



REPUBLIC OF TURKEY
FOOD, AGRICULTURAL and LIVESTOCK MINISTRY
GENERAL DIRECTORATE of AGRICULTURAL RESEARCH AND POLICY



TURKEY COTTON RESEARCHES

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WHERE IS TURKEY ?

Turkey is located in the northern hemisphere between the 36° - 42° northern parallels and the 26° - 45° eastern meridians like a bridge through Asia and Europa.



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SIO, NOAA, U.S. Navy, NGA, GEBCO



TURKEY

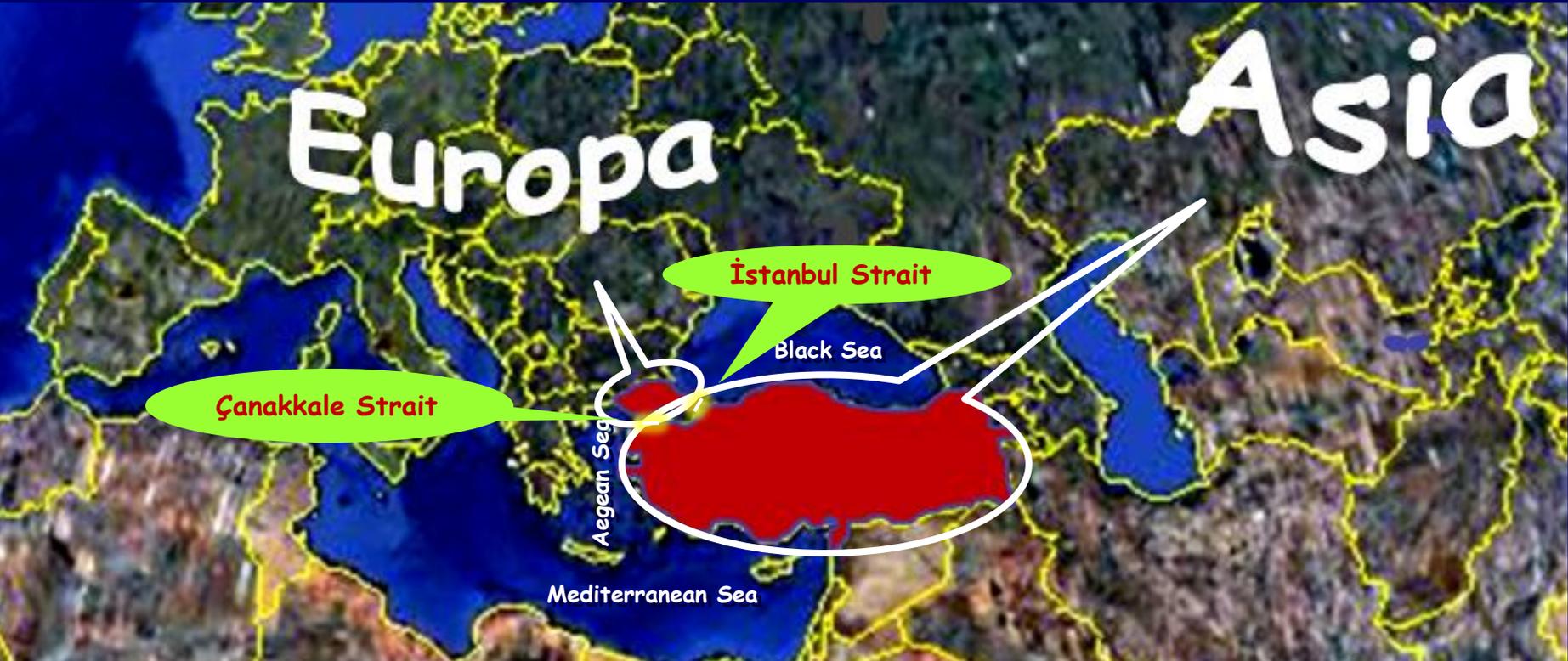


Turkey is surrounded by seas on the three sides.

- ➔ Mediterranean Sea
- ➔ Aegean Sea
- ➔ Black Sea



TURKEY



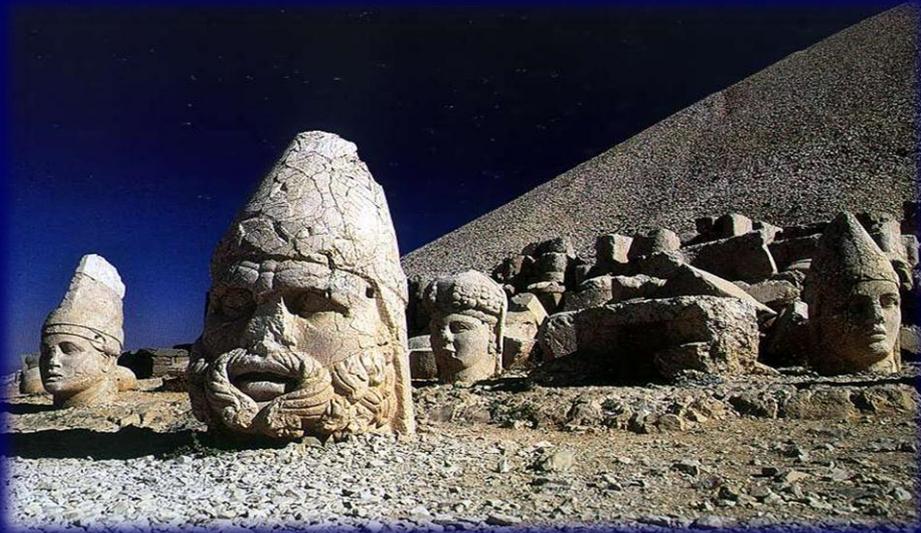
- ➔ Geographically, Turkey straddles two continents, Europe in the west and Asia in the east.
- ➔ The two continents are divided by İstanbul and Çanakkale (Dardanelles) straits.



TURKEY



➔ Turkey is famous for its natural and historical beauties.



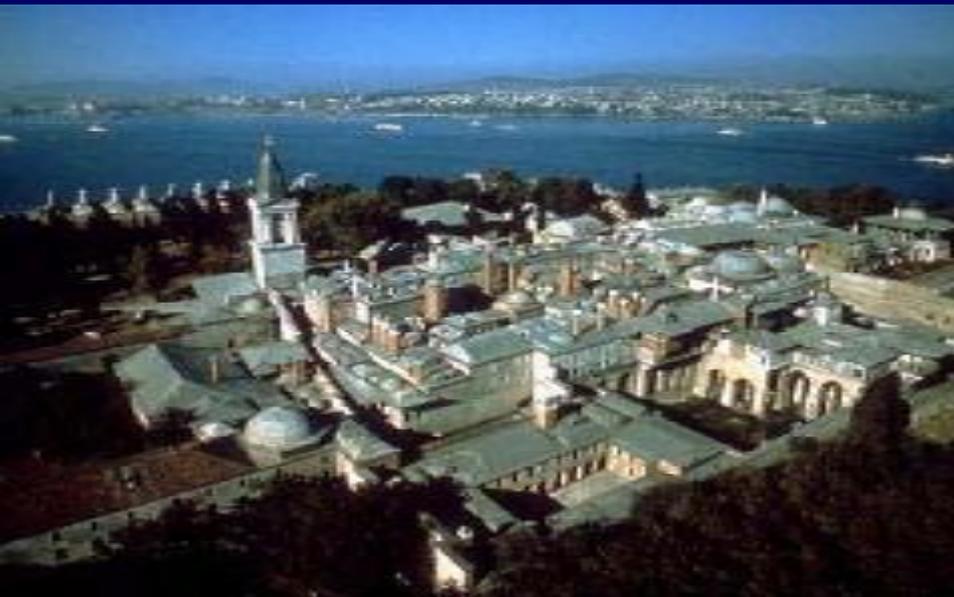


TURKEY

➔ Istanbul is the only city in the world built on two continents.



