

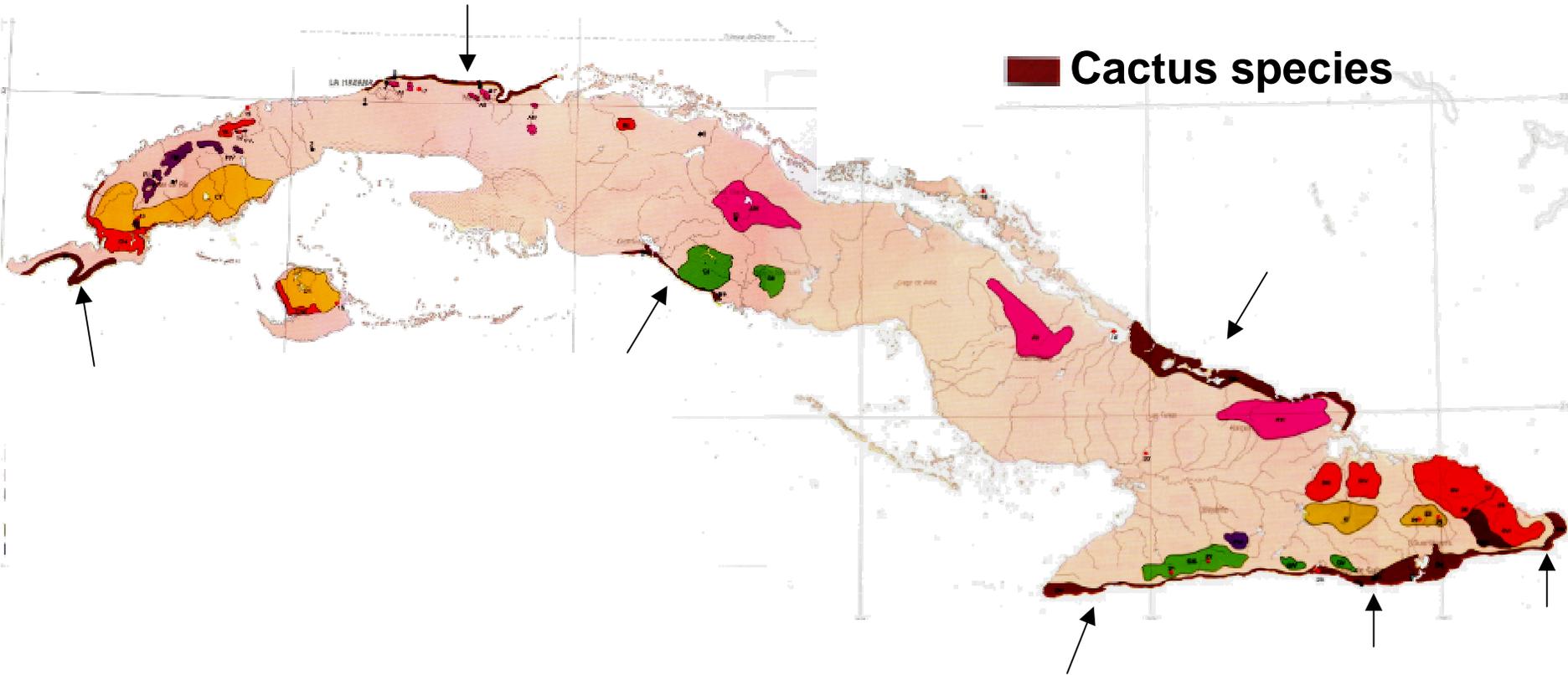


# **Some considerations about *Cactoblastis cactorum* in Cuba and its impact.**

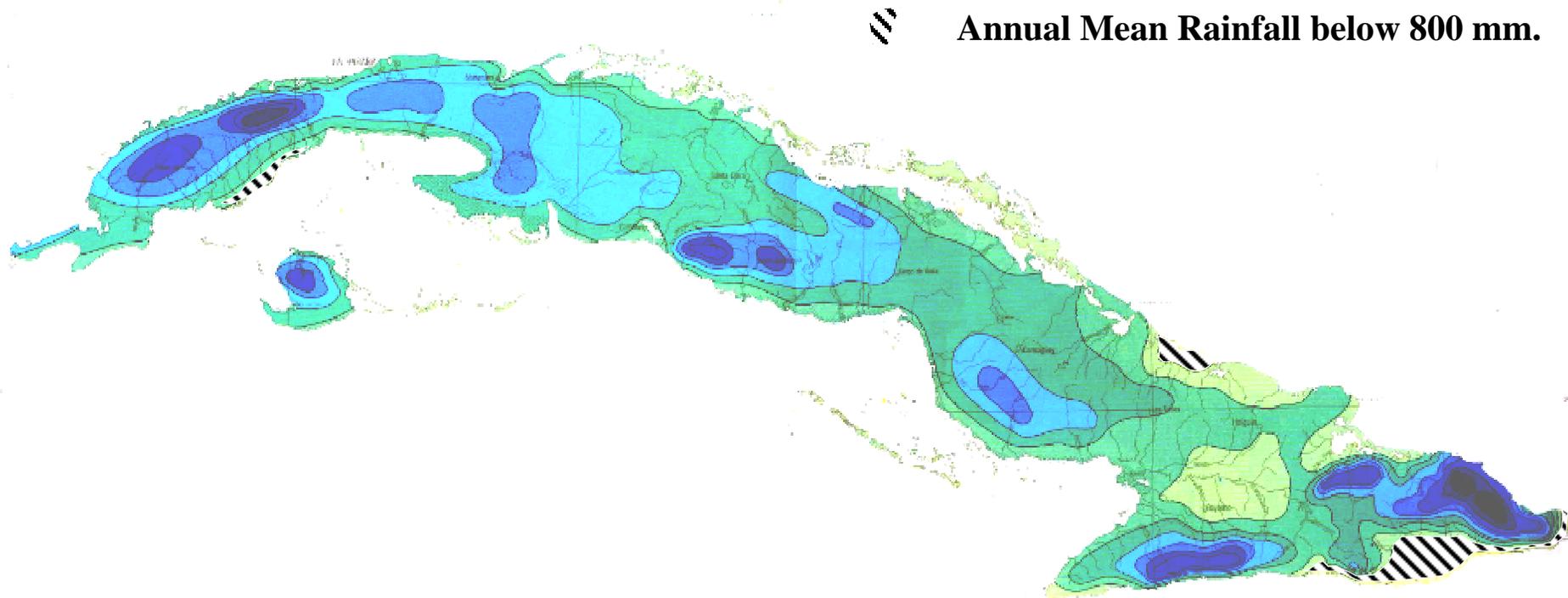
**Dr. Eduardo Pérez Montesbravo  
Plant Protection Research Institute  
INISAV**

