Research Report

EVALUATION OF POLYTHENE MULCH FOR WEED CONTROL IN BUSH FRUITS

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Summary

Weeds below gooseberry, black currant, boysenberry, and raspberry plants are inaccessible to cultivation implements and require weeding by hand. Hand-weeding is time-consuming and costly. Black polythene sheet as a mulch to control weeds under bush fruit plants was examined at the Horticultural Research Station, Levin, in the 1961-62 season. The polythene used was 36 in. wide, 0.005 in. thick and was anchored by means of wire staples. The technique appeared sufficiently promising to warrant further study.

INTRODUCTION

THE GROWTH HABITS of blackcurrant, boysenberry, gooseberry, and raspberry plants prevent access by normal cultivation machinery to the soil surface underneath them. Control of weeds in these areas is usually done by hand. Labour shortages and costs are forcing many growers to look for alternative methods. Weedicides may be the solution, but, as yet, even the most promising of these have limitations.

Weed control on bush fruits is particularly important over the years of establishment. In this period, and particularly in the first season, they are susceptible to competition.

Herbicides are more likely to damage young plants than those with an established root system.

In 1961-62 the feasibility of using black polythene sheet as a mulch to control weeds below blackcurrant, boysenberry, gooseberry and raspberry plants was examined in an exploratory trial.

TREATMENTS AND METHODS

For each kind of bush fruit there were two treatments:

- (1) *Cultivation*. Bushes were planted into bare soil. Weeds were controlled by hand-hoeing of a 3 ft wide strip below the plants. Weeds growing against the plant bases were removed by hand. Hand-weedings were done at 5 to 6 week intervals. Five weedings were needed between planting and mid-March.
- (2) *Polythene*. Bushes were planted into soil previously covered by 3 ft wide, 0.005 in. thick, black polythene sheet. Planting holes were made through the sheet by cutting two 4 in. slits to form a cross. During the planting operation the V-shaped flaps were tucked under out of the way.

To encourage emergence of raspberry canes the lengthwise planting slits were extended 4 in. on either side of the original plant about four weeks after planting. The sheet had been anchored on September 14 by staples at 12 in. intervals parallel to and about 1 in. inside each sheet. Staples were made of 13 gauge wire and had 4 in. backs and 2½ in. prongs. Longer pronged staples would have been needed if the soil had not been well firmed. Weeds growing through planting holes were removed by hand at about 8-week intervals between planting and mid-March. Three hand-weedings were done.

All plots had a single row of plants in a hedge system. The polythene covered strip continued the length of the plots. Outside these

strips a white clover (*Trifolium repens*) and weed sward was regularly mown down to 2 in. with a rotary mower. There were two replications for each kind of fruit.

Factors with the different fruits are set out in Table 1.

The soil, a silt loam, had been under cultivation for two years and was prepared by rotary cultivations, rolling and smoothing. Before the polythene was laid, fertilizer was applied on all plots in bands on the soil surface on both sides of the row.

All plants had roots cut back to within 1 in. of the main root just before planting. Plants were set into minimum sized holes and in the same way for both treatments. Though drought occurred from late December until mid-January, and in early March, no irrigation was done.

The effects of polythene and cultivation on growth were assessed by comparison of the amounts of wood growing through the season. In May the current season's growth from all plots was removed and weighed. In addition, raspberry canes of reasonable size were counted and weighed separately.

TABLE 1: DETAILS OF EXPERIMENTAL SPECIES AND THEIR TREATMENT

Kind of Plant	Variety	Distance between Plants in the Row (ft)	No. Plants per Plot	Date of Planting in September	Planting Depth	Pruning immediately following Planting
Blackcurrant	Goliath	3.0	4	15	4 in. below nursery level	All wood cut to leave 2 buds above soil level.
Boysenberry	Nectarberry	12.5	2	22	1 in. below nursery level	All canes cut to 6 in. above soil level.
Gooseberry	Levin Early	3.0	4	15	At nursery level	Year-old wood reduced by half.
Raspberry	Marcy	1.5	7	18	At nursery level	Canes cut 1 in. above soil level and on Dec. 1 reduced to 6 in.

RESULTS

Weed control was not examined in detail but the five hand-weedings done in the cultivation treatment were the minimum number needed. It was found that weeds growing through the planting holes in the polythene sheet had to attain some size before they could be easily grasped for hand pulling. Consequently these were removed only three times.

White clover and some weeds, especially black nightshade (*Solanum nigrum*), growing at the edge of the sheet developed a prostrate habit after several mowings, and grew over the sheet. When the direction of mowing was reversed they were drawn up to the cutting blades.

Plant growth for the season with polythene and cultivation was as shown in Table 2.

Apart from raspberry the growth of the various plants was not as great as expected. Gooseberry plants grew poorly.

Weight of current season's wood was definitely greater with polythene mulch than cultivation for blackcurrant and boysenberry, and slightly greater with gooseberry plants. It was the same under both treatments with raspberries. Though the number of raspberry canes of reasonable size was considerably more with cultivation than polythene, the weight of these was much the same: apparently individual canes were larger.

TABLE 2: AMOUNT OF GROWTH OVER THE SEASON
FROM PLANTING UNTIL MAY

	Blackcurrant		Boysenberry†		Gooseberry		Raspberry				
	Culti-	Poly-	Culti-	Poly-	Culti-	Poly-	Culti-	Poly-			
	vation	thene	vation	thene	vation	thene	vation	thene			
Mean wt. (g) per plant of current season's growth	40	102		270	446		20	29		109	105
Mean No. of new canes of reasonable size* per plant	—	—		—	—		—	—		2.4	1.7
Mean total weight of new canes of reasonable size* per plant	—	—		—	—		—	—		65	71

* i.e., 8mm or more diameter at 6 in. above soil level.

† leaves on.

Wind did not lift the polythene sheet at any time through the season and very little deterioration occurred to it.

DISCUSSION

Hand hoeing was eliminated by use of polythene mulch but weeds growing through planting holes had to be removed by hand. Some hand pulling of weeds close to bush bases was also needed on cultivation plots.

The comparatively poor growth of some of the plants was attributed to the combination of late planting, severe root pruning, competition for moisture from the adjacent mown sward, and the drought periods.

The reduced number of raspberry canes on polythene compared with cultivation plots was undoubtedly caused by the restricted area available for new canes to emerge.

Experience with 0.002 in. polythene as a mulch on strawberries indicated that the 0.005 in. sheet should last four to five seasons.

The main disadvantage of the mulching method would be the initial cost of polythene and staples. The cost of 0.005 in. sheet would be between £120 and £180 per acre, depending on distance between rows. Factory-made staples would cost between £12 and £15. In addition, there is the cost of laying. This outlay would easily be recouped by savings in labour costs.

CONCLUSIONS

Hand hoeing beneath plants was eliminated by the polythene sheet. Some hand removal of weeds growing through planting holes was needed.

Under somewhat unfavourable conditions for bush fruit establishment, growth of mulched plants was, over the first season, equal to, or greater than hand-weeded plants.

In spite of high initial cost, the use of black polythene sheet below blackcurrant, boysenberry, gooseberry and raspberry plants appeared to be worthy of further study.

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