

RECOMMENDATIONS FOR THE IDENTIFICATION & REPORTING OF ORGANISMS IN LIVING COLLECTIONS



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INTRODUCTION

This document has been prepared to support decision-making in botanical gardens and plant collection organisations when suspicious plant damage is observed and/or when organisms are detected that could pose a risk to the health of living plant collections.

It is designed to support horticultural staff, Plant Health Focal Points, curators, and directors in responding consistently and proportionately to suspected plant health issues, in alignment with national plant protection systems.

This guide is based on the principles established by the International Plant Protection Convention (IPPC), which sets international standards for plant health protection and pest reporting.

The manual explains, in a clear and accessible manner, the rationale behind each step in the process of identifying and reporting organisms of concern.

The accompanying Decision Flow Diagram provides practical, rapid guidance on the actions to take in different situations.

Together, these documents constitute a practical decision-making tool for plant biosecurity.

Why is this important?

A sentinel plant functions as an early warning system: when a plant species is cultivated outside its natural range as part of a living collection, it can reveal new associations with insects, pathogens, or other organisms. If unusual damage is detected, the collection may provide the first indication of an emerging pest or disease.

Due to their taxonomic diversity, the presence of non-native species, rigorous collection documentation, and regular monitoring by trained staff, botanical gardens are often places where new pests and other organisms of plant health concern are detected for the first time.

In this context, botanical gardens and their living collections can serve as sentinel sites for plant health surveillance.

Early detection protects biodiversity, agriculture, conservation collections, trade, and institutional credibility.



What is considered a pest?

According to IPPC terminology, a “pest” includes any organism harmful to plants or plant products, such as:

- Insects and mites
- Nematodes
- Fungi
- Bacteria
- Virus and viroids
- Phytoplasmas
- Weeds and parasitic plants

It all begins when something unusual is detected.

STEPS



STEP 1 - OBSERVATION

It all begins with observation.

If a member of staff observes an unknown organism or an unusual symptom on plants, soil, plant products, or growing media, the procedure is initiated.

Ask yourself:

- Is it new?
- Is it unusual for this host?
- Is it causing unexpected damage?

If nothing unusual is observed → No action is required under this procedure.

If something unusual is observed → Proceed with the immediate on-site response (Step 2).

Trust your professional judgement

STEP 2 - IMMEDIATE ON-SITE RESPONSE

If the damage appears severe, unusual, or unknown:

- Isolate the affected plants or area, where feasible.
- Restrict the movement of plants, soil, and tools.
- Take clear photographs for diagnosis.
- Collect a sample following the garden's Standard Operating Procedure (SOP).
- Immediately notify the Plant Health Focal Point.

Avoid applying treatments at this stage unless specifically instructed.

If the pest appears minor and known:

- Record it in the monitoring system.
- Apply routine Integrated Pest Management (IPM) measures.
- Reassess if the situation worsens.

Containment and communication come before control



STEP 3 - IDENTIFICATION

An accurate identification determines the next step.

If identification is uncertain:

- Send the sample, together with information on the host plant, location, date, and symptoms, to a designated expert or diagnostic laboratory.
- Maintain containment measures until identification is confirmed.
- If the pest appears serious or exotic, consult your NPPO (National Plant Protection Organization) before sending samples externally.

If identification is confirmed:

- Use the scientific name of the pest.
- Proceed with the regulatory assessment (Step 4).

Identification determines whether there are legal reporting obligations

STEPS



STEP 4 - REGULATORY ASSESSMENT

Check the identified pest against the national list of regulated pests maintained by the NPPO.

- If it is a regulated pest → Follow the Regulated Pest Pathway (Step 5a).
- If it is not a regulated pest → → Follow the Non-Regulated Pest Pathway (Step 5b).
- If there is uncertainty but it appears serious or exotic → Treat it as potentially regulated and contact the NPPO.

If there is uncertainty, consult your NPPO

STEP 5a - REGULATED PESTS (OR SUSPECTED TO BE REGULATED)

If the pest is regulated or potentially regulated, the garden becomes part of the national plant health response system.

Internal actions:

- Inform the Garden Director and the person responsible for the collections.
- Activate plant health emergency procedures.
- Restrict movement and implement hygiene protocols.

External reporting:

- Prepare a pest report including:
 - Scientific name
 - Host species
 - Location (map or coordinates)
 - Date of detection
 - Extent of the infestation
 - Description of the risk
 - Measures taken
- Submit the report through the official NPPO notification channel.

Follow the instructions provided by the NPPO regarding further surveys, eradication measures, containment actions, or additional sampling requirements



STEPS



STEP 5b - NON-REGULATED PESTS

Non-regulated pests are not subject to regulatory control but may still pose a plant health risk.

