

PROCEEDINGS OF THE AUSTRALIAN RANGELAND SOCIETY BIENNIAL CONFERENCE
Official publication of The Australian Rangeland Society

Copyright and Photocopying

© The Australian Rangeland Society. All rights reserved.

For non-personal use, no part of this item may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior permission of the Australian Rangeland Society and of the author (or the organisation they work or have worked for). Permission of the Australian Rangeland Society for photocopying of articles for non-personal use may be obtained from the Secretary who can be contacted at the email address, rangelands.exec@gmail.com

For personal use, temporary copies necessary to browse this site on screen may be made and a single copy of an article may be downloaded or printed for research or personal use, but no changes are to be made to any of the material. This copyright notice is not to be removed from the front of the article.

All efforts have been made by the Australian Rangeland Society to contact the authors. If you believe your copyright has been breached please notify us immediately and we will remove the offending material from our website.

Form of Reference

The reference for this article should be in this general form;

Author family name, initials (year). Title. *In*: Proceedings of the *n*th Australian Rangeland Society Biennial Conference. Pages. (Australian Rangeland Society: Australia).

For example:

Anderson, L., van Klinken, R. D., and Shepherd, D. (2008). Aerially surveying Mesquite (*Prosopis* spp.) in the Pilbara. *In*: 'A Climate of Change in the Rangelands. Proceedings of the 15th Australian Rangeland Society Biennial Conference'. (Ed. D. Orr) 4 pages. (Australian Rangeland Society: Australia).

Disclaimer

The Australian Rangeland Society and Editors cannot be held responsible for errors or any consequences arising from the use of information obtained in this article or in the Proceedings of the Australian Rangeland Society Biennial Conferences. The views and opinions expressed do not necessarily reflect those of the Australian Rangeland Society and Editors, neither does the publication of advertisements constitute any endorsement by the Australian Rangeland Society and Editors of the products advertised.



The Australian Rangeland Society

Lynray Quandong (*Santalum acuminatum*) Orchard Establishment

Cooper, N.

Woolworths and Landcare Australia: Email: nicolaicooper@hotmail.com

Keywords: *Santalum acuminatum*; quandong; Australian native foods

Abstract

This paper has collated information obtained from existing quandong (*Santalum acuminatum*) growers and literature on factors to consider when establishing a small quandong orchard. The quandong orchard was established on a grazing property in the semi-arid rangelands of NSW as a potential alternative source of income. It highlights that industry growers have and will continue to, depend on their own research for development. Individual seedlings rather than grafted genotypes have been used in this orchard. The orchard is designed to compare growth rates of quandong on a selection of semi-arid host species. The orchard could potentially be used as a source of genetic material for future breeding.

Introduction

Lynray Station is located in NSW 180 km north-north-west of Broken Hill on the NSW-South Australian Border. The station is located on the boundary of the Simpson-Strzelecki linear dunefield system and the western foothills of the Barrier Range. The dominant soil type consists of red siliceous sands, although the dune cores contain clay and soil carbonate. The area has a semi-arid rainfall of 230mm a year

A grant to assist in the establishment of the orchard was obtained from Woolworth's Sustainable Farming Grant delivered through Landcare Australia. It was highlighted by Lethbridge (2004) that due to funding limitations for emerging industries such as quandongs, growers will have to depend on their own experimentation. Lethbridge (2004) also mentions that pioneered a technique for industries like the quandong industry to "Do our own Research" termed the 'DOOR' method.

This report outlines the approach Lynray Station has taken to establish the quandong (*Santalum acuminatum*) orchard. It describes the design of the orchard to test the suitability of a selection of semi-arid host plants on quandong growth.

Aim

The objectives of the project are to gather as much information available from talking to existing quandong growers and reviewing literature in methods of establishing an effective quandong orchard. The orchard has been set up as an experiment to see which hosts are best used in this environment.

Method

Site Description

The location is 31°02' latitude and 141°15' longitude. The soil is light textured red sand. There is little soil profile however, limestone bedrock occurs at approximately 60cm depth. The site was weed free, however contains native annual and perennial plants. Some of the plants at the site include *Sasola kali*, *Rhagodia spinescens*, *Atriplex stipitata* and *Maireana pyramidata*. It was assumed that these species comprise the seed bank that could potentially provide hosts to the quandongs.

Site Preparation

The proposed site was graded lightly. Existing topsoil was distributed around the site to even the surface. The steady gradient of less than 1° slope toward the south was not altered. Eight rip lines were made with a single tine up to 60cm deep. Limestone was hit at this depth.

Planting design

The layout of Lynray quandong orchard comprises of 4 x 30 metre paired rows. There are spacings of 4 metres between each paired row. The rows in pairs are 1.5 meters apart. Each pair of rows has half the length (15m) assigned to a particular host. This comprises of eight individual 15m x 1.5m treatment plots. Each host plant is alternated with a quandong plant. There is 1.5m between each quandong and it's host and 3m between each quandong plant along the row. Each treatment plot has 10 quandongs and 12 hosts. One plot was left

without an assigned host plant for the purpose of a control. The rows run in a north-south direction. A windbreak comprising of Peppercorn (*Schinus areira*) was established on the western side of the plot 4.5 meters from the first row.

Seedlings

Quandongs were purchased from a hobby grower. The plants purchased germinated in late September 2009. The seed came from a variety of sources including Lynray Station NSW, Snow Town SA and Wentworth NSW. It is stated by Hele *et al.* (2006) that Quandongs are predominately cross pollinated and orchard designs should include close-proximity planting of at least two different varieties. The seedlings were obtained in February and given a Seasol™ dilution of 300ml/9L of water every 4 weeks as recommended by grower. They were planted in the ground in June 2010. Weeds that came with the seedlings were not removed as it has been noted by Herde (2007) that quandong seedlings use the weed as a primary host, removing the weeds could have killed them.

