EARLY DETECTION OF BARNYARDGRASS (*Echinochloa crusgalli*) QUINCLORAC-RESISTANT BIOTYPES AT THE EXPERIMENTAL UNIT OF PASO DE LA LAGUNA (UEPL in sp.) IN URUGUAY

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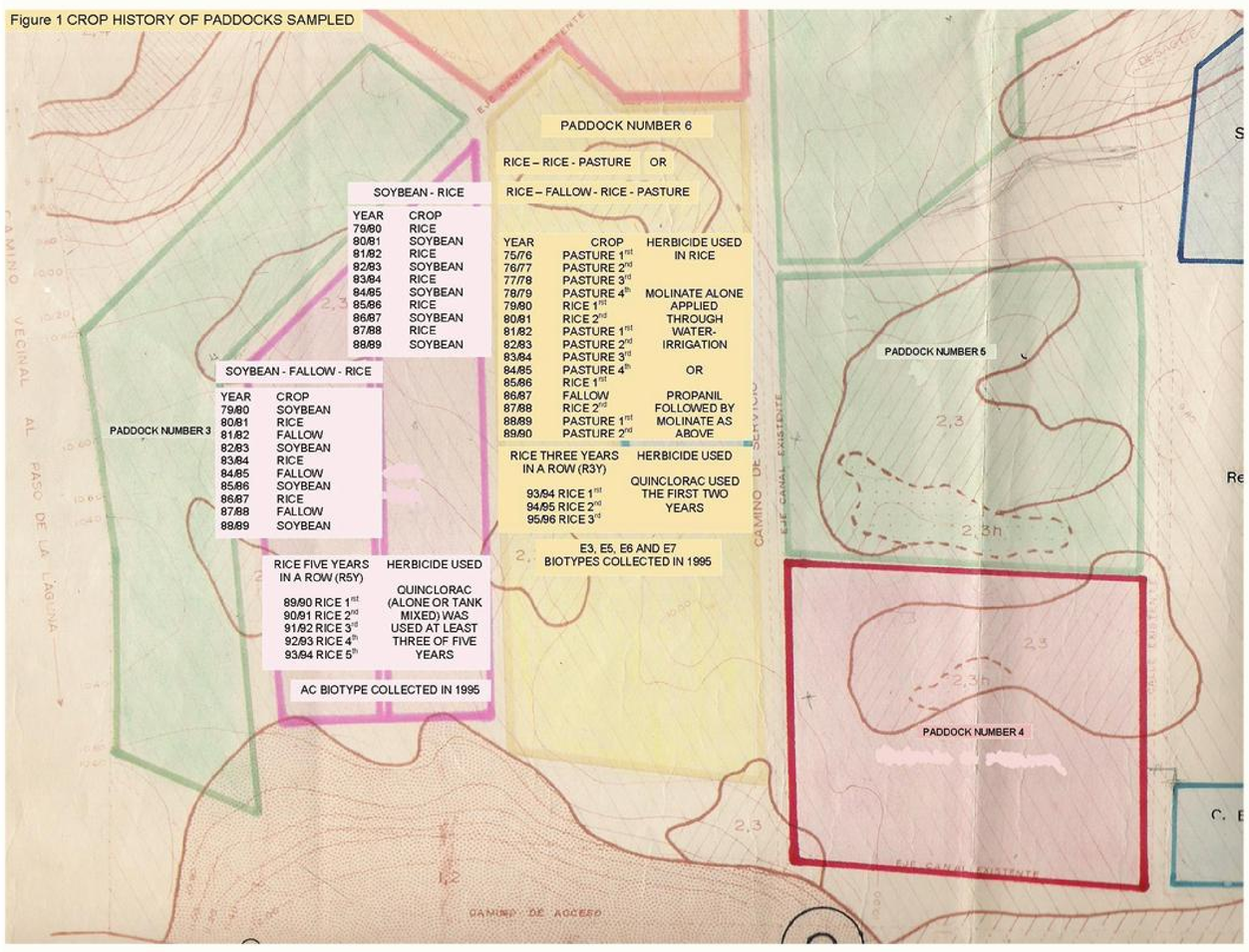
INTRODUCTION

