

Hawes Lab Publications:

2000

- Hawes, M. C., Gunatilaka, U., Miyasaka, S., and Zhao, X. 2000. The role of root border cells in plant defense. *Trends in Plant Sciences* 5: 128-133.
- Zhao, X., Misaghi, I. J., and Hawes M. C. 2000. Stimulation of border cell production in response to increased carbon dioxide levels. *Plant Physiol.* 122: 181-188.

1999

- Brigham LA, Michaels PJ, Flores HE 1999 Cell-specific production and antimicrobial activity of naphthoquinones in roots of *Lithospermum erythrorhizon*. *Plant Physiol.* 119: 417-428.
- Wen, F., Zhu, Y., and Hawes, M. C. 1999. Effect of pectin methylesterase gene expression on pea root development. *Plant Cell* 11: 1129-1140.
- Woo, H. H., Orbach, M. J., Hirsch, A. M., and Hawes, M. C. 1999. Meristem localized inducible expression of an UDP-glycosyltransferase gene is essential for growth and development in pea and alfalfa. *Plant Cell* 11: 2303-2315.
- Woo HH, Brigham LA, and Hawes MC 1999 Detection of low-abundance messages by a combination of PCR and ribonuclease protection. In *Expression Genetics: Differential Display*, eds. AB Pardee, M McClelland pp.401-404. Eaton Publishing.

1998

- Brigham LA, Woo HH, Wen F., Hawes MC 1998 Meristem-specific suppression of mitosis and a global switch in gene expression in the root cap of pea (*Pisum sativum* L.) by endogenous signals. *Plant Physiol.* 118: 1223-1231.
- Hawes MC, Brigham LA, Wen F, Woo H-H, Zhu Y 1998 Function of root border cells in plant health: pioneers in the rhizosphere. *Annu. Rev. Phytopathol.* 36: 311-327.
- Woo HH, LA Brigham and MC Hawes, 1998, Detection of low abundance messages by a combination of PCR and ribonuclease protection, *Expression Genetics: Differential Display* (Ed. A. Pardee and M. McClelland), Ch.47, pp401-406. Eaton Publishing.

1997

- Brigham LA, Michaels PJ, Flores HE. 1997 The ability of the naphthoquinone shikonin to influence microorganisms in the rhizosphere of *Lithospermum erythrorhizon*. In *Radical Biology: Advances and Perspectives on the Function of Plant Roots*, ed. HE Flores, JP Lynch, D Eissenstat, pp. 451-453. Am. Soc. Plant Physiol.
- Flores HE, Brigham LA, Vivanco JM 1997 The future of radical biology? Connecting roots people, and scientists. In *Radical Biology: Advances and Perspectives on the Function of Plant Roots*, ed. HE Flores, JP Lynch, D Eissenstat, pp. 451-453. Am. Soc. Plant Physiol.
- Hawes MC, Brigham LA, Wen F, Woo H-H, Zhu Y. 1997 Root border cells: phenomenology in signal exchange. In *Radical Biology: Advances and Perspectives on the Function of Plant Roots*, ed. HE Flores, JP Lynch, D Eissenstat, pp. 451-453. Am. Soc. Plant Physiol.

Woo HH 1997. In-cell RT-PCR in a single, detached plant cell. *Plant Molecular Biology Manual*, Second edition, Section G, Supplement 2, Chapter G4 pp1-8, Kluwer academic publishers, Dordrecht.

Woo HH and Hawes MC 1997. Cloning of genes whose expression is correlated with mitosis and localized in dividing cells in root caps of *Pisum sativum* L. *Plant Molecular Biology*, 35: 1045-1051.

Woo HH and MC Hawes, 1997, Rapid mapping and subcloning of genomic clones in bacteriophage lambda by PCR. *BioTechniques*. 22 (5) 822-824.

Zhu, Y., Pierson III, L. S., Hawes, M. C. 1997. Induction of microbial genes for pathogenesis and symbiosis by chemicals from root border cells. *Plant Physiol*. 115: 1691-1698.

1996

Hawes MC, Brigham LA, Woo HH, Zhu Y, 1996 Regulation of root exudate production and release in legumes. *Proc. Ann. Mtg. Of the Am Soc. of Agronomy, Crop Sci. Soc. of Am., and Soil Sci. of Am.* (in press)

Hawes MC, Woo HH, Brigham LA 1996 Function of root border cells in plant-microbe interactions. *Adv. Mol. Genetics of Plant-Microbe Int.* Vol 4. (in press)

Niemira BA; Safir GR Hawes MC (1996) Arbuscular mycorrhizal colonization and border cell production: a possible correlation. *Phytopathol*. 86: 563-565.

1995

Brigham LA, Woo HH, Hawes MC 1995 Differential expression of proteins and mRNAs from border cells and root tips of *Pisum sativum* L. *Plant Physiol* 109:457-463

Brigham LA, Woo HH, Hawes MC 1995 Root border cells as tools in plant cell biology studies. *Methods in Cell Biology* 49:377-387

Nicoll SM, Brigham LA, Wen F, Hawes, MC 1995 Expression of transferred genes during hairy root development in pea. *Plant Cell, Tissue and Organ Culture* 42:57-66

Woo HH, Brigham LA, Hawes MC 1995 Detection and quantitation of low abundant messages by a combination of PCR and RNase protection assays. *BioTechniques* 18(5):778-779

Woo HH, Brigham LA, Hawes MC 1995 Molecular cloning and expression of mRNAs encoding H1 histone and an H1 histone-like sequences in root tips of pea. *Plant Molecular Biology* 28:1143-1147

Woo HH, Brigham LA, Hawes MC 1995 In-cell RT-PCR in a single, detached plant cell. *Plant Molecular Biology Reporter* 13:355-362

1994

Hawes MC, Brigham LA, Woo HH, Zhu Y 1994 Plant genes controlling rhizosphere ecology. *Molecular Ecology* (in press)

Stephenson M, Hawes MC 1994 Correlation of root border cell separation with pectinmethylesterase activity in root caps of pea. *Plant Physiol* 106: 739-745

Woo HH, Brigham LA, Pape M, Hawes MC 1994 Primary structure of the mRNA encoding a 16.5 kDa ubiquitin conjugating enzyme of *Pisum sativum*. *Gene* 148: 369-370

Zhu Y, Hawes MC 1994 Release of biologically active chemicals by root border cells. *Phytopathol* 84: 1153.

1993

Hawes MC, Brigham LA, Nicoll SM, Stephenson MB 1993 Plant genes controlling the release of root exudates. *Biotechnology and Plant Protection* 4: 1-10

1992

Hawes MC, Brigham LA 1992 Impact of root border cells on microbial populations in the rhizosphere. *Adv Plant Pathol* 8: 119-148

1991

Hawes MC, Smith LY, Stephenson M 1991 Root organogenesis from single cells released from the root cap of *Medicago* sp. *Plant Cell, Tissue and Organ Culture* 27: 303-308.

1990-

Hawes MC, Lin HJ 1990 Correlation of pectolytic enzyme activity with programmed release of cells from the root cap of pea. *Plant Physiol* 94: 1855-1859

Hawes MC 1990 Sloughed root cap cells: A regulator of microbial populations in the rhizosphere? *Plant Soil* 129: 19-27

1980-1989

Goldberg N, Hawes MC, Stanghellini M (1989) Specific attraction to and infection of cotton root cap cells by zoospores of *Pythium dissotocum*. *Can J Bot* 67: 1760-1767

Hawes MC, Robbs SL, Pueppke SG 1989 Use of a root tumorigenesis assay to detect genotypic variation in susceptibility of 34 cultivars of *Pisum sativum* to crown gall. *Plant Physiol* 90: 180-184

Hawes MC, Smith LY 1989 Requirement for chemotaxis in pathogenicity of *Agrobacterium tumefaciens* on roots of soil grown pea plants. *J Bacteriol* 171: 5668-5761

Hawes MC, Pueppke SG (1989) Variation in binding and virulence of *Agrobacterium tumefaciens* chromosomal virulence (chv) mutant bacteria on different plant species. *Plant Physiol.* 91:: 113-118

Hawes MC, Pueppke SG 1987 Correlation between binding of *Agrobacterium tumefaciens* by root cap cells and susceptibility of plants to crown gall. *Plant Cell Rep* 6: 287-290

Hawes MC, Pueppke SG 1986 Sloughed peripheral root cap cells: yield from different species and callus formation from single cells. *Am J Bot* 73: 1466-1473

Hawes MC, Wheeler HE 1982 Factors affecting victorin-induced cell death: temperature and plasmolysis. *Physiol Plant Pathol* 20: 137-144

Poster Presentations:

- Brigham LA, Hawes MC 1992 Characterization of proteins in root border cells. Proceedings, 6th Internatl Symposium on Molecular Plant Microbe Interactions.
- Brigham LA, Woo HH, Hawes MC 1994 Gene expression in root border cell development. Proceedings, 7th Internatl Symposium on Molecular Plant Microbe Interactions.
- Brigham LA, Woo HH, Hawes MC 1994a Implications for border cell specific gene expression in plant microbe interactions. *Phytopathol* 84: 1084
- Brigham LA, Nicoll SM, Woo HH, Hawes MC 1993 Isolation of cell specific cDNAs of a pea root border cell library. *Plant Physiol* 102: 151
- Zhu Y, Wen F and Hawes MC 1997. Function and genetic control of border cell separation from plant root. Proceedings of the 5th International Congress of Plant Molecular Biology.
- Zhu Y and Hawes MC 1996. Specific induction of nodulation genes by chemicals from root border cells. Proceedings of the 8th International Symposium on Molecular Plant-Microbe Interactions (ISMPMI).
- Zhu Y, Wen F and Hawes MC 1996. Expression of a unique pectinmethylesterase gene whose activity is synchronized with production of root border cells. Proceedings of the 8th International Symposium on Molecular Plant-Microbe Interactions (ISMPMI).
- Zhu Y and Hawes MC 1995. Release of biologically active chemicals by root border cells. Proceedings of the Symposium of Annual Phytopathology Society” (APS).

