SULFONYL-UREA RESISTANCE IN CROSS-RESISTANT ANNUAL RYEGRASS, *(LOLIUM RIGIDUM)*, MAY INVOLVE A WHEAT-LIKE DETOXIFICATION SYSTEM

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Abstract. Lolium rigidum Gaud. biotype SR 31 is resistant to diclofop-methyl and cross-resistant to several other sulfonyl-urea herbicides. Wheat and the cross-resistant ryegrass have similar suites of resistance to sulfonyl-urea herbicides, suggesting that the mechanism endowing resistance in wheat may also operate in resisitant ryegrass. The biotype is also cross-resistant to the wheat-selective imidazolinone herbicide imazamethabenz.

The extractable activities of the sulfonyl-urea target enzyme acetolactate-synthase are similar for the resistant and susceptible biotype. The acetolactate-synthase from the two biotypes are equally inhibited by chlorsulfuron in vitro. Therefore less sensitive target enzyme is not the basis of resistance to chlorsulfuron in cross-resistant ryegrass (1).

Studies using [^{14}C]-chlorsulfuron show that the cross-resistant biotype metabolises the herbicide at a faster rate than a biotype which is susceptible to both diclofop-methyl and chlorsulfuron. A third biotype which is resistant to diclofop-methyl but not to chlorsulfuron metabolised chlorsulfuron at the same rate as the susceptible biotype. The increased metabolism of chlorsulfuron observed in the cross-resistant biotype is, therefore, correlated with the pattern of resistance observed between these *Lolium* biotypes.

HPLC analysis of the products of the metabolism of chlorsulfuron in ryegrass showed that the major metabolite produced coeluted with the major metabolite produced in wheat. The products are clearly different to those produced by the resistant, broadleaf species flax (*Linium usitatissimum* L) .

The data on the metabolism of [^{14}C]-chlorsulfuron and the dose response studies indicate that the mechanism of resistance to sulfonyl-ureas in the cross-resistant ryegrass involves the ability to metabolise the herbicide at a faster rate than the susceptible biotype and that the metabolic pathway is probably similar to that operating in wheat.

REFERENCES

1. Matthews, J.M., Holtum, J.A.M., Liljegren, D.R, Powles, S.B. (1990). Plant Physiol. In press.