Bosporus Bridge



Topkapi Palace



Sultanahmet Mosque



TURKEY



➔ The place for the two of the Seven Wonders of the ancient world, Ephesus and Halicarnasus are in Turkey.



➔ The famous Trojan Wars took place in Turkey.



TURKEY



General Information

Name	Republic of Turkey
Capital	Ankara
Area	783.562 km ²
Population	73,7 million



ADANA



Area
Population (2010)

14.256 km²
1.836.432



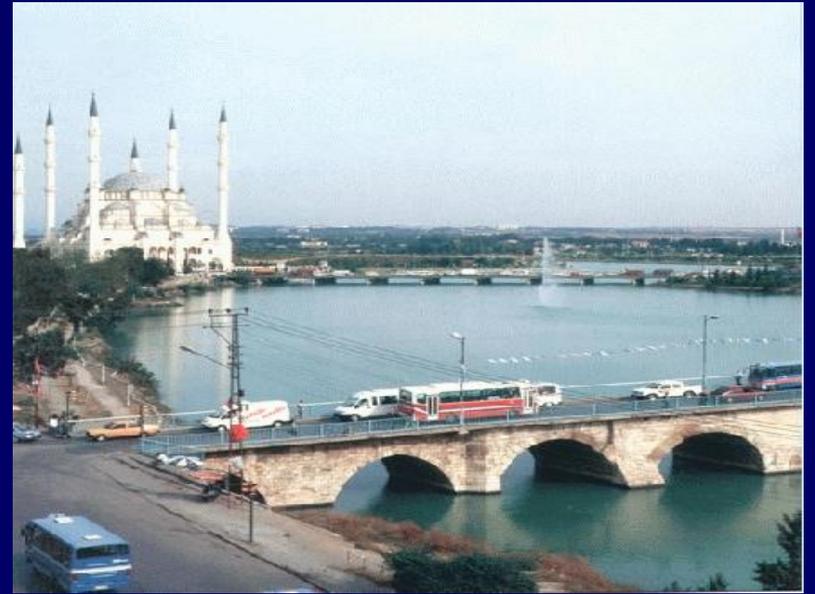
ADANA



- ➔ Situated in the middle of the Cukurova Plain, Adana is the fourth largest city of Turkey, nestled in the most fertile agricultural area of the whole country which is fed by the lifegiving waters of River Seyhan.



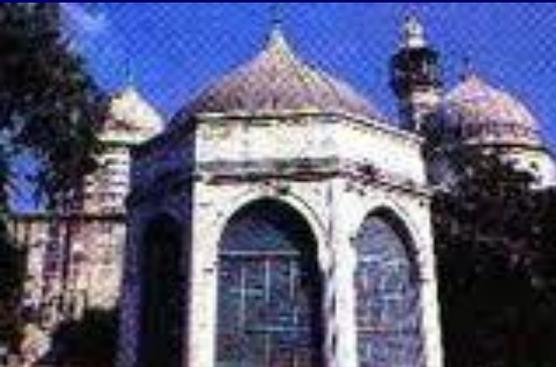
ADANA



➔ The precious River Seyhan is spanned by the ancient Stone Bridge which was built in Roman times.



ADANA



- ➔ In the city, Great Mosque, Eski Mosque, Hasan Aga Mosque, the Clock-Tower, an old covered bazaar, Bedesten or Arasta are of interest. Adana is also famous for its delicious Adana Kebap.





ADANA



- ➔ The tea houses and restaurants alongside the Seyhan Dam and Lake provide a cool and perfect view of the city and the river at sunsets.





ADANA



- ➔ The first steps of cotton production and researches in Turkey were begun in Adana.
- ➔ So cotton is the unique symbol of Adana .
- ➔ Furthermore every year an International Film Festival is held in Adana called 'Adana Golden Boll Film Festival' symbolizing cotton as a product of Çukurova region and Adana.





AGRICULTURAL RESEARCHES AND GDARP



AGRICULTURAL RESEARCHES IN TURKEY

Cotton researches are carried out by

➔ Food, Agricultural and Livestock Ministry,
coordinates and implement the agricultural
research and development activities through
the Agricultural Research Institutes of
General Directorate of Agricultural
Research and Policy

G D A R P

GENERAL DIRECTORATE OF AGRICULTURAL RESEARCHES and POLICY

Thematic R&D Areas

- ➔ Plant Breeding
- ➔ Plant Protection
- ➔ Livestock Breeding and Husbandry
- ➔ Animal Health
- ➔ Aquaculture
- ➔ Food and Feed
- ➔ Natural and genetic resources



G D A R P
GENERAL DIRECTORATE OF
AGRICULTURAL RESEARCHES and POLICY

Staff

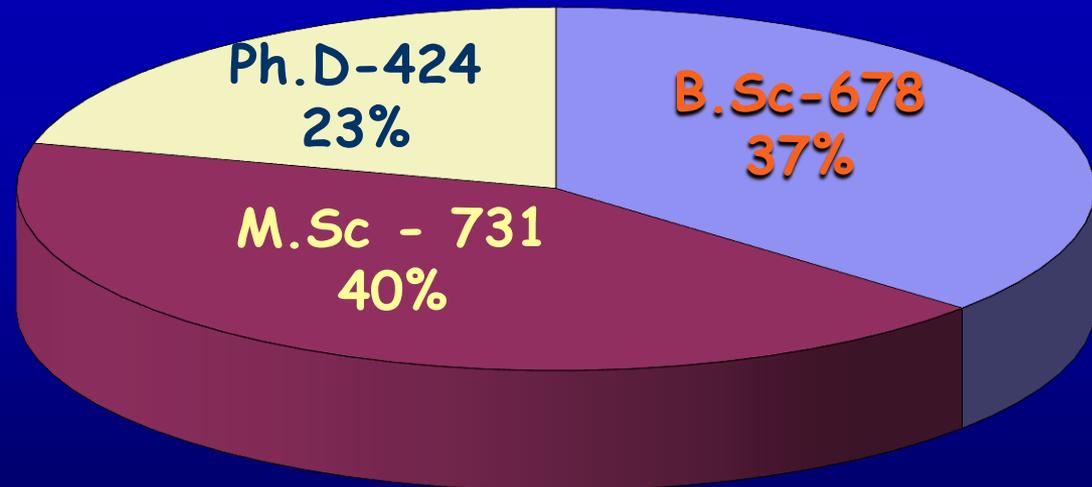
Research&Administration	1.833
Technician- Lab. staff	552
Support Staff	813
Worker	3.553
TOTAL	6.751