Thesis and Dissertation

- Brigham LA. 1996. Gene expression in root border cells. Ph. D. thesis, University of Arizona, Tucson AZ.
- Chen J. 1998. Border cell specific expression of an endogenous galactosidase in pea. M. S. Thesis, University of Arizona, Tucson AZ
- Zhao X. 1997. Regulation of border cell production by controlled atmosphere. M.S. thesis
- Zhu Y. 1999. Characterization of a root cap pectinmethylesterase and characterization of its impact on root development and root-microbe interactions. Ph.D. Thesis, University of Arizona, Tucson.

Search History

* #1 (Hawes-mc) in AU,CA (31 records)

Record 1 of 31 in AGRICOLA 1998-2000/09

AN: IND 22036171

UD: 200005

AU: Hawes,-M.C.; Gunawardena,-U.; Miyasaka,-S.; Zhao,-X.

TI: The role of root border cells in plant defense.

SO: Trends-plant-sci. Kidlington, Oxford : Elsevier Science, Ltd., c1996-. Mar 2000. v. 5 (3) p. 128-133.

FTXT: ScienceDirect (tm)

http://www.sciencedirect.com/science?_ob=GatewayURL&_origin=SilverLinker&_urlversion=4&_method=citationSearch&_volkey=1360%2d1385%235%23128%233&_version=1&md5=968a8a27311a8515dad c04e92dca53b2

CN: DNAL QK1.T74

PA: Foreign

PY: 2000

LA: English.

CP: England; UK

IS: ISSN: 1360-1385

NT: Includes references.

PT: Article

SF: IND

DE: plant-physiology. plant-diseases. plant-pests. defense-mechanisms. root -tips. root-caps. signals-. plant-morphology. plant-anatomy. ultrastructure-.

CC: F600; F400

XAU: University of Arizona, Tucson, AZ.

Record 2 of 31 in AGRICOLA 1998-2000/09

AN: IND 22020859

UD: 200003

AU: Wen,-F.; Zhu,-Y.; Hawes,-M.C.

TI: Effect of pectin methylesterase gene expression on pea root development.

SO: Plant-cell. [Rockville, MD : American Society of Plant Physiologists, c1989 -. June 1999. v. 11 (6) p. 1129-1140.

FTXT: HighWire <http://www.plantcell.org/cgi/content/full/11/6/1129>

CN: DNAL QK725.P532

PA: Other-US

PY: 1999

LA: English

CP: Maryland; USA

CO: PLCEEW

IS: ISSN: 1040-4651

NT: Includes references.

PT: Article

SF: IND

ID: pisum-sativum. pectinesterase-. genes-. complementary-dna. nucleotide -sequences. amino-acid-sequences. gene-expression. messenger-rna. root -caps. plant-development. reporter-genes. transgenic-plants. beta -glucuronidase-. histoenzymology-. genetic-transformation. agrobacterium -rhizogenes. antisense-rna. genetic-regulation. inhibition-. roots-. growth-. ph-. molecular-sequence-data. genbank/af056493-. repme1-gene. border-cells. hairy-roots.

CC: F200; F600

AB: Expression of an inducible gene with sequences common to genes encoding pectin methylesterase (PME) was found to be tightly correlated, both spatially and temporally, with border cell separation in pea root caps. Partial inhibition of the gene's expression by antisense mRNA in transgenic pea hairy roots prevented the normal separation of root border cells from the root tip into the external environment. This phenotype was correlated with an increase in extracellular pH, reduced root elongation, and altered cellular morphology. The translation product of the gene exhibited PME activity in vitro. These results are consistent with the long-standing hypothesis that the demethylation of pectin by PME plays a key role in cell wall metabolism.

XAU: University of Arizona, Tucson.

Record 3 of 31 in AGRICOLA 1998-2000/09

AN: IND 22004382

UD: 199910

AU: Brigham,-L.A.; Woo,-H.H.; Wen,-F.; Hawes,-M.C.

TI: Meristem-specific suppression of mitosis and a global switch in gene expression in the root cap of pea by endogenous signals.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Dec 1998. v. 118 (4) p. 1223-1231.

FTXT: HighWire <http://www.plantphysiol.org/cgi/content/full/118/4/1223>

UR: Materials specified: Plant gene register URL: <http://www.opelia.com/pgr/> Access method: http

CN: DNAL 450-P692

PA: Other-US

PY: 1998

LA: English

CP: Maryland; USA

CO: PLPHAY

IS: ISSN: 0032-0889

NT: Includes references.

PT: Article

SF: IND

DE: pisum-sativum. root-caps. apical-meristems. mitosis-. regulation-. signals -. cell-growth. cell-differentiation. genetic-regulation. gene-expression. developmental-stages. plant-anatomy.

ID: border-cells.

CC: F400; F600; F200

AB: Two functionally distinct sets of meristematic cells exist within root tips of pea (*Pisum sativum*): the root apical meristem, which gives rise to the body of the root; and the root cap meristem, which gives rise to cells that differentiate progressively through the cap and separate ultimately from its periphery as border cells. When a specific number of border cells has accumulated on the root cap periphery, mitosis within the root cap meristem, but not the apical meristem, is suppressed. When border cells are removed by immersion of the root tip in water, a transient induction of mitosis in the root cap meristem can be detected starting within 5 min. A corresponding switch in gene expression throughout the root cap occurs in parallel with the increase in mitosis, and new border cells begin to separate from the root cap periphery within 1 h. The induction of renewed border cell production is inhibited by incubating root tips in extracellular material released from border cells. The results are consistent with the hypothesis that operation of the root cap meristem and consequent turnover of the root cap is self-regulated by a signal from border cells.

XAU: University of Arizona, Tucson, AZ.

Record 4 of 31 in AGRICOLA 1998-2000/09

AN: IND 21972685

UD: 199903

AU: Hawes,-M.C.; Brigham,-L.A.; Wen,-F.; Woo,-H.H.; Zhu,-Y.

TI: Function of root border cells in plant health: pioneers in the rhizosphere.

SO: Annu-rev-phytopathol. Palo Alto, Calif. : Annual Reviews, inc., 1963-. 1998. v. 36 p. 311-327.

CN: DNAL 464.8-An72
PA: Other-US
PY: 1998
LA: English
CP: California; USA
CO: APPYAG
IS: ISSN: 0066-4286
NT: Includes references.
PT: Article
SF: IND
DE: plants-. roots-. plant-tissues. cells-. root-exudates. rhizosphere-. soil -flora. growth-. inhibition-. microbial-flora. populations-. plant -pathogenic-fungi. genetic-engineering. ecology-. root-systems. root-caps. gene-expression. anthocyanins-. enzyme-activity. cell-wall-components. cytoplasm-. infection-. symbiosis-. literature-reviews.
CC: F600; F830; F200
XAU: University of Arizona, Tucson, AZ.

Record 5 of 31 in AGRICOLA 1998-2000/09

AN: IND 21638405
UD: 9810
AU: Woo,-H.H.; Hawes,-M.C.
TI: Cloning of genes whose expression is correlated with mitosis and localized in dividing cells in root caps of *Pisum sativum* L.
SO: Plant-mol-biol. Dordrecht : Kluwer Academic Publishers. Dec 1997. v. 35 (6) p. 1045-1051.
FTXT: Kluwer Academic Publishers <http://kapis.www.wkap.nl/oasis.htm/149325> EBSCO Online
<http://www.ebsco.com/online/direct.asp?ArticleID=1LHT6DU92N82J1101NQ> 0 InformationQuest
http://www.eiq.com/usr_login.html?sici=0167-4412%28000000%2935%3A6%3C1045%3AX%3E2.0.CO%3B2-X
CN: DNAL QK710.P62
PA: Foreign
PY: 1997
LA: English
CP: Netherlands
CO: PMBIDB
IS: ISSN: 0167-4412
NT: Includes references.
PT: Article
SF: IND
DE: pisum-sativum. structural-genes. glycoproteins-. plant-proteins. nucleotide -sequences. amino-acid-sequences. gene-expression. mitosis-. root-caps. messenger-rna. multigene-families. cell-differentiation.
ID: pshrgp1-gene. pscap23-gene. psrb41-gene. callus-protein-23. hydroxyproline -rich-glycoproteins. ribosomal-proteins. molecular-sequence-data. genbank/u78951-. genbank/147968-. genbank/147967-.
CC: F200; F600
AB: Removal of border cells from pea roots synchronizes and induces root cap cell division, wall biogenesis and differentiation. Three messages which are expressed differentially in such induced root caps have been cloned. Sequence analyses showed that the PsHRGP1-encoded protein has high homology with a hydroxyproline-rich glycoprotein. The PsCaP23-encoded protein has high homology with an alfalfa callus protein or translationally controlled human or mouse tumor protein P23. The PsRbL41 -encoded protein has high homology with a highly basic 60S ribosomal protein L41. In situ hybridization showed that PsHRGP1, PsCaP23 and PsRbL41 messages are localized within dividing cells of the root cap. PsHRGP1 is highly expressed in uninduced root caps, but its message is repressed by 10-11 times as soon as cell division and differentiation begin. Expression of PsHRGP1 recovers to higher than (180%) its initial level in 30 min. PsHRGP1 is root-specific. PsCaP23 and PsRbL41 messages increase ca. 3-fold within 15 min

after root cap induction. All three genes represent small families of 3-5 closely related genes in the pea genome.

