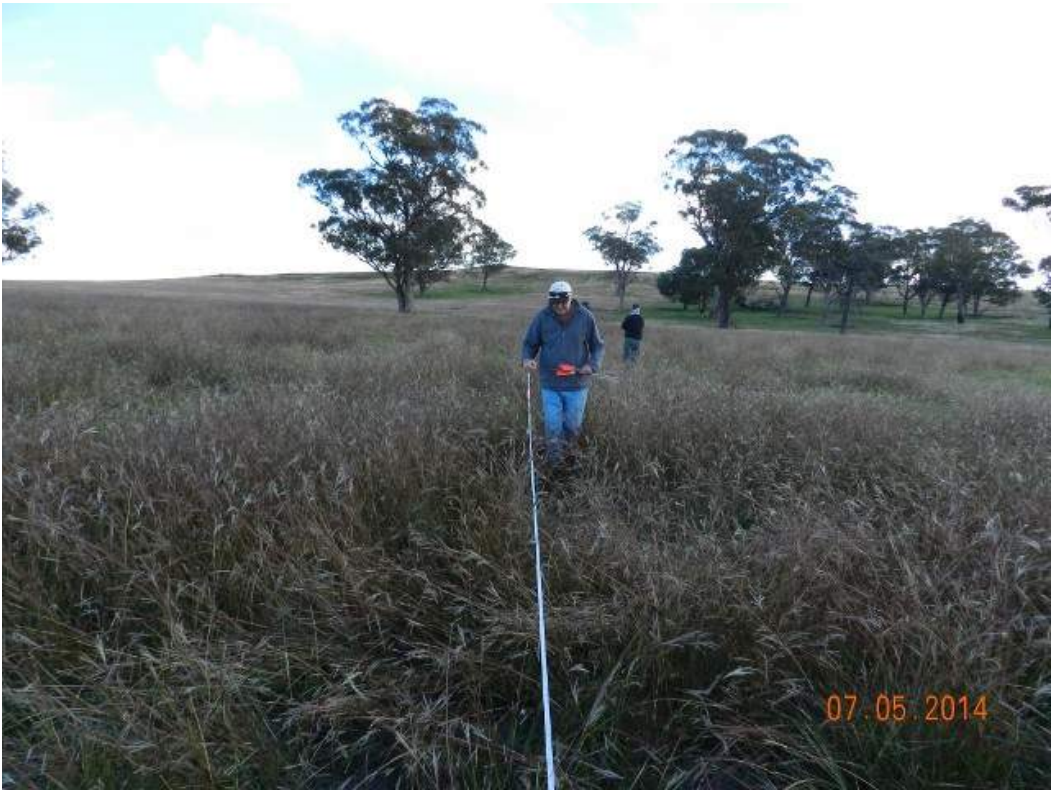
Newsletter

Number 52

July 2014

Native Grasses Association Inc



Using adaptive management of livestock to increase landscape function and accelerate storage of soil carbon.

Photograph: Graeme Hand

Inside: Multi-species Pasture-Cropping, Action on the Ground Project Update & Never Take Advice 7.

www.stipa.com.au

CONTENTS

STIPA is not an acronym. The association was named after the *Stipa* genus of grasses, now *Austrostipa*. One of the *Stipas* is commonly known as spear grass. At its inception in 1997, the association aimed to spearhead a change in attitude to native grasses. As that change is occurring, Stipa continues to promote the use of native grasses to achieve profit from a healthy landscape.

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From the Chair

Annabel Walsh

Welcome to the Stipa Native Grasses Association winter newsletter. It's been a roller coaster ride for many of our members with such a dry back half to 2013 followed by wonderful February rains in much of the southern regions. Unfortunately Northern NSW and Queensland missed out on their summer falls. This pattern of rainfall has had some affect on the Stipa Action on the Ground (AotG) project, giving Graeme and the farmers a few challenging decisions in deciding the best treatment to maximize soil carbon.

