Host plants/habitats and their distribution in the PRA area

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INTRODUCTION

Think like an analyst

1. Analysts do not compile host lists.



2. Whenever a plant is cited as a host, what **questions** does the analyst ask?

🌱🕵️🔍

3. **Analysts evaluate whether a host association changes the PRA conclusion.**

🌱 → 🚚 → 🌍 → 💥

Thought experiment: More hosts ≠ more risk

- A new pest is detected in the PRA area
- Should we be concerned?

It depends

Host record found in the literature:

- 350 hosts.
- Present in 42 botanical families.
- ✗ Records dating back 30 years.

? Adults observed only feeding

✗ No reproduction demonstrated

✗ Many records come from experimental studies.

✓ Main host in Asia but absent from the PRA area.

Host plants/habitats and their distribution in the PRA area

PM 5/5 and information sources

7. Host plant/habitats and their distribution in the PRA area (PM 5/5)

7. Host plants /habitats* and their distribution in the PRA area

If the host range is large, you may group plants (e.g. deciduous trees, or at the family level, e.g. Brassicaceae, Rosaceae), and/or focus on those occurring in the PRA area. When appropriate, the difference of susceptibility between hosts should be noted. If there are many habitats, focus on those occurring in the PRA area. Reference to FAOSTAT and EUROSTAT may help assess distribution of host plants.

Host Scientific name (common name) / *habitats**	**Presence in PRA area (Yes/No)**	**Comments (e.g. total area, major/minor crop in the PRA area, *major/minor habitats**)**	***Reference***

**Specify habitat for invasive plants, host plants for other pests.*

Why hosts and habitats are central to PM 5/5

Host plants/habitats and their distribution in the PRA area (Section 7; Stage 2)

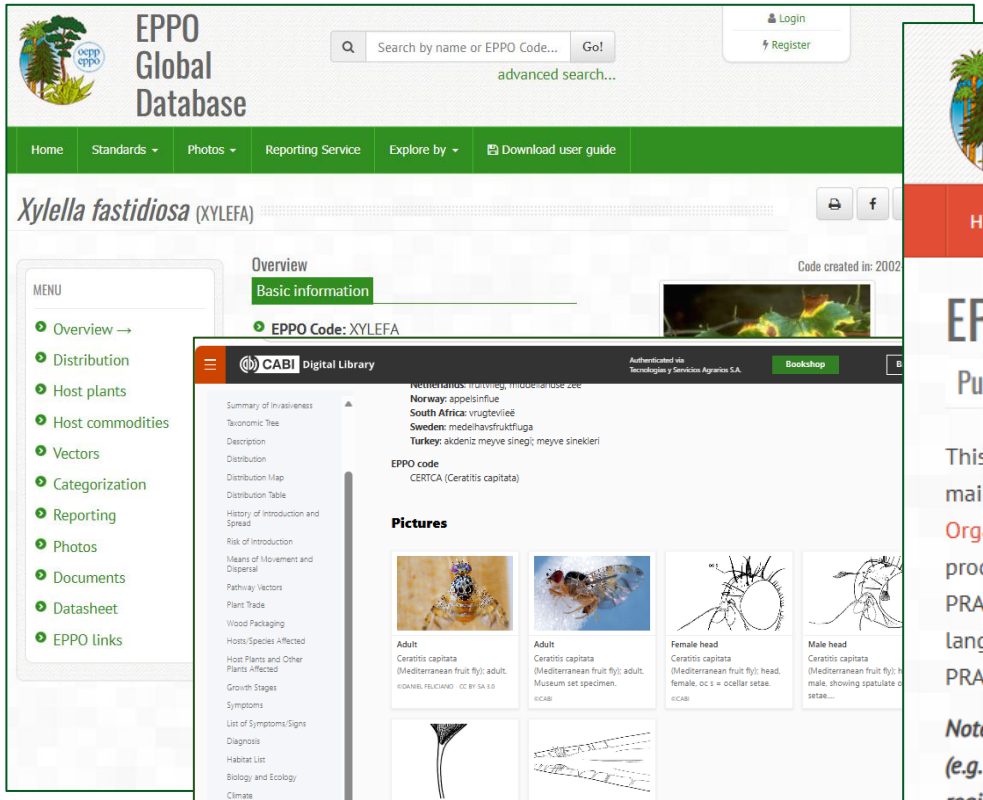
Host information is one of the few datasets used repeatedly throughout the entire PRA.

