Effect of biodegradable mulches on pepper production and purple nutsedge (*Cyperus rotundus* L.) control

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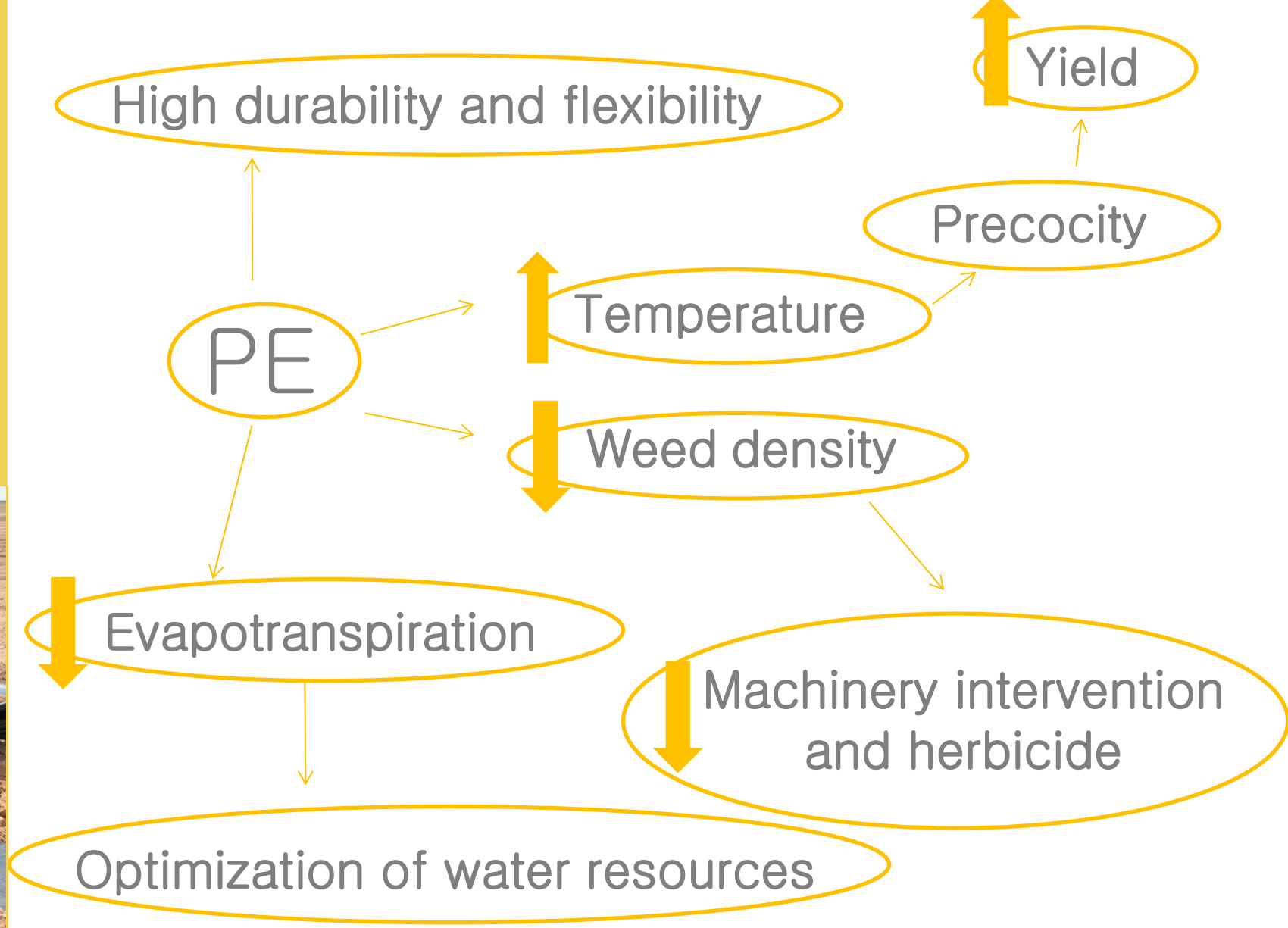
Advantages in the use of PE



