

Grower attitudes to issues associated with weed seed contamination in dried sultanas*

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Summary

Growers of dried vine fruit were surveyed on issues associated with control of three-cornered jack, *Emex australis*. The attitudes of growers to cultural practices promoting high quality of sultanas are discussed, and a communication strategy outlined that will ensure effective communication on weed control.

Introduction

Growers need to be aware of the best management practices known to control spiny weeds. Several government bodies and grower organisations have been working closely with growers to solve the problem. Furthermore, there are a number of communication methods available to pass messages on to growers.

This research study focused on management practices and grower perceptions of these practices, the industry bodies and communications methods, in an attempt to devise a strategy to promote the most effective management practices for minimizing the contamination problem.

Following qualitative research in the field late in 1988, a quantitative research study was designed and executed during 1989 with a sample of 141 growers in the Mildura/Robinvale area.

The work involved collaboration by a number of independent organisations. Funding was provided by the Dried Fruits Research Council. The Victorian Department of Agriculture and Rural Affairs (DARA) provided very significant fieldwork assistance. The direction and shape of the research work was strongly guided by consultative input from both the Australian Dried Fruits Association (ADFA) and DARA. Project management was provided by the School of Agriculture and Forestry of the University of Melbourne and the market research consulting firm of Yann Campbell Hoare Wheeler.

Survey sample and administration of the questionnaire

A random sample of 780 names with Victorian post codes was drawn from the complete listings of growers in the Sunraysia district of Victoria held by the ADFA. A sub-sample of 150 of those with street addresses rather than post office box addresses was set aside for direct contact.

The remaining sample was segmented according to ethnic origin of the name. Questionnaires in the appropriate language, plus an English language version, were dispatched to this sample of around 600. The ethnic mix was as follows:

Australia/English origin	59%
Italian origin	24%
Greek origin	8%
Yugoslav origin	5%
Turkish origin	5%

The survey questionnaire was designed for self completion and was administered to the respondents in two ways - mail out/mail back, and direct contact with block managers. The mail out of 600 questionnaires generated 51 (9%) usable returns, which was significantly below the expected return of around 100 (17%). A further 90 responses were obtained by direct contact, which took the total sample for the survey to 141.

Direct contact was made by a team of Sunraysia DARA officers and a University of Melbourne employee. The team was briefed on site by the project leaders, and the first day's interviewing supervised by the project leaders.

The bulk (83%) of respondents were of Australian origin, with the Italian segment (9.2%) representing the largest non-Australian element. The final respondent sample was thus significantly biased toward the Australian segment.

Only the Australian segment was sufficiently large in sample size to allow independent analysis. The results presented below therefore are based on the entire sample of 141 respondents.

The median block size managed by the respondents is around 26 acres. Most of the block area is taken up by vines (median area 23 acres) with a lesser portion again taken up specifically with sultana vines (median area 18 acres).

On average, most of the sultanas are dried (15 acres median of 18 acres median). Hand harvesting is still the most common means of gathering the crop, particularly in the blocks with smaller areas. Mechanical harvesting is more popular for larger blocks, although it is emphasized that the sample base for this observation is inadequate.

The total area of vines irrigated via furrows is still significantly greater than the area irrigated by piped means, although as block size increases it is more common to find piped irrigation.

It seems evident from these data that block

amalgamation is frequently associated with an orientation toward technologically based management practices - mechanical harvesting and piped irrigation - which reduce recurrent overheads associated with labour costs.

It is likely that this trend, coupled with the increases in productivity associated with rootstock grafted vines, represents the direction in which the industry is heading. If this is indeed the case, the benefit of reduced weed seed contamination which is associated with these management practices, will flow on as a secondary, long term, outcome.

Growers' attitudes

Measurement of attitudes at best of times can be difficult. In the past we have found that many farmers tend to give answers they feel will be most helpful to the research workers. Hence we sought to investigate attitudes and perceptions in a more objective way.

The attitudes of growers towards issues related to sultana production and seed contamination were determined using Galileo analysis, a relatively new multidimensional scaling technique which has been used locally to measure Hamilton graziers' and Charlton wheat growers' attitudes towards trees on farms (Cary, Beel and Hawkins 1986), Loddon-Avoca farmers' perceptions of dryland soil salinity (Vanclay and Cary 1989) and onion growers' perceptions of soil management problems in northern Tasmania (Ewers *et al.* 1989).

