



Australian Government
**Cotton Research and
Development Corporation**

Crop Consultants Australia

Qualitative Report on the **2009–10** cotton season



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1 INTRODUCTION

This qualitative survey marked the second year in which the survey was conducted with cotton consultants rather than growers. A total of 34 consultants undertook the 2010 survey – almost 50% more than in 2009 – with questions about themselves as well as their grower clients.

An estimated total of 182,000 hectares of irrigated and dryland cotton were grown in the 2009–10 season (source: Cotton Australia, *Australian Cotton Production Forecast March 2010 Post Flood*). The 34 consultants in the 2010 survey represented about 74% of the industry hectares and 312 growers, who represented 38% of all 2009–10 growers (source: Monsanto). The surveyed hectares comprised approximately 86% irrigated and 14% dryland.

Methodology

The survey consisted of quantitative and qualitative questions, which sought to draw out both the details of actual agronomic practices and consultants' views of those practices. It was conducted in May and June 2010, with questions referring to the previous cotton season: that is, 2009–10.

Crop Consultants Australia Inc. collected the raw data. They also undertook and reported on a separate quantitative survey during the season.

Analysis

The Cvent survey program was used once more and provides a useful method of sorting data and compiling results into convenient graphs and tables. Interpretations are up to the user.

Disclaimer

The Cotton Research and Development Corporation (CRDC) provide the information in this publication to assist understanding of the agronomic performance of the Australian cotton industry. CRDC accepts no responsibility or liability for the accuracy or currency of the information contained in this publication, nor for any loss or damage caused by reliance on the information and management approaches surveyed. While the 2010 survey contains information that should be of value to extension officers and researchers in defining future industry needs and as an information source in seeking to improve industry management practices, users of this publication must form their own judgement about the information it contains.

Analysis and compilation

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2 ABOUT THE RESPONDENTS

QUESTION 1

What is your age group?

(34 respondents)

QUESTION 2

In which region/s are your clients based?

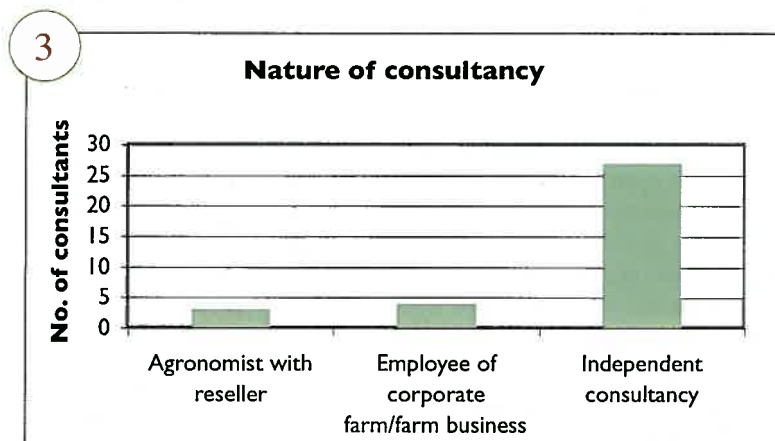
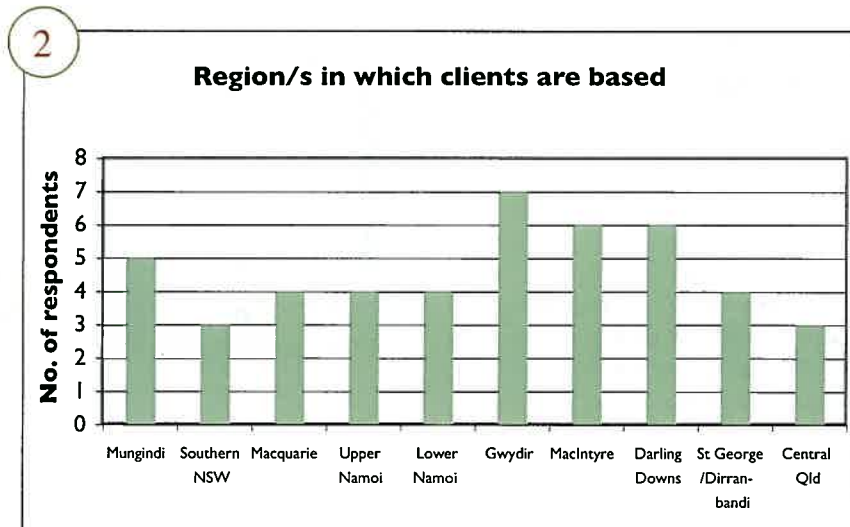
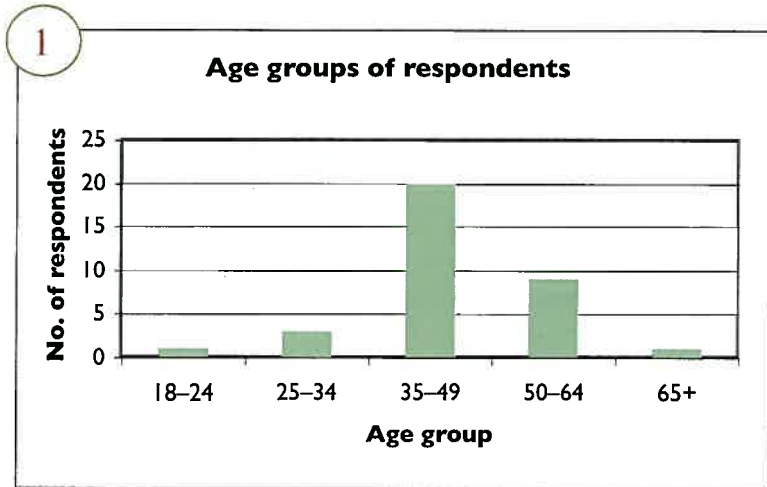
(36 respondents)

Comment: Some consultants have clients in more than one region.

QUESTION 3

Which of the following best describes your role as a consultant?

(34 respondents)



QUESTION 4

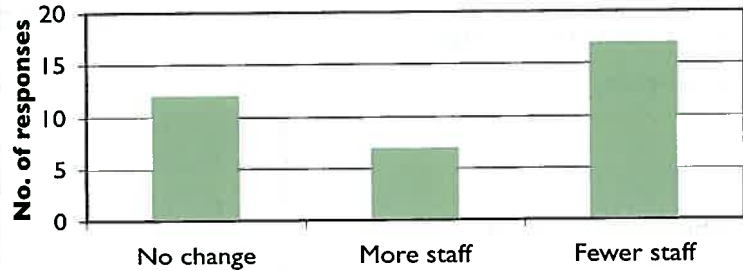
Over the last 5 years, how has the number of staff servicing cotton clients employed in your business changed?

(36 respondents)

Comment: Most of the years from 2005 to 2010 were severe drought years, with tough economic times. Although 6 consultants had more staff than 5 years ago, 16 consultants had lost staff. A total of 34 staff were lost from these 16 consultants in the last 5 years.

4

Changes in staffing levels between 2005 and 2010



QUESTION 5

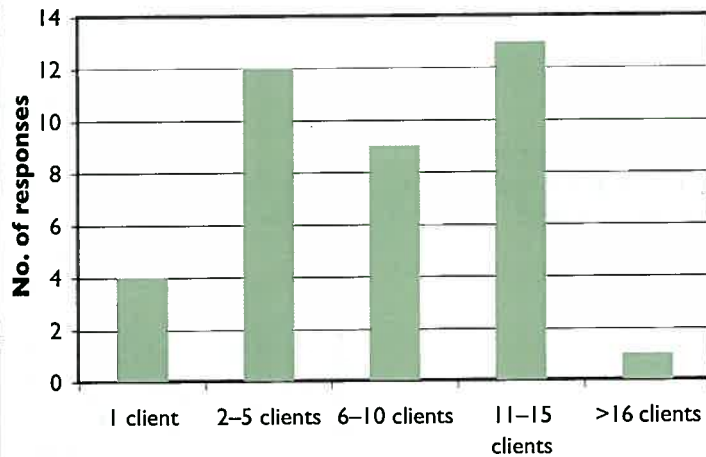
How many cotton growing clients did you provide consultancy services to in 2009–10?

(35 respondents)

Note: the total number of cotton growers in the industry in 2010 was 804, with 312, or 38% of these, covered in the survey. (source: Monsanto).

5

Number of cotton growing clients



QUESTION 6

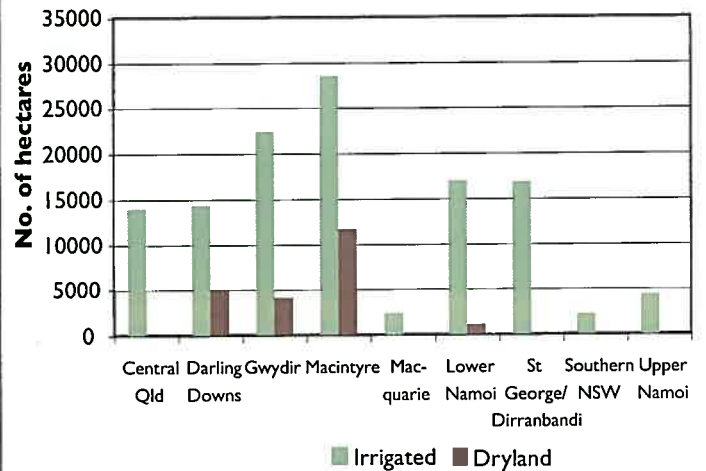
How many hectares of cotton did your clients plant in 2009–10?

(34 respondents)

Comment: Some discrepancies are noted in total hectares reported between questions. Totals reported for Question 6 are 124,644 hectares of irrigated cotton grown and 22,045 of dryland cotton, making a total of 146,689 hectares. Some of the district figures for each consultant are estimates, as they include growers from more than one region.

6

Hectares of cotton planted by clients in 2009–10



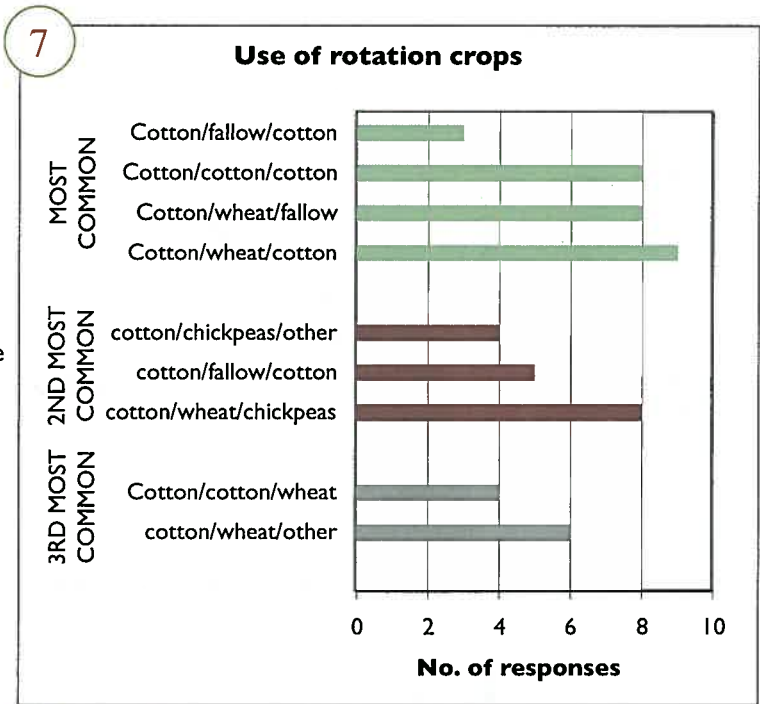
3 MANAGEMENT PRACTICES

QUESTION 7

Please list the three most common crop rotations/crop sequences used by your cotton growers.

(34 respondents)

Comment: Figures appear to back up anecdotal evidence that not many legume crops are used in rotation. These results show very low level of summer crops in rotation with cotton, eg, sorghum, maize and soy beans were grown by a small number of clients.

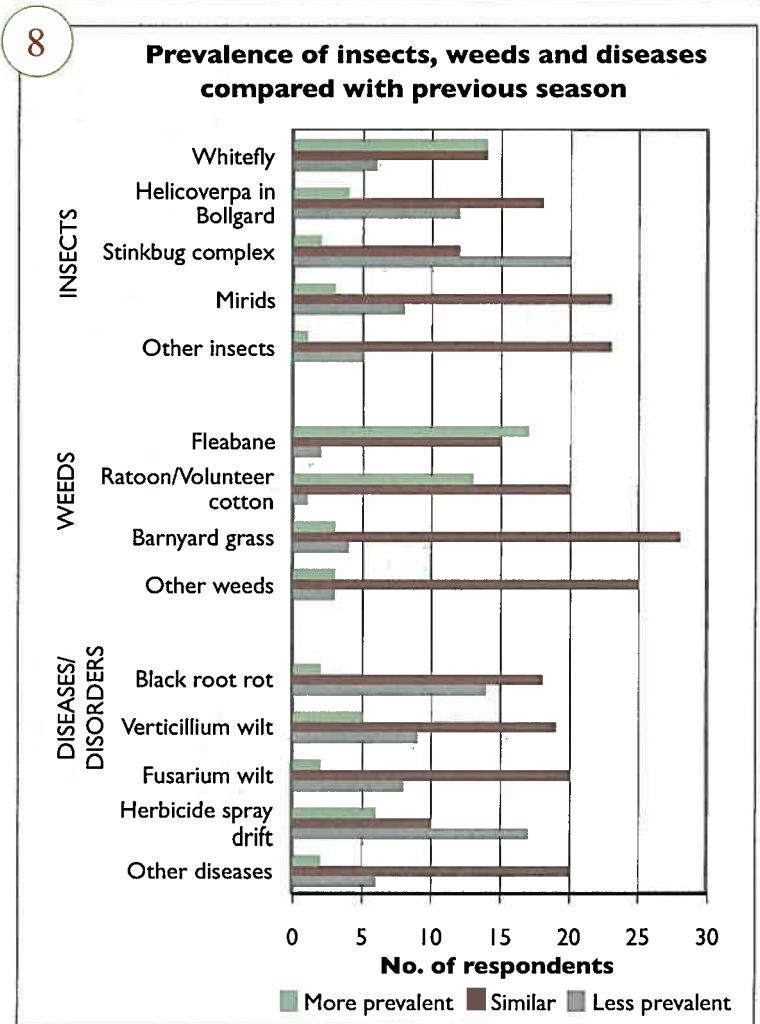


QUESTION 8

In comparison with the 2008/09 season, what was the prevalence of insects, weeds and diseases in the 2009–10 season?

(34 respondents)

Comment: Significantly and pleasingly, 52% reported less spray drift.



QUESTION 9

Rank the pests according to which had the greatest impact on profitability for your clients in 2009–10.

(36 respondents)

Comment: The figures in the raw data show a similar insect pest pattern across the regions.

QUESTION 10

Rank the weeds according to which had the greatest impact on profitability for your clients in 2009–10.

(36 respondents)

Comment: The lower ranking for summer grasses may be due to practice change. This could be because only glyphosate is used with this weed and it is a cheaper chemical. However, resistance could become an issue. Ratoons and Fleabane had the greatest impact on profitability, mainly due to the more expensive chemicals needed to control them and also due to the number of operations needed. As with insect pests, the figures in the raw data show a similar pattern across the regions.

QUESTION 11

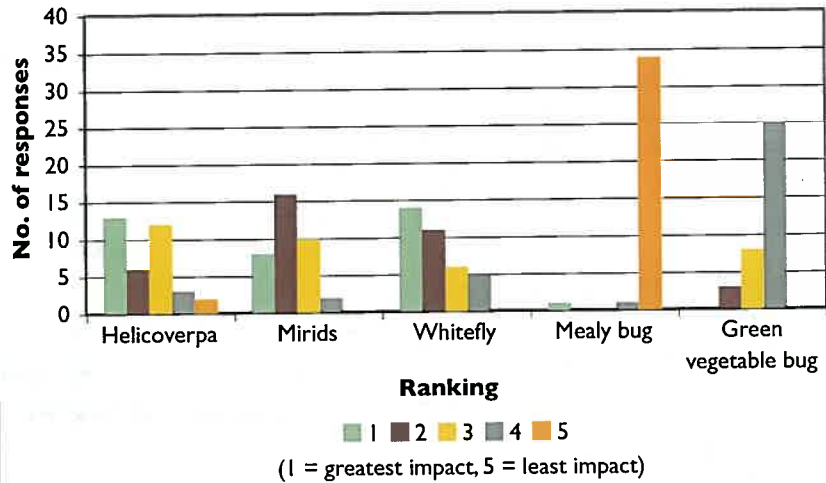
Rank the diseases and disorders according to which had the greatest impact on profitability for your clients in 2009–10?