Graeme is going to speak further on this in the newsletter but I would like to thank all the farmer participates, for their cups of tea, the physical work of fencing and applying the treatments and their interests in accompanying Graeme out to the plots and pondering over the condition and composition of the pasture.

Water, how critical it is to the successfully production of our farm produce and sequestration of carbon.

The carbon debate rages to a point where the community is getting totally confused by the politics that is being played out on the steps of parliament. This all happening, at a time, where our politicians should, through their appropriate channels, be guiding the nation to an understanding of the physical and chemical nature of climate change, of the consequences of climate change and the many solutions to mitigate effects. And this is where I would like to make my point, because soil carbon is falling off the list and could in the long run be the most valuable.

The renewable energy sector has been well supported, but, the soil carbon sequestration is not

Chair report continued from page 3.

being given the support and recognition needed for farmers to transition. Our farmers have been farming with high input industrial farming systems that undermine the very attributes and integrity of the soils ability to function naturally to hold water and store carbon.

One of the major effects of climate change has been the prediction and hard evidence on rising ocean levels. We have lost so much soil carbon from our soils throughout the world the water holding capacity is greatly reduced, causing chronic flooding of the landscape. This precious water either evaporated or is contributing greatly to the quantity of water (and soil) flowing out to the oceans.

As farmers if we can increase the water holding capacity of our soils by improving the composition and condition of our perennial grasses in our grazing pastures and cropping systems, this will contributing greatly to reducing the loss of water to the oceans and evaporation.

This brings us back to the opening comments about rainfall. It is predicted to become more fickle so if we can employ management system that retains that precious rainfall in our soils protecting it against evaporation and run off it will mitigate the effects of these extended dry periods.

The governments focus in NRM needs to change from an obsession of protecting individual species combined with inappropriately designed vegetation legislation and start putting governance in place that looks at whole landscape function. Australia could take a lead here, our international look is not very impressive and our Stipa members would welcome a focus in this direction.

The Stipa team encourage all members to keep up improving your knowledge base and innovation to improve your landscape function and to share your failures and successes so we all keep learning.

Sincerely
Annabel Walsh
Chairman Stipa.

From the CEO

Graeme Hand

Photo By Lucy Hand

In this report:
Mongolia
Action on the ground project – Update and some of the outputs

Mongolia
We have been fortunate to receive funding from the Australian Rangeland Society Travel Grant to go to Mongolia to co-design a research project. Please see article in this newsletter for details.

Action on the Ground Project
The Action on the ground project (funded by the Australian Government) – Demonstrating practices that increase soil carbon sites is entering its final year. The sites are really starting to fire and this should provide support for many of the practices that Stipa members know restore native perennial grasslands and biodiversity. Contact me if you would like more details

Graeme

Friends of Grasslands

Supporting native grassy ecosystems

'Grass half full or grass half empty? Valuing native grassy landscapes.

Thursday 30 October to Saturday 1 November 2014 at

CSIRO Discovery Centre, ACT

Talks, discussions, posters, field visits to local grasslands and grassy woodlands.

More information available on ***www.fog.org.au/forum2014.htm***

or email the president at

president@fog.org.au

Multi-species Pasture-Cropping

Colin Seis

Since its inception in the mid 1990s by Colin Seis and Daryl Cluff , 'pasture cropping' has been practiced with the use of a variety of crops ranging from wheat, barley, oats, cereal rye, lupins, and canola. Summer crops have been sown with millet, cow peas, lablab and sorghum. These have usually been sown as a single species into perennial grassland or pasture, not as a mixture of species.

'Pasture cropping' with a single crop species into a diverse perennial grass base has achieved great success by improving soil structure, increasing in soil carbon, improving nutrient cycling and more efficient use of water while producing good crops for grain and /or forage. It has also been shown that the technique will increase perennial grass numbers and species diversity.

