2006-025: DRAFT ANNEX TO ISPM 27 – *Aphelenchoides besseyi, A. fragariae* and *A. ritzemabosi*

Comm. no.	Para. no.	Comment type	Comment	Explanation	Country	SC Responses
1.	*G*	Editorial	New figures are suggested left to the appreciation of th e drafting team and TPDP	Addition figures to illustrate the section on detection	EPPO, European Union	Incorporated
2.	*G*	Editorial	Scientific names should be in italics along the draft.	See comment	COSAVE, Argentina, Peru, Brazil, Uruguay, Chile, Paraguay	Incorporated
3.	*G*	Editorial	En este tipo de documentos es muy importante manten er las reglas para la escritura de los nombres científicos, e sto aplica a los pies de página que están en cursiva Se agradece la elaboración del protocolo, sin embargo, al hacer la revisión del documento algunos de los métodos de extracción de nematodos señalados en el documento, se consider a que son poco prácticos para algunos procesos regula torios como identificación en puntos de ingreso, tardad os y costosos	Para mejorar la implementación de la norma.	Costa Rica, Mexico	
4.	*G*	Substantive	I support the document as it is and I have no comments		Georgia, Indonesia, Lao People's Democratic Republic, New Zealand, United States of America, Nepal, Mexico, Congo, South Africa, Barbados, Bahrain, Guyana,	

					Belize, Ghana, Burundi	
5.	*G*	Technical	Use subheadings for different species in the pest information section [7], Taxonomic information section [19] and extraction methods [48]	Gives a clear differentiation between the species.	Australia	Noted. It will be adjusted before posting the adopted DP.
6.	*G*	Technical	QBOL is a consortium of 20 partners (universities, research institutes and phytosanitary organizations) from all over the world working together and sharing their research expertise in the field of DNA barcoding of Arthropods, Bacteria, Fungi, Nematodes, Phytoplasmas and Viruses. Thereby, we would like to request the TPDP to evaluate the relevance to include this method in protocols.	See comment	Peru	Considered but not incorporated : as far as known by the drafting group, QBOL is an EU funded project that ended in 2012. A reference to QBANK, a curated database with specific concern for quarantine pests is already included in the protocol (para. 97). Most of the sequences and data obtained from Qbol project were deposited in QBANK;
7.	*G*	Technical	QBOL is a consortium of 20 partners (universities, research institutes and phytosanitary organizations) from all over the world working together and sharing their research expertise in the field of DNA barcoding fo Arthropods, Bacteria, Fungi, Nematodes, Phytoplasmas and Virus. Thereby, we would like to request the TPDP to evaluate the relevance to include this method in this protocol.	See comment	Brazil	Considered but not incorporated : see above

8.	*7*	Technical	**1. Pest Information**	The section includes in different places references to symptom description. We suggest that all elements referring to symptoms should appear under the section 3 detection. A word version will be provided to the IPPC Secretariat highlighting the text that should be considered for transfer to section 3	EPPO, European Union	Modified. Paragraph 12 has been moved under section 3.1.1. on symptoms of Aphelenchoides bessyi. For the other elements they are relevant in the prest information section are they are more linked to the biology of the nematode than its symptoms on plants Nb: no word version was provided for suggestion of changes.
9.	*8*	Editorial	*Aphelenchoides* spp. occurs worldwide (Fortuner and Williams, 1975; CABI, 2013). The majority of species within the genus *Aphelenchoides* Fischer, 1894 are mycetophagous, but a small group including *A. besseyi* (Christie, 1894), *A. fragariae* (Ritzema Bos, 1891)and *A. ritzemabosi* (Schwartz, 1911) also feed on higher plants. The members of this group are called foliar/leaf or bud nematodes because they are common and widespread parasites on these parts of plants. They are migratory ectoparasites and endoparasites of leaves, buds, stems and very occasionally corms, causing crinkling, blotching and growth retardation of the leaves, resulting in a reduction of quality and yield of many ornamental and crop plants such as *Oryza sativa* (rice), *Fragaria* spp. (strawberry) and *Chrysanthemum* spp. It is important to identify the particular species in the infestation as the life cycle of each species is slightly different.	"Christie, 1894" is missing from the references section.	Singapore	Considered but not incorporated : the TPDP formatting rules include that the references of descriptors of genus or species are not included in the reference list (e.g. Fischer 1894, Schwartz, 1911).
10.	*8*	Editorial	*Aphelenchoides* spp. occur~~s~~ worldwide (Fortuner and Williams, 1975; CABI, 2013). The majority of species within the genus *Aphelenchoides* Fischer, 1894 are	editorial!	EPPO, European Union	Incorporated

			mycetophagous, but a small group including *A. besseyi* (Christie, 1894), *A. fragariae* (Ritzema Bos, 1891)and *A. ritzemabosi* (Schwartz, 1911) also feed on higher plants. The members of this group are called foliar/leaf or bud nematodes because they are common and widespread parasites on these parts of plants. They are migratory ectoparasites and endoparasites of leaves, buds, stems and very occasionally corms, causing crinkling, blotching and growth retardation of the leaves, resulting in a reduction of quality and yield of many ornamental and crop plants such as *Oryza sativa* (rice), *Fragaria* spp. (strawberry) and *Chrysanthemum* spp. It is important to identify the particular species in the infestation as the life cycle of each species is slightly different.			
11.	*8*	Technical	*Aphelenchoides* spp. occurs worldwide (Fortuner and Williams, 1975; CABI, 2013). The majority of species within the genus *Aphelenchoides* Fischer, 1894 are mycetophagous, but a small group including *A. besseyi* (Christie, 1894), *A. fragariae* (Ritzema Bos, 1891)and *A. ritzemabosi* (Schwartz, 1911) also feed on higher plants. 180 species of *Aphelenchoides species* (plus 19 of uncertain status) have been described until now. Plant feeding Aphelenchoides species have the ability to survive unfavourable consitions in a quiescent stage. The members of this group are called foliar/leaf or bud nematodes because they are common and widespread parasites on these parts of plants. They are migratory ectoparasites and endoparasites of leaves, buds, stems and very occasionally corms, causing crinkling, blotching and growth retardation of the leaves, resulting in a reduction of quality and yield of many ornamental and crop plants such as *Oryza sativa* (rice), *Fragaria* spp. (strawberry) and *Chrysanthemum* spp. It is important to identify the particular species in the infestation as the life cycle of each species is slightly different.	Addition of two new sentences These are important information for this section. For the first sentence the reference is Zootaxa, p. 209, Reference 292A, p.32	EPPO, European Union	Incorporated
12.	*8*	Technical	*Aphelenchoides* spp. occurs worldwide (Fortuner and Williams, 1975; CABI, 2013). The majority of species within the genus *Aphelenchoides* Fischer, 1894 are mycetophagous, but a small group including *A. besseyi* (Christie, 1894), *A. fragariae* (Ritzema Bos, 1891)and *A. ritzemabosi* (Schwartz, 1911) also feed on higher	give further clarification	Kenya	Incorporated.

			plants. The members of this group are called foliar/leaf or bud nematodes because they are common and widespread parasites on these parts of plants. They are migratory ectoparasites and endoparasites of leaves, buds, stems and very occasionally corms, causing crinkling, blotching and growth retardation of the leaves[reduced leaf size], resulting in a reduction of quality and yield of many ornamental and crop plants such as *Oryza sativa* (rice), *Fragaria* spp. (strawberry) and *Chrysanthemum* spp[give reference]. It is important to identify the particular species in the infestation as the life cycle of each species is slightly different.			
13.	*9*	Technical	*Aphelenchoides besseyi* is known as the causal agent of the 'white tip disease'~~for the symptoms it causes~~ on its major host, *O. sativa (rice)* ,~~.~~ wherever this host occurs worldwide. However, the nematode also infests *Fragaria* spp., where it is a cause of crimp disease recorded from the United States, Australia and more recently Europe. Other crops recorded as infested include grasses (*Panicum, Pennisetum* and *Setaria*), ornamentals (e.g. *Begonia* and *Chrysanthemum*) and vegetables (e.g. A*llium* and *Dioscorea*) (CABI, 2013). It was recently identified as the causal agent of the 'black spot disease' on *Phaseaolus vulgaris* (Bean) (Chaves et al. 2013).	Important to refer to the name of the disease and to the new information on bean References proposed: 1/ Hockland S. (2004) Aphelenchoides besseyi. OEPP/EPPO, Bulletin OEPP/EPPO, 34, 303–308. 2/ Chaves, N., Cervantes, E., Zabalgogeazcoa, I. & Araya, C. (2013) Aphelenchoides besseyi Christie (Nematoda: Aphelenchoididae), agente causal del amachamiento del frijol común. Tropical Plant Pathology, 38 (3), 243–252. http://dx.doi.org/10.1590/S1982-56762013005000009	EPPO, European Union	Incorporated (except the word "rice" as it is already included in the previous paragraph)
14.	*11*	Technical	As with some other *Aphelenchoides* spp., *A. besseyi* may be found between leaves and buds in *Fragaria* spp. and may cause distortion of the leaves, which is more noticeable on newly formed leaves after growth resumes in spring (Brown *et al.*, 1993). On Strawberry, A. besseyi appears in summer and is called the 'summer crimp nematode' (Esser, 1966). it is a parasite of warm regions; according to EPPO (1997) A. besseyi is not found beyond latitudes 43° N on rice or beyond 40° N on strawvberries grown outdoors.	Additional useful information References: EPPO (1997). Quarantine Pests for Europe. 2nd edition. Edited by Smith IM, McNamara DG, Scott PR, Holderness M. CABI International, Wallingford, UK, 1425 pp Esser R.P. (1966). Nematodes attacking plants above the soil surface. Crimp (Foliar Nematode on Strawberry). Nematology Circular No. 5. Florida Department of Agriculture Division of Plant Industry.	EPPO	Incorporated
15.	*11*	Technical	As with some other *Aphelenchoides* spp., *A. besseyi* may be found between leaves and buds in *Fragaria* spp. and may cause distortion of the leaves, which is more noticeable on newly formed leaves after growth resumes in spring (Brown *et al.*, 1993). On Strawberry, A. besseyi appears in summer and is called the 'summer crimp nematode' (Esser, 1966)	Additional useful information References: EPPO (1997). Quarantine Pests for Europe. 2nd edition. Edited by Smith IM, McNamara DG, Scott PR, Holderness M. CABI International, Wallingford, UK, 1425 pp Esser R.P. (1966). Nematodes attacking plants above the soil surface. Crimp (Foliar Nematode on Strawberry). Nematology Circular No.	European Union	Incorporated

			. It is a parasite of warm regions; according to EPPO (1997) A. besseyi is not found beyond latitudes 43° N on rice or beyond 40° N on strawberries grown outdoors.	5. Florida Department of Agriculture Division of Plant Industry.		
16.	*12*	Editorial	In *O. sativa* and *Fragaria* spp., *A. besseyi* feeds ectoparasitically, but the nematode may also be endoparasitic, as in *Ficus elastica* and *Polianthes tuberosa*, in which it causes leaf drop and leaf lesions, respectively. On *Capsicum annum* var. *longum* the infestation appears to result in rotting of the pods and premature pod drop, similar to some fungal diseases (Hockland and Eng, 1997). In the grass *Sporobolus poirettii*, thisthe nematode stimulates growth, resulting in increased flowering.	editorial	EPPO, European Union	Incorporated
17.	*13*	Technical	*Aphelenchoides fragariae* is an endoparasite and ectoparasite of the aerial parts of plants, and is commonly called foliar or bud and leaf nematode. It has an extensive host range – more than 250 plant species in 47 families – and it is widely distributed in temperate and tropical regions throughout the world (EPPO, 2013b).	Deletion suggested as it is repeated from paragraph 8. Reference will need to be adapted due to other suggested changes in the text (e.g. addition of a reference to other EPPO publications)	EPPO, European Union	Incorporated
18.	*14*	Editorial	*A. fragariae* is a causal agent of *Fragaria* spp. crimp or spring dwarf disease on *Fragaria* spp.and can also cause serious damage to many other agricultural and ornamental crops,including ferns, foliage and flowering plants, and herbaceous and woody perennials (Kohl, 2011). *A. fragariae* is commonly found in the aerial parts of plants, corms and soil or growing media associated with host plants. It can be detected on leaves showing discoloured mosaic or angular spots. *A. fragariae* is responsible for an economic loss of millions of dollars each year in the ornamental nursery industry (Jagdale and Grewal, 2006). This nematode feeds on the epidermis, mesophyll and parenchyma tissues of leaves or fronds, resulting in chlorosis or vein-delimited lesions that turn necrotic, resulting in defoliation over time. The nematode can be distributed over long distances in shipments of asymptomatic infested plants.	Rearrangement of sentence for clarity.	Singapore	Incorporated
19.	*14*	Technical	*A. fragariae* is a causal agent of *Fragaria* spp. crimp or spring dwarf disease and can also cause serious damage to many other agricultural and ornamental crops,including ferns, foliage and flowering plants, and herbaceous and woody perennials (Kohl, 2011).	Additional information on survival	EPPO, European Union	Incorporated but complete reference is missing

			A. fragariae is commonly found in the aerial parts of Incorporated but plants, corms and soil or growing media associated with host plants. It can be detected on leaves showing discoloured mosaic or angular spots. *A. fragariae* is responsible for an economic loss of millions of dollars each year in the ornamental nursery industry (Jagdale and Grewal, 2006). This nematode feeds on the epidermis, mesophyll and parenchyma tissues of leaves or fronds, resulting in chlorosis or vein-delimited lesions that turn necrotic, resulting in defoliation over time. In the absence of plant residues or wild host plants, A. fragariae can survive a few months in the soil (Abrogioni & Greco, 2014). The nematode can be distributed over long distances in shipments of asymptomatic infested plants.			
20.	*17*	Editorial	*A. ritzemabosi* was found in association with *Phytophthora cryptogea* on diseased *Gloxinia* plants (Stokes and Alfieri, 1969) and is linked with *Corynebacterium fascians* in the onset of "cauliflower" disease in strawberries (Crosse and Pitcher, 1952). Madej *et al.* (2000) found several plant-parasitic fungi in association with *A. ritzemabosi* on *Chrysanthemum* and *Zinnia* plants affected by this~~the~~ nematode, which increased the necrotic symptoms observed~~necrosis~~.	Editorial	EPPO, European Union	Incorporated
21.	*18*	Editorial	*A. ritzemabosi* is a major pest of *Chrysanthemum* spp. in Europe, North America, New Zealand and Australia and has been reported on this host from several other countries (CABI/EPPO, 2000; EPPO, 2013).Both~~*A. ritzemabosi* as well as* *A. fragariae*, *A. ritzemabosi* cause~~s~~ damage to *Fragaria* spp. in several European countries as well as in Mexico (CABI/EPPO, 2000; EPPO, 2013). *A. ritzemabosi* ~~The nematode~~ has been recorded on a wide range of ornamental and other hosts from Europe, Asia, North America, South America and Oceania (CABI/EPPO, 2000; EPPO, 2013). The nematode was reported as occurring in South Africa by Wager in 1972, but these records were made on the basis of symptoms only and the nematodes were not positively identified taxonomically. The first report of *A. ritzemabosi* in South Africa that was morphologically identified was on *Nerine* bulbs in nurseries (Swart *et al.*, 2007).	Editorial It is also suggested to replace the last two sentences by This nematode was reported as occurring in South Africa by Wager in 1972, but this record was made on the basis of symptoms only and the nematodes were not identified based on morphology. The first report of A. ritzemabosi in South Africa identified based on morphological characters was on Nerine bulbs (Swart et al., 2007).	EPPO	Incorporated

