Improving biosecurity in the British Overseas Territories through Pest Risk Assessments.

PRA guidance for Anguilla, Cayman Islands, Montserrat and Turks & Caicos Islands

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Note: This document is based on the 'Guidelines for pest risk analysis PRA for St Helena' supplemented with specific guidelines to conduct rapid PRAs using four new PRA templates developed during DPLUS074: Improving biosecurity in the SAUKOTs through Pest Risk Assessments. We are thankful for the insights and feedback from the participants of the workshop Improving biosecurity in the Caribbean British Overseas Territories through Pest Risk Assessments, January 20-24th.

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Part A: General guidelines for planned introductions of biological material, horticultural products and other commodities

1. Background

British Overseas Territories, in particular islands, have relatively few pests, weeds and diseases compared to continental areas such as Africa or Europe. In order to protect the British Overseas Territories from the threat of new introductions, the goods or commodities which are most likely to harbour pests are assessed to determine what the risk is, and how it can be minimised. Biosecurity recognises that a zero-risk approach is not practical, and the aim is to reduce the risk to an acceptable level. This process is called pest risk analysis. Procedures are based on International Phytosanitary Standard Measures No 11 (2004) "Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms."

There are three categories, depending on how frequently the commodity is imported, and so the confidence with which specific levels of risk for each commodity can be evaluated:

- Category 1: frequently imported commodities which are well known (low concern)
- Category 2: regularly imported commodities which are moderately well known and for which import conditions have been defined for specific pathways (medium concern)
- Category 3: new commodities or pathways which are unknown, risk management measures have not been established (high concern)

2. Category 1. Frequently imported commodities

These are commodities that are imported on a routine basis, and both commodity and pathway are therefore well known. An example would be fresh produce from Florida, USA to the Caribbean OTs. In most cases, Import Health Standards have been agreed for commodities in this group. Import licences are required for fresh produce and the licence lists the pre-border conditions for each produce type. Within this group, commodities are classified as high, medium or low risk. Sampling and inspection protocols have been developed for the different risk levels, as appropriate, for border controls.

Import conditions for commodities in this group need to be revised if the risk profile changes (for details see Section 5).

3. Category 2. Regularly imported commodities

The group includes less frequently but still regularly imported commodities, such as plant material for propagation or ornamental plants, for which an Import Health Standard has been approved for a specific pathway. A number of species are regularly imported, and specific import health conditions have been defined that list the pre-border treatments required.

Any fruit, vegetable or other commodity or pathway not imported before and not covered by a previous assessment, has to be considered to be of high concern and included in Category 3.

Import conditions for commodities in Category 2 need to be revised if the risk profile changes (for details see Section 5).

4. Category 3. New commodities and pathways

This group includes anything not covered in the first two groups outlined above. All new pathways and commodities lacking approved import health standards or defined import health conditions are of high concern and subject to a pest risk analysis (PRA).

Reason for performing a PRA:

- New plant or animal species imported for breeding, research or biocontrol
- New animal species imported as pet
- New plant species imported as ornamental, forestry or crop
- New pathway
- New commodity not previously imported
- Phytosanitary regulations being revised

5. Revising existing import conditions

Import conditions for commodities in Categories 1 and 2 should be revised if the risk profile changes, and periodically on a routine basis:

- If new pests or diseases are reported from the country of origin;
- A new pathway is opened;
- Periodically (at least every five years or sooner if required), to check whether any conditions have changed and revisions are required:
    - Have new pests been reported from the country of origin?
    - Has the country of origin been declared free of any quarantine pests?
    - Has the territory changed their list of quarantine pests?

Revision of existing import conditions includes the following actions, as appropriate:

- ✓ Check if the newly reported pest or disease is known to be a serious problem for crops grown and/or native and endemic plants on Anguilla, Cayman Islands, Montserrat or Turks & Caicos Islands.
- ✓ Check if the new pathway could introduce known new pests or diseases to the island – for example: what pests and diseases occur in the new country of origin which are different to those in the previous one?
- ✓ Check if any new pest or disease incursions have been reported within the last 12 months in the country of origin. Have any pests or diseases been declared eradicated?
- ✓ Check if the exporting country has made any changes to its biosecurity procedures, legislation or national certification schemes.
- ✓ Check if border inspections or monitoring suggest higher risk (e.g. higher interceptions).
- ✓ Check if the commodity has any major global pest alert.

Part B: Pest Risk Analysis (PRA)

PRA is a two-step process, risk assessment followed by risk management. Depending on the purpose and/or target species of the PRA, one of the four templates (provided in the colour-coded sections of this document) should be used to generate a PRA.

PRA template 1: planned introduction of biological material and commodities *pp. 13-21*

(Use this template for commodities in category 3, new commodities or pathways for which there is no previous knowledge and risk management measures have not been established)

PRA template 2: planned introduction of biological control agents *pp. 24-34*

PRA template 3: accidental introduction of potentially invasive species *pp. 37-44*

(Use this template in the event of intercepting a species new to the Territory, or to assess the risk of species identified through a Pest Alert or horizon scanning exercise)

PRA template 4: species already present in the territory *pp. 47-55*

Requests to import new commodities are often received by Biosecurity teams. It is recommended that a PRA is initiated only when appropriately authorised by the relevant authority, based on the proposed commodity having one of the following:

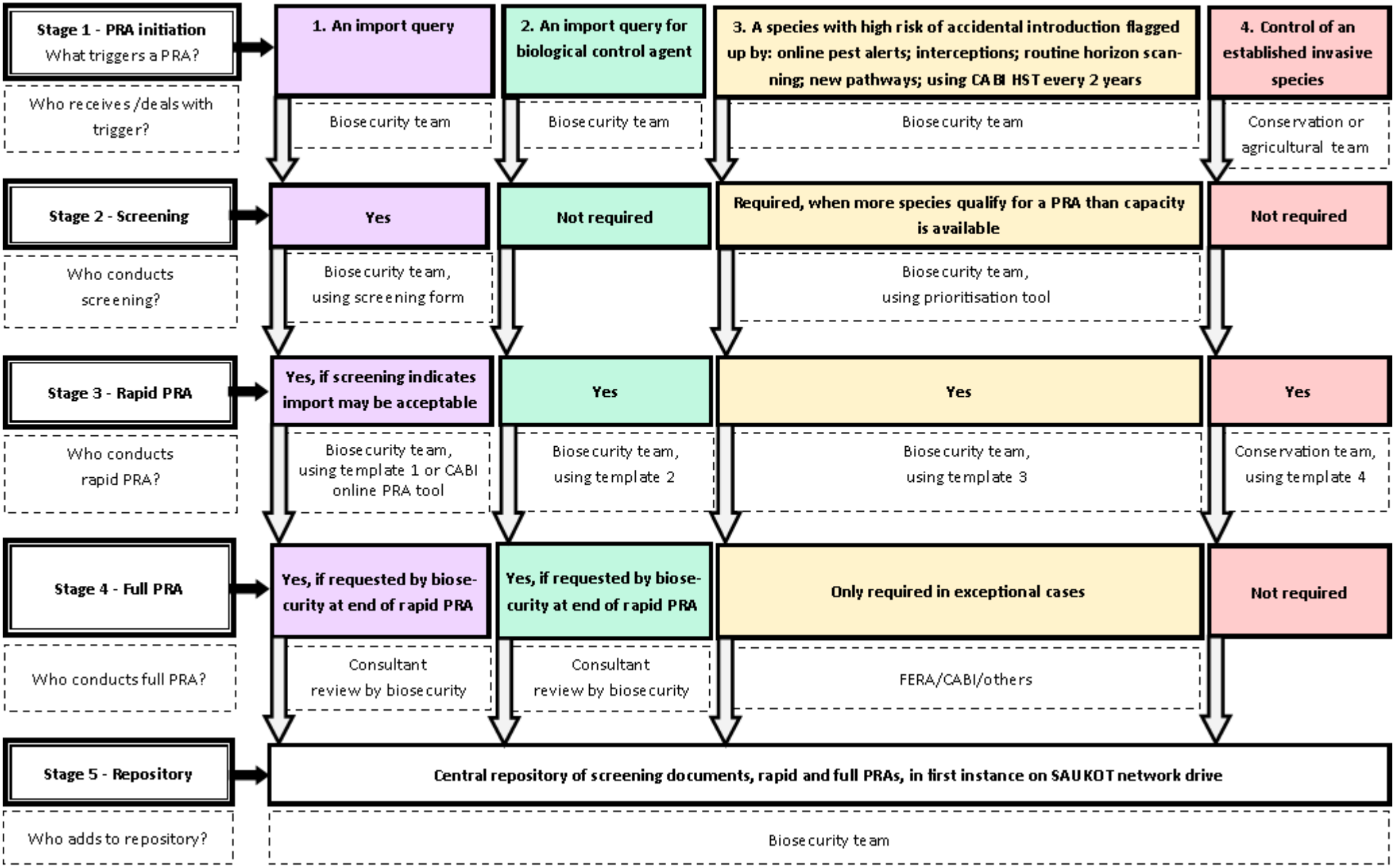
- economic benefits for the territory
- environmental benefits for the territory
- high amenity value
- high aesthetic value

There are additional factors, such as pest alerts, horizon scanning exercises, the need to assess the safety of biological control agents, or the need to prioritise individual invasive species for urgent control measures, which can trigger the conduct of a PRA. The workflow diagram below (page 6) provides an overview over the stages and responsibilities for each type of PRA. Each stage is explained in more detail in the specific procedure notes provided for the individual PRA templates.

The OT Biosecurity project carried out a horizon scanning exercise for all the OTs in 2018 and 2019, to identify priority species likely to arrive in the next 5 to 10 years. The resulting species lists can be found at http://www.nonnativespecies.org/index.cfm?pageid=634. Additional horizon scanning, as a way to regularly update species lists or to explore specific pathways, can be done using the CABI online tool (www.cabi.org/horizonscanningtool). The most cost-effective way to reduce the risk of the introduction of high priority species is to focus biosecurity measures on the pathways of arrival, and these measures can be applied at any point along the biosecurity continuum: pre-border, at the border, and post-border. Pathway action planning recommends implementing actions pre-border wherever possible, as they prevent new invasive species from getting near the border. They include assessment of the biosecurity risk of a range of commodities. Therefore, any newly conducted PRA

should be crosschecked, to see whether this should result in an update of the existing pathway action plan. Vice versa, any pathway action plan in place should be used as background information to help with the conduct of a new PRA, particularly with regards to any biosecurity procedures already in place.

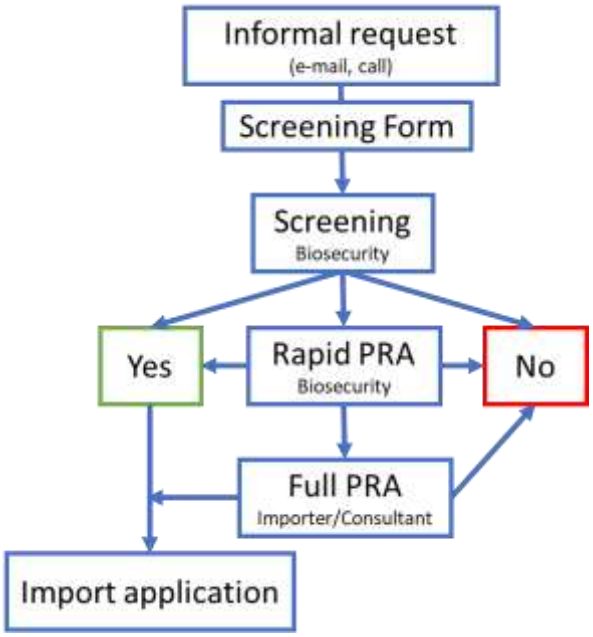
Flow chart PRA process



PRA type 1: Planned introduction of plants, animal, commodities or other biological material

The aim of carrying out a PRA under this heading is to answer the question "Is it safe for this commodity to be imported into the territory?" By "safe" we mean having an acceptably low risk of introducing new pests, weeds or diseases, or of becoming a pest or weed in its own right. The commodity may be assessed as "safe", or the ways in which it can be made "safe" are identified (by, for example, pre-border inspections or treatments). The end result is a decision on whether it can be imported or not, and if so, what the import conditions are. Here we introduced a screening step, to quickly identify the definite "yes, it is safe" and "no, it is not safe" species. A rapid PRA then only needs to be carried out for the "not sure" species, to save time and effort.

The diagram below summarises the different stages of a PRA of this type.



Stage 1 Initiation

Step 1: Which circumstances/activities can trigger a PRA?

- Whenever an application or request is made to the Biosecurity team; particularly concerning 'Category 3 of the guidelines for PRA)

Step 2: Biosecurity team to request basic background from importer

- Ask importer to fill out pre-application form, shown on next page

Import request (pre-application) form for the planned introduction of biological material and commodities, and biological control agents

All sections should be completed. If not applicable indicate why

1.1 Species name (common and scientific name)

1.2 Which parts/forms of the species (seeds, bare rooted plants, etc.)

1.3 Country of origin / source of imported goods

1.4 Quantities to be imported

1.5 Existing quarantine procedures at origin

1.6 Proposed shipping route

1.7 Importer details

Company/Institution/Department:

Name and Job Title:

Address:

Phone (office and/or mobile): Email:

Signature: Date:

Stage 2 Screening

Use the simple decision-making form (screening form) given on the next page to decide whether an application for import should be accepted or rejected without the need for a PRA, or whether a PRA is required.

If the screening results in an approval for the application (step 2 or 7), inform the importer to go ahead and submit a full application.

If the outcome is negative (steps 2, 3 or 8), inform the importer that the pre-application has been rejected. Alternatively, start the process of conducting a rapid PRA.

Applications for commodities that fall into Categories 1 and 2 of the PRA guidelines are not likely to require a specific PRA unless:

- There is a change in the risk profile.
- A new pathway has opened.
- New pests have been reported in the country of origin that are associated with the commodity.
- A revision of the plant health standard for the target commodity is due.

Applications for new commodities and pathways (Category 3) will most likely require a PRA, or will already have been rejected at the screening stage.

The assessor should double check the results from the screening, and discuss the outcome within the Biosecurity team.

If a rapid PRA is required, the next step is to start filling out PRA template 1.

