



## Native Grasses in the Farmscape

Field Day Report

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Col Seis is renowned for his innovative “Pasture Cropping” technique, winning the prestigious Bob Hawke Landcare Award in 2014 for his efforts. Now practised across Australia and the world, “Pasture Cropping” as a farm management system can bring improvements to crop yields, animal production and soil health. The system means reduced input costs due to greater inherent soil fertility and reduced pest management needs.

Held by MCCL on Saturday 23.4.16, the field day looked at how native grasses can fit into a farming strategy. Another successful MCCL event saw a group of over 20 local residents and visitors attend to day to hear Col speak, followed by a presentation and paddock walk looking at identifying local grassland species by Paul Melehan from Hunter TAFE. The day was supported with funding from Hunter LLS and the National Landcare Program.

The following is an overview of the material and ideas presented by Col at the Native Grasses in the Farmscape field day.

Plants, including grasses, are made up of C3 and C4 plants. C3 or C4 refers to the way in which plants use carbon dioxide, which, at a basic level, affects their heat, drought and cold tolerance. Approximately 93% of plants on Earth are C3, while less than 1% are C4.

C3 plants are more cold tolerant and include native species such as Wallaby Grasses and Weeping Grass and Wheat Grass. They also include crops such as wheat, oats and rye.

C4 plants are more likely to be summer growers, having a higher heat tolerance. These produce a greater bulk of dry matter but may be of lower nutritional quality. These also exhibit a greater efficiency in regard to water use. C4 species include native Windmill grasses, Kangaroo grass, Warrego and Red Grass, as well as exotic species such as Premier Digit, Green Panic, Rhodes Grass and Paspalum. Crop types include Corn, Millet and Sorghum.

Forbs and herbs found in grasslands are important to the diversity of the ecosystem, and encourage actions such as pest control, mineral and nutrient accumulation and cycling, and pollination. Native species include legumes such as Glycines, orchids and lilies. Introduced species include legumes such as clovers and lucerne, as well as chicory and plantain.



**Grassland diversity = production.**

**Grassland diversity = the ability to build soil quality and soil health.**

Grasslands are found naturally across the world. Australia's native grasslands historically contained up to 35% organic matter and included a good mix of C3 and C4 grasses as well as forbs and herbs. A good mix of diverse species provides a well-functioning grassland. Historic records from early explorers and pioneering settlers report of the lush and productive natural grasslands encountered, as well as mentioning the levels of surface layers of compost which had naturally layered from the long term functioning of natural grassland.

Col Seis considers a natural grassland to be the best benchmark we have to model our farms on, to allow our farms overall to function as a healthy and productive ecosystem, and suggests we model our farm management on grassland function to achieve this.

Native grasslands can be as productive as introduced on forage value, protein and digestibility. Native grasslands have the advantages of being more resilient in our climate. They evolved here and therefore have a greater tolerance of our droughts, lower nutrient and often acid soils. Their disadvantages are more beliefs rather than fact. They are believed to have seeds which can damage stock and wool, whereas this is often introduced species such as barley grass, and they are also believed to be unpalatable and have lower nutrition.

Why are these negative perceptions held? Over time with heavy grazing, stock have weeded out the better species by continuous grazing. This is purely related to grazing management – grasslands are stocked too heavily and too frequently to allow time for species to regenerate. While compaction is seen as a major issue with stocking rates and frequency, it is much more likely that constant eating off is the culprit.

**As Col says, it is mouths rather than feet that do the damage to the function of a native grassland.**

So what do we do? We kill things that want to grow, then try to replace them with things that don't naturally want to grow there. What SHOULD we do? We need to stop killing the original plants and allow them to regrow. We need to allow the perennial plants to grow that want to grow, and aid them to restore their natural function in their natural grassland state. Annual weeds are less of an issue in a natural grassland as the ground covering capability of a well-functioning grassland prohibits the widespread invasion of undesirable plants.



Grazing doesn't kill plants. Ploughing and herbicide quite obviously kills plants and damages soil health and structure. Poor grazing management and no recovery time kills plants. In a pasture it is better to follow a correct grazing rotation which allows grazing time but also allows good recovery time for the pasture to maintain good diversity; and to allow time for the plants to grow both strong deep root systems and adequate top growth for both future grazing capacity and for building layers of natural organic matter for natural mulching and soil-building.

The root system ultimately provides access for the plants to soil-borne fertiliser, nutrients and water, benefits the soil ecosystem and increases the resilience of the pasture. Soil structure is built by encouraging leaf litter and root growth. Inappropriate grazing techniques which have not changed over hundreds of years are a major cause of damage in Australia to grassland and soil health since European settlement. Constant grazing leads to shorter root growth, unproductive leaf growth and unhealthy, badly structured and nutrient-depleted soil. Pastures then need increased fertiliser applications and watering to replace what nature would otherwise provide.

