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LIST OF DISEASES AND PESTS

Note by the secretariat

This document is based on ECE/TRADE/WP.7/GE.6/2006/12. It contains the list of diseases and pests as amended by the Specialized Section.

NOTE: This text presents a list of the major diseases affecting potato, a basic description of the disease and the extent of certification measures for each disease. More detailed information on the symptomology and epidemiology of the diseases can be obtained from the following textbooks:

European Handbook of Plant Diseases.(1998) Edited by I M Smith, J Dunez, R A Elliot, D H Phillips and S A Archer. Blackwell Scientific Publications, Oxford, UK [ISBN 0-632-01222-6]

Compendium of Potato Diseases (2001, 2nd Edition). Edited by W R Stevenson, R Loria, G D Franc and D P Weingartherner. The American Phytopathological Society, 3340 Pilot Knob Road, St Paul, Minnesota 55121-2097, USA. [ISBN 0-89054-275-9]

Potato Diseases (1996) Edited by D E van der Zaag, E Asscheman, H Brinkman, C B Bus, M van Delft, P H Hotsma, C P Meijers, A Mulder, L J Turkensteen and R Wustman. NIVAA, P O BOX 17337, 2502 CH Den Haag, The Netherlands. [ISBN 90-802036-2-9]

Kartoffel- Krankheiten, Schädlinge und Unkräuter, 2003, edited by W. Radke, W. Rieckmann and F. Brendler. Verlag Thomas Mann Gelsenkirchen [ISBN 3-7862-0113-7]

Potato Diseases (2005) Edited by Dr.Ir.A.Mulder, Dr.Ir.L.J.Turkensteen. NIVAP, P.O.Box 84102 NL - 2508 AC Den Haag, The Netherlands. www.nivap.nl [ISBN 90-802036-4-5]

Disease	French name	Agent	Status in the UNECE Standard	Recommended diagnostic method	General Disease Description	Comment
FUNGUS						
Potato wart disease	Galle verruqueuse	<i>Synchytrium endobioticum</i>	Zero tolerance	Visual observation of tubers and stem base	Tuber = tumours Plant = tumours and galls on stolons and stem base	
Late blight	Mildiou	<i>Phytophthora infestans</i>	Tolerance for wet or dry rot	Visual observation of plants and tubers	Tuber = rot at harvest and in storage Plant = necrosis of leaves and stems	
Dry rot	Fusariose	<i>Fusarium solani</i> var. <i>coeruleum</i> , <i>F. sulphureum</i> , <i>F. avenaceum</i> and other <i>F.</i> spp.	Tolerance	Visual observation of tubers and identification on selective medium	Tuber = storage rot Plant = non-emergence or weak plants	
Gangrene	Gangrène	<i>Phoma foveata</i> and other <i>Phoma</i> spp.	Tolerance for dry rot	Visual observation of tubers and identification on selective medium	Tuber = storage rot	May be regulated without tolerance in some regions
Leak and pink rot	Pythiales	<i>Pythium</i> spp, (wet rot agent), <i>Phytophthora erythroseptica</i> (pink rot agent)	Tolerance for wet rot	Visual observation of tubers and identification on selective medium	Tuber = rot, primarily soon after harvest	
Rubbery rot		<i>Goetrichum candidum</i>	Tolerance for wet rot	Visual observation of tubers and identification on selective medium	Tuber = storage rot	
Rhizoctonia Black scurf (on tuber)/ Stem canker (on the plant)	Rhizoctone brun	Perfect state: <i>Corticium</i> ; imperfect state: <i>Rhizoctonia solani</i>	Tolerance on tubers (black scurf)	Visual observation of plants and tubers	Tuber = surface blemish Plant = uneven emergence, wilting and stunting	Stem canker regulated in some regions. No need for general regulation because regulation of black scurf is seen as more effective
Silver scurf	Gale argentée	<i>Helminthosporium solani</i>	Treated indirectly through tolerance for shrivelled tubers	Visual observation of tubers and identification on selective medium	Tuber : skin blemish	Regulated with tolerance in some regions
Black dot	Dartrose	<i>Colletotrichum coccodes</i>	Treated indirectly through	Visual observation of tubers and identification on	Tuber = skin blemish Growing plant =	Regulated with tolerance in some

Disease	French name	Agent	Status in the UNECE Standard	Recommended diagnostic method	General Disease Description	Comment
			tolerance for shrivelled tubers	selective medium	may contribute to early dying disease in warm climates	regions
Skin spot	Oosporiose	<i>Polyscytalum pustulans</i>	Not regulated	Visual observation of tubers	Tuber = skin blemish and death of eyes Plant = uneven and non emergence	Regulated with tolerances in some regions. No need for a general regulation, not a barrier to trade.
Early blight	Alternariose	<i>Alternaria solani</i> and <i>Alternaria alternata</i>	Treated indirectly through tolerances for dry rot	Visual observation of leaves and tubers	Tuber = largely superficial rot Plant = necrosis of leaves	
White mould	Sclerotiniose	<i>Sclerotinia sclerotiorum</i>	Not regulated	Visual observation of stem	Tuber = rot, rare Plant = wilting and death of individual stems	Not to be regulated. Infection is from soil inoculum and not from the tuber
Powdery scab	Gale poudreuse	<i>Spongospora subterranea</i>	Tolerance	Visual observation of tubers with confirmation by microscope	Tuber = surface scab and cankers at rose end	May be regulated with tolerance in some regions
Verticillium wilt	Verticilliose	<i>Verticillium dahliae</i> and <i>V. alboatrum</i>	Not regulated	Visual observation of leaves and plant	Tuber = vascular discoloration Plant = wilting and death	No need for regulation in UNECE standard because path of infection is primarily through infested soil and not the seed tuber
VIRUS						
Severe mosaic	Virose grave	Potato viruses Y (all strains), A, V, M and in combination with PVX and S	Tolerance for severe virus	Visual observation of plant and ELISA test	Plant = with or without discolorations of the foliage. Deformation can be rugosity, crinkle, rolling and rigidity of the leaves or dwarfing of plant Tuber = superficial necrosis caused	Tuber symptoms, regulated with tolerance in some regions