Screening for introduction of biological material to the territory

Species name: _____

If a plant, which is the part being imported? _____

If an animal, what stage or part is being imported (dead, development stage, etc.)? _____

• Is the taxonomy well known (do we excatly know what species we are dealing with)? •	If YES, go to step 2 If NO, reject application	1
• Is the import of the species permitted by current regulation (e.g. llisted on a white list)? • Is the import of the species prohibited by current regulation (e.g. llisted on a black list)? • Is the import of the species neither permitted nor prohibited by current regulation?	If YES, accept application If YES, reject application If YES, go to step 3	2
• Has it been rejected previously for import and circumstances have not changed? •	If YES, reject application If NO, go to step 4	3
• Has it been considered invasive or harmful elsewhere? •	If YES, request a stage 3 rapid PRA If NO, go to step 5	4
• Will it arrive from in an area with similar climatic conditions to the territory? •	If YES or unsure, request a stage 3 rapid PRA If NO, go to step 6	5
• Might the species carry any pests or pathogens not known in the territory? •	If YES, request a stage 3 rapid PRA If NO, go to step 7	6
• Will it be completely safe to the biodiversity, economy, animal and human health of the territory? •	If YES, accept application If NO, or not sure, go to step 8	7
• Is there any mitigation action that could feasibly be applied to reduce the risk? •	If YES, request stage 3 rapid PRA If NO, reject application	8

Source of information: _____

Decision: reject / PRA / accept

Justification: *open text*

Stage 3 Conducting a rapid PRA

Biosecurity teams take on the responsibility of conducting rapid PRAs for planned introductions using PRA template 1 or the CABI online PRA tool (https://www.cabi.org/PRA-Tool/login). The template should be filled out and the PRA completed to the best of the available knowledge and availability of knowledge resources. Please note that text from the CABI compendia (e.g. Invasive Species Compendium) does not need to be altered, so long as the source is acknowledged. It is recommended that drafts of the PRA are shared with colleagues from other UKOT Biosecurity teams to maximise knowledge input.

Once the rapid PRA is finalised and if the outcome is positive, the importer is requested to send in a formal application.

Only the Biosecurity team will be qualified to crosscheck the contents of the application with the finalised PRA. They will need to check whether the application is in line with the existing import health standards of the territory, and confirm whether existing biosecurity procedures are sufficient to prevent any negative impacts associated with the import of the target species. Again, as with the initial screening, the Biosecurity team has to decide whether to reject or accept the import application based on the information provided in the PRA. At this stage, the involvement of other stakeholders, such as an environmental committee, should be considered. In cases where a decision cannot be easily reached, it is recommended that the team outsource the PRA and upscale to a fully comprehensive PRA. This more comprehensive full PRA would be the responsibility of the importer.

Stage 4 Upscaling to full PRA

If necessary, upscaling to a fully comprehensive PRA can be outsourced to a qualified consultant or institution dealing with PRAs such as Fera Science Ltd. or CABI. When possible, importers should be provided with a list of qualified consultants/institutions. The finalised full PRA needs to be handed back to the Biosecurity team for a final review. The Biosecurity team then has to decide whether to reject or accept the import application, based on the information provided in the full PRA. The Biosecurity team may consider having the final version of the PRA reviewed by a committee. In cases where the outcome is positive, the importer is requested to send in a formal application with a completed import application (use existing form). If the outcome of a full PRA is negative, the application for import is rejected. However, if the outcome of a rapid PRA is negative, but there are reasons that a full PRA might reverse this decision these reasons should be given in a note-box provided at the end of the PRA template.

Stage 5 Repository

You are encouraged to share screening results, as well as rapid and full PRAs with stakeholders within your own territory, amongst other territories, as well as with the wider scientific community, to facilitate future PRAs concerning the same or closely related species or pathways. All documents should be centrally deposited, initially within the newly established Caribbean UKOT biosecurity network (see Part D). Finalised versions of online PRAs conducted through the CABI PRA tool should

be deposited and made available to the public on the tool website (https://www.cabi.org/PRA-Tool/login).

Next steps

Even when a PRA allows the acceptance of an import application, further steps may be required. For example, acceptance may have been based on the condition that new or modified biosecurity measures are put in place before imports begin, to minimise any negative impacts. An action plan to put these measures in place would need to be developed prior to import. Once implemented, a licence for import could then be issued.

PRA template 1 (planned introduction of biological material and commodities)

Pest Risk Analysis (PRA) for

Name of organism: *Scientific name* (English name)

Territory: e.g. Anguilla **Assessment Number: 001/year**

Date: dd/mm/yyyy **Version: 1**

PRA type: planned introduction

All sections should be completed. If not applicable, indicate it

Part 1: Initiation

1.1 Purpose of planned introduction

☐	Ornamental plant
☐	Pet
☐	Crop; garden crop
☐	Fodder plant
☐	Livestock
☐	Living food for livestock or pets
☐	Commodity (fruit; vegetables, compost, etc.; please specify
☐	Species suitable for fishing (introduction fish/crayfish/fishing baits etc.)
☐	Species for aquaculture
☐	Compost
☐	Bulk commodity
☐	Others (please explain)

1.2 Summary of assessment results (max. 500 words)

Give a brief summary of the risks of introduction, establishment, spread, impact and overall risk. Fill this part in at the end of the PRA process, only after you have completed the rest of the PRA template below.

1.3 Source of material

Indicate the country where your material originates from and the importing route towards the territory (e.g. transit)

1.4 Importer details

Company/Institution/Department:
Name and Job Title:
Address:
Phone (office and/or mobile): Email:

1.5 Assessor details

Company/Institution/Department:
Name and Job Title:
Address:
Phone (office and/or mobile): Email:

Part 2: Background

2.1 Aim of assessment

This section is intended to put the new organism(s) in perspective of the wider activities having led to conducting this PRA (e.g. planned usage for the new species; all technical/scientific words must be explained)

2.2 Identity

Identify the organism as fully as possible

Scientific name (incl. taxonomic authority, date):

What is it? (max. 2 sentence description):

English name(s):

Family:

Synonyms:

Other taxonomic remarks:

2.3 Images of the species if available

If available, please provide pictures of different stages and habitats

Figure 1:

Figure 2:

2.4 Existence of PRAs for this species

Please indicate if PRAs for this species already exist and which target areas and climatic conditions these cover (for suggestions of websites to check see guidance notes)

2.5 Has the species been introduced into the territory before?

2.6 Biology/Ecology

Please provide background information relevant to your application covering the bullet points in the box below whenever applicable; see also guidance notes

- **Growth form and size:**
- **Habitat:**
- **Lifecycle (e.g. reproduction and dispersal):**
- **Hosts/prey:**
- **Host specificity:**
- **Associated pathogens, pests or parasites:**
- **Other:**

2.7 What is the current distribution of the species?

Consider: native range, history of introduction and invasion outside native range

Part 3: Risk of unintended establishment and spread

3.1 Probability of establishment

3.1.1 Does the territory provide suitable climatic and habitat conditions for the species to **survive** and **reproduce** under natural conditions, unassisted or without human interference (e.g. without cultivation)? **Consider:** climate similarity between the species global range and the PRA area, availability of the habitat conditions required by the species based on its behaviour elsewhere; identify/name specifically the climate/habitat it might survive? Which land-cover? Justify why and provide landmarks as examples); for definition of human interference see guidance notes 3.2.1

- **Survival:**
- **Reproduction (self-sustaining population):**

3.1.2 How likely can the species survive and reproduce indoors or in similar habitats (e.g. polytunnels, gardens, urban area)? **Consider:** availability of the habitat conditions required by the species based on its behaviour elsewhere; identify/name specifically the conditions it might survive.

- **Survival:**
- **Reproduction (self-sustaining population):**

Summary probability of establishment

Probability of establishment in the wild	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

3.2 Probability of spread

3.2.1 What is the potential spread in the territory? **Consider:** rate and distance of spread elsewhere; natural barriers in PRA area, the occurrence of a dispersal vector or commodity; see also guidance notes 3.3.1

- **Self-dispersal:**
- **Direct transport by humans:**
- **Transport via vehicles (e.g. boat, cars, including tyres):**
- **Wind drift or via driftwood:**
- **Water:**
- **Transport via animals (e.g. berries digested by birds, seeds stuck to wool, etc.):**
- **Transport with vectors:**
- **Other:**

3.2.2 Can the species spread to parts of the territory where an introduction is not planned or desired? (Use the same categories as in 3.2.1)

- **Self-dispersal:**
- **Direct transport by humans:**
- **Transport via vehicles (e.g. boat, cars, including tyres):**
- **Wind drift or via driftwood:**
- **Water:**
- **Transport via animals (e.g. berries digested by birds, seeds stuck to wool, etc.):**
- **Transport with vectors:**
- **Other:**
- **How rapidly would the organism spread by natural means?:**

Summary probability of spread

How quickly can the species spread (excluding deliberately assisted by humans)?	Less than 10 m/year. Can't occupy suitable habitats within next 100 years Very slowly ☐	Between 10 and 100 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Slowly ☐	Between 100 and 500 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Moderate pace ☐	> 500 m per year. Can occupy suitable habits throughout the territory within 5 to 20 years Quickly ☐	Can occupy suitable habits throughout the territory within 5 years Very quickly ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 4: Economic and environmental risks of target species/product

It is important to look at the potential magnitude of the consequences, and to look at distribution effects (i.e. who bears the risks). **Consider only the adverse or negative effects** in this section of the application. Consider potential maximum impact. Positive effects are considered in part 6 (benefits).

Please **complete this section with referenced supporting material**. Please cite the material in the text and provide a description of where the information in the application has been sourced in the list of references (e.g. from in-house research, independent research, technical literature, community or other consultation, and provide that information with this application). If the information available is scarce, include information about related species (e.g. same genus or family), clearly indicating that it does not correspond to the organism being assessed.

Consider the accidental introduction of multiple unknown species potentially associated with the target import (e.g. in compost or associated with ornamental plants) in part 5.

4.1 Risks recorded from outside the territory, which are applicable to the territory

4.1.1 Is the species listed in the following Plant Protection organizations and Invasive lists and if so, what is its status?

America
COSAVE: yes/no
NAPPO: yes/no
OIRSA: yes/no
Europe
EPPO: yes/no
EC Plant Health Directive (Council Directive 2000/29/EC): yes/no
Africa
ARC: yes/no
Others:
CABI CPC
CABI ISC
GISD
Other organizations relevant for the territory (e.g. regional, national…)

4.1.2 Is there any negative impact of the species on the economy, environment or public health recorded from any parts of its current distribution? Please provide a summary of the available information.

4.2 Economic and socioeconomic effects

4.2.1 Could the species have any negative effect on economic activities in the territory? Please include any information about specific assessments from areas outside the PRA area, including experiences with closely related species with relevance for the area of interest. **Consider:** reduction in crop yield or quality; reduction in prices or demand, including export markets; increase in production costs (including costs of control); vectoring of other pests of economic importance; extent of phytosanitary regulations imposed by importing countries).

- **Agriculture:**
- **Livestock:**
- **Fisheries:**
- **Aquaculture:**
- **Forestry:**
- **Tourism:**
- **Recreational potential:**
- **Infrastructure:**
- **Employment rates:**
- **Other:**

4.2.2 Are there any risks of impacts on cultural valuable species, habitats, landscapes, practices or other values? Please include any information about specific assessments from areas outside the PRA area including experiences with closely related species with relevance for the area of interest

- **Competition with or impact on cultural valuable species:**
- **Impact on historically valuable practices:**
- **Change of landscape:**
- **Value of landscape for recreation:**
- **Other:**

Summary economic and socioeconomic impacts

Make sure the summary score is well linked with the information reported above so the scoring is fully justified (for more information risk levels see guidance notes)

Risk of socioeconomic impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.3 Impact on public health

4.3.1 Could there be any impact on public health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for human diseases?

Summary public health impact

Risk of impact on public health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.4 Impact on animal health

Could there be any impact on animal health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for animals?

Summary animal health impact

Risk of impact on animal health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.5. Environmental and ecosystem effects

4.5.1 Are there any threats to native or endemic species? Indicate direct effects on native species; note any aspects related to pollination of native species should be covered in the following question. **Consider**: threat to endangered species; impact on keystone species; changed community structure; hybridization with native species.

4.5.2 What is the level of potential negative impact on ecosystem services in the PRA area? **Consider**: provisioning services (freshwater, wood and fibre, fuel); regulating services (soil formation, natural hazards, water and air quality); cultural services (aesthetic, educational, recreational, spiritual); supporting services (nutrient cycling, habitat stability; pollination). See also guidance notes 4.5.2

Summary environmental impact

Risk of environmental impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 5: Pest risk management (risks to accidentally introduce species associated with the target import and their prevention and control)

5.1 Contingency plan

5.1.1 What mitigation measures can be put in place in case the imported species becomes invasive and start to impact negatively on the economy and/or environment?

5.2 Associated species (risk management concerning species associated with the target import)

5.2.1 What species are reported to be associated with the target import?

5.2.2 Which measures **already** in place are suitable to minimise the risk of introduction and establishment? **Consider**: inspection of commodities; trapping, disrupting specific pathways, etc. (please check with existing biosecurity measures).

- **Pre-border:**
- **At the border:**
- **Post-border:**
- **Other:** (provide additional information)

5.2.3 Which measures **not yet** in place are suitable to minimise the risk of introduction and establishment? **Consider**: inspection of commodities; trapping, disrupting specific pathways, etc.

- **Pre-border:**
- **At the border:**
- **Post-border:**
- **Other:** (provide additional information)

5.2.4 Are there any species listed or described in 5.2.1 which are not covered by existing prevention measures, the pathway action plan or feasible new measures as listed in 5.2.3? See also guidance notes

Summary efficacy of current prevention measures from 5.2.2

Probability of prevention measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary efficacy of proposed prevention measures from 5.2.3

Probability of suitable future prevention measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 6: Costs and benefits

Provide information of the benefits (positive effects) and costs of the planned introduction. It is important to look at distribution effects (who/what bears the risk), likelihood of occurrence (probability) and the potential magnitude. Please complete this section with referenced supporting material. Please provide a description of where the information in the application has been sourced from (e.g. from in-house research, independent research, technical literature, community or other consultation, and provide that information with this application). This section should cover the costs and benefits anticipated by the introduction of the organism(s) but not any costs associated with direct or indirect risks (negative effects), which have been assessed in Part 4.

6.1.1 What are the benefits of introducing the species/commodity? **Consider:** Income generated from introduced organism(s); yield loss prevented; etc.; consider not only economic benefits but also benefits for the environment and society

Summary benefits

Commercial trade benefits	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for agriculture and livestock	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for public health	Very small ☒	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for ecosystem services	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for the protection of native/endemic species	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for pollination, bee keeping	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Other	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

6.1.2 What are the costs for introducing the species/commodity? **Consider:** costs for release and/or monitoring programme, etc.

6.2 Cost-benefit analysis

This part is only optional; a detailed cost-benefit analysis is beyond the scope of this PRA but any information available, which can be included in the table below may help to address potential conflicts of interest and facilitate the final decision on the overall outcome.

This table should summarize the costs and benefits anticipated during and after the introduction of the organism(s) but not any costs associated with direct or indirect risks (negative effects). For each cost or benefit add a new row estimating approximately its monetary value within an uncertainty range (error) and where and when it will occur. Please bear in mind that often some of the benefits as well as negative impacts cannot be translated into monetary values, but can be of equal importance for decision making.

