The Main Quarantine Bioaggressors Threatening Strategic Crops in Maghreb Countries

Prof. Bouzid NASRAOUI

National Agronomic Institute of Tunisia (INAT)
University of Carthage, Tunis, Tunisia

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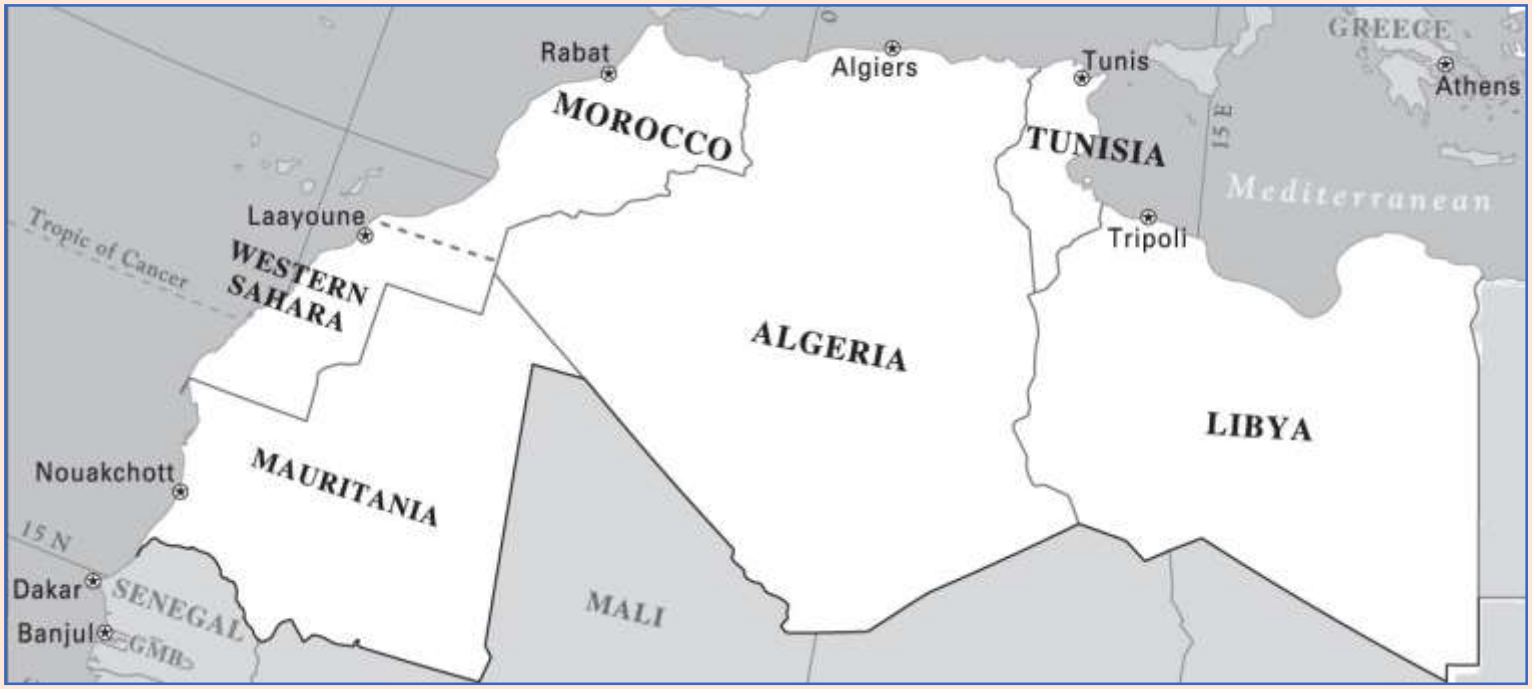
Maghreb Countries (UAM)