As might be expected, growers place a very high value on the concept of premium quality fruit. The problem of jacks in dried fruit is seen as much more serious than some other contaminants such as bunch stalk.

The notion of spraying vines for pests and disease is seen to be closely linked to premium quality fruit. Thus, whatever negative aspects might be associated with chemicals or spraying appear to be overcome by the benefits of product quality. There seems to be no aversion to the use of sprays as a management tool for the vineyards. However, no differentiation was made in this study of the various types of chemical preparations used on blocks.

Control of weed seeds by spraying of weed plants is much more highly regarded than control by cultivation. Weed spraying is seen to be more closely associated with premium quality dried fruit than weed cultivation. It is therefore highly probable that endorsement and promotion of management strategies involving use of sprays will be positively received.

Sprinkler, drip and micro-jet irrigation are held in higher regard than furrow irrigation, despite the fact that most still use the latter method. Piped irrigation also is seen to be more closely associated with premium quality fruit. These attitudes suggest some possibilities for further promotion of the more 'environmentally friendly' piped irrigation methods.

*Footnote. This paper is based on the report 'Management of Weed Seed Contamination in Dried Sultanas' by Hawkins *et al.* (1989).

Mechanical harvesting has a very poor image in comparison to hand harvesting. Premium quality dried fruit is very closely associated with hand harvesting. This outcome therefore makes it unlikely that the potential of mechanical harvesting for reducing weed seed contamination can in fact be readily realized. Nevertheless growers do perceive mechanical harvesting to be superior to hand harvesting with respect to the issue of contamination of fruit with spiny seeds.

However, there appear to be significant negative aspects of mechanical harvesting which will prevent its rapid adoption under current economic circumstances and grower perceptions. The design of our study does not allow us to draw firm conclusions about these negative aspects. We can only speculate that they might include the initial cost of equipment, rough handling of fruit, uneven drying of berries, loss of vine vigour and more complex management demands.

If mechanical harvesting is the most potent means of avoiding contamination of fruit with jacks then there appears to be a significant conversion task ahead for those responsible for planning the communications strategy. On the other hand, as the economic pressures from rising labour costs and for productivity increases become greater, mechanical harvesting is likely to become more attractive.

The concept of packing shed penalties for contamination of fruit by weed seeds is well regarded, and it is likely that the level of penalty could be increased. However, detection difficulties make this approach difficult to rely on as a management technique. It is also possible that our research findings on this issue have been influenced by the fact that penalties are rarely imposed.

Although we have no objective evidence from the survey, it is conceivable that the very low returns from the mail back component, and the low participation overall by ethnic growers, could be traced to their suspicion of an external organization asking questions about spiny weed seeds and associated penalties.

The psychological literature is rich in quantity of research on the effects of punishment versus rewards. Ideas are somewhat more limited in agriculture and horticulture. The pasture seeds industry has elaborate procedures for ensuring clean and certified seed, but there have been no studies of the effects of penalties and incentives. Hubble and Mein (1986) made some interesting observations about the effect of incentives on King Island dairy farmers, indicating that rewards were more effective than punishments in stimulating farmers to adopt more hygienic practices. The same principle could well be considered in strategies for motivating growers to adopt optimum weed control practices.

Control of weeds in both drying greens, under vines and in rows is seen as closely related to dried fruit quality, indicating good

understanding of the fundamental importance of weed control as a management priority. In comparison, mechanical harvesting is seen as only distantly related to dried fruit quality. The removal of jacks at the packing shed is also seen as only distantly associated with premium quality dried fruit, indicating that growers see little value in this approach to upgrading fruit quality.

There is very little difference in the association of premium quality dried fruit with the export market on the one hand and the domestic market on the other. Both these markets thus are perceived as similar from the growers' stand-point. Hence, either might be stressed effectively in a communication campaign.

In terms of organisations, growers feel most closely associated with the ADFA and DARA, and see the former as the most effective and competent. Any communication programs relating to management of spiny seeds should be undertaken as joint ventures between the ADFA and DARA to maximize the benefit of the goodwill associated with both organizations in people's minds.