(35 respondents)

Comment: Even though the responses to Question 8 show that the prevalence of Black root rot is declining, it is still having an economic impact. Fusarium wilt appears to have had a large impact for 14 of 36 consultants' clients but much less of an impact for those of 10 consultants, probably due to the cotton region/s in which the consultants operate.

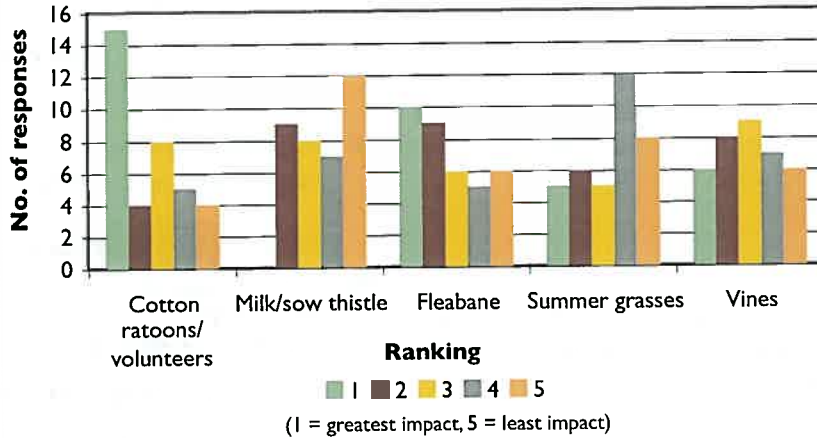
9

Insects with greatest impact on clients' profitability



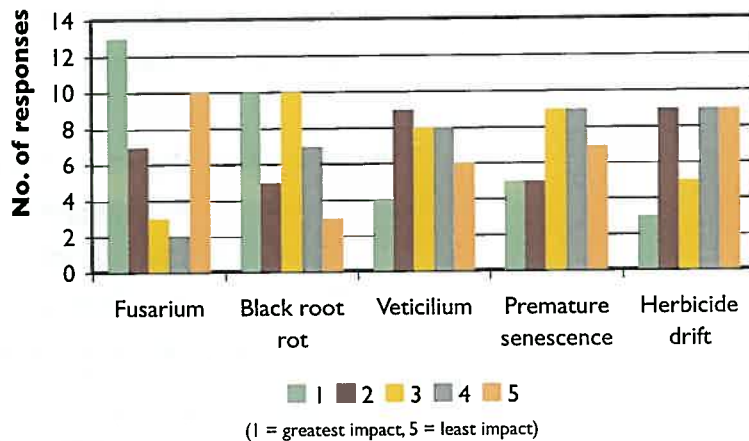
10

Weeds with greatest impact on clients' profitability



11

Diseases and disorders with the greatest impact on clients' profitability



QUESTION 12

Please indicate the degree to which IPM is important to you as a cotton consultant.

(35 respondents)

QUESTION 13

With regards to insect pest management, how widely used (in terms of hectares) are the practices listed below?

(34 respondents)

Comment: These practices reflect best practice in the new myBMP.

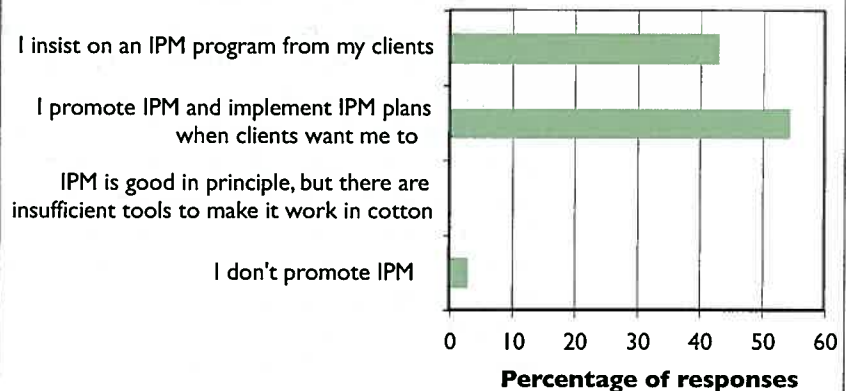
QUESTION 14

Do you have any comments to make regarding Question 13?

(14 respondents)

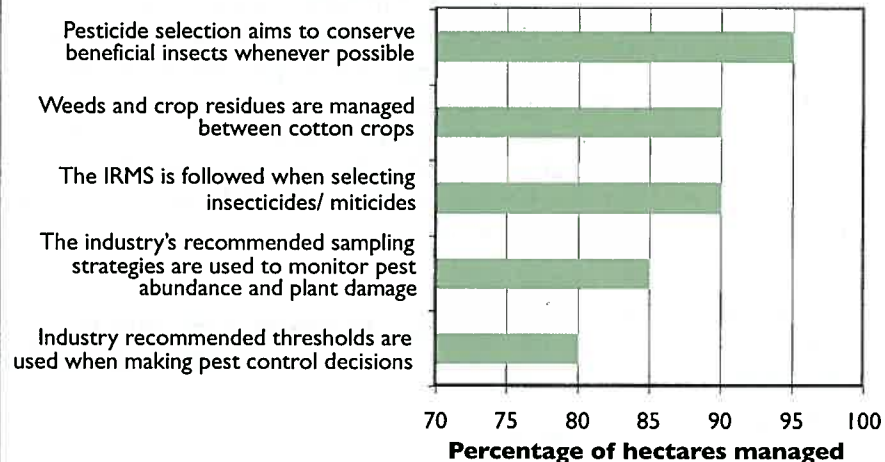
12

Importance placed on IPM by consultants



13

Use of described practices for insect pest control as percentage of hectares managed



14

Comments regarding Question 13

With potential *Helicoverpa* resistance, whitefly here to stay, as well as emerging problems with new threats such as mealy bug, IPM is more important now than it ever was.

These principles are imperative to growing cotton profitably these days.

Depending upon the situation, some insect thresholds are lowered if season is short or pressure is constant but sub threshold.

Shortages of insecticides this season.

In some instances, eg mirids, stink bugs and cotton stainers, I do not believe that the thresholds in the Pest Management Guide are realistic at all. Consequently I put a 0 in the hectares for which industry thresholds are followed. For most other pests the industry threshold is used in practice over the full 7000 hectares.

By promoting an IPM program, all my clients understand the importance of maintaining all fields free of crop residues and weeds. We follow the industry strategies for pest abundance and damage and early crop toll. We try to stick as much as we can with the recommended industry thresholds based on crop development and the level of risk the grower is prepared to take. This could change if water available is limited– the threshold are reduced by 25%. The selection of pesticide is always aim to preserve beneficial insects.

QUESTION 14 continued

Industry recommended thresholds are used on all hectares where possible. This year the day degrees were exceeded on the whitefly matrix so common sense prevailed! Also, upcoming climatic conditions and other variables are considered when making the decisions – such as rain or irrigations, which may bring forward or delay a spray and the threshold is adjusted accordingly.

Industry recommended thresholds are used for *Helicoverpa*. For pests such as mirids and whitefly, thresholds are largely dependent on growers' perception of the threat to the health of their crops (based on consultant's findings in the field).

In some situations I treat below industry thresholds, mainly with the sucking pests like mirid. Soft chemicals are not always the best or registered option, especially when treating secondary pests late in the season.

IPM has been less important in recent years, though the emergence of whitefly in the Macquarie will re-focus pesticide selections to IPM friendly products, particularly in conventional cotton.

There needs to be a sound understanding of the reason to deviate from the industry guidelines, otherwise follow them.

The industry's recommended thresholds are considered in all decisions but may be overruled in some cases due to logistical or cost consideration.

Product supply and cost are now overriding factors for grower financial viability. IPM is always considered for the longer-term outcome but IRMS (insecticide resistance management strategy) is compromised.

Thresholds used are dynamic. If damage is happening then thresholds are reduced. This seems to happen frequently with sucking pests in Central Queensland, where sometimes significant damage happens with below threshold numbers. And this happens more so with insects like Cotton Stainers, Green Stink Bugs And GVBs, as well as Mirids.

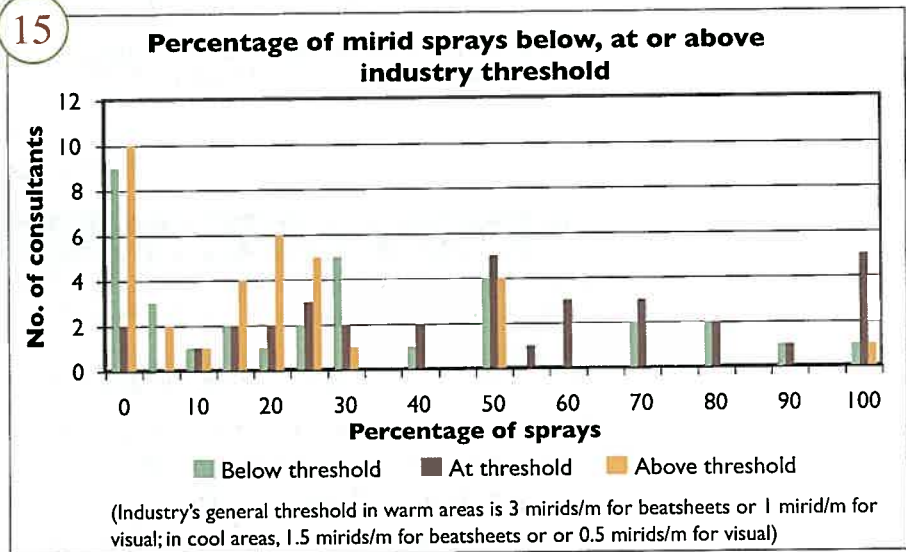
QUESTION 15

How often are the sprays you request for mirids above, at or below the industry's general threshold?

(35 respondents)

Comment: If spraying is below threshold, this generally signifies sprays have taken place either for convenience within the enterprise's operations or from a belief that the industry threshold is too high and therefore risky. If sprays are above threshold, this generally signifies that the spray should have occurred earlier.

15



Figures in the graph show, for example, that six consultants reported 20% of their sprays are ABOVE industry threshold; with another five reporting 30% of their sprays are BELOW industry threshold and five reporting that 100% of their sprays are AT industry threshold.

QUESTION 16

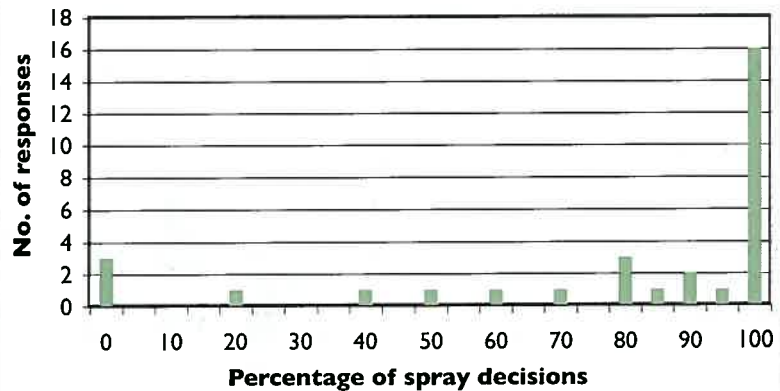
How often are the sprays you request for silverleaf whitefly consistent with the industry's threshold Matrix?

(32 respondents)

Comment: Figures in the graph show that three consultants said NONE of their sprays decisions were consistent with industry threshold, while 16 said 100% were consistent.

16

Percentage of spray decisions consistent with industry's threshold matrix



QUESTION 17

What do you believe would help to increase your grower's confidence with IPM?

(28 respondents)

and

QUESTION 18

What do you believe would help to increase your own confidence with IPM?

(26 respondents)

Please refer to the appendix for individual responses to both questions.

Comment: There are interesting slight differences in issues that would make consultants more confident with IPM than the growers' reasons imply.

17
& 18

Most common responses regarding IPM

Increase growers' confidence	Increase consultants' confidence
Costs are decreased	Already using IPM confidently
Already using IPM confidently	Trial results
Whitefly control is improved	Secondary pest issues
Bollgard efficacy confidence	Costs are decreased

QUESTION 19

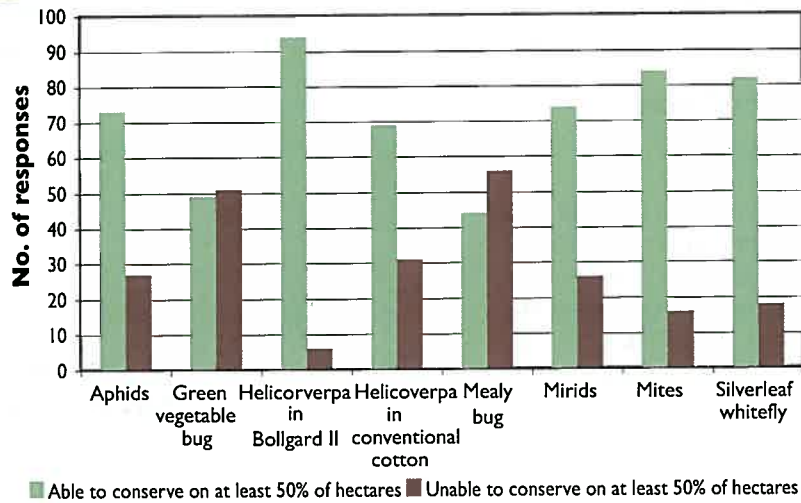
When making spray decisions for the listed target pests, how well are you able to conserve beneficial insects throughout the season?

(33 respondents)

Comment: Not all respondents answered for each pest (especially Green vegetable bug), which may indicate those pests are not a significant issue in their region/s. Interestingly – Mealybugs and GVBs were the most difficult to conserve for about 50% of consultants.

19

Conservation of beneficial insects throughout season when spraying



QUESTION 20

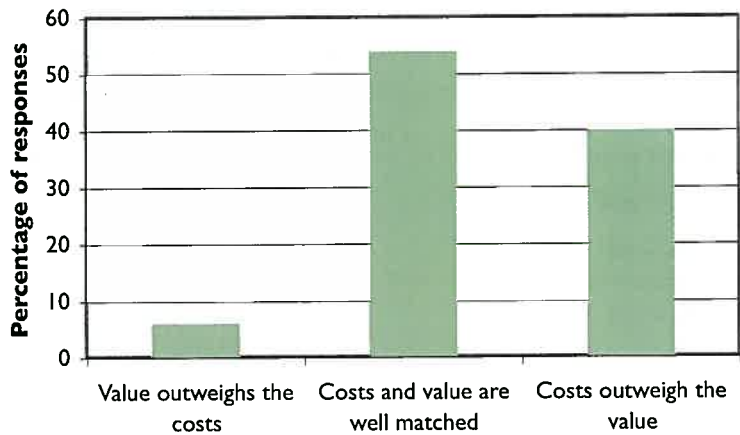
Which of the following statements best reflects your opinion of how well matched the costs of Bollgard II are to the value the technology provides to the systems?

(35 respondents)

Comment: The 40% of respondents who believe that the costs outweigh the value reflect many comments throughout the survey that Bollgard II is too expensive.

20

Perceptions of the cost value provided by Bollgard II



QUESTION 21

Under what circumstances, if any, would you encourage a grower to plant non-Bt cotton on their farm?

(33 respondents)

Note: The most common responses to this question have been aggregated. Please refer to the appendix for individual responses.

and

QUESTION 24

In your opinion, what should be the role of conventional cotton (non-Bt) in the Australian industry into the future?

(31 respondents)

Please refer to the appendix for individual responses to both questions.