Host plant selection

Tennakoon *et al* (1997) highlighted the benefits of using a nitrogen fixing plant including Acacias and Casuarinas. Lethbridge concluded that *Acacia victoriae* is an effective host (Herde, 2007). From Loveys *et al.* (2001) research, it is evident that the Hydraulic gradient between the host and quandong it was found to be a determining factor of quandong host selection. The selected plants were *Enchylaena tomentosa*, *Rhagodia spinescens*, *Maireana pyramidata*, *Acacia aneura*, *Myoporum montanum*, *Acacia victoriae* and *Senna phyllodinea*. The main determining factor was to grow plants that have already proven to grow well at or near the site. Host plants were planted from propagated and purchased tubestock at the same time as quandong planting.

Planting

Planting methods at Lynray followed Sunraysia Nurseries (2003). These methods stress the importance of not tampering with quandong roots during planting. A 15cm x 30 cm planting hole was dug and filled with water, with a knife, both side of the tube were slit leaving the milk carton in position around the soil. The plant and carton were placed in the hole and back filled. The two halves of the milk carton were then removed. When transplanting from

the ground, as much soil was dug around very young quandongs, care was taken not to handle the quandong seedling at all while placing it in the prepared hole and backfilled.

Physical protection

In Sunraysia Nurseries (2003), the importance of seedling protection was highlighted. Each quandong plant and host plant at Lynray was protected by a steel bucket with the bottom of the bucket removed. The steel bucket is 30cm in diameter and 55cm high. During winter months, the top of each bucket will be covered over with a hessian bag when there was the threat of a frost.

Irrigation

A one-inch poly pipe on a circuit will distribute water around the site. The pipe was laid in the centre of each paired row. Fine sprinkler heads were fitted 3 meters apart, which equates to 10 sprinklers per paired row. A bore in the vicinity was fitted with a submersible pump and 50mm pipeline delivering the water to a 20,000L tank. In addition, surface water will be used in the seedling establishment phase. Watering will occur in response to a soil moisture level of 60Kpa on an iron meter as recommended by Herde (2007).

Recording

Photographs were taken a fixed point at each stage of the development. Further photos will correspond with a bi-annual recording of plant height.

Discussion

Clonal vs seedling orchard

Powell (1992) recommends for quality control of the fruit that only good varieties should be grown. Barlass *et al* (1980) proved that clonal propagation was possible with quandongs. Favourable varieties have been successfully grafted and used for production some are outlined by Hele *et al* (2006). The Lynray orchard could potentially be used as a source of genetic material for future breeding. Hele *et al*. (2006) mentions the value in domesticated and wild seedling resources in preserving genetic variability.

Industry body

The Australian Quandong Industry Association was established in 1993 (Lethbridge, 2004). This Association is no longer existing. The community of quandong growers for this research were very helpful and willing to share their experiences. It appears that the industry would benefit greatly if a government agency or group be funded to continue research or at least coordinate “Do Our Own Research” from existing and new growers in south-eastern Australia.

Acknowledgements

Paul Brown for supplying the quandong seedlings and providing planting ideas, Robert and Bonnie Tavian for sharing their quandong production experiences, Graham and Iris Herde for quandong growing advice, Ken and Daphne Schwarz for providing advice and experience, Keith Leggett for providing comments and editing paper and Deb James from Sunraysia garden centre for sending info sheets.

References

Barlass, M., Grant, W.J.R. and Skene, K.G.M. (1992). Shoot Regeneration *in vitro* From Native Australian Fruit-Bearing Trees - Quandong and Plum Bush. *Australian Journal of Botany* **28(4)** 405 – 409.

Hele, A., Latham, Y., Ryder, M. and O’Hanlon, M., Lethbridge B (2006). Quandong Production. Government of South Australia *Primary Industries and Resources SA Factsheet No: 17/03*.

Herde, G.J. and I.L. (2007). Practical Plantation Planning and Establishment for Santalum Growers. G Herde.

Lethbridge, B. (2004). DOOR For Quandong Production – a feasibility study. RIRDC Web Publication No W04/111.

Loveys, B.R. and Tyerman S.D. (2001) Water relations and gas exchange of the root hemiparasite *Santalum acuminatum* (quandong). *Australian Journal of Botany* **49(4)** 479 – 486.

Powell, B. (1992). Quandong, *Santalum acuminatum* or wild peach: research history and growing quandongs at Quorn Experimental Orchard 1974-1991. Community Landcare Conference, 2nd, 14-15 Apr 1992, Watervale SA, Proceedings. South Australia, Department of Agriculture, Adelaide SA, 1992, 5p.

Sunraysia Nurseries (2003). Recommended Transplanting Technique for Quandong. Mildura, Sunraysia Nursery.

Tennakon, K.U., Pate. J.S. and Arthur. D. (1997). Ecophysical aspects of the woody root heiparasite *Santalum acuminatum* (R BR) A DC and its common hosts. *Annals of botany* **1997-09, 80** (3).

Cooper, N. (2010). Lynray quandong (*Santalum acuminatum*) orchard establishment. In: *Proceedings of the 16th Biennial Conference of the Australian Rangeland Society*, Bourke (Eds D.J. Eldridge and C. Waters) (Australian Rangeland Society: Perth).