22.	*18*	Editorial	*A. ritzemabosi* is a major pest of *Chrysanthemum* spp. in Europe, North America, New Zealand and Australia and has been reported on this host from several other countries (CABI/EPPO, 2000; EPPO, 2013).Both~~*A. ritzemabosi* as well as~~ *A. fragariae* and *A. ritzemabosi* cause~~s~~ damage to *Fragaria* spp. in several European countries as well as in Mexico (CABI/EPPO, 2000; EPPO, 2013). *A. ritzemabosi* ~~The nematode~~ has been recorded on a wide range of ornamental and other hosts from Europe, Asia, North America, South America and Oceania (CABI/EPPO, 2000; EPPO, 2013). The nematode was reported as occurring in South Africa by Wager in 1972, but these records were made on the basis of symptoms only and the nematodes were not positively identified taxonomically. The first report of *A. ritzemabosi* in South Africa that was morphologically identified was on *Nerine* bulbs in nurseries (Swart *et al.*, 2007).	Editorial It is also suggested to replace the last two sentences by This nematode was reported as occurring in South Africa by Wager in 1972, but this record was made on the basis of symptoms only and the nematodes were not identified based on morphology. The first report of A. ritzemabosi in South Africa identified based on morphological characters was on Nerine bulbs (Swart et al., 2007).	European Union	Incorporated
23.	*18*	Substantive	*A. ritzemabosi* is a major pest of *Chrysanthemum* spp. in Europe, North America, New Zealand and Australia and has been reported on this host from several other countries (CABI/EPPO, 2000; EPPO, 2013). *A. ritzemabosi* as well as *A. fragariae* causes damage to *Fragaria* spp. in several European countries as well as in Mexico (CABI/EPPO, 2000; EPPO, 2013). It has previously been reported from circa 200 plant species (Escuer & Bello, 2000; McCuiston 2007) The nematode has been recorded on a wide range of ornamental and other hosts from Europe, Asia, North America, South America and Oceania (CABI/EPPO, 2000; EPPO, 2013). The nematode was reported as occurring in South Africa by Wager in 1972, but these records were made on the basis of symptoms only and the nematodes were not positively identified taxonomically. The first report of *A. ritzemabosi* in South Africa that was morphologically identified was on *Nerine* bulbs in nurseries (Swart *et al.*, 2007).	suggested addition Ref: 1/ Escuer, M. & Bello, A. (2000) Nematodos del género Aphelenchoides de interés fitopatológico y su distribución en España. Boletin de sanidad vegetal. Plagas, 26, 47–63. 2/ McCuiston, J., Hudson L., Subbotin A., Davis E. & Warfield, C. (2007) Conventional and PCR Detection of Aphelenchoides fragariae in diverse ornamental host plant species. Journal of Nematology, 39, 343–355.	EPPO, European Union	Incorporated
24.	*22*	Technical	**Common names:** Preferred common name: rice leaf nematode (CABI, 2013); common names: summer crimp nematode, white tip, white tip nematode ~~of rice~~ (CABI, 2013)	It's common name.	China	Considered but not incorporated. The drafting team checked in different sources and the

						common name is given this way.
25.	*24*	Editorial	**Synonyms:** *Aphelenchus fragariae*~~Aphelenchus fragariae~~ Ritzema Bos, 1890; *Aphelenchus olesistus*~~Aphelenchus olesistus~~ Ritzema Bos, 1892; *Aphelenchoides olesistus*~~Aphelenchoides olesistus~~ (Ritzema Bos, 1892) Steiner, 1932; *Aphelenchus olesistus*~~Aphelenchus olesistus~~ var. *longicollis*~~longicollis~~ Schwartz, 1911; *Aphelenchoides olesistus*~~Aphelenchoides olesistus~~ var. *longicollis*~~longicollis~~ (Schwartz, 1911) Goodey, 1933; *Aphelenchus pseudolesistus*~~Aphelenchus pseudolesistus~~ Goodey, 1928; *Aphelenchoides pseudolesistus*~~Aphelenchoides pseudolesistus~~ (Goodey, 1928) Goodey, 1933; *Aphelenchus ormerodis*~~Aphelenchus ormerodis~~ Jegen, 1920 (nec Ritzema Bos, 1891)	The scientific name should be italized.	Thailand	Incorporated
26.	*24*	Substantive	**Synonyms:** Aphelenchus fragariae Ritzema Bos, 1891~~0~~; Aphelenchus olesistus Ritzema Bos, 1893~~2~~; Aphelenchoides olesistus (Ritzema Bos, 1893~~2~~) Steiner, 1932; Aphelenchus olesistus var. longicollis Schwartz, 1911; Aphelenchoides olesistus var. longicollis (Schwartz, 1911) Goodey, 1933; Aphelenchus pseudolesistus Goodey, 1928; Aphelenchoides pseudolesistus (Goodey, 1928) Goodey, 1933; Aphelenchus ormerodis Jegen, 1920 (nec Ritzema Bos, 1891)	To be consistent with Siddiqi, M.R. 1974. Aphelenchoides fragariae. CIH descriptions of plant-parasitic nematodes, Set 5, No. 74. St Albans, UK, CIP. 4 pp.	Singapore	Incorporated
27.	*29*	Editorial	**Taxonomic position:** Nematoda, Aphelenchida, ~~Tylenchina,~~ Aphelenchoidea, Aphelenchoididae, Aphelenchoidinae, *Aphelenchoides*	"Tylenchina" is unnecessary.	China	Considered but nor incorporated. The current taxonomic position is under discussion. The drafting team refers to the most recent elements (see answer to comment 28).
28.	*29*	Substantive	**Taxonomic position:** Nematoda, ~~Aphelenchida~~Rhabditida, Tylenchina, Aphelenchoidea, Aphelenchoididae, Aphelenchoidinae, *Aphelenchoides*	This modification is consistent with Kennedy, M.W. and Harnett, W. (2013)*1 and Kanzaki, N (2014) *2. *1 Kennedy, M.W. and Harnett, W. (2013) Parasitic	Japan	Incorporated

				Nematodes. 2nd edition. U.K., CAB International, 423 pp. *2 Kanzaki, N (2014) Taxonomy of superfamily Aphelenchoidea and key to genera. Nematol. Res. 44, 9-26.		
29.	*29*	Technical	**Taxonomic position:** Nematoda, Aphelenchida, Tylenchina, Aphelenchoidea, Aphelenchoididae, Aphelenchoidinae, *Aphelenchoides*	Aphelenchida, Tylenchina: This should be either Rhabditida, Tylenchina OR Aphelenchida, Aphelenchina Aphelenchoides: Following which classification scheme?	EPPO, European Union	Considered but nor incorporated. The current taxonomic position is under discussion. The drafting team refers to the most recent elements (see answer to comment 28).
30.	*34*	Technical	During early growth of *O. sativa*, the most conspicuous symptom caused by this nematode is the emergence of the chlorotic tips of new leaves from the leaf sheath (Figure 1). These tips later dry and curl, while the rest of the leaf may appear normal. The young leaves of infested tillers can be speckled with a white splash pattern or have distinct chlorotic areas. Leaf margins may be distorted and wrinkled but leaf sheaths are symptomless. The flag leaf enclosing the panicle crinkles and distorts, and the panicle is reduced in size, as are the grains. Symptoms may be confused with calcium and magnesium deficiency. Infested panicles are shorter than normal panicles, with fewer spikelets and a smaller proportion of filled grain (Dastur, 1936; Yoshii and Yamamoto, 1951; Todd and Atkins, 1958). In severe infestations, the shortened flag leaf is twisted and can prevent the complete extrusion of the panicle from the boot (Yoshii and Yamamoto, 1950; Todd and Atkins, 1958). They also often stay erect (Liu et al, 2008) and discolorations can be observed (CABI, 2015). . The grain is small and distorted (Todd and Atkins, 1958) and the kernel may be discoloured and cracked (Uebayashi *et al.*, 1976) see Figure 1A (Bridge et al. 1990). Infested plants mature late and have sterile panicles borne on tillers produced from high nodes.	Suggested addition "They also often stay erect." Ref: Liu,W., Lin,.M, Li,H., SUN,M., Dynamic Development of Aphelenchoides besseyi on Rice Plant by Artificial Inoculation in the Greenhouse, Agricultural Sciences in China 08/2008; 7(8):970-976. "...and discolorations can be observed . Ref: Plantwise Knowledge Bank, http://www.plantwise.org/KnowledgeBank/Datasheet.aspx?dsid=6378 It is also suggested to add a new Fig. 1A (Bridge et al 1990)	EPPO, European Union	Incorporated

31.	*35*	Technical	On *Fragaria* spp., A. besseyi is the causal agent of 'summer dwarf" (Perry & Moens, 2006). ~~s~~ Symptoms include leaf crinkling and distortion, and dwarfing of the plant with an associated reduction in flowering (Figure 1B). Symptoms may be similar to and therefore confused with those caused by other *Aphelenchoides* species ~~(leaf and bud nematodes)~~, emphasizing the importance of correct identification.	Suggested amendment of the first sentence to refer to the name of the disease reference Perry, R. N., Moens, M.. Plant Nematology.2006. CABI Publishing: Wallingford, UK. Deletion of 'leaf and bud nematodes' as it is a repetition Reference to an added picture	EPPO, European Union	Incorporated
32.	*37*	Technical	Common symptoms of plants damaged by *A. fragariae* are chlorosis, necrosis, distortion, deformation and dwarfing of the leaves, stems, flowers or bulbs, leaf tattering and defoliation. The symptoms are often confused with symptoms caused by powdery mildew. Symptoms typically manifest as vein-delimited lesions or blotches that start as lightly chlorotic and then turn brown to black or necrotic and dry (Figure 2). Symptom expression, however, may be highly variable due to the characteristics of host plant species and the influence of environmental conditions. Infested plants sometimes do not exhibit symptoms until the plant is heavily infested with nematodes.	More complete description of symptoms	EPPO, European Union	Incorporated
33.	*38*	Editorial	The shape and pattern of the blotches is closely related to the venation pattern of the leaf, such as on *Buddleja* sp., *Convolvulus arvensis*, *Phymatodes diversifolium*, *Salvia* sp. and *Stachys riederi*, with infested leaves appearing pale green to tan in colour or showing dark brown mosaic spots or angular necrotic lesions (Figure 3) (Knight *et al*., 2002; Khan *et al*., 2008; Kohl, 2011). On *Hosta*, leaf blotch symptoms appear as long and narrow necrotic patches bounded by longer veins, and in severe cases, the entire leaf dries and dies (Figure 4) (Zhen *et al.*, 2012). The leaf bloth~~spot~~ symptoms on ferns appear as narrow, linear patches perpendicular to the midrib of the frond, corresponding to closely spaced lateral veins, as chevron-like stripes (Figure 5) (Cobon and O'Neill, 2011). On *Cyclamen* spp., *Begonia* spp. and *Andrographis paniculata,* infested leaves show water-soaked irregular patches that later turn brown (Figure 6) (Southey, 1993; dan Supriadi, 2008). In general, the blotches form more or less angular chlorotic areas in ternate or palmate	In the sentence 3, the word "The leaf spot symthoms" should be replaced with the word "The leaf bloth symthoms" in order to be consistent with the title of figure 5.	Thailand	Incorporated

			leaves with reticulate venation or with main veins radiating from the petiole–lamina junction, while infected thicker and succulent leaves initially show water-soaked irregular patches that subsequently become necrotic without defined margins; ultimately, the entire leaf dies (Richardson and Grewal, 1993; Southey, 1993). On *Fragaria* spp., the initial symptoms of infestation are plant growth with stunting and deformation of buds, leaves and flowers; infested plants show malformations including twisting and puckering of leaves, discoloured areas with hard and rough surfaces, undersized leaves with crinkled edges, tight aggregation or death of crowns, reddened and stunted petioles, and flower stalks with aborted or partly aborted flowers (Figure 7). Heavily infested plants do not produce fruit (Siddiqi, 1975).			
34.	*38*	Editorial	The shape and pattern of the blotches is closely related to the venation pattern of the leaf, such as on *Buddleja* sp., *Convolvulus arvensis*, *Phymatodes diversifolium*, *Salvia* sp. and *Stachys riederi*, with infested leaves appearing pale green to tan in colour or showing dark brown mosaic spots or angular necrotic lesions (Figure 3) (Knight *et al*., 2002; Khan *et al*., 2008; Kohl, 2011). On *Hosta*, leaf blotch symptoms appear as long and narrow necrotic patches bounded by longer veins, and in severe cases, the entire leaf dries and dies (Figure 4) (Zhen *et al.*, 2012). The leaf spot symptoms on ferns appear as narrow, linear patches perpendicular to the midrib of the frond, corresponding to closely spaced lateral veins, as chevron-like stripes (Figure 5) (Cobon and O'Neill, 2011). On *Cyclamen* spp., *Begonia* spp. and *Andrographis paniculata,* infested leaves show water-soaked irregular patches that later turn brown (Figure 6) (Southey, 1993; dan Supriadi, 2008). In general, the blotches form more or less angular chlorotic areas in ternate or palmate leaves with reticulate venation or with main veins radiating from the petiole–lamina junction, while infected thicker and succulent leaves initially show water-soaked irregular patches that subsequently become necrotic without defined margins; ultimately, the entire leaf dies (Richardson and Grewal, 1993; Southey, 1993). On *Fragaria* spp., the initial symptoms	simplification of sentence structure.	Kenya	Incorporated

			of infestation are plant growth with stunting[rephrase to read stunted plant growth] and deformation of buds, leaves and flowers; infested plants show malformations including twisting and puckering of leaves, discoloured areas with hard and rough surfaces, undersized leaves with crinkled edges, tight aggregation or death of crowns, reddened and stunted petioles, and flower stalks with aborted or partly aborted flowers (Figure 7). Heavily infested plants do not produce fruit (Siddiqi, 1975).			
35.	*38*	Technical	The shape and pattern of the blotches is closely related to the venation pattern of the leaf, such as on *Buddleja* sp., *Convolvulus arvensis*, *Phymatodes diversifolium*, *Salvia* sp. and *Stachys riederi*, with infested leaves appearing pale green to tan in colour or showing dark brown mosaic spots or angular necrotic lesions (Figure 3) (Knight *et al*., 2002; Khan *et al*., 2008; Kohl, 2011). On *Hosta*, leaf blotch symptoms appear as long and narrow necrotic patches bounded by longer veins, and in severe cases, the entire leaf dries and dies (Figure 4) (Zhen *et al.*, 2012). The leaf spot symptoms on ferns appear as narrow, linear patches perpendicular to the midrib of the frond, corresponding to closely spaced lateral veins, as chevron-like stripes (Figure 5) (Cobon and O'Neill, 2011). On *Cyclamen* spp., *Begonia* spp. and *Andrographis paniculata,* infested leaves show water-soaked irregular patches that later turn brown (Figure 6) (Southey, 1993; dan Supriadi, 2008). In general, the blotches form more or less angular chlorotic areas in ternate or palmate leaves with reticulate venation or with main veins radiating from the petiole–lamina junction, while infected thicker and succulent leaves initially show water-soaked irregular patches that subsequently become necrotic without defined margins; ultimately, the entire leaf dies (Richardson and Grewal, 1993; Southey, 1993). On *Fragaria* spp., the initial symptoms of infestation are plant growth with stunting and deformation of buds, leaves and flowers; infested plants show malformations including twisting and puckering of leaves, discoloured areas with hard and rough surfaces, undersized leaves with crinkled edges, tight aggregation or death of crowns, reddened and stunted	A new picture is proposed	EPPO, European Union	Incorporated

			petioles, and flower stalks with aborted or partly aborted flowers (Figure 7, 7A). Heavily infested plants do not produce fruit (Siddiqi, 1975).			
36.	*38*	Technical	The shape and pattern of the blotches is closely related to the venation pattern of the leaf, such as on *Buddleja* sp., *Convolvulus arvensis*, *Phymatodes diversifolium*, *Salvia* sp. and *Stachys riederi*, with infested leaves appearing pale green to tan in colour or showing dark brown mosaic spots or angular necrotic lesions (Figure 3) (Knight *et al*., 2002; Khan *et al*., 2008; Kohl, 2011). On *[Hosta]*, leaf blotch symptoms appear as long and narrow necrotic patches bounded by longer veins, and in severe cases, the entire leaf dries and dies (Figure 4) (Zhen *et al.*, 2012). The leaf spot symptoms on ferns appear as narrow, linear patches perpendicular to the midrib of the frond, corresponding to closely spaced lateral veins, as chevron-like stripes (Figure 5) (Cobon and O'Neill, 2011). On *Cyclamen* spp., *Begonia* spp. and *Andrographis paniculata,* infested leaves show water-soaked irregular patches that later turn brown (Figure 6) (Southey, 1993; dan Supriadi, 2008). In general, the blotches form more or less angular chlorotic areas in ternate or palmate leaves with reticulate venation or with main veins radiating from the petiole–lamina junction, while infected thicker and succulent leaves initially show water-soaked irregular patches that subsequently become necrotic without defined margins; ultimately, the entire leaf dies (Richardson and Grewal, 1993; Southey, 1993). On *Fragaria* spp., the initial symptoms of infestation are plant growth with stunting and deformation of buds, leaves and flowers; infested plants show malformations including twisting and puckering of leaves, discoloured areas with hard and rough surfaces, undersized leaves with crinkled edges, tight aggregation or death of crowns, reddened and stunted petioles, and flower stalks with aborted or partly aborted flowers (Figure 7). Heavily infested plants do not produce fruit (Siddiqi, 1975).	hosta spp to mean any species in that genera.	Kenya	Incorporated
37.	*41*	Editorial	On *Chrysanthemum* spp., infestation from the soil, dead leaves or weed hosts progresses from the base of the plant upwards under moist conditions. Infested leaves show characteristic angular blotches delimited by the	Spelling correction.	Singapore	Incorporated