QUESTION 22

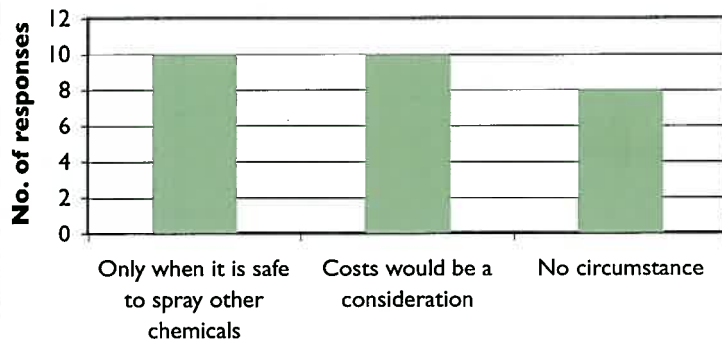
From your perspective, what are the three most important reasons for having Bt cotton?

(34 respondents)

Please refer to the appendix for details of 'Other' responses (see Table 22, adjoining).

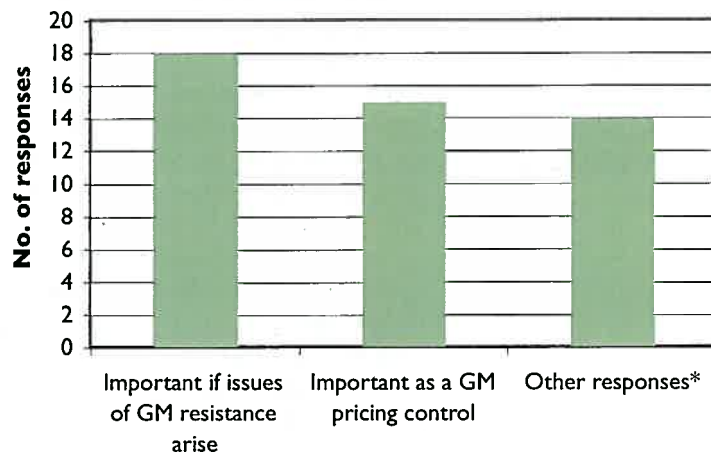
21

Circumstances under which non-Bt cotton would be recommended to growers



24

What should be the future of non-Bt cotton in the Australian industry?



22

Reasons given for importance of Bt cotton, in order of popularity

1	Enables you to focus more attention on management issues other than pests.
2	Generally easier to monitor pests and damage.
3	Easier budgeting for insect control.
4	Avoids risks associated with (insecticide) product forecasting.
5	Bollgard II varieties have higher yield potential.
6	Easier management of secondary pests.
7	Lower cost of insect control.
8	Generally takes less of your time per hectare.
9	Generally easier for you to train staff.
10	Greater flexibility to stop/restart a crop when water is short.
	Other (please see the appendix for details of this category).

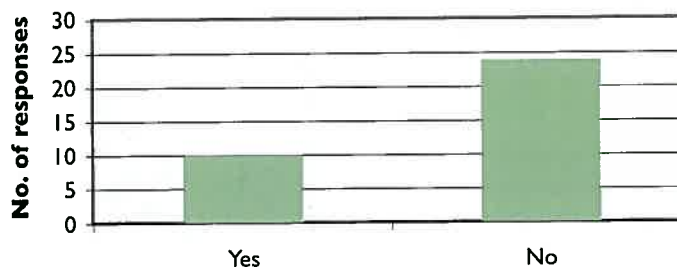
QUESTION 25

Given your experience with the Insect Resistance Management Strategies (IRMS), do you believe the industry could use a voluntary compliance framework to manage resistance risks for *Bt* cotton?

(34 respondents)

25

Could the industry use a voluntary compliance framework to manage resistance in *Bt* cotton?



QUESTION 25.1

Why should the industry have or not have a voluntary compliance framework to manage resistance risks for *Bt* cotton?

(29 responses)

Note: Of the 34 respondents who answered 'yes' or 'no' in Question 25, only 29 made a comment in Question 25.1.

25.1

Respondents who answered 'yes' to Question 25

The IRMS has been 'voluntary' – most growers abide by the IRMS but every now and then stretch the rules for their circumstances – generally not a large area that is impacted by these 'bendings'.

I'm assuming that this is on top of the Office of the Gene Technology Register (OGTR) regulations already in place. I thought that there was already an extension of the IRMS covering *Bt* cotton?

With Bollgard 3 the risks should be significantly reduced/eliminated.

For monitoring of escaped *Helicoverpa* larvae, for accuracy of feedback to growers of potential insecticide shortages, for correct usage of pesticide products as per the advisory guidelines.

I consider the valley-specific strategy to be a voluntary compliance framework, which I think most people stick to well.

The IRMS showed high compliance levels over a long period of time, allowing cotton to be grown profitably during times of high resistance to chemicals.

As long as it was not too radical, industry has proven it's willing to adhere to voluntary IRMS.

We have done it before with conventional chemistry: eg, Synthetic Pyrethroids.

Respondents who answered 'no' to Question 25

There is still not enough IPM done voluntarily. Look how heavier spraying has contributed to whitefly issues.

The Monsanto auditing process should be covering this. Growers don't need any more paperwork to bog them down.

I don't think growers would abide by regulations.

Unsure what that is really getting at, but if it is aimed at people working out what to use and when, then I would be opposed.

Each farmer's opinion of effective pupae busting is different. Economics also influences the quality of pupae busting techniques.

IRMS becomes useless when there are shortages of chemicals. Industry becoming too regulation-reliant.

Because I think there would be too much cutting of corners, particularly with regards to refuges.

No, there are too many people in the industry who only take a short-term view and are more interested in short term gains in profitability to the detriment of longer-term sustainability.

Growers generally make decisions for economic reasons and would cut corners when it comes to managing resistance.

QUESTION 25.1 continued

Too many in the industry are short sighted and still in the habit of flogging a product because they believe a new one will turn up. On the other hand, I firmly believe more flexibility is required in the Bt system to take full advantage of the product.

The first thing to be dropped would be the refuge.

I still believe there are growers very unhappy with the refuge requirements of 10% unsprayed cotton. It will be easier if the unsprayed refuge is 5% unsprayed cotton. Pigeon pea refuge is difficult to establish and manage in a Bollgard Roundup Flex program.

Will be open to abuse.

More grower education on the value and importance of refuges needs to take place before a voluntary compliance framework can work.

Best to make sure all conform. Too many examples of self-regulation gone wrong. I guess what we have is a mix of both self regulation and regulation at present.

While it continues to be difficult to fully explain, and have industry understand, the risks associated with resistance management in Bt cotton and the refuge options are priced at a premium to conventional systems, industry will push the envelope of best practice when it comes to resistance management.

Private enterprise cannot be trusted to manage itself because it will ultimately choose the less expensive option that will meet the resistance management requirements.

People always take short cuts if you provide the means. It is one industry and it should stick to the basic rules.

Too many growers would cut corners to save costs.

Although there is not full compliance, it is the framework for resistance management for both *Helicoverpa* and now, and more importantly, for secondary pests.

We are struggling to get growers to abide by the current rules, let alone give them free range. I believe this would be disastrous. I believe current penalties are not harsh enough.

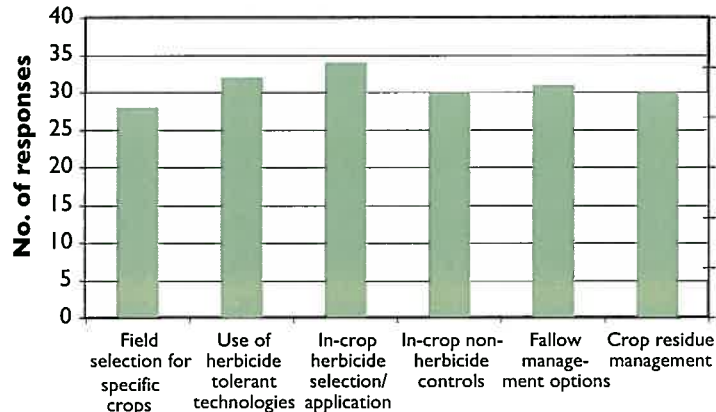
QUESTION 26

In which of the following areas of weed management do you assist the majority of your clients with their decision-making?

(34 respondents)

26

Areas of weed management in which advice is given to a majority of clients



QUESTION 27

With regard to weed management, how widely used are the practices listed below?

(33 respondents)

Note: The most common widely used practices mentioned have been aggregated into the adjoining nine key practices:

Comment: There were difficulties in interpreting the number of hectares provided in the raw data; however, we could ascertain that the top three weed management practices listed in this table cover nearly all the hectares in this survey, with the last practice involving about 50% of the hectares.

QUESTION 28

Do you have any comments to make regarding the above question?

(17 respondents)

27

Most common widely used weed management practices

1	Tillage is used strategically.
2	Weeds strategies are targeted to manage problem weeds.
3	Key weeds are identified and weed burdens are assessed at least annually.
4	Good farm hygiene is practiced to minimise the entry of new weeds to the farm.
5	Good farm hygiene is practiced around the crop, fallow and rotation fields, irrigation structures, waste areas and between fields.
6	Herbicide programs effectively rotate chemical groups for winter weeds.
7	Herbicide programs effectively rotate chemical groups for summer weeds.
8	Residual herbicide/s included in weed management program for cotton.
9	Chipping is used when required to prevent seed set.

28

Comments regarding Question 27

Once again there are many cotton fields not growing cotton. Weeds are still managed in these fields (unable to give hectares).
Fleabane is our main issue. Pupae busting can suit us as we get to plough in fleabane escapes as well as mix in manure. Except, of course, that we bring new seeds to the surface. Fleabane is forcing us to use as many tools as possible, which are also assisting with overall weed control
All points are important weed management processes. Residual herbicides are going to increase in our production systems in the future.
The question was answered knowing that all the areas do not go into cotton due to lack of water.
We are an integral part of the management process in the farming systems on the Downs.
The heavy reliance on Roundup Ready (RR) cotton is the major weed issue. We are seeing a rapid increase in RR-tolerant weeds as well as RR cotton now becoming the major weed itself. This has major implications not only for weed management but also for pest and disease management.
One of the biggest problems at the moment is controlling volunteer cotton during summer.
Chipping is used where required if it is cost effective and depending on the weed species.

QUESTION 29

How important do you believe herbicide resistance is to your clients?

(31 respondents)

QUESTION 30

Thinking about the range of cropping rotations and farming systems used by your clients, what conditions create the highest risk of cotton ratoons?

(31 respondents)

Please refer to the appendix for full individual responses to the question.

QUESTION 31

What are the most effective and reliable operations your clients use to prevent cotton ratoons?

(32 respondents)

Please refer to the appendix for full individual responses to the question.

29

Importance of herbicide resistance to clients

There is an over-use of glyphosate associated with the increased plantings of RR cotton. Glyphosate is also extensively used on fallow country. Herbicide programs are designed according to crops planted rather than according to necessary rotation of chemical groups (which to some extent automatically rotates groups). Rotation of chemical groups may only be possible to a limited extent in an irrigated situation growing equal to or more than 50% cotton.

Good weed control is getting harder, needs some novel research and different approaches.

RR Flex technology has definitely resulted in cleaner weed-free cotton crops and their surrounding structures. However it has made reliance on glyphosate more pronounced. Chemistry rotation in the winter program is dollar-driven until weed resistance becomes an economic impact on the gross margin.

Weed management and herbicide rotations and hygiene are becoming more important

Use of glyphosate in fallow and in-crop is a concern long term – need robust alternatives

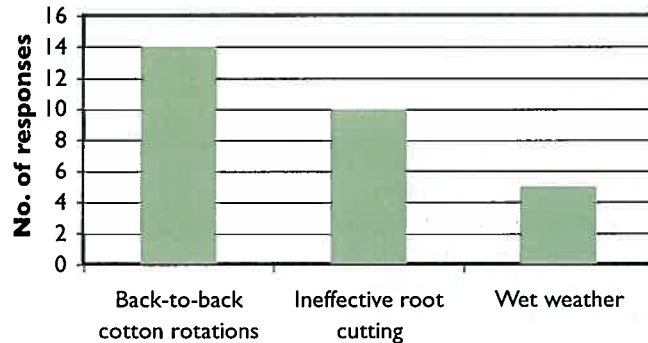
Integrated Weed Management is critical in the weed control (including volunteer cotton) of the farm.

Too much reliance on glyphosate in cotton and fallows.

Farm hygiene is very difficult in government-controlled schemes as they are incredibly poor at weed control, especially in their drainage systems!!!

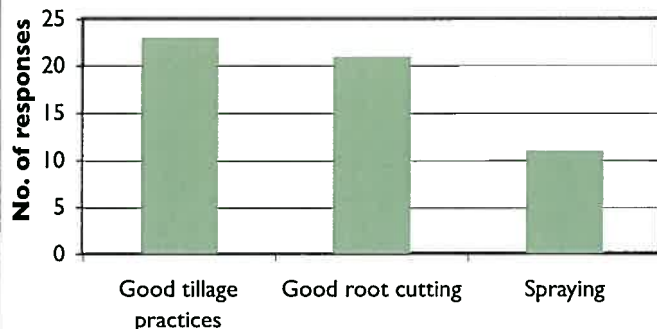
30

Farming systems and crop rotations used by clients that create the greatest risk of ratoons (most common responses)



31

Which practices are the most reliable and effective in controlling ratoons? (most common responses)



QUESTION 32

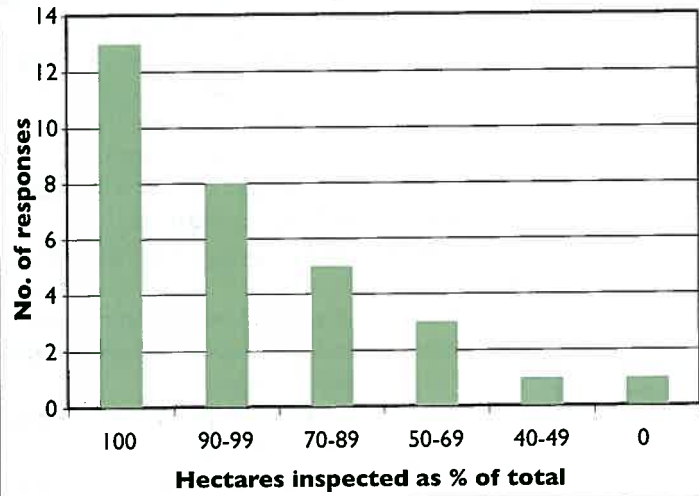
In 2009–10 how many hectares of Bollgard II did you inspect in your role as a consultant?

(32 responses)

Comment: Note that in this graph, 13 consultants inspected 100% Bollgard II and one consultant inspected no Bollgard II.

32

Bollgard II hectares consultant inspected as a percentage of total hectares



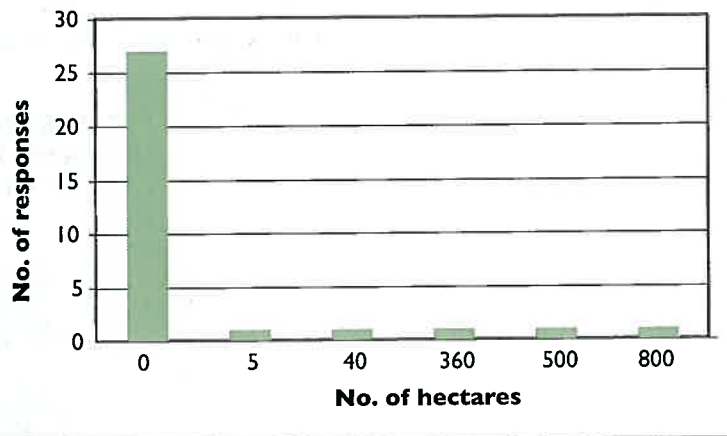
QUESTION 33

In 2009–10, how many hectares of Bollgard II reached the *Helicoverpa* threshold (of at least two larvae 3-8mm/m in at least two consecutive checks or one larvae greater than 8mm/m)?

(32 responses)

33

Hectares of Bollgard II cotton under management that reached the *Helicoverpa* threshold



QUESTION 34

In 2009–10, how many hectares of Bollgard II reached the *Helicoverpa* threshold based entirely on larvae smaller than 8mm in length?

(32 respondents)

Comment: 31 respondents had no hectares in this category, with one consultant reporting that 1000 hectares reached the *Helicoverpa* threshold based entirely on larvae smaller than 8mm in length.