XAU: University of California, Los Angeles, CA.

Record 6 of 31 in AGRICOLA 1998-2000/09

AN: IND 21237367

UD: 9808

AU: Zhu,-Y.; Pierson,-L.S.-III.; Hawes,-M.C.

TI: Induction of microbial genes for pathogenesis and symbiosis by chemicals from root border cells.

SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Dec 1997. v. 115 (4) p. 1691-1698.

UR: Materials specified: Plant gene register URL: <http://www.opelia.com/pgr/> Access method: http

CN: DNAL 450-P692

PA: Other-US

PY: 1997

LA: English

CP: Maryland; USA

CO: PLPHAY

IS: ISSN: 0032-0889

NT: Includes references.

PT: Article

SF: IND

DE: pisum-sativum. medicago-sativa. zea-mays. root-caps. gene-expression. induction-. temperature-. genes-. promoters-. agrobacterium-tumefaciens. pathogenesis-. rhizobium-leguminosarum. symbiosis-. rhizobium-meliloti. genetic-regulation. antibiotics-. biosynthesis-. pseudomonas-.

ID: vire-genes. nod-genes. pseudomonas-aureofaciens.

CC: F200; F833; F500

AB: Reporter strains of soil-borne bacteria were used to test the hypothesis that chemicals released by root border cells can influence the expression of bacterial genes required for the establishment of plant-microbe associations. Promoters from genes known to be activated by plant factors included *virE*, required for *Agrobacterium tumefaciens* pathogenesis, and common *nod* genes from *Rhizobium leguminosarum* bv *viciae* and *Rhizobium meliloti*, required for nodulation of pea (*Pisum sativum*) and alfalfa (*Medicago sativum*), respectively. Also included was *phzB*, an autoinducible gene encoding the biosynthesis of antibiotics by *Pseudomonas aureofaciens*. The *virE* and *nod* genes were activated to different degrees, depending on the source of border cells, whereas *phzB* activity remained unaffected. The homologous interaction between *R. leguminosarum* bv *viciae* and its host, pea, was examined in detail. *Nod* gene induction by border cells was dosage dependent and responsive to environmental signals. The highest levels of gene induction by pea (but not alfalfa) border cells occurred at low temperatures, when little or no bacterial growth was detected. Detached border cells cultured in distilled water exhibited increased *nod* gene induction (*ini*) in response to signals from *R. leguminosarum* bv *viciae*.

Record 7 of 31 in AGRICOLA 1992-1997

AN: IND 20594608

UD: 9710

AU: Niemira,-B.A.; Safir,-G.R.; Hawes,-M.C.

TI: Arbuscular mycorrhizal colonization and border cell production: a possible correlation.

SO: Phytopathology. St. Paul, Minn. : American Phytopathological Society, 1911 -. June 1996. v. 86 (6) p. 563-565.

CN: DNAL 464.8-P56

PA: Other-US

PY: 1996

LA: English

CP: Minnesota; USA

CO: PHYTAJ
IS: ISSN: 0031-949X
NT: Includes references.
PT: Article
SF: IND
DE: plant-nutrition. vesicular-arbuscular-mycorrhizas. symbiosis-. roots-. cell -growth. induction-. species-
. symbionts-. surveys-. checklists-
CC: F500; F600
XAU: Michigan State University, East Lansing, MI.

Record 8 of 31 in AGRICOLA 1992-1997

AN: IND 20564334
UD: 9705
AU: Brigham,-L.A.; Woo,-H.H.; Nicoll,-S.M.; Hawes,-M.C.
TI: Differential expression of proteins and mRNAs from border cells and root tips of pea.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Oct 1995. v. 109 (2)
p. 457-463.
CN: DNAL 450-P692
PA: Other-US
PY: 1995
LA: English
CP: Maryland; USA
CO: PLPHAY
IS: ISSN: 0032-0889
NT: Includes references.
PT: Article
SF: IND
DE: pisum-sativum. root-systems. cell-differentiation. cells-. root-caps. root -meristems. rhizosphere-
protein-analysis. protein-synthesis. plant -anatomy. messenger-rna. protein-secretion. cytochemistry-. plant
-composition. gene-expression.
CC: F600; F200
AB: Many plants release large numbers of metabolically active root border cells into the rhizosphere. We
have proposed that border cells, cells produced by the root cap meristem that separate from the rest of the
root upon reaching the periphery of the cap, are a singularly differentiated part of the root system that
modulates the environment of the plant root by producing specific substances to be released into the
rhizosphere. Proteins synthesized in border cells exhibit profiles that are very distinct from those of the root
tip (root cap, root meristem, and adjacent cells). In vivo-labeling experiments demonstrate that 13% of the
proteins that are abundant in preparations from border cells are undetectable in root tip preparations.
Twenty-five percent of the proteins synthesized by border cells in a 1-h period are rapidly excreted into the
incubation medium. Quantitative variation in levels of specific marker proteins, including glutamine
synthetase, heat-shock protein 70, and isoflavone reductase, also occurs between border cells and cells in
the root tip. mRNA differential-display assays demonstrate that these large qualitative and quantitative
differences in protein expression are correlated with similarly distinct patterns of gene expression. These
observations are consistent with the hypothesis that a major switch in gene expression accompanies
differentiation into root border cells, as expected for cells with specialized functions in plant development.
XAU: University of Arizona, Tucson, AZ.

Record 9 of 31 in AGRICOLA 1992-1997

AN: IND 20505988
UD: 9605
AU: Woo,-H.H.; Brigham,-L.A.; Hawes,-M.C.
TI: Molecular cloning and expression of mRNAs encoding H1 histone and an H1 histone-like sequences in
root tips of pea (*Pisum sativum* L.).

SO: Plant-mol-biol. Dordrecht : Kluwer Academic Publishers. Sept 1995. v. 28 (6) p. 1143-1147.
CN: DNAL QK710.P62
PA: Foreign
PY: 1995
LA: English
CP: Netherlands
CO: PMBIDB
IS: ISSN: 0167-4412
NT: Includes references.
PT: Article
SF: IND
DE: pisum-sativum. complementary-dna. histones-. nucleotide-sequences. amino -acid-sequences. gene-expression. messenger-rna. root-tips. multigene -families.
ID: molecular-sequences. genbank/140471-. genbank/134578-.
CC: F200
AB: Two cDNA clones representing mRNAs, highly expressed in pea root tips, were isolated by mRNA differential display. Ribonuclease protection analyses showed different patterns of expression of these two messages in several pea tissues. Sequence analysis showed that the first clone, PsH1b-40, has 100% homology with a previously isolated H1 histone cDNA, PsH1b. However, it has an additional 30 nt at the 3' end which is absent in PsH1b, suggesting possible multiple polyadenylation sites in the same mRNA. The second clone, PsH1b-41, encodes a deduced 19.5 kDa protein of 185 amino acids with an isoelectric point of 11.5. The putative globular domain of the encoded protein showed 67-71% residue identity with globular domains of 28 kDa pea PsH1b H1 histone and Arabidopsis thaliana H1-1 H1 histone. It has 9 repeating motifs of (T/S)XXK. In the C-terminal domain, there are four lysine-rich repeating motifs of SXX(T/S)PXXXXK which may be involved in chromatin condensation and decondensation. Southern blot analysis of nuclear DNA shows that PsH1-41 belongs to a multigene family.
XAU: University of Arizona, Tucson, AZ.

