

STRAWBERRIES

PHPS 5

Special requirements for strawberry plants to qualify as nuclear stock

NS

Eligible material	Any new or established variety or candidate material of potential new varieties can be entered. The progeny of nuclear stock is eligible as parent material to produce Foundation grade certified plants.
Growing conditions	<p>Nuclear stock plants must have been maintained in a suitably designed insect-proof gauzehouse containing only strawberry nuclear stock material.</p> <p>Strict precautions should be taken to prevent the introduction of any pest or disease listed in Annex 1/Annex 2, as appropriate. Quality pests and diseases such as powdery mildew should be kept at as low a level as practically possible.</p> <p>All mother plants must be grown singly in sterilised growing medium and in individually labelled containers.</p> <p>Runners should be propagated upwards with the rooting media above the mother plants to minimise possible contamination by red core or crown rot.</p>
Pests and diseases	<p>At least once in the previous year the mother plants must have been individually tested and found free from the pests and diseases listed in Annex 1A/Annex 2, as appropriate, using the indicator plants or test methods described.</p> <p>No plants are to be entered into the nuclear stock house unless tested and found free of all the pests and diseases listed in Annex 1A/Annex 1B and Annex 2, as appropriate.</p> <p>Any plants found to be infected or exhibiting suspicious symptoms should be removed immediately.</p>
Documentation	<p>The Director or other person responsible for the production of the plants must provide documentary evidence to show that the material has been produced under the conditions described above and that all the necessary tests were carried out and no evidence of infection was found.</p> <p>This evidence must be provided to the purchaser of the nuclear stock material before it can be used as parent material to produce Foundation grade.</p>
Reference for further details	EPPO 1994 Certification scheme for strawberry , EPPO Bulletin 24,875-889.1994. Martin RR (Ed) 2004. Recommended procedures for detection of viruses in small fruit crops. Proceedings of Tenth International Symposium on Small Fruit Virus Diseases. Acta Hort. 656:199-207, 2004.



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ANNEX 1A

NS

Material originating in the EC

Pest or disease	Preferred test method and indicator plant	Other acceptable test methods or indicator plant
<p>Aphid – borne viruses: Strawberry crinkle rhabdovirus Strawberry mild yellow edge Strawberry mottle Strawberry vein banding caulimovirus</p>	<p>Leaf grafting onto indicator UC4 Leaf grafting onto indicator UC6</p>	<p>UC5 F. Virginiana UC12</p>
<p>Nematode – borne viruses: Arabis mosaic nepovirus Raspberry ringspot nepovirus Strawberry latent ringspot nepovirus Tomato black ring nepovirus</p>	<p>Sap inoculation onto <i>Chenopodium quinoa</i></p>	<p>None available. Serology may be used to identify any symptoms seen on indicator plants</p>
<p>Leafhopper – borne agents: Strawberry green petal phytoplasma</p>	<p>Examine for diagnostic symptoms on flowering mother plants</p>	
<p>Fungus diseases: Red core (<i>Phytophthora fragariae</i>) Crown rot (<i>Phytophthora cactorum</i>) Strawberry blackspot (<i>Colletotrichum acutatum</i>)</p>	<p>Root tip bait test with Alpine strawberry or <i>F. vesca</i> Clone VSI or used in combination with PCR testing of bait plants and water. Petiole float test or PCR direct on crowns and petioles. Incubation of petiole bases after treatment with paraquat</p>	<p>Plating on selective media Alternatives as in EPPO diagnostic protocol PM 7/25(1)</p>
<p>Leaf nematodes: <i>Ditylenchus dipsaci</i> <i>Aphelenchoides fragariae</i> <i>A. ritzemabosi</i></p>	<p>Baerman's technique on leaves and buds from crowns</p>	

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ANNEX 1B

NS

Material originating in the EC

Pest or disease	Preferred test method and indicator plant	Other acceptable test methods or indicator plant
Bacterial diseases: <i>Xanthomonas fragariae</i>	Real time PCR (Weller S.A. et al Detection of <i>Xanthomonas fragariae</i> and presumptive detection of <i>Xanthomonas arboricola</i> pv. <i>fragariae</i> , from strawberry leaves, by real time PCR. Journal of microbiological methods 70 (2007) p.379-383)	EPPO accredited testing protocol PM 7/65(1)

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ANNEX 2

NS

Material originating outside the EC

Pest or disease	Preferred test method and indicator plant	Other acceptable test methods or indicator plant
All those listed in Annex 1 plus those specified below		
Aphid – borne viruses: Pseudo mild yellow edge carlavirus Strawberry latent C	Leaf graft onto indicator UC6 Leaf graft onto indicator UC5	UC12, Alpine strawberry EMC
Nematode – borne viruses: Tomato black ring nepovirus	Sap inoculation onto <i>Chenopodium quinoa</i>	UC5, Alpine strawberry
Leafhopper – borne agents: Aster yellows Lethal decline Mycoplasma yellows Rickettsia yellows	Visual examination of mother plants for diagnostic symptoms	
Vector unknown: Chlorotic fleck Leafroll Witches broom Multiplier plant Feather leaf Pallidosis Tobacco streak	Leaf graft onto EMB, EMC, EMK, UC11 Leaf graft onto UC5 Leaf graft onto UC4 Diagnostic symptoms in mother plants Leaf graft onto UC4, Alpine strawberry Leaf graft onto UC11, UC10 Leaf graft onto UC4	Diagnostic symptoms UC5, symptoms UC1, Diagnostic symptoms in mother plants Alpine strawberry Sap inoculation onto <i>Chenopodium quinoa</i>

Abbreviations for strawberry indicators:

- Numbers 1-10 are clones of *Fragaria vesca*, University of California
- Numbers 11-12 are clones of *Fragaria virginiana*, University of California
- Alpine strawberry means *Fragaria vesca* var *semperflorens* cg. cv. Baron Solemacher
- EMC, EMB, EMK are clones of *Fragaria vesca* from HRI East Malling