Disease	French name	Agent	Status in the UNECE Standard	Recommended diagnostic method	General Disease Description	Comment
					only by PVY ^{NTN}	
Mild mosaic	Virose legere	PVX, PVS and PVY strains especially PVY ^N	Tolerance for mild mosaic	Visual observation of plant and ELISA test	Plant = discolouration or mottle of leaves without distortion Tuber : superficial necrosis caused only by PVY ^{NTN}	Tuber symptoms, regulated with tolerance in some regions
Leafroll	Enroulement (Virus E)	Potato leaf roll virus	Tolerance for severe virus	Visual observation of plant and ELISA test	Plant = rolling of leaves and stunting Tuber = net necrosis in flesh	
Mop top (Spraing in tubers)	Mop top	Potato mop top virus	Not regulated ¹	Visual observation of plant and tubers, ELISA test and PCR	Plant = marked mottling of leaves and stunting of all or some stems Tuber = necrotic rings or arcs on surface and in flesh	Regulated with a zero tolerance in some regions
Tobacco rattle virus (Spraing in tubers)	Rattle	Tobacco rattle virus	Not regulated ¹	Observation of tubers and PCR	Plant = mottling and distortion of leaves and stunting of some or all stems Tuber = internal discoloured arcs and rings, rarely visible on the surface	Regulated in some regions with tolerances
Tomato spotted wilt virus	TSWV	Tomato spotted wilt virus	Not regulated		Plant = leaf spotting and necrosis Tuber = skin blemish and internal necrotic spotting	Regulated in some regions with zero tolerance
BACTERIA						
Blackleg	Jambe noire	<i>Erwinia carotovora</i>	Tolerance for crop and	Observation of plant and tuber	Plant = stem rot Tuber = soft rot	

¹ According to the experience in certain areas, the disease can eradicate itself due to low transmission rates.

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		subsp. <i>atroseptica</i> and subsp. <i>carotovora</i> , <i>Erwinia chrysanthemi</i>	tuber for wet rot			
Ring rot	Flétrissement bactérien, pourriture annulaire	<i>Clavibacter michiganensis</i> subsp. <i>sepedonicus</i>	Zero tolerance	Observation of plant and tuber, test by IF and PCR	Tuber = vascular soft rot Plant = wilting and death	
Brown rot	Pourriture brune	<i>Ralstonia solanacearum</i>	Zero tolerance	Observation of plant and tuber, test by IF and PCR	Tuber = vascular soft rot Plant = wilting	
Common scab	Gale commune	<i>Streptomyces scabiei</i> and other <i>S.</i> strains e.g. <i>Streptomyces europaeiscabiei</i> <i>S. stelliscabiei</i> .	Tolerance on the tuber	Observation of tuber	Tuber = scabs	
Netted scab	Galle Plate	<i>S. europaeiscabiei</i> <i>Reticuliscabiei</i>	Tolerance on the tuber	Observation of tuber	Tuber superficial netted scabs	
VIROID						
Potato spindle tuber viroid	Viroïde des tubercules en fuseau	Potato spindle tuber viroid	Zero tolerance	Observation of plant and tuber. Test by molecular hybridization and PCR	Tuber = elongation of tuber Plant = stunting and leaf rolling	
PHYTOPLASMA						
Stolbur	Stolbur	Phytoplasma . [The principal vectors are leafhoppers (<i>Macrostelus</i> spp, <i>Hyalestes</i> spp)]	Zero tolerance	Visual observation of leaves and tubers	Plant : stunting and leaf rolling	In some regions regulated, zero tolerance
NEMATODES						
Cyst nematodes	Nématodes à kystes	<i>Globodera rostochiensis</i> and <i>Globodera pallida</i>	Zero tolerance	Visual observation of the field and testing of soil	Plant : wilting and death	
Root knot nematodes	Nématodes à galle	<i>Meloidogyne chitwoodi</i> and <i>fallax</i>	Zero tolerance	Observation of tuber, microscopic examination of cut tuber, and PCR	Tuber : surface galls and internal necrotic spots	In some regions regulated, zero tolerance

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				test		
Potato rot nematode	Nématodes libres	<i>Ditylenchus destructor</i>	Zero tolerance	Observation of tuber	Tuber : surface cracking and cortical spotting	In some regions regulated, zero tolerance
PESTS						
Colorado beetle	Doryphore	<i>Leptinotarsa decemlineata</i>	Unregulated	Visual observation of eggs, larvae and adults	Plant : leaf damage	In some regions regulated, zero tolerance
Wireworms/ slugs	Taupin	<i>Agriotes sp.:</i> <i>A. obscurus,</i> <i>A. sputator,</i> <i>A. lineatus/</i> <i>Tandonia budapestensis,</i> <i>Arion hortensis</i>	Unregulated	Visual observation of tubers	Tuber : tunnels and holes	
Tuber moth	Teigne	<i>Phthorimea opercullella</i>	Unregulated	Visual observation of leaves and tubers	Tuber : leaf Plant : tunnels in flesh damage.	In some regions regulated, zero tolerance