



final report

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Rhagodia as a Fodder Shrub in the Northern Wheat belt

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Project Objective.

Develop a novel new fodder shrub Rhagodia (*R. preissii*) grazing system to improve animal enterprises and prevent salinity.

Project methodology

Rhagodia preissii seedlings were planted as small paddocks on 5 farms in the Binu region in late winter 2006. Project funds were used to pay Green Oil Nursery to produce and plant the seedlings. A total of 30 ha were planted across the 5 sites.

The 2006/07 season at Binu turned out to be the worst drought ever seen in WA. There was no grain delivered to the bin, 80% of the stock left the region, almost all lambs were put down and almost 100% of the land was severely affected by wind erosion, despite the destocking. The 2007/08 season was only marginally better than 2006/7.

The Rhagodia seedlings were not planted until late June or early August 2006 as it was by far the latest break to the season ever seen (7 July 2006). There was successful establishment on 4 of the 5 sites planted (i.e. 5 ha failed).

The Rhagodia was assessed in terms of initial establishment, persistence, visual assessment of dry matter production and animal palatability. The plan had been to graze the paddocks of Rhagodia with sheep and take measurements to assess animal production in the second year (i.e. animal growth rates, condition scores and grazing days). Despite the extreme drought the Rhagodia did grow remarkably well and there was feed available for stock by the end of 2007. However, when sheep were put into the paddocks they refused to eat the Rhagodia and were quickly removed. As a result, the aim of assessing the animal production from Rhagodia could not be achieved. The 5 sites had between 120 and 140 mm rain for 2006.

Results

Table: Summary of PIRD Rhagodia sites

Site	Location	Hectares	Establishment success	Notes
Don Nairn	East Binu	5	95%	Yellow sand Oats sown in inter row in 2007 & 2008
Bjorn Wilson	East Binu	5	95%	Yellow sand on eroding ridge
Peter Cripps	West	5	90%	Poor white sand

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	Binnu			
Ross Johnson	Horrocks	10	95%	Pale yellow sand
Peter Simkin	Kalbarri	5	5%	Mice killed young seedlings

Plant samples of Rhagodia were taken for lab analysis of feed quality from several sites. Crude protein was in the range of 12% to 17%. Digestibility was exceptionally high, in the range of 80% to 87%. These extremely high digestibility results need to be considered with caution as the conversion factors from lab results (invitro) to actually animal digestible (invivo) have never been calibrated for Rhagodia. The Enrich team are studying real digestibility of Rhagodia in animal house studies.

Dry Matter production of the edible component of Rhagodia was assessed as ranging from 400 kg/ha to 1,200 kg/ha in 14 month old Rhagodia seedlings across the successful sites.

Site photographs

Don Nairn's, March 2007 drought.



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Don Nairn's, May 2008 NAG field day



Peter Cripps



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Bjorn Wilson



Ross Johnson (mother plant for project seedlings)



Peter Simkin's (seedlings killed by mice)



Project learnings

1. Rhagodia can be successfully established under extreme drought by deep ripping and hand planting on sand plain soils.
2. Young seedlings can be killed by pests, and mice may be a previously unrecognized threat to shrub seedlings.
3. Rhagodia seedlings can grow remarkably well on deep sands in drought conditions, and are probably utilising deep soil moisture.
4. Established Rhagodia will be drought tolerant, at least on some soil types.
5. Chemical analysis suggests that Rhagodia produces high quality feed, but this may not reflect the true feed quality of Rhagodia.
6. Rhagodia is at times highly palatable to stock, but at other times highly unpalatable.
7. It is still unclear as to whether the problem of unpalatability is due to drought stress or flowering.
8. Alleys of Rhagodia can protect sandy soils from erosion.
9. It may be possible to integrate Rhagodia in to an alley farming configuration so the cropping can continue in the paddock.
10. Rhagodia warrants further research and development effort.

The PIRD sites were seen by large numbers of farmers during two years of extreme drought. All were impressed by the productivity of the Rhagodia under challenging conditions. Farmers who visited the PIRD site have come from all over WA and as a result Rhagodia is now being tested across WA. There was also considerable press coverage across Australia. There have been enquiries from the eastern states and Green Oil Nursery has sent seedlings to the east for farmer trial plantings. Green Oil Nursery sold out of Rhagodia seedlings in 2008.

A clear impact of this PIRD project is that many farmers will now test Rhagodia on their own farms for the first time.

One of the PIRD project farmers, Don Nairn, will now plant Rhagodia in wide alleys on crop paddocks to test fodder shrubs in cropping systems.

