

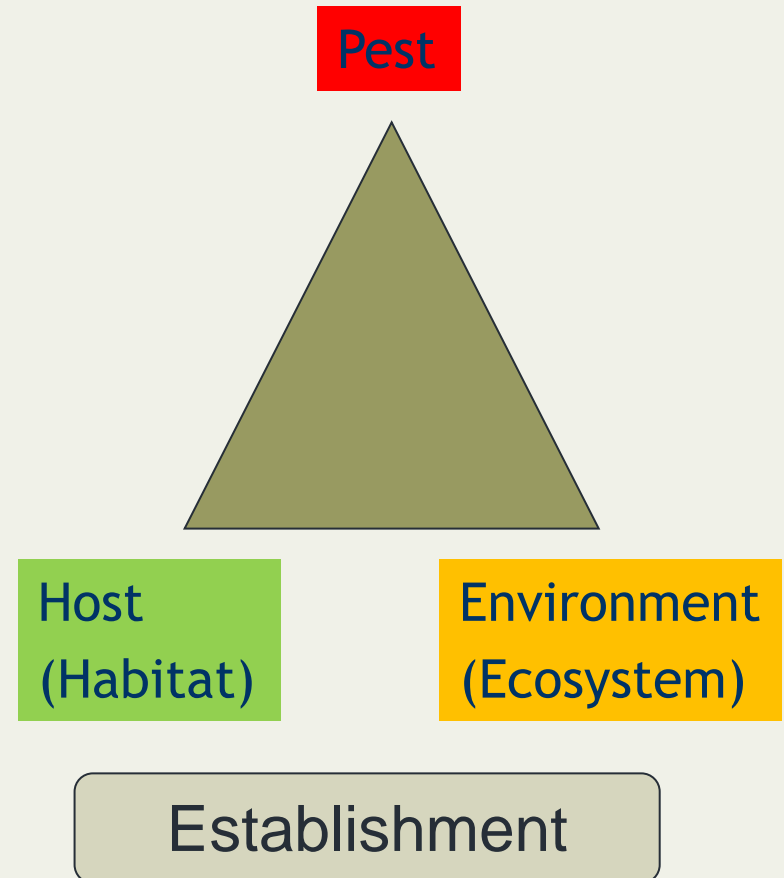
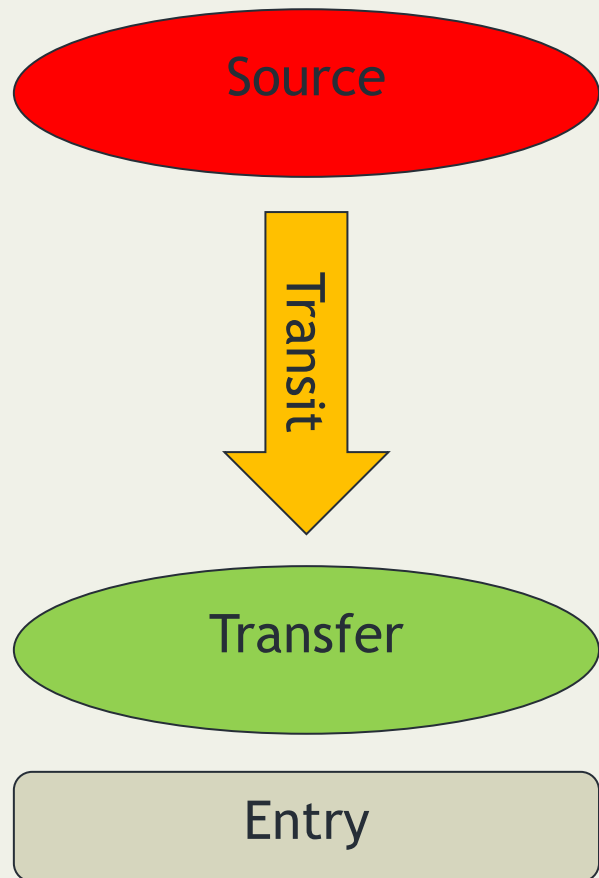


PRA and entry and establishment

Julian Smith



Or Introduction



Introduction: The **entry** of a **pest** resulting in its **establishment** [FAO, 1990; revised FAO, 1995; IPPC, 1997]

Entry

- Top questions:
 - Association of pest (and vector of a pest) with pathway at origin
 - Transport and survival
 - Fate of viable infectious agents within PRA area

Entry: Movement of a pest into an area where it is not yet present, or present but not widely distributed and being officially controlled

[FAO, 1995]

Intercepted pest: The detection of a pest during inspection or testing of an imported consignment

[FAO, 1990; revised CEPM, 1996]

Pathways

- Pest associations with consignment
 - Seed or vegetative planting material
 - Plant produce intended for food or feed
 - Plant produce intended for non-food uses e.g. biofuels, compost
 - Plant based packaging e.g. wood crates
 - Wood furniture
 - Soil associated with plant or other consignment e.g. stones
- Natural spread and spread by extreme weather events
- Human trafficking of infected or contaminated materials
- Waste from shipping and plane transportation

