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CITRUS INDUSTRY IN IRAN

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SUMMARY - An account on the history of the citrus industry in Iran is given, highlighting the sanitary problems occurring with the importation of a great number of citrus varieties from different countries and the importance of establishing a nucellar programme for the production of virus-free planting material. Agronomical and pest management is mentioned and the main pests reported. Data on production and planting areas referred to the different Iranian provinces and Citrus spp. are also indicated as well as the research and training organization in the country. Efforts for the establishment of the 3rd National Citrus Research and Rehabilitation project were made in 1999 aimed at distributing virus-free material of economically important varieties, thus increasing citrus production in Iran.

Key words : *Citrus*, virus and virus-like diseases, pests, agronomical practices, research, training, disease-free planting material, Iran.

RESUME - *Un compte rendu sur l'histoire des agrumes en Iran est donné; ceci en mettant en évidence les problèmes sanitaires, dus à une importation massive de diverses variétés d'agrumes et l'importance de l'établissement d'un programme pour la production de matériel de multiplication indemne de virus. Une vue d'ensemble est donnée sur la gestion agronomique et phytosanitaire ainsi que sur les pathogènes les plus importants de cette culture. Des données sur la production et sur les surfaces cultivées relatives aux variétés et aux provinces iraniennes sont citées, de même que l'organisation de la formation et de la recherche dans le pays. En 1999, a travers la mise en place du projet National de la recherche et de la réhabilitation des agrumes, des efforts considérables ont été réalisés afin de distribuer des variétés économiquement importantes et indemnes de virus, ceci dans le but d'augmenter la production d' agrumes en Iran.*

Mots clés*: Agrumes, maladies à virus et de type viral, pathogènes, pratiques agronomiques, recherche, formation, matériel de multiplication indemne de virus, Iran.*

INTRODUCTION

Citrus growing in Iran has a very old history, which goes back as far as 330 BC**.** The production of citrus fruit as a market crop is almost 303 years old.

During the last 41 years, since the citrus research program started and followed by a rehabilitation program, great changes have occurred. Technical citrus industry has given a new face to the citrus groves of the country and new commercial and improved varieties were imported from leading citrus producing countries like the U.S.A, Spain, Italy, France and others. Following different citrus research projects, 140 improved citrus cultivars were evaluated in 3 citrus belts and suitable cultivars were released (Tab. 1,2,3).

Unfortunately, most of these imported cultivars were infected by different virus and virus-like diseases. In 1966, an effort was made by Prof. Y. Ebrahimi (*Citrus Research Institute*) to eliminate these pathogens through the nucellar selection programme. Today, these nucellar lines are the source of virus and virus-like free materials in the country.

For years, Citrus Research Stations in Iran were responsible for the production and distribution of citrus plants. Since 1996, this duty has gradually been transferred to private nurseries. At present, all

citrus nursery plants available in Iran are propagated by private nurseries which produce around 4 million plants per year. All are from nucellar origin or presumed virus-free. Budwood and seeds for rootstocks selected varieties are still being supplied by Citrus Experimental Stations.

CULTURAL PRACTICES

Almost all citrus groves are chemically fertilized twice a year; at the end of Winter (February.- March) and once again in the middle of Spring (May). Pest control measures coincide with the same period.

Old citrus groves still exist in three main citrus belts, where the trees are usually closely planted (400-500/ha), but the trees in the newly established groves are planted 4x8 m apart with 310 or less trees/ha. Old irrigation methods (flood or furrow) are replaced by drip irrigation to overcome shortage of water in the Inland and Persian Gulf belts, and also in the Eastern part of Caspian Sea belt.

Almost all citrus orchards are irrigated the year round in different periods of time, except in West Mazandaran and East Guilan provinces, which are rainfed. Nowadays, there are 40-50 days of drought period during the Summer.

In the past, citrus orchards were cultivated by hand, but for the past two decades, mechanical (by tractors) and chemical (herbicides) weeds control are used. Pruning and harvesting are still hand made.

