THE CHEMICAL CONTROL OF SWEET BRIAR

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Introduction

Sweet briar, *Rosa rubiginosa* or *R. eglanteria*, was first recorded in New Zealand by Hooker in 1867. It is a bushy shrub which grows up to 7 or 8ft. high. Plants have up to 40 canes with a crown of up to 18in. in diameter. Most of the canes, particularly the younger ones, are covered with numerous spines. The foliage of the canes overhang the crown of the plant and would cover a circular area of up to 10ft. in diameter. In places it forms almost impenetrable thickets.

Smaller plants have up to 6 canes 3 to 5ft. high. The young tender shoots are eaten by stock, but spines protect the older canes from grazing. Canes increase in size to a thickness of about 1½in. at maturity.

It is not known at what stage of development plants produce hips, but from about 3ft. of growth they produce many pink flowers in the early summer and an abundant supply of red hips which ripen in the late autumn. Each hip contains 20 to 25 seeds.

Birds, horses, deer, cattle and sheep eat the hips and distribute seed in their dung.

Plants send up suckers from their vigorous root systems, which leads to the development of thickets.

Distribution

According to Allan (1) the weed is common in waste places in both the North and the South Islands, but for the purposes of this paper remarks will be confined to the South Island tussock grassland.

Sweet briar occurs to a greater or lesser degree from the Wairau River in Marlborough to Southland. It extends in places to an altitude of over 3000 feet.

Most of the heavier infestations are to be seen on unstable areas such as on shingle fans, riverbeds and steep faces where runnels or gutters bring down soil and shingle, cover seed distributed by animals and encourage germination. Once established, plants develop and become centres of infestation for adjoining areas.

Where it is strongly established, there is almost continuous infestation of up to 100 acres. In other places patches of up to 4 or 5 acres may be found in any one locality.

It also occurs on steep embankments such as on roads and railways where it is useful in stabilising these slopes. According to hearsay it was originally planted in the Waimakariri River Valley for this purpose.

It is often found growing in association with matagouri (*Discaria toumatou*) and fern.

Sweet briar occurs mainly on the warm sunny faces of lower altitude, which are used as winter country for sheep on high country runs. Towards the end of the winter weak sheep may become entangled in the spines of the plant and die from starvation.

Method of Control

Prior to 1930 the only method of control was by hand grubbing or pulling out plants with a horse (2). During the depression in the early thirties, owing to financial difficulties, little or no control was carried out.

Sodium chlorate was on trial as a weedkiller in 1930, and by 1938 its use for the control of sweet briar was established. (3) It was considered that a definite attempt should be made to check the spread of the weed. Landowners were requested to do this by first dealing with small and scattered plants and by doing a certain amount each year to gradually gain control. It was recognised that it was beyond the financial means of landowners to attempt more than this on properties which were heavily infested. County Councils were approached to stock sodium chlorate, so that it could be supplied at cost.

The treatment recommended was to apply crystals to the roots of the plant during March/June and in August, but no quantities were suggested. A very broad figure was given on one occasion as a tablespoonful of crystals per foot of growth up to 3ft., then double the quantity for every additional foot of growth over and above 3ft.

In 1946 trials with 2,4-D were laid down on sweet briar with concentrations of 1 per cent., 2 per cent. and 4 per cent. spray applied with a knapsack sprayer. The foliage of selected bushes was covered as completely as possible. Up to 6 pints of solution was used of the 1 per cent., 4 pints of 2 per cent., and 3 pints of 4 per cent. spray, applied at the beginning of November on a dry, warm, windy day with the possibility of rain. Observations were made at fortnightly intervals. Initially the leaves wilted, but the plants gradually recovered. In all cases the treatments had no permanent effect, and the development of hips proceeded normally.

Further trials with the butyl ester of 2,4,5-T at concentrations of 1 to 266 and 1 to 133 laid down in July and November, 1951, initially gave better results. There appeared to be a contact kill of the foliage soon after application, according to the completeness of spray coverage. Although much of the foliage and some canes of individual bushes were killed by the Autumn of 1952 in all cases new shoots had been produced and the plants survived.

