

# Scottish Beekeepers' Association Survey 2012 Report

Magnus Peterson, Alison Gray

Department of Mathematics and Statistics,

University of Strathclyde

June 2013

## 1 Introduction

### 1.1 Background

In 2012 the Scottish Beekeepers' Association (SBA) again supported the carrying out of a survey of its members in late spring and early summer in order to continue monitoring the state of beekeeping in Scotland. These surveys began in 2006 and have all been designed and carried out from the University of Strathclyde, with the help of the SBA.

As in 2010 and 2011, the data from the survey provided the basis of a return from Scotland to the COLOSS organisation ([www.coloss.org](http://www.coloss.org)) which monitors honey-bee colony losses internationally.

### 1.2 Design of the survey

As in all but one of the surveys so far, this survey was a postal one for which the sample was selected from the SBA's membership list, using stratified random sampling, the stratification being on a geographical basis. The details of the sample selection process were as follows:-

A Neyman allocation scheme (using the winter 2010–2011 overall loss rates per area) was used to divide the chosen sample size of 250 between the main SBA administrative areas, namely Aberdeen and the North combined, the East and the West. These samples were then subdivided in proportion to the SBA membership in the smaller geographical sub-areas that were also used in the previous recent surveys. Orkney, Shetland and the Outer Hebrides were included in the North Far-North sub-area, and the Inner Hebrides were included in the North North-West. The details are in Table 1:

Area	No. of members	No. sampled	Sub-region	Size	No. sampled	Responses	Response rate (%)
Aberdeen	84	19		84	19	7	37
East	556	117	East-Central	377	79	51	44
			North-East	125	26	11	48
			South-East	54	12	2	42
North	201	52	Far-North	84	20	21	40
			Inverness & surrounding area	78	18	7	35
			North-West	59	14	7	39
West	250	62	South-West	145	36	25	40
			West-Central	105	26	17	47
Total	1111	250			250	104	42

Table 1: Details of the survey design and response rates

Once more we offered a prize to be competed for by those responding (as in the last few surveys, kindly provided by Thorne of Wragby and Newburgh), and organised the sending out of reminders to those who had failed to respond by the initial deadline.

Altogether 250 questionnaires were sent out and of these 104 were returned, giving a final response rate of 42%. Table 1 shows the response rate by area. This year however only 13 of the 104 (12.5%) who responded were not beekeepers so that the remaining 91 (87.5%) were beekeepers, giving us a larger number of responses from beekeepers than in 2011 (although the response rate in the 2011 survey was a little higher at 47%).

These are reasonably good response rates for postal surveys, although not sufficiently high to give great confidence that we have avoided all the hazards associated with non-response bias. Certainly it is the case that with a larger sample size the risk of non-response bias would be lower, and also greater statistical precision could be achieved in estimation, giving more confidence that the results are an accurate reflection of all beekeepers.

## 2 The Questionnaire used

This followed fairly closely the 2011 survey, the only changes being made to conform with COLOSS policy for 2012. Questions addressing all the COLOSS “essential questions” were included and as many of the “optional questions” as were feasible.

The full final questionnaire used is included as an appendix to this report.

The questions can sensibly be grouped according to the sections in that questionnaire as

1. Preliminary questions.
2. Location, scale and details of beekeeping activities and colony losses.
3. Questions on races of bees being kept.
4. Queens and their replacement.
5. *Varroa* and its management.
6. Provision of pollination services, migratory beekeeping and forage.
7. Management issues.
8. Final comments.

As last year, the main body of the report will be arranged in sections following this arrangement for the most part, though with deviations where these are appropriate.

## 3 Going through the questionnaire

### 3.1 Preliminary Questions

#### 3.1.1 Anonymous response

Respondents were asked to disclose their contact details, but could also choose to remain anonymous. Of the 104 respondents returning their questionnaires, only 17 (16%) chose to remain anonymous, a result fairly close to that found in 2011.

#### 3.1.2 Beekeepers and non-beekeepers

As remarked above, of the 104 respondents, 13 (about 12.5%) were not beekeepers at some time between April 1st 2011 and May 31st 2012. Possibly the allowance of a whole year, during any of which the respondent might have been keeping bees, gave this higher proportion of beekeeper respondents than there were in 2011.

Two questions were specifically addressed to the non-beekeepers:–

- Are you interested in becoming a beekeeper?
- Have you previously been a beekeeper?

### Interest in becoming a beekeeper

Only 10 of the non-beekeepers answered this question, and of these 7 (70%) said they were interested.

### Previously been a beekeeper

There were 11 responses to this question. Of these 11, 8 (73%) had previously been beekeepers, and 3 had not.

Combining these responses yields the results in Table 2. The number of responses here is so small that no definite conclusion can be drawn, but it is striking that every respondent has either previously been a beekeeper, or is interested in becoming one.

		Previously?			
		No	Yes	No answer	Totals
Interested?	No	0	3	0	3
	Yes	3	4	0	7
	No answer	0	1	2	3
Totals		3	8	2	13

Table 2: Cross-tabulation of Interest in becoming a beekeeper against having Previously been a beekeeper, for non-beekeeper respondents

### Length of time as a beekeeper

This year again respondents were asked for how long they had been keeping bees. The results are summarised in the histogram in Figure 1 and Tables 3 and 4. About 10 years was typical, with a maximum of 50 years experience. The distribution of number of years of experience is rather skewed, with most keeping bees for 5 years or fewer, but quite a few longer than that. Five beekeepers had failed to answer this question. Clearly there are quite a few respondents newer to beekeeping, which is an encouraging aspect of these results.

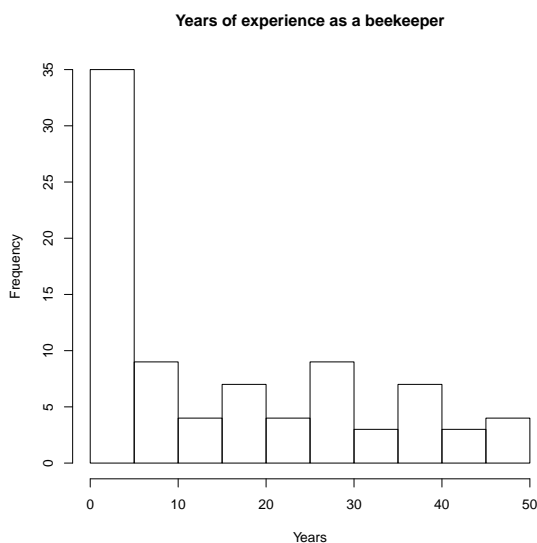


Figure 1: Distribution of years of experience among respondents

### Age and gender distribution

Respondents were also asked their age-band, and whether they were male or female. The results are summarised in Table 5, and the age distribution is shown in the bar-plot in Figure 2.

These beekeepers were notably biased towards older people and males, though among the younger age groups in this sample the gender bias was less extreme, suggesting that women are becoming more interested in beekeeping than they have been in the past. Over all 65 (72%) of those answering were male and 25 (28%) were female. No beekeeper in this sample however was aged under 30.

Years	< 2	2 or 3	4 or 5
Frequency	11	13	11
Percentage	12.9	15.3	12.9

Years	6 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41 – 45	46–50	Total
Frequency	9	4	7	4	9	3	7	3	4	85
Percentage	10.6	4.7	8.2	4.7	10.6	3.5	8.2	3.5	4.7	100.0

Table 3: Frequency distribution of years of experience, split by age group

	<b>Minimum</b>	<b>Median</b>	<b>Mean</b>	<b>Maximum</b>	<b>No response</b>
<b>Summary statistics</b>	0	10	16.7	50	6

Table 4: Summary statistics for distribution of years of experience

Age band	Gender				
	Female	Male	No answer	Totals	% of total
Under 20	0	0	0	0	0.0
20–29	0	0	0	0	0.0
30–39	2	3	0	5	5.5
40–49	7	9	0	16	17.6
50–59	5	7	0	12	13.2
60–69	9	28	0	37	40.7
70 or over	2	18	0	20	22.0
No Answer	0	0	1	1	1.1
<b>Totals</b>	25	65	1	91	100.0

Table 5: Cross-tabulation of age-band and gender distribution

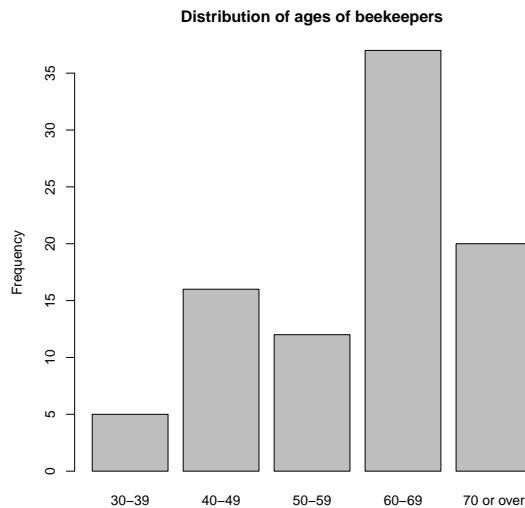


Figure 2: Distribution of ages of beekeepers

### Provision of additional educational support

The next question asked whether any need was felt for additional educational support in beekeeping, either at national or local level. All beekeepers answered this question, 74 (81%) saying they felt no need for such

additional support, but 17 (19%) saying they would wish such additional support. Those who said they would like such additional support were asked to specify the nature of what they would wish.

