

EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION
ЕВРОПЕЙСКАЯ И СРЕДИЗЕМНОМОРСКАЯ ОРГАНИЗАЦИЯ ПО КАРАНТИНУ И ЗАЩИТЕ РАСТЕНИЙ
ORGANIZATION EUROPEENNE ET MEDITERRANEENNE POUR LA PROTECTION DES PLANTES

02/9829
PPM Point 6.4

PEST RISK ASSESSMENT SCHEME

Organism:

Tecia solanivora (Povolny)

Assessor(s):

Jean-François GERMAIN

Date:

Septembre 2002

**Approximate time
spent on the
assessment**

5 jours

PEST RISK ASSESSMENT

STAGE 1: INITIATION		
Identify pest		
<i>This section examines the identity of the pest to ensure that the assessment is being performed on a real identifiable organism and that the biological and other information used in the assessment is relevant to the organism in question.</i>		
1. Is the organism clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank? <i>if yes go to 3</i> <i>if no go to 2</i>	Oui	Insecta Lepidoptera Gracillariidae <i>Tecia solanivora</i> (Povolny)
2. Attempt to redefine the taxonomic entity so that the criteria under 1 are satisfied. Is this possible? <i>if yes go to 3</i> <i>if no go to 22</i>		
The PRA area		
<i>The PRA area can be a complete country, several countries or part(s) of one or several countries</i>		
3. Clearly define the PRA area. <i>go to 4</i>		Union Européenne avec extension avec la zone OEPP.
Earlier analysis		
<i>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.</i>		
4. Does a relevant earlier PRA exist? <i>if yes go to 5</i> <i>if no go to 7</i>		Une ARP résumée a été réalisée en février 2000.
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 Is the earlier PRA still entirely valid, or only partly valid (out of date, applied in different circumstances, for a similar but distinct pest)? <i>if entirely valid End</i> <i>if partly valid go to 6</i> <i>if not valid go to 7</i>		La présence de <i>Tecia solanivora</i> dans un territoire insulaire d'un état membre de la Communauté Européenne (Espagne), et à proximité d'un état membre de l'OEPP (Maroc) amène à revoir cette étude. Présence en plein champs sur l'île de Ténériffe et dans des stocks sur les îles de La Gomera, Gran Canaria et Lanzarote (information OEPP).
6. Proceed with the assessment, but compare as much as possible with the earlier assessment. <i>go to 7</i>		

STAGE 2: PEST RISK ASSESSMENT		
Section A: Pest categorization (qualitative criteria of a quarantine pest)		
Geographical criteria		
<i>This section considers the geographic distribution of the pest in the PRA area.</i>		
7. Does the pest occur in the PRA area? <i>if yes go to 8</i> <i>if no go to 9</i>	non	
8. Is the pest of limited distribution in the PRA area? <i>Note: "of limited distribution" means that the pest has not reached the limits of its potential range either in the field or in protected conditions; it is not limited to its present distribution by climatic conditions or host-plant distribution. There should be evidence that, without phytosanitary measures, the pest would be capable of additional spread.</i> <i>if yes go to 18</i> <i>if no go to 22</i>		
Potential for establishment		
<i>For the pest to establish, it must find a widely distributed host plant in the PRA area (do not consider plants which are accidental/very occasional hosts or recorded only under experimental conditions). If it requires a vector, a suitable species must be present or its native vector must be introduced. The pest must also find environmental conditions suitable for survival, multiplication and spread, either in the field or in protected conditions.</i>		
9. Does at least one host plant grow to a substantial extent in the PRA area, in the open, in protected conditions or both? <i>if yes go to 10</i> <i>if no go to 22</i>	oui	<i>Solanum tuberosum est largement cultivé en Europe.</i>
10. Does the pest have to pass part of its life cycle on a host plant other than its major host (i.e. obligate alternate host plant)? <i>if yes go to 11</i> <i>if no go to 12</i>	non	
11. Does the alternate host plant also occur in the same part of the PRA area as the major host plant ? <i>if yes go to 12</i> <i>if no go to 22</i>		
12. Does the pest require a vector (i.e. is vector transmission the only means of dispersal)? <i>if yes go to 13</i> <i>if no go to 14</i>	non	
13. Is the vector (or a similar species which is known or suspected to be a vector) present in the PRA area or likely to be introduced. If in doubt, a separate assessment of the probability of introduction of the vector (in		

