Observations on the influence of grazing by sheep or cattle on the density and cover of ragwort

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Summary

The comparative seasonal growth of ragwort (*Senecio jacobaea* L.), as affected by cattle and sheep, was measured at eight sites over two growing seasons. There was a large variation in the density of ragwort plants between sites and times of the year, but densities were generally highest on an ungrazed site and lowest on sites grazed by sheep, except during summer when the density was greatest on some sites grazed by cattle. Grazing by sheep either prevented, or considerably reduced, flowering. It also reduced the percentage ground cover of ragwort to a low level (2 %) whereas grazing by cattle usually caused increased ragwort cover.

It is suggested that ragwort has been over-emphasized as a weed of pastures in Victoria.

Introduction

Ragwort (*Senecio jacobaea* L.) is a persistent weed in pastures in America (Nagel and Isaacson, 1974; Hawkes and Johnson, 1976), Canada (Harris *et al.*, 1971), Europe (Harper, 1958), New Zealand (Poole and Cairns, 1940) and Australia (Schmidl, 1972). In the United Kingdom, New Zealand, Tasmania and Victoria, attempts have been made to enforce the control of ragwort through noxious weeds legislation. The main control measure is the extensive use of herbicides, particularly 2,4-D, although Poole and Cairns (1940) reported that continuous grazing by sheep prevented ragwort from flowering.

In southern Victoria, approximately 400 000 ha of pasture, forest plantations and abandoned farmland are infested with ragwort (Schmidl, 1972). Its possible biological control is being investigated because of frequently changing land ownership, inaccessability of much of the area, the need for frequent spraying and local community concern about the use of herbicides. The investigation reported here was initiated to provide basic data for an associated biological control programme. The results provide background information on the seasonal growth of ragwort when ungrazed or grazed by cattle or sheep in the south Gippsland hills of Victoria and suggest that ragwort has been over-emphasized as a weed of pastures.

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Methods

Eight sites were selected to cover a range of typical situations in which ragwort occurs in southern Victoria, although dense stands were intentionally chosen. The study area was in the hills above Foster and Yarram between latitudes 38°30' and 38°40'S and longitudes 146° and 147°E. The average annual rainfall at Tarwin East, the most representative meteorological station in the area, is 1070 mm. The soils are acidic (pH 5.5 to 6.5) and mainly rough-ped fabric structured earths with clay loam A horizons. Slopes ranged from 11° to 28° and most sites had a southerly aspect. All sites consisted of grazed pastures on commercial farms, except one which had a 9-month-old plantation of mountain ash (*Eucalyptus regnans* F. Muell.) on a recently abandoned pasture. Four sites were grazed by cattle and three grazed mainly by sheep. The average stocking rate in the region is approximately 0.8 beef animals or 10 dry sheep equivalents per hectare (G. Savage, personal communication), but the stocking rate varies considerably throughout the year.

All sites contained the widely sown pasture species perennial ryegrass (*Lolium perenne* L.), cocksfoot (*Dactylis glomerata* L.) and white clover (*Trifolium repens* L.). At one site, subterranean clover (*T. subterraneum* L.) was also present. Most locations had a number of volunteer species, including bent grass (*Agrostis tenuis* Sibth.), Yorkshire fog grass (*Holcus lanatus* L.), ribwort (*Plantago lanceolata* L.), catsear (*Hypochoeris radicata* L.), biddy biddy (*Acaena anserinifolia* (Forst. & Forst.f.) Druce s.lat., bracken (*Pteridium esculentum* (Forst.f.) Cockayne), creeping buttercup (*Ranunculus repens* L.) and spear thistle (*Cirsium vulgare* (Savi) Ten.).

At each site, 20 quadrats each 1 m^2 were located at random within a 20 m × 20 m area and permanently marked. The density of ragwort plants and the number of flowering plants were recorded in spring (October), summer (January–February) and autumn (April–May) between April 1978 and February 1980. The percentage cover of ragwort, grasses, other broad-leaved plants, litter and bare ground was estimated visually in each quadrat on the same dates.

Results

There was a large variation in the density of ragwort plants between sites and times of the year and this was strongly influenced by the germination of seedlings which were observed mainly in autumn and spring. A high natural mortality of adult plants after flowering occurred on the ungrazed site and most of the plants counted were seedlings.