INTRODUCTION

Disadvantages in the use of PE

Waste management: costs

RESIDUOUS/WASTE GENERATION

INTRODUCTION

Disadvantages

Waste management: costs

Limitation of land use

RESIDUOUS/WASTE GENERATION

INTRODUCTION

Disadvantages

Waste management: costs

Limitation of land use

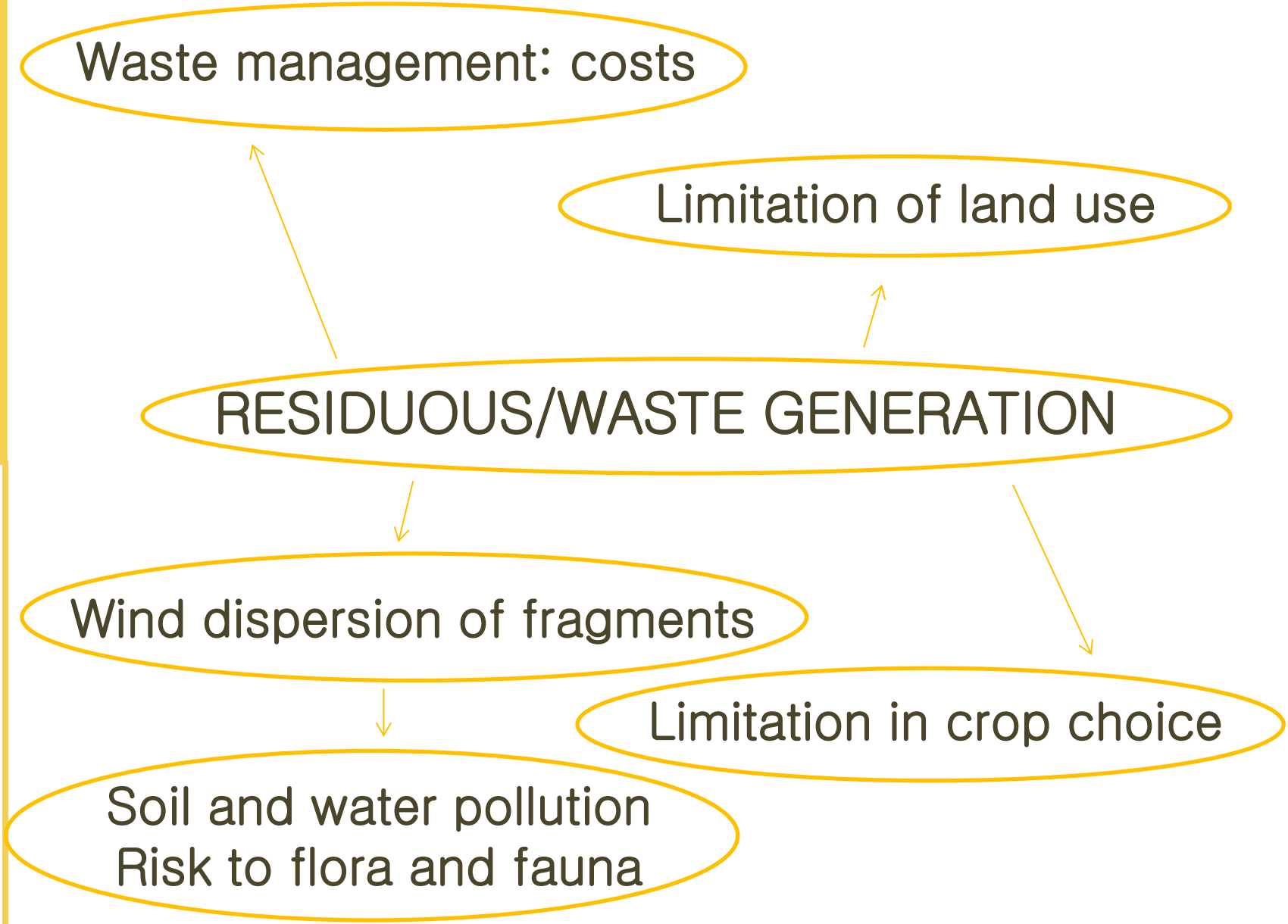
