

The third point to consider is grazing management to reduce spray damage. The amount of clover leaf should be at a minimum at the time of spraying in order that it presents the least possible area for hormone absorption.

This is usually most readily secured by hard grazing before spraying. However, if the weeds to be treated are palatable, this grazing may not be desirable as it may lead to a less effective weed control.

SUMMARY

To sum up we should consider this matter of clover damage according to the circumstances under which it appears. It is most serious in newly established pastures and least serious on high fertility land which carries swards usually containing abundant clover.

Clover damage may be reduced to a minimum in most circumstances:—

1. By using where possible the sodium salt of MCP or 2,4-D.
2. By using the minimum effective rate for weed control.
3. By applying the weedkiller when it is most effective against the weeds treated, and
4. By hard grazing the area shortly before spraying.

Certain exceptions to these rules have been given and there are others depending on the weed treated and the type of pasture. But though it is necessary that users of hormone weedkillers should be aware of the possibility of causing clover damage, this will not, I hope, deter them from using these useful materials more extensively for weed control in pastures.

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In North Canterbury the development of a satisfactory method for the control of docks in pasture is very closely tied to the question of clover tolerance, since methods which give satisfactory kills of docks also damage the clovers. Much of the land with a high water-table in this district is heavily infested with the seeds of the broad leaved and curled dock. When pastures are renewed (usually after a short cycle of cropping) there is often a dense strike of dock seedlings. If left unchecked, these become firmly established and considerably reduce the value of the pasture. During the past year we have carried out strip trials and field scale spraying to determine the most satisfactory method of dealing with this problem. Materials used were sodium MCP, amine 2,4-D, and polyethylene glycol 2,4-D at 1½ and 2lb. per acre. From observations made the position appears to be as follows:—

A complete kill of dock seedlings can be obtained with 1½lb. acid equivalent of MCP or 2,4-D provided spraying is done before the largest seedlings have passed the 4 true leaf stage. Spraying at this rate and time will severely check or kill the red and white clover seedlings. Sodium MCP is least severe in this respect.

Once past the 4 true leaf stage the docks become very resistant except for a short period when the seed stalk is just beginning to grow upwards. Results at the "early seed stalk" stage have been very variable due probably to the fact that all dock plants in any one field will not be at the same stage of development at the time of spraying. Factors which improve the kill at this period, namely the use of the high rate of polyethylene glycol 2,4-D and allowing the docks to recover from

grazing before spraying, also increase the damage to the clovers. In North Canterbury, due possibly to the dry conditions at this time of the year (late November, early December) the check to the clovers from the high rates of application can last for several weeks and result in a considerable loss of production. The effect of competition from the grasses is also intensified.

It seems, then, that there are two periods in the establishment of a pasture when docks can be controlled. The decision as to when to spray must be made by weighing the advantages of:—

- (a) A complete kill of docks and considerable loss of clover production against
- (b) An incomplete kill, a variable loss of clover production occasioned by spraying, a loss due to the competition between docks, clover, and grasses and prior to spraying and higher cost of materials.

In conclusion it would appear that due to the clash between methods effective for eradicating docks and clover tolerance, spraying can only be justified economically in the case of the very heavy infestations. Spraying in the seedling stage followed by oversowing of clovers may prove the best solution to the problem.

DISCUSSION

Q.—Are you prepared to accept some degree of clover damage under high-fertility soil conditions?

A.—(Lynch). Yes. Under high-fertility conditions, where conditions are right for clover growth, you get the least interval of clover suppression.

Q.—Would weed spraying be considered suitable on pastures other than those on which clover is growing?

A.—(Lynch). Pastures weak in clovers due to low soil fertility are better not sprayed. The farmer should be putting on fertiliser before worrying about weed control spraying.

Q.—Is there any information concerning the reactions of clovers other than white, subterranean, and red clovers?

A.—(Lynch). I understand that strawberry clover is fairly susceptible and annual clovers in general terms are very susceptible. No work has been done in New Zealand on strawberry clover and alsike.

A.—(Allen). I have found seedling suckling clover more resistant to low rates of MCP than seedling white clover.

Q.—Has the hairiness of the clover leaf any bearing upon susceptibility to hormone sprays?

A.—(Lynch). Subterranean clover, which is hairy, has been found in New Zealand to be much more resistant than the hairless white clover. On the other hand, red clover, also hairy, is more susceptible than white.

Q.—What percentage of the spray solution is absorbed by the leaf surface as compared with that absorbed by stems and crowns of the clover plants?

A.—(Lynch). No definite information is available, but one would surmise that there would be far more absorption by the leaves because:—

(a) Stomata are present on the leaves, and overseas work has shown that considerable amounts of hormone sprays enter the plants via the stomata.

(b) There is far more absorption area exposed by leaves than stems.

A.—(Allen). In spraying grass and clover seed areas it is necessary to close graze. Where clover has not been hard grazed, most damage has resulted.