Introduction
This survey was conducted as part of the Lettuce IPM project VG05044 and to complement work in the IPM Stocktake (VG05043). Information was sought on how to best deliver support to agricultural consultants that would enable them to support the development of integrated pest management (IPM) skills among their clients. A telephone survey of consultants for the vegetable and lettuce industries was conducted in July 2006. The purpose of the survey was to determine the level of knowledge of, and confidence in integrated pest management. The survey was modified from the key IPM informant survey used in IPM Stocktake.

A list of consultants was generated through the project’s industry network and a total of 12 were interviewed. All those contacted were prepared to undertake the interview. Whilst the number interviewed is small it is virtually the entire population of agricultural consultants in this field. General understandings of the consultants’ knowledge and confidence in IPM can be made, and serves as an indicator of the current skill level amongst consultants.

The Lettuce IPM Consultants Survey Results
The survey questions (see appendix 1) were designed to elicit information on the skills and confidence levels the consultants may have in the three main aspects of IPM support, that is: the ability to identify problems at hand, providing suitable recommendations and thirdly providing information about the use of biorational options.

The Agronomic services provided by consultants
The commercial consultants surveyed ranged from small single person operations to large corporations. They provide a wide variety of services to growers. These services include:

- Regular farm visits
- Crop protection services including: sap testing, crop monitoring, and water testing
- Full agronomic services including: crop nutrition, soil monitoring and testing, irrigation management, chemical advice, and crop scheduling
- Chemical sales and advice
- Biocontrol agent supply
- Research and trial work

The smaller consultants tended to provide more restricted or specialised services, or have a limited number of farms for which they provide services. Two consultants provided specialist biocontrol agent services only, whilst one consultant provided purely chemical control advice and services. The largest business services over 200 farms and the smallest services 8 farms. Crops included greenhouse and field crops, cucumbers, strawberries, lettuce, tomatoes, sweet corn, melons, brassicas, celery onions and processing lines including tomatoes, peas and carrots.

Main pest and disease issues
The consultants were asked to identify the main pest and disease issues and the issues or trends in crop protection they or the farmers see. These are listed in Table 1 in order of priority as determined by the frequency of mention.
### Table 1

<table>
<thead>
<tr>
<th>Pest</th>
<th>Disease</th>
<th>Issues raised/perceived trends</th>
</tr>
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<tbody>
<tr>
<td>Western Flower Thrips</td>
<td>Foliar fungal diseases</td>
<td>Lack of IPM understanding (growers)</td>
</tr>
<tr>
<td>Aphids</td>
<td>Botrytis</td>
<td>Lack of available chemistry</td>
</tr>
<tr>
<td>Nematodes</td>
<td>Sclerotinia</td>
<td>Perceived lack of need for IPM</td>
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<tr>
<td>Thrips and assoc viruses</td>
<td>Downey mildew</td>
<td>IPM takes time to catch on</td>
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<tr>
<td>Heliothis</td>
<td>Leaf diseases</td>
<td>Trends towards use of softer chemicals BT, Primicarb, Chess</td>
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<tr>
<td>Diamond back moths</td>
<td>White blister</td>
<td>Lettuce Aphid – permits</td>
</tr>
<tr>
<td>Cutworms</td>
<td>Soil borne fungi</td>
<td>Lack of resistant varieties</td>
</tr>
<tr>
<td>Cabbage White Butterfly</td>
<td>Club root</td>
<td>Growers not confident to go non-chemical</td>
</tr>
<tr>
<td>Silver Leaf Whitefly</td>
<td>Powdery mildew</td>
<td>Limited access to BT</td>
</tr>
<tr>
<td>Whitefly</td>
<td>Virus from White Fly</td>
<td>With emergence of LA and state trade regs, blanket spraying and overuse of Confidor® leading to decreases in beneficials to control heliothis &amp; WFT. So these are re-emerging as serious pests whereas before under an IPM program they were under control.</td>
</tr>
<tr>
<td>Green Peach Aphid</td>
<td>Sudden wilt</td>
<td>Poor prices</td>
</tr>
<tr>
<td>Mites</td>
<td></td>
<td>Market dominated by supermarkets</td>
</tr>
<tr>
<td>Lettuce root aphid</td>
<td></td>
<td>More beneficial controls</td>
</tr>
<tr>
<td>Tomato russet mite</td>
<td></td>
<td>Need for bigger range of chemicals compatible with biocontrols</td>
</tr>
</tbody>
</table>

### Confidence levels in IPM techniques

Consultants were asked to rate their confidence level in the delivery of particular services or providing certain advice. This was to ascertain the skill and capability of delivering IPM messages and services. Where skill or confidence levels are low this could indicate where training or support is needed.

