



Food and Agriculture
Organization of the
United Nations



International
Plant Protection
Convention

Pest Risk Analysis for *Fall Armyworm*

Webinar Series: Fall Armyworm, a global threat to prevent

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Pest Risk Assessment

Stage 1: Initiation

Stage 2: Pest Risk Assessment

- Pest categorization
- Assessment of the probability of introduction and spread
- Assessment of potential economic consequences

Stage 3: Pest Risk Management

- Acceptability of risk
- Identification and selection of appropriate risk management options
- Phytosanitary certificates and other compliance measures

Phytosanitary regulation

Pest risk analysis

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

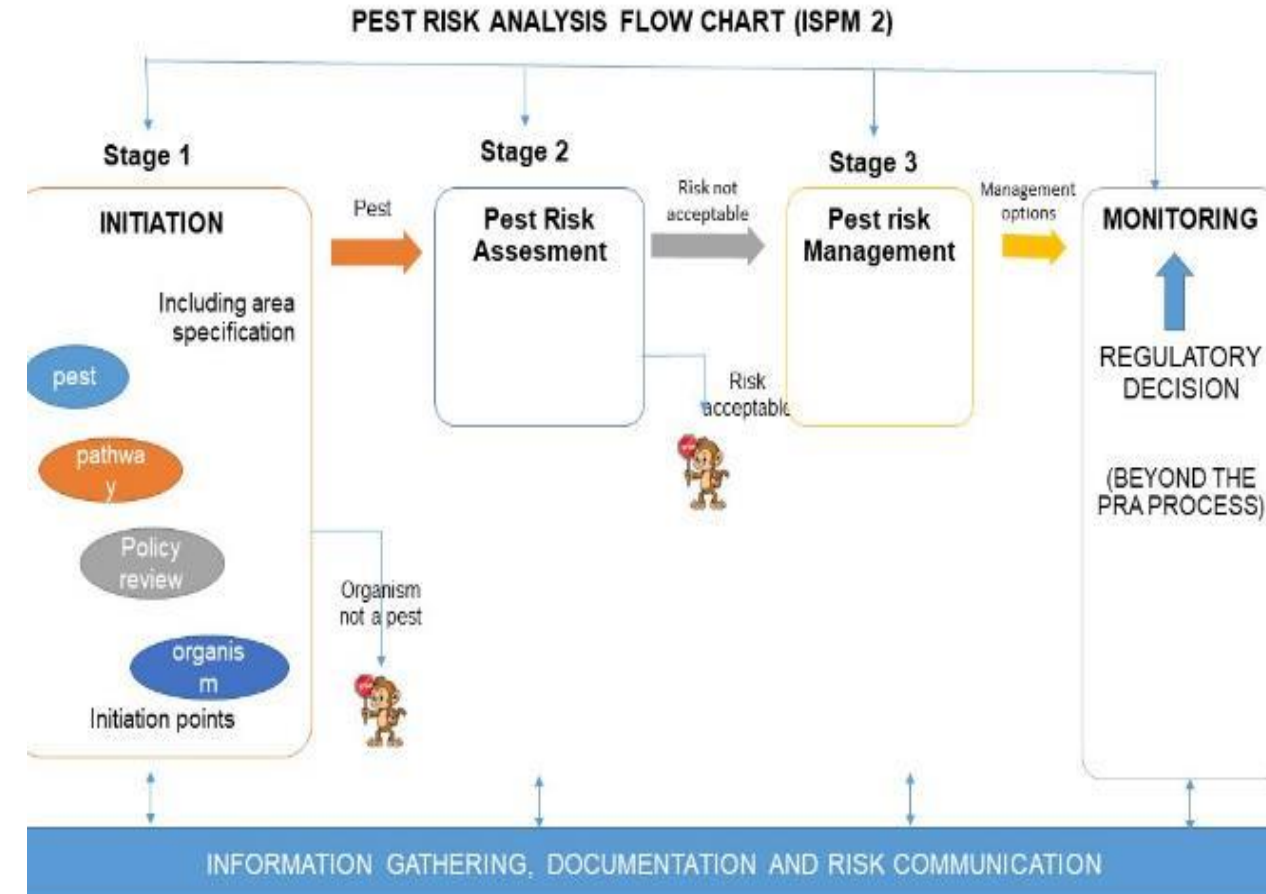
Definition

The process of evaluating **biological** or **other scientific** and **economic** evidence to **determine whether an organism is a pest, whether it should be regulated, and the strength of any phytosanitary measures to be taken** against it" (ISPM 5).