**Cactus Moth (*Cactoblastis cactorum*) Consultants Meeting.  
International Atomic Energy Agency (IAEA).  
Vienna, Austria.  
15-19 July, 2002**

# Areas with high quantities of endemic species.



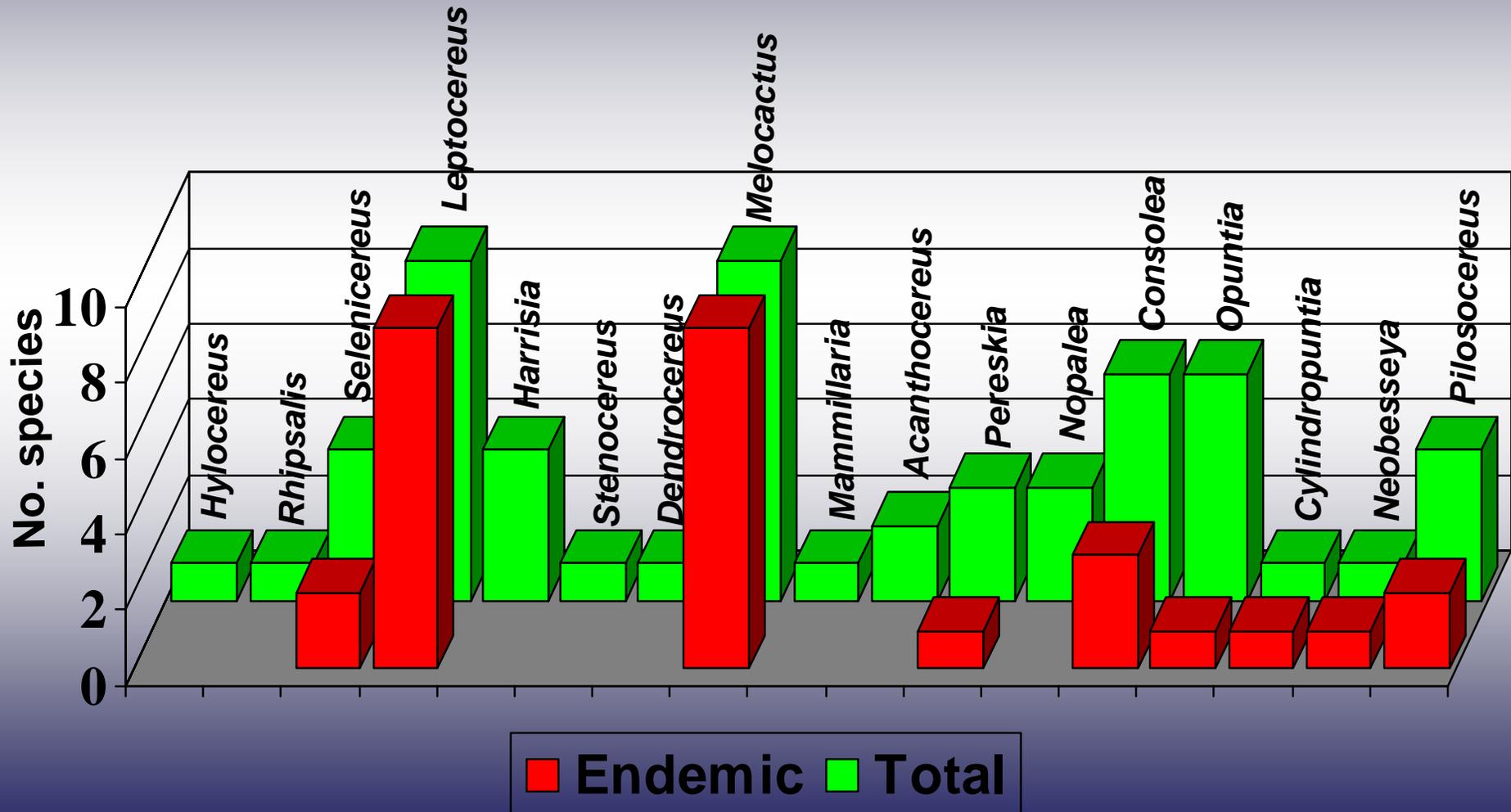
# Cuban rainfall



## Reasons for protecting cactus species in Cuba.

- **Protection of biodiversity.**
- **Crops production (Soil conservation and enrichment).**  
*Opuntia ficus-indica*  
*Nopalea cochenillifera.*
- **Ornamental, garden and folklore.**

# Total and endemic species of cactus in each genus in Cuba.



Distribution: Guantanamo, Endemic

*Opuntia militaris*



A photograph of a cactus, identified as *Opuntia stricta* var. *stricta*, growing in a greenhouse. The cactus has several flat, green, paddle-shaped segments. It is situated on a bed of light-colored gravel and rocks. In the background, there are other plants, including palm trees, and the structural elements of the greenhouse, such as metal frames and glass panels. The lighting is bright, suggesting a sunny day.