PRA COMPONENT	ROLE OF HOSTS
Entry (Sec. 8)	Association with a pathway and transfer
Establishment (Sec. 9-10)	**Availability of suitable hosts in the PRA area**
Spread (Sec. 12)	Distribution and connectivity of hosts in the PRA area
Impact (Sec. 13)	Exposure of crops and habitats in the PRA area
Measures	Scope of regulation in the PRA area

- **Host availability in the PRA area** is a key factor influencing pest Establishment, Spread and Impact, and also contributes to pest entry through transfer.
- **Host plants in the area of origin** influence the likelihood of pest association with the commodity.
- The same host may be important for Entry but irrelevant for Establishment (or *vice versa*)

Sources for hosts

List of references vs. List of confirmed hosts







Sources for hosts
List of references ≠ List of confirmed hosts

SOURCE	MAIN USE
EPPO Global Database,	Datasheets: distribution, type, more ref., documents, links
CABI-Crop Protection Compendium (CPC)	Datasheets: distribution, type, ,biology, impact, references
EPPO PRA Platform	Previous PRAs, reasoning, measures
Peer-reviewed papers	Confirm host associations
NPPO reports, Pest surveys, Official interception reports	Additional supporting evidence

- **A list of references is not a list of confirmed hosts**
- **Host associations should be supported by several independent sources whenever possible.**

PRA is an iterative process, according to ISPM N.2: - *Information gathering, documentation and risk communication are carried out throughout the PRA process . - PRA is not necessarily a linear process because, in conducting the entire analysis, it may be necessary to go back,*

Sources for hosts:
Information needed for each identified host

INFORMATION	DESCRIPTION
Host identity	Scientific name, synonyms, Updated taxonomy
Evidence	Confirmed host : Natural observations, experimental studies, PRAs, NPPO records.
Association level	Main, other
Distribution	Presence in the area of origin and in the PRA area
Economic or environmental importance	Crop, forestry, ornamental, or wild
Uncertainty	Lack of confidence in host status, Data gaps

Sources for habitats: Information needed for each habitat type

INFORMATION	DESCRIPTION
Habitat type	Based on EUNIS (or other, e.g. IUCN)
Habitat classification	Based on EUNIS (or other, e.g. IUCN)
Status of habitat	Protected/conservation value/not protected
Pest presence	IAP occurs in hábitat in PRA area/Potential to occur
Distribution of habitat	Major/minor habitat in PRA area

All of the above should be supported with references

Habitats – sources of information

Copernicus Europe's eyes on Earth

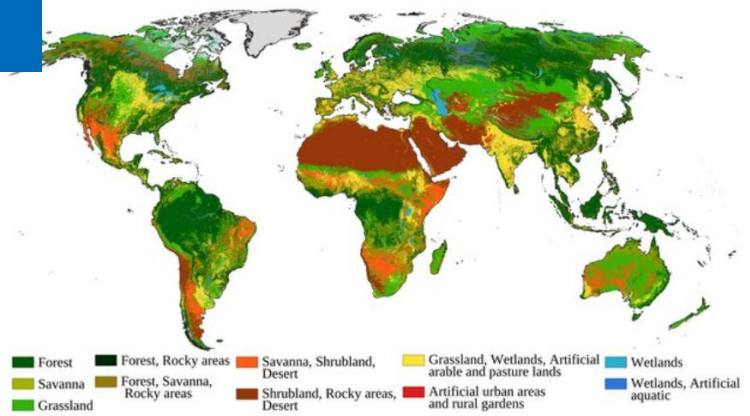
Land Monitoring Service

Home > Portfolio overview > CORINE Land Cover

CORINE Land Cover

EUNIS habitat distribution plots (spatial data)

