



GUIDE FOR DEVELOPING PEST RISK ANALYSIS (PRA) - BY VIA

Adapted by DSV

PEST RISK ANALYSIS

FOR THE IMPORT OF [PLANT PART]
FROM [COMMON NAME] (SCIENTIFIC
NAME) ORIGIN [COUNTRY OF ORIGIN]

[Country], [Month] of [Year]

[INTERESTED]

[ARP OBJECT IMAGE]

	Name	Cargo	Signature
elaboration			
Revision			
Technique			

Table 1. List of pests associated with _____(product)_____ present in _____(country of origin).

Prague (all species that attack the crop present in the country of origin)	Taxonomy	RB² association with the plant species	RB of Presence in the area of origin	Presence in the ARP area (YES/NO)¹ e RB	Regulation (PQA/PQP/ PNQR)³	Association with the entry route (YES/NO), justification and RB	Economic impact potential (YES/NO), justification and RB
MITES							
INSECTS							
NEMATODES							
FUNGI							
BACTERIA AND PHYTOPLASMS							
VIRUSES AND VIROIDS							
WEED PLANTS							
OTHER ORGANISMS							

¹ In the case of pests present (P) in the ARP area, it is not necessary to complete the information in the other columns for the respective pest.

² RB: Bibliographic references:

³ PQA: Quarantine Plague Absent; PQP: Present Quarantine Plague; PNQR: Regulated Non-Quarantine Plague

Do not leave blank cells in the table, for example, fill the cells with hyphens if there is no information in them.

GRADES

Prague: Include the current and valid scientific name. Research the validity of scientific names. If an organism cited in a work is a synonym, that is, the currently accepted name is another, the current name must be adopted and the synonym must be left in brackets. For example, a record of association with the fungus was found *Bipolaris australiensis* and, when checking the taxonomy, it appears that the current/accepted name is *Curvularia australiensis*, you must then register as follows:

Curvularia australiensis (Bugnic. ex M.B. Ellis) Manamgoda, L. Cai & K.D. Hyde [sin. *Bipolaris australiensis* (Bugnic. ex M.B. Ellis) Tsuda & Ueyama]

Only use a synonym when a record of association is found in the literature, and when checking the validity of the name, the current one is different. In other words, if the search for association with the host only finds a record with the name that is valid, it is not necessary to cite synonymy.

If association records are found for more than one synonymy, you must indicate how many records were found. For example, assuming that in addition to registering association with *B. australiensis* a record of association with *Drechslera australiensis*, the table will read:

Curvularia australiensis (Bugnic. ex M.B. Ellis) Manamgoda, L. Cai & K.D. Hyde [sin. *Bipolaris australiensis* (Bugnic. ex M.B. Ellis) Tsuda & Ueyama; sin. *Drechslera australiensis* Bugnic. ex Subram. & B.L. Jain]

Taxonomy: Include the Order and Family of the organism evaluated. In the case of viruses and viroids, include Family and Genus. You must register as follows (using *Curvularia australiensis* for example):

Pleosporales: Pleosporaceae

RB of the association with the plant species: Cite the reference where the association with the plant species/product in question was found.

RB of Presence in the area of origin: Cite the reference of where the record of occurrence of the pest was found in the country of origin of the evaluated product.

Presence in the ARP area (YES/NO) and RB: Inform whether or not you are present in Brazil. If so, cite the reference where the record of occurrence of the pest in Brazil was found.

Official regulation (PQA/PQP/PNQR): Research and inform whether the pest is officially considered quarantine absent, quarantine present or non-quarantine regulated by Brazil. If any record has been found in the literature indicating the presence of a certain pest in Brazil and it is later found that it is officially regulated, the analysis must follow the country's official position. However, at the same time, the record found of presence in Brazil must be maintained in the report.

