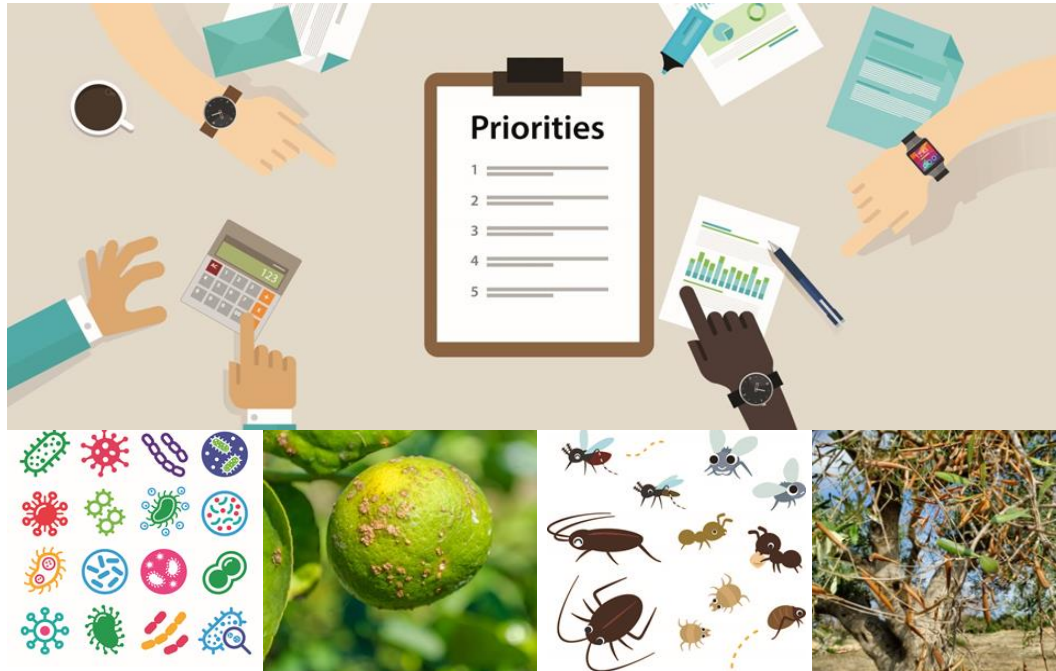


The Impact Indicator for Priority Pests (I2P2): a new plant pest ranking tool for the EU



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The authors are solely responsible for the content of the presentation. The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission

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JRC TECHNICAL REPORTS

The Impact Indicator for Priority Pests (I2P2): a tool for ranking pests according to Regulation (EU) No 2016/2031

Sánchez, Berta
Barreiro-Hurle, Jesús
Soto Embodas, Iria
Rodríguez-Cerezo, Emilio

2019



We just published our **Final JRC Report...**

it has been **the basis of the Delegated Act** that was adopted on August and must be applied from 14 December



Brussels, 1.8.2019
C(2019) 5637 final



COMMISSION DELEGATED REGULATION (EU) .../...

of 1.8.2019

supplementing Regulation (EU) 2016/2031 of the European Parliament and of the Council by establishing the list of priority pests

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE DELEGATED ACT

Article 6(2) of Regulation (EU) 2016/2031 of the European Parliament and the Council on protective measures against pests of plants¹ empowers the Commission to adopt delegated acts supplementing that Regulation by establishing a list of the priority pests.

Priority pests are the Union quarantine pests whose potential economic, environmental or social impact is the most severe in respect of the Union territory. The criteria to determine them are set out in Section 2 of Annex I to that Regulation. Due to their severe impacts, Regulation (EU) 2016/2031 sets out the obligations for more intensive surveys in Article 24, contingency plans in Article 25 and simulation exercises in Article 26.

The Commission has carried out an assessment to determine the list of priority pests, on the basis of a methodology developed by the Commission's Joint Research Centre (JRC) and the European Food Safety Authority (EFSA). That methodology takes into account the probability of spreading, establishment and consequences of the pests assessed for the Union territory. It addresses the fact that the criteria listed in that Regulation cover multiple dimensions (economic, social and environmental), and each of them is described by multiple impacts.

