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Editorial

The feature in this issue is undoubtedly Russell Starr's timely article warning caution in the use of commercial varieties of *Danthonia*, when these become available. Their potential must be spelt out with more care, otherwise overuse or inappropriate usage could cause a backlash against native grasses in general. What is needed, Russell says, “.. in parallel to the commercial production of native grass seed is research into general principles of harvesting, establishment and maintenance for different genera (thereby allowing) park managers, after selecting the most appropriate species for their situation, to go out and get the grass, either from commercial sources or the wild.”

Also featured in this issue is a review of native grass harvesting technology, along with extracts from various newsletters and journals, and of course our regular features. Correspondence includes a letter from England about the ornamental use of New Zealand grasses (and Tasmanian sedges!) there, and raises the possibility of an interest in the use of Victorian and Tasmanian grasses in European landscape gardening.

The surprise in the garden this summer has been *Stipa mollis*, which is still green, long after the other *Stipas* have dried off. It also gave a spectacular flowering display - it thickened up considerably late September and then just exploded into flower, within the fortnight, sending up flowers to almost two metres. *Microlaena* is also still green, and lush looking.

Dermott Kelly

Commercial Seed Production of *Danthonia*

by Russell Starr

Early in 1989 the CSIRO put out a press release about a joint venture between their Division of Plant Industry and Hodder and Tolley for the commercial production of *Danthonia* seed (see Newsletter No.6). After four years of research *D. richardsonii* was chosen for commercial release. It is interesting to note that as far back as 1932 this same species had been identified at the Waite Agricultural Research Institute as a grass worth exploiting for dryland pasture and hay production (Cashmore, 1932). We seem to have rediscovered native grasses.

Potential uses quoted for the grass by the CSIRO include dryland parks and roadsides throughout eastern and southern Australia. It is in fact what many of us have been screaming for, a native grass to use in parks to replace mown weeds and irrigated turf. There is now a real potential to create truly low maintenance landscapes without having to worry about the perennial question of 'where can we buy the seed?'

However, I have real fears that unbridled enthusiasm, marketing tactics and ignorance may generate overuse or inappropriate usage of *D. richardsonii*. The two main potential threats are invasion (into areas it was previously unknown) and hybridization. The enthusiasm of some native plant growers to plant interstate trees and shrubs in urban fringe areas has led to some 'natives' becoming weeds. *Pittosporum* and *Acacia baileyana* in the Adelaide Hills are an example. The threat is that *D. richardsonii* could be used in areas (where) it is not indigenous and it invades and overruns habitats occupied by other species of grass.

Currently the NPWS (National Parks & Wildlife Service) have a responsibility to only grow indigenous plants in national parks. So areas under their control could not even use *D. richardsonii* if it were not found to be indigenous to the area. And even if it is, the question remains

as to whether there are different subspecies that are specific in their location or range. You then have the potential problem of swamping the genetic pool of specific subspecies by introducing a commercially grown subspecies. This then raises the issue of hybridization. Fortunately Cashmore (1932) states that an "outstanding feature of the group (*Danthonia*) is the absence of intercrossing" and that "no single case of hybridism has been observed, although Cockayne and Allan state that *D. pilosa* produces polymorphic swarms of hybrids with *D. semiannularis* in New Zealand". Thus it must not be completely ignored.

In South Australia *D. richardsonii* is only recorded (Jessop and Toelken, 1986) as occurring in the southern Lofty Ranges area. And if my memory serves me correct, this is only based on a couple of records, one of which being the plants grown for research at Waite Agricultural Research Institute which originally came from Victoria. Thus in S.A. this species may have only limited potential in national park areas or possibly no use whatever.

Another potential problem is selection of *D. richardsonii* for dryland landscapes thinking that it will solve all maintenance problems. *Danthonia* are principally spring and early summer growers. And although they can respond to summer thunderstorms, they are principally dormant over summer. Thus they could represent a potential fuel load for fires if not mown. Is this then contrary to what is intended for dryland 'natural' landscapes? I feel that a lot of work needs to be done on selecting summer growing native grasses, for use in areas where fire is a serious threat, to avoid having to do what is already done, creating boring mown parks.

Establishment may also pose problems. Cashmore (1932) refers to the problem with

Danthonia of slow establishment and excessive weed invasion during the first year after seeding. In the 1980's and 1990's we have the benefit of a wide range of herbicides to allow selective growth, however little research has been done. What is worth pursuing however, is the use of broad leaf control agents with native grasses and the use of triazine herbicides with summer growing grasses. But without some innovative work by some people in this area, workers in the field will undoubtedly become frustrated trying to establish weed free native grass stands to the point of abandoning the idea.

A potential benefit of the commercialisation of *D. richardsonii* is that it will wet the appetite of park managers for other native grasses. The press release from CSIRO indicated that within the next few years it is hoped that other species suitable for landscaping will be released. What we don't want is a blind adoption of *D. richardsonii* for all purposes, only to find it not suitable or inappropriate or it creates management or genetic disasters and thus causing a backlash against native grasses.

What is needed, in parallel to the commercial production of native grass seed is research into general principles of harvesting, establishment and maintenance for different genera. This would then allow park managers, after selecting the most appropriate species for their situation, to go out and get the grass, either from commercial sources or the wild. This is in preference to trying to use *D. richardsonii* for all situations.

With respect to *D. richardsonii* and its current commercialisation I feel that its potential must be spelt out with more care. It has, of course potential as a pasture grass in areas of low fertility. This was identified way back in 1932. The next potential use is in non-irrigated parks in urban areas away from bushland. This is to prevent genetic dilution of local subspecies and invasion of bushland. In urban fringe areas, rural parks and national parks it would be more appropriate to use locally indigenous grasses.

With respect to roadsides (as mentioned in the press release) I have mixed feelings. It may be more appropriate to use *D. richardsonii* than rye grass in many situations. However, my comments with respect to parks is just as relevant for roadsides. In the end each case must be evaluated independently by competent technical staff. Let's hope that research and development of the management and commercialisation of more native grasses quickly follows the release of *D. richardsonii* before too many mistakes are made.

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Russell Starr
Greening of Adelaide
SA Department of Environment and Planning

More News ..

The New South Wales Dept. of Agriculture & Fisheries (Tamworth) is currently selecting cultivars of *Danthonia linkii* and *D. richardsonii* for commercial release in 1992, initially for general landscaping and soil conservation, both here and overseas, for example, the Middle East. The Dept. will conduct its own seed increase of selected lines, the overall objective being to provide seed of these *Danthonia spp.* to graziers on the slopes and tablelands of northern NSW.

STOP PRESS Bushland Flora have just announced the first commercial release of Wallaby Grass seed (*Danthonia setacea* MIX) in Australia.

Harvesting Native Grasses: A Review

by Dermott Kelly

First in a three part series on the current technology for harvesting, processing and sowing native grasses.

Introduction The type of harvester and/or the type of harvesting method used will depend on a number of factors, for example, the species being harvested, the size of the stand, the proximity and size of other stands, the purity of the stand (i.e. weeds, other native grasses), the ruggedness of the site (i.e. rocks, slope and accessibility), ecological considerations (i.e. how much should be left?) and the intended use of the harvested seed (i.e. commercial/private).

When to Harvest The other important factor is timing; timing and the method of harvest will mainly determine the yield and quality of seed recovered.¹ The period over which high yields of good quality seed can be harvested varies between species, within species and between sites, and will also depend to a large degree on weather conditions.^{1,2} Seed plots can be used to estimate the periods of peak seed production.²

The optimum time for a single destructive harvest occurs after the commencement of shedding (of ripe seed) - a "destructive" harvest taking the entire inflorescence, both ripe and unripe seeds. McDougall³ recommends harvesting *Themeda* when 35-40% of the seed has been dropped. However, Loch¹ says that harvest recommendations made on this basis are unreliable and suggests that harvesting occur when the bulk of the seed is about to drop i.e. when ripening seeds can be removed easily by gentle rubbing and shaking of the heads.

Manual Collection In South Australia at least, and probably for the rest of south-eastern Australia, sites "have uneven surfaces with exposed rock and contain many unwanted weed species. They are often small, offer poor access

and are becoming rare"³. For the private collector, like myself though, quantity is not important, and a pair of secateurs and some paper bags are sufficient. Martin O'Malley's text² is also recommended as a useful guide on the manual collection of seed from *Aristida spp.*, *Danthonia spp.*, *Dichanthium sericeum*, *Enneapogon spp.*, *Poa labillardieri*, *Stipa spp.* and *Themeda*.

However, even at this level improvements are possible, for example, the early *buffel grass seed harvesters of Northern Australia used hand-held metal "combs", cut from metal or pirated from old stripper harvesters, and attached to wooden handles.^{4,5} Another device was a piece of wood with protruding nails along it.⁵ These were used to strip the spikelets from the heads and helped speed up things considerably. To date though, there's still a need, in Australia, the U.S. and third world countries, for a versatile backpack collector that can harvest chaffy-seeded grasses from wild stands.^{5,6}

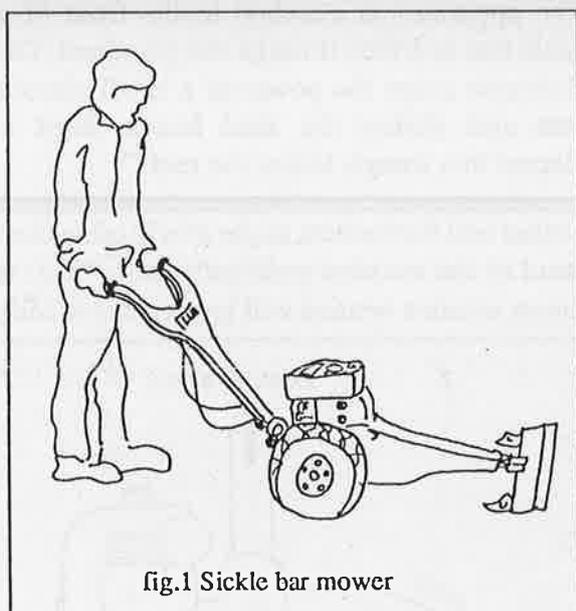
Harvested seed needs to be dried before storage and can be stored in brown paper bags. It should be stored in a dry place, away from direct sunlight and temperature extremes. Protection against predators, such as mice and insects, may also be necessary.