RESIDUOUS/WASTE GENERATION

Wind dispersion of fragments

Soil and water pollution
Risk to flora and fauna

INTRODUCTION

Disadvantages



INTRODUCTION

Waste management

Costs of removing material from the field: 115€/ha

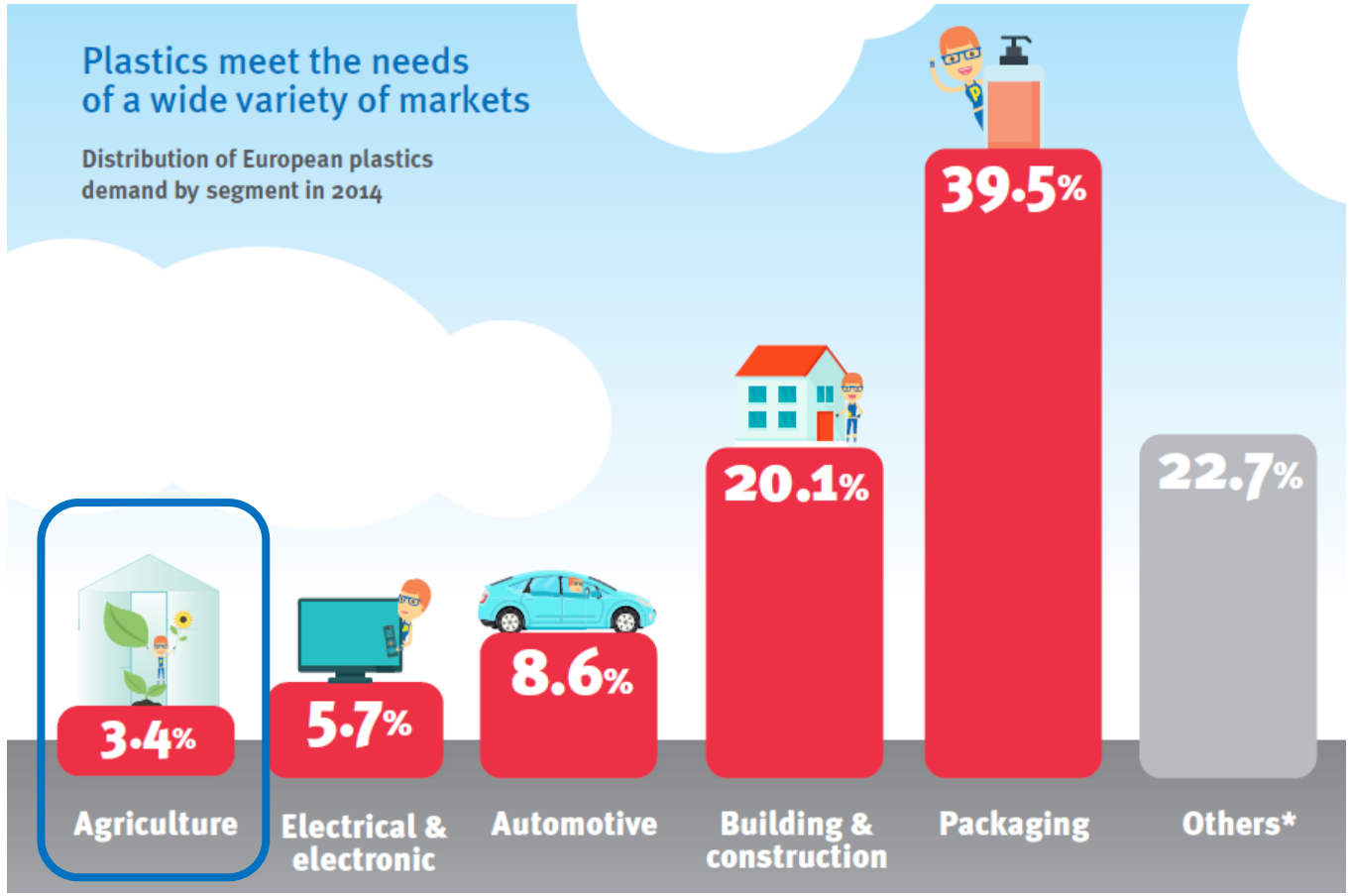
Plastic recycling plants: Limitation with impurities >5%
Normally : 75-85%

