GoGrape

Alex Banks
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Level 1
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Telephone: (02) 8295 2300
Fax: (02) 8295 2399
E-Mail: horticulture@horticulture.com.au

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TG05007

David Oag
Department of Primary Industries and Fisheries,
Queensland.

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Project Leader.
David Oag
Department of Primary Industries and Fisheries
PO Box 501, Applethorpe, Qld 4380
t. 07 4681 6100
f. 07 4681 1769
email david.oag@dpi.qld.gov.au

Key Personnel.
Clinton McGrath, Department of Primary Industries and Fisheries, Applethorpe, Queensland.

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Media Summary

Working together boosts knowledge of Queensland tablegrape growers.

The regional GoGrape™ tablegrape growers groups at Mundubbera and St George have shown that by working together individuals can greatly boost there knowledge over that possible when working alone.

The GoGrape™ groups were formed out of the need to address viticultural issues and develop production practices effective under subtropical Queensland growing conditions.

The GoGrape™ groups are part of a DPIF project supported by voluntary contributions from participating growers and Horticulture Australia Ltd. Project leader and senior viticulturist with DPIF, David Oag said "the GoGrape™ groups have been highly active over the last 2 seasons, undertaking multiple field trials assessing several production practices".

The field trial work has shown a substantial increase in fruitfulness of Menindee Seedless vines can be achieved by cincturing. "The extra fruitfulness will mean a good fruit yield in most years, whereas vines not cinctured will produce marginal or possibly uneconomic yields," Mr Oag said.

The GoGrape™ groups have undertaken field trial work on postharvest pruning to improve vine fruitfulness and GA sprays to increase berry size of Menindee Seedless. Mr Oag said "that whilst postharvest pruning is used successfully overseas the field trial results show it is counterproductive with standard production practices in Queensland".

Growers were concerned about using GA to increase berry size of Menindee Seedless, because of reported negative impacts on vine fruitfulness. Results from the field work now cast considerable doubt over the effectiveness of this practice; a practice that is widespread throughout the industry.

The GoGrape™ growers now regularly measure vine performance at key times during the season. The information gathered gives the grower a precise knowledge of the vine and greatly improves their capability to increase vineyard productivity and ultimately profitability.

"If you don't measure it - you can't control it" Mr Oag said.

Whilst there is a lot more to learn about growing tablegrapes under the subtropical conditions in Queensland, the GoGrape™ project has unequivocally demonstrated that a lot can be achieved through substantial *collaboration* between growers and researchers, *cooperation* between growers and *participation* by growers.

Tablegrape growers currently not participating in GoGrape™ are welcome to join and if interested should contact David Oag at DPIF (tel 4681 6100).

Technical Summary

GoGrape involves regional tablegrape grower groups at Mundubbera and St George in Queensland. Participating growers are those individuals interested in finding solutions to local grapegrowing issues and are willing to work together to maximise the information gathered and knowledge gained.

The ultimate objective is to improve vineyard productivity and profitability by establishing effective production practices and enhancing the management capabilities of growers. To be able to more proficiently manage vines it is necessary to quantify their current performance, hence the old adage *'if you don't measure it - you can't control it'*.

GoGrape growers collect data on vine performance at key growth stages throughout the year (pruning, flowering, harvest), with the assistance of the DPIF viticulturist. The GoGrape growers have now developed the vine monitoring skills to collect the information required to optimise vine management and performance.

Growers within GoGrape now regularly conduct dormant bud fertility assessments prior to pruning as the technique has been shown to provide a reliable prediction of vine fruitfulness in Queensland. Project results indicate death of the floral primordium, commonly referred to as 'bunch abortion', is not occurring.

The GoGrape groups have undertaken field trials to determine the effectiveness of postharvest pruning, cincturing and GA sizing sprays.

Cincturing after fruit set is highly effective in increasing the fruitfulness of Menindee Seedless vines in the following year. At Mundubbera, cincturing can increase inflorescence numbers per vine by up to 83% and convert uneconomically low crop loads into acceptable yields. A 52% increase in the number of inflorescences per vine was recorded at St George. The practical difference of the extra inflorescences is in the quality of inflorescence (ie size, position within the canopy), as non-cinctured vines had approximately 30 bunches each.

Choosing between a light crop load to harvest early and capture a higher price per kilogram or a larger crop load, for a later harvest when prices are usually lower, but a higher gross income, is a common dilemma for tablegrape growers in northern Australia. A field trial at St George showed that grafted Menindee Seedless vines struggle to ripen 40 bunches per vine. Crop loads of 16 and 24 bunches per vine produced substantially superior fruit quality with highly uniform berry size within bunches. The level of inputs needs to be increased to avoid the reduction in fruit quality which occurred at higher crop loads (32 B/vine).