Maghreb Countries

Maghreb Countries Common Phytosanitary Problems

Desert Locust

Tomato miner

Fire blight

Red Palm Weevil

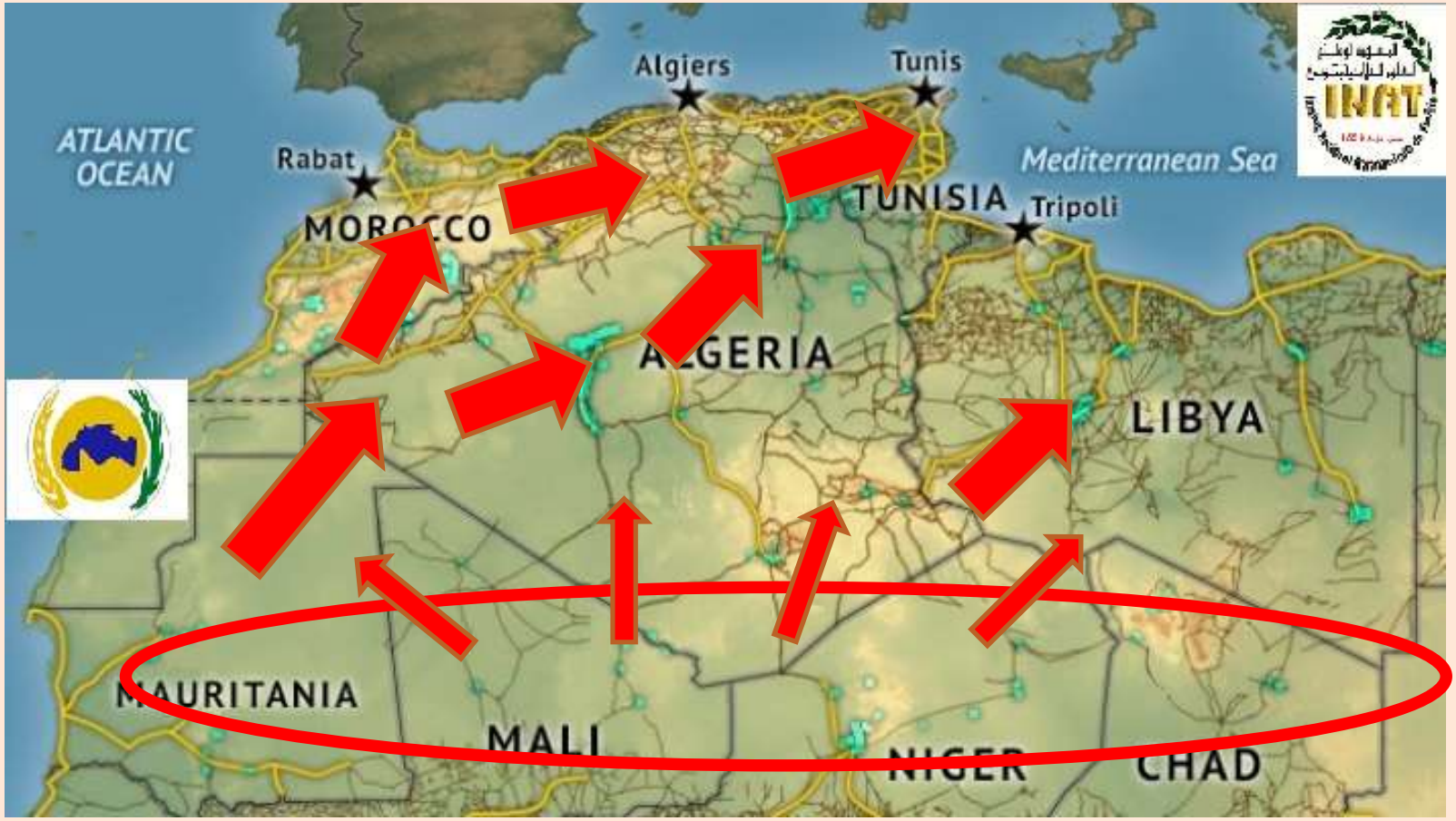
Bayoudh

Xylella

Greening (HLB)

Desert Locust

Invasions of 1988 & 2005



Desert Locust

(With the help of FAO)

Desert Locust

Great work of CLCPRO / FAO

Every year (specially at autumn):

- Preparation and maintenance of materials and facilities

- Detailed surveillance of spots forming swarms

- Quick chemical destruction of all forming swarms

- In case of invasion: huge campaign to combat the invader pest

CLCPRO: Commission de Lutte contre le Criquet Pèlerin de la Région Ouest

Tomato Miner

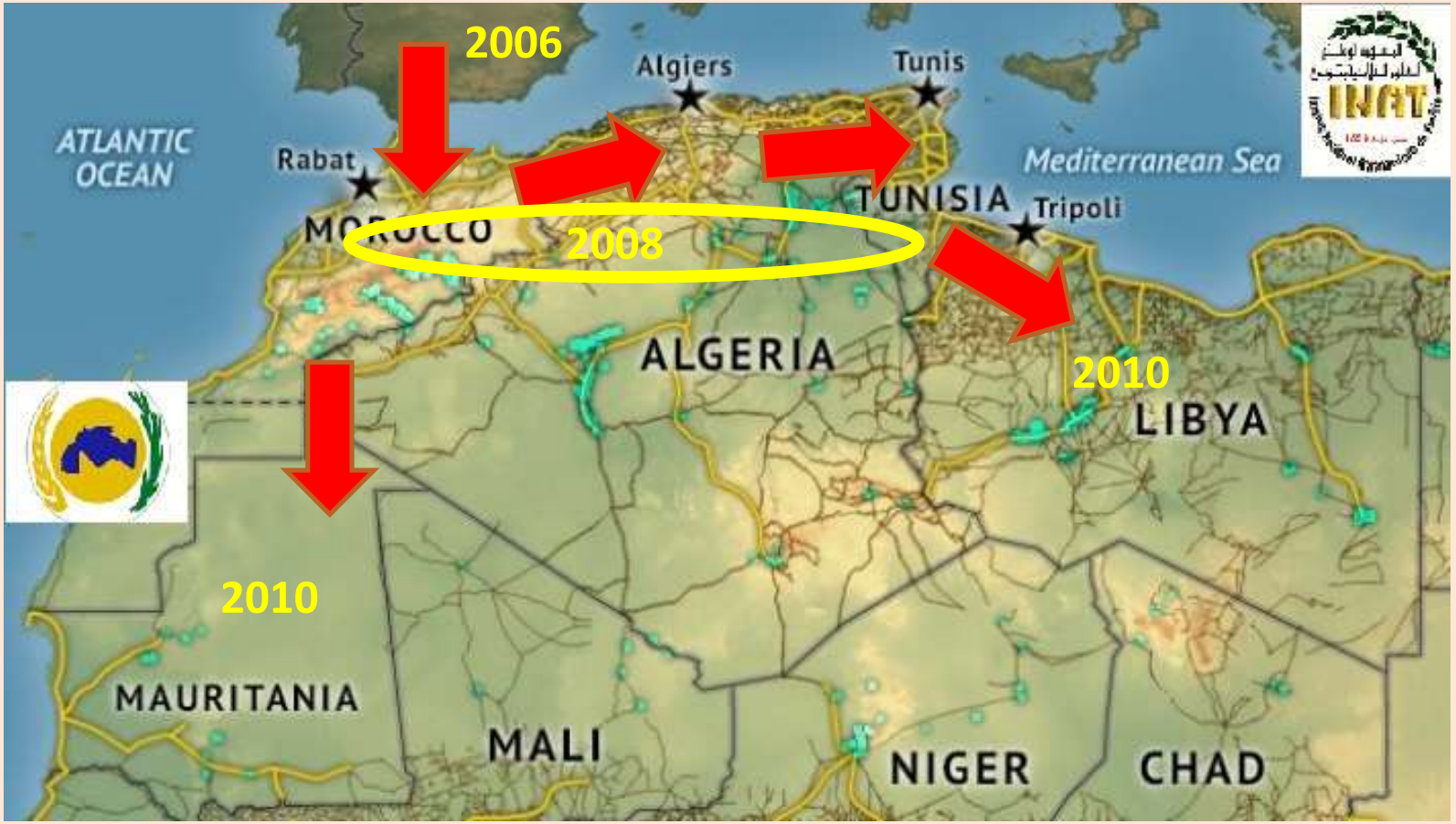
(*Tuta absoluta*)