Distribution: Pinar del Rio

*Opuntia stricta* var. *stricta*

Distribution: All Cuba, cultivated



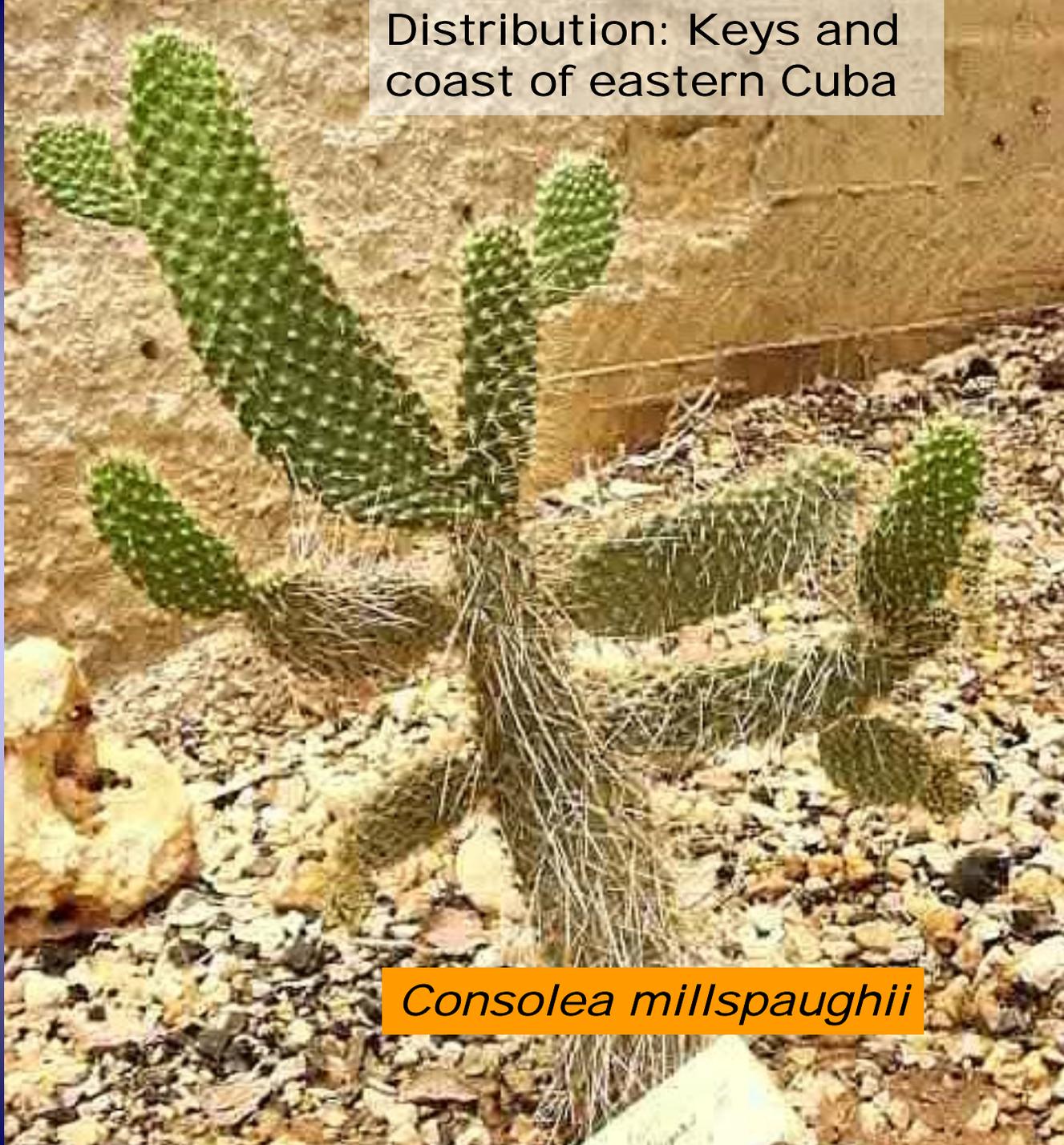
*Opuntia streptacantha*

Distribution: All Cuba, cultivated.



*Nopalea cochenillifera*

Distribution: Keys and coast of eastern Cuba



*Consolea millspaughii*

Distribution: Guantánamo  
and Santiago de Cuba.  
Endemic.