As a result of that assessment, as well as the outcome of the consultation of the general public carried out via the Better Regulation Portal, the Commission proposes the listing of 20 priority pests, which are listed in the Annex to this Regulation.



Directorate-General for Health and Food Safety (DG SANTE)



2. CONSULTATIONS PRIOR TO THE ADOPTION OF THE ACT

The Commission consulted the Expert Group on Plant Health on 16 January 2018, 9 July 2018, 9 January 2019, 24 April 2019, 27 May 2019 and 9 July 2019.

This draft Delegated act was subject to consultation of the general public between 6 June and 4 July 2019 via the Better Regulation portal. A total of 49 responses were received which are publicly available.



ANNEX
List of priority pests

Agrilus anxius Gory

Agrilus planipennis Fairmaire

Anastrepha ludens (Loew)

Anoplophora chinensis (Thomson)

Anoplophora glabripennis (Motschulsky)

Anthonomus eugenii Cano

Aromia bungii (Faldermann)

Bactericera cockerelli (Sulc.)

Bactrocera dorsalis (Hendel)

Bactrocera zonata (Saunders)

Bursaphelenchus xylophilus (Steiner et Bühner) Nickle *et al.*

Candidatus Liberibacter spp., causal agent of Huanglongbing disease of citrus/citrus greening

Conotrachelus nenuphar (Herbst)

Dendrolimus sibiricus Tschetverikov

Phyllosticta citricarpa (McAlpine) Van der Aa

Popillia japonica Newman

Rhagoletis pomonella Walsh

Spodoptera frugiperda (Smith)

Thaumatotibia leucotreta (Meyrick)

Xylella fastidiosa (Wells *et al.*)

3.

LEGAL ELEMENTS OF THE DELEGATED ACT

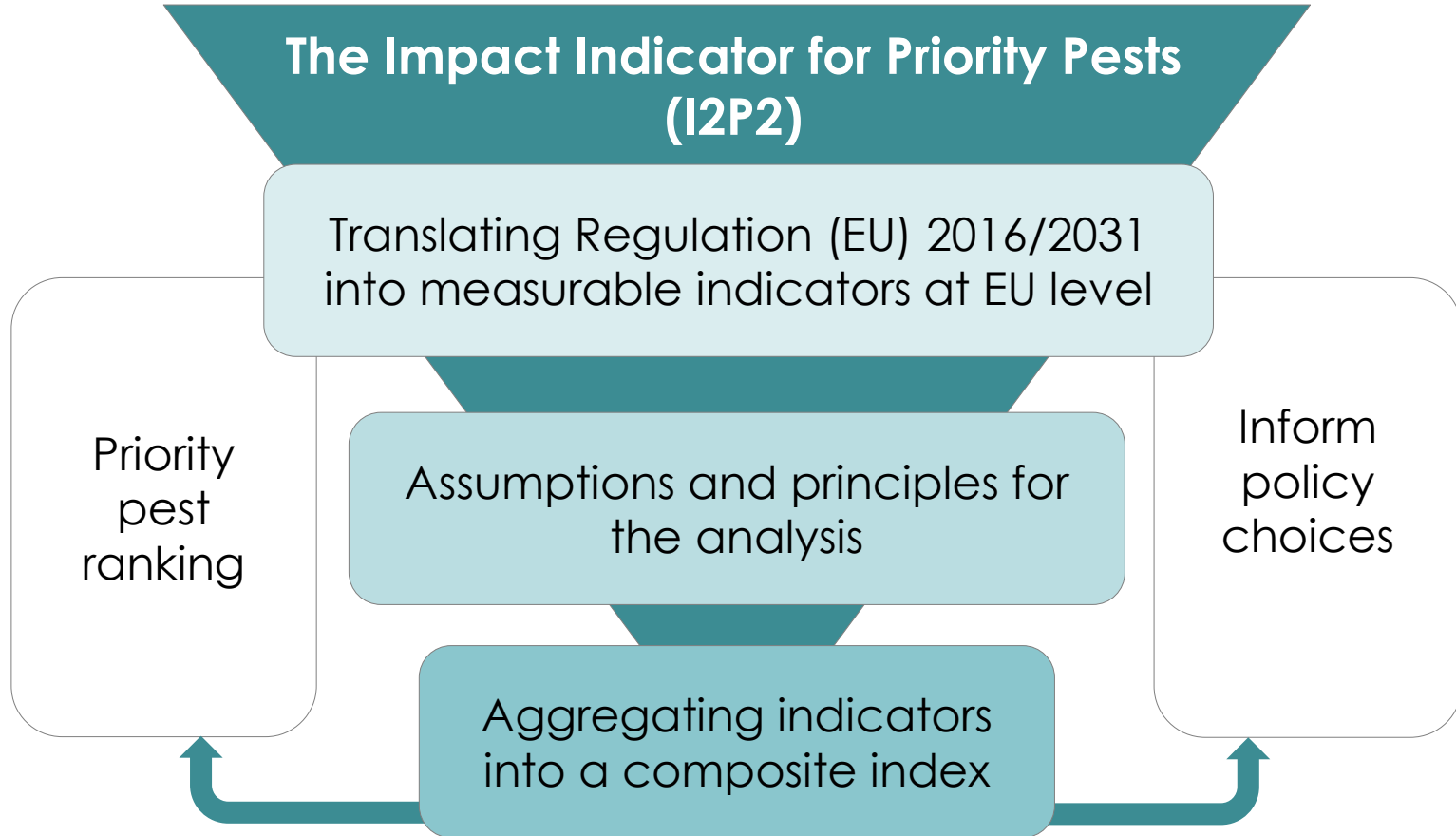
The Delegated Act provides for a list of priority pests in accordance with Article 6(2) of Regulation (EU) 2016/2031.



