Final report on the Australian Flora Foundation funded project

THE COLLECTION AND EVALUATION OF DAISIES (TRIBE INULEAE) WITH HORTICULTURAL POTENTIAL

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Introduction

A planned field trip to western Queensland to collect seed of potential species was aborted due to poor autumn rains and general drought conditions during 1992. Research was therefore limited to seed obtained from commercial seed suppliers. A major review of the Asteraceae has also been published since the commencement of this research and as a result many name changes have taken place. The germination requirements of twenty seven species were evaluated at Redlands Research Station and these are listed in Table 1 along with synonyms where appropriate.

Materials and methods

Test seed was stored for a minimum of six months at room temperature prior to treatment. Germination trials were conducted in 9 cm petri dishes lined with two Whatman No. 1 filter papers on laboratory benches in ambient temperature conditions. A minimum of three and maximum of six species were evaluated in each of five germination trials. Each trial was a completely randomised design of three germination treatments; intact seed treated with water, scarified seed treated with water, and intact seed treated with gibberellic acid, with two light levels (light and dark) and five replicate petri dishes of 15 seeds, for each species evaluated. Seeds were moistened with either 5 ml distilled water or 500 mg/1 GA3 solution. Both solutions contained 0.2% Thiram fungicide (Amalgamated Chemicals). Seeds were scarified by piercing the seed coat with a dissecting needle to expose a portion of the endosperm. Seed of Chrysocephalum apiculatum was considered too small to scarify without damaging the embryo. This treatment was therefore omitted for this species. Dark treated seeds were covered with alfoil while light treatments were exposed to a combination of fluorescent and natural light for 10 to 12 hours daily.

Germinated seeds were counted at day 15 in dark treatments and every three days for 30 days in light treatments. Seed was considered to have germinated once the radicle had emerged. At the end of the assessment period ungerminated seeds were dissected and those which contained partially formed or no embryos were scored as nonviable. Germination was then recorded as percent viable seed. Results were statistically analysed using arcsine transformed data.

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Results and discussion

A summary of the results and recommendations for seed treatment is presented in Table 1. Some species such as *Leucochrysum fitzgibbonii* and *Rhodanthe moschata* were still dormant up to nine months after seed collection while *Rhodanthe chloroccphala* subsp. *rosea* and *Rhodanthe humboldtiana* were not dormant after six months storage at room temperature.

Gibberellic acid was beneficial as a pre-germination treatment for *Chrysocephalum podolepidium, Leucochrysum fitzgibbonii, Leucochrysum molle, Myriocephalus stuartii, Podolepis jaceoides, Rhodanthe moschata, Rhodanthe polygalifolia* and *Rhodanthe stricta.*

Scarification was necessary for the germination of dormant seed of *Lawrencella rosea* and promoted germination in *Leucochrysum stipitatum, Rhodanthe chlorocephala* subsp. *chlorocephala* and *Rhodanthe manglesii.*

Light was not an obligatory requirement for germination in any of the species evaluated however it did have a promotory influence on germination of *Brachyscome iberidifolia, Chrysocephalum apiculatum, Hyalosperma glutinosum* subsp. *venustum, Leucochrysum fitzgibbonii, Leucochrysum stipitatum, Rhodanthe stricta* and *Watzia acuminata.* It is therefore suggested that these species be sown on the soil surface.

Further research

The support received from the AFF during 1991 was instigative in the securing of further funds from the Horticultural Research and Development Corporation. The new research 'Year-round Production of Australian Daisies' will be conducted over a three year period (1992-1993) and aims to determine the flowering requirements of native daisies. Further research into the germination and vegetative propagation of native daisies will continue within the new grant. An exciting development from this new work has been the discovery that high temperature storage may break dormancy of many daisies and we are looking into this in more detail.

Publication and extension

Sharman K.V. (1992) Flowering daisies - in July. Ornamentals Update 7: 4.

Sharman *K.V.* (1992) Research to put native daisies on desks. Prime News 5: 3.

Sharman K.V. (1992) Research focus on flowers. The Redland Times 9 Sept.

Sharman K.V. (1992) Native paper daisies have future as fresh flowers. Flower Link 10(12):23.

