Experiences with triflusulfuron-methyl resistant witloof chicory
(Cichorium intybus var. foliosum)

Hilde Eelen1, Robert Bulcke1, Els Desmet1 and Robrecht Sarrazyn2
1Ghent University, Coupure links 653, B-9000 Ghent, Belgium
2Provincial Research and Advisory Centre, B-8800 Rumbeke, Belgium

Summary In chicory (Cichorium intybus L.), including the ‘vegetable witloof’ (= var. foliosum Hegi) and the ‘industrial’ (= var. sativum Lam. & DC.) types, weedy representatives of the Asteraceae family, particularly Galinsoga parviflora Cav. and Galinsoga quadriradiata Ruiz & Pavon, frequently cause major problems.Dicot weed control has long been dependent almost exclusively on soil acting ‘veteran’ herbicides applied pre-plant incorporated (PPI) or pre-emergence (PRE) including benfluralin (PPI only), chloropropham, propyzamide, carbetamide and asulam (PRE). Although some of these herbicides, such as asulam, also have post-emergence (POST) activity, their POST application has to be restricted with respect to rate and crop growth stage due to poor crop selectivity. The recent registration of the sulfonylurea triflusulfuron-methyl (mainly foliar acting), isoxaben and metolachlor (both almost exclusively soil acting) has resulted in the development of weed control systems with more emphasis on POST applications and lower rates. However, application of such systems may still result in significant initial crop injury or growth inhibition. Recently, joint French efforts by the Université des Sciences et Technologies de Lille and the breeder Hoquet Graines to select witloof chicory lines with an insensitive ALS enzyme conferring non-transgenic resistance to selected sulfonylurea herbicides, resulted in the introduction on the market of a triflusulfuron-methyl resistant hybrid variety, ‘Mont-Blanc’, formerly ‘Everest’. In greenhouse bioassay experiments with triflusulfuron-methyl applied PPI into a sandy loam soil, the highest concentration (512 µg kg⁻¹) did not significantly affect the pre-commercial resistant hybrid ‘TR’ at the foliage fresh weight level whereas the ‘conventional’ ‘Tabor’ was significantly inhibited (38%). In another pot experiment with four varieties, differential responses were recorded following application of triflusulfuron-methyl (up to 15 g a.i. ha⁻¹ for ‘Senator’ and ‘Atlas’ and up to 120 g a.i. ha⁻¹ for ‘TR’ and ‘Mont-Blanc’) at the 1–2 leaf stage. Foliage fresh weight of the resistant hybrid ‘Mont-Blanc’ was not negatively affected by rates of up to 120 g a.i. ha⁻¹ whereas both ‘conventional’ varieties ‘Senator’ and ‘Atlas’ were significantly inhibited by 15 g a.i. ha⁻¹ (45% and 55% growth inhibition respectively compared with their respective untreated controls). The pre-commercial resistant hybrid ‘TR’ displayed an intermediate response with 30% inhibition at 15 g a.i. ha⁻¹.

Experiences from field experiments illustrate that by growing a resistant variety such as ‘Mont-Blanc’, the excellent selectivity of triflusulfuron-methyl, when applied to the foliage or to the soil, may be exploited advantageously by using it from early growth stages onwards and occasionally in a crop displaying staggered emergence. However, taking into account the incomplete weed spectrum of this sulfonylurea, it needs to be integrated into systems including other established chicory herbicides.

Keywords Witloof chicory, triflusulfuron-methyl, resistance.