Association with the route of entry (YES/NO), justification and RB: Inform whether the pest is associated with the route of entry, that is, whether there is a possibility of the pest being associated with the product to be imported under analysis. If so, it is necessary to explain the reason for the association, that is, the reason why the possibility of the pest being associated with the product to be imported is considered, citing the reference that supports such consideration. If not, it is again necessary to explain the reason why it is considered that there is no possibility of the pest being associated with the product to be imported, citing the reference that supports such consideration.

Example: for seed import

YES. The plague "Xxxxxx yyyyyyy" occurs in the seeds of the plant species considered (Author, year) and is therefore associated with the route of entry.

NO. No reports of association with seeds of the plant species considered were found. The plague "Xxxxx yyyyyyy" is associated only with leaves (Author, year). Therefore, it is considered that the pest is not associated with the route of entry.

Potential economic impact (YES/NO), justification and RB: Inform whether the pest has the potential to cause negative economic impacts on plants. If so, it is necessary to explain the reason, that is, the reason why it is considered the possibility of the pest causing some negative economic impact on the plants, citing the reference that supports such consideration. If not, it is again necessary to explain the reason why it is considered that there is no possibility of the pest causing any negative economic impact on the plants, citing the reference that supports such consideration. The assessment of the economic impact is not limited to the plant species being analyzed, that is, any crop that may be affected must be considered.

Yes. There are reports of plague damage."Xxxxx yyyyyyy" in soybean (Author, year), avocado (Author, year) and sorghum (Author, year) crops.

No. No information was found about damage to any crops. Silva et al. (year) reported that, although "Xxxxx yyyyyyy" was associated with soybean plants, there are no reports of damage.

Or

No. There is practically no data in the literature about "Xxxxx yyyyyyy". Therefore, considering that there is no information available about the potential damage caused by the Plague, it is considered that there is no basis to consider possible economic damage.

LIST OF PESTS ASSOCIATED WITH THE CROP THAT ARE NOT PRESENT IN THE COUNTRY OF ORIGIN

List all organisms that were researched, but no record of presence was found in the country of origin.

The bibliographic reference of the association with the host species being evaluated must be indicated alongside.

Example:

Xxxxxxx yyyyyy (Name, year)

Tttttt eeeeeee (Name year)

Ppppppp hhhhhh (Name, year)

PROCEDURE FOR GENDER-ONLY MEMBERSHIP RECORDS

In cases where the research found a record of association with the crop only with the pest genus, some research should be carried out, as indicated below, to assess whether there is any risk in relation to species of this genus.

- 1) Indicate the species already evaluated in the ARP;
- 2) Indicate whether or not there is any species that is PQA;
- 3) Perform searches on Google with the terms “evaluated gender” and “evaluated culture”, recording the search result;
- 4) Perform searches in “Google Advanced Search” with the terms “evaluated gender” and “evaluated culture” in the “Find pages with all these words” field and restricting the website or domain to that of the country of origin. The results of this research must be recorded;
- 5) If there is a species such as PQA, research must be carried out for each of them to see if there is an association with the culture being evaluated;
- 6) Make a general conclusion about the research carried out.

A. Completion of Stage I

Identification of pests that are associated with the road and that will, therefore, be evaluated in stage II of the pest risk assessment.

Table 2. List of pests that move to Stage II of the ARP.

Prague	Taxonomy
MITES	
INSECTS	
NEMATODES	
FUNGI	
BACTERIA AND PHYTOPLASMS	
VIRUSES AND VIROIDS	
WEED PLANTS	
OTHER ORGANISMS	

STAGE II. PEST RISK ASSESSMENT

All information to be included in this stage must be associated with the corresponding bibliographic reference, to consult the scientific justification during the risk assessment stage.

In the report to be prepared, replace the items considered in each evaluation with the justification (with bibliographical reference) of the assigned value. For example:

In the assessment (1) “Probability of survival of the pest in cultivation” of the probability of entry, the items must be removed

- Presence of the pest in a state of development associated with the product.
- Phytosanitary management in places where the pest is present.
- History of interceptions and entry into new areas.
- Official certification systems (for propagation materials)
- Official Control

And instead, describe the reasons why the probability is considered to be low, medium or high, indicating the supporting literature.