By NPPO/RPPO

Relevant standards:

- **ISPM 2** (*Framework for pest risk analysis*)(FAO 2016)
- **ISPM 11** (*Pest risk analysis for quarantine pests*) (FAO 2016)



Stage 1: Initiation

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

- **The pest:** *Spodoptera frugiperda* Smith (Lepidoptera: Noctuidae)
- **Commodities:** : asparagus, pepper, eggplant, Momordica and cut flowers (for instance among 350 host plants from 75 families).
- **Identification of PRA area:**
 - **South Europe:** France, Italy, Spain, Greece, Portugal
 - **North Africa and Near East:** Morocco, Iraq, **Syria Arab Republic**, Saudi Arabia, Libya, **Oman**, **Lebanon**, **Jordan**, Algeria
 - **South Pacific:** **Australia**, New Zealand, **Papua New Guinea**, Vanuatu, Fiji Islands, federal States of Micronesia, Guam
- **Existing PRA**
 - EFSA (2018 <https://efsa.onlinelibrary.wiley.com/doi/10.2903/j.efsa.2018.5351>),
 - Australian (DAWE) Final Pest Risk Analysis for Cut Flower and Foliage Parts 1 & 2
 - Pest Risk Assessment of the Fall Armyworm, *Spodoptera frugiperda* in Egypt. (2017)

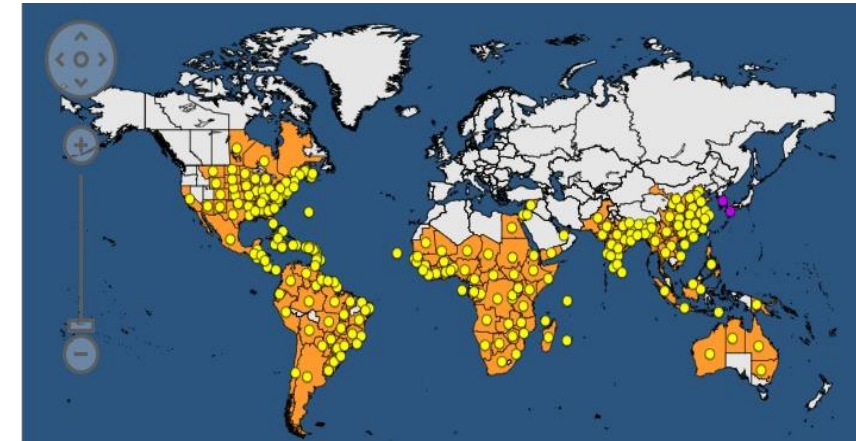


Stage 2: Pest Risk Assessment

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

Pest categorization

- **Identity of pest** : *Spodoptera frugiperda* (Lepidoptera: Noctuidae)
Single species with **two strains**: rice and **maize** strains (EFSA 2017)
- **Status** (Presence in or absence) in PRA area (See the map)
- **Regulatory status** :
 - Regulated in the EU as a harmful organism (Council Directive 2000/29/CE).
 - Quarantine pest for many countries
- **Potential for establishment and spread in PRA area.**
 - FAW can enter the endangered area and potentially establish in. It can be carried on several host commodities such as pepper, eggplant, Momordica and cut flowers.
 - Potential for economic consequences in PRA area. yes
 - FAW is polyphagous (More than **350 host plants** from more than **75 families**).
 - The damage to African maize production totaled **US\$3 billion in 2017** (Stokstad 2017)
 - Increased damage



Assessment of the probability of introduction and spread Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

Probability of entry of a pest **Medium to High** (Uncertainty: Uncertain to medium)

Trade

Pupae



Larvae



As:

Commodities



Cut flower



Pepper



Eggplant



Pepper
er
Asparagus



maize

Travel (Stowaway
on international
flight) / Travelers

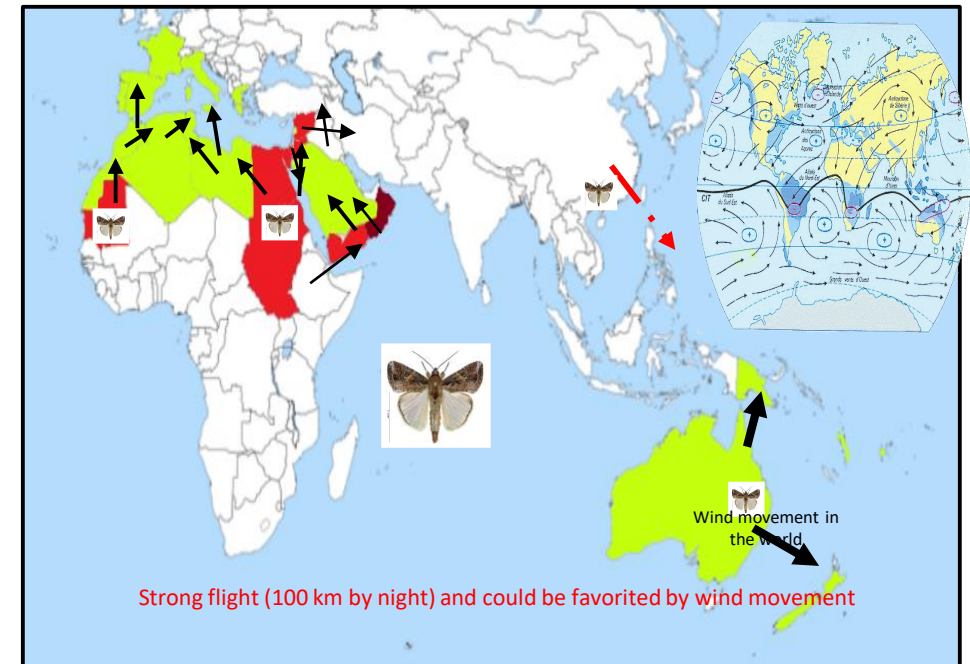
Eggs



Adult



By migration



FAW is likely to enter the PRA area on commodities and by natural migration

Assessment of the probability of establishment Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

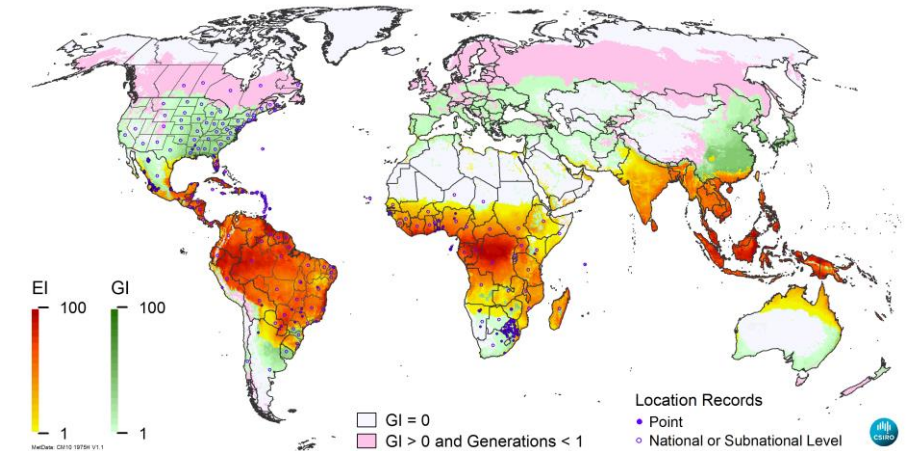
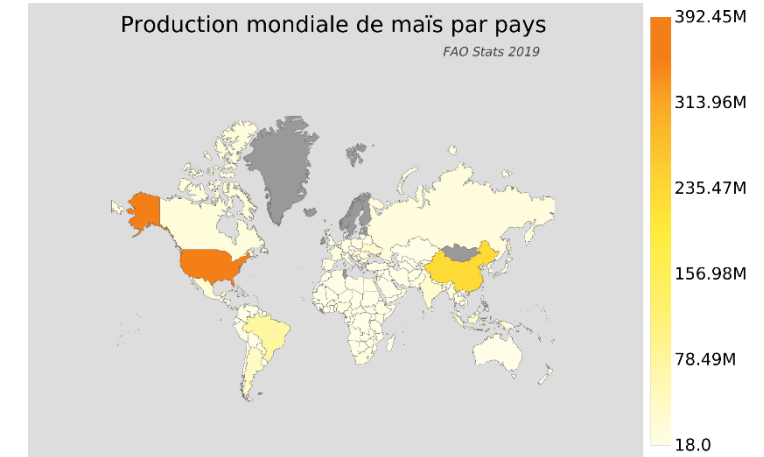
Probability of establishment **Medium to High** (Uncertainty: low to medium)