<p>section B1) may be needed? <i>if yes go to 14</i> <i>if no go to 22</i></p>		
<p>14. Does the known geographical distribution of the pest include ecoclimatic zones comparable with those of the PRA area? <i>if yes go to 18</i> <i>if no go to 15</i></p>	<p>oui</p>	<p>Dans la première PRA en 2000 il était écrit « Au Costa Rica, les zones concernées par la culture de la pomme de terre rencontrant des problèmes d'attaque par cet insecte, sont comprises entre 1300 et 2300m d'altitude. Les températures annuelles moyennes s'y échelonnent de 23°C à 19°C. Dans les zones supérieures à 2600m, avec des températures diminuant de 19,4 °C à 8,6°C les infestations sont moindres (Povolny, 1973). Seules les zones dépassant 3000m pourraient être comparée avec certaines régions européennes avec une température moyenne annuelle de 14°C. Ce niveau n'est atteint que dans la partie sud de l'Europe ».</p> <p>L'établissement récent de <i>Tecia solanivora</i> aux îles Canaries confirme cette hypothèse. La comparaison de deux stations des îles Canaries, Las Palmas au bord de la mer (fig.1) et La Laguna, à 641 m d'altitude (fig.2) offrent des correspondances avec un indice de similarité supérieur à 50% seulement avec les régions méditerranéennes.</p> <p>Les conditions thermiques de développement de <i>T. solanivora</i> proposées par Notz (1996), utilisées dans le logiciel de prévisions Climex © montrent des possibilités de développement de l'insecte dans toute l'Europe, le Maghreb et la bande côtière proche-orientale (fig.3). Seules seraient épargnées les régions froides de Scandinavie, de Russie et les zones désertiques. Cette répartition semble optimiste car en condition de laboratoire l'insecte ne peut résister à des températures inférieures à 7°C (Notz, 1996).</p>
<p>15. Is it probable, nevertheless, that the pest could survive and thrive in a wider ecoclimatic zone that could include the PRA area? <i>if yes go to 18</i> <i>if no go to 16</i></p>		
<p>16. Could the ecoclimatic requirements of the pest be found in protected conditions in the PRA area? <i>if yes go to 17</i> <i>if no go to 22</i></p>		
<p>17. Is a host plant grown in protected conditions in the PRA area? <i>if yes go to 18</i> <i>if no go to 22</i></p>		

Potential economic importance		
<p><i>Economic impact principally concerns direct damage to plants but may be considered very broadly, to include also social and environmental aspects. The effect of the presence of the pest on exports from the PRA area should also be allowed for.</i></p> <p><i>In deciding whether economically important damage or loss to plants may occur, it is necessary to consider whether climatic and cultural conditions in the PRA area are conducive to damage expression, which is not always the case even if both host and pest survive under these conditions.</i></p> <p><i>Note: when performing a PRA on a pest that is transmitted by a vector, consider also any possible damage that the vector may cause.</i></p>		
<p>18. With specific reference to the host plant(s) which occur(s) in the PRA area, and the parts of those plants which are damaged, does the pest in its present range cause significant damage or loss?</p> <p><i>if yes go to 21</i> <i>if no go to 19</i></p>	<p>oui</p>	<p>En Equateur en 2001, 500 000 sacs de pomme de terre ont été détruits et des dizaines de milliers d'hectares de cultures n'ont pas été récoltés et la situation en 2002 semble plus grave qu'en 2001 (données IRD, 2002). 50% de perte à Santa Cruz de Tenerife.</p>
<p>19. Could the pest, nevertheless, cause significant damage or loss in the PRA area, considering ecoclimatic and other factors for damage expression?</p> <p><i>if yes go to 21</i> <i>if no go to 20</i></p>		
<p>20. Would the presence of the pest cause other negative economic impacts (social, environmental, loss of export markets)?</p> <p><i>if yes go to 21</i> <i>if no go to 22</i></p>		
<p>21. This pest could present a risk to the PRA area</p> <p style="text-align: center;">Go To Section B</p>		
<p>22. This pest does not qualify as a quarantine pest for the PRA area and the assessment can stop</p> <p><i>However, if this is the first time that the decision-making scheme has directed you to this point, it may be worth returning to the question that led you here and continuing through the scheme in case the remaining questions strongly indicate categorization as a possible quarantine pest. In this latter case, seek a second opinion to decide whether the answers which led you to this point could be given a different reply.</i></p>		

