

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte A. GURURAJ RAO
and
NANDHA K. BALASUBRAMANIAM

Appeal No. 95-4520
Application 08/038,761¹

ON BRIEF

Before WINTERS and WILLIAM F. SMITH, Administrative Patent Judges, and
FRED E. MCKELVEY, Senior Administrative Patent Judge.

WILLIAM F. SMITH, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the final rejection of claims 1-20, all the claims in the application. Claims 1, 4, 8, 9, 12, 18, 19, and 20 are illustrative of the subject matter on appeal and read as follows:

¹ Application for patent filed March 24, 1993. According to appellants, this application is a continuation-in-part of Application 07/921,179, filed July 24, 1992.

1. A compound toxic to European corn borer and having the amino acid sequence of Bauhinia purpurea lectin except that one or more of the lysine residues is replaced by an amino acid selected from Ala, Arg, Asn, Gln, Gly, His, Ile, Leu, Met, Phe, Ser, Thr, Trp, Tyr, and Val.

4. A method according to Claim 3 wherein the diet of the larvae comprises the tissues of a living plant.

8. A DNA sequence which codes for a compound according to Claim 1.

9. An expression cassette comprising a DNA sequence according to Claim 8 operably linked to plant regulatory sequence which cause the expression of the DNA clone in plant cells.

12. Transformed plant cells containing as foreign DNA at least one copy of the DNA sequence of an expression cassette according to Claim 9.

18. A larvicidal composition, comprising a European corn borer larvicidal amount of a compound according to Claim 1 or a combination of such compounds in a non phytotoxic vehicle.

19. A method of killing or controlling European corn borer larvae in harvested plant material, comprising applying to the harvested material a composition according to claim 18.

20. A method of killing or controlling European corn borer larvae in harvested plant material, comprising incorporating into the harvested materials a compound according to Claim 1 or a combination thereof.

The references relied upon by the examiner are:

Kunkel, Thomas A., "Rapid and efficient site-specific mutagenesis without phenotypic selection," 82 Proc. Natl. Acad. Sci. USA, 488-492 (January 1985).

Pratt, Richard C., et al. (Pratt), "Isolation and Partial Characterization of a Seed Lectin from Tepany Bean that Delays Bruchid Beetle Development," 93 Plant Physiol., 1453-1459 (April 1990).

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Fromm, Michael E., et al. (Fromm), "Inheritance and Expression of Chimeric Genes In The Progeny Of Transgenic Maize Plants," 8 Bio/Technology, 833-839 (Sept. 1990)

Kusui, Kaoru et al. (Kusui), "cDNA Cloning and Expression of Bauhinia purpurea Lectin," 109 J. Biochem., 899-903 (1991).

Fischhoff, David A., et al. (Fischhoff), "Insect Tolerant Transgenic Tomato Plants," 5 Bio/Technology, 807-813.

The claims stand rejected as follows:

1. Claims 1 and 8 under 35 U.S.C. § 103 as unpatentable over Kusui taken with Kunkel and Pratt,
2. Claims 2-4 and 18-20 under 35 U.S.C. § 103 as unpatentable over Pratt taken with Kusui and Kunkel,
3. Claims 5, 7-9, 15 and 16 under 35 U.S.C. § 103 as unpatentable over Fischhoff taken with Kusui and Kunkel, and,
4. Claims 6, 13, 14 and 17 under 35 U.S.C. § 103 as unpatentable over Fischhoff taken with Kusui and Kunkel and Fromm. We reverse.

DISCUSSION

As explained at page 2, lines 5-21 of the specification:

The lectin from Bauhinia purpurea is a glycoprotein the cDNA-derived amino acid sequence of which indicates a polypeptide chain comprising 262 amino acids that include 7 lysine residues. See, e.g., "cDNA Cloning and Expression of Bauhinia purpurea Lectin." Kusui et al., J. Biochem. 109, 899-903 (1991). This lectin has been determined by Czapla et al. To have larvicidal activity against European corn borer, as disclosed in the copending, commonly assigned U.S. patent application "Larvicidal

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Lectins and Plant Insect Resistance Based Thereon, “ filed September 20, 1991, Serial No. 07/763,100 [now U.S. Patent 5,407,454]. One of us is also a coinventor of that application. Other insects show little susceptibility to this lectin, and acquired resistance to naturally occurring lectine is likely to exist. Thus, a continuing need is felt for new larvicidal proteins which are not found in nature, yet can easily be expressed in plant cells as a gene product of a single structural gene.

The present invention involves a *Bauhinia purpurea* lectin (BPL) in which one or more lysine residues has been replaced by an amino acid selected from those set forth in claim 1 on appeal. The claimed invention also involves a DNA sequence which codes for such a compound. See claim 8 on appeal. As seen from the other claims reproduced above, the claimed invention involves the use of the altered BPL and DNA sequences coding therefor.

Kusui describes the nucleotide sequence in deduced amino acid sequence of a cDNA clone coding for BPL. See Figure 4 of Kusui. The examiner does not allege that Kusui teaches or suggests altering either the protein or DNA sequence described therein in the manner required by the claims on appeal.

Kunkel describes a procedure called site-specific mutagenesis which is capable of producing a site-specific mutation within a DNA sequence. As explained in the last sentence of the abstract, this procedure can “potentially be used to examine the biological consequences of specific lesions placed at defined positions within a gene.” The

examiner does not allege that Kunkel teaches or suggests modifying a DNA sequence coding for BPL in any manner or for any purpose.

In setting forth the rejection of claims 1 and 8 on pages 3 and 4 of the Examiner's Answer, the examiner states "it would have been an obvious modification to alter the amino acid sequence derived from [the gene taught by Kusui] by site-directed mutagenesis, as taught by Kunkel, to substitute amino acid residues by a known method to produce a protein that has equivalent activity to the prior art protein."

However, the examiner has begun to explain how the applied prior art supports his conclusion that it would have been obvious "to produce a protein that has equivalent activity to the prior art protein." Neither Kusui or Kunkel teach or suggest modifying BPL in any manner whatsoever, let alone a manner in which the insecticidal activity of the protein is retained.

It appears to us that the examiner has viewed the prior art in light of appellants' disclosure of the present invention. The examiner has not relied upon any prior art that establishes that one of ordinary skill in the art would have reasonably expected prior to the present invention that modifying BPL in the manner required by claimed invention would have resulted in a protein retaining insecticidal activity. It is the prior art which must suggest this reasonable expectation of success, not appellants' success.

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The rejection of claims 1 and 8 on the basis of Kusui and Kunkel is key to the remaining rejections before us for consideration. None of the references relied upon by the examiner in the remaining rejections rectify the fundamental deficiency we have outlined above which exist in the examiner's first rejection. Accordingly, all rejections are reversed.

The decision of the examiner is reversed.

REVERSED

SHERMAN D. WINTERS)	
Administrative Patent Judge)	
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WILLIAM F. SMITH)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
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FRED E. McKELVEY, Senior)	
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