The following graphs indicate how the consultants rated their own confidence levels in particular areas.

**Figure 1**

Confidence level (1 low, 5 high) for Pest identification.

**Figure 2**

Confidence level (1 low, 5 high) for Disease identification.

**Figure 3**

Confidence level (1 low, 5 high) for On-site viral identification.

**Figure 4**

Confidence level (1 low, 5 high) for Access to services.
These results (Figs. 1, 2, 3 & 4) show that consultants are very confident in on-site pest and disease identification, perhaps a little weaker in disease and viral identification. The majority are very confident of having access to services to support positive identification. They also rate their skills in making recommendations and crop monitoring very highly (Figs 5 & 6). A high level of confidence in pest and disease identification is needed if a consultant is to gain and retain the respect and confidence of their clients. Clearly the consultants are well skilled in these areas. Viral disease recognition is difficult without laboratory testing and confirmation. The lower levels of confidence in viral disease recognition is understandable and is not necessarily a problem provided there is sufficient laboratory services available to assist diagnosis. The two respondents reporting lower levels of confidence also reported reduced access to laboratory services to assist identification. This indicates they are under-resourced in this area.

These consultants are very confident in providing sound recommendations to their clients. Figures 5-10 indicate high levels of confidence in their crop monitoring skills, designing scouting methods to suit a particular situation, providing control recommendations, assessing the efficacy of control measures, recommending when to opt for insecticide use rather than persisting with biocontrols and slightly less confidence in recommending thresholds or other decision making triggers. These are areas of strength. The consultant’s reputations rely on having these skills. These skills would also support a broadened IPM consultant skills set.
Areas in which the consultants report lower levels of confidence concern the use of biocontrol strategies (Figs 11-16). Consultants were less confident in providing advice on implementation of biocontrol strategies, conservation of natural enemies, selection of biocontrol agents for particular circumstances, effective release levels, timing of release of biocontrols or maintenance of biocontrols in crops. This indicates that knowledge of biocontrol strategies are an area of weakness for some of these consultants. These areas are the key technical details involved in IPM. Reduced confidence in these skills would result in fewer IPM recommendations being made and IPM strategies being developed.

The lack of confidence in the consultants own skills is reflected in their comments about farmer confidence in IPM. Those consultants who reported lower self-confidence in IPM related skills also reported lower farmer confidence in IPM. The two biocontrol agent supply consultants and one other consultant were very positive in their perception of the grower’s attitudes to IPM. This was reflected in their confidence in their own skills.

One area that would indicate a whole farm approach to pest and disease management would be farm planning. If a consultant’s levels in this area were high, it is more likely that they would take a holistic approach to pest management. This is an important aspect of IPM as areas of neglect on a farm can lead to increased or unmanageable pest problems. Figure 17 indicates that confidence in this area could be improved.
Factors assisting grower adoption of IPM

The consultants were asked to identify factors that helped promote or increase grower adoption of IPM. The responses are listed in Appendix 2. The factors as suggested by the consultants can be categorised as farmer education, technical issues and market issues.

Generally the consultants thought that farmers needed more education and training on IPM. Showing the growers that IPM works through demonstrations on their farms or the farms of others was considered necessary to build their confidence in IPM. Having IPM explained, demonstrated and proved successful on their own farm leads to greater understanding and acceptance. The consultants also recognised that for some ‘lazy’ farmers IPM was never going to be an option. More information was needed about beneficials and the cost benefits of IPM.