Mechanical Harvesting

"With few exceptions equipment available for harvesting and cleaning native grass seed has not been designed for that purpose. Most has been borrowed or adapted from agriculture."³

“Harvesting chaffy seed has been a difficult task to mechanize. The hairs, awns, and other inert appendages surrounding the caryopses of certain native and introduced grasses make their harvesting difficult. Seed size, indeterminate growth habits, and variable head heights all contribute to the problems associated with mechanically harvesting such seed.”

Mowers. “These are destructive harvesters that cut the culms of the plants for later collection by hand or machine. An example is the sickle bar mower (self-driven but manoeuvred by hand). See fig.1.

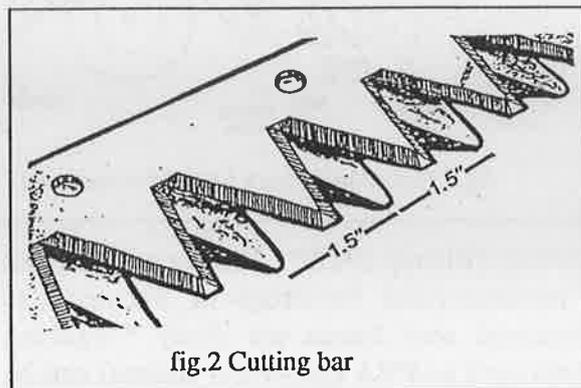


The cutting edge consists of two rows of teeth that move in opposition and can be controlled for speed. The machine is small and easily operated in the rough terrain of a natural grassland (and produces good yields of *Themeda triandra* seed).”³ However, the sickle bar mower collects a lot of chaff (chaff to seed ratio 13:1, w/w, for *Themeda*)³ and requires two people, one to rake and bale the hay. A high chaff to seed ratio may increase threshing time if clean seed is required. The blades of the mower can also produce sparks when they contact rocks, and the risk of causing a fire needs to be considered when mowing on hot summer days.³

“Slashers and brush cutters also operate destructively by cutting culms but are more

violent in their action than a sickle bar mower.”³

Headers. Headers consist of a cutting bar (see fig.2) and a rotating reel that directs the culms into the blades along the cutting bar. The cutting edge can be adjusted to suit the height of the crop. A header is generally used as part of a combine.³ See fig.3 overleaf.



Combines. “These are large machines that cut the crop with a header and thresh it in a single operation. Seed is collected in a bin on the harvester and other material is blown away .. Combines have been used successfully for harvesting *Themeda triandra* seed in South Africa (Prof. J.J.P. van Wyk, Research Institute for Reclamation Ecology, pers. comm.) .. (and) could be considered if the crop is grown commercially but seem to be inappropriate for natural stands. Site conditions such as surface rock, uneven terrain, fire risk and susceptibility of (the tussocks) to damage (from the weight of such a large machine) are constraints on harvests.”³

In central Queensland, combines harvesting *buffel grass, and other chaffy-seeded grasses, have been modified by replacing the conventional sieves with large mesh or by blowing the seed through a rotating circular wire mesh screen, thereby giving them a higher cleaning capacity.¹

Windrowers. “Windrowing is a technique used with some crops for harvesting before full ripeness. Harvesters are available that deposit the hay in rows where it can be picked up later by crop lifters or pick-up fronts attached to

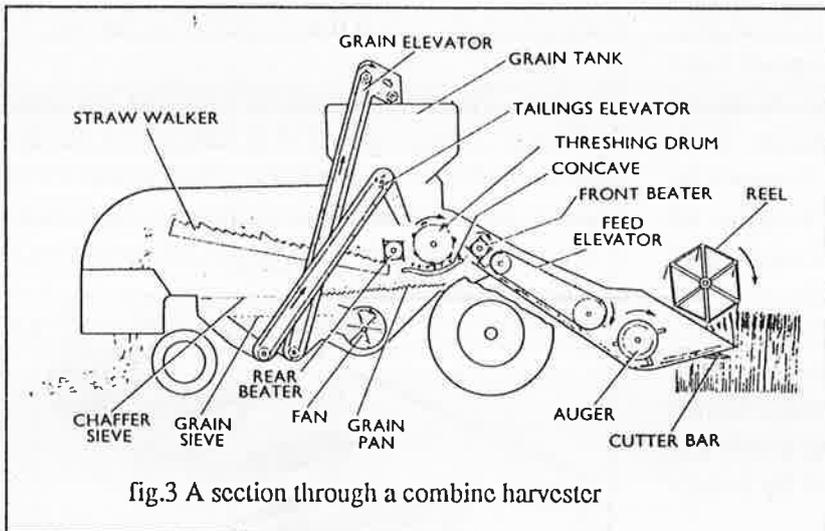


fig.3 A section through a combine harvester

Strippers “These have been used to remove seed from the crop without cutting the plants. They attempt to dislodge the seed by knocking or shaking the heads as the machine passes through the stand.”³ Examples are the reel harvester described by Wotzko (1981)¹¹ and the OSU (Oklahoma State University) grass seed stripper⁷. The former consists of (wooden) paddles attached to a reel (see figs.5&6 - opposite page).

combines (Bishop 1982)⁸ .. Windrowing cannot be recommended for crops of *Themeda* as substantial seed losses are likely.”³ Tacking agents such as PVA (polyvinyl acetate) can be used to prevent shedding (of seed) in the crop and so improve yields but although “PVA was effective in inhibiting shedding at the rate of 150 ml/m², its use cannot be recommended.”³

“The apparatus is attached to the front of a vehicle that is driven through the grassland. The reel rotates under the power of a small electric motor and shakes the seed heads. Seed is collected in a trough below the reel.”³

On other reel harvesters, angle iron is often used instead of the wooden paddles/beaters.¹² This is because wooden beaters will break more readily

Vacuum harvesters. As far as I know none have been used effectively for grass seed collection, although large vacuum harvesters may have application if the crop is grown commercially, for example, low growing, prolific seeders such as *Danthonia spp.*,⁹ *Enneapogon* and *Chloris*.

Another approach has been to vacuum the soil and litter throughout the stand. “Tests carried out in the USA¹⁰ .. showed that considerable seed stocks can be retrieved from the soil .. using a vacuum apparatus (see fig.4). Over 7,000 seeds per square metre, of which 90% were grass seeds, were retrieved from soil in a grassland area (and 800 seeds/m² from the litter, of which all were grass seed).”²

“Commercial application of this system might involve a large vacuum mounted on a truck that would travel over the soil surface. Ahead of the vacuum nozzle would be a rake to disturb the soil surface. The vacuuming would be done when the soil was dry (and) after seeds have ripened.”¹⁰

