EXOSMOSED SUBSTANCES ON THE LEAF-BLADE OF RICE (*ORYZA SATIVA* L.)

WHILE the study of root excretions as such or in relation to soil-borne fungal diseases has gained impetus in recent years,[1] an analogous situation on the leaf-surface, arising out of exosmosed substances has been hitherto little recognized, in so far as they influence the preferential spread of air-borne pathogens. Brown[2] has indicated the role of these exosmosed substances as factors governing the germination of spores of *Botrytis cinerea*. The present report deals with the preliminary investigations on the nature of these exosmosed substances on the leaf-blades of varieties of rice, resistant and susceptible (Co 4 and Adt 10) to the 'Blast' disease caused by *Piricularia oryzæ* Br. *et* cav. Since guttation drops cannot be regarded as the sole seat of accumulation of exosmosed solutes, the following technique for collecting them was employed: two-week-old intact potted seedlings were washed with several changes of glass-distilled water and surface-dried with Whatman No. 1 filter-paper. Later, they were sprayed with equal aliquots of glass-distilled water at 6 p.m. and kept in highly humid conditions (95%). At 8 a.m. on the subsequent day, the moisture on the leaf-blades was absorbed with the aid of Whatman No. 1 filter-paper strips and stored in 80% ethyl alcohol. This process was continued for a week, at the end of which, the filter-papers were ground and concentrated for analysis. The amino acids and organic acids were determined by the ascending paper chromatographic technique. The relative concentration of each acid was determined visually by noting the intensity of spots developing on the paper chromatogram. The results are presented in Table I.

Although the four amino acids, *viz.*, alanine, methionine, tryptophane and lysine were common to both the resistant and susceptible varieties, the susceptible one, however, had glycine in addition. While succinic acid was characteristically present in the resistant plants, it was not detected in the susceptible ones. It should be stated that both the resistant and susceptible varieties had two unidentified and slow-moving organic acids, although the former recorded them in greater concentration.

TABLE I

Exosmosed solutes on the leaf-blades of rice (Oryza sativa *L.*)

Exosmosed substances	Relative Concentration	
	Resistant (Co 4)	Susceptible (Adt 10)
Glycine	Absent	+
Alanine	+	+
Methionine	++	++
Tryptophane	+	+
Lysine	+	+
Succinic acid	++	Absent

It is now well recognized that in the case of many air-borne infections, a very high humidity permitting the presence of free moisture on the leaves is an essential prerequisite for successful disease development and indeed this has been true with the blast disease of rice.[3] Therefore, diffusion of solutes under such humid conditions to the exterior of the host, possibly enabling the pre-penetration stages of infection has been indicated by the present study. An inquiry into the exosmosed metallic ions of the host and vitamins as well, since especially this fungus is known to be heterotrophic to B-vitamins,[4] is bound to throw considerable light on the mechanism of resistance to the blast disease and work on these lines is underway.

Since writing this to press, the authors have come across the reference of Kovàcs, A. and Szeöke, E., *Phytopath. Z.*, 1956, 27, 335 (*Rev. appl. mycol.*, 1957, 36, 121), wherein they have indicated the stimulatory/inhibitory influence of

exosmosed substances on the germination of spores of certain air-borne pathogens. The present note, however, has gone a step forward in presenting a qualitative analysis of such exosmosed substances.

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