G D A R P GENERAL DIRECTORATE OF AGRICULTURAL RESEARCHES and POLICY

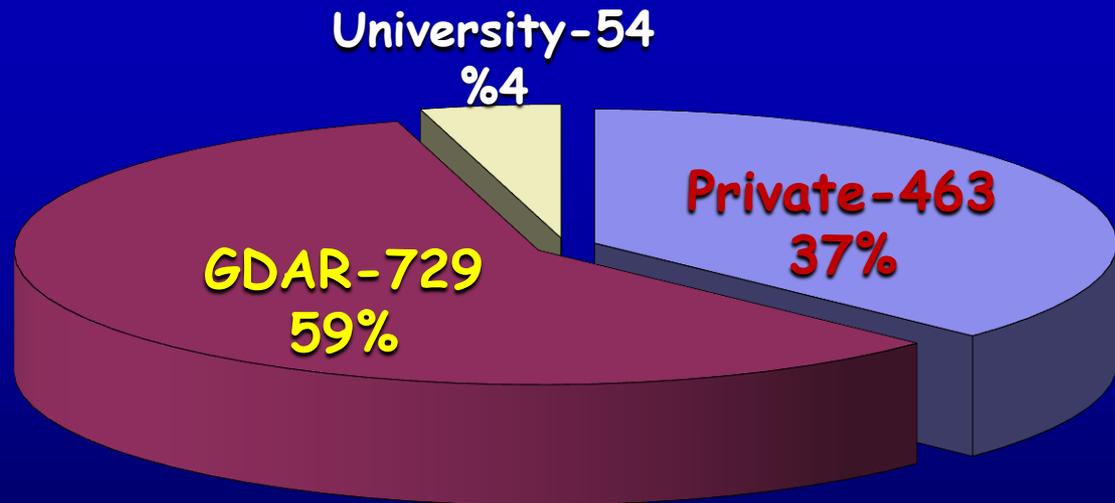


Distribution of Researchers According to Academic Degrees



G D A R P GENERAL DIRECTORATE OF AGRICULTURAL RESEARCHES and POLICY

Registered Varieties by Sectors



G D A R P GENERAL DIRECTORATE OF AGRICULTURAL RESEARCHES and POLICY

Completed Projects

FIELD	2005	2006	2007	2008	2009	2010
Field Crops	21	40	40	54	78	78
Horticulture	32	40	72	66	34	34
Plant Protection			30	75	55	55
Animal Husbandry	6	7	7	8	7	7
Animal Health	6			11	11	11
Aquaculture and Fisheries	6	2	2	5	4	4
Food and Feed	5	10	9	6	6	6
TOTAL	76	99	160	225	195	235





COTTON PRODUCTION AND RESEARCHES



COTTON IN THE WORLD...

Year	Area (ha)	Production (tone)	Yield (kg/ha)
1980	34.319	13.979	407
1990	33.100	18.867	570
2000	31.822	18.658	586
2007	33.057	25.521	772
2008	30.432	23.455	767
2009	30.212	22.170	727
2010	33.555	24.87	741
2011	35.836	26.61	743



COTTON IN TURKEY..

Yıllar	Türkiye Toplam		
	Ekim (000 ha)	Üretim (000 ton)	Lif Verimi (kg/da)
1980/81	673	500	74.3
1985/86	659	518	79.0
1990/91	642	655	102.0
1995/96	757	851	112.0
2000/01	654	880	134.6
2001/02	697	923	132.4
2002/03	694	983	141.6
2003/04	637	918	144.0
2004/05	640	936	146.3
2005/06	456	766	167.9
2006/07	534	985	184.5
2007/08	520	675	129.8
2008/09	384	500	131.8
2009/2010	420	658	156.9
2010/2011	475	641	1350



COTTON PRODUCTION AREAS IN TURKEY





TURKEY, REGIONS AND COTTON...

Year	AEGEAN REGION			MEDITERRANEAN REGION			AEGEAN REGION			SOUTHEASTERN ANATOLIA REGION		
	Aegean			Antalya			Çukurova			Southeast. Anatolia		
	Area (000 ha)	Prod. (000 ton)	Yield (kg/da)	Area (000 ha)	Prod. (000 ton)	Yield (kg/da)	Area (000 ha)	Prod. (000 ton)	Yield (kg/da)	Area (000 ha)	Prod. (000 ton)	Yield (kg/da)
1980/81	218	185	84.9	35	36	102.9	369	253	68.6	51	26	50.9
1990/91	258	285	110.4	32	38	118.8	211	190	90.0	141	142	100.7
2000/01	208	286	137.5	13	14	107.7	116	153	131.9	317	427	134.7
2002/03	224	305	136.2	9	12	133.3	141	212	150.3	320	454	141.9
2003/04	203	266	131.0	8	12	150.0	126	196	155.6	300	444	148.0
2004/05	176	254	144.3	9	14	155.6	130	192	147.7	325	476	146.5
2005/06	112	168	150.0	3	4	133.3	82	157	191.5	259	437	168.7
2006/07	117	203	173.5	3	4	133.3	117	242	206.8	297	536	180.4
2007/08	120	150	125.0	5	7	140.0	125	158	126.4	270	360	133.3
2008/09	75	95	127	5	7	140	84	108	129	220	290	132



COTTON IN THE COUNTRIES

AREA

- ➔ INDIA
- ➔ CHINA
- ➔ USA
- ➔ PAKISTAN
- ➔ UZBEKISTAN
- ➔ BRAZIL
- ➔ AUSTRALIA
- ➔ TURKEY

PRODUCTION

- ➔ CHINA
- ➔ INDIA
- ➔ USA
- ➔ PAKISTAN
- ➔ BRAZIL
- ➔ AUSTRALIA
- ➔ UZBEKISTAN
- ➔ TURKEY

YIELD

- ➔ AUSTRALIA
- ➔ BRAZIL
- ➔ TURKEY
- ➔ CHINA
- ➔ USA
- ➔ UZBEKISTAN



TURKEY'S PLACE IN THE COTTON WORLD ...

Turkey is,

- ➔ 8th for Production Area
 - ➔ 8th for Production
 - ➔ 3th for yield/ha
 - ➔ 4th for Consumption
- in the World...



