Effect of two wheat cultivars differing in hydroxamic acid concentration on detoxification metabolism in the aphid Sitobion avenae

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Hydroxamic acids (Hx) are wheat secondary metabolites conferring resistance for cereals against aphids. The activity of five enzymatic systems were evaluated in the aphid Sitobion avenae reared on the high-Hx wheat cultivar Chagual and the low-Hx wheat cultivar Huayún for 10 generations. Enzyme solutions were prepared from aphid homogenates and assayed for mixed function oxidases (including cytochrome P-450 monooxygenases and NADPH cytochrome c reductase), glutathione S-transferases, esterases, and catalase. Specific activities per aphid individual of cytochrome P-450 monooxygenases, NADPH cytochrome c reductase, glutathione S-transferases, and esterases were significantly increased in wheat cultivars relative to oat (only marginal increase of esterases in Chagual). Aphids fed on cv. Huayún showed an overall higher induction of enzymatic systems than those fed on cv. Chagual. Comparison of these results with reported effects of Hx on detoxifying enzymes in other insects, including aphi