Further field work is required to quantify the effectiveness and cost benefits of individual vineyard practices, particularly those with a high labour component (ie leaf removal, shoot thinning), as well as clarify some of the results of this project (eg. GA berry sizing sprays). This type of work can be achieved with regional grower groups like GoGrape, however, viticultural research is required for a substantial increase in vine productivity in the subtropics to be achieved.

Whilst there is a lot more to learn about growing tablegrapes under the local subtropical conditions in Queensland, the GoGrape™ project has unequivocally demonstrated that much can be achieved through substantial *collaboration* between growers and researchers, *cooperation* between growers and *participation* by growers.

Introduction

The GoGrape™ project consists of a grower group at St George and another at Mundubbera. Tablegrape growers who participate in GoGrape™ are those individuals who are interested in improving their tablegrape production practices by seeking new information and developing solutions to local problems. A preparedness to collaborate and share information from trials in their own vineyard is fundamental to the success of GoGrape™. Participating growers provide a small financial contribution towards the costs of the project.

GoGrape™ was initiated by the need for solutions to production issues that arose in the subtropical growing conditions of the tablegrape districts in Queensland. Whilst the issues were of importance to growers in the expanding Queensland industry, they were invariably not of the complexity or magnitude to secure national research funding. It was then that a number of motivated growers formed local groups and engaged the expertise of DPIF viticulturists to assist with addressing issues of local importance.

This project builds on the vine monitoring skills developed amongst tablegrape growers during the previous projects and utilises results from the performance of Menindee Seedless to identify specific topics for more detailed field trials. Much of the project work is with Menindee Seedless, as it is the major variety grown in Queensland and by those growers participating in the project. The vine performance monitoring work and many of the field trials, have been aimed at how to improve the fruitfulness of Menindee Seedless and successfully manage vines for consistent yield over consecutive years.

Vine Performance Monitoring

The purpose of this activity was to ultimately improve vineyard productivity whilst developing the management skills of the tablegrape growers. Hence the activity was a combination of skills training as well as data collection. The rationale for this work is the old adage of *'if you don't measure - it you can't control it'.*

The first step was a discussion between the participating growers and DPIF viticulturist to decide on the relevant data to collect and then demonstrating to the growers the various data collection techniques to be used. Several vines are tagged in each vineyard block and all data is collected from these same tagged vines throughout the season.

Data is collected at key growth stages during the season, namely budload following pruning, fruitfulness prior to flowering, then yield and fruit quality at harvest. A bud fertility assessment before pruning is optional but has been encouraged amongst the GoGrape™ growers. The information throughout the season provides a quantitative picture of vine performance and allows growers to make informed management decisions.

Bud fertility assessments.

Bud fertility assessments prior to pruning is the first task for the season in monitoring vine performance and has now become standard practice for growers in the GoGrape™ group. It provides growers with the opportunity to change bud numbers at pruning to compensate for low bud fertility, as well as plan vineyard management strategies around the reduced gross income from a lower projected yield. An indication of the level of bud mite infestation is included in the information and this allows growers to plan their early season spray programme to control mite numbers.

The technique has proven to be highly reliable in predicting the fruitfulness (percent fruitful shoots) of vines prior to flowering, both across districts and seasons. In the 2004 season (Figure 1) the bud fertility assessment either closely predicted or under-estimated the percentage of fruitful shoots after budburst in more than 80% of the vineyards assessed. The fruitfulness predicted from dormant bud assessments closely approximated the percentage fruitful shoots for all vineyards assessed in the 2006 season. This indicates death in the bud of the floral primordium is not occurring, which is contrary to comments by industry operators when they refer to 'bunch abortion' as an explanation for low vine fruitfulness.