Each assessment must be justified.

ASSESSMENT

1) Probability of introduction and dispersal

a) Probability of introduction

Entry Probability

1. Probability of survival of the pest in cultivation

- Presence of the pest in a state of development associated with the product.
- Phytosanitary management in places where the pest is present.
- History of interceptions and entry into new areas.
- Official certification systems (for propagation materials)
- Official Control

If you do not have information to evaluate this point, the evaluation should be considered HIGH.

2. Probability of survival to management post-harvest/primary transformation

- Post-harvest/primary transformation processes

If you do not have information to evaluate this point, the evaluation should be considered HIGH.

3. Probability of pest survival under transport conditions

- Transport conditions (e.g. temperature, humidity)
- Transport time

Standard transport conditions are considered.

high

Average

Low

high

Average

Low

high

Average

Low

<p>4. Probability of not detecting the pest in the entrance inspection</p> <ul style="list-style-type: none"> • Internal/external damage. Location of the pest on the product. • Presence of symptom/sign • Morphological features 	<div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">high</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Average</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Low</div>
<p>5. Likelihood of transfer to an appropriate host</p> <ul style="list-style-type: none"> • Dispersal mechanisms of different evolutionary states, including vectors • Expected use <p>In the case of propagation materials, the probability of transfer is generally high.</p> <p>Variables to consider: time of year in which the import takes place, how the product will be distributed in the area, etc.</p>	<div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">high</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Average</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Low</div>
<p>6. Import frequency and volume.</p> <p>In the case of propagation material, it can be evaluated as HIGH, due to its multiplication capacity.</p>	<div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">high</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Average</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Low</div>

Table 1: Summary of entry probability for (pest name).

Probability of survival of the pest in the crop at origin	
Probability of survival to post-harvest management/primary transformation	
Probability of pest survival under transport conditions	
Probability of not detecting the pest in the entrance inspection	
Probability of transfer to appropriate host	
Import frequency and volume	
Value	
Risk	

Probability of Establishment

<p>1. Availability, quantity and distribution of possible hosts in the ARP area</p>	<div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">high</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Average</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Low</div>
<p>2. Presence of climatic conditions in the ARP area suitable for the development of the pest.</p> <ul style="list-style-type: none"> • Similarity of the ARP area to the climatic conditions where the pest is present. • Similarity of the climatic conditions of the ARP area with the bioecological characteristics of the pest. 	<div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">high</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Average</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Low</div>
<p>3. Pest adaptation potential</p>	<div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">high</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Average</div> <div style="border: 1px solid black; padding: 5px; width: 50px; margin: 0 auto;">Low</div>

- Distribution of the pest in areas with different climatic conditions.
- Range of climatic needs of the pest.
- Host range.

4. Reproductive strategy and survival method

- Playback type
- Number of generations per year/ Number of individuals per generation.
- Ability to disperse itself or assisted by vectors or other factors.
- Resistance structures

high

Average

Low

Table 2: Summary of probability of establishment for (pest name).

Availability, quantity and distribution of possible hosts in the ARP area	
Presence of climatic conditions in the ARP area suitable for the development of the pest	
Pest adaptation potential	
Reproductive strategy and survival method	
Value	
Risk	

Introduction Potential Conclusion:

Entry Probability	Probability of establishment	Probability of introduction

b) Probability of dispersal after establishment

high

Average

Low

1. Pest characteristics that affect dispersal (reproductive strategy, self-dispersal capacity, etc.)
2. Adequacy of the natural or managed environment to the natural spread of the pest;
3. Presence of natural barriers to prevent the spread of the pest;
4. Movement with entry routes or means of transport in the ARP area;
5. Presence of potential pest vectors in the ARP area;
6. Presence of potential natural enemies of the pest in the ARP area;
7. Intended use of the product.

c) Conclusion of the Introduction and Dispersion Potential:

Probability of introduction	Dispersion probability	Probability of introduction and dispersal

2) Potential economic consequences,

Consider the importance of all possibly affected crops as pest hosts in the ARP area.