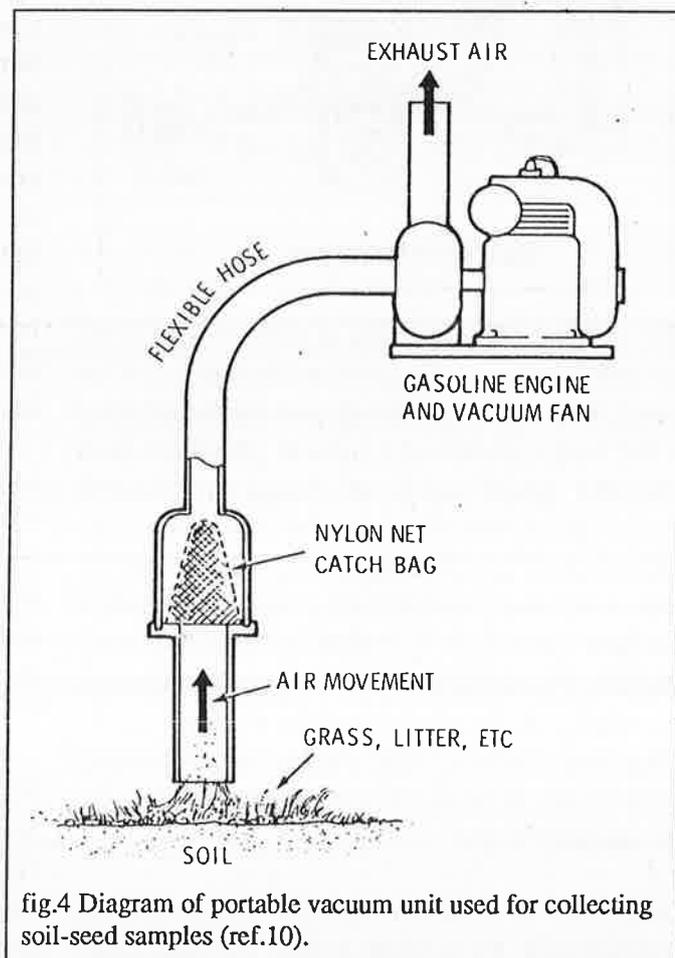
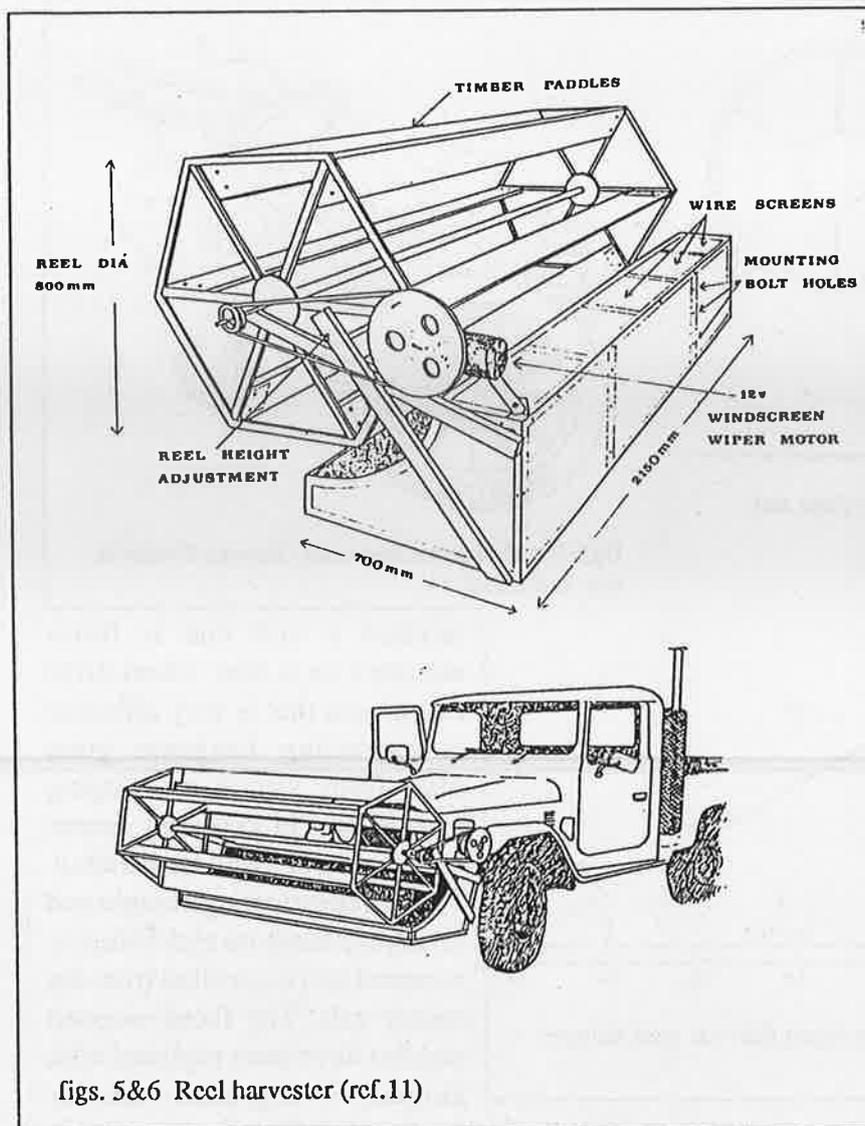


fig.4 Diagram of portable vacuum unit used for collecting soil-seed samples (ref.10).



figs. 5&6 Reel harvester (ref.11)

if they hit some obstruction, however this also acts as a safety device, and steel beaters with sharp edges will cut more rubbish than wooden ones with rounded corners, and the aim should be to have a beater which throws less trash into the collector.¹² The gap/clearance between the beaters and the leading edge, the diameter of the reel and the reel speed (and the forward speed of the machine) will also determine the amount of trash received, and all/some of these parameters will vary, depending on the species/variety.

The OSU grass seed stripper consists of a stripping reel, cross-feeding augers, a material handling fan for pneumatic conveying, a screen separator for removing seed from the air stream, and a collection hopper mounted on a commercial windrower chassis. All rotating

elements are driven hydraulically. The stripper reel consists of eight bars equally spaced about a central shaft with nylon flails 22 cm long (3.2 mm diameter) attached to four of the bars (see fig.7 overleaf). Spacing of the flails along the bars is 2.5 cm.

“A hand-operated type of stripper made by Poynter Products Pty. Ltd. is (also) described by Wotzko (1981)¹¹. It traps the seed heads in a comb from which they are stripped by a reel and fed into a collection tray or bag.”³ See fig.8 (overleaf).

A second type of stripper is the brush harvester^{13,14,15} which uses a front mounted rotating (nylon) brush and air pressure to harvest and store chaffy grass seed. An example is the Woodward flail-vac seed stripper¹², a design radically different from the above in that it uses a brush rotating away

from the machine and upward at the leading edge. The idea “was that a brush which rotated upward at its leading edge would result in less stem breakage and thus a cleaner product than would be possible from a downward rotation. Also the air flow into the brush itself would provide sufficient velocity to gather seed heads into the flailing brush and thus increase the amount of seed harvested.”¹³

See fig.9 (overleaf) “The rotating brush in conjunction with the curved shroud and windboard creates a vacuum (low pressure area) and airflow around the brush helps lift seed heads into position for stripping. Flailing action of the bristles removes seed from the inflorescence as the unit moves forward. Airflow above and behind the brush carries the stripped seed into the

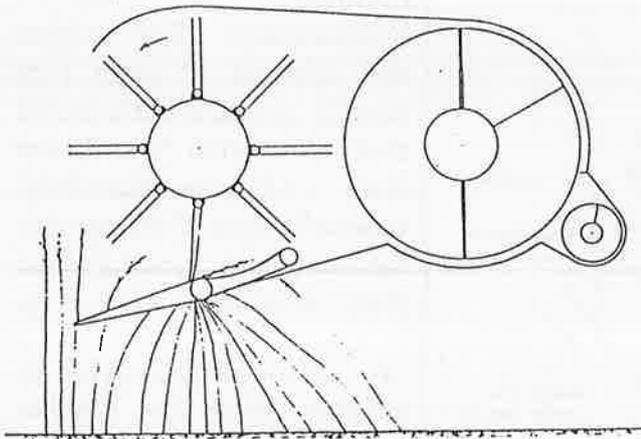


fig.7 Schematic of stripper reel, concave plate and cross augers (ref. 7)

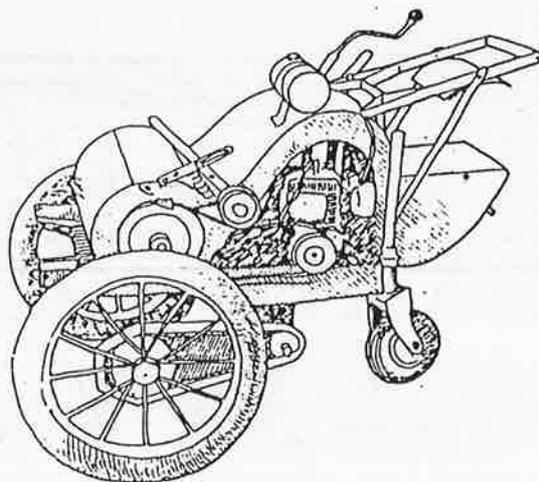


fig.8 Hand-directed harvester (Poynter Products Pty. Ltd.). Ref. 11

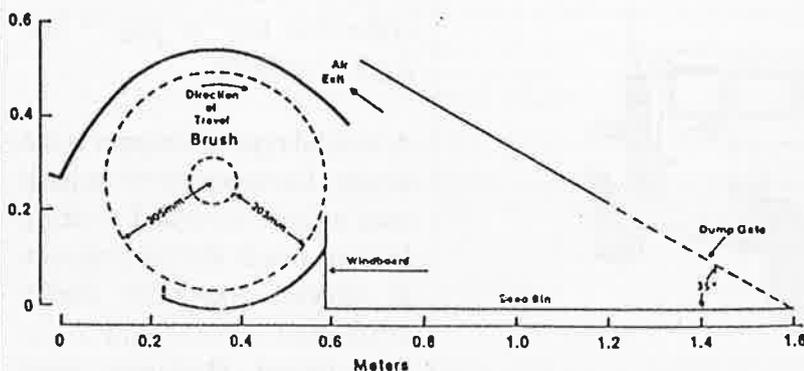


fig.9 Cross sectional diagram of the Woodward flail-vac seed stripper with component dimensions (ref. 13)

produce a unit that is front-mounted on a four wheel-drive tractor and that is very effective in harvesting kangaroo grass seed from stands on sloping ground and in confined spaces where ground speed is restricted. The reel speed, trough height and tilt adjustments are hydraulically powered and controlled from the tractor cab. The fixed wooden paddles have been replaced with hinged, swing-back tubular

bin where it is deposited by a 180 degree change in airflow direction."¹³

The Woodward flail-vac seed stripper can also be constructed more cheaply on the farm than the OSU grass seed stripper.¹

(i) *reel harvesters.* The Wotzko reel harvester¹¹ works better with some native grass species than with others, for example, it's very effective with *Stipa*^{2,16} and possibly *Danthonia*², and less so with kangaroo grass³. Long-unburnt tussocks of kangaroo grass are particularly sensitive to traffic and repeated passes of a vehicle and harvester over a stand may cause soil compaction and tussock damage.³ The harvester is also easily damaged in rocky stands.³

John Stafford¹⁷ has tackled these problems to

paddles, and immediately below the reel, and in close tolerance to it, is a flail rotor i.e. a 2" diam. steel roller, along which lengths of 1/8" diam. steel rod have been welded and pierced with several hundred pieces of fencing wire, each twisted into a V-shape. The combination effectively "strips" the spikelets from the heads in one pass.