Record 10 of 31 in AGRICOLA 1992-1997

AN: IND 20503513
UD: 9604
AU: Woo,-H.H.; Brigham,-L.A.; Hawes,-M.C.
TI: In-cell RT-PCR in a single, detached plant cell.
SO: Plant-mol-biol-report. Athens, Ga. : International Society for Plant Molecular Biology, University of Georgia. Dec 1995. v. 13 (4) p. 355-362.
CN: DNAL QK710.P63
PA: Other-US
PY: 1995
LA: English
CP: Georgia; USA
CO: PMBRD4
IS: ISSN: 0735-9640
NT: Includes references.
PT: Article
SF: IND
DE: pisum-sativum. seedlings-. roots-. genetic-analysis. transcription-. polymerase-chain-reaction. plant-breeding-methods. digoxigenin-. uptake-. genes-. nucleotide-sequences.
ID: reverse-transcription-polymerase-chain-reaction. molecular-sequence-data. genbank/134578-.
CC: F200
XAU: University of Arizona, Tucson, AZ.

Record 11 of 31 in AGRICOLA 1992-1997

AN: IND 20483196

UD: 9511
AU: Nicoll,-S.M.; Brigham,-L.A.; Wen,-F.; Hawes,-M.C.
TI: Expression of transferred genes during hairy root development in pea.
SO: Plant-cell,-tissue-organ-cult. Dordrecht, The Netherlands : Kluwer Academic Publishers. July 1995. v. 42 (1) p. 57-66.
CN: DNAL QK725.P53
PA: Foreign
PY: 1995
LA: English
CP: Netherlands
CO: PTCEDJ
IS: ISSN: 0167-6857
NT: Includes references.
PT: Article
SF: IND
DE: pisum-sativum. agrobacterium-tumefaciens. agrobacterium-rhizogenes. genetic -transformation. transgenic-plants. gene-expression. gene-transfer. roots -. cell-growth. plant-development. marker-genes. strain-differences. cultivars-. genetic-variation. pathogenicity-.
CC: F200; F600; F832
AB: Root border cell development and expression of reporter genes were evaluated in transgenic pea hair) roots. Successful induction of hairy roots in pea is conditioned by bacterial strain and plant genotype, as well as by developmental and environmental factors. Morphological changes sometimes occur when hairy roots are transferred from infected plants to tissue culture media, but such changes are confined to specific clones. Expression of reporter genes under the control of promoters from bean (*Phaseolus vulgaris* L.) "stress" genes encoding phenylalanine ammonia lyase and chalcone synthase were evaluated. Expression patterns vary between hairy roots taken directly from infected plants, and those grown in culture; most hairy roots taken from infected plants exhibit expression throughout all tissues, whereas expression in cultured hairy roots is most often localized to specific tissues. Patterns of expression that occur during different stages of hairy root development are very similar to those observed in transgenic plants expressing the same fusion genes. Border cell separation and release in hairy roots is normal, and expression of glucuronidase in border cells of some transgenic roots resulted in development of bright blue single cells. Cultured hairy roots should provide a very useful model for studying the effect of defined changes in root border cells on microbial associations with roots of this important legume.
XAU: University of Arizona, Tucson, AZ.

Record 12 of 31 in AGRICOLA 1992-1997

AN: IND 20451142
UD: 9500
AU: Stephenson,-M.B.; Hawes,-M.C.
TI: Correlation of pectin methylester activity in root caps of pea with root border cell separation.
SO: Plant-physiol. Rockville, MD : American Society of Plant Physiologists, 1926-. Oct 1994. v. 106 (2) p. 739-745.
CN: DNAL 450-P692
PA: Other-US
PY: 1994
LA: English
CP: Maryland; USA
CO: PLPHAY
IS: ISSN: 0032-0889
NT: Includes references.
PT: Article
SF: IND

DE: pisum-sativum. root-caps. pectins-. esterases-. enzyme-activity. cell -differentiation. regulation-. gene-expression. genetic-code. galacturonic -acid. derivatives-. ph-. purification-. developmental-stages. cell-growth.

CC: F600; F200

AB: We tested predictions of the hypothesis that pectin methylesterase in the root cap plays a role in cell wall solubilization leading to separation of root border cells from the root tip. Root cap pectin methylesterase activity was detected only in species that release large numbers of border cells daily. In pea (*Pisum sativum*) root caps, enzyme activity is correlated with border cell separation during development: 6-fold more activity occurs during border cell separation than after cell separation is complete. Higher levels of enzyme activity are restored by experimental induction of border cell separation. A corresponding increase in transcription of a gene encoding root cap pectin methylesterase precedes the increase in enzyme activity. A dramatic increase in the level of soluble, deesterified pectin in the root tip also is correlated with pectin methylesterase activity during border cell development. This increase in acidic, de-esterified pectin during development occurs in parallel with a decrease in cell wall/apoplastic pH of cells in the periphery of the root cap.

XAU: University of Arizona, Tucson, AZ.

Record 13 of 31 in AGRICOLA 1992-1997

AN: IND 20432859

UD: 9412

AU: Woo,-H.H.; Brigham,-L.A.; Hawes,-M.C.

TI: Primary structure of the mRNA encoding a 16.5-kDa ubiquitin-conjugating enzyme of *Pisum sativum*.

SO: Gene. Amsterdam : Elsevier Science Publishers. 1994. v. 148 (2) p. 369-370.

CN: DNAL QH442.A1G4

PA: Foreign

PY: 1994

LA: English

CP: Netherlands

CO: GENED6

IS: ISSN: 0378-1119

NT: Includes references.

PT: Article

SF: IND

DE: pisum-sativum. messenger-rna. complementary-dna. enzymes-. ubiquitin-. chemical-reactions. nucleotide-sequences. amino-acid-sequences.

ID: molecular-sequence-data. genbank/129077-.

CC: F200

AB: The complementary DNA (PsUBC4) representing an mRNA encoding an ubiquitin -conjugating enzyme (UBC) of *Pisum sativum* has been cloned. The coding region is 444 nucleotides (nt) in length and capable of specifying a 16.5 -kDa protein of 148 amino acids (aa) with an isoelectric point of 7.95. The deduced aa sequence showed 97% identity with *Arabidopsis thaliana* AtUBC8-12 families and tomato ERT17, and 80% identity with yeast ScUBC4 and ScUBC5 and *Drosophila melanogaster* DmUBC4. The active site cysteine (Cys85) found in UBCs so far described is also conserved in the *P. sativum* sequence.

Record 14 of 31 in AGRICOLA 1992-1997

AN: IND 92008190

UD: 9204

AU: Hawes,-M.C.

TI: Conditional requirement for chemotaxis in induction of rooty tumors by *Agrobacterium tumefaciens* on roots of *Pisum sativum*.

SO: NATO-ASI-Ser-Ser-H-Cell-Biol. [Berlin, W. Ger.] : Springer-Verlag. 1989. v. 36 p. 123-127.

CN: DNAL QH573.N37

PA: Foreign

PY: 1989
LA: English
CO: NASBE4
IS: ISSN: 0258-1256
NT: In the series analytic: Signal molecules in plants and plant-microbe interactions / edited by B.J.J. Lugtenberg. Proceedings of the NATO Advanced Research Workshop on Molecular Signals in Microbe-Plant Symbiotic and Pathogenic Systems, May 21-26, 1989, Biddinghuizen, The Netherlands.
Includes references.
PT: Article
DE: pisum-sativum. agrobacterium-tumefaciens. roots-. infection-. root-caps. chemotaxis-. tumors-. crown-gall. mutants-. virulence-.
ID: sloughed-root-cap-cells.
CC: F832
XAU: University of Arizona, Tucson, AZ.

Record 15 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 91009978
UD: 9104
AU: Robbs,-S.L.; Hawes,-M.C.; Lin,-H.J.; Pueppke,-S.G.; Smith,-L.Y.
TI: Inheritance of resistance to crown gall in Pisum sativum.
SO: Plant-Physiol. Rockville, Md. : American Society of Plant Physiologists. Jan 1991. v. 95 (1) p. 52-57.
ill.
CN: DNAL 450-P692
PA: Other-US
PY: 1991
LA: English
CO: PLPHA
IS: ISSN: 0032-0889
NT: Includes references.
PT: Article
DE: pisum-sativum. genotypes-. agrobacterium-tumefaciens. genetic-resistance. crown-gall. inheritance-. organogenesis-.
ID: tumorigenesis-.
CC: F831; F200
AB: We screened a total of 1365 pea (*Pisum sativum*) lines for response to inoculation with *Agrobacterium tumefaciens*, strain B6, and characterized resistance in one cultivar, Sweet Snap. Sweet Snap seedlings were highly resistant to tumorigenesis under most conditions. Resistance was overcome at inoculum concentrations of greater than 10(9) bacteria per milliliter. At such high concentrations, very small tumors developed on Sweet Snap in response to four wide-host-range *Agrobacterium* strains, but tumors on other cultivars were two- to sevenfold larger than those that formed on Sweet Snap. The hypervirulent strain A281 induced larger tumors on Sweet Snap than did other *Agrobacterium* strains, but tumors on other genotypes were more than 100% larger than those on Sweet Snap. Physiological experiments suggested that tumorigenesis in Sweet Snap is not blocked in early stages of infection, and genetic analysis indicated that inheritance of resistance to crown gall is a quantitative trait. In addition to the observed resistance in Sweet Snap, three 'super-susceptible' genotypes, which developed very large tumors, also were identified.
XAU: Sugarcane Field Station, Canal Point, FL.