Multi-species Pasture-Cropping on Winona

Research data from the USA has shown multiple species crops are better than monocultures for improving soil carbon, soil biology, and soil structure as well as providing improved forage quality for grazing livestock. Multiple species crops can also be used as a soil biology primer, disease and weed control and carbon building technique. USA research has also shown that by including flowering plants in a crop mix will increase insect diversity which controls insect attack on crops and attracts birds and other animals. This will improve the ecology of the whole farm and move the farm closer to functioning as an ecosystem.

For the last three years Colin Seis has been developing 'multi species pasture cropping' with the aim of producing better quality forage and improving soil health even more than single species pasture cropping does. The technique has the added advantage of being able to still harvest a grain crop after the multi species crop is grazed.

'Multi Species Pasture Cropping' uses a group of plant species that produce good quality forage, have a range of different root systems, includes, legume species, flowering plants and species that will add to organic

Multi-species Pasture-Cropping continued from page 7.

matter on the soil surface and in the soil as root mass. The plant mixture also produces a variety of plant root exudates which feed soil micro-organisms which further enhances soil health and soil carbon.

Since developing 'Multi Species Pasture Cropping' Colin Seis has achieved the following results when comparing 'Multi Species Pasture Cropping' to single species 'Pasture Cropping' on his property Winona. Both crops were sown into native grassland.

The photos show 'multi species pasture cropping' on 'Winona' in 2014.

The crop is of a mix of oats, forage brassica, vetch, field pea, and clover sown into native grassland of around 40 species.

'Multi Species Pasture Cropping' using a mix of oats, forage brassica, annual vetch, and field pea produced:

- better quality stock forage with improved fattening value and superior stock health benefits, than a single species of oats. (*The sheep did not develop scours on a mix of species.)*

- The Multi species grew better and produced more forage than oats on its own in a dry season.
- The soil structure and water infiltration was improved.
- Less weeds. (*This is due to the shading effect and quick canopy closure of the faster growing brassica species)*
- More beneficial insects observed in the crop.
- After grazing the Multi species crop, the oats was harvested for grain.

Soil surface after grazing. Significant litter will increase nutrient cycling.

Cropping practices in approximate order of increasing landscape function and increasing biodiversity.

Developed by Graeme Hand with input from Colin Seis

Mongolia

Graeme Hand

Stipa has been fortunate to receive an Australian Rangeland Society travel grant to enable me to travel to Mongolia in July to set up a project with the Council of Erdenetsagaan soum of Sukhbaatar aimag. The working title of the project is **Influence of management on the Carbon stocks in the different types of pasture in the ecosystems of Mongolia and desert steppe of Australia**

Annabel, who has been the driver of this project, has also decided to join me (self-funded) to help with working people that she already has developed a relationship with.

A part of this project is to look at field testing what is described as the positive deviance approach www.positivedeviance.org. The web site describes positive deviance as:

Positive Deviance is based on the observation that in every community there are certain individuals or groups whose uncommon behaviours and strategies enable them to find better solutions to problems than their peers, while having access to the same resources and facing similar or worse challenges.

Some of the ideas that resonated with us were:

Success of the positive deviance approach is predicated on the principle that telling people about a new behaviour or tool or strategy is not enough. People have to actually practice in order to internalize things and see the benefits for themselves.

Problems embedded in social and behavioural patterns resist technical fixes.

It's easier to act your way into a new way of thinking, than to think your way into a new way of acting.

The Positive Deviance approach is an asset-based, problem-solving, and community-driven approach that enables the community to discover these successful behaviours and strategies and develop a plan of action to promote their adoption by all concerned.

Minimum Specifications to classify a project as a “Positive Deviance” project

1) Define the problem, current perceived causes, challenges and constraints, common practices, and desired outcomes

2) Determine the presence of positive deviant individuals or groups in the community.

3) Discover uncommon but successful practices and strategies through inquiry and observation.

4) Design activities to allow community members to practice the discovered behaviours.

5) Monitor and evaluate the resulting project or initiative which further fuels change by documenting and sharing improvements as they occur, and help the community discern the effectiveness of the initiative.