QUESTION 35

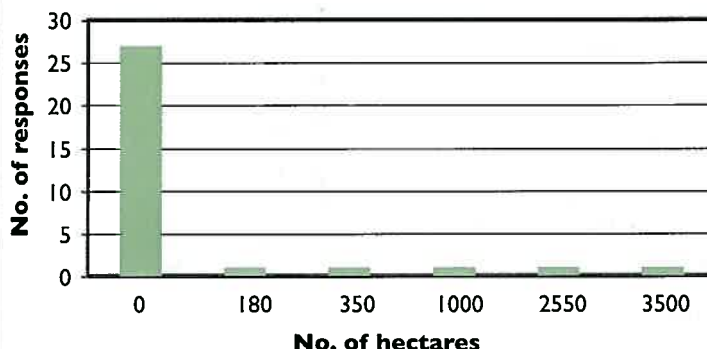
In 2009–10, how many hectares of Bollgard II that reached the *Helicoverpa* threshold did you spray at least once for *Helicoverpa* larvae?

(32 respondents)

Comment: Again, 31 respondents had no hectares in this category, with one consultant reporting that 1000 hectares reached the *Helicoverpa* threshold and were sprayed.

36

Hectares of Bollgard II that DID NOT reach the *Helicoverpa* threshold sprayed at least once for *Helicoverpa* larvae



QUESTION 36

In 2009–10, how many hectares of Bollgard II that DID NOT reach the *Helicoverpa* threshold did you spray at least once for *Helicoverpa* larvae?

(32 respondents)

QUESTION 37

Have you any additional comments on Question 36?

(16 respondents)

37

Comments on Question 36

I still have grave concerns for the amount of boll damage I am finding from *Helicoverpa* that are less than five mm long. Considering this was a low pressure *Helicoverpa* year, I am concerned what will happen in the heavier years. No one can give me an answer yet on why this is happening. We are considering a set spray of Steward for mirids and *Helicoverpa* at early boll fill.

Bollgard II controlled the *Helicoverpa* pressure really well this season. Highest egg pressure received was up to 30 eggs per metre. In past years, where we have had to control we have had *Helicoverpa* pressure up to 100 eggs per metre.

Poor retention caused spraying options.

Only odd larvae seen compared to last season.

Control was better this year.

The larvae came off conventional volunteer plants in a *Bt* cotton field.

The last two seasons have been relatively quiet in terms of survivors in Bollgard II in my area. I think this is primarily due to very low *Helicoverpa* pressure during the crop growth period where fluctuations in efficacy often cause problems.

Worked well this season.

I have fields where larvae were found but never reached the threshold levels in two consecutive checks.

Some late season survivors below threshold

Should be more faith in the *Bt* technology and less spraying.

Have not sprayed Bollgard II for *Helicoverpa* for the past two seasons.

Bollgard II worked very well in Macquarie and southern NSW under light to mod pressure.

IPM and Bollgard II work very well together, and have done so for years.

Only a small part of one field was close to threshold.

High egg pressure leads to square loss.

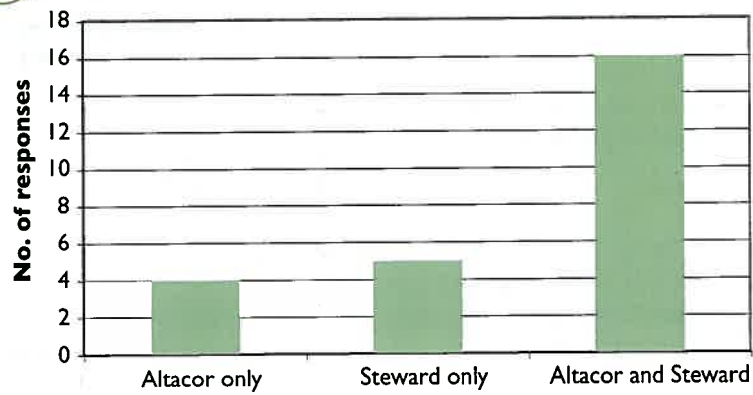
QUESTION 38

Did you use Altacor® or Steward® in the 2009–10 season?

(25 respondents)

38

Use of Altacor® and Steward® in the 2009–10 season



QUESTION 39

What are the most important criteria in determining which larvicide to use?

(32 respondents)

39

Most important criteria for larvicide

1	Past performance of that product
2	Beneficial safety
3	Residual activity
4	Environmental safety
5	Secondary pest control
6	Knockdown activity
7	Access/supply
8	Ease of use
9	I just feel more confident with that product
10	Grower preference
11	Fits my program
12	Part of the budget
13	Rainfastness
14	OH&S
15	Temperature stability

QUESTION 40

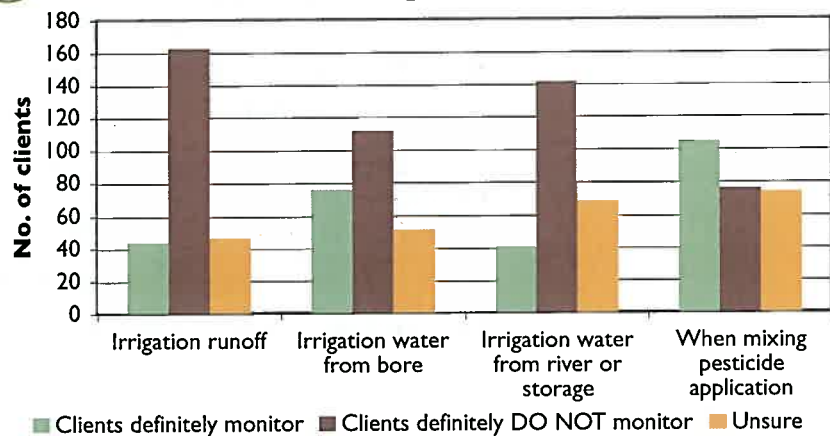
How many of your clients undertake water quality monitoring?

(32 respondents)

Comment: The parameters shown in this graph are aspirational practices in Levels 2,3 & 4 in myBMP

40

Client monitoring of water quality



QUESTION 41

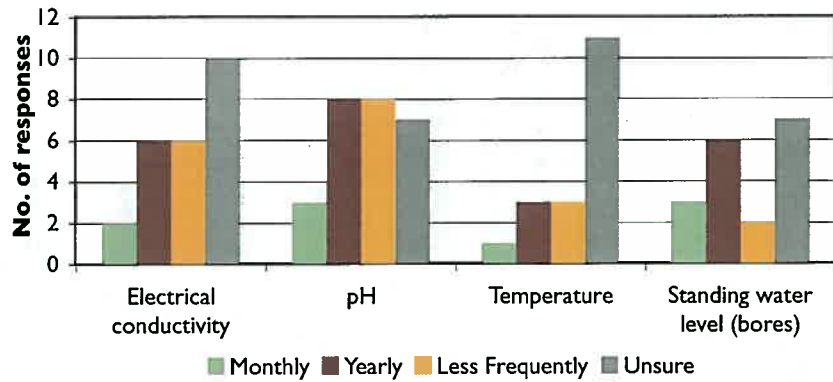
Of your clients who DO monitor water quality, which of the following parameters do they monitor and how frequently?

(26 respondents)

Comment: Yearly testing seems to be most common, especially for pH, EC and bore levels.

41

Parameter and frequency of monitoring for clients who monitor water quality



QUESTION 42

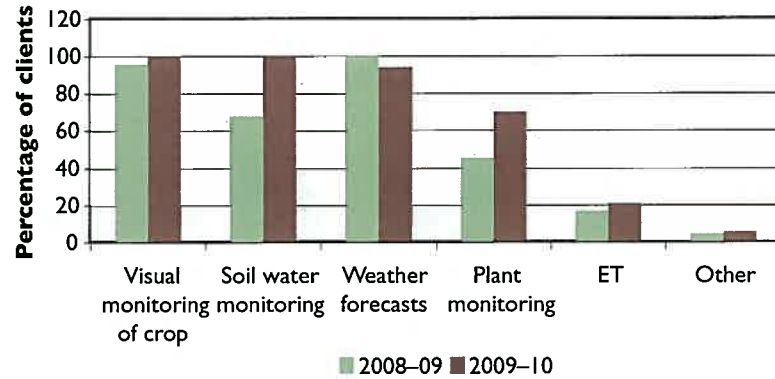
What tools are used by your growers to assist in the decisions regarding scheduling irrigations?

(33 respondents)

Comment: Figures are similar across the two seasons, with the exceptions of soil water monitoring and plant monitoring. The fact that there were 33 respondents to this question in 2009-10 but only 22 respondents in 2008-09 may explain these significant variations.

42

Tools used by growers to assist in decisions regarding scheduling irrigations: a comparison of 2008-09 and 2009-10



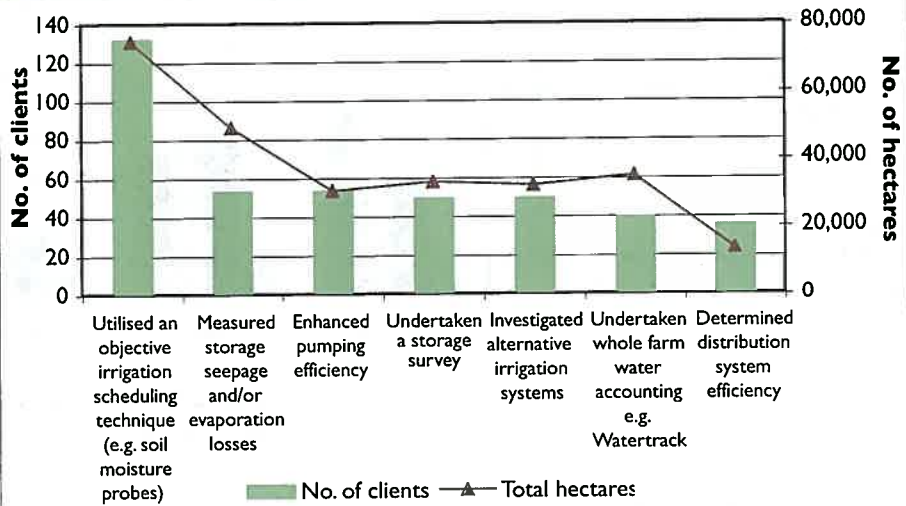
QUESTION 44

Please indicate which changes or improvements to water management your growers have made in the last 12 months (record as many as are applicable).

(28 respondents)

44

1. Changes or improvements to water management clients have made in the last 12 month (top 7 changes)



QUESTION 46

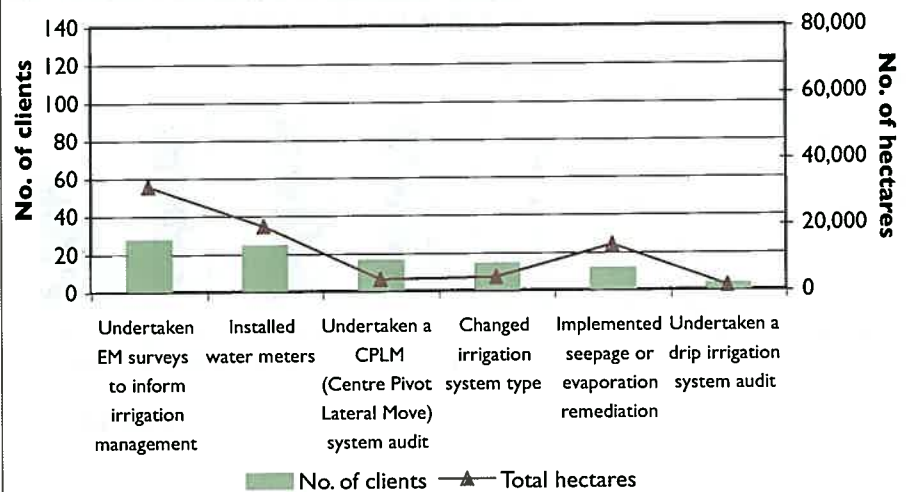
With regards to soil management, how widely used are the practices listed below?

(32 respondents)

Note: The hectares consulted on total 926,875, of which 146,689 are cotton hectares.

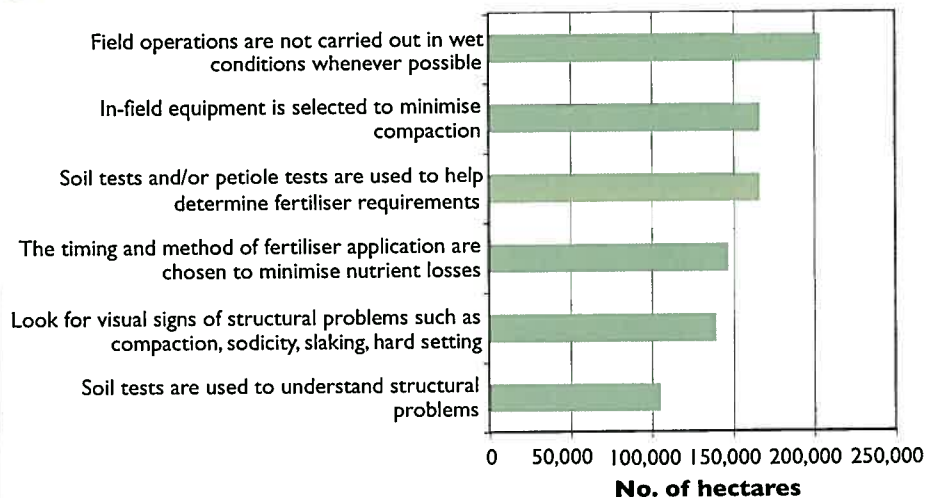
Comment: The above practices are the Soils Best Practice management in myBMP.

2. Changes or improvements to water management clients have made in the last 12 month (next 6 changes)



46

Use of soil management practices by clients



QUESTION 47

Do you have any comments to make regarding the above question?

(9 respondents)

QUESTION 48

What tools are used by your growers to assist with decisions regarding application of fertiliser to their cotton crops and how frequently are the tools used?

(32 responses)

Comment: One grower used the Greenhouse Gas Calculator (on 450 hectares). The most commonly used tools on an annual and/or seasonal basis were – cropping history; nutrient budgeting. While soil tests were mainly conducted annually, Field History was conducted seasonally rather than annually and leaf/petiole tests tended to be mainly conducted at growth stages rather than annually.

47

Comments regarding Question 46

Growers are all very concerned about their soils but they have a perception that there is very limited information available about soil health. Growers need help in trying to work out how to practice minimal till under furrow irrigated conditions.

Although testing or investigations are not carried out, farmers are looking to use less in-crop tillage to prevent crop compaction and soil disturbance, as Roundup Ready Flex has allowed greater weed control.

These are very important management points that probably have some of the most impact on profitability.

Apart from cultivation for pupae control in *Bt* cotton and hilling/bedding up for furrow irrigation, all my clients use minimum tillage practices over their entire farms.

Nitrogen loss down the field is a major management issue affecting yields. We are moving to a more variable application technique to try and reduce this effect.

All my clients to some extent are using all of the above practices

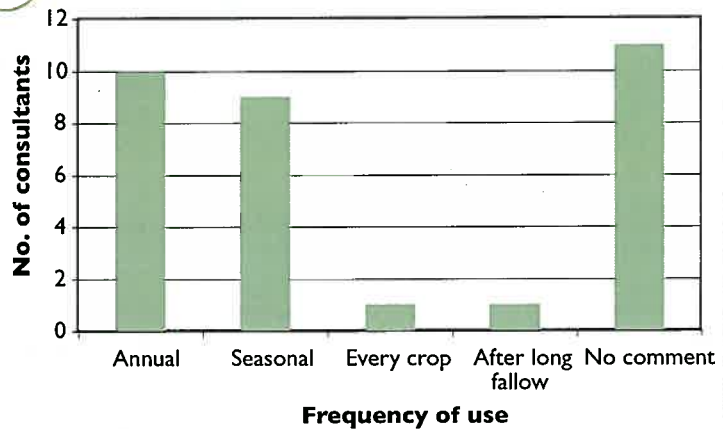
Minimum tillage with permanent beds is practiced as much as possible

Monitoring of soil fertility is not done every year. Areas cited indicate growers who are planning to this year or did last year.