Growers currently learn about recommended practices from a wide variety of personal and media sources. Results relating to communications methods show that face-to-face contact such as field days, personal consultations and neighbours are the most highly regarded, together with the TV program 'On the Land'. 'ADFA News' is the most highly endorsed of the printed media.

These results suggest that a co-ordinated campaign starting with field days, supported with timely messages in 'On the Land', and backstopped with 'ADFA News' and regular articles in the local newspaper will provide the most effective and durable campaign strategy.

However, more personal sources such as friends, neighbours and valued advisers are known to be the most effective in bringing about significant changes in attitudes. Any method that can be used to promote informal but informed discussion among family members, friends and neighbours must be given high priority.

Communication strategy

Results from this study, combined with principles of effective communication developed in many other projects, lead us to recommend a strategy along the following lines:

1. *The messages.* It is essential to have simple, unambiguous, technically sound messages about spiny weed seed contamination and control that are acceptable to key participants in the industry, i.e. the ADFA, DARA, packing sheds, growers' representatives, etc. The emphasis should be on positive aspects of methods to produce premium quality dried fruit, rather than on penalties. Growers must be reminded they are the front line of action rather than the packing sheds.

2. *General community awareness.* Educational information should be promulgated through all media drawing attention to the economic, social and biological consequences of NOT adopting stricter control measures, as well as to the positive advantages that will accrue.

3. *School children.* Comprehensive control of weeds will be a long term project. Today's children are tomorrow's growers. Hence it is wise to develop educational kits for school use to make children aware of the problem at a higher level of understanding than punctured bicycle tyres. This consciousness then will lead many to press their errant parents to adopt more careful control measures.

4. *Growers' Program.* Messages aimed specifically at growers should include strategic reminders of when and what to spray on emerging *Emex*, how to use cultivation and irrigation to maximum effect, etc. The messages should be planned for the local media, including the television program 'On the Land', feature articles in the local newspaper, reminders from the packing sheds and a DARA field day with appropriate demonstrations of control methods and effects. Clearly, the timing of such messages is highly dependent on weather conditions, labour requirements and biological conditions, so they must be planned for maximum flexibility of delivery, i.e. messages developed and ready for the specific medium such as the 'ADFA News', 'On the Land' or the newspaper once biological conditions are optimum for control. Some should be disseminated during the period when weeds are dormant (and when growers are not very busy, say, with picking). Visual material for television use also could be developed into videos for home viewing or for group discussion.

5. *Discussion groups.* Discussion groups should be developed around the concept of clean vineyards and clean drying greens as essential to a clean and hence more valuable product. Membership and participation in such groups is likely to be stimulated if some form of positive incentive scheme for maintaining weed-free blocks is introduced. The groups also are more likely to be successful and productive if they are perceived to be 'owned' by the growers themselves, i.e. organized or co-ordinated by the ADFA, with DARA providing expert advice and back-up.

6. *Reinforcement.* Single messages have limited effect. Growers must be reminded at regular intervals about the weed problem, using the various media at hand.

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References

- Cary, J.W., Beel, A.J. and Hawkins, H.S. (1986). Farmers Attitudes towards Land Management for Conservation. Report. (University of Melbourne, School of Agriculture and Forestry).
- Ewers, C.R., Hawkins, H.S., Kennelly, A.W. and Cary, J.W. (1989). Onion Growers' perceptions of Soil Management Problems in Northern Tasmania. Report. (University of Melbourne, School of Agriculture and Forestry)
- Hawkins, H.S., Cary, J.W. and Rhee, C. (1989). Management of Weed Seed Contamination in Dried Sultanas. Report. (University of Melbourne, School of Agriculture and Forestry).
- Hubble, I.B. and Mein, G.A. (1986). Incentive payment for bulk milk cell count: influence on mastitis control practices used by dairy farmers. *Australian Journal of Dairy Technology* 41(4), 90-93.
- Vanclay, F.M. and Cary, J.W. (1989). Farmers' Perceptions of Dryland Soil Salinity. Report. (University of Melbourne, School of Agriculture and Forestry).

Questions and discussion

Q. Brendon Gledhill. Is there a need to follow-up the people surveyed in the mail questionnaire?

A. The results of mail questionnaires need to be interpreted with a great deal of caution. Personal interviews are a more reliable technique.