PEST RISK ANALYSIS (PRA)

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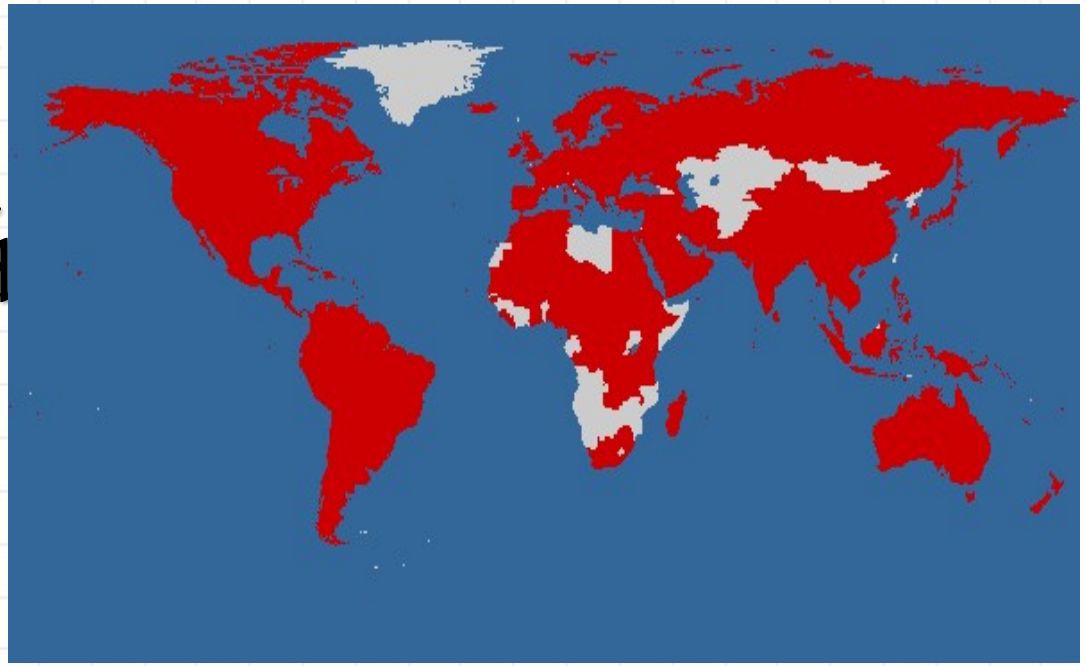
CAREC, Tbilisi
April 25-27 2019

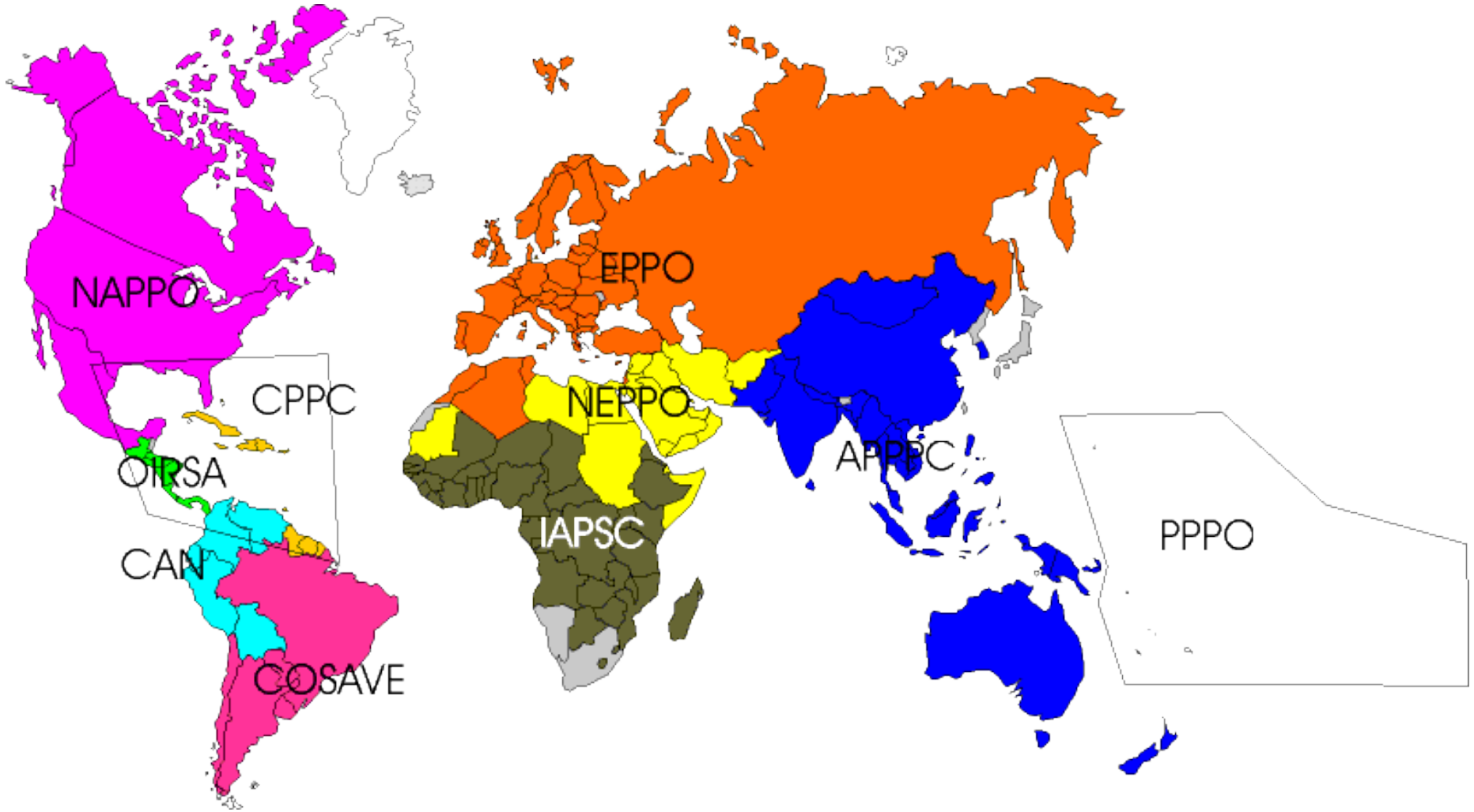
International Plant Protection Convention (IPPC)

- Multilateral treaty on international cooperation in the area of plant quarantine and protection
- The developer of international standards (ISPMs)
- Headquartered in Rome in the FAO building



183 contracting parties to IPPC (beginning of 2019)

Regional plant quarantine and protection organizations

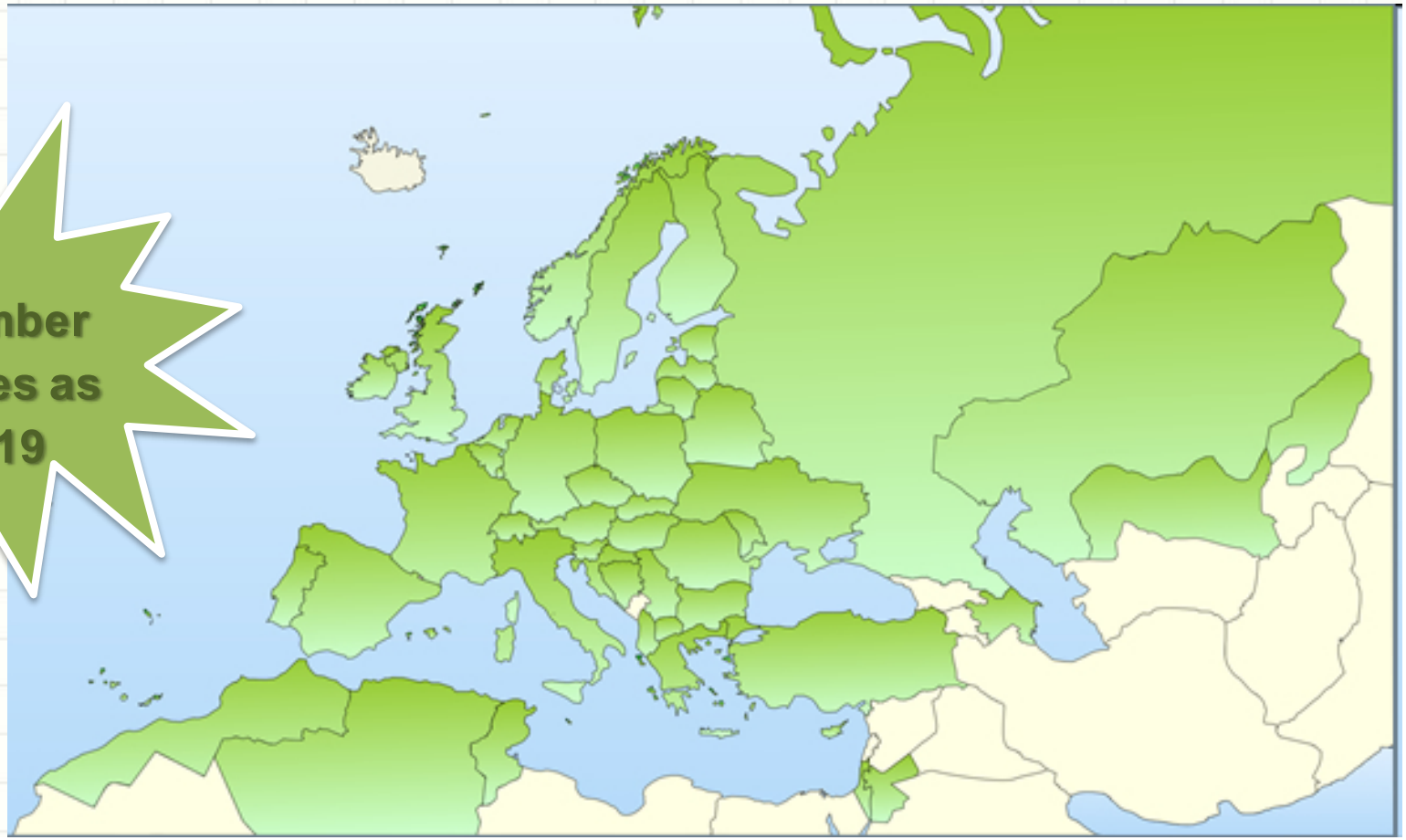


International Plant Protection Convention
Protecting the world's plant resources from pests

European and Mediterranean Plant Protection Organization (EPPO)

- Established in 1951
- Headquartered in Paris
- Main task – international cooperation in the area of plant quarantine and protection

52 member countries as of 2019



International Standards for Phytosanitary Measures (ISPMs)

- Provide the contracting parties with guidance on the implementation of national plant quarantine and protection programs and the fulfillment of IPPC requirements
- Main be very general, such as the Glossary (ISPM 5), or
- Very specific, such as ISPM 6 on surveillance or ISPM 15 on wood packaging materials