The consultants identified technical issues that increased the adoption of IPM. In particular, the reduced availability of pesticides and the increased incidence of resistance or the threat of resistance were drivers in the adoption of IPM. Improvements in the availability of softer pesticides made the switch to IPM more likely. Other technical issues were the availability of biocontrol options.

It is somewhat difficult to separate the consultants own concerns from those voiced to them by the farmer. And to a large extent the consultants concerns regarding IPM (or perhaps biocontrol) are those of the farmer in any case.

There was a clear call for training on IPM for both growers and consultants. Information on foundations of IPM should be provided to growers so that the consultants did not have to sell the IPM concept as well as the actual mechanics of IPM. The consultants are also asking for training for themselves, recognising there are gaps in their skills and that they could provide enhanced services to their growers if they had more information.

Calls for technical support include: more information about softer or biorational pesticides and their interaction with beneficials, and back up support in identification and problem solving.

It was clear from some responses that there is a need for better communication between IPM specialists so that each are better informed. Consultants were suggesting that there were conflicting and competing messages being delivered on and about IPM and that better networking could improve confidence in IPM as a sound means of pest management.

General discussion

Consultants exhibited a considerable range of commitment to IPM; from committed IPM consultants and biocontrol developers to downright antagonists. The mid-range exhibited an understanding and acceptance of the principles, but were thwarted in developing their skills and IPM on-farm implementation, by lack of understanding and confidence in the farmers they supported. A consultant’s lack of IPM confidence may be reflective of or be reflected by a farmer’s lack of confidence. One delivers the other. So building the IPM confidence of the consultant is integral to developing IPM successes amongst farmers. A confident consultant can persuade a risk adverse grower provided he/she has sufficient knowledge to back up the confidence.

But a sense of risk taking is not the only barrier to IPM adoption. The consultants identified other barriers including supermarkets’ demands for completely insect free produce. This demand causes ‘day before spraying’ and negates all the benefits of IPM in terms of reduced pesticide use and biocontrol.
Consultants were suggesting that this generates a ‘what’s the point?’ attitude amongst growers. Consultants identified a lack of understanding amongst buyers and consumers about IPM and that there are ‘good bugs’. This intolerance of ‘good bugs’ means that growers are required to decontaminate all produce, destroying natural enemies in the field and applying unnecessary pesticides. Attention may need to be paid to the supermarket buyers and agents when developing an IPM strategy to support the IPM efforts the farmers are making.

Consultants suggested that there was also undermining of the IPM message by chemical company representatives. These organisations or individuals have a considerable amount to gain by touting IPM failures. That “failures get heard about quickly” suggests that ‘good news IPM stories’ are slower to travel.

However there was also an element of hope for the future of IPM; one consultant suggesting the “the new generation taking over has more interest in IPM”. This suggests that growers may be increasingly more aware and accepting of IPM strategies and that targeting the new farmers with training and information may be a worthwhile strategy.

**Conclusion**

This survey of lettuce consultants has demonstrated that these particular consultants generally have a well developed skill set. They report high levels of confidence in providing advice on general agronomic and pest management practices, but lack confidence in providing advice on biocontrol strategies. They have a sound understanding of the concept and principles of IPM but lack detailed knowledge. They are clearly experts on pest and disease recognition and have good access to support services to back up diagnoses. They have high levels of confidence in crop monitoring.

In general the consultant suggest that farmer understanding and acceptance of IPM and the complexity of IPM limit the adoption and that proven on-farm successes and ‘outside’ influences (lack of available chemicals, resistance crises) improve adoption.

Several options for improving support of IPM were identified by consultants. The main suggestion was education or training. Improving the knowledge and awareness of IPM amongst growers makes the job of the consultant easier. They can focus on the details of the IPM strategy with the grower rather than having to educate the grower on the IPM concept. The buyers and consumers also need further information about IPM and biocontrol. If there is a general understanding and acceptance of IPM amongst growers and their customers, adoption can be improved.

Consultants also identified their own training needs and made suggestions including (consultant only) workshops and resources that would assist them to improve IPM consultancy services they offered.

A general impression was gained from the survey that IPM messages are an important part of current and future consultancy services but consultants require greater surety about IPM implementation.