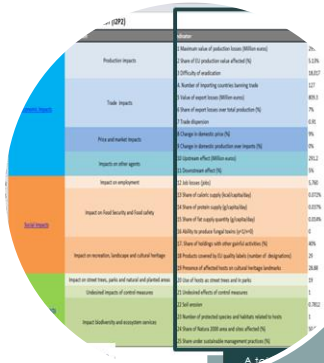
European
Commission

How did we build the I2P2 to rank pests based on their socioeconomic and environmental impact?

Composite indicators including multiple criteria



Structure of the I2P2



1. Indicators selection
(Reg. criteria/data availability)

Quantitative / qualitative measures by HOST / PEST

RANKING

| Pest | I2P2 | | Ranking by domains | | |
|---|------|--------|--------------------|--------|-------------|
| | Rank | Value | Economic | Social | Environment |
| <i>Apple fastidiosa</i> (Pierce's disease) | 1 | 0.8104 | 1 | 1 | 1 |
| <i>Pagillia japonica</i> (Japanese beetle) | 2 | 0.5117 | 4 | 3 | 2 |
| <i>Thaumetobia leucostrepta</i> (Citrus codling moth) | 3 | 0.4724 | 8 | 2 | 3 |
| <i>Coniodatus liberibacter</i> (Citrus greening) | 4 | 0.3750 | 2 | 5 | 5 |
| <i>Conotrachelus nemophar</i> | 5 | 0.3349 | 10 | 6 | 4 |
| <i>Phononemus eugeni</i> | 6 | 0.2963 | 5 | 9 | 7 |
| <i>Pericoma cockerelli</i> | 7 | 0.2792 | 7 | 4 | 14 |
| <i>Pericoma pomonella</i> (Apple maggot fly) | 8 | 0.2728 | 3 | 12 | 10 |
| <i>Argyrotaenia</i> (Fall armyworm) | 9 | 0.2245 | 11 | 10 | |
| <i>Pericoma pomonella</i> (Oriental fruit fly) | 10 | 0.2068 | 17 | 11 | |
| <i>Pericoma pomonella</i> (Oriental fruit fly) | 11 | 0.2051 | 16 | | |
| <i>Pericoma pomonella</i> (Oriental fruit fly) | 12 | 0.1983 | | | |
| <i>Pericoma pomonella</i> (Oriental fruit fly) | 13 | | | | |