Tomato Miner

Tuta absoluta

- Originating from South-America
- Europe: Firstly reported in Spain (2006)
- Maghreb: Morocco (early 2008), Algeria and Tunisia (2008), Mauritania and Libya (2010)
- Quick invasion and establishment
- *T. absoluta* is no more a Quarantine Pest

Tomato Miner



Red Palm Weevil

(*Rhynchophorus ferrugineus*)

Canary palms

Red Palm Weevil

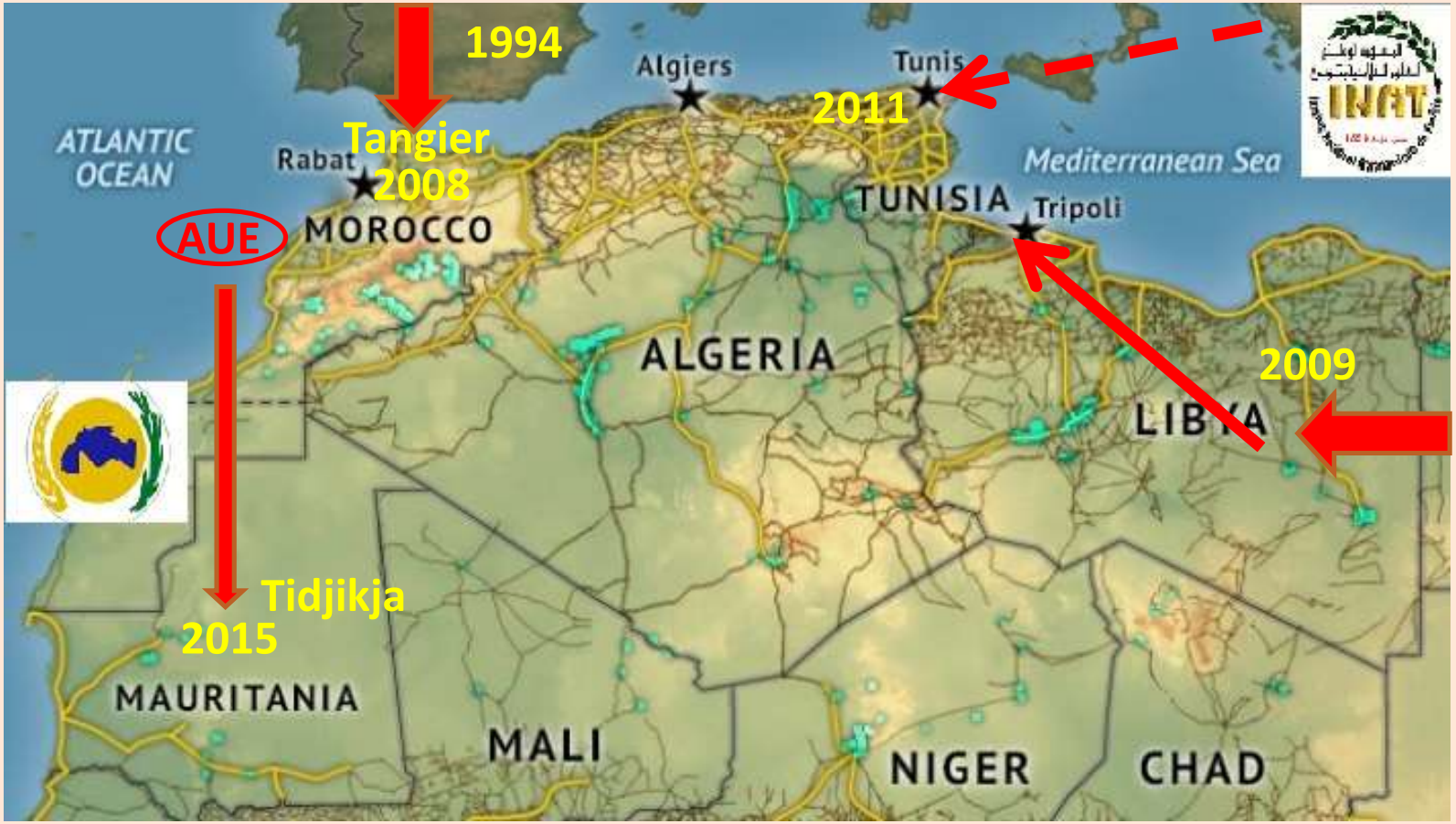
(*Rhynchophorus ferrugineus*)