If the damage is minor:

- Record the occurrence.
- Manage through routine IPM.
- Continue monitoring.

If the damage is severe:

- Escalate internally.
- Adjust the IPM strategy.
- Consider collaboration with research partners.
- Seek technical advice from the NPPO where appropriate.
- Document actions taken and outcomes.

Non-regulated pest does not necessarily mean that it poses no risk

STEP 6 - DOCUMENTATION & ANNUAL REVIEW

For all cases, record:

- Pest name (scientific name if known, or “unknown” if not identified)
- Host plant
- Location
- Date of detection
- Observer
- Symptom severity
- Actions taken
- Communication with laboratories or the NPPO

Review annually to update training, priority pest lists, and ensure SOPs remain aligned with current regulations.



IMPORTED MATERIAL

If a pest is detected on newly imported plants:

→ If they are accompanied by a phytosanitary certificate:

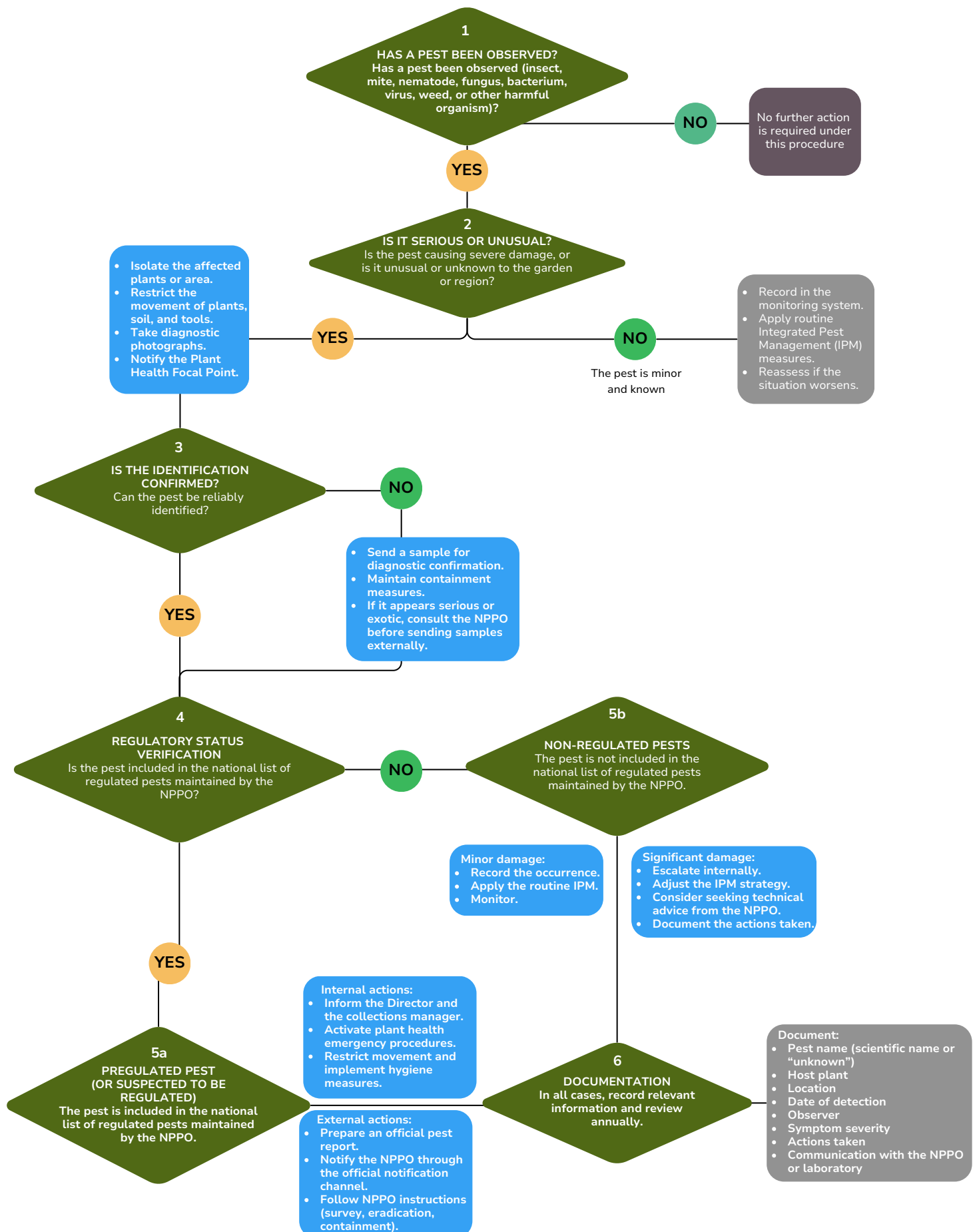
- Retain the documentation.
- Notify the NPPO if the pest is regulated or suspected to be regulated.
- Hold the shipment until further instructions are received.