			principal veins. The discoloration progresses from translucent yellowish and brownish green to dark brown. At a late stage, dead shrive~~l~~led leaves, hanging down, extend to the top of the plant (Figure 8). The nematodes also invade and feed within the buds, sometimes killing the growing point and preventing flowering or producing malformed leaves with surface irregularities and rough brown scars.			
38.	*41*	Technical	On *Chrysanthemum* spp., infestation from the soil, dead leaves or weed hosts progresses from the base of the plant upwards under moist conditions. Infested leaves show characteristic angular blotches delimited by the principal veins. The discoloration progresses from translucent yellowish and brownish green to dark brown. At a late stage, dead shrivelled leaves, hanging down, extend to the top of the plant (Figure 8). Although some stems of a given plant may bear dead leaves, other may be completely symptomless. The nematodes also invade and feed within the buds, sometimes killing the growing point and preventing flowering or producing malformed leaves with surface irregularities and rough brown scars.	Additional information on the expression of symptoms	EPPO, European Union	Incorporated
39.	*47*	Substantive	In leaves infested with *A. besseyi, A. fragariae* or *A. ritzemabosi*, nematodes can be detected by inspecting ~~small, young~~ cut leaves immersed in tap water in a Petri dish under a stereomicroscope (the nematodes will swim into the water within 30 min if there is a heavy infestation).	Big and mature leaves can also be infected by the nematodes.	Singapore	Modified. Small leaves are more likely to have the nematodes in them. It doesn't mean larger leaves won't have them but it is less likely. The term "especially" was added before "small young…".
40.	*48*	Substantive	**3.2.2 Extraction methods**	This section should include seed extraction methods.	Australia	Considered but not incorporated. Aphelenchs are unlikely to be found in seeds with the exception of A. besseyi. To cover

						this exception, the reference of ISTA international procedure is included (paragraphs 54 and 55).
41.	*49*	Technical	*A. besseyi, A. fragariae* or *A. ritzemabosi* can be extracted from plantmaterial, soil or growing medium with suspected infestation using the Baermann funnel technique (Baermann, 1917), modified Baermann-tray method (Hooper and Evans, 1993), adapted sugar-flotation method (Coolen and D'Herde, 1972) or mistifier technique (Hooper *et al*., 2005).These extraction methods should be conducted for 48 h at room temperature to detect low levels of infestation. In heavily infested plant material, nematodes can be isolated by soaking plant material in water for one hour. Any plant material to be tested should be cut into small pieces or sliced before extraction to increase the efficacy of extraction. Complementary information on extraction methods, advantages and drawbacks can be found in EPPO (2013a).	More precise There are 3 references from EPPO from 2013 cited in the protocol	EPPO, European Union	Incorporated
42.	*50*	Substantive	For the Baermann funnel technique (Hooper and Evans, 1993), a piece of rubber tubing is attached to a glass or plastic funnel stem and closed with a spring or screw clip. The funnel is placed in a suitable support and almost filled with water. Plant material containing nematodes is cut into small pieces, placed in a square of butter muslin, which is folded to enclose the material, and gently submerged in the water in the funnel. Nematodes emerge from the tissues and sink to the bottom of the funnel stem. After some hours, or preferably overnight, some of the water can be run off and examined for nematodes.	Plastic funnels can also be used to serve the same purpose.	Singapore	Incorporated
43.	*52*	Technical	The adapted sugar-flotation method (Coolen and D'Herde, 1972) follows instructions for "mobile stages". Nematodes are released from plant material by means of a mixer (Waring blender) that has two running speeds. A container with a capacity of 0.5 litre is half filled with water. The sample is mixed with the water at	sentence starting with 'The sugar solution is poured into a 5 µm sieve 5 µm is rarely used, extremely expensive and does not give any better result than using a 20 µm sieve instead. It is suggested to give a range, i.e. 5-20 µm	EPPO, European Union	Incorporated

			low speed. The suspension is poured through a 1 000 µm sieve placed on a homogenization jar and rinsed with a fine, powerful, fan-shaped water jet produced by a low-volume fog spray nozzle until the jar contains 0.5 litre. After homogenization of the suspension by compressed air (about 1 min), a 100 ml aliquot is tapped off from the bubbling mixture into a centrifuge tube. Kaolin powder (1 ml) is added and the tube contents are thoroughly mixed by a mechanical stirrer (which is carefully cleaned after each operation). The mixture is centrifuged for 5 min at 1 800 *g*, after which the supernatant is poured off. The residue is mixed with a sugar solution (∂ = 1.15) by mechanical stirring for at least 30 s. The suspension is centrifuged again for 4 min at 1 800 *g*. The sugar solution is poured into a 5 µm sieve, which is placed in a small dish previously filled with the same liquid, until the meshes of the sieve are just covered. After about one minute the dish is gently emptied sideways. The mobile stages on the sieve are washed with the spray atomizer into 100 ml water, ready for identification.			
44.	*53*	Editorial	The mistifier technique, as described by Hooper *et al*. (2005), results in recovery of nematodes that are more active than the Baermann methods because oxygenation is better, and sap and decomposition products from the plant material, especially from bulbs such as *Narcissus*, which inactivate the nematodes, are washed away. A fine mist of water is sprayed over the plant material. A spray nozzle, passing about 4.5 litre water per hour, is used. Most systems use an intermittent spray of, for example, 1 min in every 10 min. Oil burner nozzles or gas jets can sometimes be adapted, and a water pressure of about 2.8 kg/cm^2 is usually required to produce a suitable mist. The plant material to be treated is cut into pieces 3–4 mm long and placed on a milk filter or tissue supported on a mesh set in a funnel as described for the modified Baermann-tray method. Optimum sample size depends on the sieve diameter and water flow rate; increasing the sample size can decrease the efficacy of extraction. Nematodes collected in the tube attached to the funnel stem can be released in a beaker for further examination. Compared with the modified Baermann	For clarity.	Singapore	Incorporated

			techniques, plant material will decompose much more slowly, thus allowing prolonged extraction times of up to two weeks. Several funnels can be set up on a rack and one or two nozzles can supply all of them. The whole apparatus can be set up on a bench if enclosed with a polyethylene cover and left to stand on a drainage tray.			
45.	*53*	Technical	The mistifier technique, as described by Hooper *et al*. (2005), results in nematodes that are more active than the Baermann methods because oxygenation is better, and sap and decomposition products from the plant material, especially from bulbs such as *Narcissus*, which inactivate the nematodes, are washed away. A fine mist of water is sprayed over the plant material. A spray nozzle, passing about 4.5 litre water per hour, is used. Most systems use an intermittent spray of, for example, 1 min in every 10 min. Oil burner nozzles or gas jets can sometimes be adapted, and a water pressure of about 2.8 kg/cm^2 is usually required to produce a suitable mist. The plant material to be treated is cut into pieces 3–4 mm long and placed on a milk filter or tissue supported on a mesh set in a funnel as described for the modified Baermann-tray method. Optimum sample size depends on the sieve diameter and water flow rate; increasing the sample size can decrease the efficacy of extraction. Nematodes collected in the tube attached to the funnel stem can be released in a beaker for further examination. Compared with the modified Baermann techniques, plant material will decompose much more slowly, thus allowing prolonged extraction times of up to two weeks. Several funnels can be set up on a rack and one or two nozzles can supply all of them. The whole apparatus can be set up on a bench if enclosed with a polyethylene cover and left to stand on a drainage tray.	Sentence starting with The plant material to be treated is cut into pieces 3–4 mm long and placed on a milk filter or tissue Please check if that is really what is done in practice, as milk filters are generally not used on a mistifier. Cotton fibers can be loosened and washed into the nematode suspension making nematode detection difficult (similar size). Can be replaced by "placed in a support in the funnel"	EPPO, European Union	Incorporated
46.	*56*	Technical	Under a stereomicroscope, stylet-bearing nematodes with a well-demarcated large median pharyngeal bulb can be transferred with a pipette or a needle from all the nematodes isolated in a small Petri dish to a glass slide for microscopic examination.	replace this paragraph by Under a stereomicroscope, stylet-bearing nematodes with a well-demarcated large metacorpus are separated from other nematodes present in the Petri dish and transferred with a pipette or a needle to a glass slide for microscopic examination. We suggest to use the morphological terms according to EPPO Pictorial glossary of morphological terms in nematology. This	EPPO, European Union	Incorporated

				glossary is referred to in the recently adopted protocol for Ditylenchus EPPO Technical Document No. 1056 (Rev.4) available at http://www.eppo.int/QUARANTINE/diag_activities/EPPO_TD_1056_Glossary.pdf Add the following sentence The morphological terms used are defined in EPPO (2013c) (letter will need to be adjusted at the end)		
47.	*59*	Editorial	Because ~~the nematodes of~~ *Aphelenchoides* are very difficult to identify to species level using morphological characters alone, molecular diagnostic tools have been developed to support the morphological identification of *Aphelenchoides* species (Ibrahim 1994a, 1994b). Molecular methods can be applied to identification of all life stages, including the immature stages, and may be particularly helpful when there is a low level of infestation or when adult specimens are atypical or damaged. However, the specificity of currently available molecular tests may be limited as they have generally been developed and evaluated using a restricted number of species and populations from different geographic regions.	Inclusion of the word "nematodes" is redundant as Aphelenchoides are nematodes.	Singapore	Incorporated
48.	*59*	Editorial	Because the nematodes of *Aphelenchoides* are very difficult to identify to species level using morphological characters alone, molecular diagnostic tools have been developed to support the morphological identification of *Aphelenchoides* species (Ibrahim et al. 1994a, 1994b). Molecular methods can be applied to identification of all life stages, including the immature stages, and may be particularly helpful when there is a low level of infestation or when adult specimens are atypical or damaged. However, the specificity of currently available molecular tests may be limited as they have generally been developed and evaluated using a restricted number of species and populations from different geographic regions.	editorial	EPPO, European Union	Incorporated
49.	*60*	Editorial	**4.1 Morphological identification of aphelench<u>u</u>s**	The term "aphelenchus" is misspelled and should be corrected.	Thailand	Not incorporated : the wording is correct

50.	*61*	Editorial	**4.1.1 Preparation of aphelenchus for morphological identification**	The term "aphelenchus" is misspelled and should be corrected.	Thailand	Not incorporated : the wording is correct
51.	*62*	Editorial	Individual nematodes of *Aphelenchoides* species can be picked from the extract produced by any of the extraction methods described in section 3.2.2 and collected in a drop of water on a slide.The nematodes are slowly heated (to approximately 60 °C) until they become immobile (Hooper *et al*., 2005). The habitus~~body~~ of nematodes killed by gentle heating is almost straight. The nematodes can be sealed on the slide with wax or they can be placed in a drop of fixative before sealing with wax. There are some differences in the appearance of water and fixed specimens, with the former being preferable, but in fixed preparations some features such as the stylet~~s~~ are more distinct.	1 more correct term 2 should be singular	EPPO, European Union	Incorporated
52.	*63*	Substantive	~~**4.1.2 Identification of the family Aphelenchoididae**~~ **Delete the whole part of the 4.1.2**	Don't need for the content of this section is unnecessary.	China	Considered but ot incorporated : this section was include for consistency with other IPPC protocol in order to provide enough guidance for any user of this protocol.
53.	*64*	Technical	The family Aphelenchoididae is characterized by a large metacorpus and pharengeal~~oesophageal~~ glands usually not enclosed in a bulb (overlapping). The dorsal pharyngeal ~~oesophageal~~ gland opens into the metacorpus. Males have caudal papillae.	Adjustment of terminology as explained in para 56	EPPO	Incorporated
54.	*64*	Technical	The family Aphelenchoididae is characterized by a large metacorpus and pharyngeal~~oesophageal~~ glands usually not enclosed in a bulb (overlapping). The dorsal pharyngeal ~~oesophageal~~ gland opens into the metacorpus. Males have caudal papillae.	Adjustment of terminology as explained in para 56	European Union	Incorporated
55.	*67*	Technical	**Body part** **Characteristic**	Description of the Oesophagus (replacement by Pharynx proposed). This text seems to be taken from Hunt, 1993. However this is a mistake and should be	EPPO	Incorporated

			Body form: Vermiform, not swollen Lateral field: Usually w~~W~~ith four or fewer incisures (two to four, rarely 6) Stylet: Slender, with narrow lumen and usually with small basal knobs or swellings Pharynx ~~Oesophagus~~: Isthmus rudimentary or absent, nerve ring circumpharyngeal to circumintestina~~circumoesophageal~~, pharingeal~~oesophageal~~ glands lobe-like and long dorsally overlapping intestine Post-uterine sac: Usually present Spicule: Rose thorn-shaped or derived therefrom Adanal bursa: Rarely present (reported to date only from *Pseudoaphelenchus*)~~Absent~~ Gubernaculum: Absent Tail shape: Both sexes similar, conoid, with pointed or rounded, often mucronate, terminus	as corrected (reference Kanzaki et al. 2009) Adanal bursa : correction		
56.	*67*	Technical	**Body part** / **Characteristic** Body form: Vermiform, not swollen Lateral field: Usually w~~W~~ith four or fewer incisures (two to four, rarely 6) Stylet: Slender, with narrow lumen and usually with small basal knobs or swellings Pharynx ~~Oesophagus~~: Isthmus rudimentary or absent, nerve ring circumpharyngeal to circumintestinal~~circumoesophageal~~, pharyngeal~~oesophageal~~ glands lobe-like and long dorsally overlapping intestine	Description of the Oesophagus (replacement by Pharynx proposed). This text seems to be taken from Hunt, 1993. However this is a mistake and should be as corrected (reference Kanzaki et al. 2009) Adanal bursa : correction	European Union	Incorporated

			<table><tr><td>Post-uterine sac</td><td>Usually present</td></tr><tr><td>Spicule</td><td>Rose thorn-shaped or derived therefrom</td></tr><tr><td>Adanal bursa</td><td>Rarely present (reported to date only from *Pseudoaphelenchus*)~~Absent~~</td></tr><tr><td>Gubernaculum</td><td>Absent</td></tr><tr><td>Tail shape</td><td>Both sexes similar, conoid, with pointed or rounded, often mucronate, terminus</td></tr></table>			
57.	*74*	Technical	**Stylet:** very difficult to see under low power microscopy; under high power, the stylet varies from clearly discernible to very faint. Generally about 10–12 µm long. Similarly, basal knobs or swellings are sometimes clear but often indistinct. Unfortunately, measurements of these knobs have rarely been made.	Is the last sentence needed? Either recommend that stylet morphometrics should be more thoroughly recorded or remove.	EPPO, European Union	Modified. The sentence was deleted.
58.	*75*	Editorial	**Oesophagus:** oesophageal procorpus long and slender; metacorpus (medial bulb) well developed, spherical to rounded-rectangular, with central valve plates; oesophageal gland lobe long,with dorsal~~ly~~ overlap~~ping~~ of the intestine (Figure 9(C)).	Better english	EPPO, European Union	Incorporated
59.	*75*	Technical	**Pharynx~~Oesophagus~~:** pharyngeal~~oesophageal~~ procorpus long and slender; metacorpus ~~(medial bulb)~~ well developed, spherical to rounded-rectangular, with central valve plates; oesophageal gland lobe long, dorsally overlapping intestine (Figure 9(C)).	Adjustment of terminology as explained in para 56	EPPO, European Union	Incorporated
60.	*84*	Editorial	**Table 2.** Key to distinguish *Aphelenchoides* spp. from species of other genera in soil and plant material	The last column of Table 2 should be formatted correctly i.e. NAS should be aligned with the corresponding text in the middle column. Adjustment of terminology as explained in para 56	EPPO, European Union	Comment left to the IPPC secretariat as a formatting issue
61.	*85*	Editorial	<table><tr><td>Stylet present</td><td>2</td></tr><tr><td>Stylet absent</td><td>NAS</td></tr></table>	Editorial	EPPO	Incorporated