Section B: Quantitative evaluation

The second part of the risk assessment process firstly estimates the probability of the pest being introduced into the PRA area (its entry and establishment) and secondly makes an assessment of the likely economic impact if that should happen. From these two aspects, it should be possible to consider the level of "pest risk" presented by the pest; this can then be used in the pest risk management phase to decide whether it is necessary to take phytosanitary measures to prevent the introduction of the pest, or if the measures chosen are appropriate for the level of risk. The questions in this section require an evaluation from minimum probability or impact (1) to maximum probability or impact (9). This must be done by an expert who can make an estimate according to the information provided (following the format of the check-list of EPPO (OEPP/EPPO, 1993a) and also according to comparison with other pests.

Answer as many of the following questions as possible, insofar as they are relevant to the pest concerned. If you cannot answer a particular question, do not give any score. Note whether this is because of lack of information or because the question is irrelevant to the pest concerned.

Questions marked with an asterisk (*) are to be considered as more important than the others in the same section.

1. Probability of introduction

Introduction, as defined by the FAO Glossary of Phytosanitary Terms, is the entry of a pest resulting in its establishment.

Entry

List the pathways that the pest could be carried on.

Note: a pathway can be any form of human activity that could transport the pest from a particular origin: e.g. plants and plant products moving in trade, any other traded commodity, containers and packing, ships, planes, trains, road transport, passengers, mail, etc. Note that similar means of pest transport from different origins can present greatly different probabilities of introduction, depending on the concentration of the pest in the area of origin. The pathways given should be only those already in operation, or proposed.

1.1 How many pathways could the pest be carried on?

*few = 1
many = 9*

1

Toute importation de pomme de terre est interdite, exceptée lorsque existent des mesures dérogatoires mais alors ces introductions font l'objet de contrôles sévères.

Par contre un risque d'introduction important existe par voie maritime via les « cambuses » des navires. Soit par les cargos reliant l'Amérique Centrale et l'Amérique du Sud à l'Europe, soit par le flux des plaisanciers traversant l'Atlantique et qui font pour la plupart une escale aux Îles Canaries pour se ravitailler. On ne peut exclure l'embarquement de sacs de pomme de terre contaminés des stocks attaqués ayant été trouvés sur la plupart des îles des Canaries.

1.2 For each pathway, starting with the most important pathway identified above (i.e. that which carries the greatest trade or which is most likely to act as a means of introduction) and then in descending order of importance, answer questions 1.3 – 1.13. If one of the questions 1.3a, 1.5a, 1.7a or 1.12a is answered by 'no', the pathway could not act as a means of

La filière maritime est retenue comme voie d'entrée possible.

<p>entry for the pest, and the scheme will return directly to this point, omitting later questions. Use expert judgement to decide how many pathways to consider. Go to 1.3</p>		
<p>1.3a Could the pest be associated with the pathway at origin? <i>Note: does the pest occur in the area of origin? Is the pest in a life stage which would be associated with commodities, containers, or conveyances?</i> <i>if yes go to 1.3b</i> <i>if no go to 1.2</i></p>	oui	Les larves de l'insecte se développent dans les tubercules de pomme de terre. Des chrysalides peuvent être fixées sur les sacs servant au transport des tubercules.
<p>1.3b How likely is the pest to be associated with the pathway at origin? [i.e. are all areas infested or highly infested; will every consignment or part of it be infested?] <i>not likely = 1</i> <i>very likely = 9</i></p>		Non renseigné.
<p>1.4 Is the concentration of the pest on the pathway at origin likely to be high? [i.e. will there be many individuals associated with the consignment?] <i>not likely = 1</i> <i>very likely = 9</i></p>		Non renseigné.
<p>1.5a Could the pest survive existing cultivation or commercial practices? <i>Note: these are practices mainly in the country of origin, such as pesticide application, removal of substandard produce, kiln-drying of wood.</i> <i>if yes go to 1.5b</i> <i>if no go to 1.2</i></p>	oui	Son expansion en Amérique centrale puis en Amérique du Sud à partir de son aire d'origine, le Guatemala, montre que oui.
<p>1.5b How likely is the pest to survive existing cultivation or commercial practices? <i>not likely = 1</i> <i>very likely = 9</i></p>	9	
<p>1.6 How likely is the pest to survive or remain undetected during existing phytosanitary procedures? <i>Note: existing phytosanitary measures (e.g. inspection, testing or treatments) are most probably being applied as a protection against other (quarantine) pests; the assessor should bear in mind that such measures could be removed in the future if the other pests were to be re-evaluated.</i> <i>The likelihood of detecting the pest during inspection or testing will depend on a number of factors including:</i></p> <ul style="list-style-type: none"> • <i>ease of detection of the life stages which are likely to be present. Some stages are more readily detected than others, for example insect adults may be more obvious than eggs;</i> • <i>location of the pest on the commodity. Surface feeders are more readily</i> 		Des contrôles phytosanitaires appliquées aux réserves alimentaires des cargos ne semblent pas possibles du fait de leur statut extra-territorial et ils apparaissent difficiles à mettre en place pour les embarcations de plaisance.