RESEARCH INSTITUTES DEALING WITH COTTON IN TURKEY

The National Cotton Project is carried out by these 6 Institutes

**Coordinator
Institute**

**Nazilli Cotton
Research
Institute/Aydın**



**Kahramanmaraş
Agricultural Research
Institute/KMaraş**



**Southeastern Anatolia
Agricultural Research
Institute /Diyarbakır**



**West Mediterranean
Agricultural Research
Institute/Antalya**



**East Mediterranean Agricultural
Research Institute/Adana**



**GAP Agricultural
Research
Institute/Şanlıurfa**



AEGEAN SEA

MEDITERRANEAN SEA



NATIONAL COTTON RESEARCH PROJECT

NATIONAL COTTON RESEARCH PROJECT



Under the

“National Cotton Integrated Crop Management,
Research, Application and Training Project”

There are 32 projects

NATIONAL COTTON RESEARCH PROJECT



- ➔ They are on the different topics:
 - ➔ breeding and biotechnology
 - ➔ agronomy,
 - ➔ fiber technology,
 - ➔ organic and natural coloured cotton
 - ➔ diseases and pests



**CUKUROVA AGRICULTURAL
RESEARCH INSTITUTE
(CUTAEM)**





East Mediterranean Agricultural Research Institute

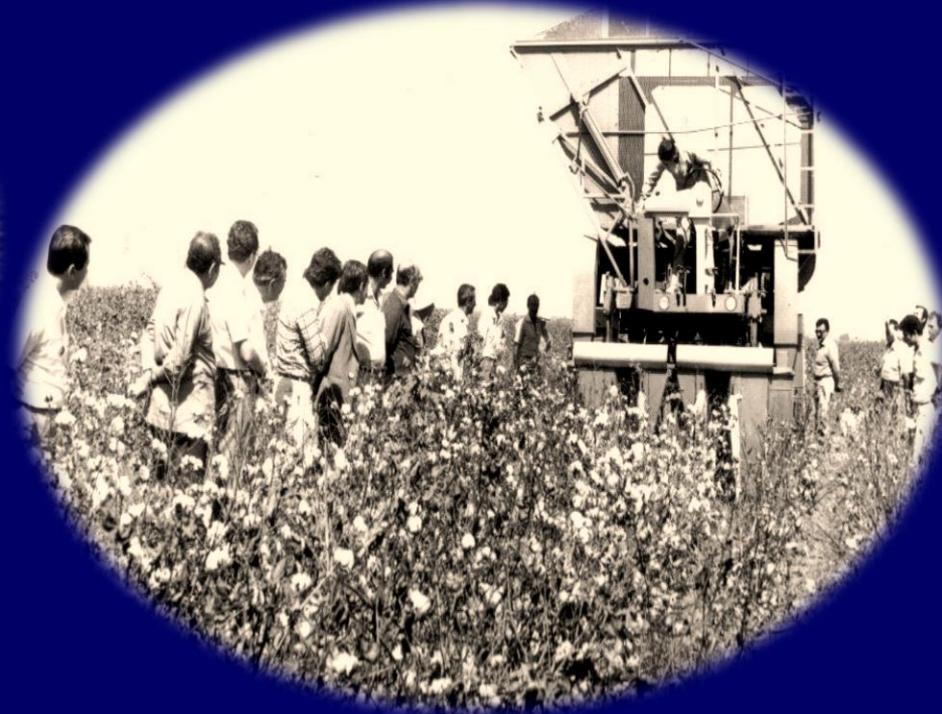
➔ The Seed Breeding Station established in 1924 in Adana was a first step for our Institute





Eastern Mediterranean Agricultural Research Institute

➔ The first cotton researches in Turkey were start at that station.





East Mediterranean Agricultural Research Institute

➔ Lots of researches were carried out on breeding, agronomy, physiology, fiber technology, disease and pests at our institute since 1924.





East Mediterranean Agricultural Research Institute

➔ In 1961 Our Institute was established as Forage
Crops Production Center





East Mediterranean Agricultural Research Institute

→ Then it was reestablished in 1987 as Çukurova Agricultural Research Institute





East Mediterranean Agricultural Research Institute

➔ And in 2011 the name of the institute was changed as East Mediterranean Agricultural Research Institute



East Mediterranean Agricultural Research Institute

EMARI AREA

We have 600 hectares irrigated area.



East Mediterranean Agricultural Research Institute

EMARI STAFF

Research & Administration

64

Technician- Lab. Staff

8

Support Staff

32

Worker

114

TOTAL

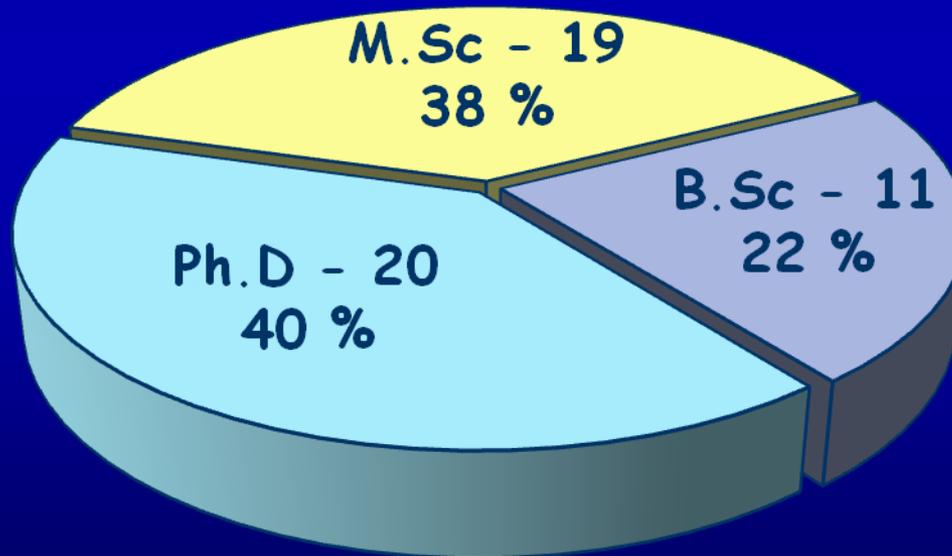
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EMARI STAFF

