17th European Weed Research Society Symposium - Montpellier, 22-26 June 2015

EXCELLENT WEED CONTROL WITH BIODEGRADABLE MULCHES IN PEPPER GROWN OPEN-AIR

A. Cirujeda[1], G. Pardo[1], J. Aibar[2] , A.I. Marí[1], M.M. Moreno[3], C. Moreno[3], R. Meco[4], I. Lahoz[5], J.I. Macua[5], L. Martín-Closas[6], A. Pelacho[6], N. Pastor[6], J. Costa[6]
[1]Unidad de Sanidad Vegetal, CITA, Avda. Montañana 930, 50059 Zaragoza, España (acirujeda@aragon.es, carza@aragon.es)
[2] EPS, Univ. de Zaragoza. [3]Univ. Castilla-La Mancha, Ciudad Real; [4]C. de Agricultura, Toledo; [5]INTIA, Cadreita, Navarra; [6]Univ. Lleida, Spain.

Introduction and Objectives

The most used weed control technique in pepper grown open-air in Spain is the use of polyethylene (PE) mulch.

The management of the mulch waste after harvest is costly, time-consuming and, in occasions, very difficult (wind)

The aim of this work was to test several biodegradable mulch materials for their weed control and pepper yield in four different Spanish locations.

Methods

Table 1. tested treatments in the field trials at Aragón, Ciudad Real, Navarra and Lleida.

Treatment	Company	Material descripttion	
Unweeded control	-	-	
Manual weeding	-	-	
Polyehtylene	Several	Black, 15µm	Low-density polyethylene
Mater-Bi®	Novamont	Black, 15µm	Maize starch-based
Sphere 4®	Sphere Group Spain	Black, 15µm	Potato starch-based
Sphere 6®	Sphere Group Spain	Black, 15µm	Potato starch-based
Bioflex ®	Fkur	Black, 15µm	Polylactic acid-based
Ecovio®	BASF	Black, 15µm	Polylactic acid-based
MimGreen®	MimCord	Black, 85 g.m^{-2}	Paper

Mechanical lay-down of the mulches.

Common field trial year 2014.

Common methodology to assess weed control 21, 42 and 63 days after planting.

Results

- Weed species composition was different for each location. Domminating species were: *Cypeurs rotundus*, *Setaria* spp. and *Digitaria sanguinalis* at Aragón; *Diplotaxis virgata* and *Amaranthus albus* at Ciudad Real; *Stellaria media* and *Cirsium arvense* at Navarra; *Portulaca oleracea* and *Amaranthus retroflexus* at Lleida.
- Total weed density increased in time and was the highest at Lleida and the lowest at Navarra (Figure 1).

- Weed control exceeded 90% for all materials at all locations excepting plastics when *Cyperus rotundus* was found (at Aragón). This weed pierced most Sphere 4 and Bioflex and was well-controlled by the paper mulch (Figure 2).

- Commercial pepper yield was similar to that obtained for PE with some oscilations but lower for manual weeding (Figure 3).

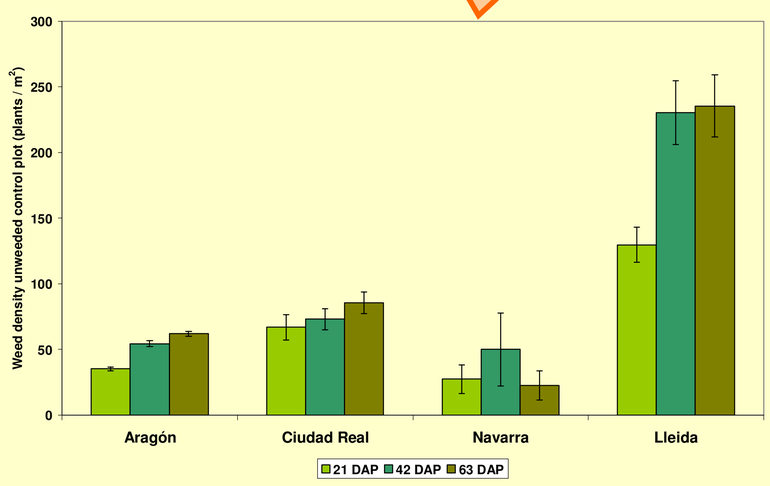

Figure 1. Weed density (plants m^{-2}) in the untreated control plots 21, 42 and 63 days after plantation.

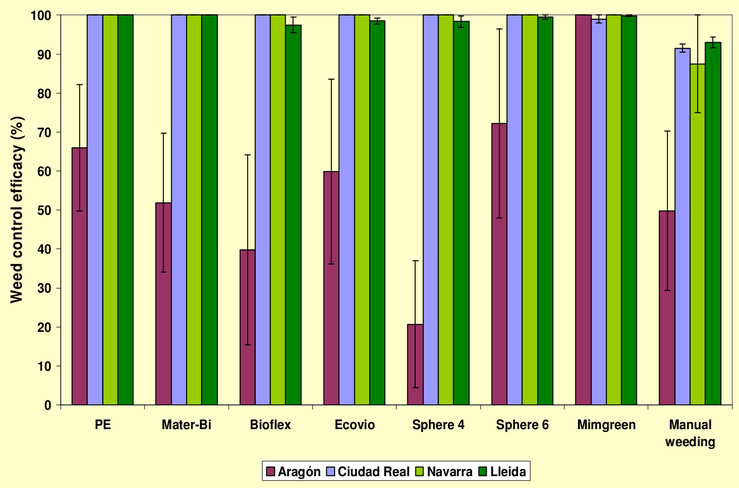

Figure 2. Weed control efficacy (%) 63 days after plantation.

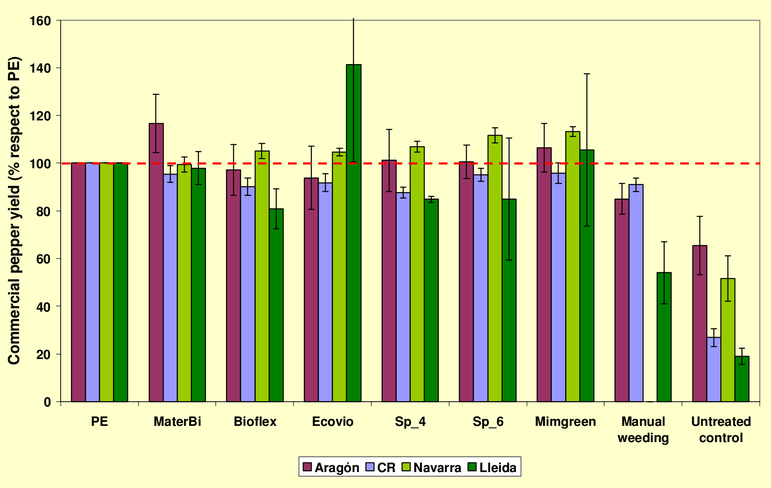

Figure 3. Commercial pepper yield as a sum of all the harvests in relation to PE yield. (100%= 13.5-59.4 t/ha depending on the location)

Conclusions

Picture 1: *Cyperus rotundus* pierces plastic films.

1. **Several biodegradables mulches were able to control weeds effectively excepting *C. rotundus, however* controlled with paper mulch.**
2. **Commercial pepper yield on the degradable mulches was similar to that obtained growing on PE.**
3. **Technically, these materials are an alternative to PE reducing waste problems.**

Acknowledgements: the research is funded by the Project RTA2011-00104-C04 from the INIA (Spanish Ministry of Economy and Competitivity). Thanks to F. Arrieta, J.A. Alins, M. León for their support in field and laboratory.