*Consolea moniliformis*  
*subsp guantanamana*

Distribution: South coast of  
eastern and central Cuba.  
Endemic



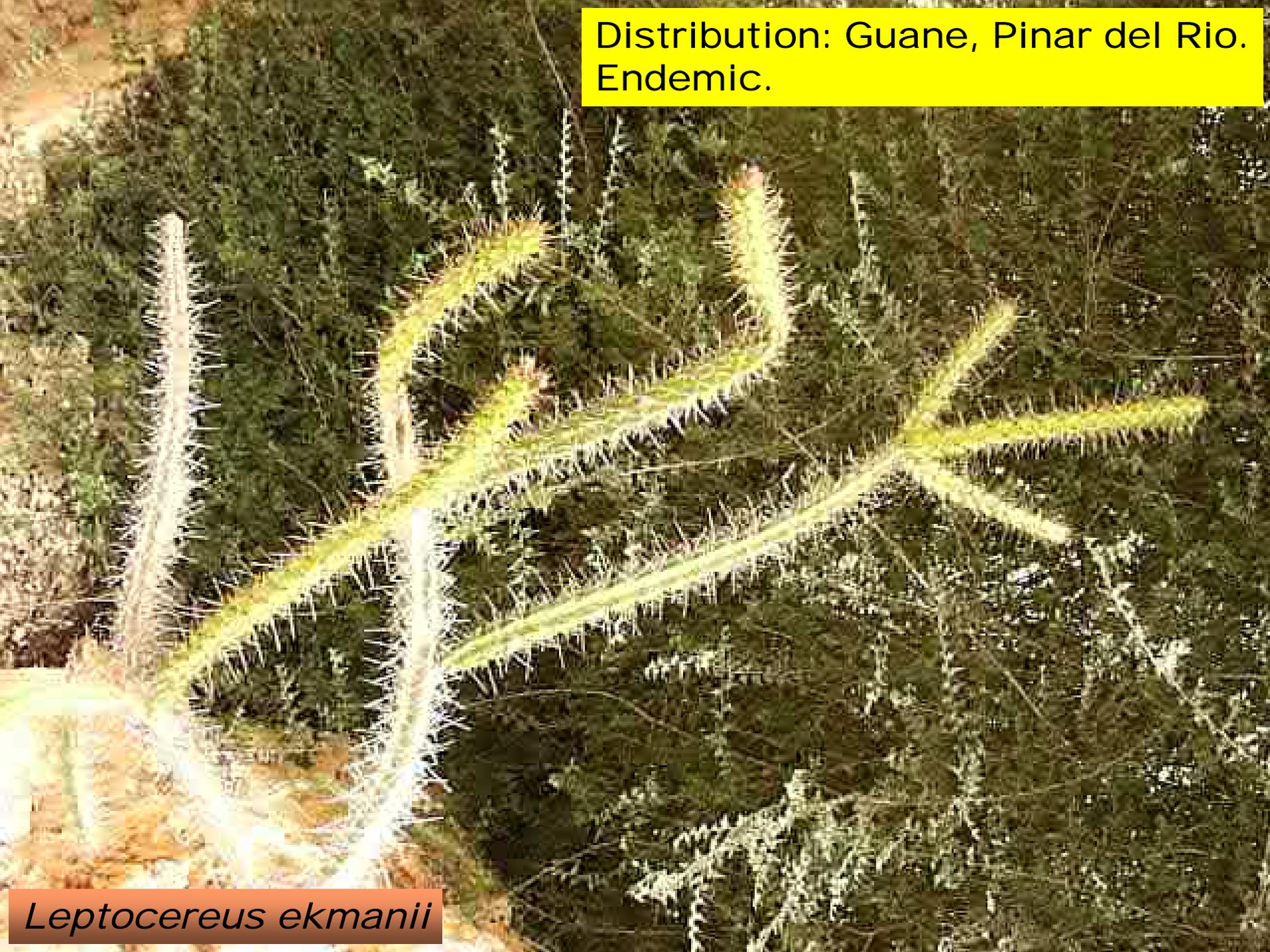
*Consoula macracantha*

Distribution: Guantnamo. Endemic.



*Cylindropuntia hystrix*

Distribution: Guane, Pinar del Rio.  
Endemic.



*Leptocereus ekmanii*



*Leptocereus sylvestris*

Distribution: Manzanillo,  
Guantanamo and  
Santiago de Cuba.  
Endemic.

Distribution: Dry coast  
of eastern Cuba.



*Stenocereus hystrix*

Distribution: Dry coast  
of Havana. Endemic



*Leptocereus wrightii*

Distribution: Dry coast of Cuba.



*Dendrocereus nudiflorus*

Distribution: All Cuba. Cultivated



*Hylocereus undatus*

Distribution: Matanzas. Endemic

*Melocactus matanzanus*



Distribution: Las Villas  
and Camaguey. Endemic



*Melocactus guittartii*

Distribution: All Cuba.

*Mammillaria prolifera*  
*var. haitiensis*

Distribution: Forest, all Cuba

*Rhipsalis baccifera*



Distribution: Forest all Cuba.



*Selenicereus glandiflorus*

In 1976 were **21 240 ha** of grassland invaded by *Opuntia stricta* var. *dilleni* in Santiago de Cuba and Guantnamo provinces.

The protection of endemic cactus flora of those areas was the main reason of the no introduction of any natural enemy as biological control.

