Establishment proves challenging for warm-season perennials

By Jill Griffiths
Kondinin Group

ABOVE: Direct sowings of old man saltbush at the Meckering site. (Photo: Brad Wintle, DAFWA)

Providing cost-effective recipes for reliable establishment of perennials is one of the aims of a national research project, based primarily in Western Australia. The project will use recently-developed seed treatments to find ways to improve the establishment of saltbush, warm-season grasses and legumes and native pasture species from seed.

The project combines germination-enhancing chemical treatments and seed coatings with agronomic studies into seeding techniques.

The seed biology investigations are being done by Kings Park and Botanic Gardens and Parks Authority (BGPA).

key points

- Sowing depth is critical for successful establishment of warm-season perennial pastures
- Grading seed to increase the proportion of viable seed will boost germination rates
- Soil temperature at seeding could affect the successful establishment of old man saltbush.

The four-year project, commissioned by Meat & Livestock Australia, Australian Wool Innovation, Land and Water Australia and the FFI CRC, will develop a wide range of establishment recipes for target species.

Project team member Ron Yates from the Department of Agriculture and Food Western Australia (DAFWA) said more farmers had turned to planting perennial pastures, particularly warm-season grasses, but had experienced poor pasture establishment due to many factors, including incorrect seed depth, poor seed quality and dormancy issues.

"It's critical for all warm-season species to be sown at a depth of between 5-10 millimetres," Ron said. "We have found that it is important to have independent sowing points that can ride with the bumps – we use a depth wheel so the seeding depth is precise."

Ron said that furrow depth and configuration were also vital, as was seed-soil contact.

"In sandy soils there are problems with furrow collapse and seed being buried too deeply, sometimes with as much as 30 mm of soil covering them."

Ron said there were also problems with seed quality. Seed viability was generally low and in many batches only reached 20 per cent. By grading the seed and sowing only the heaviest 20%, higher germination rates can be achieved.

Chemical priming appeared to offer new options for increasing establishment success according to Ron. The interplay between seed maturity and dormancy was also being investigated. It was apparent that to obtain successful germination from direct seeding, the interaction of many factors needed to be considered.

Direct seeding saltbush

"With regards to direct seeding of saltbush, initial field experiments at Meckering, WA looked at five species: old man saltbush (*Atriplex nummularia*), river saltbush (*A. amnicola*), wavy leaf saltbush (*A. undulata*) and small leaf bluebush (*Maireana brevifolia*). Of these the most exciting results have been achieved with old man saltbush."

The trial was sown at the end of August 2007 using an experimental cone-seeder on a mildly saline, duplex soil.

A range of seed treatments were used before seeding to determine which gave the best germination. These included chemical and water priming (in which seeds are soaked and then dried down) and removal of the bracts surrounding the seeds (de-bracting), compared with bracted seed.

Other aspects of germination were also trialled in the experiment, including light requirements and aspects of the machinery to be used. One trial investigated whether lucerne points were suitable for seeding.

"We achieved quite exceptional establishment of old man saltbush, with less success for the other species. We think a lot of this was to do with how cold the soil was when the trial was sown. Temperature requirements for the germination of old man saltbush appear to be lower than the other species. We will investigate this in the warmer northern agricultural regions of WA this year," Ron said.

Bracts enhance germination

Results indicated that the de-bracted seed also showed poor germination. This led researchers to surmise that the bracts may act like a sponge to keep the seed moist, thus enhancing germination. The only area in which the de-bracted seed established well was in a section of waterlogged soil, perhaps indicating the critical importance of water.

These hypotheses will be tested in the laboratory this year.

Further field trails will be carried out in other agricultural regions of WA this spring.

Different soil types will be targeted and trials will be sown using a modified commercial seeding combine to more closely represent the type of seeding machinery that farmers might use.

The aim is to find a viable way to direct seed saltbush, which would prove a far more economic way of establishing perennials over broad areas.

More information

Ron Yates, DAFWA
T: (08) 9368 3665
M: 0427 550 125
E: ryates@agric.wa.gov.au

sgsl research results

Farmers talk to farmers when it comes to salinity according to a survey conducted late last year.

The survey included 100 farmers with salt-affected areas of land within their farm and 100 agronomists, extension, catchment and local government authorities who deal with land managers who have salt-affected areas of land.

It asked primary producers how they currently become informed on salinity and concluded that nine out of 10 talk with their peers when looking for information.

The survey aimed to highlight a way to deliver to farmers the extensive information to come out of the *Sustainable Grazing on Saline Lands* (*SGSL*) sub-program of Land Water Wool, a national research program funded by Australian Wool Innovation, Land & Water Australia, Meat & Livestock Australia and the Future Farm Industries Cooperative Research Centre.

Aside from their peers, 80 per cent of those surveyed also turned to relevant state departments of agriculture for information.

The survey showed that almost all farmers used a variety of publications and newsletters for gathering information on salinity.

But only 28% said they turned to the internet for this advice. While the research concluded that internet was becoming an ever-increasing business management tool for farmers, page download speed remains a barrier to internet use. Only 28% had access to broadband, with 29% using satellite and 34% still on a dial up connection.

Topics of most interest to farmers surveyed were information on saltland pasture and re-vegetation, and preferably on a local and practical level. Farmers wanted to see the cost:benefit analysis of various options for managing salinity (77%), but two thirds were also interested in the environmental opportunities for saltland, as well as pasture and management issues.

The second group surveyed — made up of intermediaries in the industry — had similar interests when it came to salinity information.

More information

Greg Lawrence, FFI CRC
T: (08) 6488 7353
E: greg.lawrence@futurefarmcrc.com.au