

WEEDS OF HORTICULTURAL CROPS IN NEW SOUTH WALES

Reviewed by
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The culture of fruit trees and vines, and vegetables, account for the bulk of commercial horticultural production in New South Wales. Since fruit trees and vines are essentially perennial crops and vegetables mainly annuals, they are reviewed separately hereunder.

FRUIT TREES AND VINES

Fruit growing in New South Wales occupies some 130,000 acres with a gross annual value of \$68 million (5% of total New South Wales rural production) and is by far the greatest activity within the classification of horticulture. The areas of production of major importance can be broadly classified into coastal, tableland, and inland with the climate varying from the hot humid sub-tropical conditions of the north coast to the dry arid conditions of the Murrumbidgee Irrigation Area and Lower Murray River. However, whilst the range of conditions affects the weed species which are present in any one locality, weeds are of major significance in all areas. In fact, economic production from fruit trees and vines is not possible unless some measure of weed control is practised.

Weed control during orchard establishment is extremely important since the root systems are restricted in their ability to obtain water and nutrients and there are large areas of soil exposed as seed beds for the development of weeds. Likewise, the control of weeds during the production of nursery planting material is essential for the quick development of strong healthy growth.

Until recently, weed control has been accomplished almost entirely by mechanical means - hand chipping in nursery beds and around young trees, and cultivation in established orchards and vineyards. In the latter case weed control is part of an overall management programme with frequent cultivations during the growing season, spring, summer and early autumn. Cover crops of sown species such as oats and legumes or 'volunteer' weed growth in autumn and winter are cultivated in the spring to provide organic matter.

Although the summer cultivation-winter cover crop management

technique is the most widely practised, the use of herbicides is becoming prominent. The trend to high density orchard plantings has been accelerated with the development of herbicides. Previously these have been restricted by the necessity to allow for free movement of cultivation implements.

Trials overseas and in Australia have indicated that, compared to the summer cultivation-winter cover crop regime, increases in production can be obtained using herbicides.

Pre-emergence herbicides are being used with all fruits. Whilst citrus are tolerant to several herbicides, simazine, diuron and terbacil can be used on apples, and simazine and diuron on grapevines, and with the latter. Diuron has sometimes produced plant injury on lighter soil types. Stone fruits are susceptible to most except terbacil. Established bananas effectively shade the whole soil surface and thus there is little need for herbicides. Triflurin is effective in nurseries and may be used as a pre-plant herbicide. The necessity for mechanical incorporation, has reduced its use in established orchards.

'Knock-down' herbicides, such as amitrol and 2,2-DPA, which are also translocated in the plant are used in combination with simazine in pome fruit orchards. They are also used in banana plantations, especially during the establishment period, together with the dessicants arsenic and paraquat. Generally, these types are not used on their own in fruit tree culture except for spot spraying of nuisance weeds because the number of applications required to maintain a weed-free surface make their use uneconomical.

Most weeds are controlled by the pre-emergence herbicides but some such as paspalum, skeleton weed and couch grass are difficult. The latter two can be controlled reasonably well with bromacil but paspalum has to be spotted with a dessicant or chipped. Nut grass, a problem in some orchards, is not effectively controlled by herbicides. Research by the agricultural chemical industries has led to the discovery of the range of herbicides now available, and their suitability is being tested in various field trials. The Department of Agriculture has herbicide management trials in progress at all horticultural research centres from which much information is becoming available.

Apart from extension of these research results, control of weeds, as part of efficient orchard management, is stressed by all horticultural extension officers in New South Wales. It is easy to get this point across to the grower as neglected orchards soon decline in performance when overcome by weeds.

Except for the need to control declared noxious plants, the banana industry is the only one in which a level of weed control is enforced and here the legislation was brought down to facilitate inspection for banana weevil borer and bunchy top disease.

VEGETABLES

Vegetable crops in New South Wales occupy about 67,000 acres, the gross value at the point of production being \$21 million annually.

Weeds affect the yields of vegetable crops by direct competition and by being hosts for diseases and pests. Efficient weed control usually means higher yields and thus lower production costs.

Weeds are more troublesome in crops which are slow to make spreading top growth like onions, lettuce, and beetroot than in fast growing crops such as potatoes, beans, and bush tomatoes which compete for light with weeds after they are established. In such perennial crops as asparagus, weed control is more important in the nursery beds than after planting out when hilling is practised.

It is usually necessary to achieve satisfactory weed control for most of the life of the crop, since the presence of tall growing weeds hinders growth and can cause harvest difficulties whether manual or mechanical methods are used.

Control of weeds by mechanical means largely dictates practices such as row spacing and choice of transplanting or direct seeding.

Weed control practices vary widely, both mechanical or chemical methods are used. Since yields are dependent on freedom from weeds early in the life of the crop, mechanical weed control suffers from the disadvantage that it is dependent on weather conditions and is usually more time consuming than the use of herbicides.

In some crops such as potatoes a combination of mechanical methods (hilling) and herbicide application (at lay-by) may be practised. Satisfactory potato yields have, however, been obtained using only a pre-emergence herbicide at planting. Combinations of herbicides to control different weeds species may be used at the same time or as split applications if the duration of weed control is insufficient after the first application. This technique is applicable to slow growing vegetables mentioned earlier.

Research results have resolved most of the problems associated with weed control in vegetables for a given situation.

However, the application of these results to other regions and situations is sometimes unsuccessful as the mode of action of the herbicide and its performance under varying conditions of soils, climate, and farming practices have not been elucidated.

The number of herbicides continually becoming available also creates an extension problem in that the adviser often has to recommend herbicides with which he has had more personal experience and which may not be as effective as newer herbicides.

WEED PROBLEM OF PASTURES AND GRAZING LANDS

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Potential pasture productivity reduction by a weed is seldom recognized until a major infestation occurs, this may apply for an individual property or on a much wider area. Widespread infestation of a weed tends to create an attitude of living with the problem and attributes of the plant are sought in justification.

THE PROBLEM PLANTS

This attitude of living with the problem is most marked in regard to grasses which form the basis of natural pastures of the State. Many grasses must be regarded as weedy, particularly those which produce vegetable fault in wool such as *Stipa* spp., *Aristida* spp., *Hordeum* spp. Other grasses, either native or introduced, are characterized by low productivity and include *Nassella trichotoma*, *Poa* spp., *Eragrostis chloromeles*, *Andropogon virginicus* and others. These grasses usually occur in low fertility situations and in most areas can be successfully replaced by improved pastures.

Broadleaved weeds cause losses in productivity by stock poisoning, *Swainsona* spp., reduction in value of animal products, *Xanthium* spp., *Galotia* spp., or by reduction of pasture production, *Bassia birchii*, *Silybum marianum*, *Onopordum acanthium*. These