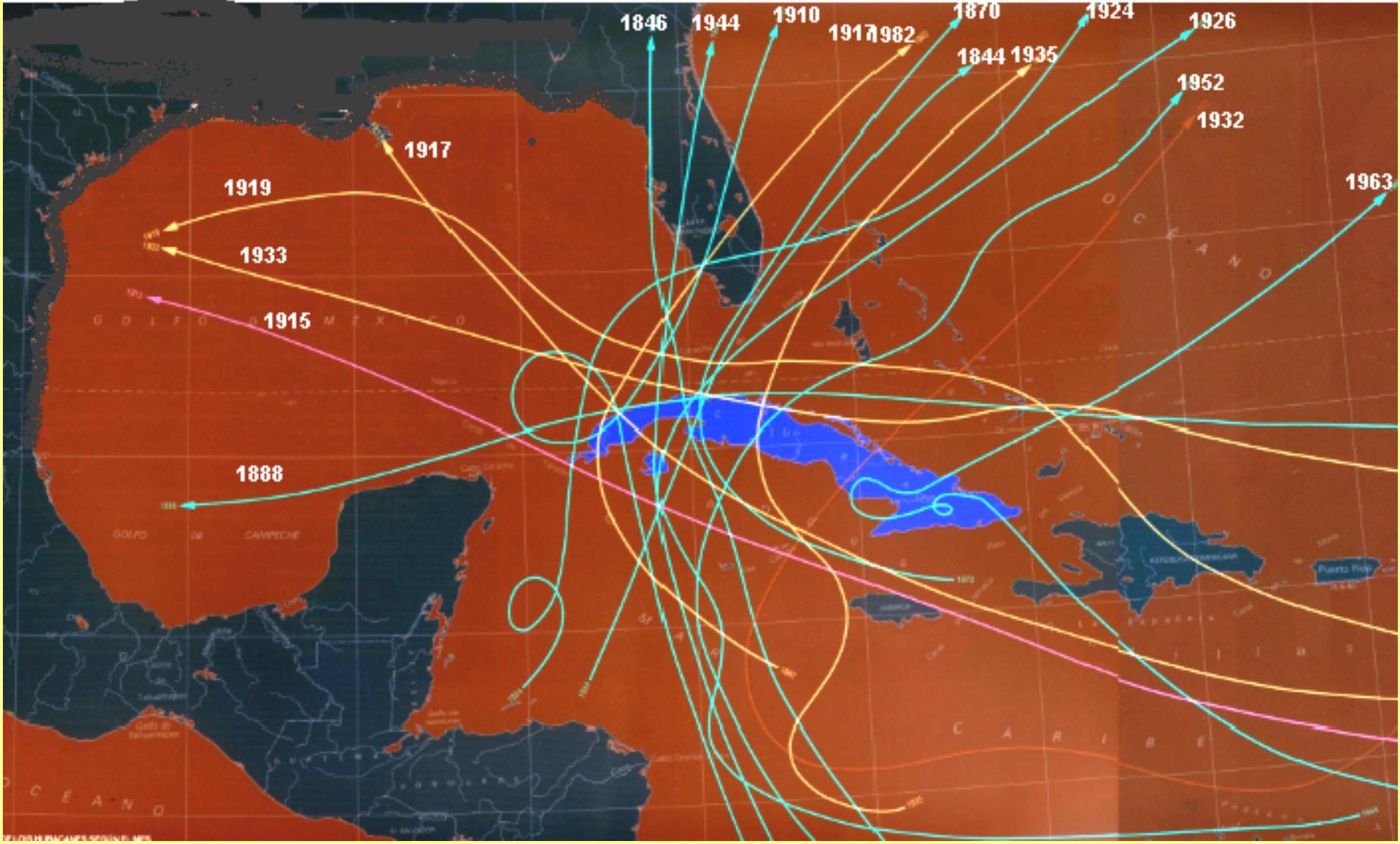


*Cactoblastis cactorum*  
was observed on  
*Opuntia stricta* var. *dillenii*  
Caimanera, Guantnamo, 1980.