Hazardous waste category, high cost

Abandonment, burning or burial of material

INTRODUCTION

Waste in numbers

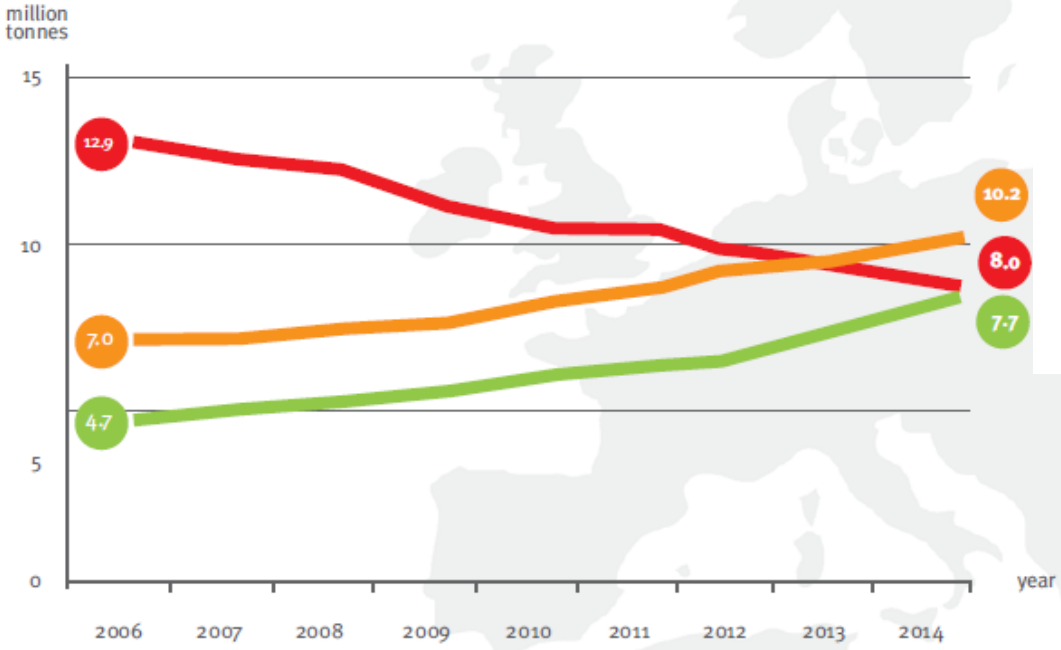


INTRODUCTION

Waste in numbers

Recycling
+64%

Energy recovery
+46%



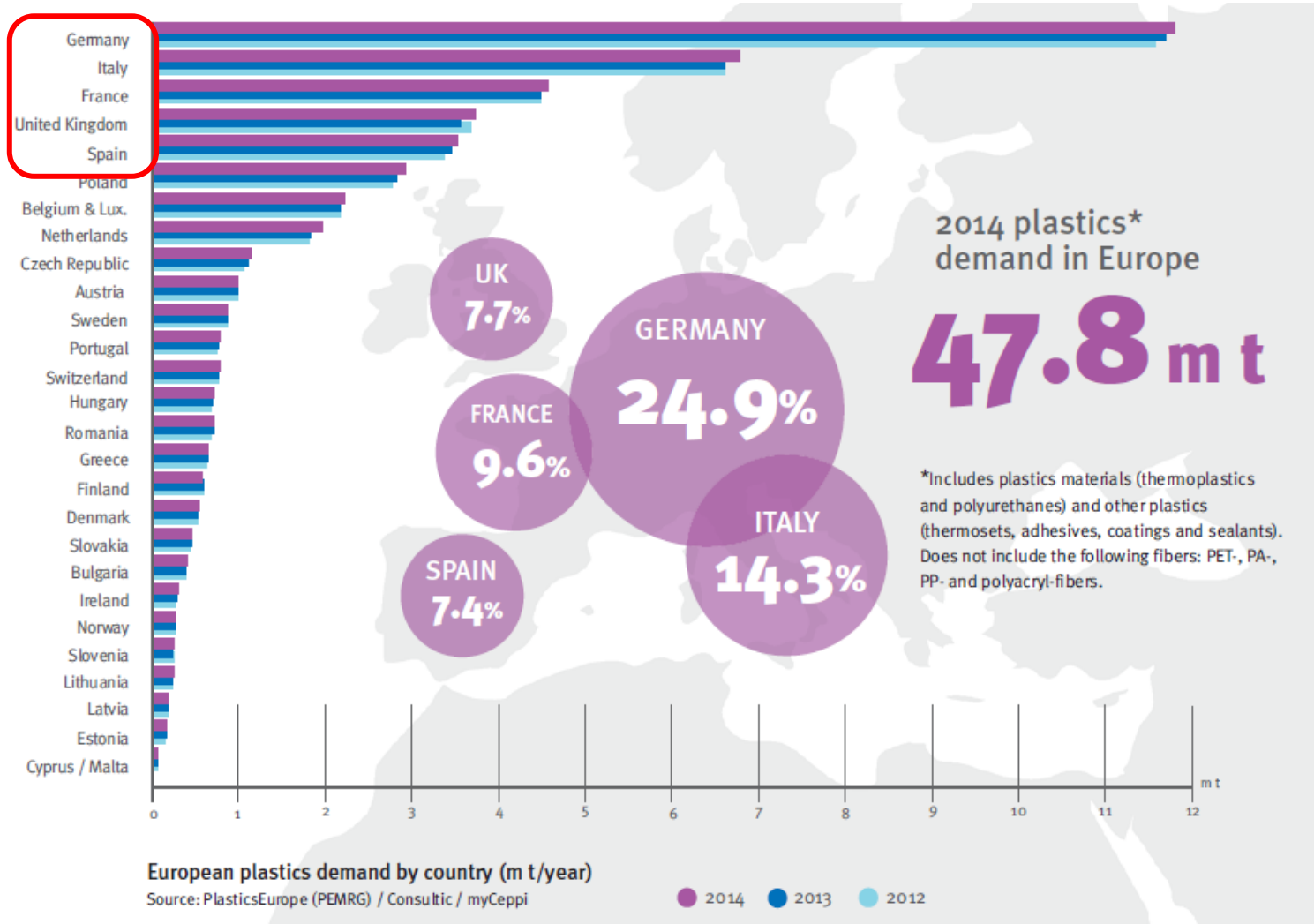
Landfill
-38%

Treatment of post-consumer plastics waste 2014
(EU-28 + CH/NO)
Source: Consultic

INTRODUCTION

Waste in numbers

2/3 OF PLASTICS DEMANDS IN EUROPE IS CONCENTRATED IN FIVE COUNTRIES



INTRODUCTION

Waste in data

SPAIN

Year 2012: **200.000 tones** of plastics used in agriculture

6.3% of **total Spanish plastic consumption**

40 % Coverage plastics

75.000 t/year of residues

INTRODUCTION

Waste in data

European directive 2008/98 CE Marco de Residuos (DMR)

↓