				Three-part oesophagus with corpus (a cylindrical procorpus followed by a valvulated metacorpus), slender isthmus and glandular basal bulb Two-part oesophagus, anterior part slender, posterior part expanded, glandular and muscular	3 NAS		
				Dorsal oesophageal gland outlet in metacorpus; metaco~~a~~rpus very large, often appears nearly as wide as the diameter of the body Dorsal oesophageal gland outlet in procorpus behind stylet knobs; metaco~~a~~rpus moderate to reduced in size (less than three-fourths body width)	4 NAS		
				Oesophageal glands lobe-like, long dorsal~~ly~~ overlap~~ping~~ of intestine Oesophageal glands pyriform, no overlapping intestine; or oesophageal glands lobe-like, ventral~~ly~~ overlap~~ping~~ of intestine	5 NAS		
				Lateral fields with four or fewer incisures; stylet with basal knobs or swellings; female tail conoid, ~~or~~ elongate conoid ,~~or~~ convex conoid or subcylindrical to a pointed or narrowly rounded terminus; male spicules robust~~thick~~, thorn-shaped; adanal bursa absent Lateral fields with six or more incisures; stylet without basal knobs; female tail short, subcylindroid and with broadly rounded terminus; male spicules slender, tylenchoid; adanal bursa present	6 NAS		

			Tails of both sexes short, usually less than four times anal body width Tails of both sexes elongate to filiform, usually more than four times anal body width	7 NAS		
			Stylet slender, often about 10–12 µm and usually less than 20 µm; vulval flap absent; male without small bursa-like flap at tail tip Not with the above combination of characters	*Aphelenchoides* NAS		
62.	*85*	Editorial	Stylet present Stylet absent	2 NAS	Editorial	European Union	Incorporated
			Three-part oesophagus with corpus (a cylindrical procorpus followed by a valvulated metacorpus), slender isthmus and glandular basal bulb Two-part oesophagus, anterior part slender, posterior part expanded, glandular and muscular	3 NAS		
			Dorsal oesophageal gland outlet in metacorpus; metac<u>o</u>~~a~~rpus very large, often appears nearly as wide as the diameter of the body Dorsal oesophageal gland outlet in procorpus behind stylet knobs; metac<u>o</u>~~a~~rpus moderate to reduce<u>d</u> in size (less than three-fourths body width)	4 NAS		
			Oesophageal glands lobe-like, long dorsal~~ly~~ overlap~~ping~~ <u>of</u> intestine Oesophageal glands pyriform, no overlapping intestine; or oesophageal glands lobe-like, ventral~~ly~~ overlap~~ping~~ <u>of</u> intestine	5 NAS		

			5	Lateral fields with four or fewer incisures; stylet with basal knobs or swellings; female tail conoid, ~~or~~ elongate conoid ,~~or~~ convex conoid or subcylindrical to a pointed or narrowly rounded terminus; male spicules robust~~thick~~, thorn-shaped; adanal bursa absent Lateral fields with six or more incisures; stylet without basal knobs; female tail short, subcylindroid and with broadly rounded terminus; male spicules slender, tylenchoid; adanal bursa present	6 NAS			
			6	Tails of both sexes short, usually less than four times anal body width Tails of both sexes elongate to filiform, usually more than four times anal body width	7 NAS			
			7	Stylet slender, often about 10–12 µm and usually less than 20 µm; vulval flap absent; male without small bursa-like flap at tail tip Not with the above combination of characters	*Aphelenchoides* NAS			
63.	*85*	Technical	1	Stylet present Stylet absent	2 NAS	2 According to most books on morphology the cylindrical procorpus and the valvulated metacarpus are counted as separate parts; modify text accordingly Alternatively the reference to numbers could be deleted to take into account the fact that some genera have an amalgamated procorpus and metacarpus	EPPO	Incorporated
			2	Four~~Three~~-part pharynx~~oesophagus~~ with ~~corpus (a~~ cylindrical procorpus~~, followed by a~~ valvulated metacorpus~~)~~, slender isthmus and glandular basal bulb Two-part pharyngeal~~oesophagus~~, anterior part slender, and muscular	3 NAS	posterior part expanded, glandular		
			3	Dorsal pharyngeal~~oesophageal~~ gland outlet in metacorpus; metacarpus very large, often appears nearly as wide as the diameter of the body Dorsal pharyngeal~~oesophageal~~ gland outlet in procorpus behind stylet knobs; metacarpus moderate to reduce in size (less than three-fourths body width)	4 NAS			
			4	Pharyngeal~~Oesophageal~~ glands lobe-like, long dorsally	5 NAS	overlapping intestine		

				Pharyngeal~~Oesophageal~~ glands pyriform, no overlapping intestine; or pharyngeal~~oesophageal~~ glands lobe-like, ventrally overlapping intestine			
			5	Lateral fields with four or fewer incisures; stylet with basal knobs or swellings; female tail conoid or elongate conoid or convex conoid or subcylindrical to a pointed or narrowly rounded terminus; male spicules thick, thorn-shaped; adanal bursa absent Lateral fields with six or more incisures; stylet without basal knobs; female tail short, subcylindroid and with broadly rounded terminus; male spicules slender, tylenchoid; adanal bursa present	6 NAS		
			6	Tails of both sexes short, usually less than four times anal body width Tails of both sexes elongate to filiform, usually more than four times anal body width	7 NAS		
			7	Stylet slender, often about 10–12 µm and usually less than 20 µm; vulval flap absent; male without small bursa-like flap at tail tip Not with the above combination of characters	*Aphelenchoides* NAS		
64.	*85*	Technical	1	Stylet present Stylet absent	2 NAS	2 According to most books on morphology the cylindrical procorpus and the valvulated metacarpus are counted as separate parts; modify text accordingly Alternatively the reference to numbers could be deleted to take into account the fact that some genera have an amalgamated procorpus and metacorpus	European Union	Incorporated
			2	Four~~Three~~-part pharynx~~oesophagus~~ with ~~corpus (a~~ cylindrical procorpus ~~followed by a~~ valvulated metacorpus~~)~~, slender isthmus and glandular basal bulb Two-part pharynx~~oesophagus~~, anterior part slender, posterior part expanded, glandular and muscular	3 NAS			
			3	Dorsal pharyngeal~~oesophageal~~ gland outlet in metacorpus; metacarpus very large, often appears nearly as wide as the diameter of the body Dorsal pharyngeal~~oesophageal~~ gland outlet in procorpus behind stylet knobs; metacarpus moderate to reduce in size (less than three-fourths body width)	4 NAS			

			Pharyngeal~~Oesophageal~~ glands lobe-like, long dorsally overlapping intestine Pharyngeal~~Oesophageal~~ glands pyriform, no overlapping intestine; or pharyngeal~~oesophageal~~ glands lobe-like, ventrally overlapping intestine	5 NAS		
			Lateral fields with four or fewer incisures; stylet with basal knobs or swellings; female tail conoid or elongate conoid or convex conoid or subcylindrical to a pointed or narrowly rounded terminus; male spicules thick, thorn-shaped; adanal bursa absent Lateral fields with six or more incisures; stylet without basal knobs; female tail short, subcylindroid and with broadly rounded terminus; male spicules slender, tylenchoid; adanal bursa present	6 NAS		
			Tails of both sexes short, usually less than four times anal body width Tails of both sexes elongate to filiform, usually more than four times anal body width	7 NAS		
			Stylet slender, often about 10–12 µm and usually less than 20 µm; vulval flap absent; male without small bursa-like flap at tail tip Not with the above combination of characters	*Aphelenchoides* NAS		
65.	*89*	Technical	The plant-infesting *Aphelenchoides* species include *A. besseyi*, *A. blastophthorus*, *A. fragariae*,and *A. ritzemabosi*. ~~and~~ *A. subtenuis*, although present in root, bulbs and tubers can occasionally migrate to growing points. However, it hsould be noted that other fungivorous *Aphelenchoides* species,may be found in plant material, for instance in buds of *Fragaria* plants ~~which live in the above-ground parts of plants~~. Plant infesting *Aphelenchoides* species~~They~~ can be distinguished from other species of the genus by their	A. subtenuis doesn´t attack above-ground parts of plants (In contrast to other Aphelenchoides species, A. subtenuis penetrates roots.) A rewording is consequently proposed Additional information on the possible presence of fungivorous Aphelenchoides species.	EPPO, European Union	Considered but nor incorporated. There is a fine distinction between finding this nematode in roots rather than leaves. It is more likely to be found in roots, but the drafting team suggests that it may be found as

			slender body and the more posterior position of the hemizonid: six to ten annules behind the excretory pore (vs one to three annules) (Thorne, 1961).			a result of contamination rather than migration. The drafting team agrees that other fungivorous, Aphs may be found in the same habitat, but unless to be able to distinguish species at this point, it cannot be stated that they are plant infesting. Thus the drafting team would keep the original wording.
66.	*90*	Technical	*Aphelenchoides* is a large genus. Allen (1952) provided a key to the four species of bud and leaf nematodes (*A. besseyi*, *A. fragariae*, *A. ritzemabosi* and *A. subtenuis*). Sanwal (1961) produced a dichotomous key to the 35 *Aphelenchoides* species that were recognized at the time. Fortuner (1970) devised a dichotomous key to 11 *Aphelenchoides* species with star-shaped mucros. Baranovskaya (1981) provided a dichotomus key to 97 species with descriptions of 105 species. Shahina (1996) provided a compendium to 141 *Aphelenchoides* species and used tail terminus to divide these species into four groups: (1) tail simple without any outgrowth or mucronate structure; (2) tail terminus with one or sometimes two mucronate structures; (3) tail with tetramucronate spine or star-shaped; and (4) tail outgrowth other than with a spine or star-shaped. EPPO (2004) devised a polytomous key to 17 *Aphelenchoides* species including 14 species with star-shaped mucros and 3 species of bud and leaf nematodeswithout star-shaped mucros (*A. blastophthorus*, *A. fragariae* and *A.ritzemabosi*), and divided the tail terminus of *Aphelenchoides* species into five groups: (1) with star-shaped mucro; (2) with a single mucro; (3) bifurcate; (4)	A new publication is proposed	EPPO, European Union	Incorporated

			mucro shape belonging to other type at tail tip; and (5) without mucro.			
67.	*91*	Editorial	*A. besseyi* differs from other plant-parasitic species of the genus by having a star-shaped mucro, although other~~,~~ non-pathogenic~~,~~ species of *Aphelenchoides* also have star-shaped mucros. *A. besseyi* is the most common plant-parasitic species with a star-shaped mucro although plant-parasitic species can be found in strawberries (*A. blastophthorus, A. fragariae* and *A. ritzemabosi*) as follows: *A. besseyi* has a post-vulval sac that is always less than one-third of the distance from the vulva to the anus, whereas sacs of the other species are longer than this; the tail of *A. besseyi* has a conoid shape, similar to *A. blastophthorus*, but shorter than that of *A. fragariae* and *A. ritzemabosi*, which tend to be elongate conoid; the excretory pore is usually positioned near the anterior edge of the nerve ring in *A. besseyi*, whereas in the other species it is either level with or posterior to the nerve ring; and the spicules of *A. besseyi* are distinctive in that the proximal ends lack a dorsal process (or apex) and have only a moderately developed ventral one (rostrum), while spicules of *A. blastophthorus* are comparatively large for the genus, have a rather stout dorsal limb that is characteristically flattened about midway along its arch, with its distal end curved ventrally to give it a hooked or knobbed appearance, and the apex and rostrum are pronounced structures, spicules of *A. fragariae* have a moderately developed apex and rostrum, and the smoothly curved spicules of *A. ritzemabosi* seem to lack a dorsal or ventral process.	For clarity.	Singapore	Incorporated
68.	*91*	Technical	*A. besseyi* differs from other plant-parasitic species of the genus by having a star-shaped mucro, although other, non-pathogenic, species of *Aphelenchoides* also have star-shaped mucros. *A. besseyi* is the most common plant-parasitic species with a star-shaped mucro although plant-parasitic species can be found in strawberries (*A. blastophthorus, A. fragariae* and *A. ritzemabosi*) as follows: *A. besseyi* has a post-vulval sac that is always less than one-third of the distance from the vulva to the anus, whereas sacs of the other species are longer than this; the tail of *A. besseyi* has a conoid shape, similar to *A. blastophthorus*, but shorter than that of *A. fragariae* and *A. ritzemabosi*, which tend to be elongate conoid; the	Sentence A. besseyi is the most common plant-parasitic species with a star-shaped mucro although plant-parasitic species can be found in strawberries (A. blastophthorus, A. fragariae and A. ritzemabosi) as follows: The second part of the sentence is not linked to first part of the sentence. Second part of sentence can be deleted as this information was given before. A. besseyi are distinctive in that the proximal ends lack a dorsal process correction according to Seni Jesus et al (in press)	EPPO, European Union	Incorporated

			excretory pore is usually positioned near the anterior edge of the nerve ring in *A. besseyi*, whereas in the other species it is either level with or posterior to the nerve ring; and the spicules of *A. besseyi* are distinctive in that the proximal end has an indistinct ~~s lack a~~ dorsal process (or apex) and have only a moderately developed ventral one (rostrum), while spicules of *A. blastophthorus* are comparatively large for the genus, have a rather stout dorsal limb that is characteristically flattened about midway along its arch, with its distal end curved ventrally to give it a hooked or knobbed appearance, and the apex and rostrum are pronounced structures, spicules of *A. fragariae* have a moderately developed apex and rostrum, and the smoothly curved spicules of *A. ritzemabosi* seem to lack a dorsal or ventral process.			
69.	*92*	Technical	*A. besseyi*, *A. blastophthorus*, *A. fragariae*, *A. ritzemabosi* and ~~,~~ *A. subtenuis* and ~~*A. saprophilus*~~ live as parasites in buds and leaves of plants. *A. saprophilus*, a fungivorous species, is also often found in damaged or diseased plant material, including bulbs and corms. Andrássy (2007) provided a key to 47 *Aphelenchoides* species found in Europe, including the six species encountered in buds and leaves. A short dichotomous key to Aphelenchoides besseyi, A. fagariae and A. ritzemabozei ~~these bud and leaf nematodes~~ is given in Table 3.	A. subtenuis can be found in foliar parts, but often more usually found in roots. See rewording proposed above for A. subtenuis para 89 A. saprophilus is not considered a parasite of buds and leaves of plants and therefore should be removed. The text as it reads indicates that Table 3 covers all five plant-parasitic species mentioned in the beginning of this paragraph. This is not the case. Modify accordingly.	EPPO, European Union	Incorporated
70.	*94*	Editorial	As *A. besseyi, A. fragariae* and *A. ritzemabosi* can all occur in a wide range of habitats, including occasionally in planting media, all *Aphelenchoides* nematodes that may be found in these habitats need to be considered in a diagnosis. Unfortunately, many of these nematodes are difficult to identify because there is little to distinguish them, a problem not alleviated by the poor descriptions of the species themselves. However, several authors have improved the original descriptions for the three targeted species. In addition, studies on *Aphelelchoides*species have shown the degree of variation in measurements made on populations from different hosts ~~(Table 3)~~.	The bracket and the content has no relation with this sentence .	China	Incorporated
71.	*95*	Editorial	As with all identifications involving the use of morphological characters, the combination of several key features is crucial to a positive diagnosis. In the polytomous key there is some overlap of codes, and users are advised to refer to original descriptions if in doubt	Table 4 appears after table 6 – numbering should be reassigned.	EPPO, European Union	Considered but not incorporated: the table 4 is placed under the section on “”comparison with

			about a diagnosis or to refer to the database (Table 4) for further guidance and proceed to molecular testing to confirm.			similar species". This position helps the user to get the full information in the same part of the protocol.
72.	*95*	Technical	As with all identifications involving the use of morphological characters, the combination of several key features is crucial to a positive diagnosis. In the polytomous key there is some overlap of codes, and users are advised to refer to original descriptions if in doubt about a diagnosis or to refer to the database (Table 4) for further guidance and proceed to molecular testing to confirm.	Can the reference to a database be clarified?	EPPO, European Union	Modified. The reference to the database has been replaced to explicit reference to table 4.
73.	*97*	Technical	Reference material can be found through different resources (e.g. Q-bank http://www.q-bank.eu/Nematodes/)	add another database NCE http://www.nce.nu/	EPPO, European Union	Incorporated
74.	*98*	Editorial	**Table 3.** Key to distinguish *Aphelenchoides besseyi, A. fragariae* and *A. ritzemabosi* from other species	Ensure correct formatting of the last column of Table 3. (Names should be aligned to the last line)	EPPO, European Union	Considered but left to the IPPC secretariat as a formatting issue
75.	*98*	Technical	**Table 3.** Key to distinguish *Aphelenchoides besseyi, A. fragariae* and *A. ritzemabosi* from other species	The key is very simple, maybe too simple as it is based on few characters, among which some are difficult to observe (e.g. lateral field). Furthermore some exception might exist, for example for A. fragariae, one population from Chili showed lateral field with 4 incisures. It might be relevant to include additional characters such as shape of the spicules, or shape / aspect of the cephalic region, which might be easier and more reliably observed. Another option could be to indicate in the title that it is a simplified key.	EPPO, European Union	Incorporated
76.	*99*	Technical	1 Post-vulval sac length more than one-third the distance between the vulva and the anus — 2 Post-vulval sac length less than one-third the distance between the vulva and the anus and possessing a star-shaped mucro — *A. besseyi*	These should rather not be recognized as mucro, which may be confusing, but as processes. The structure on tail terminus is also known as box-like structure. (description from Hunt (1993))	EPPO, European Union	Incorporated

