

Lebanon

Abou-Zeid M.

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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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Importance of citriculture

Citrus production is very important in the Lebanese economy, representing an important value of total crop production. Citrus is mainly cultivated along the coastal zone and the total production area, mainly represented by oranges, increased from 11939 to 16300 ha between 1973 and 1977. Many factors are the reason for citrus declining: absence of agricultural export organization, quality standards, failure of new introduced varieties, absence of proper cultural and pest management practices.

Citrus distribution map



Citrus varieties

Species/Varieties	Cultivated areas	Area (Ha)
Oranges		8.400
Common		
Navel		
Blood		
Sour		
Acidless		
Mandarins and mandarin-like		2.000
Lemons and lemon-like		3.900
Grapefruit		600
Others		

Citrus phytosanitary problems

Pathogens		Diseases		References
Virus and virus-like				
CVV		Inf. variegation/Crinkly leaf		
GiLRV		Leaf rugose		
CPsV	X	Psorosis	X	(Saade, 1996); (D'Onghia <i>et al</i> , 1998)
SDV		Satsuma dwarf		
CTLV		Tatterleaf/Citrange stunt		
CTV	X	Tristeza	X	(Saade, 1996)
CVEV		Vein enation/Woody gall		
		Concave gum	X	(Saade, 1996)
		Cristacortis		
		Impietratura		
CEVd	X	Exocortis	X	(Saade, 1996)
CCaVd	X	Cachexia	X	(Saade, 1996)
CVds		Citrus viroids		
		Chlorotic dwarf disease		
		Gummy bark		
Fungus				
<i>Phytophthora sp</i>	X	Phytophthora gummosis	X	(Nienhaus and Saad, 1969)
<i>Fusarium sp</i> , <i>Roselinia sp</i>		Root rot	X	(Nienhaus and Saad, 1969)
<i>Phoma tracheiphila</i>		Mal secco	X	(Nienhaus and Saad, 1969)
Bacteria and Bacteria-like				
<i>Pseudomonas syringae</i>		Blast and Black pit	X	(Nienhaus and Saad, 1969)
<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		X	(Nienhaus and Saad, 1969)
<i>Pratylenchus vulnus</i>				
Phytoplasmas				
<i>Spiroplasma citri</i>		Stubborn	X	(Nienhaus and Saad, 1969)
		Witches' broom		

X= present in the country

Public and private institutions working in citrus

Institutions or others	Location	Type of activity	Personnel		Facilities
			Number	Qualifications	
Public					
Ministry of Agriculture	Beirut, Tyr, Tripoli	Plant Protection IPM			Nursery Lab Rearing natural enemies + 2 glass houses in Tyr (under construction)
Lebanese Agricultural Research Institute (ARIL)		IPM Male sterile production for ceratitis			Labs
FANAR		Plant Protection			Labs (virology, partially equipped)
Private					
America University of Beirut	Beirut				Labs (plant protection, virology, tissue culture, gree houses)

Financial Table

Project steps	Facility/instruments/activity	Units	Cost (€)
Inventory	GPS	1	5.000
	GIS	1	8.000
Conservation for characterization	Planting and equipments for the conservation field	1 Ha	25.000
Genetic and agronomic characterization	Laboratory equipments, furnitures and running materials	1	100.000
Physiological WUE characterization	Laboratory equipments and running materials	1	30.000
Sanitary assessment	Laboratory equipments and running materials	1	55.000
	1 Indexing greenhouse, equipments (benches, shade etc...) and running materials	100 m ²	100.000
	1 Insect-proof screenhouse	100 m ²	40.000
Sanitation	Equipments for <i>in vitro</i> laboratory	1	50.000
	1 thermotherapy chamber	1	15.000
	1 conditioned greenhouse	100 m ²	50.000
Conservation <i>in vitro</i>	Equipments for <i>in vitro</i> laboratory	1	50.000
Conservation <i>in vivo</i> and assessment of pomological traits	1 Insect-proof screenhouse	200 m ²	100.000
Training	Short-courses		80.000
	Stages		100.000
	Technical visits		70.000
	Travel expenses		45.000
Missions and part time personnel			80.000
Supply	Transport vehicle	1	30.000
	Books, publications, CD		3.000
	Personal computer and printer	1	3.000
General expenses			103.900
TOTAL			1.142.900