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COMMITTEE FOR TRADE, INDUSTRY AND ENTERPRISE DEVELOPMENT

Working Party on Standardization of Perishable Produce and Quality Development

<u>Specialized Section on Standardization of</u> <u>Seed Potatoes</u> Thirty-second session, Geneva, 4-6 March 2002 Item 5 of the provisional agenda

## TABLE ON QUARANTINE AND QUALITY DISEASES

Note by the secretariat

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Disease	French name	Causative agent	Pathogen	Optimal temperature	Transmission/Survival	Symptoms - vegetation	Symptoms - tubers	Action		
FUNGUS										
Black dot	Dartrose	Colletotrichum coccodes	Fungus	25° - 30° C	Plant residue from potatoes and tomatoes	Warm summers: yellowing, curling up and withering of the leaves and stem, and (a typical symptom of early destruction of the roots) sloughing of the epidermis of the roots and formation of numerous black dots	Microsclerotia with cilia	Healthy seedlings and rotation		
Dry rot	Fusariose	Fusarium roseum var. sambucinum, Fusarium solani var. coeruleum	Fungus	15° - 25° C	Primary inoculum in soil and tuber		Dry rot	Avoid harvesting more than three weeks after vine-killing, treat with a fungicide containing imazalil and thiabendazole		
Silver scurf	Gale argentée	Helminthosporium solani	Fungus	20° - 25° C	Contaminated tubers. Can live in the soil for several months		Pale, silvery patches	Avoid early planting, treat seedlings with special mancozeb-based fungicide		
Dry rot or gangrene	Gangrène	<i>Phoma exigua</i> var. <i>foveata</i> and var. <i>exigua</i>	Fungus	Low temperatures after harvesting or processing	In soil, survival facilities	Black pycnidia, sometimes located at the base of the stem after vine-killing, at the end of the growing season	Dry rot, dark, sunken "thumbprint" patches	Wound parasite. Harvest three weeks after vine-killing, avoid low temperatures or (sharp) falls in temperature immediately after harvesting. Fungaflor TZ.		
Powdery scab	Gale poudreuse	Spongospora subterranea	Fungus	Low temperatures	In the soil, but contamination is mainly through infected tubers; vector of the mop-top virus	Formation of cankers on the roots, white during vegetation period, turning to brown	Light-coloured blisters that grow darker	Healthy seedlings and rotation at least once every five years for contaminated soils		
Late blight	Mildiou	Phytophthora infestans	Fungus	17° - 20° C and humidity near saturation	Three means of survival: in soil, in infected tubers left in the ground or close to the field (main source of primary inoculum), and in seedlings	On foliage: discoloured patches that turn brown and are encircled by a yellow halo on the upper side of leaves. Characteristic white mildew-like growth on underside of leaves	Mottled reddish-brown areas on the surface that may extend from the epidermis to the centre of the tuber	Copper-based fungicides (risk of phytotoxicity), contact fungicides (maneb, mancozeb), penetrating fungicides (cymoxanil) or systemic pesticides (metalaxyl, oxadixyl)		

Disease	French name	Causative agent	Pathogen	Optimal temperature	Transmission/Survival	Symptoms - vegetation	Symptoms - tubers	Action				
FUNGUS ( <u>continued</u> )												
Stem canker	Rhizoctone	Perfect state: Corticium Imperfect state: Rhizoctonia solani	Fungus	Cold, moist	Sclerotia	Contaminated plants stand upright, sometimes (but not always) with small above-ground tubers. The infected parts of plants that have been pulled up can be identified by the brown and dry necrotized areas	Black Sclerotia	Fungicides: Monceren (pencycuron), Dithane M-45 (mancozeb), Rizolex (tolclofos-methyl), Electer (fenpiclonil), Iota (flutolanil) etc.				
Verticillium wilt	Verticilliose	Verticillium alboatrum and V. dahliae	Fungus		Inoculum borne in soil and in irrigation and run-off water	Yellowing of the leaves (sometmes on only one side of the plant), followed by overall withering of the leaves. Small black clerotia on the dead stem	Brown patches on the vascular ring, that can turn into cavities	Apply fungicides (benomyl, mancozeb, etc.) before planting, and rotate at least every three years				
					VIRUS							
Potato virus A	Virus A	PVA	Virus		Transmitted by aphids. Potato virus A is non-persistent as it survives only two hours inside the aphid, which becomes infectious immediately after probing a contaminated plant. Also transmitted mechanically (wind, machines, contact)	Primary infection (contamination during the current year): mild mosaics (easier to see in overcast weather). Secondary infection (contamination dates from pervious year): pronounced mosaics		Treat with mineral oils; healthy seedlings				
Potato virus M	Virus M	PVM	Virus		Transmitted by aphids. Potato virus M is non-persistent as it survives only two hours inside the aphid, which becomes infectious immediately after probing a contaminated plant	Spoon-shaped, limp, curled-up leaves		Treat with mineral oils; healthy seedlings				