			<table><tr><td>2</td><td>Lateral field with three or four incisures Lateral field with two incisures</td><td>3 *A. fragariae*</td></tr><tr><td>3</td><td>Tail terminus with a single mucro Tail terminus with two to fourprocesses pointing posteriorly giving it a paintbrush-like appearance ~~mucro~~</td><td>Other species *A. ritzemabosi*</td></tr></table>			
77.	*100*	Substantive	**4.2 Morphological identification of *Aphelenchoides besseyi*** Unite the key and develop a format for 3 kind of Aphelenchoides.	Too many keys, and too many repeated information in this section.	China	Considered but not incorporated; this formatting is in line with the one used in previous IPPC diagnostic protocol. Furthermore this protocol should be used by any operator, including the novice ones.
78.	*103*	Technical	**Female:** Body slender, straight to slightly arcuate ventrally when relaxed. Cephalic region rounded, unstriated, slightly offset and wider than body at lip base. Lateral fields about one-fourth as wide as body, with four incisures. Metacorpus ~~Median oesophageal bulb~~ oval, with a distinct valvular apparatus slightly behind its centre. Excretory pore usually near anterior edge of nerve ring. Post-vulval sac narrow, inconspicuous, not containing sperm, 2.5–3.5 times anal body width but less than one-third the distance from the vulva to the anus. Tail conoid, 3.5–5 anal body widths long. Terminus bearing a mucro of diverse shape with three to four pointed processes.	Adjustment of terminology as explained in para 56	EPPO, European Union	Incorporated
79.	*104*	Substantive	**Male:** Often as numerous as females. Posterior end of body curved by about 180 degrees in relaxed specimens. Tail conoid, with terminal mucro with two to four pointed processes. Spicules typical of the genus except that the proximal ends lack an apex and have only a moderately developed rostrum.	It's more complete.	China	Incorporated

			Add measurements after the paragraph 104.			
80.	*104*	Technical	**Male:** Often as numerous as females. Posterior end of body curved by about 180 degrees in relaxed specimens. Tail conoid, with terminal mucro with two to four pointed processes. Spicules typical of the genus except that the proximal ends lack a~~n~~ distinct apex and have only a moderately developed rostrum.	see comment on para 91	EPPO, European Union	Incorporated
81.	*107*	Editorial	**4.2.2.1 *Dichotomous key for Aphelenchoides besseyi*~~Aphelenchoides besseyi~~**	The latin name should be italic.	China	Not incorporated: the format of the heading is italic. Consequently the species name which is normally in italic becomes normal.
82.	*109*	Editorial	Dichotomous key to distinguish *A. besseyi* from other related species of *Aphelenchoides*	Would the format of this key benefit from being presented as a table?	EPPO, European Union	Considered but not incorporated. The drafting team considers that a dichotomous key, used in conjunction with the polytomous key is best.
83.	*122*	Editorial	**4.2.2.2 *Polytomous key for Aphelenchoides*~~Aphelenchoides~~ *species***	The latin name should be italic.	China	Not incorporated see answer to comment 81
84.	*122*	Substantive	**4.2.2.2Polytomous key for Aphelenchoides similar species** ~~***Polytomous key for*Aphelenchoides *species***~~	The contents of this section is the Polytomous key for Aphelenchoides similar species.	China	Considered but not incorporated; this section covered both specific polytomous key and similar Aphelenchoides species. So the general heading, as written now, is more appropriate.

<table>
<tr><td>85.</td><td>134</td><td>Substantive</td><td>C. Tail shape (Figure 12 (B))</td><td>TECHNICAL suggestion of a reference to the Figure in the main title for consistency with A</td><td>EPPO, European Union</td><td>Incorporated</td></tr>
<tr><td>86.</td><td>148</td><td>Technical</td><td>F. Relative position of the excretory pore and nerve ring (Figure 12 (C))</td><td>suggestion of a reference to the Figure in the main title for consistency with A</td><td>EPPO, European Union</td><td>Incorporated</td></tr>
<tr><td>87.</td><td>153</td><td>Editorial</td><td>Table 4~~5~~. Polytomous codes of selected species</td><td>wrong table numbering</td><td>Australia</td><td>Considered but not incorporated; the table 4 is called earlier in the text, but has been placed next to table 6 for the easiness of use of the protocol.</td></tr>
<tr><td>88.</td><td>153</td><td>Editorial</td><td>Table 4~~5~~. Polytomous codes of selected species</td><td>The tables should be in order and as such this should be table 4. Please ensure that reference to tables in text are adjusted accordingly.</td><td>Canada</td><td>Considered but not incorporated; the table 4 is called earlier in the text, but has been placed next to table 6 for the easiness of use of the protocol.</td></tr>
<tr><td>89.</td><td>154</td><td>Technical</td><td>
<table>
<tr><th>Species/code</th><th>A</th><th>B</th><th>C</th><th>D</th><th>E</th><th>F</th></tr>
<tr><td>A. besseyi</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>A. hylurgi</td><td>1</td><td>1</td><td>1</td><td>1</td><td>4</td><td>3</td></tr>
<tr><td>A. unisexus</td><td>1</td><td>1</td><td>1/3</td><td>1</td><td>3</td><td>3</td></tr>
<tr><td>A. asteromucronatus</td><td>1</td><td>1</td><td>1/3</td><td>2</td><td>1</td><td>3</td></tr>
<tr><td>A. siddiqii</td><td>1</td><td>1</td><td>3/4</td><td>1</td><td>1</td><td>1/2/3</td></tr>
<tr><td>A. asterocaudatus</td><td>1</td><td>1/2</td><td>1</td><td>1</td><td>3</td><td>3</td></tr>
<tr><td>A. andrassyi</td><td>1</td><td>1/2</td><td>2/3</td><td>1/2</td><td>2</td><td>4</td></tr>
<tr><td>A. wallacei</td><td>1</td><td>1/2</td><td>3</td><td>3</td><td>1</td><td>1</td></tr>
<tr><td>A. goodeyi</td><td>1</td><td>2</td><td>1</td><td>1</td><td>1</td><td>3</td></tr>
<tr><td>A. lichenicola</td><td>1</td><td>2</td><td>1</td><td>1/2</td><td>1</td><td>2/3</td></tr>
<tr><td>A. silvester</td><td>1</td><td>2</td><td>1</td><td>1/2</td><td>1</td><td>4</td></tr>
<tr><td>A. fujianensis*</td><td>1</td><td>2</td><td>1</td><td>1/3</td><td>1</td><td>1/2</td></tr>
</table>
</td><td>Experts from our region commented that In the polytomous key, some species have the same values for all criteria (A to F), e.g. A. goodeyi and A. lichenicola. It would be good to explain how to manage in such case: should the operator compare its specimen with the original description and find additional information? Guidance should be provided for such cases. However we have noted that paragraph 59 refers to molecular tools in case of doubt and paragraph 90 refers to several dichotomous keys. Although it is self-explaining to the user that if there is a dead end in one key, they have other options, it may be wise including a foot note to refer to these paragraphs. A. subtenuis is a widely distributed species and should be added A= 2 B= 2 C= 4 D= 1 E= 2 F= 2/3</td><td>EPPO, European Union</td><td>Modified. A sentence has been added in paragraph 187 to address the possible added value of molecular identification if any uncertainty with morphological identification. But information was already included in paragraph 59.

Elements on A. subtenuis are incorporated</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td colspan="2">
<table>
<tr><td>A. jonesi</td><td>1</td><td>2</td><td>1</td><td></td><td>1/3</td><td>1</td><td>2</td></tr>
<tr><td>A. brevistylus</td><td>1</td><td>2</td><td>1 / 2</td><td></td><td>2</td><td>3</td><td>1</td></tr>
<tr><td>A. aligarhiensis</td><td>1</td><td>2</td><td>2 / 3</td><td></td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>A. blastophthorus</td><td>2</td><td>2</td><td>1 / 2</td><td></td><td>3</td><td>1</td><td>2</td></tr>
<tr><td>A. ritzemabosi</td><td>4</td><td>2</td><td>2</td><td></td><td>1</td><td>1</td><td>3</td></tr>
<tr><td>A. fragariae</td><td>2/4</td><td>2</td><td>2</td><td></td><td>1</td><td>3</td><td>2/3</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>90.</td><td>160</td><td>Editorial</td><td>Female: Body slender (a = 45–70), straight to arcuate ventrally when relaxed. Cuticle finely annulated, lateral field with two incisures. Cephalic region almost continuous with body, appears smooth under the microscope, and four to five annuli visible by scanning electron microscopy (Khan et al., 2007, 2008). Stylet slender, about 8–14 µm long, often 10–11 µm; conus and shaft nearly equal in length; basal knobs minute but distinct. Oesophagus typical of the genus, median bulb oval and highly muscular with central valve plates, oesophageal gland lobe dorsal~~ly~~ overlap~~ping~~ of intestine, two to four body widths long. Nerve ring encircling isthmus near its base, about one body width behind median bulb. Excretory pore level with or close behind nerve ring. Genital tract monoprodelphic, outstretched, with oocytes in a single row, never reaching oesophagus. Post-vulval sac long, extending more than half the vulva–anus distance. Tail elongate conoid with a single simple spike or minute mucro at tail tip.</td><td>Editorial change of english</td><td>EPPO, European Union</td><td>Incorporated</td></tr>
<tr><td>91.</td><td>160</td><td>Technical</td><td>Female: Body slender (a = 45–70), straight to arcuate ventrally when relaxed. Cuticle finely annulated, lateral field with two incisures. Cephalic region almost continuous with body, appears smooth under the microscope, and four to five annuli visible by scanning electron microscopy (Khan et al., 2007, 2008). Stylet slender, about 8–14 µm long, often 10–11 µm; conus and shaft nearly equal in length; basal knobs minute but distinct. Pharynx~~Oesophagus~~ typical of the genus, metacorpus~~median bulb~~ oval and highly muscular with central valve plates, pharyngeal ~~oesophageal~~ gland lobe dorsally overlapping intestine, two to four body widths long. Nerve ring encircling isthmus near its base, about one body width behindmetacorpus~~median bulb~~. Excretory pore level with or close behind nerve ring. Genital tract monoprodelphic, outstretched, with oocytes in a single</td><td>Adjustment of terminology as explained in para 56</td><td>EPPO, European Union</td><td>Incorporated</td></tr>
</table>

			row, never reaching pharynx~~oesophagus~~. Post-vulval sac long, extending more than half the vulva–anus distance. Tail elongate conoid with a single simple spike or minute mucro at tail tip.			
92.	*161*	Substantive	**Male:** Abundant. Essentially similar to female in general morphology. Tail arcuate through 45 to 90 degrees when relaxed, not sharply curved like a hook, with a simple terminal spine. Three pairs of caudal papillae present. Spicules rose thorn-shaped with moderately developed apex and rostrum, dorsal limb 10–19 µm long. Add measurements after the paragraph 161.	It's more complete.	China	Considered but not incorporated Measurements of male of A. fragariae are essentially the same as the female, as already stated in the paragraph 161. The specific elements for the spicules are already provided in the text.
93.	*163*	Editorial	body 0.4~~0~~–1.0 mm long, very slender (a = 45–70) (Figure 13(D–F))	For consistency reduce to one digit, i.e. 0.4	EPPO, European Union	Incorporated
94.	*168*	Technical	lateral field with generally two incisures (Figure 13(H, O))	As previously commented (para 99), specific populations of A. fragariae showed different number of lateral fields (4 and not 2).	EPPO, European Union	Incorporated
95.	*171*	Technical	*A. fragariae* is similar to *A. arachidis*, *A. helophilus*, *A. resinosi* and *A. rhytium* , but can be distinguished from all other species described in *Aphelenchoides* by its more slender body (a = 45–70), lateral field with generally two incisures and tail terminus with a single mucro. *A. fragariae* can be distinguished from these similar species using the key given in Table 6. A diagnostic compendium of *A. fragariae* and similar species and bud and leaf nematodes of the genus is presented in Table 6, which provides details to help to determine the identity of these similar species.	As previously commented (para 99), specific populations of A. fragariae showed different number of lateral fields (4 and not 2).	EPPO, European Union	Incorporated
96.	*172*	Editorial	**Table 5~~6~~.** Dichotomous key to distinguish *Aphelenchoides fragariae*from morphologically similar species	Tables should be in order and as such this should be table 5. Please ensure the reference to tables in text are adjusted accordingly.	Canada	Considered but not incorporated; the table 4 is called earlier in the

						text, but has been placed next to table 6 for the easiness of use of the protocol. So the numbering of the tables is correct.
97.	*174*	Editorial	**Table 4.** Morphological characters of *Aphelenchoides fragariae* compared with similar species	The format of the table 4 should be adjusted so that the table fit in one page and is not splited between two pages. Additionnaly, it would help if the heading of the table is on the left hand side and not on the right one. In addition numbering should be checked as it is presented after Table 6.	EPPO, European Union	Incorporated. To be done by IPPC secretariat.
98.	*174*	Editorial	**Table 54.** Morphological characters of *Aphelenchoides fragariae* compared with similar species	wrong table number order	Australia	Considered but not incorporated; the table 4 is called earlier in the text, but has been placed next to table 6 for the easiness of use of the protocol. So the numbering of the tables is correct.
99.	*174*	Editorial	**Table 64.** Morphological characters of *Aphelenchoides fragariae* compared with similar species	Tables should be in order and as such this should be table 6. Please ensure the reference to tables in text are adjusted accordingly.	Canada	Considered but not incorporated; the table 4 is called earlier in the text, but has been placed next to table 6 for the easiness of use of the protocol. So the numbering of the tables is correct.
100.	*175*	Substantive	Species / L (mm) / A / B / C / c´ / Tail (µm) / Tail shape[1] / Terminal mucro shape[1] / V / PVS/VA[2] / Stylet / LL[3] / Spicules (µm) / References	For example, a-value in table 4 of A. Ritzemabosi is wrong （40-45）	China	Incorporated

												(µm)			
A. arachidis	0.51–1.0	39–50	11–18	25–42	2–3	22–28	Subcylindroid	Single central spine	67–74	Approximately ½	11–12	2	15–25	Bridge and Hunt (1985)
A. besseyi	0.66–0.75	32–42	10.2–11.4	17–21	3.5–5.0	36–42	Conoid	Star	68–70	Less than ⅓	10–12	4	18–21	Franklin and Siddiqi (1972); Andrássy (2007)
A.blastophthorus	0.68–0.95	28–50	9.0–12.8	15–28	2.3–5.0	42–48	Conoid	Single central spine	62–74	Approximately ½	15–19.5	4	24–32	Hooper (1975); Shahina (1996)
A. fragariae	0.45–0.	36–63	8–15	12–20	4.9	38–42	Elongate conoid	Single central spine	64–71	More than ½	10–11	2	14–17	Siddiqi (1975); Shahina

				80											(1996)
			A. helophilus	0.80–1.30	43–78	12–14	14–20	5.5	>40	Elongate conoid	Single central spine	65–79	Not known	12	Unknown	26	Shahina (1996); Andrássy (2007)
			A. resinosi	0.40–0.80	29–53	7–13	12–19	3–4	33.7	Conoid	Single central spine	66–79	Less than ½	10–11	2	13–15	Kaisa *et al*. (1995)
			A. rhytium	0.78–0.94	43–48	11.7–13.4	16–21	56.2	Elongate conoid	Single central spine	67	Less than ½	11	Absent	22.9	Massey (1974); Shahina (1996)	
			A. ritzemabosi	0.77–1.20	40–~~54~~45	10–13	18–24	4–5	47	Elongate conoid	Peg with two to four minute processes	66–75	More than ½	12	4	20–22	Allen (1952); Siddiqi (1974); Andrássy

																(2007)
			A. saprophilus	0.45–0.62	26–33	8–12	12–18	2.5–3.0	32	Conoid	Ventral peg	66–70	Approximately ½	11	4	22–23	Shahina (1996); Andrássy (2007)
			A. subtenuis	0.87–1.15	44–57	12–17	24–28	2.78–3.27	42.4	Subcylindroid	Single ventral spine	69–71	More than ½	11	3 or 4	18–23	Allen (1952); Deimi *et al*. (2006)
			There are some wrong data in the draft, For example, a-value in table 4 of *A. Ritzemabos*i is wrong（40-45）. Please check the data and references.														
101.	*175*	Technical	Species	L (mm)	A	B	C	c´		Tail shape	Tail (µm)	Head shape	Terminal mucro shape[1]	number of V	EPPO, European Union PVS/VA[2]	Stylet (µm)	L[3]	Modified. Footnote added table 4 to explain that some population of A. fragariae may have more than 2 lateral fields.	Spicules after (µm)
			A. arachidis	0.51–1.0	39–50	11–18	25–42	2–3			22–28	Subcylindroid	Single central spine	67–74	Approximately ½	11–12	2		15–25
			A. besseyi	0.66–0.75	32–42	10.2–11.4	17–21	3.5–5.0			36–42	Conoid	Star	68–70	Less than ⅓	10–12	4		18–21

As previously commented (para 99), specific populations of A. fragariae showed different lateral fields (Hairshape2).