2. Normalization and weighting

Aggregate indicators and compare pests

Ranking uncertainty - EFSA parameters

| Pest | Median | | Q25 | | Q75 | |
|---------------|---------|--------|---------|--------|---------|--------|
| | Ranking | Change | Ranking | Change | Ranking | Change |
| disease) | 1 | 1 | = | 1 | = | |
| beetle) | 2 | 2 | = | 2 | = | |
| codling moth) | 3 | 3 | = | 3 | = | |
| greening) | 4 | 4 | = | 5 | -1 | |
| | 5 | 5 | = | 4 | 1 | |
| | 6 | 6 | = | 8 | | |
| | 7 | 7 | = | 7 | | |
| | 8 | 10 | | | | |

3. Uncertainty and sensitivity analysis

Different data sources

EFSA*

Data on Hosts; Potential distribution; Y,Q loss; Spread/detection rate; Quarantine; Treatments

MS and experts

Ad-hoc data requests on Forestry; Cultural heritage; street-park trees; prices

Secondary data

Data on production (EUROSTAT,FAO); trade (COMEXT); Soil erosion(articles)

Data calculated by JRC

All indicators per pest

*Note: data for a maximum spread scenario based on the current environmental conditions and production practices, within a time frame long enough to take into account the temporal variation

1 Indicators by PEST

THE IMPACT INDICATOR FOR PRIORITY PEST (I2P2)

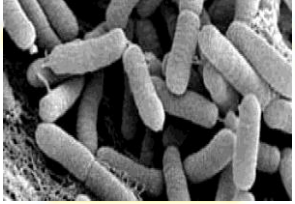
Anastrepha_ludens

| Domain | Sub-domain | Indicator | Result |
|--|---|---|--|
| Economic Impacts | Production impacts | I.1 Maximum value of production losses (Million euros) | 295.4 |
| | | I.2 Share of EU production value affected (%) | 5.13% |
| | | I.3 Difficulty of eradication | 18,017 |
| | Trade impacts | I.4. Number of importing countries banning trade | 127 |
| | | I.5 Value of export losses (Million euros) | 809.3 |
| | | I.6 Share of export losses over total production (%) | 7% |
| | | I.7 Trade dispersion | 0.91 |
| | Price and market impacts | I.8 Change in domestic price (%) | 9% |
| | | I.9 Change in domestic production over imports (%) | 0% |
| | Impacts on other agents | I.10 Upstream effect (Million euros) | 291.2 |
| | | I.11 Downstream effect (%) | 5% |
| Social Impacts | Impact on employment | I.12 Job losses (jobs) | 5,760 |
| | | I.13 Share of caloric supply (kcal/capita/day) | 0.072% |
| | Impact on Food Security and Food safety | I.14 Share of protein supply (g/capita/day) | 0.037% |
| | | I.15 Share of fat supply quantity (g/capita/day) | 0.014% |
| | | I.16 Ability to produce fungal toxins (y=1/n=0) | 0 |
| | Impact on recreation, landscape and cultural heritage | I.17. Share of holdings with other gainful activities (%) | 40% |
| | | I.18 Products covered by EU quality labels (number of designations) | 29 |
| | | I.19 Presence of affected hosts on cultural heritage landmarks | 28.88 |
| | Environmental impacts | Impact on street trees, parks and natural and planted areas | I.20 Use of hosts as street trees and in parks |
| Undesired impacts of control measures | | I.21 Undesired effects of control measures | 1 |
| | | I.22 Soil erosion | 0.7812 |
| Impact biodiversity and ecosystem services | | I.23 Number of protected species and habitats related to hosts | 1 |
| | | I.24 Share of Natura 2000 area and sites affected (%) | 50.0% |
| | | I.25 Share under sustainable management practices (%) | 0.21% |

