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54

Method for treating pests and/or infections.

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The present invention relates to a method for treating a pest and/or infection in an affected subject, comprising exposing the affected subject to infrared radiation. The source of the infrared radiation comprises in particular a carbon crystal heating element, which can be applied to and/or positioned in the vicinity of an affected subject. In particular, the present invention provides a method for treating infections in a tree, such as bleeding canker in horse chestnut trees and/or canker in kiwifruit trees. The invention further relates to the use of a carbon crystal heating element for treating a pest and/or infection in an affected subject.

METHOD FOR TREATING PESTS AND/OR INFECTIONS

The present invention relates to the treatment of pests and/or infections, and in particular to pests and/or infections in affected trees.

5 Many trees suffer from pests and/or infections from which they ultimately die. This is a major burden on the organisations and authorities responsible for the maintenance of parks and public plantations, on (professional) horticulturists, as well as on individuals keeping trees in their gardens and backyards, as the dead trees need to be cut down, removed and replaced with new trees. Yields of fruit trees can be completely lost.

10 An example of an infection is for instance the infection of horse chestnut trees and/or kiwifruit trees by the bacterial pathogen, *Pseudomonas syringae* respectively *Pseudomonas syringae* *pv actinidiae*. This pathogen infects the bark around the trunk and main branches of the tree, and leads to the disease named canker (bleeding canker in horse chestnut trees).

15 At the site of infection the tissue dies and the bark peels away. This allows a sticky, blood coloured liquid to ooze from blemishes on the bark of infected trunks, leaving rust spots behind when it dries up. The oozing liquid is clear yellow at first, then becomes dark, blood coloured and sticky, and runs down the trunk. Eventually the tree dies.

20 Chances of survival of an affected tree are slim: no full recovery has ever been reported. Normally, it takes between 1 to 3 years from the appearance of the first symptoms until the tree dies. However, sometimes an affected tree dies within a very short period of time such as a couple of months.

25 It is not possible to identify (bleeding) canker in an early stage, as the infection occurs underneath the bark. The rust spots that appear on the bark of the tree are initially too small to be identified. These are only noticed when they gradually become larger and start bleeding. In addition, no other symptoms have been specifically correlated with the disease. The yellowing or browning of leaves, dying twigs, and/or drying of fruits are all symptoms that may also have a different cause. It is therefore that most trees are already infected and sick before showing any visual symptoms.

30 The bacterial pathogen *Pseudomonas syringae* multiplies in the cadmium tissue of the bark, resulting in the degradation of the bark and subsequent bleeding. Laboratory tests have shown that the multiplication of the bacteria can be inhibited by exposing the bacteria to a temperature of at least 39°C. This indicates that (bleeding) canker may be treated by exposing the bacteria in the bark of infected trees to temperatures of at least 39°C.

35 One way to use heat treatment for reducing or eliminating bacterial growth is by arranging a garden hose around the trunk or branches of the tree at the site of infection and passing hot water through the hose. The hose-wrapped trunk and/or branches of the tree need to be covered with

insulation material in order to avoid heat loss as good as possible. It has been demonstrated that bark samples of affected horse chestnut trees contained *Pseudomonas syringae* before such heat treatment and no longer contained *Pseudomonas syringae* after such heat treatment.

The above described method is however not very practical and for some trees not even possible. In order to heat the bark of a tree, more than 250 up to 1.000 meters of hose would be required. Water cools down every meter. It is therefore not feasible to heat the entire bark to 39 °C. Especially not since this method greatly depends on the temperature of the groundwater used and the outside air temperature. A major complication is that the temperature of the groundwater and outside temperature vary a lot during night and day. Also, this water hose method takes a very long time (up to 72 hours).

It is therefore an object of the present invention to provide a practical method for treating a pest and/or infection in an affected subject, such as for example treating bleeding canker in an affected horse chestnut tree and/or treating canker in an affected kiwifruit tree.