→ If they do not have adequate documentation:

- Inform the Director and the Plant Health Focal Point.
- Consider voluntary notification to the NPPO if the situation is serious.
- Review compliance procedures.



DECISION-MAKING FLOW DIAGRAM



GLOSSARY OF TERMS

Biosecurity: A set of measures aimed at preventing the introduction, establishment, and spread of harmful organisms that could affect plants, ecosystems, agriculture, or trade.

Containment: Measures aimed at limiting or preventing the spread of a pest or organism to other plants, areas, or collections, for example through the isolation of affected plants or restriction of movement.

Diagnosis: The process of determining the identity of an organism or agent causing damage to plants, usually through analysis by specialists or diagnostic laboratories.

Harmful organism: Any organism that can cause damage to plants or plant products, including insects, mites, nematodes, fungi, bacteria, viruses, weeds, or parasitic plants.

Host (or host plant): A plant on which an organism, such as an insect, fungus, bacterium, or virus, lives, feeds, or reproduces.

Identification: The determination of the species or type of organism present, usually through specialist observation, taxonomic analysis, or laboratory diagnosis.

Imported material: Plants or plant products introduced from another country or region, which are often subject to phytosanitary requirements and official documentation.

Integrated Pest Management (IPM): A pest management approach that combines monitoring, cultural practices, biological control, and, when necessary, targeted treatments, with the aim of minimising risks to the environment and human health.

International Plant Protection Convention (IPPC): An international treaty that establishes standards and principles for protecting plant health and preventing the spread of plant pests between countries.

Living collections: A collection of plants cultivated and maintained in botanical gardens, arboreta, or other institutions for conservation, research, education, or display purposes.

Monitoring: The systematic observation and inspection of plants to enable the early detection of pests, diseases, or unusual symptoms.

National Plant Protection Organization (NPPO): The national authority responsible for implementing phytosanitary measures, pest surveillance, and coordinating responses to plant health risks.

National plant protection system: The set of institutions, regulations, and procedures established by a country to prevent, detect, and manage risks to plant health.

Non-regulated pest: A pest that is not included on official lists of regulated pests but may still cause damage and require management measures.

Pest: Any species, strain, or biotype of harmful organism affecting plants or plant products.

Pest notification: Formal communication to the relevant authorities regarding the detection of a pest or suspected organism that may pose a phytosanitary risk.

Regulated pest: A pest subject to official control by phytosanitary authorities due to its potential economic, environmental, or agricultural impact.

Sentinel plant: A plant grown outside its natural range that can act as an early warning system by revealing new associations with insects, pathogens, or other organisms.

Standard Operating Procedure (SOP): A document that clearly and systematically describes the steps to be followed to carry out an activity consistently and safely.

Survey (Phytosanitary): A systematic activity involving observation or inspection to detect the presence or absence of pests in a defined area.

Symptom: A visible manifestation of damage or alteration in a plant, such as spots, deformities, or wilting, caused by a pest, pathogen, or other factor.

Useful Links

The following resources provide technical, regulatory, and scientific information on plant health, pest detection, phytosanitary surveillance, and the management of harmful organisms. They can support the identification, reporting, and management of pests in living collections.

- **International Plant Protection Convention (IPPC):** Official portal of the International Plant Protection Convention. Provides information on international standards, pest surveillance, phytosanitary certification, and international cooperation to protect plant health.

<https://www.ippc.int/>

- **International Standards for Phytosanitary Measures (ISPMs):** A collection of international standards providing guidance on the prevention, detection, and control of pests, as well as pest risk analysis and phytosanitary certification.

<https://www.ippc.int/en/core-activities/standards-setting/ispm/>

- **Regional Plant Protection Organizations (RPPOs):** A network of regional organizations that coordinate pest surveillance and management among countries and support the implementation of international plant health standards.

<https://www.ippc.int/en/ippc-community/regional-plant-protection-organizations/>

- **National Plant Protection Organizations (NPPOs):** Each country has a National Plant Protection Organization responsible for pest surveillance and plant health management. Consult the website of the relevant national plant protection authority for information on legal requirements, regulated pest lists, and official reporting channels.

<https://www.ippc.int/countries/nppos/list-countries/>

- **CABI – Plantwise Knowledge Bank:** An international database of plant pests, diseases, and weeds. It provides pest technical factsheets, diagnostic resources, and information on geographic distribution.

<https://plantwiseplusknowledgebank.org>

- **International Plant Sentinel Network (IPSN):** An international network connecting botanical gardens, arboreta, and other plant health institutions to support the early detection of plant pests and diseases through the use of sentinel plants.

<https://www.bgci.org/our-work/networks/ipsn/>