	Name of benefit/cost	Best estimate	Uncertainty range	Spatial distribution	Temporal distribution
Direct monetary benefits					
Direct monetary costs					
Indirect costs					

Other information

Add here any further information you wish to include in this application including if there are any ethical considerations that you are aware of in relation to your application

Is the import of the target species/commodity approved?

(for further explanation see note-box below)

No ☐ (final rejection) No ☐ (result may change after a more detailed PRA) Yes ☐

Reasons why a full PRA can lead to a reconsideration of the outcome given above

Please consider additional information, which a more detailed PRA may be able to provide

References and information sources consulted

Occurrences from Gbif.org
www.Palmpedia.net
Florida University

Appendices and referenced material (if any) and glossary (if required)

If this is an application being made for the deliberate introduction of a species/commodity, it is recommended that you contact a member of the Biosecurity team as early in the application process as possible. Biosecurity can assist you with any questions you have during the preparation of your application including providing advice on any consultation requirements.

Unless otherwise indicated, all sections of this form must be completed for the application to be formally received and assessed. If a section is not relevant to your application, please provide a comprehensive explanation of why this does not apply.

Commercially sensitive information must be included in an appendix to this form and be identified as confidential. If you consider any information to be commercially sensitive, please indicate this in the relevant section of this form and cross reference to where that information is located in the confidential appendix.

Any information you supply to Biosecurity prior to formal submission of your application will not be publicly released. Following formal submission of your application, any information in the body of this application form and any non-confidential appendices will become publicly available.

PRA type 2: Planned introduction of a biological control agent

The aim of carrying out a PRA under this heading is to answer the question "Is it safe for this control agent to be imported into the territory?" By "safe" we mean having an acceptably low risk of becoming a pest or weed in its own right or exerting any negative non-target impacts. The end result is a decision on whether it can be imported or not, and if so, what the import conditions are.

Stage 1 Initiation

Step 1: Which circumstances/activities can trigger a PRA?

- Whenever an import of a new biological control agent is considered

Note
Generally, imports of biocontrol agents should be separated into two categories: (1) the import of commercial control agents from private importers for inundative pest control (mostly in polytunnels and greenhouses); and (2) applications for classical biological control (CBC) agents. The latter will almost always be pre-assessed by importers (government, research organisations, conservation bodies). In all cases, a preapplication form (as provided for PRA type 1, see above) should be filled out, for statistical and recording purposes. However, a screening stage is generally obsolete for CBC agents, and the next step for these can be the rapid PRA of Stage 3.

Step 2: Biosecurity team to request basic background from importer in cases where a commercial inundative control agent is being considered

- Ask importer to fill out preapplication form shown on page 8.

Stage 2 Screening
As described above, screening is normally only required for the commercial import of inundative control agents from commercial suppliers, and not for CBC agents. If the control agent has already been licensed for import before and circumstances have not changed, a license can be reissued by Biosecurity without the need for further risk assessments. In all other cases, proceed directly to the next stage.

Stage 3 Conducting a rapid PRA
The government department responsible for importing and releasing the biological control agent should conduct the rapid PRA using template 2. The template should be filled out and the PRA completed to the best of the available knowledge and availability of knowledge resources. Please note that text from the CABI compendia (e.g. Invasive Species Compendium) does not need to be altered, so long as the source is acknowledged. It is recommended that drafts of the PRA are shared with colleagues from other UKOT Biosecurity teams to maximise knowledge input.

Once the rapid PRA is finalised, it needs to be handed over to the Biosecurity team, along with a completed import application (use existing form), for a final review. Only Biosecurity will be qualified to double check the results and outcome, and compare these with the existing import health standards of the territory. Biosecurity has to decide whether to reject or accept the import application

based on the information provided in the PRA. At this stage, the involvement of other stakeholders, such as an environmental committee, should be considered. In cases where a decision cannot be easily reached, a recommendation can be made to outsource and upscale to a fully comprehensive PRA.

Stage 4 Upscaling to full PRA

If necessary, upscaling towards a fully comprehensive PRA can be outsourced to either an institution dealing with PRAs, such as Fera Science Ltd. or CABI, or qualified and approved consultants. When possible, importers should be provided with a list of qualified consultants/institutions. The finalised full PRA needs to be handed back to the Biosecurity team for a final review. Biosecurity then has to decide whether to reject or accept the import application based on the information provided in the full PRA. Biosecurity may consider having the final version of the PRA reviewed by a committee. In cases where the outcome is positive, the importer is requested to send in a formal application with a completed import application (use existing form). If the outcome of a full PRA is negative, the application for import is rejected. However, if the outcome of a rapid PRA is negative, but there are reasons that a full PRA might reverse this decision these reasons should be given in a note-box provided at the end of the PRA template.

Stage 5 Repository

You are encouraged to share screening results, as well as rapid and full PRAs with stakeholders within your own territory, amongst other territories, as well as with the wider scientific community, to facilitate future PRAs concerning the same or closely related species. All documents should be centrally deposited, initially within the newly established Caribbean UKOT biosecurity network (See Part D below).

Next steps

Even when a PRA allows the acceptance of an import application, further steps may be required. For example, acceptance may have been based on the condition that new or modified biosecurity measures are put in place before imports begin, to minimise any negative impacts. An action plan to put these measures in place would need to be developed prior to import. Once implemented, a licence for import would then be issued.

PRA template 2 (planned introduction of biological control agents)

Pest Risk Analysis (PRA) for

Name of organism: *Scientific name* (English name)

Territory: e.g. Cayman Islands Assessment Number: 001/year

Date: dd/mm/yyyy Version: 1

PRA type: introduction of biological control agent

All sections should be completed. If not applicable indicate it

Part 1: Initiation

1.1 Purpose of planned introduction

☐	Biological control of plant pest in greenhouse environment
☐	Biological control of plant pest outside, commercial
☐	Biological control of plant pest outside, ornamental
☐	Biological control of plant pest outside, environmental
☐	Control agent for invasive alien arthropod
☐	Control agent for invasive alien plant/weed
☐	Others (please explain)

1.2 Summary of assessment results (max. 500 words)

Give a brief summary of the risks of introduction, establishment, spread, impact and overall risk. Fill this part in at the end of the PRA process, only after you have completed the rest of the PRA template below.

1.3 Source of material

Indicate the country where your material originates from and the importing route towards the territory (e.g. transit)

1.4 Importer details

Company/Institution/Department:
Name and Job Title:
Address:
Phone (office and/or mobile): Email:

1.5 Assessor details

Company/Institution/Department:
Name and Job Title:
Address:
Phone (office and/or mobile): Email:

Part 2: Background

2.1 Aim of assessment

This section is intended to put the new organism(s) in perspective of the wider activities having led to conducting this PRA (e.g. planned usage for the new species, risks and impact caused by target organism; all technical/scientific words must be explained)

2.2 Identity

Identify the organism as fully as possible

Scientific name (incl. taxonomic authority, date):

What is it? (max. 2 sentence description)

English name(s):

Family:

Synonyms:

Other taxonomic remarks:

2.3 Images of the species if available

If available, please provide pictures of different stages and habitats

Figure 1:

Figure 2:

2.4 Existence of PRAs for this species

Please indicate if PRAs for this species already exist and which target areas and climatic conditions these cover (for suggestions of websites to check see guidance notes)

2.5 Biology/Ecology

Please provide background information relevant to your application covering the bullet points in the box below whenever applicable; see also guidance notes

- **Growth form and size:**
- **Habitat:**
- **Lifecycle (e.g. reproduction and dispersal):**
- **Other:**

2.6 What is the current distribution of the species

Consider: native range, history of introduction and invasion outside native range

2.7 Is the species intended for augmentative or classical biological control?

Augmentative is the repeated release for targeted control of pest outbreaks; classical biological control (CBC) becomes self-sustained after agent release

2.8 Has any prior host range testing been conducted for the species?

Provide background information about the tests undertaken and/or requirements to perform further tests for the PRA area

2.9 If the release of additional complementary control agents for a specific target species is applied for, what is known about synergistic effects of these multiple species?

2.10 Has the species been introduced into the territory before?

Part 3: Establishment and spread

3.1 Probability of establishment

3.1.1 Does the territory provide suitable climatic and habitat conditions for the species to **survive** and **reproduce** under natural conditions, unassisted or without human interference (e.g. without cultivation)? **Consider:** climate similarity between the species global range and the PRA area, availability of the habitat conditions required by the species based on its behaviour elsewhere; identify/name specifically the climate/habitat it might survive? Which land-cover? Justify why and provide landmarks as examples; for definition of human interference see guidance notes 3.2.1

- **Survival:**
- **Reproduction (self-sustaining population):**

3.1.2 How likely can the species survive and reproduce only indoors or in similar habitats (e.g. polytunnels, gardens, urban area)? **Consider:** availability of the habitat conditions required by the species based on its behaviour elsewhere; identify/name specifically the conditions it might survive?

- **Survival:**
- **Reproduction (self-sustaining population):**

3.1.3 Do you plan to put in place any measures to improve establishment of the agent?

Summary probability of establishment

Probability of establishment in the wild	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

3.2 Probability of spread

3.2.1 What is the potential spread in the territory? **Consider:** rate and distance of spread elsewhere; natural barriers in PRA area, the occurrence of a dispersal vector or commodity;

- **Self-dispersal:**
- **Human-aided dispersal:**
- **Other:**

3.2.2 Can the species spread to parts of the territory where to an introduction is not planned or desired? **Consider:** rate and distance of spread elsewhere; natural barriers in PRA area, the occurrence of a dispersal vector or commodity; see also guidance notes 3.3.2

- **Self-dispersal:**
- **Direct transport by humans:**
- **Transport via vehicles (e.g. boat, cars, including tyres):**
- **Wind drift or via driftwood:**
- **Water:**
- **Transport via animals (e.g. berries digested by birds, seeds stuck to wool, etc.):**
- **Transport with vectors:**
- **Other:**
- **How rapidly would the organism spread by natural means?:**

3.2.3 Do you plan to put any measures in place to accelerate the spread of the agent?

Summary probability of spread

How quickly can the species spread (excluding deliberately assisted by humans)	Less than 10 m/year. Can't occupy suitable habitats within next 100 years Very slowly ☐	Between 10 and 100 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Slowly ☐	Between 100 and 500 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Moderate pace ☐	> 500 m per year Can occupy suitable habits throughout the territory within 5 to 20 years Quickly ☐	Can occupy suitable habits throughout the territory within 5 years Very quickly ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 4: Economic and environmental risks of introducing the control agent

It is important to look at the potential magnitude of the consequences, and to look at distribution effects (who bears risks). **Consider only the adverse or negative effects** in this section of the application. Consider potential maximum impact. Positive effects are considered in Part 6 (benefits).

Please **complete this section with referenced supporting material**. Please cite the material in the text and provide a description of where the information in the application has been sourced in the list of references (e.g. from in-house research, independent research, technical literature, community or other consultation, and provide that information with this application). If the information available is scarce, include information about related species (e.g. same genus or family) clearly indicating that it does not correspond to the organism being assessed.

4.1 Risks recorded from outside the territory, which are applicable to the territory

4.1.1 Is there any negative impact of the species on the economy, environment or public health recorded from any parts of its current distribution? Please provide a summary of the available information

4.2 Economic and socioeconomic non-target effects

4.2.1 Could the species have any negative effect on economic activities in the territory? Please include any information about specific assessments from areas outside the PRA area including experiences with closely related species with relevance for the area of interest. **Consider:** reduction in crop yield or quality; reduction in prices or demand, including export markets; increase in production costs (including costs of control); vectoring of other pests of economic importance; extent of phytosanitary regulations imposed by importing countries)

- **Agriculture:**
- **Livestock:**
- **Fisheries:**
- **Aquaculture:**
- **Forestry:**
- **Tourism:**
- **Recreational potential:**
- **Infrastructure:**
- **Employment rates:**
- **Other:**

4.2.2 Are there any risks of impacts on cultural valuable species, habitats, landscapes, practices or other values? Please include any information about specific assessments from areas outside the PRA area including experiences with closely related species with relevance for the area of interest

- **Competition with or impact on cultural valuable species:**
- **Impact on historically valuable practices:**
- **Change of landscape:**
- **Value of landscape for recreation:**
- **Other:**

Summary economic and socioeconomic non-target effects

Make sure the summary score is well linked with the information reported above so the scoring is fully justified (for more information risk levels see guidance notes)

Risk of socioeconomic impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.3 Impact on public health

4.3.1 Could there be any impact on public health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for human diseases? Identification of potential health hazards and analysis of the risks posed to staff operatives exposed when handling biological control agents under laboratory, production and application conditions.

Summary public health non-target effects

Risk of impact on public health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.4 Impact on animal health

4.4.1 Could there be any impact on animal health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for animals?

Summary animal health non-target effects

Risk of impact on animal health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.5. Environmental and ecosystem non-target effects

4.5.1 Are there any threats to native or endemic species? Indicate direct effects on native species; note any aspects related to pollination of native species should be covered in the following question. **Consider**: threat to endangered species; impact on keystone species; changed community structure; hybridization with native species.

4.5.2 Will they be predated on or parasitized by any other native species in the PRA area?

4.5.3 What is the level of potential negative impact on ecosystem services in the PRA area? **Consider**: provisioning services (freshwater, wood and fibre, fuel); regulating services (soil formation, natural hazards, water and air quality); cultural services (aesthetic, educational, recreational, spiritual); supporting services (nutrient cycling, habitat stability; pollination). See also guidance notes 4.5.2.

Summary environmental non-target effects

Risk of environmental impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 5: Pest risk management

5.1 Pest risk management of species associated with the control agent

5.1.1 What species have reported to be associated with the control agent?

5.1.2 Which measures do you suggest to put in place to prevent introduction and establishment of associated species? **Consider**: inspection of cultures; trapping in and around quarantine facilities, etc.

- **Pre-border:** (information on any phytosanitary measures taken prior to shipment should be provided)
- **At the border:**
- **Post-border:**
- **Other:** (provide additional information)

Summary efficacy prevention measures

Probability of prevention measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

5.2 Pest risk management for biological control agent

This section covers any of the available or proposed management options for the control of the agent itself after its release. Consider both areas where the release has been intended and areas of the territory to which a spread is not intended.