PESTS AND DISEASES

There are more than 30 different pests that feed on citrus trees in Iran, and which cause damage to the Iranian citrus industry. The major pests are cottony cushion scale *(Iceria purchasi* Mask), yellow scale *(Aonidiella citrina* Coy.), purple scale *(Lepidosaphes beckii* Newm.), citrus rust mite *(Phyllocoptruta oleivora* Ashmead), citrus leaf miner *(Phyllocnistis citrella* Stainton) and slugs *(Omalonyx telina).*

Because of the use of susceptible rootstocks, *Phythophthora* root rot and foot rot is the most severe fungal disease, which causes severe damage to citrus trees in the Inland and Persian Gulf belts. Presently, the known virus, virus-like, bacterial and phytoplasma diseases in three citrus growing belts are tristeza, psorosis, vein enation, ring pattern, exocortis, yellow vein, stubborn, canker and witches' broom of lime. The last two diseases were observed within the past five years.

PRODUCTION

As it s shown in table 4,5,6,7, in the 1999-2000 season, the total areas under citrus cultivation in the country has been estimated at 235,000 hectares of which 91.4% are producing 3,712,000 tons annually. The new plantations which cover 8.6 percent of the total area, will greatly increased the country's production. The principal varieties are of Navel and Valencia oranges, Page and Kinnow mandarin and Orlando tangelo which are grown mostly in Northern and Southern citrus growing belts.

MARKETING, PROCESSING AND EXPORT

Nearly all of Iranian citrus crop is sold as fresh fruit in the domestic markets and only small quantities of oranges, lime and lemon varieties, Satsuma mandarin and grapefruit are exported to Persian Gulf states and Northern neighbours of Russia.

Nineteen citrus processing plants, with a total annual production capacity of 100,000 M/T are active in the country and of their product, only 1230 MT were exported in 1999.

It can be concluded that the Iranian citrus industry will be facing over production in the next decade,

and for this reason, the establishment of new processing plants and dynamic marketing effort have to be included in the country's immediate development plans. It is of importance to mention that most of our citrus groves are trying to change the existing varieties to meet domestic market's demand for Valencia and Washington navel oranges.

RESEARCH, EDUCATION AND EXTENSION

The Agricultural Research, Education and Extension Organization (AREEO), which is currently based at Ministry of Agriculture of Iran, is responsible for all agricultural research programs within the country, and has been active since 1959.

The Citrus Research Institute, which is also under the authority of this organization is responsible for citrus research programs on citrus breeding (rootstock and variety), virus and virus-like diseases, irrigation, nutrition, cultural practices, post-harvest physiology and other applied research in citrus industry of Iran. This institute offers scholarships to talent horticultural students in different horticultural schools and colleges of the country.

During the graduation and post-graduation periods, these students are trained in both empiric and scientific fields at Ramsar and Kotra Citrus Experimental Stations located in the Northern part of Iran. After graduation, they act as scientific staff members of the Citrus Research Institute in the Citrus Experimental Stations located in three citrus growing belts of Iran.

PROSPECTS

The 3rd national five-year citrus research and rehabilitation project began in 1999, and the emphasis was put on sustainable horticulture. Priority was given to organic culture by integrated programming. At the end of this period, the present average annual yield of 16.7 MT/ha is predicted to reach the level of 22 MT/ha.

All existing citrus commercial cultivars will be re-indexed for virus and virus-like diseases. The main citrus nursery owners and plant producers will also be lead to form cooperatives and all virus-free budwood and seeds for this project will be provided by the Citrus Experimental Stations within the country.

All produced plants will be required to be certified with the cooperation of the Pests and Diseases Research Institute (PDRI) and Plant Protection Organization (PPO) of the Ministry of Agriculture.

Diversification programs, which were initiated in the 1st and 2nd five-year programs, will also be continued. Introduction of new citrus genotypes will also be encouraged and old citrus groves will eventually be replaced by the more economic and improved varieties.