In one aspect, the present invention relates to a method for treating a pest and/or infection in an affected subject, comprising exposing the affected subject to infrared radiation.

The energy or generated heat of infrared radiation is absorbed by the affected subject and heats up its wood. This heat reduces or eliminates the pest and/or infection by killing the bacteria, fungi, and/or parasites which cause the pest and/or infection.

In one embodiment, the affected subject is exposed to infrared radiation by applying a source of infrared radiation to the affected subject, preferably at the site of infection, and/or by positioning the source of the infrared radiation in the vicinity of the affected subject. The source of the infrared radiation can be applied to, and/or positioned in the vicinity of, the affected subject in any suitable manner. A few examples are given in Figures 1-5. For instance, the source of the infrared radiation may be wrapped around part(s) of the affected subject, and/or positioned in the vicinity of the affected subject, such as for instance in front of and/or behind and/or on the sides and/or above part(s) of, or the entire, affected subject. It may also be positioned to cover the entire affected subject. The inventors have found that a carbon crystal electric heating element is particularly useful as the source of infrared radiation. Carbon crystal electric heating is a technology used in the heating of buildings, such as for instance in floor and wall heating systems. It produces far infrared radiation that does not heat the air but heats the object. It heats up in a couple of seconds and distributes the heat evenly. It is therefore very suitable for evenly heating, for instance, the trunk and/or branches of a tree.

The carbon crystal electric heating element may be composed of a foil comprising carbon crystals. "Brownian motion" is initiated by providing an electric current, wherein the friction and impact of the carbon molecules generate heat and infrared radiation. The conversion rate obtained

by converting electricity into infrared radiation can be as high as 96%, making it a very efficient way of heating.

Accordingly, in a preferred embodiment the source of the infrared radiation comprises a carbon crystal electric heating element.

5 The carbon crystal electric heating element needs to be set at a temperature sufficient to heat up the affected subject to the temperature at which the bacteria, fungi, and/or parasites are killed. For example, when the temperature of a tree needs to reach about 39°C, the carbon crystal electric heating element needs to be set at about 60-70°C. A carbon crystal electric heating element can, however, be set in the range of 0-140°C, depending on its application.

10 It may take some time before the tree has reached the desired temperature. For example, it takes about 180 minutes for a tree to reach about 39°C when a carbon crystal electric heating element is set at about 60-70°C. The time and temperature settings can easily be adapted to the circumstances, such as for instance to the type of bacteria, fungi, and/or parasites that needs to be killed and the outdoor conditions.

15 The carbon crystal electric heating element needs to be applied to the affected subject for a period sufficient to kill all, or nearly all, bacteria, fungi, and/or parasites.

In a preferred embodiment, the method further comprises monitoring and/or regulating the temperature of the affected subject with a temperature sensor. The temperature sensor may be applied into a hole created in the wood of the affected subject. Preferably, the temperature sensor is
20 coupled to the source of the infrared radiation. When coupled, the source of the infrared radiation may be switched off when the temperature of the tree reaches the desired temperature and/or a temperature which is considered harmful to the tree. Also, the temperature of the tree can be hold at a set temperature for a longer period of time, by reducing the current applied to the carbon crystal electric heating element. The source of infrared radiation may be turned back on when the
25 temperature of the affected subject drops below the desired temperature.

The method of the present invention can be used for all types of pests and/or infections of a variety of subjects, as long as the temperature of the affected subject reaches the temperature at which the bacteria, fungi, and/or parasites are killed. The temperatures at which bacteria, fungi, parasites, etc are killed are well known. For example, the temperature required for killing
30 *Pseudomonas syringae* and/or *Pseudomonas syringae* pv *actinidiae* is 39 °C.

