Evaluating the potential of biodegradable films as alternatives to fossil fuel-derived plastic mulches for weed control in an organic field vegetable system

Plastics are widely used in many forms of farming but especially in horticulture, for example as polytunnel coverings and in produce packaging. The EU funded H2020 project **Organic-PLUS**, concerned with contentious inputs in organic agriculture, identified weed supressing mulches as a particular issue.

Two replicated trials (n=4) were established in 2019, near Coventry in the English Midlands, using onions and cabbages as test crops.

Treatments

1) Weeded control
2) Unweeded control
3) Woven polypropylene
4) Polythene
5) Commercial biodegradable 1
6) Commercial biodegradable 2
7) Innovative biodegradable: CUT 1
8) Innovative biodegradable: CUT 2

The CUT mulches were developed by partners at Czestochowa University of Technology

All the black mulches effectively suppressed weeds but the innovative films CUT1 and CUT2 (both translucent white) degraded before the end of the growing season (Fig. 1). The weed competition was reflected in the onion yields (Fig. 2). However, in the cabbage trial (data not shown) all the mulches lasted long enough to compete with the weeds whilst the crop was vulnerable and the final plot yields, except the unweeded control, were comparable. We conclude that rapid biodegradation need not be a problem, depending on the crop.

Although effective, the manufacture and transport of starch-based biodegradable mulches still has an environmental impact. Ongoing work is investigating loose mulches made from on-farm materials including woodchip and hay.

Figure 1. The development of weed ground cover in the onion crop

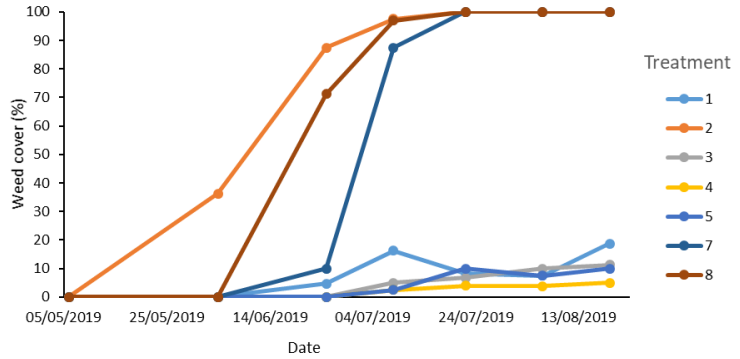
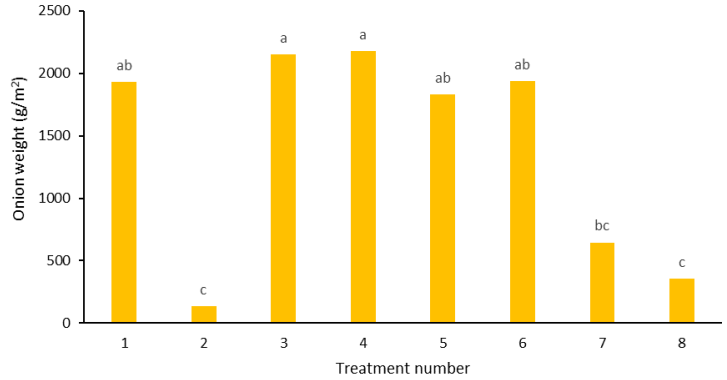


Figure 2. Marketable yield of onions. Different letters indicate significant differences (P<0.05)



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