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BEETLES, MITES AND CHICORY:

Why I am Sowing Chicory

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Summary: I have gown and sold chicory cultivar Grasslands Puna for a period of 4 years. In this time I have seen tremendous successes and failures with this species. Chicory has three main advantages, the first is that it is non bloating, the second is that once it is established it has the ability to use deep water providing valuable late summer and early autumn growth and the third advantage is the tremendous animal growth rates that are achievable on chicory. These benefits depend on establishment success and in the Wagga Wagga district their are a number of important steps that can be taken to ensure successful pasture establishment. These will be considered in this paper.

Chicory is a broadleaf perennial herb thought to be native to Europe. Chicory has been deliberately or accidently introduced to other countries such as Australia and New Zealand. In these countries it is most commonly found growing wild along road sides. Initially this plant was overlooked as a pasture species, until research in New Zealand in the 1970s identified its importance. Subsequently a plant improvement program was undertaken which culminated in the release in 1985 of the only commercially available cultivar 'Grasslands Puna' which I will refer to simply as chicory.

In Australia a wild relative of chicory can be seen growing along roadsides . It is most easily identified in autumn growing ungrazed along roadsides where its distinctive tall stems (up to 2 m) and mauve flowers make it easily identifiable. This provides an indicator as to where chicory may be gown.

Growing Chicory

Chicory, like most improved pasture species prefers a well drained fertile soil. It is more tolerant of acid soils than lucerne however it does not fix nitrogen like lucerne. This means chicory needs to be gown with a legume (lucerne, white clover or sub clover) or if sown with a grass (phalaris, cocksfoot, fescue or perennial ryegrass) nitrogen will need to be added. The amount of nitrogen it receives either fixed or fertilised will have a huge bearing on how much dry matter it produces.

Chicory is a spring/summer/ autumn grower and it quite dormant over winter. Basically its growth rhythm is similar to that of lucerne. Although summer rainfall is essential for maximum dry matter production it seems to persist and grow well in the Wagga district, surviving on summer storms and stores soil moisture the same as dryland lucerne. It has a deep taproot which allows it to persist over the extended dry periods which can occur over summer in this environment. Some paddocks sown before the 1994 drought are still in production in the Tarcutta-Eurongilly area. At present I am recommending it in rainfall areas above 500 mm annual average rainfall.

Sowing time of chicory is best in autumn or spring but tends to prefer a spring sowing. As with lucerne, winter sowings may be less successful as chicory is dormant in winter. Chicory will establish under a variety of sowing regimes from the conventionally prepared seedbed to direct drilling with minimum disturbance points. Being a smallish seed, a shallow sowing depth is important as deep sowings will result in poor emergence and establishment. In a prepared seed bed this is best achieved with a band seeder which is very popular for sowing canola. Chicory can also be direct drilled. I have recently used a Caldow Grassliner which is a tyned drill. This paddock was sown last spring and there has been an excellent establishment of the chicory. At sowing with a fertiliser containing both phosphorus and nitrogen is preferred.

Weed control for any establishing pasture is important and chicory is no exception. Ideally a weed control program should commence at least

no potential damage problems to chicory however broadleaf herbicides need to be considered more carefully. Currently no broadleaf herbicides are registered in chicory however research conducted by B. Milne at Orange indicates Broadstrike®, Eclipse®, Spinnaker® and Spinnaker® plus simazine are suitable for broadleaf weed control in establishing chicory. In established chicory diuron + gramoxone can be added to the previous list for broadleaf weed control.

While on the topic of weed control, another advantage of chicory is its ability to compete with other species once established. Being a broadleaf plant, chicory competes against broad leaf species in particular by developing a rosette of large soft leaves which shades neighbouring plants. Chicory may be able to take the place of some of the invading weeds that become such a problem in perennial pastures.

