Dock: weed or pasture plant?

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The pasture weed dock, *Rumex* species, is a familiar sight in Western Australia's high rainfall South-West, particularly in cattle pastures. It is usually more evident in cattle pastures because sheep, particularly when they are stocked at heavy rates, can eat out dock plants over summer.

The most widespread species is fiddle dock, but curled dock dominates wetter areas. Dock plants are extremely successful competitors with other plant species because they have hardy underground tubers and set prolific amounts of seed. There is evidence that this seed can remain viable for many years.

It is doubtful if herbicide control of the weed is justified in pastures, because of the high costs and doubtful returns. This is one of the reasons the Department of Agriculture's entomologists are seeking biological control agents overseas.

Meanwhile, research workers at the Department's Bunbury District Office accepted that dock is likely to comprise part of our south-west pastures for many years to come, devised a series of experiments to test the effects of the weed as a component of pasture and of hay.

**Pasture trials**

For the pasture trials, the research team selected plots from established pastures with dock contents of nil; 13; 26; 40 and 54 per cent. They selected enough plots to allow a section of each dock content category to be cut each month from June to November. At each cutting time, three one-square-metre areas, which had been protected from grazing by pasture cages for one month, were cut to ground level.

The plant tops were sorted and the dock separated from other plants including weeds, grasses and subterranean clover. Next the dry weights and 'in vitro digestibility' (IVD) were determined. The IVD is tested by treating plant material with ruminal fluid in the laboratory.

In this trial, the amount of pasture produced was the same at all proportions of dock infestation over all test months.

In most plots, the proportion of dock in the pasture remained constant over the season. The only significant variation was in the 26 per cent plots.

However, there were significant changes in the quality of the dock components of the pasture. First, the IVD of the dock increased from June to August (Figure 1), then it fell slowly in September and October before plunging to only about 40 per cent in November.
This digestibility change is important to farmers in the high rainfall areas. It means that even though their pasture production increases in the November 'spring flush', the value of that feed, per unit of weight, can be reduced greatly if dock is a major component.

The results showed that the other components of the pastures remained of good quality throughout the test months, except for those in the heavy dock plots. The research team considered that this may have been a result of the severe shading effect of the dock at that time, causing a high proportion of stem growth of low digestibility.

This pasture trial indicates that dock may be an important and useful component of pasture in high rainfall areas early in the season. However, as the plants run to seed at about hay cutting time, the quality of a pasture can fall dramatically if dock is a major component.

For example, in the heavily infested plots where dock provided 54 per cent of the dry matter, its IVD was only two-thirds that of the other components by November. In terms of digestible energy, this was a drop from 1.71 digestible tonnes to 1.38 digestible tonnes per hectare during that month.

Hay trials

The research team used groups of two-tooth Merino wethers to investigate the effects of various proportions of dock on meadow hay.

The wethers were categorised on their liveweights then divided evenly into five treatment groups. Each of the first four groups was fed similar quality hay with a different content of dock, as in the table, during late summer and early autumn.

The hay was fed over two periods. In both of these periods, the dock component was 29 per cent digestible, and the other constituents—mainly ryegrass—were 50 to 55 per cent digestible. During the second feeding period, the researchers included a fifth treatment, using hay of 60 per cent digestibility to determine whether a liveweight gain could be expected from the same sheep, given hay of reasonable quality.

During the first feeding period, the sheep were fed an excess of unchopped hay through self-feeders which were replenished every second day. Residues were collected and weighed at that time.

In the second feeding period, all the feed was chopped, and all groups were initially offered the same amount of feed at 3.1 per cent of liveweight. This led to excessive wastage. After two weeks this was adjusted to an offering of 10 per cent more than the highest consuming group had eaten in the previous week. Once again residues were collected and weighed.

The sheep were weighed every week, and the group feed intakes were measured by weighing the hay fed, and the residues. At the end of each feeding period, three sheep from each treatment were slaughtered and their kidneys checked for any damage from oxalate crystals. These crystals are sometimes deposited after animals eat dock, which has a high content of oxalic acid.

At the end of the first feeding period, the residues were fed back to the sheep for eight days. The research team recorded the amount they consumed and the changes in their liveweight.

Unchopped hay

During the six weeks of the first feeding period, the wethers preferred to eat other plant species in the hay, rather than the dock. The proportion of residue increased as the proportion of dock in the hay increased.

This resulted in a small liveweight loss in all groups. This did not vary with the proportion of dock in each treatment.

When the residues were fed back at the end of the six week period, the sheep rejected more of the feed if the hay originally contained a high proportion of dock. This caused further liveweight losses of 1.8 kg; 2.6 kg; 2.5 kg and 2.5 kg for treatments 1 to 4 respectively by the end of the eighth day.

Once again, the sheep were able to select components of hay other than the coarse dock. They ate some of the previously rejected dock but were seen to discard the very coarse stems during chewing.

Chopped hay

In the second feeding period, the wethers were offered the same qualities of hay, hammermilled. Over the eight week period they ate about 950 g per head a day of the good clover-ryegrass hay, but only about 800 g/day of any of the hay containing dock, irrespective of the proportions.

In this feeding period, the only group of wethers which lost liveweight were in the treatment with the highest proportion of dock.

None of the slaughtered sheep suffered any kidney damage from oxalate crystals, and no other animal health problems were observed.

Is dock hay worthwhile?

These trials demonstrated that hay containing a high proportion of dock has only about the same feed value as poor quality, grassy hay. Such hay was typical of the 1981 season when late rains caused delayed cutting and moisture spoilage. Fed unchopped, hay with a dock content was not good enough to maintain the liveweights of two-tooth wethers.
The first feeding trial highlighted the sheep’s ability to select a reasonable quality diet even though most of the feed offered was of poor quality. The second trial showed how much better results could be gained from better feed presentation, when using poor quality hays. Thus hay with a dock content could be used better if hammermilled before feeding. Sheep were less able to reject the dock stems when the feed was chopped.

The fact that the sheep were able to do as well on dock-contaminated hay as on the poor quality hay indicates that the digestibility of dock stems could vary along the length of these stems. Possibly, the thickest parts of the stem would be the least digestible.

**Interpretation**

The research team concluded that the main effect of a high dock content in paddock feed or in hay is probably the preclusion of more desirable species. This effect is unimportant until the dock matures and dries. Then the grazing animals (sheep or cattle) actively select against the dock component of the pasture. With higher dock proportions there will be less pasture of acceptable quality available at that time.

Despite the observations made during these studies, there is no other information on the effect on animals of prolonged grazing of actively growing dock.

The trials indicate that it should be of better feed value early in the season and of much lower value after it starts to seed. However, pure, growing dock stands have been known to cause hypocalcaemia and oxalate poisoning in sheep.

Feeding dock-contaminated hay in paddocks could contribute to spreading the weed on the farm, thus further lowering the quality of paddock feed.