WEED CONTROL IN CANE AND BUSH FRUITS

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Summary

Suggestions are made for weed control in areas of raspberry, bramble, blackcurrant and gooseberry. For propagation areas the methods include the use of sawdust, paraquat, diquat, and simazine for raspberries, and black polythene sheet for gooseberries and blackcurrants. Methyl bromide as a pre-planting soil fumigant is also suggested. In both first-season and established areas chemical weed control is based on paraquat or diquat applied while plants are dormant to provide a weed-free soil not only for the plants at their first growth but also for the application of simazine. Sheep and geese used judiciously can assist weedicides in some established areas. A black polythene mulching strip is a suggested alternative for blackcurrants and gooseberries. Mown clover sward in the central portion of the alleys is considered more suitable with these weed control methods than is cultivation. Integration of several methods enable weeds to be controlled almost without hand labour.

INTRODUCTION

IN New Zealand, production of the cane fruits raspberry, boysenberry and loganberry, and the bush fruits blackcurrant and gooseberry is over 1,800 tons or only 1.5 lb per head of the population.

Control of weeds completely without hand work could contribute significantly to the lowering of production costs. Towards this end, integrated use of some of the available weed control methods involving weedicides, polythene sheet mulch, sawdust mulch, methyl bromide fumigation, grazing by sheep or geese, and mown sward together with maintenance of plant vigour has much to offer. The use of a particular control method must fit in with overall management.

Unless otherwise stated, rates of chemicals are as active ingredient per treated acre.

WEED CONTROL METHODS

THE WEEDICIDES PARAQUAT, DIQUAT AND SIMAZINE

Directional spraying refers to the application of herbicides as close as practical to the above-ground portions of the crop plants without their being touched, and is done with a directed or shielded nozzle. Unless specified as directional, weedicide applications mentioned are by means of unshielded off-centre nozzles set to spray towards and through each row of plants, each side being sprayed separately. The nozzles are adjusted so that the incidental spraying of the crop plants is kept as low as possible.

In established areas, chemical weed control is based on paraquat and diquat applications in the winter while the plants are dormant, to prepare

a weed-free soil surface for application of simazine at the start of plant growth.

The choice between paraquat and diquat depends on the weed species present. Sufficient non-ionic spreader should be added to the weedicide-water mixture to give complete coverage of the weeds.

Paraquat and diquat are best applied in a high volume of water. The amount of weedicide-water mixture sprayed depends on the area of weed surface wetted to "run-off" rather than the area of ground. High volume spraying allows the use of high dilutions which are tolerated by dormant cane and bush fruits and, though involving a large amount of water, reduces drift hazards, improves penetration into weeds, and simplifies the operation. Dilutions as low as 1:700 commercial paraquat or diquat (both 2 lb a.i. per gallon) with water and sufficient spreader will kill many annual weeds when these are thoroughly wetted. In directional spraying where the cane and bush plants are not contacted, a dilution of 1:300 is used as it kills a wider range of weeds.

Though these weedicides can be applied directionally during the growing season, their real usefulness is against annual weeds in the winter when bush and cane fruits are dormant and when wet and cold soil and weather conditions make eradication of these weeds by cultivation very difficult.

Simazine at 2 or 3 lb is applied in a moderately low volume of water at bud break. It can give good control of annual weeds until February and in the shade under vigorous crop plants considerably later. Weed growth after this is declining, and may have no deleterious effect on bush and cane fruits. It is later eradicated by application of paraquat or diquat during the winter.