A metal comb would also strip the heads but is more susceptible to rock damage, and the swing-back paddles have the advantage of allowing loose rocks and other debris to pass through without damaging the mechanism. The machine has a speed of one km/hour i.e. 0.2 ha/h for a header width of two metres.

The reel harvester of Wotzko (1981)¹¹ has been tried twice in Victoria for harvesting *Themeda* and although on both occasions the operators

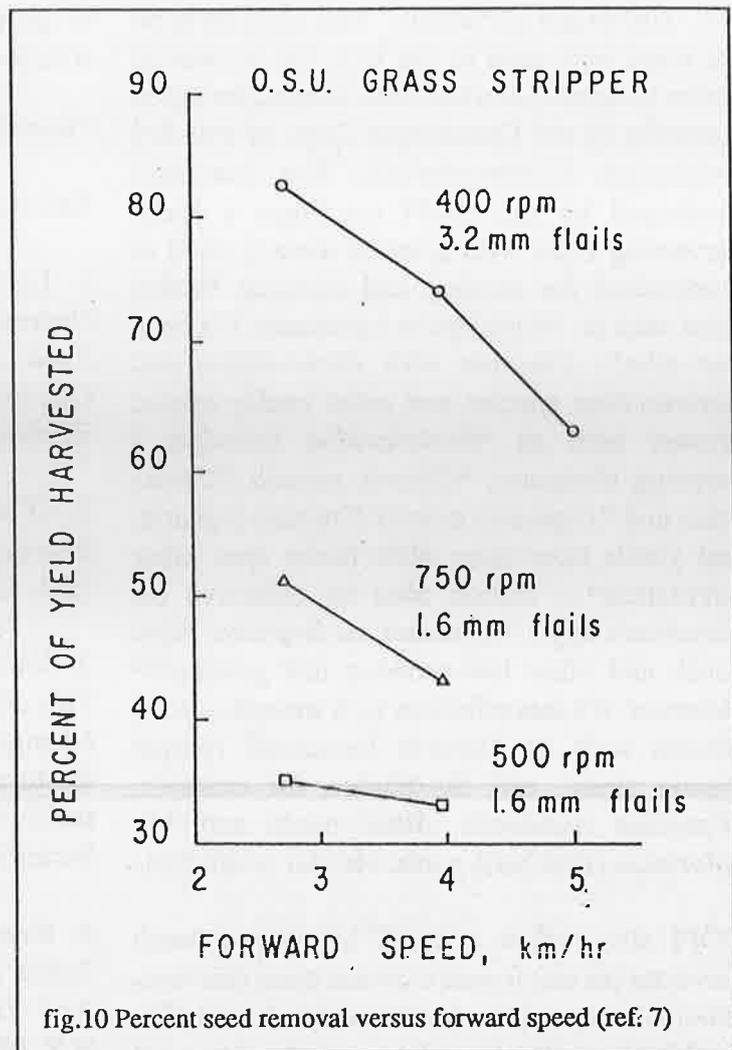
considered the yield low, the machine was considered adequate for this purpose³. The great advantage of a reel machine is that it can be used by one man for harvesting most native grasses above 15 cm.¹⁸ It can also be constructed in the farm workshop, from cheap materials.^{1,12,18}

The Land Conservation Unit (Alice Springs) built a reel harvester in 1987 (three wool bale capacity) and have used it to harvest *Astrelba pectinata* /barley-mitchell grass, *Cenchrus ciliaris* /buffel grass and *Cenchrus setigerus* /birdwood grass.^{19,20} The machine has a suction blower which moves back and forth on rails above the reel, drawing the seed from the back of the reel, and blowing it onto the back face of a screening apparatus so that the seed falls into the collecting bags, and out of the air stream.

The City Parks Administration (Canberra) has a Wotzko reel harvester and has used it mainly for harvesting *Themeda* and *Bothriochloa macra*¹⁸, and in South Australia there are two reel harvesters, the one described above and the one built by Greentech Aust. (Adelaide) for Blackwood Seed Collectors of Murray Bridge.

Queensland pastoralists though have been building and using reel machines since 1963, to harvest *buffel grass.¹²

To my knowledge, the OSU grass seed stripper has not been used in Australia. It was developed with the *Bothriochloa-Dichanthium* complex of grasses in mind, as these were considered the most difficult to harvest. Harvesting speeds of up to 5 kms/hour are possible i.e. 1.2 ha/h for the 2.7 m header width of the stripper, and the machine has a collection capacity of 2.16 m³. The stripper can harvest seed head heights of 15 cm to 122 cm, has a seed collection system adaptable to bulk handling methods, and is a pull-type machine compatible with farm tractors.⁷ The percentage of seed removed is dependent on both reel rpm



and forward speed (see fig.10), and as both can be adjusted over a wide range, multiple harvests of stands are possible. In field trials, seed was removed without any significant reduction in quality.⁷

(ii) *Poynter pneumatic stripper harvester.* Made by Poynter Products Pty Ltd (Melbourne)²¹ and suitable for small areas, harvesting one hectare per day, in good conditions. Ground speed 4 kms/hour. The comb is 60 cm wide and the machine can crop heights from 23 cm to 76 cm. Used and recommended for harvesting native grasses by Andrew Paget of Bushland Flora (Melbourne)⁹. Compares favourably with the sickle bar mower in terms of chaff to seed ratio (4:1 vs 13:1, w/w), labour (one person instead of two) and time.³ However, it is less manoeuvrable than the mower.³

(iii) *brush harvester*. This appears to be the main type used in the U.S. for harvesting native grass seed and has been adapted for use in Australia by the Queensland Dept. of Primary Industries (Toowoomba). The machine developed by the QDPI combines a brush harvesting front with systems already used in Queensland for moving and cleaning *buffel grass seed in *buffel grass harvesters. It's been particularly effective with *Dichanthium* and *Bothriochloa* species and other chaffy-seeded grasses such as **Bothriochloa insculpta* / creeping bluegrass, **Chloris gayana* /Rhodes grass and **Digitaria smutsii* /Premier digitaria, and yields have been 50% better than other harvesters¹⁴ - should also be effective on *Danthonia spp.*, **Cynodon incompletus* /blue couch and other low-growing turf grasses.^{15,22} However, it's less effective with smooth-seeded grasses such as **Setaria incrassata* /purple pigeon grass and the panics, for example, **Panicum antidotale* /Blue panic and **P. coloratum* /Bambatsi panic. Header width 5 m.

QDPI also makes a small batch-type brush harvester for small seed increase areas (harvests about 0.2 ha per hour; header width 2.5 m). The machine is easily cleaned down and can be used to harvest a wide range of grasses.¹⁵

"The best crops for brush harvesting are unlodged with upright stems carrying the seed heads at an even height well clear of the foliage. This minimises the amount of trash recovered and hence makes cleaning easier .. Brush harvesting is less efficient where heads are carried over a range of different heights in the crop as often occurs in practice. Heads that are too high are pushed over and not brushed, while low heads are either missed entirely or the seed may be removed and lost before it can be caught by the vacuum created by the brushing action. Attention needs to be given to solving this problem, for example, by running a second downward-rotating brush above and forward of the main brush to pull in high heads that would otherwise be missed. Crop management to produce a dense, even, unlodged crop, however,

is probably the most appropriate long-term solution."¹⁵

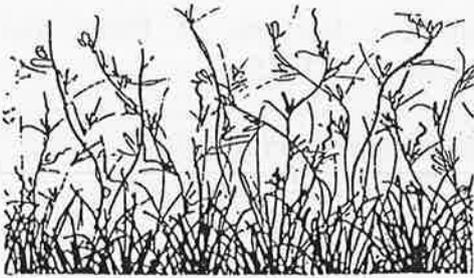
*introduced/naturalised grass

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Letting the Grass Grow

by Laurie Lees

Reprinted from SGAP Victoria Newsletter of December, 1989

At the National Trust property 'Mooramong' near Skipton, Laurie Lees of Central Highlands SGAP has been Ranger since 1984. In 1985 seed harvesting of native grasses and herbs began, initially, in conjunction with Dr David Robertson from Melbourne University. Since 1986 Neville Scarlett from Latrobe University has been assisting; and with a grant from the World Wildlife Fund, growing, planting, (weeding) and monitoring of rare and endangered species has been a primary activity on the reserve.

Although tree planting is carried out, more emphasis is now placed on restoring the indigenous grassland of the basalt plains. This could take many years to achieve. Laurie details his yearly timetable -

In late January this year our annual *Themeda* harvest got under way. With myself and son, Mark, mowing and four ATC Volunteers raking and packing, it was our aim to fill over 100 wool packs for the week.

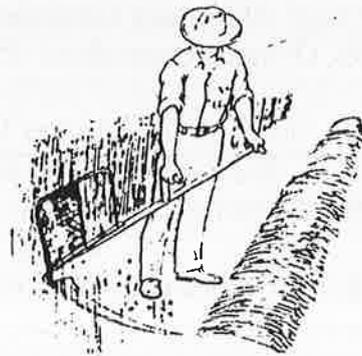
As available roadside areas get less and less, we have to travel further afield and use areas that we would have considered too small to bother with a couple of years ago.

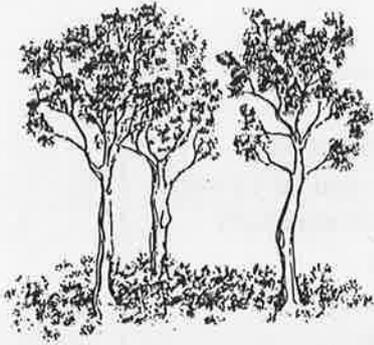
Over the past four years we have seen over 50 km of native grassland on roadsides ploughed, sprayed and sown down to various agricultural crops. The unfortunate sequence that follows the ploughing (which is usually carried out in the name of fire protection) is the invasion of perennial weeds such as phalaris and brown top

bent grass, which, in turn, become a greater fire risk than the original native grasslands ever were.