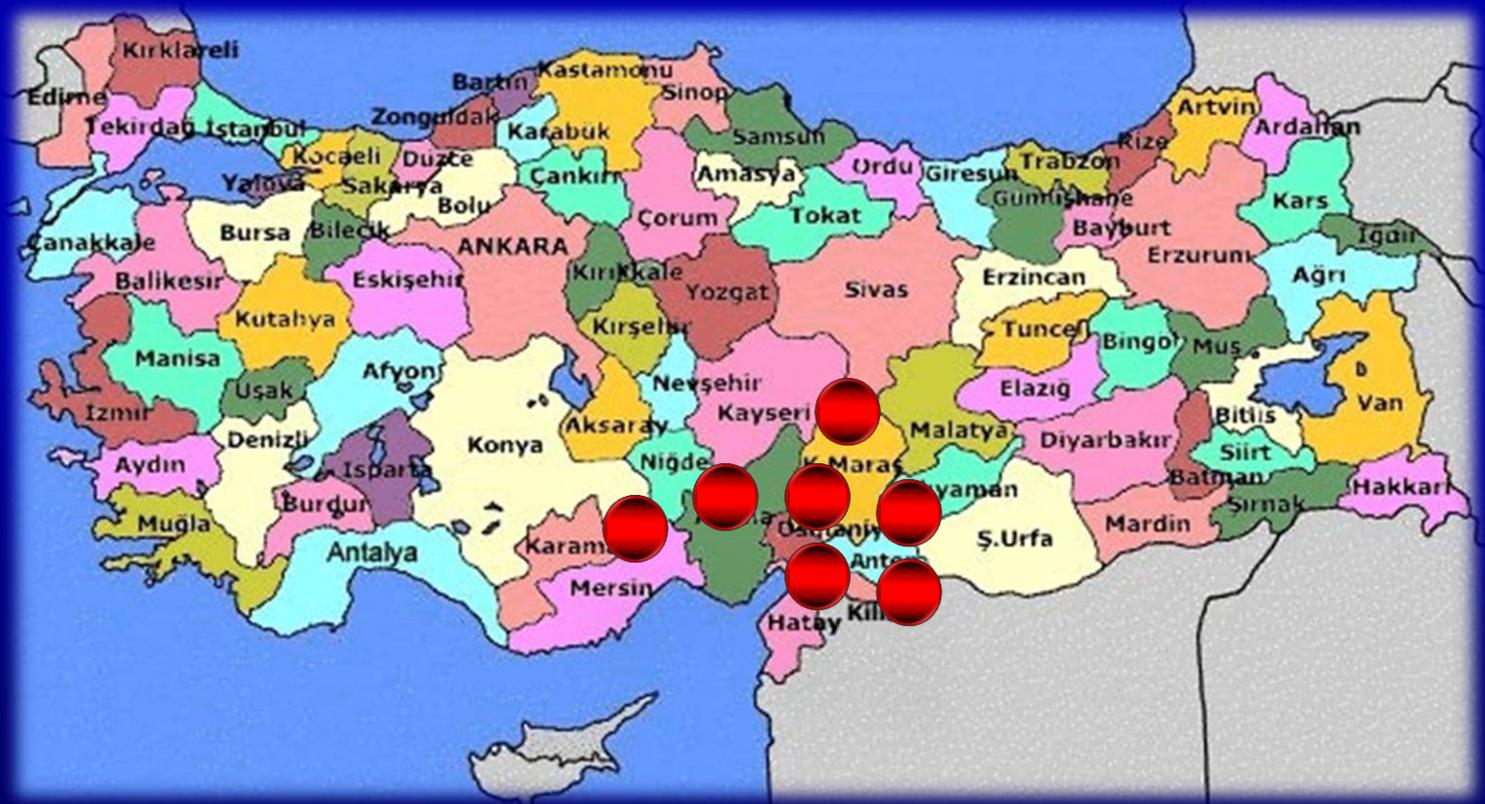
Distribution of Researchers According to Academic Degrees



EMARI ACTIVITY REGIONS

In the East Mediterranean Region, we have been working for the following regions

- ➔ Adana
- ➔ Hatay
- ➔ Kahramanmaraş
- ➔ İçel
- ➔ Gaziantep
- ➔ Osmaniye
- ➔ Kilis





EMARI RESEARCH AREAS

In the East Mediterranean Region,
Our Thematic Research Areas are;

Field Crops

Pasture Forage and Fodder Crops

Livestock



EMARI

COTTON RESEARCHES



COTTON RESEARCHES IN EMARI

- ➔ In 1924 The Seed Breeding Station established in Adana was a first step for our Institute and Cotton Studies in Turkey.
- ➔ The first cotton researches in Turkey were start at that station.
- ➔ Lots of researches were carried out on breeding, agronomy, physiology, fiber technology, disease and pests at our institute in Adana since 1924.



COTTON RESEARCHES IN EMARI

- ➔ Until 1960 lint yield of the cultivated varieties was 600 kg/ha under irrigated conditions.
- ➔ In the 1960's with the new varieties registered for the region lint yield was 800 kg/ha.



COTTON RESEARCHES IN EMARI

- ➔ In the 1980's lint yield increased to 1300 kg/ha through,
 - ➔ new varieties registered
 - ➔ ridge planting methods
 - ➔ improved agronomical techniques.



COTTON RESEARCHES IN EMARI

Nowadays, with the improved agronomical techniques and higher yielded varieties,

- ➔ Lint yield is high in Çukurova Region.
- ➔ But the amount of planting area has been decreased due to the high cotton production costs and low selling prices.



COTTON RESEARCHES IN EMARI

➔ Up to now 9 cotton varieties were registered.

Acala 130	1946
DPL 15/21	1960
Carolina Queen	1968
Adana 967-10	1977

Sayar 314	1980
Çukurova 1518	1982
Adana 98	1998
ADN P-01	2008
Beren	2010

NEW REGISTERED CULTIVARS

ADN P1



ADN P1 was registered in 2008
for Southeastern Anatolia Region

It was sold to private sector for
seed production and selling rights.

Variety Properties

- Earliness : Medium
- 100 Seed Weight : 10.9 g
- Leaf Shape : Palmate
- Hairiness : Medium
- Boll Size : Medium
- Seed Cotton Yield : High
- Lint % : 41

Fiber Properties

- Fiber Length : 30.1 mm
- Fiber Fineness: 4.8 mic.
- Fiber Strength: 30.0 g/teks
- Uniformity Index: 85-88

Resistance to Verticillium Wilt: Moderate

Suitability to Mechanical Harvesting: Very Good

NEW REGISTERED CULTIVARS

BEREN



Variety Properties

- Earliness : Good
- 100 Seed Weight : 9.9 g
- Leaf Shape : Palmate
- Hairiness : Medium
- Boll Size : Medium
- Seed Cotton Yield : High
- Lint % : 38,7

Fiber Properties

- Fiber Length: 30.0 mm
- Fiber Fineness: 4.0 mic.
- Fiber Strength: 31.5 g/teks
- Uniformity Index: 85-88

Resistance to Verticillium Wilt: Good

Suitability to Mechanical Harvesting: Very Good

BEREN was registered in
2010 for Aegean and
Mediterranean Regions



RESULTED PROJECTS
DURING THE LAST 10 YEARS
IN EMARI

RESULTED PROJECTS

RESEARCH ON SUITABILITY OF DIFFERENT COTTON (*Gossypium hirsutum* L.) VARIETIES FOR MECHANICAL HARVESTING IN SOUTHEASTERN ANATOLIA REGION (Ayten DOLANÇAY)

RESEARCH ON *IN VITRO* REGENERATION OF COTTON (*Gossypium hirsutum* L.) (Dr.Şaire R.TÜRKOĞLU)

A RESEARCH TO DETERMINE THE NATURAL CROSSING IN COTTON (*Gossypium hirsutum* L.), ISOLATION DISTANCE AND POLLINATORS IN ÇUKUROVA REGION (Dr.Şaire R.TÜRKOĞLU)

A RESEARCH OF DETERMINATION OF EFFECTS ON MORPHOLOGICAL, PHYSIOLOGICAL AND TECHNOLOGICAL PROPERTIES OF COTTON GROWN UNDER PLASTIC MULCH IN ÇUKUROVA REGION (Bekir.S.ÖZBEK)

RESEARCH TO DETERMINE GROWING DEGREE DAYS FOR TWO LOCAL VARIETIES (*Gossypium hirsutum* L.) IN ÇUKUROVA REGION (Sedat SÜLLÜ)

THE COMPARISON OF FIBER PROPERTIES ON STANDART COTTON VARIETIES GROWN IN ÇUKUROVA, SOUTHESTERN AND AEGEAN REGION (Hacer KAYA)

AN INVESTIGATION EFFECT OF SOME AGRICULTURAL APPLICATIONS ON PLANT MONITORING PARAMETERS AND PLANT MAPPING OF COTTON (Dr. Petek TOKLU)

RESULTED PROJECTS

RESEARCH ON SUITABILITY OF DIFFERENT COTTON (*Gossypium hirsutum* L.) VARIETIES FOR MECHANICAL HARVESTING IN SOUTHEASTERN ANATOLIA REGION

In this study six cotton (*Gossypium hirsutum* L.) varieties were compared to determine the suitability for mechanical harvesting in Southeastern Anatolia region during 2002-2004.