Sharman K.V. (1992) Year - round production of flowering daisies. Seminar presented at Redlands Research Station 2 Dec.

Sharman K.V. (1992) Front Cover Australian Horticulture, profile of author and research activities. 90(12) 44.

Sharman K.V. (1993) Seed Germination and Dormancy of Australian Daisies (Asteraceae) Scientia Horticulturae (in preparation).

Budget summary

Item	$
Seed from seed suppliers	500
Petri dishes	164
Dissecting equipment	110
Gibberellic acid	260
Miscellaneous consumables	100
Casual labour	866
TOTAL	2000

Note that considerably more casual labour was supplied from funds obtained from other granting sources including Consolidate Revenue of the Department of Primary Industries and the Horticultural Research and Development Corporation, as part of the recently funded daisy project.

Acknowledgments

The assistance of the Australian Daisy Study Group is gratefully acknowledged. The enthusiasm of the group and donations of seed from keen daisy lovers have helped to extend the project and urge us on to greater achievements.

Table 1: Recommendations for seed propagation of 22 species of Australia which have been stored at room temperature.

Species	Storage Time (months) A	Dormancy Present	Pre-sowing treatment B	Light Response C	Sowing depth
Brachysome iberidifolia	8	no	none	+	surface
Brachysome latisquaemea	8	no	none	0	shallow
*Chryscocephalum apiculatum (*syn *Helichrysum apiculatum)*	7	no	none	+	surface
Chrysocephalum podolepidium (syn. Helichrysum podolepidium)	8	yes	GA_3*	0	shallow
Erymophyllum ramosum subsp. *involucratum (*syn. *Helipterum involucratum)*	-D	-	-	-	-
Hyalosperma glutinosum subsp. *venustum (*syn. *Helipterum venustum)*	7	no	none	+	surface
*Lawrencella davenportii (*syn. *Helicyhrysum davenportii)*	-	-	-	-	-
*Lawrencella rosea (*syn. *Helichrysum lindleyii)*	8	yes	scarify*	0	shallow
*Leucochrysum fitzgibbonii (*syn. *Helipterum fitzgibbonii)*	9	yes	GA_3+	+	surface
*Leucochrysum molle (*syn. *Helipterum molle)*	9	yes	GA_3*	0	shallow
*Leucochrysum stipitatum (*syn. *Helipterum stipitatum)*	7	yes	Scarify or GA_3 +	+	surface
Minuria denticulata	-	-	-	-	-
Myriocephalus stuartii	-	yes	GA_3+	0	shallow
Podolepis auriculata	-	-	-	-	-
Posolipis gracilis	9	no	none	0	shallow
Podolepi jaceoidess	9	yes	GA_3+	0	shallow
Rhodanthe chlorodephala subsp. *chlorocephala (*syn. *Helipterum chlorocephalum)*	6	yes	scarify+	0	shallow
Rhodanthe chlorocephala subsp. *rosea (*syn *Helipterum roseum)*	6	no	none	0	shallow

Species	Storage time (months)A	Dormancy present	Pre-sowing treatment B	Light response C	Sowing depth
Rhodanthe humboldtiana (syn. Helipterum humboldtianum)	6	no	none	0	shallow
Rhodanthe manglesii (syn. Helipterum manglesii)	6	yes	scarify +	0	shallow
Rhodanthe moschata (syn. Helipterum moschatum	9	yes	GA_3+	0	shallow
Rhodanthe polygalifolia (syn. Helipterum polygalifolium)	7	yes	GA_3+	0	shallow
Rhodanthe stricta (syn. Helipterum stricta)	7	yes	GA_3+	+	surface
Schoenia filifolia subsp. subulifolia (syn. Helichrysum subsulifolium)	8	no	none	0	shallow
Watzia acuminata	10	no	none	+	surface
Watzia aurea	-	-	-	-	-
Watzia citrina	-	-	-	-	-

A Storage time at ambient temperature prior to sowing.

B Treatments shown to significantly increase germination of fully (*) or partially (+) dormant seed, scarify = seed coat pierced with dissecting needles and seeds moistened with water, GA_3 = intact seeds moistened with 500 mg 1^{-1} GA_3 Solution.

C (+) light increases germination
(0) no effect

D Species failed to germinate.