The WTO Agreement on the Application of Sanitary and Phytosanitary Measures (WTO SPS Agreement, 1994)

«**Members** shall **ensure that their** sanitary or **phytosanitary measures are based** on an **assessment** of the **risks** to **plant** life or **health taking into** account **risk assessment techniques developed by the relevant international organizations**»

The essence of IPPC principles and the SPS Agreement

- The countries have a sovereign right to apply phytosanitary measures
- These measures must be:
  - Applied only when needed
  - Technically justified with the help of the **phytosanitary risk assessment (PRA)**
  - Not stricter that necessary for risk management
  - Non-discriminatory
  - Transparent
  - Reviewed regularly
- Measures not in line with the ISPMs and not justified with the help of PRA, are considered technical barriers to trade

SCOPE OF ISPMs 2, 11 and 21 on PRA

- ISPM 2 – PRA procedures to be used by NPPOs to justify their phytosanitary measures
- ISPM 11 – Details of PRA for quarantine pests and integrated processes for risk assessment and risk management assessment
- ISPM 21 – PRA guidelines for RNQPs

EPO PRA standards

- Developed in line with ISPM 2 and 11
- Detail all PRA steps
- Fine-tuned during practical application in EPPO and EPPO countries

EPPO PRA standards

- PM 5/1(1) Check-list of information required for pest risk analysis (PRA)
- PM 5/2(2) Pest risk analysis on detection of a pest in an imported consignment
- ~~PM 5/3(1) Pest risk assessment scheme~~
- ~~PM 5/4(1) Pest risk management assessment scheme~~
- PM 5/3(5) Decision-making scheme for quarantine pests

EPPO PRA standards

- PM 5/5(1) Decision support scheme for the express pest risk analysis
- PM 5/6(1) EPPO prioritization process for invasive alien plants
- PM 5/7(1) Screening process to identify priorities for commodity PRA for plans for planting

EPPO PRA standards

- PM 5/8(1) Guidelines on the phytosanitary measure "Plants grown under complete physical isolation"
- PM 5/9(1) Preparation of pest lists in the framework of commodity PRAs
- PM 6/4(1) Decision-support scheme for import and release of biological control agents of plant pests

Who conducts PRA?

- Countries – PRA is one of the main functions of NPPOs in accordance with IPPC
- Regional plant quarantine and control organizations
- Trade blocks (EU, EAEU etc.)

Importance of PRA

Key element of the national phytosanitary systems:

- National lists of regulated pests (RP+RNQP) are drafted on the basis of PRA
- National phytosanitary requirements are based on the conclusion of the PRA risk management assessment
- A documented PRA is the “technical justification” for phytosanitary measures

Pest risk analysis (PRA)

Process of evaluating biological or other scientific and economic evidence to determine whether a pest should be regulated and the strength of any phytosanitary measures to be taken against it

PRA STAGES & STEPS:

- Stage 1: Preparation
- Stage 2: Pest risk analysis
  - Step 1: Pest categorization
  - Step 2: Assessing the probability of introduction (invasion + acclimatization) and spread
  - Step 3: Potential harm assessment
  - Step 4: General risk assessment
  - Step 5: Uncertainty assessment
- Stage 3: Pest risk management assessment
- Stage 4: Documenting the PRA

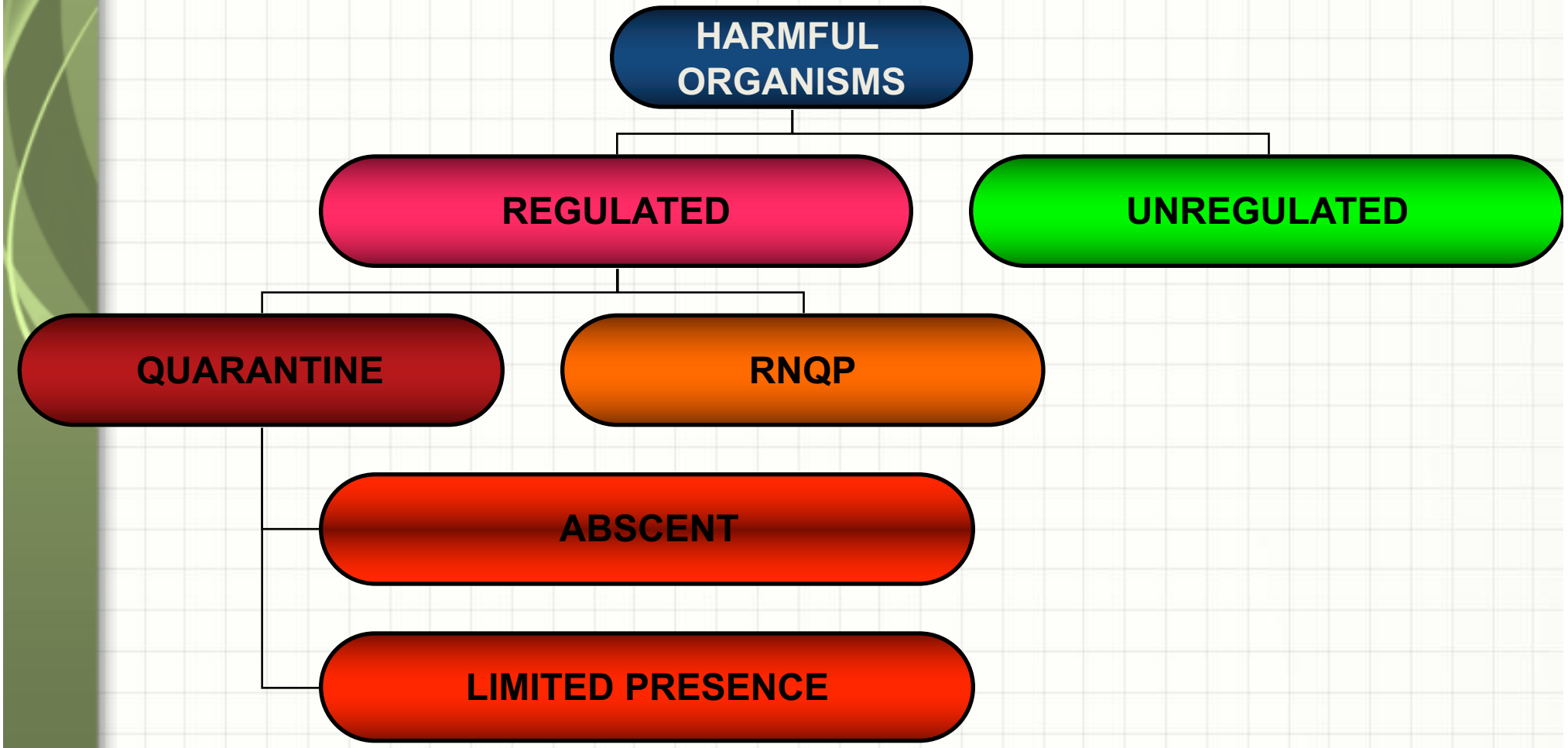
PR STAGE 1 – PREPARATION

1. Initiation options (grounds for PRA):
    1. Defining the commodity and other ways of spreading
    2. Pest definition
    3. Revision of the phytosanitary strategy
2. Defining the PRA zone
3. Collecting information about:
    1. Taxonomy
    2. Spreading
    3. Connections with fodder plants
    4. Previous PRAs
4. Conclusions: organism(s) potentially harmful for the PRA zone defined and information necessary for the PRA collected

STAGE 2 – PEST RISK ASSESSMENT

1. Pest categorization
2. Assessing the probability of introduction and spreading
3. Assessing the potential economic implications and environmental impact

