NAME OF THE ORGANISM: Ditylenchus gigas (DITYGI)

GENERAL INFORMATION ON THE PEST

Name as submitted in the project specification (if different to the preferred name):

Pest category:

Nematoda **1- Identity of the pest/Level of taxonomic listing:**
Is the organism clearly a single taxonomic entity and can it be adequately distinguished from other entities of the same rank?

Yes
Is the pest defined at the species level or lower?:

Yes
Can listing of the pest at a taxonomic level higher than species be supported by scientific reasons or can species be identified within the taxonomic rank which are the (main) pests of concern?

* Not relevant: Fodder plant seed sector, Vegetable seed sector

Is it justified that the pest is listed at a taxonomic rank below species level?

Not relevant
Conclusion:

* Candidate: Fodder plant seed sector, Vegetable seed sector

Justification (if necessary):

Ditylenchus gigas was considered previously as the giant race of Ditylenchus dipsaci. This is the reason why the EPPO Secretariat proposed to add this pest to the RNQP project. D. gigas is suspected to only affect Vicia faba (ARVALIS, 2017). **2 – Status in the EU:**

Is this pest already a quarantine pest for the whole EU?

No
Presence in the EU:

Conclusion:

candidate
Justification (if necessary):

The pest is present in Germany, Italy, Poland and Spain (EPPO Global Database, CABI 2015)

HOST PLANT N°1: Vicia faba (VICFX) for the Fodder plant seed sector.

Origin of the listing:

Plants for planting:

Seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

Yes
Conclusion:

Candidate

Justification:

Ditylenchus gigas is now considered as conspecific with the D. dipsaci 'giant race' in Vicia faba. Seed transmission of D. gigas to the planted crop is well established and planting certified nematode-free seeds is recognised as an important control practice for this disease. Of 144 stem nematode populations obtained from commercial Vicia faba seed lots from England 93% were found to be infected with D. gigas (Stawniak, 2011). Contaminated seed can be controlled by seed testing and the removal of contaminated seed lots from the market. Crop rotation plays a significant roll in reducing seed infection. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

The pest causes swelling and deformation of stem tissue or lesions, leaf and petiole necrosis and infected seeds are darker, distorted and smaller in size. Heavy infestations often kill the main shoots. On faba bean (V. faba), D. dipsaci induces necrosis or swelling of the tissue and these more severe symptoms are usually induced by the 'giant race', specific to faba bean (CABI, 2015). D. gigas is one of the most devastating plant-parasitic nematodes, especially in temperate regions and without control, it can cause complete failure of host crops such as legumes. Industry reports (PGRO, 2007) suggested yield reductions of 0.8 tonnes per hectare in humid and wet years in the UK. Seed rejected because of infected seeds are usually used for animal feed, but the price of deteriorated material is reduced significantly by at least 15% (Stawniak, 2011).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Major
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

No
Conclusion:

Candidate
Justification:

 **6 - Are there feasible and effective measures available to prevent the presence of the pest on the plants for planting at an incidence above a certain threshold (including zero) to avoid an unacceptable economic impact as regards the relevant host plants?**

Yes

Conclusion:

candidate
Justification:

Planting disease free seed, field inspections, where crop infected produce not used for seed. Prevent build up of pest through adequate rotation, a break of 5 to 10 years before growing beans where an infested crop was found. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on data. Remark: this would be a new regulation in the European Union on Vicia faba. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Zero tolerance approach, based on visual examination and/or testing. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

For all categories of material:
(A) (a) The crop has been inspected at least once at an appropriate time since the beginning of the last complete cycle of vegetation and no symptoms of Ditylenchus gigas have been observed;
and
(b) No Ditylenchus gigas has been revealed by laboratory tests on a representative sample;
OR
(B) The seeds have been subjected to an appropriate physical or chemical treatment against Ditylenchus gigas and have been found to be free of this pest after laboratory tests on a representative sample.
Justification (if necessary):

In case of finding, producers are not producing Vicia faba for 5 to 10 years on the same field. No physical and chemical treatments are available. Such treatments probably may be developed in the future (‘ThermoSeed’ treatments). Experts of the SEWG concluded that a laboratory test should be mandatory. **REFERENCES:**

* ARVALIS (2017) Les fiches accidents. Némathode des tiges et bulbes: Ditylenchus dipsaci. Consulted the 09/08/2017. Available from <http://www.fiches.arvalis-infos.fr/fiche_accident/fiches_accidents.php?mode=fa&type_cul=9&type_acc=3&id_acc=314>;
* CABI (Centre for Agricultural Bioscience International) (2015) Online. Datasheets Ditylenchus dipsaci (stem and bulb nematode). Invasive species compendium. CABI, Wallingford, UK. Available from <http://www.cabi.org/isc/datasheet/19287>;
* Stawniak N (2011) Studies on stem nematode species (ditylenchus spp.) associated with faba bean (vicia faba L.) in the United Kingdom and their implications for field management. PhD thesis, University of Reading. Available from <http://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.578032>;
* PGRO (Processors and Growers Research Organisation) (2007) Information Sheet Number 168 Stem & Bulb nematode (Ditylenchus dipsaci) in field beans. Processors and Growers Research Organisation, Peterborough, UK;

HOST PLANT N°2: Vicia faba (VICFX) for the Vegetable seed sector.