■ Availability of suitable hosts :

- Polyphagous pest,
- Very wide host range with 350 host plants from 75 families with preference to Poaceae.
- Many of these plant species are grown throughout the endangered area

■ Suitability of environment

Climate suitability for *Fall Armyworm* globally modelled using CLIMEX, including the spatially-explicit effects of irrigation. The Ecoclimatic Index (EI) describes the potential suitability for persistence, while the Growth index (GI) describes suitability for population growth. (Du Plessis et al., 2019. *Spodoptera frugiperda*)

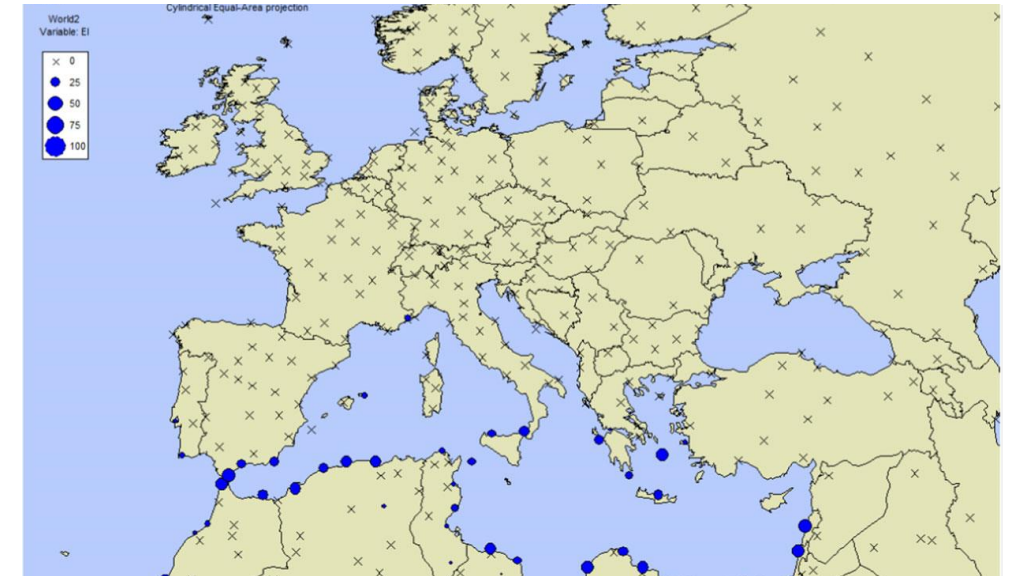


Assessment of the probability of establishment Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

- In Mediterranean area, the map suggest climatic support the establishment of FAW

In the Mediterranean area (Climate suitability for FAW in Africa and Europe modelled using CLIMEX. Parameters from du Plessis et al. (2018) with irrigation scenario)

- Other characteristics of the pest affecting the probability of establishment
 - The lowest temperatures in the coldest months
 - Area of Forest



Fall Armyworm has the potential to establish and spread within endangered area. However, establishment is stopped by frosty and cold winters.

Likelihood medium to very high (Uncertainty: very low to medium)