Prod-ID: DAT-137-en | Published 15 Nov 2021 | Last modified 09 Oct 2025



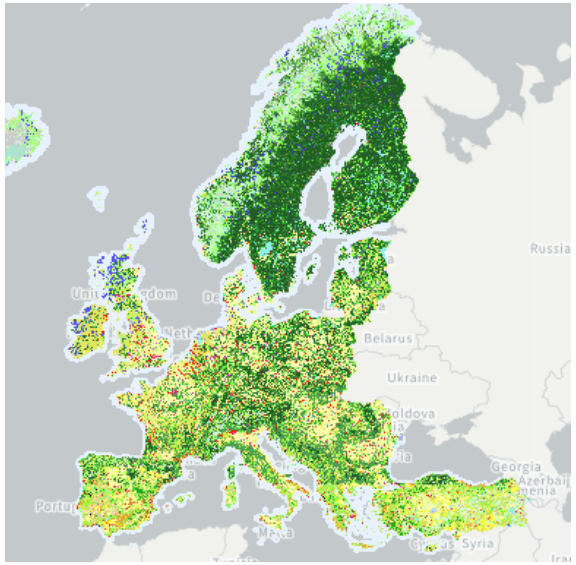
IBAT

GBIF

www.cabi.org

IUCN International Union for Conservation of Nature

EPPO Global Database



EUNIS (eurpeoan Nature Information System)

The EUNIS (European Nature Information System) typology is a classification of natural, semi-natural, and anthropogenic habitats in terrestrial and marine areas of Europe

MA - Littoral biogenic habitat types (salt marshes)
N - Coastal habitat types
Q - Wetlands habitat types
R - Grassland and lands dominated by forbs, mosses or lichens habitat types
S - Heathland, scrub and tundra habitat types
T - Forest and other wooded land habitat types
U - Inland habitats with no or little soil and mostly with sparse vegetation
V - Vegetated man-made habitat types

T2 Broadleaved evergreen forest
T212 : Quercus ilex and Q. rotundifolia forest
T24 : Olea europaea-Ceratonia siliqua forest
T3A : Mediterranean lowland to submontane Pinus forest

Host plants/habitats and their distribution in the PRA area

How analysts think about hosts

How analysts think about hosts

🔬 EVIDENCE

↘

🌱 HOST STATUS

↘

🔗 EPIDEMIOLOGICAL ROLE

↘

📍 PRESENCE IN PRA AREA

↘

🎯 RISK CONCLUSION

❓ UNCERTAINTY

For every host record

Host record ≠ Confirmed host

A confirmed host is a plant where the pest:

- ✅ survives
- ✅ develops
- ✅ reproduces
- ✅ maintains populations under natural conditions.

Confirmed host (True host): *A plant on which the pest can complete its life cycle, reproduce and maintain populations under natural conditions*

Records of different/particular life stages on a host may support confirmed host status'

≠ Main host

Evidence hierarchy for host determination

Evidence level	Typical evidence	Uncertainty
🟢 Natural infestation + reproduction demonstrated under natural conditions	Confirmed host	Low
🟢 Repeated natural observations from independent sources 🟢 Reports of economic impact	Strong support for host status	Low
🟡 Only experimental development	Host status not confirmed under natural conditions	Moderate (more/less relevant depending on the category of the pest)
🟠 Feeding, infection, or oviposition observed only	Association demonstrated, host status uncertain	High
🔴 Historical citation without supporting evidence	Weak support for host status	Very high

Note: Interceptions should be interpreted carefully

- May support confirmed host status (e.g. *Xylella*)
- May only indicate transport association ("hitchhiking") (e.g. *Lycorma delicatula*)

Types of hosts detailed in the literature

MAIN/PRIMARY/MAJOR HOST

OTHER (SECONDARY HOST / OCCASIONAL HOST)

ALTERNATE HOST

RESERVOIR HOST

A plant may be a confirmed host but epidemiologically irrelevant. Conversely, a secondary or wild host may be the key driver of establishment and spread in the PRA area.