In one embodiment, the pest is caused by an organism selected from the group consisting of *Synanthedon myopaeformis*, *Tuta absoluta*, *Ardis brunniventris*, *Parthenolecanium cornii*, *Thaumetopoea proccessionea*, *Lygocoris pabulinus*, *Archips rosana*, *Stephanitis*, *Argyresthia trifasciata*, *Cameraria ohridella*, *Resseliella oculiperda*, *Agrilus sinuatus*, *Saperda carcharias*,
35 *Stigmella pupulnea*, *Oligonychus unuguis*, *Cryptorrhynchus laphatii*, *Cossus cossus*, *Xestobium rufovillosum*, *Cerambycidae*, sapwood beetle, *Scolitus multistriatus*, *Anoplophora chinensis*, and

Elatobium abietinum.

In one embodiment, the infection is an infection caused by bacteria, fungi, and/or parasites. The bacteria may be bacteria selected from the group consisting of *Pseudomonas*, in particular *Pseudomonas syringae*, *Pseudomonas syringae* pv *actinidiae* and *Pseudomonas syringae* subsp *savastonii*, *Xanthomonas*, *Erwinia*, in particular *Erwinia amylovora*, *Erwinia carotovora* sub.sp *Atroseptica*, *Erwinia carotovora* sub.sp *carotovora* a., *Xanthomonas* in particular *Xanthomonas arboricola* pv *pruni*, *Vaccinium corymbosum*, and *Xylella*, in particular *Xylella fastidiosa* Tobacco Ringspot Virus,. The fungi, which include yeast, may be selected from the group consisting of *Verticillium dahlia*, *Phytophthora* in particular *Phytophthora ramorum* and *Phytophthora cactorum*, *Ceratocystis fimbriata*, *Cylindrocarpon mali*, *Chalaropsis thielavioides*, *Chalara fraxinea*, *Fusarium foetens*, *Splanchnonema platani*, *Phytophthora ramorum*, *Guignardia aesculi*, *Gnomonia leptostyla* or *marssonina*, *Cylindrocladium buxicola*, *Hymenoscyphus pseudoalbidus*, *Taphrina betulina*, *Splanchnonema platani*, *Nectria cinnabarina*, *Gymnosporangium clavariiforme*, *Venturaria inaequalis*, *Venturia*, *Didymascella thuja*, *Kabatina juniperi* or *Didymascella thujae*, *Nectria galligena*, *Ascomycetes*, and *Fusarium oxysporum*. The parasites may be woodworm.

In one embodiment, the affected subject is a tree, in particular a tree of a species selected from the group consisting of *Aesculus*, in particular *Aesculus hippocastanum*, *Actinidia*, in particular *Actinidia chinensis* and *Actinidia Deliciosa*, *Picea sitchensis*, *Picea pungens*, *Dilleniaceae*, *Sanryoku*, *Prunus*, *Pyrus* and *Pyrus communis*, *Citrus*, *Malus*, *Catalpa bignonioides*, *Magnolia*, *Oleaceae Quercus robur*, *Platanus x hispanica*, *Ailanthus altissima*, *Ailanthus altissima*, *Carpinus betulus*, *Salix alba*, *Ulmus x hollandica*, *Quercus robur*, *Styphnolobium japonicum*, *Pterocarya fraxinifolia*, *Tilia x europaea*, *Castanea sativa*, *Ginkgo biloba*, *Salix alba*, *Betula pendula*, *Acer pseudoplatanus 'Leopoldii'*, *Fagus sylvatica 'Atropunicea'*, *Platanus orientalis*, *Alnus cordata*, *Populus x Canadensis*, *Fagus sylvatica*, *Pyrus communis*, *Prunus serrulata*, *Alnus glutinosa*, *Juglans regia*, *Taxodium ascendens*, *Tilia tomentosa*, *Liriodendron tulipifera*, *Quercus rubra*, *Sequoiadendron giganteum*, *Castanea sativa*, *Acer pseudoplatanus*, *Picea pungens*, *Quercus robur*, *Fraxinus excelsior*, *Vitis vinifera*, *Pyrus communis*, *Populus nigra*, *rataegus laevigata*, *Fagus sylvatica*, *deliciosa*, *Vaccinium*, *Ficus*, *Prunus*, *Malus domestica*, *Pyrus communis*, *Fagaceae*, *Rosaceae*, *Oleaceae*, *Malus* and *Castanea*

The method of the present invention may also be used in applications other than the treatment of trees, such as for instance the treatment of with woodworm infected furniture. All applications wherein the killing of bacteria, fungi, and/or parasites is desired will benefit from the present invention.

