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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.

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[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.

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