<p><i>detected than internal feeders;</i></p> <ul style="list-style-type: none"> • <i>symptom expression - many diseases may be latent for long periods, at certain times of the year, or may be without symptoms in some hosts or cultivars and virulent in others;</i> • <i>distinctiveness of symptoms - the symptoms might resemble those of other pests or sources of damage such as mechanical or cold injury;</i> • <i>the intensity of the sampling and inspection regimes;</i> • <i>distinguishing the pest from similar organisms.</i> <p><i>not likely = 1</i> <i>very likely = 9</i></p>		
<p>1.7a Could the pest survive in transit? <i>Note: consideration should be given to:</i></p> <ul style="list-style-type: none"> • <i>speed and conditions of transport;</i> • <i>vulnerability of the life-stages likely to be transported;</i> • <i>whether the life cycle is of sufficient duration to extend beyond time in transit;</i> • <i>the number of individuals likely to be associated with a consignment.</i> <p><i>Interception data can be used to estimate the ability of a pest to survive in transit.</i> <i>if yes go to 1.7b</i> <i>if no go to 1.2</i></p>	oui	
<p>1.7b How likely is the pest to survive in transit? <i>not likely = 1</i> <i>very likely = 9</i></p>	9	<p>La durée de traversée des cargos à travers l'Atlantique est compatible avec le cycle de développement de l'insecte. L'insecte présente deux générations par an à 10°C et 10 générations à 25°C, avec des cycles de développement prenant respectivement environ 28 et 5 semaines (Notz, 1996).</p>
<p>1.8 Is the pest likely to multiply during transit? <i>not likely = 1</i> <i>very likely = 9</i></p>	9	<p>L'insecte se développe très bien dans les stocks de pomme de terre.</p>
<p>1.9 How large is movement along the pathway? [i.e. how much trade?] <i>not large = 1</i> <i>very large = 9</i></p>	1	
<p>1.10 How widely is the commodity to be distributed throughout the PRA area? <i>Note: the more scattered the destinations, the more likely it is that the pest might find suitable habitats.</i> <i>not widely = 1</i> <i>very widely = 9</i></p>	1	<p>Les denrées alimentaires stockées ne sont pas sensées quitter le navire.</p>