POLYTHENE MULCHING

For established areas, black polythene sheet as a mulching strip under the plants is easiest laid before planting and after fertilizer application. Severe root pruning facilitates planting through this sheet and does not appear to retard the plants provided they are fully dormant. When planted, the polythene sheet is anchored by both edges, being buried to a depth of 2 in. It can also be anchored on well-consolidated soil by special galvanized wire staples inserted at 12 in. intervals 1 inch from the edge. These staples are made of No. 13 gauge soft wire and have prongs at least 2.5 in. long and backs of not less than 4 in. Staples are especially useful if planting is into uncultivated soil straight from short sward, particularly on small areas. Once an area is planted and the sward grows over the edges of the sheet, wind is unlikely to lift it. Black polythene sheet of 0.005 in. thickness to cover a 3 ft strip below plants with 9 ft between rows costs about \$280 per acre and will last at least 6 years; 0.002 in. sheet costs about \$110 and will last 2 years.

SHEEP AND GESE

Sheep can be grazed among established dormant raspberries, blackcurrants and gooseberries and brambles (once the new canes have been tied up) to reduce weed bulk and facilitate the use of paraquat and diquat. Some damage to plants inevitably occurs but this is at a minimum with young sheep and low stocking rates.

Geese can be used until late dormancy in raspberries and gooseberries, and until four weeks before the next season's harvest in blackcurrants.

Weedicides will need to be used against weeds which are avoided by geese.

RELEVANT MANAGEMENT

IMPORTANCE OF PLANT VIGOUR

The hedge system of plant spacing, particularly with raspberries and to some extent with blackcurrants and gooseberries, together with maintenance of plant vigour by adequate fertilizer, moisture, and disease and pest control, smothers most weed growth under the plants from late spring until the commencement of leaf fall.

MOWN SWARD IN ALLEY CENTRES

In established plantations, mown sward in the central region of alleys between the rows is more suited to weed control by chemicals and polythene sheet than is cultivation (Porter, 1963). Freedom from cultivation prevents residual weedicides being diluted or shifted below the soil surface zone and eliminates the problem of cultivation close to polythene sheet. Sward cover also reduces soil compaction, aids moisture entry, and maintains a smooth and pleasant working surface. Mowing in itself controls the growth of weeds. White clover (*Trifolium repens*) is very suitable sward as it is not aggressive, is restricted by shading under the plants, and has some resistance to most weedicides. Clover has the disadvantages of being slippery to machinery on relatively steep areas and, as with all sward, aggravates drought conditions. With sward in alleys, weedicides need to be applied only to the weed-free strip at the bases of plants.

WEED CONTROL IN PARTICULAR CROPS

RASPBERRY

Propagation: Raspberry plants are propagated in cane-beds, 3 to 4 ft wide strips in which new canes are produced each season. Unwanted canes are mown off while still dormant and the area immediately rotary cultivated so as to cover stumps and reduce their exposure to infection by *Stereum purpureum* which causes silver leaf. Four to five inches of sawdust mulch above the soil allows rotary cultivation without soil and root disturbance. Weeds growing after this are eradicated with paraquat or diquat before the new canes emerge. Plants in cane-beds must be vigorous and healthy and as such are able to smother most weeds. Weeds at the outer fringe of the bed are not smothered and can be controlled by simazine at 2 lb applied at the end of dormancy and by directional spraying of diquat or paraquat. Soil fumigation by methyl bromide is advisable before laying down a cane-bed.

1st Season: Weeds between planting, in June or July, and late dormancy can be eliminated by paraquat or diquat used at dilutions of not less than 1:400. Simazine at 1 lb can be applied at early bud break.

Established Fruiting Areas: While canes are dormant, several applications of paraquat or diquat at dilutions of not less than 1:400 are applied to produce a weed-free soil before later application of simazine at 2 to 3 lb at early bud break.

BRAMBLE

Propagation: Field propagation is by tips of new canes being buried 3 to 4 in. in February or March, and producing new plants. Methyl bromide fumigation of the soil, a month before tips are buried, and light cultivation later to remove germinated resistant weeds, such as clover, gives very good weed control. Fumigation must be at least 3 ft from the mother plants. Alternatively, the area can be fumigated several weeks before mother plants are set out.

1st Season: Plants are set 2 in. lower than nursery level. Directional sprays of paraquat or diquat will kill weeds before an application of simazine at 1 lb at bud break.