Date palms

Red Palm Weevil

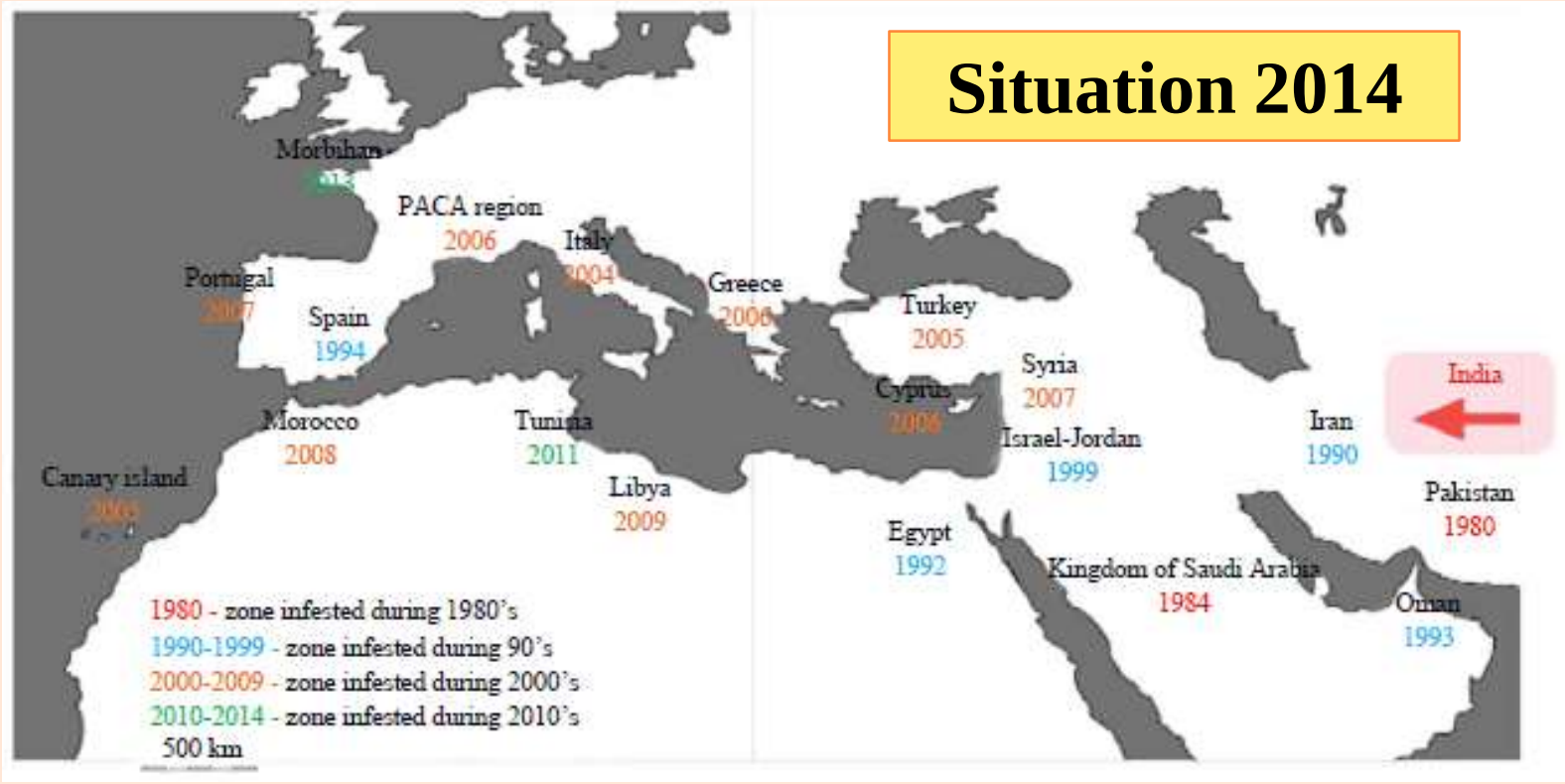
(*Rhynchophorus ferrugineus*)

Red Palm Weevil



Red Palm Weevil

(*Rhynchophorus ferrugineus*)



Red Palm Weevil (2016)

(*Rhynchophorus ferrugineus*)

Tunis / Number of infested and mostly cut palm trees : 30 (2011) → 2,700 (2016)

Bayoudh

(*Fusarium oxysporum* f. sp. *albedinis*)

* Bayoudh: means "Whitening" (of the leaves of the infected palms)

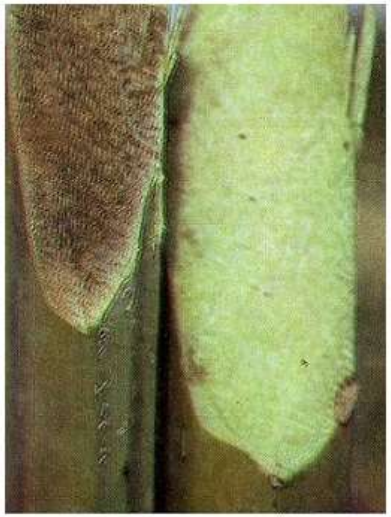
* First observation in Morocco: Zagora 1887

* During more than 1 century, destruction of:
  - 12 Million palm trees in Morocco (2/3)
  [Morocco became date importer]
  - 03 Million palm trees in Algeria (1/3)

Bayoudh

(*Fusarium oxysporum* f. sp. *albedinis*)