Categories of organisms harmful to plant health



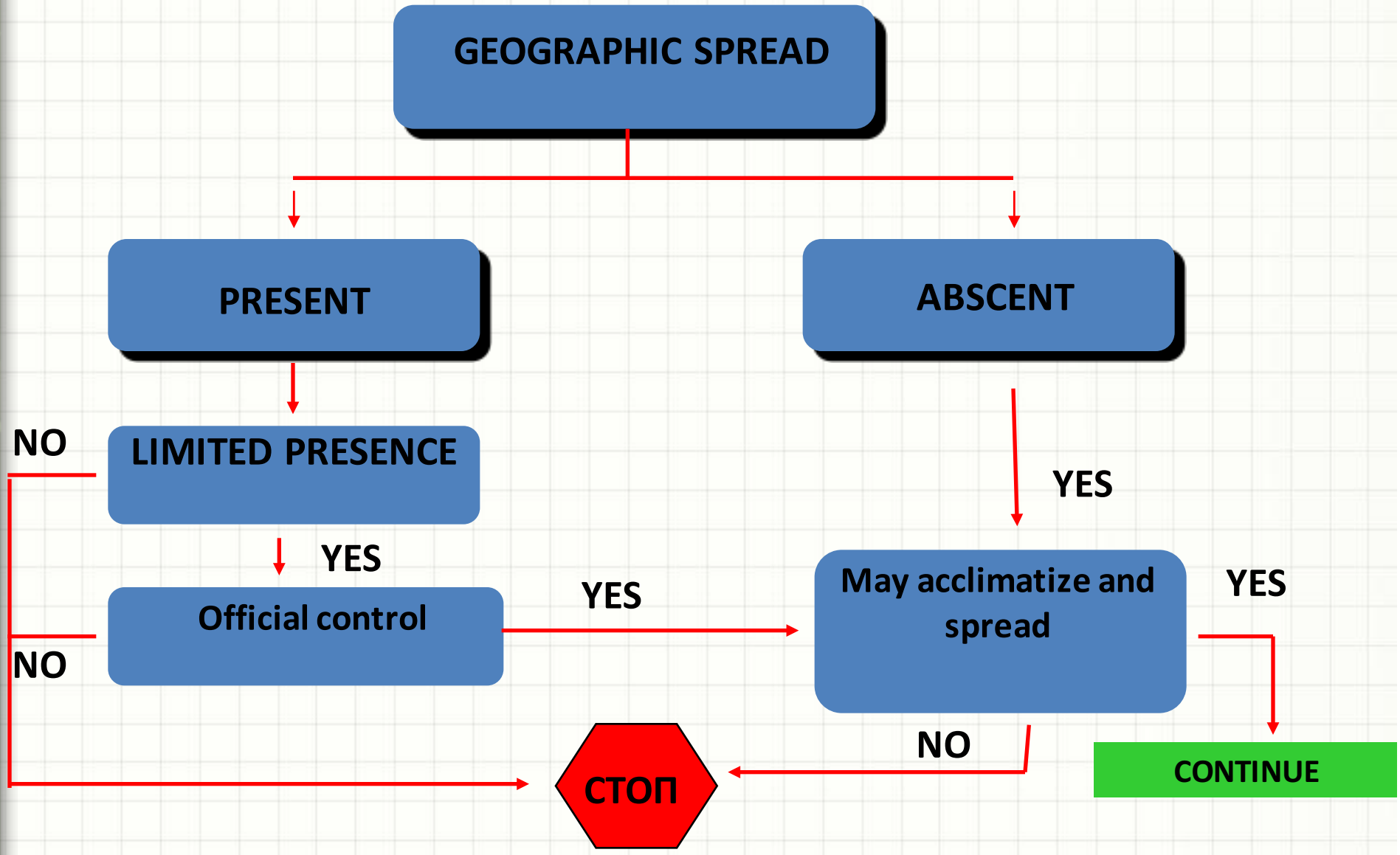
DEFINITIONS

QUARANTINE PEST

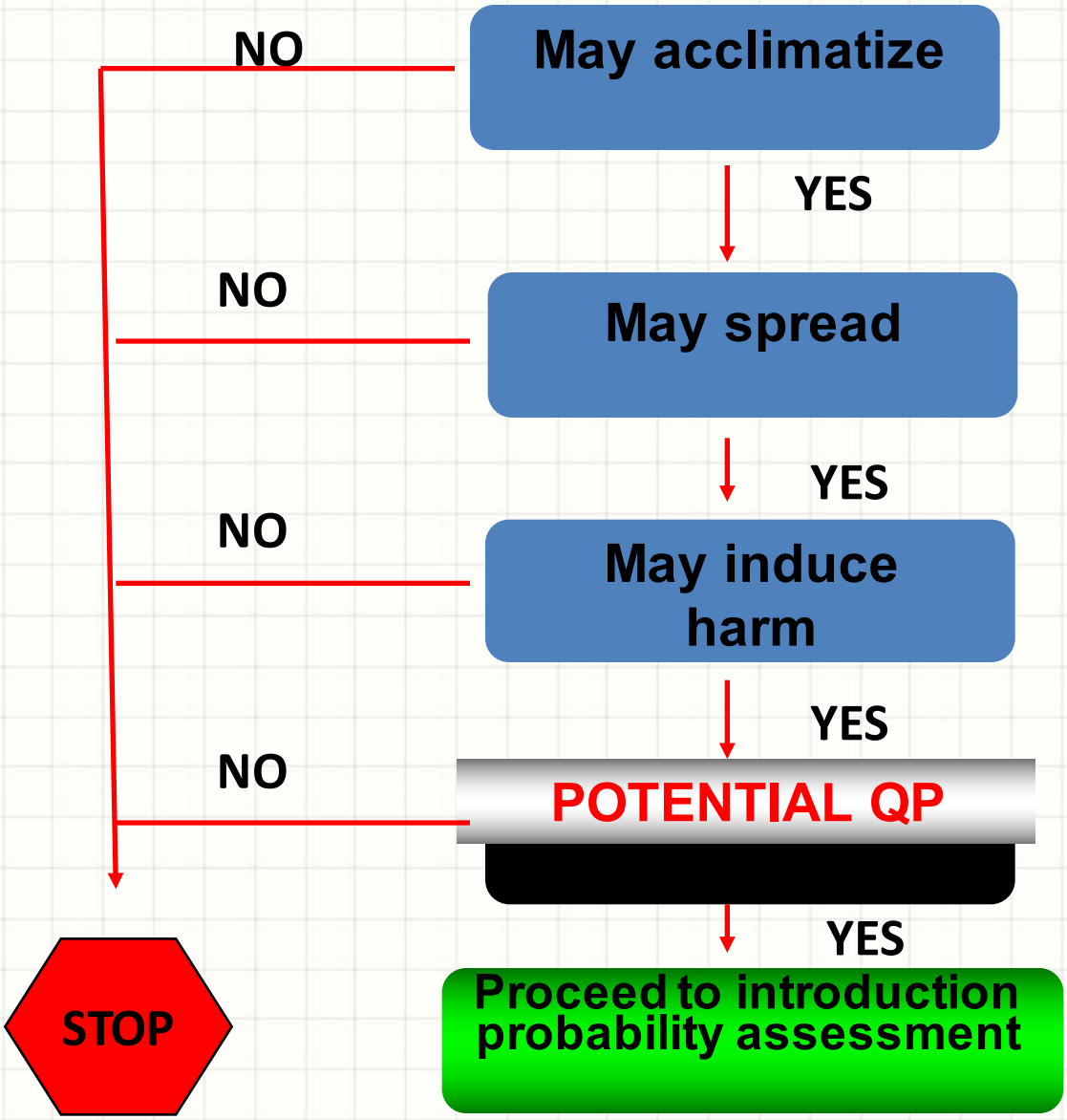
– A **pest** of potential economic importance to the **area endangered** thereby and not yet present there, or present but not widely distributed and being **officially controlled**

- **RNQP**
  – A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party

For QP: PEST CATEGORIZATION



For QP: PEST CATEGORIZATION



PROBABILITY OF INTRODUCTION

- SPREADING FROM THE EXPORT LOCATION TO DESTINATION

- PEST OCCURRENCE
  - Pest amount in the source zone
  - Development stage related to the commodity
  - Volume and frequency of goods movements (import)
  - Seasonal distribution of the goods (import)
  - Pest control practices at the place of origin
- SURVIVAL DURING TRANSPORTATION OR STORAGE

PROBABILITY OF INTRODUCTION (continued)

- SURVIVAL UNDER EXISTING PROCEDURES
- PROBABILITY OF TRANSMISSION TO A SUITABLE HOST
  - Mechanisms and spectrum of the commodity dispersal
  - Proximity of suitable hosts
  - Time of the year for import
  - Intended use of the commodity
  - Risks from associated products or waste

PROBABILITY OF ACCLIMATIZATION

- Presence, amount and distribution of hosts in the PRA zone (for plants – suitable locations)
- suitability of the environment in the PRA zone
- the pest's genetic adaptability
- the pest's reproductive strategy
- the pests' survival methods

PROBABILITY TO SPREAD AFTER ACCLIMATIZATION

- Suitability of the environment for the natural spread of the pest
- The pest's ability to spread independently
- Natural barriers
- Movement with the cargo or transport
- Intended use of the product
- Potential pest hosts in the PRA zone
- Potential natural enemies of the pest in the PRA zone

POTENTIAL DIRECT ECONOMIC CONSEQUENCES

- Known and potential host plants
- Types, size and frequency of damage
- Losses to productivity and quality
- Biotic and abiotic factors influencing the harm and losses
- Speed of spreading
- Control measures, their effectiveness and cost
- Influence on the existing production practices
- Environmental impact

Direct and indirect harm

Direct harm: direct damages to plants


Colorado beetle


Phytophthora ramorum


Pinetree trunk eelworm

Indirect harm: indirect harm to plants through competition, damages to plant-useful organisms, such as pollinators, earthworms etc.,


Japanese knotweed


New Zealand worm


Aethina tumida

POTENTIAL INDIRECT ECONOMIC CONSEQUENCES

- Impact on the domestic and external market including market access
- Changes to cost of production
- Undesired environmental impact of control measures on the environment
- Funds for additional research and consultations
- Social and other effects (tourism)

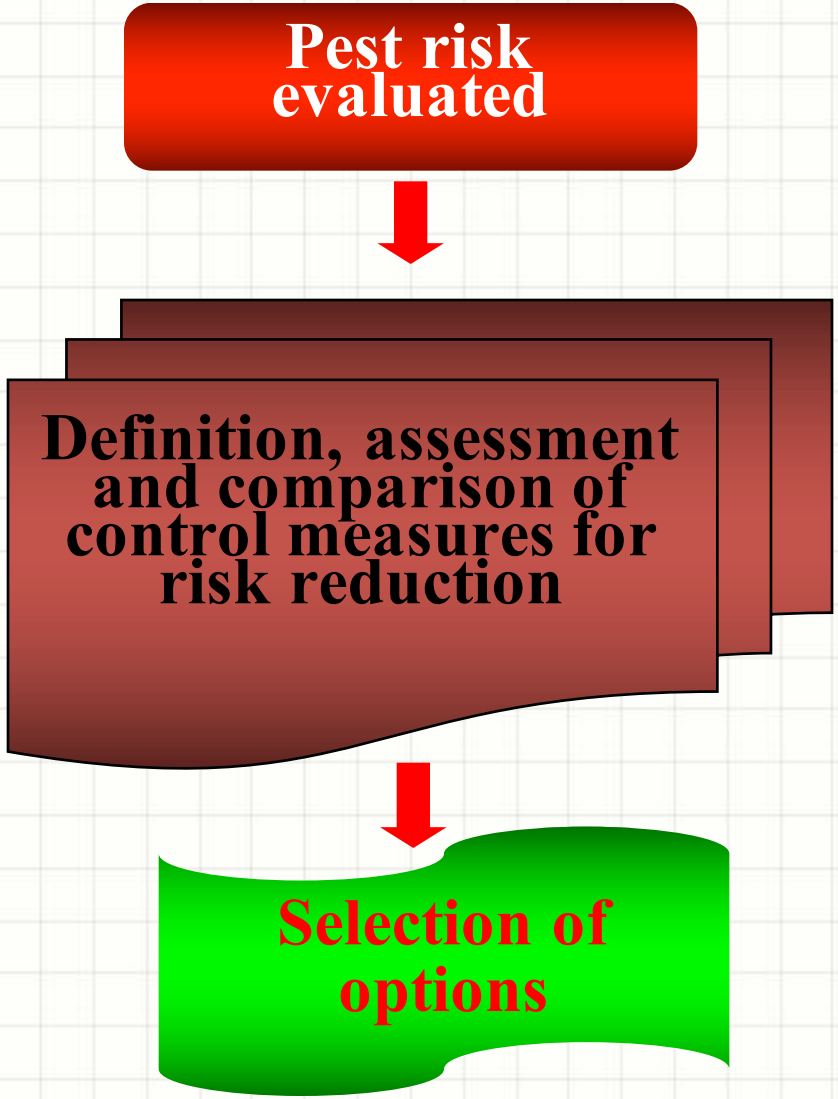
Risk acceptability

1. If the risk level as defined at the pest risk assessment stage is unacceptable, one needs is necessary to identify measures to reduce the risk to an acceptable level or below it
2. Measures are not justified if the risk is:
   - already acceptable
   - non-manageable (for instance with natural spreading)

STAGE 3 - PEST RISK MANAGEMENT ASSESSMENT

- **For QP** – selection and assessment of the options to reduce the risk of introduction and spread of the pest
- **For RNQP** - selection and assessment of the options to reduce the risk that the pest contained in the plant materials will have an economically unacceptable impact on the intended use of this material