5.2.1 What existing control measures available in the territory for the control of other pests can provide adequate control to mitigate the risks described above? **Consider:** cultural practices; pest control programmes; natural enemies; please link to effectiveness, practicality, costs, negative consequences and acceptability

- **Eradication:**
- **Containment to prevent further spread:**
- **Mechanical/chemical control:**
- **Biological control:**
- **Other (provide additional information):**

5.2.2 What additional control measures currently not available in the territory can provide adequate control to mitigate the risks described above? **Consider:** cultural practices; pest control programmes; natural enemies; please link to effectiveness, practicality, costs, negative consequences and acceptability

- **Eradication:**
- **Containment to prevent further spread:**
- **Mechanical/chemical control:**
- **Biological control:**
- **Other (provide additional information):**

Summary efficacy of current control measures from 5.2.1

Probability of current control measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary efficacy of proposed control measures from 5.2.2

Probability of suitable future control measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 6: Costs and benefits

Provide information of the benefits (positive effects) and costs of the planned introduction. It is important to look at distribution effects (who/what bears the risk), likelihood of occurrence (probability) and the potential magnitude. Please, complete this section referencing supporting material. Please, provide a description of where the information in the application has been sourced from (e.g. from in-house research, independent research, technical literature, community or

other consultation, and provide that information with this application). This section should cover the costs and benefits anticipated by the introduction of the organism(s) but not any costs associated with direct or indirect risks (negative effects), which have been assessed in Part 4.

6.1.1 What are the benefits of introducing the species/commodity? **Consider:** Income generated from introduced organism(s); yield loss prevented; etc.; diminished risks caused by target organism; consider not only economic benefits but also benefits for the environment and society

6.1.2 How likely will the agent impact successfully on the target species? If available, provide references to previous releases of this or closely related species

Summary benefits

Commercial trade benefits	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for agriculture and livestock	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for public health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for ecosystem services	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for the protection of native/endemic species	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Benefits for pollination, bee keeping	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		
Other	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

6.1.3 What are the costs for introducing the species/commodity? **Consider:** costs for release and/or monitoring programme, etc.

6.1.4 Are there any plans for post-release monitoring of establishment and spread? **Consider**: costs involved.

6.1.5 Cost-benefit analysis

This part is only optional; a detailed cost-benefit analysis is beyond the scope of this PRA but any information available, which can be included in the table below may help to address potential conflicts of interest and facilitate the final decision on the overall outcome.

This table should summarize the costs and benefits anticipated during and after the introduction of the organism(s) but not any costs associated with direct or indirect risks (negative effects). For each cost or benefit add a new row estimating approximately its monetary value within an uncertainty range (error) and where and when it will occur. Please bear in mind that often some of the benefits as well as negative impacts cannot be translated into monetary values, but can be of equal importance for decision making.

	Name of benefit/cost	**Best estimate**	**Uncertainty range**	**Spatial distribution**	**Temporal distribution**
Direct monetary benefits					
Direct monetary costs					
Indirect costs					

Part 7: Planned shipment, release and monitoring of establishment and impact

Provide information of the benefits (positive effects) and costs of the planned introduction. It is important to look at distribution effects (who/what bears the risk), likelihood of occurrence (probability) and the potential magnitude. Please, complete this section referencing supporting material. Please provide a description of where the information in the application has been sourced from (e.g. from in-house research, independent research, technical literature, community or other consultation, and provide that information with this application). This section should cover the costs and benefits

7.1. Shipment

7.1.1 What is the source of the organism? **Consider:** accurate information on locations of field sites

7.1.2 What is the nature of the material? **Consider:** how it will be packaged and transported

7.1.3 Are there any procedures in place to identify accurately and, if necessary, eliminate from the culture the host upon which the biological control agent or beneficial organism was cultured?

7.1.4 Are there any procedures in place to identify accurately and, if necessary, eliminate from the culture parasitoids, hyperparasitoids, pathogens and other contaminants?

7.2. Release

7.2.1 What are the planned procedures to release the biological control agent?

7.2.2 Who will carry out the work? **Consider:** mass rearing, release, monitoring, etc. Provide details of their qualifications in this area.

7.2.3 Where will the work be done? Give details of the facilities and equipment available.

7.2.4 How will the work be funded?

7.2.5 Where will the work be done? Give details of the facilities and equipment available.

7.3 Post-release monitoring

Provide details how you plan to monitor the target pest and biological control agent post-release, including for how long this will continue.

Other information

Add here any further information you wish to include in this application, including if there are any ethical considerations that you are aware of in relation to your application.

Is the import of the control agent approved?

(for further explanation see note-box below)

No ☐ (final rejection) No ☐ (result may change after a more detailed PRA) Yes ☐

Reasons why a full PRA can lead to a reconsideration of the outcome given above

Please consider additional information, which a more detailed PRA may be able to provide

References and information sources consulted

Occurrences from Gbif.org
www.Palmpedia.net
Florida University

Appendices and referenced material (if any) and glossary (if required)

If this is an application made for the deliberate introduction of a species/commodity, it is recommended that you contact a member of the Biosecurity team as early in the application process as possible. Biosecurity can assist you with any questions you have during the preparation of your application including providing advice on any consultation requirements.

Unless otherwise indicated, all sections of this form must be completed for the application to be formally received and assessed. If a section is not relevant to your application, please provide a comprehensive explanation as to why this does not apply.

Commercially sensitive information must be included in an appendix to this form, and be identified as confidential. If you consider any information to be commercially sensitive, please indicate this in the relevant section of this form, and cross reference to where that information is located in the confidential appendix.

Any information you supply to Biosecurity prior to formal lodgement of your application will not be publicly released. Following formal lodgement of your application any information in the body of this application form and any non-confidential appendices will become publicly available.

PRA type 3: Risk of accidental introduction of an invasive alien species not specifically linked to the planned import of biological material

Stage 1 Initiation

Which circumstances/activities can trigger a PRA?

- Interceptions at border control

Interceptions of new species during import/border control should lead to a rapid PRA being conducted, primarily to check whether the species has the potential to establish and spread in the territory and whether any additional preventative measures need to be implemented. Alternatively, an unexplained increase in the number of interceptions of a species already assessed may require an existing PRA to be updated.

- Pest alerts (online, news media others)

News of newly emerging pests and diseases, particularly ones that have demonstrated the potential to spread rapidly on a global scale (e.g. Fall armyworm; Harlequin ladybird), should be followed up, whenever possible. A rapid PRA should be conducted to allow the territory sufficient time to prepare an adequate response before the species arrives. Early warning and pest alert links (see Annex 1) should be checked regularly (at least every 6 months).

- Horizon scanning for emerging new threats

A list of species likely to invade the territory within the next ten years (2019-2029) has been provided through onsite consultation with experts. This list should be complemented and regularly updated through the CABI horizon scanning tool available online (www.cabi.org/horizonscanningtool). This should be routinely updated every 2-3 years. A separate horizon scan (HS) should be conducted every time a new pathway is established (e.g. new transport link, new import of a commodity etc.)

Stage 2 Screening

When many species are being considered for risk assessment, and the capacity to address them all is limited, a prioritisation and selection exercise of the most important species needs to be conducted. The species on the existing expert HS list are already ranked according to priority, but any new HS exercise is likely to come up with numerous potentially threatening species. A precise and unbiased prioritisation process is very difficult, but a comparison of the species list from any HS with an updated pest alert list can help in the first instance. In addition, HS species lists derived from the CABI online tool can be ranked using the associated prioritisation tool. This tool is under constant development and improvement. Thus, it is recommended that the final selection of species for a rapid PRA should not be made by a single decision maker, but would be best discussed more widely with the whole Biosecurity team. It is also recommended that teams coordinate the selection with other OT Biosecurity teams, in order to avoid duplication of work and to share the burden of conducting multiple PRAs.

Stage 3 Conducting a rapid PRA

Conduct a rapid PRA using template 3. The template should be filled out and the PRA completed to the best of the available knowledge and availability of knowledge resources. Annex 1 provides links to websites that contain information on individual species. Please note that text from the CABI compendia (e.g. Invasive Species Compendium) does not need to be altered, so long as the source is acknowledged. It is recommended that drafts of the PRA are shared with colleagues from other UKOT Biosecurity teams to maximise knowledge input.

Once the rapid PRA is finalised, crosscheck the results and outcome with the pathway action plan of the territory. This will confirm whether existing biosecurity procedures are sufficient to prevent invasion of the target species as much as is reasonably possible, or whether suggestions for changes to the pathway action plan need to be made. In exceptional cases (e.g. when the threat posed by the target species is considered high, but information providing evidence for this is scarce) a recommendation can be made to outsource the PRA and upscale it to a fully comprehensive PRA.

Stage 4 Upscaling to full PRA

If necessary, the upscaling to a fully comprehensive PRA can be outsourced to either a qualified consultant or institution that deals with PRAs, such as GBNNSS, Fera Science Ltd. or CABI. However, this will most likely incur additional costs.

Stage 5 Repository

You are encouraged to share rapid and full PRAs with stakeholders within your own territory and amongst other territories, as well as with the wider scientific community, to facilitate future PRAs concerning the same or closely related species in other geographic regions. All documents should be centrally deposited, initially within the Caribbean UKOT biosecurity network (see Part D below). Finalised versions of online PRAs conducted through the CABI PRA tool should be deposited and made available to the public on the tool website (https://www.cabi.org/PRA-Tool/login).

Next steps

Depending on the results of the PRA, further steps may be required, such as the development of an action plan if current biosecurity measures are not considered sufficient. Updating of the pathway action plan may also be required.

PRA template 3 (accidental introduction of potentially invasive species)

Pest Risk Analysis (PRA) for

Name of organism: *Scientific name* (English name)

Territory: e.g. Montserrat Assessment Number: 001/year

Date: dd/mm/yyyy Version: 1

PRA type: accidental introduction

All sections should be completed. If not applicable indicate it

Part 1: Initiation

1.1 Summary of assessment results (max. 500 words)

Give a brief summary of the risks of introduction, establishment, spread, impact and overall risk. Fill this part in at the end of the PRA process, only after you have completed the rest of the PRA template below.

1.2 Assessor details

Institution/Department:
Name and Job Title:
Address:
Phone (office and/or mobile): Email:

Part 2: Background

2.1 Aim of assessment

This section is intended to put the new organism(s) in perspective of the wider activities having led to conducting this PRA (e.g. previous horizon scanning, recent alerts or interceptions); all technical/scientific words must be explained.

2.2 Identity

Identify the organism as fully as possible

Scientific name (incl. taxonomic authority, date):

What is it? (max. 2 sentence description)

English name(s):

Family:

Synonyms:

Other taxonomic remarks:

2.3 Images of the species if available

If available, please provide pictures of different stages and habitats

Figure 1:

Figure 2:

2.4 Existence of PRAs for this species

Please indicate if PRAs for this species already exist and which target areas and climatic conditions these cover (for suggestions of websites to check see guidance notes

2.5 Biology/Ecology

Please provide background information relevant to your application covering the bullet points in the box below whenever applicable; see also guidance notes

- Growth form and size:
- Habitat:
- Lifecycle (e.g. reproduction and dispersal):
- Hosts:
- Host specificity:
- Associated pathogens, pests or parasites:
- Other:

2.6 What is the current distribution of the species?

Consider: native range, history of introduction and invasion outside native range

Part 3: Risk of accidental introduction, establishment and spread

3.1 Probability of entry/introduction

3.1.1 Has the species been introduced into other countries and/or have multiple introductions been reported?

3.1.2 Has the species been intercepted in the territory in the past? Please check existing interception data in the territory

3.1.3 What are the likely pathways for the accidental introduction of the species?

Consider whether the species or some of its life-stages can easily be overlooked?

3.1.4 What is the probability of the pest being associated with the pathway(s) at origin?

Please give any information available about: prevalence of pest in the source area; occurrence of life stage able to associate with consignment; volume and frequency of movement along the pathway; seasonal timing; pest management procedures applied at place of origin; for definition of probability, see guidance notes 3.1.

3.1.5 What is the probability of the pest surviving during transport?

Consider: speed and conditions of transport; duration and vulnerability of life cycle; previous interceptions of the pest; prevalence of pest; commercial procedures during transport (e.g. refrigeration)

3.1.6 What is the probability of the pest evading existing biosecurity procedures?

Consider: inspection methods and quality control; certification schemes; chemical treatment

3.1.7 What is the probability of transfer from entry point to a suitable host or habitat?

Consider: dispersal mechanisms, including vectors; number of destinations; proximity to suitable hosts; seasonality

Summary probability of accidental introduction

Probability of introduction in next 10 years	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

3.2 Probability of establishment

3.2.1 Does the territory provide suitable climatic and habitat conditions for the species to **survive** and **reproduce** under natural conditions, unassisted or without human interference (e.g. without cultivation)? **Consider:** climate similarity between the species global range and the PRA area, availability of the habitat conditions required by the species based on its behaviour elsewhere; identify/name specifically the climate/habitat it might survive? Which land-cover? Justify why and provide landmarks as examples; for definition of human interference see guidance notes 3.2.1

- **Survival:**
- **Reproduction (self-sustaining population):**

3.2.2 How likely can the species survive and reproduce indoors or similar habitats (e.g. polytunnels, gardens, urban area)? **Consider:** availability of the habitat conditions required by the species based on its behaviour elsewhere; identify/name specifically the conditions it might survive?

- **Survival:**
- **Reproduction (self-sustaining population):**

3.2.3 (**Only for pests and diseases**) If hosts or vectors are required, are these available in the PRA area? **Consider:** abundance of hosts and alternate hosts or vectors and how these are distributed in the PRA area; geographic proximity of hosts to pathway destinations; presence of other suitable species that could be new hosts; compare the known distribution of the pest with ecoclimatic zones in the PRA area; soil factors for soilborne pests; survival strategies; survival in protected cultivation

Summary probability of establishment

Probability of establishment in the wild	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

3.3 Probability of spread

3.3.1 What is the potential spread in the territory? **Consider:** rate and distance of spread elsewhere; natural barriers in PRA area, the occurrence of a dispersal vector or commodity; see also guidance notes 3.3.1

- **Self-dispersal:**
- **Direct transport by humans:**
- **Transport via vehicles (e.g. boat, cars, including tyres):**
- **Wind drift or via driftwood:**
- **Water:**
- **Transport via animals (e.g. berries digested by birds, seeds stuck to wool, etc.):**
- **Transport with vectors:**
- **Other:**
- **How rapidly would the organism spread by natural means?:**

Summary probability of spread

How quickly can the species spread (excluding deliberately assisted by humans)	Less than 10 m/year. Can't occupy suitable habitats within next 100 years Very slowly ☐	Between 10 and 100 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Slowly ☐	Between 100 and 500 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Moderate pace ☐	> 500 m per year Can occupy suitable habits throughout the territory within 5 to 20 years Quickly ☐	Can occupy suitable habits throughout the territory within 5 years Very quickly ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 4: Economic and environmental risks

It is important to look at the potential magnitude of the consequences, and to look at distribution effects (who bears risks). Consider potential maximum impact.

Please, **complete this section referencing supporting material**. Please, cite the material in the text and provide a description of where the information in the application has been sourced in the list of references (e.g. from in-house research, independent research, technical literature, community or other consultation, and provide that information with this application). If the information available is scarce, include information about related species (e.g. same genus or family) clearly indicating that it does not correspond to the organism being assessed.