FIGURES

Figure 1 is an illustration showing how a carbon crystal heating element can be wrapped around a tree horizontally.

5 Figure 2 is an illustration showing how a carbon crystal heating element can be wrapped around a tree vertically.

Figure 3 is an illustration showing how a carbon crystal heating element can be used as a surface covering an area with one or more trees.

10 Figure 4 is an illustration how a carbon crystal heating element can be wrapped horizontally around multiple trees.

Figure 5 is an illustration how a full tree is covered with a high shield of carbon crystal heating element.

Figure 6A is a graph showing the temperature of the tree as measured by a sensor placed in the bark of the tree.

15 Figure 6B is a table showing the presence of *Pseudomonas syringae* in a tree after treatment with a carbon crystal heating element.

0 = not detected

1 = very slightly present

2 = slightly present

20 3 = very moderately present

4 = moderately present

5 = strongly present

6 = very strongly present

25 EXAMPLE

1-3.5 m long stretches of carbon crystal electric heating material were covered with a fabric provided with insulation materials on the outer side. These stretches were applied both horizontally and vertically to the trunk of a horse chestnut tree. The stretches were applied such
30 that they covered the trunk and/or some bigger branches.

A 220V electric current was applied. The carbon crystal electric heating material was heated to approximately 60-67 °C. Figure 6A shows the temperature of the tree from the start until the end of the treatment.

35 After approximately 180 minutes, the bark of the tree reached 40 °C as measured by the sensors applied into small holes prepared in the bark before applying the carbon crystal electric heating material.

Samples of the bark were taken before (monster I) and after (monster II) treatment and analysed. The results in Figure 6B indicate that *Pseudomonas syringae* was very strongly present in the sample taken before the treatment, whereas *Pseudomonas syringae* was only very slightly present in the sample taken after the treatment. These results may indicate that *Pseudomonas*
5 *syringae* is still slightly present after the treatment, however, this may also be due to the presence of remaining DNA and not to the actual presence of live bacteria.

CONCLUSIES

1. Werkwijze voor het behandelen van een pest en/of infectie in een aangetast onderwerp, omvattende het blootstellen van het aangetaste onderwerp aan infraroodstraling, waarbij de bron van infraroodstraling een carbon crystal elektrisch verwarmingselement omvat.
2. Werkwijze volgens conclusie 1, waarbij de bron van infraroodstraling wordt aangebracht op, en/of geplaatst in de nabijheid van, het aangetaste onderwerp.
3. Werkwijze volgens conclusie 1 of 2, waarbij de bron van infraroodstraling wordt ingesteld op een temperatuur voldoende om bacteriële, schimmel, en/of parasitische groei te reduceren of elimineren.
4. Werkwijze volgens een der conclusies 1-3, waarbij de werkwijze verder het monitoren en/of reguleren van de temperatuur van het aangetaste voorwerp met een temperatuursensor omvat.
5. Werkwijze volgens een der conclusies 1-4, waarbij het aangetaste voorwerp een boom is.
6. Werkwijze volgens conclusie 5, waarbij de boom een boom van het geslacht *Aesculus*, in het bijzonder een boom van de soort *Aesculus hippocastanum*, en/of een boom van het geslacht *Actinidia*, in het bijzonder een boom van de soort *Actinidia chinensis* en/of *Actinidia deliciosa*, is.
7. Werkwijze volgens een der conclusies 1-6, waarbij de infectie is veroorzaakt door *Pseudomonas syringae* en/of *Pseudomonas syringae pv actinidiae*.
8. Werkwijze volgens een der conclusies 2-7, waarbij de temperatuur van de bron is ingesteld op een temperatuur tussen 50-80°C, en bij voorkeur tussen 60-70°C.
9. Gebruik van een carbon crystal elektrisch verwarmingselement als bron van infraroodstraling voor het behandelen van een pest en/of infectie in een aangetast onderwerp.
10. Gebruik volgens conclusie 9, waarbij de infectie een *Pseudomonas syringae* infectie van een boom van het geslacht *Aesculus*, in het bijzonder een boom van de soort *Aesculus hippocastanum*, en/of een boom van het geslacht *Actinidia*, in het bijzonder een boom van de soort *Actinidia chinensis* en/of *Actinidia deliciosa*, is.

