium	
<i>Pleiospermium alatum</i>	1
Severinia	
<i>Severinia buxifolia</i> CRC	1
<i>Severinia buxifolia</i> SRA	1

Citrus programmes

Programmes	Proposed	Running	Legislation
Clonal and sanitary selection		2001	Research Protocols
Monitoring, eradication and control of quarantine pests		2001	By Law
Certification		2001	Research Protocols
Quarantine		2001	By Law
Others			

Public and private institutions working in citrus

Institutions or others	Location	Type of activity	Personnel		Facilities
			Number	Qualifications	
Public					
Tuzcu Citrus Collection (TCC)	Adana	Conservation of citrus genetic material and Assessment of plant propagating material			Greenhouses, Experiment field Laboratories
Horticultural Research Institute (ATAE)	Antalya	Assessment of plant propagating material Adaptation of different cultivars and rootstocks			Screenhouse Experiment field Laboratories
Alata Horticultural Research Institute (ABKAE)	Erdemli	Adaptation of different cultivars and rootstocks			Laboratories Experiment field
Tea Research Station (TRS)	Rize	Research			Laboratories Experiment field
Ege University	Ýzmir	Research			Laboratories Experiment field
Akdeniz University	Antalya	Research			Laboratories Experiment field
Plant Production Station	Sultanhisar	Nursery			Greenhouse
Plant Production Station	Ýskenderun	Nursery			Greenhouse
Citrus Nursery	Ödemi°	Nursery			Greenhouse
Citrus Nursery	Alanya	Nursery			Greenhouse
Government Production Farm	Dalaman	Production			Production parcel
Government Production Farm	Dörtýol	Production			Production parcel

Financial Table

Project steps	Facility/instruments/activity	Units	Cost (€)
Inventory	GPS	4	20.000
	GIS	2	16.000
Conservation for characterization	Planting and equipments for the conservation field	3 Ha	75.000
Genetic and agronomic characterization	Laboratory equipments and running materials	1	200.000
Physiological WUE characterization	Laboratory equipments and running materials	2	100.000
Sanitary assessment	Laboratory equipments and running materials	1	85.000
	1 Indexing greenhouse, equipments (benches, shade etc...) and running materials	100 m ²	100.000
	1 Insect-proof screenhouse	300 m ²	120.000
Sanitation	Equipments for <i>in vitro</i> laboratory	1	100.000
	1 thermotherapy chamber	1	30.000
	1 conditioned greenhouse	100 m ²	100.000
Conservation <i>in vitro</i>	Equipments for <i>in vitro</i> laboratory	1	100.000
Conservation <i>in vivo</i>	1 Insectproof screenhouse	800 m ²	320.000
Assessment of pomological traits	Planting conservation field	1.5 Ha	45.000
Training	Short- courses		200.000
	Stages		300.000
	Technical visits		120.000
	Travel expenses		100.000
Missions and part time personnel			120.000
Supply	Transport vehicle	1	30.000
	Books, publications, CD		3.000
	Personal computer and printer	1	3.000
General expenses			228.700
TOTAL			2.515.700

Agreement

Official country agreement to the project on "Improvement of the citrus sector by setting up common conservation strategies for the free exchange of healthy citrus plant genetic resources"

REPUBLIC OF TURKEY
MINISTRY OF AGRICULTURE AND RURAL AFFAIRS
General Directorate of Agricultural Research

Ankara, April, 2001

Prof. Dr. Önder TUZCU, General Coordinator of MECINET,
Çukurova University, Balcalı / ADANA- Turkey

Ref. Your letter dated 19. 01. 2001.

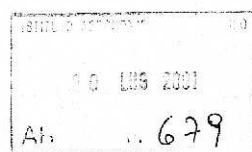
Dear Prof. Dr. TUZCU,

In response to your above mentioned letter, I am very pleased to inform you that **The Ministry of Agriculture and Rural Affairs of Turkey** has approved to participate in "The Improvement of The Citrus Sector in The Mediterranean by Setting up of Common Conservation Strategies for Free Exchange of Healthy Citrus Genetic Resources" Project and will support its activities.

Sincerely,



Assoc. Prof. Dr. Hamit AYANOĞLU
Undersecretary



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