4.1 Risks recorded from outside the territory, which are applicable to the territory

4.1.1 Is the species listed in the following Plant Protection organizations and Invasive lists and if so, what is its status?

America
COSAVE: yes/no
NAPPO: yes/no
OIRSA: yes/no

Europe
EPPO: yes/no
EC Plant Health Directive (Council Directive 2000/29/EC): yes/no
Africa
ARC: yes/no
Others:
CABI CPC
CABI ISC
GISD
Other organizations relevant for the territory (e.g. regional, national…)

4.1.2 Is there any negative impact of the species on the economy, environment or public health recorded from any parts of its current distribution? Please provide a summary of the available information

4.2 Economic and socioeconomic effects

4.2.1 Could the species have any negative effect on economic activities in the territory? Please include any information about specific assessments from areas outside the PRA area including experiences with closely related species with relevance for the area of interest. **Consider:** reduction in crop yield or quality; reduction in prices or demand, including export markets; increase in production costs (including costs of control); vectoring of other pests of economic importance; extent of phytosanitary regulations imposed by importing countries)

- **Agriculture:**
- **Livestock:**
- **Fisheries:**
- **Aquaculture:**
- **Forestry:**
- **Tourism:**
- **Recreational potential:**
- **Infrastructure:**
- **Employment rates:**
- **Other:**

4.2.2 Are there any risks of impacts on cultural valuable species, habitats, landscapes, practices or other values? Please include any information about specific assessments from areas outside the PRA area including experiences with closely related species with relevance for the area of interest

- **Competition with or impact on cultural valuable species:**
- **Impact on historically valuable practices:**
- **Change of landscape:**
- **Value of landscape for recreation:**
- **Other:**

Summary economic and socioeconomic impacts

Make sure the summary score is well linked with the information reported above so the scoring is fully justified (for more information risk levels see guidance notes)

Risk of socioeconomic impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.3 Impact on public health

4.3.1 Could there be any impact on public health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for human diseases?

Summary public health impact

Risk of impact on public health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.4 Impact on animal health

4.4.1 Could there be any impact on animal health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for animals?

Summary animal health impact

Risk of impact on animal health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.5. Environmental and ecosystem effects

4.5.1 Are there any threats to native or endemic species? Indicate direct effects on native species; note any aspects related to pollination of native species should be covered in the following question. **Consider**: threat to endangered species; impact on keystone species; changed community structure; hybridization with native species.

4.5.2 What is the level of potential negative impact on ecosystem services in the PRA area?
Consider: provisioning services (freshwater, wood and fibre, fuel); regulating services (soil formation, natural hazards, water and air quality); cultural services (aesthetic, educational, recreational, spiritual); supporting services (nutrient cycling, habitat stability; pollination). See also guidance notes 4.5.2.

Summary environmental impact

Risk of environmental impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 5: Pest risk management

5.1 Prevention

5.1.1 Which measures **already** in place are suitable to minimise the risk of introduction and establishment? **Consider**: inspection of commodities; trapping, disrupting specific pathways, etc.

- **Pre-border:**
- **At the border:**
- **Post-border:**

5.1.2 Which measures **not yet** in place are suitable to minimise the risk of introduction and establishment **Consider**: inspection of commodities; trapping, disrupting specific pathways, etc.

- **Pre-border:**
- **At the border:**
- **Post-border:**

Summary efficacy of current prevention measures from 5.1.1

Probability of prevention measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary efficacy of proposed prevention measures from 5.1.2

Probability of suitable future prevention measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

5.2 Control

5.2.1 What existing control measures available in the territory for the control of other pests can provide adequate control to mitigate the risks described above? **Consider:** cultural practices e.g. irrigation, planting, harvesting methods etc.; pest control programmes; natural enemies; please link to effectiveness, practicality, costs, negative consequences and acceptability

- **Eradication:**
- **Containment to prevent further spread:**
- **Mechanical/chemical control:**
- **Biological control:**
- **Other (provide additional information):**

5.2.2 What additional control measures currently not available in the territory can provide adequate control to mitigate the risks described above? **Consider:** cultural practices e.g. irrigation, planting, harvesting methods etc.; pest control programmes; natural enemies; please link to effectiveness, practicality, costs, negative consequences and acceptability

- **Eradication:**
- **Containment to prevent further spread:**

- **Mechanical/chemical control:**
- **Biological control:**
- **Other (provide additional information):**

Summary efficacy of current control measures from 5.2.1

Probability of control measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary efficacy of proposed control measures from 5.2.2

Probability of suitable future control measures being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Other information

Add here any further information you wish to include in this application, including if there are any ethical considerations that you are aware of in relation to your application

Is there a need for a more detailed PRA or for more detailed analysis of particular sections of the PRA? (For completion by the Biosecurity team only)

No ☐ Yes ☐

If yes, please forward to Fera Science Ltd. or NNSS or other suitable organisations

References and information sources consulted

Occurrences from Gbif.org
www.Palmpedia.net
Florida University

Appendices and referenced material (if any) and glossary (if required)

In case this is an application made for the deliberate introduction of a species/commodity it is recommended that you contact a member of the Biosecurity team as early in the application process as possible. Biosecurity can assist you with any questions you have during the preparation of your application including providing advice on any consultation requirements.

Unless otherwise indicated, all sections of this form must be completed for the application to be formally received and assessed. If a section is not relevant to your application, please provide a comprehensive explanation why this does not apply.

Commercially sensitive information must be included in an appendix to this form and be identified as confidential. If you consider any information to be commercially sensitive, please show this in the relevant section of this form and cross reference to where that information is located in the confidential appendix.

Any information you supply to Biosecurity prior to formal lodgement of your application will not be publicly released. Following formal lodgement of your application any information in the body of this application form and any non-confidential appendices will become publicly available.

PRA type 4: PRA for alien/invasive species already present in territory

Stage 1 Initiation

Which circumstances/activities can trigger a PRA?

- Accelerated spread of an already established IAS

Sometimes an introduced plant species will establish in the wild but will not be invasive for many years or decades until it starts to significantly increase its spread. Similarly, ornamental plants are often only established within gardens for a long period, after which they start to naturalise and spread elsewhere. In all such cases, it is recommended to conduct a rapid PRA to establish if specific actions are required to prevent severe impacts on agriculture or biodiversity. In some cases, incoming reports of invasive behaviour of species not currently causing a problem in the territory may also justify the implementation of a PRA.

- Failed eradication attempt

In cases where early eradication after interception or trapping of new arrivals have failed, and reports of new records indicate establishment, a PRA can provide valuable information on the best approach to control or contain the target species.

- Prioritisation of species for control when limited resources are available

In most territories, a plethora of invasive species, both plants and animals, cause severe negative impacts on the island ecosystems. However, resources to control these are generally limited, and in order to maximise mitigation effects, species will need to be prioritised. In such cases, rapid PRAs for species most likely to be of priority concern will provide information on predicted levels of threats, thus supporting any decision making.

- Species already present and not behaving invasive but with future imports planned or anticipated

Occasionally, introduced plants are only invasive species of minor concern due to restricted spread. However, in some cases this benign behaviour is displayed only by specific sub-species, populations or varieties. Therefore, any further import of such species will require a risk assessment. This should also be conducted if the accidental arrival of such more aggressive taxa remains a possibility.

Stage 2 Screening

Not required

Stage 3 Conducting a rapid PRA

Conduct a rapid PRA using template 4. The template should be filled out by the conservation department/organisation tasked to deal with the target species, and the PRA should be completed to the best of the available knowledge and availability of knowledge resources.

Annex 1 provides links to websites containing information on individual species. Please note that text from the CABI compendia (e.g. Invasive Species Compendium) does not need to be altered, so long as the source is acknowledged. It is recommended that drafts of the PRA are shared with colleagues from other UKOT Biosecurity teams to maximise knowledge input.

Once the rapid PRA is finalised, crosscheck the results and outcome with any action plans and control strategies that are currently in place to mitigate the impact of invasive species. This will confirm whether existing biosecurity procedures are sufficient, or whether suggestions for changes of these plans/strategies need to be made.

Stage 4 Upscaling to full PRA

Not required

Stage 5 Repository

You are encouraged to share rapid PRAs with stakeholders within your own territory and amongst other territories, as well as with the wider scientific community, to facilitate future PRAs concerning the same or closely related species in other geographic regions. All documents should be centrally deposited, initially within the Caribbean UKOT Biosecurity network (see Part D below). Finalised versions of online PRAs conducted through the CABI PRA tool should be deposited and made available to the public on the tool's website (https://www.cabi.org/PRA-Tool/login).

Next steps

Depending on the results of the PRA, further steps may be required, such as the development of an action plan if current control and/or biosecurity measures are not considered sufficient. Updating the current control strategies may also be required.

PRA template 4 (species already present in the territory)

Pest Risk Analysis (PRA) for

Name of organism: *Latin name* (English name)

Territory: e.g. Turks & Caicos Islands **Assessment Number: 001/year**

Date: dd/mm/yyyy **Version: 1**

PRA type: alien species already present

All sections should be completed. If not applicable indicate it

Part 1: Initiation

1.1 Summary of assessment results (max. 500 words)

Give a brief summary of the risks of introduction, establishment, spread, impact and overall risk. Fill this part in at the end of the PRA process, only after you have completed the rest of the PRA template below.

1.2 Assessor details

Institution/Department:
Name and Job Title:
Address:
Phone (office and/or mobile): Email:

Part 2: Background

2.1 Aim of assessment

This section is intended to put the new organism(s) in perspective of the wider activities having led to conducting this PRA (e.g. recent alerts, signs of increased invasiveness, ongoing control efforts); all technical/scientific words must be explained

2.2 Identity

Identify the organism as fully as possible

Scientific name (incl. taxonomic authority, date):

What is it? (max. 2 sentence description)

English name(s):

Family:

Synonyms:

Other taxonomic remarks:

2.3 Images of the species if available

If available, please provide pictures of different stages and habitats

Figure 1:

Figure 2:

2.4 Existence of PRAs for this species

Please indicate if PRAs for this species already exist and which target areas and climatic conditions these cover (for suggestions of websites to check, see guidance notes)

2.5 Biology/Ecology

Please provide background information relevant to your application, covering the bullet points in the box below whenever applicable; see also guidance notes

- **Growth form and size:**
- **Habitat:**
- **Lifecycle (e.g. reproduction and dispersal):**
- **Hosts:**
- **Host specificity:**
- **Associated pathogens, pests or parasites:**
- **Other:**

2.6 What is the current distribution of the species?

Consider: native range, history of introduction and invasion outside native range

2.7 How did the species first arrive in the territory?

☐	Ornamental plant
☐	Pet
☐	Crop; garden crop
☐	Fodder plant
☐	Livestock
☐	Living food for livestock or pets
☐	Species for fishing or aquaculture
☐	Human aided accidental introduction
☐	Natural colonisation
☐	Others (please explain)

2.8 Have there been multiple introductions?

2.9 Is the species still being imported to the territory?

Part 3: Establishment and spread

3.1 Establishment

3.1.1 Is the species already fully established? **Consider:** survival and reproduction unassisted by human, adventive establishment; sporadic occurrence; restriction to cultivation or certain habitats (e.g. indoors, urban areas)

- **Survival:**
- **Reproduction (self-sustaining population):**

3.1.2 Does the territory provide suitable climatic and habitat conditions for a wider establishment? **Consider:** climate similarity between the species global range and the PRA area, availability of the habitat conditions required by the species based on its behaviour elsewhere; identify/name specifically the climate/habitat it might survive? Which land-cover? Justify why and provide landmarks as examples; for definition of human interference see guidance notes 3.2.1

- **Survival:**
- **Reproduction (self-sustaining population):**

3.1.3 (**Only for pests and diseases**) If hosts or vectors are required, are these widely available in the PRA area? **Consider:** abundance of hosts and alternate hosts or vectors and how these are distributed in the PRA area; geographic proximity of hosts to pathway destinations; presence of other suitable species that could be new hosts; compare the known distribution of the pest with ecoclimatic zones in the PRA area; soil factors for soilborne pests; survival strategies; survival in protected cultivation

3.2 Spread

3.2.1 Is the species still spreading or has it reached maximum spread?

3.2.2 If the species is still spreading, how fast is the current spread?

How quickly can the species spread? (excluding deliberately assisted by humans)	Less than 10 m/year. Can't occupy suitable habitats within next 100 years Very slowly ☐	Between 10 and 100 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Slowly ☐	Between 100 and 500 m per year. Suitable habitats are likely to be occupied between 50 and 100 years Moderate pace ☐	> 500 m per year Can occupy suitable habits throughout the territory within 5 to 20 years Quickly ☐	Can occupy suitable habits throughout the territory within 5 years Very quickly ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

3.2.3 Is density and abundance in areas where the species has already arrived increasing?

3.2.4 What are the main means of spread in the territory? **Consider:** rate and distance of spread elsewhere; natural barriers in PRA area, the occurrence of a dispersal vector or commodity

- **Self-dispersal:**
- **Direct transport by humans:**
- **Transport via vehicles (e.g. boat, cars, including tyres):**
- **Wind drift or via driftwood:**
- **Water:**
- **Transport via animals (e.g. berries digested by birds, seeds stuck to wool, etc.):**
- **Transport with vectors:**
- **Other:**
- **How rapidly would the organism spread by natural means?:**

Part 4: Economic and environmental risks

It is important to look at the potential magnitude of the consequences, and to look at distribution effects (who bears risks). Consider potential maximum impact.

Please **complete this section with referenced supporting material**. Please cite the material in the text and provide a description of where the information in the application has been sourced in the list of references (e.g. from in-house research, independent research, technical literature, community or other consultation, and provide that information with this application). If the information available is scarce, include information about related species (e.g. same genus or family) clearly indicating that it does not correspond to the organism being assessed.

4.1 Risks recorded from outside the territory, which are applicable to the territory

4.1.1 Is the species listed in the following Plant Protection organizations and Invasive lists and if so, what is its status?

America COSAVE: yes/no NAPPO: yes/no OIRSA: yes/no **Europe** EPPO: yes/no EC Plant Health Directive (Council Directive 2000/29/EC): yes/no **Africa** ARC: yes/no **Others:** CABI CPC CABI ISC GISD **Other organizations relevant for the territory (e.g. regional, national…)**

4.1.2 Is there any negative impact of the species on the economy, environment or public health recorded from any parts of its current distribution? Please provide a summary of the available information

4.1.3 Is there a possibility that the strain/population/subspecies currently present in the territory behaves less invasive than future new establishments of this species may do? **Consider**: records from other parts of its introduced range; asses in the context of repeated introduction of ornamentals

4.1.4 Are there any indication that the species is currently in a lag phase not behaving very invasive? Please, provide supporting evidence from other geographical areas or indications that closely related species have shown to go through a lag phase before.