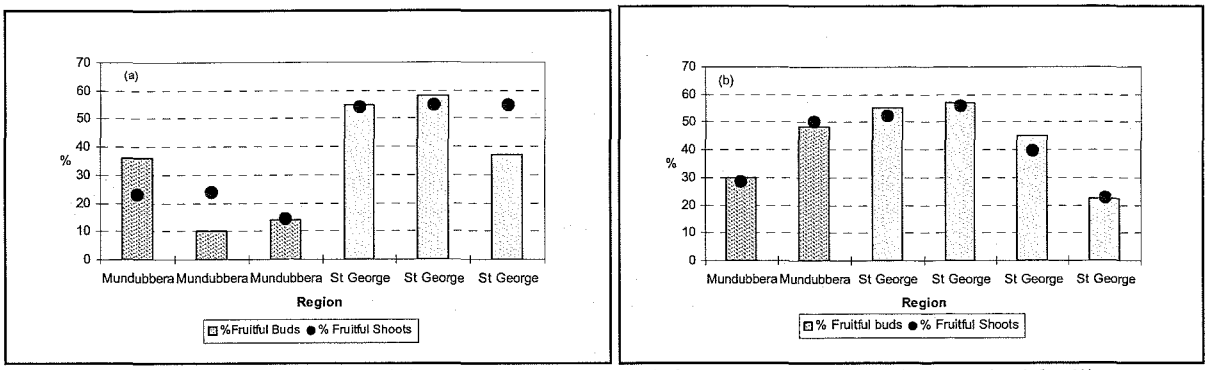

Figure 1. Prediction of vine fruitfulness (% fruitful shoots) from assessments of dormant bud fertility (a) 2004 season and (b) 2006 season.

Pruning

Following pruning and prior to budburst a systematic count is made of the number of buds on the vine. Combining this information with the bud fertility assessments enables an early prediction of bunch number and yield to be made.

Data collected in 2005 (Table 1) shows that growers in St George leave considerably more buds per vine than growers in Mundubbera. Poor budburst of spurs retained in the crown and finding sufficient quality replacement canes is an issue in Queensland tablegrape districts. The number of crown buds per vine is recorded to assist with monitoring this problem.

Spurs retained at pruning are often dead come budburst. The reasons(s) for the death of crown spurs and the causal factors are unknown. It is common in Queensland to find the crown of relatively young vines just below or even above the cordon wires, as a result of the frequent lack of renewal canes arising from the crown.

Table 1. Pruning data (2005/06 season) for Menindee Seedless grown at Mundubbera and St George.

	St George	Mundubbera
Number of Count buds per Vine	94	73
Number of Canes per Vine	7	5
Number of Count Buds per Cane	13	13
Buds per Cane	15	15
Buds per Vine	120	87
Crown buds per Vine	26	14

Actual Fruitfulness

A systematic count of the number of shoots and inflorescences at each node position along the winter cane is undertaken between budburst and flowering. This data provides a wealth of information about the vine, two key pieces being the effectiveness of the Dormex applied and the actual fruitfulness of the vine.

Collecting the Merbein Bunch Count data is a two person job and the DPIF viticulturist has often assisted each grower with this task. Several growers are now undertaking this task without assistance from project staff. The DPIF viticulturist collates and analyses the data from all vineyards and prepares an interpretation report for each grower on the data for their vineyard together with the average for the district.

Under the subtropical growing conditions of Queensland's tablegrape districts the percent budburst when Dormex has been applied is only 60% to 70%. The data collected in this

project was the first time the percent budburst of Menindee Seedless had been quantified in Queensland. There is scope to in part overcome the fruitfulness problem by simply improving the percent budburst.

A strong plant-environment interaction appears to be occurring, as indicated by the lower fruitfulness of Menindee Seedless vines at Mundubbera (Table 2). The lower percentage of fruitful shoots at bud burst translates into fewer bunches per vine and ultimately a lower yield at harvest.

Also typical of Menindee Seedless vines at Mundubbera was the higher ratio of fruitful tendrils to normal, fully developed inflorescences. In the 2005 season the number of fruitful tendrils amounted to 25% of the normal, fully developed inflorescences on a vine (Table 2). If many of these fruitful tendrils could be converted into fully developed inflorescences, then the fruit yield at harvest could potentially be increased by up to 20%.

Table 2. Fruitfulness of Menindee Seedless vines after budburst (2005/06 season) at St George and Mundubbera.

	St George	Mundubbera
Budburst percentage	69	61
Percent fruitful shoots of burst nodes	53	39
Total bunches per vine	39	18
Crown shoots per vine	4	4
Total shoots per vine	76	45
Percent fruitful tendrils (ft's)	5.7	25

Harvest

Data collected at harvest provides the final snapshot of vine performance for the season along with an opportunity to quantify how effective were the management practices applied during berry growth and ripening. At Mundubbera, vines of Menindee Seedless invariably produced smaller berries of a lower sugar concentration despite the lighter crop load (Table 3). Rain during harvest (2005) severely disrupted sugar accumulation. The smaller berry size (diameter and weight) is largely related to the unfavourable growing conditions during the 2005 season. The impact of management practices in individual vineyards is yet to be established.

The harvest data presented in Table 3, is for the entire crop on the vine prior to trimming and packing for market. This data reflects the total production capacity of the vine and the actual variability in berry size. A combination of this data and the total number of packed cartons per hectare, enables each grower to calculate the percent pack-out rate; an important indicator of the efficiency of the vineyard.