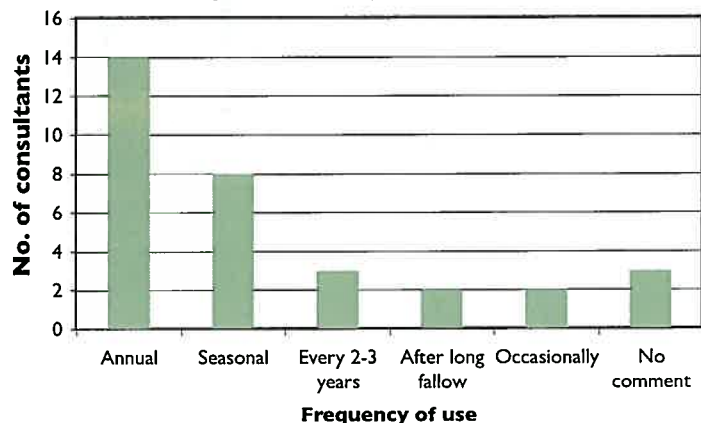
Nutrition and soil management is a key management consideration due to yield expectations and fertiliser prices.

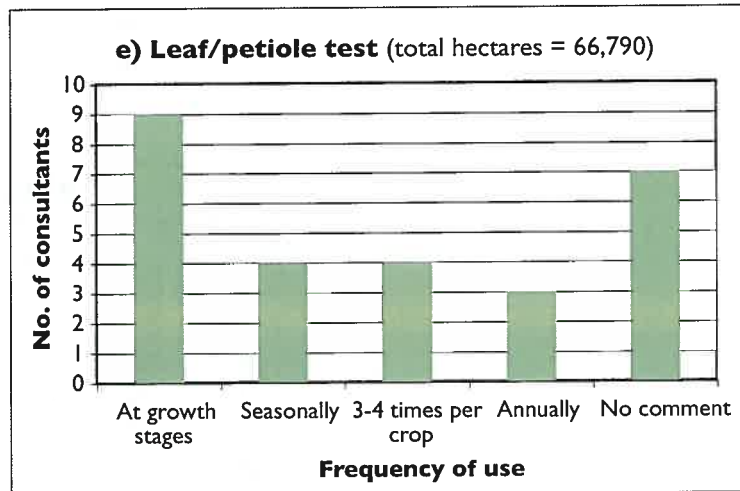
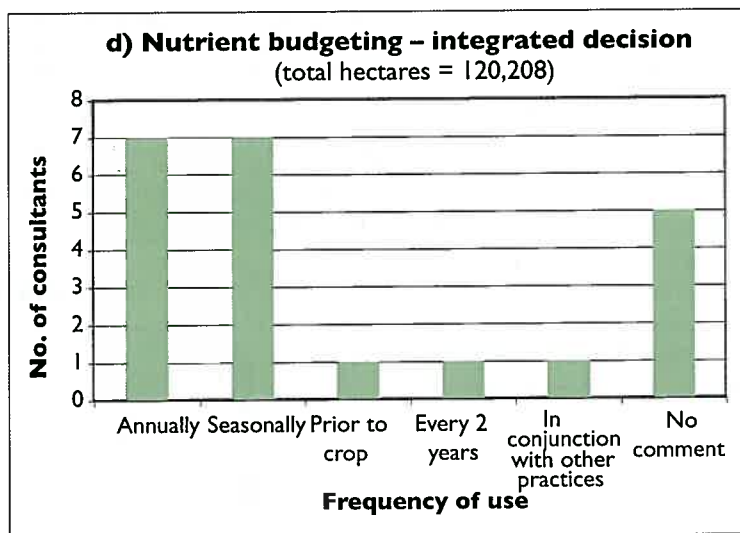
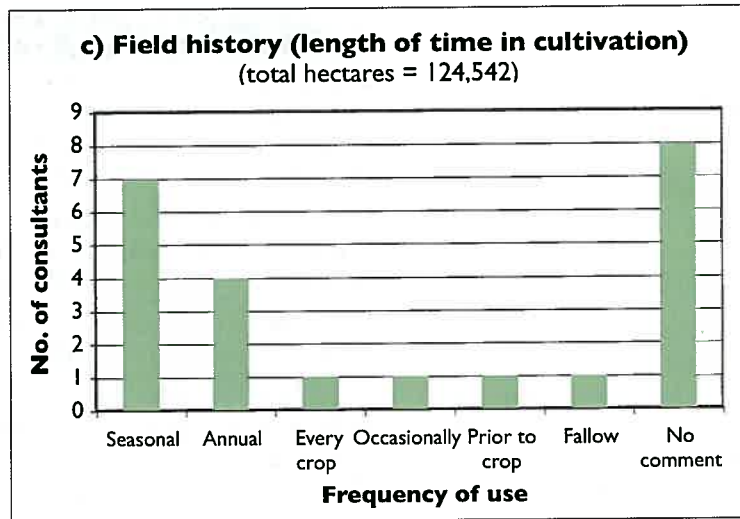
48

a) Cropping history (total hectares = 188,274)

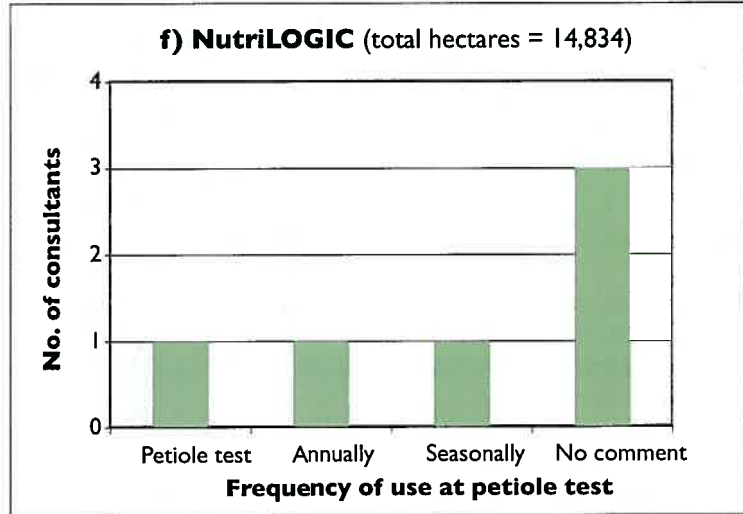


b) Soil tests (total hectares = 168,899)





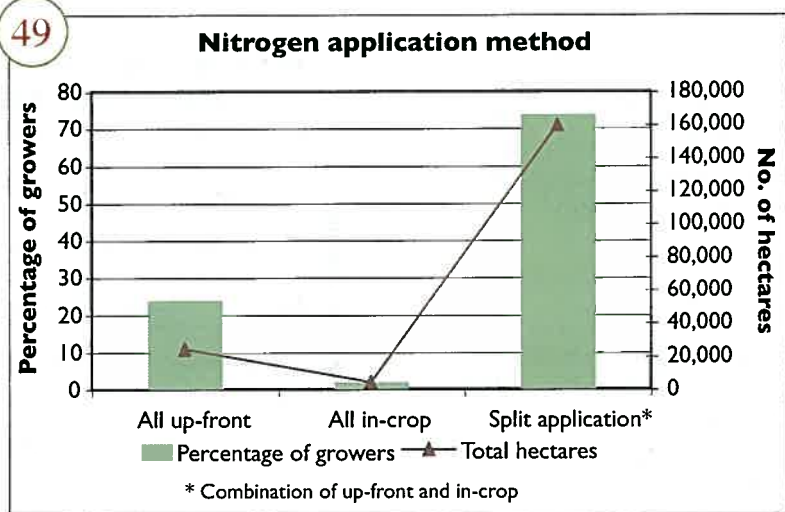
QUESTION 48 continued



QUESTION 49

How do your clients apply their crop's nitrogen requirements?
(32 respondents)

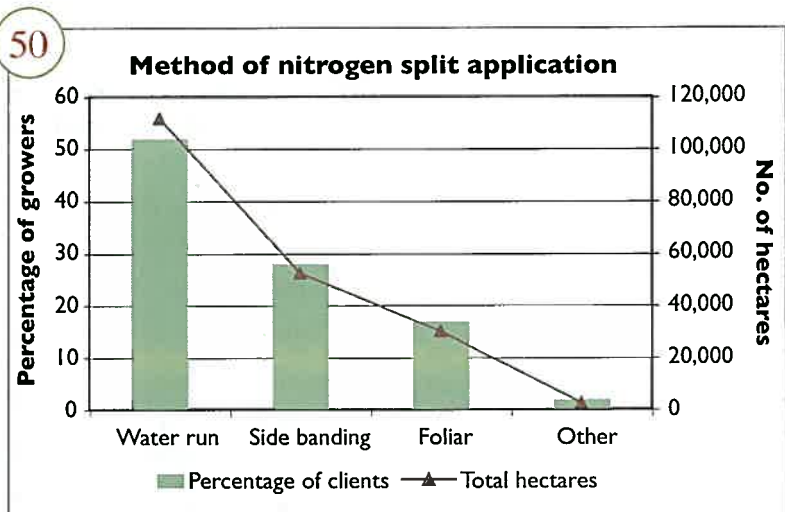
Comment: 74% of the 312 growers represented in this survey applied nitrogen via split application, with only 2% applying 'all in-crop'. The practice of split application of fertiliser has increased in recent years, as shown by previous CCA surveys.



QUESTION 50

Of your clients that use split application, how commonly used are the following methods of application?
(31 respondents)

Comment: The total number of clients is greater than stated in this question, which may be because some clients use more than one method.



QUESTION 51

For your clients, how has the amount of nitrogen applied per hectare for each cotton crop changed over the last five years?

(32 respondents)

Comment: As can be seen in graph 51a, 10 irrigated cotton growers have decreased nitrogen application by an average of 60 kg/ha over the past 5 years, while the majority have increased nitrogen by an average of 45 kilograms per hectare.

In graph 51b, no dryland growers decreased nitrogen application in the past 5 years, with 10 growers increasing nitrogen by an average of 24 kilogram per hectare.

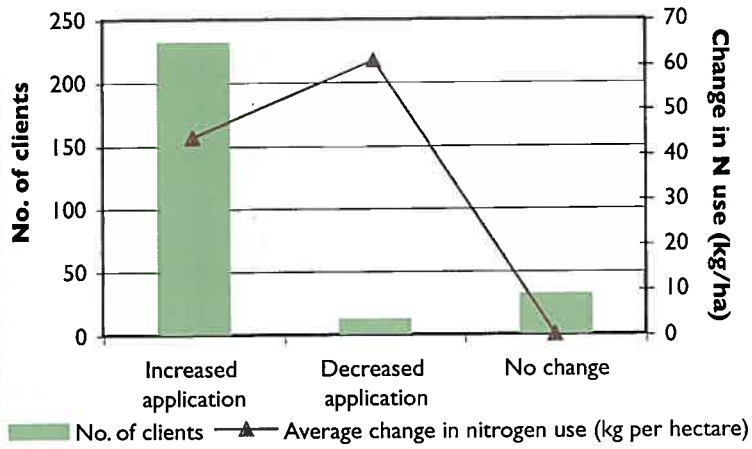
QUESTION 52

For your clients, how has the amount of phosphorus applied per hectare for each cotton crop changed over the last five years?

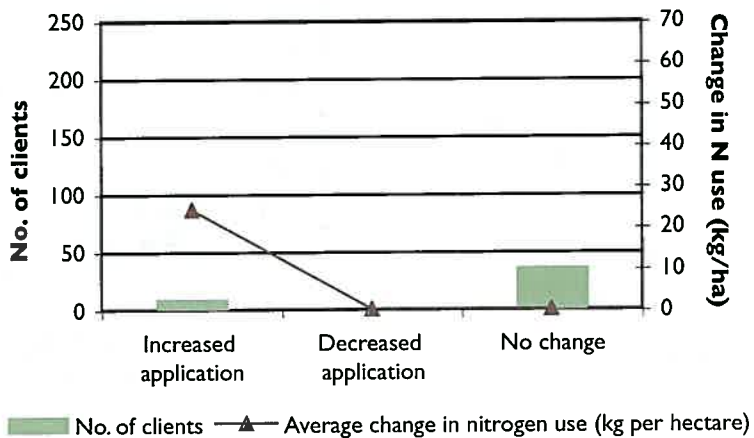
(29 respondents)

51

a) Irrigated cotton – change in the amount of nitrogen applied over the last five years

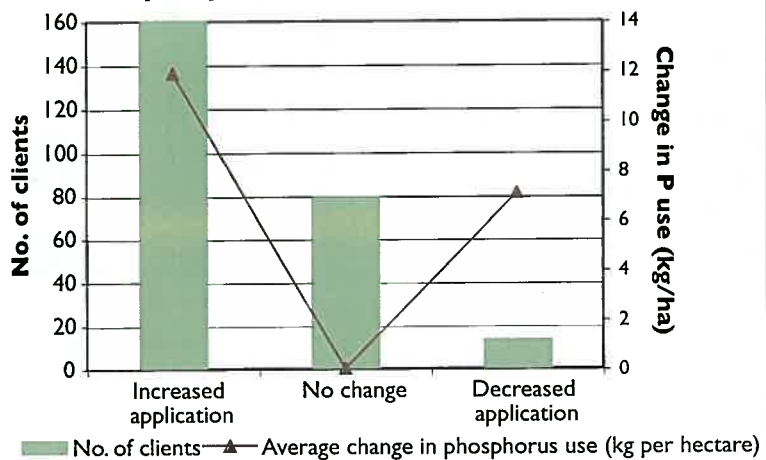


b) Dryland cotton – change in the amount of nitrogen applied over the last five year

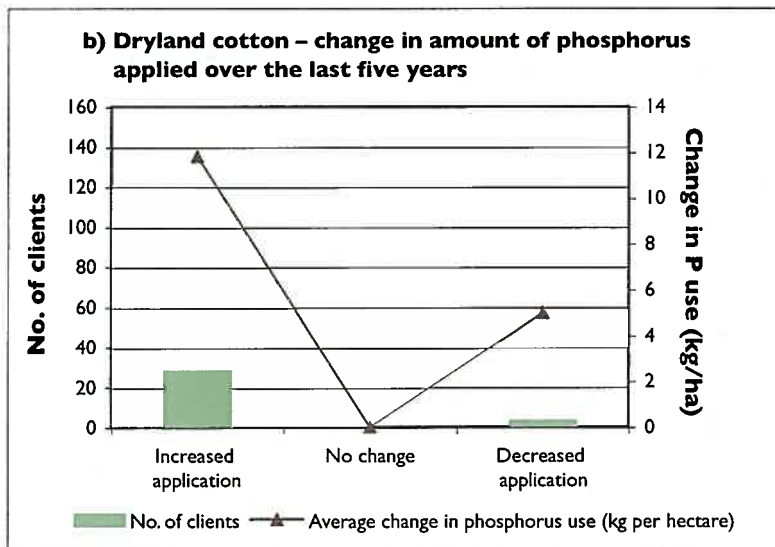


52

a) Irrigated cotton – change in amount of phosphorus applied over the last five years



QUESTION 52 continued



QUESTION 53

Thinking about your clients who do apply phosphorus fertiliser, please indicate the number who apply it at each of the following times.

(31 respondents)

QUESTION 54

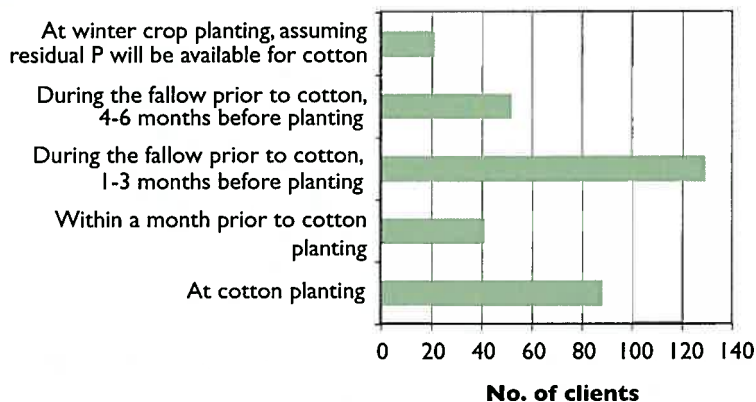
How commonly do your clients use cover crops?

