



Netherlands Food and Consumer
Product Safety Authority
Ministry of Economic Affairs

National Plant Protection Organization, the Netherlands

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1 What is the scientific name (if possible up to species level + author, also include (sub)family and order) and English/common name of the organism?
Add picture of organism/damage if available and publication allowed.

Radopholus similis (Cobb, 1893), Pratylenchidae, Tylenchida.



Fig. 1: *Vallisneria* imported plants

		 <p>Fig. 2: Brown lesions on the roots of <i>Vallisneria</i> plants infested with <i>Radophyllis similis</i></p> <p>Fig 3: Roots of non-infested <i>Vallisneria</i> plants</p>
2	<p>What prompted this quick scan? <i>Organism detected in produce for import, export, in cultivation, nature, mentioned in publications, e.g. EPPO alert list, etc.</i></p>	<p>The organism was detected in the aquatic plant <i>Vallisneria</i> imported from Malaysia (Figs 1,2). The plants were inspected as part of a survey for nematodes in various imported aquatic plants. <i>Vallisneria</i> is not known to be a host plant of <i>R. similis</i> (1,2,4,6). The known host plants of <i>R. similis</i> are inspected and sampled to confirm absence of the organism. Plants which are not known to be host plants are not standard checked on <i>R. similis</i> and these plants can form an unnoticed pathway for the spread of this nematode.</p>
3	<p>What is the current area of distribution?</p>	<p>The citrus race of <i>R. similis</i> is absent in the EU and present in Florida, Hawaii, Cote d'Ivoire, Cuba, Dominican Republic, Puerto Rico, Guyana. The banana race is widely spread in tropical areas and in greenhouses in temperate areas where it is reported in the EU in greenhouses in Belgium, France, Italy and the Netherlands and Slovenia (4,6)</p>
4	<p>What are the host plants?</p>	<p><i>R. similis</i> has a large host range including a.o. <i>Araceae</i>, <i>Citrus</i>, <i>Fortunella</i>, <i>Marantaceae</i>, <i>Musaceae</i>, <i>Piper nigrum</i> and <i>Strelitziaceae</i> (5). In a survey performed by the Netherlands, <i>R. similis</i> was found many times in adhering soil of <i>Livistona</i> sp., additionally in some cases root samples of <i>Livistona</i> sp. were analysed and found to be infested with <i>R. similis</i> (EPPO bulletin, in preparation). Experimental research is needed to confirm the host plant status of <i>Livistona</i> sp.</p>

5	<p>Does the organism cause any kind of plant damage in the current area of distribution and/or does the consignment demonstrate damage suspected to have been caused by this organism? <i>Yes/no + plant species on which damage has been reported + short description of symptoms.</i> <i>Please indicate also when the organism is otherwise harmful (e.g. predator, human/veterinary pathogen vector, etc.).</i></p>	<p>Generally, <i>R. similis</i> causes lesions on the roots of its host plants. A severe infestation leads to decay of the root system which can cause growth reduction or death of the plant. In banana the decay of the root system results in the toppling over or uprooting of banana plants when bearing fruits (3). The <i>Vallisneria</i> plants which were found to be infested showed a typical brown discoloration (lesions) of the roots (Fig. 2).</p>
6	<p>Assess the probability of establishment in the Netherlands (NL) (i.e. the suitability of the environment for establishment).</p> <ol style="list-style-type: none"> In greenhouses (low, medium, high) Outdoors (low, medium, high) Otherwise (e.g. storage facilities, human environment) 	<ol style="list-style-type: none"> High. This nematode is a tropical species and, thus, prefers high temperatures that occur in heated greenhouses but not outdoors. Low. The temperatures in the Netherlands are too low to make establishment of this nematode possible outdoors. Absence of the species has been confirmed by high numbers of outdoor soil samples taken in the Netherlands by various laboratories every year. In these samples no <i>R. similis</i> has been detected (data NPPO). Not relevant.
7	<p>Assess the probability of establishment in the EU (i.e. the suitability of the environment for establishment).</p>	<p><i>R. similis</i> is unlikely to establish outside in the temperate regions within the EU. Establishment in the warmer areas is possible. Also, establishment in greenhouses is possible.</p>
8	<p>What are the possible pathways that can contribute to spread of the organism after introduction? How rapid is the organism expected to spread (by natural dispersal and human activity)?</p>	<p>The main pathway for spread of the organism is by trade of infested plant material. For the known hosts of <i>R. similis</i>, a standard inspection regime is in force to prevent spread by this pathway. With unknown host plants the risk of spread is higher, because infestations will not be detected by standard inspections. The finding concerns an aquatic plant. If infested plants are discarded to waterways this might lead to infestation of surface water. If this water is used for irrigation, fields may become infested.</p>
9	<p>Provide an assessment of the type and amount of direct and indirect damage (e.g. lower quality, lower production, export restrictions, threat to biodiversity, etc.) likely to occur if the organism would become established in NL and the EU, respectively?</p>	<p>Establishment outdoors in the Netherlands is unlikely because of the unsuitable climatic conditions. For the Netherlands, the species is especially a risk for export markets. Currently, <i>R. similis</i> has a restricted distribution in glasshouses producing ornamentals in the Netherlands. Specific measures are in place to guarantee pest freedom for export to countries where <i>R. similis</i> is a quarantine pest.</p> <p><i>R. similis</i> can likely establish outdoors in Southern Europe (including Spanish and Portuguese islands). Direct damage on host plants can lead to decreased production levels of especially banana and citrus. Furthermore, establishment outdoors and further spread of the species would alter the pest status for the EU and could affect export markets.</p>