STAGE III – RISK MANAGEMENT ASSESSMENT



Selection of acceptable risk management options

1. Cost-efficiency and feasibility of measures
2. Trade restriction no greater than necessary
3. Application to the minimal possible area to protect the endangered zone
4. If the existing measures are effective, no additional measures should be imposed
5. Accounting for the equivalency of measures
6. There should be no discriminatory measures on the domestic or international levels
7. The measures must be coherent (other ways of spreading)

Categories of phytosanitary measures

1. Applied to cargoes
2. Applied to reduce primary contamination of the crop or goods in the importing country
3. Applied to ensure the zone or production location is free (of the pest)
4. Ban on the import of cargoes

STAGE IV - DOCUMENTING

Principle of transparency (ISPM 1) (upon request, countries must provide technical justification of their phytosanitary requirements)

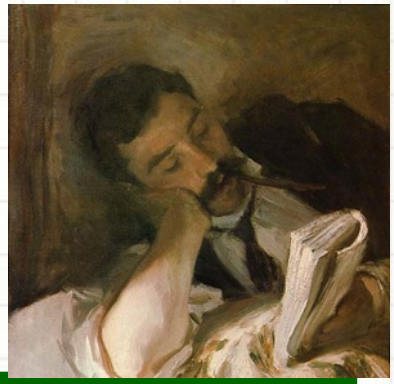
1. Aim
2. Pest or a list of pests, ways of spreading, endangered PRA zone
3. List of pests by categories
4. Conclusions of the pest risk assessment
5. Pest risk management
6. Selected management options

JOINT (EPPO/EU) PROJECT «PRATIQUE» (2007-2011)

- The project resulted in the development of a new version of the EPPO PM 5/3(5) Standard Decision support scheme for quarantine pests
- EPPO software «CAPRA» was developed (Computerized PRA)

Why was a computerized scheme necessary?

The latest version of EPPO PRA in figures (the printout is 35 pages!):



Section of the PRA scheme	Number of questions
Initiation/categorization	18
Introduction	14
Acclimatization	15
Spread	4
Impact	16
Management	44

Earlier analysis
The pest, or a very similar pest, may have been subjected to the PRA process before, nationally or internationally. This may partly or entirely replace the need for a new PRA.

4. Does a relevant earlier PRA exist?
   if yes **Go to 5**
   if no **Go to 6**

5. Is the earlier PRA still entirely valid, or only partly valid (out of date, applied in different circumstances, for a similar but distinct pest, for another area with similar conditions)?
   if entirely valid **End**
   if partly valid proceed with the PRA, but compare as much as possible with the earlier PRA **Go to 6**
   if not valid **Go to 6**

6. Specify all host plant species (for pests directly affecting plants) or suitable habitats (for non parasitic plants). Indicate the ones which are present in the PRA area.

Note: the taxonomic level at which hosts are considered should normally be the species. The use of higher or lower taxonomic levels should be scientifically justified. The pest should be able to complete its life cycle or multiply on the hosts considered. Some other plant species might also prove to be suitable hosts in the absence of the usual host species. Additionally, it may be appropriate to distinguish between major and minor hosts when answering this question. If the PRA is conducted on a pest which is indirectly injurious to plants through effects on other organisms, these organisms should also be present in the PRA area. Habitats may be considered according to the CORINE land cover classification (see appendix I). It may be useful to consider associations with key-stone or dominant species of plants. For intentionally introduced plants, indicate the unintended habitats.

Go to 7

7. Specify the pest distribution

Go to Stage 2

Stage 2: Pest Risk Assessment

Section A: Pest categorization

At the outset, it may not be clear which pest(s) identified in Stage 1 require(s) a PRA. The categorization process examines for each pest whether the criteria in the definition for a quarantine pest are satisfied. In the evaluation of a pathway associated with a commodity, a number of individual PRAs may be necessary for the various pests potentially associated with the pathway. The opportunity to eliminate an organism or organisms from consideration before in-depth examination is undertaken is a valuable characteristic of the categorization process.

An advantage of pest categorization is that it can be done with relatively little information; however information should be sufficient to adequately carry out the categorization.

There is no need to answer these questions in cases where it is clear from the outset that a full Pest Risk Assessment is required.

Identify the pest (or potential pest)

The identity of the pest (or potential pest) should be clearly defined to ensure that the assessment is being performed on a distinct organism, and that biological and other information used in the assessment is relevant to the organism in question. If this is not possible because the causal agent of particular symptoms has not yet been fully identified, then it should have been shown to produce consistent symptoms and to be transmissible.

If yes **go to 3.29**
If no **go to 3.6**

3.6. Could entry by natural spread be reduced or eliminated by control measures applied in the area of origin?
If yes **possible measures: control measures in the area of origin**
go to 3.7

3.7. Could the pest be effectively contained or eradicated after entry? (see answer to question 1.24, 1.32)
If yes **possible measures: internal containment and/or eradication campaign**
Go to 3.8

3.8. Was the answer "yes" to either question 3.6 or question 3.7?
If yes **Go to 3.29**
If no **Go to 3.38**

3.9. Is the pathway that is being considered the entry with human travellers?
If yes **possible measures: inspection of human travellers, their luggage, publicity to enhance public awareness on pest risks, fines or incentives. Treatments may also be possible**
Go to 3.29
If no **Go to 3.10**

3.10. Is the pathway being considered contaminated machinery or means of transport?
If yes **possible measures: cleaning or disinfection of machinery/vehicles**
Go to 3.29

For other types of pathways (e.g. commodities other than plants or plant products, exchange of scientific material, packing material, grain, wool, hides, sand, gravel ...), not all of the following questions may be relevant; adapt the questions to the type of pathway.

Go to 3.12

Existing phytosanitary measures
Phytosanitary measures (e.g. inspection, testing or treatments) may already be required as a protection against other (quarantine) pests (see stage 2: question 1.9). The assessor should list these measures and identify their efficacy against the pest of concern. The assessor should nevertheless bear in mind that such measures could be removed in the future if the other pests are re-evaluated.

3.11. If the pest is a plant, is it the commodity itself?

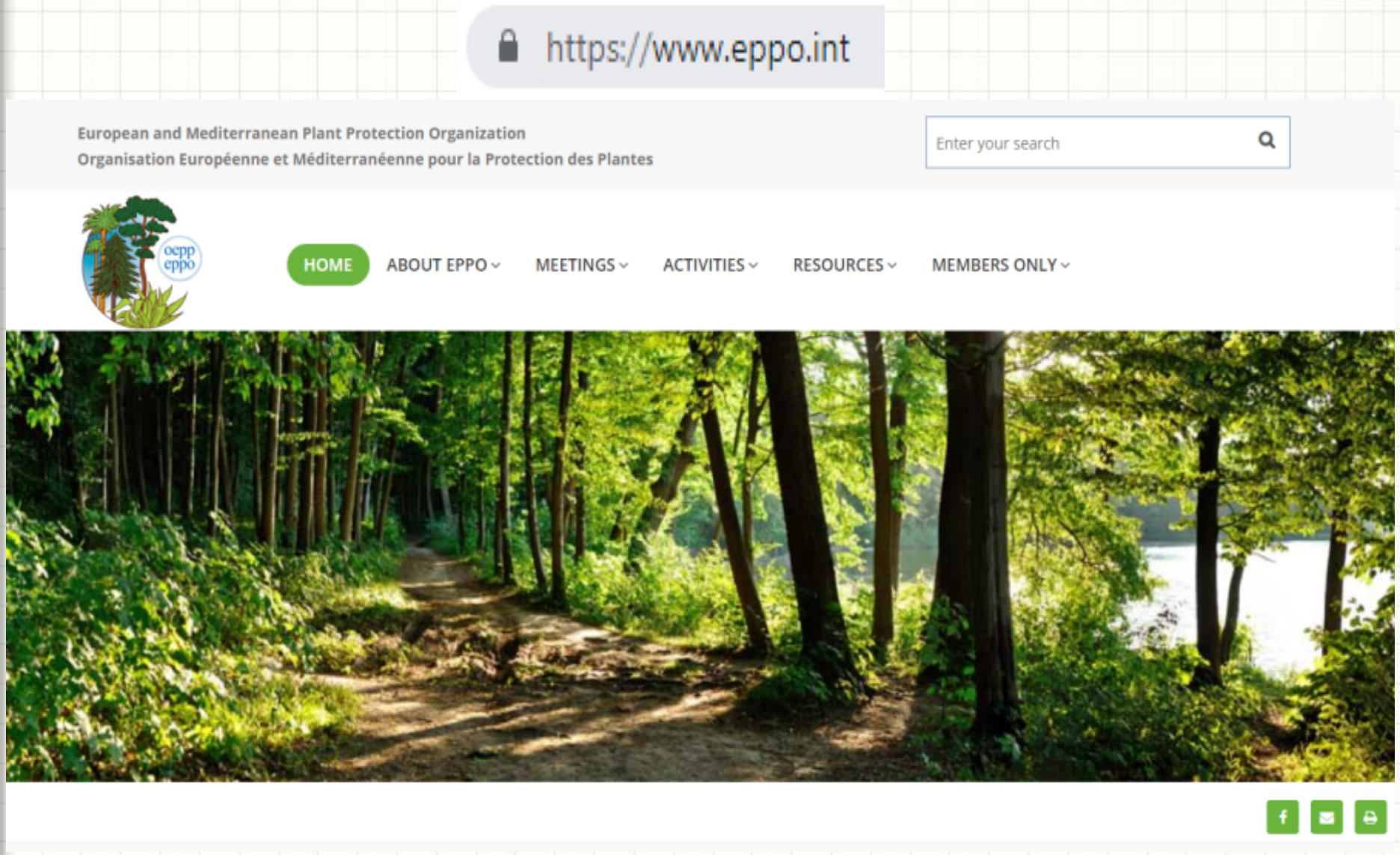
If yes **Go to 3.29**
If no (the pest is not a plant or the pest is a plant but is not the commodity itself) **go to 3.12**

3.12. Are there any existing phytosanitary measures applied on the pathway that could prevent the introduction of the pest?
if appropriate, list the measures and identify their

Latest version of the CAPRA software

- The software may be downloaded from the website: http://capra.eppo.org/download.php
- A user guide may be downloaded
- CAPRA is compatible with Windows XP, Vista, Seven and later, but not with Mac and Linux 
- Updates are offered as the software becomes more sophisticated

