

CONTROL OF CAREX LONGIBRACHIATA

E. N. HONORE

Department of Agriculture, Auckland

SUMMARY

This paper summarizes the results of chemical control trials against *Carex longibrachiata* conducted in the Auckland area during the period 1960-63. Chemicals used were sodium dichloropropionate, paraquat, isocil, esters of 2,4-D, and the potassium salt of MCPA, used as overall sprays on plants ranging in size from regrowths 6 in. high to mature plants 3 ft high.

Re-establishment of pasture following treatment is discussed and it is concluded that with a combination of chemical control and good farming practices this weed can be controlled.

INTRODUCTION

AN AUSTRALIAN SEDGE, *Carex longibrachiata*, has been known in New Zealand for many years, as *Carex longifolia* being recorded as such by Cheeseman in 1906 in the vicinity of Auckland. Until quite recently this weed has been of little economic importance being essentially a weed of low fertility pastures and waste places. Its spread throughout the country has probably been helped by the movement of sheep, as when fossicking round seeding bushes their fleeces would be likely to receive a generous supply of the seed. Today there are numerous serious infestations which, if left neglected, could rival nassella tussock (*Nassella trichotoma*). On Waiheke Island, for instance, thousands of acres are being threatened with a complete loss of production as this sedge takes charge.

Almost invariably it is found that farms on which this weed is a problem have a past history of chronic overgrazing and are on soils of low natural fertility with unthrifty open pastures, conditions ideal for spreading this prolific seeder far and wide.

During the summer and autumn, the leaves dry off and readily carry a fire. The usual reaction of a farmer is to burn. Unfortunately this practice merely weakens what is left of the pasture while the large plants commence rapid regrowth. In the absence of competition from a vigorous pasture, seedlings readily establish and the farmer then finds himself with an even worse problem on his hands.

In the seedling or spring regrowth stage *C. longibrachiata* appears quite unpalatable to sheep. Fortunately at this time cattle will eat it quite readily and even where there is no great shortage of food, will keep clumps trimmed. This factor will probably be an important one in the economic control of this weed.

EXPERIMENTAL WORK

In 1960 work was commenced in the Auckland area to find a practical and economic method of control. A difficulty, which immediately became apparent, was that of obtaining an efficient coverage of the plants with a chemical spray. A mature bush consists of a densely packed mass of slender, tough, shiny leaves up to 3 ft in length which completely enclose, by their drooping habit, the base of the plant from which new tillers develop.

All spraying was done with a hand boom on an Oxford sprayer and each plot was sprayed twice to ensure adequate coverage. Most plants, when sprayed, were mature and dense, with from 60 to 100%

ground coverage of the plot. The amount of carrier was usually at 100 gal per ac for mature plants and 40 gal per ac on the few plots done where regrowths were sprayed. All materials used are expressed in terms of lb active ingredient per acre.

From 1960 to the present date the following trials were conducted:

EXPERIMENT 60/1197

Date of application — August 3, 1960. No other treatment followed the spraying.

TABLE 1: TREATMENTS AND RESULTS ACHIEVED
IN EXPT. 60/1197

<i>Treatment (lb)</i>				<i>Estimated reduction of Carex after two years</i>
Sodium dichloropropionate 8.5	.....	.....	.....	10%
Sodium dichloropropionate 17	.....	.....	.....	50%
Sodium dichloropropionate 34	.....	.....	.....	80%

EXPERIMENT 61/1003

Date of application — January 13, 1961.

TABLE 2: TREATMENTS AND RESULTS ACHIEVED
IN EXPT. 61/1003

<i>Treatment (lb)</i>				<i>Control after two years</i>
(1) Sodium dichloropropionate 8.5+Amitrole 0.5	.....	.....	.....	Very Poor
(2) Sodium dichloropropionate 21.25	.....	.....	.....	Excellent
(3) Sodium dichloropropionate 8.5+Amitrole 1.0	.....	.....	.....	Very Poor
(4) Sodium dichloropropionate 21.25	.....	.....	.....	Very Poor

Three months after spraying Treatments 1 and 2 were burned then grass seed and fertilizer were sown in the ashes. Treatments 3 and 4 were similarly treated six months later.