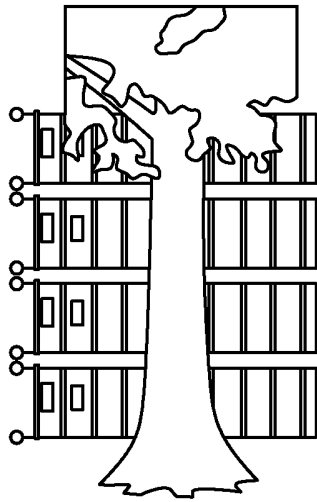


FIG. 1

1/2

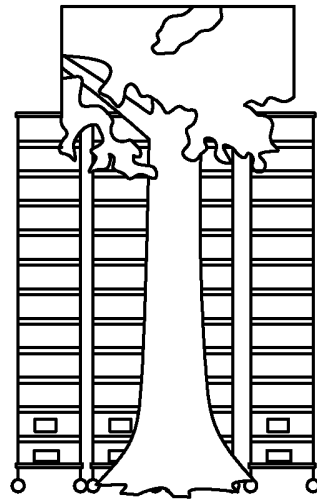


FIG. 2

FIG. 3

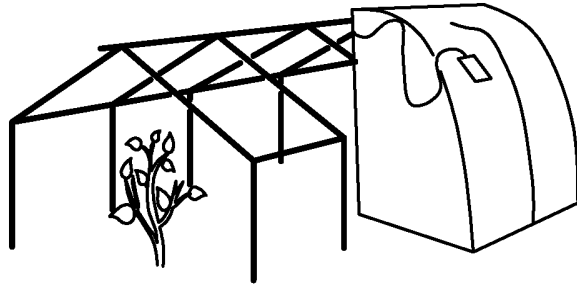


FIG. 4

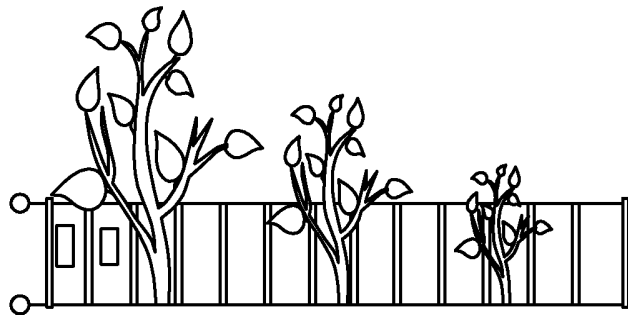
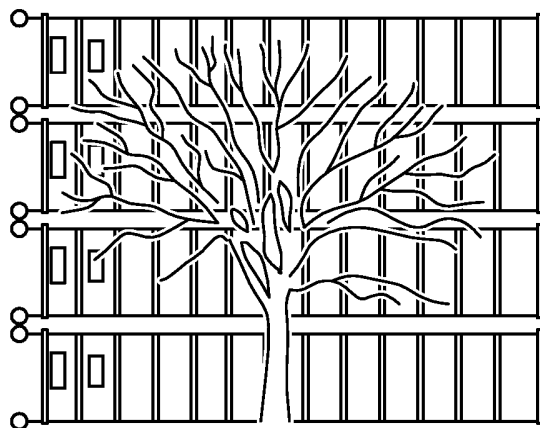