The data presented in Tables 1, 2 and 3 are examples of the type of information returned to each regional GoGrape™ group. Each grower receives the reports with the actual data for their own vineyard for comparison against the regional average. From the vine performance data collected throughout the season (Tables 1, 2 & 3) it is possible to isolate the areas for improvement to achieve a specified performance target eg improve percent budburst or increase bunch weight to increase yield.

Table 3. Performance of Menindee Seedless vines at St George and Mundubbera at harvest 2005.

	St George	Mundubbera
Average weight of commercial bunches (g)	557	533
Number of commercial bunches per vine	29	20
Yield in commercial bunches (kg/vine)	16	11
Average berry weight (g)	6.2	4.1
Average berry diameter (mm)	19.1	18.1
Sugar level at harvest (% brix)	15.9	13.9
Sugar:Acid ratio	29.4	23.5

Berry growth measurements.

Weekly berry measurements to monitor the rate of berry growth can be used to predict berry size at harvest and as an indicator of vine response to weather events or management practices. Growers within GoGrape™ have been making weekly berry growth measurements and the data collected over the last two seasons is starting to provide an understanding of the typical berry growth curve for Menindee Seedless under local growing conditions. Weekly berry size measurements greatly enhance the ability to predict harvest date, on preharvest maturity testing only, and provide the additional data on anticipated fruit quality. This greatly enhances the ability of an individual grower to commence marketing of their fruit prior to harvest.

Management Practices - Vineyard Trials

Within this project there was a change in emphasis from quantifying actual vine performance to conducting vineyard trials on a specific aspect of vine management. The vine management practices to be targeted in the vineyard trials were those identified from the vine performance monitoring work as areas to be improved. The areas of field work selected were (a) quantify the impact of cincturing on vine fruitfulness; (b) establish the effectiveness of postharvest pruning on vine fruitfulness; and (c) quantify the carrying capacity of vines plus the associated gross income for each crop load.

Cincturing for Fruitfulness

Several growers within GoGrape™ established small trials to quantify the impact of cincturing on vine fruitfulness in the following season. This invariably involved a number of vines within a vineyard block not being cinctured whilst the remainder were cinctured after fruit set.

A Merbein Bunch Count was conducted after budburst the following season on multiple vines. The percent budburst, percent fruitful shoots and percent fruitful tendrils were calculated, along with average number of shoots and inflorescences per vine.

Cincturing has consistently improved the fruitfulness of vines in both the Mundubbera and St George districts. The improved fruitfulness occurs as a larger number of inflorescences per vine and higher percentage of fruitful shoots. The latter is important in tablegrape production where standard practice is to retain only one bunch per shoot.

At Mundubbera in the 2006 season cinctured vines had 83% more inflorescences for a total number of inflorescences per vine close to the optimum commercial crop load. The fruitfulness of non-cinctured vines was inadequate at less than 13 inflorescences each. The

difference in bunch number translates into an extra 536 cartons of fruit, for a conservative additional gross income of $13,400 per hectare.

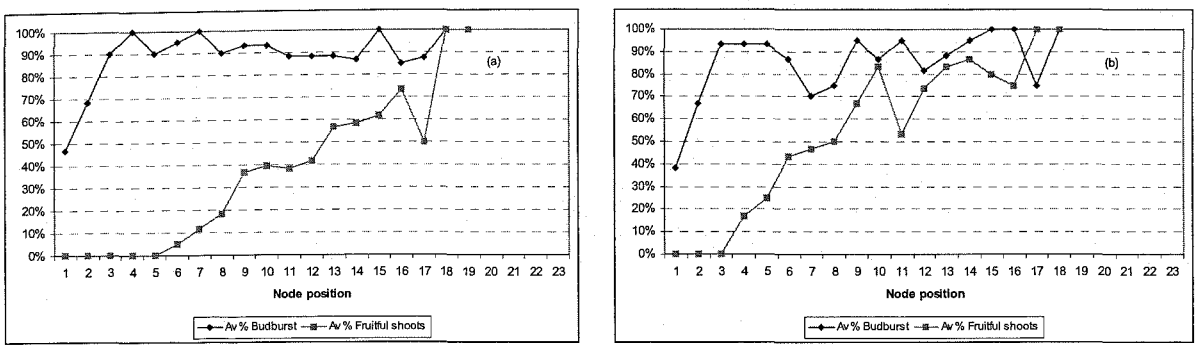

Figure 2. Typical fruitfulness along canes of Menindee Seedless on vines (a) not cinctured and (b) cinctured in the previous season. (Mundubbera, 2006 season)

A similar improvement in fruitfulness was recorded at St George. The number of inflorescences per vine was 52% greater on cinctured vines than non-cinctured vines. However, the fruitfulness of cinctured and non-cinctured vines at St George was substantially greater than for vines at Mundubbera, such that the non-cinctured vines at St George had adequate inflorescences for a commercial crop. The practical consequence of the extra inflorescences is the opportunity to select and retain better quality of inflorescences (ie size, position within the canopy).