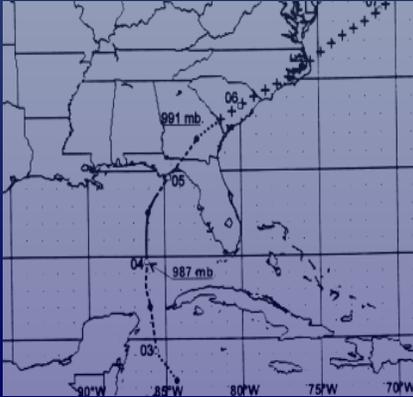


# Route of high intensity hurricane across Cuba. 1844-1985

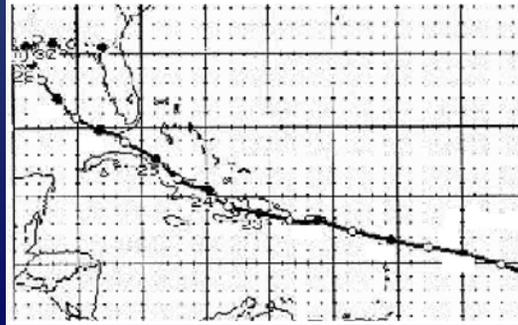


# Some hurricane of high intensity since 1995.

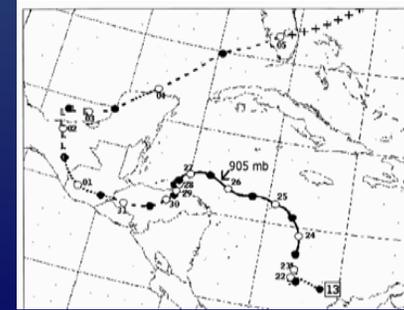
## Allison-1995



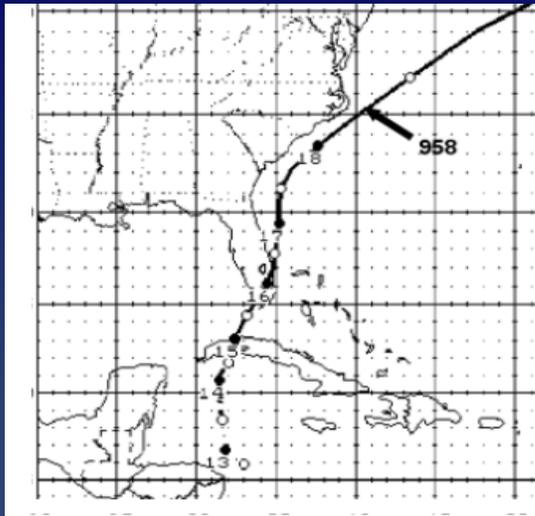
## Georges-1998



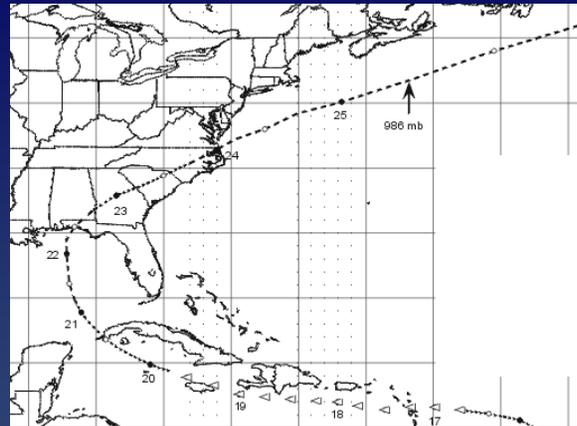
## Mitch-1998



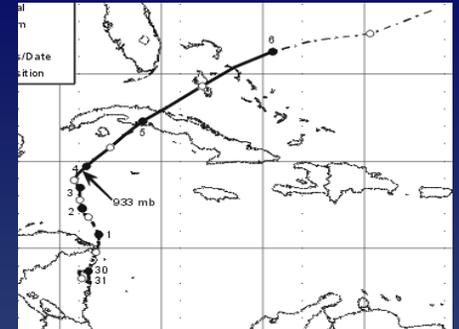
## Irene-1999



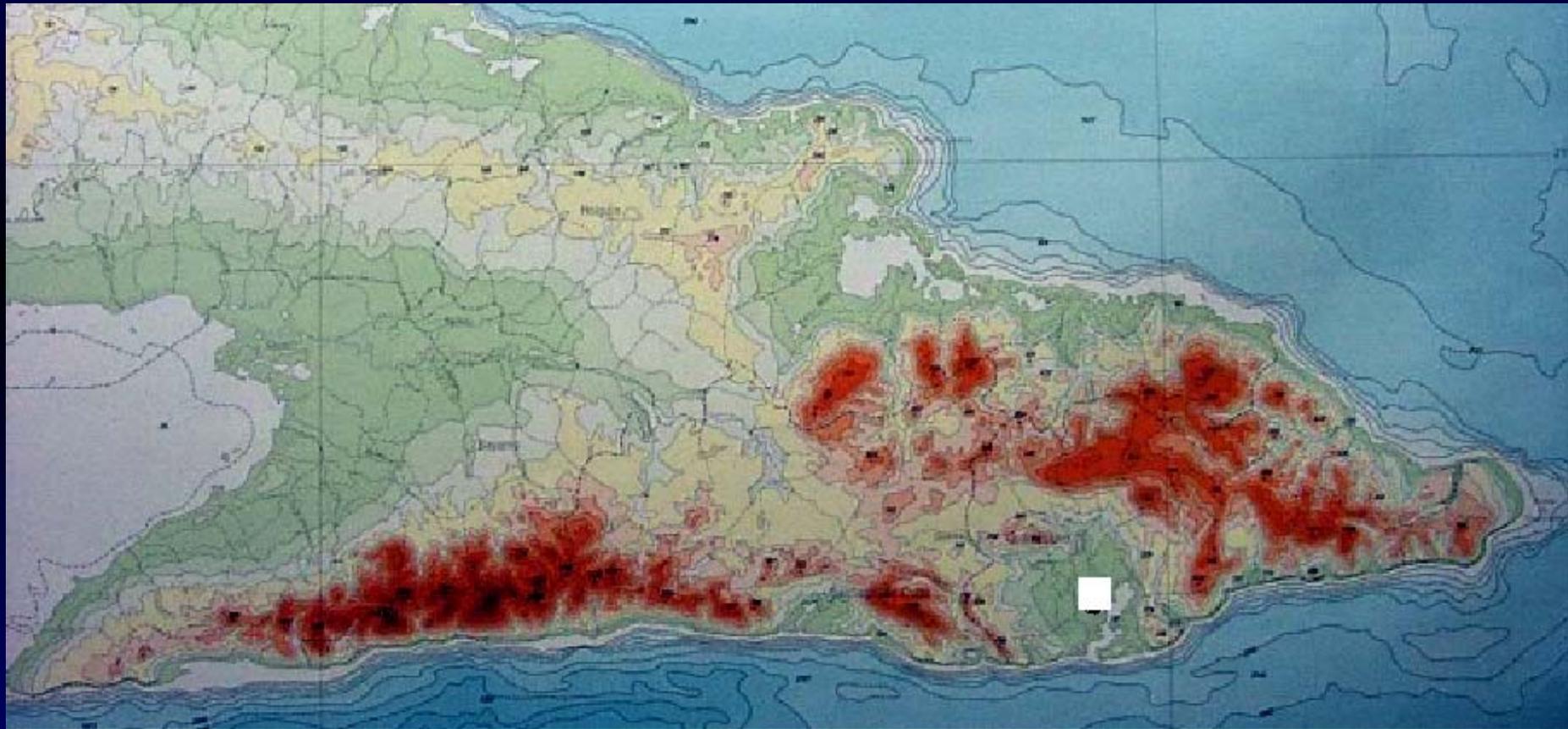
## Helene-2000



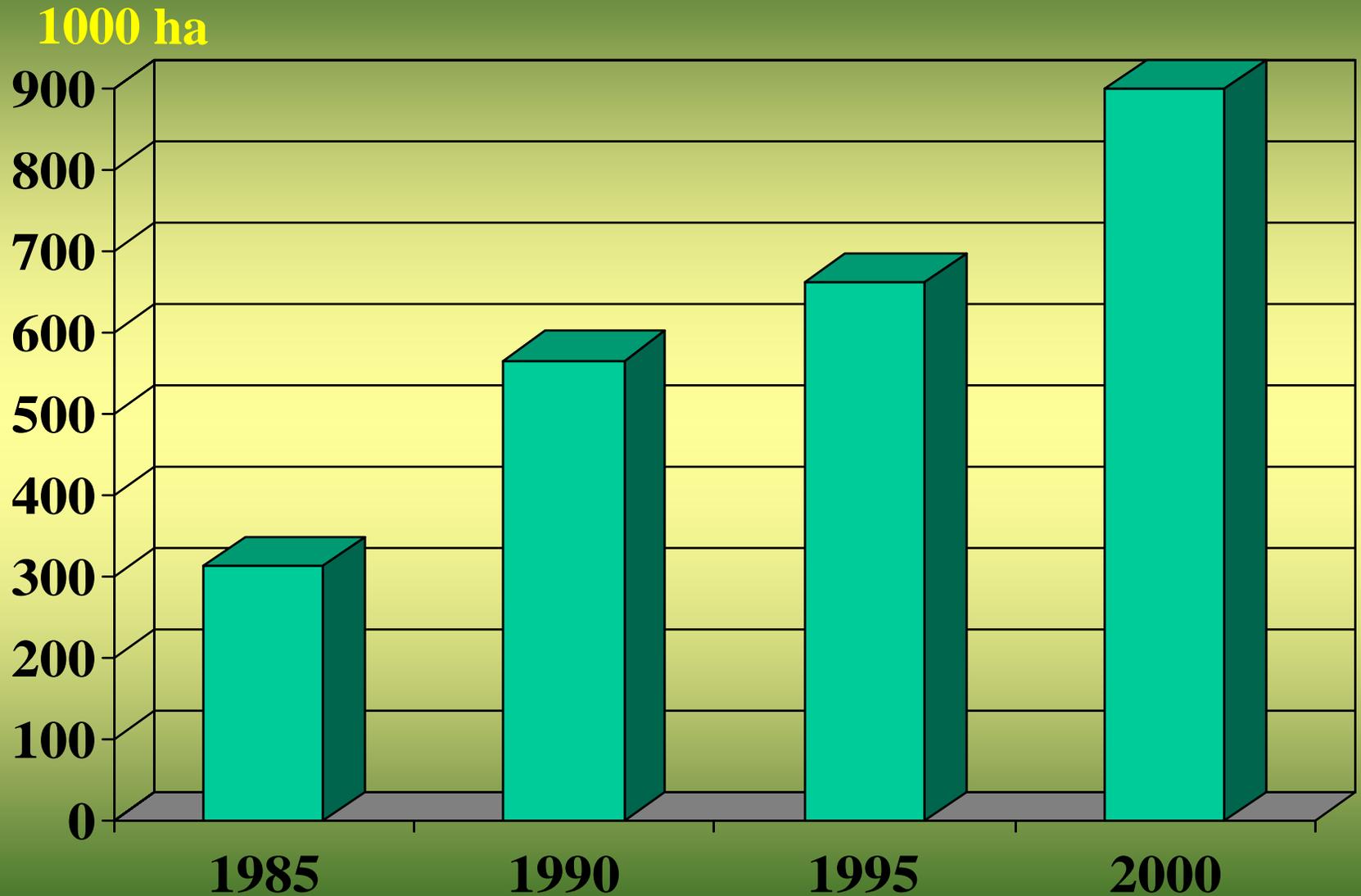
## Michele-2001



# Natural barrier to avoid the dissemination of *C. cactorum*



# Area treated with biopesticides and entomophagous.



# Actual use of entomofagous against lepidopterous.

*Trichogramma spp*

*Lixophaga diatraeae*

*Cotesia spp*

*Diadegma spp*

*Telenomus spp*

*Rogas spp*

*Euplectrus phatyhypenae*

*Eucelatoria spp*

*Chelonus insularis*

*Archytas marmoratus*

# Actual use of biopesticides.

*Bacillus  
thuringiensis*

*Beauveria  
bassiana*

*Verticillium  
lecanii*

*Metarhizium  
anisopliae*