Protection against red legged earth mite is advisable in the establishment year although I have observed that chicory as a seedling is particularly unpalatable for red legged earth mite and lucerne flea in a situation where lucerne was decimated. Disease problems are generally few although they may be exacerbated by crown damage in autumn and winter form over grazing. There has been one report of a fungal disease 'charcoal rot' in the Orange but this had no major impact.

Grazing management

Chicory is very, very palatable to stock, so grazing management becomes important to help maintain the stand. I've heard of stock preferentially grazing chicory over most other pasture species (lucerne, sub and white clover, phalaris, cocksfoot etc.) grown in the Wagga district. As with most perennial pasture species the set and for get grazing strategy can be a disaster for plant persistence. Chicory needs to be rotationally grazed to prevent the crown being damaged. The rest period allows new growth and replenishment of plant root reserves. Time between grazings can also be a compromise between trying to get as much leaf as possible on the plant but not allowing development of too much low quality stem material. Grazing strategies can be strict rotations (*i.e.*: 3 - 6 weeks grazing followed by 3 - 6 weeks rest) or based on valued judgments as to when dry matter has been best utilised and when adequate growth has returned. This approach has some value as plant growth rates vary throughout the year depending on temperature and soil moisture. This means shorter rest periods can be used in late spring and longer periods in winter.

Animal performance on chicory

A number of growth rate trials have been conducted both in Australia and New Zealand on lambs, cattle and deer over the last few years. Liveweight gains have been exceptional for lambs with up to 350 g/head/day being recorded. Work at Cowra found that lambs on chicory grew at 240 - 310 g/day compared with 230 - 250 g/day on lucerne. Similar large liveweight gains have been reported with deer and cattle in New Zealand. Work with cattle suggests that chicory produces liveweight gains equivalent to improved pasture but suggested it was important to keep chicory from getting too 'stemmy' as this material is of low quality.

The other important characteristic relating to ruminant animals is chicory's non bloating advantages. Research in New Zealand has shown that Grasslands Puma contains condensed tannins that significantly reduce the risk of bloat. This makes it an ideal species to mix with other legumes such as lucerne. Other New Zealand work has shown that rumination time of chicory compared to perennial ryegrass is much lower. This work carried out on deer is also relevant to sheep and cattle. Deer grazing two pasture types for equivalent periods per day had rumination times of 33 mins/day on chicory compared with 270 mins/day on ryegrass. Lower rumination time increases the potential voluntary intake of pasture.

Sowing mixtures

Several mixtures with chicory are possible. In the paddock I established last spring the mix I used included chicory (1.5 kg/ha), lucerne (3 kg/ha), cocksfoot (1.5 kg/ha) and phalaris (1 kg/ha). A chicory and lucerne combination offers a simpler approach where the lucerne provides the nitrogen also both species have similar grazing management requirements. It is important to note that spring sowing of chicory means that it can't be sown with sub clover. Top dressing in the following autumn with sub clover and superphosphate is a real possibility in this situation.

Other combinations are possible although some of these have disadvantages. For example chicory sown in combination with grasses results in nitrogen depletion of the soil profile. In this situation nitrogen has to be added to the pasture for it to remain productive. This however is costly and within the cropping zone pastures are mostly established to replenish soil nitrogen levels. Therefore for most circumstances chicory should be grown with a legume.

Conclusion

As a commercial agronomist and a cattle producer, I will be sowing more chicory at home this year and will be recommending the adoption of chicory in mixed pastures on an increasing level. Although Puna retails for around $20/kg (compared to proprietary lucerne cultivars at $7/kg), I think it is well worth it. The benefits are obvious to those that have used chicory. The palatability is exceptional. With dry matter production as good as lucerne and the ability to grow on poorer soil types, Puna is a great option as a summer producer. In the Wagga district, April-May can be our toughest months as far as feed gaps go. I think that on mixed pastures that contain Puna cattle will continue to fatten as has been the case in the last three months.

For myself and my clients, I want high levels of production from pastures. Grasslands Puna chicory off high levels of dry matter production, palatability and stock 'do' well.