

A practical system for WA South Coast cattle producers to double their production with the C4 grass ,Kikuyu (*Pennisetum clandestinum*)

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Introduction Beef cattle production on the South Coast of Western Australia ,has traditionally been based on C3 annual or perennial grasses and legumes originating from European and Mediterranean climates e .g .rye grasses ,phalaris ,fescue , subterranean clovers ,serradellas .These pastures are productive during cooler wetter months but are poorly adapted to hot and dry conditions that are a feature of summer and autumn months on the south coast of WA .In contrast C4 sub-tropical perennial grasses such as Kikuyu (*Pennisetum clandestinum*) are ideally adapted to hot ,high light intensity ,moisture limiting conditions and can respond dramatically to the out of season rainfall events ,which are a frequent occurrence here .Kikuyu is particularly productive because it can handle arrange of grazing pressure and persist and spread via underground runners as well as prolific seed set .

Combining C3 and C4 grasses in one system allows the growing season to be extended by up to 4 months and allows some of the worst sandy soils to become highly productive .The C3 legumes fix N which drives the C3 winter grasses and C4 summer grasses .

A specific trial site ,as well as long term experience of including Kikuyu in our pasture systems ,has shown that provided the correct procedures are followed for establishment ,fertilizer and grazing management ,kikuyu pastures can double production compared to typical annual pastures .An added bonus that is now appearing and being tested for ,is the high levels of Carbon sequestration that appear to be occurring under these sustainable perennial systems .

Materials and methods A poor sandy paddock with reasonable subterranean clover pasture base was selected as a trial area to see what production levels could be achieved .Since C4 grasses establish best at soil temperatures greater than 15-18 degrees C and nil competition ,the annual pasture was sprayed out in August with Glyphosate .It was then spread with clay at 100-300 tons /ha as well as limed at 2 tons /ha .The paddock was ploughed ,harrowed and seeded at 10kg /ha with a mixture of subtropical Perennials (including Kikuyu at 100gms/ha) and barley at 10 kg /ha as a cover crop .Timely rainfall resulted in an extremely good germination of all species—the barley was subsequently harvested yielding enough to pay for the establishment costs .

Results and discussion The establishment of this paddock was extremely successful-by the following summer it carried 25 % more cattle on a year round basis .Importantly it provided green feed during the harsh summer and autumn months .

Now ,6 years later it carries double the district average of cattle and has become completely dominated by Kikuyu grass ,even though the seeding rate was so low .It has given us the confidence to continue major spring seeding programs of Kikuyu with as little as 500gm /ha to achieve good success .The kikuyu is also being spread in cattle dung and after summer rainfall events germination is profuse .

We can now see the aim of achieving 100% C4 perennial based pasture system as being highly achievable .We aim to double our beef production / ha as well as fix large amounts of soil Carbon allowing us to farm profitably and sustainably well into the future .

Reference

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