**Some researches have been carried out about the cycle life of *C. cactorum* showing two generation per year.**

**According to the behavior of other species of *Pyralidae* family in Cuba, *C. cactorum* could develop more than two generation per year.**

## F1 STERILITY

**It could be used in two cases:**

- 1. Eradication of *C. cactorum* from the areas of new introduction or isolated areas.**
- 2. Establishment of a barrier to avoid the dissemination to new areas.**

**Before use this control method it is necessary to do:**

- 1. Analysis of risk of its introduction in each particular condition.**
- 2. The practical necessity to use this eradication method.**

# Legal regulations of plant transportation in Cuba to avoid *C. cactorum* dissemination.

## National territory

- Phytosanitary certification of free transit given by Territorial Station of Plant Protection.

## Importation and exportation

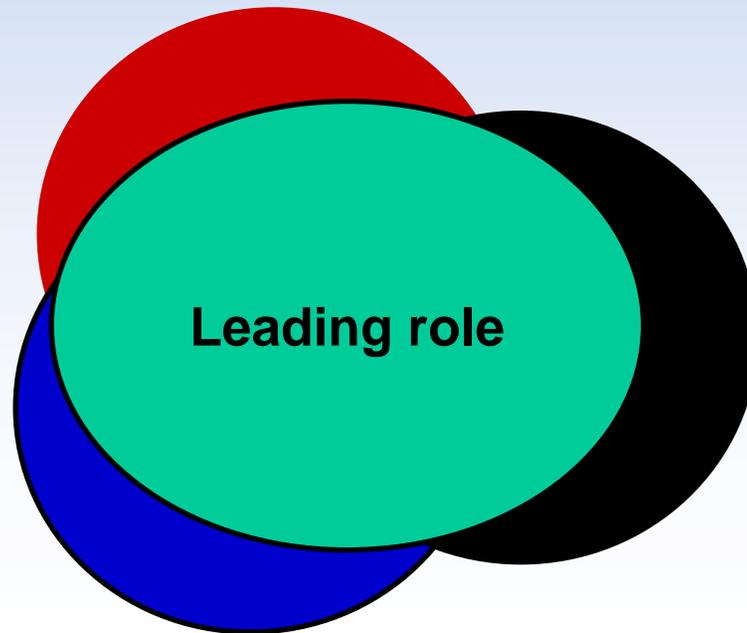
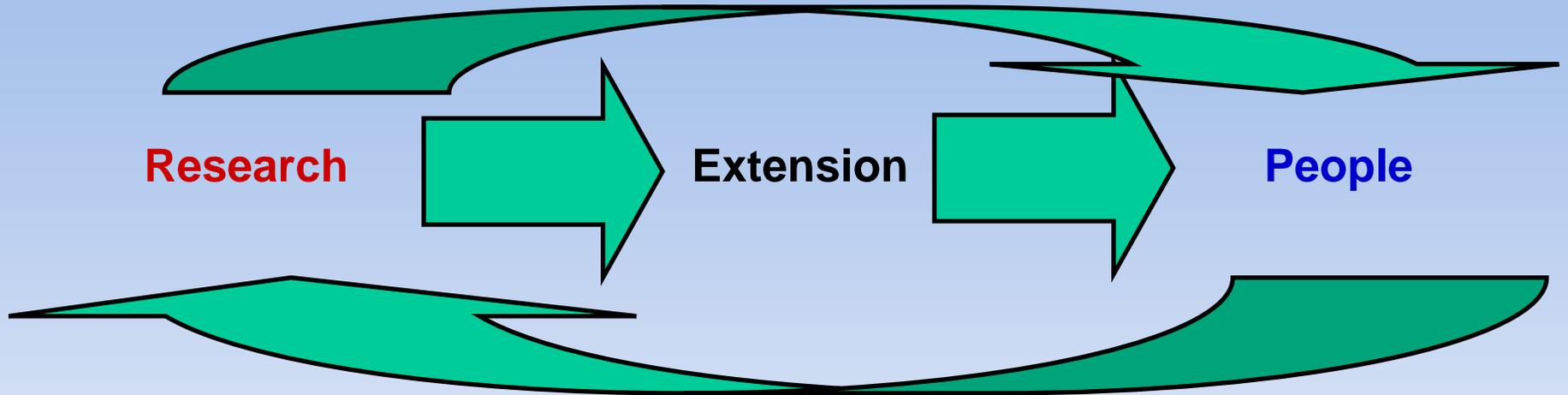
- Authorization given by quarantine department of Plant Protection National Center.
- Permission of alive organism given by National Center of Biological Security.
- Environmental license to introduce species given by Ministry of Science Technology and Environment.