Bayoud disease external symptoms



Infected palm Control palm

Bayoud disease on date palm

Bayoud disease. Internal symptoms on date palm trunk

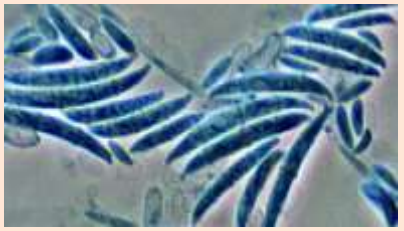
Bayoudh

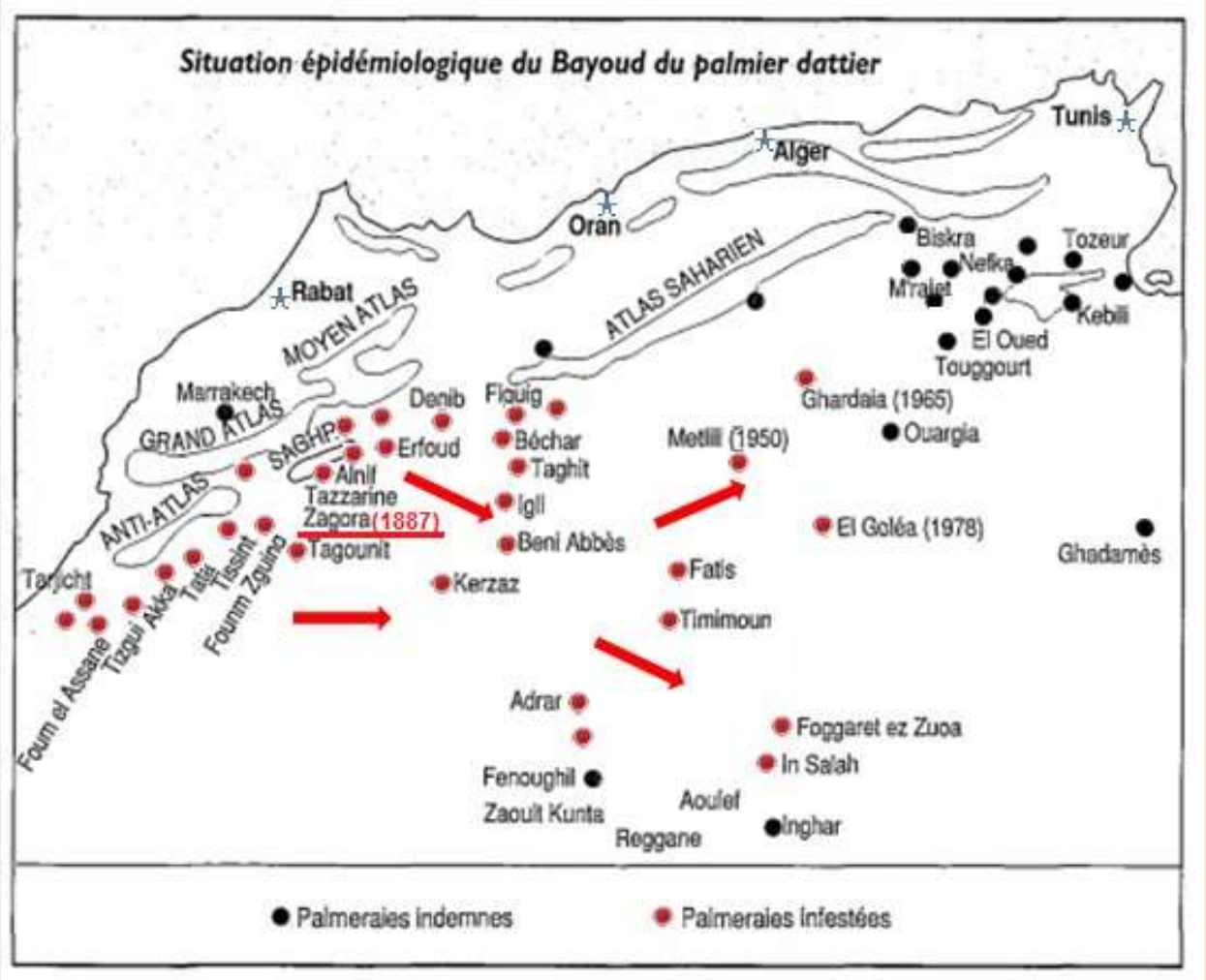
(*Fusarium oxysporum* f. sp. *albedinis*)

Bayoud disease. External symptoms on date palms

Bayoudh

(*Fusarium oxysporum* f. sp. *albedinis*)



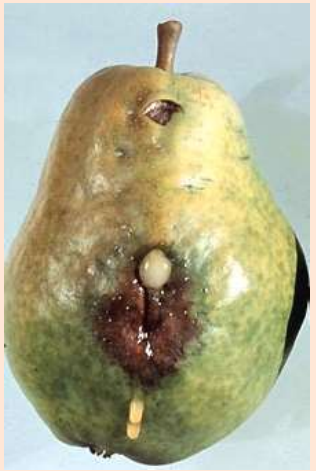


Threatened:

- **Mauritania**
- **East-Algeria**
- **Tunisia**
- **Libya**

Fire Blight

(*Erwinia amylovora*)