Much of the improved fruitfulness of cinctured vines arises from the improved fruitfulness of buds along the basal third of canes (Figure 2). This would suggest the timing of cincturing is before the initiation of floral primordia in basal buds, yet floral primordia were found at fruit set as far out as node position 10 on canes of Menindee Seedless grown at Emerald (Oag & Shaw, 2003). There is also a minor increase in the fruitfulness of buds along the middle third of canes. The lower percentage of fruitful tendrils on cinctured vines suggests that cincturing promotes the complete development of a floral primordium into a normal inflorescence.

Postharvest Pruning for Fruitfulness

Several growers within the project established small trials to quantify the effectiveness of postharvest pruning in improving the fruitfulness of Menindee Seedless. The vines were cinctured in 2005, pruned in early 2006 after harvest and a then shoot and inflorescence counts recorded (September 2006) flowing budburst. The technique had proven successful in South Africa (Capespan, pers comm.), particularly in the northern production districts where there is a long postharvest period similar to that in Queensland tablegrape districts.

The theory behind the technique is that removal of unnecessary canes allows the vine reserves accumulated after harvest to be channelled into the renewal canes retained for next season. The higher level of reserves in turn improves survival of the bud, development of the floral primordium and increases the percent budburst. It is important to note that theoretically, postharvest pruning should have no impact on the number of bunches on the vine next season, as the process of floral initiation is largely finished by harvest.

There was no evidence to suggest that postharvest pruning improved the fruitfulness of Menindee Seedless vines. Further, the percentage of fruitful tendrils was higher on vines that had been postharvest pruned, which was an unexpected and unexplainable result.

A striking result from the field trials was the negative impact of the combination of postharvest pruning with cincturing. The percentage of fruitful shoots on vines that had been cinctured and postharvest pruned was approximately half that of vines that were cinctured only. This result was consistent at both St George and Mundubbera.

Postharvest pruning appeared to reduce vine fruitfulness by 20% on vines that had been cinctured in the field trial at Mundubbera. The percent fruitful shoots of vines was 49%, 38%

and 28% respectively for cinctured only, cinctured plus postharvest pruned and postharvest pruned only. The interaction between cincturing and postharvest pruning is unclear, as the cincture has overgrown and the phloem reconnected well before postharvest pruning.

GA Berry Sizing of Menindee Seedless.
Growers had shown considerable interest in the use of gibberellic acid (GA) to increase berry size in Menindee Seedless, but have reservations about the effectiveness of the rates being used throughout the industry. The fruitfulness of Menindee Seedless is relatively low and anecdotal reports claim the variety is sensitive to GA sprays applied after fruit set. All of which presents a dilemma to growers striving for extra fruit quality (berry size) but at the risk of reduced fruitfulness in the following season.

It has also been suggested that a GA sizing spray will improve the uniformity of berry size at harvest and that this is achieved by increasing the size of the small berries within a bunch. Data could not be found as there appears to have been no published research work to test the effectiveness of GA sprays on berry sizing in Menindee Seedless.

To obtain a quantitative comparison of the effectiveness of GA rates a small field trial was undertaken in a vineyard at Mundubbera during the 2005/06 season. The treatments were nil (control), 2.5ppm, 5.0ppm, 7.5ppm, 10ppm and 15ppm applied as a single spray.

There was no significant difference in berry size (data not presented) for any of the GA treatments. This result is contrary to anecdotal information from numerous growers in Queensland using GA. Further field work is necessary to clarify just how effective GA is in increasing berry size of Menindee Seedless and hence whether or not growers are wasting their money in continuing the practice.

Cincturing after fruit set is used to both increase berry size in the current season and improve fruitfulness (floral initiation) the following season. Some growers have been using both GA sizing sprays and cincturing to improve fruit quality. Field trial work comparing both practices is required as growers are uncertain which is the most effective and cost efficient of the two practices.

Balancing yield and harvest time of Menindee Seedless.
The balance between yield and harvest time is a proverbial dilemma for tablegrape growers in early ripening districts. Declining early season prices as volumes have increased in recent years has made the situation all the more acute. The question growers regularly face is 'what is the optimum fruit yield to return maximum gross income and profit?'

The major factor for growers to consider is the delay in harvest time with increasing crop loads and to a lesser extent, a reduction in fruit quality (ie less uniformity and smaller berry size). The unit price ($/carton) will often be lower with later harvest dates, however, gross income per hectare is likely to be higher because of the larger yield.

