



**Mixed Winter Cover Crops and Dynamics of Weeds in Agricultural Systems of Rolling Pampas Argentine**

**María V. Buratovich<sup>1,2</sup> and Horacio A. Acciaresi<sup>1,3</sup>**

<sup>1</sup> Instituto Nacional de Tecnología Agropecuaria, Estación Experimental Agropecuaria INTA Pergamino, Pergamino, Buenos Aires, Argentina. [Buratovich.maria@inta.gob.ar](mailto:Buratovich.maria@inta.gob.ar)

<sup>2</sup> Consejo Nacional de Investigaciones Científicas y Técnicas. Pergamino, Buenos Aires, Argentina.

<sup>3</sup> Comisión de Investigaciones Científicas. Pergamino, Buenos Aires, Argentina.



**Introduction**

The Rolling Pampas Region of Argentina is one of the most appropriate areas in the world for grain production, due to the suitability of its soils and climatic conditions. But, reiterated and excessive use of herbicides as only tool for weed management increased selection pressure on biotypes of weeds causing the evolution of resistance to different mechanisms of action with the consequent expansion of resistance. Thus, in Argentina, twenty-seven biotypes of resistant weeds were detected, since 1996 to actuality, with a tendency to an exponential increase. In recent years, the use of cover crops (CC) for weed management had increased markedly. So, it is necessary to generate information about the different species and combinations to be used. The aim of this study was to determine if different mixtures (in different proportion) and monocultures of CC limit aerial biomass and number of autumn- winter weeds.

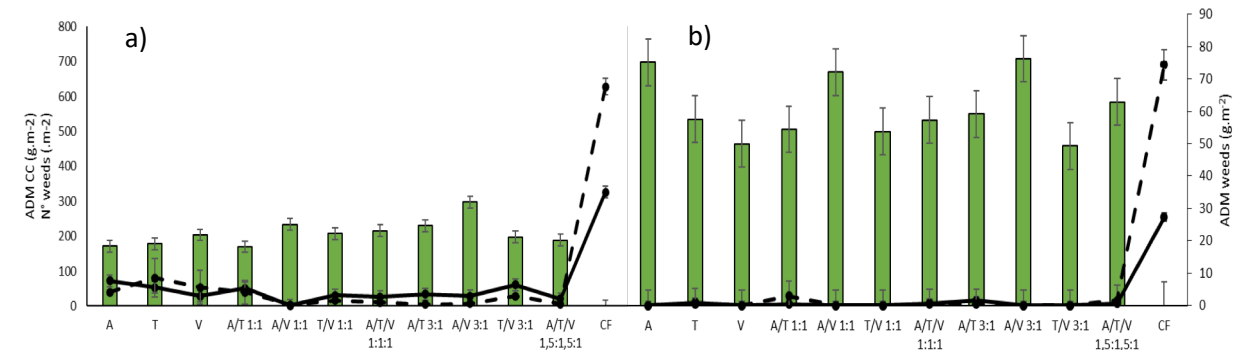
**Materials and Methods**

In the Estación Experimental Agropecuaria INTA Pergamino (Pergamino, Buenos Aires, Argentina, 33° 51' S, 60° 34' W) an experiment with different species of CC was implanted. The species used were: *Avena sativa*, *Triticosecale* and *Vicia villosa*. Mixtures and monocultures of CC were used, at a density of 250 pl.m<sup>-2</sup>, except in hairy vetch that was 125 pl.m<sup>-2</sup>. Double and triple mixtures CC were planted, in a relationship 1:1 and 3 (grass) :1 (hairy vetch). Also, a sector was left without CC, with chemical

fallow. In each experimental unit total aboveground biomass of CC and weeds were quantified as dry matter in two moments. Too, total number and species of weeds were registered. The data obtained were analyzed by an analysis of variance (ANOVA) with general and mixed linear models using the statistical program Infostat, according to the corresponding experimental design. Treatment means were compared by DGC test (Di Rienzo, Guzmán, and Casanoves), ( $p < 0,05$ ).

**Results**

At tillering of CC (Z 2.5, Zadoks *et al.*, 1974), the proportion 3:1 of *Avena sativa*/*Vicia villosa* showed the biggest aboveground dry matter (ADM) (298 g.m<sup>-2</sup>) while non-significant differences between the other CC were observed (200 g.m<sup>-2</sup>). At the end of cycle of CC (Z 7.3), there were no significant differences between CC in terms of ADM (540 g.m<sup>-2</sup>). In both moments, the biggest number and ADM of weeds were observed in fallow plots (326 and 242 weeds.m<sup>-2</sup> and 70,70 and 74,29 g ADM.m<sup>-2</sup> in Z 2.5 and Z 7.3, respectively), while no significant differences were showed between the different CC treatments (37 and 3 weeds.m<sup>-2</sup> and 2,97 and 0,51 g ADM.m<sup>-2</sup> in Z 2.5 and Z 7.3, respectively) ( $p > 0,05$ ).



Aerial dry matter (ADM, g.m<sup>-2</sup>) at tillering (a) and milky grain (b) of CC (bars), ADM of weeds (g.m<sup>-2</sup>) (dotted line) and number of weeds (n<sup>o</sup>.m<sup>-2</sup>) (solid line). b) A: *Avena sativa*, T: *Triticosecale*, V: *Vicia villosa*, CF: Chemical fallow. Pergamino, Buenos Aires, Argentina. 2018-2019.

**Conclusions**

According to the results obtained, CC allow to reduce number and aboveground dry matter of weeds, regardless the proportions and consociations used. Thus, the use of CC is a valid tactic for resistant weed management in Rolling Pampas Argentine, rationalizing the use of herbicides in the Region and minimizing the possible environmental impact of chemical control.