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VIRUS ( <u>continued</u> )										
Potato virus S	Virus S	PVS - two strains: ordinary PVS, which is widespread in Europe, and the Andean strain of PVS, classed as quarantine pests	Virus		Transmitted by aphids. Potato virus S is non-persistent as it survives only two hours inside the aphid, which becomes infectious immediately after probing a contaminated plant. Also transmitted mechanically (wind, machines, contact)	Generally weak symptoms (latent)		Treat with mineral oils; healthy seedlings		
Potato virus X	Virus X	PVX	Virus		Transmitted by aphids. Potato virus X is non-persistent as it survives only two hours inside the aphid, which becomes infectious immediately after probing a contaminated plant. Also transmitted mechanically (wind, machines, contact	Primary infection (contamination during the current year): mild mosaics (easier to see in overcast weather). Secondary infection (contamination dates from pervious year): pronounced mosaics		Treat with mineral oils; healthy seedlings		
Potato virus Y	Virus Y (Yo <yn<yntn) Yo</yn<yntn) 	PVY	Vius		Mostly transmitted by aphids Mostly transmitted by aphids	Primary infection (contamination during the current year) takes the appearance of black patches of veinal necrosis on the underside of leaves. Symptoms of secondary infection are pronounced: stippled, crinkled, mosaic		Treat with mineral oils; healthy seedlings		
	Yn	Necrotic PVY			Mostly transmitted by aphids	Primary infection: mild mosaic. Secondary infection: mosaic may be either less visible or more pronounced		Treat with mineral oils; healthy seedlings		

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VIRUS ( <u>continued</u> )										
Potato tuber necrotic ringspot disease (PTNRD)	Yntn	Necrogenic virus	Virus		Mostly transmitted by aphids	Crinkle-type (like Yo) rather than mosaic-type (classic Yn) symptoms	Superficial annular necrosis in the form of rings or arcs, not penetrating inside	Treat with mineral oils; healthy seedlings		
Potato leaf roll	Virus E (enroulement)	PLRV	Virus		Persistent virus: the aphid becomes infectious after a latent period during which the virus passes into the insect's gut and salivary glands	Primary infection: top leaves slightly rolled up and yellowish. Secondary infection: leaves at the base clearly rolled up and hard; plant stands more upright and internodes are shorter		Insecticide treatment, healthy seedlings		
Potato mop-top	Mop-top	PMTV	Virus	Cool, damp weather	Transmitted by a soil fungus, <i>Spongospora</i> <i>subterranea</i> (powdery scab)	Bright yellow patches, sometimes in arcs or stripes, on low leaves, shorter internodes on top part	Brown necrosis in the form of more or less concentric rings or lines, often extending without a break into the flesh of the tuber	Healthy seedlings free of powdery scab, not too much water		
Tobacco rattle virus	Rattle	Tobacco rattle virus			Transmitted by free- living soil nematodes of the genera <i>Trichodorus</i> and <i>Paratrichodorus</i>	Some strains may produce deformities of leaves, with light patches that have no clear-cut edges	Cross section of the tuber reveals brown corky arcs. Symptoms may be extreme	Soil disease, requires healthy plots		
BACTERIA										
Blackleg	Jambe noire	Erwinia carotovora ssp. atroseptica (Erwinia chrysanthemi), a problem in some countries	Bacteria	Temperate zone, when cool and damp climatic conditions are followed by water shortage	Contaminated tuber	Stunted growth in the case of early attacks. "Blackleg" refers to appearance of damp rot at the base of the stem		Total elimination of plants affected by blackleg		

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				В	ACTERIA ( <u>continued</u> )				
Soft rot	Pourriture molle	Erwinia carotovora ssp. atroseptica and ssp. carotovora, Erwinia chrysanthemi	Bacteria		Contamination by infected tuber through lenticels or wounds	In warm conditions, <i>Erwinia</i> <i>Chrysanthemi</i> leads to wilting and brown rot inside the stem	Soft, moist rot inside tuber; diagnosis confirmed by cross section	Avoid damaging tubers, store in cool, dry conditions	
Ring rot	Flétrissement bactérien, pourriture annulaire	Clavibacter michiganensis ssp. sepedonicus	Bacteria		Plant residue, contaminated seedlings	Wilting	Ring rot	Quarantine pest: use healthy seedlings	
Brown rot	Pourriture brune	Ralstonia solanacearum	Bacteria		Plant residue, contaminated seedlings		Brown rot	Quarantine pest: use healthy seedlings	
Common scab and netted scab (1)	Gale commune	Genus Streptomyces: S. scabies and other species (S. europaeiscabie i and S. stelliscabiei)		19 <sup>°</sup> - 24 <sup>°</sup> C			Blister or raised form leading to craters in the tuber	Avoid light soil, avoid liming just before potato cultivation, irrigate to saturate the soil when the tubers begin to grow (in the case of blister scab). Lengthen intervals between rotations and use hardy	
Common scab and netted scab (2)	Gale commune	Genus Streptomyces: S. reticuliscabiei and some strains of S. europaeiscabiei		13° - 17° C		Symptoms sometimes visible on the roots or stolons when the attack takes place early in the season	Corky texture, known as flat or superficial scab, corresponding to superficial corky patches	varieties	
VIROID									
Potato spindle tuber viroid (PSTV)	Viroïde des tubercules en fuseau	Ribonucleic acid (RNA) viroid			Transmitted by contact and also by aphids (to a limited extent)	In the case of a virulent strain, dark green leaves, crinkling, spoon-shaped leaf roll	Reduction in size of tubers, which take an elongated "spindle-shaped" form	Harmful organism subject to quarantine: use healthy seedlings	