2 RANKING (pest affecting crops example)

| Pest | I2P2 | | Ranking by domains | | |
|---|------|--------|--------------------|--------|---------------|
| | Rank | Value | Economic | Social | Environmental |
| <i>Xylella fastidiosa</i> (Pierce's disease) | 1 | 0.8104 | 1 | 1 | 1 |
| <i>Popillia japonica</i> (Japanese beetle) | 2 | 0.5117 | 4 | 3 | 2 |
| <i>Thaumatotibia leucotreta</i> (Citrus codling moth) | 3 | 0.4714 | 8 | 2 | 3 |
| <i>Candidatus liberibacter</i> (Citrus greening) | 4 | 0.3750 | 2 | 5 | 5 |
| <i>Conotrachelus nenuphar</i> | 5 | 0.3349 | 10 | 6 | 4 |
| <i>Anthonomus eugenii</i> | 6 | 0.2960 | 5 | 9 | 7 |
| <i>Bactericera cockerelli</i> | 7 | 0.2792 | 7 | 4 | 14 |
| <i>Rhagoletis pomonella</i> (Apple maggot fly) | 8 | 0.2728 | 3 | 12 | 10 |
| <i>Spodoptera frugiperda</i> (Fall armyworm) | 9 | 0.2246 | 11 | 10 | 11 |
| <i>Bactrocera dorsalis</i> (Oriental fruit fly) | 10 | 0.2068 | 17 | 11 | 8 |
| <i>Anastrepha ludens</i> (Mexican fruit fly) | 11 | 0.2051 | 16 | 14 | 6 |
| <i>Bactrocera zonata</i> (Peach fruit fly) | 12 | 0.1983 | 15 | 13 | 9 |
| <i>Grapevine flavescence doree</i> (Flavescence doree of grapevine) | 13 | 0.1958 | 9 | 16 | 12 |
| <i>Ralstonia solanacearum</i> (Bacterial wilt; Brown rot) | 14 | 0.1747 | 12 | 7 | 17 |
| <i>Thrips palmi</i> | 15 | 0.1707 | 20 | 8 | 13 |
| <i>Xanthomonas citri</i> (Citrus canker) | 16 | 0.1321 | 19 | 18 | 15 |
| <i>Phyllosticta citricarpa</i> (Black spot of citrus) | 17 | 0.1262 | 18 | 19 | 16 |
| <i>Tilletia indica</i> (Karnal bunt of wheat) | 18 | 0.1220 | 6 | 20 | 20 |
| <i>Clavibacter michiganensis</i> ssp. <i>Sepedonicus</i> (Bacterial ring rot of potato) | 19 | 0.1126 | 13 | 15 | 19 |
| <i>Synchytrium endobioticum</i> (Wart disease of potato) | 20 | 0.0930 | 14 | 17 | 18 |

Some figures for the pests in the podium



Xylella fastidiosa (Pierce's disease)

Loss of production: 5.5 billion EUR

Export losses: 0.7 billion EUR



Popillia japonica (Japanese beetle)

Loss of production: 2.4 billion EUR

Export losses: 2.2 billion EUR



Thaumatotibia leucotreta (Citrus codling moth)

Loss of production: 1.2 billion EUR

Export losses: 1.9 billion EUR

3 Sensitivity analysis - alternative weights

| Pests considered | Reasoning | Weights per domain | | |
|------------------|--|--------------------|--------|---------------|
| | | Economic | Social | Environmental |
| <i>All</i> | <i>All indicators have a social dimension and therefore indicators reflecting only social impacts should be given less importance.</i> | 40 | 20 | 40 |
| <i>Crops</i> | <i>Economic losses are the most important for crops, thus they should have more weight.</i> | 50 | 25 | 25 |
| <i>Forest</i> | <i>Social impacts for forests have limited information; economic and environmental domains should drive the assessment.</i> | 50 | 0 | 50 |