Effects caused by the pest:

The. Direct

1. Known or potential host plants.
2. Type, amount and frequency of damage.
3. Losses in harvest, yield and quality.
4. Measures for control, effectiveness and cost.
5. Effects on existing production practices.
6. Environmental damage caused.

B. Indirect

1. Effects on domestic and export markets, including market access.
2. Changes in the cost of production.
3. Environmental effects of control measures.
4. Social effects.

w. Conclusion of potential economic consequences

high

Average

Low

3) Potential pest risk

Potential pest risk is the combination of the probabilities of pest introduction and dispersal and the economic consequences of introduction.

Completion of Stage II

Probability of introduction and dispersal	Consequences of the economic impact	Potential pest risk

With the elements above, you will arrive at a pest risk level that can be: HIGH, MEDIUM, LOW.

It is considered that, from the MEDIUM level, it should be determined as a quarantine pest. In the event that, as a result of the ARP, it is determined that a pest is quarantined, it must be incorporated into the list of national quarantine pests.

GENERAL CONCLUSION OF STEPS I AND II

A table must be created that considers the final result for each pest evaluated,

providing a final report for each one.

Table 3. Final result – Completion of Stages I and II.

[illegible]

¹ A brief summary must be made justifying the possible regulation of the pest.

STAGE III: PEST RISK MANAGEMENT

This stage of the ARP will be carried out by the responsible area of DSV.

ASPECTS COMMON TO ALL ARP STAGES

Uncertainty

Uncertainty can be defined as the lack of safe and clear knowledge about a relevant topic or aspect in the ARP. Uncertainties must be identified especially as they increase the level of risk.

Some uncertainties may arise from:

- **The natural variability of data on pest populations.**
- **The need to deduce or formulate hypotheses, typical of the ARP study, based on scientific studies conducted with objectives different from those required for an ARP.**
- **Contradictory scientific information.**
- **Organisms involved of uncertain nature.**

In the context of transparency, it must also be explained how and in what aspects expert judgment was considered.

Documentation

For each specific analysis, the entire process, from inception to pest risk management, must be sufficiently documented so that the sources of information and the justification for management decisions can be clearly demonstrated.

All information mentioned in the document must have its bibliographic references, mentioning the author(s) and the year, title, edition, publisher, country and number of pages of the publication. In the case of periodicals or magazines, also indicate the number of pages from which the publication was obtained. At the end, the list of complete bibliographic references will be detailed (in the case of internet sites, inform the date of consultation, download link and preferably keep the file in PDF).

Important: to facilitate the evaluation of the report, it is recommended that files of consulted references be kept available for consultation by the DSV team. It is suggested to create a PDF file containing all the bibliography consulted.

Bibliography

ANNEX I: INFORMATION

1 CULTIVATION INFORMATION

This information is provided by the NPPO in the country of origin, another source of consultation and/or standard procedures.

Propagation material production system:(protected cultivation,*in vitro*, controlled conditions, etc.)

Post-harvest/primary transformation process:specify the post-harvest/primary transformation procedures (selection, application of products, treatments, etc.)

Storage and transportation:description of the type of storage, substrates, transport conditions (cold, controlled atmosphere, weather, etc.)

2 PLAGUE INFORMATION

1) Identification of the pest

1.1. Prague: (scientific name of the pest).

Synonyms: Other scientific names that are not the current name.

Common names:

- Portuguese
- Spanish
- English

1.2. Taxonomic Position:At least Order and Family. Include taxonomic subdivisions (subspecies, pathotypes, special forms)

2) Hosts: List plague hosts (genus and species).

List hosts in the ARP area, their distribution and importance.

3) Geographic Distribution of Prague:

List all countries, in alphabetical order, where there is records of confirmed occurrence of the plague, grouped by continent.