The fire obtained on Treatment 2 in March was very effective. The plants burned very close to the ground and it is believed that the effectiveness of the treatment is mainly due to this factor, as it appears that a really hot fire close to the growing point of *Carex* is a much more effective killer than sodium dichloropropionate. On other plots the fire was not particularly good, leaving high stumps and doing relatively little damage to regrowths. As the pasture established was poor, thistles and other broadleaved plants started to take charge of the area in the spring. 2,4-D superphosphate at 2 cwt per ac containing the sodium salt of 2,4-D at 1.2 lb was applied to Treatments 1 and 2 in September. It was soon noticed that the hormone was affecting regrowths and when a similar application was applied to Treatments 3 and 4 in November, a small plot was sprayed with the ethyl ester of 2,4-D at 2 lb. This confirmed the suspicions that *C. longibrachiata* was susceptible to hormones. A fence was erected around an area of the trial in an attempt to control regrowths with heavy stocking of sheep. Rather than eat the *C. longibrachiata* the sheep appeared to prefer death by starvation.

EXPERIMENT 62/1013

Date of application — January 26, 1962.

Paraquat only and in combination with sodium dichloropropionate gave spectacular results as far as foliage desiccation was concerned, but at the time of burning on March 29, 1962, strong re-

TABLE 3: TREATMENTS AND RESULTS ACHIEVED IN
EXPT. 62/1013

Treatment (lb)	Percentage Plot in Carex on April 5, 1963		
	Rep. 1	Rep. 2	Rep. 3
(1) Control	30	40	40
(2) Sodium dichloropropionate 4.25	5	1	5
(3) Sodium dichloropropionate 8.5	2	½	1
(4) Sodium dichloropropionate 17	½	½	trace
(5) Paraquat 1	30	10	20
(6) Sodium dichloropropionate 4.25 + Paraquat 1	10	5	15
(7) Sodium dichloropropionate 8.5 + Paraquat 1	2	1	10
(8) Sodium dichloropropionate 17 + Paraquat 1	1	trace	trace
(9) Paraquat 2	20	5	10
(10) Sodium dichloropropionate 4.25 + Paraquat 2	20	5	20
(11) Sodium dichloropropionate 8.5 + Paraquat 2	20	½	5
(12) Sodium dichloropropionate 17 + Paraquat 2	1	trace	trace

growths were appearing on plots sprayed with paraquat only or paraquat plus sodium dichloropropionate at 4.25 lb. An excellent burn was obtained on all plots except controls and on April 2, 1962, an appropriate seed mixture with serpentine superphosphate at 4 cwt and lime at 8 cwt per ac was applied to the trial area. This was followed by chain harrowing to cover the seed. The trial area was protected from stock for six weeks and a vigorous ryegrass, white and red clover pasture was established. The trial area was grazed with dry dairy cattle and throughout the winter and early spring most regrowths were kept grazed down to pasture height. A further dressing of superphosphate at 4 cwt per ac was applied in October and it was noted that on plots where regrowths were weak the stock were still keeping the *C. longibrachiata* in check.

At this time replication 2 was sprayed with 0.9 lb of the butoxyethanol ester of 2,4-D. As can be seen from Table 3 this resulted in a substantial reduction on all plots except the control and those with 17 lb of sodium dichloropropionate. Table 3 also shows that the paraquat only treatment has resulted in some reduction. This is probably due to the fierceness of the fire burning the plants down to ground level. However, the strong desiccant effect of paraquat appears to have inhibited the translocation of the sodium dichloropropionate as the combination of these two chemicals has given poor results.