References & Sources:

1. Basic Field Guide to the Positive Deviance Approach, Tufts University, September 2010
2. Pascale, Richard; Sternin, Jerry; Sternin, Monique (2010-06-16). The Power of Positive Deviance: How Unlikely Innovators Solve the World's Toughest Problems (p. 77). Harvard Business Review Press. Kindle Edition.

As part of the funding requirements we will prepare a detailed report of this trip which will be included in the December Newsletter

Action on the Ground Project

Demonstrating practices that increase soil carbon: Update Autumn 2014

Graeme Hand

The Stipa-led Action on the Ground project is supported by funding from the Federal Department of Agriculture under the Carbon Farming Initiative. In this update we show photographs taken in March 2013 and May 2014 of two sites (one in NSW and one in Vic) that show the changes to landscape function. Each site shows significantly increased coverage of the soil surface with perennial grass leaves and litter. This increases the cycling of nutrients in the soil which provides a positive feedback loop; more nutrient cycling, more grass. These results have been obtained by extended exclusion of livestock from the sites with a short period (part of a day) where livestock have been placed into the site to press any suspended litter onto the soil surface and to create small spots of disturbance for germination of perennial grasses.

The project funding ends in June 2015. We plan to take soil samples in October or November 2014 so we can measure any changes in soil organic carbon. We will write up a complete report which will be submitted to the government as part of the project and will create a special feature

Above: 'Animal Impact'. Below: the results

Central West NSW Site Overview

March 2013

May 2014

Central West NSW Site Soil Surface

March 2013

May 2014

Site Comments

March 2013

May 2014

Management: Livestock exclusion to allow these perennial grasses to grow, developing large masses of leaves and roots.

Results: There has been a significant increase in perennial grass leaf area (including significant development of litter). The bases of the perennial grasses have also increased. This indicates the site is now able to capture and cycle nutrients and water much more efficiently. The site used to be dominated by Sporobolus but now contains Red Grass, Warrego, Cotton Panic, Microlaena and some couch. There is significant decomposition of litter on the soil surface indicating the developing of increased levels of soil organic matter.

We haven't quantified this, but expert observation would suggest that the site has developed a significant amount of high quality feed for livestock.

South West Victoria Site Overview

March 2013

May 2014

South West Victoria Site Soil Surface

March 2013

May 2014

Site Comments

March 2013

May 2014

Management: Livestock exclusion to allow these perennial grasses to grow, developing large masses of leaves and roots. Site has been impacted twice since the start of the project

Results: There has been a significant increase in perennial grass leaf area (including significant development of litter). The bases of the perennial grasses have also increased. This indicates the site is now able to capture and cycle nutrients and water much more efficiently. The site used to develop mainly annual grasses and weeds. Now there is significant Phalaris, Microlaena, and Wallaby Grass . There is significant decomposition of litter on the soil surface indicating the developing of increased levels of soil organic matter. We haven't quantified this, but expert observation would suggest that the site can now reliably supply a significant amount of high quality feed for livestock throughout the year.

Southern Rivers NSW Site Overview

March 2013

May 2014

Southern Rivers NSW Site Soil Surface

March 2013

May 2014

Site Comments

March 2013

May 2014

Management: 44 two year old heifers were placed in the site for 24 hours in October 2013. Since then they have been excluded from the site to allow these perennial grasses to grow, developing large masses of leaves and roots.

Results: There has been a significant increase in perennial grass leaf area (including significant development of litter). The site is dominated by Cocksfoot with other species present. Annual weeds (mustard weed and thistle) have disappeared. This site is now highly efficient at capturing and cycling nutrients and water.

When the animals were removed in October 2013 they were content with good gut fill scores indicating that at least 4000 kgDM/ha of feed was available .

Never take advice 7

Why are researchers unable to confirm this obvious redesign?

Graeme Hand

In Never take Advice 6 How could we re-design grazing enterprises to lower risk and increase profit it was suggested that researchers are unable to confirm the obvious, more profitable, redesign of moving to contemporary grazing management while at the same time reducing inputs to decrease risk and workload. This article generated some comment and recently I had to provide a presentation to a group to justify these statements.