Pathway: Any means that allows the entry or spread of a pest

[FAO, 1990; revised FAO, 1995]

Probability as a pathway

- Association at origin
 - Pest prevalence in country of origin
 - Probability of pest surviving pre-export management practices
 - Volume and number of lots per consignment
 - Seasonal association of pest and traded consignment
- Survival during transport
 - Length of time and condition during transport
 - Robustness of pest, especially certain life stages
 - Load of pest associated with consignment
- Efficacy of existing phytosanitary measures
 - Control practices applied for other pests effective against pest under review
 - Extent a pest may evade visual inspection e.g. latent infection

Consignment destination and pest fate

- Intended and unintended use of the commodity
 - Processing or consumption
 - Seed for production or seed
 - Seed, when intended for processing or consumption
- Permissiveness of pathway in time and space
 - Proximity of suitable host and vectors (if required)
 - Seasonality of host presence and time of year at which import occurs



Establishment

- Top questions:
 - Availability of suitable hosts, alternate hosts and vectors
 - Suitability of environment, including biotic & abiotic factors
 - Cultural practices and control measures
 - Other characteristics affecting probability of establishment

Perpetuation, for the foreseeable future, of a pest within an area after entry

[FAO, 1990; revised FAO, 1995; IPPC, 1997; formerly established]

Host and pest vector information

- List of hosts
 - Natural hosts
 - Experimental hosts
- Prevalence and geographic distribution of all hosts
- List of vectors (if required for pest infection)
- Prevalence and geographic distribution of all vectors
- Spatial and temporal proximity of hosts and pest vectors to pest pathway entry points

Pest information

- Mobility of the pest (eg flying insects, aerial spores, water and irrigation)
- Reproducibility of the pest (eg fungal sporulation rates, insect life cycling rates; day length)
- Effect on the pest by normal prevailing weather patterns; how similar to that at the pest origin
- Effect of extreme weather events on pest survival
- How adaptable is the pest to climates, is the pest likely to complete reproductive cycles and perpetuate?
- Evidence of establishment from equivalent climates of other countries

Climate information

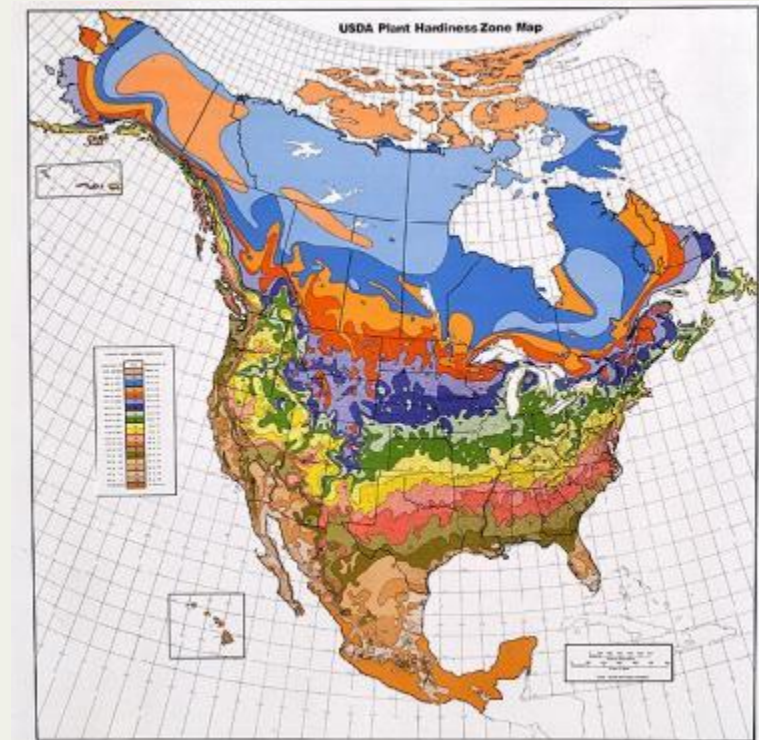
- How dependent on weather variables is the pest based on other country experiences
- How equivalent is the climate prevailing in the PRA area to that of countries where the pest is prevalent
- What is the evidence that the extremes of weather (i.e. cold/hot, dry/wet) would prevent establishment over foreseeable future

Existing control practices and phytosanitary measures

- Compare cultivation practices of host crops in the area of origin and PRA area
- Would existing practices mitigate risk?
- Are there any pest control programs or natural enemies already in the PRA area?
- Are these measures sufficient to prevent establishment (i.e. prevent perpetuation of pest for foreseeable future)

