USE OF GRAFTED CUCURBITS IN THE MEDITERRANEAN REGION AS AN ALTERNATIVE TO METHYL BROMIDE

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Rootstocks

- Several species of the same family (*Cucurbitaceae*) can be used as rootstock. This should:
  - Be resistant to the disease that is being used to prevent
  - Have a good compatibility with scion
  - Give vigour and strength
  - Possess good conditions for the grafting to be carried out
  - Not modify fruit quality unfavourably

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Rootstocks

- Species that are used as rootstocks in cucurbitaceae

	Melon	Cucumber	Watermelon
Cucumis melo	+		
Citrullus lanatus			+
Cucur.moschata			+
Cucur.ficifolia		+	
C.max x C.mosch.	+	+	+
Lagenar. siceraria			+
Benincasa cerifera	+		

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Grafting methods

- Tongue aproach
  - During the union phase the two plants (rootstoc and scion) conserve their root systems

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Grafting methods

- Insertion grafting
  - Once joined, the union is stronger.
  - There is no need to cut the stem of the scion

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Grafting methods

- Splice grafting
  - It has the same advantages as the “insertion grafting”
  - It seems more easily automated

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Grafting methods

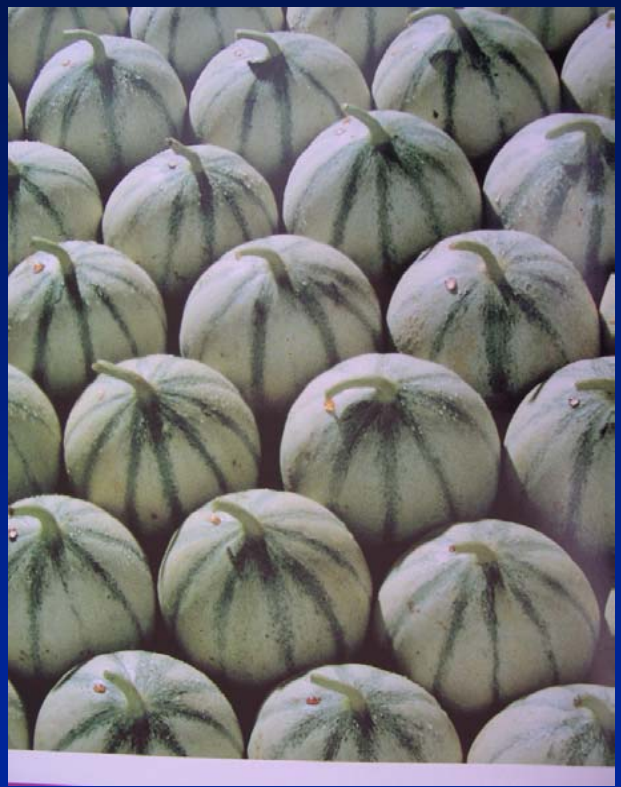
- Grafting is carried out in specialized nurseries, by trained personnel.

- Now they are beginning to use robots that improve labour efficiency

Pathogens controled by grafting

	Melon	Cucumb	Waterm..
F. oxysp. melonis	+		
F. oxysp. niveum			+
F. oxysp. cucumerinum		+	
Phomopsis sclerotioides		+	
Monosporascus cannonballus	+		+
Melon Necrotic Spot Virus (MNSV)	+		+
Meloidogyne sp.	+	+	+

Use of grafting in France



- Melon
  - **Fusarium oxysporum melonis**
  - **C.maxima x C. moschata**
  - **Area with grafted plants 1000Ha**
- Cucumber
  - **Phomopsis sclerotioides**
  - **C.ficifolia or**
  - **C.maxima x C. moschata**
  - **Area 3% of the total**

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Use of grafting in Italy

- Melon
  - **Fusarium oxysporum melonis**
  - **Hybrid cucurbita or Cucumis melo**
  - **5-6 million plants grafted**
  - **Splice grafting**
- Watermelon
  - **Hybrid cucurbita**
  - **20 million plants grafted**

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Use of grafting in Spain

- Melon
  - **Monosporascus or MNSV**
  - **Hybrid cucurbita**
  - **Less than 1 million plants (Cantaloup and C.melo var flexuosus)**
- Watermelon
  - **Fusarium oxysporum niveum**
  - **Hybrid cucurbita**
  - **30 million plants grafted (12000 Ha)**

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Use of grafting in other countries

- Greece
  - Melon and cucumber
- Israel
  - Melon (Monosporascus and Meloidogyne)and watermelon
- Jordan.
  - Grafting was introduced by “MB Phase Out Project”
  - Melon (10 Ha) and watermelon (40 Ha) and cucumbe
- Morocco
  - Melon and watermelon

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Cost of grafted plants
(seedless fruit)

- **Cost of grafted plants**
  - **2000 plants/Ha x 0.51 E/pl = 1020 E/Ha**
  - **1000 plants/Ha x 0.33 E/pl = 330 “**
  - **TOTAL 1350 E/Ha**
- **Cost of ungrafted plants**
  - **3000 plants/Ha x 0.21 E/pl = 630 E/Ha**
  - **1500 plants/Ha x 0.05 E/pl = 75 “**
  - **TOTAL 705 E/ha**
- **Difference between grafted and ungrafted plants 645 E/Ha**
- **Cost of MB disinfection 6000 E/Ha**

Conditions under which grafting melon is of interest

- **Onto hybrid cucurbit (only compatible varieties)**
  - **Soil with** Fusarium wilt, Monosporascus or MNSV
- **Onto melon (varieties not resistants)**
  - **Soil with** Fusarium wilt
- **In case of infection by nematodes, combine grafting with nematicides, solarization or biofumigation**

Conditions under which grafting cucumber is of interest

- In intensive farming
- Soil infected with Fusarium wilt or Phomopsis sclerotioides, graft onto Cucurbita ficifolia or C.maxima x C.moschata.
- If there are nematodes, combine grafting with othe techniques.

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Conditions under which grafting watermelon is of interest

- Grafting is allways interesting, specialy in soils with
  - Fusarium oxysporum niveum
  - Monosporascus cannonballus
  - Verticillium dahliae
  - Melon Necrotic Spot Virus
- In case of nematode infection, combine grafting with other practises or utilize resistant rootstocks (if possible)

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