Half the seed we harvested was sown direct over existing pasture and weed species. The rest was stored for broadcasting in late spring. The whole area is then burnt in early summer and, we hope, *Themeda* seed germination will begin as soon as the soil temperature rises to 20-25 °C.

The split seeding methods give an each-way bet on the season ahead. The hygroscopic properties of the seed bury the first sown seed to a depth of 2cm+. This seed will germinate over several years, whereas the later sown seed reacts more quickly to the summer temperature, germinates at a higher rate, and requires follow-up summer rainfall to ensure survival of seedlings.





Australian Grasses in Cultivation

by Dermott Kelly

Synopsis of a talk given to the January 26 (1989) meeting of SGAP S.A.. Reprinted from the SGAP S.A. Newsletter of August, 1989.

Introduction: There is a wide range of native grasses, of which there are species suitable for a variety of uses including erosion control, lawns, parklands, and low fire-hazard (plantings).

Locating and identifying grasses: How do you tell a native grass from an introduced one? It is much easier to identify an introduced one because there are many beautiful colour photographs and/or line drawings of these to be found in any book about weeds. Not so for the native grasses however, though a good introduction to the subject is given by Nadine Brown.¹ (She groups the grasses) .. according to the shape of their inflorescence, and the reader is then presented with a list of likely species, with black and white photos and descriptions of each, for quick and easy identification.

Native grasses mainly survive in undisturbed areas, and the best time to go grass-hunting is late spring to early summer as most species will be flowering and starting to set seed, and will be easier to identify. There are also the grass display beds at the Black Hill Flora Centre, Athelstone, where some of the most common, and many of our most ornamental native grasses can be seen, clearly labelled, any day of the week. If you're still unsure, take a specimen to the State Herbarium. It is always best to obtain native grass seed from as close to where you live as possible, and from a similar environment. This

ensures that local forms and variations are preserved.

Seed collection: The simplest method is to use a pair of secateurs and a large brown paper bag. The main trick is knowing when the grass seed is ripe, and the seed is ripe to harvest when it is hard - it's a simple matter to squeeze any number of florets, for hard seed. Each seed is enclosed by two bracts, the lemma and the palea, and collectively referred to as the floret. However, not every floret contains a seed but more of this later when we talk about direct seeding.

Seeds harvested when soft, will not grow, and again the best time to harvest is often late spring to early summer. A table giving peak collecting times for some of our more common native grasses .. (can be found in Martin O'Malley's report, "Revegetating with Native Grasses"²).

Dormancy or after-ripening periods: Most grasses exhibit dormancy or after-ripening periods; that is, after collection, the seed must be stored (for a period of time), before it will germinate. This is a natural mechanism to ensure that the seeds will not germinate until conditions are right for growth (see table opposite page). To overcome these periods, the seed is best dried and stored in brown paper bags. It has been found that many species will lose their after-ripening periods quicker when stored in hot conditions;

	<i>Dormancy</i>
<i>Aristida behriana</i> (brush-wire grass)	Approx. 6-9 months
<i>Chloris truncata</i> (umbrella grass)	Uncertain - can be 12 mths
<i>Cymbopogon ambiguus</i> (lemon-scented grass)	No data (6-9 months?)
<i>Danthonia caespitosa</i> (wallaby grass)	3-4 months
<i>Dichanthium sericeum</i> (silky bluegrass)	Virtually none
<i>Enneapogon nigricans</i> (black heads)	4-9 months
<i>Poa labillardieri</i> (tussock grass)	None
<i>Stipa spp.</i> (spear grass)	4-11 months
<i>Themeda triandra</i> (kangaroo grass)	Variable - approx. 5 mths

when all or part of the “husk” (palea and lemma) is removed; and/or when the seeds are soaked in gibberellic acid solution (100 ppm GA3).

Choosing where to plant, and site preparation: It is important to select a spot that reflects the grasses natural habitat and one from which weeds have been eliminated. Again, there is a habitat profile and illustrations of the relative growth forms of the above species to be found in reference (2). *Poa labillardieri*, for example, is found on south-facing moist gullies so would need to be planted in a well-watered spot sheltered from direct afternoon sun. The other listed species are quite hardy.

Areas that have been heavily composted or that have a history of superphosphate application may need to have their nutrient levels lowered first by, for example, planting to vegetables for a couple of years.

Native grasses are either summer-growing, winter-growing, or year-round growing, and if you’re planting a large area the types of weeds present will determine whether or not the weeds can be controlled. For example, if winter-growing weeds dominate a particular spot, plant summer-growing native grass; the weeds can be wiped out when the native grasses are dormant. Likewise, plant winter-growing native grasses where summer-growing weeds predominate. However, both types of weeds must be eliminated before planting year-round growing native grasses. A summary of the major exotic grass species and their growth periods can be

found in a workshop paper given by Paget and Shimmen Bushland Seeds.³

Themeda triandra, *Chloris truncata*, *Aristida behriana*, *Dichanthium sericeum* and *Cymbopogon ambiguus* are summer-growing species; *Enneapogon nigricans* is green throughout the year but mainly active throughout the summer months; *Danthonia caespitosa*, *Stipa* species and *Poa labillardieri* are winter-growing species.

Choose open areas in which to plant your grasses as, with the possible exception of *Stipa elegantissima*, *Microleana stipoides*, and some others, most grasses clearly grow best when they don’t have to compete with trees and shrubs. It’s more difficult to grow grasses in already established bush gardens than it is to grow trees and shrubs amongst already established grasses. Also, establish your grasses where they will be accessible, for example, along paths and/or en masse - this is important for maintenance such as mowing or slashing. Grasses and spreading groundcovers do not mix - it must be one or the other, though small plants such as daisies, legumes, orchids, lillies, and herbs, are common grassland species in the wild and can be seeded amongst your grasses and vice versa.

Direct seeding: Now that you’ve harvested your florets, how much seed do you actually have? To determine this, you must do a fill or seed count. Take a sample of 100 florets and squeeze each one - those with a hard lump inside have a seed - and this will give you a percentage seed fill. It’s

then possible to calculate seeds per kilogram of florets, if this is important to you. However, some grasses, like *Poa labillardieri*, for example, have very small florets and a hand-lens or microscope is required.

How many of these seeds will germinate? Take 100 florets, sow them and then count how many actually germinate. This will give you the percentage of germinable seed and you then multiply this figure by the percentage seed fill to get the actual percentage of germinable seed per 100 florets, and from this, the percentage of germinable seed per kilogram of florets. The table below shows some of my own figures:

particular, *Dichanthium sericeum*, *Enneapogon nigricans*, and *Neurachne alopecuroidea*, and there are probably others. Helen Bizzai (pers. comm.)⁴ has found that plants that are pricked out prefer cool weather in which to get established.

The **important** thing to remember when planting grasses is to plant at the right time of the year. This is because most species grow best at a particular time of the year and it is important to sow the seeds at the time when you will get the best growth.

Summer-growing grasses: Sow in late winter to early spring.

*Spring plantings (late Sept., 1988)			
	% seed fill	% germination of seed	germination time
<i>Cymbopogon sp.</i>	87% (54/62)	40% (22/54)	20-37 days
<i>Dichanthium sericeum</i>	41%	93% (90/97)	8-36 days
<i>Enneapogon nigricans</i>	10%	20% (2/10)	15 days
<i>Neurachne alopecuroidea</i>	43%	83% (53/64)	15-32 days
<i>Stipa elegantissima</i>	-	94% (32/34)	14-19 days
<i>S. mollis</i>	93%	86% (78/91)	15-32 days
<i>S. nodosa</i>	50%	75% (12/16)	9-20 days
<i>S. pubinodis</i>	38%	27% (10/37)	20-29 days
<i>S. semibarbata</i>	40%	14% (3/21)	19-24 days
<i>Themeda triandra</i>	12%	100% (7/7)	10-21 days
	% germination of florets (not checked for seed)		
<i>Chloris truncata</i>	56%	5%	12-20 days

*seed trays, watered every morning

These figures are just to give some idea for the above species, and it must be borne in mind that they will vary depending on when and from where the seed was collected. The age of the seed will also determine per cent germination. However, such general figures are helpful because some species do not like being pricked out and planted directly thus into the ground, in

Winter and year-round growing grasses: Sow in autumn after the first good rains.

One can see from this that moisture during germination and initial establishment is vital, and better results will be obtained with most species if the area sown is mulched or irrigated. The rule of thumb for sowing grass seed is to sow

1,000 germinable seeds per square metre; however, as most of us don't have this much seed and/or are interested in only propagating a few individuals we can either plant our seed in clumps at intervals or plant tubes.

As a general rule, if the seeds are small and/or have small awns, like *Chloris* or *Enneapogon*, they should be surface sown but ensure good seed-soil contact; if the seeds have large awns this indicates that seed burial is required for germination - just stick the seeds into the ground or seed mix, like pins into a cushion, with the awns sticking up.