Plan Nacional Integral de Residuos 2008-2015 (PNIR)

↓

Plan específico gestión de plásticos de uso agrario (PUA)

↓

Plan Estatal de Marco de Gestión de Residuos 2016-2022 (PEMAR)

↓

"**Biodegradable polymers** can contribute to reduce those residues because at the end of their lifetime those materials decompose within a reasonable time" (MAGRAMA, 2016)

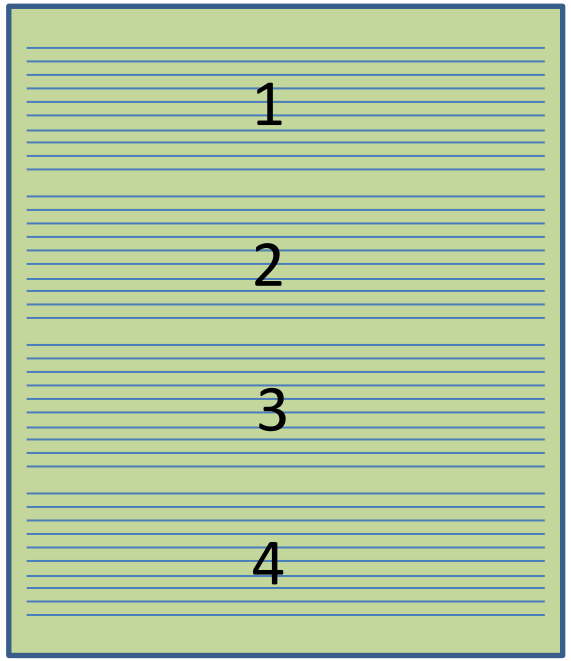
INTRODUCTION

Objectives

EVALUATE BIODEGRADABLE MATERIALS AS MULCH IN ORDER TO FIND AN ALTERNATIVE TO PE

with the study of weeds density and pepper yield

MATERIAL AND METHODS



Years 2014-2015

Zaragoza, Spain

10 treatments

PLASTICS	PAPERS	UNWEEDED CONTROL
Polyethylene (PE)	Mimgreen®	
Mater-Bi®	A240	
Sphere® 4	A69	
Sphere® 6		
Bioflex		
Ecovio®		