Record 16 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 90052472
UD: 9101
AU: Rong,-L.; Karcher,-S.J.; O'Neal,-K.; Hawes,-M.C.; Yerkes,-C.D.; Jayaswal, -R.K.; Hallberg,-C.A.; Gelvin,-S.B.

TI: picA, a novel plant-inducible locus on the *Agrobacterium tumefaciens* chromosome.
SO: J-Bacteriol. Washington, D.C. : American Society for Microbiology. Oct 1990. v. 172 (10) p. 5828-5836. ill.
CN: DNAL 448.3-J82
PA: Other-US
PY: 1990
LA: English
CO: JOBAAY
IS: ISSN: 0021-9193
NT: Includes references.
PT: Article
DE: agrobacterium-tumefaciens. chromosomes-. loci-. genes-. plant-extracts. roots-. daucus-carota. polysaccharides-.
CC: F832
AB: We used the transposon Mu dI1681 to identify genes on the *Agrobacterium tumefaciens* chromosome that are inducible by extracts from carrot roots. One such locus (picA, for plant inducible chromosomal), harbored by *A. tumefaciens* At156, was inducible 10- to 50-fold by these extracts. Mutation of picA had no detectable effect upon bacterial growth or virulence under laboratory assay conditions. However, *A. tumefaciens* cells harboring a mutated pica locus aggregated into long "ropes" when incubated with pea root tip cells. Such aggregation was not displayed by the parental strain *A. tumefaciens* A136. A preliminary characterization of the inducing compound in the carrot root extract suggests that the active substance is an acidic polysaccharide that is most likely derived from the pectic portion of the plant cell wall.
XAU: Purdue University, West Lafayette, IN.

Record 17 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 89065969
UD: 9001
AU: Hawes,-M.C.; Pueppke,-S.G.
TI: Variation in binding and virulence of *Agrobacterium tumefaciens* chromosomal virulence (chv) mutant bacteria on different plant species.
SO: Plant-Physiol. Rockville, Md. : American Society of Plant Physiologists. Sept 1989. v. 91 (1) AGL p. 113-118. ill.
CN: DNAL 450-P692
PA: Other-US
PY: 1989
LA: English
CO: PLPHA
IS: ISSN: 0032-0889
NT: Includes references.
PT: Article
DE: plants-. species-. plant-pathogens. agrobacterium-tumefaciens. chromosomes -. virulence-. mutants-. binding-. hosts-of-plant-diseases. inoculation-. root-caps. cells-.
CC: F832
AB: Chromosomal virulence (chv) mutants of *Agrobacterium tumefaciens* have been reported to be deficient in binding to cells of zinnia, tobacco, and bamboo. The mutants are nonpathogenic on stems of *Kalanchoe*, sunflower, tomato, Jerusalem artichoke, and tobacco, but they cause tumors on tubers of *Solanum tuberosum*. We used a root cap cell binding assay to test ability of cells from individual plants of 13 different plant species to bind parent or chv mutant bacteria. The same plants than inoculated to test for disease response. Cells from nine of the plant species were grossly deficient in their abilities to bind mutant bacteria, and the plants inoculated with mutant bacteria failed to form tumors. In contrast, root cap cells as well as root hairs and root surfaces of *S. tuberosum*, *S. okadae*, and *S. hougasii* bound chv mutant bacteria as well as wild type. Nevertheless, *S. tuberosum* roots inoculated with mutant bacteria did not develop tumors. Although *S. okadae* plants inoculated with mutant bacteria formed a few tumors, and *S. hougasii*

developed as many tumors in response to chv mutants as in response to the parent strain, the tumors induced by mutant bacteria were smaller.

Record 18 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 89061904
UD: 8912
AU: Hawes,-M.C.; Smith,-L.Y.
TI: Requirement for chemotaxis in pathogenicity of *Agrobacterium tumefaciens* on roots of soil-grown pea plants.
SO: J-Bacteriol. Washington, D.C. : American Society for Microbiology. Oct 1989. v. 171 (10) p. 5668-5671.
CN: DNAL 448.3-J82
PA: Other-US
PY: 1989
LA: English
CO: JOBAAY
IS: ISSN: 0021-9193
NT: Includes references.
PT: Article
DE: pisum-sativum. roots-. agrobacterium-tumefaciens. chemotaxis-. motility-. mutants-. plant-tumors. virulence-.
CC: F832

Record 19 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 89051966
UD: 8911
AU: Hawes,-M.C.; Robbs,-S.L.; Pueppke,-S.G.
TI: Use of a root tumorigenesis assay to detect genotypic variation in susceptibility of thirty-four cultivars of *Pisum sativum* to crown gall.
SO: Plant-Physiol. Rockville, Md. : American Society of Plant Physiologists. May 1989. v. 90 (1) p. 180-184. ill.
CN: DNAL 450-P692
PA: Other-US
PY: 1989
LA: English
CO: PLPHA
IS: ISSN: 0032-0889
NT: Includes references.
PT: Article
DE: pisum-sativum. cultivars-. disease-resistance. genetic-variation. genotypes -. susceptibility-. inoculation-. agrobacterium-tumefaciens. galls-plant.
CC: F200; F832

AB: We developed a quantitative assay to measure tumorigenesis on roots and root crowns, the natural sites of *Agrobacterium tumefaciens* infection. Efficiency of tumor formation and tumor weight on seedlings of *Pisum sativum* 'Little Marvel' were directly proportional to the logarithm of inoculum concentration. Depth of wounding prior to inoculation also significantly influenced tumor weight but not efficiency. Mean weight of tumors that developed in response to inoculation with strain B6 varied significantly among 34 different commercial cultivars. Tumors on the most susceptible cultivar, Target, were more than tenfold heavier than those formed on the least susceptible cultivar, Sweet Snap. Efficiency of tumorigenesis on 'Sweet Snap' was also relatively low: only 64% of inoculated seedlings developed tumors compared with 89 to 100% efficiencies for all other cultivars.

Record 20 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 89045712
UD: 8910
AU: Goldberg,-N.P.; Hawes,-M.C.; Stanghellini,-M.E.
TI: Specific attraction to and infection of cotton root cap cells by zoospores of *Pythium dissotocum*.
SO: Can-J-Bot-J-Can-Bot. Ottawa, Ont. : National Research Council of Canada. June 1989. v. 67 (6) p. 1760-1767. ill.
CN: DNAL 470-C16C
PA: Foreign
PY: 1989
LA: English; Summary in: French
CO: CJBOAW
IS: ISSN: 0008-4026
NT: Includes references.
PT: Article
DE: gossypium-barbadense. gossypium-hirsutum. seedlings-. root-caps. root -exudates. attractants-. infection-. pythium-. spores-. arizona-.
CC: F831

Record 21 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 89038425
UD: 8909
AU: Kanemoto,-R.H.; Powell,-A.T.; Akiyoshi,-D.E.; Regier,-D.A.; Kerstetter, -R.A.; Nester,-E.W.; Hawes,-M.C.; Gordon,-M.P.
TI: Nucleotide sequence and analysis of the plant-inducible locus *pinF* from *Agrobacterium tumefaciens*.
SO: J-Bacteriol. Washington, D.C. : American Society for Microbiology. May 1989. v. 171 (5) p. 2506-2512. ill.
CN: DNAL 448.3-J82
PA: Other-US
PY: 1989
LA: English
CO: JOBAAY
IS: ISSN: 0021-9193
NT: Includes references.
PT: Article
DE: plant-diseases. agrobacterium-tumefaciens. loci-. nucleotide-sequence. plasmids-. cytochromes-. enzymes-. mutants-. genetic-transformation.
ID: open-reading-frames.
CC: F832

AB: Several loci on the tumor-inducing plasmid from *Agrobacterium tumefaciens* were transcriptionally activated in the presence of wounded plant tissue or extracts. The inducible virulence loci were required for efficient tumor formation. In contrast, the plant-inducible locus *pinF* was not observed to be absolutely essential for virulence. Mutants in *pinF* showed an attenuated virulence on a variety of dicotyledonous hosts, and this attenuation became more pronounced with decreasing numbers of bacterial cells in the inoculum. The DNA sequence of a 5.5-kilobase region which included the *pinF* locus from the octopine-type tumor-inducing plasmid A6 was determined. Four open reading frames consistent with the observed transcription of *pin F* were observed. Two of the open reading frames, *pinF1* and *pinF2*, coded for polypeptides with relative molecular weights of 47,519 (*pinF1*) and 46,740 (*pinF2*). A comparison of the amino acid sequences of *pinF1* and *pinF2* indicated that they were similar to each other and to known polypeptide sequences for cytochrome P-450 enzymes.