3 Sensitivity analysis - alternative weights

| Pest | Equal weights | 40-20-40 | | 50-25-25 | |
|--|---------------|----------|--------|----------|--------|
| | Ranking | Ranking | Change | Ranking | Change |
| <i>Xylella fastidiosa</i> (Pierce's disease) | 1 | 1 | = | 1 | = |
| <i>Popillia japonica</i> (Japanese beetle) | 2 | 2 | = | 2 | = |
| <i>Thaumatotibia leucotreta</i> (Citrus codling moth) | 3 | 3 | = | 3 | = |
| <i>Candidatus liberibacter</i> (Citrus greening) | 4 | 4 | = | 4 | = |
| <i>Conotrachelus nenuphar</i> | 5 | 5 | = | 5 | = |
| <i>Anthonomus eugenii</i> | 6 | 6 | = | 6 | = |
| <i>Bactericera cockerelli</i> | 7 | 8 | -1 | 7 | = |
| <i>Rhagoletis pomonella</i> (Apple maggot fly) | 8 | 7 | 1 | 8 | = |
| <i>Spodoptera frugiperda</i> (Fall armyworm) | 9 | 9 | = | 9 | = |
| <i>Bactrocera dorsalis</i> (Oriental fruit fly) | 10 | 12 | -2 | 13 | -3 |
| <i>Anastrepha ludens</i> (Mexican fruit fly) | 11 | 11 | = | 12 | -1 |
| <i>Bactrocera zonata</i> (Peach fruit fly) | 12 | 13 | -1 | 14 | -2 |
| <i>Grapevine flavescence doree</i> (Flavescence doree of grapevine) | 13 | 10 | 3 | 10 | 3 |
| <i>Ralstonia solanacearum</i> (Bacterial wilt; Brown rot) | 14 | 14 | = | 11 | 3 |
| <i>Thrips palmi</i> | 15 | 16 | -1 | 15 | = |
| <i>Xanthomonas citri</i> (Citrus canker) | 16 | 18 | -2 | 18 | -2 |
| <i>Phyllosticta citricarpa</i> (Black spot of citrus) | 17 | 19 | -2 | 19 | -2 |
| <i>Tilletia indica</i> (Karnal bunt of wheat) | 18 | 15 | 3 | 16 | 2 |
| <i>Clavibacter michiganensis ssp. Sepedonicus</i> (bacterial ring rot of potato) | 19 | 17 | 2 | 17 | 2 |
| <i>Synchytrium endobioticum</i> (Wart disease of potato) | 20 | 20 | = | 20 | = |

Cut-off

No change

Get out

Get into

3 Incorporating uncertainty – EFSA parameters

Percentiles of the uncertainty distributions of the proportion of yield loss [%] caused by species with effect on yield of citrus fruits

| Species with effect on yield of citrus fruits | | | Percentiles of the proportion of yield loss [%] | | | | | | | | | | | | |
|---|---|---------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Class | Species | EPPO code/host | 1% | 5% | 10% | 17% | 25% | 33% | 50% | 67% | 75% | 83% | 90% | 95% | 99% |
| BACTERIA | <i>Candidatus Liberibacter</i> spp. (citrus greening) | LIBEXX/citrus | 17.7% | 29.8% | 37.7% | 45.0% | 52.0% | 57.8% | 67.8% | 76.7% | 81.1% | 85.7% | 89.8% | 93.5% | 97.6% |
| INSECTS | <i>Thaumatotibia leucotreta</i> | ARGPLE/citrus | 7.4% | 11.5% | 14.1% | 16.7% | 19.3% | 21.7% | 26.2% | 31.0% | 33.8% | 37.4% | 41.2% | 45.8% | 54.3% |
| BACTERIA | <i>Xanthomonas citri</i> | XANTCI/high impact citrus | 1.8% | 3.1% | 4.2% | 5.5% | 7.0% | 8.5% | 12.2% | 17.4% | 21.3% | 27.2% | 35.2% | 47.6% | 83.6% |
| BACTERIA | <i>Xylella fastidiosa</i> | XYLEFA/citrus | 0.1% | 0.7% | 1.5% | 2.8% | 4.5% | 6.4% | 10.9% | 16.2% | 19.4% | 23.1% | 26.7% | 30.2% | 34.4% |
| INSECTS | <i>Bactrocera dorsalis</i> | DACUDO/citrus | 0.6% | 1.6% | 2.5% | 3.5% | 4.7% | 5.9% | 8.6% | 11.9% | 14.2% | 17.2% | 20.9% | 25.7% | 36.4% |
| INSECTS | <i>Anoplophora chinensis</i> | ANOLCN/citrus | 2.5% | 3.5% | 4.3% | 5.0% | 5.8% | 6.6% | 8.3% | 10.3% | 11.7% | 13.6% | 16.0% | 19.3% | 27.4% |
| INSECTS | <i>Bactrocera zonata</i> | DACUZO/citrus | 0.4% | 1.2% | 2.0% | 2.9% | 4.0% | 5.0% | 7.3% | 9.9% | 11.7% | 13.9% | 16.5% | 19.8% | 26.5% |
| FUNGI | <i>Anastrepha ludens</i> | ANSTLU/citrus, peaches | 0.9% | 1.5% | 1.9% | 2.4% | 3.0% | 3.6% | 4.9% | 6.8% | 8.1% | 10.0% | 12.5% | 16.3% | 26.7% |