3: Assessment of potential economic consequences

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

■ Direct effects

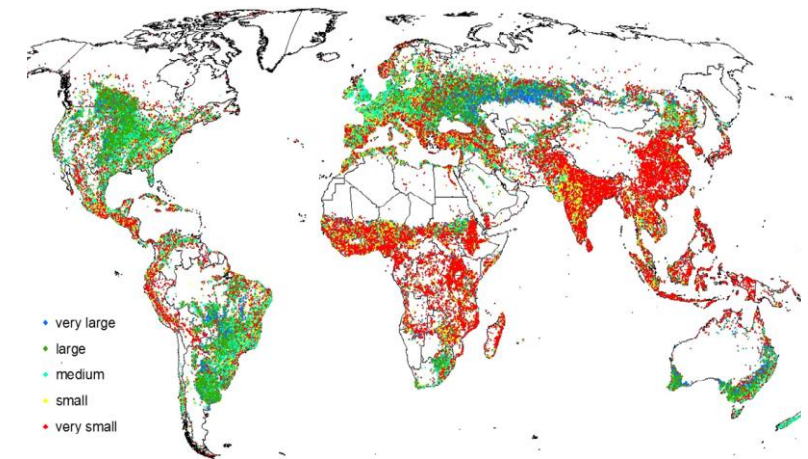
- FAW is polyphagous.
- A pest of economic importance. The **larval** causes substantial damage to **maize**, **rice**, **sorghum**, cotton, soybean and sugarcane, **highly cultivated** in the **endangered area**. (can also damage other crops such as tomatoes).
- FAW can severely reduce production (yield, quality).
 - In USA, Average annual losses of **\$60 million** in the period **1975-1983** in **9** states.
 - In Brazil: more than 400Million \$ damage annually
 - Total direct economic loss across all 8 crops = \$2.68 billion/year (first year of infestation) (**Egypt: FAW PRA 2017**)



■ Indirect effects: Side effect of pesticides

■ Analysis of economic consequences

- Social impact as **small stakeholders** are dominant within the endangered area
- Analysis of commercial consequences: High risk and stringent phytosanitary measures banning importation from infested area. **FAW is a regulated specie in various countries and if established, it could significantly affect export markets,**



The spatial distribution of dominant field size
Myroslava Lesiv et al, .Glob Change Biol. 2019;25:174–186.

Stage 3: Pest Risk Management

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

Acceptability of risk

- High likelihood impact on a number of important crops (EFSA 2017) Strong feeding to losses.
- Natural spread (Strong fliers :100 km a day) possibility to spread to neighboring countries,
- It is too difficult to eradicate the pest once established
- Risk unacceptable.

Identification and selection of appropriate risk management options

■ Options for consignments

- Originate from free area established by NPPO
- No sign observed since the beginning of the last complete cycle of vegetation
- Pre export visual inspection at borders according to ISPM 23
- Pre export fumigation or appropriate pesticide treatment

■ Options preventing or reducing infestation in the crop

- Prior to export inspection of the commodity to certify that it is free from FAW or has been subjected to treatment to ensure freedom from the pest
- Light traps and pheromone traps to detect adult the field (pepper) in production, storage and handling facilities (EPPO, 2015).



Stage 3: Pest Risk Management

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

- ***Options ensuring that the area, place of production or crop is free from the pest***
 - Official pest free area (PFA), Pest free place of production (PFPP), Pest free production site (PFPS) according to ISPM4, ISPM 10
 - Pheromone traps and Surveillance
 - Chemical control in exporting countries to reduce the risk of infestation
- ***Options for other types of pathways***
 - Inspection of travelers at airport
- ***Options within the importing country***
 - Visual inspection at borders according to ISPM 23 (High level of confidence 95%), All stages can be detected visually (EFSA, 2017) With sampling (ISPM 31) if needed
 - Availability of chemical pesticides control and biological control, The same control practices used for *O. nubilalis* and *S. nonagrioides* largely function for the control of *S. frugiperda* (EFSA, 2018)
- ***Prohibition of commodities***
 - From highly infested countries if no measures implemented

Phytosanitary certificates and other compliance measures

Additional declaration

Phytosanitary regulation

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*

a **quarantine pest** (Regulation 2019/2072).

a **priority quarantine pest** (Regulation 2019/1702)

Additional declaration on the
phytosanitary certificate
(requirements)

- **permanent** until further notice on plants such *Chrysanthemum* spp., *Dianthus* spp. and *Pelagonium* spp. (Annex VI to Implementing Regulation 2019/2072, point 25).

- **temporary** for fruits of sweet or hot peppers, bitter melon, African scarlet eggplant (*Solanum aethiopicum*), African eggplant and eggplants, and plants – other than live pollen, plant tissue cultures, seeds and grains – of maize originating in third countries other than Switzerland until 20 June 2021, (Commission Implementing Decision 2018/638 amended by the Commission Implementing Decision 2019/1598).





Phytosanitary regulation

Prevention, Preparedness and Response Guidelines for *Spodoptera frugiperda*



High-risk FAW host products

- cut flowers
- asparagus, etc.

National Priority Plant Pest targeted
for

- surveillance
- Inspection
- Diagnostics
- stakeholder awareness



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Thank you

IPPC Secretariat

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