FIG. 5



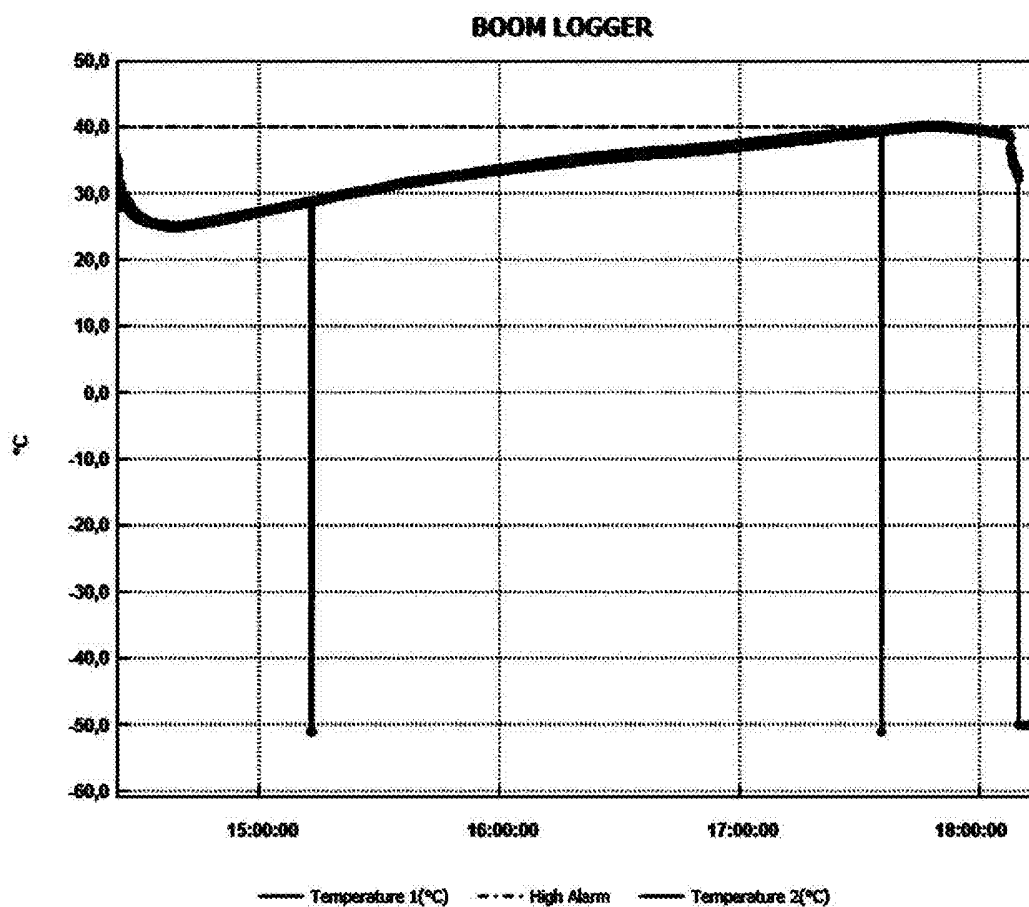


FIG. 6A

#	I	BACTERIE	
0	0	<i>Agrobacterium tumefaciens</i>	1
0	0	<i>A. tumefaciens</i> Ti-plasmid	2
0	0	<i>Clavibacter michiganensis</i> sp.	3
0	0	<i>Erwinia amylovora</i>	4
0	0	<i>Erwinia carotovora</i> sub.sp <i>atroseptica</i>	5
0	0	<i>Erwinia carotovora</i> sub.sp <i>carotovora</i>	6
0	0	<i>Erwinia chrysanthemi</i>	7
0	0	<i>Pseudomonas cichorii</i>	8
0	0	<i>Pseudomonas fluorescens</i>	9
0	0	<i>Pseudomonas marginalis</i>	10
1	0	<i>Pseudomonas syringae</i>	11
0	0	<i>Pseudomonas syringae</i> pv. <i>porri</i>	12
0	0	<i>Pseudomonas viridiflava</i>	13
0	0	<i>Ralstonia solanacearum</i>	14
0	0	<i>Xanthomonas fragariae</i>	15

