Weed control with environmentally friendly alternatives in smallholder agriculture in Cuba

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Introduction

Plant residues and organic amendments have shown to have herbicidal effects under different climatic conditions. In countries like Cuba, this is particularly important because such materials are available, while herbicides usually are hardly affordable for small farmers.

In addition, organic amendments as soil treatment were shown to have less environmental impacts than chemical herbicides. In order to evaluate the herbicidal effects of plant residues in comparison the manure and plastic mulch the present investigation was carried out.

Materials and methods

1. The experiment was carried out on a Ferric Acrisol soil in the central part of Cuba, using a randomized block design, with 1 m2 plots and four replicates during 60 days.

2. The following treatments were tested: I) air dried cabbage (*Brassica oleraceae* L.) residues at an amount of 10 Mg ha−1 with plastic mulch, II) poultry manure applied at an amount of 50 Mg ha−1 with plastic mulch, III) plastic mulch only, IV) a control without any treatments against weeds.

3. The taxonomic classification of the weeds, their number and weight were determined at the end of the experiment.

4. Planta data were subjected to analysis of variance. The means were compared by the HSD Tukey test. The statistical analyses were performed using SPSS 15.0.

Table 1. Weed species present in each treatment

Treatment	Weed Species
Cabbage + mulch	
Manure + mulch	*Eleusine indica* (L) Gaertn
	Cyperus rotundus L.
Mulch	*Eleusine indica* (L) Gaertn
	Cyperus rotundus L.
Control	*Eleusine indica* (L) Gaertn
	Cyperus rotundus L.
	Portulaca oleracea
	Amaranthus dubius Mart.
	Dichanthium annulatus Forsk
	Cynodon dactylon (L) Pers.
	Rottboellia exaltata L.
	Lepidium virginicum L.
	Xanthium strumarium L.
	Urena lobata L.
	Commelina diffusa Burm.

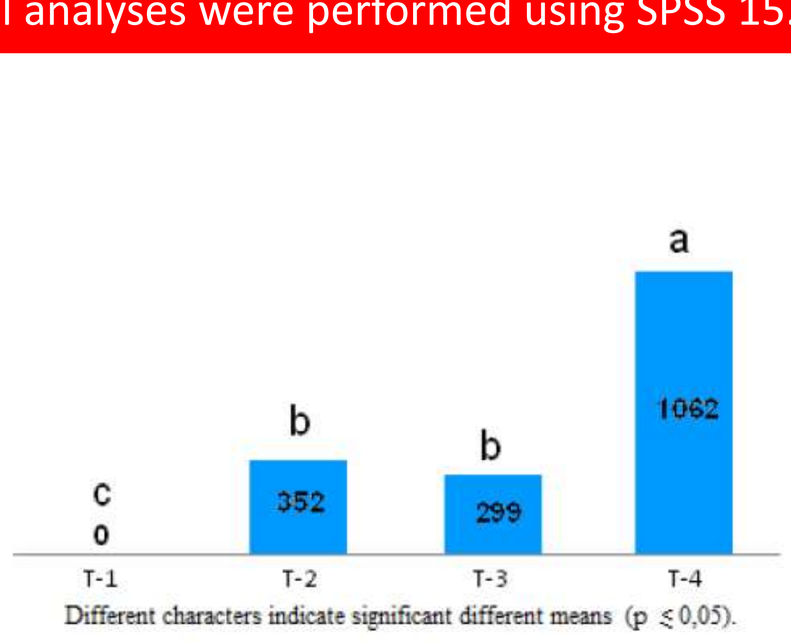

Fig. 1. Effects of the treatments on the total dry weigh of the weeds (g/m²)

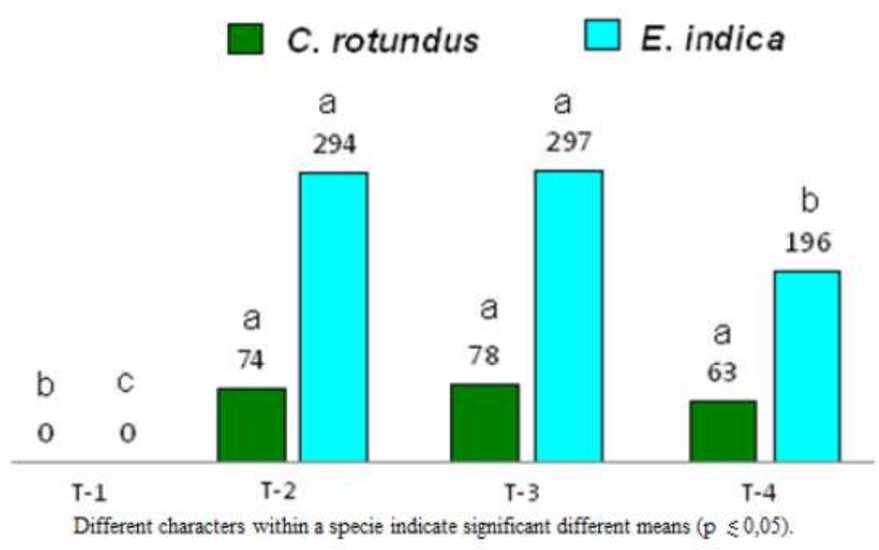

Fig. 2. Effects of the treatments on the number of plants of *C. rotundus* and *E. indica* (plants/m²)

Conclusions

1. Of all the treatments investigated, only that of cabbage residues with plastic mulch was able to control all weeds, including the most resistant *E. indica* and *C. rotundus*.

2. Especially for smallholder farms, dry cabbage residues with plastic mulch can be recommended as a cost-effective and environmentally friendly weed control measure.