## International regulations to avoid the *C. cactorum* dissemination.

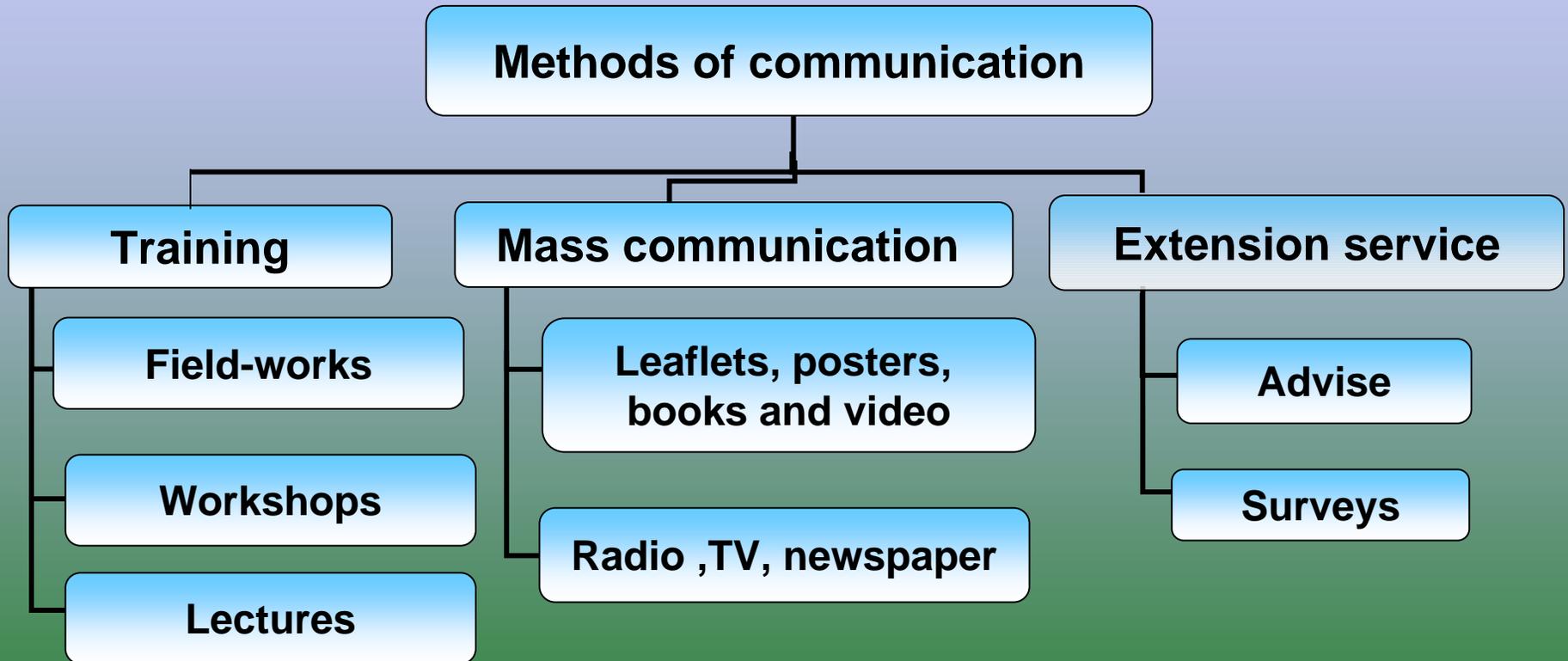
- Convention of phytosanitary certification (FAO).
- Convention of biological biodiversity.
- Convention of trade of species of flora and fauna in dangers of extinction (CITES)\*.

\*CITES meeting conclusion  
(Leiden 13-17 may, 2002) :  
Exclusion of Opuntiods species.

# System of communication



# Different ways of communication



# Considerations about Cactus moth vs. Cactus

It is necessary to conduct some research about *C. cactorum* in the next:

- Potential host range.
- Survey actual spread across Cuba.
- Study of life cycle in natural condition in a Caribbean country and the influence of biotic and abiotic factors over the number of generation.
- Effect of natural enemies and the current biological control to regulated the population.
- Specify with biotype is in each place.

About the impact of *C. cactorum* on will life there will know:

- Special interest as a study case must be done to the protected areas where *C. cactorum* is already present (Guantanamo).
- Give a priority attention to the Guanacabibes peninsula (eastern side of Cuba) due to the possibility of *C. cactorum* dissemination to Yucatan.
- Taken as a general goal to protect biodiversity of cactus to the all region (Cuban endemic species are in dangerous) with special attention to Mexico.