RESULTED PROJECTS

RESEARCH ON SUITABILITY OF DIFFERENT COTTON (*Gossyium hirsutum* L.) VARIETIES FOR MECHANICAL HARVESTING IN SOUTHEASTERN ANATOLIA REGION



RESULTED PROJECTS

RESEARCH ON SUITABILITY OF DIFFERENT COTTON (*Gossyium hirsutum* L.) VARIETIES FOR MECHANICAL HARVESTING IN SOUTHEASTERN ANATOLIA REGION



RESULTED PROJECTS

RESEARCH ON SUITABILITY OF DIFFERENT COTTON (*Gossyium hirsutum* L.) VARIETIES FOR MECHANICAL HARVESTING IN SOUTHEASTERN ANATOLIA REGION



RESULTED PROJECTS

RESEARCH ON SUITABILITY OF DIFFERENT COTTON (*Gossyium hirsutum* L.) VARIETIES FOR MECHANICAL HARVESTING IN SOUTHEASTERN ANATOLIA REGION

According to the two years' results, comparing the varieties and harvesting methods it was found that cv Maraş-92 was the most promising variety and mechanical harvesting was more economic than hand picking harvesting.



RESULTED PROJECTS

RESEARCH ON *IN VITRO* REGENERATION OF COTTON (*Gossypium hirsutum* L.)

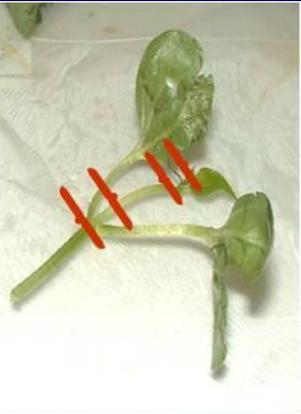


- ➔ This study was conducted to determine the effects of different media on callus induction and plant regeneration from various explants of different cotton varieties through
 - ➔ organogenesis,
 - ➔ somatic embryogenesis
 - ➔ anther culture

RESULTED PROJECTS

RESEARCH ON *IN VITRO* REGENERATION OF COTTON (*Gossypium hirsutum* L.)

ORGANOGENESIS



Initiation



Regeneration



Rooting



Potting



Acclimatization



Field Growing

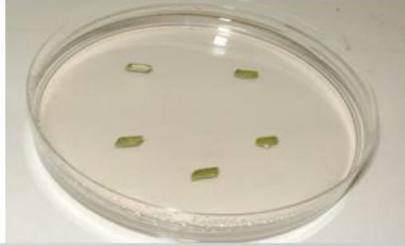
RESULTED PROJECTS

RESEARCH ON *IN VITRO* REGENERATION OF COTTON (*Gossypium hirsutum* L.)

SOMATIC EMBRYOGENESIS



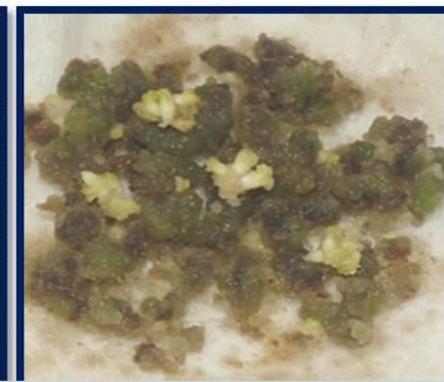
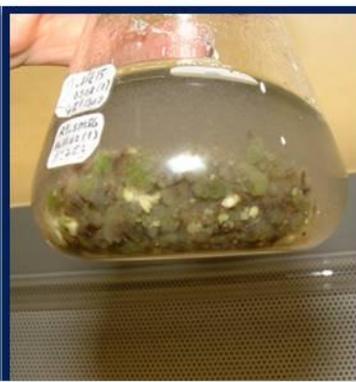
Hypocotyl Explants In Vitro



Callus Induction



Embryogenic Callus



Liquid Culture, Somatic Embryogenesis, Sub-culturing the Somatic Embryos



Maturing Somatic Embryos



Rooting

RESULTED PROJECTS

RESEARCH ON *IN VITRO* REGENERATION OF COTTON (*Gossypium hirsutum* L.)

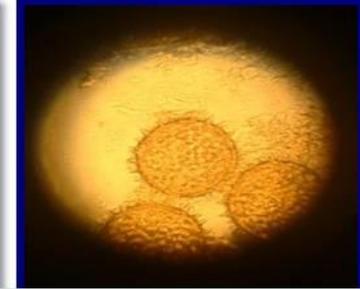
ANTHER CULTURE



Harvest of Squares



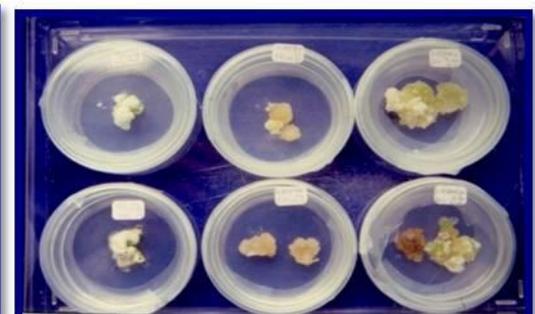
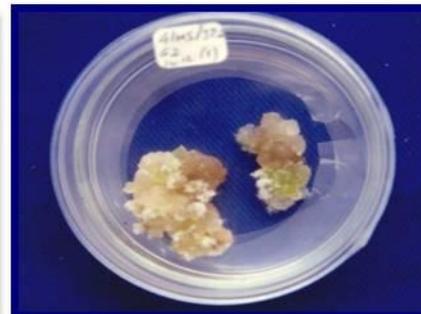
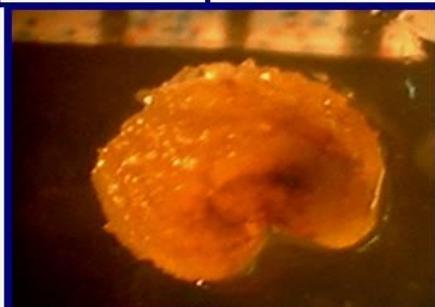
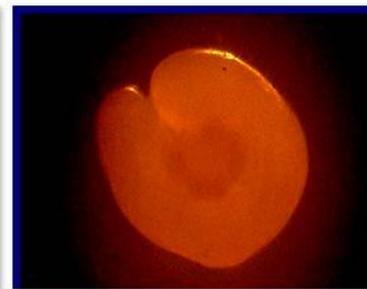
Determining the suitable Microspor Stage



Surface Sterilization



In Vitro Culture of Anthers



Callus Induction

RESULTED PROJECTS

A RESEARCH TO DETERMINE THE NATURAL CROSSING IN COTTON (*Gossypium hirsutum* L.), ISOLATION DISTANCE AND POLLINATORS IN ÇUKUROVA REGION (Dr. Şaire R. TÜRKÖĞLU)

According to genetical markers the regional standent variety Çukurova-1518 - green leaf (female) and Mc-Namara red-leaf (male) for red leaf trait were used. This study was carried out to measure the extent of natural crossing in cotton and to determine the isolation distance required for seed production in Çukurova region during 2002-2003.