INCIDENTAL HOST

- Term inconsistently used in the literature
- May refer to an epidemiologically unimportant host/ to an accidental association / to a non-confirmed host
- Avoided unless clearly defined by the source

Risk-relevant host characteristics

	Relevant for:
CULTIVATED HOST ORNAMENTAL HOST FORESTRY HOST	Entry Establishment Impact
WEED HOST WILD HOST	Establishment Spread and long-term persistence
SYMPTOMATIC HOST ASYMPTOMATIC HOST	An asymptomatic host may be more important than a symptomatic host because it can maintain the pest unnoticed
PROPAGATION METHOD (seed, cuttings, grafting, tissue culture, bulbs, etc.)	Entry Spread

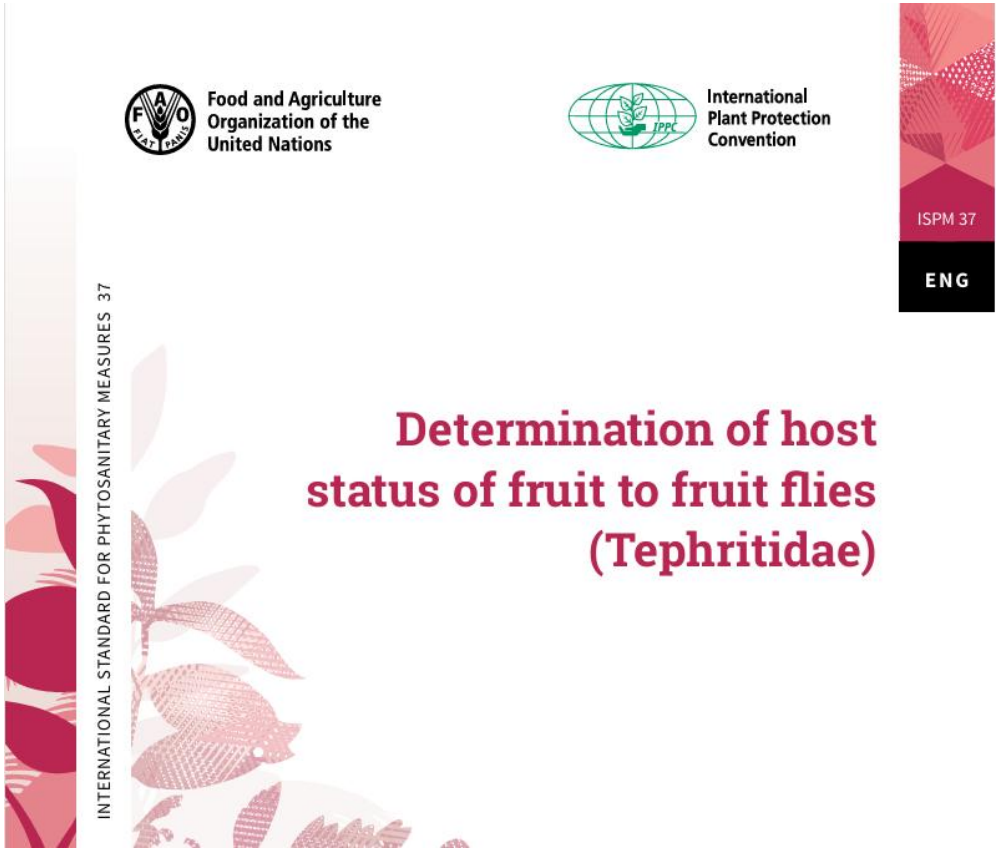
How does the host contribute to the risk of Entry, Establishment, Spread and Impact?