Source table : EFSA (European Food Safety Authority), Baker R., et al 2019. Scientific report on the methodology applied by EFSA to provide a quantitative assessment of pest-related criteria required to rank candidate priority pests as defined by Regulation (EU) 2016/2031. EFSA Journal 2019;17(6):5731, 61 pp.

3 Incorporating uncertainty – EFSA parameters

| Pest | Median | Q25 | | Q75 | |
|--|---------|---------|--------|---------|--------|
| | Ranking | Ranking | Change | Ranking | Change |
| <i>Xylella fastidiosa</i> (Pierce's disease) | 1 | 1 | = | 1 | = |
| <i>Popillia japonica</i> (Japanese beetle) | 2 | 2 | = | 2 | = |
| <i>Thaumatotibia leucotreta</i> (Citrus codling moth) | 3 | 3 | = | 3 | = |
| <i>Candidatus liberibacter</i> (Citrus greening) | 4 | 4 | = | 5 | -1 |
| <i>Conotrachelus nenuphar</i> | 5 | 5 | = | 4 | 1 |
| <i>Anthonomus eugenii</i> | 6 | 6 | = | 8 | -2 |
| <i>Bactericera cockerelli</i> | 7 | 7 | = | 7 | = |
| <i>Rhagoletis pomonella</i> (Apple maggot fly) | 8 | 10 | -2 | 6 | 2 |
| <i>Spodoptera frugiperda</i> (Fall armyworm) | 9 | 8 | 1 | 9 | = |
| <i>Bactrocera dorsalis</i> (Oriental fruit fly) | 10 | 11 | -1 | 10 | = |
| <i>Anastrepha ludens</i> (Mexican fruit fly) | 11 | 9 | 2 | 11 | = |
| <i>Bactrocera zonata</i> (Peach fruit fly) | 12 | 12 | = | 12 | = |
| <i>Grapevine flavescence doree</i> (Flavescence doree of grapevine) | 13 | 13 | = | 13 | = |
| <i>Ralstonia solanacearum</i> (Bacterial wilt; Brown rot) | 14 | 15 | -1 | 14 | = |
| <i>Thrips palmi</i> | 15 | 14 | 1 | 15 | = |
| <i>Xanthomonas citri</i> (Citrus canker) | 16 | 17 | -1 | 16 | = |
| <i>Phyllosticta citricarpa</i> (Black spot of citrus) | 17 | 18 | -1 | 17 | = |
| <i>Tilletia indica</i> (Karnal bunt of wheat) | 18 | 16 | 2 | 18 | = |
| <i>Clavibacter michiganensis ssp. Sepedonicus</i> (Bacterial ring rot of potato) | 19 | 19 | = | 19 | = |
| <i>Synchytrium endobioticum</i> (Wart disease of potato) | 20 | 20 | = | 20 | = |

Cut-off

No change

Get out

Get into

Future steps

1. Increase the quality of our database (e.g., control and surveillance measures cost)
2. Develop a simplified version of the I2P2 for a quicker analysis in case of new emerging pests
3. Extend the analysis to all the EU quarantine pests
4. Extend the analysis under different scenarios of climate change

Thanks for your attention!

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