Predicting the most profitable option of lower yield, early harvest, higher unit price or higher yield, later harvest, lower unit price, higher gross income is always difficult.

The lack of quantitative information on how much of a delay in harvest time occurs with increasing crop load prompted GoGrape™ growers to request a field trial be undertaken. Equally, there is an absence of quantitative information on what is the carrying capacity of vines in the growing conditions of the early maturing districts in Queensland.

A field trial was undertaken in the 2005/06 season to investigate the effect of crop load on harvest time and fruit quality. Vines of Menindee Seedless on Teleki rootstock in a vineyard at St George were used. The crop load treatments were 16, 24, 32 and 40 bunches per vine applied to single vines, with four replicate vines of each crop load treatment. Bunch thinning was completed prior to flowering. Several berry samples were collected preceding harvest for maturity analysis and then all vines were harvested on the same day.

Results.

Sugar concentration (°Brix) or the ratio of sugar to acid (Brix:TA) can be used as the benchmark for fruit maturity. In this study possible harvest time was deemed to be when the fruit achieved a minimum sugar concentration of 16°Brix.

Possible harvest time was delayed with increasing crop load. The lightest crop load (16B/vine) was at least 10 days earlier than the heaviest crop load (40B/vine). This interval was probably even greater as the sugar concentration of fruit of the lightest crop load exceeded 16°Brix at the first berry sampling date (11 Dec).

Fruit of the 40B/vine treatment had not reached 16°Brix when the trial was harvested (21 Dec) and the ripening curve suggests the fruit may never have reached 16°Brix (Figure 3). It appears a crop load of 40B/vine is about or slightly more than the capacity of the vine under local growing conditions.

The fruit of all crop load treatments exceeded the Queensland industry benchmark sugar:acid ratio on 11 December (Figure 3). However, at this time the sugar concentration of the two heaviest crop loads was at levels often associated with low palatability and eating quality.

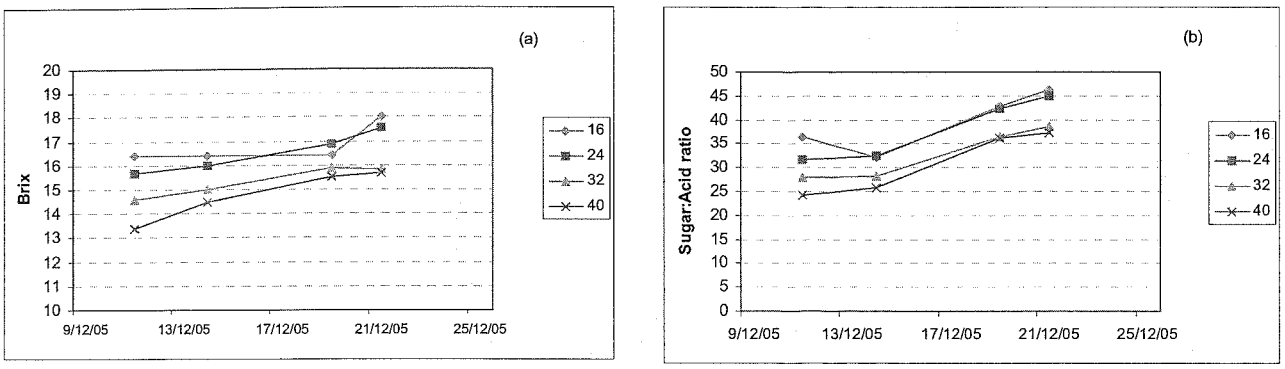

Figure 3. Ripening curves of four crop loads on vines of Menindee Seedless at St George - (a) sugar concentration (Brix) and (b) sugar:acid ratio.

Visible differences in fruit quality were evident across the crop load treatments. Fruit of 16B/vine was of superior quality having a larger average berry size, more uniform berry size and larger bunches. Whilst the difference in average berry weight was 1.0g from the lightest to heaviest crop load, most of the difference (0.5g) occurred between 16B/vine and 24B/vine (Table 4).

The striking difference in terms of fruit quality was the difference in uniformity of berry size across the crop load treatments (Figure 4). Fruit of the two lightest crop loads (16 and 24B/vine) was reasonably uniform with only a small number of small berries per bunch. Fruit quality of both the 32B/vine and 40B/vine treatments was noticeably inferior because of the large number small berries in bunches giving rise to highly uneven berry size.

Table 4. Yield and fruit quality data at harvest (21 Dec 2005) of Menindee Seedless for four crop loads.