FIG. 6B

ABSTRACT

5 The present invention relates to a method for treating a pest and/or infection in an affected subject, comprising exposing the affected subject to infrared radiation. The source of the infrared radiation comprises in particular a carbon crystal heating element, which can be applied to and/or positioned in the vicinity of an affected subject. In particular, the present invention provides a method for treating infections in a tree, such as bleeding canker in horse chestnut trees and/or canker in kiwifruit trees. The invention further relates to the use of a carbon crystal heating element for treating a pest and/or infection in an affected subject.

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE		KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE	
		4K/2SB41/TN/1	
Nederlands aanvraag nr.		Indieningsdatum	
2015316		18-08-2015	
		Ingeroepen voorrangsdatum	
Aanvrager (Naam)			
Rede Investments B.V.			
Datum van het verzoek voor een onderzoek van internationaal type		Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr.	
02-02-2016		SN65544	
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)			
Volgens de internationale classificatie (IPC)			
A01G7/06			
II. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK			
Onderzochte minimumdocumentatie			
Classificatiesysteem		Classificatiesymbolen	
IPC		A01G	
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen			
III.	☐	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)	
IV.	☐	GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)	

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2015316

A. CLASSIFICATIE VAN HET ONDERWERP
INV. A0167/06
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)

A01G

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)

EPO-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	WO 2014/001476 A2 (UNIV WAGENINGEN [NL]; STICHTING DIENST LANDBOUWKUNDI [NL]) 3 januari 2014 (2014-01-03) * het gehele document *	1-12
A	WO 2006/021225 A1 (POLLINGER HARTWIG [IT]) 2 maart 2006 (2006-03-02) * het gehele document *	1-12
A	JP 2013 230122 A (UNIV SHIMANE) 14 november 2013 (2013-11-14) * het gehele document *	1-12
A	WO 2010/066733 A1 (ISOTTON ADRIANO [IT]; PASQUALOTTO CRISTIAN [IT]) 17 juni 2010 (2010-06-17) * het gehele document *	1-12
	-/--	



Verdere documenten worden vermeld in het vervolg van vak C.



Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

* Speciale categorieën van aangehaalde documenten

"A" niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

"D" in de octrooiaanvraag vermeld

"E" eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

"L" om andere redenen vermelde literatuur

"O" niet-schriftelijke stand van de techniek

"P" tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

"T" na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwaarlijk is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

"X" de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

"Y" de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

"Z" lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

25 mei 2016

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

De bevoegde ambtenaar

Balzar, Maarten

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2015316

C. (Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie *	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	US 2012/210637 A1 (KAMAHARA MASATAKA [JP]) 23 augustus 2012 (2012-08-23) * samenvatting * * alinea [0036] * * alinea [0046] * * alinea [0500] * * alinea [0740] * * alinea [0453] * * alinea [0940] * * alinea [1352] - alinea [1354] * -----	1-12

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2015316

In het rapport genoemd octrooigescrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie	
WO 2014001476	A2	03-01-2014	EP 2866550 A2	06-05-2015
			WO 2014001476 A2	03-01-2014
WO 2006021225	A1	02-03-2006	WO 2006021225 A1	02-03-2006
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			EP 2457435 A1	30-05-2012
			JP 5351352 B2	27-11-2013
			JP 2013150636 A	08-08-2013
			US 2012210637 A1	23-08-2012
			WO 2011010444 A1	27-01-2011

WRITTEN OPINION

File No. SN65544	Filing date (day/month/year) 18.08.2015	Priority date (day/month/year)	Application No. NL2015316
International Patent Classification (IPC) INV. A01G7/06			
Applicant Rede Investments B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner Balzar, Maarten
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WRITTEN OPINION