EXPERIMENT 62/1031

Date of application — February 28, 1962. These treatments were applied, during a very dry period, to *Carex* that was recovering from a spring mowing.

TABLE 4: TREATMENTS AND RESULTS ACHIEVED IN
EXPT. 62/1031

Treatment (lb)	Control after six months			
Butoxyethanol ester of 2,4-D 1.8	poor
Butoxyethanol ester of 2,4-D 3.6	partial
Butoxyethanol ester of 2,4-D 5.4	partial

EXPERIMENTS 62/1102 AND 62/1103

These were identical trials in different districts and it was intended to apply monthly treatments from September onwards. Monthly treatments were not possible but applications of the butoxyethanol ester of 2,4-D at 3.6 and 7.2 lb were applied on October 30, 1962, December 11, 1962, January 7, 1963, and February 26, 1963.

Results so far to hand suggest that the December spraying will be the most effective, with little difference between the two rates and a kill of 70% of the plants against a 50% kill for the spraying in October. The two applications following after these have given indifferent results and it is possible that the natural drying out of the plants after flowering inhibits the translocation of the hormones.

The potassium salt of MCPA was also used in this trial with little success in December and January applications at 4 and 8 lb.

ISOCIL

Isocil was used successfully at two rates, being applied on December 1, 1961, at 16 and 24 lb to mature plants.

CONCLUSIONS

Although the work on the control of *Carex longibrachiata* is far from complete the evidence gained to date shows that a solution to the problem is near at hand. One property owner on which some of these trials were conducted has been successful with the ethyl ester of 2,4-D at a dilution rate of 1 in 75 for spot spraying. About 75% of the plants he sprayed in October and November have died while surviving plants are mainly a mass of dead leaves with few regrowths. This farmer has also demonstrated that thorough cultivation is an excellent method of control on ploughable ground.

Sodium dichloropropionate applied at rates of 8.5 lb and higher is moderately successful if the following conditions can be obtained:

- (1) A good coverage by the spray.
- (2) A good burn to reduce the bush to ground level.
- (3) The successful establishment of a strong pasture to give competition to regrowths. Residual toxicity can make this difficult.
- (4) Stocking with cattle to control regrowths.

HORMONES

Esters of 2,4-D appear to give the best control of *C. longibrachiata* when used as late spring or early summer sprays. Although, when used at high rates, they eliminate clovers from the pasture, nevertheless they cause far less pasture damage than sodium dichloropropionate.

More work is required to find critical rates of application per acre, to confirm the right time of the year for spraying, the possible effects of stickers or spreaders, and to prove the effectiveness of different formulations of 2,4-D.

RECOMMENDATIONS

On the basis of the work done to date farmers can be recommended to treat *C. longibrachiata* in the following way:

- (1) With light, scattered infestations, spot spray with esters of 2,4-D at a suitable strength. Subsequent farm management should aim at producing a tight vigorous pasture to prevent re-infestation.
- (2) Where the infestation is dense the area should be treated in the following manner:
 - (a) Treat with esters of 2,4-D in the spring.
 - (b) Burn the treated plants in March or April to destroy the

dead tops and to check any regrowths.

- (c) Sow a suitable grass seed mixture in the ashes with sufficient fertilizers to establish a vigorous pasture.
- (d) Do not graze the new pasture until it is well established and then the grazing policy through the winter and spring should be a quick grazing off, preferably with cattle, followed by spelling to allow a complete recovery.

In this manner any regrowths will suffer from both the smothering effect of the pasture and also from the grazing of stock. Such a management system will also tend to strengthen the pasture. Subsequent farm management should aim at keeping a good ground cover of desirable species and the spot spraying of any plants which still persist.

ACKNOWLEDGEMENTS

The writer gratefully acknowledges assistance and encouragement given by the staff of the Farm Advisory Division, Auckland, in both the trial work and on the preparation of the paper and to the staff of Ivon Watkins Ltd., New Plymouth, who co-operated with Expt. 62/1031.