A few of the comments were of a very general nature and did not mention anything specific. However it is possible to summarise a number of them under different headings, a few of which were mentioned several times. Below is a summary of what these said. If no repetition number is given, the topic was only mentioned once.

- Mentoring and support for beginners (three times).
- More education on diseases and pesticide problems (three times).
- Queen problems and swarm control (twice).
- Courses leading to National Diploma in Beekeeping.
- Improvement to SBA web-site.
- Management techniques and honey extraction.
- “Natural” and organic/biodynamic beekeeping.
- Practical courses at intermediate level.
- Tuition on microscopy.

## 3.2 Location, scale and details of beekeeping activities

### 3.2.1 Scale of beekeeping enterprises

#### Numbers of apiaries being managed

As in previous surveys the number of apiaries being managed was asked for, and as in previous years the overwhelming number were managing only 1 apiary, the maximum number of apiaries being managed by any one beekeeper in this sample being 4. Two beekeepers did not answer the question. The results are summarised in Table 6.

Number of apiaries	1	2	3	4	No Answer	Total
Frequency	59	23	3	4	2	91
Percentage	64.8	25.3	3.3	4.4	2.2	100.0

Table 6: Numbers of apiaries being managed

#### How far afield are bees being kept?

Beekeepers were asked whether they kept all their bees within 10 miles of where they lived. Only one failed to answer this question. Of the rest 83 (92%) said that they did, and only 7 (8%) said they did not.

#### Geographical distribution of beekeeping businesses

In order to get some idea of the distribution of the beekeeping enterprises being investigated across the country, respondents were asked to give some indication of where in Scotland their main apiary was located, either an abbreviated postcode, or the name of a nearby town or village. Only one beekeeper failed to answer this question.

All the responses have been converted here into abbreviated postcodes, and their rough locations are indicated in Table 7, with the set of postcodes corresponding to that location alongside. The areas have been arranged geographically from north to south and then from west to east, as far as possible.

General area	Number in that area	List of Postcodes
Caithness and Orkney	1	KW14
Sutherland	1	IV24
Skye and Lochalsh	3	IV22, IV22, IV44
Inverness area	4	IV2, IV2, IV7, IV7
South Inverness-shire	2	PH21, PH22
Nairn	3	IV12, IV36, IV36
Moray	1	AB38
Aberdeen city area	2	AB22, AB23
Aberdeenshire	4	AB30, AB31, AB35, AB51
Hebrides	1	PA46
Lochaber	3	PH33, PH34, PH36
Kincardineshire	2	DD10, DD11
Dundee city area	0	
Angus	2	DD7, DD8
Argyll	1	PA37
North Perthshire	1	PH15
Perth city area	2	PH2, PH7
Stirlingshire	4	FK8, FK15, G63, G63
Fife	12	KY1, KY3, KY5, KY6, KY7, KY10, KY11, KY12, KY15, KY15, KY16, KY16
West Lothian & Mid Lothian	8	EH14, EH14, EH14, EH22, EH23, EH25, EH48, EH49
Greater Glasgow area	5	G44, G64, G81, G84, G84
Edinburgh city area	2	EH4, EH5
East Lothian	4	EH32, EH37, EH39, EH39
Peebles-shire	3	EH45, EH45, EH46
Isle of Arran	1	KA27
Lanarkshire, Kilmarnock and Renfrewshire	8	KA2, KA6, KA17, KA23, KA23, KA24, ML6, ML11
South Ayrshire	1	KA7
East Borders	1	TD11
Dumfries and Galloway	8	DG5, DG7, DG7, DG7, DG8, DG10, DG11, DG12
No Answer	1	—
<b>Total</b>	<b>91</b>	

Table 7: Geographical distribution of enterprises (main apiary)

### 3.3 Colony numbers and colony losses

#### 3.3.1 Colony numbers

Beekeepers were asked how many production colonies they had at three dates during the period which this survey covered, namely 2011 April 1st, 2011 October 1st and 2012 April 1st.

The summary statistics for these three dates are given in Table 8.

As in other recent reports of surveys, the numbers quoted for October will be taken as most nearly representing the desired size of enterprises of the beekeepers, since at both the April dates the numbers of stocks will be reduced by losses occurring during the preceding winter, without there being any reasonable opportunity to increase the number of stocks. On the other hand, over the summer such opportunities do exist, and most beekeepers in Scotland aim to go into winter with the number of stocks they wish to manage in the long term.

In Figure 3 the histogram shows the distribution of enterprises as measured by the number of colonies managed in October.

Date	Summary statistics			
	Minimum	Median	Mean	Maximum
2011 Apr 1	0	2	4.0	40
2011 Oct 1	0	3	4.7	41
2012 Apr 1	0	2	3.9	38

Table 8: Summary statistics for numbers of colonies being managed at different seasons

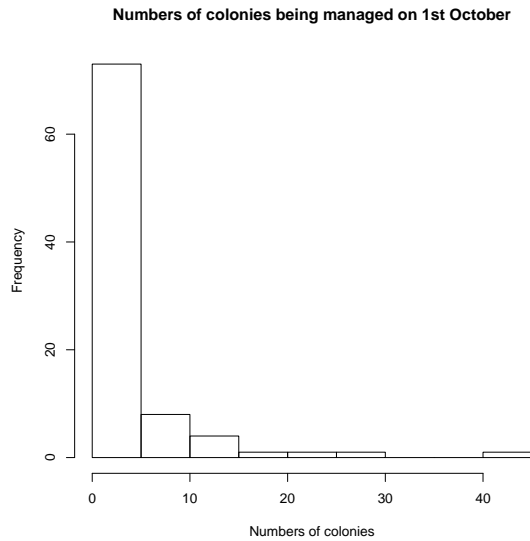


Figure 3: Distribution of size of enterprise according to numbers of stocks held in October

For such a heavily skewed distribution the median is a better summary of the typical number than the average. The median number of colonies held is 3. Most beekeepers manage no more than 5 colonies (82.0% of beekeepers in our sample).

As was found in earlier surveys, the number of colonies being managed does not match closely the number of apiaries managed. This is illustrated by the scatter-plot in Figure 4. (Note that “jitter” has been applied to the plotting points to separate from one another many points that would otherwise overlap).

For example, one of the largest operators with over 20 stocks only has one apiary, whereas two of the beekeepers with 4 apiaries have fewer than 5 stocks.

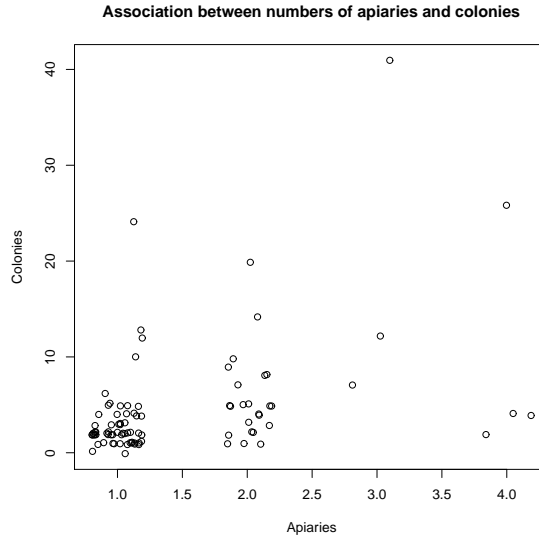


Figure 4: Scatterplot showing lack of association between numbers of apiaries and numbers of colonies

### 3.3.2 Planned changes in colony numbers

As in previous surveys, beekeepers were asked what planned changes in colony numbers they had made either as increases (by making splits, taking swarms, or buying in stocks) or decreases (by uniting/merging, giving away or selling stocks). This was asked both for the summer season of 2011 and also for the winter season of 2011–12. Clearly a beekeeper managing a larger number of stocks will have more opportunity for making planned changes, so in presenting the results in tabular form, they are cross-tabulated with the number of stocks that beekeepers was keeping in October 2011.