Fire Blight

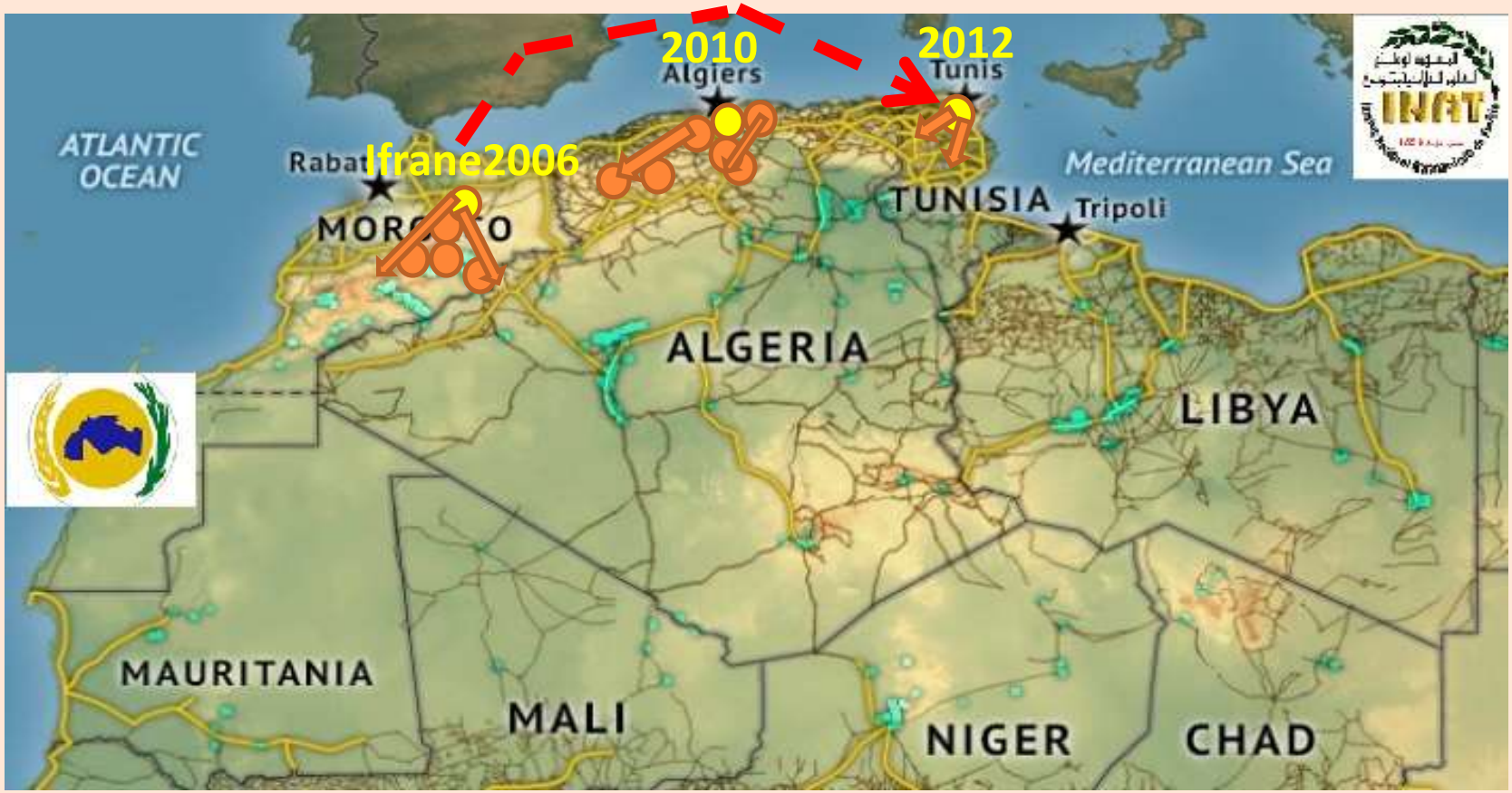
(*Erwinia amylovora*)

Propagation in tree

Propagation between trees (Windy rains, Bees, Man pruning,…)

Fire Blight (2016)

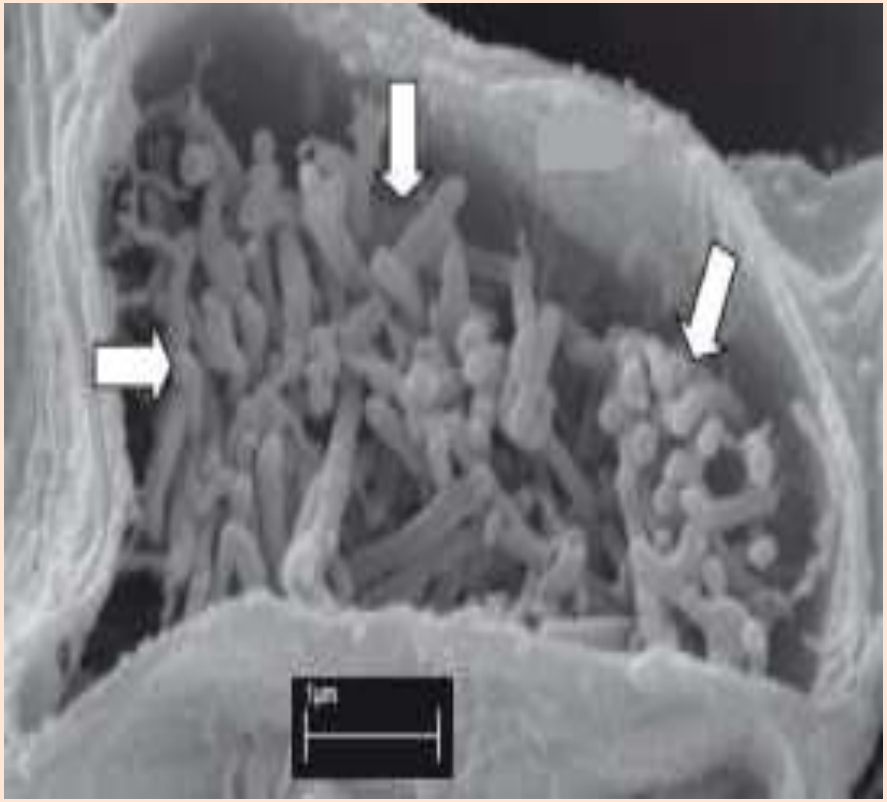
(*Erwinia amylovora*)