Key Points:

> *Successful **low input** contemporary grazing management relies on **increasing landscape function** especially nutrient cycling. Nutrient cycling requires long recoveries to grow perennial grass leaf litter (dead leaves) followed by management that promotes their decomposition.*
>
> *In **high input** grazing systems costs are high. The assumption is then made that to make this system work financially high perennial grass plant utilisation before litter is formed (dead leaves) is required. This management **decreases landscape function**.*

The key points highlight that the separation in thinking and outcomes appears to be related to the importance of **perennial grass leaf litter.**

Much of the research on grazing of perennial grass plants ignores this key point and describes that once the actively growing leaves have been restored (3 leaves perennial ryegrass) then waiting any longer results in waste and other problems with shading and reduced tillering.

For example dairy research presented in 'Principles for developing an effective grazing management system for ryegrass-based pastures[1]' the following high risk, low profit statements are made:

'The lifespan of a leaf is equal to the time taken for 3 leaves to

Never take advice 7 continued from previous page

grow per tiller. Thus, each tiller maintains a maximum of about 3 live leaves - as each new leaf emerges after this '3-leaf stage,' the oldest leaf dies. This is a basic principle on which sound pasture management practices are based, that leaves have a limited lifespan, and if they are not harvested (grazed), they will die and be wasted'.

'As the 4th leaf emerges, the oldest leaf (leaf 1) begins to die, so that the tiller maintains 3 live leaves. At this stage, pasture quality begins to decline and increasing amounts of pasture are wasted. The 3 to 3½-leaf stage is considered to be the ***maximum grazing interval****'.*

This seems so logical and sensible it is quoted in research papers and presentations **without** any supporting references on the impact on erosion, water infiltration and nutrient cycling, pasture persistence, risk, long term profitability etc.

This simplistic idea of waste makes most of the research and stories about forms of rotational grazing management irrelevant as without litter increasing and decomposing very few (~20%) of the benefits are reproduced. An example that sticks in my mind is an Evergraze researcher at Orange, NSW telling me that they had improved planned grazing by focusing more on the

Continued next page...

Image:

Colin Seis holding the result of the leaves dying and being "wasted". This significant handful of organic matter is being transformed into soil organic matter which will increase nutrient cycling and water infiltration (and soil carbon).

Photograph: Graeme Hand

Never take advice 7. Continued from previous page...

animals and reducing the recovery periods to reduce waste. The outcome of this research was that there was about a 27% increase in carrying capacity using planned grazing but this would not be worthwhile if you needed to spend money on changed infrastructure[2]. This outcome was predictable before the experiment was carried out as 'the improvements' result in low litter production and therefore low landscape function.

Excerpts from San Jolly's (sheep nutrition specialist) presentation at the BCG Sheep Nutrition Day

"One of the hazards of winter pastures is there is not enough dry matter on offer. If you are lambing onto these sorts of pastures at the moment, there are huge implications for early rumen development in these lambs. ....Another issue at the moment is that pastures can be excessively high in protein. Early grass dominant pastures can be as high as 30 percent protein... the reality is that ewes only need about 14-15 percent protein... The rest gets converted to ammonia in the rumen, sent off to the liver, converted to urea and excreted back out on to the pasture. This is a highly-energy expensive process, and that is energy the ewe needs to maintain herself."

From the same publication the following consequences are discussed. I have inserted comments in red (most from current scientific literature) in an attempt to indicate the consequences from a different context.