CAPRA software



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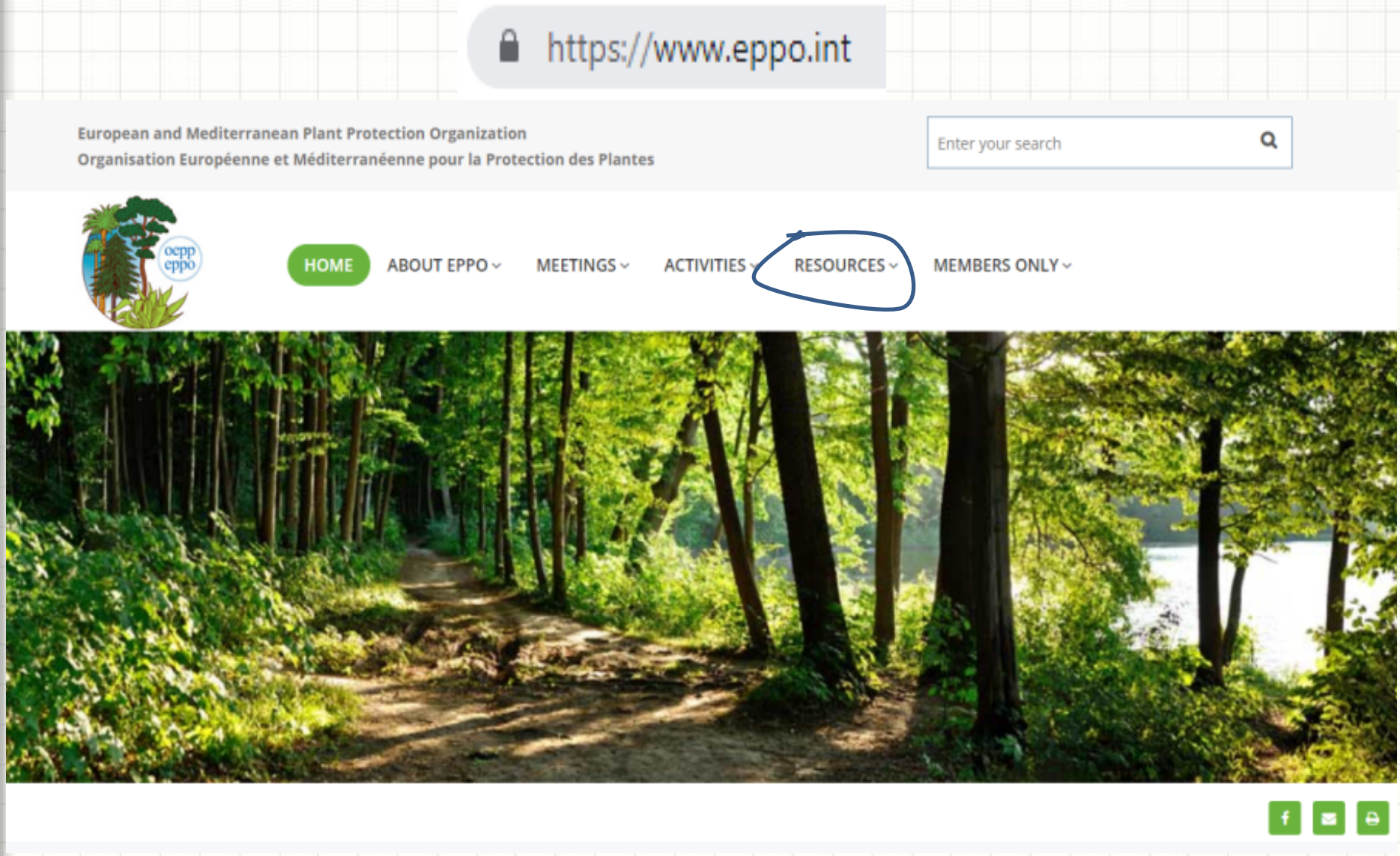

CAPRA software

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EPPO Platform on PRAs – **NEW**

This online platform aims to share information on activities that are related to the evaluation of pest risk in the EPPO region. It includes Pest Risk Analyses (PRAs) produced by EPPO, EFSA, NPPOs or other related agencies from EPPO countries (e.g. Express PRAs, quick scans, interception PRAs, commodity PRAs). These PRAs cover a wide range of pests. Part of the platform is restricted to registered users, so that they can also share draft PRAs or plans for future PRAs. The EPPO Platform on PRAs was released in September 2018.

more information | **access database**

EPPO Database on Diagnostic Expertise

This online database provides useful data on diagnostic laboratories of the EPPO member countries. Experts from more than 100 diagnostic laboratories of the EPPO region have provided details about the pests they can diagnose and the methods they use. EPPO member countries are encouraged to continue to provide data on their laboratories and expertise. Validation data for diagnostic tests is also included in this website.

more information | **access database**

CAPRA (Computer Assisted Pest Risk Analysis)

CAPRA software

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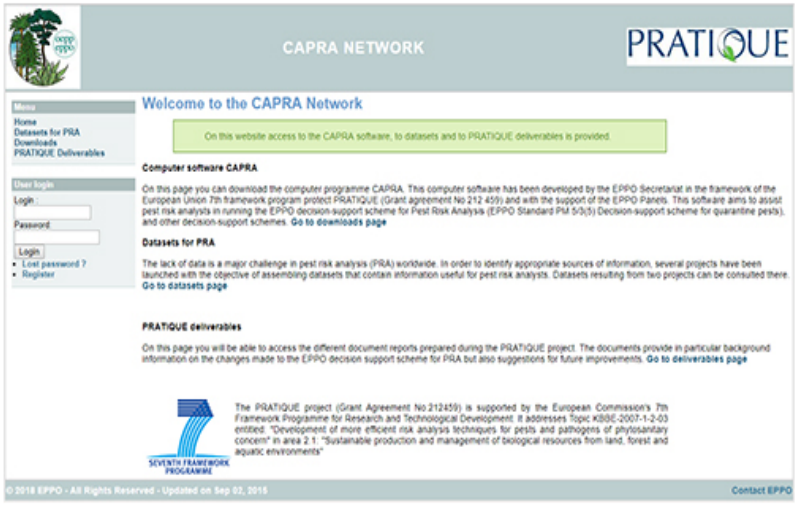
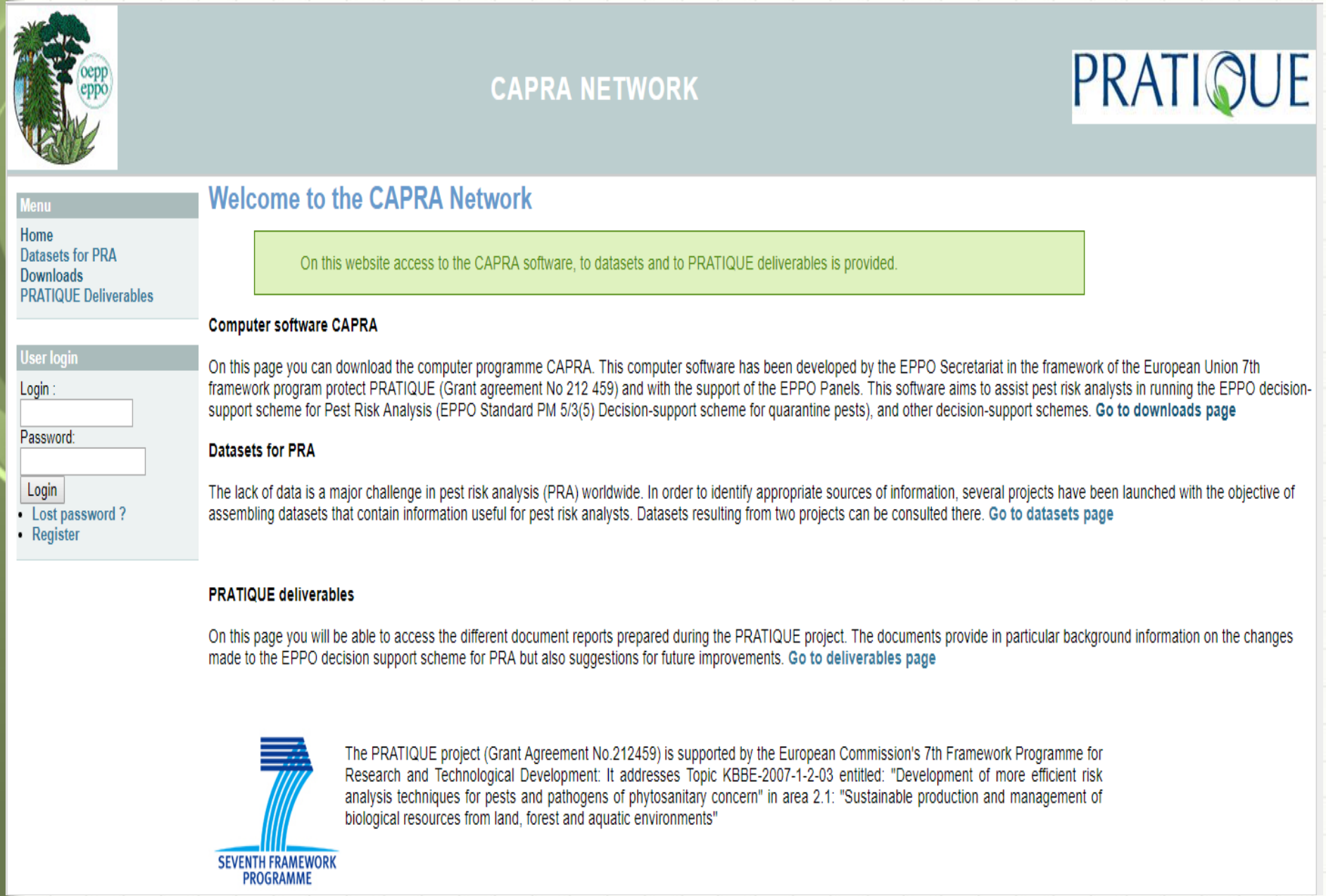
CAPRA – Computer Assisted Pest Risk Analysis

CAPRA is a software developed by EPPO to assist pest risk analysts in running the EPPO decision-support scheme for Pest Risk Analysis (PRA), and other decision-support schemes. This work was supported by the European Union 7th framework Programme project PRATIQUE (Grant Agreement No. 212459).



Access CAPRA

CAPRA software



CAPRA software

CAPRA NETWORK

PRATIQUE

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Welcome to the CAPRA Network

On this website access to the CAPRA software, to datasets and to PRATIQUE deliverables is provided.