<p>1.11 How widely spread in time is the arrival of different consignments? <i>Note: introduction at many different times of the year will increase the probability that entry of the pest will occur at a life stage of the pest or the host suitable for establishment.</i> <i>not widely = 1</i> <i>very widely = 9</i></p>	9	
<p>1.12a Could the pest transfer from the pathway to a suitable host? <i>Note: consider innate dispersal mechanisms or the need for vectors, and how close the pathway on arrival is to suitable hosts.</i> <i>if yes go to 1.12b</i> <i>if no go to 1.2</i></p>	oui	Les papillons adultes peuvent très bien s'échapper des cargos et trouver leur plante hôte proche des zones portuaires par exemple en Bretagne ou aux Pays-bas, ou en Méditerranée.
<p>1.12b How likely is the pest to be able to transfer from the pathway to a suitable host? <i>not likely = 1</i> <i>very likely = 9</i></p>	1	La probabilité pour une femelle féconde de trouver un support de ponte dans une zone portuaire semble faible.
<p>1.13 Is the intended use of the commodity (e.g. processing, consumption, planting, disposal of waste) likely to aid introduction? <i>Note: consider whether the intended use of the commodity would destroy the pest or whether the processing, planting or disposal might be done in the vicinity of suitable hosts.</i> <i>not likely = 1</i> <i>very likely = 9</i></p>	1	
Establishment		
<p>1.14 How many host-plant species are present in the PRA area? <i>one or very few = 1</i> <i>many = 9</i></p>	1	Une seule plante-hôte est considérée mais elle est largement répartie dans la zone PRA que ce soit en culture ou sous forme de stock.
<p>1.15 How extensive are the host plants in the PRA area? <i>rare = 1</i> <i>widespread = 9</i></p>	9	
<p>1.16 If an alternate host is needed to complete the life cycle, how extensive are such host plants in the PRA area? <i>rare = 1</i> <i>widespread = 9</i></p>		
<p>1.17 *If a vector is needed for dispersal, how likely is the pest to become associated with a suitable vector? <i>Note: is the vector present in the PRA area, could it be introduced or could</i></p>		

¹ Questions marked with an asterisk are to be considered as more important than the others in the same section.

<p><i>another vector be found?</i> <i>not likely = 1</i> <i>very likely = 9</i></p>		
<p>1.18 Has the pest been recorded on crops in protected conditions elsewhere? (Answer this question only if protected cultivation is important in the PRA area.) <i>no = 1</i> <i>often = 9</i></p>		
<p>1.19 How likely are wild plants (i.e. plants not under cultivation, including weeds, volunteer plants, feral plants) to be significant in dispersal or maintenance of populations? <i>not likely = 1</i> <i>very likely = 9</i></p>	1	
<p>1.20 *How similar are the climatic conditions that would affect pest establishment in the endangered area and in the area of origin? <i>Note: the climatic conditions in the PRA area to be considered may include those in protected cultivation.</i> <i>not similar = 1</i> <i>very similar = 9</i></p>	9	La comparaison climatique retenue est celle entre les stations des îles Canaries et de l'Europe.
<p>1.21 How similar are other abiotic factors in the PRA area and in the area of origin? <i>Note: the major abiotic factor to be considered is soil type; others are, for example, environmental pollution, topography/orography.</i> <i>not similar = 1</i> <i>very similar = 9</i></p>		Non renseigné
<p>1.22 How likely is the pest to have competition from existing species in the PRA area for its ecological niche? <i>very likely = 1</i> <i>not likely = 9</i></p>	9	Une seule espèce présente, <i>Phthorimaea operculella</i> (zeller) dans les régions méditerranéennes de l'Europe.
<p>1.23 How likely is establishment to be prevented by natural enemies already present in the PRA area? <i>very likely = 1</i> <i>not likely = 9</i></p>		Non renseigné.

<p>1.24 *If there are differences in the crop environment in the PRA area to that in the area of origin, are they likely to aid establishment? <i>Note: factors that should be considered include time of year that the crop is grown, soil preparation, method of planting, irrigation, whether grown under protected conditions, surrounding crops, management during the growing season, time of harvest, method of harvest, etc.</i> not likely = 1 very likely = 9</p>	1	La protection phytosanitaire des cultures de pomme de terre est plus pertinente en Europe que dans le nord de l'Amérique du Sud.
<p>1.25 Are the control measures which are already used against other pests during the growing of the crop likely to prevent establishment of the pest? very likely = 1 not likely = 9</p>	1	De nombreux traitements sont réalisés contre divers ravageurs.
<p>1.26 *Is the reproductive strategy of the pest and duration of life cycle likely to aid establishment? <i>Note: consider characteristics which would enable the pest to reproduce effectively in a new environment, such as parthenogenesis/self-crossing, duration of the life cycle, number of generations per year, resting stage, etc.</i> not likely = 1 very likely = 9</p>	9	La capacité de l'insecte à assurer son développement dans les tubercules ne peut que favoriser un éventuel établissement, tout comme ses possibilités de développement entre 10 et 25°C.
<p>1.27 How likely are relatively low populations of the pest to become established? not likely = 1 very likely = 9</p>	9	Les populations 'canariennes' se seraient développées à partir d'un sac de semences en provenance du Venezuela.
<p>1.28 How probable is it that the pest could be eradicated from the PRA area ? very likely = 1 not likely = 9</p>	9	Un insecte établi est quasiment impossible à éradiquer.
<p>1.29 How genetically adaptable is the pest? <i>Note: is the species polymorphic, with, for example, subspecies, pathotypes? Is it known to have a high mutation rate? This genotypic (and phenotypic) variability facilitates the pest's ability to withstand environmental fluctuations, to adapt to a wider range of habitats, to develop pesticide resistance and to overcome host resistance.</i> not adaptable = 1 very adaptable = 9</p>		Non renseigné