#### Planned changes over the summer

A simple initial measure of activity of this kind, to allow for the scale of beekeeping, is the total number of reported changes of this kind made over the summer divided by the total number of colonies being managed in the following October. This is an approximate measure of the number of planned changes per colony over-all during the summer.

That proportion with these data is 43%.

The results for the summer season are summarised in more detail in Table 9 and Table 10, showing respectively the numbers of increases and of decreases reported for enterprises of different sizes.



Colonies Oct 2011	Total summer planned increase										Totals
	0	1	2	3	4	6	7	8	9	10	
1	1	5	1	0	0	0	0	0	0	0	7
2	0	12	6	0	0	0	0	0	0	0	18
3	0	1	1	3	0	0	0	1	0	0	6
4	1	4	1	1	1	0	0	0	0	0	8
5	0	2	2	4	3	0	0	0	0	0	11
7	0	1	1	0	0	0	0	0	0	0	2
8	0	0	1	1	0	0	0	0	0	0	2
9	0	0	1	0	0	0	0	0	0	0	1
10	1	0	0	0	0	0	0	0	0	0	1
12	0	0	0	0	0	1	0	0	0	1	2
13	0	0	0	0	0	0	1	0	0	0	1
14	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	1	0	0	0	0	0	1
24	1	0	0	0	0	0	0	0	0	0	1
26	0	0	0	0	0	0	0	0	1	0	1
41	0	0	0	0	0	1	0	0	0	0	1
Totals	4	25	14	9	5	2	1	1	1	1	63

Table 9: Cross-tabulation of frequencies of total summer planned increase v numbers of colonies being managed in October

Colonies Oct 2011	Total summer planned decrease									Totals
	0	1	2	3	4	5	8	10		
1	6	1	0	0	0	0	0	0	0	7
2	15	3	0	0	0	0	0	0	0	18
3	5	0	0	1	0	0	0	0	0	6
4	5	1	0	1	1	0	0	0	0	8
5	6	2	3	0	0	0	0	0	0	11
7	1	0	0	1	0	0	0	0	0	2
8	1	0	1	0	0	0	0	0	0	2
9	1	0	0	0	0	0	0	0	0	1
10	0	0	1	0	0	0	0	0	0	1
12	0	0	0	0	0	1	0	1	0	2
13	1	0	0	0	0	0	0	0	0	1
14	0	0	0	0	0	0	0	0	0	0
20	1	0	0	0	0	0	0	0	0	1
24	0	0	1	0	0	0	0	0	0	1
26	0	0	0	0	0	0	1	0	0	1
41	0	0	0	0	0	1	0	0	0	1
Totals	42	7	6	3	1	2	1	1	1	63

Table 10: Cross-tabulation of frequencies of total summer planned decrease v numbers of colonies being managed in October

### Planned changes over the winter

Starting again with the simple measure of the rate of occurrence of planned changes over the winter, the total number of planned changes reported divided by the total number of colonies being managed in October 2011 yields the value 8%. As expected, this is much lower than the corresponding rate over the summer.

As for the summer data, the numbers of planned increases and decreases reported over the winter against size of enterprise are tabulated in Table 11 and Table 12.

Colonies Oct 2011	Total winter planned increase					Totals
	0	1	2	3	8	
1	0	2	0	0	0	2
2	0	1	0	0	0	1
4	2	0	0	0	0	2
5	2	0	0	0	0	2
7	1	0	0	1	0	2
8	0	0	1	0	0	1
10	1	0	0	0	0	1
12	1	0	0	0	0	1
13	0	0	0	0	1	1
24	1	0	0	0	0	1
Totals	8	3	1	1	1	14

Table 11: Cross-tabulation of frequencies of total winter planned increase v numbers of colonies being managed in October

Colonies Oct 2011	Total winter planned decrease				Totals
	0	1	2	6	
1	2	0	0	0	2
2	0	1	0	0	1
4	0	1	1	0	2
5	1	0	1	0	2
7	0	2	0	0	2
8	0	0	1	0	1
10	0	0	1	0	1
12	0	1	0	0	1
13	1	0	0	0	1
24	0	0	0	1	1
Totals	4	5	4	1	14

Table 12: Cross-tabulation of frequencies of total winter planned decrease v numbers of colonies being managed in October

### 3.3.3 Summer Losses

Of the 89 beekeepers answering these questions, 16 (18%) reported summer losses.

To calculate the loss rate we use the total number of colonies lost over the summer as a proportion of the total number of colonies being managed at the start of April. The over-all summer loss rate reported was, as in previous surveys, fairly low at 7.4% (in total 26 colonies lost over the summer out of 353 in total being managed at the start of the season). The causes reported for these losses are summarised in Table 13. Colony Depopulation Syndrome (CDS) is the term used by COLOSS to describe those losses where a colony dies in a well-provisioned hive, but there are no dead bees to be found in the hive or apiary.

The other known causes of loss reported were “Nosema” (2 cases, 1 colony each), “Blue tits feeding young” (1 case, 6 colonies), “Weak hive” (1 case, 1 colony). The last was rather more elaborately specified in fact.

Perhaps the most striking finding is that 5 colonies were reported lost due apparently to isolation starvation. Normally this only occurs during the winter, but there were certainly long periods of cold wet weather during the summer of 2011. Three separate beekeepers reported this kind of loss of 1 colony each. In one case this was the beekeeper’s only colony, in another it was 1 out of 8 and in another it was 1 out of 14. One beekeeper reported losing 2 colonies in this way out of a total of 25 colonies.

Cause of loss	Number of colonies lost	% of total
Starvation	3	11.5
Isolation starvation	5	19.2
CDS	2	7.7
Queen problems	7	26.9
<i>Varroa</i>	1	3.8
Other known cause	8	3.1
Unknown cause	0	0.0
<b>Total</b>	<b>26</b>	<b>100.0</b>

Table 13: Reported causes of loss of colonies during summer 2011

### 3.3.4 Winter losses

Of the 89 beekeepers answering these questions, 36 (40%) reported winter losses.

The over-all reported rate of winter loss was 15.9% (66 colonies out of 415). This is considerably lower than the over-all winter loss rates reported in the surveys of the last two years.

### 3.3.5 Causes of winter losses

Beekeepers were asked to state the causes of their winter losses. The results are summarised in Table 14.

Assigned cause	Number of instances	% of total
Starvation	1	1.4
Isolation starvation	11	15.7
CDS	6	8.6
Queen problems	28	40.0
<i>Varroa</i>	8	11.4
Other	8	11.4
Unknown	8	11.4
Total	70	100.0

Table 14: Reported causes of winter losses in the winter of 2011 – 12

One obvious paradox here is that the number of assigned causes (70) exceeds the total number of colonies lost (66). The explanation is that some respondents assigned multiple causes to the loss of a single colony.

The most frequently reported cause of loss was Queen problems (Queenlessness or a drone-laying queen), with Isolation Starvation as the second most frequently reported cause.

The “Other” causes of loss reported were explained as “Weak colony” or “Small colony” (5 cases), “Robbing plus queen problems” (1 case) “Colony dwindled in late spring” (1 case) and “Hive was knocked over by sheep and chilled” (1 case).

In recent surveys, a strong association between an increased rate of winter loss has been reported for those keeping bees in the East of Scotland as opposed to the West of Scotland, and also for those whose bees foraged on Oil Seed Rape (OSR), as opposed to those whose bees did not forage on that crop. Since both of these associations may potentially be linked with raised exposure of bees to neonicotinoid pesticides, which have proven sub-lethal harmful effects on bees, this data set has also been investigated for such an association. Tables 15 and 16 show the results.

Region	Colonies October 2011	Winter losses	Loss rate
East	257	40	15.6%
West	158	26	16.5%

Table 15: Winter losses and loss rates for beekeepers in the East and the West

In the data from this survey, there is very little difference between the reported loss rates in the East and in the West of Scotland. This does go against the trend of the results found in recent years.