Through this PIRD project the NAG group now knows that Rhagodia can grow successfully in this region, and that it may play an important part for drought proofing the region against climate change. However, the PIRD has raised new questions about the palatability of Rhagodia that requires further research. This issue is being investigated by the 'Enrich' project of the Future farm CRC.

The project did not generate the animal production data as planned, so the economic impact of Rhagodia cannot be assessed.

This PIRD project very clearly demonstrated that there are very large environmental benefits from incorporating fodder shrubs into mixed farming systems. The Rhagodia clearly prevented the extreme wind erosion that occurs on almost all of the annual pasture and crop paddocks. What is not known are the long term impacts of extreme drought that can occur with annual based farming systems.

The PIRD project has demonstrated that fodder shrubs like Rhagodia can prevent the extreme land degradation that may become more widespread due to climate change.

This PIRD project also contributed to the morale of local farmers (and support industries) during a soul destroying drought. Even though there were only small areas of Rhagodia and other perennials in the district, those patches of green gave hope that it may be possible to adapt to extreme climate change. There were no suicides in the NAG group.

The PIRD sites have also been visited a number of times by researchers from the Enrich project of the Future Farm CRC. There is now regular communications between the PIRD group farmers and key fodder shrub researchers around Australia.

Field days, seminars and press articles

During the 2006/07 drought field days were held in the Binu region about every two weeks. The Rhagodia sites were visited on many of these days (~20 times over the life of the project). Accurate numbers of numbers attending were not kept, but would be estimated in the order of 400 people visited the sites. It is likely that thousands of people across Australia are now aware of the potential of Rhagodia as a fodder shrub.

Press articles on Rhagodia were published by DAFWA Geraldton and the 'Enrich' project team in both state and national publications. Articles were also published in the state wide 'Evergreen' newsletter which is circulated to 500 members.

Tim Wiley and Rob Grima, DAFWA, Geraldton gave talks at seminars and conferences around the nation on the experiences of drought at Binu. These talks included photos of Rhagodia at the PIRD sites. Major events where presentations were given include the WA 'Crop updates', WA 'Livestock updates', 'Grain & Graze' conferences and ABARE 2008 national conference. Presentations were given a large number of local seminars outside the NAG region. The findings of this PIRD project have also been used extensively by members of the Enrich project team of the Future Farm CRC.

Improvements in the PIRD project

The main failing of this PIRD was that it did not generate the animal production data as planned. Unfortunately, this could not be avoided as the problem with palatability was previously unknown.

The group would be interested in working closely with the Enrich researchers on Rhagodia. The Enrich scientists are doing more detailed studies in the lab and animal house on the palatability issue. Their findings could then be used to inform the NAG farmers on how to better manage Rhagodia in the paddock. This would result in a feedback loop between the scientists and the practitioners.

The NAG group rate this PIRD project highly as it has clearly demonstrated the Rhagodia can survive extreme drought.

Uptake of the technology

Ian Pulbrook, Green Oil Nursery, Mingenew, is the developer and sole supplier of Rhagodia seedlings in Australia. In 2006, 60% of the seedlings he planted went into the PIRD sites. As a consequence of the publicity from these PIRD sites Ian has sent seedlings to other states and this will help test the potential of Rhagodia nationwide.

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Year	Seedling numbers	Hectares planted**
2006*	30,000	48
2007	80,000	128
2008	150,000	240

* 18,000 of these seedlings went in to the PIRD project

** at 625 plants per effective hectare (i.e. some paddocks were alley farmed and therefore the total area now have Rhagodia).

Success of the PIRD

The PIRD was highly successful in demonstrating the drought tolerance and production potential of Rhagodia. It was also extremely successful in encouraging other farmers to try Rhagodia for themselves, not just in the NAG group but across Australia.

The PIRD did not achieve the objective of assessing the animal production from Rhagodia. It did however highlight for the first time that there can be palatability issues with Rhagodia under certain situations. It was not possible to do an economic analysis as planned without the animal production data. It is planned that at least some of the farmers will weigh sheep in and out record grazing days in the near future. With this data we can then include Rhagodia in the DAFWA whole farm economics model (STEP) that has been developed for the NAG region.

The PIRD has created very valuable linkages between farmers using new fodder shrubs and the Enrich researchers developing new species. This has led to new fodder scrub agronomy trials being established in the NAG groups region (i.e. Enrich and DAFWA, Geraldton). The regional catchment council, NACC, is now contributing \$30,000 for 3 Enrich fodder species trials in the region. Funds are being sort from NLP and Caring for Country to measure the sequestration rates of fodder shrubs, and other perennials, in this region.