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Lowering Pre-Emergent Herbicides Use To Junglerice (*Echinochloa colona*) Control

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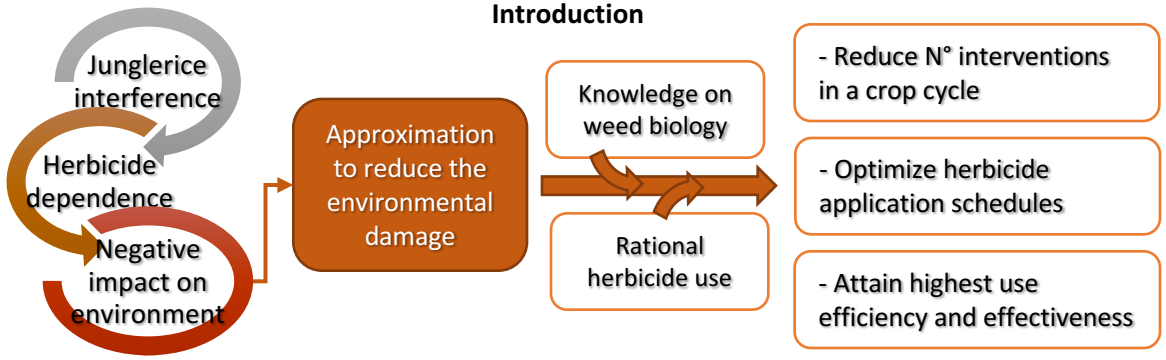
Introduction



Materials and Methods

Experiments were carried out between September 2016 - January 2021 at INTA (Pergamino, Argentina, 33.95°S, 60.57°W). Pre-emergent herbicides were applied at different timings during *E. colona* seedling emergence (Fig. 1). Application timing were calculated using a seedling emergence model. Bicyclopyrone plus s-metolachlor, and clomazone and pyroxasulfone plus saflufenacil were applied in corn and soybean, respectively.

Cumulative relative emergence was calculated according to the expression $[Er_i=\Sigma(E_0..E_i)/E_n]$, where Er_i is the cumulative relative emergence (%) at time i, E is the number of seedlings from the beginning (E_0) to time i (E_i), and E_n is the total number of emerged seedlings in untreated plot. To determine the effective control period (EC) GDD were calculated from the beginning of the emergence cycle to the emergence of new seedlings after herbicide application.

Results

Maximum efficiency of the mixture bicyclopyrone plus s-metolachlor application were founded at 348 and 399 GDD in the 2016/17 and 2017/18 seasons, respectively. It was due to lowest Er (2 and 3%) and maximum EC (1282 and 993 GDD) were achieved (Fig. 2a/2b).

Aplication of clomazone was more effective at 457 and 472 GDD in the 2018/19 and 2020/21 seasons, respectively. At these application timings, Er was 15% and EC was of 913 and 770 GDD inboth seasons (Fig. 2c/2d).

Finally, when pyroxasulfone plus saflufenacil were applied at 378 and 396 GDD in 2018/19 and 2020/21, respectively, lowest Er (4%) and maximum EC (998 and 1092 GDD) were observed (Fig. 2e/2f).

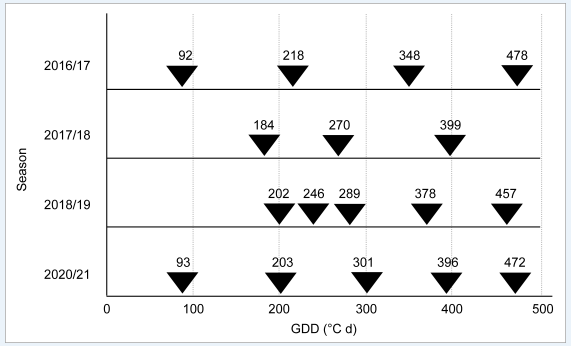


Fig. 1. Application timing of different herbicides (triangles) according to an air temperature-based model

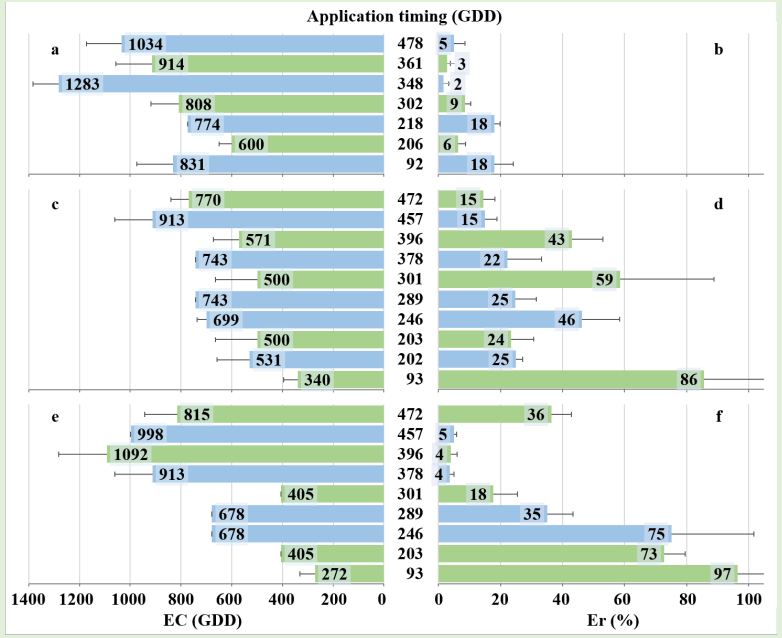


Fig. 2. Duration of effective control period (EC, left side) and relative seedling emergence (Er, right side) in bicyclopyrone plus s-metolachlor (top), clomazone (center), and pyroxasulfone plus saflufenacil (bottom) at different application timings (central axis) in the first (green) and second (blue) experimental season.

Conclusions

The results from the present study indicate that an emergence model based on thermal time allows to adjust herbicide applications to improve their efficiency and effectiveness. This in turn, contributes to reducing both the number of applications and the volume of herbicides. Herbicide application efficiency was found to be highest shortly before reaching 400 GDD from the beginning of the emergence cycle of junglerice. Thus, 400 GDD could be set as the critical timing to junglerice control.