Forage includes	Colonies October 2011	Winter losses	Loss rate
OSR	101	21	20.8%
No OSR	314	45	14.3%

Table 16: Winter losses and loss rates for colonies foraging and not foraging on Oil Seed Rape

Thirty one of the 89 beekeepers reported that their bees foraged on Oil Seed Rape (OSR).

While there was again a greater winter loss rate reported among colonies that were known to have foraged on OSR than there was among those not known to have been foraging on OSR, the difference this time is less marked, and fails to be significant at the 5% significance level when using Fisher's Exact Test ( $p$ -value 0.158 which is greater than 0.05). So we cannot conclude that this year's data shows a statistically significant association between foraging on OSR and a raised rate of winter loss. However the reported loss rate is again this year greater among colonies which have foraged on that crop.

### 3.4 The races of bees being kept

As last year, respondents were asked which specific race of bees was the principal race they were keeping. The options offered to them were

- Don't know;
- Local strain of no named type;
- *Apis mellifera mellifera* (*A.m.m.*), the Northern European dark bee;
- *A. mellifera carnica*, the Carniolan bee;
- *A. mellifera ligustica*, the Italian bee;
- the "Buckfast" strain;
- any other named race (to be specified).

The responses are summarised in Table 17. Two of the 91 beekeepers did not answer this question.

Race	Number claiming this	Percentage of respondents claiming this
Don't know	13	14.3%
Local unknown	48	52.7%
<i>A. mellifera mellifera</i>	26	28.6%
<i>A. mellifera carnica</i>	2	2.2%
<i>A. mellifera ligustica</i>	1	1.1%
The "Buckfast" strain	5	5.5%
Another named race	0	0.0%
No response	2	2.2%

Table 17: Races of honey-bees that respondents state they are keeping

In this table the numbers in column 2 do not sum to 91 (the number of beekeepers who responded to the survey), nor do the percentages in column 3 add up to 100%. The reason for this is that 6 of the beekeepers claim to be keeping two distinct races.

The details are as follows:–

- Two beekeepers claim to be keeping both *A. m. m.* and a local unknown strain, one in two separate apiaries, and the other in a single apiary.

- Two claim to be keeping both *A. m. m.* and the Buckfast strain, each in two separate apiaries.
- One claims to be keeping both *A. m. carnica* and a local unknown strain in 1 apiary.
- One claims to be keeping *A. m. m.* and not to know what race is being kept in just one apiary.

The last one has clearly not responded in a logical way to the question. Moreover in the phrasing of the question, an effort had been made to eliminate such multiple claims. However it seems best simply to report what has been stated.

### 3.5 *Varroa* and its management

The management of *Varroa* infestation has become one of the most difficult aspects of beekeeping in Scotland since this parasitic mite has spread through most of the country, though some recent work by Atchley and Ramsay (see below) suggests that there are still remote parts of Scotland where it is not yet present.

This survey addressed this problem through three approaches:-

1. Investigation of the respondents' beliefs about the incidence of *Varroa* in their own local area.
2. Enquiring about methods used for detecting the presence of this parasite, and for monitoring infestation levels.
3. Enquiring about methods of treatment being applied to keep the infestation under control.

#### 3.5.1 Incidence of *Varroa* infestation

The question asked was whether the respondent believed that *Varroa* infestation was present in most bee stocks in the local area.

The responses are summarised in Table 18.

Response	Number	Percentage
Yes	79	86.8%
No	10	11.0%
No response	2	2.2%
<b>Total</b>	91	100%

Table 18: Do you believe the *Varroa* mite is present in most bee stocks in your area?

The claim by 11% of the sample that they do not believe *Varroa* is present in the majority of stocks seems rather high.

In fact only 6 (7%) of the respondents lived in areas thought to be *Varroa*-free, as determined by the status of their own postcode address according to the results of Atchley and Ramsay (2012) as reported at

<http://www.scottishbeekeepers.org.uk/PracticalBeekeeping/Research.aspx>

Cross-tabulating belief in the presence of *Varroa* against *Varroa*-free status, gives the results shown in Table 19.

		Belief in presence of <i>Varroa</i>		Totals
		No	Yes	
<i>Varroa</i> -free status	No	4	79	83
	Yes	6	0	6
<b>Totals</b>		10	79	89

Table 19: Cross-tabulation of beekeeper's belief in the presence of the *Varroa* mite in most bee stocks in their area, against *Varroa*-free status as proposed by Atchley and Ramsay

Of the 10 beekeepers believing that their area was *Varroa*-free, in fact 4 were living in areas where *Varroa* is known to be present.

### 3.5.2 Detecting and monitoring *Varroa* infestation

Those who do not believe that *Varroa* is present in their area were next asked what steps, if any, they were taking to detect any infestation. All but three of these stated they were regularly sending floor scrapings to Science and Advice for Scottish Agriculture (SASA) for the detection of any infestation. Of the three not taking this measure, two are living in areas where *Varroa* is endemic, and it is fairly clear that these two may well be unaware of the reality of their situation. One of those regularly sending floor scrapings to SASA in addition is regularly uncapping drone brood to try to detect the presence of *Varroa*.

Those who did believe that *Varroa* was present in their area were next asked whether they took any steps to monitor the level of infestation in their hives. The results are summarised in Table 20. A very high proportion (91%) did in fact do some such monitoring.

Monitor?	Number	Percentage
Yes	74	91.4%
No	7	8.6%
<b>Total</b>	81	100%

Table 20: Do you take any steps to measure the level of *Varroa* infestation?

They were next asked what those steps were, with the following options offered:

- Count mite drop.
- Uncapping sealed drone brood.
- Another method (to be specified).

The responses are summarised in Table 21.

Method	Number	Percentage
Count mite drop	62	76.5%
Uncap drone brood	41	50.6%
Other	28	34.6%
<b>Total</b>	131	–

Table 21: Use of different *Varroa*-monitoring methods

Many respondents used more than one method, which is why the total number of responses exceeds 81 and the total percentage exceeds 100.

The numbers of methods used by respondents are shown in Figure 5.

The “other” methods used for monitoring infestation levels can be briefly summarised as

- Some variation on checking mite drop personally (15 cases).
- Sending floor scrapings to SASA for checking (3 cases).
- Checking general health of bees (3 cases).
- A variety of miscellaneous methods most once each: “icing sugar drop test” (2 cases), “survey physical effects of *Varroa* — microscope”; “brood treatment”; “visual inspection”; “regular monitoring of hive”; “drone sacrifice, sugar dusting”.

Of the last category, some are in our view rather ill-defined, and two — “drone sacrifice, sugar dusting” and “icing sugar drop test” — would seem to be describing a method of treatment rather than a method of monitoring infestation level.

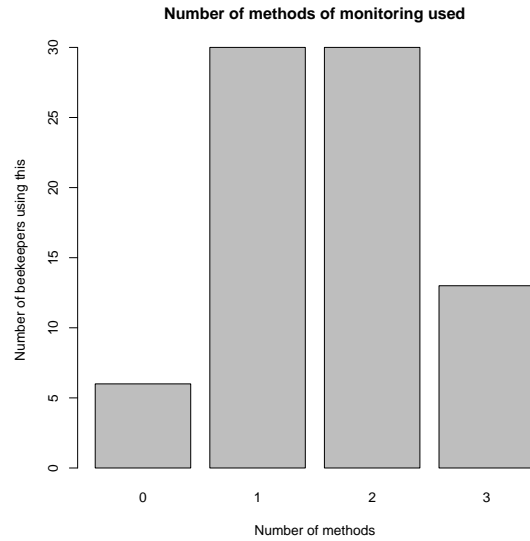


Figure 5: Frequency distribution of the number of methods used to monitor levels of *Varroa* infestation

Finally in this section, respondents were asked in which year they were first aware that their own stocks were infested with *Varroa*, with the following options:-

- Before 2011.
- In 2011.
- In 2012.
- *Varroa* not yet detected (NYD).

The results are displayed in Figure 6 and Table 22.