Mc-Namara - red-leaf (male)

Çukurova-1518 - green leaf (female)

RESULTED PROJECTS

A RESEARCH TO DETERMINE THE NATURAL CROSSING IN COTTON (*Gossypium hirsutum* L.), ISOLATION DISTANCE AND POLLINATORS IN ÇUKUROVA REGION (Dr. Şaire R. TÜRKOĞLU)

Çukurova-1518 - green leaf (female)

Mc-Namara - red-leaf (male)



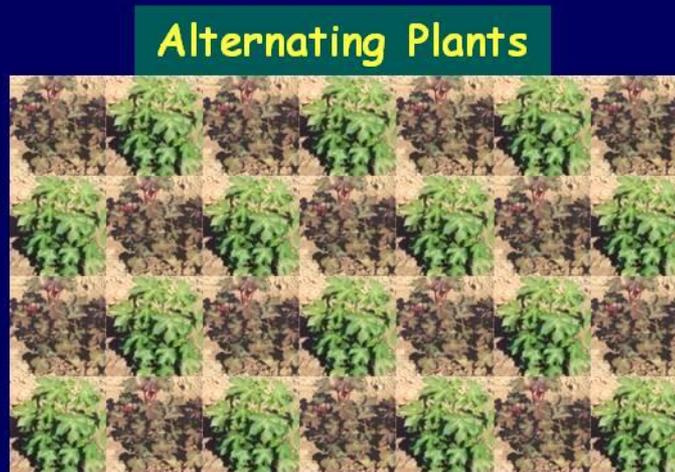
RESULTED PROJECTS

A RESEARCH TO DETERMINE THE NATURAL CROSSING IN COTTON (*Gossypium hirsutum* L.), ISOLATION DISTANCE AND POLLINATORS IN ÇUKUROVA REGION (Dr. Şaire R. TÜRKOĞLU)

To determine the extent of natural crossing the plots were designed as alternating rows and alternating plants in a row.



Ç. 1518 (female)



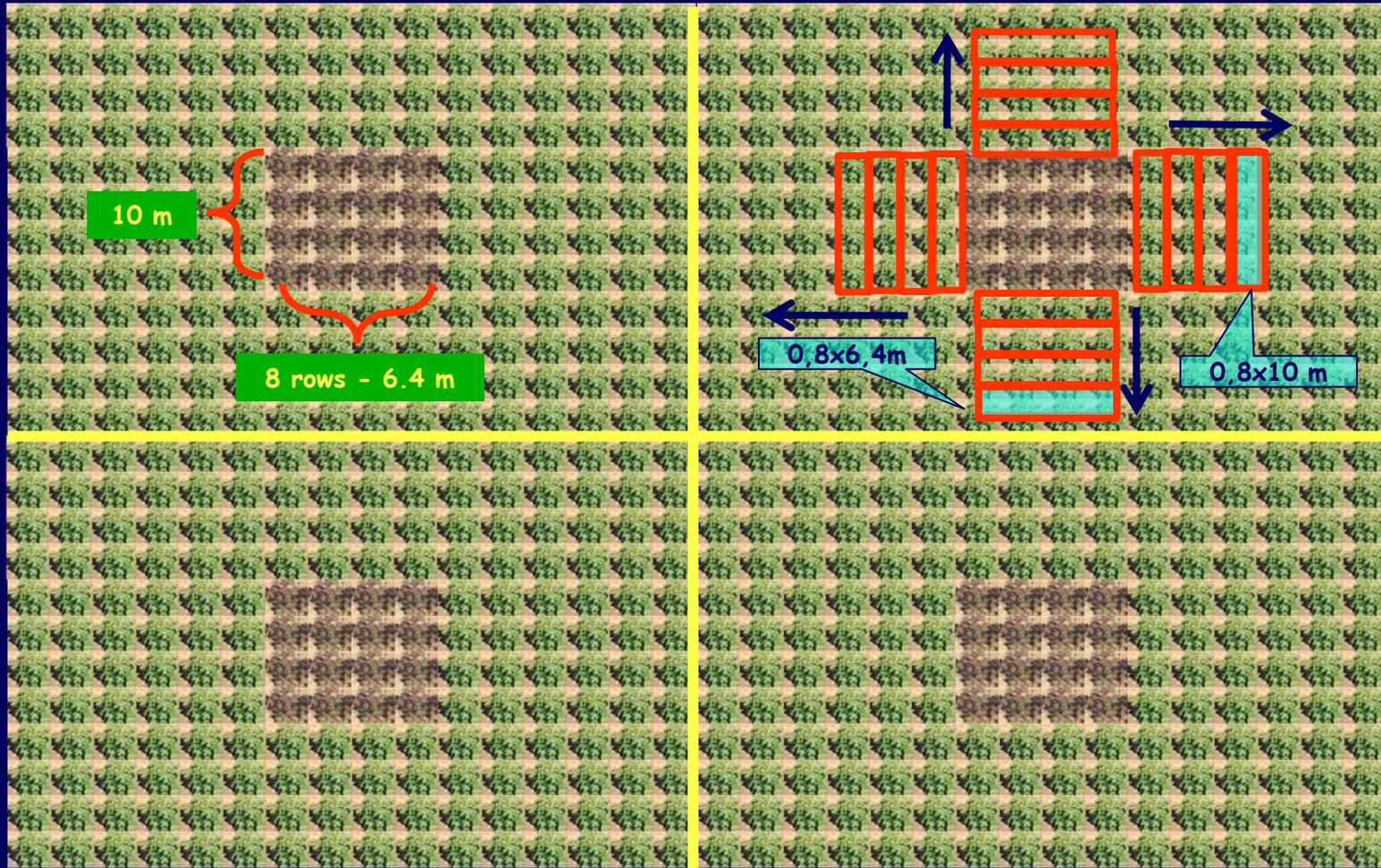
Mc Namara
Red Leaf

RESULTS PROJECTS

A RESEARCH TO DETERMINE THE NATURAL CROSSING IN COTTON (*Gossypium hirsutum* L.), ISOLATION DISTANCE AND POLLINATORS IN ÇUKUROVA REGION (Dr. Şaire R. TÜRKÖĞLU)

To determine the isolation distance four plots included Mc-Namara (male) planted in the middle as a block and Çukurova-1518 (female) planted round. Harvest was carried out according to two kinds of sub plots designed on the way the lines (A sub plots) and parallel to the lines (B sub plots) round the red plants block.