Plants are the drivers of soil health and the nutrient cycle. Plants drive water retention and the carbon cycle. Deep root systems bring nutrients and minerals from a great depth to the surface for plant and microbial use. A good root system encourages soil microbes and can drive the health and pest and disease balance of a farming ecosystem. It is grasslands that create top soil naturally. It is healthy productive grasslands that create well-structured soils, build soil carbon and cycle soil nutrients.

**Short graze + long rest allows the plants to recover fully and builds soil health.**

Production should be calculated from the whole pasture which contains a diverse range of species over the year – not just on individual species. Carrying capacity should be calculated on the period of lowest production in a particular season or time of year. Stocking rates need to be adjusted to the seasons and conditions. Farm management also needs to be adjusted to the seasons and conditions. If grasses are growing well and faster, move your animals faster. If it is dryer with slower growth, move your stock at a slower pace. This sounds backwards, but allows the greater recovery time for your pastures. Grazing systems which are appropriate can be referred to as cell grazing, planned grazing, rotational grazing or time control grazing. Basically they all mean the same thing, which is grazing to manage best recovery time for the pasture.



Pasture Cropping is the system Col and his friend invented to reinvigorate his depleted family property. Col has seen and documented remarkable improvements on many levels since he began implementing their innovative ideas for this farm management system.

Pasture Cropping could also be referred to as perennial cover cropping. The system can actually restore perennial pastures. It combines grazing and cropping in a management system so that each benefits the other. Crops are planted into established perennial pastures using zero till seeding equipment. The crop can be grazed until early August, allowed to produce grain and harvested like a normal crop. Immediately post-harvest, the perennial pasture species dormant below the harvested crop are ready to shoot away and grow, using the benefits of any nutrients recycled from the crop cycle. Grazing stock add to the nutrient cycle as well with manure and trampling to aid in building a mulch layer.

Pasture Cropping keeps grassland intact. Since you never plough you never kill the perennial species. This is the underlying point. Weeds are managed by good grazing practices which also aids creation of thick leaf litter, leading to greater annual weed control as well as building soil structure and health.

The level to which you take the management system for your farm depends on you. Pasture Cropping can be organic but doesn't need to be. Col says he has not turned fully organic as he finds it too restrictive. His system allows for the very careful use of targeted selective herbicide use where absolutely necessary. You can choose if you use higher or lower levels of inputs. The levels of yield, perennial grass recruitment and ecological function are dependent on the management practices you put into place on your own farm.

The crop can be grown as a single species or multi species of up to ten species planted at the same time. Multiple species sown as a crop supplies better diet and nutrition for stock, is better for soil and environmental health, as well as reducing soil erosion by wind and water erosion from exposed paddocks. Water retention is greater. Leaching of nutrients and minerals is decreased.

Pasture Cropping as a farm management system leads to increasing improvements in diversity, soil and plant health, time management and production. Col says at first he felt guilty as he sat with a beer watching his neighbours farm at all hours. He has so dramatically reduced the time he spends actually farming as his system allows Nature to manage his pastures so well that he gets continued improvements in stock and plant health, his farm ecosystem and his own quality of life.

Col's implementation of Pasture Cropping allows him to graze right up to the last minute before the crop is planted and still return a grain harvest. Over time he has gradually improved his practices,



and has added variety of crop species into each pasture to increase diversity and crop, pasture and stock health. He is now experimenting with adding vegetables into his mix, allowing his stock access to a greater range of nutrition as well as his family to harvest their own food spontaneously from the pastures.

Col has seen his system innovations return increased production on his property. He uses less diesel and has fewer input costs from herbicides and insecticides. He has less disease in stock and crops. He direct drills any crops planted so has been able to reduce tractor movements and also use fewer implements. He harvests native grass seed for sale, as well as traditional grain. He has more quality time available for himself and his family. He says it is his son who mainly manages the farm now while he has a new career speaking, inspiring and educating on the topic of Pasture Cropping, Grazing Management and grassland management, around the world.

We all know the principals of good gardening but we forget to take this outside the homestead fence and apply it to the whole farm. We make compost, build the soil and grow our own vegetables and flowers. We need to think of this in the wider Farmscape too. Agriculture and sound ecological practices go together. A farm should be seen and treated as an ecosystem.

**“Agricultural practices need to function closer to how Nature had it originally designed.” Col Seis**

For further information, below is Col Seis’ website, with information on Pasture Cropping and links to Col’s businesses, including native seed for sale, and an extensive list of relevant articles to trawl.

<http://www.winona.net.au/>

Texts distributed to attendees were the DPI publications, available from the Tocal bookshop:

"Grasses of the NSW tablelands" by Harry Rose, Jenene Kidson, Carol Rose and Clare Edwards.

"Legumes and herbs of coastal NSW" by Harry Rose, Carol Rose and Trevor Rose.

Also available is "Grasses of coastal NSW" by Harry and Carol Rose