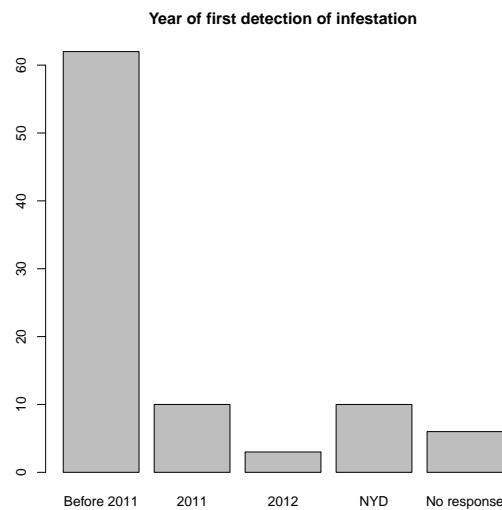


Figure 6: The year in which each beekeeper first became aware of *Varroa* infestation

Year	Number	Percentage
Before 2011	62	68.1%
2011	10	11.0%
2012	3	3.3%
Not Yet detected	10	11.0%
No response	6	6.6%
<b>Total</b>	91	100%

Table 22: Table of the year in which each beekeeper first became aware of *Varroa* infestation

The fact that 68% of respondents report that they have been aware of the presence of *Varroa* in their bees for more than two years is a reflection of the fact that in most of Scotland this pest has been long established. Some of those stating a shorter time than this are only re-stating the fact that they have not been keeping bees for very long, and so have not looked for it for very long. Four of those claiming not yet to have detected it almost certainly have the infestation, but the remainder are probably still clear of *Varroa* since they do all live in remote parts of the country where no reports of its presence have yet been made as reported above.

### 3.5.3 Treatment of *Varroa* infestation

Three factors cause the pattern of treatments being used to control *Varroa* infestation in Scotland to keep changing. The first is the relentless spread of the parasite; the second is the fact that in most areas of the UK now, evidence is starting to accumulate that the mite is developing resistance to the synthetic pyrethroids which were the main line of defence when it first entered the country; the third is that an ever-increasing number of methods for its control are being devised.

Some of these methods are being introduced after prolonged testing for efficacy and safety as fully licensed veterinary medicines, and others with less rigorous testing and less certainty about both their efficacy and their safety, but many having their use tolerated since it is seen as essential to have a wide range of control measures available.

All that can be hoped for in a survey like this one is to give an indication of the range of methods being employed, with some information about how popular each is, and in what seasons it is usually deployed.

As stated in the survey of 2011, methods of treatment can be conveniently divided into four classes:–

1. General management practices, usually used all year, of which the main one is the use of open mesh floors.
2. Biotechnical methods such as the creation of sacrificial drone comb for cutting out, or the trapping of the queen on sacrificial brood combs. These are only available at appropriate seasons.
3. The application of non-toxic “soft” substances, such as dusting with icing sugar, to try to remove a proportion of mites at appropriate seasons.
4. Treatment with chemicals which are toxic to mites — “hard” substances — with the aim of deliberately killing them. Appropriate timing of the application of these is usually important.

Below are what we have had reported on the use of all these different types of treatment.

### 3.5.4 Use of open mesh floors

The reported use of open mesh floors in 2011–12 as compared with that in 2010–11 is shown in Table 23.

The reported use of open mesh floors is more extensive in this survey than it was in the last, though with these small numbers this increase is not statistically significant.

### 3.5.5 Other methods of *Varroa* control

Of the 91 beekeepers who were asked about *Varroa* control, 80 (88%) said they adopted at least one method, while only 6 (7%) said they were taking no steps. Five did not answer the question.



Response	Number		% over-all		% of responses	
	10-11	11-12	10-11	11-12	10-11	11-12
Use	43	77	67.2%	84.6%	75.4%	87.5%
Do not use	14	11	21.9%	12.1%	24.6%	12.5%
No response	7	3	10.9 %	7.7%	–	–
<b>Totals</b>	64	91	100.0	100.0	100.0	100.0

Table 23: Reported use by beekeepers of open mesh floors in this survey (11-12) compared to the survey of 2010-11 (10-11)

The possible types of treatment listed for those answering the question about treatment were:-

1. Pyrethroid strips (Apistan or Bayvarol);
2. Apiguard;
3. Thymol-soaked pad;
4. Oxalic acid (trickle method);
5. Oxalic acid (sublimation method);
6. Formic acid;
7. Dusting with icing sugar;
8. Drone brood removal;
9. Queen trapping followed by brood destruction.

In addition, respondents were invited to name other control methods they might have used. The frequencies with which the different methods were used in the different months are summarised in Table 24. Note that in line with the form of question used by COLOSS, the month shown is the month of *starting* a treatment.

Year	Month	Methods										Totals
		1	2	3	4	5	6	7	8	9	Other	
2010	November	12	3	0	5	0	0	0	0	0	2	22
	December	1	0	0	26	1	0	0	0	0	0	28
2011	January	0	0	0	8	1	0	0	0	0	1	10
	February	0	0	0	0	0	1	0	0	0	1	2
	March	0	2	0	0	1	1	2	0	0	0	6
	April	0	2	1	1	0	1	4	0	0	1	10
	May	0	0	1	0	0	0	3	4	0	1	9
	June	1	0	1	1	0	2	1	6	0	1	13
	July	1	0	0	0	0	0	1	3	0	0	5
	August	5	4	2	0	0	2	3	0	0	3	19
	September	19	5	0	0	0	3	0	0	0	3	30
2012	October	9	3	0	0	0	2	0	1	0	2	17
	November	2	1	0	2	2	1	0	0	0	1	9
	December	1	0	0	20	3	0	0	0	0	0	24
	January	0	0	0	12	6	0	0	0	0	1	19
	February	0	0	0	2	2	0	0	0	0	0	4
	March	0	3	0	0	1	3	3	0	0	3	13
	<b>Totals</b>	51	23	5	77	17	16	17	14	0	20	240

Table 24: Frequencies of use of the different *Varroa* control measures, by month of the year in which a treatment was started

This table reveals several things. First it is clear that, for the most part, treatments are being applied at the recommended seasons, with the use of pyrethroid strips (method 1) and Apiguard (2) being mainly confined to late summer and autumn, and the use of oxalic acid to mid-winter. Biotechnical methods are mainly usable only during the summer.

Oxalic acid is by quite a long distance the most frequently used control measure, particularly if the two methods of application — trickle (4) and sublimation (5) — are combined. Pyrethroid strips (1) are the next most frequently used method, with the two applications of thymol (either as the licensed medication Apiguard (2), or as a thymol-soaked pad (3)) being the next most popular.

Among biotechnical methods, dusting with icing sugar (7) is the most frequently reported, probably because it is cheap, trouble-free, and considered to have no adverse effect on the bees. Drone brood removal (8) is almost as frequently reported however. None of the respondents to this survey had used queen trapping and brood destruction (9). This is a method that is technically very demanding, which no doubt results in its being less frequently used.

A large variety of “other” treatments was reported. Those mentioned more than once were:–

Treatment	Times reported
Apivar strips	10
Apilife Var	3
Oxvar	3

Apilife Var is a *Varroa* control product based upon Thymol, Menthol Levo, Eucalyptus Oil and Camphor racemic, fairly recently licensed for use in the UK. Apivar is not yet licensed for use in the UK, though it is licensed in (for example) France and Italy. The active ingredient in Apivar is Amitraz. We have not yet been able to trace any *Varroa* treatment product called Oxvar.

### 3.6 Some beekeeping management issues

#### 3.6.1 Queens and their replacement

Respondents were asked what was the principal source of new queens for their colonies. The responses gave the frequencies shown in Table 25 for the various options. The reason that the total exceeds the total number of beekeepers who responded, and that the sum of the percentages of responses exceed 100% is that while 3 beekeepers gave no response, as indicated, 4 indicated two different main sources.

Source	Frequency	% of respondents
Colony being re-queened	61	67.0
A selected colony of the beekeeper	15	16.5
A Scottish Queen Breeder	12	13.2
A Queen Breeder from elsewhere in the UK	1	1.1
Outside the UK	2	2.2
Another source	1	1.1
No response	3	3.3
<b>Total</b>	95	104.4

Table 25: Principal source of replacement queens

The two cases where queens had been sourced from outside the UK had queens sourced from Sweden. The one queen from an “other” source was stated to have been “acquired with the colony” but the source of the colony was not stated. Two beekeepers specified both “colony being re-queened” and “a selected colony”, and two others indicated “colony being re-queened” and a source outside the UK.

Clearly most beekeepers responding to this survey aim to raise their own queens.

#### 3.6.2 Comb replacement

Another question asked was the percentage of comb that was replaced annually. The mean was just under 20%, but the distribution was very skew, as shown in Figure 7. The median was 15%. Nine respondents did not answer this question.