A.blastophthorus	0.68–0.95	28–50	9.0–12.8	15–28	2.3–5.0	42–48	Conoid	Single central spine	62–74	Approximately ½	15–19.5	4		24–32	
A. fragariae	0.45–0.80	36–63	8–15	12–20	4.9	38–42	Elongate conoid	Single central spine	64–71	More than ½	10–11	2 (generally)		14–17	
A. helophilus	0.80–1.30	43–78	12–14	14–20	5.5	>40	Elongate conoid	Single central spine	65–79	Not known	12	Unknown		26	
A. resinosi	0.40–0.80	29–53	7–13	12–19	3–4	33.7	Conoid	Single central spine	66–79	Less than ½	10–11	2		13–15	
A. rhytium	0.78–0.94	43–48	11.7–13.4	16–21	56.2	Elongate conoid	Single central spine	67	Less than ½	11	Absent	2	2.9	Massey (1974 Shahina (199	
A. ritzemabosi	0.77–1.20	40–54	10–13	18–24	4–5	47	Elongate conoid	Peg with two to four minute processes	66–75	More than ½	12	4		20–22	
A. saprophilus	0.45–0.62	26–33	8–12	12–18	2.5–3.0	32	Conoid	Ventral peg	66–70	Approximately ½	11	4		22–23	

			A. subtenuis	0.87–1.15	44–57	12–17	24–28	2.78–3.27	42.4	Subcylindroid	Single ventral spine	69–71	More than ½	11	3 or 4	18–23
102.	*183*	Technical	**Female:** Body slender, 0.77–1.20 mm long; annules 0.9–1.0 µm wide, distinct; lateral fields one-sixth to one-fifth as wide as body, with four incisures. Lip region hemispherical, set off by a constriction, slightly wider than adjacent body, no annulations visible under a light microscope; framework hexaradiate, weakly sclerotized. Stylet~~Spear~~ about 12 µm long, with distinct basal knobs and sharply pointed anterior. Procorpus slender; metacorpus ~~or median oesophageal bulb~~ large, somewhat oval in shape, highly muscular, with prominent internal cuticular thickening and orifices of dorsal and subventral oesophageal glands. Nerve ring in neotype 1.5 body widths behind bulb. Excretory pore 0.5–2 body widths posterior to nerve ring. Three oesophageal glands forming a lobe extending about four body widths over intestine dorsally. Oesophago-intestinal junction about 8 µm behind metacorpus~~median oesophageal bulb~~, indistinct and ~~lacking a~~ valve not discernible. Intestine with small spherical granules and a distinct lumen throughout. Vulva slightly protruding~~raised~~, transverse slit. Post-vulval uterine sac extending for more than half the vulva–anus distance, often containing sperm. Ovary single anteriorly outstretched, oocytes in multiple rows. Tail elongate conoid, bearing a terminal peg which has two to four minute processes pointing posteriorly giving it a paintbrush-like appearance.		1 for consistency within the text stylet should be used on spear 2 Adjustment of terminology as explained in para 56 3 more correct technically						EPPO		Incorporated	
103.	*183*	Technical	**Female:** Body slender, 0.77–1.20 mm long; annules 0.9–1.0 µm wide, distinct; lateral fields one-sixth to one-fifth as wide as body, with four incisures. Lip region hemispherical, set off by a constriction, slightly wider than adjacent body, no annulations visible under a light microscope; framework hexaradiate, weakly sclerotized. Stylet~~Spear~~ about 12 µm long, with distinct basal knobs and sharply pointed anterior. Procorpus slender; metacorpus ~~or median oesophageal bulb~~ large, somewhat oval in shape, highly muscular, with prominent internal cuticular thickening and orifices of dorsal and subventral pharyngeal~~oesophageal~~ glands. Nerve ring in neotype 1.5		1 for consistency within the text stylet should be used on spear 2 Adjustment of terminology as explained in para 56 3 more correct technically						European Union		Incorporated	

			body widths behind bulb. Excretory pore 0.5–2 body widths posterior to nerve ring. Three pharyngeal~~oesophageal~~ glands forming a lobe extending about four body widths over intestine dorsally. Pharyngo~~Oesophago~~-intestinal junction about 8 µm behind metacorpus~~median oesophageal bulb~~, indistinct and ~~lacking a~~ valve not discernible. Intestine with small spherical granules and a distinct lumen throughout. Vulva slightly protruding~~raised~~, transverse slit. Post-vulval uterine sac extending for more than half the vulva–anus distance, often containing sperm. Ovary single anteriorly outstretched, oocytes in multiple rows. Tail elongate conoid, bearing a terminal peg which has two to four minute processes pointing posteriorly giving it a paintbrush-like appearance.			
104.	*184*	Editorial	**Male:** Common. Posterior end of body usually curved through 180 degrees upon relaxation. Lip region, spear and oesophagussimilar to that of ~~as in~~ female. Testis single, outstretched. Three pairs of ventro-submedian caudal papillae: first pair adanal, second midway on tail, third near tail end. Spicules smoothly curved, rose thorn-shaped, lacking a dorsal or ventral process at the proximal end; dorsal limb 20–22 µm long. Tail peg with two to four processes, of variable shape.	Editorial change of english	EPPO, European Union	Incorporated
105.	*184*	Technical	**Male:** Common. Posterior end of body usually curved through 180 degrees upon relaxation. Lip region,stylet~~spear~~ and pharynx~~oesophagus~~ as in female. Testis single, outstretched. Three pairs of ventro-submedian caudal papillae: first pair adanal, second midway on tail, third near tail end. Spicules smoothly curved, rose thorn-shaped, lacking a dorsal or ventral process at the proximal end; dorsal limb 20–22 µm long. Tail peg with two to four processes, of variable shape.	Adjustment of terminology as explained in para 56	EPPO, European Union	Incorporated
106.	*185*	Technical	**Measurements:** ♀♀: L = 0.77–1.20 mm; a = 40–45; b = 10–13; c = 18–24; V = $^{48–33}$66– 75$^{14–17}$. Neotype ♀: L = 0.85 mm; a = 42; b = 12; c = 18; V = ^{35}68^{17}; stylet~~spear~~ = 12 µm. ♂♂: L = 0.70–0.93 mm; a = 31–50; b = 10–14; c = 16–30; T = 35–64.	consistency of terminology in the protocol	EPPO, European Union	Incorporated
107.	*187*	Technical	*Aphelenchoides* species are morphologically very similar and can be easily confused. Primary diagnostic characters of *A. ritzemabosi* are the length of the post-vulval sac as a fraction of the distance between the vulva and the anus; the shape of the tail terminus and tail; body length; and	Repetition to section 4 Identification, Is this really needed here? If not, delete.	EPPO, European Union	Incorporated (deletion of the sentence, reference to table 4 kept)

			the ratios a and c. More information can be found in Table 4.			
108.	*189*	Technical	Several molecular tests for the identification of *Aphelenchoides* spp. have been developed and are now in use (McCuiston *et al.*, 2007; Rybarczyk-Mydłowska *et al.,* 2012). Polymerase chain reaction (PCR) with species-specific primers can be used for diagnosis of nematodes isolated from plant material (section 3.2.2). Any development stage can be subjected to the molecular assay. The molecular identification should be complemented by other tests to confirm pests viability.	For regulatory proposes it is not enough the identification by molecular techniques but also to determine the viability of the pests.	COSAVE, Argentina, Peru, Brazil, Uruguay, Chile, Paraguay	Considered but not incorporated: nematodes viability is a key issue, but on one hand viability tests don't always exist (no specific test for Aphelenchoides) and on the other hand, the regulatory policies may differ from one country to another and don't always include viability as a decision data.
109.	*190*	Technical	In this diagnostic protocol, methods (including reference to brand names) are described as published, as these defined the original level of sensitivity, specificity and/or reproducibility achieved. ~~The use of names of reagents, chemicals or equipment in these diagnostic protocols implies no approval of them to the exclusion of others that may also be suitable.~~ Laboratory procedures presented in the protocols may be adjusted to the standards of individual laboratories, provided that they are adequately validated.	Text deleted for consistency with other adopted DP, and because it is included in the agreed footnote linked to each brand named in the Protocol.	COSAVE, Argentina, Peru, Brazil, Uruguay, Chile, Paraguay	To be confirmed by the IPPC secretariat what the content of the disclaimer should be.
110.	*192*	Substantive	**4.5.1 DNA extraction[dna extraction procedure is missing]**	the procedure should be conclusive as possible.	Kenya	Considered but not incorporated. As stated in the current text, DNA extraction methods refer to the source paper and is not included in the protocol.
111.	*194*	Substantive	**4.5.2 Real-time PCR for ~~four~~three foliar nematode species**	It is the molecular identification for three species of foliar nematode.	China	Considered but not incorporated: the current protocol

						focuses on three foliar nematode species, but the molecular test itself targets 4 different foliar species. So the heading is correct.
112.	*195*	Substantive	Rybarczyk-Mydłowska *et al.* (2012) designed a small subunit (SSU) ribosomal DNA (rDNA)-based species-specific PCR for the three ~~four~~ foliar nematode species, *A. besseyi*,*A. fragariae*,*A. ritzemabosi* ~~and*A. subtenuis*~~. The species-specific primers were designed based on the full-length SSU rDNA sequences of these four *Aphelenchoides* species, and they were used for real-time PCR to rapidly identify one or more foliar nematode species isolated from plant material and soil.	It is the molecular identification for three species of foliar nematode.	China	Considered but not incorporated: the information currently included are relevant and important for supporting the specificity of this molecular test. Si this information should be kept.
113.	*214*	Substantive	*A. fragariae* generated a 169 base pair (bp) fragment in the rDNA-ITS1 region (other species did not amplify DNA) using the species-specific primers AFragF1 and AFragR1. The reaction mixture is composed of 2.0 µl of total DNA extract, 1.25 U TaqDNA polymerase, 1× PCR buffer (20 mM Tris-HCl (pH 8.4), 50 mM KCl), 1 mM $MgCl_2$, 200 µM each dNTP, 0.4 µM each oligonucleotide primer and sterile molecular-grade water to a final volume of 25 µL. The cycling parameters are as follows: 94 °C for 2 min; 40 cycles of 94 °C for 1 min, 53 °Cfor 40 s and extension at 72 °C for 1 min; followed by a final extension at 72 °C for 10 min. Add one section as 4.5.4 PCR for A. besseyi after paragraph 214.	It's more reasonable.	China	Considered but not incorporated: no section can be added as no molecular test specific for A. besseyi is recommended by the drafting team.
114.	*243*	Translation	Gratitude is expressed to CABI for permission to reproduce Figures 8, 11, 12, 15, and parts of Figures 1 and 13 from John Bridge/CABI BioScience (2006) and Franklin and Siddiqi (1972).	John Bridge/CABI is missing in the references	EPPO, European Union	Incorporated

115.	*244*	Technical	**8. References**	Check references thoroughly for correct wording and format, e.g. scientific names in italic etc.	EPPO, European Union	Incorporated
116.	*249*	Technical	**Baermann, G.** (1917) Ein einfache Methode zur Auffindung von Anklyostomum (Nematoden) Larven in Erdproben. Geneesk. Tijdschr. Nederlandsch-Indie 57, 131–137. Add new row: Baranovskaya, I.A., 1981. [Nematodes of soil and plants (aphelenchoidids and seinurids)] (in Russian), Nauka, Mos cow, 233 pp.	A publication item added	EPPO, European Union	Incorporated
117.	*250*	Technical	**Bridge, J. & Hunt, D.J.** 1985. Aphelenchoides arachidis.CIH descriptions of plant-parasitic nematodes,Set 8, No. 116. St Albans, UK, Commonwealth Institute of Helminthology (CIH). 3 pp. Add new row: Bridge, J., Luc, M. & Plowright, R.A., 1990. Nematode par asites of rice. *in* Plant Parasitic Nematodes in Subtropical and Tropical Agriculture, M. Luc, R.A. Sikora, J. Bridge ed s., pp. 69-108, C.A.B. Int. Inst. Parasitol. London	A publication item added	EPPO, European Union	Incorporated
118.	*255*	Technical	**Cobon, J. & O'Neill, W.** 2011. Aphelenchoides fragariae *(Ritzema Bos, 1890) Christie, 1932.* Australasian Plant Pathology Society Pathogen of the Month, August.	Journal missing or reference to internet page	EPPO, European Union	Considered but not incorporated. The "Australasian Plant Pathology Society Pathogen of the Month" is the review.
119.	*261*	Editorial	**EPPO** (European and Mediterranean Plant Protection Organization).2013a. PM7/119 (1) Nematode extraction. *EPPO Bulletin*, 43, 471-495.	THree different references for the same year 2013	EPPO, European Union	Incorporated
120.	*262*	Technical	**EPPO** (European and Mediterranean Plant Protection Organization).2013b. EPPO Plant Quarantine Data Retrieval (PQR) system, 5.0. Paris, EPPO. Available at http://www.eppo.int/DATABASES/pqr/pqr.htm (last accessed X Month YEAR).	add the following new reference EPPO (European and Mediterranean Plant Protection Organization). 2013c. Diagnostic protocols for regulated pests: Pictorial glossary of morphological terms in nematology. EPPO Technical Document No. 1056 (Rev. 4). Available at	EPPO, European Union	Incorporated

				http://www.eppo.int/QUARANTINE/diag_activities/EPPO_TD_1056_Glossary.pdf.		
121.	*273*	Editorial	~~**Hoshino, S. & Togashi, K.** 2002.Mass extraction method for determining *Aphelenchoides besseyi* density in *Oryza sativa* seeds. *Japanese Journal of Nematology*, 32(2): 25–30.~~	Deleted because it is not metioned in the text.	COSAVE, Argentina, Peru, Brazil, Uruguay, Chile, Paraguay	Incorporated
122.	*273*	Technical	**Hoshino, S. & Togashi, K.** 2002. Mass extraction method for determining *Aphelenchoides besseyi* density in *Oryza sativa* seeds. *Japanese Journal of Nematology*, 32(2): 25–30.	not present in the text	EPPO, European Union	Incorporated
123.	*290*	Editorial	**Ritzema Bos, J.** 1891. Zwei neue Nnematodenkrankheiten der Eerdbeerpflanzen. *Zeitschrift fuür Pflanzenkrankheiten und Pflanzenschutz* 1:1-16~~ **Ritzema Bos, J.** 1893. Neue nematodenkrakheiten bei topfplanzen. *Zeitschrift fur Pflanzenkrankheiten und Pflanzenschutz,* 3: 69–82.~~	Duplication of [291]	EPPO, European Union	Incorporated
124.	*291*	Editorial	**Ritzema Bos, J.** 1893. Neue Nnematodenkrankheiten bei Ttopfplanzen. *Zeitschrift fuür Pflanzenkrankheiten und Pflanzenschutz,* 3: 69–82.	Error in the journal title	EPPO, European Union	Incorporated
125.	*292*	Technical	**Rybarczyk-Mydłowska, K., Mooyman, P., van Megen, H., van den Elsen, S., Vervoort, M., Veenhuizen, P., van Doorn, J., Dees, R., Karssen, G., Bakker, J. & Helder, J**. 2012. Small subunit ribosomal DNA-based phylogenetic analysis of foliar nematodes (*Aphelenchoides* spp.) and their quantitative detection in complex DNA backgrounds. *Phytopathology,* 102(12): 1153–1160.	add a reference Sánchez-Monge , A., Flores, L., Salazar L., Hockland, S., Bert, W. (2015) An updated list of the plants associated with plant-parasitic Aphelenchoides (Nematoda: Aphelenchoididae) and its implications for plant-parasitism within this genus, Zootaxa 4013 (2): 207–224	EPPO, European Union	Incorporated
126.	*315*	Technical	**Figure 1.** Symptoms caused by *Aphelenchoidesbesseyi* on *Oryza sativa* leaves: left and middle, white tip; right, necrotic patches and crinkled leaves (left, from Society of Nematologists slide set, 1980; middle and right, from J. Bridge, CABI BioScience (reproduced from the Crop Protection Compendium, 2006 edition, © CABI 2006)). Add new pictures and their descriptions:	Better quality pictures are available. E.g. Donald Groth Aphelenchoides besseyi photograpy on web sites New pictures and their descriptions added Is the Crop protection compendium the correct reference? New possible pictures will be provided directly to the IPPC Secretariat?	EPPO, European Union	Incorporated