4) Plague biology:

4.1. Biological cycle of the pest. Describe when appropriate:

- a) development rate (typical duration, or degree days, for successive stages of the life cycle; reproduction rate);
- b) number of generations per year;
- d) type of reproduction and multiplication;
- e) typical duration of the life cycle in the growing season and relationship with the host plant cycle;
- f) possible number of infection cycles per crop growing season;
- g) if there is mandatory alternation between hosts (for fungi);
- h) morphological characteristics of the plague (sizes of the different stages; etc.)
- i) eating habits (external; internal)
- j) anamorphic states (for fungi) and occurrence of teleomorph (regular, irregular, rare, unknown).

- 4.2. Pest reproductive strategies:
- 4.3. Dispersion type:
 - a) natural means;
 - b) speed and range of dispersion;
 - c) agricultural or forestry practices that affect the rate of dispersal;
 - d) vectors.
- 4.4. Survival mechanisms in adverse conditions. Describe when appropriate:
 - a) capacity for winter or summer diapause and climate information relevant to the occurrence;
 - b) physiological adaptations for survival at low temperatures, desiccation, etc.;
 - c) formation of special states/structures for long-term survival (e.g. sclerotia);
 - d) possibilities of survival in soil, in hosts, in seeds, on contaminated surfaces, machinery, etc. (including longevity and survival time of dormant stages).
- 4.5. Edapho-climatic conditions:
 - a) ideal for the development of the pest (maximum, minimum, average temperature; relative air humidity; photoperiod; rainfall; soil humidity)
 - b) in the ARP area
- 4.6. Adaptability: Plasticity
 - a) records of changes in the behavior of the pest (extension of the geographic area, extension of the host range, expansion to hosts grown in greenhouses);
 - b) records of special forms or races of the pest (adapted to different geographic areas, different hosts, with different potential for economic damage);
 - c) congeneric species of the pest.
- 4.7. Symptoms, and damages:

5) Economic impact of the pest in the areas where it is present: Evidence will be gathered that the pest is likely to have an unacceptable economic impact on the ARP area.

6) Control methods: description of existing and used control methods (chemical, cultural, biological, etc.)

7) Association for input(s):

- 7.1. Part of the plant affected by the pest.
- 7.2. Entry forms.

8) Detection: Include all details of the plant parts or structure where it is recommended to carry out the inspection (consider the morphological characteristics of the pest described previously).

9) Regulatory situation in the world: Indicate which country(ies) regulate the pest. (PCA, PCP or PNCR)

10) History of interceptions:

ANNEX II: Values and Classifications to evaluate probabilities

Values and classifications to be used

Table 1

Weighting	Value	Breaks
HIGH	7	4,90-7,00
AVERAGE	2,8	1,90-4,89
LOW	1	1,00-1,89

Steps to follow:

- 1) Consider each risk ("Weighting" column)
- 2) Add the weighted values in point 1 for each assessment (column "Value")
- 3) Divide the sum obtained by the number of values
- 4) Compare the value obtained with that of Intervals (column "Intervals")

Method of obtaining the values and ranges used

Table 2

Weighting		HIGH	AVERAGE	LOW
	Value	3	2	1
HIGH	3	9	6	3
AVERAGE	2	6	4	2
LOW	1	3	2	1

Table 3

	Sum of weights with equal condition	Average*	Midpoint	Lower range value	Interval
HIGH	21	7,00	2,1	4,90	4,90-7,00
HALF	14	2,80	0,9	1,90	1,90-4,89
LOW	1	1,00		1,00	1,00-1,89

- 1) Multiplication of probabilities to compose Table 2.
- 2) Sum the values of cells with the same condition (sum of cells with the same color) to obtain the values in column 1 of Table 3.
- 3) These values are divided by the number of cells of this color and an average is obtained (column 2 of Table 3).
This way, all evaluations (colors) contribute to the final value.
- 4) Obtaining the intervals. By calculating the midpoint between the average values (e.g. $[(21.67-14)/2]+14$), the limits of each range are obtained. (column 5 of Table 3).