Table 1. List of the citrus cultivars evaluated in Caspian Sea belt

Scion varieties			**Rootstocks**
Orange	*Mandarin & mandarin-like*	*Lemon*	
Washington navel Thomson navel Local seedy Moro Salustiana Hamlin Marrs	Satsuma owari Satsuma wase Clementine Younesi Page	Lisbon Eureka	Sour orange, Trifoliate orange, Troyer citrange, Citrumelo Swingle Citromelo, Cleopatra mandarin, Yuzu, Shel-mohalleh (local)

Table 2. List of the citrus cultivars evaluated in Inlad belt

Scion varieties				**Rootstocks**
Orange	*Mandarin & mandarin-like*	*Lime & Lemon*	*Grapefruit*	
Washington navel	Tancrine	Palestine sweet lime	Marsh seedless	Backraii (local)
Marss early	Bam no.1 (local)	Mexican lime	Red blush	Volkameriana lemon
Moro blood	Orlando tangelo	Persian lime	Ruby red	Rough Lemon
Local seedy	Siahoo (local)	Roodan lime	Ruby star	Mexican lime
Valencia	Clementine	Eureka lemon		Sour orange
	Kinnow	Lisbon Lemon		Cleopatra mandarin

Table 3. List of the citrus cultivars evaluated in the Persian Gulf coast belt

Scion varieties				**Rootstocks**
Orange	*Tangerine*	*Lime & Lemon*	*Grapefruit*	
Local seedy	Siahoo (local)	Mexican lime	Marsh seedless	Mexican lime
Valencia	Kinnow	Persian lime	Red blush	Sour orange
		Eureka lemon	Ruby red	Backraii
		Lisbon Lemon		

Table 4. Citrus planting and production in the Caspian Sea region (1999)

Province	**Growing area** *(ha)*		**Average yield** *(kg/ha)*	**Production** *(ton)*
	No bearing	Bearing		
Guilan	307	7330	14337.9	105098
Mazandaran	3897	80337	17920.5	1433612
Golestan	204	1899	15652.8	29694

Table 5. Citrus planting and production in the Inland belt (1999)

Province	**Growing area** *(ha)*		**Average yield** *(kg/ha)*	**Production** *(ton)*
	No bearing	Bearing		
Ilam	25	5	5086.02	24
Jiroft	284	31784	16236.17	516051
Khorasan	17	49	7841.46	386
Khouzestan	182	4715	10145.01	45831
Fars	3167	44503	21507.52	957149
Kreman	401	11098	8676.97	96297
Kermanshah	190	23	5869.57	135
Kohkiluye & Boyrahmad	111	621	18988.13	11784
Baluchestan	493	1957	6251.92	12235

Table 6. Citrus planting and production in the Persian Gulf (1999)

Province	**Growing area** *(ha)*		**Average Yield** *(kg/ha)*	**Production** *(ton)*
	No bearing	Bearing		
Hormozgan	7822	28434	16994.7	483201
Boushehr	641	2201	8187.6	18097

Table 7. The breakdown of *Citrus* spp. in 3 citrus growing belts

***Citrus* spp.**	**No bearing** *(ha)*	**Bearing** *(ha)*	**Production** *(ha)*	**Average yield** *(kg/ha)*
Orange	8911	116080	1766225	16077
Mandarin & Mandarin-like	2268	42023	760498	18097
Lime & Lemon	8150	49714	972001	19482.5
Grapefruit	69	2244	47310	21085
Sour orange	614	3450	48567	14078
Others	26	1485	1922	11397
Total	**20038**	**214996**	**3596523**	**100216,5**

REFERENCES

Bové J. M. (1995). Virus and virus-like diseases of citrus in the Near East region. FAO Rome Eds.: 518.

Ebrahimi Y. (1977). The citrus varieties in Iran. Ramsar Citrus Experimental Station, Ramsar, Iran.

Ebrahimi Y. (1983). The evolutionary development of citrus growing and nursery activities in Iran. Ramsar Citrus Experimental Station, Ramsar, Iran.

Ebrahimi Y. (1984). Identification of nucellar seedling in seedbed. Ramsar Citrus Experimental Station, Ramsar, Iran.

Ebrahimi Y. (1985). The citrus production, maintenance and distribution of virus free planting materials in the Islamic Republic of Iran. FAO consultation meeting, Rome, Italy.

Ebrahimi Y. and Anvari, F. (1988). Evaluation of eleven different citrus cultivars as Ring Pattern virus diseases indicator plants in Northern Iran. In *Proc. 10th IOCV Conf*., Spain, 1986 UC Riverside: 365-366

Iran meteorological yearbook (1999). Ministry of Agriculture, Teheran, Iran.