Computer software CAPRA

On this page you can download the computer programme CAPRA. This computer software has been developed by the EPPO Secretariat in the framework of the European Union 7th framework program protect PRATIQUE (Grant agreement No 212 459) and with the support of the EPPO Panels. This software aims to assist pest risk analysts in running the EPPO decision-support scheme for Pest Risk Analysis (EPPO Standard PM 5/3(5) Decision-support scheme for quarantine pests), and other decision-support schemes. **Go to downloads page**

Datasets for PRA

The lack of data is a major challenge in pest risk analysis (PRA) worldwide. In order to identify appropriate sources of information, several projects have been launched with the objective of assembling datasets that contain information useful for pest risk analysts. Datasets resulting from two projects can be consulted there. **Go to datasets page**

PRATIQUE deliverables

On this page you will be able to access the different document reports prepared during the PRATIQUE project. The documents provide in particular background information on the changes made to the EPPO decision support scheme for PRA but also suggestions for future improvements. **Go to deliverables page**

SEVENTH FRAMEWORK PROGRAMME

The PRATIQUE project (Grant Agreement No.212459) is supported by the European Commission's 7th Framework Programme for Research and Technological Development: It addresses Topic KBBE-2007-1-2-03 entitled: "Development of more efficient risk analysis techniques for pests and pathogens of phytosanitary concern" in area 2.1: "Sustainable production and management of biological resources from land, forest and aquatic environments"

CAPRA software

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Programs and documents which can be downloaded

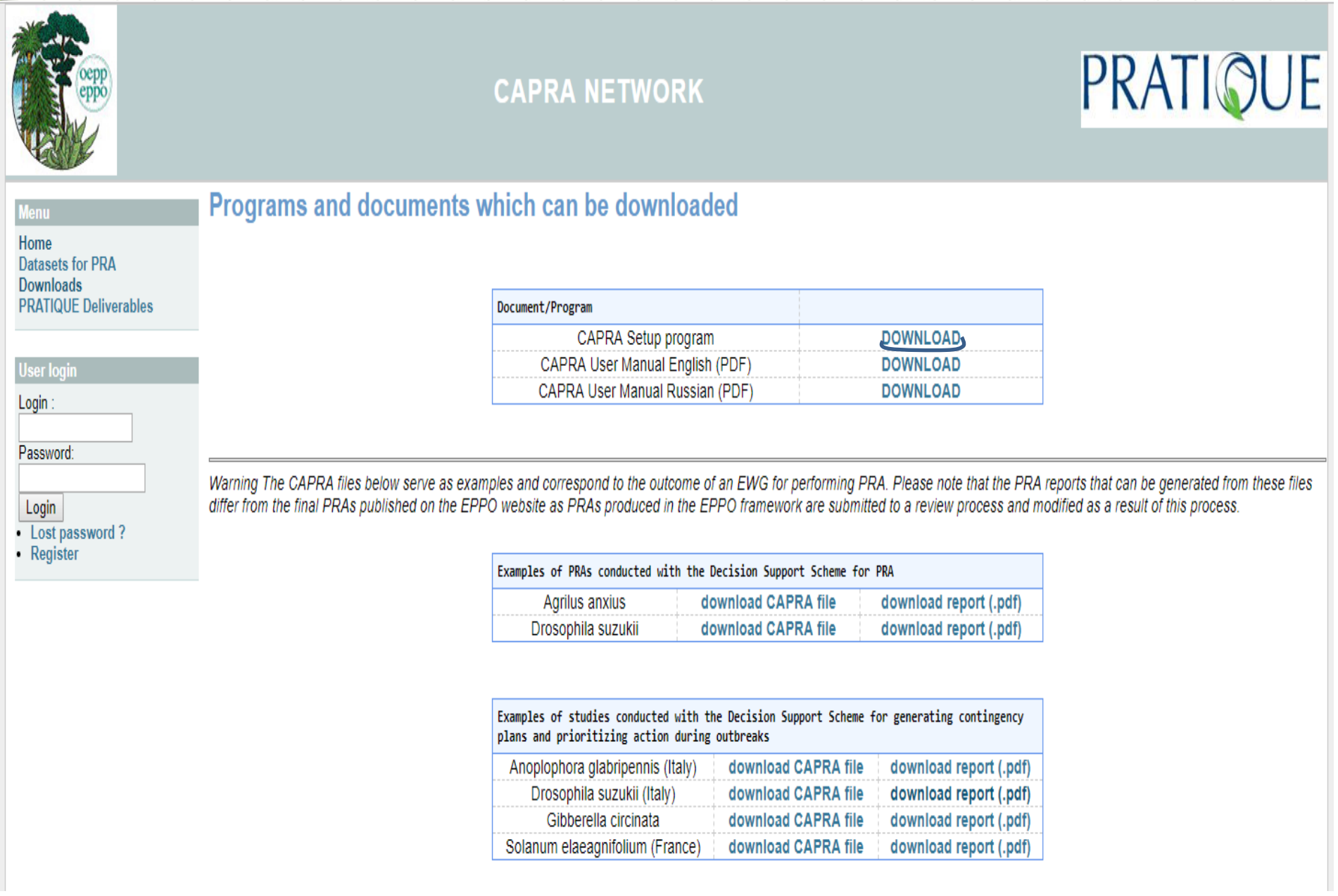
Document/Program	
CAPRA Setup program	DOWNLOAD
CAPRA User Manual English (PDF)	DOWNLOAD
CAPRA User Manual Russian (PDF)	DOWNLOAD

Warning The CAPRA files below serve as examples and correspond to the outcome of an EWG for performing PRA. Please note that the PRA reports that can be generated from these files differ from the final PRAs published on the EPPO website as PRAs produced in the EPPO framework are submitted to a review process and modified as a result of this process.

Examples of PRAs conducted with the Decision Support Scheme for PRA		
Agrilus anxius	download CAPRA file	download report (.pdf)
Drosophila suzukii	download CAPRA file	download report (.pdf)

Examples of studies conducted with the Decision Support Scheme for generating contingency plans and prioritizing action during outbreaks		
Anoplophora glabripennis (Italy)	download CAPRA file	download report (.pdf)
Drosophila suzukii (Italy)	download CAPRA file	download report (.pdf)
Gibberella circinata	download CAPRA file	download report (.pdf)
Solanum elaeagnifolium (France)	download CAPRA file	download report (.pdf)

CAPRA software



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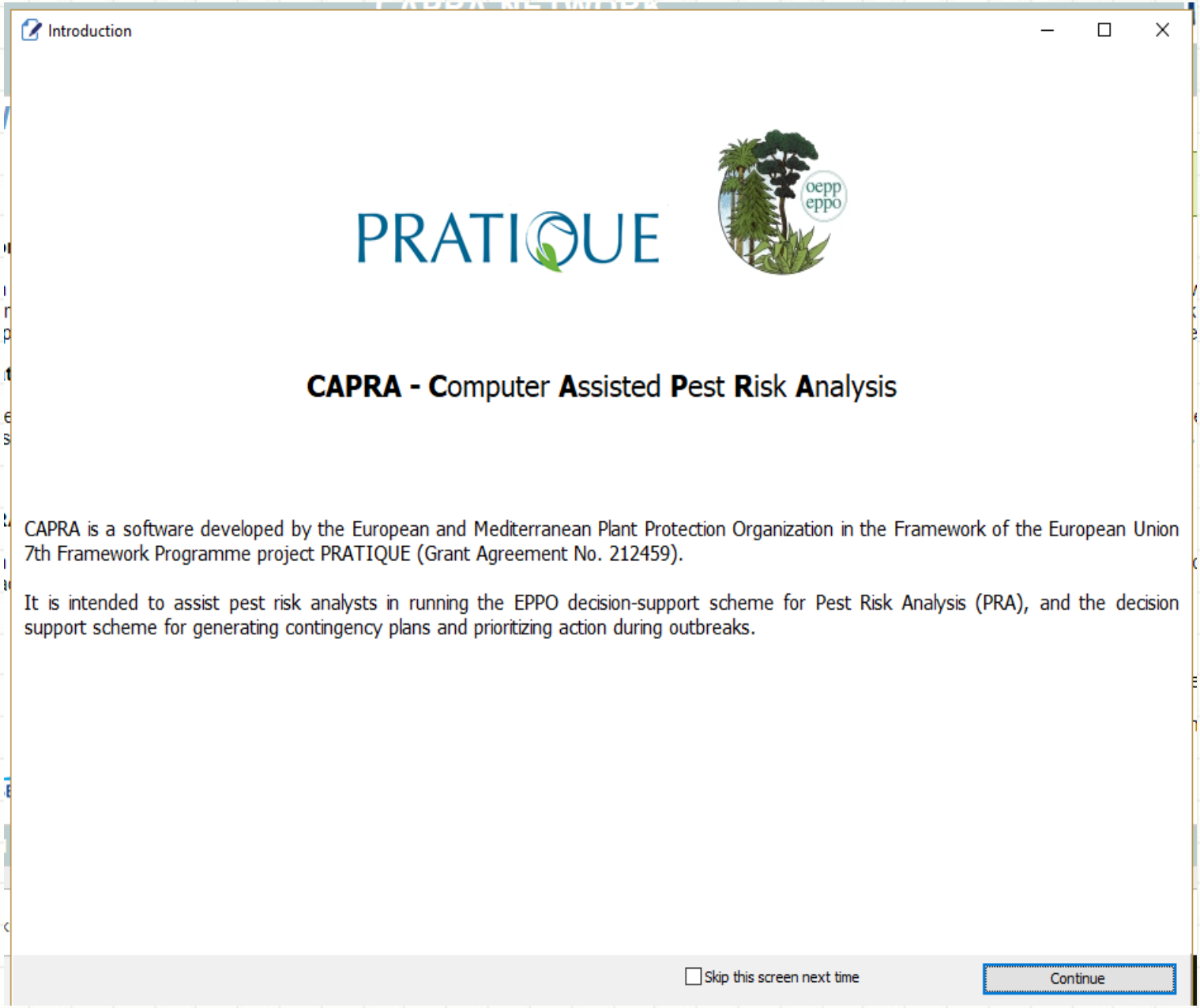