A plant may be a confirmed host but epidemiologically irrelevant. Conversely, a secondary or wild host may be the key driver of establishment and spread in the PRA area.

	Relevant for:
SUITABLE HABITAT	Forest ecosystems Natural vegetation Riparian habitats Urban landscapes

ISPM No. 37-Determination of host status of fruits to fruit flies (Tephritidae)

ISPM No.37



NATURAL HOST	Natural infestation
CONDITIONAL HOST	Semi-natural confirmation
NON-HOST	No complete development

Host plants/habitats and their distribution in the PRA area

Real-world examples

REAL CASE 1

Situation:

Hypothenemus hampei

Coffee berry borer

Primary host: Coffea spp.



Fruit and flowers (Poas, Costa-Rica, 2019)
Courtesy: Camille PICARD, EPPO

PRA implication:

Hosts absent or extremely limited in PRA area

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Establishment unlikely

Conclusion:

- Host **presence** may differ between the area of origin and the PRA area.

REAL CASE 2

Situation:

Rhynchophorus ferrugineus

Palm weevil



PRA implication:

Rhynchophorus ferrugineus*:** historically associated mainly with **coconut** and **date palm**, but ***Phoenix canariensis became one of the most important and severely affected hosts in the EPPO region.

Conclusion:

- Host **importance** may differ between the area of origin and the PRA area

REAL CASE 3

Situation:
Anastrepha suspensa and *litchi*
From reported host to non-host



File:Anastrepha suspensa 5193018.jpg - Wikimedia Commons

PRA implication:

Historical reports

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Litchi considered a host

↓

Better experimental evidence

↓

Host status re-evaluated

↓

Litchi considered Non-host / incidental host

Conclusion:

- Host **status** may change when better evidence becomes available

Host plants/habitats and their distribution in the PRA area

Key message and uncertainty

Uncertainty

- **Hosts are one of the main sources of uncertainty**
- Uncertainty should be described transparently and traceably.

🔴 **High uncertainty**
- single report
- old report
- experimental host only
- taxonomic confusion

🟠 **Moderate uncertainty**
- several observations
- limited biological evidence
- conflicting sources
- confusion between feeding, oviposition, and complete development

🟢 **Low uncertainty**
- repeated natural infections
- reproduction demonstrated
- multiple independent sources

Host uncertainty propagates through the entire PRA.
Uncertainty in hosts creates uncertainty in:
- pathways
- establishment
- spread
- impact
- measures

Common mistakes

REMEMBER:

- Host record ≠ confirmed host
- Feeding ≠ host
- Oviposition ≠ host
- Many hosts ≠ high risk (unless those hosts are abundant, widespread and epidemiologically important in the PRA area.)
- Important in origin ≠ important in PRA area
- Host ≠ pathway of entry

Take-home messages

- A host record is not necessarily evidence of host status.
- Not all host records are equally reliable.
- Host relevance depends on the PRA question.
- Host uncertainty affects Entry, Establishment, Spread, Impact and Measures. Uncertainty should be documented transparently.
- **The role of the PRA analyst is not to compile host lists, but to determine which host associations are sufficiently supported to influence the risk assessment.**

Group exercise

- EPPO Global Database,
- EPPO Extranet

FOR Vascular streak dieback agent & *Erthesina fullo*

- Compile hosts from EPPO GD and other relevant sources
- Identify the main hosts for the purpose of the PRA
- Discuss which additional criteria should be recorded in this table and would be useful in other sections of the PRA
- Discuss uncertain and/or experimental hosts





FOR Reynoutria multiflora

For IAP assess known habitats and potential habitats using EUNIS system.



Thank you!

linkedin.com/company/eppo-oepp/

bsky.app/profile/epponews.bsky.social

www.facebook.com/EPPOsecretariat/