CROSS-RESISTANCE PATTERNS TO ALL ALS-INHIBITING HERBICIDE GROUPS IN *CYPERUS DIFFORMIS* L

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Weed control with ALS (acetolactate synthase)-inhibiting herbicides in California rice has become problematic due to evolved resistance to bensulfuron-methyl. However, these herbicides offer multiple advantages, and new compounds are being developed for use in California rice. Various mutations on the ALS gene determine different cross-resistance patterns. The specific mutations will dictate the relative success of existing and new ALS-inhibiting herbicides. The objective of this study was identify the cross resistance patterns in *C. difformis* for future determination of the corresponding mutations on the ALS and their distribution in the rice areas of California. Three biotypes from California (WA, BI and AS) and one biotype from Italy (IR) were evaluated in whole plant bioassays and "in vitro" studies of ALS enzyme activity The herbicides and their respective herbicide families were: bensulfuron-methyl and IR5878 (sulfonylurea); imazethapyr (imidazolinone); penoxsulam (triazolo-pyrimidine-sulfonamide); bispiribac-sodium (pyrimidiny benzoate); and propoxycarbazone-sodium (sulfonylamino-carboxyl-triazolinone). Both types of assays were conducted twice. At the whole plant level, the biotypes AS and BI were equally susceptible to all herbicides, the biotype IR was resistant to all herbicides except penoxsulam and the biotype WA was resistant to the other herbicides and moderately resistant to penoxsulam. The ALS activity evaluation confirmed the same pattern of resistance found in the whole plant assay indicating that the mechanism of resistance in the WA and IR biotypes is due to an altered ALS enzyme with reduced sensitivity to the herbicides. Therefore, the control of resistant populations and mainly the design of prevention strategies to resistant evolution are viable by alternating ALS herbicide groups.