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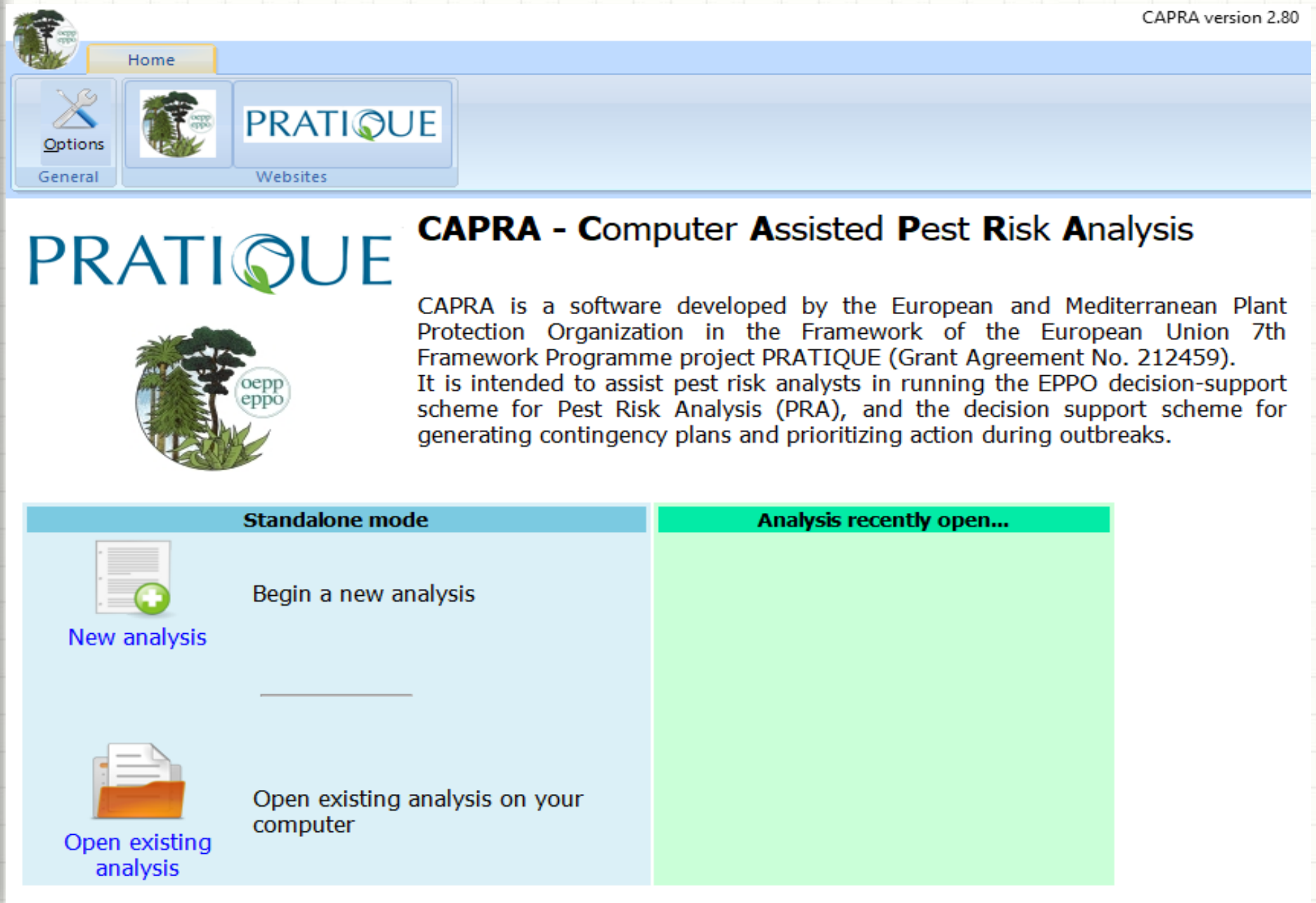

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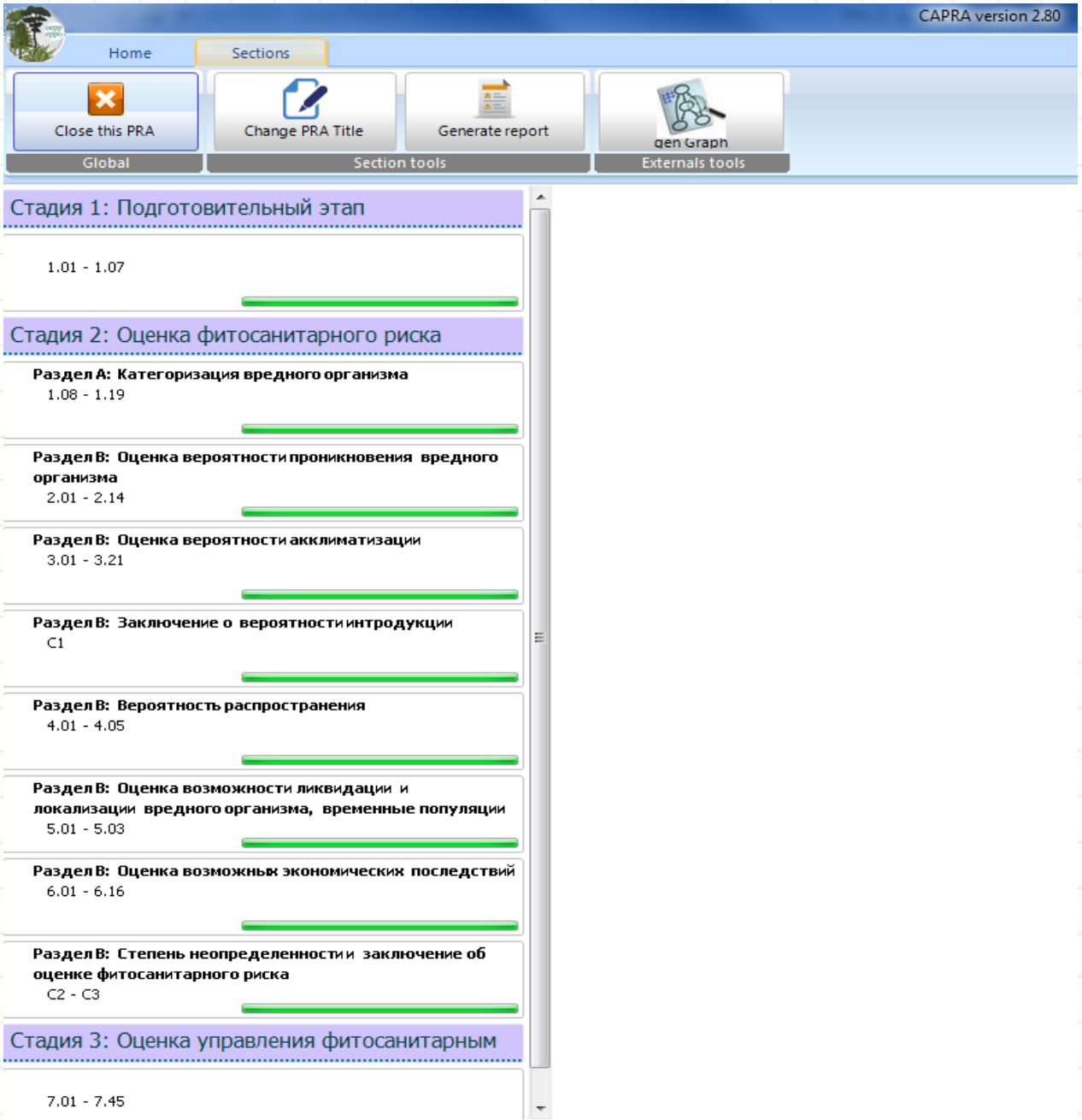

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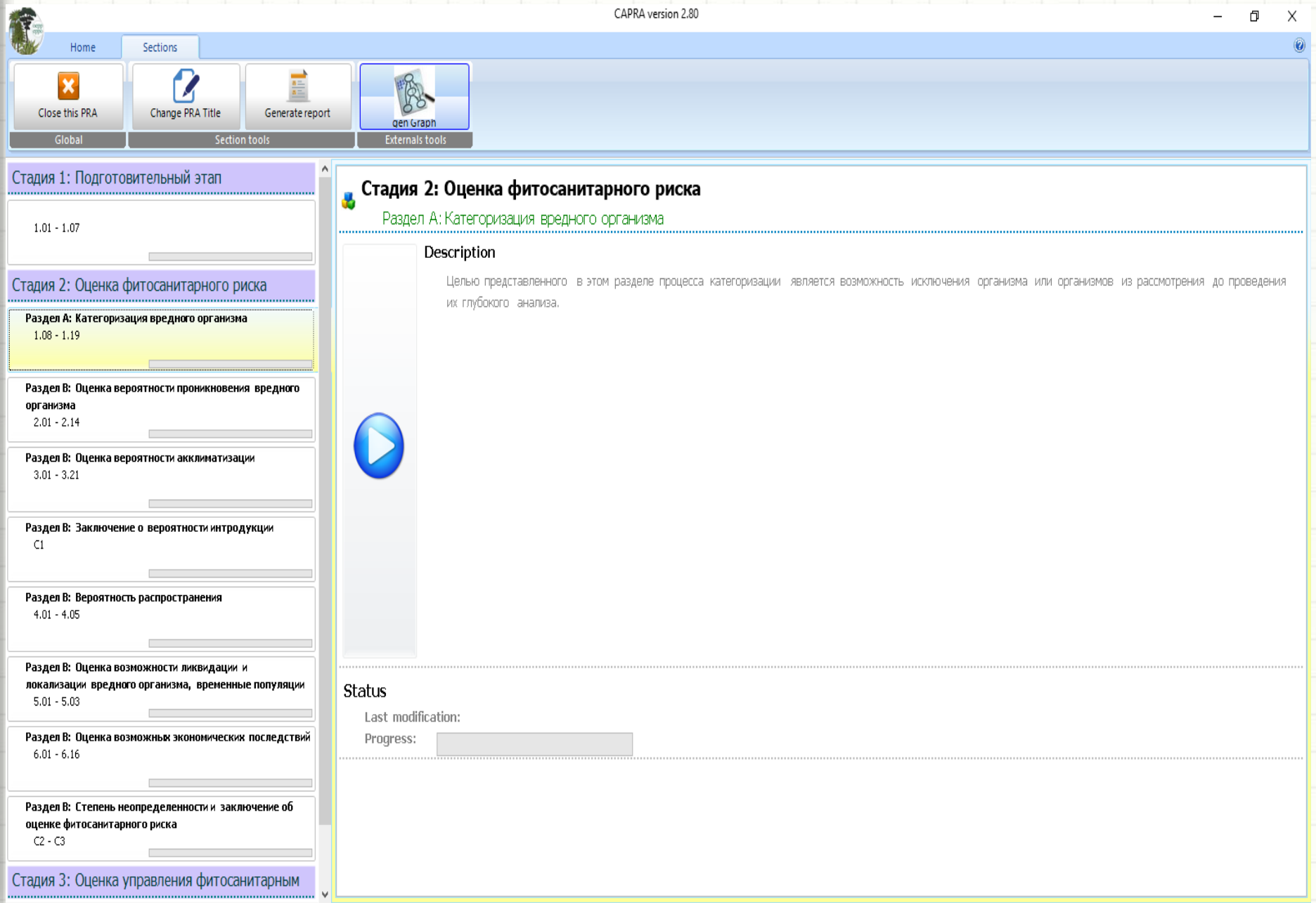