Record 22 of 31 in AGRICOLA (1984 - 12/91)

AN: ADL 89034381

UD: 8908
AU: Hawes,-M.C.
TI: The use of isolated root cap cells to teach cellular aspects of host -parasite recognition.
SO: Plant-Dis. St. Paul, Minn. : American Phytopathological Society. Oct 1988. v. 72 (10) p. 916-917. ill.
CN: DNAL 1.9-P69P
PA: Other-US
PY: 1988
LA: English
CO: PLDIDE
IS: ISSN: 0191-2917
NT: Includes references.
PT: Article
DE: roots-. plant-diseases. root-caps. cells-. hosts-. binding-site. biochemistry-. assays-. host-parasite-relationships. susceptibility-.
ID: meristematic-cells.
CC: F830; F400

Record 23 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 88005358
UD: 8807
AU: Hawes,-M.C.; Pueppke,-S.G.
TI: Correlation between binding of Agrobacterium tumefaciens by root cap cells and susceptibility of plants to crown gall.
SO: Plant-Cell-Rep. Berlin, W. Ger. : Springer International. 1987. v. 6 (4) p. 287-290. ill.
CN: DNAL QK725.P54
PA: Foreign
PY: 1987
LA: English
CO: PCRPD8
IS: ISSN: 0721-7714
NT: Includes references.
PT: Article
DE: plants-. agrobacterium-tumefaciens. cell-walls. binding-site. root-caps.
CC: F832

Record 24 of 31 in AGRICOLA (1984 - 12/91)

AN: ADL 86085532
UD: 8701
AU: Hawes,-M.C.; Pueppke,-S.G.
TI: Sloughed peripheral root cap cells: yield from different species and callus formation from single cells.
SO: Am-J-Bot. Baltimore, Md. : Botanical Society of America. Oct 1986. v. 73 (10) p. 1466-1473. ill.
CN: DNAL 450-AM36
PA: Other-US
PY: 1986
LA: English
CO: AJBOA
IS: ISSN: 0002-9122
NT: Includes references.
PT: Article
DE: root-caps. cells-. callus-. cell-walls. cell-physiology. yields-. viability -. plant-physiology.
CC: F400; F600

Record 25 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 86051991
UD: 8608
AU: Hawes,-M.C.; Pueppke,-S.G.
TI: Relationship between binding of Agrobacterium tumefaciens to isolated root cap cells and susceptibility of plants to crown gall.
SO: Curr-Top-Plant-Biochem-Physiol-Proc-Plant-Biochem-Physiol-Symp-Univ-Mo -Columbia. Columbia, Mo. : The Interdisciplinary Plant Biochemistry and Physiology Program. 1985. v. 4 p. 244.
CN: DNAL QK861.P55
PA: Other-US
PY: 1985
LA: English
NT: Includes 5 references.
PT: Article
DE: agrobacterium-tumefaciens. root-caps. galls-plant. susceptibility-
CC: F832

Record 26 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 85065038
UD: 8511
AU: Hawes,-M.C.; Sharpe,-D.Z.; Plata,-M.I.; Pueppke,-S.G.; Chourey,-P.S.
TI: Auxin-independent growth of maize tissue culture cells.
SO: Plant-Sci. Limerick, Ireland : Elsevier Scientific Publishers Ireland. Sept 1985. v. 40 (3) p. 197-202.
ill.
CN: DNAL QK1.P5
PA: Foreign
PY: 1985
LA: English
CO: PLSCE4
IS: ISSN: 0168-9452
NT: Includes 16 references.
PT: Article
DE: zea-mays. cell-culture. auxins-. growth-
CC: F600

Record 27 of 31 in AGRICOLA (1984 - 12/91)

AN: IND 84079815
UD: 8410
AU: Hawes,-M.C.; Wheeler,-H.
TI: Detection of effects of nuclear genes on susceptibility to Helminthosporium maydis race T by a root cap cell bioassay for HMT-toxin [Corn, phytotoxicity].
SO: Physiol-Plant-Pathol. London, Eng. : Academic Press. Mar 1984. v. 24 (2) p. 163-168.
CN: DNAL SB599.P45
PA: Foreign
PY: 1984
LA: English
CO: PPPYBC
IS: ISSN: 0048-4059
NT: Includes references.
PT: Article
CC: F200; F831

Record 28 of 31 in AGRICOLA (1979 - 1984)

AN: IND 84079815
UD: 8400
AU: Hawes,-M.C.; Wheeler,-H.
TI: Detection of effects of nuclear genes on susceptibility to *Helminthosporium maydis* race T by a root cap cell bioassay for HMT-toxin [Corn, phytotoxicity].
SO: *Physiol-Plant-Pathol.* London, Eng. : Academic Press. Mar 1984. v. 24 (2) p. 163-168.
CN: DNAL SB599.P45
PA: Foreign
PY: 1984
LA: English
CO: PPPYBC
IS: ISSN: 0048-4059
NT: Includes references.
PT: Article
CC: F200; F831

Record 29 of 31 in AGRICOLA (1979 - 1984)

AN: IND 83108331
UD: 8300
AU: Hawes,-M.C.
TI: Technique for using isolated corn root cap cells in a simple, quantitative assay for the pathotoxin produced by *Helminthosporium maydis* race T *Zea mays*, maize.
SO: *Phytopathology.* St. Paul : American Phytopathological Society. Aug 1983. v. 73 (8) p. 1184-1187.
CN: DNAL 464.8-P56
PA: Other-US
PY: 1983
LA: English
CO: PHYTA
IS: ISSN: 0031-949X
NT: Includes references.
PT: Article
CC: F831

Record 30 of 31 in AGRICOLA (1979 - 1984)

AN: IND 83066278
UD: 8300
AU: Hawes,-M.C.
TI: Sensitivity of isolated oat root cap cells and protoplasts to victorin Pathotoxin produced by *Helminthosporium victoriae*.
SO: *Physiol-Plant-Pathol.* London : Academic Press. Jan 1983. v. 22 (1) p. 65 -76.
CN: DNAL SB599.P45
PA: Foreign
PY: 1983
LA: English
CO: PPPYB
IS: ISSN: 0048-4059
NT: Includes references.
PT: Article
CC: F831

Record 31 of 31 in AGRICOLA (1979 - 1984)

AN: IND 82059054
UD: 8200
AU: Hawes,-M.C.; Wheeler,-H.
TI: Factors affecting victorin-induced root cap cell death: temperature and plasmolysis *Helminthosporium victoriae*, oat cultivars.
SO: *Physiol-Plant-Pathol.* London, Academic Press. Mar 1982. v. 20 (2) p. 137 -144. ill.
CN: DNAL SB599.P45
PA: Foreign
PY: 1982
LA: English
IS: ISSN: 0048-4059
NT: Includes 27 ref.
PT: Article
CC: F831

Search History

* #4 hawes-m-c (25 records) #3 (hawes) in AU (656 records) #2 (hawes-mc) in AU (0 records) #1 hawes-mc (0 records)

Record 1 of 25 in Biosis Previews 1998/07-1998/12

TI: Function of root border cells in plant health: Pioneers in the rhizosphere.
AU: Hawes-M-C {a}; Brigham-L-A; Wen-F; Woo-H-H; Zhu-Y
AD: {a} Dep. Plant Pathol., Univ. Ariz., Tucson, AZ 85721, USA
BK: *Annual Review of Phytopathology.* 1998; 36 : 311-327.
AUB: Webster-R-K: Ed
PB: Annual Reviews Inc., P.O. Box 10139, 4139 El Camino Way, Palo Alto, California 94306, USA
PY: 1998
DT: Book-
IS: 0066-4286
IB: 0824313364
LA: English
MC: Infection-
ST: Tracheophyta-: Plantae-
OR: vascular-plants (Tracheophyta-)
TN: Plants-; Vascular-Plants
PS: root-: border-cells
MI: plant-health; rhizosphere-; root-system-ecology; Book-Chapter
AN: 199800520541
UD: 19980929

Record 2 of 25 in BIOSIS Previews Part 1 (1992)

TI: Root organogenesis from single cells released from the root cap of *Medicago* sp.
AU: Hawes-M-C; Smith-L-Y; Stephenson-M
CS: *Dep. Plant Pathol. Mol. Cell Biol., Univ. Ariz., Tucson, AZ 85721*
SO: *Plant Cell Tissue and Organ Culture* 27(3): 303-308
PY: 1991
CO: PTCEDJ
IS: 0167-6857
LA: English
AB: Root border cells were isolated from alfalfa seedlings, and incubated in culture medium with growth regulators. Alfalfa seedlings yielded 1500 + 100 cells per root, and initial viability of the cells was 95 + 5%. Multiple cell divisions occurred in the border cells within two weeks. Cell clusters transferred to

solidified medium containing growth regulators developed into rapidly growing, friable callus. When transferred to growth regulator-free medium, some of the calluses generated normal roots.

DE: CALLUS FORMATION; GROWTH REGULATORS; METHOD

MJCC: CC32500 (Tissue-Culture-Apparatus-Methods-and-Media) CC51510 (Plant -Physiology-Biochemistry-and-Biophysics-Growth-Differentiation) CC51514 (Plant-Physiology-Biochemistry-and-Biophysics-Growth-Substances)

CC51524 (Plant-Physiology-Biochemistry-and-Biophysics-Apparatus-and -Methods)

MNCC: CC52506 (Agronomy-Forage-Crops-and-Fodder)

BC: BC26260 Leguminosae

ST: Plants; Vascular plants; Spermatophytes; Angiosperms; Dicots

DT: Article

AN: 093116233

JA: Biological Abstracts Vol. 093 Iss. 001 Ref. 116233

UD: 199200

Record 3 of 25 in BIOSIS Previews Part 1 (1992)

TI: Root organogenesis from single cells released from the root cap of *Medicago* sp.