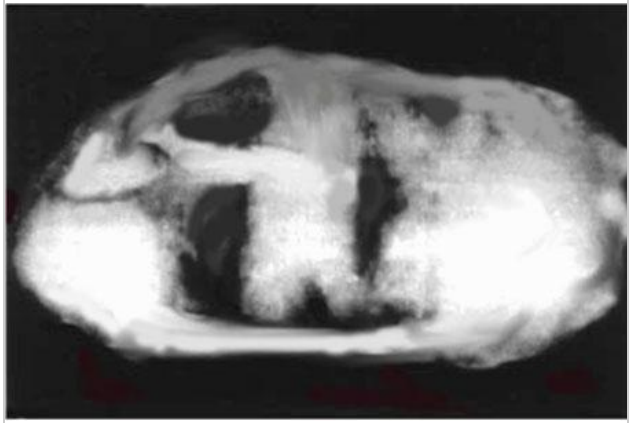
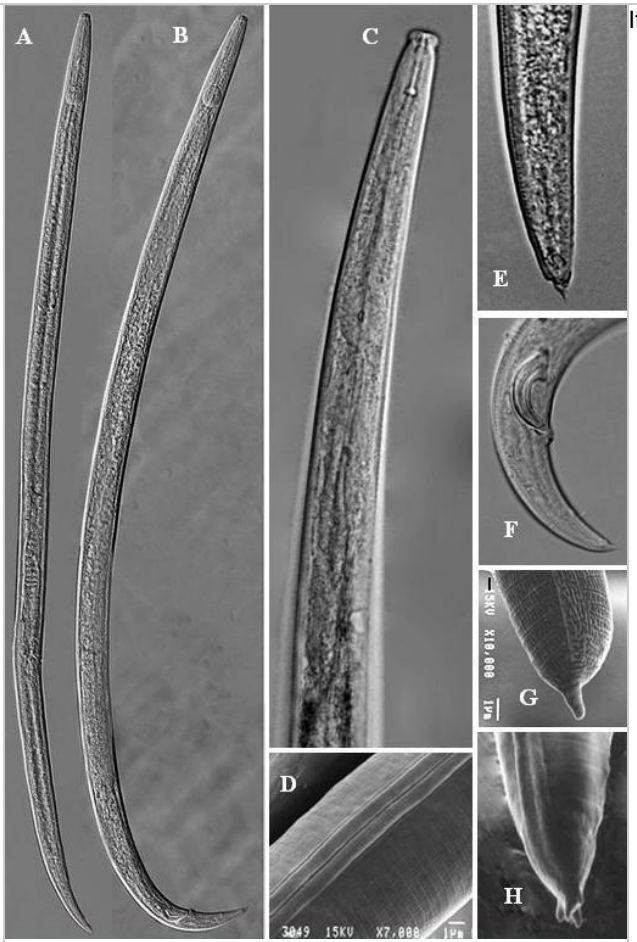
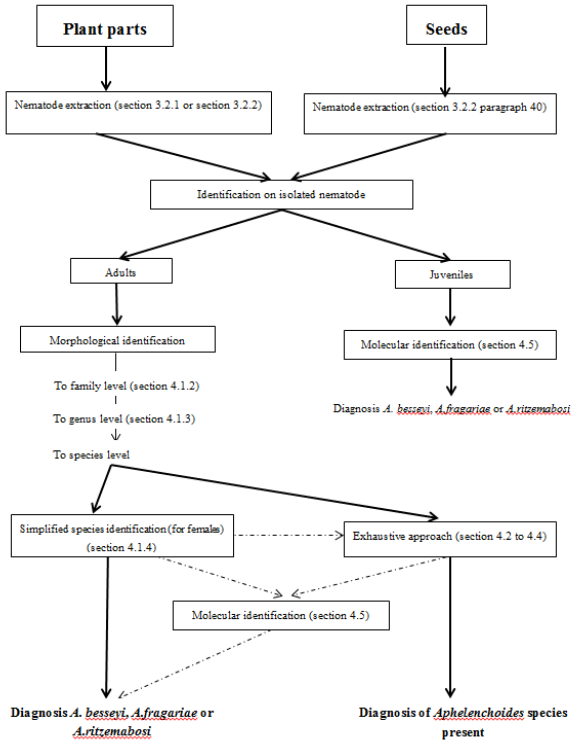
			 Figure 1A. Necrotic lesions caused by *Aphelenchoides besseyi* in endosperm of rice kernel (from Bridge et al., 1990)			

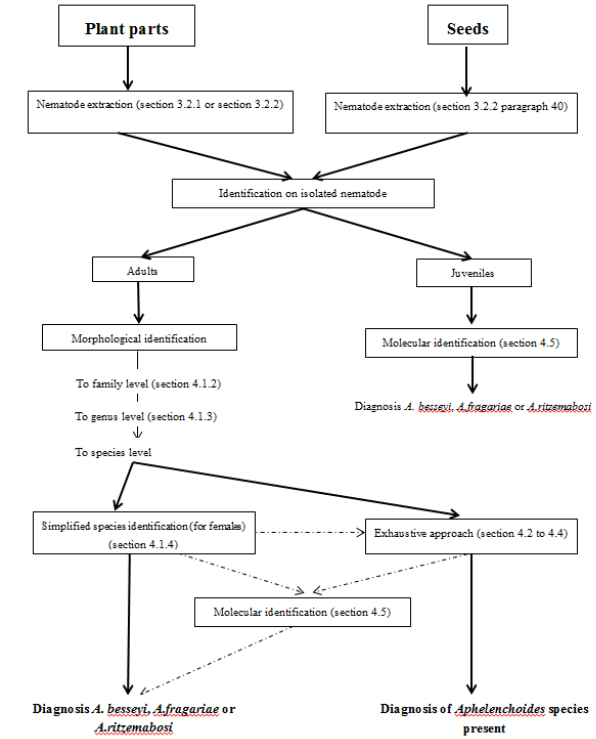
			 Figure 1B. Symptoms caused by *Aphelenchoides besseyi* on strawberry (phot. Jeffrey Lotz, FDOACS, Gainesville, Florida, USA)			
127.	*327*	Editorial	**Figure 7.***Fragaria* spp. plants infested with *Aphelenchoides fragariae:* (A) tight aggregation of ~~*Fragaria spp.*~~ crown with malformed leaves; (B)	"Fragaria spp." is unnecessary.	China	Incorporated

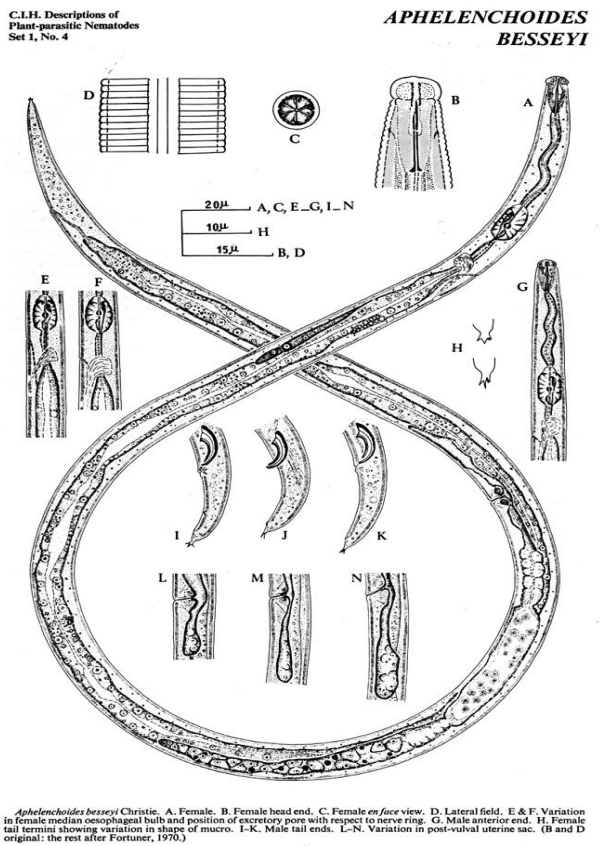
			abnormalplantgrowthwithstuntinganddeformation; (C) not infested plant (from Cobon and O'Neill, 2011).			
128.	*327*	Technical	**Figure 7.***Fragaria* spp. plants infested with *Aphelenchoides fragariae:* (A) tight aggregation of *Fragaria* spp. crown with malformed leaves; (B) abnormalplantgrowthwithstuntinganddeformation; (C) not infested plant (from Cobon and O'Neill, 2011). Add new picture and its description:  Figure 7A. *Fragaria* sp. plant infested with *Aphelenchoides fragariae*: malformed leaves; (phot. Adam Szczygiel, formerly at Institute of Pomology and Floriculture, Experimental Research Station at Brzezna, Poland).	New picture and its description added	EPPO	Incorporated
129.	*327*	Technical	**Figure 7.***Fragaria* spp. plants infested with *Aphelenchoides fragariae:* (A) tight aggregation of *Fragaria* spp. crown with malformed leaves; (B) abnormal plant growth with stunting and deformation; (C) not infested plant (from Cobon and O'Neill, 2011). Add new picture and its description:	New picture and its description added	European Union	Incorporated

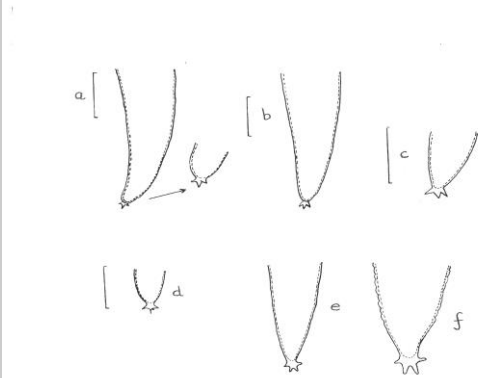
			 Figure 7A. *Fragaria* sp. plant infested with *Aphelenchoides fragariae*: malformed leaves; (phot. Adam Szczygiel, formerly at Institute of Pomology and Floriculture, Experimental Research Station at Brzezna, Poland).			

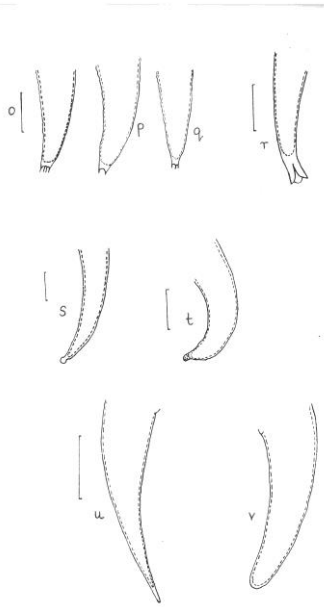
130.	*331*	Substantive	 Delete this figure.	It's unnecessary.	China	Considered but not incorporated. These basic pictures are necessary for all and especially for less experienced operators
131.	*332*	Substantive	~~**Figure 9.** *Aphelenchoides* spp.: (A) female; (B) male; (C) female anterior end; (D) lateral field; (E) female tail; (F) male tail; (G) female tail terminal mucro; and (H) male tail terminal mucro ((A), (B) and (E) after Wang *et al.*, 2013; (D) and (G) after Deimi *et al.*, 2006; (H) after Yu and Tsay, 2003; (C) and (F) courtesy Z. F. Yang and H. Xie, South China Agricultural University).~~	It's unnecessary.	China	Considered but not incorporated. These basic pictures are necessary for all and

						especially for less experienced operators.
132.	*332*	Technical	**Figure 9.** *Aphelenchoides* spp.: (A) female; (B) male; (C) female anterior end; (D) lateral field; (E) female tail; (F) male tail; (G) female tail terminal mucro; and (H) male tail terminal mucro ((A), (B) and (E) after Wang *et al.*, 2013; (D) and (G) after Deimi *et al*., 2006; (H) after Yu and Tsay, 2003; (C) and (F) courtesy Z. F. Yang and H. Xie, South China Agricultural University).	Great pictures, but on the whole this Figure 9. is quite confusing. It would be preferable to add the name of species to each small picture or exclude this Figure. SEM pictures are of good value, but most operators don't have access to this equipment. It would be good to add pictures from lateral fields and tail's mucro taken with a conventional microscope.	EPPO, European Union	Considered but not incorporated. The drafting team would agree to include other picture, but it doesn't have other pictures to provide for the protocol.
133.	*333*	Editorial		Under Seeds, "Nematode extraction" refers to the wrong paragraph. Paragraph 40 is a title for section 3.1.3	Canada	Incorporated. The paragraph number is deleted but the section number is kept.

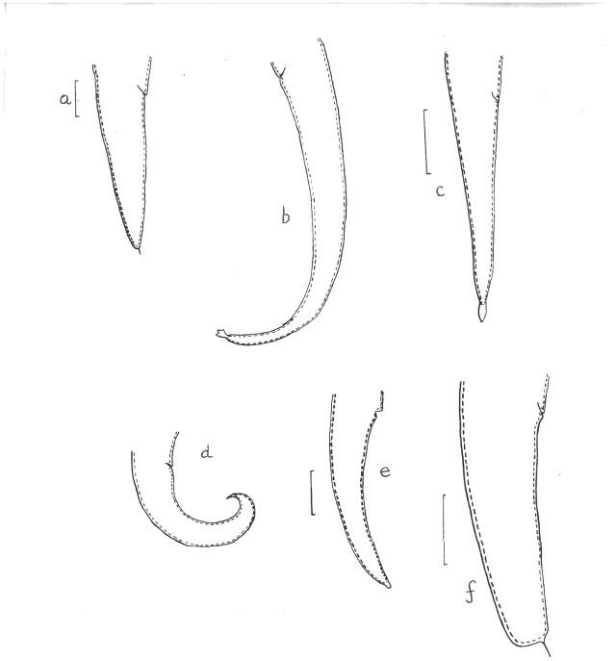
134.	*333*	Technical		The term "diagnosis" used in "Diagnosis A. besseyi, A. fragariae or A. ritzemabosi" (twice) and "Diagnosis of Aphelenchoides species present" is confusing. The term probably means that identification to a given species was performed successfully. Results of identification may be positive (presence of A. besseyi, A. fragariae and/or A. ritzemabosi in the tested sample) or negative (their absence in the sample). The analysis process should lead to clear indication whether the sample is infested or not. This is not clear from the diagram. For that reason, it is suggested that in the diagram phrases which currently use the word "diagnosis" read "A.besseyi, A.fragariae or A.ritzemabosi detected" and "A.besseyi, A.fragariae or A.ritzemabosi not detected", respectively.	EPPO, European Union	Incorporated

135.	*335*	Editorial	 Delete the explanatory text in the picture.	Repeated with paragraph 336.	China	Incorporated (formatting of the picture to delete the legend)
136.	*336*	Technical	**Figure11.***Aphelenchoides besseyi*: **(**A) female; (B) female head end; (C) female *en face* view; (D) lateral field; (E, F) variation in female metacorpus and pharynx region and ~~median oesophageal bulb~~ and position of excretory pore with respect to nerve ring; (G) male anterior end; (H) female tail termini showing variation in shape of mucro; (I–K) male tail ends; and (L–N) variation in post-vulval sac (from Fortuner, 1970, except for "D: lateral fields" from Franklin and Siddiqi, 1972).	Replace head end by by Anterior or lip region. Adjustment of terminology as explained in para 56	EPPO, European Union	Incorporated

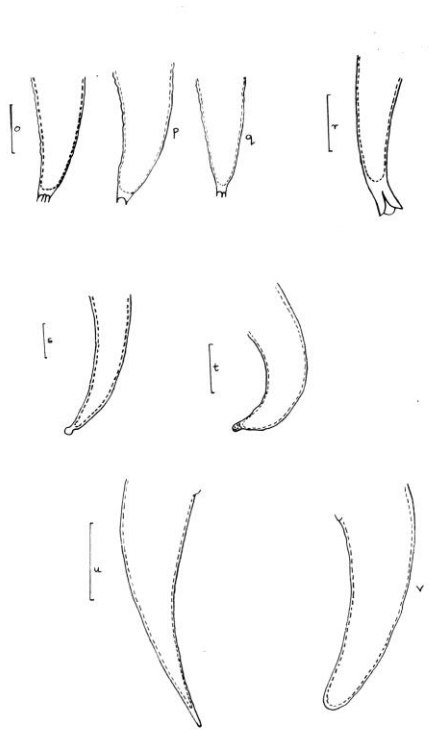
137.	*337*	Substantive		It's unnecessary. China	Considered but not included. These drawings have a real added value for the operators and should be kept.