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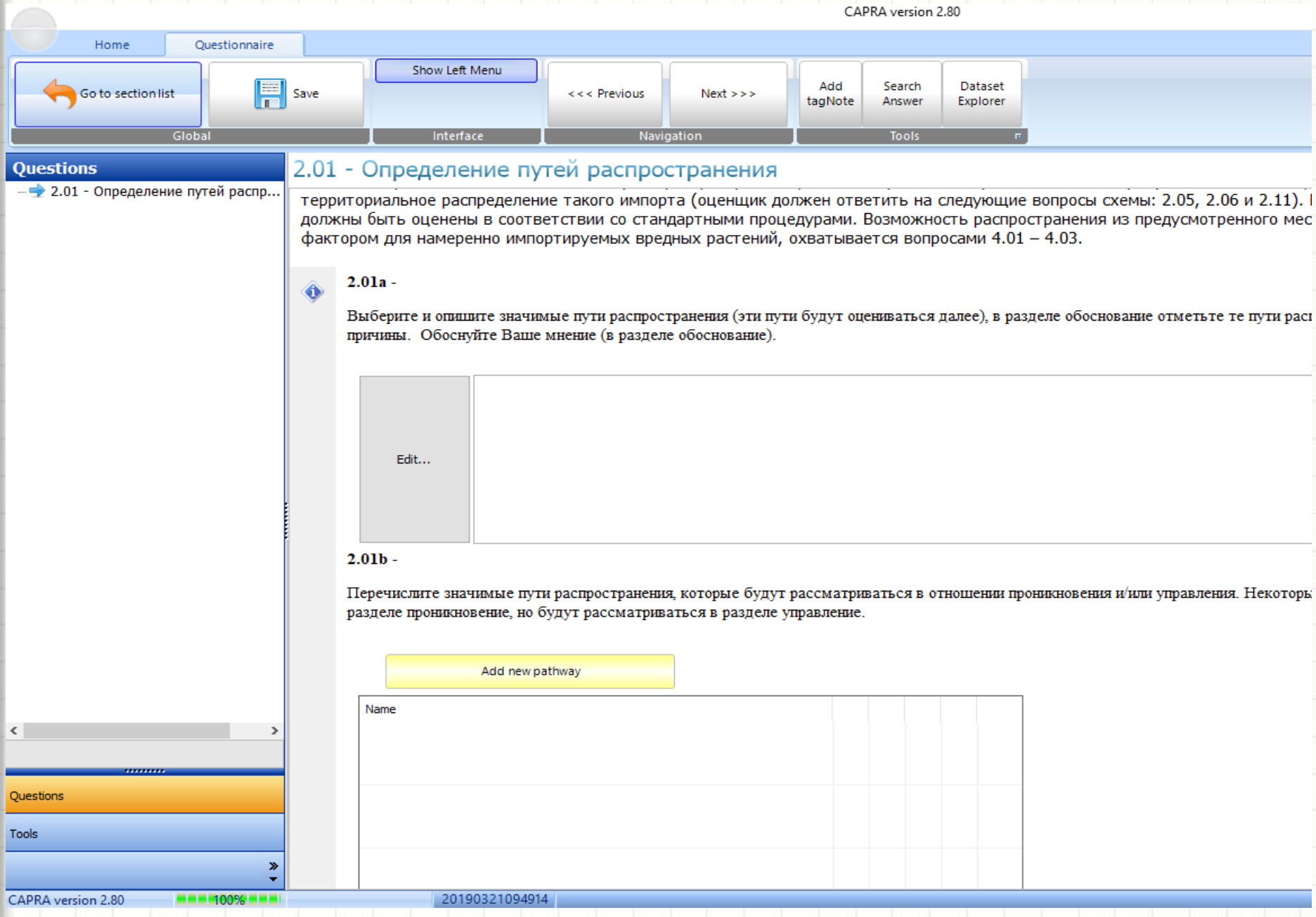

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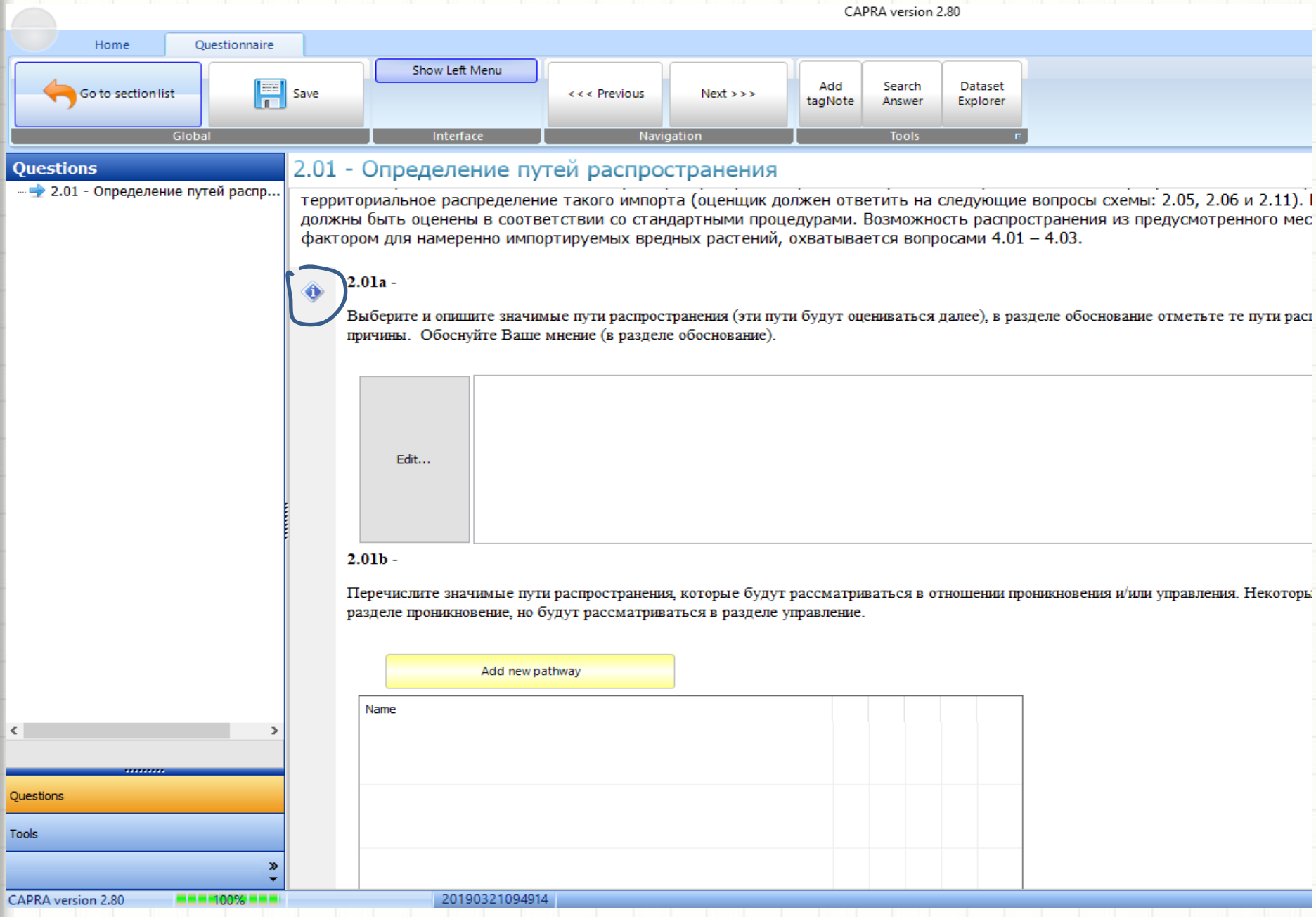

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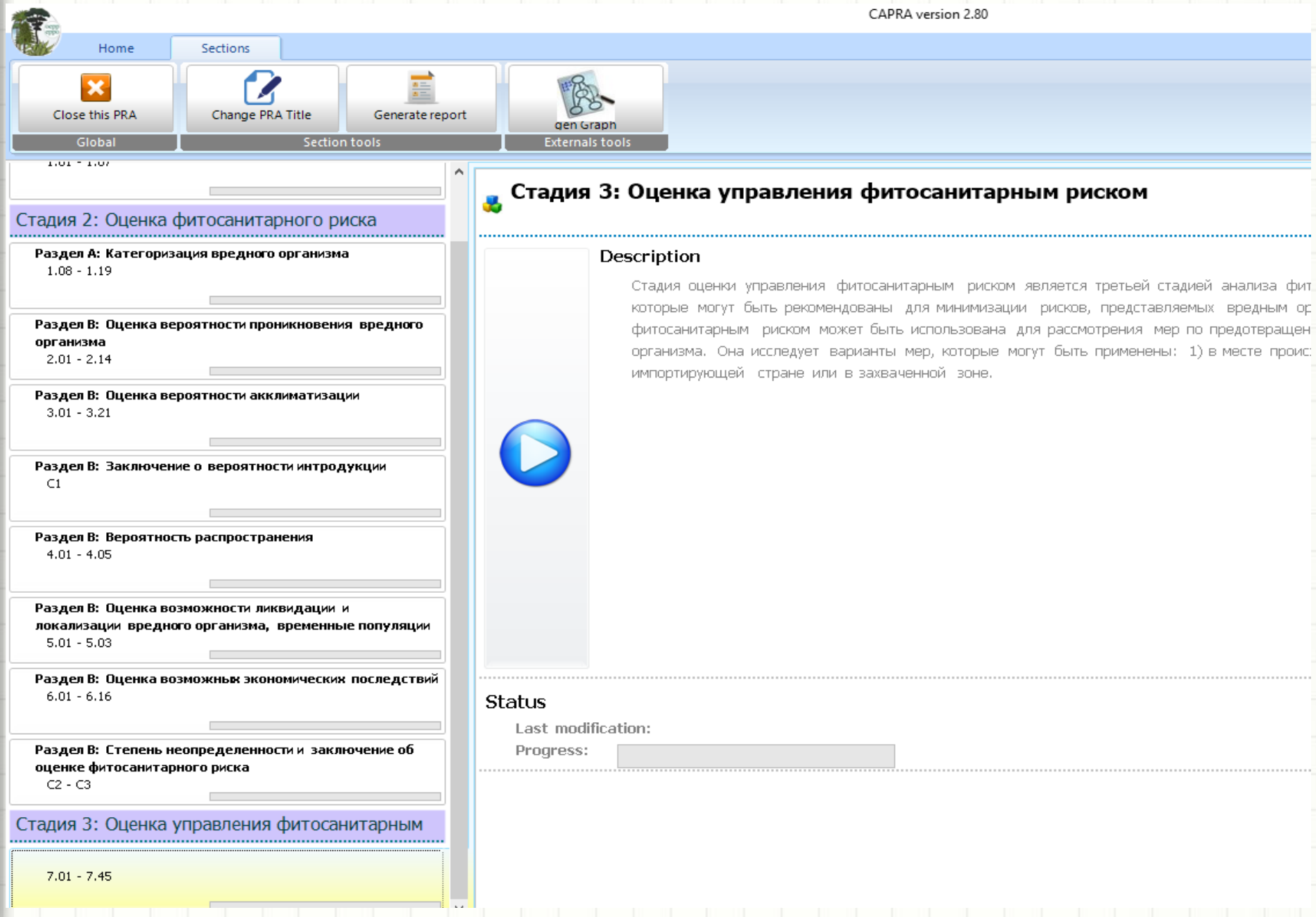

Thank you for your attention