<p>1.30 *How often has the pest been introduced into new areas outside its original range? <i>Note: if this has happened even once before, it is important proof that the pest has the ability to pass through most of the steps in this section (i.e. association with the pathway at origin, survival in transit, transfer to the host at arrival and successful establishment). If it has occurred often, it suggests an aptitude for transfer and establishment.</i> <i>never = 1</i> <i>often = 9</i></p>	9	L'insecte s'est répandu en Amérique du Sud à parti de son aire d'origine en Amérique Centrale et il s'est établi aux Iles Canaries.
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<p>2. Economic Impact Assessment <i>Identify the potential hosts in the PRA area, noting whether wild or cultivated, field or glasshouse. Consider these in answering the following questions. When performing a PRA on a pest that is transmitted by a vector, consider also any possible damage that the vector may cause. According to the pest and host(s) concerned, it may be appropriate to consider all hosts together in answering the questions once, or else to answer the questions separately for specific hosts.</i></p> <p><i>Note that, for most pest/crop/area combinations, precise economic evaluations are lacking. In this section, therefore, expert judgement is asked to provide an evaluation of the likely scale of impact. Both long-term and short-term effects should be considered for all aspects of economic impact.</i></p>		
<p>2.1 *How important is economic loss caused by the pest within its existing geographic range? <i>little importance = 1</i> <i>very important = 9</i></p>	9	Voir ci-dessus le point 18.
<p>2.2 How important is environmental damage caused by the pest within its existing geographic range? <i>Note: environmental damage may be impact on ecosystem health, such as effects on endangered/threatened species, keystone species or biodiversity.</i> <i>little importance = 1</i> <i>very important = 9</i></p>		Non renseigné.
<p>2.3 How important is social damage caused by the pest within its existing geographic range? <i>Note: social effects could be, for example, damaging the livelihood of a proportion of the human population, or changing the habits of a proportion of the population (e.g. limiting the supply of a socially important food).</i> <i>little importance = 1</i> <i>very important = 9</i></p>	9	Par la perte alimentaire.

<p>2.4 *How extensive is the part of the PRA area likely to suffer damage from the pest? <i>Note: the part of the PRA area likely to suffer damage is the <u>endangered area</u>, which can be defined ecoclimatically, geographically, by crop or by production system (e.g. protected cultivation).</i> <i>very limited = 1</i> <i>whole PRA area = 9</i></p>	9	
<p>Spread potential is an important element in determining how fast economic impact is expressed and how readily a pest can be contained.</p>		
<p>2.5 *How rapidly is the pest liable to spread in the PRA area by natural means? <i>very slowly = 1</i> <i>very rapidly = 9</i></p>	1	<p>L'expansion naturelle serait lente si l'on considère la situation sud-américaine. L'insecte est arrivé au Costa Rica en 1970 transporté par l'homme, son passage du Costa Rica au Venezuela s'est passé de la même façon. Son passage ultérieur en Colombie et en Equateur est du aux mêmes négligences humaines (sources IRD , fiche scientifique 120).</p>
<p>2.6 How rapidly is the pest liable to spread in the PRA area by human assistance? <i>very slowly = 1</i> <i>very rapidly = 9</i></p>	1	<p>L'état sanitaire des pomme de terre entrant dans les circuits commerciaux en Europe, est garanti comme sain.</p>
<p>2.7 How likely is it that the spread of the pest could be contained within the PRA area? <i>Note: consider the biological characteristics of the pest that might allow it to be contained in part of the PRA area; consider the practicality and costs of possible containment measures.</i> <i>very likely = 1</i> <i>not likely = 9</i></p>	1	<p>Les cultures de pomme de terre sont déjà très contrôlées en production de plants comme en production pour la consommation (traitements phytosanitaires, cahier des charges, calibrage, ...).</p>
<p>2.8 *Considering the ecological conditions in the PRA area, how serious is the direct effect of the pest on crop yield and/or quality likely to be? <i>Note: the ecological conditions in the PRA area may be adequate for pest survival but may not be suitable for significant damage on the host plant(s). Consider also effects on non-commercial crops, e.g. private gardens, amenity plantings.</i> <i>not serious = 1</i> <i>very serious = 9</i></p>	1	
<p>2.9 How likely is the pest to have a significant effect on producer profits due to changes in production costs, yields, etc., in the PRA area? <i>not likely = 1</i> <i>very likely = 9</i></p>	1	<p>La production de plants qui s'étale sur un laps de temps relativement court avec des traitements lourds, les effets de <i>T. solanivora</i> ne seraient que minimes. En production de consommation on pourrait estimer un surcoût de 4 à 5 traitements.</p>