Management: If you're establishing a grassland, in the long term it is desirable to overseed the established grassland with other native grass and herb species, in order to establish a viable ecology which can self-perpetuate itself. Burning-off is obviously impractical in urban situations, so mowing or slashing is necessary, though this only needs be done once or twice a year, usually after seed set. However, the timing will depend of course, on what you want i.e. more foliage or more flower heads. *Poa spp.*, *Themeda triandra*, and *Stipa elegantissima*, will only tolerate a mow once or twice a year and none of the other species will tolerate frequent mowing. It is probably not necessary to slash/mow below 100 mm though *Chloris* can be slashed to 20 mm and *Stipa nodosa* to 5 mm.

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Box 386, Gawler P.O. S.A. 5118

Poa tussocks for road batters

Reprinted, with permission, from *Indigenotes*
Volume 2 No. 11, November 1989. Page 6.

Trevor Ritchie and family, write from Portland:

"Vegetative propagation of native tussock grass species has not had good PR because of the risk of introducing weed species with the soil. For example Keith McDougall tried it at Organ Pipes and introduced Onion Grass. The following method involving a nursery cycle virtually eliminates the movement of weeds from one site to another provided the nursery is clean. I have tried subdivision of *Themeda* and *Stipa* (mine were broken down as Ken Arthur's giving more than 100 pieces for a 20cm *Themeda* tussock and about 50 pieces for *Stipa*) but failed when direct planted into the wild. It should have worked but it didn't. Hence my jubilation when a friend introduced me to Ken Arthur"

Ken Arthur (RMB 5450, Koroit, Victoria) is the road side maintenance worker for Vic roads at Warrnambool. He has recently perfected a nursery technique for the vegetative propagation of native tussock grass (*Poa sp.*). Ken has aimed at finding alternatives to Pigface for road batters and an instant result to suit landscaping requirements.

Source: Tussocks about 10cm to 30cm in diameter, lifted carefully.

Treatment: Cut tops well back with a hacksaw; divide by pulling apart down to individual pieces with a root and a green-shoot. At least 10 to 50 pieces can be obtained per tussock.

Potting: 5cm diameter tubes plus a potting mix of whatever can be obtained. Ken uses a local heavy soil plus slow release fertilizer, but he thinks a more porous mix would be better. A potting rate of 800 per day was obtained using home gardener equipment.

Care: Tubed stock are kept well watered. Use of a nursery hot bed increased initial growth but regardless a 95% strike rate was achieved.

Timing: Potting in February, April and July were equally successful. Within 6 months the 5cm tubes are bursting.

Ongoing: The tubed plants are ready to be planted out into the wild in 3 to 4 months. Save some for stock plants which can be split into 5 to 10 pieces.

Other tussock species should be able to be propagated in a similar manner. However the minimum size of a propagatable piece may be species dependent. Ken will be experimenting with other species and methods in the coming year.

Productive Native Grasses

(From the Grassland Society of Victoria newsletter, No. 163, Sept. 1989)

An experiment at Glenn Innes, NSW, indicated that in some circumstances native grasses may be more productive than is generally believed. The production and feeding value of six native grasses were compared with two introduced grasses over a three year period.

The total annual DM (dry matter) production of the native grasses was at least as great as Demeter fescue (6908 kg/ha) and *Phalaris* (8056 kg/ha) and was greater for *Poa* (9190 kg/ha), *Sporobolus* (9484 kg/ha) and *Bothriochloa* (10580 kg/ha). However, the last two grasses and *Danthonia* were much less leafy, and all the natives were more seasonal in growth, producing more in summer and less in winter. The digestibility of the natives was also mostly less; that of the summer-growing perennials *Themeda*, *Sporobolus* and *Bothriochloa* was very low in winter when they did not grow and only dry residues were present.

The authors speculate that in their environment (cold dry winter, warm wet summer, supplementary irrigation) some of the native grasses tested could have a useful (but not dominant) role in pastures, through their attributes of persistence, tolerance of drought and low soil fertility, and a growth pattern complimentary to the commonly grown species.

Extrapolation to the totally different conditions in Victoria would be dangerous. However the findings, plus an observed wide variation in agronomic characters within some of the species, suggests that selections from native grasses may yet find a place in our pastures.

Ian Cameron (Melbourne)

Summary from:-

Robinson, G.G. and Archer, K.A. (1988).

Agronomic potential of native grass species on the Northern Tablelands of New South Wales.

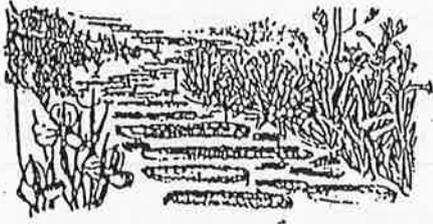
Aust. J. agric. Res. 39:415-436

Herbicide News

Extract from Southern Tablelands Grasslands Society Field Day Notes 30.11.89 *Native Grass/Herbicide Sensitivity/Direct Drill Sowing Demonstrations* conducted by Michael Keys and Peter Simpson, District Agronomists Queanbeyan & Goulburn.

“Roundup devastates *Danthonia* but *Microlaena* is resistant to even heavy rates in time. Effects of Sprayseed are minimal on both grasses .. *Microleana* could be even more tolerant of Roundup in spring than autumn and is unaffected by Sprayseed. *Danthonia* could be less affected by Sprayseed in spring but is still quite sensitive to Roundup .. “





Display Gardens

Tasmania:

The Grasslands Gully/Domain Native Flora Garden, on Upper Domain Road, Hobart

Victoria:

Bushland Flora nursery "indigenous display garden", Ferntree Gully.

The Botany System Garden at Monash University, includes native grasses. A System Garden is a collection of growing plants chosen and arranged for a particular educational purpose - the teaching of plant taxonomy. Care has been taken that there is easy access to any plant.

Castlemaine - Ian Higgins is establishing a display garden of the Castlemaine region's indigenous plants (includes grasses). His address is 54 Hunter St., Castlemaine. 3450. Ph: (054) 72 3093

Royal Botanic Gardens, South Yarra, is in the process of establishing display beds of "interesting" native grasses. Contact Josie Dujmovic, c/- Dr. R. Spencer (Horticultural Botanist), Royal Botanic Gardens, Birdwood Avenue, South Yarra. 3141.

VCAH Burnley Campus. For further information, contact Greg Moore there.

South Australia:

Black Hill Flora Centre, Athelstone - grass display beds.

New South Wales:

Native grasses lawn - Handle St., Armidale (front lawns and median strip) and in the grounds

of the University of New England (University cricket and hockey oval). For further information, contact Dr. R.D.B. Whalley at the Botany Dept.

The native grass lawns at Armidale seem to be a mixture of **Elevsine tristachya* and *Chloris truncata*, and some *Bothriochloa macra*. The mixture is fairly drought tolerant and is mown periodically, however there are problems with broad-leaf weed invasion (*Dichondra* and Dandelions) and, when *Bothriochloa macra* dies back in winter, invasion by *Poa annua* (winter grass). The recent very wet weather has exacerbated these problems.

In other areas such as the sub-tropics, native grasses such as *Digitaria didactyla* and *Axonopus assinis* (carpet grass) are also used widely in lawns there.

*introduced/naturalised grass





Publications

The Re-establishment of Themeda triandra (Kangaroo Grass): Implications for the Restoration of Grassland

Keith McDougall (Arthur Rylah Institute for Environmental Research, Melbourne. Technical Report Series No. 89) 1989

The most comprehensive report to date on the harvesting, establishment and management of *Themeda triandra* grasslands.

Flowering Grasslands in the Australian Landscape by James Hitchmaugh et al. (1989) *Landscape Australia* November, 1989

Excellent paper concerned with the management and/or re-establishment of the broad-leaved flowering herbs or forbs found in grassland communities. The paper examines three strategies: i) the sensitive management of existing grasslands to retain and maximise populations of component forbs ii) the re-introduction of native forbs into native or exotic dominated grasslands, and iii) the re-creation of flowering grasslands from scratch, and presents results and discussion for the latter using the following forb species:

<i>Brunonia australis</i>	Blue Pincushion Flower
<i>Bulbine bulbosa</i>	Native Leek, Bulbine Lily
<i>Burchardia umbellata</i>	Milkmaids
<i>Convolvulus erubescens</i>	Blushing Bindweed
<i>Dichopogon strictus</i>	Chocolate Lily
<i>Leptorhynchus tenuifolius</i>	Wiry Buttons
<i>Stylidium graminifolium</i>	Triggerplant
<i>Wahlenbergia stricta</i>	Tall Bluebell

The first part of the study established optimal light and temperature regimes for the germination of the eight species and then, as a prelude to field sowing experiments, glasshouse trials were undertaken to investigate the effect of sowing depth on percentage emergence. Finally, direct seeding trials were conducted in the field. The direct seeding methods used were hand broadcasting, fluid drilling and slot sowing via a self-propelled slot seeder.

Bush Regeneration: Recovering Australian Landscapes

Robin A. Buchanan. NSW TAFE (Student Learning Publications. 1989)

"From urban remnants to rainforests, wetlands to deserts, *Bush Regeneration* offers practical strategies and techniques on how to re-establish native plant species or the original natural bush. Although primarily for students, the book is also useful for anyone involved with the land: farmers, planners, administrators, mining, forestry, council and park workers; even inspired gardeners wondering what to do about those patches of weeds down the back.

The book is a full colour production of 272 pages including over 200 colour photographs. It covers

the regeneration of common Australian plant species, including mangroves, wetlands, rainforests, dunes, heath, dry and wet sclerophyll forests, grasslands(?), arid and semi-arid lands, woodlands and the rehabilitation of severely

degraded landscapes .. “ \$24.95 (exc. postage)

Native Plants of the Sydney District: An Identification Guide

Alan Fairley and Philip Moore (NSW SGAP, 1989)

“This is an identification guide to the native plants of the Greater Sydney district, an area which extends from Newcastle to Nowra and west to the Great Dividing Range. It contains colour photographs and descriptions of about 1500 species and is the result of over 12 years of research and photographic expeditions in search of both common and ‘elusive’ species. Special features include .. a full range of plants from ferns, herbs, sedges and grasses to shrubs and trees, many of which have not been illustrated in previous books .. “ Special offer to SGAP members \$70 + \$5 postage and packing.