One rice crop per year is seeded in Uruguay. A rice-pasture-rotation experiment was conducted at the UEPL in 1974-1991. The first sequence was rice-rice-pasture (2:4) and later on was modified to rice-fallow-rice-pasture (1.1:1:4). Since 1993, rice was cropped three years in a row (R3Y) on pasture paddocks. Another crop-rotation experiment alternating rice-soybean was done in 1979-1988. Since 1989, rice was seeded five years in a row (R5Y) on soybeans-paddock. The objective was to assess susceptibility of barnyardgrass escapees to quinclorac, propanil and clomazone in R3Y and R5Y scenarios

MATERIALS AND METHODS

Mass seed of barnyardgrass biotypes E3, E5, E6 and E7 from R3Y and AC from R5Y were collected in March 1995.

Figure 1 CROP HISTORY OF PADDOCKS SAMPLED



Pot experiments were carried out to asses barnyardgrass biotypes resistance in 2011-2012. Zero, 1/8, ¼, ½, 1, 2, 4 and 8 X rates were used for every combination herbicide / biotype studied with four replications. One X rate was 375, 1920 and 480 g a.i. ha^{-1} for quinclorac, propanil and clomazone; respectively. Adjuvants recommended for each herbicide were applied. Trials were repeated twice, following Herbicide Resistance Action Committee's protocols. According to Ritz & Streibig (2005), log-logistic models were adjusted by means of the drc package of the R software being the fresh weight per pot the dependent variable.

The relationship between LD50 resistant/LD50 susceptible biotypes was used as the resistance factor (RF).

RESULTS

Table 1 Quinclorac resistance assessment

Biotypes	LD50 ± sd	t-value	p.	RF*
	g a.i. ha^{-1}			
RY3 scenario				
E3(1)	3000	na	na	64.2
E5	302 ± 122	2.453	0.0156	6.5
E6	2957 ± 485	6.106	0.0000	63.3
E7	6185 ± 2670	2.316	0.0239	132.3
RY5 scenario				
AC	2470 ± 262	2.368	0.000	52.8

(1)= resisted maximum rate used, na= not available, *= LD50 replaced by the lowest rate (46.7) evaluated for susceptible biotype A33P2 just used for resistance factor (RF) estimates

Table 2 Propanil resistance assessment

Biotypes	LD50 ± sd	RF ± sd	t-value	p.
	g a.i. ha^{-1}			
RY3 scenario				
E3*	856 ± 151	4.7 ± 1.6	2.368	0.0183
E5	na	na	na	na
E6**	1306 ± 206	7.3 ± 2.4	2.596	0.0097
E7*	1885 ± 444	10.4 ± 3.8	2.459	0.0143
RY5 scenario				
AC**	28.8 ± 125	0.2 ± 0.7	-1.173	0.2414

*= LD50 susceptible biotype Pbarrob 180 ± 51 (p. 0.0000),na= not available, **= LD50 susceptible biotype Pbarrob 179 ± 52 (p. 0.0007)

Table 3 Clomazone resistance assessment

Biotypes	LD50 ± sd	RF ± sd	t-value	p.
	g a.i. ha^{-1}			
RY3 scenario				
E3*	147 ± 24	5.0 ± 3.9	1.009	0.3129
E5	na	na	na	na
E6*	173 ± 19	5.9 ± 4.6	1.059	0.2901
E7**	259 ± 24	7.9 ± 3.6	1.919	0.0566
RY5 scenario				
AC**(1)	60	1.8	na	na

*= LD50 susceptible biotype Leites2 29.5 ± 22.8 (p. 0.1982), na= not available, **=LD50 susceptible biotype Leites2 32.4 ± 14.4 (p. 0.0255), (1)=LD50 replaced by the lowest rate evaluated

CONCLUSIONS After two years using quinclorac in R3Y-paddock number 6 and at least three times in R5Y-paddock, E3, E6, E7 and AC biotypes showed high level resistance (Rf>10). E7 would also be propanil-resistant and look like tolerant to clomazone because never was exposed to it.