

New legume offers multiple options

GRAEME JENNINGS

North Dakota conservation farmer Gabe Brown advocates that farmers grow combinations of winter grasses, winter broadleaved crops, summer grasses and summer broadleaves to improve their soils.

Sulla, *Hedysarum coronarium*, may be an option for farmers looking to build such a system.

Sulla, a biennial Mediterranean pasture legume is widely grown in southern Europe but is relatively new to Australia.

Kelly Burke, Product Development Manager for Wrightson Seeds, estimates growers have sown about 2,000 ha of sulla Australia-wide.

Sulla has a deep root system similar to lucerne but is shorter-lived than lucerne, making it more easily managed in a cropping system. It grows actively in autumn, spring and early summer, but unlike lucerne is strongly dormant over summer. It produces little growth during winter months due to cold soil and short day lengths.

According to SARDI Livestock, Feed and Forage Group senior research scientist Carolyn de Koning, author of a management package developed as part of a Pastures Australia project to make Sulla available in Australia, the legume can produce more than 100 kg/ha of dry matter a day with adequate moisture and optimal temperatures.



SULLA IS A SPECTACULAR CROP IN FULL BLOOM.

Second-year stands can produce 20 t/ha of dry matter, given sufficient spring and autumn moisture. Yield from first-year stands is often less than 10 t/ha dry matter. However, this level of production requires ideal conditions and commercial yields to date have generally been below these figures.

Sulla is best suited to districts with rainfall of 400 mm to 800 mm, so it is not an option for growers in lower-

rainfall districts.

It has high nutritional value, with leaf protein levels of more than 25% and dry matter digestibility up to 70%, and grows in slightly acid to alkaline soils (pH 6 to 8.5), performing best in well-drained alkaline clay or loam soil. It is very tolerant of free lime but does not tolerate long-term waterlogging.

Sulla does not cause bloat like many



SULLA NEEDS

Basic requirements for successful sulla production include:

- Annual rainfall of 400 to 800 mm
- Fertile, well-drained soils
- Slightly acid to alkaline soil pH
- Weed-free seed bed
- Inoculation with Superstrike, which contains *Hedysarum* rhizobia
- Sow in autumn or spring

LEFT: CAROLYN DE KONING STANDING IN SULLA STAND ON TURRETFIELD RESEARCH CENTRE SHORTLY BEFORE IT WAS CUT FOR HAY.



SULLA IS GREEN OVER SUMMER BUT REMAINS STRONGLY DORMANT UNTIL AUTUMN.



HEADING INTO THE SECOND YEAR. SULLA SEEDLINGS HAVE GERMINATED AROUND ESTABLISHED PLANTS IN THIS SECOND-YEAR STAND.

other legumes, a characteristic attributed to the high levels of condensed tannins it contains, and is reported to have anthelmintic properties that can help reduce worm burdens in livestock, although this is yet to be confirmed in Australian conditions.

The tannins in sulla also increase protein digestion by livestock and make the plants less attractive to insects.

There are three Australian sulla cultivars but only one, Wilpena, is currently available commercially.

Wilpena, an erect, mid to late maturing variety selection best suited to cutting for hay or silage, was bred by SARDI as part of the National Annual Pasture Legume Improvement Program (NAPLIP) and is marketed by Wrightson Seeds Australia.

The other two Australian varieties that are not currently available are Moonbi, a sister line to Wilpena, and Flamenco, which was produced by DAFWA plant breeder Ron Yates.

Dr de Koning recommends that sulla be sown in autumn at a rate of five to 10 kg/ha, with the aim of achieving 25 plants a square metre in the second year.

Spring sowing is possible in southern Australia provided there is sufficient subsoil moisture.

Seeding depth should be 10 to 20 mm, with establishment significantly reduced if seed is sown deeper than 30 mm.

Pre-seeding weed control is important because sulla is slow to develop after germination and there is no herbicide registered for use on it in Australia.

Information in Dr de Koning's management package publication Sulla will tolerate post-emergent application of bentazone (Basagran), imazethapyr (Spinnaker), flumetsulam (Broadstrike) and glyphosate but is susceptible to Dual Gold, Simazine, 2,4-D B, bromoxynil and bromoxynil plus diflufenican (Jaguar).

Its tolerance of glyphosate opens the way for it to be used as a 'cleaning crop' to remove grasses and other susceptible weeds growing under the sulla stand, which can be removed by spraying with 2,4-D B when the paddock is to be returned to crop.

Sulla needs to be inoculated with its own specific root-nodule bacteria (*Rhizobium sullae* - strain WSM 1592) if it is to fix nitrogen, since most Australian soils do not contain *Hedysarum* rhizobia. Good nodulation is vital for high dry matter production and persistence of the stand.

The efficacy of the rhizobia drops dramatically after three weeks, Dr de Koning said, so pre-inoculated pelleted seed needs to be sown into a moist seed bed within three weeks of being coated.

Superstrike™ inoculant, which is used by Wrightson Seeds Australia, contains *Rhizobium sullae*.