Tunisia / Surface of Rooted out Trees : 3,300 ha (2016)

Citrus Greening

(Candidatus *Liberibacter*)



*** Three species of bacteria:**
- Cand. *Liberibacter asiaticus*
- Cand. *Liberibacter africanus*
- Cand. *Liberibacter americanus*

*** They are injected in citrus plants by insect pests**

*** They locate and spread in liber tissue of the citrus phloem**

Citrus Greening/HLB

(Candidatus *Liberibacter*)

*** Disease firstly observed in China 1956, then called: *Huang-Long-Bing* (HLB), meaning Yellow Shoot Disease**

*** Known also as Greening disease**

*** Bacteria transmitted by rootstock, graft and sap-sucking insects feeding on citrus**

Citrus Greening/HLB

(Candidatus *Liberibacter*)

Vector insect

African psyllid
(*Trioza erytreae*)

Cand. *Liberibacter*
africanus

Citrus Greening

(Candidatus *Liberibacter*)

Vector insect

Asian psyllid

(*Diaphorina citri*)

Cand. *Liberibacter*

asiaticus

and

Cand. *Liberibacter*

americanus

Citrus Greening/HLB

(Candidatus *Liberibacter*)

Symptoms

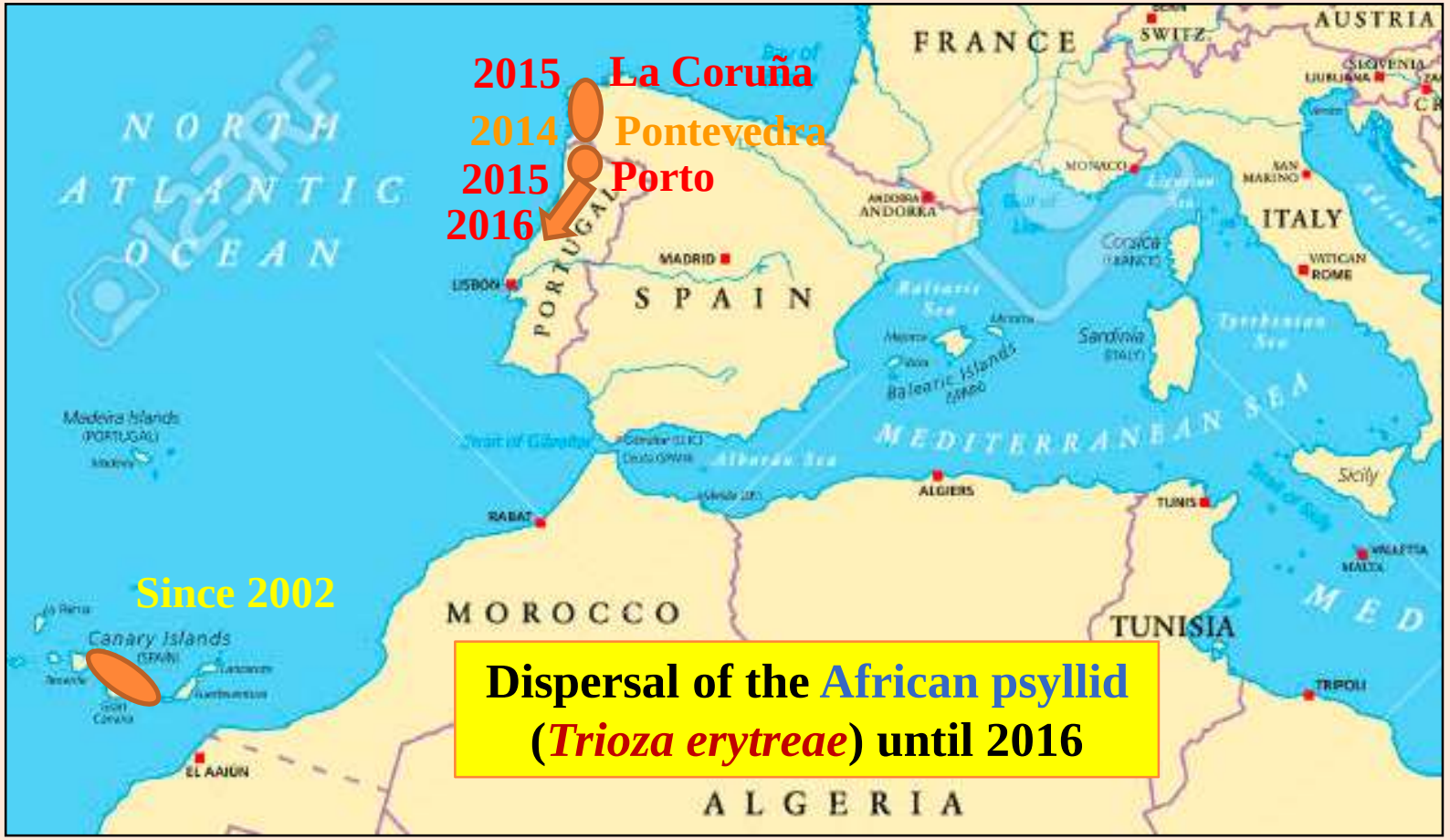
Citrus Greening/HLB

(Candidatus *Liberibacter*)