	Crop Load (Bunches/vine)			
	16	**24**	**32**	**40**
FW/vine (kg)	14.1	19.3	22.3	28.3
Bunches/vine	16.75	24.4	31.6	42.2
Average Bunch weight (g)	849	792	703	672
Brix	18.0	17.6	15.9	15.6
TA (g/l)	3.9	3.9	4.1	4.2
Sugar:Acid ratio	46.2	45.0	38.7	37.3
Av berry wt (g)	5.3	4.8	4.6	4.3
Av berry diameter (mm)	18.5	18.2	17.9	17.4

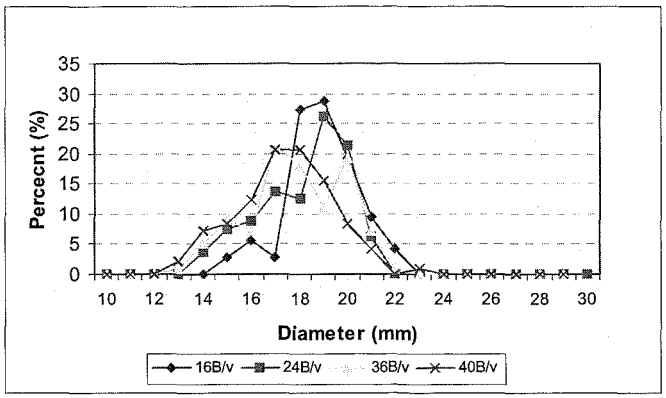

Figure 4. Uniformity of Menindee Seedless berries for four crop loads - St George, 2005.

Costs of Production

Itemising and analysing the costs of production enables the tablegrape grower to identify areas to target for cost reduction, as well as determine the cost effectiveness of individual management practices.

A topic of considerable discussion within GoGrape™ was the cost of growing tablegrapes and this in turn led to a survey of production costs. GoGrape™ growers provided data on costs of growing Menindee Seedless for the 2004 harvest season.

The average cost of production was around $25.10 for a 10kg carton. Average yield was approximately 910 cartons/ha at about 1230 vines/ha.

Harvest (labour and materials) was the largest single expense at 37% of the total cost of production (Figure 5). Cultural practices including canopy management (shoot thinning, leaf removal, bunch thinning) were next at 21%. These are also operations with a high labour component.

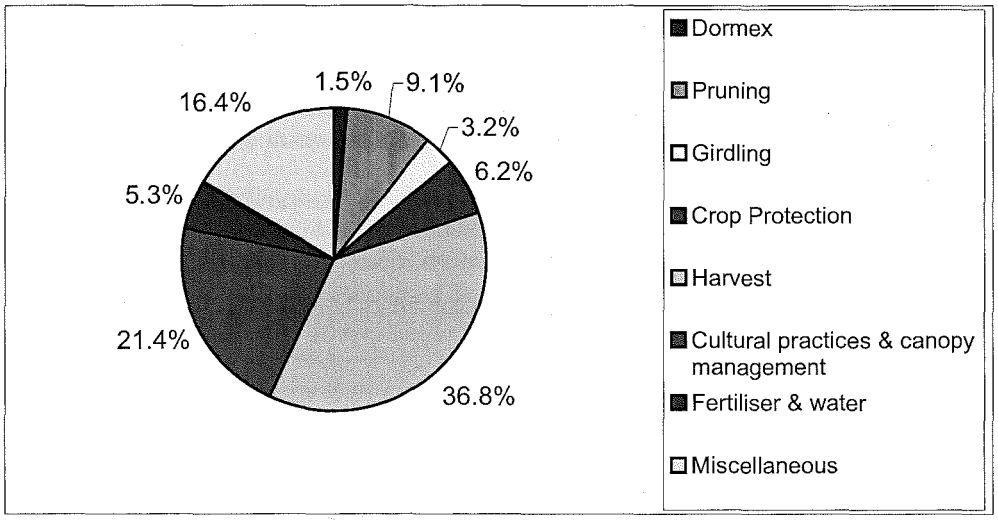

Figure 5. Breakdown of production costs for growing Menindee Seedless (2004-05 season).

Following the financial benchmarking several growers have identified areas within their own business where there is scope to reduce costs and improve efficiency. The GoGrape™ growers have nominated a number of vine management practices that require field trials to confirm the cost effectiveness of the operation.

GoGrape™ growers were extremely positive about the output of this work and found the information enlightening, particularly as this type of information is rare in the tablegrape industry. The growers have continued this work as an activity within the GoGrape™ project.

New Varieties.
Several new varieties have recently become available to Australian tablegrape growers after a lengthy period of no new tablegrape varieties. Not only does this provide growers with a choice, but also the dilemma of how will the variety perform under their local growing conditions and which new variety is best for their target market.