DENSITY AND % WEED COVERAGE:

21, 42 y 63 DAT
Sampling frame 0.2 m^2

TOTAL PEPPER YIELD:

Weight and nº of fruits

RESULTS AND DISCUSSION

Agro-enviromental details

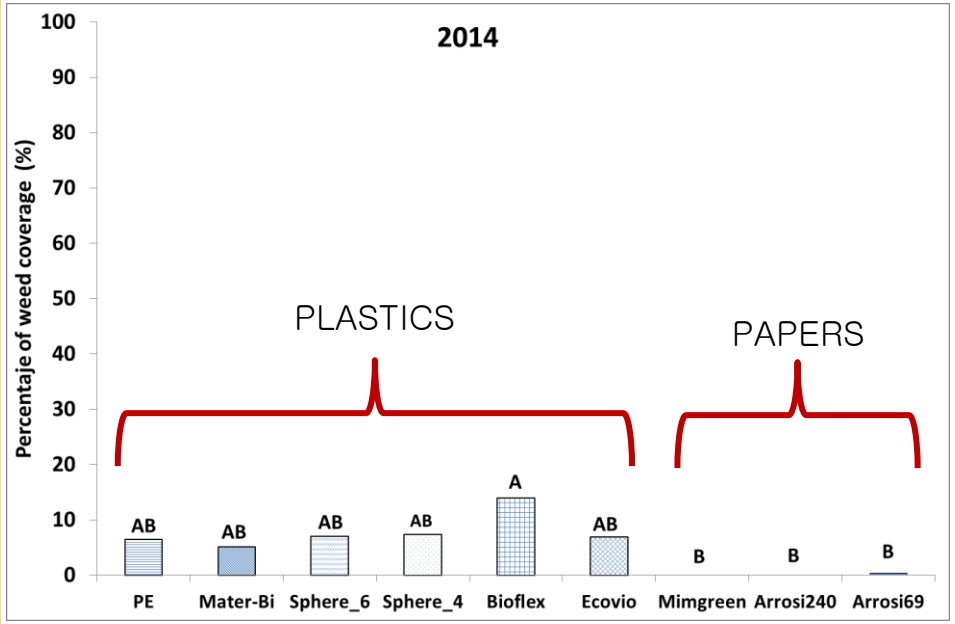
Problems of film lifting due to strong gust of wind.The same with crops that had low percentaje of film covered
(Harrington *et al.* 2004).

Early tears and degradation. Situation with other experimental materials (Zandstra 2007)

RESULTS AND DISCUSSION

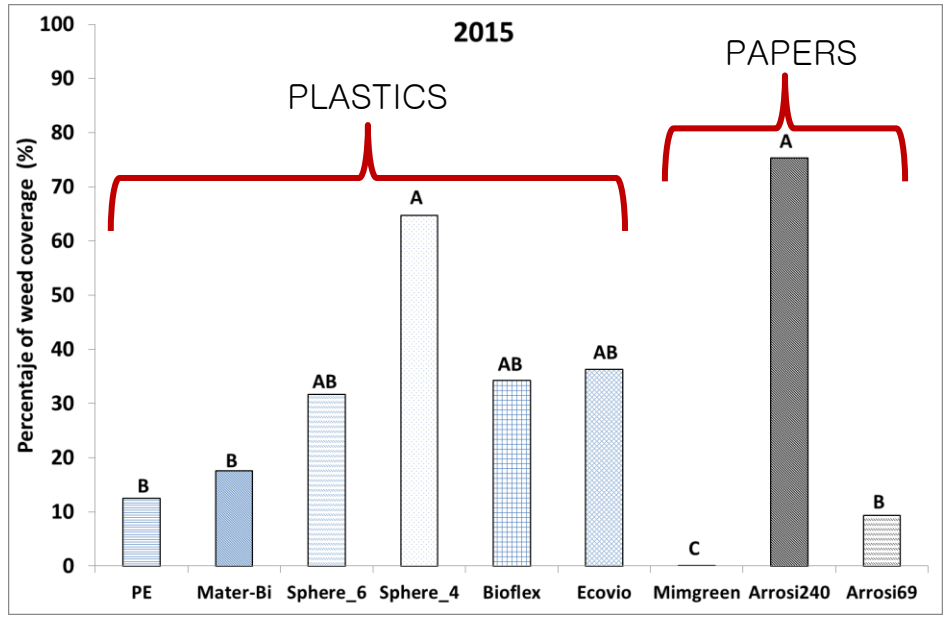
WEEDS

% total weed coverage



Biodegradable plastics were as efficient as PE

Similar results to essays with tomato (Cirujeda *et al.* 2012).