Consequences of a longer grazing interval:

From both a plant's and an animal's perspective, grazing after the 3-leaf stage, even though an increase in growth rate may still be measured, will result in:

- an increase in dead leaves, representing wastage of feed [Waiting till litter has formed (dead leaves) results in increased landscape function and is crucial to increasing soil pH, N & P plant availability and soil carbon[3]].
- increased shading of ryegrass tillers and clover stolons [New perennial grass plants are germinated and established by high animal impact and long recoveries[4] reducing the focus on tillers. High landscape function changes the pathway for plant available nitrogen reducing the need for legumes such as clover[5]]

- a greater chance of damage by rust fungus (if present)
- increased stem elongation (seed heads) in spring. [Plants with full root reserves remain vegetative for longer in spring[6]].
- a decrease in the nutritive value of feed, because fibre increases, while digestibility and ME levels decrease. [Pastures with long recoveries have the correct amount of fibre and a better balance of protein and energy pasture with lower non protein nitrogen producing better dung score and rumen function. This increases use of the energy available decreasing the need for feeding and increasing fertility[6, 7]].
- a decrease in utilisation by the grazing animal. [Controlled by increase stock density[6]]

Nasholm et al 1998 found:

Current conceptual models of nitrogen cycling is based on the assumption that mineralisation of organic nitrogen by soil microorganisms is a prerequisite for plant nitrogen acquisition. Laboratory studies have shown that some plants can use amino acids and proteins, thereby bypassing the common mineralisation pathway.

The lack of data showing this in the field is due to the lack of field techniques that would allow scientists to distinguish the pathways of plant uptake of nitrogen.

References & Sources:

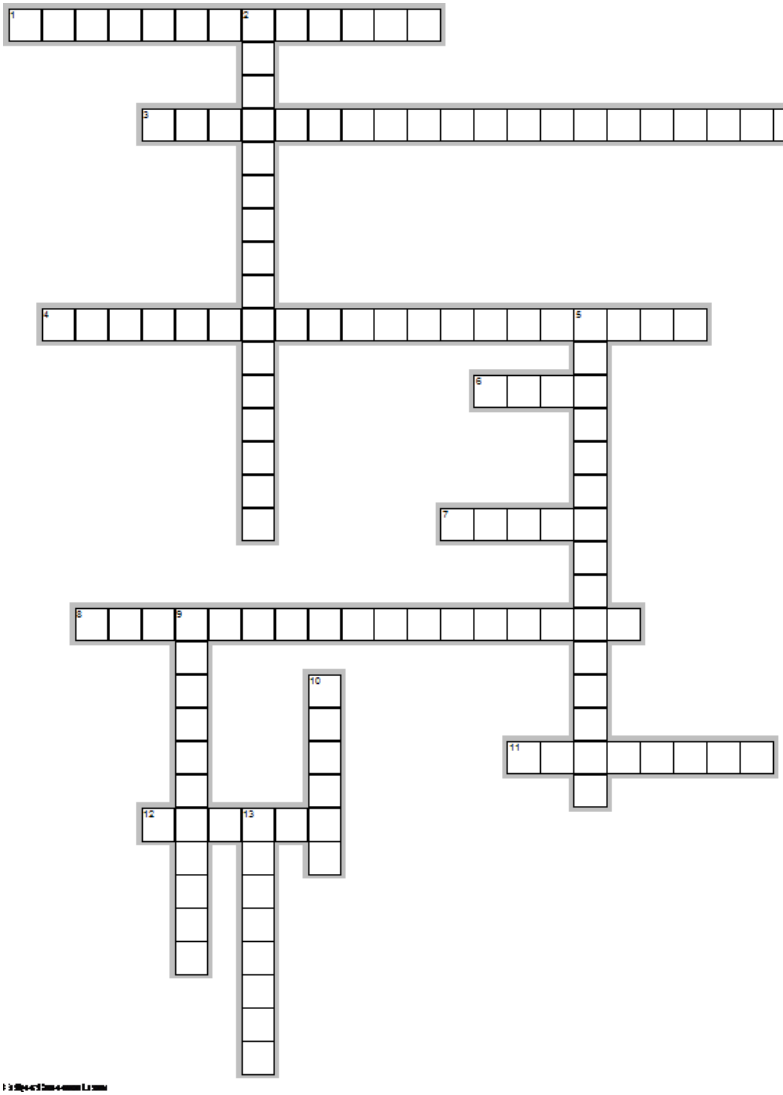
1. Donaghy D and Fulkerson B, 2001. Principles for developing an effective grazing management system for ryegrass-based pastures. Tasmanian Institute of Agricultural Research, Burnie, Tasmania
2. http://www.evergraze.com.au/library-content/higher-stocking-rates-but-lower-animal-performance-on-native-pasture-rotational-grazing-systems/
3. Tongway, D and Hindley N.L 20014. Landscape Function Analysis: procedures for monitoring and assessing landscapes. CSIRO Sustainable Ecosystems. Canberra.
4. Ampt, P and Doornbos, S. 2011. Communities in Landscapes project: Benchmark Study of Innovators. Landcare NSW, WYONG.
5. Nasholm et al 1998. Boreal forest plants take up organic nitrogen. Nature Vol 392.
6. Hand G. (unpublished data)
7. Birchip Cropping Group: Extract from a transcript from the San Jolly Sheep Nutrition Day. 29 July 2005.

