PLANT PHYSIOLOGY
EMAIL CONTENT DELIVERY e-toc
HOME HELP FEEDBACK SUBSCRIPTIONS ARCHIVE SEARCH TABLE OF CONTENTS
QUICK SEARCH: [advanced]
Author: Keyword(s):
Go
Year: Vol: Page:

Perform your original search, **Aluminum Resistant Crops**, in *Plant Physiol.* Search

Plant Physiol, March 2001, Vol. 125, pp. 1473-1484

The High Level of Aluminum Resistance in Signalgrass Is Not Associated with Known Mechanisms of External Aluminum Detoxification in Root Apices[1]

Peter Wenzl,[2]* Gloria M. Patiño, Alba L. Chaves, Jorge E. Mayer, and Idupulapati M. Rao

Centro Internacional de Agricultura Tropical, A.A. 6713, Cali, Colombia (P.W., G.M.P., A.L.C., I.M.R.); Institut für Pflanzenphysiologie, Universität Wien, A-1090 Vienna, Austria (P.W.); and Center for the Application of Molecular Biology to International Agriculture, G.P.O. Box 3200, Canberra ACT 2601, Australia (J.E.M.)

Al resistance of signalgrass (*Brachiaria decumbens* Stapf cv Basilisk), a widely sown tropical forage grass, is outstanding compared with the closely related ruzigrass (*Brachiaria ruziziensis* Germain and Evrard cv Common) and Al-resistant genotypes of graminaceous crops such as wheat, triticale, and maize. Secretion of organic acids and phosphate by root apices and alkalinization of the apical rhizosphere are commonly believed to be important mechanisms of Al resistance. However, root apices of signalgrass secreted only moderately larger quantities of organic acids than did those of ruzigrass, and efflux from signalgrass apices was three to 30 times smaller than from apices of Al-resistant genotypes of buckwheat, maize, and wheat (all much more sensitive to Al than signalgrass). In the presence, but not absence, of Al, root apices of signalgrass alkalinized the rhizosphere more than did those of ruzigrass. The latter was associated with a shortening of the alkalinizing zone in Al-intoxicated apices of ruzigrass, indicating that differences in alkalinizing power were a consequence, not a cause of, differential Al resistance. These data indicate that the main mechanism of Al resistance in signalgrass does not involve external detoxification of Al. Therefore, highly effective resistance mechanisms based on different physiological strategies appear to operate in this species.

This Article
- Full Text
- Full Text (PDF)
- Alert me when this article is cited
- Alert me if a correction is posted

Services
- Email this article to a friend
- Similar articles in this journal
- Similar articles in ISI Web of Science
- Similar articles in PubMed
- Alert me to new issues of the journal
- Download to citation manager
- © Get Permissions

Citing Articles
- Citing Articles via HighWire
- Citing Articles via CrossRef
- Citing Articles via ISI Web of Science (47)
- Citing Articles via Google Scholar

Google Scholar
- Articles by Wenzl, P.
- Articles by Rao, I. M.
- Search for Related Content

PubMed
- PubMed Citation
- Articles by Wenzl, P.
- Articles by Rao, I. M.
- **Pubmed/NCBI databases**
  - Compound via MeSH
  - Substance via MeSH
- **Hazardous Substances DB**
  - ALUMINUM

Agricola
- Articles by Wenzl, P.
- Articles by Rao, I. M.

V V

Aluminum PegBoard X2™
World Leader in Aluminum PegBoard, Strong, Sleek, Load Rated, $6.99/sf
www.diamondlifegear.co

Aluminum Fabrication
Custom aluminum fabrication. CNC, Anodize, Drill, Punch
www.ProfilePrecisionExtr

Aluminum Foil Sheets
Aluminum Foil Sheets Precision Cut. Burr Free. Request a quote now!
www.VortexMetals.com

Oral Chelation Works
Remove Aluminum & 15 Heavy Metals Safely & Effectively From the Body
www.scienceformulas.co

[1] This work was supported by the Kommission für Entwicklungsfragen of the Austrian Academy of Sciences, and by the Colombian Ministry of Agriculture and Rural Development.

[2] Present address: Center for the Application of Molecular Biology to International Agriculture, G.P.O. Box 3200, Canberra ACT 2601, Australia.

[*] Corresponding author; e-mail peter@cambia.org.au ; fax 61-2-6246-4501.