2015: similar to 2014 but with higher densities

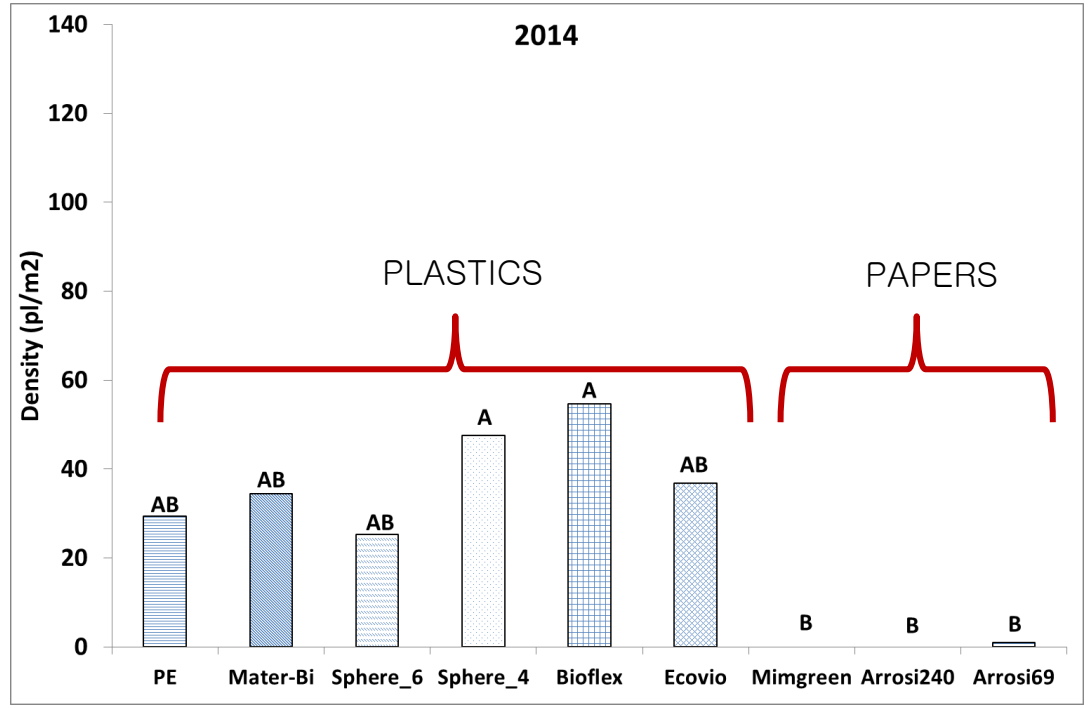
UNWEEDED CONTROL

PAPER

PLASTIC

RESULTS AND DISCUSSION

Weeds:
Cyperus rotundus



Biodegradables plastics more pierced than PE (Cirujeda *et al*. 2012)