4.2 Economic and socioeconomic effects

4.2.1 Could the species have or has already any negative effect on economic activities in the territory? Please include any information about specific assessments from areas outside the PRA area including experiences with closely related species with relevance for the area of interest (**consider:** reduction in crop yield or quality; reduction in prices or demand, including export markets; increase in production costs (including costs of control); vectoring of other pests of economic importance; extent of phytosanitary regulations imposed by importing countries).

- **Agriculture:**
- **Livestock:**

- **Fisheries:**
- **Aquaculture:**
- **Forestry:**
- **Tourism:**
- **Recreational potential:**
- **Infrastructure:**
- **Employment rates:**
- **Other:**

4.2.2 Are there any risks of impacts or impacts the species already on cultural valuable species, habitats, landscapes, practices or other values? Please include any information about specific assessments from areas outside the PRA area including experiences with closely related species with relevance for the area of interest

- **Competition with or impact on cultural valuable species:**
- **Impact on historically valuable practices:**
- **Change of landscape:**
- **Value of landscape for recreation:**
- **Other:**

Summary existing economic and socioeconomic impacts

Make sure the summary score is well linked with the information reported above so the scoring is fully justified (for more information risk levels see guidance notes)

Existing risk of socioeconomic impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary predicted economic and socioeconomic impacts

Make sure the summary score is well linked with the information reported above so the scoring is fully justified (for more information risk levels see guidance notes)

Predicted risk of socioeconomic impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.3 Impact on public health

4.3.1 Could there be or is there already any impact on public health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for human diseases?

Summary existing public health impact

Existing risk of impact on public health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary predicted public health impact

Predicted risk of impact on public health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.4 Impact on animal health

Could there be any or is there already be an impact on animal health? **Consider:** Can the species be disease-causing or be a parasite, or be a vector or reservoir for animals?

Summary existing animal health impact

Existing risk of impact on animal health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary predicted animal health impact

Predicted risk of impact on animal health	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

4.5. Environmental and ecosystem effects

4.5.1 Are there any threats, current or predicted to native or endemic species? Indicate direct effects on native species; note any aspects related to pollination of native species should be covered in the following question. **Consider**: threat to endangered species; impact on keystone species; changed community structure; hybridization with native species)

4.5.2 What is the level of current or potential negative impact on ecosystem services in the PRA area? **Consider**: provisioning services (freshwater, wood and fibre, fuel); regulating services (soil formation, natural hazards, water and air quality); cultural services (aesthetic, educational, recreational, spiritual); supporting services (nutrient cycling, habitat stability; pollination). See also guidance notes 4.5.2.

Summary existing environmental impact

Existing risk of environmental impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Summary predicted environmental impact

Predicted risk of environmental impact	Very small ☐	Small ☐	Medium ☐	Large ☐	Very large ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Part 5: Pest risk management

5.1 Eradication

5.1.1 Is eradication still feasible? **Consider**: suitable methods, scale, costs, previous attempts

5.1.2 Are there any eradication efforts currently underway?

Please describe methods, scale of effort and costs

Likelihood of eradication being successful

Probability of eradication attempts being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

5.2 Containment

5.2.1 Is containment to certain areas of the territory still feasible?

Consider: suitable methods, scale, costs, previous attempts

5.2.2 Are there any containment efforts currently underway?

Please describe methods, scale of effort and costs

Likelihood of containment being successful

Probability of containment attempts being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

5.3 Control

5.3.1 In case no control has been attempted, what methods are available to be deployed in the future for the control (short-term and long-term) of this species?

Consider: suitable methods, scale, costs

5.3.2 Are there any control efforts currently underway?

Please describe methods, scale of effort and costs, efficacy, sustainability

5.3.3 Are there any additional control strategies feasible to be deployed in the future such as classical biological control?

Please describe methods, experiences in other geographical areas, sustainability, benefits, risks and costs.

5.3.4 To what degree are current control efforts successful in mitigation the risks described above?

5.3.5 To what degree are additional control efforts/methods likely to mitigate the risks described above?

Likelihood of current control strategy being successful

Probability of current containment attempts being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Likelihood of future control strategies being successful

Probability of future containment attempts being effective	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely ☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

5.4 Risk of reintroduction after eradication

5.4.1 Has the species been introduced into other countries and/or have multiple introductions been reported? Please check existing interception data in the territory

5.4.2 What are the likely pathways for the accidental introduction of the species?
Consider whether the species or some of its life-stages can easily be overlooked?

5.4.3 What is the probability of the pest evading existing biosecurity procedures? **Consider:** inspection methods and quality control; certification schemes; chemical treatment. Have likely pathways of previous introduction(s) been closed?

Summary probability of accidental re-introduction after eradication

Probability of introduction in next 10 years	Very unlikely ☐	Unlikely ☐	Moderately likely ☐	Likely☐	Very likely ☐
Confidence	High confidence ☐	Medium confidence ☐	Low confidence ☐		

Other information

Add here any further information you wish to include in this application including if there are any ethical considerations that you are aware of in relation to your application

Is there a need for a more detailed PRA or for more detailed analysis of particular sections of the PRA? (For completion by the Biosecurity team only)

No □ Yes □

If yes, please forward to Fera Science Ltd. or NNSS or other suitable organisations

References and information sources consulted

Occurrences from Gbif.org
www.Palmpedia.net
Florida University

Appendices and referenced material (if any) and glossary (if required)

In case this is an application made for the deliberate introduction of a species/commodity it is recommended that you contact a member of the Biosecurity team as early in the application process as possible. Biosecurity can assist you with any questions you have during the preparation of your application including providing advice on any consultation requirements.

Unless otherwise indicated, all sections of this form must be completed for the application to be formally received and assessed. If a section is not relevant to your application, please provide a comprehensive explanation why this does not apply.

Commercially sensitive information must be included in an appendix to this form, and be identified as confidential. If you consider any information to be commercially sensitive, please indicate this in the relevant section of this form and cross reference to where that information is located in the confidential appendix.

Any information you supply to Biosecurity prior to formal submission of your application will not be publicly released. Following formal submission of your application, any information in the body of this application form and any non-confidential appendices will become publicly available.

Part C: Additional guidance notes to fill out PRA templates 1-4

General guidance

1. Citations

Add citations for every statement you make. Throughout the rapid PRA, every statement made should be supported by providing the original sources. Direct links to websites can be embedded into the text, but it is advisable to also include them in the reference section at the end of the PRA, citing the title of the website and authors whenever possible. When providing website links in the reference list, please also provide the date when it was accessed. Reference publications (journals, book) in the text by providing the author(s) surname and year of publication immediately after the sentence, or at the end of the paragraph if the whole paragraph is based on the cited source (e.g. Stevens, 2015). Give the full reference in alphabetical order at the end of the PRA. No specific citation style is required, as long as the information is sufficient to trace the source.

2. Likelihood and confidence levels

2.1 Assessing likelihood

Each level of the risk assessment requires an assessment of "likelihood", and this can be very subjective. Confidence in making these decisions only comes with experience, and it is unlikely that requests for PRAs on the individual Territories will be received often enough to generate that experience. Note that countries such as the UK, Australia and New Zealand have teams of people dedicated to PRAs alone, who have access to an extensive network of taxonomic experts, and also have funding to support meetings and specific research into key areas.

As a rule of thumb, a lack of available data on a pest or disease implies that the species is not of major concern; serious pests and diseases inevitably receive a lot of attention. This interpretation of sparse data should be verified by consultation with local or international experts.

Essentially, the PRAs can be divided into two categories:

- Easy: sufficient data is available, and/or there is clear evidence of the risk profile. Decisions of likelihood can be made with a relatively high level of confidence.
  - Complete the PRA as well as possible and make a recommendation
- Difficult: limited data is available in key areas, and/or there is conflicting evidence of the risk profile. There is relatively low confidence in the decisions.
  - Reject the commodity through the precautionary principle, OR
  - Contract appropriate expertise to carry out the PRA, such as Fera Science Ltd, UK

2.2 Confidence levels

Throughout the PRA templates, confidence levels (low, medium, high) should be provided for all assessment summaries. Currently there aren't any strict definitions for such confidence levels, and they're not meant to be measurable in a mathematical/statistical sense. They are solely there to provide a rough estimate as to what degree the authors of the PRA believe (based on the information)

that their assessment summaries are correct. They will, of course, always contain a level of speculation. As a rough guide, follow the bullet points below:

Low confidence

- Little background information (published or reported) is available to back up your assessment.
- Due to a lack of information, the assessment is based on species with a similar ecology but which are not very closely related to the target species.

Medium confidence

- Either some information is available that directly relates to the target species, or plenty of information regarding closely related species (whose ecology and behaviour are likely to be similar to the target species) is available.

High confidence

- Background information for your assessment is readily available.
- Available information is consistent and not contradictory.
- Clear facts increase confidence levels (example: we can say with high confidence that a frost intolerant perennial plant won't establish in a territory where winter temperatures regularly drop below freezing).

3. Stakeholders

For all PRAs (including Category 3 commodities) it is recommended that a small consultation group is formed consisting of appropriate stakeholders, who can discuss the results before a recommendation is made. Stakeholders may be, for example, representatives of government departments for agriculture, the environment or conservation, or local farmer or importer associations, etc. It is very important to involve relevant key stakeholders, as decisions made on the basis of agricultural risk only may ignore those affecting conservation values, and vice versa.

For any Category 1 or 2 commodities judged as particularly high risk, controversial or where limited data is available, consultation with a multi-sector group is also recommended.

4. Timescale

It takes time to collect all the information, consult stakeholders and complete the assessment. For the application of planned imports, it is recommended that a response is given within 6 months. This response could be:

- That the commodity may be imported, with no conditions attached;
- That the commodity may be imported, subject to specified conditions to mitigate identified risks;
- That the commodity may not be imported due to its risk profile, giving reasons;
- That the PRA for the commodity can't be completed, giving reasons, and the commodity may not be imported at the present time. Funding may need to be secured for an experienced consultant.

Guidance to specific parts of the PRA templates

Part 1: Initiation

1.3 Source of material (only templates 1 and 2)

Each source country represents a separate pathway. Generally, this implies that for each source country, a separate PRA has to be conducted. However, under specific circumstances, a summarised PRA may be the only option. For example, if the territory wants to explore the option of importing a new, specific commodity/plant/etc. but the source country is yet to be identified, a more generic PRA can provide very valuable information: this would support a decision on whether to proceed with further steps towards the import of this commodity, or whether to reject the idea at an early stage. One example is the case study PRA on imports of palm trees to St Helena (Annex 3).

Part 2: Background

2.4 Existence of PRAs for this species (all templates)

As well as searching directly for existing PRAs for a specific species using internet search engines, there are also some useful websites to check out for existing PRAs:

- Australian Government, Department of Agriculture (http://www.agriculture.gov.au/biosecurity/risk-analysis)
- CABI Crop Protection Compendium (https://www.cabi.org/cpc/ and https://www.cabi.org/cpc/pest-risk-analysis/) (currently more advice on conducting PRAs than a repository of PRAs)
- CABI Invasive Species Compendium (https://www.cabi.org/isc/)
- DEFRA (https://planthealthportal.defra.gov.uk/data/priority-pests/pra-available) (currently 140+ PRAs available)
- EPPO Platform on PRAs (https://pra.eppo.int/) (currently most comprehensive and up to date platform)
- Fera Science Ltd (https://www.fera.co.uk/) currently more advice on PRA conduct than depository of PRAS)
- GBNNSS (http://www.nonnativespecies.org/factsheet/index.cfm)
- USDA (https://www.aphis.usda.gov/aphis/ourfocus/planthealth/import-information/commodity-import-approval-process/CT_Pralist)

2.6 Biology/Ecology

If information on a newly emerging invasive (e.g. *Mytilus edulis*) is sparse, information on biology, invasiveness, impact and control should draw on closely related other species, and one should collate information about these as long as there is no indication that the target species would behave significantly differently.

Part 3: Risk of accidental introduction, establishment and spread

General notes for part 3:
Please provide a short discursive description for all questions wherever possible, not only answering with 'yes' or 'no' (see example PRA for *Tuta absoluta* in Annex 3). Please note that 'human interference' mostly refers to: plants that require horticultural attendance for survival; or pests that can only survive in human assisted environments (e.g. polytunnels greenhouses etc.). It does not, however, apply to human parasites such as mosquitos.

3.1 Probability of entry/introduction

Consideration should be given to: speed and conditions of transport (including treatments performed during transport); vulnerability of the life-stages likely to be transported (for plants, the viability of seeds or other propagules; for all pests, their tolerance of low or elevated temperatures); whether the life cycle is of sufficient duration to extend beyond the time in transit; the intended use of the commodity (e.g. consumption, planting); any pre-shipment phytosanitary measures already in place that may be efficient against the pest; seasonal timing appropriate for the pest to be associated with the pathway at origin.

3.1.4 What is the probability of the pest being associated with the pathway(s) at origin? (only template 3)

With regards to association with pathways, each pathway has to be treated separately and if in doubt, maximum risk should always be assumed.

Please indicate here whether the target species is highly unlikely, unlikely, likely, or highly likely to be associated with each individual pathway. Examples are given below for different major groups:

<u>Plants:</u>
Pathway example: Lawn seed mixture

- Highly unlikely for plants that are only known to spread vegetatively (e.g. *Fallopia japonica*).
- Unlikely for plants having larger seeds (e.g. *Impatiens glandulifera*).
- Likely for plants with small seeds that are not typically associated with grassland habitats.
- Highly likely for typical pasture weeds that produce small seeds.

<u>Terrestrial invertebrates:</u>
Pathway example: Sterilised compost, stored openly for some time prior to shipment

- Highly unlikely for slow moving invertebrates normally not associated with soil (e.g. most scale insects).
- Unlikely for larger invertebrates not associated with soil habitats (e.g. locusts, mantis etc.).
- Likely for invertebrates associated with soil but slow moving and avoiding dry conditions (smaller snail species, springtails).
- Highly likely for fast moving invertebrates preferring to hid in dark moist places and/or associated with soil (e.g. earwigs, spiders, centipedes, millipedes).

Marines:

Pathway example: Ballast water

- Highly unlikely for species where no comparably small life stage is associated with open waters (e.g. turtles, sea snakes).
- Unlikely for species not associated with open waters and no small life stages specifically adapted to disperse through drift in open water (e.g. some fish and crustaceans of coastal habitats).
- Likely for invertebrates associated with open water but that are generally rare in areas where ballast water is taken on.
- Highly likely for the majority of marine species with small life stages that are specifically adapted to disperse by drifting in open waters (e.g. jellyfish, many small crustaceans etc.).