(30 respondents)

Comment: 13 consultants said that none of their clients used cover crops, while 17 said that their clients did use cover crops. There was actually a higher frequency of cover crop use in the Darling Downs region. Only 12.5% of growers in the responses, representing 27,340 hectares, used cover crops; however, the Darling Downs varied significantly from this result, with almost 60% using cover crops.

53

Timing of clients' application of phosphorus fertiliser



QUESTION 55

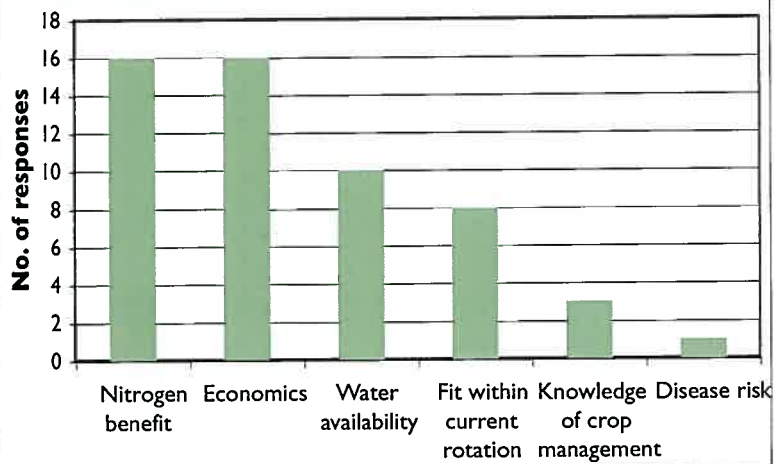
Rank according to importance the reasons for utilising legumes.

(33 respondents, representing 312 clients)

Comment: The responses to this question seem to indicate a theoretical interest in legumes. For the context relating to this question, please see Question 7, which indicates the actual use of legumes in a rotation system is quite low.

55

Reasons for utilising legumes in crop rotations



QUESTION 56

How many of your clients use the following

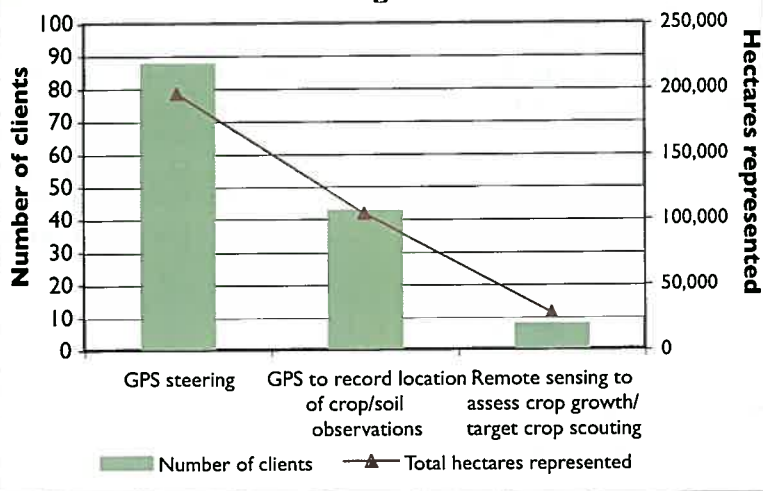
(33 respondents, representing 312 clients)

Note: the figures in both graphs in Question 56 represent total hectares consulted on, not just cotton.

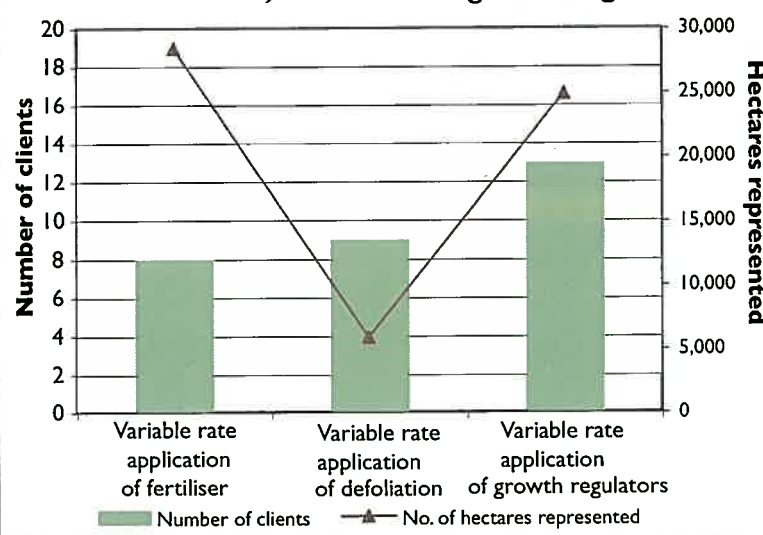
Comment: a notably low percentage of growers used variable rate application of fertilisers and defoliants: the variable rate application (VRA) of fertiliser was used by 24 growers out of a total of 312 growers in the survey, the VRA of defoliation by 28 growers and the VRA of growth regulator by 34 growers.

56

a) Number of clients who use GPS and/or remote sensing



b) Number of clients who use variable rates of fertiliser, defoliant and growth regulator

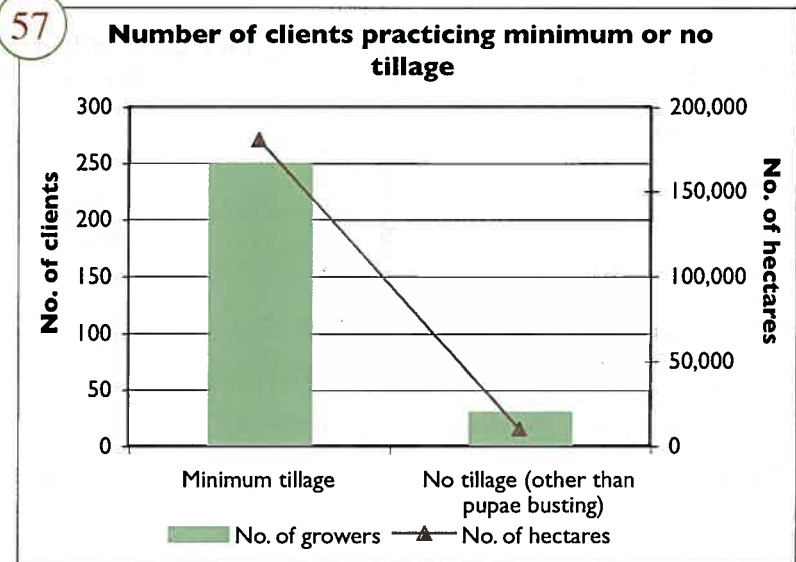


QUESTION 57

How widespread is the use of reduced tillage practices by your clients?

(33 respondents)

Comment: This figure represents all hectares consulted on in 2009–10, including cotton. The use of minimum tillage is almost universal, with 11% practicing no till on a small number of hectares.

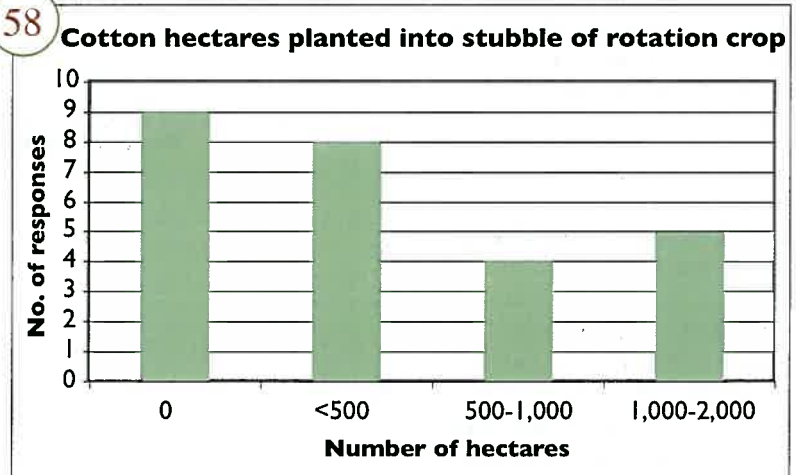


QUESTION 58

In spring of 2009, how commonly was cotton planted directly into the stubble of a rotation crop?

(32 respondents)

Note: The total number of hectares represented is 31,770, which is approximately 30% of total hectares in the 2010 survey. These hectares represent 90 clients using this practice out of a total of 312 clients.



QUESTION 59

How commonly used were the following row spacings for cotton in 2009–10?

(33 respondents)

and

QUESTION 60

Thinking back 5 years, how commonly used were the following row spacings for cotton in 2004–05?

(29 responses)

Note: the responses for Questions 59 and 60 have been combined in separate graphs for irrigated and dryland cotton to demonstrate the changes in row spacings over the five years.

Comment: The most common response was that row spacings depend on water availability. As can be seen in the responses to Questions 59 and 60, use of 1.5 metre wide rows for dryland cotton has increased since 2004–05, while 2 metre wide spacings have increased in irrigated cotton since 2004–05. Note that some growers have more than one row-spacing system on the same farm.

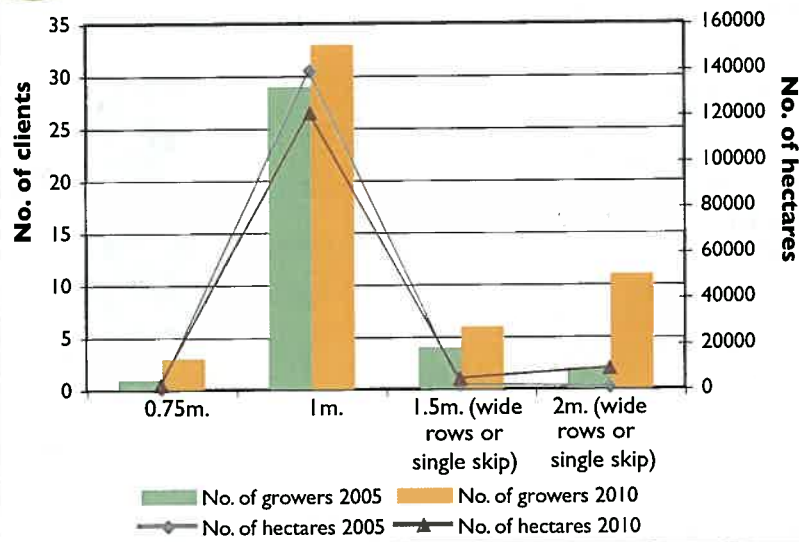
QUESTION 61

Do you have any comments to make regarding Question 60?

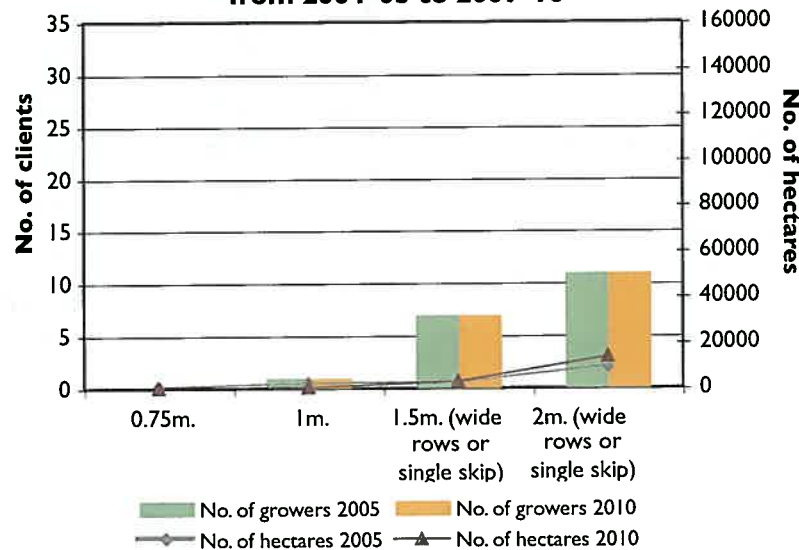
(19 responses)

59 & 60

a) Change in irrigated cotton row spacing from 2004–05 to 2009–10



b) Change in dryland cotton row spacing from 2004–05 to 2009–10



61

Comments regarding Question 60

Next year will see a significant increase in the amount of irrigated cotton grown single skip and two metre single row.

Row spacings only change depending upon water availability. For this season going forward, there will be plenty of double skip on irrigation fields that will be irrigated only if water becomes available.

More skip row two metre and single skip with reduced water.

We were growing 38 centimetre cotton on a large area, so haven't put in these figures.

Change bought about because of quality issues, and also trying to standardise planter configurations.

No change in row spacings, only change was availability of water. I believe row spacing will be the next biggest advancement in cotton.

QUESTION 61 *continued*

More for broadacre farmers, not irrigated farms.
All hectares grown (even in drought) were still either 40 inch or one metre.
Re Question 60, I reverted to percentage rather than hectares because the areas change with each season according to water availability and cotton prices. Re Question 59, the 1000 hectares was cotton planted on one metre row spacing but single skip configuration.
No change to row spacings.
I have one grower on 90 centimetre spacing.
Growers that have more land than they can effectively irrigate tend to grow single or double skip cotton (often in fields that can be irrigated if water becomes available). The 2009–10 season has produced some remarkably high yields (with very low inputs) in those systems, thanks to good rainfall and the ability to irrigate some of those 'speculative' fields.
We consider changing the row spacing if growing dryland or limited water irrigation cotton. Double skip would be the main row spacing under either of these scenarios.
One metre row still dominates due to machinery logistics – more 750 millimetre row spacing emerging in Murrumbidgee.
There is a trend towards wider row spacings both for irrigated and dryland. Some of the yields coming off super single and wider are amazing. I feel we will see more of these used if cotton prices stay comparable with grain.
About 75% of growers were on one metre rows and 25% on 0.75 metre rows.
Growers are becoming semi-irrigated farmers due to lack of reliable water and will continue to do so until water security is available at planting.
I believe 0.75 metres is the way to go, but established growers are set up on one metre. Expensive to change.

QUESTION 62

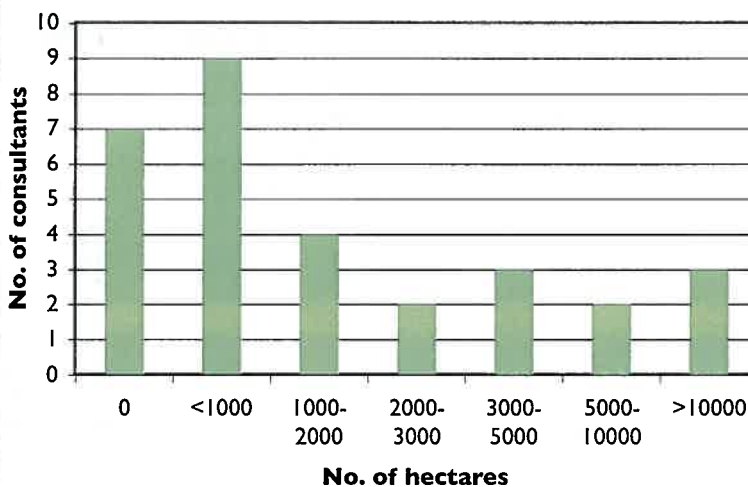
How common were bare fallows this past summer on the farms of your cotton clients?

(30 respondents)

Comment: this includes all hectares consulted on, including cotton. These results indicate that there are opportunities to extend information about the benefits that minimum tillage offer in relation to soil and water in irrigated cotton systems.

62

Amount of bare fallow in 2009–10 summer



QUESTION 63

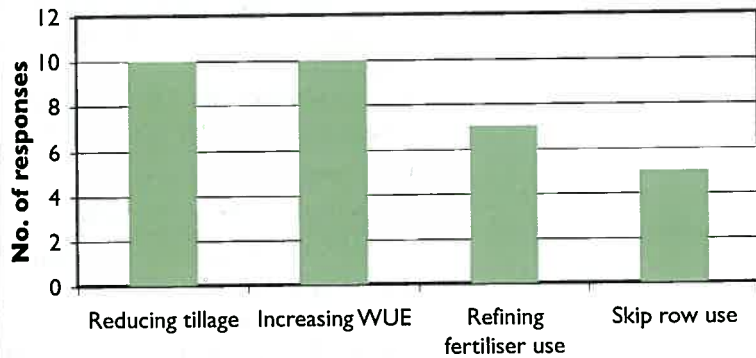
Please list any changes in management practices that you have helped a client (or clients) to implement in order to reduce the cost of cotton production during the last 12 months.