In December, 1951, the "tip immersion" technique was tried. Tips of sweet briar were immersed in the butyl ester of 2,4,5-T for 1 hour at dilutions of 1 to 200, 1 to 300, 1 to 400 and 1 to 500. Later in March, 1952, further dilutions of 1 to 500, 1 to 1000 and 1 to 1500 were tried with butyl and butoxy ethanol ester preparations of 2,4,5-T. In this series, too, an adjacent bush was given a coverage spray of the same concentration as the immersed tip.

All the "tip immersion" treatments gave a contact kill, not a translocated one.

Coverage spray showed that the most promising treatment was butoxy ethanol ester of 2,4,5-T of concentration 1 to 500. The coverage of foliage was complete, and all leaves have wilted. However, as previous trials have shown that sweet briar has power of recovery after some months of depressed growth, it is too early to give an opinion on the effectiveness of this treatment. Furthermore, as the plant is deciduous, the final result of this treatment will not be known until the spring.

Further treatments were applied in May, 1952, to both standing bushes and some cut to ground level the previous November, 1951. Sodium chlorate was applied to the roots as a dry powder at the rate of $\frac{1}{2}$ lb. and also as a 5 per cent. solution coverage spray to standing plants, butoxy ethanol ester of 2,4,5-T at 1 to 1500 and polyethylene glycol ester of 2,4,5-T in concentrations of 1 to 350, 1 to 500 and 1 to 700 were also applied as coverage spray to standing bushes. Other treat-

ments of sodium chlorate 5 per cent, 2,4,5-T butoxy ethanol ester at 1 to 500 and polyethylene glycol ester of 2,4,5-T at 1 to 700 were applied at the rate of 1 pint per cut plant to ensure complete coverage.

These trials are still in progress, and interim results show that both sodium chlorate and the butoxy ethanol ester of 2,4,5-T react quickly and give an initial contact kill. The polyethylene glycol ester of 2,4,5-T appears to react slowly and in this regard may have more opportunity of translocation to the vigorous root system of the plant.

Method of Application:

Owing to the topography of the country and distance from supplies of water, the use of mechanical equipment for spraying is limited to roadsides and adjacent areas within the compass of a hand boom attached to the tractor. Even the knapsack sprayer has limited use over large areas owing to distance of water supplies and topography.

Conclusions:

Sweet briar is a strong-rooted woody perennial weed. Although sodium chlorate has proved successful as an effective weedkiller, it is expensive and of limited supply.

Hormone type weedkillers are available, but require dilution. Water supplies are often at some distance from infested areas, which in most cases are inaccessible either on steep country or on rocky outcrops. Further, the nature of the country rules out the use of known mechanical spraying equipment.

One application of the weedkillers which have been tried will not kill plants completely and also care must be taken to ensure complete spray coverage of bushes. It appears that 2 or more sprays of 2, 4, 5-T—the most effective hormone type of weedkiller applied so far—may be necessary for a kill.

It would appear that until a highly effective weedkiller is proved as being able to kill sweet briar after one application of spray or dust and that the material can be applied by air, all efforts at control should aim at attacking isolated bushes to prevent its spread to clean areas and if possible to confine the plant to already heavily infested areas.

Investigations with hormone type weedkillers have shown that:—

1. The butyl ester of 2, 4, 5-T sprayed at the rate of 1 to 266 and 1 to 133 causes initial wilting of the foliage and death of up to 80 per cent. of canes.
2. The most effective treatment appears to be the butoxy ethanol ester of 2, 4, 5-T applied at the concentration of 1 to 500.
3. The method of kill appears to be by contact rather than translocation.
4. To be effective, bushes must be given complete coverage.
5. Repeat applications appear necessary to obtain 100 per cent. kill.
6. Cutting with the view to spraying regrowth may prove the most efficient method of eradication.

References:

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2. 1922. N.Z. Journal of Agriculture, Vol. 24, Page 57.
3. 1938. N.Z. Journal of Agriculture, Vol. 56, Page 278.