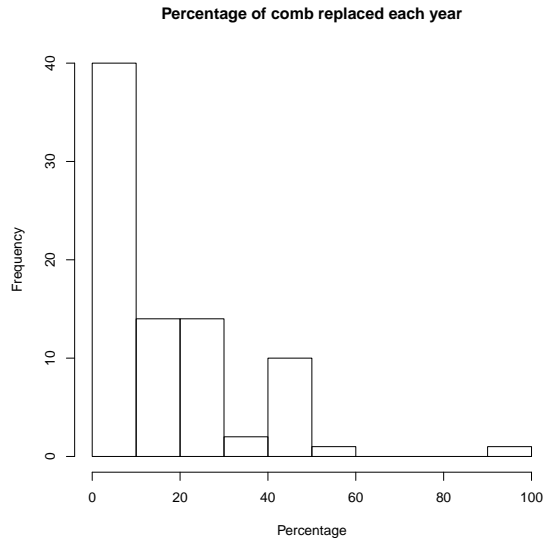


Figure 7: Percentage of comb replaced annually

Beekeepers are being encouraged to replace brood combs regularly, in order to reduce the load of pathogens to be found in old combs. Of the 82 who answered this question, 16 or about 20% were making no regular change of combs each year. This is perhaps higher than might have been hoped.

### 3.6.3 Feeding colonies

Beekeepers were asked to indicate what type of feeding they had supplied for their bees at different seasons during the period covered by the survey. Four seasons were included — Summer 2011, Autumn 2011, Winter 2011–12, and Spring 2012. No attempt was made to discover the amount fed, since this would have involved seeking a colony by colony breakdown which would have been hard to respond to and to report on.

Five different types of feed were specifically asked about — sugar syrup, bee feeding syrup, candy or fondant, honey (not the colony’s own) and Pollen substitute. The responses are summarised in Table 26.

Season	Summer 2011	Autumn 2011	Winter 2011-12	Spring 2012	Totals	%
<b>Type of feed</b>						
Sugar Syrup	29	58	17	47	151	50.0
Bee Feeding Syrup	7	26	7	18	58	19.1
Candy/Fondant	2	8	48	22	80	26.3
Honey (not the colony’s own)	1	0	0	7	8	2.6
Pollen Substitute	2	0	1	4	7	2.3
<b>Totals</b>	41	92	73	98	304	100.0
<b>%</b>	13.5	30.3	24.0	32.2	100.0	

Table 26: Summary of different types of feeding given at different seasons

The most commonly used type of feed was sugar syrup (50% of feeds given), followed by candy/fondant (26.3%), but with bee feeding syrup a fairly close runner up to these two (19.1%). Pollen substitute and honey from a source other than the colony being fed were rarely used (2.6% and 2.3% respectively), and then mostly in the spring.

Spring and autumn were the seasons when most feeding was done (32.2% and 30.3% respectively), with a little more feeding taking place in the spring than in the autumn.

As expected, the most commonly used feed in the winter was candy/fondant.

Beekeepers were also asked to report on any other type of feed that they had used.

In the autumn one beekeeper reported feeding the colony their own stored combs of honey, and another reported feeding cappings — presumably after the extraction of harvested honey.

Two reported using dampened sugar bags in winter in place of candy/fondant, and one of these continued this into the spring, with two others starting this feed then.

Two also reported feeding the colony’s own stored honey in the spring.

### 3.6.4 Forage plants being accessed by colonies

Beekeepers were asked which of a range of possible forage plants they believed were being accessed by their bees. The result is shown in Table 27, both as the numbers reporting each one and the percentage of all beekeeping respondents this represents. Most of the beekeepers reported 4 or 5 of these plants as being used by their bees as shown in Table 28.

Plant	Number	% of respondents
Oil seed rape	31	34.1
Maize	0	0.0
Sunflower	7	7.7
Bell Heather	27	29.7
Ling Heather	36	39.6
Lime	47	51.6
Dandelion	60	65.9
Willow	59	64.8
Wild Flowers	78	85.7
Honeydew	8	17.6

Table 27: The numbers and percentages of beekeepers reporting their bees accessing various forage plants

The numbers of these different plants reported by the respondents as being used by their bees are shown in Table 28.

Number of plants	0	1	2	3	4	5	6	7	Total
Frequency	7	5	9	11	20	20	16	3	91
Percentage	7.7	5.5	9.9	12.1	22.0	22.0	17.6	3.3	100.0

Table 28: The numbers and percentages of respondents claiming their bees forage on different numbers of the given plants

Beekeepers were also given the opportunity to report on up to two other plants they regarded as important sources of forage for their bees. Table 29 shows the results, in decreasing order of frequency.

Some respondents chose more than the permitted two additional plants, while others gave general classes of plants such as “garden flowers”. In compiling the table, we have included all particular plants named, even if they exceeded the specified two, but have omitted all the more general statements.

Plant	Frequency of reporting	% of respondents
Rosebay Willow Herb	15	16.5
Sycamore	12	13.2
Clover	7	7.7
Himalayan balsam	6	6.6
Hawthorn	5	5.5
Bramble	3	3.3
Gorse	2	2.2
Buddleia globosa	1	1.1
Cherry	1	1.1
Cotoneaster	1	1.1
Field Bean	1	1.1
Ivy	1	1.1
Plum	1	1.1
Raspberry	1	1.1
Rowan	1	1.1
Thistle	1	1.1

Table 29: The numbers and percentages of respondents claiming their bees forage on various other plants not on the given list

### 3.7 Provision of pollination services and migratory beekeeping in general

As in previous surveys respondents were asked whether they had any of their colonies contracted for the provision of pollination services, and also more generally what, if any, migration of their stocks they undertook, either for pollination of crops, or to take advantage of a particular opportunity for gathering a honey harvest.

#### 3.7.1 Contracts for pollination services

Three of the beekeepers who responded to the survey failed to answer the question on whether they had undertaken any contracts to supply bees for pollination services, and of the remaining 88, only 1 stated that a pollination contract had been undertaken. However the one beekeeper who claimed to have undertaken a pollination contract did not state how many contracts had been undertaken, or how many colonies had been involved. However as that particular beekeeper was only keeping 1 colony in October 2011, the operation was surely not a very large one.

#### 3.7.2 Migratory beekeeping for honey production

Two principal questions were asked about this. The first was the number of colonies each beekeeper had moved for honey production during 2011. The results are summarised in Table 30.

Number of colonies moved	0	1	2	3	4	9	12	14	No response
Frequency	75	2	5	1	2	1	1	1	3

Table 30: Numbers of colonies moved for honey production during 2011

Once again three beekeepers had not answered this question. Of the other 88, only 13 (15%) had moved any colonies, and of these, 7 had moved either 1 or 2 colonies. Just 3 beekeepers had moved more than 4 colonies.

The second main question asked how many moves in total had been made. The results are summarised in Table 31. As for the previous question, the same 3 beekeepers failed to respond, and of the others 75 (85%) had made no moves. Only 2 beekeepers had made more than 1 move, one making 2 moves, and the other 3 moves.

<b>Number of moves</b>	0	1	2	3	No response
<b>Frequency</b>	75	11	1	1	3

Table 31: Number of moves of stocks for honey production during 2011

The relationship between the numbers of colonies moved and the number of moves made are shown in Figure 8.

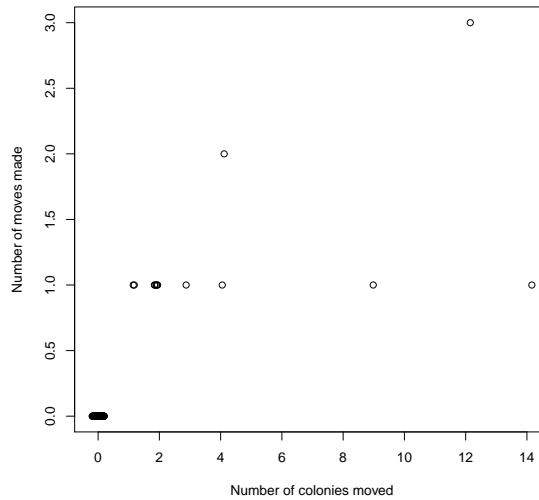


Figure 8: Relationship between numbers of colonies moved and number of moves made

There is a tendency for those making more moves to be moving more colonies. For example the beekeeper who made 3 moves was moving 12 colonies in all. However the beekeeper who moved the largest number of colonies — 14 — made just one move.

The final question in this section asked what distance in miles the bees were moved on each double journey. The distribution of distances reported are shown in Table 32.