Because of the confounding of site variables such as soil type, slope and stocking rate it was not possible to undertake a statistical analysis of the effects of grazing on either the density or percentage ground cover of ragwort. However, the ragwort density was generally highest on the ungrazed site and lowest on the three sites grazed by sheep, except during summer when the density was greatest on some sites grazed by cattle (Table 1). Virtually all the flowering of ragwort occurred in summer. The mean densities of flowering ragwort plants per square metre in January 1979 and February 1980 were: ungrazed 3.5, cattle-grazed 3.9 and sheep-grazed 0.5. Grazing by sheep prevented ragwort from flowering on two sites and considerably reduced it at a third site.

The percentage ground cover of ragwort on the three sites grazed by sheep was consistently lower than that on the ungrazed site, whereas the cover on the four sites grazed by cattle was usually higher (Table 2). There were no consistent differences in the composition of the other vegetation. Bare ground was recorded mainly in autumn when some sites were pugged by animal hooves on the wet slopes. Means for percentage bare ground in autumn 1978, 1979 and 1980 were cattle-grazed 3.3 (range 0 to 8) and sheep-grazed 3.3 (range 2 to 5), whereas there was no bare ground on the ungrazed site.

Discussion

Sheep are frequently used to suppress ragwort in southern Victoria (Schmidl,

Table 1 Density of ragwort (plants m^{-2})

	Spring				Summer			Autumn			
	October 1978	October 1979	October 1980	Mean	January 1979	February 1980	Mean	April 1978	May 1979	May 1980	Mean
Ungrazed (1 site)	117	26	93	79	6	14	10	84	32	13	43
Cattle-grazed (4 sites)											
mean	16	24	44	28	13	19	16	12	8	21	14
range	(1–36)	(5–44)	(38–52)		(1–19)	(4–32)		(1–23)	(0.1–18)	(12–32)	
Sheep-grazed (3 sites)											
mean	11	8	10	10	7	8	8	10	6	7	8
range	(6–15)	(5–15)	(3–24)		(4–11)	(4–14)		(6–14)	(4–10)	(1–16)	

Table 2 Percentage cover of ragwort

	Spring	Summer	Autumn
	October 1979	February 1980	May 1980
Ungrazed (1 site)	5.0	6.0	5.0
Cattle-grazed (4 sites)			
mean	12.3	13.2	7.8
range	(1.5–28.7)	(2.0–24.5)	(1.7–13.3)
Sheep-grazed (3 sites)			
mean	1.7	2.0	2.0
range	(trace–3.7)	(trace–5.0)	(trace–4.0)

1972) where heavy grazing of ragwort by sheep compared with selective avoidance by cattle can readily be seen. Observations suggest that this occurs over a range of stocking rates. Grazing by sheep on the experimental sites reduced both the density and size of ragwort plants and either prevented or considerably reduced flowering. The generally higher percentage ground cover of ragwort in pastures grazed by cattle compared with the ungrazed site is probably due to selective grazing of the other species by the cattle.

Measurements on the eight sites over a 2-year period indicate the degree to which ragwort persists in heavily infested pastures in Victoria, but the importance of such infestations on livestock production is not so clear. The current status of ragwort as a serious weed of pastures is attributed to its toxicity to stock and suppression of pasture growth. Ragwort is known to be potentially toxic to cattle and, to a lesser extent, sheep (Harper, 1958; Mortimer and White, 1975), although the only documented report of losses of cattle due to ragwort poisoning in Victoria is that of Murnane (1933) and no losses of cattle or sheep have been reported to Victorian veterinarians during the last 10 years. No problems with stock were reported on the experimental sites.

The estimations of ground cover provide a useful measure of the interaction between ragwort and pasture species. Mean values of ragwort cover were only 1.7 to 2.0% under sheep grazing and it is unlikely that this level could significantly reduce pasture production. The mean value of ragwort cover in ungrazed pasture was only 5.0 to 6.0%, whilst that of four cattle-grazed pastures was 7.8 to 13.2%. The only other known estimate of the ground cover of ragwort was made on coastal dunes in Holland by van der Meijden (1979) who reported values between 0.2% and 17.8% for 102 populatioms over a 6-year period. The effects of ragwort on pasture and animal productivity are difficult to assess accurately, but the results presented here suggest that it is unlikely that ragwort has a significant effect on pasture production, except perhaps in extremely dense infestations and where grazed by cattle.

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