© 2001 American Society of Plant Physiologists

This article has been cited by other articles:

ANNALS OF BOTANY HOME

V. Poozesh, P. Cruz, P. Choler, and G. Bertoni
Relationship between the Al Resistance of Grasses and their Adaptation to an Infertile Habitat
Ann. Bot., May 1, 2007; 99(5): 947 - 954.
[Abstract] [Full Text] [PDF]

Plant Physiology HOME

H. Liao, H. Wan, J. Shaff, X. Wang, X. Yan, and L. V. Kochian
Phosphorus and Aluminum Interactions in Soybean in Relation to Aluminum Tolerance. Exudation of Specific Organic Acids from Different Regions of the Intact Root System
Plant Physiology, June 1, 2006; 141(2): 674 - 684.
[Abstract] [Full Text] [PDF]

ANNALS OF BOTANY HOME

J. L. YANG, L. ZHANG, Y. Y. LI, J. F. YOU, P. WU, and S. J. ZHENG
Citrate Transporters Play a Critical Role in Aluminium-stimulated Citrate Efflux in Rice Bean (Vigna umbellata) Roots
Ann. Bot., April 1, 2006; 97(4): 579 - 584.
[Abstract] [Full Text] [PDF]

CROP SCIENCE HOME

P. Wenzl, A. Arango, A. L. Chaves, M. E. Buitrago, G. M. Patino, J. Miles, and I. M. Rao
A Greenhouse Method to Screen Brachiariagrass Genotypes for Aluminum Resistance and Root Vigor
Crop Sci., February 24, 2006; 46(2): 968 - 973.
[Abstract] [Full Text] [PDF]

Plant Physiology HOME

S. J. Zheng, J. L. Yang, Y. F. He, X. H. Yu, L. Zhang, J. F. You, R. F. Shen, and H. Matsumoto
Immobilization of Aluminum with Phosphorus in Roots Is Associated with High Aluminum Resistance in Buckwheat
Plant Physiology, May 1, 2005; 138(1): 297 - 303.
[Abstract] [Full Text] [PDF]

Journal of Experimental Botany HOME

J. L. Yang, S. J. Zheng, Y. F. He, and H. Matsumoto
Aluminium resistance requires resistance to acid stress: a case study with spinach that exudes oxalate rapidly when exposed to Al stress
J. Exp. Bot., April 1, 2005; 56(414): 1197 - 1203.
[Abstract] [Full Text] [PDF]

ANNALS OF BOTANY HOME

T. WATANABE and K. OKADA
Interactive Effects of Al, Ca and Other Cations on Root Elongation of Rice Cultivars Under Low pH
Ann. Bot., January 2, 2005; 95(2): 379 - 385.
[Abstract] [Full Text] [PDF]

Plant & Cell Physiology HOME

M. Nanamori, T. Shinano, J. Wasaki, T. Yamamura, I. M. Rao, and M. Osaki
Low Phosphorus Tolerance Mechanisms: Phosphorus Recycling and Photosynthate Partitioning in the Tropical Forage Grass, Brachiaria Hybrid Cultivar Mulato Compared with Rice
Plant Cell Physiol., April 15, 2004; 45(4): 460 - 469.
[Abstract] [Full Text] [PDF]

Soil Science Society of America Journal HOME

P. Wenzl, L. I. Mancilla, J. E. Mayer, R. Albert, and I. M. Rao
Simulating Infertile Acid Soils with Nutrient Solutions: The Effects on Brachiaria Species
Soil Sci. Soc. Am. J., September 1, 2003; 67(5): 1457 - 1469.
[Abstract] [Full Text] [PDF]

Plant & Cell Physiology HOME

Y. Kobayashi and H. Koyama
QTL Analysis of Al Tolerance in Recombinant Inbred Lines of Arabidopsis thaliana
Plant Cell Physiol., December 15, 2002; 43(12): 1526 - 1533.
[Abstract] [Full Text] [PDF]

Plant Physiology HOME

B. Ezaki, M. Katsuhara, M. Kawamura, and H. Matsumoto
Different Mechanisms of Four Aluminum (Al)-Resistant Transgenes for Al Toxicity in Arabidopsis
Plant Physiology, November 1, 2001; 127(3): 918 - 927.
[Abstract] [Full Text] [PDF]

Copyright © 2001 by the American Society of Plant Biologists