Application number
NL2015316

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	4, 5, 9, 11
	No: Claims	1-3, 6-8, 10, 12
Inventive step	Yes: Claims	
	No: Claims	1-12
Industrial applicability	Yes: Claims	1-12
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:

D1 WO 2014/001476 A2 (UNIV WAGENINGEN [NL]; STICHTING DIENST LANDBOUWKUNDI [NL]) 3 januari 2014 (2014-01-03)

- 1 The present application does not meet the criteria of patentability, because the subject-matter of claims 1-3, 6-8, 10 and 12 is not new.
- 1.1 Document D1 discloses a "werkwijze voor het behandelen van een pest en/of infectie in een aangetast onderwerp, omvattende het blootstellen van het aangetaste onderwerp aan infraroodstraling" (abstract, note "The present invention provides methods and apparatus for controlling or stopping bacterial infections in trees by heat-treatment ..."; page 3, lines 5-9, note "The heat source may be lamps (e.g. infra-red lamps), ..."). Therefore, the subject-matter of independent claim 1 is not new.
- 1.2 Document D1 further discloses that
- # "een bron van infraroodstraling wordt aangebracht op, en/of geplaatst in de nabijheid van, het aangetaste onderwerp" (page 3, lines 13-16). (claim 2)
 - # "de bron van infraroodstraling wordt ingesteld op een temperatuur voldoende om bacteriële, schimmel, en/of parasitische groei te reduceren of elimineren" (page 15, line 4 - page 16, line 5). (claim 3)
 - # "het aangetaste voorwerp een boom is" (abstract, note "The present invention provides methods and apparatus for controlling or stopping bacterial infections in trees by heat-treatment ..."). (claim 6)
 - # "de boom een boom van het geslacht *Aesculus*, in het bijzonder een boom van de soort *Aesculus hippocastanum*, en/of een boom van het geslacht *Actinidia*, in het bijzonder een boom van de soort *Actinidia chinensis* en/of *Actinidia deliciosa*, is" (page 3, line 21 - page 4, line 6). (claim 7)

"de infectie is veroorzaakt door *Pseudomonas syringae* en/of *Pseudomonas syringae pvactinidiae*" (page 3, line 21 - page 4, line 6). (claim 8)

Therefore, the subject-matter of dependent claims 2, 3 and 6-8 is not new.

- 1.3 The same reasoning (see above point 1.1) applies, mutatis mutandis, to the subject-matter of the corresponding independent claim 10, which therefore is considered not new.
- 1.4 The same reasoning (see above point 1.2) applies, mutatis mutandis, to the subject-matter of the corresponding dependent claim 12, which therefore is also considered not new.
- 2 The present application does not meet the criteria of patentability, because the subject-matter of claims 4, 5, 9 and 11 does not involve an inventive step.
 - 2.1 The additional feature of claim 4 ("waarbij de bron van infraroodstraling een carbon crystal elektrisch verwarmingselement omvat") is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to obtain the to-be-expected advantages. Therefore, the subject-matter of claim 4 does not involve an inventive step.
 - 2.2 Concerning claim 5, document D1 discloses "Temperature sensors may be used ... to achieve substantially uniform temperatures ..." (page 3, lines 19-20). The additional feature of claim 5 is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to obtain the to-be-expected advantages. Therefore, the subject-matter of claim 5 does not involve an inventive step.
 - 2.3 The additional feature of claim 9 is merely one of several straightforward possibilities from which the skilled person would select, in accordance with circumstances, without the exercise of inventive skill, in order to obtain the to-

be-expected advantages. Therefore, the subject-matter of claim 9 does not involve an inventive step.

- 2.4 The same reasoning (see above point 2.1) applies, *mutatis mutandis*, to the subject-matter of the corresponding dependent claim 11, which therefore is considered not inventive.