(28 respondents)

Please refer to the appendix for individual responses to this question.

63

Management changes made in 2009–10 to reduce clients' production cost
(most common responses)



QUESTION 64

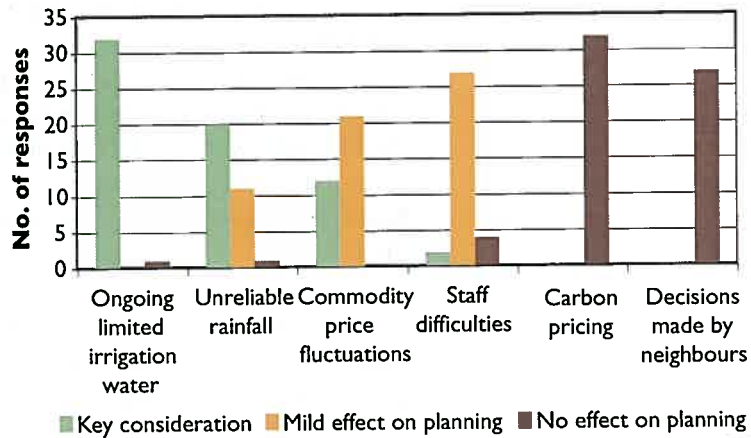
How much do the following external issues affect your clients' planning?

33 respondents)

Comment: Water was the biggest issue (either rainwater or available water), with carbon price and neighbours a lower impact on planning.

64

External factors that affect clients' planning



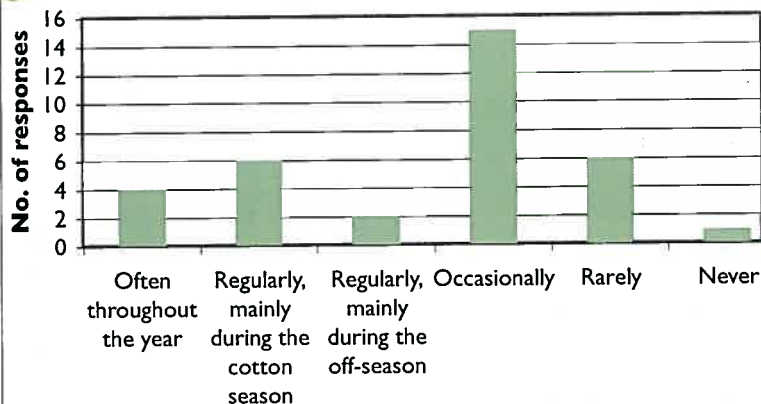
QUESTION 66

How frequently do you access the Cotton CRC website?

(34 respondents)

66

How often do you access the Cotton CRC website?



QUESTION 67

What are the strengths of the Cotton CRC website?

(23 respondents)

and

QUESTION 68

What are the weaknesses of the Cotton CRC website?

(17 respondents)

67 & 68	Strengths	Weaknesses
	Voluminous amounts of information that is available.	CottASSIST does not meet my expectations. It will need to be a more robust website to entice me back again. I wasted considerable hours entering data here only to find that it could not be edited, also very slow website – poorly structured.
	Not sure as I rarely use it. Please link it to the CCA website and 'consultants catchup' to jog my memory.	Never remember to go and look. I also have good contacts within the industry so I prefer to ring people direct for information.
	The agronomic tools. We use the online tool to monitor specific growers' cotton crops. General agronomic information that is stored on the website is also very useful.	Not advertised well enough. Probably should email when updates are made.
	Good forum for information updates.	Difficult to navigate – have lost the historical information the old website had on it (or it's hidden really well).
	Able to find research information	No time to look at anything other than tools.
	A range of industry information in one spot.	Sometimes very slow when trying to use cotton tools.
	Tools.	Very slow downloading, web design could be improved.
	Weather data such as day degree calculator, and other agronomic information I use to jog my memory if I have forgotten meeting info: eg resistance levels etc. I think it is ok for the amount of use I give it.	Difficult to navigate.
	Agronomy tools eg nutriLOGIC relating to petiole test interpretation. Handy site for industry publications online.	Day degrees calculator is difficult to open and difficult to use.
	Useful information and crop management tools all located conveniently on the one site.	None.
	Good information source.	No real problems, but some items need keeping up to date.
	Access to good reliable information and latest research publications.	Cumbersome.
	Information grapevine.	Limited historical research papers stored – would be great if there was a comprehensive one-stop point where I could access current and past research.

Strengths	Weaknesses
The tools – especially the day degrees calculator.	None.
All information in one place if required.	Often fails to bring up a page. Delay in putting up new research.
Easy to use/navigate.	None.
Looks inviting, easy to navigate, all the CRC information is there. About as good as can be expected.	
Single site for a comprehensive source of industry and research information.	
Source of information.	
Useful information, easy to find.	
Plant monitoring and crop/insect information library.	
Finding the latest research.	
When security of water returns, a more repeatable production system will return allowing thee use of such monitoring systems.	

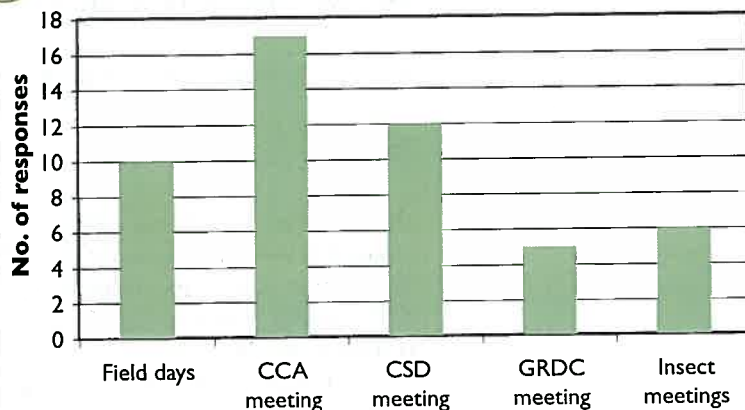
QUESTION 69

What professional development have you undertaken in the past 12 months?

(33 respondents)

69

Professional development by consultants in 2009–10



QUESTION 70

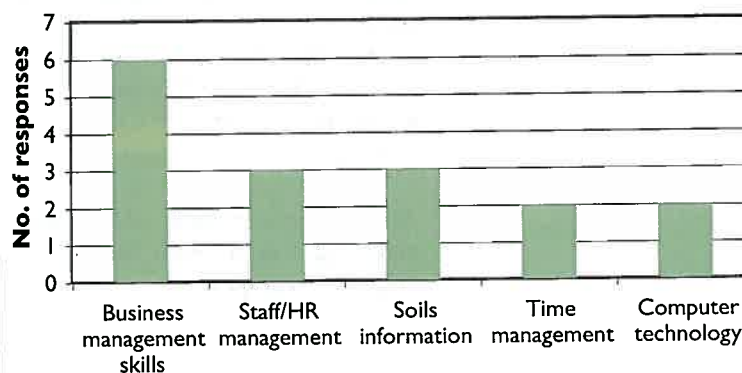
What professional development (across all issues, not just agronomic) would you, the consultant, be interested in doing over the next twelve months?

(19 responses)

Note: This graph shows the most common responses. Please refer to the appendix for individual responses to this question.

70

Professional development in which consultants would be interested over next twelve months



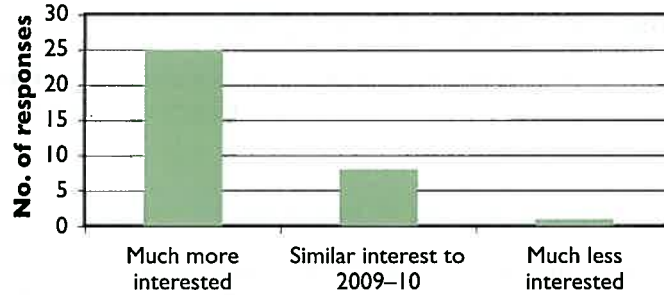
QUESTION 71

Thinking about ALL your clients, what do you predict will be their interest in dryland cotton over the next three seasons?

(34 responses)

71

Prediction of clients' interest in dryland cotton over the next three seasons



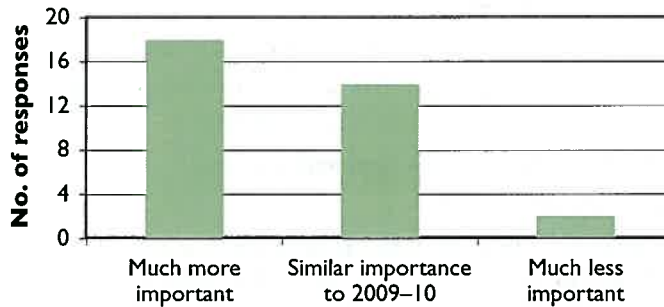
QUESTION 72

Given your prediction about interest in dryland cotton, how important will advising on dryland cotton crops be to your business over the next 3 years?

(34 responses)

72

Predicted importance of advising on dryland farming to consultant's business over the next three years



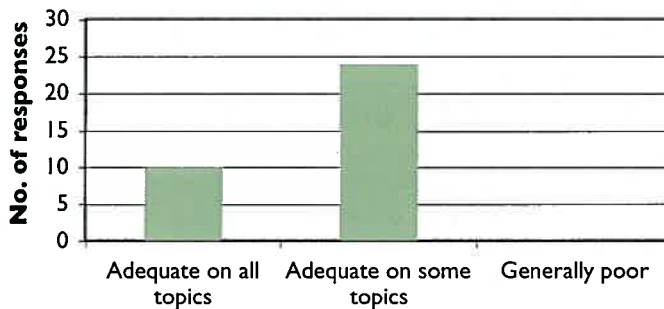
QUESTION 73

How do you rate the availability of information for optimising dryland cotton production?

(34 responses)

73

Adequacy of availability of information on optimising dryland cotton production



4 APPENDIX

What is included in the appendix?

Below you will find individual responses to questions where these responses add to an understanding of the graphed information in Section 3 of the publication, beginning on page five.

QUESTION 17

What do you believe would help to increase your grower's confidence with IPM?

Growers are quite confident at the moment; however, the following things would help: reduced drift from other crops (e.g., pyrethroid from sorghum); softer sucking bug sprays; increased knowledge on parasitoids, especially of whitefly; greater confidence in Bollgard II® efficacy.

An increase in new pests that require IPM strategies to adequately control them: i.e., the emergence of whitefly in the Namoi valley will require a more stringent IPM plan in order to control them. Forcing growers to adopt and increase their IPM plans.

If the beneficial insects to control Silverleaf whitefly continue to increase in numbers next season and aid in keeping control. Lower costs.

Cheaper products, more widespread commercial trials.

Same yield/return for both IPM and standard program. These days, with Bollgard II there aren't many insect sprays, so generally the system is an IPM system.

Better secondary pest management strategies.

They are all IPM friendly.

Following the IPM guidelines has been a lot easier with the majority planted being Bollgard. Results using guidelines in Bollgard are satisfactory and confidence is ok. With conventional, we have seen less consistent results with IPM as regards *Helicoverpa* control in this area. Greater yield whilst following them to the tee would help.

Practical and successful experience with IPM on their own farms. You have to have clients with the mindset and confidence in the consultant and his checking regime to allow him to have a go. Clients have to think beyond the cost of a single spray e.g., SP (eg Dominex Duo) at \$5 per hectare versus Altacor at \$55 for *Helicoverpa* control in conventional crops, or SP at \$5 per hectare versus Regent/Shield at \$15 for secondary pests in Bollgard/conventional crops.

Growers are using IPM.

Needs to be implemented gradually rather than quickly and with significant changes.

I believe most of my growers are confident with the IPM program. A wider approach to preserving beneficials by limiting the use of wide spectrum chemical early in all districts. Some growers question why some districts still are allowed to use hard chemicals early that in many cases cause the outbreak of other pest such as whitefly.

Cheaper chemicals.

All of our growers follow IPM closely and are convinced due to repeated good results compared to others and neighbours. All use it in broadacre programs now too.

More work on mirid impacts during boll fill.

Growers in general believe in IPM principles. However, low cost of disruptive chemistry (OP, SP) is often seen as an attractive alternative to higher-priced, less disruptive chemistry, especially during years of low cotton price and reduced water.

Controls put on the use of pyrethroids in Bollgard cotton. Information on pest, spray records and yields of growers who have a history of low sprays in Bollgard cotton. Less pressure on some consultants to go for unreasonably high yields and have very clean crops.

Cost of selective chemistry per hectare can sometimes be a hindrance but I would say in general that there is a high degree of confidence in IPM amongst my clients.

A bad secondary insect year.

A case study on the increase in whitefly numbers after using a disruptive insecticide.
My growers are confident with IPM.
Nothing. They prefer IPM to the alternatives.
More plant mapping. More economic data.
Additional information for Question 16. No spraying this year. Did spray one farm with canopy oil and shield as a preventative. In relation to Question 17, better explanations and belief from consultants.
Product price. Application cost. Residual effect.
Being able to see IPM growers' bottom line.
The problem is the variability in insect damage from differing numbers in checks. High numbers don't mean high damage and vice versa.

QUESTION 18

What do you believe would help to increase your own confidence with IPM?

Not much. I am sold.
More research and better, more detailed information on controlling and preventing population establishments.
Trials and benchmarking analysis.
Better secondary pest management.
I am IPM friendly. More selective chemistries.
Following the IPM guidelines with Bollgard being the majority planted has been a lot easier as far as following them goes. Results using guidelines in Bollgard are satisfactory and confidence is ok. With conventional, we have seen less consistent results with IPM as regards <i>Helicoverpa</i> control in this area. Greater yield whilst following them to the tee would help.
I'm quite happy with my IPM experiences on the Downs and will gain more confidence each year of implementation. I have no desire to go back to the days when broad-spectrum pesticides were our only choice. It was a recipe for disaster with regard to resistance build-up in the primary pest population. It also flared secondary pests. Expounding the virtues of IPM to me is preaching to the converted!
I am confident with current IPM strategies and they are followed the majority of the time, except when they don't fit with overall farming
I have always followed IPM and in my opinion it is the only way to a sustainable Industry. In my opinion TIMS committee should be stricter on the early chemical usage. New soft chemistry could help in the future. Cheaper chemicals
I'm already confident it works!
We spray mirids typically at threshold levels to prevent damage to small bolls. Need more work on whether this is justified.
More scientific data on actual commercial thresholds for mirids in particular. I believe that the whitefly matrix, whilst useful for making recommendations, is too simplistic, especially when pest numbers are still low. The recommended sampling technique is difficult to implement in the field due to the high mobility of the pest.
My confidence in IPM is fairly high. Since the introduction of Bollgard we have not seen any significant flaring of pests. However, it is interesting to note that even after an application of disruptive chemistry (e.g., Rogor® or SP versus mirids), secondary pests such as mites have not increased significantly. Also, the level of whitefly activity at the end of the season does not seem to have been significantly different in fields where disruptive chemistry was used earlier in the season compared with fields where apparently 'softer' chemicals were used earlier.
Making sure that there is regional agreement about no pyrethroids in Bollgard cotton.
Robust cost effective soft options on secondary pests. Reliable supply of chemicals.
A bad secondary pest year.

A very soft insecticide, which manages the sucking insect complex.
Nothing. They prefer IPM to the alternatives.
More plant mapping. More economic data.
More work on mirid impacts during boll fill.
I am fine – a believer 100%.
Confidence in product outcome without causing extra cost to grower. There is no room for compromising profitability with current water and commodity issues.
Growers who totally embrace IPM are getting much greater profits.
Thresholds will always be dynamic and should be! Thresholds are just a guide, I believe. We need a better and quicker way to access boll damage from sucking pests.

QUESTION 21

Under what circumstances, if any, would you encourage a grower to plant non-Bt cotton on their farm?