Determining the isolation distance



100 m

92.8 m

RESULTED PROJECTS

A RESEARCH TO DETERMINE THE NATURAL CROSSING IN COTTON (*Gossypium hirsutum* L.), ISOLATION DISTANCE AND POLLINATORS IN ÇUKUROVA REGION (Dr. Şaire R. TÜRKOĞLU)

For the germinating tests, the seeds obtained from every plots were sown in the plastic box contained sterilized sand covered with transparent lid (100 seeds per box). The plastic boxes were incubated in the growth room under 28°C, 16 hours light and 8 hours dark conditions. After 7-10 days incubation period the seedlings were counted and natural crossing rates were determined using the number of red and total seedlings.



RESULTED PROJECTS

A RESEARCH OF DETERMINATION OF EFFECTS ON MORPHOLOGICAL, PHYSIOLOGICAL AND TECHNOLOGICAL PROPERTIES OF COTTON GROWN UNDER PLASTIC MULCH IN ÇUKUROVA REGION (Bekir.S.ÖZBEK)

This study, was carried out to determine the effects of plastic mulch system on cotton production in 2001 and 2003. The research results showed that, mulching provided earliness in harvest.



RESULTED PROJECTS

A RESEARCH OF DETERMINATION OF EFFECTS ON MORPHOLOGICAL, PHYSIOLOGICAL AND TECHNOLOGICAL PROPERTIES OF COTTON GROWN UNDER PLASTIC MULCH IN ÇUKUROVA REGION (Bekir.S.ÖZBEK)

Immediately after sowing rows were covered with mulching film.



RESULTED PROJECTS

A RESEARCH OF DETERMINATION OF EFFECTS ON MORPHOLOGICAL, PHYSIOLOGICAL AND TECHNOLOGICAL PROPERTIES OF COTTON GROWN UNDER PLASTIC MULCH IN ÇUKUROVA REGION (Bekir.S.ÖZBEK)

At establishment the plastic mulching film was perforated and nearly 1 month later was completely removed.



RESULTED PROJECTS

AN INVESTIGATION EFFECT OF SOME AGRICULTURAL APPLICATIONS ON PLANT MONITORING PARAMETERS AND PLANT MAPPING OF COTTON (Dr. Petek TOKLU)

This investigation was conducted to determine plant mapping and decide to agricultural application using plant monitoring at different growing conditions (stress, optimum and excess conditions) in 2005 and 2006.



RESULTED PROJECTS

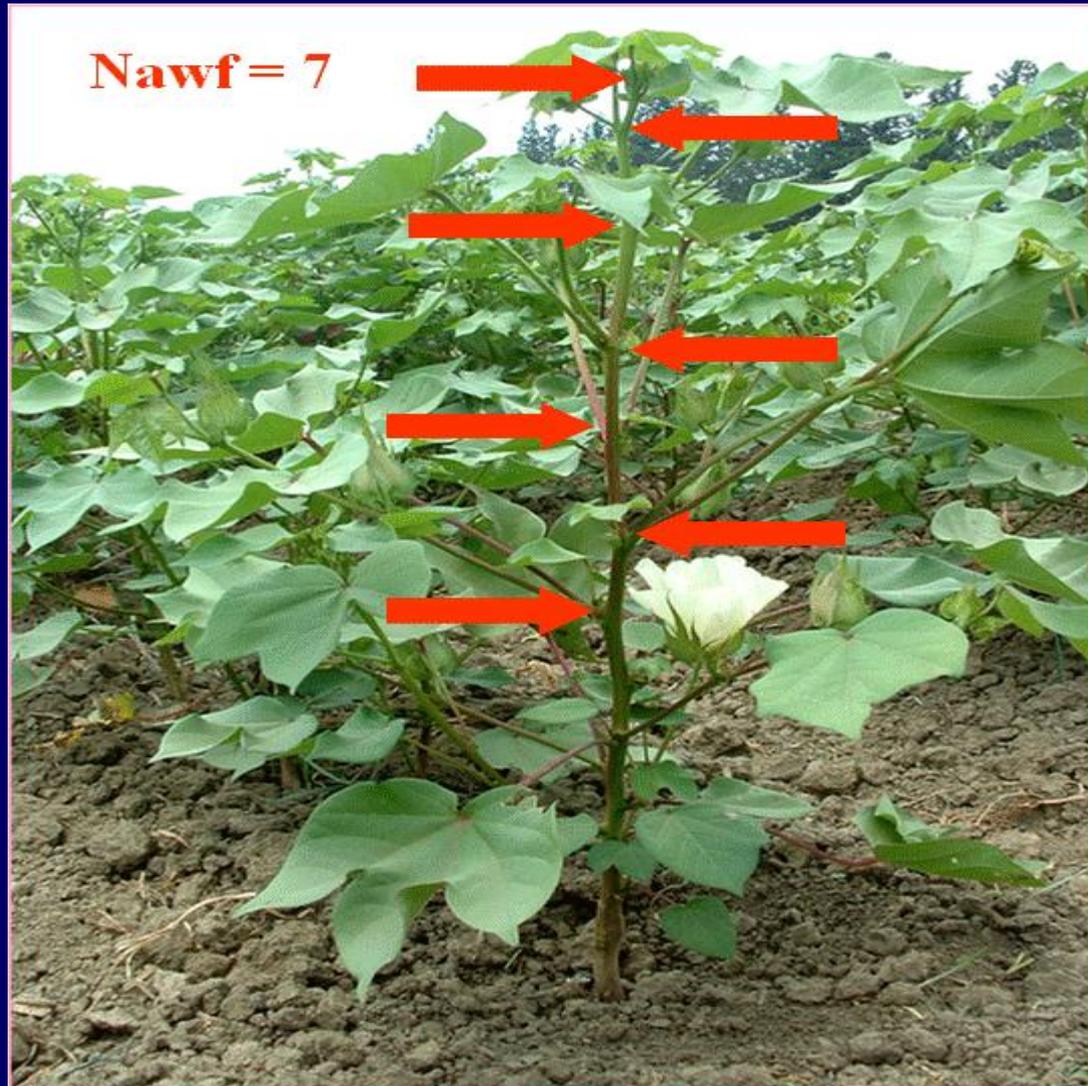
AN INVESTIGATION EFFECT OF SOME AGRICULTURAL APPLICATIONS ON PLANT MONITORING PARAMETERS AND PLANT MAPPING OF COTTON (Dr. Petek TOKLU)

A lot of monitoring parameters were researched but, plant height, number of nodes, plant height/number of nodes, length of upper 5th internode, number of bolls on the upper 5 sympodial branch and NAWF values were found to be most important parameters showing the vegetative/generative balance of cotton plant growth.



RESULTED PROJECTS

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