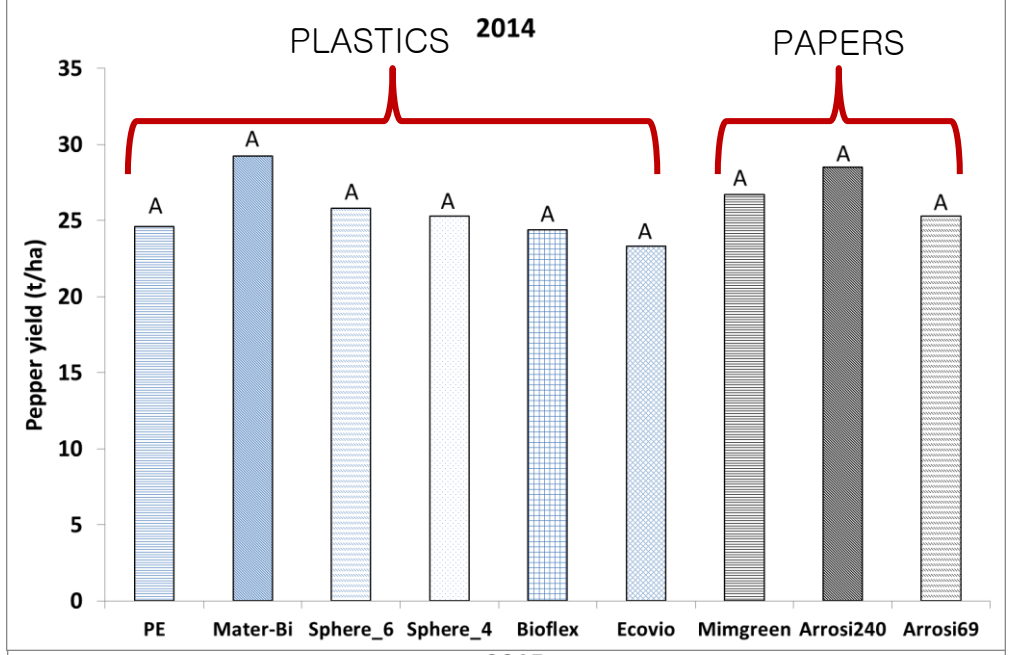
3–5 weeks at the beginning without yellow nutsedge can increase pepper yield 10%
(Motis *et al.*, 2003).

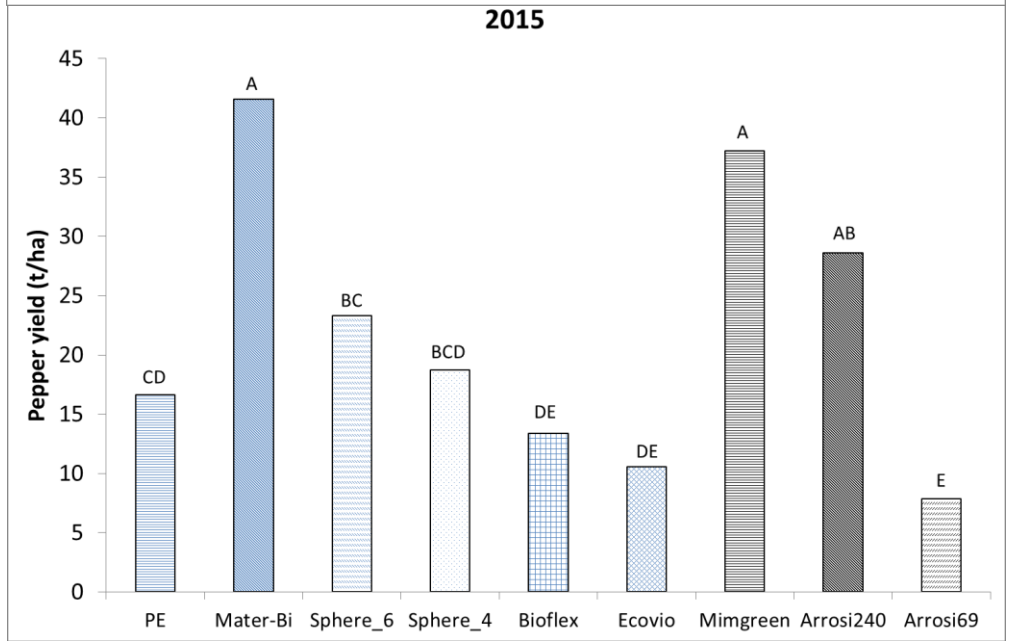
Efficient control of purple nutsedge with papers, similar results with tomato (Cirujeda *et al*. 2012, Anzalone *et al.* 2010).

2015. Data not shown.

RESULTS AND DISCUSSION

Marketable pepper yield





Yield were similar within materials. The same situation ocuured with tomato (Cirujeda *et al.* 2012)

High temperatures and problems with irrigation early breaks.

CONCLUSIONS

- Both **paper and biodegradable plastic mulches are efficient as PE** in weed control.

- **Paper films were the only materials capable of prevent nutsedge to pierce** . A recommendable material in case of severe nutsedge infestations.

- **Total marketable yield were similar as the one obtained with PE, even higher in the case of the biodegradable plastic Mater-Bi. Any of these materials are a good alternative to PE**.

THANK YOU FOR YOUR ATENTION