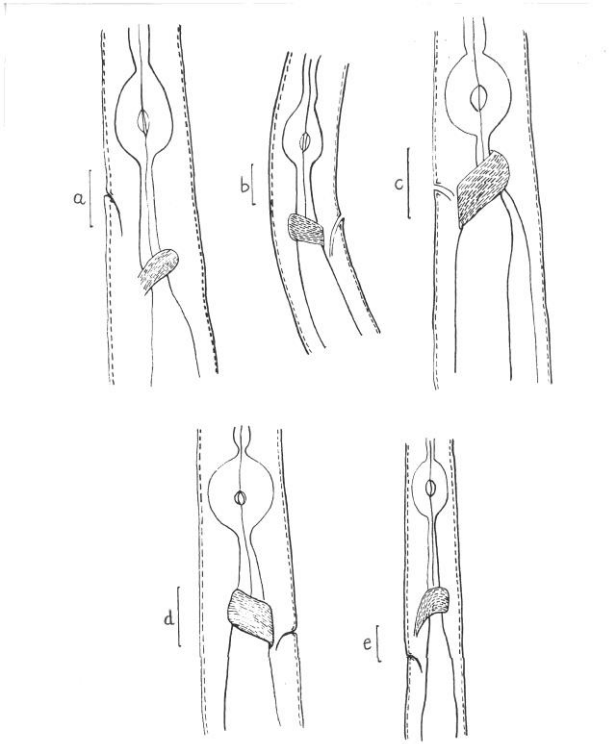
			 Delete this figure.			
138.	*338*	Editorial	**Figure 12(A).** Tail terminus types of *Aphelenchoides* species (code numbers according to the polytomous key cf 4.2.2.2): (a–f) star shape: (a) *A. aligarhiensis*, (b) *A. asterocaudatus*, (c) *A. besseyi* and (d) *A. goodeyi* (all scale bars = 10 µm); (e, f) *A. nonveilleri* (×1 100 and ×2 200, respectively); (g–m) single terminal mucro: (g) *A. richardsoni*, (h) *A. nechaleos*, (i) *A. vaughani,* (j) *A. tsalolikhini* and (l, m) *A. submersus*; (n) bifurcate: *A. bicaudatus* (all scale bars = 10 µm); (o–t) other: (o–q) *A. ritzemabosi*, (r) *A. sphaerocephalus*, (s) *A. gynotylurus* and (t) *A. helicosoma* (all scale bars = 10 µm); and (u, v)	Increase letter size in graph for better reading	EPPO, European Union	Incorporated

			no mucro: (u) *A. microstylus* (scale bar = 10 µm) and (v) *A. obtusus* (×1 250). (Photos courtesy: Sue Hockland)			
139.	*338*	Substantive	~~**Figure 12(A).** Tail terminus types of *Aphelenchoides* species (code numbers according to the polytomous key cf 4.2.2.2): (a–f) star shape: (a) *A. aligarhiensis*, (b) *A. asterocaudatus*, (c) *A. besseyi* and (d) *A. goodeyi* (all scale bars = 10 µm); (e, f) *A. nonveilleri* (×1 100 and ×2 200, respectively); (g–m) single terminal mucro: (g) *A. richardsoni*, (h) *A. nechaleos*, (i) *A. vaughani*, (j) *A. tsalolikhini* and (l, m) *A. submersus*; (n) bifurcate: *A. bicaudatus* (all scale bars = 10 µm); (o–t) other: (o–q) *A. ritzemabosi*, (r) *A. sphaerocephalus*, (s) *A. gynotylurus* and (t) *A. helicosoma* (all scale bars = 10 µm); and (u, v) no mucro: (u) *A. microstylus* (scale bar = 10 µm) and (v) *A. obtusus* (×1 250). (Photos courtesy: Sue Hockland)~~	It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and should be kept with its legend.

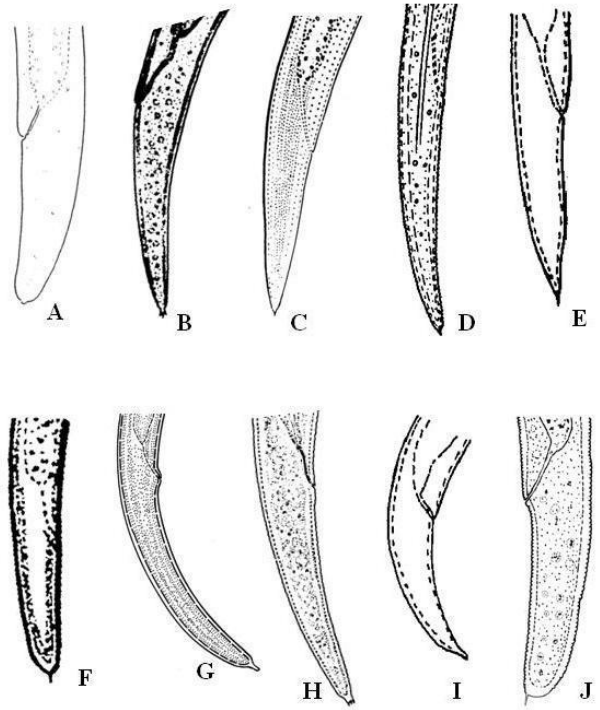
140.	*339*	Substantive	 Delete this figure.	It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and should be kept.
141.	*340*	Substantive	~~**Figure 12(B).** Tail shapes in *Aphelenchoides* species (scale bars = 10µm): (1) conoid: (a) *A. blastophthorus*; (2) elongate conoid: (b) *A. andrassyi* (no scale bar) and (c) *A. chalonus*; (3) dorsally convex conoid: (d) *A. fluviatilis* (×1 100) and (e) *A. franklini*; (4) sub cylindroid: (f) *A. subtenuis.* (Photos courtesy: Sue Hockland)~~	It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and

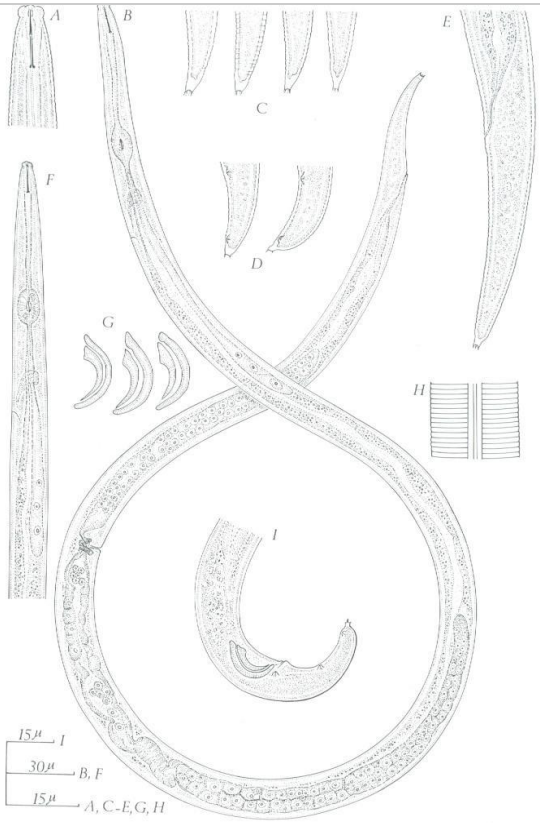
						should be kept with its legend.
142.	*340*	Substantive	**Figure 12(B).** Tail shapes in *Aphelenchoides* species (scale bars = 10µm): (1) conoid: (a) *A. blastophthorus*; (2) elongate conoid: (b) *A. andrassyi* (no scale bar) and (c) *A. chalonus*; (3) dorsally convex conoid: (d) *A. fluviatilis* (×1 100) and (e) *A. franklini*; (4) sub cylindroid: (f) *A. subtenuis.* (Photos courtesy: Sue Hockland)	The additional numbers (in brackets) are confusing as they do not appear in the graph. They can be deleted without losing any information.	EPPO, European Union	Incorporated
143.	*341*	Substantive		It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and should be kept.

			 Delete this figure.			

144.	*342*	Substantive	 Delete this figure.	It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and should be kept.
145.	*343*	Editorial	**Figure 12(C)**. Positions of the excretory pore relative to the nerve ring in *Aphelenchoides* species: (1) excretory pore is anterior to, or level with the anterior edge of the nerve ring: (a) *A. longiurus* and (b) *A. blastophthorus*; (2) excretory pore is level with the nerve ring (from behind the anterior point to in front of the posterior point): (c) *A. cibolensis*; (3) excretory pore is level with the posterior edge of the nerve ring (d, *A. arcticus*), or posterior to it (e,	Numbering (numbers in brackets) can be deleted as not shown in graph and no relevance for it.	EPPO, European Union	Incorporated

			A. ritzemabosi) (all scale bars = 10 µm). (Photos courtesy: Sue Hockland)			
146.	*343*	Substantive	~~**Figure 12(C).** Positions of the excretory pore relative to the nerve ring in *Aphelenchoides* species: (1) excretory pore is anterior to, or level with the anterior edge of the nerve ring: (a) *A. longiurus* and (b) *A. blastophthorus*; (2) excretory pore is level with the nerve ring (from behind the anterior point to in front of the posterior point): (c) *A. cibolensis*; (3) excretory pore is level with the posterior edge of the nerve ring (d, *A. arcticus*), or posterior to it (e, *A. ritzemabosi*) (all scale bars = 10 µm). (Photos courtesy: Sue Hockland)~~	It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and should be kept with its legend.
147.	*345*	Technical	**Figure 13.** *Aphelenchoides fragariae*: **(**A, N) female head end; (B) male head end; (C) (a) female and (b) male of *A. olesistus* Ritzema Bos, 1893 (= *A. fragariae*); (D) (a) male and (b) posterior portion of female of *Aphelenchus fragariae* Ritzema Bos, 1891; (E) male; (F) female; (G) female tail; (H, O) lateral field; (I, M, P) female tail tip; (J, K, Q) male tails; and (L) spicules ((A, B and E–L) from Siddiqi, 1975; (C) from Ritzema Bos, 1893; (D) from Ritzema Bos, 1891; (M) from Allen, 1952; (N, Q) from Kohl, 2011; (O, P) from Khan *et al*., 2008).	replace head end by Anterior or lip region	EPPO, European Union	Incorporated

148.	*346*	Substantive	 Delete this figure.	It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and should be kept.
149.	*347*	Substantive	~~**Figure 14.** Tails of *Aphelenchoides fragariae* and related species of *Aphelenchoides*: (A) *A. arachidis*; (B) *A. besseyi*; (C) *A. blastophthorus*; (D) *A. fragariae*; (E) *A. helophilus*; (F) *A. resinosi*; (G) *A. rhytium*; (H) *A. ritzemabosi*; (I) *A. saprophilus*; and (J) *A. subtenuis* ((A) from Bridge and Hunt, 1985; (B) from Franklin and Siddiqi, 1972; (C) from Hooper, 1975; (D) from Allen, 1952; (E) from Shahina, 1996; (F) from Kaisa *et al.*, 1995; (G) from Massey, 1974; (H) from Siddiqi, 1974; (I) from Shahina, 1996; (J) from Deimi *et al.*, 2006).~~	It's unnecessary.	China	Considered but not included. These drawings have a real added value for the operators and should be kept with its legend.

150.	*348*	Substantive	 Reoffered the picture.	It is not complete of the head of (B)female.	China	Incorporated, picture replaced
151.	*349*	Editorial	**Figure 15.** *Aphelenchoides ritzemabosi:* (A) female head end; (B) female; (C) female tail ends; (D) male tail ends; (E) female tail; (F) female oesophageal region; (G) spicules; (H) lateral field; and (I) male tail region (from Siddiqi, 1974).	Number error.	China	Incorporated
152.	*349*	Editorial	**Figure 15.** *Aphelenchoides ritzemabosi:* (A) female head end; (B) female; (C) female tail ends; (D) male tail ends; (E) female tail; (F) female oesophageal region; (G)	correction of figure number	EPPO, European Union	Incorporated

			spicules; (H) lateral field; and (I) male tail region (from Siddiqi, 1974).			
153.	*349*	Editorial	**Figure 15~~5~~.** *Aphelenchoides ritzemabosi:* (A) female head end; (B) female; (C) female tail ends; (D) male tail ends; (E) female tail; (F) female oesophageal region; (G) spicules; (H) lateral field; and (I) male tail region (from Siddiqi, 1974).	Editorial correction	Japan	Incorporated
154.	*349*	Technical	**Figure 5.** *Aphelenchoides ritzemabosi:* (A) female head end; (B) female; (C) female tail ends; (D) male tail ends; (E) female tail; (F) female pharyngeal ~~oesophageal~~ region; (G) spicules; (H) lateral field; and (I) male tail region (from Siddiqi, 1974).	Adjustment of terminology as explained in para 56 It would be great, if a SEM photograph with the details would be also added here, as was in previous species.	EPPO, European Union	Incorporated
155.	*350*	Technical	**Footnote 1:** ~~In this diagnostic protocol, methods (including reference to brand names) are described as published, as these defined the original level of sensitivity, specificity and/or reproducibility achieved~~. The ~~U~~use of names of reagents chemicals or equipment in ~~these~~ this diagnostic protocol~~s~~ implies no approval of them to the exclusion of others that may also be suitable. ~~Laboratory procedures presented in the protocols may be adjusted to the standards of individual laboratories, provided that they are adequately validated.~~This information is given for the convenience of users of this protocol and does not constitute an endorsement by the CPM of the chemical, reagent and/or equipment named. Equivalent products may be used if they can be shown to lead to the same results.	1. Text deleted because it is already included in the text of DP (paragraph 190). 2. Text added according to the previously agreed footnote.	COSAVE, Argentina, Peru, Brazil, Uruguay, Chile, Paraguay	To be fixed by the IPPC secretariat according to the rules for the disclaimer.
156.	*351*	Editorial	~~**Footnote 2:** See footnote 1.~~	Paragraphs [315-353] are not necessary. All in-text footnotes should point to Footnote 1 [350].	Canada	To be fixed by the IPPC secretariat according to the rules for the disclaimer.
157.	*352*	Editorial	~~**Footnote 3:** See footnote 1.~~	Paragraphs [315-353] are not necessary. All in-text footnotes should point to Footnote 1 [350].	Canada	To be fixed by the IPPC secretariat according to the rules for the disclaimer.
158.	*353*	Editorial	~~**Footnote 4:** See footnote 1.~~	Paragraphs [315-353] are not necessary. All in-text footnotes should point to Footnote 1 [350].	Canada	To be fixed by the IPPC secretariat

						according to the rules for the disclaimer.