<b>Miles moved</b>	4	5	8	10	14	18	25	30	40	50	60	80
<b>Frequency</b>	1	1	1	2	1	1	1	1	1	1	3	1

Table 32: The distances in miles of all double moves of bee colonies

The mean of all these 15 reported double journeys is 31.6 miles — just over 15 miles in each direction. The median is 25 miles — 12.5 miles in each direction.

### 3.8 Comments about other concerns

All beekeepers were invited in the final question to give details of any other beekeeping issues which they felt were of importance but had not been covered elsewhere in the survey.

Of the 91 beekeepers responding to the survey, 23 (just over 25%) had added at least one such comment.

It would take too much space to report them all in detail here, so instead the topics raised are grouped together here, with some indication given of what opinions were expressed, and how frequently for each topic raised.

The results are summarised in Table 33.

Altogether there were 24 separate points raised and among them we identified 8 main distinct topics, of which by far the most frequently discussed was the problem of colony losses. Most frequently the respondent was seeking an explanation for the raised levels of loss being experienced currently by many beekeepers, and as well as

Topic	Subtopic	Frequency	% of all comments
Losses	Explanation sought	5	20.8
	Caused by weather effect	4	16.7
	Caused by agricultural sprays	2	8.3
	Caused by inferior imported strains	1	4.2
<i>Varroa</i>	Resistance to pyrethroids	2	8.3
	Association with Deformed Wing Virus	2	8.3
	Protection of <i>Varroa</i> -free areas of Scotland	1	4.2
Feral honey-bee colonies	As a genetic resource	2	8.3
Management	High standards possible and needed	2	8.3
Depletion of drone numbers by culling		1	4.2
Neonicotinoid pesticides		1	4.2
Registration of beekeepers		1	4.2

Table 33: Frequency of reporting of other concerns

a general plea for research into causes, several possible specific causes — weather, agricultural sprays, and inferior imported strains of bees were mentioned, along with one respondent who gave a long list of possible causes.

The next most frequently raised topic was *Varroa*. The development of resistance to pyrethroid acaricides, the association of *Varroa* infestation with Deformed Wing Virus, and the desirability of protecting *Varroa*-free areas of Scotland were all raised.

The other topics were less frequently mentioned, but all are listed in Table 33.

## 4 Principal Findings

Here we attempt to summarise what we feel are the main points of interest to emerge from this survey. They are grouped under the main headings used in the report.

### 4.1 Preliminary questions

One encouraging sign, which confirms what has been reported elsewhere, is that the number of new beekeepers forms quite a high proportion of the respondents to this survey. Over 40% of those who responded had been keeping bees for at most 5 years. However none of the respondents was very young. There were none at all who were under 30 years of age.

### 4.2 Colony losses

The over-all rate of colony loss reported during the winter of 2011–12 was the lowest winter loss rate reported for several years. The overall rate reported was 66 colonies out of 415 at risk, giving 15.9% as the over-all loss rate.

The most frequently reported cause of colony loss was queen problems — either a stock going queenless, or else the queen becoming a drone-layer. Of the colonies lost over the winter, 28 were lost in this way, making 40% of all the winter losses. The next most frequently reported cause of winter loss was isolation starvation (11 cases — 15.7%). Interestingly, in the summer of 2011, 5 colonies were reported as lost in this way, giving 19.2% of the reported summer losses. It is unusual for this type of loss to occur during the summer, but that particular summer did have many long cold wet periods. Beekeepers must be alert to this possible danger during periods of poor summer weather.

In several recent surveys we have reported much higher rates of winter loss among beekeepers in the East of Scotland than among those in the West. This effect did not appear this time, the rates being nearly identical in the two areas.

Another interesting effect which we reported from several recent surveys is that higher over-all reported rates of winter loss were found among those whose bees were stated to have foraged on Oil Seed Rape (OSR) than were found among the beekeepers whose bees were not stated to have foraged on this crop. The difference recently reported has been statistically significant. Although such a higher rate was again found in this year's data (20.8% as against 14.3%), the difference was less marked this year, and, on its own, was no longer statistically significant.

### 4.3 The races of bees being kept

The majority of those responding (67%) this year either stated that they did not know what race of bees they were keeping, or that their bees were a local strain of no selected race. However 28.6% of those who responded to this question claimed to be keeping *Apis mellifera mellifera*, the Dark North European Bee, formerly the race native to Scotland.

### 4.4 The incidence of *Varroa* and the existence of possible *Varroa*-free areas in Scotland

The work of Atchley and Ramsay on the extent of the possibly *Varroa*-free areas still existing in Scotland allowed us to evaluate more realistically respondent's claims that they believed their bees were free of *Varroa*. In this survey 10 people made such a claim, and on checking the areas in which they were living, it was apparent that 6 of them might realistically make such a claim. The other 4 are almost certainly mistaken in their belief. Of those believing they did have an infestation of the mite, all 79 were almost certainly correct. None of them were living in areas believed still to be *Varroa*-free.

### 4.5 Pollination services and migratory beekeeping

Unlike commercial bee farmers, hardly any of the members of the SBA earn money by providing pollination services. Only one of our respondents this year claimed to do so, and as this respondent was only keeping one colony, the operation must have been on a small scale.

Migratory beekeeping of any kind is also rather rare. Among our 91 beekeeping respondents, 75 (82%) did not move any stocks of bees at all on any occasion.

### 4.6 A management issue

Despite the fact that all beekeepers are nowadays being encouraged to change a proportion of their brood combs every year, in order to prevent the build-up of pathogens that tends to happen in old comb, 20% of those replying to this question said they were not making any regular comb changes.

### 4.7 Other concerns

An opportunity was given at the end of the questionnaire to raise any matter of concern which had not been raised elsewhere in the survey. The many points are reported fully in the report, but it was clear from the responses made here that for most beekeepers the two matters of main concern are

- the observed high levels of loss of colonies being experienced;
- how to deal with the problems of *Varroa* infestation.

Many particular aspects of these two key questions were discussed, but these two are undoubtedly the focus of most concern and anxiety among our respondents.



Appendix: questionnaire used

**SBA Survey 2012  
Questionnaire**

**Contact details or anonymous response**

Unless you indicate you are willing to be contacted by the SBA for possible follow-up of your answers, your responses will remain anonymous. If you are willing to be contacted, **please give your contact details here:–**

Name .....

Address .....

.....

.....

Phone .....

email .....

**OR**

I wish my response to this questionnaire to remain anonymous.

*Tick box if anonymous return desired.*

## 1. Preliminary questions

1. Were you keeping bees at any time between April 1st 2011 and May 31st 2012?

Yes/No

*Please ring one.*

2. If you answered 'No' to question 1:–

(a) are you interested in becoming a beekeeper?

Yes/No

*Please ring one.*

(b) Have you previously been a beekeeper?

Yes/No

*Please ring one.*

3. If you answered 'Yes' to question 1, for how many years (approximately) have you been keeping bees?

*Please insert number.*

4. If you answered "Yes" to Question 1, please answer questions (a), (b) and (c) below.

(a) In which age bracket are you?

*Please tick one box.*

Under 20	20–29	30–39	40–49
50–59	60–69	70 or over	I do not wish to answer

(b) Are you male or female?

*Please tick one box.*

Male	Female	I do not wish to answer
------	--------	-------------------------

(c) The SBA offers educational resources and support for beekeepers. Do you feel any need for education on any topic not currently offered by the SBA or not offered locally to the beekeeper?

Yes/No

*Please ring one.*

*If 'Yes', please provide details*

.....

.....

.....

*If you answered 'No' to Question 1, this is the end of your questionnaire. Thank you for your participation. Please return the Questionnaire as instructed.*

*If you answered 'Yes' to Question 1, please continue with the questionnaire.*

## SECTIONS FOR PRACTISING BEEKEEPERS

### 2. Location, scale and details of your beekeeping activities and of colony losses

5. For how many separate permanent apiaries do you have primary responsibility?

*Please insert number in the box above.*

6. Do you keep all your bees within 10 miles of where you live?

Yes/No

*Please ring one.*

7. For your main apiary, please give some indication of its approximate location (e.g., an abbreviated postcode, or a nearby town or village).

#### 2.1 Changes in colony numbers (including colony losses)

*Where numbers of colonies lost are asked for in the following questions, please consider a colony as lost if it is dead, or reduced to a few hundred bees, or alive but with unsolvable queen problems.*

##### A Summer 2011

8. In total how many production colonies (i.e., queen-right colonies strong enough to yield a honey harvest or to provide a pollination service in season) did you have on April 1st 2011?