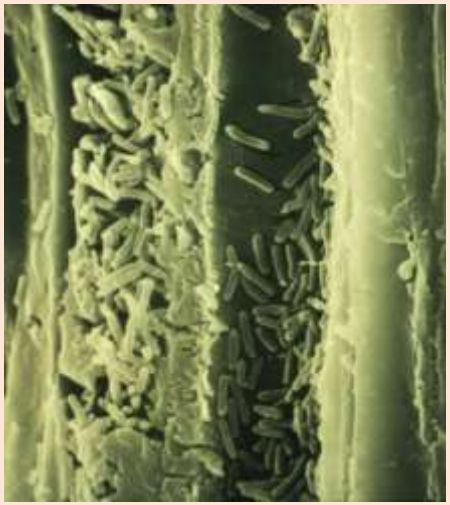
Symptoms

Citrus Greening/HLB

(Candidatus *Liberibacter*)



Xylella fastidiosa Diseases



*** One species of bacterium living in xylem vessels: *Xylella fastidiosa***

*** Many subspecies:**

- ***X. fastidiosa* subsp. *fastidiosa***
- ***X. fastidiosa* subsp. *multiplex***
- ***X. fastidiosa* subsp. *pauca***
- ***X. fastidiosa* subsp. *sandyi***

and

- ***X. fastidiosa* subsp. *morus* changed in 2016 in a new species: *Xylella taiwanensis***

Xylella fastidiosa Diseases

Xylella fastidiosa **causes several diseases on numerous host plants (around 300 plant species):**

- **Grapevine Pierce's disease (PD)**
- **Citrus variegated chlorosis (CVC)**
- **Phony peach disease (PPD)**
- **Oleander leaf scorch (OLS)**
- **Plum leaf scald (PLS)**
- **Almond leaf scorch (ALS)**
- **Coffee leaf scorch (CLS)**
- **Olive quick decline (OQD),…**

+ A number of forest and shade trees

Xylella fastidiosa Diseases

Xylella fastidiosa **is transmitted by numerous (around 40 species) sap-sucking insects belonging to Hemiptera (Cicadellidae & Cercopidae).**

Examples of Cicadellidae

Xyphon fulgida

Homalodisca vitripennis

Xylella fastidiosa Diseases

Example of Cercopidae

Philaenus spumarius

Xylella fastidiosa Diseases

Grapevine Pierce's Disease (PD)

Caused by *X. fastidiosa* subsp. *fastidiosa*

Xylella fastidiosa Diseases

Grapevine Pierce's Disease (PD)

Caused by *X. fastidiosa* subsp. *fastidiosa*

Xylella fastidiosa Diseases

Citrus Variegated Chlorosis (CVC)

Caused by *X. fastidiosa* subsp. *pauca*

Xylella fastidiosa Diseases

Phony Peach Disease (PPD)

Caused by *X. fastidiosa* subsp. *multiplex*

Xylella fastidiosa Diseases

Oleander Leaf Scorch (OLS)

Caused by *X. fastidiosa* subsp. *sandyi*

Xylella fastidiosa Diseases

Oleander Leaf Scorch (OLS)

Caused by *X. fastidiosa* subsp. *sandyi*

Xylella fastidiosa Diseases

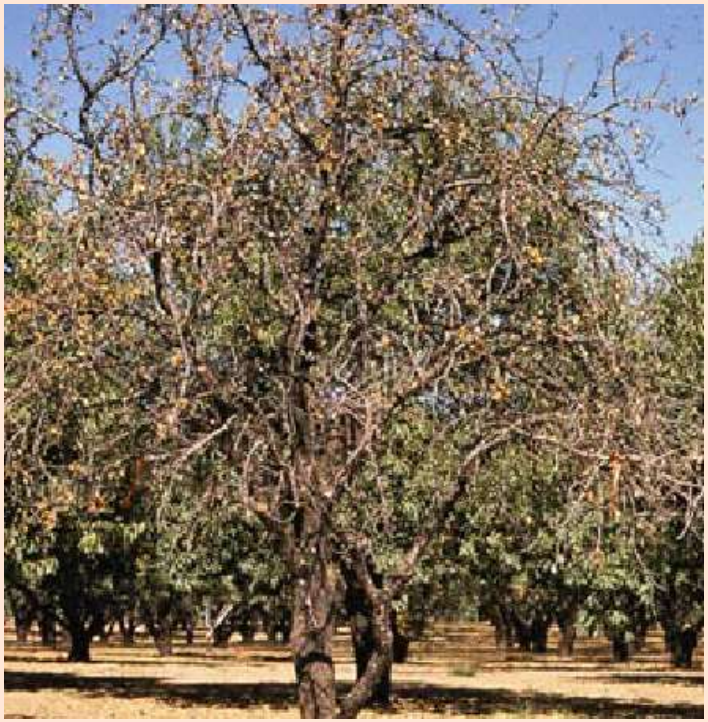
Almond Leaf Scorch (ALS)

Caused by *X. fastidiosa* subsp. *fastidiosa*
and *X. fastidiosa* subsp. *multiplex*

Xylella fastidiosa Diseases

Almond Leaf Scorch (ALS)

Caused by *X. fastidiosa* subsp. *fastidiosa*
and *X. fastidiosa* subsp. *multiplex*



Xylella fastidiosa Diseases

Olive Quick Decline (OQD)

Caused by *X. fastidiosa* subsp. *pauca*

Xylella fastidiosa Diseases

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Caused by *X. fastidiosa* subsp. *pauca*

Xylella fastidiosa Diseases

Olive Quick Decline (OQD)

Caused by *X. fastidiosa* subsp. *pauca*

Xylella fastidiosa Diseases




Thank You