

PLANT PROTECTION:

Use of ammonium nitrate (Nitram®) and urea as herbicides for the control of St. John's Wort (*Hypericum perforatum*)

M.H. Campbell

NSW Agriculture, Agricultural Research Centre, Orange, NSW, 2800

Nitrogenous fertilisers have been used by some landholders to kill St. John's wort (e.g. A. Ellis, "Collingwood", Mudgee). Both Nitram® and urea, applied to the crowns at any time of the year, were reported to kill the weed at 18 kg/225 L of water. Because the rate of mixture/ha, and thus the rate of fertiliser/ha, applied was not known, and because of renewed local interest, investigations were undertaken to ascertain the effect of different rates and types of fertiliser on the control of St. John's wort.

Methods

Experiments 1 and 2 were carried out near Tuena N.S.W. and experiment 3 near Mandurama N.S.W. Liquids were applied with a pneumatic sprayer and dry fertiliser was hand spread.

Experiment 1: Five rates of Nitram® were applied dry, and in a 500 L/ha water mix to St. John's wort on 22 March 1974 in a randomised block experiment (plots 4 x 4 m) with 3 replications; results were recorded on 14 May 1974.

Experiment 2: Nitram® at 0, 400, 600, 1000 kg/ha was applied dry to St. John's wort on 27 June 1974 in a randomised block experiment (plots 4 x 4 m) with 3 replications; results were recorded on 5 December 1974.

Experiment 3: Various rates of Nitram® (Table 2) were applied dry and in a 1500 L/ha water mix to St. John's wort on 1 and 20 December 1994 and results recorded 2 and 11 weeks later (Table 2). The experiment was a randomised block (plots 5 x 2 m) with 4 replications.

Results

Experiment 1: Six weeks after applying Nitram® ratings for 0, 50, 100, 150, 200 and 300 kg/ha were respectively, 1.0, 1.5, 1.6, 2.8, 2.6 and 3.5, where 1 = normal and 4 = vigorous growth.

Table 1. Effect of Nitram® applied dry to St. John's wort on 27 June 1974 (Experiment 2)

Rate of Nitram® (kg/ha)	Brown out ¹ (%)	Ground cover ² (%)
0	18c	96a
400	38b	78a
600	53ab	48b
1000	72a	30b

¹ Brown out 8 weeks after application; ² Ground cover 5 months after application; Means in columns followed by a common letter do not differ significantly ($P < 0.05$).

There was no difference between sprayed and dry Nitram® under the 156 mm rainfall in the 6 weeks after application.

Experiment 2: Increasing rates of Nitram® caused increasing brown out of St. John's wort 8 weeks after application (Table 1). Rainfall in the 8 weeks was 189 mm. Although ground cover of wort was still depressed ($P < 0.05$) by 600 and 1000 kg/ha five months after application (Table 1) the weed was recovering well and no permanent reduction in ground cover resulted.

Experiment 3: Nitram® caused much greater defoliation of St. John's wort 2 weeks after spraying than urea (Table 2). Nitram® applied dry had little effect on St. John's wort (Table 2) despite 38 mm of rain in the 2 weeks after application. St. John's wort recovered on all treatments in the 11 weeks after spraying by producing new growth from crowns (Table 2).

Discussion

The experiments showed that although Nitram® can defoliate St. John's wort the weed will recover with little long-term damage. Nitram® applied in summer was more ($P < 0.05$) phytotoxic as a spray than when applied dry and, at 500 kg/ha, was more ($P < 0.05$) damaging than urea. The maximum rate of Nitram® applied was 1000 kg/ha because it was not possible to mix more than 1000 kg in 1500 L/ha of water. If higher rates of Nitram® are required

Table 2. Effect of Nitram® and urea applied as sprays or dry to St. John's wort in Experiment 3

Date applied	Method	Fertiliser	Rate (kg/ha)	Brown	Cover	
				out 2 W	(%) 11W	increase in cover 11W
1.12.94	Sprayed	Nitram®	250	97a	48	2a
	Sprayed	Nitram®	500	98a	48	2a
	Sprayed	Nitram®	1000	99a	46	2a
	Sprayed	Urea	500	15c	60	9ab
	Dry	Nitram®	250	3d	65	15ab
	Dry	Nitram®	500	4d	56	11ab
	Dry	Nitram®	1000	3d	57	17b
20.1.94	Sprayed	Nitram®	250	71b	53	9ab
	Sprayed	Nitram®	500	72b	55	2a
	Sprayed	Nitram®	1000	99a	46	2a
	Control			0	55	15ab

Means in columns followed by a common letter do not differ significantly ($P < 0.05$); WA = weeks after application

then higher rates of water will be needed. Robbins *et al.* (1942) recommended 5000 kg/ha of ammo-

num nitrate for killing weeds. However as the recommended retail price of Nitram® is \$395/tonne (November 1994) the cost of applying rates higher than 1000 kg/ha would preclude its use as a herbicide.

Nitram® failed to kill St John's wort in these experiments but it did kill the weed near Mudgee (J Strang, *pers. comm.* 1974). The difference may have been due to the application of the spray to the foliage in experiments 1 and 3 whereas it was applied to the crowns at Mudgee. In dense stands of wort, as in experiments 1 and 3, it is difficult to apply the spray to the crowns, but this could have been done on scattered patches at Mudgee. Although dry fertiliser reached the crowns of St John's wort in our experiments it was ineffective indicating that the success of dry fertilisers at Mudgee may be due to application of rates well in excess of 1000 kg/ha.

References

- Robbins, W.W., Crafts, A.S. and Raynor, R.N. (1942). Weed Control. *McGraw-Hill Book Co.* New York. p33.