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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<sup>1</sup>

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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 alkalization 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 alkalized the rhizosphere more than did those of ruzigrass. The latter was associated with a shortening of the alkalizing zone in Al-intoxicated apices of ruzigrass, indicating that differences in alkalizing 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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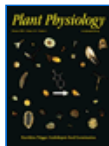
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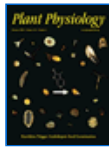
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