Let me know if not clear or if you have any questions

Graeme

Crossword

Graeme Hand

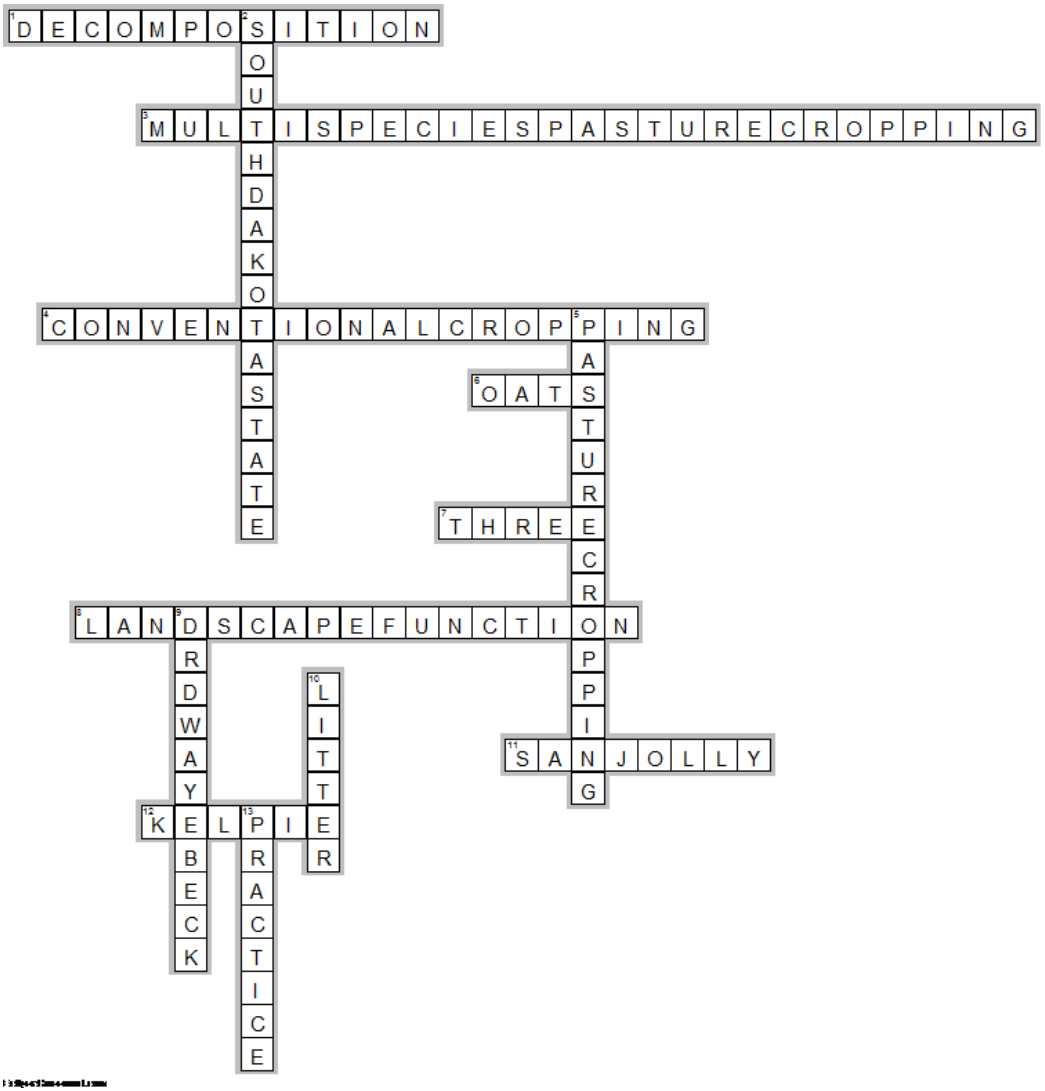


Across

1. Required for high nutrient cycling
3. Name of the highest regenerative level of regenerative cropping recently developed
4. Lowest level of cropping
6. What will be allowed to mature then harbested for grain in multi-species pasture cropping
7. Number of actively growing leaves on a perennial ryegrass plant
8. Successful low input contemporary grazing management relies on increasing 9,8
11. Name of sheep nutrition specialist
12. Breed of dog sitting on the motorbike in the multi-species pasture crop

Down

2. University where USDA cropping researcher works
5. Type of cropping system that is on the right track
9. USDA cropping researcher
10. Key difference between low input and high input grazing management
13. What people have to actually do in order to internalize things and see the benefits for themselves


1 DECOMPOSITION
2 SOUTHDAKOTA
3 MULTISPECIESPASTURECROPPING
4 CONVENTIONALCROPPING
5 PASTURE
6 OATS
7 THREE
8 LANDSCAPEFUNCTION
9 RDWAY
10 LITTER
11 SANJOLLY
12 KELBECK
13 PRACTICE

Membership renewals

Please note

Stipa is changing the way they renew memberships. We will endeavour to mail out your renewal tax invoice one month prior to your expiry date. If you would like to renew please mail us a cheque or EFT your membership.

Please remember to make reference on all EFTs and return cheques your INVOICE NUMBER (found on the top of your Stipa tax invoice).

Attention all members

To ensure that you continue to receive Stipa newsletters and updates, please remember to advise us of any change of address.