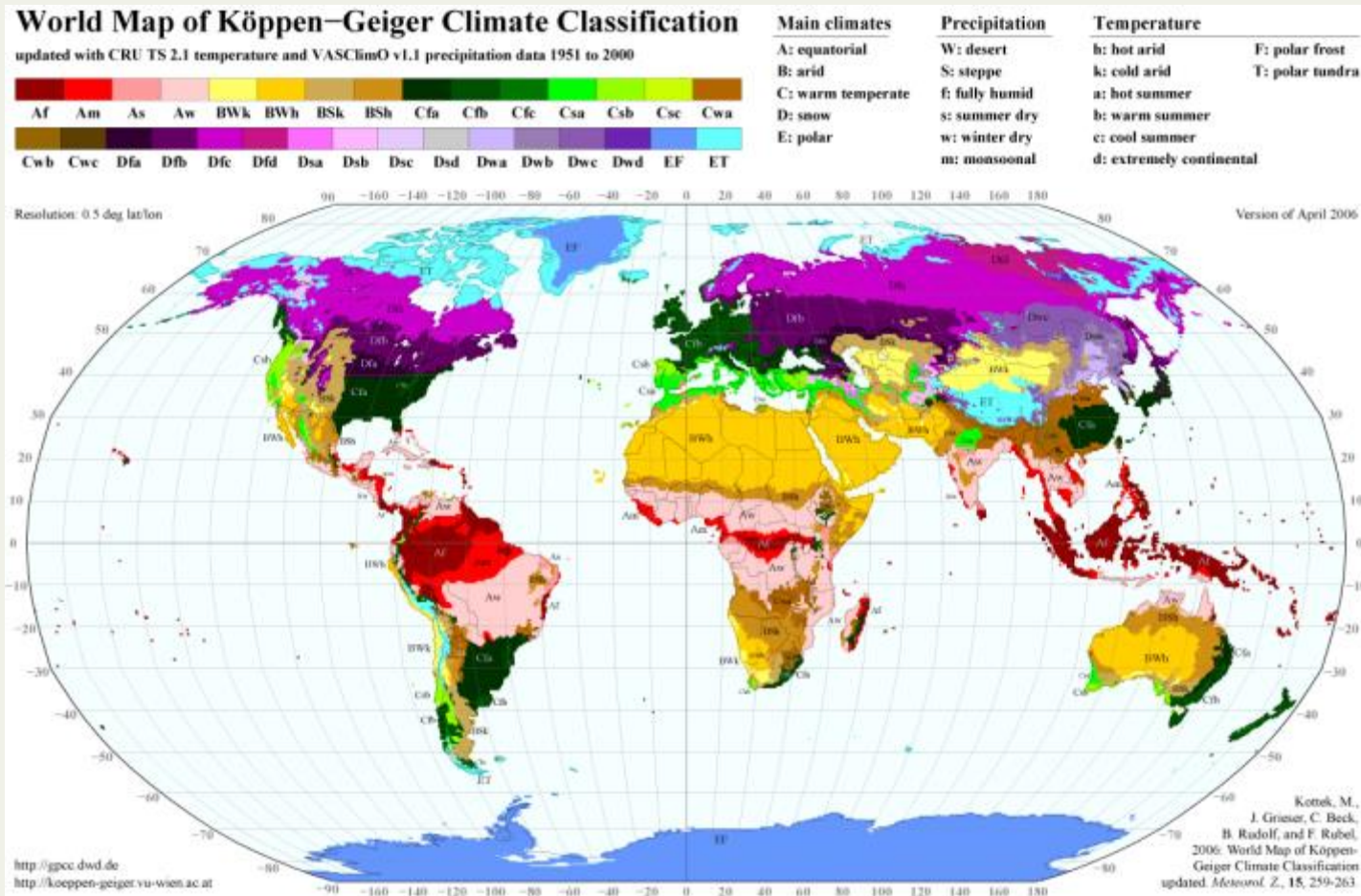
Tools for predicting establishment

- Plant hardiness zone maps
- Climate maps
- Climate-matching models
- Bio-climatic models



- Plant hardiness maps based on presence of limiting factors

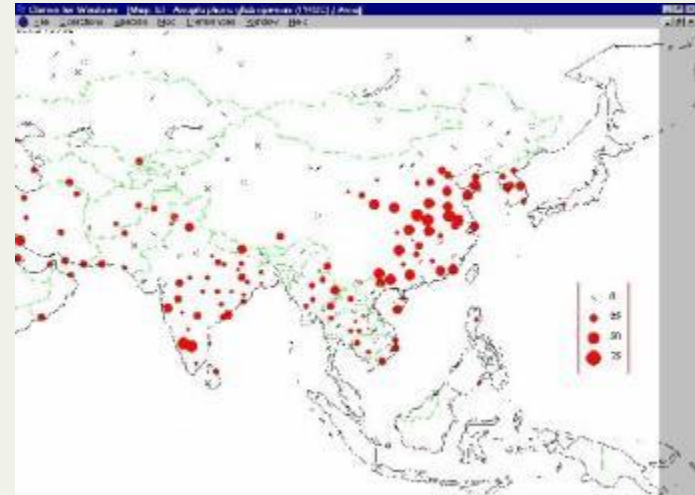
Köppen-Geiger climate classification



- <http://koeppen-geiger.vu-wien.ac.at/>

CLIMEX

- Computer software containing long term data (30 years) from almost 3000 locations worldwide
- Is used to predict the effects of climate on plants and animals based on biological parameters e.g. response to temperature
- Generates a single number - the Eco-climatic Index to describe how favourable a location is for a particular species



Any questions!

- If you have any questions please feel free to contact:
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