3.1.7 What is the probability of transfer from entry point to a suitable host or habitat? (only template 3)

At the point of entry, the environment is often hostile for many accidentally introduced species. For example, the hostile and mostly dry environment often surrounding harbour facilities is not conducive to allowing species adapted to moist forest habitats and with low dispersal rates (such as small snails) to reach suitable habitats, which only occur in the centre of the island, to establish. For marine species, a similar situation may occur when, for example, the target species requires a shallow sandy seabed for survival but this habitat is not present in the area where ballast water is discharged or where boats are anchoring.

3.1 in template 1 and 2; 3.2 in template 3 (Probability of establishment)

In order to estimate the probability of establishment of a species, reliable biological information (life cycle, host range, survival etc.) should be obtained from the areas where the pest currently occurs. The situation in the PRA area can then be compared with that in the areas of current distribution. For a pest to establish, it must find host plants or a suitable habitat. Natural hosts should be of primary concern but, if such information is lacking, plants which are recorded as hosts only under experimental conditions or accidental/very occasional hosts may also be considered. The pest must also find environmental conditions suitable for its survival, multiplication and spread, either in natural or in protected conditions. Examples of the factors to consider are:

- Availability, quantity and distribution of hosts in the PRA area
- Environmental suitability in the PRA area
- Potential for adaptation of the pest
- Reproductive strategy of the pest
- Cultural practices and control measures

When the PRA is considering plants to be imported, the assessment of the probability of establishment concerns the unintended habitats.

Factors in the environment (e.g. suitability of climate, soil, pest and host competition) that are critical to the development of the pest, its host (and if applicable, its vector), and to their ability to survive periods of climatic stress and complete their life cycles, should be identified. It should be noted that

the environment is likely to have different and separate effects on the pest, its host and its vector. This needs to be recognized, in order to determine whether the interactions between these organisms will be different in the PRA area, either to the benefit or detriment of the pest. The probability of establishment in a protected environment, e.g. in glasshouses, should also be considered.

Where applicable, practices employed during the cultivation/production of the host crops should be compared, to determine whether there are differences in such practices between the PRA area and the origin of the pest that may influence its ability to establish.

Other characteristics of the pest that could affect the probability of establishment include the reproductive strategy of the pests (e.g. parthenogenesis/self-crossing), genetic adaptability, and the minimum population needed for establishment. Detailed data covering such characteristics are often not available, and their assessment is beyond the scope of a rapid PRA.

As a rough guide, follow the descriptions below for the summary assessment:

- Very unlikely: A species (cultivar), which normally only survives through human intervention (many cultivars), or a pest, for which no suitable host is known from the territory; climatic conditions, which don't allow the survival of some seasons (winter frost, summer heat/dryness etc.).
- Unlikely: A species which only rarely escapes from cultivation and can only become temporarily established. As an example, the species might occasionally survive mild winters, but generally the climatic conditions wouldn't allow a long-term self-sustaining establishment.
- Moderately likely: For example, species known to frequently occur outside of cultivation, which can build up temporary populations, normally perishing again, but which, over time, may have a chance of becoming permanently established through long-term adaptation.
- Likely: At least some parts of the territory provide conditions (climate, hosts) that fall within the range of the species' ecology, and are therefore suitable for it to establish. Examples from other invaded areas with similar setups are often available.
- Very likely: Conditions and host availability matching the biological requirements of the species very well. Examples from other invaded areas with similar setups are often available.

Please make sure that the text in boxes above fit your summary assessment.

3.2.1 (template 1); 3.3.1 (template 3) What is the potential spread in the territory, outside cultivation?

In this context, spread is defined as the capacity to disperse and to establish at previously uninvaded places. It does not refer to the increase in abundance in a place where the species is already established.

Natural population spread, increasing the infested area, can result from the movement of the pest by flight (of an insect), wind or water dispersal, transport by vectors such as insects, birds or other animals (internally through the gut or externally on the fur), natural migration, rhizome growth. Consider human mediated dispersal; the presence of natural barriers; suitability of the environment (climate and habitat match). With ornamental plants, consider human aided spread within gardens throughout the territory.

Under ‘how rapidly would the organism spread by natural means?’ you should give a short discursive answer, back up with references whenever possible. For example, the answer could be phrased: “Spread is likely to be slowly/rapidly/etc., because of…”

3.2.3 If transmitted by vectors, what is the likelihood of suitable vectors being available? (only template 3)

Please only consider biological vectors for this question. In the vast majority of cases these will be insect vectors transmitting plant, animal or human diseases. Less likely is that arthropod pests such as mites need to be transported between hosts by insect vectors. Define this likelihood in the context of a broad range of different invasive species.

Part 4: Economic and environmental risks/effects of target species/product

4.1.2 Is there any negative impact of the species on the economy, environment or public health recorded from any parts of its current distribution?

Consider: Is any new animal or plant species proposed for import known to be a pest or weed anywhere else with a comparable climate, latitude and ecosystem characteristics?

4.2 to 4.5 Assessment of the potential for negative impact in the territory

Consider the presence of plants and animals known to be impacted by the pest, their extent, and importance to the island. Climatic and cultural conditions should be considered to decide whether important economic, environmental or social damage may occur.

4.2 Economic and socioeconomic impacts

Is the species known to cause economic damage? There should be clear indications that the pest is likely to have an unacceptable economic impact. Damage could be to agriculture, forestry, tourism, or fisheries.

Summary of economic and socioeconomic impacts (all templates)

Note: We are only asking for estimates in this summary section. More precise predictions, including absolute amounts of economic costs or percentage of population impacted on, referenced with evidence, would be desirable but are beyond the scope of a rapid PRA. However, if major concerns remain regarding the forecast of economic and socioeconomic impacts this can lead to a suggestion to scale up to a full PRA.

Guidance to impact levels:

- Very small: No negative impact expected at all, or a negligible level (most likely unmeasurable).
- Small: Impact would be small enough not to significantly affect people's lifestyle or income, but impact may become noticeable or measurable over time (e.g. farmers needing to spend a small but noticeable amount of time weeding an introduced weed in their field; pest symptoms become visible on crop plants, but there is no significant loss of yield or decrease of product quality, and no change in crop treatment is necessary).
- Medium: Significant negative impacts, which would lead to some small but measurable income losses and require adaptation to working procedures, such as new crop protection measures. Impact is, however, still small enough not to lead to job losses.
- Large: Negative impact would be large enough to significantly change traditional ways of lives (e.g. change of agricultural methods). Highly likely to lead to some job losses and some changes in the overall economy.
- Very large: Risk that the negative impact could threaten the economy or food security for the entire territory (change of employment rates).

4.3 Is there likely to be an impact on human health or wellbeing?

Consider if the pest is a vector for a human disease or parasite; is known to cause allergies; can reduce amenity values; can reduces aesthetic values; is a public health pest.

Summary of public health impact

Guidance to impact levels:

- Very small: No negative impact expected at all, or a negligible level (most likely unmeasurable).
- Small: Impact would be small enough not to significantly affect people's lifestyle or income, but impact may become noticeable or measurable over time (e.g. there may be a few reports of people being bitten or stung by a newly introduced arthropod, but with no risk of disease transmission or allergic reactions).
- Medium: Significant negative impacts, but still restricted to a new species becoming a nuisance rather than a real threat to health. For example, an overall increase of mosquito bites occurring after the introduction of a new species. Sometimes an adaptation to the current lifestyle is required to address the negative impacts (e.g. use of insect repellents, installation of fly screens etc.); rare occurrence of allergic reactions to bites or stings.
- Large: Negative impact would be large enough to pose a significant new threat to health, such as the regular occurrence of potentially life-threatening allergic reactions to bites/stings. Measurable increase in costs required for the control of a new pest in order to avoid negative heath impacts.
- Very large: Threats to life are likely to occur, at least long-term. For example, the introduction of a vector of potentially life-threatening diseases, even if the disease itself hasn't arrived in the territory yet. Impact on human health, which may lead to changes to the current lifestyle (e.g. change of agricultural methods because a new weed produces allergenic pollen).

Summary of animal health impact

Guidance to impact levels:

- Very small: No negative impact expected at all, or at a negligible level (most likely unmeasurable).
- Small: Impact small enough not to significantly affect livestock or pet health, but impact may become noticeable or measurable over time (e.g. reports that livestock gets bitten or stung by a newly introduced arthropod, but with no risk of disease transmission).
- Medium: Significant negative impacts, but still restricted to a new species becoming a nuisance rather than a real threat to animal health. For example, an increase of mosquito bites after the introduction of a new species, which leads to changing behaviour of livestock, but doesn't reduce productivity. Sometimes an adaptation to the current lifestyle is required to address the negative impacts (change in pasture management; keeping pets indoors at certain times of the day etc.); rare occurrence of allergic reactions by animals to bites or stings.
- Large: Negative impact would be large enough to pose a significant new threat to animal health, such as the regular occurrence of potentially life-threatening allergic reactions to bites/stings. Measurable increase in costs required for the control of a new pest in order to avoid negative animal health impacts.
- Very large: Threats to life are likely to occur, at least long-term. For example, the introduction of a vector of potentially life-threatening diseases, even if the disease itself hasn't arrived in the territory yet. Impact on animal health, which may lead to changes to the traditional ways

of lives (e.g. some livestock can't be reared, or at least not in a profitable way anymore; livestock and/or pets dying from the impact of the newly arrived species).

4.5 Environmental and ecosystem effects

Is the species known to cause environmental damage? There should be clear indications that the pest is likely to have an unacceptable environmental impact. Damage could be genetic, direct, or through habitat transformation, pest or disease introduction.

4.5.1 Are there any threats to native or endemic species? (all templates)

Please consider that the threat posed to native and endemic species not only relates to top-down impacts within a food chain (e.g. predatory invasives feeding on endemic invertebrates) but that direct competition can pose an equally significant threat. Therefore, it is important to consider the affinity of the target species to native species in your territory. The more closely related any native species is to the target species, the higher the threat of direct competition between them, and the more difficult the eradication or control efforts (e.g. biological control) will be.

4.5.2 What is the level of potential negative impact on ecosystem services in the PRA area (all templates)

In many cases it is important to consider pollination here. Will the target PRA species impact on pollination or other pollinators (via competition or predation) in natural or semi-natural ecosystems? If the target species is a pollinator itself it may have an indirect impact on introduced plant species, and in certain circumstances it could cause a specific introduced plant species to become invasive, through increased levels of seed setting. These questions may be relevant not only to species that can be accidentally introduced but also for some planned introductions (e.g. pollinators planned to be introduced for crop pollination in greenhouses). Ornamental plants planned to be introduced may impact directly on native pollinators and indirectly on the pollination of native plants by changing the behaviour of the native pollinators and attracting them away from native plants.

Summary of environmental impact

Guidance to impact levels:

- Very small: No negative impact expected at all, or at a negligible level (most likely unmeasurable).
- Small: Impact small enough not to significantly affect biodiversity or ecosystem services, but impact may become noticeable or measurable over time (e.g. reports it causes that some native species decline, but not to a degree that has knock-on effects, or that the affected species becomes threatened).
- Medium: Significant negative impacts, but restricted to only a single or few native species, with little or no secondary impacts on whole systems or ecosystem services. Sometimes specific measures would be required to prevent the impact becoming larger over time, and to prevent a severe decline in specific native species.
- Large: Negative impact would be large enough to pose a significant new threat to native or endemic species. Some species may become threatened with extinction. Significant impacts on ecosystem services is possible, posing secondary threats to other native or endemic species not directly affected by the target species. Significant costs would be required for the control of the new pest to avoid irreversible changes to local ecosystems.

- Very large: Threats that would irreversibly change the whole local ecosystem, with the loss of native and endemic species likely and unpreventable. Ecosystem services (water supply, pollination of crops etc.) changed negatively and irreversibly.

Part 5: Pest risk management

General notes:

For each pest, weed and disease identified as a concern, an assessment of the acceptability of risk is carried out in Part 5.

Identification of appropriate risk management options for each pest, weed and disease of concern, separated into pre-border, at the border and post-border options:

- Pre-border: production in a sterile environment, phytosanitary certificates based on pre-shipment inspections, packaging that prevents contamination, any other regulation such as pesticide treatments, heat treatments and fumigation taking place before or during shipment. *(Is the pest or are symptoms of the disease visible by inspection? Are inspections of the growing plant required, or can they be done at the point of export?)*
- At the border: Inspections and treatments *(Is the pest or are symptoms of the disease visible by inspection? Does the inspection take place in an environment where escape and survival of pests is of low risk? Are there any treatments (e.g. pesticide sprays, heat treatments etc.) which remove or reduce the risk of live organisms in the commodity?)*
- Post-border: Options for containment and eradication (*Are there any treatments (e.g. pesticide sprays) which can be done post-border? How easy is the pest, disease or weed to detect and manage?)*

Evaluation of risk management options: Consider: how reliable are the various mitigation options in reducing the risk? What is the confidence in the biosecurity systems of the exporting countries?

5.1.1 What mitigation measures can be put in place if the imported species becomes invasive and starts to impact negatively on the economy and/or environment? (templates 1 and 2)

Please keep in mind that any mitigation measures for planned introductions should include plans to address accidental introduction of associated species (or groups of ecologically similar species, such as mealybugs or thrips).

5.2.1 What species are reported to be associated with the target import?

Through literature research and/or conducting an online PRA for your target species/commodity, generate a list of associated species (mainly pests and diseases) which are not yet present in the territory, and include a list of these species in the section 5.2.1. If available, provide and reference additional information that links these species to the target commodity.

5.2.4 Are there any species listed or described in 5.2.1 which are not covered by existing prevention measures, the pathway action plan or feasible new measures as listed in 5.2.3?

List all associated species not covered by existing or feasible new biosecurity measures. If there are any, this will most likely lead to a sentence in the summary that states that current prevention measures are not sufficiently effective. This will either lead to the rejection of the import application, or a suggestion to assess the species in question in more detail through a separate rapid PRA using template 3. As a rough guide for the likelihood that control measures will be effective in preventing introduction and establishment, follow the directions/examples below for the summary assessment.

- Very unlikely: Some life-stages of the target species are so difficult to detect that inspections are not effective. Species are very commonly intercepted but only spot-check inspections are possible. Also includes species that can reach the territory unaided by humans (wind drift, driftwood etc.)
- Unlikely: For example, species that can easily be detected during inspections and that are not commonly intercepted, but only spot-check inspections are possible.
- Moderately likely: Species for which the measures in place have prevented introduction in some other countries, but not in all. Species with post-border records but with no reported establishment.
- Likely: Species with a similar ecology to similar pests, for which prevention measures have proven to work effectively. Also, species that are widespread outside the territory and are known to be invasive, but that have limited pathways which are easily restricted.
- Very likely: Species with a low likelihood of arrival in the first place; easy detection of the life stages, which can survive in the territory. Restricted to very specific pathways, which can easily be closed off. Quarantine procedures allow detection of any life stages of the target species.