*Please insert the number.*

9. During the summer of 2011 (from April 1st till October 1st) what pattern of colony losses did you have? Please give the total number lost in each way described below, and the overall total of losses.

Pattern/cause of loss	Number lost
Dead workers in cells and no food present in colony (starvation)	
Dead workers in cells and food present in colony (isolation starvation)	
Death in a well-provisioned hive without dead bees in the hive or apiary	
Queen problems (queenlessness or drone-laying queen)	
Effects of <i>Varroa</i> infestation	
Other (specify):	
Unknown but different from any of the above	
<b>Over-all total losses</b>	

10. Did you buy, sell, unite, split or promote (from nucleus to production status) colonies during the summer of 2011, or take swarms to keep (from April 1st to October 1st)?

Yes/No

*Please ring one.*

If 'Yes' what changes in numbers of production colonies did you have

by buying colonies, making splits or taking swarms?	+
by promoting nuclei to production colonies?	+
by selling or giving colonies away?	-
by uniting or merging colonies?	-

### B Winter 2011 – 12

11. In total how many production colonies (i.e., queen-right colonies strong enough to yield a honey harvest or to provide a pollination service in season) did you have on October 1st 2011?

*Please insert the number.*

12. During the winter of 2011–12 (from October 1st 2011 till April 1st 2012) what pattern of colony losses did you have? Please give the total number lost in each way described below, and the overall total of losses.

Pattern/cause of loss	Number lost
Dead workers in cells and no food present in colony (starvation)	
Dead workers in cells and food present in colony (isolation starvation)	
Death in a well-provisioned hive without dead bees in the hive or apiary	
Queen problems (queenlessness or drone-laying queen)	
Effects of <i>Varroa</i> infestation	
Other (specify):	
Unknown but different from any of the above	
<b>Over-all total losses</b>	

13. Did you buy, sell, unite or split colonies during the winter of 2011–12 (from October 1st 2011 to April 1st 2012)?

Yes/No

*Please ring one.*

If 'Yes' what changes in numbers of production colonies did you have

by buying colonies or making splits?	+
by selling or giving colonies away?	-
by uniting or merging colonies?	-

14. How many production colonies did you have on April 1st 2012?

*Please insert the number.*

### 3. Questions on races of bees being kept

*Various races of the Western Honeybee (Apis mellifera) are kept by beekeepers in Britain. Some beekeepers specialise in specific races, though many accept the local strains of bees prevalent in their own areas, without any particular effort to maintain a pure race. It is believed that some races may be more resistant than others to the threats to bees which are appearing nowadays.*

15. Which specific race of bees do you know with some confidence is the principal race that you are keeping?

*Please tick the relevant box.*

Don't know	
Local strain of no named type	
<i>A. mellifera mellifera</i> (the Northern European dark bee)	
<i>A. mellifera carnica</i> (the Carniolan bee)	
<i>A. mellifera ligustica</i> (the Italian bee)	
The "Buckfast" strain	
Any other named race	Please specify:

### 4. Queens and their replacement

16. What is the origin of the majority of your queens?

*Please tick one only or add required particulars.*

Reared by the colony being re-queened	
Reared from one of your own selected queens	
Acquired from a queen breeder in Scotland	
Acquired from a queen breeder elsewhere in the UK	
Acquired from a source outside the UK	Specify country of origin:
Other	Specify:

17. For how many of your production colonies did you provide new queens between 1st April 2011 and 1st September 2011

- (a) because of a policy of regular replacement of old queens?

*Please insert number.*

- (b) because of queen problems?

*Please insert number.*

- (c) to deal with swarming preparations?

*Please insert number.*

## 5. Varroa and its management

18. (a) Do you believe the *Varroa* mite is present in most bee stocks in your area?

Yes/No

*Please ring one.*

*Only if you answered "No" to question (a) please answer question (b).*

(b) What steps (if any) did you take during the past year to detect any infestation of your bees with *Varroa*?

Steps taken	Please tick or leave blank
Send floor scrapings to SASA	
Other (specify)	
None	

*Only if you answered "Yes" to question (a) please answer questions (c)–(d).*

(c) Do you monitor the levels of *Varroa* in your colonies?

Yes/No

*Please ring one.*

If 'Yes', please tick all the methods used:–

- Count mite drop
- Uncapping sealed drone brood with uncapping fork
- Other (specify) .....

(d) In which year did you first find any of your colonies of bees infested with *Varroa*?

*Please tick the relevant box.*

Before 2011	
In 2011	
In 2012	
<i>Varroa</i> not yet detected	

19. Do you use open mesh floors on most of your hives as a measure against *Varroa*?

Yes/No

*Please ring one.*

20. Did you apply any other treatment against *Varroa* to any of your colonies between November 2010 and March 2012?

Yes/No

*Please ring one.*

21. Do you treat all your colonies in an apiary at the same time and in the same way against the *Varroa* mite?

Yes/No

*Please ring one.*

22. Using which treatments and starting in which months have you treated your colonies for *Varroa* mites during the period detailed below?

*Possible treatments which have been used include: (1) Pyrethroid strips (Apistan/Bayvarol) (licensed veterinary medicines); (2) Apiguard (licensed veterinary medicine); (3) Thymol-soaked pad; (4) Oxalic acid trickle method; (5) Oxalic acid sublimation method; (6) Formic acid; (7) Dusting with icing sugar; (8) Drone brood removal; (9) Queen trapping followed by brood destruction. You should add others if you have used them.*

<b>Year</b>	<b>Month</b>	<b>Treatment(s) started</b>
2010	November	
	December	
2011	January	
	February	
	March	
	April	
	May	
	June	
	July	
	August	
	September	
	October	
	November	
	December	
2012	January	
	February	
	March	

## 6. Provision of pollination services, migratory beekeeping and forage

23. (a) Were any of your colonies contracted commercially for payment for pollination services last year?

Yes/No

*Please ring one.*

*Only if you answered "Yes" to question (a) please answer questions (b) and (c) below.*

- (b) How many times were your colonies contracted commercially for pollination services last year?

*Please insert number of times.*

- (c) In total how many of your colonies were contracted commercially for pollination services last year?

*Please insert total number of colonies.*

24. How many of your colonies were moved for honey production last year?

*Please insert number.*

*In the next question you are asked about the number of movements of your colonies. Please count travelling to the honey flow and returning as in total one movement.*

25. How many times were any of your colonies moved for honey production last year?

*Please insert number.*

26. Approximately how many miles have your colonies been moved last year on each double journey?

Occasion	Distance there and back — miles
First move	
Second move	
Third move	

27. Have your colonies foraged last year on:-

Rape	
Sweetcorn/maize	
Sunflower	
Bell heather	
Ling heather	
Lime	
Dandelion	
Willow	
Wild flowers	
Honeydew <sup>1</sup>	
Other (first)	Specify
Other (second)	Specify

28. Is it possible that honeydew honey remained in the hives during the winter?

Yes/No

*Please ring one.*

<sup>1</sup> Honeydew is derived from aphids feeding on trees.



## 7. Management issues

29. Approximately what percentage of combs did you replace in the majority of your production colonies last year?

*Please insert approximate percentage.*

30. What feeding of your bees did you undertake in the past year?

*Please indicate whether a particular feed was used or not.*

Type of feed	Season			
	Summer 2011	Autumn 2011	Winter 2011–12	Spring 2012
	Used Y or N	Used Y or N	Used Y or N	Used Y or N
Sugar syrup				
Bee feeding syrup				
Candy/fondant				
Honey (not the colony's own)				
Pollen substitute				
Other: specify				

## 8. In conclusion

Most of the questions in this survey have addressed the issues which are being investigated by the international COLOSS network, which is studying the beekeeping situation and especially loss rates and factors implicated in colony losses in many countries, mainly in Europe. This is the third year we are making a Scottish contribution to the COLOSS data collection.

If there are other beekeeping issues which you feel are important, but which have not been addressed above, then please fill in your thoughts below, and we shall use them to help to form the structure of any future investigations.

.....  
.....  
.....  
.....  
.....

Thank you for your help.

We hope to report the results of this survey in a future issue of The Scottish Beekeeper. Your data will also be contributed in an anonymous way to the COLOSS survey.

Be assured that your identity will not be revealed in any report of this survey.