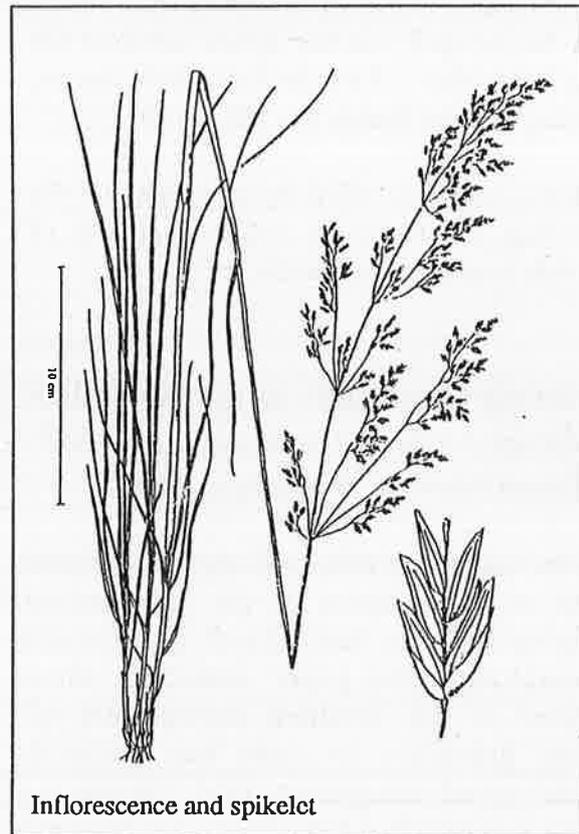
‘The Natural Garden’, Druce (Crown Lothian; \$75)
(Reviewed by T.R. Garnett in *The Age* on Tuesday, 7/11/89 under the heading *Case for the natural garden when water’s at a premium*)

“.. Eight “natural gardens” are illustrated. One is a California chaparral. Here, as in Victoria, the thermometer after a wet winter may rise, in summer, above the old century mark. From this arises what the designer describes as “one of California’s true blessings, its wonderful grasslands - Ireland green in winter and spring, and straw-blond in summer and autumn ... The changing colors enable different color schemes at different times of year” .. Of course, too, over the centuries the pendulum has swung between man’s desire to show his domination over nature, which led to knot gardens (and, later, bedding out schemes) and his desire to cooperate with nature, which led to the conception of the Wild Garden. Is it coincidence that exponents of the first philosophy have been men, while women (Gertrude Jekyll in England, Beatrix Farrand in

the US and Edna Walling in Australia) have tended in the opposite direction?

The cost of this book is probably too much for most individual gardeners; but is there any reason why garden clubs (or even groups of adjacent unit-owners) should not set up circulating libraries for gardening books? .. “

Feature Plant



Poa labillardieri, tussock grass, is a coarse, winter-growing perennial that forms a large tussock, 40 cm tall x 1 m diameter¹, though the foliage can grow to over a metre tall². Rarely produces a rhizome.³ The leaves are green to greyish, up to a metre long and 3.5 mm wide, flat or loosely inrolled, arising mostly from the base of the plant and with a weeping habit.^{1,3}

The flowering stems rise to 1.2 m and the inflorescence is a rather narrow panicle, 10-25 cm long, greenish or purplish turning straw-coloured when seeds mature.^{1,3} A panicle is an

inflorescence where the floral axis is divided into branches bearing several flowers.

The plant occurs in NSW, Q'ld, Vic., Tas. and S.A. Near Adelaide, the grass is "found only on south-facing moist gullies which dissect the foothills and on the lower to mid-slope regions of these gullies."¹ Very similar in appearance to *P. poiformis* "which occurs only in sites adjacent to the ocean and estuaries where it is under some degree of influence of salt spray. From the landward side *P. labillardieri* approaches and may even intermingle with it."³

In western NSW, "this species occurs in the southern and eastern parts of the region in two dissimilar habitats. In the south it forms a large part of the pasture in river red gum communities along the Murray River. In more north-easterly districts it occurs on scattered hillside sites, growing between and in the shelter of rocks in currawang (*Acacia doratoxylon*) and gum communities."⁴

In Victoria, the plant "appreciates a moist semi-shaded spot"⁵ and *City Parks & Cemeteries*⁶ details the occurrence of the plant in Tasmania, listing the shrubs, graminoids, herbs and other grasses found in the plant communities dominated by this *Poa*.

In Queensland, it's often confused with *P. sieberana* - the latter usually occurs on moister alluvial soils, the former on drier or more stony sites of coastal or subcoastal areas.⁷

The grass has very good potential for use in ornamental landscaping work as it is visually striking in form and colour,¹ and is already used by some professional landscapers, in Tasmania⁸. It could also be used in floodways and has potential for revegetating swampy, seasonally waterlogged sites.¹⁰ Mature plants are not grazed but stock will graze new growth from plants which have been burnt or kept short.⁴

Peak harvesting period is Nov.-Dec.¹⁰ and seed production is prolific. "Seed will persist for several weeks and are best obtained by cutting

the inflorescence off and allowing seed to fall into large paper bags. The seed will tend to spring out of the glumes if attempts are made to run the inflorescence between fingers."¹

Dormancy or after-ripening period: None.¹

Germination: Good (?).¹ Ian Higgins claims he's never had any problem germinating seed and considers it one of the easiest grasses to grow.² Seed planted in late September (Adelaide), in nursery conditions, was up within 16 days. Fast growth rate.¹¹ Seed appears to be viable for at least two years.²

Sow in late winter preferably or a little earlier, if sowing in the field,¹² and if sowing a large area ensure the site is free of winter-growing weeds. Needs a moist semi-shaded position. Can also propagate by division - for details of the technique, see page 16.

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Seed Bank Report

The following grasses are in stock:

Agropyron scabrum
Chloris truncata
Cymbopogon ambiguus
C. obtectus
C. sp.

Danthonia caespitosa
D. duttoniana
D. geniculata
D. linkii
D. linkii var. fulva
D. pilosa
D. racemosa
D. setacea
D. tenuior

Dichanthium sericeum
Dichelachne longiseta
Enneapogon avenaceus
E. nigricans
Microlaena stipoides
Poa labillardieri

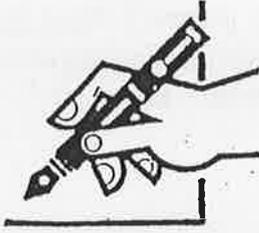
Stipa drummondii

S. elegantissima
S. eremophila
S. mollis
S. nitida
S. nodosa
S. setacea

Themeda triandra
Triodia irritans

Microlaena can be planted now, and *Poa* species later on. Seed is available to members by sending a SAE (55c postage, 60c interstate). Remember that as with other banks, you will get the most interest out of our seed bank if you make deposits!

To seed donors: please keep seed lots separate i.e. seed of the same species but collected in different seasons/years and/or from different sites. Add a pinch or two of Derris dust to kill any insects and please remember to label your seed, including the date and place of collection, aspect, type of vegetation and any other useful information.



Correspondence

Stipa grasses in England

July 27, 1989

“Thank you for your letter enquiring about species of *Stipa* grown at Wisley.

We actually grow two species in the herbaceous borders and grass beds, *S. gigantea* and *S. calamagrostis*. *S. gigantea* comes from Spain and *S. calamagrostis* from southern Europe. The former grows to about 6 feet, the latter to 3 feet plus.

Other species in cultivation in Britain are *S. splendens*, from temperate Eurasia, growing to 6 feet, *S. arundinacea* from Australia and New Zealand, growing to 5 feet, *S. pennata*, from central Europe and Siberia, growing to about 2.5 feet, and *S. capillata*, from southern and central Europe, growing to about 2.5 feet.

No one nursery sells all these species ... “

October 18, 1989

“I am sorry to have misled you over *Stipa arundinacea*. The reference I used when researching your question originally gave Australia and New Zealand as homes to this species. On further investigation it appears that *S. arundinacea* is in fact endemic to New Zealand, hence the blanks when looking for it in Australian floras. The newest reference I have to it is in fact from the 1920's since none of our newer books on the New Zealand flora include grasses. This is to say the least frustrating since

it is quite possible that name changes could have occurred of which we are unaware and which may have added to the confusion. What I can say is that *S. arundinacea* appears in both Cheeseman's and Hooker's floras of New Zealand.

As far as I can determine we do not grow any other Australian or New Zealand grasses at Wisley although several are listed by nurserymen, all from New Zealand. Examples are *Chionochoa conspicua* and *C. rigida*, *Cortaderia fulvida* and *C. richardii*.

In addition, one nurseryman has introduced many sedges from New Zealand and Tasmania, among a multitude of other plants. He is Mr. G. Hutchins, County Park Nursery, Essex Gardens, Hornchurch, Essex RM11 3BU .. (his catalogue is currently one pound sterling).”

A C Whiteley
Assistant Botanist

Cymbopogon ambiguus and soil conservation; ornamental - exotic grasses

August 31, 1989

“I found your article about growing native grasses in the SGAP journal very interesting. I am always surprised at the gardeners who think of grasses as being lawns or weeds, as many are very beautiful.