Black polythene sheet, through which plants are set, has been found to allow them to grow well and gives very good weed control. However, where training of primocanes (new canes) involves using wire hoops pushed into the soil, the polythene is punctured and spoilt within two seasons.

Established Plants: After dormant canes are tied up, paraquat or diquat at a dilution of not less than 1:700 can be applied in preparation for simazine at 2 lb at early bud break.

BLACKCURRANT

Propagation: In the field, cuttings are inserted into the soil, often in beds. Black polythene sheet mulch (0.002 in.) with cuttings pushed through at intervals of 6 in. by 6 in. gives a very good "strike" and weed control. The sheet should be laid at least 3 weeks before cuttings are inserted, as this allows weeds to germinate and be smothered before the sheet is punctured.

Methyl bromide fumigation gives very good weed control but should be completed at least a month before cuttings are inserted to enable resistant weeds to be removed.

1st Season: Plants are set 4 in. below nursery level. Paraquat or diquat at concentrations of not less than 1:600 can be used from setting until late dormancy. Simazine at 1 to 2 lb can be applied at early bud break.

Black polythene sheet as a mulch at the base of plants is suitable for blackcurrants and gives very good weed control. Planting through the sheet is facilitated by severe root pruning: this does not reduce plant vigour provided planting is done before late dormancy.

Established: Paraquat or diquat at a dilution of not less than 1:600 over the dormant period prepares the soil for application of simazine at 2 to 3 lb at early bud break.

Black polythene sheet is also useful for established areas but is best applied before planting. Weeds growing through the planting holes can be spot sprayed.

GOOSEBERRY

Propagation: As for blackcurrant propagation areas.

1st Season: Methods are similar to those for blackcurrants but plants are set only 1 in. below the nursery level. Paraquat or diquat at a dilu-

tion of not less than 1:400 is used between planting and late dormancy. Simazine is used as for blackcurrants but at 1 lb.

Established: Paraquat and diquat are used over the dormant period at a dilution of not less than 1:400 and simazine at 2 to 3 lb at early bud break.

PERENNIAL WEEDS

The following suggestions apply only to established areas as cane and bush fruits must be propagated on soil free of these weeds.

Control of perennial weeds in fruiting areas is difficult and can result in loss of yield. Too much emphasis cannot be placed on the need for weed eradication *before* planting.

Couch (Agropyron repens): Applications of paraquat through the dormant period allows new shoots of raspberry, brambles and blackcurrants to emerge without competition. Directional applications of paraquat over the crop growing season will retard couch but not kill it. If fruiting is obviously being reduced, then consideration should be given to grubbing and sterilizing with methyl bromide or using amitrol-ammonium thiocyanate with cultivation to eradicate couch before replanting.

Docks (Rumex spp.): Application of 2,4-D amine or polyethylene glycol ester at 2 lb at early dormancy of crop plants gives some control. Asulam at 1.5 lb applied at dormancy shows promise. Repeated applications of diquat in the dormant period retards dock re-growth in the spring at the critical time at which the crops start growing.

White Clover (Trifolium repens): 2,4,5-T at 3.6 lb applied as directionally as possible when crop plants are dormant will eradicate it.

Greater Convolvulus (Calystegia sepium): Once the crop plants have reached early dormancy, but before the convolvulus has been frosted, 2,4-D amine at 1 lb per 150 gal of water can be applied as directionally as possible to cover the convolvulus foliage.

Oxalis (Oxalis latifolia): There is no way of eradicating even a mild infestation of this oxalis from an area of cane or bush fruits. These crops commence growth before oxalis, thus dominating it as does the mown sward. It does not thrive in the shade below raspberries and blackcurrants and even gooseberries to some extent, so that established vigorous areas of these plants tolerate this weed to a degree. The system of non-cultivation prevents oxalis from spreading

REFERENCE

Porter, L. A., 1963: 16th N.Z. Weed Control Conf.: 33-7.