Origin of the listing:

Plants for planting:

Seeds **3 - Is the pest already listed in a PM4 standard on the concerned host plant?**

No
Conclusion:

Evaluation continues **4 - Are the listed plants for planting the main\* pathway for the "pest/host/intended use" combination? (\*: significant compared to others):**

Yes
Conclusion:

Candidate

Justification:

A survey of commercial seeds samples in the UK showed D. dipsaci occurrence in 36-45% of seed stocks of broad bean with up to 67% in a broad bean seed stock being infested. (The results do not separate D. dipsaci from D. gigas, the latter which was not recognised as a separate species until more recently). Seed transmission of D. dipsaci/D gigas to germinating seedlings for transplanting is well established and planting certified nematode-free seeds is recognized as an important control practice for this disease. In Germany, incidence varied between 3.3-13.8% per stock and a tolerance level of five nematodes/300 seeds is used to establish the risk of transmission of the pathogen to seedlings for transplanting of Vicia faba. Seed infection can be controlled by chemical or hot-water seed treatments and by seed health tests to remove infested stocks.
Nematode-infested soil is also an important inoculum source of D. dipsaci/D.gigas. The pests can also survive in plant debris and in Germany, one third of the sampled faba-bean fields were found to be infested by D. dipsaci/D gigas, in densities beyond the tolerance threshold of 2-3 nematodes/250 cm3 soil, but high densities were rare in non-faba bean fields.
Infested weeds are also recognized as a potentially important inoculum source for these two nematodes. Field control can be by rotation, soil solarization or resistant cultivars, however chemical treatments of soil are not economic for large areas (CABI, 2015).
In conclusion young plants for transplanting are a pathway for D. gigas, and if suitable control measures are carried out for the alternative inoculum sources, young plants can be considered a significant pathway compared to others. **5 - Economic impact:**
Are there documented reports of any economic impact on the host?

Yes
Justification:

Symptoms caused by the ‘giant race’ (now considered as a new species, D. gigas), on V. faba crops are generally more severe than those caused by other races of D. dipsaci, and more infested seeds are produced (Vovlas et al., 2011).
Both species cause swelling and deformation of stem tissue or lesions, leaf and petiole necrosis and infected seeds are darker, distorted and smaller in size. Heavy infestations often kill the main shoots. On faba bean (V. faba), both species induce necrosis or swelling of the tissue and these more severe symptoms are usually induced by the 'giant race' (D. gigas), specific only to Vicia faba. D. dipsaci/D.gigas is one of the most devastating plant-parasitic nematodes, especially in temperate regions and without control, it can cause complete failure of host crops such as legumes (CABI, 2015). Incorporating nematicides into pelleted faba bean seeds increased yield by 6 to 12% in Belgium, damage caused by the passage of a sprayer was eliminated and it must be assumed that the reduction of D. dipsaci [D. gigas] infestation would be reflected in the impact on any following host crops (Schiffers et al.,1984).
What is the likely economic impact of the pest irrespective of its infestation source in the absence of phytosanitary measures? (= official measures)

Major
Is the economic impact due to the presence of the pest on the named host plant for planting, acceptable to the propagation and end user sectors concerned?

No
Conclusion:

Candidate
Justification:

 **6 - Are there feasible and effective measures available to prevent the presence of the pest on the plants for planting at an incidence above a certain threshold (including zero) to avoid an unacceptable economic impact as regards the relevant host plants?**

Yes

Conclusion:

candidate
Justification:

Planting disease free seed, field inspections, where crop infected produce not used for seed. Prevent build up of pest through adequate rotation, a break of 5 to 10 years before growing beans where an infested crop was found. **7- Is the quality of the data sufficient to recommend the pest to be listed as a RNQP?**

Yes

Conclusion:

Candidate
Justification:

 **CONCLUSION ON THE STATUS:**

Recommended for listing as an RNQP, based on data. Remark: this would be a new regulation in the European Union on Vicia faba. **8 - Tolerance level:**
Is there a need to change the Tolerance level:

Yes
Proposed Tolerance levels:

Zero tolerance approach, based on visual examination and/or testing. **9 - Risk management measures:**
Is there a need to change the Risk management measure:

Yes
Proposed Risk management measure:

(a) Plants produced in areas known to be free from Ditylenchus gigas;
OR
(b) The crop has been inspected at least once at an appropriate time during the growing season and no symptoms of Ditylenchus gigas have been observed;
OR
(c) No Ditylenchus gigas has been revealed by laboratory tests on a representative sample;
OR
(d) the seeds have been subjected to an appropriate physical or chemical treatment against Ditylenchus gigas and have been found to be free of this pest after laboratory tests on a representative sample.
Justification (if necessary):

This is different from the recommendation for the same host as an agricultural crop, but there is a difference in the regulatory framework (certified seed versus standard seed). A systematic laboratory test would be too strict for the vegetable seed sector. No physical and chemical treatments are available. Such treatments may probably be developed in the future (‘ThermoSeed’ treatments). **REFERENCES:**

* ARVALIS (2017) Les fiches accidents. Némathode des tiges et bulbes: Ditylenchus dipsaci. Consulted the 09/08/2017. Available from <http://www.fiches.arvalis-infos.fr/fiche_accident/fiches_accidents.php?mode=fa&type_cul=9&type_acc=3&id_acc=314>;
* CABI (Centre for Agricultural Bioscience International) (2015) Online. Datasheets Ditylenchus dipsaci (stem and bulb nematode). Invasive species compendium. CABI, Wallingford, UK. Available from <http://www.cabi.org/isc/datasheet/19287>;
* Schiffers BC, Fraselle J, Hubrecht F & Jaumin L (1984) The control of Ditylenchus dipsaci (Kuhn) Fil. by nematicides incorporated in pelleted seeds of spring-sown field beans. Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit, Gent 49, 635-641;
* Vovlas N, Troccoli A, Palomares-Rius JE, Luca F, de Liébanas G, Landa BB, Subbotin SA, Castillo P (2011) Ditylenchus gigas n. sp. parasitizing broad bean: a new stem nematode singled out from the Ditylenchus dipsaci species complex using a polyphasic approach with molecular phylogeny. Plant Pathology 60(4), 762-775;