10	<p>Has the organism been detected on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables)?</p> <p><i>If "no", go to question 12</i></p>	No
11	<p>If the organism has been found on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables), what is the probability of introduction (entry + establishment)?</p> <p><i>Only to be answered in case of an interception or a find.</i></p>	-
12	Additional remarks	<p>In the sample of infested plants of <i>Vallisneria sp.</i>, 13 <i>Radopholus</i> nematodes (1 adult and 13 juveniles) were found in 1.7 gram of roots, indicating that a reproduction cycle had taken place and <i>Vallisneria</i> may be a real host plant. Additional research would be needed to verify the host plant status of <i>Vallisneria sp.</i></p>

13	References	<p>(1) EPPO/CABI (1992) Datasheet for <i>Radopholus citrophilus</i> and <i>Radopholus similis</i>. In: Quarantine pests for Europe (Ed. by Smith, I.M.; McNamara, D.G.; Scott, P.R.; Harris, K.M.). CAB International, Wallingford, UK.</p> <p>(2) K. Gerber, G.C. Smart, R.P. Esser. 1987. A Comprehensive catalogue of plant parasitic nematodes associated with aquatic and wetland plants. Bulletin 871. Agricultural Experimental Station Institute of Food and Agricultural Sciences. University of Florida, Gainesville.</p> <p>(3) S.R. Gowen, P. Quénehervé, R. Fogain. 2005 Nematode parasites of bananas and plantains. In: Plant parasitic nematodes in subtropical and tropical agriculture, 2nd edition. Eds. M. Luc, R.A. Sikora and J. Bridge. CAB International 2005.</p> <p>(4) EPPO (2014) PQR-EPPO database on quarantine pests (available online). http://www.eppo.int</p> <p>(5) Register Waardplanten Tab 19 01-2, document NPPO</p> <p>(6) Cabi and EPPO. Data sheets on quarantine pests; <i>Radopholus similis</i>. http://www.eppo.int/QUARANTINE/nematodes/Radopholus_similis/, 28 August 2014</p>
14	Conclusions	<p><i>Radopholus similis</i> is a quarantine pest in the EU (IIAII) and regulated for 'plants of Araceae, Marantaceae, Musaceae, Persea and Strelitziaceae, rooted or with growing medium attached or associated'. In addition, <i>R. citrophilus</i> is regulated (IIAI) for the same species and for plants of '<i>Citrus</i> L., <i>Fortunella</i> Swingle, <i>Poncirus</i> Raf., and their hybrids, other than fruit and seeds' (EU directive 2000/29/EC). Currently, <i>R. similis</i> and <i>R. citrophilus</i> are considered different races within the same species, <i>R. similis</i>. <i>R. similis</i> has a restricted distribution in some EU countries. The finding of <i>R. similis</i> in roots of the aquatic plant <i>Vallisneria</i> sp. confirms earlier findings (finding in <i>Livistona</i> sp.) that <i>R. similis</i> has a broader host range than for which it is currently regulated in the EU.</p>
15	Follow-up measures	<p>The EU will reconsider the regulated status of all IIAII organisms as part of a general revision of the plant health regulation. The findings of new host plants should be taken into account when reconsidering the regulated status of <i>R. similis</i>.</p>