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			(43) International Publication Date: 11 July 1996 (11.07.96)
(21) International Application Number: PCT/US95/07185 (22) International Filing Date: 7 June 1995 (07.06.95) (30) Priority Data: 08/366,490 30 December 1994 (30.12.94) US (60) Parent Application or Grant (63) Related by Continuation US 08/366,490 (CIP) Filed on 30 December 1994 (30.12.94) (71) Applicants (for all designated States except US): ASGROW SEED COMPANY [US/US]; 2605 East Kilgore Road, Kalamazoo, MI 49002 (US). CORNELL RESEARCH FOUNDATION, INC. [US/US]; 20 Thornwood Drive, Ithaca, NY 14850 (US). (72) Inventors; and (75) Inventors/Applicants (for US only): McMASTER, J., Russell [US/US]; 9432 Main Street, Galesburg, MI 49053 (US). BOESHORE, Maury, L. [US/US]; 8901 North 24th Street, Kalamazoo, MI 49004 (US). TRICOLI, David, M. [US/US]; 2332 S. Rose Street, Kalamazoo, MI 49001 (US). REYNOLDS, John, F. [US/US]; 14815 Trillium Drive, Au-			(74) Agent: LAWRENCE, S., Perry; Fitzpatrick, Cella, Harper & Scinto, 277 Park Avenue, New York, NY 10172 (US). (81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, ARIPO patent (KE, MW, SD, SZ, UG), European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 10 October 1996 (10.10.96)
(54) Title: PAPAYA RINGSPOT VIRUS NIa PROTEASE GENE			
(57) Abstract NIa protease genes of papaya ringspot virus strains FLA83 W and USA P-type (HA attenuated) strain are provided.			

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 95/07185

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C12N15/82 C12N9/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C12N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	J. GEN. VIROL., vol. 73, 1992, pages 2531-2541, XP002003356 S.-D. YEH ET AL.;: "Complete nucleotide sequence and genetic organisation of papaya ringspot virus RNA" cited in the application see abstract and Figure 2. ---	1-11, 23-26
Y	J. GEN. VIROL., vol. 75, 1994, pages 3547-3553, XP002003357 M.F. BATESON ET AL.;: "Papaya ringspot potyvirus: isolate variability and the origin of PRSV type P (Australia)" see abstract, introduction, Tables 1 and 2 and Figures 1 and 2. --- -/--	1-11, 23-26

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

20 May 1996

Date of mailing of the international search report

21.08.96

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INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 95/07185

C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	PROC. NATL. ACAD. SCI. USA, vol. 90, 1993, pages 6110-6114, XP002003358 I.B. MAITI ET AL.;; "Plants that express a potyvirus proteinase gene are resistant to virus infection" cited in the application see abstract and discussion. ---	1
A	US 5 162 601 A (THE UPJOHN COMPANY) 10 November 1992 see claims. ---	1,27
A	PHYTOPATHOLOGY, vol. 81, 1991, pages 722-728, XP002003359 C.A. BAKER ET AL.;; "Serological and biological variability among papaya ringspot virus type-W isolates in Florida" see abstract and discussion. -----	1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 95/07185

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

- 2 inventions See additional sheet PCT/ISA/210

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-11, 23-26 partially, and 27-30

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/210

(a) Claims 1-11, 23-26 partially and 27-30: a DNA molecule encoding the NIa protease of the FLA83 W-type strain of papaya ringspot virus (PRV), vectors, cells and plants containing the DNA and a method for preparing a PRV-resistant plant using the DNA;

(b) Claims 12-22, 23-26 partially and 31-34: a DNA molecule encoding the NIa protease of the USA P-type (HA attenuated) strain of papaya ringspot virus (PRV), vectors, cells and plants containing the DNA and a method for preparing a PRV-resistant plant using the DNA.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC: /US 95/07185

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-5162601	10-11-92	NONE	