Also if you wish to receive emails about forthcoming events and other matters of interest, it is important that we have your correct email address.

Contact Stipa

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Or

Administration

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Native Grasses Association Inc.
ABN 42 300 161 489

Stipa promotes and proves the profitable management of native grasses by motivated people in healthy landscapes.

(please keep a copy for your records) TAX INVOICE

MEMBERSHIP APPLICATION/RENEWAL

Name: .....

Company or trading name: .....

Address: .....

.....

Town: ..... State: ..... Postcode: .....

Phone: ..... Mobile: .....

Email: .....

Annual membership (please select one – note that subscriptions include GST):

☐ ACT & NSW $75 ☐ Interstate $45 ☐ Student $30 ☐ Corporate $500

Payment options (please select one):

☐ **Cheque/money order** (to Stipa Native Grasses Association Inc.) for $..... is enclosed.

☐ **Direct deposit**: Deposit of $..... made on ..... (date).

Stipa Native Grasses Association account at Westpac BSB: 032 647 Account: 106 924

Please include your surname in the reference field to help us match your payment to your membership.

Send your completed membership form (with your payment, if applicable) to:
Stipa Native Grasses Association, 150 Caroona Lane, Branxholme Vic 3302

For more information contact: Stipa CEO Graeme Hand on 0419 532 133, fax 03 5578 6370 or email graeme.hand@stipa.com.au

Stipa Native Grasses Association aims to:
*promote native grass as pasture and for conservation * educate the community about native grasses * document pasture systems using native grass * distribute information to agencies and landholders * network with other groups with complementary activities.

November 2011