<p>2.10 How likely is the pest to have a significant effect on consumer demand in the PRA area? <i>Note: consumer demand could be affected by loss in quality and/or increased prices.</i> <i>not likely = 1</i> <i>very likely = 9</i></p>	1	Sur l'achat de tubercules par le consommateur l'effet serait nul, les produits à la vente étant contrôlés, calibrés. Par contre les consommateurs cultivant des pommes de terre dans leur jardin pourraient renoncer à l'achat de plants s'ils étaient confrontés à un insecte détruisant leur production.
<p>2.11 How likely is the presence of the pest in the PRA area to affect export markets? <i>Note: consider the extent of any phytosanitary measures likely to be imposed by trading partners.</i> <i>not likely = 1</i> <i>very likely = 9</i></p>		Des pertes de marché à l'export sont possibles. Il peut y avoir une exigence de contrôles supplémentaires, l'exploitation de la présence du ravageur dans la zone PRA par des concurrents commerciaux...
<p>2.12 How important would other costs resulting from introduction be? <i>Note: costs to the government, such as research, advice, publicity, certification schemes; costs (or benefits) to the crop protection industry.</i> <i>little importance = 1</i> <i>very important = 9</i></p>		Non renseigné
<p>2.13 How important is the environmental damage likely to be in the PRA area? <i>little importance = 1</i> <i>very important = 9</i></p>	1	L'incidence de 4 à 5 traitements insecticides supplémentaires.
<p>2.14 How important is the social damage likely to be in the PRA area? <i>little importance = 1</i> <i>very important = 9</i></p>	1	Pour les populations européennes, la consommation de pomme de terre n'a pas l'importance qu'elle peut avoir en Amérique du sud. A l'extrême une diminution de la consommation de frites ne serait que positive pour la santé publique.
<p>2.15 How probable is it that natural enemies, already present in the PRA area, will affect populations of the pest if introduced? <i>very likely = 1</i> <i>not likely = 9</i></p>		Non renseigné
<p>2.16 How easily can the pest be controlled? <i>Note: difficulty of control can result from such factors as lack of effective plant protection products against this pest, occurrence of the pest in natural habitats or amenity land, simultaneous presence of more than one stage in the life cycle, absence of resistant cultivars).</i> <i>easily = 1</i> <i>with difficulty = 9</i></p>	1	Les nombreux traitements insecticides existants en production de tubercules pourraient contrôler ce nouveau ravageur. Dans le cas contraire les organismes de recherche des états européens s'impliqueraient certainement pour trouver des solutions de lutte. Le Venezuela propose l'utilisation de granulo-virus pour lutter contre <i>T. solanivora</i> (Gualdrón et Notz, 2000), ou l'utilisation de nématodes entomopathogènes (Fan Xue <i>et al.</i> , 2000).