AU: Hawes-M-C; Smith-L-Y; Stephenson-M

CS: Dep. Plant Pathol., Univ. Ariz., Tucson, Ariz. 85721

SO: Plant Cell Tissue and Organ Culture 27(3): 303-308

PY: 1991

CO: PTCEDJ

IS: 0167-6857

LA: English

AB: Root border cells were isolated from alfalfa seedlings, and incubated in culture medium with growth regulators. Alfalfa seedlings yielded 1500 + 100 cells per root, and initial viability of the cells was 95 + 5%. Multiple cells divisions occurred in the border cells within two weeks. Cell clusters transferred to solidified medium containing growth regulators developed into rapidly growing, friable callus. When transferred to growth regulator-free medium, some of the calluses generated normal roots.

DE: TISSUE CULTURE; METHOD

MJCC: CC32500 (Tissue-Culture-Apparatus-Methods-and-Media) CC51510 (Plant -Physiology-Biochemistry-and-Biophysics-Growth-Differentiation) CC51524 (Plant-Physiology-Biochemistry-and-Biophysics-Apparatus-and-Methods)

MNCC: CC52506 (Agronomy-Forage-Crops-and-Fodder)

BC: BC26260 Leguminosae

ST: Plants; Vascular plants; Spermatophytes; Angiosperms; Dicots

DT: Article

AN: 093069481

JA: Biological Abstracts Vol. 093 Iss. 001 Ref. 069481

UD: 199200

Record 4 of 25 in BIOSIS Previews Part 1 (1991)

TI: Inheritance of resistance to crown gall in *Pisum sativum*.

AU: Robbs-S-L; Hawes-M-C; Lin-H-J; Pueppke-S-G; Smith-L-Y

CS: Sugarcane Field Station, Canal Point, Fla. 33438

SO: Plant Physiology (Rockville) 95(1): 52-57

PY: 1991

CO: PLPHAY

IS: 0032-0889

LA: English

AB: We screened a total of 1365 pea (*Pisum sativum*) lines for response to inoculation with *Agrobacterium tumefaciens*, strain B6, and characterized resistance in one cultivar, Sweet Snap. Sweet Snap seedlings were highly resistant to tumorigenesis under most conditions. Resistance was overcome at

inoculum concentrations of greater than 10⁹ bacteria per milliliter. At such high concentrations, very small tumors developed on Sweet Snap in response to four wide-host-range *Agrobacterium* strains, but tumors on other cultivars were two- to sevenfold larger than those that formed on Sweet Snap. The hypervirulent strain A281 induced larger tumors on Sweet Snap than did other *Agrobacterium* strains, but tumors on other genotypes were more than 100% larger than those on Sweet Snap. Physiological experiments suggested that tumorigenesis in Sweet Snap is not blocked in early stages of infection, and genetic analysis indicated that inheritance of resistance to crown gall is a quantitative trait. In addition to the observed resistance in Sweet Snap, three 'super-susceptible' genotypes, which developed very large tumors, also were identified.

DE: AGROBACTERIUM TUMEFACIENS

MJCC: CC03504 (Genetics-and-Cytogenetics-Plant) CC54504 (Phytopathology -Diseases-Caused-by-Bacteria) CC54514 (Phytopathology-Parasitism-and -Resistance)

MNCC: CC53008 (Horticulture-Vegetables)

BC: BC04718 Rhizobiaceae; BC26260 Leguminosae

ST: Microorganisms; Bacteria; Eubacteria; Plants; Vascular plants; Spermatophytes; Angiosperms; Dicots

DT: Article

AN: 091089160

JA: Biological Abstracts Vol. 091 Iss. 001 Ref. 089160

UD: 199100

Record 5 of 25 in BIOSIS Previews Part 1 (1991)

TI: Correlation of pectolytic enzyme activity with the programmed release of cells from root caps of pea (*Pisum sativum*).

AU: Hawes-M-C; Lin-H-J

CS: Dep. Plant Pathol., Univ. Ariz., Tucson, Ariz. 85721

SO: Plant Physiology (Rockville) 94(4): 1855-1859

PY: 1990

CO: PLPHAY

IS: 0032-0889

LA: English

AB: In many plant species, the daily release of hundreds to thousands of healthy cells from the root cap into the soil is a normal process, whose function is unknown. We studied the separation of the cells in pea (*Pisum sativum*) using an aeroponic system in which separated cells were retained on the root until they were washed off for counting. We found that cell separation is a developmentally regulated, temperature-sensitive process that appears to be regulated independently of root growth. No cells were released from very young roots. When plants were grown aeroponically, cell numbers increased with increasing root length to a mean of 3400 cells per root, at which point the release of new cells ceased. The process could be reset and synchronized by washing the root in water to remove shed cells. Cell separation from the root cap was correlated with pectolytic enzyme activity in root cap tissue. Because these cells that separate from the root cap ensheath the root as it grows and thus provide a cellular interface between the root surface and the soil, we propose to call the cells "root border cells."

DE: TEMPERATURE SENSITIVITY; ROOT BORDER CELLS; CELLULAR INTERFACE

MJCC: CC02504 (Cytology-and-Cytochemistry-Plant) CC10614 (External-Effects -Temperature-as-a-Primary-Variable) CC10808 (Enzymes-Physiological -Studies) CC13004 (Metabolism-Carbohydrates)

CC51000 (Morphology -Anatomy-and-Embryology-of-Plants) CC51503 (Plant-Physiology -Biochemistry-and-Biophysics-Temperature) CC51510 (Plant-Physiology -Biochemistry-and-Biophysics-Growth-Differentiation) CC51518 (Plant -Physiology-Biochemistry-and-Biophysics-Enzymes) CC51519 (Plant -Physiology-Biochemistry-and-Biophysics-Metabolism)

MNCC: CC10064 (Biochemical-Studies-Proteins-Peptides-and-Amino-Acids) CC10068 (Biochemical-Studies-Carbohydrates) CC10804 (Enzymes-Methods)

BC: BC26260 Leguminosae

ST: Plants; Vascular plants; Spermatophytes; Angiosperms; Dicots

DT: Article

AN: 091054834

JA: Biological Abstracts Vol. 091 Iss. 001 Ref. 054834
UD: 199100

Record 6 of 25 in BIOSIS Previews Part 1 (1991)

TI: Living plant cells released from the root cap: A regulator of microbial populations in the rhizosphere?
AU: Hawes-M-C
CS: Dep. Plant Pathol., Univ. Ariz., Tucson, Ariz. 85721, USA
SO: Plant and Soil 129(1): 19-28
MT: Meeting on the Rhizosphere and Plant Growth, Beltsville, Maryland, USA, May 8-11, 1989. PLANT SOIL
PY: 1990
CO: PLSO2
IS: 0032-079X
LA: English
DE: AGROBACTERIUM TUMEFACIENS; PYTHIUM DISSOTOCUM; PYTHIUM CATENULATUM; PEA; COTTON; CORN; PLANT; BACTERIA; FUNGUS; CHEMOTAXIS; BINDING; INFECTION; AGRICULTURE
MJCC: CC12100 (Movement) CC40000 (Soil-Microbiology) CC54502 (Phytopathology-Diseases-Caused-by-Fungi) CC54504 (Phytopathology -Diseases-Caused-by-Bacteria) CC54518 (Phytopathology-General-and -Miscellaneous)
MNCC: CC00520 (General-Biology-Symposia-Transactions-and-Proceedings-of -Conferences-Congresses-Review-Annuals) CC52504 (Agronomy-Grain -Crops) CC52508 (Agronomy-Fiber-Crops) CC53008 (Horticulture -Vegetables)
BC: BC04718 Rhizobiaceae; BC15900 Phycomycetes; BC25305 Gramineae; BC26260 Leguminosae; BC26330 Malvaceae
ST: Microorganisms; Bacteria; Eubacteria; Plants; Nonvascular plants; Fungi; Vascular plants; Spermatophytes; Angiosperms; Monocots; Dicots
DT: Meeting-Document
AN: 040073801
JA: Biological Abstracts-RRM Vol. 040 Iss. 001 Ref. 073801
UD: 199100

Record 7 of 25 in BIOSIS Previews Part 2 (1990)