I do not agree with any of the choices in question 20. I encourage irrigators to grow non-Bt cotton on at least 50% of their farm. All dryland is encouraged to be Bt.
If the Bollgard planting window is not open; if it is in paddocks which are easy and safe to spray; if Bollgard starts to get sprayed more regularly for <i>Helicoverpa</i> ; if Monsanto puts the price up.
As a refuge.
In areas that are safe to apply endosulfan by ground.
Isolated from environmental issues.
Where there are no neighbouring problems/sensitive areas, good supply of chemistry, access to spray rigs.
None.
When the cost of licences is comparable to forecast cost of spraying conventional cotton; when the cost of controlling ratoon cotton and pupae busting increases; when winter cropping decisions.
None.
Rarely – if the price of Bollgard increases further conventional would be more attractive.
In irrigated fields, the grower did not want to grow pigeon peas, sorghum, corn or unsprayed cotton refuges for the Bt cotton area. The 50% sprayed conventional is a refuge option for both irrigated and raingrown fields. If non-Bt cultivars had superior characteristics to the current selection of Bt lines with regard to Fusarium tolerance, yield, quality and drought tolerance. There is often a lag phase between the release of an outstanding conventional cultivar and its Bt 'equivalent'.
Large farms that are isolated and spray drift and neighbour interaction needs are low
I'd prefer farmers to grow 100 % Bt cotton.
Only if they had to plant outside the window.
When the field of conventional is equal to or exceeds that of Bollgard
If the cost of the technology per hectare keeps increasing. At this stage I still believe the costs outweigh the value, but the reduction on chemical sprays is good for the communities and the environment.
Whilst endosulfan is available we will plant conventional cotton as the costs are significantly cheaper, we are not wasting water on pigeon peas, and the wheat yields are higher without pupae destruction.
In western areas where drift is not an issue and where the incidence of <i>Armigera</i> is less

If the prices keep going up we would consider growing conventional cotton, but it is not ideal. If we revert to growing conventional cotton it is not going to help us in providing a strong image of 'green' Australian cotton. It is VITAL for Australia's market reputation to be protected and improved if we don't want to be in the same boat as Australian Wool!

None in southern NSW

I would not encourage growers to grow non-Bt cotton. However, I would support their decision to grow it but would point out to them that availability of pesticides should be researched.

Not many, old technology, don't use non-Bt. Chemical supplies likely to be too uncertain and put crops at risk.

Where they have an unwillingness to manage an unsprayed refuge.
Where their environmental situation allows them to topically apply pesticide in 80% of prevailing conditions.

Delays in ground preparation to fit into the Bollgard window.

If had a large supply of VERY cheap chemistry and own spray equipment, would suggest maximum 50/50. Less than 0.5% of area in 09/10 was conventional.

If the farmer is particularly cost only conscious, has an area where drift is not such an issue, and is not happy about the cost of refuges.

None, but the cost of the technology should be 40 percent below current market charge. This would occur naturally if there were like-with-like competition, but conventional cotton is not a comparative crop.

If significant *Helicoverpa* were expected to survive Bt toxins and require application of insecticide in the coming season.

Never – if price gets too high. I will never check conventional cotton again.

When away from sensitive areas. Plant 50% of his farm to conventional always because it is more profitable.

If they can grow conventional cotton more economically.

Experience in cotton, location.

When the farm is more remote from sensitive areas, the grower is able to handle the potential increase in workload from extra boom spray operations. That they at least know of the potential impact if they are unable to use a plane when conditions require and the potential impact on irrigating schedules if using a boom spray.

QUESTION 22

From your perspective, what are the 3 most important reasons for having Bt cotton?

Details of 'Other' responses (See graph for Question 22 on page 11)

Neighbour relations.

Community concerns – chemicals drifting into town.

Greatly reduced insecticide application.

Less risk in controlling *Helicoverpa* for many reason.

Australia's 'green' image and environmental impacts.

Earliness.

Easier management of balance of non-Bt cotton

Less stress if delayed insecticide applications.

Environmental – fewer sprays.

Reduce risk of application issues.

Reduces risk of insect damage and increases earliness.
Lowers risk of major insect control situations.
Less chemical for the farm and environment.
Manage resistance in pests.
Just less risk of having massive increase in <i>Helicoverpa</i> .

QUESTION 24

In your opinion, what should be the role of conventional cotton (non-Bt) in the Australian industry into the future?

Extremely important.
If it is to be grown it should be environmentally friendly as possible. No heavy chemistry should be allowed. It should also still be available for resistance breaking and as a commercial competitor to Bollgard II.
It gives growers an alternative choice for cotton growing.
Continue as is. There is definitely a place for it. Keeping a balance is very important for insect resistance and as a check on Monsanto GM pricing.
Insect resistance tool; cost alternative to GM cotton; keeps GM cotton reasonably priced.
Very concerned about resistance – believe that the industry needs to go back to 50:50 or very close to that ratio.
As an evaluation for prospective new Bollgard varieties.
Conventional cotton should be used to keep Monsanto/Bayer honest in their charges.
Resistance management.
Having a proportion of conventional cotton will keep a check on Bollgard pricing, as well as keep the chemistry that is required for conventional cotton around for the future.
1. Essential as a refuge for the Bt cotton area 2. To my knowledge, elite conventional lines are bred and released to the market first. Bt genes/toxins are injected into varieties that are suited to the transformation process and then these varieties are backcrossed with the elite lines to produce new elite Bt lines. 3. It doesn't hurt to view the conventional lines in commercial situations before they are released as Bt cultivars. 4. To maintain a level of expertise in the consultancy profession in managing conventional cotton in case Bt toxins fail due to resistance build-up in the <i>Helicoverpa</i> population.
To provide choice and flexibility for those growers who choose to continue growing conventional cotton. To maintain systems and knowledge to keep conventional cotton as a viable alternative to Bollgard in order to have a fallback position in the event of greater refuge requirements for Bollgard and to provide price competition to the Bollgard system.
I think the days of non-GM cotton are numbered and the future will be better, more effective GM cotton with COMPETITION in the market. Conventional is the past, GM is the future.
50% refugia in areas where pesticide application is not a problem.
In my opinion, the areas planted to conventional cotton will be reduced unless Monsanto increases the cost of the Bollgard technology, making it less attractive for growers.
If Monsanto would price Bollgard appropriately there should be little role for conventional in the future, but they don't appear interested in doing that.
It has a place, but if there is a large pesticide shortage the crop will suffer because there will simply not be enough to go around.
Important back up in case resistance develops. Useful varieties for breeding programs – yields etc.
Maintain competitive non-GM varieties as an alternative to Bt in case unable to grow Bt in the future.
I think that the role of non-GM cotton should diminish. I would like to see the amount of GM cotton increase. However, I would also like the number of GM technology providers in the market increase. I believe increased competition in GM technology will benefit growers.

Look after *Bt* and we will not need conventional except for breeding. Useful as a refuge option. Only useful if *Helicoverpa* populations are reliably low each season.

To benchmark the ongoing value to the grower of GM. A safety net for resistance.

Maintain a percentage of conventional cotton to allow alternative management schemes to be developed and maintained as a safeguard to resistance issues in *Bt* cotton

As little as possible, though if GMO cannot keep in front of insect resistance, then will need to be re-introduced to aid insecticide management.

We have to have an alternative to GM cotton so that we have a comparison on which to base pricing.

Unsprayed refuge and research for variety improvement.

Managing *Bt* resistance in *Helicoverpa* through refuges. Dryland production at reduced cost.

Resistance management.

To keep communities viable. To balance the monopoly which would otherwise occur.

To ensure we are able to grow non-Bollgard cotton in case it falls over and to make sure there is a competitor against Monsanto.

I believe and hope it will always have a place in the industry, this will depend on where cotton is grown. Some places require *Bt* be grown because of proximity to sensitive areas. Other areas have greater flexibility and the balance will be dependent on pricing of *Bt* Cotton.

QUESTION 30

Thinking about the range of cropping rotations and farming systems used by your clients, what conditions create the highest risk of cotton ratoons?

Poor root cutting after harvest followed by a long fallow. Greatest number of ratoons occurs when there is a wet spring following the cotton.

1. Where cotton was not effectively root cut the year before; 2. Less than 5 % of our paddocks were cotton rotated back into cotton; 3. Perimeters of paddocks contaminated with last year's seed: e.g., where modules were made.

Not root cutting, and then planted into a winter crop where minimum tillage is used, followed by a long fallow.

Cotton planted back to cotton, especially Roundup Ready Flex® conventional cotton planted to Bollgard II the following season.

Back-to-back; poor plough-down; no till to winter crop.

Cotton-fallow or cotton-poorly established wheat crop.

Dry conditions that make root cutting very difficult. No root cutting at all.

Cotton/wheat rotations in years of good autumn rain.

Wet weather. Farm workers' lack of concern when root cutting.

Back-to-back RR cotton.

1) Wet winters when fallow tillage and spray programs are severely interrupted. 2) Long fallows in minimum tillage situations after RR cotton when there are long intervals between herbicide treatments. 3) RR Cotton-on-cotton rotations.

Inadequate root cutting due to insufficient depth of operation because the ground is too dry or too wet.

Back-to-back cotton.

Back-to-back cotton and double cropping cotton, chickpeas then cotton.

Poor initial cultivation after slashing

The limitation of using phenoxy herbicides during summer to avoid drift into summer crops. A wet summer makes the control of volunteers and ratoon cotton very difficult.

Insects.

Feeding stock cotton seed and then it is spread by the cattle into various dryland paddocks when grazing stubble and into the grass country.
Poor root cutting followed by summer rain.
Back-to-back cotton. Dryland cotton, if growers are reluctant to plough for reasons of moisture conservation.
Cotton after cotton does not allow much chance to spray out or cultivate out ratoons. Watering up RR Flex cotton after RR Flex cotton is a no go.
Wet pick, dry winter and back-to-back cotton.
Back-to-back cotton.
Back-to-back.
Growing cotton near previous fields and therefore having high herbicide drift risk.
Ineffective root cutting, pupae busting and primary tillage.
Back-to-back cotton after a wet pick.
Regrowth cotton.
Back-to-back cotton. RR cotton to non RR cotton
Fallow straight after cotton and no root cutting.
Nearly all my clients are back-to-back cotton.

QUESTION 31

What are the most effective and reliable operations your clients use to prevent cotton ratoons?

The most effective at minimising ratoons is stalk pulling and then burning the residue but this is an undesirable practice, so what happens the most is that crops are slashed and root-cut.
1. Effective stump removal when pupae busting. 2. No cotton on cotton. 3. Stringent controls in fallow.
Root cutting, Total bed destruction.
Mulch/root-cut/side bust/fallow over summer and spray Group B and Group I herbicides to control before going back to cotton.
Root cut; centre bust; discing; ripping.
Ally in-crop application in following wheat crop. Tillage pass/es when necessary.
Mulching and root cutting, Centre busting and fertiliser application.
1. Centre busting. 2. Double offset disc. 3. side busting.
Full reworking of beds after root-cutting.
Cultivation when young, and spraying with Bromocide when plants are less than 6-leaf.
Slashing, root cutting and middle busting as soon after picking as possible (preferably before soil gets wet from rainfall).
Root cutting.
Root cutting, side busting, fertiliser application, 100% cultivation.
Post-cotton discing of fields 2-3 times. Pre-water and then spray out with non-glyphosate or mixed herbicide.
Furrow depth centre bust with winged tines and side tine in the hill
Effective mulching and Root cutting. Middle busting or centre busting beds. Chisel plough.
Deep root cut and weed seeker.
Full cultivation, slash and root cut, bean knife cut, spray volunteers with chemicals other than glyphosate.

Tillage, weed seeking with the camera sprayer.
Root cutting is best, discing is OK, herbicide is not satisfactory.
100% soil disturbance (root cutting, ploughing). No back-to-back cotton.
Effective root cutting; pulling or spraying the old stubs; crop rotations and spraying, especially spot spraying; weed seekers.
Spray seed on plants less than 6 true leaf, cultivation with rotary hoe.
Root cutting, pulling, offsetting.
Root cut/cultivation followed by Group B herbicide in next wheat crop (ally).
Root cutting done at the correct depth, followed by good disturbance cultivation. (And then no rain so that the stumps dry and die).
Root cut, pupae bust, initial bed formation.
Root cutting and cultivation.
Broadleaf spray in winter and spring fallows.
Cultivation, rotation, hormone chemicals in autumn.
Root cutting, ripping straight after root cutting and sowing wheat straight behind the cotton.
Pre-irrigating and using Starane in the spray out mix or spray seed. The use of effective in-crop cultivation.

QUESTION 63

Please list any changes in management practices that you have helped a client (or clients) to implement in order to reduce the cost of cotton production during the last 12 months.

Aim for higher yields (reduces the cost per bale produced), better irrigation timing.
Planting irrigated cotton on wider spacings. Direct drilling 80 inch cotton onto beds in between metre sorghum rows
Increase fertiliser efficiency, reducing total fertiliser inputs with soil testing. Better water management, by implementing skip row irrigation, which increases profit per megalitre.
Use of residual herbicides to control fleabane. Reduced the amount of phosphorus in dryland plantings. Less nitrogen applied pre-plant and more strategic in-crop nitrogen.
Skip row cotton. Application of nitrogen all post planting – some water run. Softer IPM approach to whitefly. Irrigation scheduling.
Semi-irrigated cotton on double skip, and super single dryland cotton.
Reduced tillage. Improve tillage techniques to get results with fewer passes.
Irrigation scheduling.
GPS implementation. Use of Big N and Blends.
Move towards skip row configuration to improve water use efficiencies in a season with very limited water availability and to reduce Bt fees.
I agreed to go along with three cotton clients (364 hectares) who wanted to grow 50% Bollgard, 50% conventional cotton. They wanted to gain the best return per megalitre from their Bollgard refuge. As the season turned out, the pest control cost in conventional cotton managed under IPM was less than or equal to the Bt cotton program. There was certainly no yield drag in growing the conventional cotton.
Reducing the number of tillage passes and spray applications.
Trialing use of compost to replace P, K, S, Zn solid fertiliser. Reduced costs and so far no negative effects.
Integrated Weed and Pest Management. Soil Test Interpretation and Split fertiliser application.
Growing vetch and using chicken manure to offset N and P prices.

Improvements to cultivation and seed bed preparation
Whitefly management using canopy oil, weed-seeking fallows.
Increase yield through management, variety, watering, growth regulant.
Applying pest and damage thresholds to reduce cost of insect control. Interpretation of soil tests to minimise fertiliser application. Taking into account weather forecasts to improve water use efficiency (irrigation timing). Variety selection to maximise yield potential.
Spray insect pests less. Reduced costs per bale by helping get more bales per hectare. Going skip row irrigation to reduce costs. Economical herbicide rates. Schedule machinery to cover more hectares. No increase in consultancy fees.
Can't think of too many things except to reduce input rates where possible and encourage reduced tillage passes where possible. Conversely, there have been some practices changed to increase yields.
Machinery efficiencies.
Wider row spacing. Cleaner fallows.
No change.
Planting cotton into stubble. Variable rate defoliation. Irrigation scheduling, monitoring soil moisture.
Minimum tillage. Stubble planting.
Soil testing most fields. No till after planting. Semi-irrigated on limited water over larger area.
Increase irrigation deficits. Change row spacing to reduce the number of irrigations. Reduce tillage by ensuring that wheat stubble lines are not on cotton lines so we can sow straight into it.
Variable rate fertiliser.

QUESTION 70

What professional development (across all issues, not just agronomic) would you, the consultant, be interested in doing over the next twelve months?

Business skills (accounting, tax planning etc), business planning.
Small business development, legal insurance protection, staff management.
More work on moisture utilisation in dryland cotton.
Law, consulting.
Business management training
Computer skills, variable rate technology, public speaking.
Time management.
Cotton/grain marketing.
Soil sampling and soil test interpretation. I've put my name down for any courses run by Chris Dowling but have received no reply.
Business management skills.
Client satisfaction/conflict resolution.
Rural leadership course.
Professional development skills course – managing staff, clients etc.
Understanding of potential future carbon credit/tax system.
Assistance with technology, how to be more time efficient. Are training videos the answer to becoming more tech savvy quicker? Plus the general agronomic updates.
Business/economic.
Business management skills, individual crop workshops, soil management.
Using GPS and mapping to keep track of issues within paddocks.
Risk management, upskill on a soil analysis program.

2010 Cotton Consultants Australia Report



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