<p>2.17 How likely are control measures to disrupt existing biological or integrated systems for control of other pests? <i>not likely = 1</i> <i>very likely = 9</i></p>	1	<p>Nombreux traitements réalisés contre les pucerons et dans une moindre mesure contre les doryphores, des traitements additifs ne changeraient pas grand chose.</p>
<p>2.18 How likely are control measures to have other undesirable side-effects (for example on human health or the environment)? <i>not likely = 1</i> <i>very likely = 9</i></p>		<p>Non renseigné.</p>
<p>2.19 Is the pest likely to develop resistance to plant protection products? <i>not likely = 1</i> <i>very likely = 9</i></p>		<p>Non renseigné.</p>
<p><i>After completing this section, the assessor should comment on whether sufficient information exists to trust the answers given; or if he/she knows of other relevant factors that have not been considered in this evaluation</i></p>		

3. Final Evaluation

At the end of the procedure, the assessor will have at his disposal:

- (1) *one or several sets of replies (1-to-9 scores) to questions 1.1-1.13, for one or several pathways (if no pathways have been retained, the probability of introduction will be zero);*
- (2) *one set of replies (1-to-9 scores) to questions 1.14-1.30;*
- (3) *one or several sets of replies (1-to-9 scores) to questions 2.1-2.19, for single, grouped or separate hosts (according to the manner of answering which has been chosen).*

The assessor should first consider the quality and quantity of the information used to answer the questions, and give an overall judgement of how reliable the pest risk assessment can be considered. If other relevant information is available that has not been considered, this should be noted.

By the means of his choice, the assessor should attempt to make a separate estimate of the probability of introduction of the pest and its probable level of economic impact. As explained in the introduction, these estimates cannot, on the basis of the procedure used in the scheme, be expressed in absolute units. The numerical scores may be combined, weighted and averaged in appropriate ways that may enable the assessor who uses them consistently to make useful comparisons between pests, pathways and hosts. No particular mode of calculation is specifically recommended by EPPO. Certain questions have been identified as more important than others, and the assessor should take due account of this.

The assessor may then combine his estimates of probability of introduction and probable economic impact to formulate a single estimate of pest risk. This may usefully be compared with one or several reference levels of risk to decide whether the pest should be considered to be a quarantine pest, so that phytosanitary measures should be taken against it.

Finally, the scores given in answer to the different sections (particularly that on pathways) may be used again in pest risk management.

Conclusions

La culture de la pomme de terre en Europe est d'une grande importance économique et fait l'objet d'une protection phytosanitaire forte et elle est soumise à de nombreux contrôles tant à la production qu'au niveau des échanges commerciaux. L'actuelle interdiction d'importation de plants ou de tubercules devrait rendre l'introduction de *Tecia solanivora* impossible. C'est pourquoi nous ne retenons dans cette analyse de risque qu'une seule filière d'introduction, marginale, par voie maritime.

A la lecture des scores obtenus au questionnaire de l'analyse de risque la probabilité d'introduction apparaît moyenne $-5(1)/4(9)-$, la possibilité d'établissement probable $-4(1)/8(9)-$, et l'impact économique faible $-10(1)/3(9)-$. On notera que par le contenu des questions l'évaluation du risque d'établissement semble surévaluée par la comparaison de l'impact de l'insecte sur des sociétés n'ayant pas atteint des niveaux de développement sociaux et économiques comparables. On retrouve cette dissonance dans les réponses concernant l'impact économique.

Tecia solanivora apparaît comme l'une des nombreuses espèces d'insectes susceptibles d'être introduites en Europe du fait de l'intensification des échanges internationaux. Il pourra probablement s'établir dans les régions méditerranéennes de l'aire OEPP et aurait la capacité de se développer dans les stocks des régions plus septentrionales mais le niveau de protection atteint dans la culture de la pomme de terre rend ce scénario improbable. On devrait aboutir à la même situation qu'avec *Phthorimeae operculella* (la teigne de la pomme de terre) qui ne s'est établie que de façon marginale dans quelques pays méditerranéens, en France elle reste très localisée au sud de la vallée du Rhône.

Un plan de surveillance dans les ports européens entretenant des liaisons maritimes avec l'Amérique latine et les Iles Canaries pourrait être mis en place en disposant des pièges à phéromones (Rodriguez et Lepiz, 1990) comme cela a pu être fait pour les scolytes américains, pour contrôler une éventuelle introduction.

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