TI: PicA, a novel plant-inducible locus on the Agrobacterium tumefaciens chromosome.
AU: Rong-L; Karcher-S-J; O'Neal-K; Hawes-M-C; Yerkes-C-D; Jayaswal-R-K; Hallberg-C-A; Gelvin-S-B
CS: Dep. Biological Sci., Purdue Univ., West Lafayette, Indiana 47907
SO: Journal of Bacteriology 172(10): 5828-5836
PY: 1990
CO: JOBAAY
IS: 0021-9193
LA: English
AB: We used the transposon Mu dII681 to identify genes on the Agrobacterium tumefaciens chromosome that are inducible by extracts from carrot roots. One such locus (picA, for plant inducible chromosomal), harbored by A. tumefaciens At156, was inducible 10- to 50-fold by these extracts. Mutation of picA had no detectable effect upon bacterial growth or virulence under laboratory assay conditions. However, A. tumefaciens cells harboring a mutated picA locus aggregated into long "ropes" when incubated with pea root tip cells. Such aggregation was not displayed by the parental strain A. tumefaciens A136. A preliminary characterization of the inducing compound in the carrot root extract suggests that the active substance is an acidic polysaccharide that is most likely derived from the pectic portion of the plant cell wall.
DE: CARROT ROOT; CELL WALL PECTIC REGION; POLYSACCHARIDE EXTRACTS; BACTERIAL GROWTH

MJCC: CC02504 (Cytology-and-Cytochemistry-Plant) CC10062 (Biochemical-Studies -Nucleic-Acids-Purines-and-Pyrimidines) CC10506 (Biophysics-Molecular -Properties-and-Macromolecules) CC31000 (Physiology-and-Biochemistry-of -Bacteria) CC31500 (Genetics-of-Bacteria-and-Viruses) CC51522 (Plant -Physiology-Biochemistry-and-Biophysics-Chemical-Constituents) CC53008 (Horticulture-Vegetables)
MNCC: CC10052 (Biochemical-Methods-Nucleic-Acids-Purines-and-Pyrimidines)
CC10068 (Biochemical-Studies-Carbohydrates) CC32000 (Microbiological -Apparatus-Methods-and-Media)
BC: BC04718 Rhizobiaceae; BC26915 Umbelliferae
ST: Microorganisms; Bacteria; Eubacteria; Plants; Vascular plants; Spermatophytes; Angiosperms; Dicots
DT: Article
AN: 090134234
JA: Biological Abstracts Vol. 090 Iss. 001 Ref. 134234
UD: 199000

Record 8 of 25 in BIOSIS Previews Part 2 (1989)

TI: c
AU: Hawes-M-C; Pueppke-S-G
CS: Dep. Plant Pathol., Univ. Arizona, Tucson, Arizona 85721
SO: Plant Physiology (Rockville) 91(1): 113-118
PY: 1989
CO: PLPHAY
IS: 0032-0889
LA: English
AB: Chromosomal virulence (chv) mutants of *Agrobacterium tumefaciens* have been reported to be deficient in binding to cells of zinnia, tobacco, and bamboo. The mutants are nonpathogenic on stems of *Kalanchoe*, sunflower, tomato, Jerusalem artichoke, and tobacco, but they cause tumors to tubers on *Solanum tuberosum*. We used a root cap cell binding assay to test ability of cells from individual plants of 13 different plant species to bind parent or chv mutant bacteria. The same plants were then inoculated to test for disease response. Cells from nine of the plant species were grossly deficient in their abilities to bind mutant bacteria, and the plants inoculated with mutant bacteria failed to form tumors. In contrast, root cap cells as well as root hairs and root surfaces of *S. tuberosum*, *S. okadae*, and *S. hougasii* bound chv mutant bacteria as well as wild type. Nevertheless, *S. tuberosum* roots inoculated with mutant bacteria did not develop tumors. Although *S. okadae* plants inoculated with mutant bacteria formed a few tumors, and *S. hougasii* developed as many tumors in response to chv mutants as in response to the parent strain, the tumors induced by mutant bacteria were smaller.
DE: KALANCHOE; SOLANUM TUBEROSUM; SOLANUM OKADAE; SOLANUM HOUGASII; ZINNIA; TOBACCO; BAMBOO; SUNFLOWER; TOMATO; JERUSALEM ARTICHOKE; TUMOR FORMATION
MJCC: CC31000 (Physiology-and-Biochemistry-of-Bacteria) CC31500 (Genetics-of -Bacteria-and-Viruses) CC52512 (Agronomy-Tobacco-Crops) CC52514 (Agronomy-Oil-Crops) CC53004 (Horticulture-Tropical-and-Subtropical -Fruits-and-Nuts-Plantation-Crops) CC53008 (Horticulture-Vegetables)
CC54504 (Phytopathology-Diseases-Caused-by-Bacteria) CC54514 (Phytopathology-Parasitism-and-Resistance)
MNCC: CC24002 (Neoplasms-and-Neoplastic-Agents-General)
BC: BC04718 Rhizobiaceae; BC25305 Gramineae; BC25840 Compositae; BC25870 Crassulaceae; BC26775 Solanaceae
ST: Microorganisms; Bacteria; Eubacteria; Plants; Vascular plants; Spermatophytes; Angiosperms; Monocots; Dicots
DT: Article
AN: 088134874
JA: Biological Abstracts Vol. 088 Iss. 001 Ref. 134874
UD: 198900

Record 9 of 25 in BIOSIS Previews Part 2 (1989)

TI: Requirement for chemotaxis in pathogenicity of *Agrobacterium tumefaciens* on roots of soil-grown pea plants.

AU: Hawes-M-C; Smith-L-Y

CS: Dep. Plant Pathol. and Mol., Univ. Arizona, Tucson, Arizona 85721

SO: Journal of Bacteriology 171(10): 5668-5671

PY: 1989

CO: JOBAAY

IS: 0021-9193

LA: English

AB: *Agrobacterium tumefaciens* Tn5 mutants deficient in chemotaxis to root exudates were used to study the significance of chemotaxis in crown gall pathogenesis. Mutants deficient in motility and in chemotaxis were fully virulent when inoculated by direct immersion in inoculum, followed by growth for 2 weeks in moist growth pouches. Ability of mutant bacteria to move through soil to infect roots was tested by planting wounded seedlings into air-dried soil or sand that had been infested with inoculum. Mutant bacteria were almost as virulent as the parent on plants grown in sand but were avirulent on soil-grown plants.

DE: MUTANT ANALYSIS; CROWN GALL

MJCC: CC12100 (Movement) CC24002 (Neoplasms-and-Neoplastic-Agents-General)

CC31000 (Physiology-and-Biochemistry-of-Bacteria) CC40000 (Soil -Microbiology) CC52504 (Agronomy-Grain-Crops) CC52801 (Soil-Science -General-Methods)

MNCC: CC31500 (Genetics-of-Bacteria-and-Viruses) CC53008 (Horticulture -Vegetables)

BC: BC04718 Rhizobiaceae; BC26260 Leguminosae

ST: Microorganisms; Bacteria; Eubacteria; Plants; Vascular plants; Spermatophytes; Angiosperms; Dicots

DT: Article

AN: 088126537

JA: Biological Abstracts Vol. 088 Iss. 001 Ref. 126537

UD: 198900

Record 10 of 25 in BIOSIS Previews Part 2 (1989)

TI: Specific attraction to and infection of cotton root cap cells by zoospores of *Pythium dissotocum*.

AU: Goldberg-N-P; Hawes-M-C; Stanghellini-M-E

CS: Dep. Plant Pathol., Univ. Arizona, Tucson, Arizona 85721

SO: Canadian Journal of Botany 67(6): 1760-1767

PY: 1989

CO: CJBOAW

IS: 0008-4026

LA: English

LS: English French

AB: Root cap of two cotton species (*Gossypium barbadense* L. and *G. hirsutum* L.) elicited a specific chemotactic response in zoospores of *Pythium dissotocum*. When roots of cotton seedlings were placed into a suspension of *Pythium dissotocum* zoospores, there was immediate attraction, accumulation, and encystment exclusively in the root cap region. Seedlings which attracted zoospores were killed within 24 h. Furthermore, root cap cells remained attractive when isolated nondestructively from the root and placed into a zoospore suspension; attraction, accumulation, and encystment on individual root cap cells occurred within seconds after contact. Penetration and death of isolated cells occurred within 15-30 min. After 30 min, approximately 25% of living cells were directly colonized by zoospores. Root cap cells killed by freezing or drying remained attractive but at a reduced level; approximately half as many killed cells as living cells were directly colonized by zoospores. The number of root cap cells directly colonized by zoospores did not increase with time. In contrast, zoospores of *Pythium catenulatum* that exhibited a chemotactic response to *Agrostis palustris* (Bentgrass) were not attracted to and did not infect cotton seedlings or isolated root cap cells.

DE: GOSSYPIUM HIRSUTUM; GOSSYPIUM BARBADENSE; CHEMOTACTIC RESPONSE; CROP INDUSTRY; AGRICULTURE

MJCC: CC12100 (Movement) CC51522 (Plant-Physiology-Biochemistry-and-Biophysics -Chemical-
Constituents) CC52508 (Agronomy-Fiber-Crops) CC54502 (Phytopathology-Diseases-Caused-by-Fungi)
MNCC: CC10060 (Biochemical-Studies-General)
BC: BC15900 Phycomycetes; BC25305 Gramineae; BC26330 Malvaceae
ST: Plants; Nonvascular plants; Microorganisms; Fungi; Vascular plants; Spermatophytes; Angiosperms;
Monocots; Dicots
DT: Article
AN: 088078145
JA: Biological Abstracts Vol. 088 Iss. 001 Ref. 078145
UD: 198900