DPIF is preparing to evaluate many of the new varieties in grower field trials in a number of major production districts; however, this work will not proceed without some industry funding. The objective is to combine knowledge of the Australian bred varieties (CSIRO) with that of overseas varieties, to provide a comprehensive assessment of the performance of the new varieties becoming available to Australian tablegrape growers.

Rootstocks.
Recommendations on the best rootstock is information invariably sought by growers when about to plant a new vineyard. However, to generate such experience and information requires long term field trials, which by their nature do not easily fit into the short term (3 or 5 year) timeframe of industry strategic plans.

DPIF established four replicated rootstock trials in partnership with collaborating growers throughout the major Queensland production districts. A lack of funding has meant only limited data has been collected, however, it is apparent that some rootstocks have a far greater ability to ripen the crop earlier than do other rootstocks.

Crimson Seedless.
Several growers in the GoGrape™ project have young Crimson Seedless vineyards and some preliminary field trial work has been done to date. Initial investigations indicate that some of the vine management practices recommended in Western Australia do not hold true under the growing conditions in Queensland.

Crimson Seedless shows promise and has considerable potential despite the vine production problems experienced under the growing conditions in Queensland. Some growers are able to produce substantial crops (bunch numbers) whereas others have low fruitfulness problems. Insufficient colour development in fruit can be a serious problem, particularly in years of very hot weather during ripening, with the result that a large portion of the crop is not harvested. The unique crisp texture of Crimson Seedless berries and market demand, both overseas and in Australia, continues to be an incentive to growers to plant the variety. The success or otherwise of Crimson Seedless in Queensland will largely depend on whether the necessary field trial work is undertaken to overcome the vine production problems encountered.

Further Research, Development and Capacity Building
In addition to the areas already mentioned in this report, further field work is required to quantify the effectiveness and cost benefits of individual vineyard practices, particularly those with a high labour component (ie leaf removal, shoot thinning), as well as clarify some of the results of this project (eg. GA berry sizing sprays). This type of work can be achieved with regional grower groups like GoGrape™; however, viticultural research is required for a substantial increase in vine productivity in the subtropics to be achieved.

A significant increase in vine productivity is the key to maintaining the future profitability, sustainability and industry growth in northern Australia. Research on the plant-environment interaction in the subtropics is essential to development of locally effective vineyard practices that will deliver an increase in vine productivity.

Conclusion
Local field trials have illustrated that some practices effective overseas (postharvest pruning) are not effective under Queensland conditions, whilst others used widely throughout the industry (GA berry sizing sprays) were of doubtful effectiveness. Cincturing has been shown to substantially improve vine fruitfulness and is now considered a standard operating practice for Menindee Seedless production in Queensland.

Whilst there is a lot more to learn about growing tablegrapes under the local conditions throughout Australia, the GoGrape™ project has unequivocally demonstrated that a lot can be achieved through substantial *collaboration* between growers and researchers, *cooperation* between growers and *participation* by growers.

Technology Transfer

Publications.

GoGrape. Assisting industry development. The Vine, July/August 2006, vol. 2 (6); p41-42.

David Oag and Clinton McGrath. Improving productivity through grower knowledge: The GoGrape experience. The Vine, March/April 2007, vol. 3 (4); p12-13.

David Oag and Clinton McGrath. Industry works together to seek solutions. The Vine, May/June 2007, vol. 3 (5); p46-47.

Milestone report no. 2. 25 May 2006.

Milestone report no. 3. 3 July 2006.

Communications, Extension Activities.

2005.

Both GoGrape™ groups met in vineyards with the project leader to discuss issues arising from flowering and the options for managing vines following flowering (ie cincturing, berry sizing, disease control)

A preharvest vineyard walk was held at St George to view fruit of Dawn Seedless, an early ripening, white, seedless variety, relatively new to the Queensland industry. The impact of rootstocks on fruit quality and ripening time was also assessed. 20 Dec 2005.

A preharvest field walk was held at St George on a Menindee Seedless crop load trial (four treatments), at which growers visually assessed and rated the fruit quality, relative maturity time and yield. 20 Dec 2005.

End of season review meetings were held with each regional group, plus personal interviews with each participating grower to discuss the vine performance information from their vineyard and management strategies for the following season.

2006
A tasting for growers at St George of Menindee Seedless berries of known sugar concentrations, to demonstrate the desired sweetness (palatability) for maximum end user satisfaction. 21 Dec 2006.

References.

DR Oag and RG Shaw (2003). Characterising floral initiation and developing management strategies to maximise bud fruitfulness in subtropical tablegrape vines. Final report FR01002. 19pp.