XXX Congresso Brasileiro da Ciência das Plantas Daninhas
Conhecimento e Tecnologia a Serviço do Agricultor
ISBN: 978-85-64093-07-2
22 a 26 de agosto de 2016
Expo Unimed Curitiba

Effect of six weed control strategies on glyphosate-resistant corn and soybean yields and nutritional content

Élise Smedbol[1], Marc Lucotte[2], Gilles Tremblay[3], Jérôme Bernier Brillon[4], Serge Paquet[5], Matthieu Moingt[6], Émile Samson-Brais[7]

Université du Québec à Montréal[1], Université du Québec à Montréal[2], Centre de recherche sur les grains[3], Université du Québec à Montréal[4], Université du Québec à Montréal[5], Université du Québec à Montréal[6], Université du Québec à Montréal[7]

The majority of corn and soybean crops in the province of Quebec (Canada) are glyphosate-resistant (GR), with areas corresponding, respectively, to 85% and 58% of total corn and soybean crops area. The aim of this study was to identify the impacts of six different weed control strategies on corn and soybean grain yield and nutritional quality. Field experiments were conducted in 2015, at the Grain Research Center (CEROM) in the city of St-Mathieu-de-Beloeil (Quebec, Canada) and the experimental design consisted in six weed control treatments replicated four times in randomized blocks: T_1) Mechanical weeding with a four row cultivator T_2) One glyphosate-based herbicide application [1.67 L ha^{-1}] T_3) Two glyphosate-based herbicide applications [2 x 1.67 L ha^{-1}] T_4) Other herbicide application [Soybean: Chlorimuron ethyl, 36 g ha^{-1} + Imazethapyr, 312 ml ha^{-1}] [Corn: Saflufenacil + Dimethenamid-D, 1.1 L ha^{-1}] T_5) One glyphosate-based herbicide [1.67 L ha^{-1}] + other herbicide application [Soybean: Imazethapyr, 210 ml ha^{-1}] [Corn: S-metolachlor, 1.25 L ha^{-1} + Mesotrione, 0.21 L ha^{-1} + Non-ionic surfactant, 0.2% (v/v)] T_6) Two glyphosate-based herbicide applications [2 x 1.67 L ha^{-1}] + other herbicide application [Soybean: Chlorimuron ethyl, 36 g ha^{-1} + Imazethapyr, 312 ml ha^{-1} + Non-ionic surfactant, 0.2% (v/v)] [Corn: S-metolachlor, 1.25 L ha^{-1} + Mesotrione, 0.21 L ha^{-1} + Non-ionic surfactant, 0.2% (v/v)]. The yield was measured in kg ha^{-1} and the nutritional composition was analyzed using near infrared spectroscopy (Diode Array 7200 NIR Analysis system, Perten Instruments) for protein, ash, moisture, fiber, starch and fatty acids. There were no significant differences for the six weed control treatments in corn plots, whether for yield or nutritional content. In soybean, T_1 was the least productive treatment with an average of 2652 kg ha^{-1}, followed by T_2 (3917 kg ha^{-1}) and T_4 (3486 kg ha^{-1}), while T_3, T_5 and T_6 produced higher yields (4646 kg ha^{-1}, 4315 kg ha^{-1} and 4248 kg ha^{-1}). The protein content was significantly higher in T_1, while the total oil content was significantly higher in T_3, T_5 and T_6. These results demonstrate the possibility of using chemical-free weed control strategies in corn crops, such as mechanical weeding without reducing the yields or the grains nutritional content. While the use of glyphosate-based herbicides in soybean maintains higher yields, restrained usage of these herbicides in crops under soybean and maize rotation could be envisaged.

Palavras-chave: Agricultural practices, glyphosate-based herbicides, other herbicides: Chlorimuron ethyl, Imazéthapyr, S-metolachlor, Mesotrione, Saflufenacil + Dimethenamid-D