In trials of sulla on acid soils (pH 5.0), nodulation and crop performance were improved by quadrupling the rate of inoculant and applying additional fertiliser.

In weed-free paddocks sulla may be established under a cereal cover crop, but it does not handle competition well in early growth stages and in most situations

it is advisable to establish the legume before over-sowing with a cereal or grass if the aim is to establish a legume/grass pasture.

Cereals or pasture grasses, if not grazed or cut, may compete strongly with first-year sulla in dry spring conditions.

Sheep will preferentially graze sulla, so grazing pressure on young stands needs to be managed so the legume plants are not damaged.

Trial results indicate livestock perform well on sulla. In one 2008 trial, ewe hoggets grazing sulla in winter gained 2.66 kg/head more than similar animals grazing grass/clover pasture with equivalent nutritional value. Those grazing the sulla also grew more wool and had less dags.

In mid-spring 2009, sulla-based pasture produced more dry matter and was higher in nutritional value than grass/clover pasture, with ewes grazing the sulla gaining an average of 176 grams a head a day. Ewes grazing grass/clover pasture lost an average of 94 grams a head a day over the same period.

Sulla produces good-quality, highly palatable hay but its thick stems mean a mower conditioner is needed to make quality sulla hay.

According to Wrightson Seeds Product Development Manager Kelly Burke, sulla responds well to rotational grazing at intervals of 35 to 85 days depending on moisture, day length and soil temperature. In the first year it should not be cut for silage or hay and should be grazed only lightly to ensure good root establishment and plant density for the second year.

It is estimated that healthy stands of sulla will fix 22 to 25 kg of N per tonne of dry matter, which equates to approximately 220 kg/ha of N from a 10 t/ha stand; potentially 660 kg/ha of N from a stand that produces 30 t/ha of dry matter over a two-year phase, although productivity may be well short of this if conditions are not right.

Dr de Koning believes using sulla in short-term pasture phases can increase nitrogen and organic matter for cereal cropping systems, and the deep-rooted crop has the potential to increase water infiltration by leaving bio-pores (channels) through the soil as the sulla plants end their life cycle and the root systems decay.

There is potential to use a disc or knife roller to green manure sulla in the second year, she suggests.

For growers wanting to explore the concepts outlined by Gabe Brown at this year's SANTFA conference, winter broad-leaf pasture options other than clovers and medics include chickory, vetch, peas and beans. Winter-active lucerne may also be an option.

Summer broadleaf options are much harder to find, with lucerne the stand-out.



AN IMPRESSIVE CROP OF SULLA HAY IN THE MAKING.

Some of the summer legumes grown in sub-tropical areas may have potential in higher-rainfall areas. Some SANTFA members have been exploring the potential of mung and soybean, for

example, and sub-tropical pasture species may also be able to be established when there is adequate moisture; just as it is possible to grow tropical grasses such as millet and sorghum in some years.

Press Wheels, Double Disc Openers, Coulters, Discs & Agricultural Parts

Twin walking wheel assembly

Also available with out swivel and as a single press wheel

Centre mount Quick release Gang Assembly

Gangs & Gang conversions

- All Gang Types
- All Spacings

Wheels with:

- Marine Seals
- Taper Roller Bearings
- Heavy Duty Axles
- Wide and Narrow Inter-Changeable Tyres
- Semi Pneumatic and Solid Rubber Tyres
- 15" and 18" OD Wheels

Trash Coulters With:

- 18" or 20" Fluted or Plain Discs
- Twin and Single Versions
- To Suit Most Tyne Spacings
- Other Disc Types Available
- Greaseable Bearings
- Suits 3" or 4" Mounting

Assemblies with:

- Greaseable Bearings
- Adjustable Tension Springs
- Clamping Attachments
- Quick Release
- Gangs from 3 to 10 Wheels
- Single and Twin Wheel Assemblies

Single Rear Mount

In-frame, behind tyne swivel arm assembly

Double Disc Openers

Tyre options:

- Semi-Pneumatic and Solid
- 15", 16" and 18" Diameters
- Wedge, Flat, Round, Dome, Vee and Ribbed Profiles
- 2", 3", 4" and 5" Width Options
- Single, Split and Spread Row Options

Agricultural Stands:

- Side Wind and Top Wind
- Clamp on or Swivel Models
- Extra Height and Drop Leg Models
- Models from 500kg - 4,000kg

Hubs/Stubs/Axles:

- All Agricultural & Trailer
- Hubs, Stubs, Axles
- Bearings & Seals
- Protective Overcaps

Ring now or visit us online at www.manutec.com.au for an update on our latest product options and our range of aftermarket parts to suit most press wheel, disc and coulters systems.

MANUTEC PTY LTD, 30 JONAL DRIVE, CAVAN, SA 5094
PH: (08) 8260 2277 FAX: (08) 8260 2399
Email: manutec@manutec.com.au
OR CONTACT YOUR LOCAL DEALER

WEB: www.manutec.com.au