Other information

You can describe here in more detail whether the PRA supports or recommends to reject any planned introductions (templates 1 and 2), or whether there should be a revision of the current pathway action plan as a consequence of the PRA.

Part D: Communication network

1. Introduction and SWOT analysis

This section covers the proposed communication network discussed and agreed with the Caribbean British Overseas Territories during the duration of the project. The communication network is designed to respond to several challenges shared across the biosecurity teams of all the territories in relation to PRA development and capacitation. These issues were identified in a SWOT analysis developed collaboratively:

Strengths

- There're already links among the territories so sharing threats will be useful
- Develop projects collaboratively among territories
- Sharing pest alerts to be ready and prepared
- Time saving by sharing PRAs
- Sharing expertise among biosecurity teams

Weaknesses

- Data sharing restrictions for Government. Sharing critical pest alerts will need permission. But procedures, templates, PRAs could be possible.
- Limited time of staff members to help other territories. Particularly for taxonomists
- Government internet block certain Internet services and software (barracuda software)
- Financial constraints to sustain network
- Internet not available/reliable out in the field or in some key areas (e.g. cargo entry points)
- Must use personal phones and data

Opportunities

- Increase confidence levels on PRA by collaborative work, review, and sharing.
- Produce common reports and templates, and procedures
- MoU to share critical/essential information (pest alerts)
- Staff Exchange and attachments
- Potential regional meetings – all together
- Sharing professional networks
- Increase internal communication (e.g. Env-Agric)
- Sharing lab resources and species identification
- Capacity building
- Sharing experience with technology and recommendation of good practices and management

Threats

- Sharing confidential information (financial, personal…)
- Data leaks from repositories
- High staff turn-over
- Natural disasters
- Political will to finance the communication activities. Difficult to convince them if it isn't related to key aspects (e.g. tourism)

2. PRA activities that trigger communication

Stage 1 – PRA initiation Stage 2 - Screening	• Query for species identification (e.g. picture) for accidental introduction or interceptions. Keep list of taxonomists that could be approached • Access PRA repository and search in e-mail • Query biosecurity network for information on the species via e-mail group • After working on the screening, share the document form for comments if necessary. Better to be specific as possible • Share the screening form completed if it was positive or negative. If required further PRA wait till the rest of the steps
Stage 3 – Rapid PRA Stage 4 – Full PRA	• After finishing full draft of the rapid PRA share to get comments and feedback if necessary (e.g. not confident enough). Try to be specific about the feedback required. Remove personal information before sending or sharing • Very specific questions on aspects of a PRA, avoid too frequent messages
Stage 5 - Repository	• Mantain consultant database which are approved to deliver full PRA. Flexible process to add to list. Consultant/company contact details, expertise taxonomy/commodity, territory, annex: CV or portfolio of projects. Accreditation system for consultants is not required at the moment. • Deposit PRA in the repository, internally for the Caribbean BOT • Public release of PRA is currently not contemplated • Confidentialiy / Personal information. For full PRA we need to request the consultancy to make the report publicly available. Develop a template with requirements for the consultant/importer to deliver a full PRA • Interest to combine repository with SAUKOT but tequired to have internal permission from department • Announce the availability of new resource in the e-mail group

3. Pilot tools for network communication

Several available communication tools were assessed and discussed within the group to cover the key communication activities indicated above. The final set was agreed based on familiarity with the tool, practicality and government permission:

Activity	**How**
Instant Messaging (e.g. pest alerts)	WhatsApp (Smartphone App)
Queries / announcements / general messages	Google groups. groups.google.com. This is a platform that helps to organise e-mail groups. All e-mails sent to the group address will be distributed among the members. E-mails are saved in a repository with query and labelling options.
Reports and data repository	Google Drive: drive.google.com. Shared online cloud storage platform. It allows to create private online storage where all members could add and view files. There are options also to collaborative editing documents.
Regular online meetings	Skype or Zoom are the most common tools for online group meetings.

Staff exchanges and visits	Apply for funding internal or external (GB NNSS, Darwin+
Consultant database	Google Drive: drive.google.com. There are options also to collaborative editing documents. This database has a spreadsheet format that everybody can edit simultaneously.

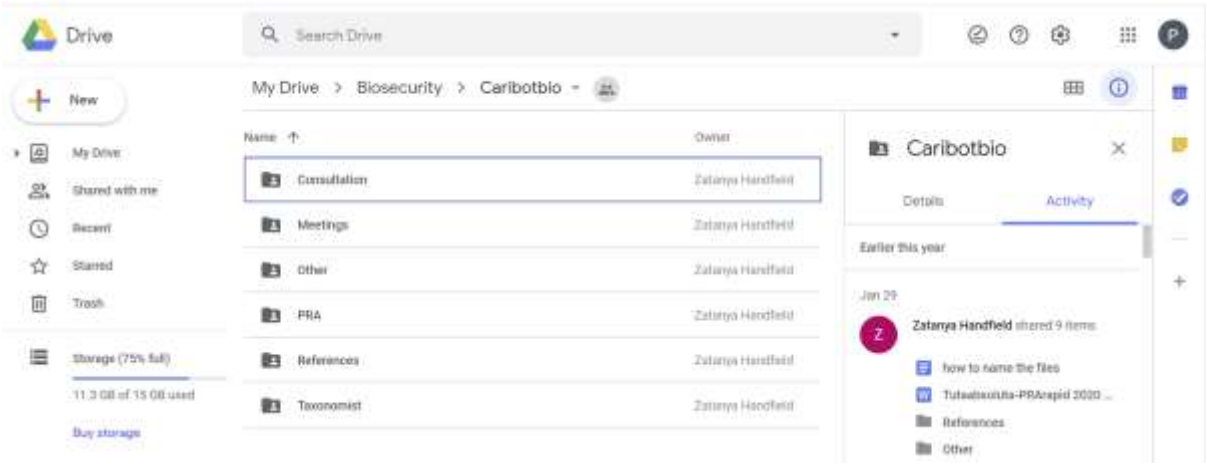


Fig 1: Screenshot of the Google Drive space for the Caribbean British Overseas Territories showing the folder hierarchy to organize the repository

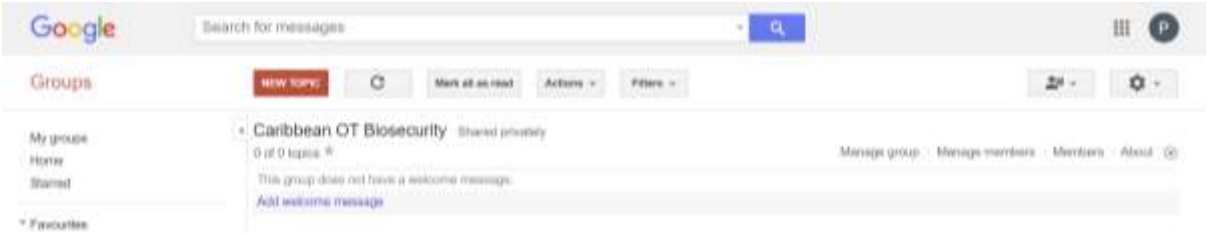


Fig 2: Screenshot of the Google Groups space for the Caribbean British Overseas Territories

Annex 1: Helpful tools and links

Tools to use:

- On-line tools such as the CABI Horizon Scanning tool (www.cabi.org/horizonscanningtool), the CABI PRA tool (https://www.cabi.org/PRA-Tool/login), the CABI Crop Protection Compendium and Invasive Species Compendium, Global Invasive Species Database, etc.
- Consultation with local experts (e.g. from governmental institutions, NGOs etc.)
- Consultation with international experts (e.g. Aliens, PestNet, JNCC, Fera Science Ltd. UK)
- Paid consultancy with consultant (e.g. Fera Science Ltd. UK, CABI and others)

Information resources

This list of online resources may help the applicant to gather information about the organism being assessed. The resources provide information on the invasiveness, description, distribution, and habitat of the species. It is recommended to check additional resources that give information about the species from within its native range (e.g. local floras).

Global

CABI, 2016. Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc

ISSG, 2015. Global Invasive Species Database (GISD). Invasive Species Specialist Group of the IUCN Species Survival Commission. http://www.issg.org/database/welcome/

ILDIS, 2005. International Legume Database and Information Service: World Database of Legumes (version 10). Reading, UK: School of Plant Sciences, University of Reading. http://www.ildis.org/

Missouri Botanical Garden, 2015. Tropicos database. St. Louis, Missouri, USA: Missouri Botanical Garden. http://www.tropicos.org/

USDA-ARS, 2015. Germplasm Resources Information Network (GRIN). Online Database. Beltsville, Maryland, USA: National Germplasm Resources Laboratory. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch.aspx

WCSP, 2015. World Checklist of Selected Plant Families. London, UK: Royal Botanic Gardens, Kew. http://apps.kew.org/wcsp/home.do

Asia

Flora of China Editorial Committee, 2015. Flora of China. St. Louis, Missouri and Cambridge, Massachusetts, USA: Missouri Botanical Garden and Harvard University Herbaria. http://www.efloras.org/flora_page.aspx?flora_id=2

Flora of Pakistan, 2015. Flora of Pakistan/Pakistan Plant Database (PPD). Tropicos website. St. Louis, Missouri and Cambridge, Massachusetts, USA: Missouri Botanical Garden and Harvard University Herbaria. http://www.tropicos.org/Project/Pakistan

Africa

Invasive Species South Africa, 2015. Plants A-Z: Flora that is invasive in South Africa. South Africa: Invasive Species South Africa. http://www.invasives.org.za/invasive-plants.html

Madagascar Catalogue, 2015. Catalogue of the Vascular Plants of Madagascar. St. Louis, Missouri, USA and Antananarivo, Madagascar: Missouri Botanical Garden. http://www.tropicos.org/project/mada

PROTA, 2015. PROTA4U web database. Grubben GJH, Denton OA, eds. Wageningen, Netherlands: Plant Resources of Tropical Africa. http://www.prota4u.org/search.asp

Americas

I3N-Brasil, 2015. Invasive alien species database. Florianópolis - SC, Brazil: Horus Institute for Environmental Conservation and Development. http://i3n.institutohorus.org.br

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Flora Mesoamericana, 2015. Flora Mesoamericana. St. Louis, Missouri, USA: Missouri Botanical Garden. http://www.tropicos.org/Project/fm

Flora of North America Editorial Committee, 2015. Flora of North America North of Mexico. St. Louis, Missouri and Cambridge, Massachusetts, USA: Missouri Botanical Garden and Harvard University Herbaria. http://www.efloras.org/flora_page.aspx?flora_id=1

FLEPPC, 2013. List of Invasive Plant Species. List of Invasive Plant Species. Fort Lauderdale, Florida, USA: Florida Exotic Pest Plant Council. http://www.fleppc.org/list/list.htm

Forzza RC, Leitman PM, Costa AF, Carvalho Jr AA, et al., 2015. List of species of the Flora of Brazil (Lista de espécies Flora do Brasil). Rio de Janeiro, Brazil: Rio de Janeiro Botanic Garden. http://floradobrasil.jbrj.gov.br

Instituto de Botánica Darwinion, 2015. Flora del Conosur. San Isidro, Argentina: Instituto de Botánica Darwinion. http://www2.darwin.edu.ar/Proyectos/FloraArgentina/BuscarEspecies.asp

Peru Checklist, 2015. The Catalogue of the Flowering Plants and Gymnosperms of Peru. St. Louis, Missouri, USA: Missouri Botanical Garden. http://www.tropicos.org/Project/PEC

USDA-NRCS, 2015. The PLANTS Database. Baton Rouge, USA: National Plant Data Center. http://plants.usda.gov/

Vibrans H, 2015. Malezas de México (Weeds of Mexico). http://www.conabio.gob.mx/malezasdemexico/2inicio/home-malezas-mexico.htm

Caribbean

Acevedo-Rodríguez P, Strong MT, 2012. Catalogue of the Seed Plants of the West Indies. Smithsonian Contributions to Botany, 98:1192 pp. Washington DC, USA: Smithsonian Institution. Online version at http://botany.si.edu/Antilles/WestIndies/catalog.htm

Broome R, Sabir K, Carrington S, 2007. Plants of the Eastern Caribbean. Online database. Barbados: University of the West Indies. http://ecflora.cavehill.uwi.edu/index.html

Kairo M, Ali B, Cheesman O, Haysom K, Murphy S, 2003. Invasive species threats in the Caribbean region. Report to the Nature Conservancy. Curepe, Trinidad and Tobago: CAB International, 132 pp. http://www.issg.org/database/species/reference_files/Kairo%20et%20al,%202003.pdf

Europe

DAISIE, 2015. Delivering Alien Invasive Species Inventories for Europe. European Invasive Alien Species Gateway. www.europe-aliens.org/default.do

EPPO, 2014. PQR database. Paris, France: European and Mediterranean Plant Protection Organization. http://www.eppo.int/DATABASES/pqr/pqr.htm

Royal Botanic Garden Edinburgh, 2015. Flora Europaea. Edinburgh, UK: Royal Botanic Garden Edinburgh. http://rbg-web2.rbge.org.uk/FE/fe.html

Oceania

Council of Heads of Australasian Herbaria, 2015. Australia's virtual herbarium. Australia: Council of Heads of Australasian Herbaria. http://avh.ala.org.au

HEAR, 2012. Alien species in Hawaii. Hawaii Ecosystems at Risk. Honolulu, USA: University of Hawaii. http://www.hear.org/AlienSpeciesInHawaii/index.html

New Zealand Department of Conservation, 2015. Common Weeds in New Zealand. Wellington, New Zealand: Department of Conservation. http://www.doc.govt.nz/conservation/threats-and-impacts/weeds/common-weeds-in-new-zealand/

PIER, 2015. Pacific Islands Ecosystems at Risk. Honolulu, USA: HEAR, University of Hawaii. http://www.hear.org/pier/index.html

University of Queensland, 2013. Weeds of Australia. Biosecurity Queensland Edition. Australia: University of Queensland. http://keyserver.lucidcentral.org/weeds/

Wagner WL, Herbst DR, Lorence DH, 2015. Flora of the Hawaiian Islands website. Washington DC, USA: Smithsonian Institution. http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm

Wagner WL, Herbst DR, Tornabene MW, Weitzman A, Lorence DH, 2015. Flora of Micronesia website. Washington DC: Smithsonian Institution. http://botany.si.edu/pacificislandbiodiversity/micronesia/index.htm

Wagner WL, Lorence DH, 2015. Flora of the Marquesas Islands website. Washington DC, USA: Smithsonian Institution. http://botany.si.edu/pacificislandbiodiversity/marquesasflora/index.htm

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The Plant List, 2013. The Plant List: a working list of all plant species. Version 1.1. London, UK: Royal Botanic Gardens, Kew. http://www.theplantlist.org/

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