I am particularly interested in trying to grow *Cymbopogon ambiguus* which you describe as Lemon Scented Grass, and wonder if you know where I could find some seeds of this grass. I find it difficult to imagine the appearance of a grass from the botanical description in a flora and don't know if it grows in the neighbourhood of Ashbourne or Strathalbyn.

Perhaps you would have a few seeds to spare? I don't know what I could offer you for them. I have found a little grass here with bronzey golden heads and which I have been dividing this winter - don't know what it is. I have put 2 clumps of it by stones on the edge of my lawn with *Danthonia* clumps, where I cannot get with the mower. How pleased I was to see by your article that I had done the right thing! .. "

Lucinda Davall
Suffolk Downs
Box 43 CMB, Ashbourne
South Australia 5157

October 26, 1989

"Many thanks for the seeds of *Cymbopogon ambiguus* and the newsletter. Am particularly interested in the fact that stock do not find it very palatable as it would seem to make it very suitable for combating erosion in the old quarry which our boundary fence runs through. The ground is being broken up at the boundary and much of what I have planted close to the fence has been quickly eaten. I don't suppose this grass will survive under the shade of the huge old red gum, but something will turn up. I want it to be a native species.

Your letter arrived the day after I had taken my bronze grass to the Botanic Gardens to be identified and seems unlikely to be a native after all. Why did I think it might be? It is still attractive and I have divided off a couple of pieces and put them in the garden where I can enjoy their form and colour."

Danthonia spp. (Wallaby grasses), *Stipa spp.* (Spear grasses) and *Microlaena stipoides* are all reputed to grow beneath trees - Ed.

November 11, 1989

".. We certainly have *Stipa* species about. I can't be sure about Wallaby Grass. I include a head or two of one that occurs and had kept green all last summer that might be Wallaby Grass. All the other interesting grasses here have turned out to be introductions. The lovely bronze headed grass was identified as *Pentaschistus thunbergii*. We seem to have two other *Pentaschistus spp.* here, one I always call Fairy Grass because it is so light and tiny. *Briza maxima* and *B. minor* flourish, also with my blessing and several others, Kangaroo Grass flourishes on our verges, but so far I have not been able to propagate it, I would like to re-establish native species around the quarry which has been fenced off as the sheep were causing major erosion along the fence line. *Dichondra* was growing there and I've been encouraging 'nat although I find it is said, in Black's Flora, to be "cosmopolitan", rather than native. It serves as a ground binder till I can get others to grow for me. Have planted a number of seedlings of *Bursaria spinosa* from seed collected a mile or so up Bull Creek Road from us .. *Cymbopogon* seed has not germinated for me. Does it take light or darkness?"

Lucinda Davall

The best time to harvest Kangaroo grass seed is late December/early January. Alternatively, you could try dividing some of the Kangaroo grass you already have. Cymbopogon seed requires darkness I should think and although it's a bit late in the year it should germinate within 20-37 days, with regular watering - Ed.



Native grasses of Castlemaine (Vic.) and establishing a mixed sward

August 18, 1989

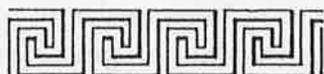
" .. There are 38 species of native grasses recorded for the Castlemaine district. I have experimented with growing the following species:

Amphibromus neesii
Aristida behriana
Bothriochloa macra
Chionochloa (Danthonia) pallida
Chloris truncata
Danthonia caespitosa
D. carphoides
D. eriantha
D. setacea
D. tenuior
Microleana stipioides
Poa labillardieri
P. sieberana
Stipa scabra ssp falcata
S. semibarbata
S. rudis ssp rudis
Themeda triandra

I'd be happy to pass on any information about these.

I am most interested in information about germination requirements for *Stipa* species; if you have any information about this genus or any species I would love to get hold of it! .. "

Bush Repair
Ian Higgins
54 Hunter St.,
Castlemaine Vic. 3450



November, 1989

"Thank you for the newsletter - a very professional production! congratulations.

You asked for any information on *Poa labillardieri*. In my experience it is one of the easiest grasses to grow. I've never had any problem germinating seed - there doesn't appear to be any dormancy, and seed appears to be viable for at least 2 years.

I've intentionally (and accidentally) sown seed in parts of my front yard and seedlings have established well against competition from other plants and are now starting to flower after one year. Two plants that I planted in Maldon one and a half years ago are enormous tussocks now - over one metre high and that's just the foliage, they haven't yet started to flower.

At the moment my front garden is dominated by *Stipa semibarbata* flower "spikes". After sowing the garden with a mixture of *S. semibarbata*, *S. rudis ssp. rudis*, *S. scabra* and various local *Danthonias* plus *Themeda*, the *Stipa semibarbata* is currently dominating the stand. I had previously had difficulty germinating this species - perhaps the seed was too fresh. The successful germination was of eleven month old seed ..

I notice you list display gardens in the newsletter. At present I am establishing a display garden of the Castlemaine region's indigenous plants (including grasses). This is a gradual process as I replace previous gardening ideas (and weeds!) with the local plants. However my nature strip (direct sown with wattles, daisies and others) is now 5 years old and tickling the SEC wires overhead, and the front yard "grassland" is very well established after only one year. I've just finished a display of small "rockery style" plants including ferns, and next on my hit list is a pond for the aquatics."

Ian Higgins

An American contact

September 13, 1989

"A horticultural friend of mine has given me your name as a source of Australian grasses. I am interested in grasses and bamboo for ornamental use. .. "

Wm. S. Harris
POB 2769
Yountville, CA, USA
94599-2769

Native bamboos

October 13, 1989

"Below is the name of the third year student I was talking to you about who deals with grasses and bamboos .. (i.e.) Ken Smith, 15 Addington Rd., Hazelbrook. NSW. 2779. Phone: (047) 586 111 .. "

Sue Bellette
1/49 Windsor St.,
Richmond. NSW 2753

Harvesting and harvesters

Dear Customer,

.. We have ordered a grass seed harvester and expect to be able to collect native grass seed in quantity during the summer of 1989/90 .. we will not carry large quantities in stock, but will collect any quantity to order.

Orders for native grass seed should be lodged before the end of November for supply during late summer .. "

Roy Gray
for Blackwood Seed Collectors
38 Verdun Road, Murray Bridge. 5253

November 7, 1989

"Many thanks for the publications .. I will be looking forward to receiving future newsletters. We harvested 12 bags of *Stipa nodosa* at Swan Reach last week - now we have to find a technique to remove the awns."

Roy Gray

September 28, 1989

" .. From what I've been able to find out, the brush harvester has not yet been tried on *Danthonia spp.* though we anticipate that it will work okay on this group of grasses. Paul Hodgkinson at Deniliquin is building a brush harvester and *Danthonia caespitosa* is one of the grasses he intends to tackle, so there should be some information on this point before much longer."

Don Loch
Q'ld Dept. Primary Industries
P.O. Box 395, Gympie
Queensland 4570

November, 1989

"I have looked into the area of harvesting and processing of *Themeda triandra* as part of my final year thesis, at UCAH Burnley. My perspective differs from the society in that you are looking at seed collection on a smaller scale, perhaps from isolated remnants. Nevertheless the principles are the same and I have sent over photocopies of some relevant information (hopefully) and some reference lists, about native grasses.

Also included is a photo of an old wheat harvester. Many workers in the area suggest a conventional wheat harvester would be able to collect seed, but have been unable to try these large machines, because the grass occurs in rocky areas (too risky). A company in Melbourne (i.e. Poynter) produces a pedestrian

operated, self-propelled machine using the same principles. This may be ideal for those small remnants .. “

Nick Graesser
9 Lothian St.,
West Melbourne. Vic. 3003

September 9, 1989

“Thanks for the short note and newsletter no.5 (Autumn 1989). I’ve managed to locate some areas of local native grassland but was unable to collect any seeds. Hopefully this summer I can make several trips and collect seed .. “

Richard Donaghey
1 Wembley St.,

On the coast

August 7, 1989

“I would like very much to join the Australian Grasses study group, first as a passive member and later a more active one. I have a coastal hillside garden where I would very much like to encourage native grasses .. Copacabana is 15 km from Gosford.”

Frances Hutchison
137 Copacabana Drive,

October 23, 1989

“Sorry for the delay in responding to your enquiry. Have been busy with a group fighting a swamp subdivision (causing flooding elsewhere) for the last 2 years and we still have not finished as this is an ongoing fight with developer and local council.

Grasses growing - only oplismenus (?), which just arrived, and *Themeda*, planted. Also had swamp foxtail - *Pennisetum alopecuroides*, but as I cannot find out if it is truly native or not (it isn't - Ed.), am not growing it, besides; it seeds all over my garden, having had to weed it out.

Please accept cheque for \$5.00 to continue to receive newsletters etc. as I find them extremely interesting.

Am aiming to place our house on the market soon and hopefully end up on an acreage on the Mid-North Coast!, possibilities for native grass pastures ??? .. “

Robyn Cummings
19 Stella Rd.,
Umina. NSW. 2257

See the annual conference proceedings of the Grassland Society of NSW (c/- South Orange P.O., Forest Road, Orange. NSW 2800 Ph: (063) 636 728) - Ed.

This newsletter is for the exchange of observations and practical details between people interested in the establishment and management of native grasses - be it for the garden, or, on a larger scale, for landscaping, revegetation, seed production or pasture.

Fees are \$5 a year, payable in June. However, to become a financial member one must also be a member of SGAP (the Society for Growing Australian Plants). Members receive the quarterly newsletter and have access to the study group's seed bank.

Contributions, illustrations and/or ideas are welcome and material for publication and enquiries should be directed to:

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